

6 FCC §2.1053 & §27.53 - Spurious Radiated Emissions

6.1 Applicable Standards

According to FCC §27.53 the power of any emissions 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.

6.2 Test Procedure

The transmitter was placed on the turntable, and it was transmitting into a non-radiating load which was also placed on the turntable.

The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. The test was performed by placing the EUT on 3-orthogonal axis.

The frequency range up to tenth harmonic of the fundamental frequency was investigated.

Remove the EUT and replace it with substitution antenna. A signal generator was connected to the substitution antenna by a non-radiating cable. The absolute levels of the spurious emissions were measured by the substitution.

Spurious emissions in dB = $10 \log(\text{TX Power in Watts}/0.001)$ – the absolute level
 Spurious attenuation limit in dB = $43 + 10 \log_{10}(\text{power out in Watts})$

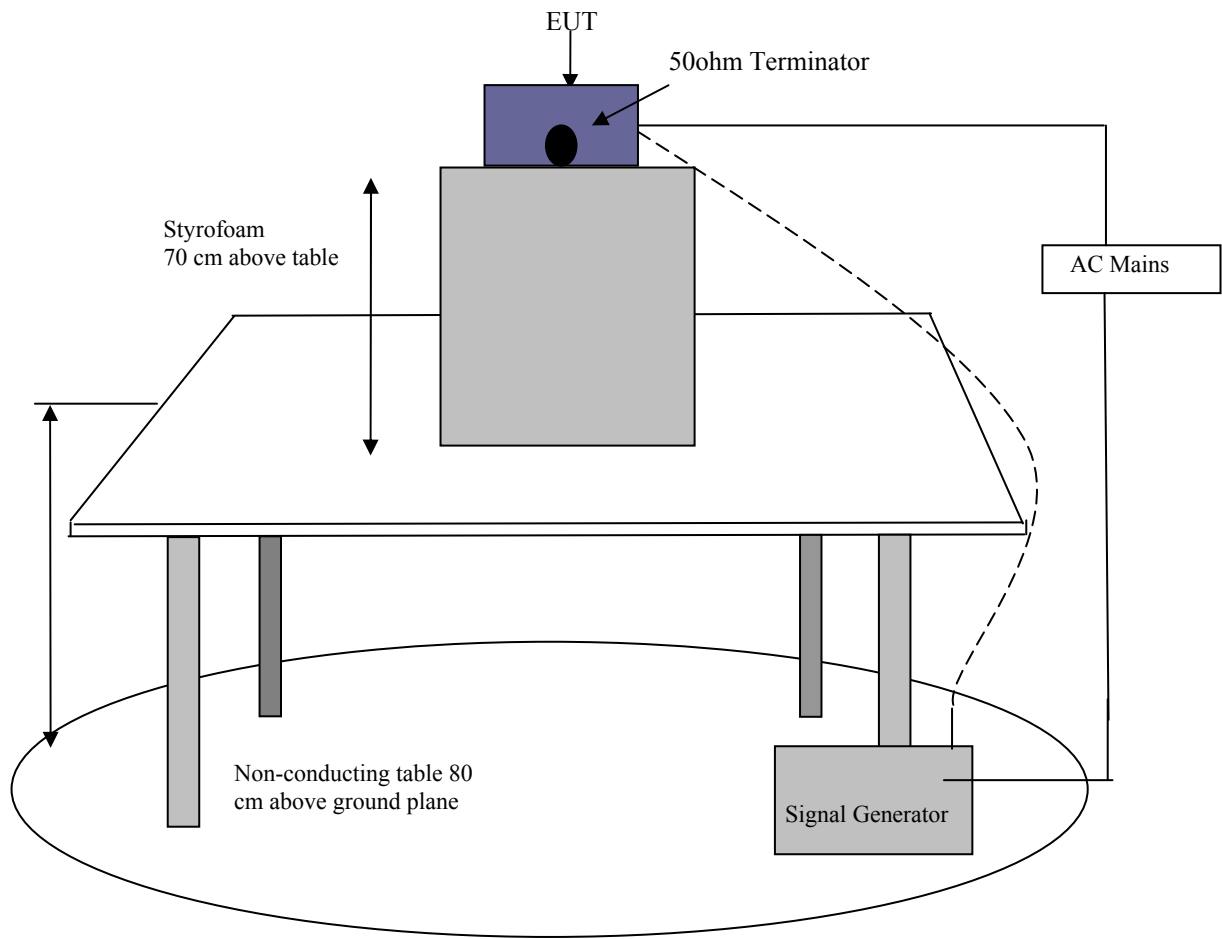
6.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date	Calibration Interval
Sunol Science Corp	System Controller	SC99V	122303-1	N/A	N/A
Sunol Sciences	Antenna, Biconi-Log	JB3	A020106-2	2014-09-17	1 year
COM-POWER	Antenna, Dipole	AD-100	721033DB1 ,2, 721033DB3, 4	2014-11-03	2 year
Hewlett Packard	Pre-amplifier 1GHz-26.5GHz	8447D	2944A06639	2015-05-08	1 year
HP/Agilent	Pre Amplifier	8449B OPT HO2	3008A0113	2015-05-19	1 year
Agilent	Analyzer, Spectrum	E4440A	MY44303352	2014-11-13	1 year
Eaton	Antenna, Horn	96001	2617	2014-11-18	1 year
EMCO	Antenna, Horn	3115	9511-4627	2015-01-15	1 year

Statement of Traceability: *BACL Corp.* attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

6.4 Test Setup Block Diagram

Radiated Emissions Testing



6.5 Test Environmental Conditions

Temperature:	20-21°C
Relative Humidity:	47-49 %
ATM Pressure:	101.4-101.6 kPa

The testing was performed by Ronak Patel on 2015-06-29 in 5 Meter Chamber 3.

6.6 Test Results

Carrier Wave Signal

DL, 2120 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1145.996	50.23	0	100	V	1145.996	-62.14	6.426	0.68	-56.394	-13	-43.394
1171.321	50.84	0	100	H	1171.321	-63.27	6.477	0.68	-57.473	-13	-44.473

DL, 2132.5 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1144	50.36	0	150	V	1144	-62.01	6.426	0.68	-56.264	-13	-43.264
1145.1	51.23	0	150	H	1145.1	-62.88	6.477	0.68	-57.083	-13	-44.083

DL, 2145 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1144	49.63	0	150	V	1144	-62.74	6.426	0.68	-56.994	-13	-43.994
1153	49.61	0	150	H	1153	-64.5	6.477	0.68	-58.703	-13	-45.703

DL, 751 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1388.098	50.82	150	100	V	1388.098	-62.13	7.557	0.79	-55.363	-13	-42.363
1142.312	51.2	51	100	H	1142.312	-62.91	6.477	0.68	-57.113	-13	-44.113

DL, 740 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1378	50.21	360	100	V	1378	-62.74	7.557	0.79	-55.973	-13	-42.973
1147	50.38	360	100	H	1147	-63.73	6.477	0.68	-57.933	-13	-44.933

UL, 1720 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
3439	62.3	153	148	V	3439	-39.58	9.602	1.47	-31.448	-13	-18.448
3440	60.95	244	188	H	5160	-46.65	9.595	1.47	-38.525	-13	-25.525
5160	61.88	137	240	V	5160	-39.34	10.578	1.1	-29.862	-13	-16.862
5160	55.3	208	175	H	5160	-41.42	10.661	1.1	-31.859	-13	-18.859

UL, 1732.5 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
3464	58.58	142	141	V	3464	-43.49	9.73	1.47	-35.23	-13	-22.23
3465	58.03	244	180	H	3465	-42.23	9.664	1.47	-34.036	-13	-21.036
5197	58.49	146	221	V	5197	-38.85	10.578	1.1	-29.372	-13	-16.372
5197	51.87	173	194	H	5197	-47.41	10.661	1.1	-37.849	-13	-24.849

UL, 1745 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
3490	59.87	179	135	V	3490	-42.2	9.73	1.47	-33.94	-13	-20.94
3490	59.87	242	162	H	3490	-40.39	9.664	1.47	-32.196	-13	-19.196
5235	66.79	133	165	V	5235	-30.55	10.578	1.1	-21.072	-13	-8.072
5234	58.63	244	148	H	5234	-40.65	10.661	1.1	-31.089	-13	-18.089

UL, 782 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1563	65.9	50	188	V	1563	-37.64	8.795	0.62	-29.465	-13	-16.465
1563	65.45	39	154	H	1563	-36.75	8.77	0.62	-28.6	-13	-15.6

UL, 710 MHz

Indicated		Azimuth (degree)	Test Antenna		Substituted					Limit (dBm)	Margin (dB)
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)		
67.45	50.89	76	162	V	67.45	-45.85	0	0.2	-46.05	-13	-33.05
66.869	43.42	311	235	H	66.869	-53.6	0	0.2	-53.8	-13	-40.8
46.35	48.02	360	100	V	46.35	-48.72	0	0.2	-48.92	-13	-35.92
106.156	43.54	275	258	H	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1420	65.08	42	186	V	1420	-36.3	6.991	0.62	-29.929	-13	-16.929
1420	65.08	36	100	H	1420	-38.47	7.209	0.62	-31.881	-13	-18.881

7 FCC §2.1051 & §27.53 - Spurious Emissions at Antenna Terminals

7.1 Applicable Standards

According to FCC §27.53 the power of any emissions 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.

7.2 Test Procedure

The EUT was connected to the spectrum analyzer and Signal Generator followed by 50Ω-75Ω matching pad

The resolution bandwidth of the spectrum analyzer was set 100 KHz or greater for frequency band 746MHz-788MHz and greater than 1MHz for 2100 and 1700 band. Sufficient scans were taken to show any out of band emissions up to 10th harmonic.



7.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2014-10-16	1 year
Agilent	Signal Generator	E4438C	MY45091309	2014-07-15	1 year

Statement of Traceability: *BACL Corp.* attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

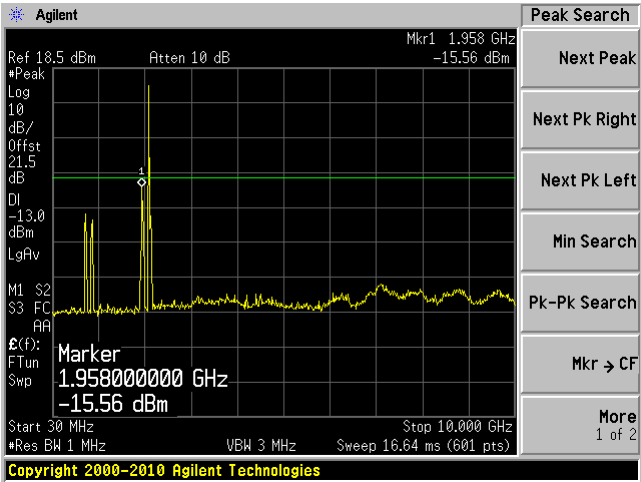
7.4 Test Environmental Conditions

Temperature:	21-23° C
Relative Humidity:	42-48 %
ATM Pressure:	101.4-102 kPa

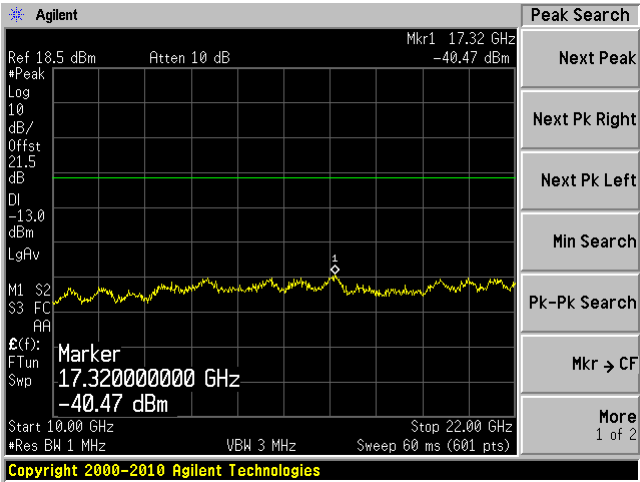
The testing was performed by Ronak Patel 2015-06-08 to 2015-06-29 in the RF Site.

Band 4, CDMA/EVDO, DL

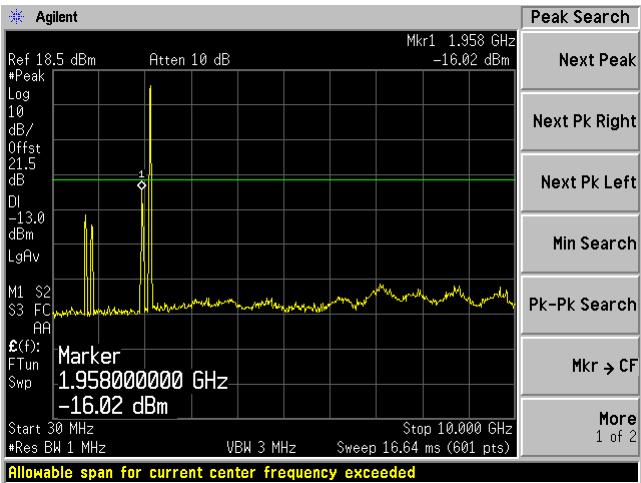
Low 30MHz-10GHz



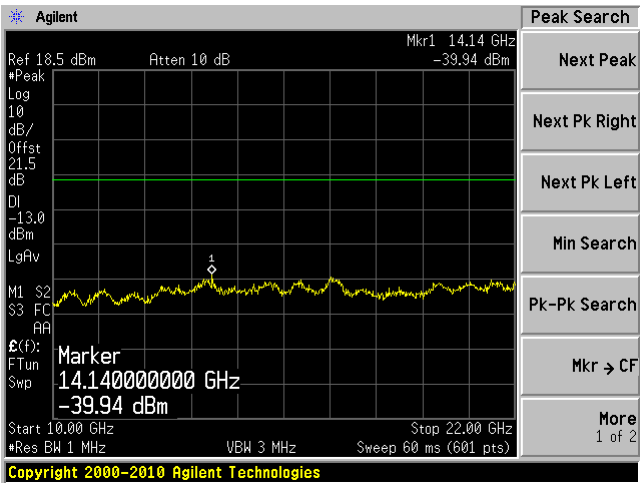
Low 10MHz-22GHz



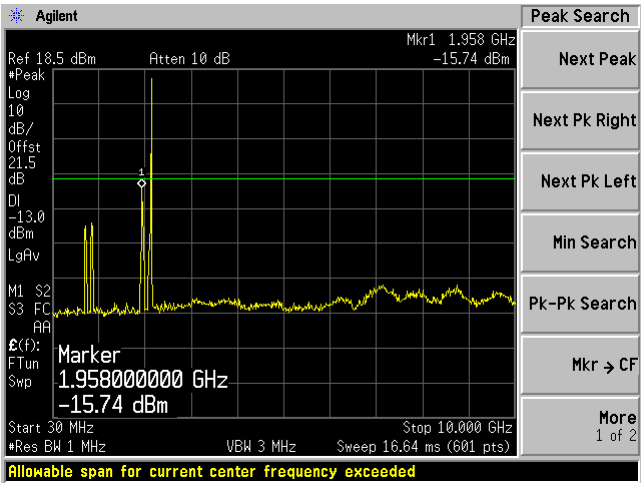
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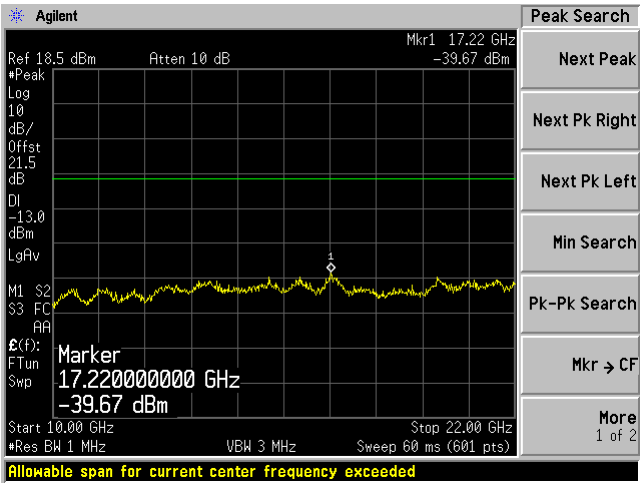
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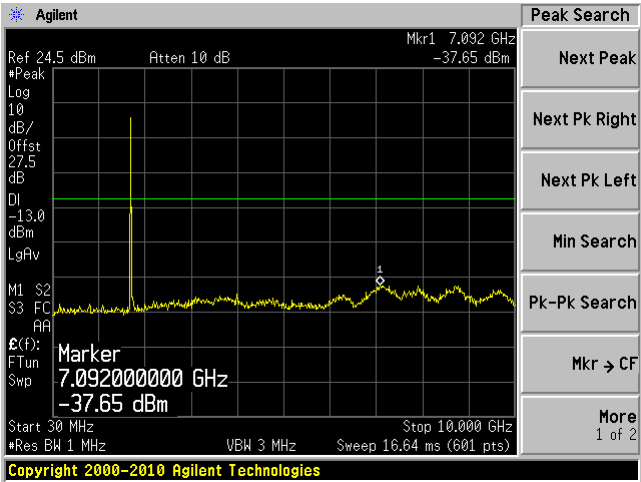


High 10MHz-22GHz

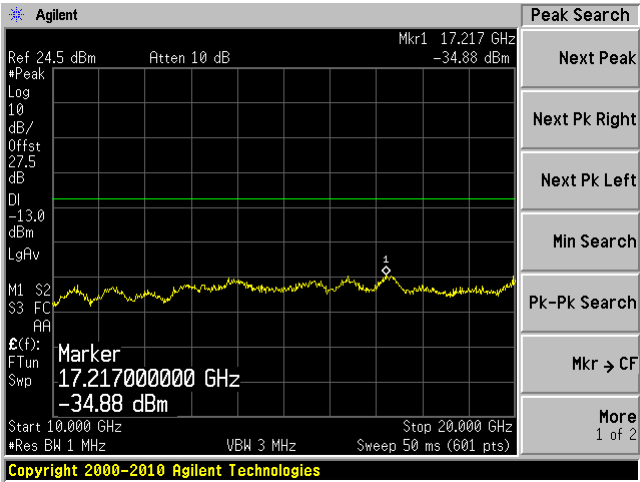


Band 4, CDMA/EVDO, UL

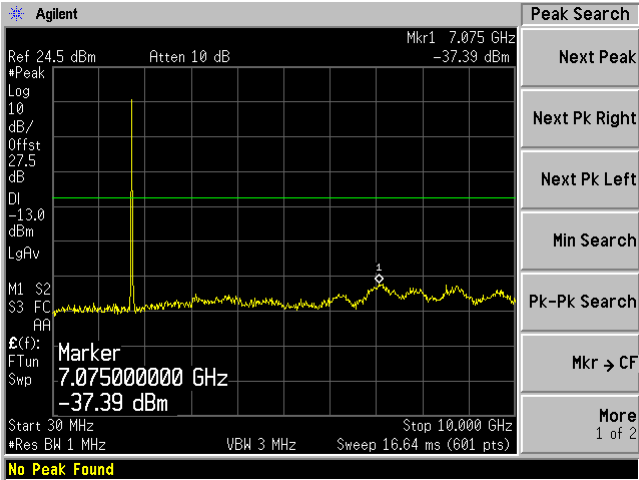
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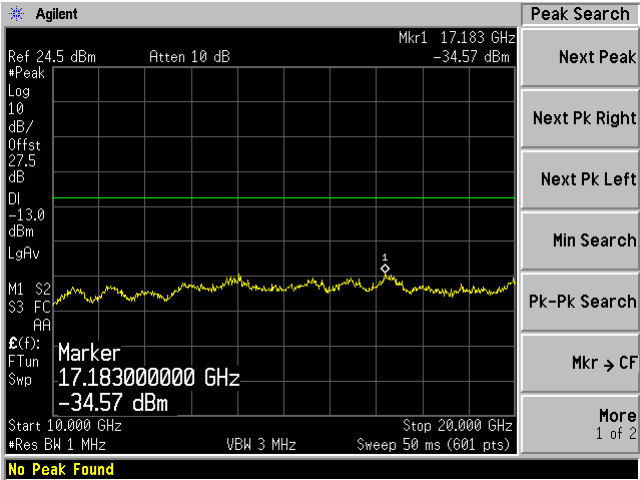
Low 10MHz-22GHz



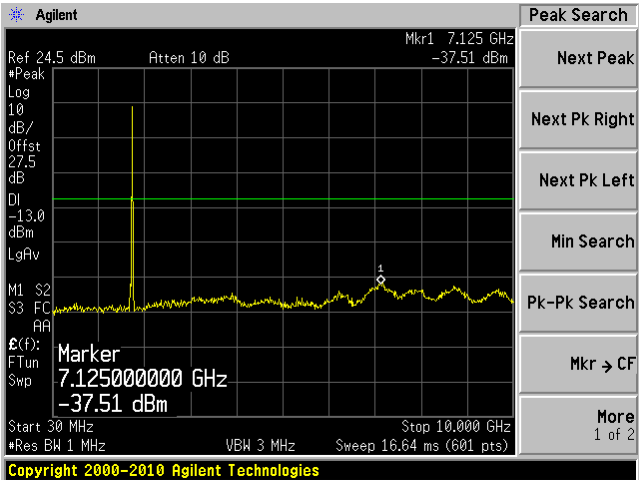
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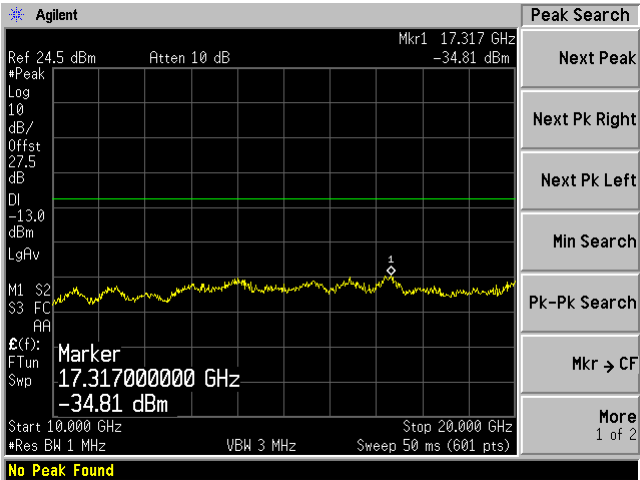
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High 30MHz-10GHz

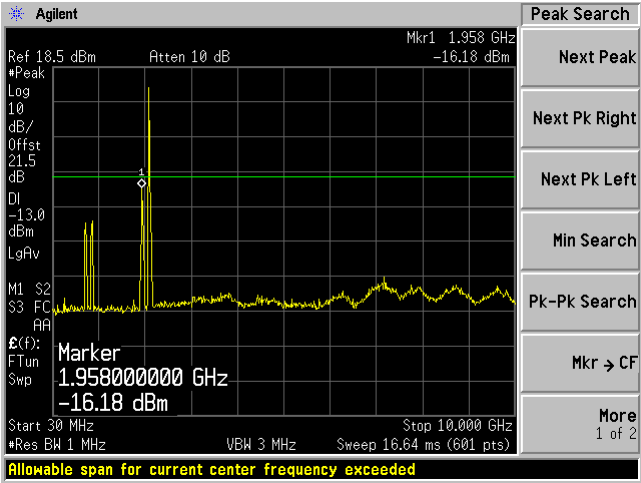


High 10MHz-22GHz

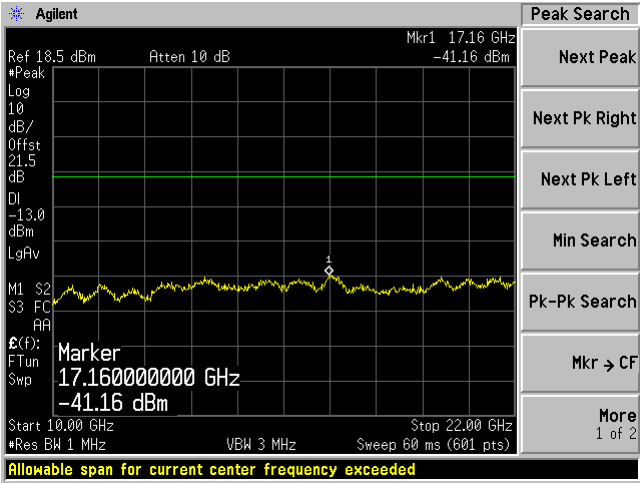


Band 4, WCDMA, DL

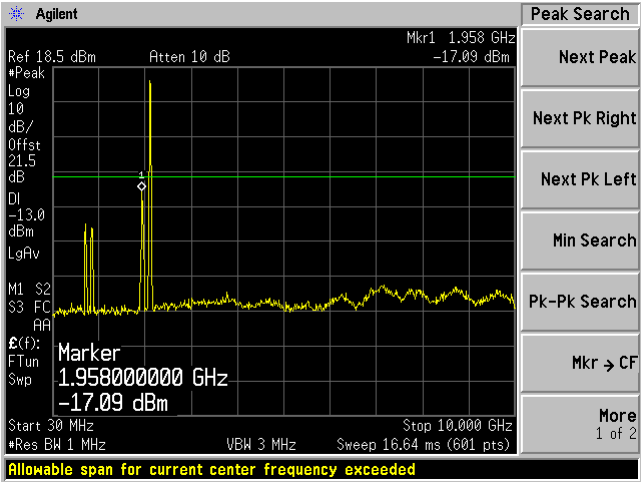
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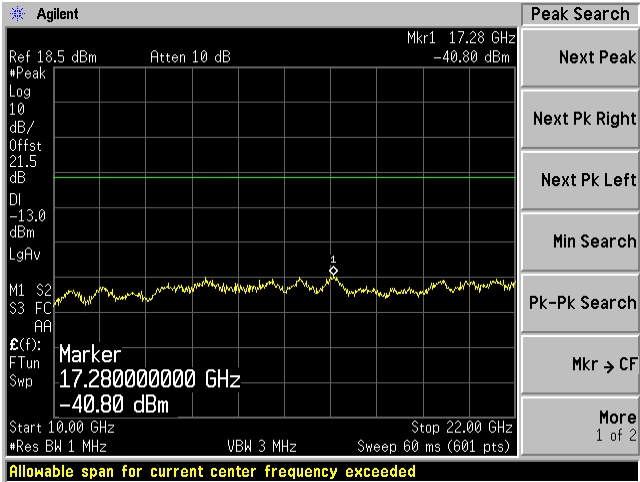
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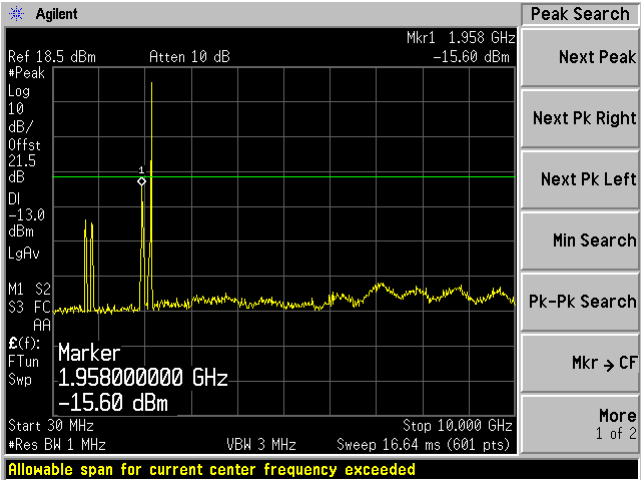
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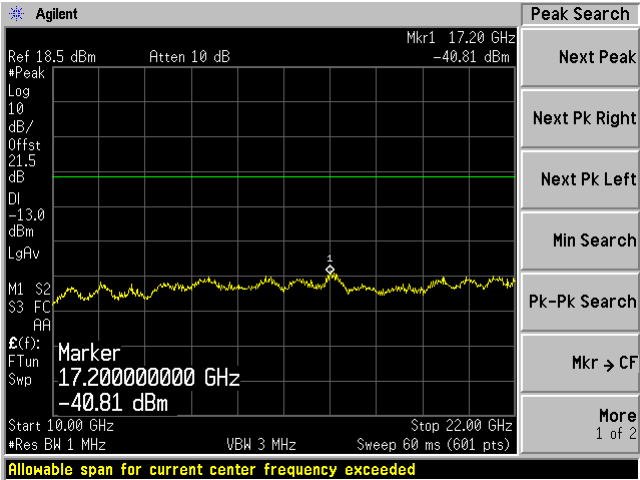
Middle 10MHz-22GHz



High 30MHz-10GHz

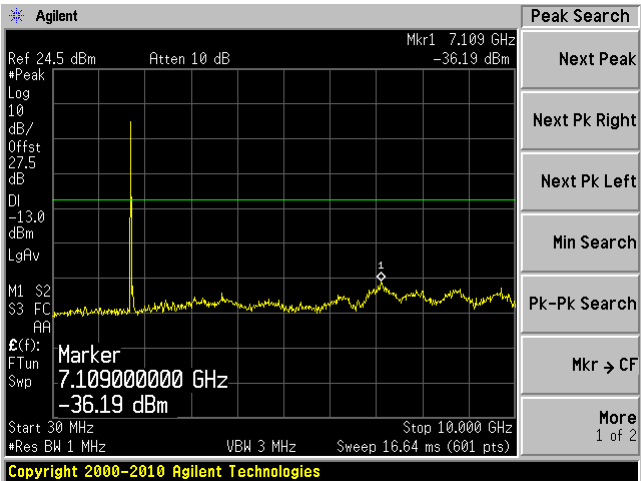


High 10MHz-22GHz

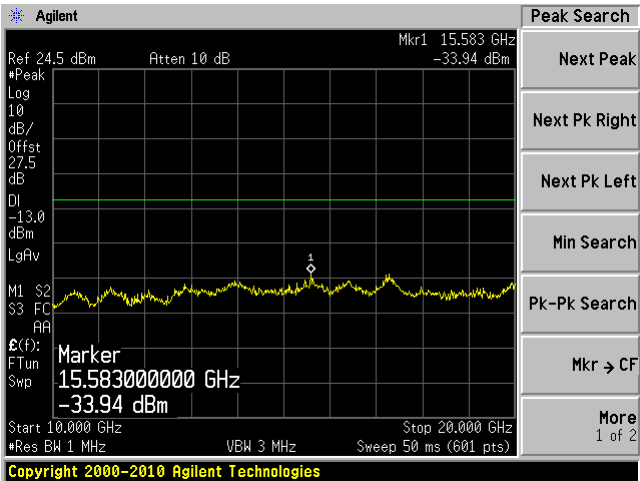


Band 4, WCDMA, UL

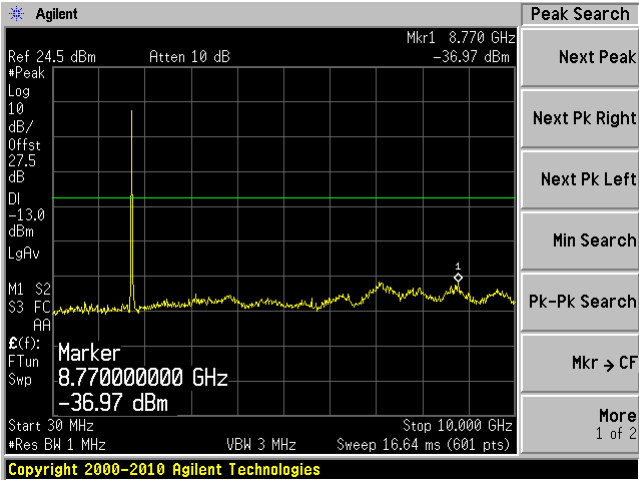
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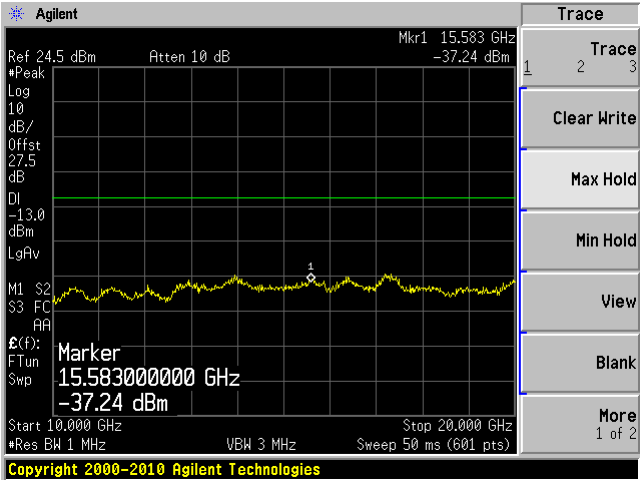
Low 10MHz-22GHz



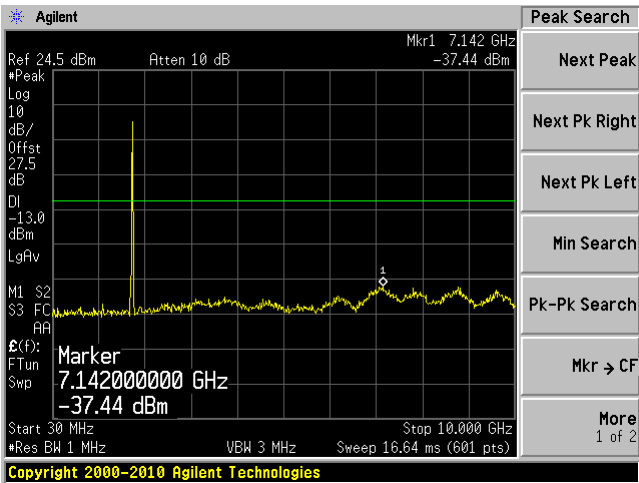
Middle 30MHz-10GHz



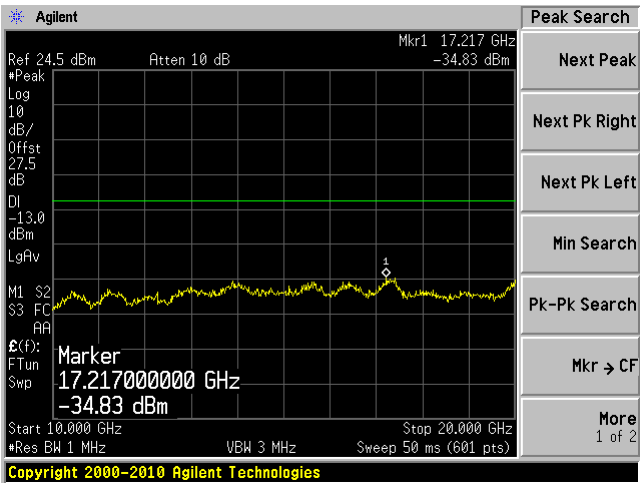
Middle 10MHz-22GHz



High 30MHz-10GHz

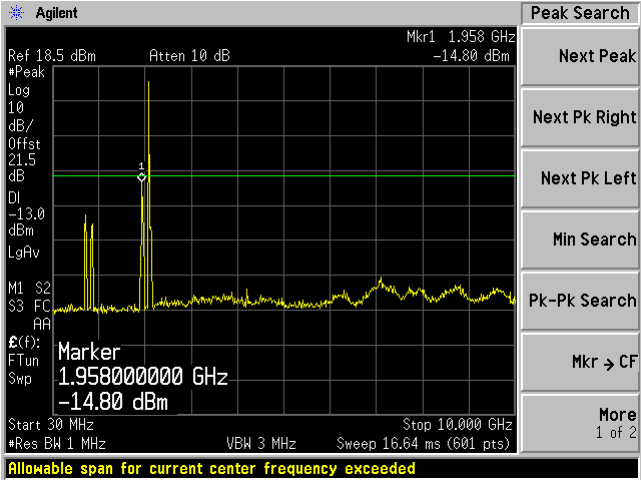


High 10MHz-22GHz

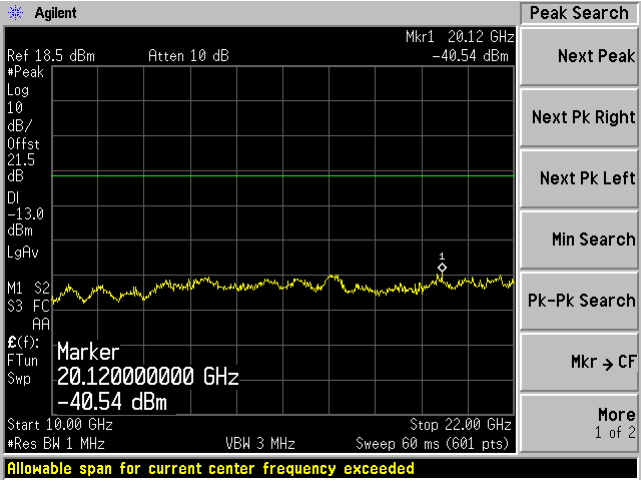


LTE Band 4, 1.4 MHz, QPSK, DL

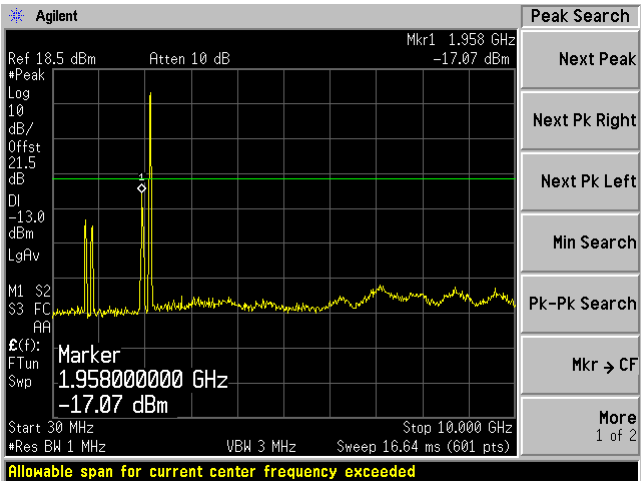
Low 30MHz-10GHz



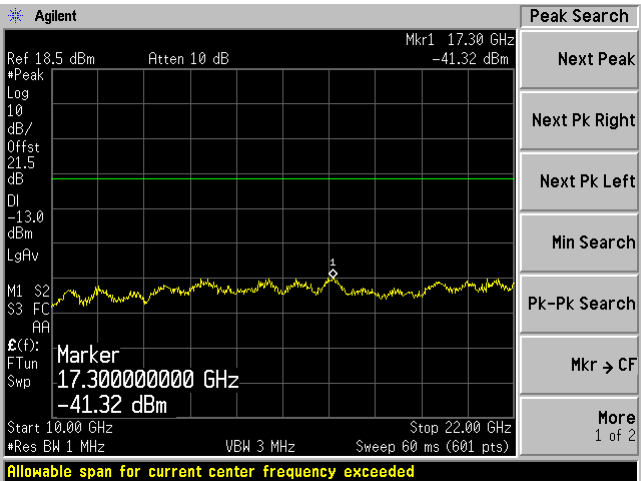
Low 10MHz-22GHz



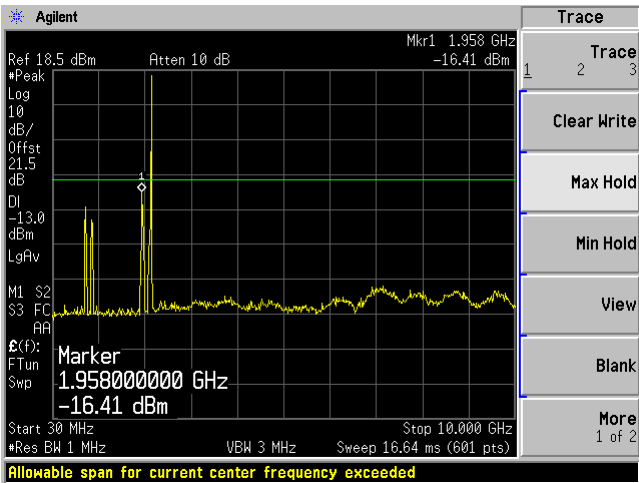
Middle 30MHz-10GHz



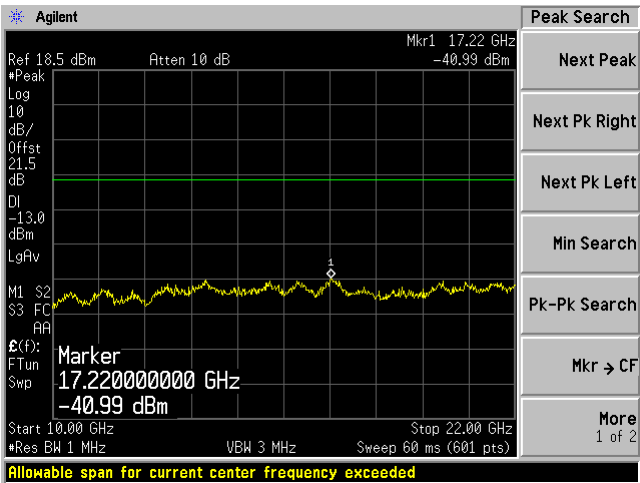
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High 30MHz-10GHz

