6 FCC §2.1053 & §24.238(a) - Spurious Radiated Emissions

6.1 Applicable Standards

According to FCC §24.238(a) 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 = $10 \log (TX \text{ Power in Watts}/0.001)$ – the absolute level Spurious attenuation limit in dB = $43 + 10 \log_{10}$ (power out in Watts)

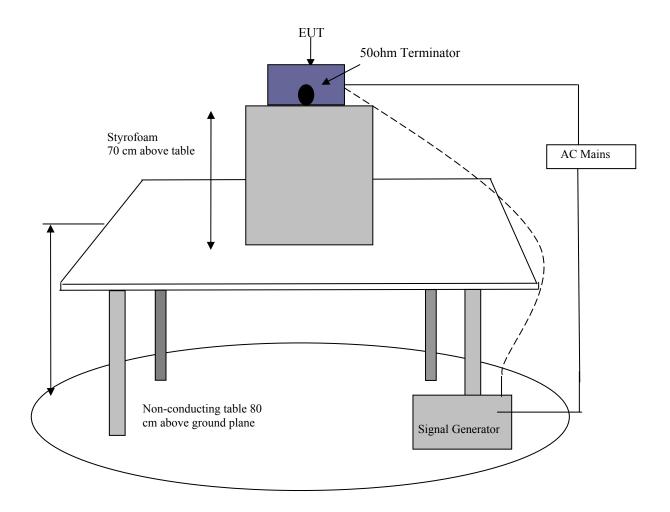
6.3 Test Equipment List and Details

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/ Agilant	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 Bo Li on 2014-04-18 in 5 Meter Chamber 3.

6.6 Test Results

Carrier Wave Signal

Downlink (Channel frequency = 1940 MHz)

Indica	ated		Test Antenn			S	Substituted				
Frequency (MHz)	S.A. Amp. (dBuV)	Azimuth (degree)	Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Correction		Absolute Level (dBm)	Limit (dBm)	Margin (dB)
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	Н	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	Н	106.156	-54.12	0	0.26	-54.38	-13	-41.38
1000	49.35	260	100	V	1000	-54.37	6.845	0.64	-48.165	-13	-35.165
3862	52.73	89	100	Н	3862	-40.68	9.251	1.47	-32.899	-13	-19.899
3862	54.63	290	100	V	3862	-39.66	8.653	1.47	-32.477	-13	-19.477
1990	46.41	307	100	Н	1990	-53.81	8.983	0.92	-45.747	-13	-32.747

Downlink (Channel frequency = 1960 MHz)

Indica	ated		Test A	ntenna		S	Substituted				
Frequency (MHz)	S.A. Amp. (dBuV)	Azimuth (degree)	Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Correction		Absolute Level (dBm)	Limit (dBm)	Margin (dB)
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	Н	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	Н	106.156	-54.12	0	0.26	-54.38	-13	-41.38
3918	65	52	100	V	3918	-29.29	8.653	1.47	-22.107	-13	-9.107
3918	61.02	21	100	Н	3918	-32.39	9.251	1.47	-24.609	-13	-11.609
9640	45.42	163	100	V	9640	-34.22	11.235	2.3	-25.285	-13	-12.285
9658	45.94	227	100	Н	9658	-40.52	12.074	2.3	-30.746	-13	-17.746

Downlink (Channel frequency = 1980 MHz)

Indica	ated		Test A	ntenna		5	Substituted				
Frequency (MHz)	S.A. Amp. (dBuV)	Azimuth (degree)	Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Correction		Absolute Level (dBm)	Limit (dBm)	Margin (dB)
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	Н	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	Н	106.156	-54.12	0	0.26	-54.38	-13	-41.38
4457	45.76	126	100	V	4457	-47.03	10.398	1.39	-38.022	-13	-25.022
3975	62.83	165	100	Н	3975	-31.06	9.283	1.52	-23.297	-13	-10.297
3975	65.81	93	100	V	3975	-27.17	8.817	1.52	-19.873	-13	-6.873
9613	45.52	181	100	Н	9613	-40.94	12.074	2.3	-31.166	-13	-18.166

Uplink (Channel frequency = 1860 MHz)

Indica	ated		Test A			9	Substituted				
Frequency (MHz)	S.A. Amp. (dBuV)	Azimuth (degree)	Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
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	Н	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	Н	106.156	-54.12	0	0.26	-54.38	-13	-41.38
3692	75	313	100	V	3692	-49.5	9.503	1.47	-41.467	-13	-28.467
3692	75.08	179	100	Н	3692	-48.66	9.586	1.47	-40.544	-13	-27.544
9245	48.66	301	100	V	9245	-63.34	11.701	2.3	-53.939	-13	-40.939
7913	45.72	220	100	Н	7913	-71.84	11.167	1.91	-62.583	-13	-49.583

Uplink (Channel frequency = 1880 MHz)

Indica	ated		Test A	ntenna		5	Substituted				
Frequency (MHz)	S.A. Amp. (dBuV)	Azimuth (degree)	Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
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	Н	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	Н	106.156	-54.12	0	0.26	-54.38	-13	-41.38
3748	83.48	43	100	V	3748	-41.02	9.503	1.47	-32.987	-13	-19.987
3748	82.53	40	100	Н	3748	-41.21	9.533	1.47	-33.147	-13	-20.147
5760	46.4	359	100	V	5760	-74.94	11.073	1.1	-64.967	-13	-51.967
4428	46.15	0	100	Н	4428	-77.77	10.885	1.39	-68.275	-13	-55.275

Uplink (Channel frequency = 1900 MHz)

Indica	ated		Test A	ntenna		5	Substituted				
Frequency (MHz)	S.A. Amp. (dBuV)	Azimuth (degree)	Height (cm)	Polarity (H/V)	Frequency (MHz)	Level (dBm)	Ant. Gain Correction (dB)	Cable Loss (dB)	Absolute Level (dBm)	Limit (dBm)	Margin (dB)
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	Н	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	Н	106.156	-54.12	0	0.26	-54.38	-13	-41.38
3833	78.16	13	100	V	3833	-44.89	9.151	1.47	-37.209	-13	-24.209
3833	73.18	350	100	Н	3833	-49.96	9.255	1.47	-42.175	-13	-29.175
5732	60.75	110	100	V	5732	-60.59	11.073	1.1	-50.617	-13	-37.617
5732	52.99	264	100	Н	5732	-68.26	11.093	1.1	-58.267	-13	-45.267

7 FCC §2.1051 & §24.238(a) - Spurious Emissions at Antenna Terminals

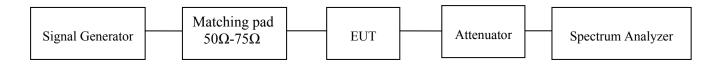
7.1 Applicable Standards

According to FCC §24.238(a) and §2.1051 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 at 1MHz. 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 M		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

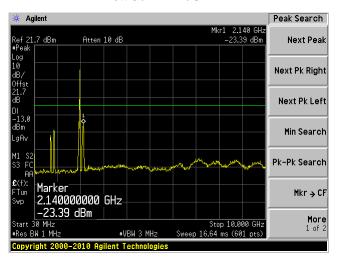
The testing was performed by Ronak Patel 2015-06-08 to 2015-06-29 in the RF Site.

7.5 Test Results

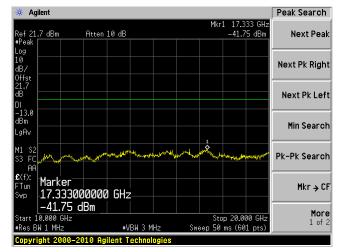
Please refer to the following plots.

GSM/GPRS DL

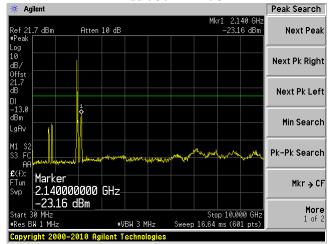
Low 30MHz-10GHz



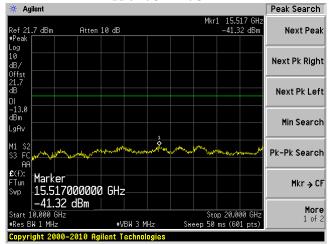
Low 10GHz-20GHz



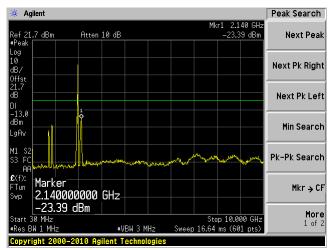
Middle 30MHz-10GHz



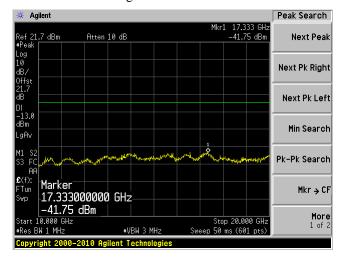
Middle 10GHz-20GHz



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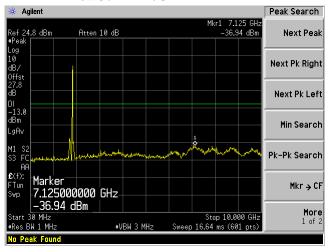


High 10GHz-20GHz

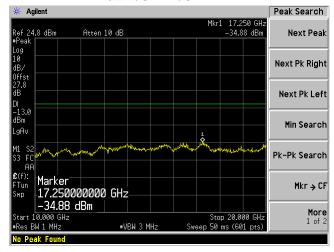


GSM/GPRS UL

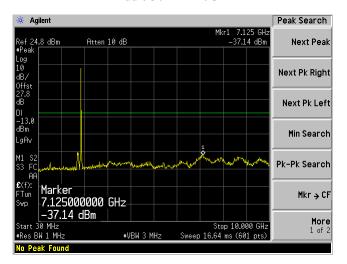
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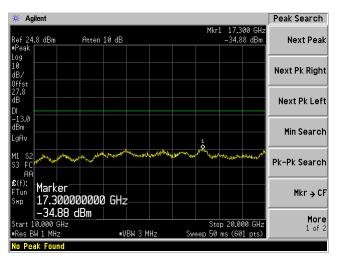


Low 10GHz-20GHz

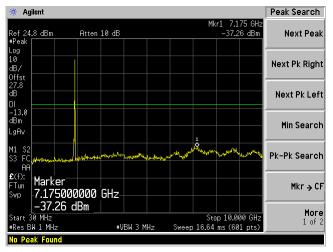


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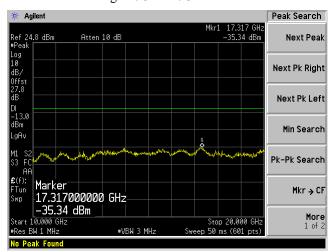




High 30MHz-10GHz

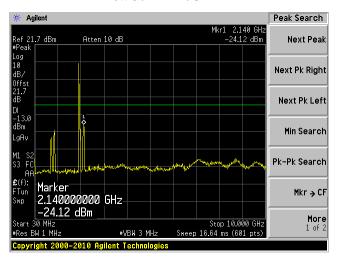


High 10GHz-20GHz

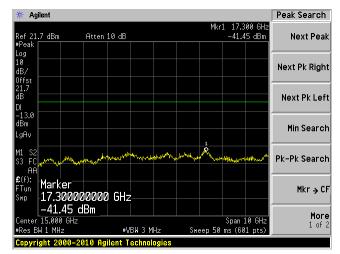


CDMA/EVDO DL

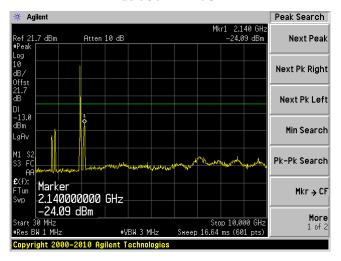
Low 30MHz-10GHz

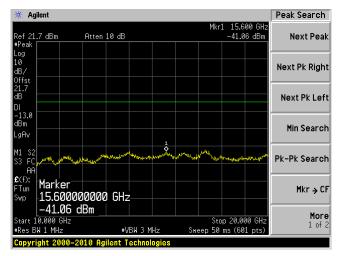


Low 10GHz-20GHz

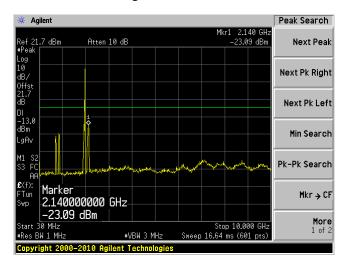


Middle 30MHz-10GHz

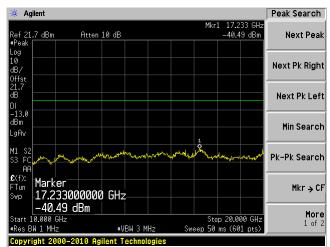




High 30MHz-10GHz

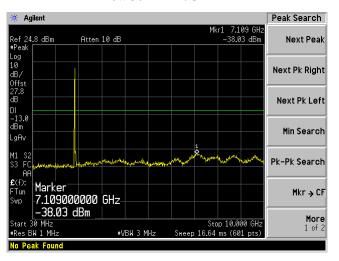


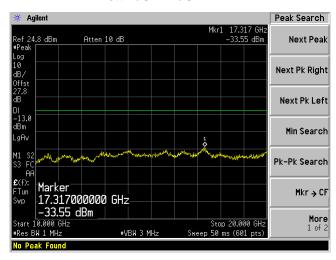
High 10GHz-20GHz



CDMA/EVDO UL

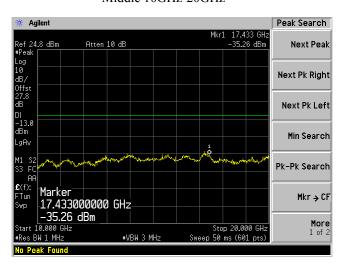
Low 30MHz-10GHz



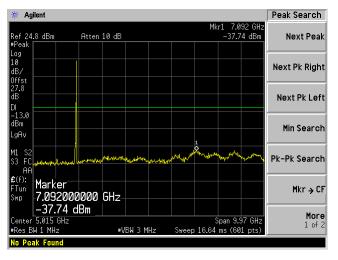


Middle 30MHz-10GHz

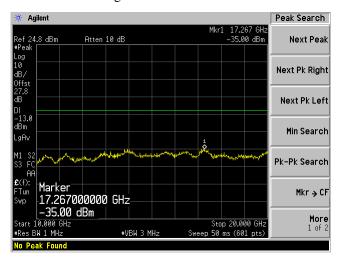
* Agilent Peak Search Ref 24.8 dBm #Peak Atten 10 dB Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 7.142000000 GHz -37.31 dBm Mkr → CF -Tun More 1 of 2 Stop 10.000 GHz Sweep 16.64 ms (601 pts) #VBW 3 MHz No Peak Found



High 30MHz-10GHz



High 10GHz-20GHz



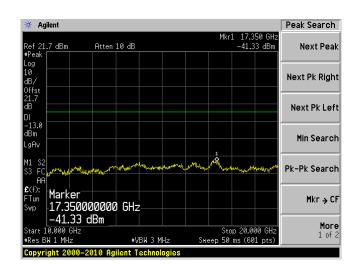
WCDMA DL

Low 30MHz-10GHz

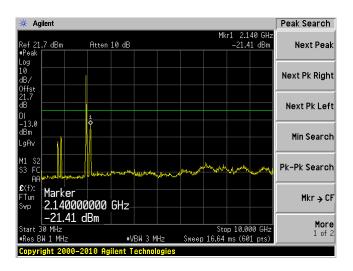
Agilent Peak Search Ref 21.7 dBm #Peak Atten 10 dB Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 2.140000000 GHz Mkr → CF Tun -19.90 dBm **More** 1 of 2 Stop 10.000 GHz Sweep 16.64 ms (601 pts) #VBW 3 MHz

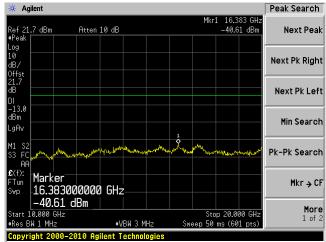
Copyright 2000-2010 Agilent Technologies

Low 10GHz-20GHz

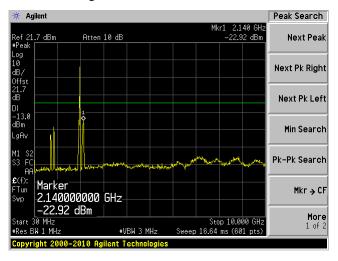


Middle 30MHz-10GHz

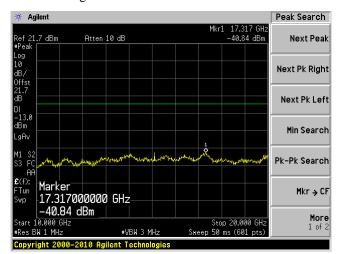




High 30MHz-10GHz

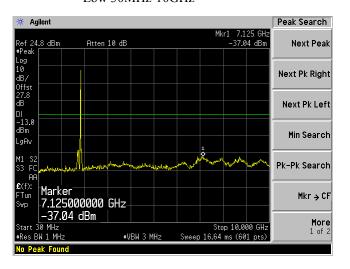


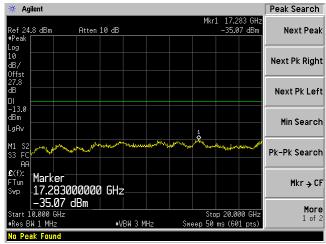
High 10GHz-20GHz



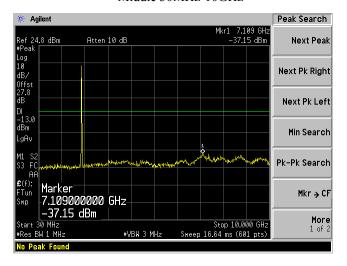
WCDMA UL

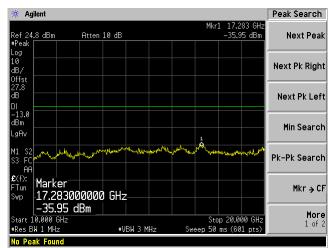
Low 30MHz-10GHz



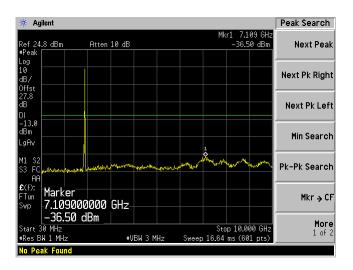


Middle 30MHz-10GHz

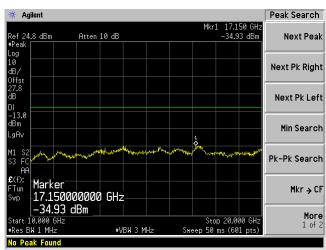




High 30MHz-10GHz



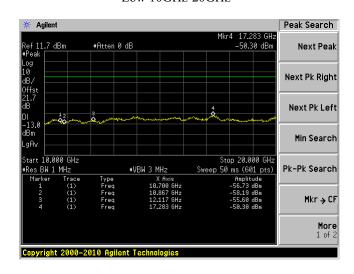
High 10GHz-20GHz



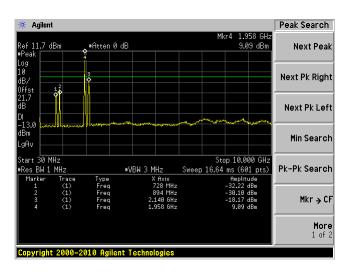
LTE 1.4 MHz QPSK DL

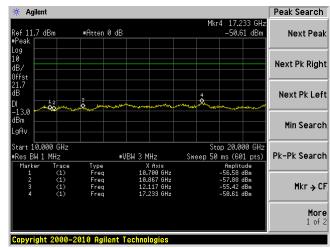
Low 30MHz-10GHz

Low 10GHz-20GHz

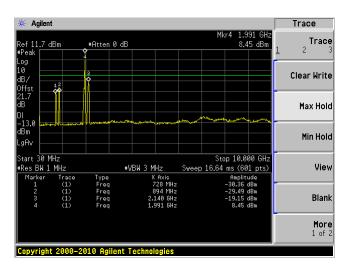


Middle 30MHz-10GHz

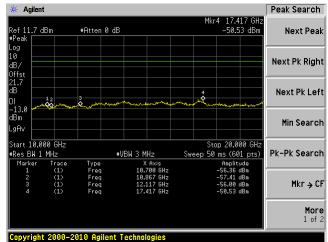




High 30MHz-10GHz

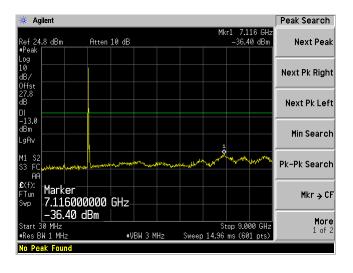


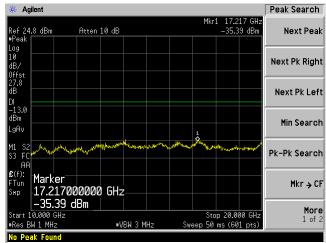
High 10GHz-20GHz



LTE 1.4 MHz QPSK UL

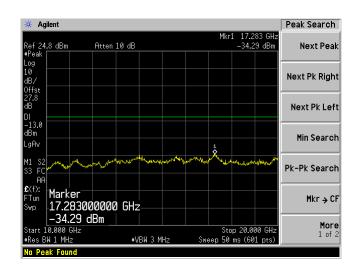
Low 30MHz-10GHz



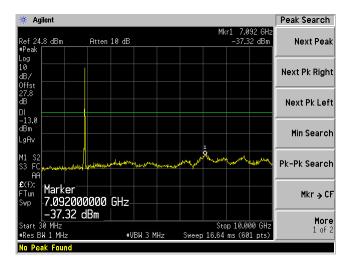


Middle 30MHz-10GHz

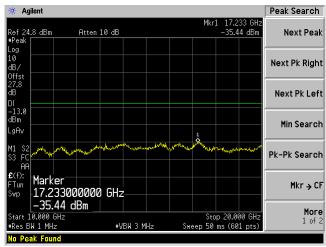
Agilent Peak Search Mkr1 7.042 GHz -37.05 dBm Ref 24.8 dBm #Peak Atten 10 dB **Next Peak** Next Pk Right Next Pk Left Min Search Pk-Pk Search Mkr → CF Tun 7.042000000 GHz -37.05 dBm Stop 10.000 GHz Sweep 16.64 ms (601 pts) #Res BW 1 MHz #VBW 3 MHz



