7. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238 and §27.53

LIMITS

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.

TEST PROCEDURE

The RF output of the transmitter was connected to a spectrum analyzer through a calibrated coaxial cable. Sufficient scans were taken to show the out-of-band Emissions, if any, up to 10th harmonic. Multiple sweeps were recorded in maximum hold mode using a peak detector to ensure that the worst-case emissions were caught.

For each out of band emissions measurement:

Set display line at -13 dBm

Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

MODES TESTED

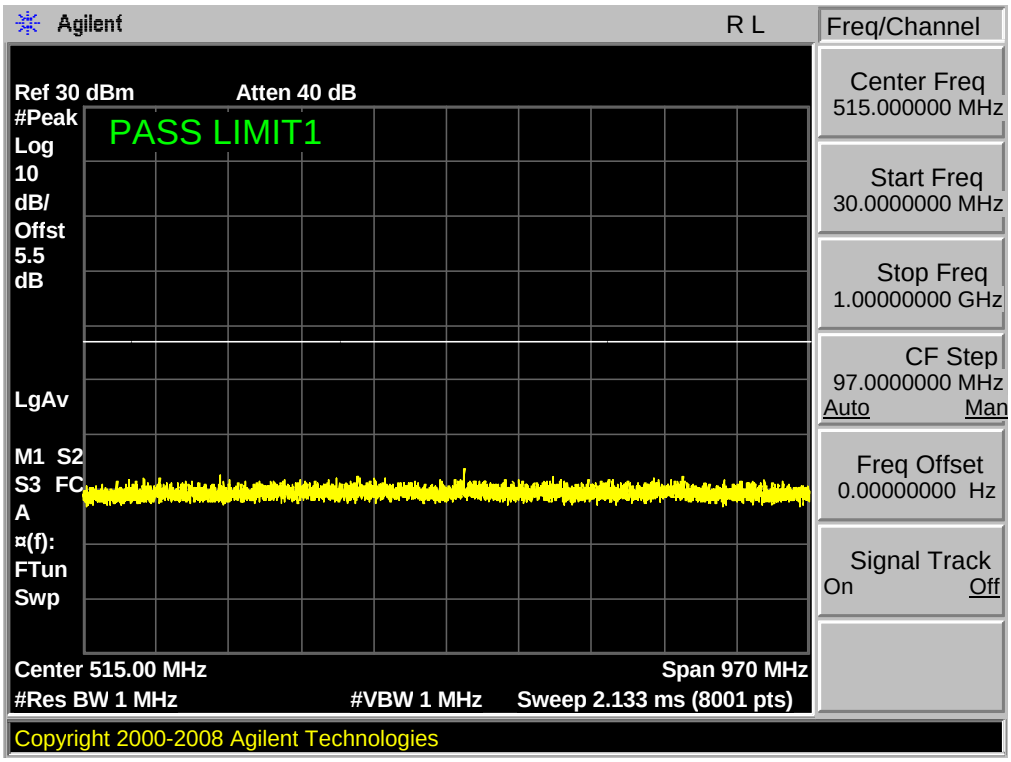
LTE Band 2
LTE Band 4
LTE Band 7
LTE Band 17

7.1 MEASUREMENT METHOD

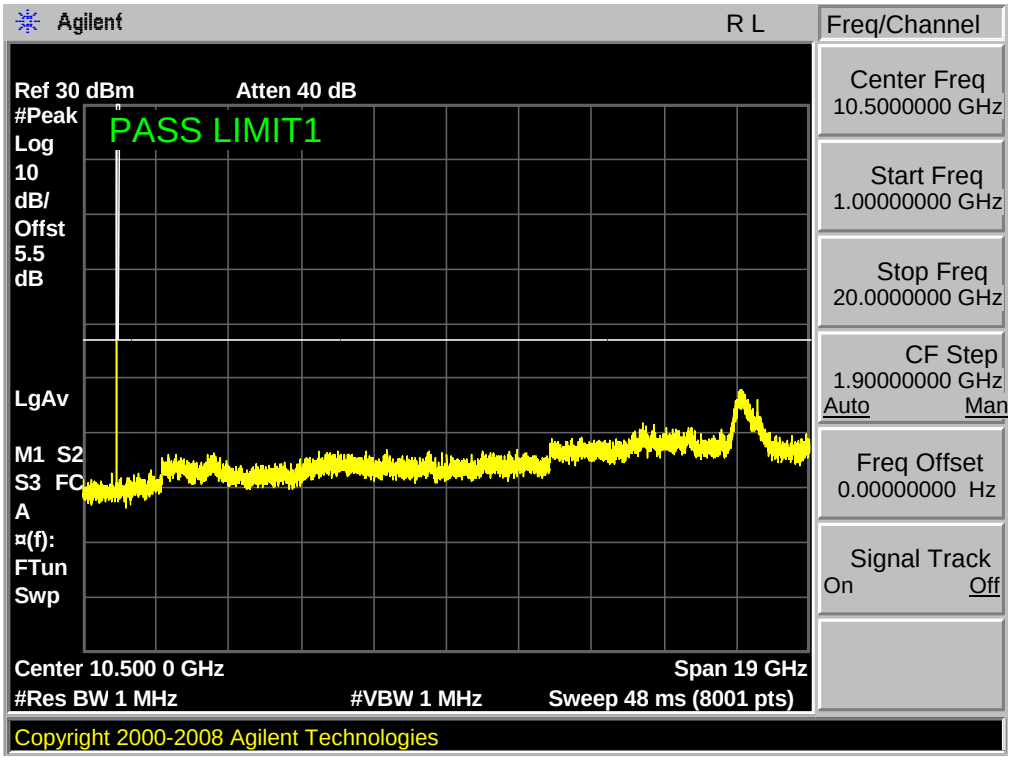
The test set up and general procedure is similar to conducted peak output power test. Only different for setting the measurement configuration of the measuring instrument of Spectrum Analyzer.

7.1.1. LTE BAND 2

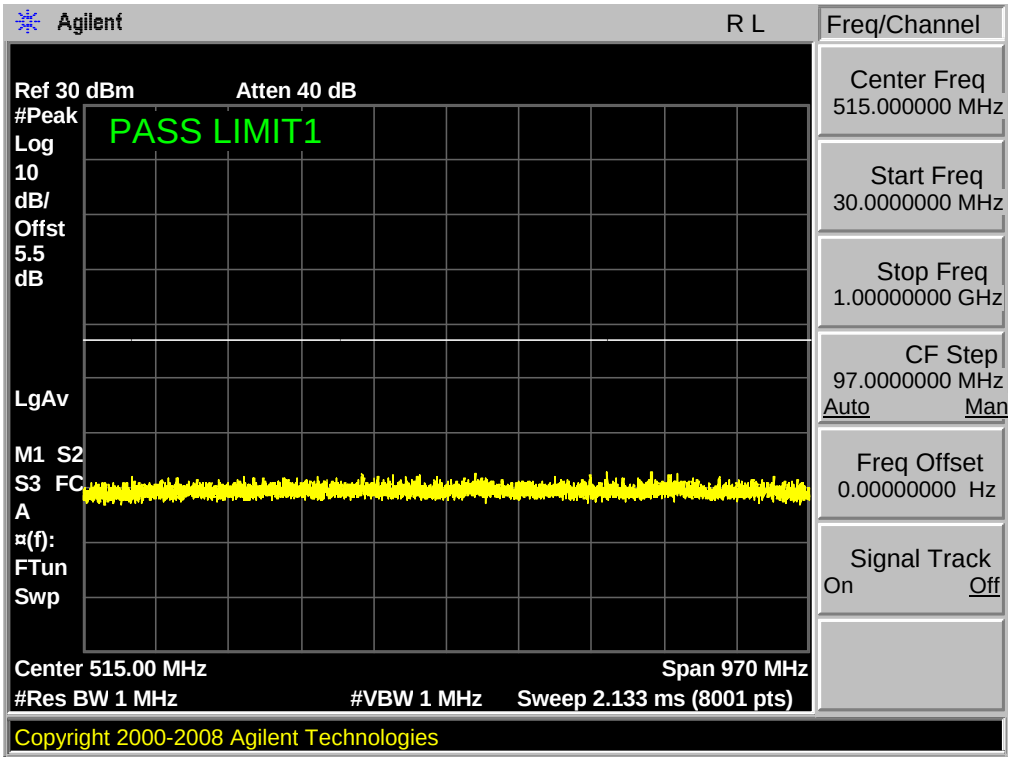
Band 2,UL Channel 18607,UL Frequency 1850.7,BW 1.4,NO. RB 1,RB POS. Low,QPSK



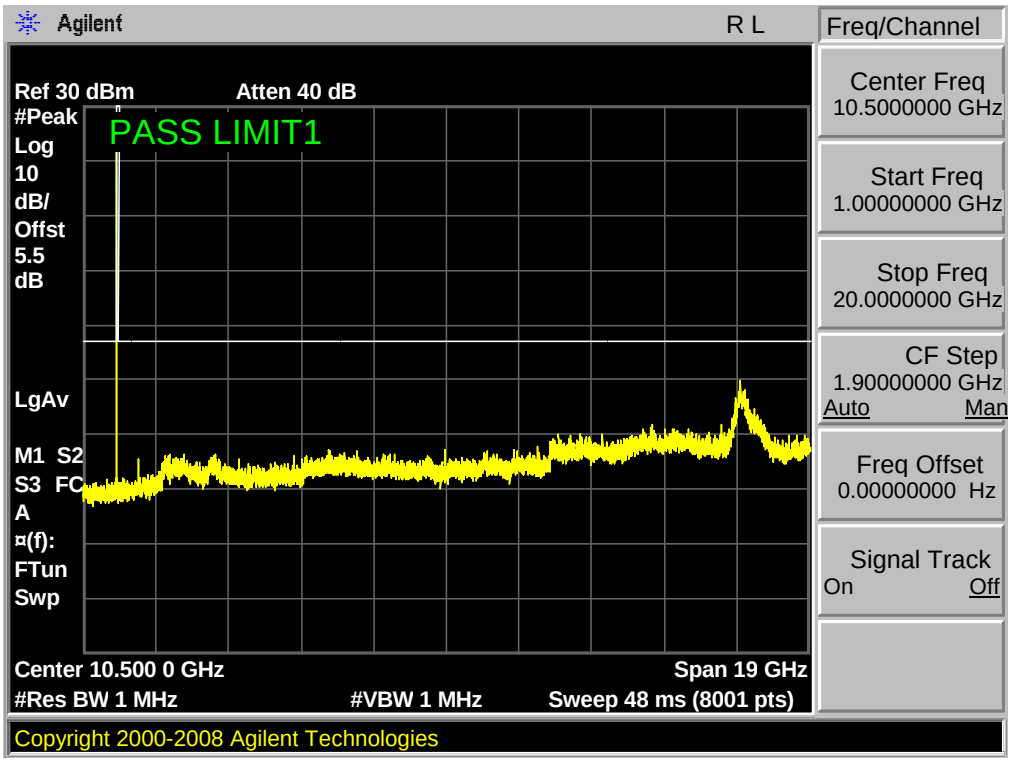
Band 2,UL Channel 18607,UL Frequency 1850.7,BW 1.4,NO. RB 1,RB POS. Low,QPSK



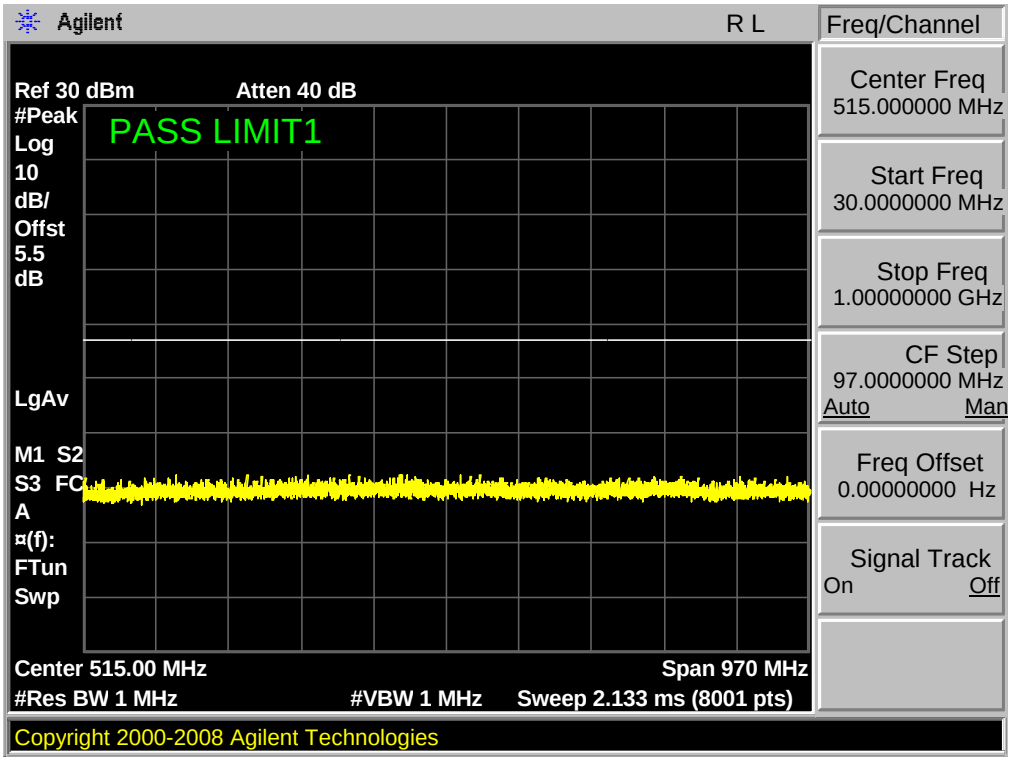
Band 2,UL Channel 18607,UL Frequency 1850.7,BW 1.4,NO. RB 1,RB POS. Low,16QAM



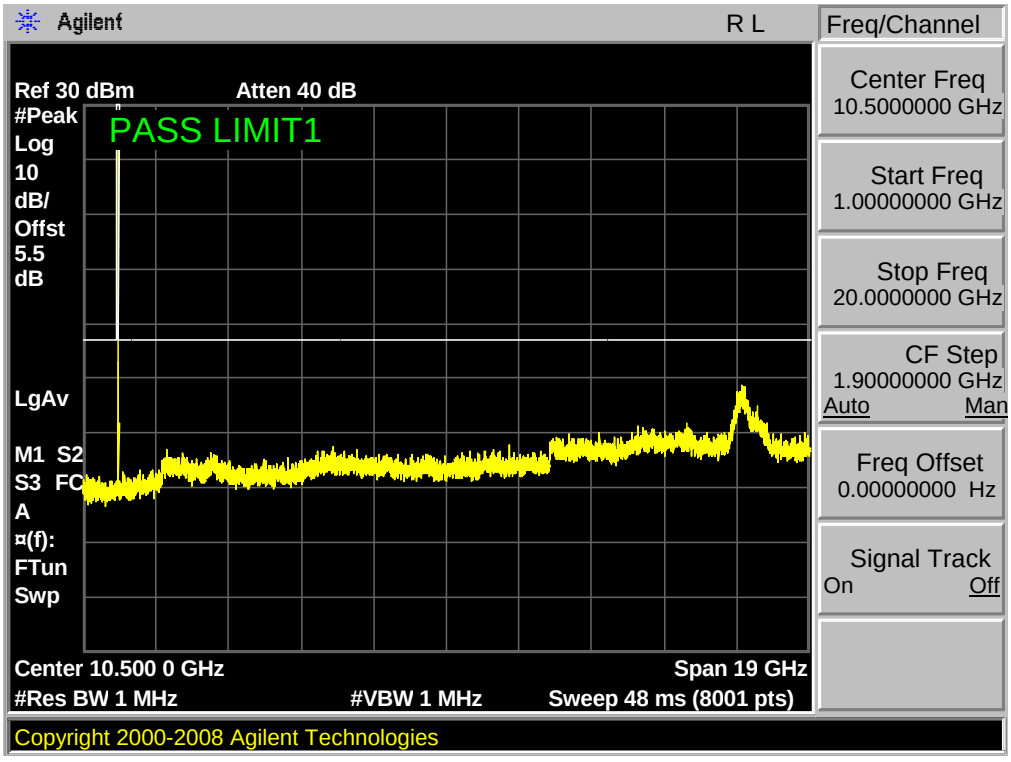
Band 2,UL Channel 18607,UL Frequency 1850.7,BW 1.4,NO. RB 1,RB POS. Low,16QAM



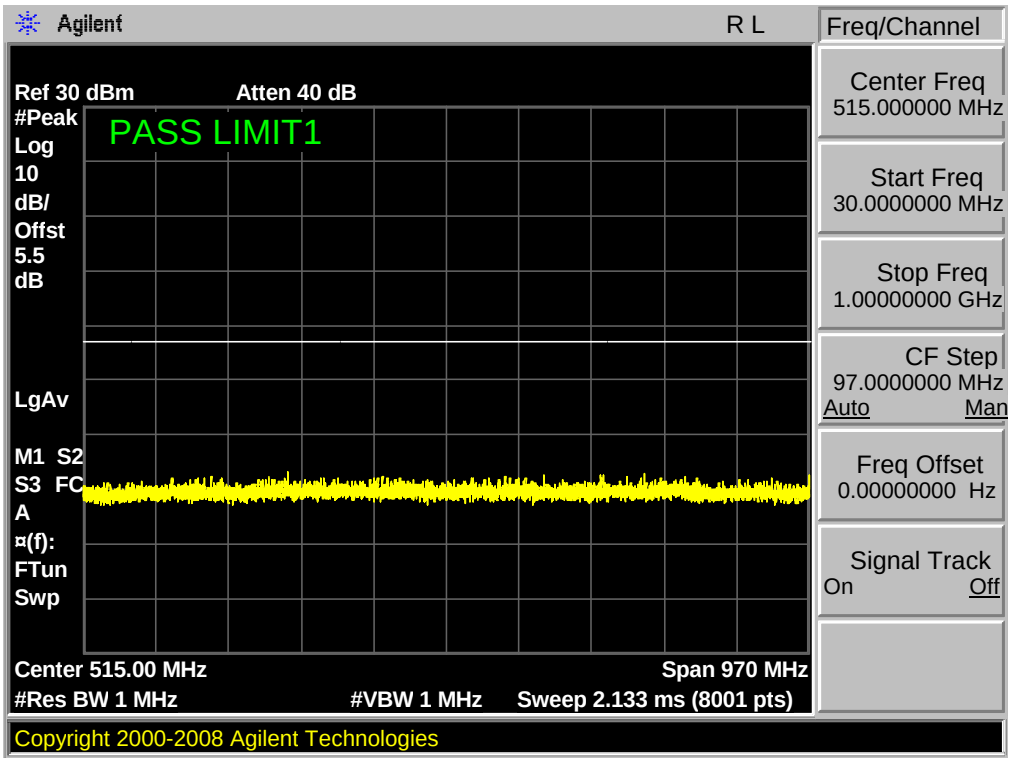
Band 2,UL Channel 19193,UL Frequency 1909.3,BW 1.4,NO. RB 1,RB POS. Low,QPSK



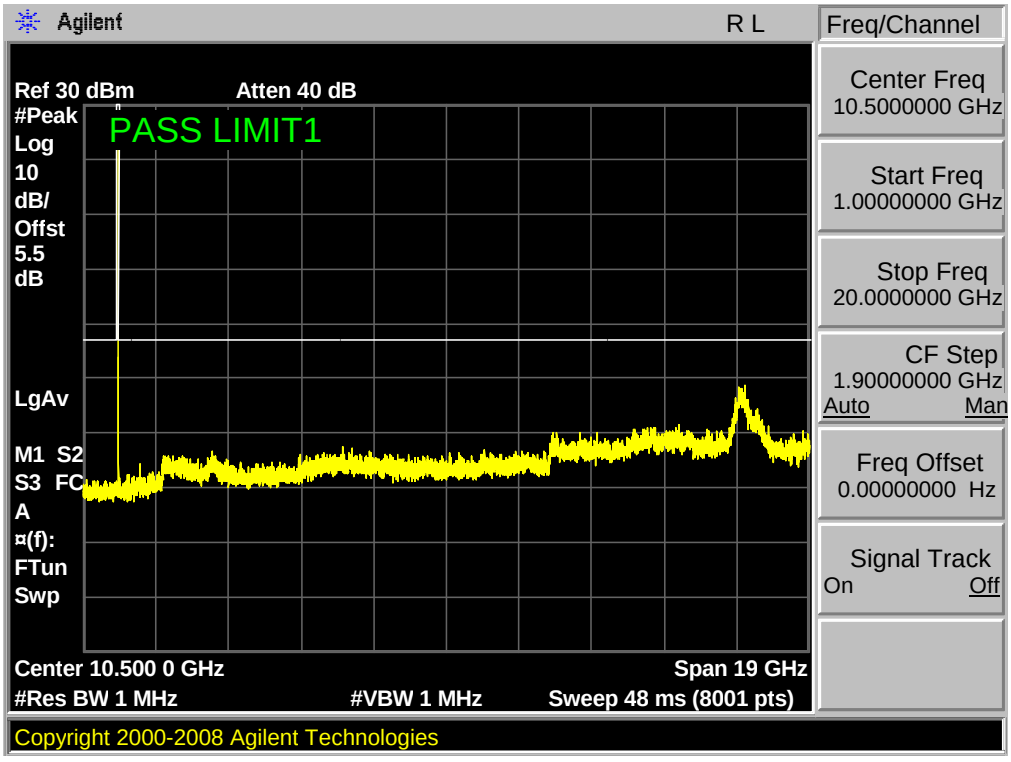
Band 2,UL Channel 19193,UL Frequency 1909.3,BW 1.4,NO. RB 1,RB POS. Low,QPSK



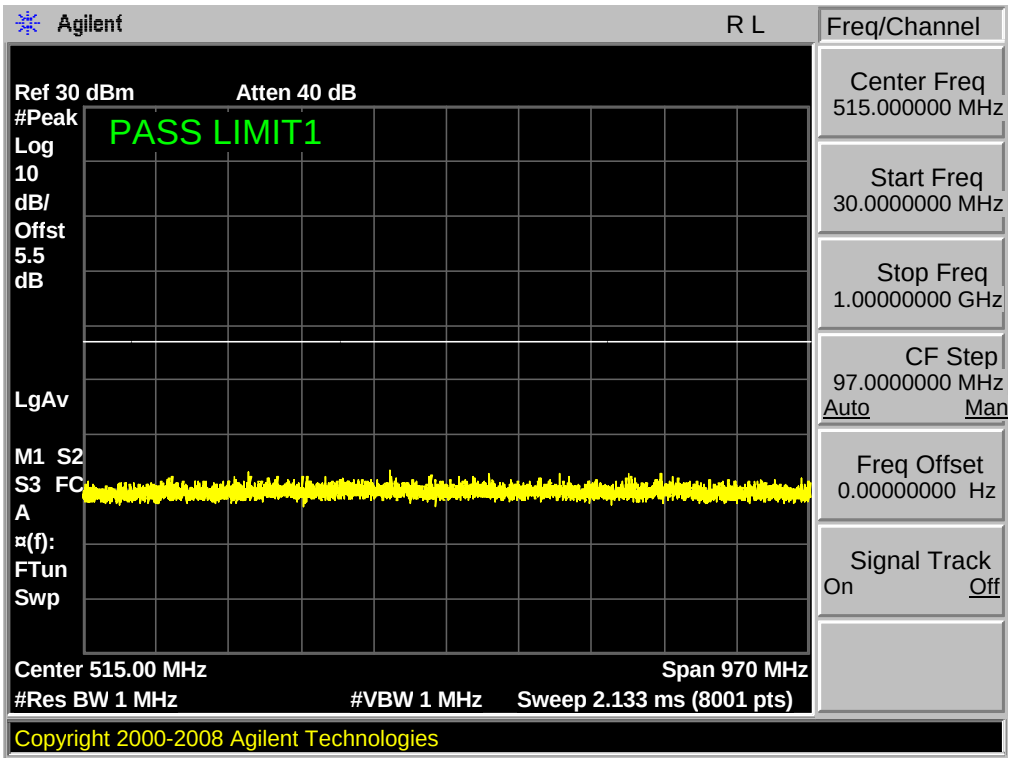
Band 2,UL Channel 19193,UL Frequency 1909.3,BW 1.4,NO. RB 1,RB POS. Low,16QAM



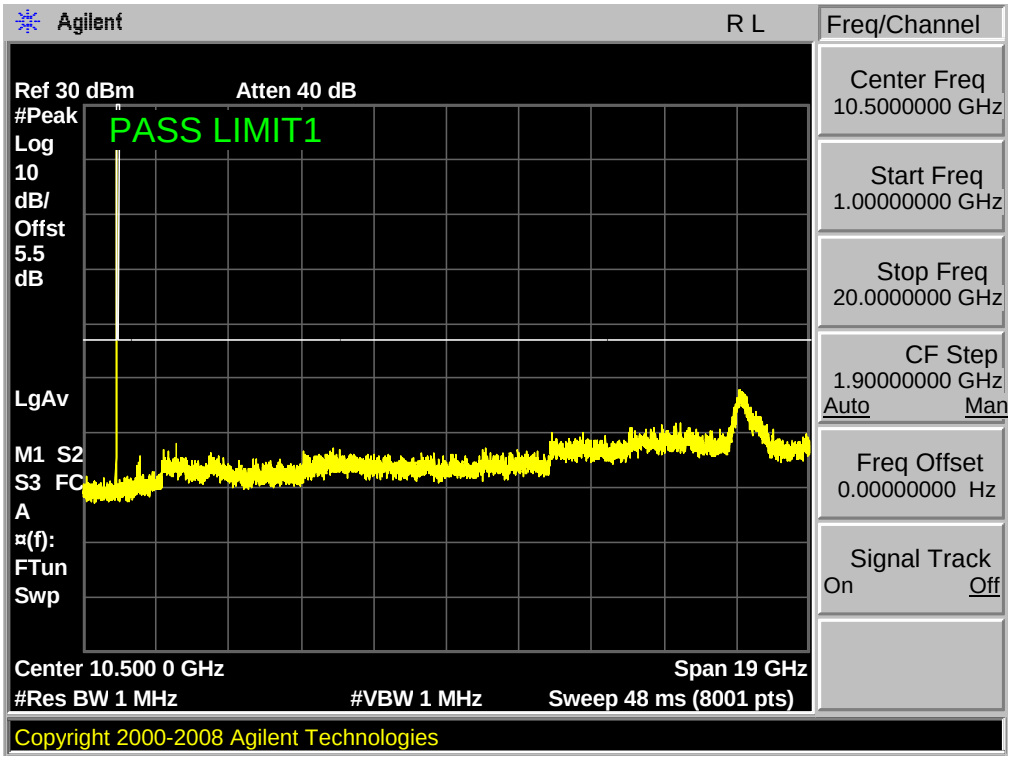
Band 2,UL Channel 19193,UL Frequency 1909.3,BW 1.4,NO. RB 1,RB POS. Low,16QAM



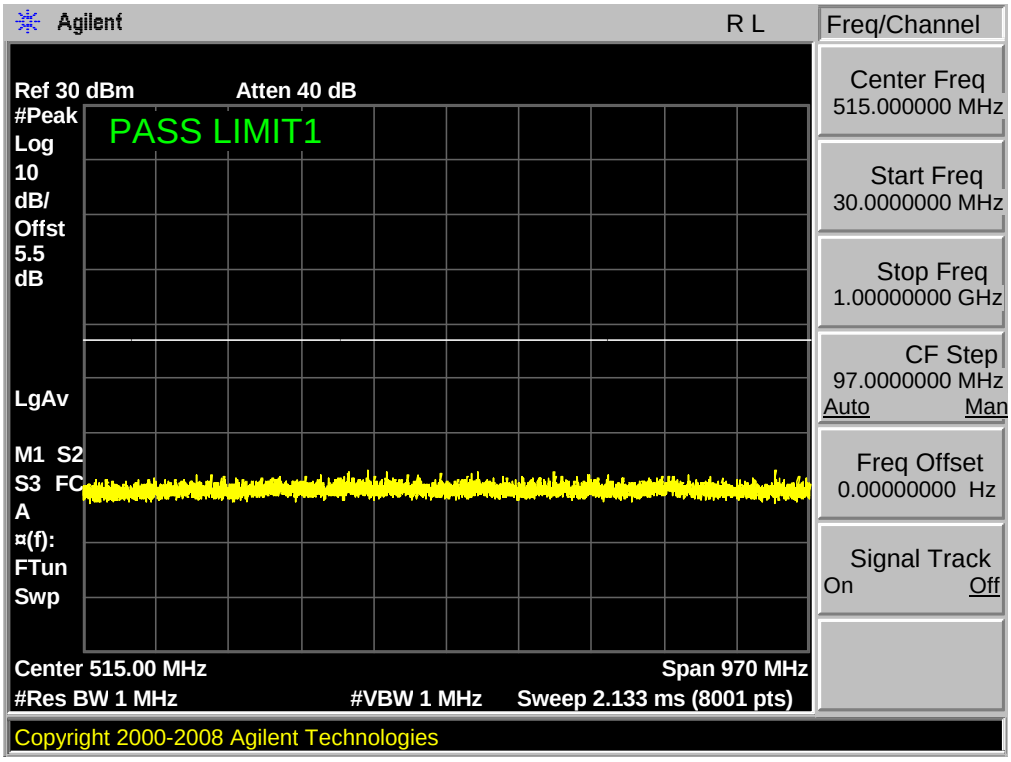
Band 2,UL Channel 18615,UL Frequency 1851.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



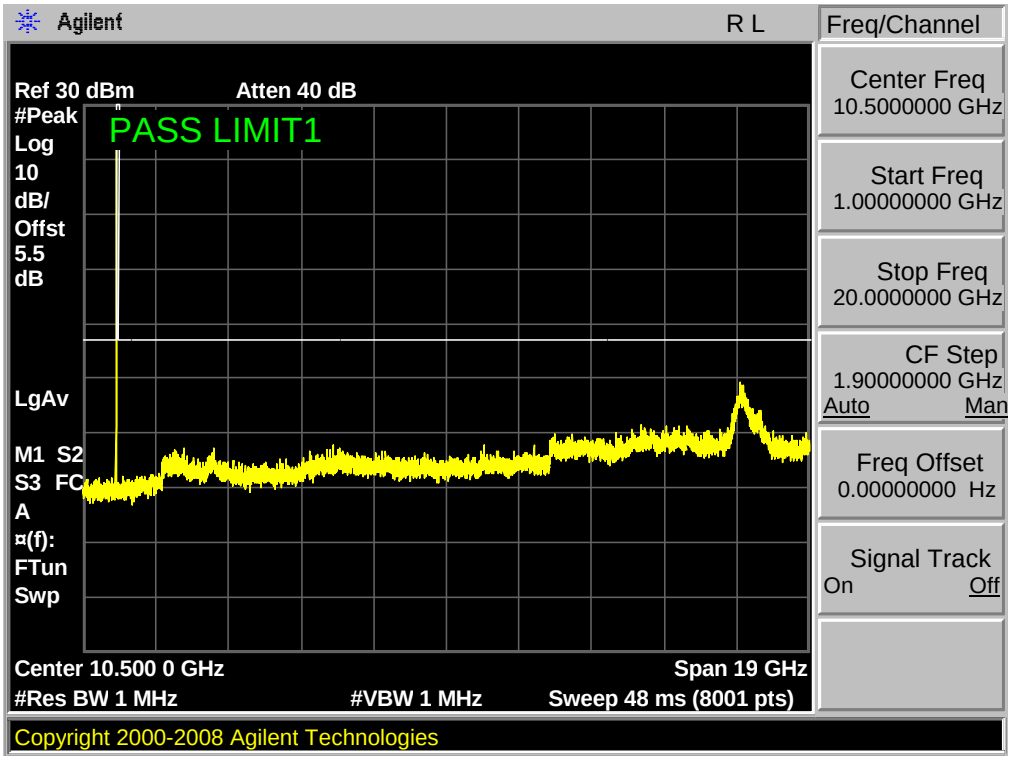
Band 2,UL Channel 18615,UL Frequency 1851.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



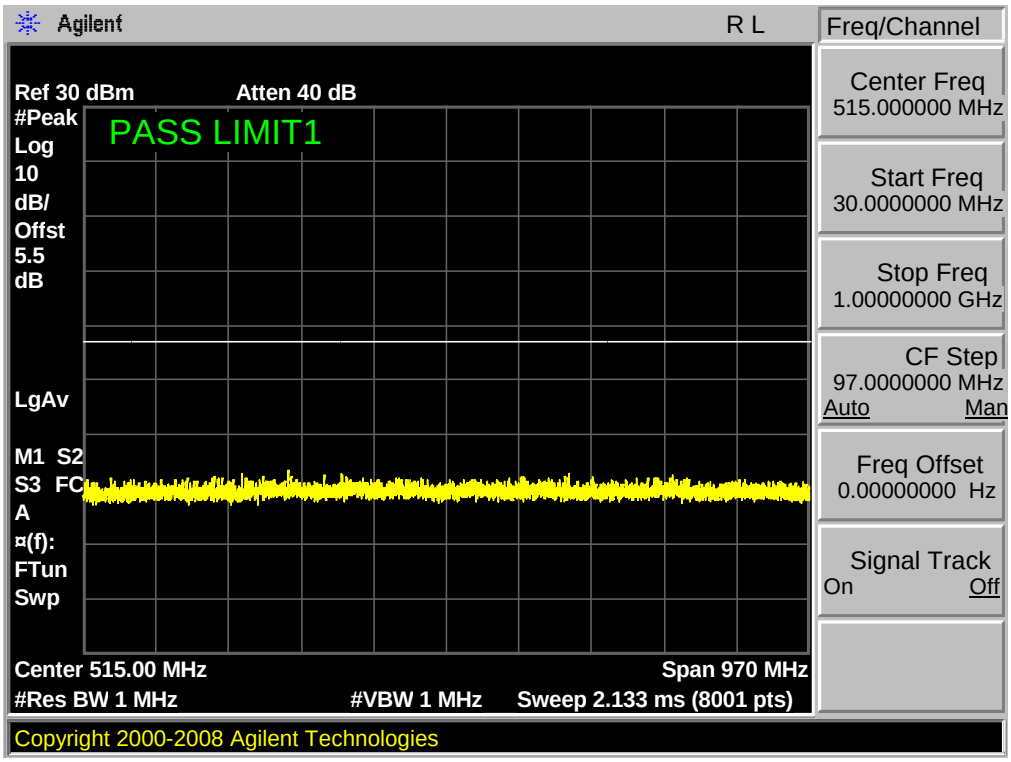
Band 2,UL Channel 18615,UL Frequency 1851.5,BW 3.0,NO. RB 1,RB POS. Low,16QAM



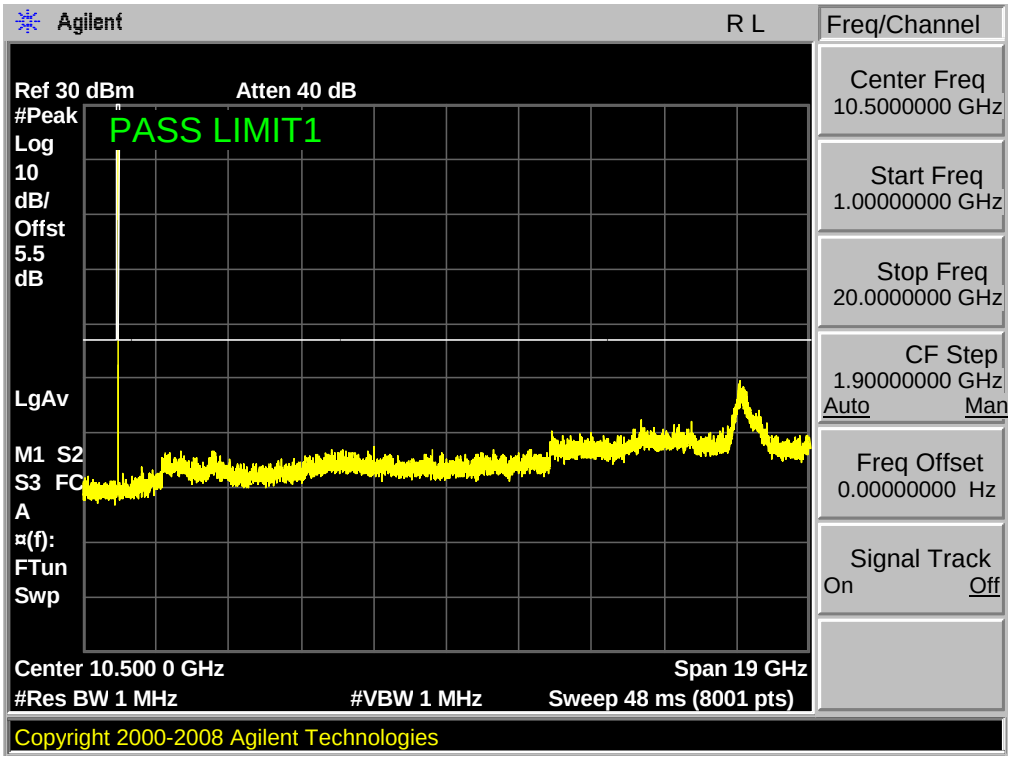
Band 2,UL Channel 18615,UL Frequency 1851.5,BW 3.0,NO. RB 1,RB POS. Low,16QAM



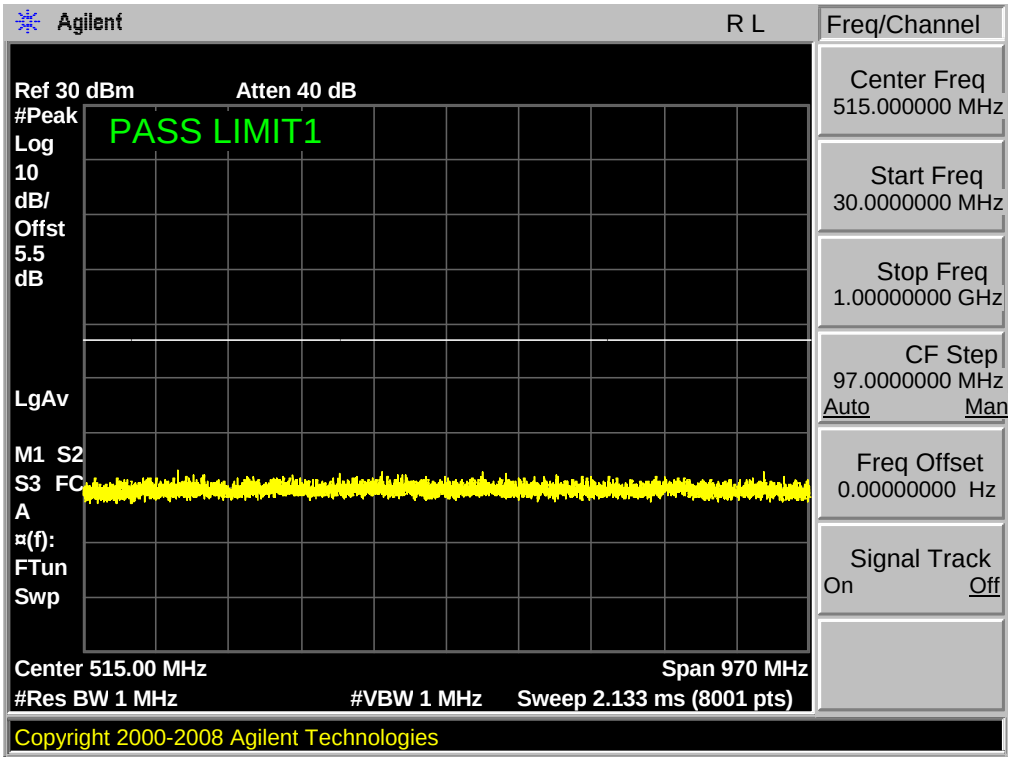
Band 2,UL Channel 19185,UL Frequency 1908.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



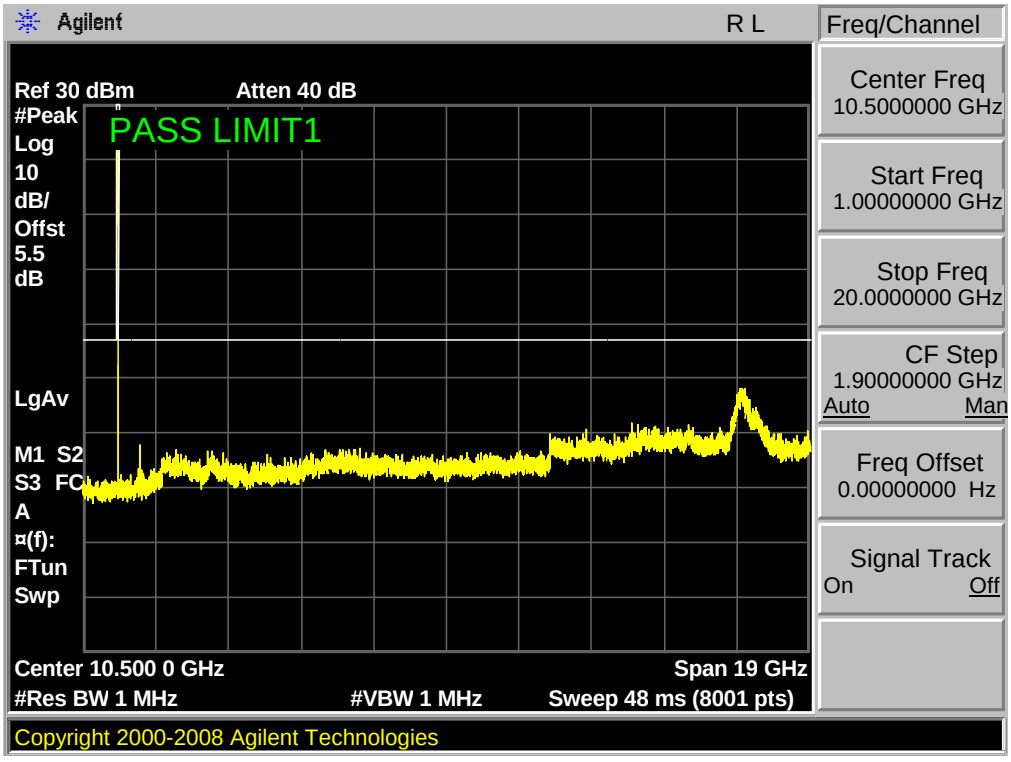
Band 2,UL Channel 19185,UL Frequency 1908.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



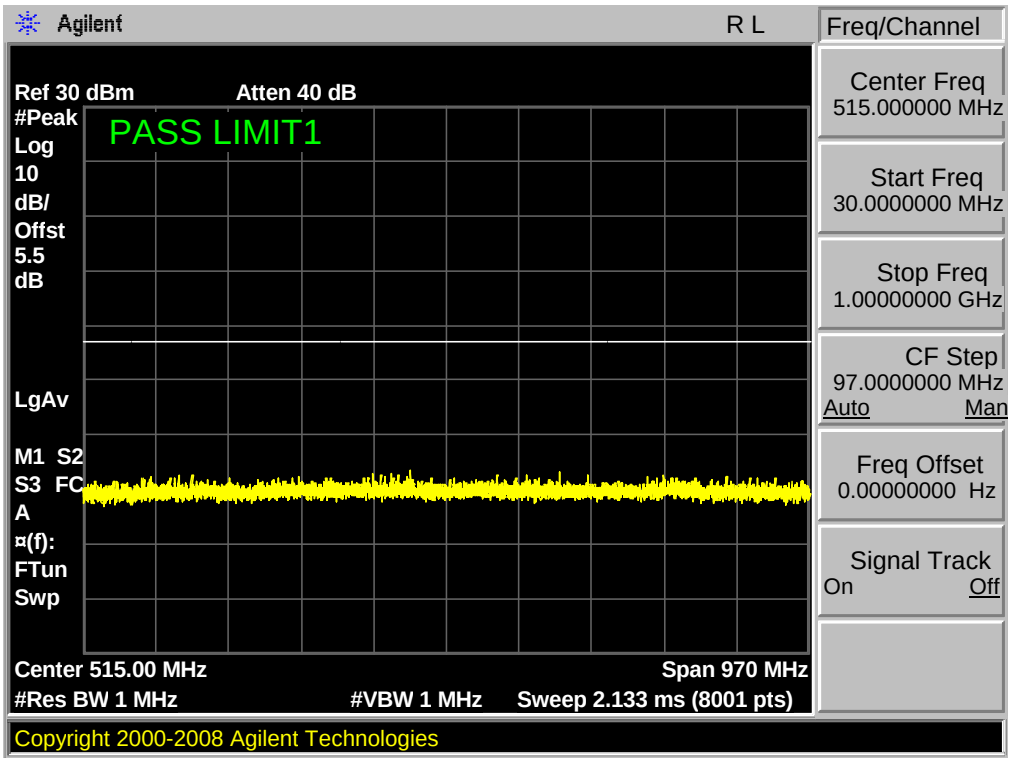
Band 2,UL Channel 19185,UL Frequency 1908.5,BW 3.0,NO. RB 1,RB POS. Low,16QAM



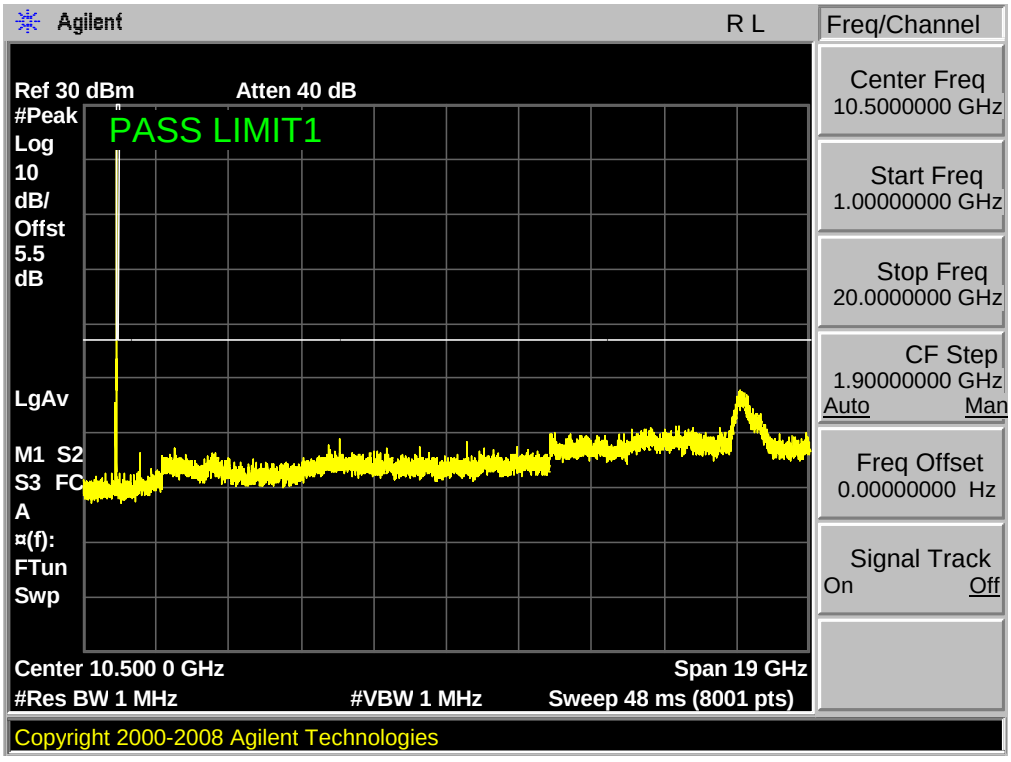
Band 2,UL Channel 19185,UL Frequency 1908.5,BW 3.0,NO. RB 1,RB POS. Low,16QAM



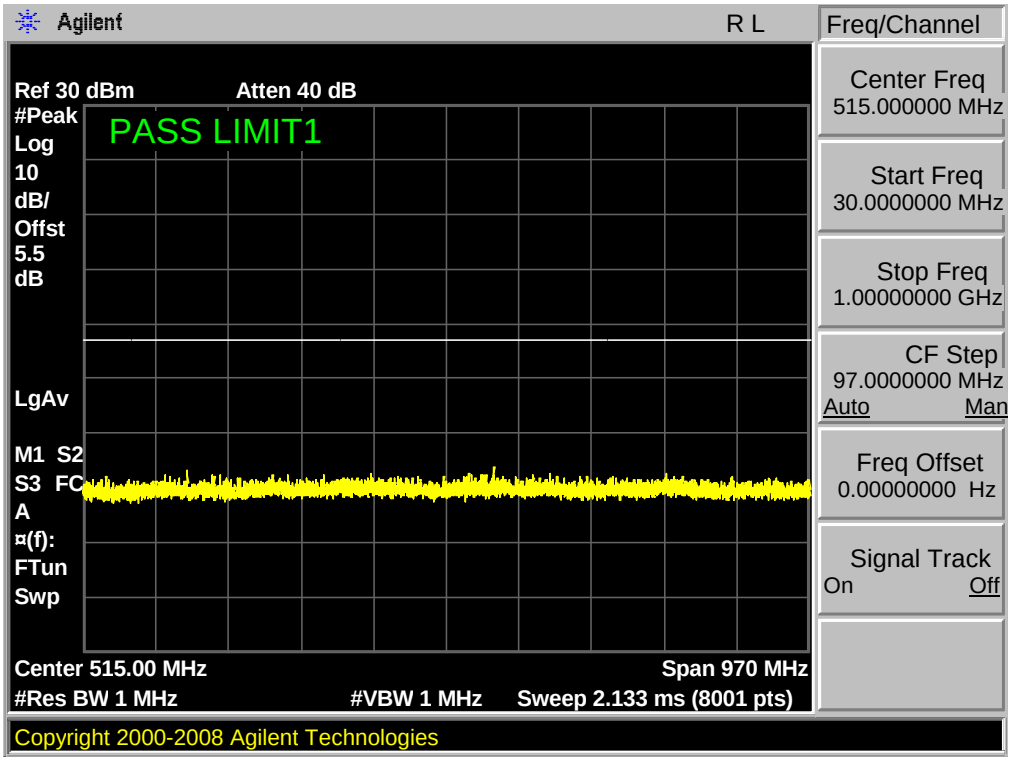
Band 2,UL Channel 18625,UL Frequency 1852.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



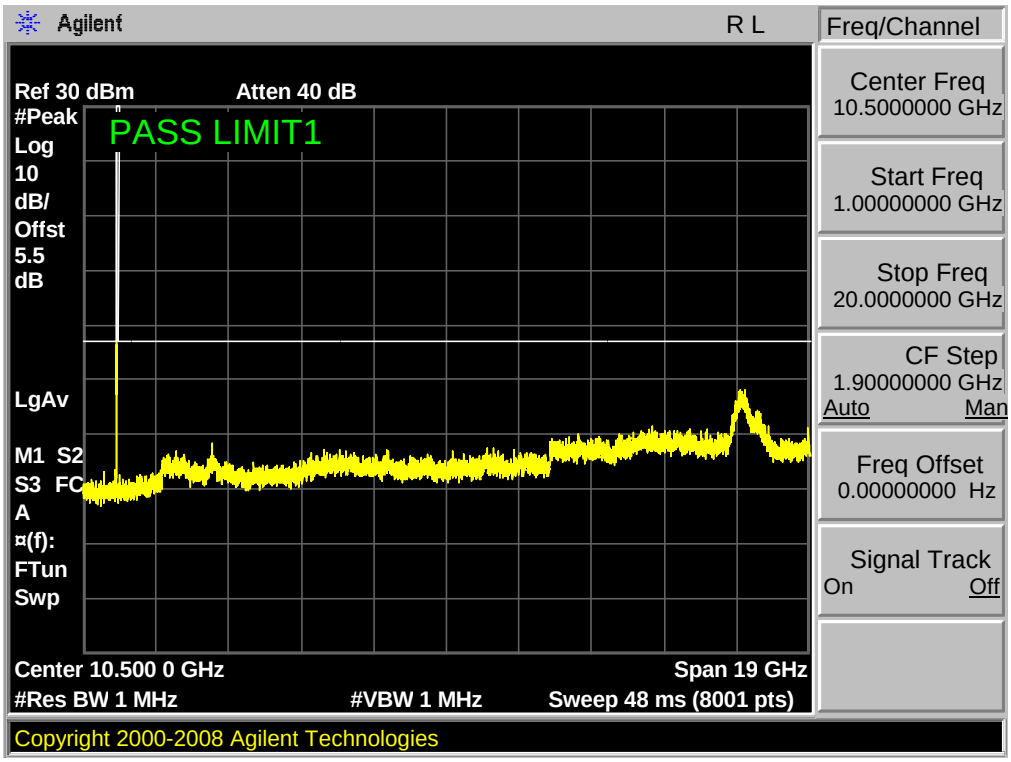
Band 2,UL Channel 18625,UL Frequency 1852.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



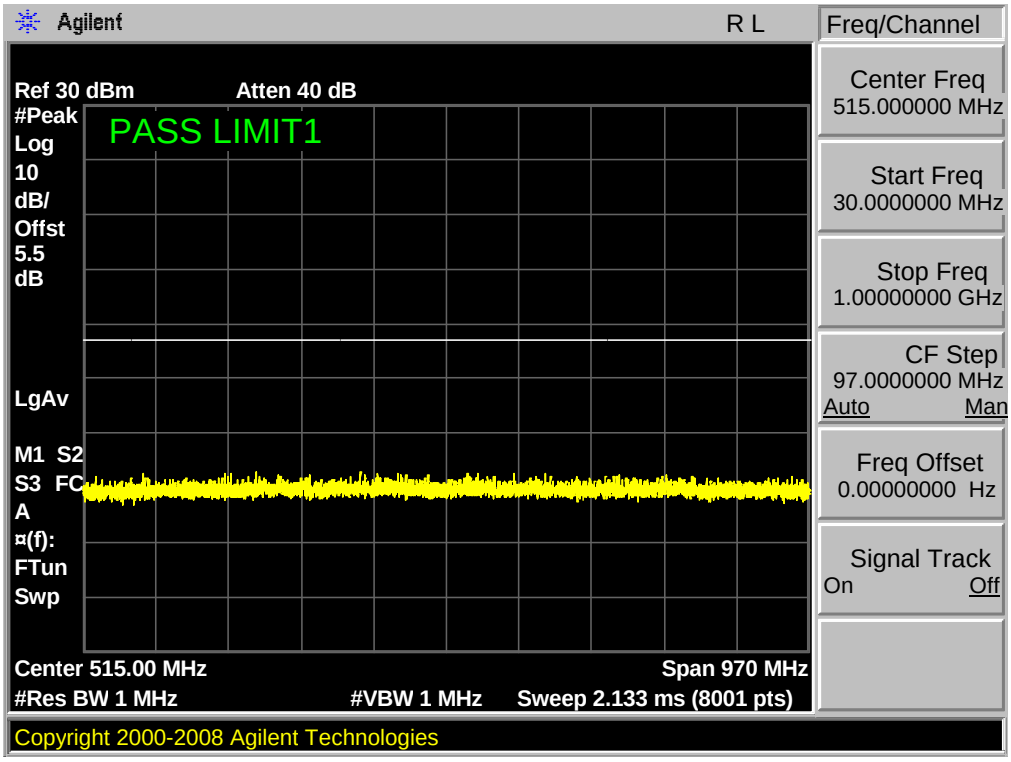
Band 2,UL Channel 18625,UL Frequency 1852.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



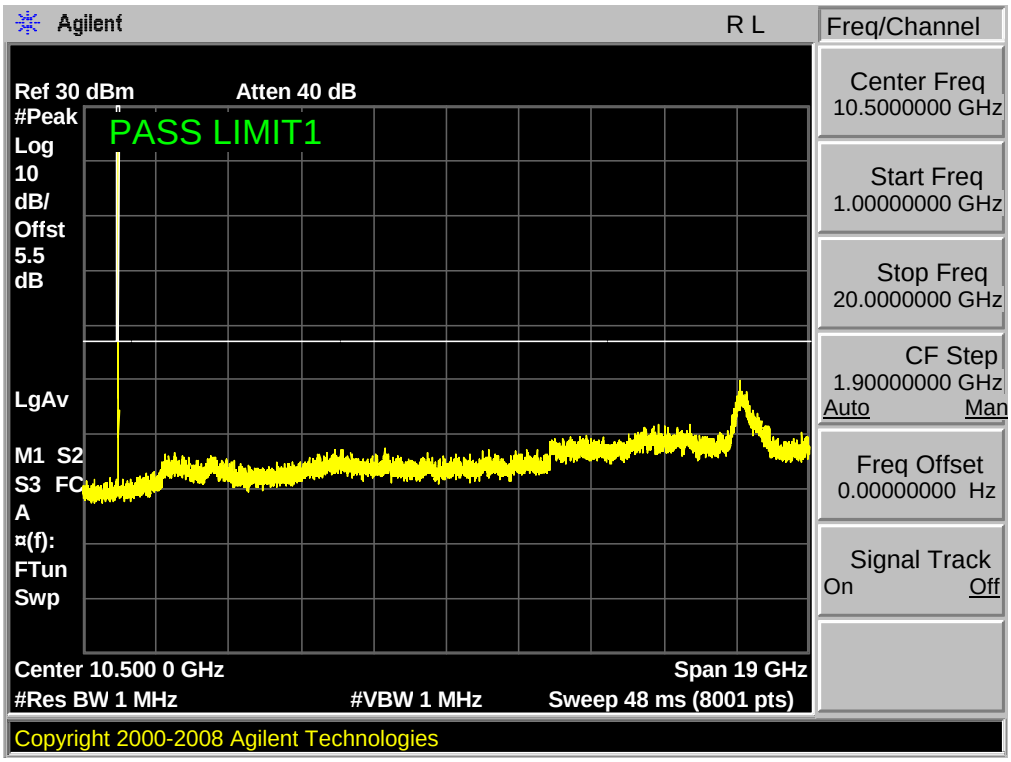
Band 2,UL Channel 18625,UL Frequency 1852.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



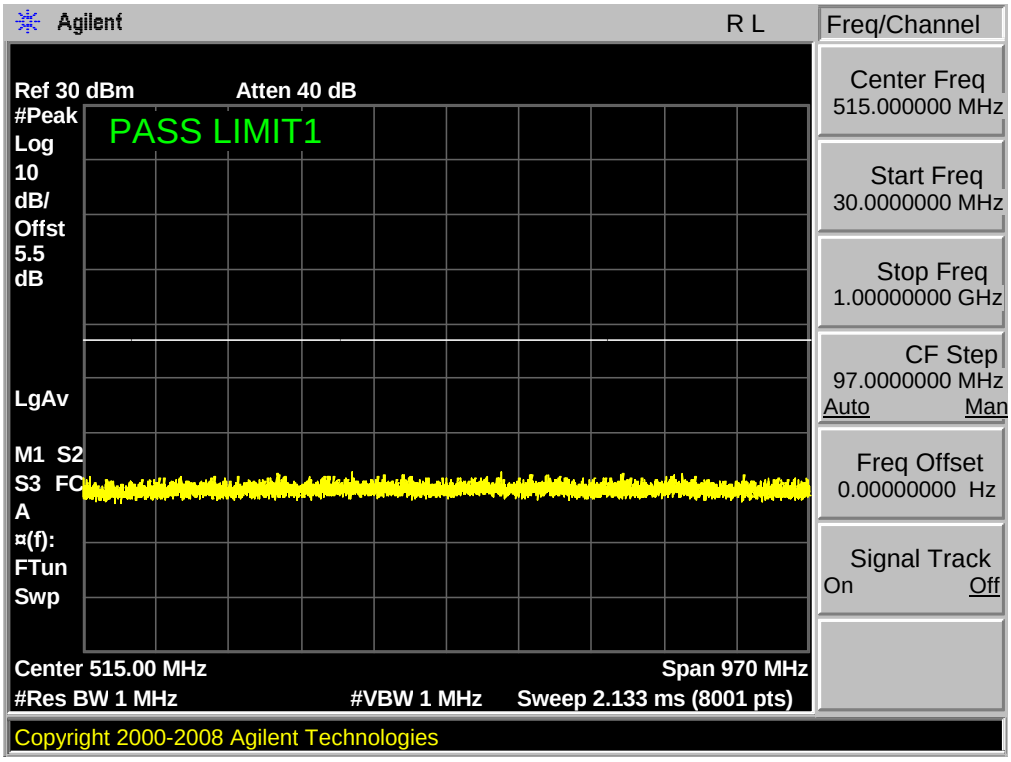
Band 2,UL Channel 19175,UL Frequency 1907.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



Band 2,UL Channel 19175,UL Frequency 1907.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



Band 2,UL Channel 19175,UL Frequency 1907.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



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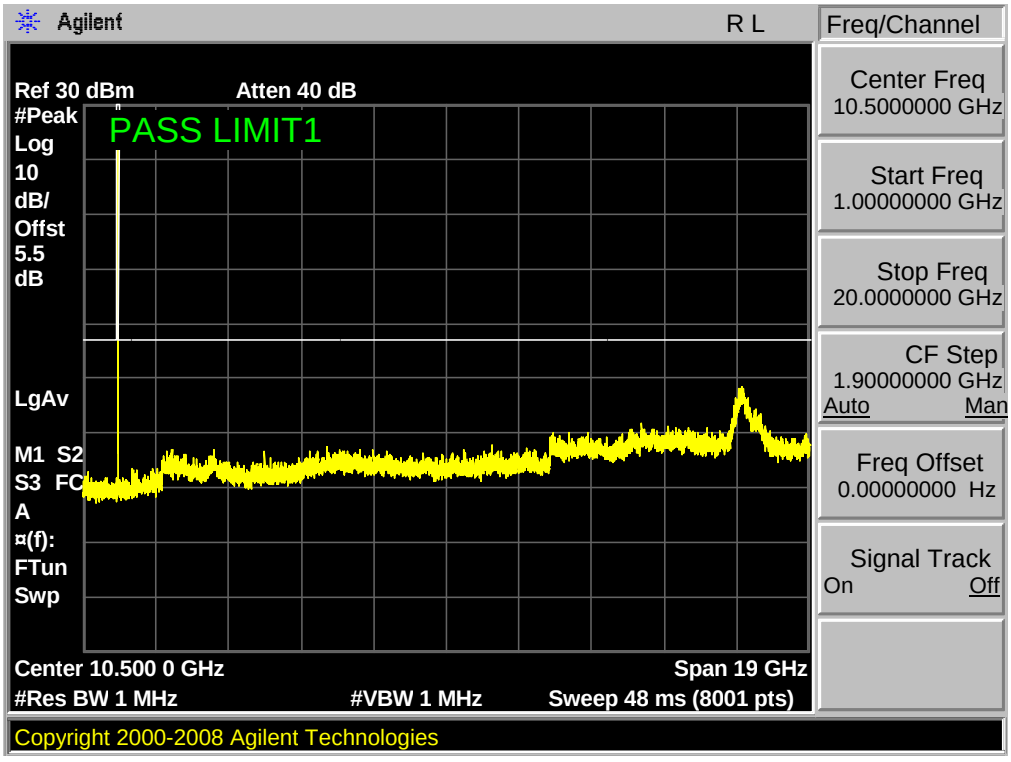
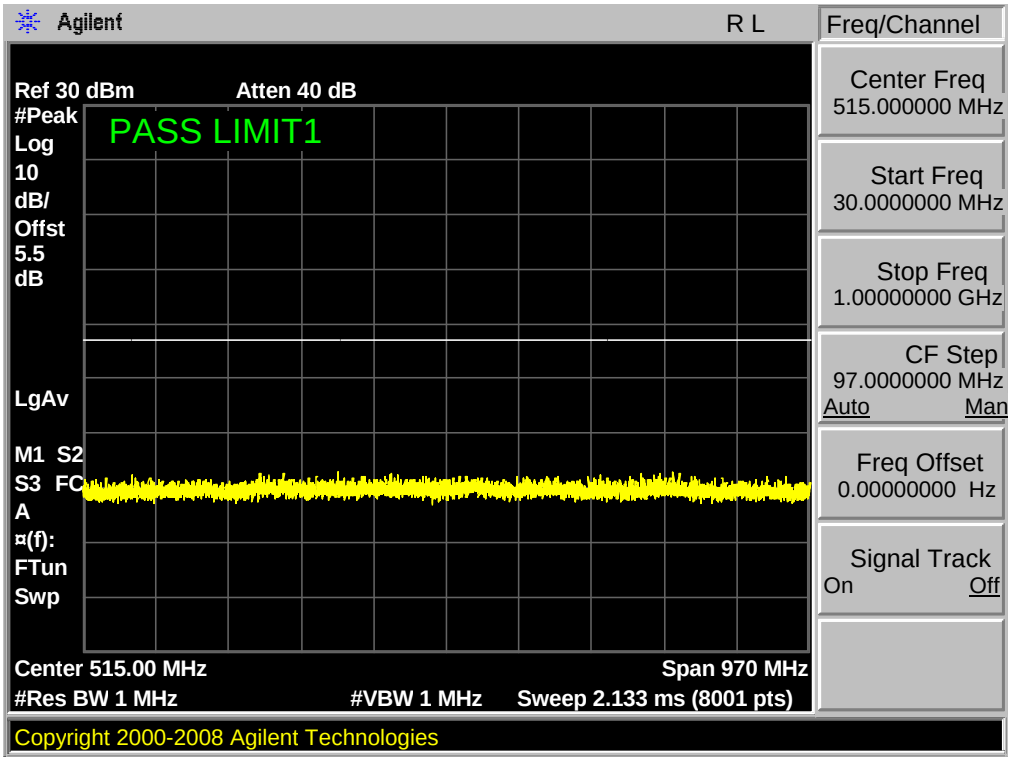
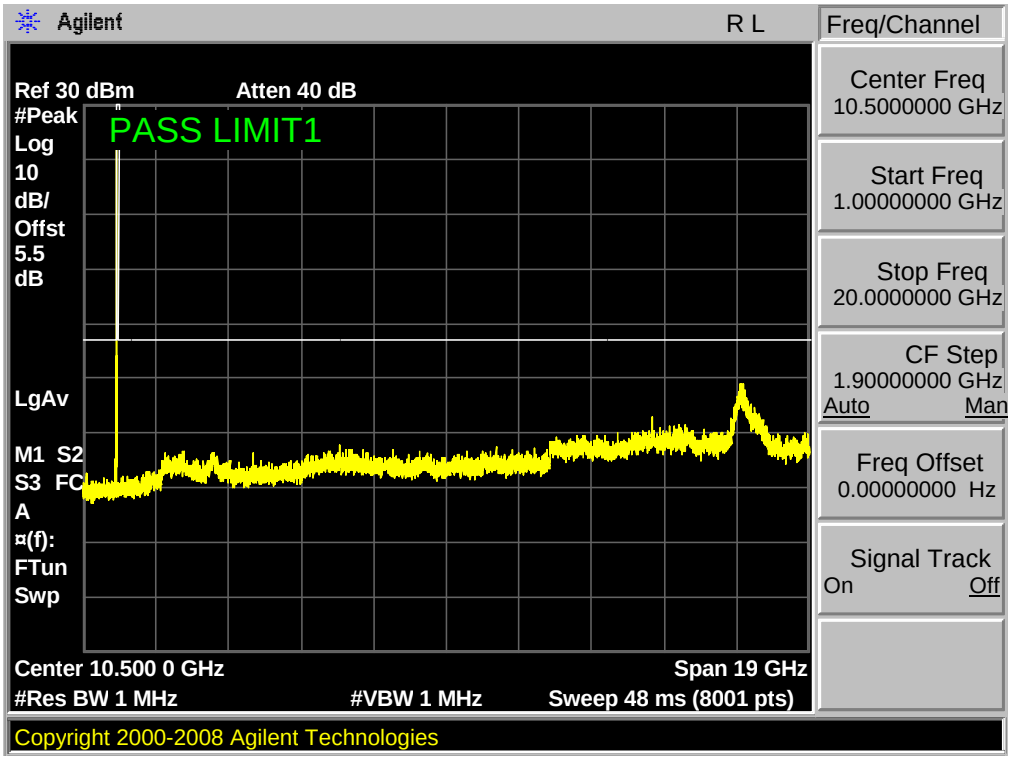


