FCC CFR47 PART 22 SUBPART H
FCC CFR47 PART 24 SUBPART E
INDUSTRY CANADA RSS-132 ISSUE 2
INDUSTRY CANADA RSS-133 ISSUE 5

CERTIFICATION TEST REPORT

FOR

iPhone With GSM WCDMA 1xRTT/CDMA 1xEVDO Rev. A, Bluetooth EDR 2.1, Bluetooth 4.0 LE, and WiFi 802.11 bgn

MODEL NUMBER: A1387

FCC ID: BCG-E2430A

IC: 579C-E2430A

REPORT NUMBER: 11U13896-1, Revision D

ISSUE DATE: OCTOBER 02, 2011

Prepared for

APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

Prepared by

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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
---	09/07/11	Initial Issue	T. Chan
A	09/08/11	Revised EUT description	A. Zaffar
B	09/14/11	Updated Port B Output Power	C. Pang
C	09/16/11	Revised report with the following: 1. Updated section 6 2. Updated client company name 3. Added Functional limitation and capability for Port A and Port B in section 5.3	F. Ibrahim
D	10/02/11	Added Test Modes at Port B/ANT2	C. Pang

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: APPLE, INC.
1 INFINITE LOOP
CUPERTINO, CA 95014, U.S.A.

EUT DESCRIPTION: iPhone With GSM WCDMA 1xRTT/CDMA 1xEVDO Rev. A, Bluetooth EDR 2.1, Bluetooth 4.0 LE, and WiFi 802.11 bgn

MODEL: A1387

SAMPLE UNIT: Conducted: E2 3544, Radiated: DVT BOM Variant 1 (D0415)

SERIAL NUMBER: C39G101HDR2W (Conducted Unit)

DATE TESTED: JULY 25 - AUGUST 29 and SEPTEMBER 29 – OCT 02, 2011

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
FCC PART 22H AND 24E	Pass
IC RSS132 AND IC RSS133	Pass

Compliance Certification Services (UL CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by UL CCS based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

Note: The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL CCS will constitute fraud and shall nullify the document. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For UL CCS By:

THU CHAN
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Tested By:

CHIN PANG
EMC ENGINEER
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2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with TIA-603-C, FCC CFR 47 Part 2, FCC CFR 47 Part 22, and FCC CFR Part 24, RSS-132 Issue 2, and RSS-133 Issue 5.

3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at http://www.ccsemc.com.

4. CALIBRATION AND UNCERTAINTY

4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards

4.2. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

4.3. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

Uncertainty figures are valid to a confidence level of 95%.

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5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The Apple iPhone, Model A1387, is a mobile phone with multimedia functions (music, application support, and video), cellular GSM, WCDMA-HSDPA & HSUPA, CDMA -1xRTT, EV-DO Rev 0 & Rev A radio, IEEE 802.11b/g/n radio and Bluetooth radio. This device measures 115.6 mm (4.55 inches) tall x 59.3 mm (2.33 inches) and 9.36 mm (0.368 inches) thick and weighs 140 grams (4.9 oz.). The rechargeable battery is not user accessible.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum conducted and ERP / EIRP output powers as follows:

PORT A/ANT1/Primary:

Part 22 Cellular Band

Frequency range (MHz)	Modulation	Conducted		ERP	
		dBm	mW	dBm	mW
824.7 – 848.31	1xRTT (RC2, SO9)	27.71	590.2	27.00	501.2
824.7 – 848.31	EV-DO - REV A	28.29	674.5	27.15	518.8

Part 22 Cellular Band

Frequency range (MHz)	Modulation	Conducted		ERP	
		dBm	mW	dBm	mW
824.2 – 848.8	GPRS	33.61	2296.1	31.97	1574.0
824.2 – 848.8	EGPRS	29.66	924.7	29.25	841.4

Part 22 Cellular Band

Frequency range (MHz)	Modulation	Conducted		ERP	
		dBm	mW	dBm	mW
826.4 – 846	UMTS, REL 99	26.70	467.7	26.27	423.6
826.4 – 846	UMTS, HSDPA	26.72	469.9	26.55	451.9

Part 24 PCS Band

Frequency range (MHz)	Modulation	Conducted		EIRP	
		dBm	mW	dBm	mW
1851.25 – 1908.8	1xRTT (RC2, SO9)	27.84	608.1	27.17	521.2
1851.25 – 1908.8	EV-DO - REV A	28.46	701.5	27.06	508.2

Part 24 PCS Band

Frequency range (MHz)	Modulation	Conducted		EIRP	
		dBm	mW	dBm	mW
1850.2 – 1909.8	GPRS	31.65	1462.2	27.78	599.8
1850.2 – 1909.8	EGPRS	28.34	682.3	26.88	487.5

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Part 24 PCS Band

Frequency range (MHz)	Modulation	Conducted		EIRP	
		dBm	mW	dBm	mW
1852.4 – 1907.6	UMTS, REL 99	26.98	498.9	23.58	228.0
1852.4 – 1907.6	UMTS, HSDPA	26.40	436.5	23.68	233.3

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PORT B/ANT2/Secondary:

Part 22 and 24 Bands

Frequency range (MHz)	Modulation	Conducted		ERP / EIRP	
		dBm	mW	dBm	mW
824.7 – 848.31	1xRTT (RCS2, SO9)	27.70	588.8	23.35	216.3
1851.25-1908.75	1xRTT (RCS2, SO9)	26.06	403.6	22.85	192.8

Part 22 and 24 Bands

Frequency range (MHz)	Modulation	Conducted		ERP / EIRP	
		dBm	mW	dBm	mW
824.7 – 848.31	EVDO - REV A	28.03	635.3	23.75	237.1
1851.25-1908.75	EVDO - REV A	26.96	496.6	23.81	240.4

Part 22 and 24 Bands

Frequency range (MHz)	Modulation	Conducted		ERP / EIRP	
		dBm	mW	dBm	mW
824.2 – 848.8	GSM Voice	33.13	2055.9	29.08	809.1
1850.2-1909.8	GSM Voice	29.50	891.3	27.16	520.0

Part 22 and 24 Bands

Frequency range (MHz)	Modulation	Conducted		ERP / EIRP	
		dBm	mW	dBm	mW
826.4 – 846	UMTS, REL 99	26.58	455.0	24.56	285.8
1852.4 – 1907.6	UMTS, REL 99	24.68	293.8	21.95	156.7

Part 22 and 24 Bands

Frequency range (MHz)	Modulation	Conducted		ERP / EIRP	
		dBm	mW	dBm	mW
826.4 – 846	UMTS, HSDPA	26.67	464.5	24.67	293.1
1852.4 – 1907.6	UMTS, HSDPA	24.59	287.7	21.82	152.1

Part 22 Band

Frequency range (MHz)	Modulation	Conducted		ERP	
		dBm	mW	dBm	mW
824.2 – 848.8	GPRS	32.99	1990.7	29.10	812.8
824.2 – 848.8	EGPRS	29.07	807.2	27.30	537.0

Part 24 Band

Frequency range (MHz)	Modulation	Conducted		EIRP	
		dBm	mW	dBm	mW
1850.2 –1909.8	GPRS	29.77	948.4	27.10	512.9
1850.2 –1909.8	EGPRS	26.34	430.5	25.00	316.2

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5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a band gap type integral antenna for the 850MHz and 1900MHz bands with a maximum peak gain as follow:

	Peak Gain (dBi)	
	Port A (LAT)	Port B (UAT)
Cell	-0.45	-3.70
PCS	0.73	-2.70

The device is capable of switching between the Primary/ANT1 and Secondary/ANT2 Antennas. The antenna switching is implemented with a physical, “break-before-make” switch such that only one antenna can be used for cellular transmission at a time. Since, both Primary and Secondary Antennas can be used for transmit and receive, the applicable transmission modes for both antennas are defined in the table below.

Antenna	Antenna Use	Antenna Type	Technologies	Tx Bands
ANT1	Primary	Metal band/FPC	CDMA 1x (voice), 1xRTT (voice/data), EV-DO, GSM (voice), GPRS/EDGE (data), UMTS (voice), UMTS (data), UMTS (Voice + data mode), HSDPA, HSUPA	850/1900
ANT2	Secondary	Metal band	CDMA 1x (voice), 1xRTT (voice/data), EV-DO, GSM (voice), GPRS/EDGE (data), UMTS (voice), UMTS (data), UMTS (Voice + data mode), HSDPA, HSUPA	850/1900
ANT3	Wi-Fi/BT	PIFA	802.11b/g/n, Bluetooth. Wi-Fi and BT cannot transmit simultaneously.	2400MHz

Notes:

* In UMTS (voice + data) mode; also called Multi-Radio Access Bearer (MRAB) mode, the same antenna is used for both voice and data transmission. The data transmission can be in any one of these wireless modes: UMTS, HSDPA or HSUPA. Only one cellular antenna is used for voice + data transmission at any given time.

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5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was 0.15.06

The EUT software installed during testing was 9A287

The EUT is linked with Agilent 8960 Communication Test Set.

5.5. WORST-CASE CONFIGURATION AND MODE

The worst-case channel for RF radiated emissions below 1GHz and AC conducted emissions are determined as the channel with the AC Power Adapter Source

Based on the investigation results, the highest peak power and enhanced data rate is the worst-case scenario for all measurements.

Worst-case modes below:

- For Cellular and PCS band: 1xRTT (RC2 SO9) Port A and 32(+F-SCH) Port B
- For Cellular and PCS band: CDMA2000 1xEV-DO Revision A (Rev. A)
- For Cellular and PCS band: GPRS and EGPRS
- For Cellular and PCS band: UMTS, REL 99 and HSDPA.

The device under test has two ports: port A (LAT) and Port B (UAT), and from the baseline scan, Port A has a higher power than Port B.

The EUT has been investigated on X/Y/Z position, the worst-case was determined on X-position for both CELL and PCS by comparing the fundamental ERP / EIRP output power.

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5.6. DESCRIPTION OF TEST SETUP

I/O CABLES (RF CONDUCTED TEST)

I/O CABLE LIST						
Cable No.	**Port**	**#of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	1	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	2m	N/A
3	Directional	1	EUT	Un-shielded	1m	N/A
4	Directional	1	Spectrum Analyzer	Un-shielded	1m	N/A
5	RF In/Out	1	Communications Test Set	Un-shielded	N/A	N/A

I/O CABLES (RF RADIATED TEST)

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US 115V	Un-shielded	2m	NA
2	DC	1	DC	Un-shielded	1m	NA
3	Jack	1	Earphone	Un-shielded	0.5m	NA
4	RF In/Out	1	Horn	Un-shielded	2m	NA

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	Foxlink Technology Ltd.	A1357	6072804	DoC
DC Power Supply	HP	E3610A	KR24104150	NA

TEST SETUP

The EUT is a stand-alone device. The Wireless Communication test set exercised the EUT.

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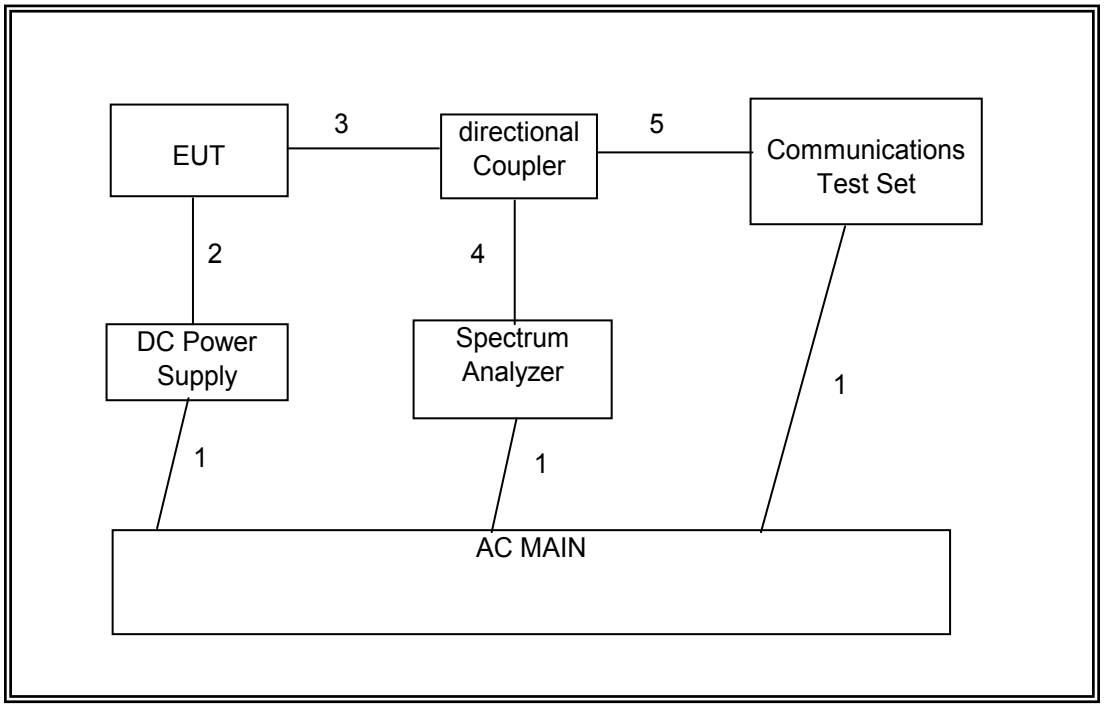
SETUP DIAGRAM FOR RF CONDUCTED TESTS



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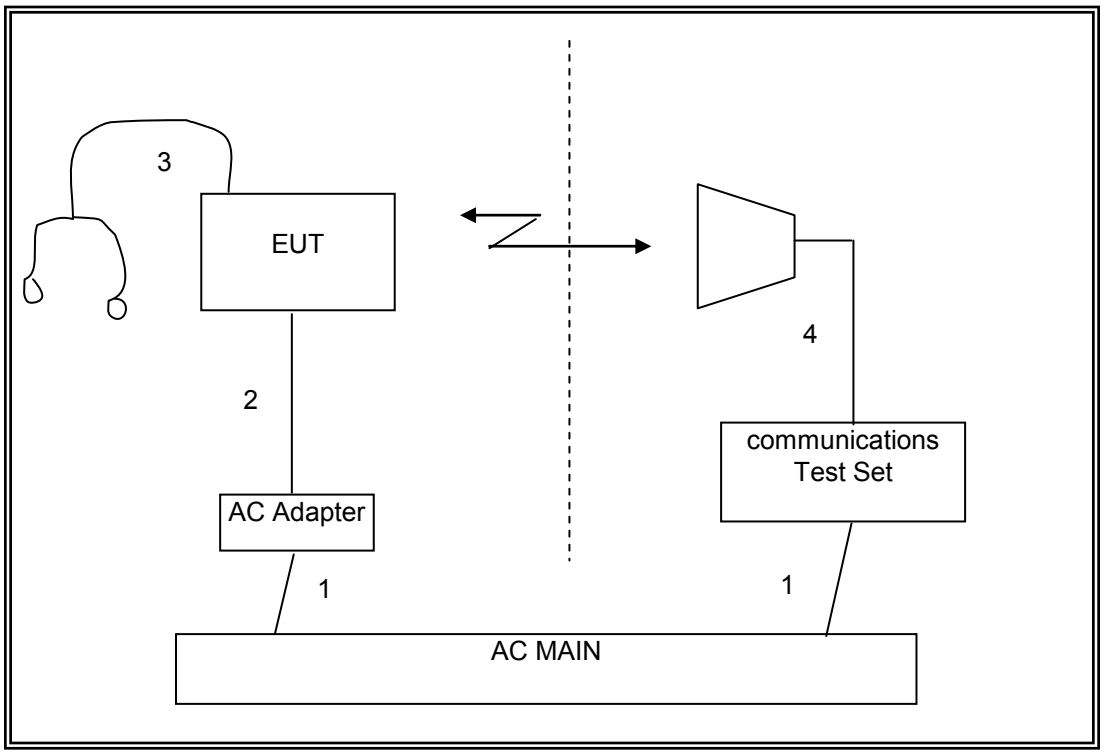
SETUP DIAGRAM FOR RF RADIATED TESTS



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6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Asset**	**Cal Due**
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01159	05/11/12
Antenna, Horn, 18 GHz	EMCO	3115	C00872	06/29/12
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	07/16/12
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	01/27/12
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	07/12/12
EMI Test Receiver, 9 kHz-7 GHz	R & S	ESCI 7	1000741	07/06/12
Communication Test Set	Agilent / HP	E5515C	C01086	06/17/12
Communication Test Set	R & S	CMU 200	C01131	06/24/12
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/10/11
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	04/20/12
Highpass Filter, 1.5 GHz	Micro-Tronics	HPM13193	N02689`	CNR
Highpass Filter, 2.7 GHz	Micro-Tronics	HPM13194	N02687	CNR
Directional Coupler	Krytar	1817	N02656	CNR
Signal Generator, 20 GHz	Agilent / HP	83732B	C00774	07/14/12
Antenna, Tuned Dipole 400~1000 MHz	ETS	3121C DB4	C00993	07/16/12

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7. RF POWER OUTPUT VERIFICATION

7.1. RF POWER OUTPUT FOR 1xRTT

TEST PROCEDURE

This procedure assumes the Agilest 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
CDMA2000 Mobile Test	B.13.08, L

- Call Setup > Shift & Preset
- Cell Info > Cell Parameters > System ID (SID) > 18
  > Network ID (NID) > 65535
- Protocol Rev > 6 (IS-2000-0)
- Radio Config (RC) > Please see following table or details
- FCH Service Option (SO) Setup > Please see following table or details
- Traffic Data Rate > Full
- TDSO SCH Info > F-SCH Parameters > F-SCH Data Rate > 153.6 kbps
  > R-SCH Parameters > R-SCH Data Rate > 153.6 kbps
- Rvs Power Ctrl > Active bits
  - Rvs Power Ctrl > All Up bits (Maximum TxPout)

RESULT

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CELL BAND:

PORT A / PRIMARY

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 1013 / 824.7 MHz	Ch. 384 / 836.52 MHz	Ch. 777 / 848.31 MHz
		Peak	Peak	Peak
RC1	2 (Loopback)	27.56	27.66	27.38
	55 (Loopback)	27.48	27.69	27.33
RC2	9 (Loopback)	27.58	**27.71**	27.40
	55 (Loopback)	27.68	27.67	27.34
RC3	2 (Loopback)	27.18	27.39	27.18
	55 (Loopback)	27.45	27.41	27.17
	32 (+ F-SCH)	27.36	27.32	27.28
	32 (+ SCH)	27.25	27.31	27.14
RC4	2 (Loopback)	27.31	27.45	27.20
	55 (Loopback)	27.33	27.40	27.12
	32 (+ F-SCH)	27.38	27.43	27.24
	32 (+ SCH)	27.34	27.44	27.28
RC5	9 (Loopback)	27.32	27.47	27.13
	55 (Loopback)	27.49	27.43	27.15

PORT B / SECONDARY

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 1013 / 824.7 MHz	Ch. 384 / 836.52 MHz	Ch. 777 / 848.31 MHz
		Peak	Peak	Peak
RC1	2 (Loopback)	27.45	27.50	27.15
	55 (Loopback)	27.35	27.55	27.10
RC2	9 (Loopback)	27.52	**27.70**	27.35
	55 (Loopback)	27.45	27.56	27.30
RC3	2 (Loopback)	27.20	27.30	27.04
	55 (Loopback)	27.35	27.30	27.10
	32 (+ F-SCH)	27.06	27.01	26.91
	32 (+ SCH)	27.10	27.04	26.86
RC4	2 (Loopback)	27.20	27.35	27.06
	55 (Loopback)	27.20	27.34	27.02
	32 (+ F-SCH)	27.30	27.39	27.10
	32 (+ SCH)	27.28	27.39	27.17
RC5	9 (Loopback)	27.18	27.40	27.08
	55 (Loopback)	27.40	27.37	27.10

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PCS BAND:

PORT A / PRIMARY

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 25 / 1851.25 MHz	Ch. 600 / 1880 MHz	Ch. 1175 / 1908.75 MHz
		Peak	Peak	Peak
RC1	2 (Loopback)	27.25	27.80	27.15
	55 (Loopback)	27.15	27.70	27.19
RC2	9 (Loopback)	27.18	**27.84**	27.25
	55 (Loopback)	27.11	27.68	27.26
RC3	2 (Loopback)	27.04	27.32	26.98
	55 (Loopback)	27.00	27.42	26.87
	32 (+ F-SCH)	27.01	27.31	27.01
	32 (+ SCH)	26.91	27.28	26.85
RC4	2 (Loopback)	27.05	27.33	26.97
	55 (Loopback)	27.01	27.31	26.91
	32 (+ F-SCH)	26.96	27.29	26.92
	32 (+ SCH)	26.81	27.40	26.78
RC5	9 (Loopback)	26.96	27.32	26.97
	55 (Loopback)	27.00	27.41	26.88

PORT B / SECONDARY

Radio Configuration (RC)	Service Option (SO)	Conducted Output Power (dBm)		
		Ch. 25 / 1851.25 MHz	Ch. 600 / 1880 MHz	Ch. 1175 / 1908.75 MHz
		Peak	Peak	Peak
RC1	2 (Loopback)	26.67	26.62	26.60
	55 (Loopback)	26.70	26.65	26.62
RC2	9 (Loopback)	26.73	**26.06**	26.30
	55 (Loopback)	26.60	26.45	26.50
RC3	2 (Loopback)	26.70	26.67	26.60
	55 (Loopback)	26.65	26.46	26.54
	32 (+ F-SCH)	25.46	25.23	25.02
	32 (+ SCH)	25.76	25.43	25.06
RC4	2 (Loopback)	26.12	26.60	26.60
	55 (Loopback)	26.65	26.55	26.57
	32 (+ F-SCH)	26.65	26.36	26.56
	32 (+ SCH)	26.60	26.43	26.47
RC5	9 (Loopback)	26.65	26.32	26.60
	55 (Loopback)	26.60	26.34	26.56

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7.2. RF POWER OUTPUT FOR CDMA2000 1xEV-DO Release 0 (Rel. 0)

TEST PROCEDURE

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
1xEV-DO Terminal Test	A.09.13

EVDO Release 0 - RTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > RTAP
  - RTAP Rate > 153.6 kbps
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

EVDO Release 0 - FTAP

- Call Setup > Shift & Preset
- Call Control:
  - Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
  - Generator Info > Termination Parameters > Max Forward Packet Duration > 16 Slots
- Call Parms:
  - Cell Power > -105.5 dBm/1.23 MHz
  - Cell Band > (Select US Cellular or US PCS)
  - Channel > (Enter channel number)
  - Application Config > Enhanced Test Application Protocol > FTAP (default)
  - FTAP Rate > 307.2 kbps (2 Slot, QPSK)
  - Rvs Power Ctrl > Active bits
  - Protocol Rel > 0 (1xEV-DO)
- Press “Start Data Connection” when “Session Open” appear in “Active Cell”
- Rvs Power Ctrl > All Up bits (Maximum TxPout)

RESULTS

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PORT A / PRIMARY

Cell Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm) Peak
307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	28.25
		384	836.52	28.27
		777	848.31	27.97

PCS Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm) Peak
307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	27.20
		600	1880.00	27.84
		1175	1908.75	27.19

PORT B / SECONDARY

Cell Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm) FTAP Peak
307.2 kbps (2 slot, QPSK)	153.6 kbps	1013	824.70	27.96
		384	836.52	27.90
		777	848.31	27.69

PCS Band

FTAP Rate	RTAP Rate	Channel	f (MHz)	Conducted power (dBm) FTAP Peak
307.2 kbps (2 slot, QPSK)	153.6 kbps	25	1851.25	26.51
		600	1880.00	26.37
		1175	1908.75	25.94

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7.3. RF POWER OUTPUT FOR CDMA2000 1xEV-DO Revision A (Rev. A)

TEST PROCEDURE

This procedure assumes the Agilent 8960 Test Set has the following applications installed and with valid license.

Application	Rev, License
1xEV-DO Terminal Test	A.09.13

EVDO Release A – RETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > RETAP
- R-Data Pkt Size > 4096
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2 > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

EVDO Release A - FETAP

- Call Setup > Shift & Preset
- Cell Power > -60 dBm/1.23 MHz
- Protocol Rev > A (1xEV-DO-A)
- Application Config > Enhanced Test Application Protocol > FETAP
- F-Traffic Format > 4 (1024, 2,128) Canonical (307.2k, QPSK)
- Protocol Subtype Config > Release A Physical Layer Subtype > Subtype 2 > PL Subtype 2 Access Channel MAC Subtype > Default (Subtype 0)
- Access Network Info > Cell Parameters > Sector ID > 00000000 > Subnet Mask > 0
- Generator Info > Termination Parameters > Max Forward Packet Duration >16 Slots > ACK R-Data After > Subpacket 0 (All ACK)
- Rvs Power Ctrl > All Up bits (to get the maximum power)

RESULTS

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PORT A / PRIMARY

Cell Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm) Peak
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	**28.29**
		384	836.52	28.19
		777	848.31	28.00

PCS Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm) Peak
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	27.58
		600	1880.00	**28.46**
		1175	1908.75	27.63

PORT B / SECONDARY

Cell Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm) FETAP Peak
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	1013	824.70	**28.07**
		384	836.52	28.03
		777	848.31	27.82

PCS Band

FETAP-Traffic Format	RETAP-Data Payload Size	Channel	f (MHz)	Conducted power (dBm) RETAP Peak
307.2k, QPSK/ ACK channel is transmitted at all the slots	4096	25	1851.25	**26.96**
		600	1880.00	26.59
		1175	1908.75	26.15

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7.4. RF POWER OUTPUT FOR GSM MODE

TEST PROCEDURE

GPRS/EGPRS

Function: Menu select > GSM Mobile Station > GSM 850/900/1800/1900
Press Connection control to choose the different menus
Press RESET > choose all to reset all settings
Connection Press Signal Off to turn off the signal and change settings
Network Support > GSM+GPRS or GSM+EGPRS
Main Service > Packet Data
Service selection > Test Mode A – Auto Slot Config. off
MS Signal Press Slot Config bottom on the right twice to select and change the number of time slots and power setting
> Slot configuration > Uplink/Gamma
> 33 dBm for GPRS 850/900
> 27 dBm for EGPRS 850/900
> 30 dBm for GPRS1800/1900
> 26 dBm for EGPRS1800/1900
BS Signal Enter the same channel number for TCH channel (test channel) and BCCH channel
Frequency Offset > + 0 Hz
Mode > BCCH and TCH
BCCH Level > -85 dBm (May need to adjust if link is not stable)
BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]
Channel Type > Off
P0> 4 dB
Slot Config > Unchanged (if already set under MS Signal)
TCH > choose desired test channel
Hopping > Off
Main Timeslot > 3 (Default)
Network Coding Scheme > CS4 (GPRS) and MCS9 (EGPRS)
Bit Stream > 2E9-1PSR Bit Pattern
AF/RF Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection Press Signal On to turn on the signal and change settings

RESULTS

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LAT (PORT A) / PRIMARY

GPRS for Cell and PCS Band

Mode	Ch.	f (MHz)	1 time slot Peak	2 time slots Peak
GPRS	128	824.2	**33.61**	31.00
	190	836.6	33.50	31.20
	251	848.8	33.50	31.20
GPRS	512	1850.2	**31.65**	31.60
	661	1880	31.48	31.40
	810	1909.8	31.13	31.10

EGPRS for Cell and PCS Band

Mode	Ch.	f (MHz)	1 time slot Peak	2 time slots Peak
EGPRS	128	824.2	29.46	29.40
	190	836.6	29.65	29.60
	251	848.8	**29.66**	29.60
EGPRS	512	1850.2	**28.34**	28.30
	661	1880	28.22	28.10
	810	1909.8	28.04	28.00

UAT (PORT B) / SECONDARY

GPRS for Cell and PCS Band

Mode	Ch.	f (MHz)	1 time slot Peak	2 time slots Peak
GPRS	128	824.2	**32.99**	30.2
	190	836.6	32.98	30.74
	251	848.8	32.90	30.62
GPRS	512	1850.2	29.43	29.44
	661	1880	29.56	29.44
	810	1909.8	**29.77**	29.73

EGPRS for Cell and PCS Band

Mode	Ch.	f (MHz)	1 time slot Peak	2 time slots Peak
EGPRS	128	824.2	29.03	28.8
	190	836.6	**29.07**	29.03
	251	848.8	28.99	28.98
EGPRS	512	1850.2	**26.34**	26.11
	661	1880	26.20	26.05
	810	1909.8	26.16	26.08

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7.5. RF POWER OUTPUT FOR UMTS REL99

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel99
	Subtest	-
WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	HSDPA FRC	Not Applicable
	HSUPA Test	Not Applicable
	Power Control Algorithm	Algorithm2
	βc	Not Applicable
	βd	Not Applicable
	βec	Not Applicable
	βc/βd	8/15
	βhs	Not Applicable
	βed	Not Applicable

RESULTS

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PORT A / PRIMARY

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)
				Peak
UMTS 850	4132	4357	826.4	26.12
	4180	4405	836.4	26.65
	4230	4455	846.6	**26.70**

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)
				Peak
UMTS 1900	9262	9662	1852.4	26.35
	9400	9800	1880.0	**26.98**
	9538	9938	1907.6	26.67

PORT B / SECONDARY

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)
				Peak
UMTS 850	4132	4357	826.4	26.08
	4180	4405	836.4	**26.58**
	4230	4455	846.6	26.56

Band	UL Ch	DL Ch	Frequency	Conducted output power (dBm)
				Peak
UMTS 1900	9262	9662	1852.4	**24.68**
	9400	9800	1880.0	24.32
	9538	9938	1907.6	24.29

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7.6. RF POWER OUTPUT FOR UMTS Rel 6 HSDPA

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA	Rel6 HSDPA
	Subtest	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	HSUPA Test	Not Applicable			
	Power Control Algorithm	Algorithm 2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βec	-	-	-	-
	βc/βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	βed	Not Applicable			
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback (Table 5.2B.4)	4ms			
	CQI Repetition Factor (Table 5.2B.4)	2			
	Ahs = βhs/βc	30/15			

RESULT

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PORT A / PRIMARY

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)
					Peak
UMTS850 (Band V)	1	4132	4357	826.4	26.60
		4180	4405	836.0	26.53
		4230	4455	846.0	26.63
	2*	4132	4357	826.4	26.68
		4180	4405	836.0	26.59
		4230	4455	846.0	26.57
	3	4132	4357	826.4	**26.72**
		4180	4405	836.0	26.56
		4230	4455	846.0	26.57
	4	4132	4357	826.4	26.63
		4180	4405	836.0	26.60
		4230	4455	846.0	26.58
UMTS1900 (Band II)	1	9262	9662	1852.4	25.92
		9400	9800	1880.0	26.21
		9538	9938	1907.6	26.24
	2*	9262	9662	1852.4	25.97
		9400	9800	1880.0	26.21
		9538	9938	1907.6	26.28
	3	9262	9662	1852.4	25.92
		9400	9800	1880.0	26.29
		9538	9938	1907.6	**26.40**
	4	9262	9662	1852.4	25.89
		9400	9800	1880.0	26.31
		9538	9938	1907.6	26.36

PORT B / SECONDARY (WORST CASE ONLY ON SUB TEST 3)

	SUB Test	UL Ch	DL Ch	Frequency	Conducted output power (dBm)
					Peak
UMTS 850 Band V	3	4132	4357	826.4	26.07
		4180	4405	836.0	26.51
		4230	4455	846.0	26.67

	SUB Test	UL Ch	DL Ch	Frequency	Conducted output power (dBm)
					Peak
UMTS 1900 Band II	3	9262	9662	1852.4	**24.59**
		9400	9800	1880.0	24.32
		9538	9938	1907.6	24.09

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7.7. RF POWER OUTPUT UMTS Rel 6 HSPA (HSDPA & HSUPA)

TEST PROCEDURE

The following summary of these settings are illustrated below:

	Mode	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA	Rel6 HSUPA
	Subtest	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/βd	11/15	6/15	15/9	2/15	-
	βhs	22/15	12/15	30/15	4/15	5/15
	βed	1309/225	94/75	47/15 47/15	56/75	47/15
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback (Table 5.2B.4)	4ms				
	CQI Repetition Factor (Table 5.2B.4)	2				
	Ahs = βhs/βc	30/15				
HSUPA Specific Settings	D E-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	12
	ETFCI (from 34.121 Table C.11.1.3)	75	67	92	71	67
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_TFCIs	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO 4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO 23 E-TFCI 75 E-TFCI PO 26 E-TFCI 81 E-TFCI PO 27	

RESULTS

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PORT A

Band	Subtest	UL Ch	DL Ch	Frequency	Conducted output power (dBm)
					Peak
UMTS850 (Band V)	1	4132	4357	826.4	26.16
		4180	4405	836.0	26.27
		4230	4455	846.0	26.24
	2	4132	4357	826.4	26.15
		4180	4405	836.0	26.10
		4230	4455	846.0	26.15
	3	4132	4357	826.4	25.95
		4180	4405	836.0	26.00
		4230	4455	846.0	25.88
	4	4132	4357	826.4	26.15
		4180	4405	836.0	**26.39**
		4230	4455	846.0	26.35
	5	4132	4357	826.4	25.90
		4180	4405	836.0	26.00
		4230	4455	846.0	25.82
UMTS1900 (Band II)	1	9262	9662	1852.4	26.09
		9400	9800	1880.0	25.95
		9538	9938	1907.6	25.86
	2	9262	9662	1852.4	25.74
		9400	9800	1880.0	25.99
		9538	9938	1907.6	26.21
	3	9262	9662	1852.4	25.88
		9400	9800	1880.0	26.03
		9538	9938	1907.6	25.69
	4	9262	9662	1852.4	26.04
		9400	9800	1880.0	25.99
		9538	9938	1907.6	25.72
	5	9262	9662	1852.4	26.01
		9400	9800	1880.0	**26.33**
		9538	9938	1907.6	25.96

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8. CONDUCTED TEST RESULTS

8.1. OCCUPIED BANDWIDTH

RULE PART(S)

FCC: §2.1049
IC: RSS-132, 4.5; RSS-133, 6.5

LIMITS

For reporting purposes only

TEST PROCEDURE

The transmitter output was connected to a calibrated coaxial cable and coupler, the other end of which was connected to a spectrum analyzer. The occupied bandwidth was measured with the spectrum analyzer at the low, middle and high channel in each band. The -26dB bandwidth was also measured and recorded.

