Lab Code: 200167-0

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TEST AND MEASUREMENT REPORT

For

NVIDIA Corporation

2701 San Tomas Expressway,

Santa Clara, CA 95050, USA

FCC ID: VOB-P1001A
IC: 7361A-P1001A

Report Type:	**Product Type:**
Original Report	2G/3G WWAN PCI-E Module

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1111165-2224	Original Report	2011-12-28

1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

This test and measurement report was prepared on behalf of *NVIDIA Corporation* and their product, *model: P1001, FCC ID: VOB-P1001A, IC: 7361A-P1001A* or the "EUT" as referred to this report. The EUT is WWAN module with GSM and WCDMA technologies.

Description	Specification
Frequency Band	Cellular Band: 824-849 MHz (TX) 869-894 MHz (RX) PCS Band: 1850-1910 MHz (TX) 1930-1990 MHz (RX)
Technologies	GPRS, EDGE, WCDMA, HSPA+

1.2 Mechanical Description

The EUT measures approximately 50mm (L) x 30mm (W) x 4 mm (H), and weighs approximately 11 g.

The test data gathered are from typical production sample, serial number: 011567008962768 provided by the manufacturer.

1.3 Objective

This type approval report is prepared on behalf of *NVIDIA Corporation* in accordance with Part 2, Subpart J, Part 22 Subpart H, and Part 24 Subpart E of the Federal Communication Commissions rules. RSS-132 Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz and RSS-133, 2 GHz Personal Communications Services of IC rules

The objective is to determine compliance with FCC rules for RF output power, modulation characteristic, occupied bandwidth, spurious emissions at antenna terminal, field strength of spurious radiation, frequency stability, band edge, and conducted and radiated margin.

1.4 Related Submittal(s)/Grant(s)

N/A

1.5 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the Code of Federal Regulations Title 47 Part 2, Sub-part J as well as the following parts:

Part 22 Subpart H – Cellular Radiotelephone Service
Part 24 Subpart E – PCS
RSS-132 - Cellular Telephones Employing New Technologies Operating in the Bands 824-849 MHz and 869-894 MHz
RSS-133 - 2 GHz Personal Communications Services

Applicable Standards: TIA/EIA-603-C, ANSI C63.4-2003.

All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.6 Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in the field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values ranging from $\pm$2.0 dB for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL Corp.

Detailed instrumentation measurement uncertainties can be found in BACL Corp. report QAP-018.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test sites at BACL have been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission, Industry Canada, and Voluntary Control Council for Interference has the reports on file and is listed under FCC registration number: 90464, IC registration number: 3062A, and VCCI Registration Number: C-2463 and R-2698. The test site has been approved by the FCC, IC, and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

2 SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was configured for testing according to TIA/EIA 603-C.

The final qualification test was performed with the EUT operating at normal mode.

2.2 EUT Exercise Software

Agilent 8960 (HP E5155C) Wireless Communication test set was used to activate the EUT.

2.3 Special Accessories

N/A

2.4 Equipment Modifications

No modifications were made to the EUT

2.5 Local Support Equipment

Manufacturer	Description	Model No.	Serial No.
DELL	Laptop	Latitude D600	CX-0X2034-48643-3A6-8307
NVIDIA	Tablet PC Host	E1290	0412911036188

2.6 Power Supply and Line Filters

Manufacturer	Description	Model	Serial Number
FSP Group Inc.	AC/DC Adapter	FSP025-DGAA1	H1191003035

2.7 Interface Ports and Cabling

Cable Description	Length (m)	From	To
RF Cable	< 1	EUT	Communication Set
RF Cable	< 1	EUT	Spectrum Analyzer

2.8 Internal Parts List and Details

Manufacturers	Descriptions	Models	Serial Numbers
Tango	PCB Board	FHJ24VD	45007071-D8L3

3 SUMMARY OF TEST RESULTS

FCC/IC Rules	Description of Test	Result
FCC §2.1046, §22.913; §24.232 IC RSS-132 §4.4, RSS-133 §6.4	RF Output Power	Compliant
FCC §2.1047 IC RSS-132 §4.2, RSS-133 §6.2	Modulation Characteristics	N/A[1]
FCC §2.1049, §22.917; §24.238 IC RSS-132 §4.5, RSS-133 §6.5	Out of Band Emissions, Occupied Bandwidth	Compliant
FCC §2.1051,§22.917; §24.238 (a) IC RSS-132 §4.5, RSS-133 §6.5	Spurious Emissions at Antenna Terminals	Compliant
FCC §2.1053, §22.917 (a); §24.238 (a) IC RSS-132 §4.5, RSS-133 §6.5	Field Strength of Spurious Radiation	Compliant
FCC §22.917; §24.238 IC RSS-132 §4.5, RSS-133: §6.5	Band Edge	Compliant
FCC §2.1055; §22.355; §24.235 IC RSS-132 §4.3RSS-133 §6.3	Frequency stability vs. temperature Frequency stability vs. voltage	Compliant
IC RSS-132 §4.6, RSS-133 §6.6	Receiver Spurious Emissions	Compliant
FCC §2.1093 IC RSS-102	RF Exposure Information	Compliant

Note: [1] there is no specific requirement for digital modulation; therefore modulation characteristic is not presented.

4 FCC §2.1046, §22.913(a), §24.232 & IC RSS-132 §4.4, RSS-132 §6.4 – RF OUTPUT POWER

4.1 Applicable Standard

According to FCC §2.1046 and §22.913 (a), the ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

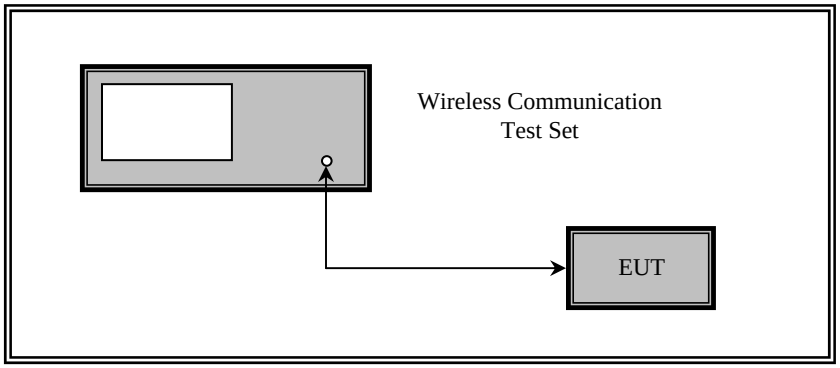
According to FCC §2.1046 and §24.232 (a), in no case may the peak output power of a base station transmitter exceed 2 watts.

According to RSS-132 §4.4 and SPS-503 5.1.3, the maximum EIRP shall be 11.5 watts for mobile stations.

According to RSS-133 §6.4 and SPS-510 5.1.2, Mobile stations and hand-held portables are limited to 2 watts maximum e.i.r.p. The equipment shall employ means to limit the power to the minimum necessary for successful communication.

4.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.



4.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4446A	US44300386	2011-05-10
Agilent	Analyzer, Communications	E5155C	GB44051221	2010-06-11 [1]

Note: [1]Base on two years calibration cycles.

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

4.4 Test Environmental Conditions

Temperature:	20 °C ~ 23 °C
Relative Humidity:	40 % ~ 45 %
ATM Pressure:	101kPa ~ 102kPa

Testing was performed by Lionel Lara from 2011-12-21 to 2011-12-26 at RF Site.

4.5 Test Results

GPRS

Mode	850 MHz (dBm)			1900 MHz (dBm)		
GPRS	**Low**	**Middle**	**High**	**Low**	**Middle**	**High**
1 slot Power Result	32.43	32.67	32.11	29.31	29.68	28.86
2 slots Power Result	29.98	30.31	29.80	26.69	26.82	26.75

EDGE

Mode	850 MHz (dBm)			1900 MHz (dBm)		
EGPRS	**Low**	**Middle**	**High**	**Low**	**Middle**	**High**
1 slot Power Result	27.13	27.51	27.03	26.28	26.51	25.43
2 slots Power Result	24.97	25.22	25.07	24.01	24.13	23.79

WCDMA/HSDPA/HSUPA

Mode	3GPP Sub test	Band V Channels			Band II Channels			MPR
		CH 4132 (dBm)	CH 4182 (dBm)	CH 4233 (dBm)	CH 9262 (dBm)	CH 9400 (dBm)	CH 9538 (dBm)	
WCDMA	1	**22.57**	**22.28**	**23.18**	**22.45**	**22.40**	**22.22**	
HSDPA	1	22.51	22.23	22.75	22.41	22.36	22.07	0
	2	22.47	22.21	22.76	22.41	22.35	22.01	0
	3	22.47	22.23	22.71	22.4	22.36	22.06	0.5
	4	22.45	22.17	22.56	22.37	22.35	22.07	0.5
HSUPA	1	22.49	22.15	22.73	22.31	22.31	22.10	0
	2	22.45	22.23	22.69	22.33	22.3	22.11	2
	3	22.41	22.17	22.78	22.31	22.27	22.07	1
	4	22.46	22.23	22.57	22.30	22.31	22.12	2
	5	22.5	22.25	22.81	22.33	22.31	22.12	0

Note: Part 22H Limit = 7 Watts = 38.45 dBm ERP, Part 24E Limit =2 Watts = 33 dBm EIRP

Antenna Gain Conclusion:

Base on the MPE calculation, the MAX antenna gain for Cellular band will be 4.8 dBi. Therefore the MAX EIRP of Cellular band will be 32.67 dBm + 4.8 dBi = 38.47 dBm will full filled the 40.6 dBm EIRP limit; the MAX EIRP of the PCS band will need full filled under the 33 dBm EIRP limit, so the MAX antenna gain will be 33 dBm-29.68 dBm = 3.32 dBi.

5 FCC §2.1047 & IC RSS-132 §4.2, RSS-132 §6.2 - MODULATION CHARACTERISTIC

5.1 Applicable Standard

There is no specific requirement for digital modulation; therefore modulation characteristic is not presented.

6 FCC §2.1049, §22.917, §22.905, §24.238 & IC RSS-132 §4.5, RSS-133 §6.5 - OCCUPIED BANDWIDTH

6.1 Applicable Standard

Requirements: FCC §2.1049, §22.901, §22.917 and §24.238.

6.2 Test Procedure

The RF output of the transmitter was connected to the simulator and the spectrum analyzer through sufficient attenuation.

The resolution bandwidth of the spectrum analyzer was set at 3 kHz (Cellular /PCS) and the -26 dB bandwidth was recorded.

6.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4446A	US44300386	2011-05-10
Agilent	Analyzer, Communications	E5155C	GB44051221	2010-06-11 [1]

Note: [1]Base on two years calibration cycles.

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

6.4 Test Environmental Conditions

Temperature:	20 °C ~ 23 °C
Relative Humidity:	40 % ~ 45 %
ATM Pressure:	101kPa ~ 102kPa

Testing was performed by Lionel Lara from 2011-12-21 to 2011-12-26 at RF Site.

6.5 Test Results & Plots

Please refer to the following tables and plots.

Cellular Band:

Channel	Frequency (MHz)	26 dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
GPRS			
Low	824.2	316.476	244.9064
Middle	836.6	322.860	250.0181
High	848.8	319.739	248.9223
EDGE			
Low	824.2	314.428	238.9145
Middle	836.6	316.366	243.0085
High	848.8	316.354	245.6621
WCDMA			
Low	826.4	4603	4121.1
Middle	836.6	4597	4146.3
High	846.6	4533	4049.0
HSDPA			
Low	826.4	4628	4124.0
Middle	836.6	4632	4185.5
High	846.6	4588	4219.5
HSUPA			
Low	826.4	4551	4122.1
Middle	836.6	4561	4093.1
High	846.6	4619	4125.5

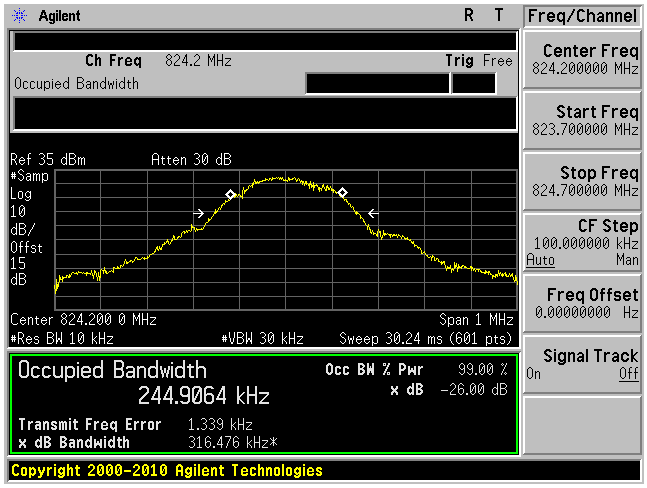
PCS Band:

Channel	Frequency (MHz)	26 dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
GPRS			
Low	1850.2	314.394	245.7709
Middle	1880	312.376	241.8918
High	1909.8	312.063	245.1425
EDGE			
Low	1850.2	308.858	249.1067
Middle	1880	313.966	241.7900
High	1909.8	312.311	242.4520
WCDMA			
Low	1852.4	4566	4116.9
Middle	1880	4628	4089.1
High	1907.6	4553	4133.9
HSDPA			
Low	1852.4	4624	4088.8
Middle	1880	4660	4122.8
High	1907.6	4506	4143.6
HSUPA			
Low	1852.4	4618	4096.4
Middle	1880	4618	4177.1
High	1907.6	4554	4087.0