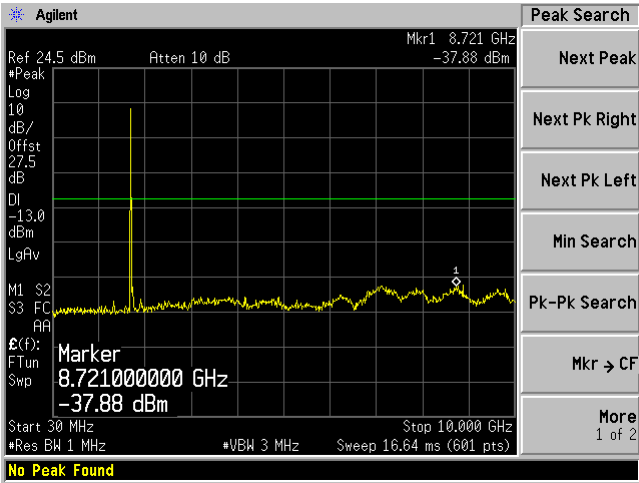


High 10MHz-22GHz

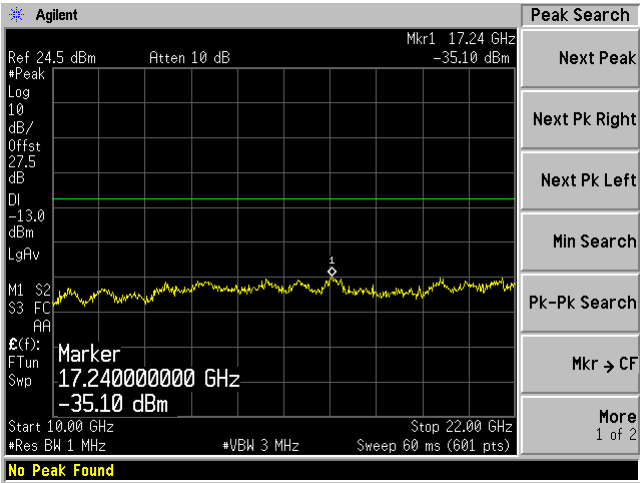


LTE Band 4, 1.4 MHz, QPSK, UL

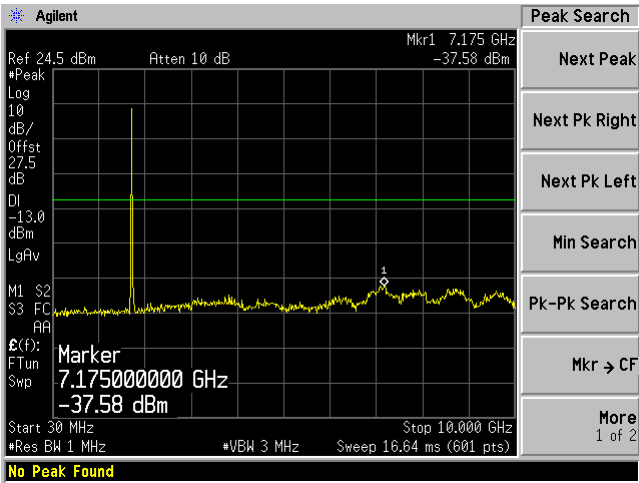
Low 30MHz-10GHz



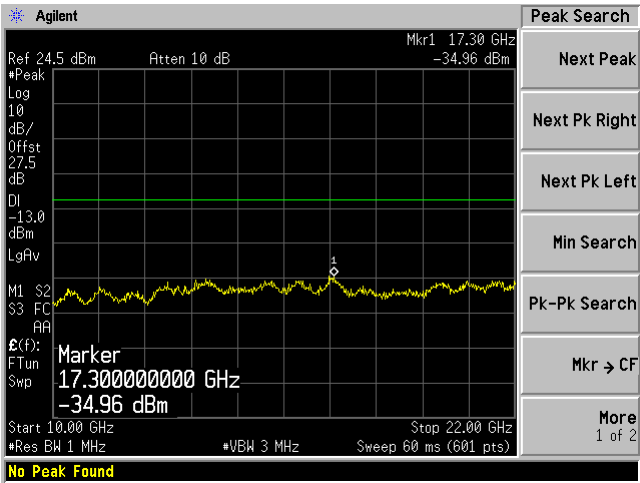
Low 10MHz-22GHz



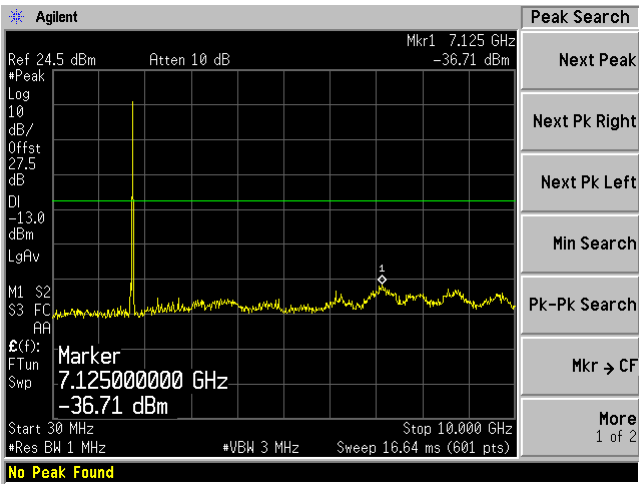
Middle 30MHz-10GHz



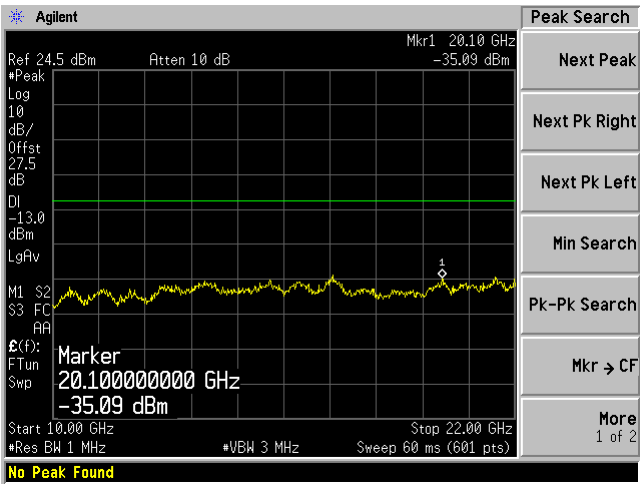
Middle 10MHz-22GHz



High 30MHz-10GHz

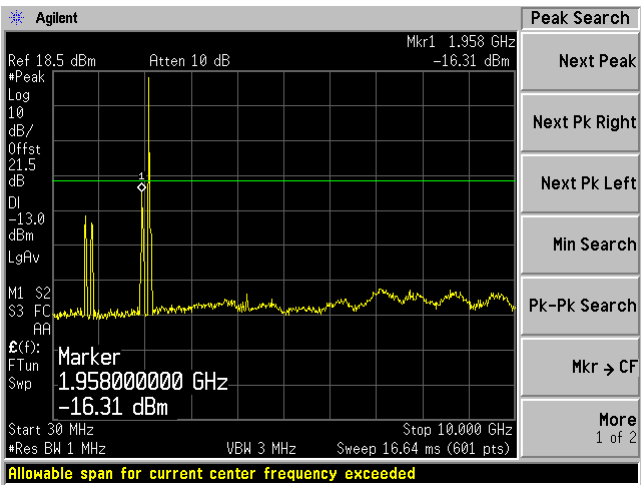


High 10MHz-22GHz

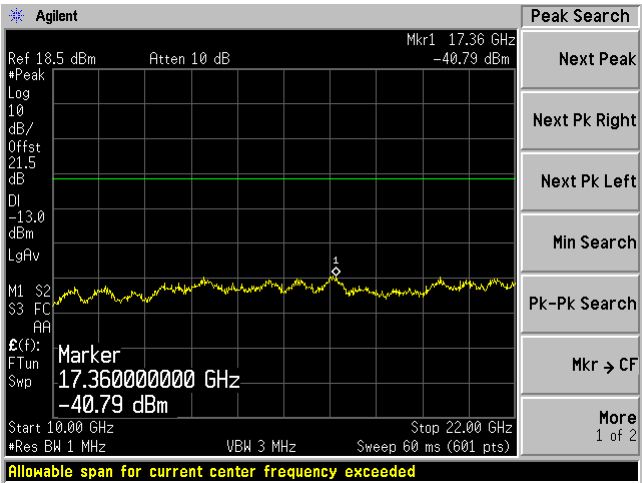


LTE Band 4, 3 MHz, QPSK, DL

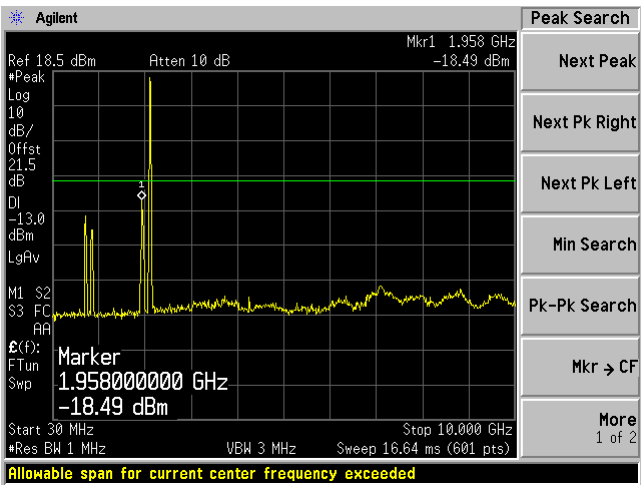
Low 30MHz-10GHz



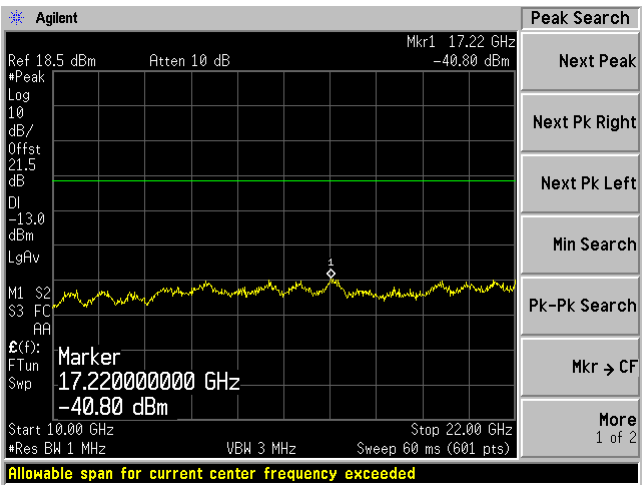
Low 10MHz-22GHz



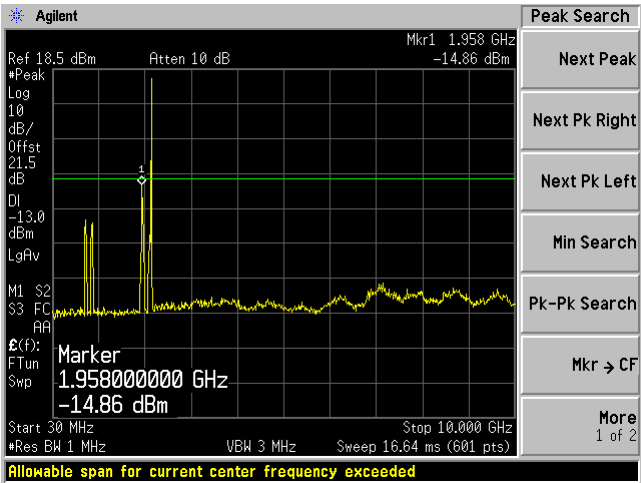
Middle 30MHz-10GHz



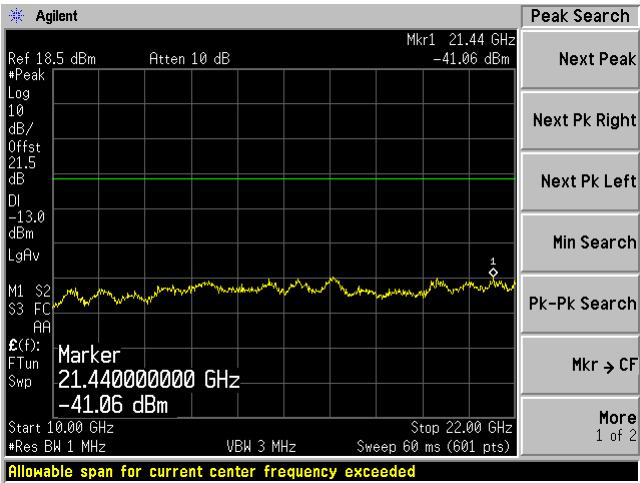
Middle 10MHz-22GHz



High 30MHz-10GHz

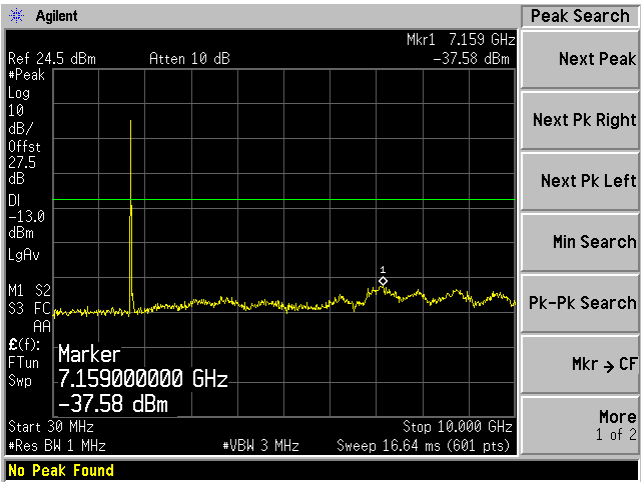


High 10MHz-22GHz

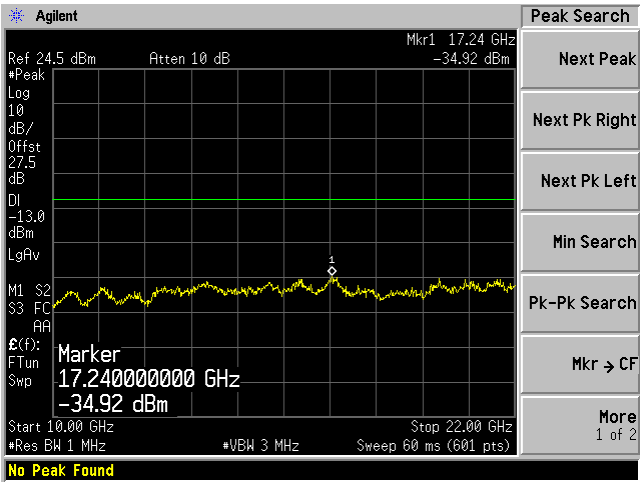


LTE Band 4, 3 MHz ,QPSK, UL

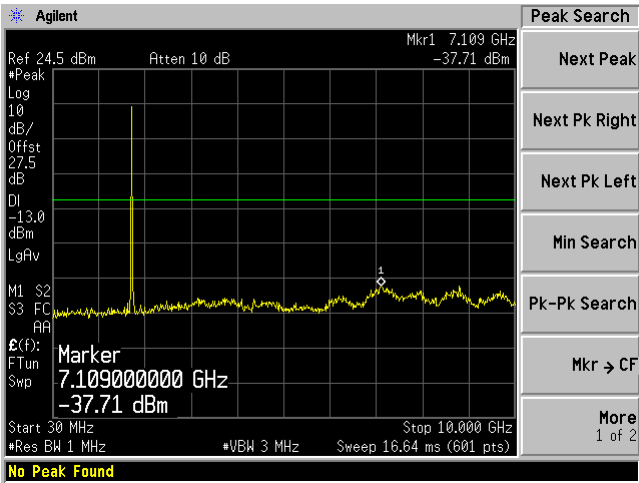
Low 30MHz-10GHz



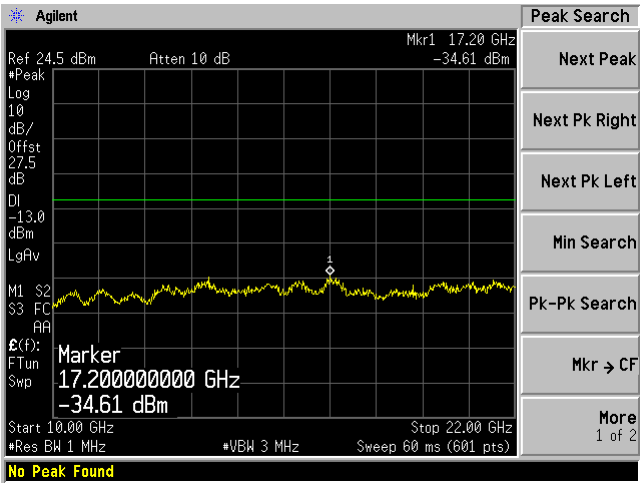
Low 10MHz-22GHz



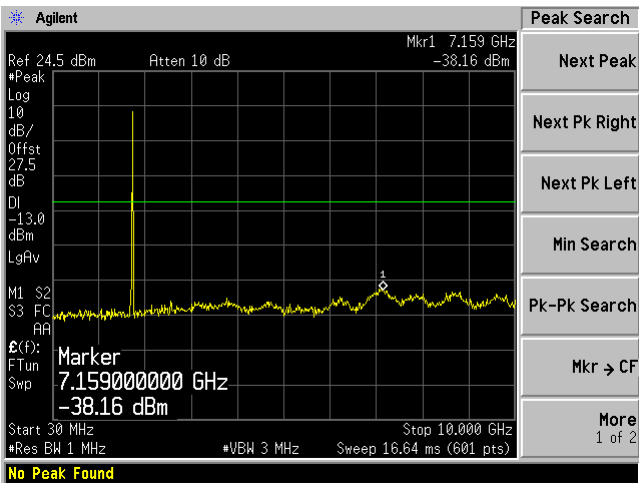
Middle 30MHz-10GHz



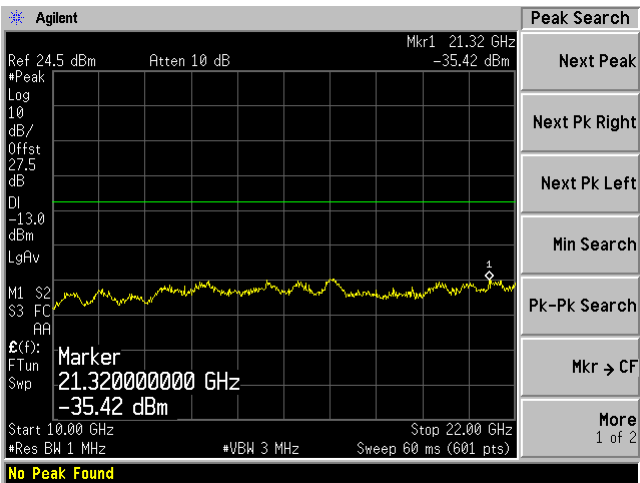
Middle 10MHz-22GHz



High 30MHz-10GHz

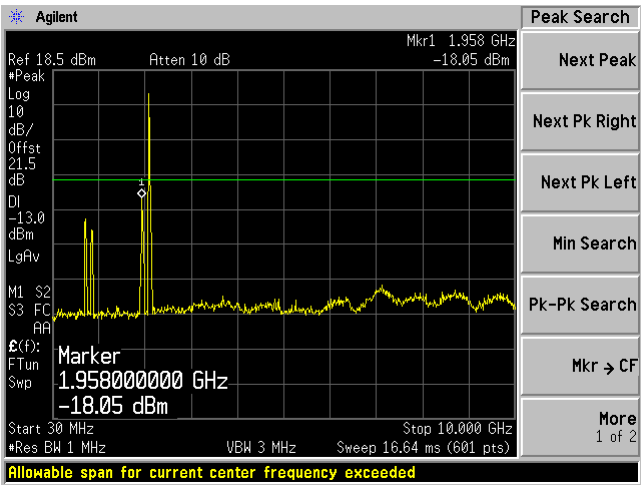


High 10MHz-22GHz

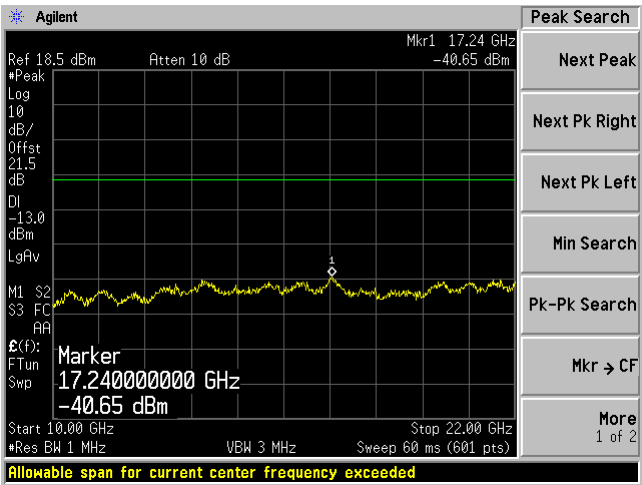


LTE Band 4, 5 MHz, QPSK, DL

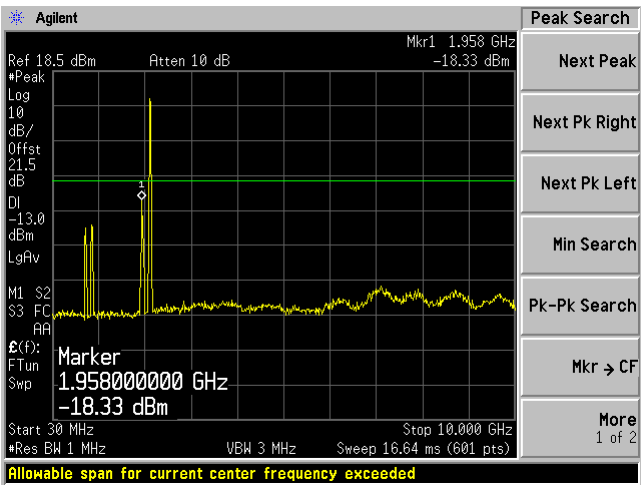
Low 30MHz-10GHz



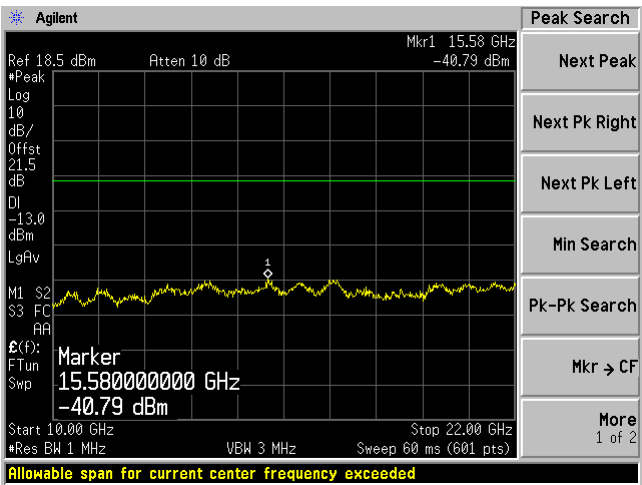
Low 10MHz-22GHz



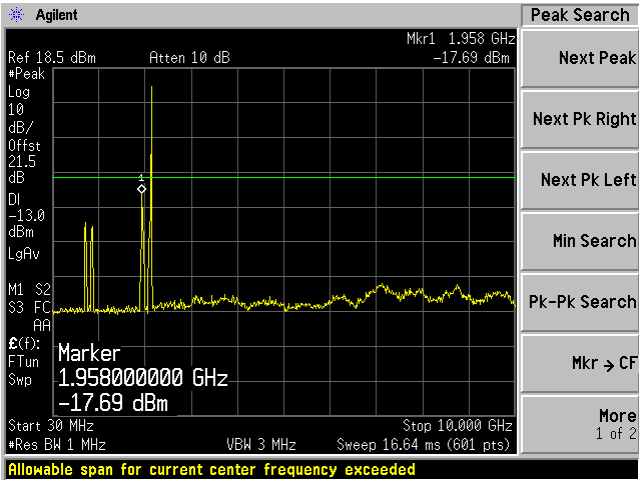
Middle 30MHz-10GHz



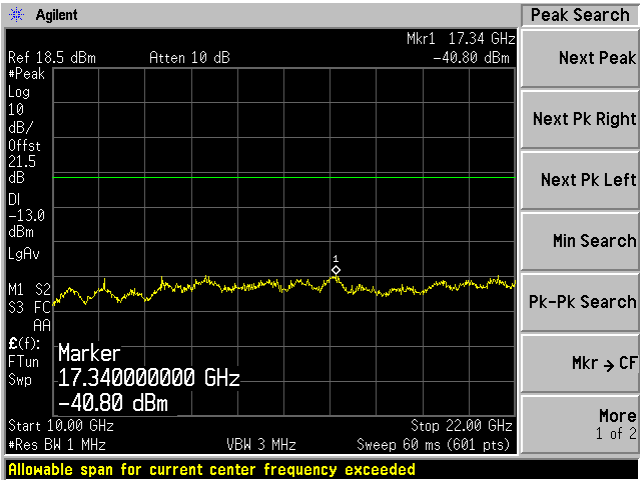
Middle 10MHz-22GHz



High 30MHz-10GHz

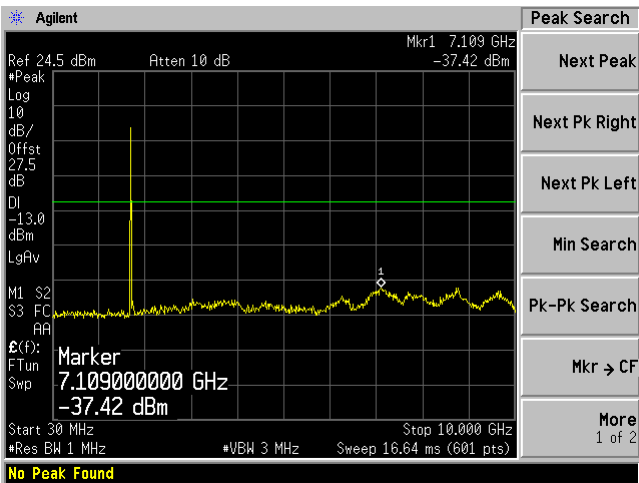


High 10MHz-22GHz

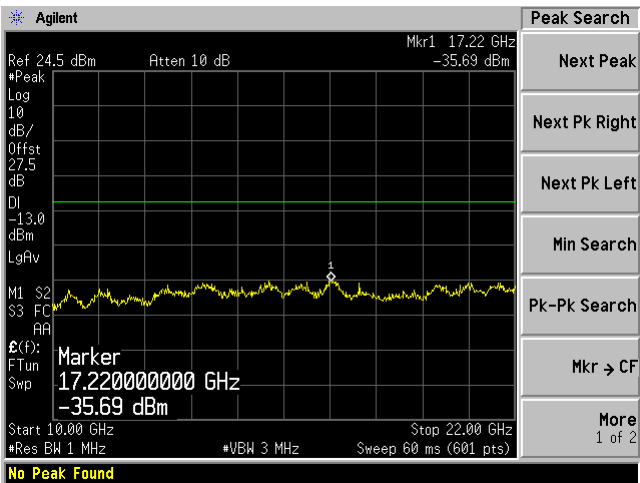


LTE Band 4, 5 MHz, QPSK, UL

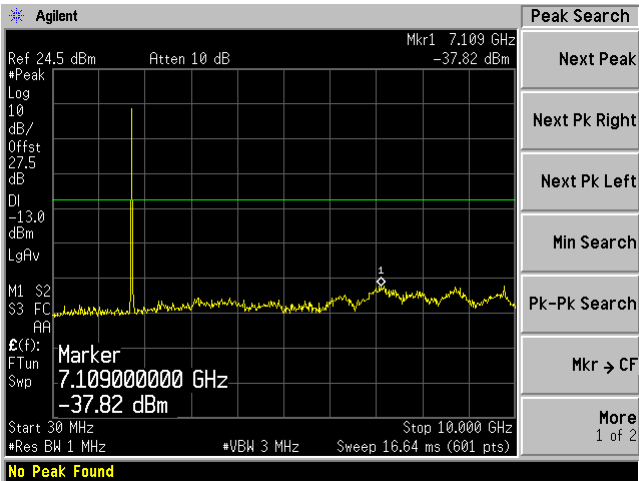
Low 30MHz-10GHz



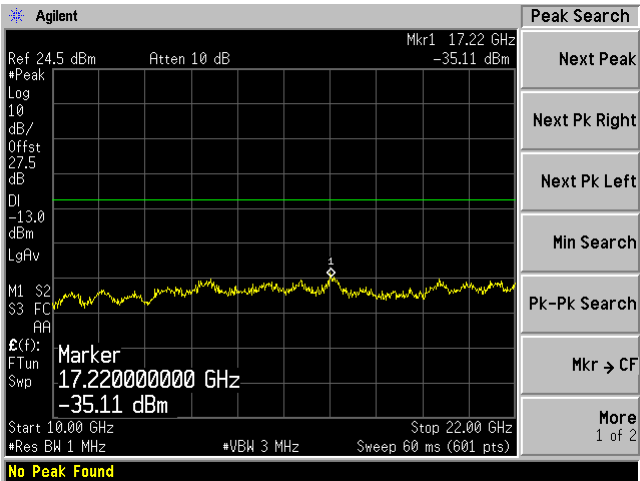
Low 10MHz-22GHz



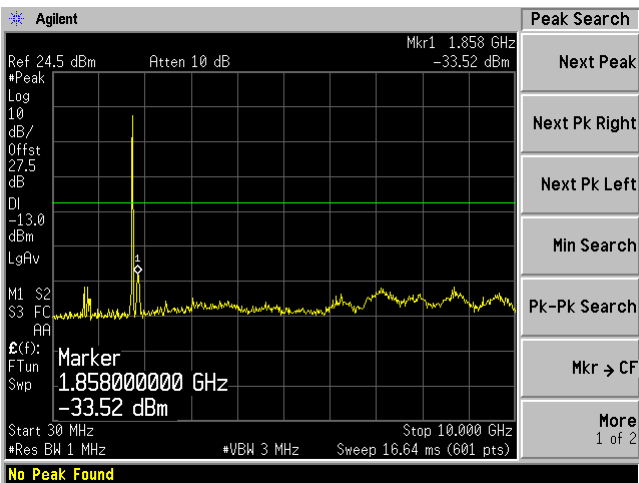
Middle 30MHz-10GHz



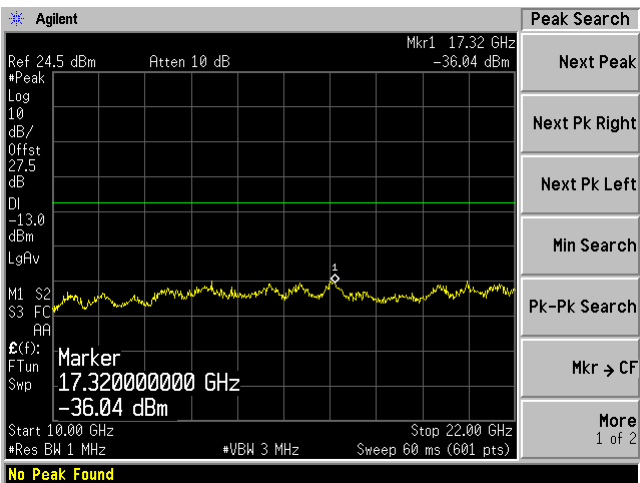
Middle 10MHz-22GHz



High 30MHz-10GHz

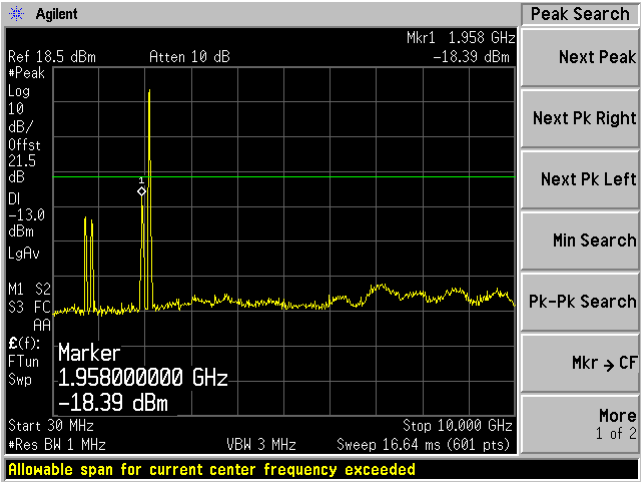


High 10MHz-22GHz

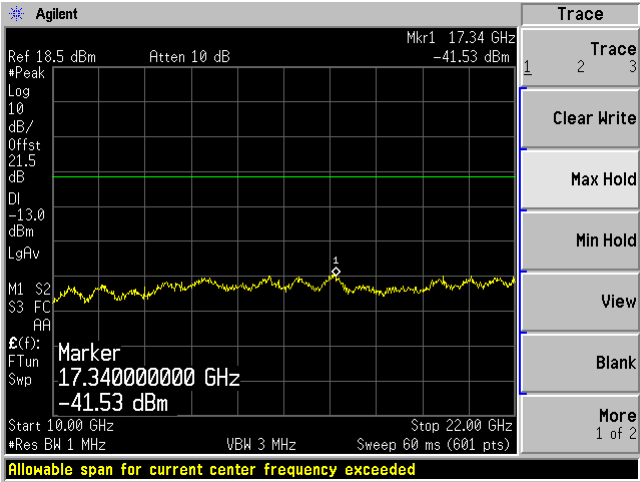


LTE Band 4, 10 MHz, QPSK, DL

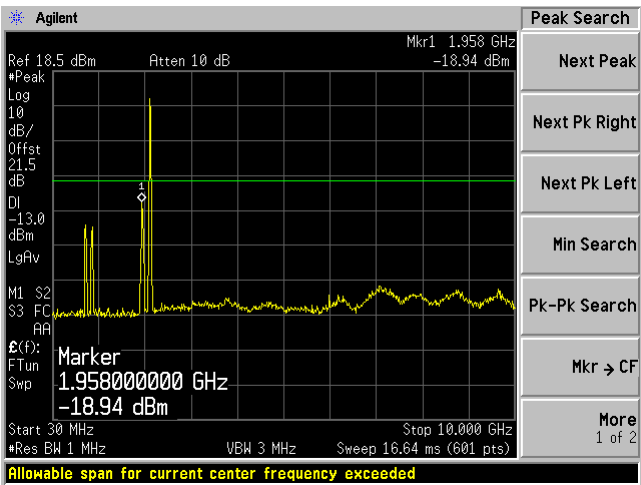
Low 30MHz-10GHz



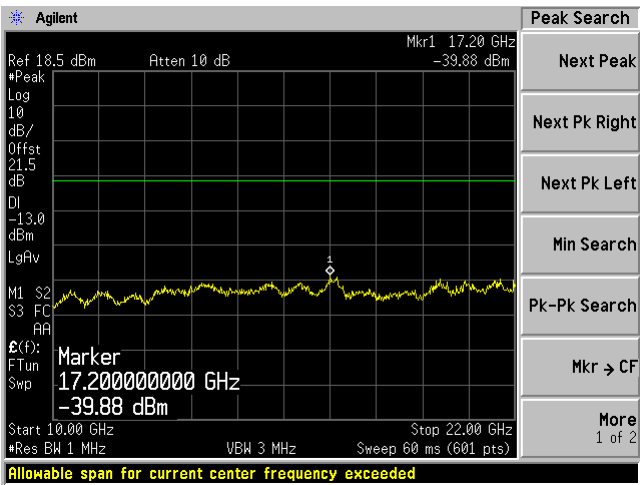
Low 10MHz-22GHz



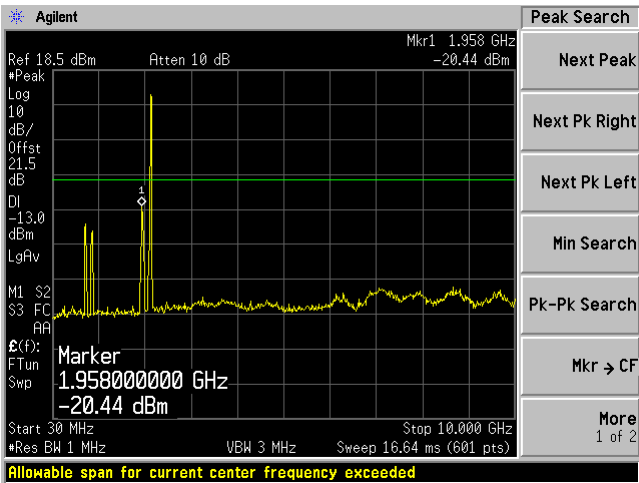
Middle 30MHz-10GHz



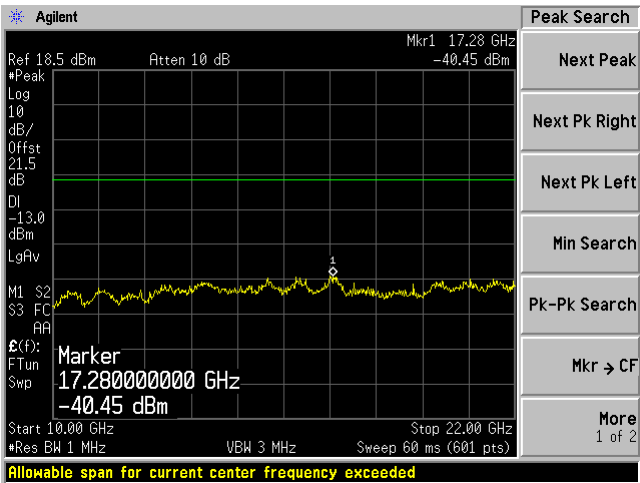
Middle 10MHz-22GHz



High 30MHz-10GHz

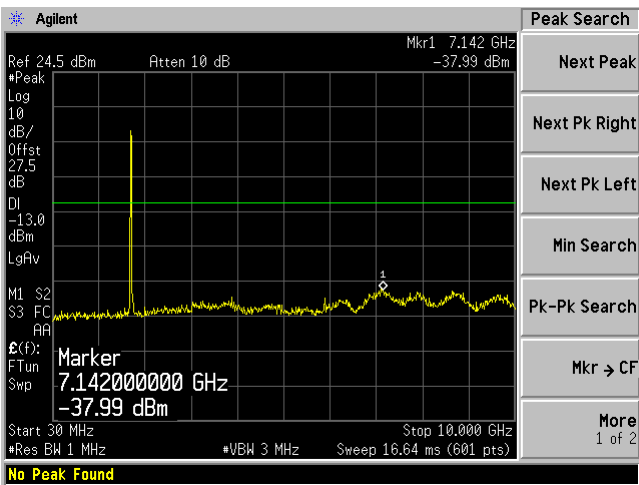


High 10MHz-22GHz

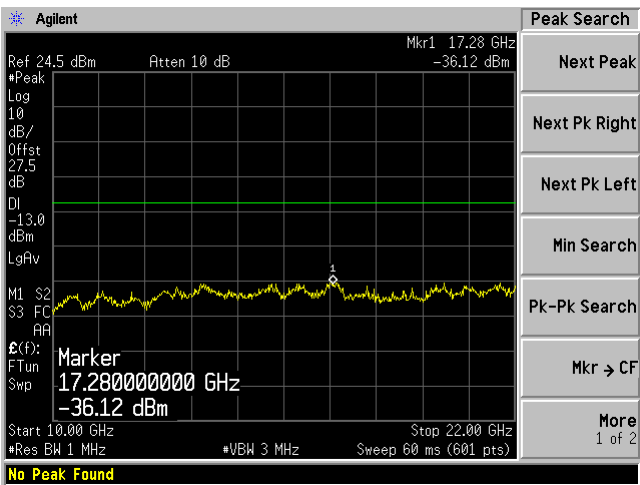


LTE Band 4, 10 MHz, QPSK, UL

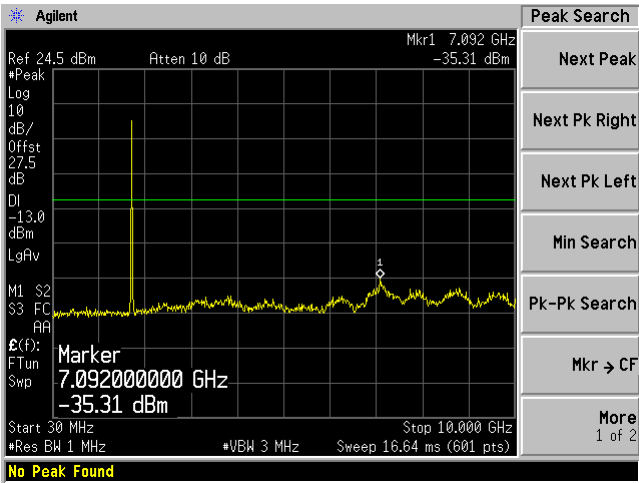
Low 30MHz-10GHz



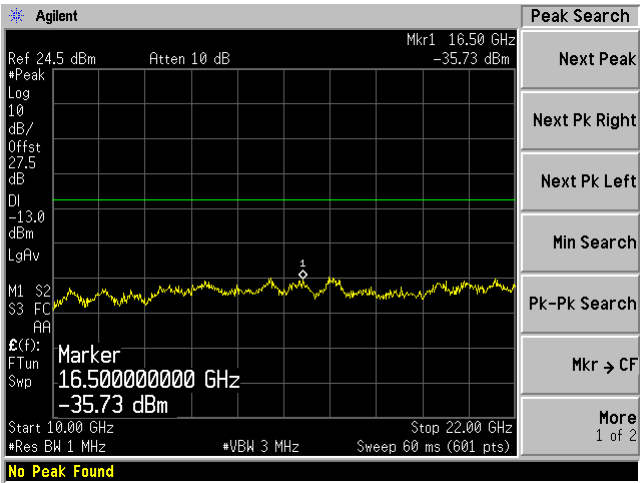
Low 10MHz-22GHz



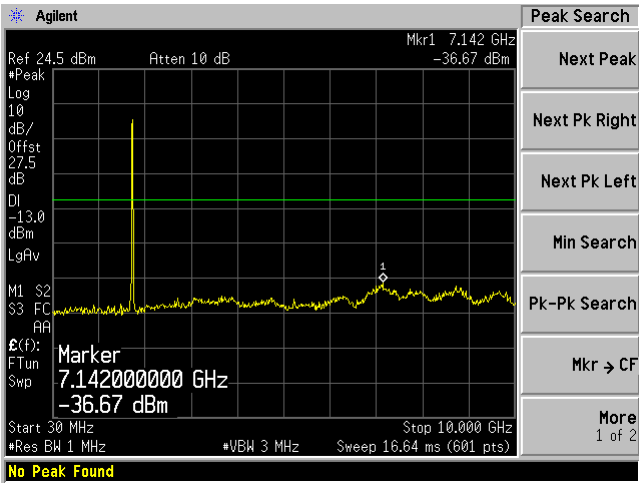
Middle 30MHz-10GHz



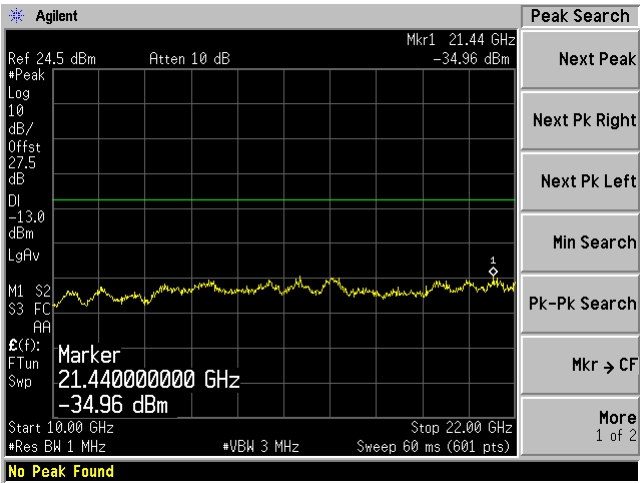
Middle 10MHz-22GHz



High 30MHz-10GHz

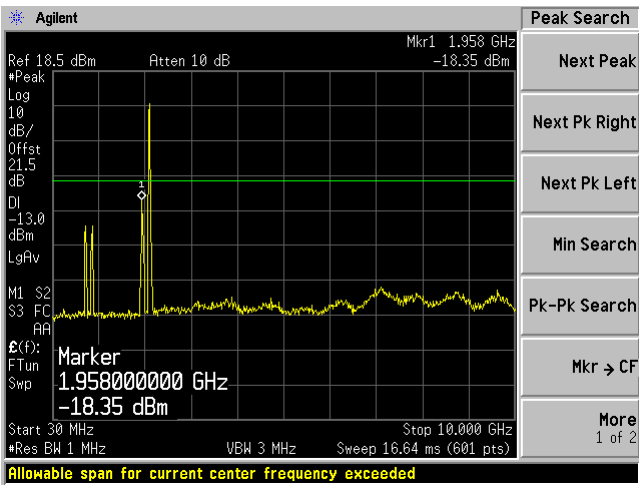


High 10MHz-22GHz

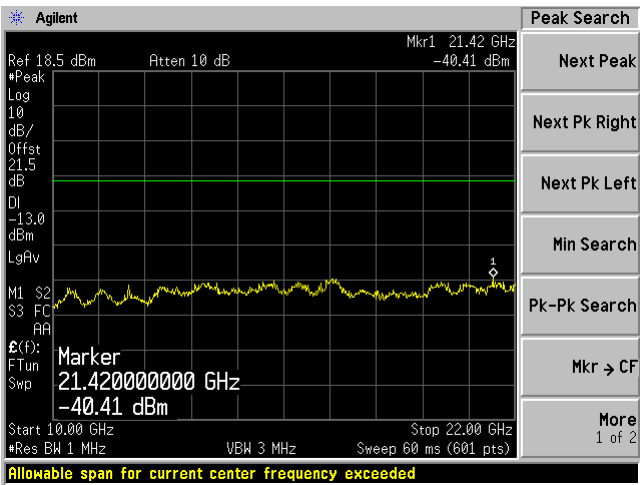


LTE Band 4, 15 MHz, QPSK, DL

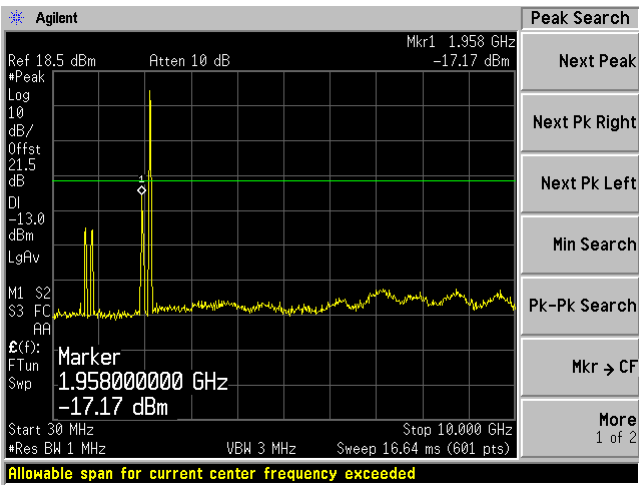
Low 30MHz-10GHz



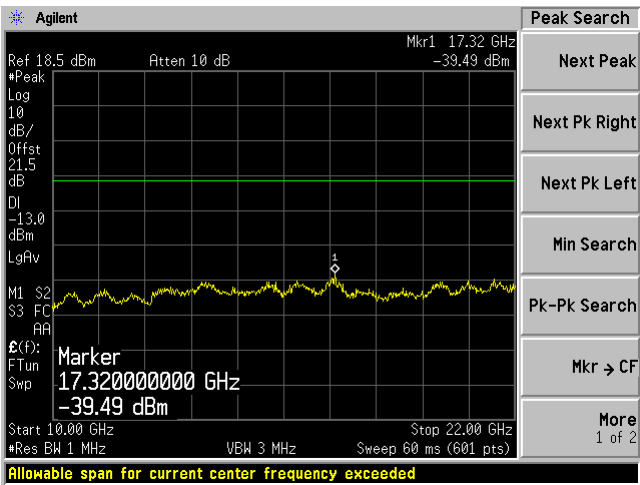
Low 10MHz-22GHz



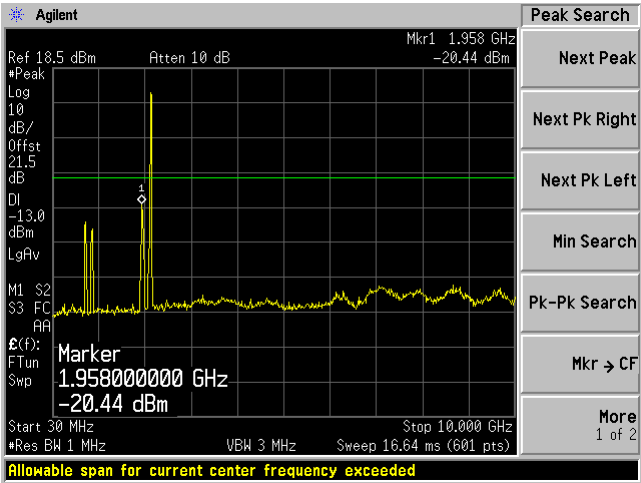
Middle 30MHz-10GHz



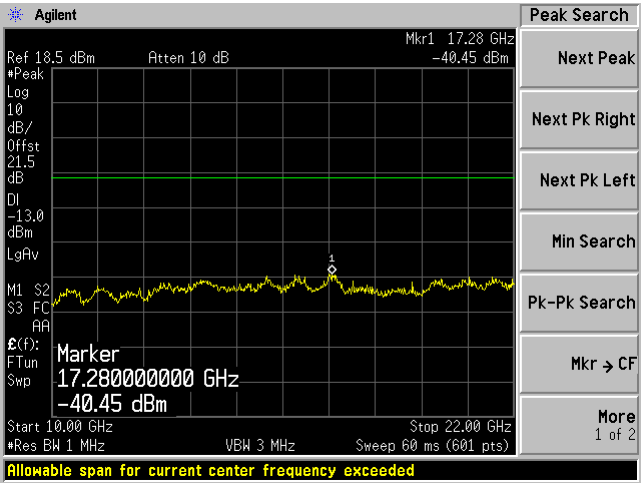
Middle 10MHz-22GHz



High 30MHz-10GHz

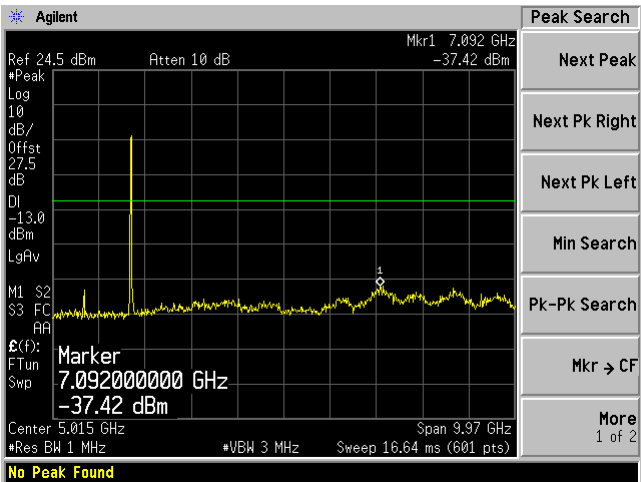


High 10MHz-22GHz

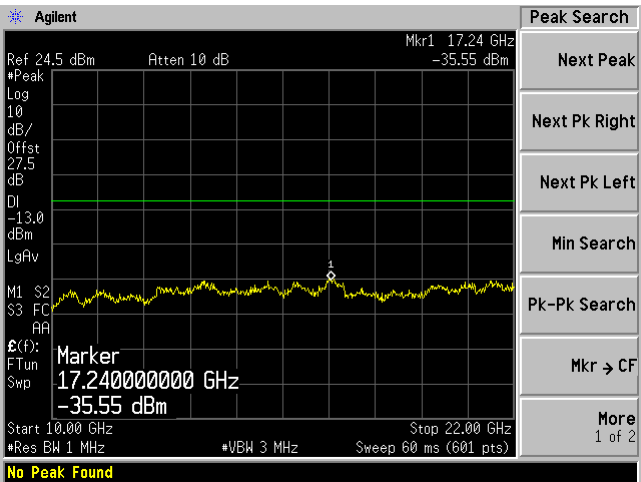


LTE Band 4, 15 MHz, QPSK, UL

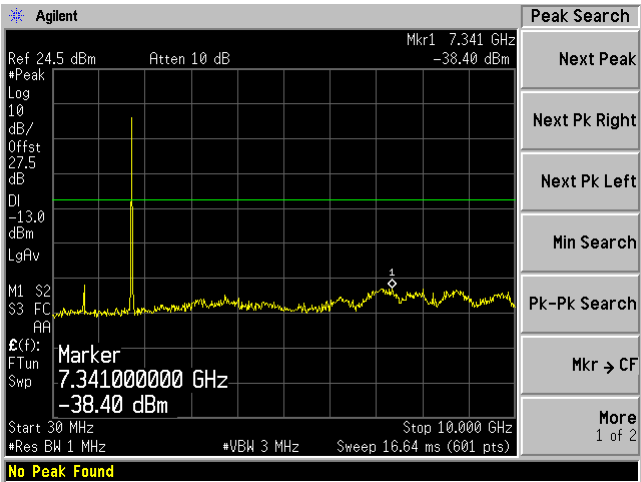
Low 30MHz-10GHz



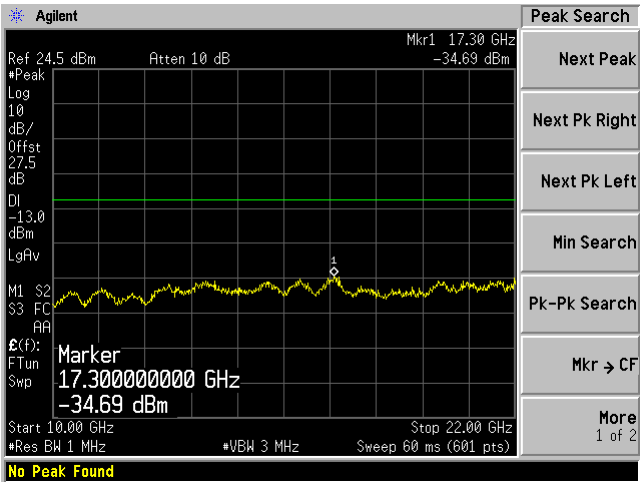
Low 10MHz-22GHz



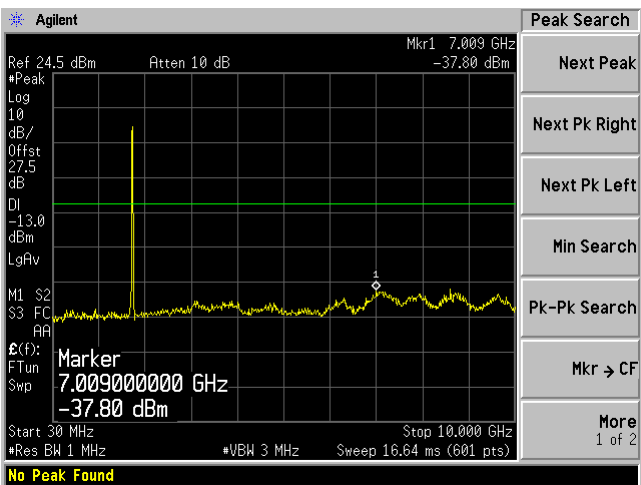
Middle 30MHz-10GHz



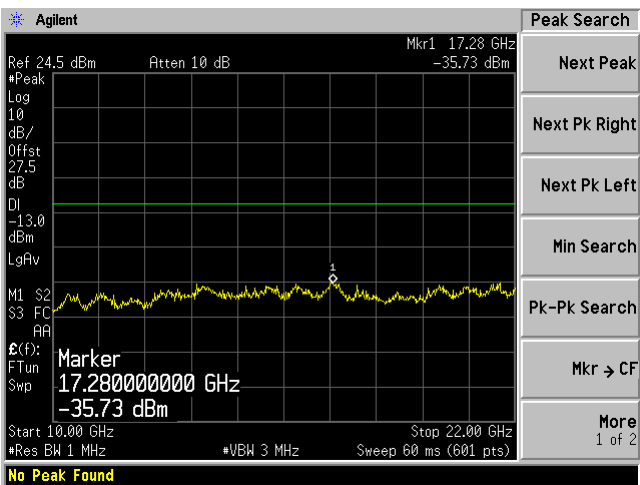
Middle 10MHz-22GHz



High 30MHz-10GHz

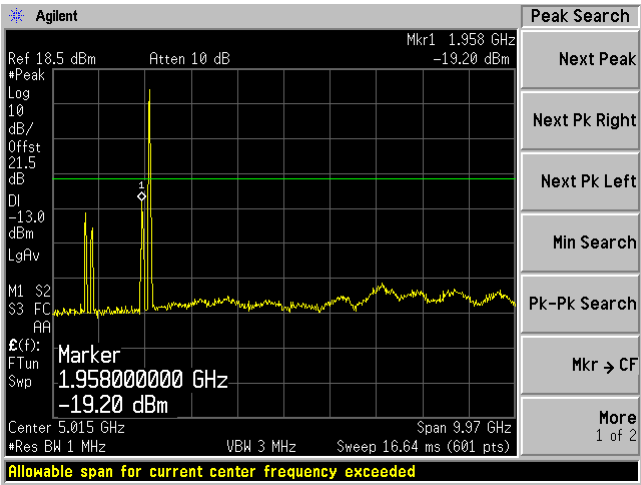


High 10MHz-22GHz

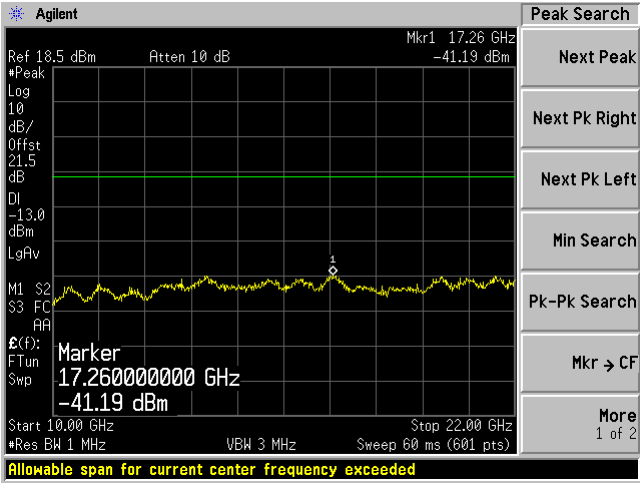


LTE Band 4, 20 MHz, QPSK, DL

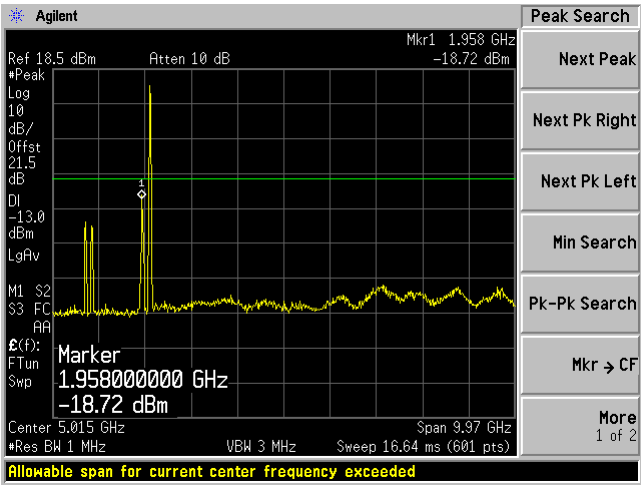
Low 30MHz-10GHz



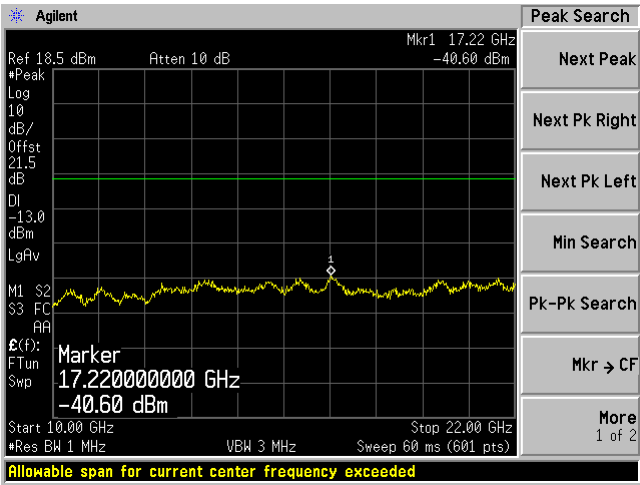
Low 10MHz-22GHz



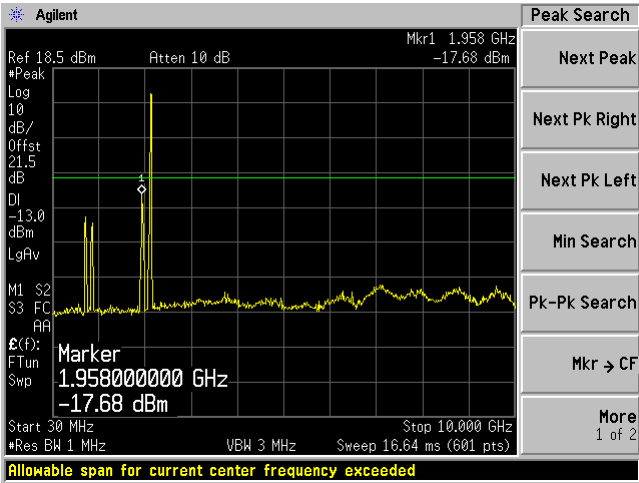
Middle 30MHz-10GHz



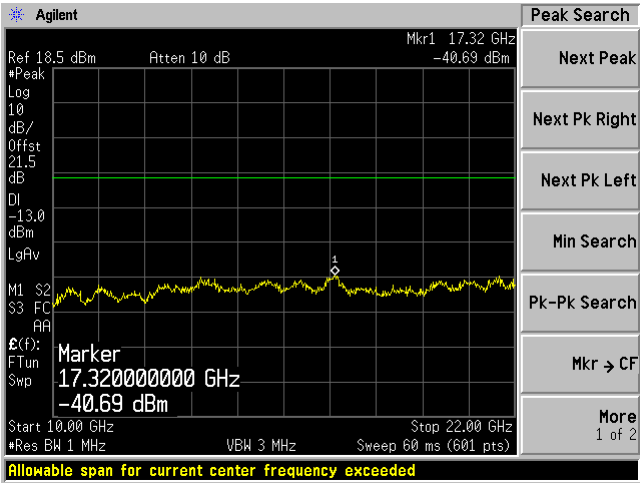
Middle 10MHz-22GHz



High 30MHz-10GHz

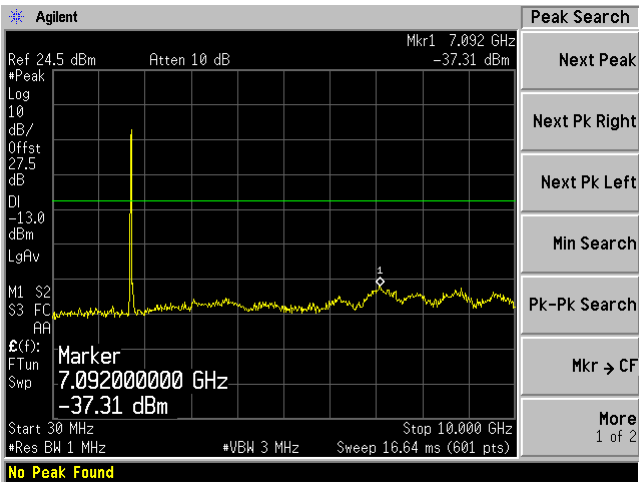


High 10MHz-22GHz

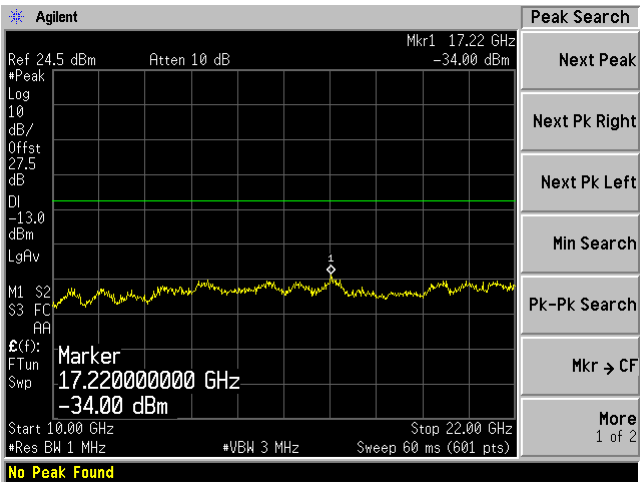


LTE Band 4, 20 MHz, QPSK, UL

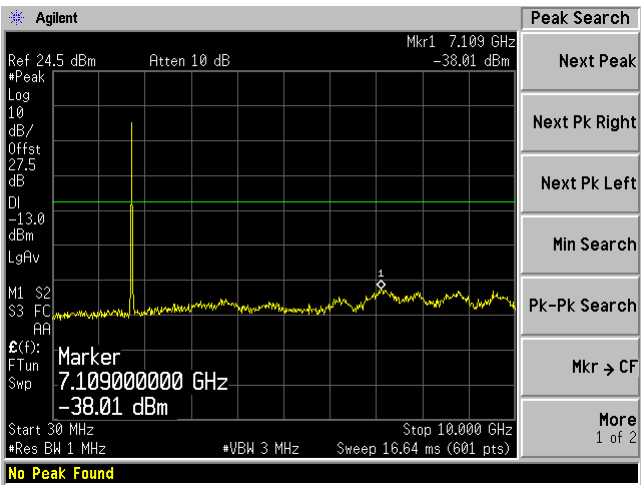
Low 30MHz-10GHz



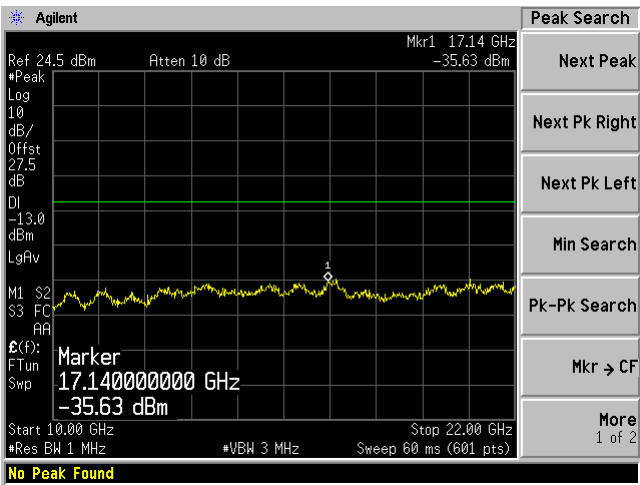
Low 10MHz-22GHz



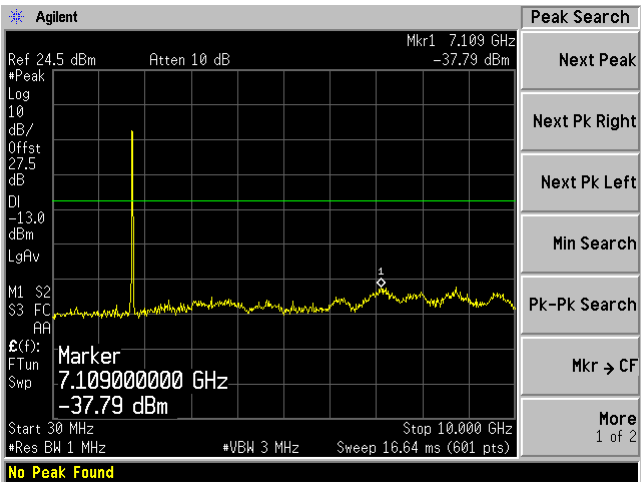
Middle 30MHz-10GHz



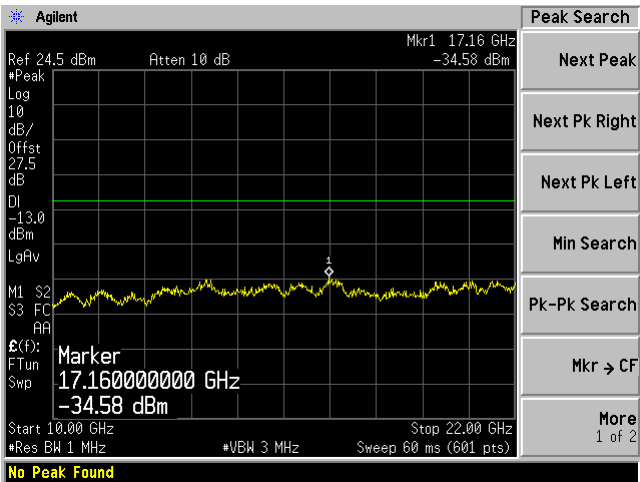
Middle 10MHz-22GHz



High 30MHz-10GHz

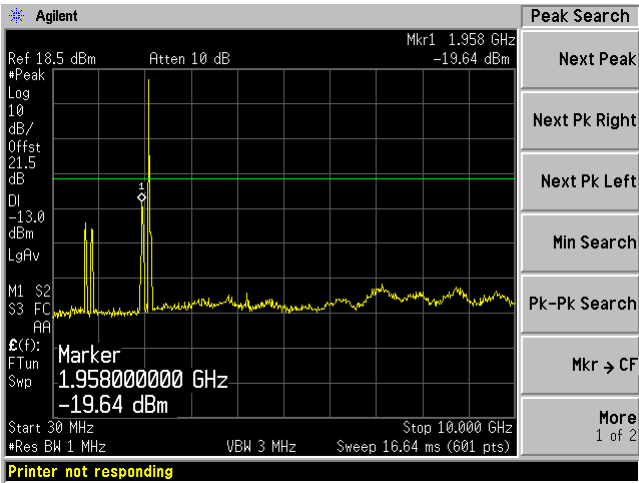


High 10MHz-22GHz

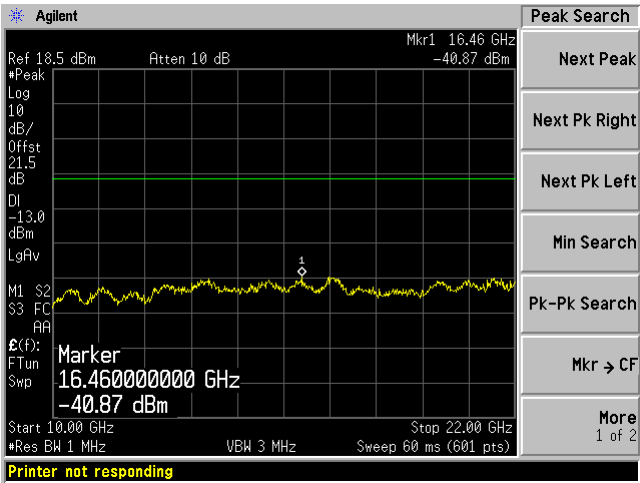


LTE Band 4, 1.4 MHz, 16QAM, DL

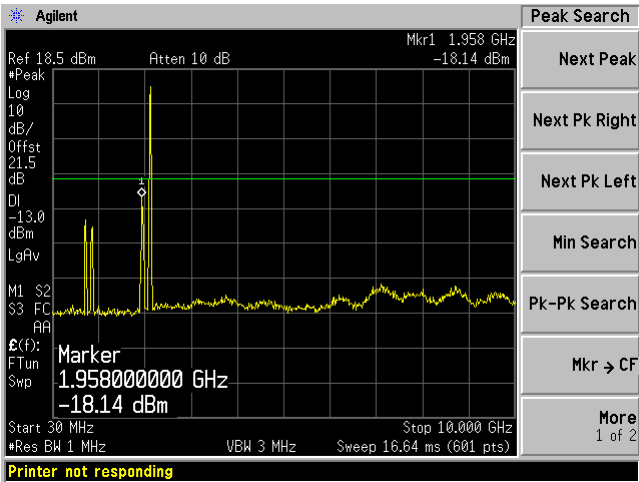
Low 30MHz-10GHz



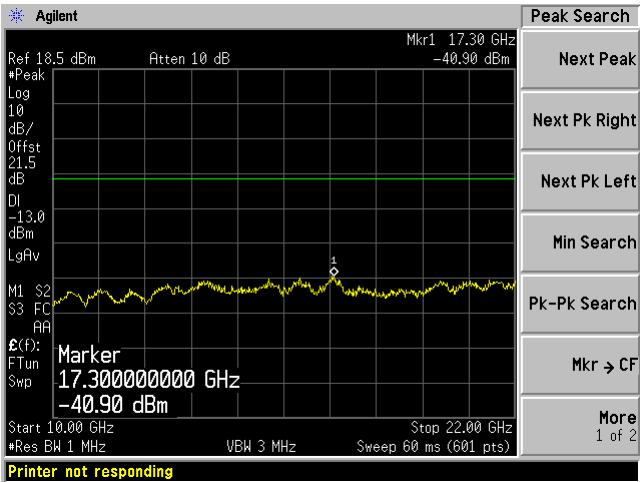
Low 10MHz-22GHz



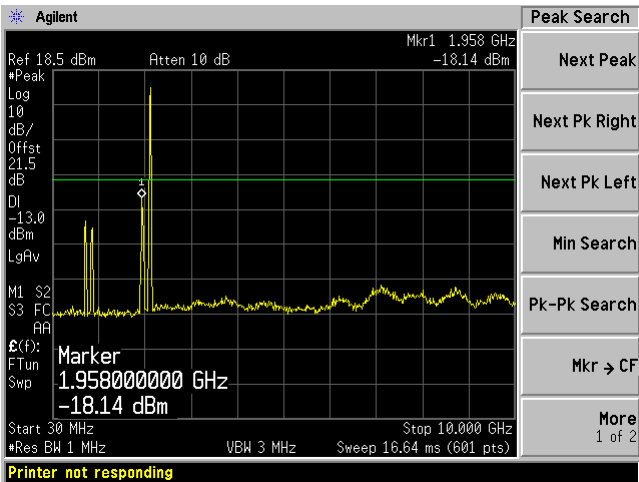
Middle 30MHz-10GHz



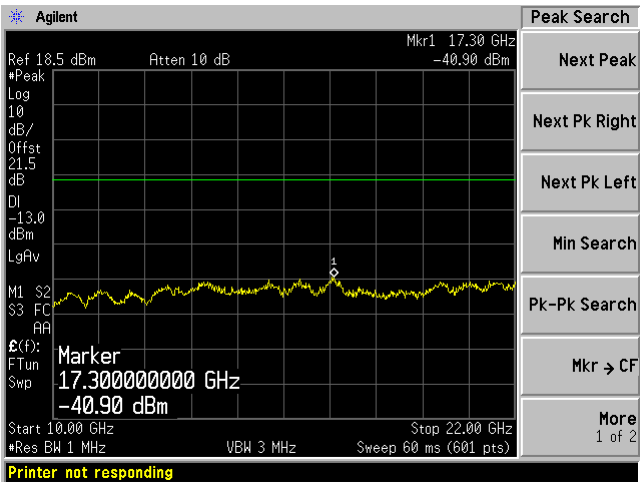
Middle 10MHz-22GHz



High 30MHz-10GHz

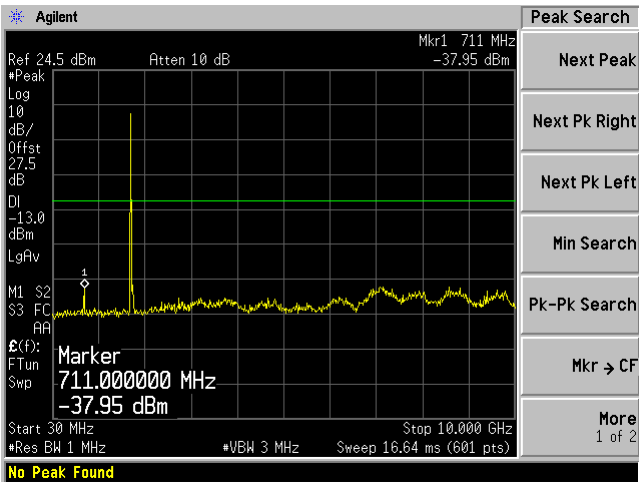


High 10MHz-22GHz

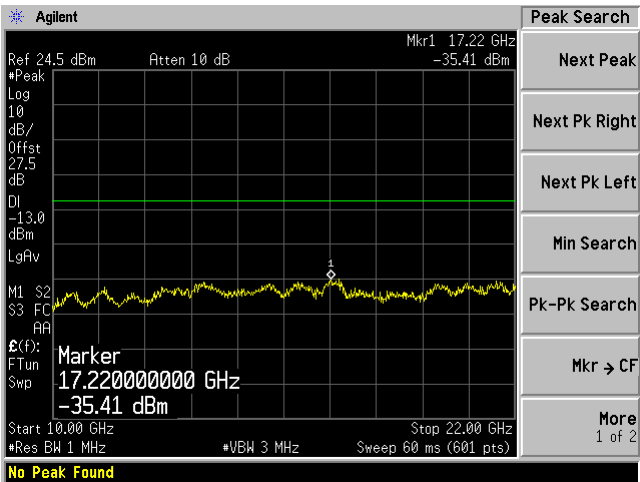


LTE Band 4, 1.4 MHz, 16QAM, UL

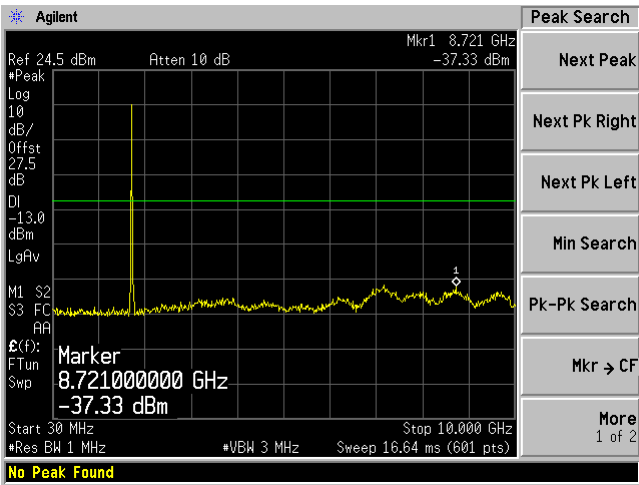
Low 30MHz-10GHz



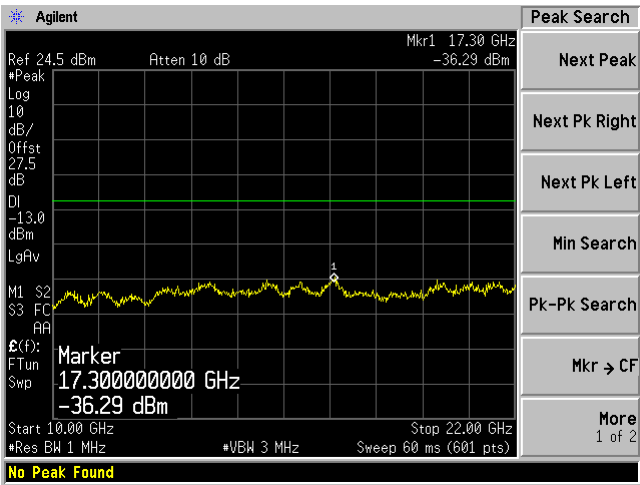
Low 10MHz-22GHz



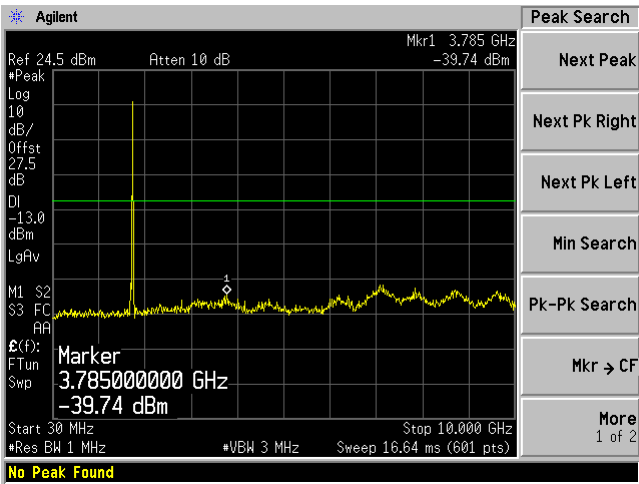
Middle 30MHz-10GHz



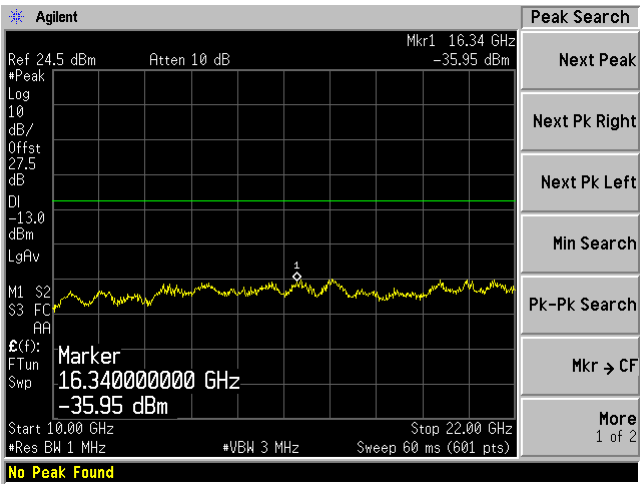
Middle 10MHz-22GHz



High 30MHz-10GHz

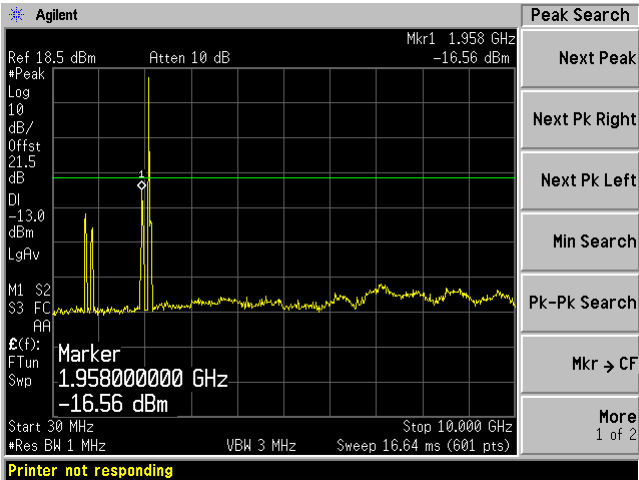


High 10MHz-22GHz

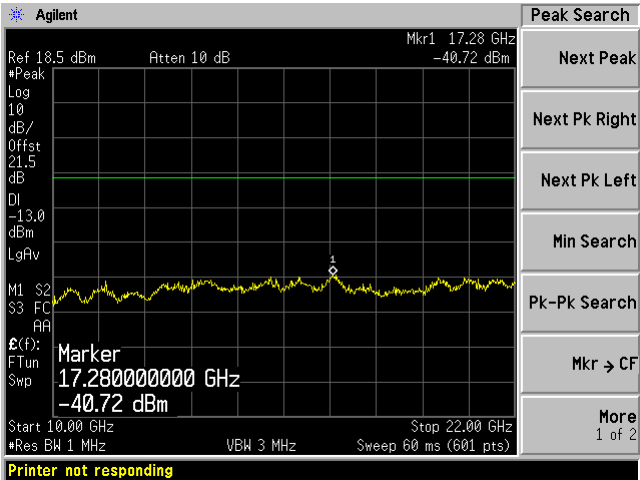


LTE Band 4, 3 MHz, 16QAM, DL

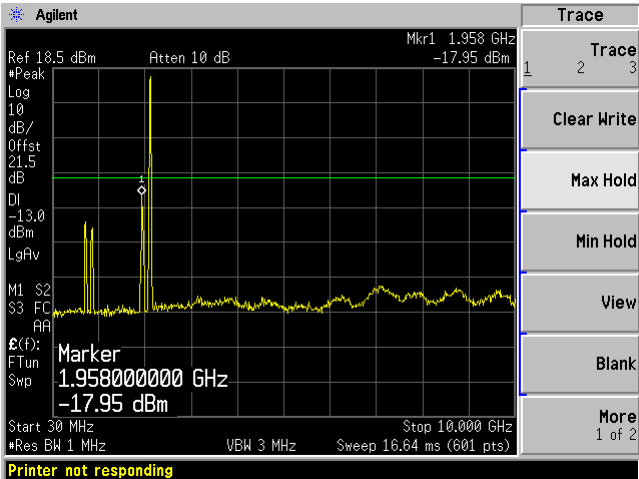
Low 30MHz-10GHz



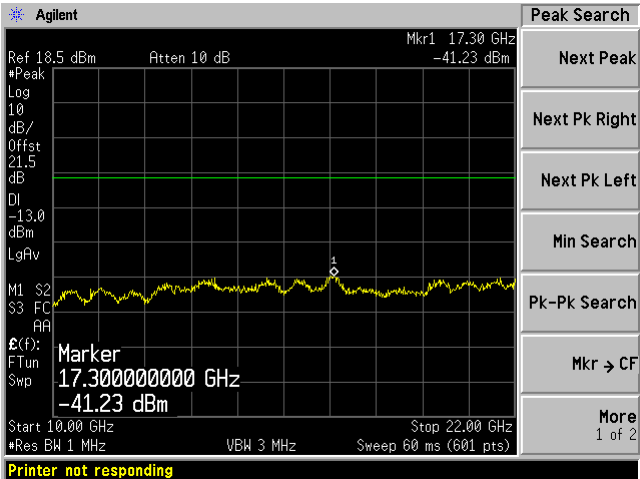
Low 10MHz-22GHz



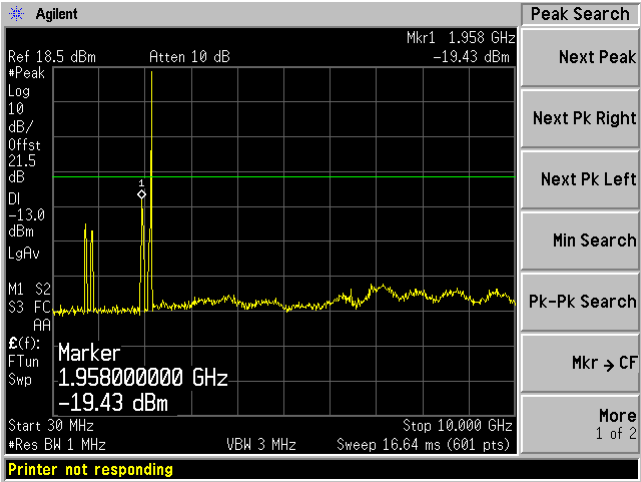
Middle 30MHz-10GHz



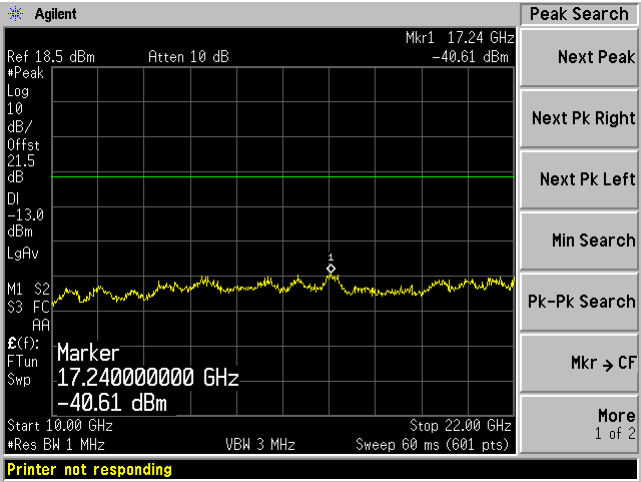
Middle 10MHz-22GHz



High 30MHz-10GHz

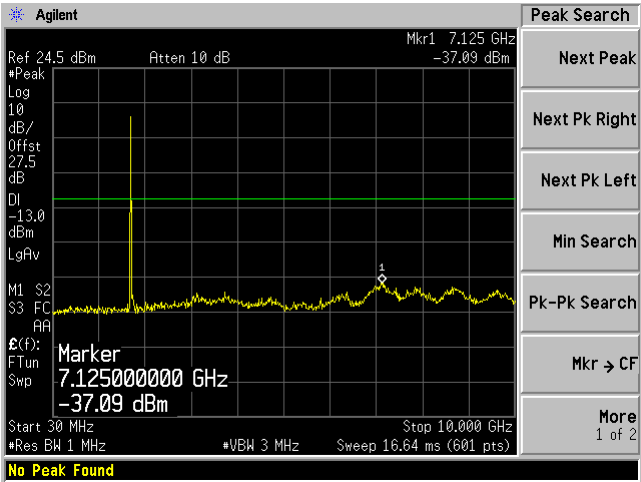


High 10MHz-22GHz

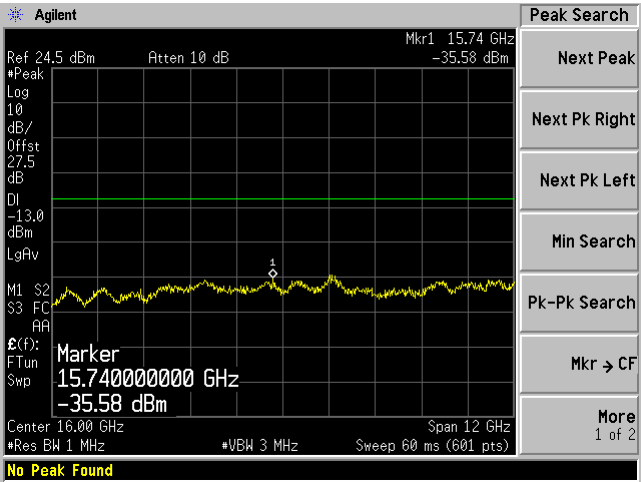


LTE Band 4, 3 MHz, 16QAM, UL

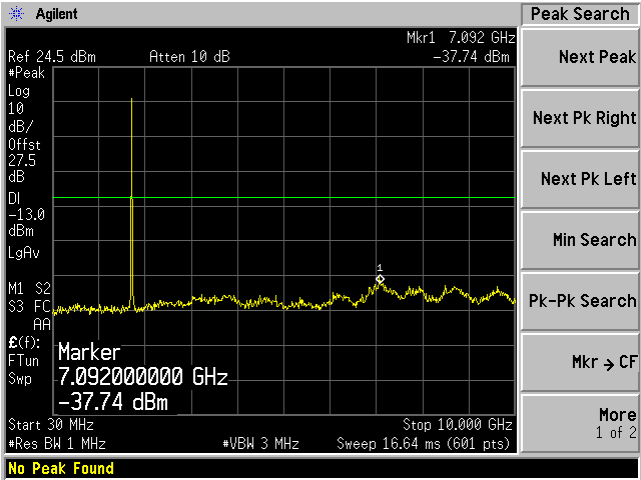
Low 30MHz-10GHz



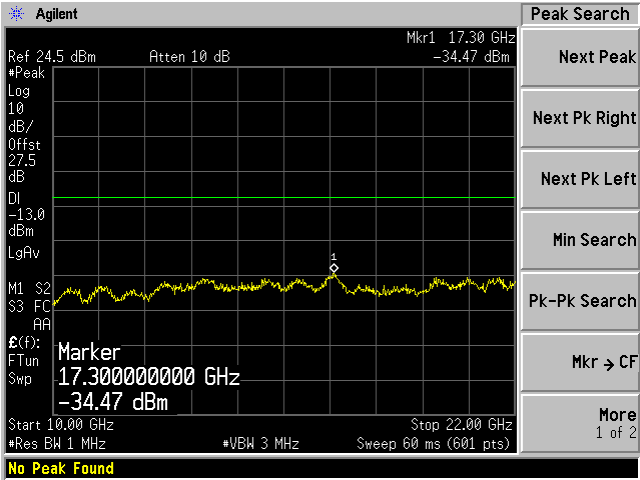
Low 10MHz-22GHz



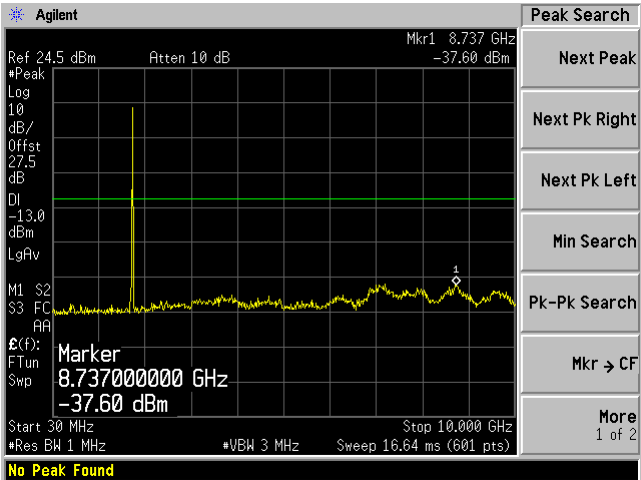
Middle 30MHz-10GHz



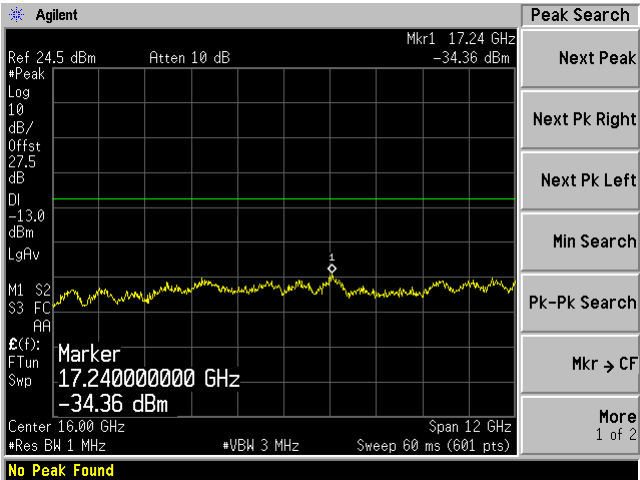
Middle 10MHz-22GHz



High 30MHz-10GHz

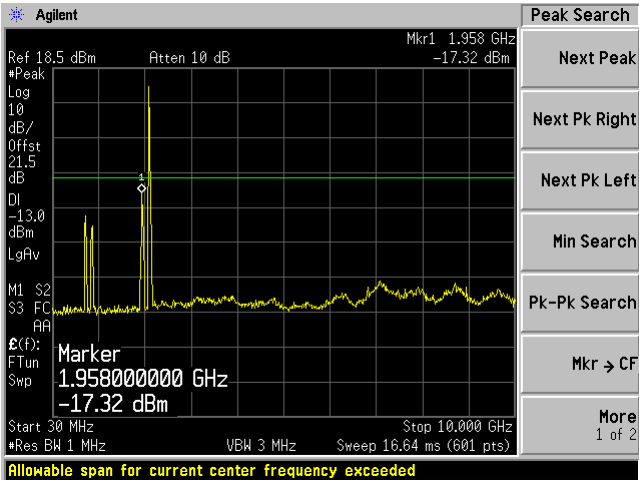


High 10MHz-22GHz

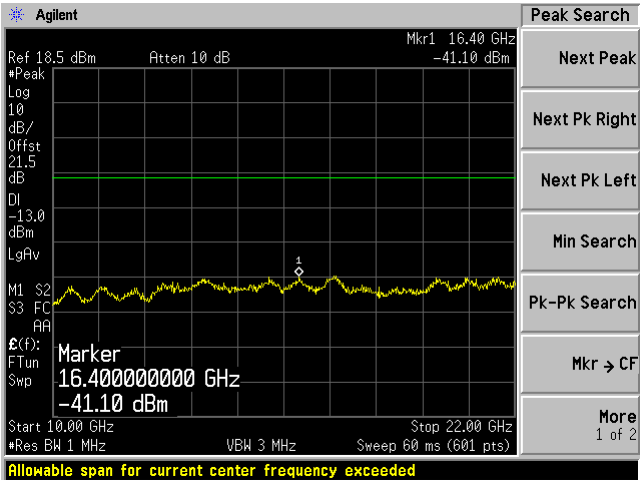