MODES TESTED

- 1xRTT – RC2, SO9
- CDMA2000 1xEV-DO Revision A (Rev. A)
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

Port A/ANT 1/Primary

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	1xRTT	1013	824.70	1.2742	1.412
		384	836.52	1.2732	1.414
		777	848.31	1.2796	1.415
	CDMA2000 1xEV-DO Revision A (Rev. A)	1013	824.70	1.2750	1.407
		384	836.52	1.2875	1.388
		777	848.31	1.2846	1.396

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
Cellular	GPRS	128	824.20	240.2927	312.420
		190	836.60	242.3343	315.388
		251	848.80	240.6359	298.580
	EGPRS	128	824.20	236.7791	281.532
		190	836.60	241.5002	301.248
		251	848.80	247.9778	307.744

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Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	UMTS, REL 99	4357	826.4	4.1511	4.598
		4405	836.0	4.1635	4.553
		4455	846.0	4.1448	4.641
	UMTS, HSDPA	128	826.4	4.1534	4.451
		190	836.0	4.1148	4.483
		251	846.0	4.1496	4.570

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
PCS	1xRTT	25	1851.25	1.2710	1.401
		600	1880.0	1.2712	1.394
		1175	1908.75	1.2792	1.388
	CDMA2000 1xEV-DO Revision A (Rev. A)	25	1851.25	1.2828	1.402
		600	1880.0	1.2771	1.391
		1175	1908.75	1.2762	1.417

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	238.4390	278.693
		661	1880.0	238.2427	300.839
		810	1909.8	244.9922	296.769
	EGPRS	512	1850.2	246.1039	281.339
		661	1880.0	238.0524	290.409
		810	1909.8	238.4365	285.821

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
PCS	UMTS, REL 99	9662	1852.4	4.2026	4.598
		9800	1880.0	4.2238	4.609
		9938	1907.6	4.1206	4.570
	UMTS, HSDPA	9662	1852.4	4.1385	4.591
		9800	1880.0	4.1335	4.520
		9938	1907.6	4.1691	4.515

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PORT B/ANT2/Secondary

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
Cellular	1xRTT 32(+F-SCH)	1013	824.70	1.2725	1.398
		384	836.52	1.2705	1.401
		777	848.31	1.2741	1.386
	1xRTT 32(+SCH)	1013	824.70	1.2699	1.369
		384	836.52	1.2713	1.406
		777	848.31	1.2786	1.397

Band	Mode	Channel	f (MHz)	99% BW (MHz)	-26dB BW (MHz)
PCS	1xRTT 32 (+F-SCH)	25	1851.25	1.2742	1.380
		600	1880.0	1.2703	1.401
		1175	1908.75	1.2728	1.392
	1xRTT 32 (+SCH)	25	1851.25	1.2754	1.397
		600	1880.0	1.2724	1.393
		1175	1908.75	1.2665	1.394

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
Cellular	GPRS	128	824.20	252.5052	313.662
		190	836.60	250.6137	307.994
		251	848.80	240.1345	292.122
	EGPRS	128	824.20	240.7380	287.744
		190	836.60	240.0633	290.102
		251	848.80	238.5842	302.390

Band	Mode	Channel	f (MHz)	99% BW (KHz)	-26dB BW (KHz)
PCS	GPRS	512	1850.2	242.2444	296.722
		661	1880.0	247.2813	305.067
		810	1909.8	243.5566	294.539
	EGPRS	512	1850.2	251.6799	284.123
		661	1880.0	242.2386	313.545
		810	1909.8	244.8373	296.449

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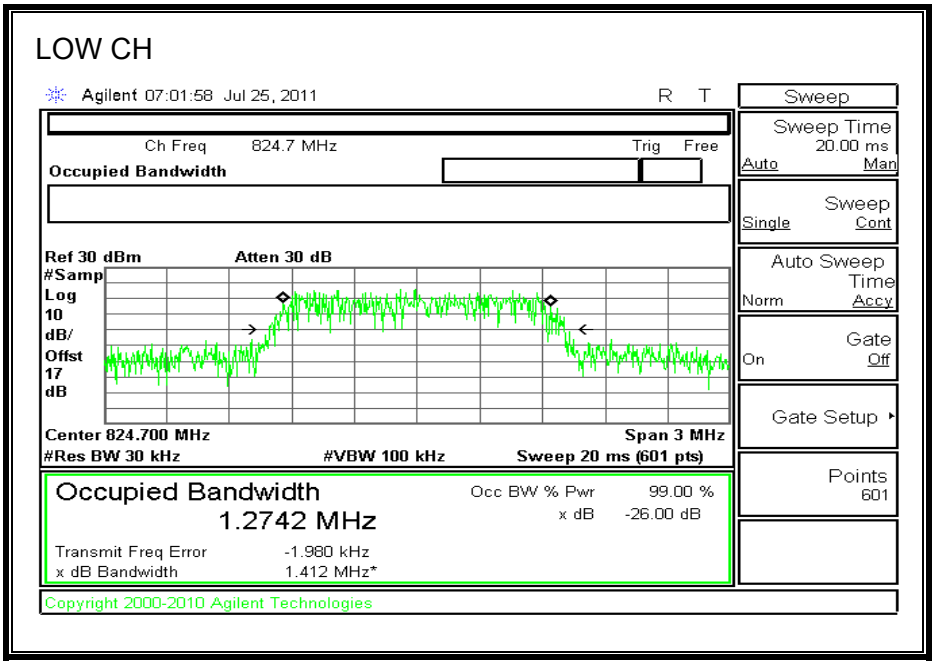
PORT A

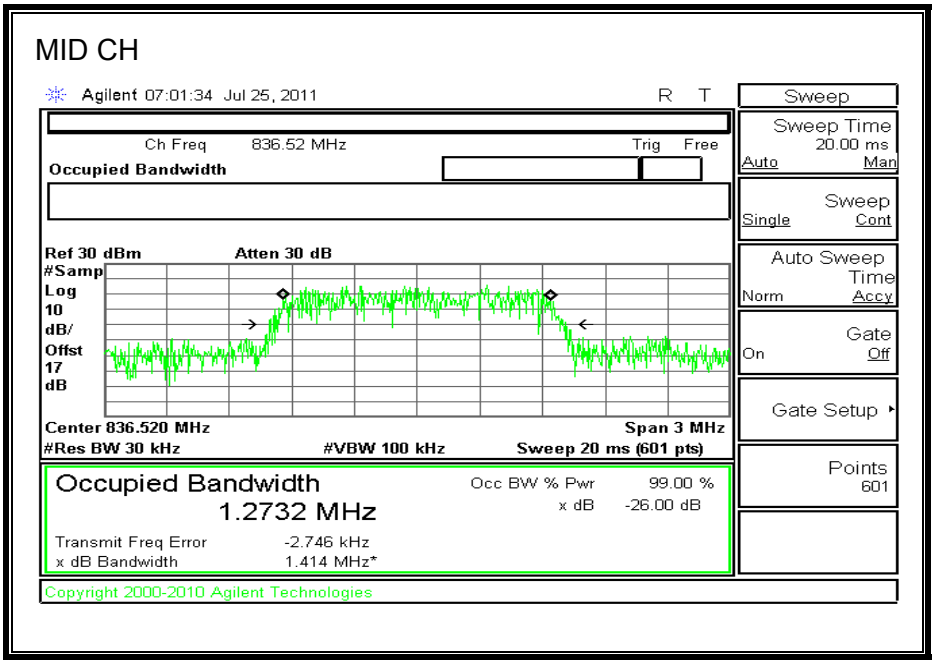
99% BANDWIDTH and 26dB

CDMA2000 1xRTT Mode (Cellular Band)

LOW CH



MID CH



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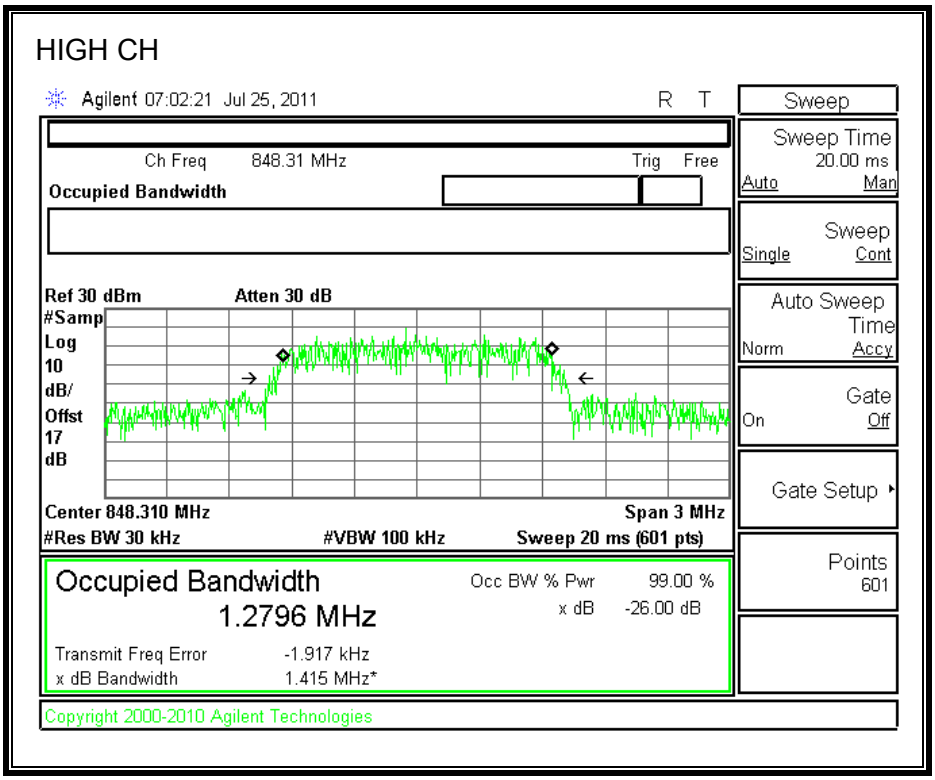

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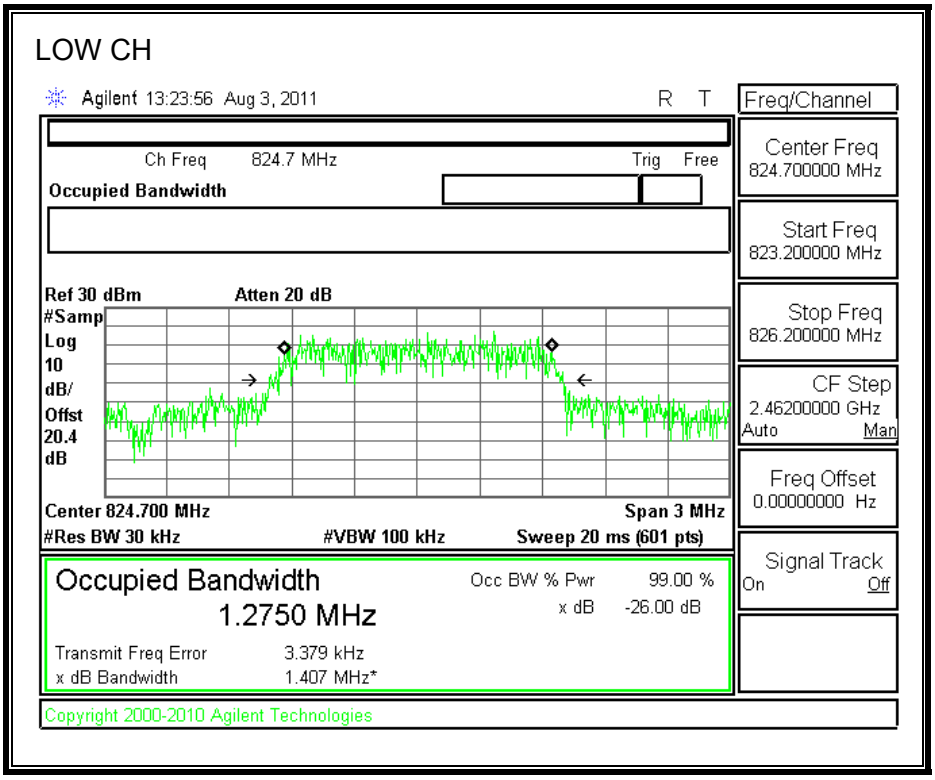
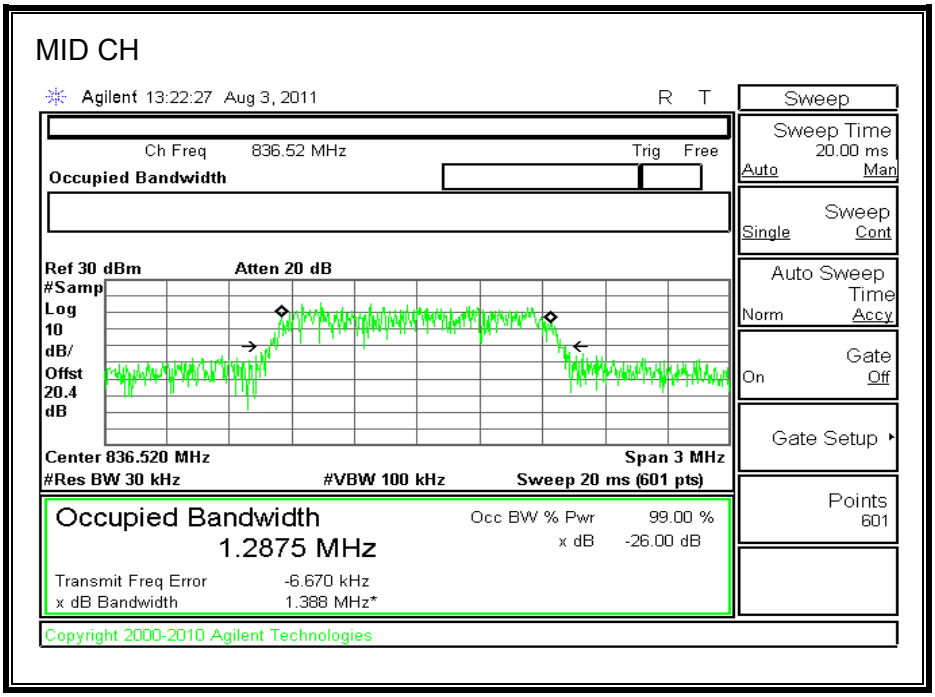
CDMA2000 1xEV-DO Revision A (Rev. A) Cellular Band

LOW CH



MID CH



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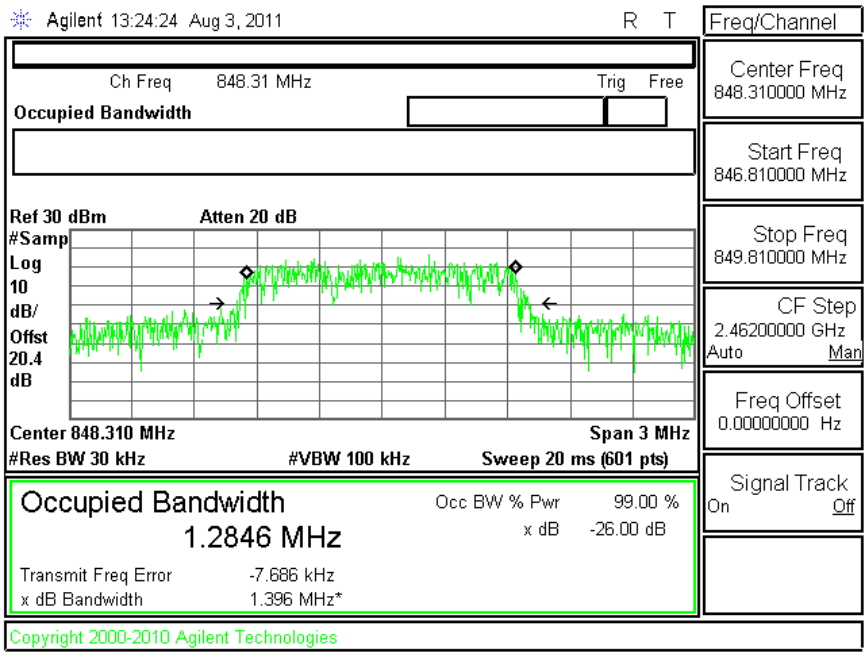
HIGH CH



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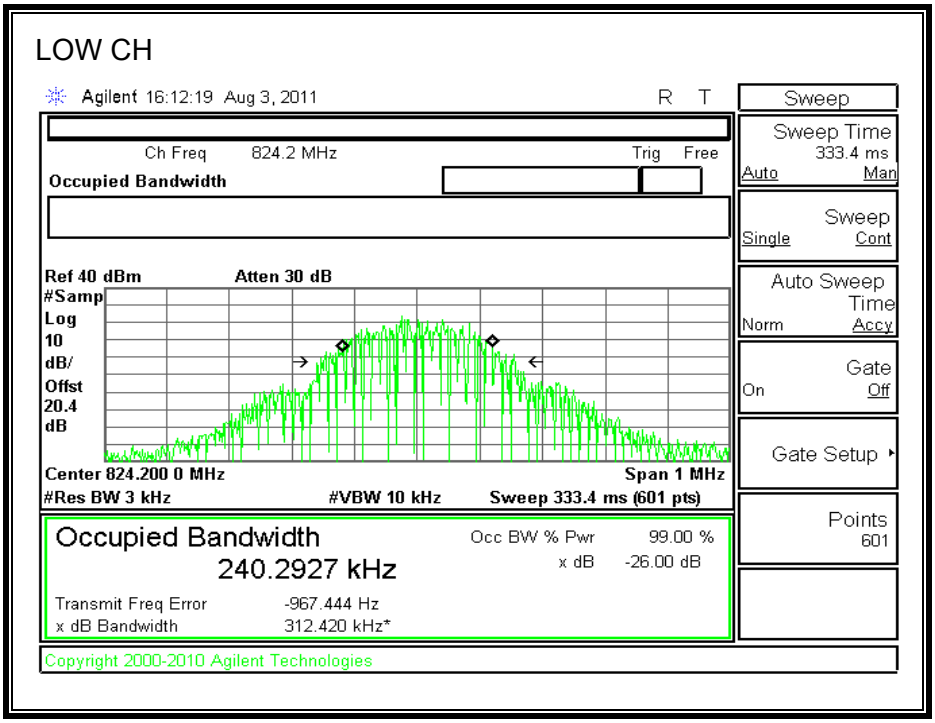
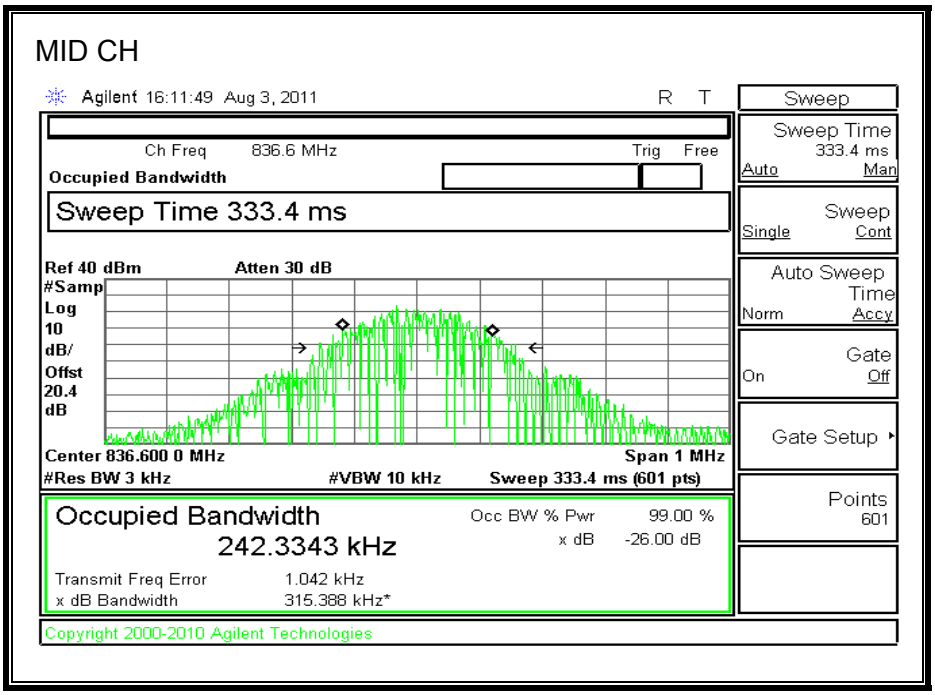
GPRS Mode (Cellular Band)





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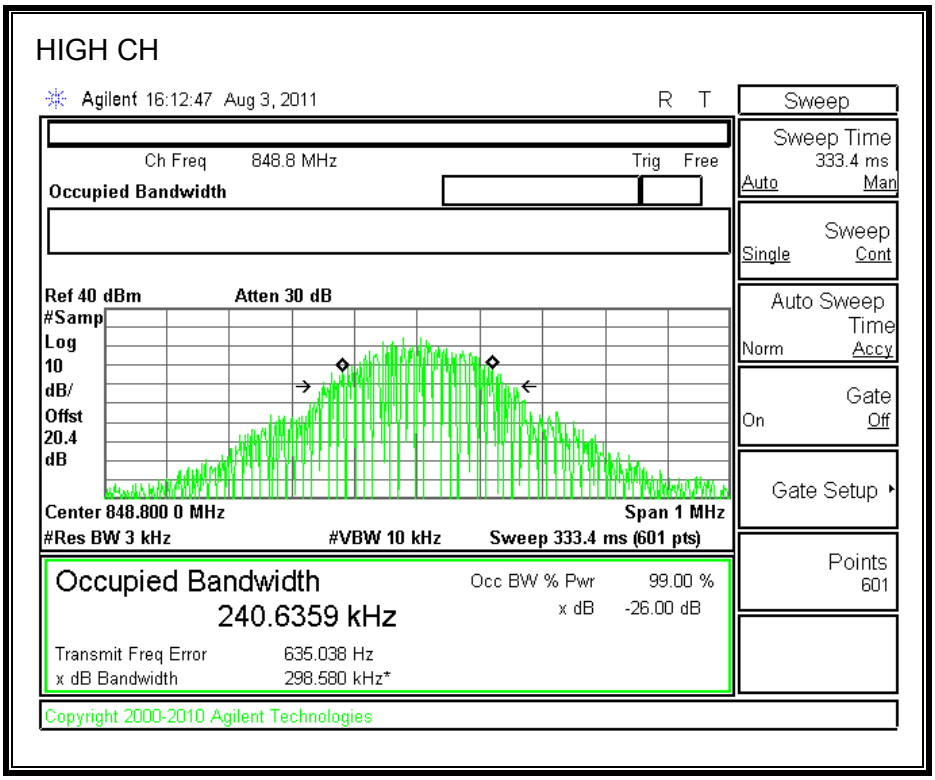
HIGH CH



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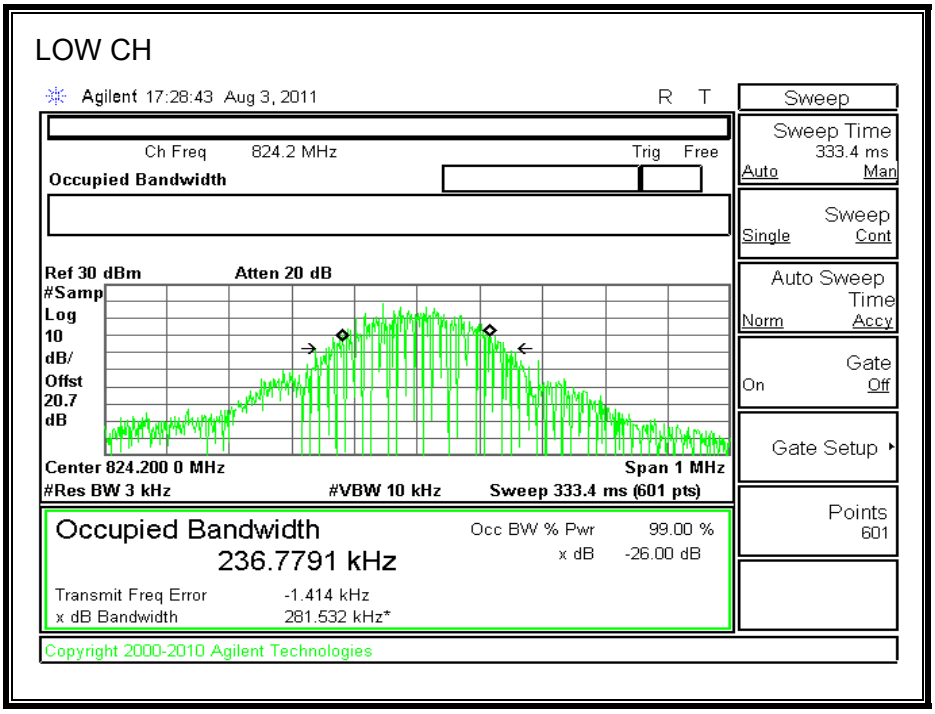
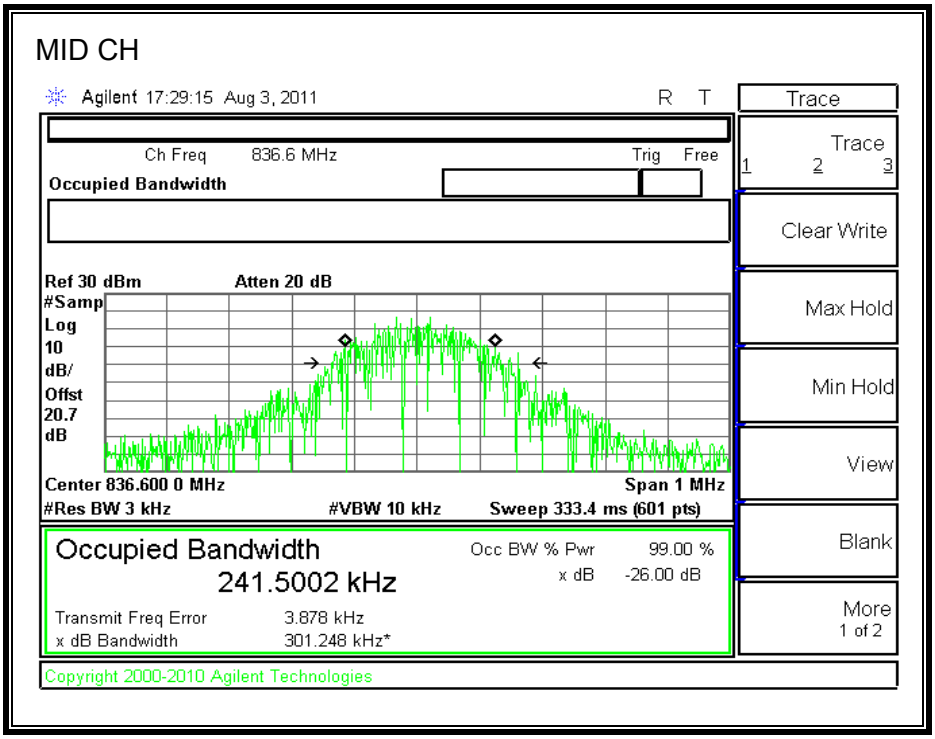
EGPRS Cellular Band

LOW CH



MID CH



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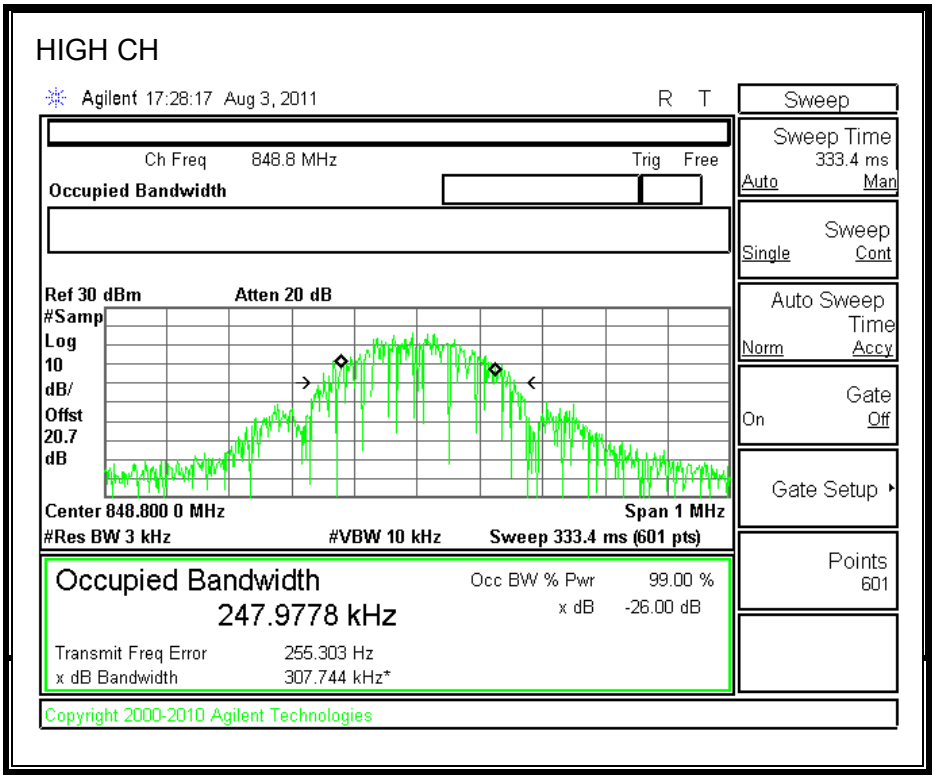
HIGH CH