High 30MHz-10GHz



High 10GHz-20GHz

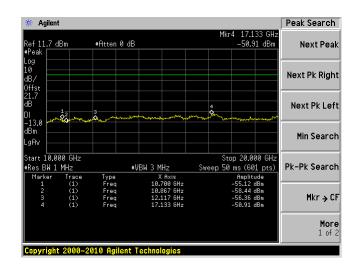


LTE 3 MHz QPSK UL

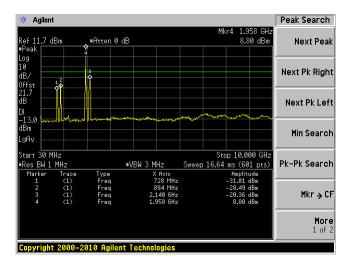
Low 30MHz-10GHz

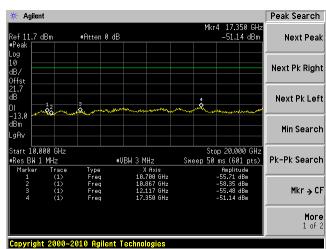
* Agilent Marker → 1.924 GH: 8.74 dBm #Atten 0 dB Ref 11.7 dBm Mkr → CF Mkr → CF Step Mkr → Start Marker || | 1.924000000 GHz Mkr → Stop 8.74 dBm Start 30 MHz #Res BW 1 MHz Stop 10.000 GHz Sweep 16.64 ms (601 pts) *VBW 3 MHz Mkr _△ → Spar Type Freq Freq Freq Freq Mkr $\triangle \rightarrow CF$ Mkr → Ref Lvl Copyright 2000-2010 Agilent Technologies

Low 10GHz-20GHz

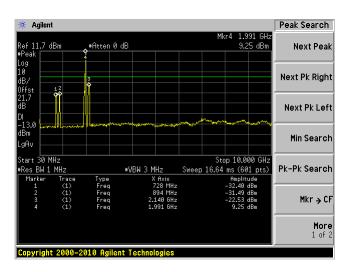


Middle 30MHz-10GHz

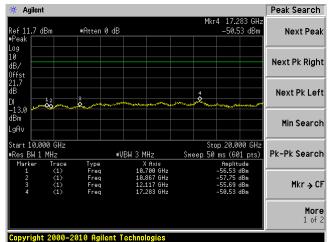




High 30MHz-10GHz

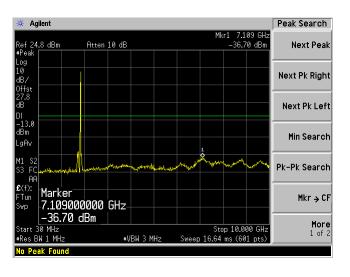


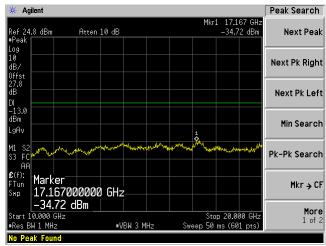
High 10GHz-20GHz



LTE 3 MHz QPSK UL

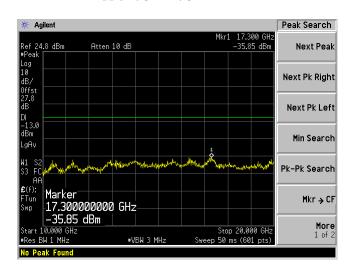
Low 30MHz-10GHz



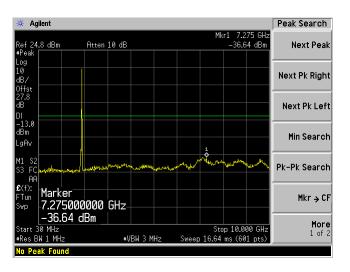


Middle 30MHz-10GHz

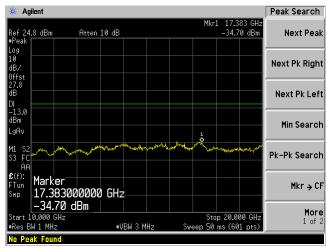
Peak Search 4kr1 7.059 GH: -38.12 dBm Ref 24.8 dBm #Peak Atten 10 dB Next Peak Log 10 dB/ Offst 27.8 dB Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 7.059000000 GHz Mkr → CF -Tun -38.12 dBm More 1 of 2 Stop 10.000 GHz Sweep 16.64 ms (601 pts) #VBW 3 MHz No Peak Found



High 30MHz-10GHz

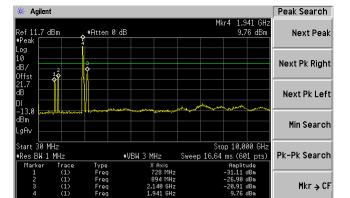


High 10GHz-20GHz

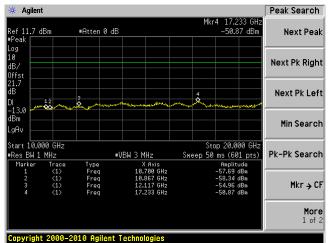


LTE 5 MHz QPSK DL

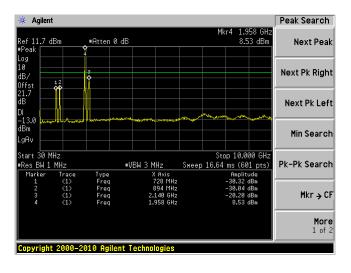
Low 30MHz-10GHz

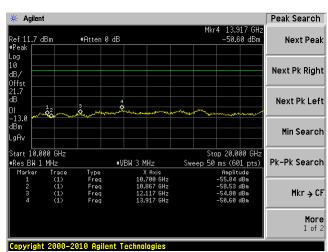


Low 10GHz-20GHz

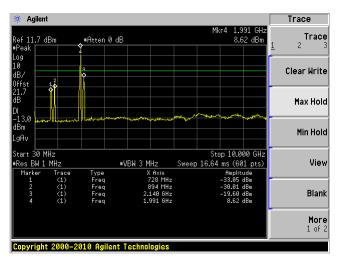


Middle 30MHz-10GHz

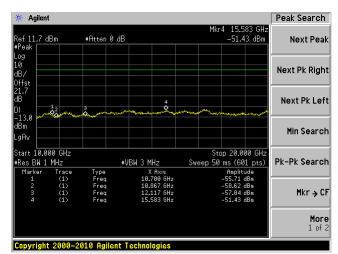




High 30MHz-10GHz



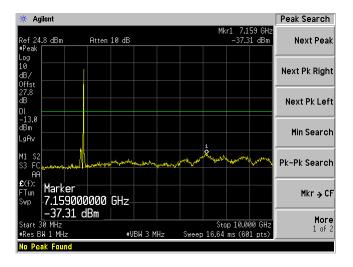
High 10GHz-20GHz

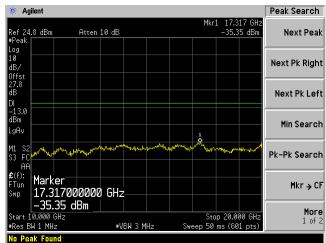


LTE 5 MHz QPSK UL

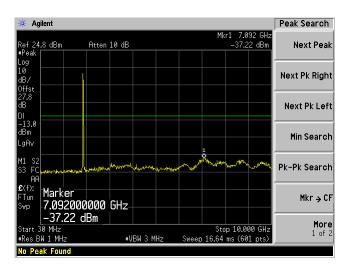
Low 30MHz-10GHz



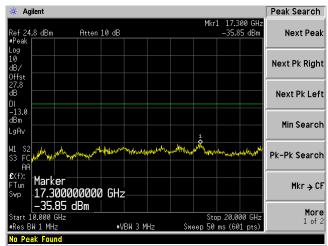




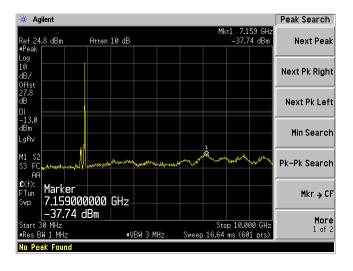
Middle 30MHz-10GHz



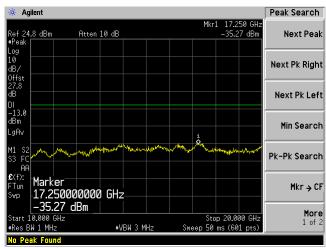
Middle 10GHz-20GHz



High 30MHz-10GHz

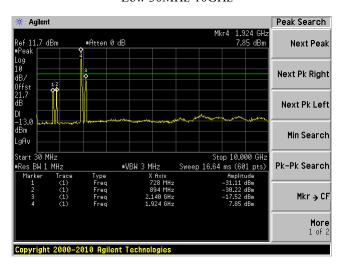


High 10GHz-20GHz

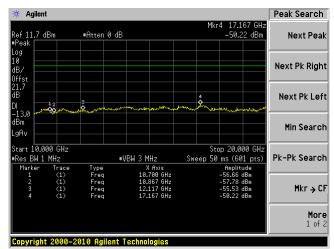


LTE 10 MHz QPSK DL

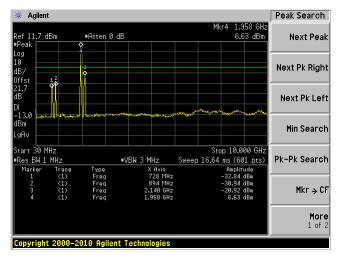
Low 30MHz-10GHz

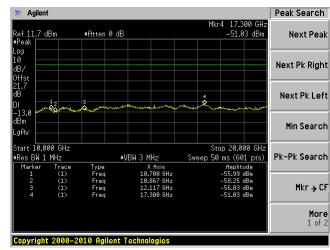


Low 10GHz-20GHz

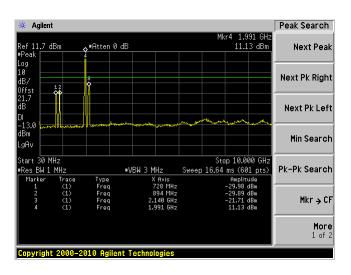


Middle 30MHz-10GHz

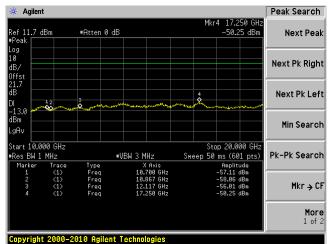




High 30MHz-10GHz

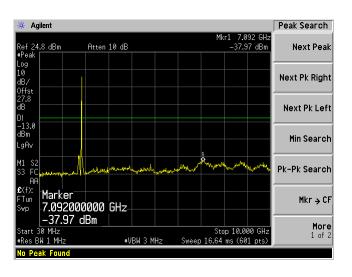


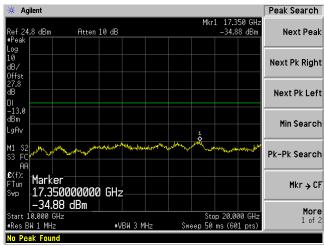
High 10GHz-20GHz



LTE 10 MHz QPSK UL

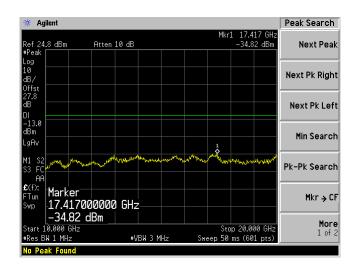
Low 30MHz-10GHz



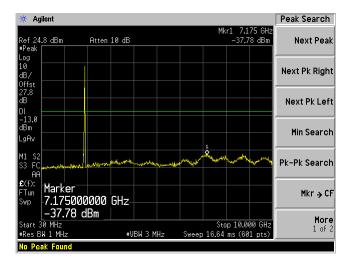


Middle 30MHz-10GHz

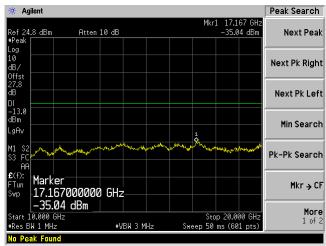
* Agilent Peak Search Atten 10 dB Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 6.876000000 GHz -Tun Mkr → CF -37.53 dBm More Stop 10.000 GHz Sweep 16.64 ms (601 pts) Start 30 MHz #Res BW 1 MHz #VBW 3 MHz No Peak Found



High 30MHz-10GHz



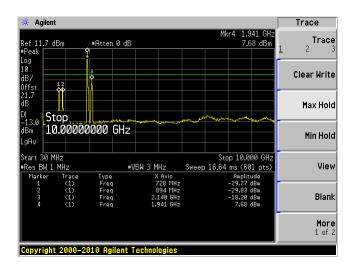
High 10GHz-20GHz

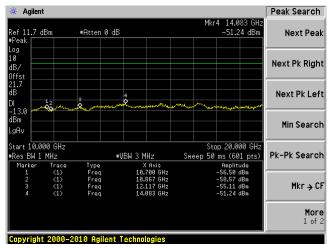


LTE 15 MHz QPSK DL

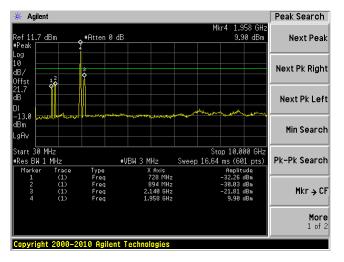
Low 30MHz-10GHz

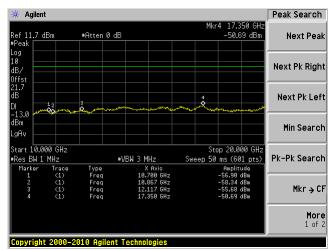
Low 10GHz-20GHz



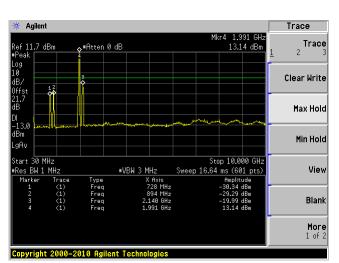


Middle 30MHz-10GHz

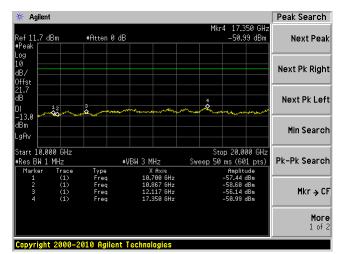




High 30MHz-10GHz

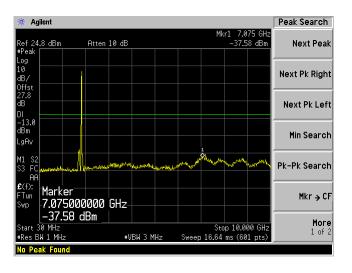


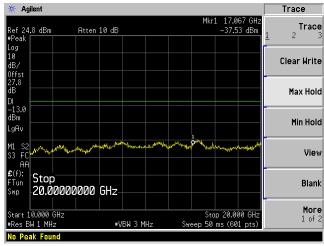
High 10GHz-20GHz



LTE 15 MHz QPSK UL

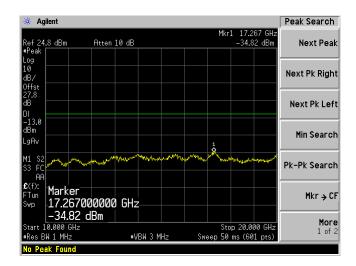
Low 30MHz-10GHz



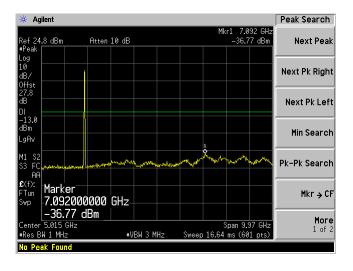


Middle 30MHz-10GHz

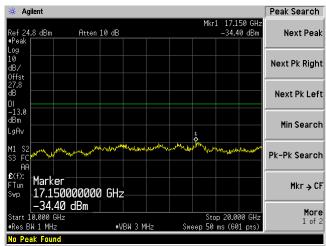
Agilent Peak Search Mkr1 6.228 GHz -40.13 dBm Ref 24.8 dBm Atten 10 dB **Next Peak** Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 6.228000000 GHz =Tun Mkr → CF -40.13 dBm More 1 of 2 Start 30 MHz #Res BW 1 MHz Stop 10.000 GHz Sweep 16.64 ms (601 pts) #VBW 3 MHz



High 30MHz-10GHz



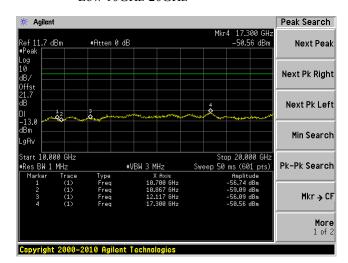
High 10GHz-20GHz



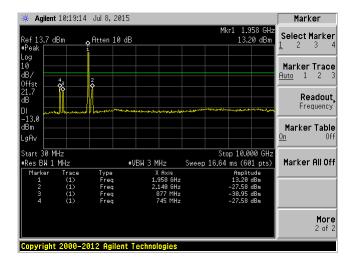
LTE 20 MHz QPSK DL

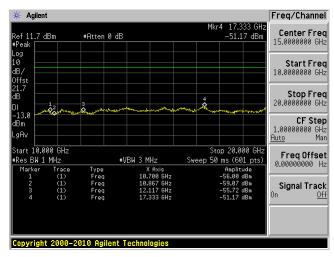
Low 30MHz-10GHz

Low 10GHz-20GHz

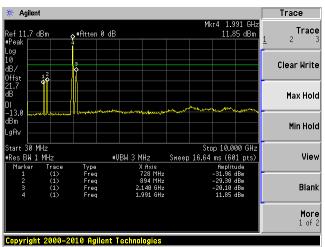


Middle 30MHz-10GHz

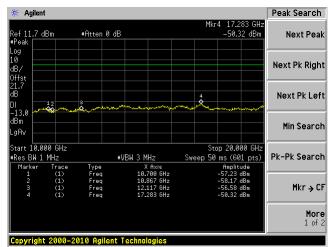




High 30MHz-10GHz

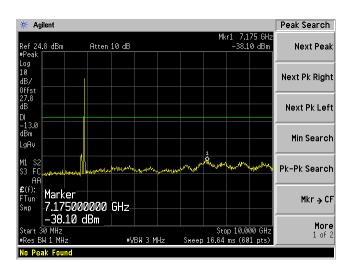


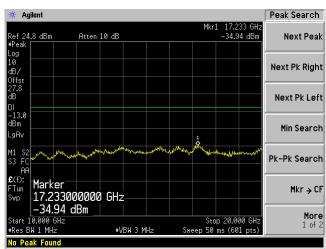
High 10GHz-20GHz



LTE 20 MHz QPSK UL

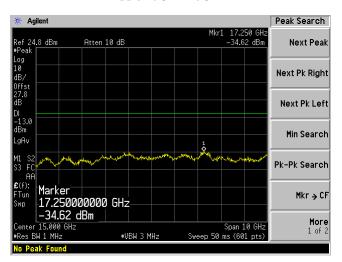
Low 30MHz-10GHz



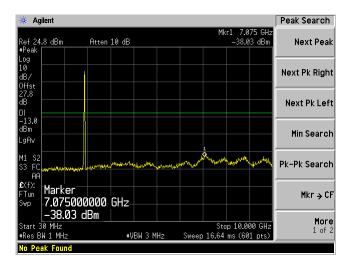


Middle 30MHz-10GHz

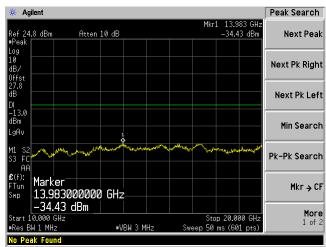
Agilent Peak Search Atten 10 dB Next Peak Next Pk Right Offst 27.8 dB Next Pk Left Min Search Pk-Pk Search Marker 7.125000000 GHz Mkr → CF -37.75 dBm More Stop 10.000 GHz 16.64 ms (601 pts) 1 of 2 #VBW 3 MHz