LTE Band 4, 5 MHz, 16QAM, DL

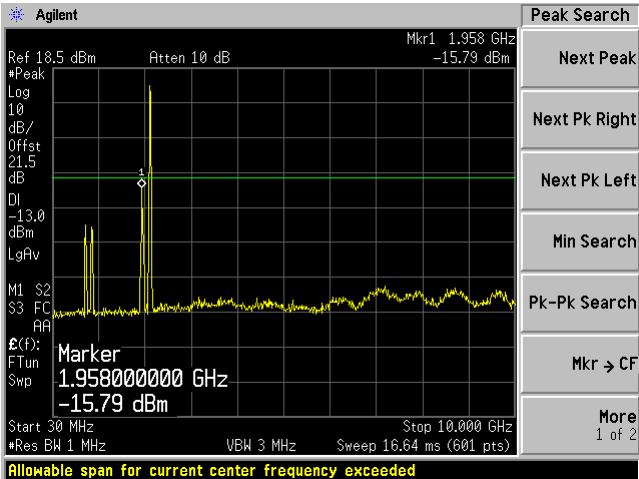
Low 30MHz-10GHz



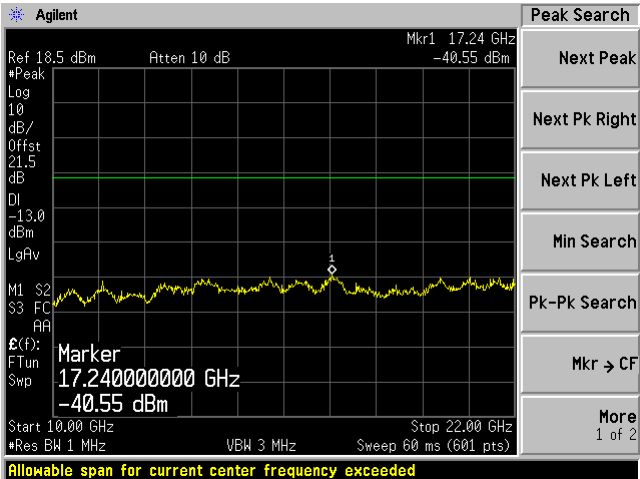
Low 10MHz-22GHz



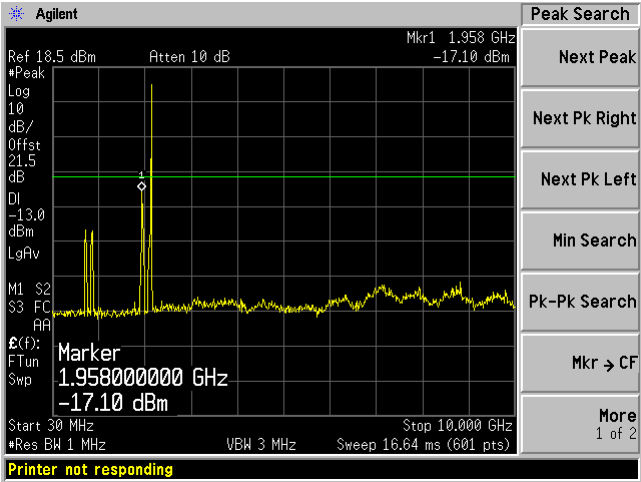
Middle 30MHz-10GHz



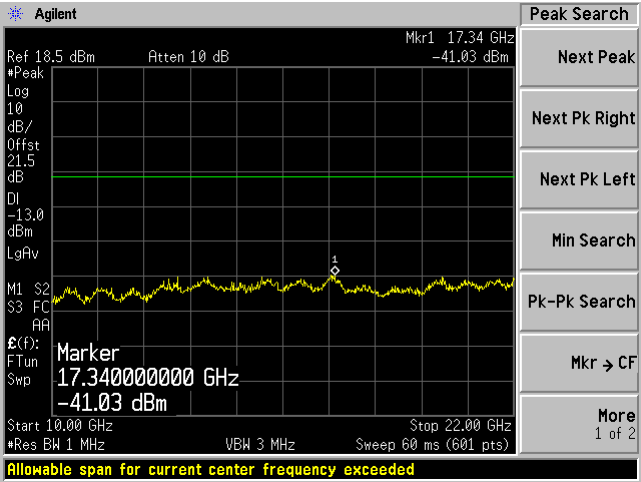
Middle 10MHz-22GHz



High 30MHz-10GHz

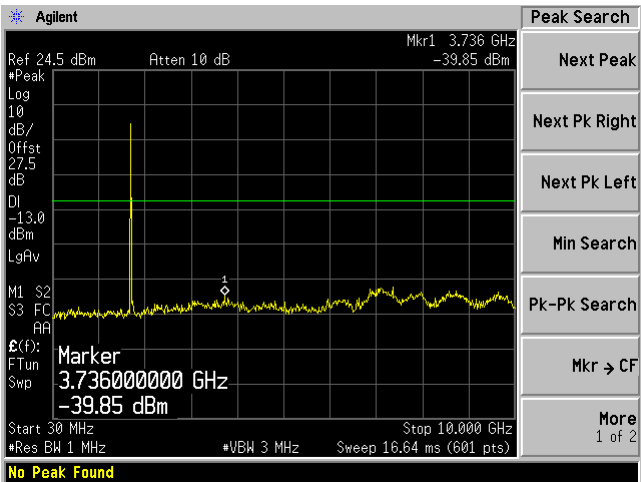


High 10MHz-22GHz

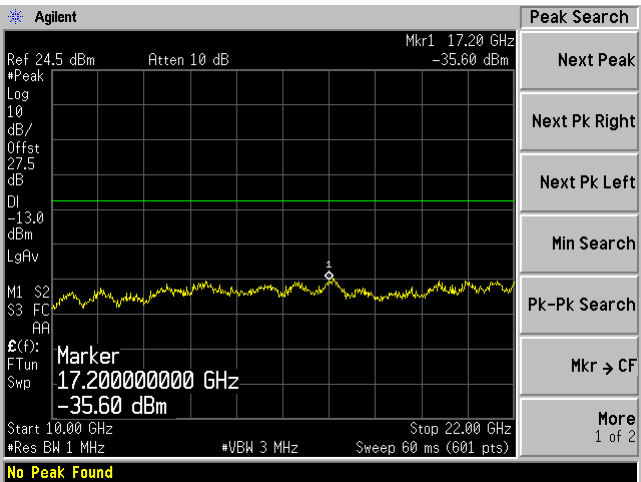


LTE Band 4, 5 MHz, 16QAM, UL

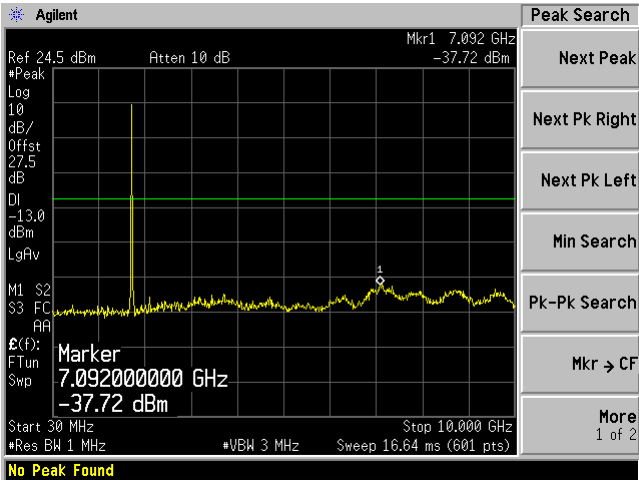
Low 30MHz-10GHz



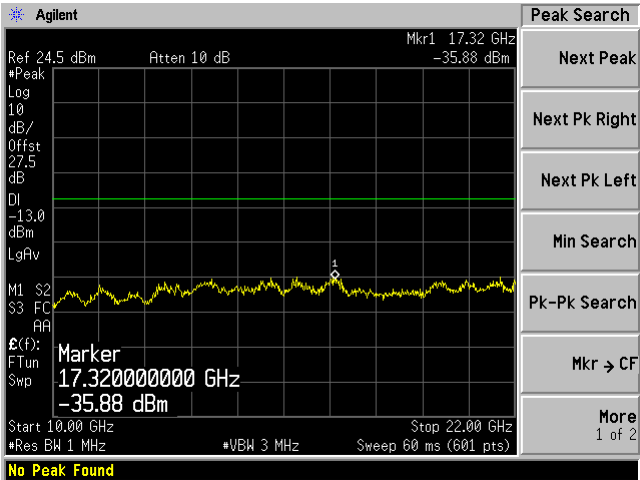
Low 10MHz-22GHz



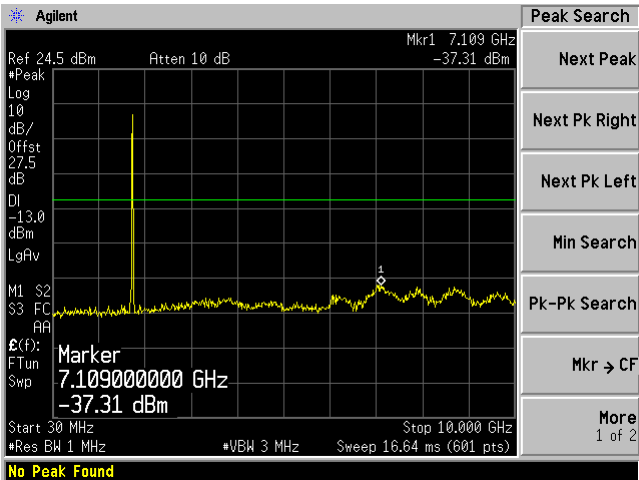
Middle 30MHz-10GHz



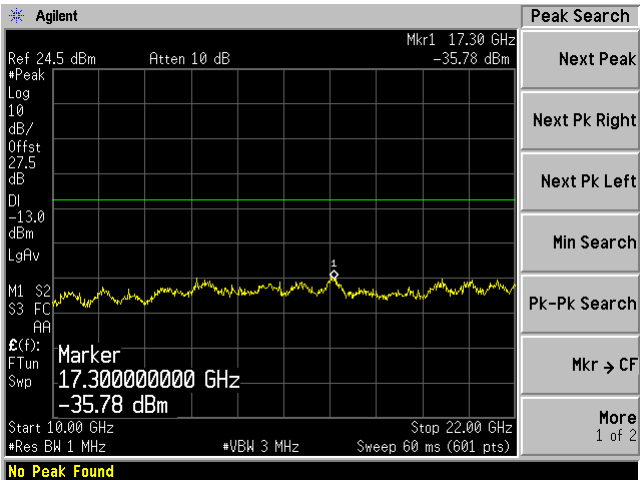
Middle 10MHz-22GHz



High 30MHz-10GHz

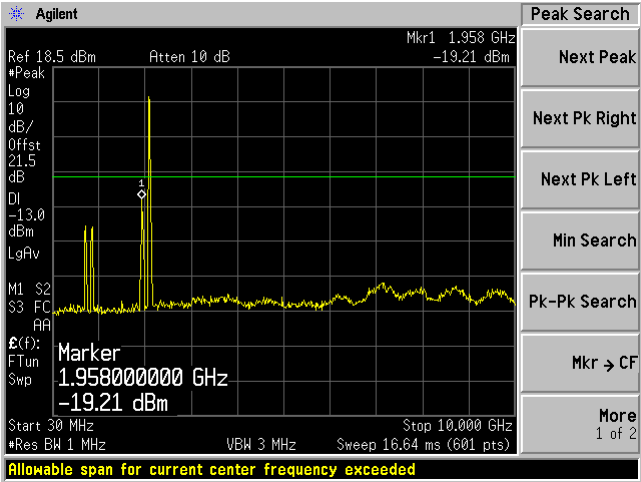


High 10MHz-22GHz

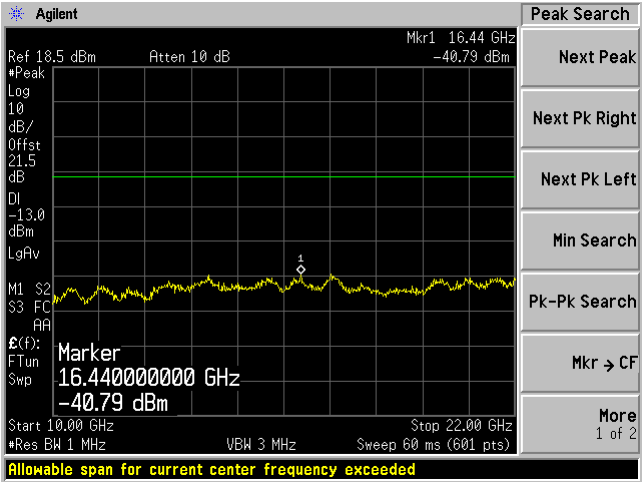


LTE Band 4, 10 MHz, 16QAM, DL

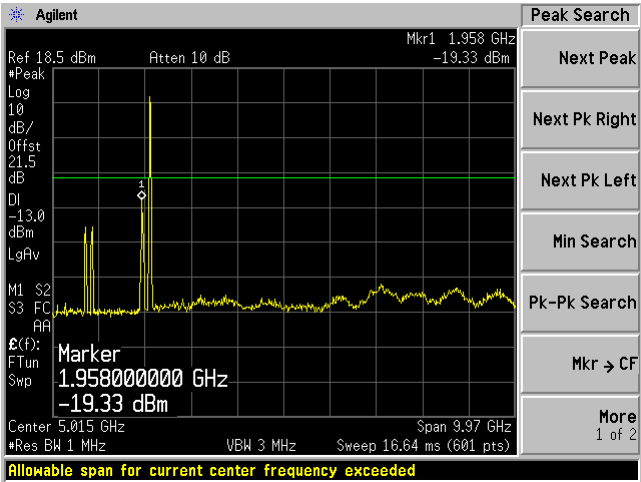
Low 30MHz-10GHz



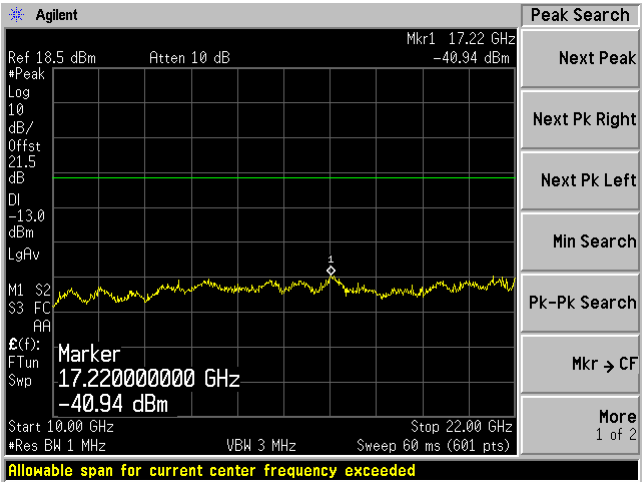
Low 10MHz-22GHz



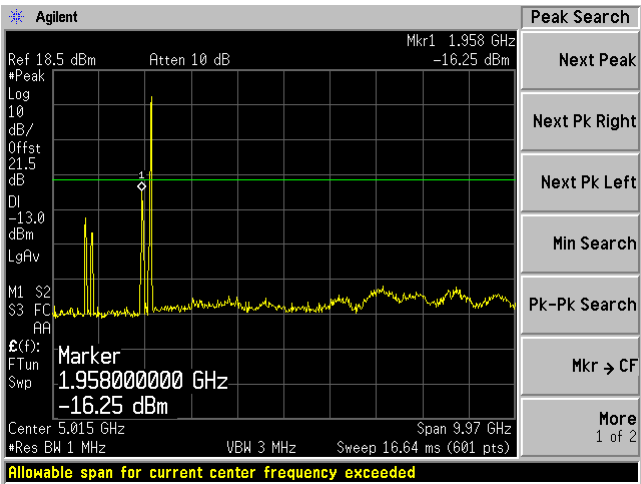
Middle 30MHz-10GHz



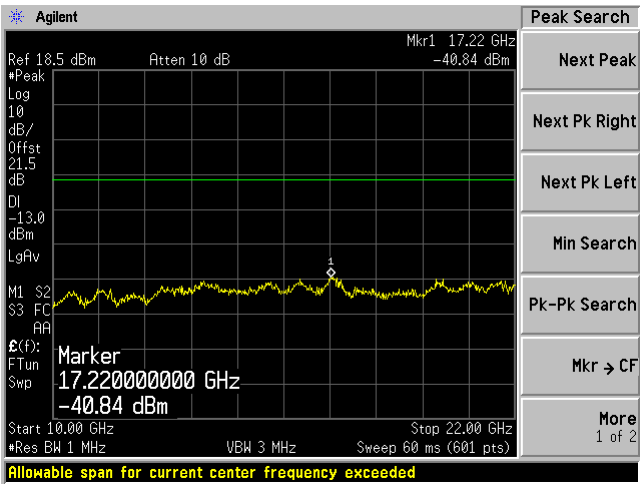
Middle 10MHz-22GHz



High 30MHz-10GHz

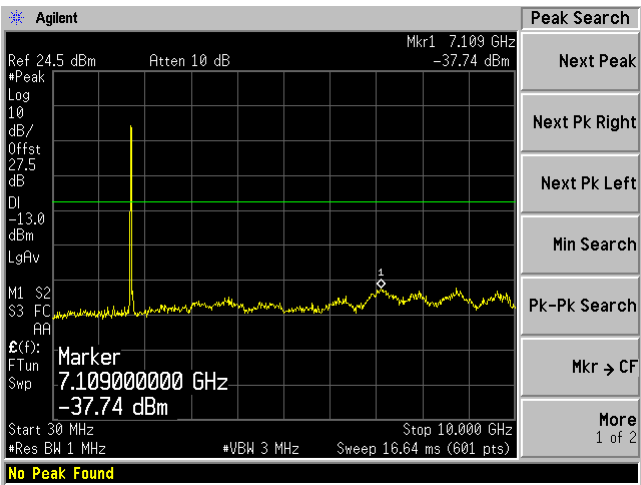


High 10MHz-22GHz

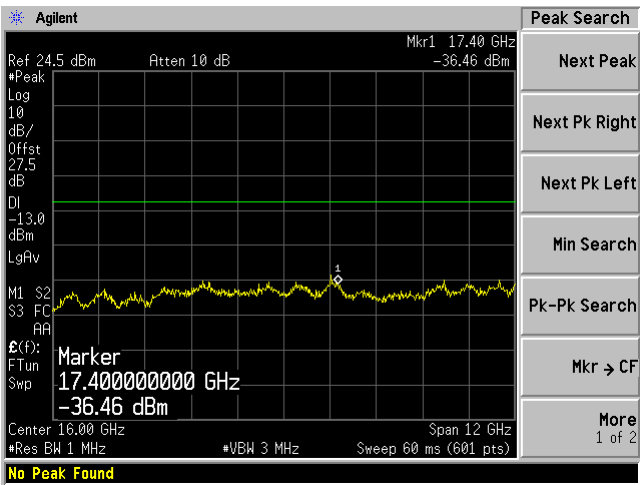


LTE Band 4, 10 MHz, 16QAM, UL

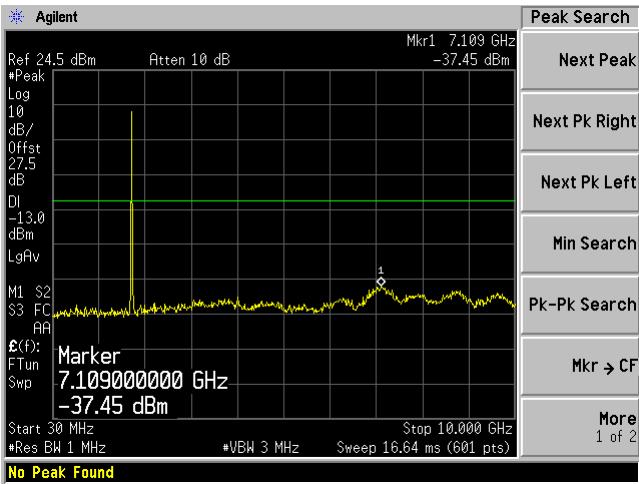
Low 30MHz-10GHz



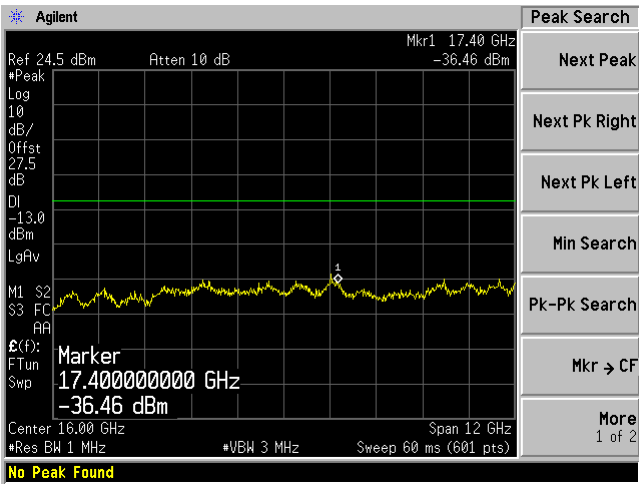
Low 10MHz-22GHz



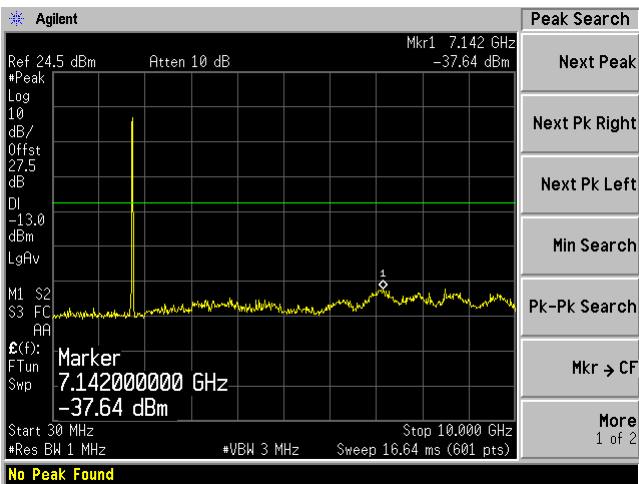
Middle 30MHz-10GHz



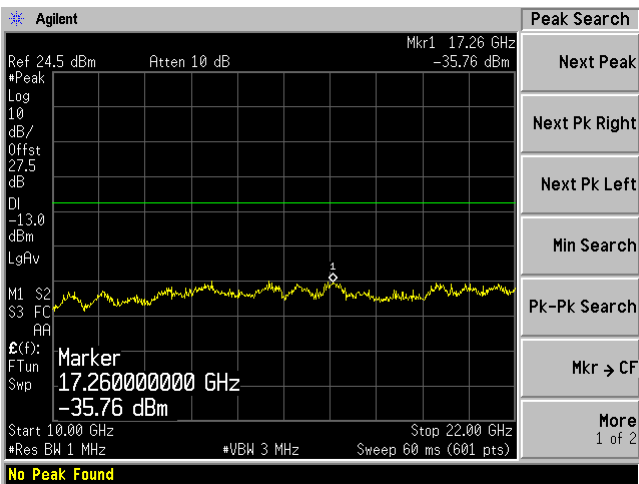
Middle 10MHz-22GHz



High 30MHz-10GHz

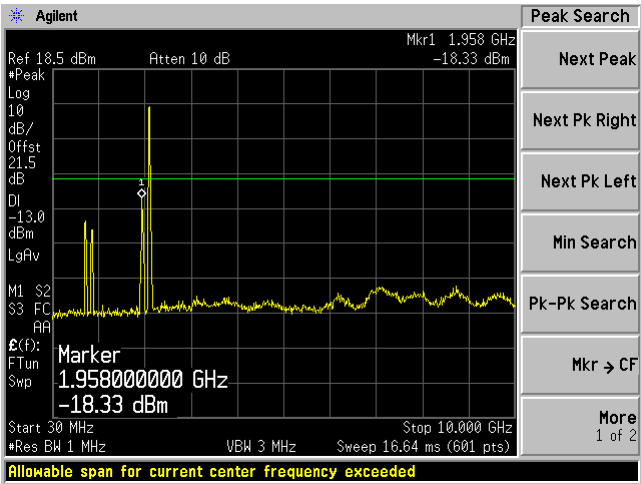


High 10MHz-22GHz

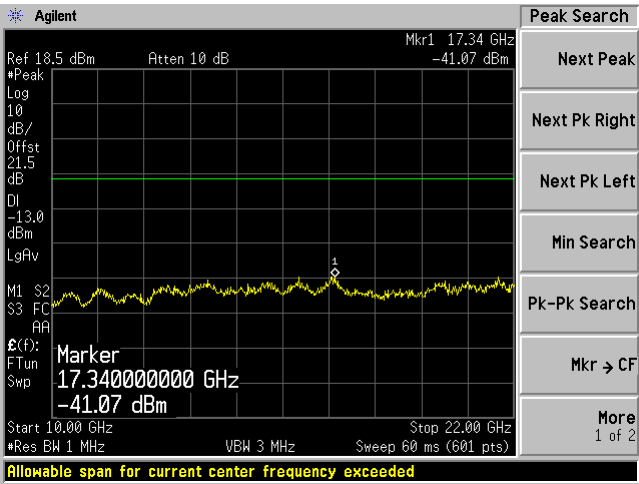


LTE Band 4, 15 MHz, 16QAM, DL

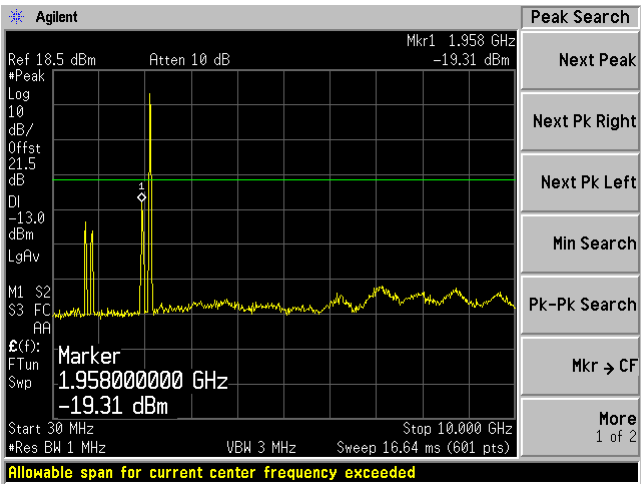
Low 30MHz-10GHz



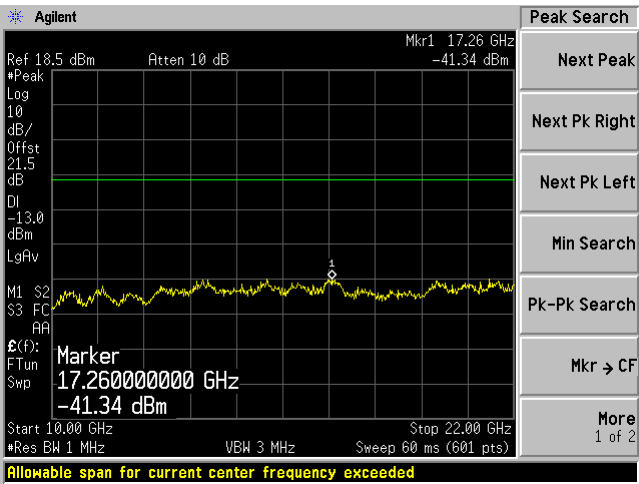
Low 10MHz-22GHz



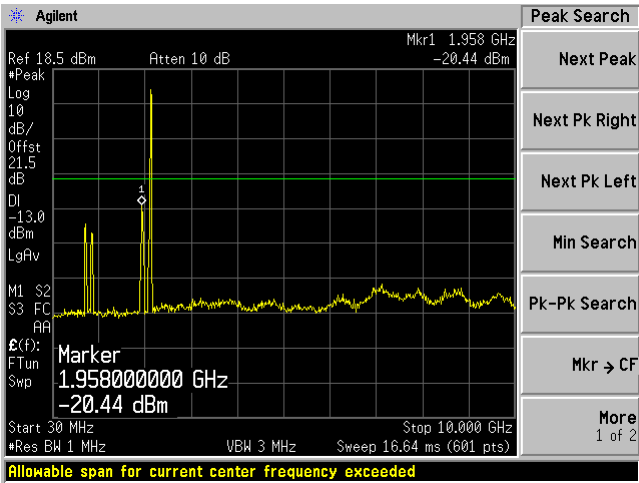
Middle 30MHz-10GHz



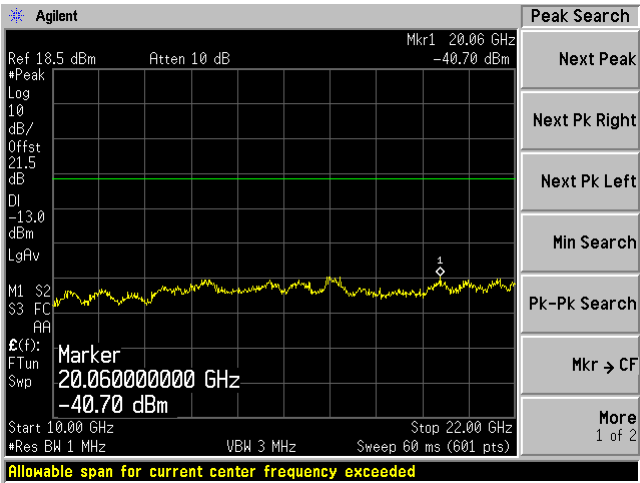
Middle 10MHz-22GHz



High 30MHz-10GHz

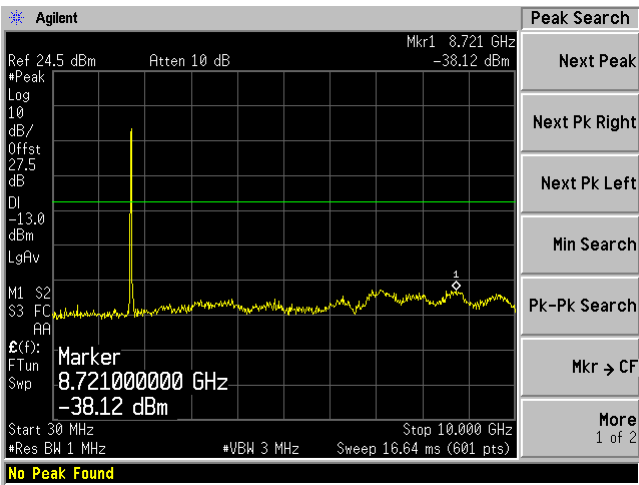


High 10MHz-22GHz

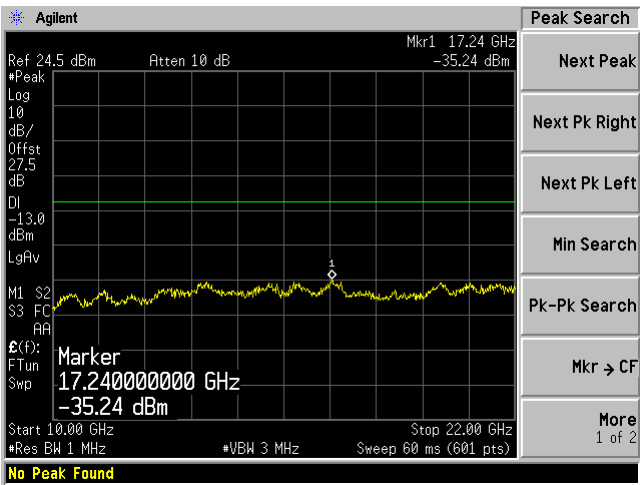


LTE Band 4, 15 MHz, 16QAM, UL

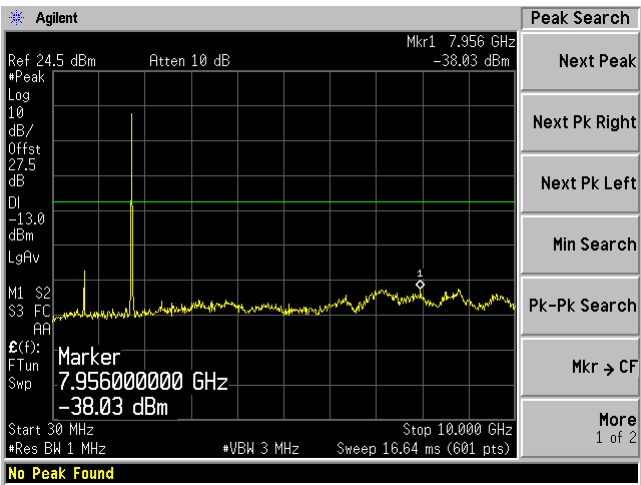
Low 30MHz-10GHz



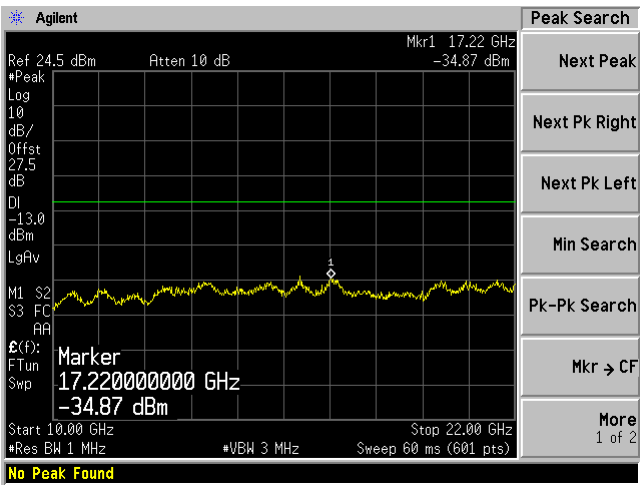
Low 10MHz-22GHz



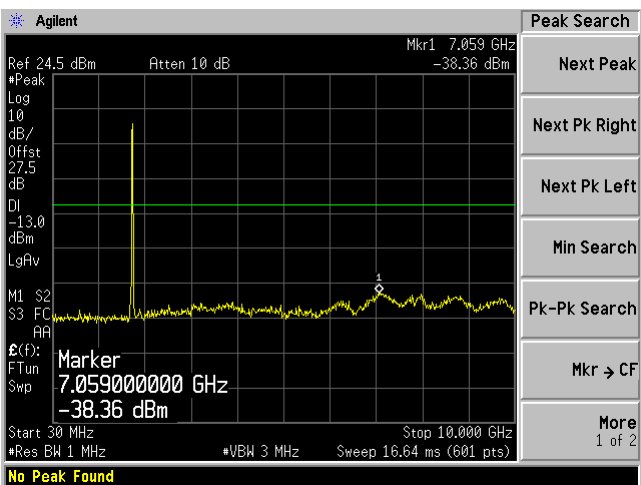
Middle 30MHz-10GHz



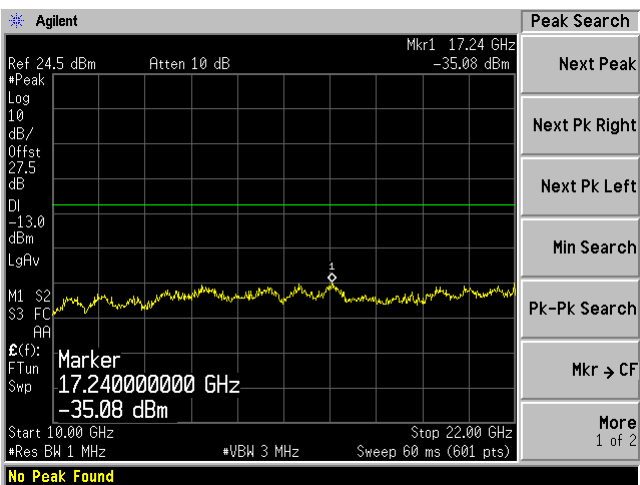
Middle 10MHz-22GHz



High 30MHz-10GHz

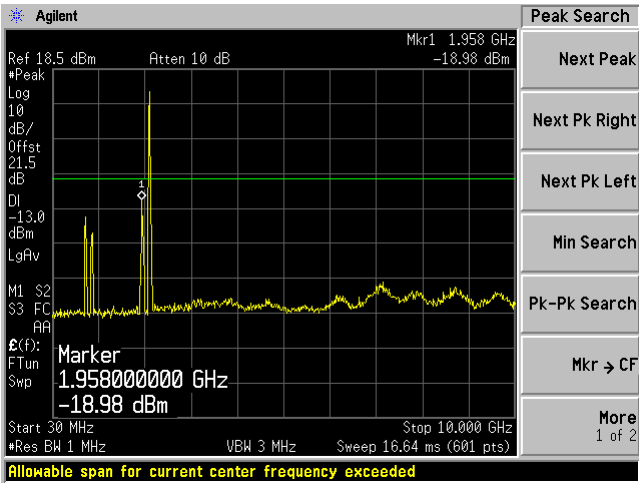


High 10MHz-22GHz

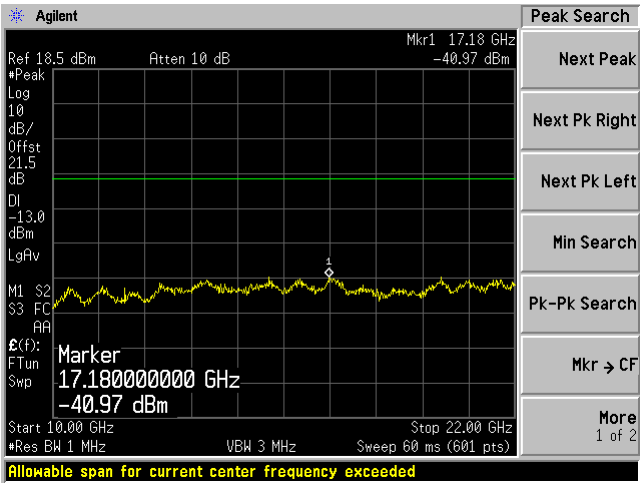


LTE Band 4, 20 MHz, 16QAM, DL

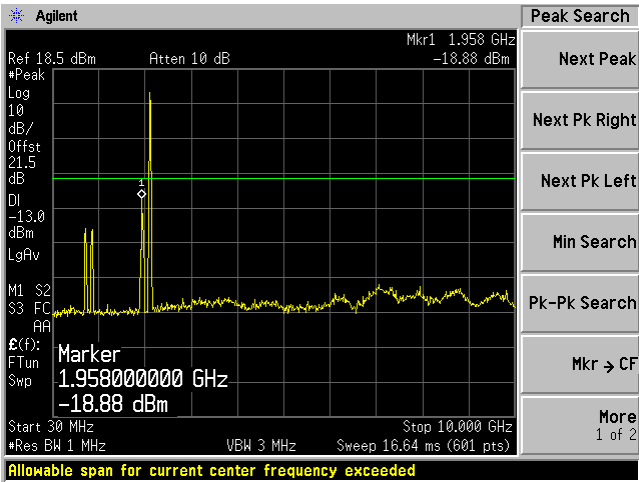
Low 30MHz-10GHz



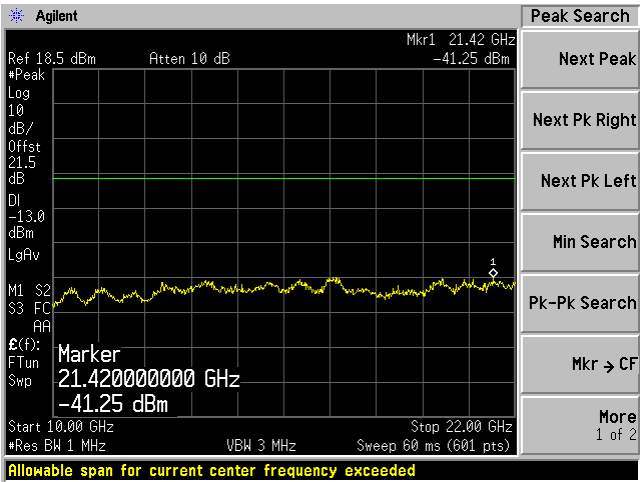
Low 10MHz-22GHz



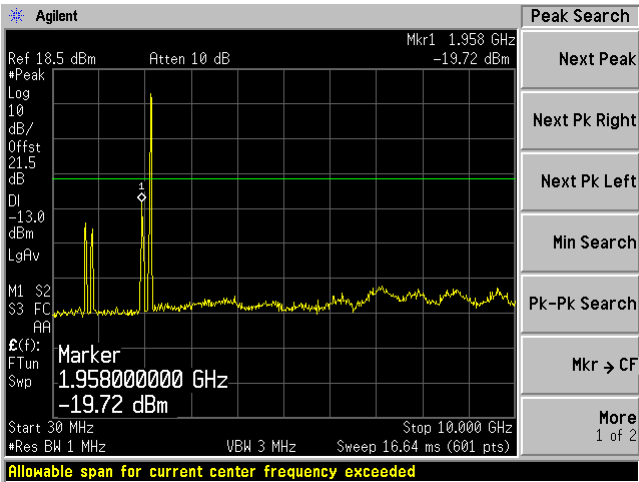
Middle 30MHz-10GHz



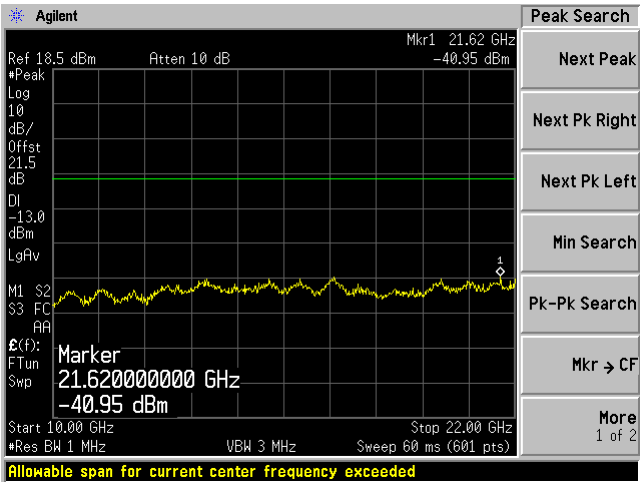
Middle 10MHz-22GHz



High 30MHz-10GHz

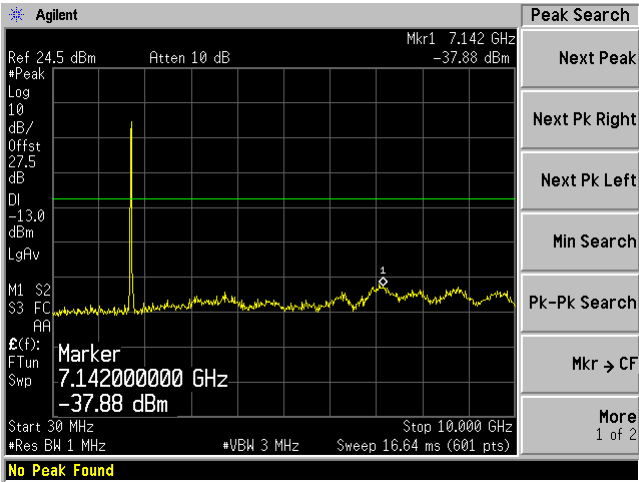


High 10MHz-22GHz

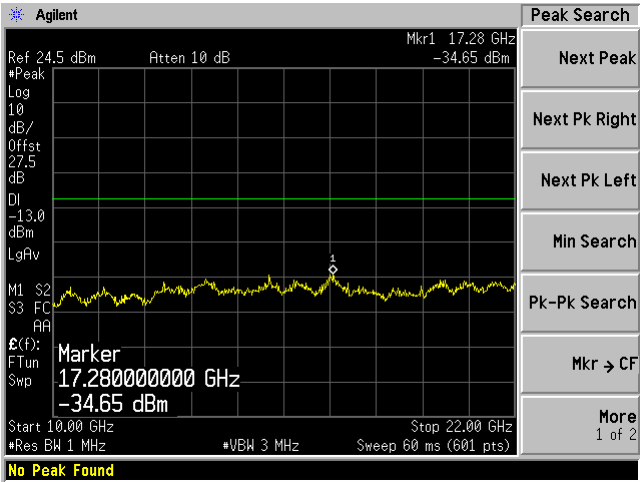


LTE Band 4, 20 MHz, 16QAM, UL

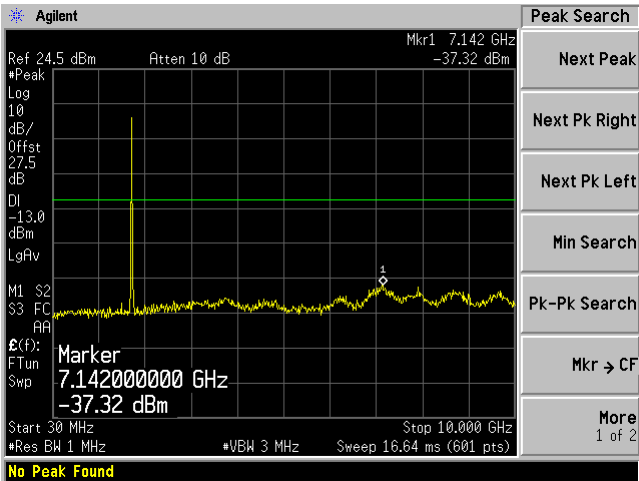
Low 30MHz-10GHz



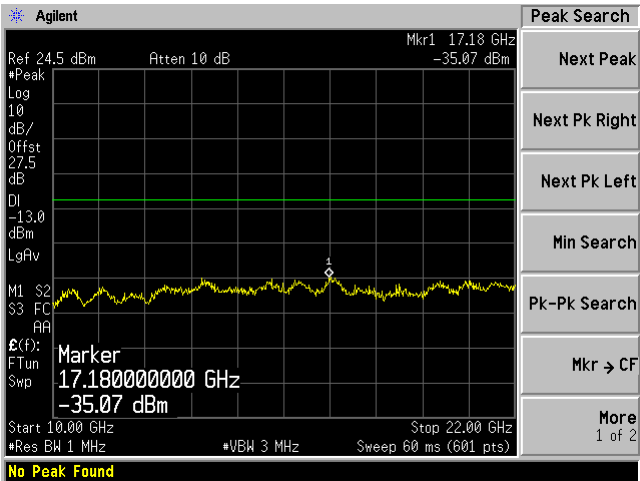
Low 10MHz-22GHz



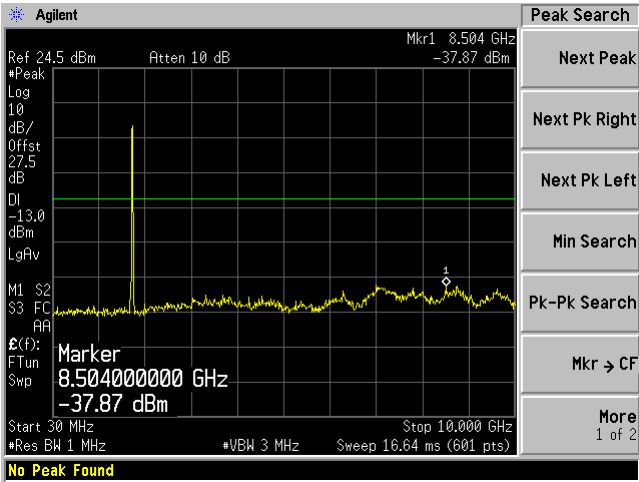
Middle 30MHz-10GHz



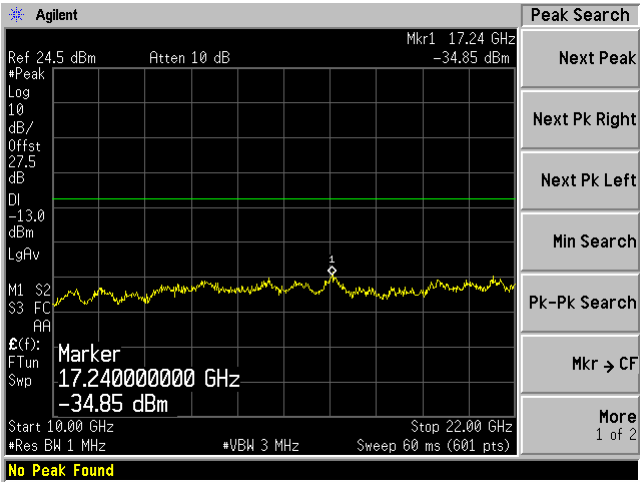
Middle 10MHz-22GHz



High 30MHz-10GHz

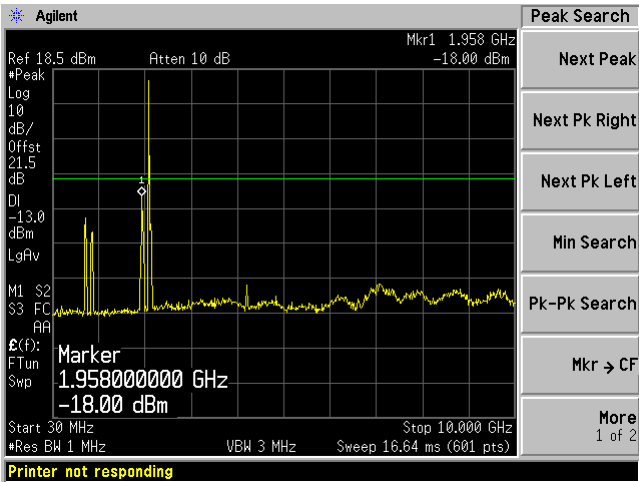


High 10MHz-22GHz

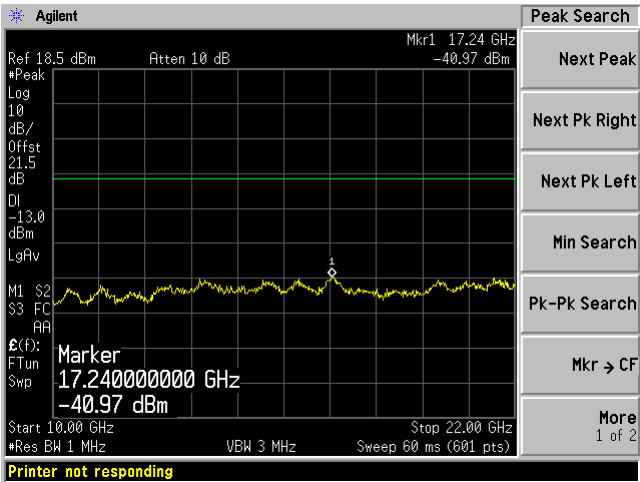


LTE Band 4, 1.4 MHz, 64QAM, DL

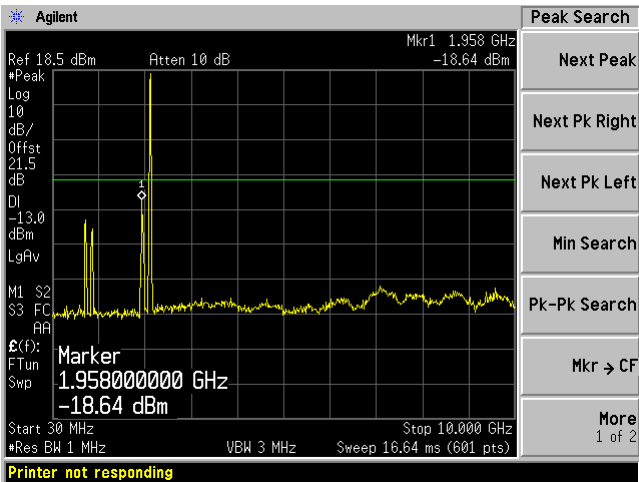
Low 30MHz-10GHz



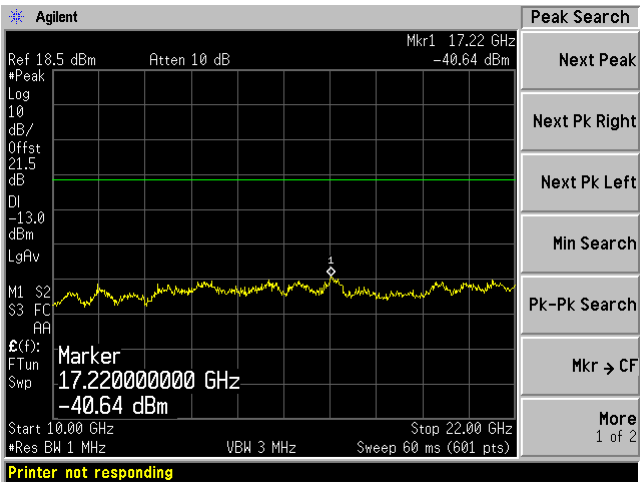
Low 10MHz-22GHz



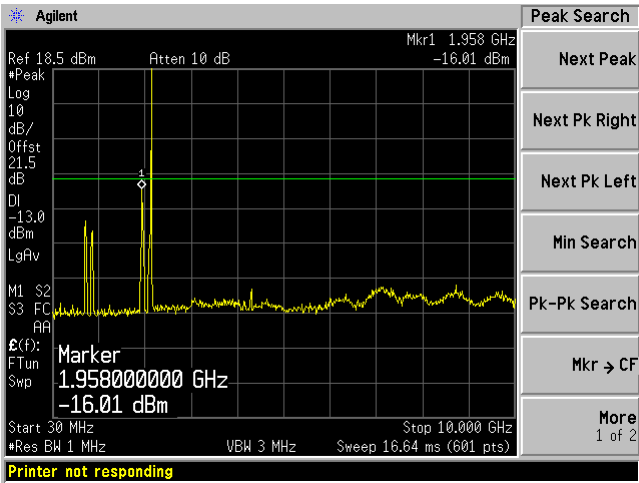
Middle 30MHz-10GHz



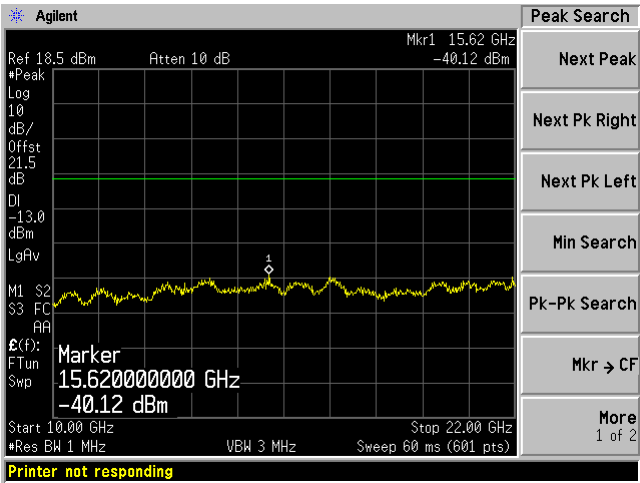
Middle 10MHz-22GHz



High 30MHz-10GHz

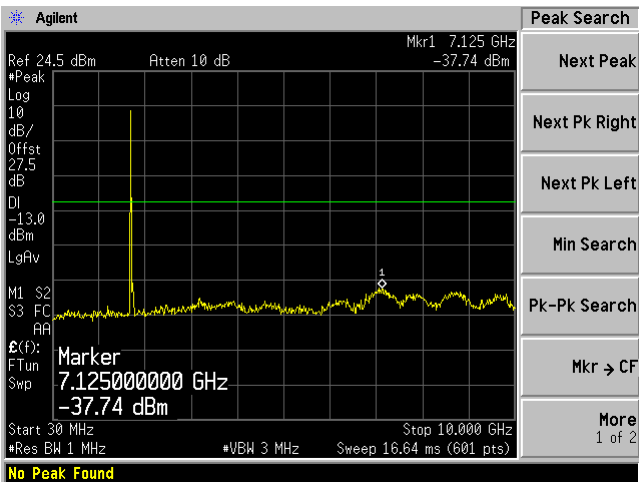


High 10MHz-22GHz

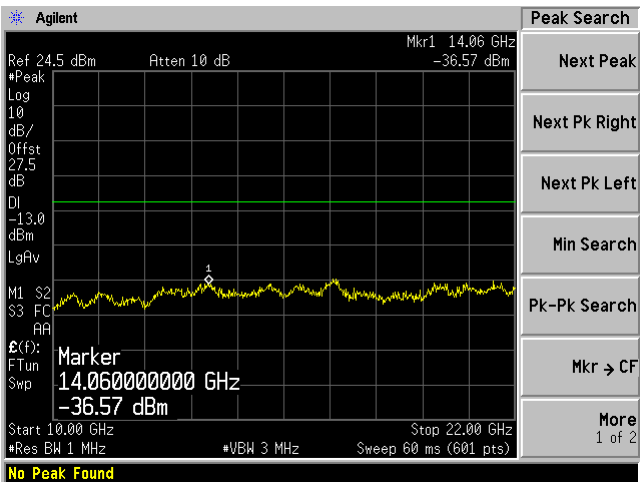


LTE Band 4, 1.4 MHz, 64QAM, UL

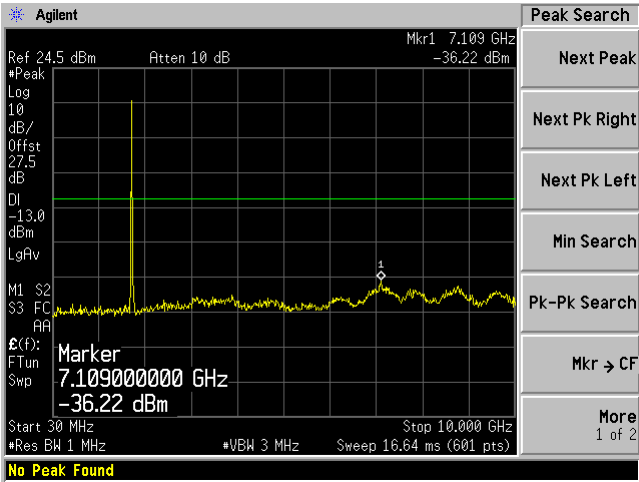
Low 30MHz-10GHz



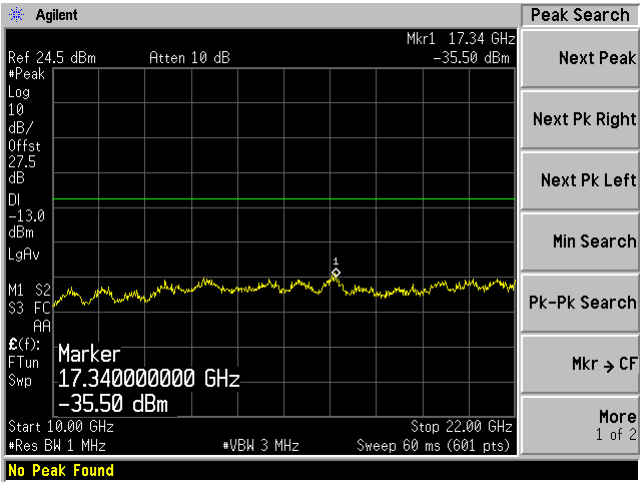
Low 10MHz-22GHz



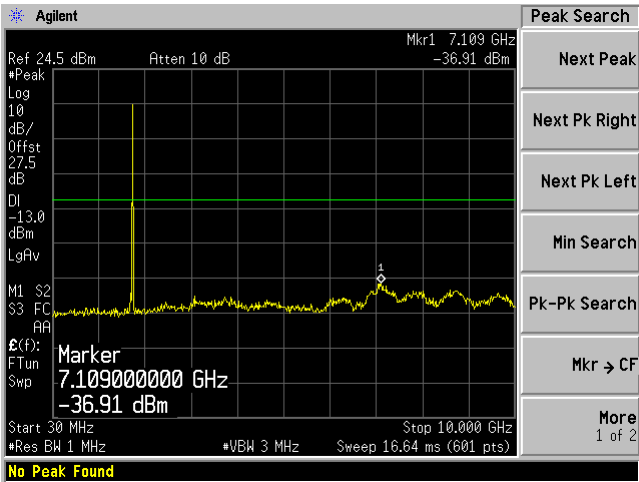
Middle 30MHz-10GHz



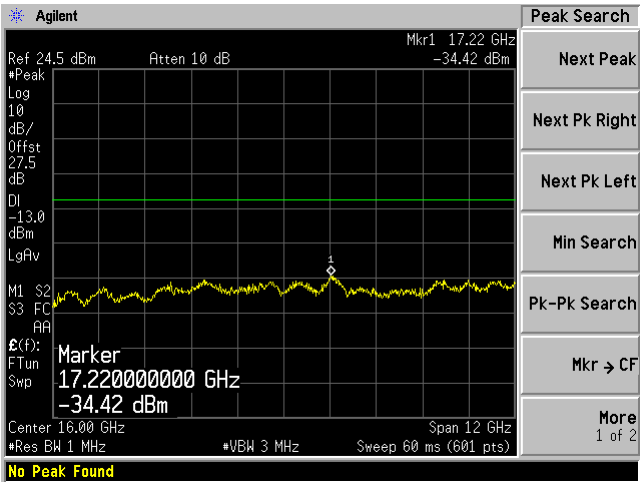
Middle 10MHz-22GHz



High 30MHz-10GHz

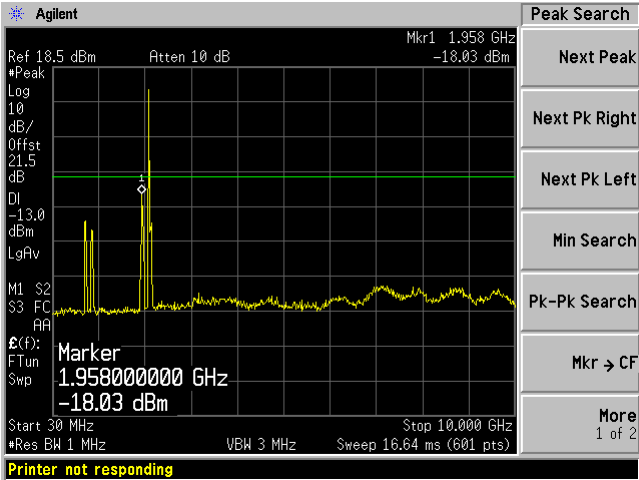


High 10MHz-22GHz

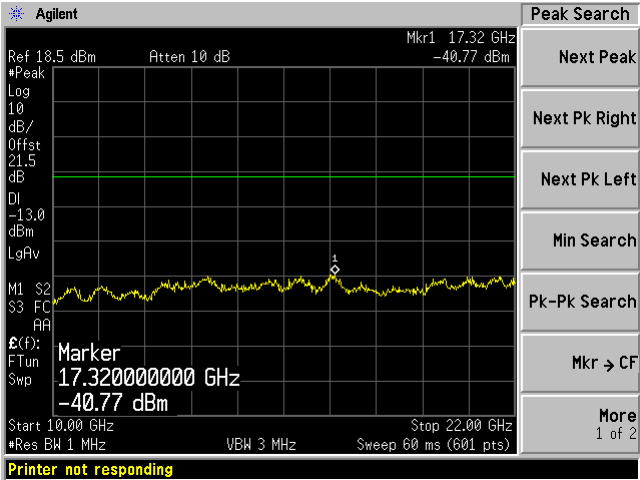


LTE Band 4, 3 MHz, 64QAM, DL

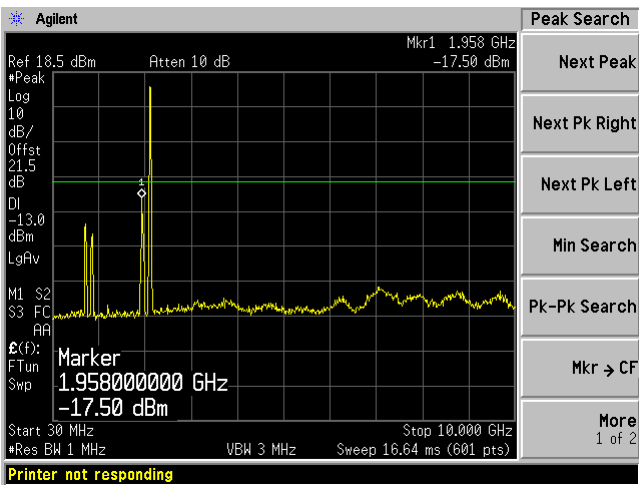
Low 30MHz-10GHz



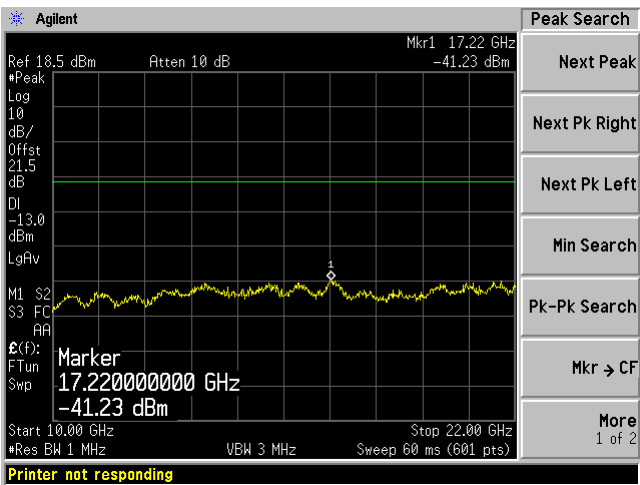
Low 10MHz-22GHz



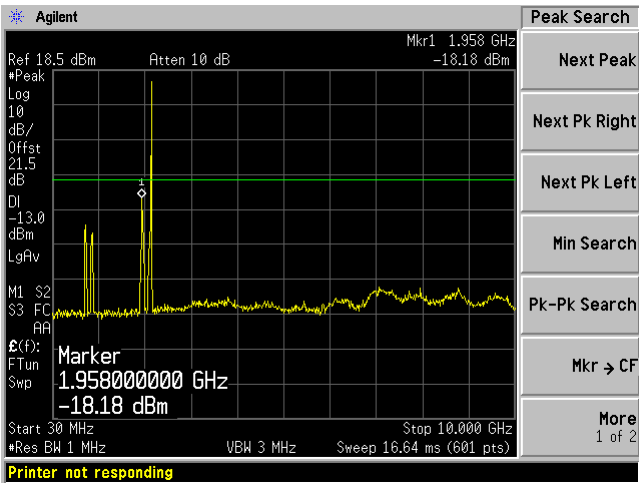
Middle 30MHz-10GHz



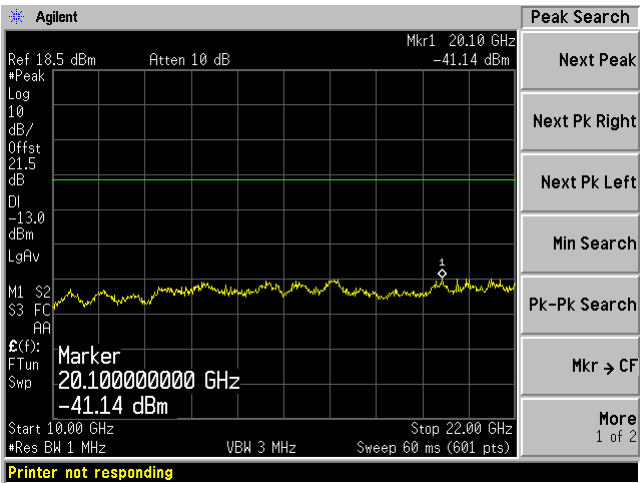
Middle 10MHz-22GHz



High 30MHz-10GHz

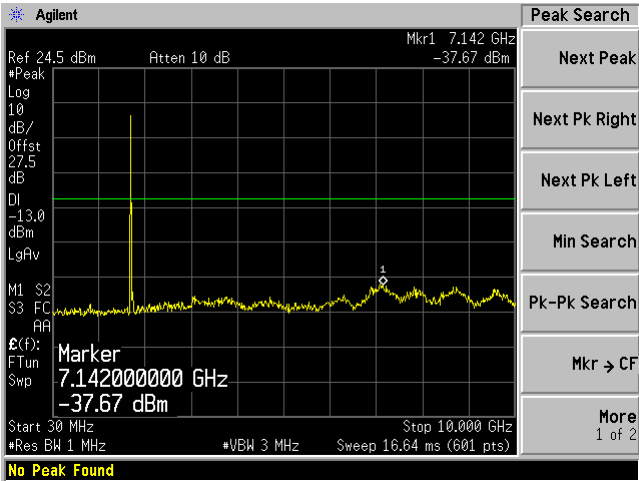


High 10MHz-22GHz

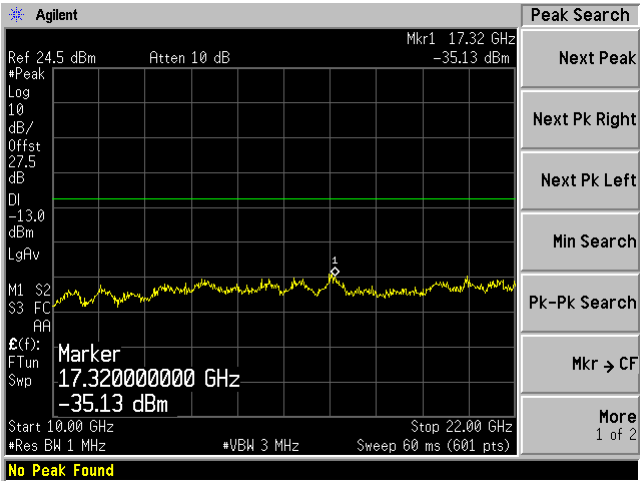


LTE Band 4, 3 MHz, 64QAM, UL

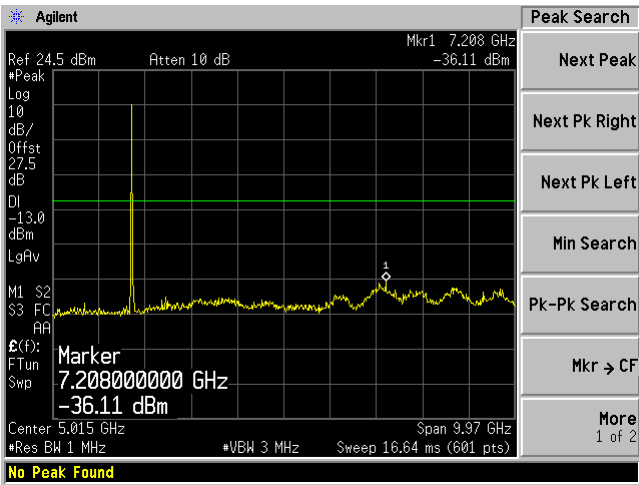
Low 30MHz-10GHz



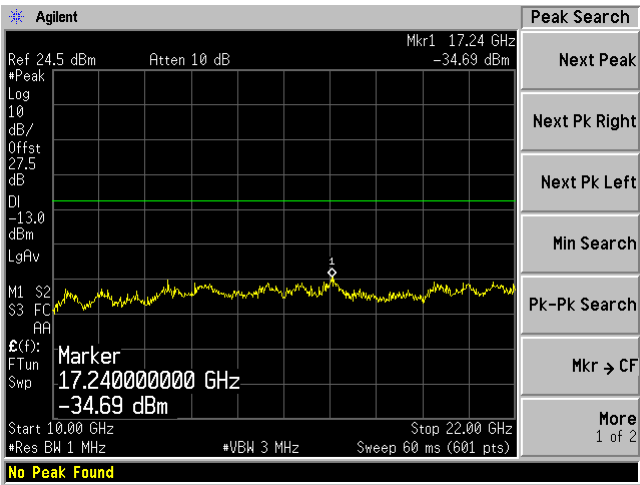
Low 10MHz-22GHz



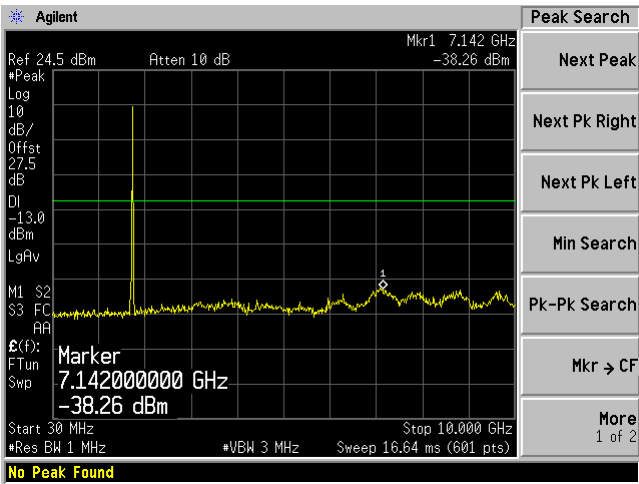
Middle 30MHz-10GHz



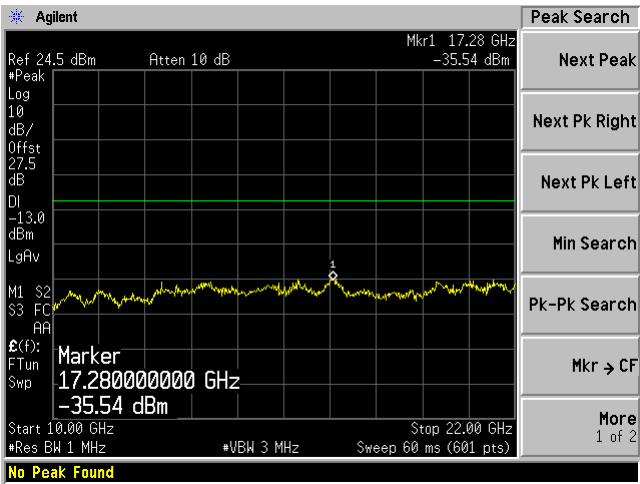
Middle 10MHz-22GHz



High 30MHz-10GHz

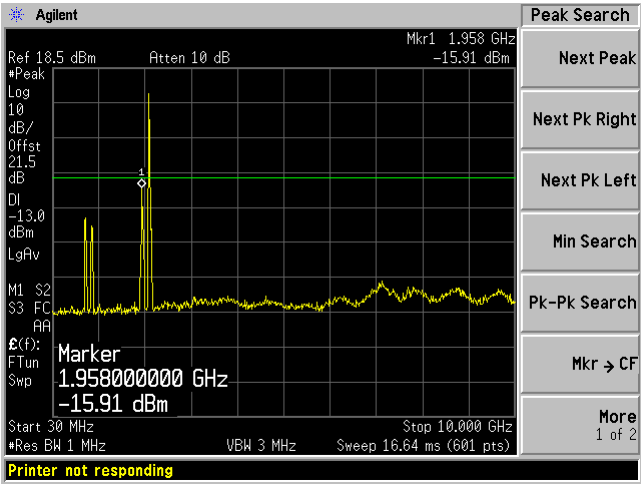


High 10MHz-22GHz

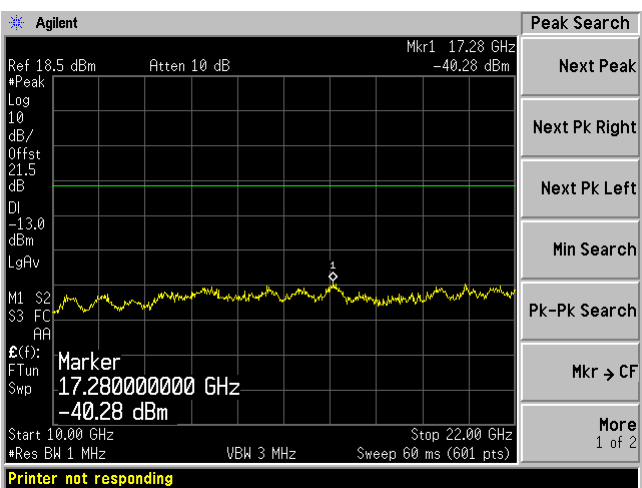


LTE Band 4, 5 MHz, 64QAM, DL

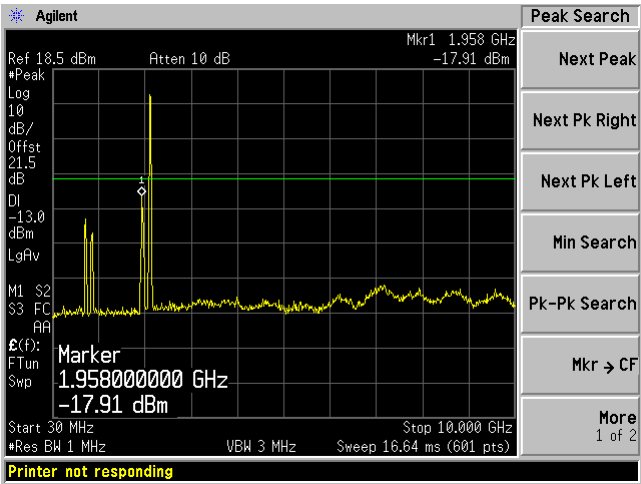
Low 30MHz-10GHz



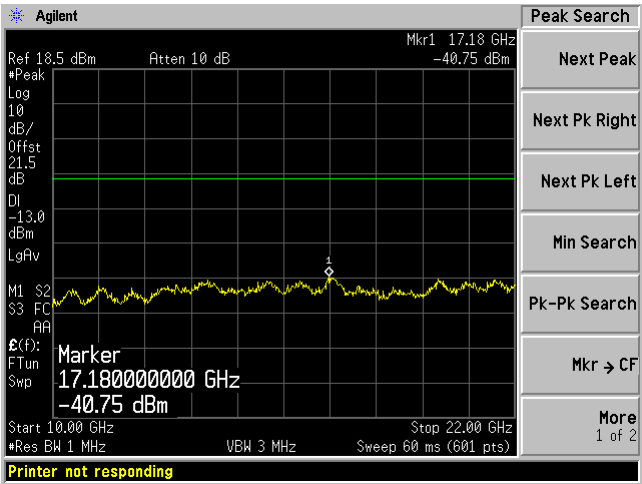
Low 10MHz-22GHz



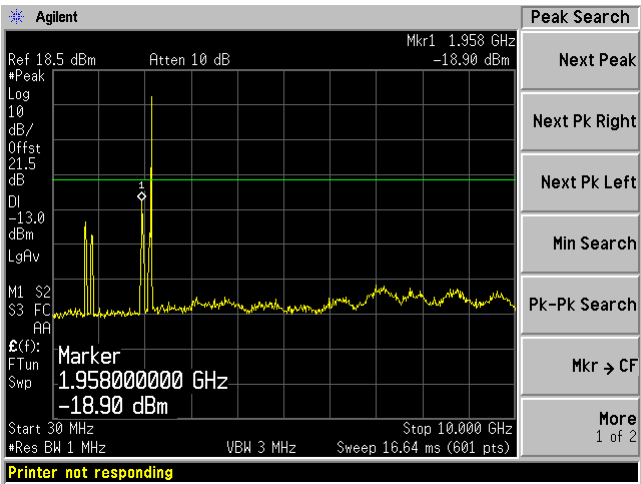
Middle 30MHz-10GHz



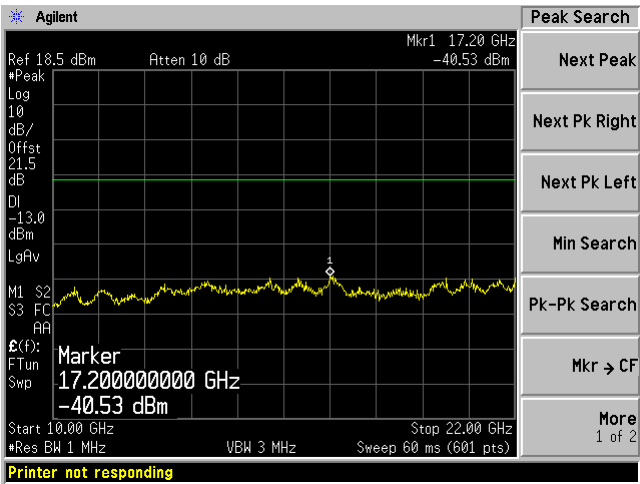
Middle 10MHz-22GHz



High 30MHz-10GHz

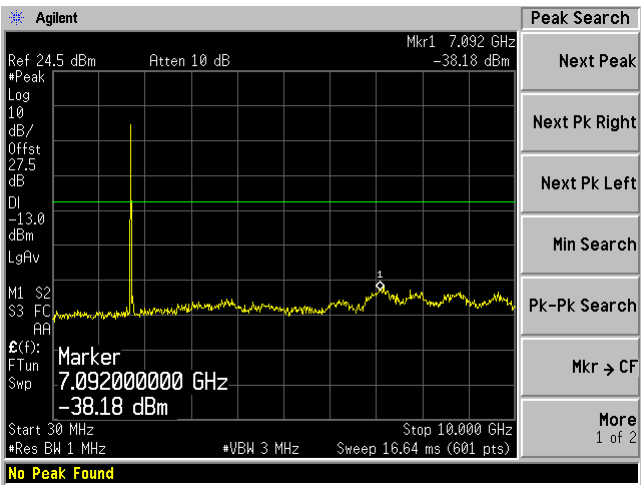


High 10MHz-22GHz

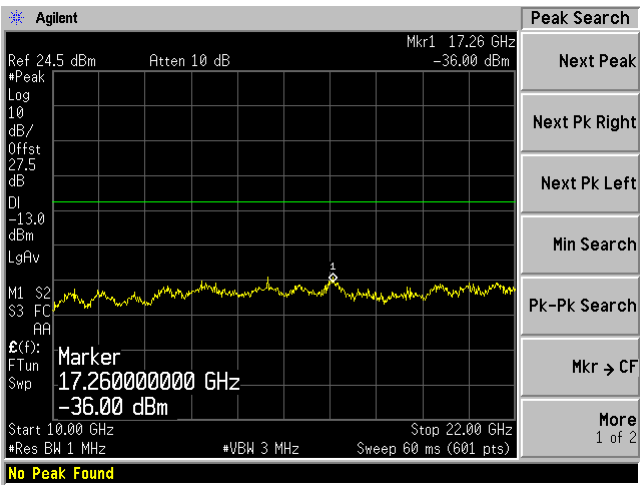


LTE Band 4, 5 MHz, 64QAM, UL

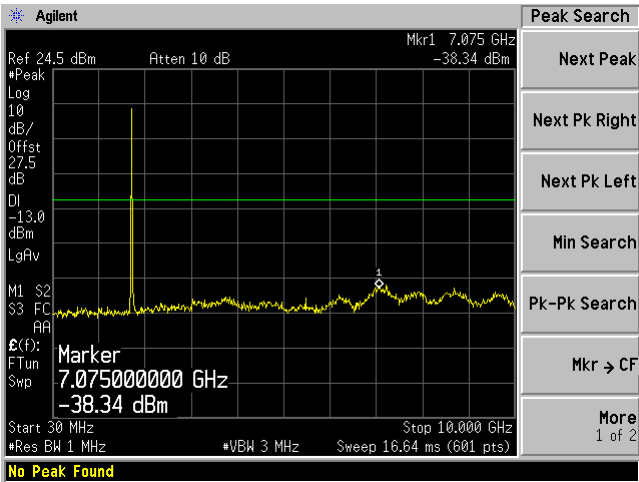
Low 30MHz-10GHz



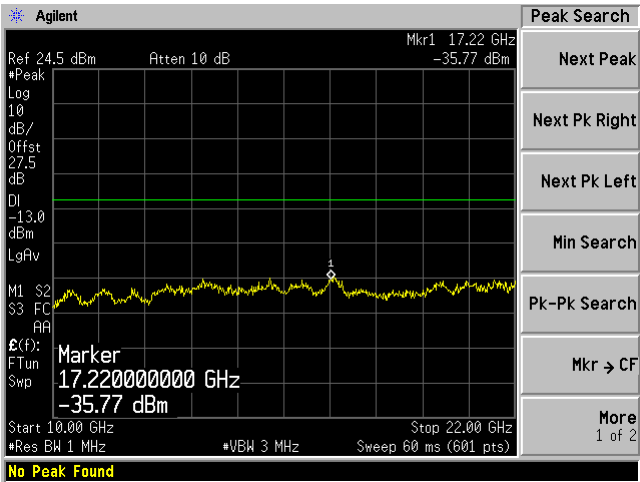
Low 10MHz-22GHz



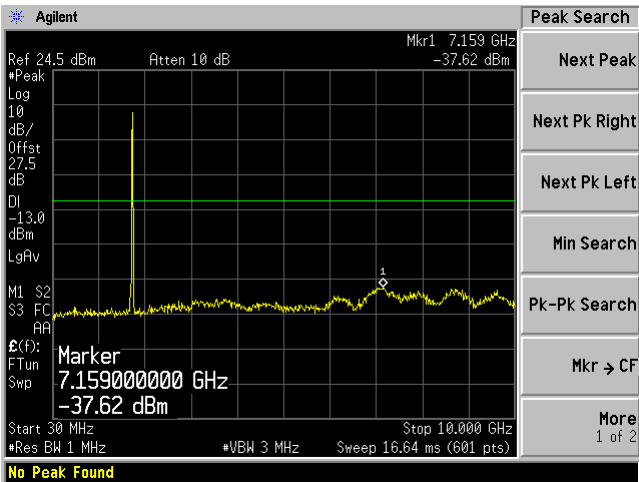
Middle 30MHz-10GHz



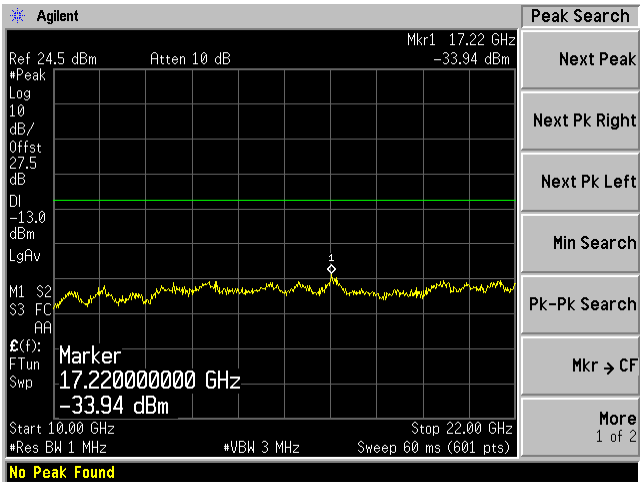
Middle 10MHz-22GHz



High 30MHz-10GHz

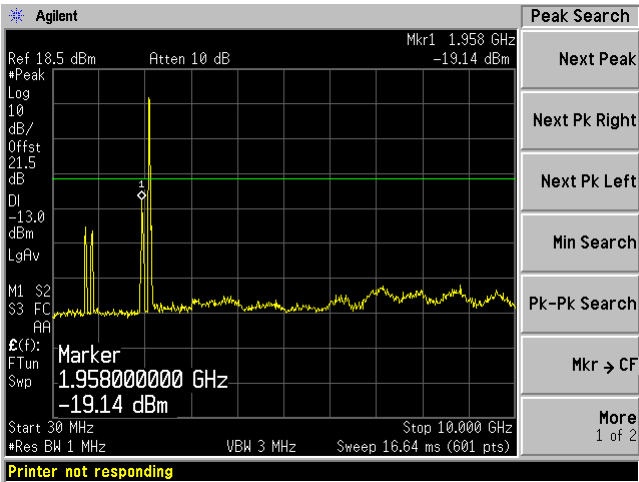


High 10MHz-22GHz

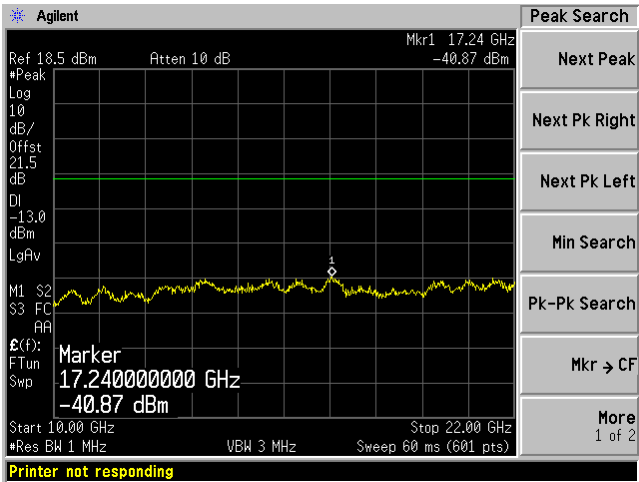


LTE Band 4, 10 MHz, 64QAM, DL

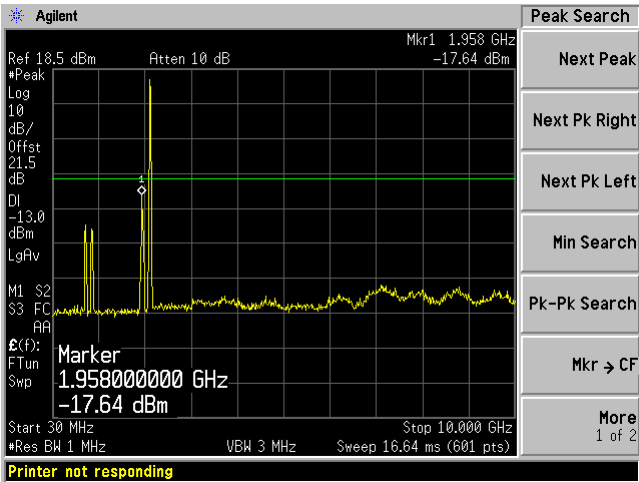
Low 30MHz-10GHz



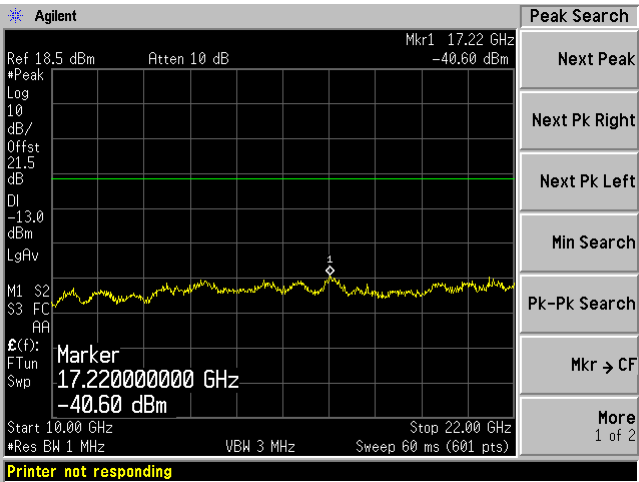
Low 10MHz-22GHz



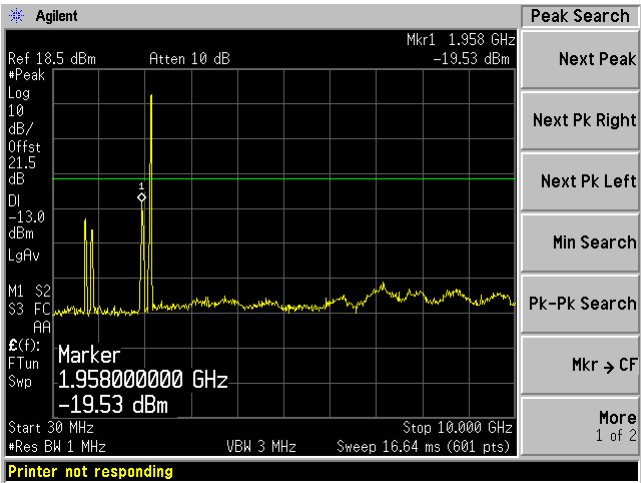
Middle 30MHz-10GHz



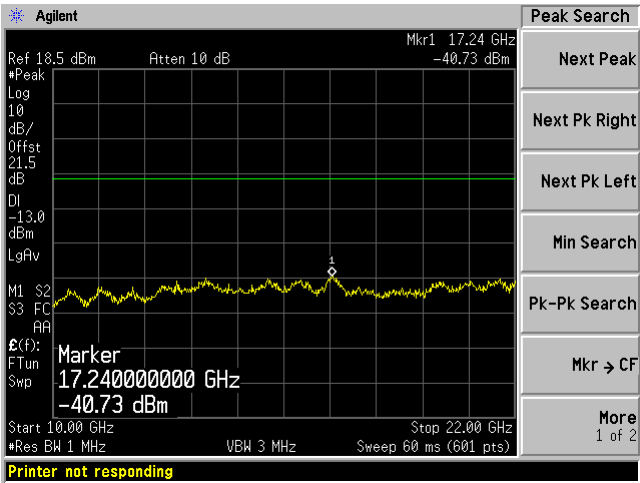
Middle 10MHz-22GHz



High 30MHz-10GHz

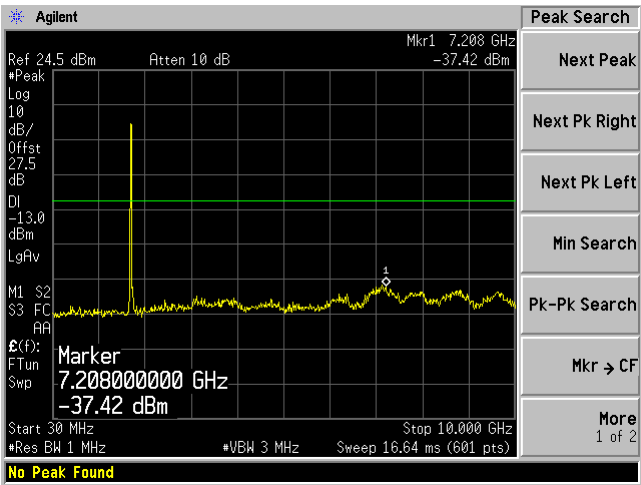


High 10MHz-22GHz

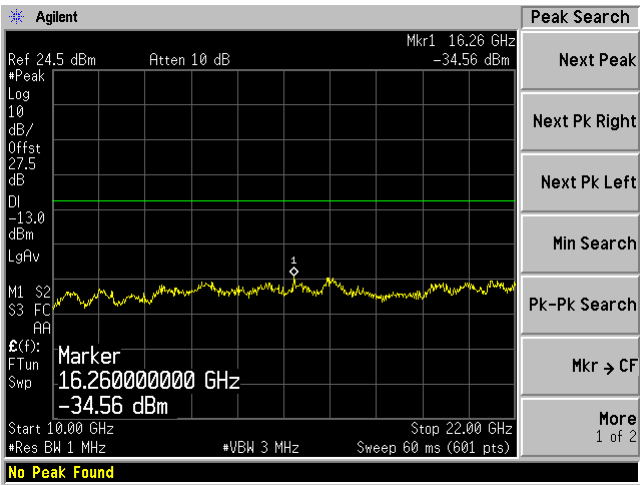


LTE Band 4, 10 MHz, 64QAM, UL

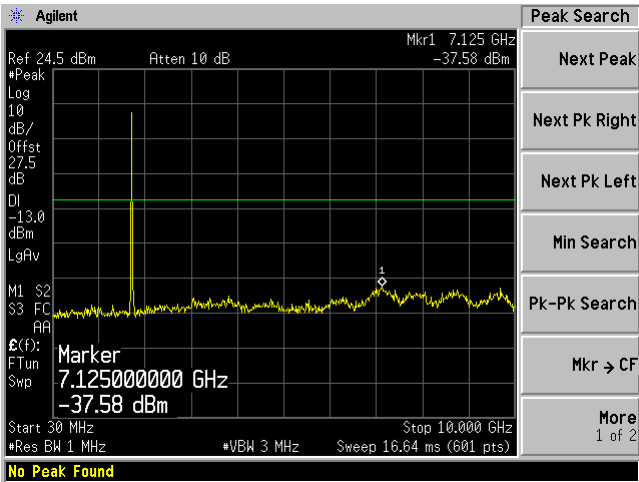
Low 30MHz-10GHz



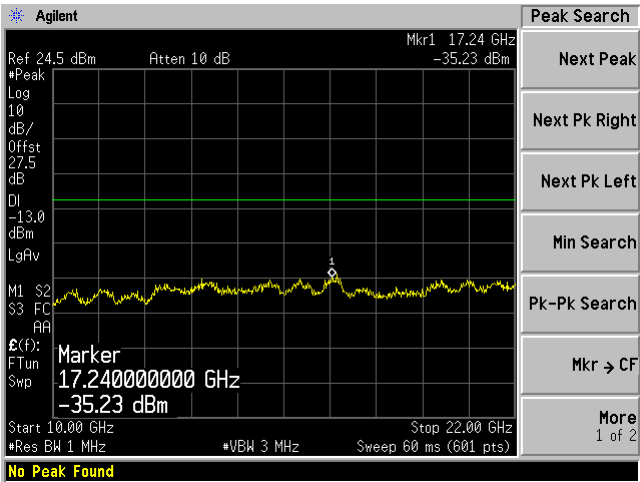