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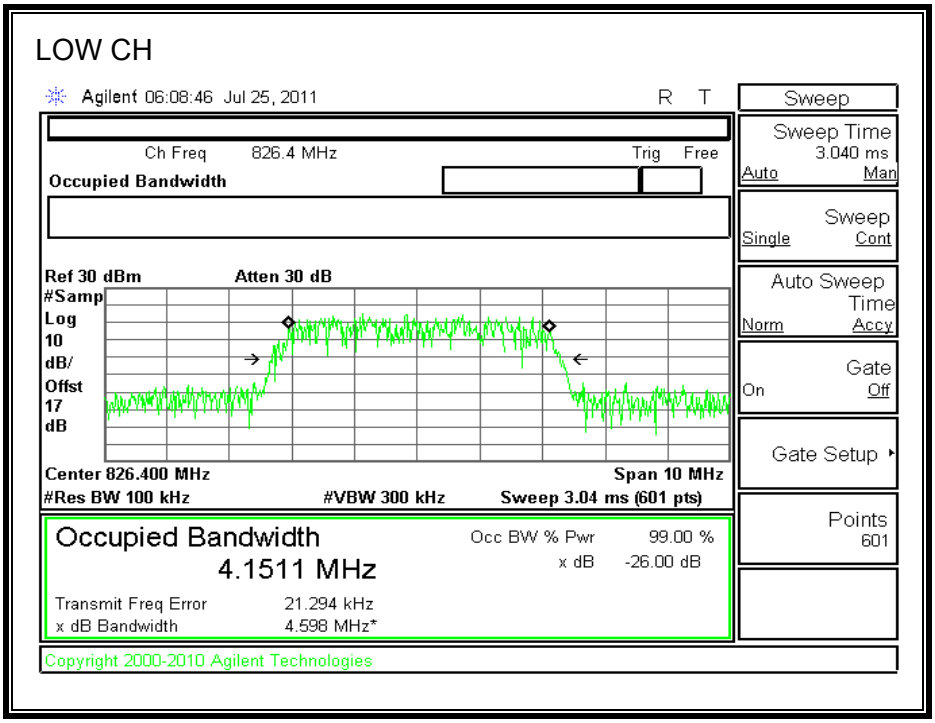
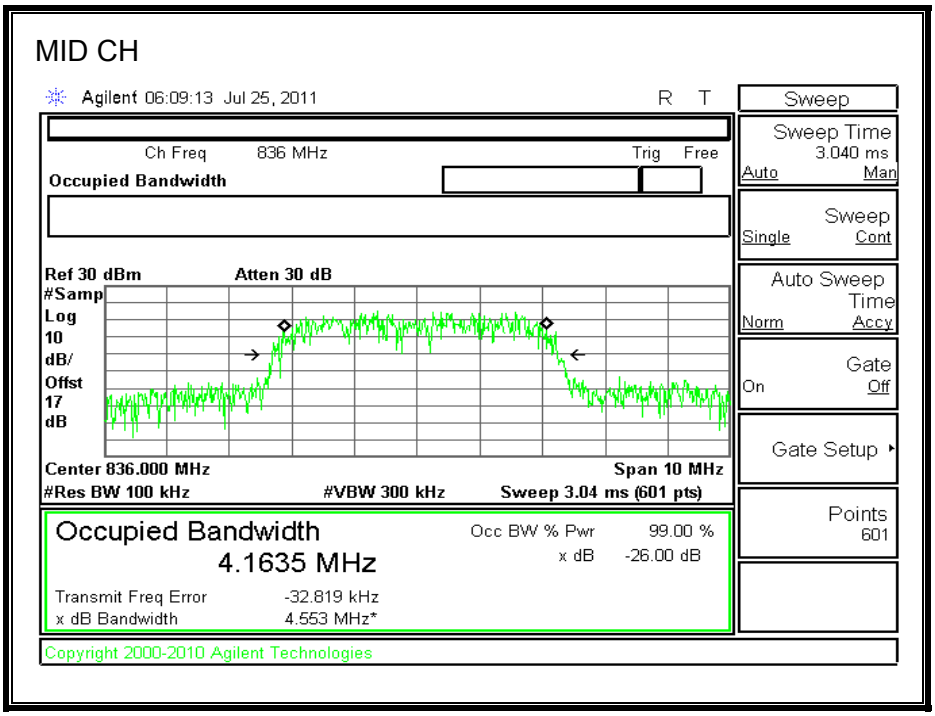
WCDMA Rel 99 (Cellular Band)





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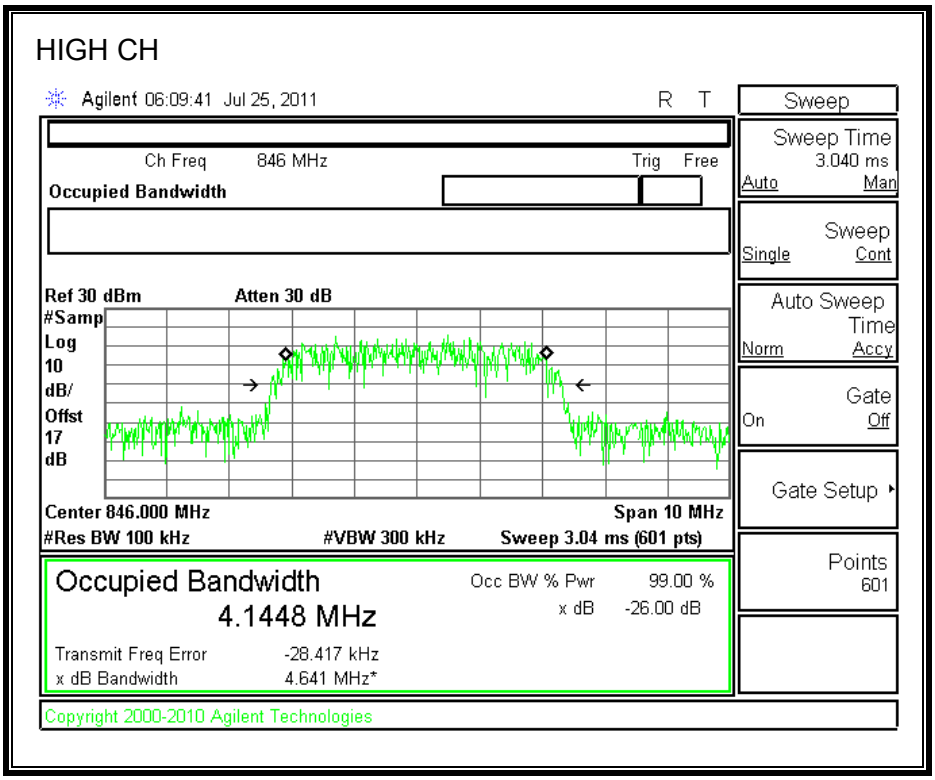
HIGH CH



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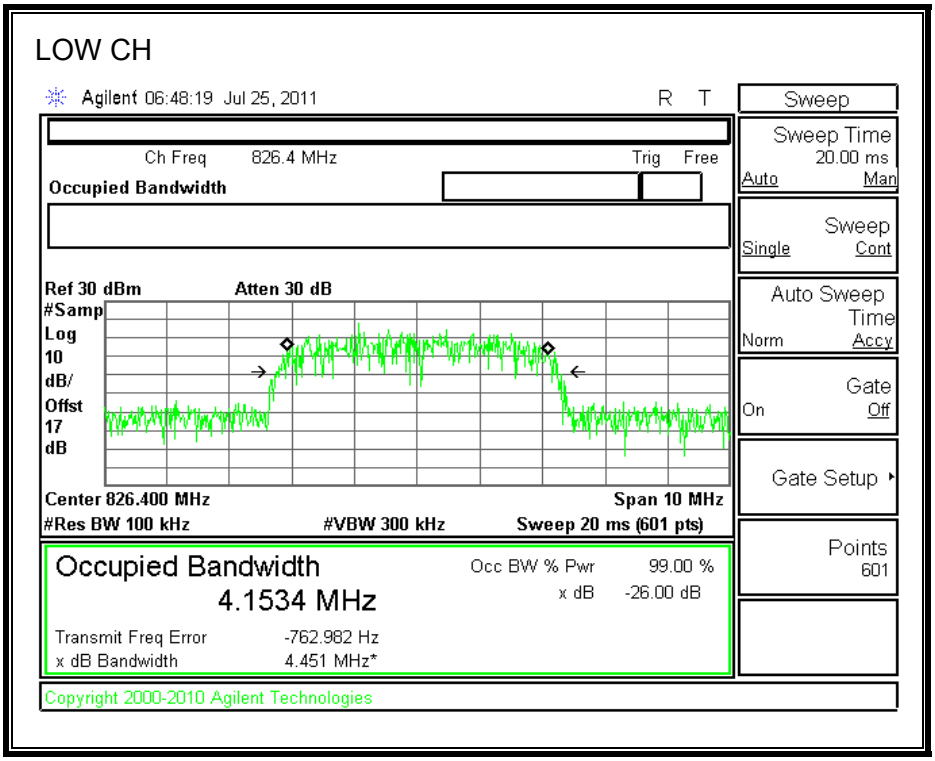
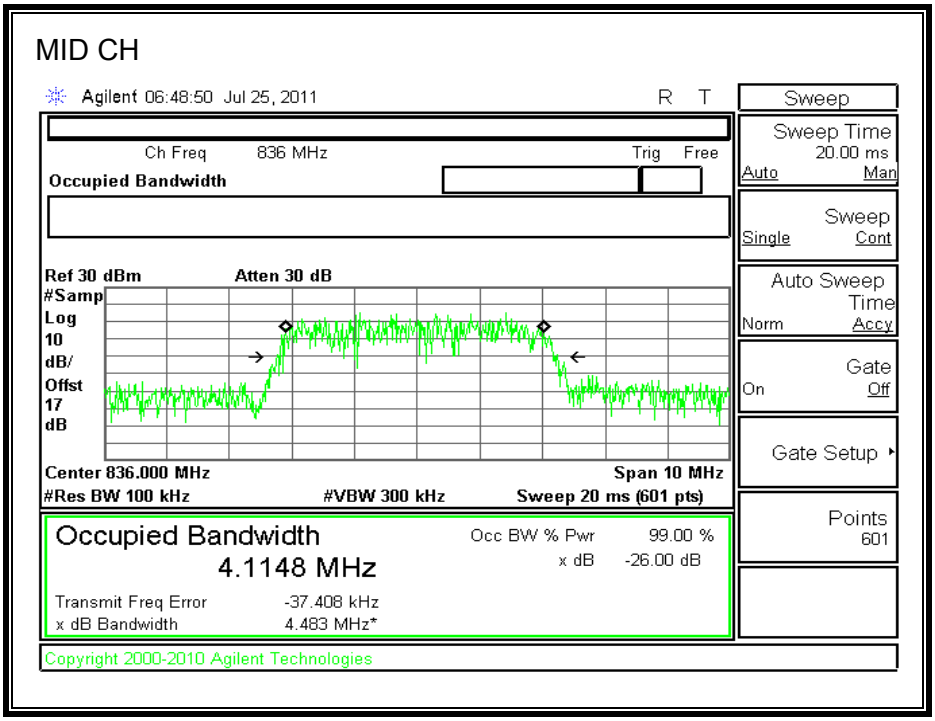
WCDMA HSDPA (Cellular Band)





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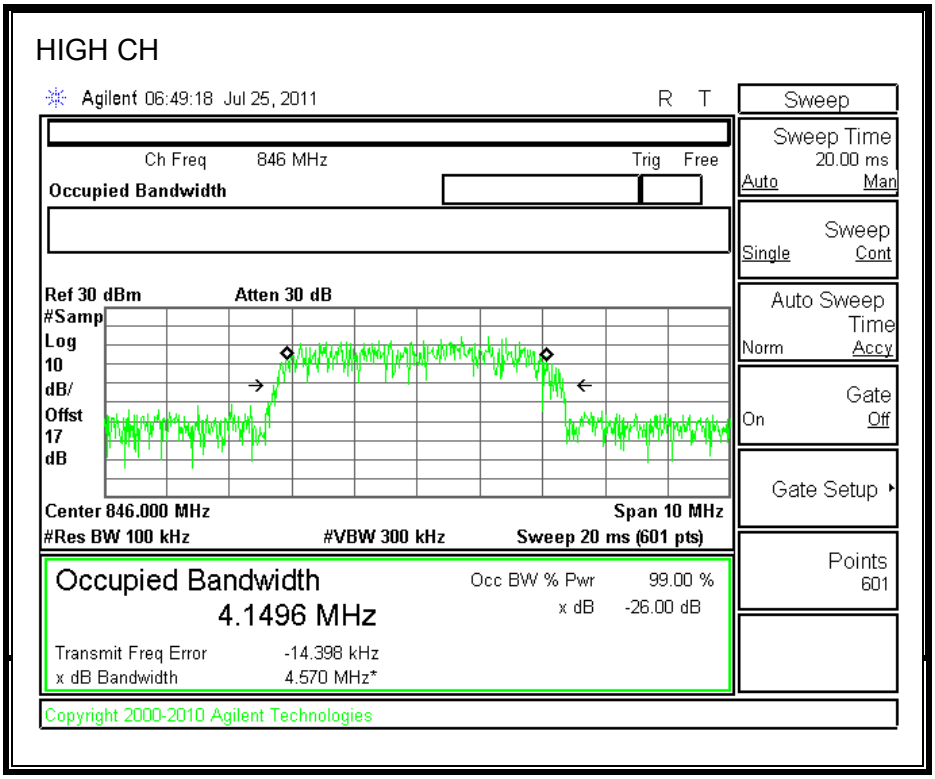
HIGH CH



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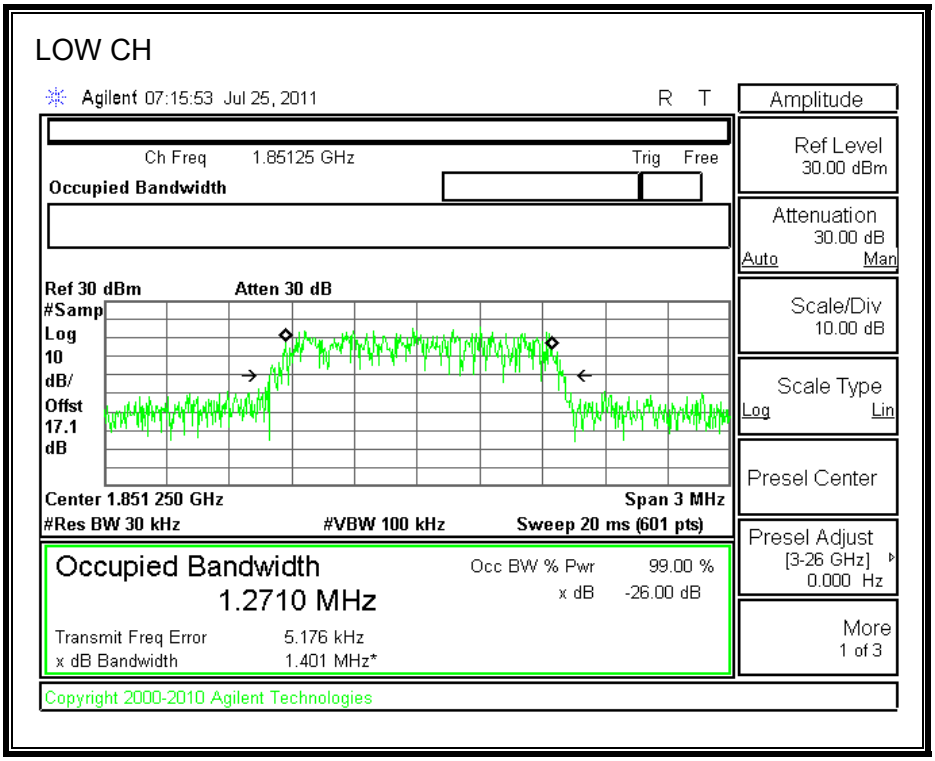
CDMA2000 1xRTT Mode (PCS Band)

LOW CH



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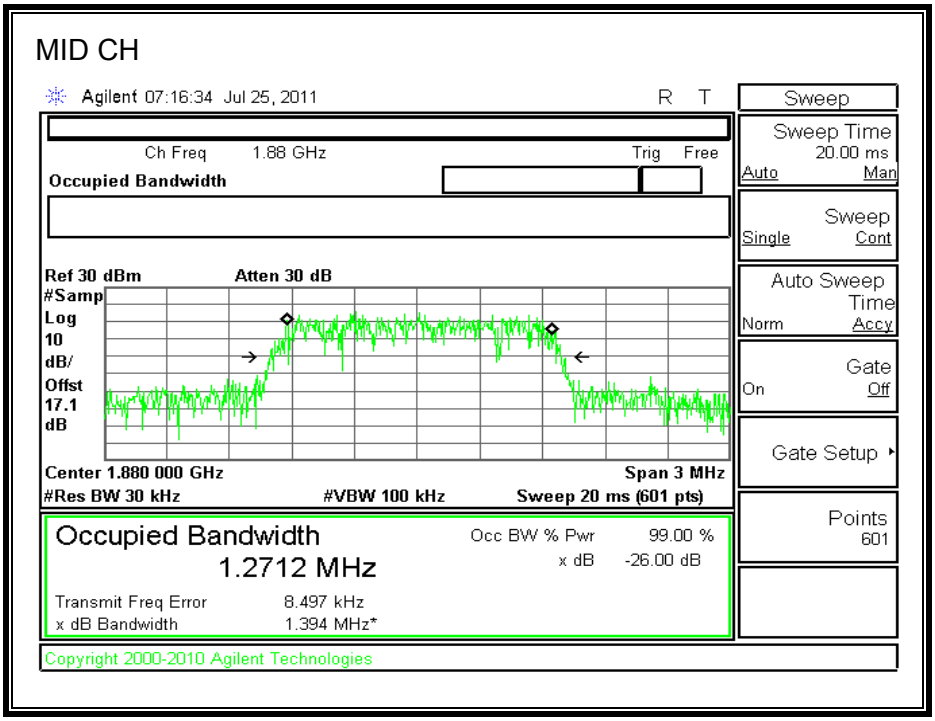

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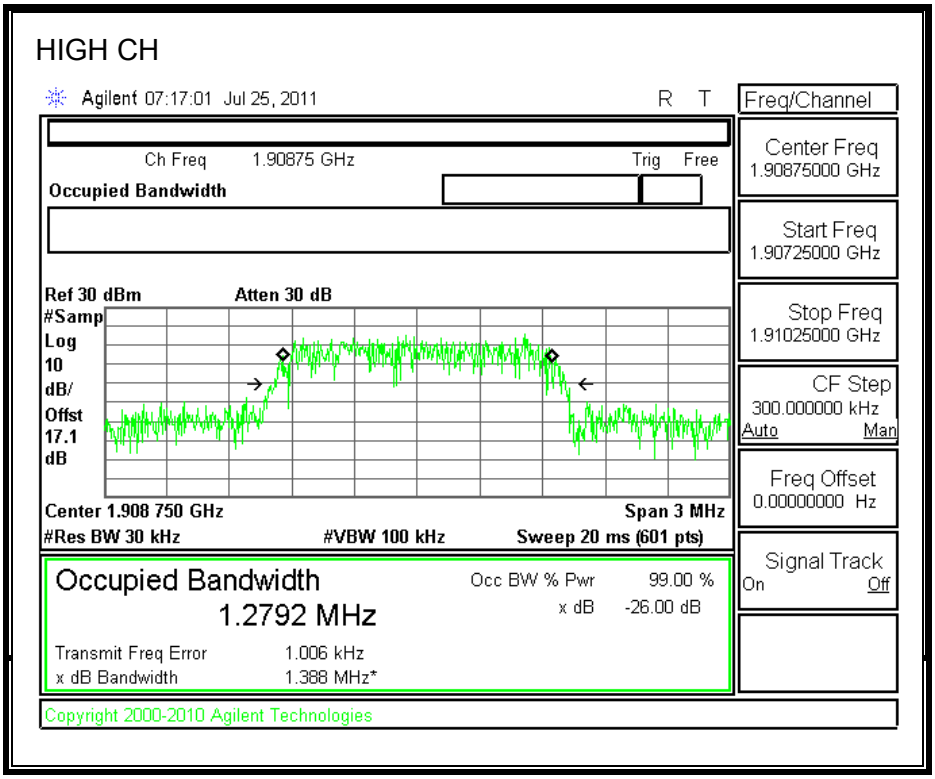
HIGH CH



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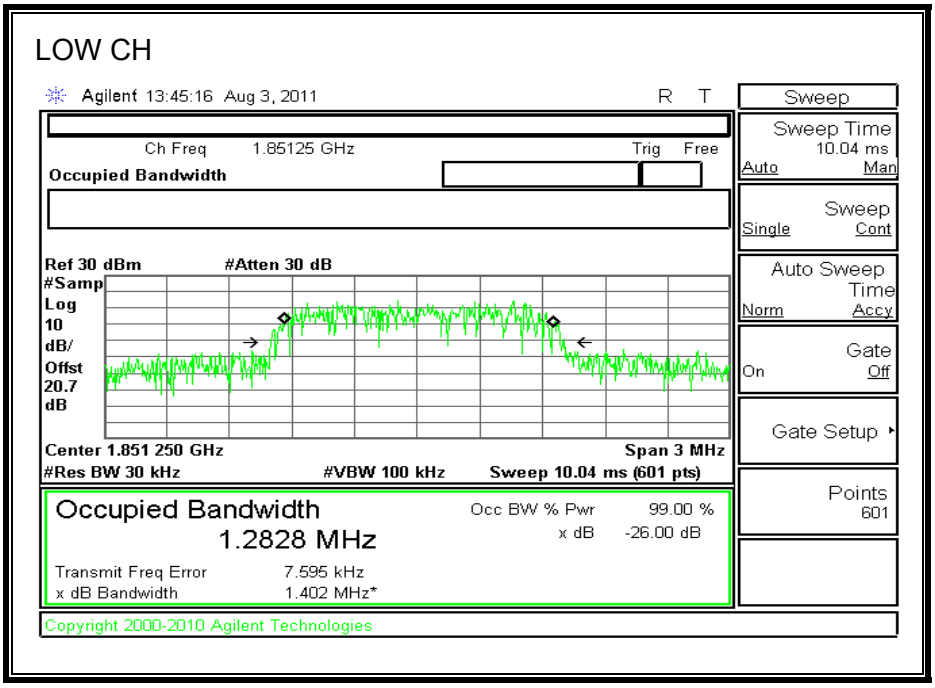
CDMA2000 1xEV-DO Revision A (Rev. A) Mode (PCS Band)

LOW CH



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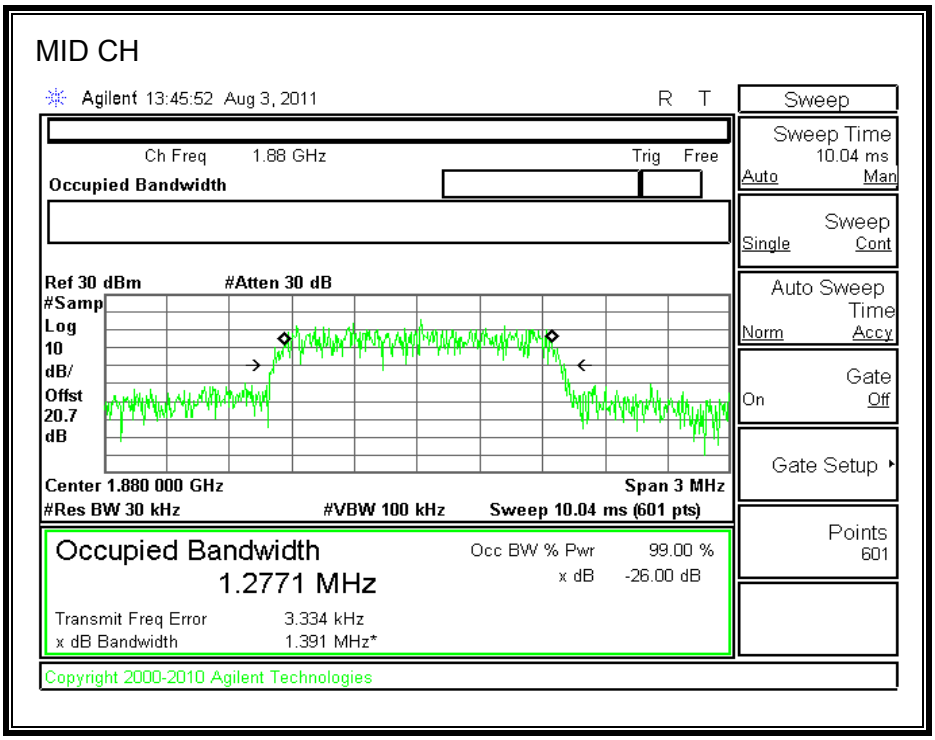

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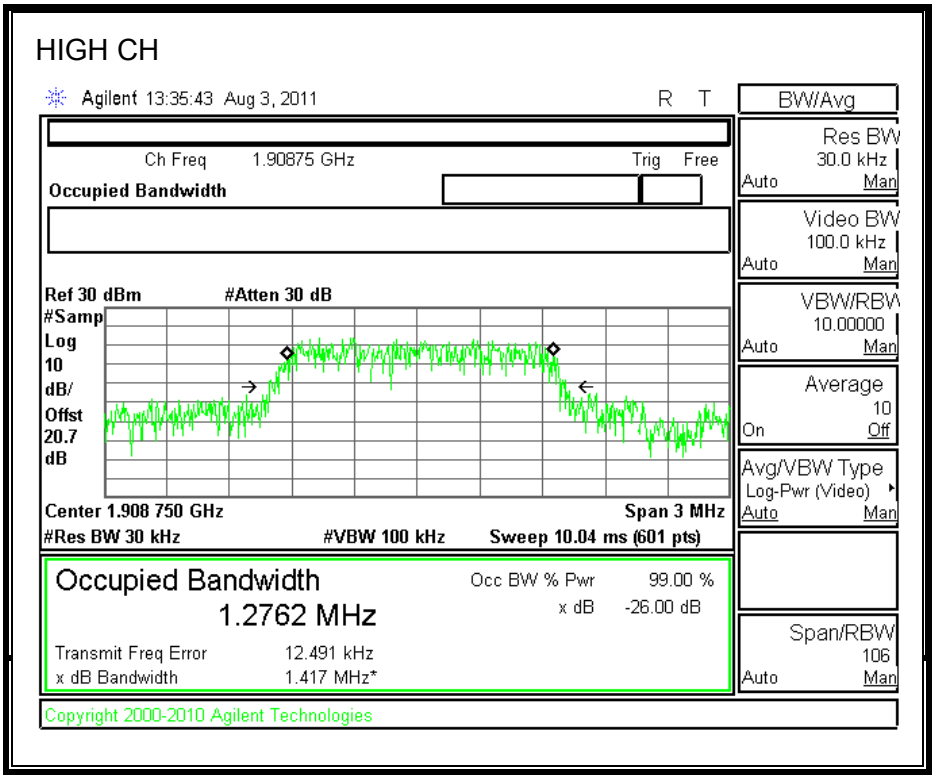
HIGH CH



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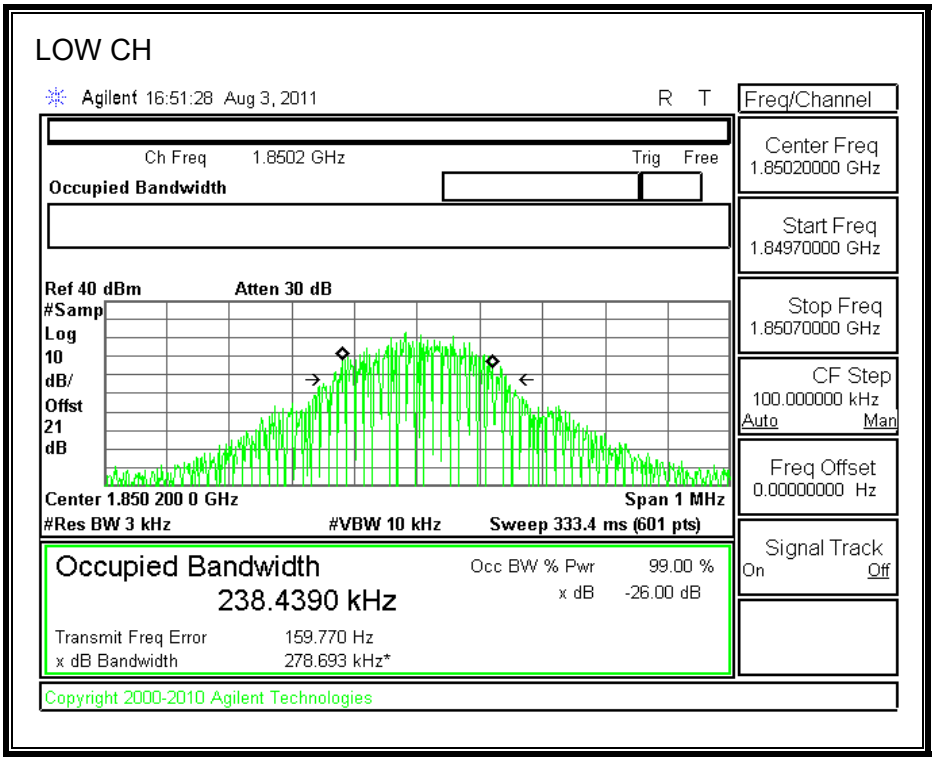
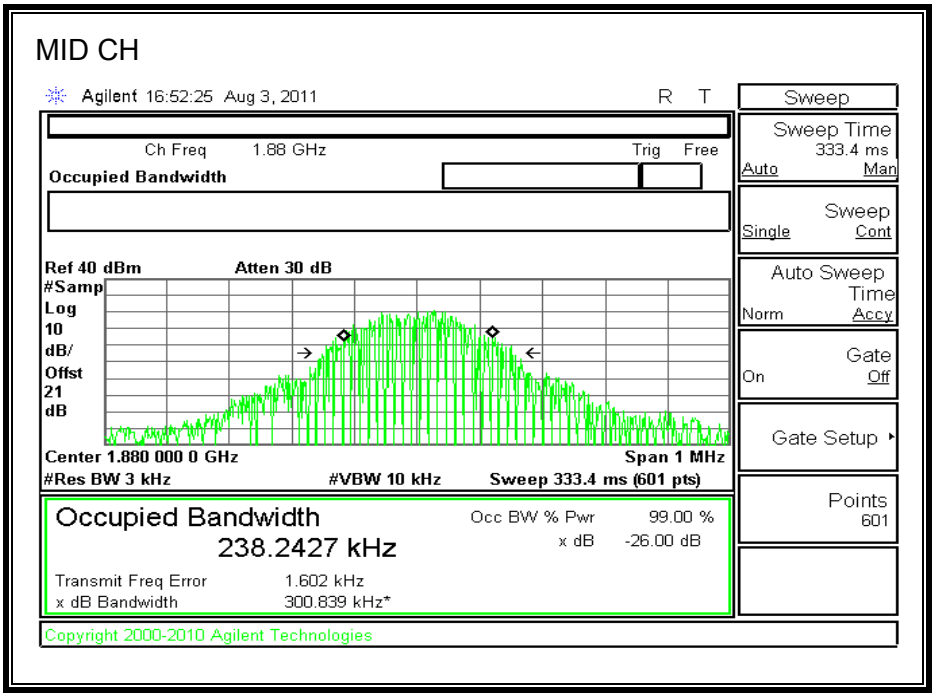
GPRS 1900 Mode (PCS Band)