High 30MHz-10GHz

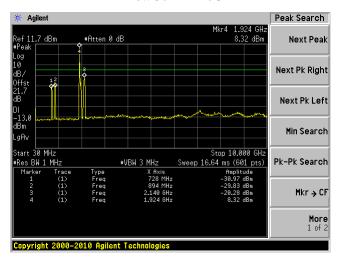


High 10GHz-20GHz

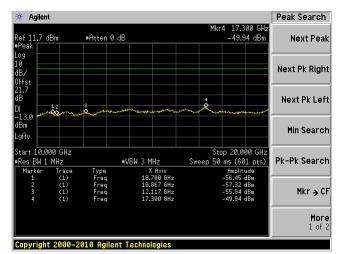


LTE 1.4 MHz 16QAM DL

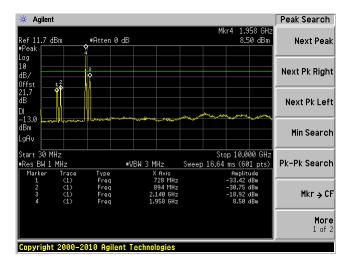
Low 30MHz-10GHz

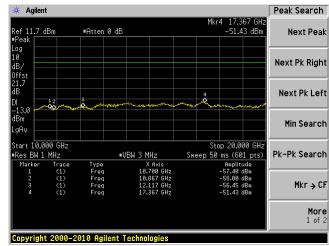


Low 10GHz-20GHz

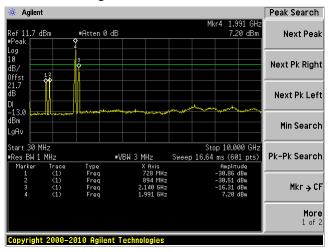


Middle 30MHz-10GHz

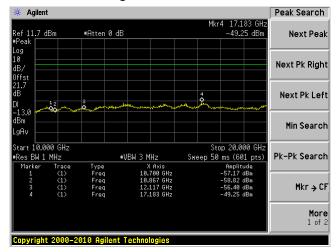




High 30MHz-10GHz

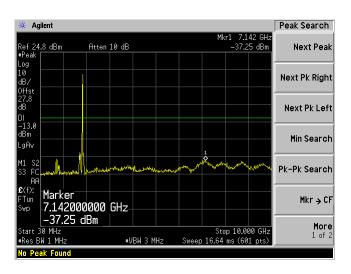


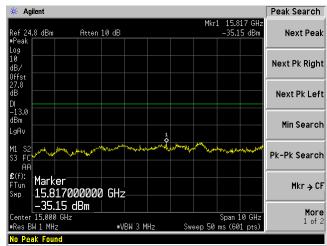
High 10GHz-20GHz



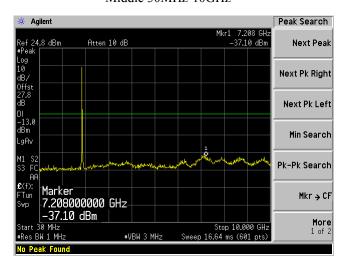
LTE 1.4 MHz 16QAM UL

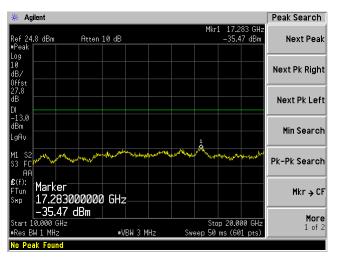
Low 30MHz-10GHz



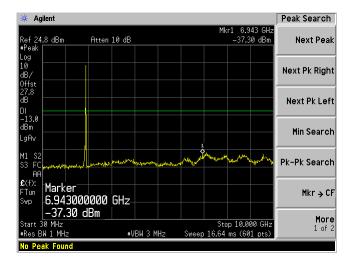


Middle 30MHz-10GHz

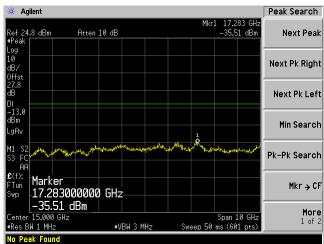




High 30MHz-10GHz

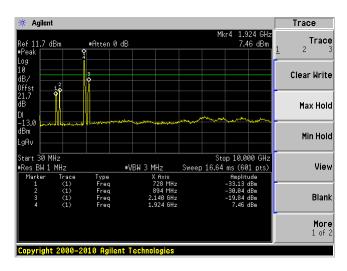


High 10GHz-20GHz

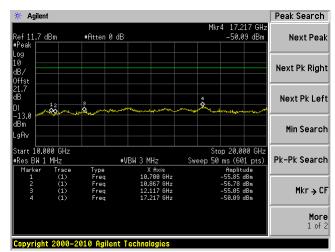


LTE 3 MHz 16QAM DL

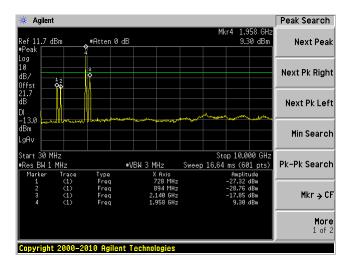
Low 30MHz-10GHz

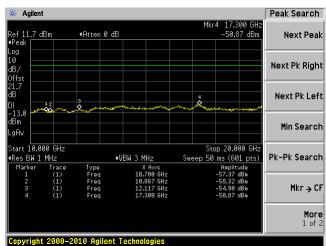


Low 10GHz-20GHz

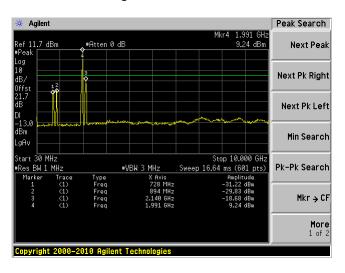


Middle 30MHz-10GHz

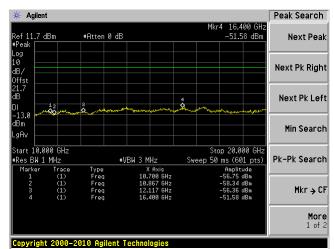




High 30MHz-10GHz

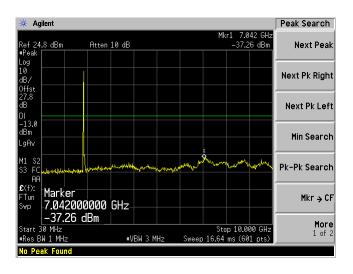


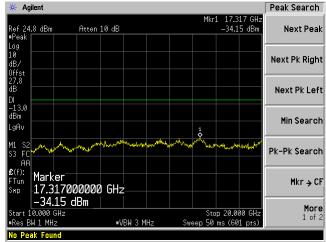
High 10GHz-20GHz



LTE 3 MHz 16QAM UL

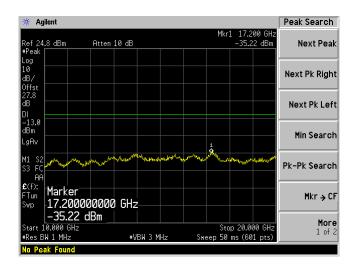
Low 30MHz-10GHz



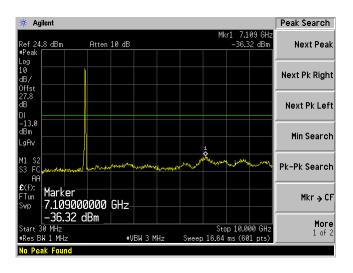


Middle 30MHz-10GHz

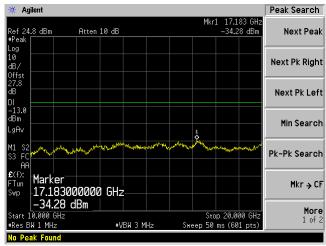
* Agilent Peak Search Atten 10 dB Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 7.159000000 GHz -Tun Mkr → CF -37.36 dBm More Stop 10.000 GHz Sweep 16.64 ms (601 pts) #Res BW 1 MHz #VBW 3 MHz No Peak Found



High 30MHz-10GHz

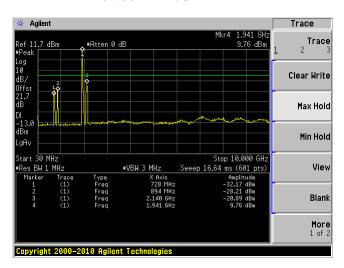


High 10GHz-20G

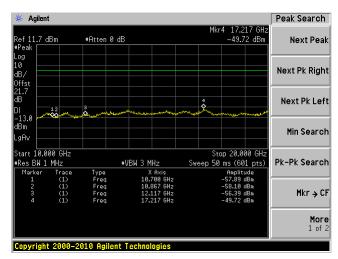


LTE 5 MHz 16QAM DL

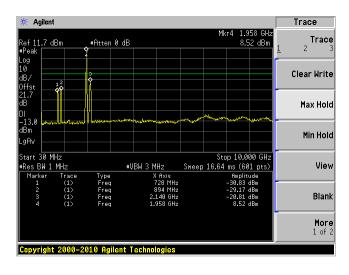
Low 30MHz-10GHz

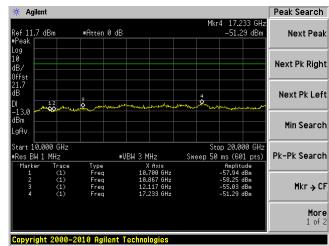


Low 10GHz-20GHz

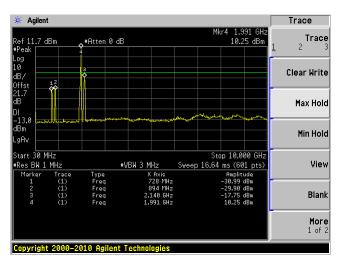


Middle 30MHz-10GHz

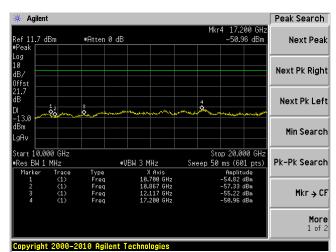




High 30MHz-10GHz

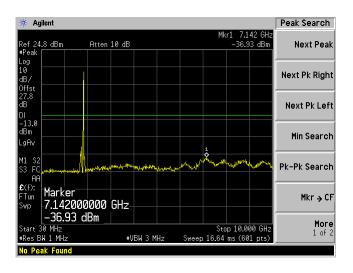


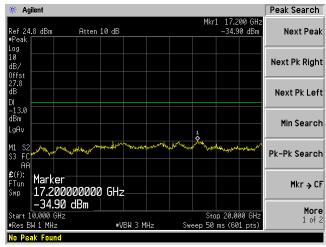
High 10GHz-20GHz



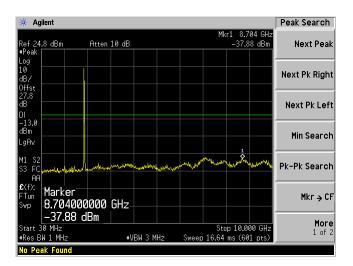
LTE 5 MHz 16QAM UL

Low 30MHz-10GHz

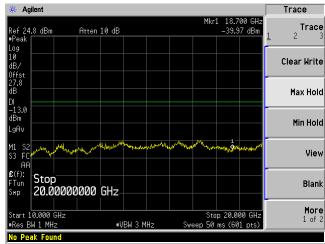




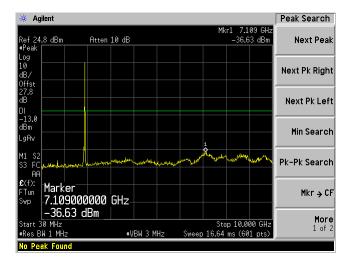
Middle 30MHz-10GHz



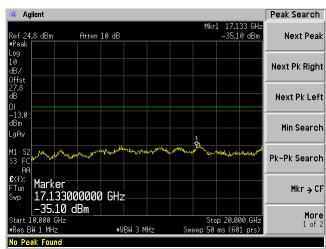
Middle 10GHz-20GHz



High 30MHz-10GHz

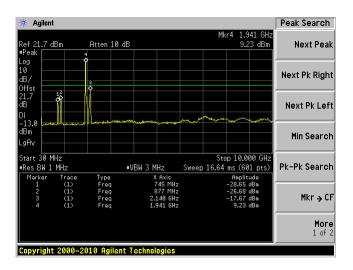


High 10GHz-20GHz

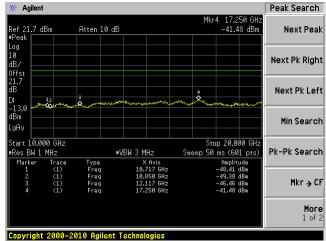


LTE 10 MHz 16QAM DL

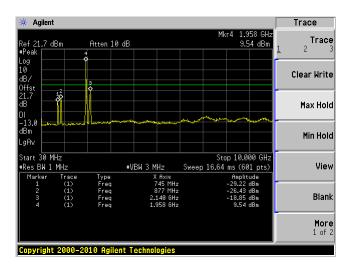
Low 30MHz-10GHz

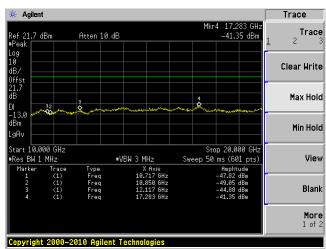


Low 10GHz-20GHz

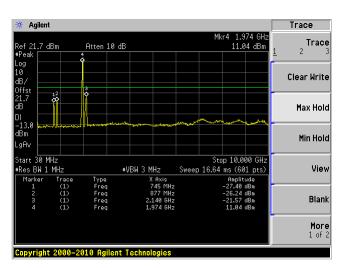


Middle 30MHz-10GHz

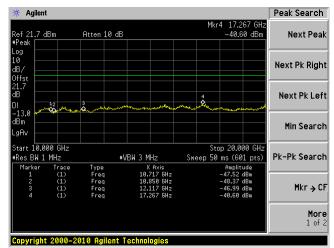




High 30MHz-10GHz

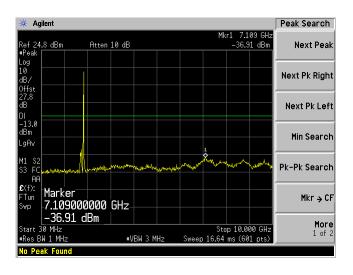


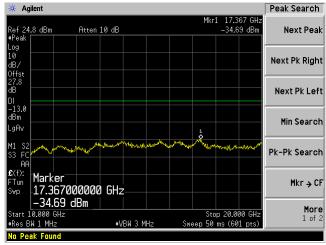
High 10GHz-20GHz



LTE 10 MHz 16QAM UL

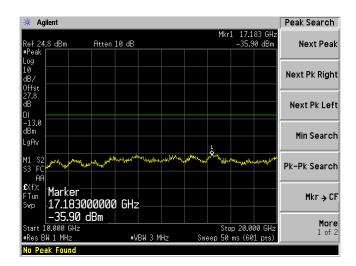
Low 30MHz-10GHz



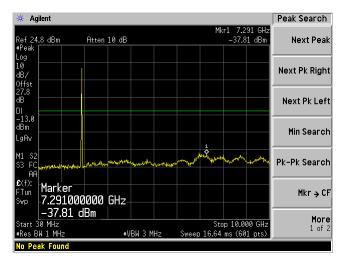


Middle 30MHz-10GHz

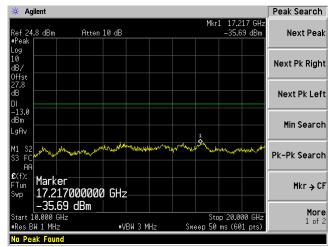
★ Agilent Peak Search Mkr1 7.175 GH: -36.92 dBm Ref 24.8 dBm #Peak Atten 10 dB Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 7.175000000 GHz Mkr → CF Tun -36.92 dBm More 1 of 2 Stop 10.000 GHz Sweep 16.64 ms (601 pts) #VBW 3 MHz No Peak Found



High 30MHz-10GHz

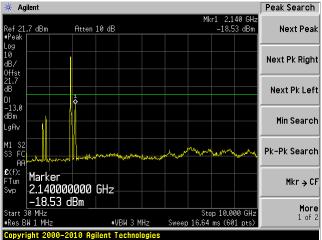


High 10GHz-20GH

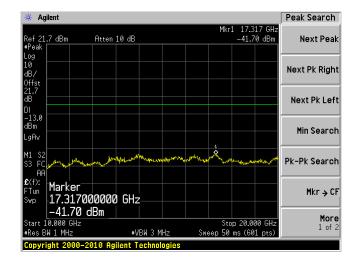


LTE 15 MHz 16QAM DL

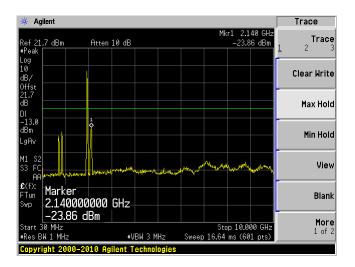
Low 30MHz-10GHz

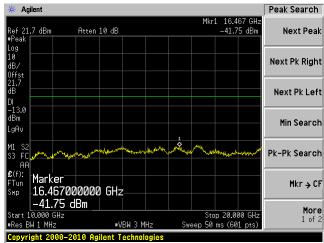


Low 10GHz-20GHz

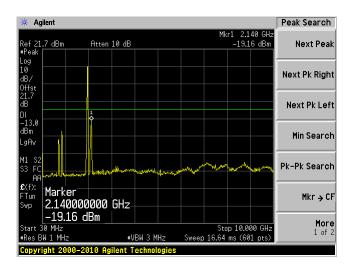


Middle 30MHz-10GHz

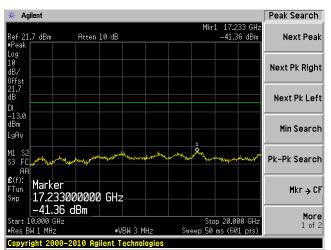




High 30MHz-10GHz

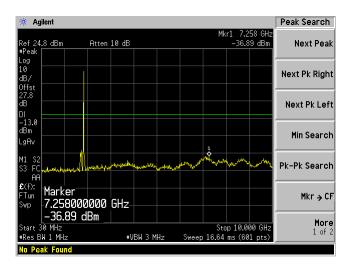


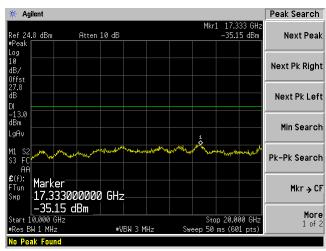
High 10GHz-20GHz



LTE 15 MHz 16QAM UL

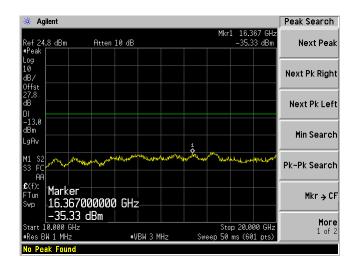
Low 30MHz-10GHz



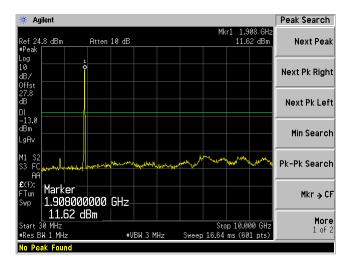


Middle 30MHz-10GHz

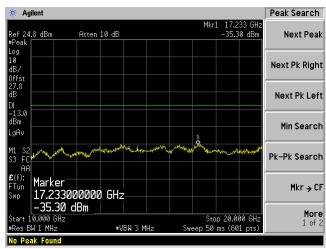
Agilent Peak Search Mkr1 7.125 GHz -37.16 dBm Ref 24.8 dBm #Peak Atten 10 dB **Next Peak** Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 7.125000000 GHz Mkr → CF -37.16 dBm Stop 10.000 GHz Sweep 16.64 ms (601 pts) #VBW 3 MHz #Res BW 1 MHz