Low 10MHz-22GHz



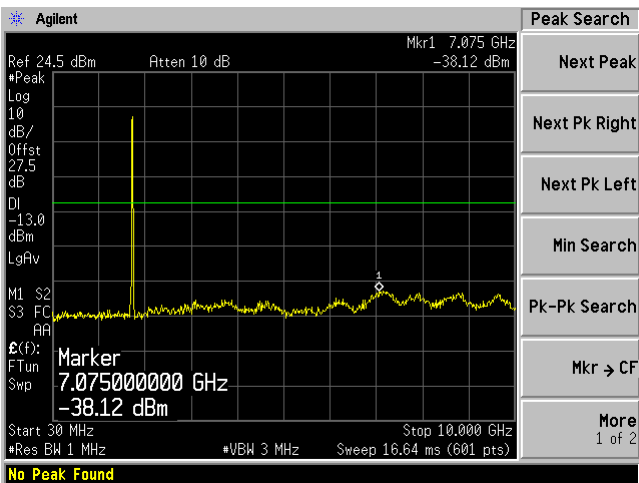
Middle 30MHz-10GHz



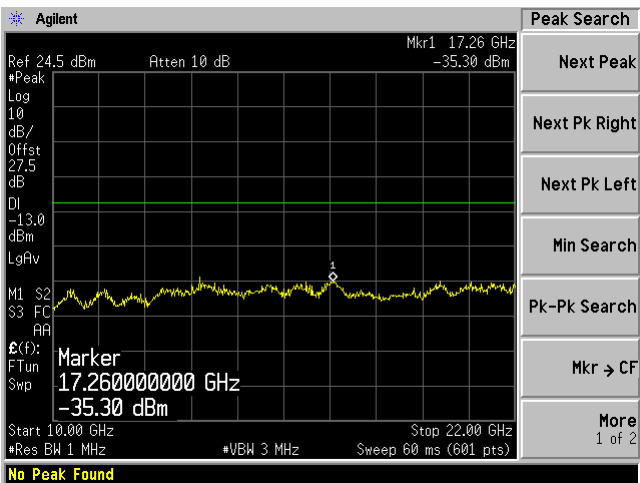
Middle 10MHz-22GHz



High 30MHz-10GHz

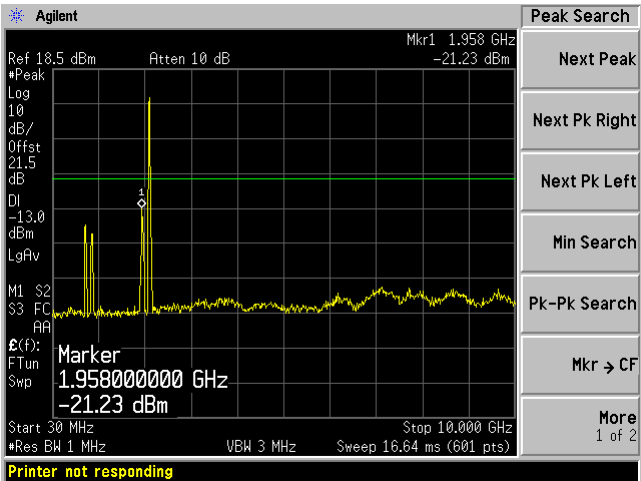


High 10MHz-22GHz

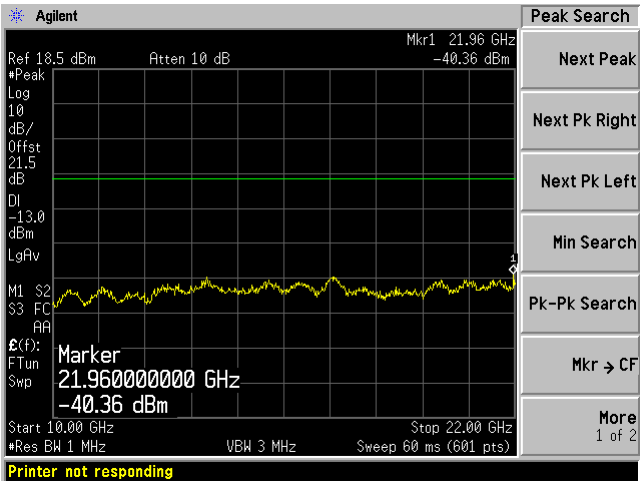


LTE Band 4, 15 MHz, 64QAM, DL

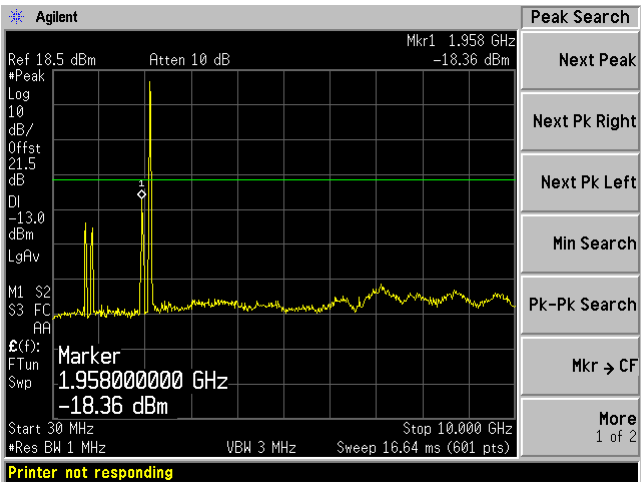
Low 30MHz-10GHz



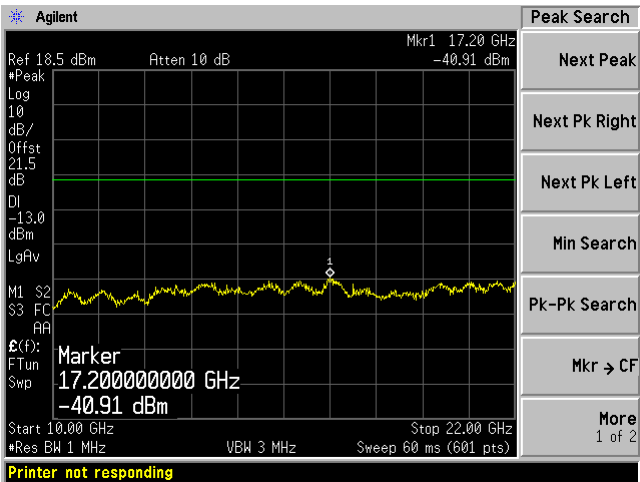
Low 10MHz-22GHz



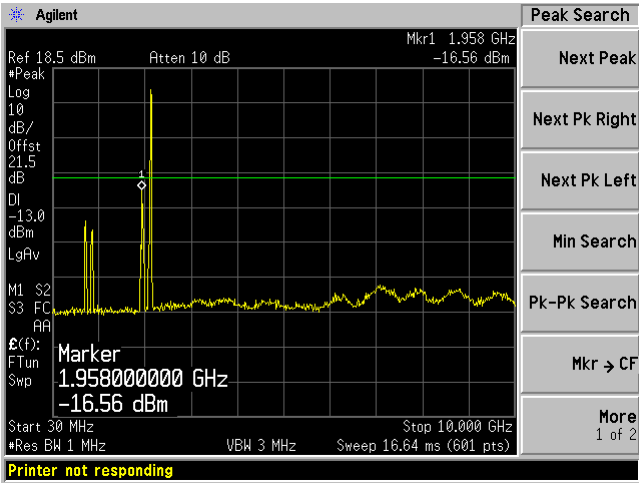
Middle 30MHz-10GHz



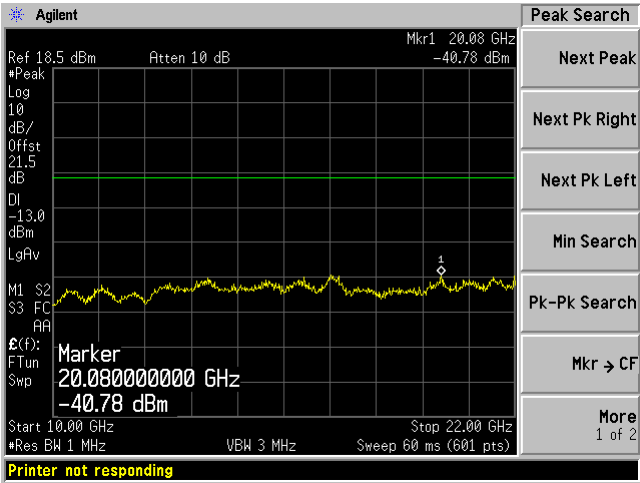
Middle 10MHz-22GHz



High 30MHz-10GHz

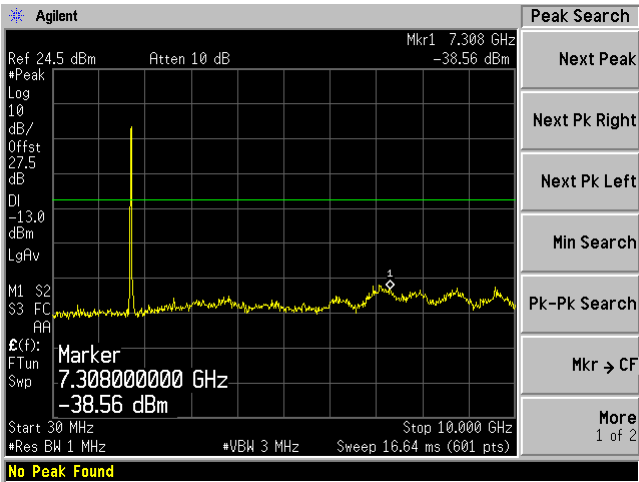


High 10MHz-22GHz

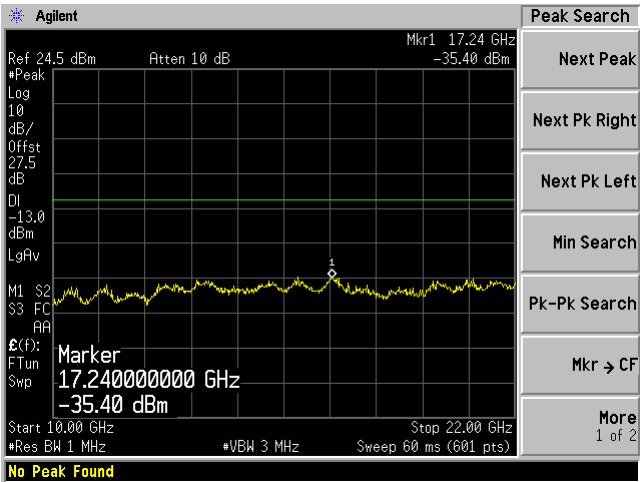


LTE Band 4, 15 MHz, 64QAM, UL

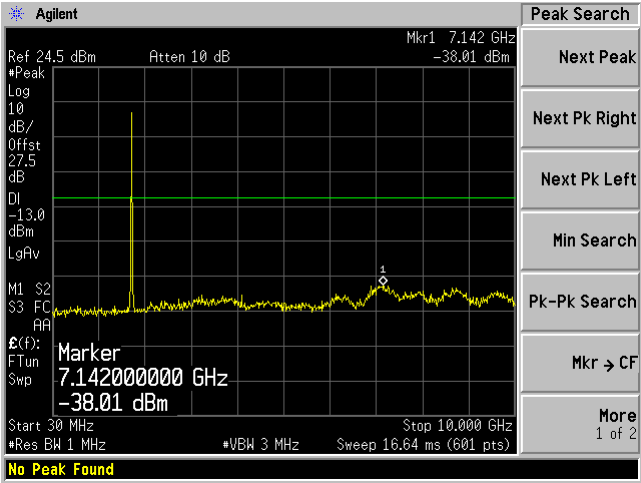
Low 30MHz-10GHz



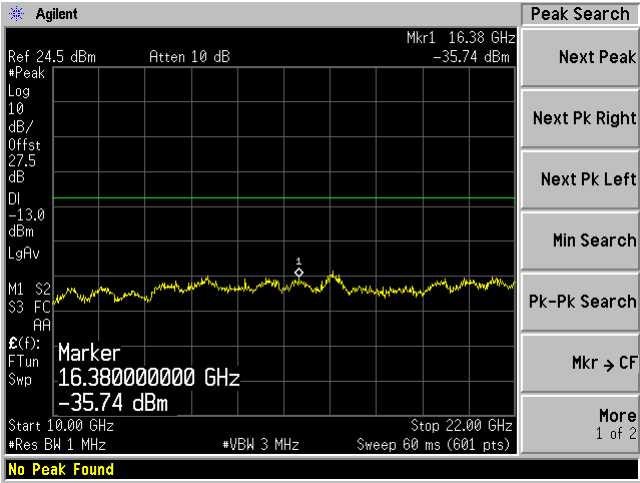
Low 10MHz-22GHz



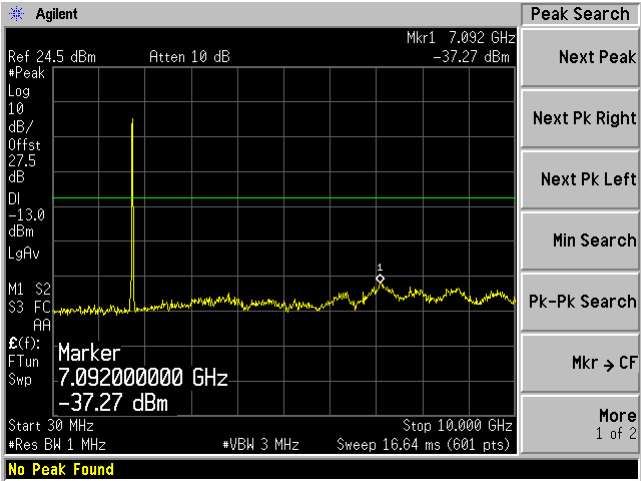
Middle 30MHz-10GHz



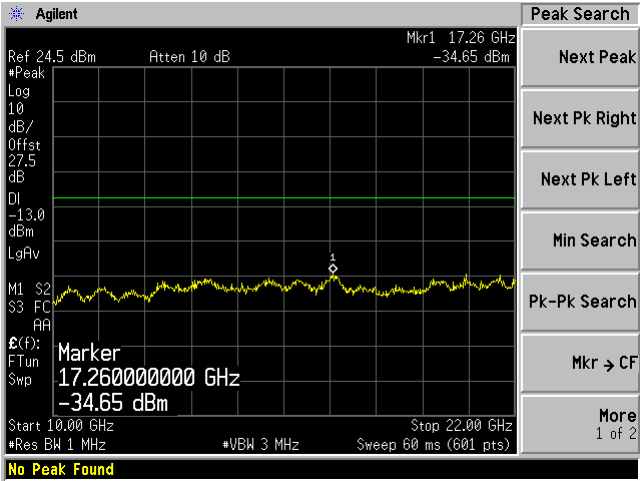
Middle 10MHz-22GHz



High 30MHz-10GHz

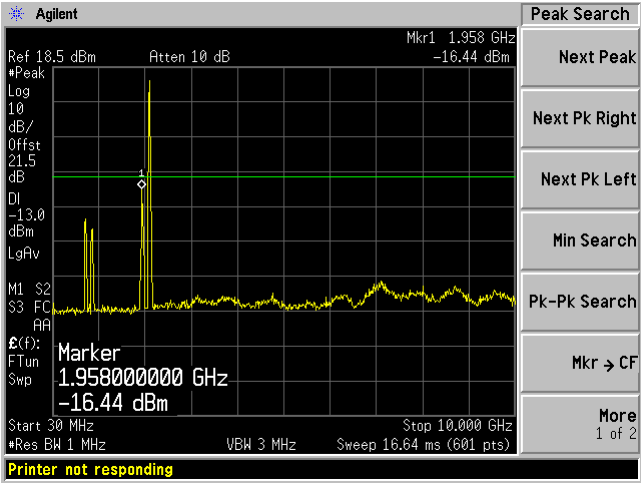


High 10MHz-22GHz

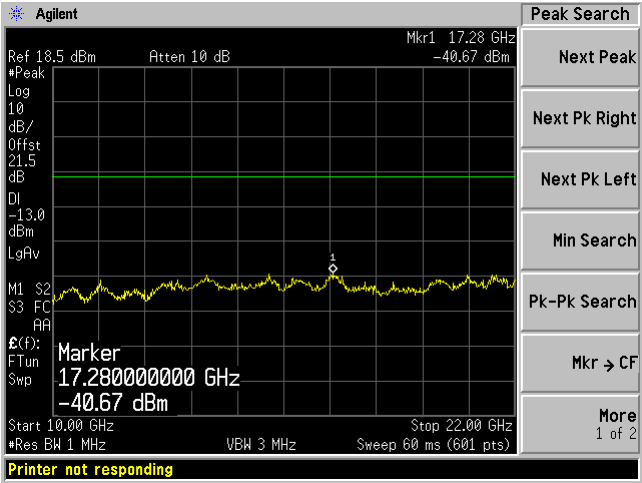


LTE Band 4, 20 MHz, 64QAM, DL

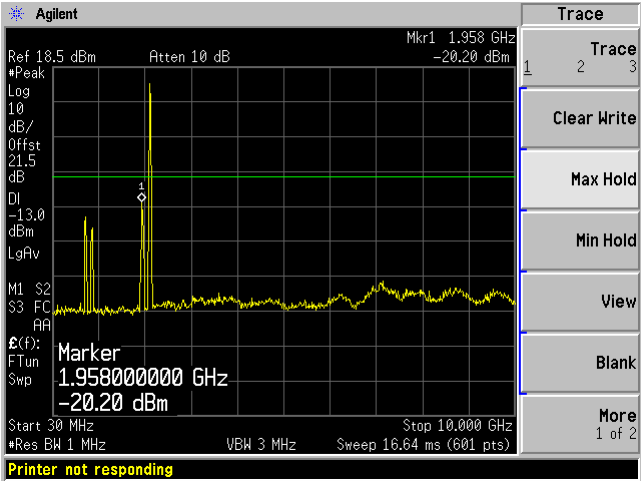
Low 30MHz-10GHz



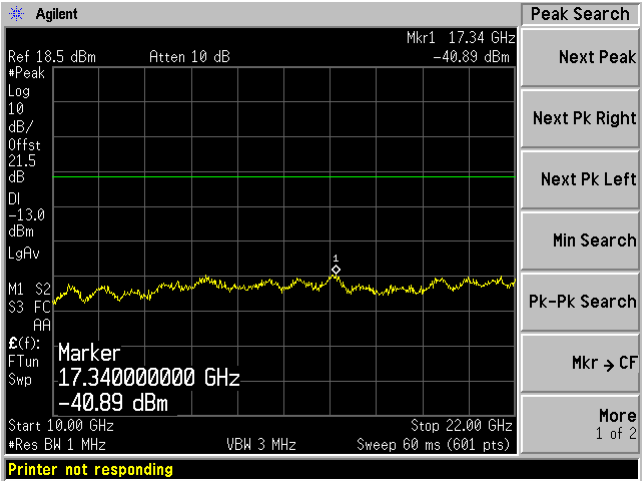
Low 10MHz-22GHz



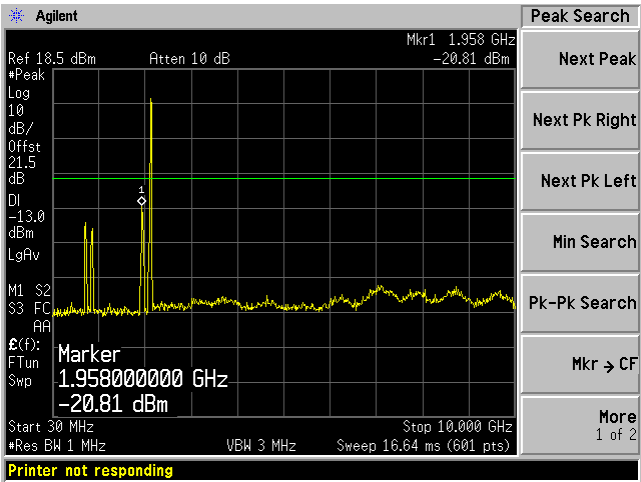
Middle 30MHz-10GHz



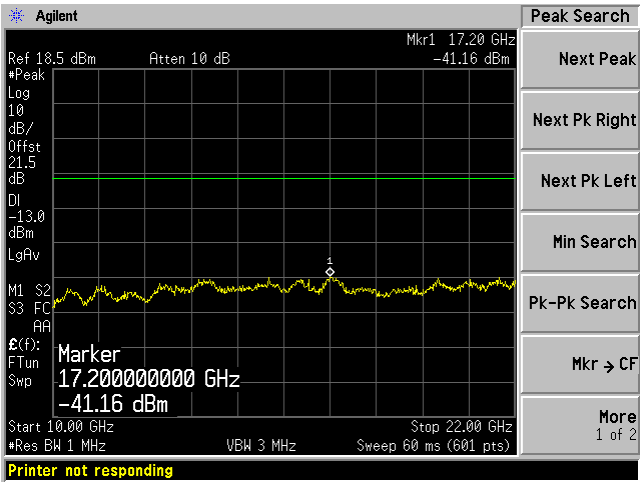
Middle 10MHz-22GHz



High 30MHz-10GHz

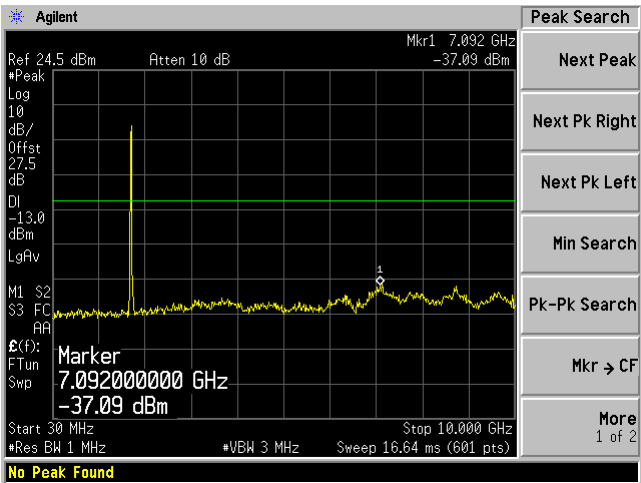


High 10MHz-22GHz

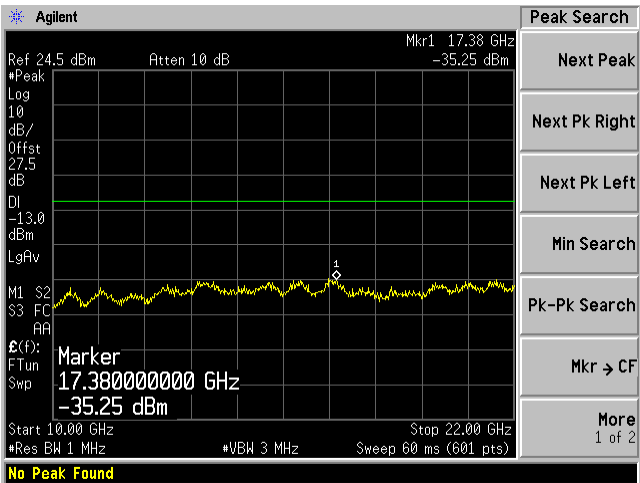


LTE Band 4, 20 MHz, 64QAM, DL

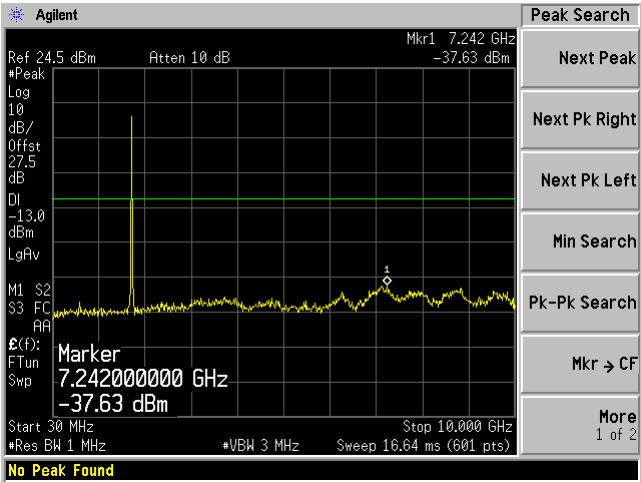
Low 30MHz-10GHz



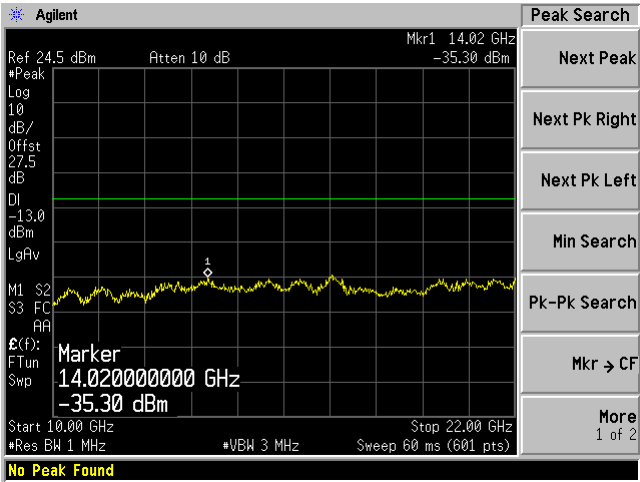
Low 10MHz-22GHz



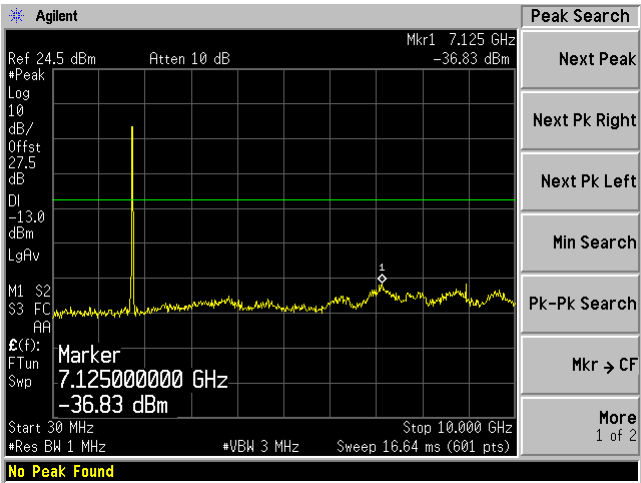
Middle 30MHz-10GHz



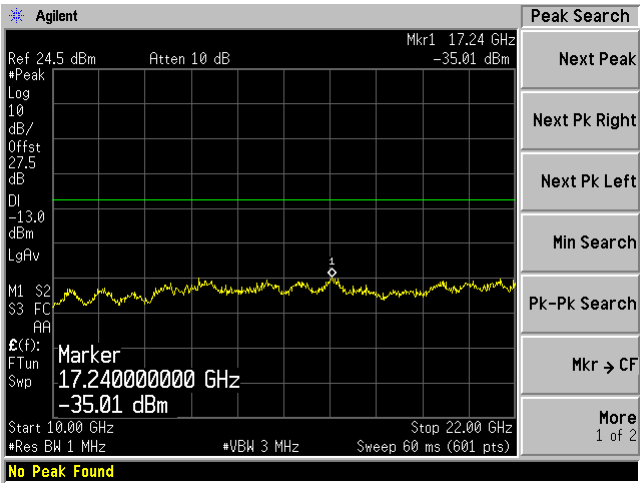
Middle 10MHz-22GHz



High 30MHz-10GHz

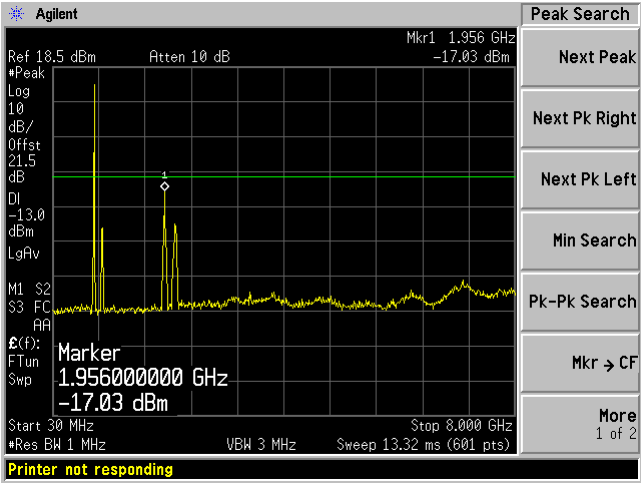


High 10MHz-22GHz

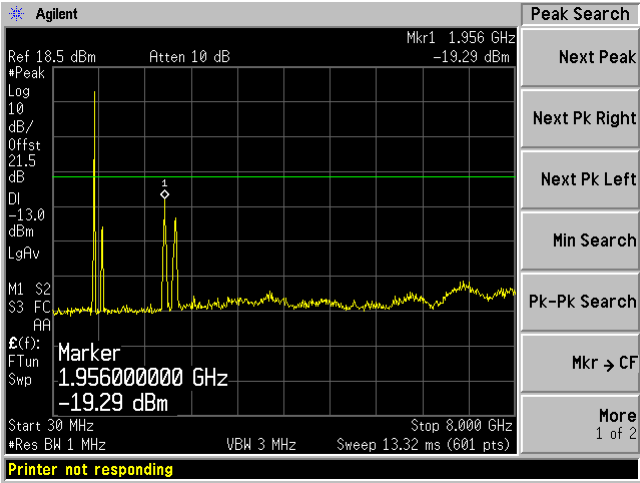


LTE Band 13, 5 MHz, QPSK

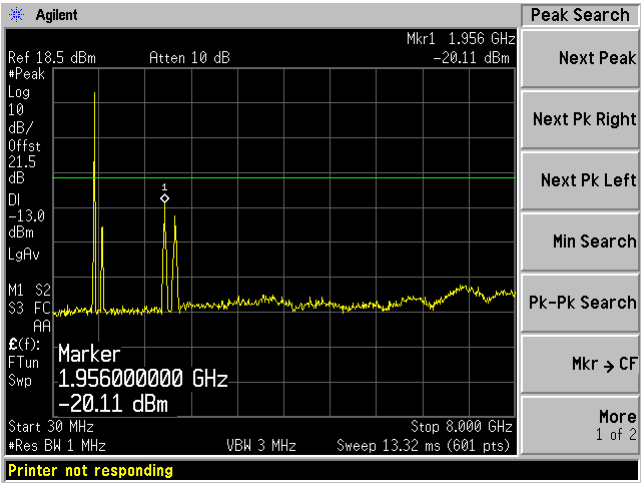
Low 30MHz-8GHz DL



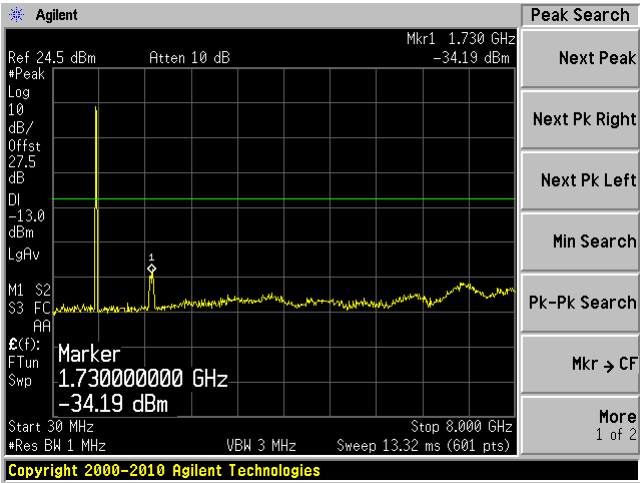
Middle 30MHz-8GHz DL



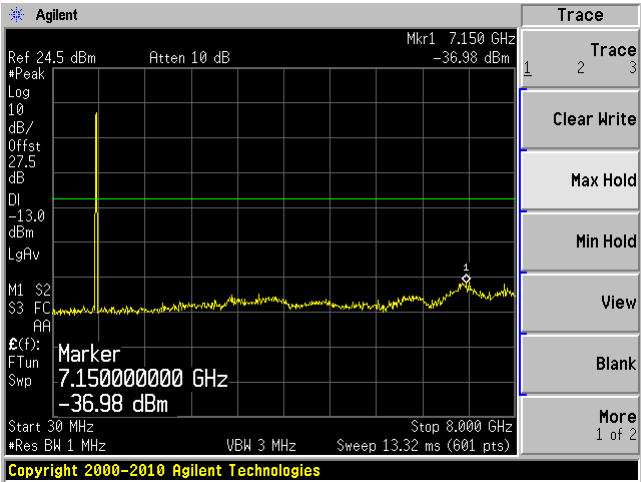
High 30MHz-8GHz DL



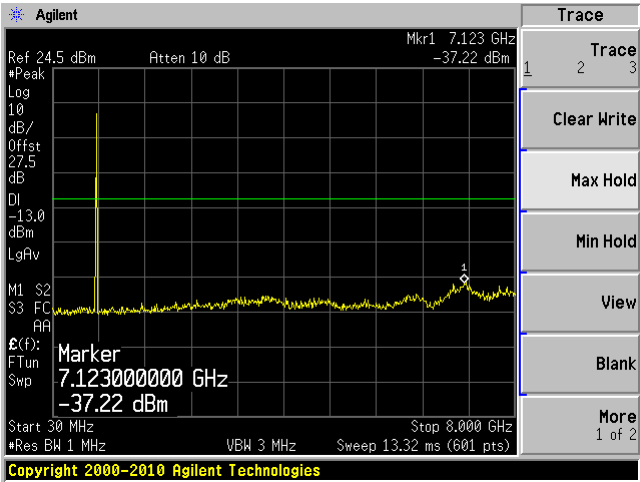
Low 30MHz-8GHz UL



Middle 30MHz-8GHz UL

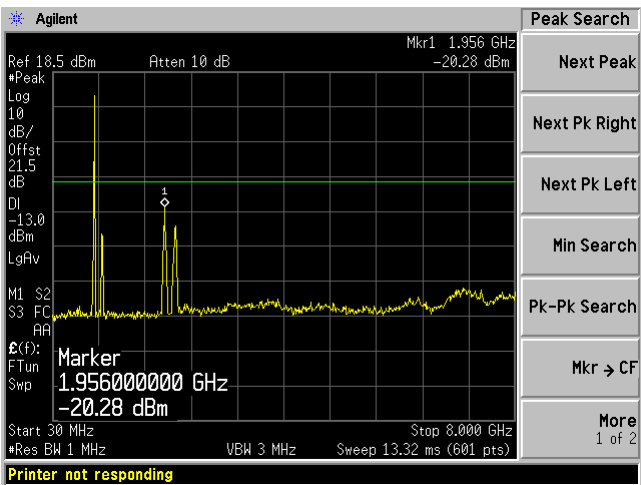


High 30MHz-8GHz UL

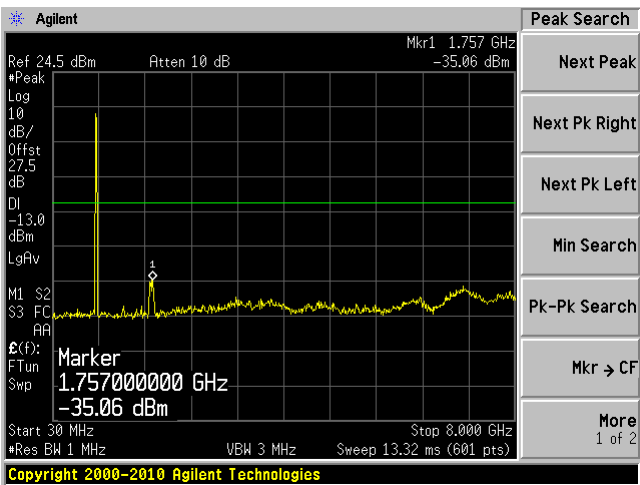


LTE Band 13, 10 MHz, QPSK

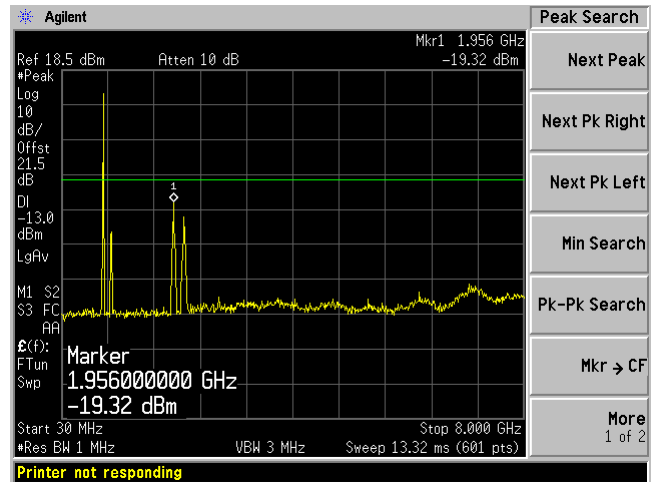
Middle 30MHz-8GHz DL



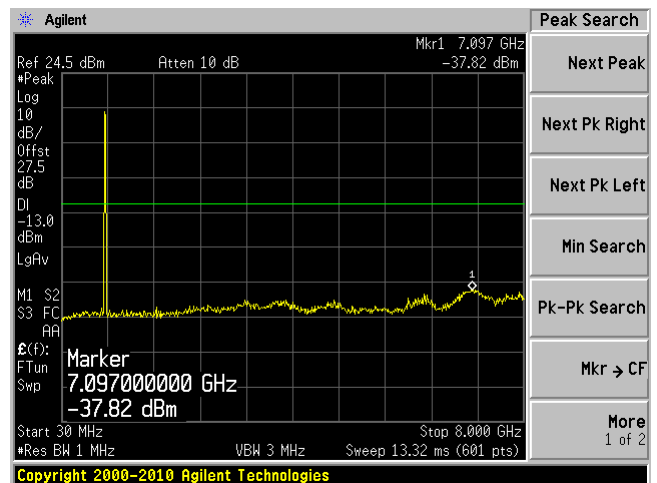
Middle 30MHz-8GHz UL



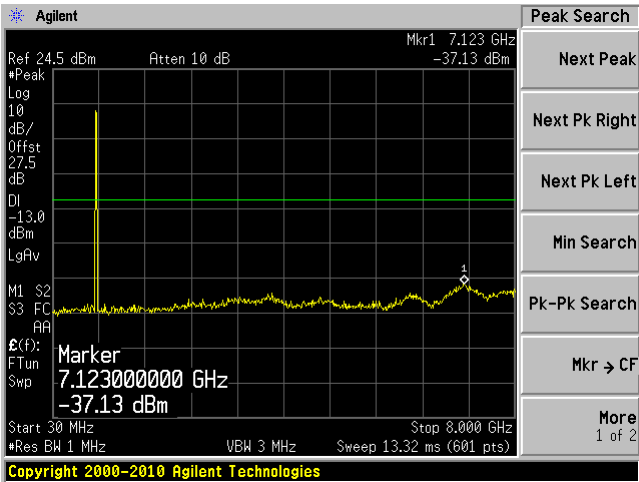
Middle 30MHz-8GHz DL



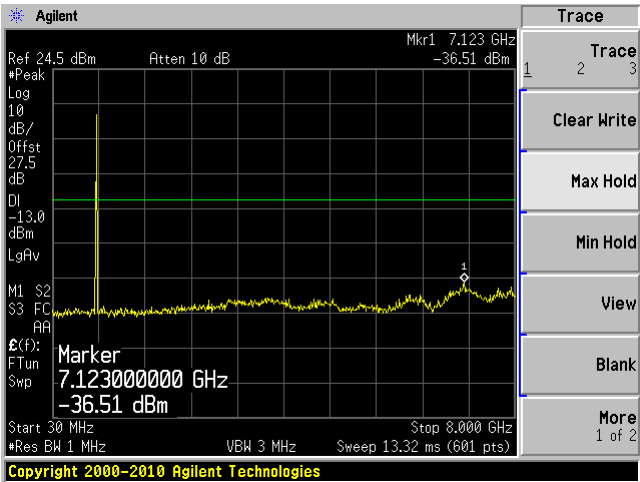
Low 30MHz-8GHz UL



Middle 30MHz-8GHz UL

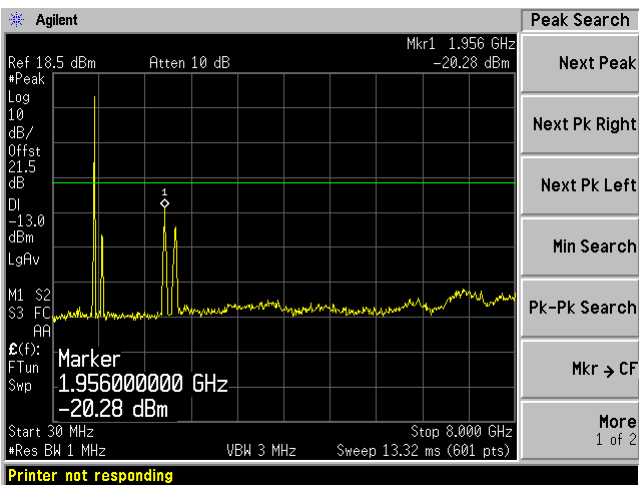


High 30MHz-8GHz UL

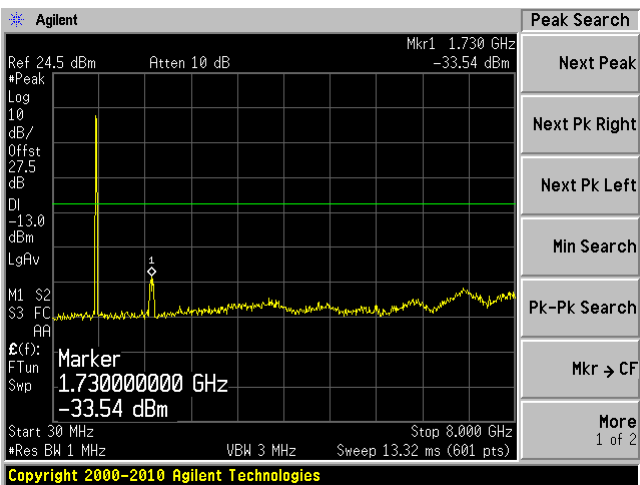


LTE Band 13, 10 MHz, 16QAM

Middle 30MHz-8GHz DL

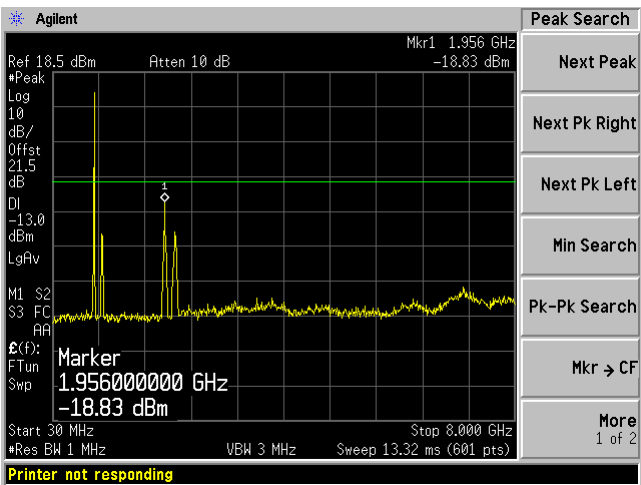


Middle 30MHz-8GHz UL

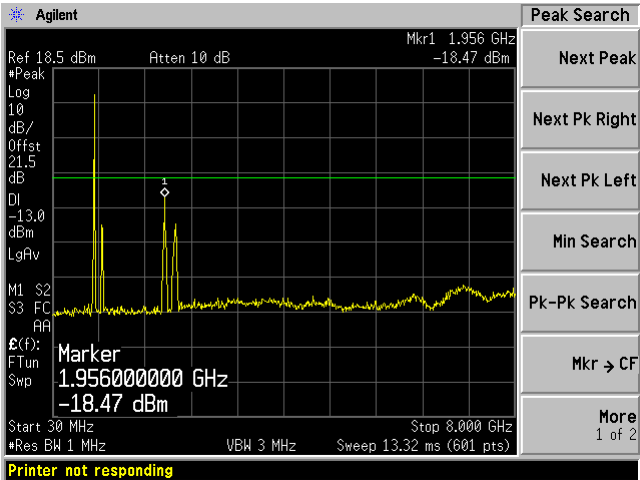


LTE Band 13, 5 MHz, 64QAM

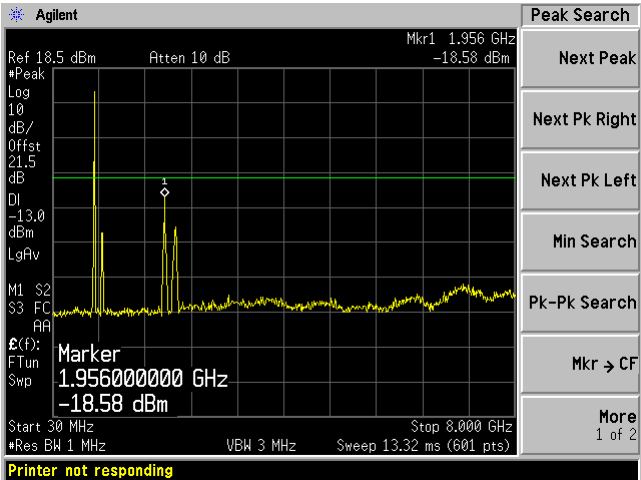
Low 30MHz-8GHz DL



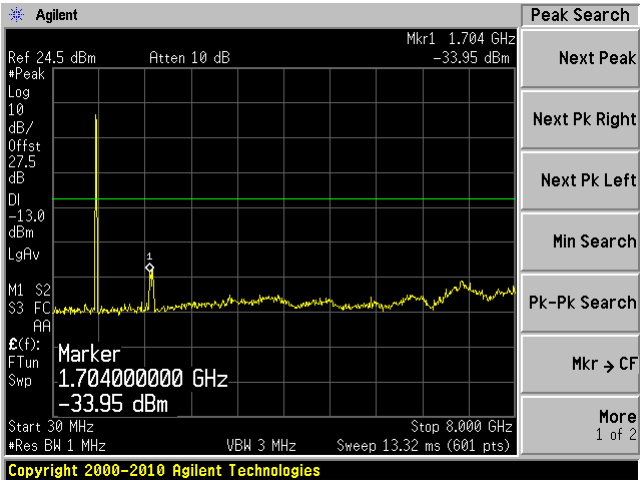
Middle 30MHz-8GHz DL



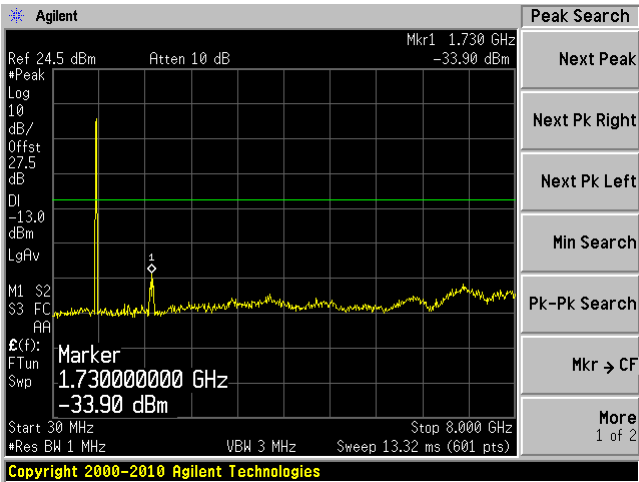
High 30MHz-8GHz DL



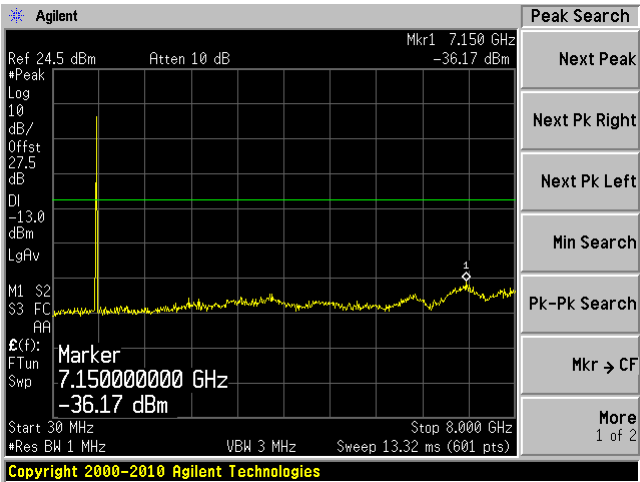
Low 30MHz-8GHz UL



Middle 30MHz-8GHz UL

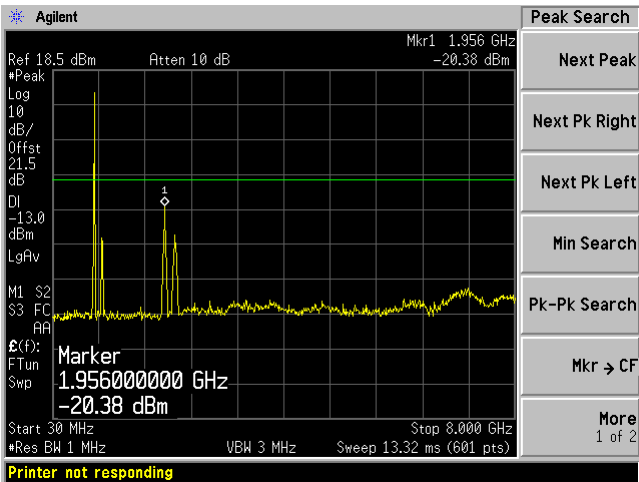


High 30MHz-8GHz UL

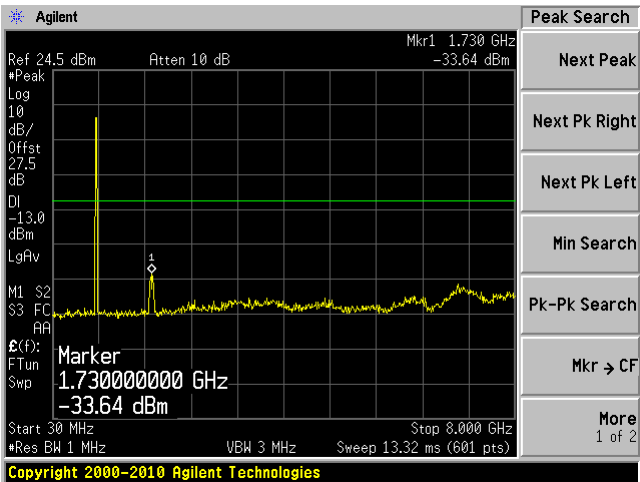


LTE Band 13, 10 MHz, 64QAM

Middle 30MHz-8GHz DL

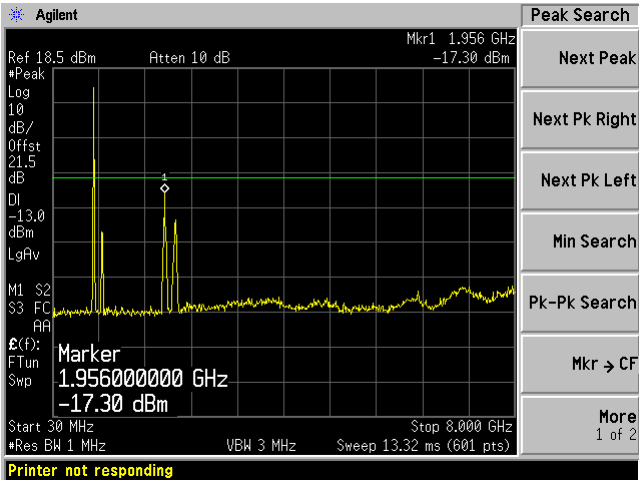


Middle 30MHz-8GHz UL

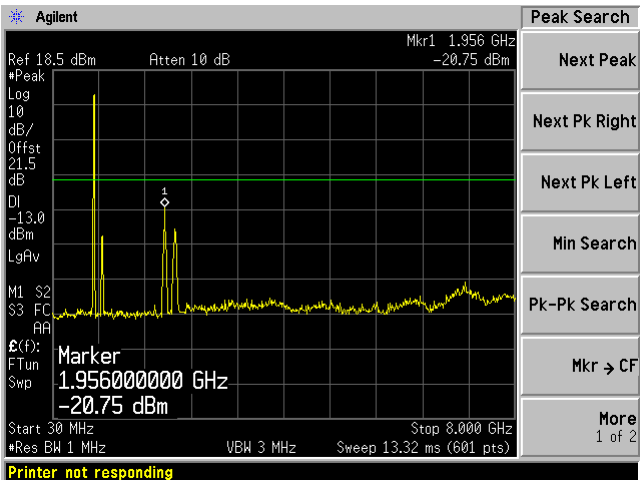


LTE Band 17, 5 MHz, QPSK

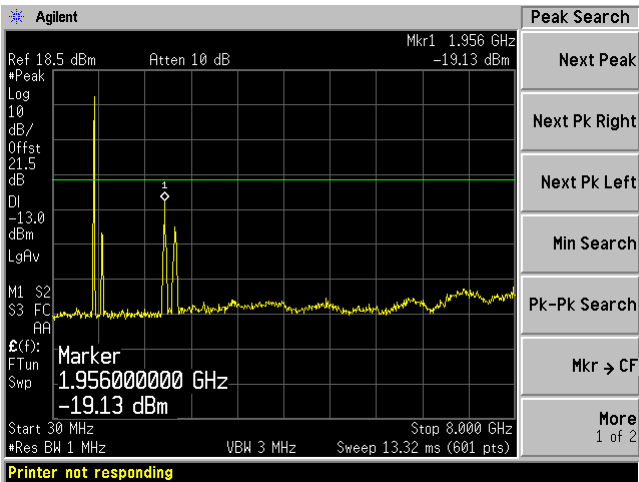
Low 30MHz-8GHz DL



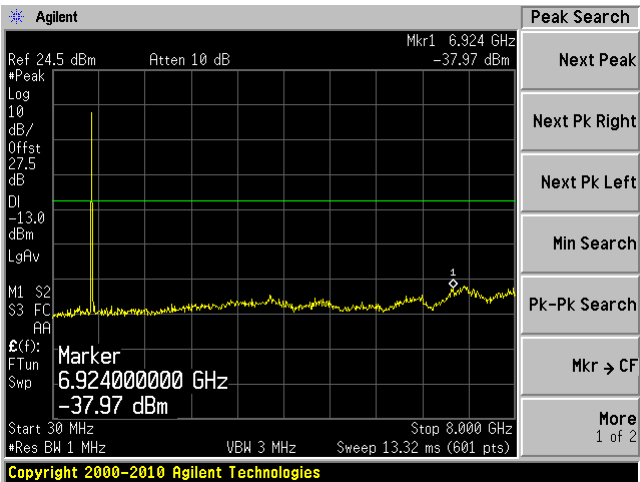
Middle 30MHz-8GHz DL



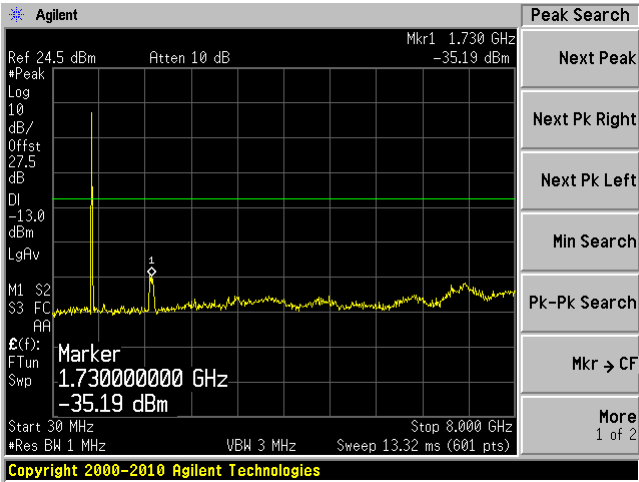
High 30MHz-8GHz DL



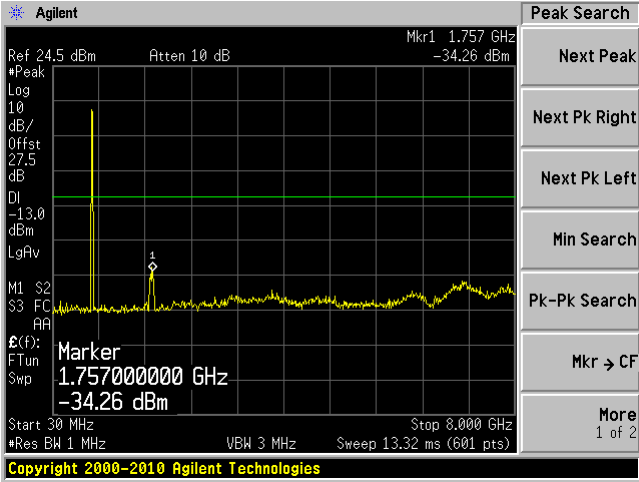
Low 30MHz-8GHz UL



Middle 30MHz-8GHz UL

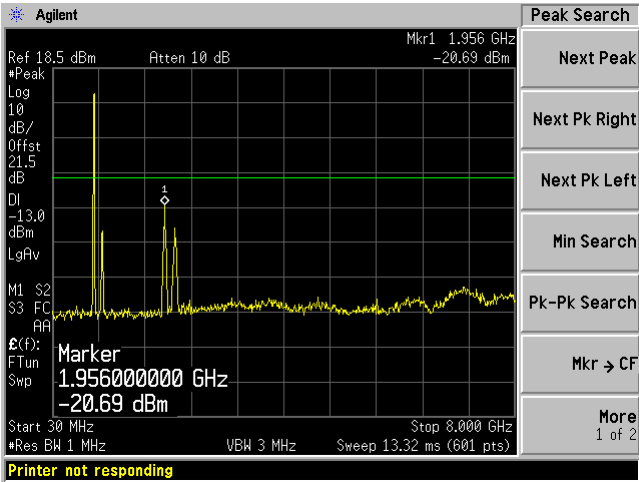


High 30MHz-8GHz UL

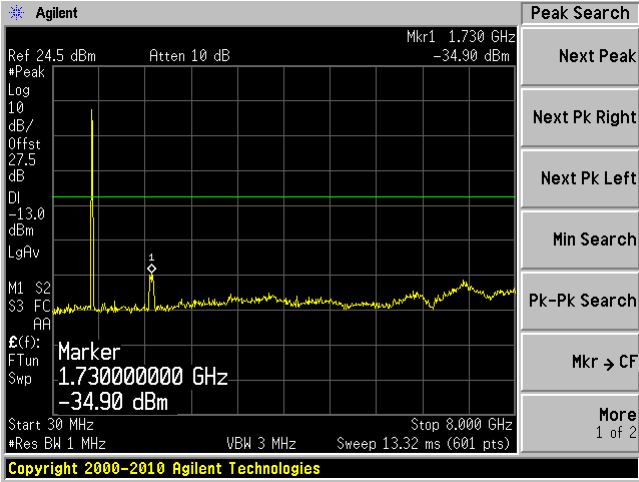


LTE Band 17, 10 MHz, QPSK

Middle 30MHz-8GHz DL

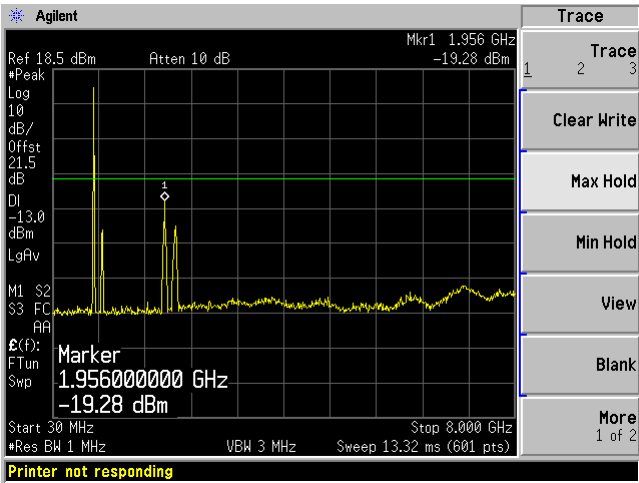


Middle 30MHz-8GHz UL

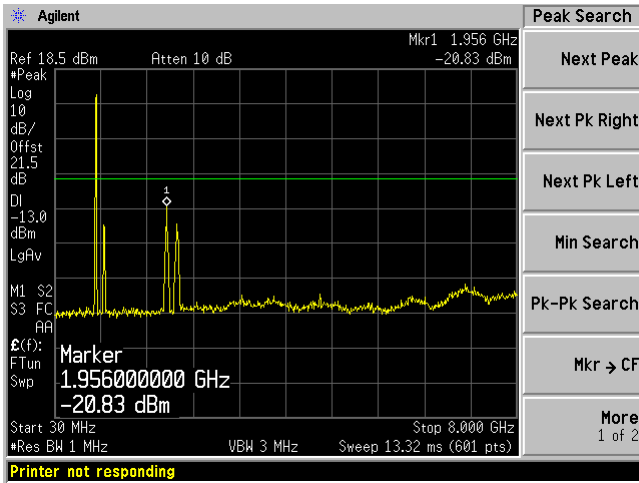


LTE Band 17, 5 MHz, 16QAM

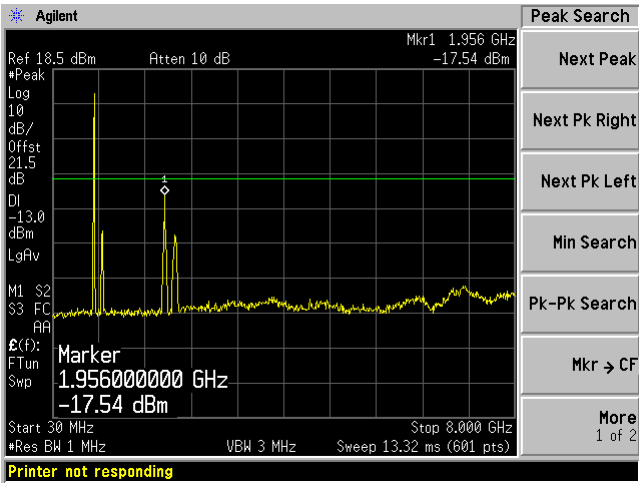
Low 30MHz-8GHz DL



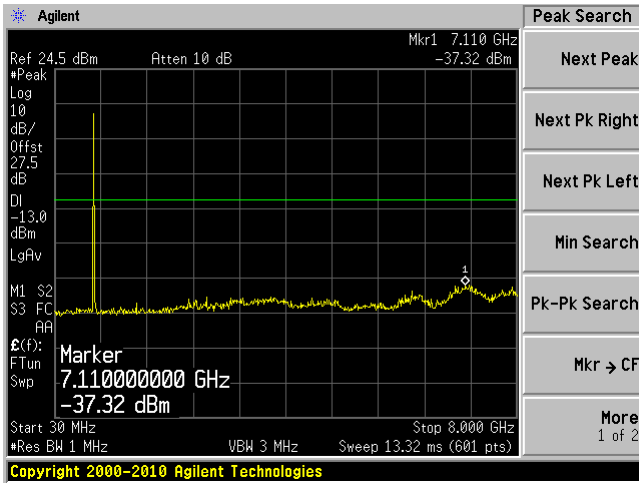
Middle 30MHz-8GHz DL



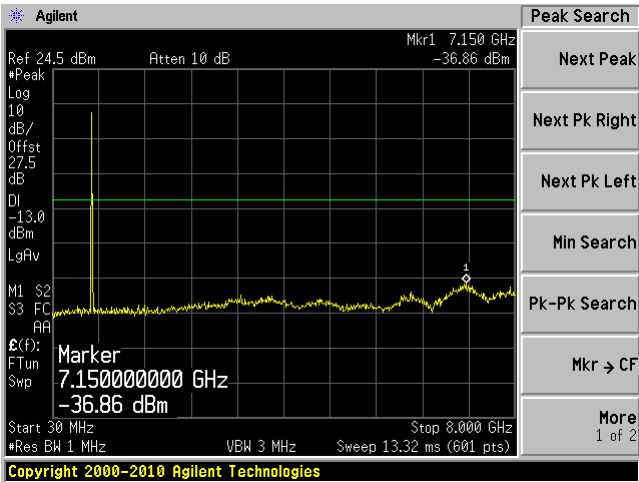
High 30MHz-8GHz DL



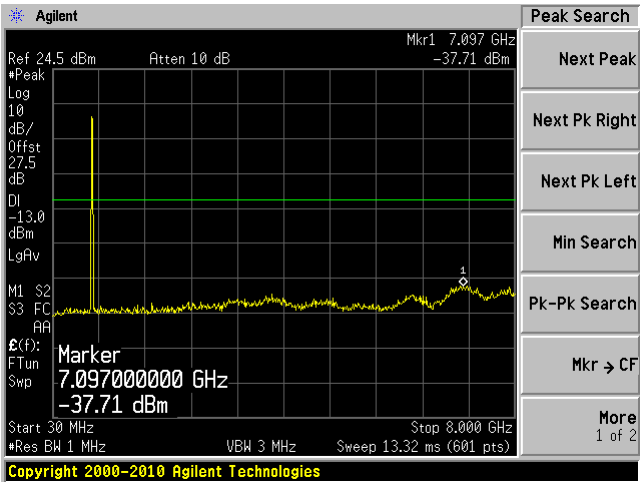
Low 30MHz-8GHz UL



Middle 30MHz-8GHz UL

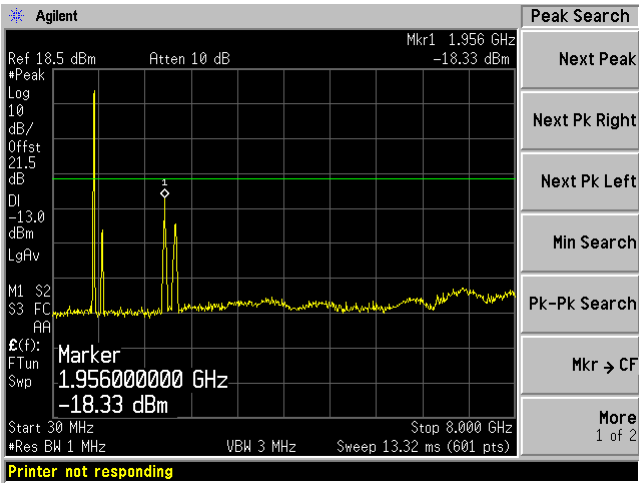


High 30MHz-8GHz UL

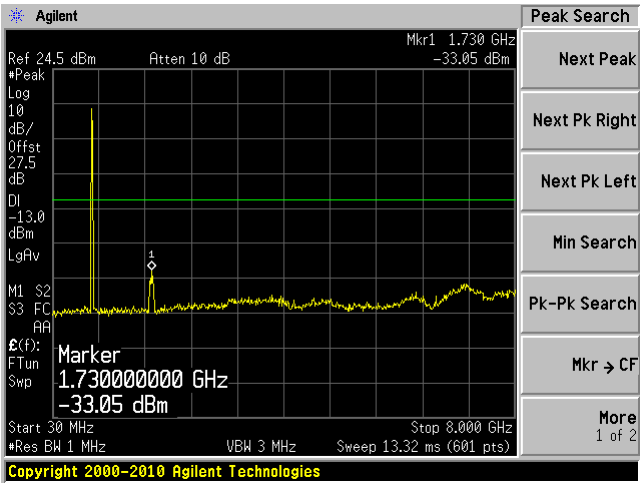


LTE Band 17, 10 MHz, 16QAM

Middle 30MHz-8GHz DL

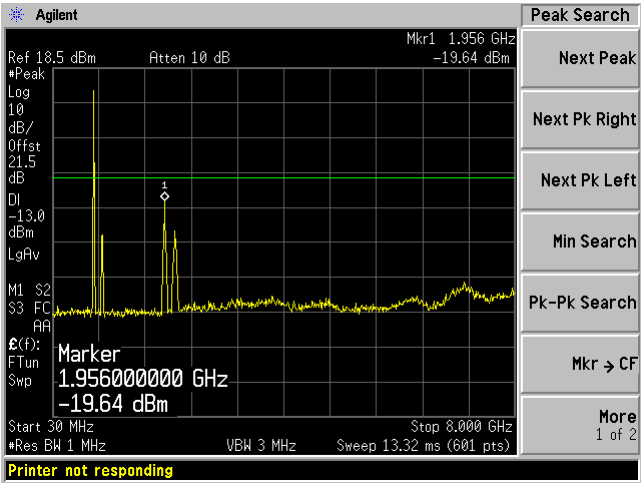


Middle 30MHz-8GHz UL

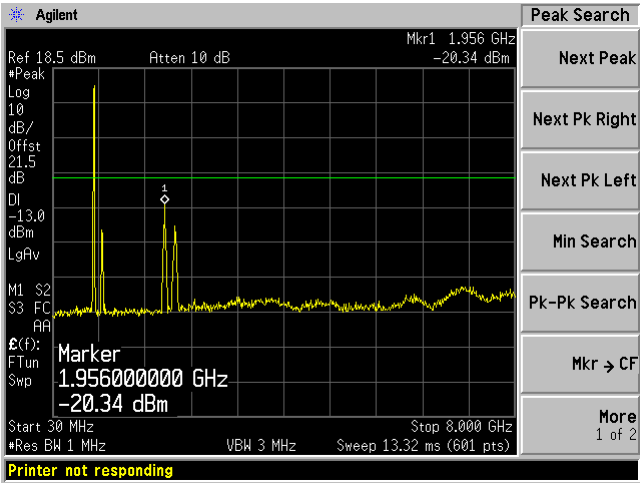


LTE Band 17, 5 MHz, 64QAM

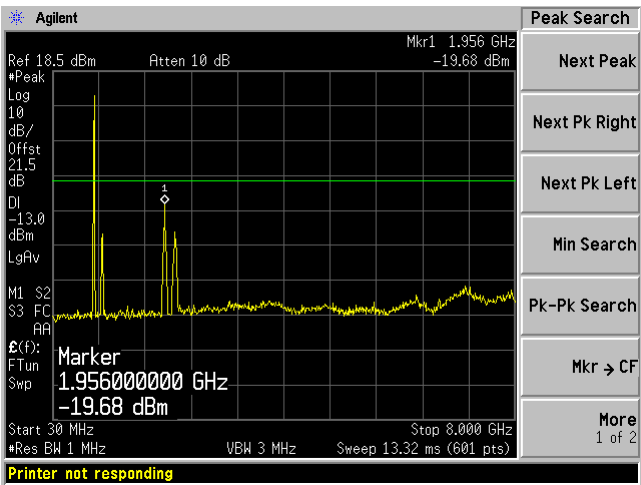
Low 30MHz-8GHz DL



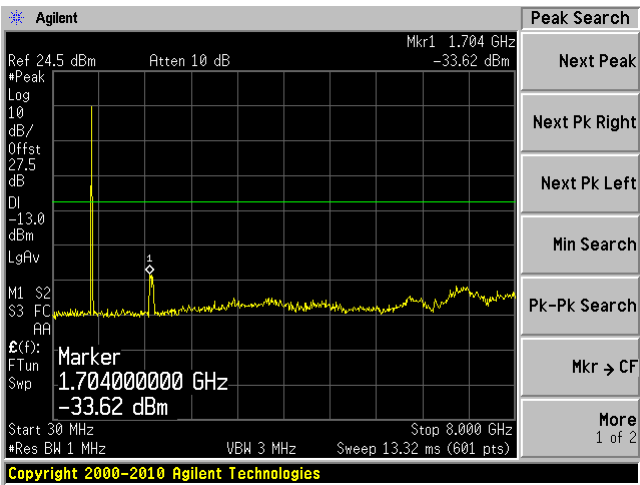
Middle 30MHz-8GHz DL



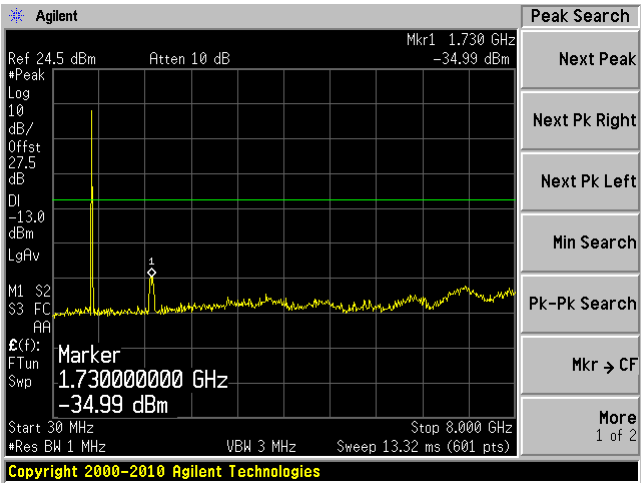
High 30MHz-8GHz DL



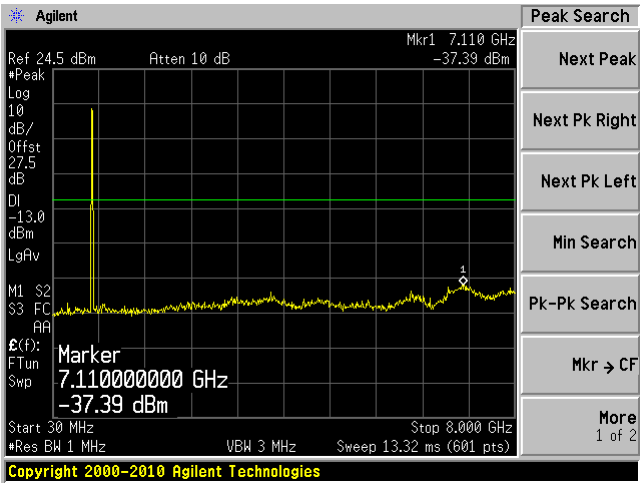
Low 30MHz-8GHz UL



Middle 30MHz-8GHz UL

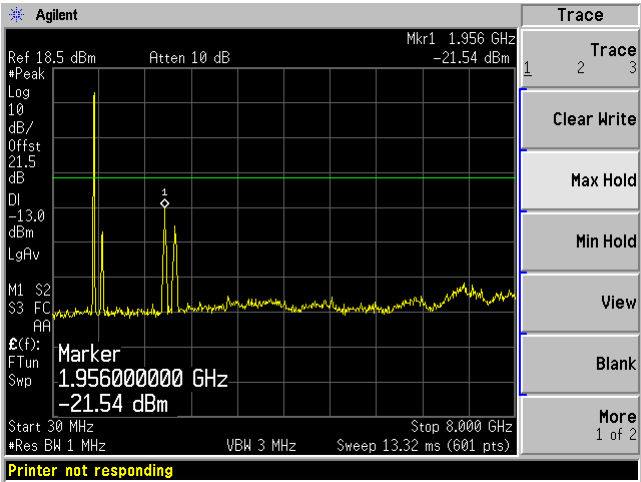


High 30MHz-8GHz UL

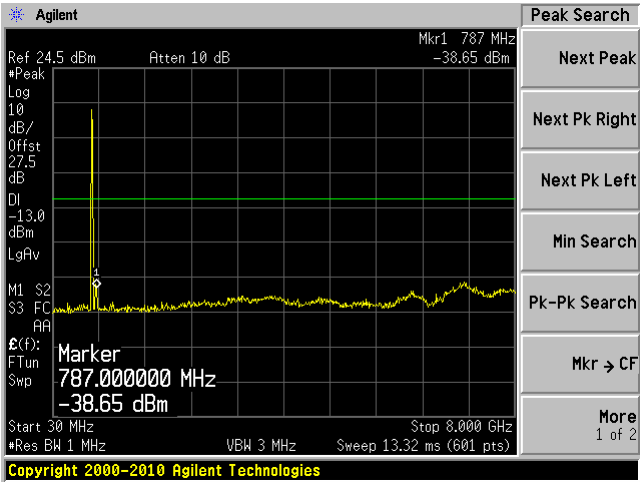


LTE Band 17, 10 MHz, 64QAM

Middle 30MHz-8GHz DL



Middle 30MHz-8GHz UL

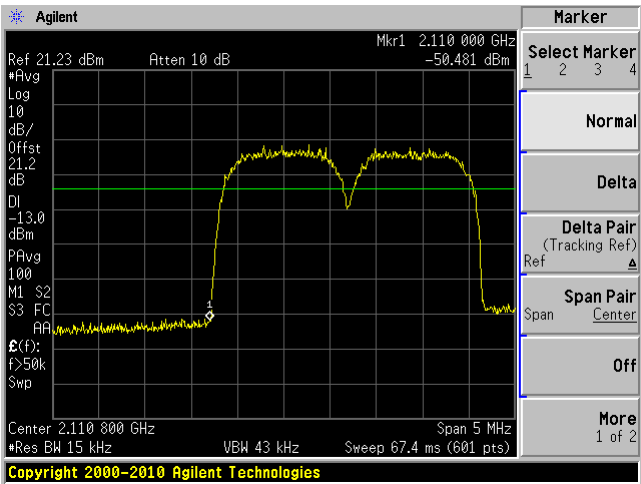


Intermodulation

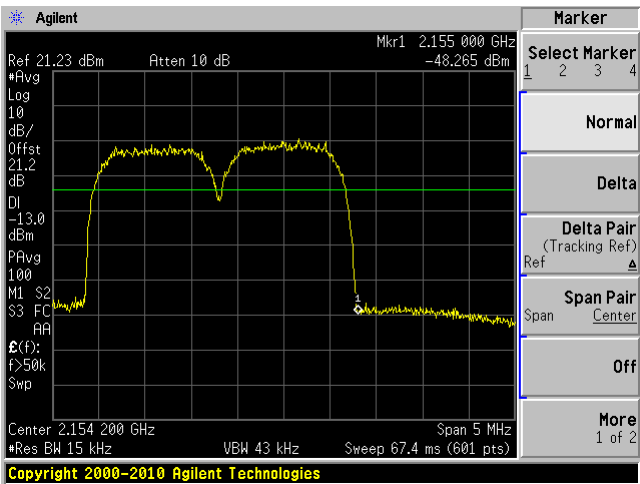
Downlink (ALC off)

Band 4, CDMA

Low Channel

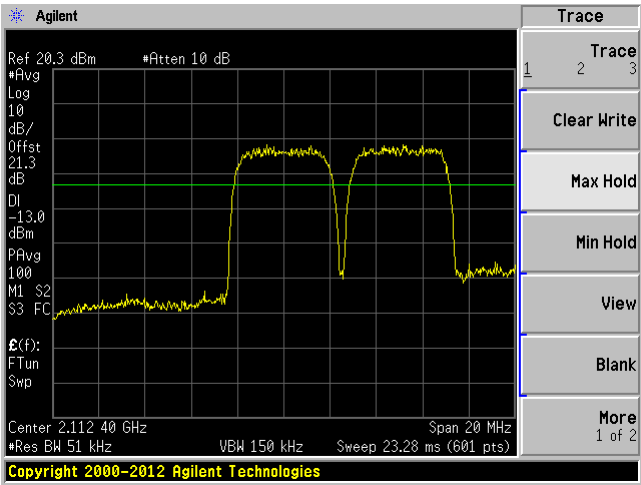


High Channel

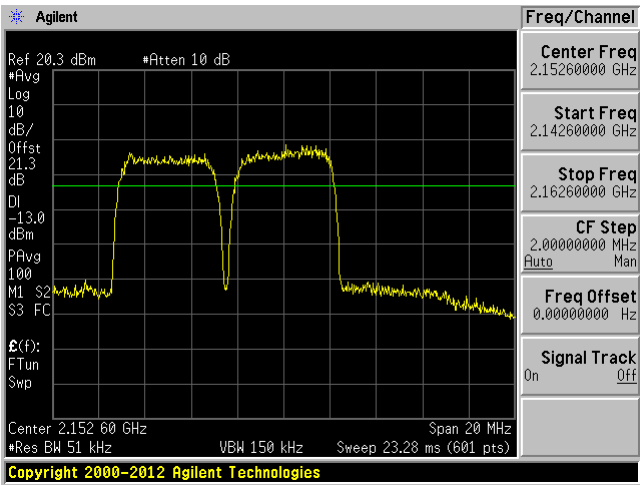


Band 4, WCDMA

Low Channel

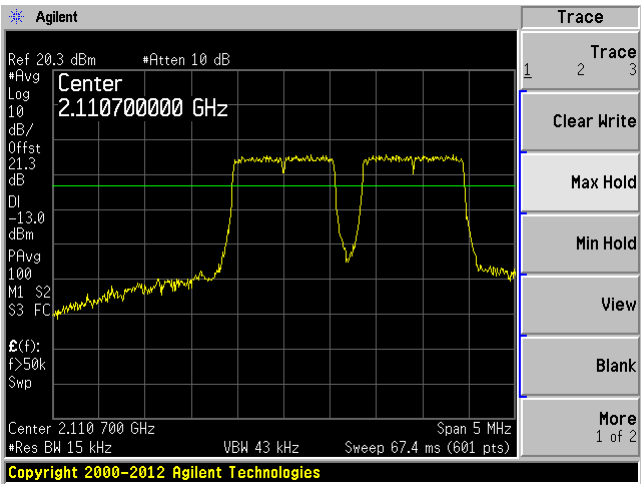


High Channel

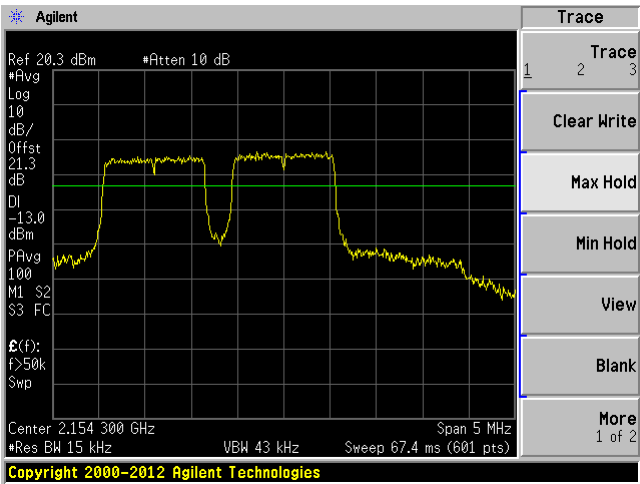


LTE Band 4, QPSK – 1.4 MHz

Low Channel

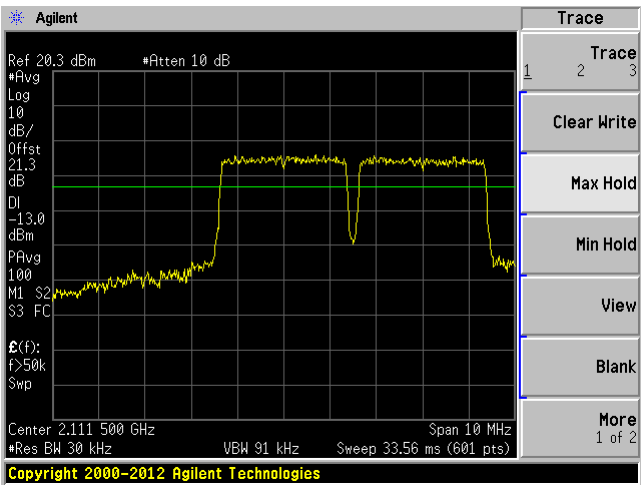


High Channel

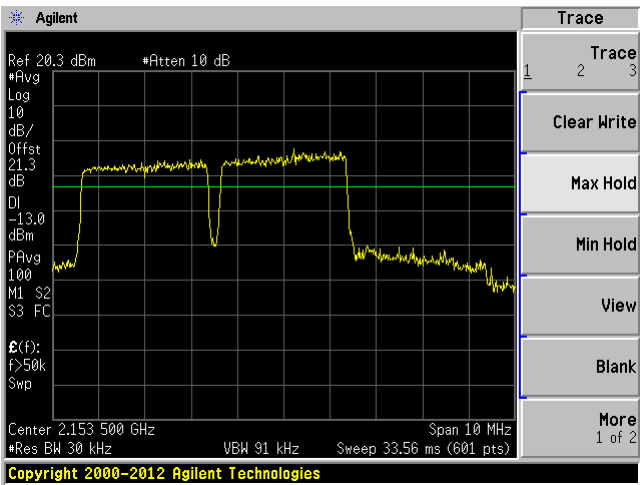


LTE Band 4, QPSK – 3 MHz

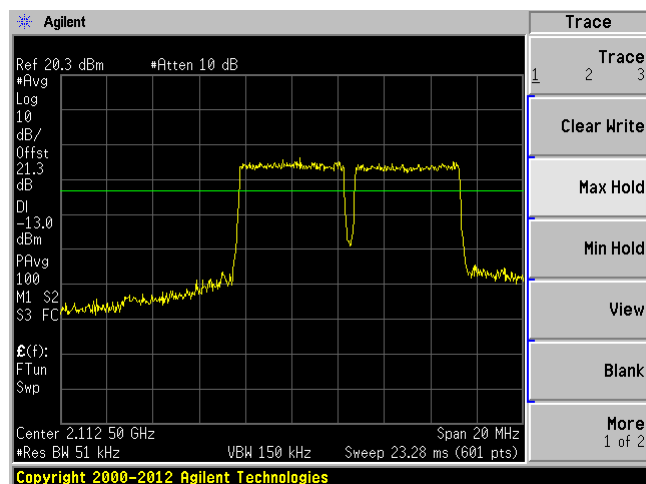
Low Channel



High Channel



Low Channel



Agilent

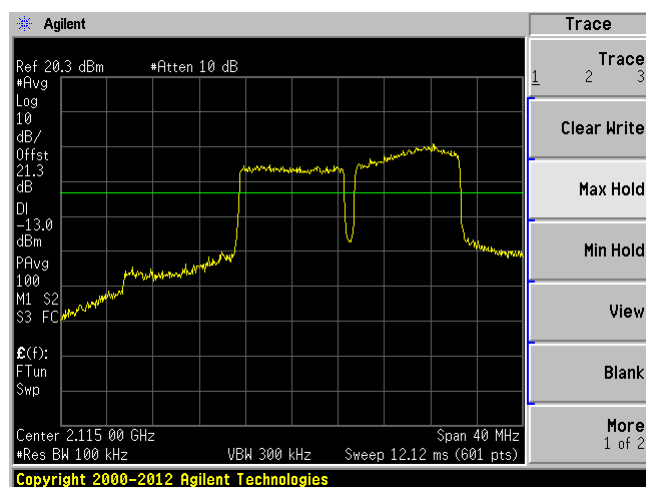
Ref 20.3 dBm *Atten 10 dB

*Avg
Log
10
dB/
Offst
21.3
dB
DI
-13.0
dBm
PAvg
100
M1 S2
S3 FC

Center 2.152 50 GHz Span 20 MHz
Res BW 51 kHz VBW 150 kHz Sweep 23.28 ms (601 pts)

Trace
Trace
1 2 3
Clear Write
Max Hold
Min Hold
View
Blank
More
1 of 2

Low Channel



Agilent

Ref 20.3 dBm #Atten 10 dB

Center 2.15000000 GHz

Span 40 MHz

Res BW 100 kHz VBW 300 kHz Sweep 12.12 ms (601 pts)