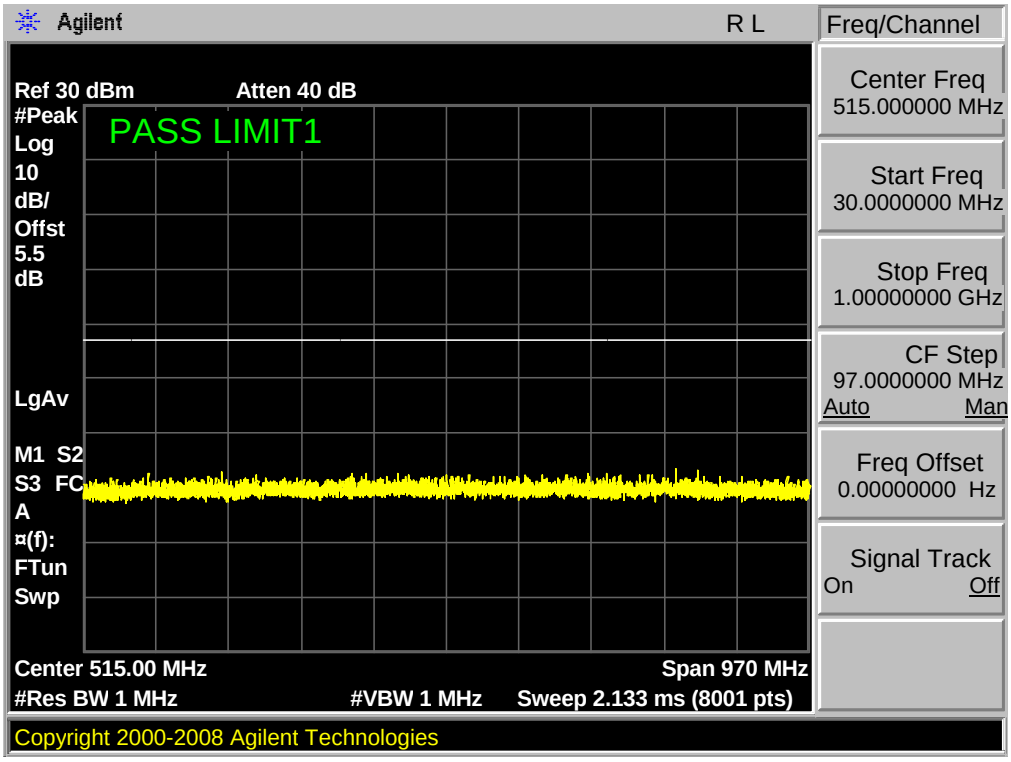
Band 2,UL Channel 18650,UL Frequency 1855.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



Band 2,UL Channel 18650,UL Frequency 1855.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



Band 2,UL Channel 18650,UL Frequency 1855.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



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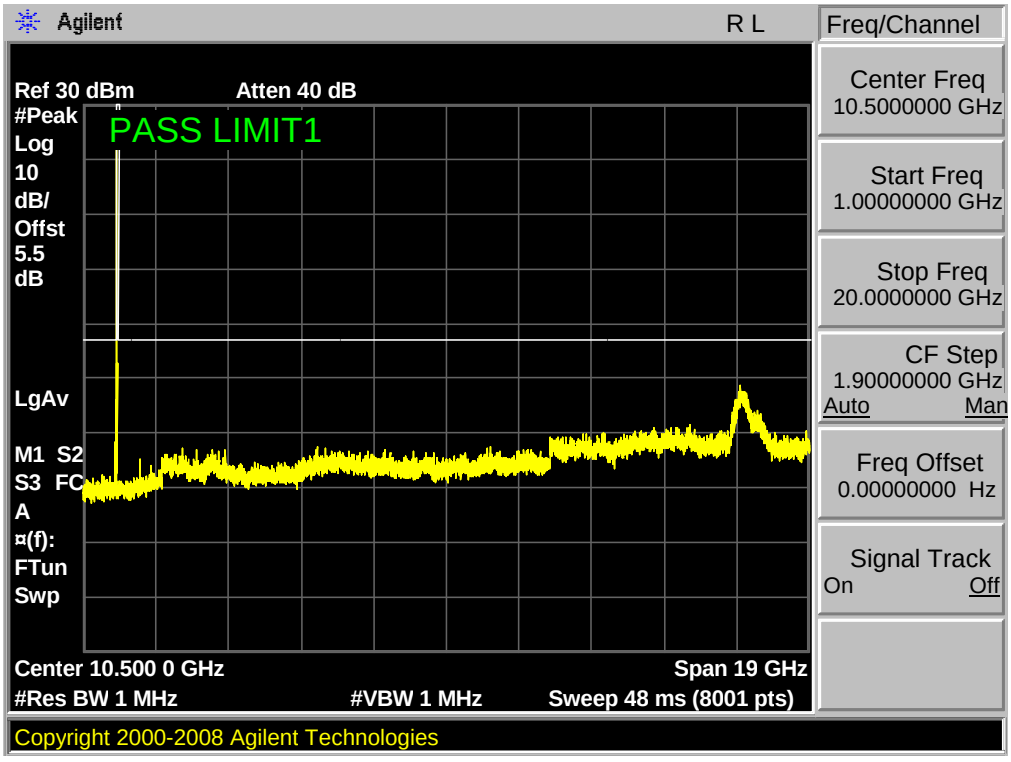
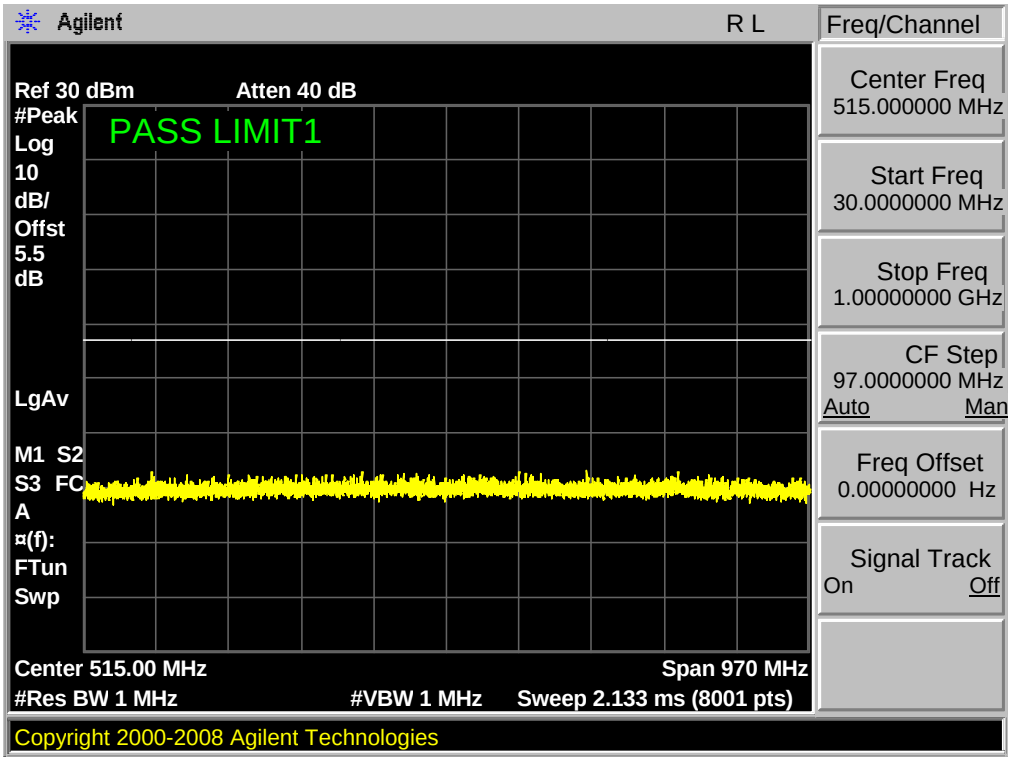
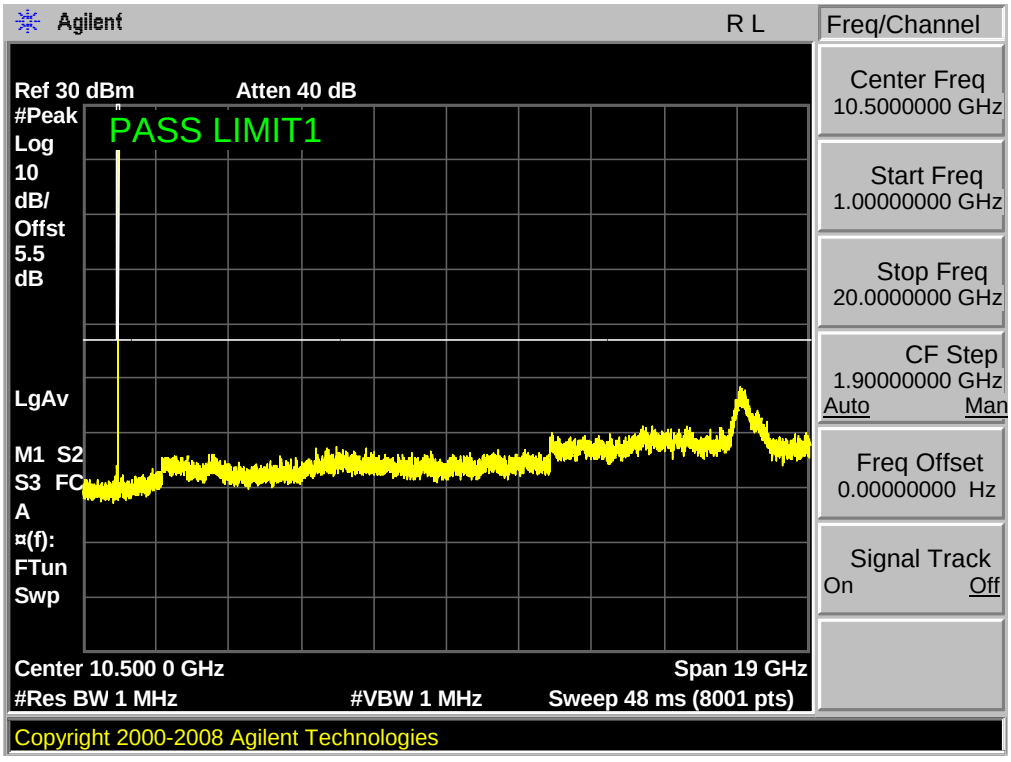


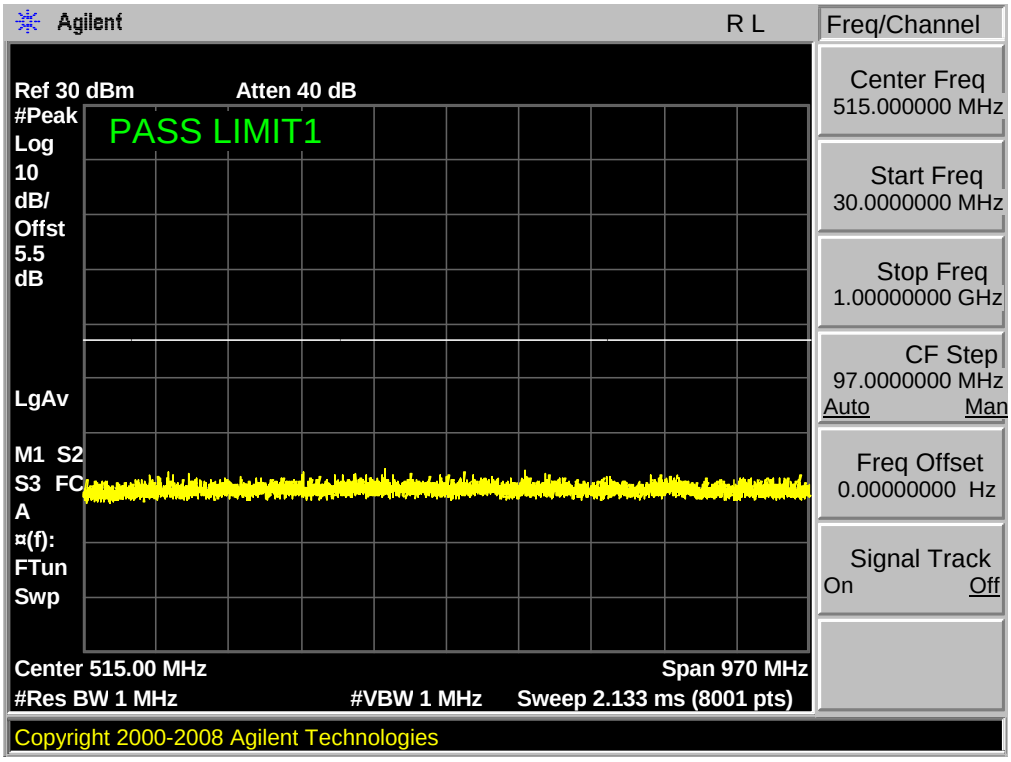
Band 2,UL Channel 19150,UL Frequency 1905.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



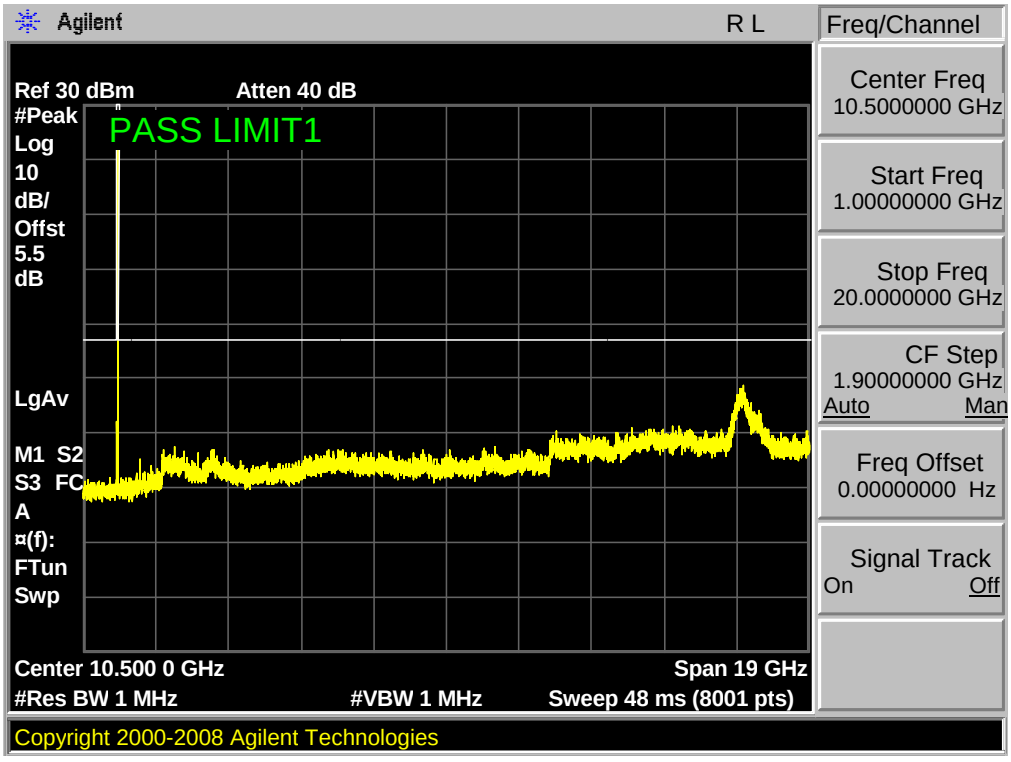
Band 2,UL Channel 19150,UL Frequency 1905.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



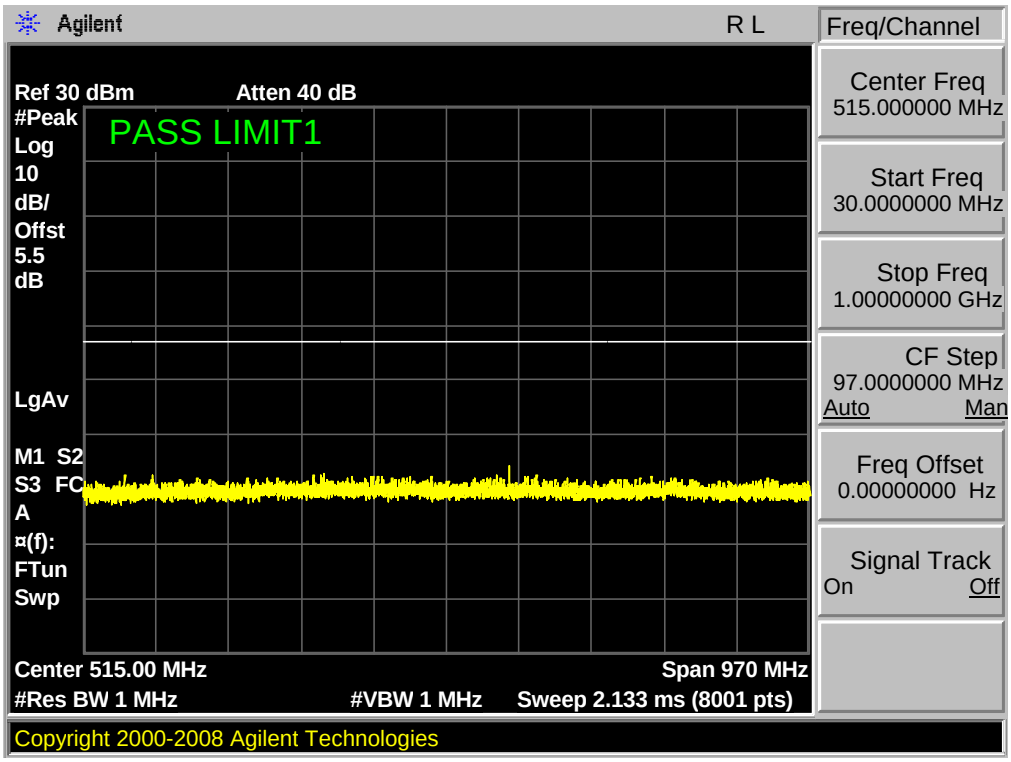
Band 2,UL Channel 19150,UL Frequency 1905.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



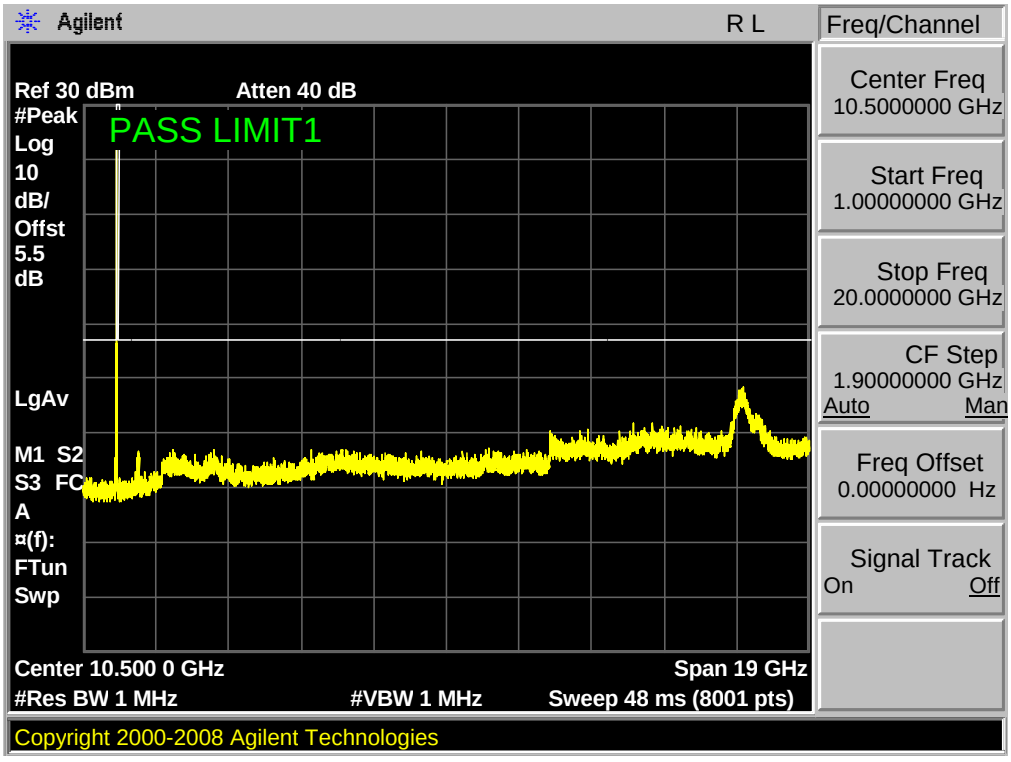
Band 2,UL Channel 19150,UL Frequency 1905.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



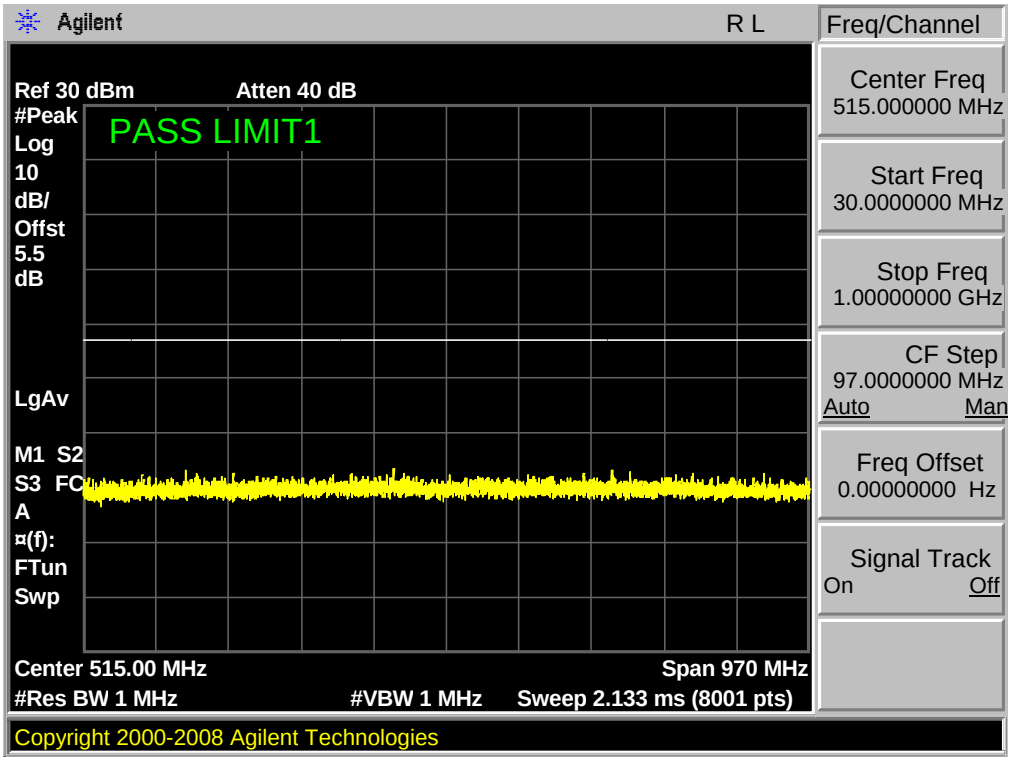
Band 2,UL Channel 18675,UL Frequency 1857.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



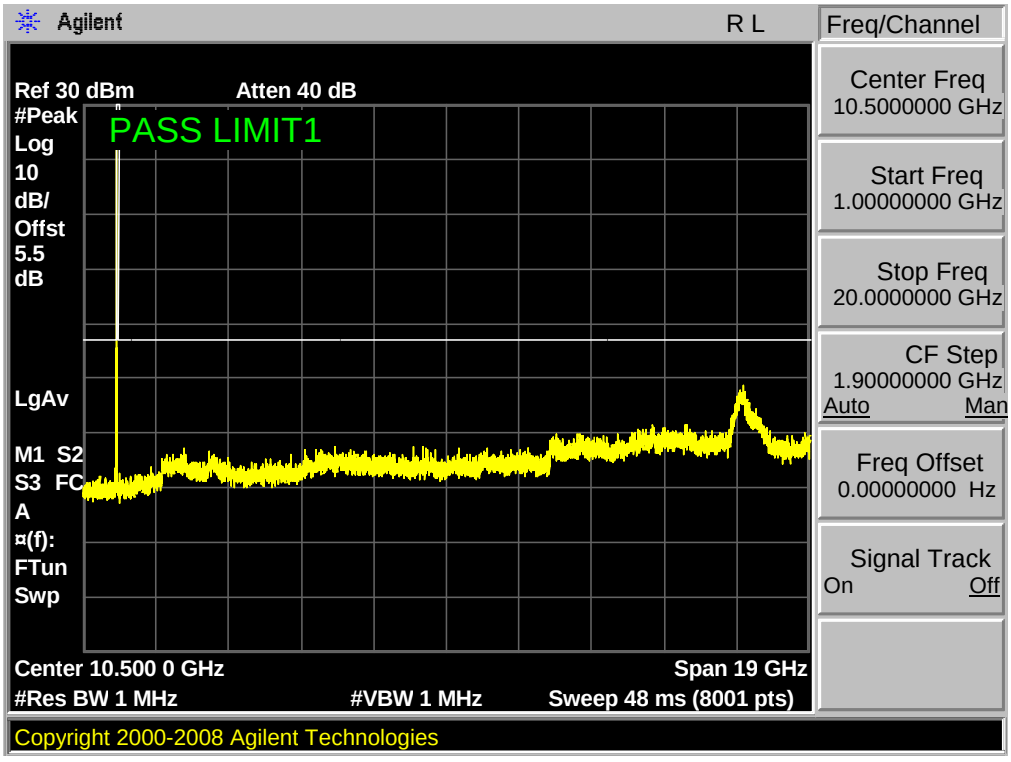
Band 2,UL Channel 18675,UL Frequency 1857.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



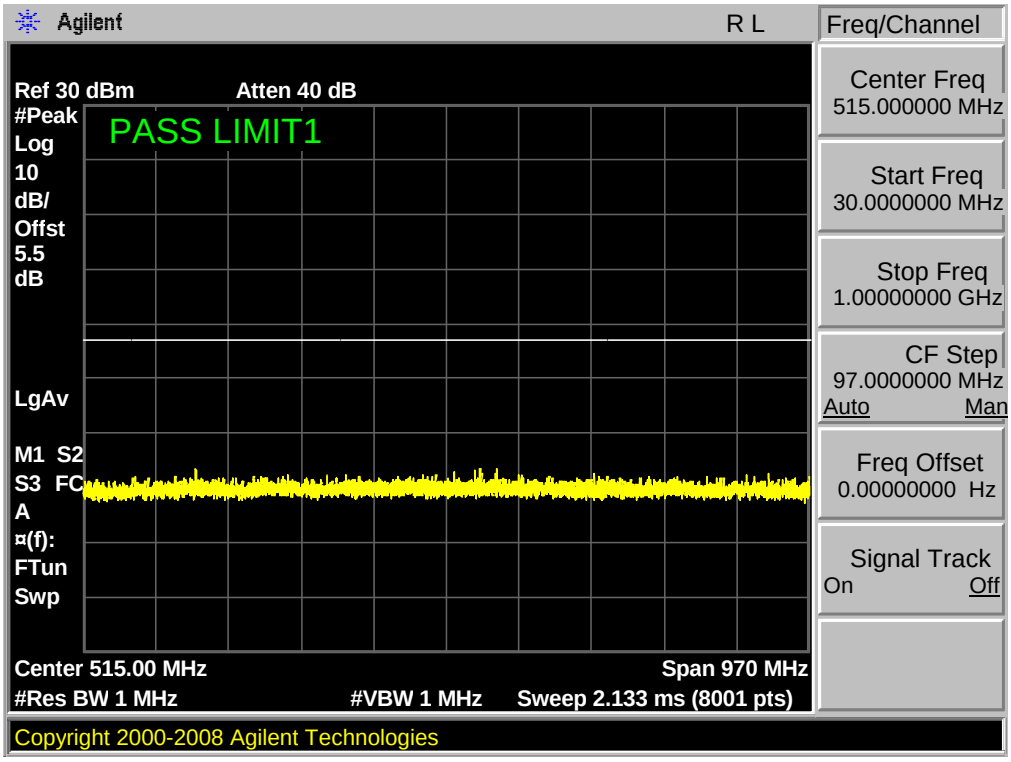
Band 2,UL Channel 18675,UL Frequency 1857.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



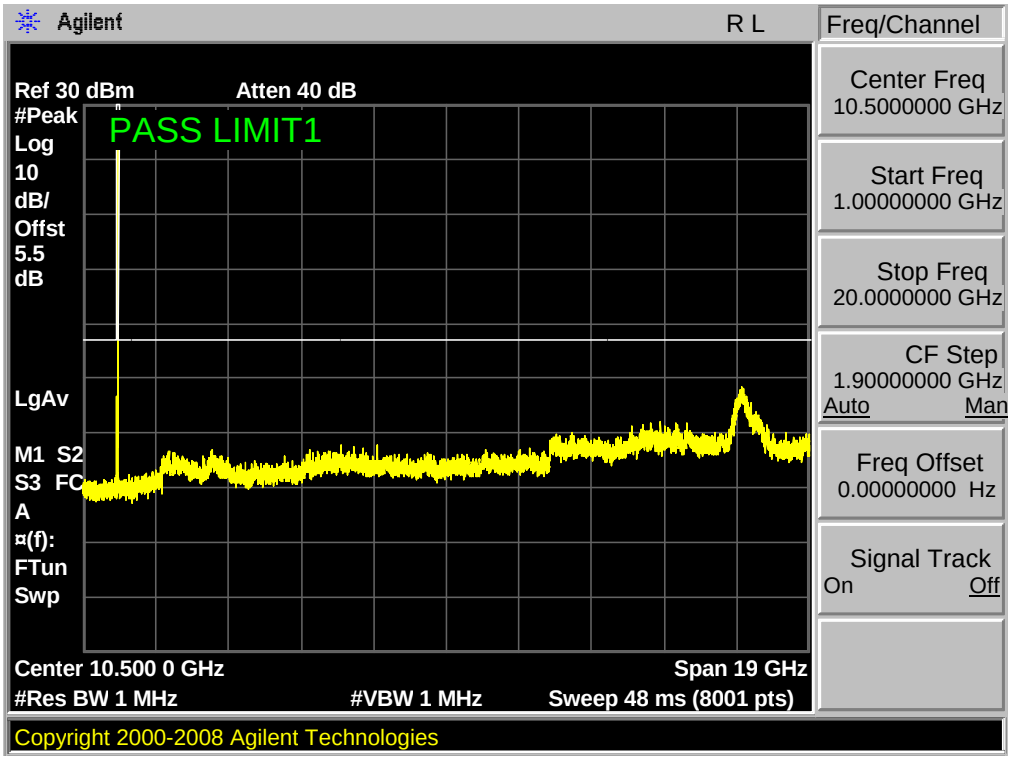
Band 2,UL Channel 18675,UL Frequency 1857.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



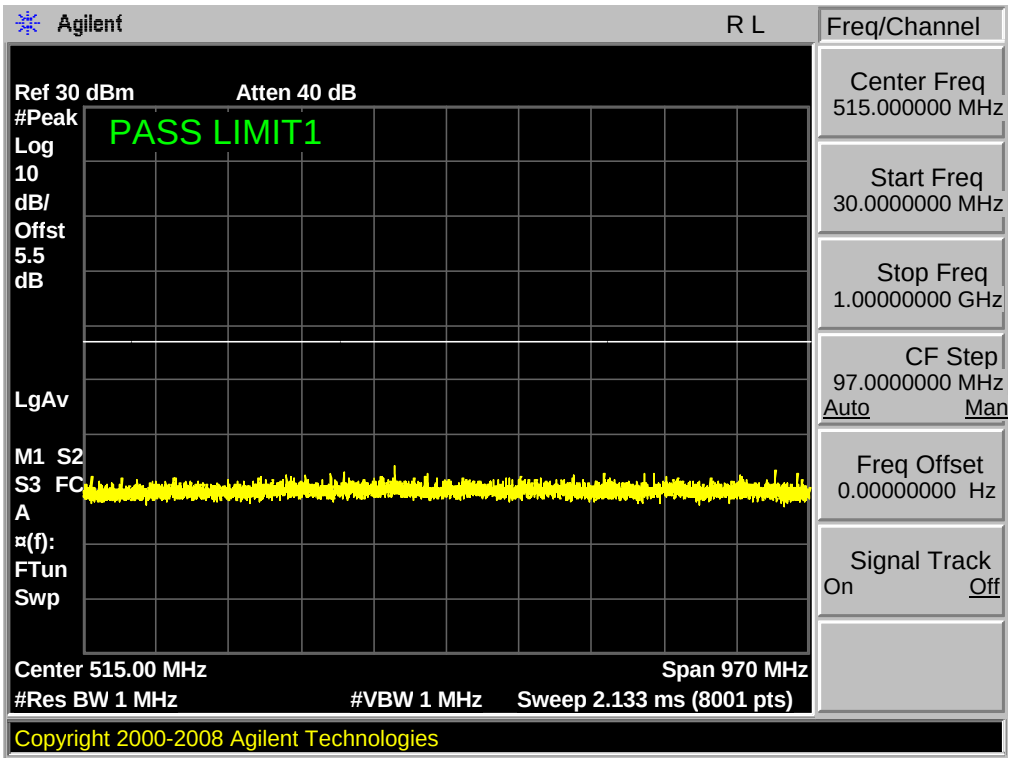
Band 2,UL Channel 19125,UL Frequency 1902.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



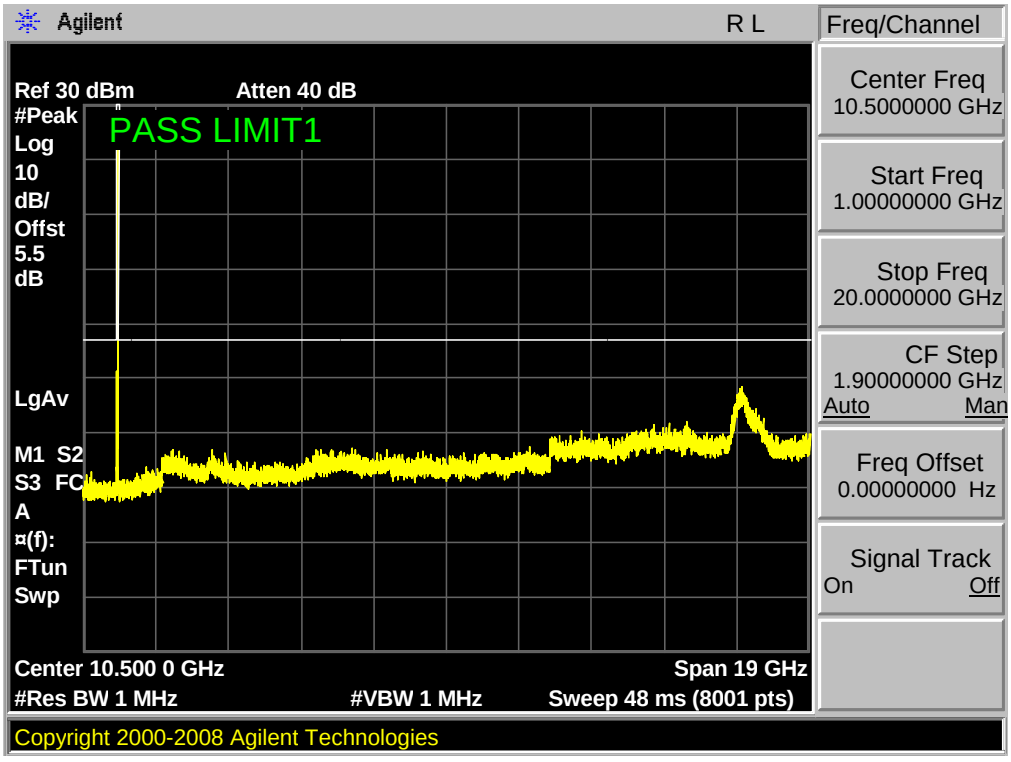
Band 2,UL Channel 19125,UL Frequency 1902.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



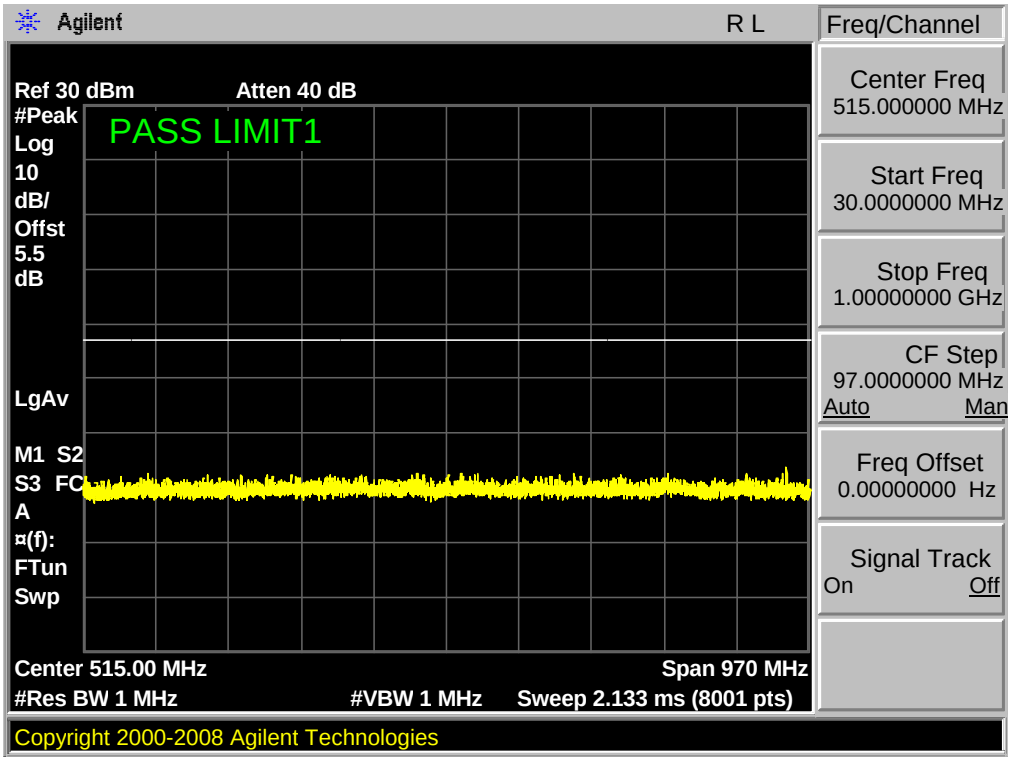
Band 2,UL Channel 19125,UL Frequency 1902.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



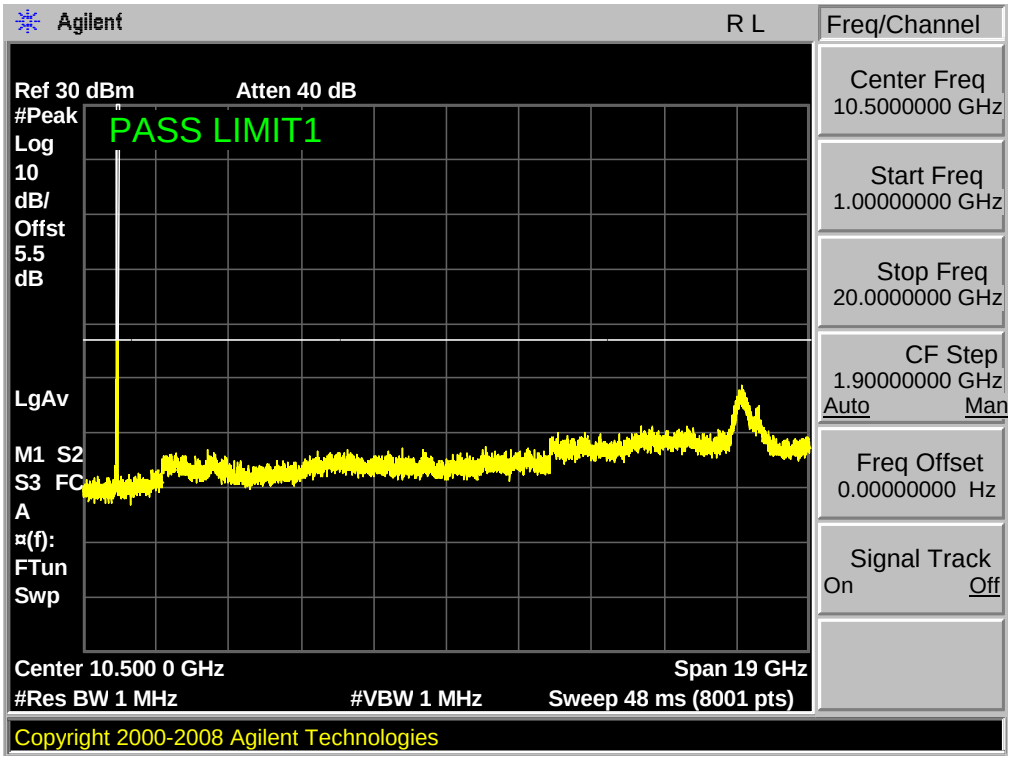
Band 2,UL Channel 19125,UL Frequency 1902.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



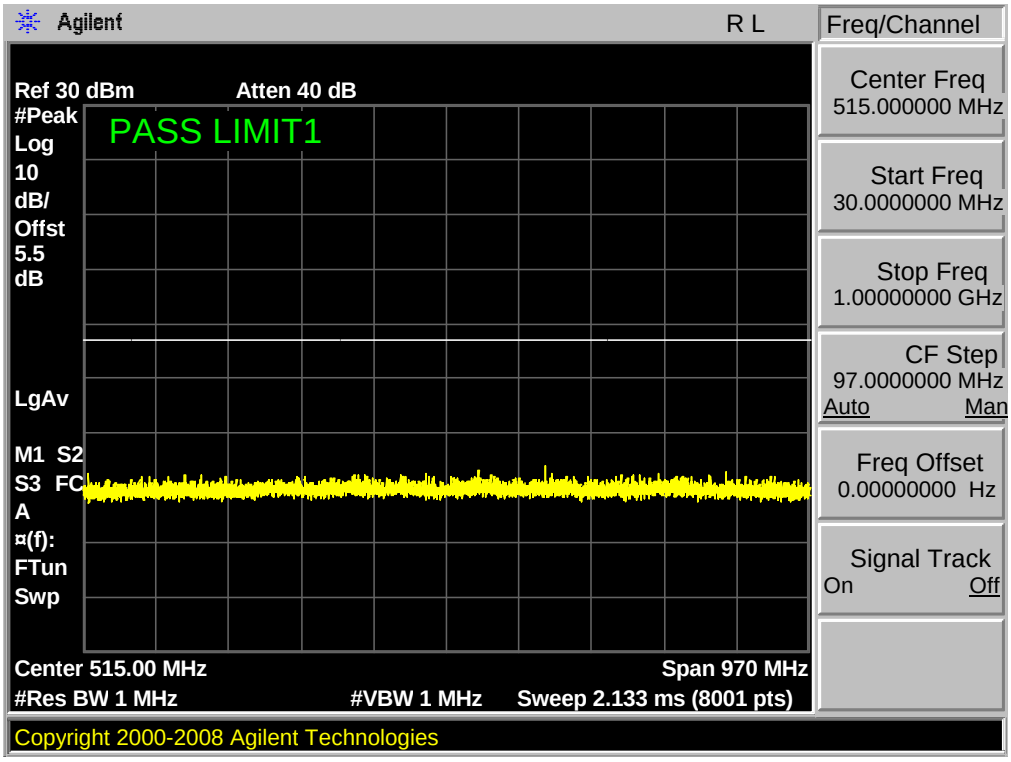
Band 2,UL Channel 18700,UL Frequency 1860.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK



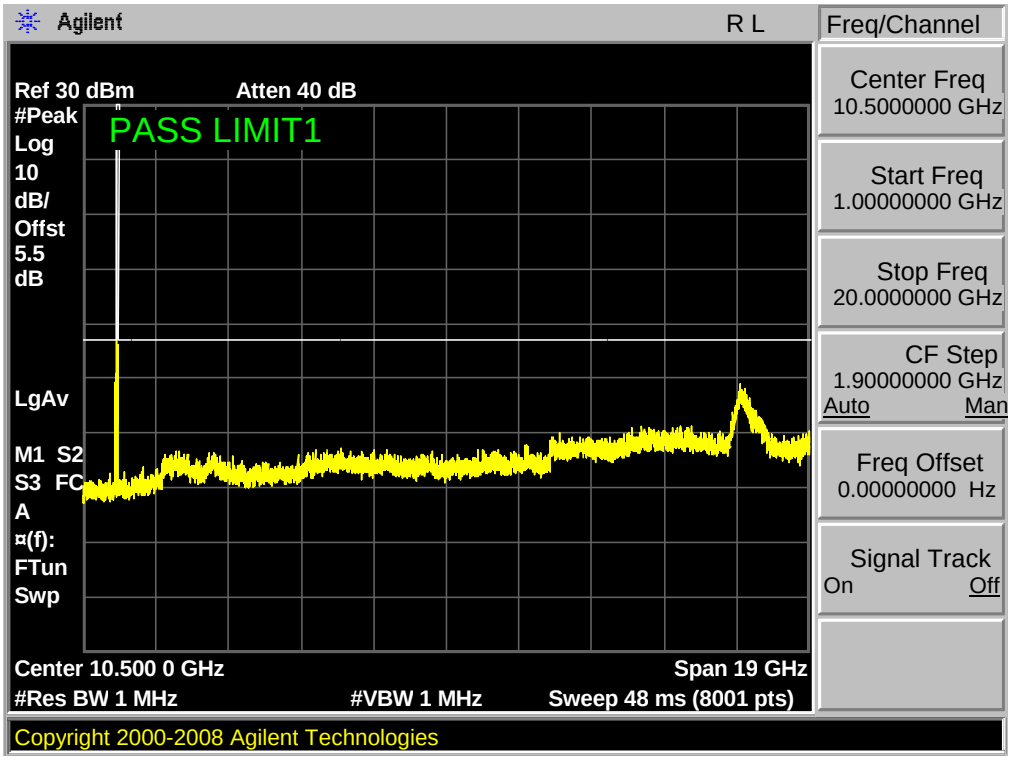
Band 2,UL Channel 18700,UL Frequency 1860.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK



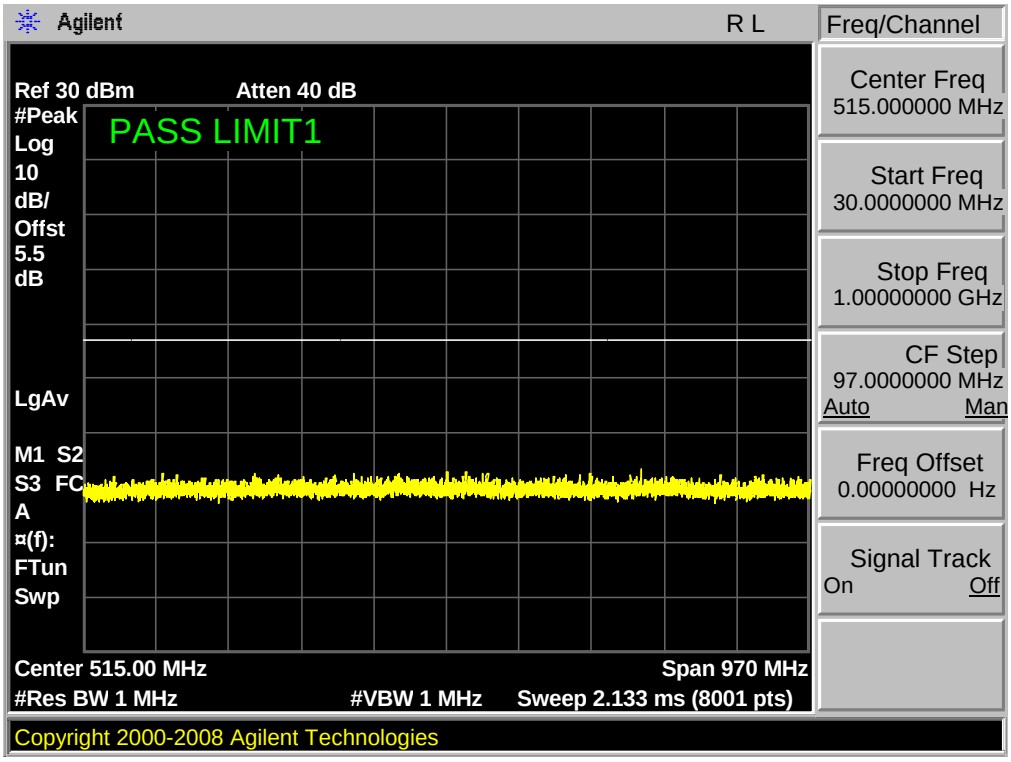
Band 2,UL Channel 18700,UL Frequency 1860.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM



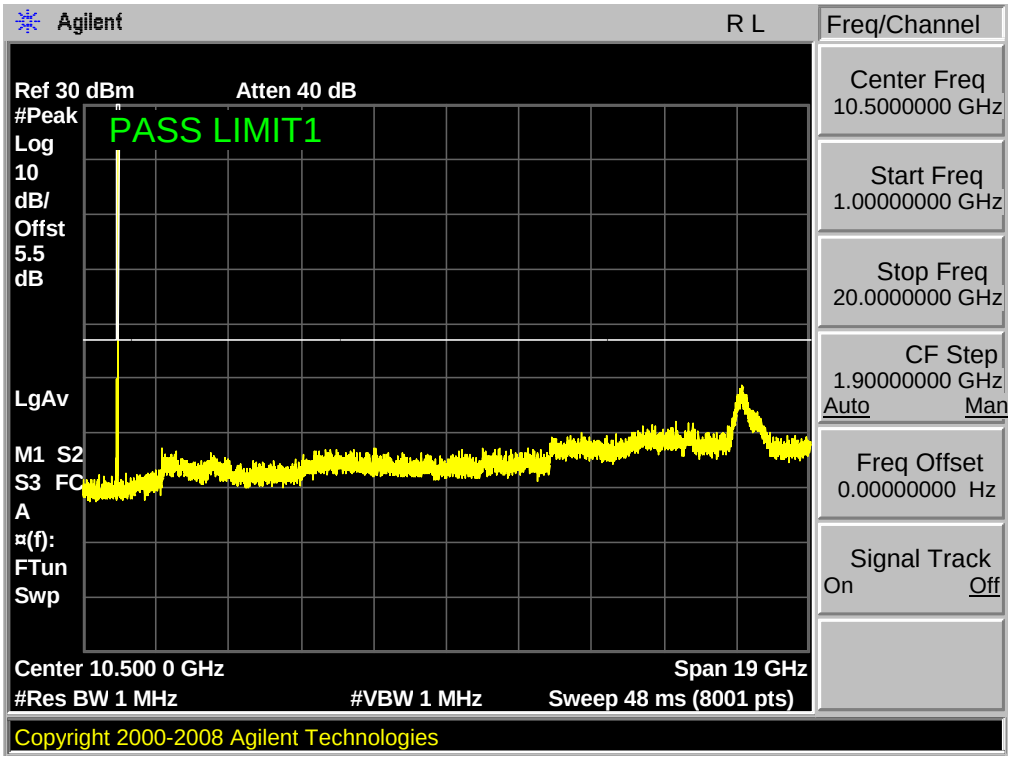
Band 2,UL Channel 18700,UL Frequency 1860.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM



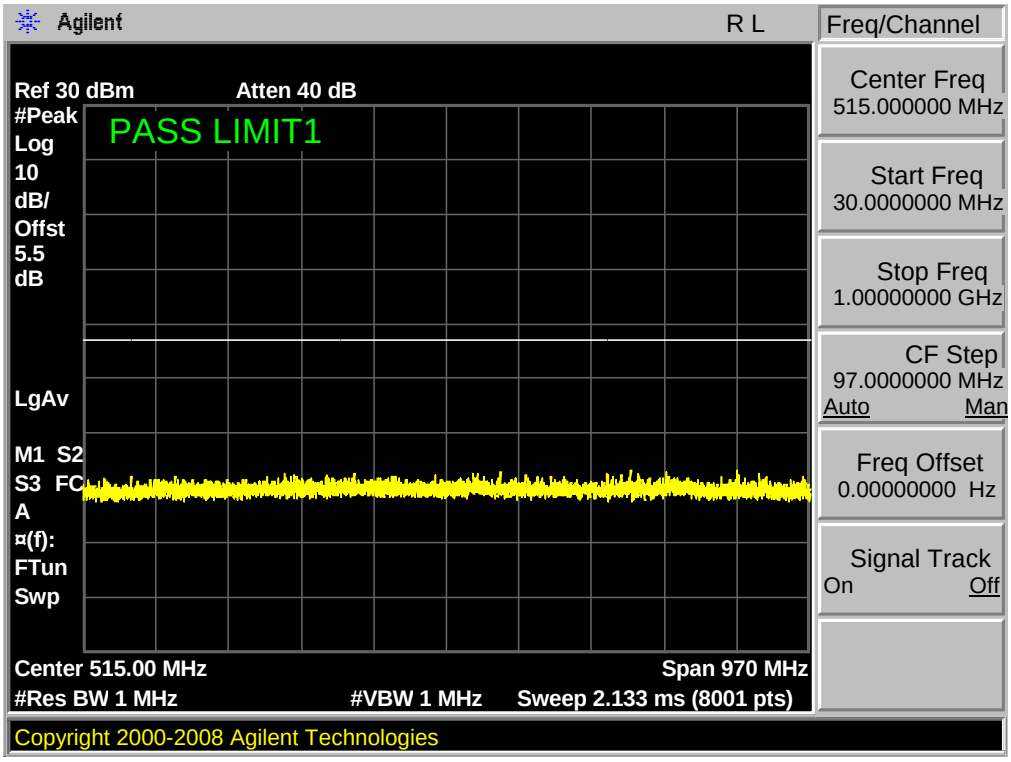
Band 2,UL Channel 19100,UL Frequency 1900.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK



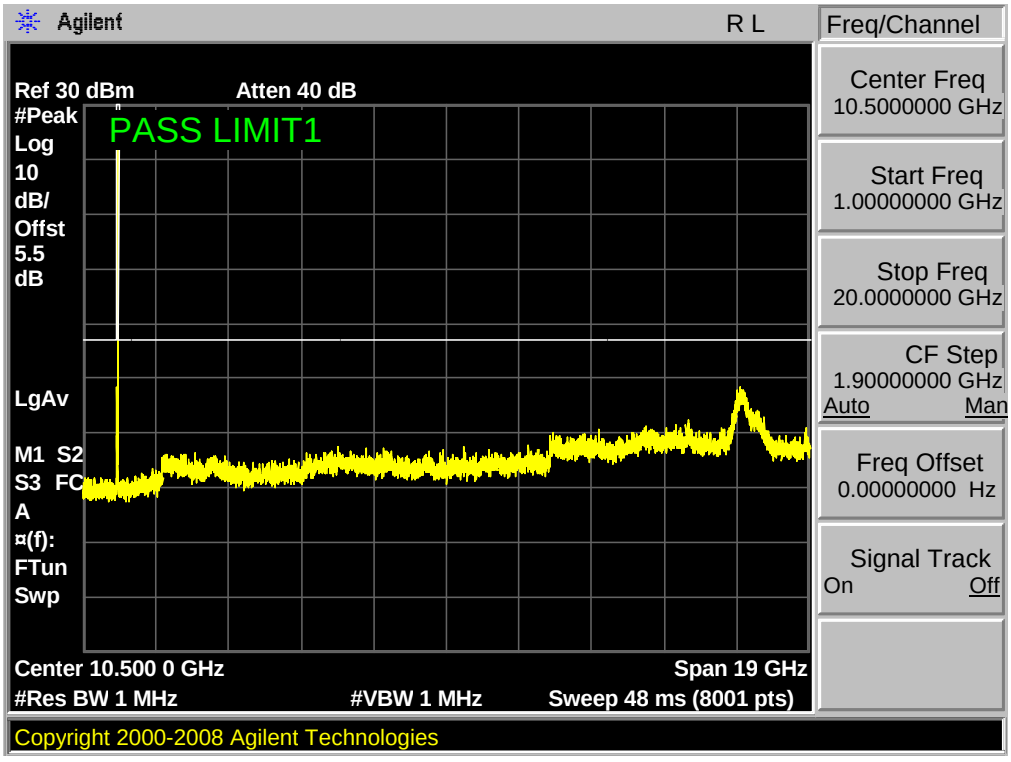
Band 2,UL Channel 19100,UL Frequency 1900.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK



Band 2,UL Channel 19100,UL Frequency 1900.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM

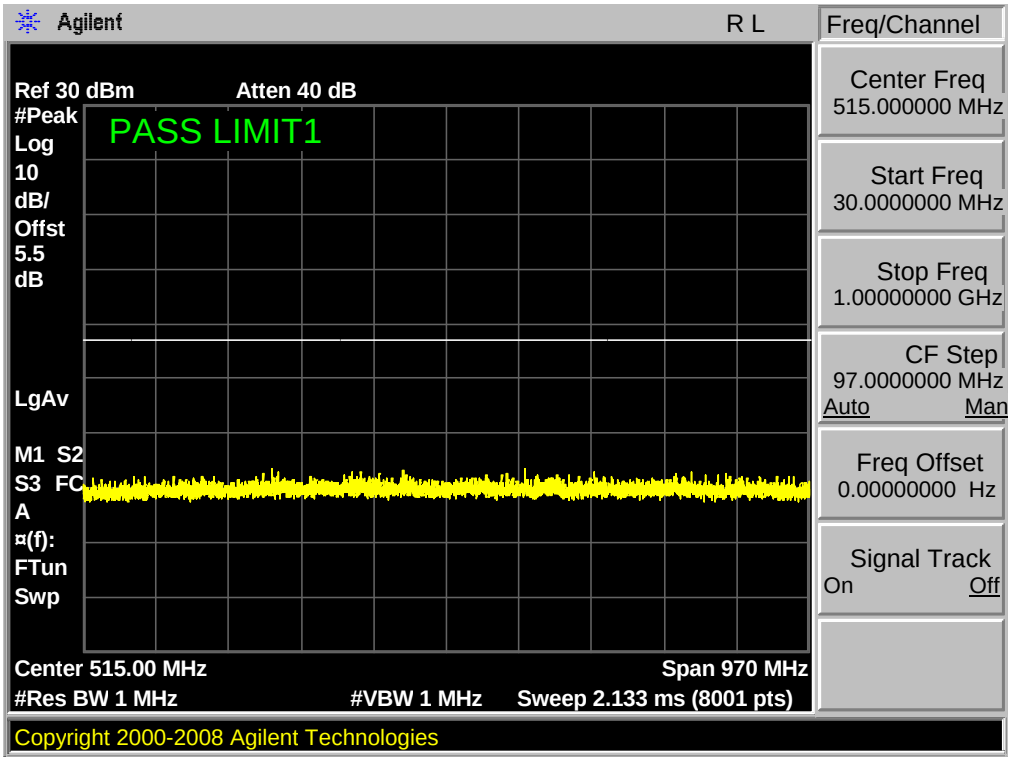


Band 2,UL Channel 19100,UL Frequency 1900.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM

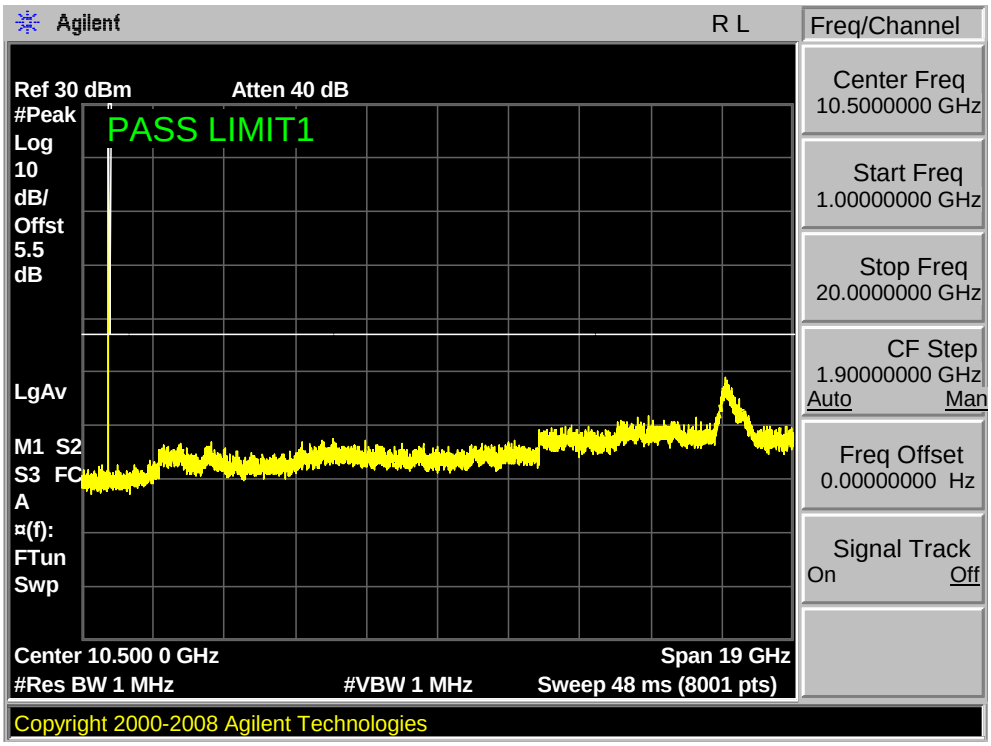


7.1.2 LTE BAND 4

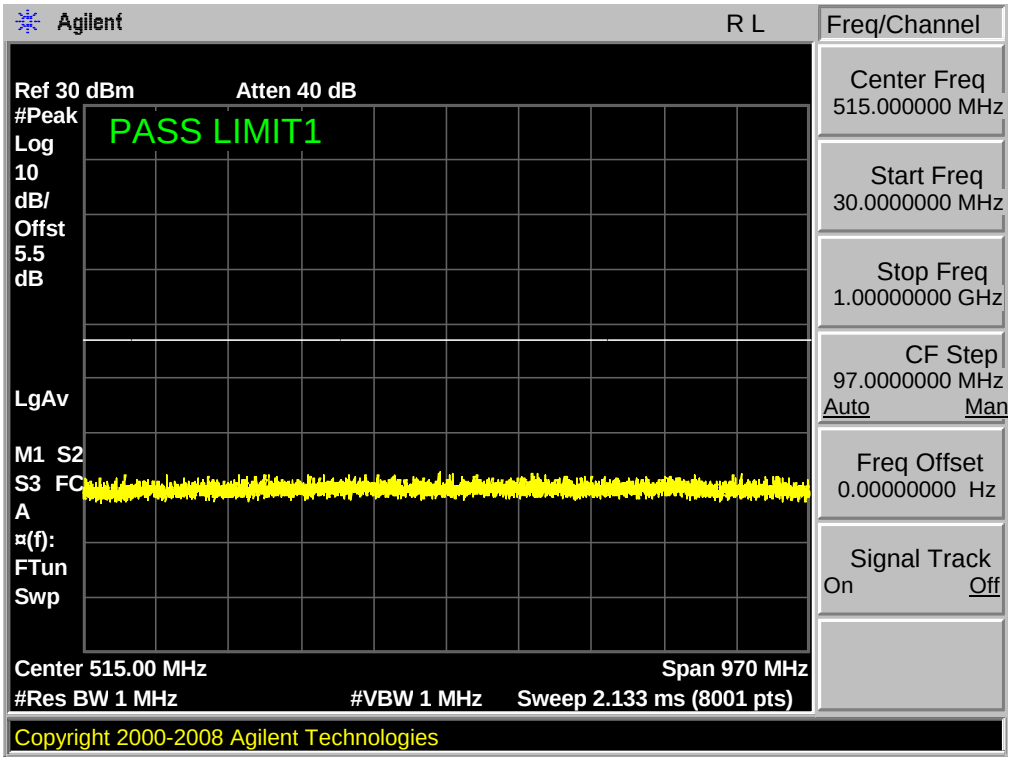
Band 4,UL Channel 19957,UL Frequency 1710.7,BW 1.4,NO. RB 1,RB POS. Low,QPSK



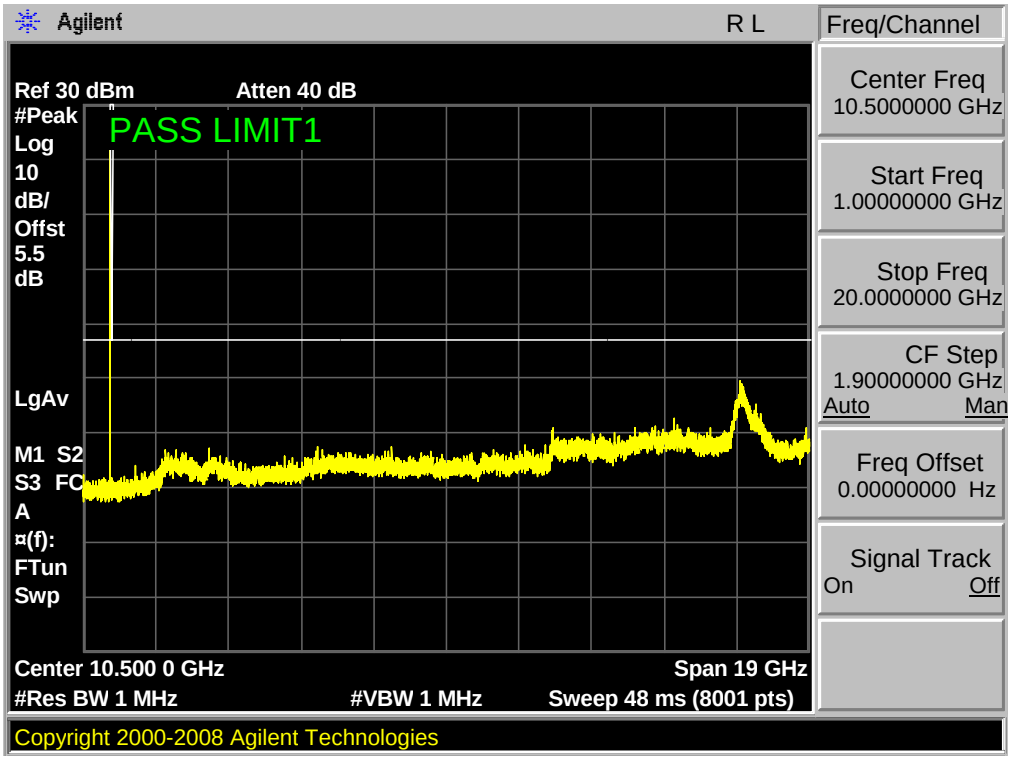
Band 4,UL Channel 19957,UL Frequency 1710.7,BW 1.4,NO. RB 1,RB POS. Low,QPSK



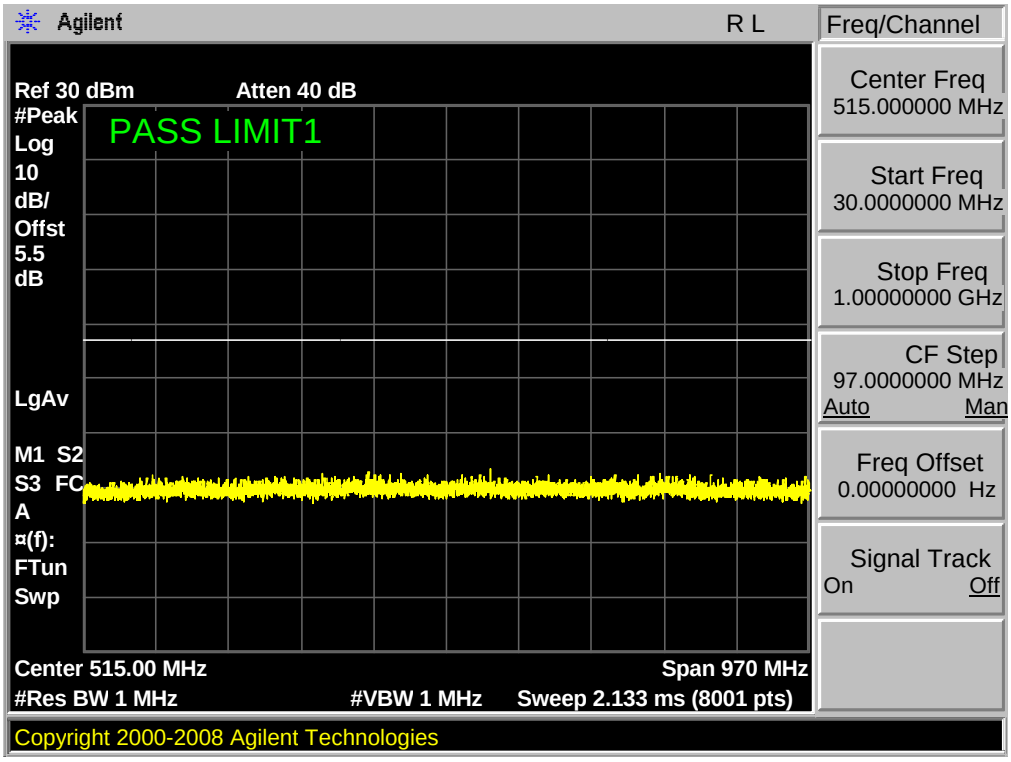
Band 4,UL Channel 19957,UL Frequency 1710.7,BW 1.4,NO. RB 1,RB POS. Low,16QAM



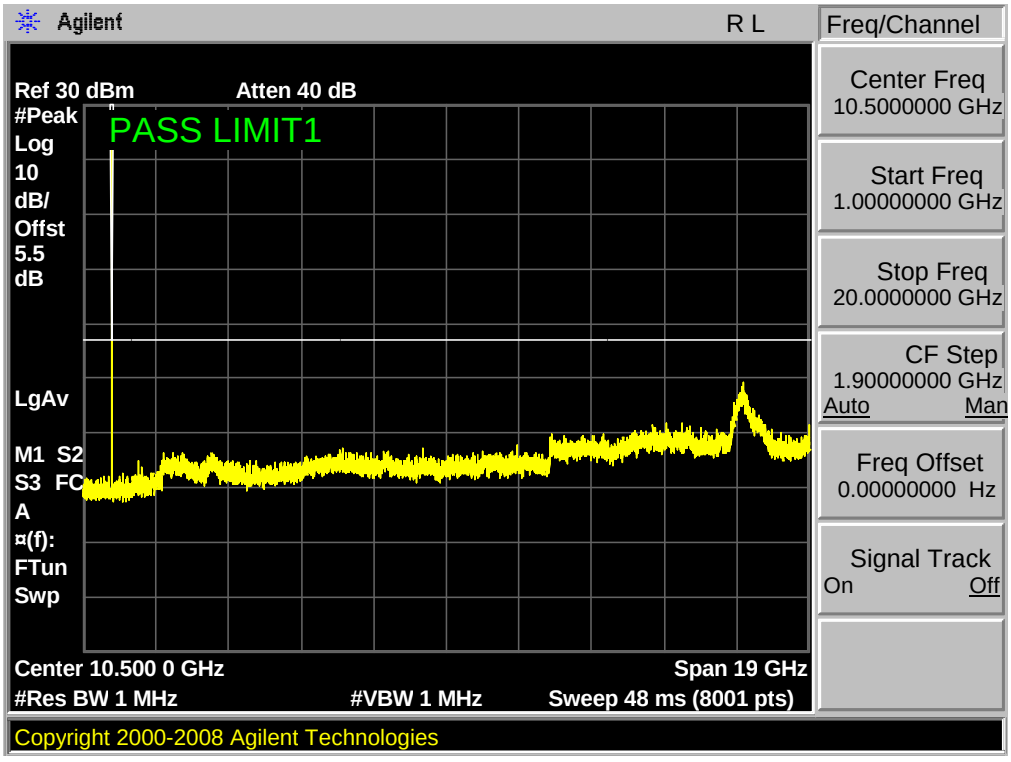
Band 4,UL Channel 19957,UL Frequency 1710.7,BW 1.4,NO. RB 1,RB POS. Low,16QAM



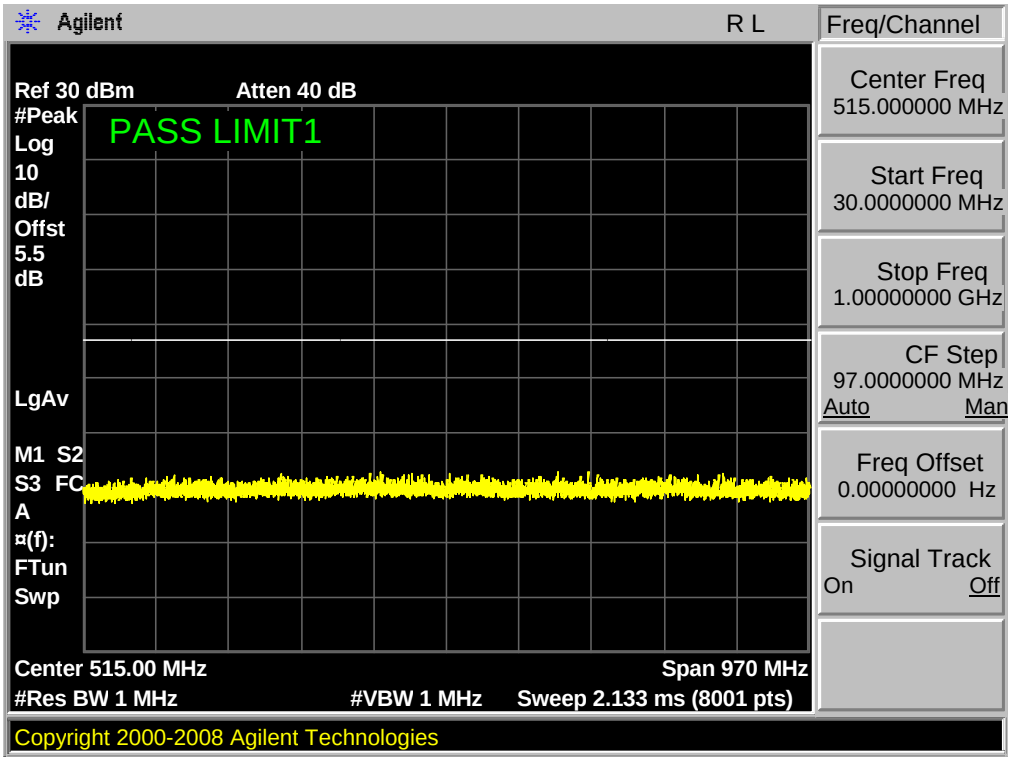
Band 4,UL Channel 20393,UL Frequency 1754.3,BW 1.4,NO. RB 1,RB POS. Low,QPSK



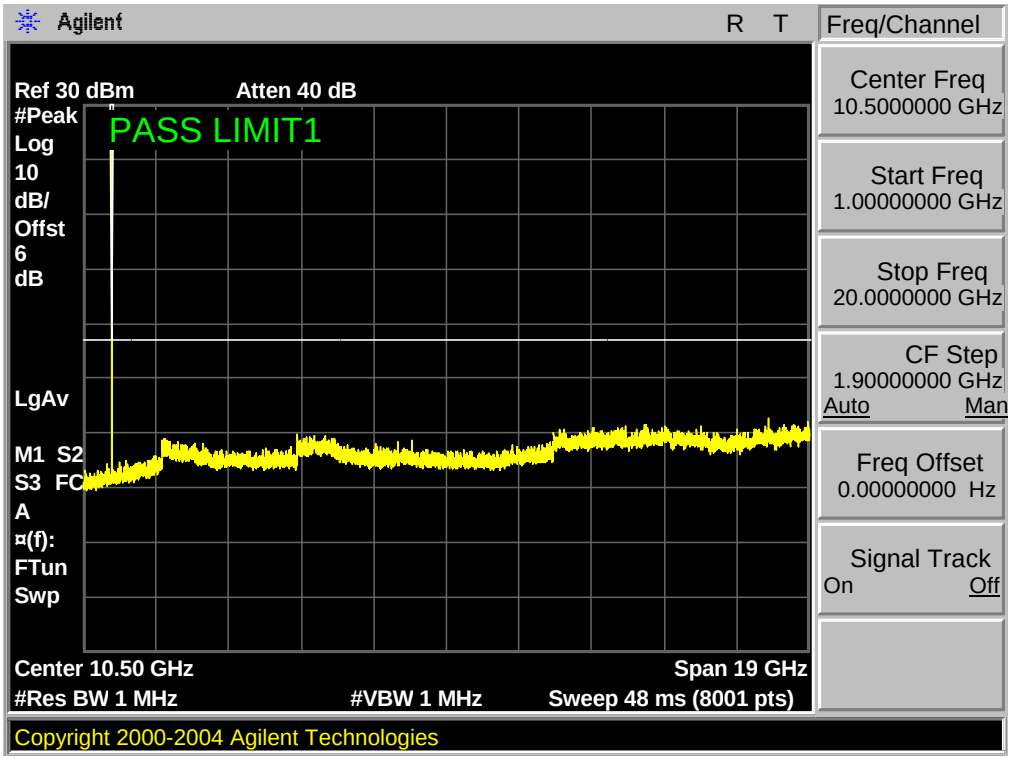
Band 4,UL Channel 20393,UL Frequency 1754.3,BW 1.4,NO. RB 1,RB POS. Low,QPSK



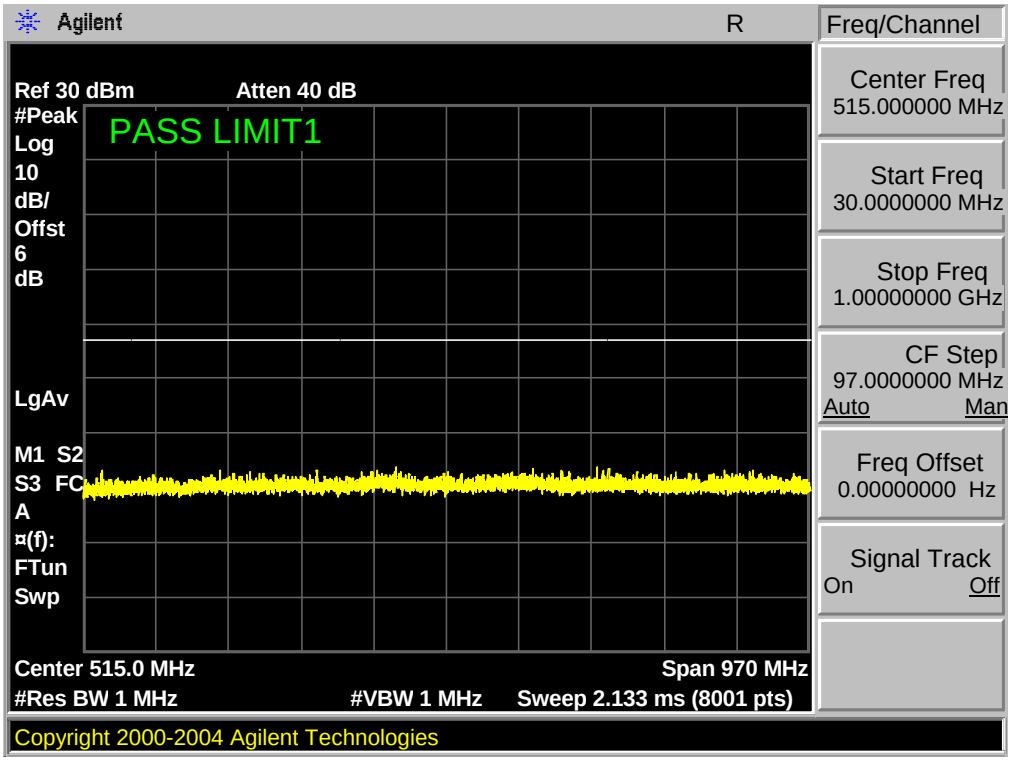
Band 4,UL Channel 20393,UL Frequency 1754.3,BW 1.4,NO. RB 1,RB POS. Low,16QAM



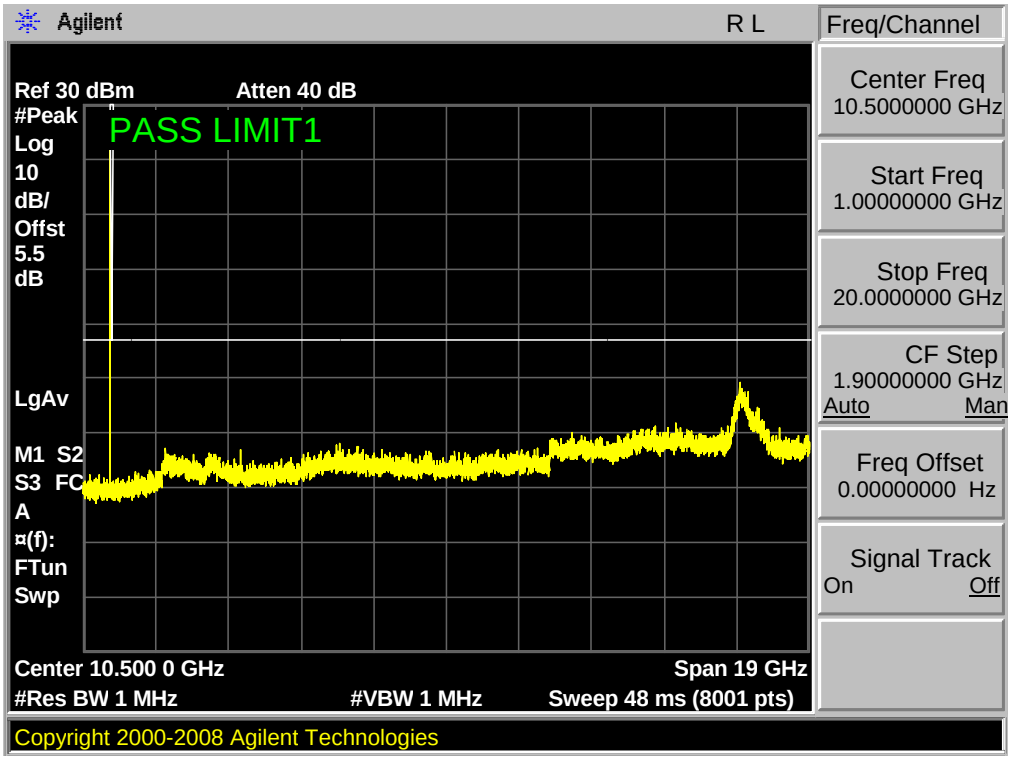
Band 4,UL Channel 20393,UL Frequency 1754.3,BW 1.4,NO. RB 1,RB POS. Low,16QAM



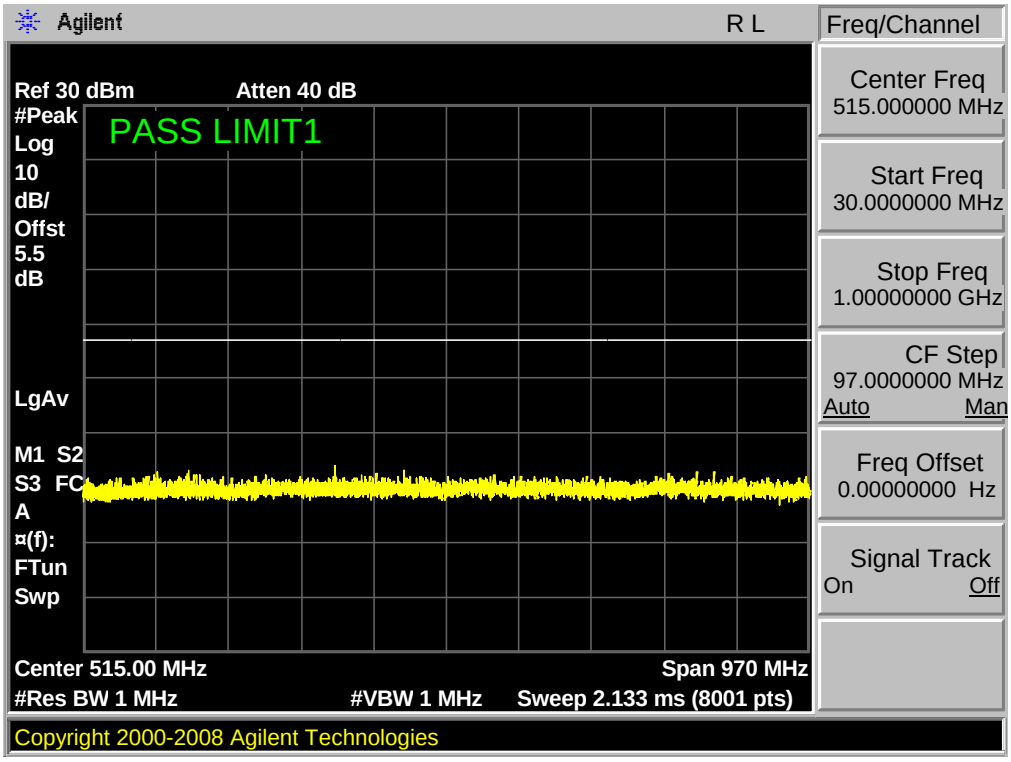
Band 4,UL Channel 19965,UL Frequency 1711.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



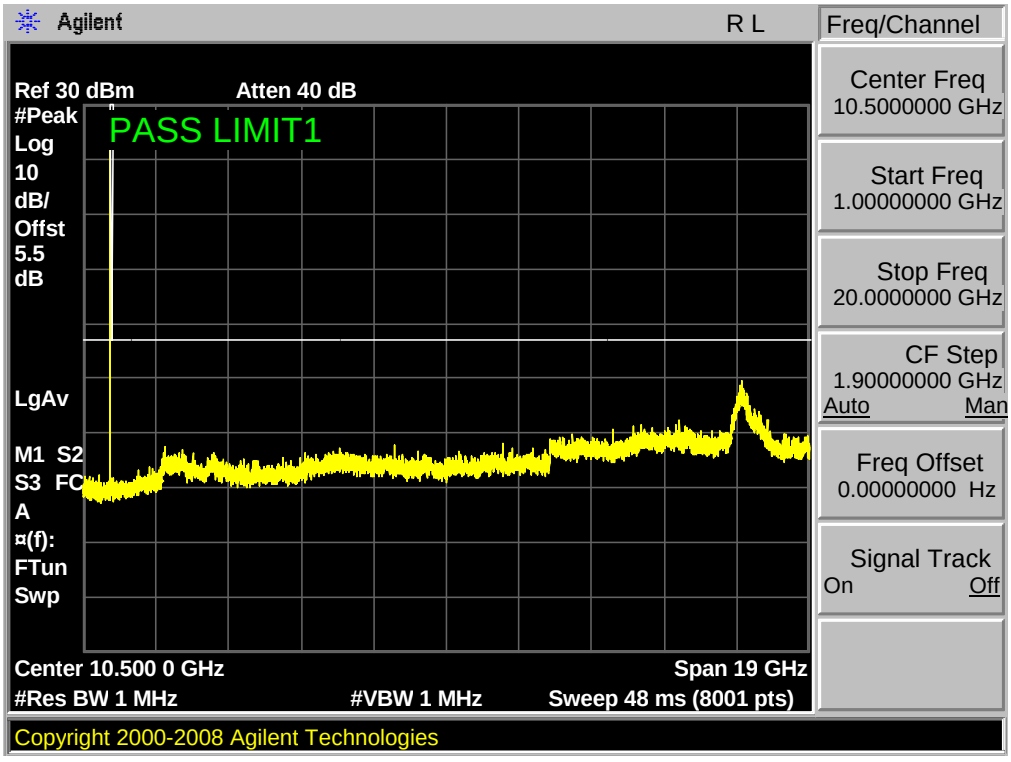
Band 4,UL Channel 19965,UL Frequency 1711.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



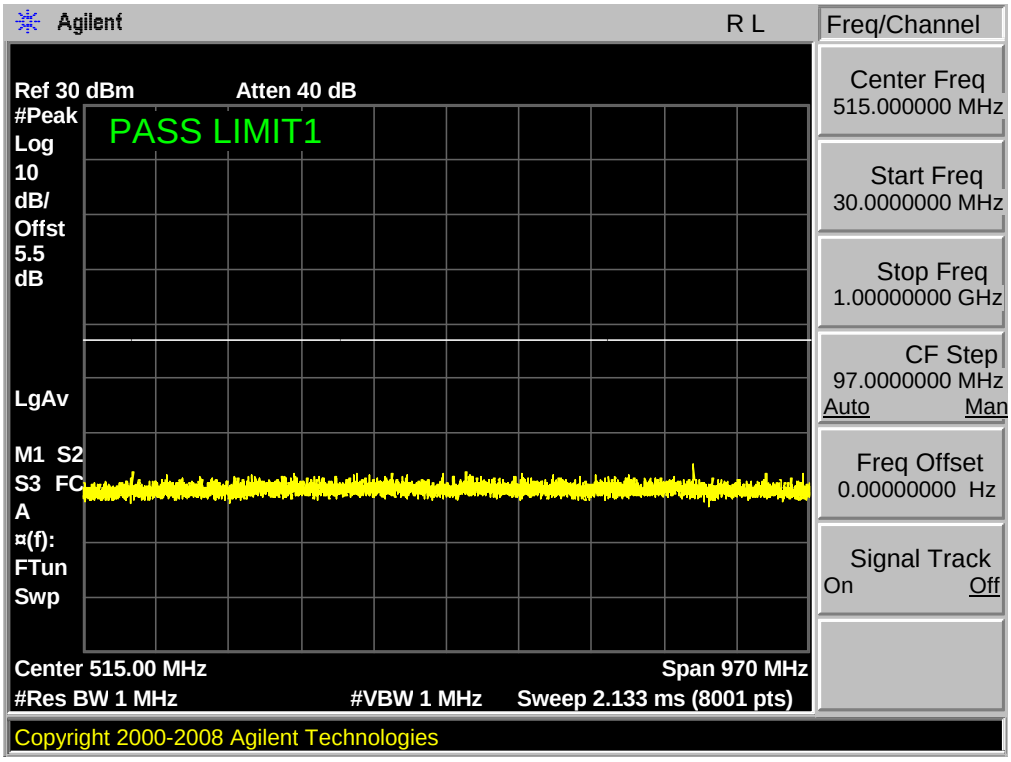
Band 4,UL Channel 19965,UL Frequency 1711.5,BW 3.0,NO. RB 1,RB POS. High,16QAM



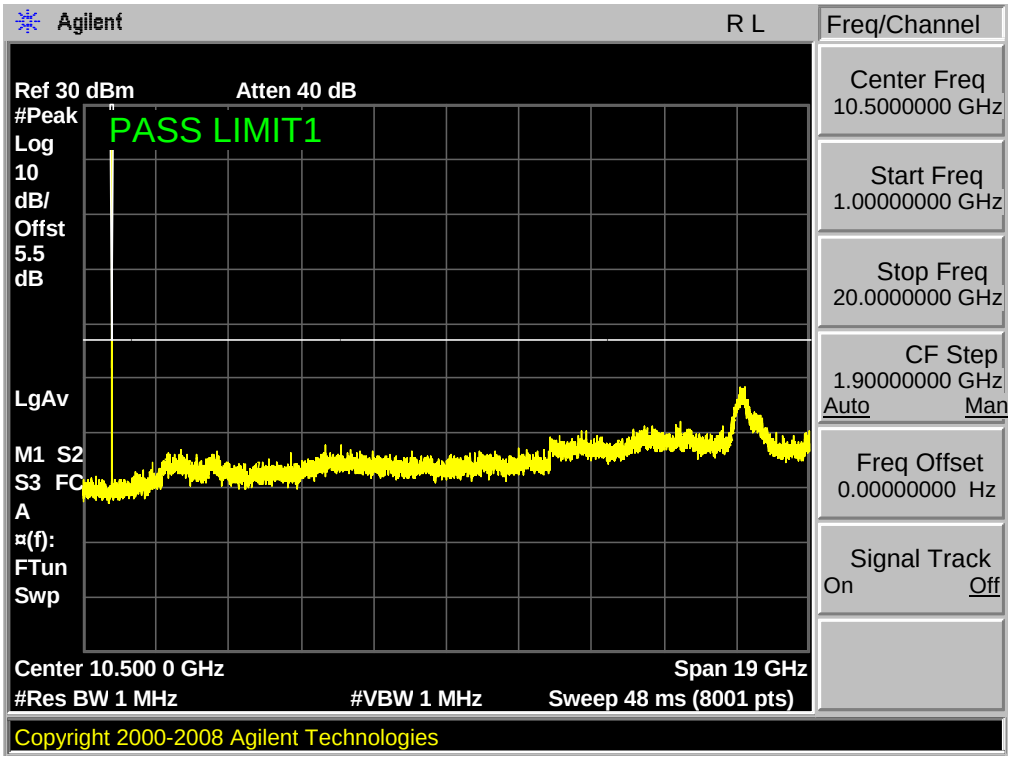
Band 4,UL Channel 19965,UL Frequency 1711.5,BW 3.0,NO. RB 1,RB POS. High,16QAM



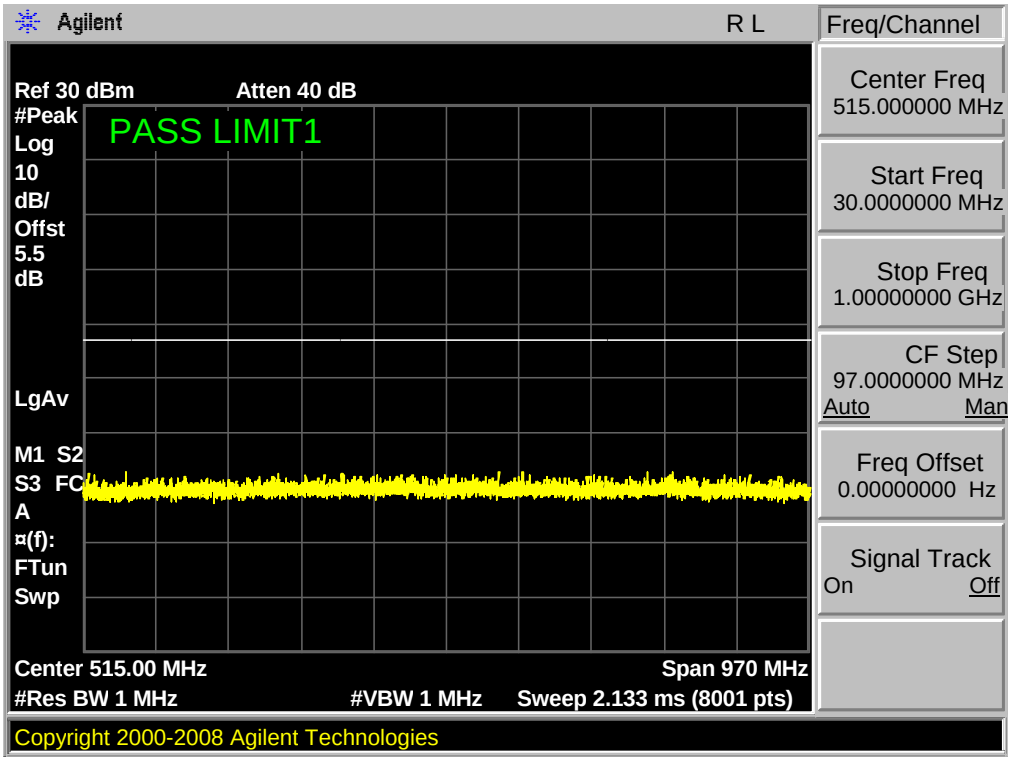
Band 4,UL Channel 20385,UL Frequency 1753.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



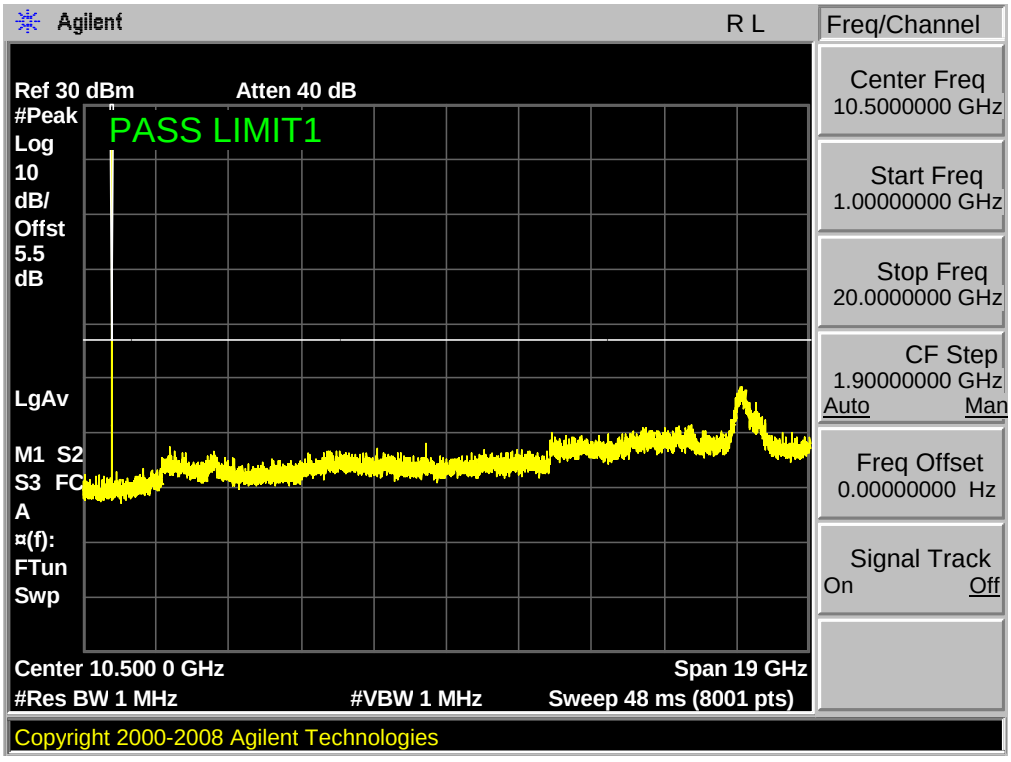
Band 4,UL Channel 20385,UL Frequency 1753.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



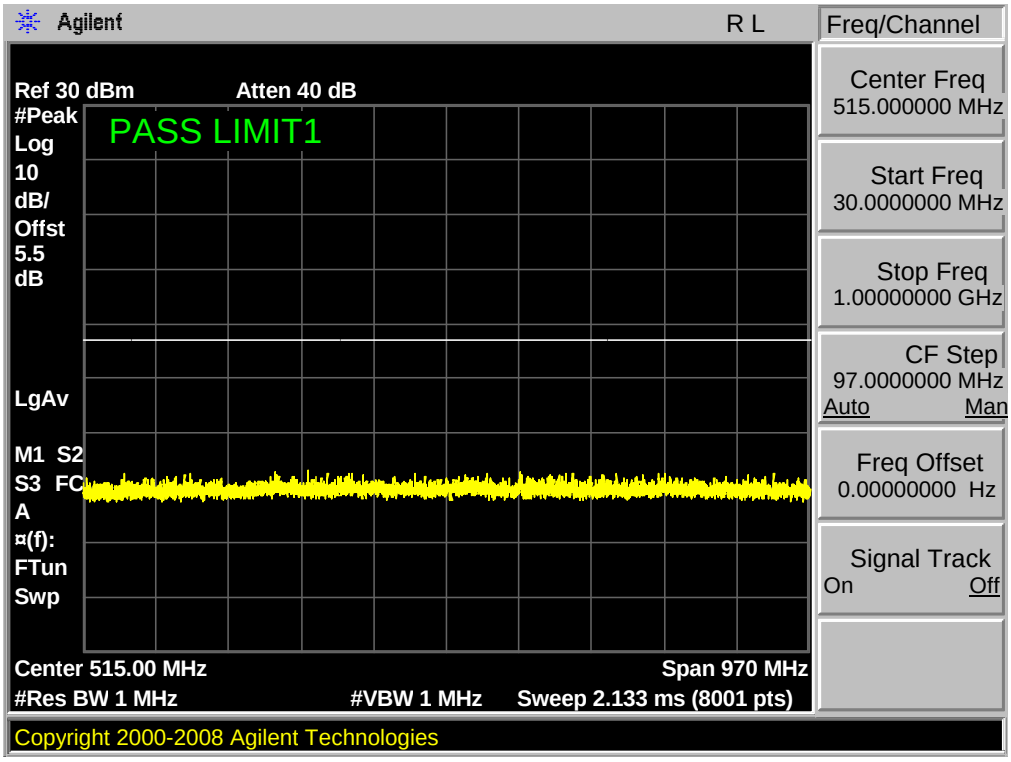
Band 4,UL Channel 20385,UL Frequency 1753.5,BW 3.0,NO. RB 1,RB POS. Low,16QAM



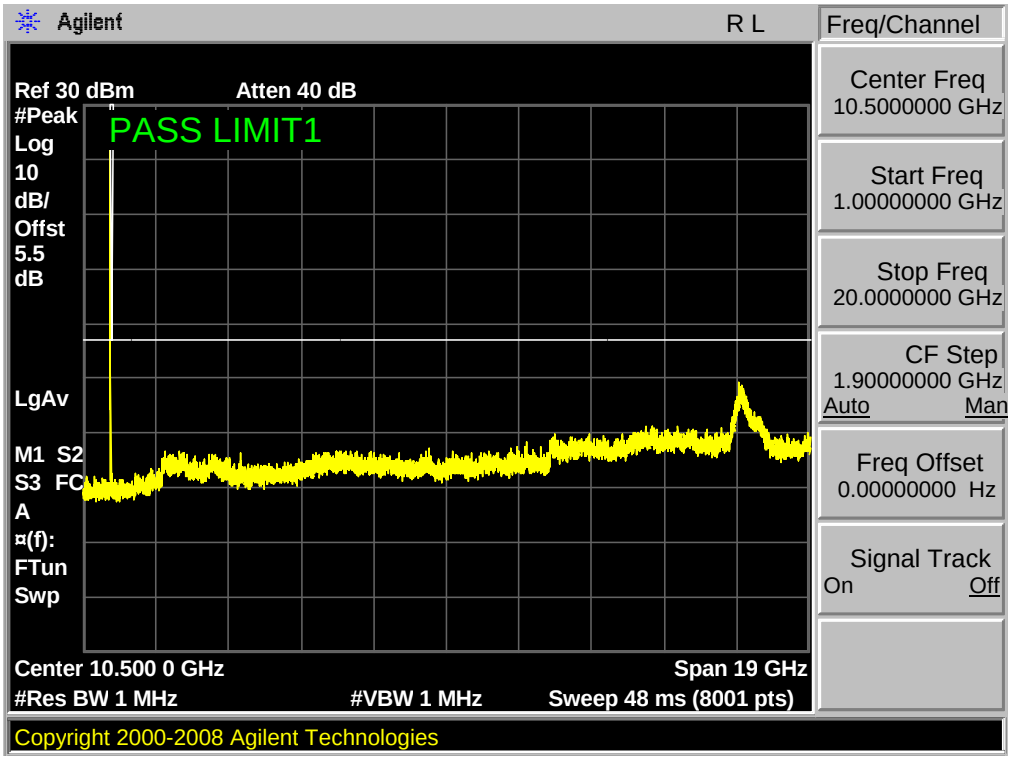
Band 4,UL Channel 20385,UL Frequency 1753.5,BW 3.0,NO. RB 1,RB POS. Low,16QAM



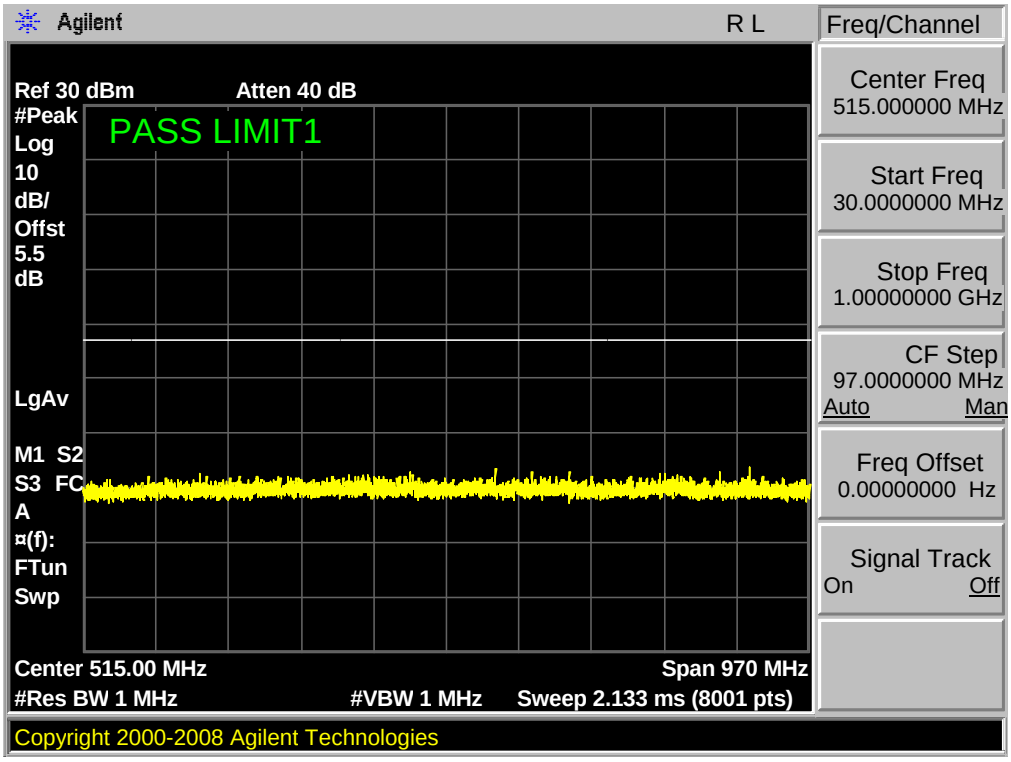
Band 4,UL Channel 19975,UL Frequency 1712.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



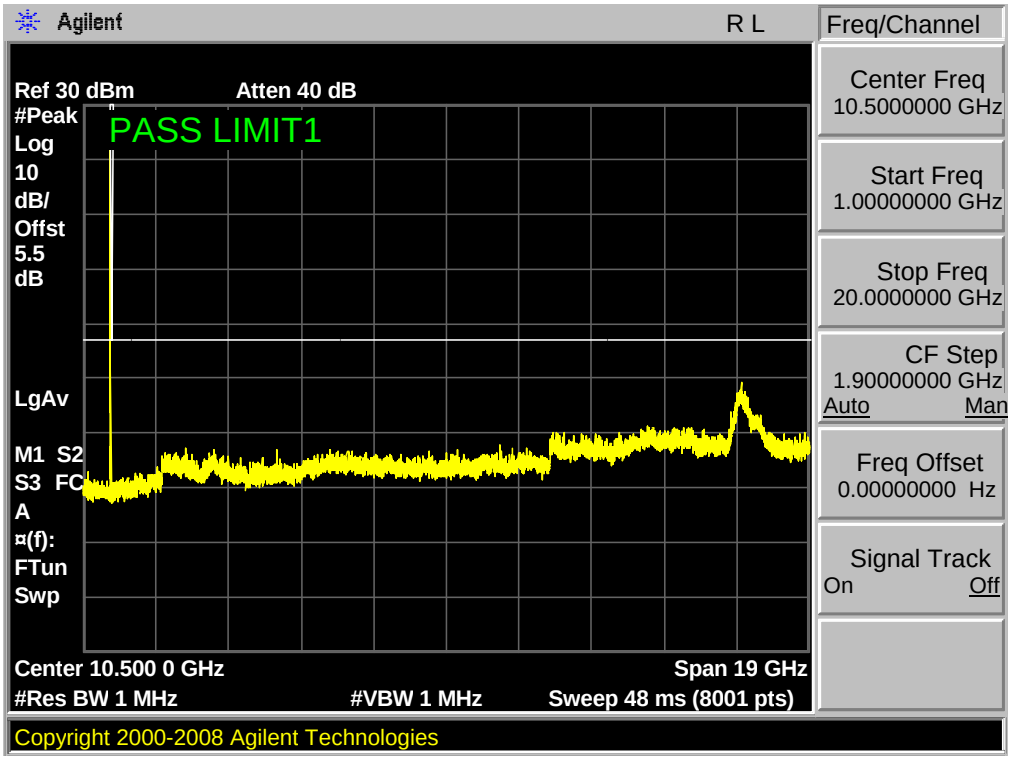
Band 4,UL Channel 19975,UL Frequency 1712.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



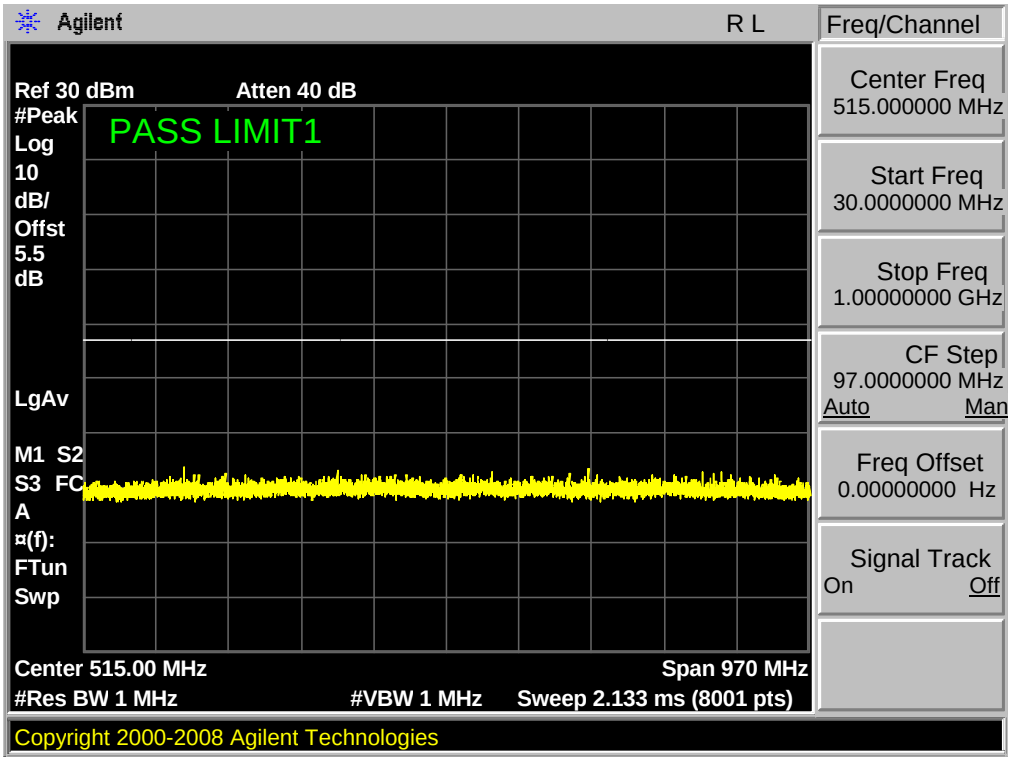
Band 4,UL Channel 19975,UL Frequency 1712.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



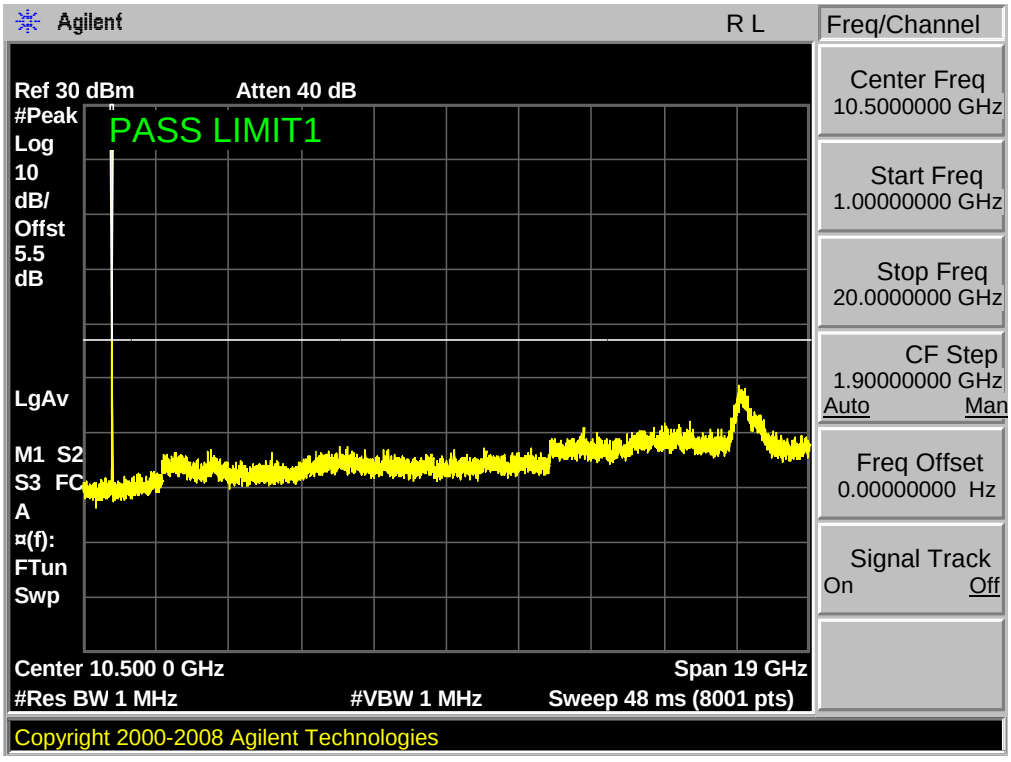
Band 4,UL Channel 19975,UL Frequency 1712.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



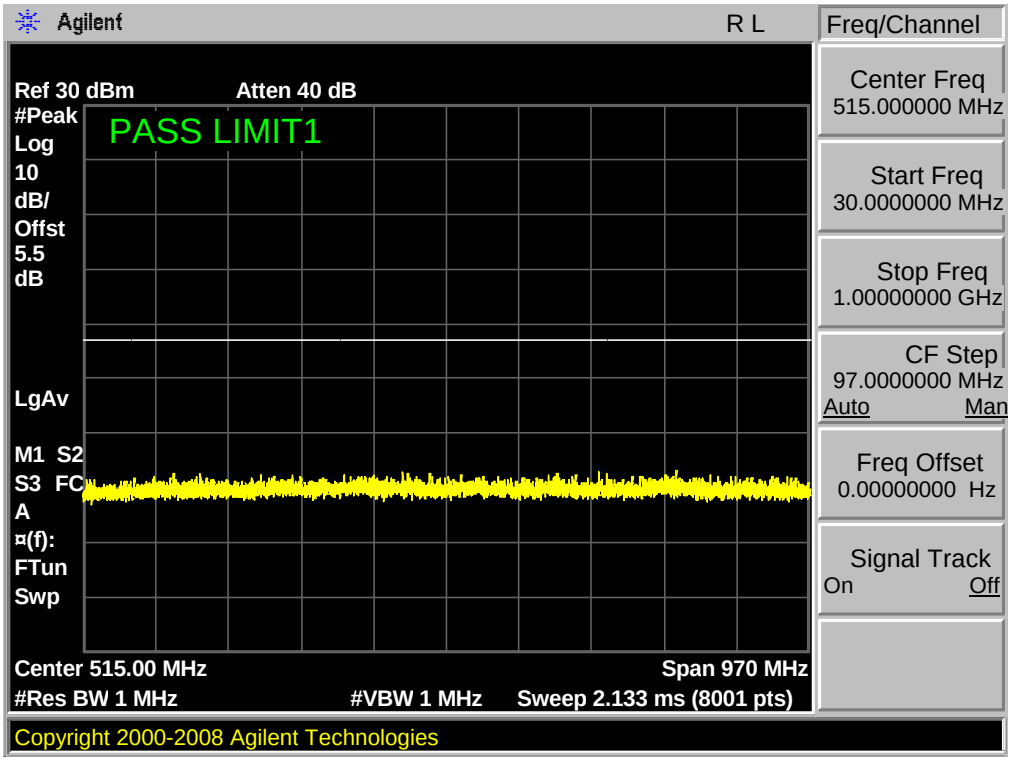
Band 4,UL Channel 20375,UL Frequency 1752.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



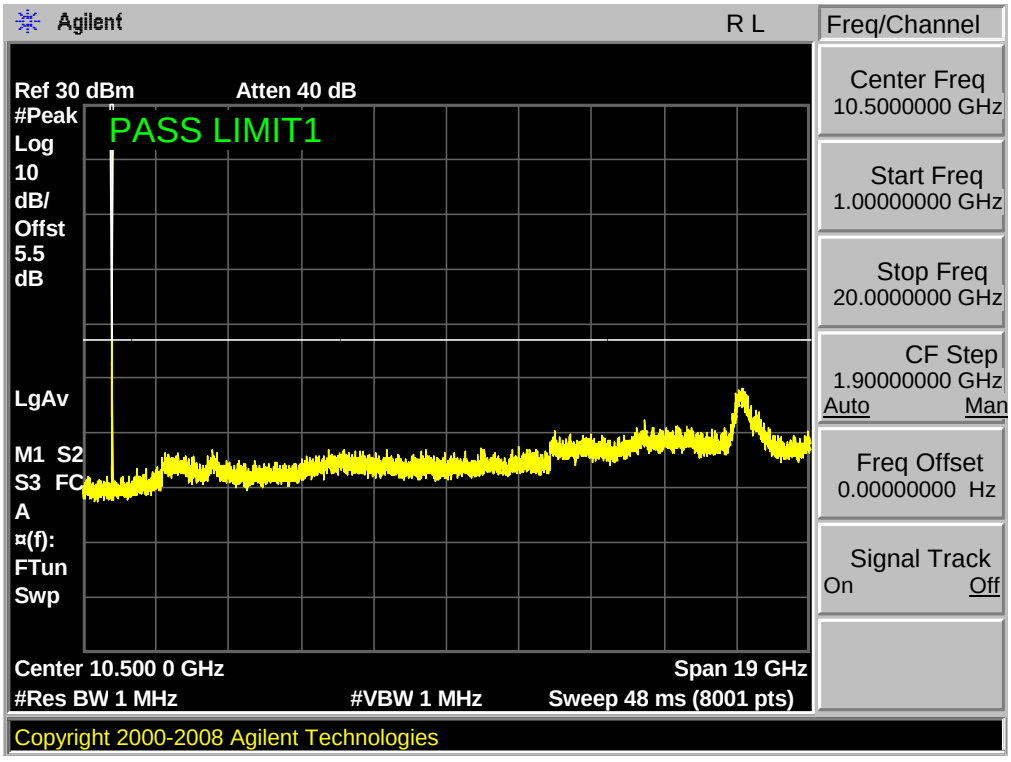
Band 4,UL Channel 20375,UL Frequency 1752.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



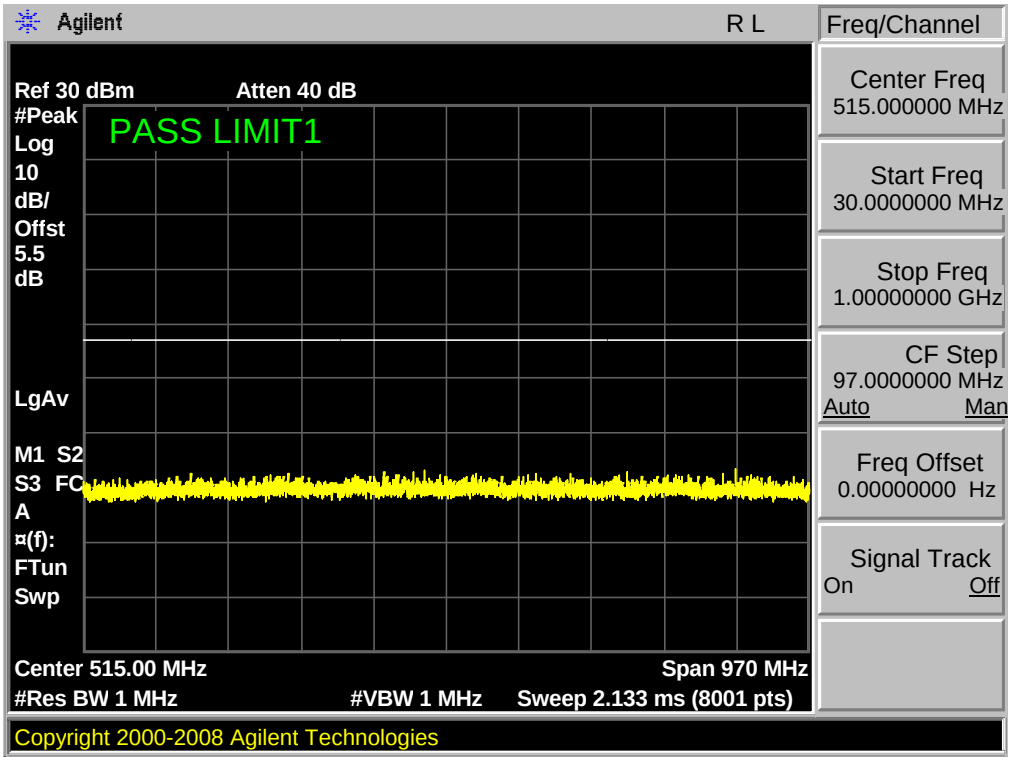
Band 4,UL Channel 20375,UL Frequency 1752.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



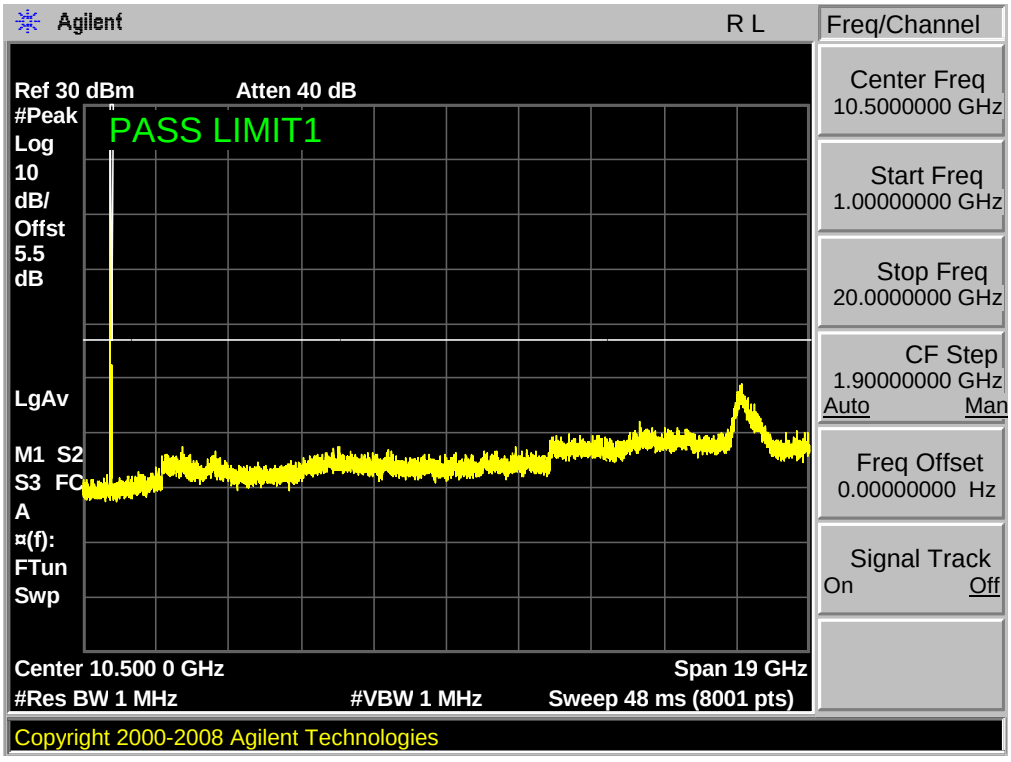
Band 4,UL Channel 20375,UL Frequency 1752.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



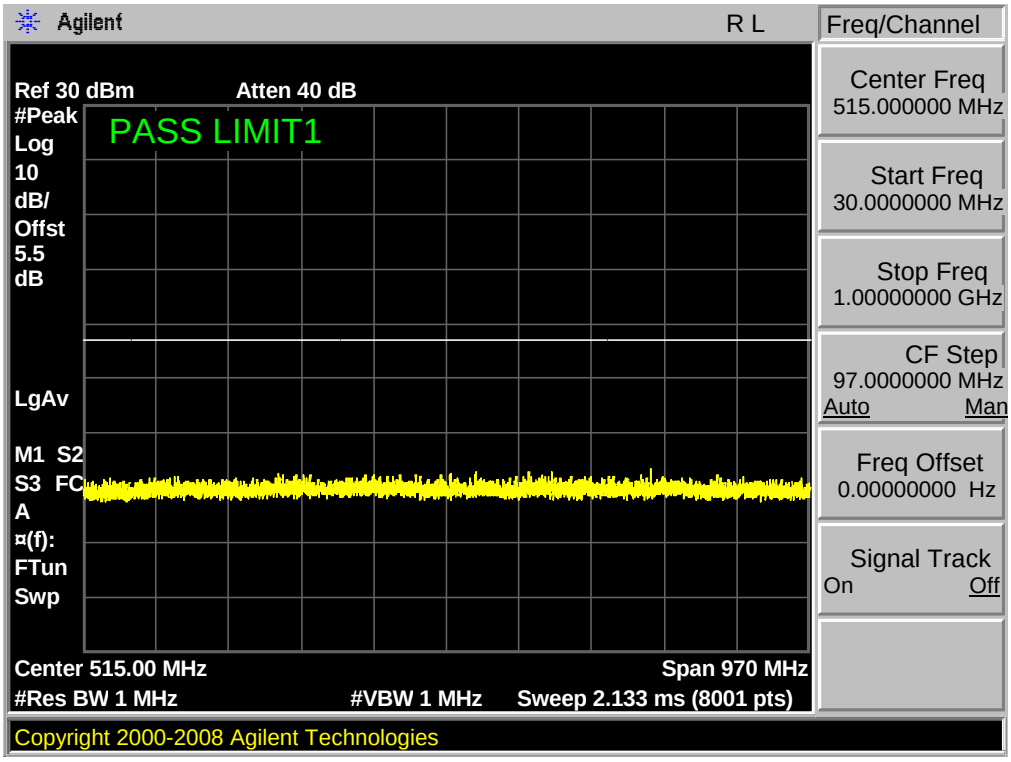
Band 4,UL Channel 20000,UL Frequency 1715.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