High 30MHz-10GHz

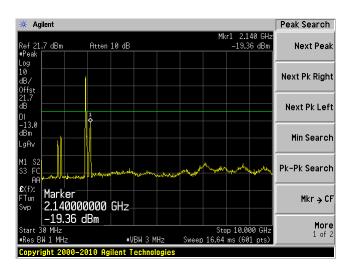


High 10GHz-20GHz

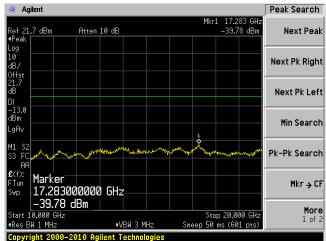


LTE 20 MHz 16QAM DL

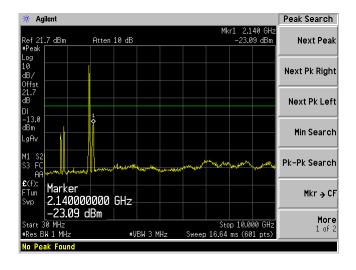
Low 30MHz-10GHz

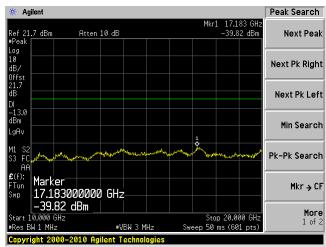


Low 10GHz-20GHz

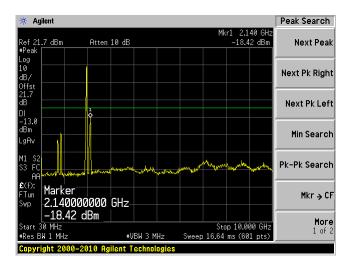


Middle 30MHz-10GHz

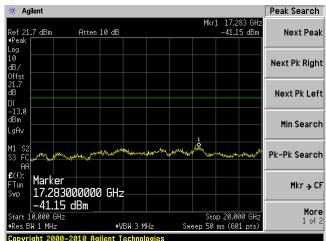




High 30MHz-10GHz

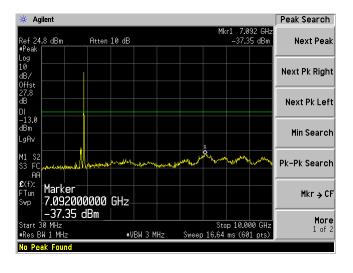


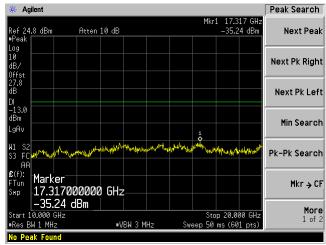
High 10GHz-20GHz



LTE 20 MHz 16QAM UL

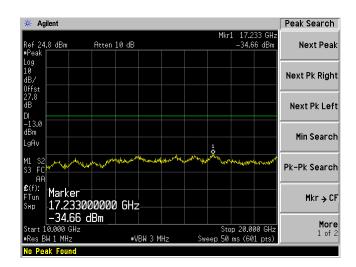
Low 30MHz-10GHz



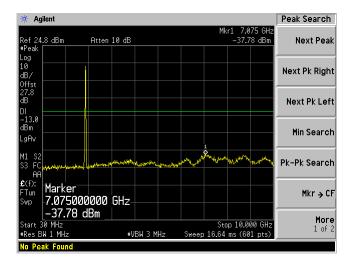


Middle 30MHz-10GHz

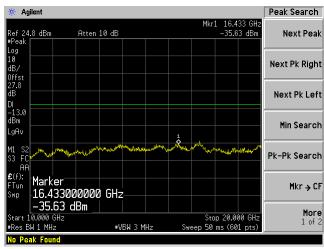
₩ Agilent Peak Search Mkr1 7.109 GH: -36.47 dBm Ref 24.8 dBm #Peak Atten 10 dB **Next Peak** Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 7.109000000 GHz Tun Mkr → CF -36.47 dBm More 1 of 2 Stop 10.000 GHz Sweep 16.64 ms (601 pts) #VBW 3 MHz No Peak Found



High 30MHz-10GHz



High 10GHz-20GHz

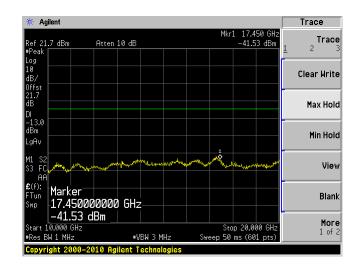


LTE 1.4 MHz 64QAM DL

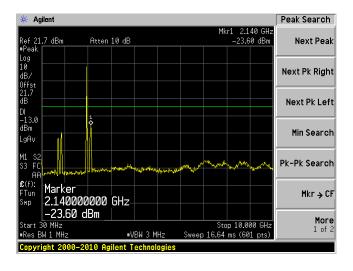
Low 30MHz-10GHz

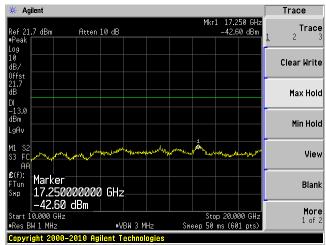
Agilent Peak Search Mkr1 2.140 GH: -21.46 dBm Ref 21.7 dBm #Peak Atten 10 dB **Next Peak** Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker Mkr → CF 2.1400000000 GHz -21.46 dBm More 1 of 2 Stop 10.000 GHz #VBW 3 MHz Sweep 16.64 ms (601 pts) Copyright 2000-2010 Agilent Technologies

Low 10GHz-20GHz

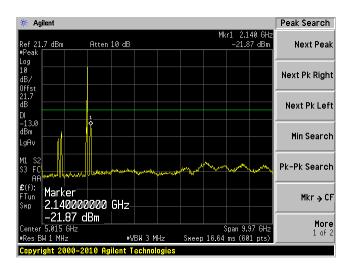


Middle 30MHz-10GHz

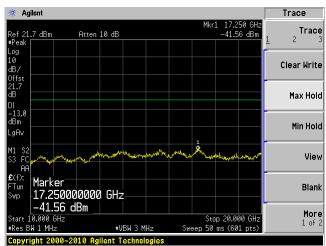




High 30MHz-10GHz

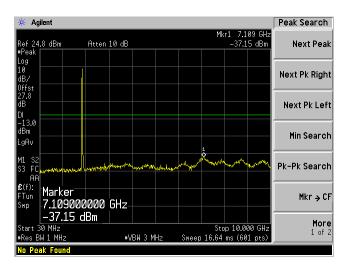


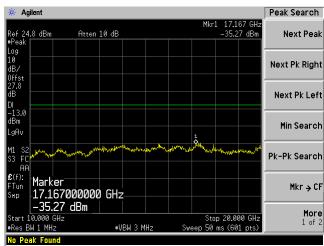
High 10GHz-20GHz



LTE 1.4 MHz 64QAM UL

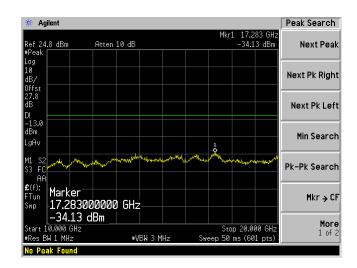
Low 30MHz-10GHz



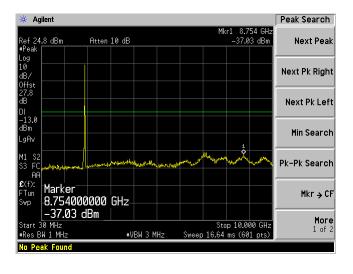


Middle 30MHz-10GHz

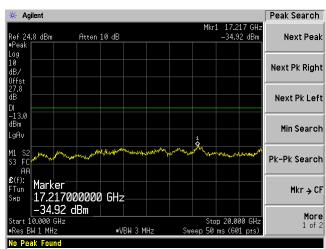
🔆 Agilent Peak Search Ref 24.8 dBm #Peak Atten 10 dB Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 7.075000000 GHz -Tun Mkr → CF -37.03 dBm More 1 of 2 Stop 10.000 GHz Sweep 16.64 ms (601 pts) #VBW 3 MHz No Peak Found



High 30MHz-10GHz

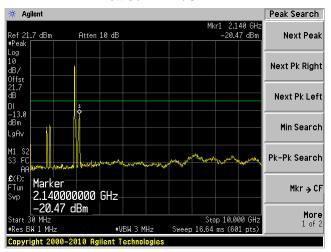


High 10GHz-20GHz

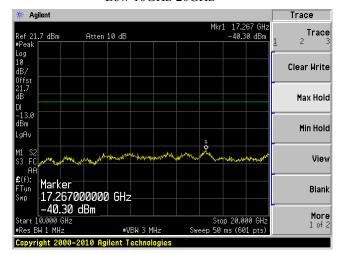


LTE 3 MHz 64QAM DL

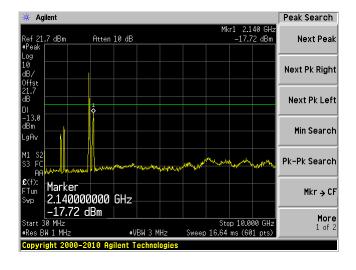
Low 30MHz-10GHz

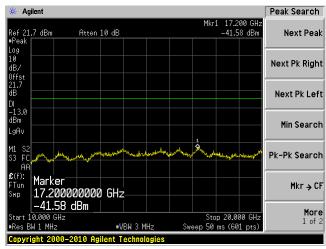


Low 10GHz-20GHz

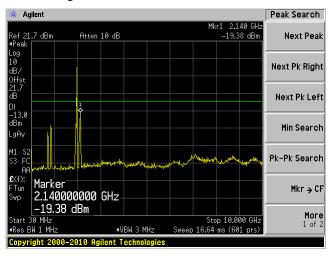


Middle 30MHz-10GHz

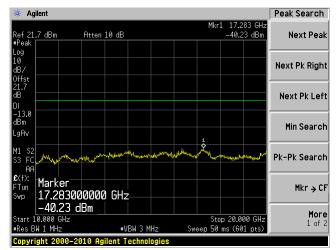




High 30MHz-10GHz

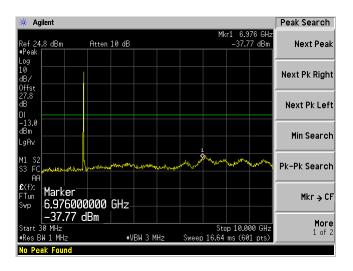


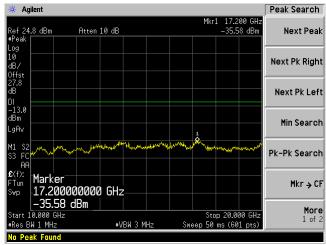
High 10GHz-20GHz



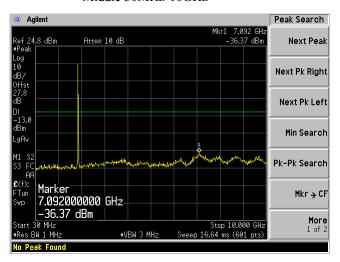
LTE 3 MHz 64QAM UL

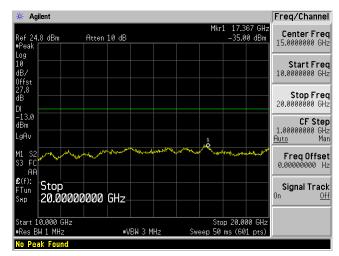
Low 30MHz-10GHz



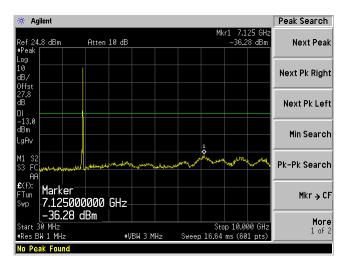


Middle 30MHz-10GHz

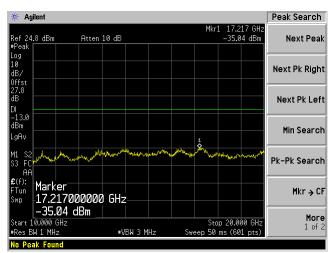




High 30MHz-10GHz



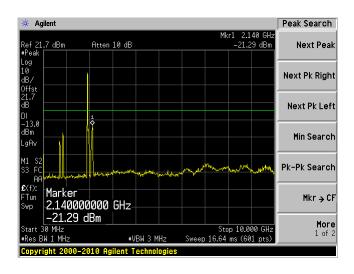
High 10GHz-20GHz

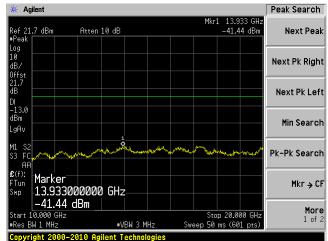


LTE 5 MHz 64QAM DL

Low 30MHz-10GHz

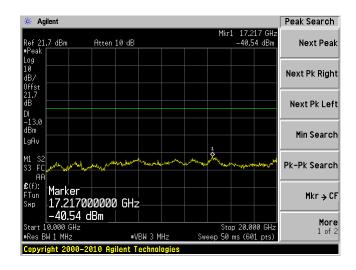
Low 10GHz-20GHz





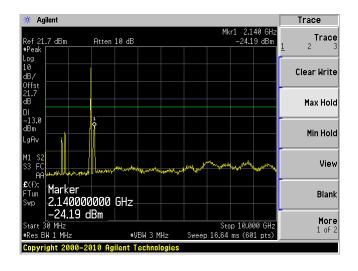
Middle 30MHz-10GHz

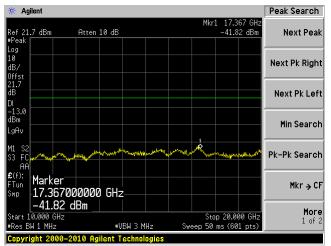
* Agilent Peak Search Ref 21.7 dBm #Peak Atten 10 dB **Next Peak** Next Pk Right Next Pk Left Min Search Pk-Pk Search £(f): Marker Mkr → CF Tun 2.140000000 GHz -23.57 dBm More 1 of 2 Stop 10.000 GHz Sweep 16.64 ms (601 pts) #VBW 3 MHz



High 30MHz-10GHz

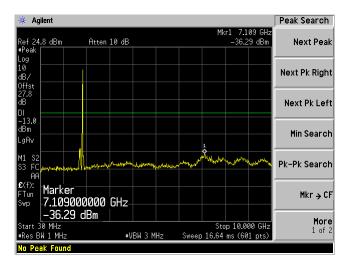
High 10GHz-20GHz

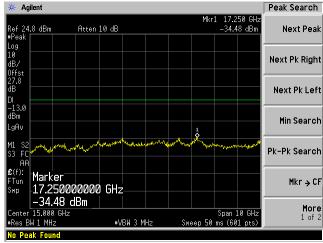




LTE 5 MHz 64QAM UL

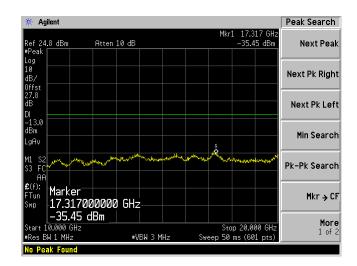
Low 30MHz-10GHz



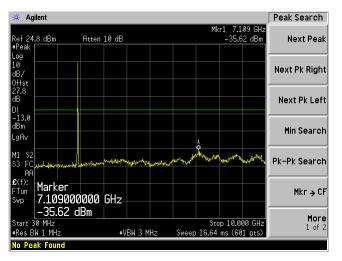


Middle 30MHz-10GHz

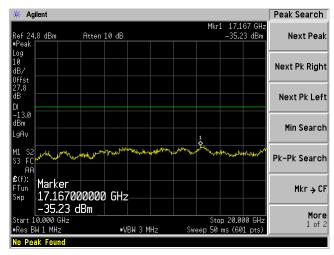
💥 Agilent Peak Search Atten 10 dB Next Peak Next Pk Right Next Pk Left Min Search Pk-Pk Search Marker 8.687000000 GHz Mkr → CF Tun -36.96 dBm **More** 1 of 2 Stop 10.000 GHz Sweep 16.64 ms (601 pts) Start 30 MHz #Res BW 1 MHz #VBW 3 MHz No Peak Found