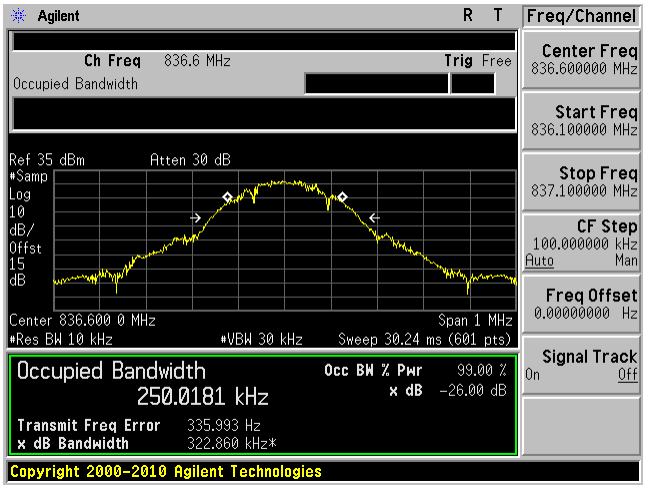
Plots of Occupied Bandwidth

GPRS-850 MHz

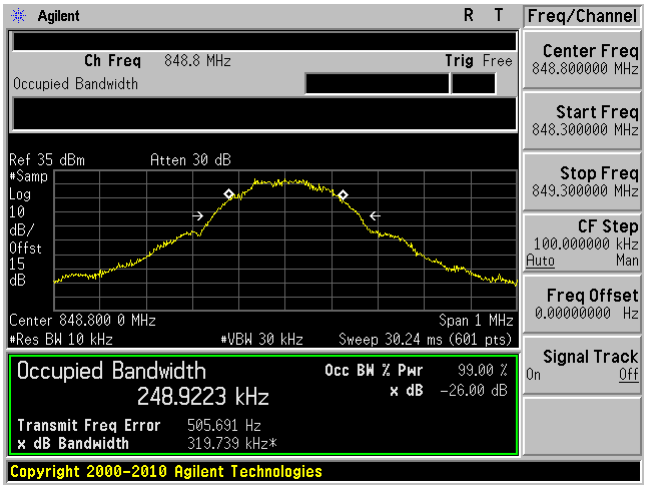
Low Channel



Middle Channel

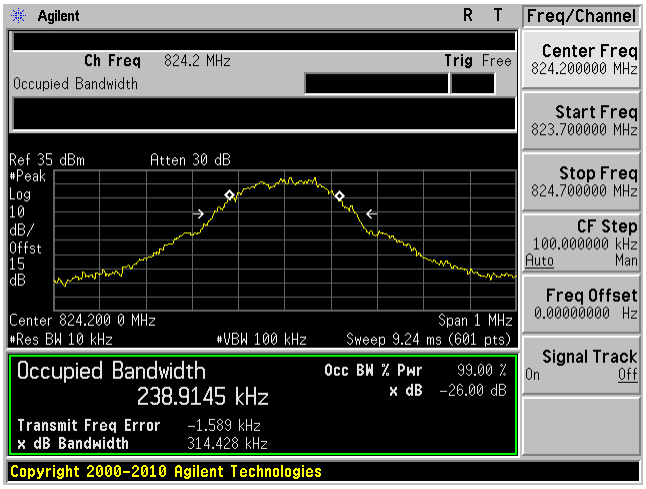


High Channel

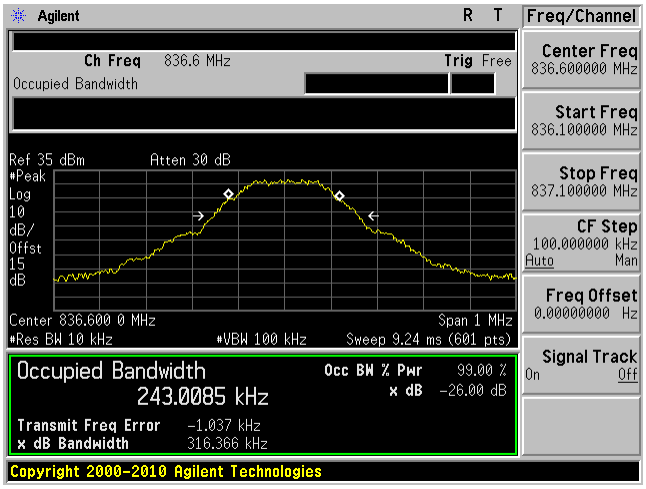


EDGE-850 MHz

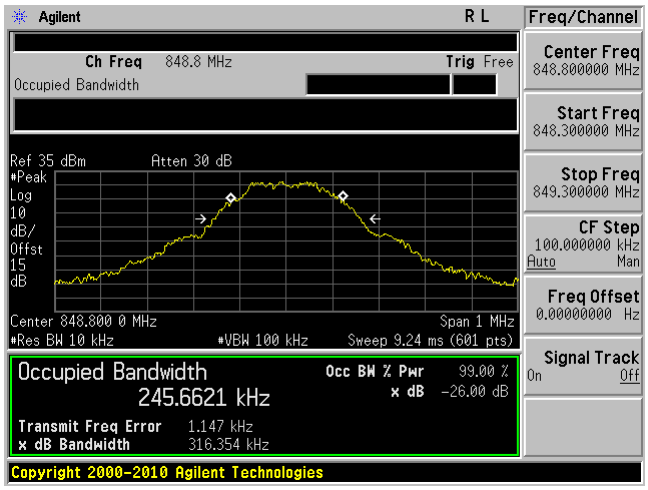
Low Channel



Middle Channel

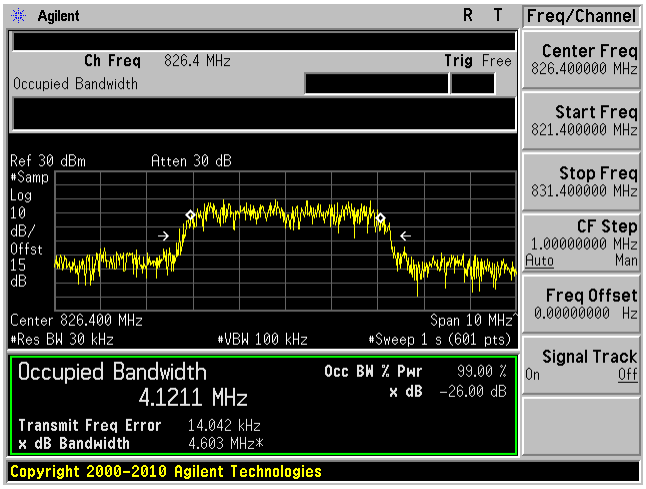


High Channel

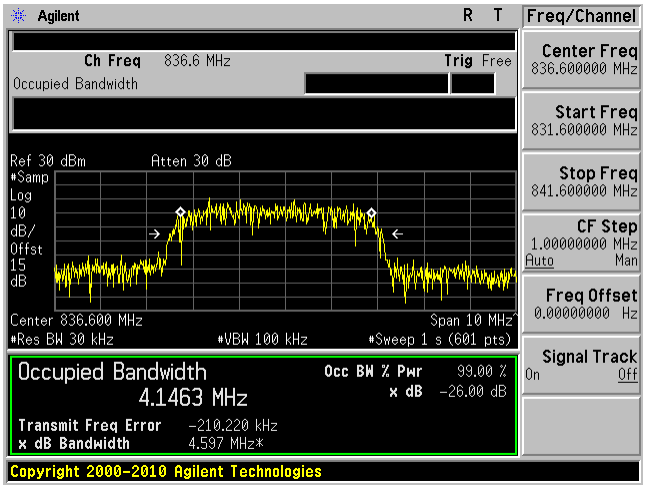


WCDMA-850 MHz

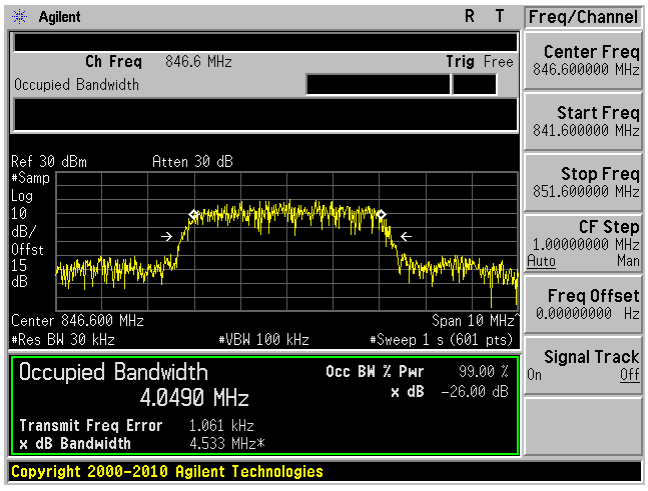
Low Channel



Middle Channel

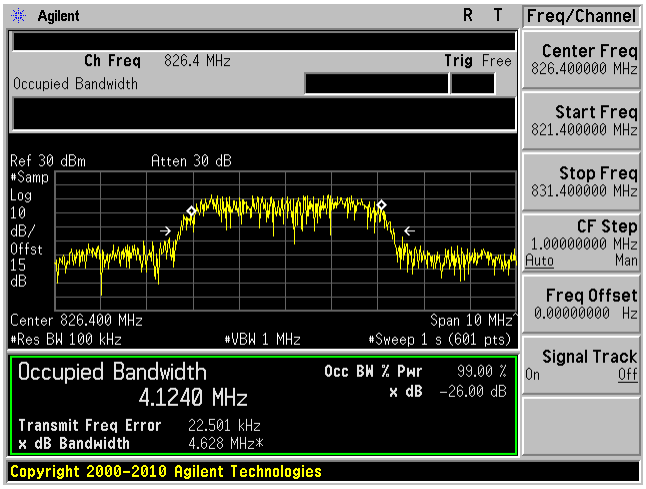


High Channel

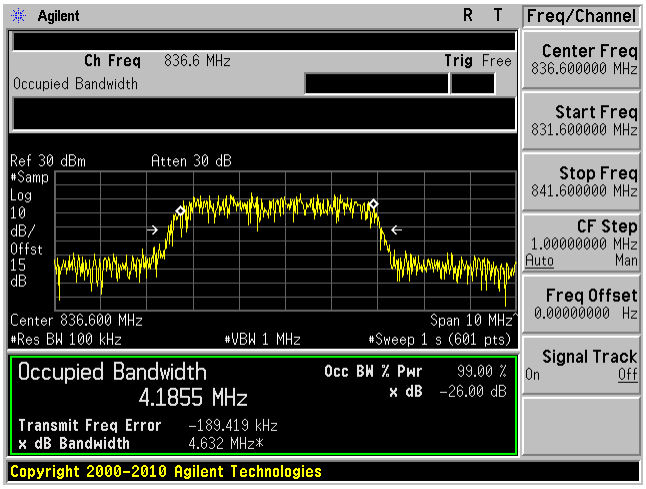


HSDPA-850 MHz

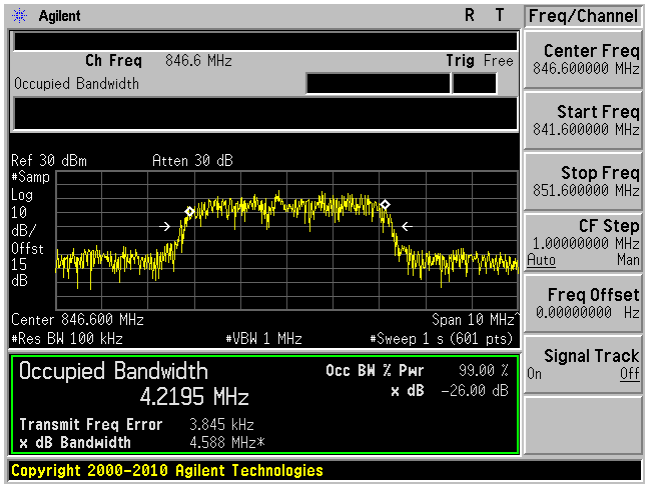
Low Channel



Middle Channel

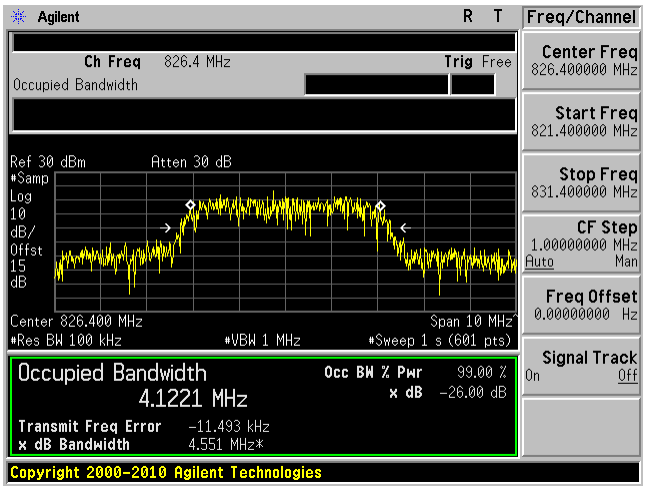


High Channel

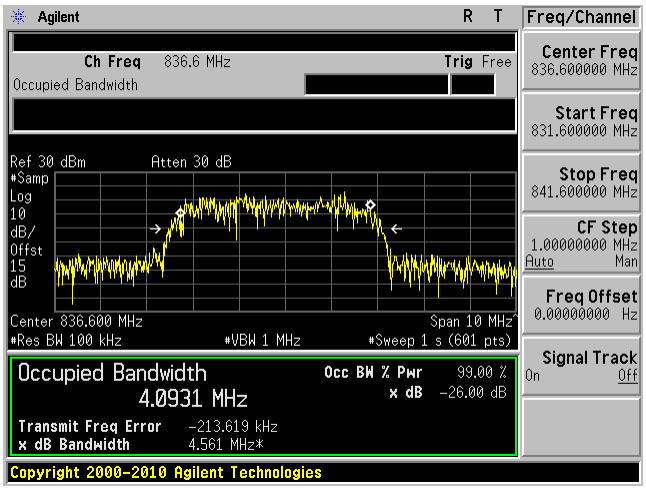


HSUPA-850 MHz

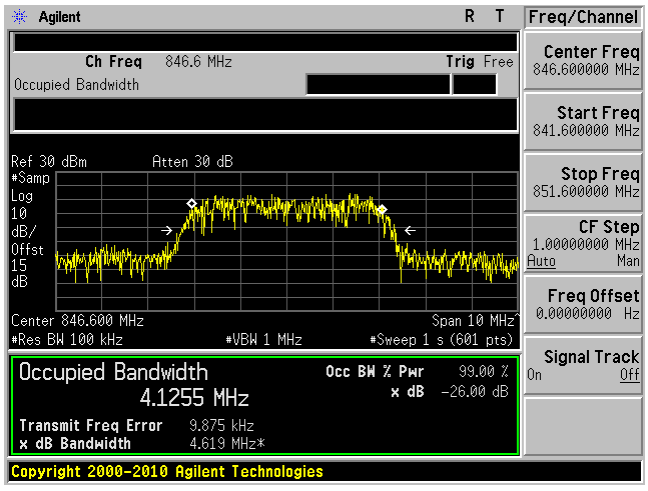
Low Channel



Middle Channel

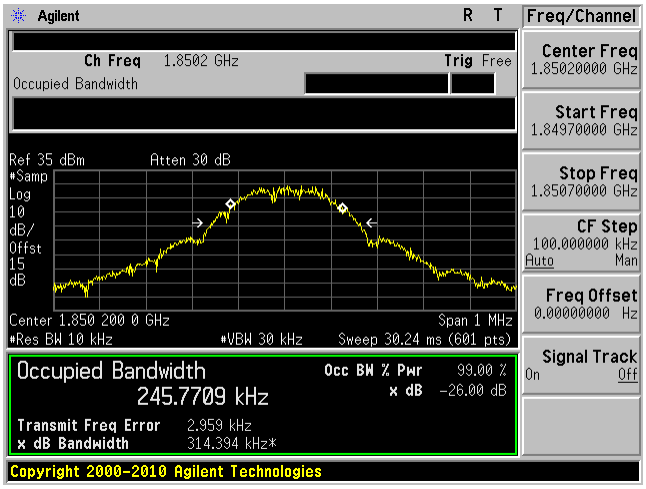


High Channel

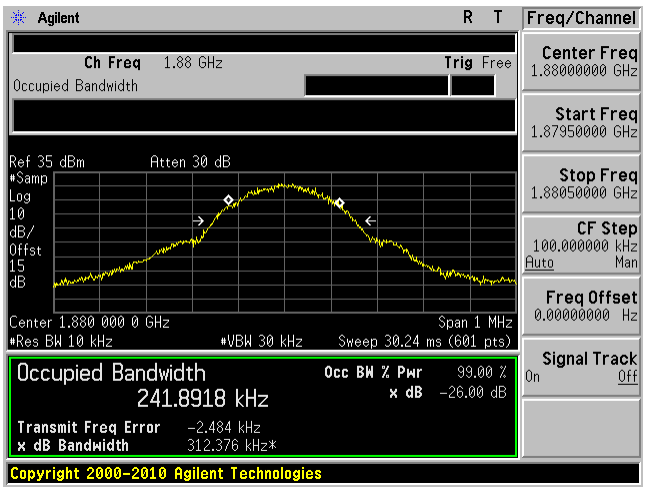


GPRS-1900 MHz

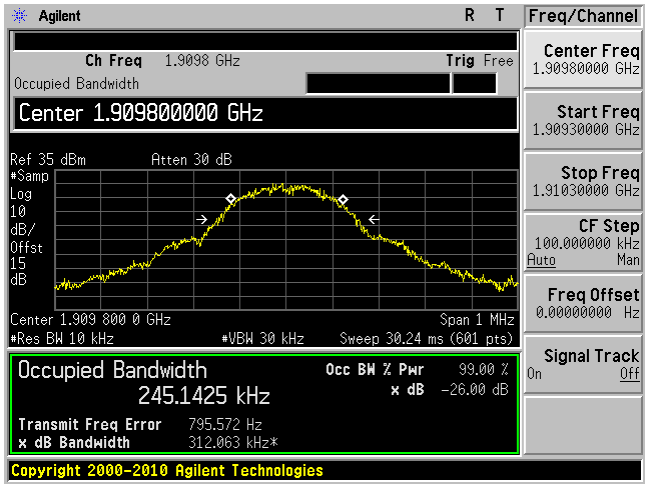
Low Channel



Middle Channel

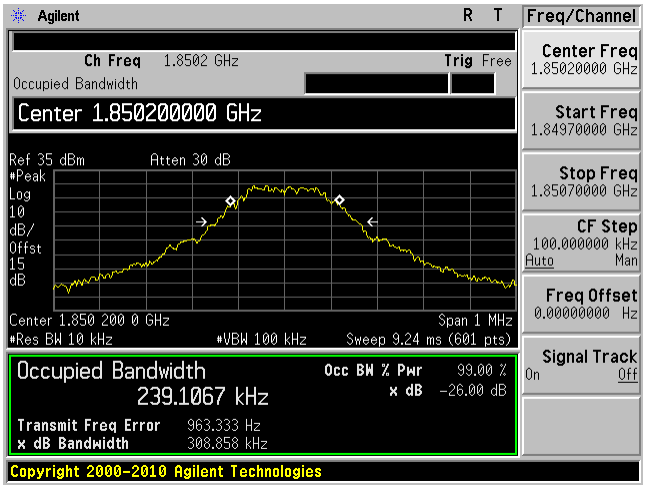


High Channel

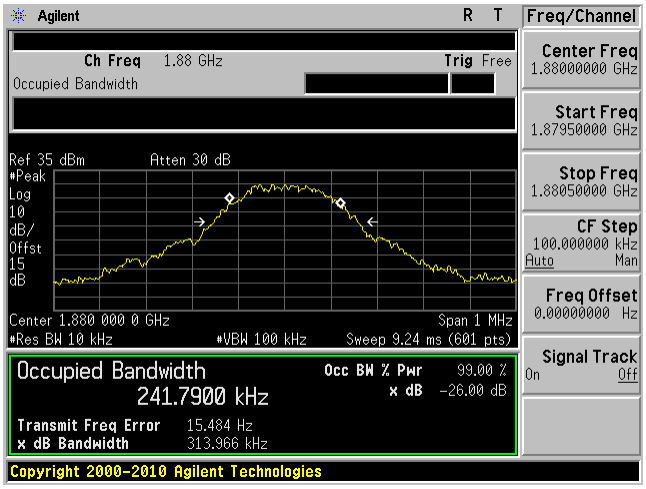


EDGE-1900 MHz

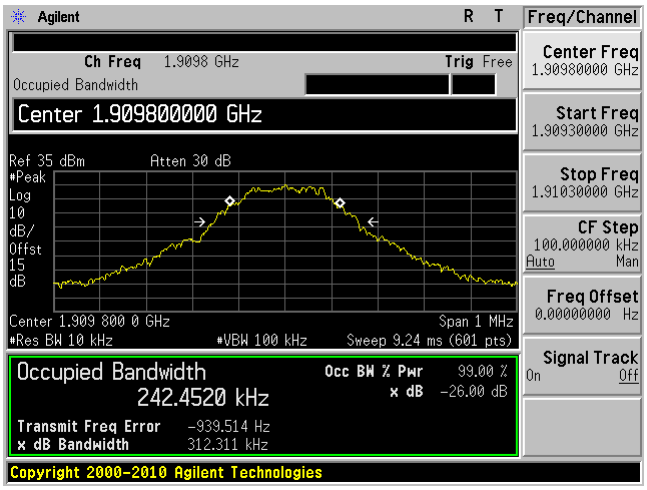
Low Channel



Middle Channel

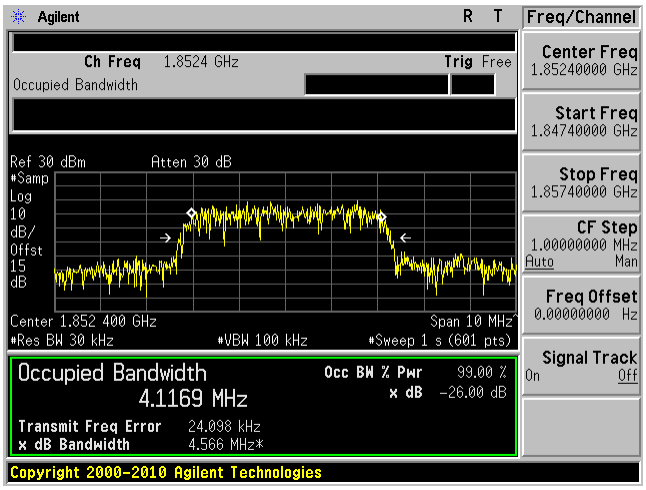


High Channel

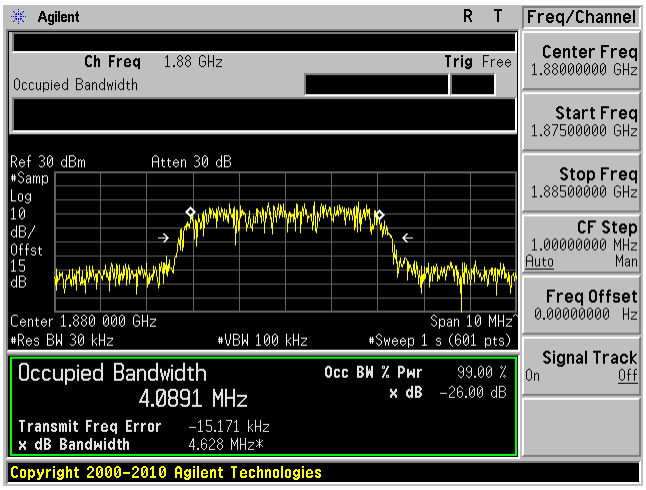


WCDMA-1900 MHz

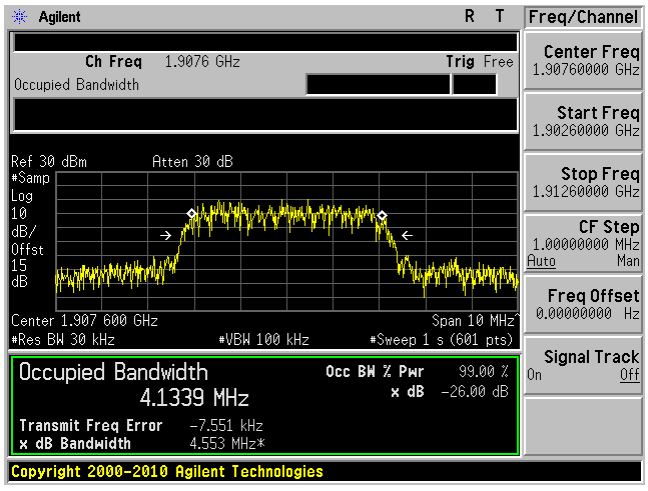
Low Channel



Middle Channel

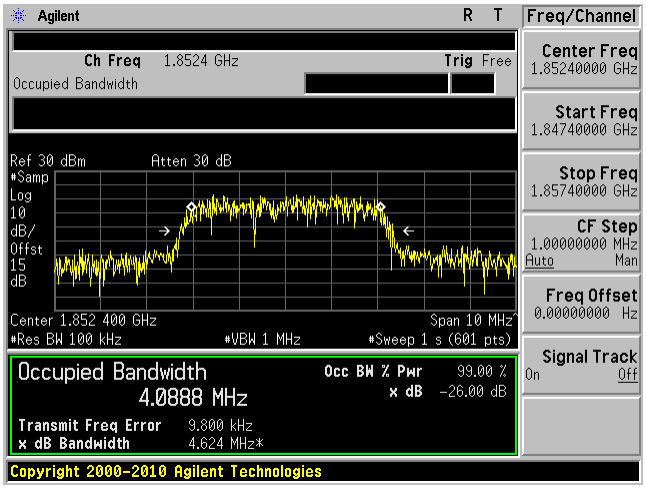


High Channel

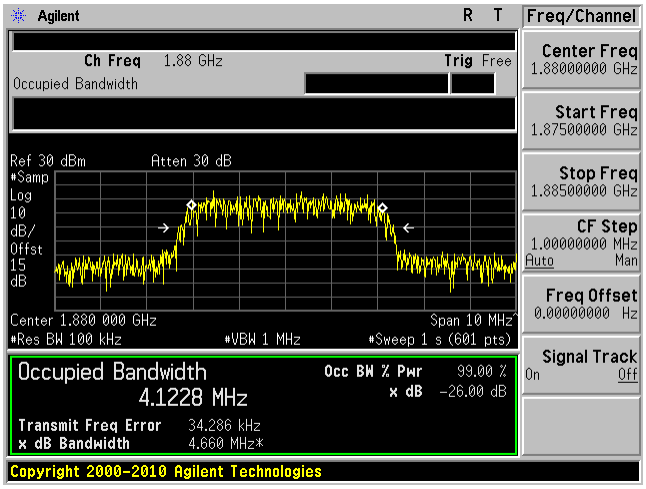


HSDPA-1900 MHz

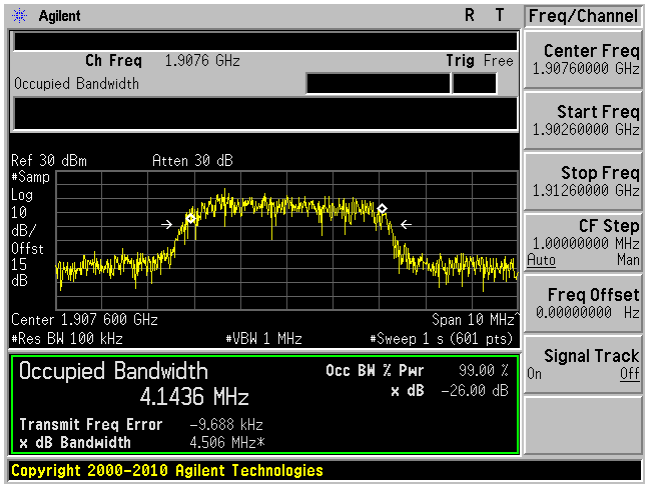
Low Channel



Middle Channel

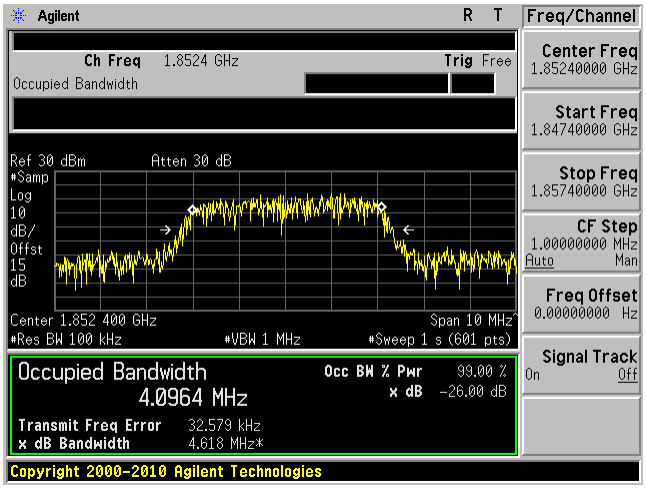


High Channel

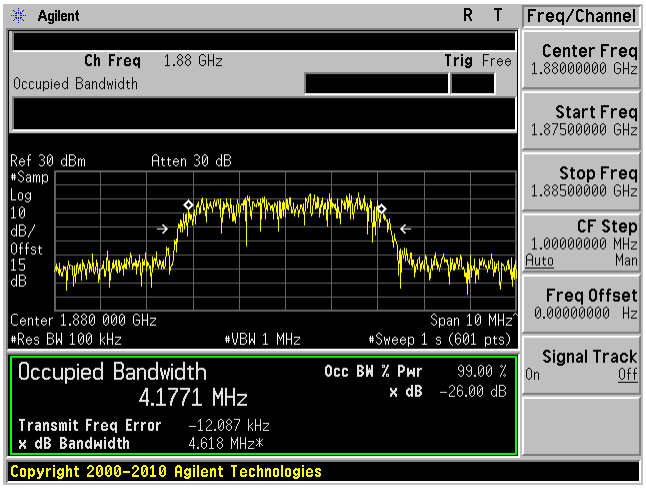


HSUPA-1900 MHz

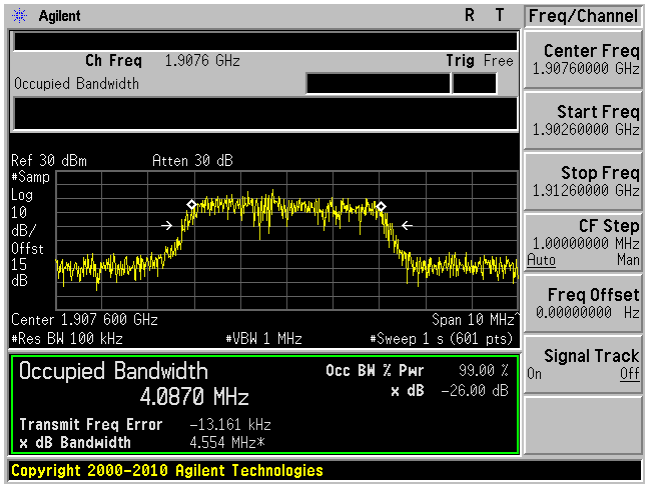
Low Channel



Middle Channel



High Channel



7 FCC §2.1051, §22.917 & §24.238(a), IC RSS-132 §4.5 & RSS-132 §6.5 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

7.1 Applicable Standard

Requirements: FCC §2.1051. §22.917 & §24.238(a). IC RSS-132 §4.5 & RSS-132 §6.5

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057. and IC RSS 132/133

7.2 Test Procedure

The RF output of the transceiver was connected to a spectrum analyzer and simulator through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

7.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4446A	US44300386	2011-05-10
Agilent	Analyzer, Communications	E5155C	GB44051221	2010-06-11 [1]

Note: [1]Base on two years calibration cycles.

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

7.4 Test Environmental Conditions

Temperature:	20 °C ~ 23 °C
Relative Humidity:	40 % ~ 45 %
ATM Pressure:	101kPa ~ 102kPa

Testing was performed by Lionel Lara from 2011-12-21 to 2011-12-26 at RF Site.

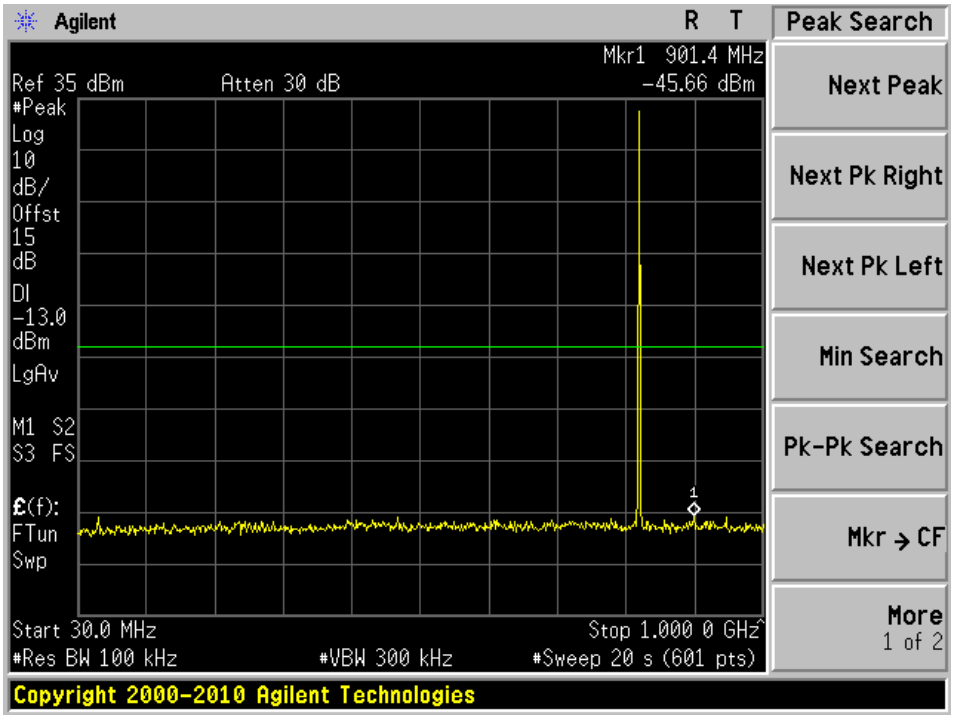
7.5 Test Results & Plots

Please refer to the following plots.