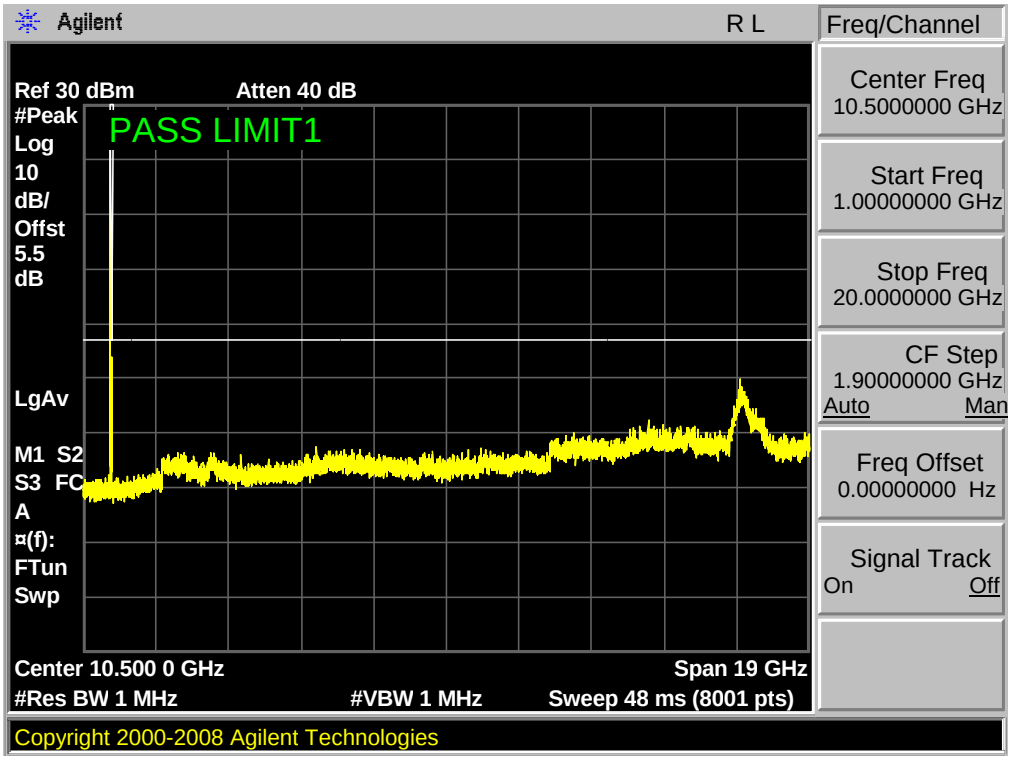
Band 4,UL Channel 20000,UL Frequency 1715.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



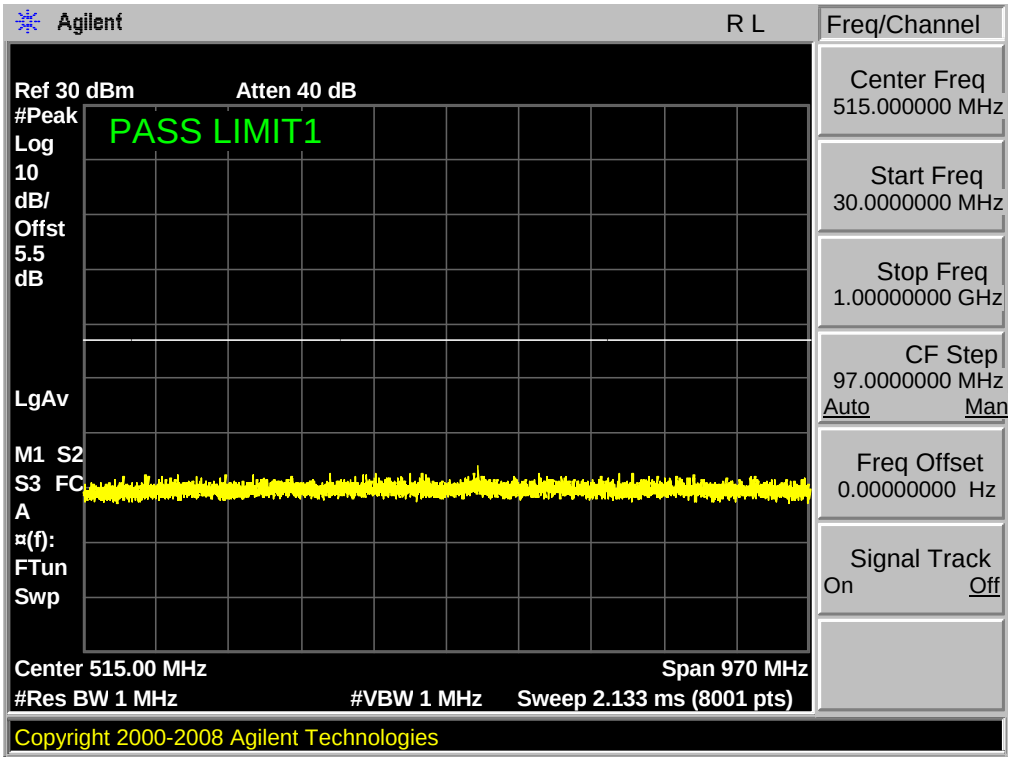
Band 4,UL Channel 20000,UL Frequency 1715.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



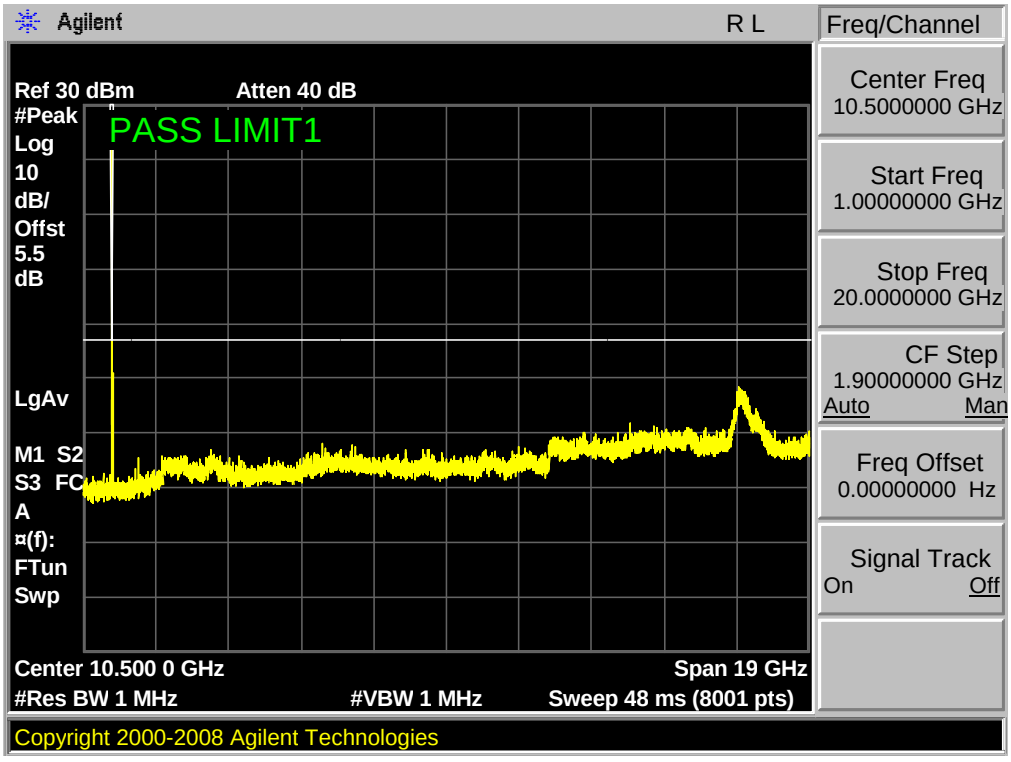
Band 4,UL Channel 20000,UL Frequency 1715.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



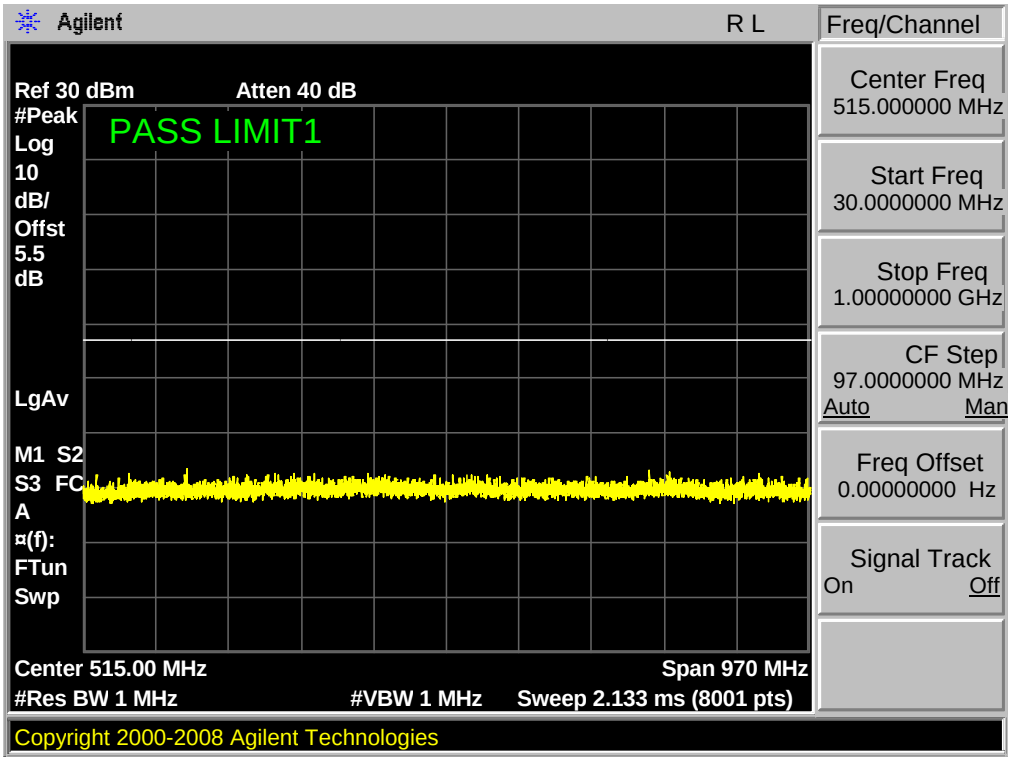
Band 4,UL Channel 20350,UL Frequency 1750.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



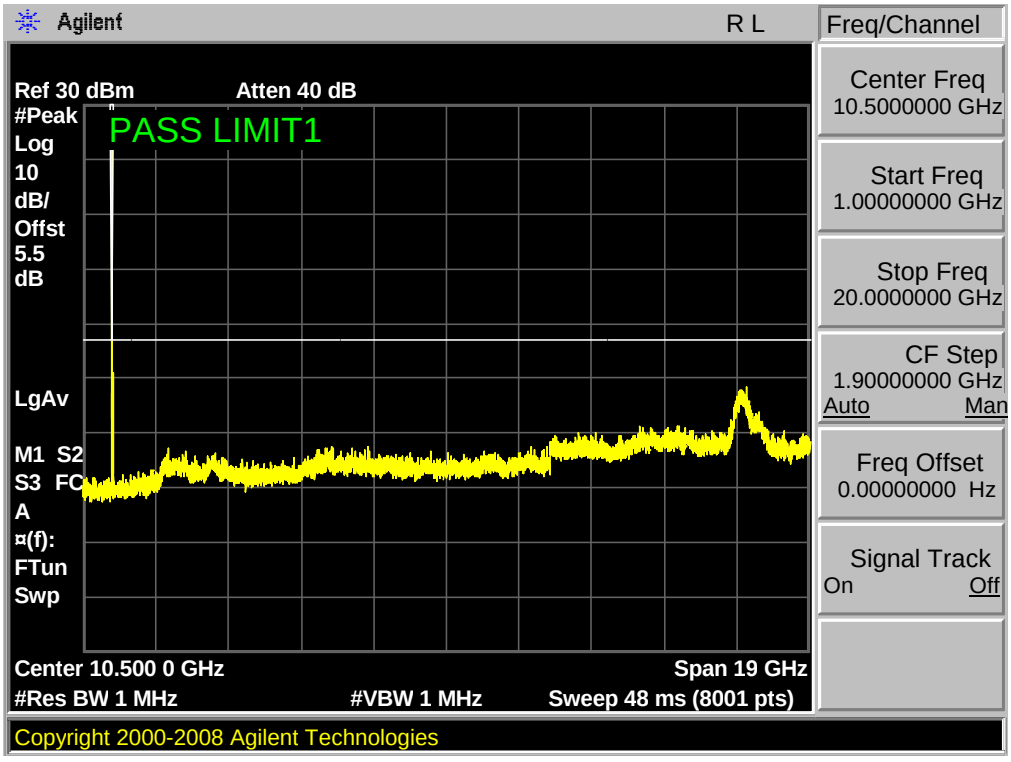
Band 4,UL Channel 20350,UL Frequency 1750.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



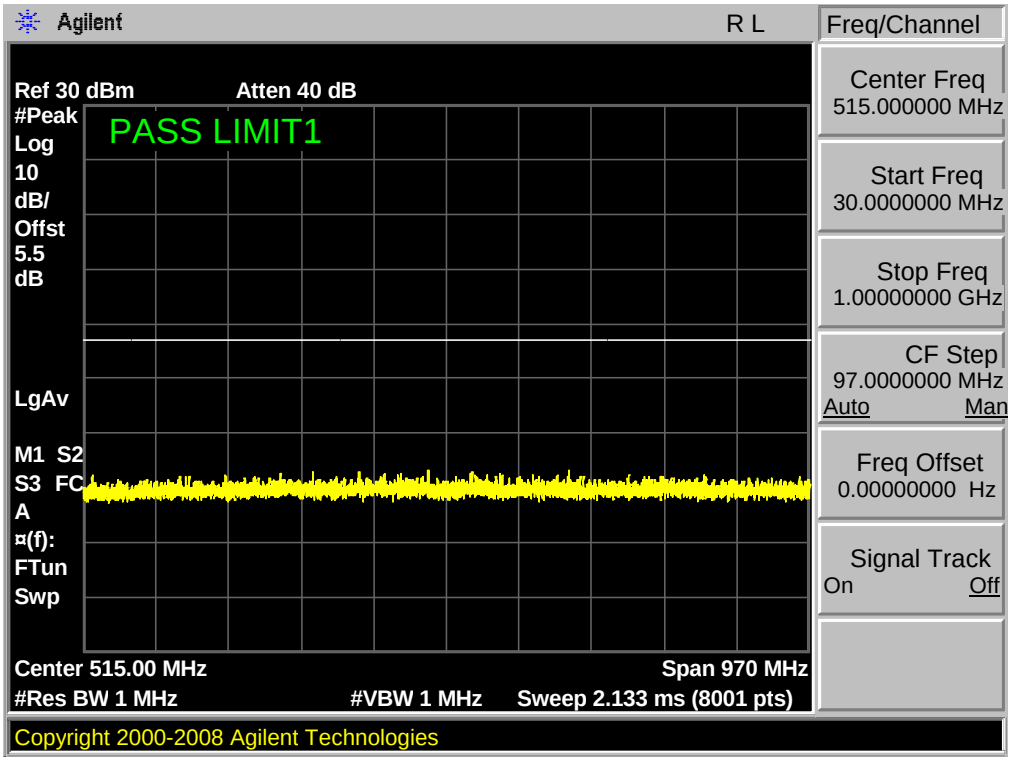
Band 4,UL Channel 20350,UL Frequency 1750.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



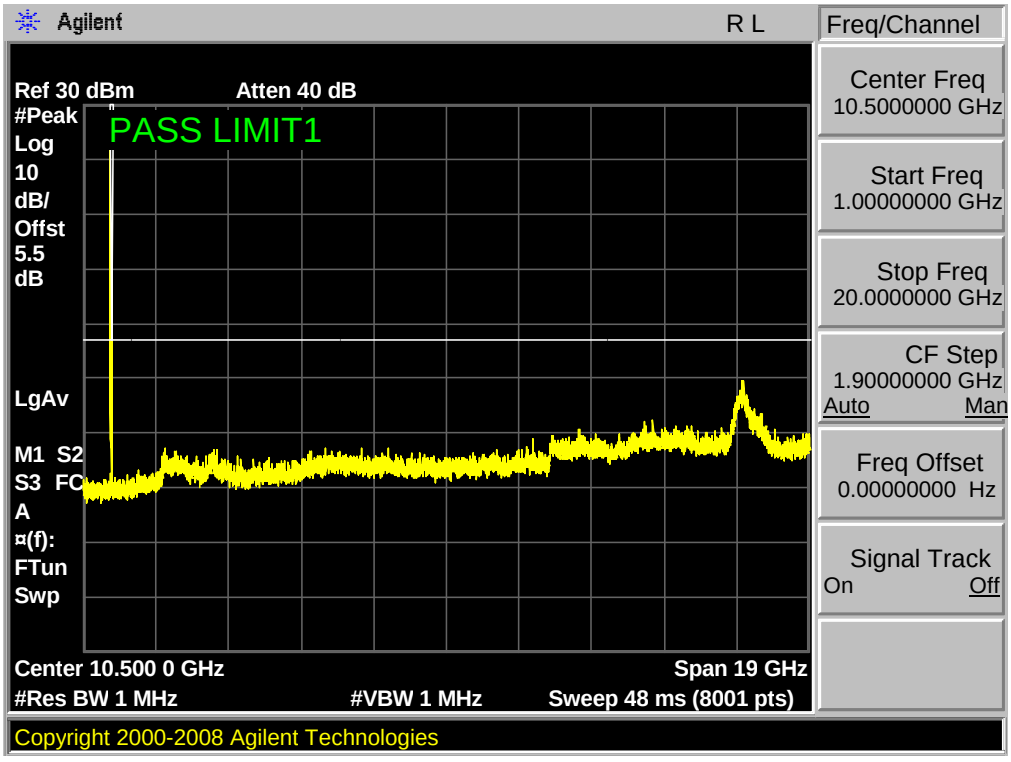
Band 4,UL Channel 20350,UL Frequency 1750.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



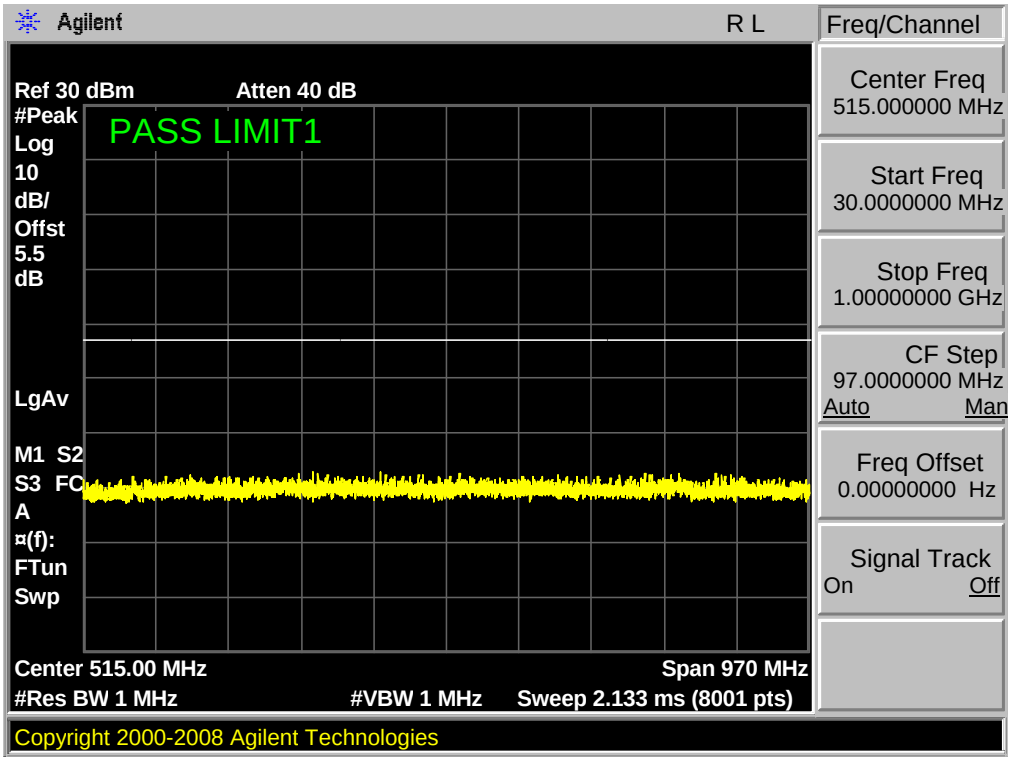
Band 4,UL Channel 20025,UL Frequency 1717.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



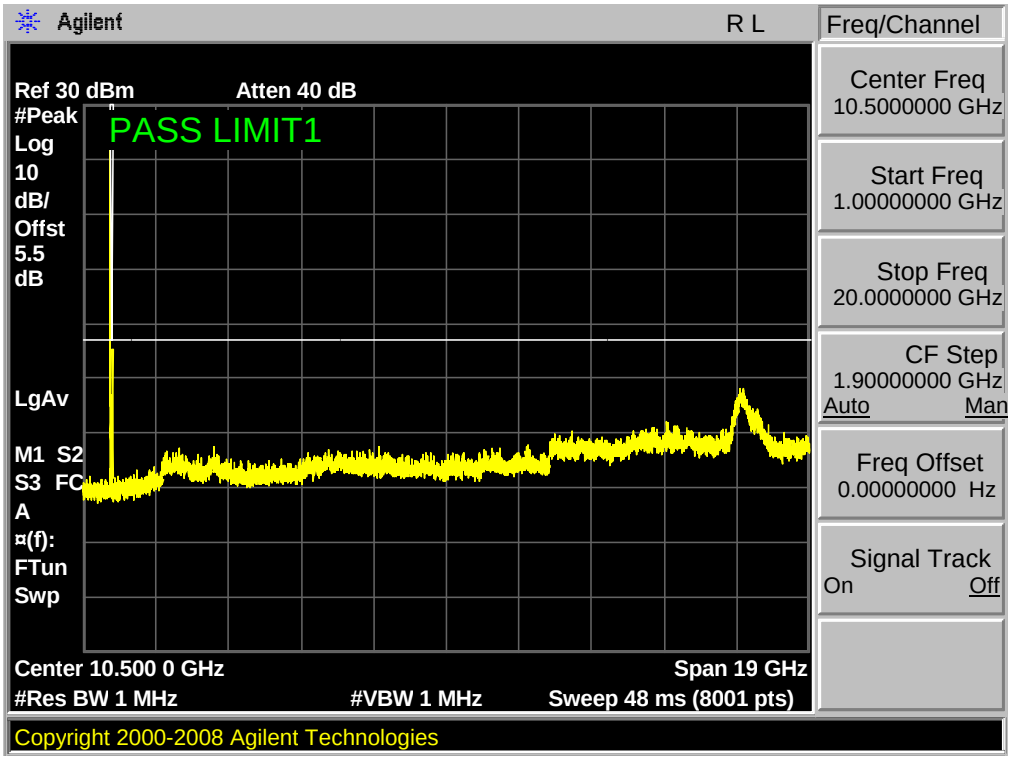
Band 4,UL Channel 20025,UL Frequency 1717.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



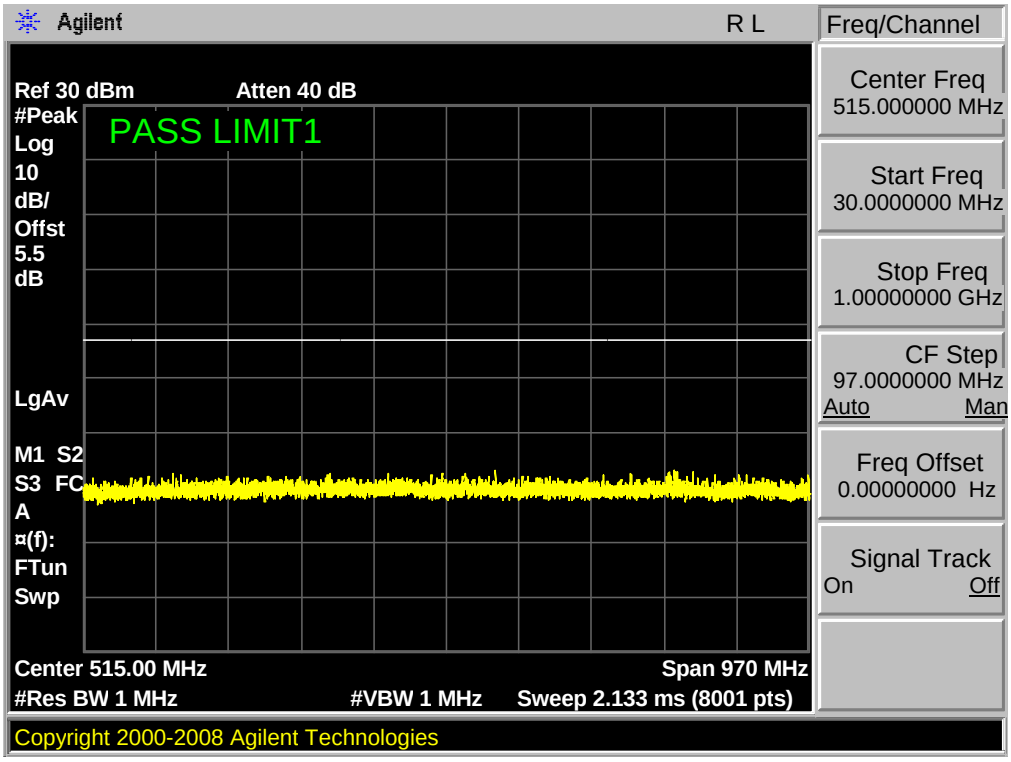
Band 4,UL Channel 20025,UL Frequency 1717.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



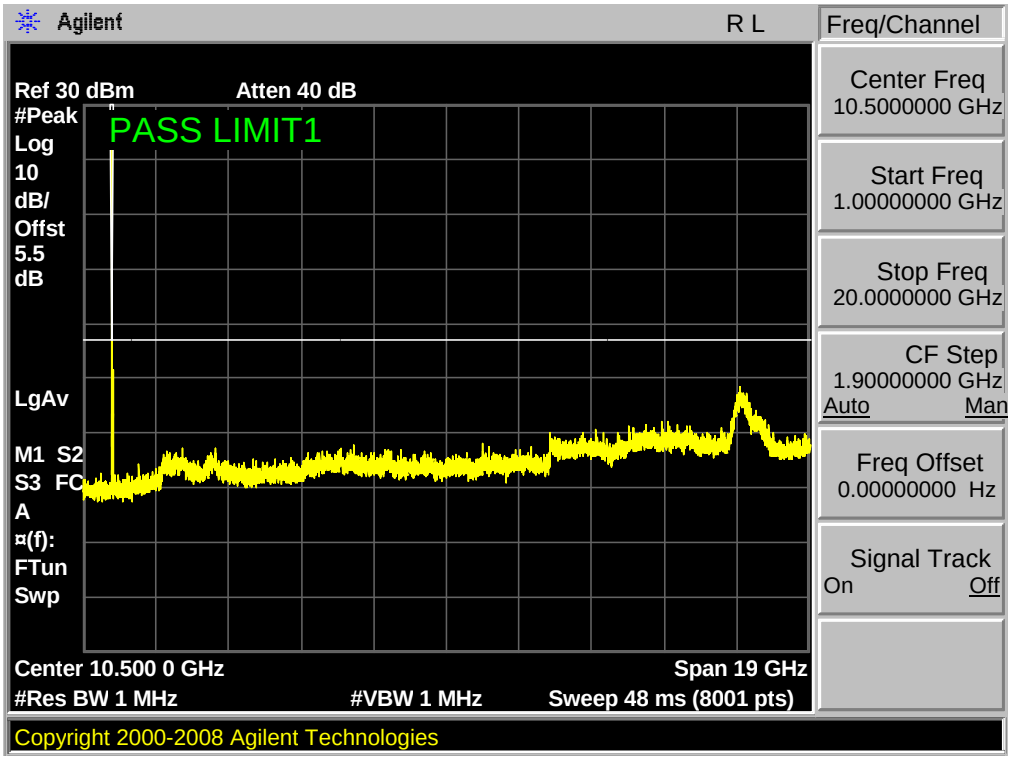
Band 4,UL Channel 20025,UL Frequency 1717.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



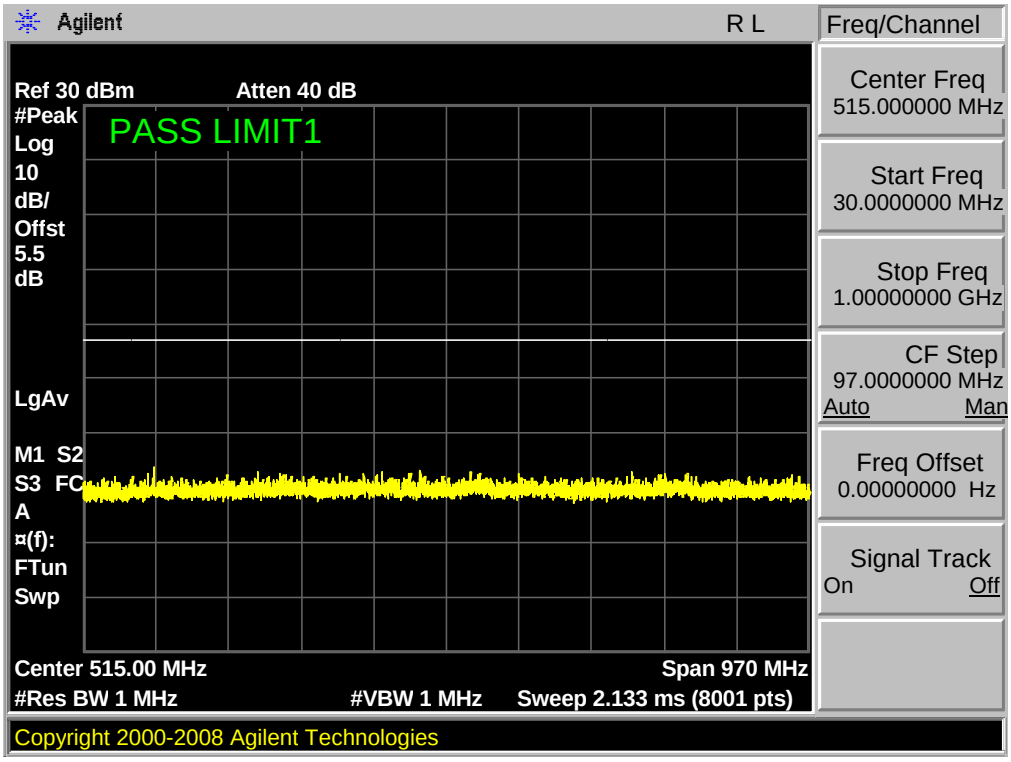
Band 4,UL Channel 20325,UL Frequency 1747.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



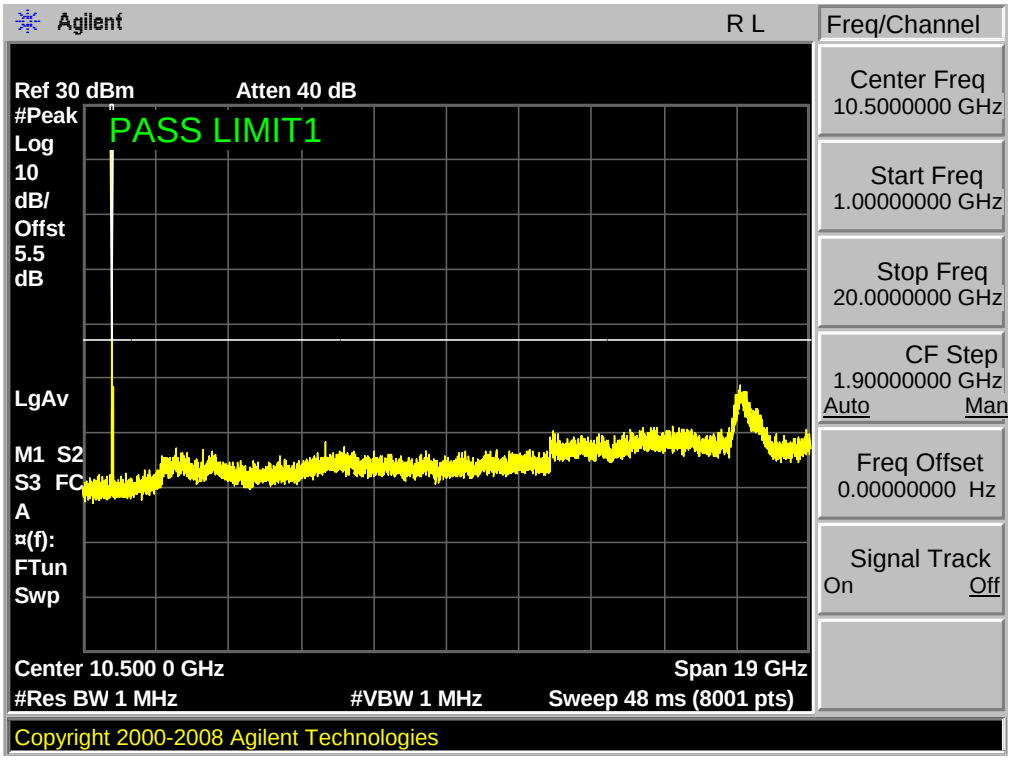
Band 4,UL Channel 20325,UL Frequency 1747.5,BW 15.0,NO. RB 1,RB POS. Low,QPSK



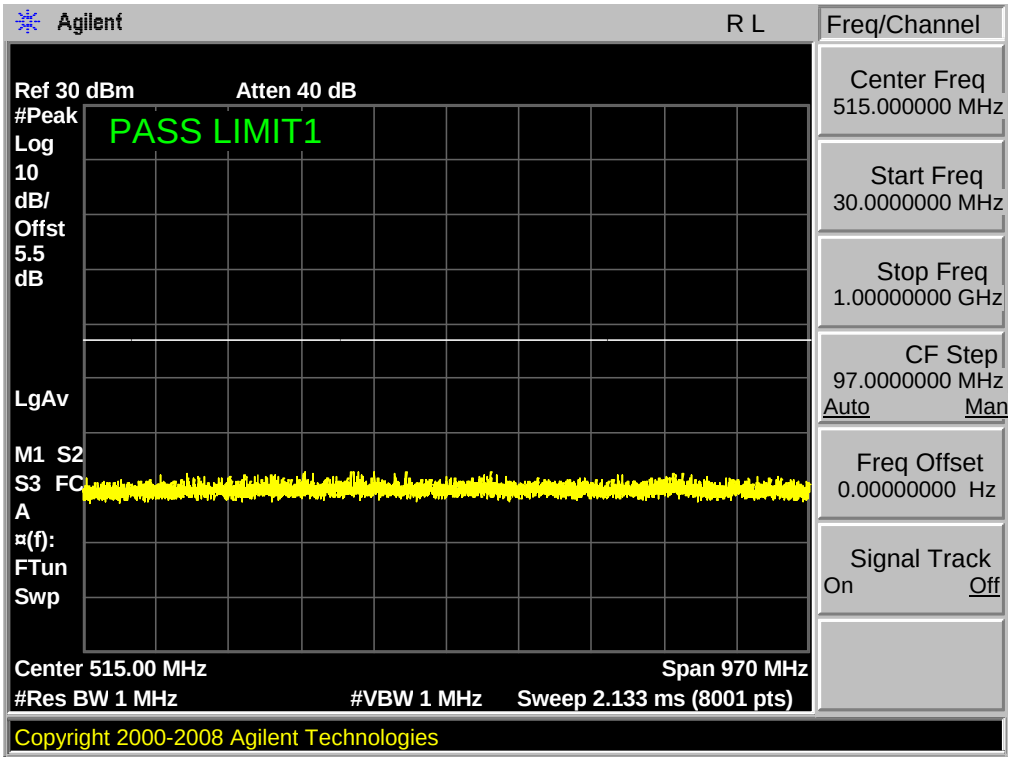
Band 4,UL Channel 20325,UL Frequency 1747.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



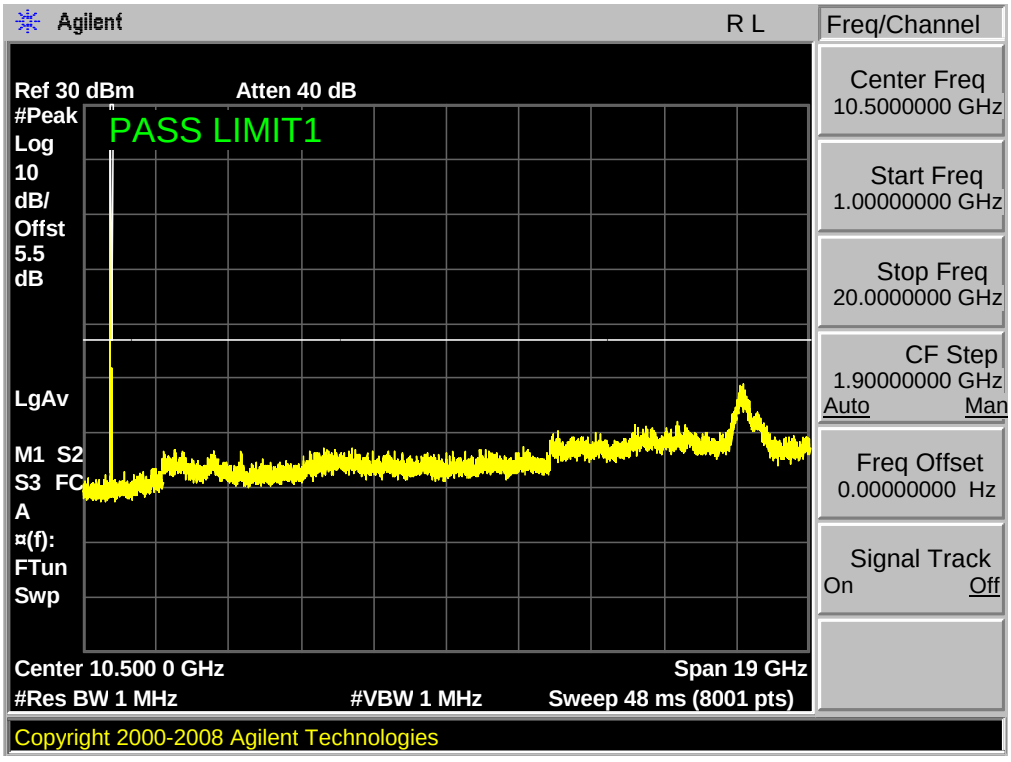
Band 4,UL Channel 20325,UL Frequency 1747.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



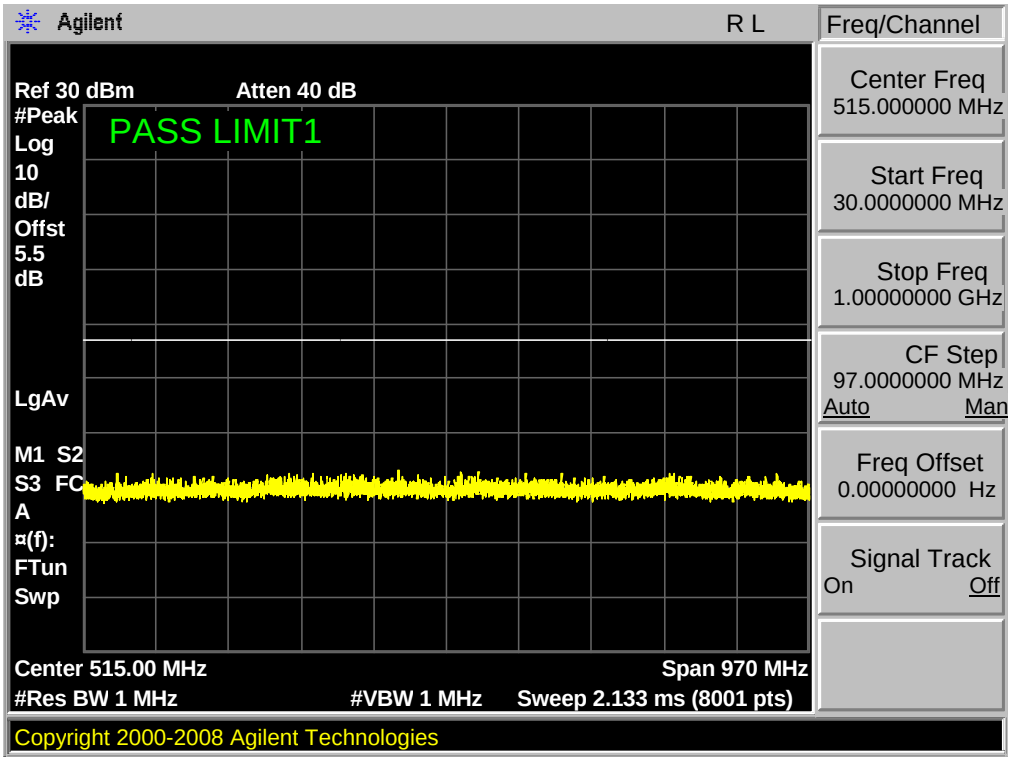
Band 4,UL Channel 20050,UL Frequency 1720.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK



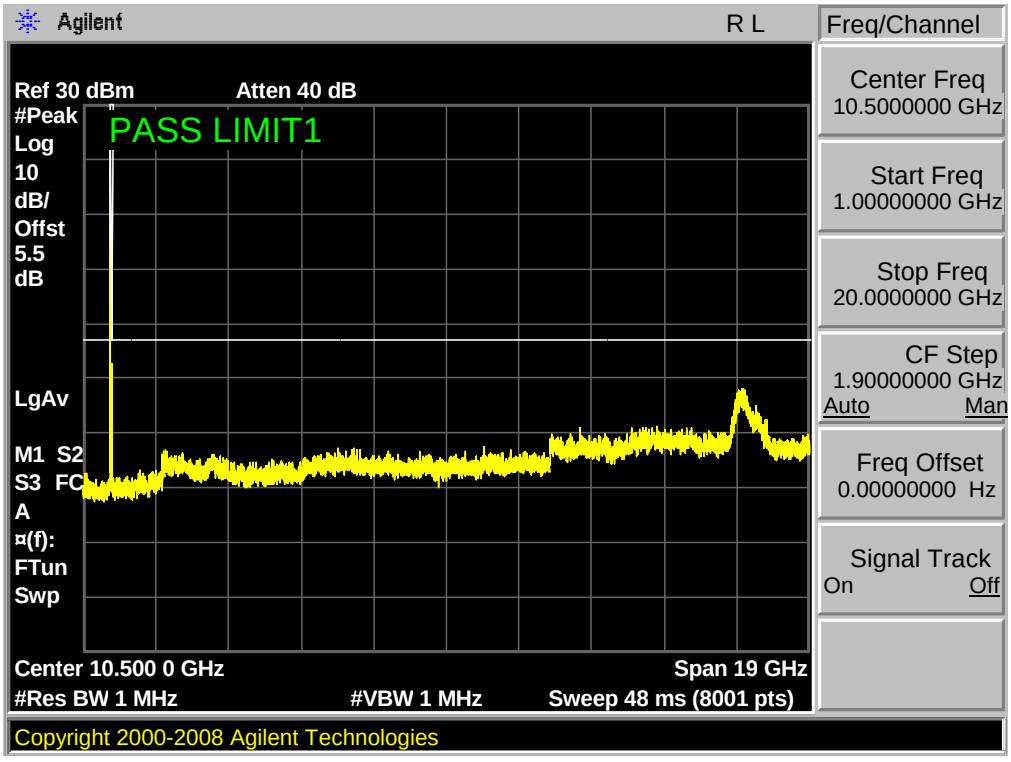
Band 4,UL Channel 20050,UL Frequency 1720.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK



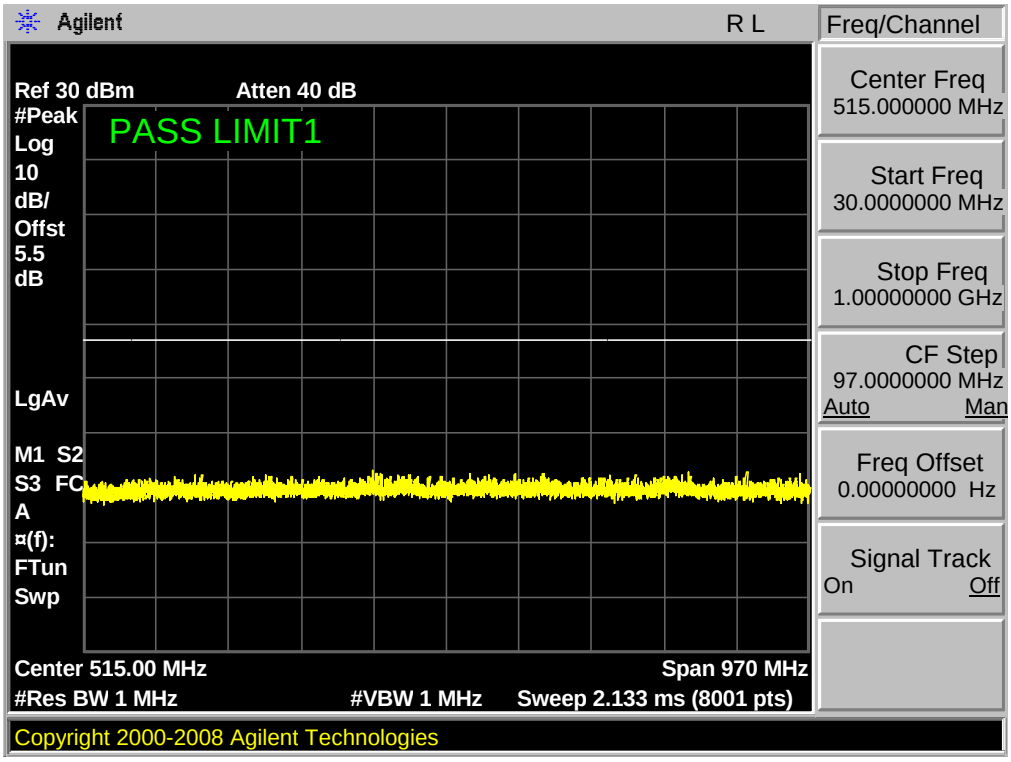
Band 4,UL Channel 20050,UL Frequency 1720.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM



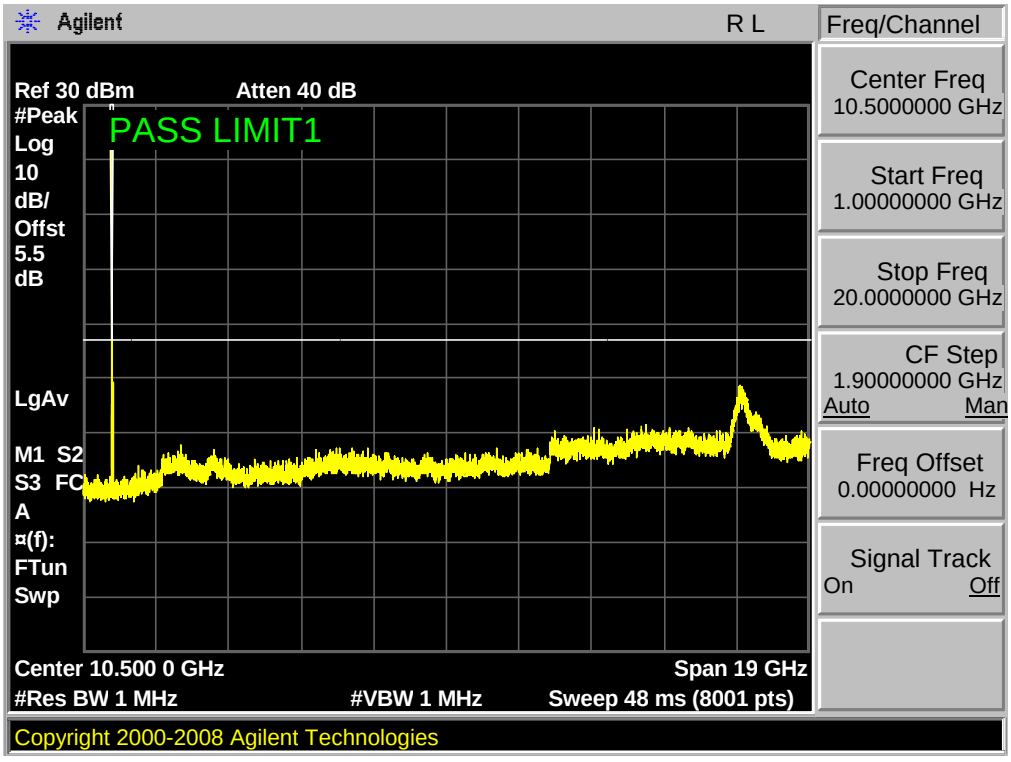
Band 4,UL Channel 20050,UL Frequency 1720.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM



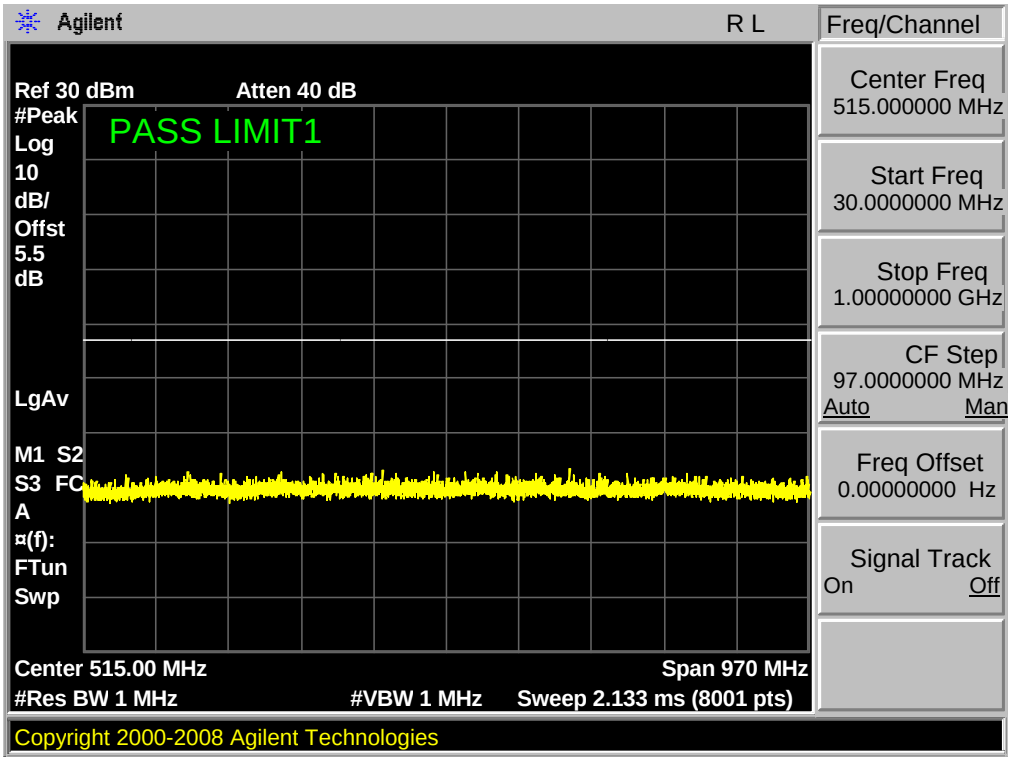
Band 4,UL Channel 20300,UL Frequency 1745.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK



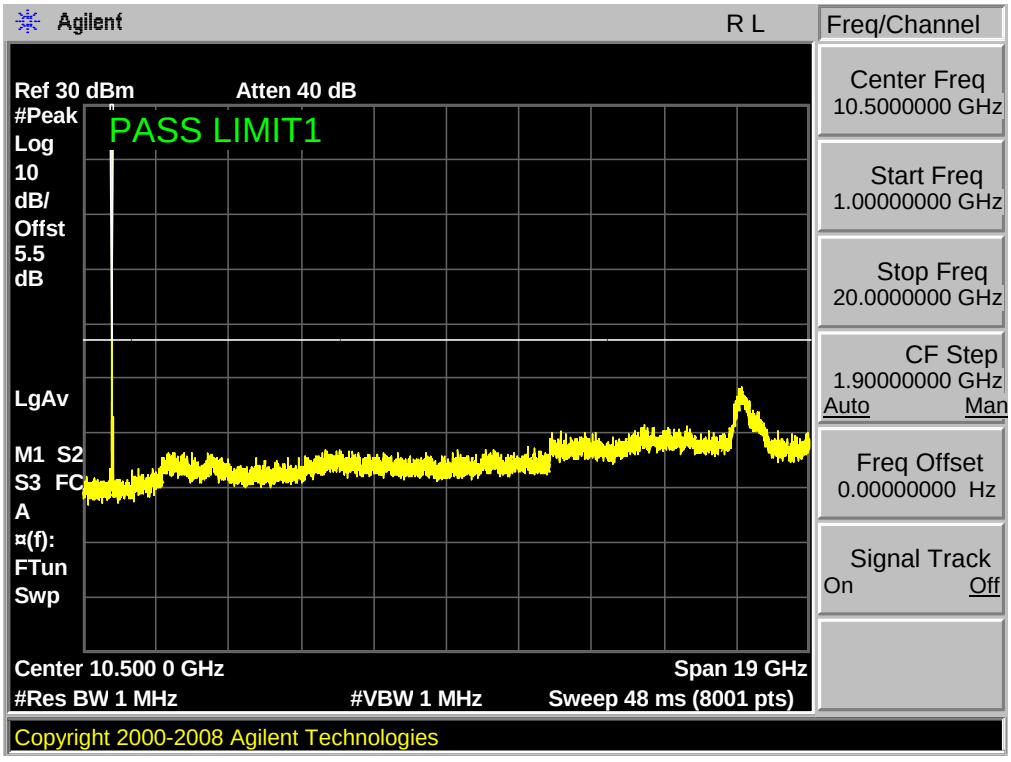
Band 4,UL Channel 20300,UL Frequency 1745.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK



Band 4,UL Channel 20300,UL Frequency 1745.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM

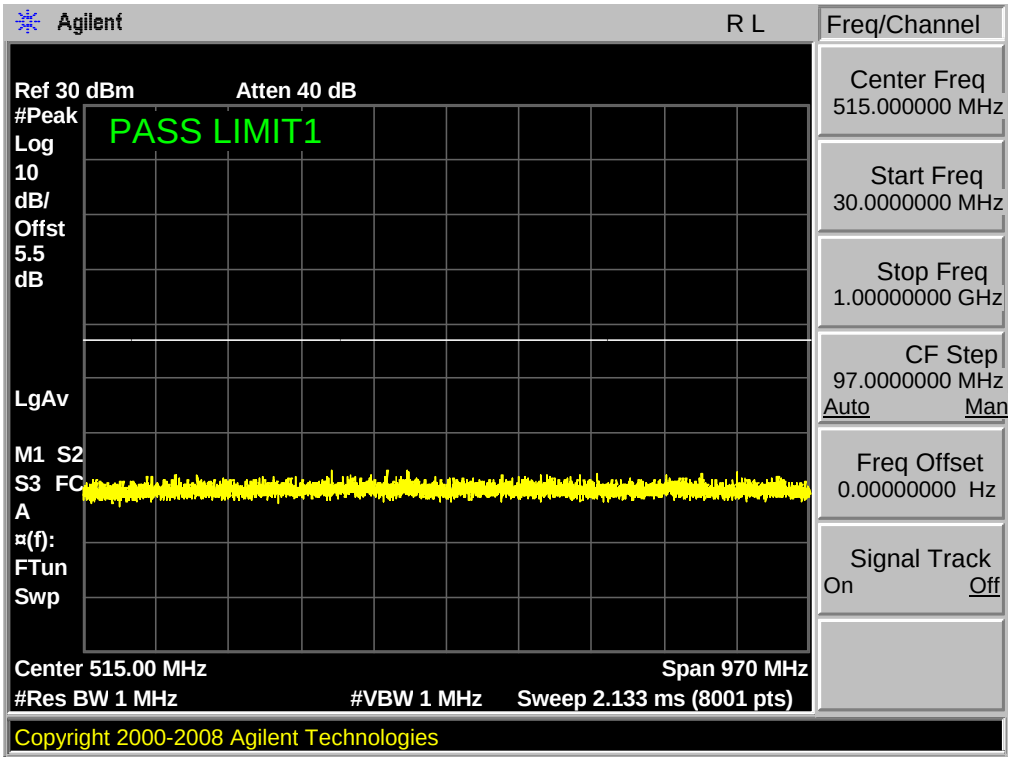


Band 4,UL Channel 20300,UL Frequency 1745.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM

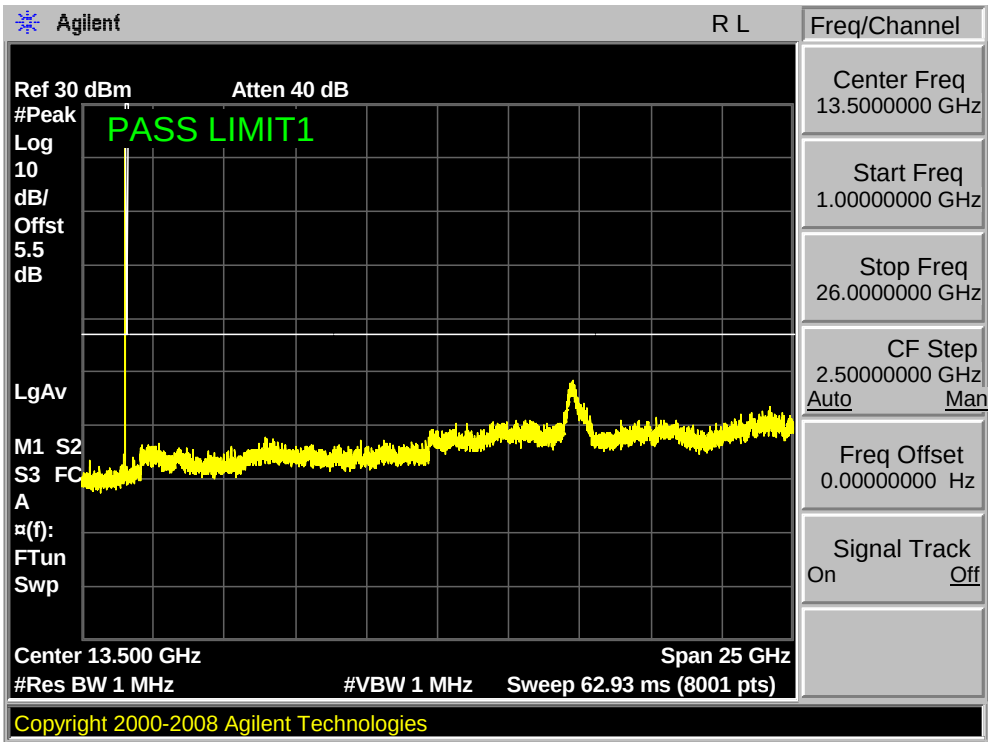


7.1.3 LTE BAND 7

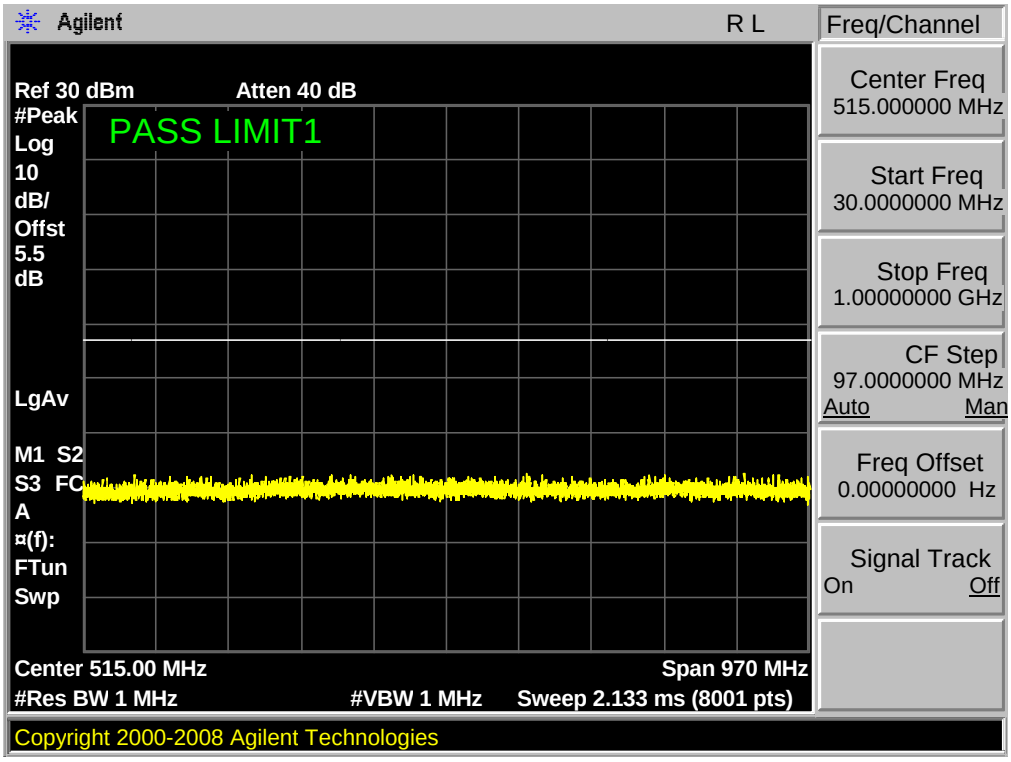
Band 7,UL Channel 20775,UL Frequency 2502.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



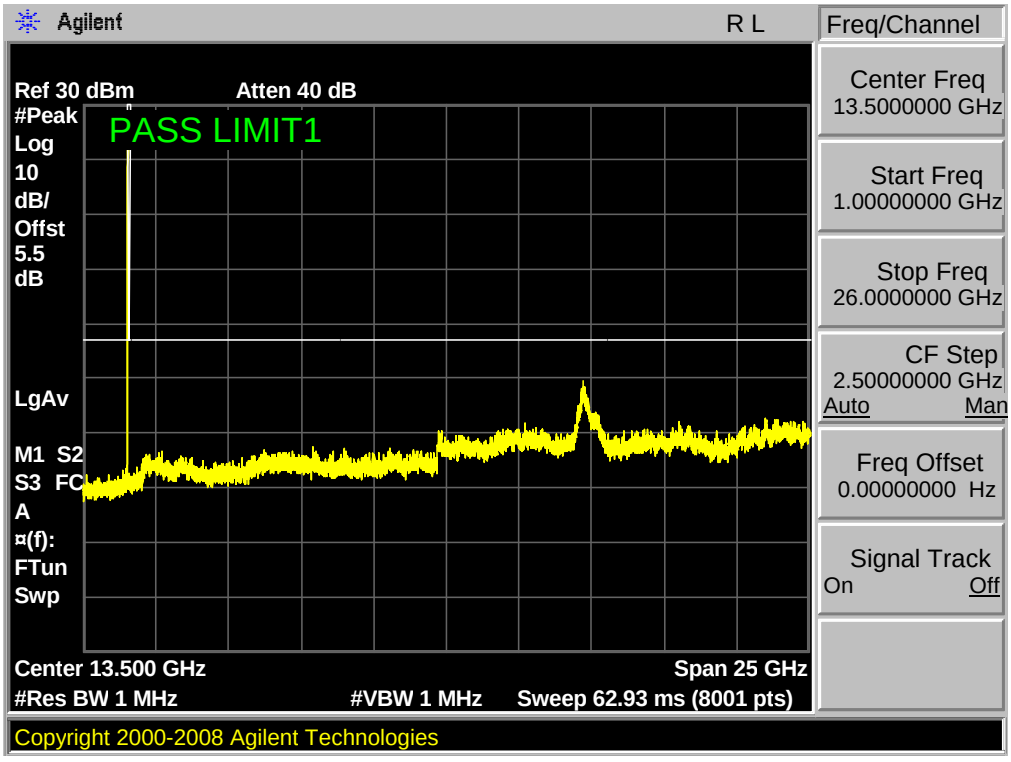
Band 7,UL Channel 20775,UL Frequency 2502.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