Trace

Trace 1 2 3

Clear Write

Max Hold

Min Hold

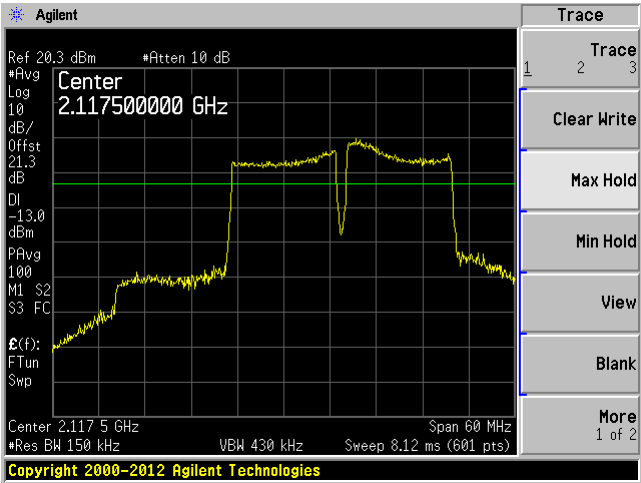
View

Blank

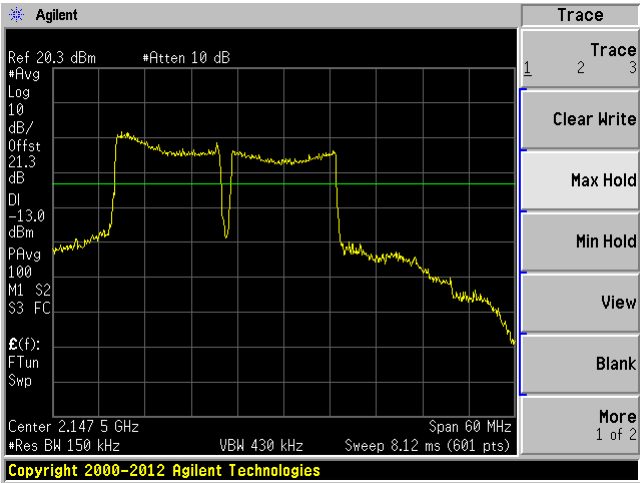
More 1 of 2

LTE Band 4, QPSK – 15 MHz

Low Channel

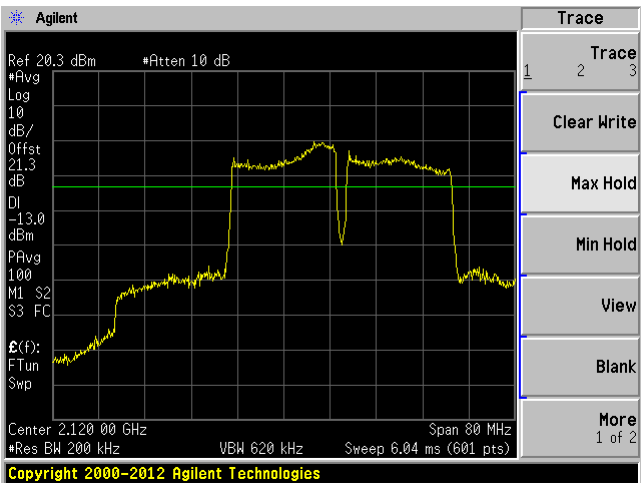


High Channel

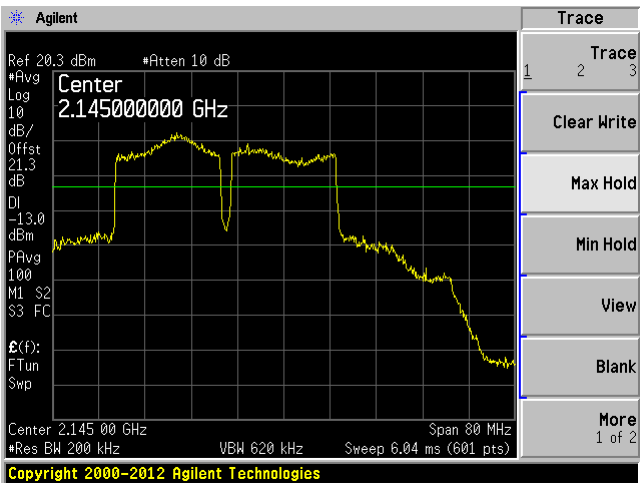


QPSK – 20 MHz

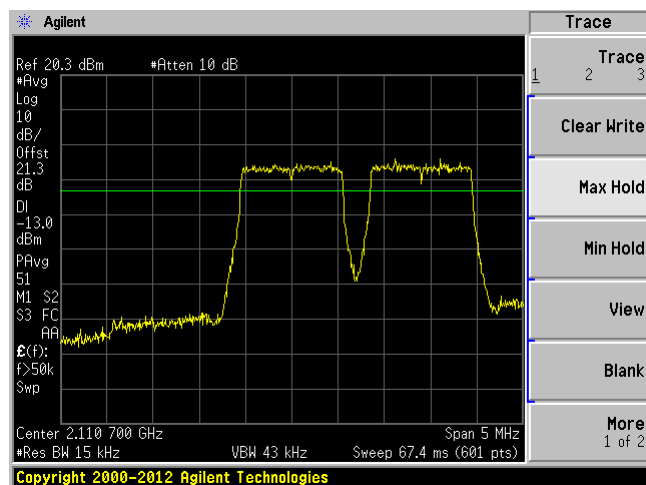
Low Channel



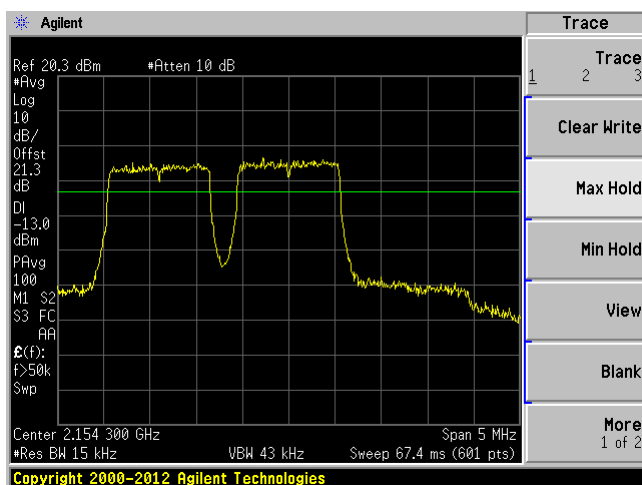
High Channel



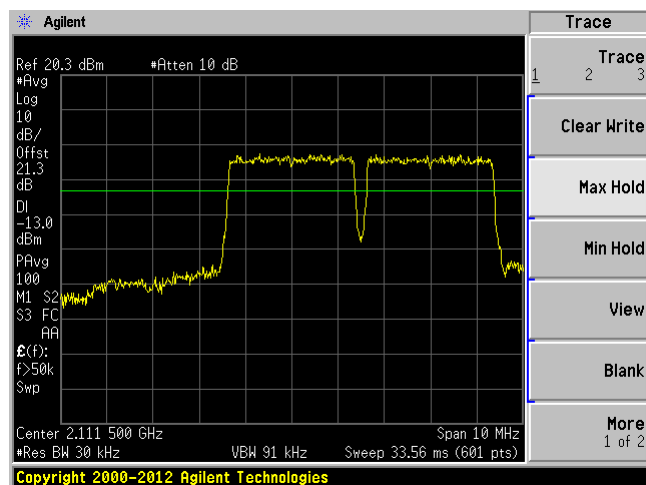
Low Channel



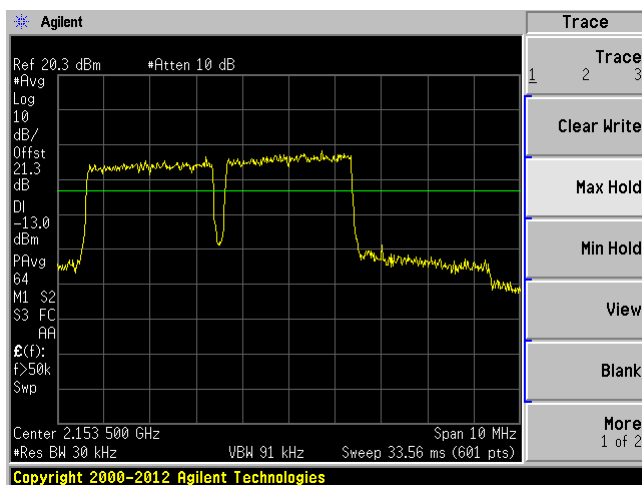
High Channel



Low Channel

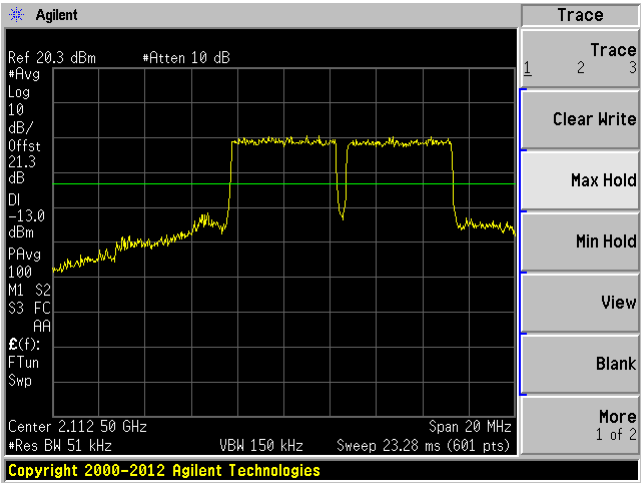


High Channel

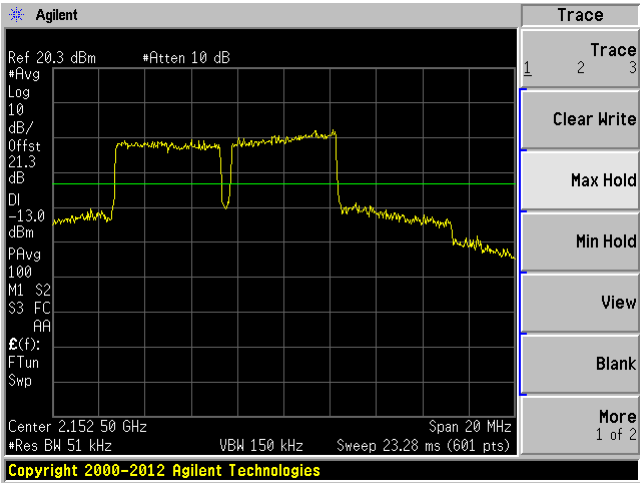


LTE Band 4, 16QAM – 5 MHz

Low Channel

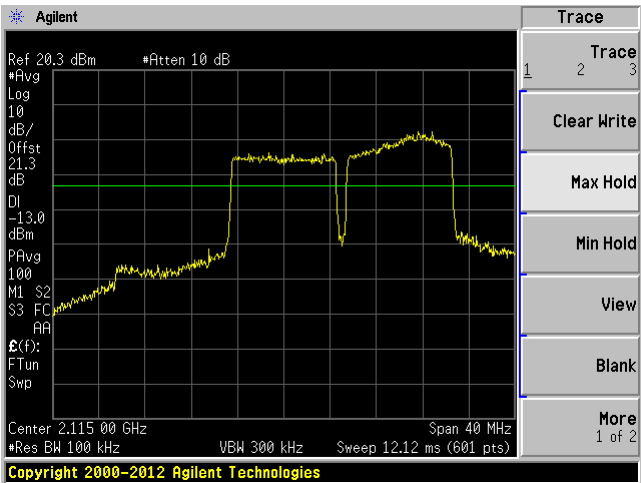


High Channel

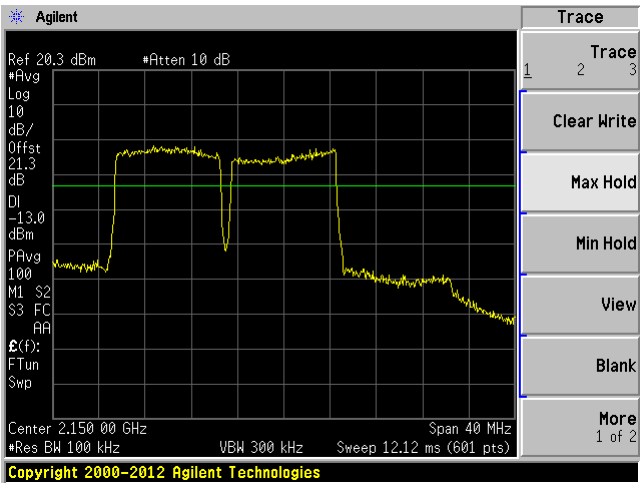


16QAM – 10 MHz

Low Channel

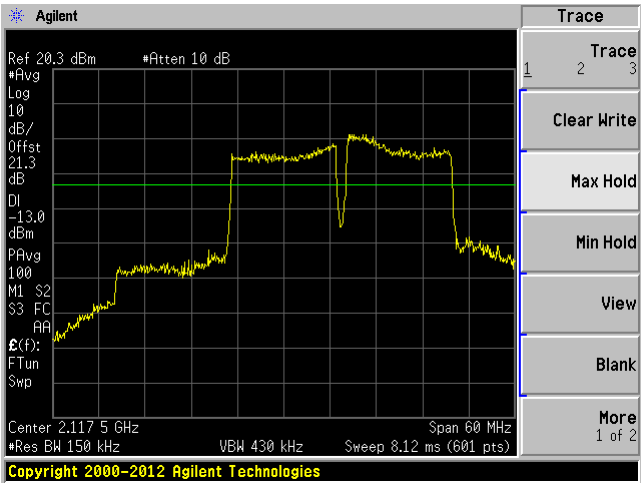


High Channel

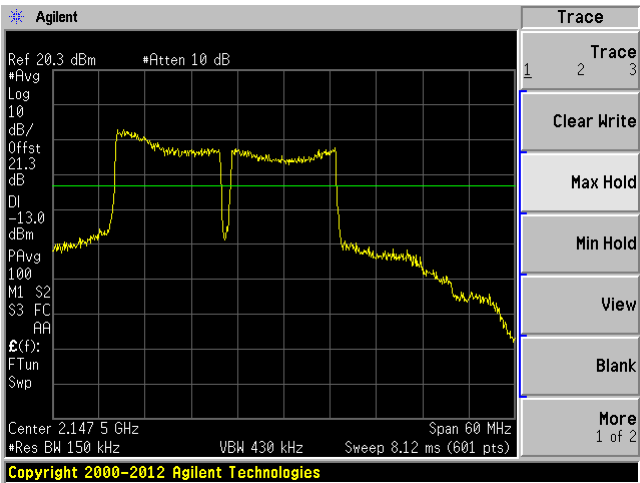


LTE Band 4, 16QAM – 15 MHz

Low Channel

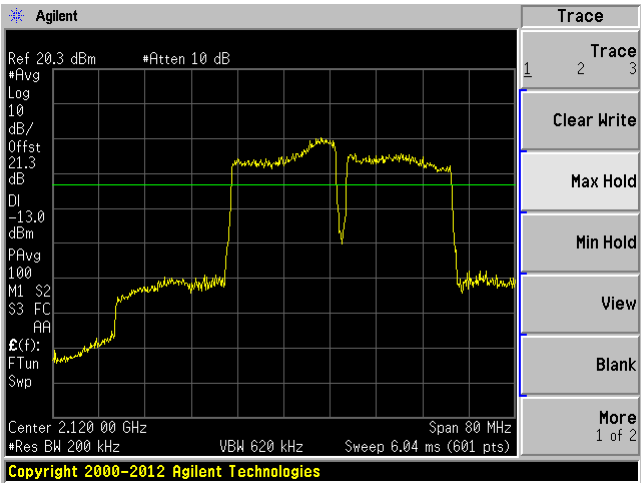


High Channel

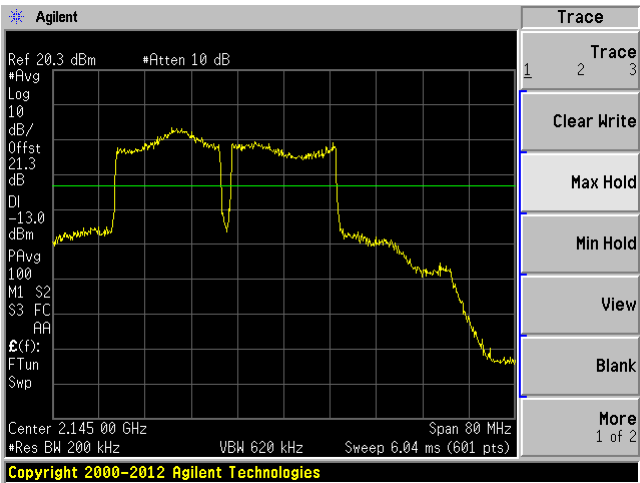


16QAM – 20 MHz

Low Channel

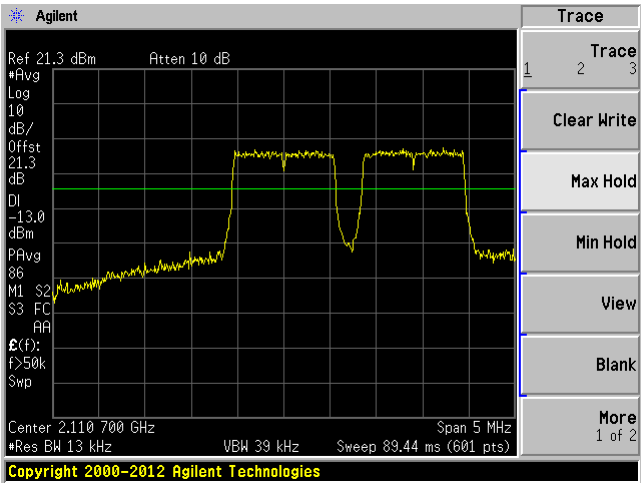


High Channel

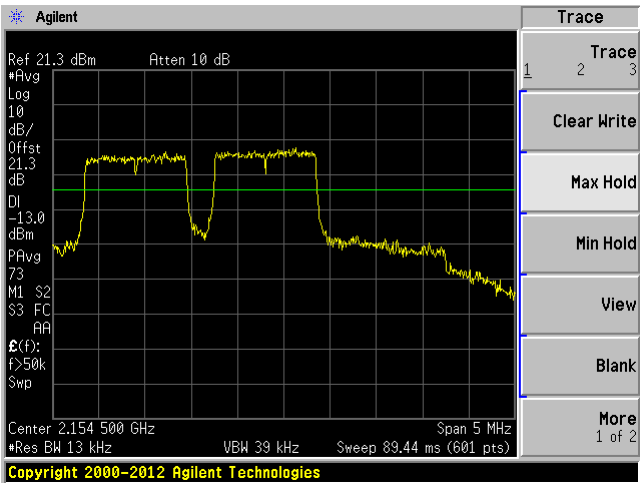


LTE Band 4, 64QAM – 1.4 MHz

Low Channel

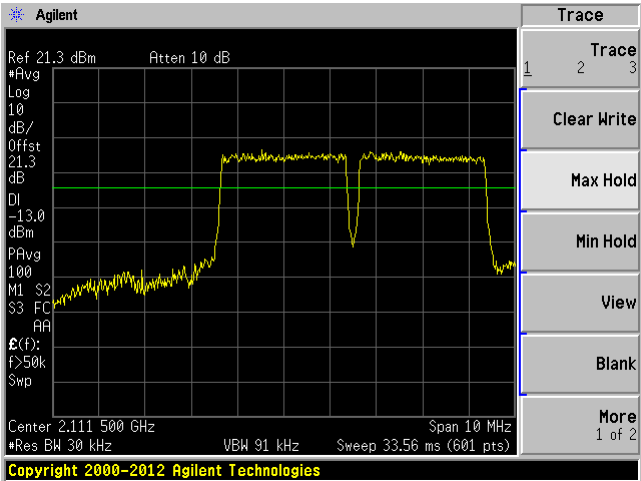


High Channel

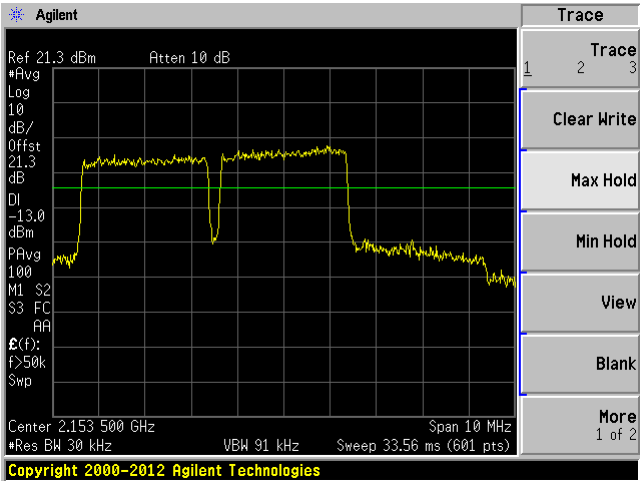


64QAM – 3 MHz

Low Channel

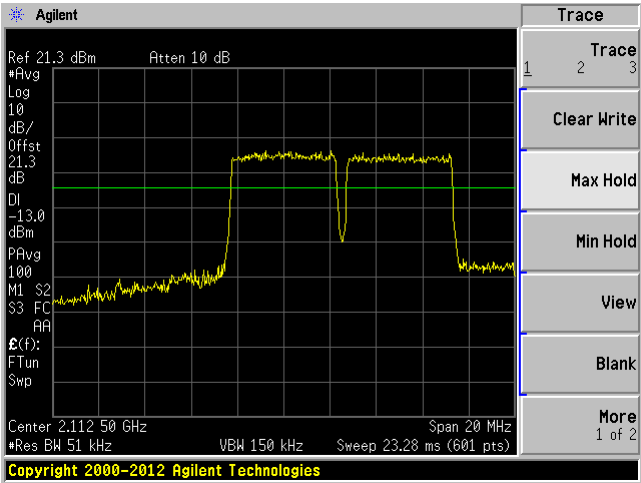


High Channel

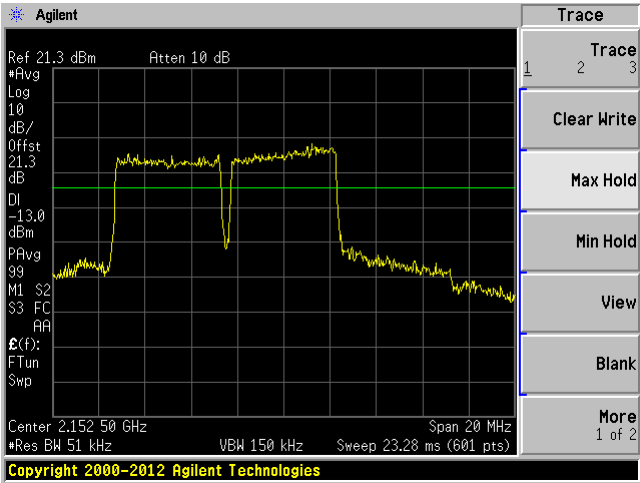


LTE Band 4, 64QAM – 5 MHz

Low Channel

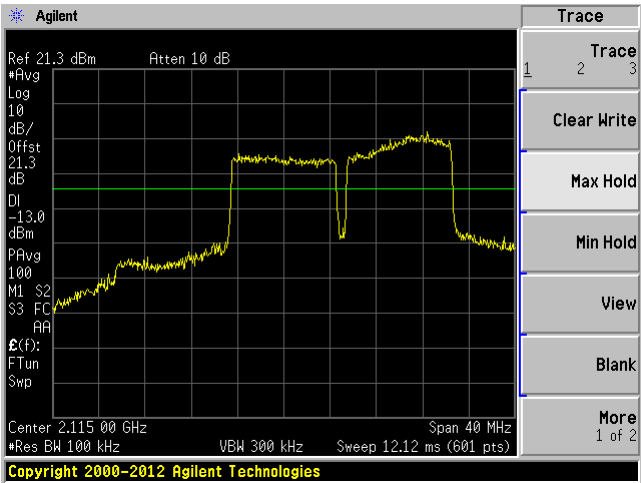


High Channel

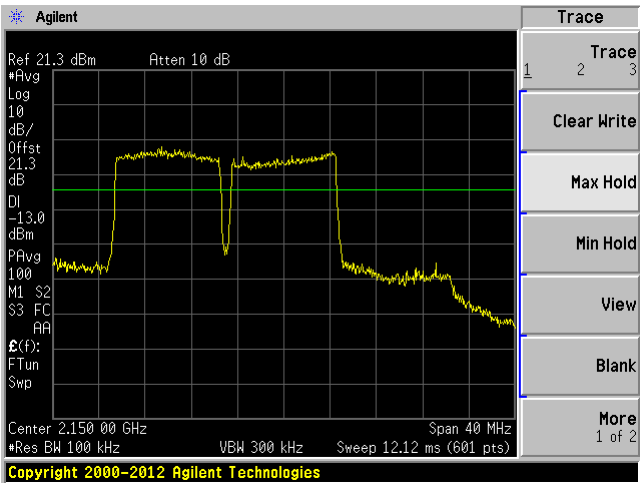


LTE Band 4, 64QAM – 10 MHz

Low Channel

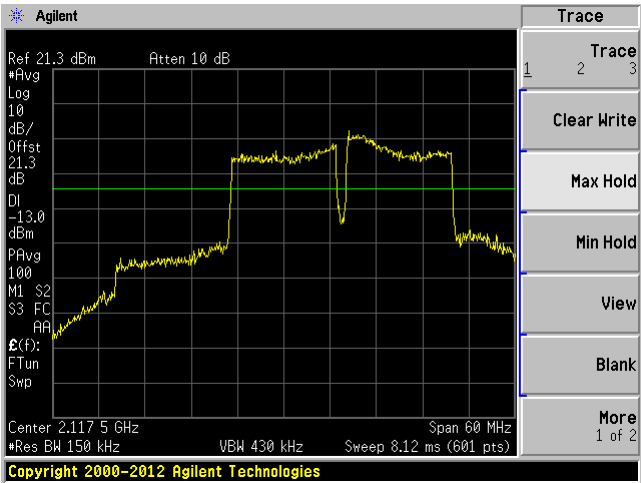


High Channel

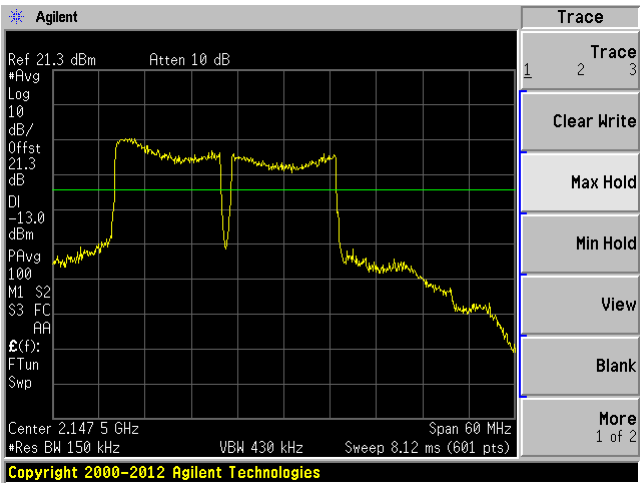


LTE Band 4, 64QAM – 15 MHz

Low Channel

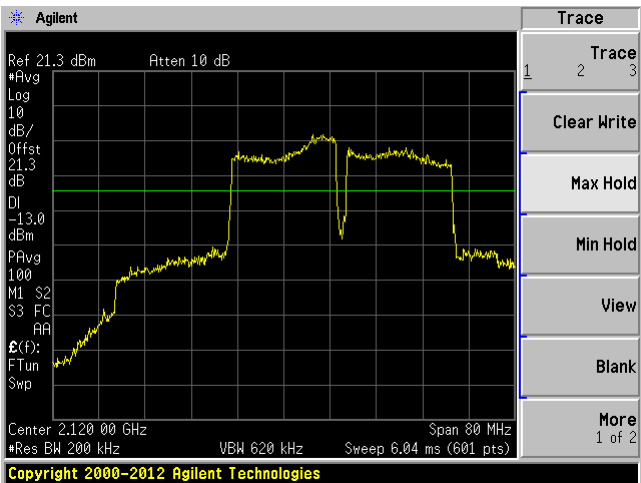


High Channel

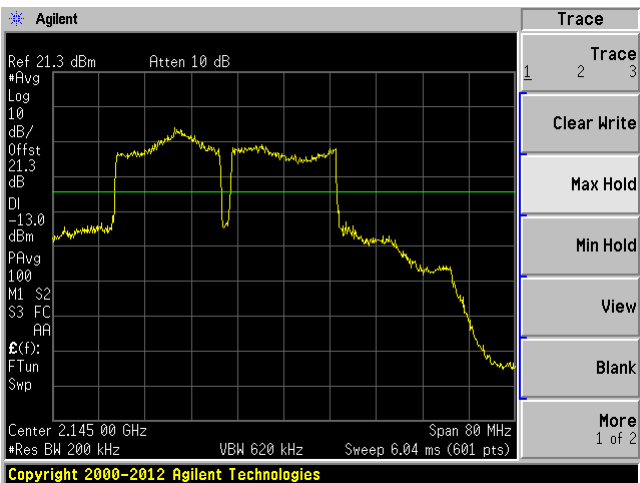


LTE Band 4, 64QAM – 20 MHz

Low Channel

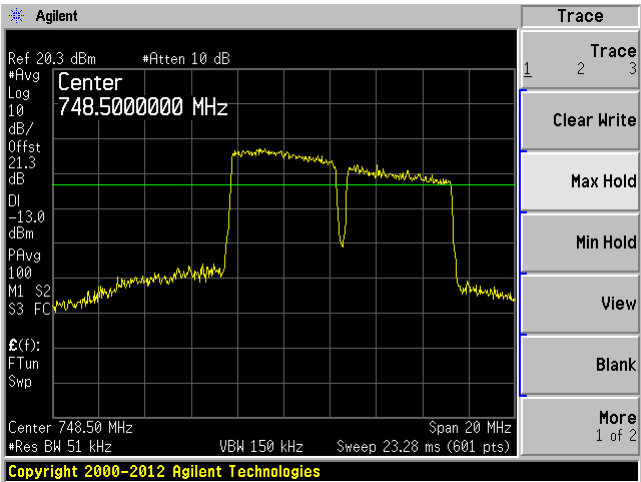


High Channel

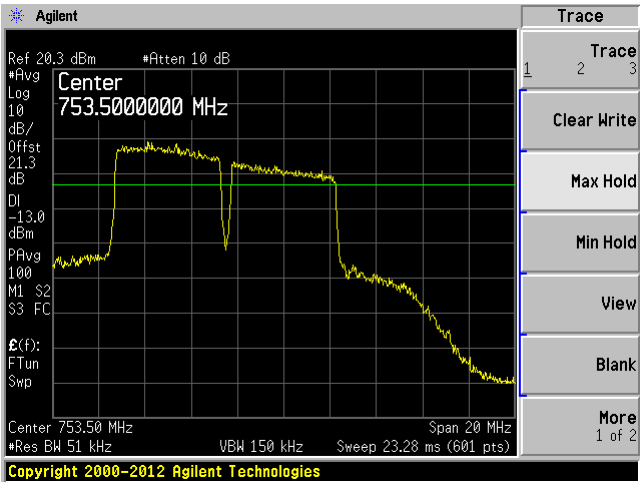


LTE Band 13, QPSK – 5 MHz

Low Channel

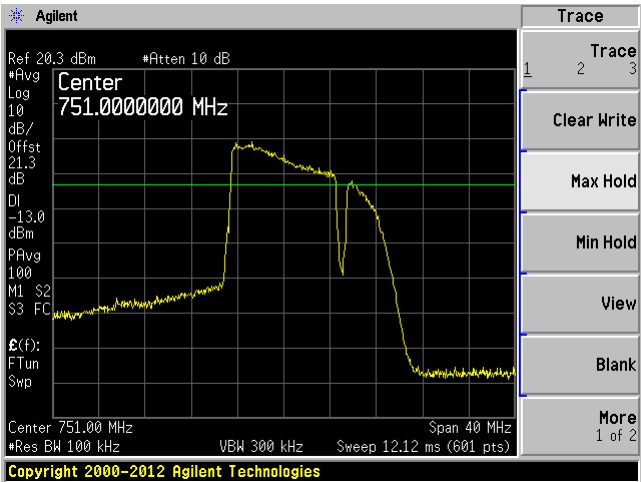


High Channel

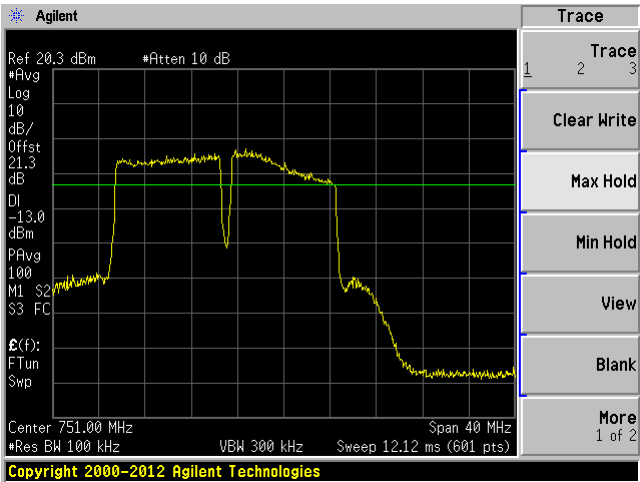


LTE Band 13, QPSK – 10 MHz

Low Channel

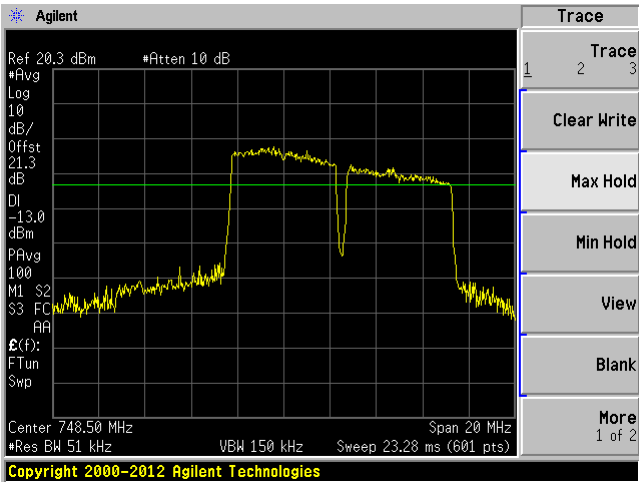


High Channel

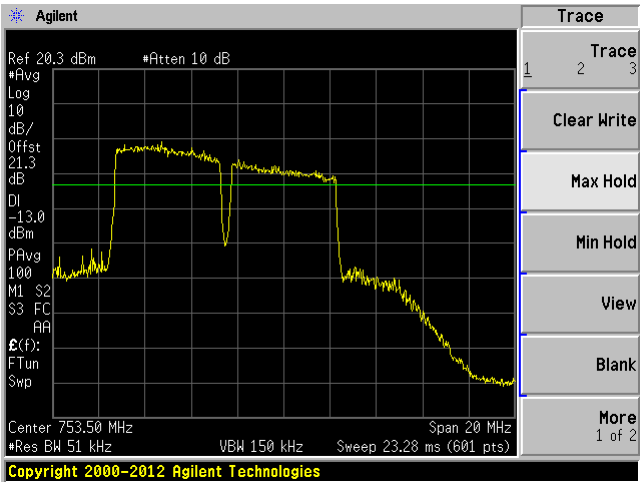


LTE Band 13, 16QAM – 5 MHz

Low Channel

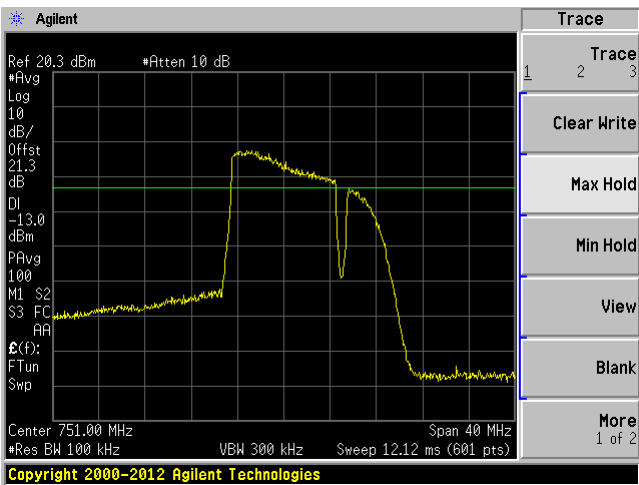


High Channel

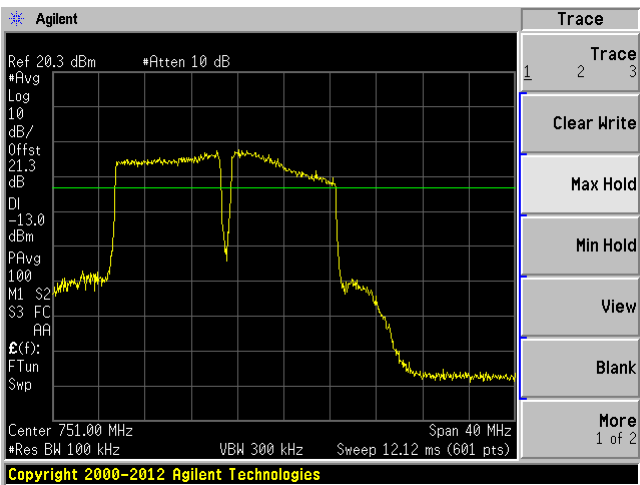


LTE Band 13, 16QAM – 10 MHz

Low Channel

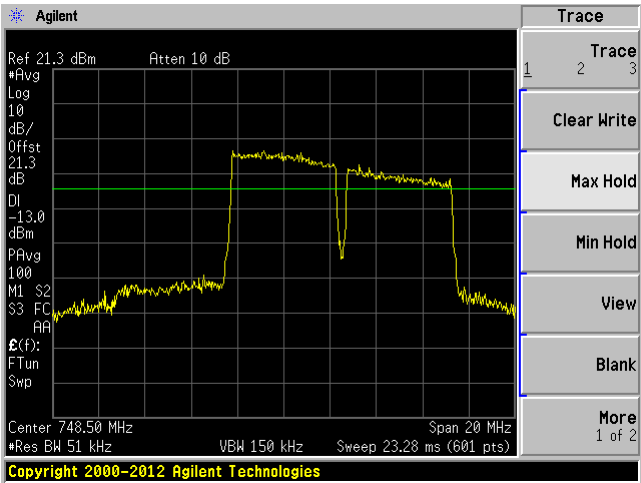


High Channel

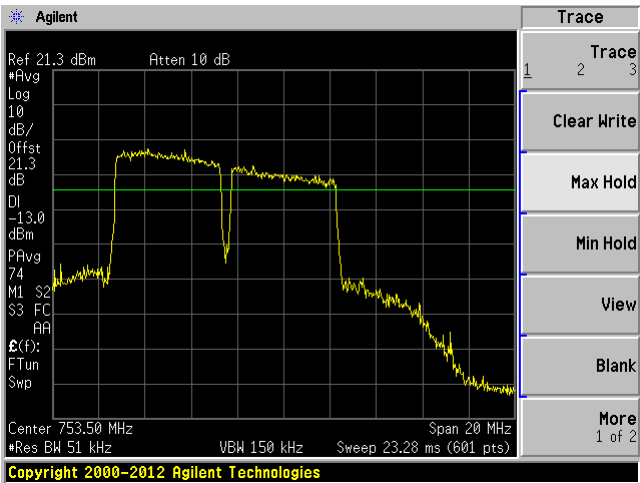


LTE Band 13, 64QAM – 5 MHz

Low Channel

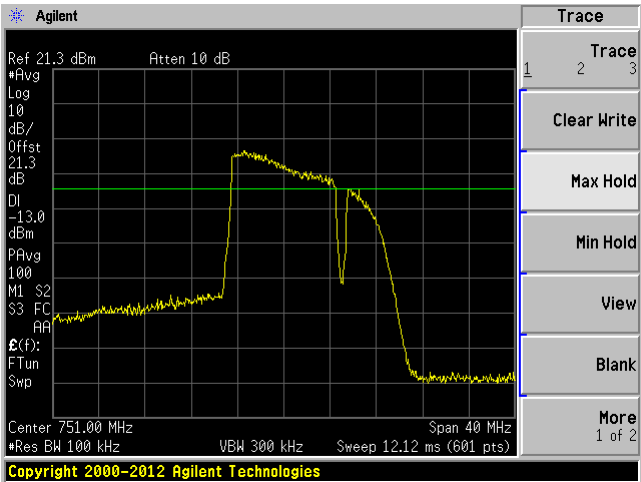


High Channel

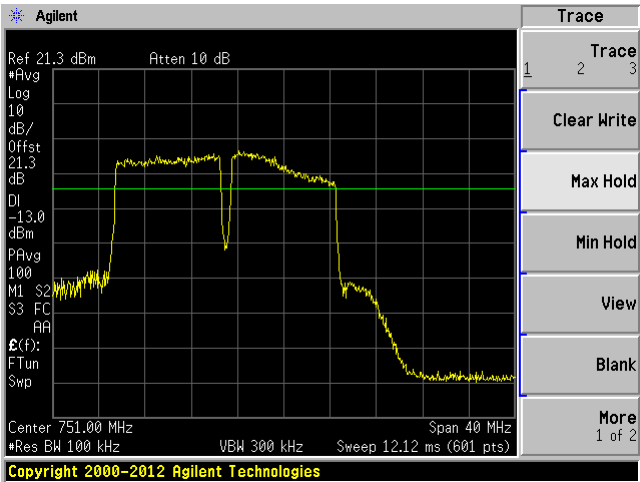


LTE Band 13, 64QAM – 10 MHz

Low Channel

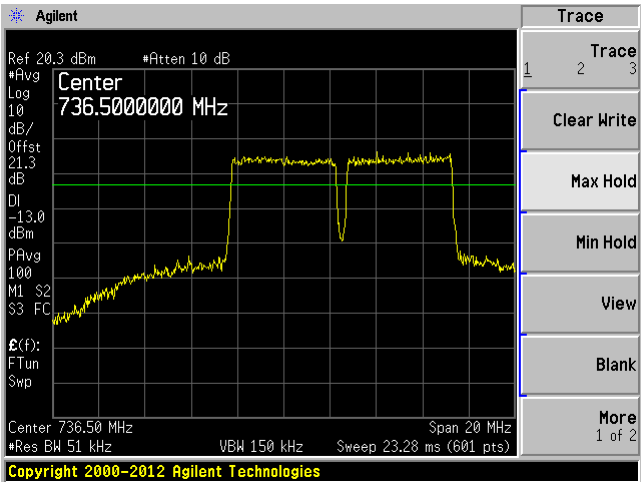


High Channel

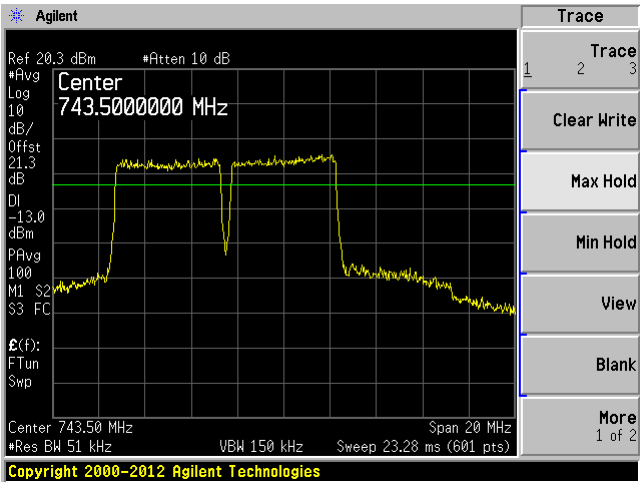


LTE Band 17, QPSK – 5 MHz

Low Channel

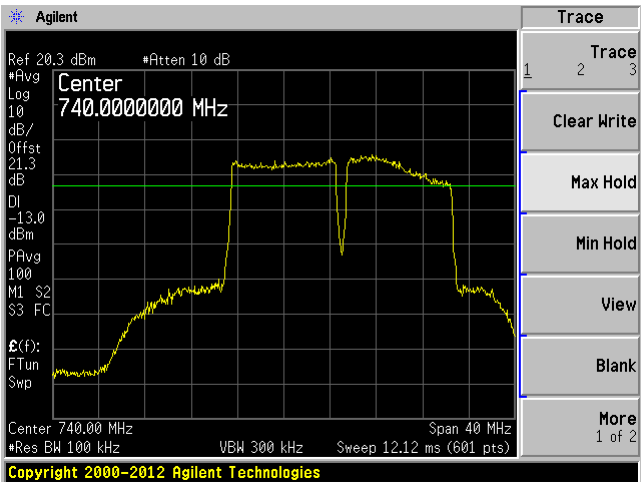


High Channel

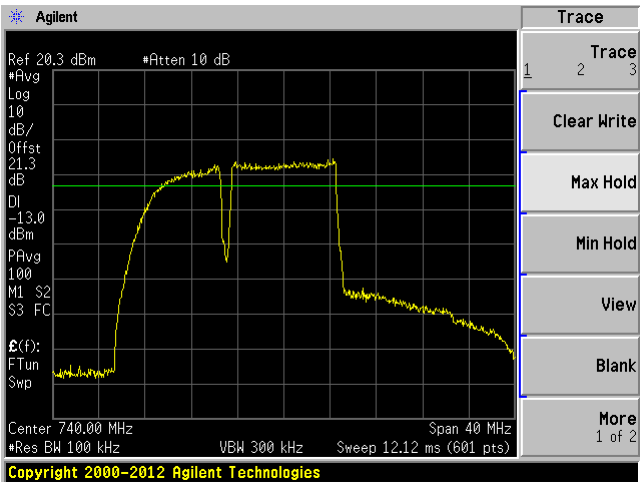


LTE Band 17, QPSK – 10 MHz

Low Channel

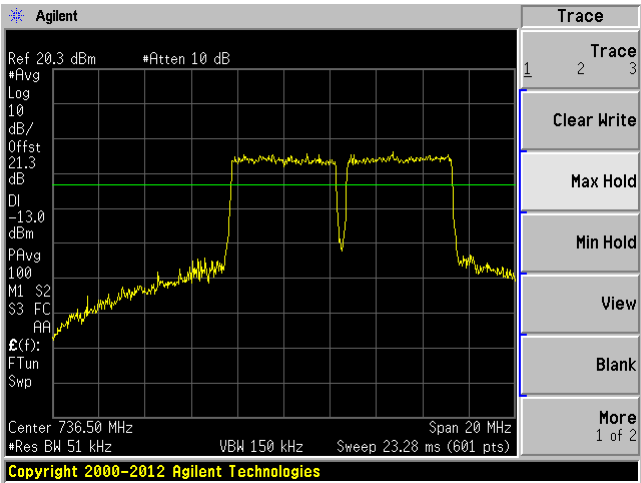


High Channel

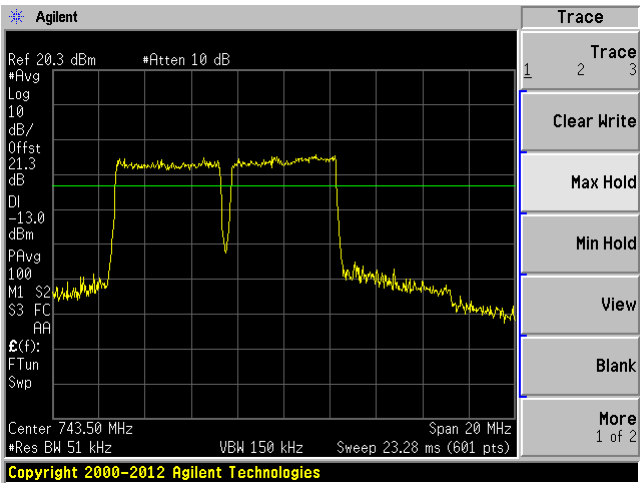


LTE Band 17, 16QAM – 5 MHz

Low Channel

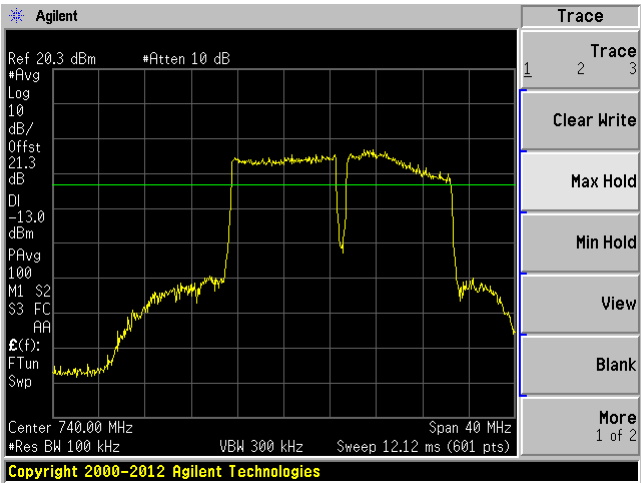


High Channel

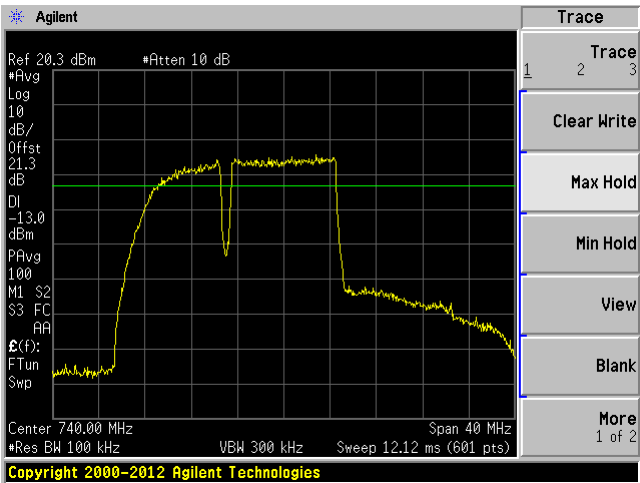


LTE Band 17, 16QAM – 10 MHz

Low Channel

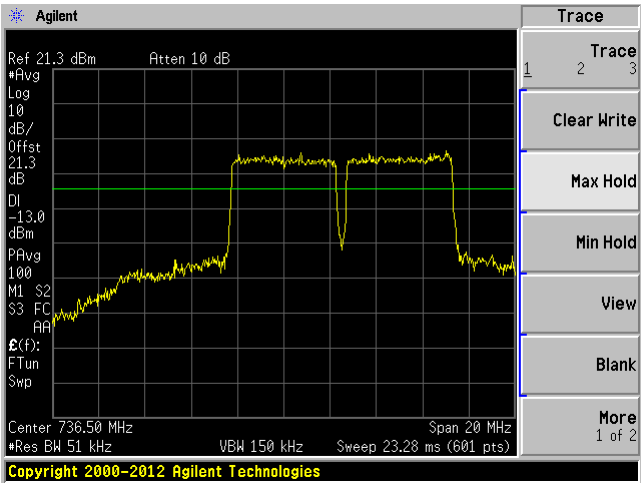


High Channel

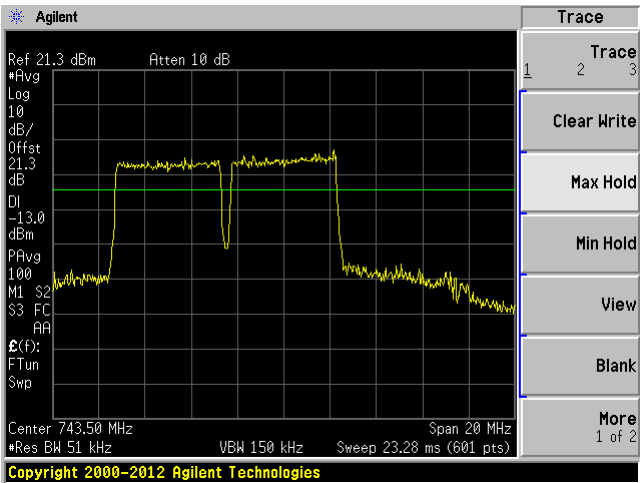


LTE Band 17, 64QAM – 5 MHz

Low Channel

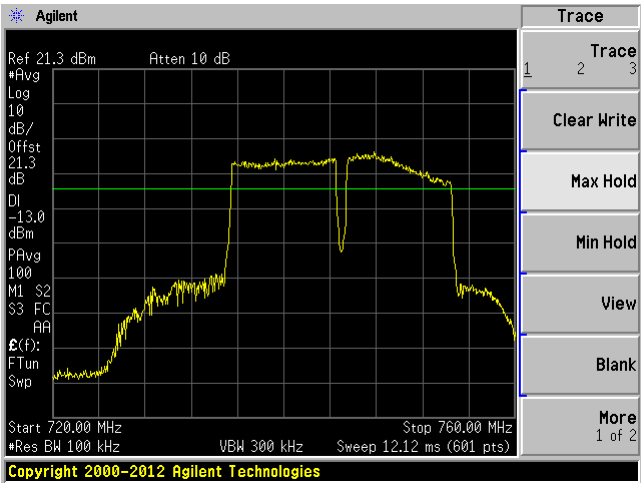


High Channel

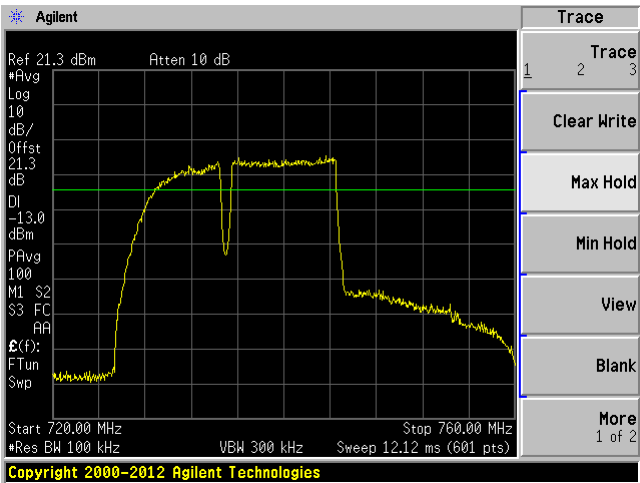


LTE Band 17, 64QAM – 10 MHz

Low Channel



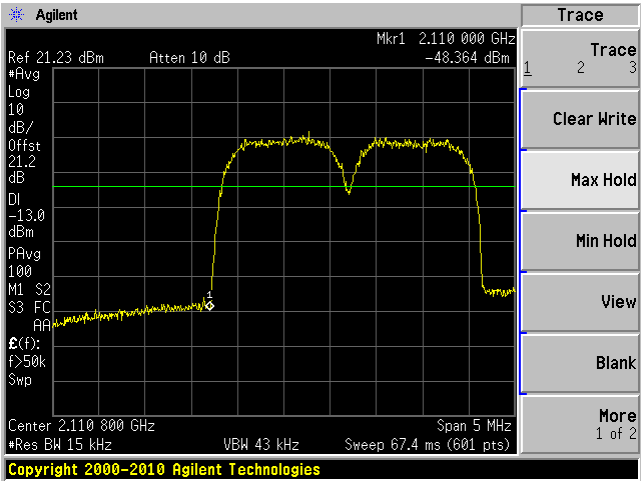
High Channel



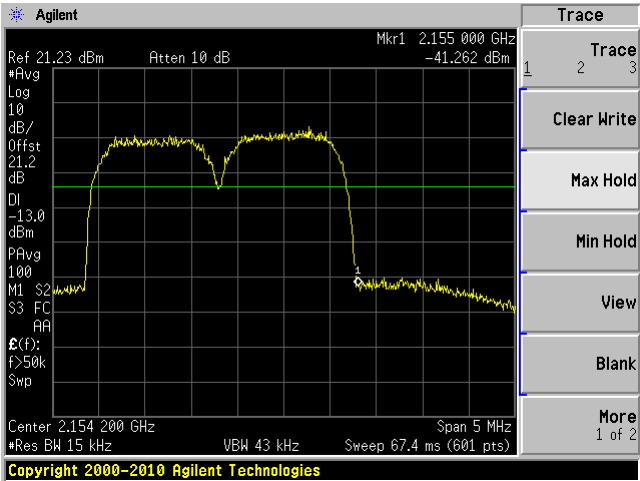
Downlink (ALC on)

Band 4, CDMA

Low Channel

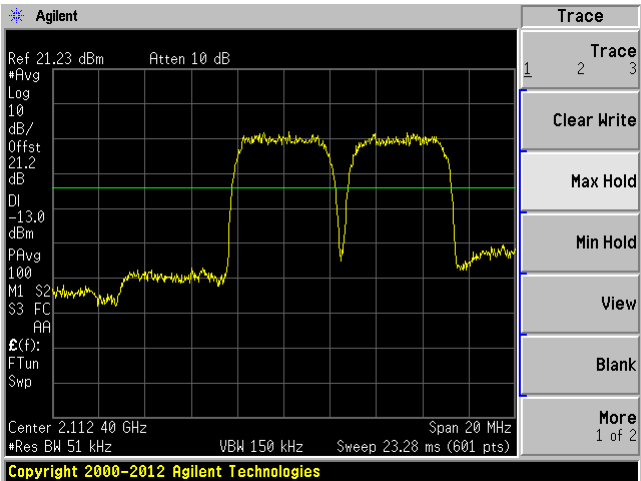


High Channel

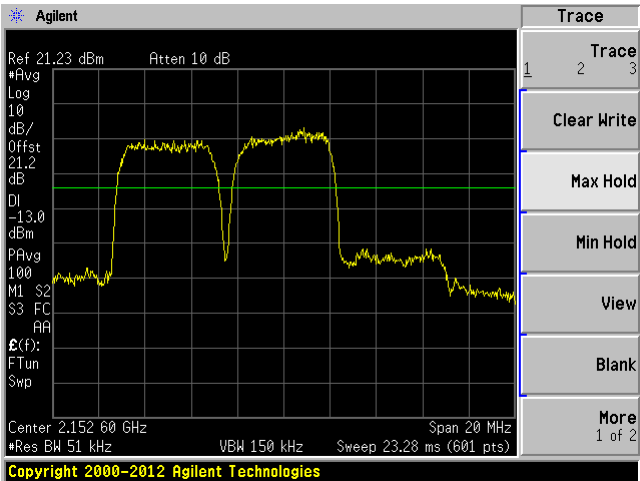


Band 4, WCDMA

Low Channel

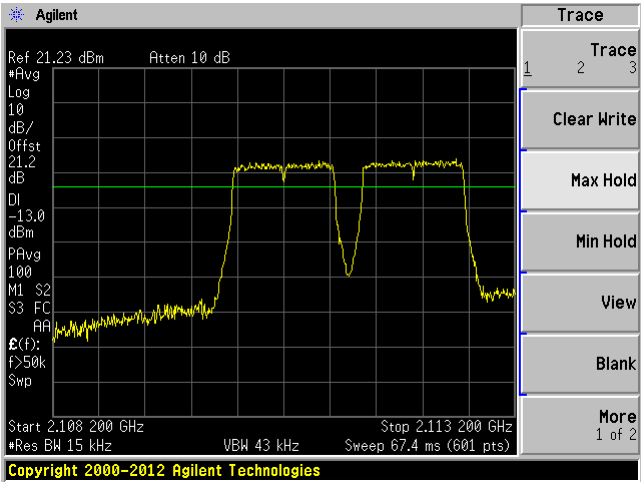


High Channel

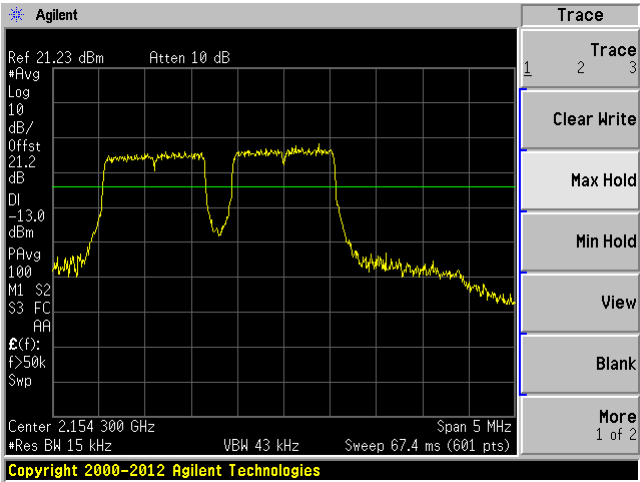


LTE Band 4, QPSK – 1.4 MHz

Low Channel

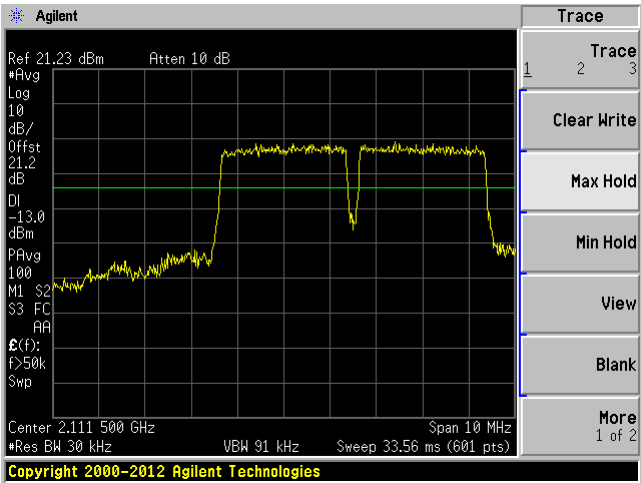


High Channel

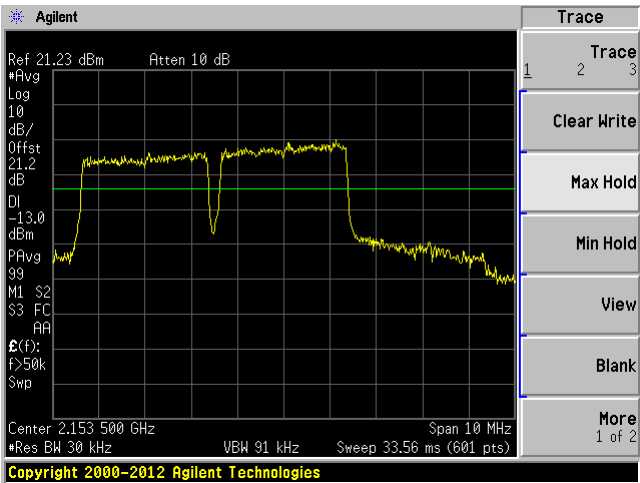


LTE Band 4, QPSK – 3 MHz

Low Channel

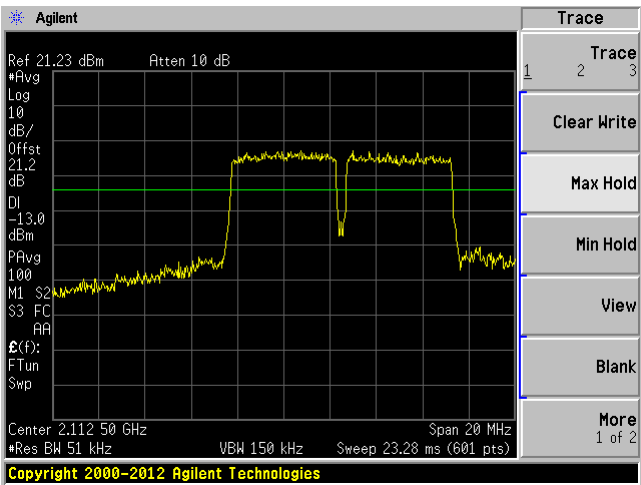


High Channel

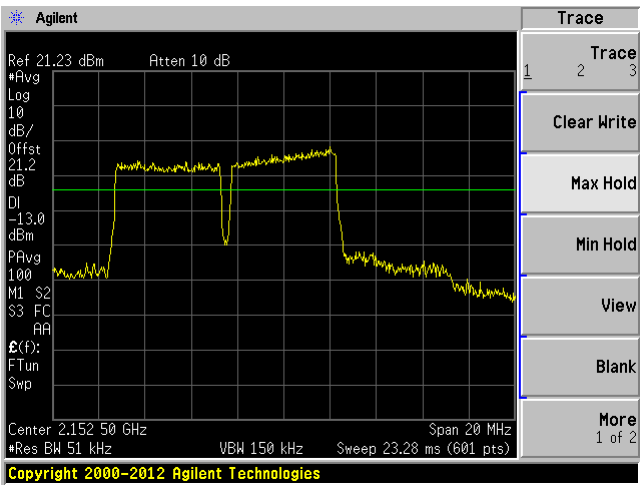


LTE Band 4, QPSK – 5 MHz

Low Channel

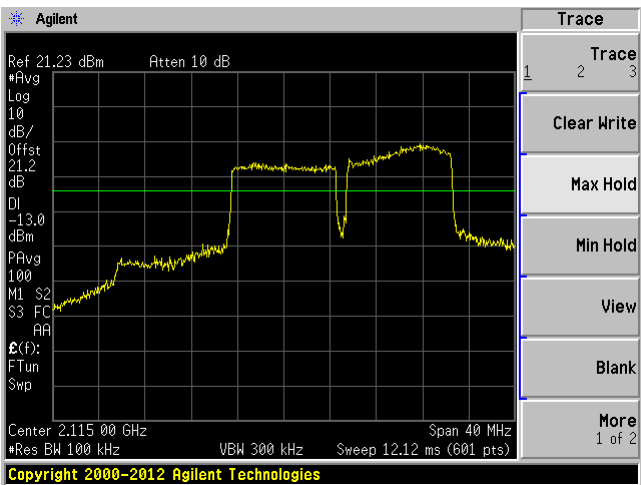


High Channel

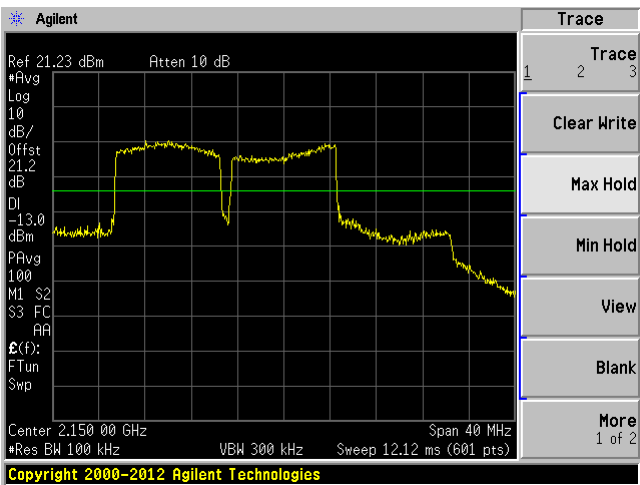


LTE Band 4, QPSK – 10 MHz

Low Channel

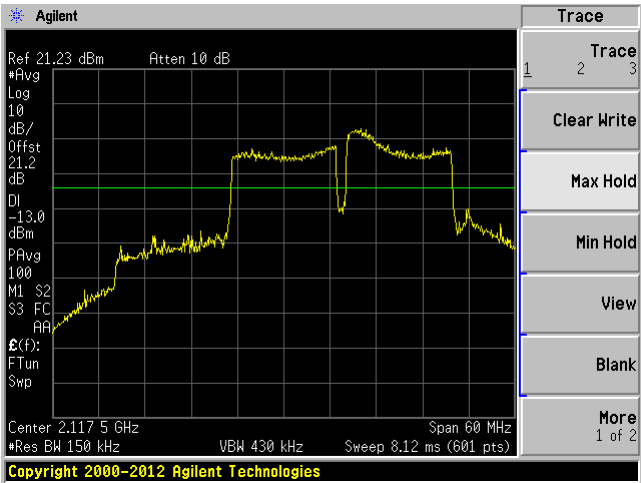


High Channel

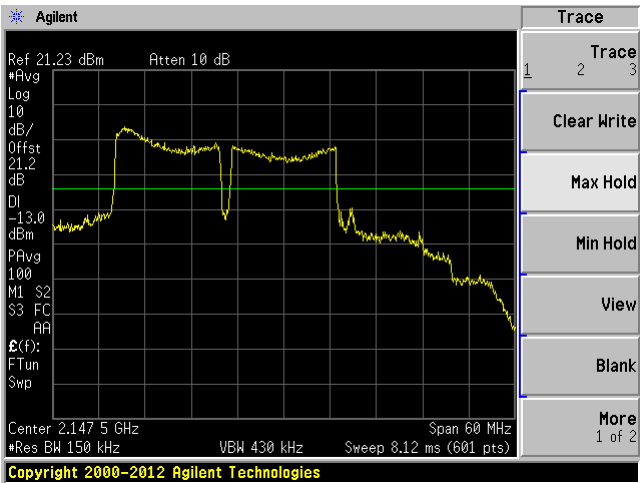


LTE Band 4, QPSK – 15 MHz

Low Channel



High Channel

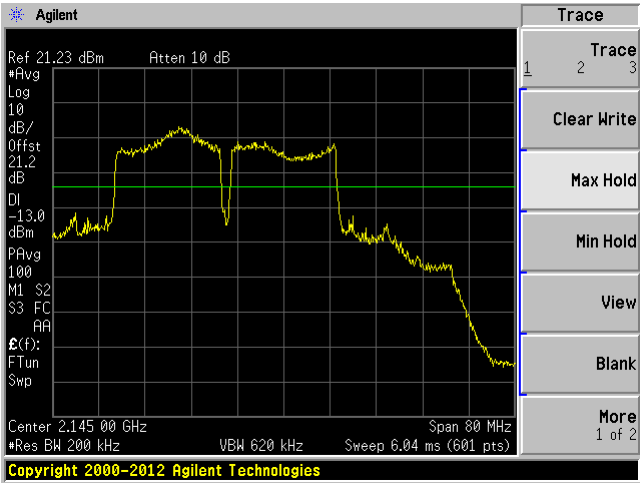


LTE Band 4, QPSK – 20 MHz

Low Channel

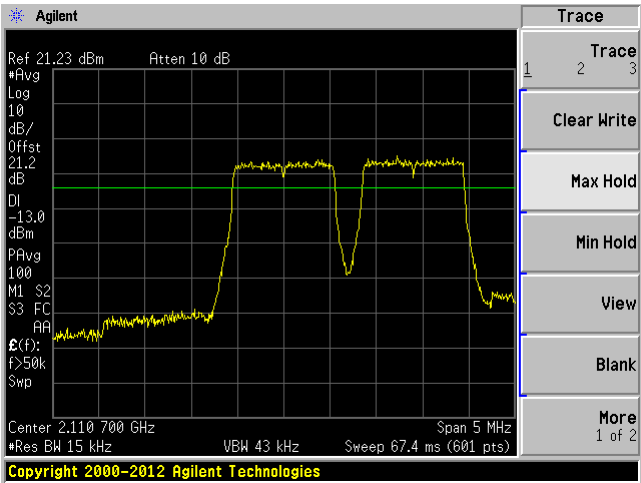


High Channel

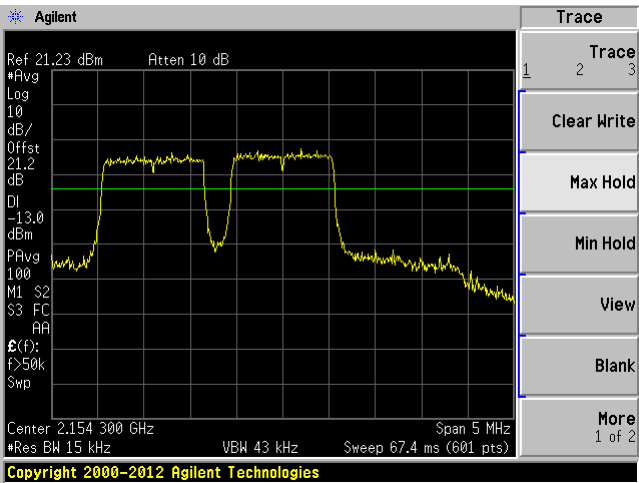


LTE Band 4, 16QAM – 1.4 MHz

Low Channel

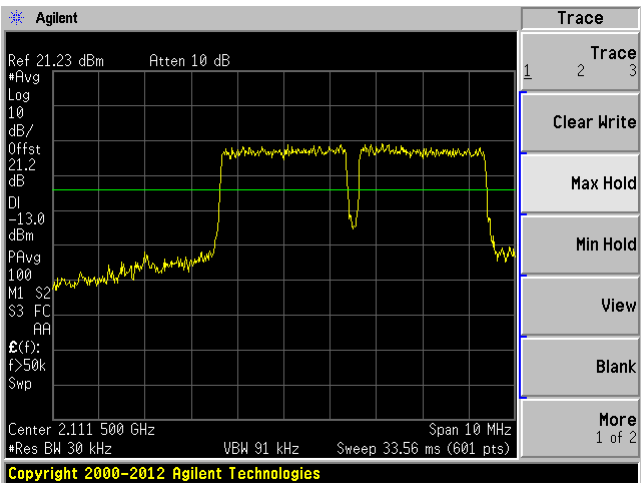


High Channel

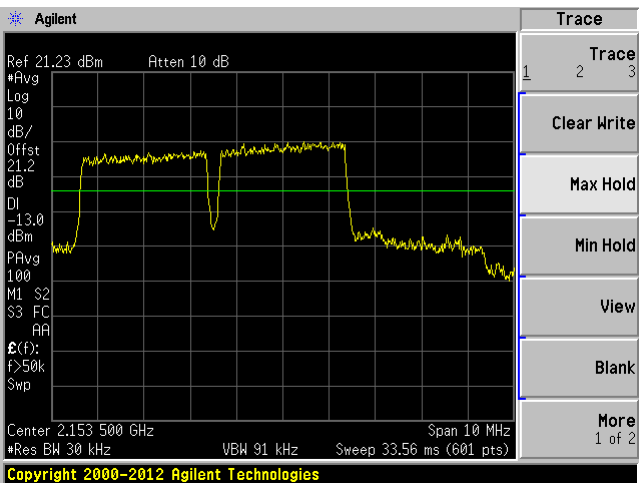


LTE Band 4, 16QAM – 3 MHz

Low Channel

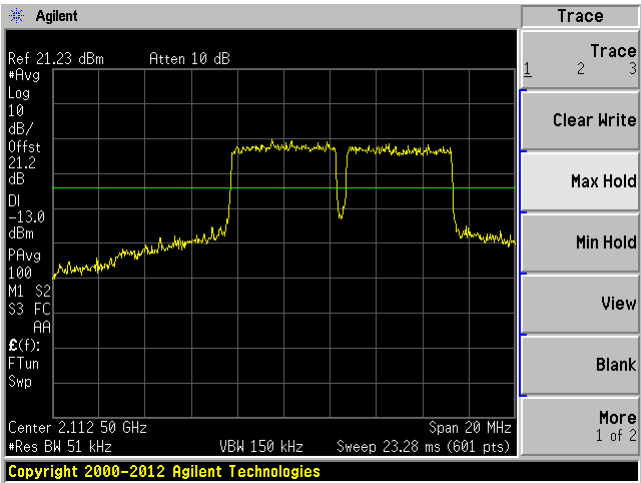


High Channel

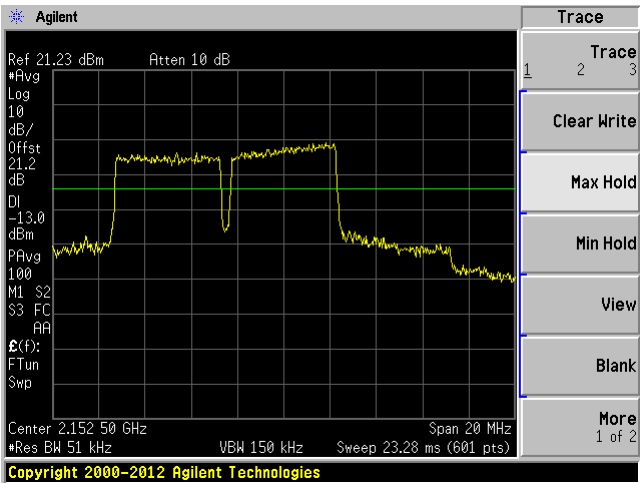


LTE Band 4, 16QAM – 5 MHz

Low Channel

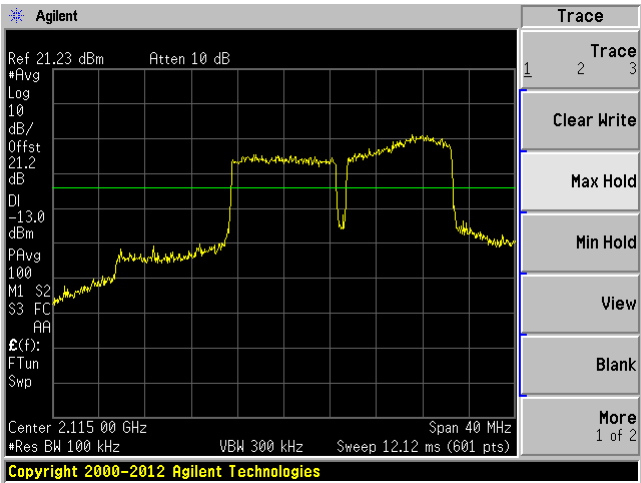


High Channel

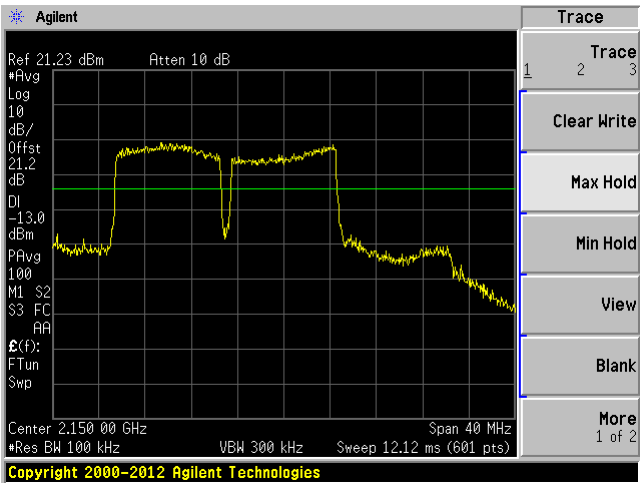


LTE Band 4, 16QAM – 10 MHz

Low Channel

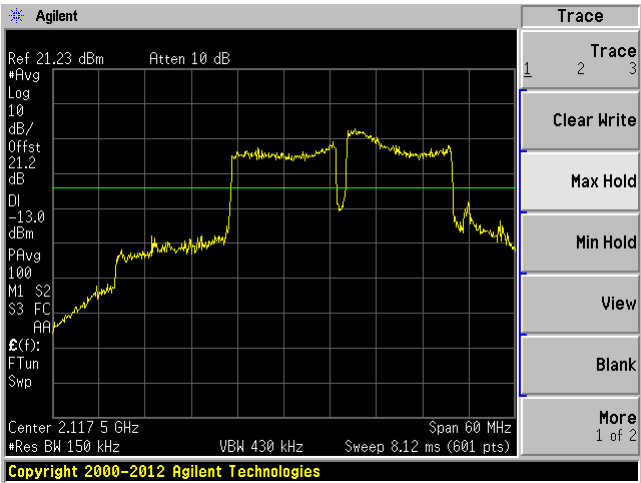


High Channel

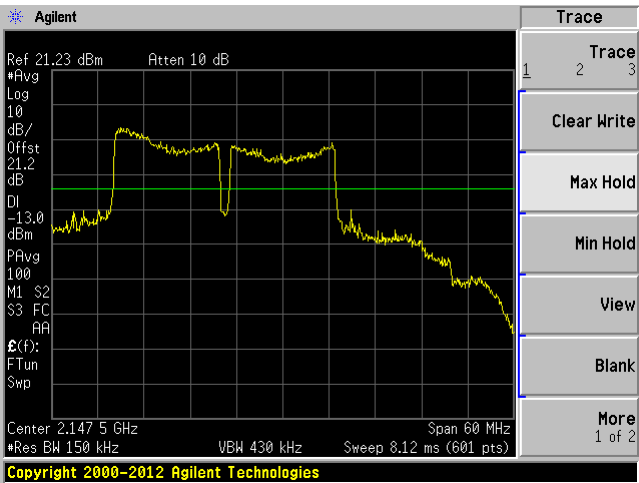


LTE Band 4, 16QAM – 15 MHz

Low Channel

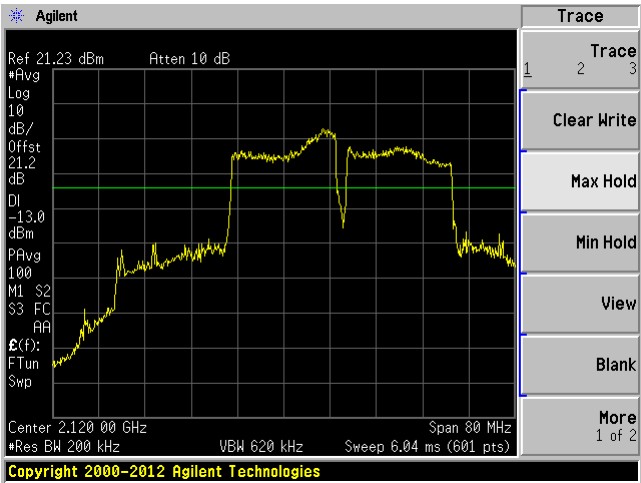


High Channel

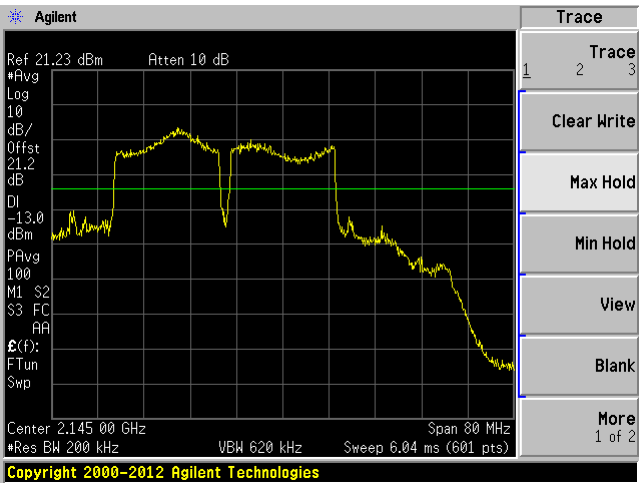


LTE Band 4, 16QAM – 20 MHz

Low Channel

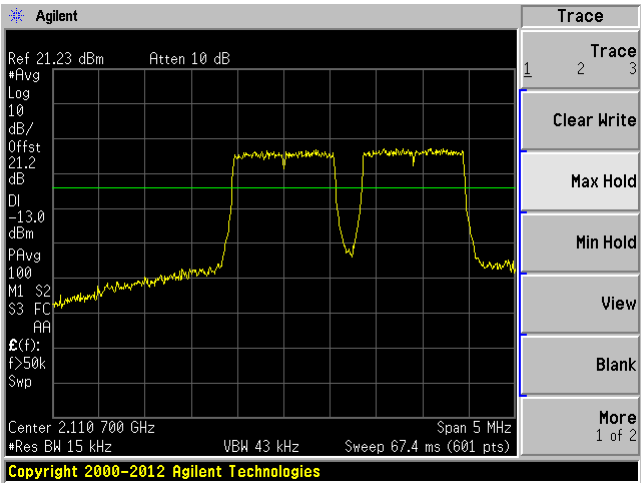


High Channel

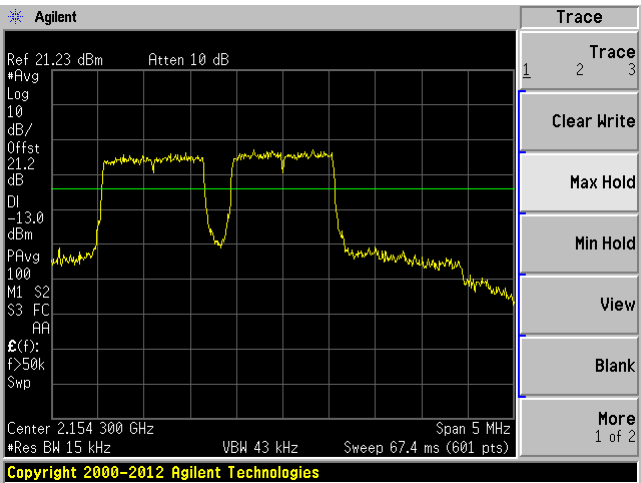


LTE Band 4, 64QAM – 1.4 MHz

Low Channel

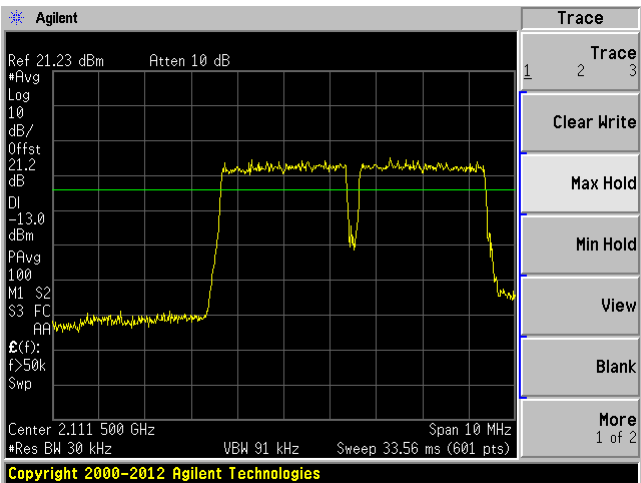


High Channel

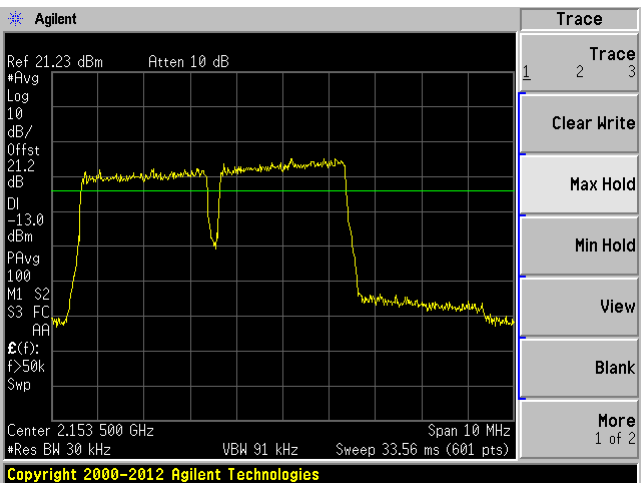


LTE Band 4, 64QAM – 3 MHz

Low Channel

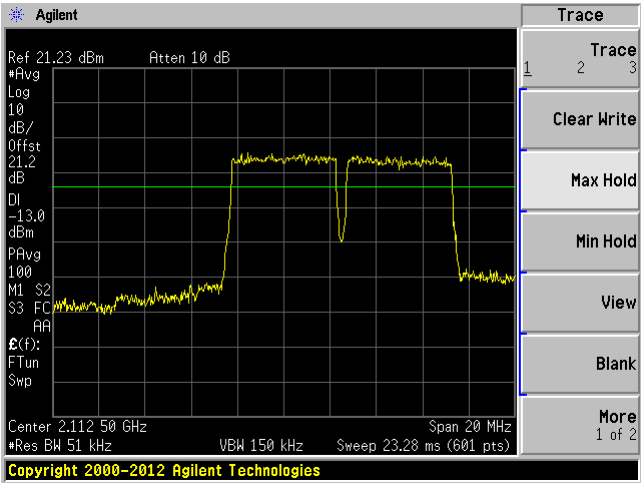


High Channel

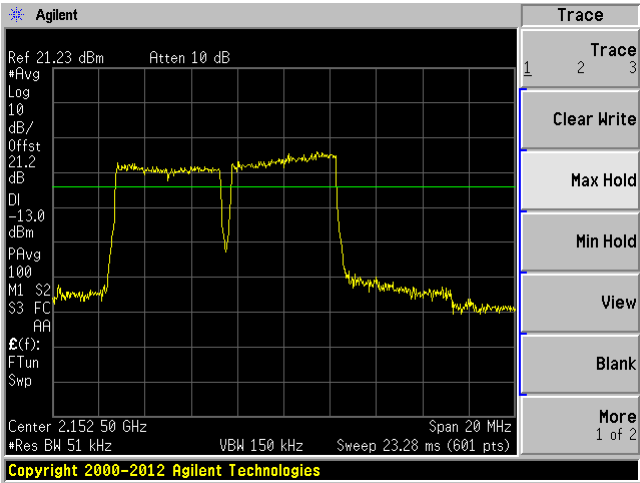


LTE Band 4, 64QAM – 5 MHz

Low Channel

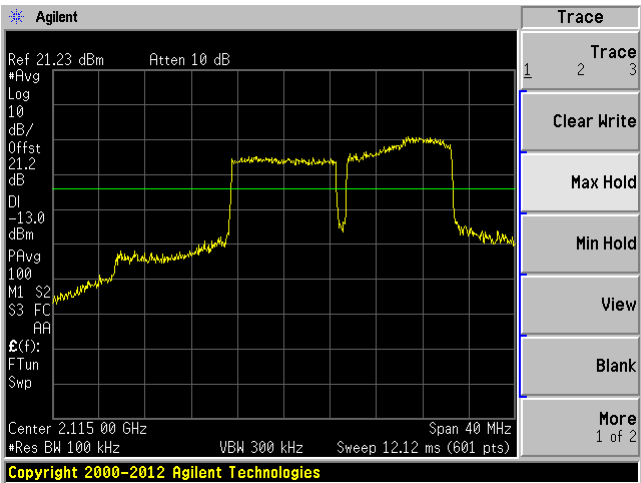


High Channel

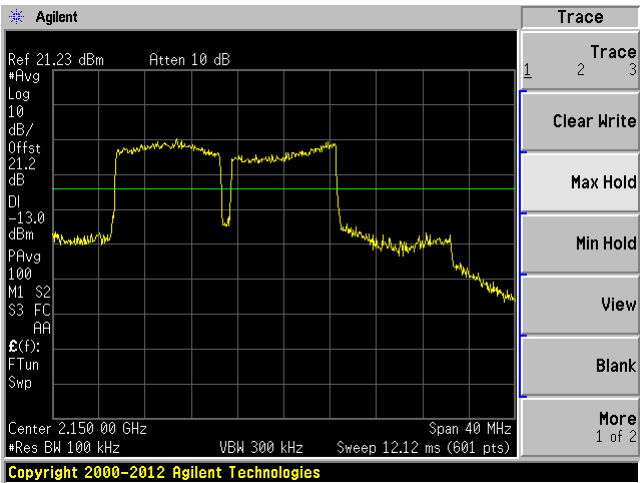


LTE Band 4, 64QAM – 10 MHz

Low Channel



High Channel

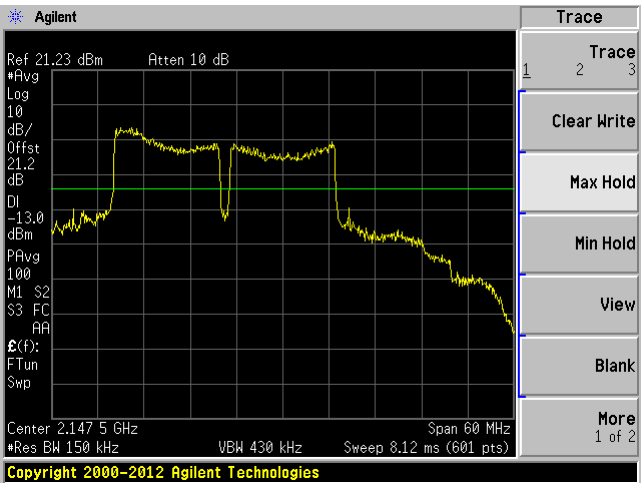


LTE Band 4, 64QAM – 15 MHz

Low Channel

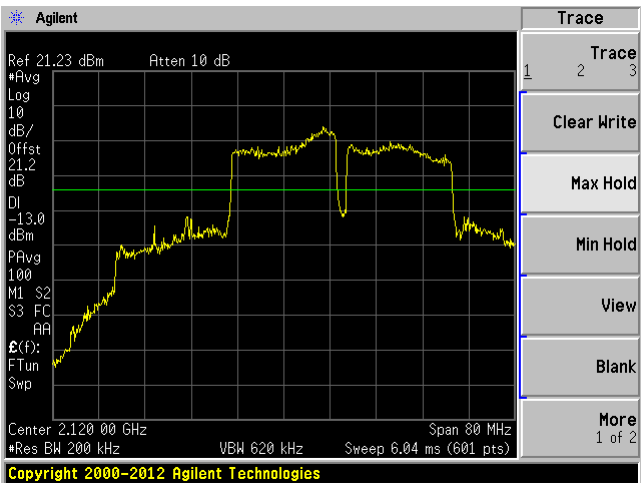


High Channel

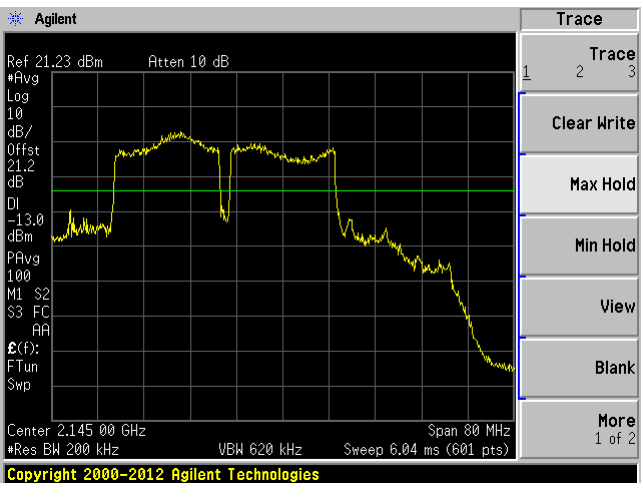


LTE Band 4, 64QAM – 20 MHz

Low Channel

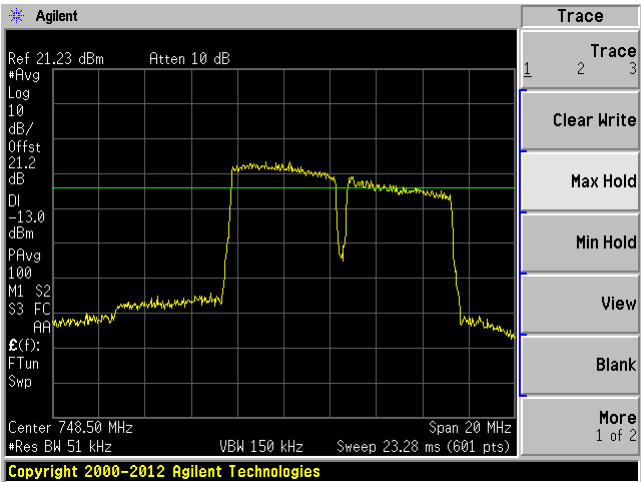


High Channel

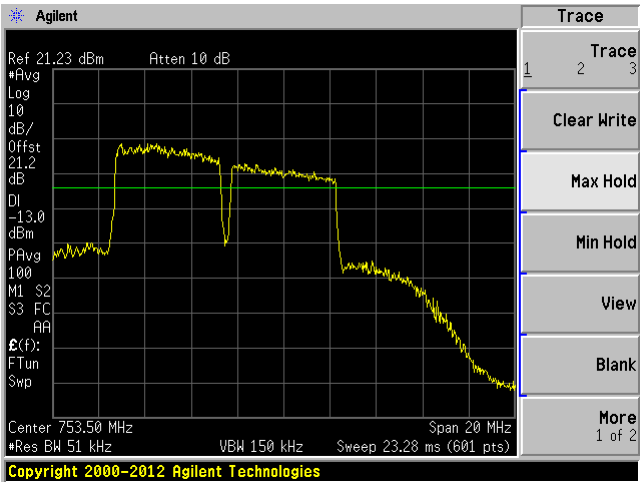


LTE Band 13, QPSK – 5 MHz

Low Channel

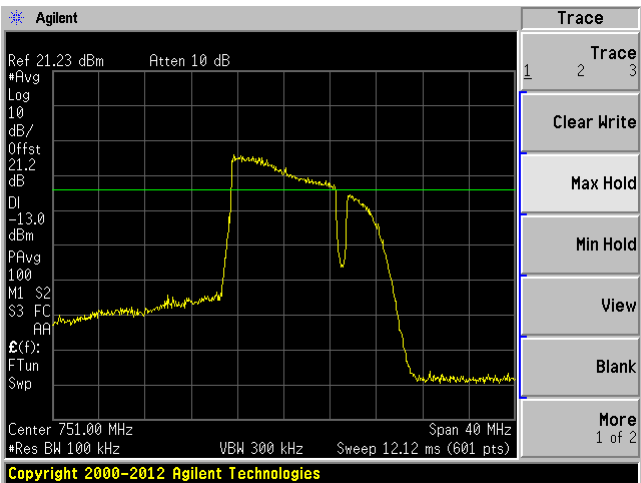


High Channel

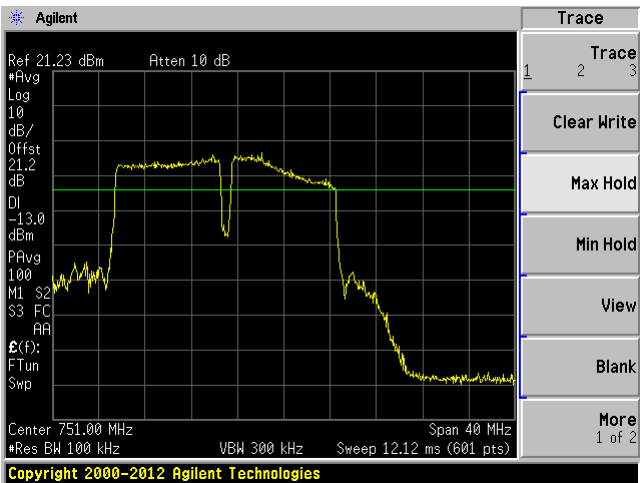


LTE Band 13, QPSK – 10 MHz

Low Channel

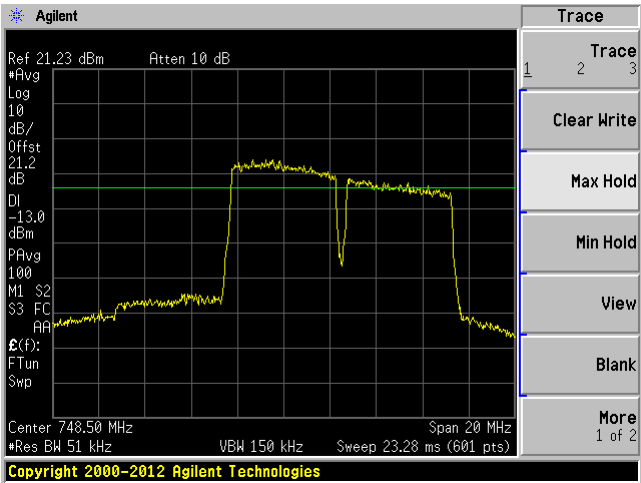


High Channel

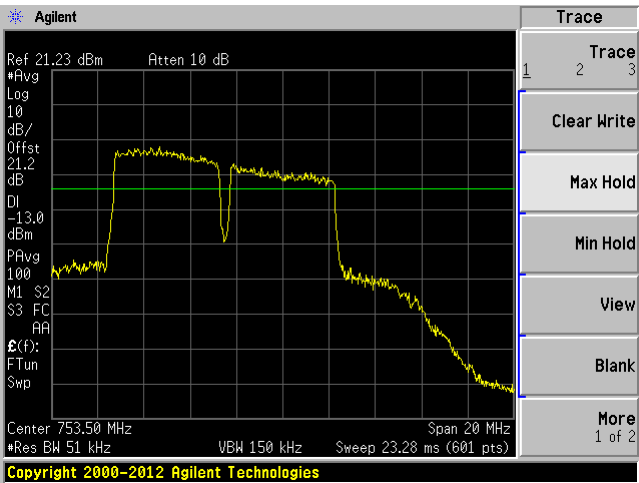


LTE Band 13, 16QAM – 5 MHz

Low Channel

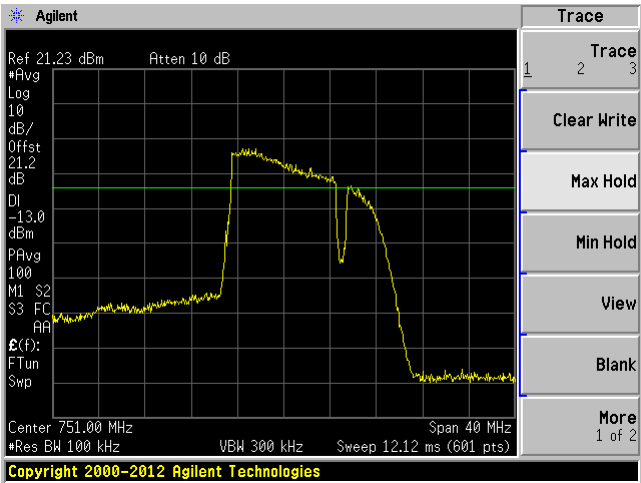


High Channel

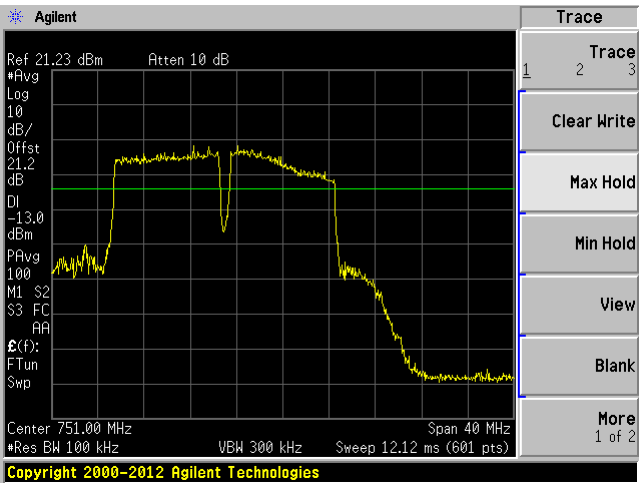


LTE Band 13, 16QAM – 10 MHz

Low Channel

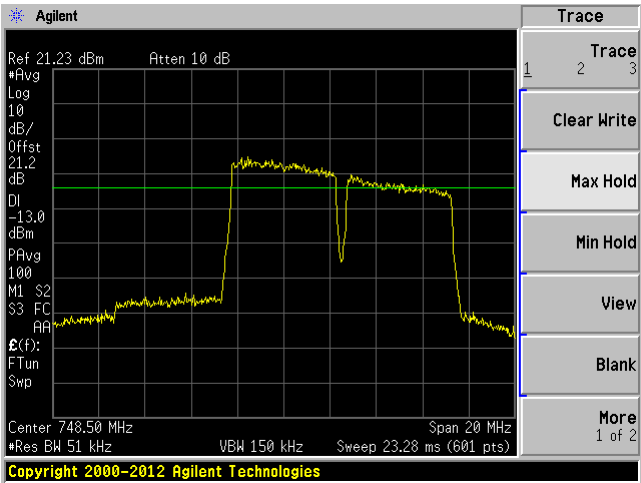


High Channel

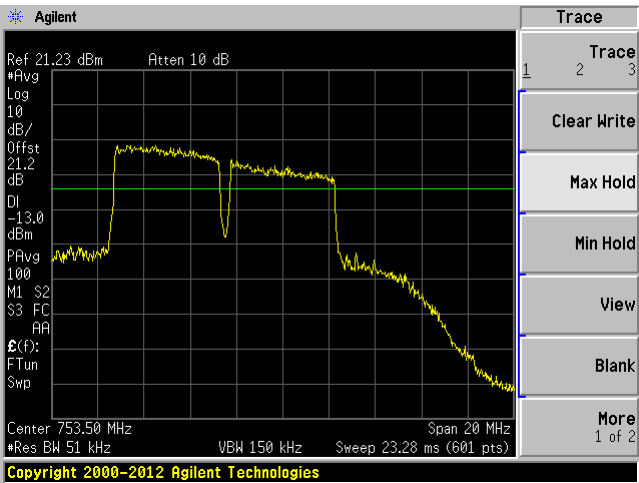


LTE Band 13, 64QAM – 5 MHz

Low Channel

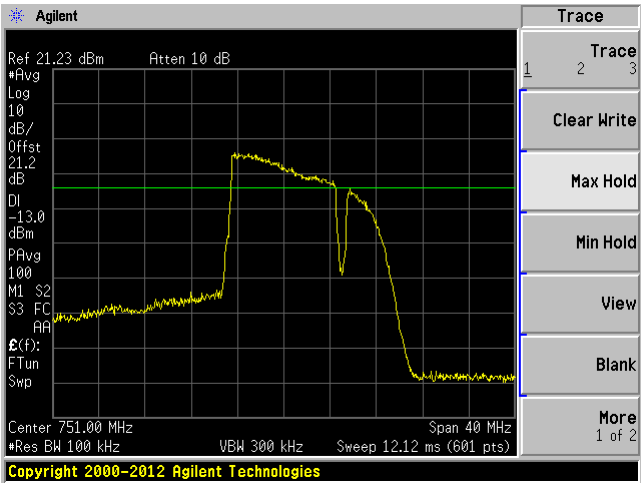


High Channel

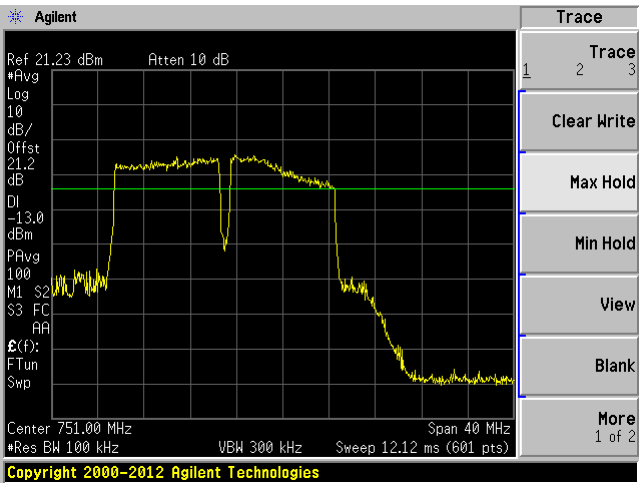


LTE Band 13, 64QAM – 10 MHz

Low Channel

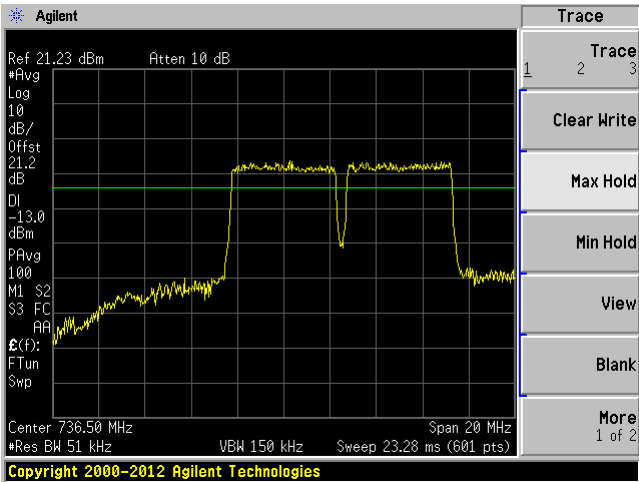


High Channel

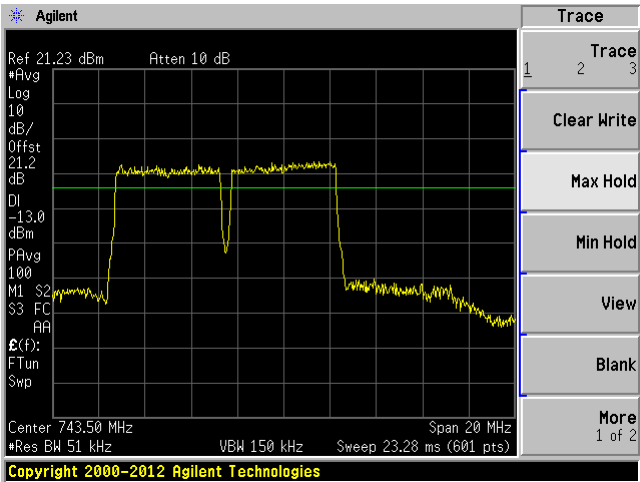


LTE Band 17, QPSK – 5 MHz

Low Channel

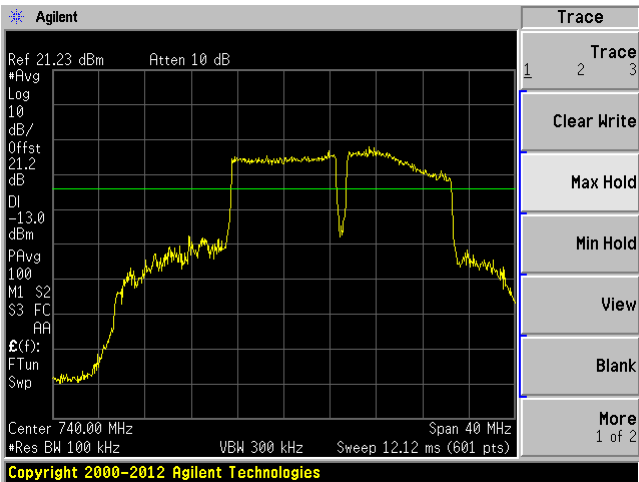


High Channel

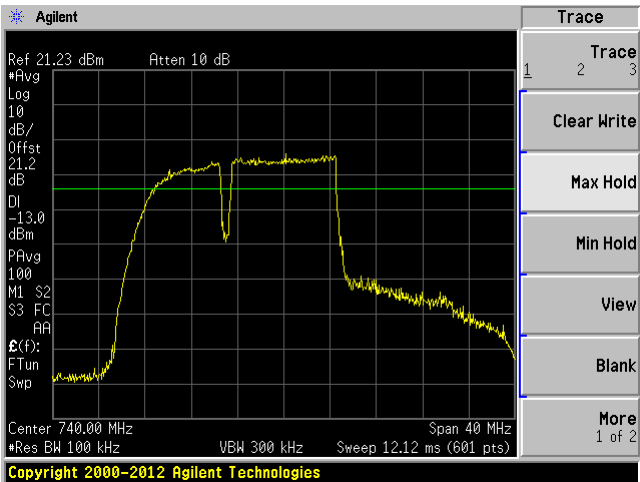


LTE Band 17, QPSK – 10 MHz

Low Channel

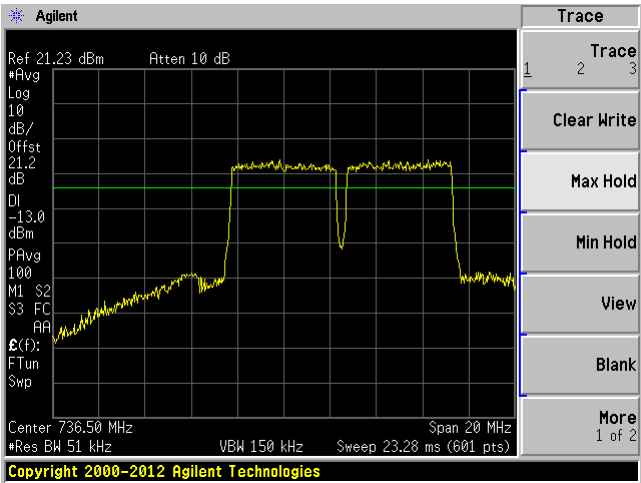


High Channel

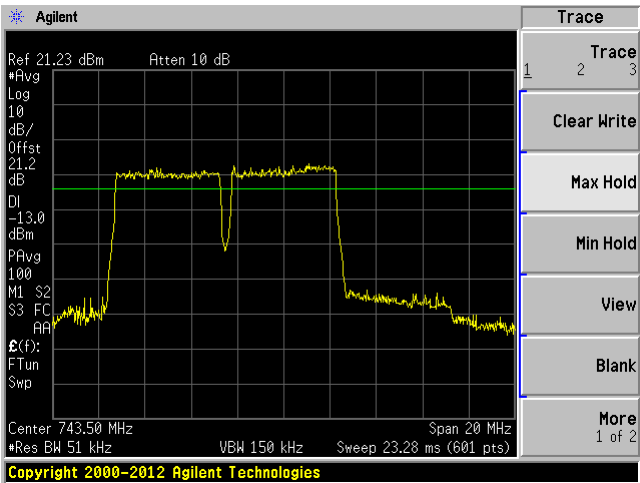


LTE Band 17, 16QAM – 5 MHz

Low Channel

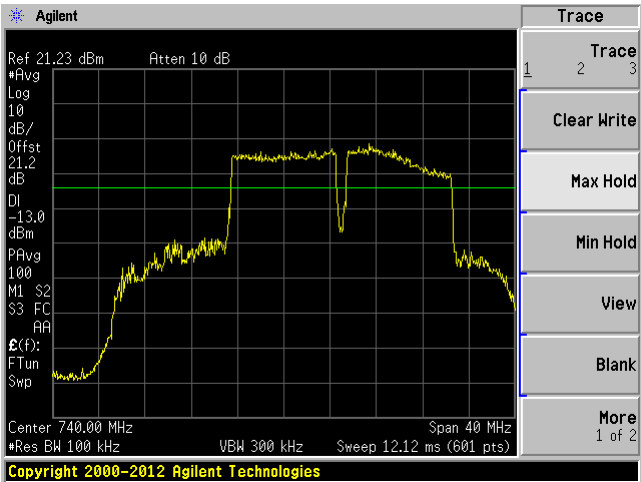


High Channel

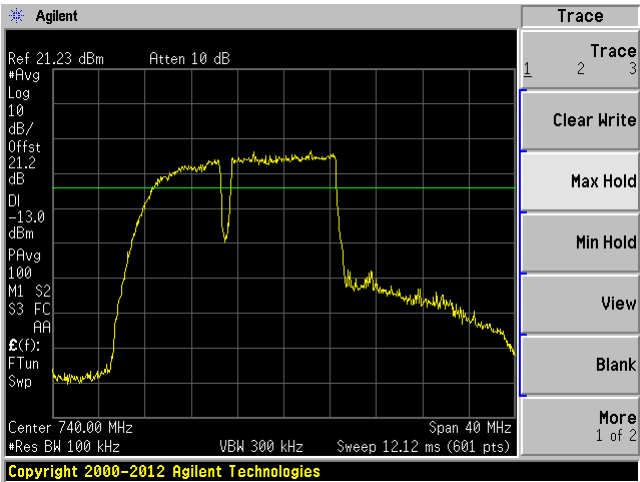


LTE Band 17, 16QAM – 10 MHz

Low Channel

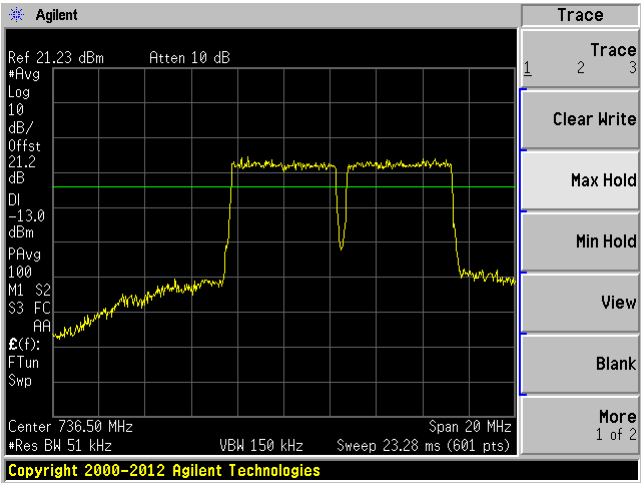


High Channel

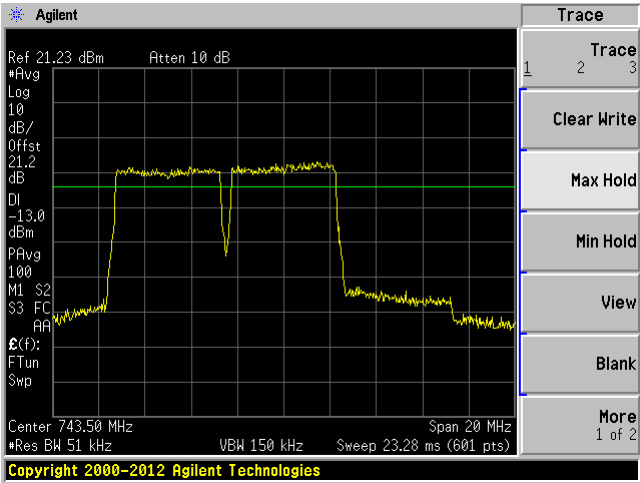


LTE Band 17, 64QAM – 5 MHz

Low Channel

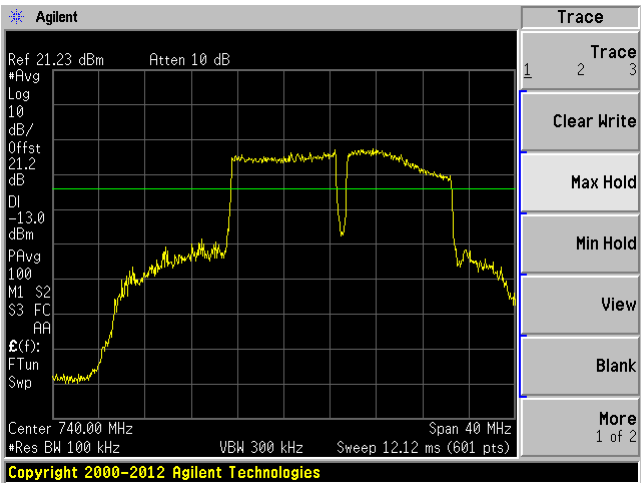


High Channel

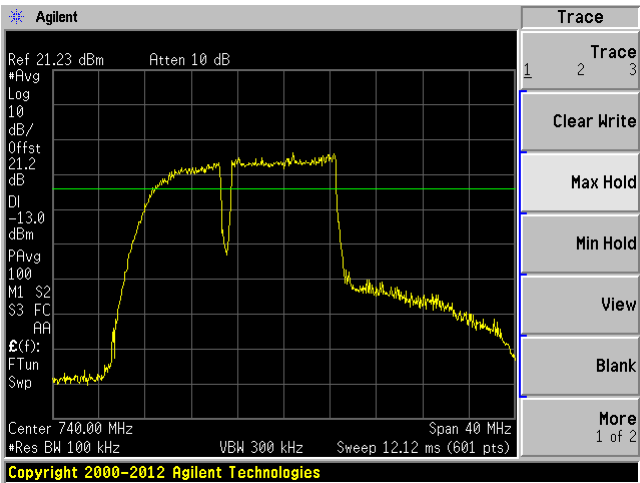


LTE Band 17, 64QAM – 10 MHz

Low Channel



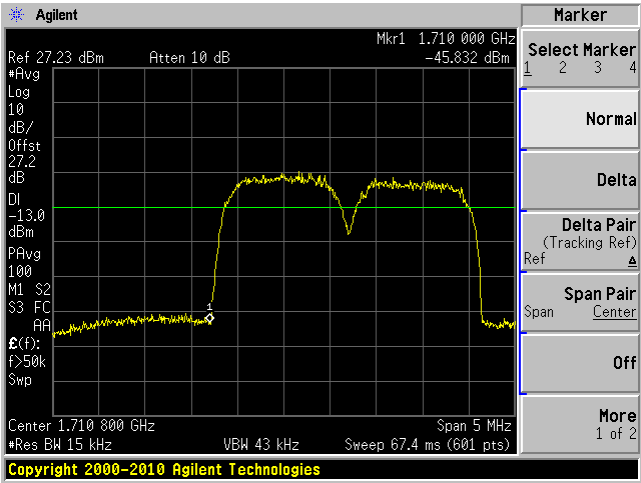
High Channel



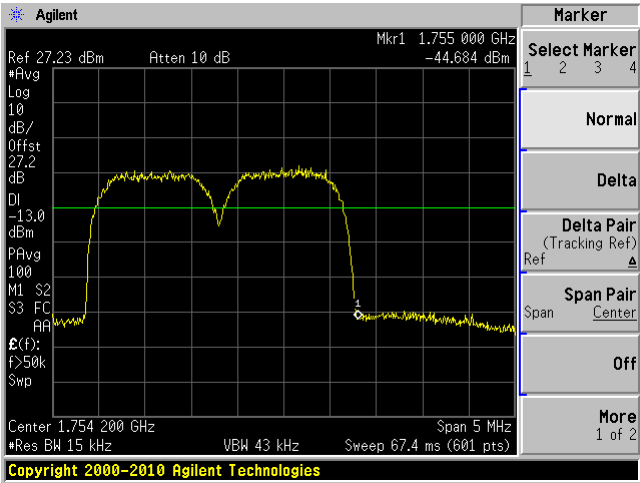
Uplink (ALC off)