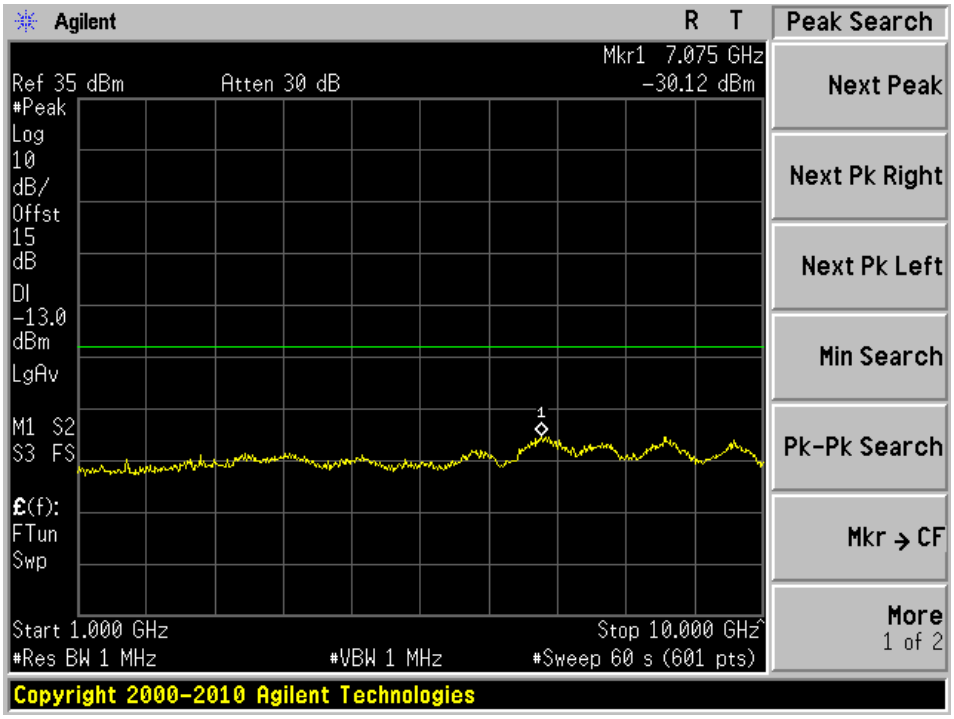
Plots of Spurious Emissions

GPRS 850 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

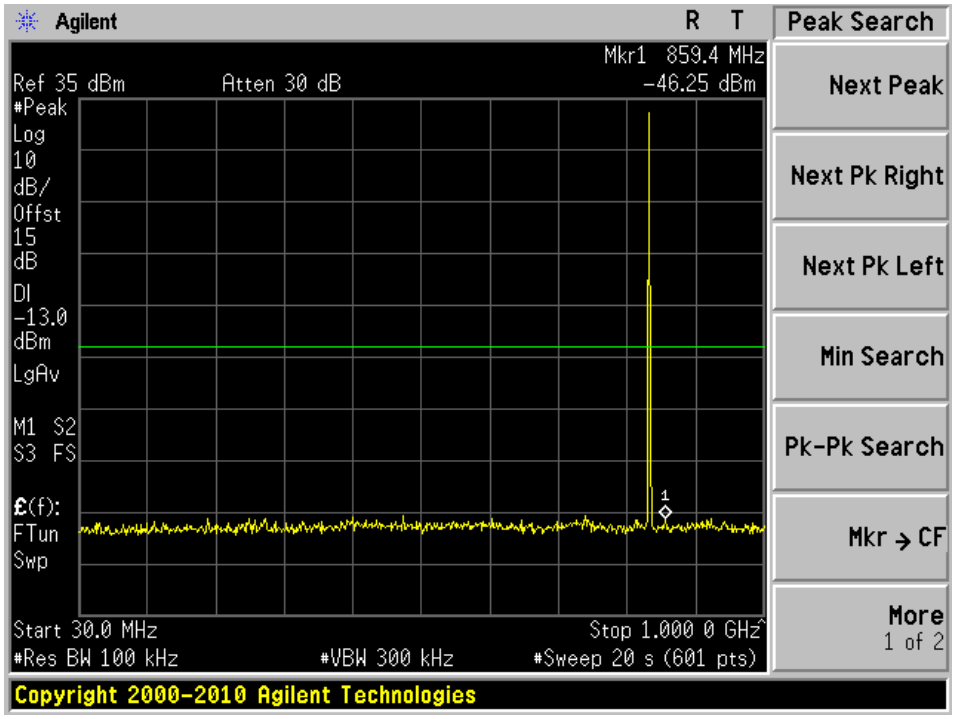


Plot 2a: 1 GHz – 10 GHz

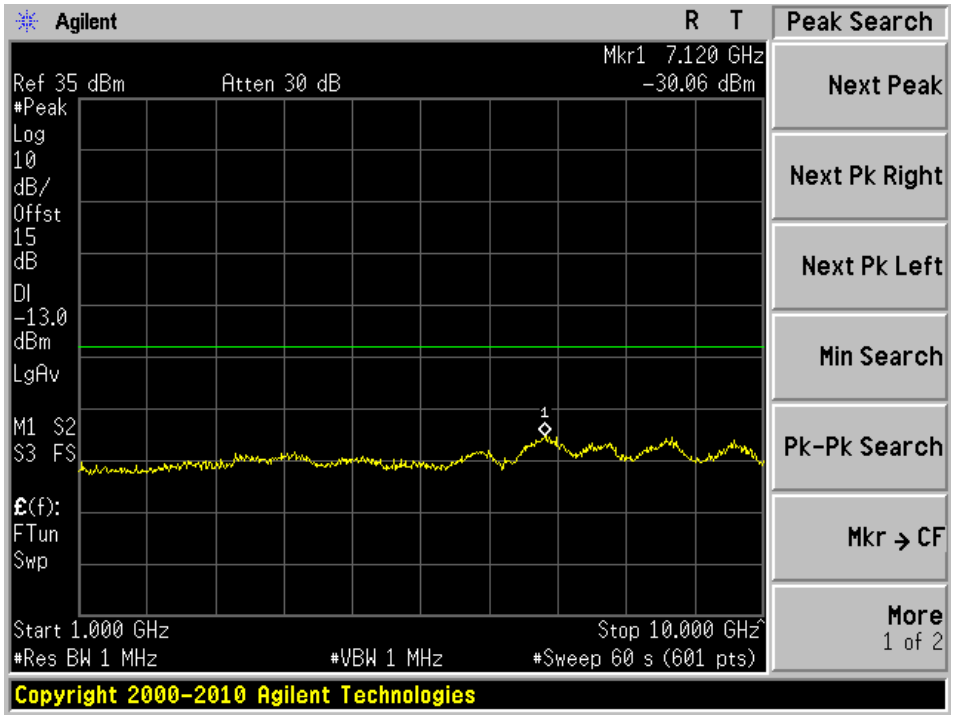


GPRS 850 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

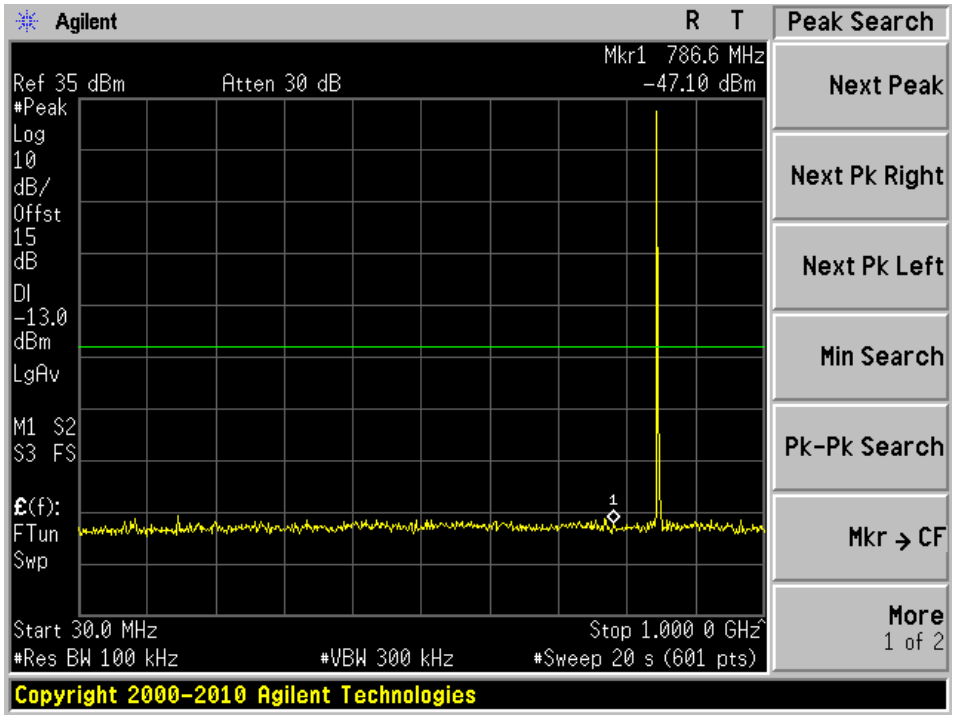


Plot 2a: 1 GHz – 10 GHz

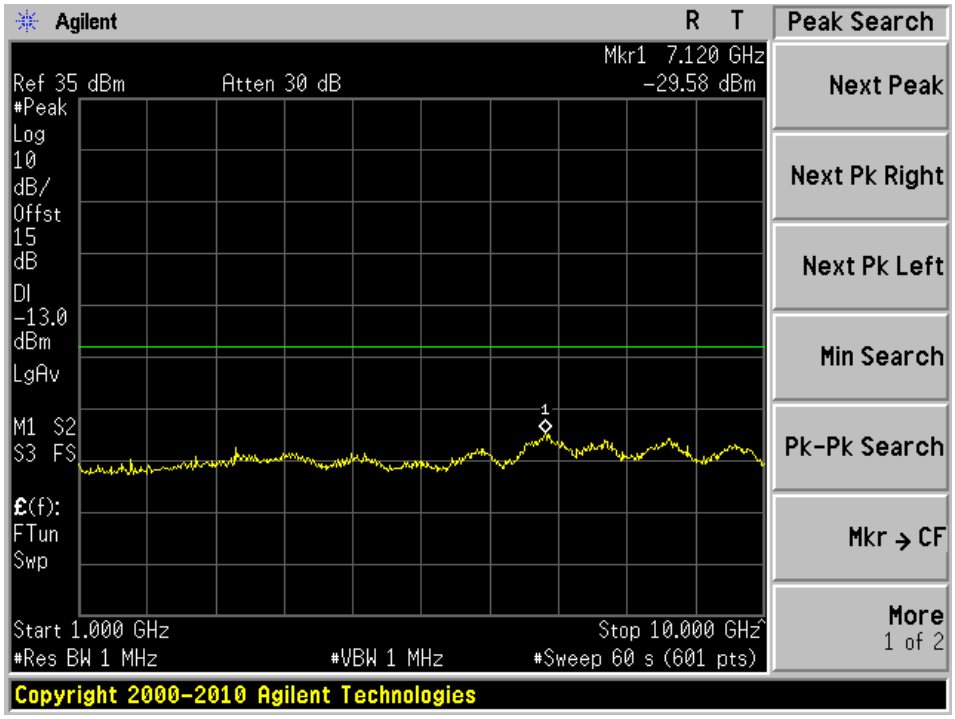


GPRS 850 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

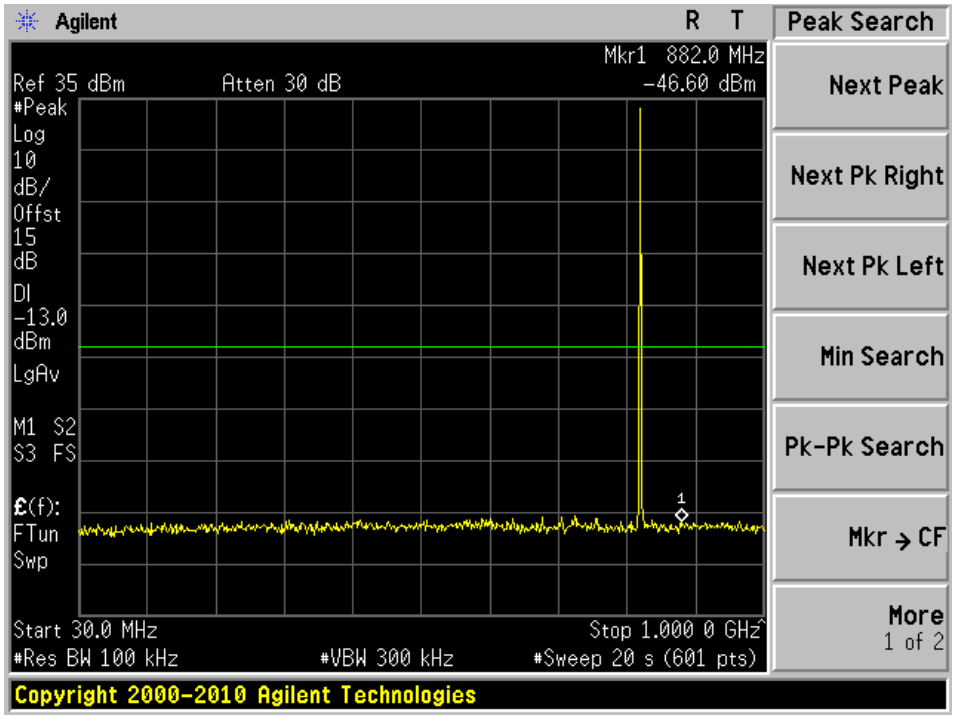


Plot 2a: 1 GHz – 10 GHz

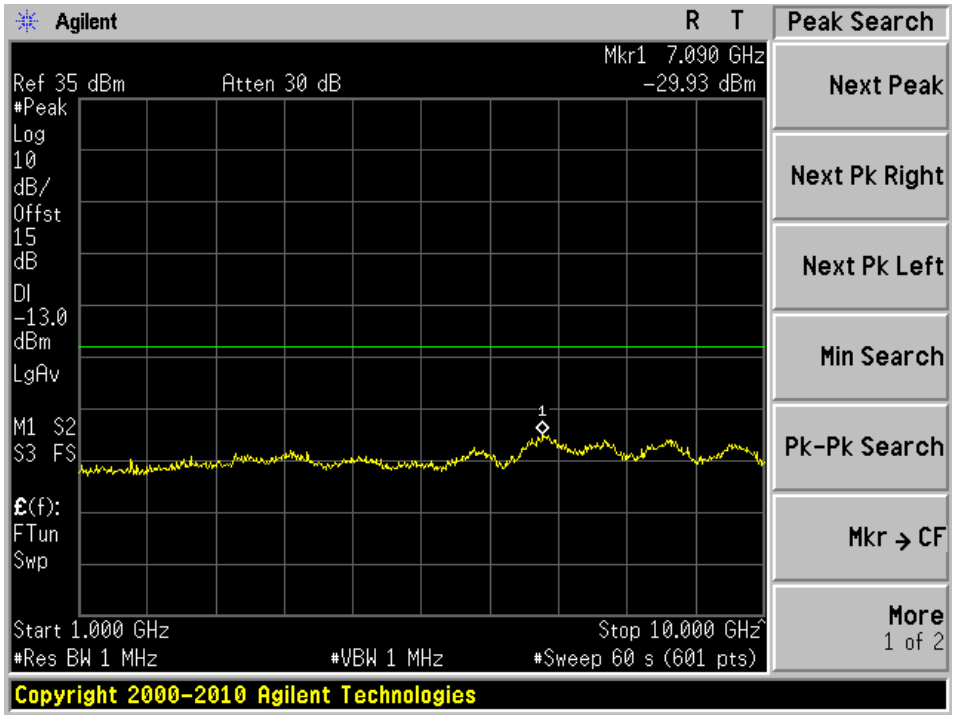


EDGE 850 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

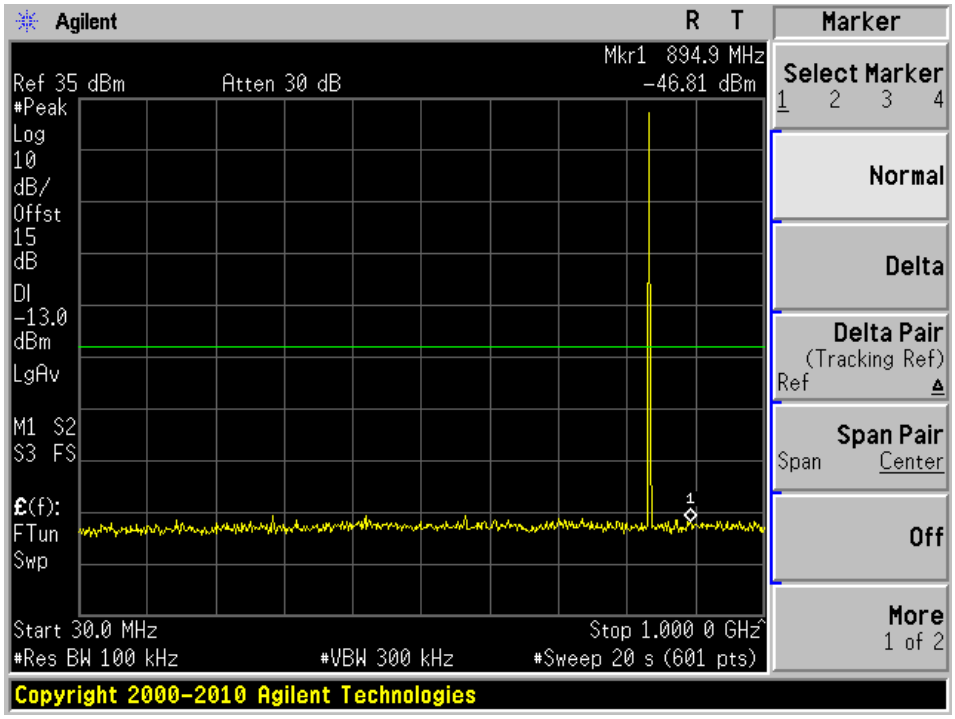


Plot 2a: 1 GHz – 10 GHz

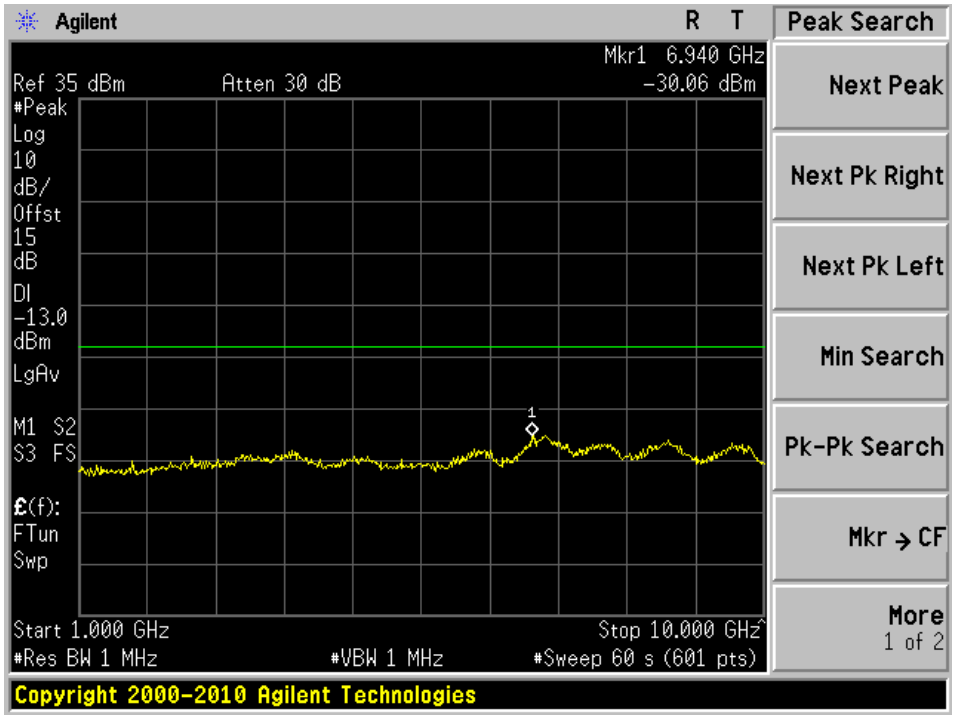


EDGE 850 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

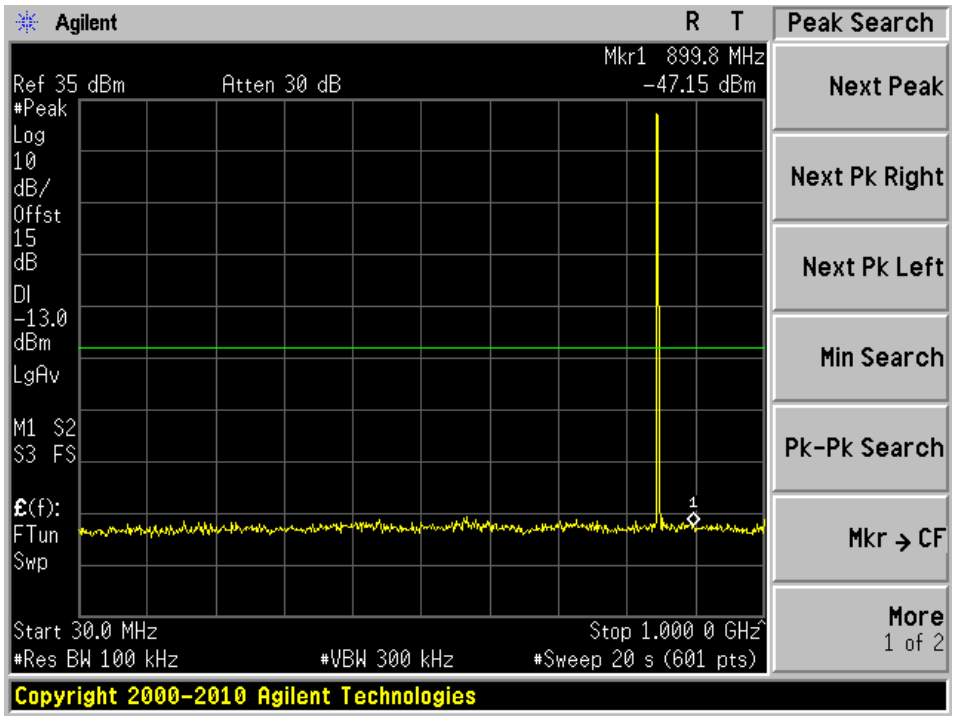


Plot 2a: 1 GHz – 10 GHz

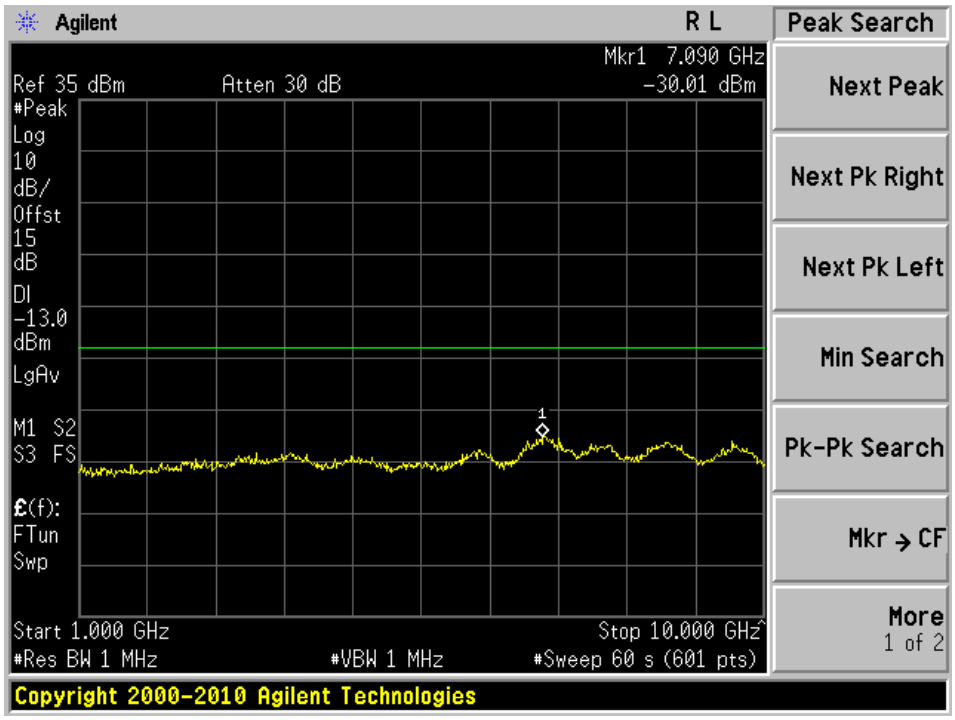


EDGE 850 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

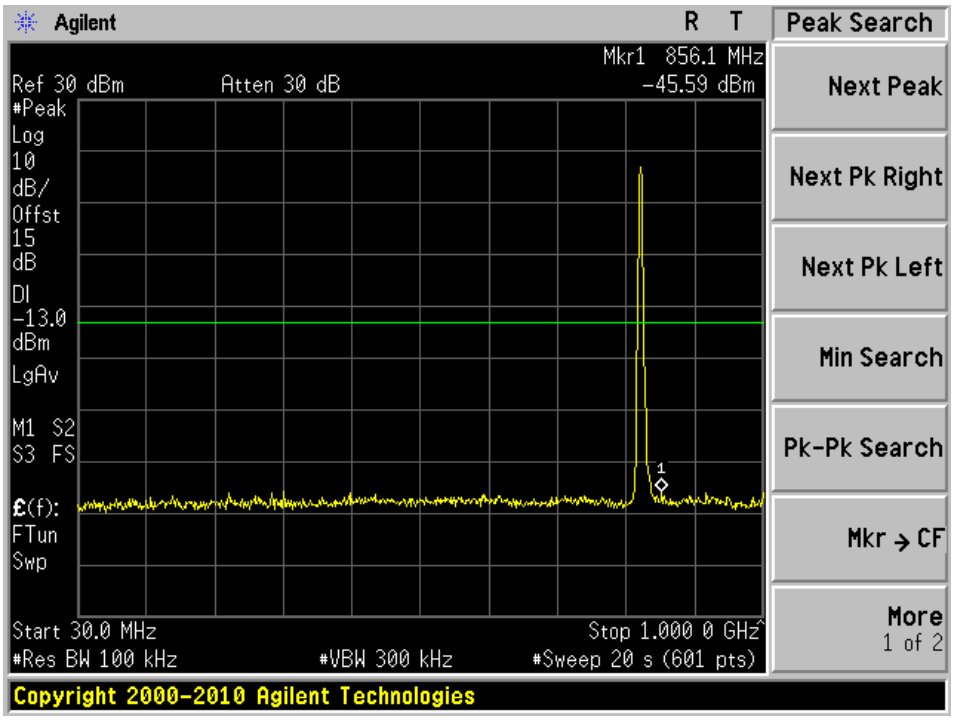


Plot 2a: 1 GHz – 10 GHz

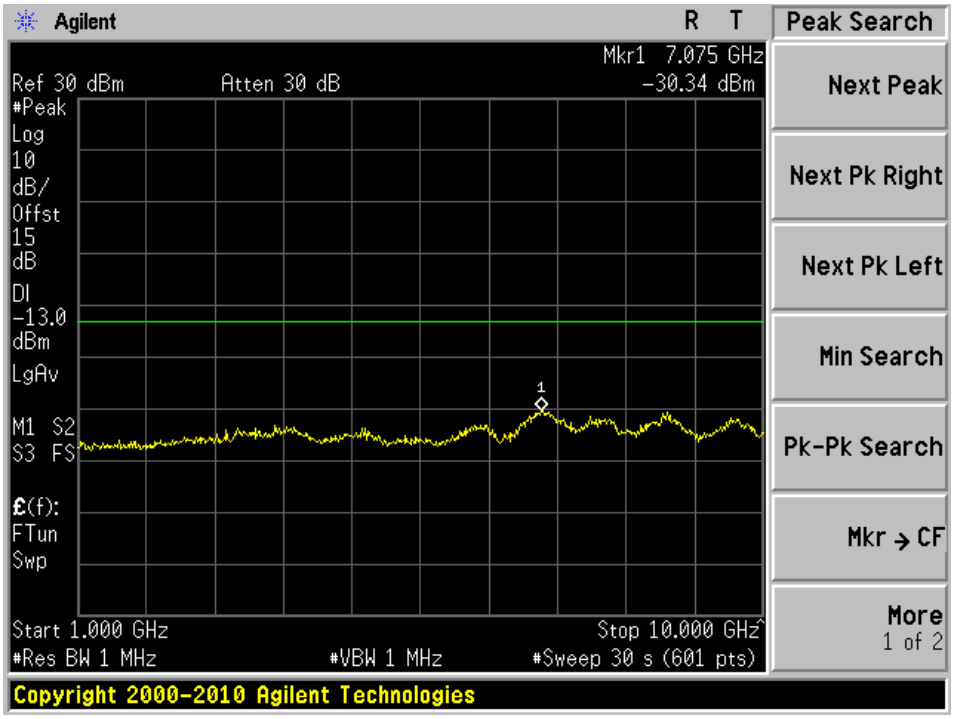


WCDMA 850 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

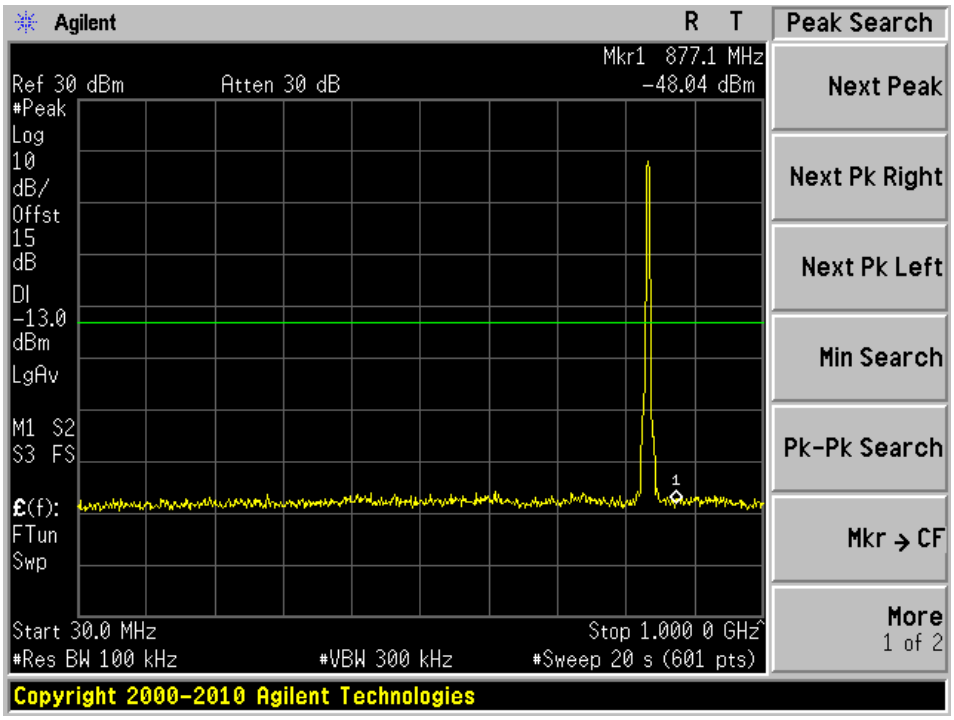


Plot 2a: 1 GHz – 10 GHz

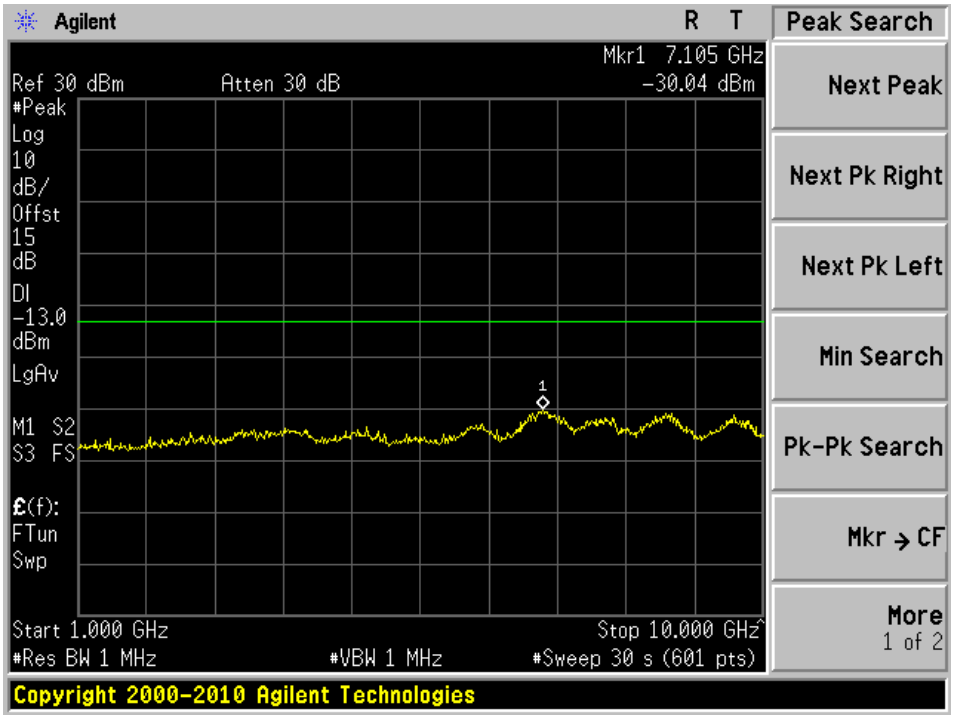


WCDMA 850 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

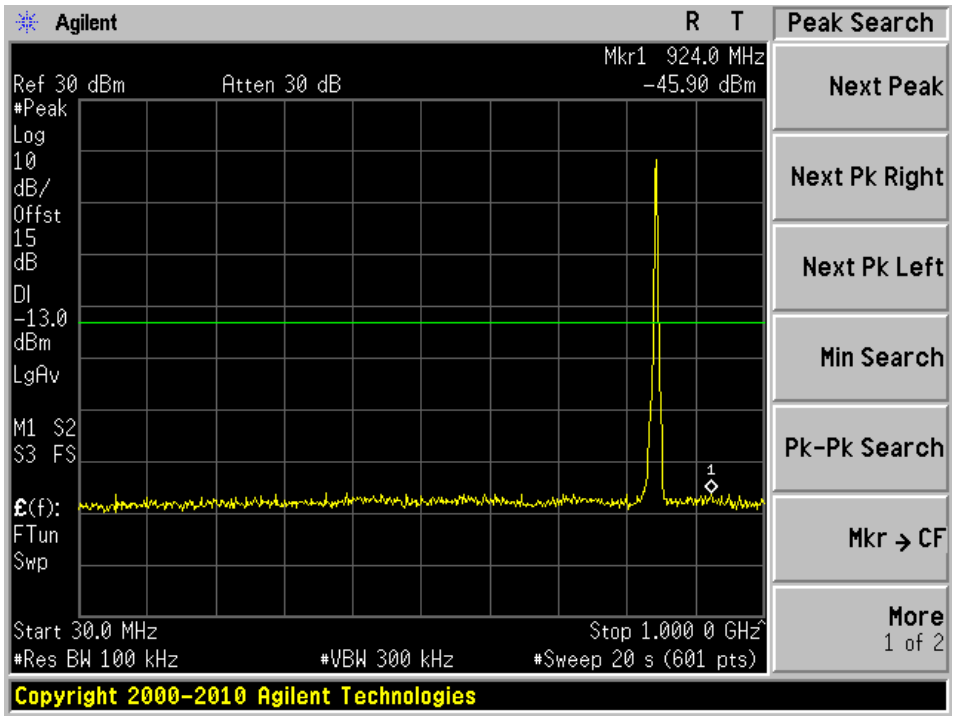


Plot 2a: 1 GHz – 10 GHz

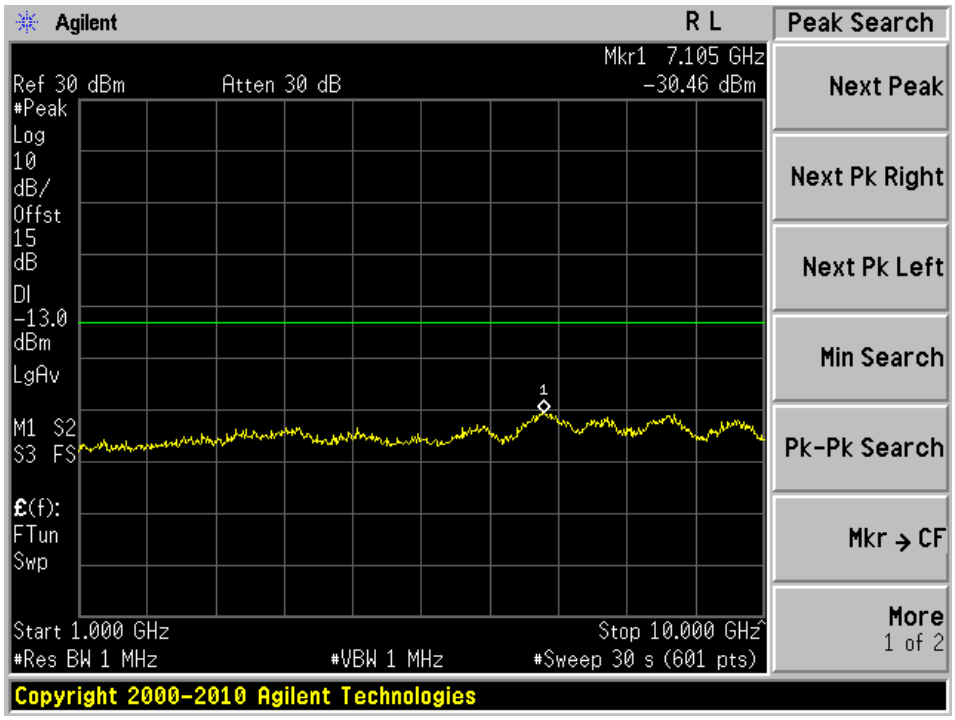


WCDMA 850 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

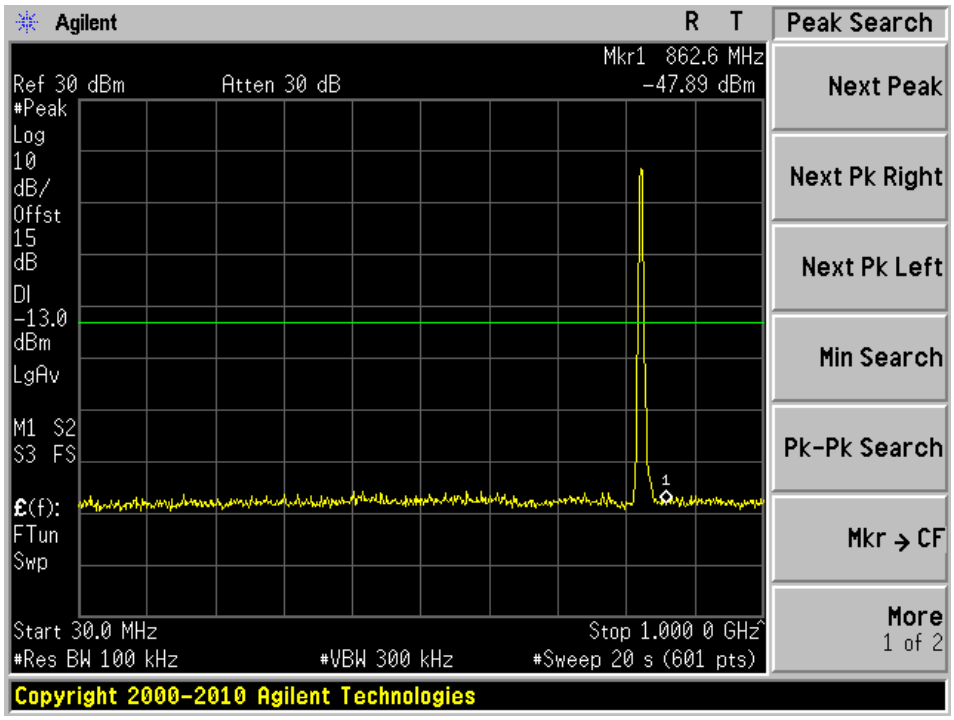


Plot 2a: 1 GHz – 10 GHz

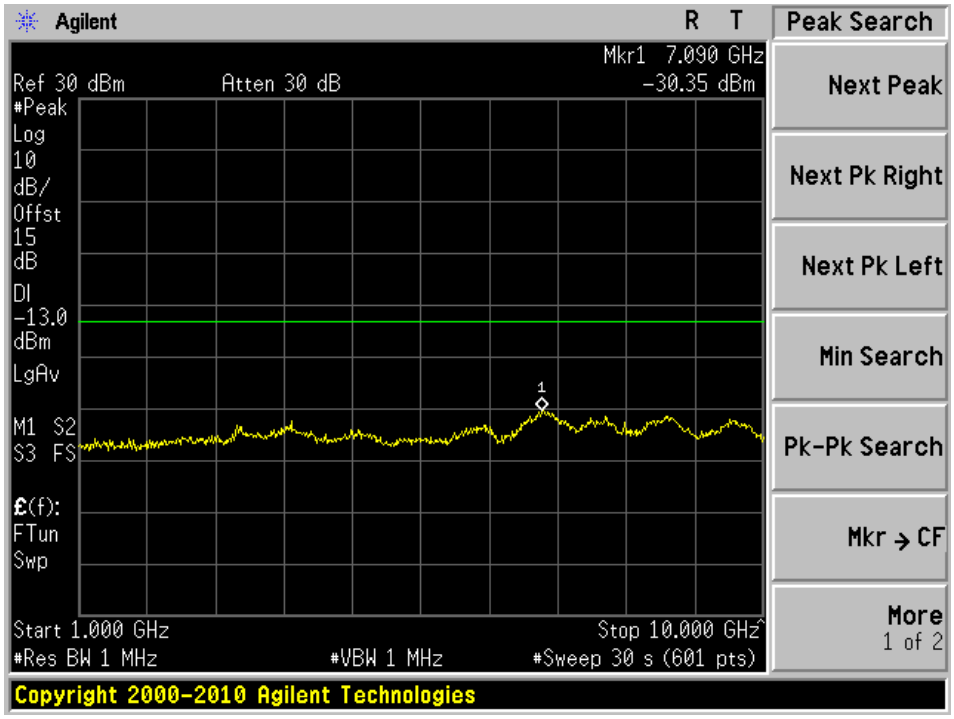


HSDPA 850 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

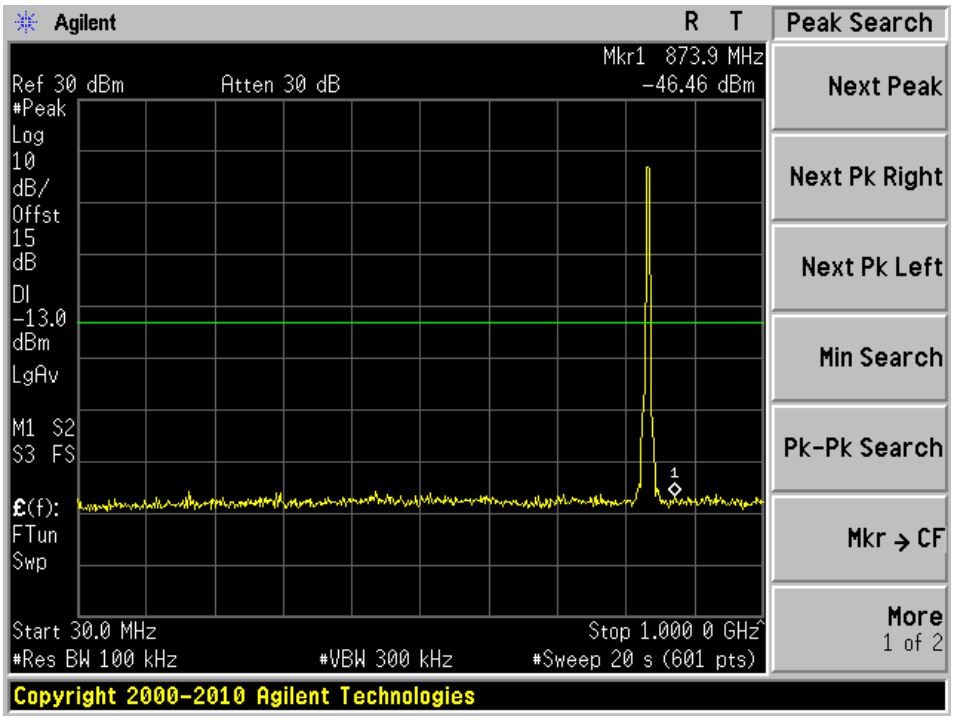


Plot 2a: 1 GHz – 10 GHz

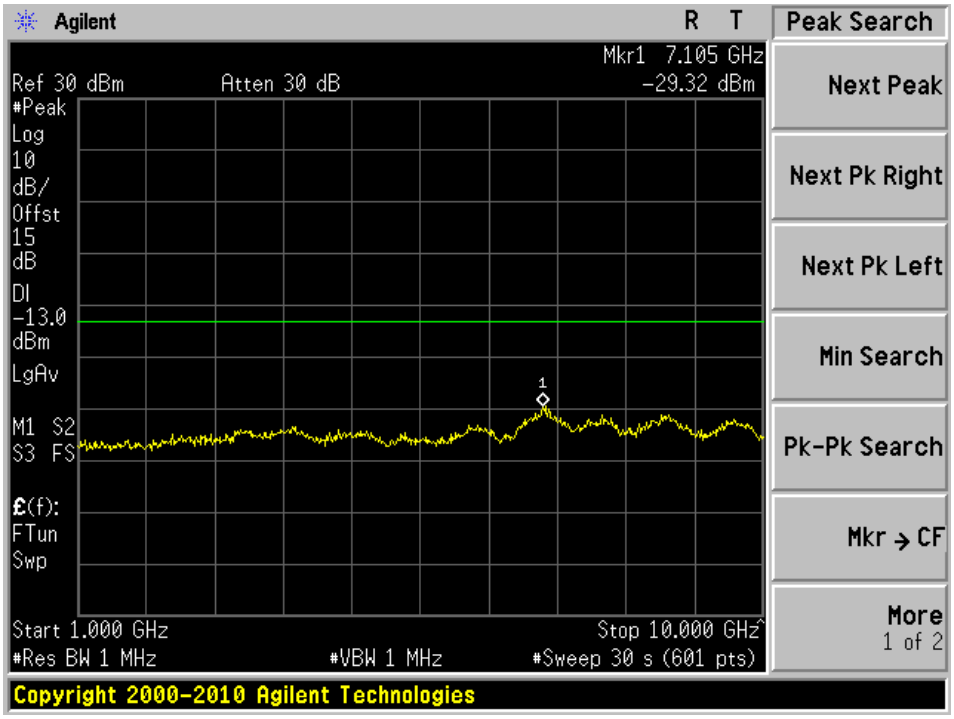


HSDPA 850 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

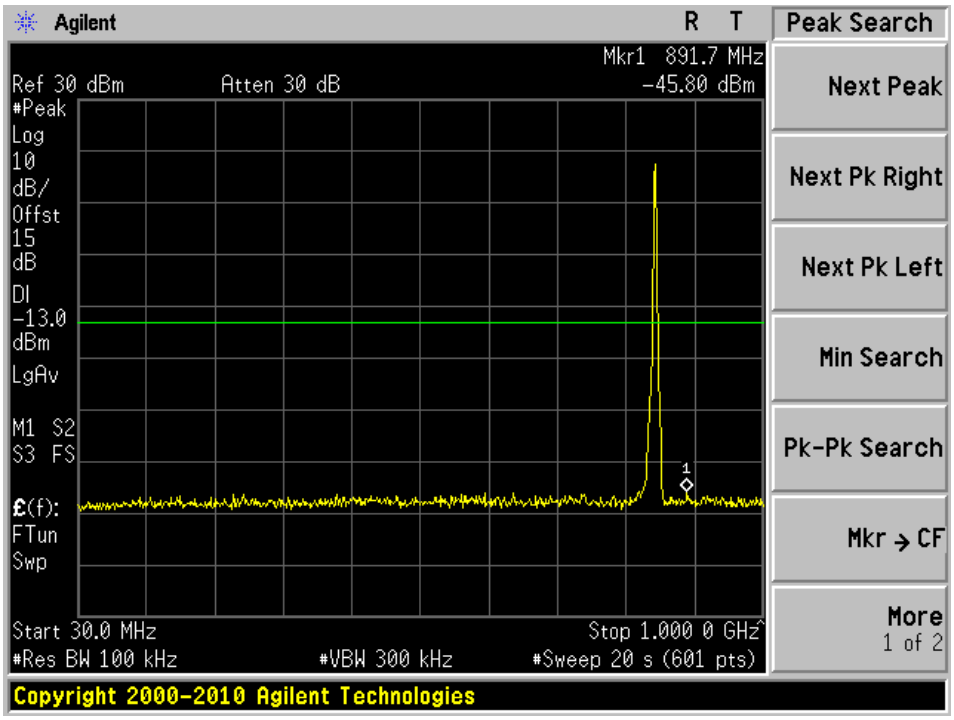


Plot 2a: 1 GHz – 10 GHz

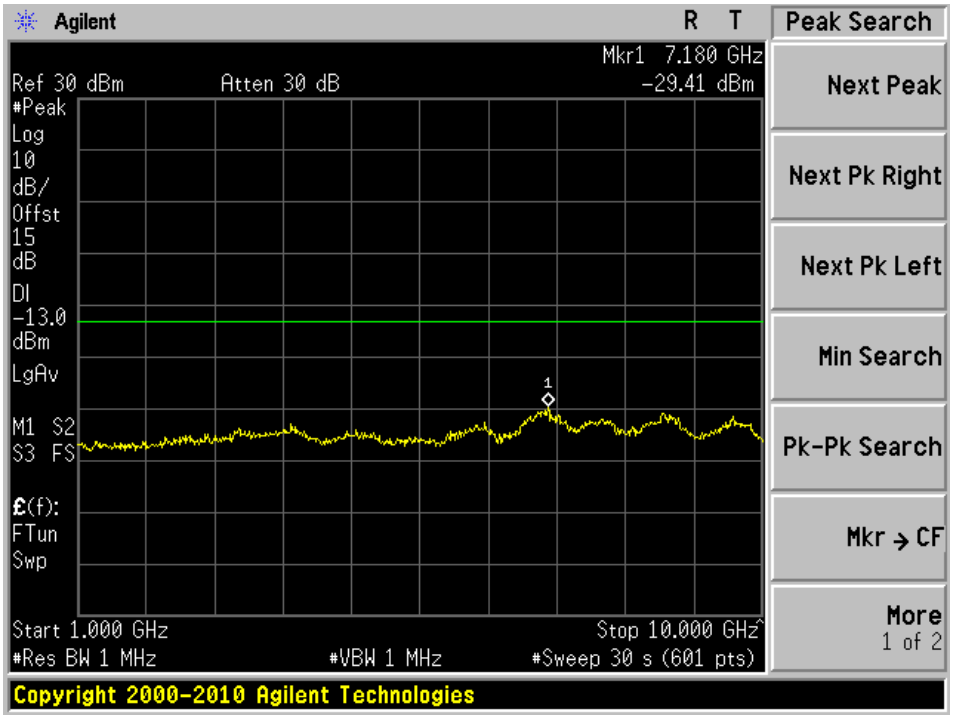


HSDPA 850 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

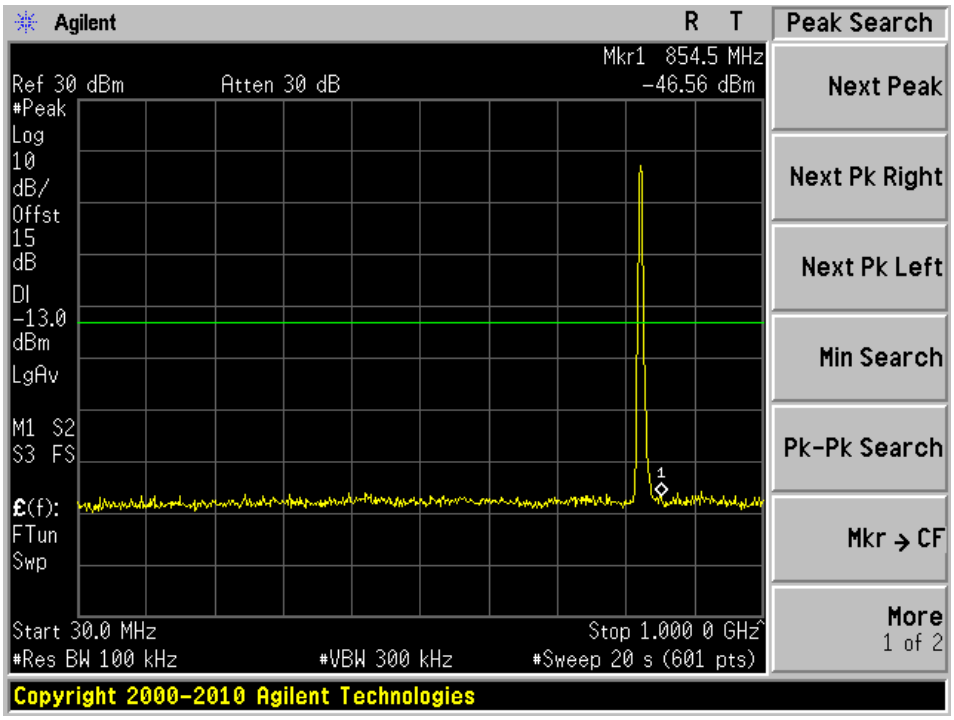


Plot 2a: 1 GHz – 10 GHz

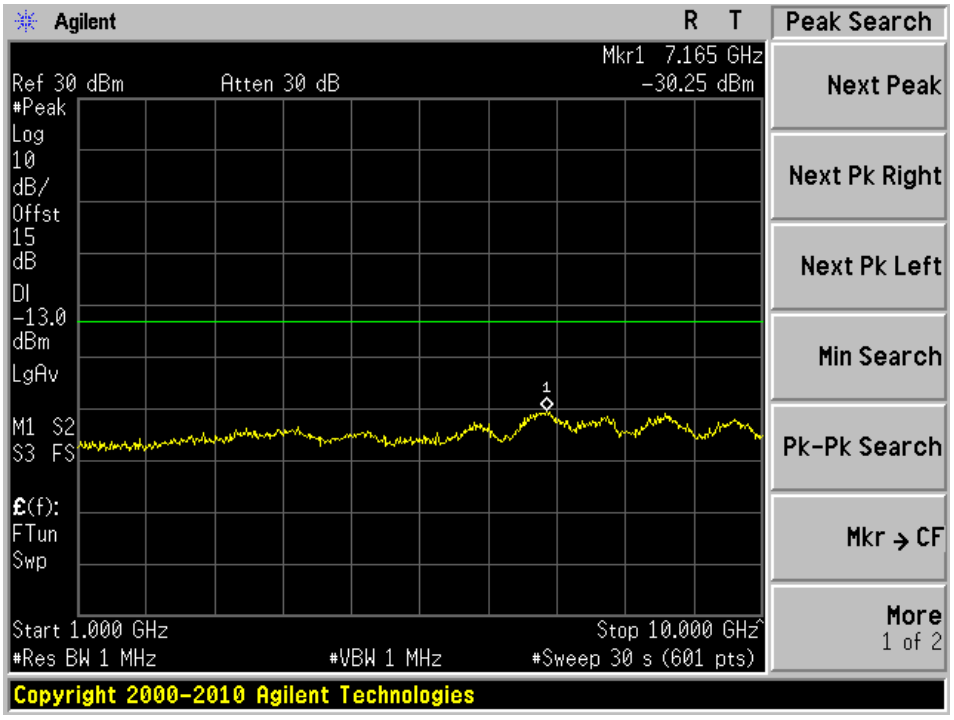


HSUPA 850 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

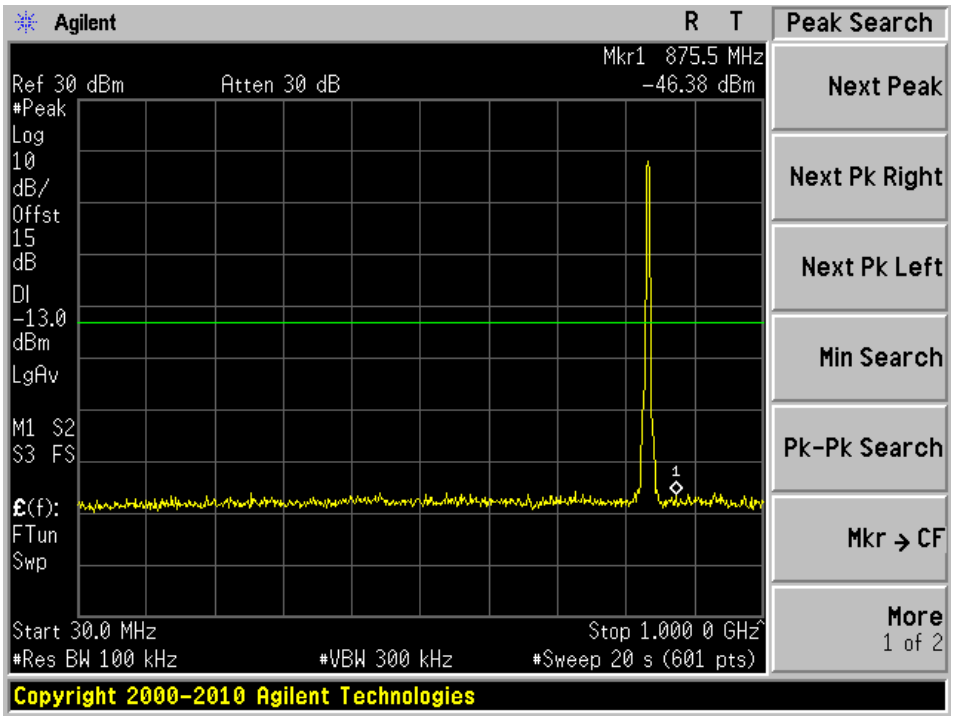


Plot 2a: 1 GHz – 10 GHz

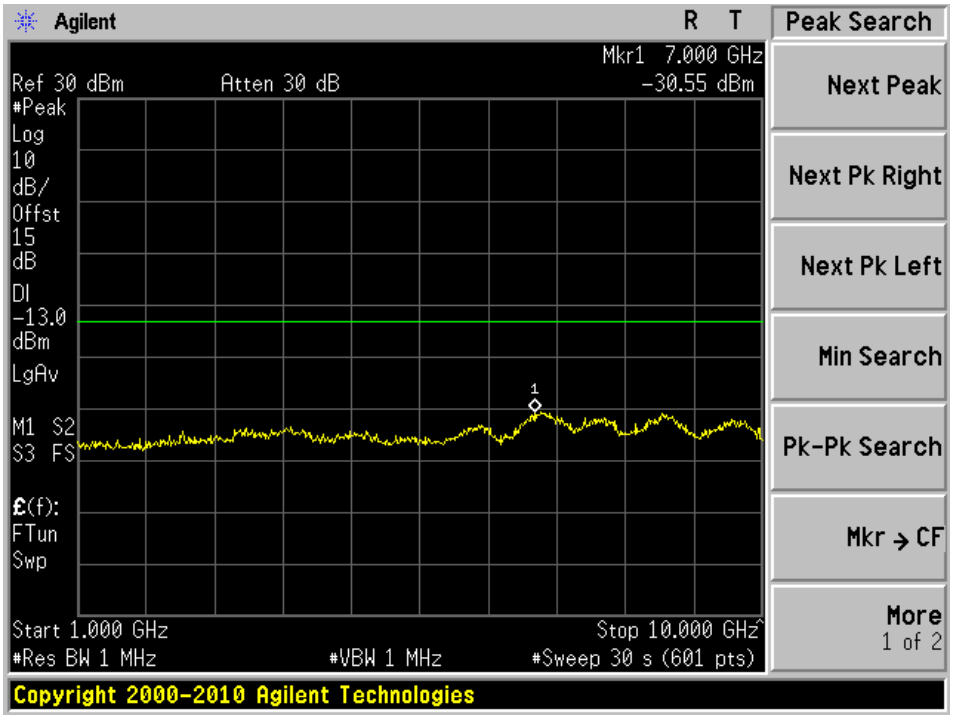


HSUPA 850 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

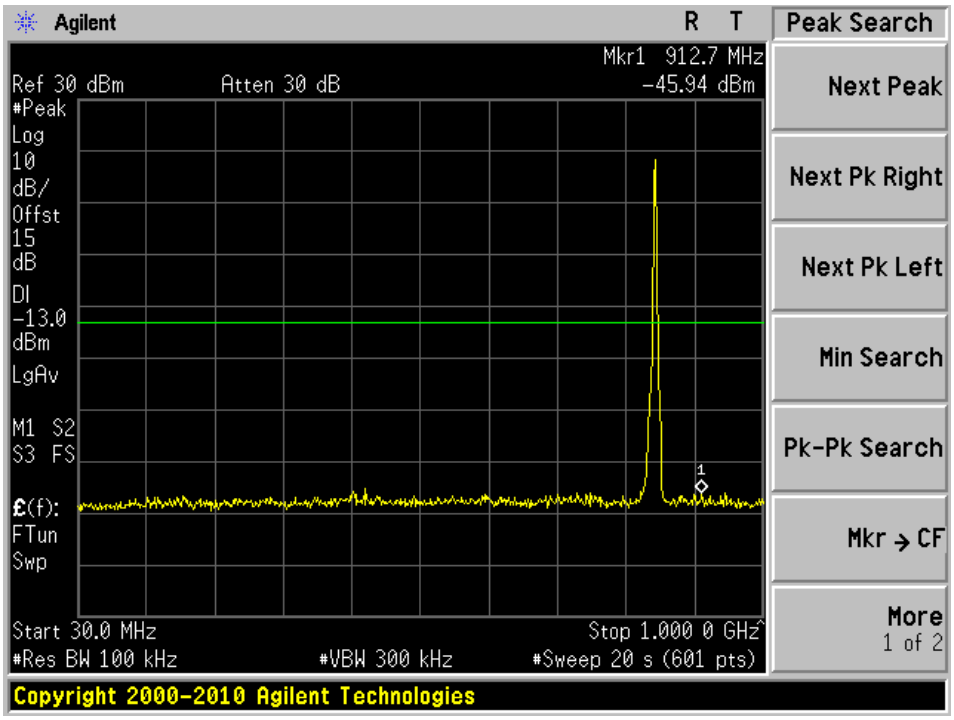