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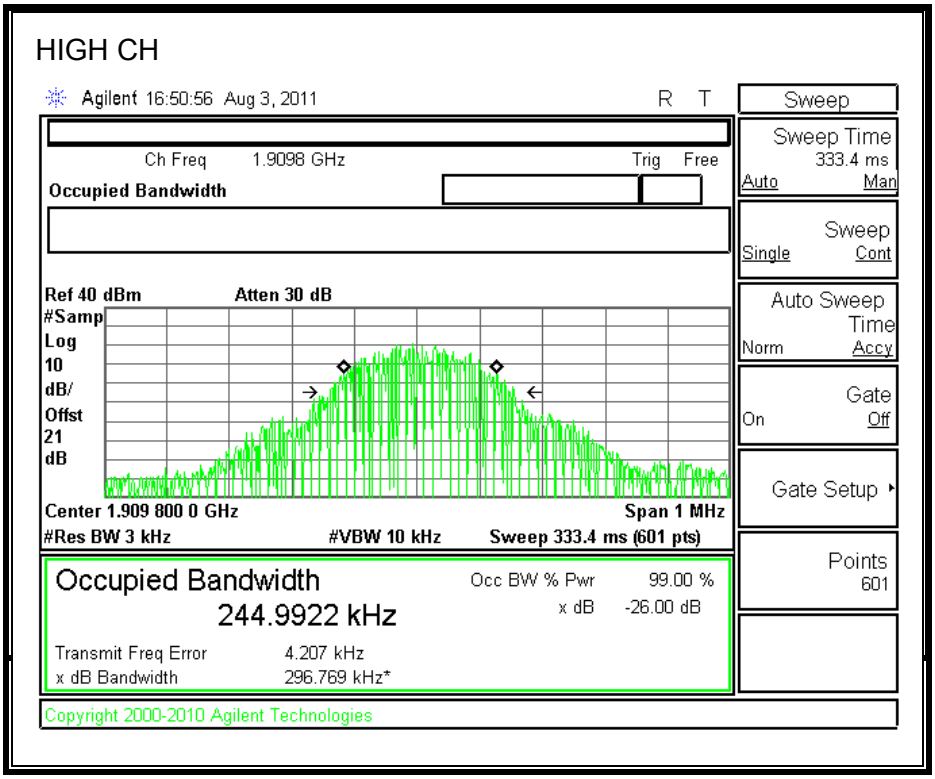
HIGH CH



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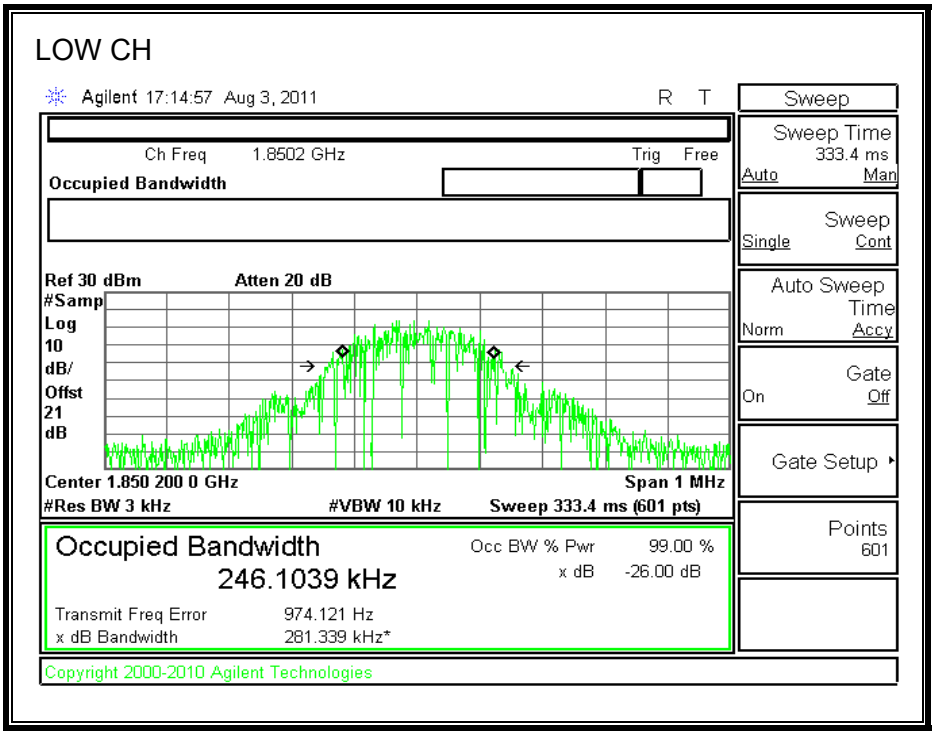
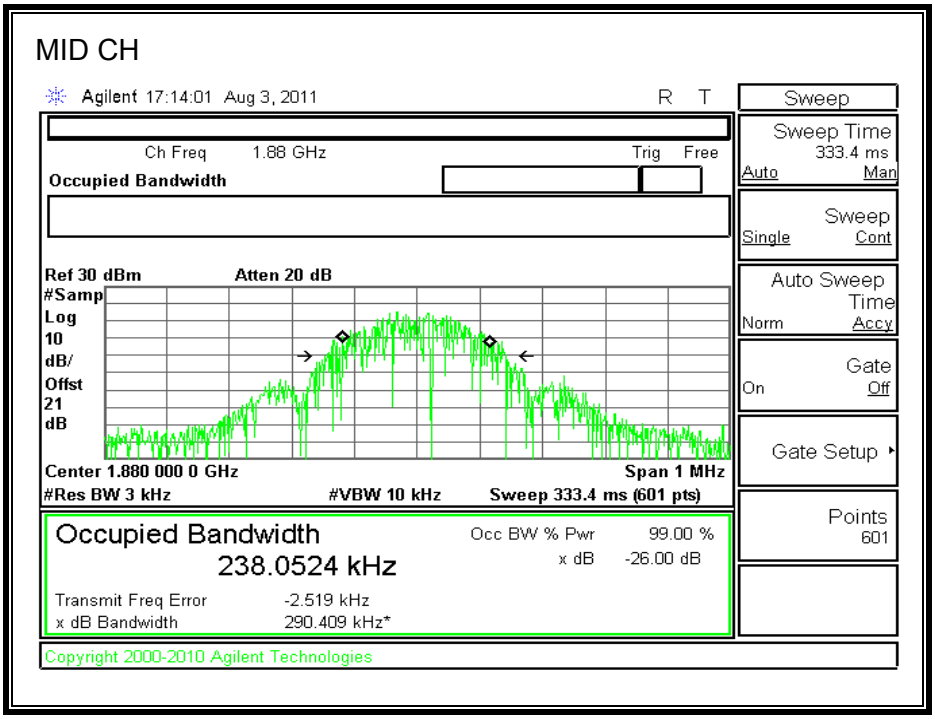
EGPRS 1900 Mode (PCS Band)

LOW CH



MID CH



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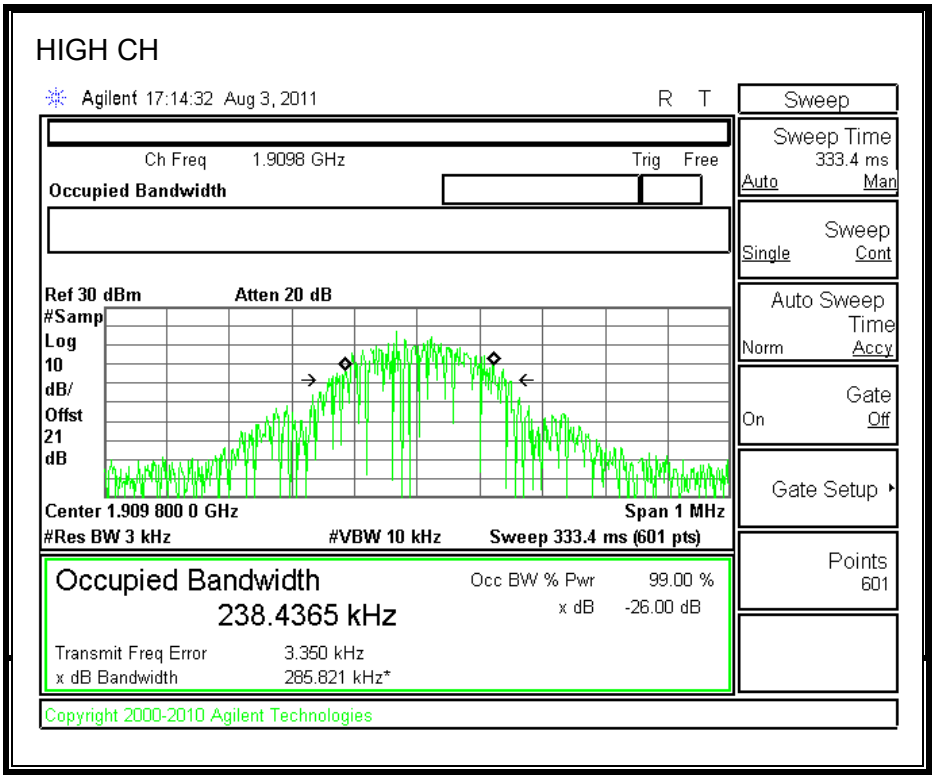
HIGH CH



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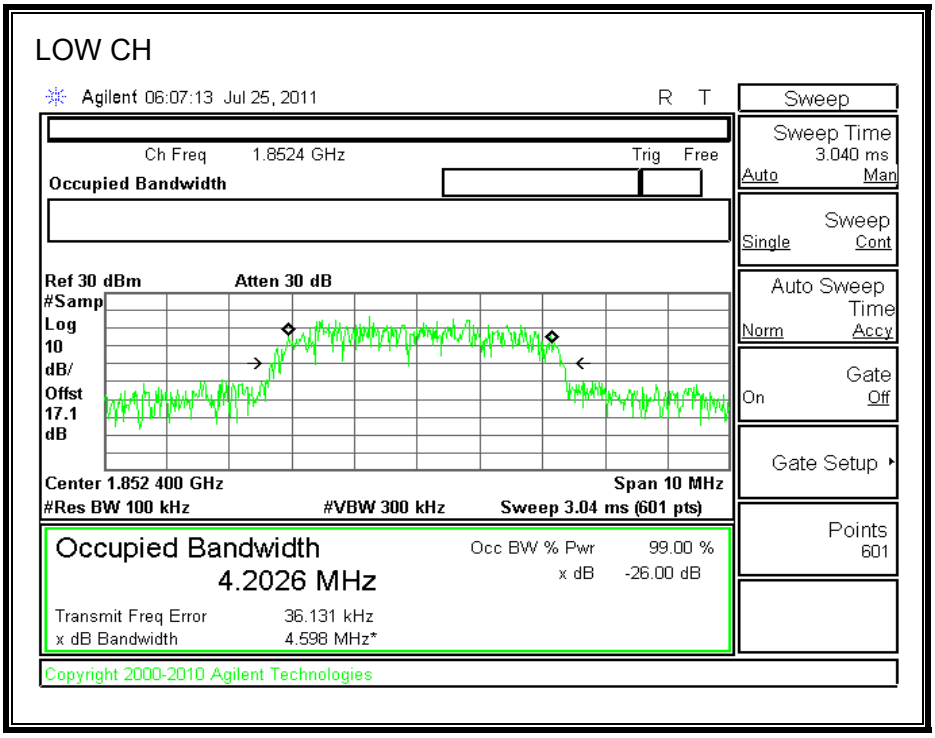
WCDMA REL 99 Mode (PCS Band)

LOW CH



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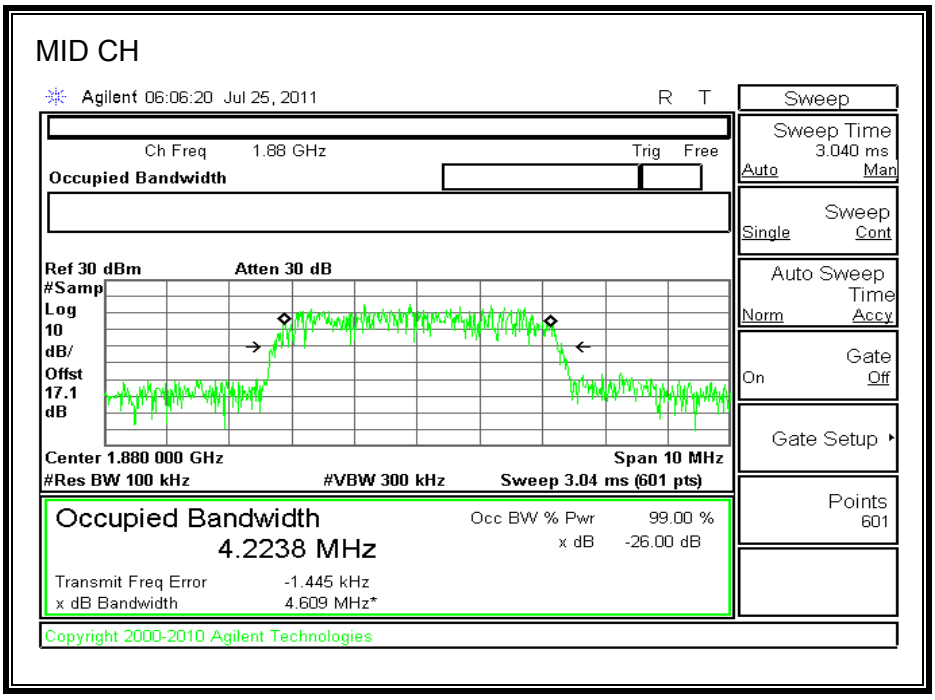

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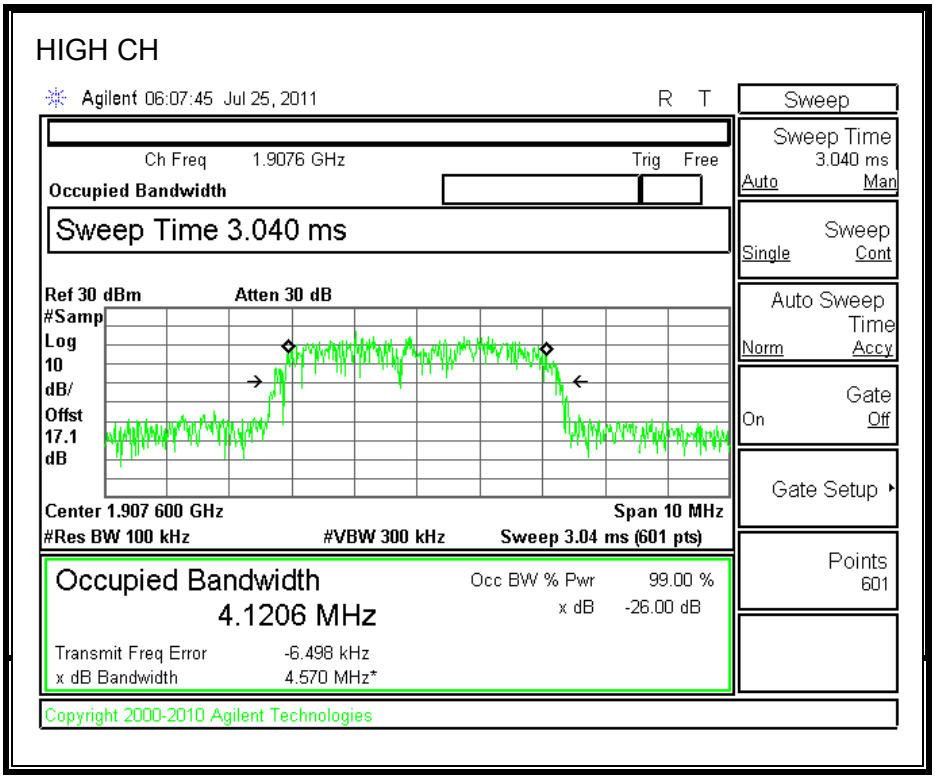
HIGH CH



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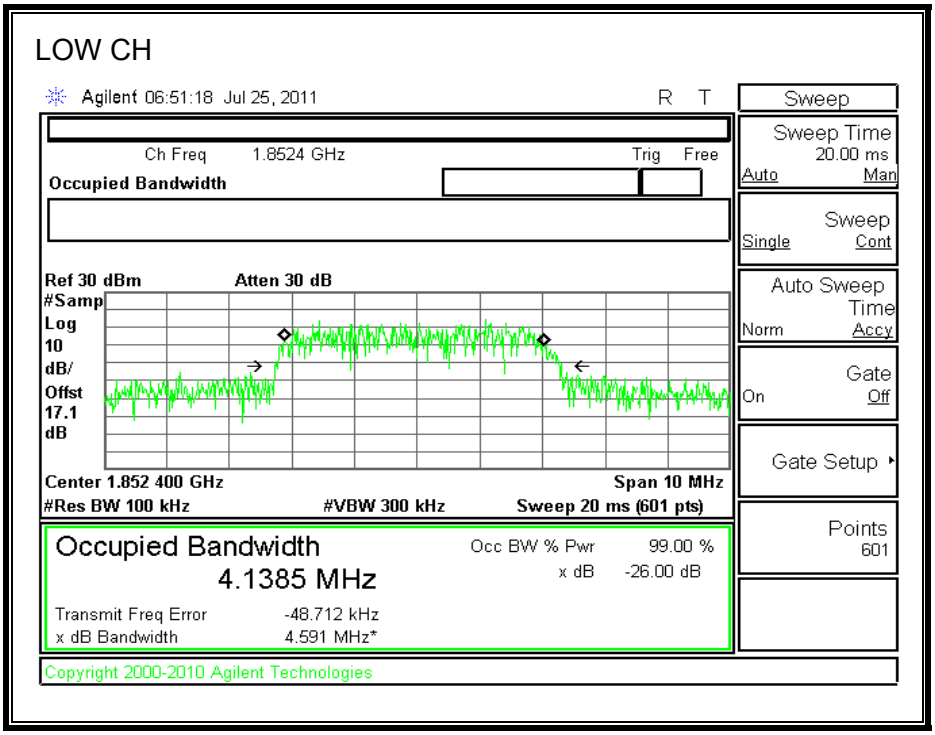
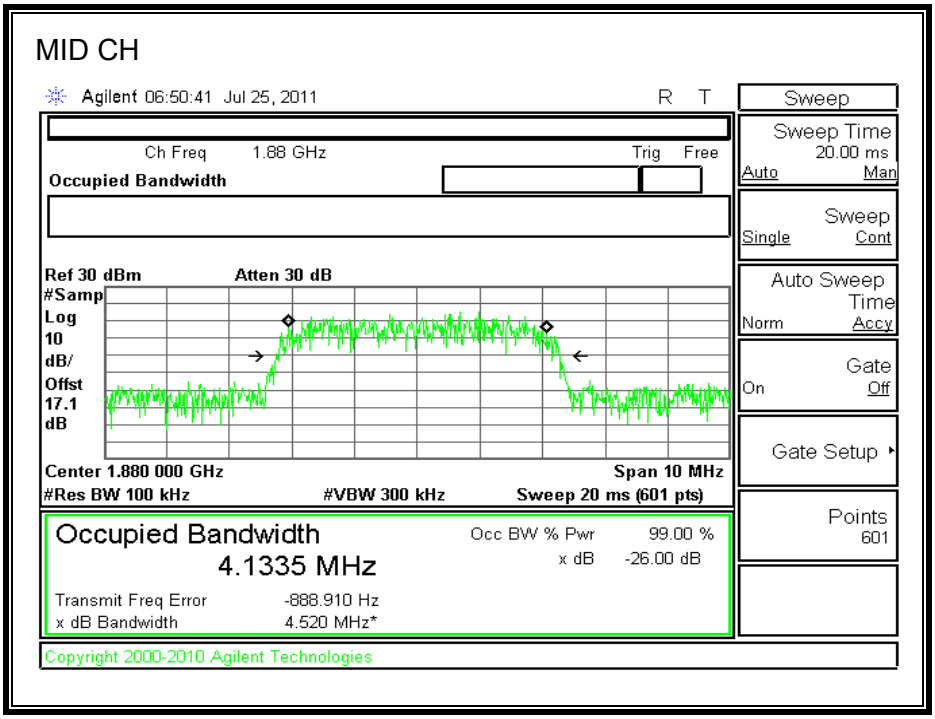
WCDMA HSDPA Mode (PCS Band)





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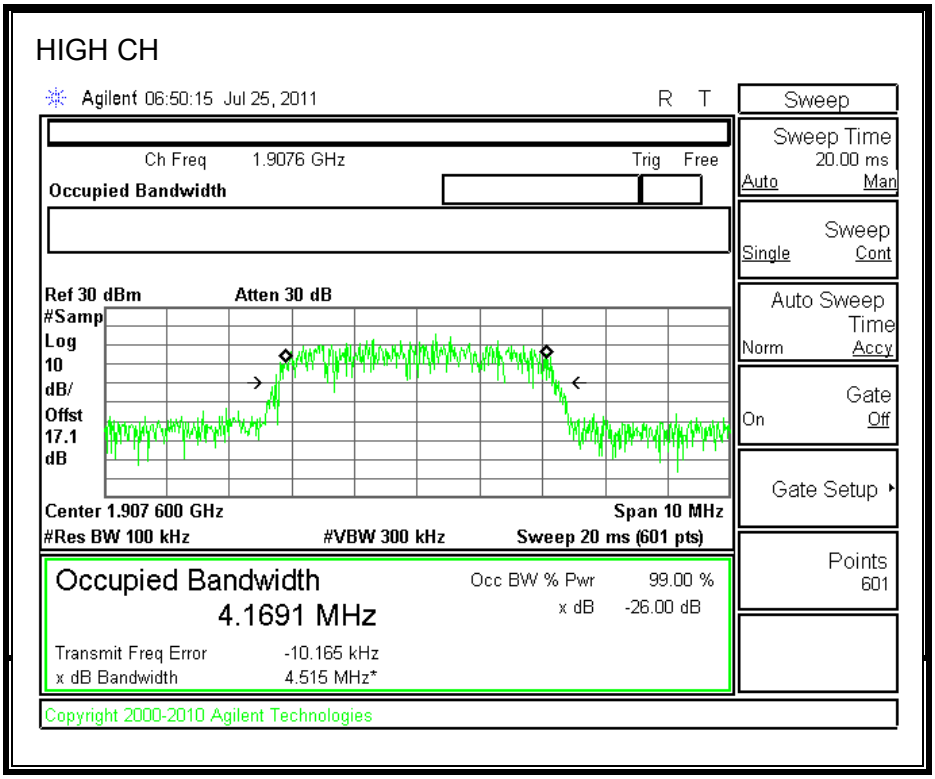
HIGH CH



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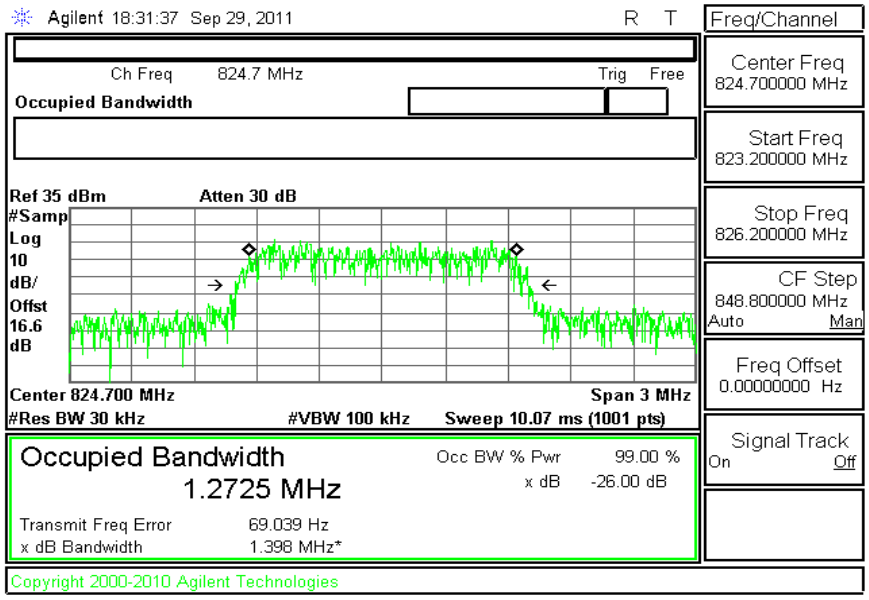
PORT B (DATA ONLY)

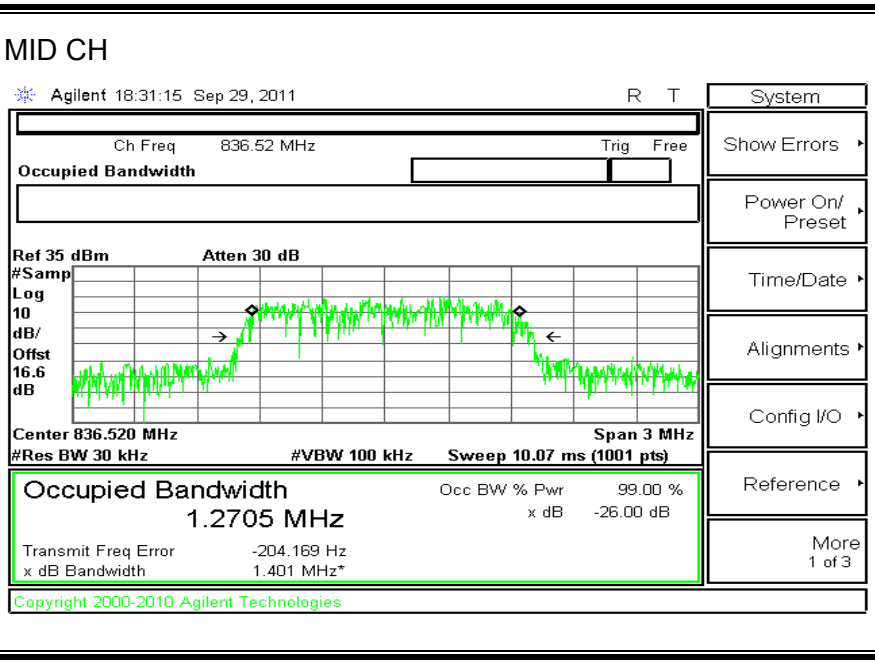
99% BANDWIDTH and 26dB

Cell Band, CDMA2000 1xRTT Mode, 32(+F-SCH)

LOW CH



MID CH



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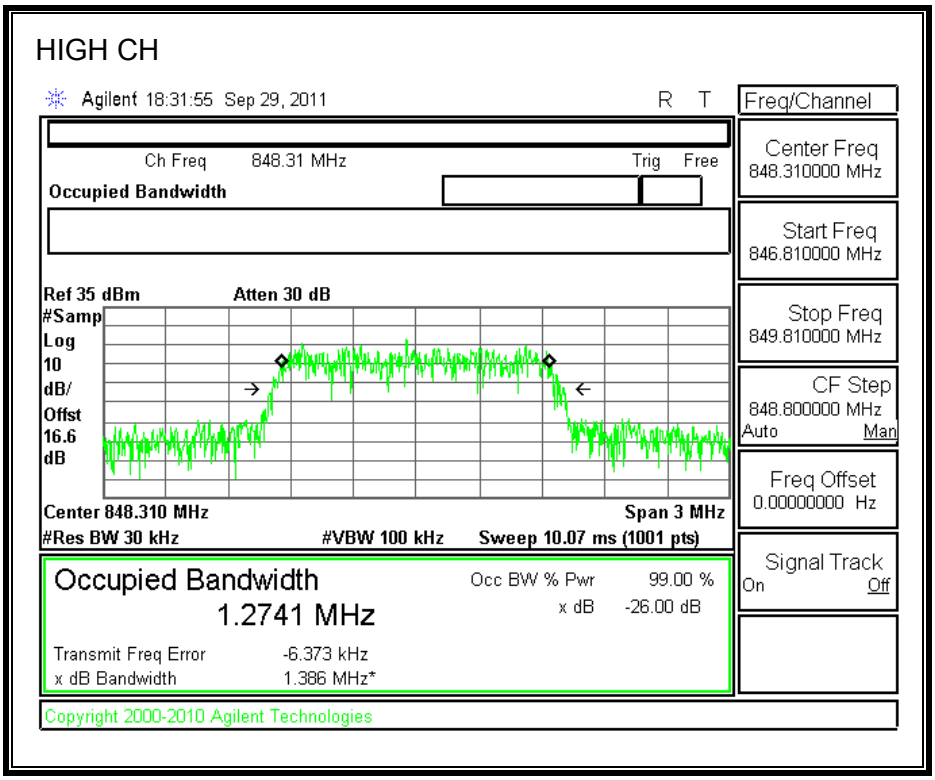
HIGH CH



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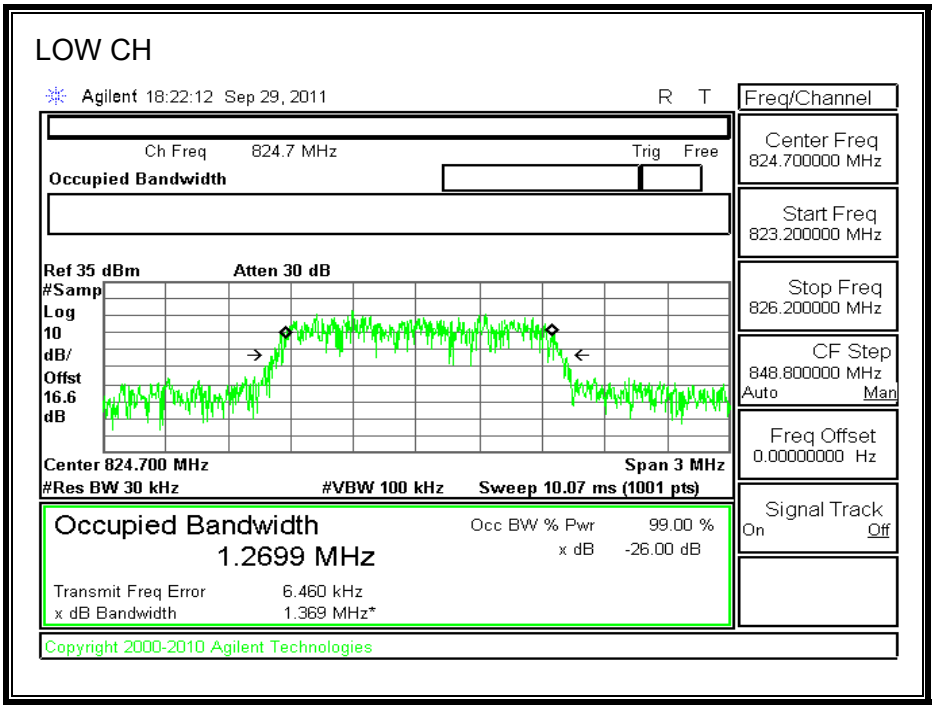
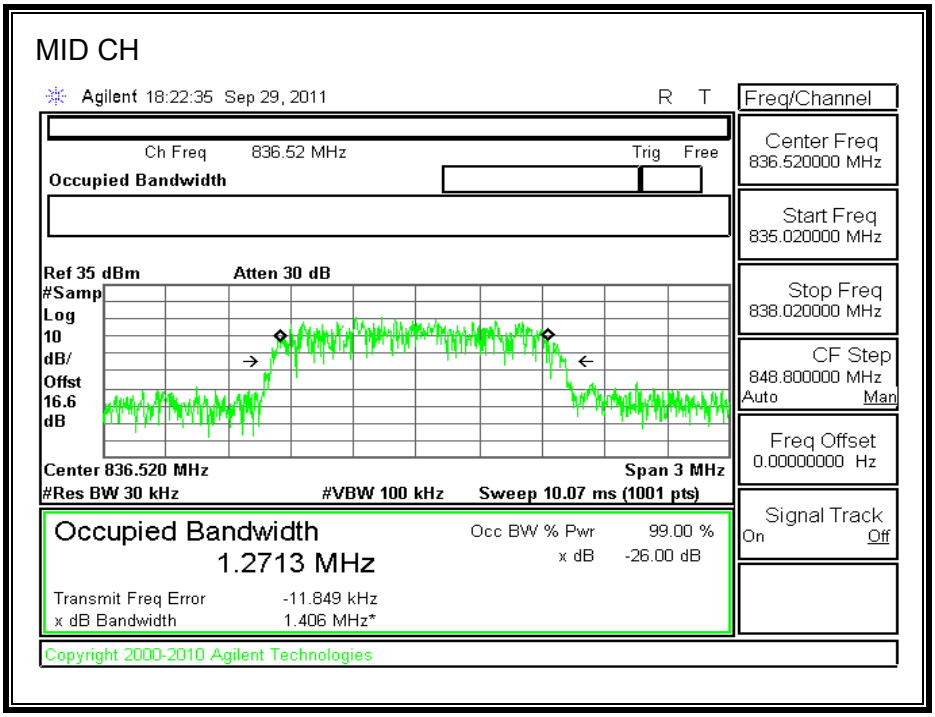
Cell Band, CDMA2000 1xRTT, 32(+SCH)