Band 4, CDMA

Low Channel

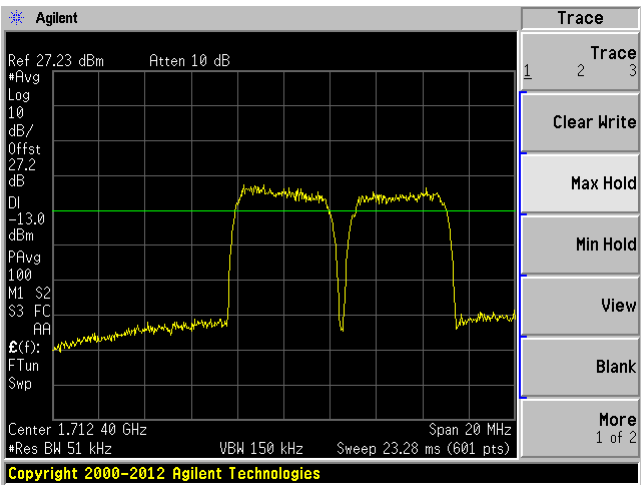


High Channel

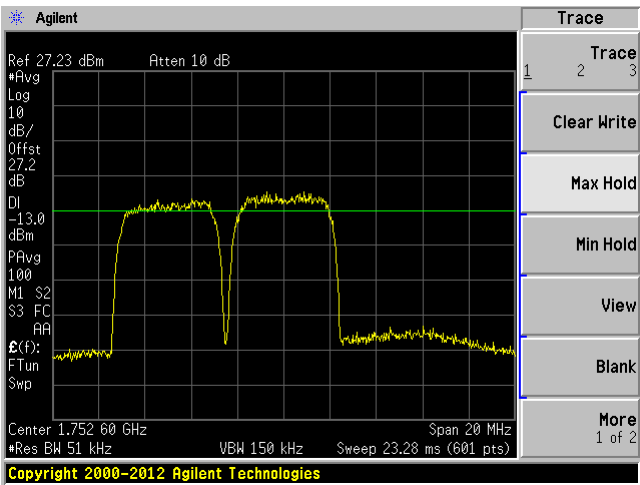


Band 4, WCDMA

Low Channel

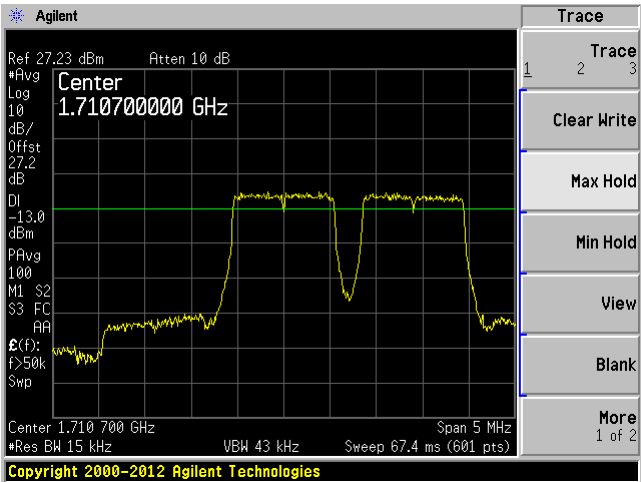


High Channel

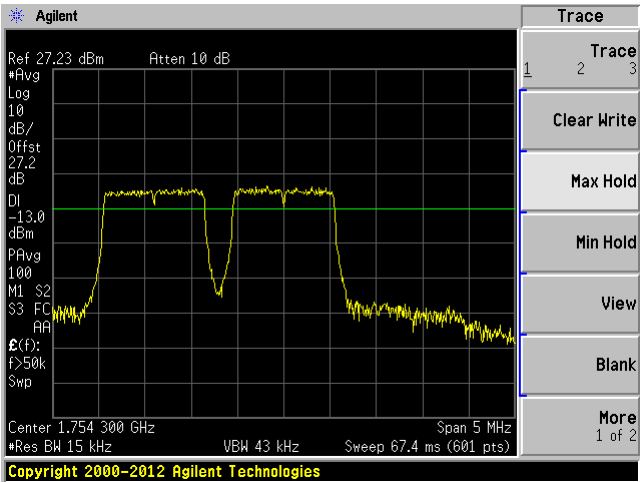


LTE Band 4, QPSK – 1.4 MHz

Low Channel

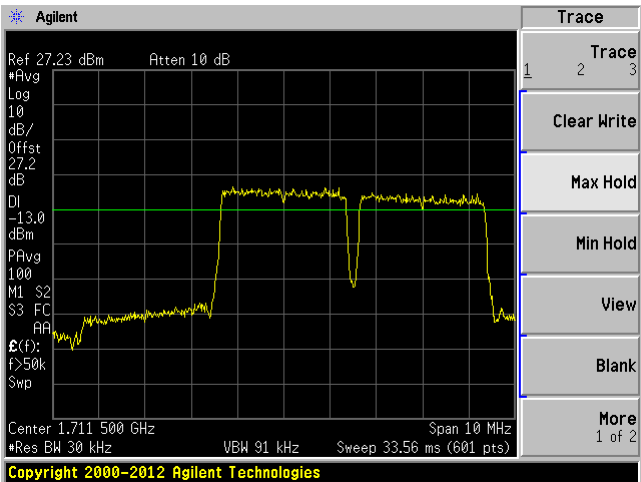


High Channel

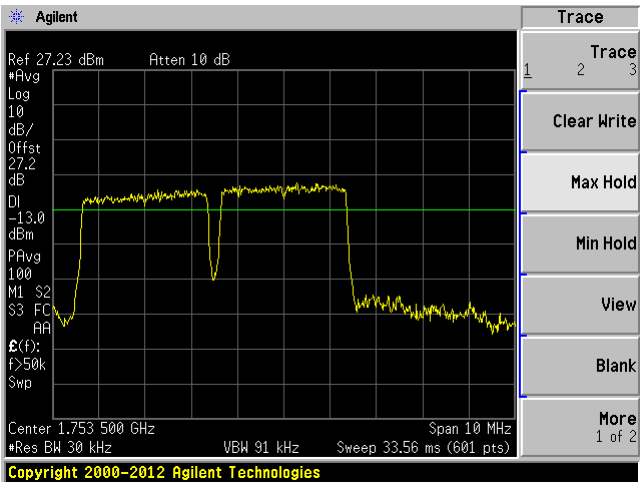


LTE Band 4, QPSK – 3 MHz

Low Channel

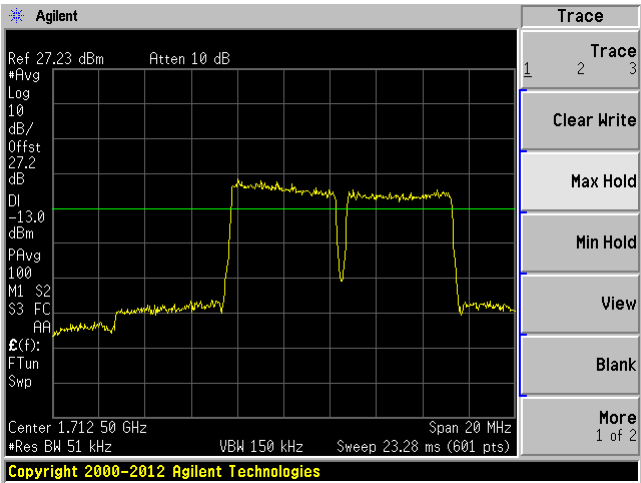


High Channel

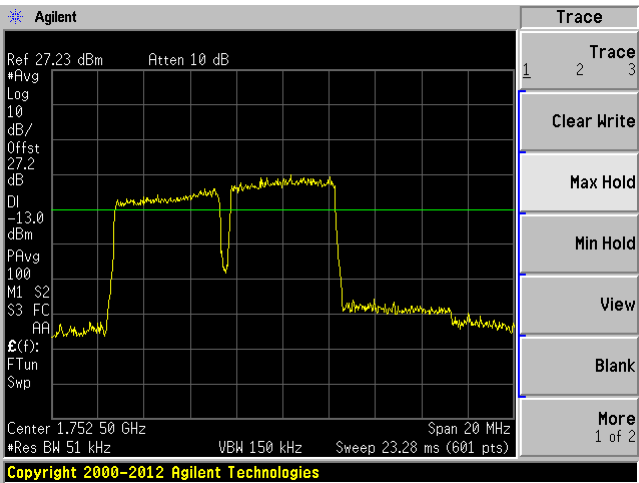


LTE Band 4, QPSK – 5 MHz

Low Channel

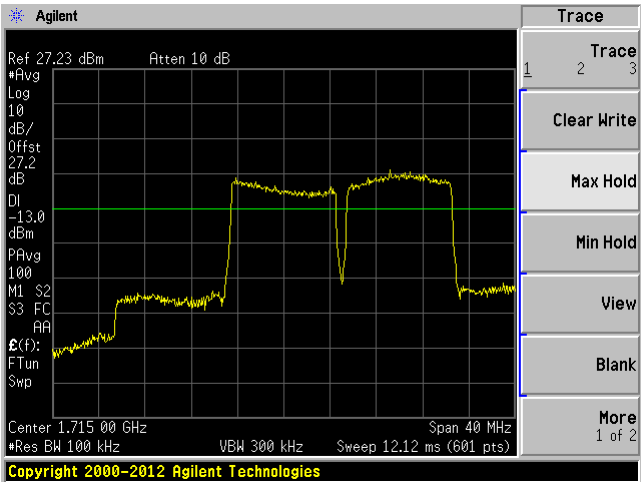


High Channel

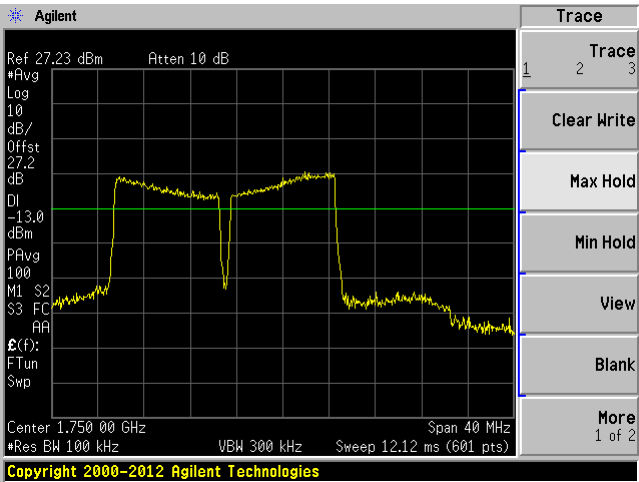


LTE Band 4, QPSK – 10 MHz

Low Channel

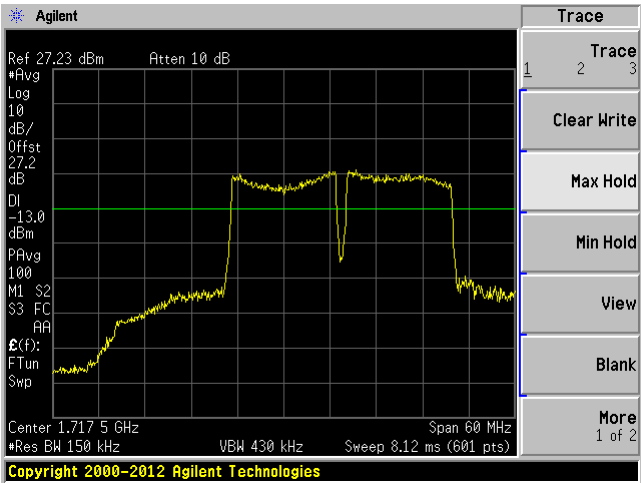


High Channel

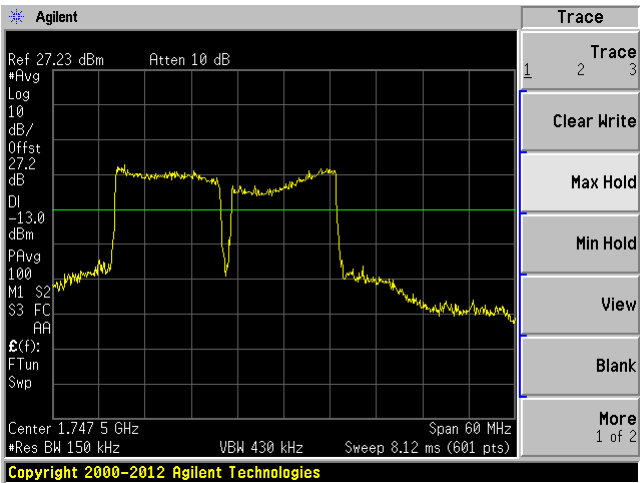


LTE Band 4, QPSK – 15 MHz

Low Channel

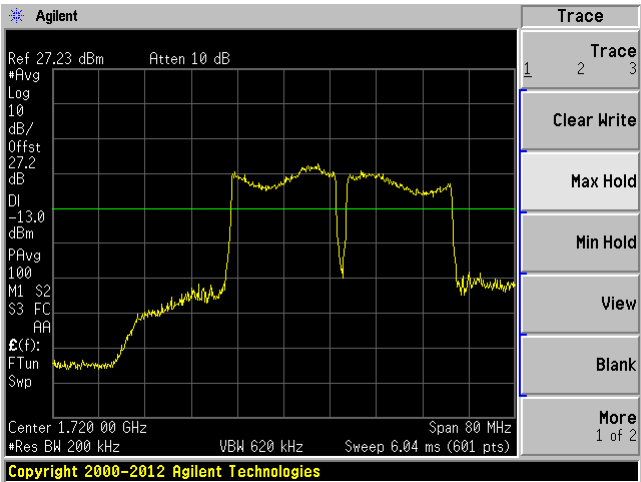


High Channel

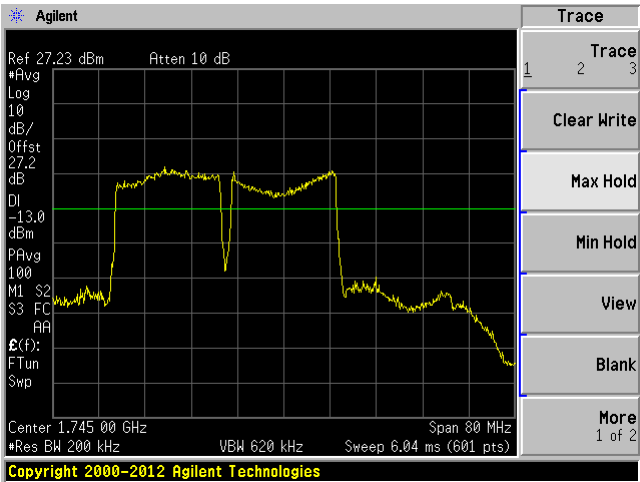


LTE Band 4, QPSK – 20 MHz

Low Channel

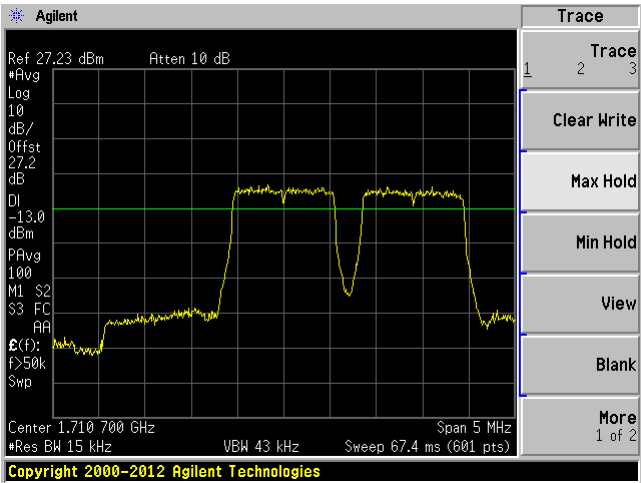


High Channel

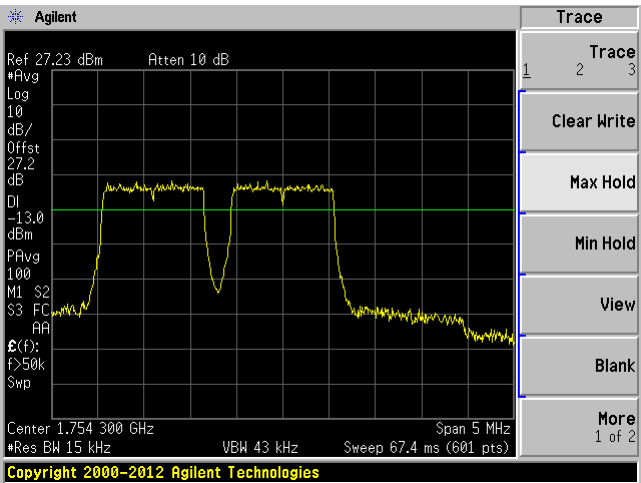


LTE Band 4, 16QAM – 1.4 MHz

Low Channel

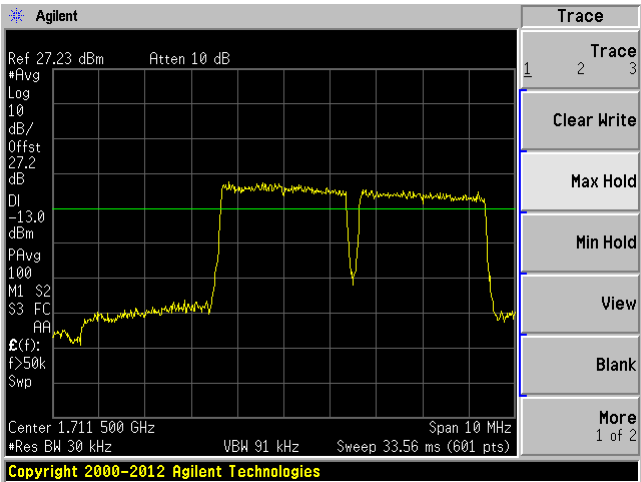


High Channel

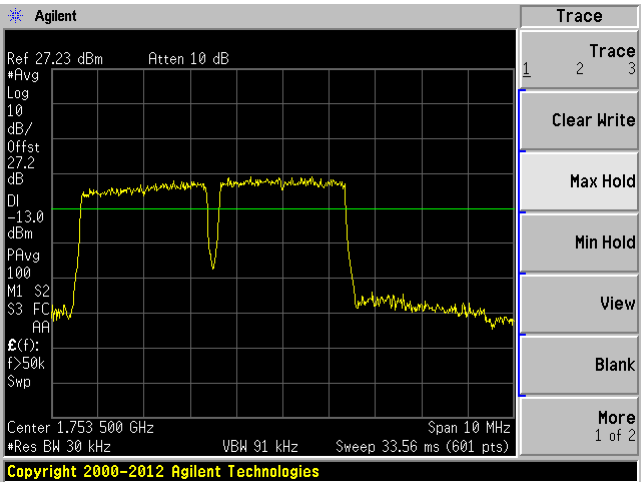


LTE Band 4, 16QAM – 3 MHz

Low Channel

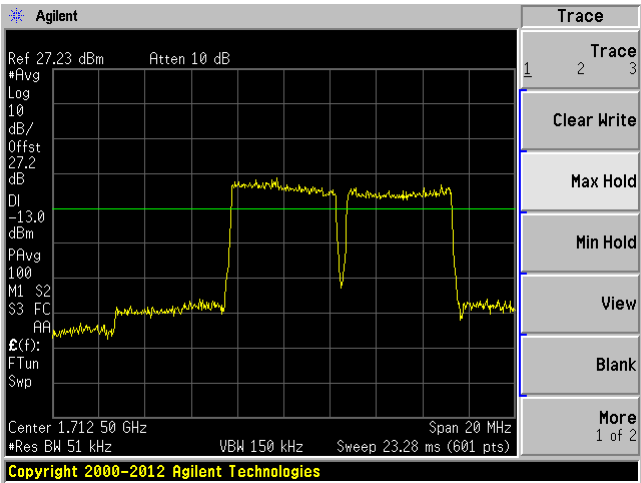


High Channel

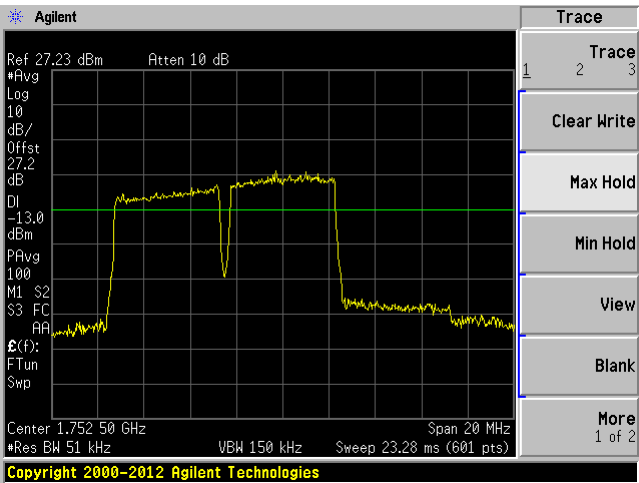


LTE Band 4, 16QAM – 5 MHz

Low Channel

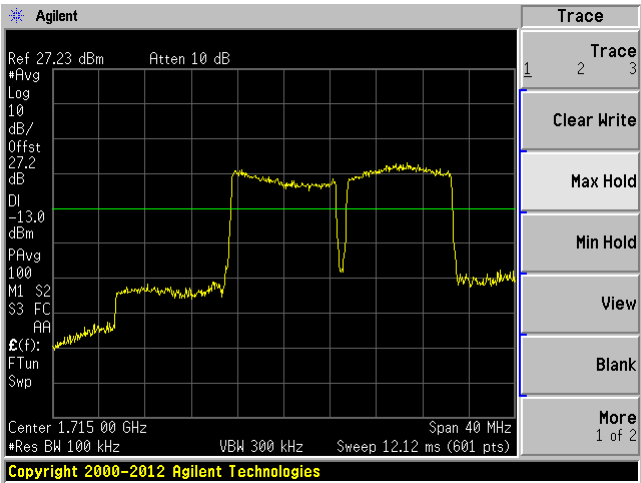


High Channel

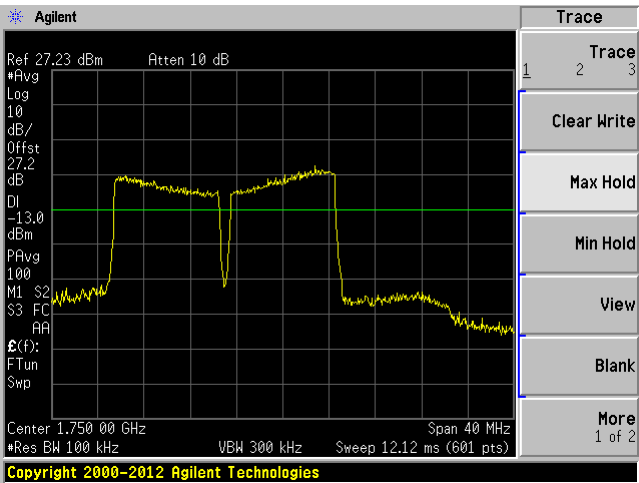


LTE Band 4, 16QAM – 10 MHz

Low Channel

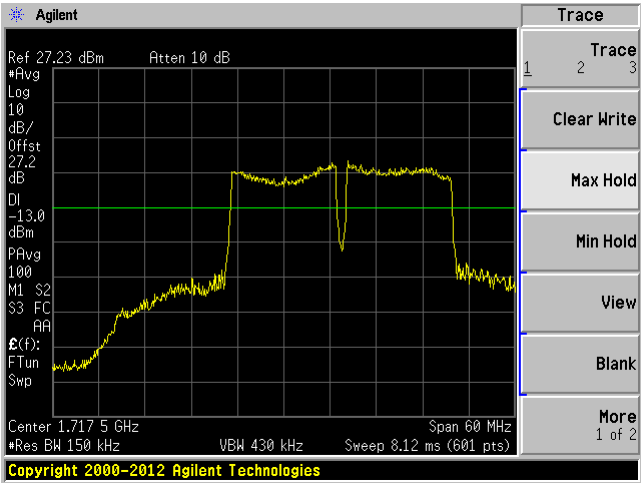


High Channel

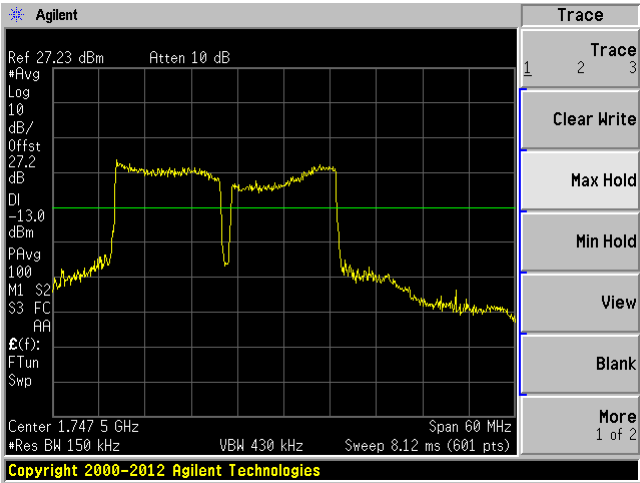


LTE Band 4, 16QAM – 15 MHz

Low Channel

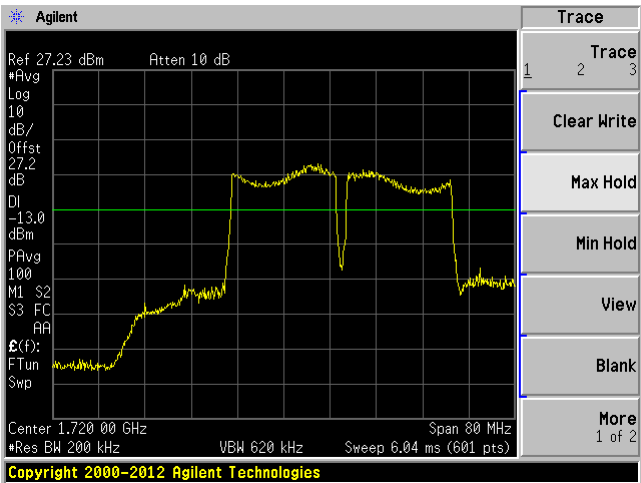


High Channel

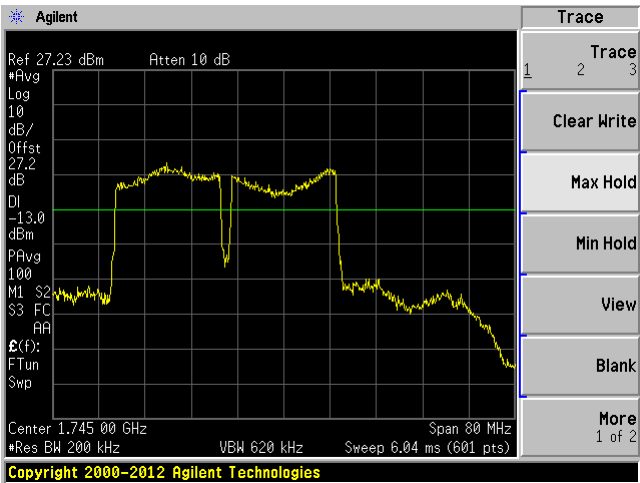


LTE Band 4, 16QAM – 20 MHz

Low Channel

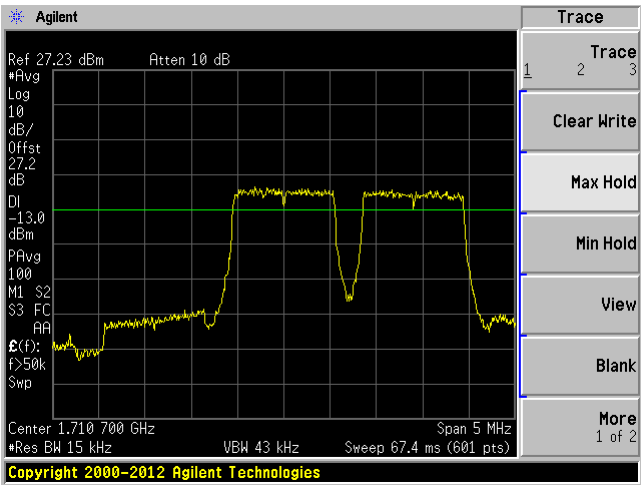


High Channel

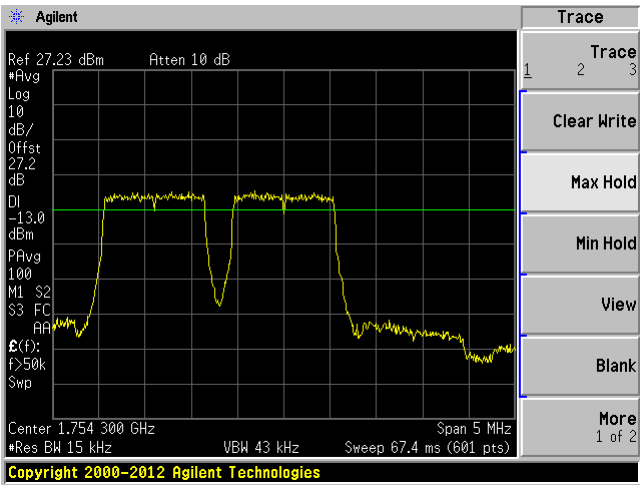


LTE Band 4, 64QAM – 1.4 MHz

Low Channel

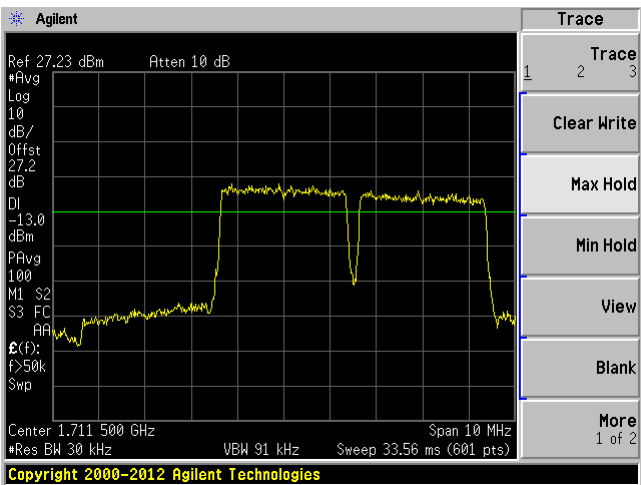


High Channel

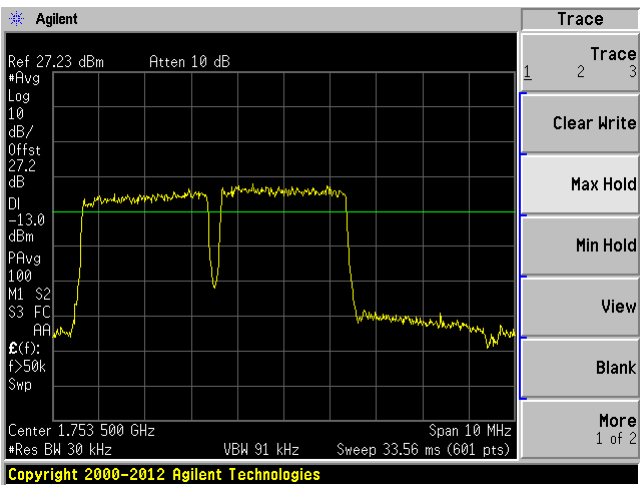


LTE Band 4, 64QAM – 3 MHz

Low Channel

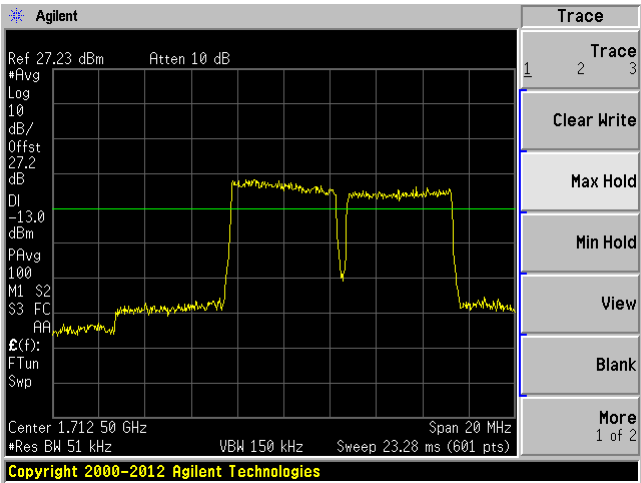


High Channel

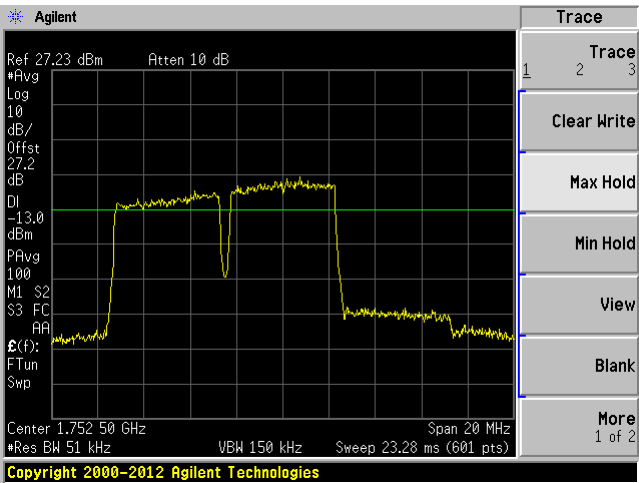


LTE Band 4, 64QAM – 5 MHz

Low Channel

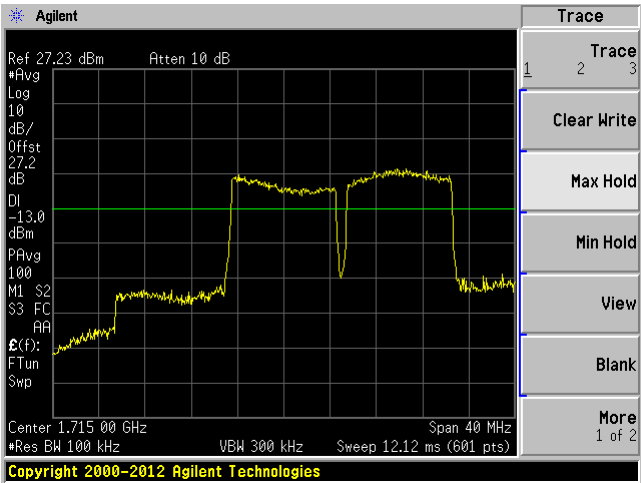


High Channel

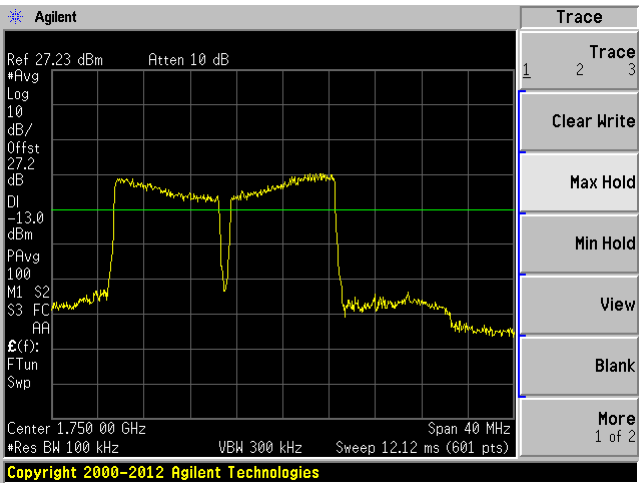


LTE Band 4, 64QAM – 10 MHz

Low Channel

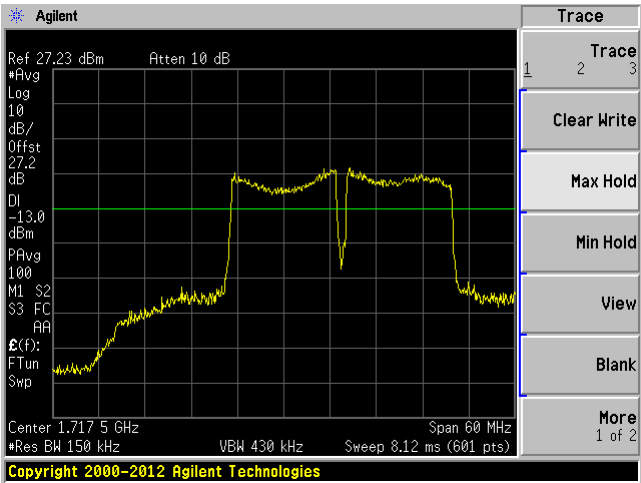


High Channel

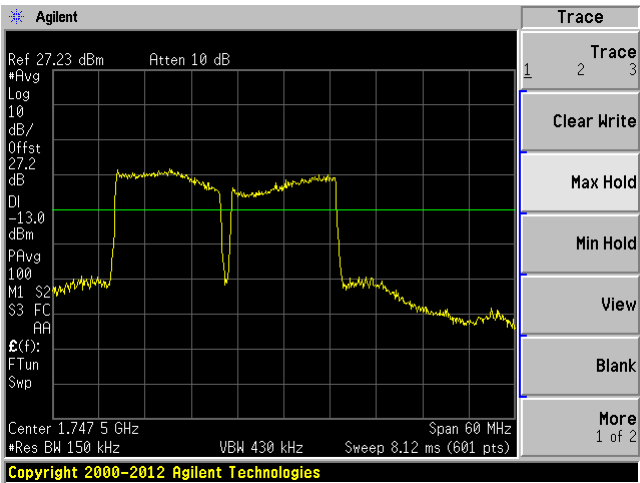


LTE Band 4, 64QAM – 15 MHz

Low Channel

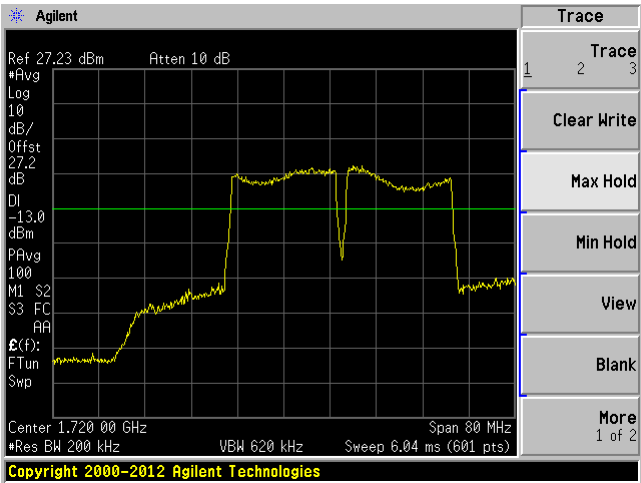


High Channel

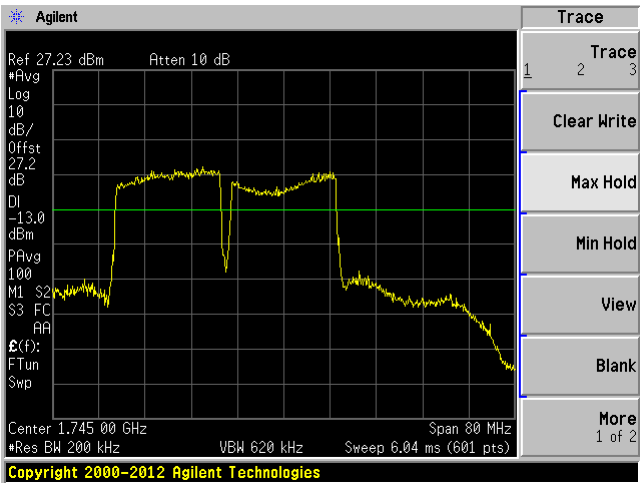


LTE Band 4, 64QAM – 20 MHz

Low Channel

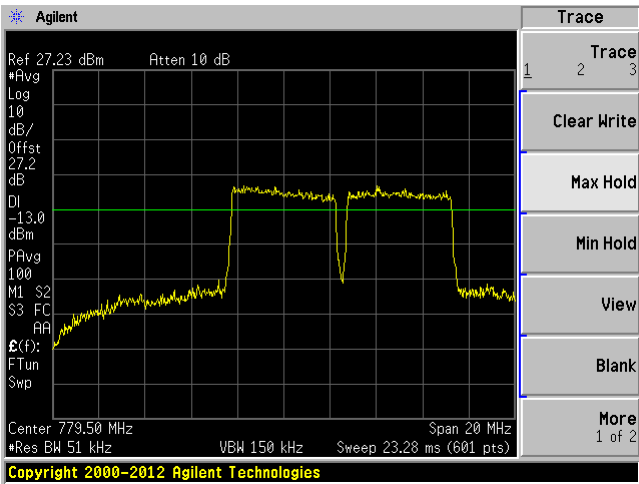


High Channel

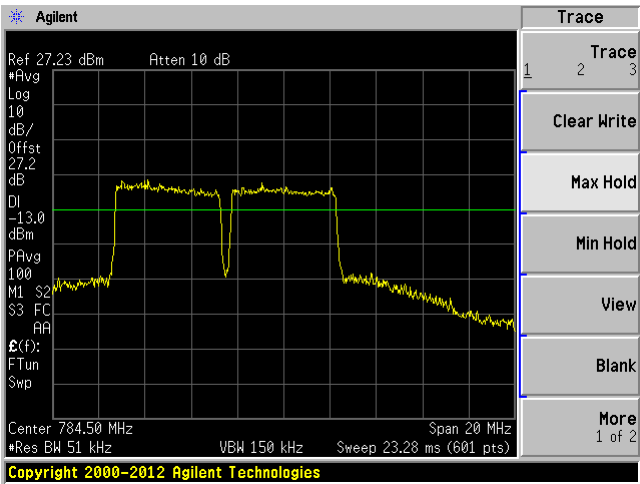


LTE Band 13, QPSK – 5 MHz

Low Channel

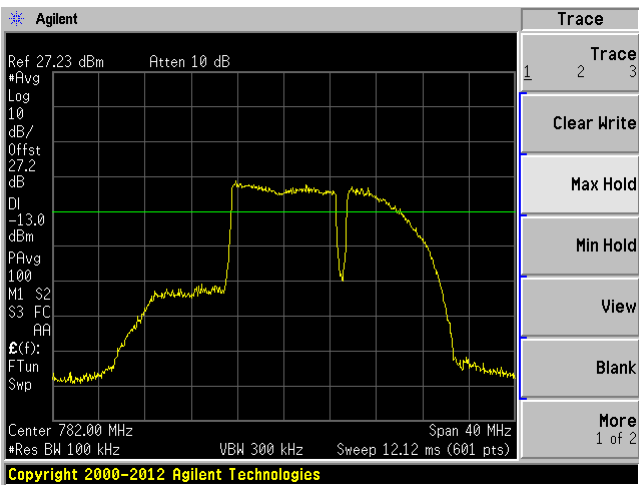


High Channel

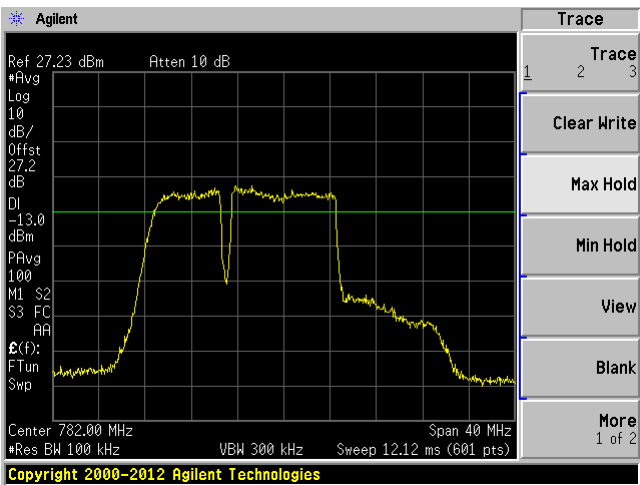


LTE Band 13, QPSK – 10 MHz

Low Channel

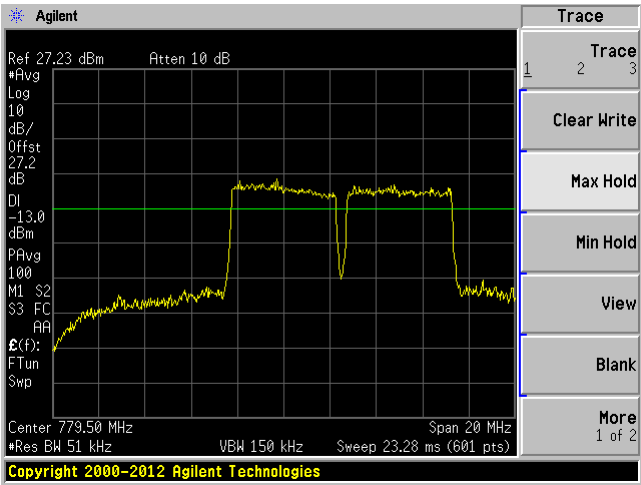


High Channel

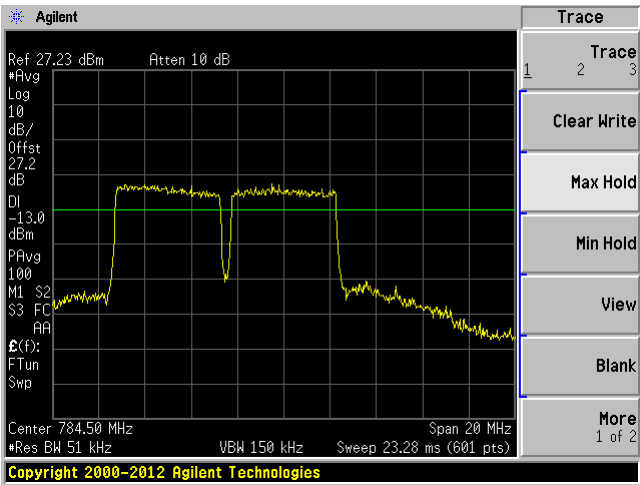


LTE Band 13, 16QAM – 5 MHz

Low Channel

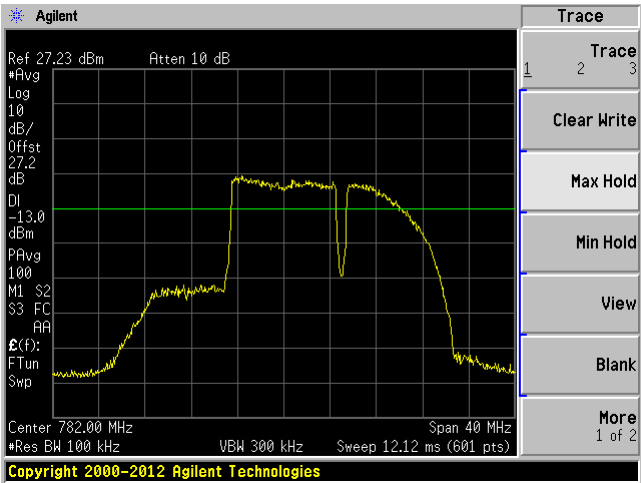


High Channel

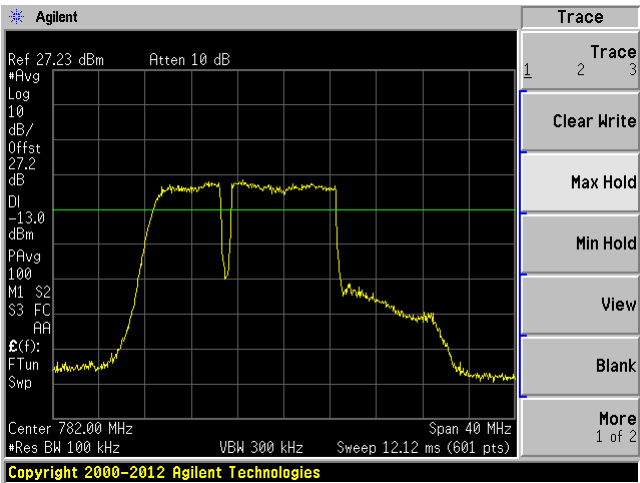


LTE Band 13, 16QAM – 10 MHz

Low Channel

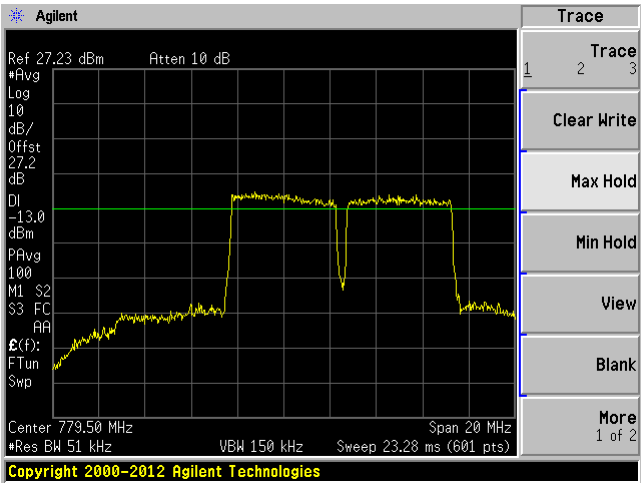


High Channel

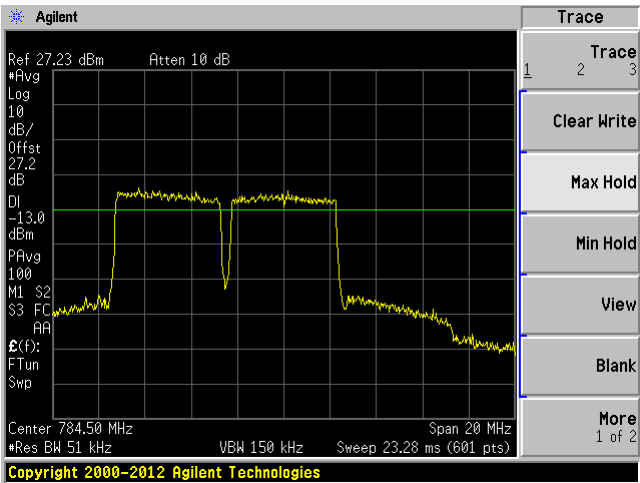


LTE Band 13, 64QAM – 5 MHz

Low Channel

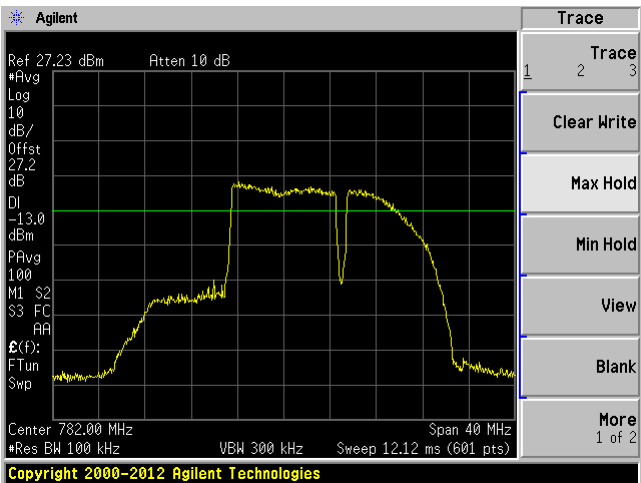


High Channel

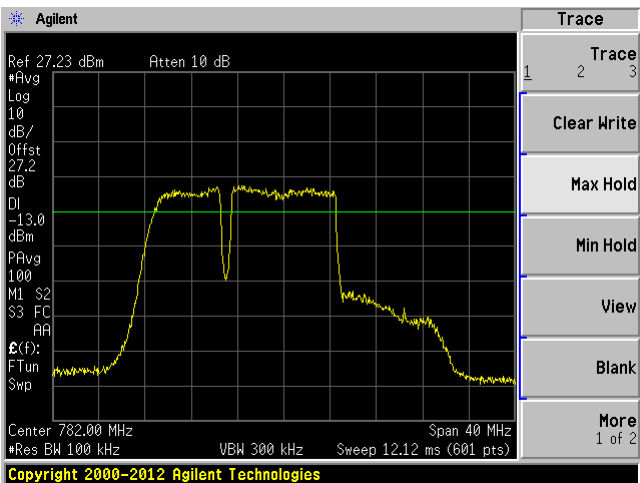


LTE Band 13, 64QAM – 10 MHz

Low Channel

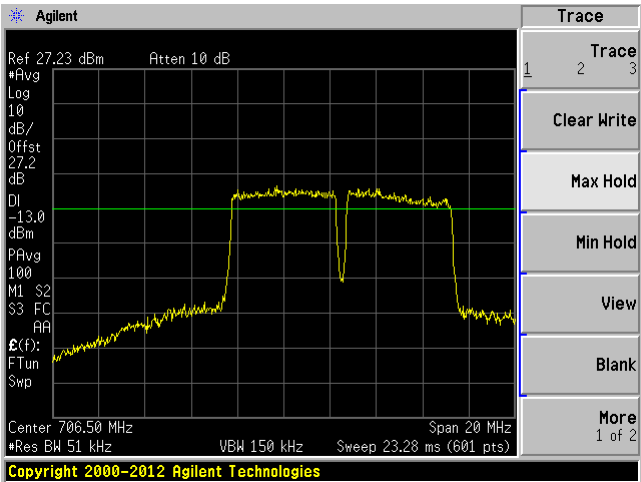


High Channel

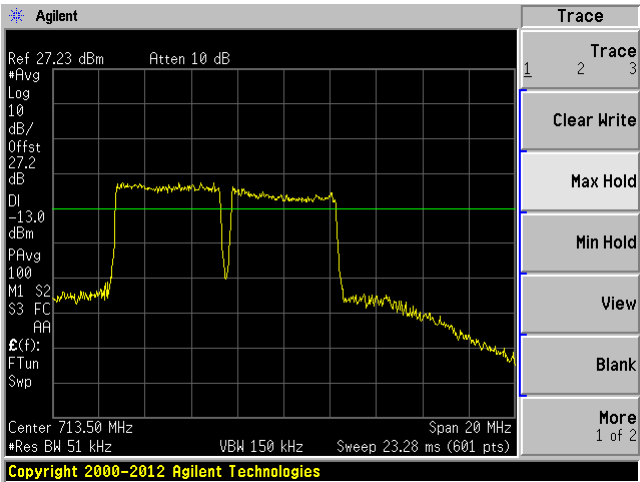


LTE Band 17, QPSK – 5 MHz

Low Channel

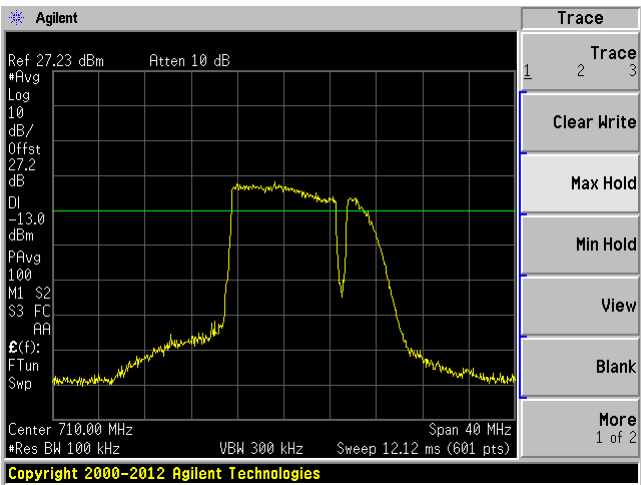


High Channel

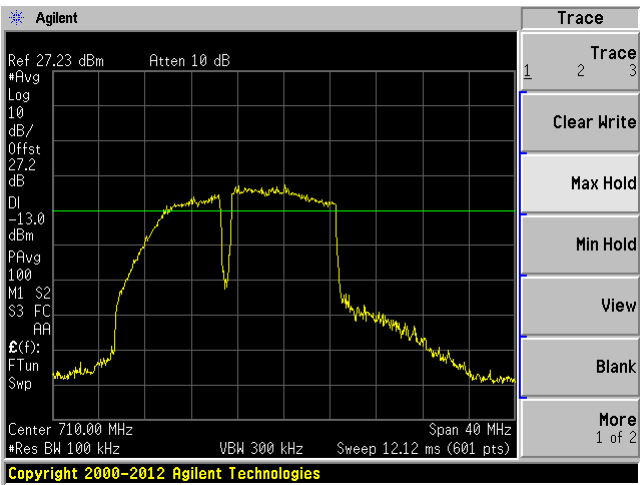


LTE Band 17, QPSK – 10 MHz

Low Channel

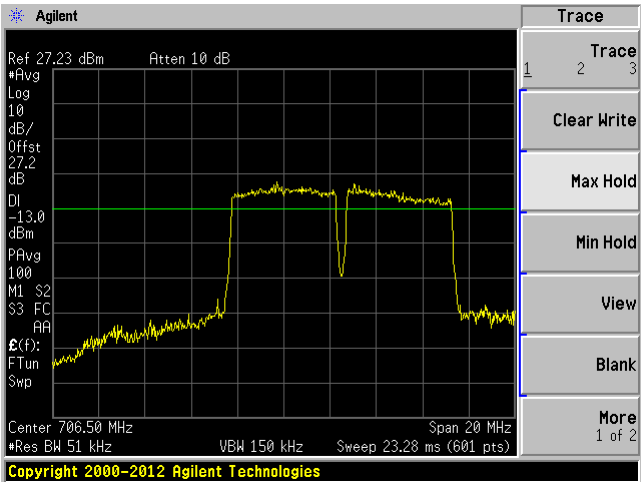


High Channel

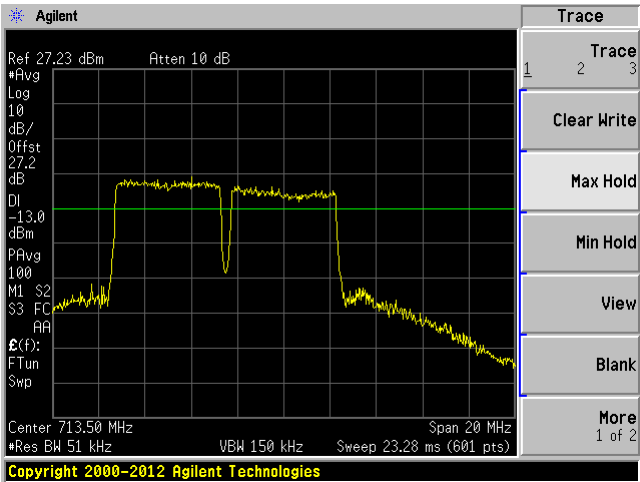


LTE Band 17, 16QAM – 5 MHz

Low Channel

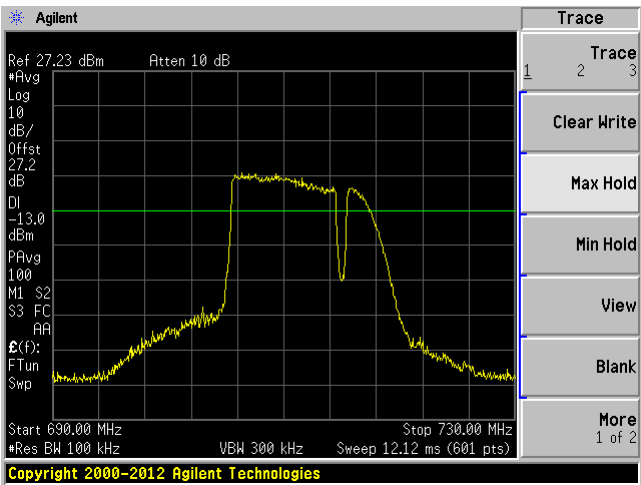


High Channel

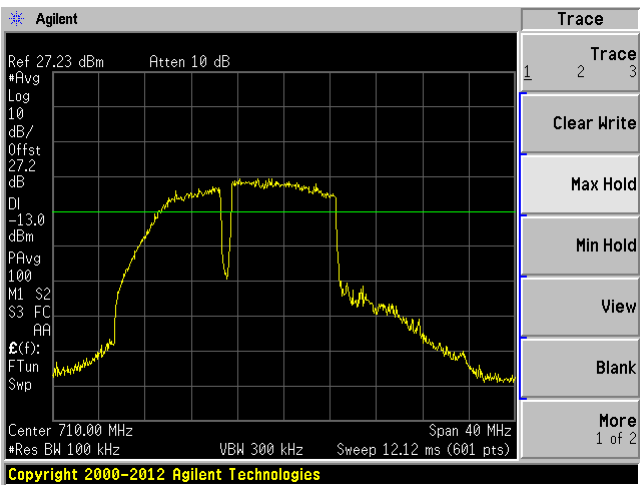


LTE Band 17, 16QAM – 10 MHz

Low Channel



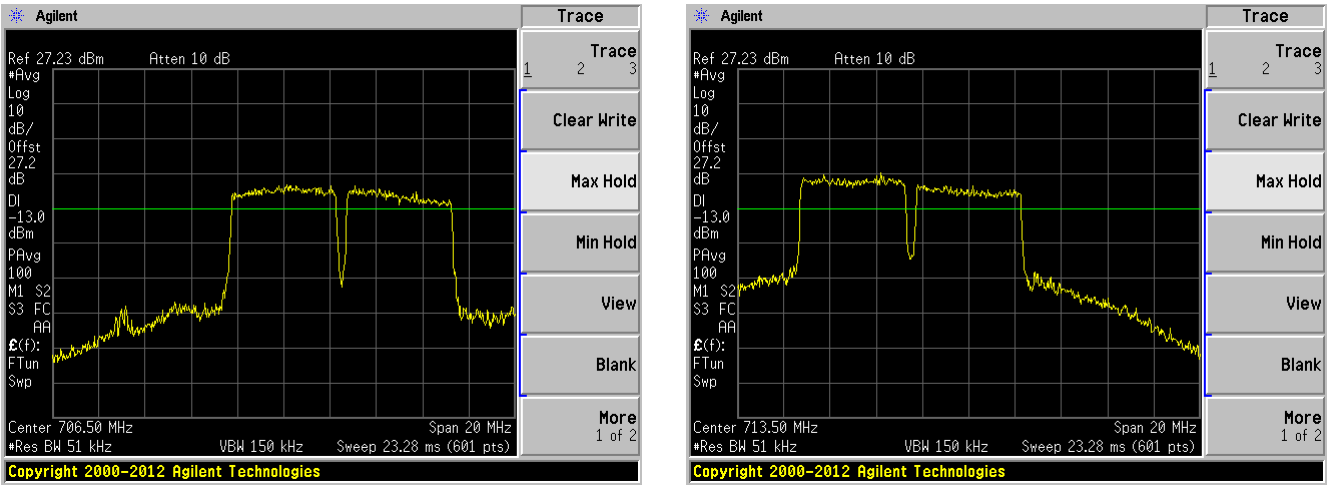
High Channel



LTE Band 17, 64QAM – 5 MHz

Low Channel

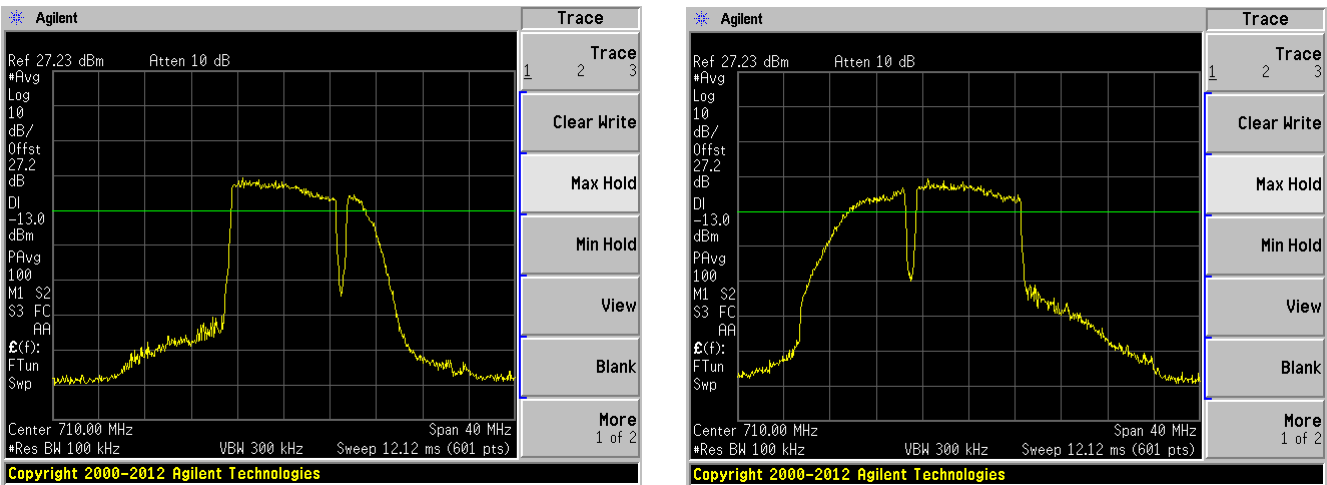
High Channel



LTE Band 17, 64QAM – 10 MHz

Low Channel

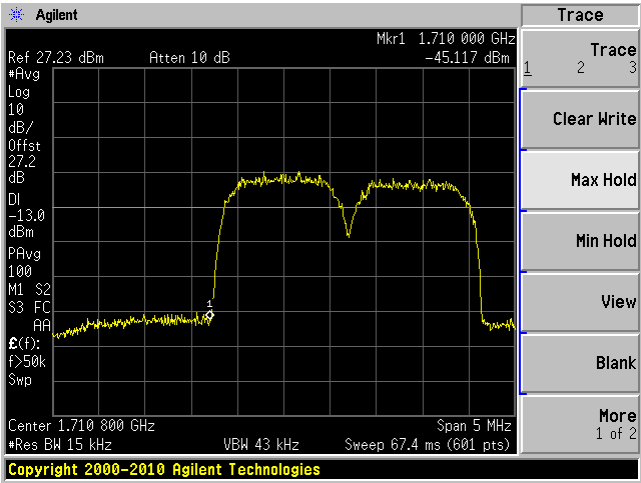
High Channel



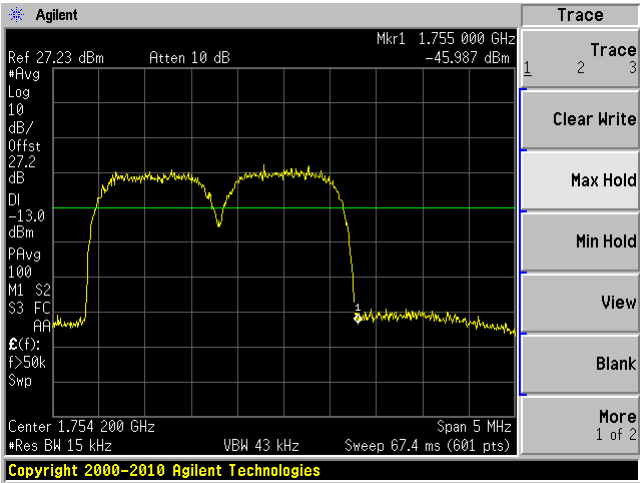
Uplink (ALC on)