Plot 2a: 1 GHz – 10 GHz

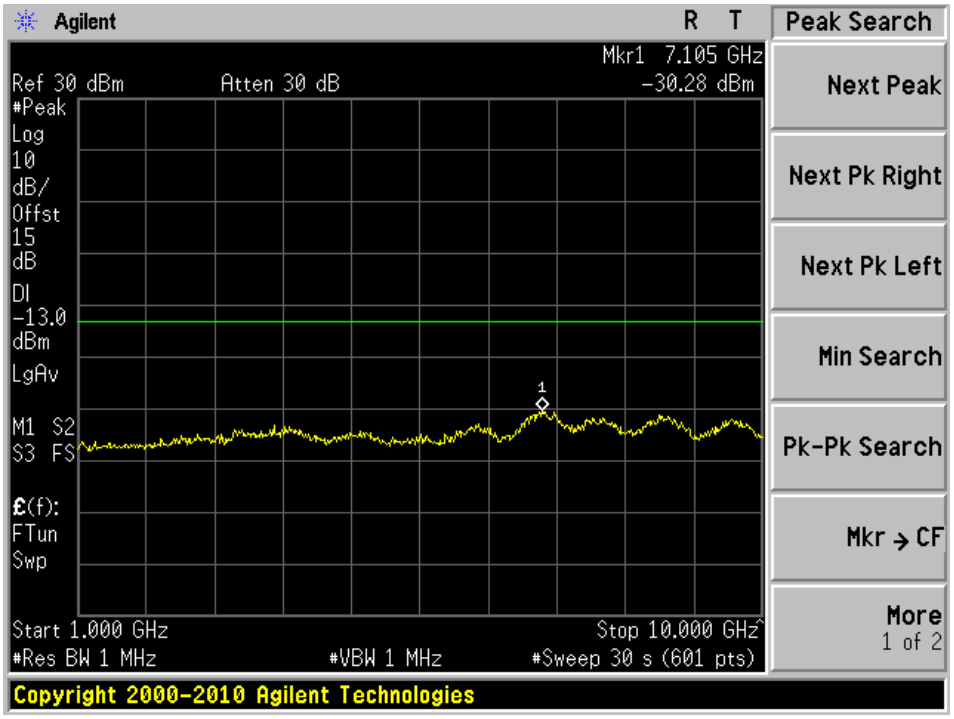


HSUPA 850 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

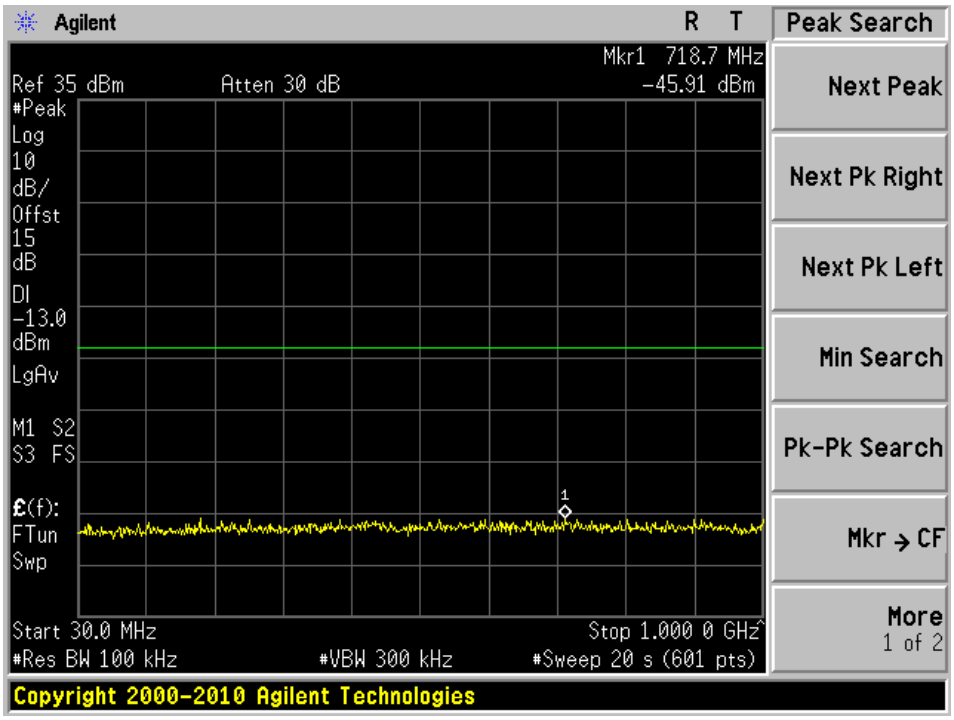


Plot 2a: 1 GHz – 10 GHz

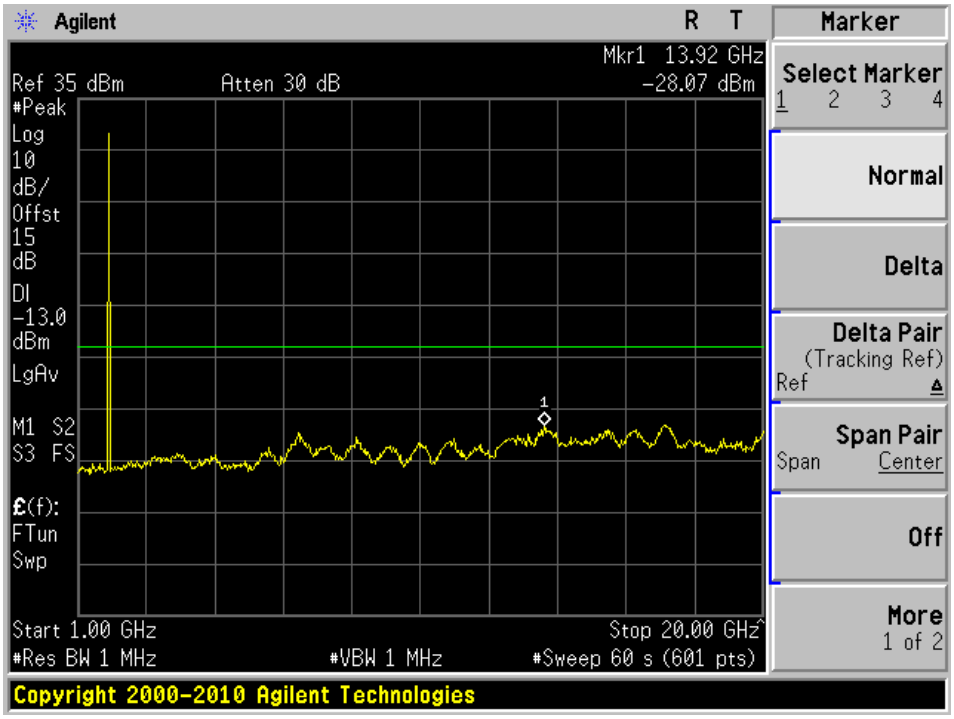


GPRS 1900 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

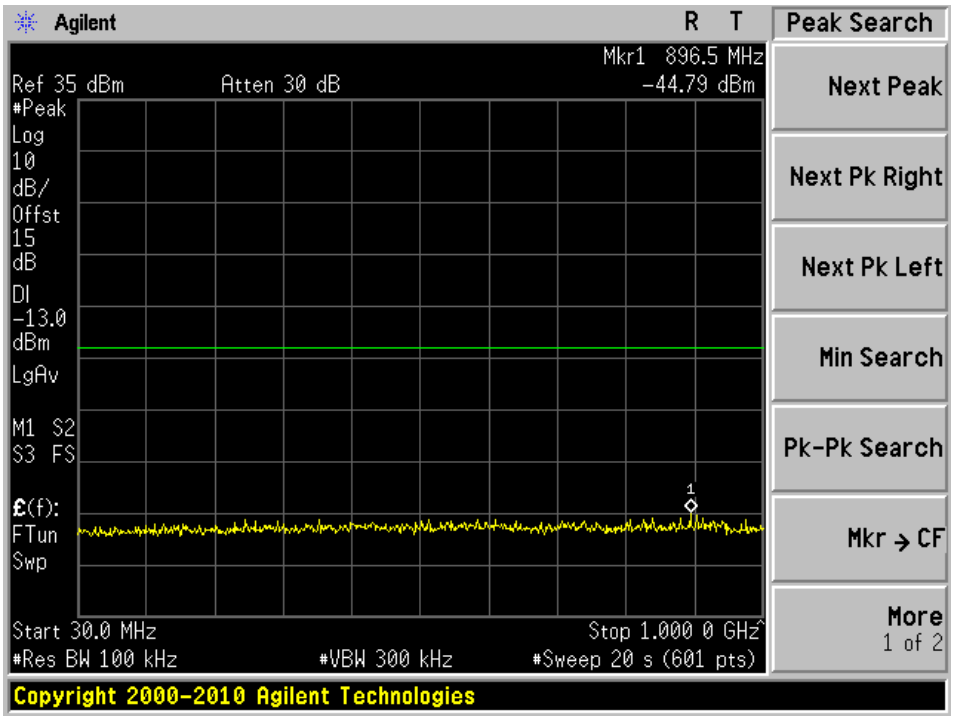


Plot 2a: 1 GHz – 20 GHz

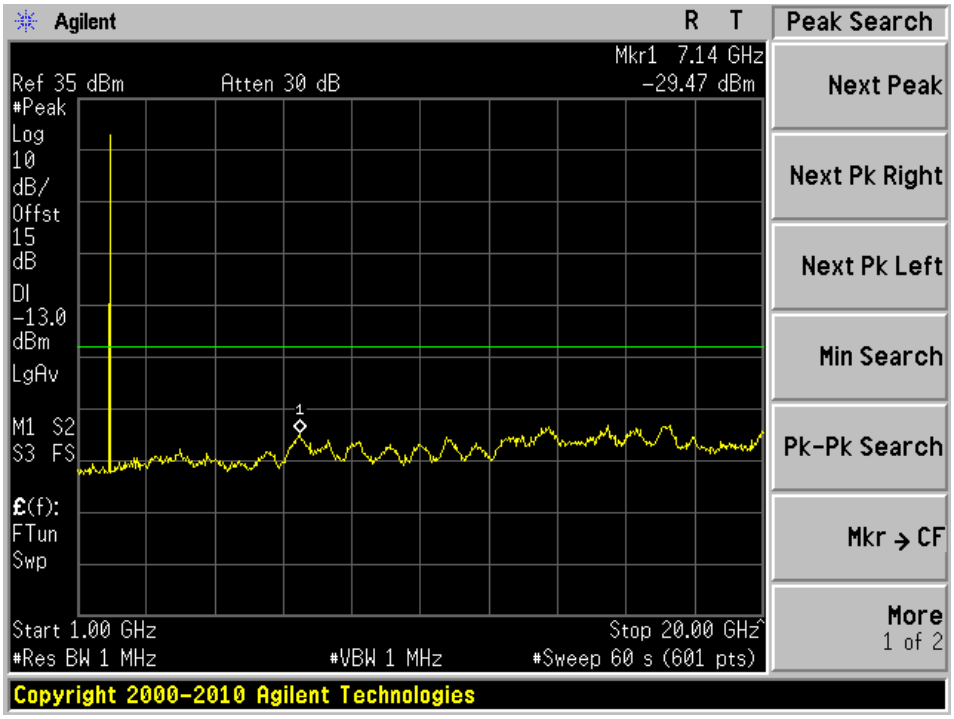


GPRS 1900 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

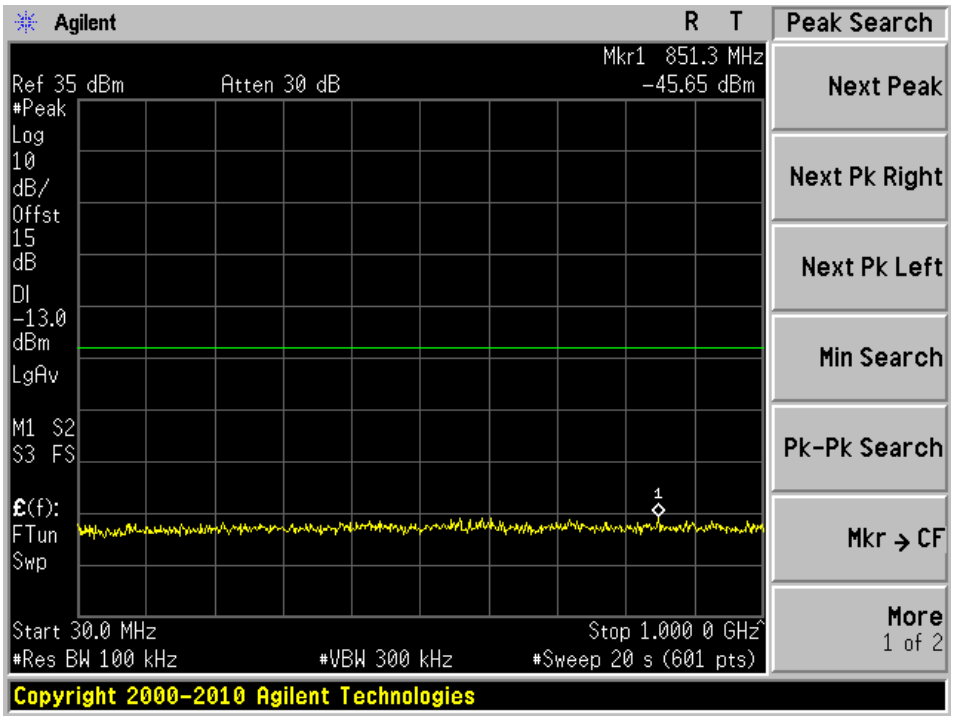


Plot 2a: 1 GHz – 20 GHz

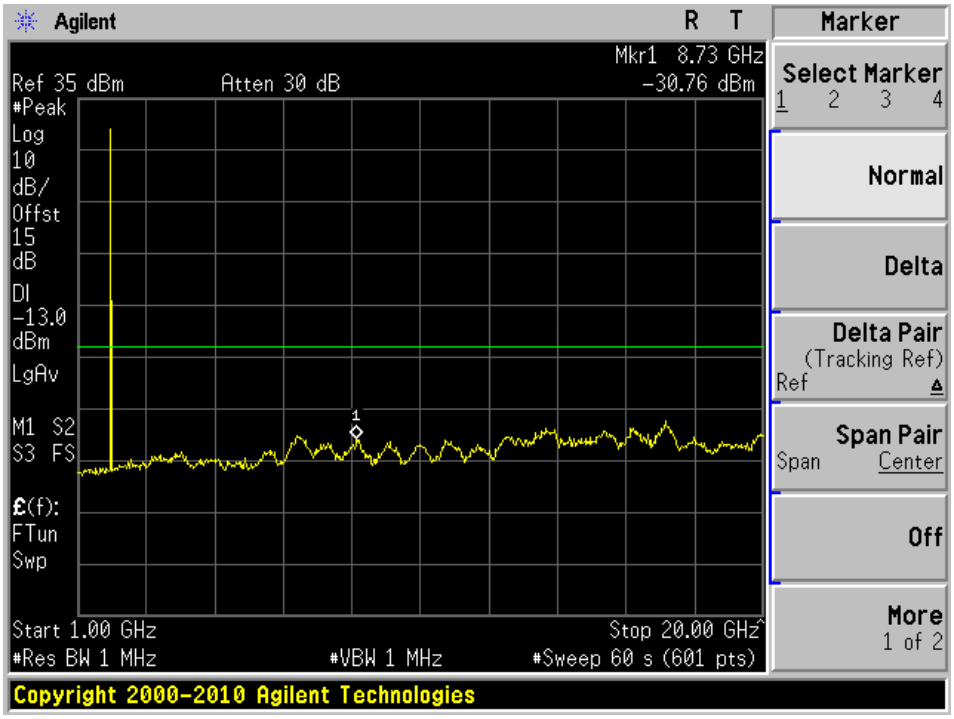


GPRS 1900 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

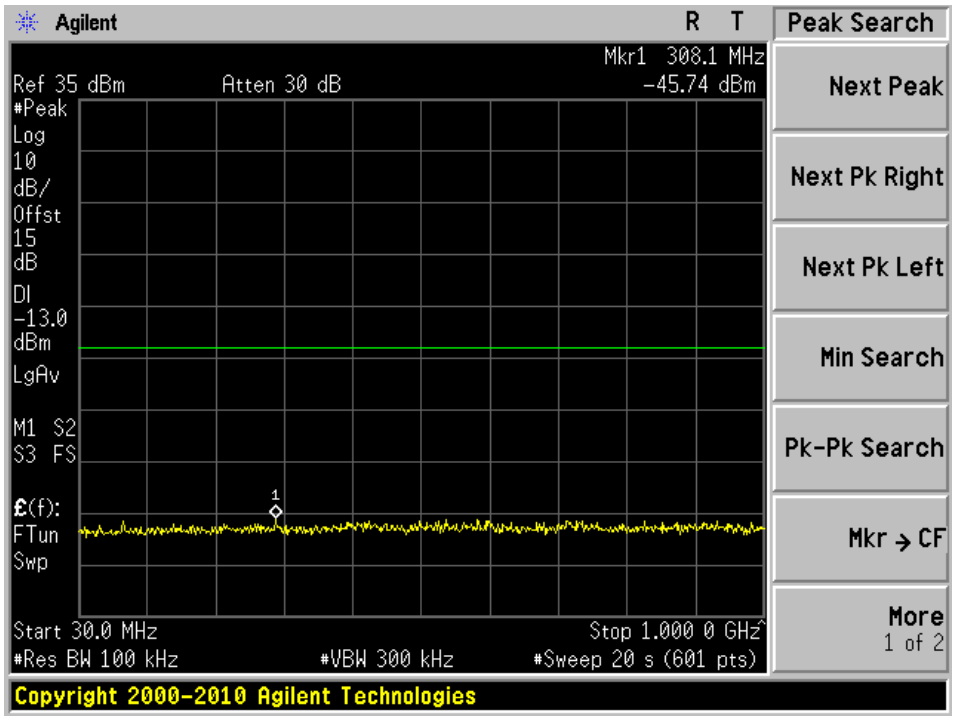


Plot 2a: 1 GHz – 20 GHz

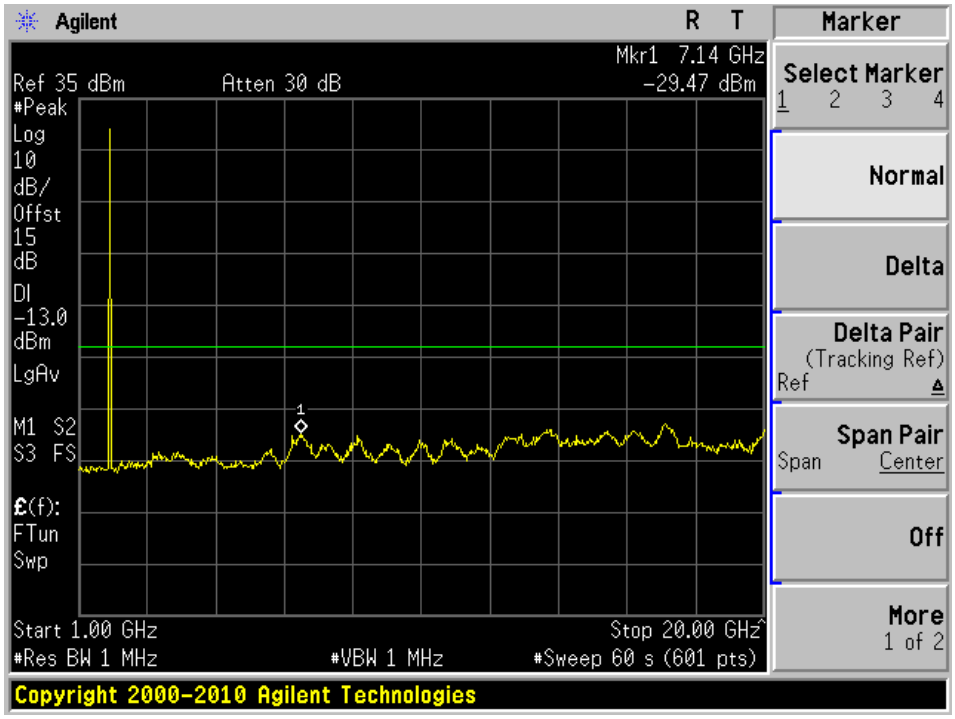


EDGE 1900 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

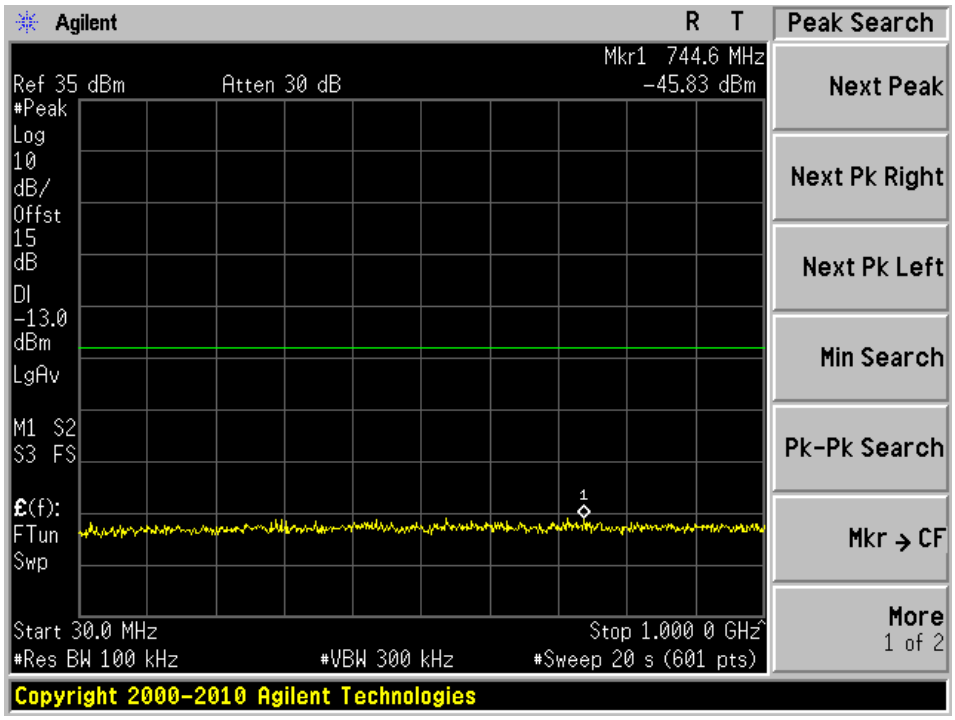


Plot 2a: 1 GHz – 20 GHz

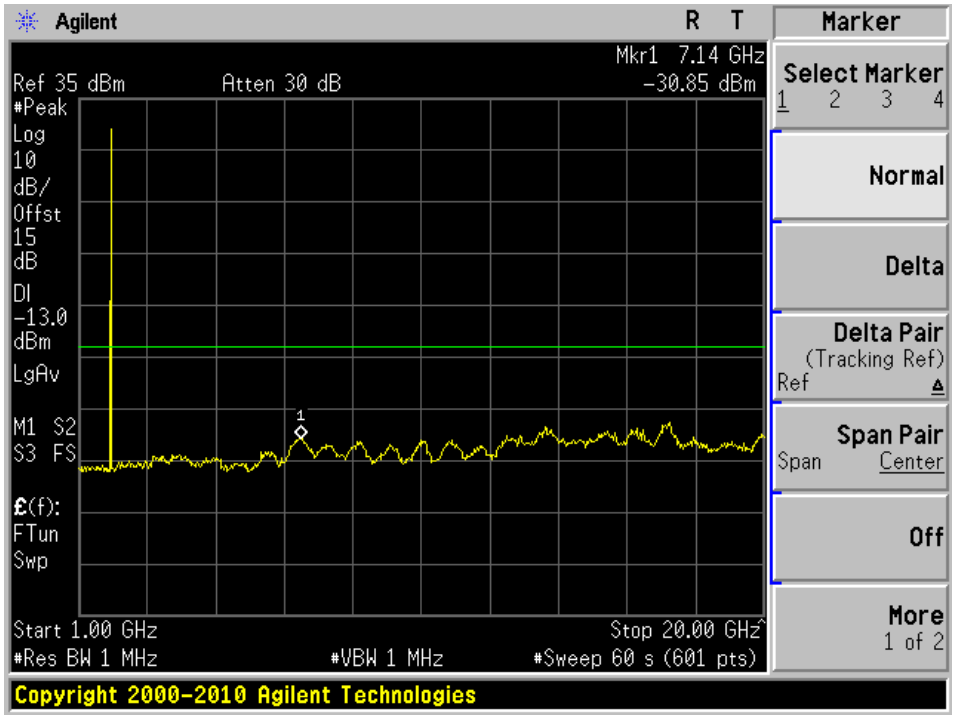


EDGE 1900 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

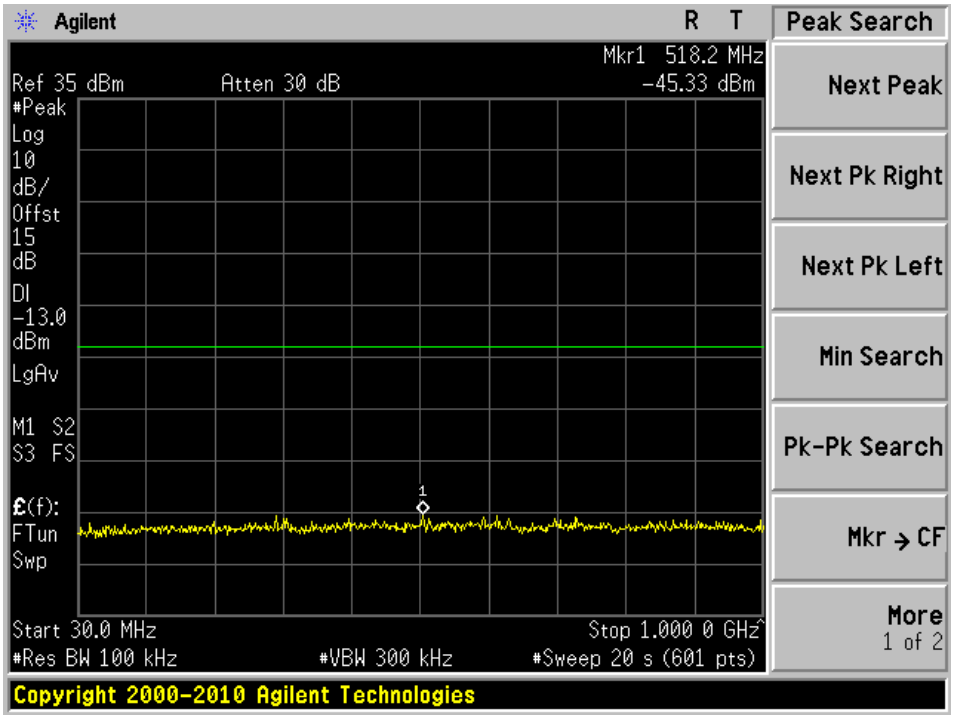


Plot 2a: 1 GHz – 20 GHz

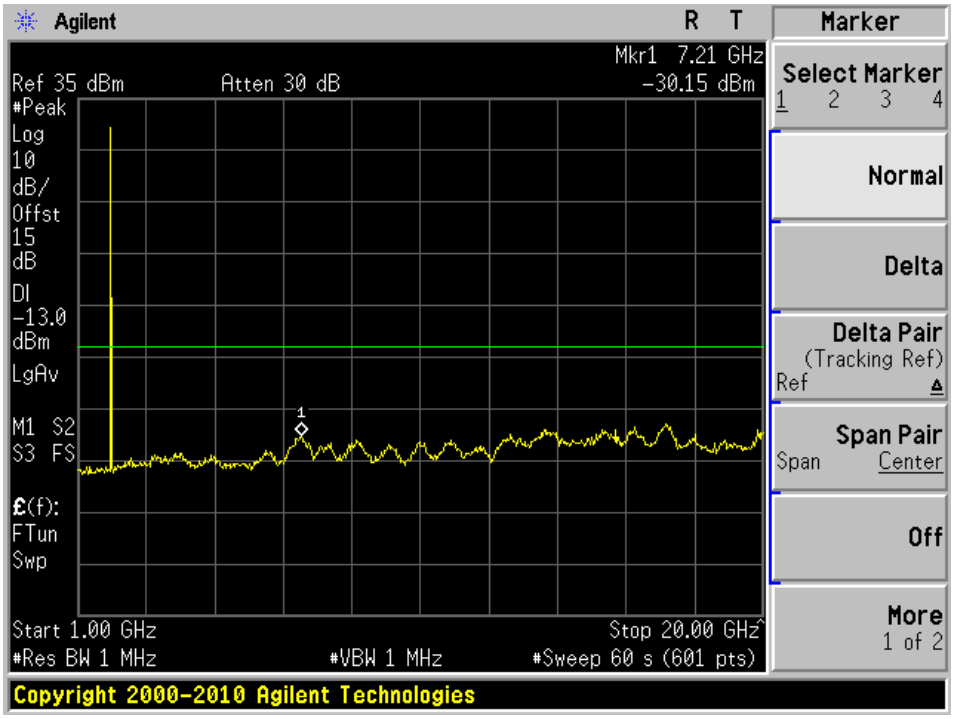


EDGE 1900 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

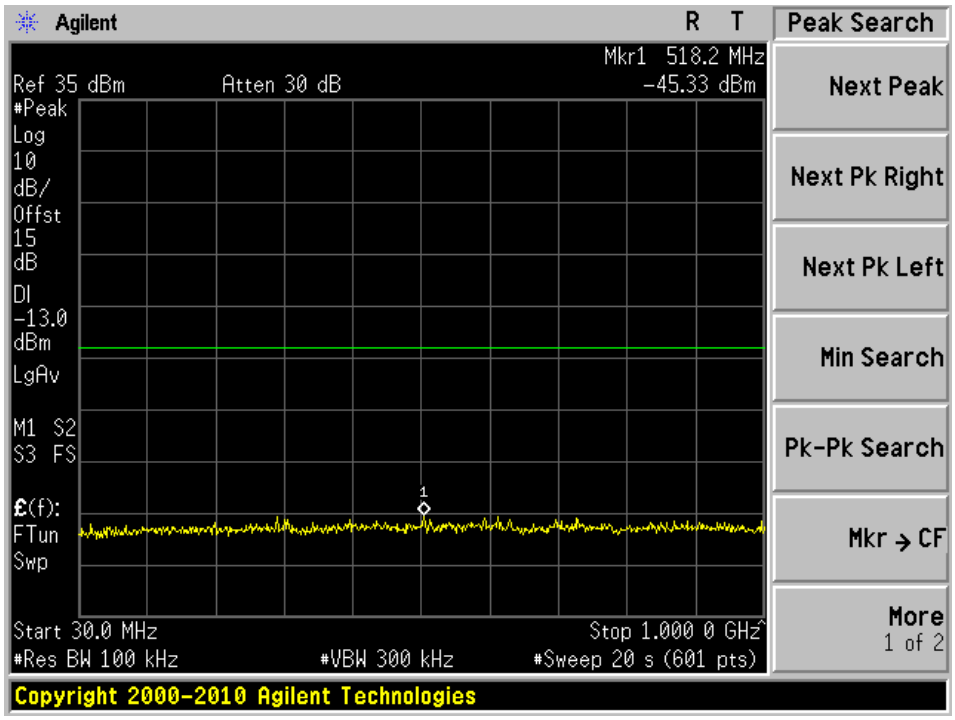


Plot 2a: 1 GHz – 20 GHz

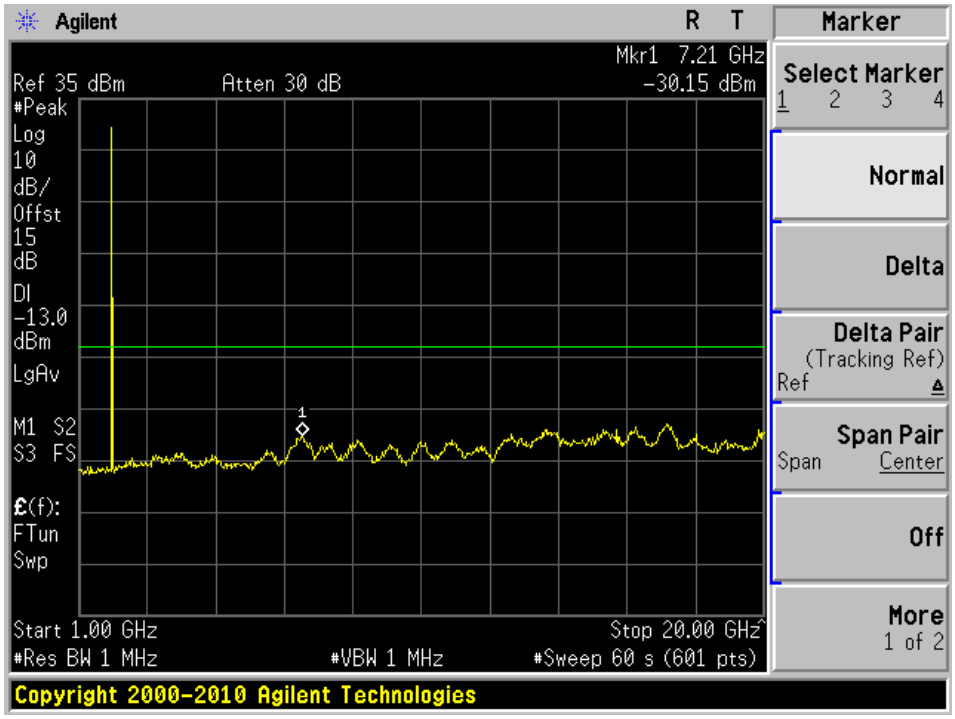


EDGE 1900 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

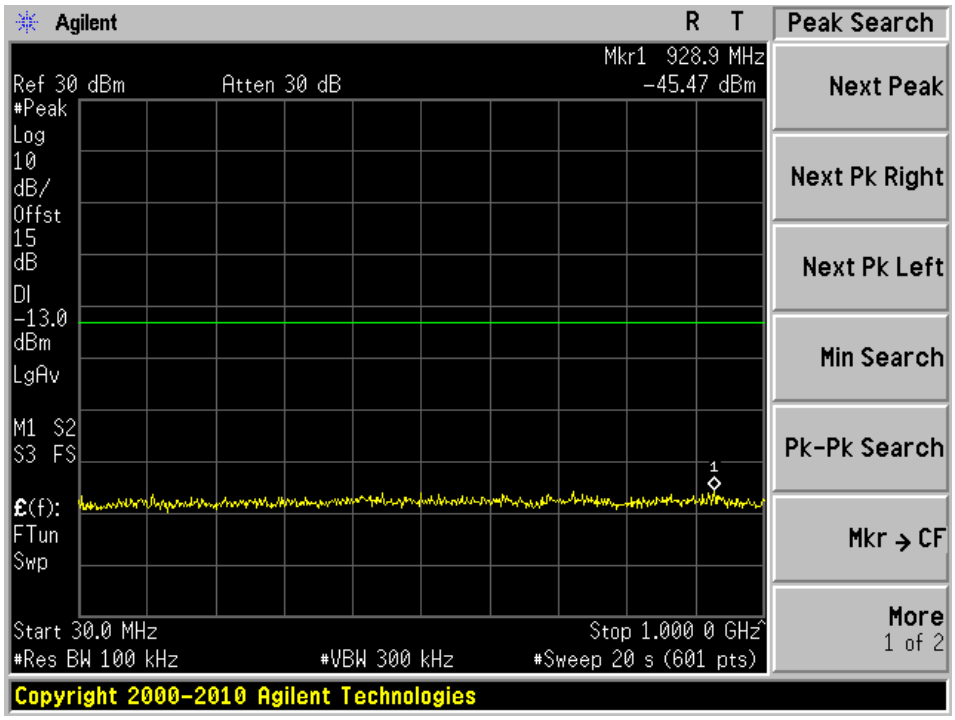


Plot 2a: 1 GHz – 20 GHz

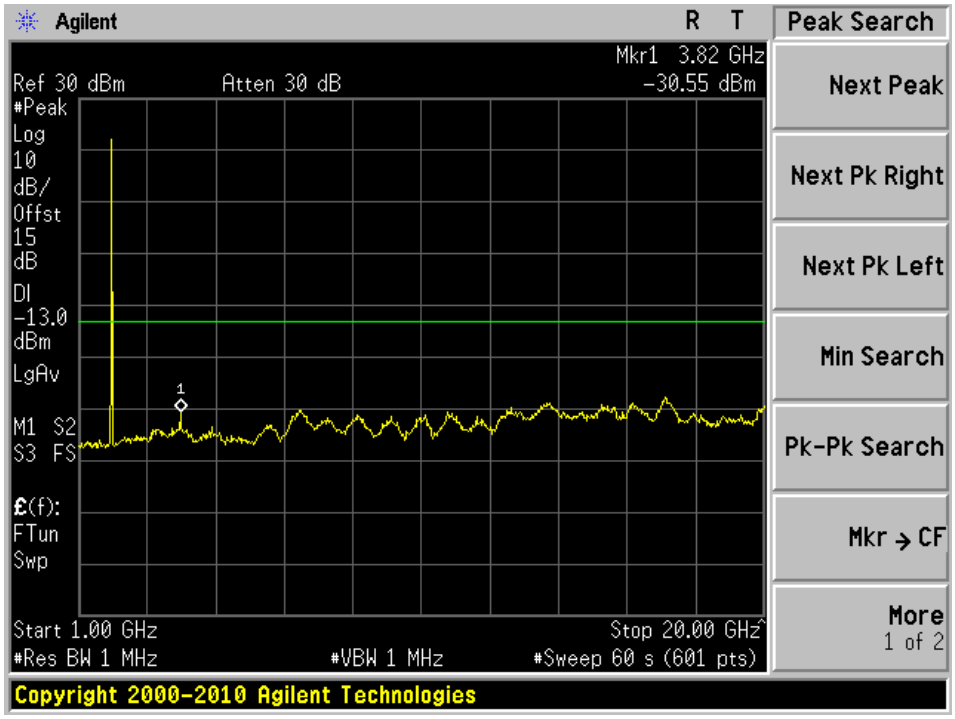


WCDMA 1900 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

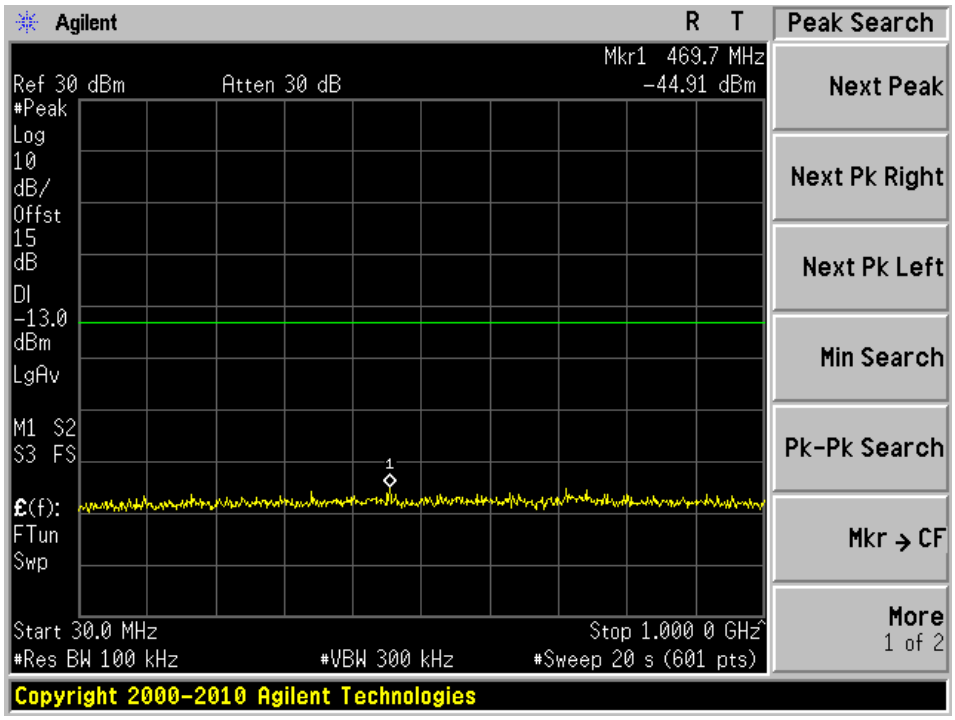


Plot 2a: 1 GHz – 20 GHz

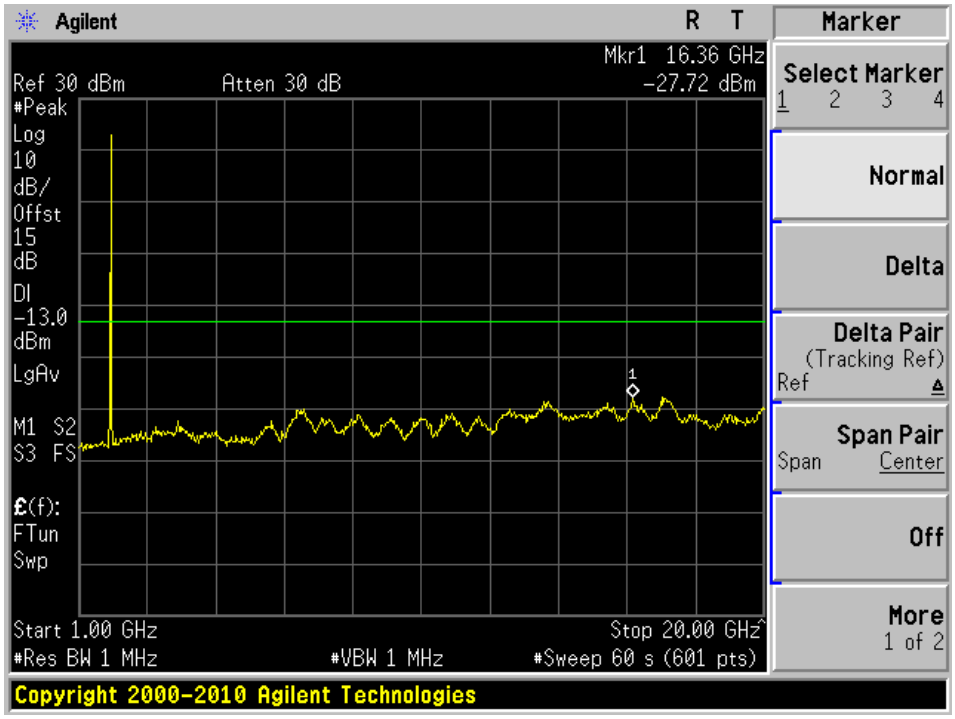


WCDMA 1900 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

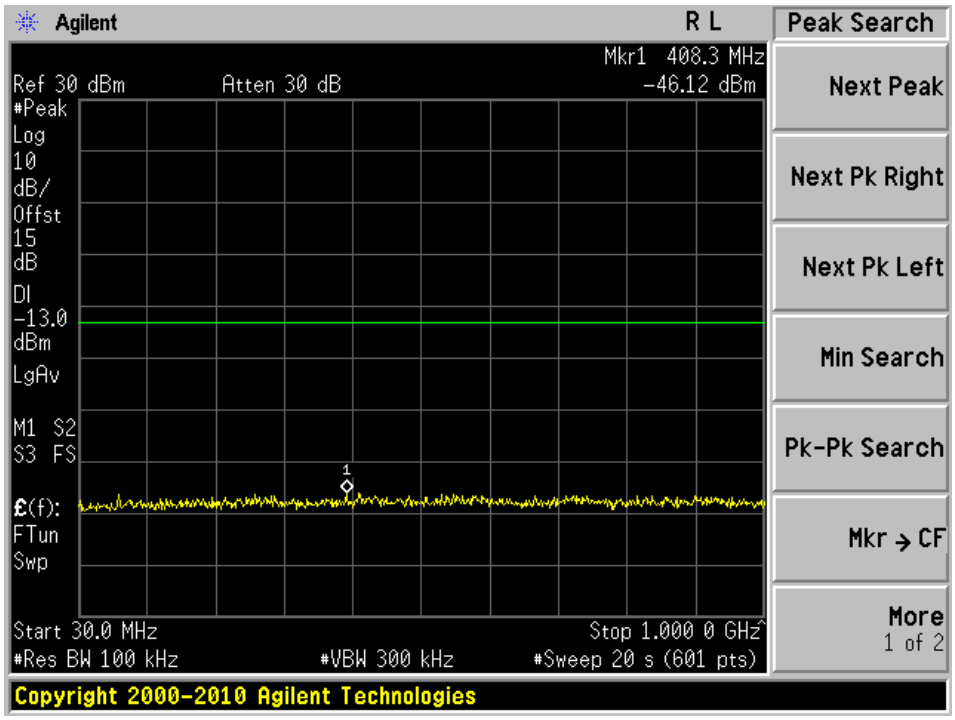


Plot 2a: 1 GHz – 20 GHz

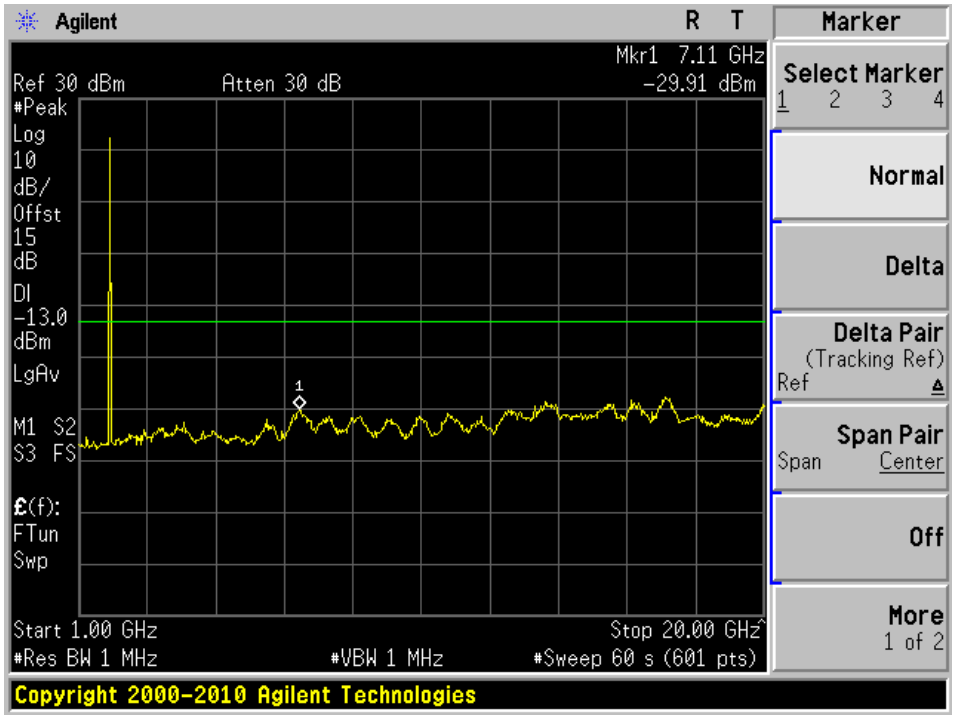


WCDMA 1900 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

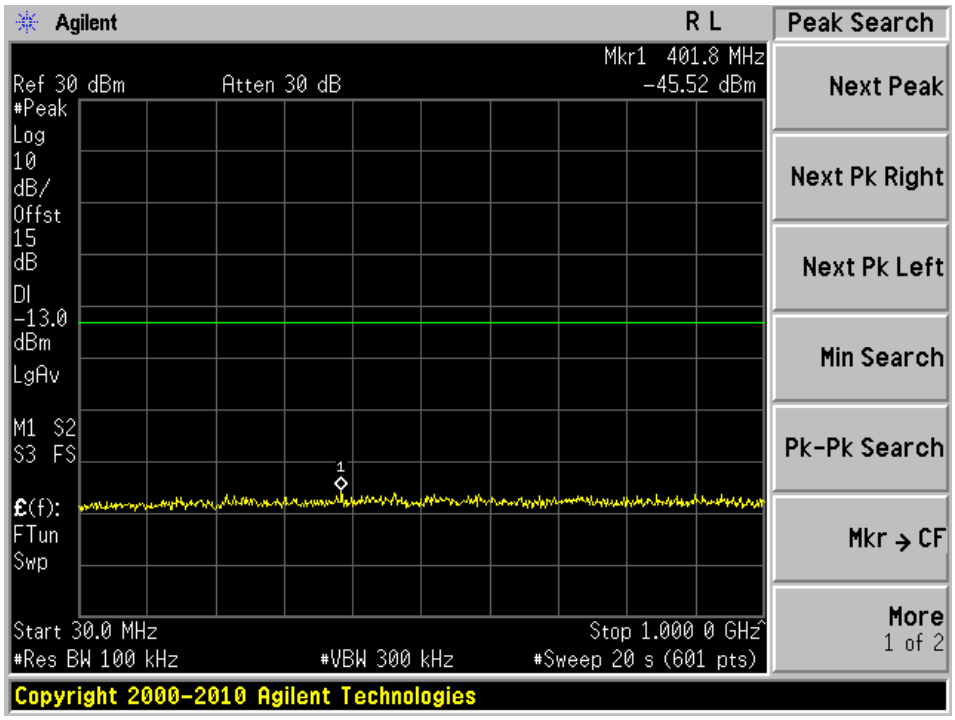


Plot 2a: 1 GHz – 20 GHz

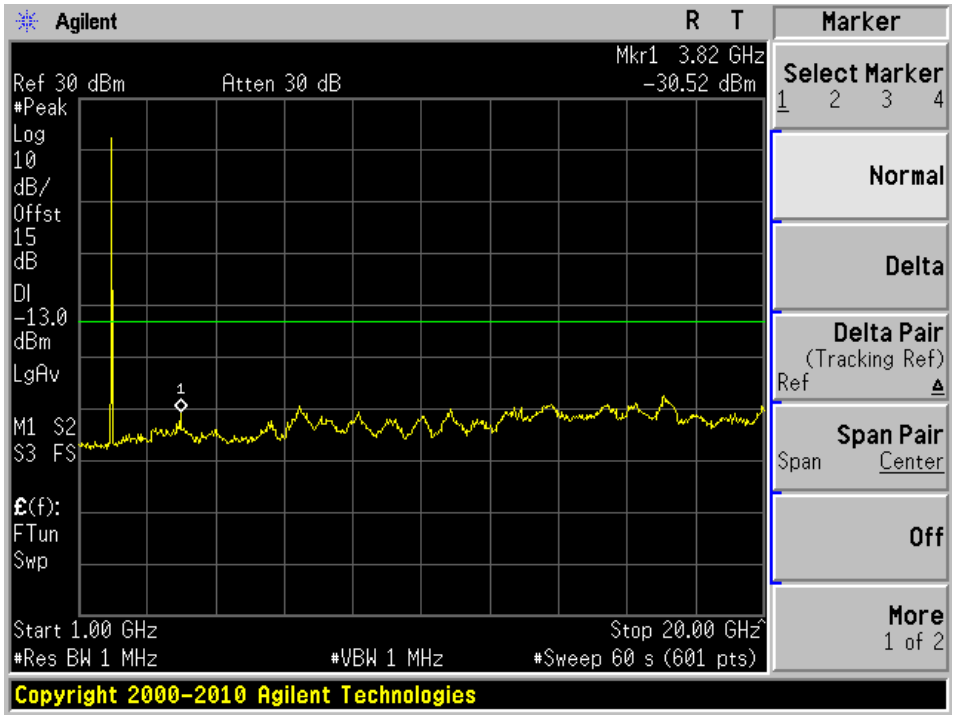


HSDPA 1900 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

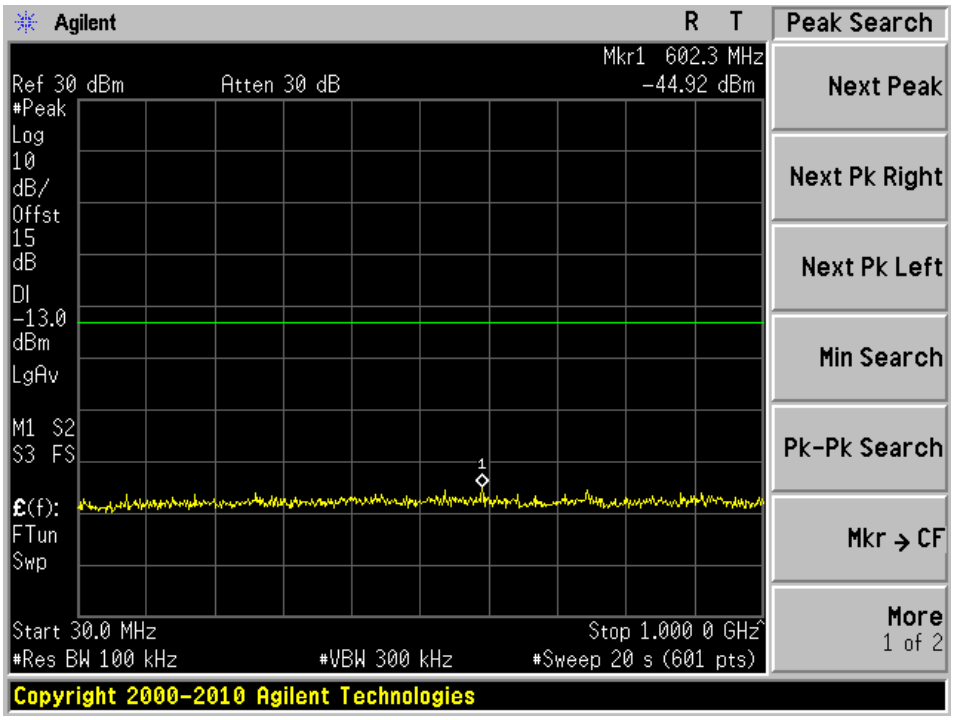


Plot 2a: 1 GHz – 20 GHz

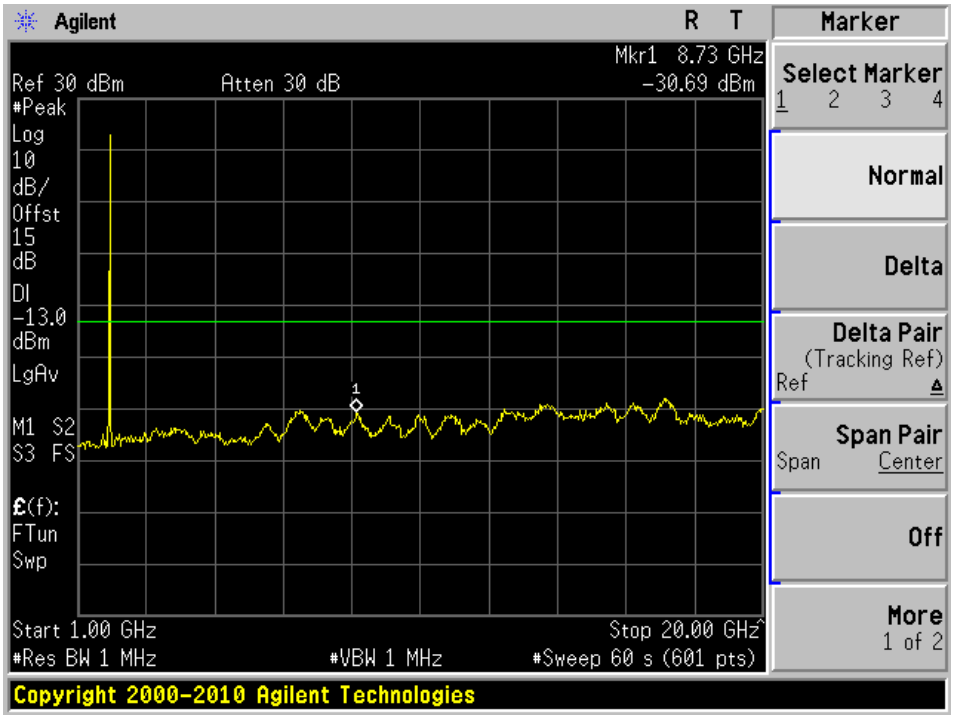


HSDPA 1900 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

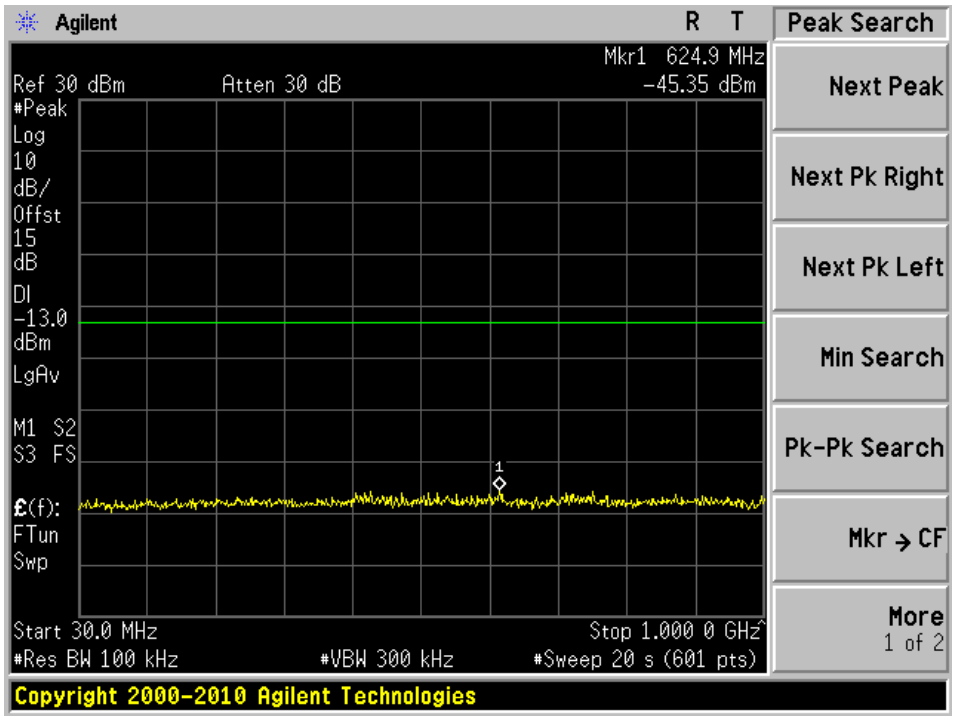


Plot 2a: 1 GHz – 20 GHz

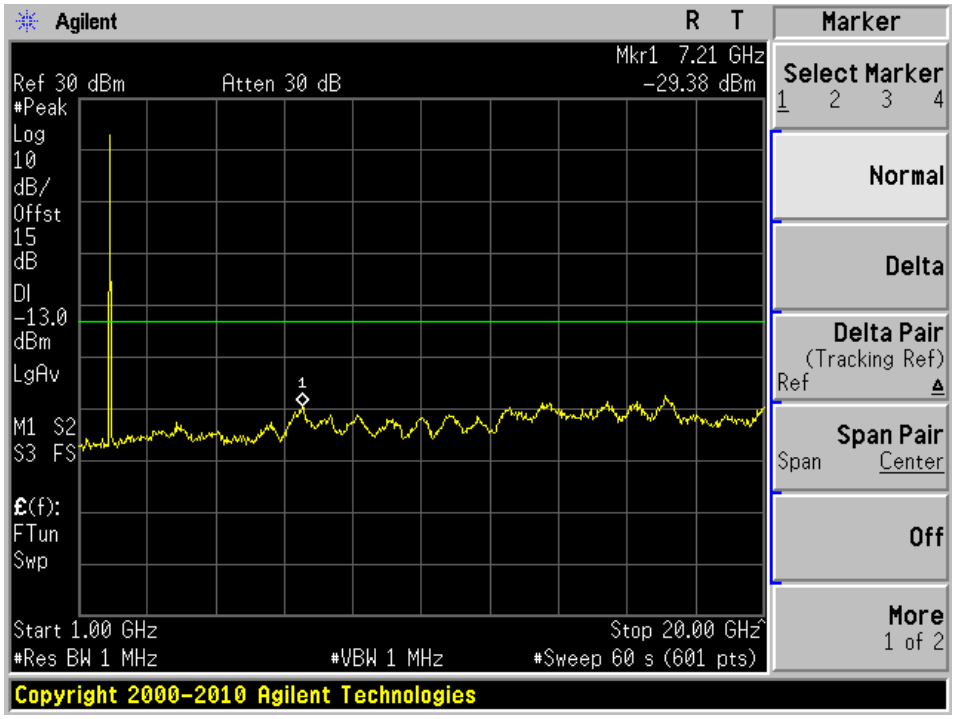


HSDPA 1900 MHz High Channel

Plot 1a: 30 MHz – 1 GHz

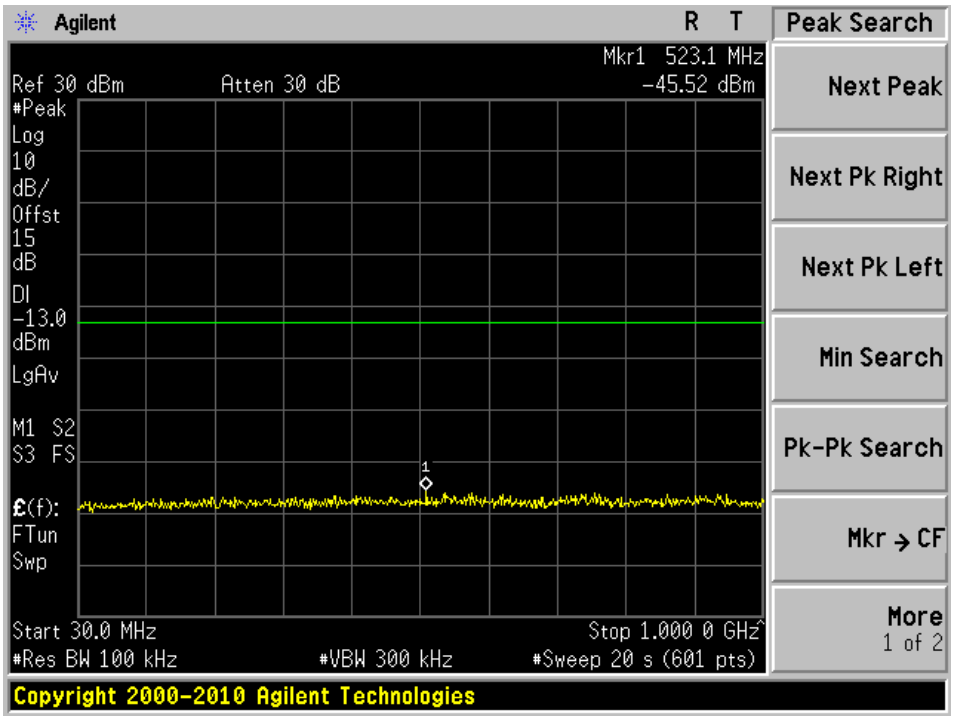


Plot 2a: 1 GHz – 20 GHz