High 30MHz-10GHz



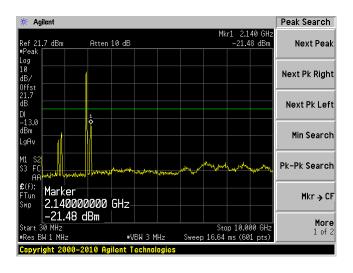
High 10GHz-20GHz

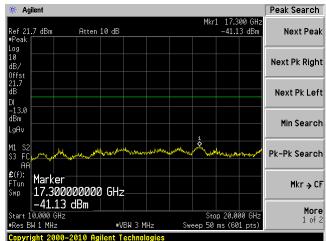


LTE 10 MHz 64QAM DL

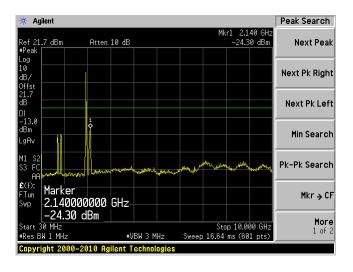
Low 30MHz-10GHz

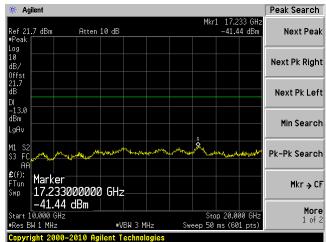
Low 10GHz-20GHz



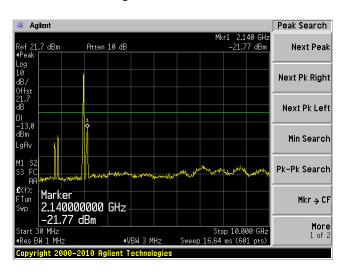


Middle 30MHz-10GHz

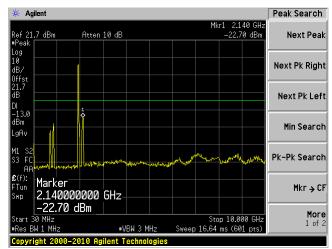




High 30MHz-10GHz

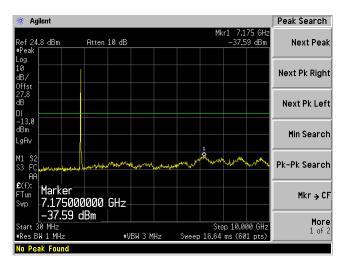


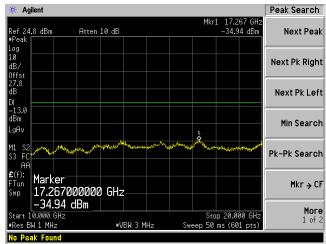
High 10GHz-20GHz



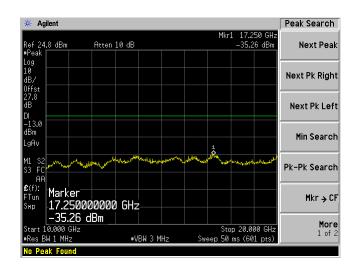
LTE 10 MHz 64QAM UL

Low 30MHz-10GHz

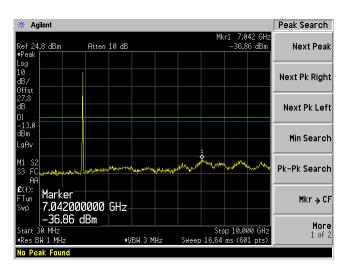




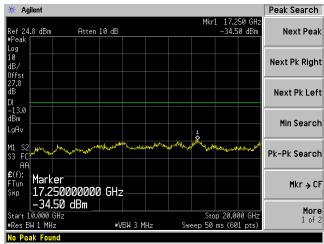
Middle 30MHz-10GHz



High 30MHz-10GHz

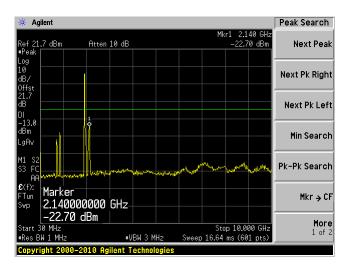


High 10GHz-20GHz

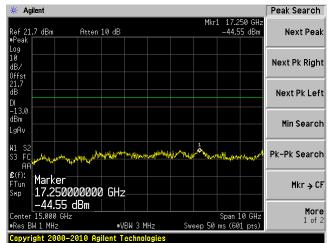


LTE 15 MHz 64QAM DL

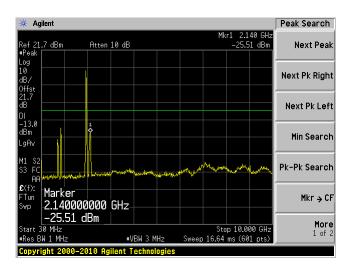
Low 30MHz-10GHz

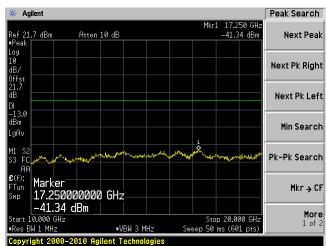


Low 10GHz-20GHz

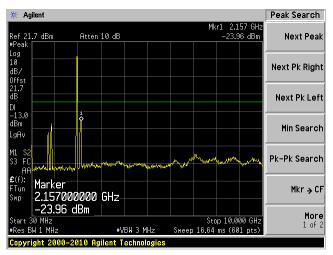


Middle 30MHz-10GHz

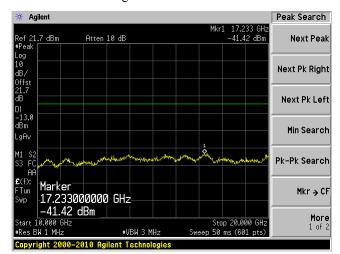




High 30MHz-10GHz

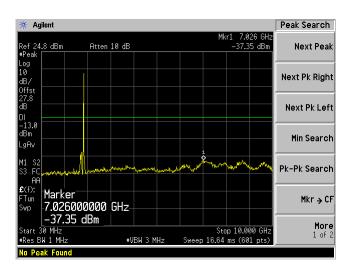


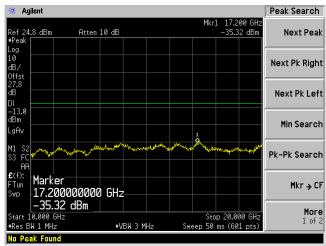
High 10GHz-20GHz



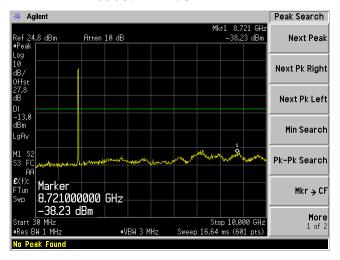
LTE 15 MHz 64QAM UL

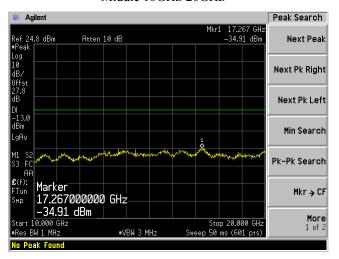
Low 30MHz-10GHz



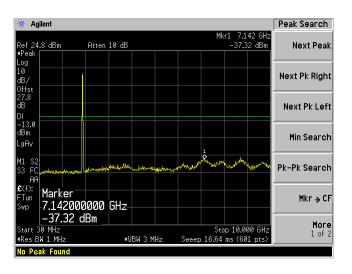


Middle 30MHz-10GHz

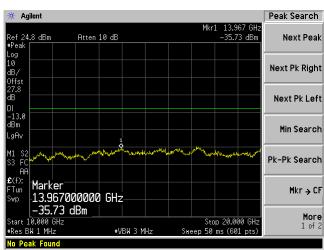




High 30MHz-10GHz

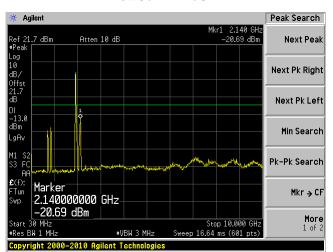


High 10GHz-20GHz

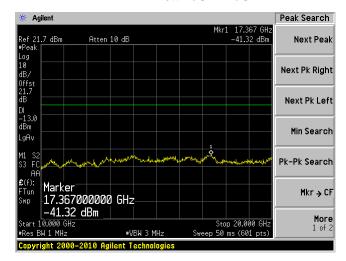


LTE 20 MHz 64QAM DL

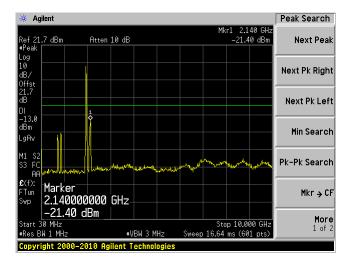
Low 30MHz-10GHz

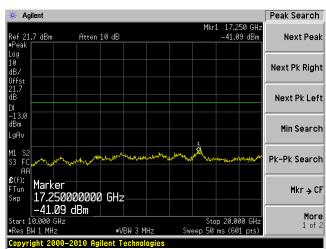


Low 10GHz-20GHz

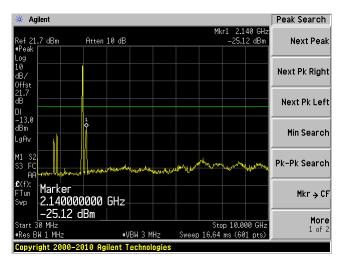


Middle 30MHz-10GHz

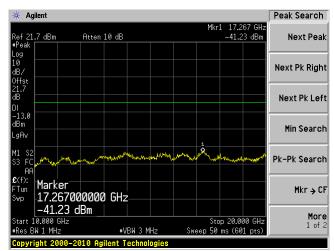




High 30MHz-10GHz

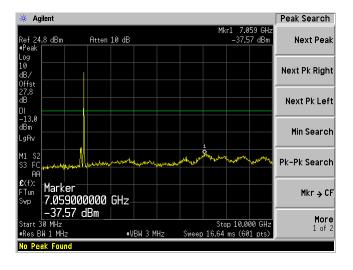


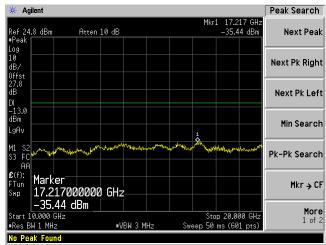
High 10GHz-20GHz



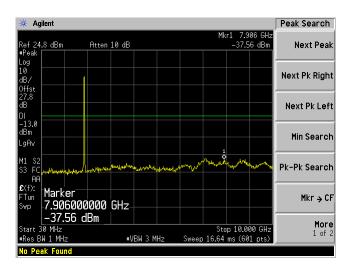
TE 20 MHz 64QAM UL

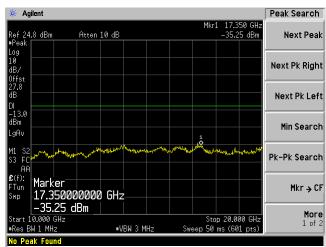
Low 30MHz-10GHz



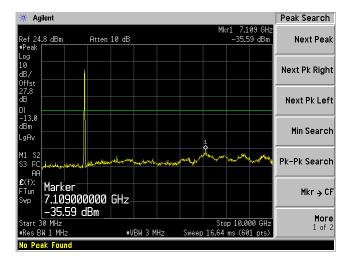


Middle 30MHz-10GHz

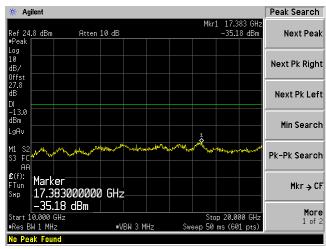




High 30MHz-10GHz



High 10GHz-20GHz



Intermodulation

Downlink (ALC off)

GSM

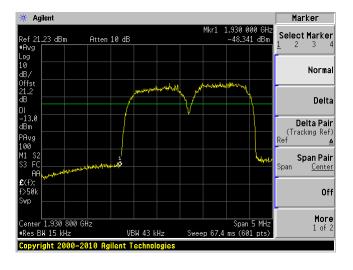
Low Channel

High Channel

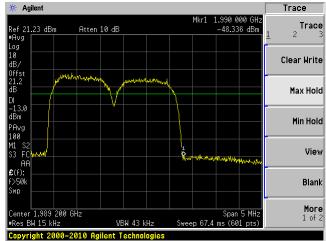


CDMA

Low Channel

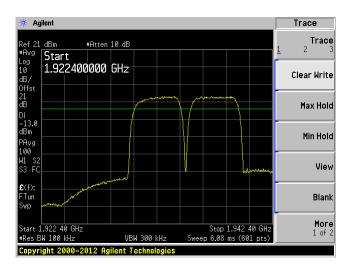


High Channel

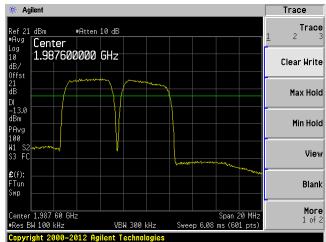


WCDMA

Low Channel

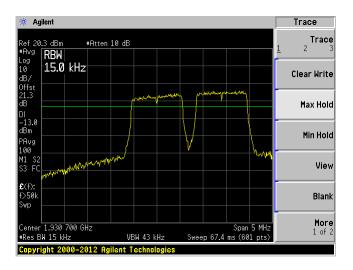


High Channel

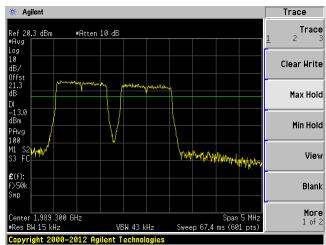


LTE-QPSK 1.4 MHz

Low Channel

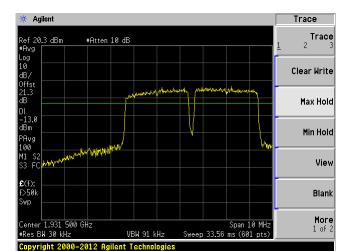


High Channel

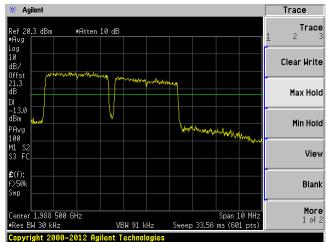


LTE-QPSK 3 MHz

Low Channel

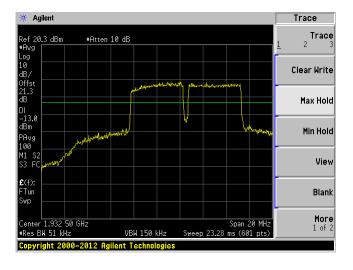


High Channel

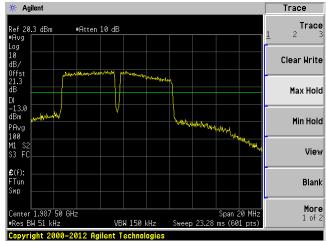


LTE-QPSK 5 MHz

Low Channel

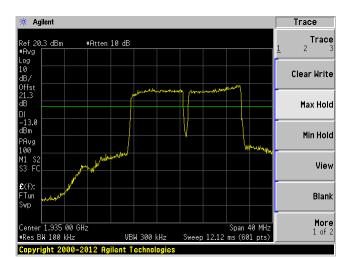


High Channel



LTE-QPSK 10 MHz

Low Channel

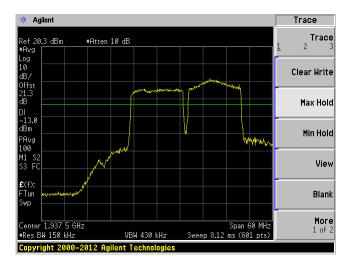


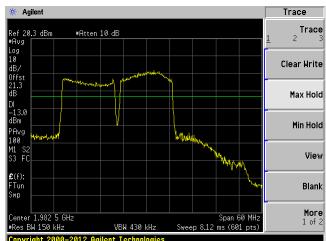
High Channel



LTE-QPSK 15 MHz

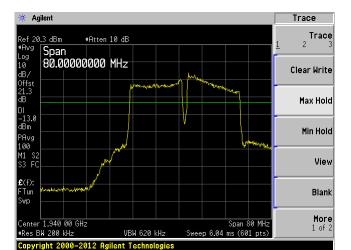
Low Channel



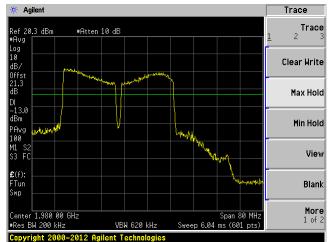


LTE-QPSK 20 MHz

Low Channel

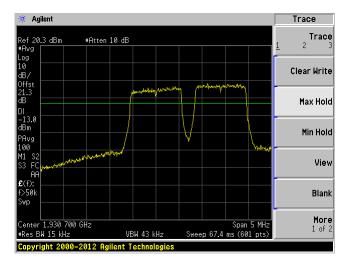


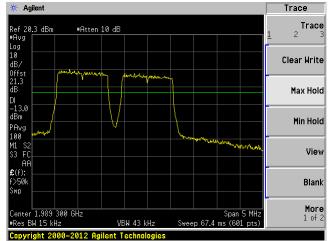
High Channel



LTE-16QAM 1.4 MHz

Low Channel



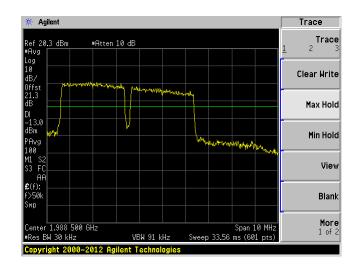


LTE-16QAM 3 MHz

Low Channel

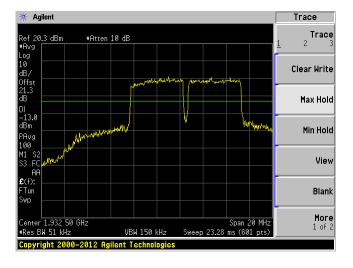
Copyright 2000-2012 Agilent Technologies

High Channel



LTE-16QAM 5 MHz

Low Channel

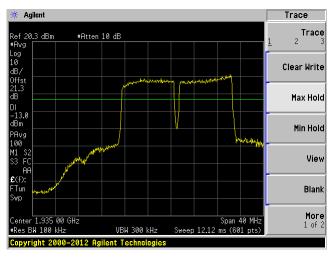




LTE-16QAM 10 MHz

Low Channel

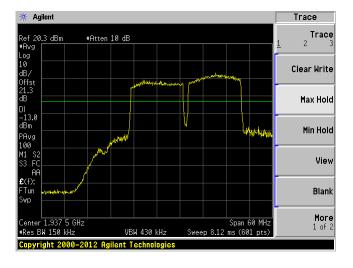
High Channel

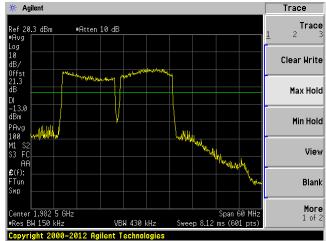




LTE-16QAM 15 MHz

Low Channel





LTE-16QAM 20 MHz

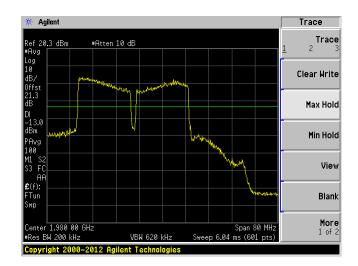
Low Channel

VBW 620 kHz

Center 1.937 50 GHz #Res BW 200 kHz

Copyright 2000-2012 Agilent Technologies

High Channel

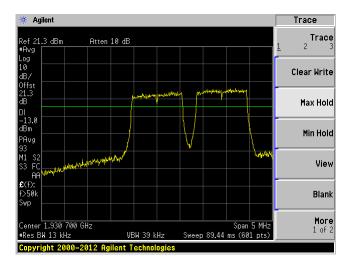


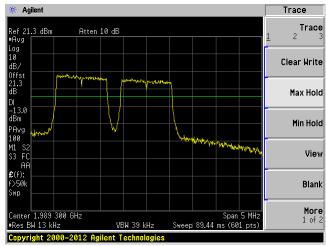
LTE-64QAM 1.4 MHz

More 1 of 2

Low Channel

Span 80 MHz Sweep 6.04 ms (601 pts)

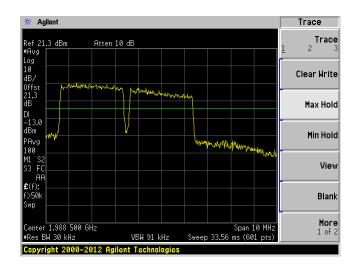




LTE-64QAM 3 MHz

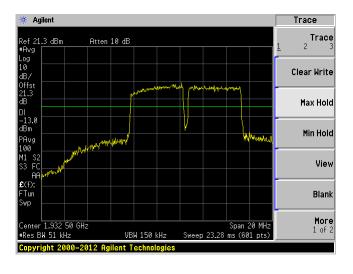
Low Channel

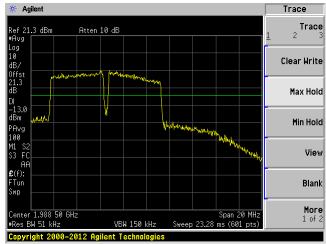
High Channel



LTE-64QAM 5 MHz

Low Channel



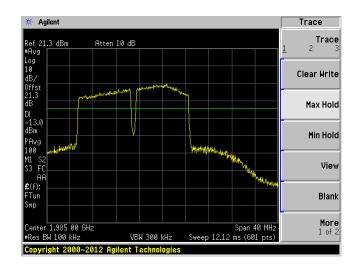


LTE-64QAM 10 MHz

Low Channel

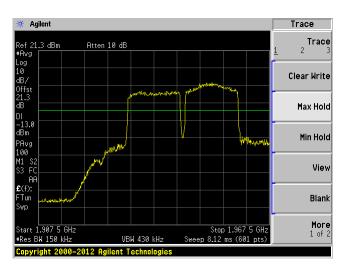
* Agilent Trace Trace Ref 21.3 dBm Atten 10 dB Clear Write Max Hold Min Hold View =Tun Blank More 1 of 2 Center 1.935 00 GHz #Res BW 100 kHz Span 40 MHz Sweep 12.12 ms (601 pts) VBW 300 kHz Copyright 2000-2012 Agilent Technologies

High Channel



LTE-64QAM 15 MHz

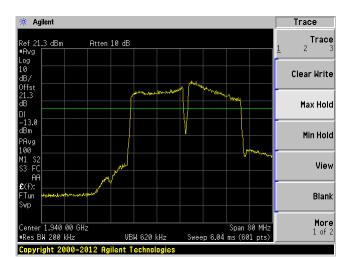
Low Channel



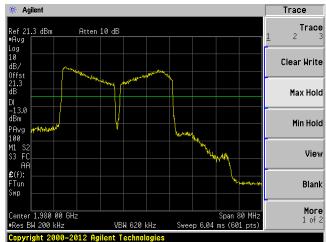


LTE-64QAM 20 MHz

Low Channel



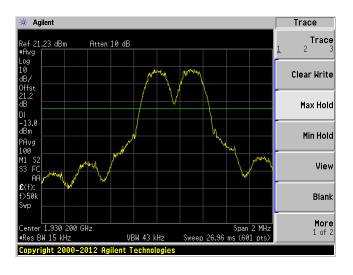
High Channel

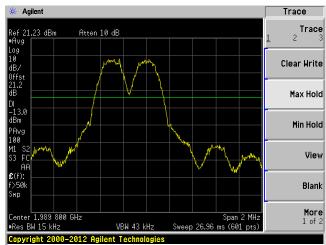


Downlink (ALC on)

GSM

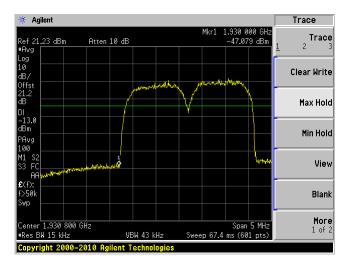
Low Channel



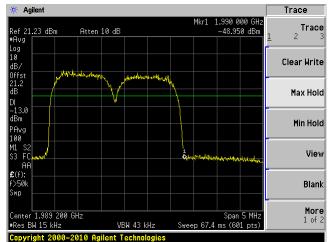


CDMA

Low Channel

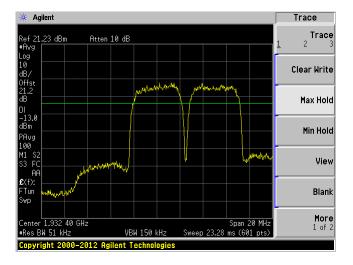


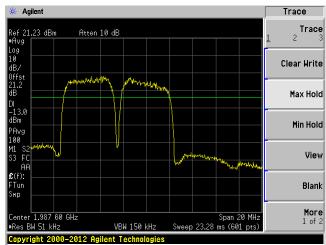
High Channel



WCDMA

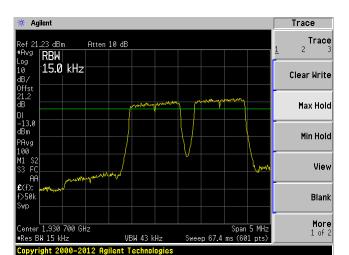
Low Channel



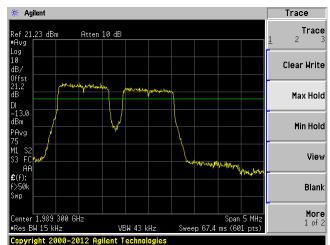


LTE-QPSK 1.4 MHz

Low Channel

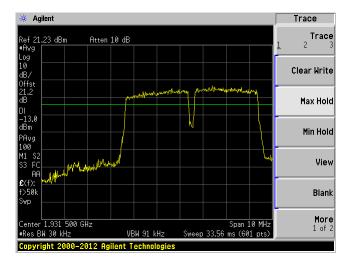


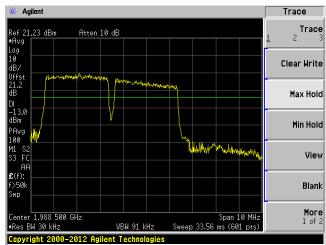
High Channel



LTE-QPSK 3 MHz

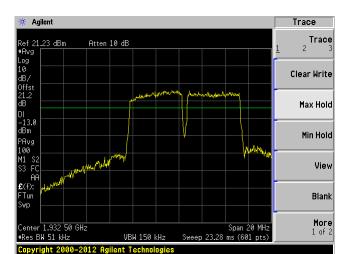
Low Channel



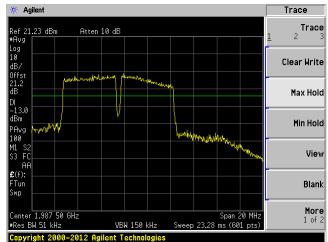


LTE-QPSK 5 MHz

Low Channel



High Channel



LTE-QPSK 10 MHz

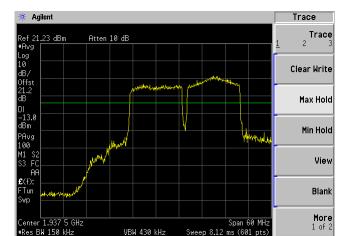
Low Channel





LTE-QPSK 15 MHz

Low Channel



VBW 430 kHz

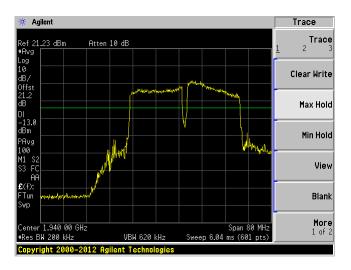
Copyright 2000-2012 Agilent Technologies