LOW CH



MID CH



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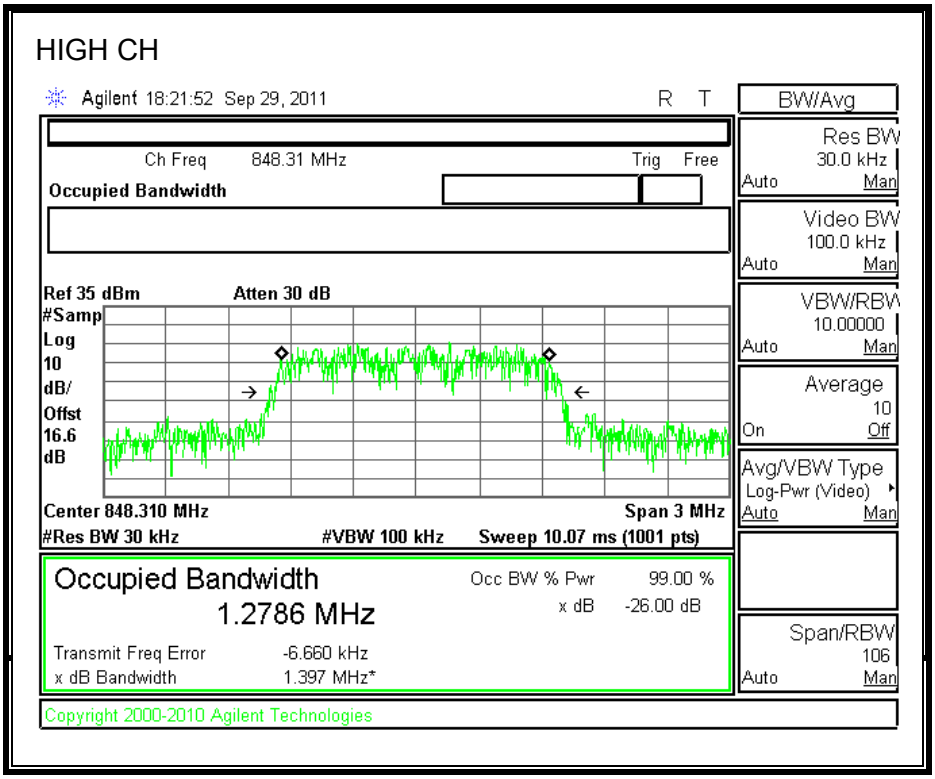
HIGH CH



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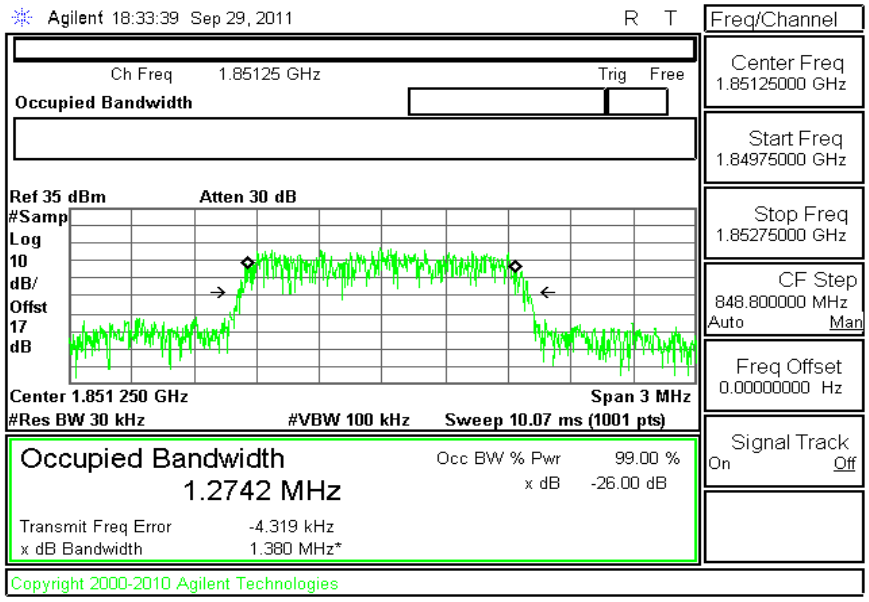
PORT B

PCS Band, CDMA2000 1xRTT Mode, 32(+F-SCH)

LOW CH



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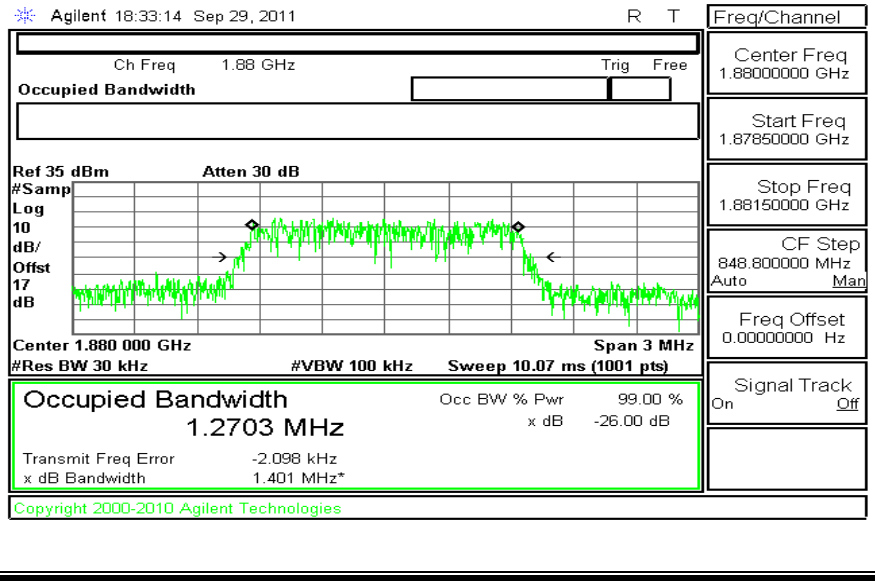

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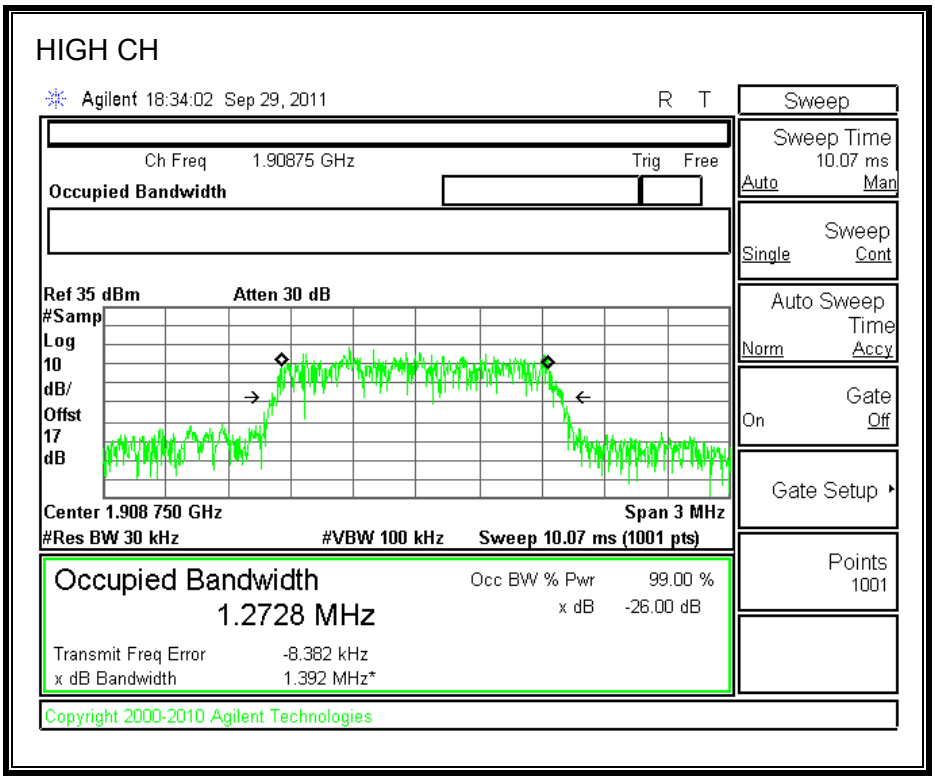
HIGH CH



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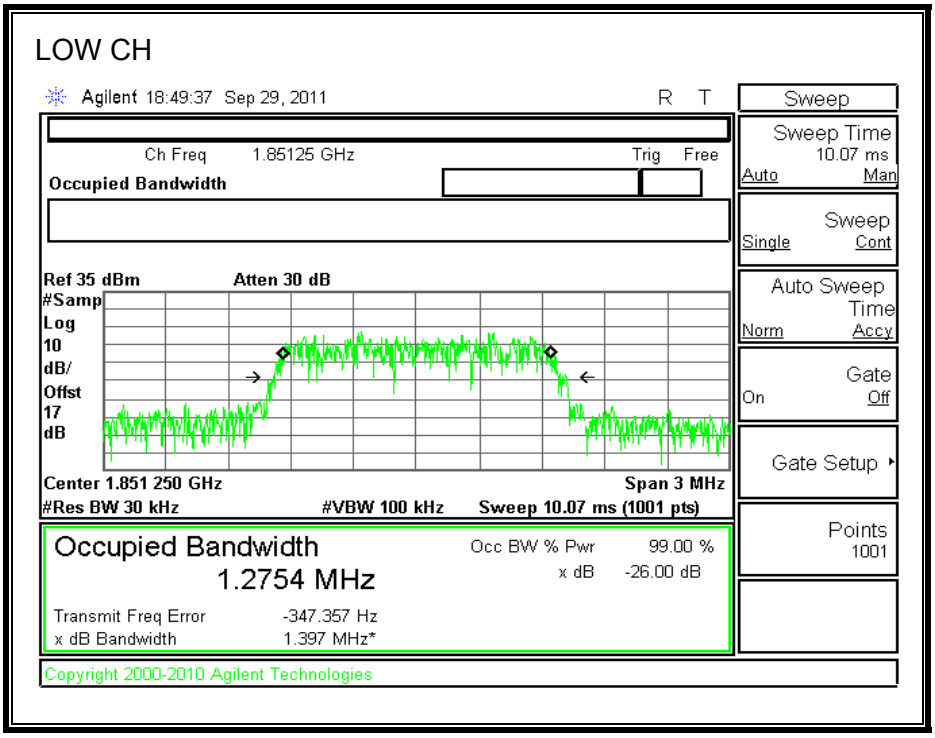
PCS Band, CDMA2000 1xRTT, 32(+SCH)

LOW CH



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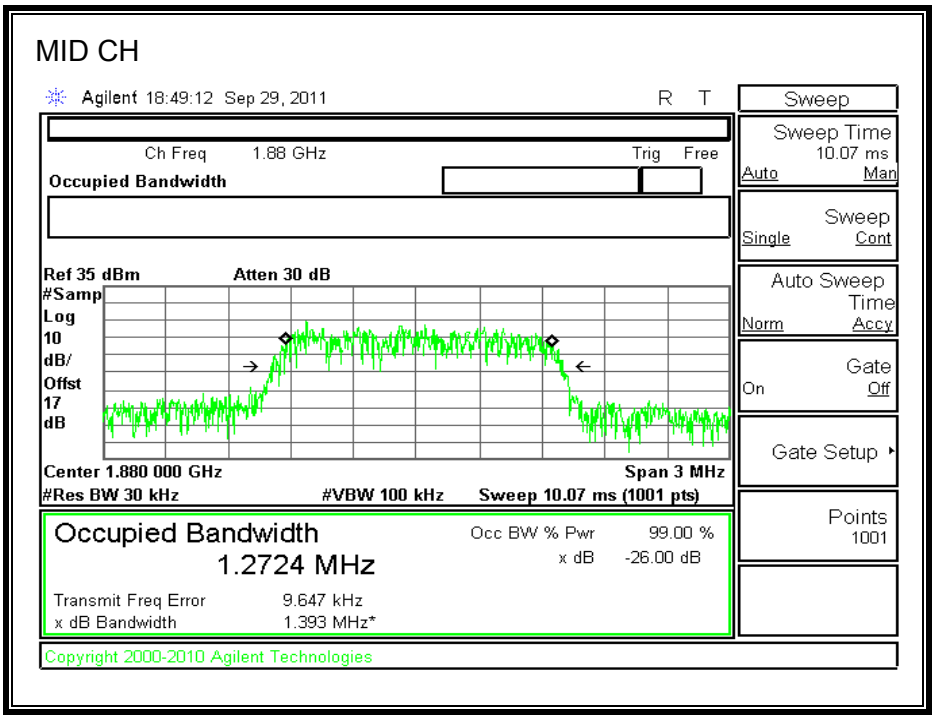

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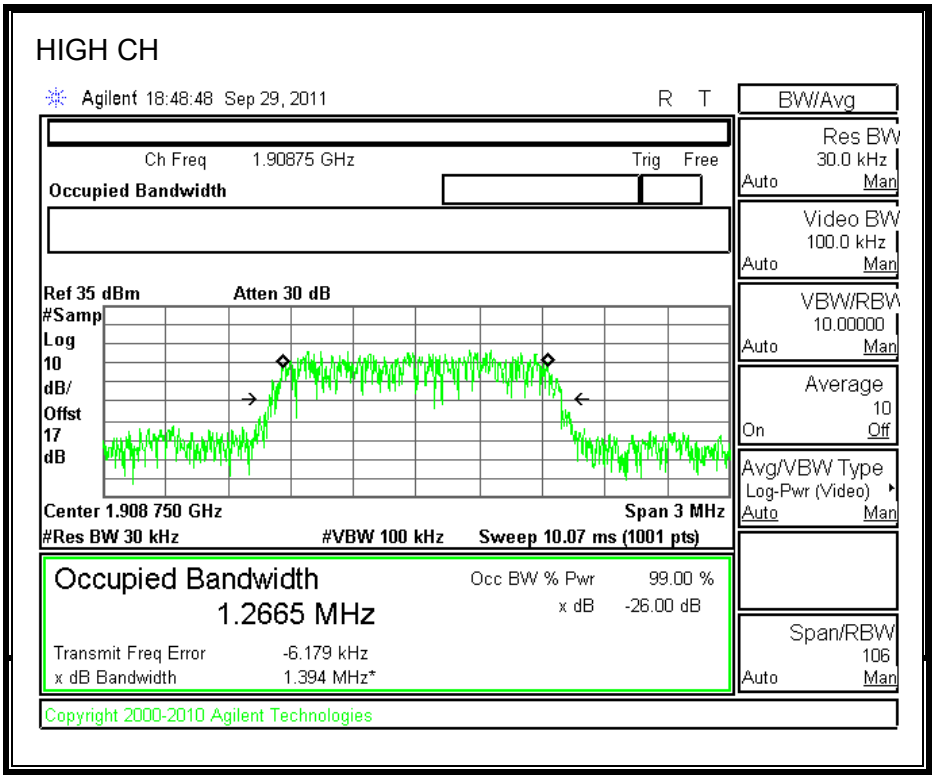
HIGH CH



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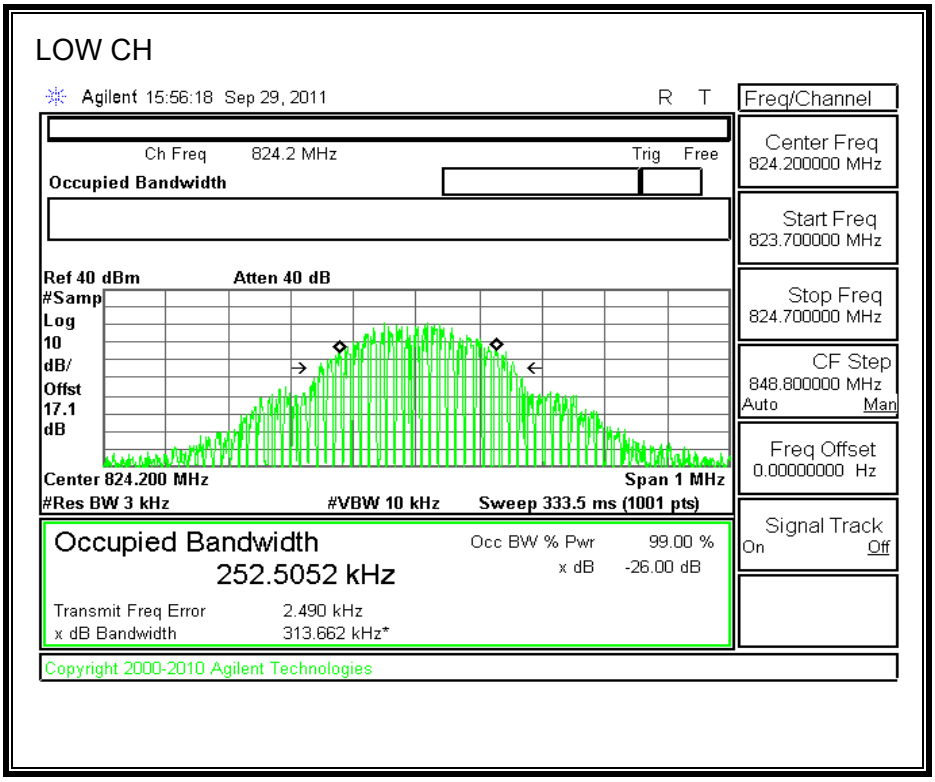
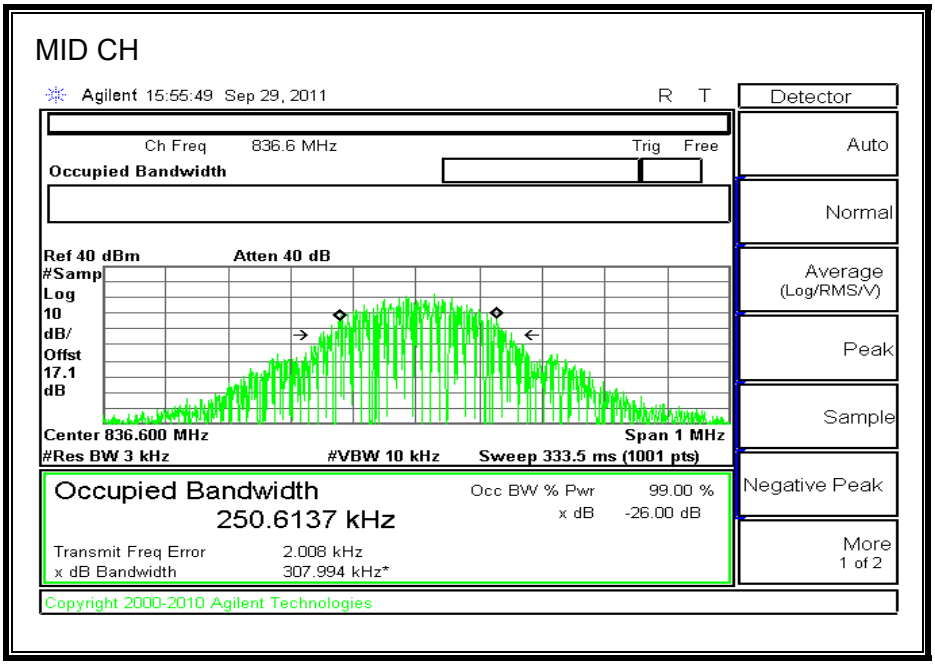
GPRS Mode (Cellular Band)





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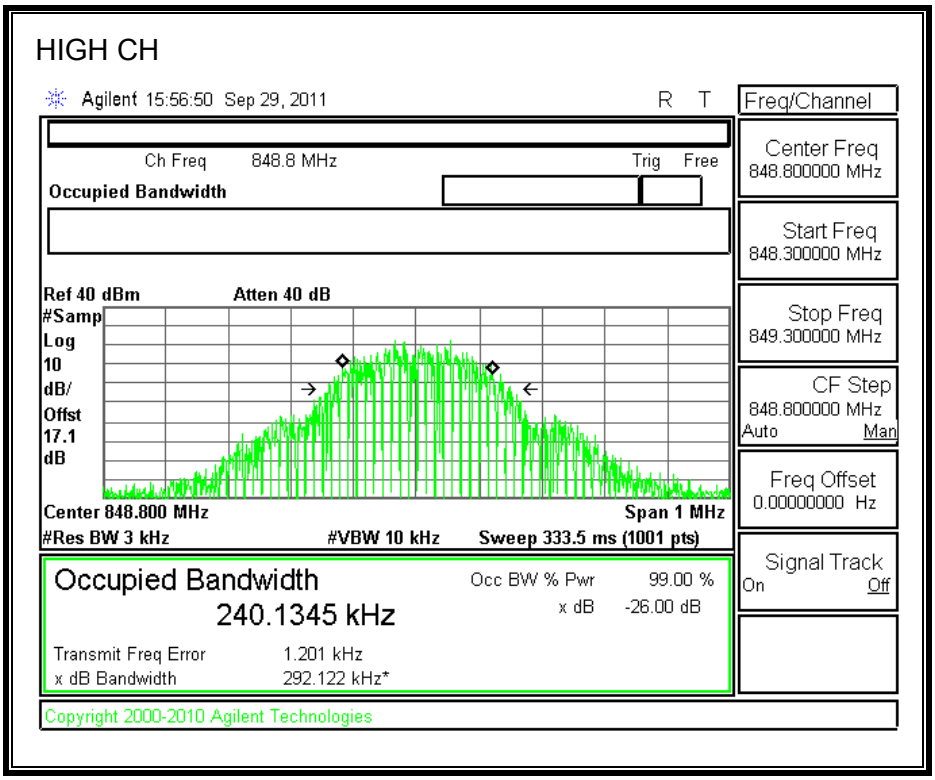
HIGH CH



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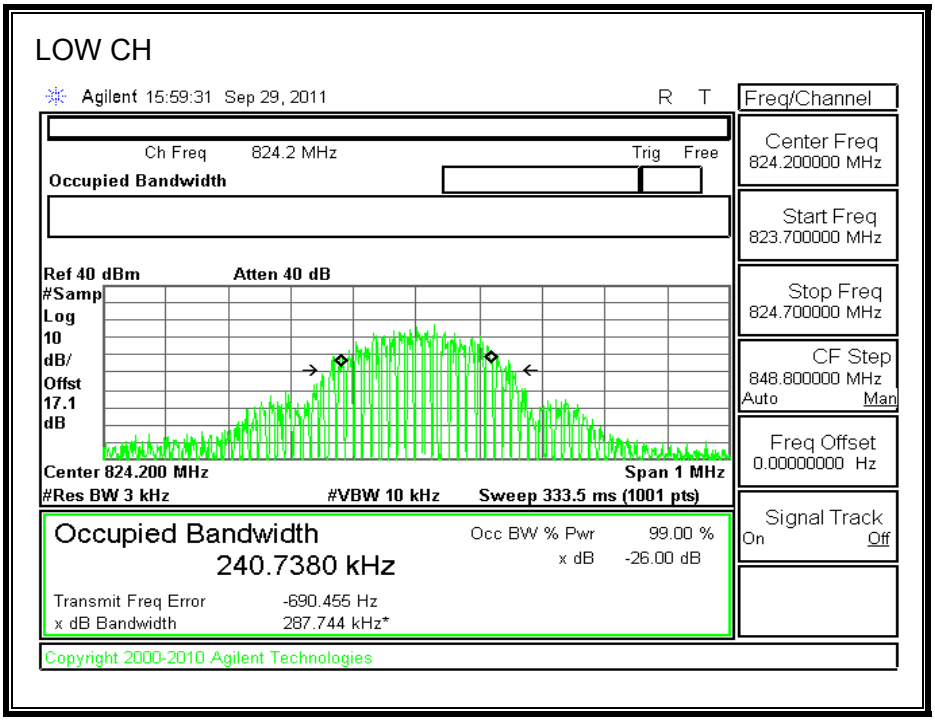
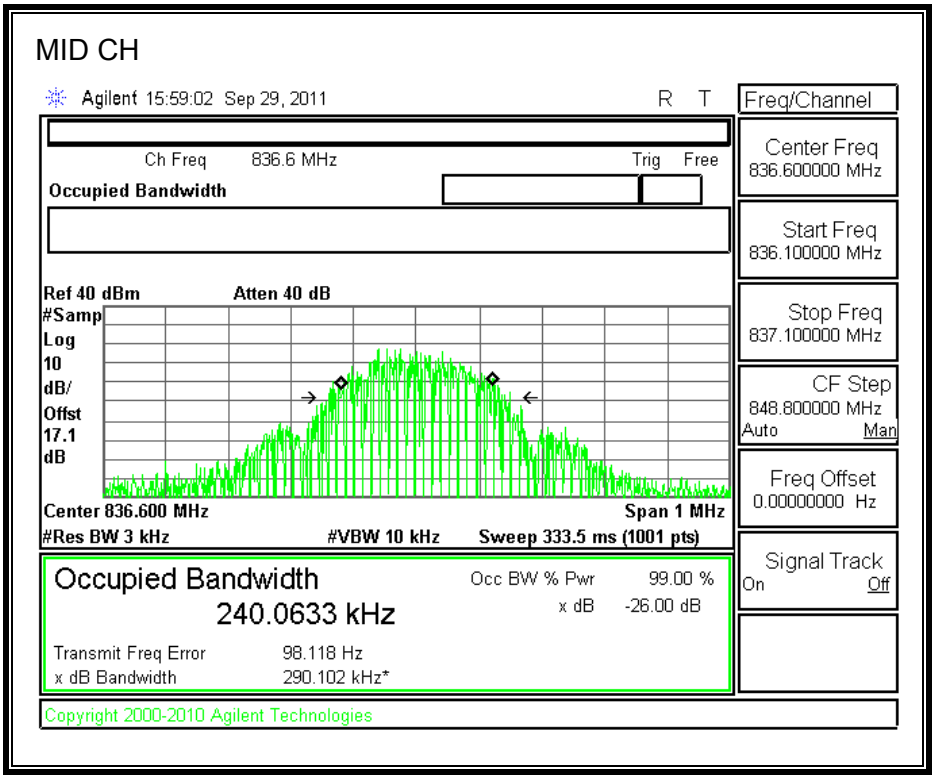
EGPRS Cellular Band





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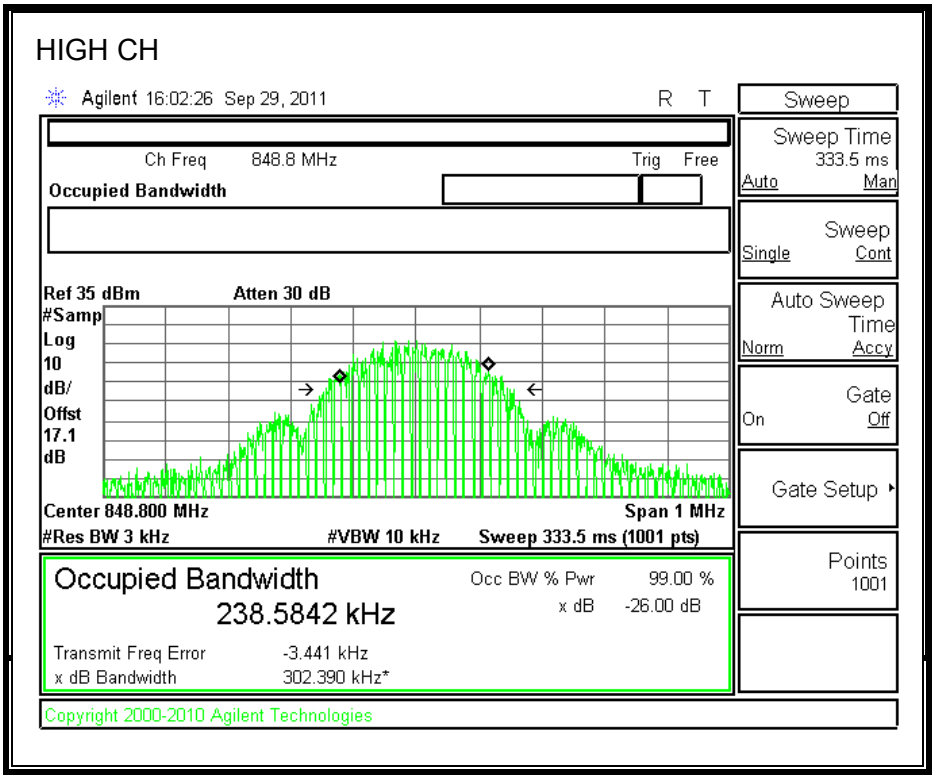
HIGH CH



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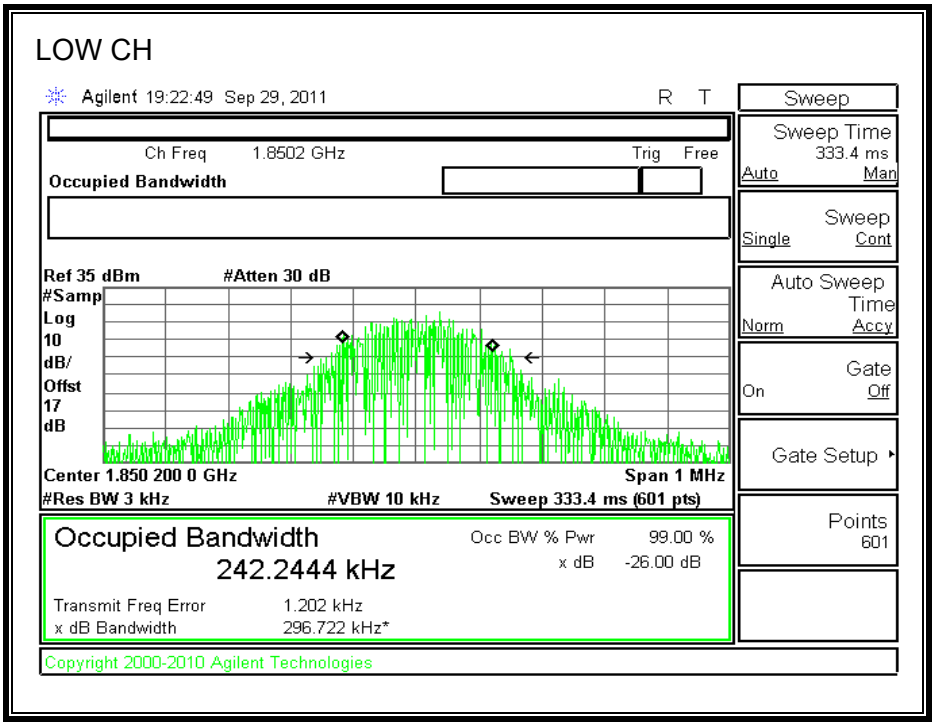
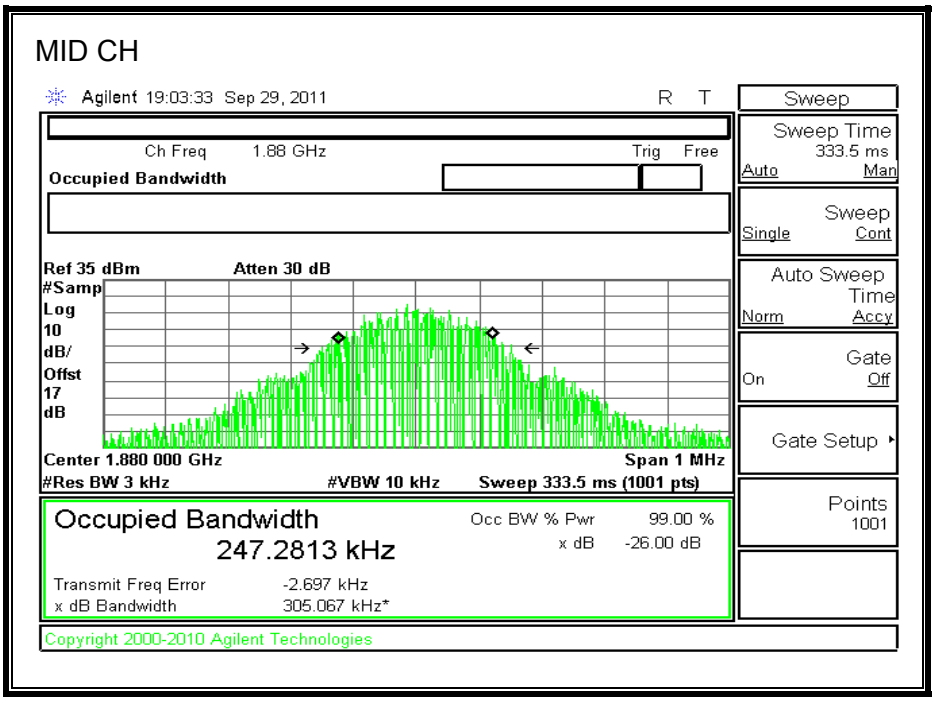
GPRS PCS Band