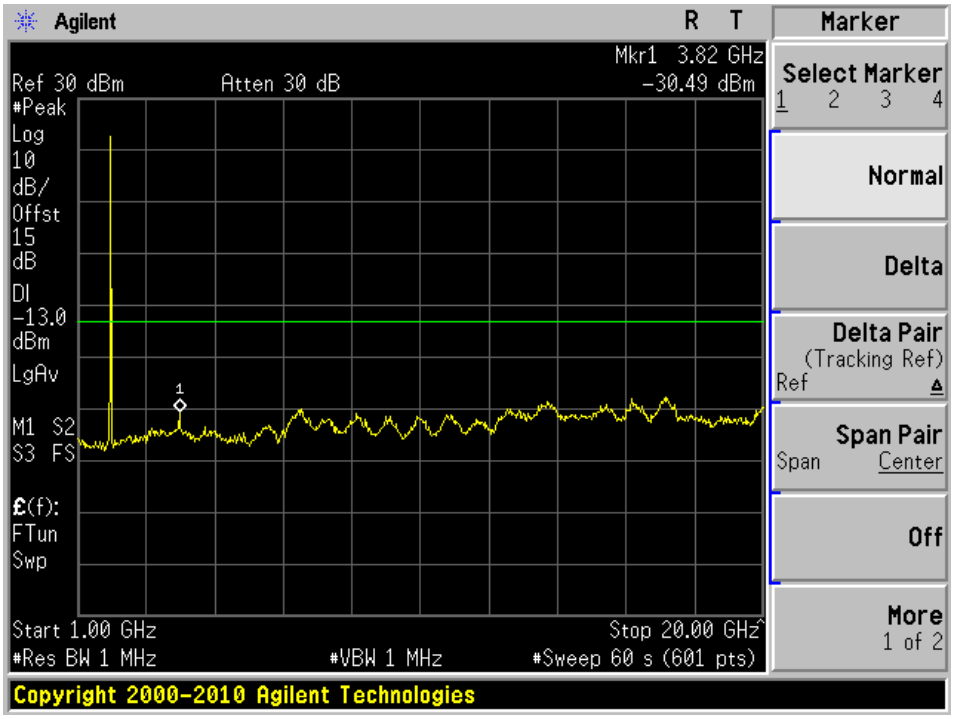


HSUPA 1900 MHz Low Channel

Plot 1a: 30 MHz – 1 GHz

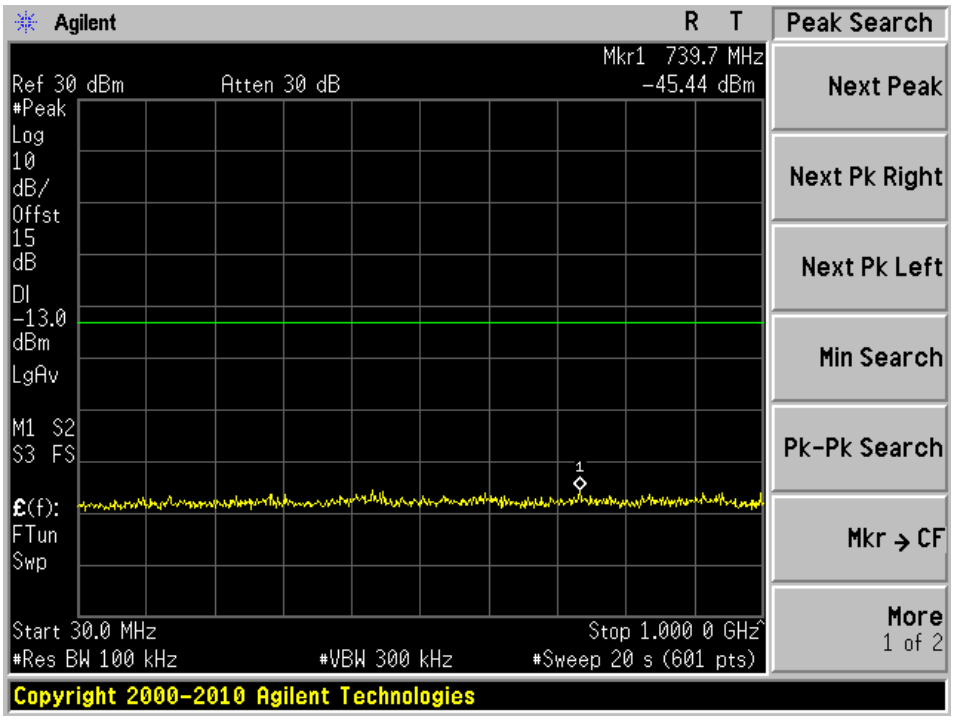


Plot 2a: 1 GHz – 20 GHz

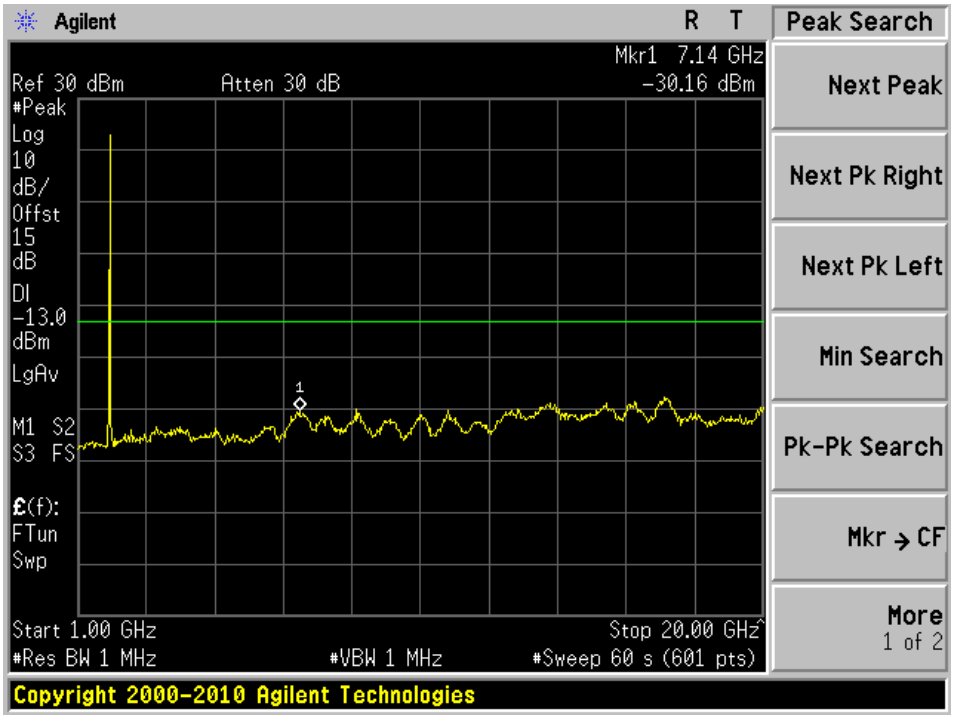


HSUPA 1900 MHz Middle Channel

Plot 1a: 30 MHz – 1 GHz

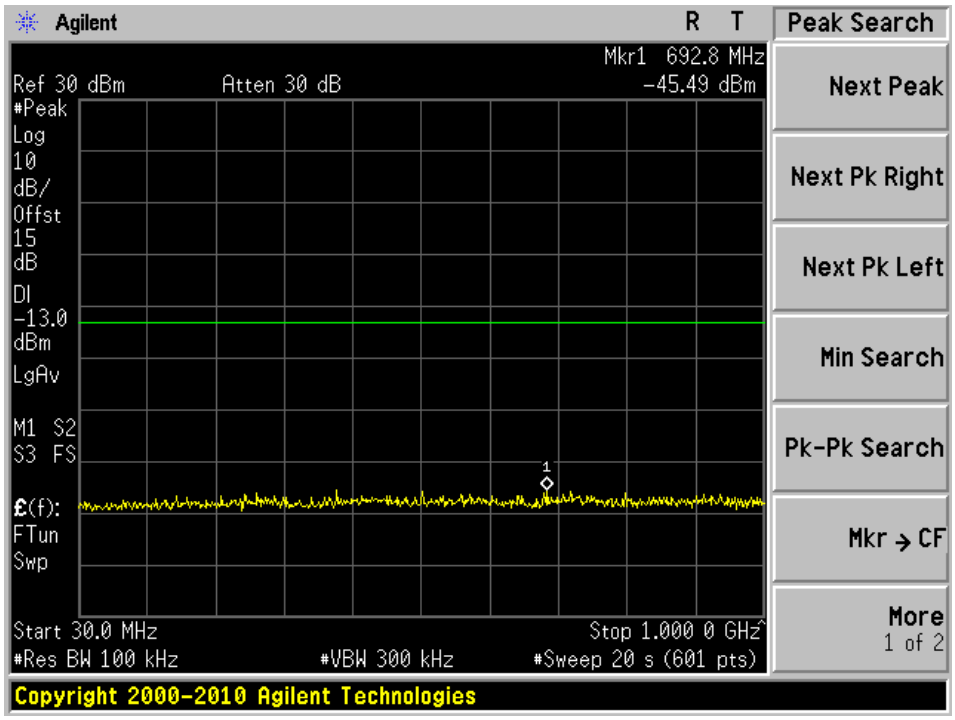


Plot 2a: 1 GHz – 20 GHz

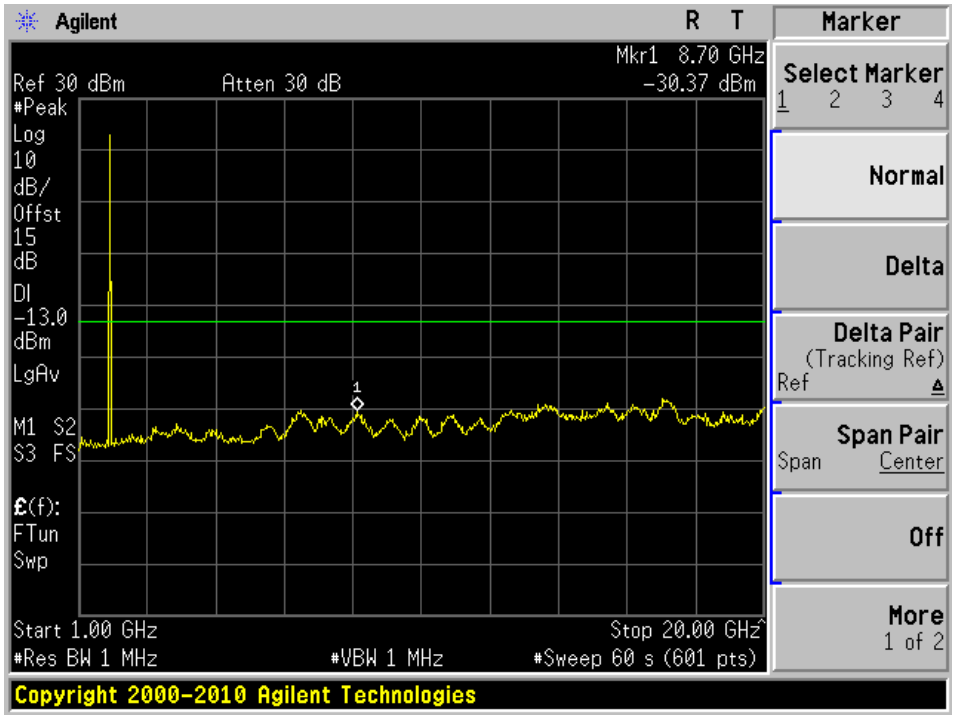


HSUPA 1900 MHz High Channel

Plot 1a: 30 MHz – 1 GHz



Plot 2a: 1 GHz – 20 GHz



8 FCC §2.1053, §22.917, §24.238 & IC RSS-132 §4.5, RSS-133 §6.5 - RADIATED SPURIOUS EMISSIONS

8.1 Applicable Standard

Requirements: FCC §2.1051. §22.917 & §24.238(a). IC RSS-132 §4.5 & RSS-133 §6.5

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057. and IC RSS 132/133

8.2 Test Procedure

The transmitter was placed on a wooden 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 Power in Watts/0.001) – the absolute level

Spurious attenuation limit in dB = 43 + 10 Log_{10} (power out in Watts)

8.3 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
A.H Systems	Antenna, Horn	SAS-200/571	261	2010-12-21
Agilent	Analyzer, Communications	E5155C	GB44051221	2010-06-11 [1]
Hewlett Packard	Pre amplifier	8447D	2944A06639	2011-06-09
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2011-08-10
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2011-03-21
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Agilent	PSA Series Spectrum Analyzer	E4440A	MY44303352	2011-05-10
HP	Pre Amplifier	8449B	3147A00400	2011-02-03

Note: [1]Base on two years calibration cycles.

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

8.4 Test Environmental Conditions

Temperature:	20 °C ~ 23 °C
Relative Humidity:	40 % ~ 45 %
ATM Pressure:	101kPa ~ 102kPa

Testing was performed by Lionel Lara from 2011-12-21 to 2011-12-26 in 5 meter chamber #3.

8.5 Test Results

Cellular Band:

GPRS: Worst Channel Middle channel 836.6 MHz

30 MHz -10 GHz Radiated Emission at 3-meter (Middle Channel, 836.6 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
249.4	44.67	248	185	H	249.4	-63.79	0	0.6	-64.39	-13	-51.39
249.4	51.01	247	150	V	249.4	-57.45	0	0.6	-58.05	-13	-45.05
425.06	43.49	200	228	H	425.06	-59.93	0	0.8	-60.73	-13	-47.73
425.06	39.16	256	243	V	425.06	-64.26	0	0.8	-65.06	-13	-52.06
2509	58.85	0	190	H	2509	-39.71	9.44	1.6	-31.87	-13	-18.87
2509	59.24	216	155	V	2509	-39.32	9.31	1.6	-31.61	-13	-18.61

EDGE: Worst Channel Middle channel 836.6 MHz