High Channel



LTE-QPSK 20 MHz

Low Channel



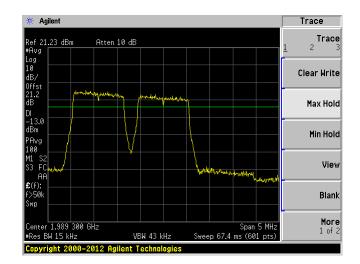


LTE-16QAM 1.4 MHz

Low Channel

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High Channel

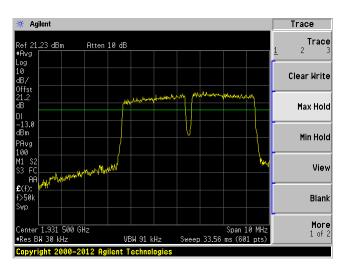


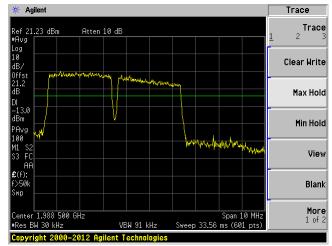
LTE-16QAM 3 MHz

More 1 of 2

Low Channel

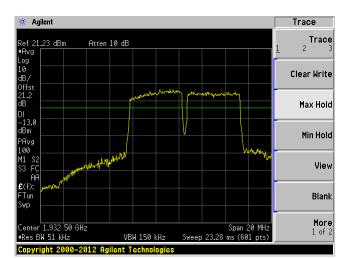
Span 5 MHz Sweep 67.4 ms (601 pts)





LTE-16QAM 5 MHz

Low Channel

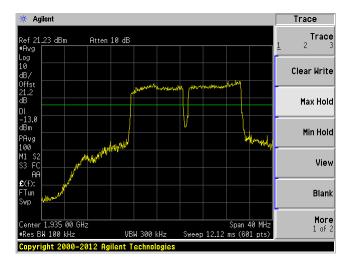


High Channel



LTE-16QAM 10 MHz

Low Channel





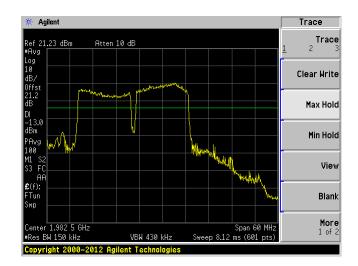
LTE-16QAM 15 MHz

Low Channel

VBW 430 kHz

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High Channel

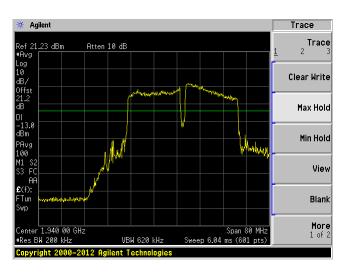


LTE-16QAM 20 MHz

More 1 of 2

Low Channel

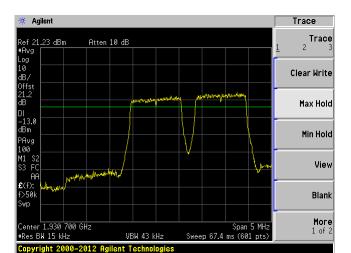
Span 60 MHz Sweep 8.12 ms (601 pts)



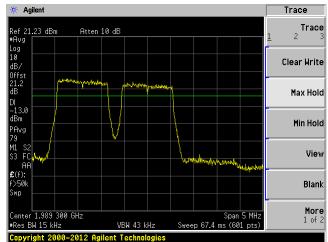


LTE-64QAM 1.4 MHz

Low Channel

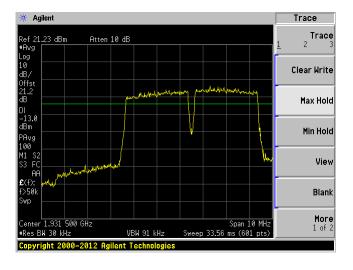


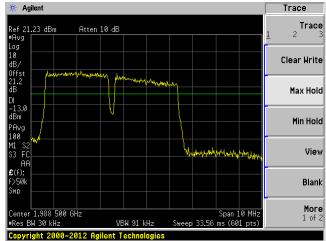
High Channel



LTE-64QAM 3 MHz

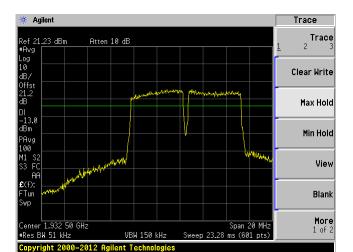
Low Channel





LTE-64QAM 5 MHz

Low Channel

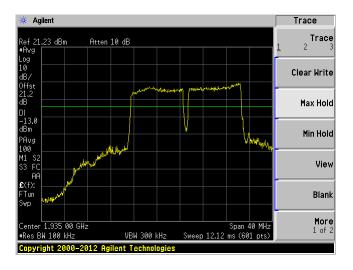


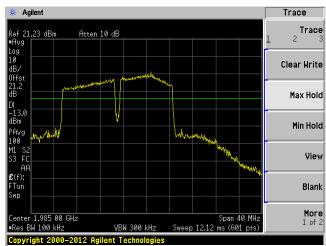
High Channel



LTE-64QAM 10 MHz

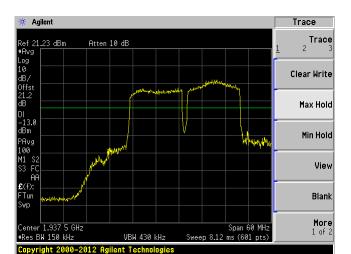
Low Channel





LTE-64QAM 15 MHz

Low Channel



High Channel



LTE-64QAM 20 MHz

Low Channel

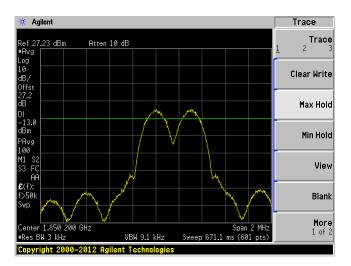




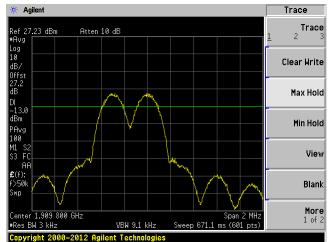
Uplink (ALC off)

GSM

Low Channel

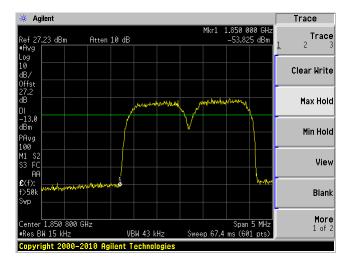


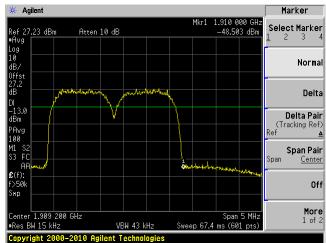
High Channel



CDMA

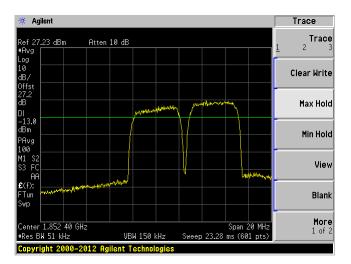
Low Channel



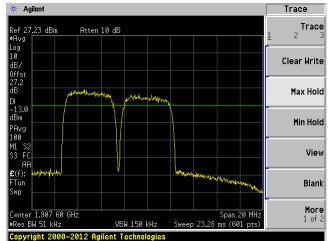


WCDMA

Low Channel

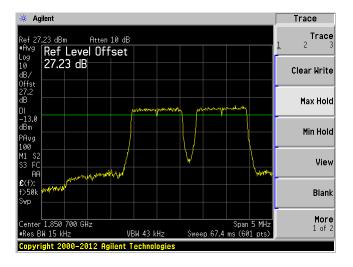


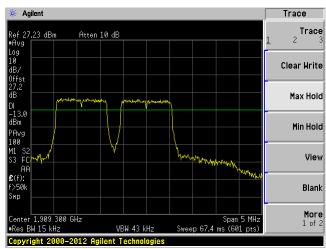
High Channel



LTE-QPSK 1.4 MHz

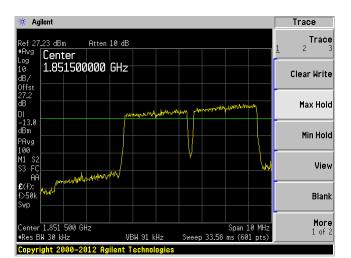
Low Channel



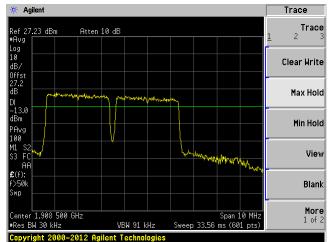


LTE-QPSK 3 MHz

Low Channel

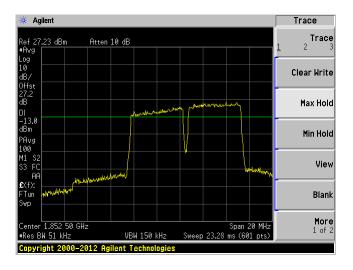


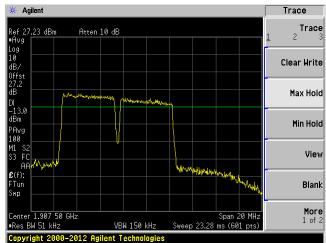
High Channel



LTE-QPSK 5 MHz

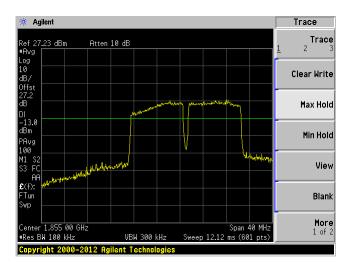
Low Channel



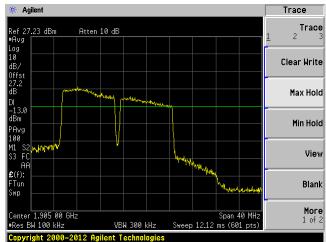


LTE-QPSK 10 MHz

Low Channel

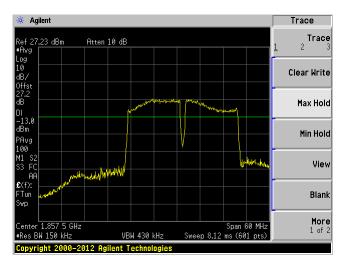


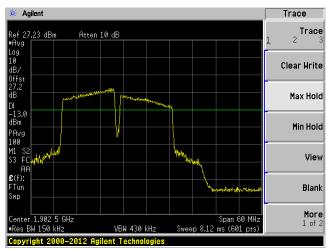
High Channel



LTE-QPSK 15 MHz

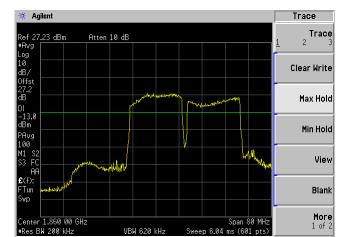
Low Channel





LTE-QPSK 20 MHz

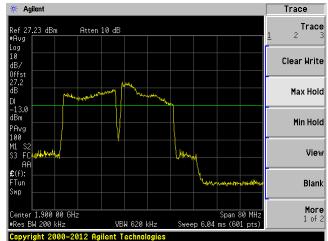
Low Channel



VBW 620 kHz

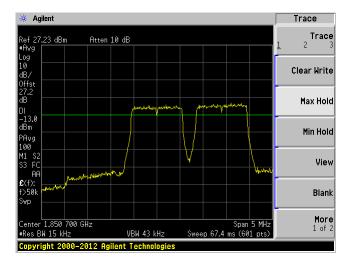
Copyright 2000-2012 Agilent Technologies

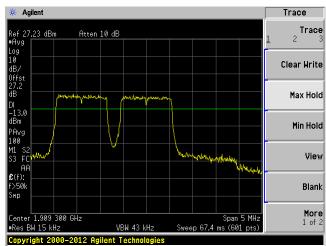
High Channel



LTE-16QAM 1.4 MHz

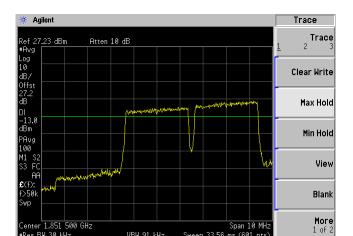
Low Channel





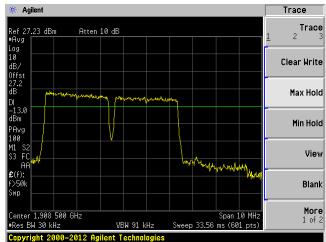
LTE-16QAM 3 MHz

Low Channel



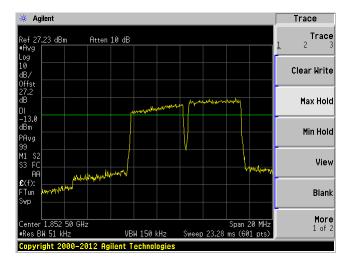
Copyright 2000-2012 Agilent Technologies

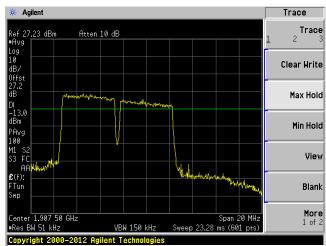
High Channel



LTE-16QAM 5 MHz

Low Channel





LTE-16QAM 10 MHz

Low Channel

Agilent

Center 1.855 00 GHz #Res BW 100 kHz

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Atten 10 dB

Trace

1 2 3

Clear Write

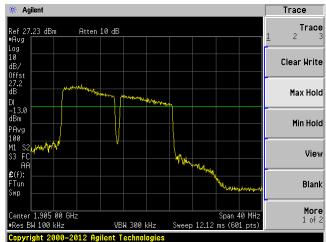
Span 40 MHz Sweep 12.12 ms (601 pts)

Min Hold

View

Blank

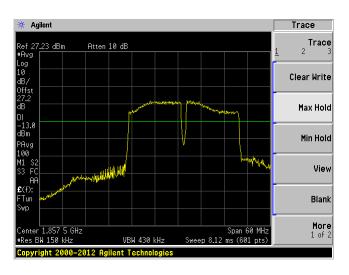
More 1 of 2

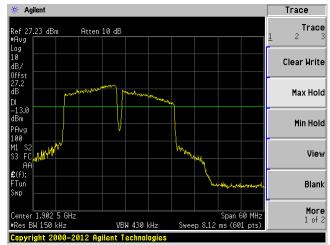


High Channel

LTE-16QAM 15 MHz

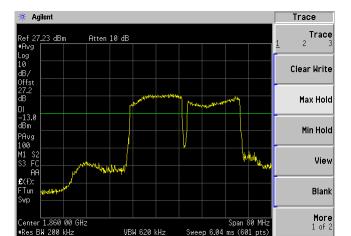
Low Channel





LTE-16QAM 20 MHz

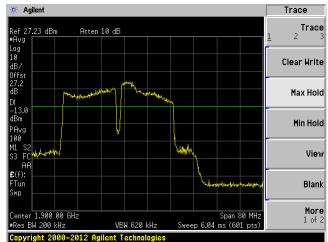
Low Channel



VBW 620 kHz

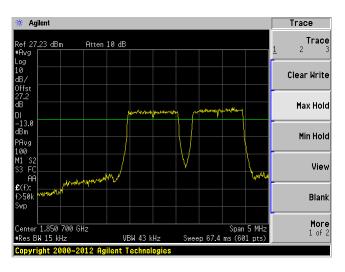
Copyright 2000-2012 Agilent Technologies

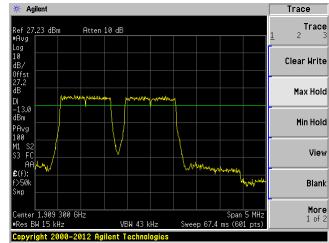
High Channel



LTE-64QAM 1.4 MHz

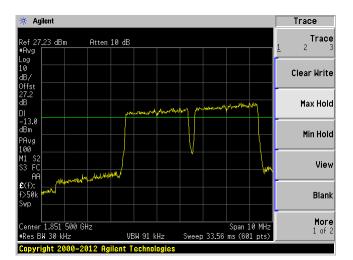
Low Channel



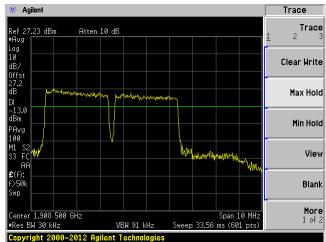


LTE-64QAM 3 MHz

Low Channel

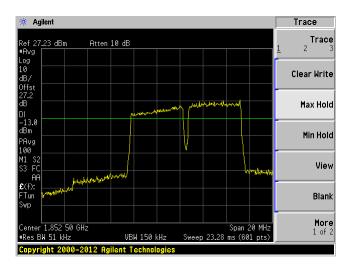


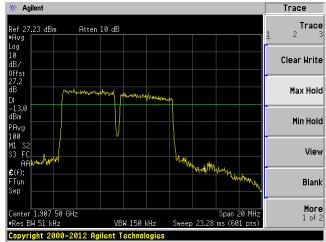
High Channel



LTE-64QAM 5 MHz

Low Channel





LTE-64QAM 10 MHz

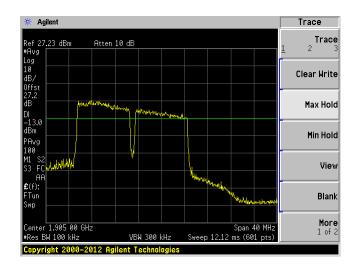
Low Channel

Agilent Trace Trace Atten 10 dB Clear Write Max Hold Min Hold View =Tun Blank **More** 1 of 2 Center 1.855 00 GHz #Res BW 100 kHz Span 40 MHz Sweep 12.12 ms (601 pts)

VBW 300 kHz

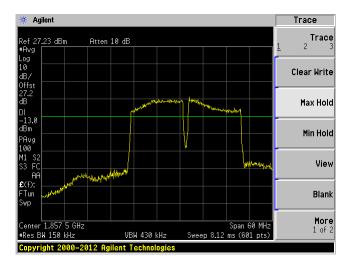
Copyright 2000-2012 Agilent Technologies

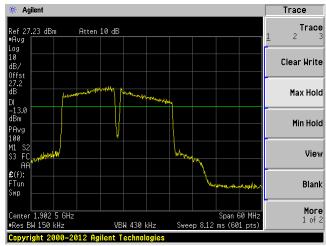
High Channel



LTE-64QAM 15 MHz

Low Channel





LTE-64QAM 20 MHz

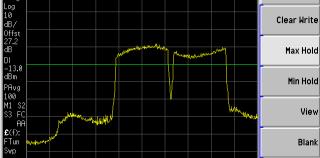
More 1 of 2

Low Channel

Atten 10 dB Trace

1 2 3

Span 80 MHz Sweep 6.04 ms (601 pts)



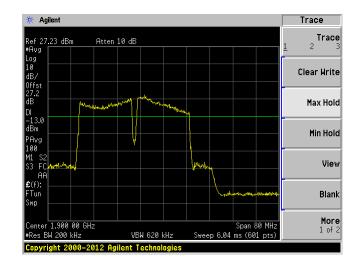
VBW 620 kHz

Agilent

Center 1.860 00 GHz #Res BW 200 kHz

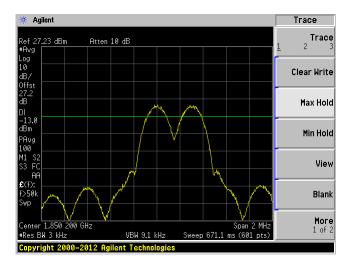
Copyright 2000-2012 Agilent Technologies