Band 4, CDMA

Low Channel

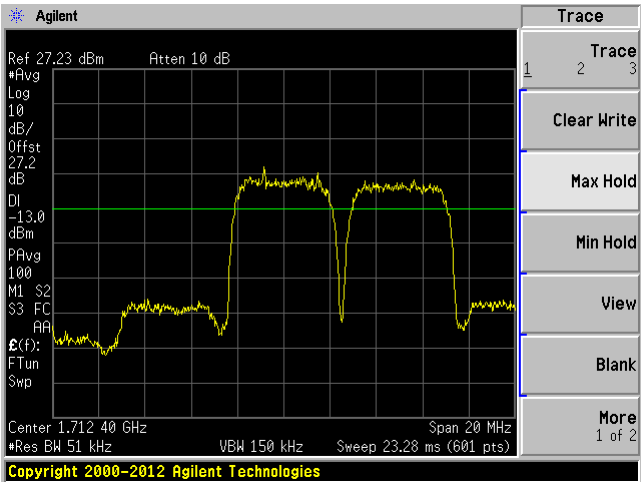


High Channel

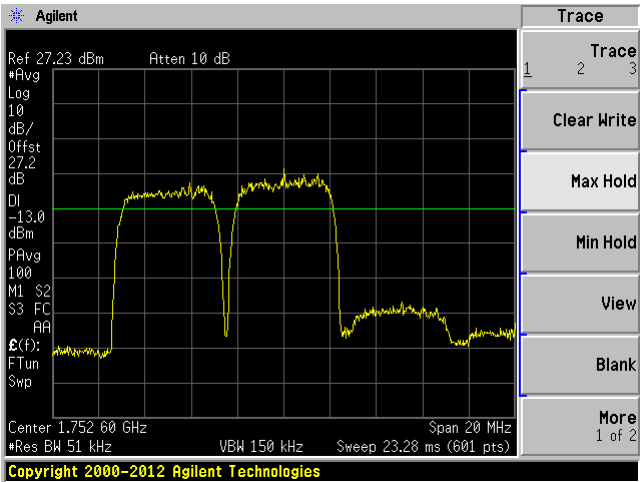


Band 4, WCDMA

Low Channel

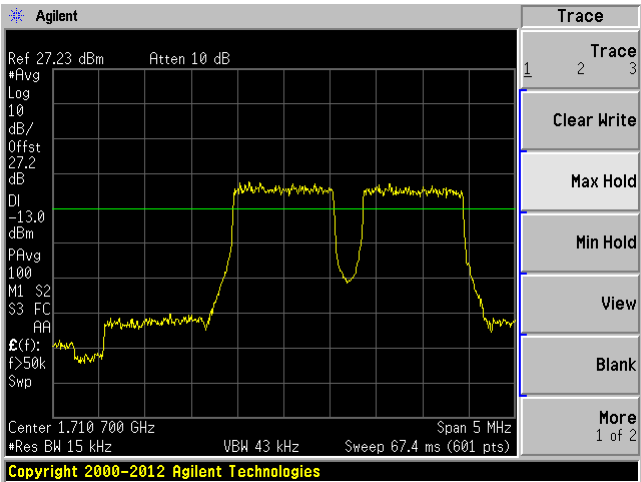


High Channel

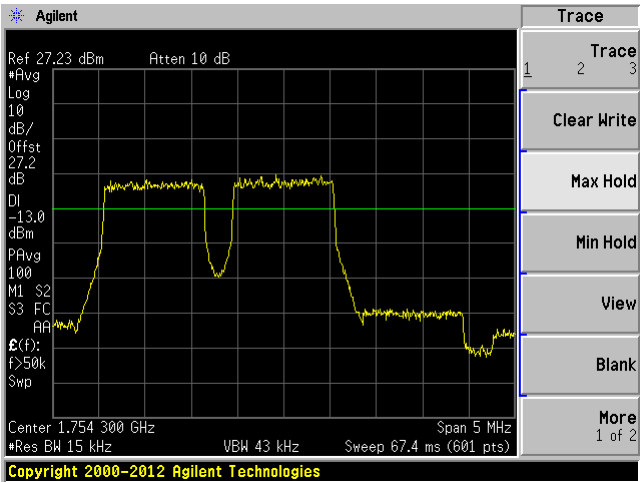


LTE Band 4, QPSK – 1.4 MHz

Low Channel

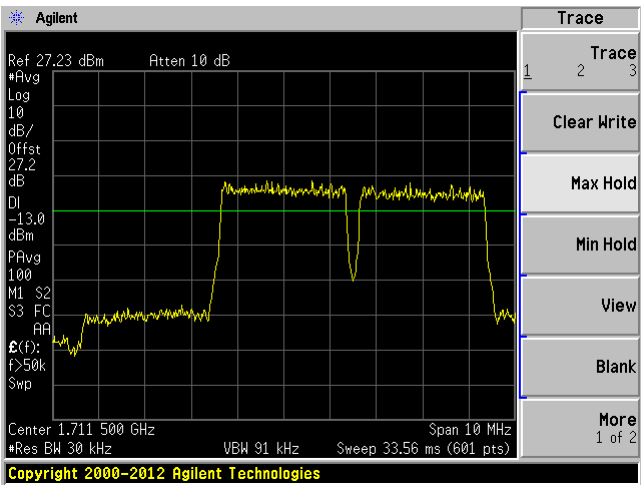


High Channel

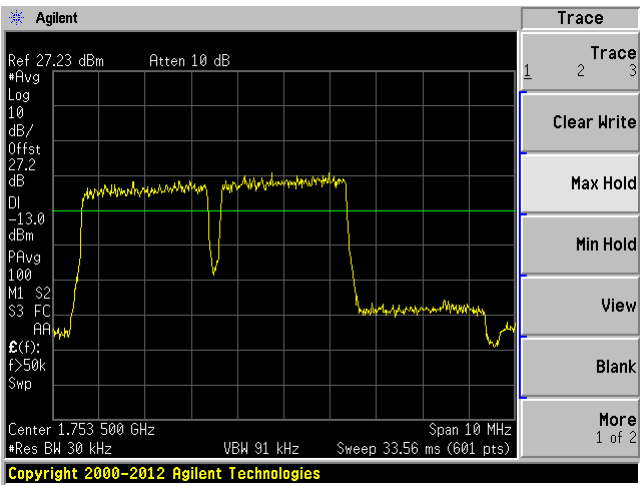


LTE Band 4, QPSK – 3 MHz

Low Channel

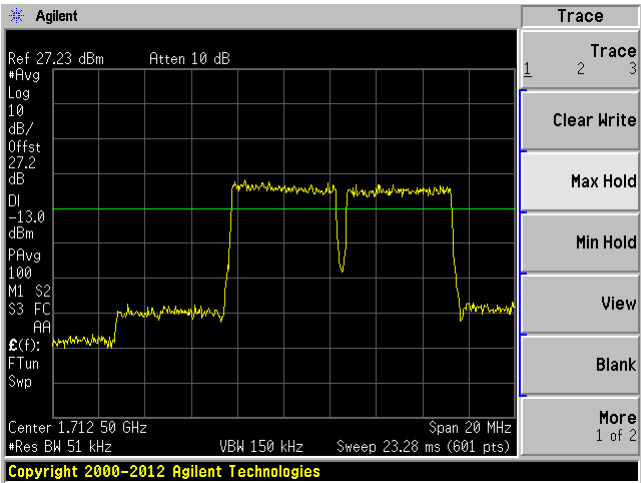


High Channel

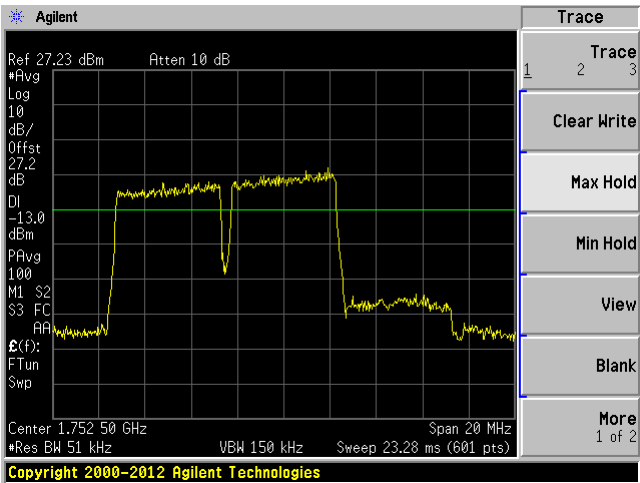


LTE Band 4, QPSK – 5 MHz

Low Channel

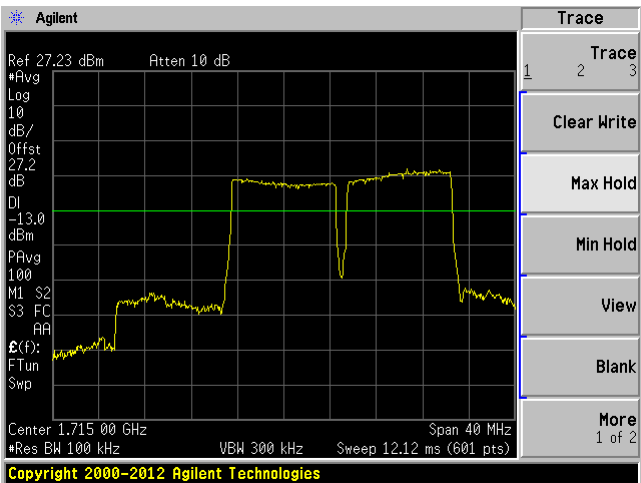


High Channel

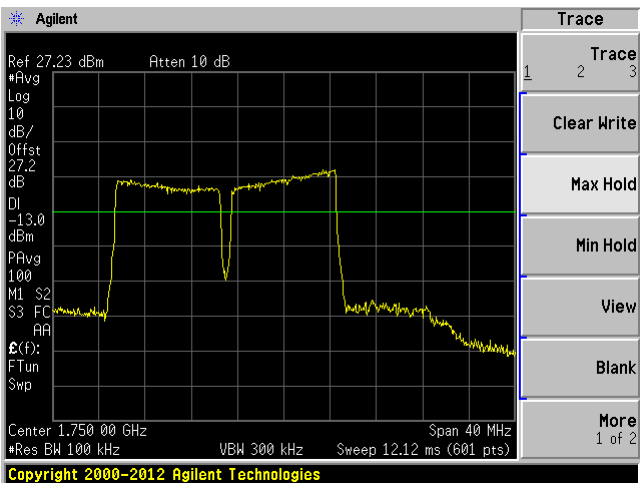


LTE Band 4, QPSK – 10 MHz

Low Channel

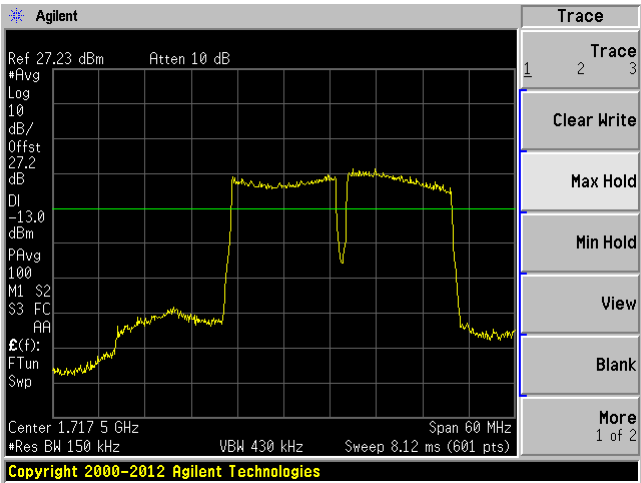


High Channel

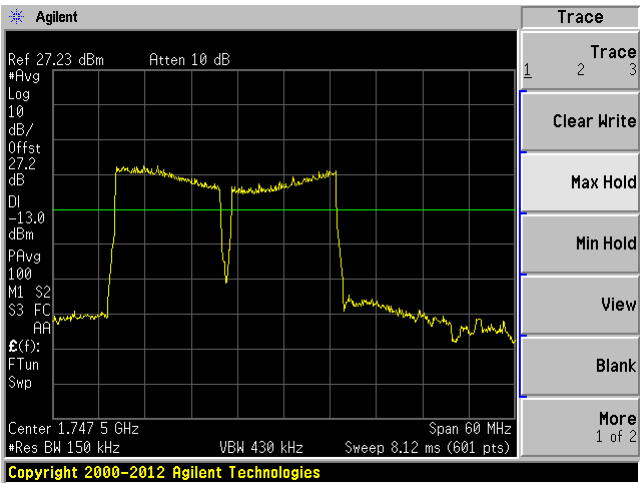


LTE Band 4, QPSK – 15 MHz

Low Channel

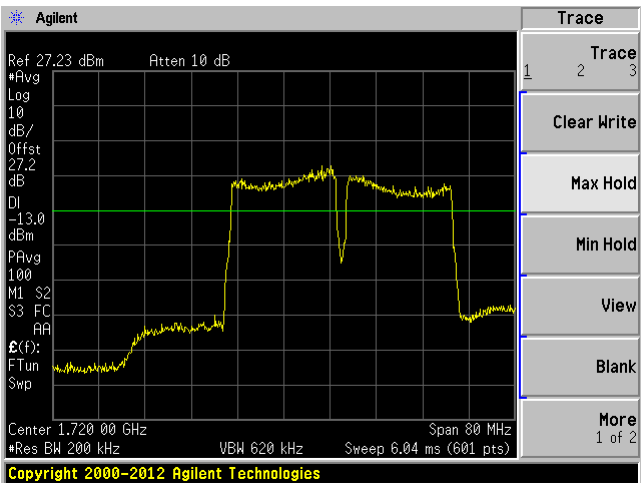


High Channel

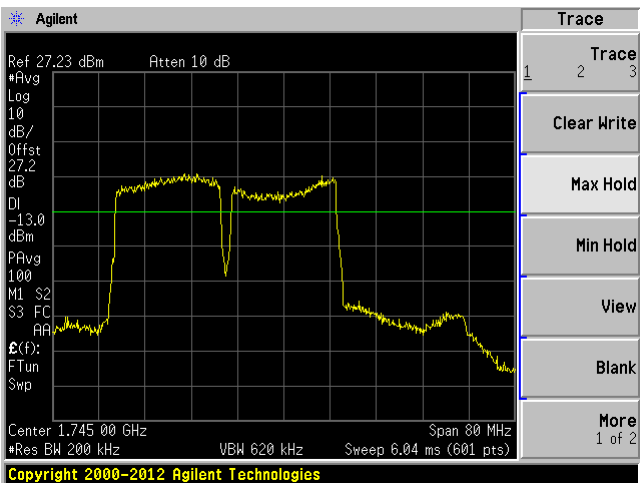


LTE Band 4, QPSK – 20 MHz

Low Channel

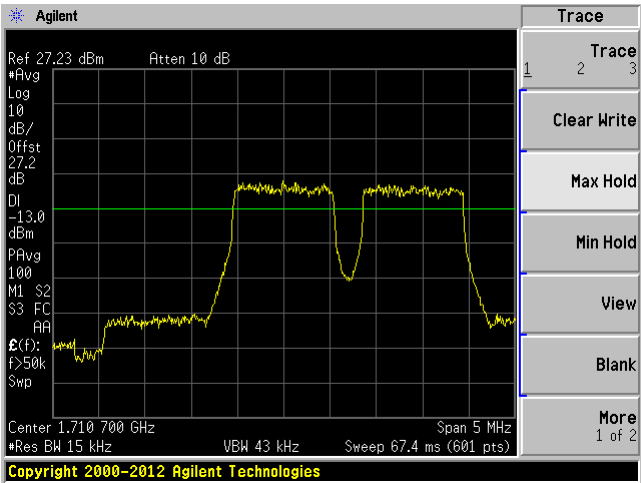


High Channel

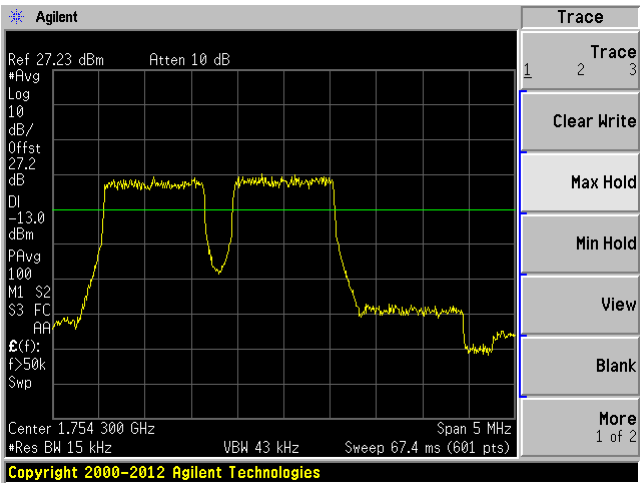


LTE Band 4, 16QAM – 1.4 MHz

Low Channel

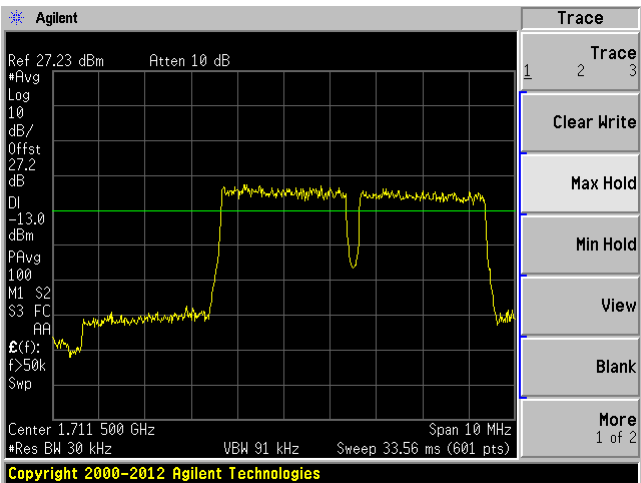


High Channel

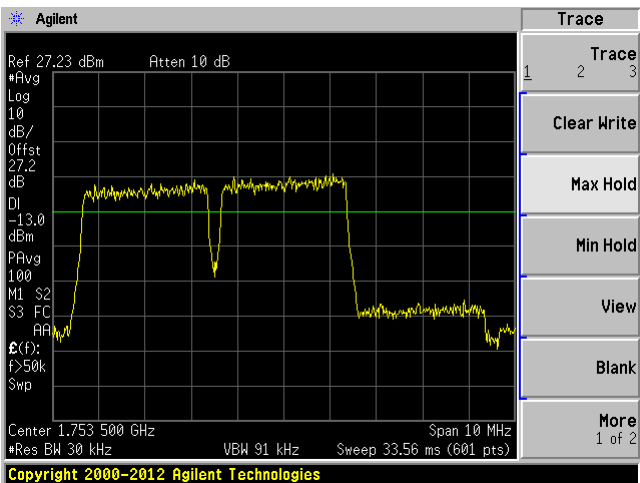


LTE Band 4, 16QAM – 3 MHz

Low Channel

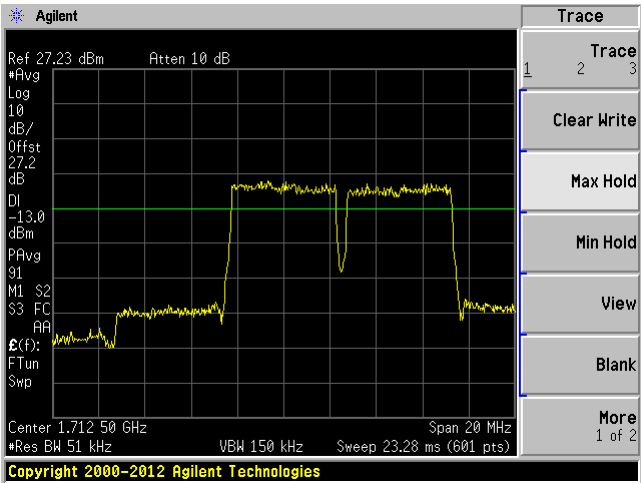


High Channel

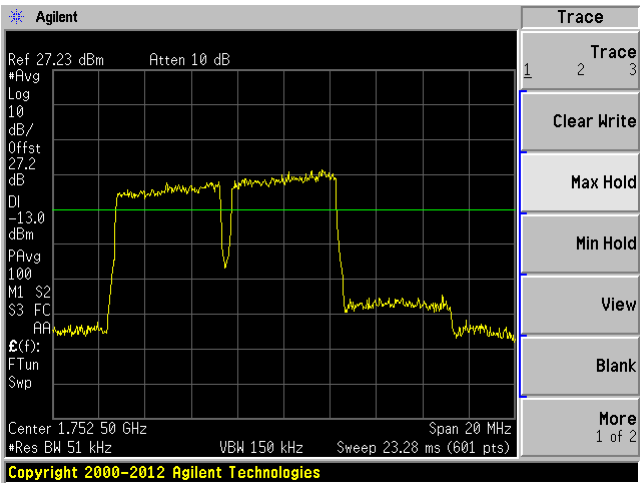


LTE Band 4, 16QAM – 5 MHz

Low Channel

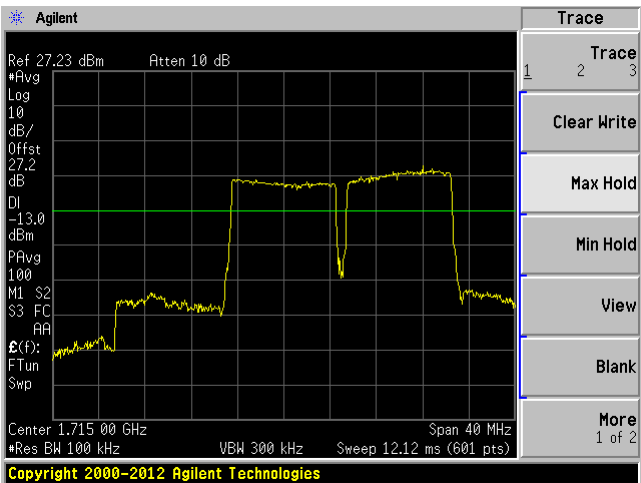


High Channel

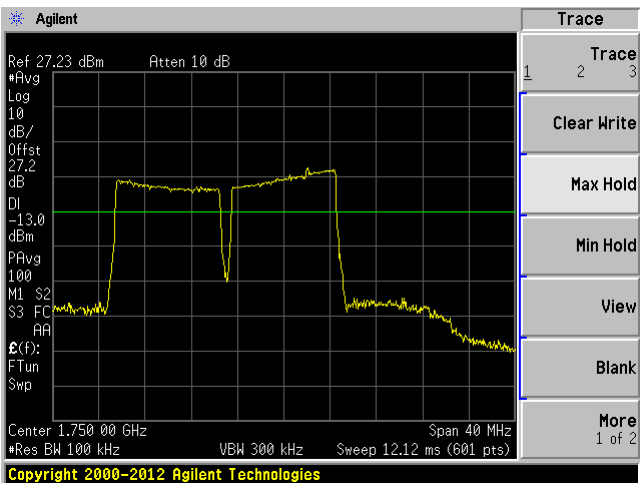


LTE Band 4, 16QAM – 10 MHz

Low Channel

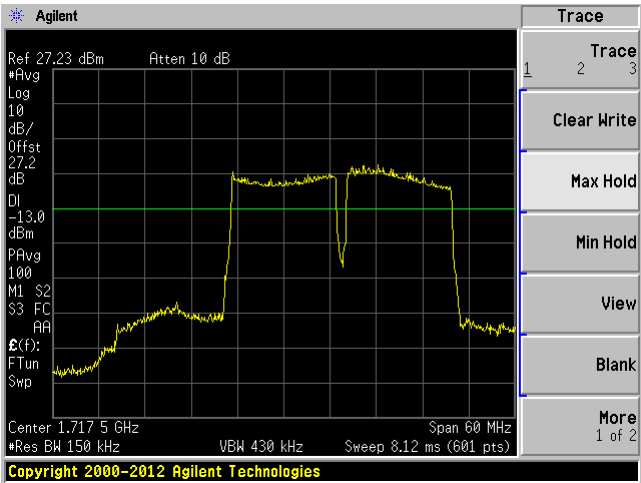


High Channel

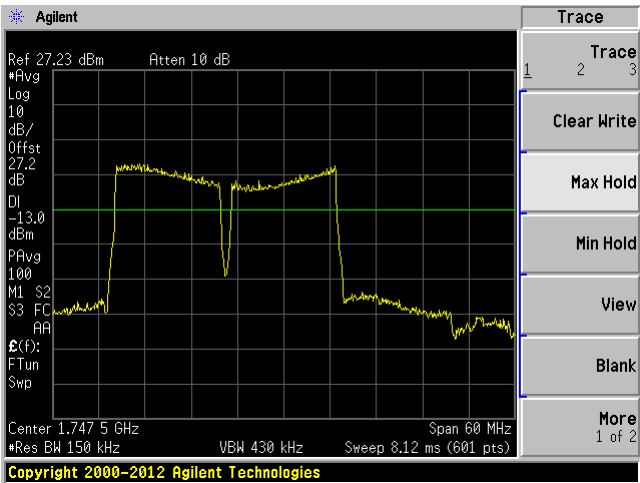


LTE Band 4, 16QAM – 15 MHz

Low Channel

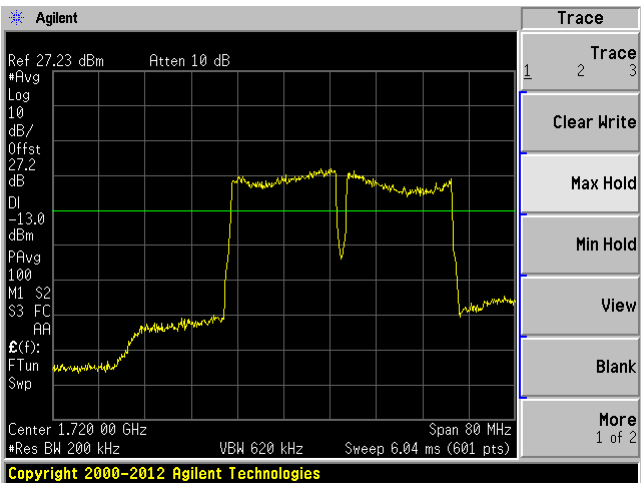


High Channel

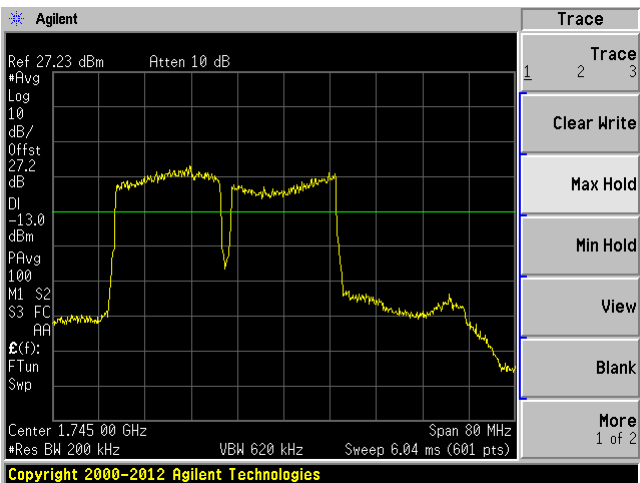


LTE Band 4, 16QAM – 20 MHz

Low Channel

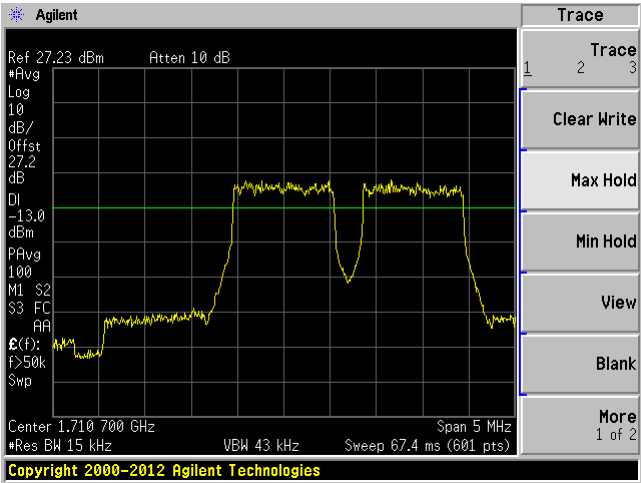


High Channel

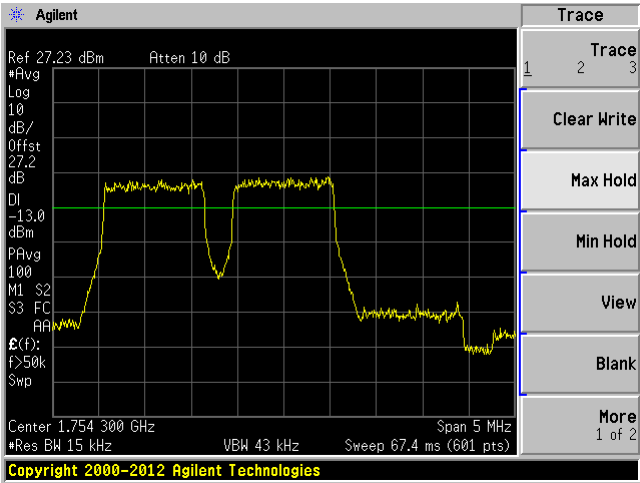


LTE Band 4, 64QAM – 1.4 MHz

Low Channel

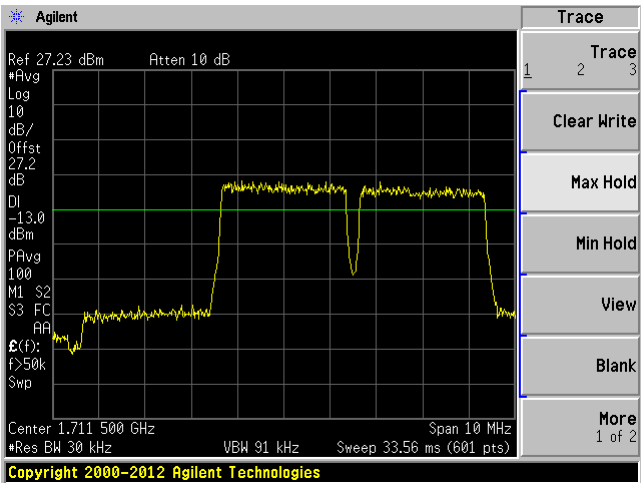


High Channel

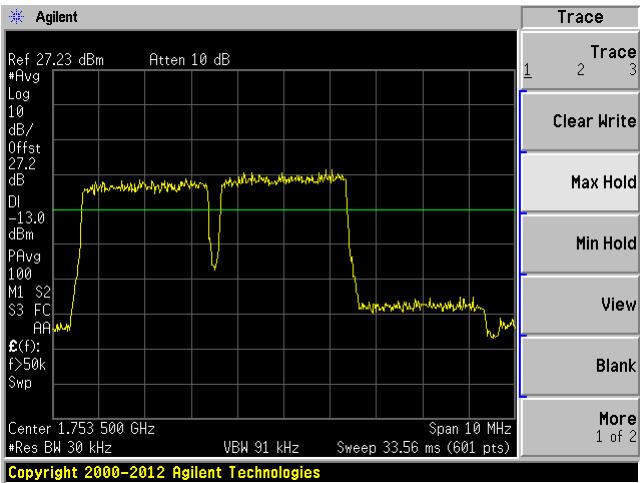


LTE Band 4, 64QAM – 3 MHz

Low Channel

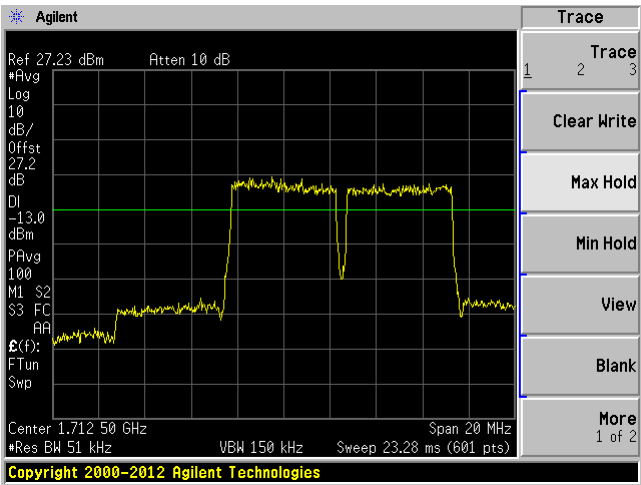


High Channel

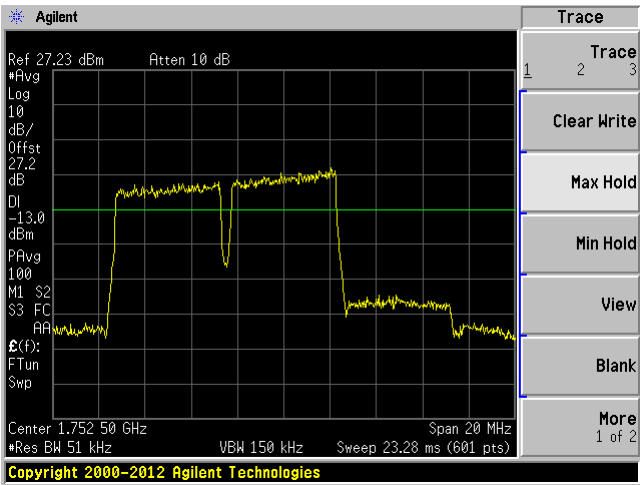


LTE Band 4, 64QAM – 5 MHz

Low Channel

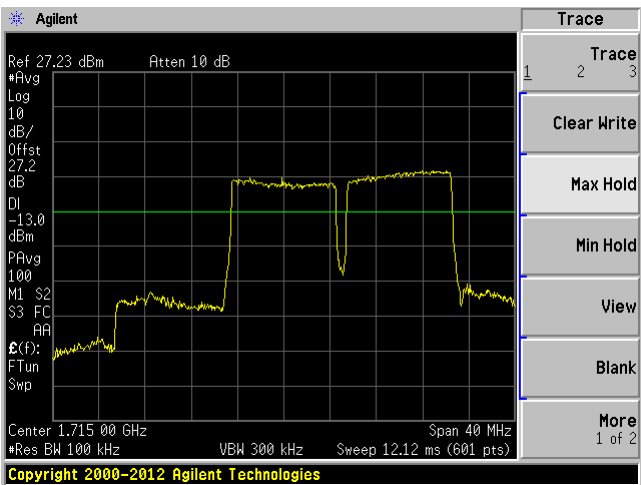


High Channel

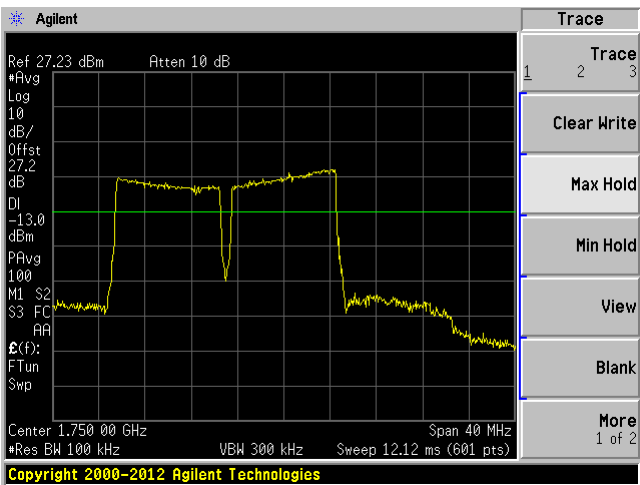


LTE Band 4, 64QAM – 10 MHz

Low Channel

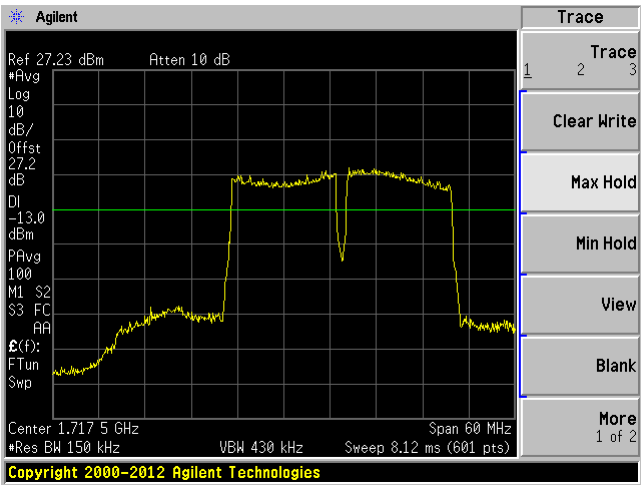


High Channel

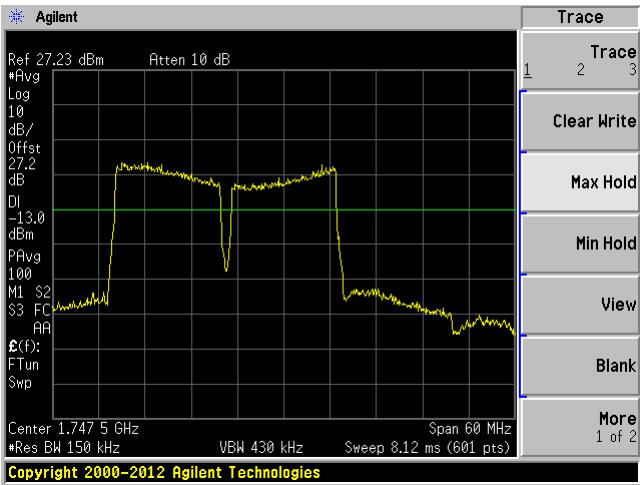


LTE Band 4, 64QAM – 15 MHz

Low Channel

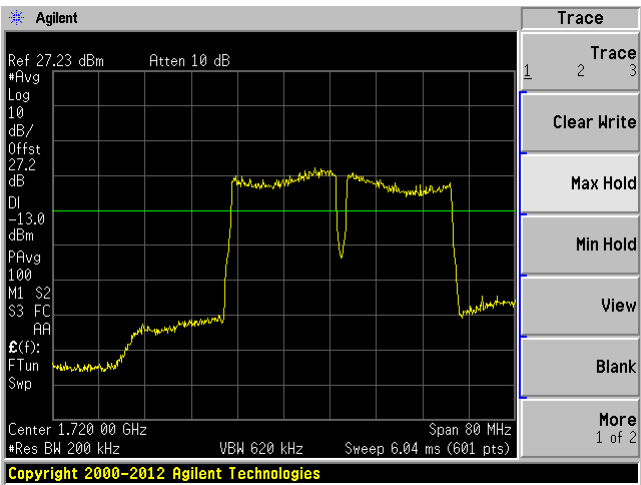


High Channel

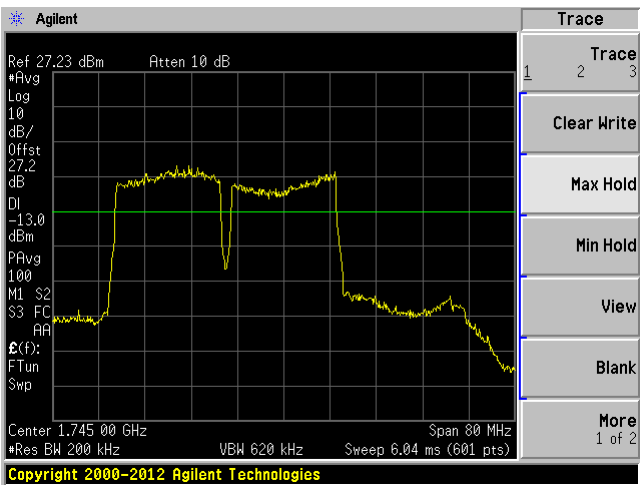


LTE Band 4, 64QAM – 20 MHz

Low Channel

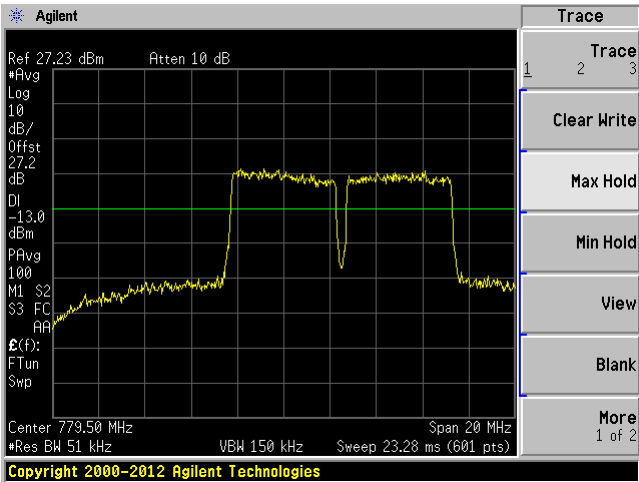


High Channel

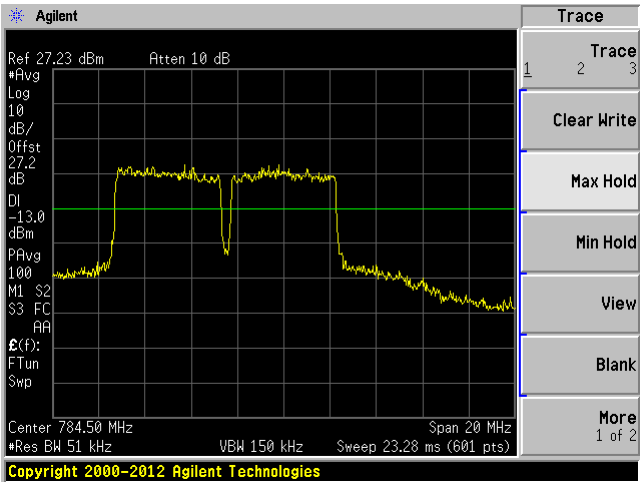


LTE Band 13, QPSK – 5 MHz

Low Channel

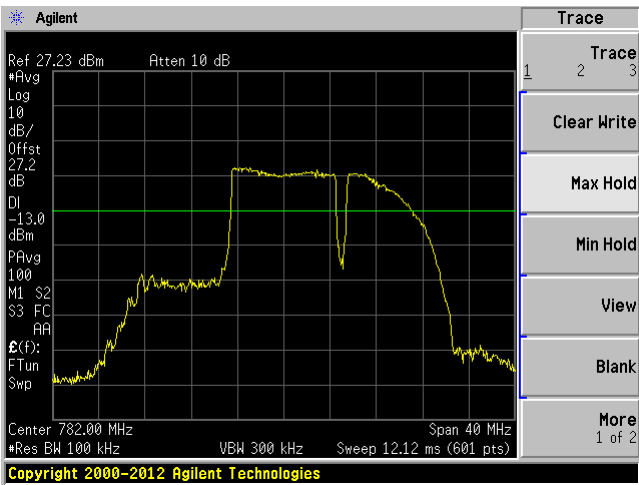


High Channel

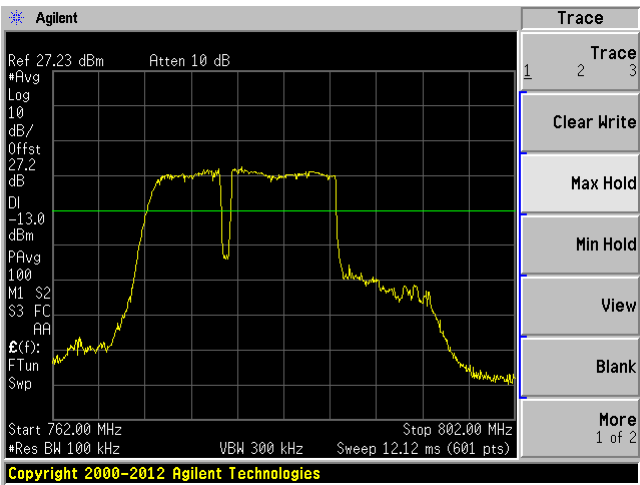


LTE Band 13, QPSK – 10 MHz

Low Channel

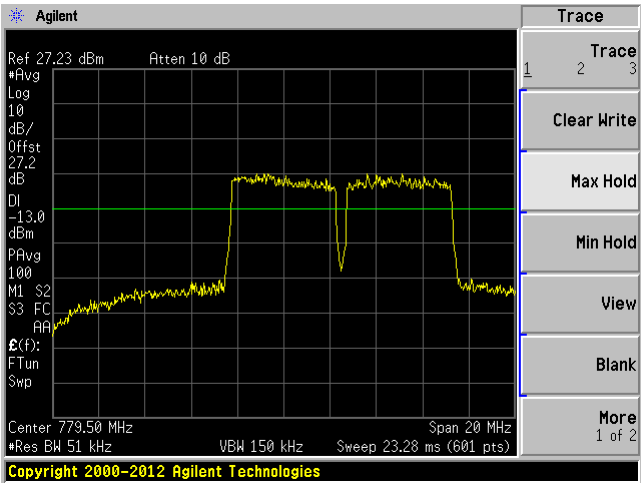


High Channel

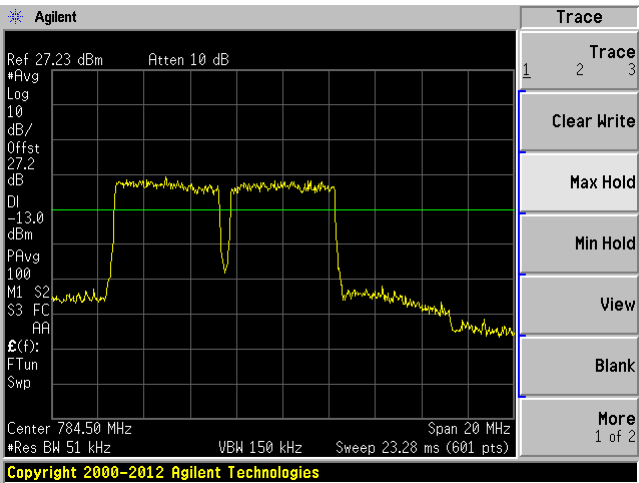


LTE Band 13, 16QAM – 5 MHz

Low Channel

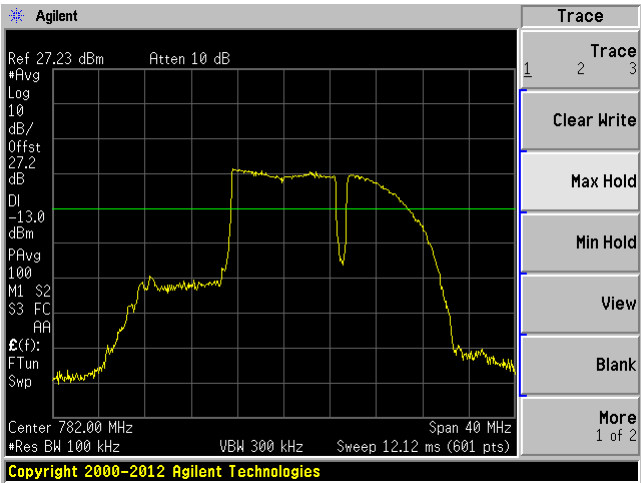


High Channel

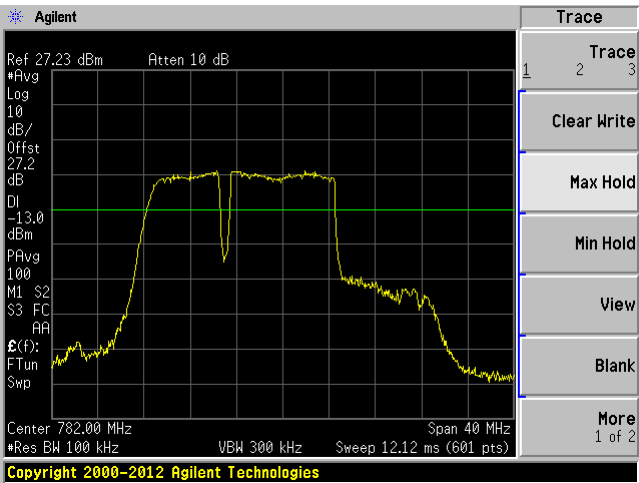


LTE Band 13, 16QAM – 10 MHz

Low Channel

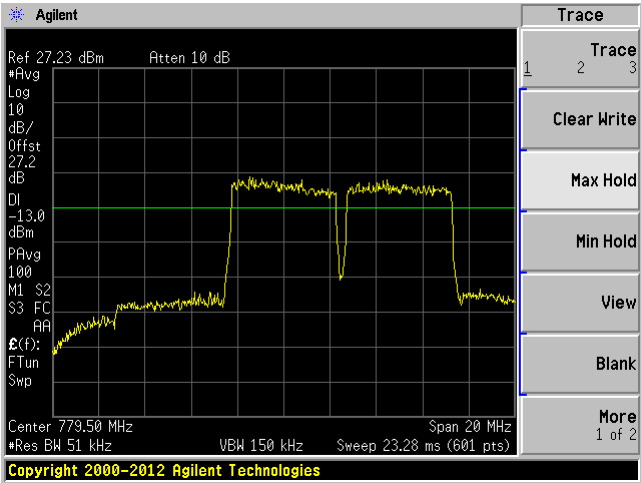


High Channel

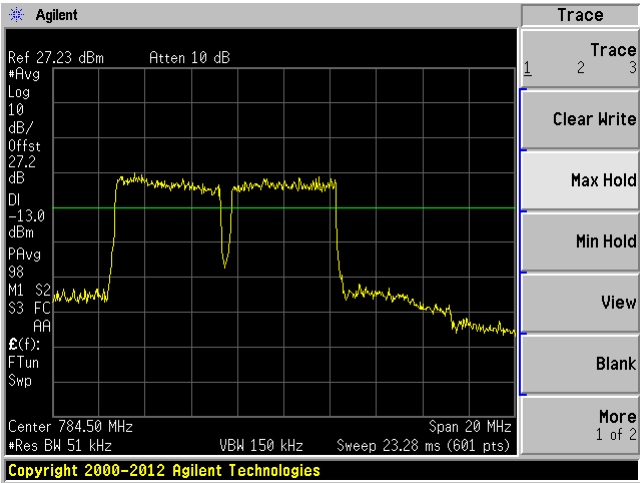


LTE Band 13, 64QAM – 5 MHz

Low Channel

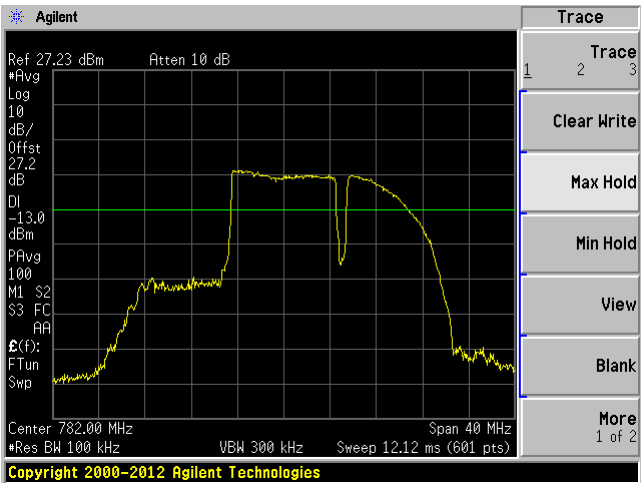


High Channel

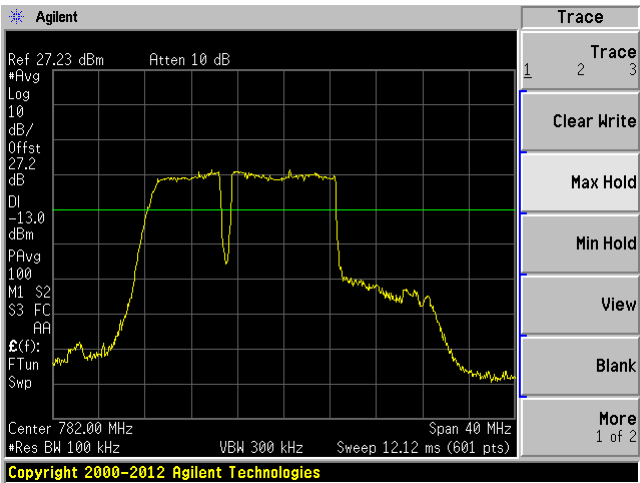


LTE Band 13, 64QAM – 10 MHz

Low Channel

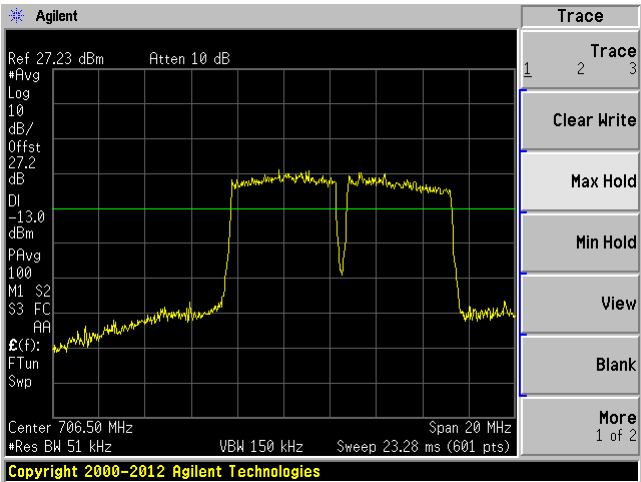


High Channel

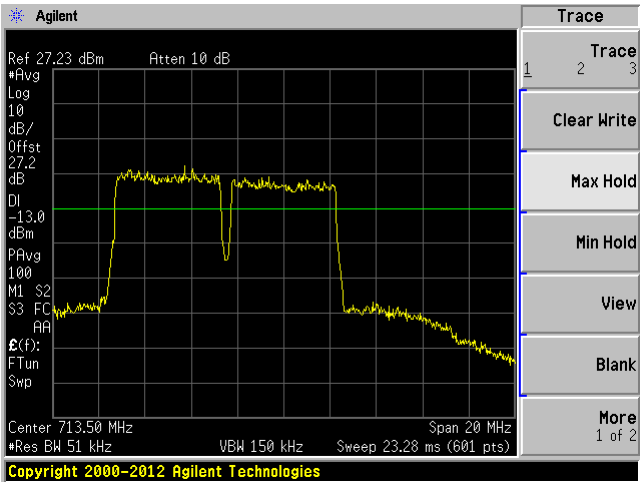


LTE Band 17, QPSK – 5 MHz

Low Channel

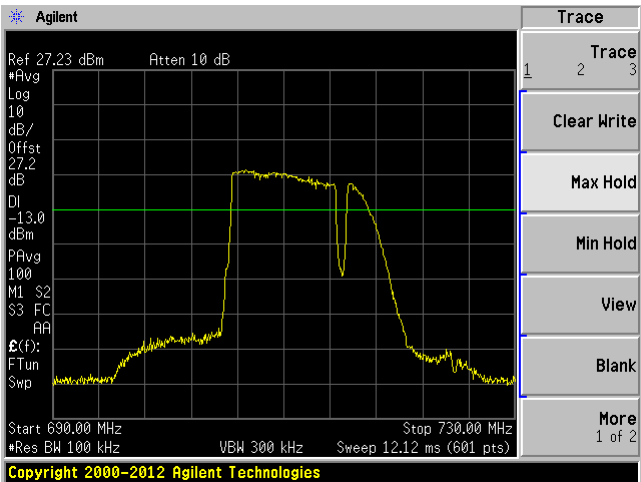


High Channel

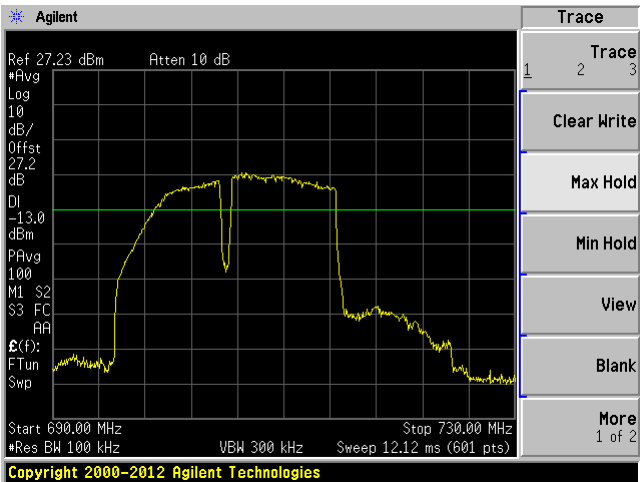


LTE Band 17, QPSK – 10 MHz

Low Channel

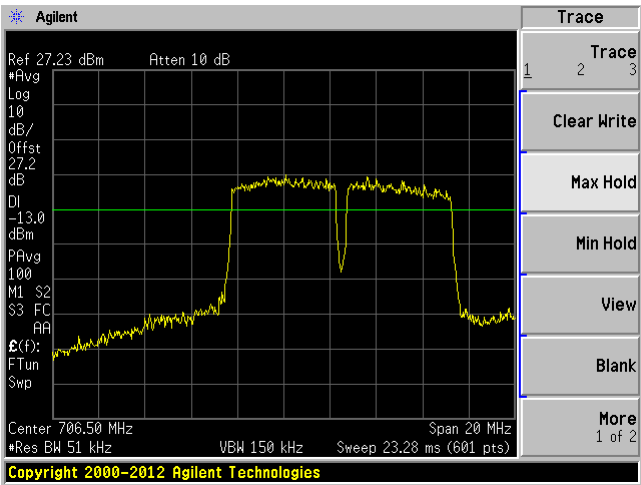


High Channel

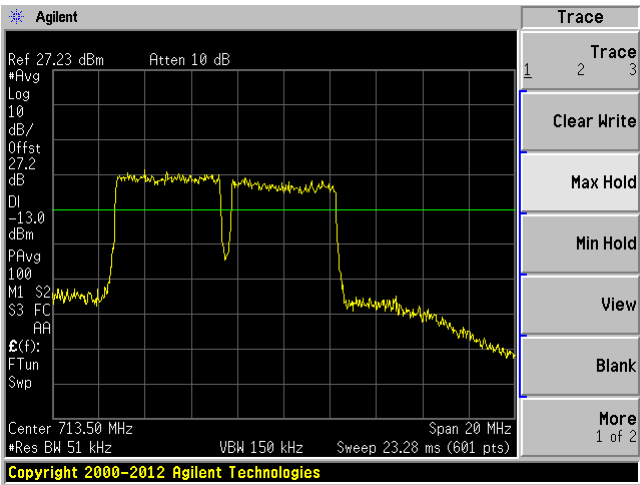


LTE Band 17, 16QAM – 5 MHz

Low Channel

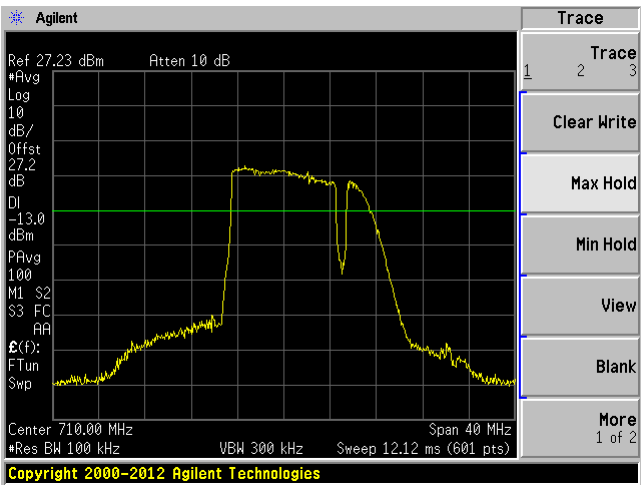


High Channel

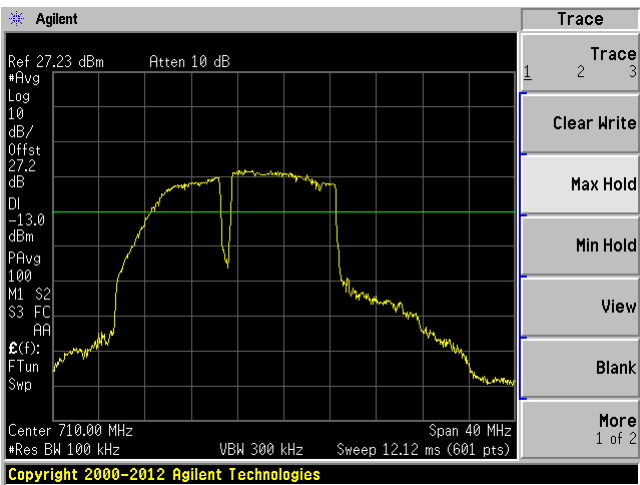


LTE Band 17, 16QAM – 10 MHz

Low Channel

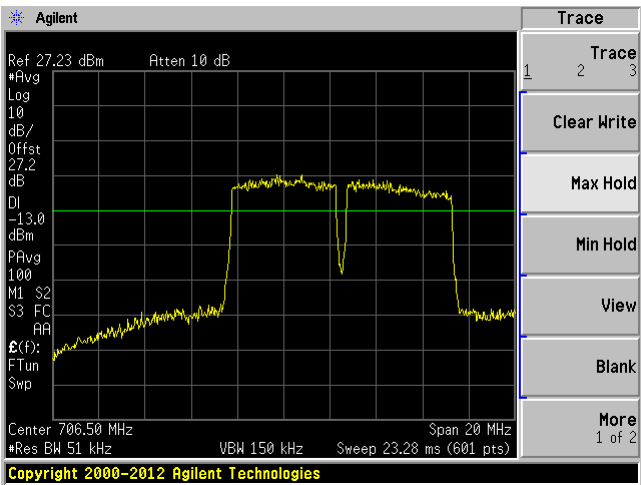


High Channel

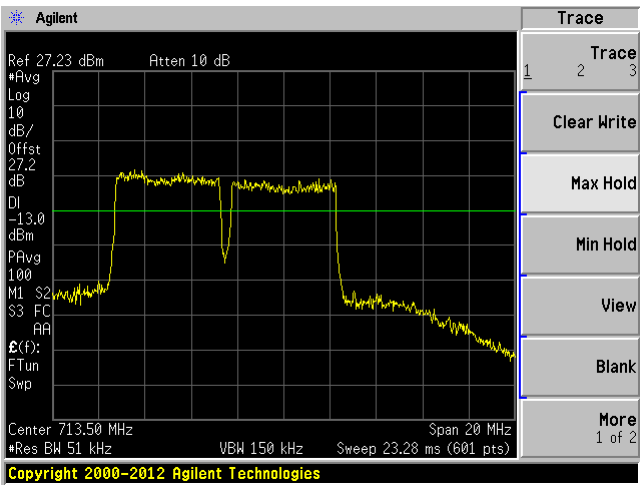


LTE Band 17, 64QAM – 5 MHz

Low Channel

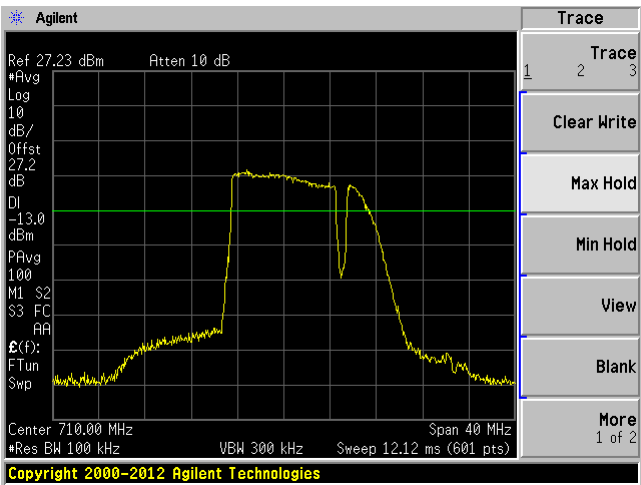


High Channel

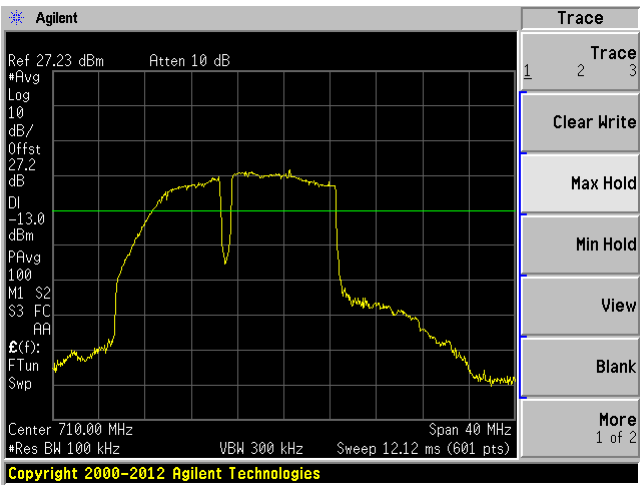


LTE Band 17, 64QAM – 10 MHz

Low Channel



High Channel



8 FCC §27.53 - Band Edge

8.1 Applicable Standards

According to FCC §27.53 the power of any emissions 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

8.2 Test Procedure

The EUT was connected to the spectrum analyzer and Signal Generator followed by 50Ω-75Ω matching pad.

The center frequency of the spectrum analyzer was set according to center frequency of the EUT to be transmitted. The RBW was set to greater than 30 KHz for 700 bands and greater than 1% of emission bandwidth for LTE 1700 and 2100



8.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2014-10-16	1 year
Agilent	Signal Generator	E4438C	MY45091309	2014-07-15	1 year

Statement of Traceability: *BACL Corp.* attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

8.4 Test Environmental Conditions

Temperature:	21-23° C
Relative Humidity:	42-48 %
ATM Pressure:	101.4-102 kPa

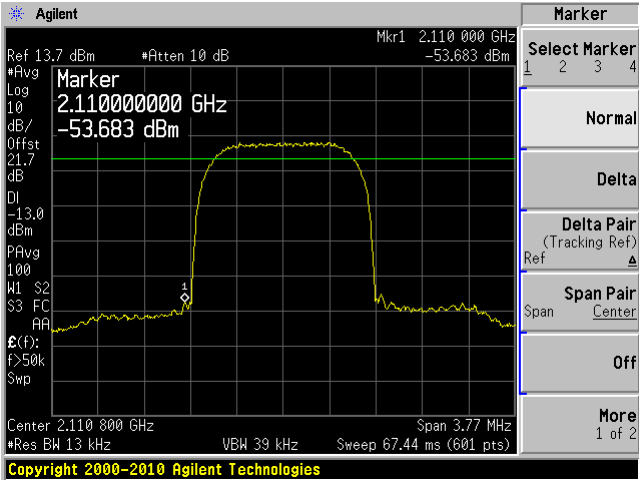
The testing was performed by Ronak Patel on 2015-06-08 to 2015-06-29 in the RF Site.

8.5 Test Results

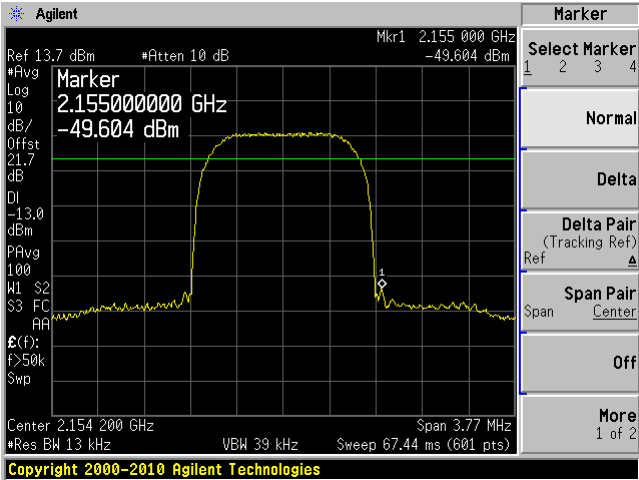
Please refer to the following plots.

Band 4, CDMA, DL

Low

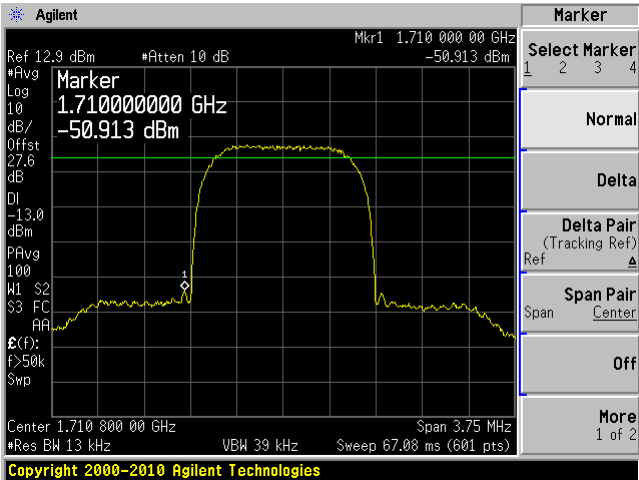


High

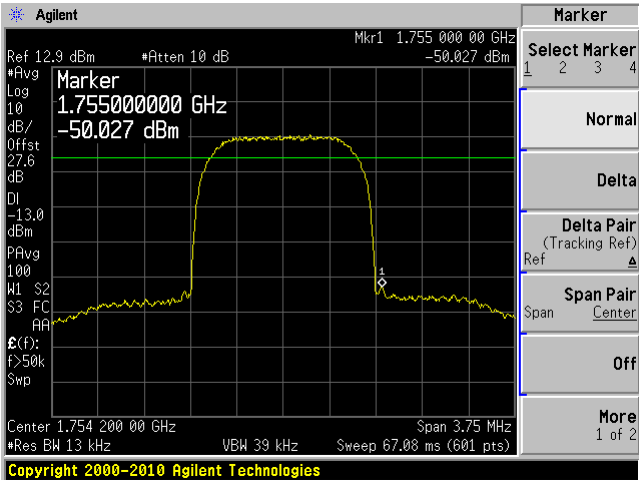


Band 3, CDMA, UL

Low

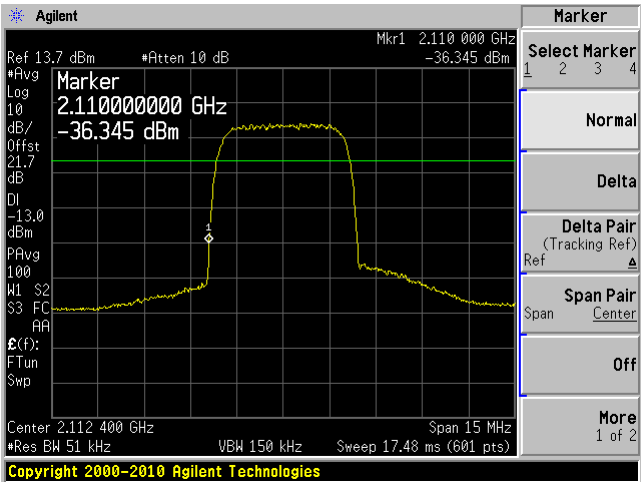


High

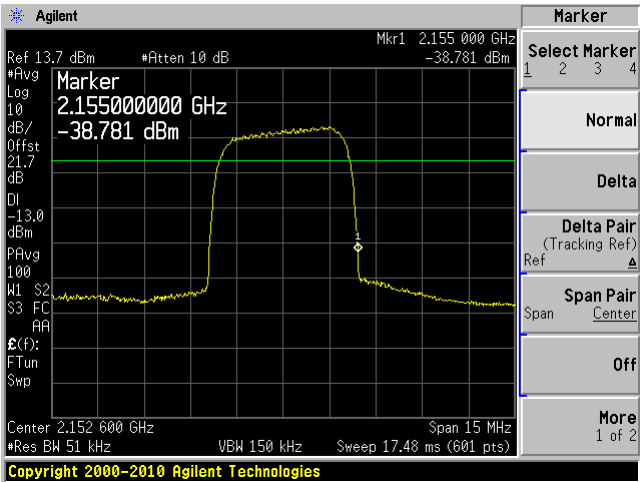


Band 4, WCDMA DL

Low

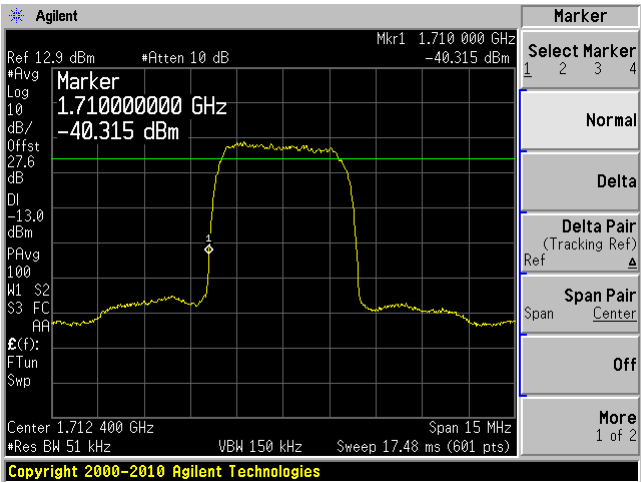


High

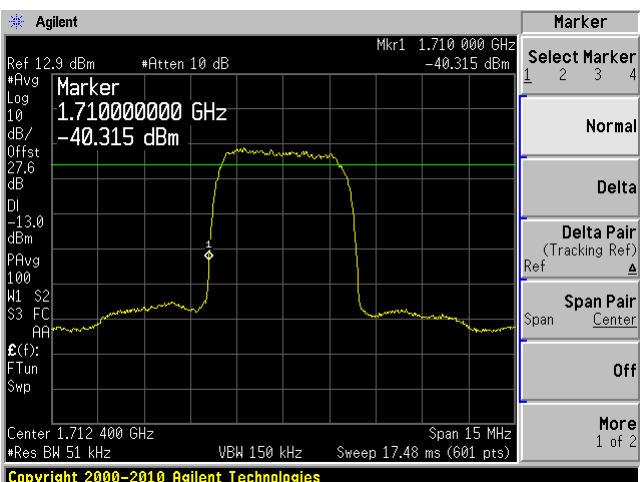


Band 4, WCDMA UL

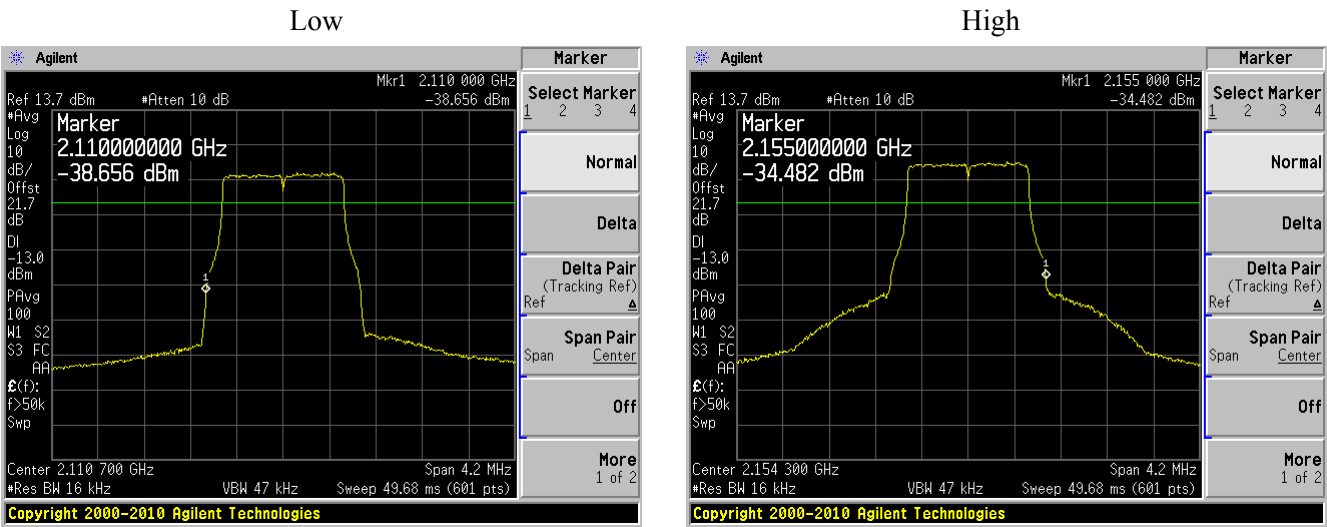
Low



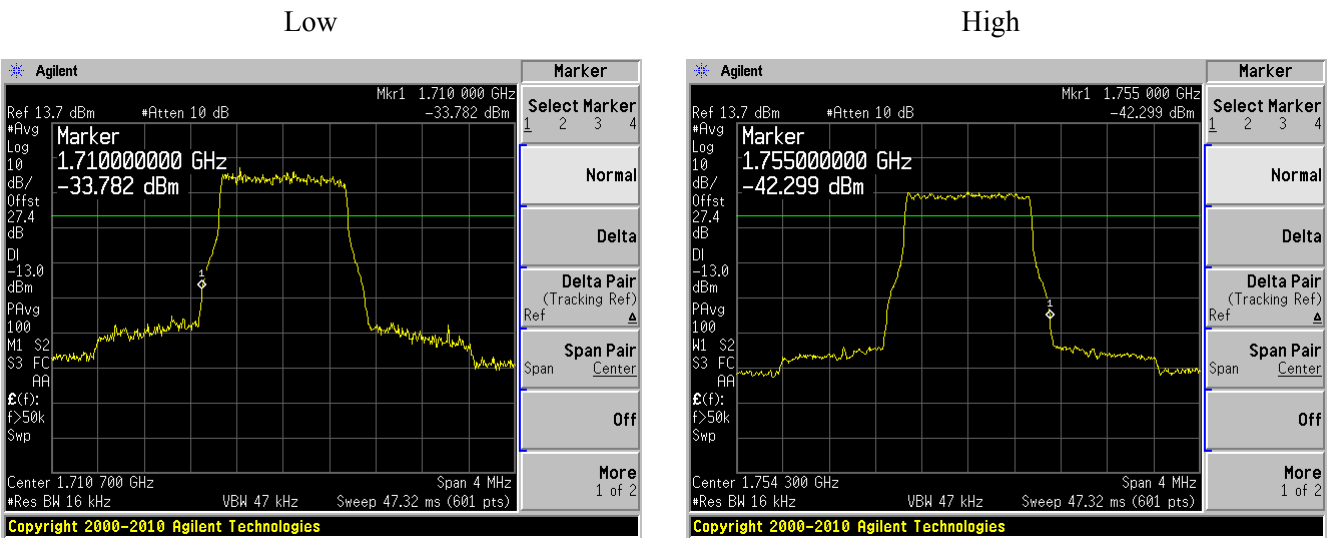
High



LTE Band 4, 1.4 MHz, QPSK, DL

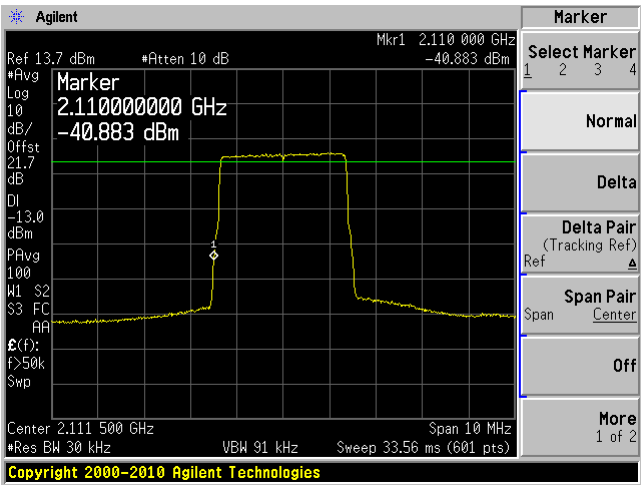


LTE Band 4, 1.4 MHz, QPSK, UL

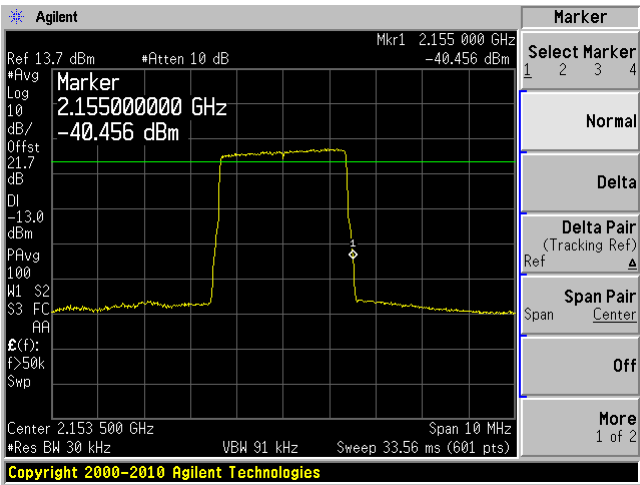


LTE Band 4, 3 MHz, QPSK, DL

Low

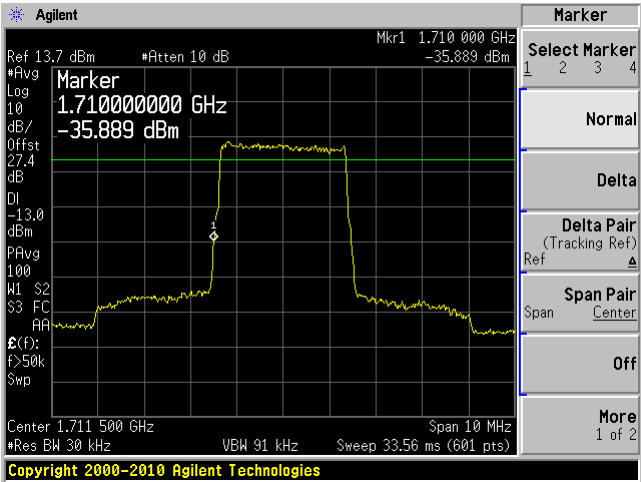


High

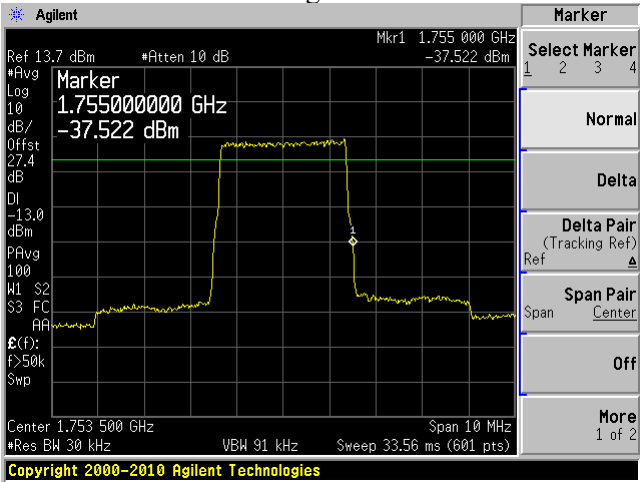


LTE Band 4, 3 MHz, QPSK, UL

Low

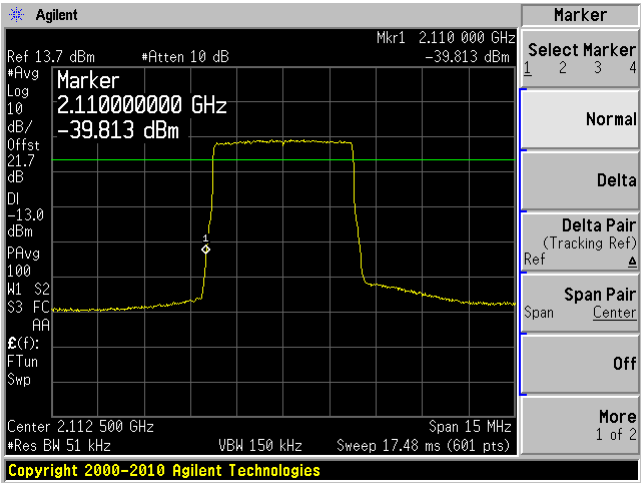


High

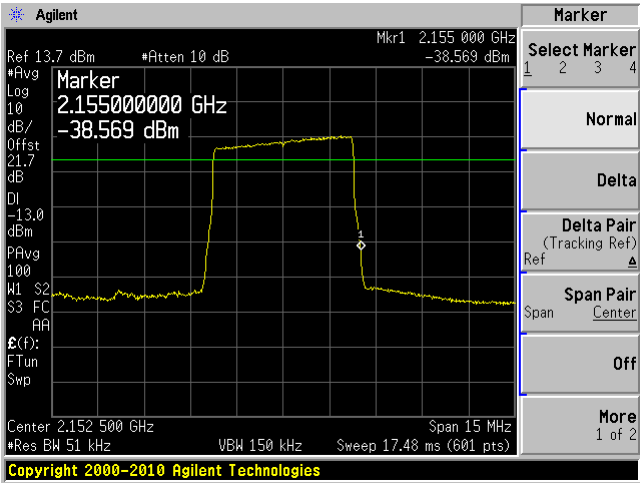


LTE Band 4, 5 MHz, QPSK, DL

Low

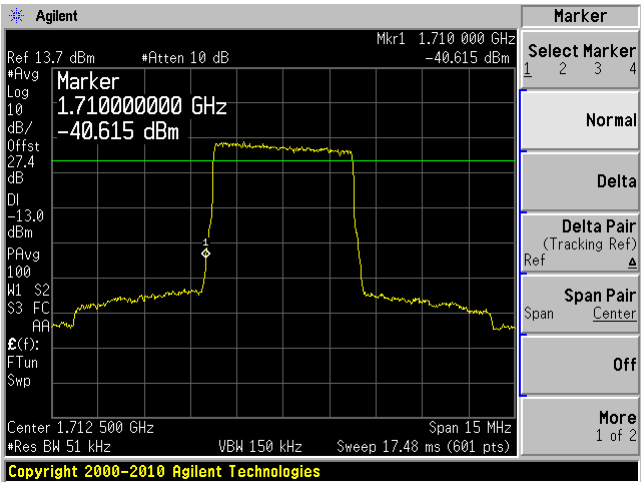


High

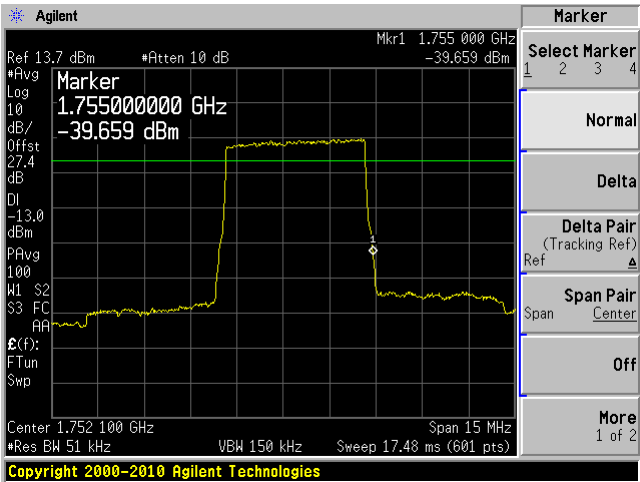


LTE Band 4, 5 MHz, QPSK, DL

Low

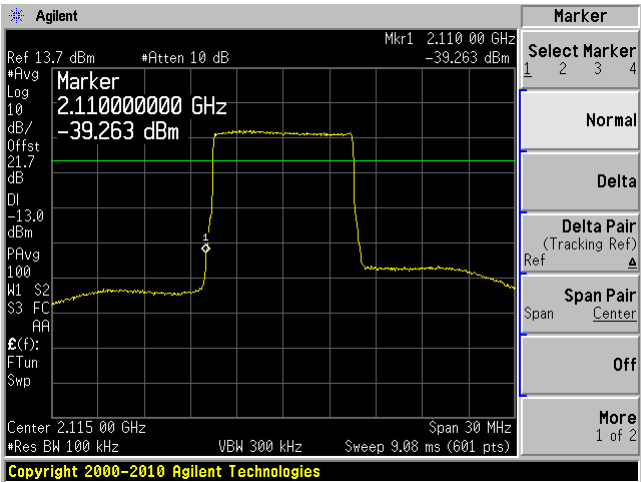


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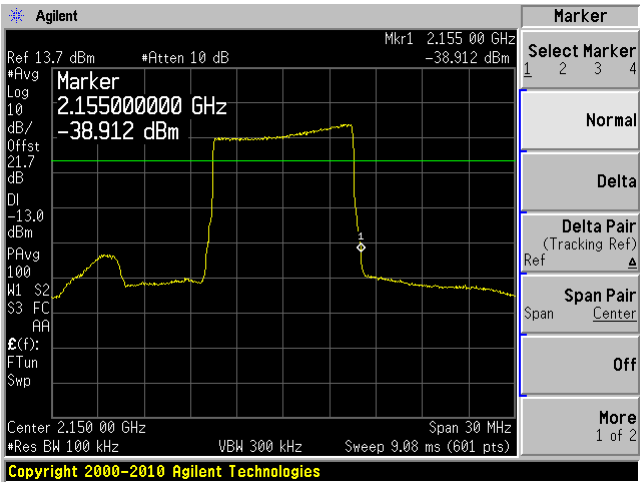


LTE Band 4, 10 MHz, QPSK, DL

Low

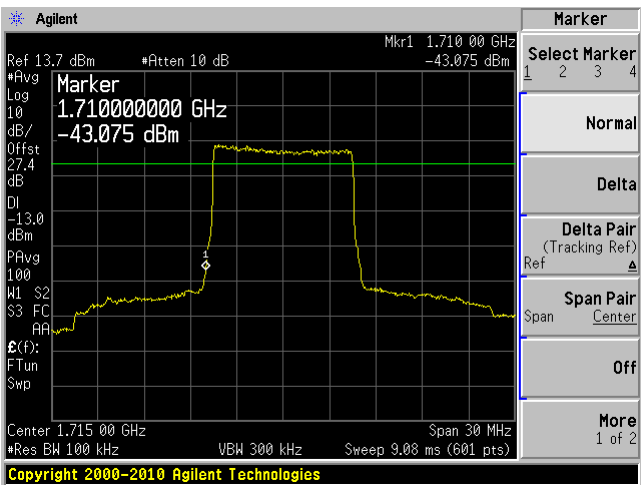


High

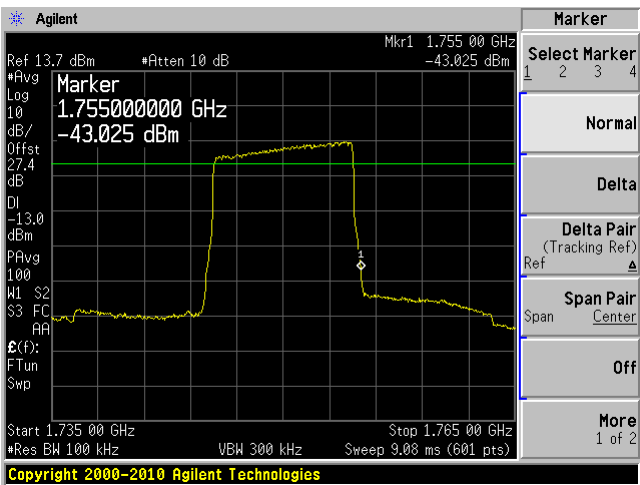


LTE Band 4, 10 MHz, QPSK, UL

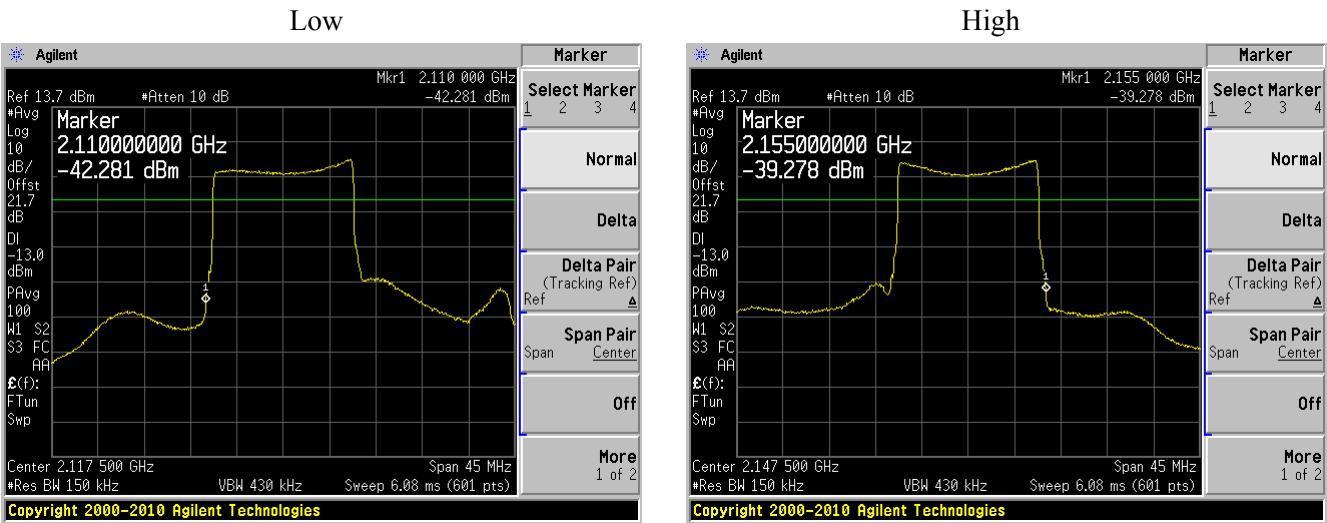
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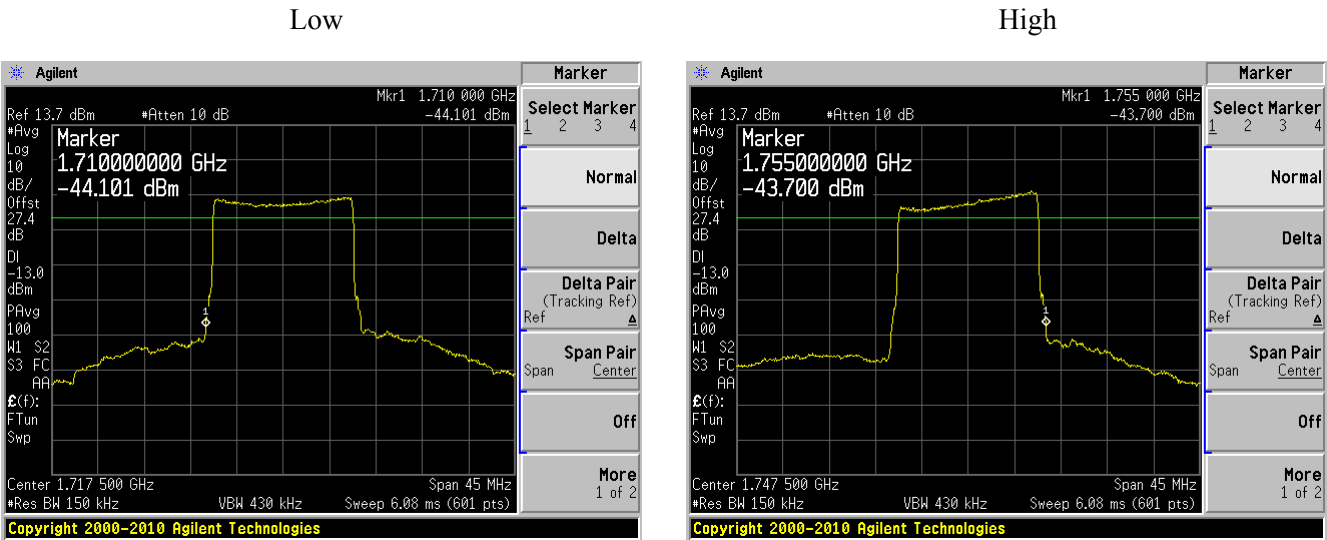
High



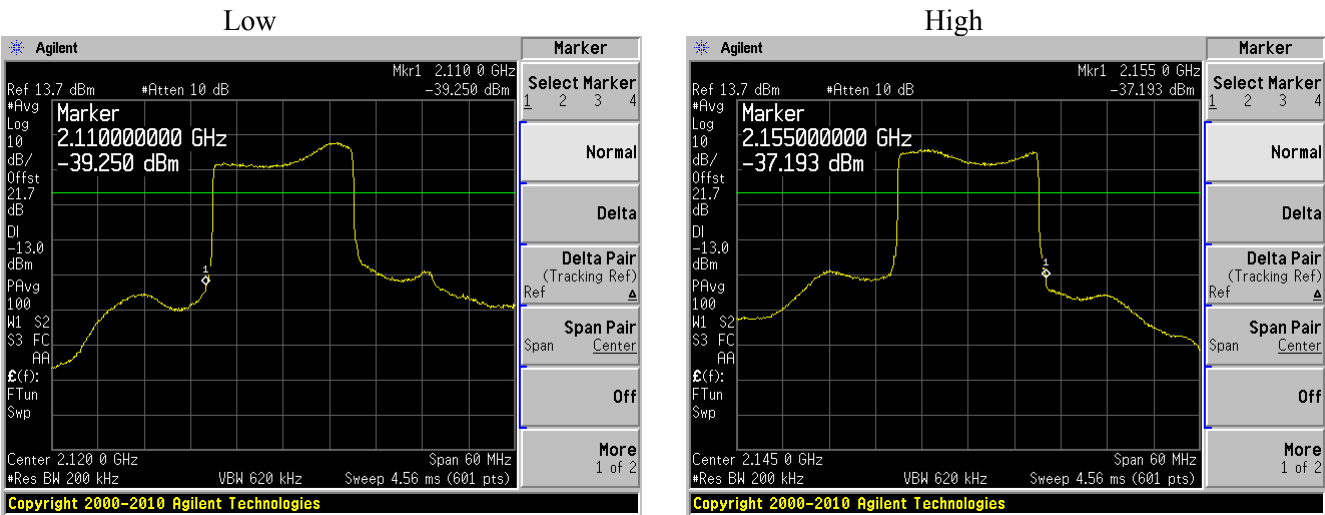
LTE Band 4, 15 MHz, QPSK, DL



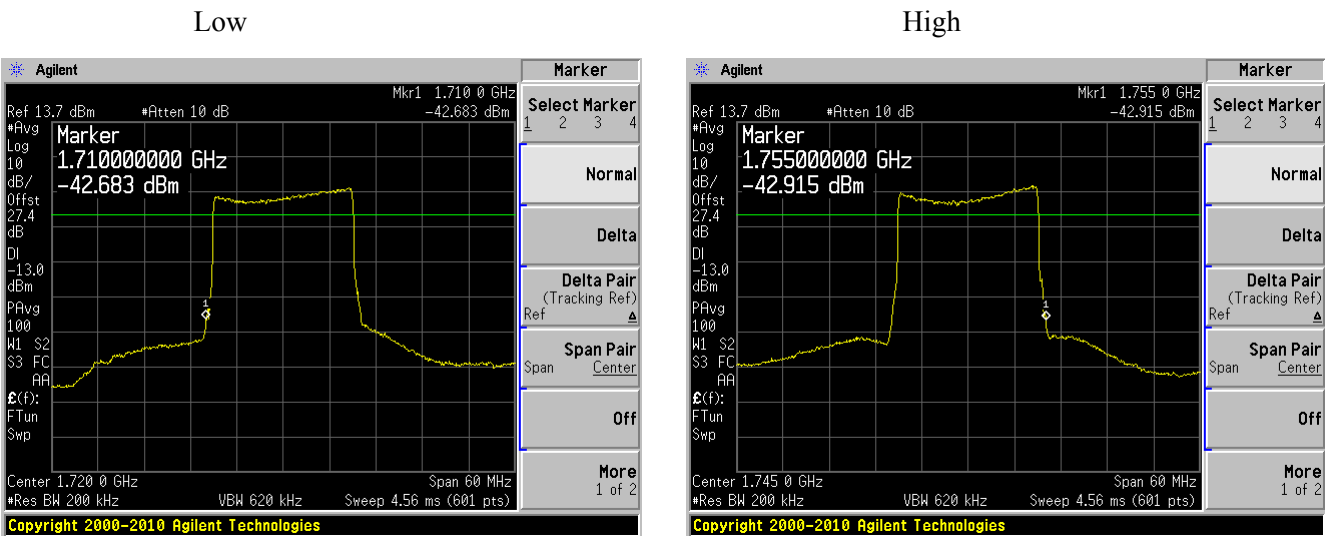
LTE Band 4, 15 MHz, QPSK, UL



LTE Band 4, 20 MHz, QPSK, DL

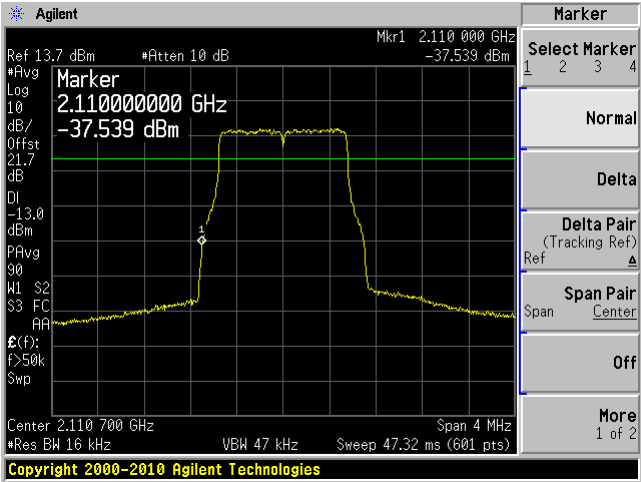


LTE Band 4, 20 MHz, QPSK, UL

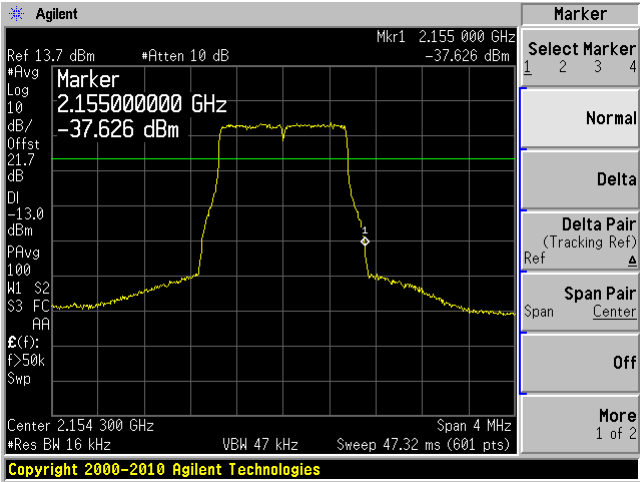


LTE Band 4, 1.4 MHz, 16QAM, DL

Low

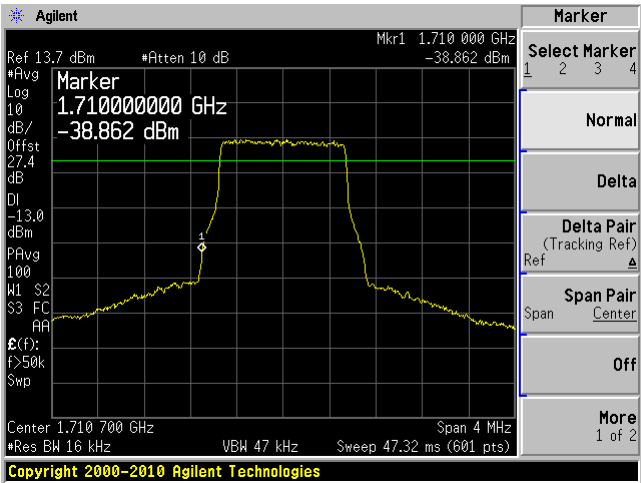


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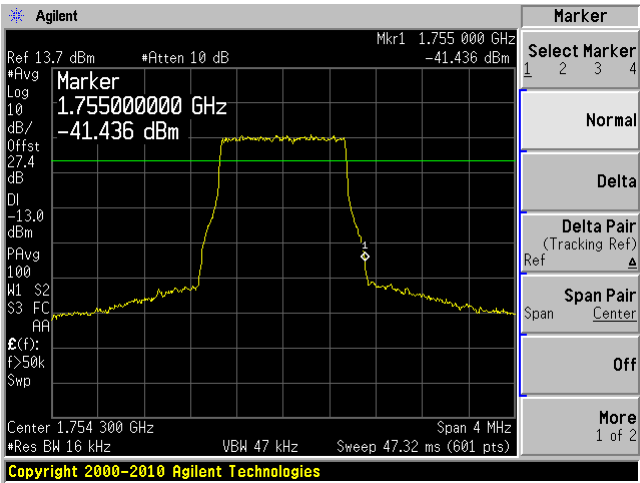