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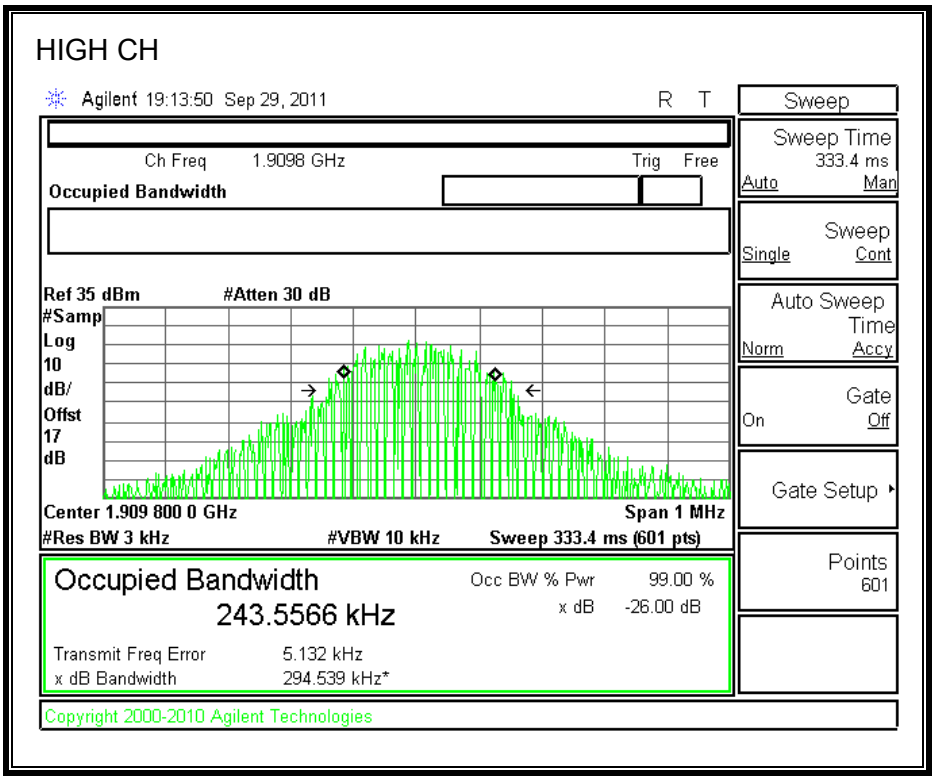

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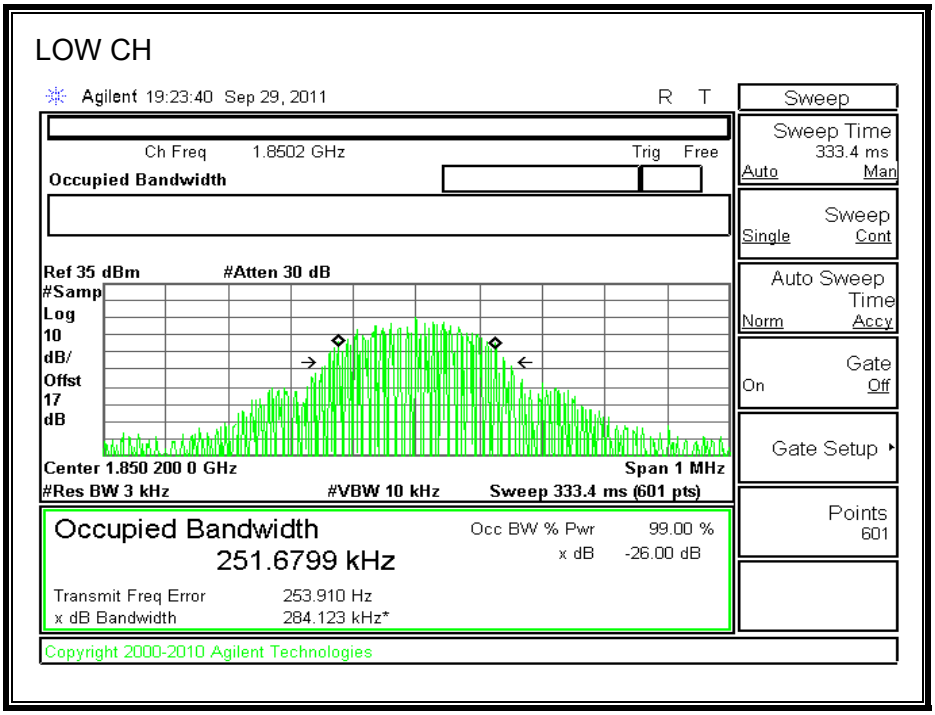
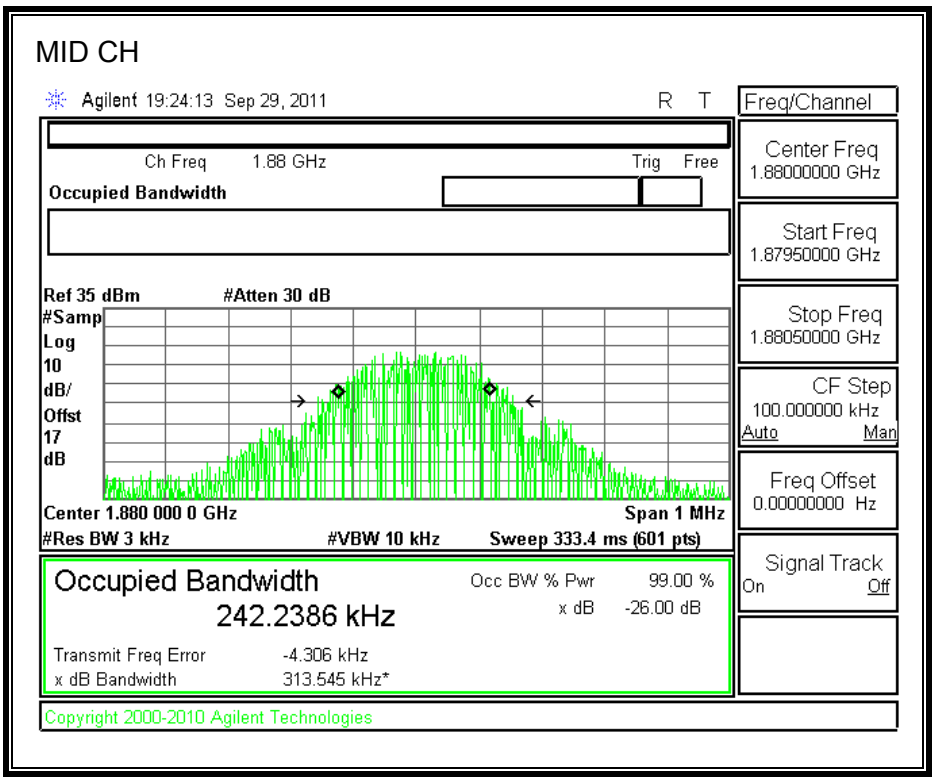
EGPRS PCS Band





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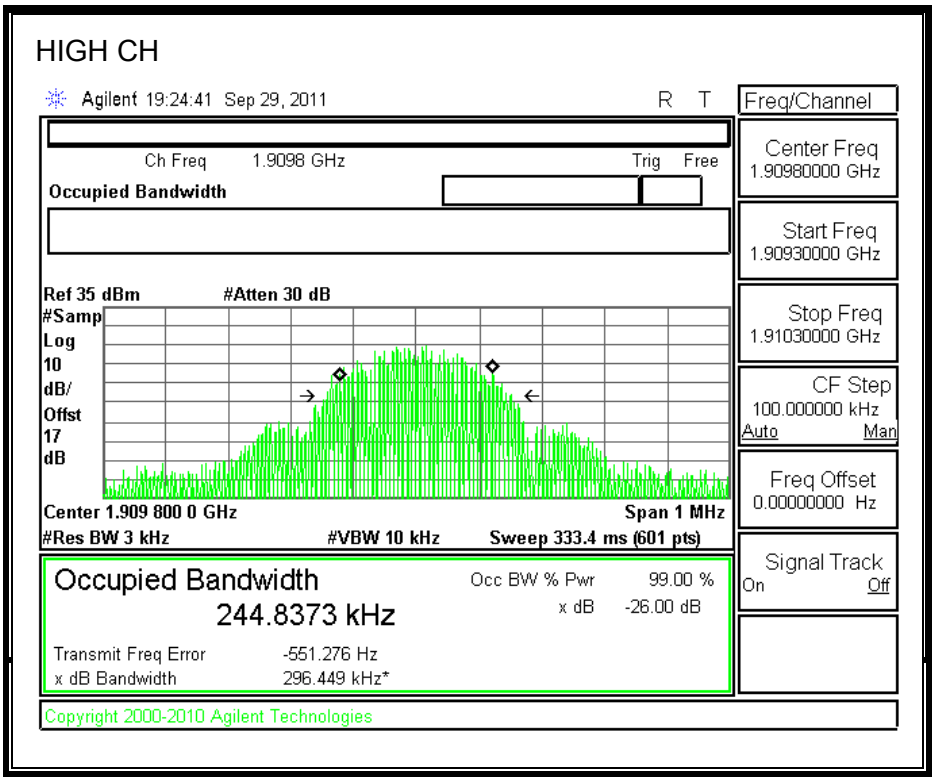
HIGH CH



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8.2. BAND EDGE

RULE PART(S)

FCC: §22.359, 24.238
IC: RSS-132, 4.5; RSS-133, 6.5

LIMITS

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

TEST PROCEDURE

The transmitter output was connected to a Agilent 8960 Test Set and configured to operate at maximum power. The band edge emissions were measured at the required operating frequencies in each band on the Spectrum Analyzer.
For each band edge measurement:

- Set the spectrum analyzer span to include the block edge frequency (824, 848, 1850, 1910MHz)
- Set a marker to point the corresponding band edge frequency in each test case.
- Set display line at -13 dBm
- Set resolution bandwidth to at least 1% of emission bandwidth.

MODES TESTED

- 1xRTT – RC2 SO9
- CDMA2000 1xEV-DO Revision A (Rev. A)
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

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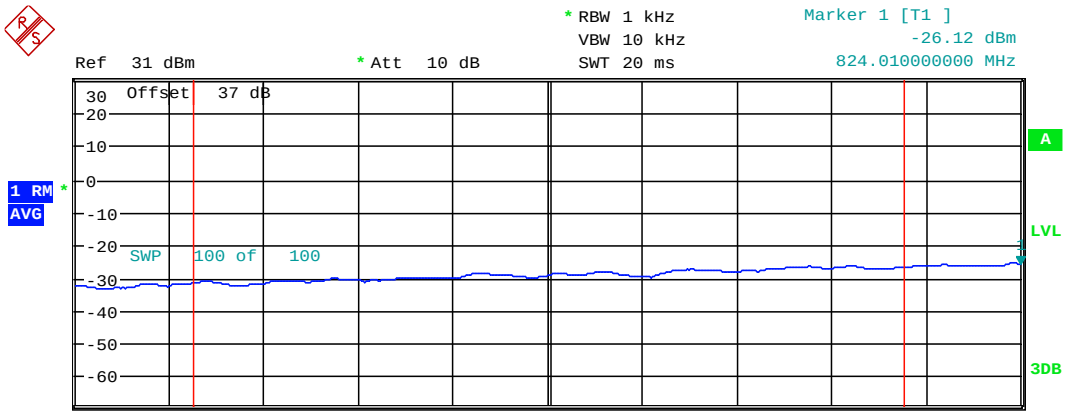
PORT A: CDMA2000 1xRTT mode (Cellular Band)

Low Channel Band Edge



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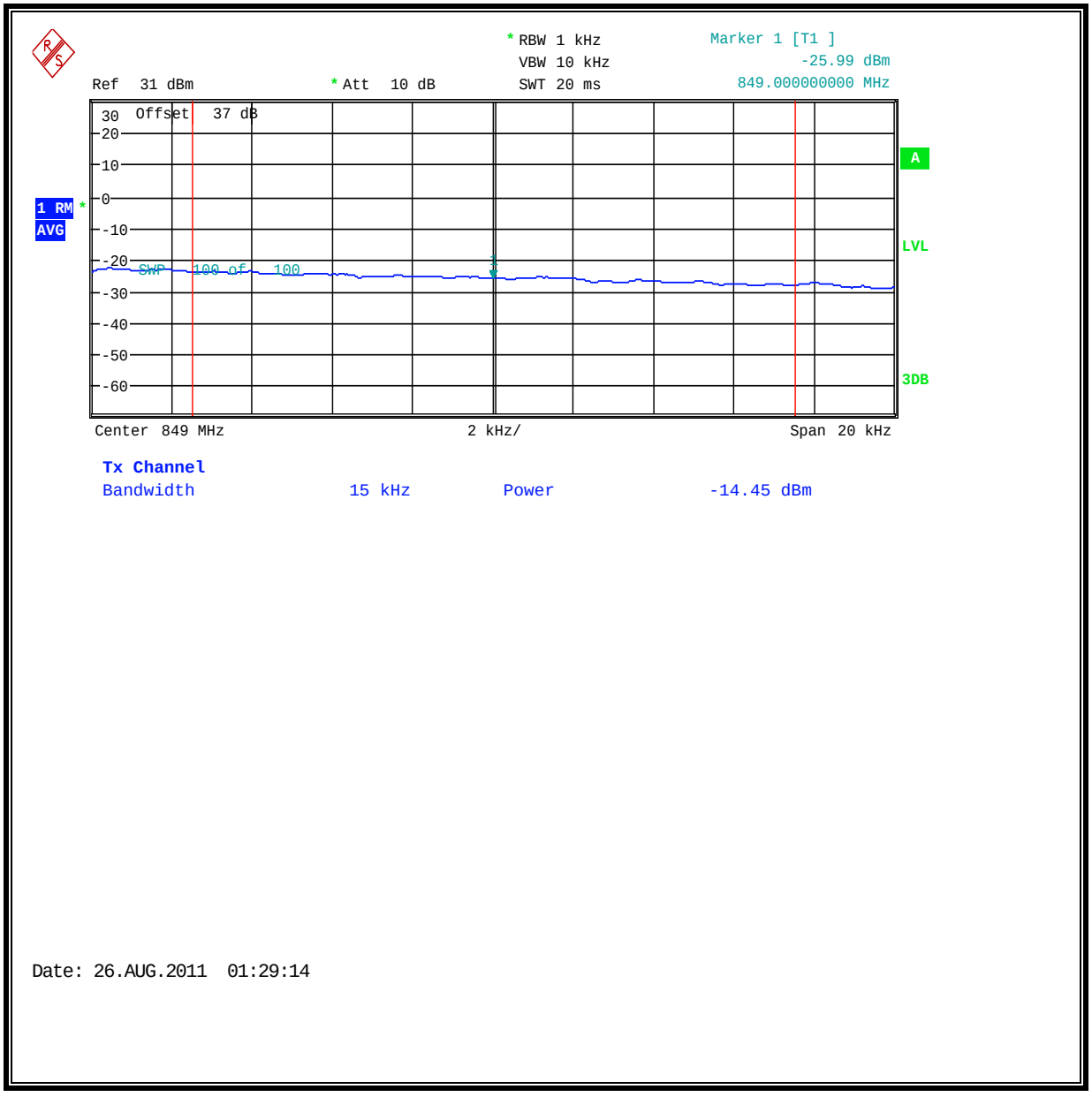
***High Channel Band Edge**



* Power is integrated over the 1 percent of emission bandwidth.

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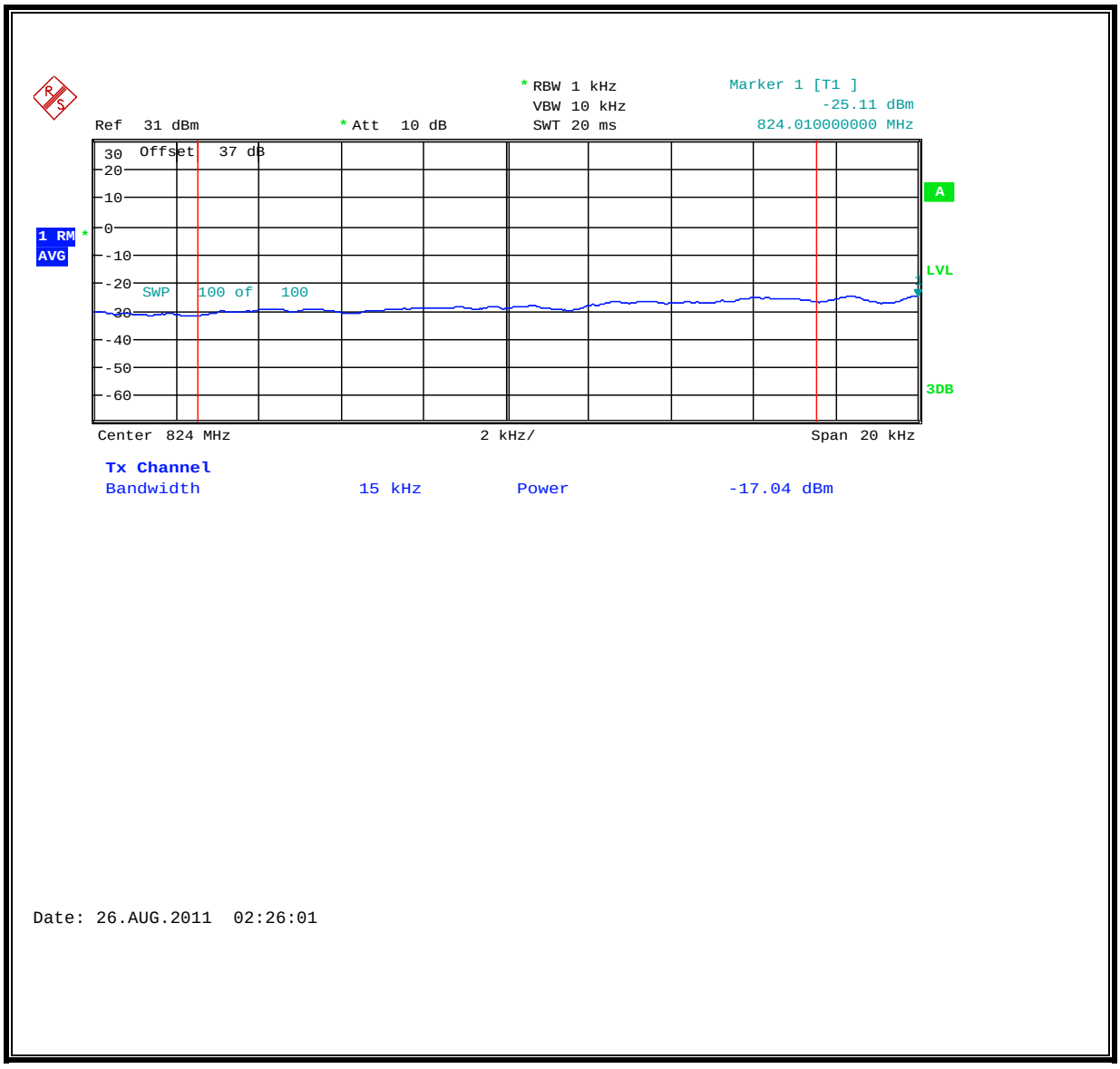
CDMA2000 1xEV-DO Revision A (Rev. A) mode (Cellular Band)

Low Channel Band Edge



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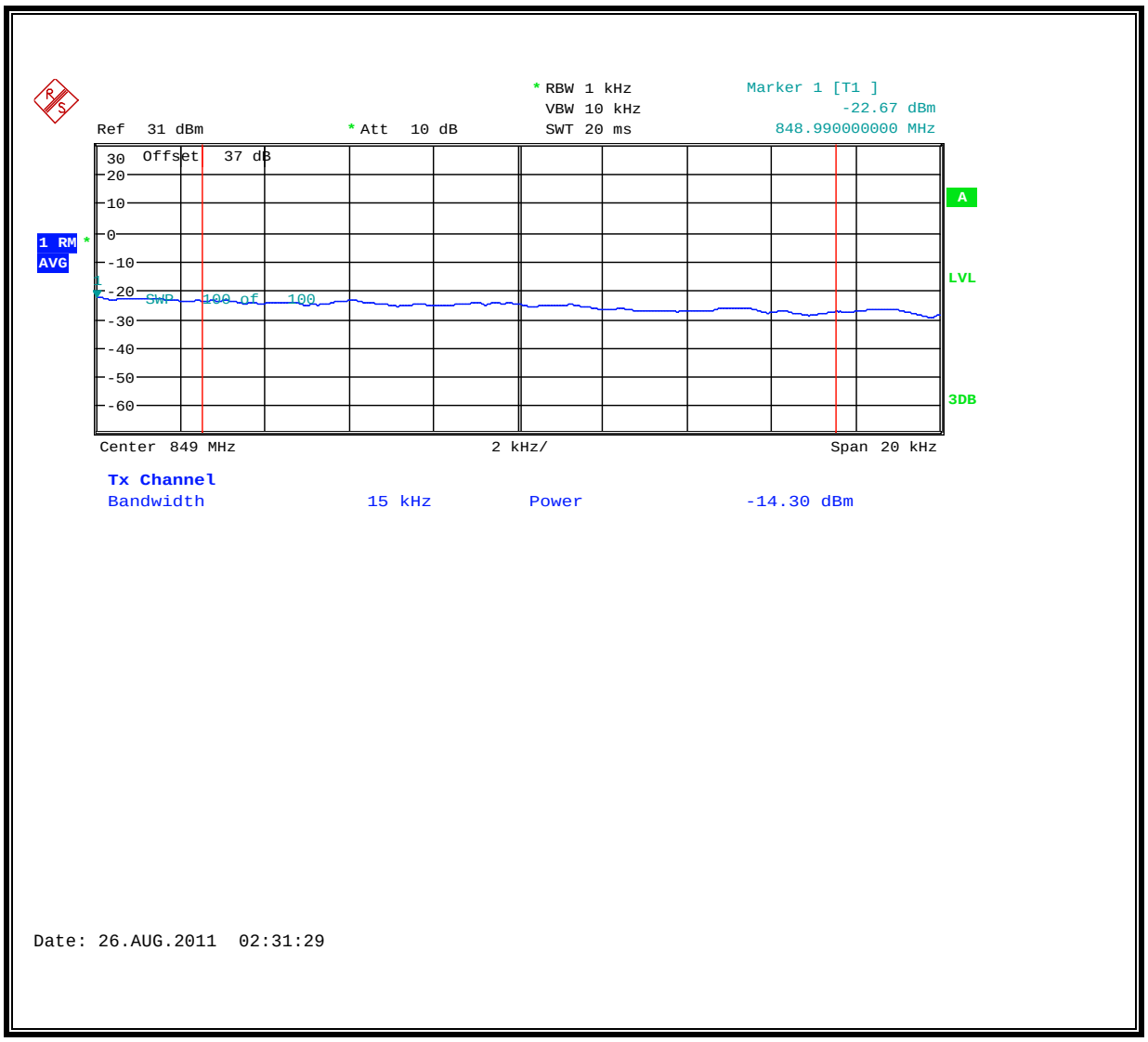
***High Channel Band Edge**



* Power is integrated over the 1 percent of emission bandwidth.

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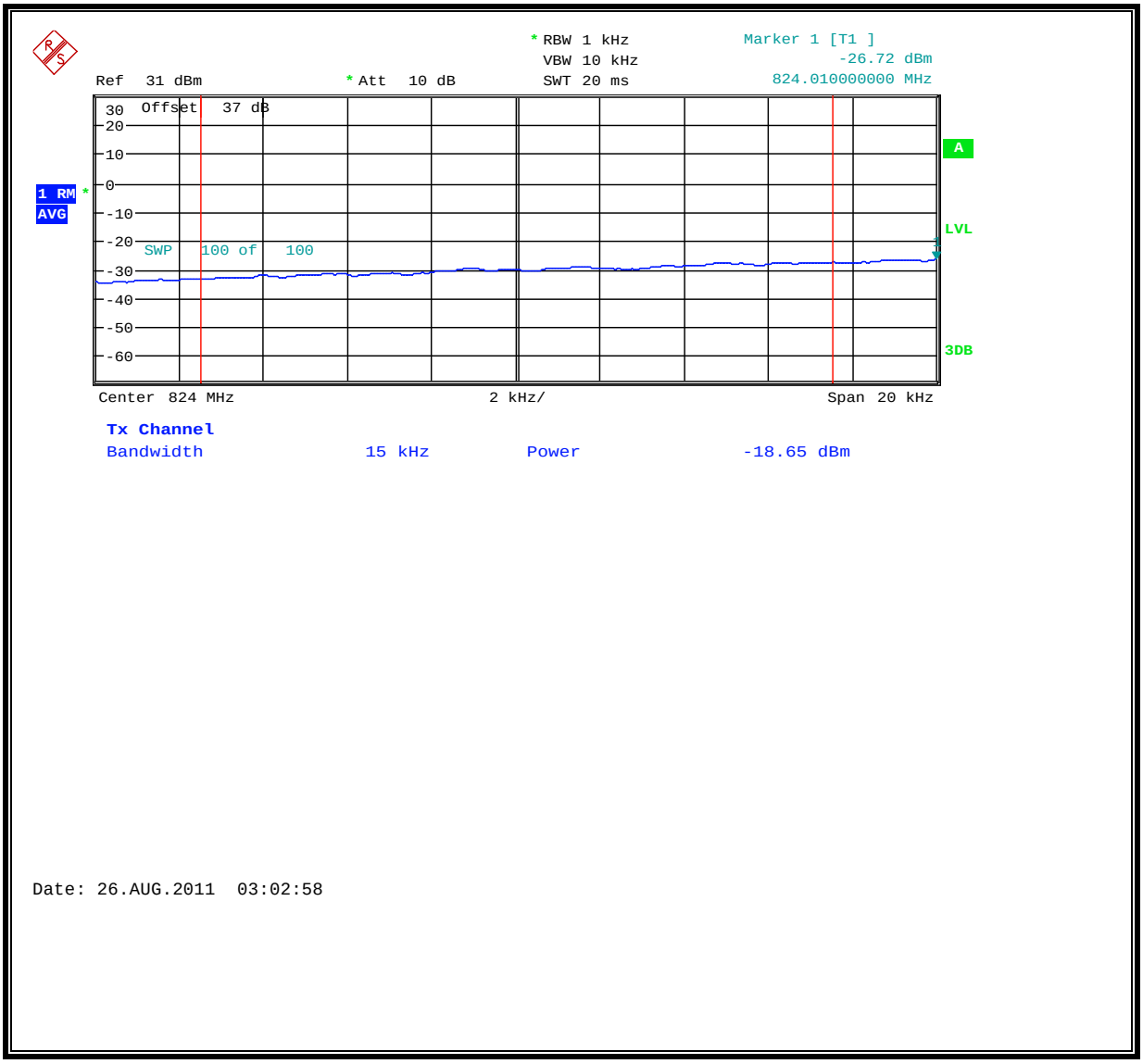
PORT B: CDMA2000 1xRTT mode (Cellular Band)

Low Channel Band Edge



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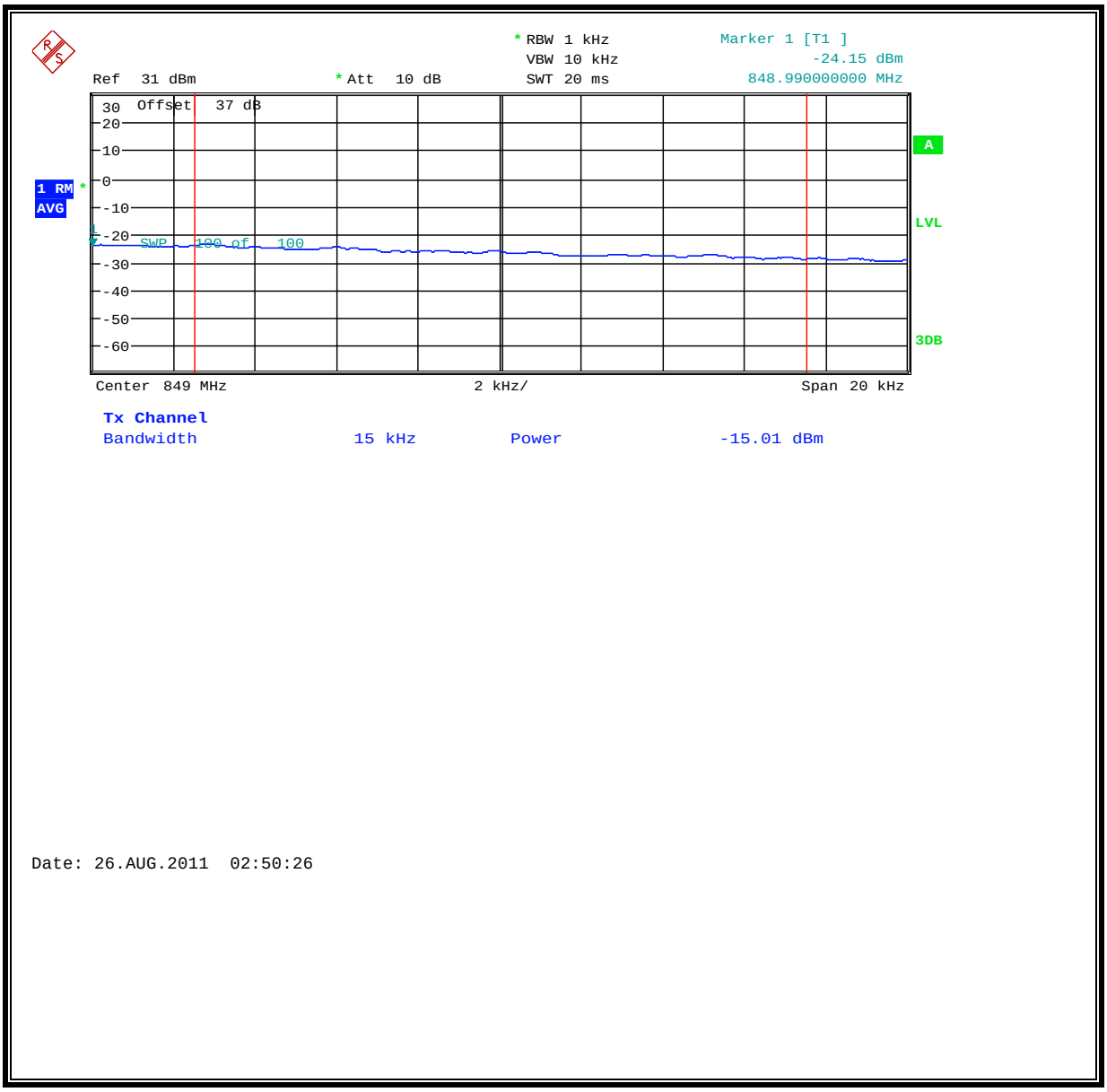
High Channel Band Edge