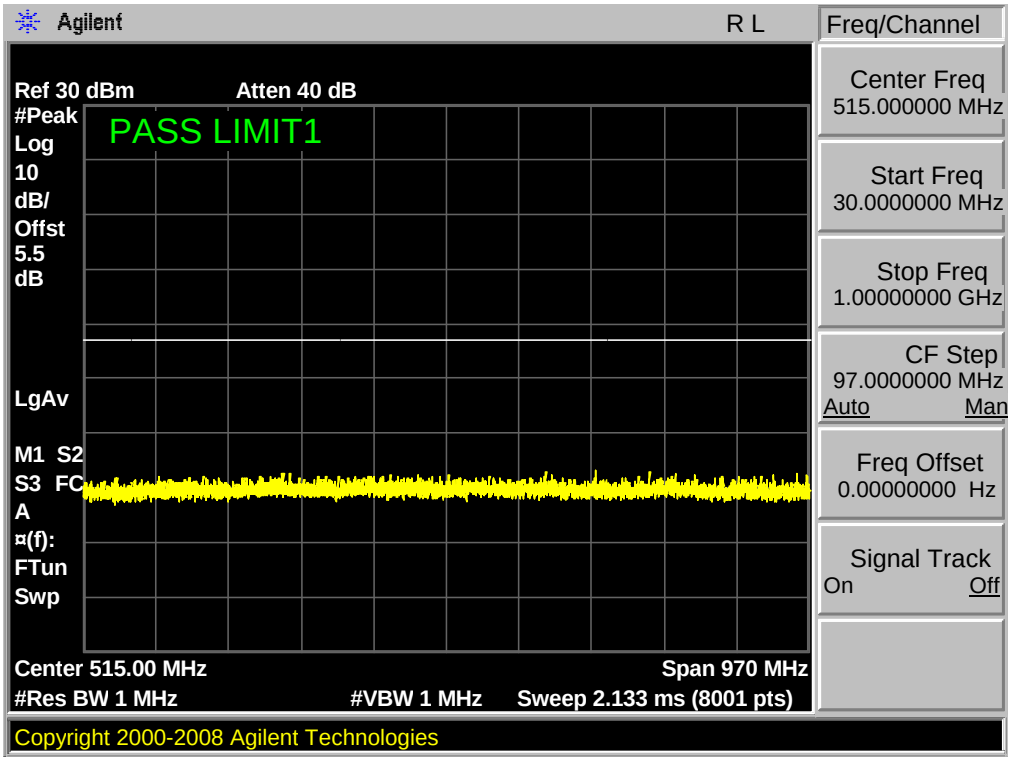
Band 7,UL Channel 20775,UL Frequency 2502.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



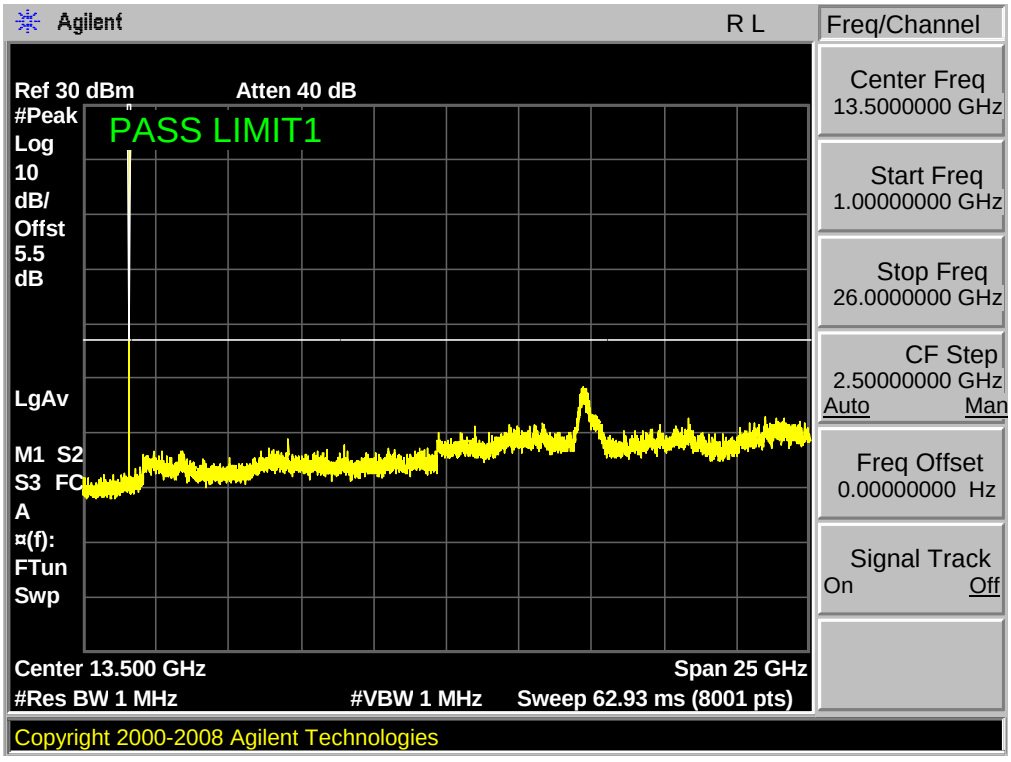
Band 7,UL Channel 20775,UL Frequency 2502.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



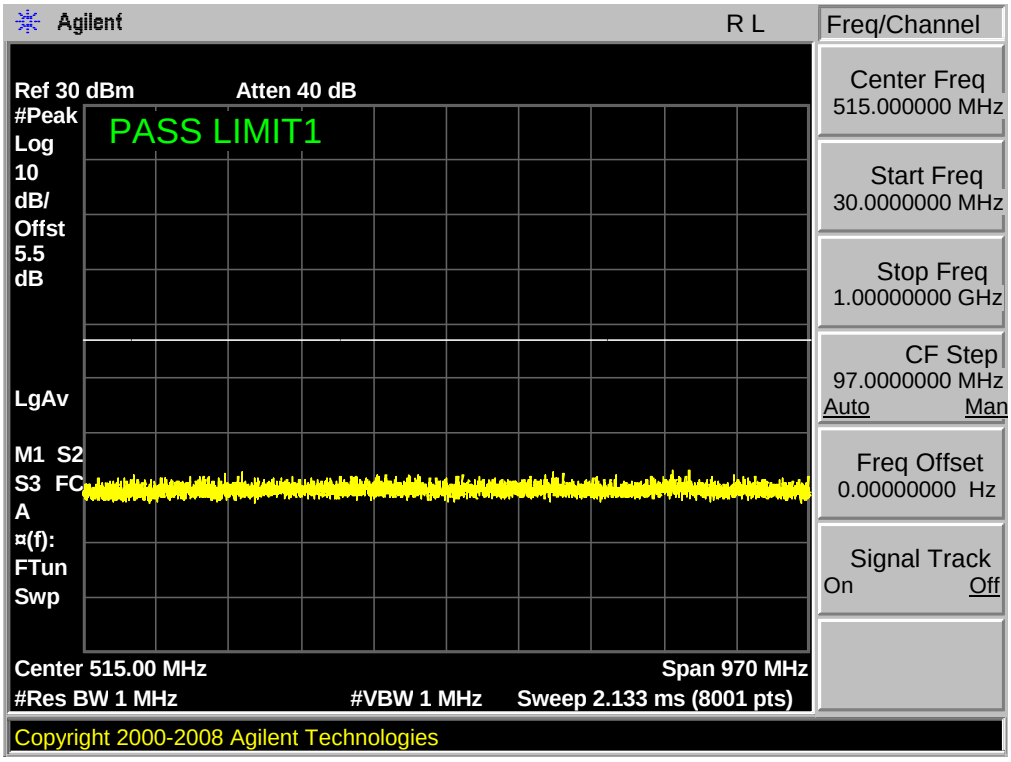
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



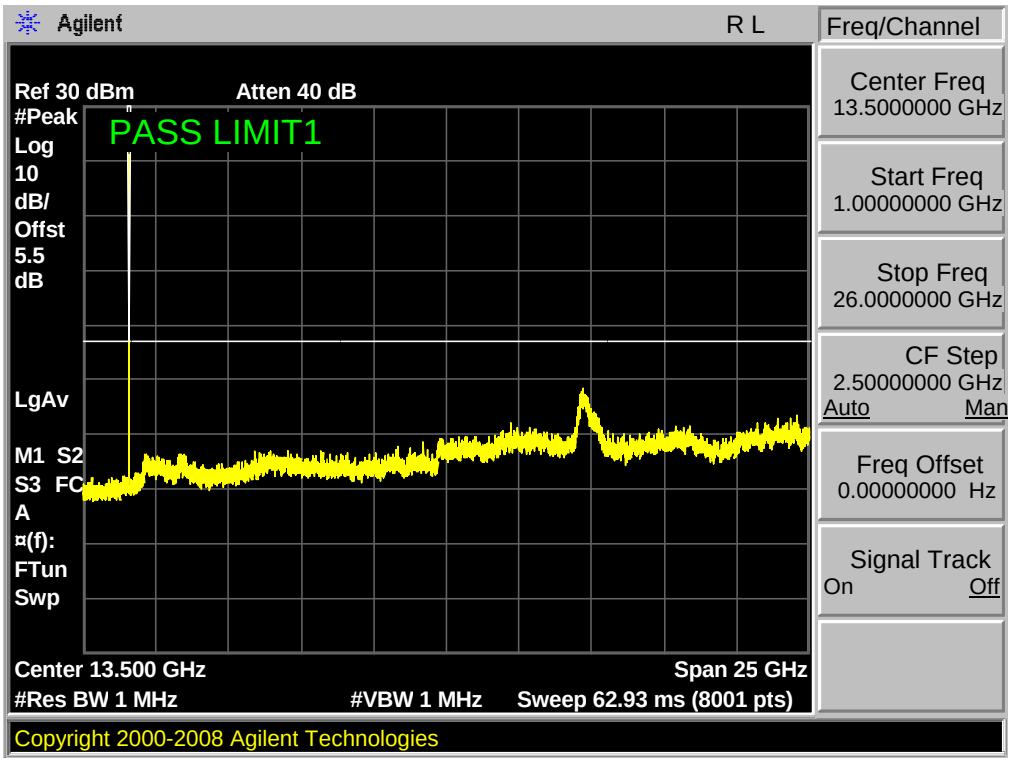
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



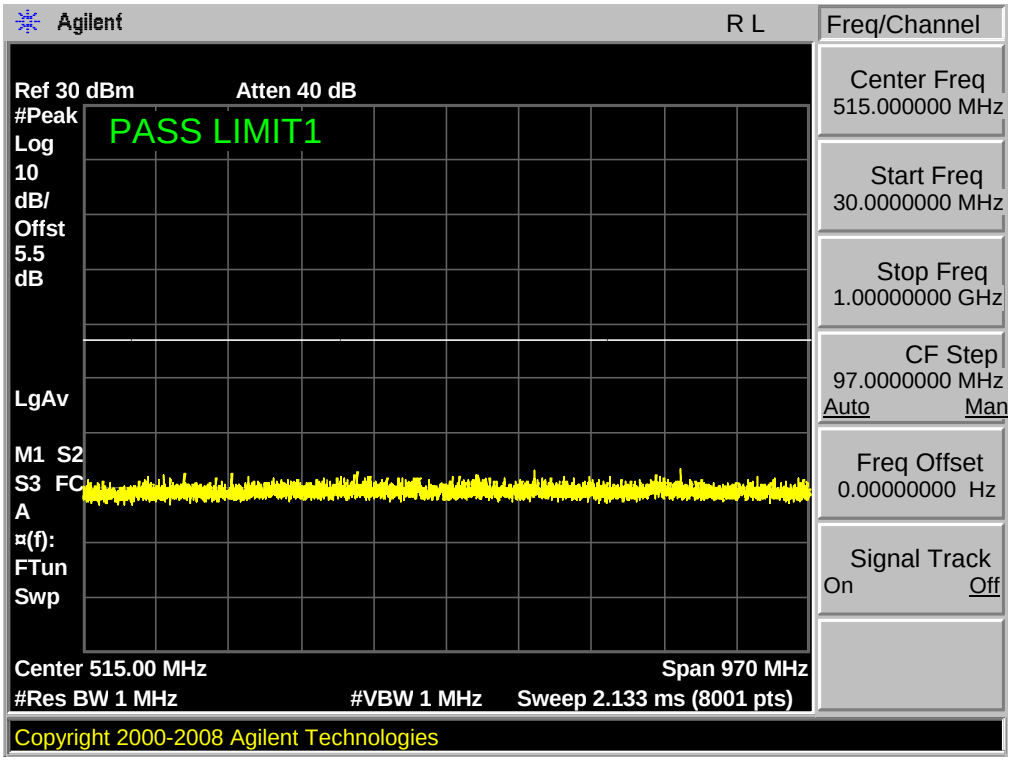
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



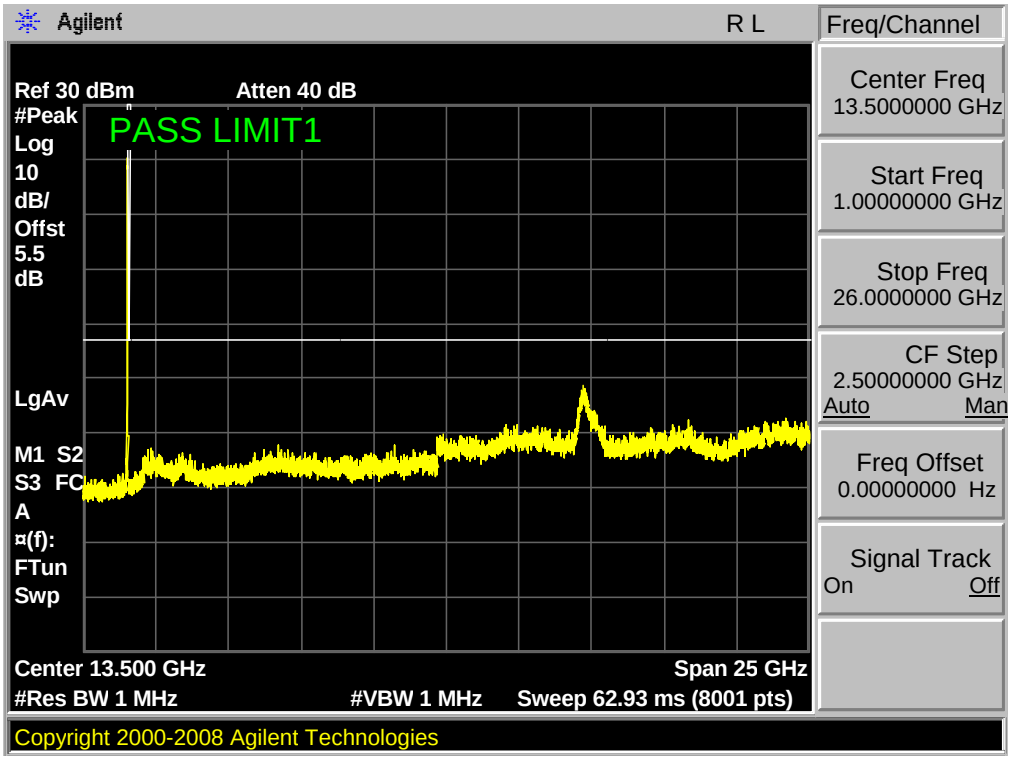
Band 7,UL Channel 21425,UL Frequency 2567.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



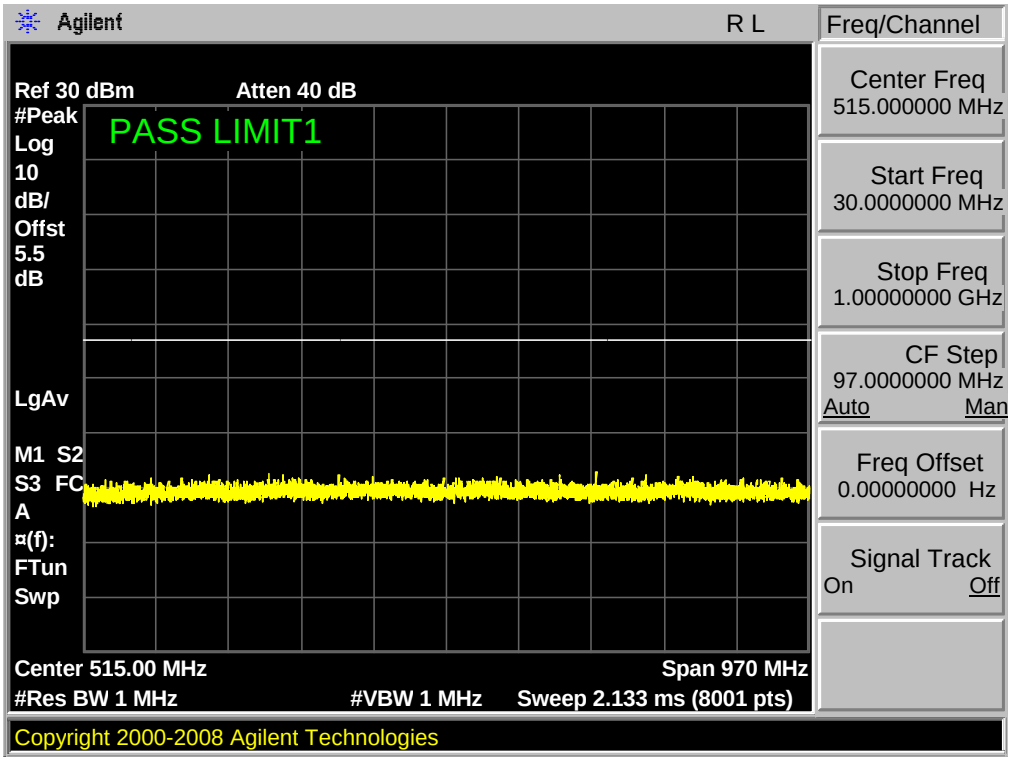
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



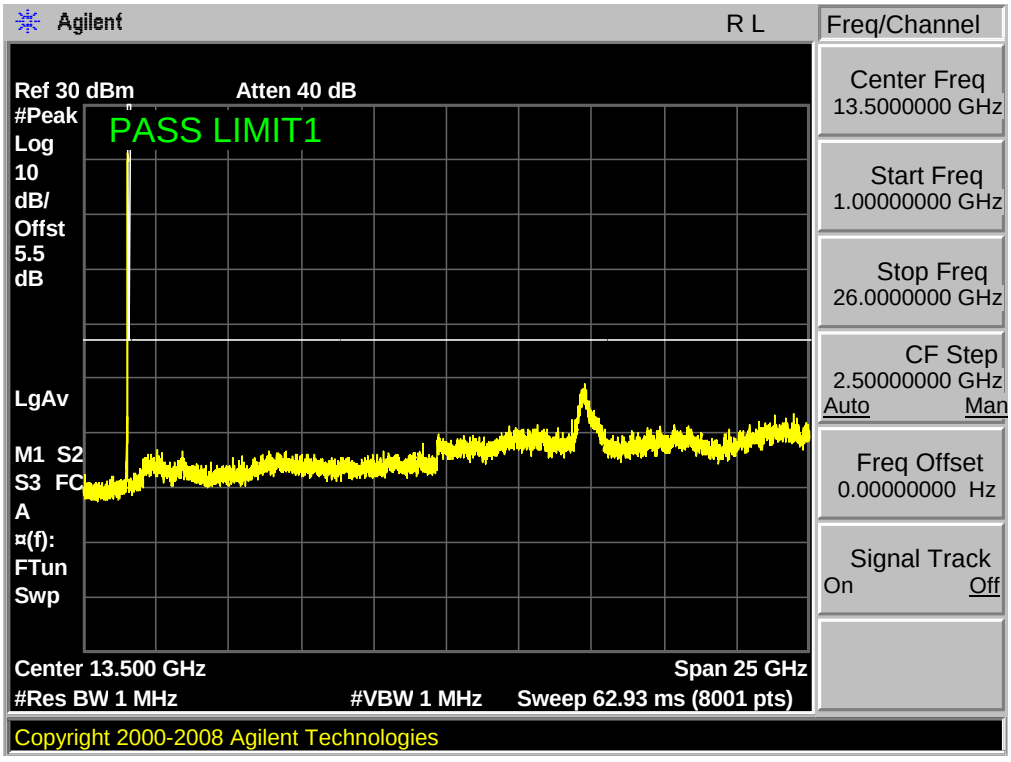
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



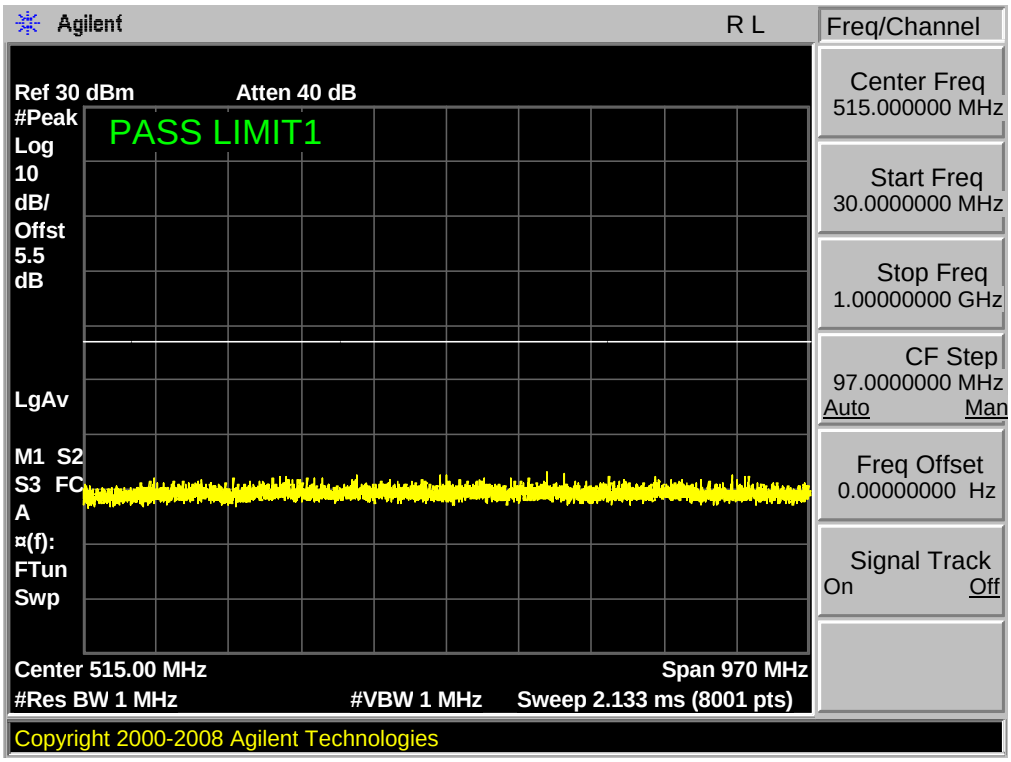
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



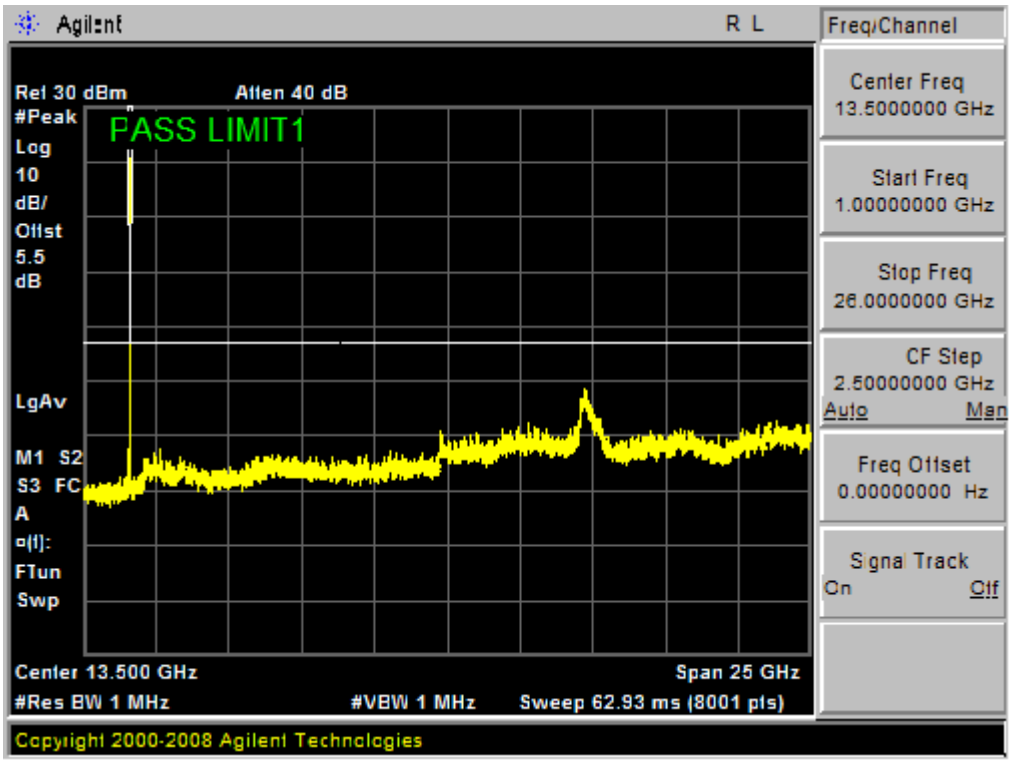
Band 7,UL Channel 20800,UL Frequency 2505.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



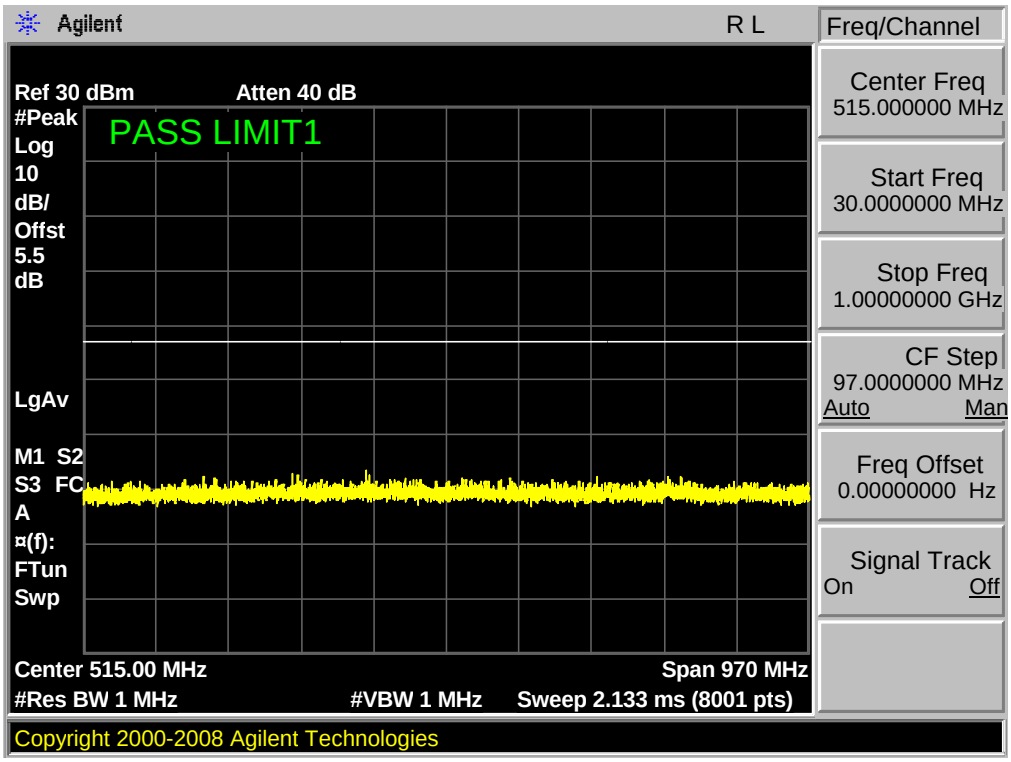
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



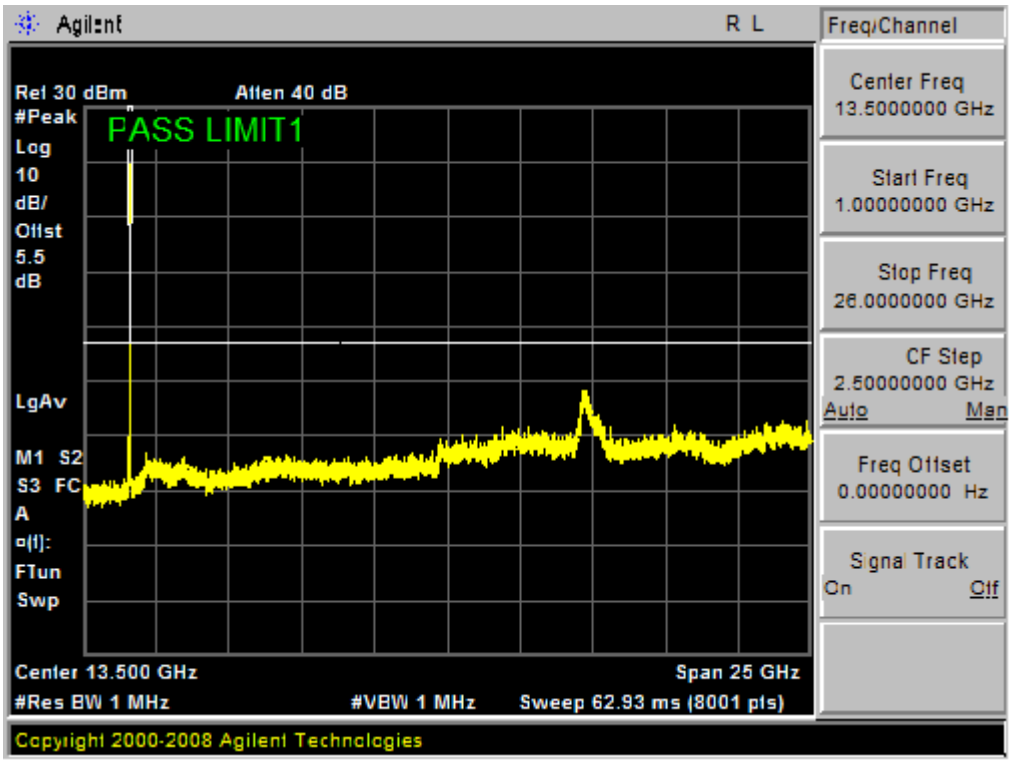
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



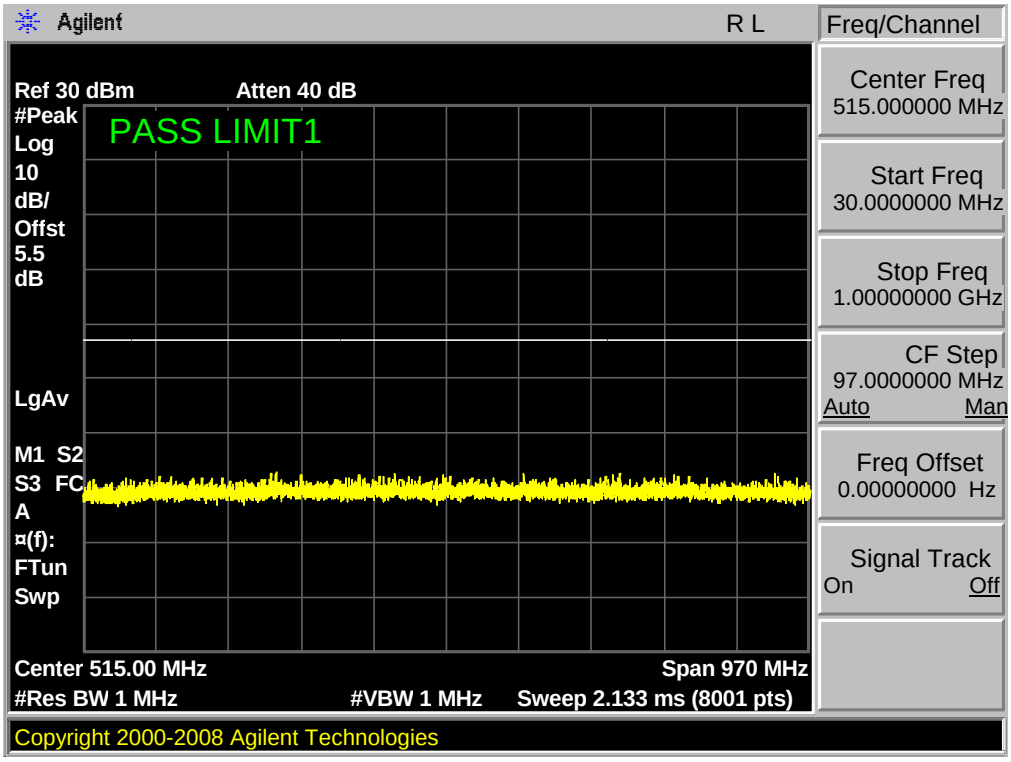
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



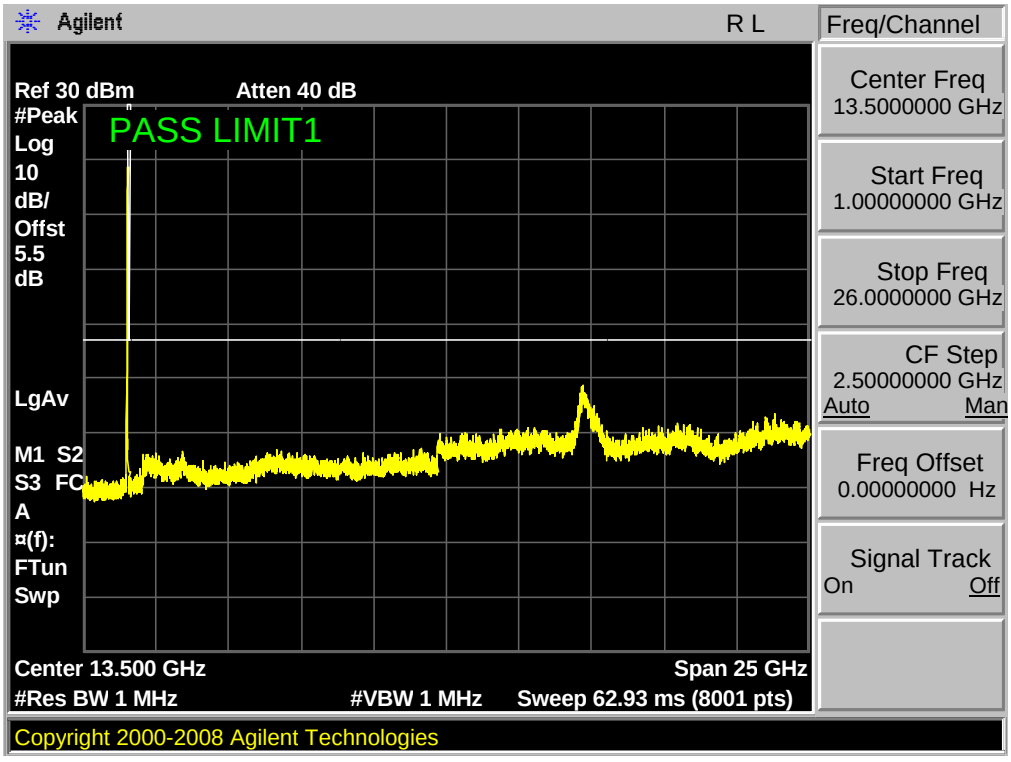
Band 7,UL Channel 21400,UL Frequency 2565.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



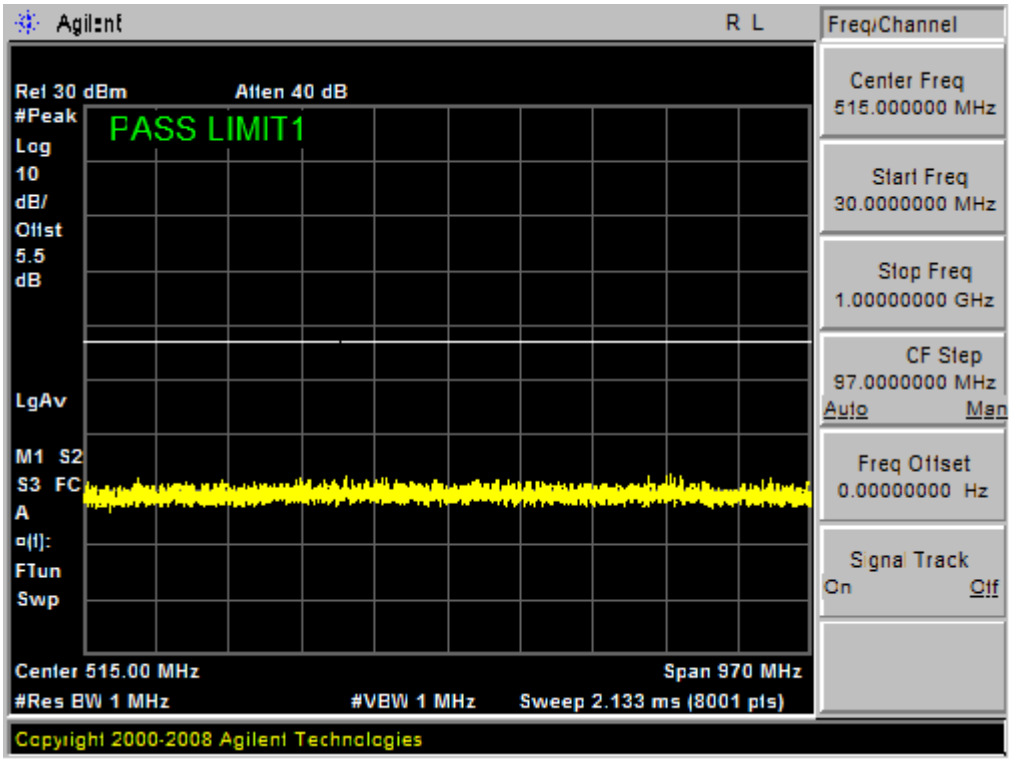
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



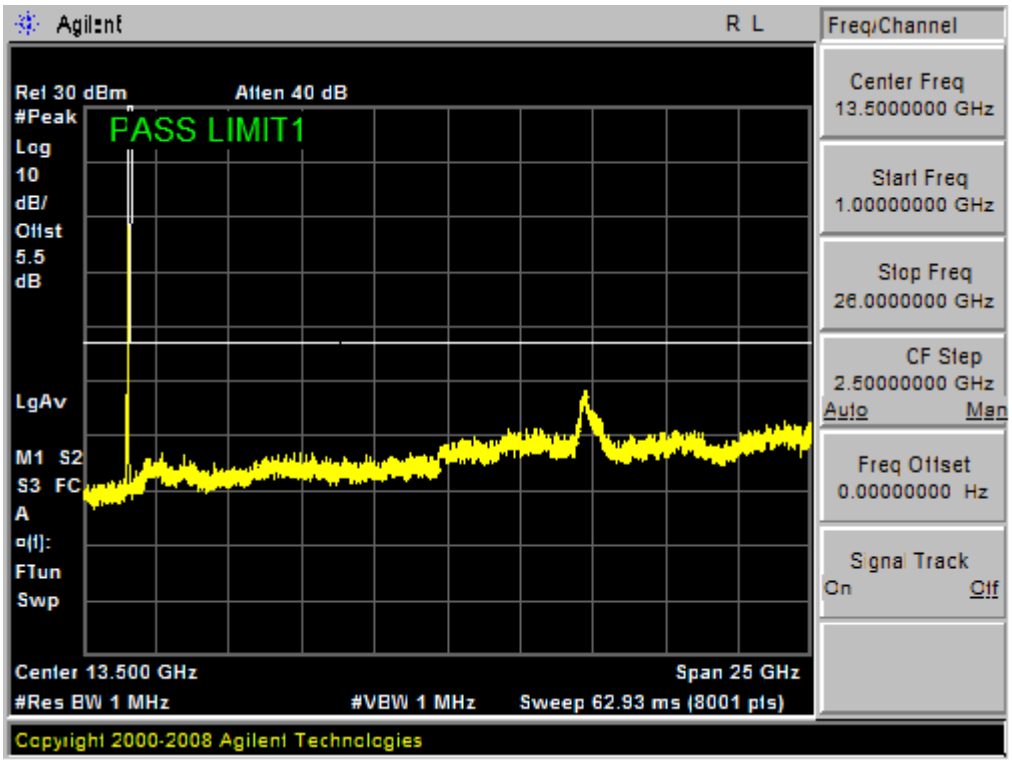
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



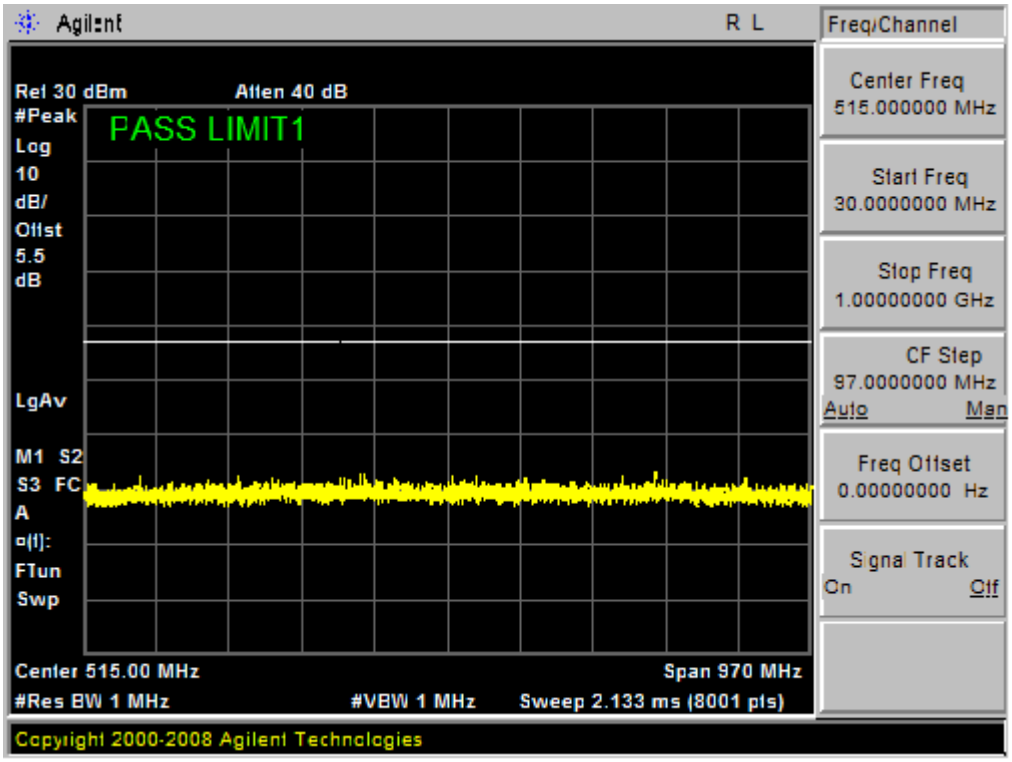
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



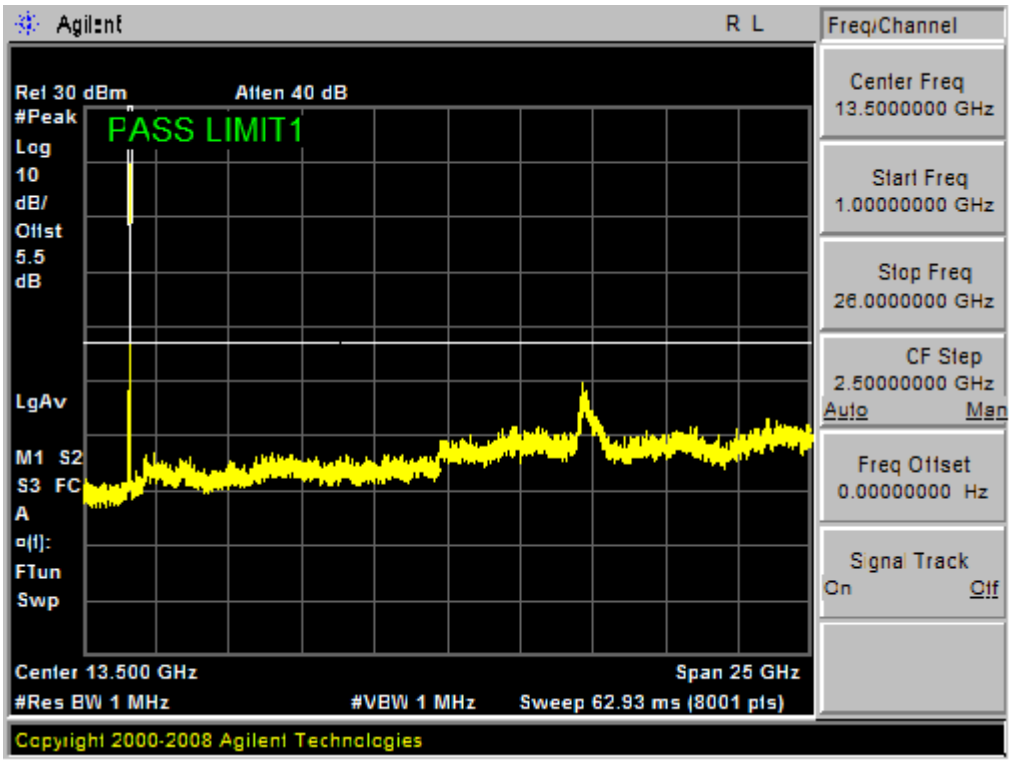
Band 7,UL Channel 20825,UL Frequency 2507.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



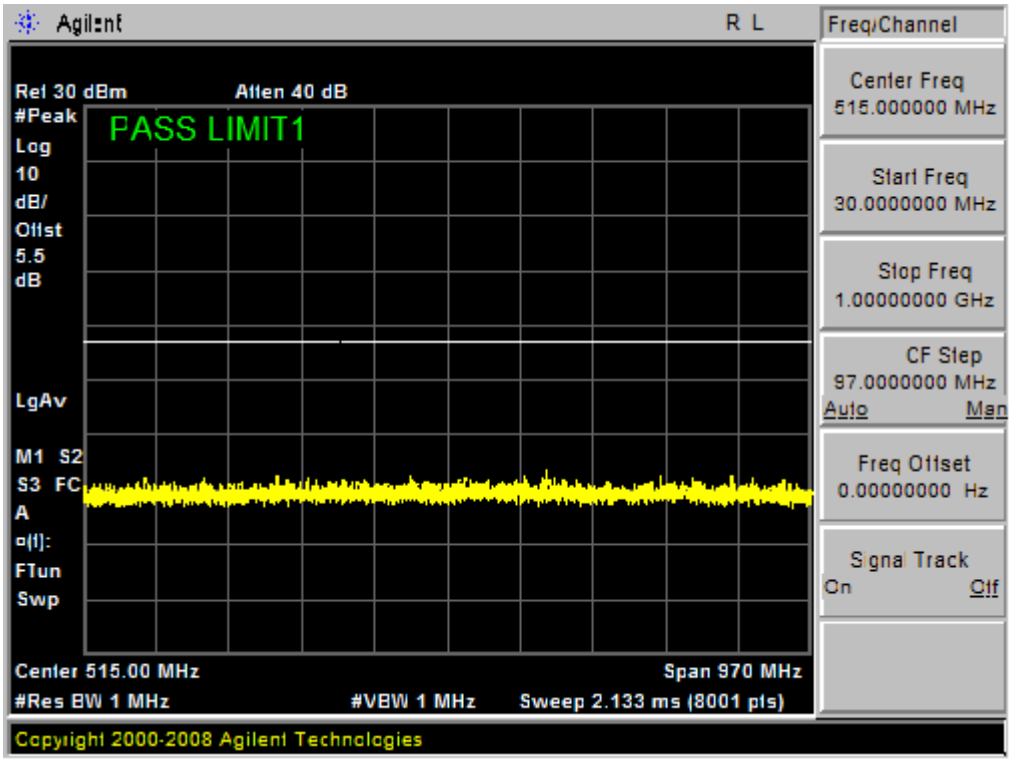
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



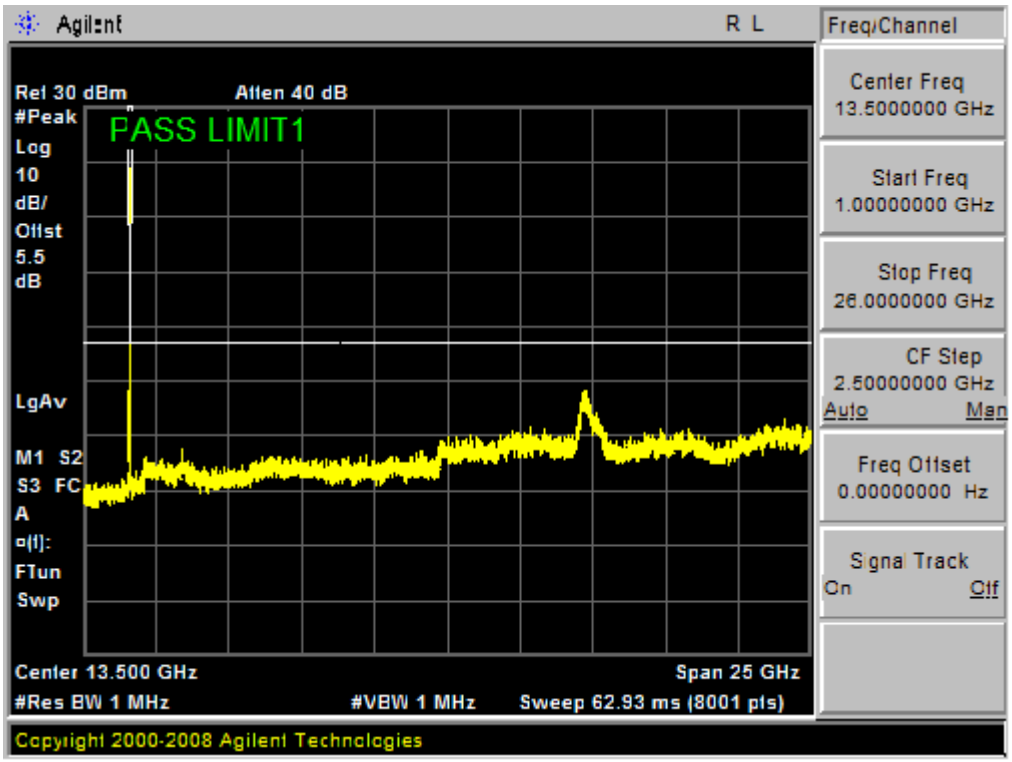
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,QPSK



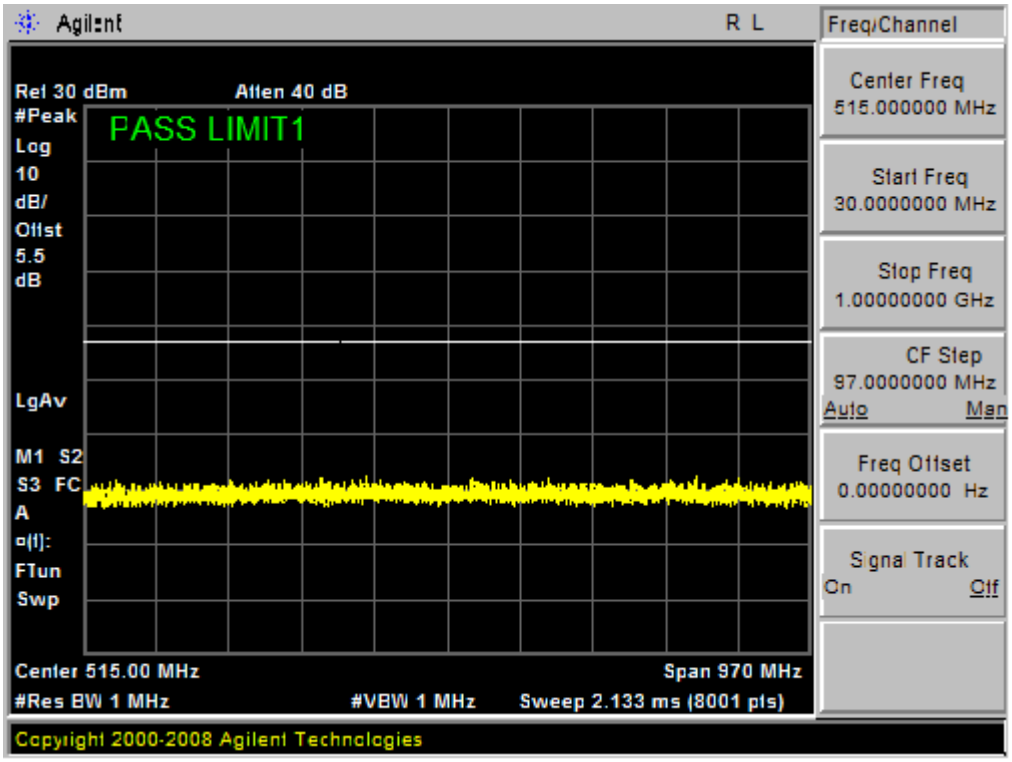
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



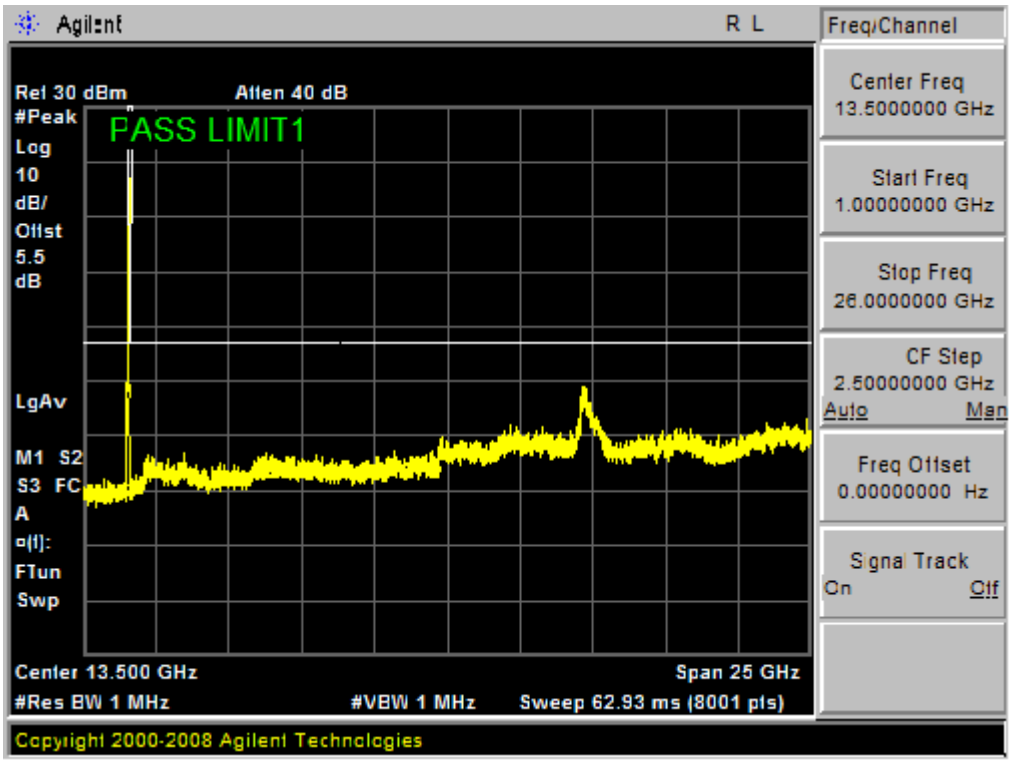
Band 7,UL Channel 21375,UL Frequency 2562.5,BW 15.0,NO. RB 75,RB POS. Low,16QAM



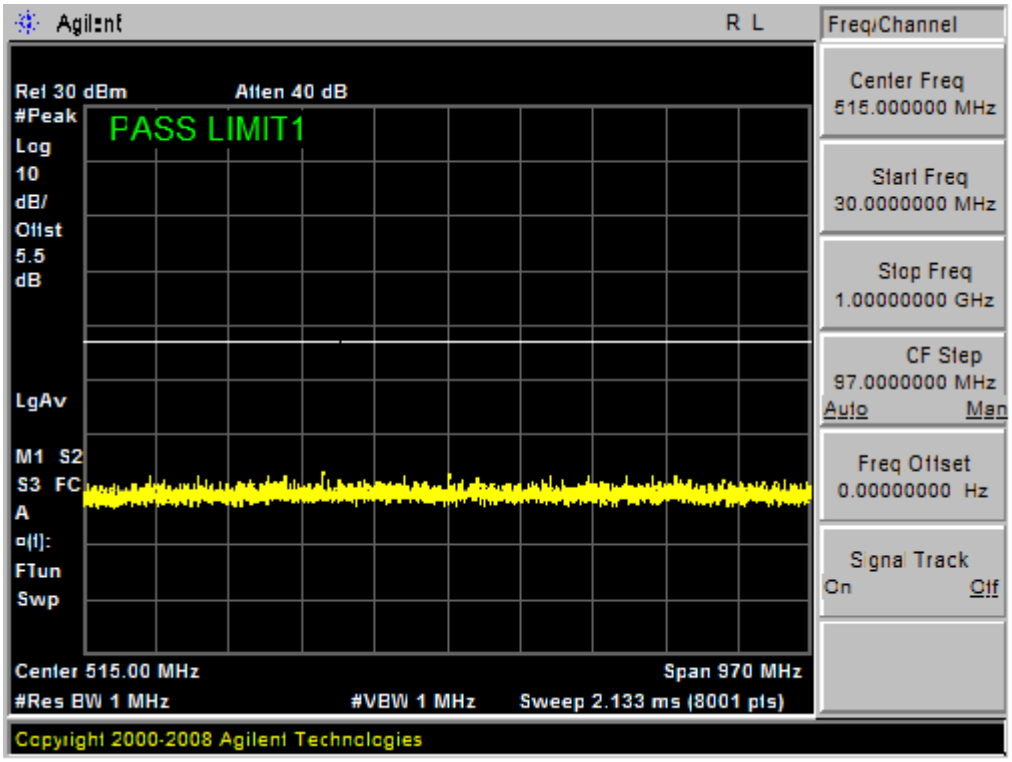
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



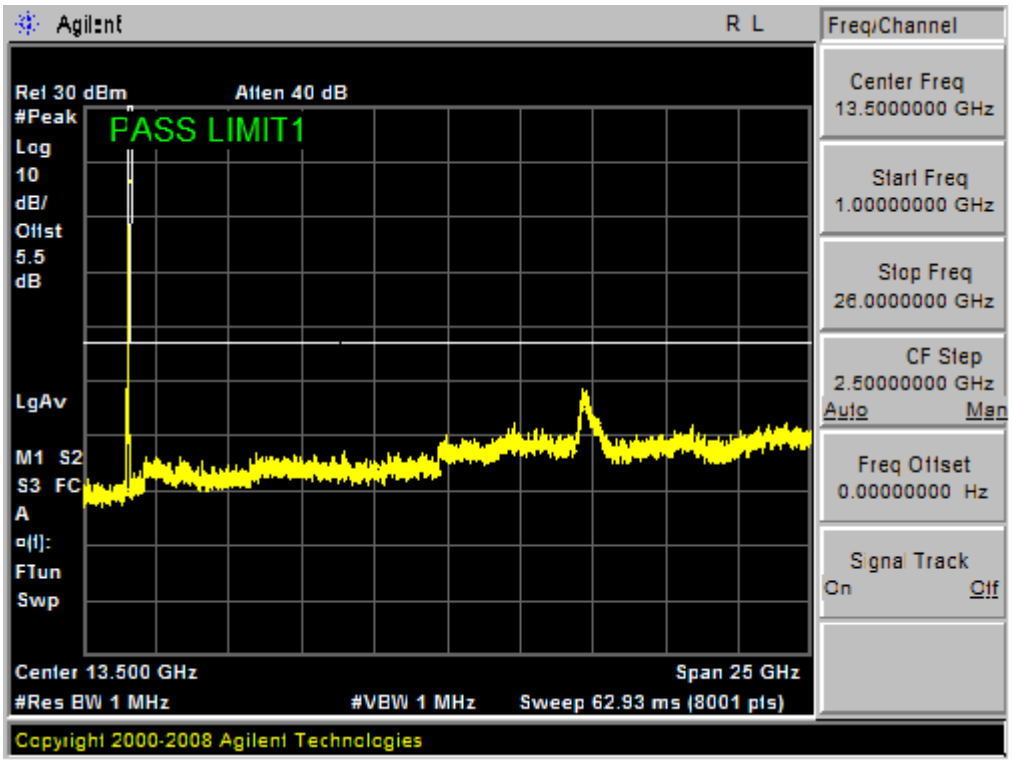
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



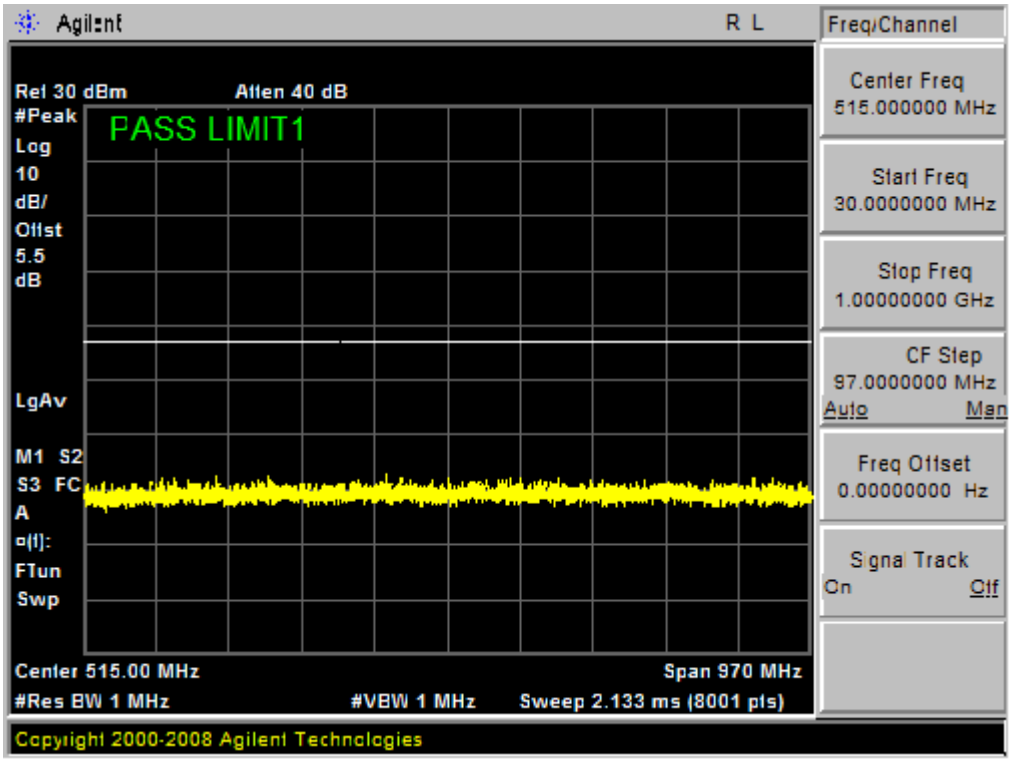
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,16QAM