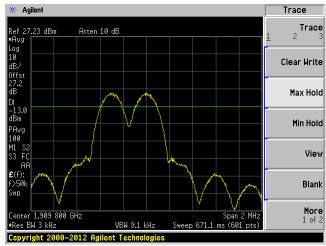
High Channel



Uplink (ALC on) GSM

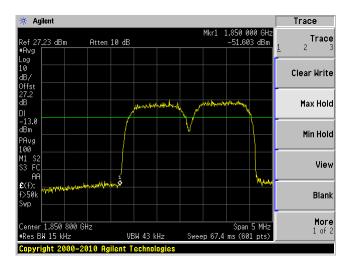
Low Channel



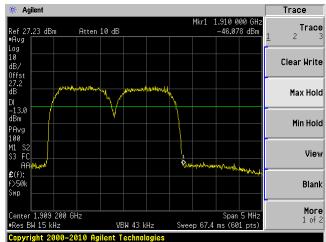


CDMA

Low Channel

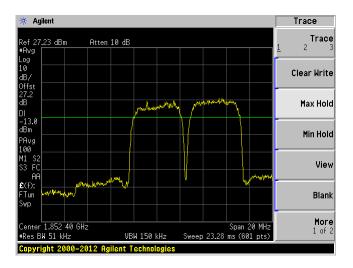


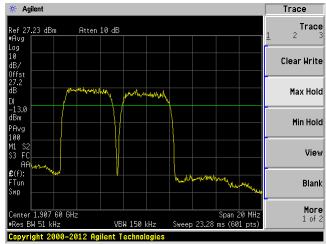
High Channel



WCDMA

Low Channel





LTE-QPSK 1.4 MHz

Min Hold

View

Blank

More 1 of 2

Low Channel

Agilent

Atten 10 dB

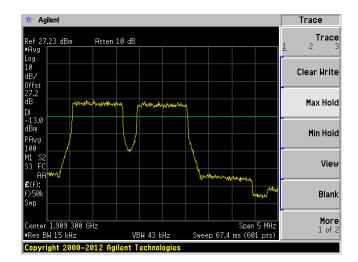
Trace
1 2 3

Clear Write

Max Hold

Span 5 MHz Sweep 67.4 ms (601 pts)

High Channel

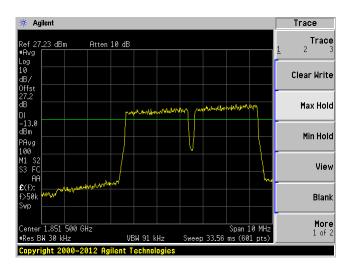


LTE-QPSK 3 MHz

Low Channel

VBW 43 kHz

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LTE-QPSK 5 MHz

Low Channel

Agilent Trace Trace Atten 10 dB Clear Write Max Hold Min Hold View Tun Blank **More** 1 of 2

VBW 150 kHz

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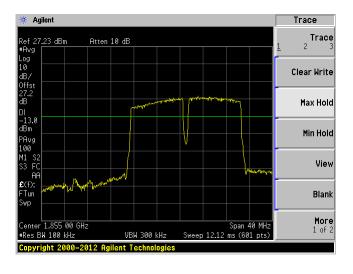
High Channel

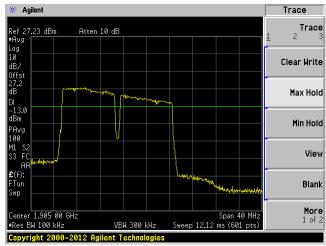


LTE-QPSK 10 MHz

Low Channel

Stop 1.862 50 GHz ep 23.28 ms (601 pts)





LTE-QPSK 15 MHz

Low Channel

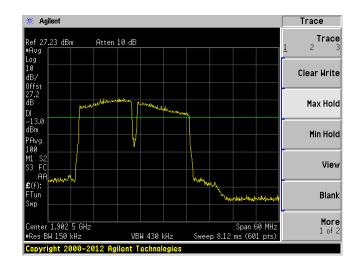
VBW 430 kHz

Tun

Center 1.857 5 GHz #Res BW 150 kHz

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High Channel



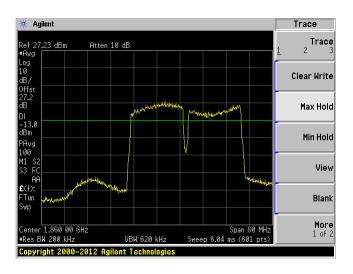
LTE-QPSK 20 MHz

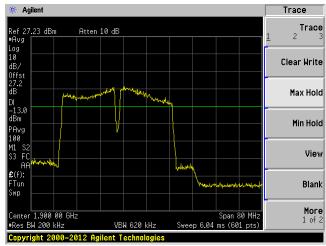
Blank

More 1 of 2

Low Channel

Span 60 MHz Sweep 8.12 ms (601 pts)



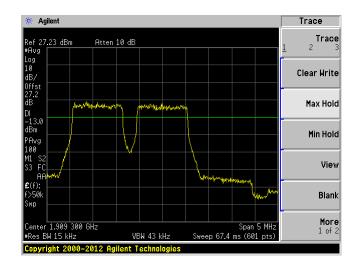


LTE-16QAM 1.4 MHz

Low Channel

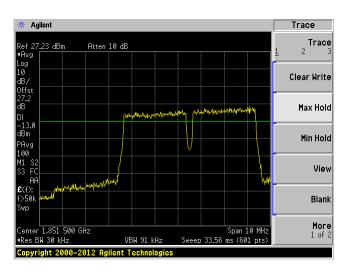
Copyright 2000-2012 Agilent Technologies

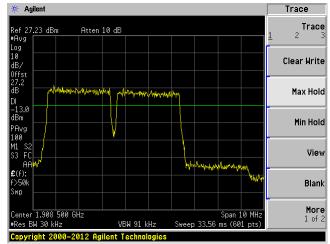
High Channel



LTE-16QAM 3 MHz

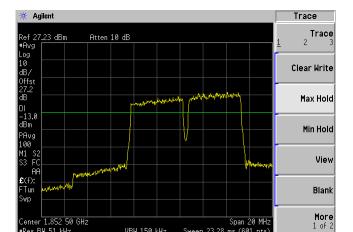
Low Channel





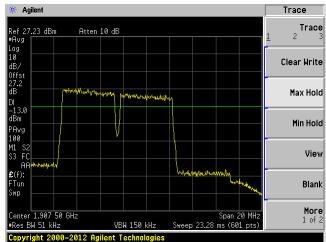
LTE-16QAM 5 MHz

Low Channel



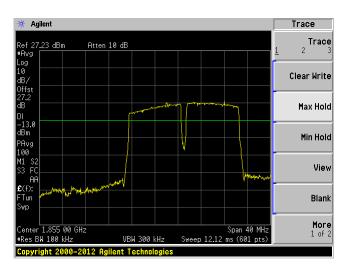
Copyright 2000-2012 Agilent Technologies

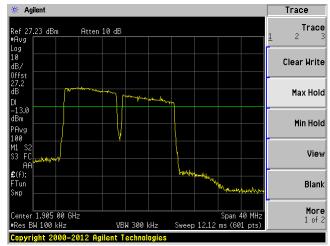
High Channel



LTE-16QAM 10 MHz

Low Channel

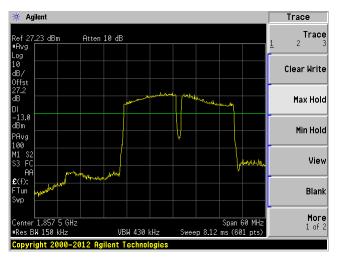


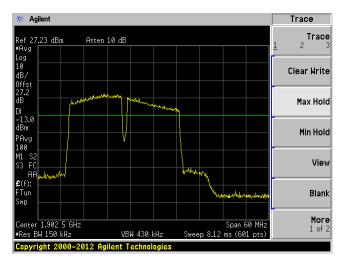


LTE-16QAM 15 MHz

Low Channel

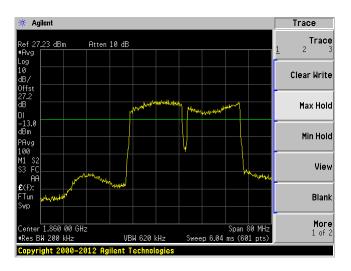
High Channel

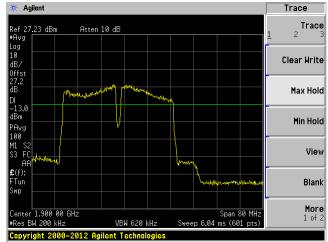




LTE-16QAM 20 MHz

Low Channel



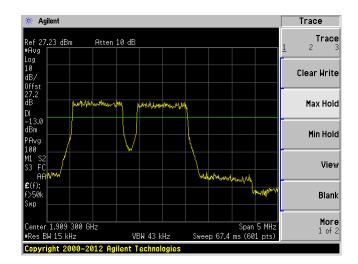


LTE-64QAM 1.4 MHz

Low Channel

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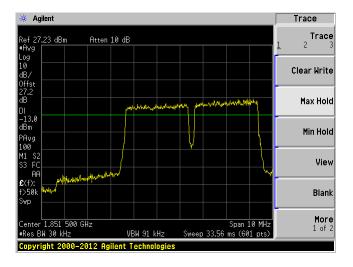
High Channel



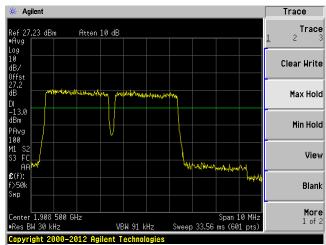
LTE-64QAM 3 MHz

More 1 of 2

Low Channel



High Channel



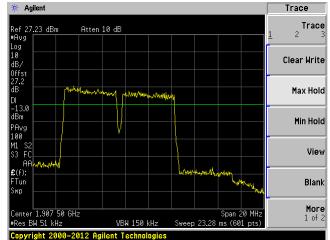
LTE-64QAM 5 MHz

Low Channel



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High Channel

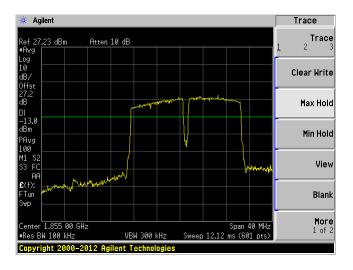


LTE-64QAM 10 MHz

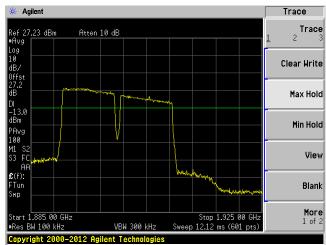
Blank

More 1 of 2

Low Channel



High Channel



LTE-64QAM 15 MHz

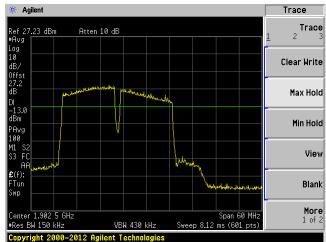
Low Channel



VBW 430 kHz

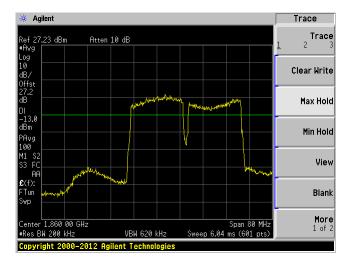
Copyright 2000-2012 Agilent Technologies

High Channel

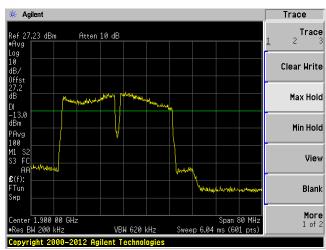


LTE-64QAM 20 MHz

Low Channel



High Channel



8 FCC §24.238(b) - Band Edge

8.1 Applicable Standards

According to FCC §24.238(b) 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 of the spectrum analyzer was set according to center frequency of the EUT to be transmitted and resolution bandwidth was set to at least 1MHz or 1% of the emission bandwidth



8.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates	Calibration Interval
Agilent	Spectrum Analyzer	E4440A	MY44303352	2015-06-22	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

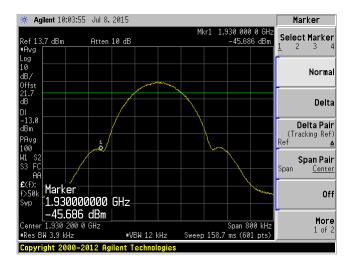
The testing was performed by Ronak Patel on 2015-06-08 to 2015-06-29 in the RF Site.

8.5 Test Results

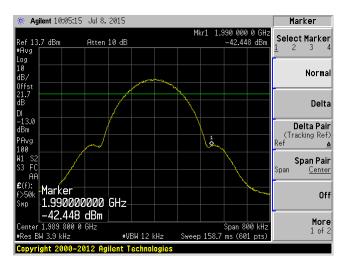
Please refer to the following plots.

GSM/GPRS

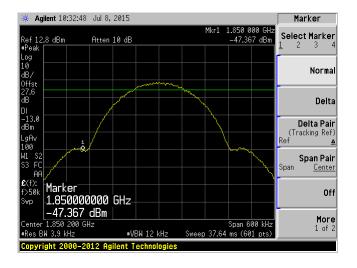
Low DL



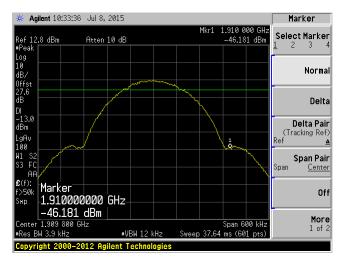
High DL



Low UL

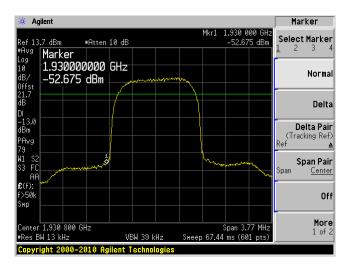


High UL

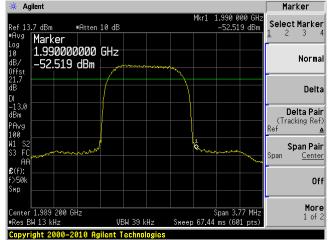


CDMA

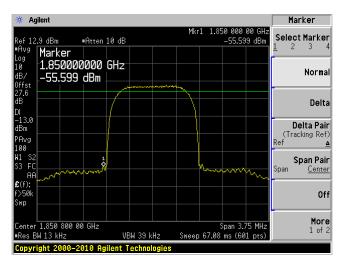
Low DL



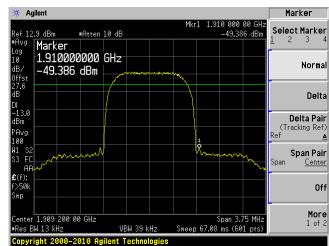
High DL



Low UL

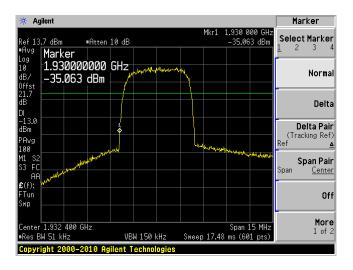


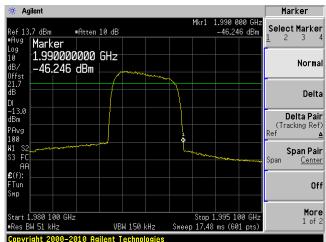
High UL



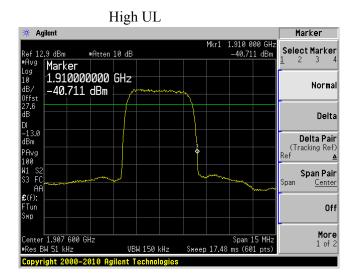
WCDMA

Low DL High DL



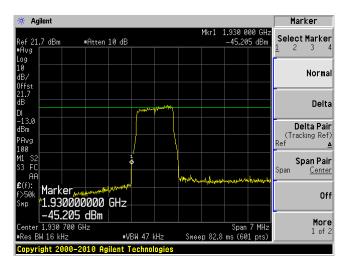


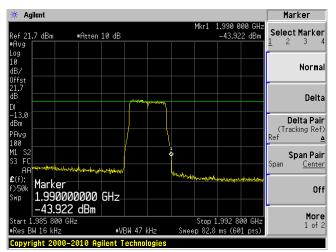
Low UL * Agilent Marker Mkr1 1.850 000 GHz -37.193 dBm Select Marker #Atten 10 dB Marker Log 10 dB/ Offst 27.6 dB 1.850000000 GHz Normal -37.193 dBm Delta DI -13.0 dBm Delta Pair **Jelta Pair** (Tracking Ref) Ref Span Pair <u>Center</u> Off More 1 of 2 Span 15 MHz Sweep 17.48 ms (601 pts) Center 1.852 400 GHz VBW 150 kHz