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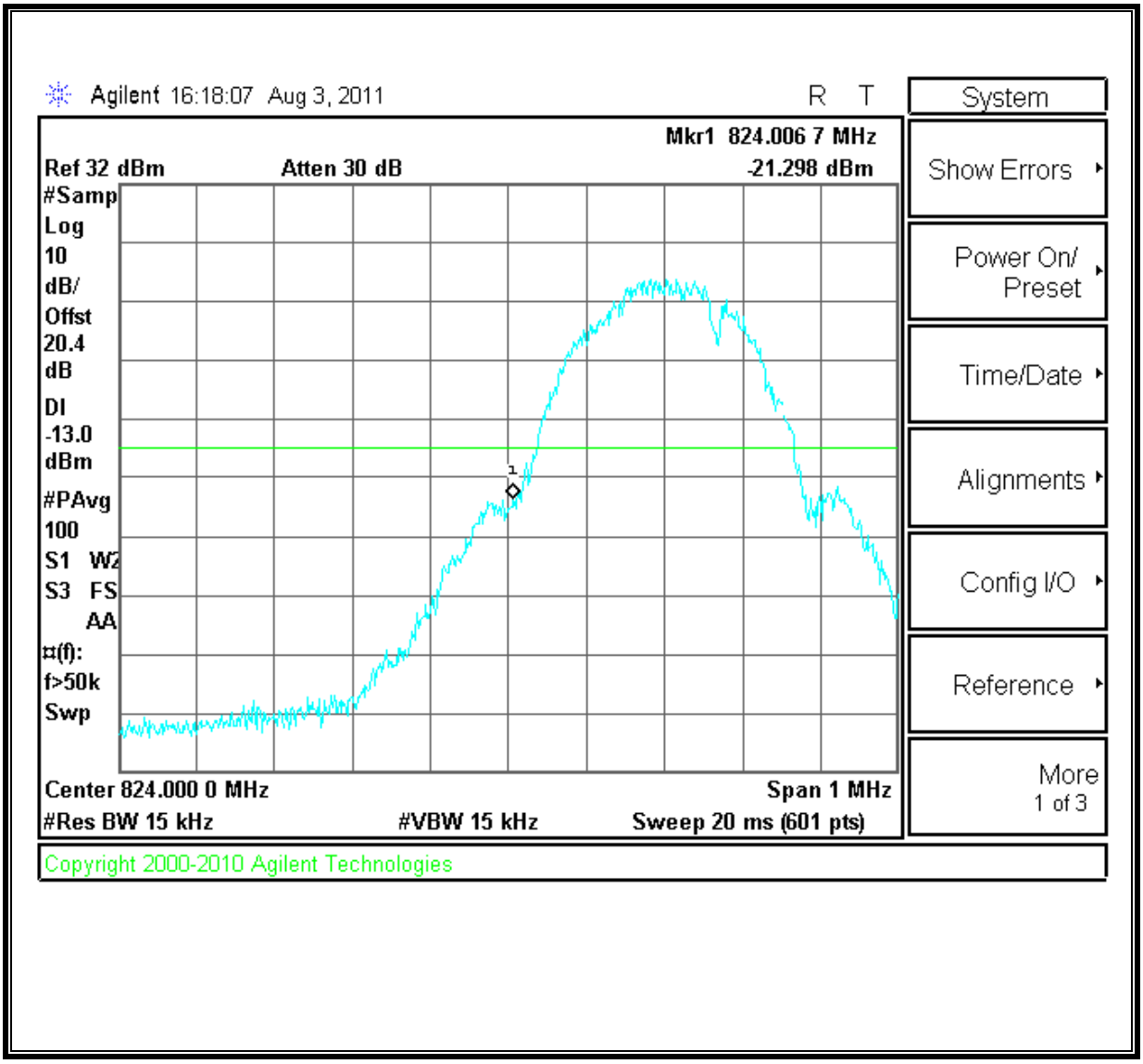
PORT A: GPRS mode (Cellular Band)

Low Channel Band Edge



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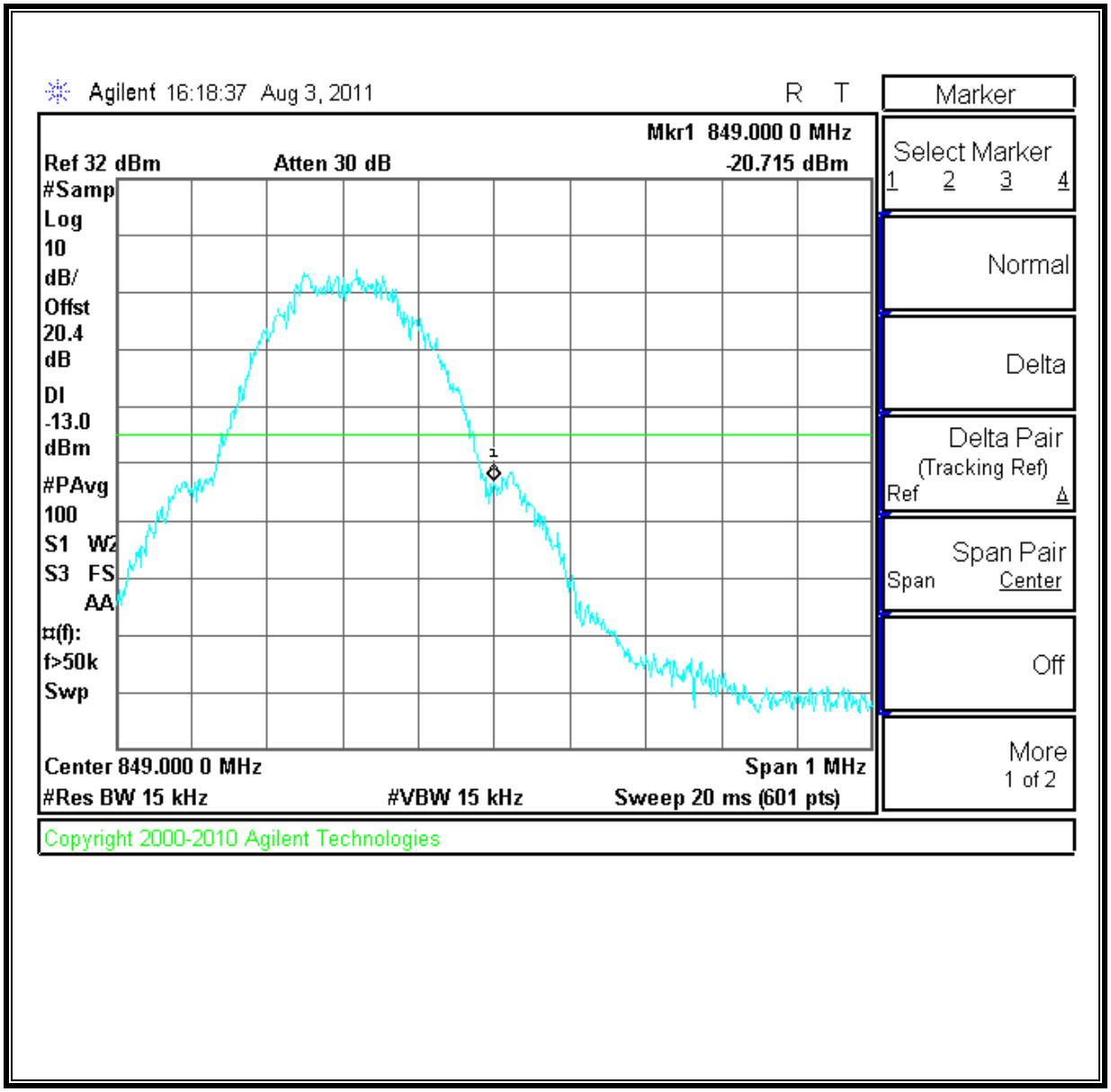
High Channel Band Edge



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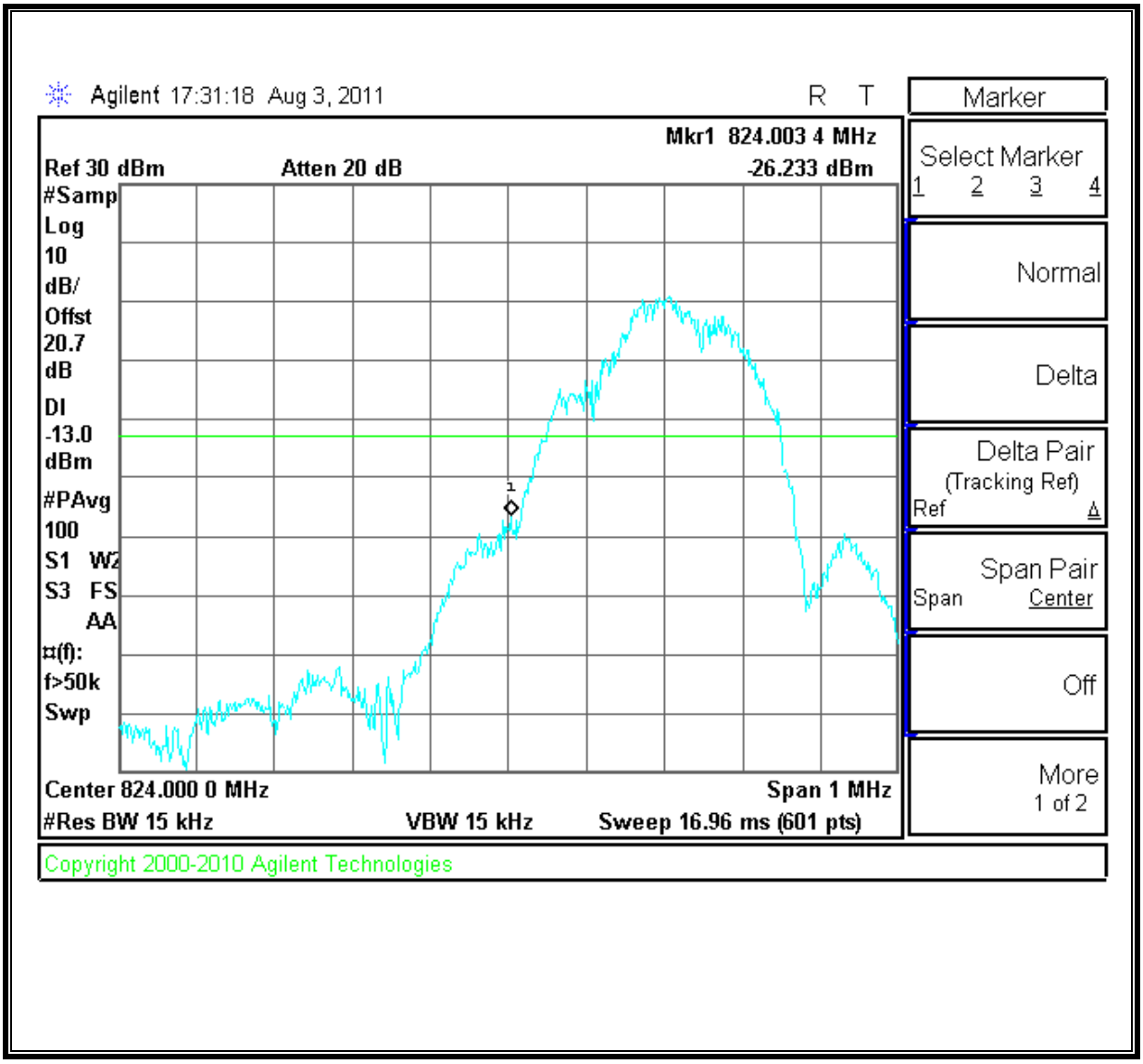
EGPRS mode (Cellular Band)

Low Channel Band Edge



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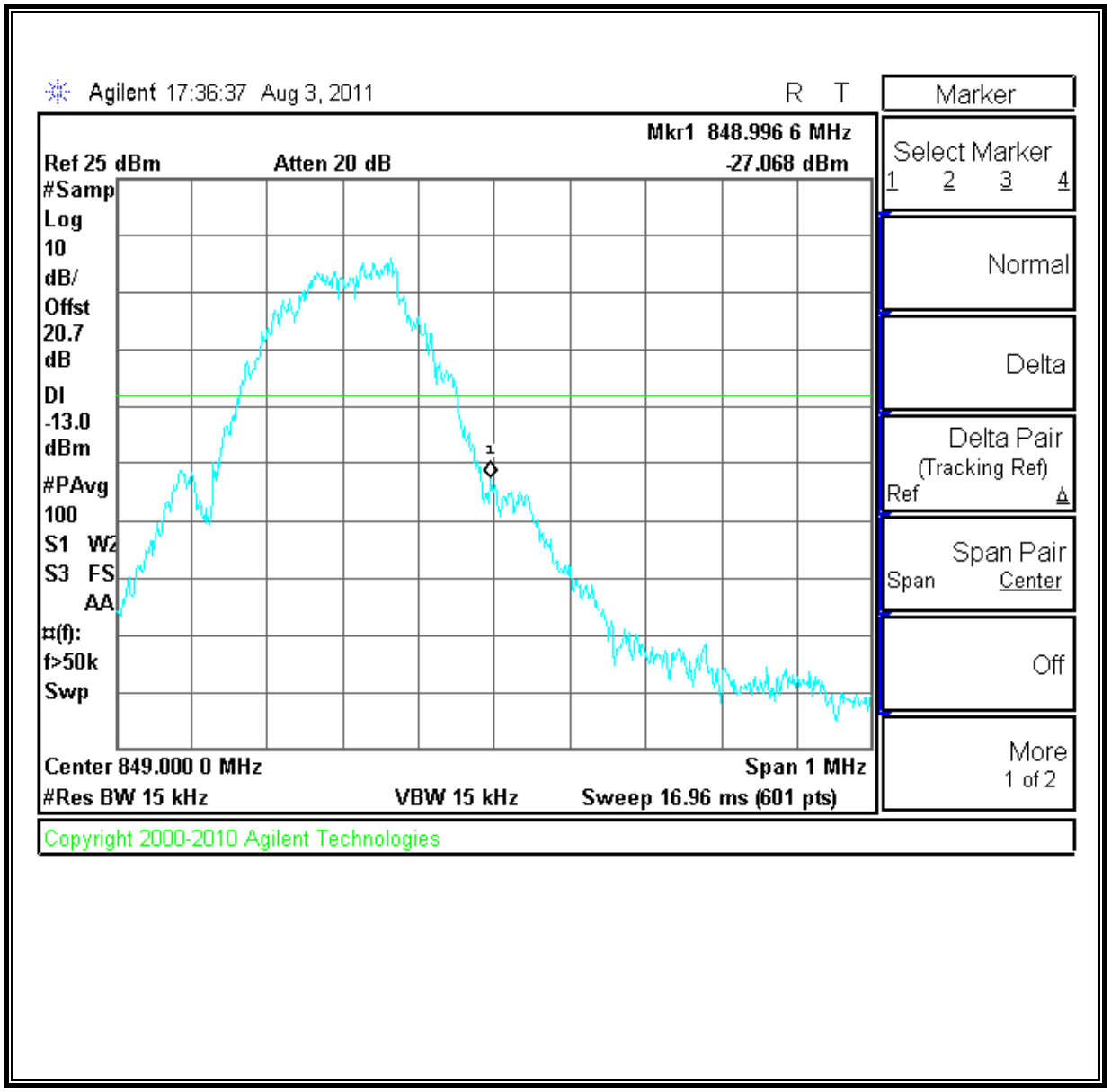
High Channel Band Edge



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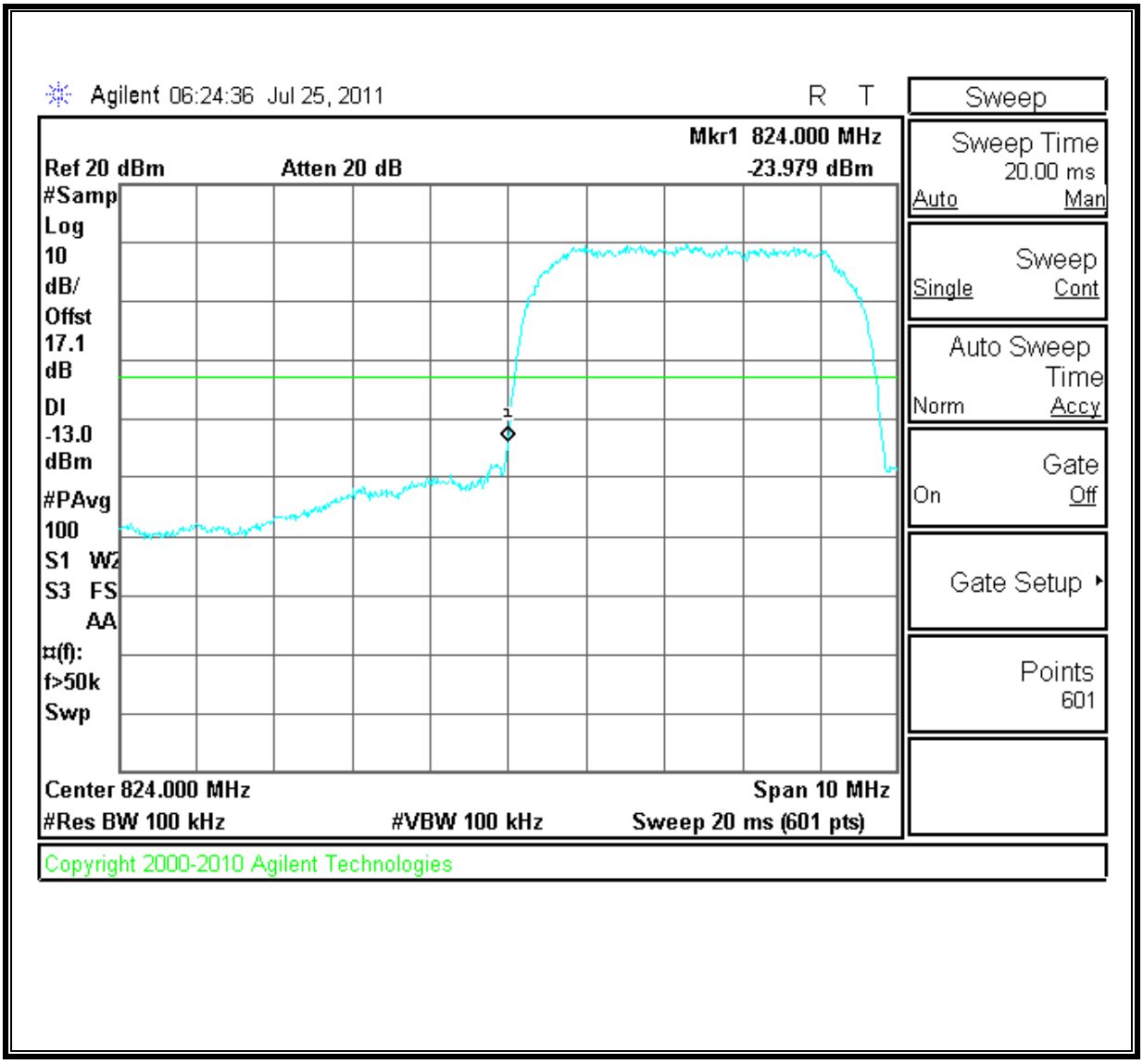
UMTS REL 99 mode (Cellular Band)

Low Channel Band Edge



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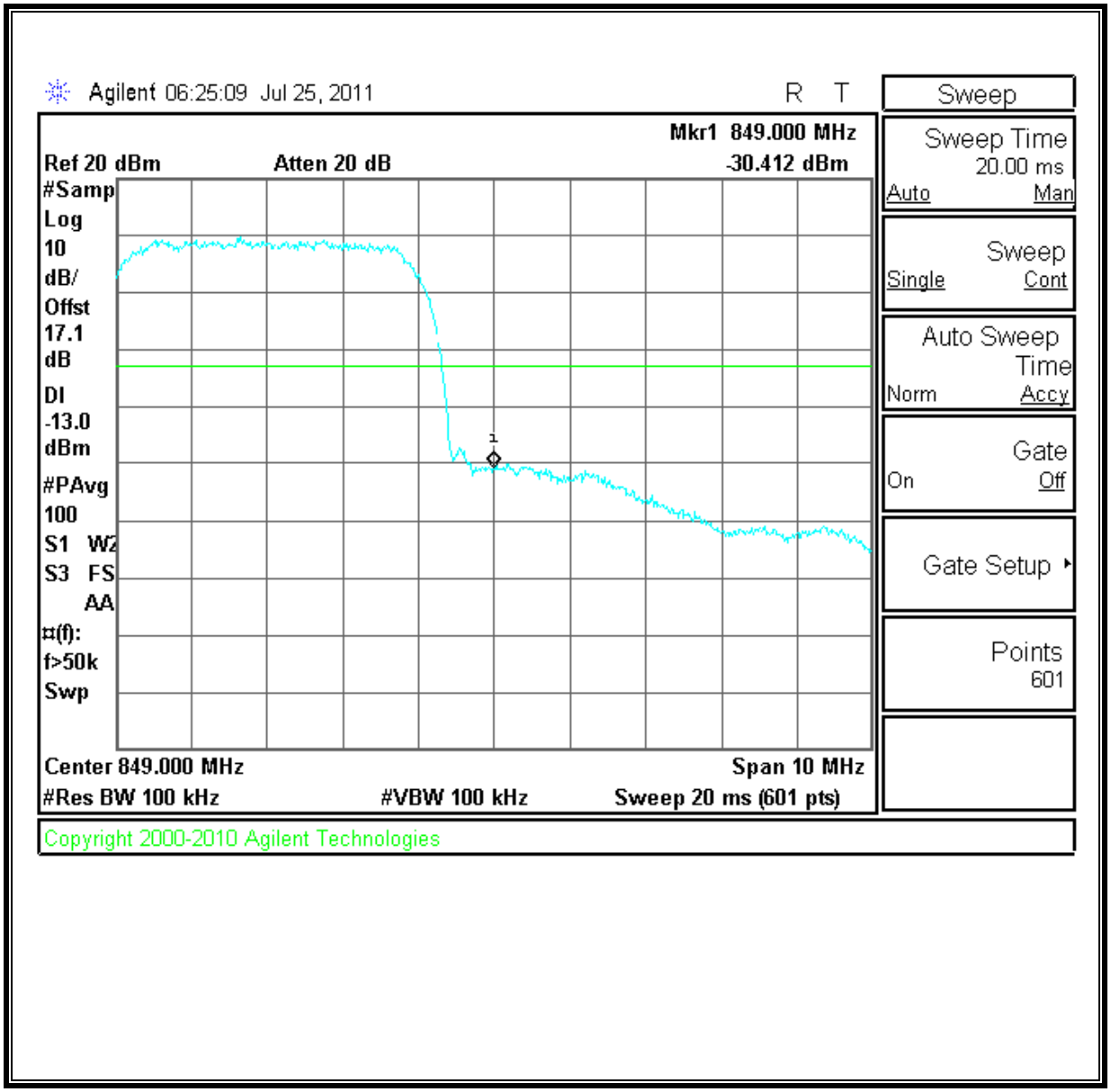
High Channel Band Edge



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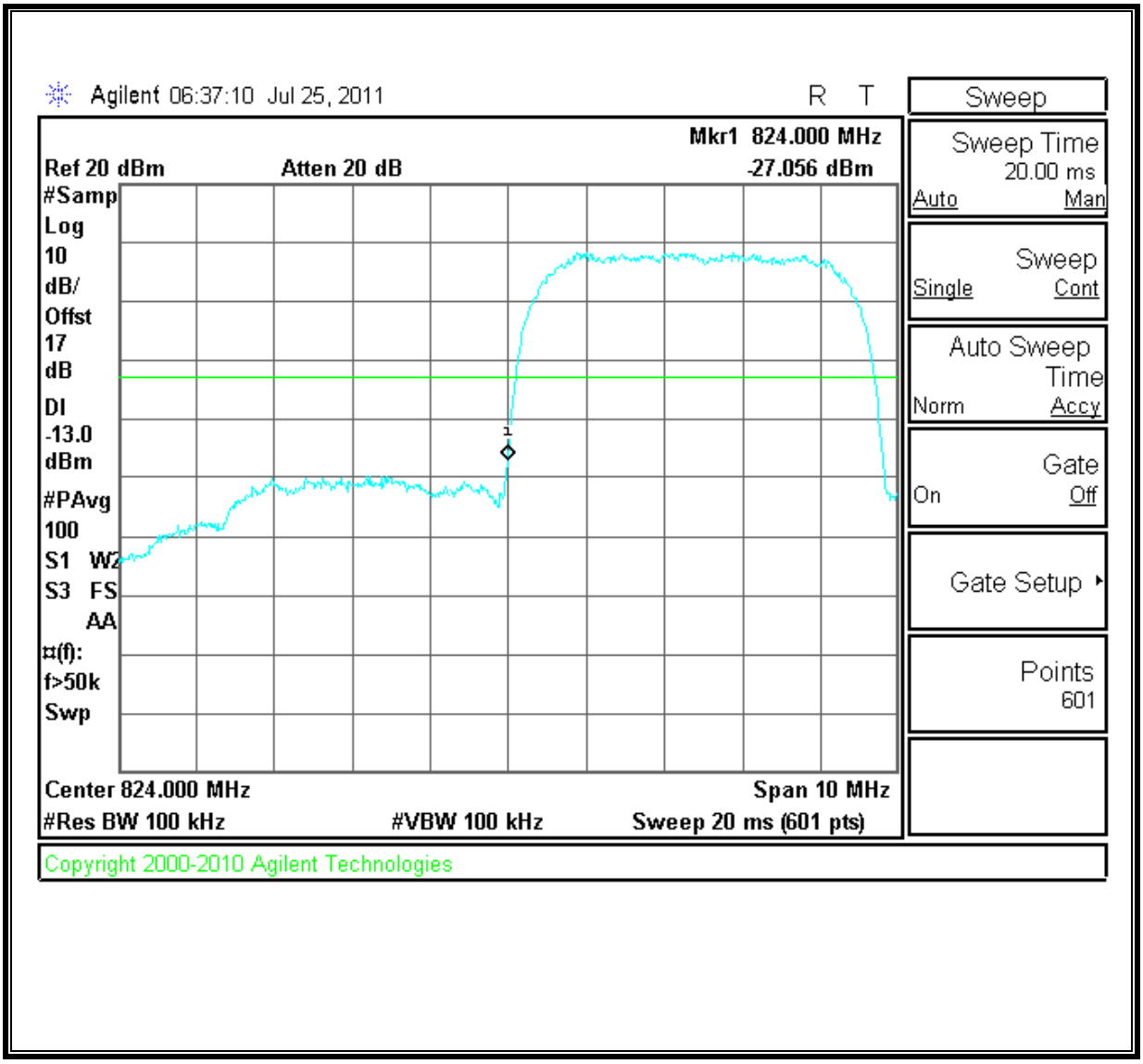
UMTS HSDPA mode (Cellular Band)

Low Channel Band Edge



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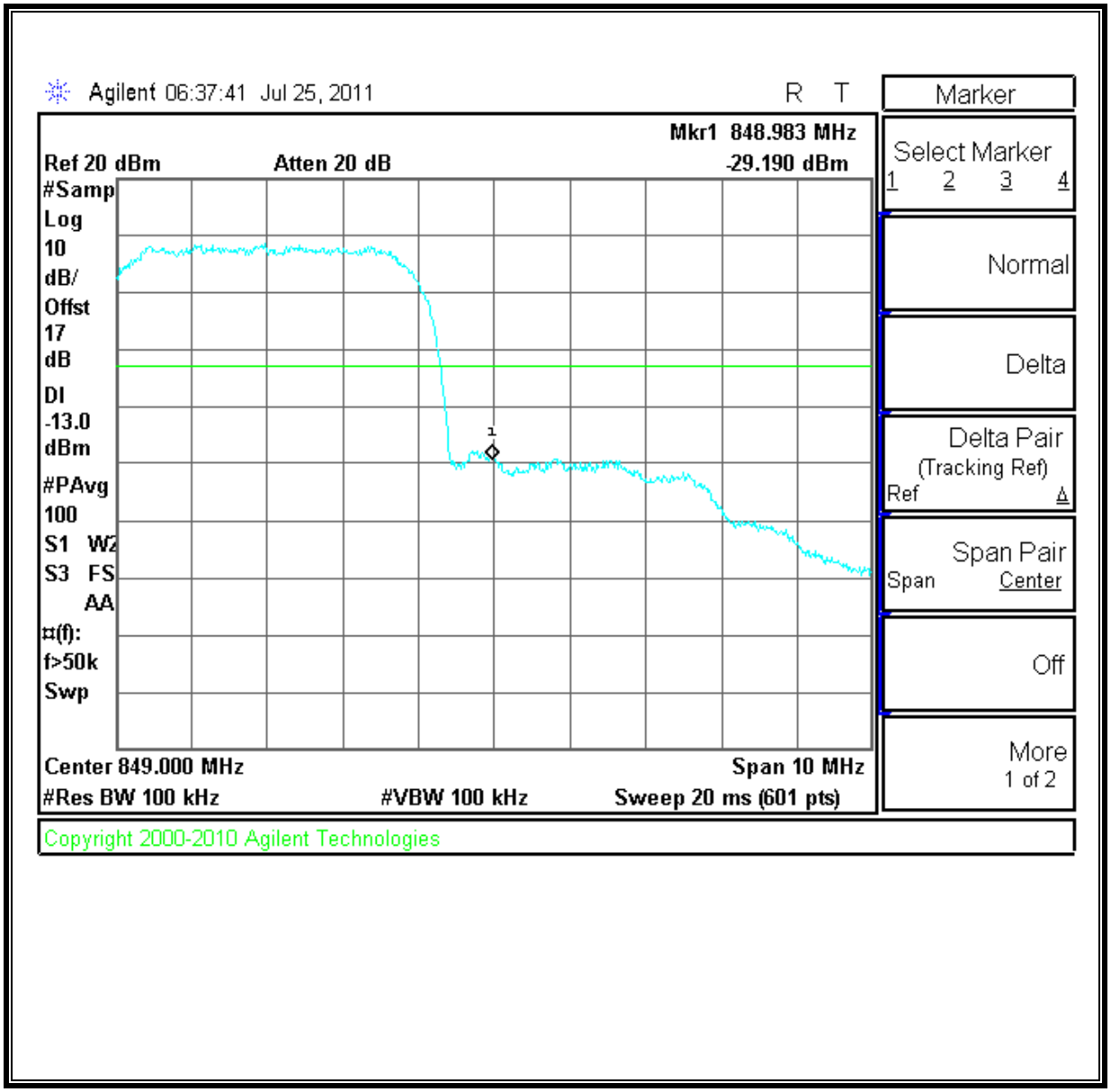
High Channel Band Edge



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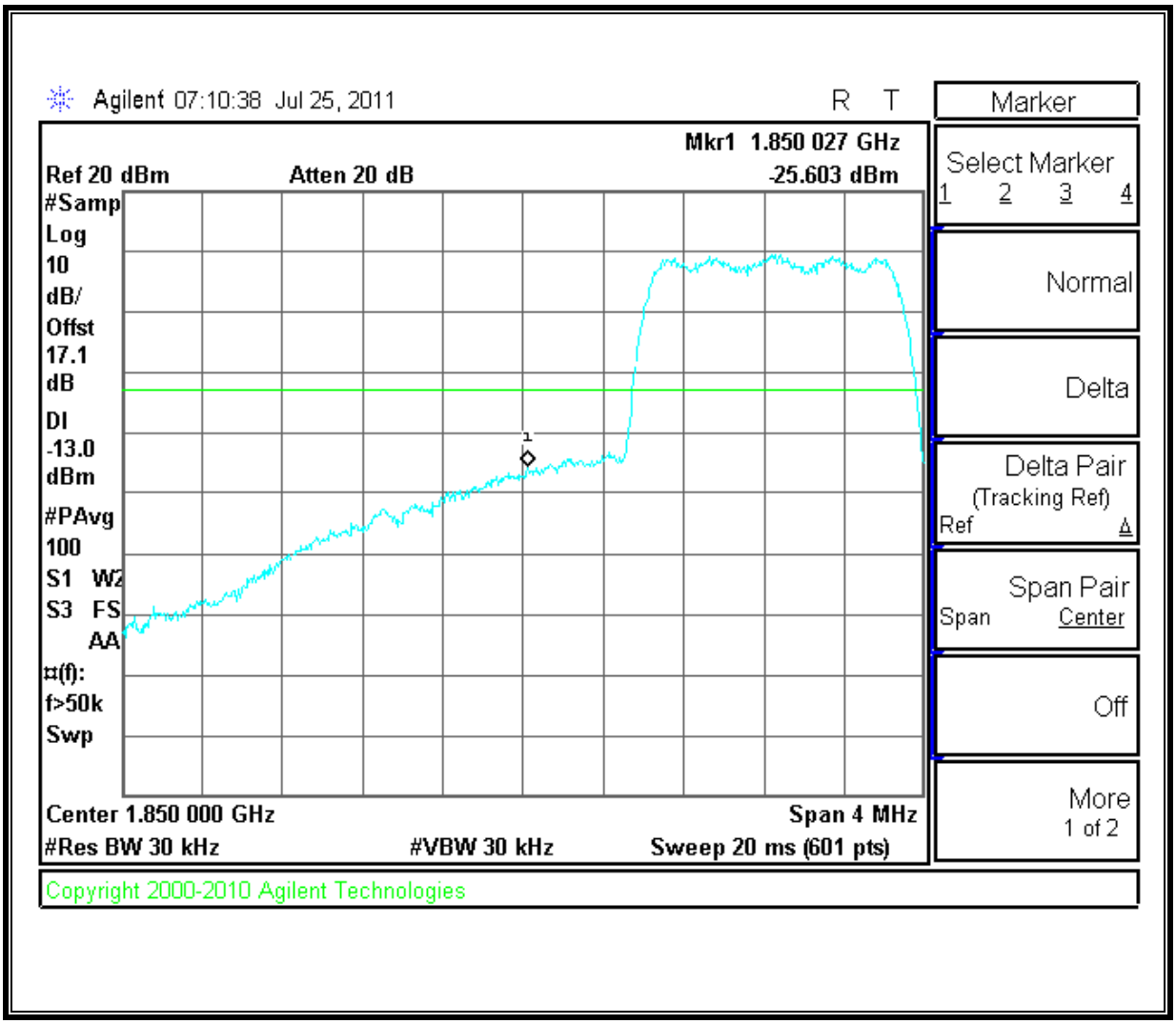
CDMA2000 1xRTT mode (PCS Band)