30 MHz -10 GHz Radiated Emission at 3-meter (Middle Channel, 836.6 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
245.2	50.86	302	262	H	245.2	-57.6	0	0.6	-58.2	-13	-45.2
245.2	53.27	257	150	V	245.2	-55.19	0	0.6	-55.79	-13	-42.79
2509	46.58	0	173	H	2509	-51.98	9.44	1.6	-44.14	-13	-31.14
2509	47.44	215	155	V	2509	-51.12	9.31	1.6	-43.41	-13	-30.41

WCDMA/HSPA: Worst Channel WCDMA High channel 846.6 MHz

30 MHz -10 GHz Radiated Emission at 3-meter (High Channel, 846.6 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
245.2	49.26	292	244	H	245.2	-59.2	0	0.6	-59.8	-13	-46.8
245.2	50.5	269	150	V	245.2	-57.96	0	0.6	-58.56	-13	-45.56
817.3	36.84	206	131	H	817.3	-13.16	0	1	-14.16	-13	-1.16
817.3	37.35	222	154	V	817.3	-12.65	0	1	-13.65	-13	-0.65
1427	42.22	172	111	H	1427	-59.85	7.17	1.4	-54.08	-13	-41.08
1427	43.54	150	120	V	1427	-58.53	6.94	1.4	-52.99	-13	-39.99

PCS Band:

GPRS: Worst Channel Middle channel 1880 MHz

30 MHz -20 GHz Radiated Emission at 3-meter (Middle Channel, 1880 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
247.1	42.38	246	182	H	247.1	-66.08	0	0.6	-66.68	-13	-53.68
247.1	49.22	251	155	V	247.1	-59.24	0	0.6	-59.84	-13	-46.84
424.06	40.14	192	240	H	424.06	-63.28	0	0.8	-64.08	-13	-51.08
424.06	36.67	261	267	V	424.06	-66.75	0	0.8	-67.55	-13	-54.55

EDGE: Worst Channel Middle channel 836.6 MHz

30 MHz -10 GHz Radiated Emission at 3-meter (Middle Channel, 836.6 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
245.2	49.87	299	253	H	245.2	-58.59	0	0.6	-59.19	-13	-46.19
245.2	52.02	262	148	V	245.2	-56.44	0	0.6	-57.04	-13	-44.04

WCDMA/HSPA: Worst Channel WCDMA Low channel 1852.4MHz

30 MHz -10 GHz Radiated Emission at 3-meter (Low Channel, 1852.4 MHz)

Indicated		Turntable Azimuth (degree)	Test Antenna		Substituted				Absolute Level (dBm)	FCC/IC	
Frequency (MHz)	S.A. Amp. (dBuV)		Height (cm)	Polar (H/V)	Frequency (MHz)	S.G. Level (dBm)	Antenna Gain (dBi)	Cable Loss (dB)		Limit (dBm)	Margin (dB)
245.3	49.26	291	209	H	245.3	-59.2	0	0.6	-59.8	-13	-46.8
245.3	52.18	268	150	V	245.3	-56.28	0	0.6	-56.88	-13	-43.88
3706	43.94	172	237	H	3706	-49.9	9.72	1.6	-41.78	-13	-28.78
3706	45.68	243	148	V	3706	-48.16	9.62	1.6	-40.14	-13	-27.14

9 FCC §22.917, §24.238 & IC RSS-132 §4.5, RSS-133 §6.5 – BAND EDGE

9.1 Applicable Standard

Requirements: FCC §2.1051. §22.917 & §24.238(a). IC RSS-132 §4.5 & RSS-133 §6.5

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057. and IC RSS 132/133

9.2 Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.

