Lab Code: 200167-0

FCC PART 27

IC RSS-131, ISSUE 2, JULY 2003

TEST AND MEASUREMENT REPORT

For

Cellphone-Mate, Inc.

48820 Kato Road, Suite 300B,

Fremont, CA 94539, USA

FCC ID: RSNAWS-75UNDER
IC: 7784A-AWS75

Report Type: Original Report	**Product Type:** AWS Bi-Directional Amplifier

Test Engineer:	Quinn Jiang
Report Number:	R1102234-27
Report Date:	2011-03-18
Reviewed By:	Victor Zhang RF Lead Engineer
Prepared By: **(84)**	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Avenue, Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R1102234-27	Original Report	2011-03-18

1 General Information

1.1 Product Description for Equipment under Test (EUT)

The *Cellphone-Mate Inc*. product, *CM2100 62dB*, *FCC ID: RSNAWSL-75UNDER* and *IC: 7784A-AWS75* or the "EUT" as referred to in this report, is a Universal in-Building Amplifier with N type female antenna connectors that operates in the AWS bands.

General Specifications:

• Operating Frequency: Downlink*:* 2110-2155 MHz
Uplink*:* 1710-1755 MHz
• Emission Designator: F9W
• Modulation: WCDMA, HSPA
• Power Source: Input: 120V/60Hz; Output: DC 6V

1.2 Mechanical Description

The EUT dimension is approximately 143mm (L) x 120 mm (W) x 30 mm (H) and weighs approximately 680g.

The test data gathered are from typical production sample, serial number: 002-000-0237A, *provided by the Manufacture.*

1.3 Objective

This type approval report is prepared on behalf of *Cellphone-Mate Inc*. in accordance with Part 2, Subpart J, Part 27, Subpart E, of the Federal Communication Commissions rules and RSS-131 of the Canadian Department of Industry Rules.

The objective is to determine compliance with

FCC rules:

- RF output power
- Modulation Characteristic
- Occupied bandwidth
- Spurious Emission at Antenna Terminals
- Transmitter Radiated Spurious Emissions
- frequency stability
- Band edges
- RF Exposure

RSS-131 Issue 2 rules:

- Amplifier Gain and Bandwidth
- Mean Output Power
- Non-Linearity
- Spurious Emission at Antenna Terminals
- Transmitter Radiated Spurious Emissions
- RF Exposure

1.4 Related Submittal(s)/Grant(s)

No Related Submittals

1.5 Test Methodology

All tests and measurements indicated in this document were performed in accordance with the FCC Part 2, Sub-part J as well as Part 27 - Miscellaneous Wireless Communications Services and IC RSS-131, issue 2, July 2003.

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 +2.0 dB for Conducted Emissions tests and +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: R-2463 and C-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 EIA/TIA-603-C.

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

2.2 EUT Exercise Software

Signal was sent through EUT using a signal generator; device was set to normal operating mode.

2.3 Equipment Modifications

No modifications were made to the EUT.

2.4 Local Support Equipment and Software List and Details

Manufacturer	Description	Model	Serial Number
Rohde & Schwarz	Signal Generator	SMIQ03	849192/0085
HP	Signal Generator	8648C	3426A00417

2.5 Interface Ports and Cables

Cable Description	Length (m)	To	From
RF Cable	< 1	Signal Generator	EUT
RF Cable	< 1	Spectrum Analyzer	EUT

2.6 Internal Configurations of EUT

Manufacturer	Description	Model	Serial Number
Cellphone-Mate, Inc.	PCB Assembly	CM2100 V1.0	002-000-0237A

3 Summary of Test Results

FCC & IC Rules	Description of Tests	Results
FCC §2.1046, §27.50 (i) IC RSS-131 §6.2	RF Output Power	Compliant
IC RSS-131 §6.1	Amplifier Gain and Bandwidth	Compliant
IC RSS-131 §6.3	Non-Linearity	Compliant
FCC §2.1047	Modulation Characteristics	N/A
FCC §2.1049, §27.53 (c)	Occupied Bandwidth	Compliant
FCC §2.1053, §27.53 (c) IC RSS-131 §6.4	Radiated Spurious Emissions	Compliant
FCC §2.1051, §27.53 (c) IC RSS-131 §6.4	Spurious Emissions at Antenna Terminals	Compliant
FCC §27.53 (c) IC RSS-131 §6.4	Band Edge	Compliant
FCC §27.54 IC RSS-131 §6.5	Frequency Stability	N/A
FCC §27.52, §2.1091 IC RSS-102	RF Exposure Information	Compliant

N/A: Not applicable

4 FCC §2.1046, §27.50 & IC RSS-131 §6.2 – RF Output Power

4.1 Applicable Standard

According to FCC §27.50, the maximum effective radiated power (ERP) of fixed and base station must not exceed 1000 Watts.

According to IC RSS-131 §3.2 (d), and §6.2. The manufacturer's output power rating Prated MUST NOT be greater than Pmean for all types of enhancers.

4.2 Test Procedure

Conducted:

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

4.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

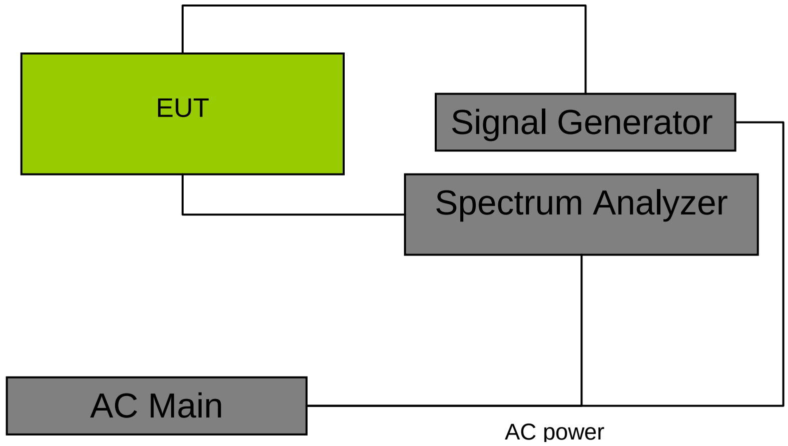
The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

4.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

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

4.5 Test Setup Block Diagram



4.6 Test Results

Modulation: WCDMA

Band	Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
2110-2155 MHz Downlink	Low	2112.4	8.83	7.638
	Middle	2132.4	9.99	9.977
	High	2152.6	9.19	8.295
1710-1755 MHz Uplink	Low	1712.4	19.61	91.41
	Middle	1732.4	24.33	271.02
	High	1752.6	21.26	133.65

Modulation: HSDPA

Band	Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
2110-2155 MHz Downlink	Low	2112.4	8.46	7.01
	Middle	2132.4	9.51	8.93
	High	2152.6	8.79	7.56
1710-1755 MHz Uplink	Low	1712.4	19.16	82.41
	Middle	1732.4	23.12	205.11
	High	1752.6	20.05	101.15

Modulation: HSUPA

Band	Channel	Frequency (MHz)	Output Power (dBm)	Output Power (mW)
2110-2155 MHz Downlink	Low	2112.4	8.37	6.87
	Middle	2132.4	9.48	8.87
	High	2152.6	8.72	7.45
1710-1755 MHz Uplink	Low	1712.4	19.16	82.41
	Middle	1732.4	23.1	204.17
	High	1752.6	20	100.00

5 IC RSS – 131 §3.2(d) & §6.1 – Amplifier Gain and Bandwidth

5.1 Applicable Standards

According to IC RSS-131 §3.2 (d), and §6.1.

The passband gain shall not exceed the nominal gain by more than 1.0 dB. The 20 dB bandwidth shall not exceed the nominal bandwidth that is stated by the manufacturer. Outside of the 20 dB bandwidth, the gain shall not exceed the gain at the 20 dB point.

5.2 Test Procedure

Adjust the internal gain control of the equipment under test to the nominal gain for which equipment certification is sought. With the aid of a signal generator and spectrum analyzer, measure the 20 dB bandwidth of the amplifier (i.e. at the point where the gain has fallen by 20 dB). Measure the gain-versus-frequency response of the amplifier from the mid band frequency f0 of the passband up to at least f0 + 250% of the 20 dB bandwidth.

5.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

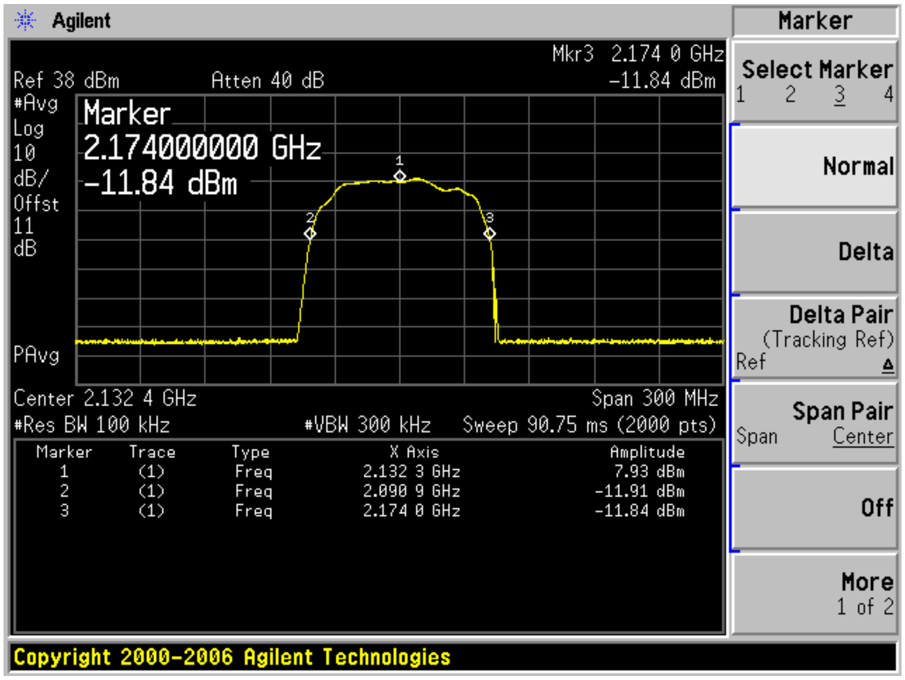
5.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

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

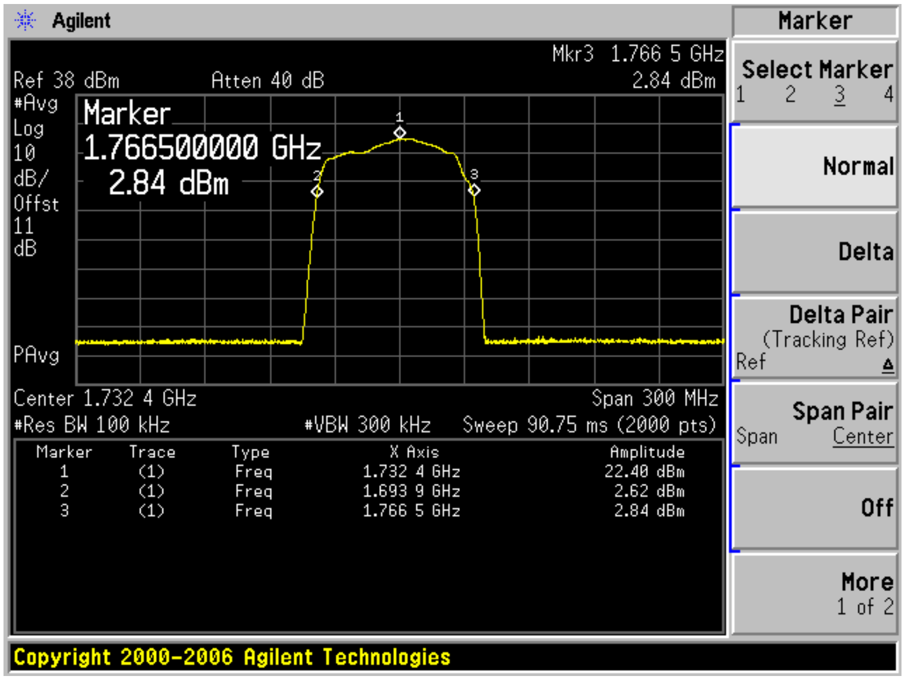
5.5 Test Results

Downlink



Note: The 20 dB Bandwidth is 2174.0 MHz – 2090.9 MHz = 83.1 MHz

Uplink



Note: The 20 dB Bandwidth is 1766.5 MHz – 1693.9 MHz = 72.6 MHz

6 IC RSS-131 §6.3 – Non-Linearity

Applicable Standard

As per RSS-131 §6.3.1:

For a multi-channel enhancer, any intermodulation product level must be attenuated, relative to P, by at least:

43 + 10 Log10P, or 70 dB, whichever is less stringent,

where P is the total RF output power of the test tones in watts.

6.1 Test Procedure

The RF output of the transmitter was connected to the input of the network analyzer through sufficient attenuation. Set the resolution bandwidth of the spectrum analyzer from 1% to 3% of the 99% emission bandwidth and set the video bandwidth to 3 times the resolution bandwidth. Record both the amplifier input and output signals.

6.2 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

6.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

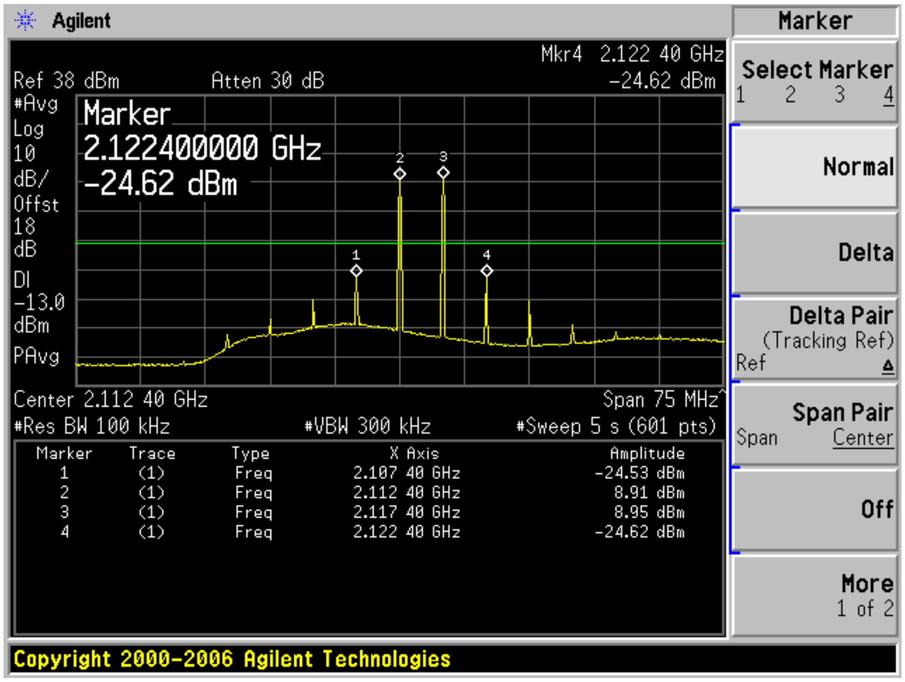
Statement of Traceability: BACL Corp. attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

6.4 Test Results

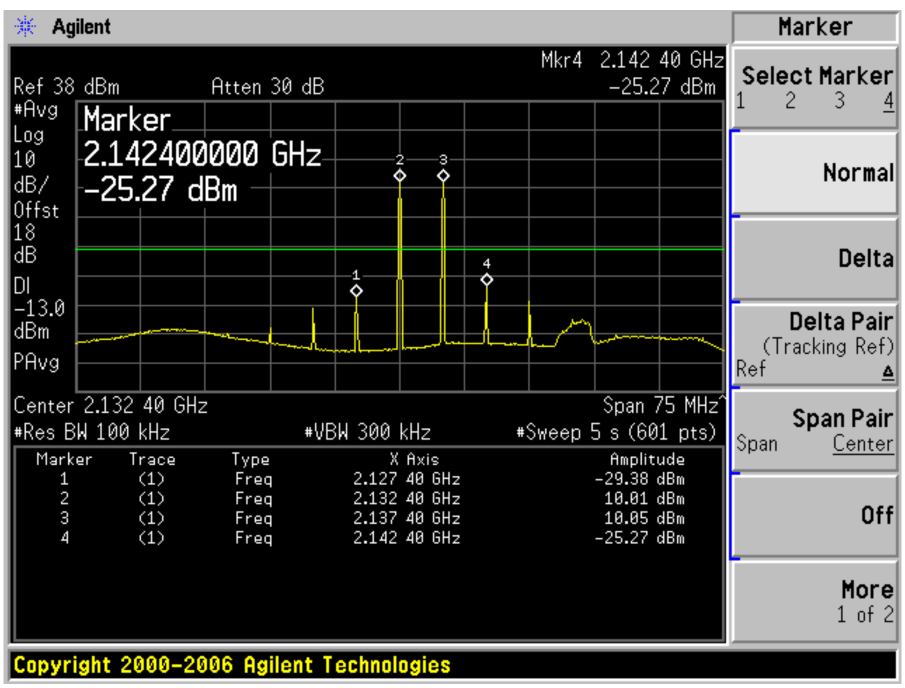
Please refer to the plots hereinafter.

2110-2155 MHz Downlink

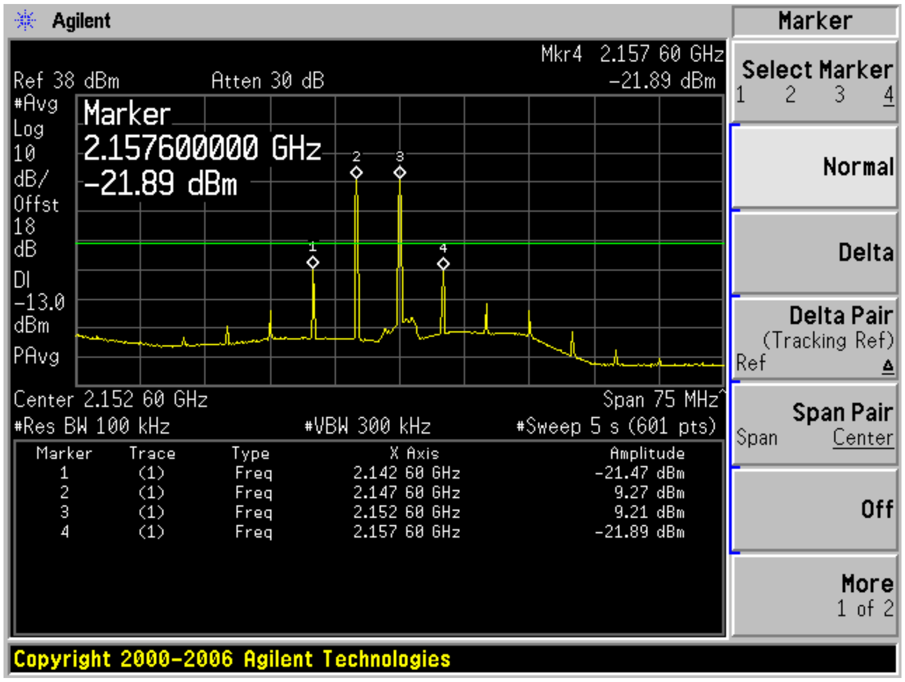
WCDMA/HSPA AWS Band Downlink, Low Channel: 2112.4 MHz



WCDMA/HSPA AWS Band Downlink, Middle Channel: 2132.4 MHz

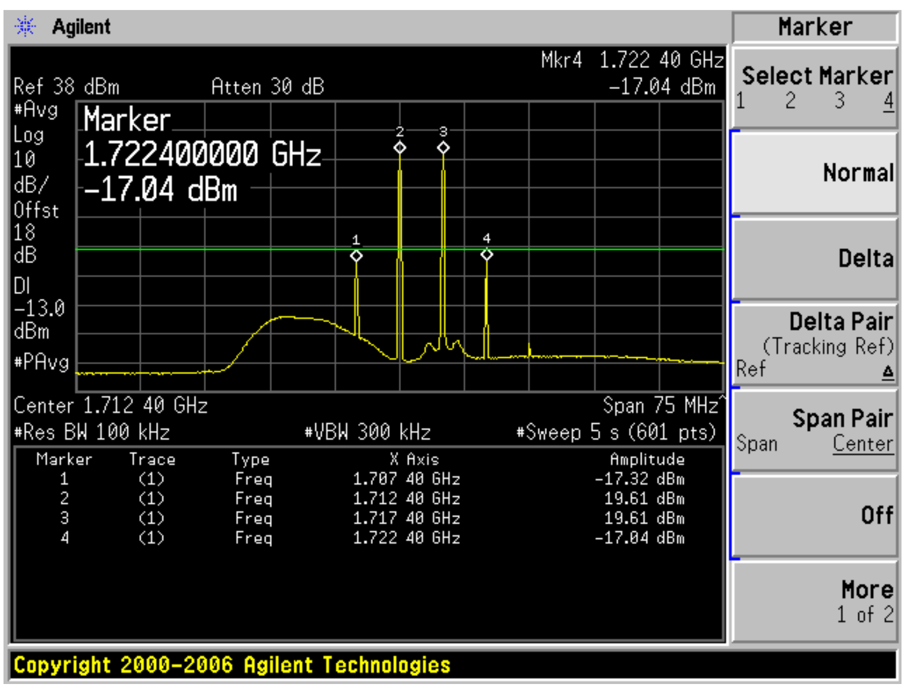


WCDMA/HSPA AWS Band Downlink, High Channel: 2152.6 MHz

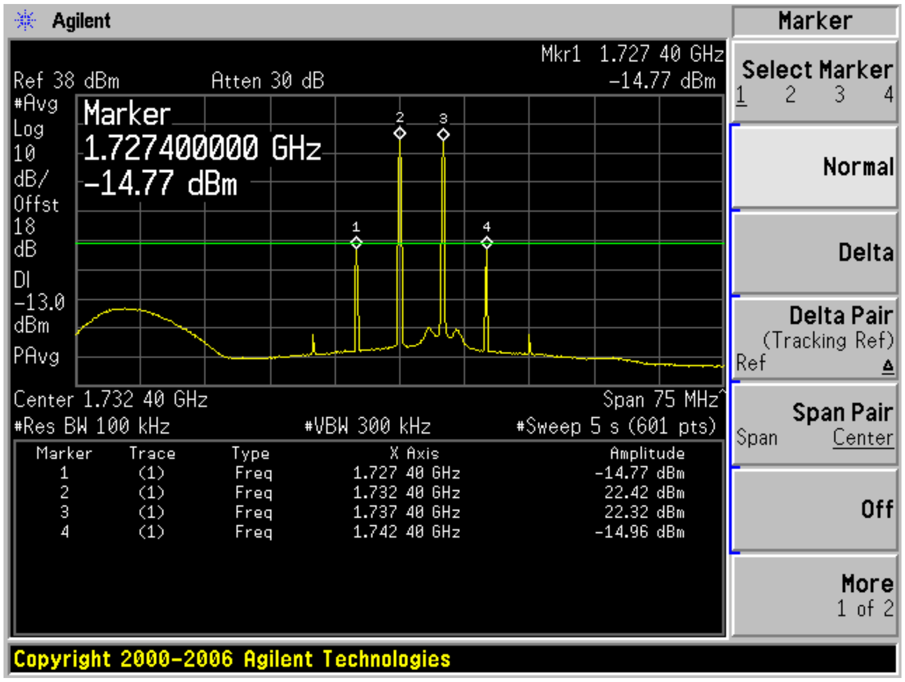


1710-1755 MHz Uplink

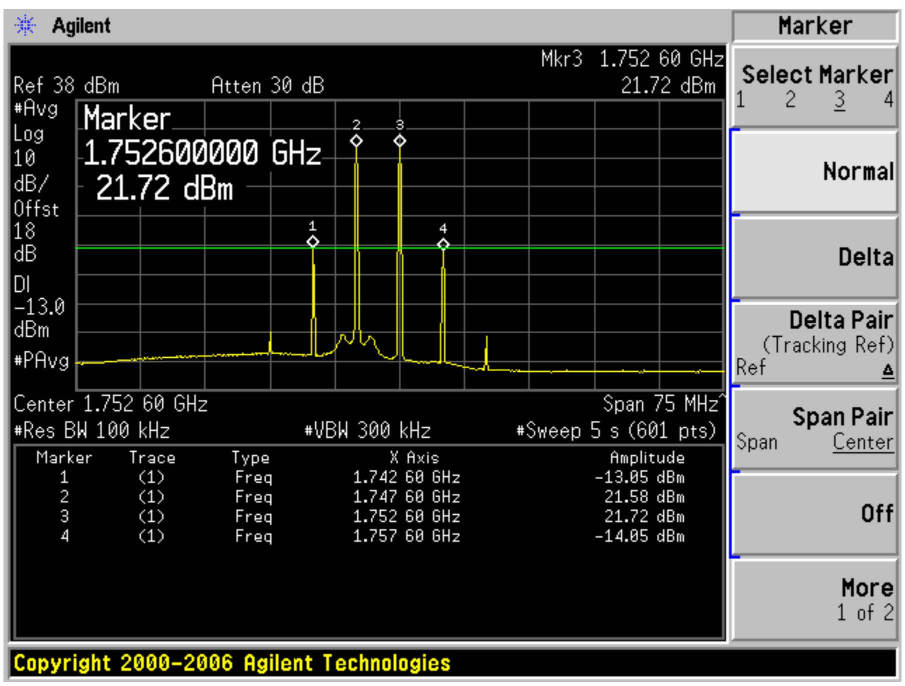
WCDMA/HSPA AWS Band Uplink, Low Channel: 1712.4 MHz



WCDMA/HSPA AWS Band Uplink, Middle Channel: 1732.4 MHz



WCDMA/HSPA AWS Band Uplink, High Channel: 1752.6 MHz



7 FCC §2.1047 - Modulation Characteristic

7.1 Applicable Standard

According to FCC § 2.1047(d) and Part 27, there is no specific requirement for digital modulation, therefore modulation characteristic is not presented.