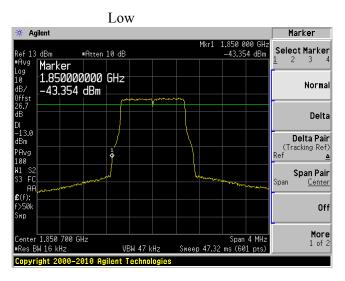
LTE 1.4MHz DL QPSK

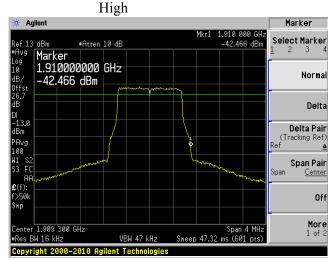
Low





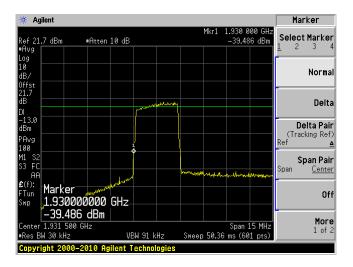
LTE 1.4MHz UL QPSK

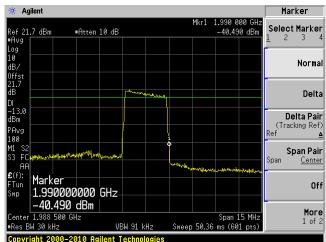




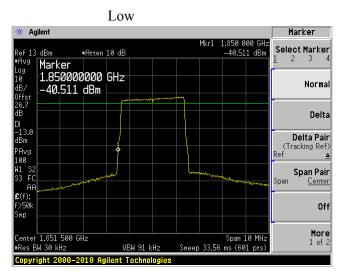
LTE 3MHz DL QPSK

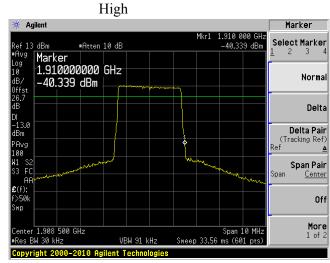
Low High



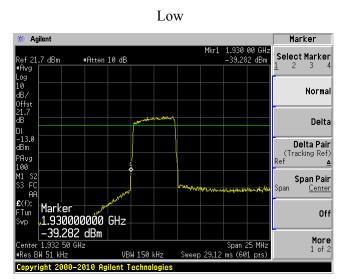


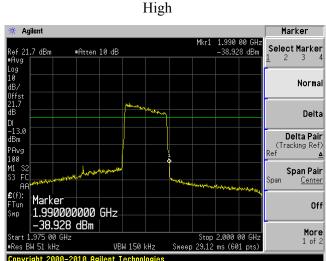
LTE 3MHz UL QPSK



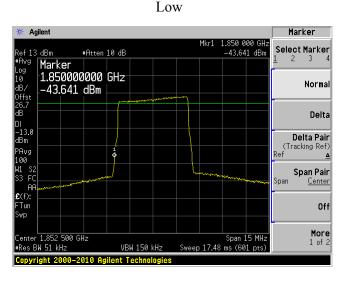


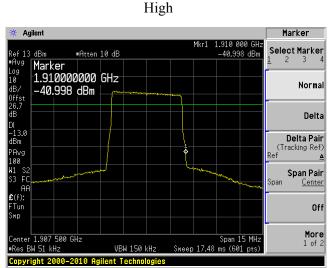
LTE 5MHz DL QPSK



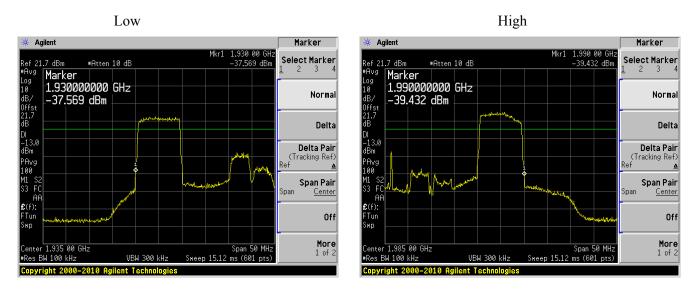


LTE 5MHz UL QPSK

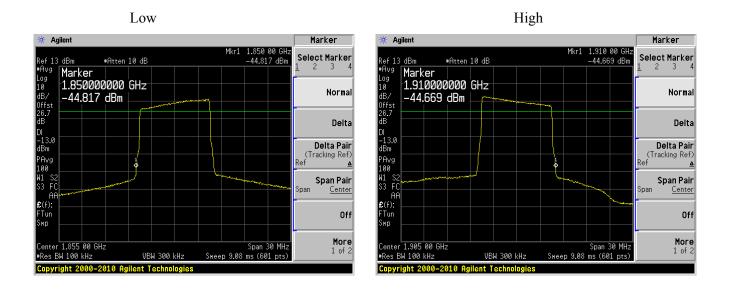




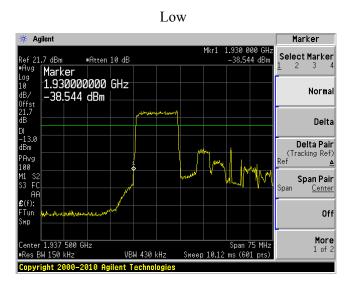
LTE 10MHz DL QPSK

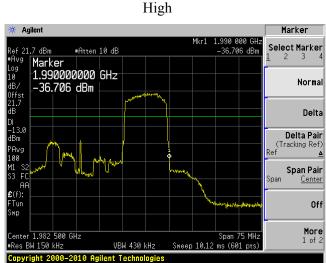


LTE 10MHz UL QPSK

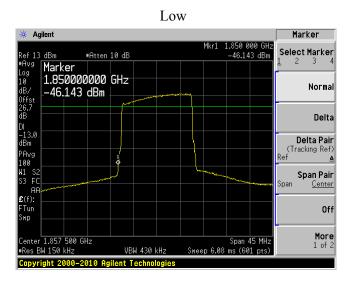


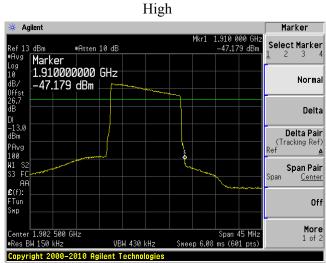
LTE 15MHz DL QPSK





LTE 15MHz UL QPSK

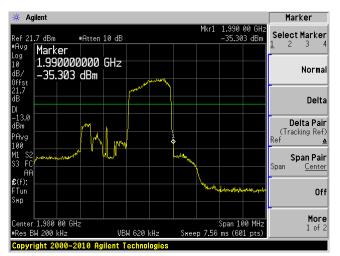




LTE 20MHz DL QPSK

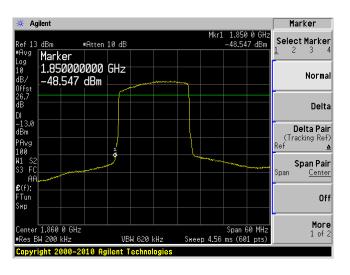






LTE 20MHz UL QPSK

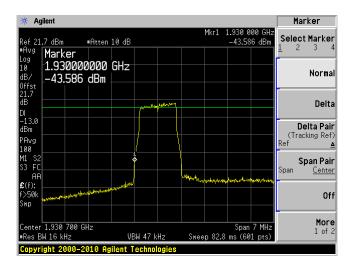
Low High

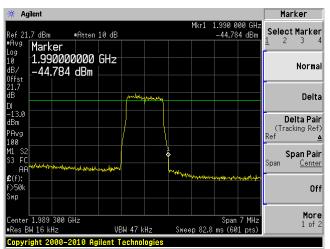




LTE 1.4MHZ DL 16QAM

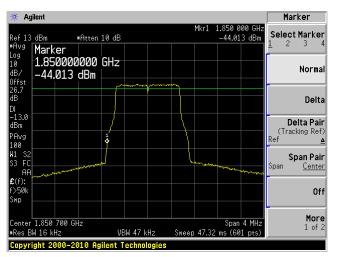
Low High

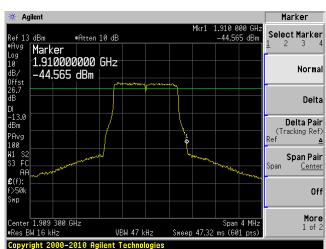




LTE 1.4MHZ UL 16QAM

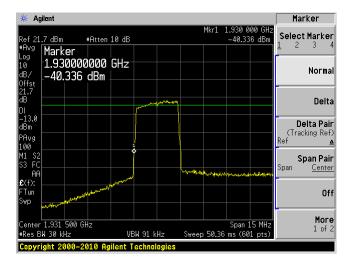
Low High

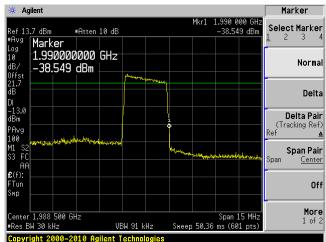




LTE 3 MHz DL 16QAM

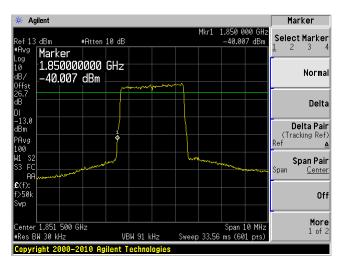
Low High

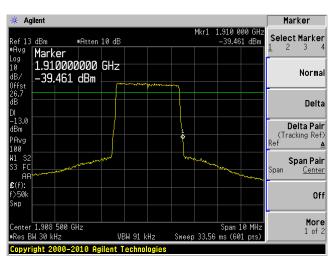




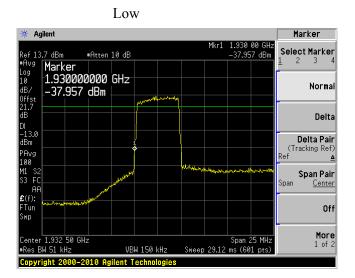
LTE 3 MHz UL 16QAM

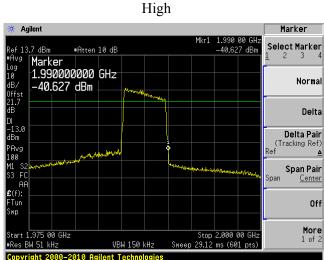
Low High



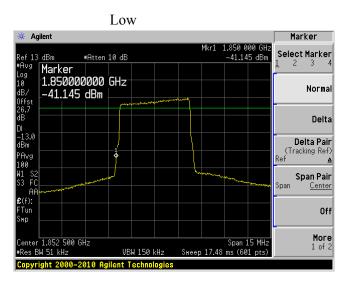


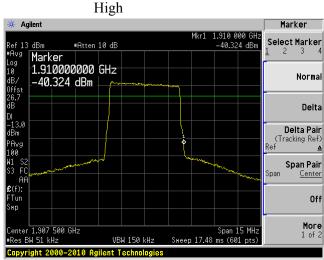
LTE 5 MHz DL 16QAM



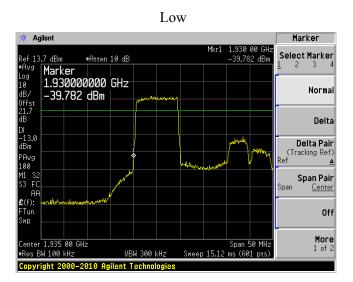


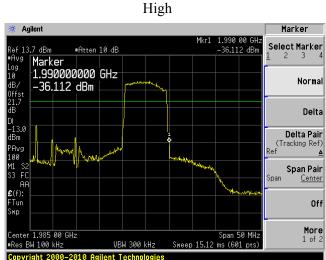
LTE 5 MHz UL 16QAM



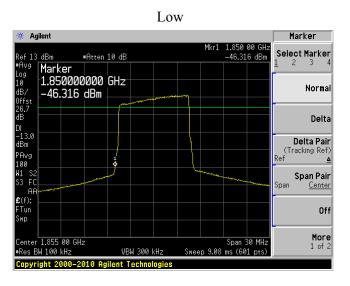


LTE 10 MHz DL 16QAM



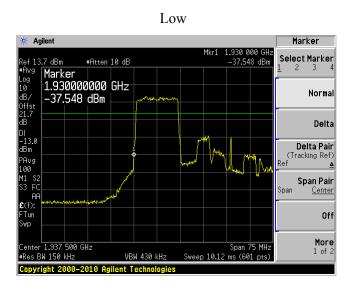


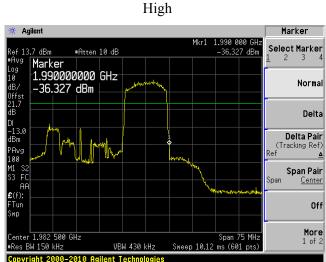
LTE 10 MHz UL 16QAM



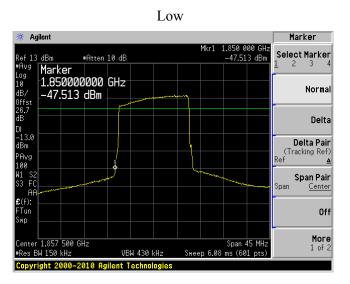


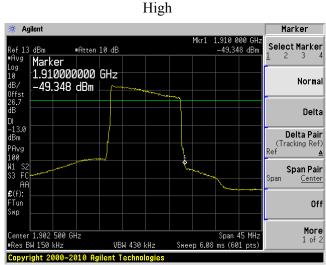
LTE 15 MHz DL 16QAM



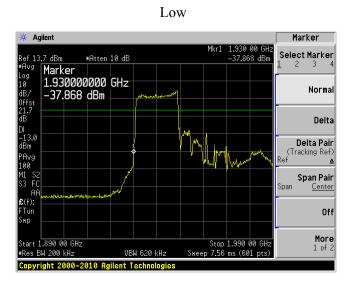


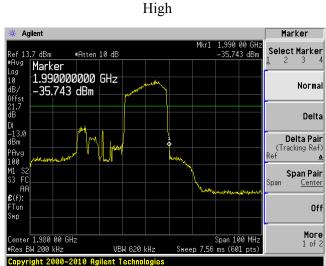
LTE 15 MHz UL 16QAM



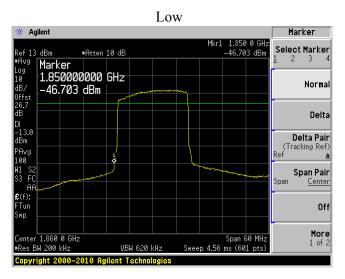


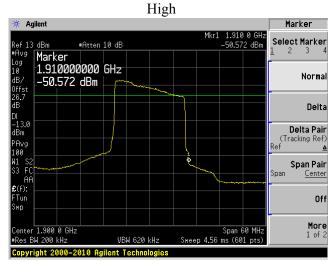
LTE 20 MHz DL 16QAM





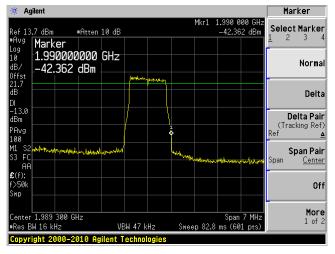
LTE 20 MHz UL 16QAM

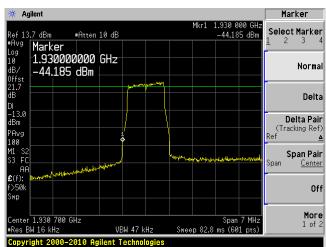




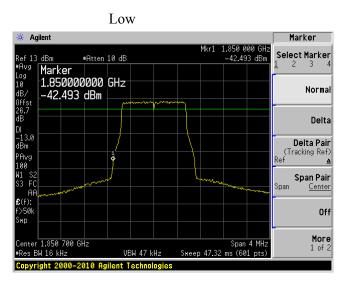
LTE 1.4 MHz DL 64QAM

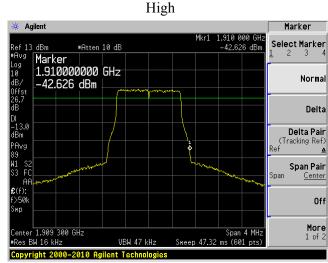




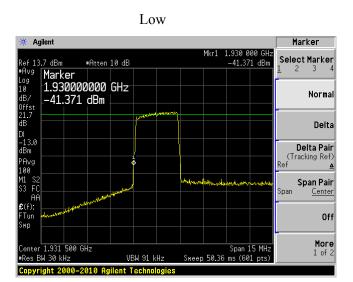


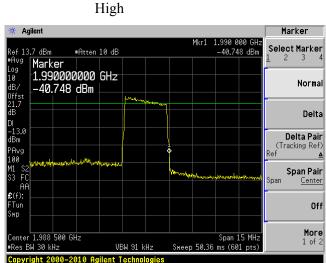
LTE 1.4 MHz UL 64QAM



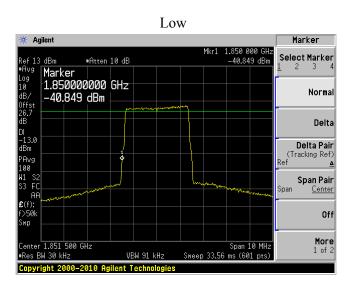


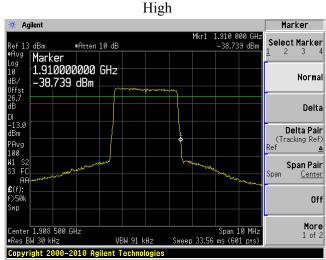
LTE 3 MHz DL 64QAM



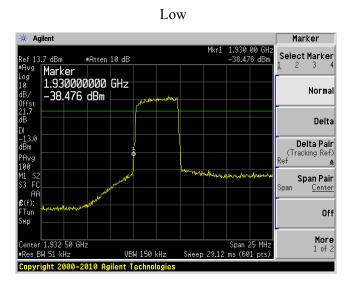


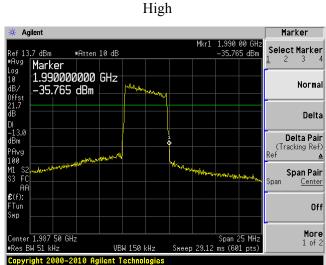
LTE 3 MHz UL 64QAM



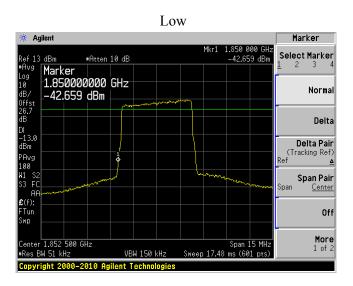


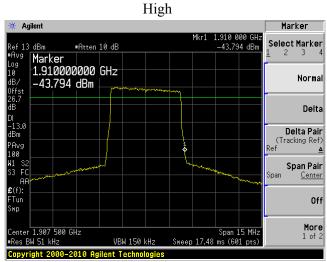
LTE 5 MHz DL 64QAM





LTE 5 MHz UL 64QAM

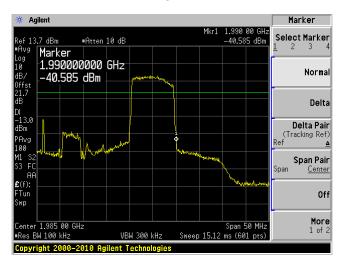




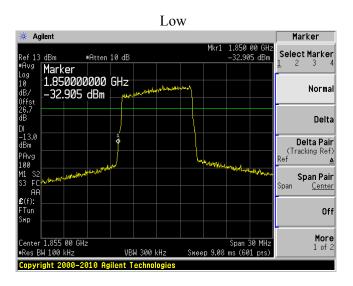
LTE 10 MHz DL 64QAM

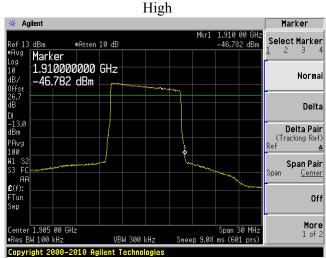
Low High



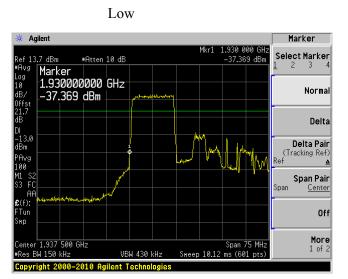


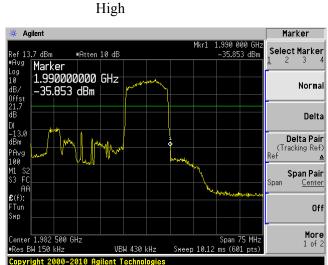
LTE 10 MHz UL 64QAM



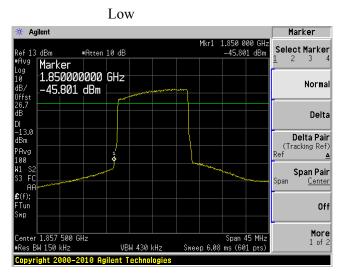


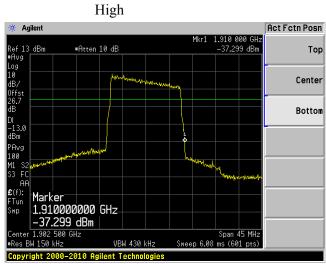
LTE 15 MHz DL 64QAM



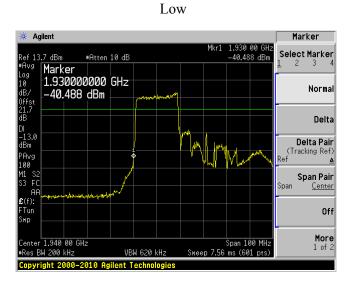


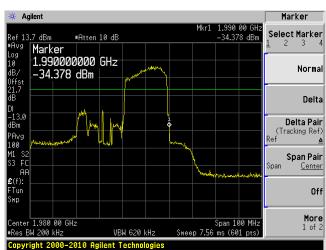
LTE 15 MHz UL 64QAM





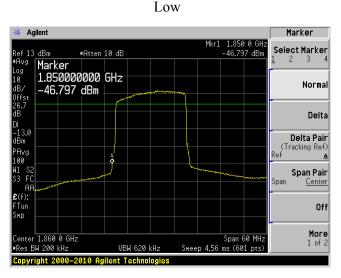
LTE 20 MHz DL 64QAM





High

LTE 20 MHz UL 64QAM





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

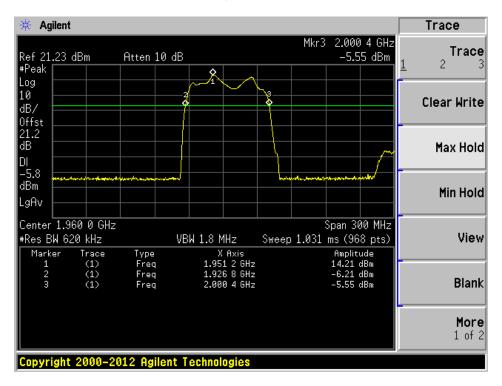
Temperature:	21-23° C
Relative Humidity:	42-48 %
ATM Pressure:	101.4-102 kPa

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

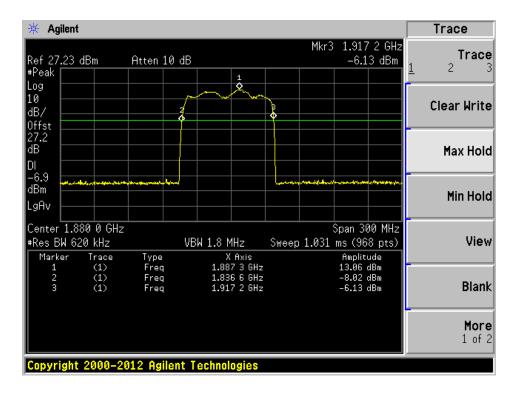
9.5 Test Results

Please refer to the following plot,

Downlink, 1930 – 1990 MHz



Uplink, 1850 – 1910 MHz



10 FCC §2.1091 - RF Exposure

10.1 Applicable Standards

According to §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/cm²)	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

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

Downlink (Directional Antenna)

Maximum peak output power at antenna input terminal (dBm): 16.04

Maximum peak output power at antenna input terminal (mW): 40.180

Prediction distance (cm): 30

Prediction frequency (MHz): 1960

Antenna Gain, typical (dBi): 10

Maximum Antenna Gain (numeric): 10

Power density at predication frequency and distance (mW/cm²): 0.036

MPE limit for uncontrolled exposure at predication frequency (mW/cm²): 1.0

^{* =} Plane-wave equivalent power density

Downlink (Omni Directional Antenna)

Prediction distance (cm): 30 Prediction frequency (MHz): 196 Antenna Gain, typical (dBi): 5 Maximum Antenna Gain (numeric): 3.1	beak output power at antenna input terminal (dBm): 16	.04
Prediction frequency (MHz): 196 Antenna Gain, typical (dBi): 5 Maximum Antenna Gain (numeric): 3.1	peak output power at antenna input terminal (mW): 40.	.180
Antenna Gain, typical (dBi): 5 Maximum Antenna Gain (numeric): 3.1	<u>Prediction distance (cm):</u> 30	_
Maximum Antenna Gain (numeric): 3.1	Prediction frequency (MHz): 19	<u>60</u>
	Antenna Gain, typical (dBi): 5	
Power density at predication frequency and distance (mW/cm ²): 0.0	Maximum Antenna Gain (numeric): 3.1	1622
1 ower density at predication frequency and distance (in whem).	ty at predication frequency and distance (mW/cm ²): 0.0	0113
MPE limit for uncontrolled exposure at predication frequency (mW/cm ²): 1.0	olled exposure at predication frequency (mW/cm ²): 1.0	<u>)</u>

Uplink

Maximum peak output power at antenna input terminal (dBm):	<u>15.86</u>
Maximum peak output power at antenna input terminal (mW):	38.548
Prediction distance (cm):	<u>30</u>
<u>Prediction frequency (MHz):</u>	<u>1852.5</u>
Antenna Gain, typical (dBi):	<u>10</u>
Maximum Antenna Gain (numeric):	<u>10</u>
Power density at predication frequency and distance (mW/cm ²):	0.0341
MPE limit for uncontrolled exposure at predication frequency (mW/cm ²):	<u>1.0</u>

Results

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