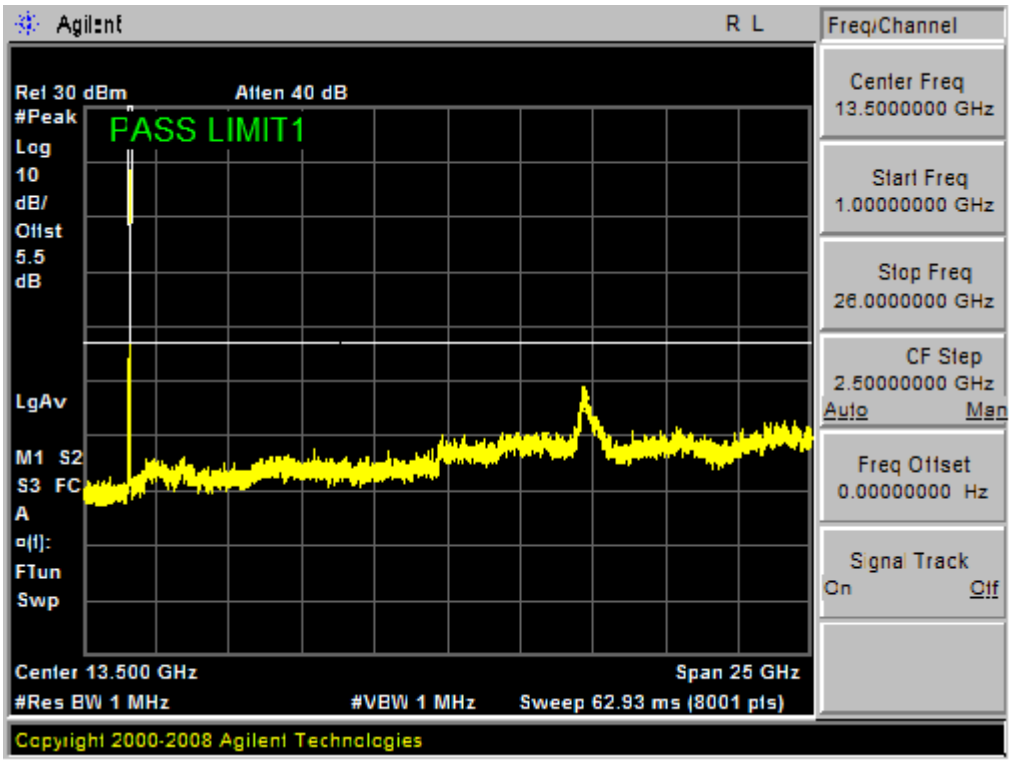
Band 7,UL Channel 20850,UL Frequency 2510.0,BW 20.0,NO. RB 100,RB POS. Low,16QAM



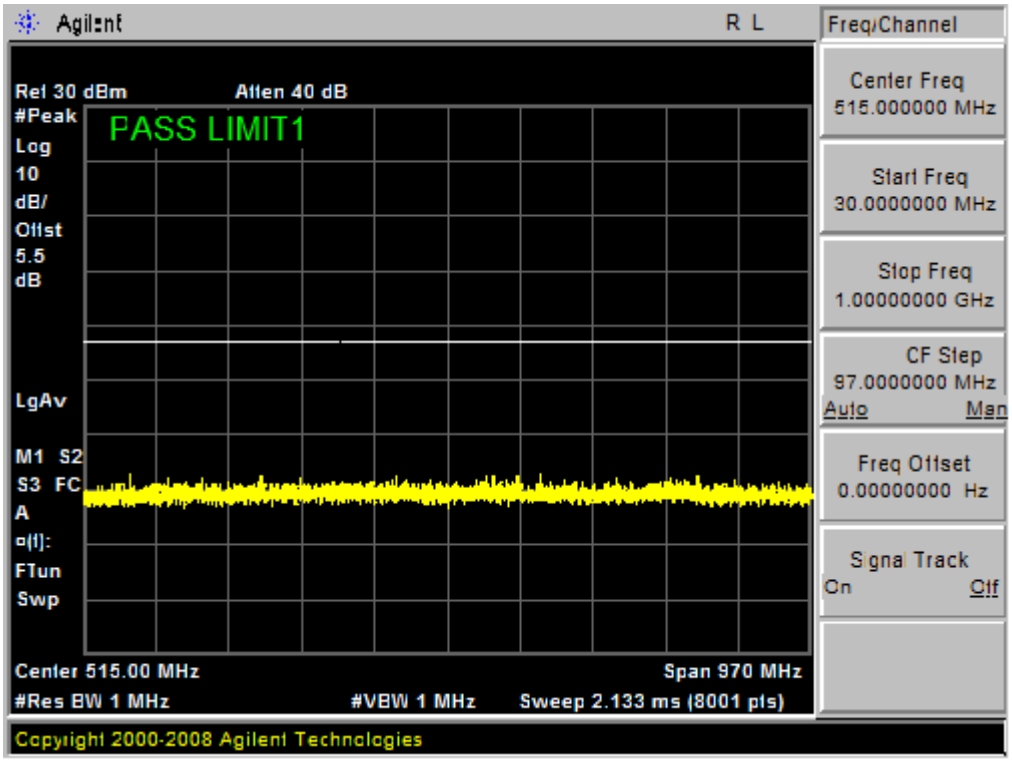
Band 7,UL Channel 21350,UL Frequency 2560.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



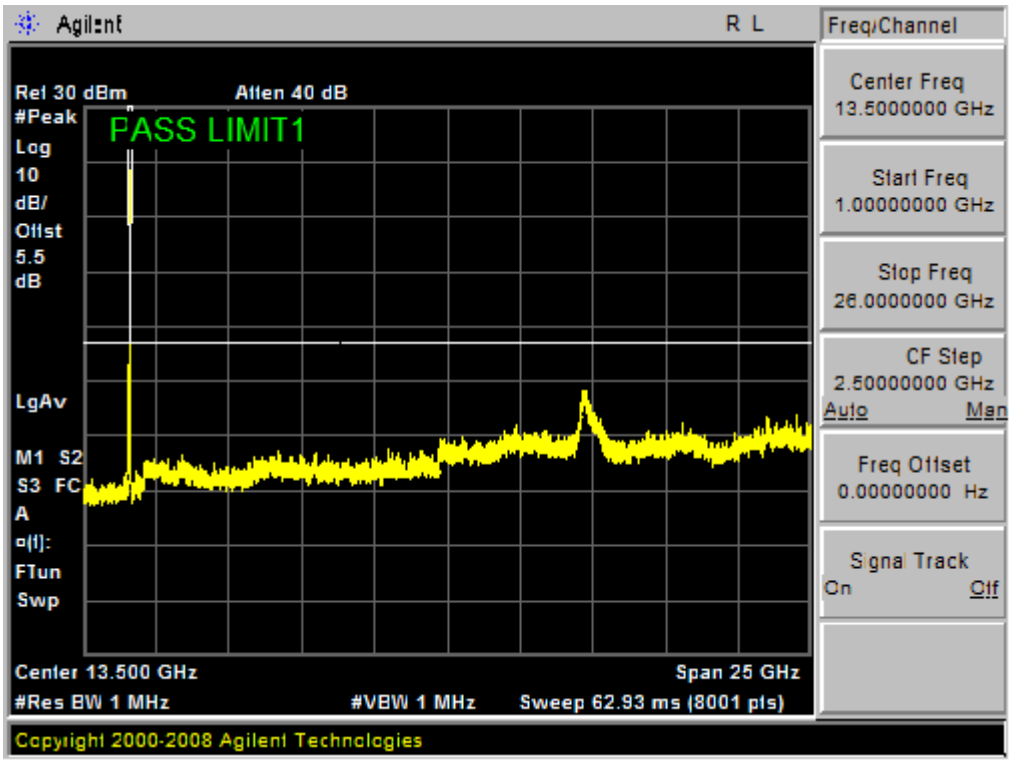
Band 7,UL Channel 21350,UL Frequency 2560.0,BW 20.0,NO. RB 100,RB POS. Low,QPSK



Band 7,UL Channel 21350,UL Frequency 2560.0,BW 20.0,NO. RB 100,RB POS. Low,16QAM

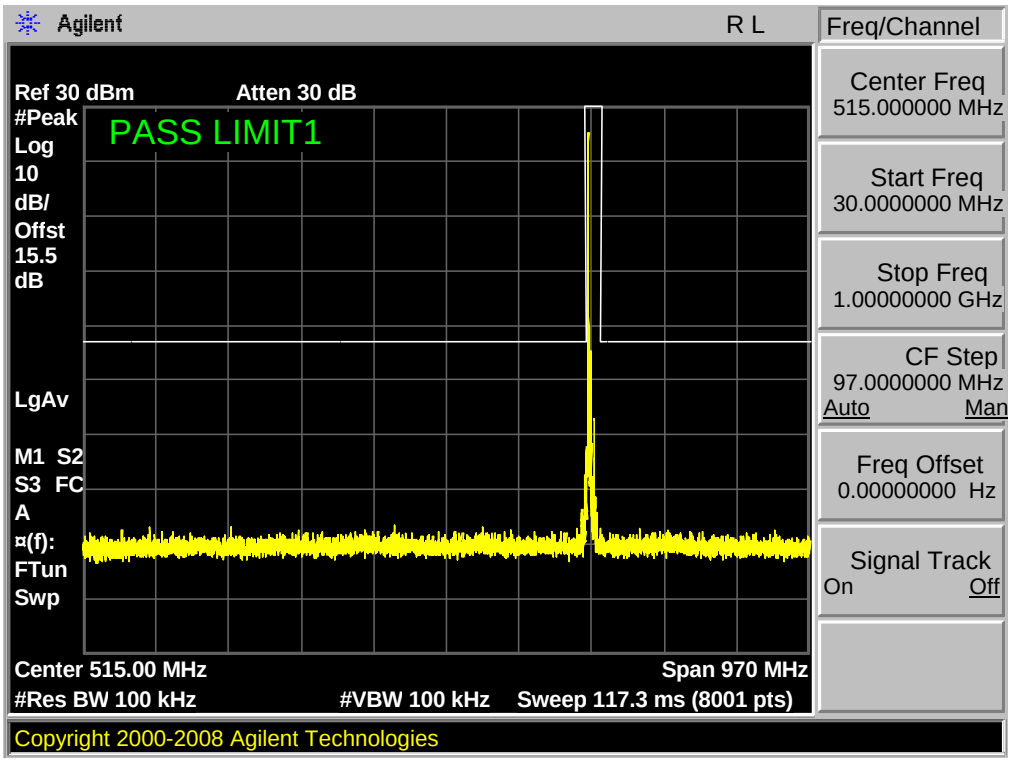


Band 7,UL Channel 21350,UL Frequency 2560.0,BW 20.0,NO. RB 100,RB POS. Low,16QAM

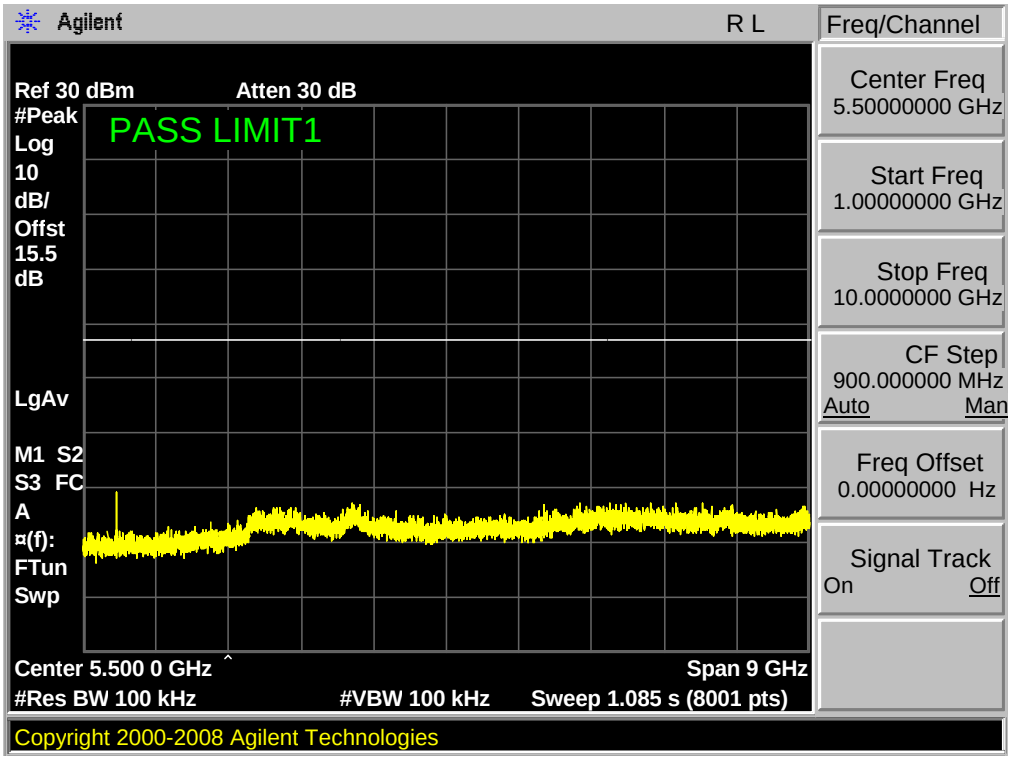


7.1.4. LTE BAND 17

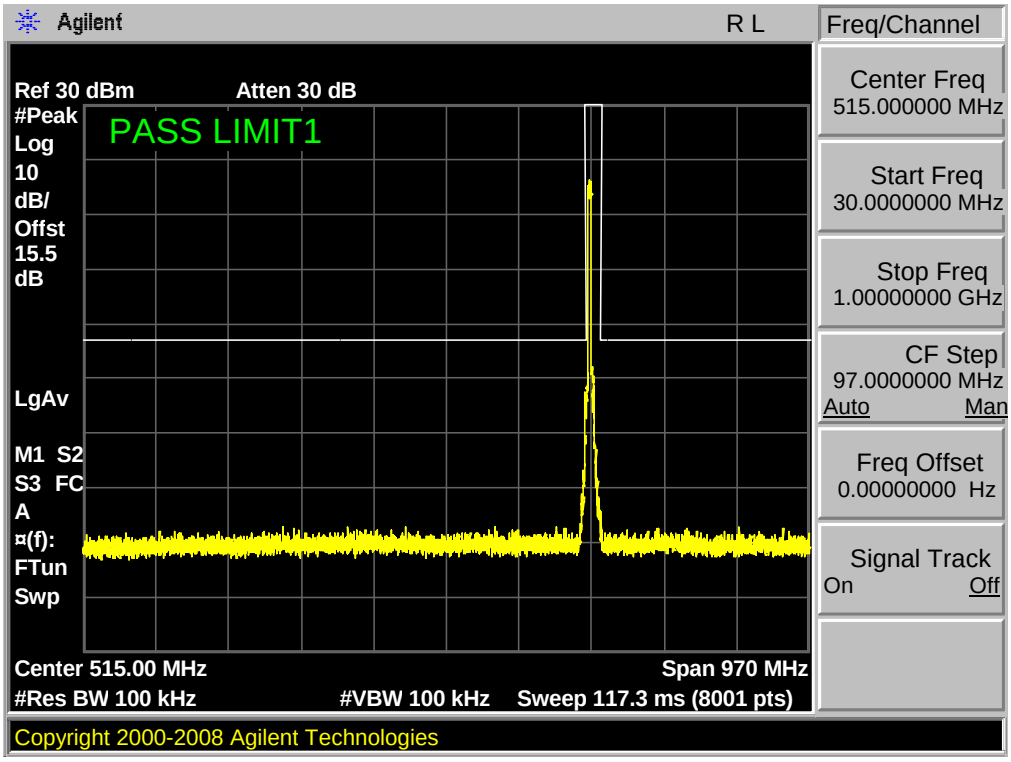
Band 17,UL Channel 23755,UL Frequency 706.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



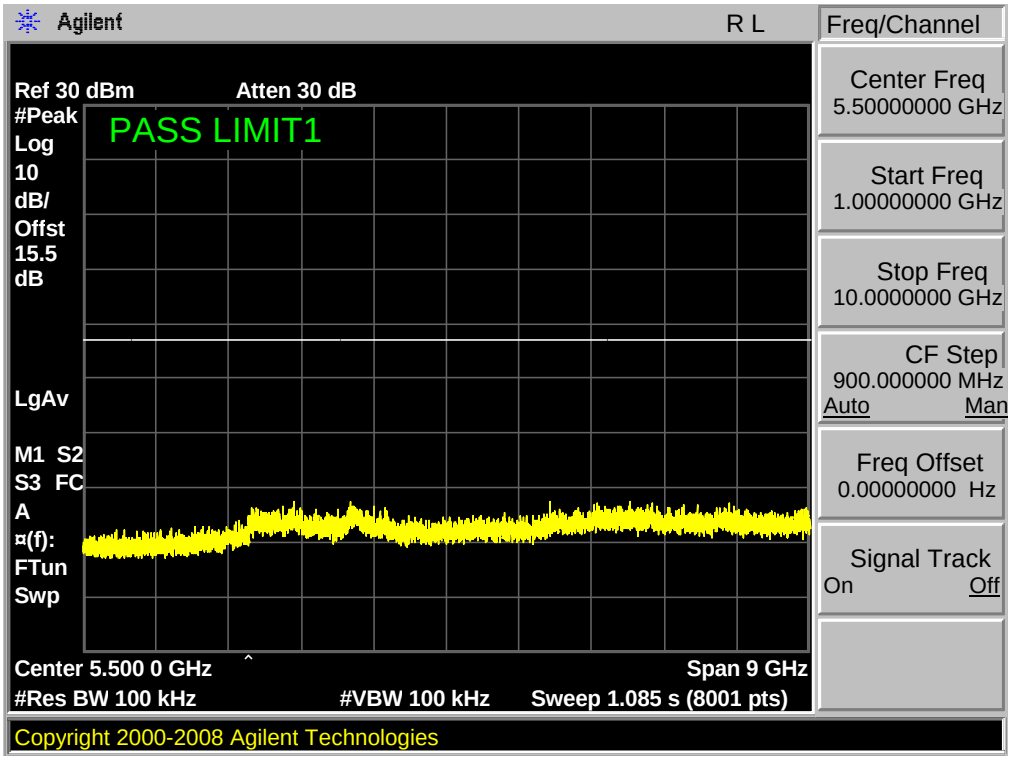
Band 17,UL Channel 23755,UL Frequency 706.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



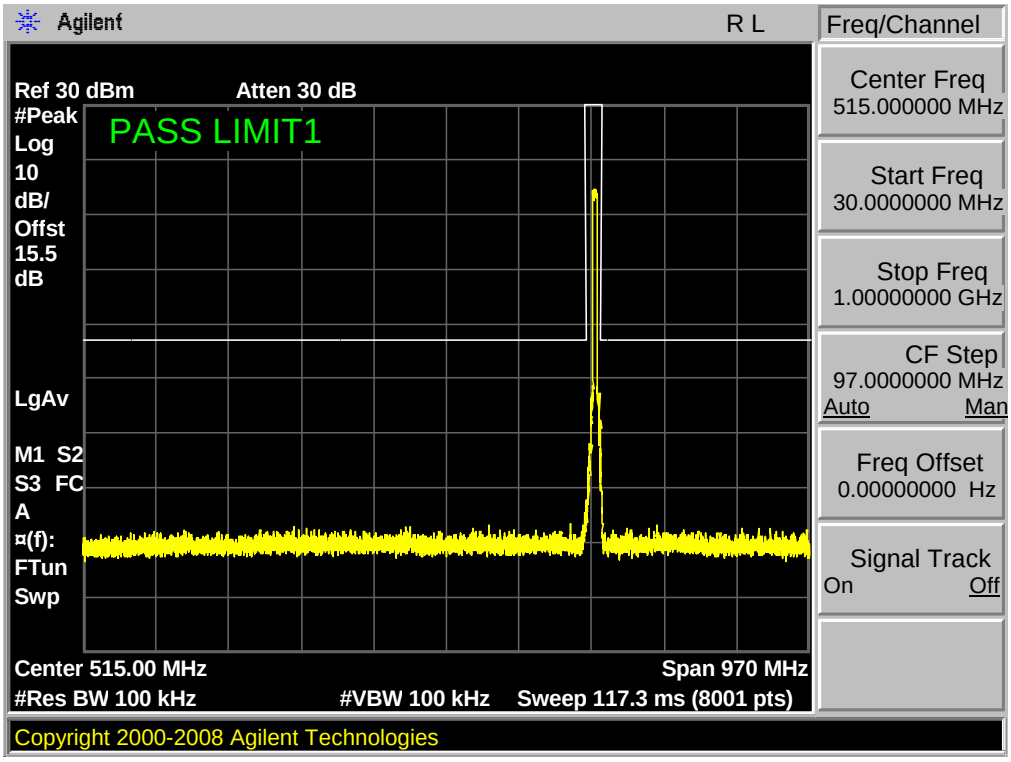
Band 17,UL Channel 23755,UL Frequency 706.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



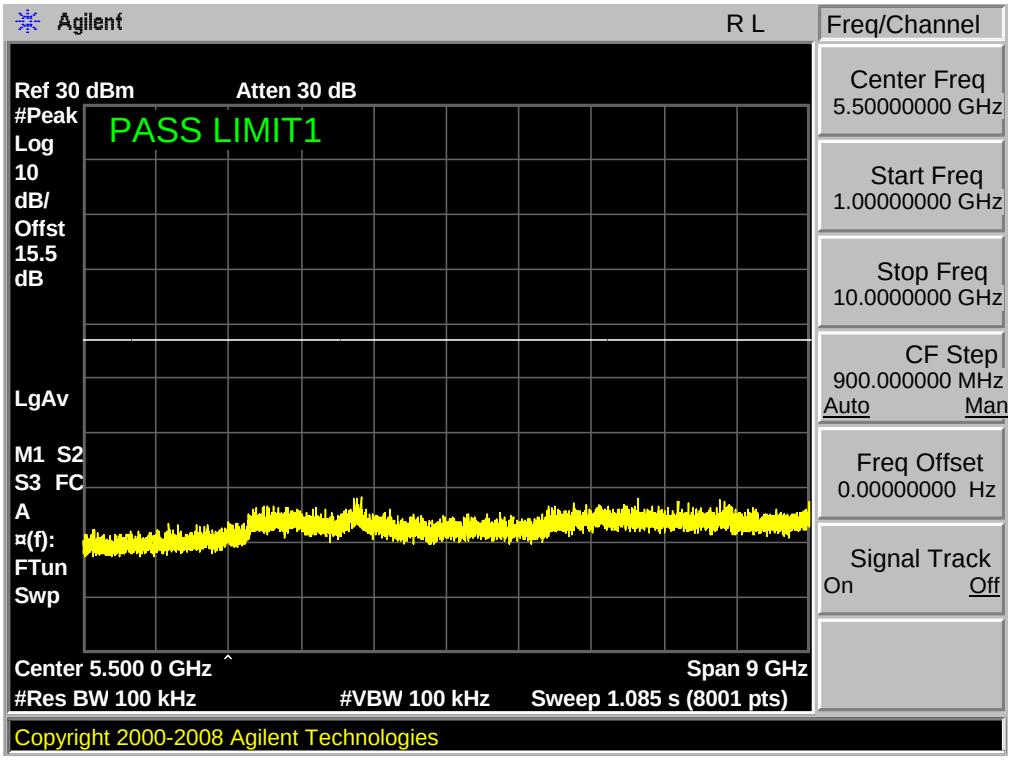
Band 17,UL Channel 23755,UL Frequency 706.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



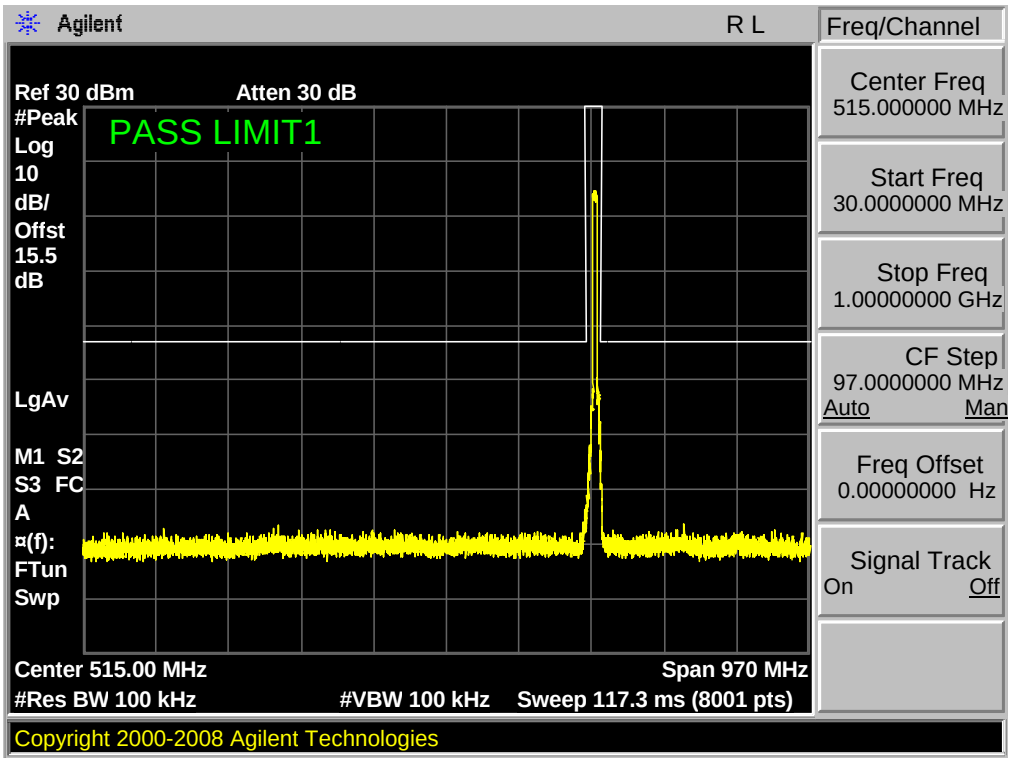
Band 17,UL Channel 23825,UL Frequency 713.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



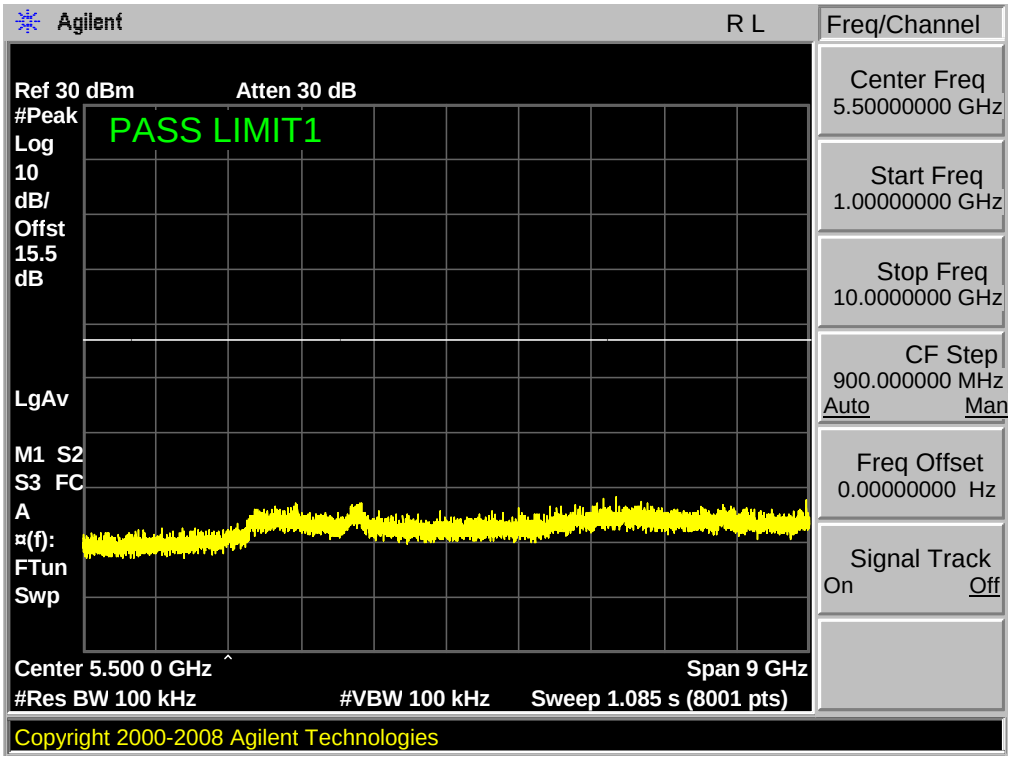
Band 17,UL Channel 23825,UL Frequency 713.5,BW 5.0,NO. RB 25,RB POS. Low,QPSK



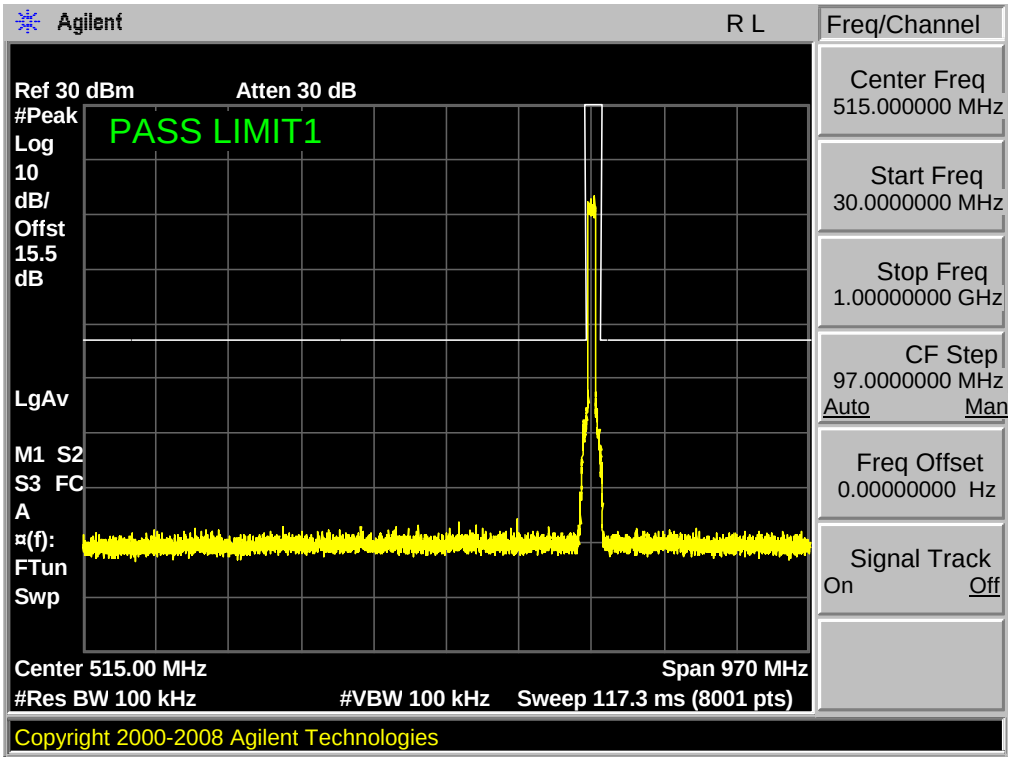
Band 17,UL Channel 23825,UL Frequency 713.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



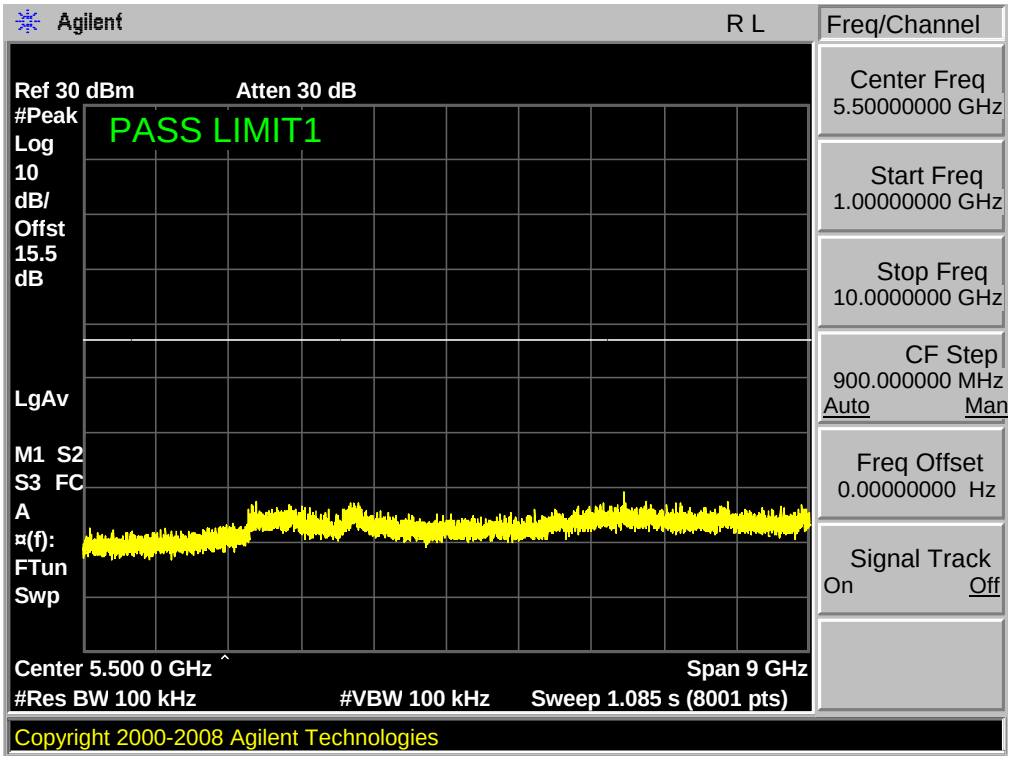
Band 17,UL Channel 23825,UL Frequency 713.5,BW 5.0,NO. RB 25,RB POS. Low,16QAM



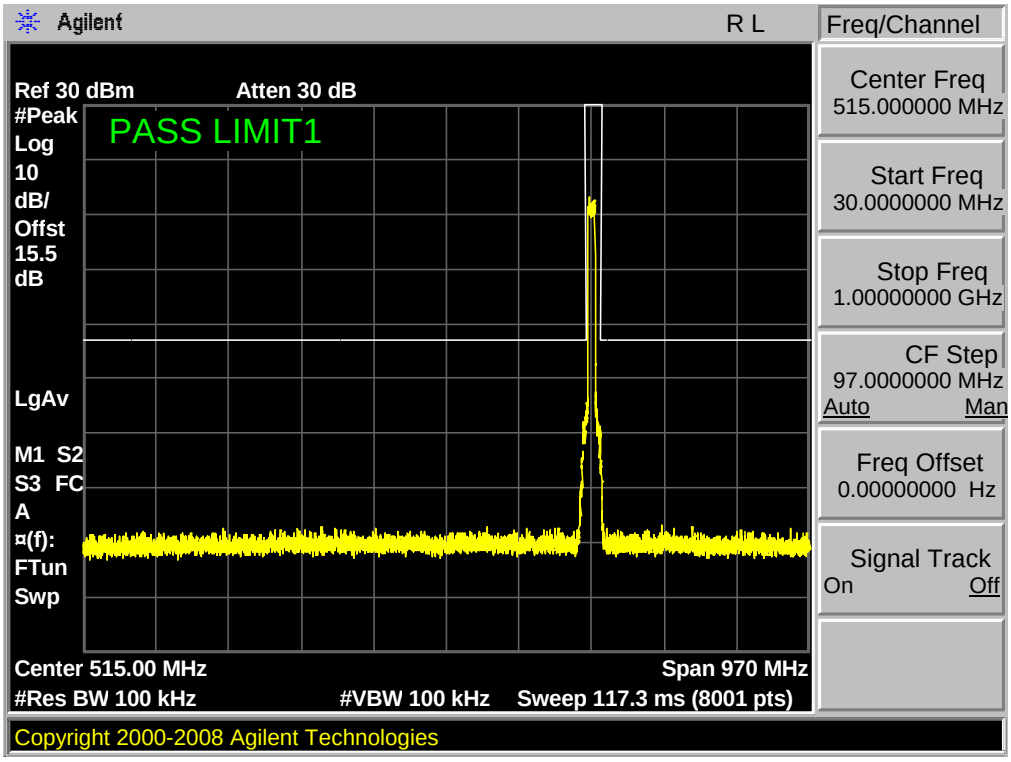
Band 17,UL Channel 23780,UL Frequency 709.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



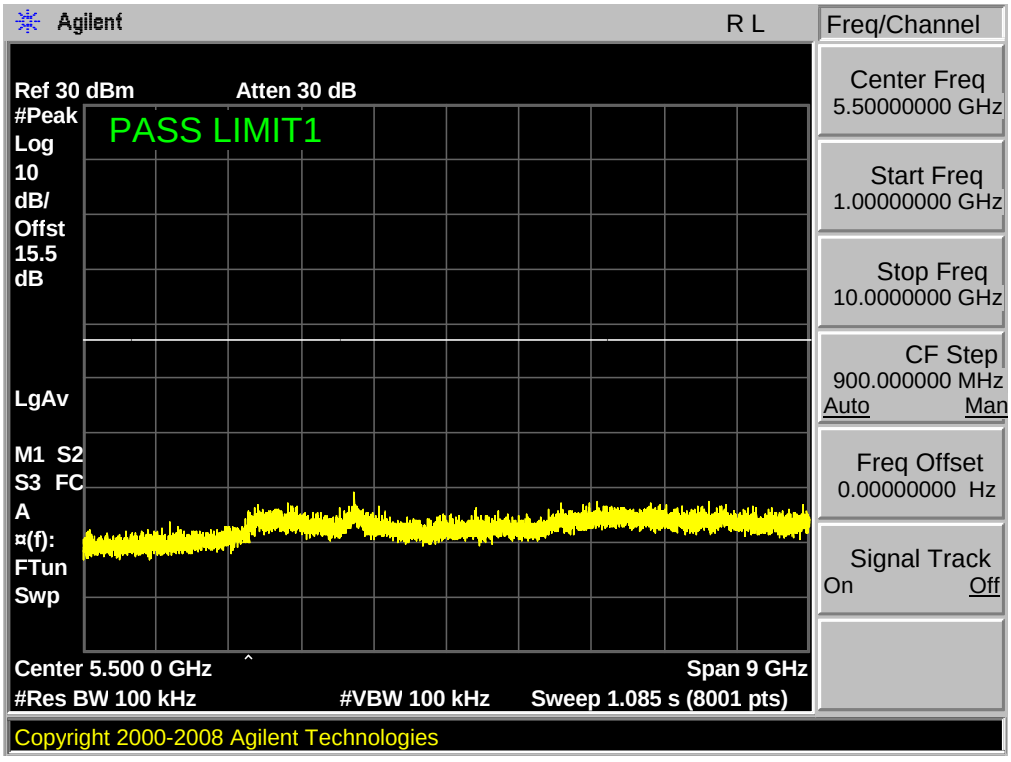
Band 17,UL Channel 23780,UL Frequency 709.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



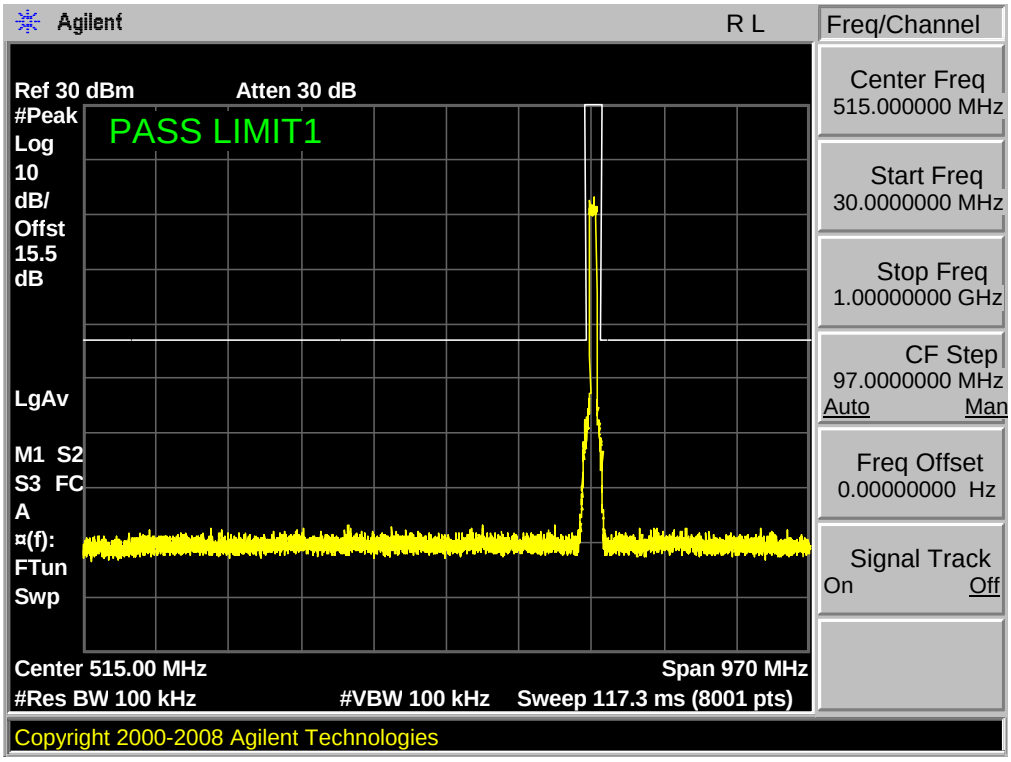
Band 17,UL Channel 23780,UL Frequency 709.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



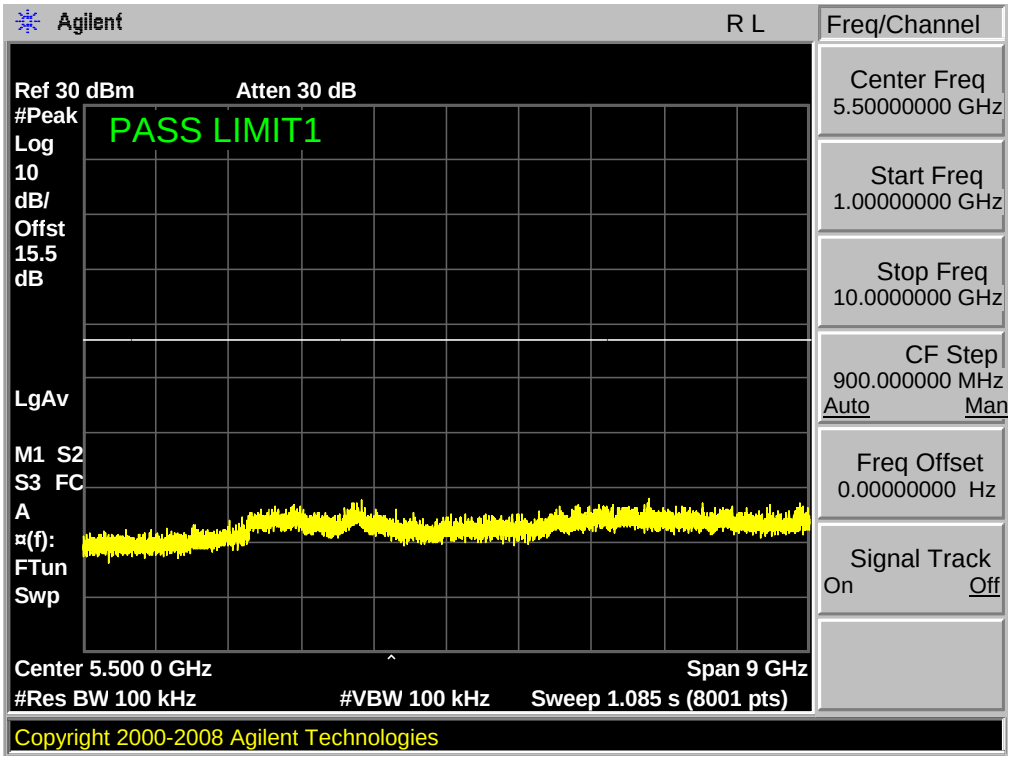
Band 17,UL Channel 23780,UL Frequency 709.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



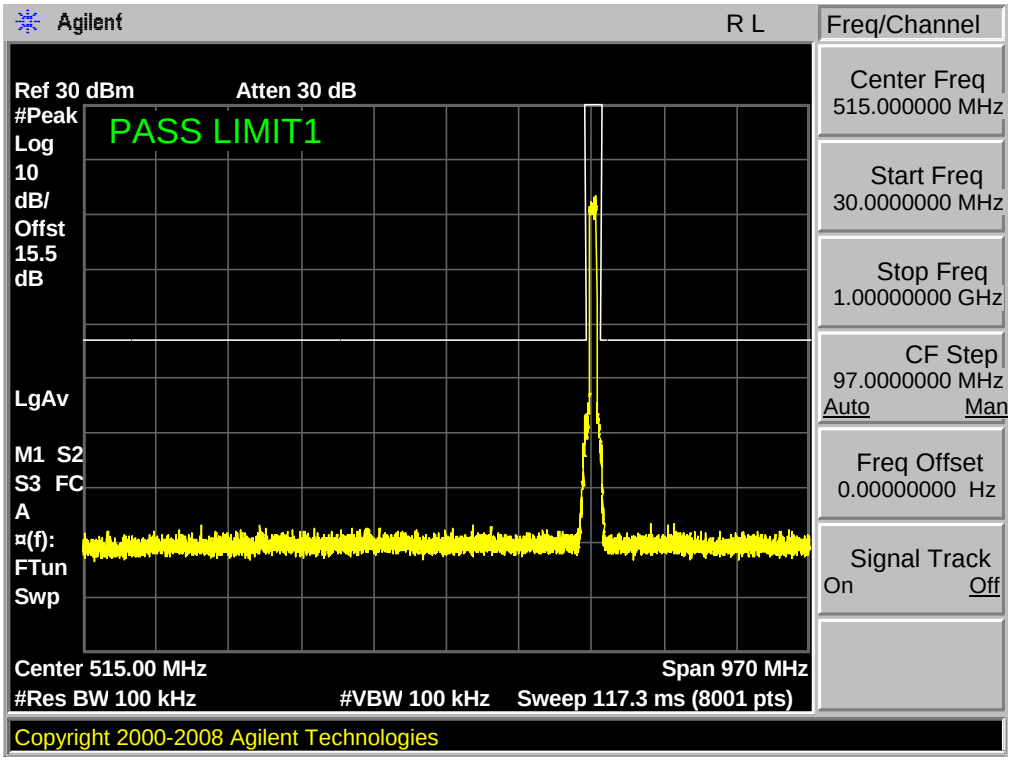
Band 17,UL Channel 23800,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



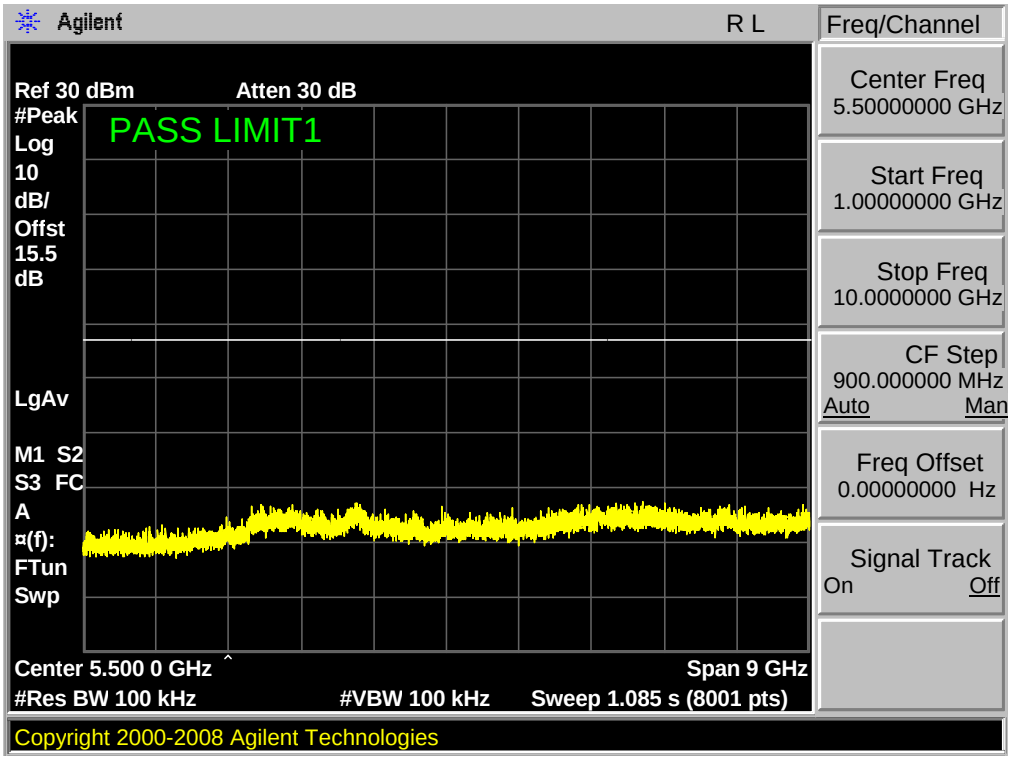
Band 17,UL Channel 23800,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,QPSK



Band 17,UL Channel 23800,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



Band 17,UL Channel 23800,UL Frequency 711.0,BW 10.0,NO. RB 50,RB POS. Low,16QAM



9. Radiated Spurious Emission

9.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232 and §27.50

LIMITS:

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.
27.50 (c) (10) the following power and antenna height requirements apply to stations transmitting in the 698–746 MHz band, the portable stations (hand-held devices) are limited to 3 watts ERP.
27.50 (b)(10) Portable stations (hand-held devices) transmitting in the 746–757 MHz, 758–763 MHz, 776–793 MHz, and 805–806 MHz bands are limited to 3 watts ERP.
27.50 (d)(4) The following power and antenna height requirements apply to stations transmitting in the 1710–1755 MHz and 2110–2155 MHz bands: Fixed, mobile, and portable (hand-held) stations operating in the 1710–1755 MHz band are limited to 1 watt EIRP.

TEST PROCEDURE

ANSI / TIA / EIA 603C Clause 2.2.17
KDB 971168 v02r01 RF power output using broadband peak and average power meter method.
KDB 971168 D01 Power Meas License Digital Systems v02r01, “Measurement Guidance for Certification of Licensed Digital Transmitters”

MODES TESTED

LTE Band 2
LTE Band 4
LTE Band 7
LTE Band 17

RESULTS

9.1.2 LTE BAND 2

Radiated Power (EIRP) for Band 2										
Mode	RB /RB SIZE	Frequency	Result							Conclusion
			PMea (dBm)	Pcl (dB)	PAg (dB)	Ga Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1850.7	-25.96	3.76	-48.53	-4.72	23.53	225.424	Horizontal	Pass
		1880	-28.53	3.91	-50.53	-4.59	22.68	185.353	Horizontal	Pass
		1909.3	-27.9	3.93	-50.53	-4.38	23.08	203.236	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-26.01	3.76	-48.53	-4.72	23.48	222.844	Horizontal	Pass
		1880	-28.32	3.91	-50.53	-4.59	22.89	194.536	Horizontal	Pass
		1909.3	-28.48	3.93	-50.53	-4.38	22.5	177.828	Horizontal	Pass
3.0MHz Band QPSK	15/0	1851.5	-26.77	3.77	-48.49	-4.72	22.67	184.927	Horizontal	Pass
		1880	-28.32	3.91	-50.51	-4.59	22.87	193.642	Horizontal	Pass
		1908.5	-27.78	3.94	-50.52	-4.38	23.18	207.970	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-25.96	3.77	-48.49	-4.7	23.46	221.820	Horizontal	Pass
		1880	-28.1	3.91	-50.51	-4.53	23.03	200.909	Horizontal	Pass
		1908.5	-28.23	3.94	-50.52	-4.35	22.7	186.209	Horizontal	Pass
5.0MHz Band QPSK	25/0	1851.5	-25.66	3.77	-48.49	-4.7	23.76	237.684	Horizontal	Pass
		1880	-27.95	3.91	-50.51	-4.53	23.18	207.970	Horizontal	Pass
		1908.5	-28.07	3.94	-50.52	-4.35	22.86	193.197	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1851.5	-26.5	3.77	-48.49	-4.72	22.94	196.789	Horizontal	Pass
		1880	-28.53	3.91	-50.51	-4.59	22.66	184.502	Horizontal	Pass
		1908.5	-27.89	3.94	-50.52	-4.38	23.07	202.768	Horizontal	Pass
10.0MHz Band QPSK	50/0	1855	-25.86	3.79	-48.49	-4.72	23.56	226.986	Horizontal	Pass
		1880	-27.97	3.95	-50.51	-4.59	23.18	207.970	Horizontal	Pass
		1905	-28.29	3.97	-50.52	-4.38	22.64	183.654	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1855	-26.89	3.79	-48.49	-4.72	22.53	179.061	Horizontal	Pass
		1880	-28.48	3.95	-50.51	-4.59	22.67	184.927	Horizontal	Pass
		1905	-27.72	3.97	-50.52	-4.38	23.21	209.411	Horizontal	Pass
15.0MHz Band QPSK	75/0	1857.5	-25.89	3.79	-48.49	-4.72	23.53	225.424	Horizontal	Pass
		1880	-28.13	3.95	-50.51	-4.59	23.02	200.447	Horizontal	Pass
		1902.5	-28.36	3.97	-50.52	-4.38	22.57	180.717	Horizontal	Pass
15.0MHz	75/	1857.5	-26.7	3.79	-48.49	-4.72	22.72	187.068	Horizontal	Pass

Band 16 QAM	0	1880	-27.89	3.95	-50.51	-4.59	23.26	211.836	Horizontal	Pass
		1902.5	-27.75	3.97	-50.52	-4.38	23.18	207.970	Horizontal	Pass
20.0MHz Band QPSK	100/0	1860	-26.56	3.81	-48.42	-4.68	22.73	187.499	Horizontal	Pass
		1880	-28.16	3.96	-50.47	-4.55	22.9	194.984	Horizontal	Pass
		1900	-27.77	4	-50.46	-4.33	23.02	200.447	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1860	-26.41	3.81	-48.42	-4.68	22.88	194.089	Horizontal	Pass
		1880	-28.13	3.96	-50.47	-4.55	22.93	196.336	Horizontal	Pass
		1900	-27.77	4	-50.46	-4.33	23.02	200.447	Horizontal	Pass

Radiated Power (EIRP) for Band 2										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			PMea (dBm)	Pcl (dB)	PAg (dB)	Ga Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1850.7	-25.98	3.76	-48.53	-4.72	23.51	224.388	Vertical	Pass
		1880	-28.87	3.91	-50.53	-4.59	22.34	171.396	Vertical	Pass
		1909.3	-28.17	3.93	-50.53	-4.38	22.81	190.985	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1850.7	-26.45	3.76	-48.53	-4.72	23.04	201.372	Vertical	Pass
		1880	-28.21	3.91	-50.53	-4.59	23	199.526	Vertical	Pass
		1909.3	-28.33	3.93	-50.53	-4.38	22.65	184.077	Vertical	Pass
3.0MHz Band QPSK	15/0	1851.5	-27.26	3.77	-48.49	-4.72	22.18	165.196	Vertical	Pass
		1880	-28.85	3.91	-50.51	-4.59	22.34	171.396	Vertical	Pass
		1908.5	-27.99	3.94	-50.52	-4.38	22.97	198.153	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1851.5	-26.46	3.77	-48.49	-4.7	22.96	197.697	Vertical	Pass
		1880	-28.08	3.91	-50.51	-4.53	23.05	201.837	Vertical	Pass
		1908.5	-28.26	3.94	-50.52	-4.35	22.67	184.927	Vertical	Pass
5.0MHz Band QPSK	25/0	1851.5	-26.28	3.77	-48.49	-4.7	23.14	206.063	Vertical	Pass
		1880	-28.44	3.91	-50.51	-4.53	22.69	185.780	Vertical	Pass
		1908.5	-28.26	3.94	-50.52	-4.35	22.67	184.927	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1851.5	-26.38	3.77	-48.49	-4.72	23.06	202.302	Vertical	Pass
		1880	-28.62	3.91	-50.51	-4.59	22.57	180.717	Vertical	Pass
		1908.5	-27.85	3.94	-50.52	-4.38	23.11	204.644	Vertical	Pass
10.0MHz Band QPSK	50/0	1855	-25.88	3.79	-48.49	-4.72	23.54	225.944	Vertical	Pass
		1880	-28.14	3.95	-50.51	-4.59	23.01	199.986	Vertical	Pass
		1905	-28.45	3.97	-50.52	-4.38	22.48	177.011	Vertical	Pass

10.0MHz Band 16 QAM	50/0	1855	-26.61	3.79	-48.49	-4.72	22.81	190.985	Vertical	Pass
		1880	-29.02	3.95	-50.51	-4.59	22.13	163.305	Vertical	Pass
		1905	-27.97	3.97	-50.52	-4.38	22.96	197.697	Vertical	Pass
15.0MHz Band QPSK	75/0	1857.5	-26.51	3.79	-48.49	-4.72	22.91	195.434	Vertical	Pass
		1880	-28.09	3.95	-50.51	-4.59	23.06	202.302	Vertical	Pass
		1902.5	-28.52	3.97	-50.52	-4.38	22.41	174.181	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1857.5	-27.08	3.79	-48.49	-4.72	22.34	171.396	Vertical	Pass
		1880	-28.39	3.95	-50.51	-4.59	22.76	188.799	Vertical	Pass
		1902.5	-28.24	3.97	-50.52	-4.38	22.69	185.780	Vertical	Pass
20.0MHz Band QPSK	100/0	1860	-26.88	3.81	-48.42	-4.68	22.41	174.181	Vertical	Pass
		1880	-28.38	3.96	-50.47	-4.55	22.68	185.353	Vertical	Pass
		1900	-27.64	4	-50.46	-4.33	23.15	206.538	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1860	-26.03	3.81	-48.42	-4.68	23.26	211.836	Vertical	Pass
		1880	-28.48	3.96	-50.47	-4.55	22.58	181.134	Vertical	Pass
		1900	-28.06	4	-50.46	-4.33	22.73	187.499	Vertical	Pass

9.1.3 LTE BAND 4

Radiated Power (EIRP) for Band 4										
Mode	RB /RB SIZE	Frequency	Result							Conclusion
			PMea (dBm)	Pcl (dB)	PAg (dB)	Ga Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1710.7	-27.75	3.12	-49.17	-5.36	23.66	232.274	Horizontal	Pass
		1732.5	-30.32	3.27	-51.17	-5.23	22.81	190.985	Horizontal	Pass
		1754.3	-29.69	3.29	-51.17	-5.02	23.21	209.411	Horizontal	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-27.8	3.12	-49.17	-5.36	23.61	229.615	Horizontal	Pass
		1732.5	-30.11	3.27	-51.17	-5.23	23.02	200.447	Horizontal	Pass
		1754.3	-30.27	3.29	-51.17	-5.02	22.63	183.231	Horizontal	Pass
3.0MHz Band QPSK	15/0	1711.5	-28.56	3.13	-49.13	-5.36	22.8	190.546	Horizontal	Pass
		1732.5	-30.11	3.27	-51.15	-5.23	23	199.526	Horizontal	Pass
		1753.5	-29.57	3.3	-51.16	-5.02	23.31	214.289	Horizontal	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-27.75	3.13	-49.13	-5.34	23.59	228.560	Horizontal	Pass
		1732.5	-29.89	3.27	-51.15	-5.17	23.16	207.014	Horizontal	Pass
		1753.5	-30.02	3.3	-51.16	-4.99	22.83	191.867	Horizontal	Pass
5.0MHz Band QPSK	25/0	1712.5	-27.45	3.13	-49.13	-5.34	23.89	244.906	Horizontal	Pass
		1732.5	-29.74	3.27	-51.15	-5.17	23.31	214.289	Horizontal	Pass
		1752.5	-29.86	3.3	-51.16	-4.99	22.99	199.067	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-28.29	3.13	-49.13	-5.36	23.07	202.768	Horizontal	Pass
		1732.5	-30.32	3.27	-51.15	-5.23	22.79	190.108	Horizontal	Pass
		1752.5	-29.68	3.3	-51.16	-5.02	23.2	208.930	Horizontal	Pass
10.0MHz Band QPSK	50/0	1715	-27.65	3.15	-49.13	-5.36	23.69	233.884	Horizontal	Pass
		1732.5	-29.76	3.31	-51.15	-5.23	23.31	214.289	Horizontal	Pass
		1750	-30.08	3.33	-51.16	-5.02	22.77	189.234	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	1715	-28.68	3.15	-49.13	-5.36	22.66	184.502	Horizontal	Pass
		1732.5	-30.27	3.31	-51.15	-5.23	22.8	190.546	Horizontal	Pass
		1750	-29.51	3.33	-51.16	-5.02	23.34	215.774	Horizontal	Pass
15.0MHz Band QPSK	75/0	1717.5	-27.68	3.15	-49.13	-5.36	23.66	232.274	Horizontal	Pass
		1732.5	-29.92	3.31	-51.15	-5.23	23.15	206.538	Horizontal	Pass
		1747.5	-30.15	3.33	-51.16	-5.02	22.7	186.209	Horizontal	Pass
15.0MHz	75/	1717.5	-28.49	3.15	-49.13	-5.36	22.85	192.752	Horizontal	Pass

Band 16 QAM	0	1732.5	-29.68	3.31	-51.15	-5.23	23.39	218.273	Horizontal	Pass
		1747.5	-29.54	3.33	-51.16	-5.02	23.31	214.289	Horizontal	Pass
20.0MHz Band QPSK	100/0	1720	-28.35	3.17	-49.06	-5.32	22.86	193.197	Horizontal	Pass
		1732.5	-29.95	3.32	-51.11	-5.19	23.03	200.909	Horizontal	Pass
		1745	-29.56	3.36	-51.1	-4.97	23.15	206.538	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	1720	-28.2	3.17	-49.06	-5.32	23.01	199.986	Horizontal	Pass
		1732.5	-29.92	3.32	-51.11	-5.19	23.06	202.302	Horizontal	Pass
		1745	-29.56	3.36	-51.1	-4.97	23.15	206.538	Horizontal	Pass

Radiated Power (EIRP) for Band 4										
Mode	RB/RB SIZE	Frequency	Result							Conclusion
			PMea (dBm)	Pcl (dB)	PAg (dB)	Ga Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
1.4MHz Band QPSK	6/0	1710.7	-28.27	3.12	-49.17	-5.36	23.14	206.063	Vertical	Pass
		1732.5	-30.65	3.27	-51.17	-5.23	22.48	177.011	Vertical	Pass
		1754.3	-29.75	3.29	-51.17	-5.02	23.15	206.538	Vertical	Pass
1.4MHz Band 16 QAM	6/0	1710.7	-28.73	3.12	-49.17	-5.36	22.68	185.353	Vertical	Pass
		1732.5	-30.52	3.27	-51.17	-5.23	22.61	182.390	Vertical	Pass
		1754.3	-29.81	3.29	-51.17	-5.02	23.09	203.704	Vertical	Pass
3.0MHz Band QPSK	15/0	1711.5	-28.45	3.13	-49.13	-5.36	22.91	195.434	Vertical	Pass
		1732.5	-30.07	3.27	-51.15	-5.23	23.04	201.372	Vertical	Pass
		1753.5	-29.6	3.3	-51.16	-5.02	23.28	212.814	Vertical	Pass
3.0MHz Band 16 QAM	15/0	1711.5	-28.3	3.13	-49.13	-5.34	23.04	201.372	Vertical	Pass
		1732.5	-30.06	3.27	-51.15	-5.17	22.99	199.067	Vertical	Pass
		1753.5	-30.08	3.3	-51.16	-4.99	22.77	189.234	Vertical	Pass
5.0MHz Band QPSK	25/0	1712.5	-27.68	3.13	-49.13	-5.34	23.66	232.274	Vertical	Pass
		1732.5	-29.87	3.27	-51.15	-5.17	23.18	207.970	Vertical	Pass
		1752.5	-29.94	3.3	-51.16	-4.99	22.91	195.434	Vertical	Pass
5.0MHz Band 16 QAM	25/0	1712.5	-28.49	3.13	-49.13	-5.36	22.87	193.642	Vertical	Pass
		1732.5	-30.47	3.27	-51.15	-5.23	22.64	183.654	Vertical	Pass
		1752.5	-30.26	3.3	-51.16	-5.02	22.62	182.810	Vertical	Pass
10.0MHz Band QPSK	50/0	1715	-27.9	3.15	-49.13	-5.36	23.44	220.800	Vertical	Pass
		1732.5	-30.11	3.31	-51.15	-5.23	22.96	197.697	Vertical	Pass
		1750	-30.28	3.33	-51.16	-5.02	22.57	180.717	Vertical	Pass

10.0MHz Band 16 QAM	50/0	1715	-29.21	3.15	−49.13	−5.36	22.13	163.305	Vertical	Pass
		1732.5	-30.74	3.31	−51.15	−5.23	22.33	171.002	Vertical	Pass
		1750	-29.98	3.33	−51.16	−5.02	22.87	193.642	Vertical	Pass
15.0MHz Band QPSK	75/0	1717.5	-27.89	3.15	−49.13	−5.36	23.45	221.309	Vertical	Pass
		1732.5	-30.09	3.31	−51.15	−5.23	22.98	198.609	Vertical	Pass
		1747.5	-31.11	3.33	−51.16	−5.02	21.74	149.279	Vertical	Pass
15.0MHz Band 16 QAM	75/0	1717.5	-29	3.15	−49.13	−5.36	22.34	171.396	Vertical	Pass
		1732.5	-30.21	3.31	−51.15	−5.23	22.86	193.197	Vertical	Pass
		1747.5	-29.28	3.33	−51.16	−5.02	23.57	227.510	Vertical	Pass
20.0MHz Band QPSK	100/0	1720	-28.47	3.17	−49.06	−5.32	22.74	187.932	Vertical	Pass
		1732.5	-30.34	3.32	−51.11	−5.19	22.64	183.654	Vertical	Pass
		1745	-30.53	3.36	−51.1	−4.97	22.18	165.196	Vertical	Pass
20.0MHz Band 16 QAM	100/0	1720	-28.27	3.17	−49.06	−5.32	22.94	196.789	Vertical	Pass
		1732.5	-30.29	3.32	−51.11	−5.19	22.69	185.780	Vertical	Pass
		1745	-29.68	3.36	−51.1	−4.97	23.03	200.909	Vertical	Pass