The center of the spectrum analyzer was set to block edge frequency, RBW set to 10 kHz.

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4446A	US44300386	2011-05-10
Agilent	Analyzer, Communications	E5155C	GB44051221	2010-06-11 [1]

Note: [1]Base on two years calibration cycles.

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

9.4 Test Environmental Conditions

Temperature:	20 °C ~ 23 °C
Relative Humidity:	40 % ~ 45 %
ATM Pressure:	101kPa ~ 102kPa

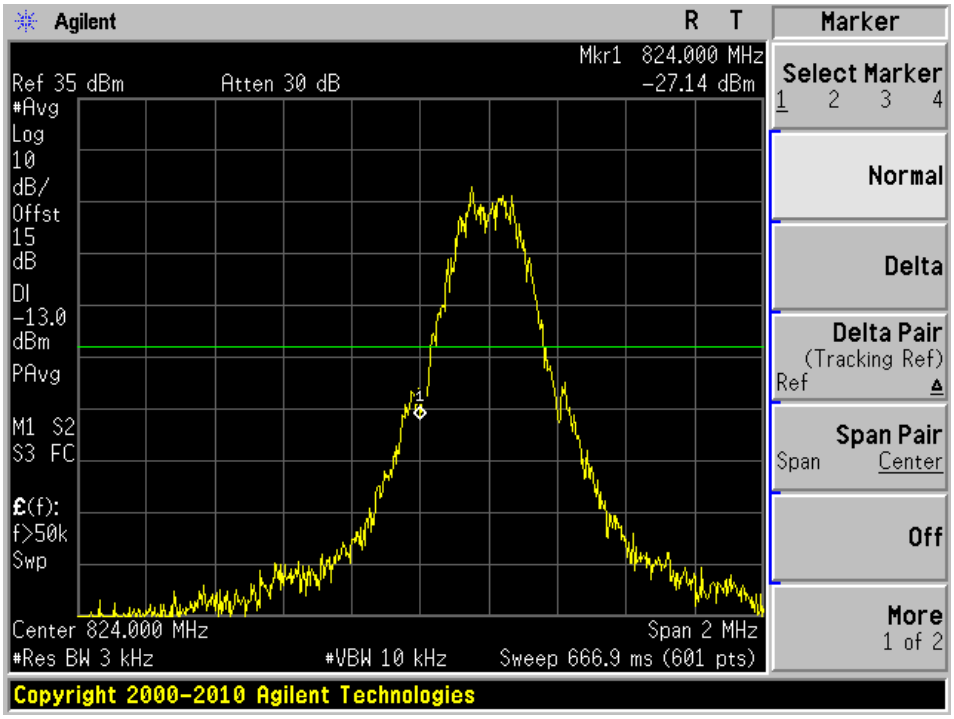
Testing was performed by Lionel Lara from 2011-12-21 to 2011-12-26 at RF Site.

9.5 Test Results & Plots

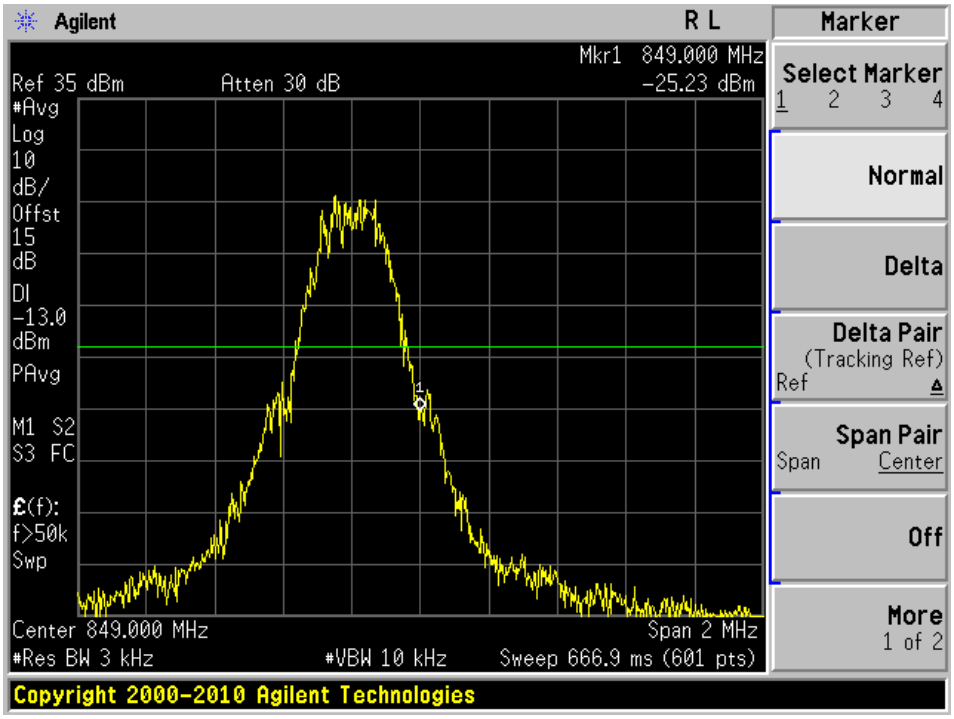
Please refer to the following plots.