7.2 Test Result

N/A

8 FCC §2.1049 & §27.53 – Occupied Bandwidth

8.1 Applicable Standard

Requirements: FCC §2.1049 and §27.53.

8.2 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 100 kHz and the 26 dB & 99% bandwidth was recorded.

8.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

8.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

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

8.5 Test Results

Modulation- WCDMA					
Band	Modulation	Channel	Frequency (MHz)	99% Emission Bandwidth	
				Input (MHz)	Output (MHz)
2110-2155 MHz	Downlink	Low	2112.4	4.956	4.977
		Middle	2132.4	4.951	5.134
		High	2152.6	4.943	5.084
1710-1755 MHz	Uplink	Low	1712.4	4.932	5.028
		Middle	1732.4	4.937	5.182
		High	1752.6	4.945	5.018

Modulation- HSDPA					
Band	Modulation	Channel	Frequency (MHz)	99% Emission Bandwidth	
				Input (MHz)	Output (MHz)
2110-2155 MHz	Downlink	Low	2112.4	4.968	5.01
		Middle	2132.4	4.961	5.05
		High	2152.6	4.949	5.049
1710-1755 MHz	Uplink	Low	1712.4	4..972	5.050
		Middle	1732.4	4.977	5.099
		High	1752.6	4.972	5.022

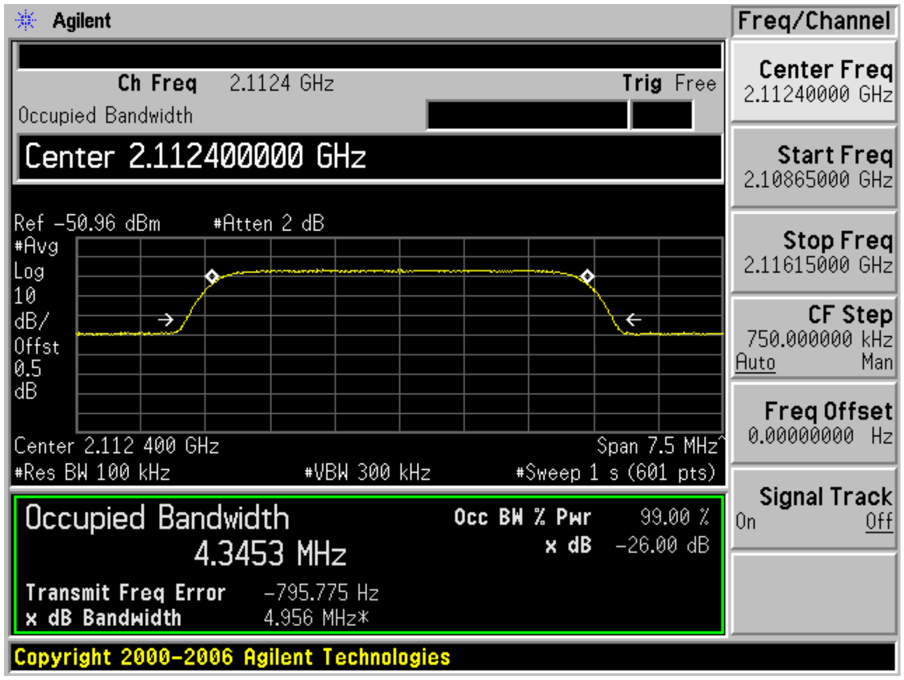
Modulation- HSUPA					
Band	Modulation	Channel	Frequency (MHz)	99% Emission Bandwidth	
				Input (MHz)	Output (MHz)
2110-2155 MHz	Downlink	Low	2112.4	4.968	5.01
		Middle	2132.4	4.961	5.05
		High	2152.6	4.949	5.049
1710-1755 MHz	Uplink	Low	1712.4	4..972	5.050
		Middle	1732.4	4.977	5.099
		High	1752.6	4.972	5.022

Please refer to the following plots for details.

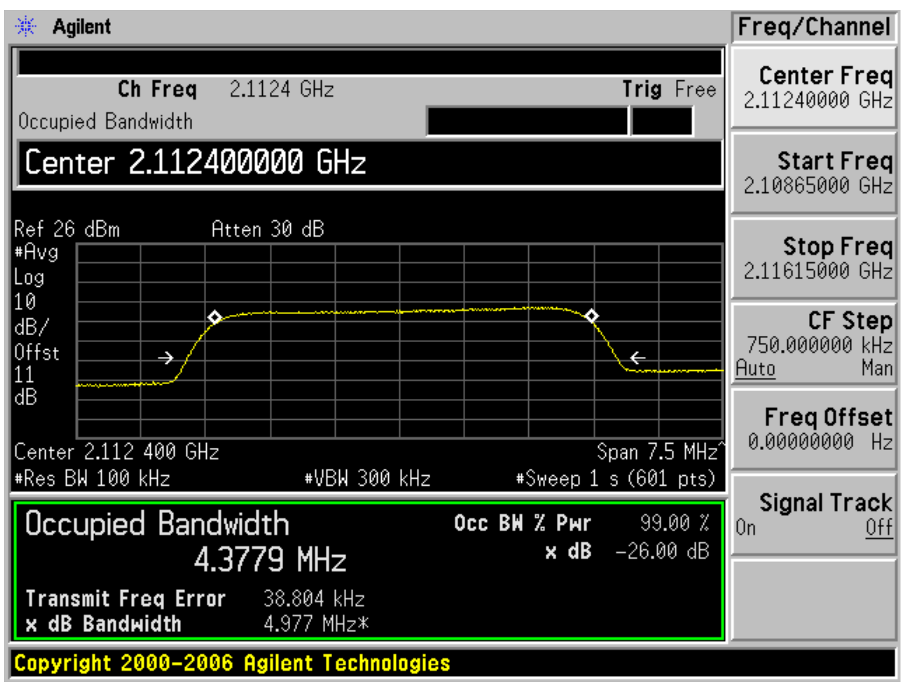
2110-2155 MHz Band, Downlink:

Modulation: WCDMA, Low Channel - 2112.4MHz

Input

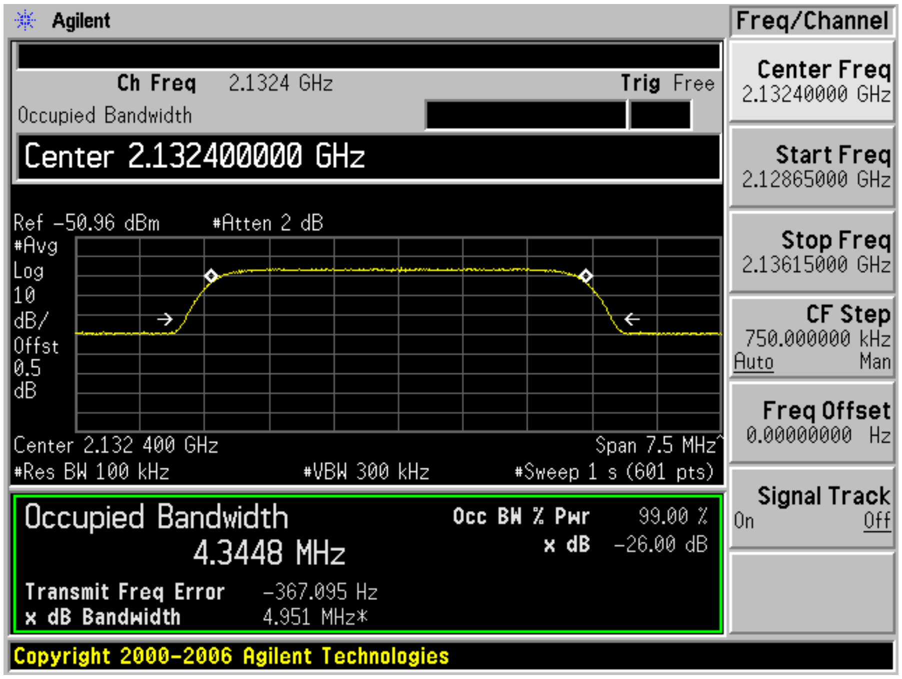


Output

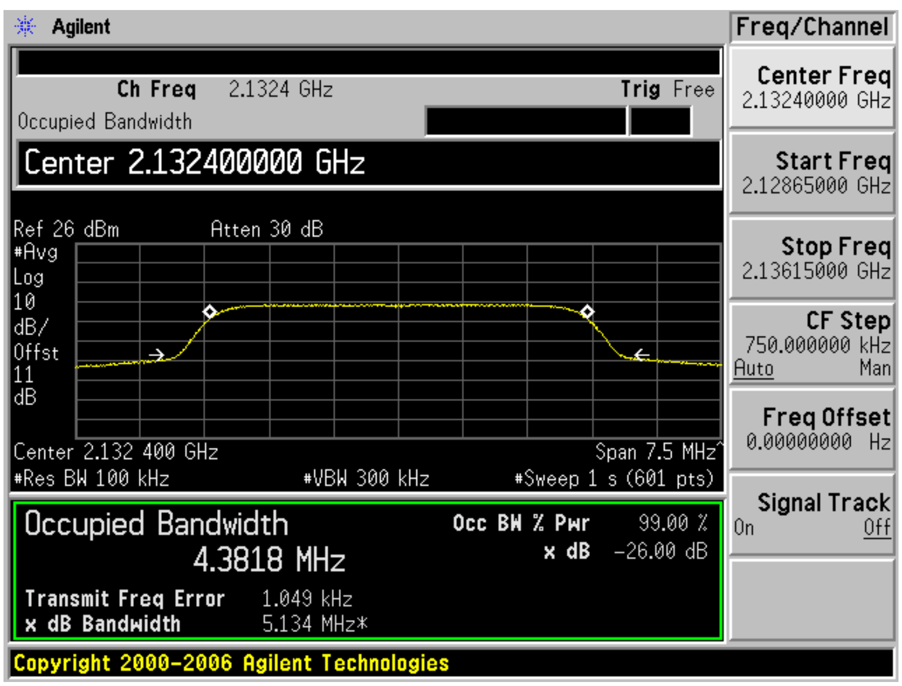


Modulation: WCDMA, Middle Channel - 2132.4MHz

Input

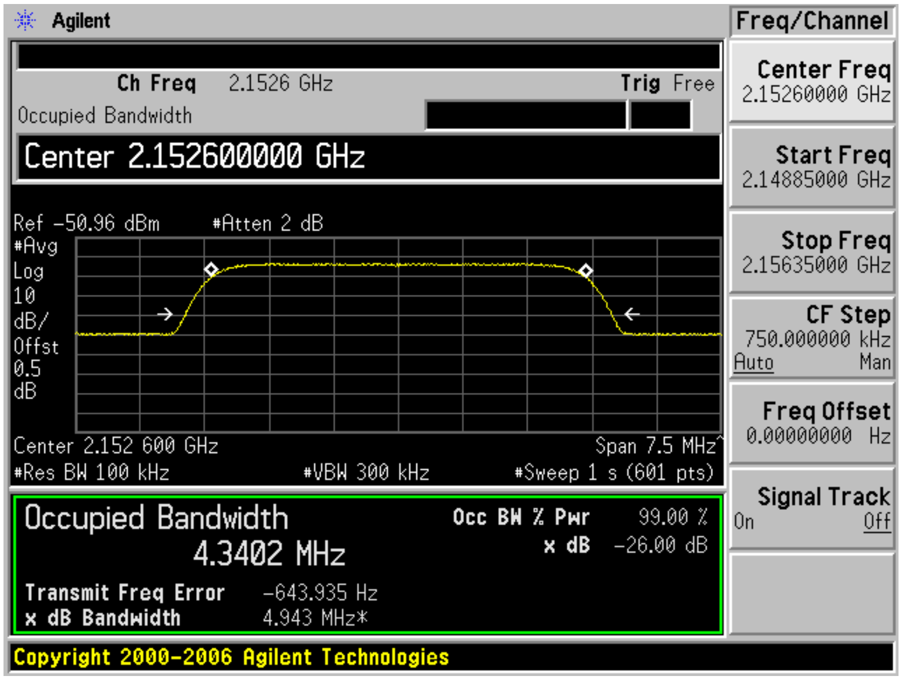


Output

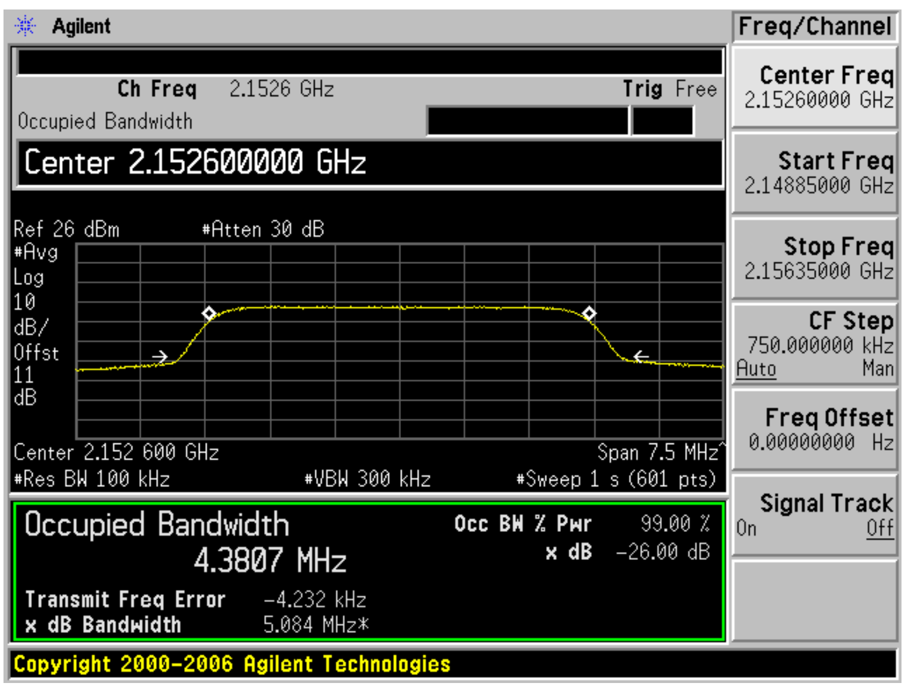


Modulation: WCDMA, High Channel - 2152.6MHz

Input



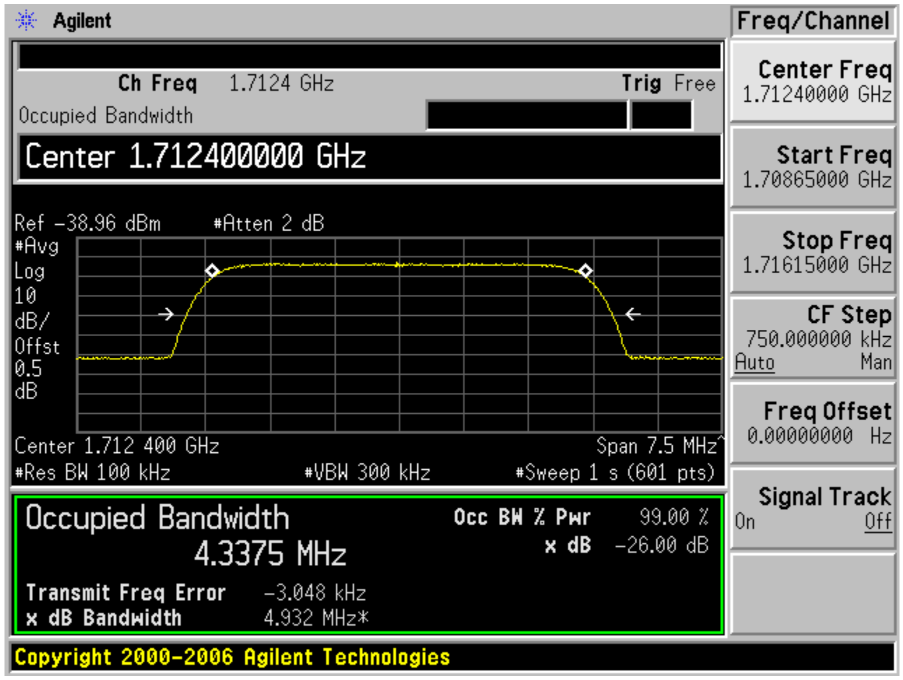
Output



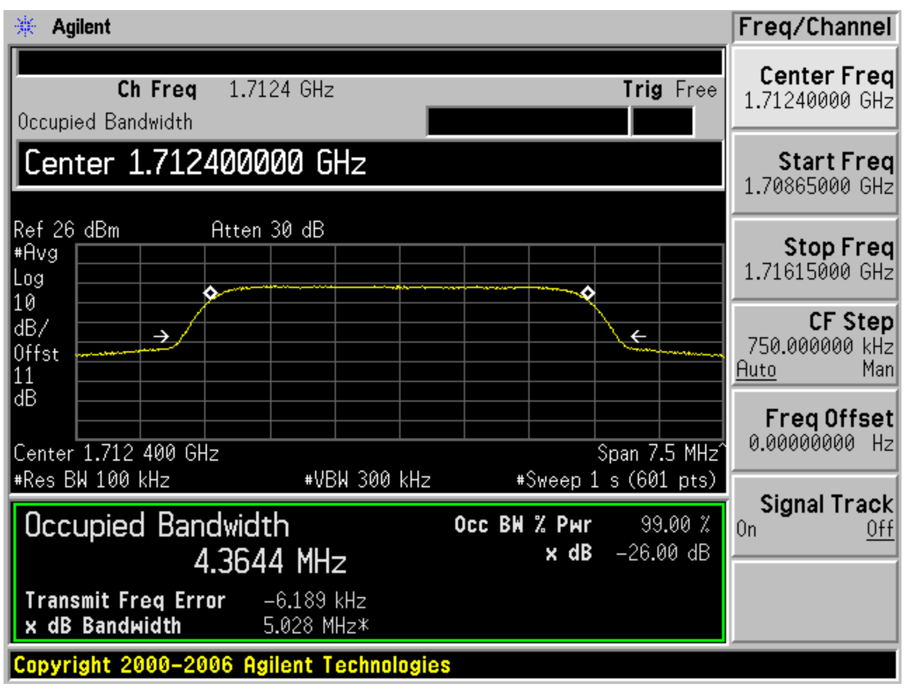
1710-1755 MHz Band, Uplink:

Modulation: WCDMA, Low Channel - 1712.4MHz

Input

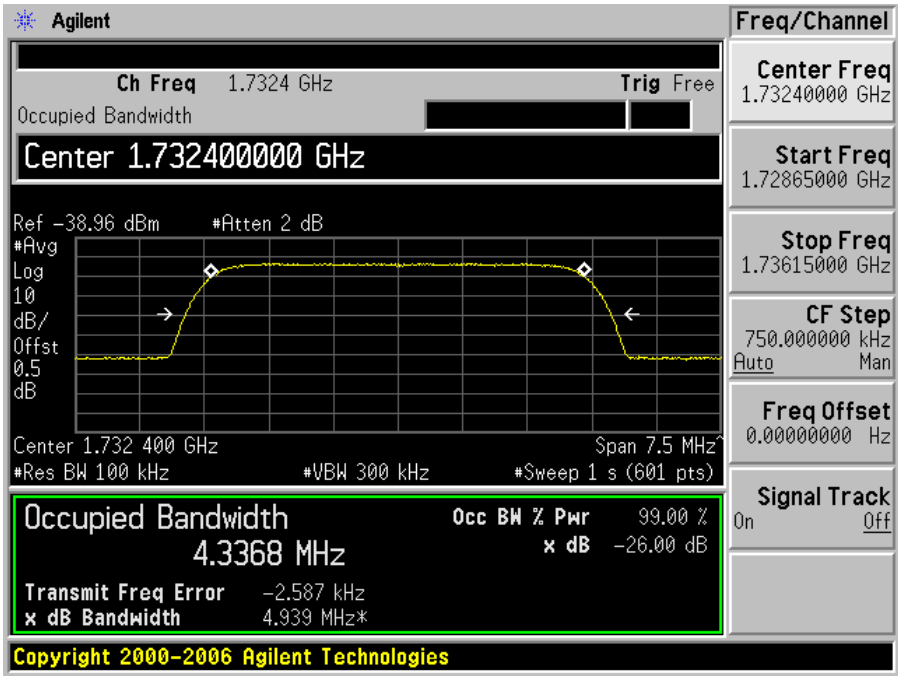


Output

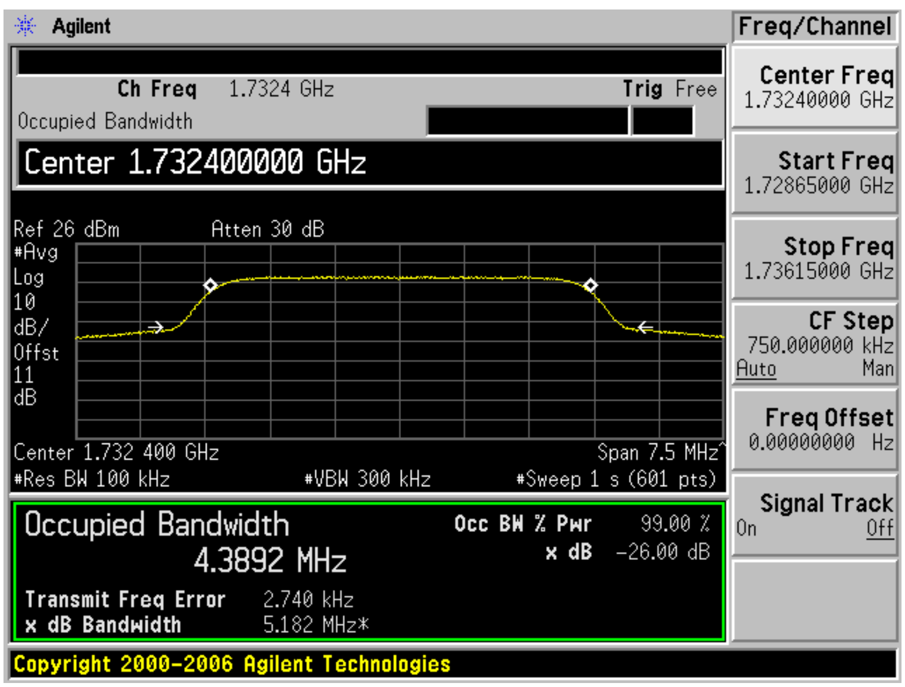


Modulation: WCDMA, Middle Channel - 1732.4MHz

Input

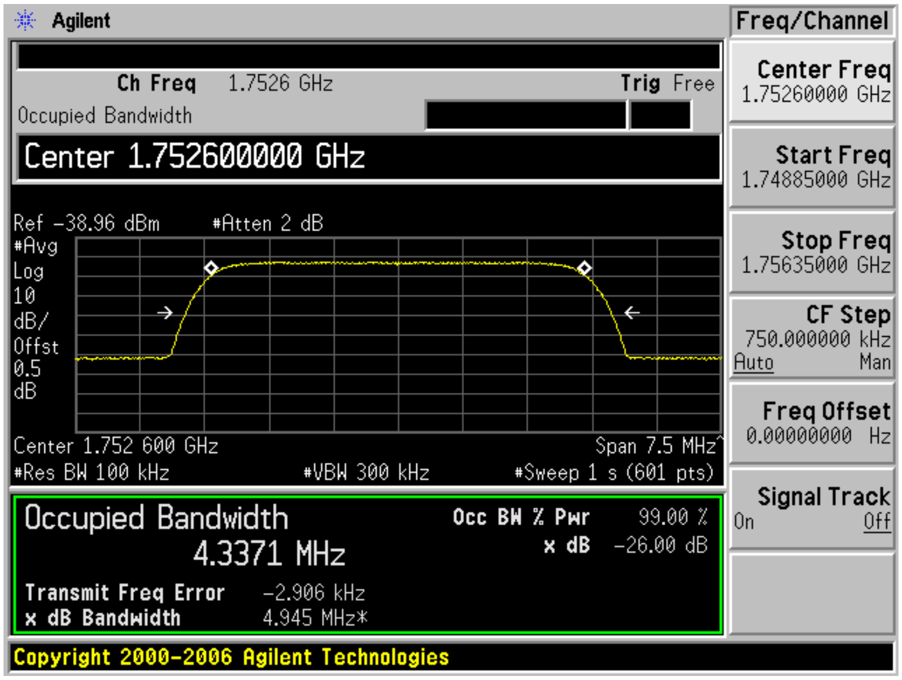


Output

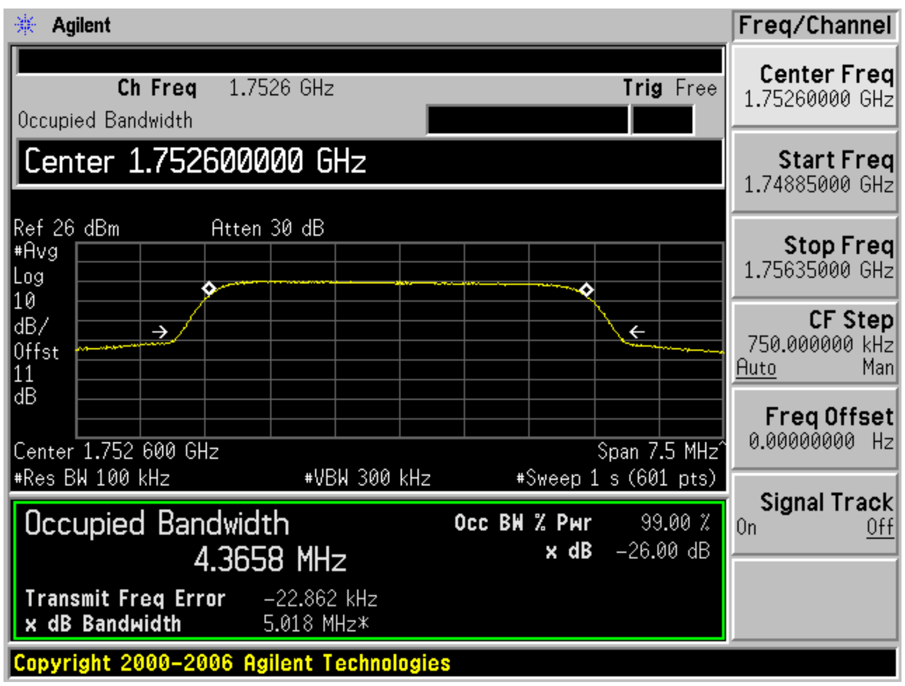


Modulation: WCDMA, High Channel - 1752.6MHz

Input



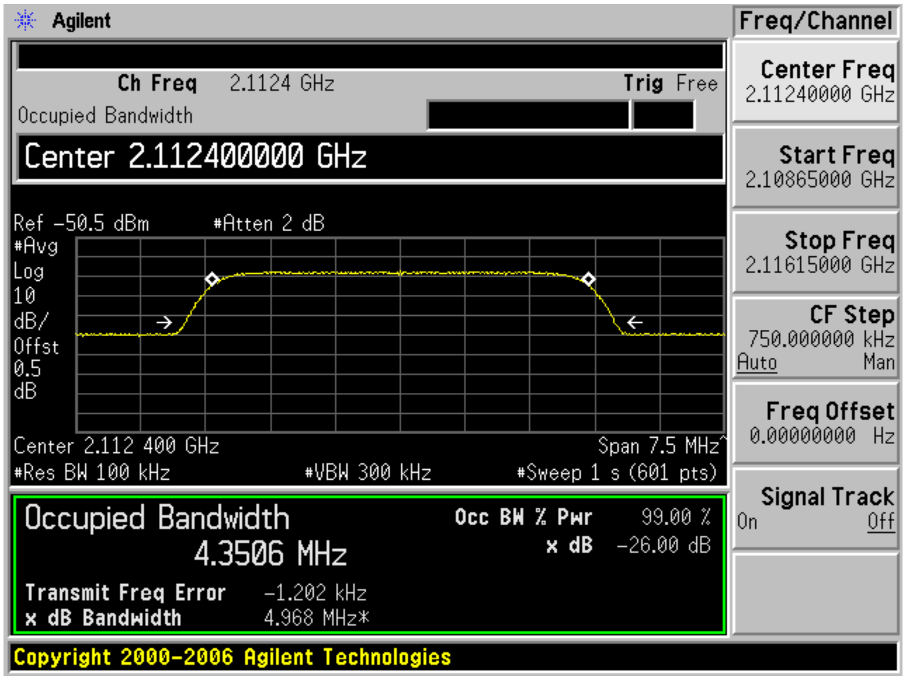
Output



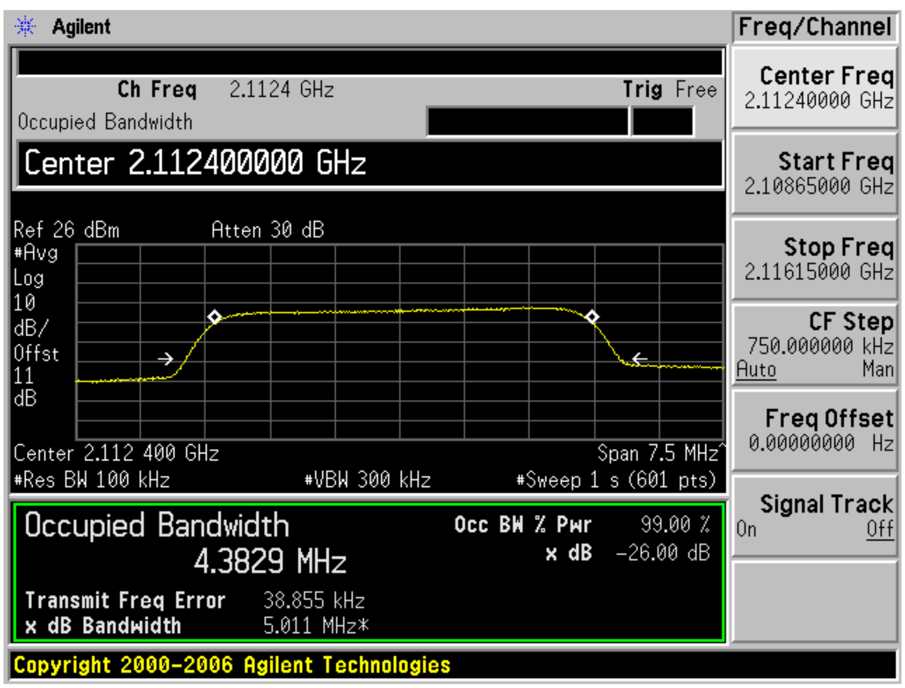
2110-2155 MHz Band, Downlink:

Modulation: HSDPA, Low Channel - 2112.4 MHz

Input

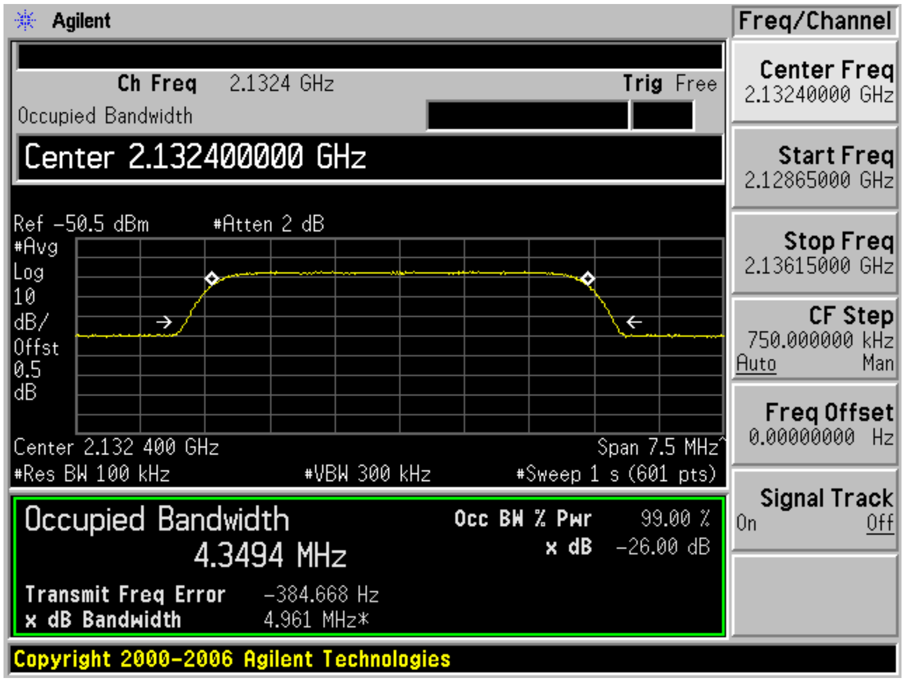


Output

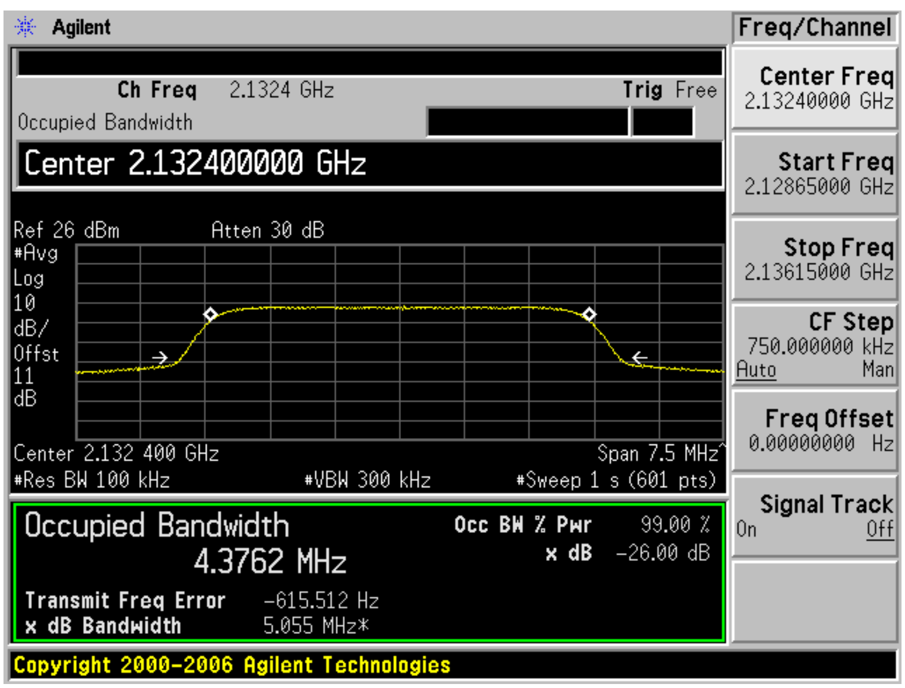


Modulation: HSDPA, Middle Channel - 2132.4 MHz

Input

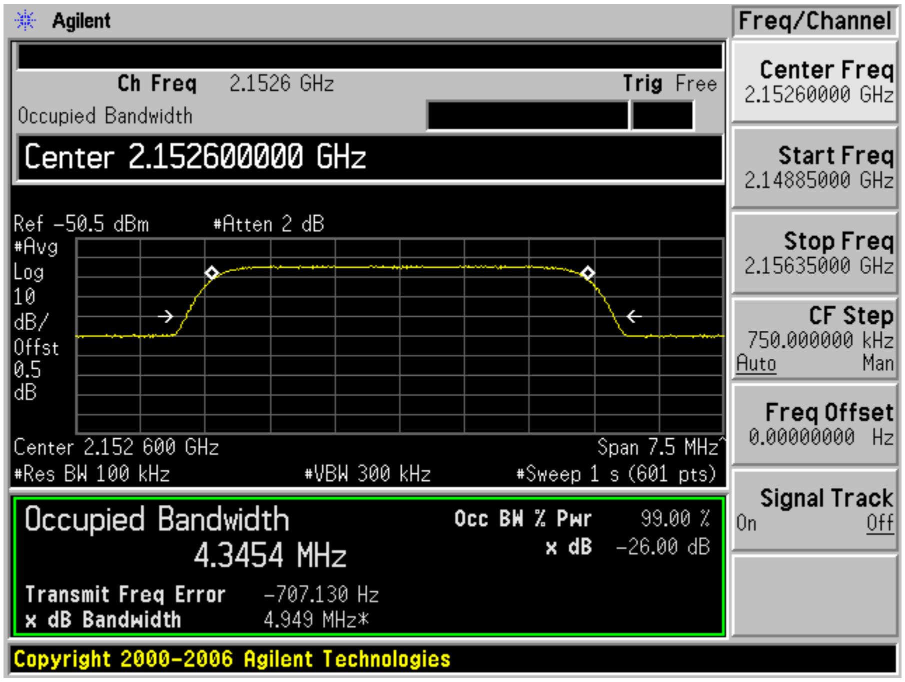


Output

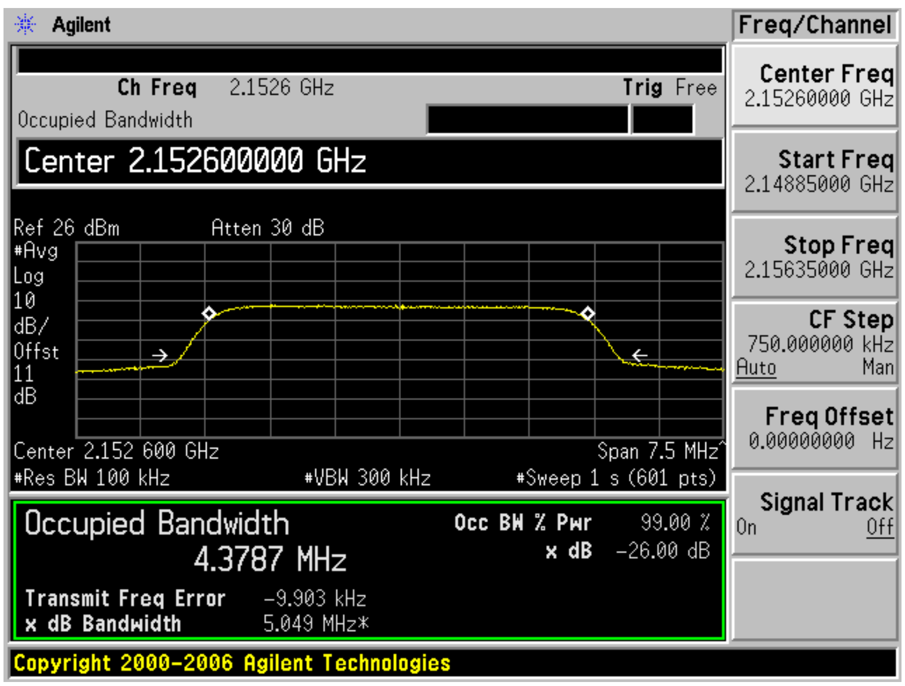


Modulation: HSDPA, High Channel - 2152.6 MHz

Input



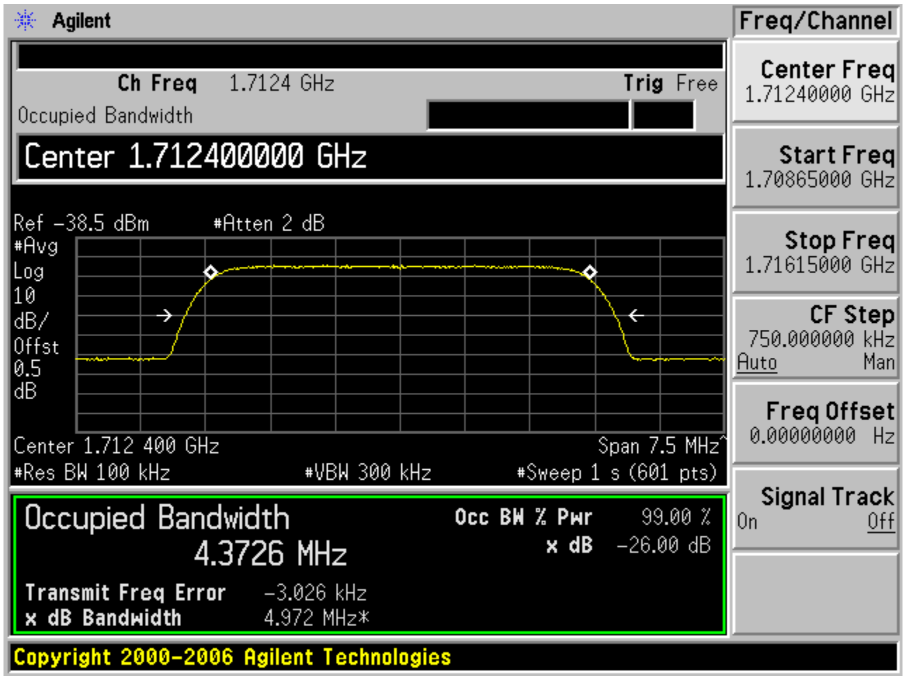
Output



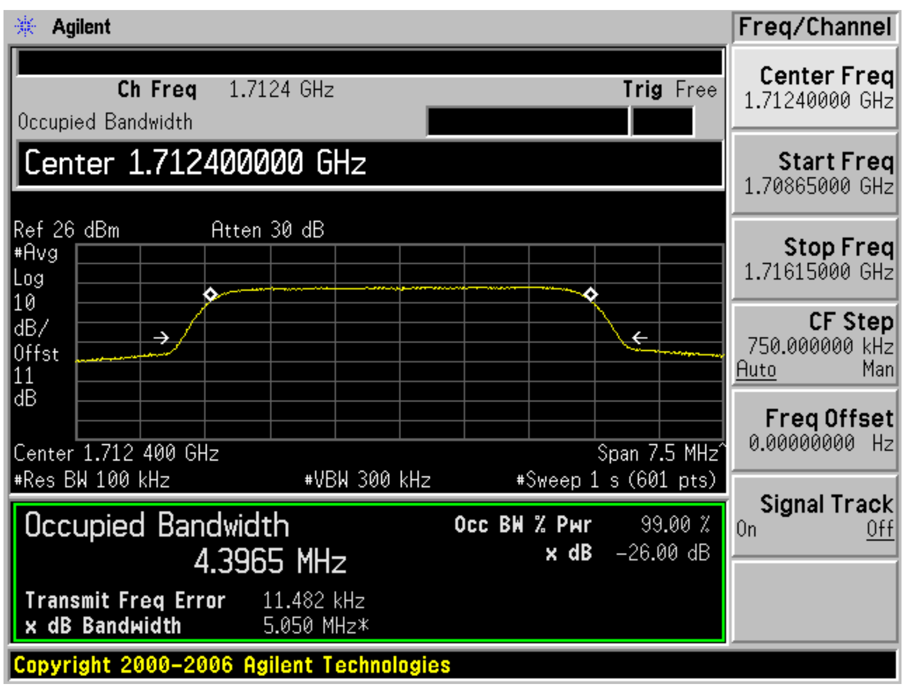
1710-1755MHz Band, Uplink:

Modulation: HSDPA, Low Channel - 1712.4 MHz

Input

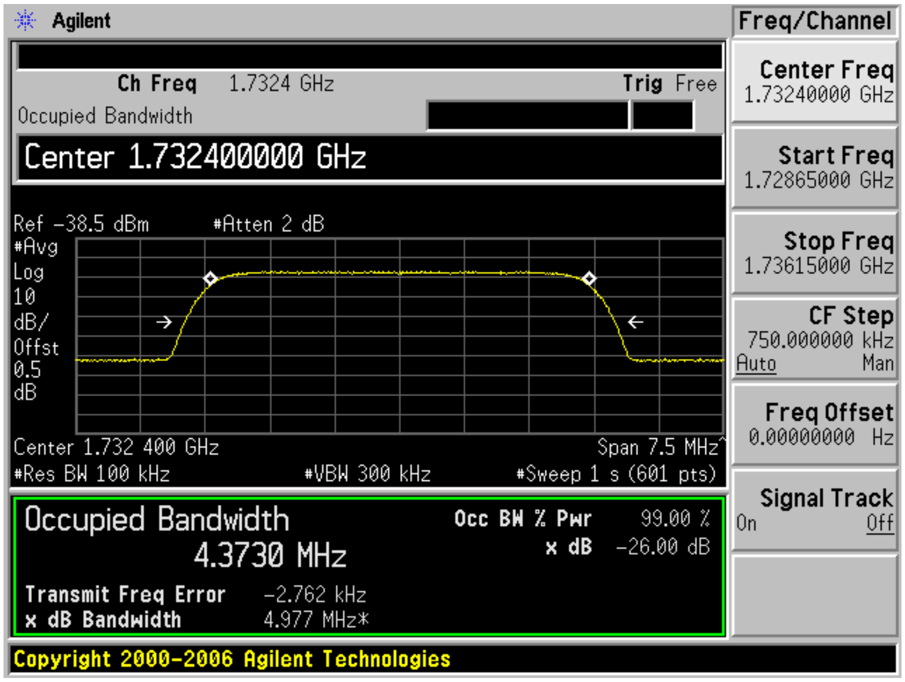


Output

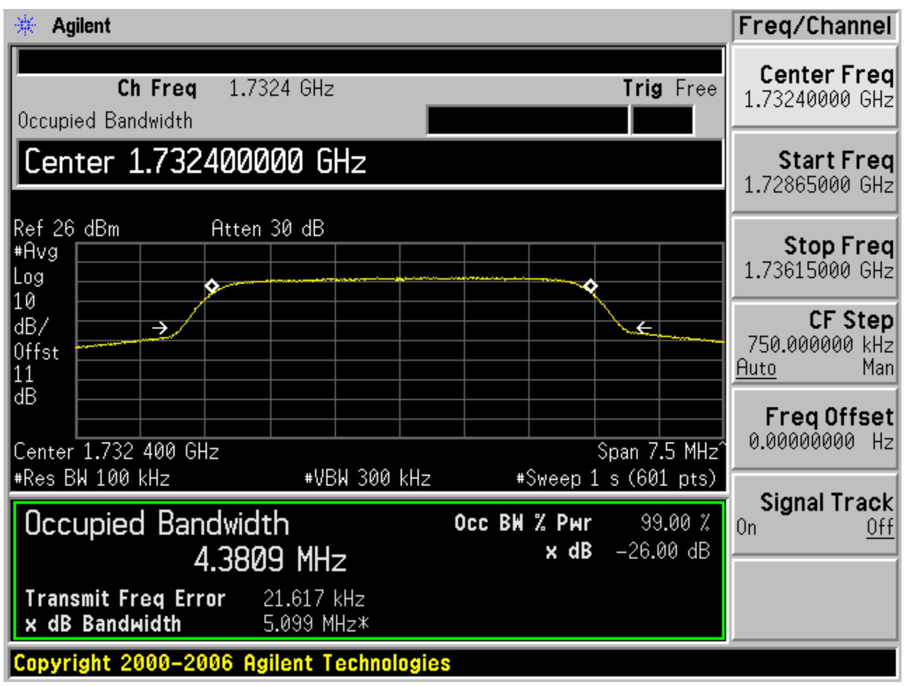


Modulation: HSDPA, Middle Channel - 1732.4 MHz

Input

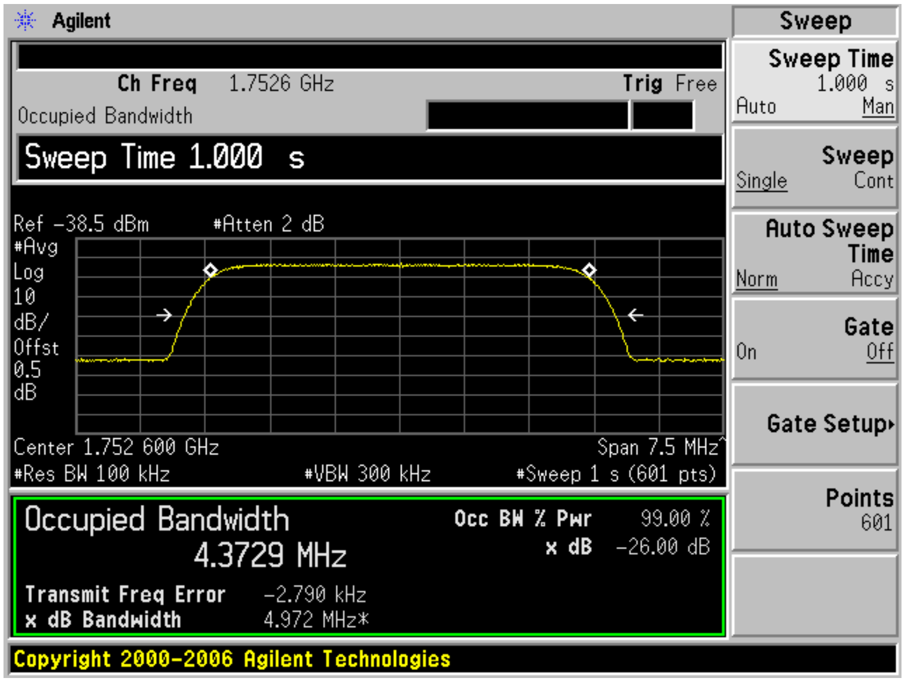


Output

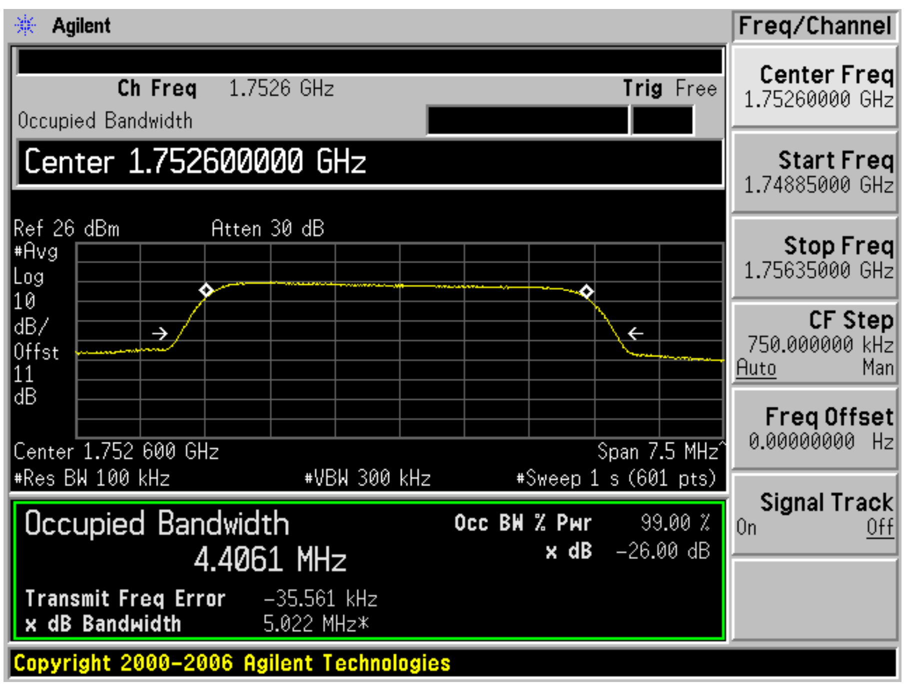


Modulation: HSDPA, High Channel - 1752.6 MHz

Input



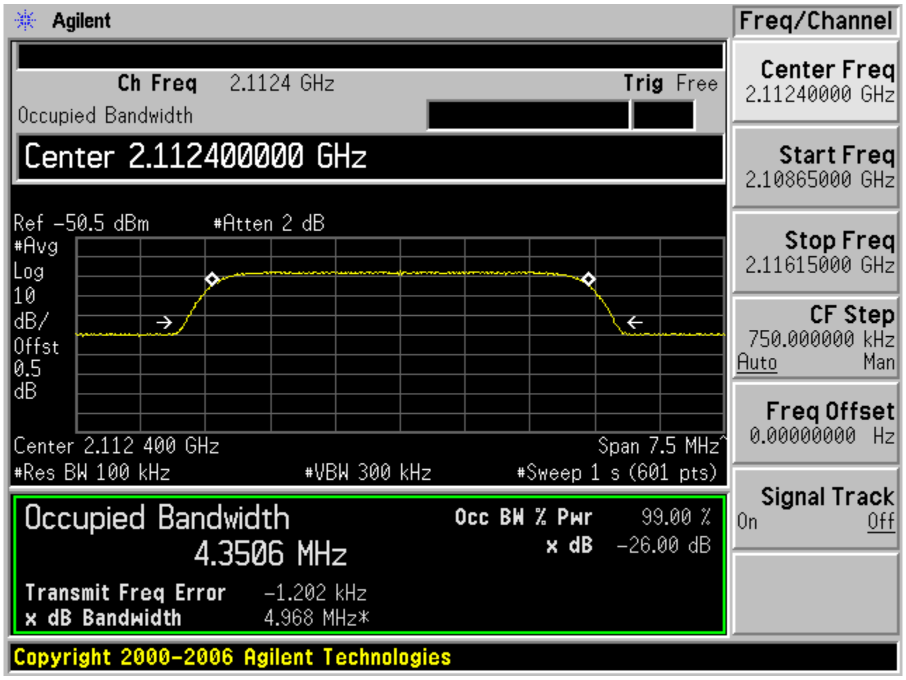
Output



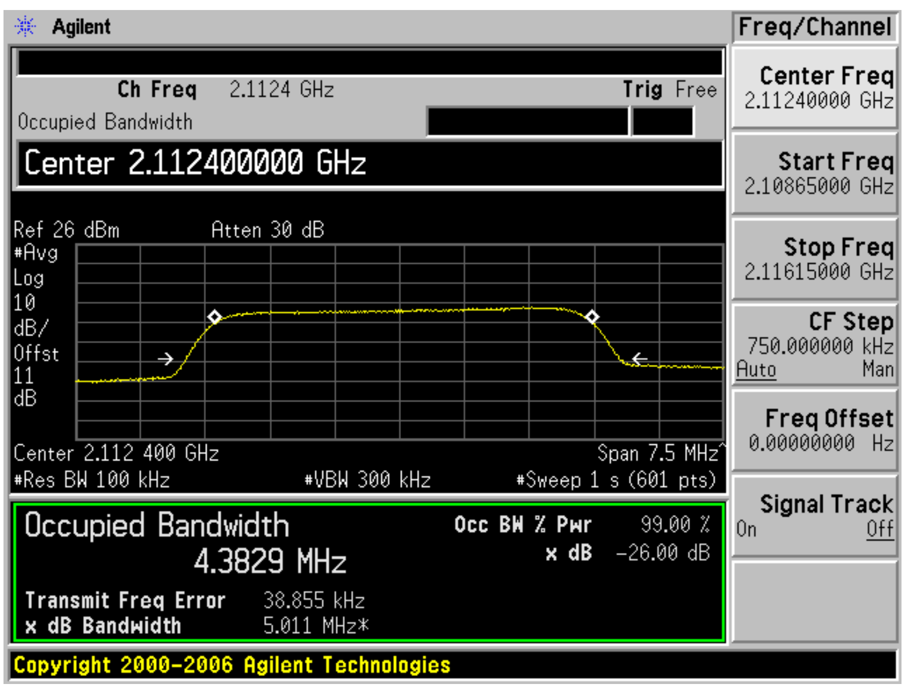
2110-2155 MHz Band, Downlink:

Modulation: HSUPA, Low Channel - 2112.4 MHz

Input

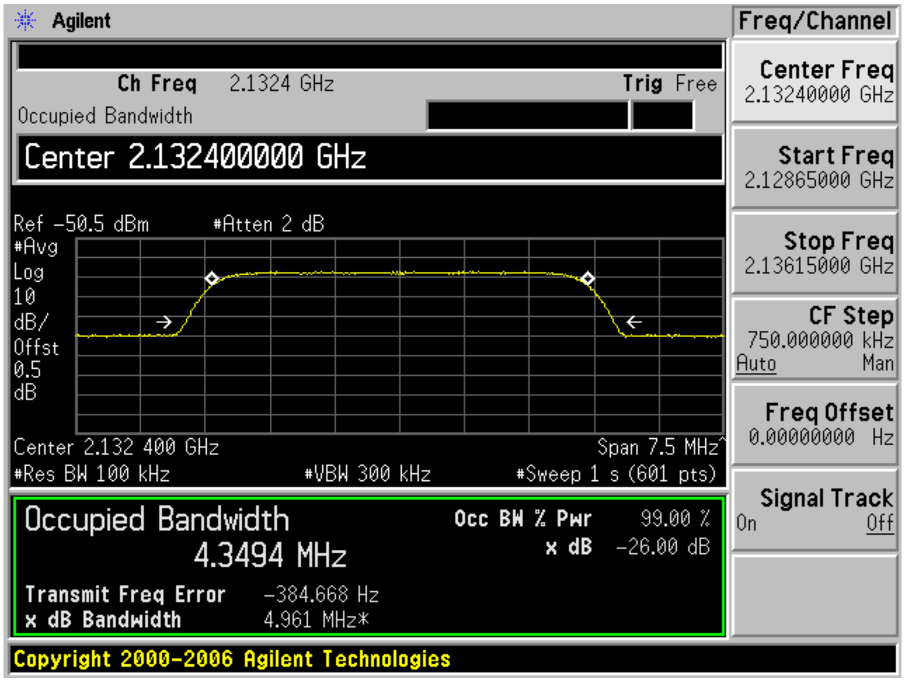


Output

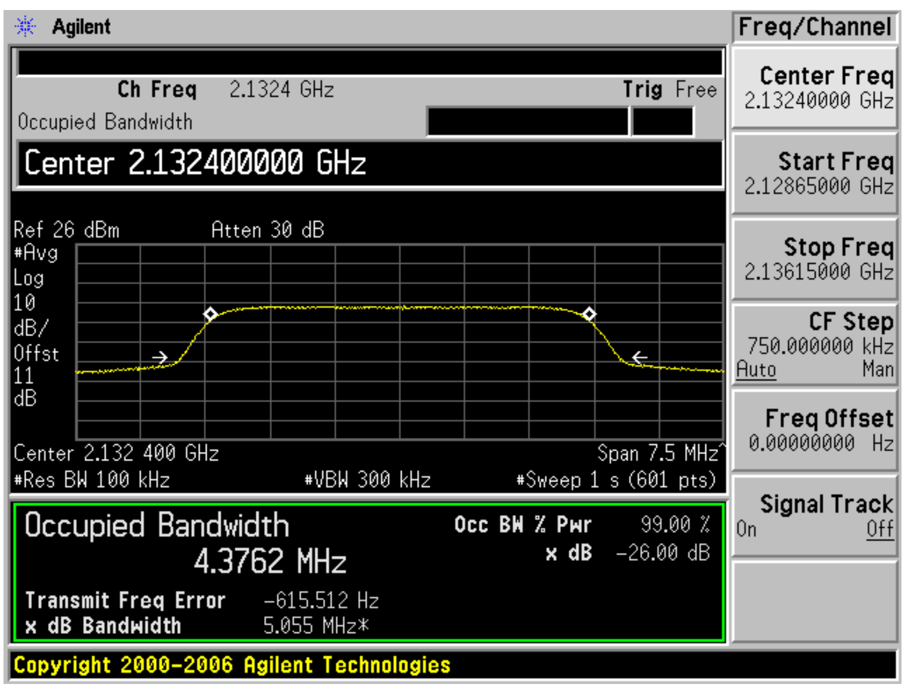


Modulation: HSUPA, Middle Channel - 2132.4 MHz

Input

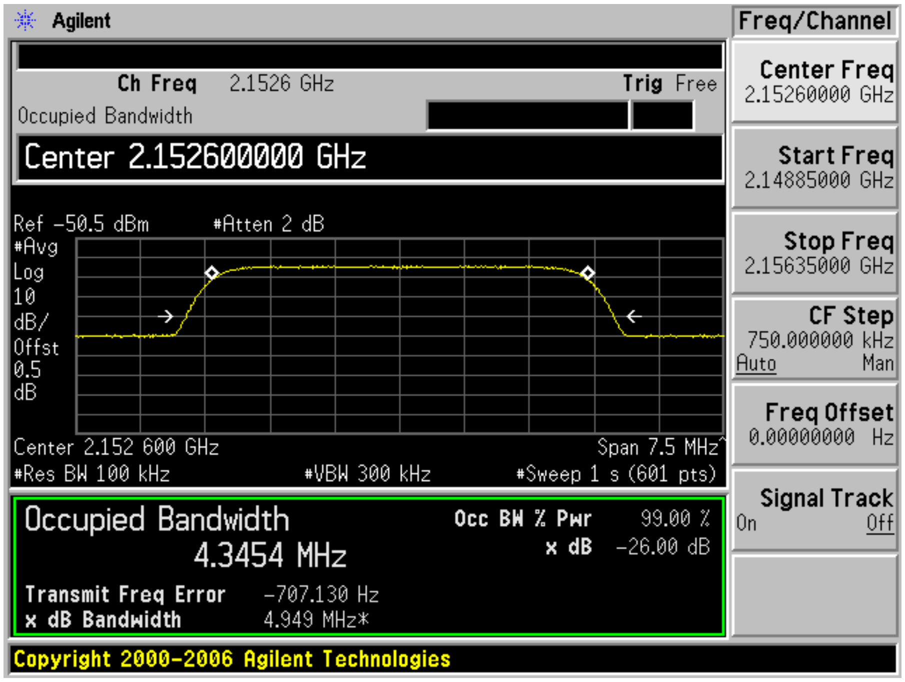


Output

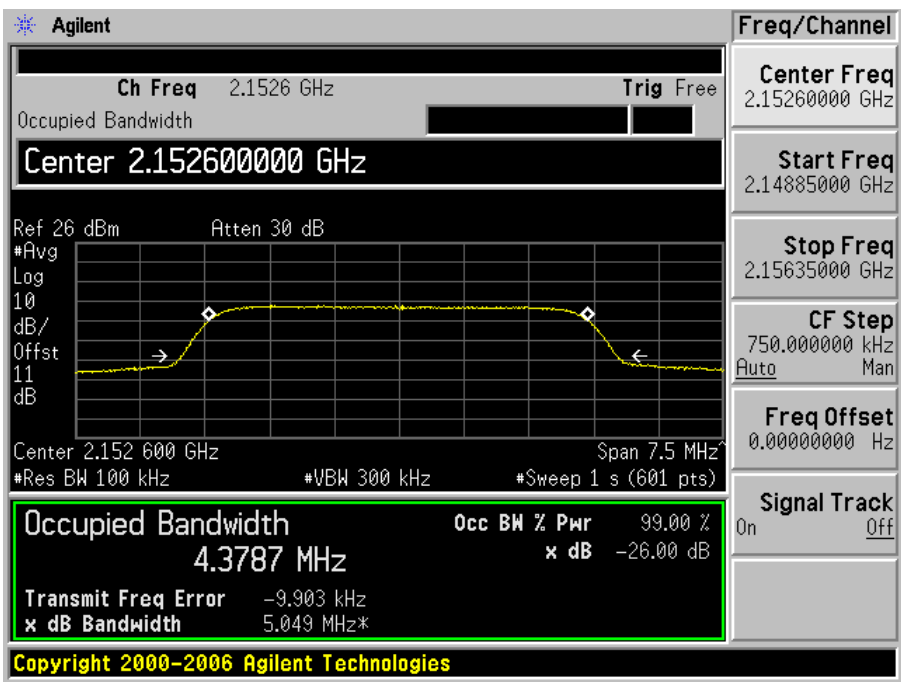


Modulation: HSUPA, High Channel - 2152.6 MHz

Input



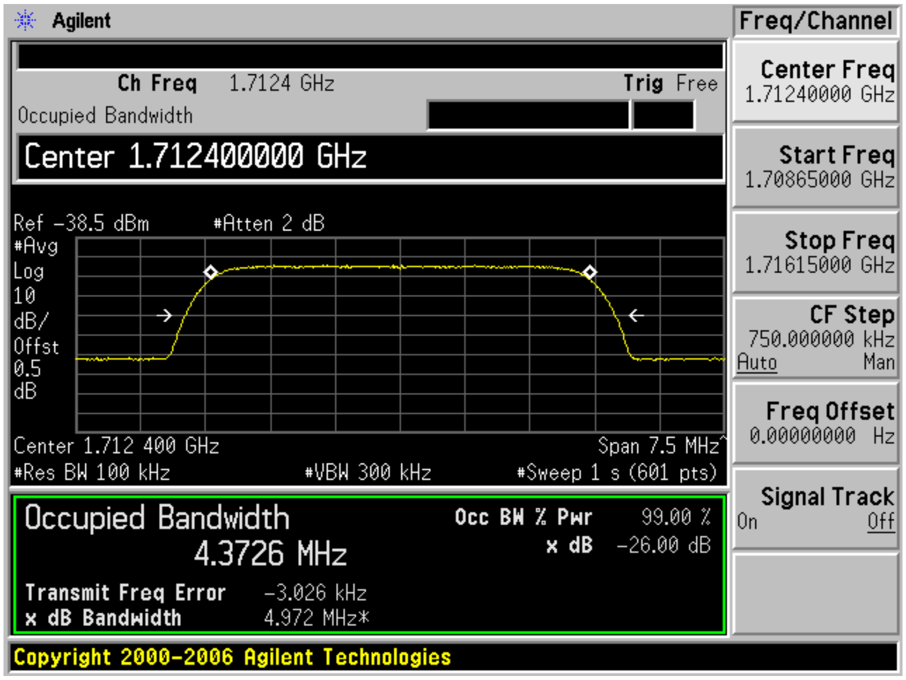
Output



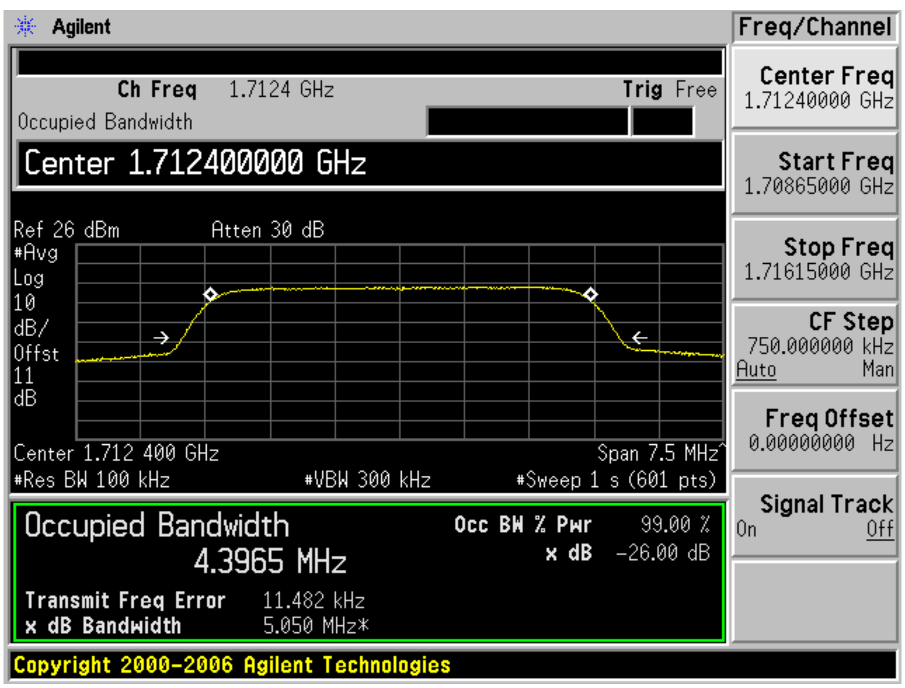
1710-1755 MHz Band, Uplink:

Modulation: HSUPA, Low Channel - 1712.4 MHz

Input

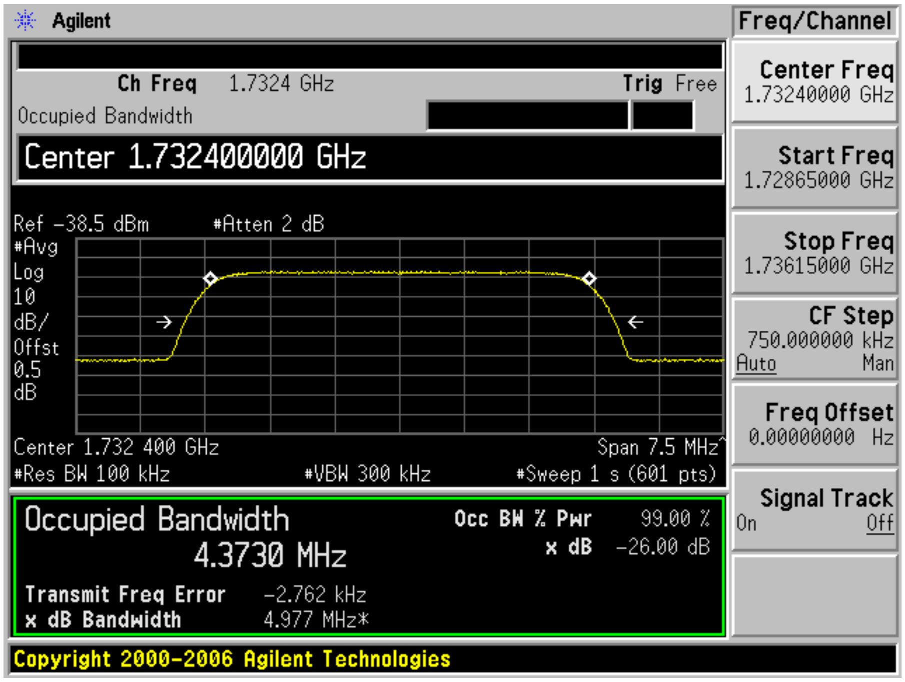


Output

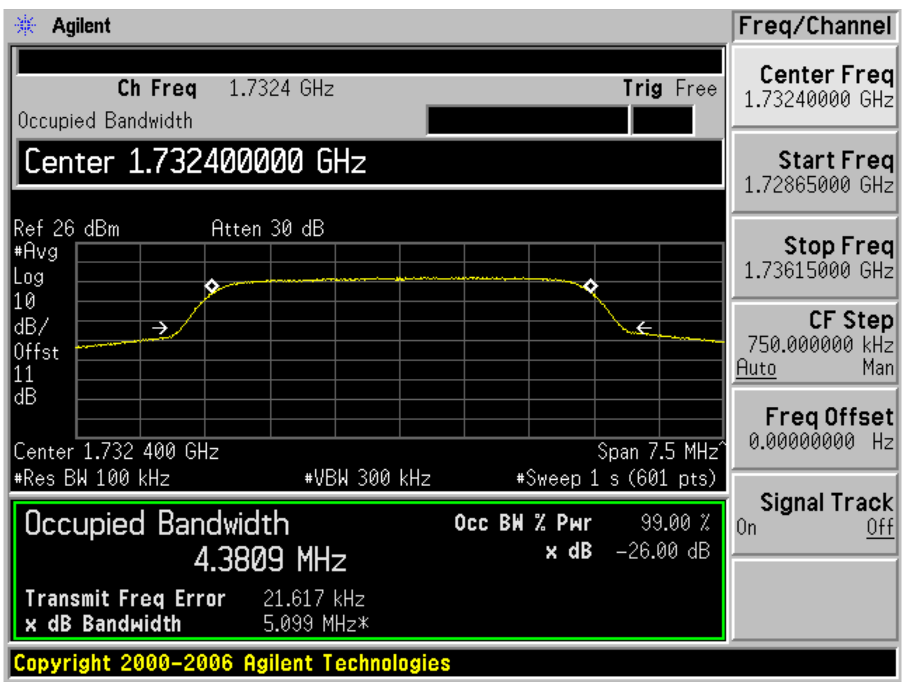


Modulation: HSUPA, Middle Channel - 1732.4 MHz

Input

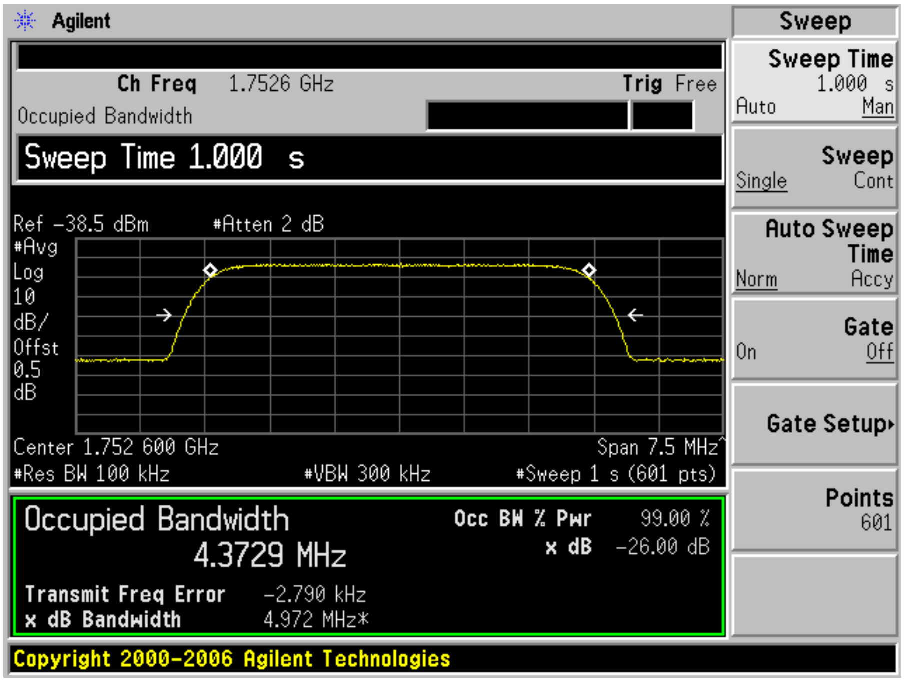


Output

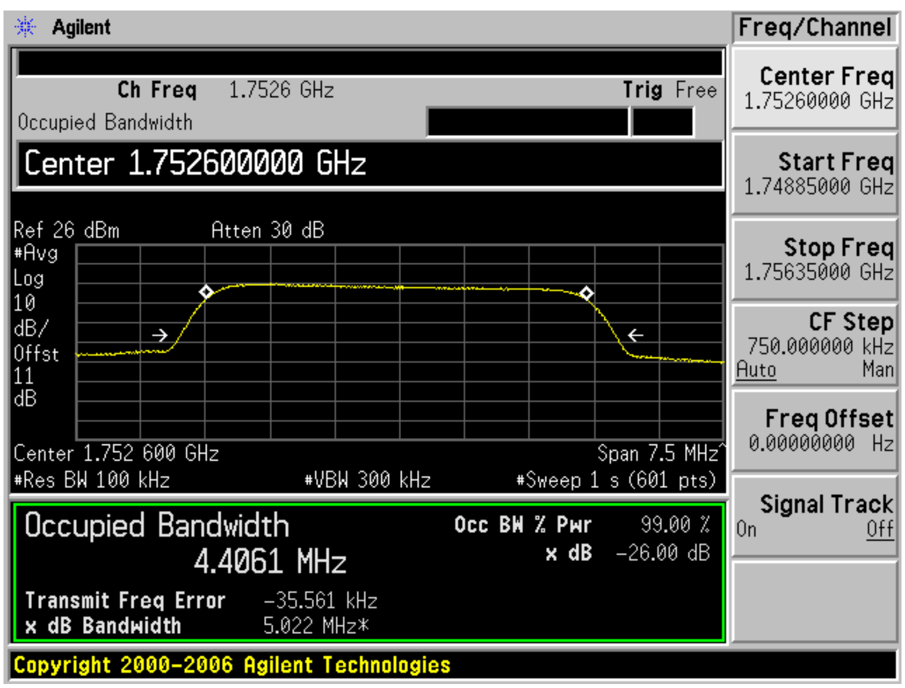


Modulation: HSUPA, High Channel - 1752.6 MHz

Input



Output



9 FCC §2.1053, §27.53 & IC RSS-131 §6.4 - Spurious Radiated Emissions

9.1 Applicable Standard

Requirements: FCC §2.1053, §27.53.

IC RSS-131 §6.4 Spurious emissions of zone enhancers and translators shall be suppressed as much as possible. Spurious emissions shall be attenuated below the rated power of the enhancer by at least:
43 +10 Log10 (Prated in watts), or 70 dB, whichever is less stringent.

9.2 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)

9.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100337	2010-03-24
Sunol Science Corp	System Controller	SC99V	122303-1	N/R
Sunol Science Corp	Combination Antenna	JB3	A0020106-3	2010-06-16
Hewlett Packard	Pre amplifier	8447D	2944A06639	2010-06-18
A.R.A Inc	Horn antenna	DRG-1181A	1132	2010-11-29
Mini-Circuits	Pre Amplifier	ZVA-183-S	570400946	2010-05-10

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:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-07 to 2011-03-08 in Chamber 3.

9.5 Test Results

Modulation: WCDMA

Indicated		**Azimuth (degree)**	**Test Antenna**		**Substituted**					**Limit (dBm)**	**Margin (dB)**
Frequency (MHz)	**S.A. Amp. (dBuV)**		**Height (m)**	**Polarity (H/V)**	**Frequency (MHz)**	**Level (dBm)**	**Ant. Gain Correction (dB)**	**Cable Loss (dB)**	**Absolute Level (dBm)**		
2110-2155MHz, Downlink, Input Signal – 2132.4MHz											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
1710-1755MHz, Uplink, Input Signal – 1732.4MHz											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Modulation: HSPA Worst Mode: HSDPA

Indicated		**Azimuth (degree)**	**Test Antenna**		**Substituted**					**Limit (dBm)**	**Margin (dB)**
Frequency (MHz)	**S.A. Amp. (dBuV)**		**Height (m)**	**Polarity (H/V)**	**Frequency (MHz)**	**Level (dBm)**	**Ant. Gain Correction (dB)**	**Cable Loss (dB)**	**Absolute Level (dBm)**		
2110-2155MHz, Downlink, Input Signal – 2132.4MHz											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-
1710-1755MHz, Uplink, Input Signal – 1732.4MHz											
-	-	-	-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-	-	-	-

Note: All emissions were on the noise floor level and/or 20dB below the margin.

10 FCC §2.1051, §27.53 & IC RSS-131 §6.4 - Spurious Emissions at Antenna Terminals

10.1 Applicable Standard

Per CFR 47, FCC § 2.1051. FCC § 27.53
The spectrum shall be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

Per RSS-131 §6.4
The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB

Spurious emissions of zone enhancers and translators shall be suppressed as much as possible.
Spurious emissions shall be attenuated below the rated power of the enhancer by at least: 43 + 10 Log10(Prated in watts), or 70 dB, whichever is less stringent.

10.2 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.

10.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

10.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

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

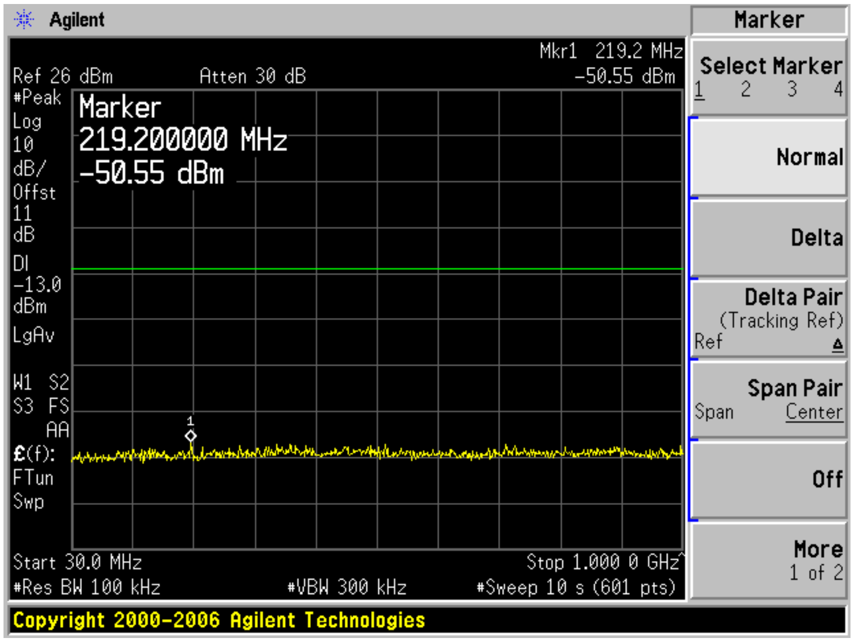
10.5 Test Results

Please refer to the following plots.

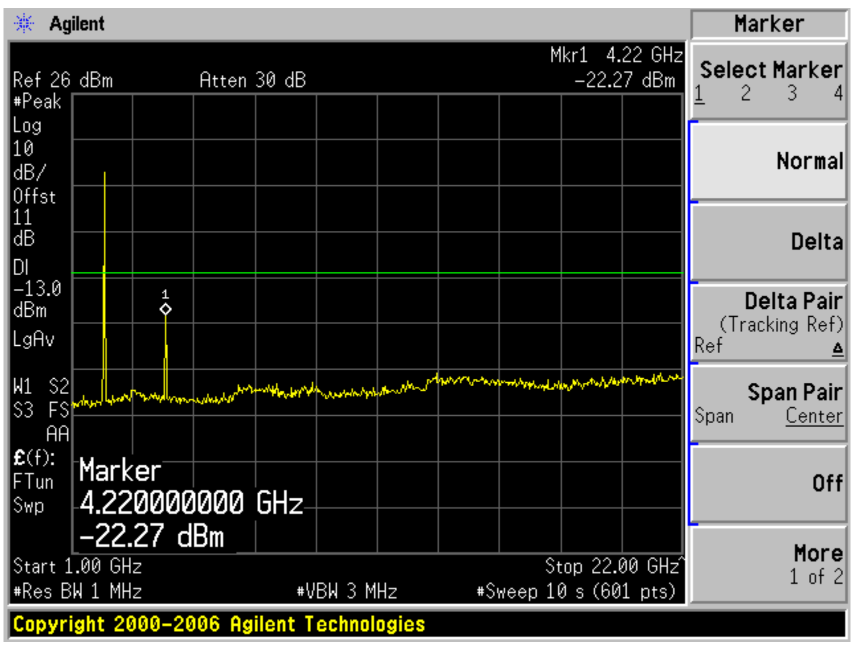
2110-2155 MHz Band, Downlink:

Modulation: WCDMA, Low Channel - 2112.4 MHz

Plot 1: 30 MHz to 1 GHz

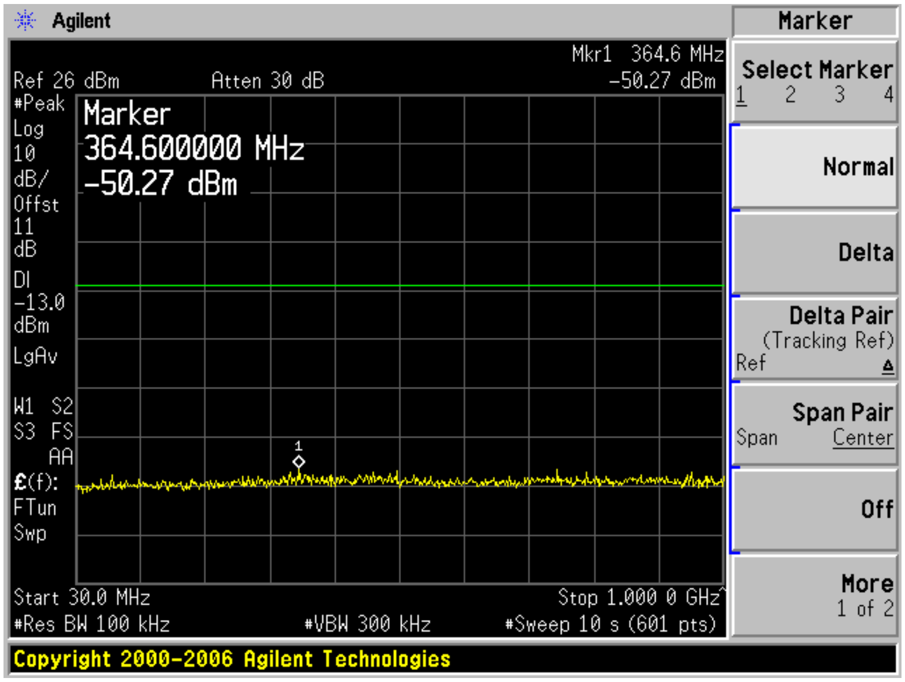


Plot 2: Above 1 GHz

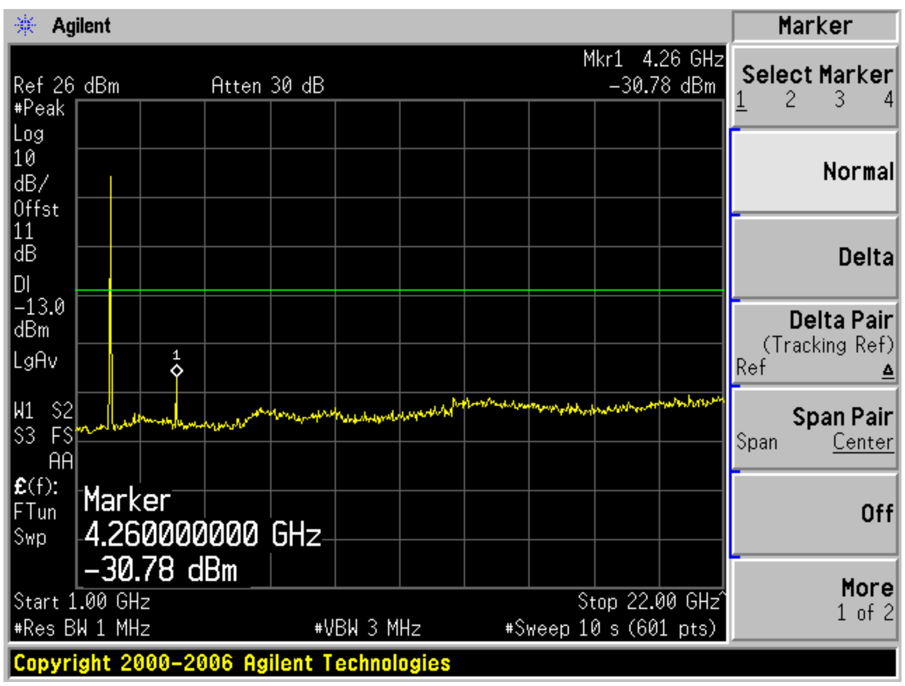


Modulation: WCDMA, Middle Channel - 2132.4 MHz

Plot 1: 30 MHz to 1 GHz

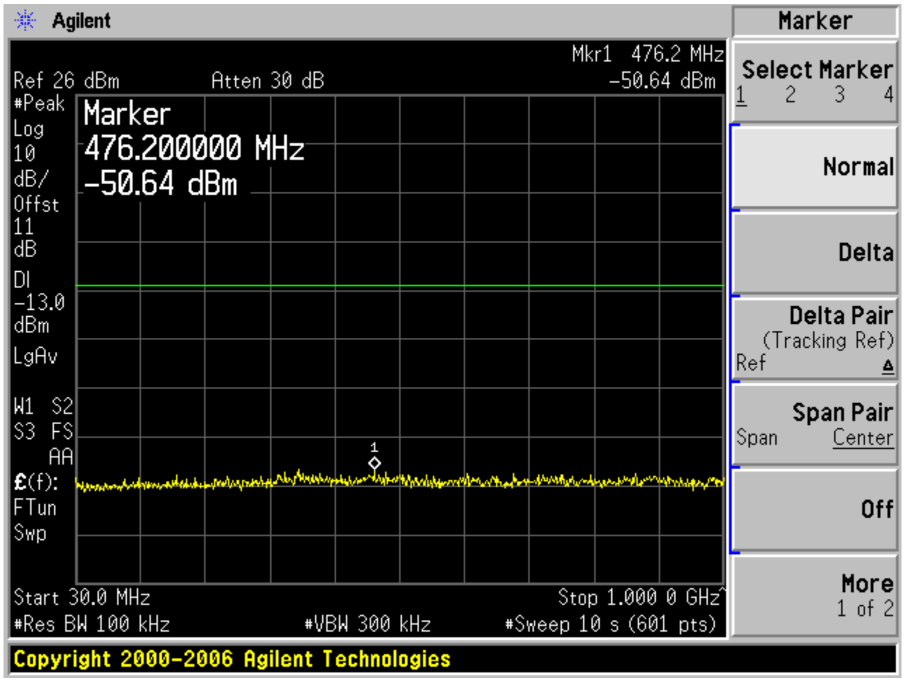


Plot 2: Above 1 GHz

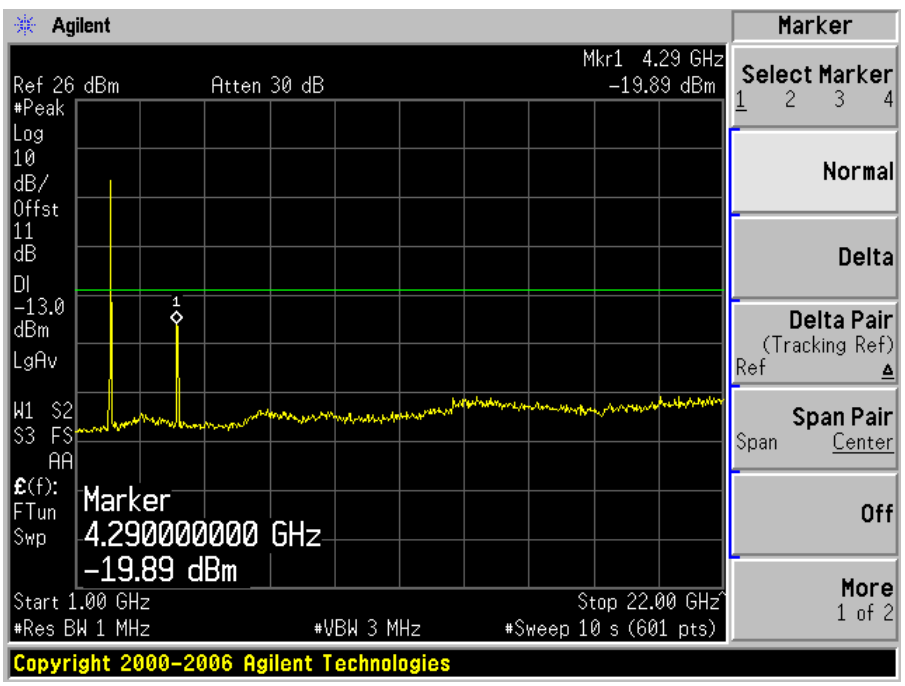


Modulation: WCDMA, High Channel - 2152.6 MHz

Plot 1: 30 MHz to 1 GHz



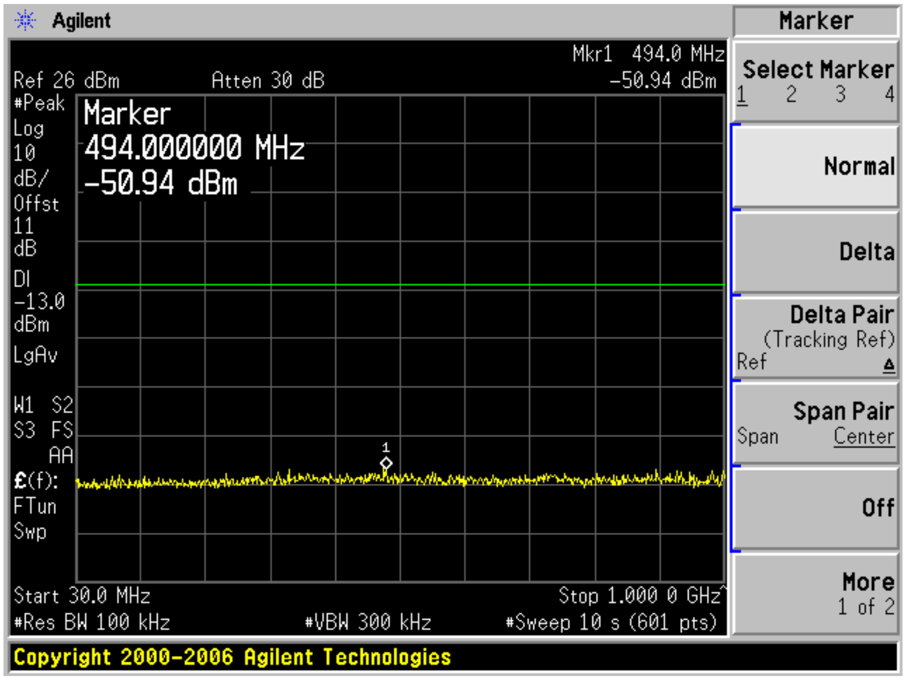
Plot 2: Above 1 GHz



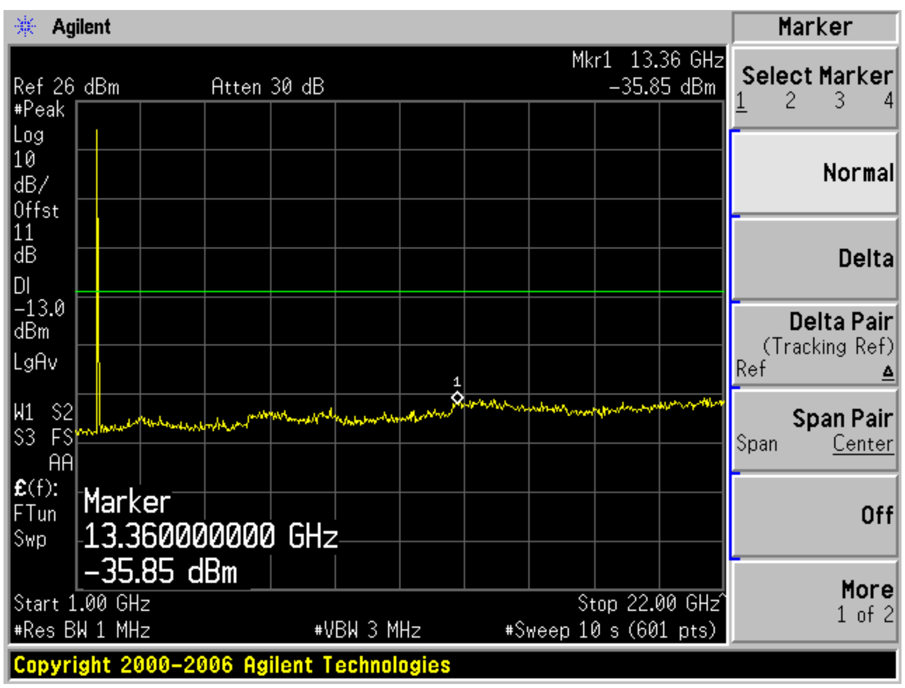
1710-1755 MHz Band, Uplink:

Modulation: WCDMA, Low Channel - 1712.4 MHz

Plot 1: 30 MHz to 1 GHz

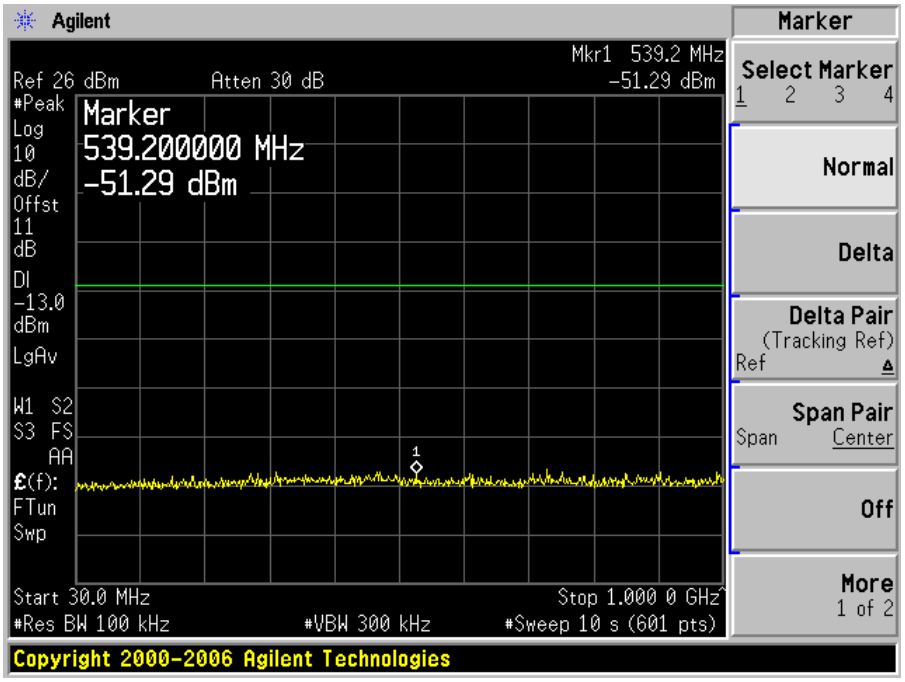


Plot 2: Above 1 GHz

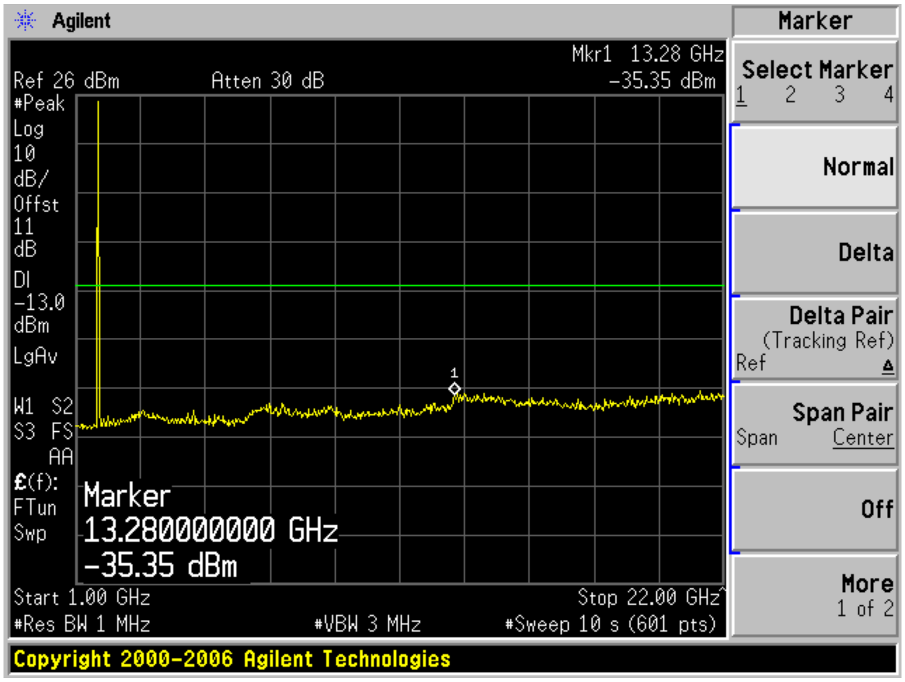


Modulation: WCDMA, Middle Channel - 1732.4 MHz

Plot 1: 30 MHz to 1 GHz

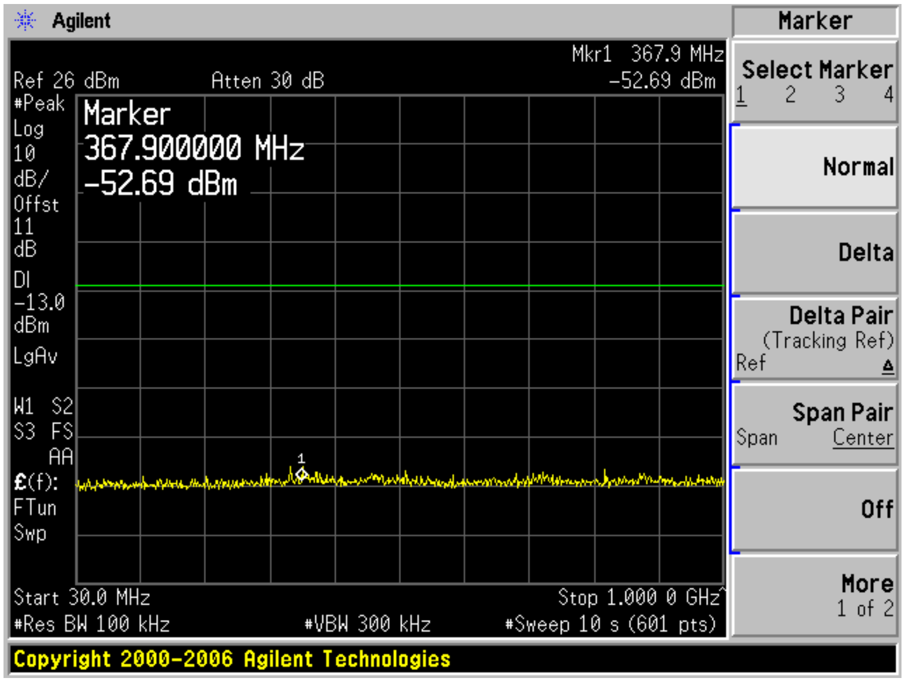


Plot 2: Above 1 GHz

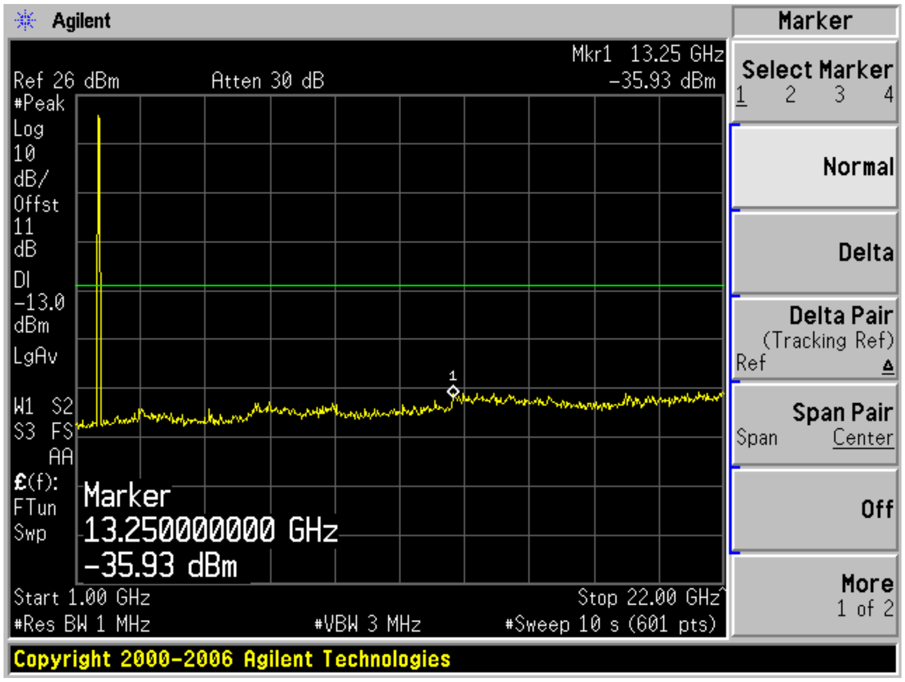


Modulation: WCDMA, High Channel - 1752.6 MHz

Plot 1: 30 MHz to 1 GHz



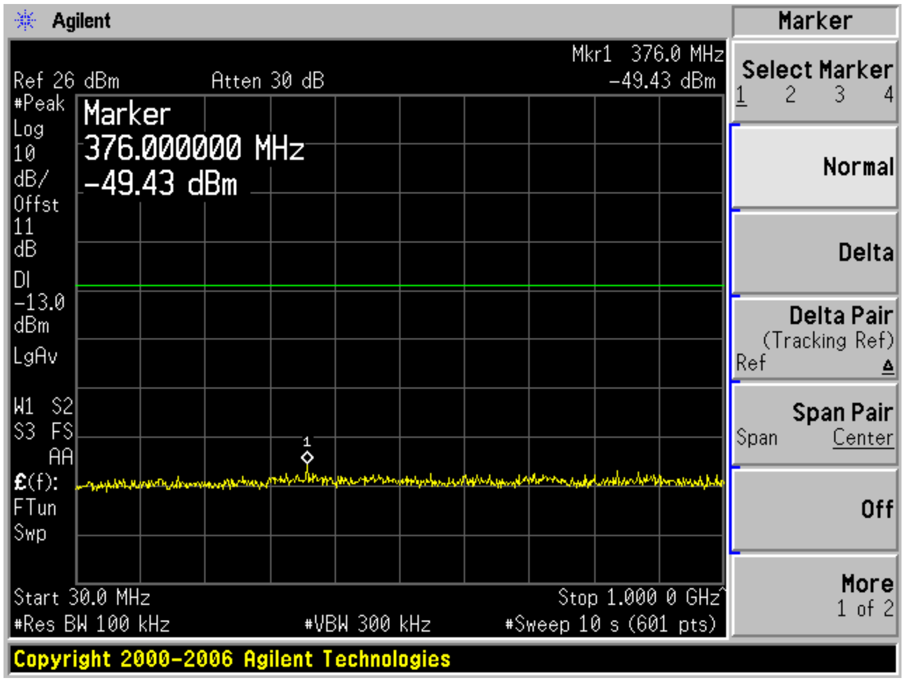
Plot 2: Above 1 GHz



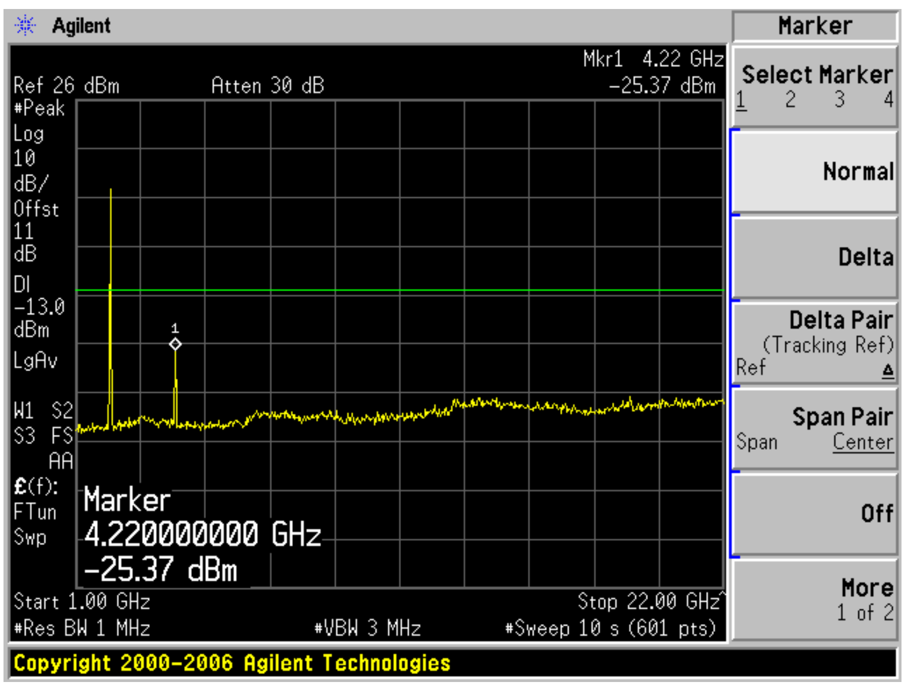
2110-2155 MHz Band, Downlink:

Modulation: HSPA Worst Case HSDPA, Low Channel - 2112.4 MHz

Plot 1: 30 MHz to 1 GHz

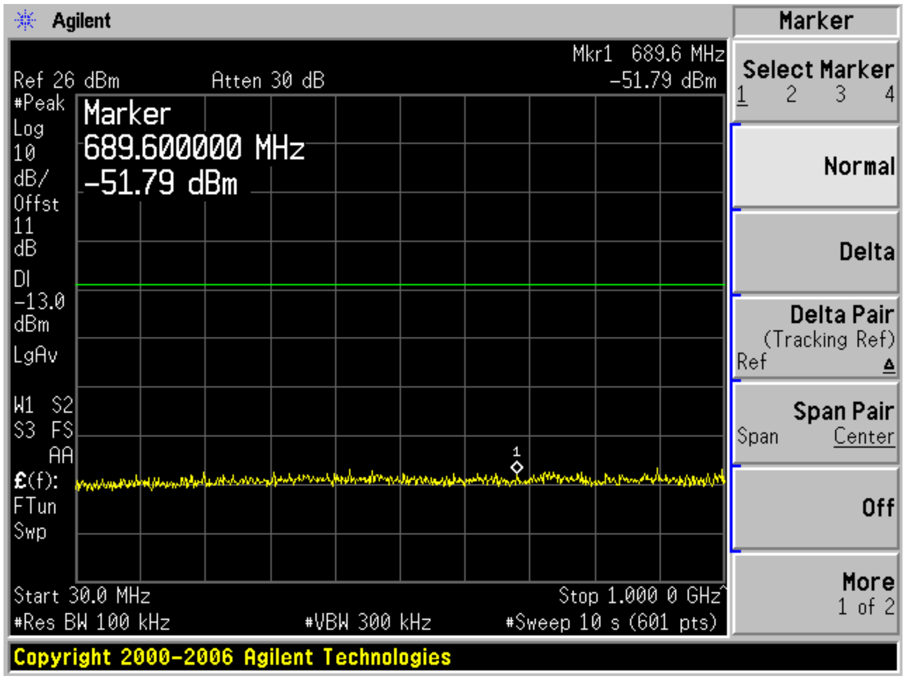


Plot 2: Above 1 GHz

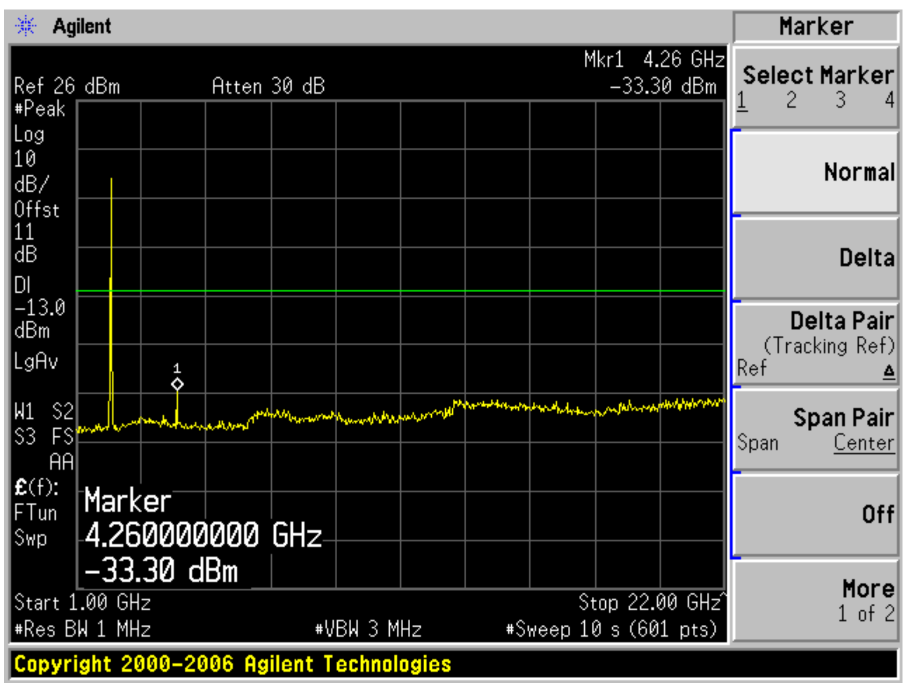


Modulation: HSPA Worst Case HSDPA, Middle Channel - 2132.4 MHz

Plot 1: 30 MHz to 1 GHz

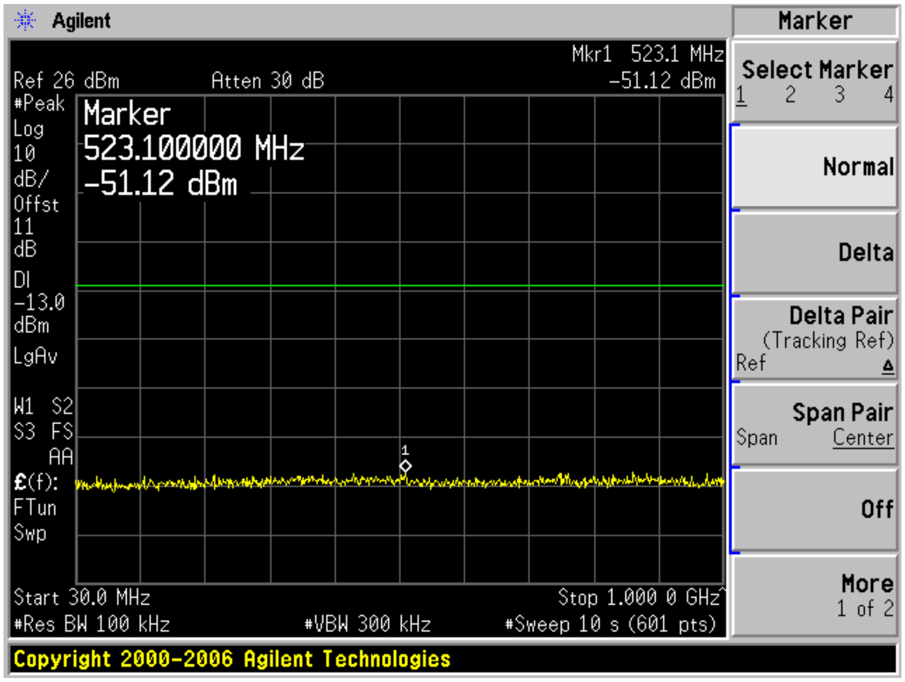


Plot 2: Above 1 GHz

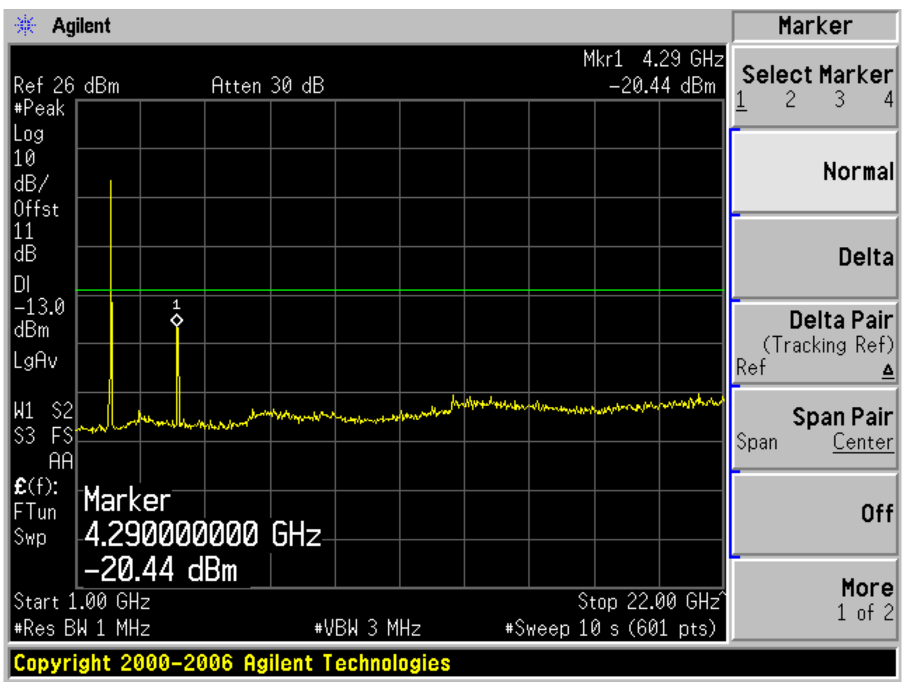


Modulation: HSPA Worst Case HSDPA, High Channel - 2152.6 MHz

Plot 1: 30 MHz to 1 GHz



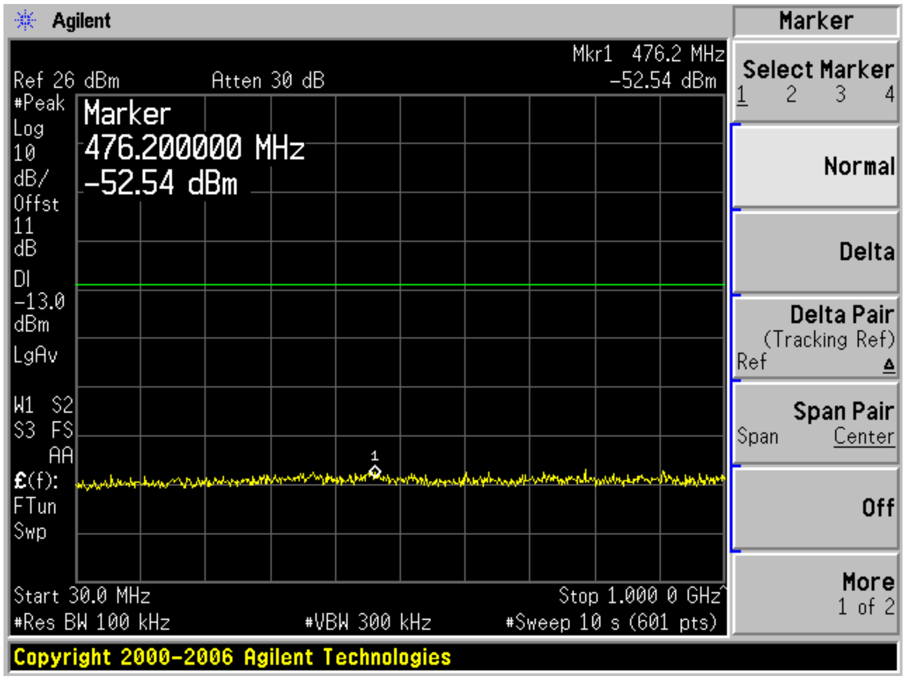
Plot 2: Above 1 GHz



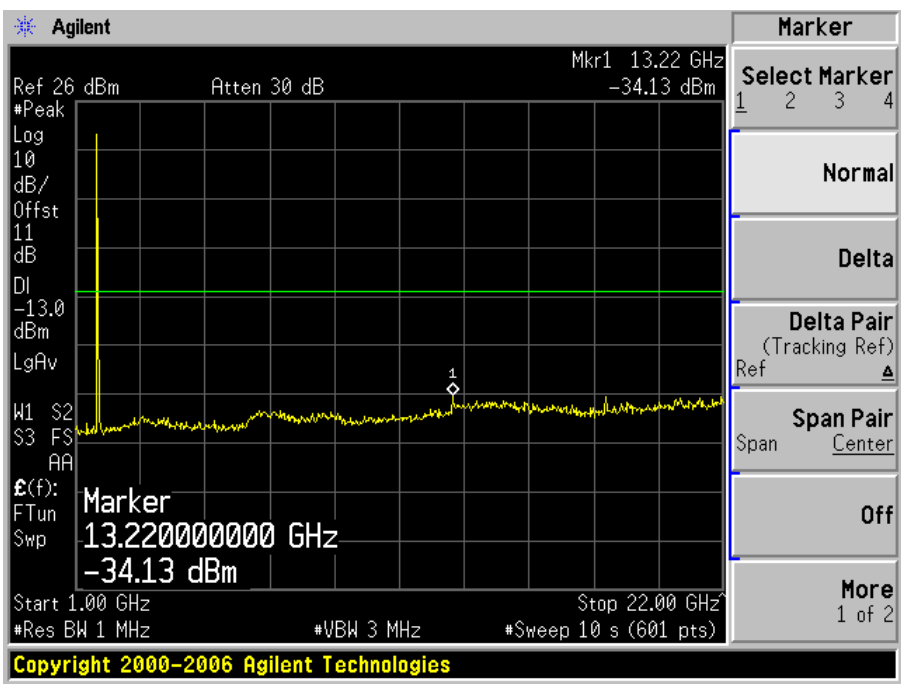
1710-1755 MHz Band, Uplink:

Modulation: HSPA Worst Case HSDPA, Low Channel - 1712.4 MHz

Plot 1: 30 MHz to 1 GHz

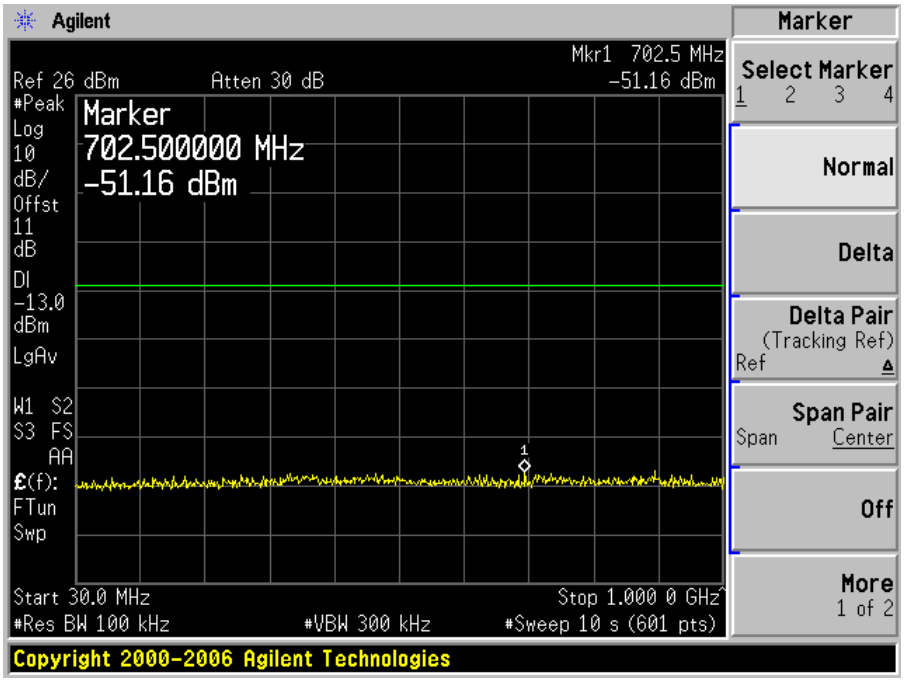


Plot 2: Above 1 GHz

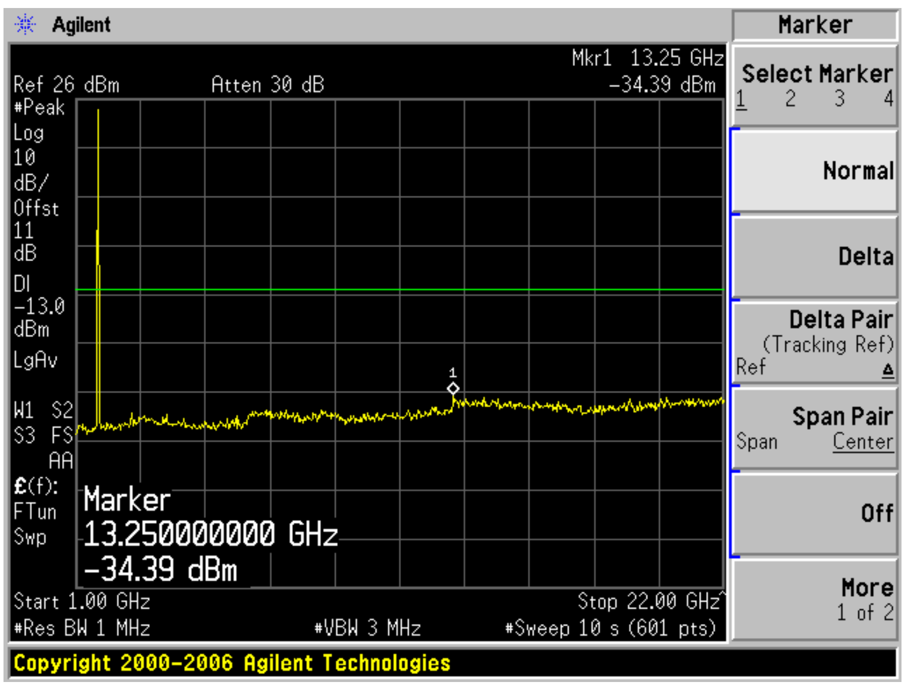


Modulation: HSPA Worst Case HSDPA, Middle Channel - 1732.4 MHz

Plot 1: 30 MHz to 1 GHz

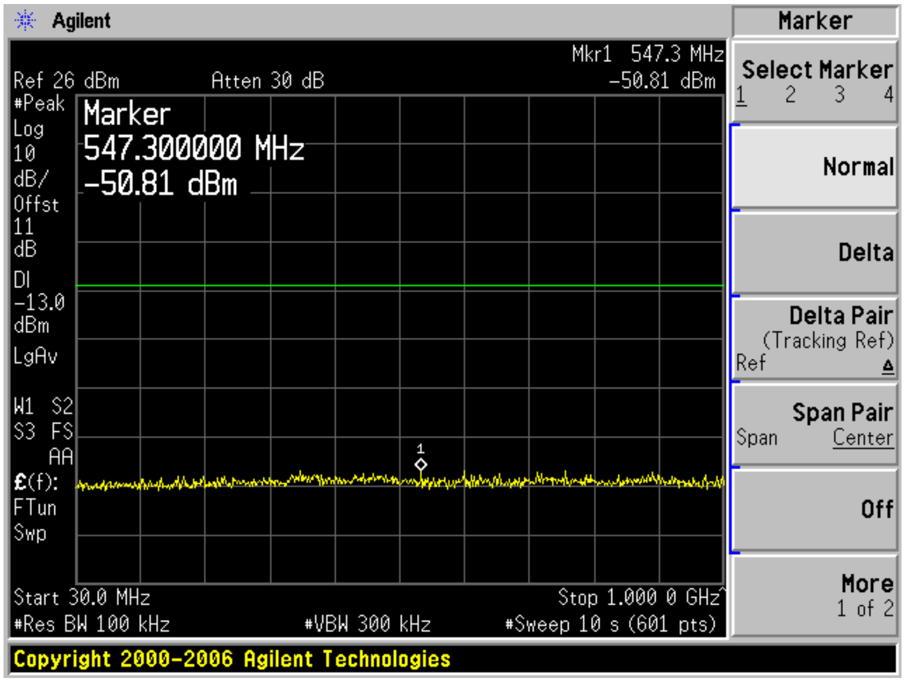


Plot 2: Above 1 GHz

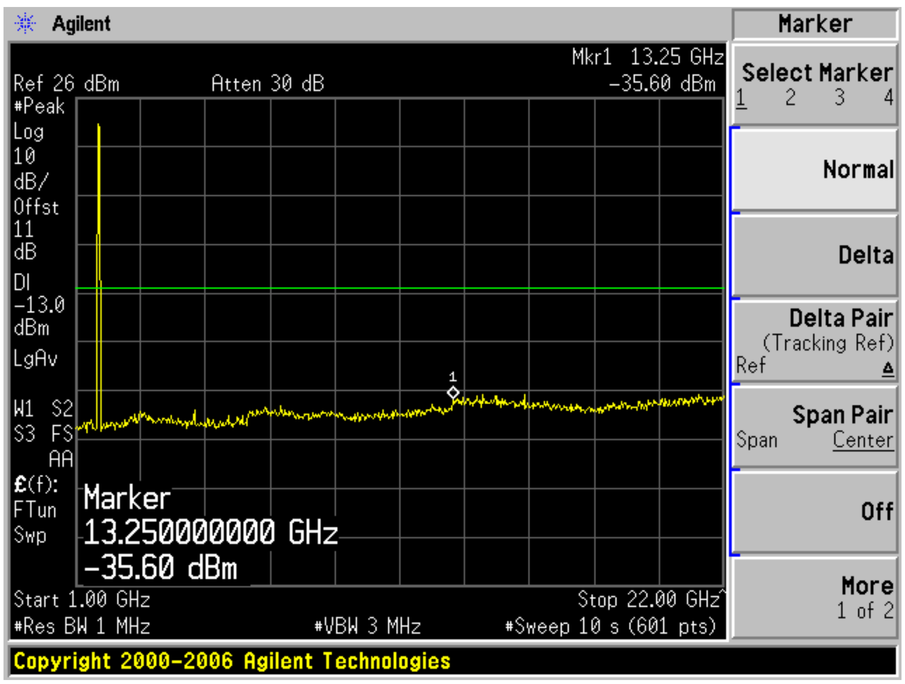


Modulation: HSPA Worst Case HSDPA, High Channel - 1752.6 MHz

Plot 1: 30 MHz to 1 GHz



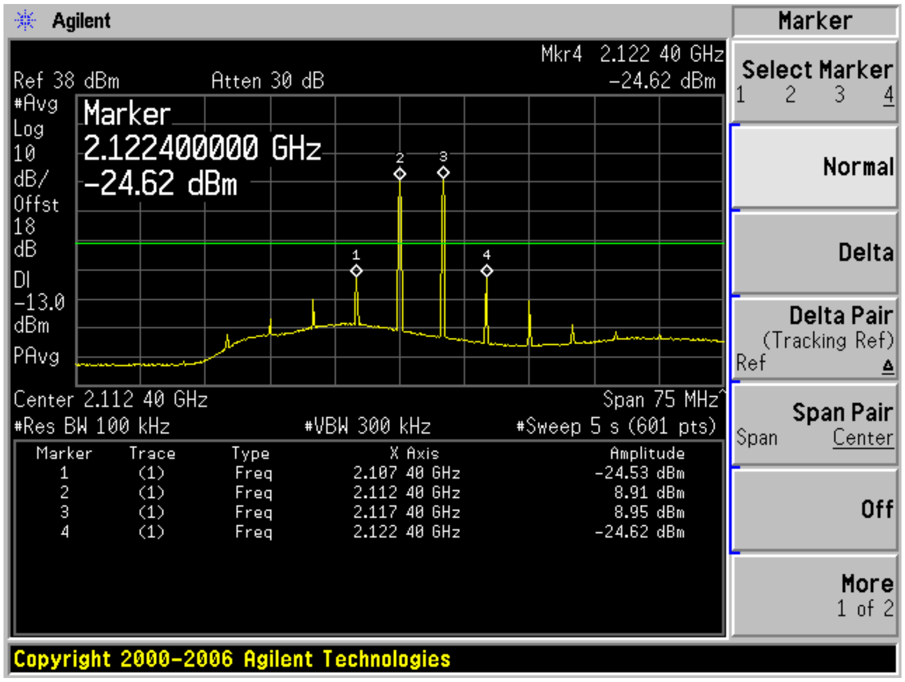
Plot 2: Above 1 GHz



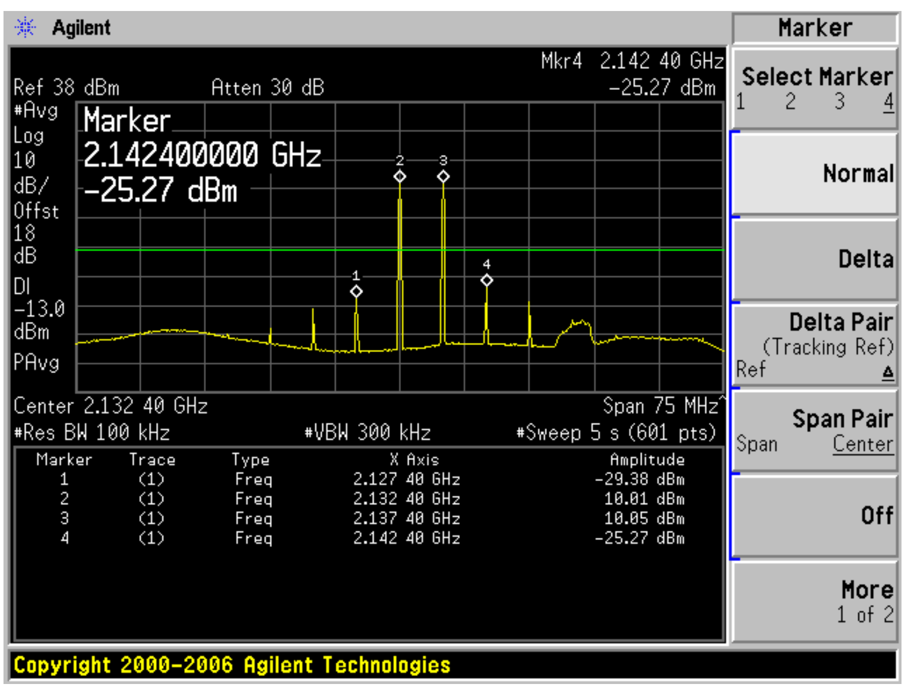
Inter-modulation:

2110-2155 MHz Downlink

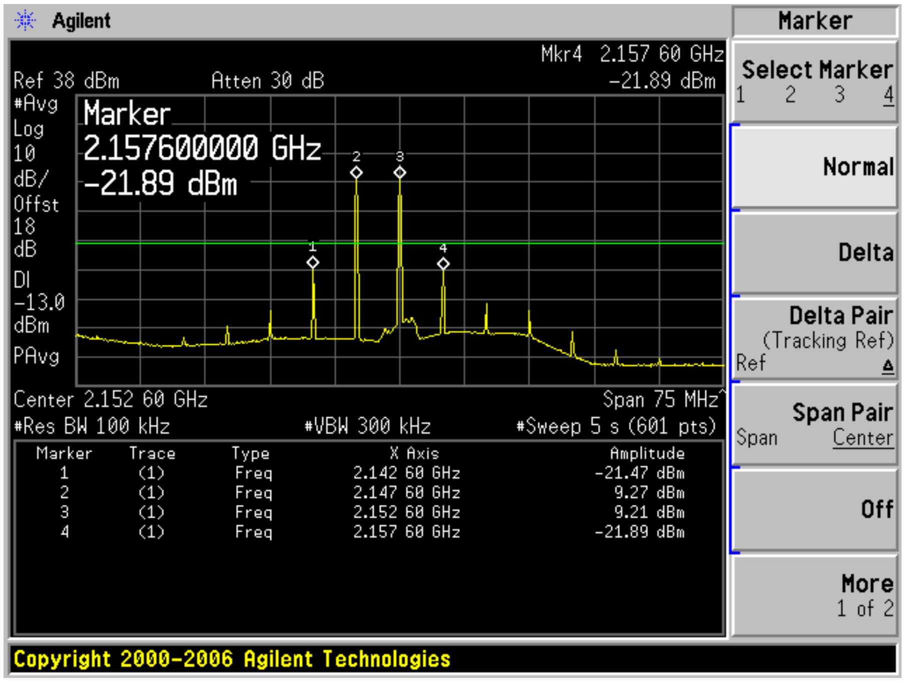
WCDMA/HSPA AWS Band Downlink, Low Channel: 2112.4 MHz