LTE Band 4, 1.4 MHz, 16QAM, UL

Low



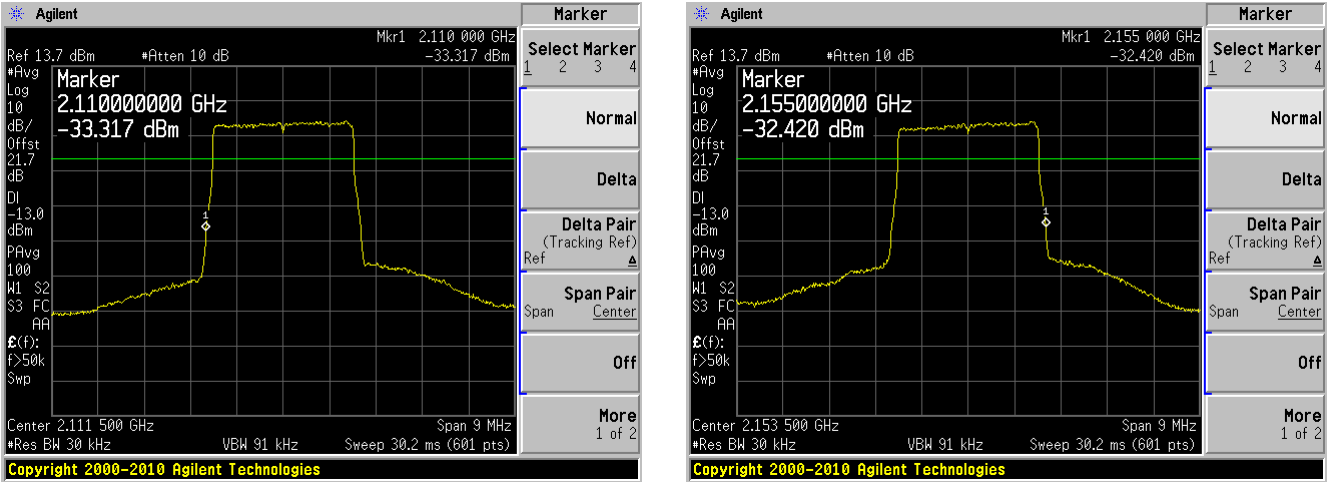
High



LTE Band 4, 3 MHz, 16QAM, DL

Low

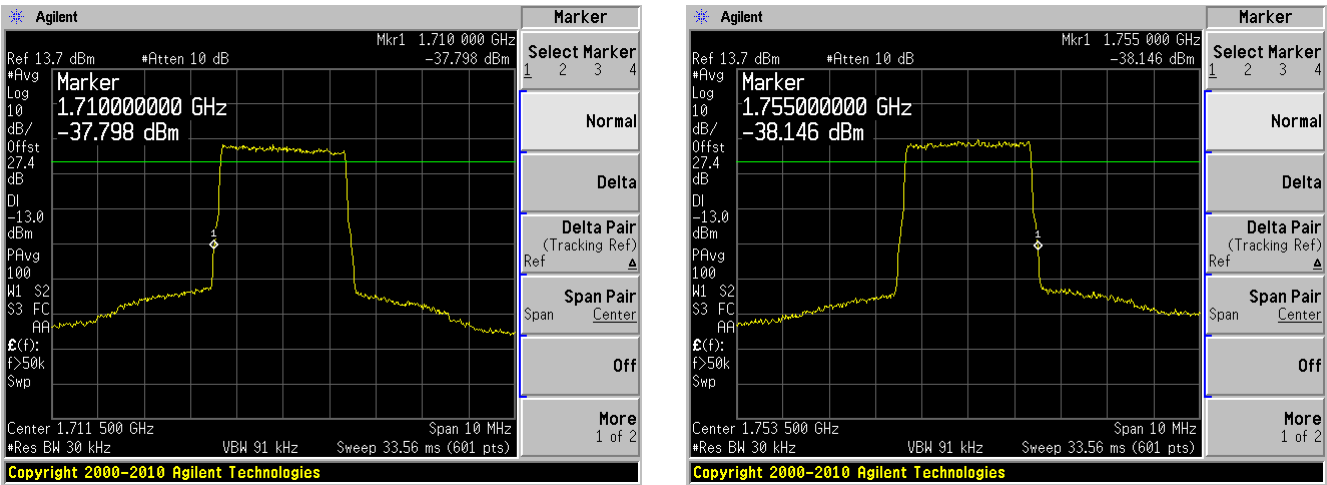
High



LTE Band 4, 3 MHz, 16QAM, UL

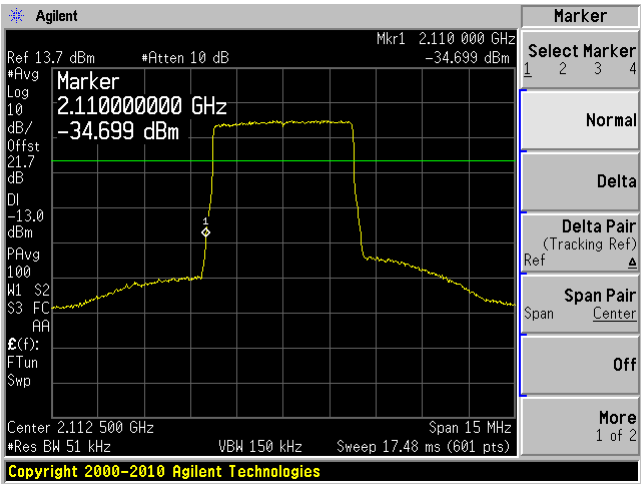
Low

High

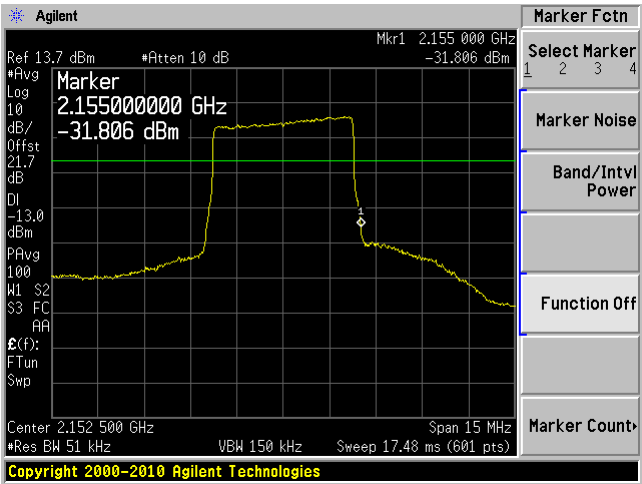


LTE Band 4, 5 MHz, 16QAM, DL

Low

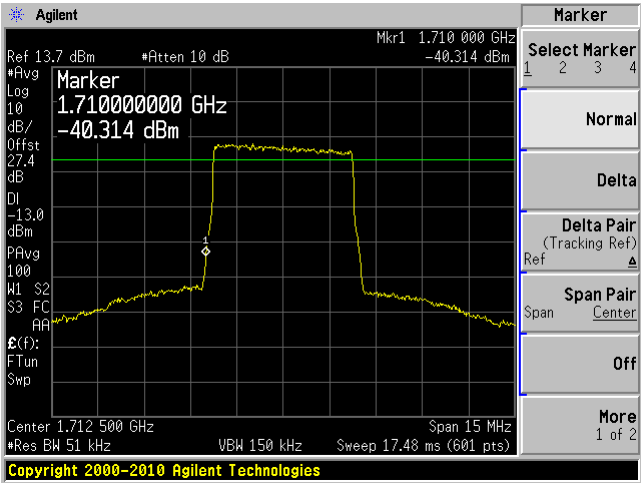


High

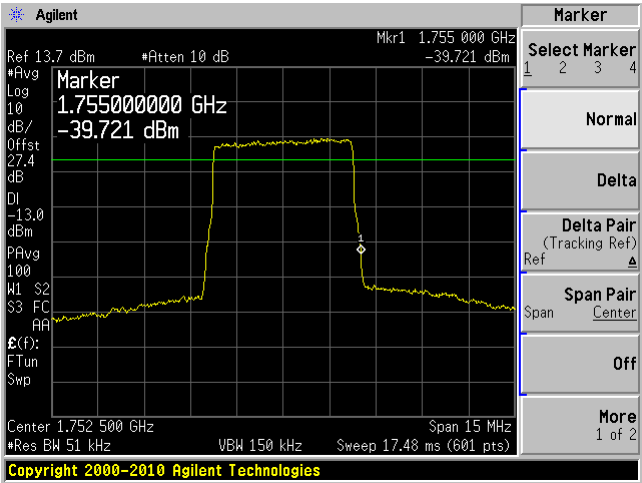


LTE Band 4, 5MHz, 16QAM, UL

Low

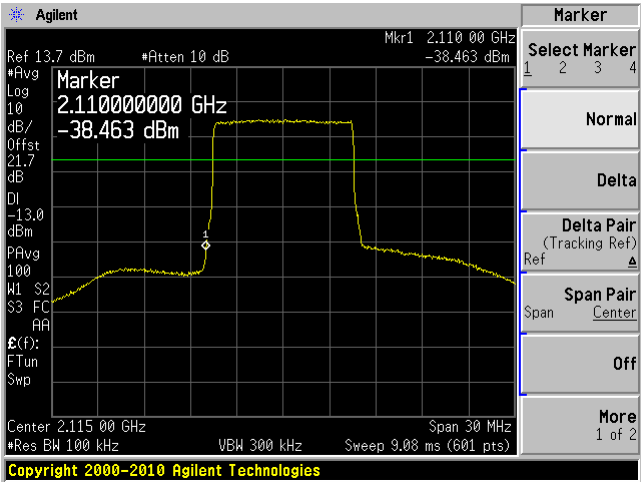


High

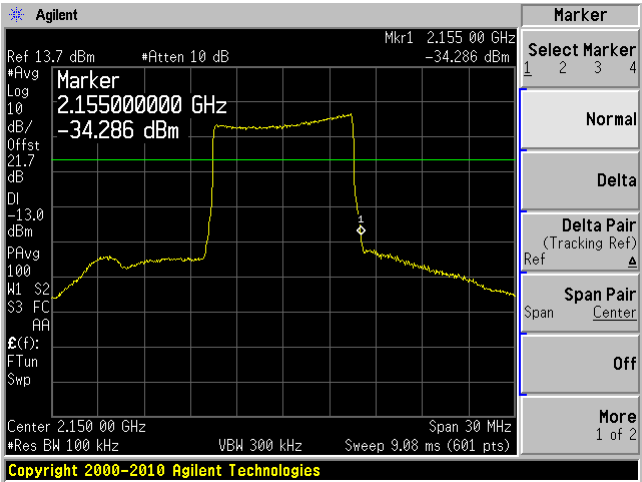


LTE Band 4, 10 MHz, 16QAM, DL

Low

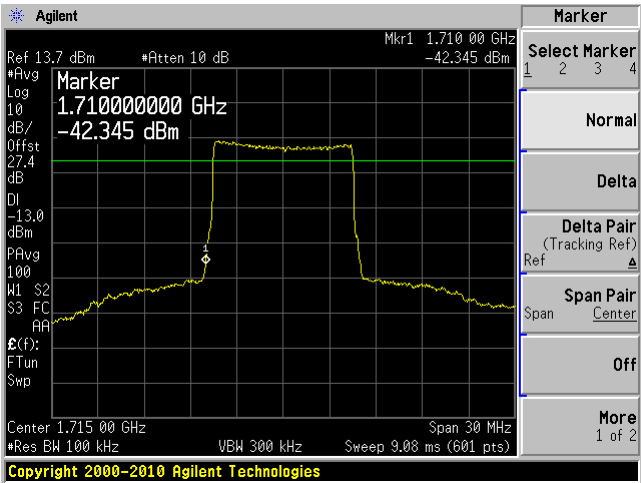


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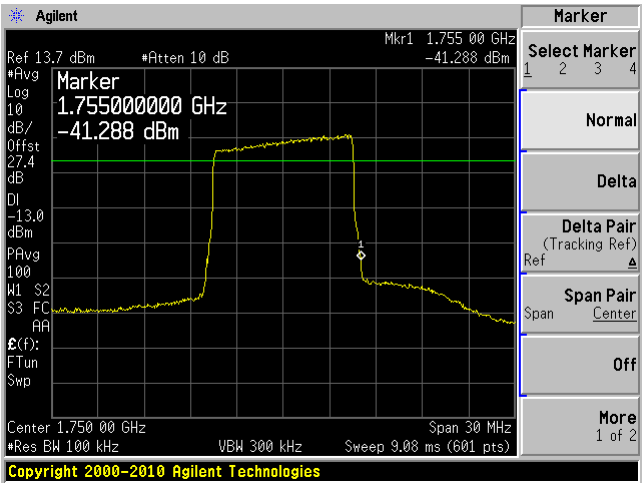


LTE Band 4, 10 MHz, 16QAM, UL

Low

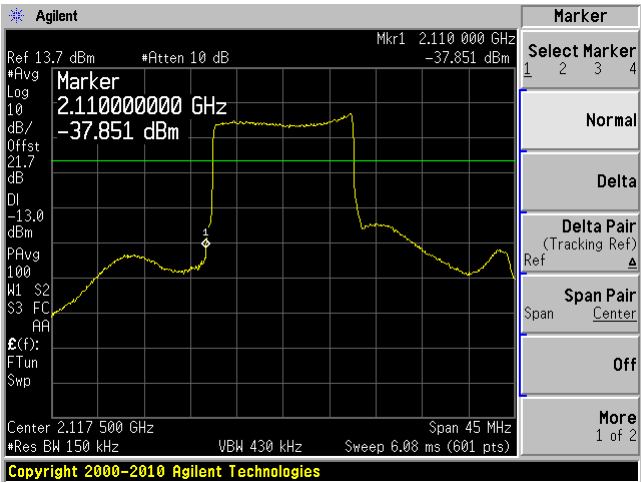


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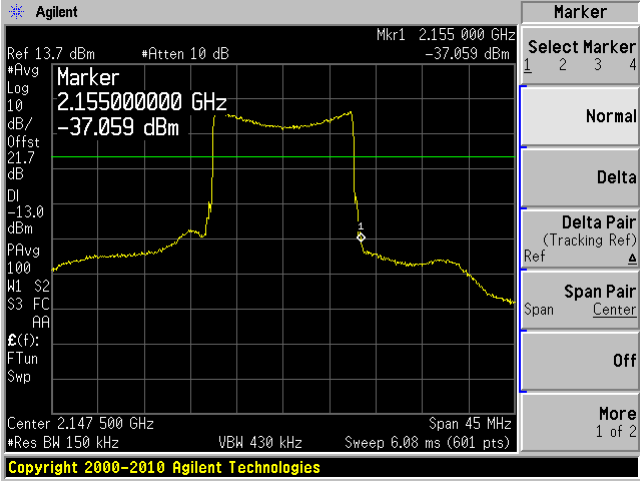


LTE Band 4, 15 MHz, 16QAM, DL

Low

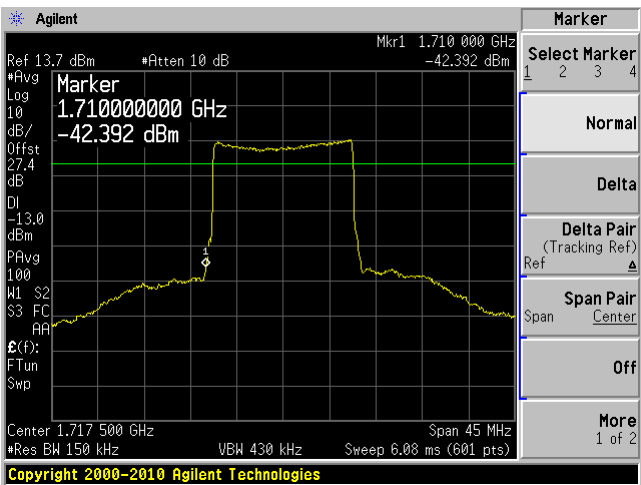


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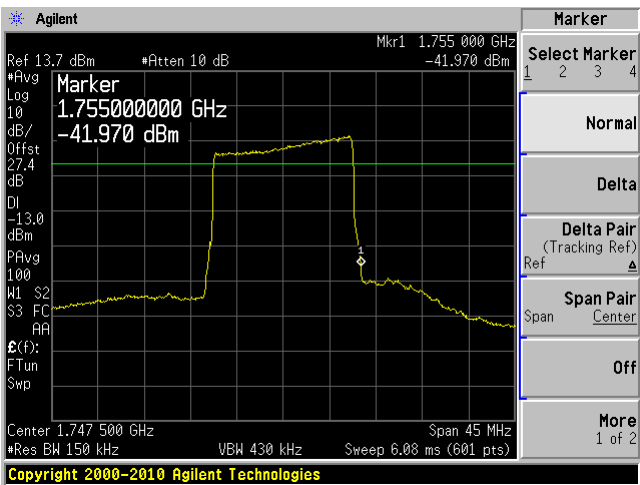


LTE Band 4, 15 MHz, 16QAM, UL

Low

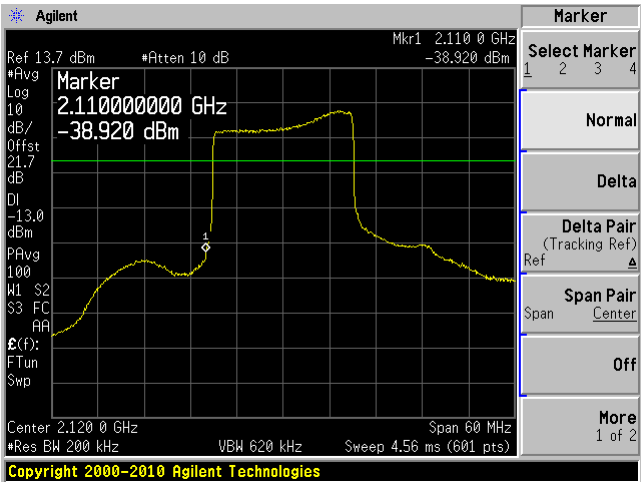


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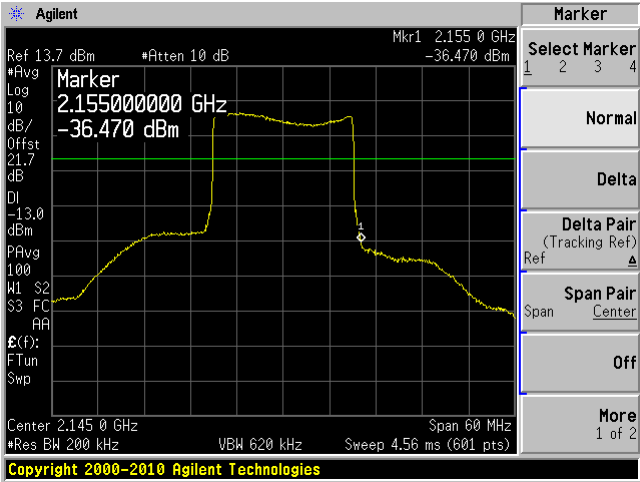


LTE Band 4, 20 MHz, 16QAM, DL

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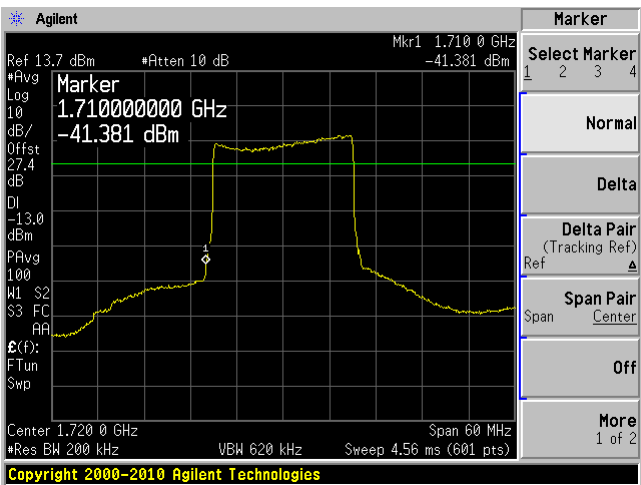


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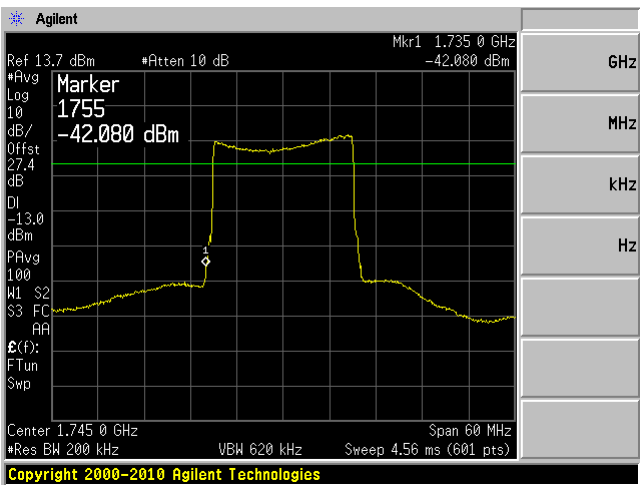


LTE Band 4, 20 MHz, 16QAM, UL

Low

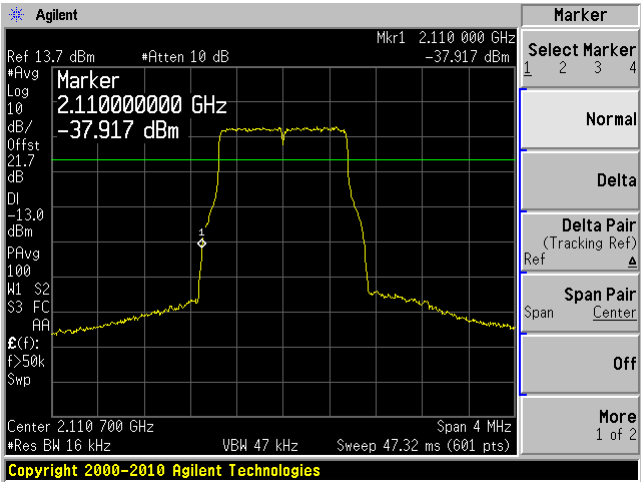


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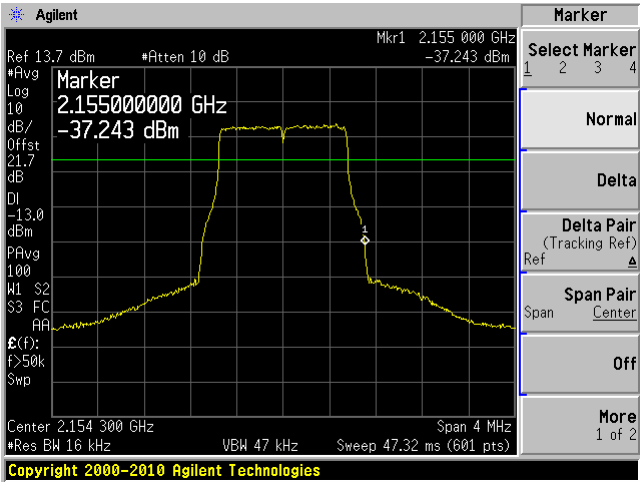


LTE Band 4, 1.4MHz, 64QAM, DL

Low

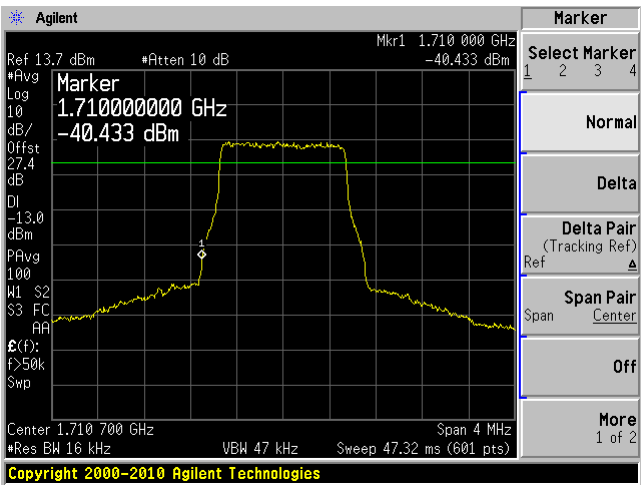


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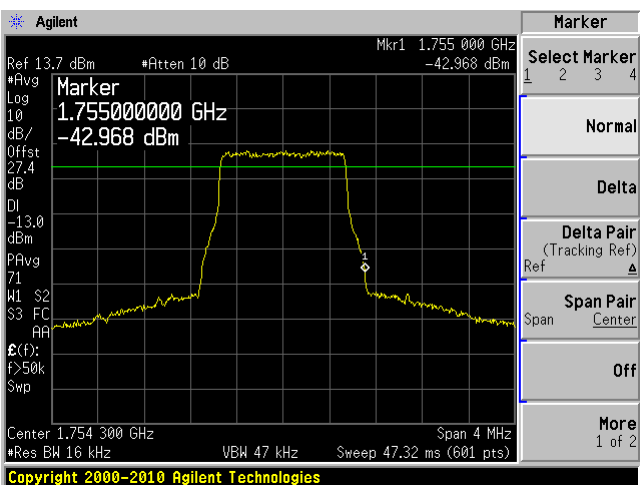


LTE Band 4, 1.4 MHz, 64QAM, UL

Low

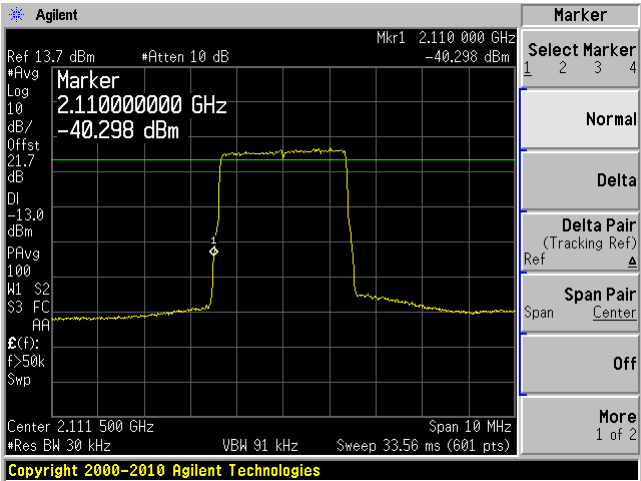


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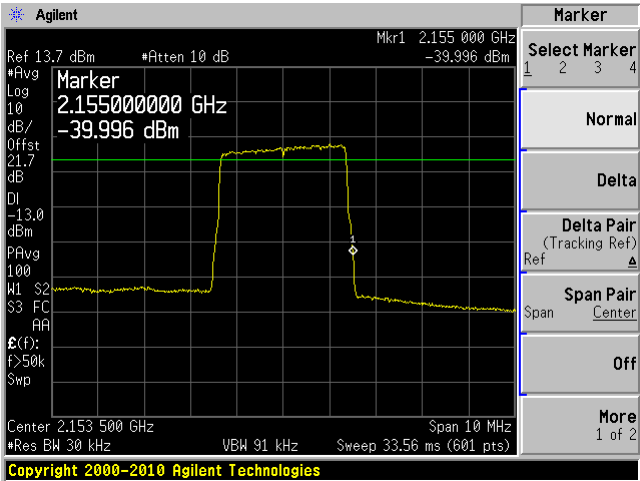


LTE Band 4, 3 MHz, 64QAM, DL

Low

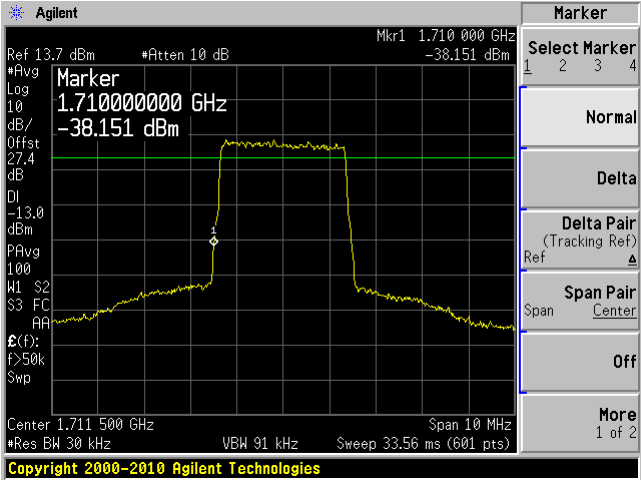


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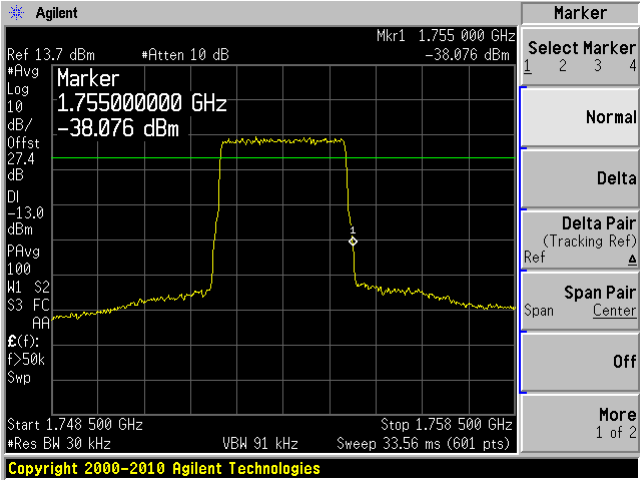


LTE Band 4, 3 MHz, 64QAM, UL

Low

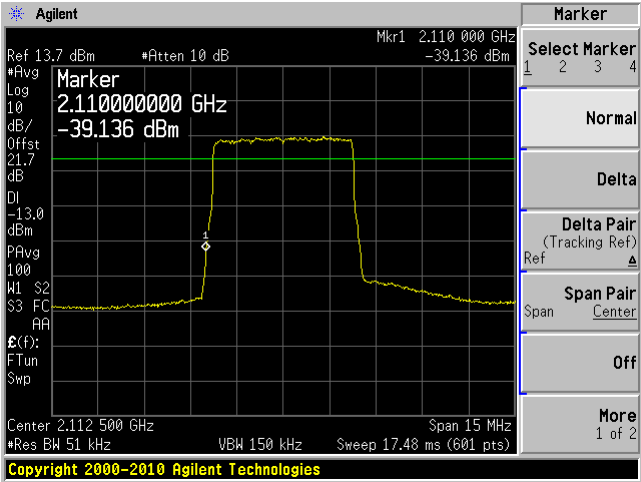


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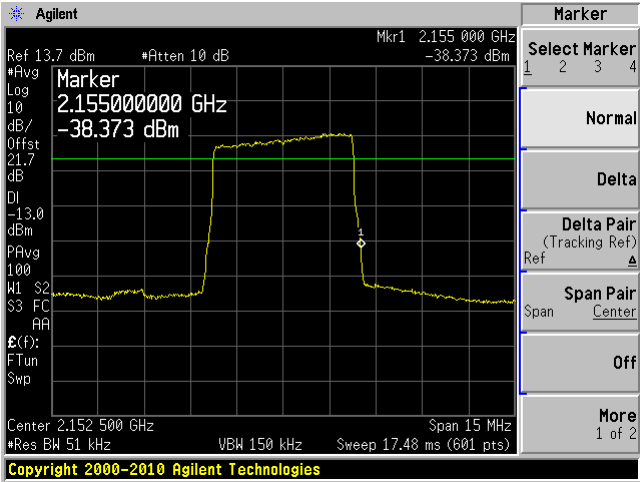


LTE Band 4, 5 MHz, 64QAM, DL

Low

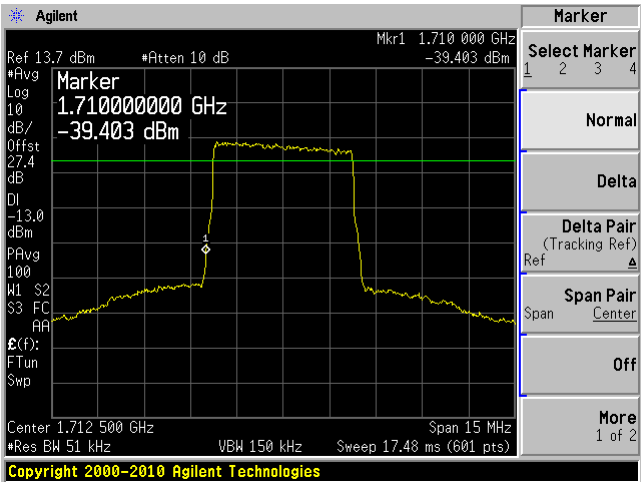


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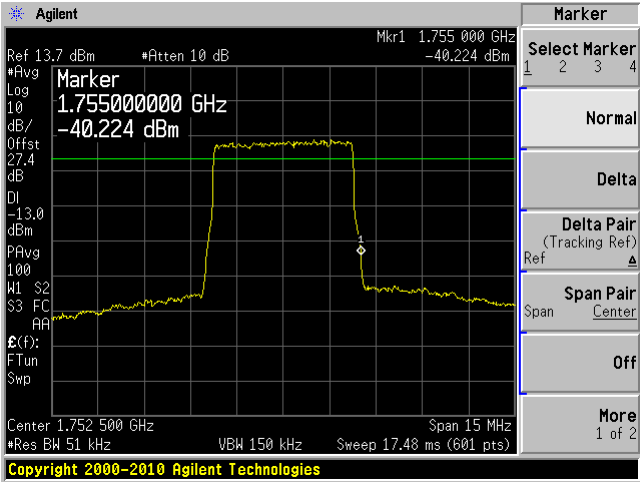


LTE Band 4, 5 MHz, 64QAM, UL

Low

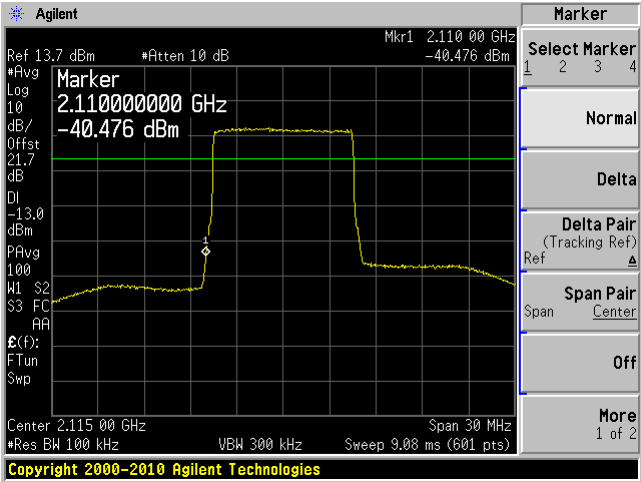


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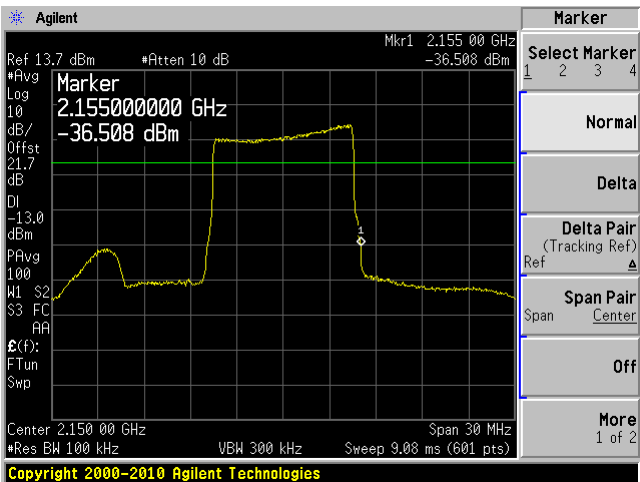


LTE Band 4, 10 MHz, 64QAM, DL

Low

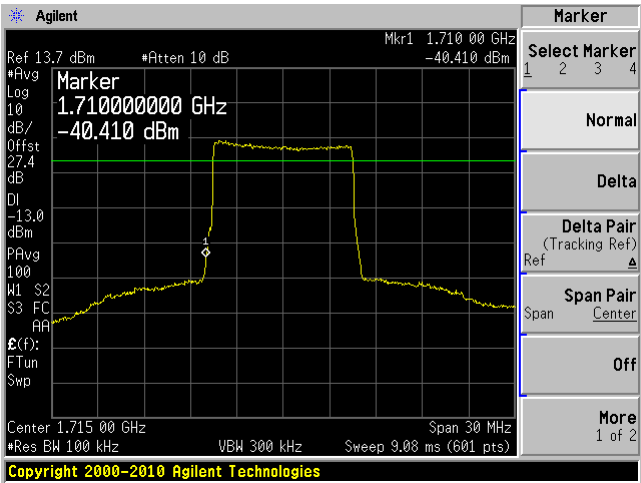


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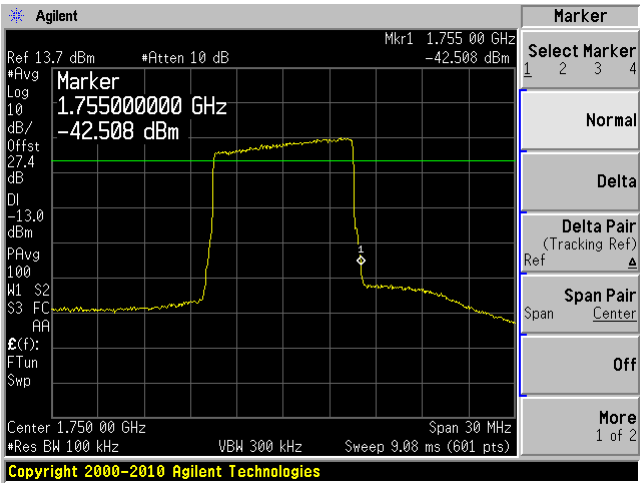


LTE Band 4, 10 MHz, 64QAM, UL

Low

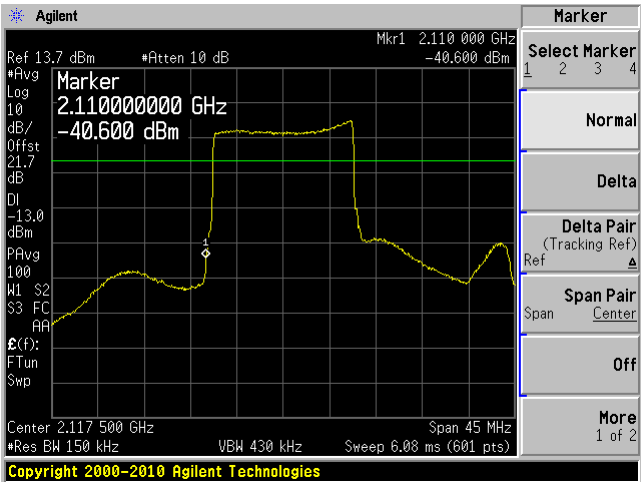


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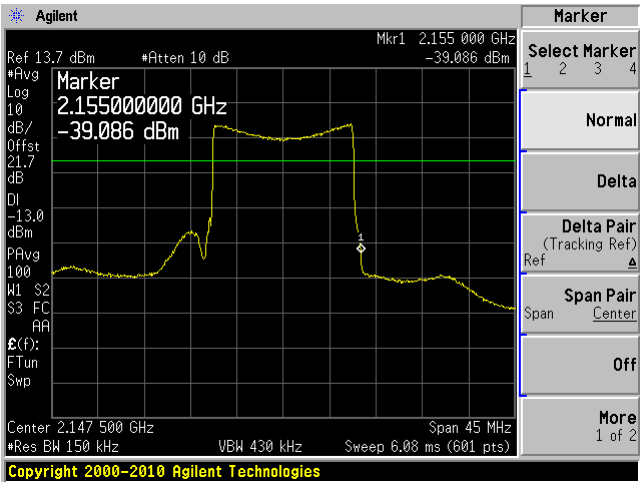


LTE Band 4, 15 MHz, 64QAM, DL

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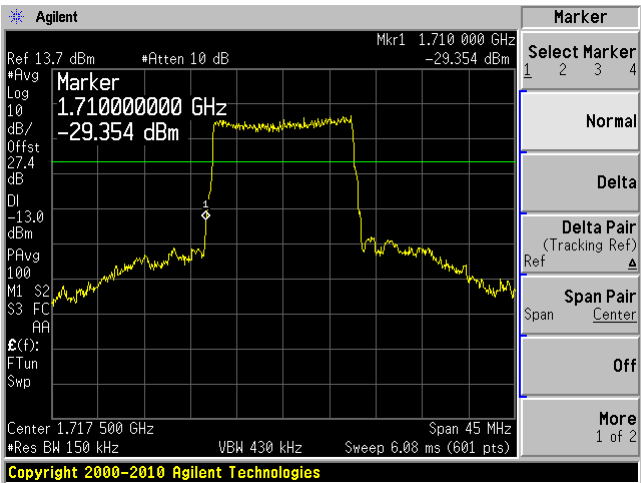


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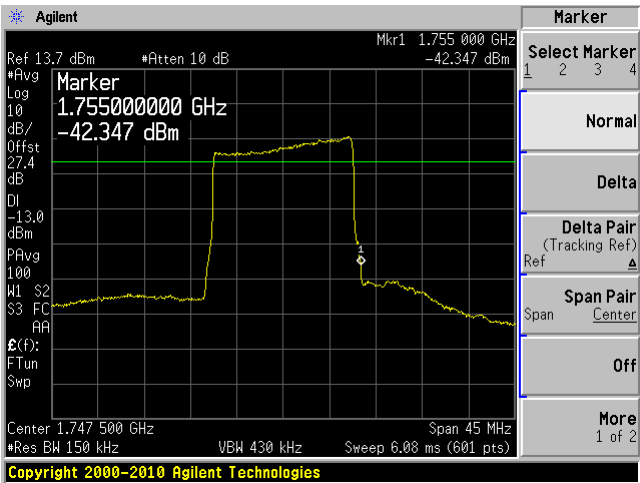


LTE Band 4, 15 MHz, 64QAM, UL

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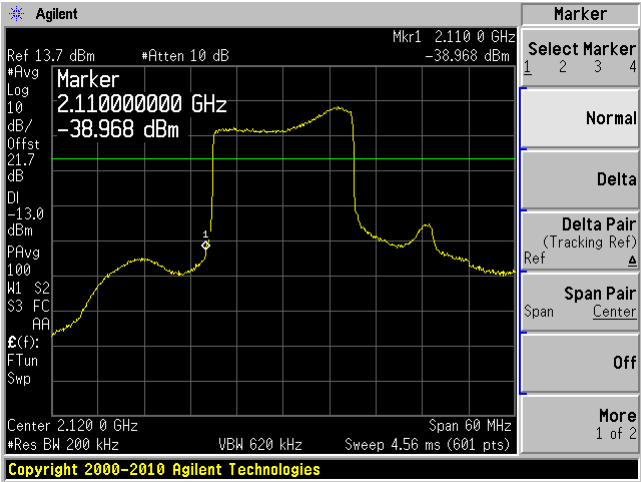


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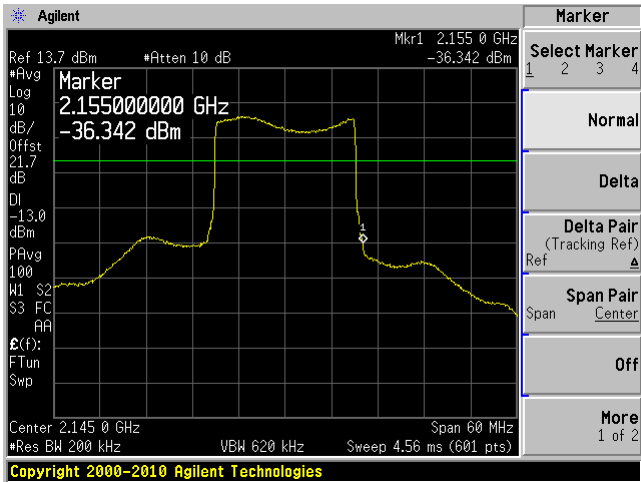


LTE Band 4, 20 MHz, 64QAM, DL

Low

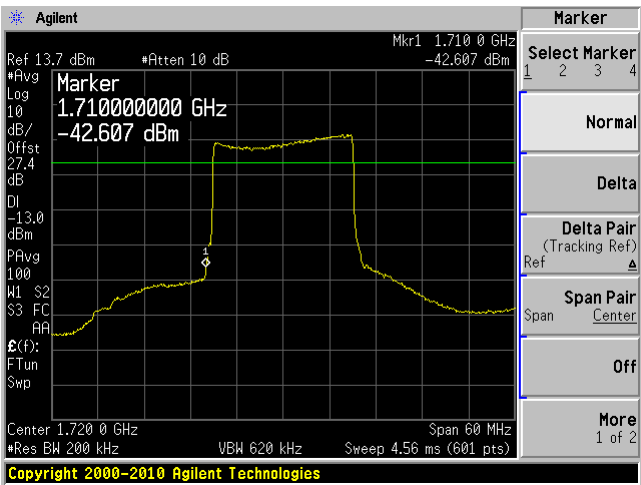


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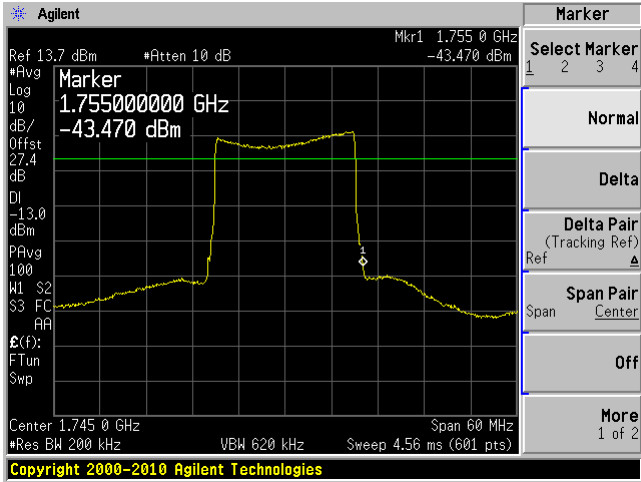


LTE Band 4, 20 MHz, 64QAM, UL

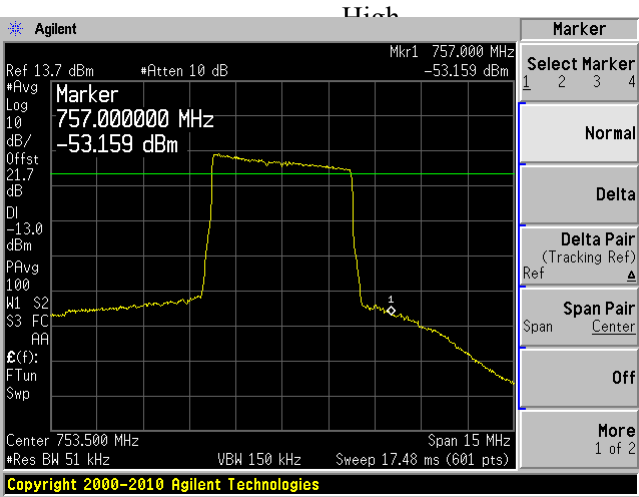
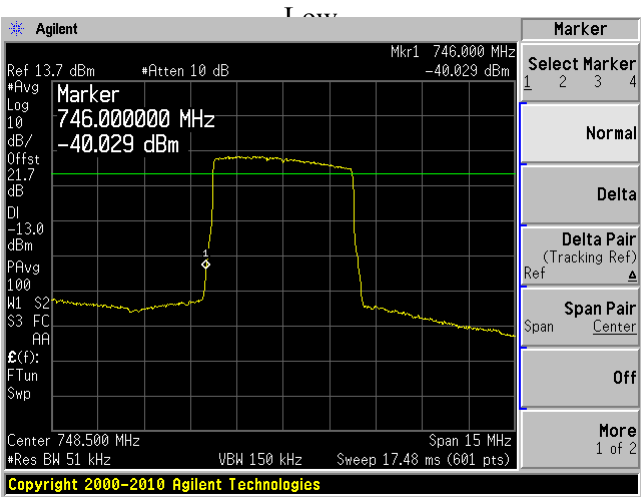
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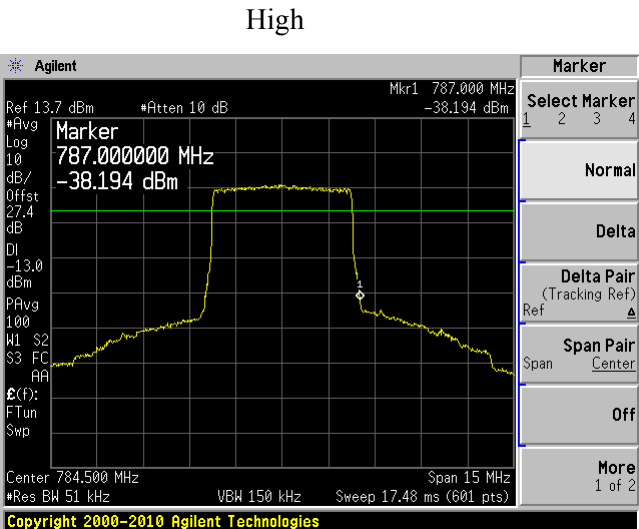
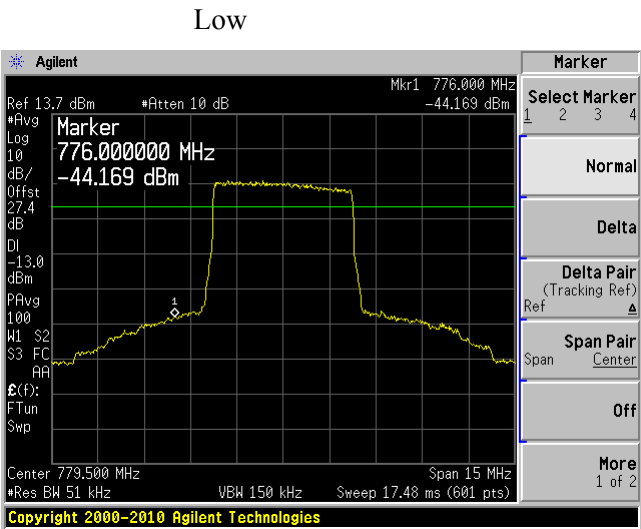
High



LTE Band 13, 5 MHz, QPSK, DL

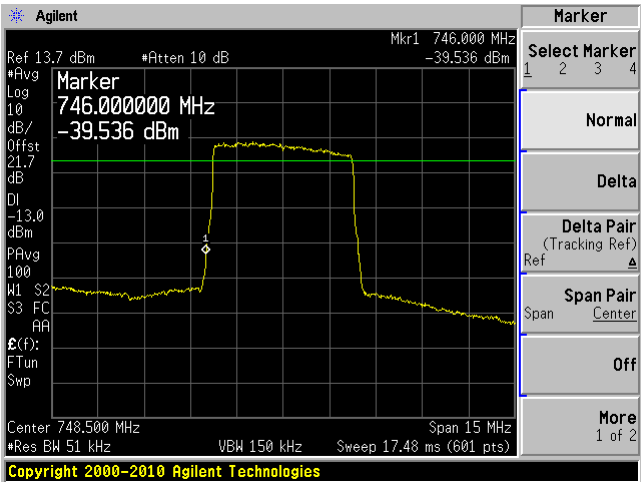


LTE Band 13, 5 MHz, QPSK, UL

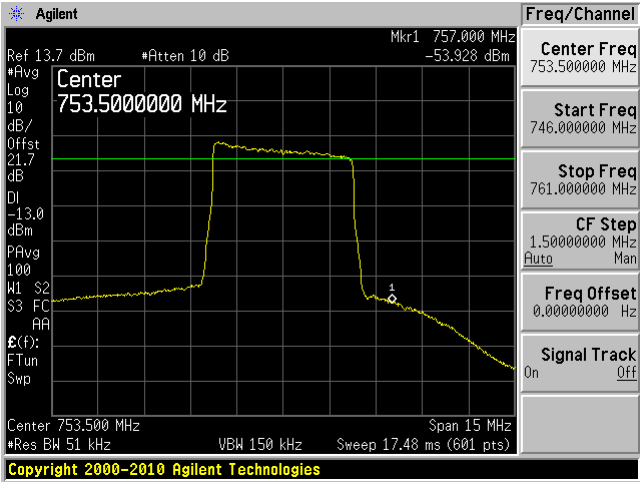


LTE Band 13, 5 MHz, 16QAM, DL

Low

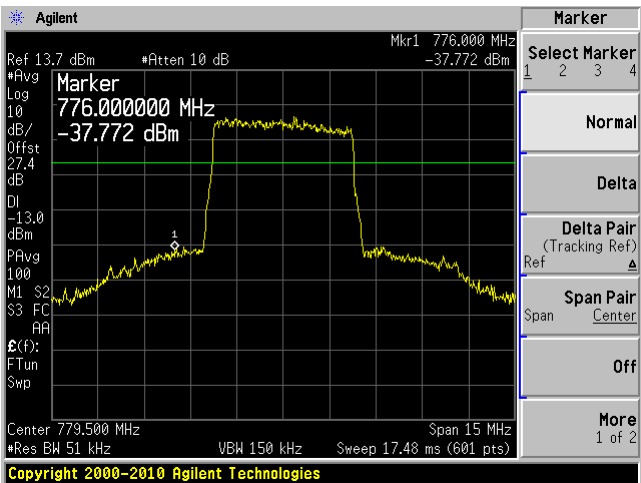


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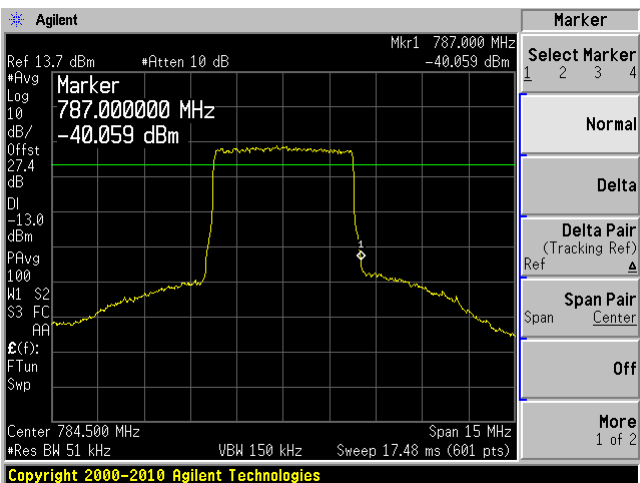


LTE Band 13, 5 MHz, 16QAM, UL

Low

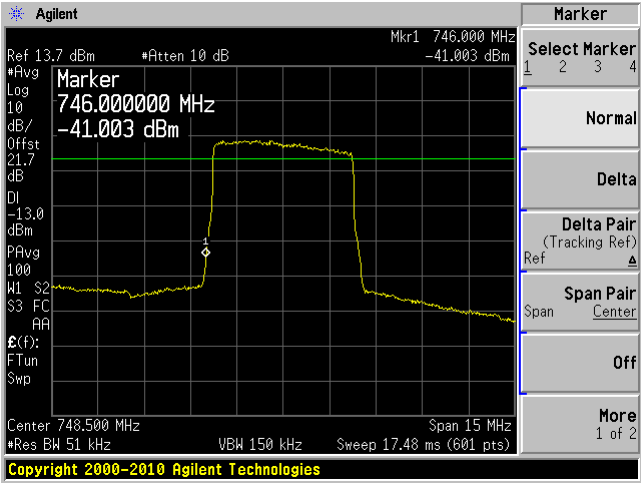


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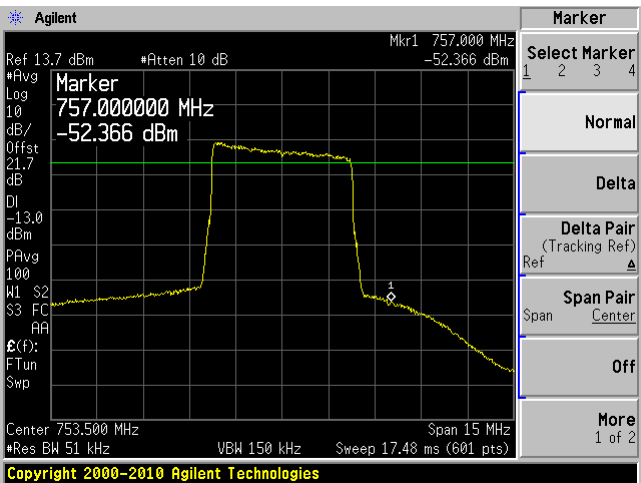


LTE Band 13, 5 MHz, 64QAM, DL

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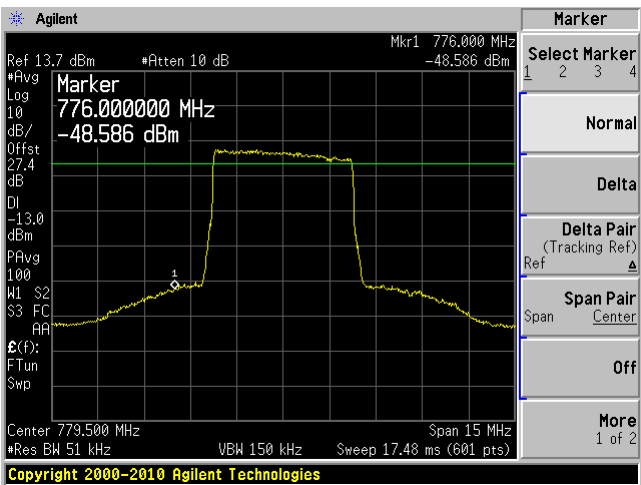


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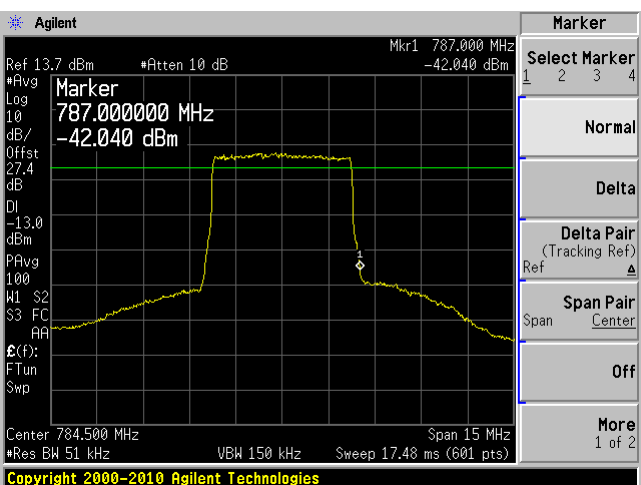


LTE Band 13, 5 MHz, 64QAM, UL

Low

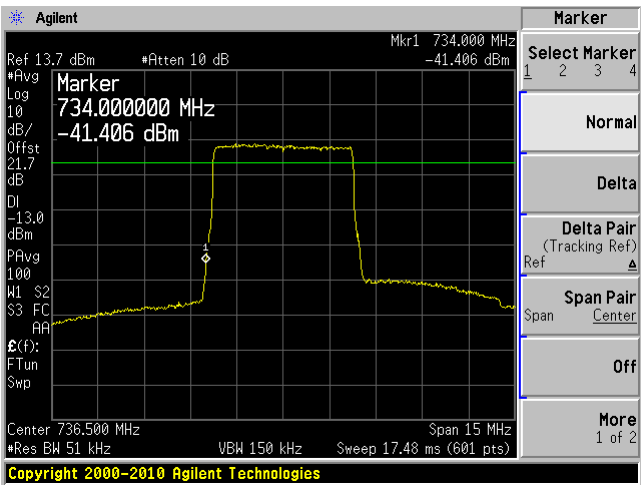


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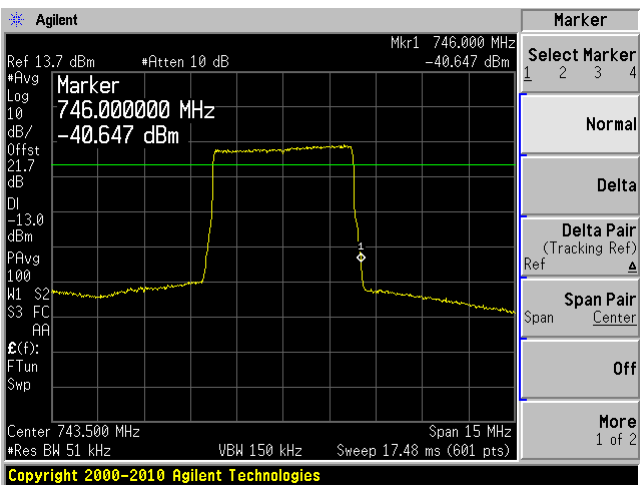


LTE Band 17, 5 MHz, QPSK, DL

Low

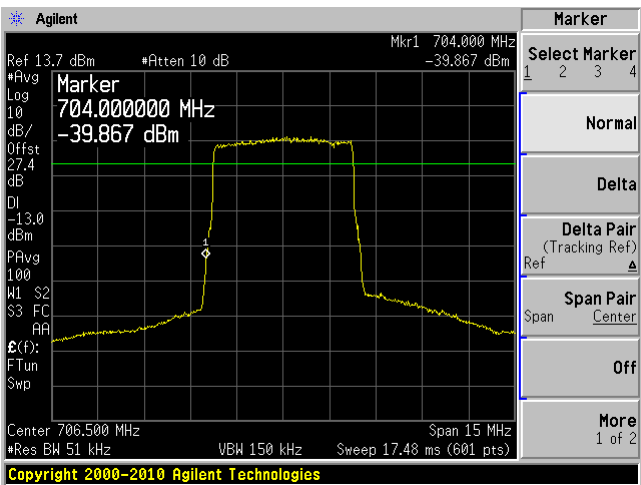


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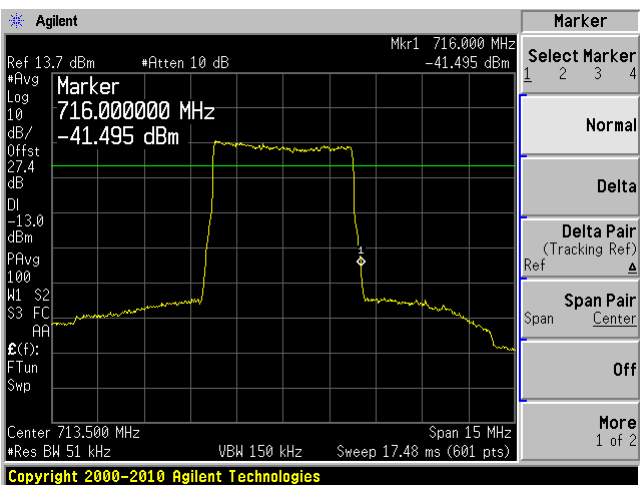


LTE Band 17, 5 MHz, QPSK, UL

Low

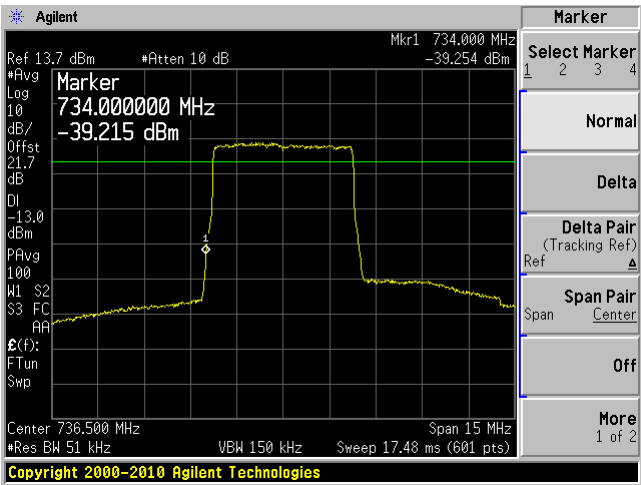


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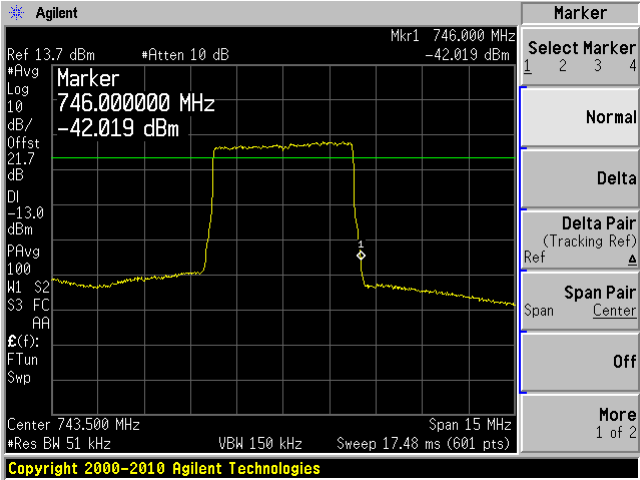


LTE Band 17, 5 MHz, 16QAM, DL

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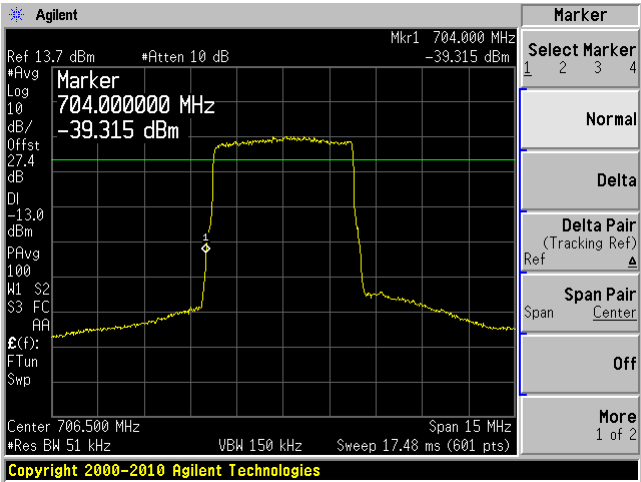


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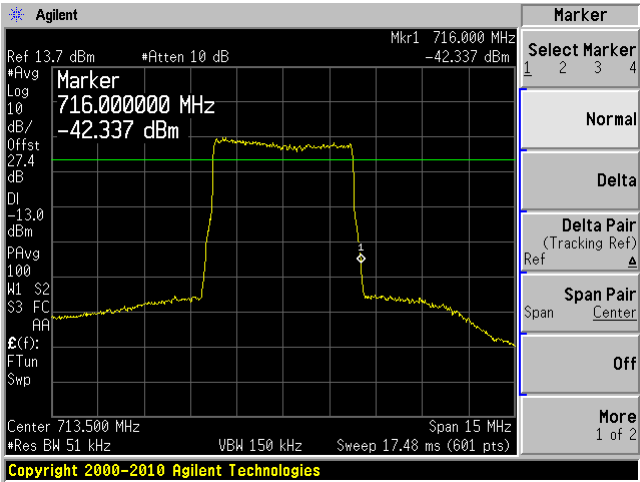


LTE Band 17, 5 MHz, 16QAM, UL

Low

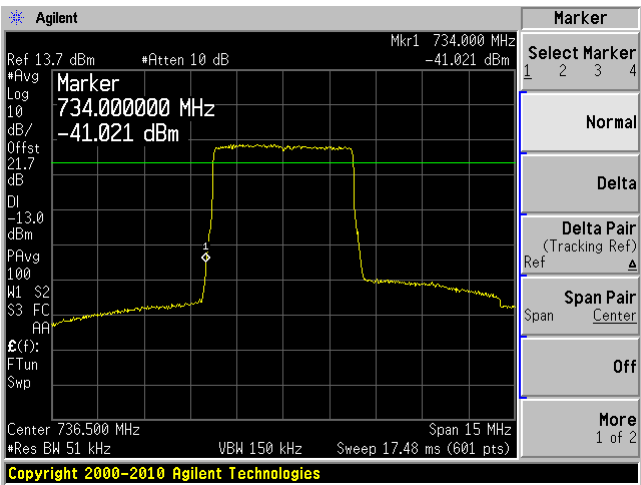


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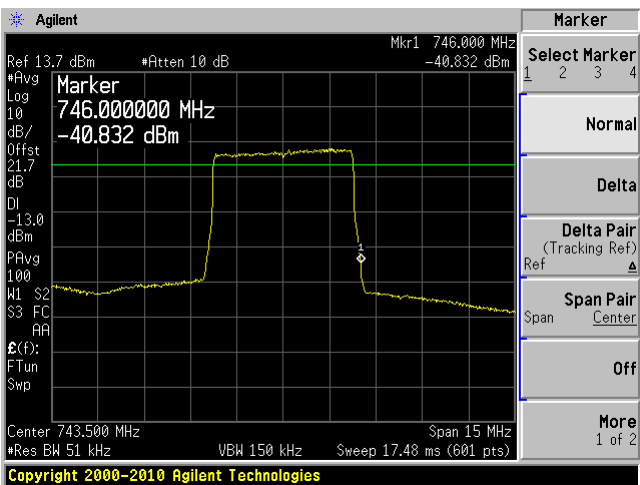


LTE Band 17, 5 MHz, 64QAM, DL

Low

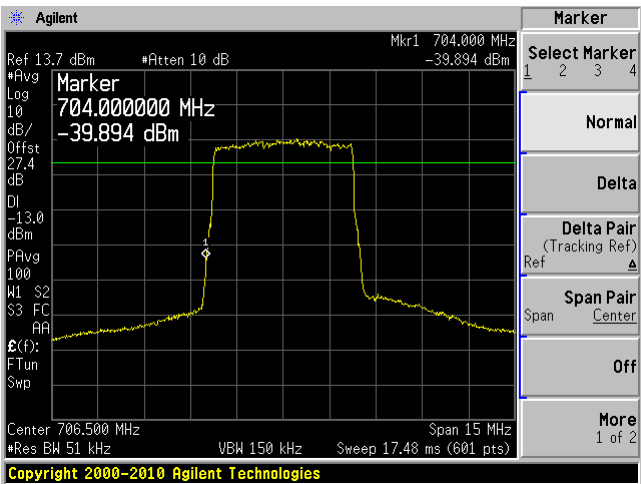


High

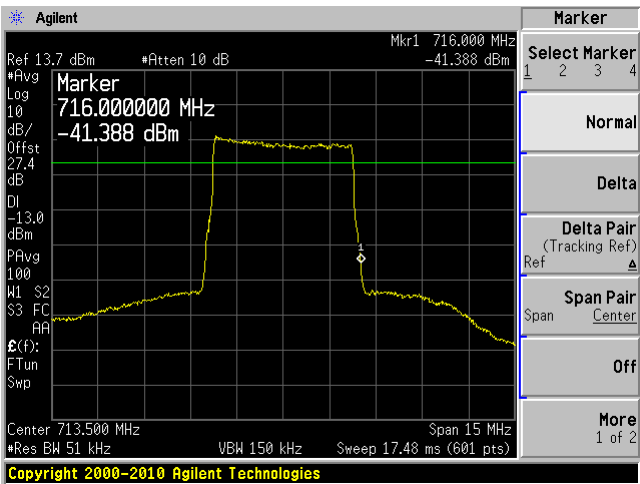


LTE Band 17, 5 MHz, 64QAM, UL

Low



High



9 FCC §20.21 - Out of Band Rejection

9.1 Applicable Standard

According to FCC Part 20.21, a frequency selective booster shall have -20 dB at the band edge referenced to the gain in the center of the pass band of the booster, where band edge is the end of the licensee's allocated spectrum.

9.2 Test Procedure

KDB 935210 D05, Section 3.3.

The RF output of the transceiver was connected to a spectrum analyzer through appropriate attenuation. The span of the spectrum analyzer was set to be wide enough in order to capture the spectrum of entire operating band.

9.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2014-10-16	1 year
Agilent	Signal Generator	E4438C	MY45091309	2014-07-15	1 year

Statement of Traceability: *BACL Corp.* attests that all calibrations have been performed per the A2LA requirements, traceable to the NIST.

9.4 Test Environmental Conditions

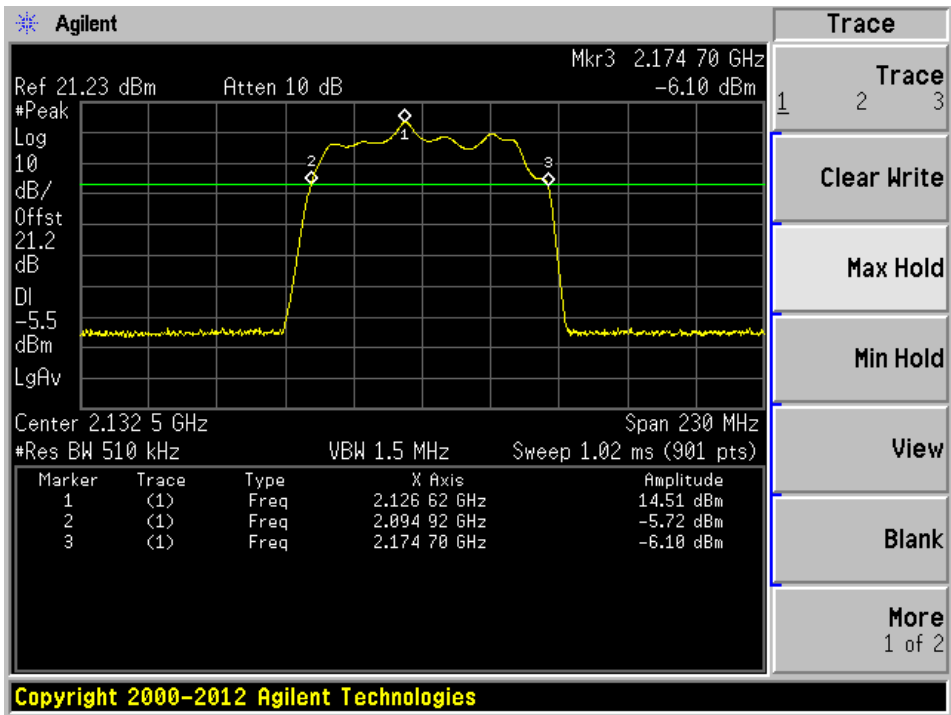
Temperature:	21-23° C
Relative Humidity:	42-48 %
ATM Pressure:	101.4-102 kPa

The testing was performed by Ronak Patel on 2015-06-08 to 2015-06-29 in the RF Site.

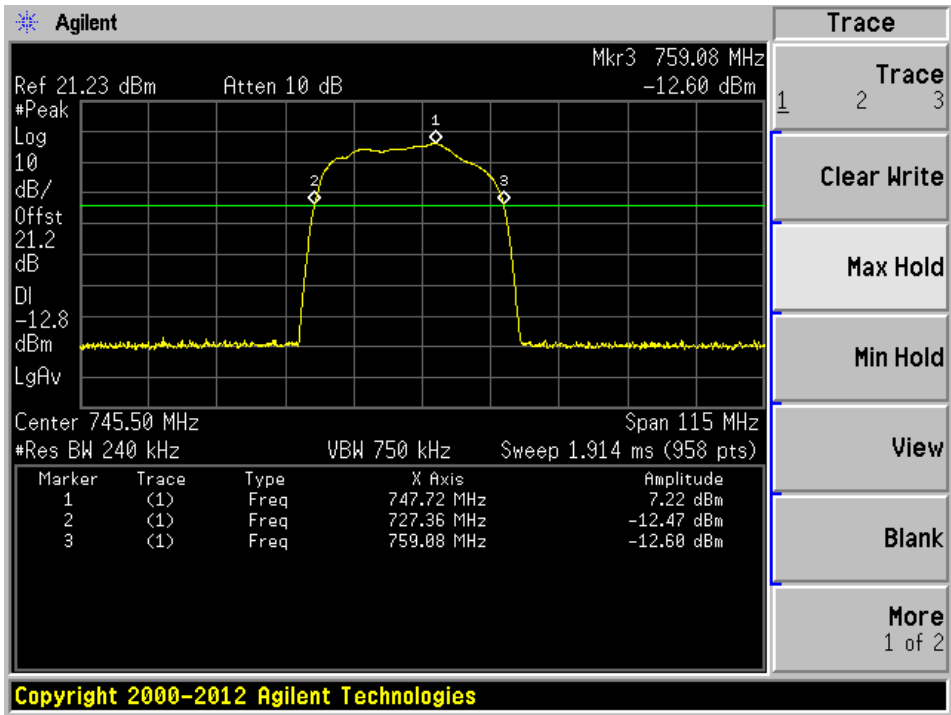
9.5 Test Results

Please refer to the following plot,

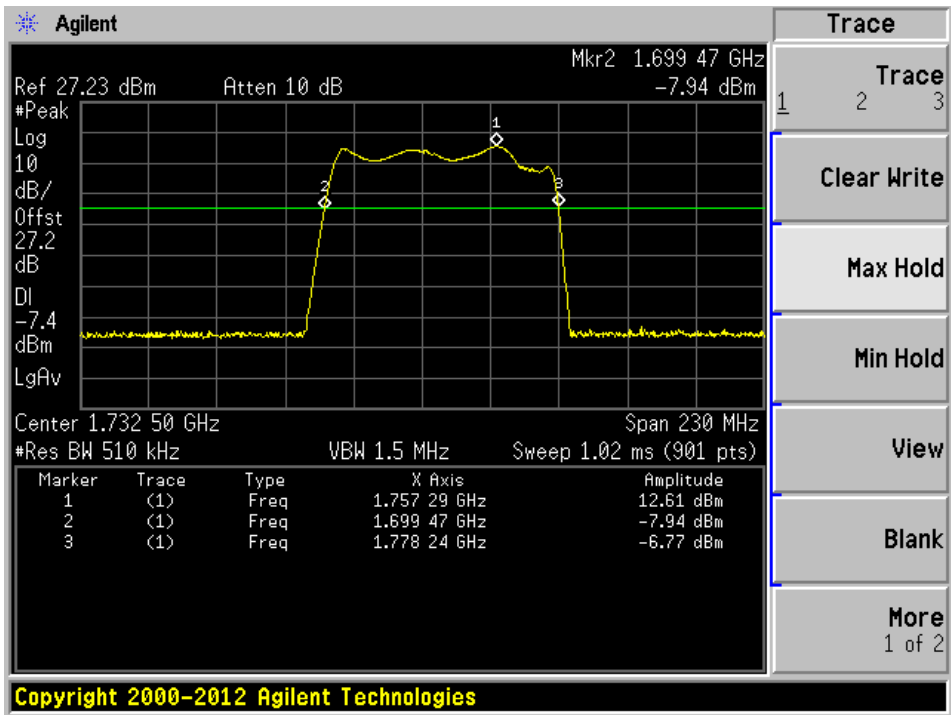
Downlink, 2110 – 2155 MHz



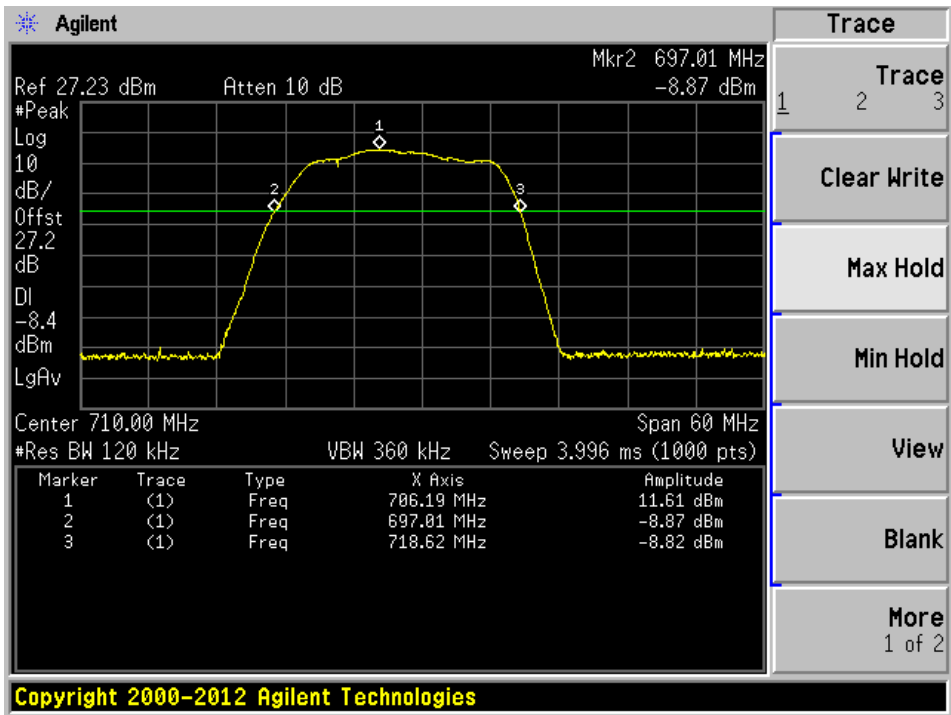
Downlink, 734 – 757 MHz



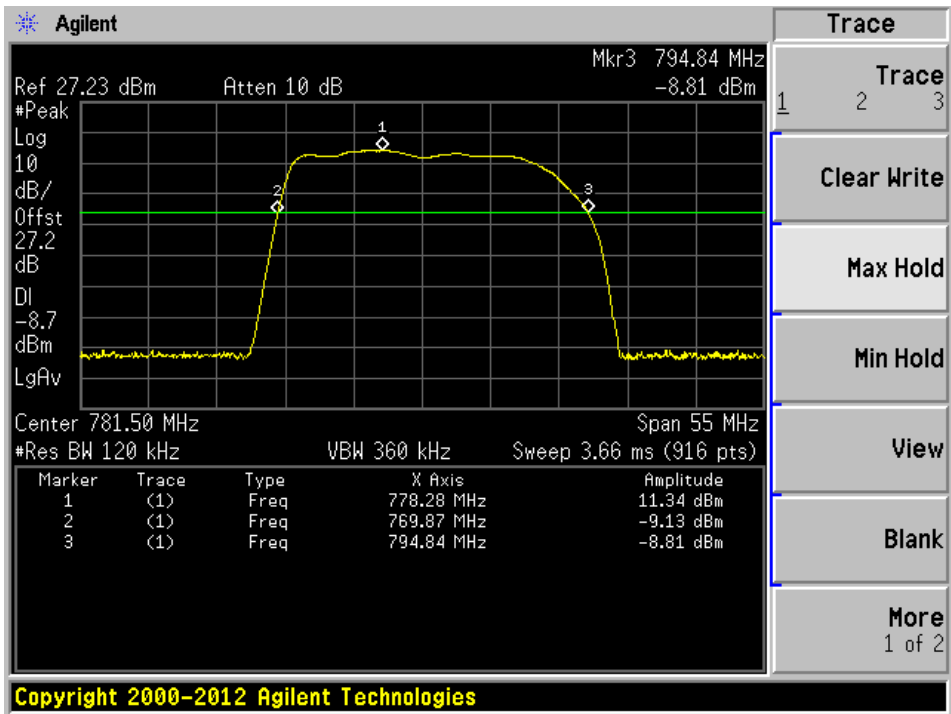
Uplink, 1710 – 1755 MHz



Uplink, 704 – 716 MHz



Uplink, 776 – 787 MHz



10 FCC §1.1307(b) (1) & §2.1091 - RF Exposure

10.1 Applicable Standards

According to §1.1310 and §2.1091 (Mobile Devices) RF exposure is calculated.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*(180/f ²)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

Note: f = frequency in MHz

* = Plane-wave equivalent power density

10.2 MPE Prediction

Predication of MPE limit at a given distance, Equation from OET Bulletin 65, Edition 97-01

$$S = PG/4\pi R^2$$

Where: S = power density

P = power input to antenna

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna

10.3 Test Results

Band 4

Downlink (Bidirectional)

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>15.80</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>38.460</u>
<u>Prediction distance (cm):</u>	<u>30</u>
<u>Prediction frequency (MHz):</u>	<u>2150</u>
<u>Antenna Gain, typical (dBi):</u>	<u>10</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>10</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.014</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>1.0</u>

Downlink (Omnidirectional)

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>15.80</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>38.460</u>
<u>Prediction distance (cm):</u>	<u>30</u>
<u>Prediction frequency (MHz):</u>	<u>2150</u>
<u>Antenna Gain, typical (dBi):</u>	<u>5</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>3.163</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.0044</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>1.0</u>

Uplink

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>16</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>39.811</u>
<u>Prediction distance (cm):</u>	<u>30</u>
<u>Prediction frequency (MHz):</u>	<u>1710.8</u>
<u>Antenna Gain, typical (dBi):</u>	<u>10</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>10</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.036</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>1.0</u>

Band 13 & Band 17**Downlink (Bidirectional)**

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>15.78</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>37.845</u>
<u>Prediction distance (cm):</u>	<u>30</u>
<u>Prediction frequency (MHz):</u>	<u>751</u>
<u>Antenna Gain, typical (dBi):</u>	<u>8.5</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>7.080</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.0238</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>0.500</u>

Downlink (Omnidirectional)

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>15.78</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>37.845</u>
<u>Prediction distance (cm):</u>	<u>30</u>
<u>Prediction frequency (MHz):</u>	<u>751</u>
<u>Antenna Gain, typical (dBi):</u>	<u>3.5</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>2.239</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.0075</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>0.500</u>

Uplink

<u>Maximum peak output power at antenna input terminal (dBm):</u>	<u>15.98</u>
<u>Maximum peak output power at antenna input terminal (mW):</u>	<u>39.628</u>
<u>Prediction distance (cm):</u>	<u>30</u>
<u>Prediction frequency (MHz):</u>	<u>706.5</u>
<u>Antenna Gain, typical (dBi):</u>	<u>8.5</u>
<u>Maximum Antenna Gain (numeric):</u>	<u>7.080</u>
<u>Power density at predication frequency and distance (mW/cm²):</u>	<u>0.0249</u>
<u>MPE limit for uncontrolled exposure at predication frequency (mW/cm²):</u>	<u>0.471</u>

Results

For uplink and downlink, the highest power density levels at **30 cm** are below the MPE uncontrolled exposure limit.