Plots of Band Edge

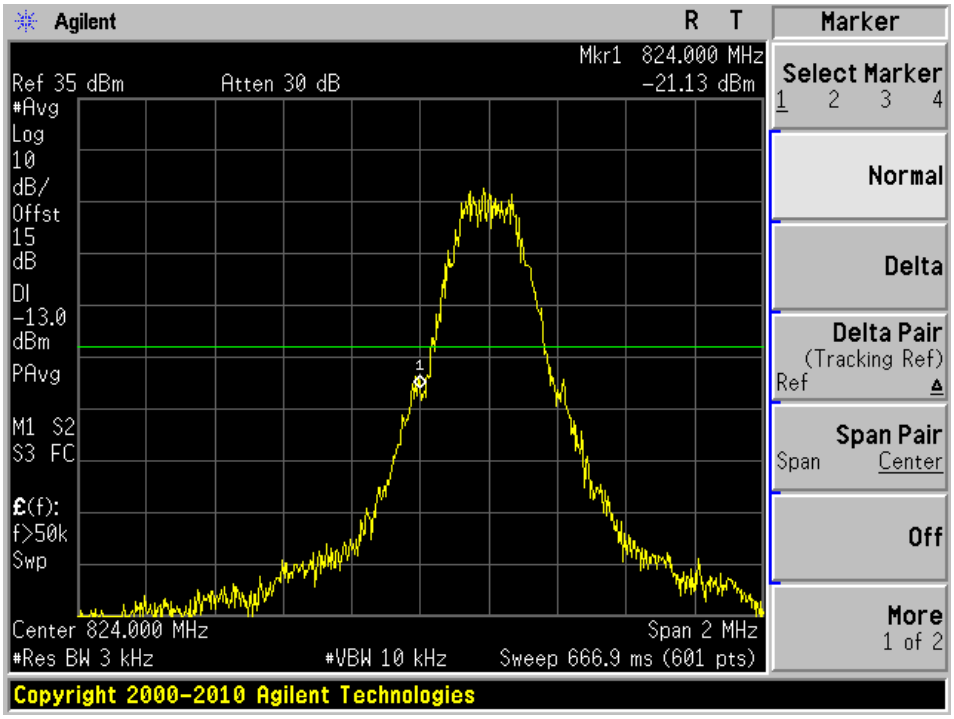
GPRS 850MHz Lowest Channel



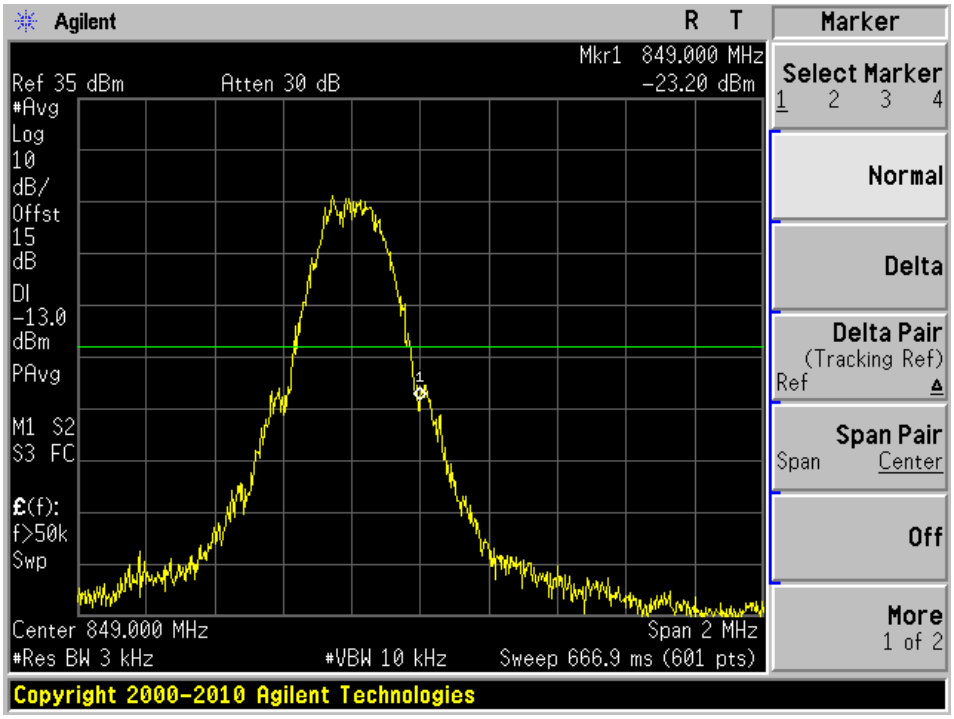
GPRS 850MHz Highest Channel



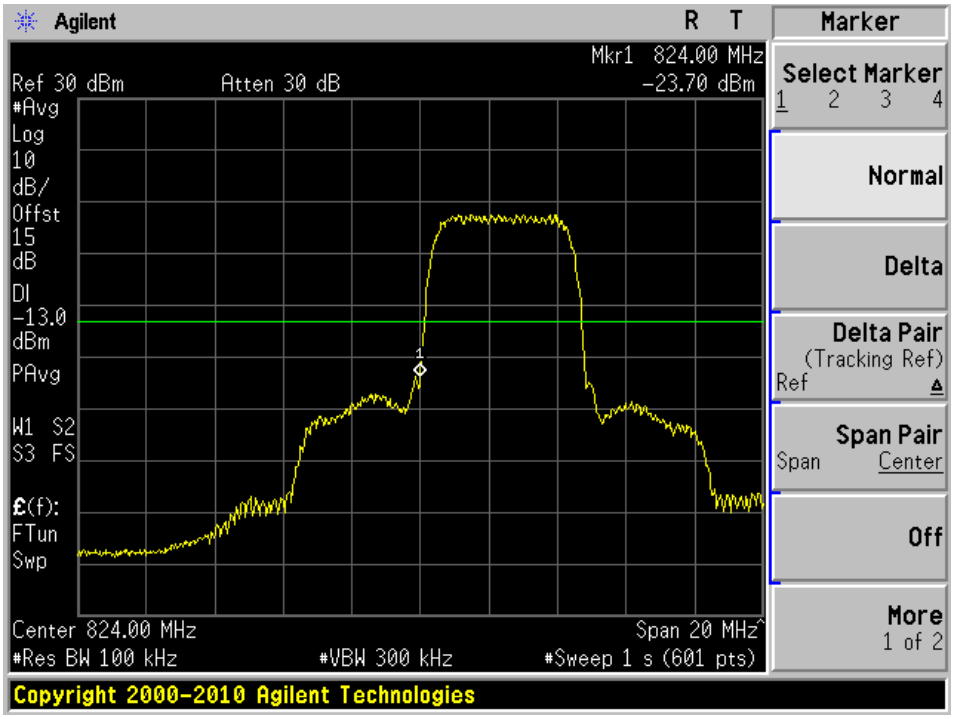
EDGE 850MHz Lowest Channel



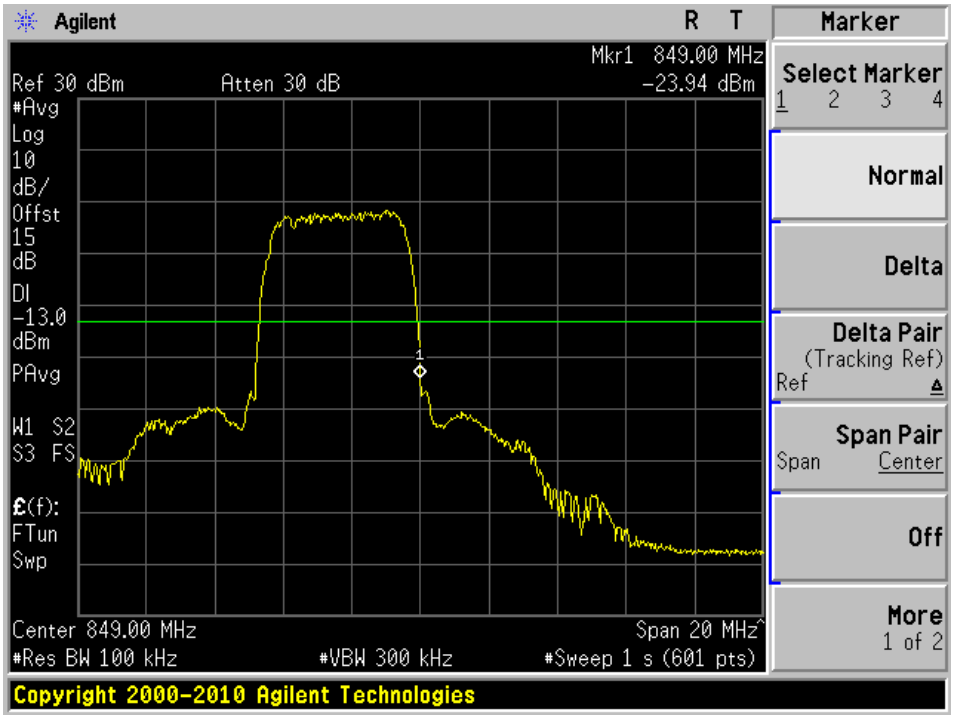
EDGE 850MHz Highest Channel



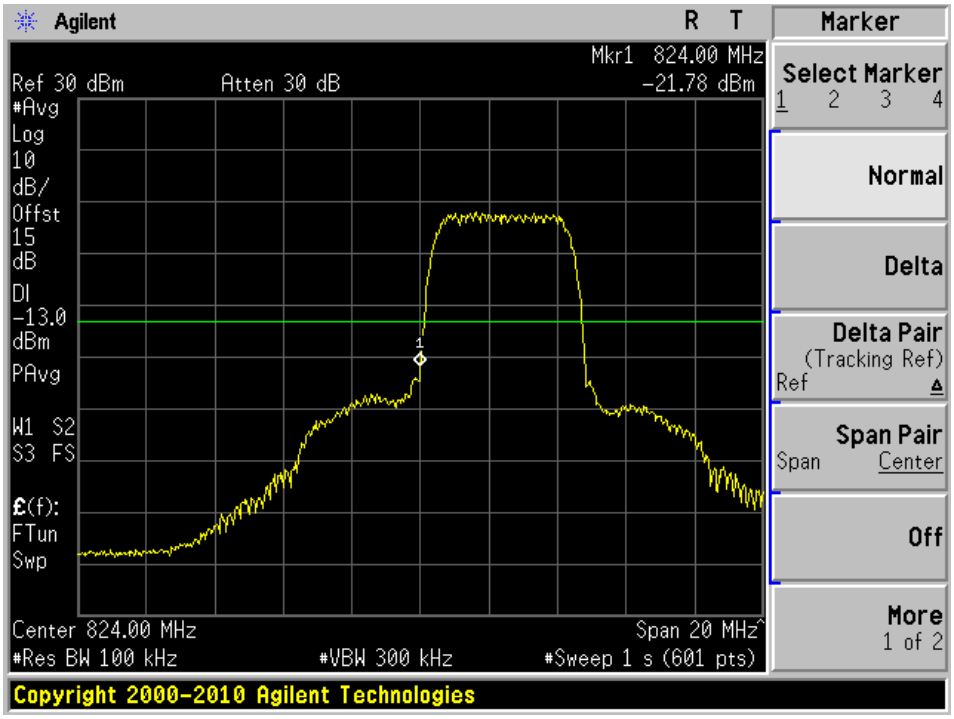
WCDMA 850MHz Lowest Channel



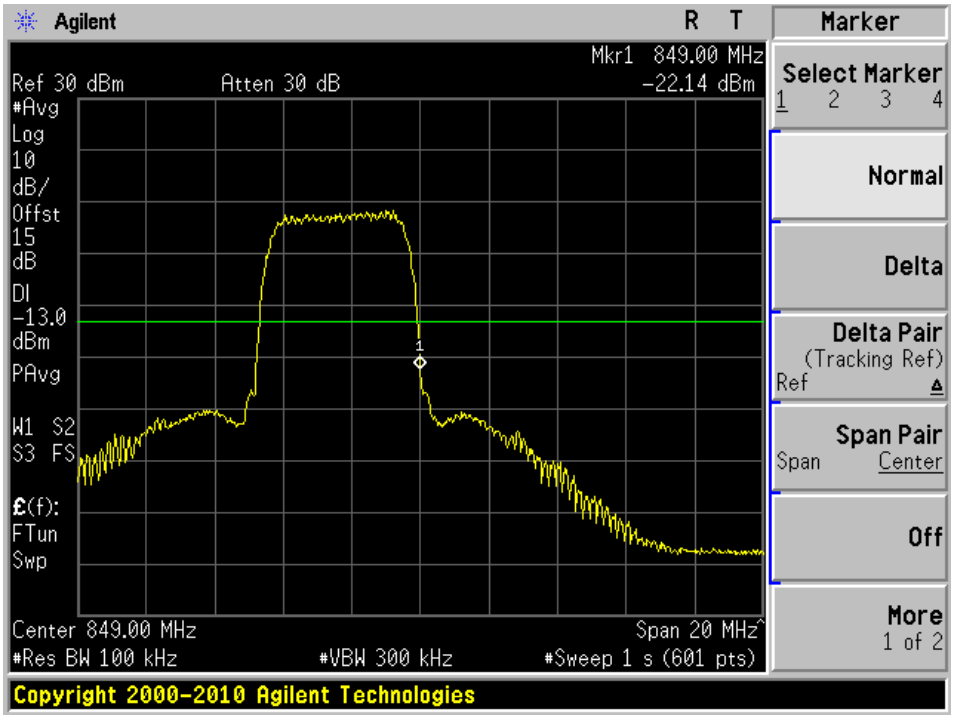
WCDMA 850MHz Highest Channel



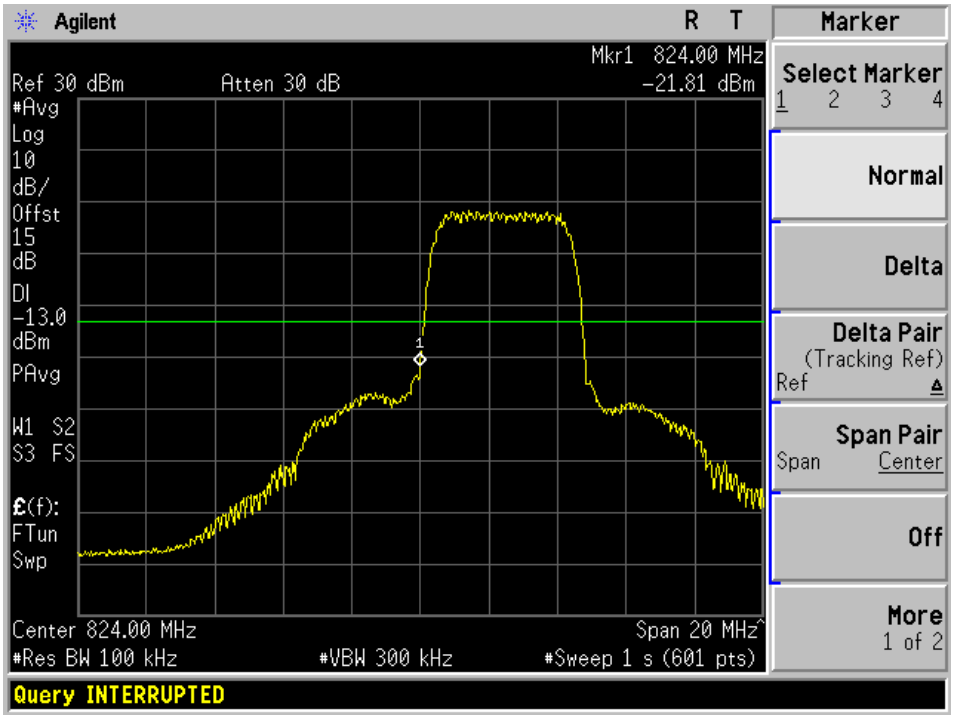
HSDPA 850MHz Lowest Channel



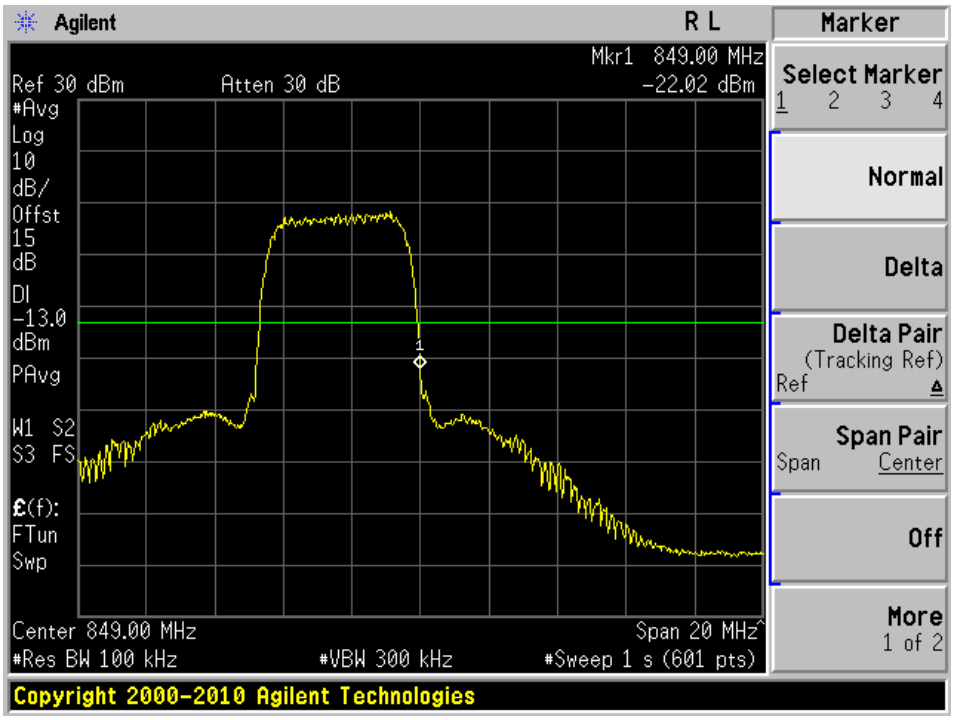
HSDPA 850MHz Highest Channel



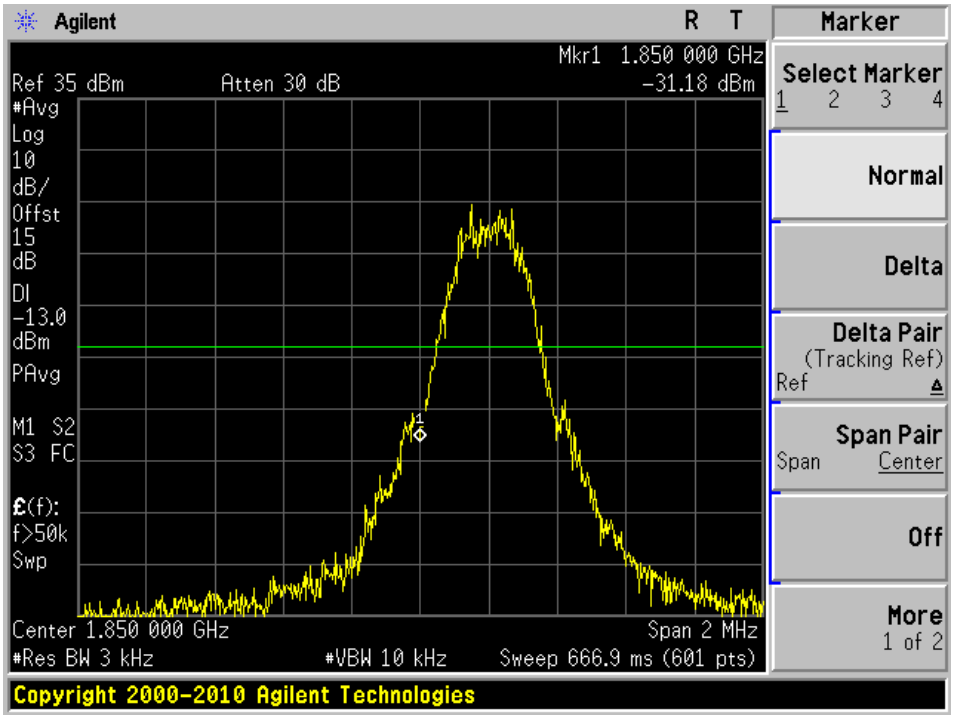
HSUPA 850MHz Lowest Channel



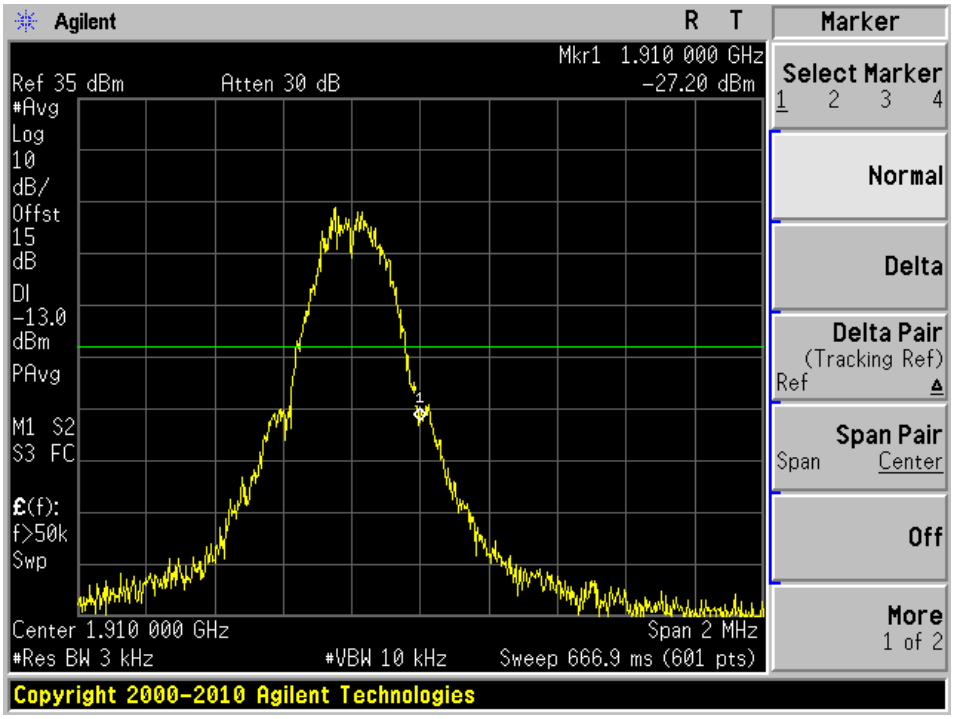
HSUPA 850MHz Highest Channel



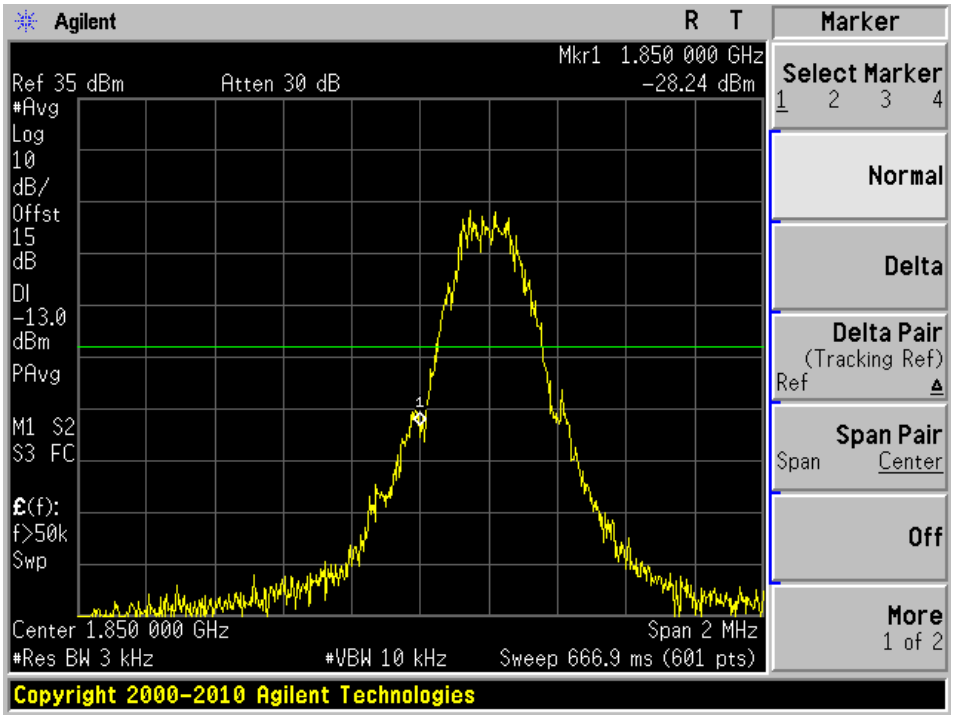
GPRS 1900MHz Lowest Channel



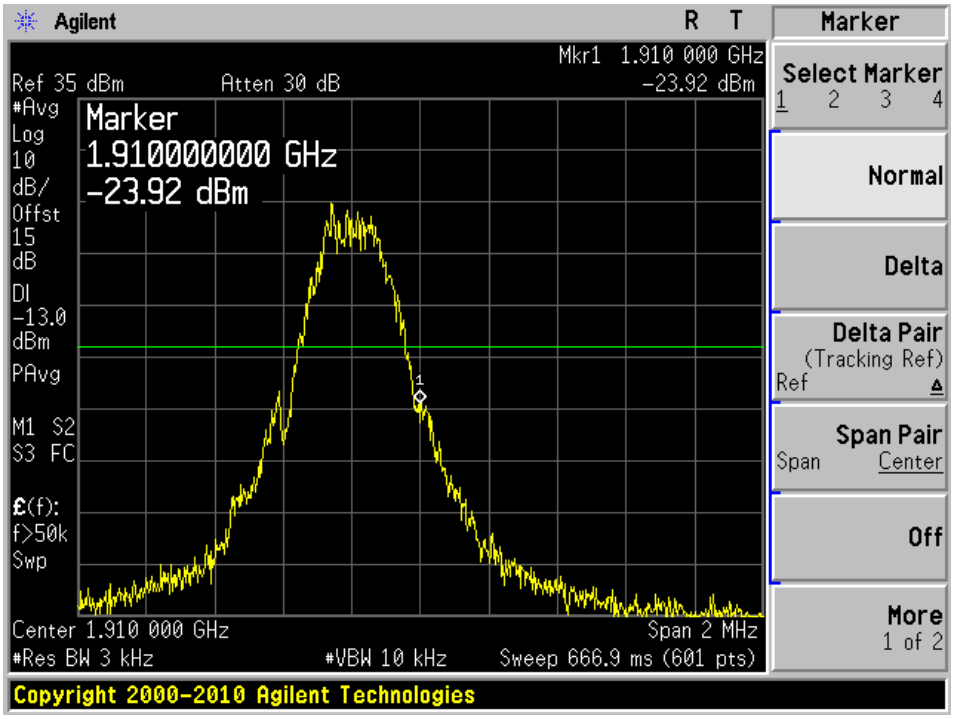
GPRS 1900MHz Highest Channel



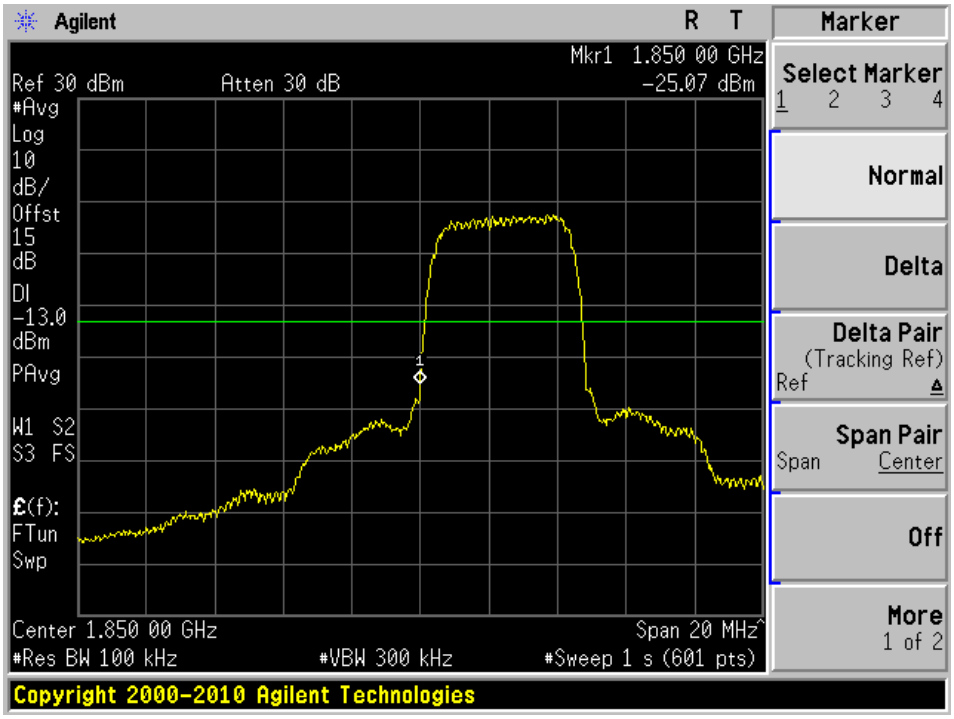
EDGE 1900MHz Lowest Channel



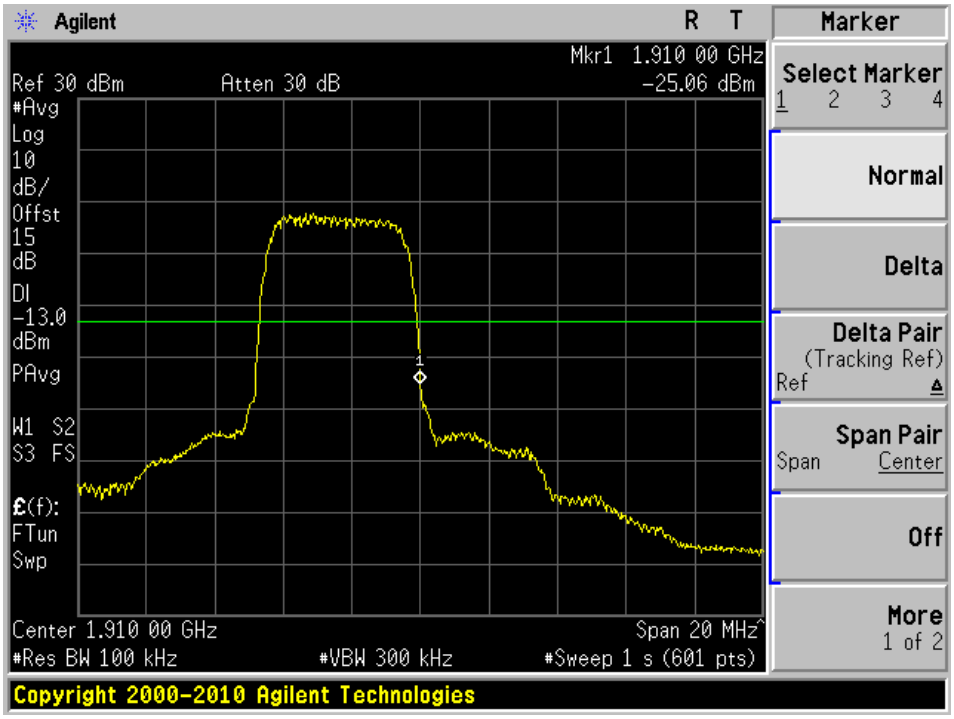
EDGE 1900MHz Highest Channel



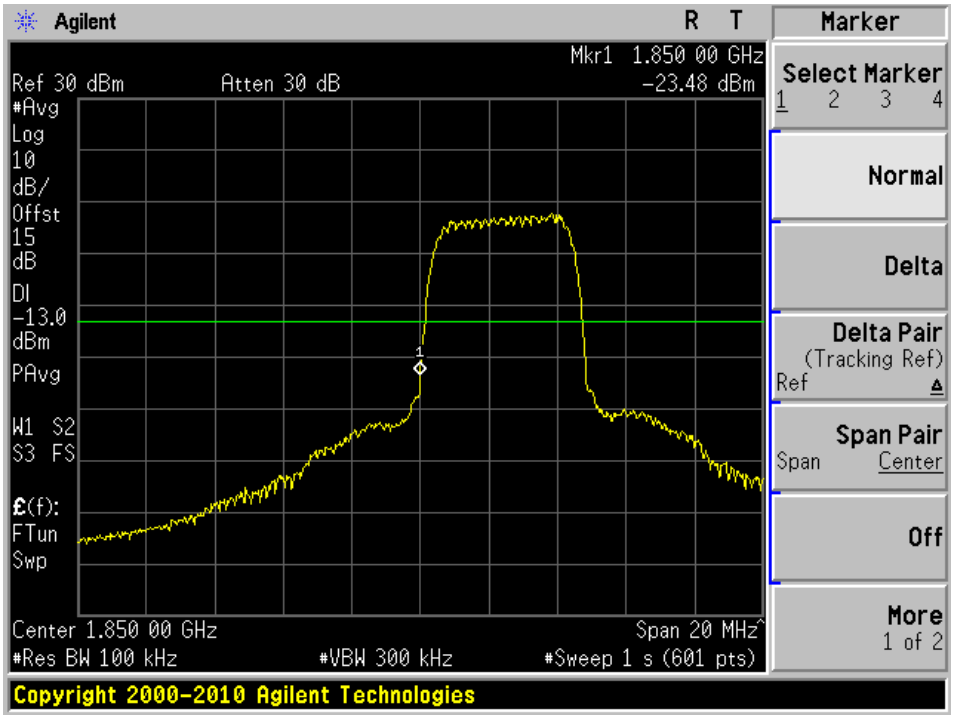
WCDMA 1900MHz Lowest Channel



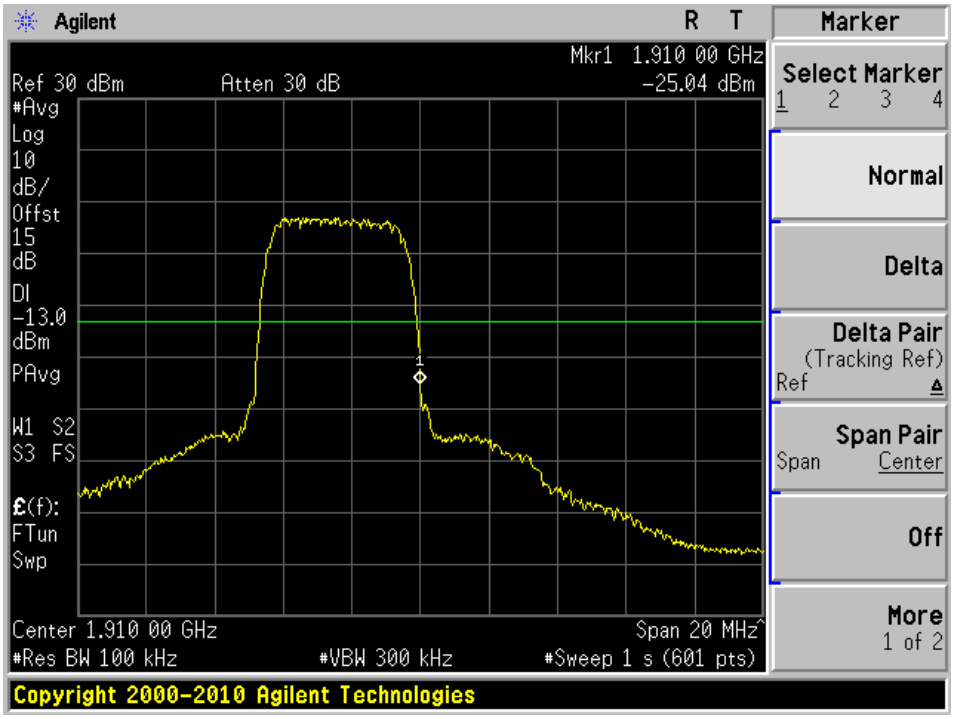
WCDMA 1900MHz Highest Channel



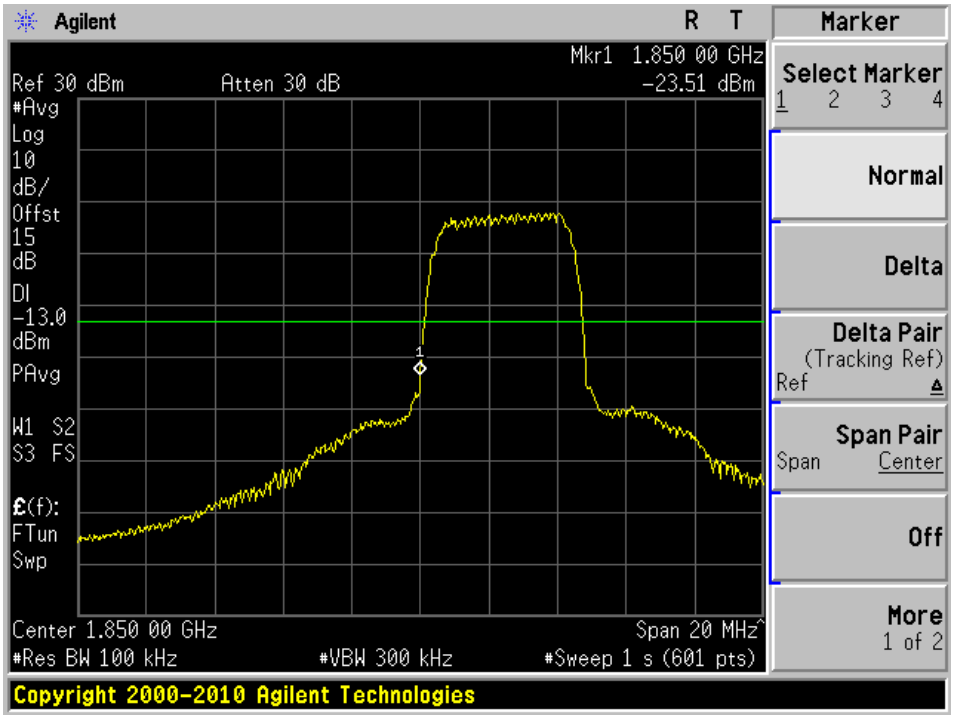
HSDPA 1900MHz Lowest Channel



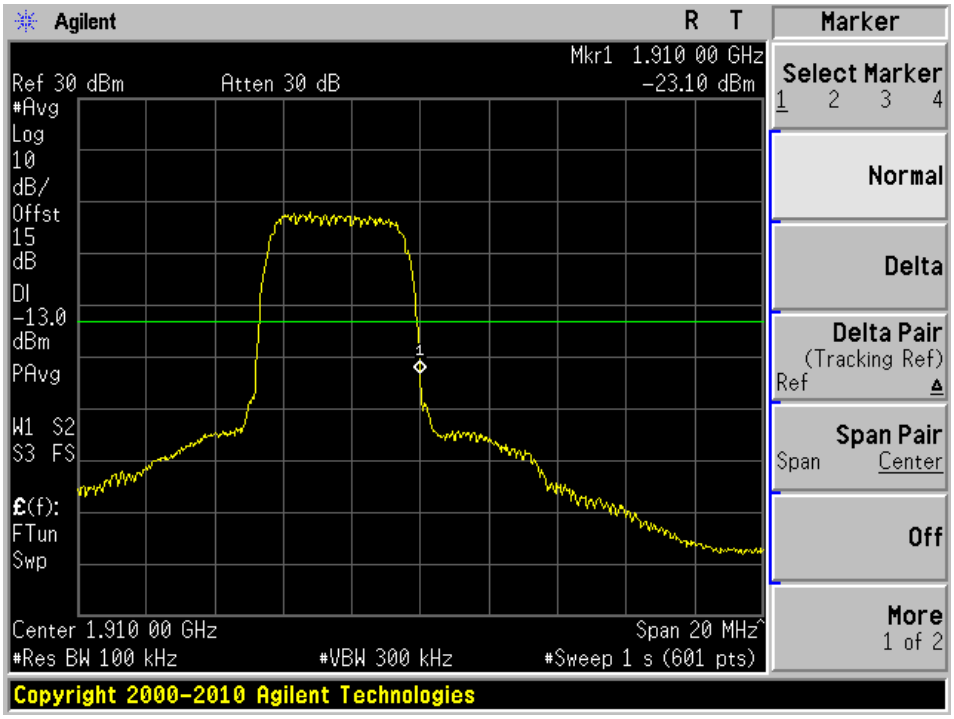
HSDPA 1900MHz Highest Channel



HSUPA 1900MHz Lowest Channel



HSUPA 1900MHz Highest Channel



10 FCC §2.1055, §22.355, §24.235 & IC RSS-132 §4.3, RSS-133 §6.3 - FREQUENCY STABILITY

10.1 Applicable Standard

Requirements: FCC §2.1055 (a), §2.1055 (d) & following:

According to FCC §22.355, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency Range (MHz)	Base, fixed (ppm)	Mobile ≤ 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929.	5.0	N/A	N/A
929 to 960.	1.5	N/A	N/A
2110 to 2220	10.0	N/A	N/A

According to FCC §24.235, the frequency stability shall be sufficient to ensure that the fundamental emissions stays within the authorized frequency block.

According to RSS-132 §4.3:
The carrier frequency shall not depart from the reference frequency in excess of ±2.5 ppm for mobile stations and ±1.5 ppm for base stations

According to RSS-133 §6.3:
The carrier frequency shall not depart from the reference frequency, in excess of ±2.5 ppm for mobile stations and ±1.0 ppm for base stations.

10.2 Test Procedure

Frequency Stability vs. Temperature: The equipment under test was connected to an external DC power supply and the RF output was connected to communication test set via feed-through attenuators. The EUT was placed inside the temperature chamber. The DC leads and RF output cable exited the chamber through an opening made for the purpose.

After the temperature stabilized for approximately 20 minutes, the frequency output was recorded from the communication test set.

Frequency Stability vs. Voltage: An external variable DC power supply was connected to the battery terminals of the equipment under test. The voltage was set to 115% of the nominal value and was then decreased until the transmitter light no longer illuminated; i.e., the battery end point. The output frequency was recorded for each battery voltage.

10.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Tenney	Temperature oven	Versa Tenn	12.431-8	2010-06-28 [1]
Agilent	Spectrum Analyzer	E4446A	US44300386	2011-05-10
Agilent	Analyzer, Communications	E5155C	GB44051221	2010-06-11 [1]

Note: [1]Base on two years calibration cycles.

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

10.4 Test Environmental Conditions

Temperature:	20 °C ~ 23 °C
Relative Humidity:	40 % ~ 45 %
ATM Pressure:	101kPa ~ 102kPa

Testing was performed by Lionel Lara from 2011-12-21 to 2011-12-26 at RF Site.

10.5 Test Results

Cellular Band:

GPRS:

Reference Frequency: 836.6 MHz, Limit: 2.5 ppm				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
Frequency Stability versus Temperature				
50	120	836.600025	0.0298829	2.5
40	120	836.600027	0.0322735	2.5
30	120	836.600039	0.0466173	2.5
20	120	836.600029	0.0346641	2.5
0	120	836.600038	0.0454219	2.5
-20	120	836.600008	0.0095625	2.5
-30	120	836.600029	0.0346641	2.5
Frequency Stability versus Voltage				
20	102	836.600031	0.0370547	2.5
20	138	836.600039	0.0466173	2.5

EDGE:

Reference Frequency: 836.6 MHz, Limit: 2.5 ppm				
Test Environment		**Frequency Measure with Time Elapsed**		
Temperature (°C)	**Power Supplied (Vdc)**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
Frequency Stability versus Temperature				
50	120	836.600050	0.0598829	2.5
40	120	836.600052	0.0622735	2.5
30	120	836.600064	0.0766173	2.5
20	120	836.600054	0.0646641	2.5
0	120	836.600063	0.0754219	2.5
-20	120	836.600033	0.0395625	2.5
-30	120	836.600054	0.0646641	2.5
Frequency Stability versus Voltage				
20	102	836.600056	0.0670547	2.5
20	138	836.600064	0.0766173	2.5

WCDMA:

Reference Frequency: 836.6 MHz, Limit: 2.5 ppm				
Test Environment		**Frequency Measure with Time Elapsed**		
Temperature (°C)	**Power Supplied (Vdc)**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
Frequency Stability versus Temperature				
50	120	836.600803	0.9598829	2.5
40	120	836.600805	0.9622735	2.5
30	120	836.600817	0.9766173	2.5
20	120	836.600807	0.9646642	2.5
0	120	836.600816	0.975422	2.5
-20	120	836.600786	0.9395626	2.5
-30	120	836.600807	0.9646642	2.5
Frequency Stability versus Voltage				
20	102	836.600809	0.9670548	2.5
20	138	836.600817	0.9766173	2.5

HSDPA:

Reference Frequency: 836.6 MHz, Limit: 2.5 ppm				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
Frequency Stability versus Temperature				
50	120	836.600552	0.6598826	2.5
40	120	836.600554	0.6622733	2.5
30	120	836.600566	0.676617	2.5
20	120	836.600556	0.6646639	2.5
0	120	836.600565	0.6754217	2.5
-20	120	836.600535	0.6395623	2.5
-30	120	836.600556	0.6646639	2.5
Frequency Stability versus Voltage				
20	102	836.600558	0.6670545	2.5
20	138	836.600566	0.676617	2.5

HSUPA:

Reference Frequency: 836.6 MHz, Limit: 2.5 ppm				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
Frequency Stability versus Temperature				
50	120	836.600217	0.2598822	2.5
40	120	836.600219	0.2622729	2.5
30	120	836.600231	0.2766166	2.5
20	120	836.600221	0.2646635	2.5
0	120	836.600230	0.2754213	2.5
-20	120	836.600200	0.2395619	2.5
-30	120	836.600221	0.2646635	2.5
Frequency Stability versus Voltage				
20	102	836.600223	0.2670541	2.5
20	138	836.600231	0.2766166	2.5

PCS Band:

GPRS:

Reference Frequency: 1880 MHz, Limit: 2.5 ppm				
Test Environment		**Frequency Measure with Time Elapsed**		
Temperature (°C)	**Power Supplied (Vdc)**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
Frequency Stability versus Temperature				
50	120	1880.000063	0.03351064	2.5
40	120	1880.000057	0.03031915	2.5
30	120	1880.000049	0.02606383	2.5
20	120	1880.000051	0.02712766	2.5
0	120	1880.000049	0.02606383	2.5
-20	120	1880.000056	0.02978723	2.5
-30	120	1880.000047	0.025	2.5
Frequency Stability versus Voltage				
20	102	1880.000038	0.02021277	2.5
20	138	1880.000027	0.0143617	2.5

EDGE:

Reference Frequency: 1880 MHz, Limit: 2.5 ppm				
Test Environment		**Frequency Measure with Time Elapsed**		
Temperature (°C)	**Power Supplied (Vdc)**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
Frequency Stability versus Temperature				
50	120	1880.000119	0.06351064	2.5
40	120	1880.000113	0.06031915	2.5
30	120	1880.000105	0.05606383	2.5
20	120	1880.000107	0.05712766	2.5
0	120	1880.000105	0.05606383	2.5
-20	120	1880.000112	0.05978724	2.5
-30	120	1880.000103	0.055	2.5
Frequency Stability versus Voltage				
20	102	1880.000094	0.05021277	2.5
20	138	1880.000083	0.0443617	2.5

WCDMA:

Reference Frequency: 1880 MHz, Limit: 2.5 ppm				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
Frequency Stability versus Temperature				
50	120	1880.001811	0.9635107	2.5
40	120	1880.001805	0.9603192	2.5
30	120	1880.001797	0.95606388	2.5
20	120	1880.001799	0.95712771	2.5
0	120	1880.001797	0.95606388	2.5
-20	120	1880.001804	0.95978729	2.5
-30	120	1880.001795	0.95500005	2.5
Frequency Stability versus Voltage				
20	102	1880.001786	0.95021281	2.5
20	138	1880.001775	0.94436174	2.5

HSDPA:

Reference Frequency: 1880 MHz, Limit: 2.5 ppm				
Test Environment		Frequency Measure with Time Elapsed		
Temperature (°C)	Power Supplied (Vdc)	Measured Frequency (MHz)	Frequency Error (ppm)	Limit (ppm)
Frequency Stability versus Temperature				
50	120	1880.001247	0.6635104	2.5
40	120	1880.001241	0.6603189	2.5
30	120	1880.001233	0.6560636	2.5
20	120	1880.001235	0.6571274	2.5
0	120	1880.001233	0.6560636	2.5
-20	120	1880.001240	0.659787	2.5
-30	120	1880.001231	0.6549998	2.5
Frequency Stability versus Voltage				
20	102	1880.001222	0.6502125	2.5
20	138	1880.001211	0.6443615	2.5

HSUPA:

Reference Frequency: 1880 MHz, Limit: 2.5 ppm				
Test Environment		**Frequency Measure with Time Elapsed**		
Temperature (°C)	**Power Supplied (Vdc)**	**Measured Frequency (MHz)**	**Frequency Error (ppm)**	**Limit (ppm)**
Frequency Stability versus Temperature				
50	120	1880.000495	0.26351	2.5
40	120	1880.000489	0.2603185	2.5
30	120	1880.000481	0.2560632	2.5
20	120	1880.000483	0.257127	2.5
0	120	1880.000481	0.2560632	2.5
-20	120	1880.000488	0.2597866	2.5
-30	120	1880.000479	0.2549994	2.5
Frequency Stability versus Voltage				
20	102	1880.000470	0.2502121	2.5
20	138	1880.000459	0.2443611	2.5

11 IC RSS-Gen §6, RSS-132 §4.6 & RSS-133 §6.6 - RECEIVER RADIATED SPURIOUS EMISSIONS

11.1 Applicable Standards

IC RSS-Gen §6, RSS-132 §4.6 and RSS-133 §6.6

11.2 EUT Setup

The radiated emissions tests were performed in the 3 meter chamber, using the setup in accordance with ANSI C63.4-2003.

11.3 Test Procedure

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations.

All data were recorded in the peak detection mode. Quasi-peak readings was performed only when an emissions was found to be marginal (within -4 dB of specification limits), and are distinguished with a "**QP**" in the data table.

11.4 Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain from the Amplitude reading. The basic equation is as follows:

Corrected Amplitude = Indicated Reading + Antenna Factor + Cable Factor - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7 dB means the emission is 7 dB below the maximum limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

11.5 Test Equipment List and Details

Manufacturer	Description	Model No.	Serial No.	Calibration Date
A.H Systems	Antenna, Horn	SAS-200/571	261	2010-12-21
Agilent	Analyzer Communications	E5155C	GB44051221	2010-06-11 1
Hewlett Packard	Pre-amplifier	8447D	2944A06639	2011-06-09
Sunol Science Corp	Combination Antenna	JB3	A020106-2	2011-08-10
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2011-03-21
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Agilent	Spectrum Analyzer	E4440A	MY44303352	2011-05-10
HP	Pre-amplifier	8449B	3147A00400	2011-02-03

Note: [1]Base on two years calibration cycles.

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

11.6 Test Environmental Conditions

Temperature:	20 °C ~ 23 °C
Relative Humidity:	40 % ~ 45 %
ATM Pressure:	101kPa ~ 102kPa

Testing was performed by Lionel Lara from 2011-12-21 to 2011-12-26 in 5 meter chamber #2.

11.7 Summary of Test Results

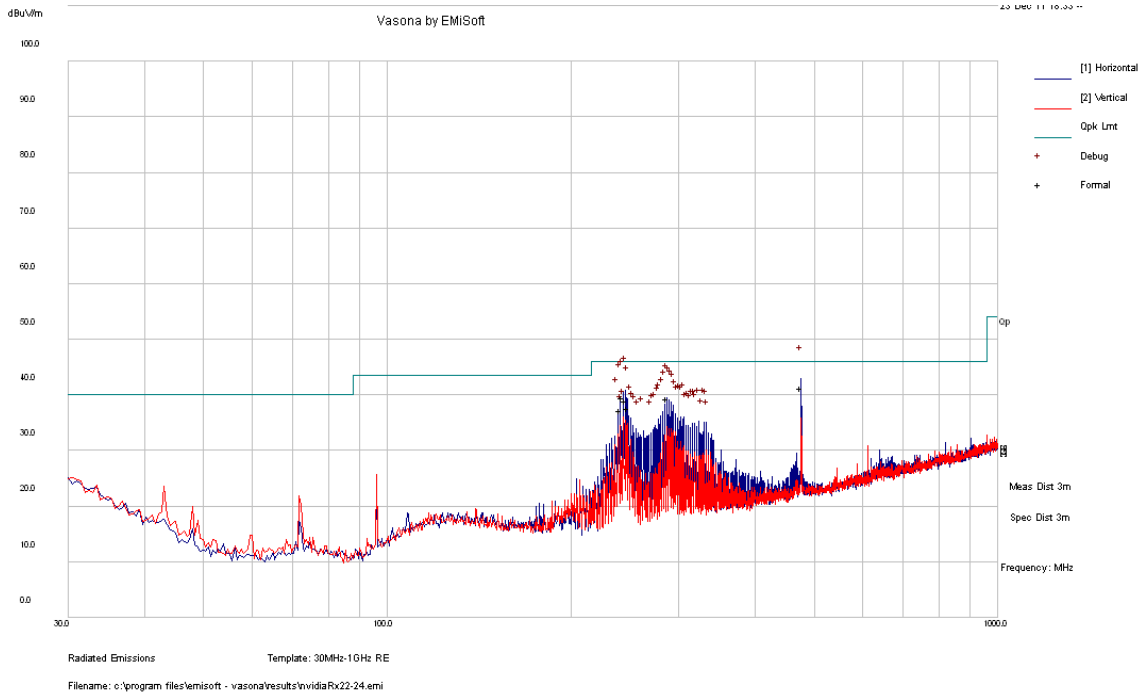
According to the test data,, the EUT complied with IC RSS-Gen, with the closest margins from the limit listed below:

Mode: Receiving			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Mode Range (MHz)**
-4.79	475.9633	Horizontal	30 MHz to 1000 MHz
-19.33	1427	Vertical	1 – 25 GHz

Please refer to the following table and plots for specific test result details

11.8 Test Results

1) 30 MHz -1 GHz, measured at 3 meters



Frequency (MHz)	Corrected Amplitude (dB)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Azimuth (degrees)	Limit (dBµV/m)	Margin (dB)
475.9633	41.21	150	H	208	46	-4.79
245.484	38.94	110	H	308	46	-7.06
243.019	39.53	133	H	124	46	-6.47
240.6298	37.36	99	H	123	46	-8.64
287.063	39.45	99	H	116	46	-6.55
247.858	37.72	157	H	131	46	-8.28

2) 1 – 25 GHz, measured at 3 meters

Frequency (MHz)	S.A. Reading (dBµV)	Turntable Azimuth (degrees)	Test Antenna			Cable Loss (dB)	Pre-Amp. (dB)	Cord. Reading (dBµV/m)	FCC & IC		Comments
			Height (cm)	Polarity (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	
1427	46.05	153	142	V	25.15	2.35	27.4	46.15	74	-27.85	Peak
1427	34.57	153	142	V	25.15	2.35	27.4	34.67	54	-19.33	Ave

12 FCC §2.1091 & IC RSS-102 - RF EXPOSURE INFORMATION

12.1 Applicable Standards

According to FCC §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minutes)
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

f = frequency in MHz
* = Plane-wave equivalent power density

Before equipment certification is granted, the procedure of IC RSS-102 must be followed concerning the exposure of humans to RF fields.

According to IC RSS-102 Issue 2 section 4.1, RF limits used for general public will be applied to the EUT.

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m^2)	Time Averaging (min)
0.003 - 1	280	2.19	-	6
1 - 10	280 / f	2.19 / f	-	6
10 - 30	28	2.19 / f	-	6
30 – 300	28	0.073	2*	6
300 – 1 500	$1.585\ f^{0.5}$	$0.0042\ f^{0.5}$	f / 150	6
1 500 – 15 000	61.4	0.163	10	6
15 000 – 150 000	61.4	0.163	10	$616000 / f^{1.2}$
150 000- 300 000	$0.158\ f^{0.5}$	$4.21 \times 10^{-4}\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000 / f^{1.2}$

Note: *f* is frequency in MHz
* Power density limit is applicable at frequencies greater than 100 MHz

12.2 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

12.3 MPE Results

For Cellular Band:

Maximum peak output power at antenna input terminal (dBm):	30.31
Maximum peak output power at antenna input terminal (mW):	1073.99
Duty Cycle:	25%
Prediction distance (cm):	20
Prediction frequency (MHz):	836.6
Maximum Antenna Gain, typical (dBi):	4.8
Maximum Antenna Gain (numeric):	3.02
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.161
Power density of prediction frequency at 20.0 cm (W/m^2):	1.61
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	0.5577
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	5.577

For PCS Band:

Maximum peak output power at antenna input terminal (dBm):	26.82
Maximum peak output power at antenna input terminal (mW):	480.84
Duty Cycle:	25%
Prediction distance (cm):	20
Prediction frequency (MHz):	1880
Maximum Antenna Gain, typical (dBi):	3.32
Maximum Antenna Gain (numeric):	2.15
Power density of prediction frequency at 20.0 cm (mW/cm^2):	0.051
Power density of prediction frequency at 20.0 cm (W/m^2):	0.51
MPE limit for uncontrolled exposure at prediction frequency (mW/cm^2):	1.0
MPE limit for uncontrolled exposure at prediction frequency (W/m^2):	10

The device is compliant with the requirement MPE limit for uncontrolled exposure.