WCDMA/HSPA AWS Band Downlink, Middle Channel: 2132.4 MHz

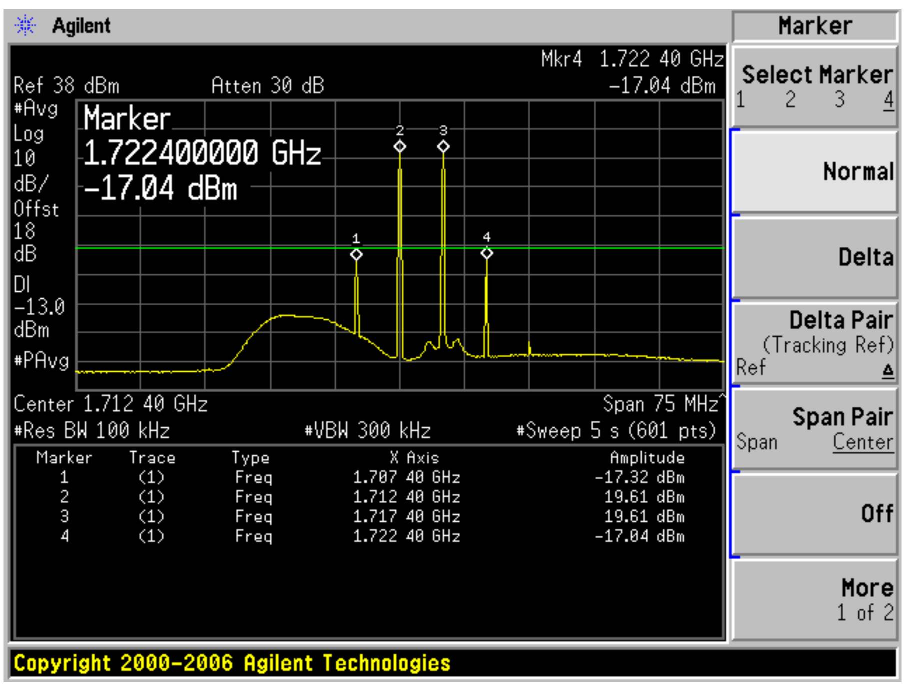


WCDMA/HSPA AWS Band Downlink, High Channel: 2152.6 MHz

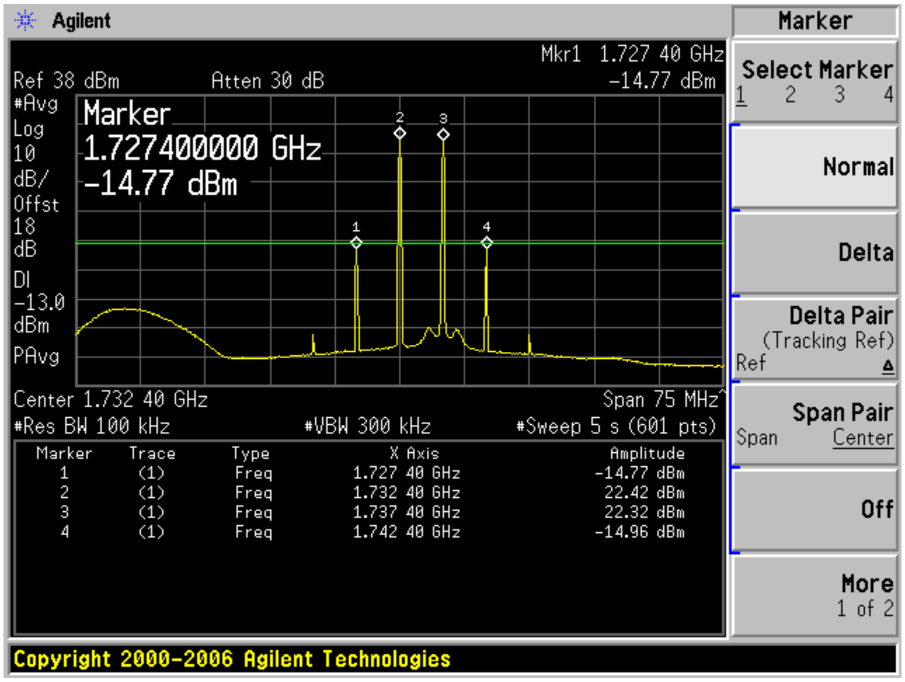


1710-1755 MHz Downlink

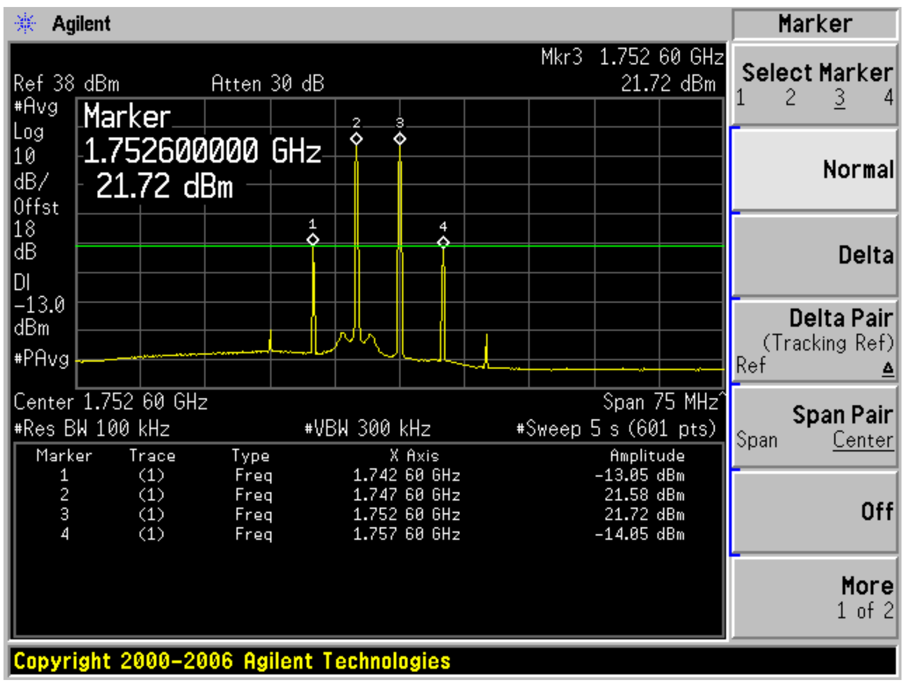
WCDMA/HSPA AWS Band Uplink, Low Channel: 1712.4 MHz



WCDMA/HSPA AWS Band Uplink, Middle Channel: 1732.4 MHz



WCDMA/HSPA AWS Band Uplink, High Channel: 1752.6 MHz



11 FCC §27.53 & IC RSS-131 §6.4 – Band Edge

11.1 Applicable Standard

According to § 27.53, the power of any emissions outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

11.2 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.

11.3 Test Environmental Conditions

Temperature:	22-24°C
Relative Humidity:	50-55 %
ATM Pressure:	101-102kPa

The testing was performed by Quinn Jiang from 2011-03-03 to 2011-03-04 in RF Site.

11.4 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
Agilent	Spectrum Analyzer	E4440A	US45303156	2010-08-09
HP	Signal Generator	8648C	3426A00417	2010-08-31
Rhode & Schwarz	Signal Generator	SMIQ 03	849192/0085	2010-03-31

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

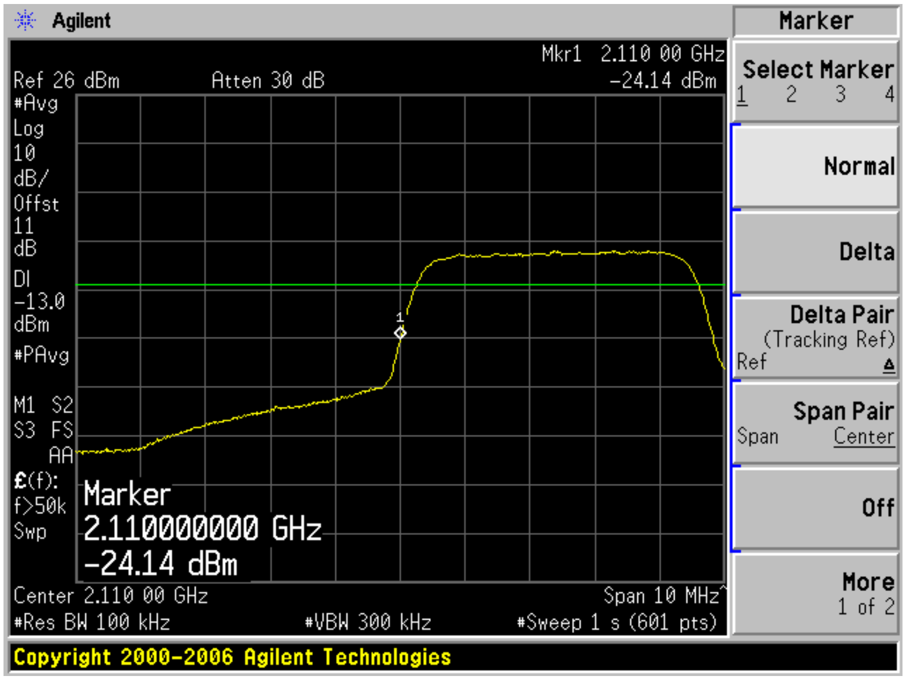
11.5 Test Results

Please refer to the following plots.

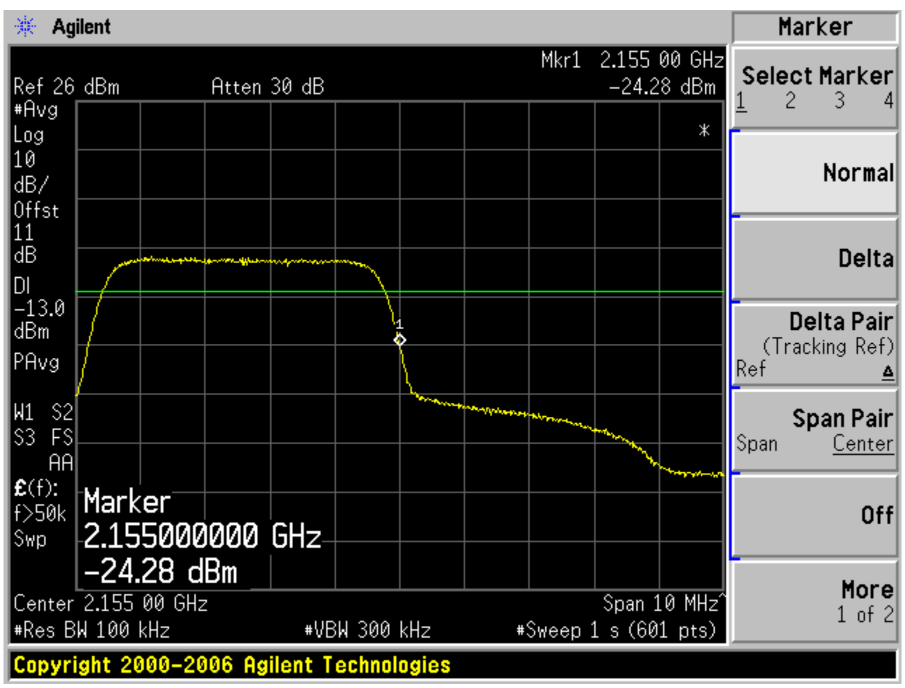
2110-2155 MHz Band, Downlink:

Modulation: WCDMA

Plot 1: Lowest Edge

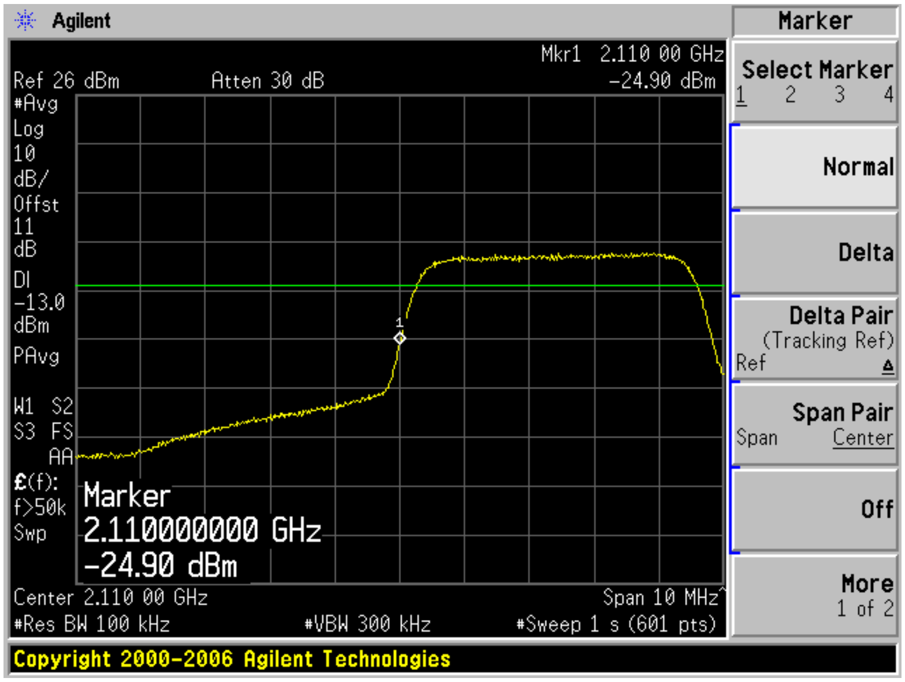


Plot 2: Highest Edge

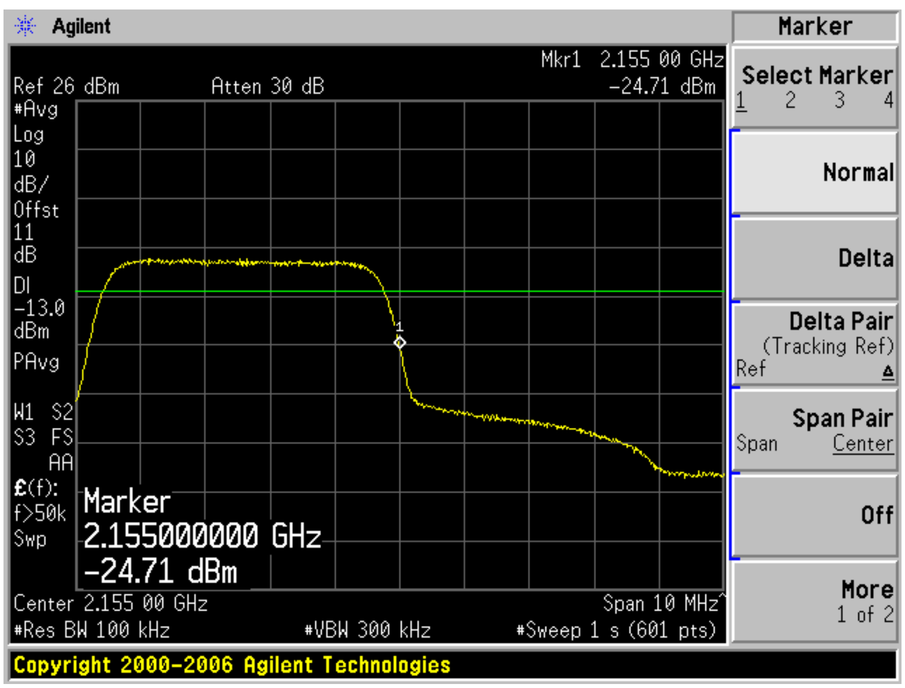


Modulation: HSPA Worst Case HSDPA

Plot 1: Lowest Edge



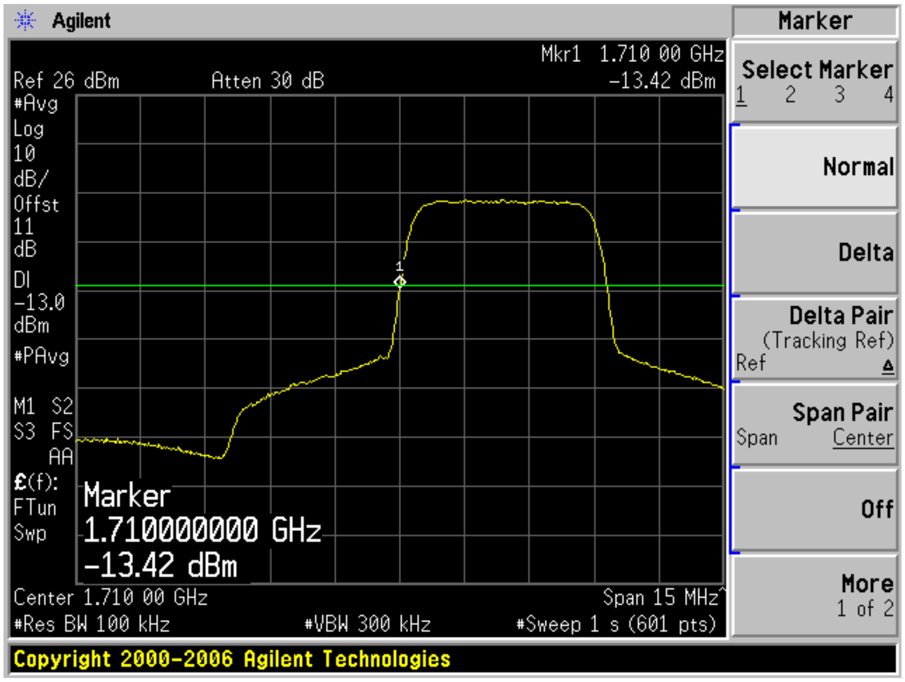
Plot 2: Highest Edge



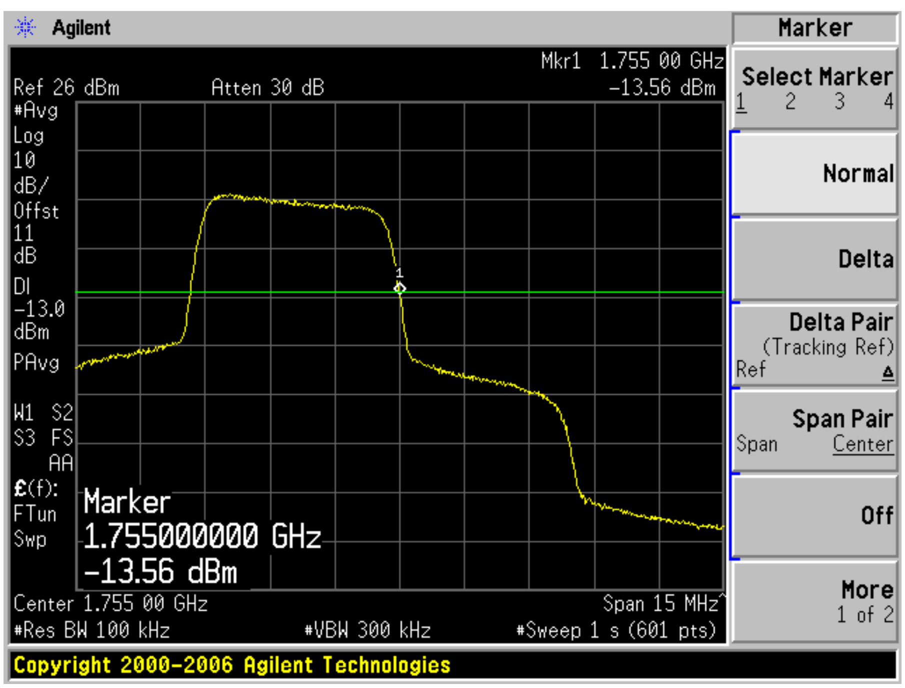
1710-1755 MHz Band, Uplink:

Modulation: WCDMA

Plot 1: Lowest Edge



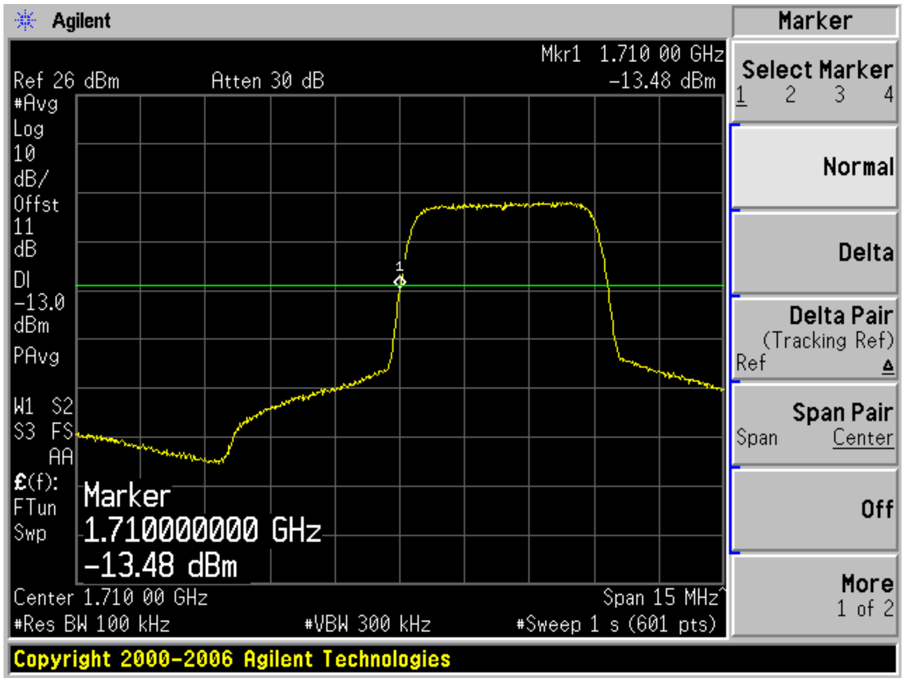
Plot 2: Highest Edge



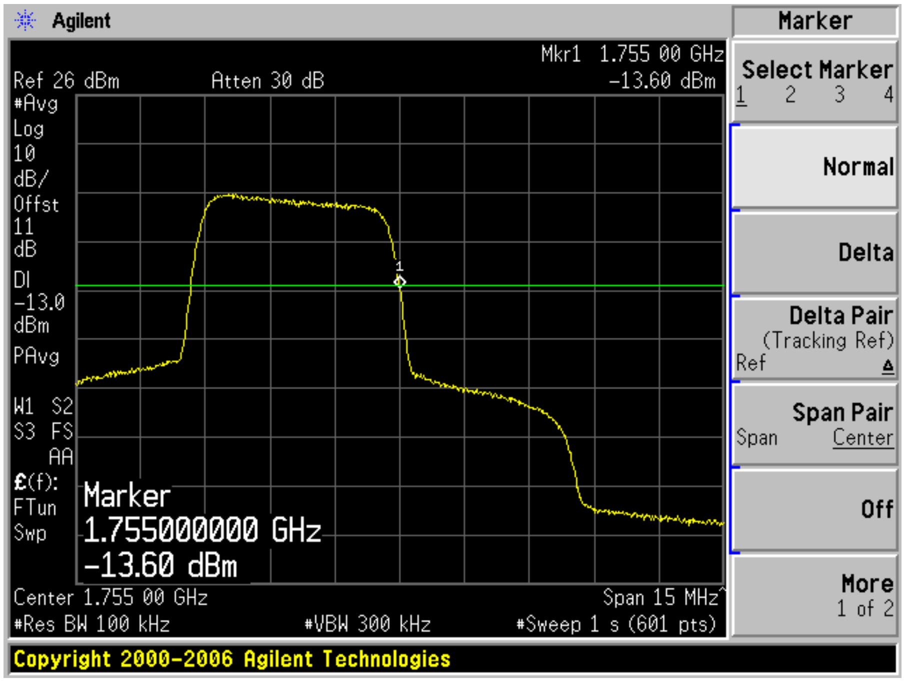
1710-1755 MHz Band, Uplink:

Modulation: HSPA Worst Case HSDPA

Plot 1: Lowest Edge



Plot 2: Highest Edge



12 FCC §2.1055, §27.54 & IC RSS-131 §6.5 – Frequency Stability

12.1 Applicable Standard

According to FCC §27.54, the frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

According to IC RSS-131 § 6.5, A band translator is essentially a repeater station and should introduce as little frequency error as possible. The frequency stability should therefore meet the objectives of the overall land mobile or cellular service for which it serves. Better frequency stability than the minimum standard cited below will therefore be required in some cases.

The frequency stability shall be within ± 1.5 parts per million (0.00015%).

12.2 Test Results

Not Applicable, the EUT is an amplifier, not a transmitter. There is no oscillator circuit in the EUT, therefore there is no frequency stability measurement required.

13 FCC §27.52, §2.1091 & IC RSS-102 - RF Exposure Information

13.1 Applicable Standard

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

Limits for General Population/Uncontrolled Exposure

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

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

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

According to 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
300-1500	$1.585\ f^{0.5}$	$0.0042\ f^{0.5}$	f / 150	6
1500-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000 / f^{1.2}$
150000-300000	$0.158\ f^{0.5}$	$4.21 \times 10\ -4\ f^{0.5}$	$6.67 \times 10^{-5}\ f$	$616000 / f^{1.2}$

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

13.2 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

Maximum peak output power at antenna input terminal (dBm):	24.33
Maximum peak output power at antenna input terminal (mW):	271.02
Prediction distance (cm):	25
Prediction frequency (MHz):	2132.4
Antenna Gain, typical (dBi):	14
Maximum Antenna Gain (numeric):	25.11
Power density at predication frequency and distance (mW/cm^2):	0.866
Power density at predication frequency and distance (W/m^2):	8.66
MPE limit for uncontrolled exposure at predication frequency (mW/cm^2):	1
MPE limit for uncontrolled exposure at predication frequency (W/m^2):	10

Test Result

For Downlink, the highest power density level at 25 cm is 0.866 mW/cm^2 (8.66 W/m^2), which is below the uncontrolled exposure limit.