9.1.3 LTE BAND 7

Radiated Power (EIRP) for Band 7										
Mode	RB /RB SIZE	Frequency	Result							Conclusion
			PMea (dBm)	Pcl (dB)	PAg (dB)	Ga Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	25/0	2502.5	-24.66	4.54	-47.75	-3.94	22.49	177.419	Horizontal	Pass
		2535	-26.97	4.69	-49.75	-3.81	21.9	154.882	Horizontal	Pass
		2567.5	-25.54	4.71	-49.75	-3.6	23.1	204.174	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-24.37	4.54	-47.75	-3.94	22.78	189.671	Horizontal	Pass
		2535	-26.45	4.69	-49.75	-3.81	22.42	174.582	Horizontal	Pass
		2567.5	-25.43	4.71	-49.75	-3.6	23.21	209.411	Horizontal	Pass
10.0MHz Band QPSK	50/0	2505	-24.2	4.55	-47.71	-3.94	22.9	194.984	Horizontal	Pass
		2535	-26.06	4.69	-49.73	-3.81	22.79	190.108	Horizontal	Pass
		2565	-25.88	4.72	-49.74	-3.6	22.74	187.932	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	2505	-24.28	4.55	-47.71	-3.92	22.8	190.546	Horizontal	Pass
		2535	-25.89	4.69	-49.73	-3.75	22.9	194.984	Horizontal	Pass
		2565	-25.4	4.72	-49.74	-3.57	23.19	208.449	Horizontal	Pass
15.0MHz Band QPSK	75/0	2507.5	-24.27	4.55	-47.71	-3.92	22.81	190.985	Horizontal	Pass
		2535	-25.91	4.69	-49.73	-3.75	22.88	194.089	Horizontal	Pass
		2562.5	-25.65	4.72	-49.74	-3.57	22.94	196.789	Horizontal	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-24.18	4.55	-47.71	-3.94	22.92	195.884	Horizontal	Pass
		2535	-25.92	4.69	-49.73	-3.81	22.93	196.336	Horizontal	Pass
		2562.5	-25.71	4.72	-49.74	-3.6	22.91	195.434	Horizontal	Pass
20.0MHz Band QPSK	100/0	2510	-24.19	4.57	-47.71	-3.94	22.89	194.536	Horizontal	Pass
		2535	-25.97	4.73	-49.73	-3.81	22.84	192.309	Horizontal	Pass
		2560	-25.8	4.75	-49.74	-3.6	22.79	190.108	Horizontal	Pass
20.0MHz Band 16 QAM	100/0	2510	-24.27	4.57	-47.71	-3.94	22.81	190.985	Horizontal	Pass
		2535	-25.89	4.73	-49.73	-3.81	22.92	195.884	Horizontal	Pass
		2560	-25.77	4.75	-49.74	-3.6	22.82	191.426	Horizontal	Pass

Radiated Power (EIRP) for Band 7										
Mode	RB/ RB SIZE	Frequency	Result							Conclusion
			PMea (dBm)	Pcl (dB)	PAg (dB)	Ga Antenna Gain (dB)	Max. EIRP Average (dBm)	Max. EIRP Average (mW)	Polarization Of Max. ERP	
5.0MHz Band QPSK	25/0	2502.5	-24.57	4.54	-47.75	-3.94	22.58	181.134	Vertical	Pass
		2535	-26.23	4.69	-49.75	-3.81	22.64	183.654	Vertical	Pass
		2567.5	-25.89	4.71	-49.75	-3.6	22.75	188.365	Vertical	Pass
5.0MHz Band 16 QAM	25/0	2502.5	-25.04	4.54	-47.75	-3.94	22.11	162.555	Vertical	Pass
		2535	-26.48	4.69	-49.75	-3.81	22.39	173.380	Vertical	Pass
		2567.5	-25.97	4.71	-49.75	-3.6	22.67	184.927	Vertical	Pass
10.0MHz Band QPSK	50/0	2505	-24.46	4.55	-47.71	-3.94	22.64	183.654	Vertical	Pass
		2535	-26.48	4.69	-49.73	-3.81	22.37	172.584	Vertical	Pass
		2565	-26.06	4.72	-49.74	-3.6	22.56	180.302	Vertical	Pass
10.0MHz Band 16 QAM	50/0	2505	-24.34	4.55	-47.71	-3.92	22.74	187.932	Vertical	Pass
		2535	-25.91	4.69	-49.73	-3.75	22.88	194.089	Vertical	Pass
		2565	-26.21	4.72	-49.74	-3.57	22.38	172.982	Vertical	Pass
15.0MHz Band QPSK	75/0	2507.5	-24.43	4.55	-47.71	-3.92	22.65	184.077	Vertical	Pass
		2535	-26.05	4.69	-49.73	-3.75	22.74	187.932	Vertical	Pass
		2562.5	-25.18	4.72	-49.74	-3.57	23.41	219.280	Vertical	Pass
15.0MHz Band 16 QAM	75/0	2507.5	-24.09	4.55	-47.71	-3.94	23.01	199.986	Vertical	Pass
		2535	-26.17	4.69	-49.73	-3.81	22.68	185.353	Vertical	Pass
		2562.5	-25.67	4.72	-49.74	-3.6	22.95	197.242	Vertical	Pass
20.0MHz Band QPSK	100/0	2510	-24.52	4.57	-47.71	-3.94	22.56	180.302	Vertical	Pass
		2535	-25.7	4.73	-49.73	-3.81	23.11	204.644	Vertical	Pass
		2560	-25.72	4.75	-49.74	-3.6	22.87	193.642	Vertical	Pass
20.0MHz Band 16 QAM	100/0	2510	-24.34	4.57	-47.71	-3.94	22.74	187.932	Vertical	Pass
		2535	-26.12	4.73	-49.73	-3.81	22.69	185.780	Vertical	Pass
		2560	-25.96	4.75	-49.74	-3.6	22.63	183.231	Vertical	Pass

9.1.4 LTE BAND 17

Radiated Power (ERP) for Band 17											
Mode	RB /RB SIZE	Frequency	Result								Conclusion
			PMea (dBm)	Pcl (dB)	PAg (dB)	Ga Antenna Gain (dB)	Correction (dB)	ERP (dBm)	ERP (W)	Polarization Of Max. ERP	
5.0MHz Band QPSK	25/0	706.5	-27.34	1.44	-53.4	0.7	2.15	21.77	150.314	Horizontal	Pass
		710	-27.85	1.46	-53.4	0.76	2.15	21.18	131.220	Horizontal	Pass
		713.5	-26.61	1.46	-53.4	0.8	2.15	22.38	172.982	Horizontal	Pass
5.0MHz Band 16 QAM	25/0	706.5	-27.05	1.44	-53.4	0.7	2.15	22.06	160.694	Horizontal	Pass
		710	-27.33	1.46	-53.4	0.76	2.15	21.7	147.911	Horizontal	Pass
		713.5	-26.50	1.46	-53.4	0.8	2.15	22.49	177.419	Horizontal	Pass
10.0MHz Band QPSK	50/0	709	-26.69	1.46	-53.2	0.72	2.15	22.18	165.196	Horizontal	Pass
		710	-26.80	1.46	-53.2	0.72	2.15	22.07	161.065	Horizontal	Pass
		711	-26.85	1.46	-53.2	0.72	2.15	22.02	159.221	Horizontal	Pass
10.0MHz Band 16 QAM	50/0	709	-26.79	1.46	-53.2	0.72	2.15	22.08	161.436	Horizontal	Pass
		710	-26.69	1.46	-53.2	0.72	2.15	22.18	165.196	Horizontal	Pass
		711	-26.40	1.46	-53.2	0.72	2.15	22.47	176.604	Horizontal	Pass

Radiated Power (ERP) for Band 17											
Mode	RB /RB SIZE	Frequency	Result								Conclusion
			PMea (dBm)	Pcl (dB)	PAg (dB)	Ga Antenna Gain (dB)	Correction (dB)	ERP (dBm)	ERP (W)	Polarization Of Max. ERP	
5.0MHz Band QPSK	25/0	706.5	-27.57	1.44	-53.4	0.7	2.15	21.54	142.561	Vertical	Pass
		710	-27.98	1.46	-53.4	0.76	2.15	21.05	127.350	Vertical	Pass
		713.5	-27.66	1.46	-53.4	0.8	2.15	21.33	135.831	Vertical	Pass
5.0MHz Band 16 QAM	25/0	706.5	-27.24	1.44	-53.4	0.7	2.15	21.87	153.815	Vertical	Pass
		710	-27.62	1.46	-53.4	0.76	2.15	21.41	138.357	Vertical	Pass
		713.5	-27.93	1.46	-53.4	0.8	2.15	21.06	127.644	Vertical	Pass
10.0MHz Band QPSK	50/0	709	-27.54	1.46	-53.2	0.72	2.15	21.33	135.831	Vertical	Pass
		710	-27.41	1.46	-53.2	0.72	2.15	21.46	139.959	Vertical	Pass
		711	-26.91	1.46	-53.2	0.72	2.15	21.96	157.036	Vertical	Pass
10.0MHz Band 16 QAM	50/0	709	-26.86	1.46	-53.2	0.72	2.15	22.01	158.855	Vertical	Pass
		710	-26.46	1.46	-53.2	0.72	2.15	22.41	174.181	Vertical	Pass
		711	-26.61	1.46	-53.2	0.72	2.15	22.26	168.267	Vertical	Pass

10.0 FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238 and §27.53

LIMIT

§22.917 (e) and §24.238 (a): Out of band emissions. 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.

§27.53 (g) For operations in the 698–746 MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least 43 + 10 log (P) dB.

§27.53 (h) For operations in the 1710–1755 MHz and 2110–2155 MHz bands, 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.

TEST PROCEDURE

For Cellular equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater. 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 100 kHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

For PCS equipment - Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, 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. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

The unwanted emission power shall be measured with a resolution bandwidth of at least 1% of the occupied bandwidth in the 1 MHz band immediately outside and adjacent to the channel edge of the equipment. Beyond the 1 MHz band immediately outside the channel edge of the equipment, a resolution bandwidth of 1 MHz shall be employed. A narrower resolution bandwidth is allowed to be used provided that the measured power is integrated over the full required measurement bandwidth of 1 MHz or 1% of the occupied bandwidth as applicable.

The power of any unwanted emissions measured from the channel edge of the equipment shall be attenuated below the transmitter power, P (dBW), as follows:
a. for base station and subscriber equipment, other than mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB; and
b. for mobile subscriber equipment, the attenuation shall not be less than 43 + 10 Log10 (p), dB at the channel edges and 55 + 10 Log10 (p) at 5.5 MHz away and beyond the channel edges where p in (a) and (b) is the transmitter power measured in watts.

MODES TESTED

LTE Band 2
LTE Band 4
LTE Band 7
LTE Band 17

RESULTS

10.1.2. LTE BAND 2

QPSK EIRP POWER FOR LTE BAND 2 (1.4.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3701.4	-29.84	12.42	-17.42	-13	-4.42	Horizontal
3701.4	-33.64	12.42	-21.22	-13	-8.22	Vertical
5552.1	-36.95	14.12	-22.83	-13	-9.83	Vertical
5552.1	-33.47	14.12	-19.35	-13	-6.35	Horizontal
Test Results for Mid Channel 1732.5MHz						
3760	-33.81	11.76	-22.05	-13	-9.05	Horizontal
3760	-35.19	11.76	-23.43	-13	-10.43	Vertical
5640	-32.05	14.56	-17.49	-13	-4.49	Vertical
5640	-34.65	14.56	-20.09	-13	-7.09	Horizontal
Test Results for High Channel 1754.3MHz						
3818.6	-31.51	11.87	-19.64	-13	-6.64	Horizontal
3818.6	-32.04	11.87	-20.17	-13	-7.17	Vertical
5727.9	-37.76	14.66	-23.1	-13	-10.1	Vertical
5727.9	-33.06	14.66	-18.4	-13	-5.4	Horizontal

QPSK EIRP POWER FOR LTE BAND 2 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3720	-29.94	12.42	-17.52	-13	-4.52	Horizontal
3720	-32.26	12.42	-19.84	-13	-6.84	Vertical
5580	-34.41	14.12	-20.29	-13	-7.29	Vertical
5580	-33.29	14.12	-19.17	-13	-6.17	Horizontal
Test Results for Mid Channel 1732.5MHz						
3760	-34.45	11.76	-22.69	-13	-9.69	Horizontal
3760	-33.36	11.76	-21.6	-13	-8.6	Vertical
5640	-32.29	14.56	-17.73	-13	-4.73	Vertical
5640	-36.96	14.56	-22.4	-13	-9.4	Horizontal
Test Results for High Channel 1754.3MHz						
3800	-33.02	11.87	-21.15	-13	-8.15	Horizontal
3800	-33.25	11.87	-21.38	-13	-8.38	Vertical
5700	-37.78	14.66	-23.12	-13	-10.12	Vertical
5700	-32.26	14.66	-17.6	-13	-4.6	Horizontal

10.1.3. LTE BAND 4

QPSK EIRP POWER FOR LTE BAND 4 (1.4.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	ARpl (dBm)	PMea(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3421.4	-29.98	12.42	-17.56	-13	-4.56	Horizontal
3421.4	-32.26	12.42	-19.84	-13	-6.84	Vertical
5132.1	-34.45	14.12	-20.33	-13	-7.33	Vertical
5132.1	-33.74	14.12	-19.62	-13	-6.62	Horizontal
Test Results for Mid Channel 1732.5MHz						
3465	-35.56	11.76	-23.8	-13	-10.8	Horizontal
3465	-32.29	11.76	-20.53	-13	-7.53	Vertical
5197.5	-33.54	14.56	-18.98	-13	-5.98	Vertical
5197.5	-36.41	14.56	-21.85	-13	-8.85	Horizontal
Test Results for High Channel 1754.3MHz						
3508.6	-33.08	11.87	-21.21	-13	-8.21	Horizontal
3508.6	-32.29	11.87	-20.42	-13	-7.42	Vertical
5262.9	-37.78	14.66	-23.12	-13	-10.12	Vertical
5262.9	-32.65	14.66	-17.99	-13	-4.99	Horizontal

QPSK EIRP POWER FOR LTE BAND 4 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
3440	-29.97	12.42	-17.55	-13	-4.55	Horizontal
3440	-33.18	12.42	-20.76	-13	-7.76	Vertical
5160	-32.28	14.12	-18.16	-13	-5.16	Vertical
5160	-33.62	14.12	-19.5	-13	-6.5	Horizontal
Test Results for Mid Channel 1732.5MHz						
3465	-36.96	11.76	-25.2	-13	-12.2	Horizontal
3465	-34.41	11.76	-22.65	-13	-9.65	Vertical
5197.5	-32.06	14.56	-17.5	-13	-4.5	Vertical
5197.5	-34.19	14.56	-19.63	-13	-6.63	Horizontal
Test Results for High Channel 1754.3MHz						
2490	-33.02	11.87	-21.15	-13	-8.15	Horizontal
3490	-32.26	11.87	-20.39	-13	-7.39	Vertical
5235	-37.89	14.66	-23.23	-13	-10.23	Vertical
5235	-35.56	14.66	-20.9	-13	-7.9	Horizontal

10.1.3. LTE BAND 7

QPSK EIRP POWER FOR LTE BAND 7 (5.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5005	-29.96	12.42	-17.54	-13	-4.54	Horizontal
5005	-32.26	12.42	-19.84	-13	-6.84	Vertical
7507.5	-64.41	14.12	-50.29	-13	-37.29	Vertical
7507.5	-33.96	14.12	-19.84	-13	-6.84	Horizontal
Test Results for Mid Channel 1732.5MHz						
5070	-34.49	11.76	-22.73	-13	-9.73	Horizontal
5070	-32.17	11.76	-20.41	-13	-7.41	Vertical
7605	-32.52	14.56	-17.96	-13	-4.96	Vertical
7605	-36.59	14.56	-22.03	-13	-9.03	Horizontal
Test Results for High Channel 1754.3MHz						
5135	-33.01	11.87	-21.14	-13	-8.14	Horizontal
5135	-33.65	11.87	-21.78	-13	-8.78	Vertical
7702.5	-35.59	14.66	-20.93	-13	-7.93	Vertical
7702.5	-32.52	14.66	-17.86	-13	-4.86	Horizontal

QPSK EIRP POWER FOR LTE BAND 7 (20.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
5020	-30.01	12.42	-17.59	-13	-4.59	Horizontal
5020	-33.16	12.42	-20.74	-13	-7.74	Vertical
7530	-34.45	14.12	-20.33	-13	-7.33	Vertical
7530	-35.59	14.12	-21.47	-13	-8.47	Horizontal
Test Results for Mid Channel 1732.5MHz						
5070	-34.41	11.76	-22.65	-13	-9.65	Horizontal
5070	-32.26	11.76	-20.5	-13	-7.5	Vertical
7605	-32.29	14.56	-17.73	-13	-4.73	Vertical
7605	-36.44	14.56	-21.88	-13	-8.88	Horizontal
Test Results for High Channel 1754.3MHz						
5120	-32.42	11.87	-20.55	-13	-7.55	Horizontal
5120	-32.19	11.87	-20.32	-13	-7.32	Vertical
7680	-37.74	14.66	-23.08	-13	-10.08	Vertical
7680	-33.62	14.66	-18.96	-13	-5.96	Horizontal

10.1.4. LTE BAND 17

QPSK EIRP POWER FOR LTE BAND 7 (5.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1413	-29.68	12.42	-17.26	-13	-4.26	Horizontal
1413	-33.62	12.42	-21.2	-13	-8.2	Vertical
2119.5	-34.47	14.12	-20.35	-13	-7.35	Vertical
2119.5	-33.65	14.12	-19.53	-13	-6.53	Horizontal
Test Results for Mid Channel 1732.5MHz						
1420	-34.41	11.76	-22.65	-13	-9.65	Horizontal
1420	-32.26	11.76	-20.5	-13	-7.5	Vertical
2130	-32.52	14.56	-17.96	-13	-4.96	Vertical
2130	-36.59	14.56	-22.03	-13	-9.03	Horizontal
Test Results for High Channel 1754.3MHz						
1427	-32.1	11.87	-20.23	-13	-7.23	Horizontal
1427	-33.56	11.87	-21.69	-13	-8.69	Vertical
2140.5	-37.91	14.66	-23.25	-13	-10.25	Vertical
2140.5	-32.99	14.66	-18.33	-13	-5.33	Horizontal

QPSK EIRP POWER FOR LTE BAND 17 (10.0MHZ BANDWIDTH)

Test Results for Low Channel 1710.7MHz						
Frequency(MHz)	Power(dBm)	A_{Rpl} (dBm)	P_{Mea}(dBm)	Limit （dBm）	Margin(dBm)	Polarity
1418	-30.12	12.42	-17.7	-13	-4.7	Horizontal
1418	-30.65	12.42	-18.23	-13	-5.23	Vertical
2127	-34.49	14.12	-20.37	-13	-7.37	Vertical
2127	-33.41	14.12	-19.29	-13	-6.29	Horizontal
Test Results for Mid Channel 1732.5MHz						
1420	-37.79	11.76	-26.03	-13	-13.03	Horizontal
1420	-32.26	11.76	-20.5	-13	-7.5	Vertical
2130	-32.52	14.56	-17.96	-13	-4.96	Vertical
2130	-36.96	14.56	-22.4	-13	-9.4	Horizontal
Test Results for High Channel 1754.3MHz						
1422	-34.17	11.87	-22.3	-13	-9.3	Horizontal
1422	-32.26	11.87	-20.39	-13	-7.39	Vertical
2133	-37.89	14.66	-23.23	-13	-10.23	Vertical
2133	-32.56	14.66	-17.9	-13	-4.9	Horizontal

11. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235, §27.54

LIMITS

§22.355 - The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations.

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

TEST PROCEDURE

Use CMW 500 with Frequency Error measurement capability.

Temp. = −30° to +50°C

Voltage =low voltage, 3.4VDC, Normal, 3.8VDC and High voltage, 4.3VDC.

Frequency Stability vs Temperature:

The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.

Frequency Stability vs Voltage:

The peak frequency error is recorded (worst-case).

MODES TESTED

LTE Band 2

LTE Band 4

LTE Band 7

LTE Band 17

RESULTS

See the following pages.

11.1.1. LTE BAND 2

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH *18900* RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	3.6	0.001933	2.5
3.8	1880	4.5	0.002397	2.5
4.3	1880	3.1	0.001628	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 QPSK, (CH *18900* RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	3.7	0.001968	2.5
Extreme (50C)	1880	4.1	0.002181	2.5
Extreme (40C)	1880	4.5	0.002394	2.5
Extreme (30C)	1880	3.9	0.002074	2.5
Extreme (10C)	1880	4.8	0.002553	2.5
Extreme (0C)	1880	5	0.002660	2.5
Extreme (-10C)	1880	3.6	0.001915	2.5
Extreme (-20C)	1880	3.9	0.002074	2.5
Extreme (-30C)	1880	4	0.002128	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH *18900* RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1880	-4.6	-0.002435	2.5
3.8	1880	-3.2	-0.001682	2.5
4.3	1880	-5.3	-0.002808	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 2 16QAM, (CH *18900* RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1880	-5.6	-0.002979	2.5
Extreme (50C)	1880	4.8	0.002553	2.5
Extreme (40C)	1880	-3.9	-0.002074	2.5
Extreme (30C)	1880	-5.1	-0.002713	2.5
Extreme (10C)	1880	-4.7	-0.002500	2.5
Extreme (0C)	1880	-4.4	-0.002340	2.5
Extreme (-10C)	1880	3.9	0.002074	2.5
Extreme (-20C)	1880	-5.6	-0.002979	2.5
Extreme (-30C)	1880	-3.9	-0.002074	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

11.1.2. LTE BAND 4

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	-7.2	-0.004161	2.5
3.8	1732.5	-8.3	-0.004806	2.5
4.3	1732.5	-5.8	-0.003328	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 QPSK, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	-7.4	-0.004271	2.5
Extreme (50C)	1732.5	-6.9	-0.003983	2.5
Extreme (40C)	1732.5	-6.5	-0.003752	2.5
Extreme (30C)	1732.5	-5.9	-0.003405	2.5
Extreme (10C)	1732.5	-7.1	-0.004098	2.5
Extreme (0C)	1732.5	-8.5	-0.004906	2.5
Extreme (-10C)	1732.5	-8.8	-0.005079	2.5
Extreme (-20C)	1732.5	-6.4	-0.003694	2.5
Extreme (-30C)	1732.5	-5.1	-0.002944	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	1732.5	-4.9	-0.002832	2.5
3.8	1732.5	-3.9	-0.002271	2.5
4.3	1732.5	-6.6	-0.003782	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 4 16QAM, (CH 20175 RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	1732.5	-4.9	-0.002828	2.5
Extreme (50C)	1732.5	-5.1	-0.002944	2.5
Extreme (40C)	1732.5	-3.9	-0.002251	2.5
Extreme (30C)	1732.5	-3.3	-0.001905	2.5
Extreme (10C)	1732.5	-3.6	-0.002078	2.5
Extreme (0C)	1732.5	-4.1	-0.002367	2.5
Extreme (-10C)	1732.5	-4.7	-0.002713	2.5
Extreme (-20C)	1732.5	-4.5	-0.002597	2.5
Extreme (-30C)	1732.5	-4.8	-0.002771	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

11.1.3. LTE BAND 7

QPSK, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH *21100* RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2535	8.5	0.003346	2.5
3.8	2535	6	0.002359	2.5
4.3	2535	6.4	0.002528	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 QPSK, (CH *21100* RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	6.9	0.002722	2.5
Extreme (50C)	2535	6.1	0.002406	2.5
Extreme (40C)	2535	5.2	0.002051	2.5
Extreme (30C)	2535	5.7	0.002249	2.5
Extreme (10C)	2535	3.8	0.001499	2.5
Extreme (0C)	2535	4.7	0.001854	2.5
Extreme (-10C)	2535	5.8	0.002288	2.5
Extreme (-20C)	2535	6.3	0.002485	2.5
Extreme (-30C)	2535	7.1	0.002801	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH *21100* RB size 100 RB Offset 0 20MHz BANDWIDTH)				
3.4	2535	9.4	0.003713	2.5
3.8	2535	-8.6	-0.003408	2.5
4.3	2535	4.5	0.001794	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 7 16QAM, (CH *21100* RB size 100 RB Offset 0 20MHz BANDWIDTH)				
Normal (25C)	2535	-6.9	-0.002722	2.5
Extreme (50C)	2535	-5.8	-0.002288	2.5
Extreme (40C)	2535	4.1	0.001617	2.5
Extreme (30C)	2535	3.6	0.001420	2.5
Extreme (10C)	2535	-4.7	-0.001854	2.5
Extreme (0C)	2535	-5.9	-0.002327	2.5
Extreme (-10C)	2535	-6.6	-0.002604	2.5
Extreme (-20C)	2535	5.1	0.002012	2.5
Extreme (-30C)	2535	4.3	0.001696	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

11.1.4. LTE BAND 17

QPSK, (10MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH *23790* RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710	3.1	0.004352	2.5
3.8	710	4.5	0.006347	2.5
4.3	710	4	0.005682	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 QPSK, (CH *23790* RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710	3.6	0.005070	2.5
Extreme (50C)	710	3.7	0.005211	2.5
Extreme (40C)	710	5.1	0.007183	2.5
Extreme (30C)	710	5.2	0.007324	2.5
Extreme (10C)	710	4.9	0.006901	2.5
Extreme (0C)	710	4.7	0.006620	2.5
Extreme (-10C)	710	4.2	0.005915	2.5
Extreme (-20C)	710	6.9	0.009718	2.5
Extreme (-30C)	710	5.3	0.007465	2.5

16QAM, (20MHz BANDWIDTH)

Frequency error vs. Voltage

Voltage [Vdc]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 16QAM, (CH *23790* RB size 50 RB Offset 0 10MHz BANDWIDTH)				
3.4	710	3.4	0.004795	2.5
3.8	710	4	0.005621	2.5
4.3	710	4.3	0.006044	2.5

Frequency error vs. Temperature

Temperature [° C]	Frequency [MHz]	Frequency* Error[Hz]	Frequency Error[ppm]	Limit [ppm]
BAND 17 16QAM, (CH *23790* RB size 50 RB Offset 0 10MHz BANDWIDTH)				
Normal (25C)	710	3.1	0.004366	2.5
Extreme (50C)	710	2.9	0.004085	2.5
Extreme (40C)	710	4	0.005634	2.5
Extreme (30C)	710	4.5	0.006338	2.5
Extreme (10C)	710	6.5	0.009155	2.5
Extreme (0C)	710	4.2	0.005915	2.5
Extreme (-10C)	710	4.7	0.006620	2.5
Extreme (-20C)	710	3.9	0.005493	2.5
Extreme (-30C)	710	3.5	0.004930	2.5

***Note:** Frequency error measurements were made by using the build-in capability of the Wireless Communication Test Set.

12. Peak-to-Average Ratio

12.1.1 DESCRIPTION OF THE PAR MEASUREMENT

The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

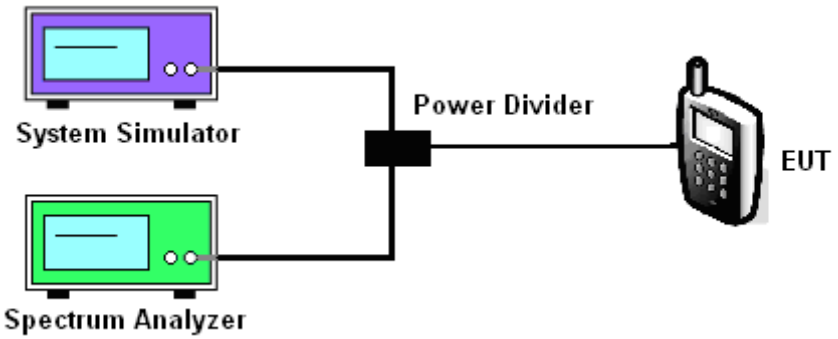
12.1.2 MEASURING INSTRUMENTS

See list of measuring instruments of this test report.

12.1.3 TEST PROCEDURES

1. The EUT was connected to Spectrum Analyzer and Base Station via power divider.
2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.
3. For GSM/EGPRS operating modes:
   a. Set the RBW = 1MHz, VBW = 1MHz, Peak detector in spectrum analyzer.
   b. Set EUT in maximum power output, and triggered the burst signal.
   c. Measured respectively the Peak level and Mean level, and the deviation was recorded as Peak to Average Ratio.
4. For UMTS operating modes:
   a. Set the CCDF (Complementary Cumulative Distribution Function) option in spectrum analyzer.
   b. The highest RF powers were measured and recorded the maximum PAPR level associated with a probability of 0.1 %.

12.1.4 TEST SETUP



MODES TESTED

LTE Band 2
LTE Band 4

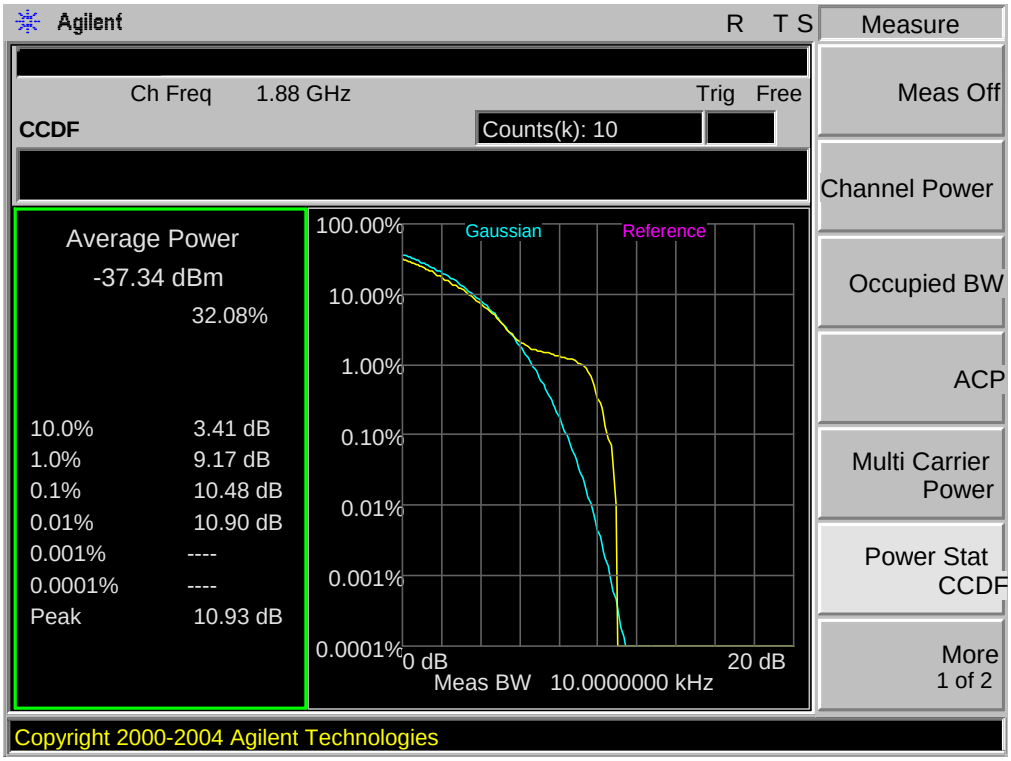
LTE Band 7
LTE Band 17

BAND	CHANNEL	Frequency [MHz]	BANDWIDTH	NO. RB	RB POS.	MODULATION	PAR [dB]
2	18900	1880.0	1.4	1	Low	QPSK	10.47
2	18900	1880.0	1.4	1	Low	16QAM	10.72
2	18900	1880.0	3.0	1	Low	QPSK	6.75
2	18900	1880.0	3.0	1	Low	16QAM	6.00
2	18900	1880.0	5.0	1	Low	QPSK	3.13
2	18900	1880.0	5.0	1	Low	16QAM	2.71
2	18900	1880.0	10.0	1	Low	QPSK	3.00
2	18900	1880.0	10.0	1	Low	16QAM	2.79
2	18900	1880.0	15.0	1	Low	QPSK	2.46
2	18900	1880.0	15.0	1	Low	16QAM	2.33
2	18900	1880.0	20.0	1	Low	QPSK	2.34
2	18900	1880.0	20.0	1	Low	16QAM	2.90
4	20175	1732.5	1.4	1	Low	QPSK	9.50
4	20175	1732.5	1.4	1	Low	16QAM	9.20
4	20175	1732.5	3.0	1	Low	QPSK	5.67
4	20175	1732.5	3.0	1	Low	16QAM	5.45
4	20175	1732.5	5.0	1	Low	QPSK	2.67
4	20175	1732.5	5.0	1	Low	16QAM	2.67

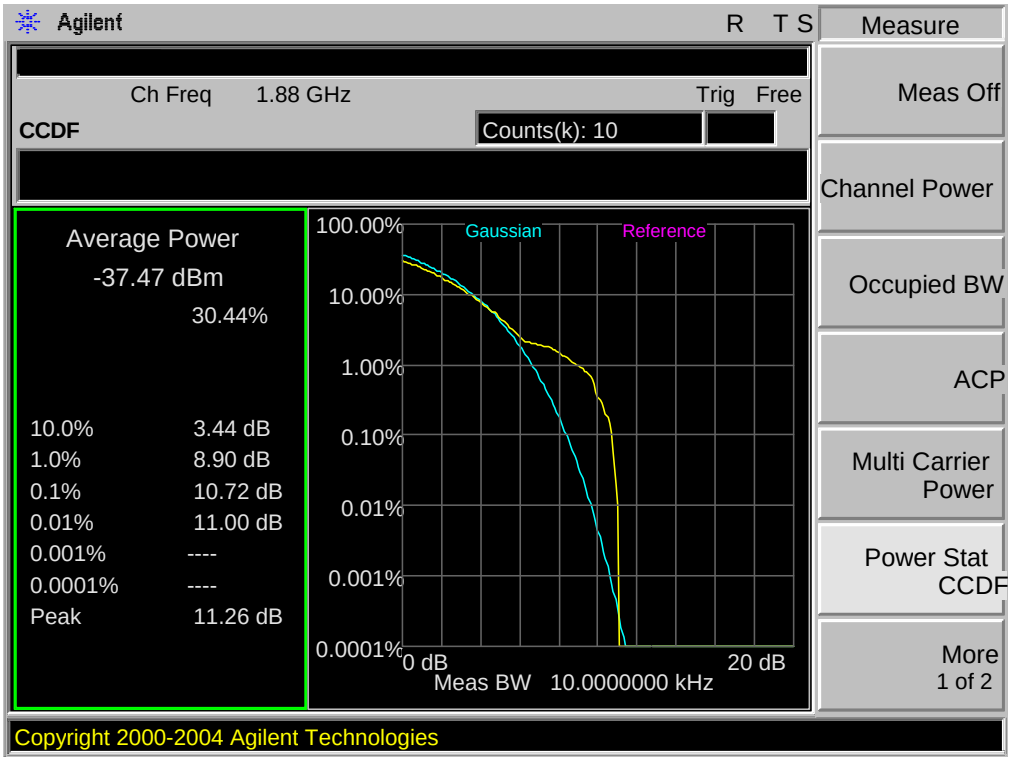
4	20175	1732.5	10.0	1	Low	QPSK	2.63
4	20175	1732.5	10.0	1	Low	16QAM	3.27
4	20175	1732.5	15.0	1	Low	QPSK	3.26
4	20175	1732.5	15.0	1	Low	16QAM	3.09
4	20175	1732.5	20.0	1	Low	QPSK	2.71
4	20175	1732.5	20.0	1	Low	16QAM	2.72
7	21100	2535.0	5.0	1	Low	QPSK	8.05
7	21100	2535.0	5.0	1	Low	16QAM	8.40
7	21100	2535.0	10.0	1	Low	QPSK	8.20
7	21100	2535.0	10.0	1	Low	16QAM	8.30
7	21100	2535.0	15.0	1	Low	QPSK	7.90
7	21100	2535.0	15.0	1	Low	16QAM	7.87
7	21100	2535.0	20.0	1	Low	QPSK	8.30
7	21100	2535.0	20.0	1	Low	16QAM	8.03
17	23790	710.0	5.0	1	Low	QPSK	1.87
17	23790	710.0	5.0	1	Low	16QAM	2.17
17	23790	710.0	10.0	1	Low	QPSK	1.83
17	23790	710.0	10.0	1	Low	16QAM	1.63

12.1.5. LTE BAND 2

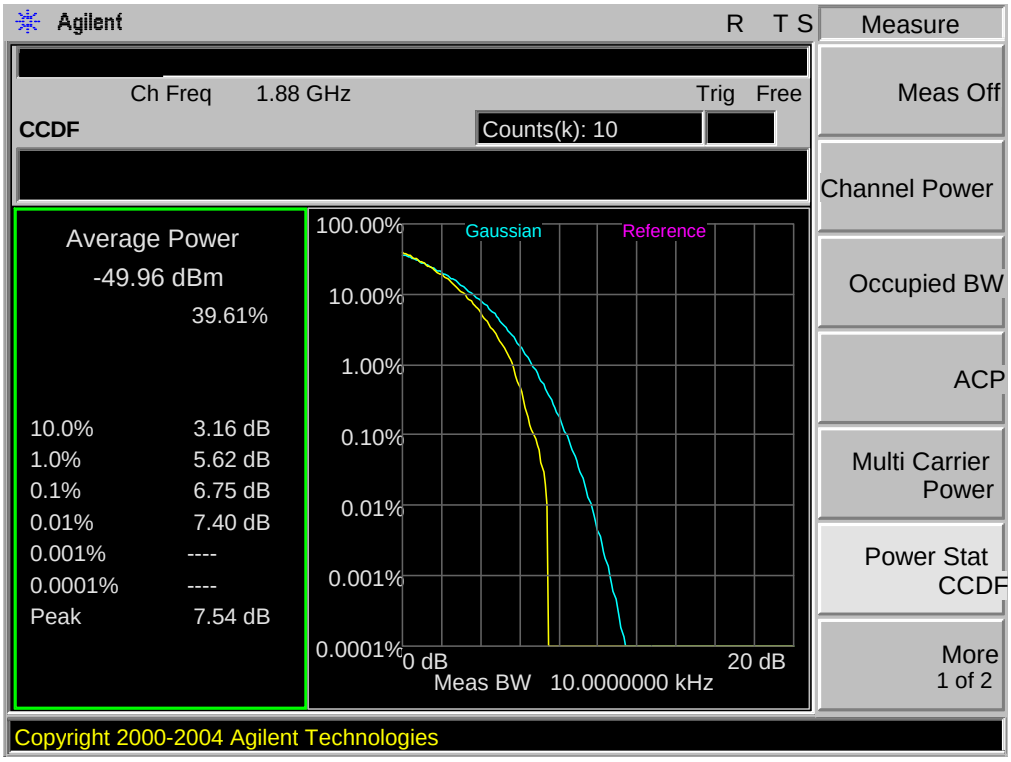
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 1.4,NO. RB 1,RB POS. Low,QPSK



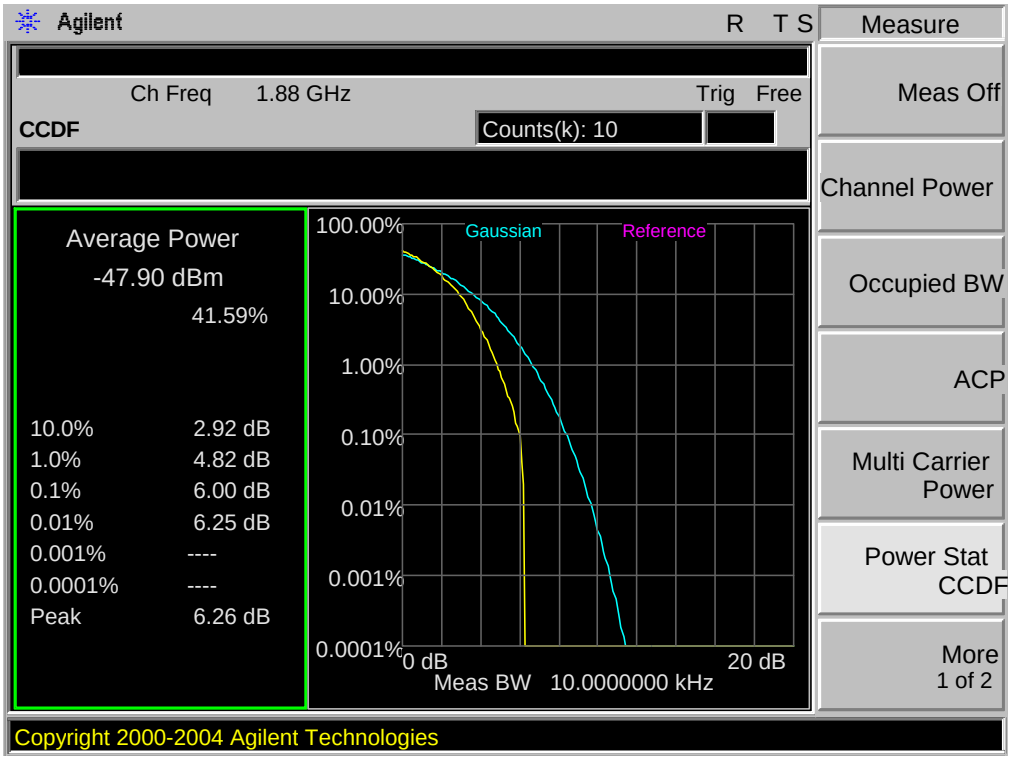
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 1.4,NO. RB 1,RB POS. Low,16QAM



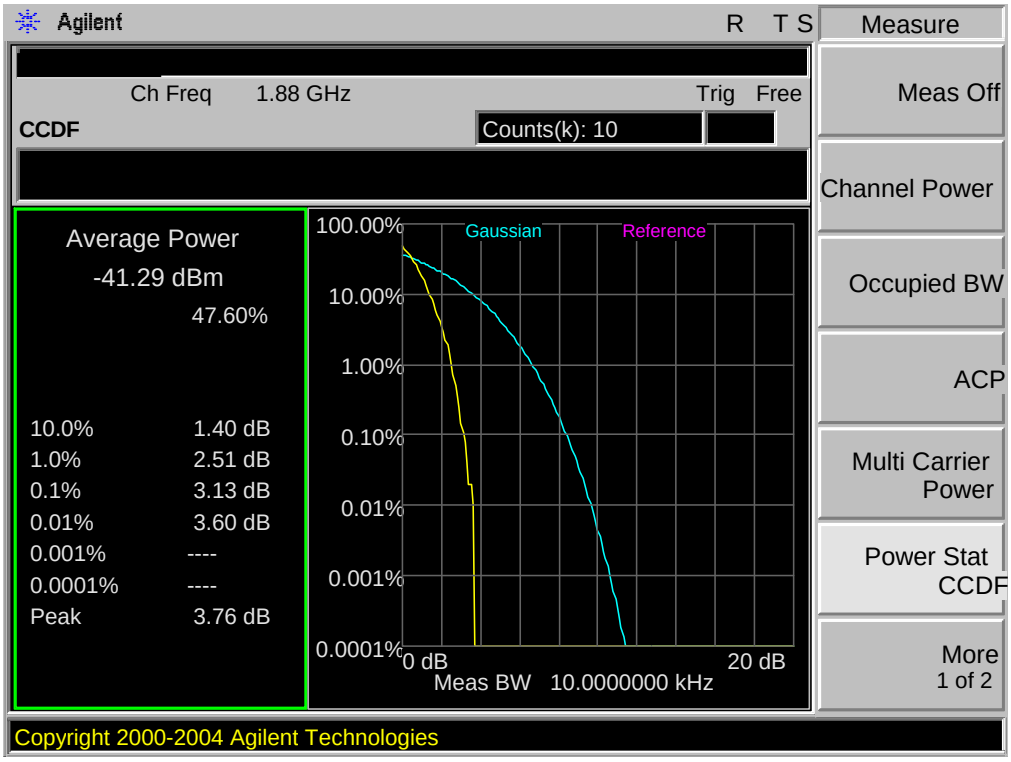
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 3.0,NO. RB 1,RB POS. Low,QPSK



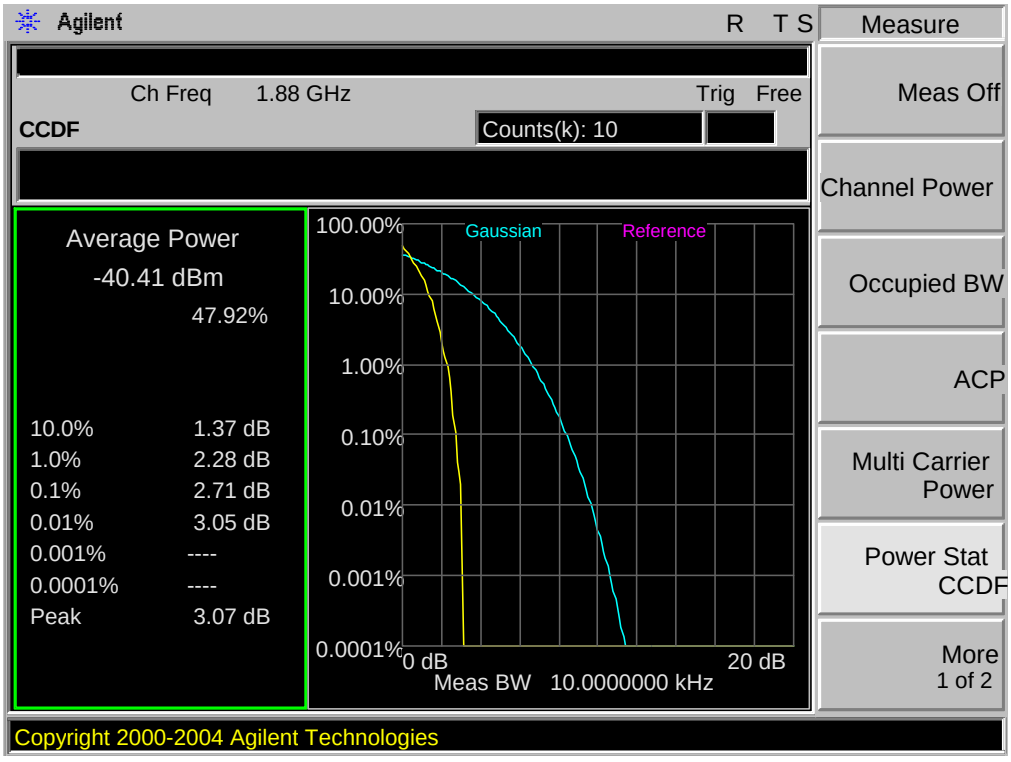
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 3.0,NO. RB 1,RB POS. Low,16QAM



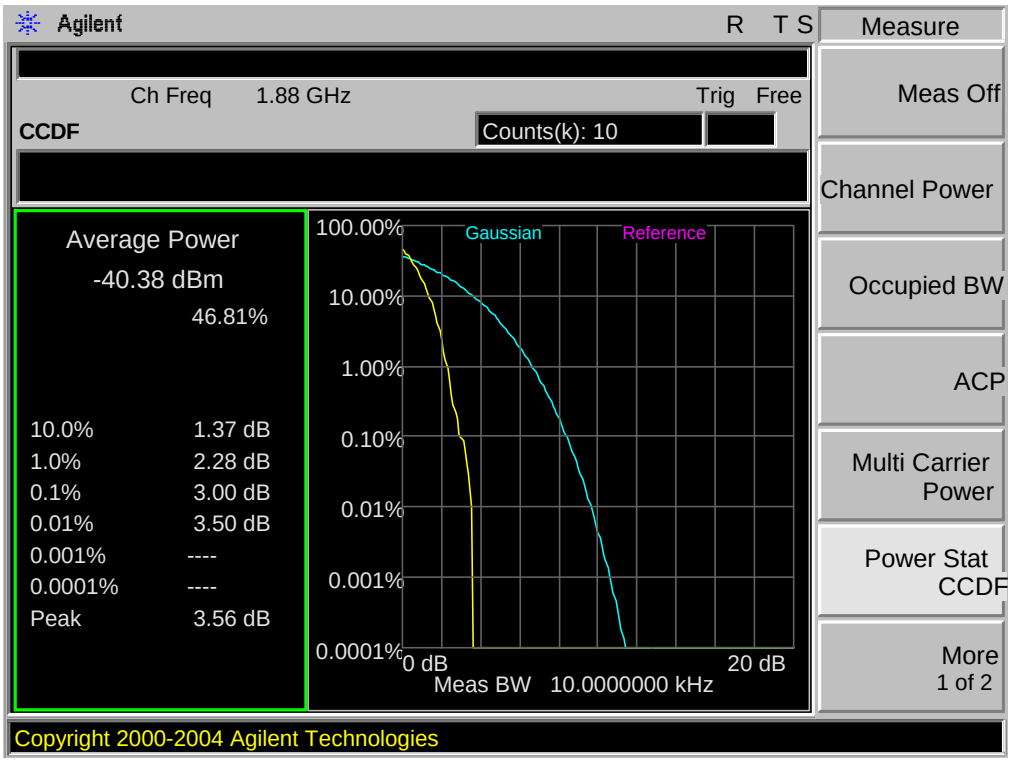
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



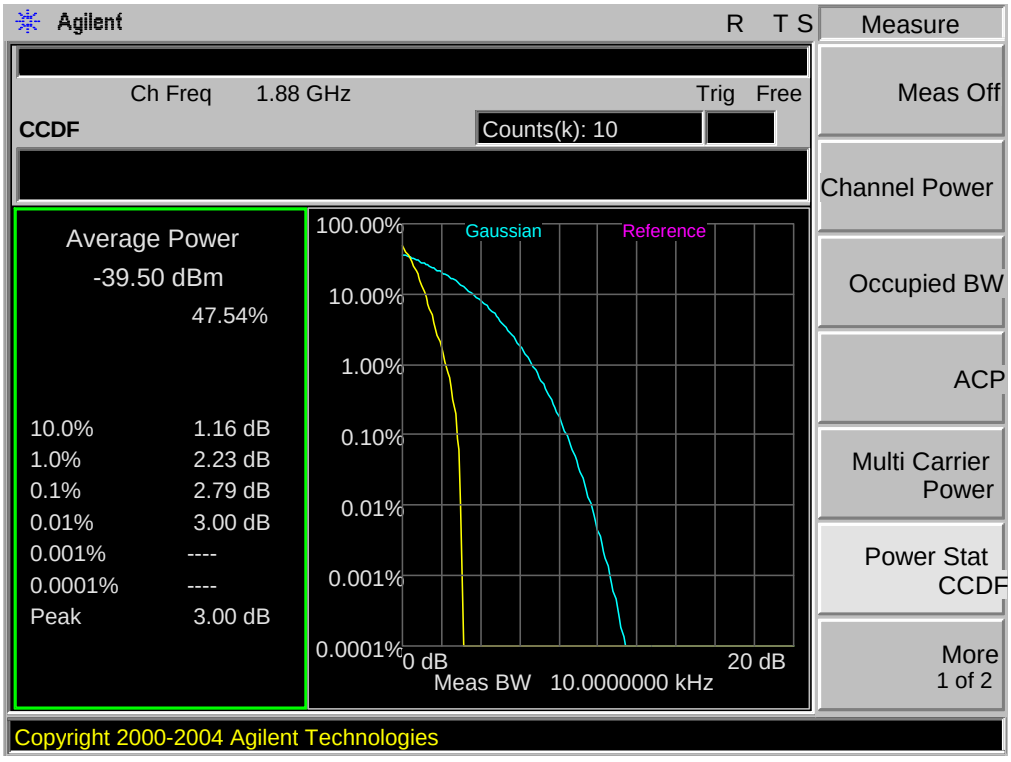
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 5.0,NO. RB 1,RB POS. Low,16QAM



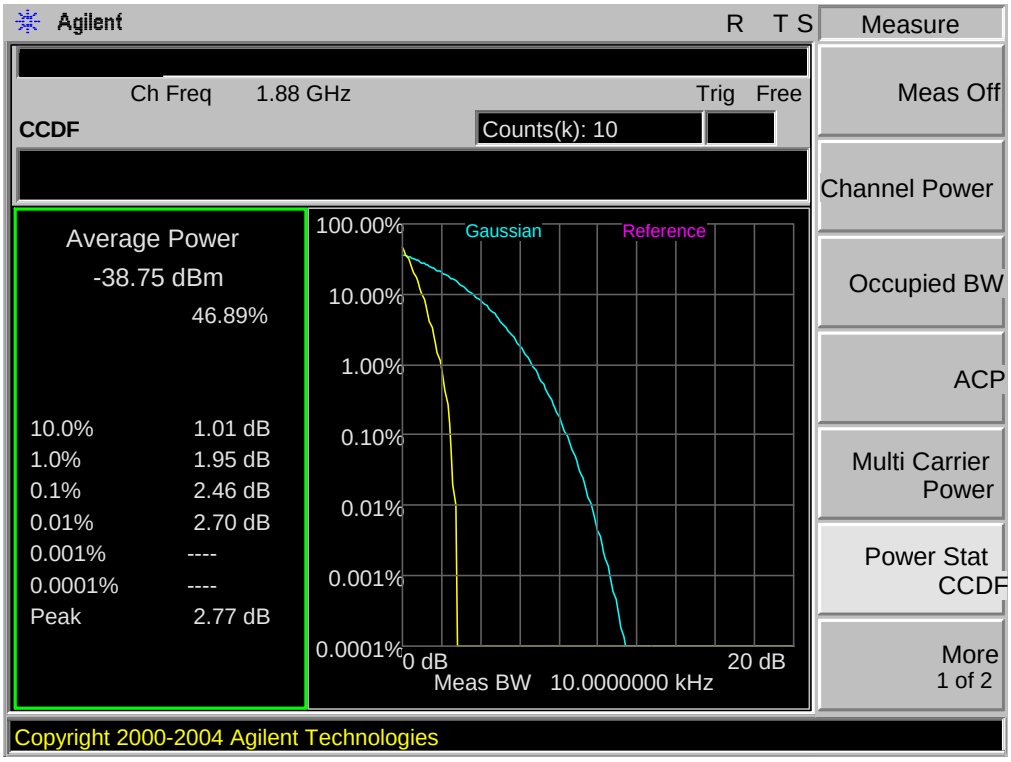
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



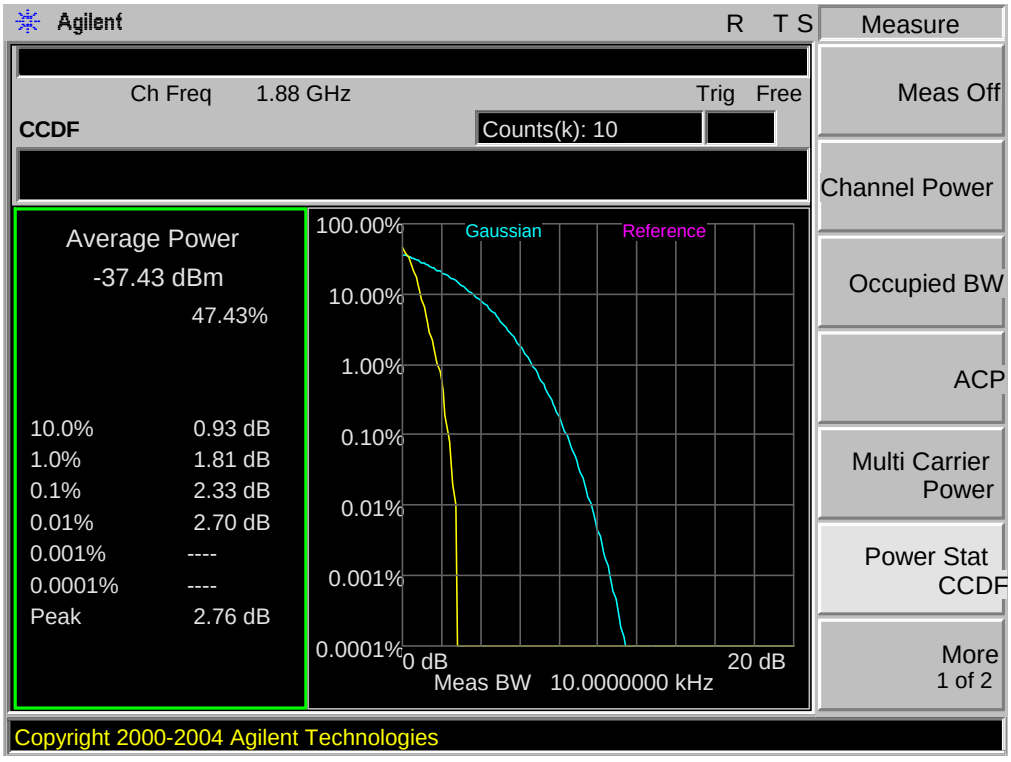
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



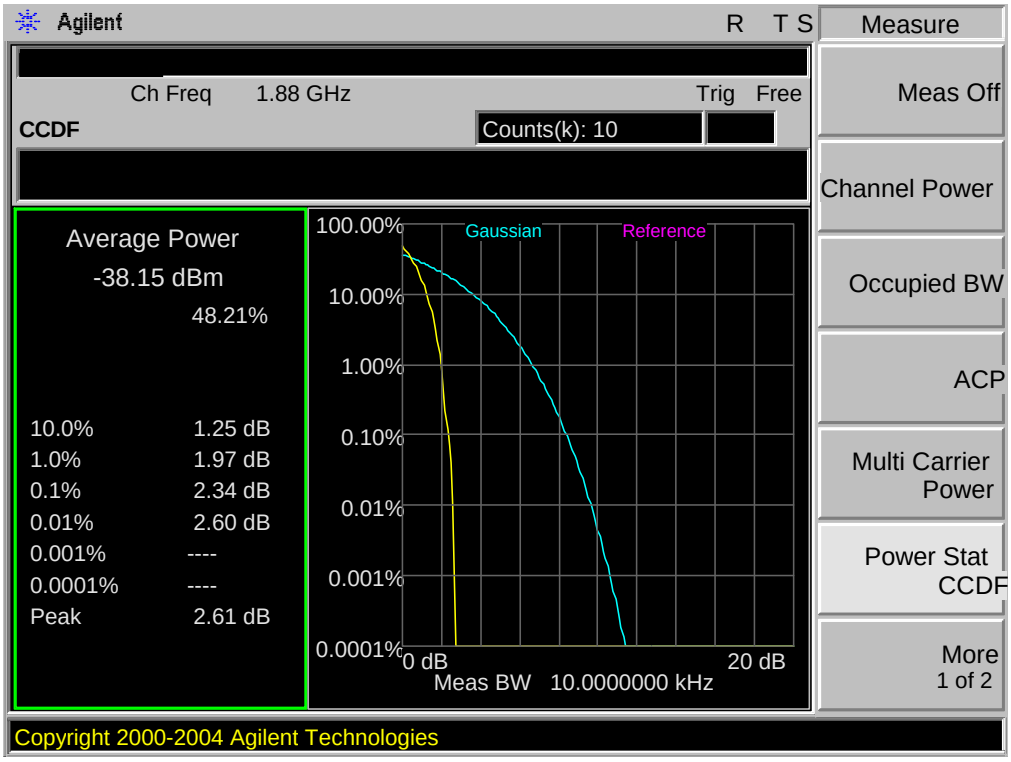
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



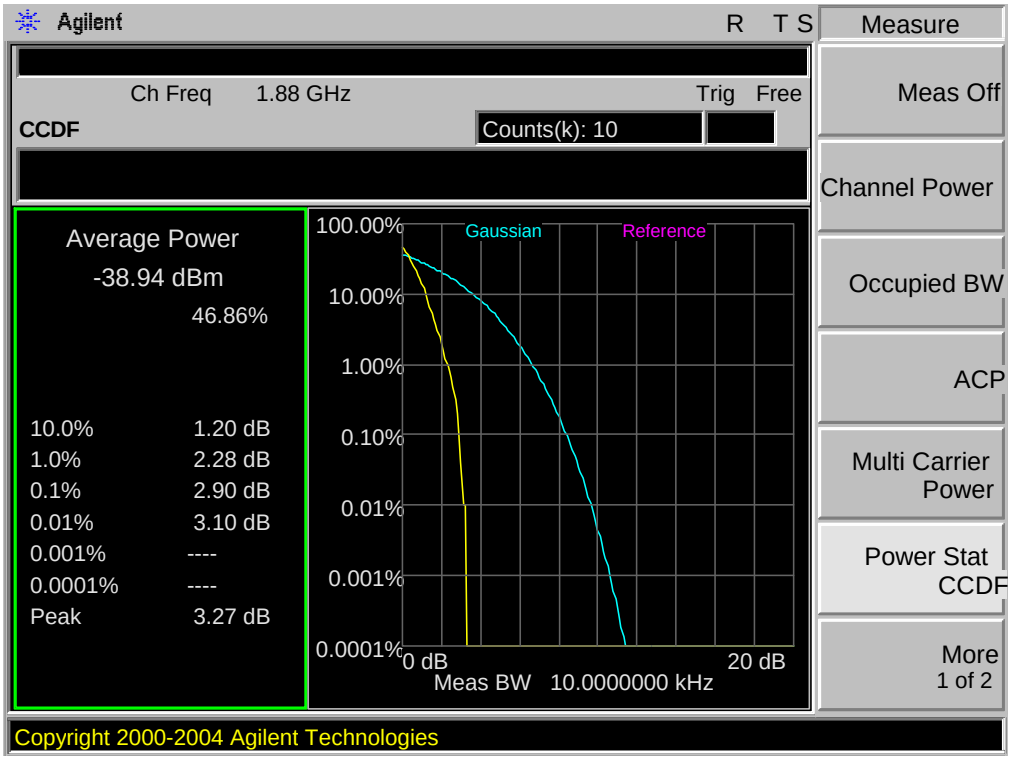
Band 2,UL Channel 18900,UL Frequency 1880.0,BW 15.0,NO. RB 1,RB POS. Low,16QAM



Band 2,UL Channel 18900,UL Frequency 1880.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK

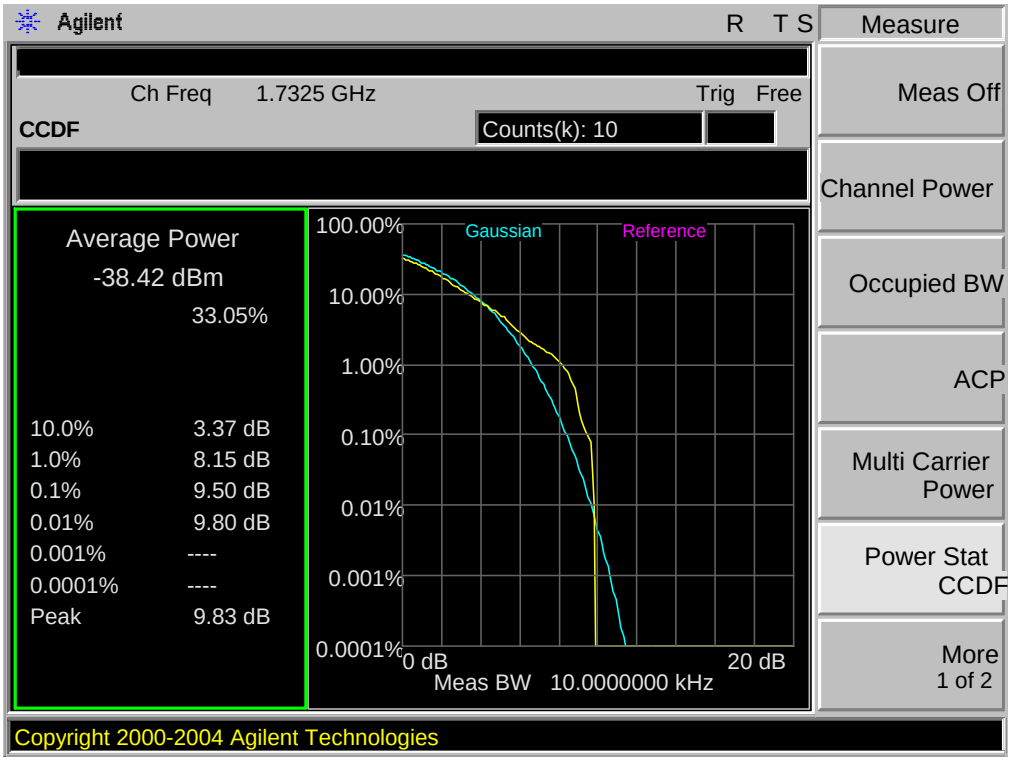


Band 2,UL Channel 18900,UL Frequency 1880.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM

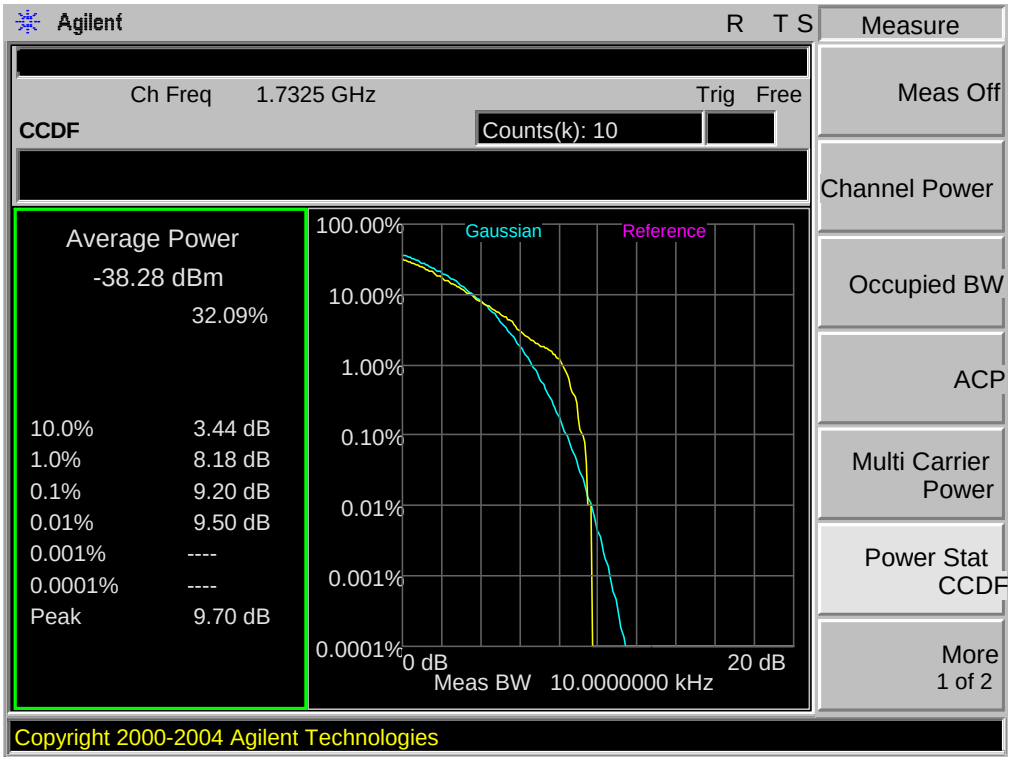


12.1.6. LTE BAND 4

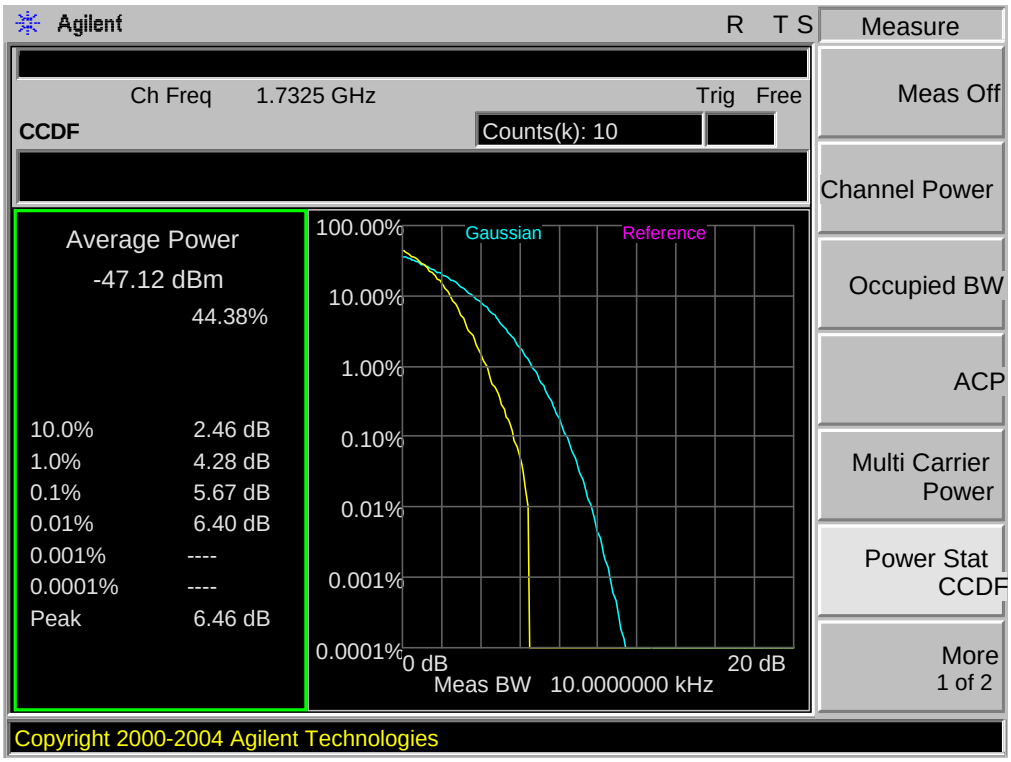
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,QPSK



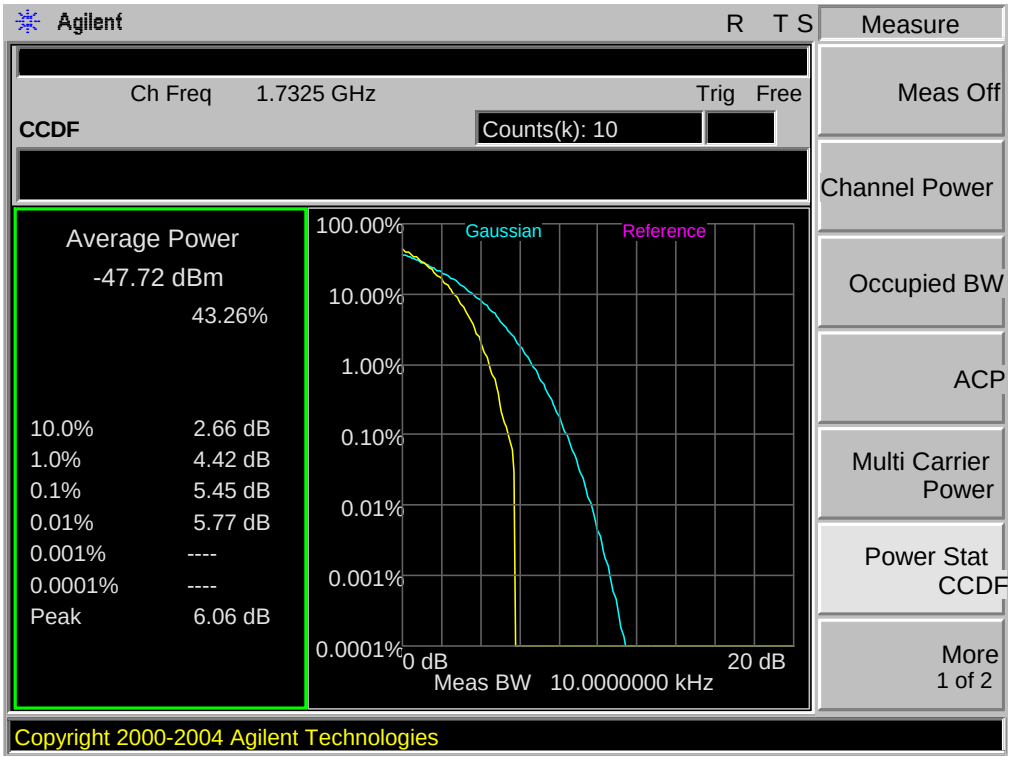
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 1.4,NO. RB 1,RB POS. Low,16QAM



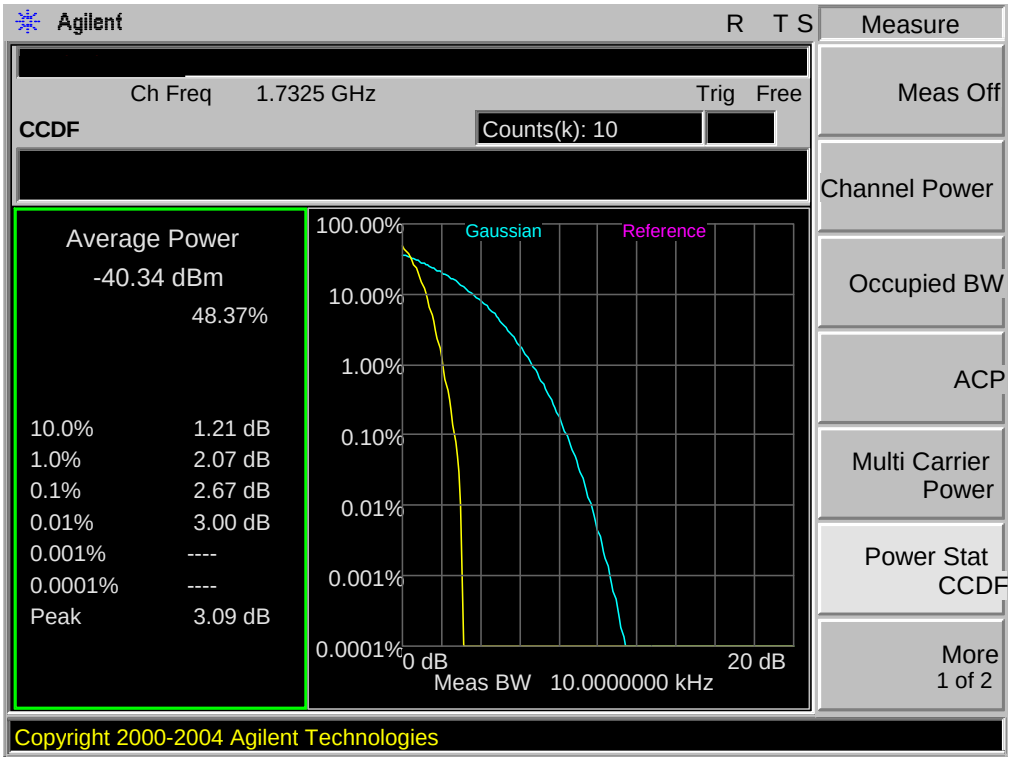
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,QPSK



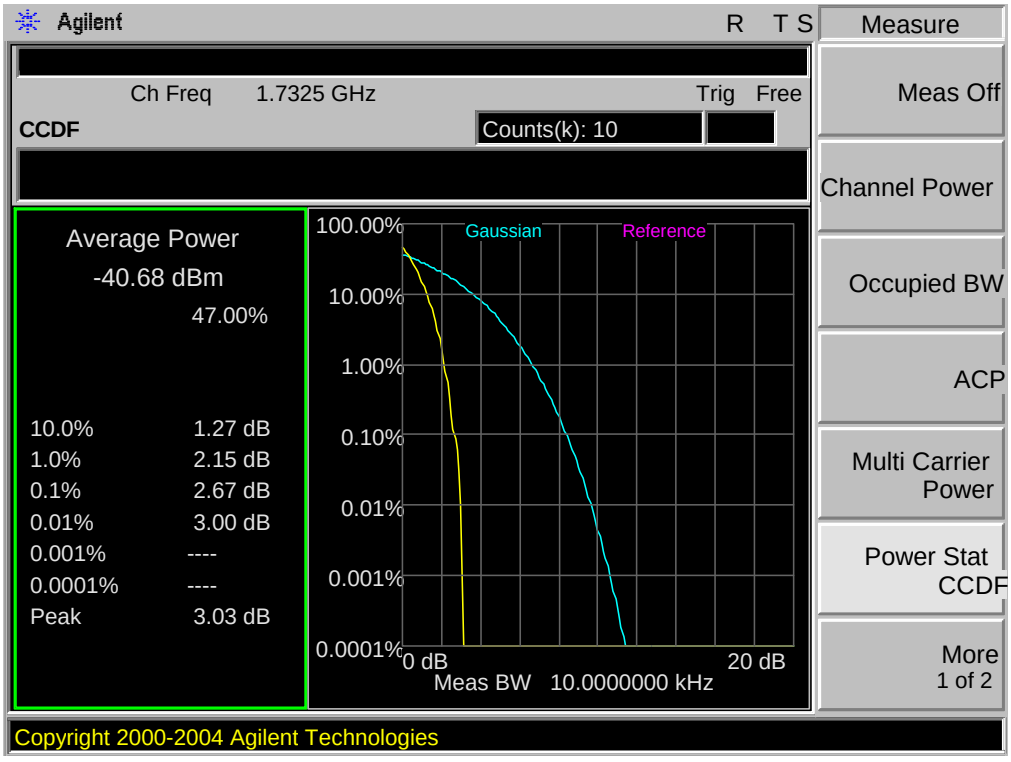
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 3.0,NO. RB 1,RB POS. Low,16QAM



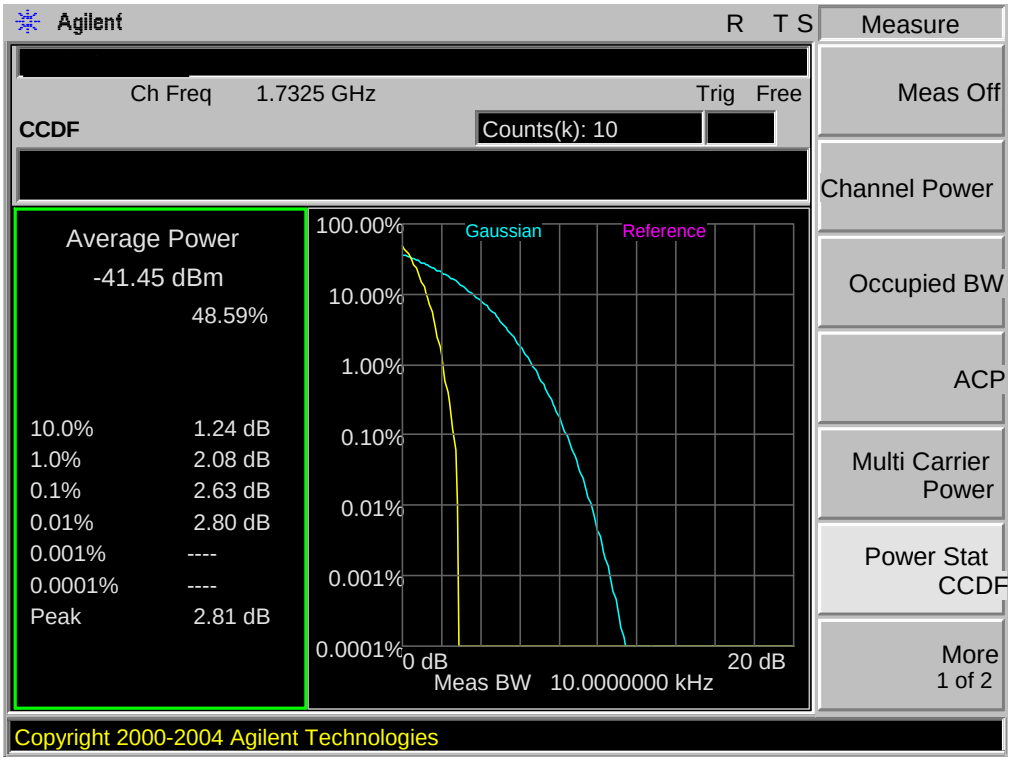
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,QPSK



Band 4,UL Channel 20175,UL Frequency 1732.5,BW 5.0,NO. RB 1,RB POS. Low,16QAM



Band 4,UL Channel 20175,UL Frequency 1732.5,BW 10.0,NO. RB 1,RB POS. Low,QPSK



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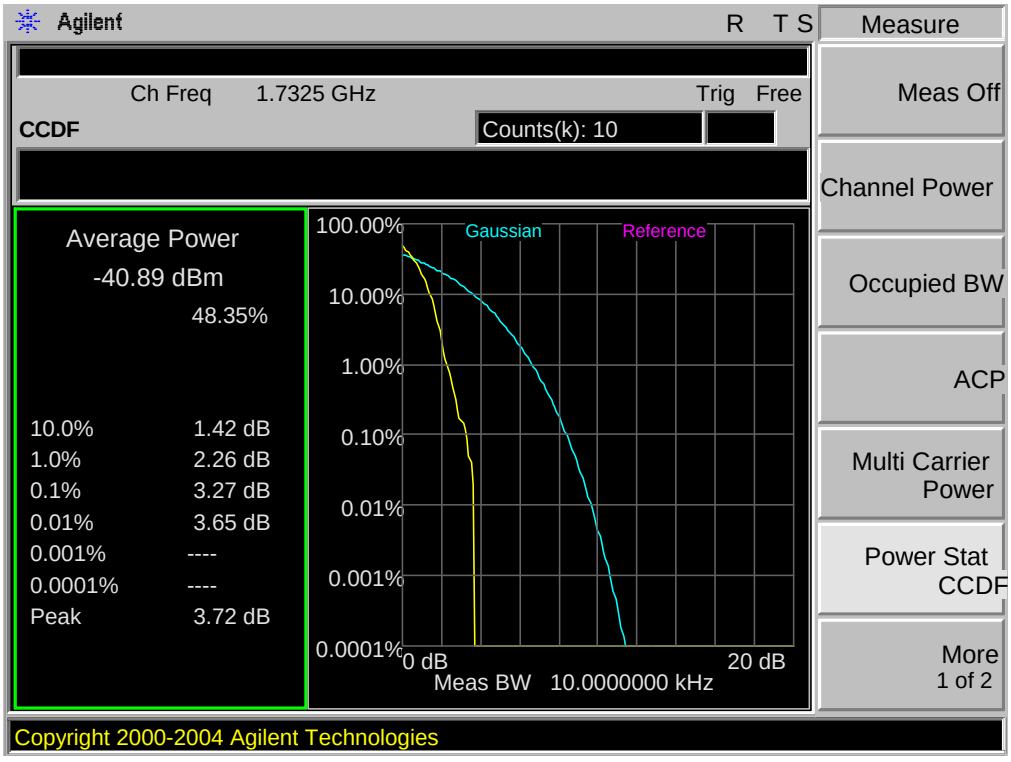

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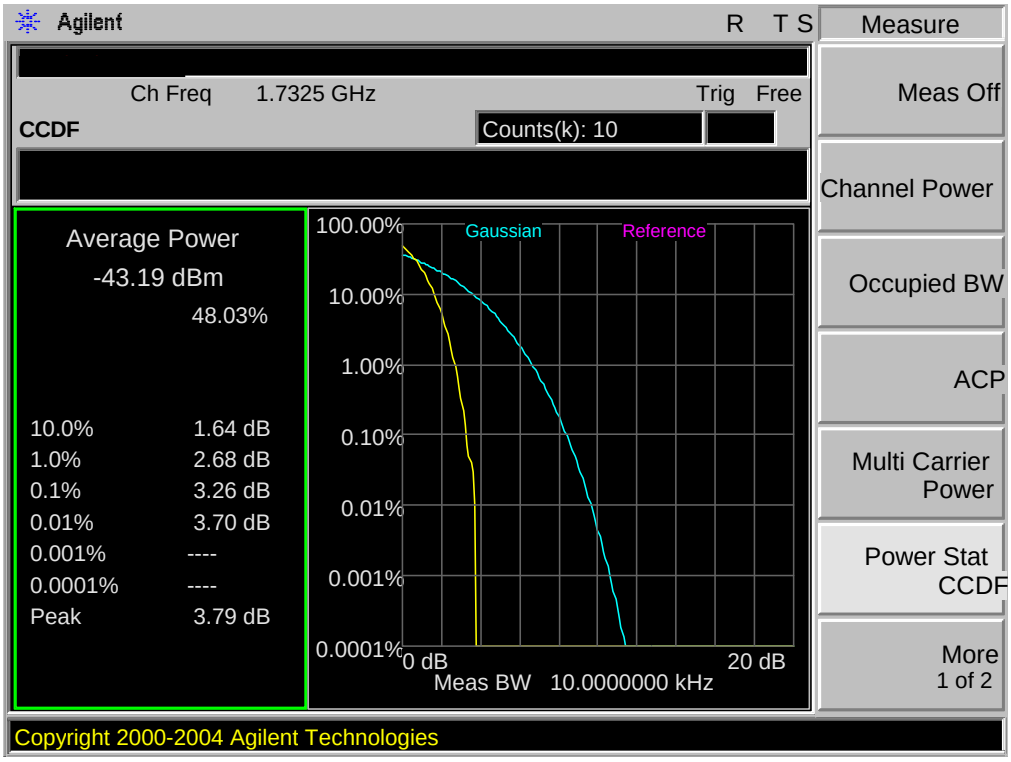
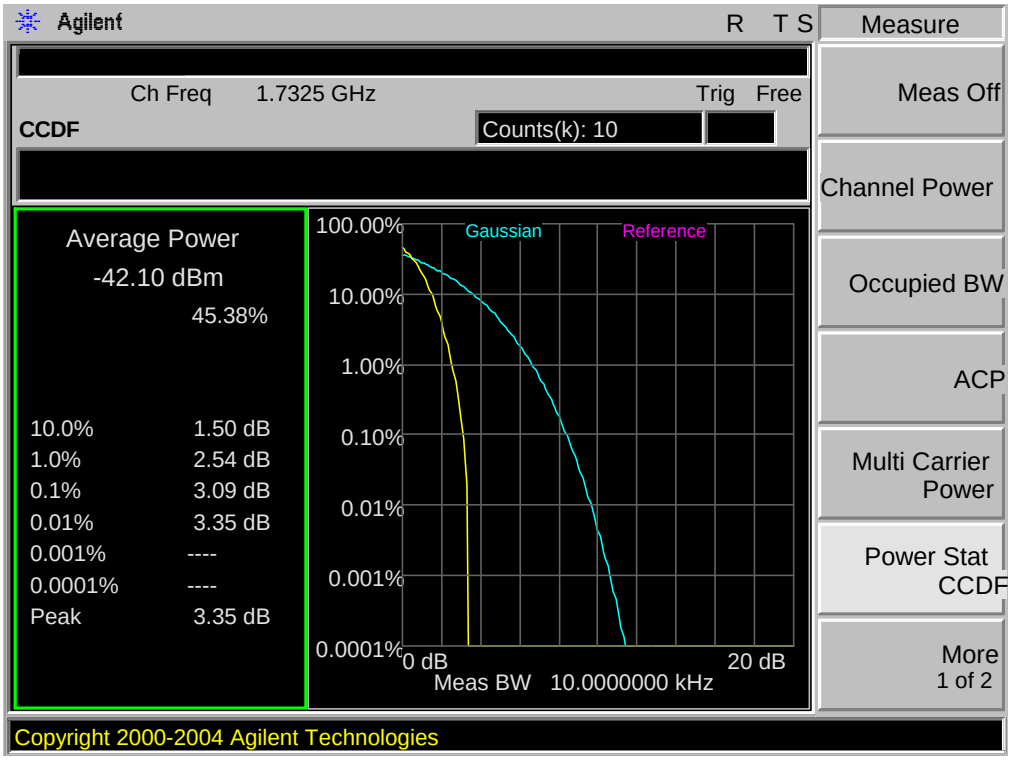
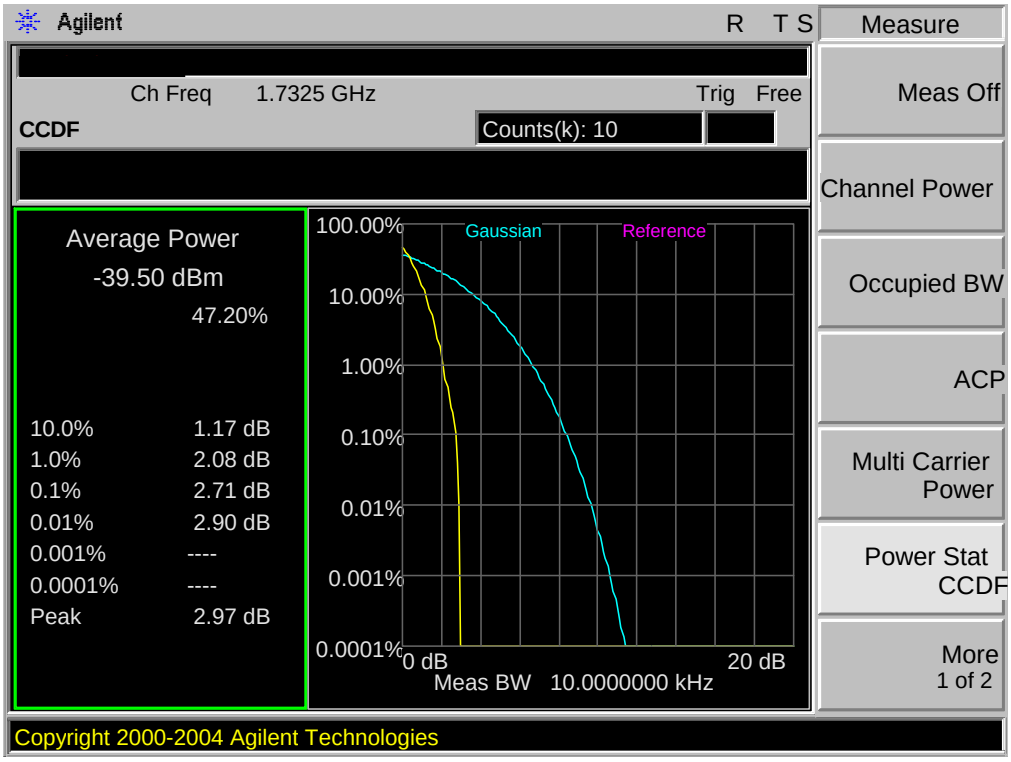


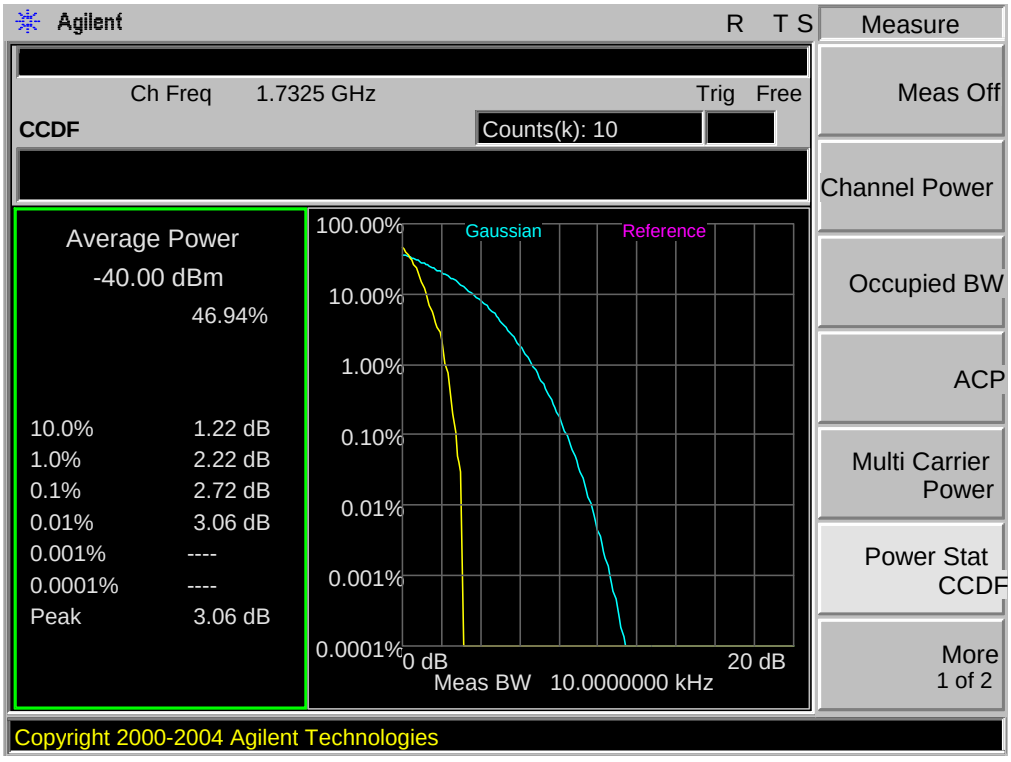
Band 4,UL Channel 20175,UL Frequency 1732.5,BW 15.0,NO. RB 1,RB POS. Low,16QAM



Band 4,UL Channel 20175,UL Frequency 1732.5,BW 20.0,NO. RB 1,RB POS. Low,QPSK

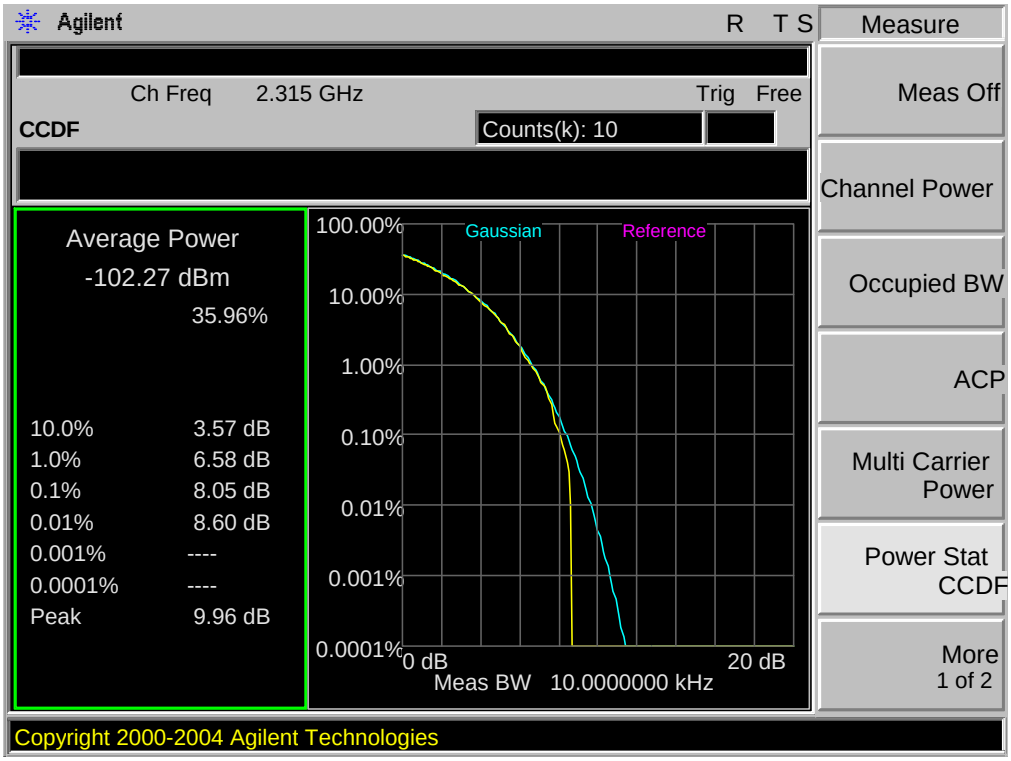


Band 4,UL Channel 20175,UL Frequency 1732.5,BW 20.0,NO. RB 1,RB POS. Low,16QAM

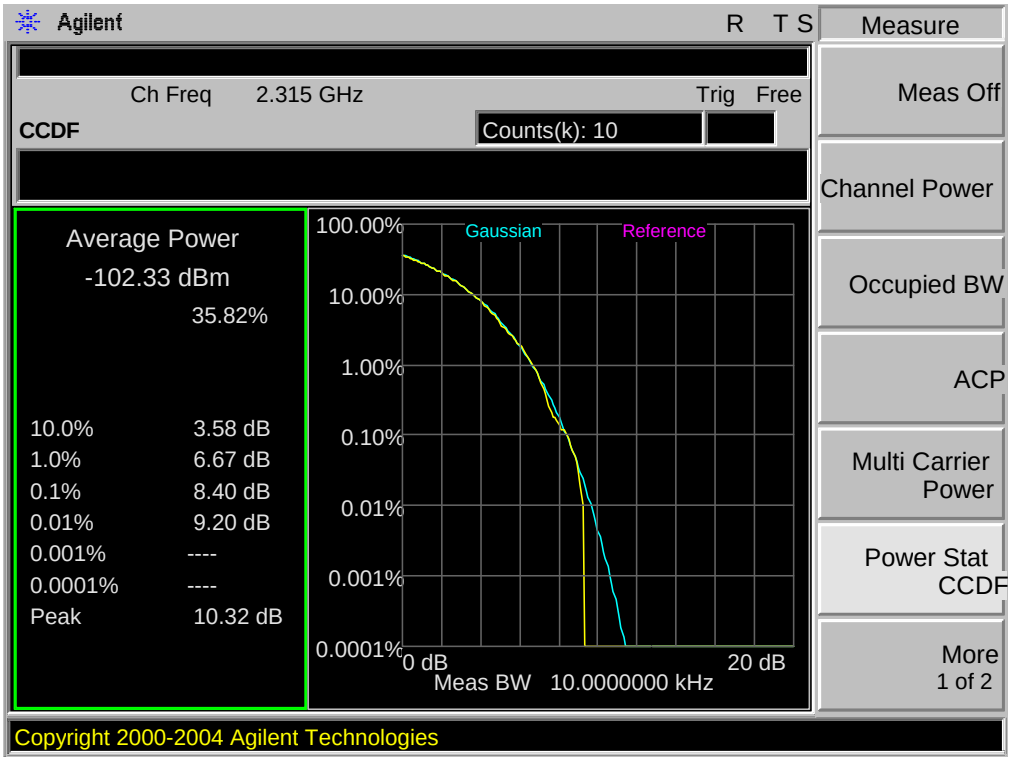


12.1.6. LTE BAND 7

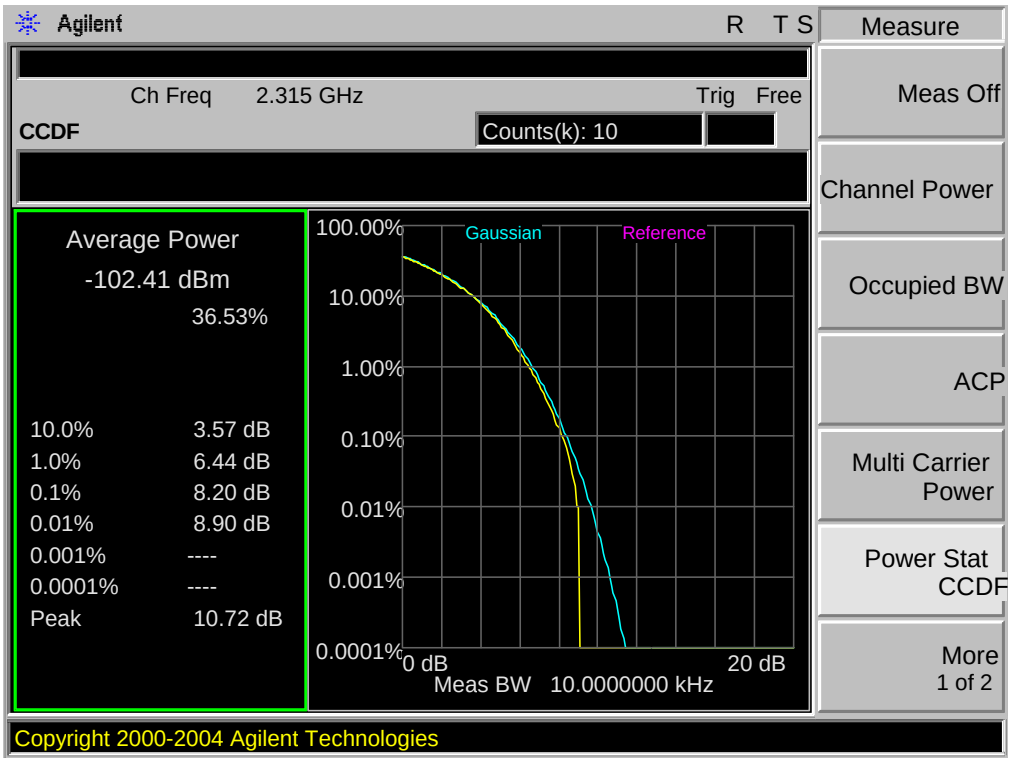
Band 7,UL Channel 18900,UL Frequency 2315.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



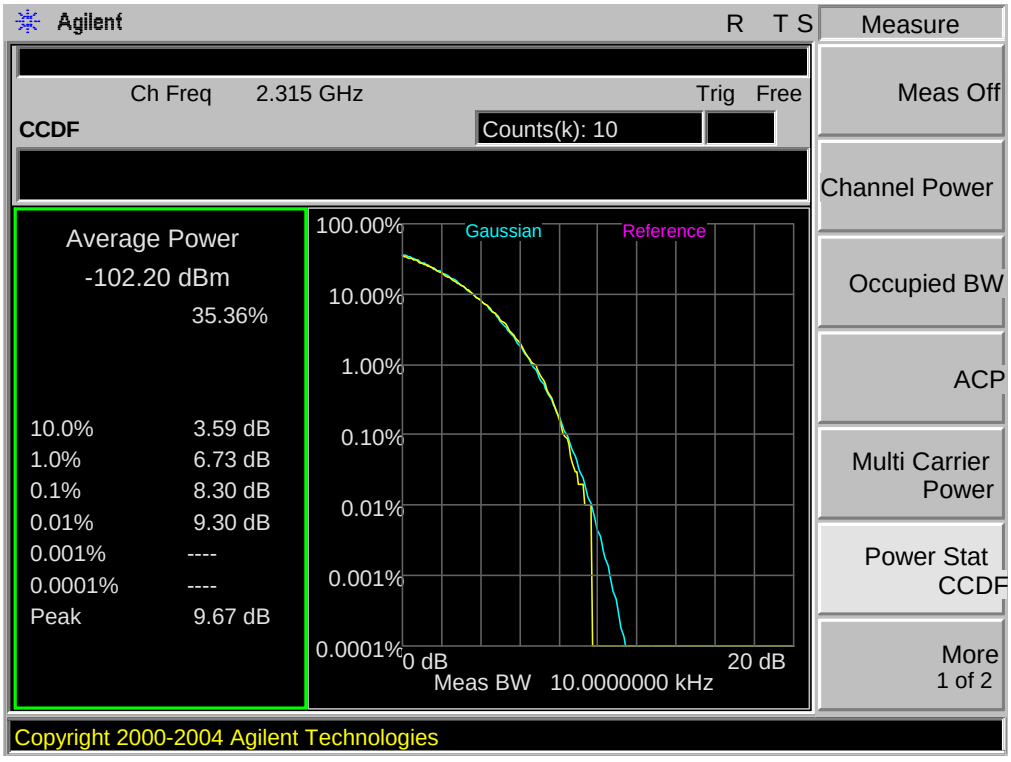
Band 7,UL Channel 18900,UL Frequency 2315.0,BW 5.0,NO. RB 1,RB POS. Low,16QAM



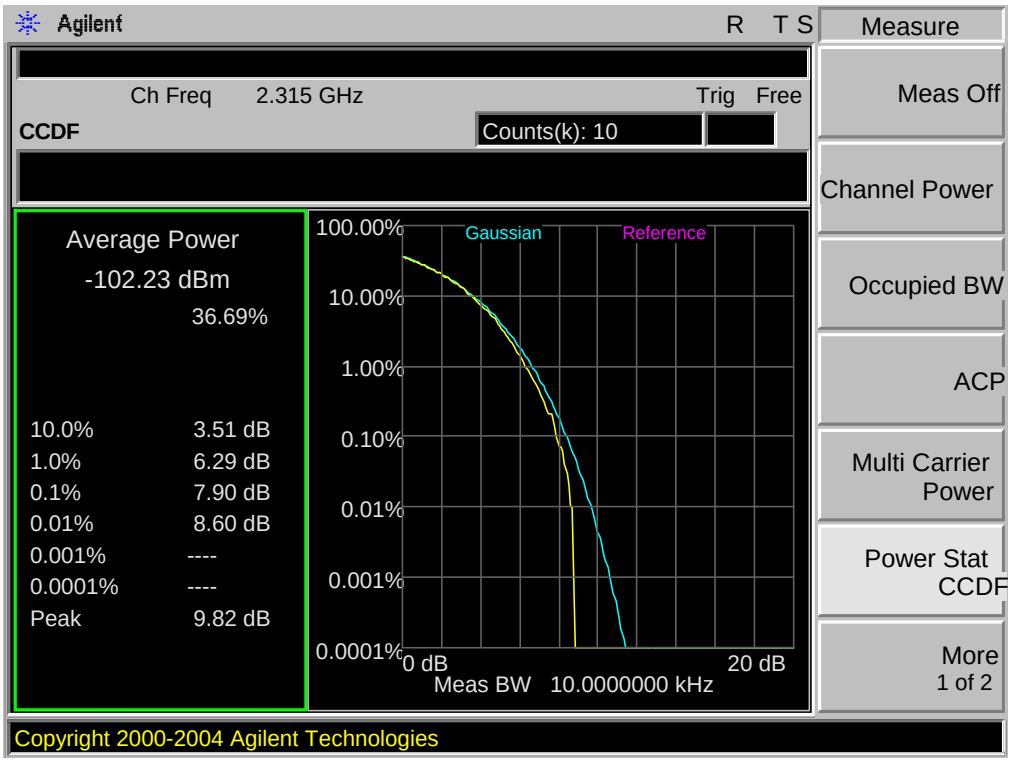
Band 7,UL Channel 18900,UL Frequency 2315.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



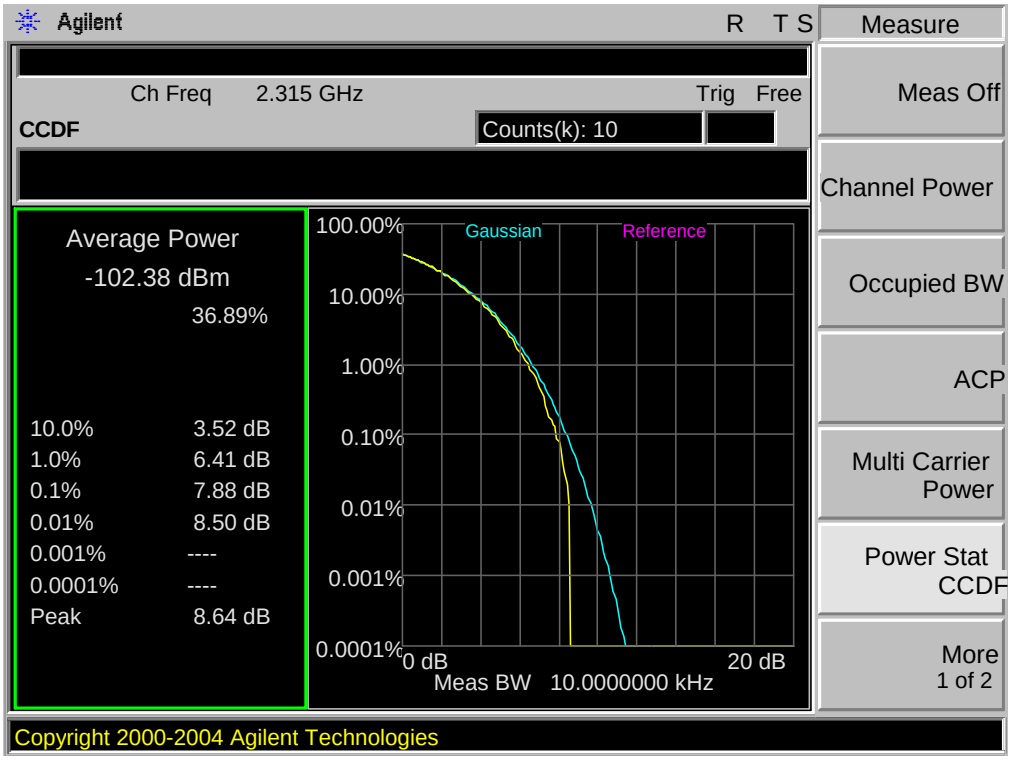
Band 7,UL Channel 18900,UL Frequency 2315.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM



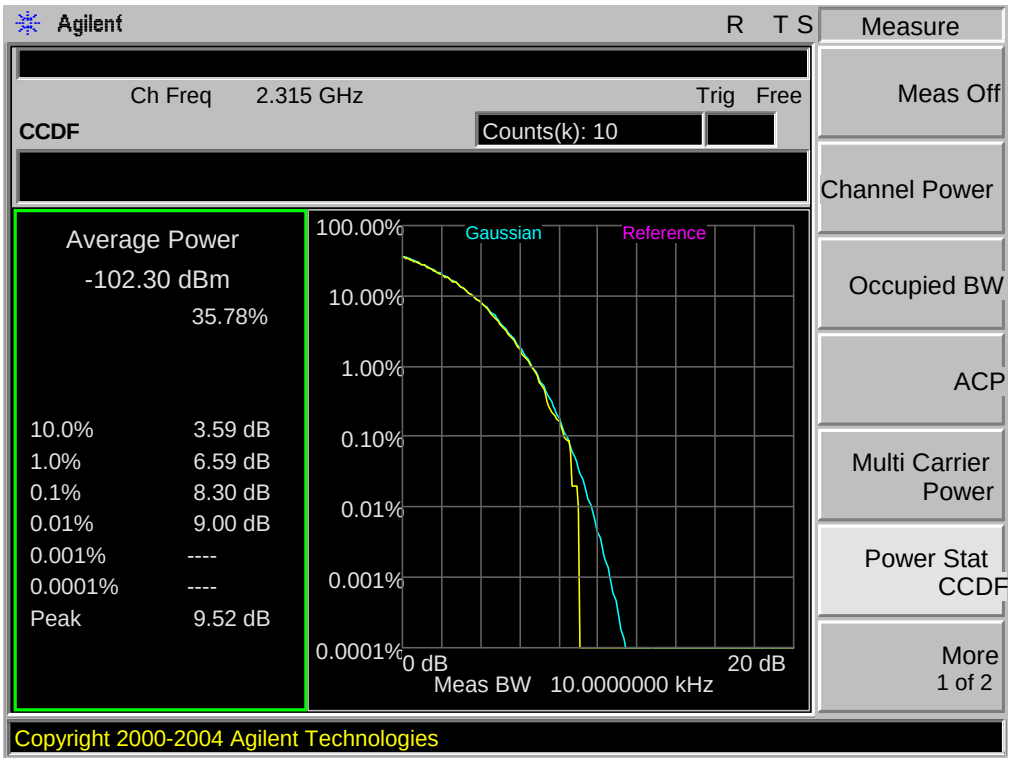
Band 7,UL Channel 18900,UL Frequency 2315.0,BW 15.0,NO. RB 1,RB POS. Low,QPSK



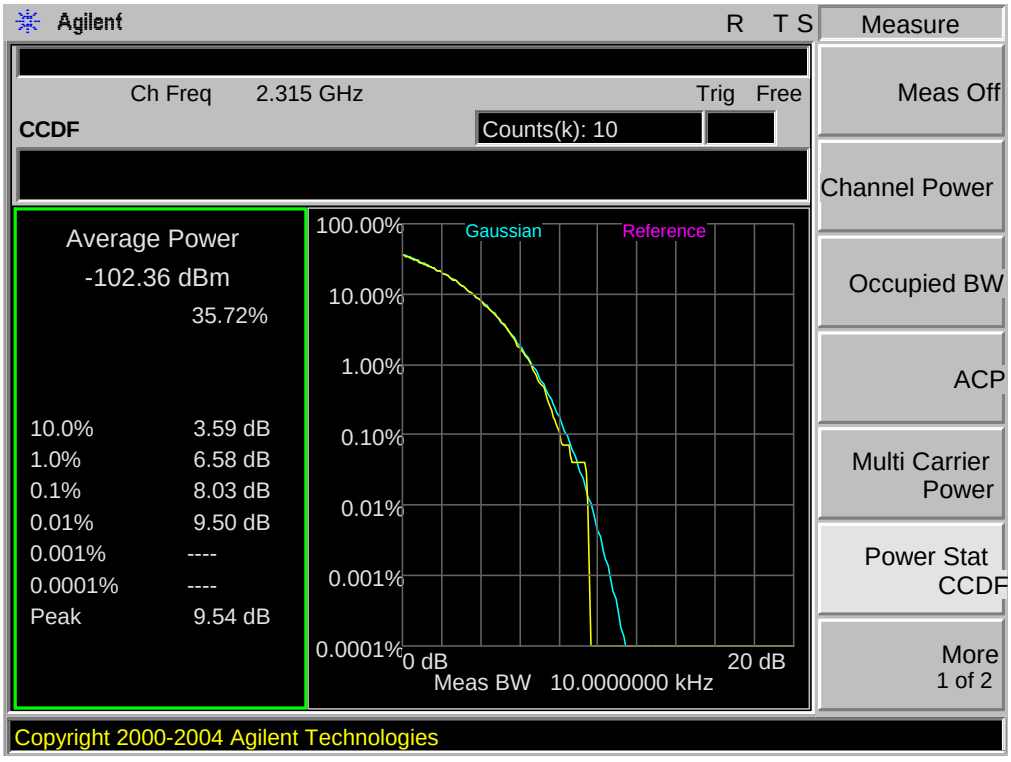
Band 7,UL Channel 18900,UL Frequency 2315.0,BW 15.0,NO. RB 1,RB POS. Low,16QAM



Band 7,UL Channel 18900,UL Frequency 2315.0,BW 20.0,NO. RB 1,RB POS. Low,QPSK

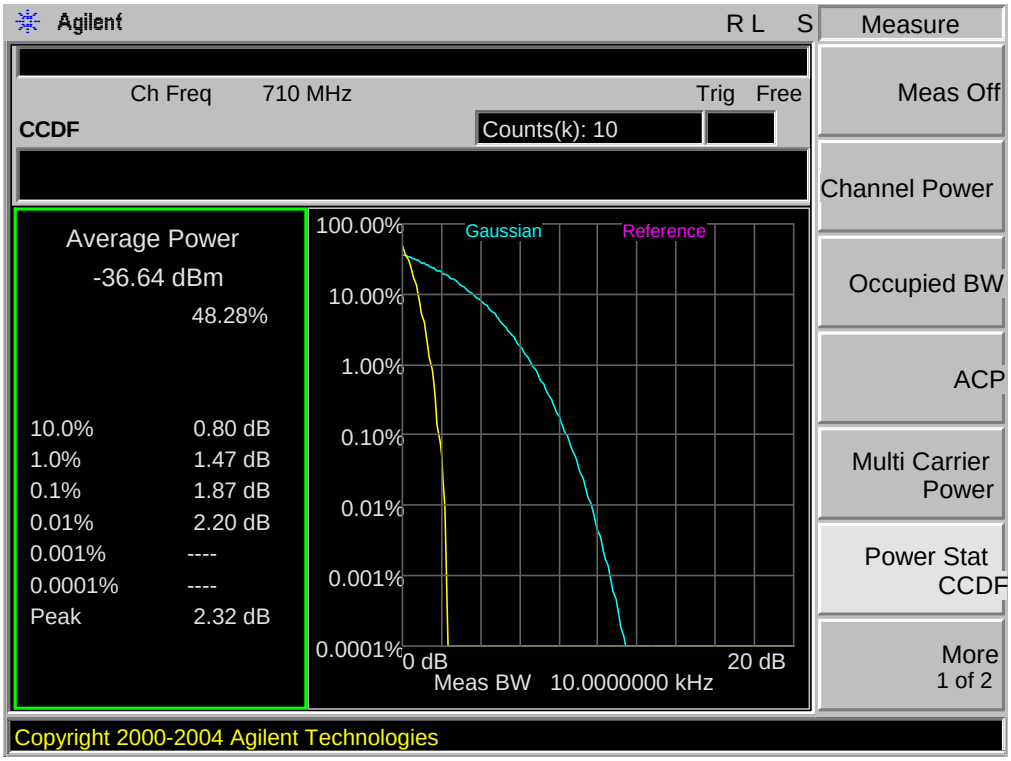


Band 7,UL Channel 18900,UL Frequency 2315.0,BW 20.0,NO. RB 1,RB POS. Low,16QAM

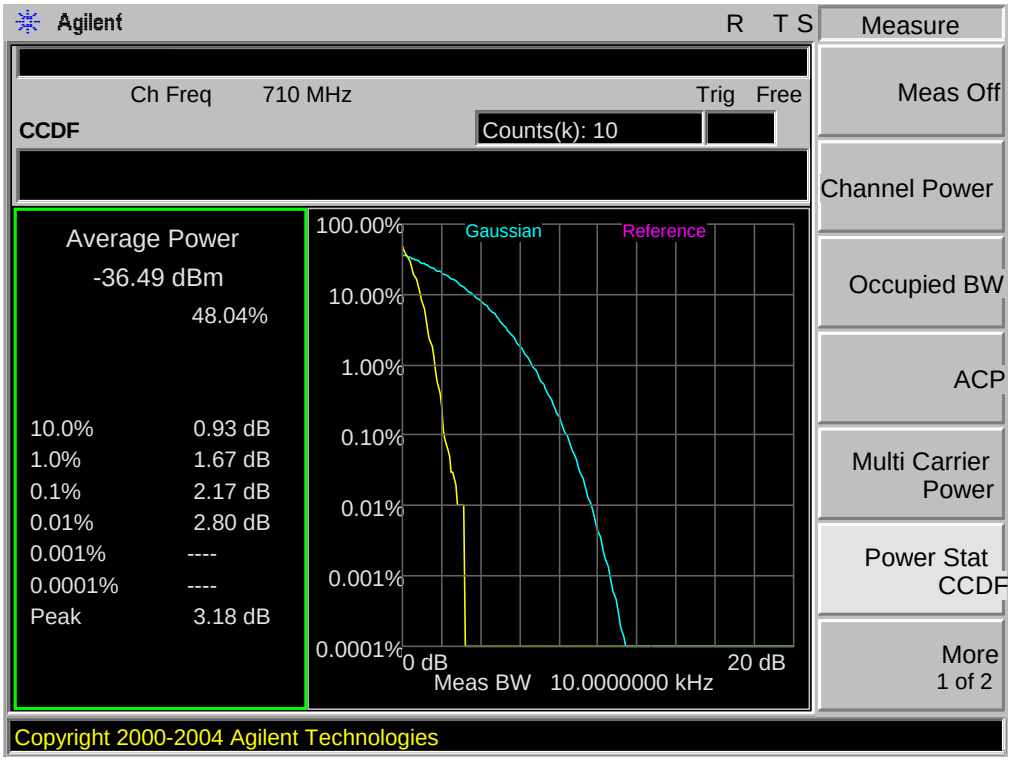


12.1.7. LTE BAND 17

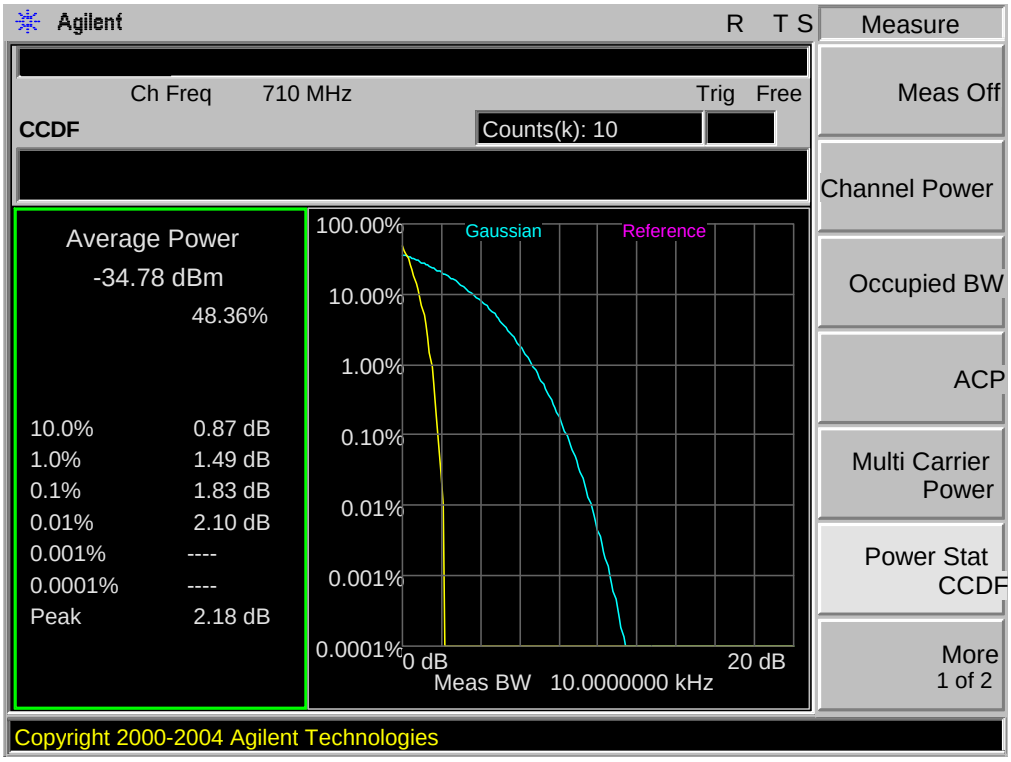
Band 17,UL Channel 23790,UL Frequency 710.0,BW 5.0,NO. RB 1,RB POS. Low,QPSK



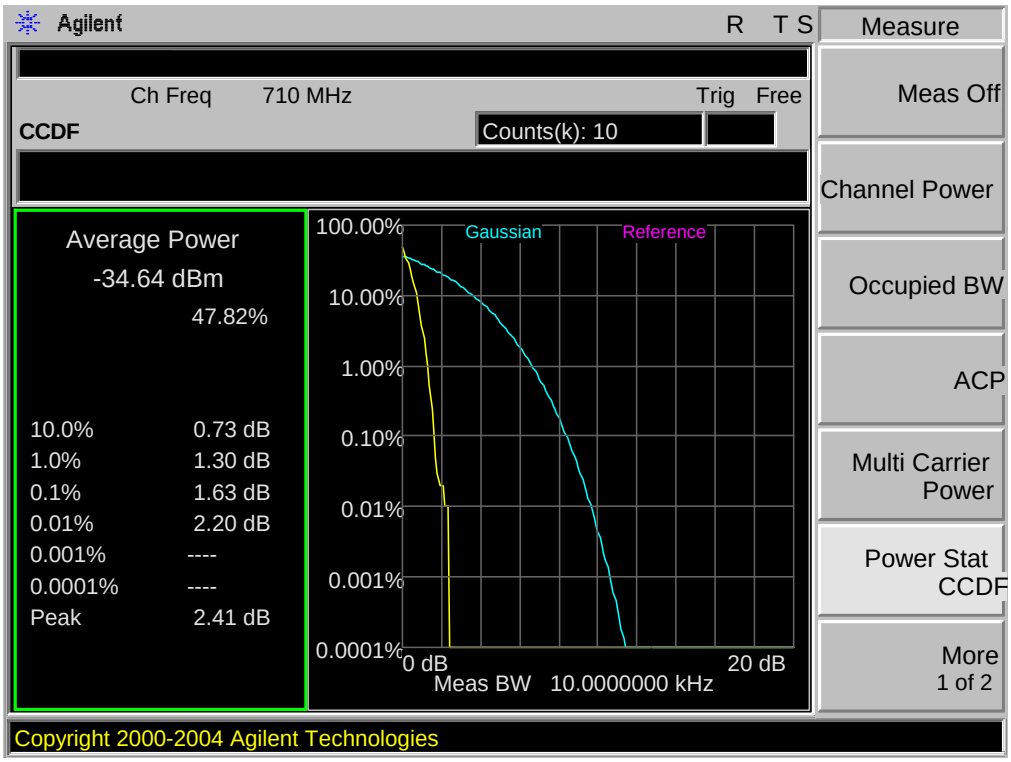
Band 17,UL Channel 23790,UL Frequency 710.0,BW 5.0,NO. RB 1,RB POS. Low,16QAM



Band 17,UL Channel 23790,UL Frequency 710.0,BW 10.0,NO. RB 1,RB POS. Low,QPSK



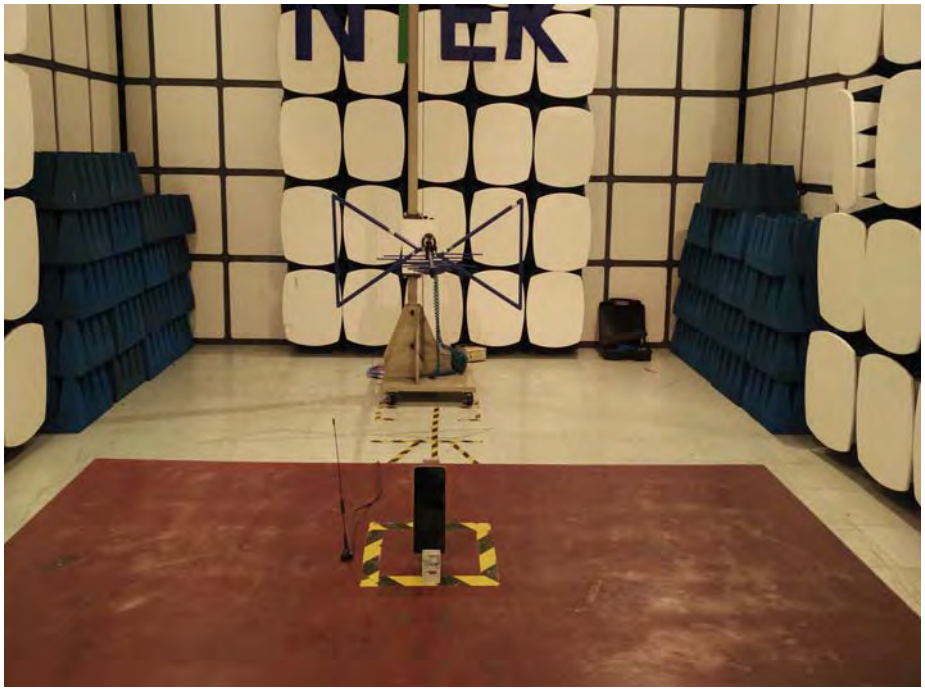
Band 17,UL Channel 23790,UL Frequency 710.0,BW 10.0,NO. RB 1,RB POS. Low,16QAM

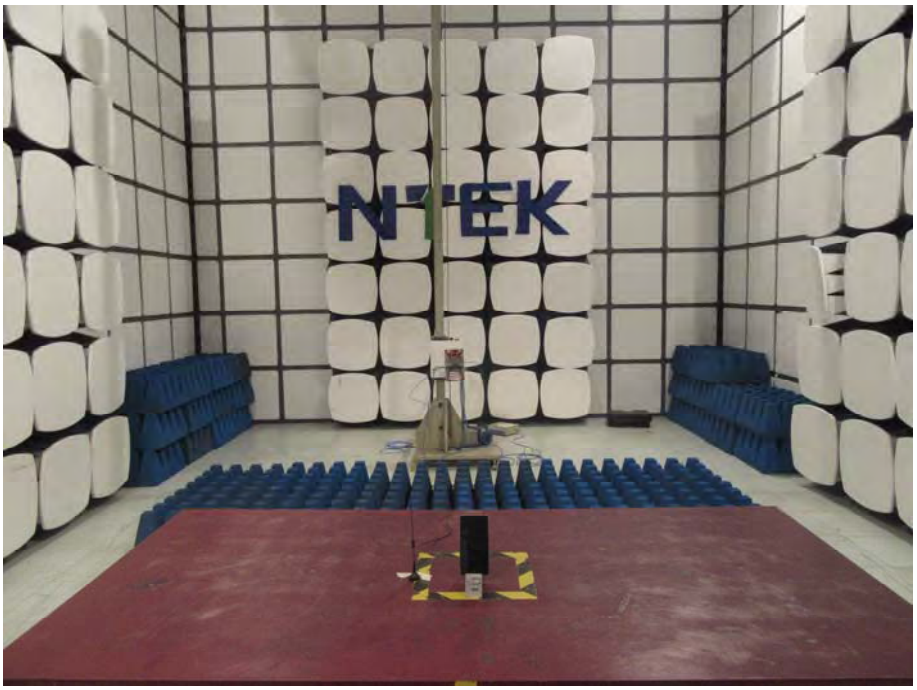


APPENDIX IV

PHOTOGRAPHS OF TEST SETUP

RADIATED SPURIOUS EMISSION





----END OF REPORT----