Low Channel Band Edge



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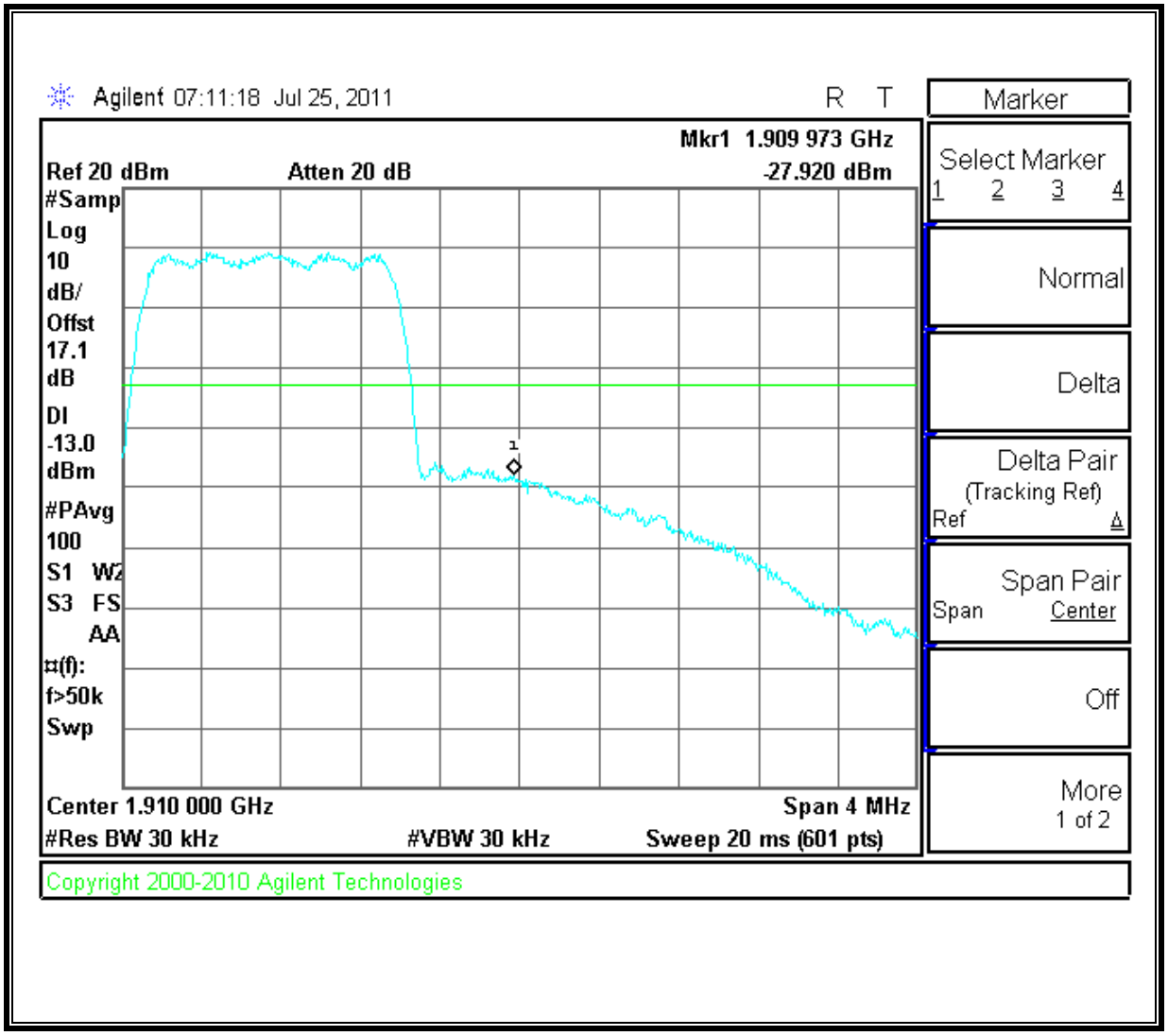
High Channel Band Edge



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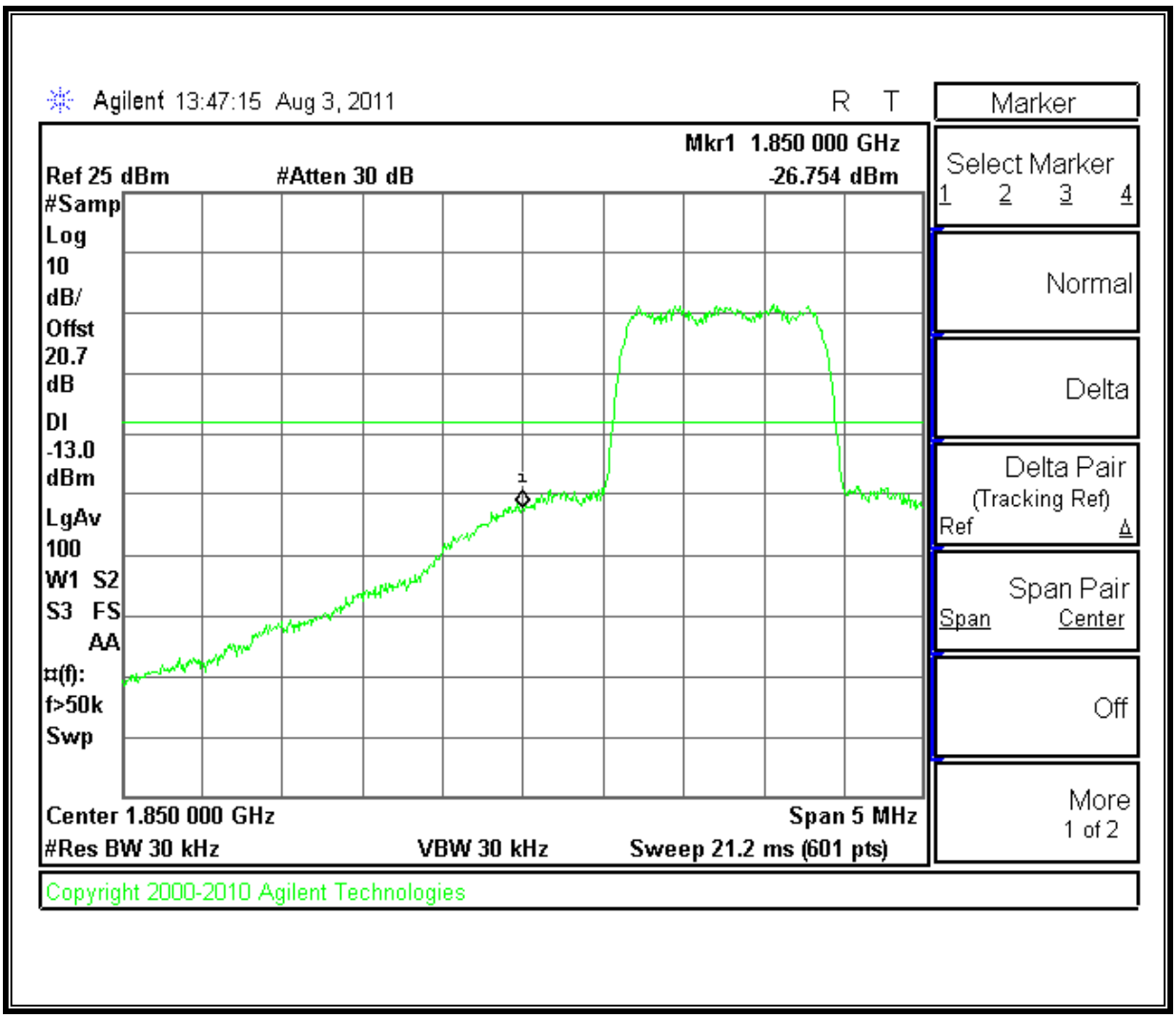
CDMA2000 1xEV-DO Revision A (Rev. A) mode (PCS Band)

Low Channel Band Edge



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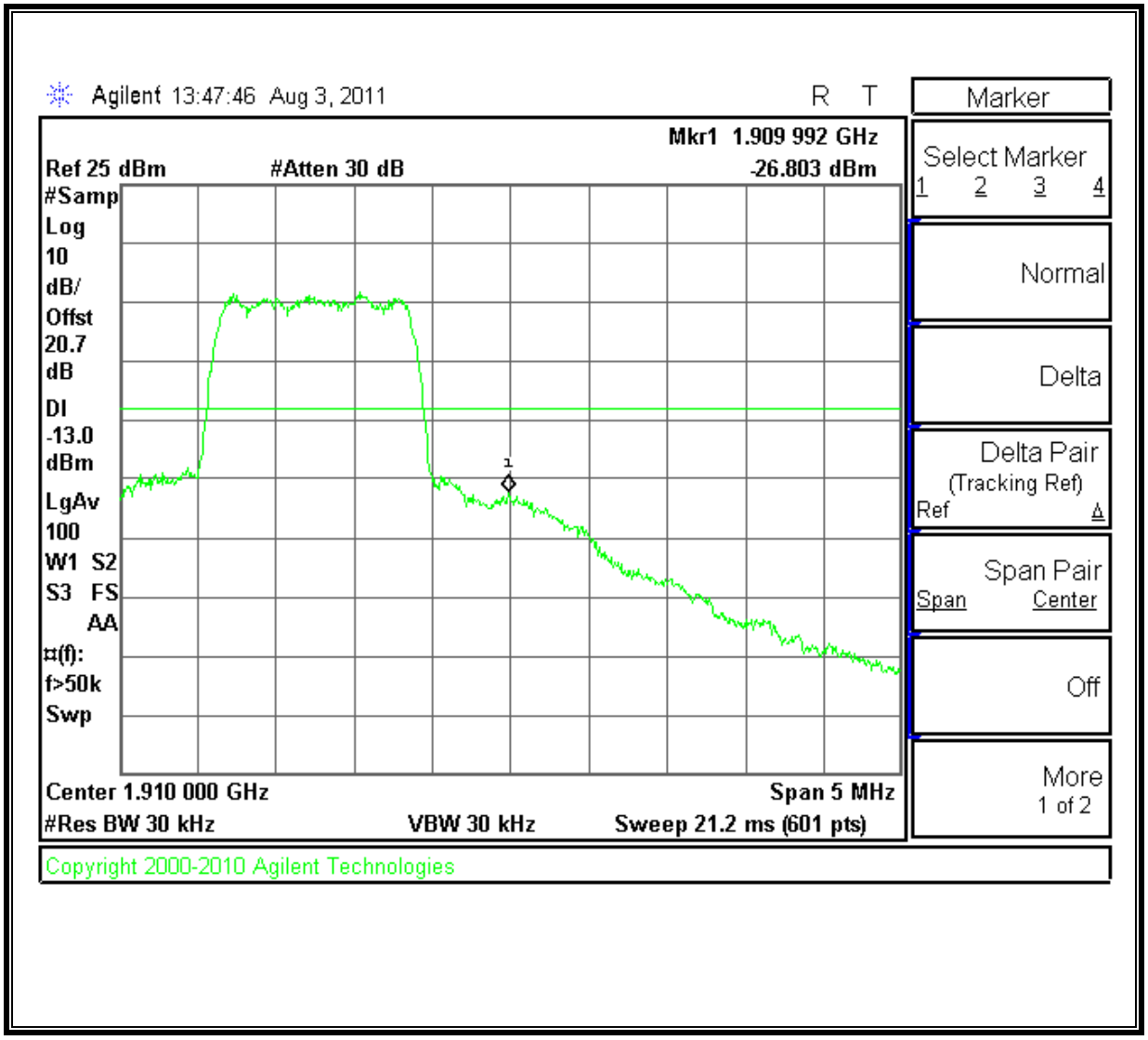
High Channel Band Edge



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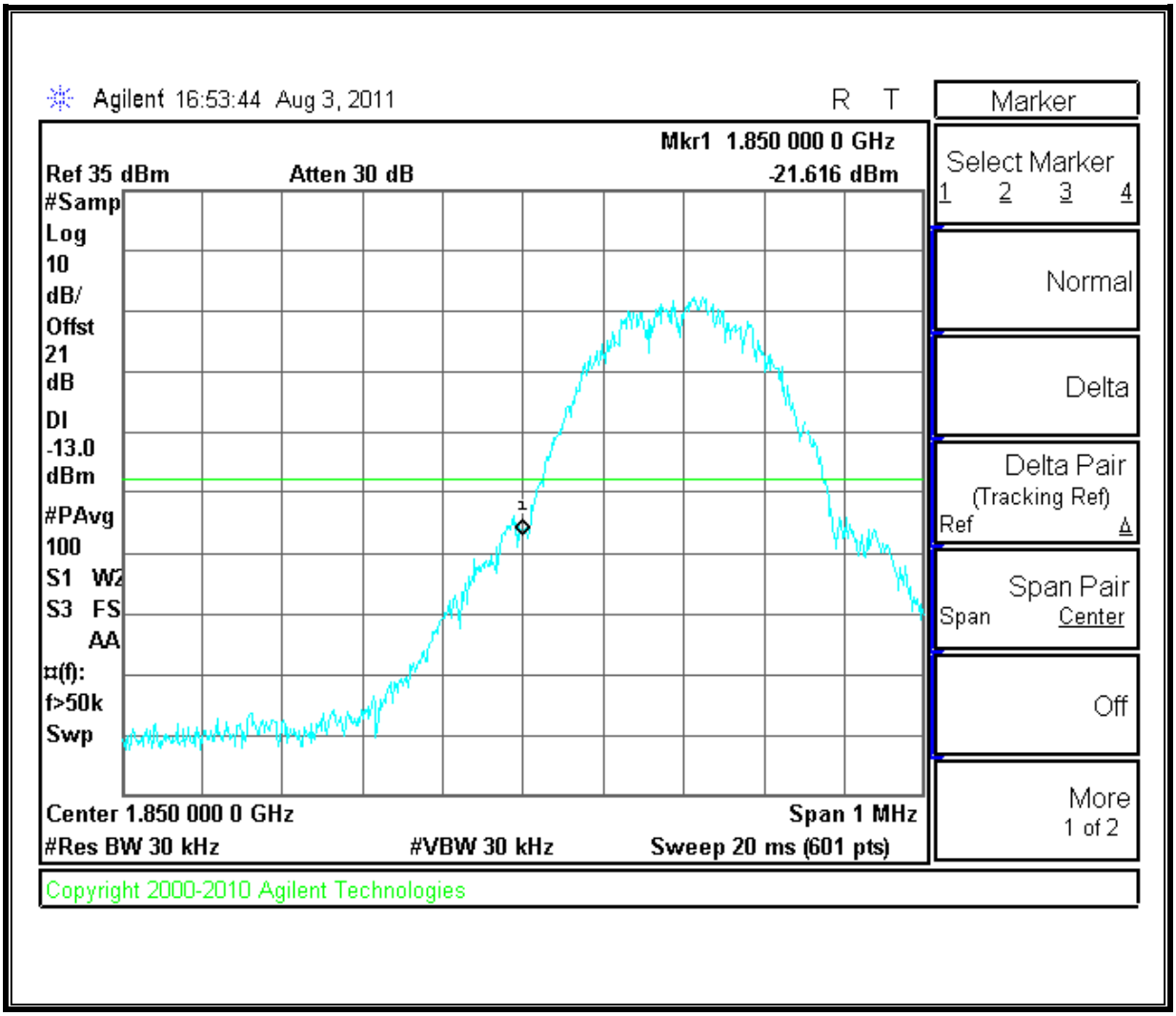
GPRS mode (PCS Band)

Low Channel Band Edge



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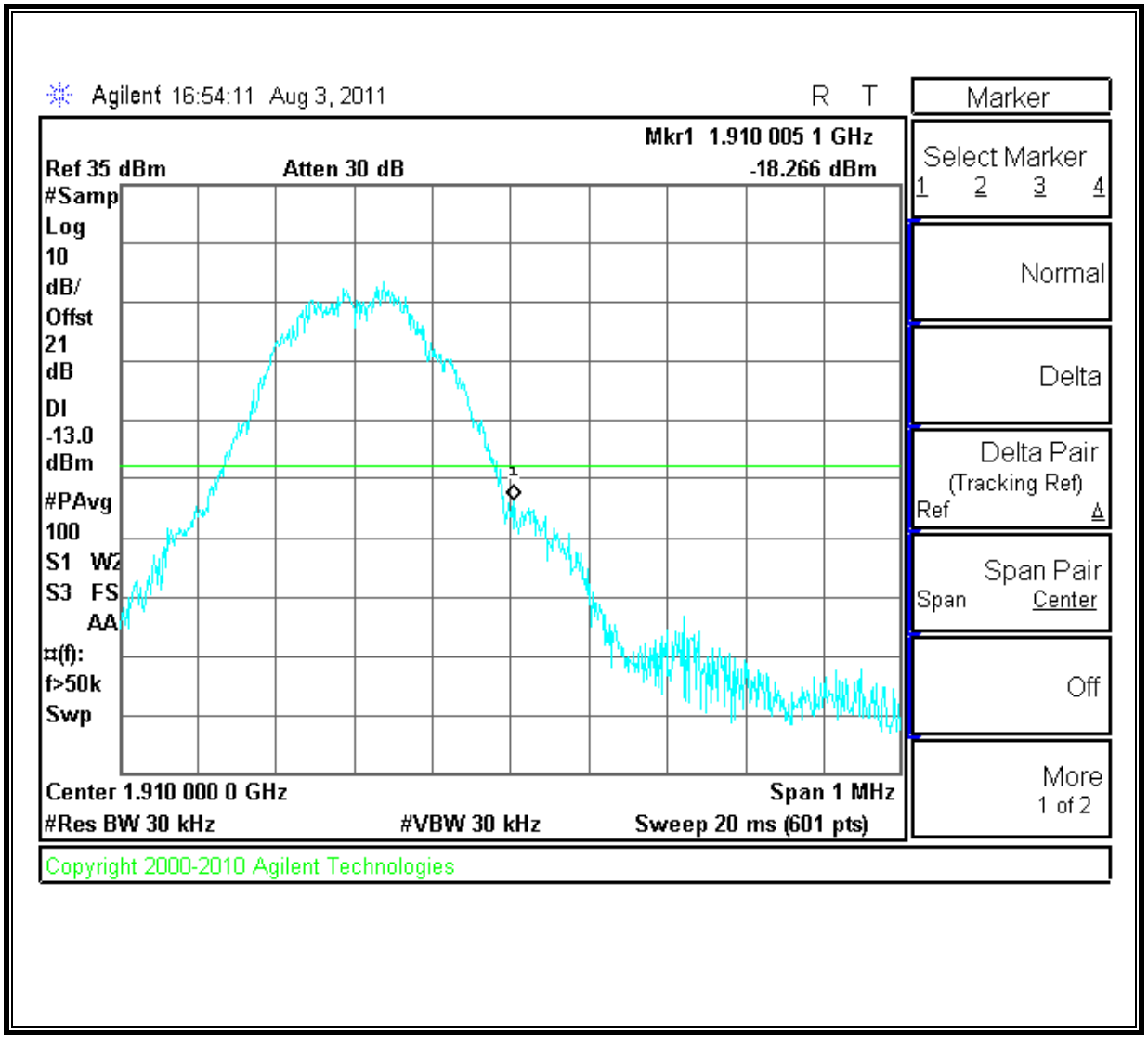
High Channel Band Edge



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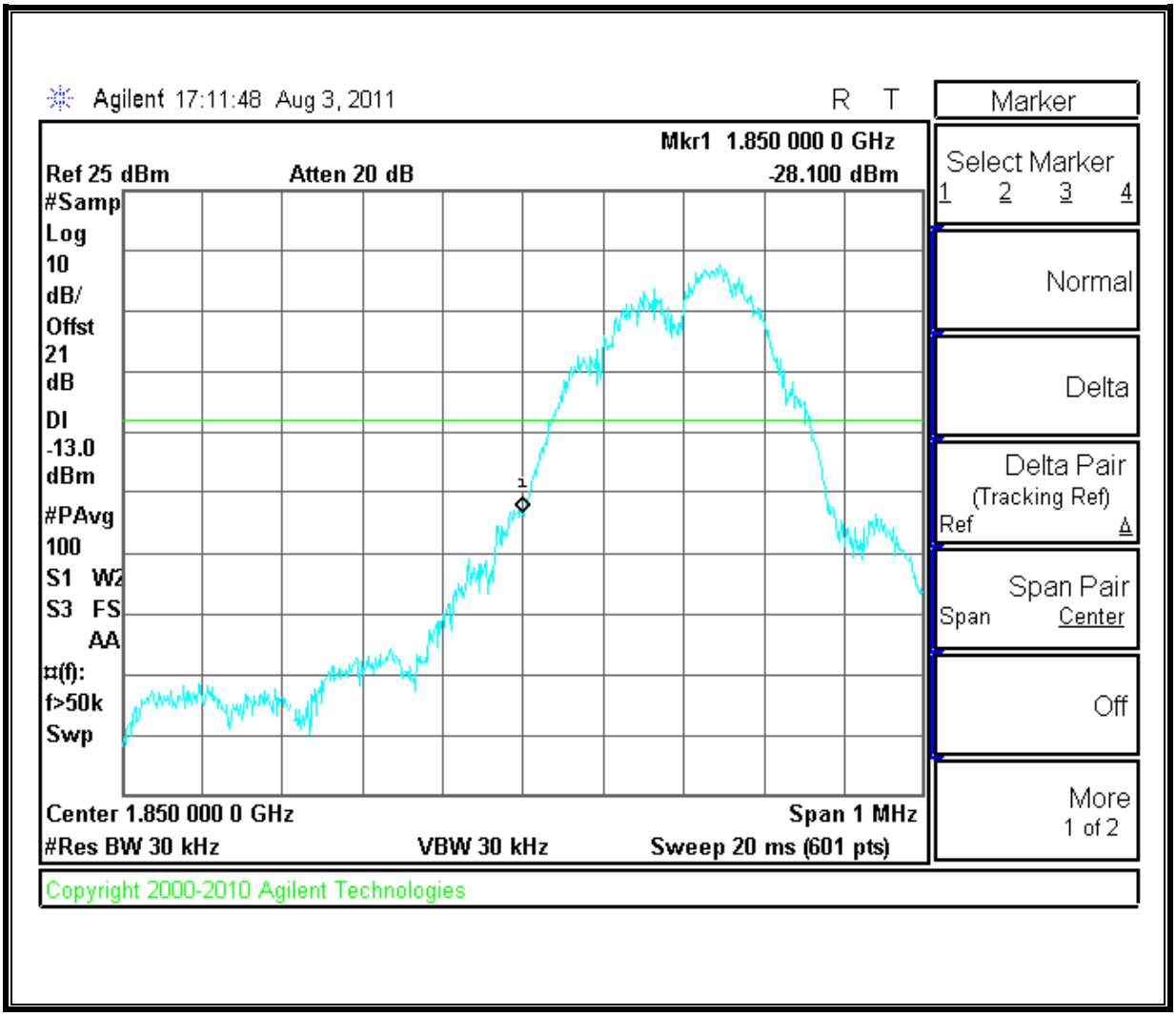
EGPRS mode (PCS Band)

Low Channel Band Edge



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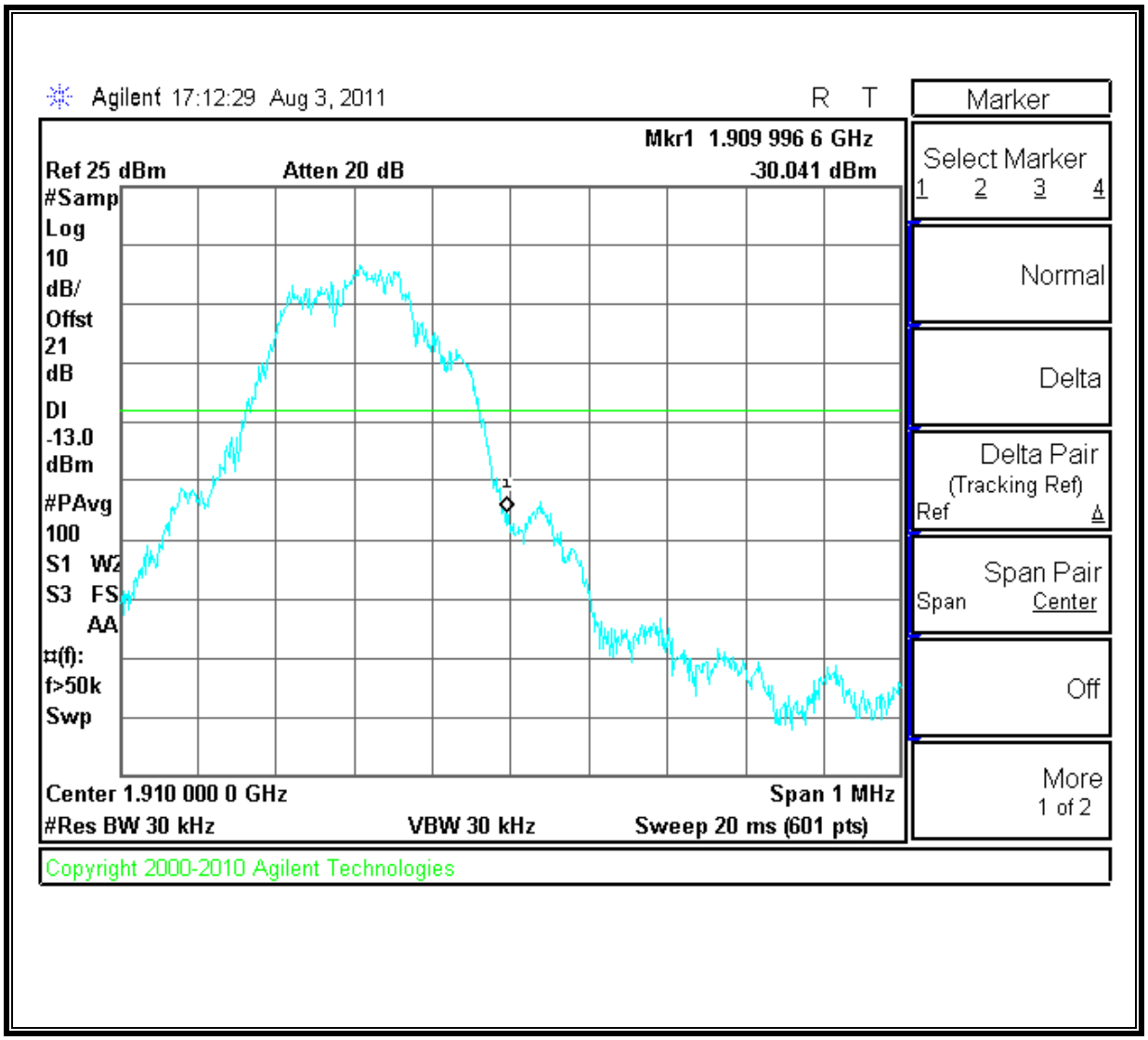
High Channel Band Edge



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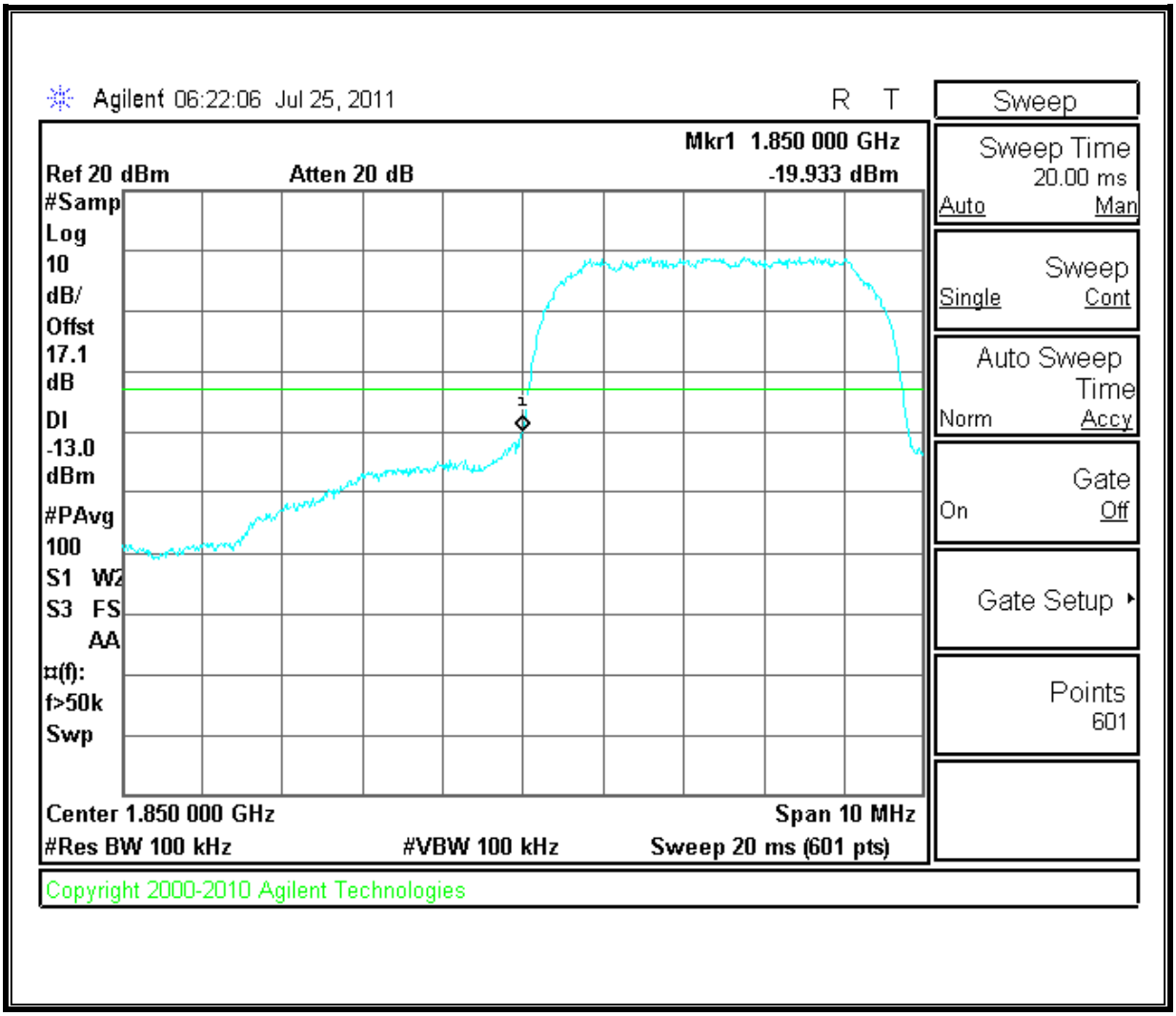
UMTS REL99 (PCS Band)

Low Channel Band Edge



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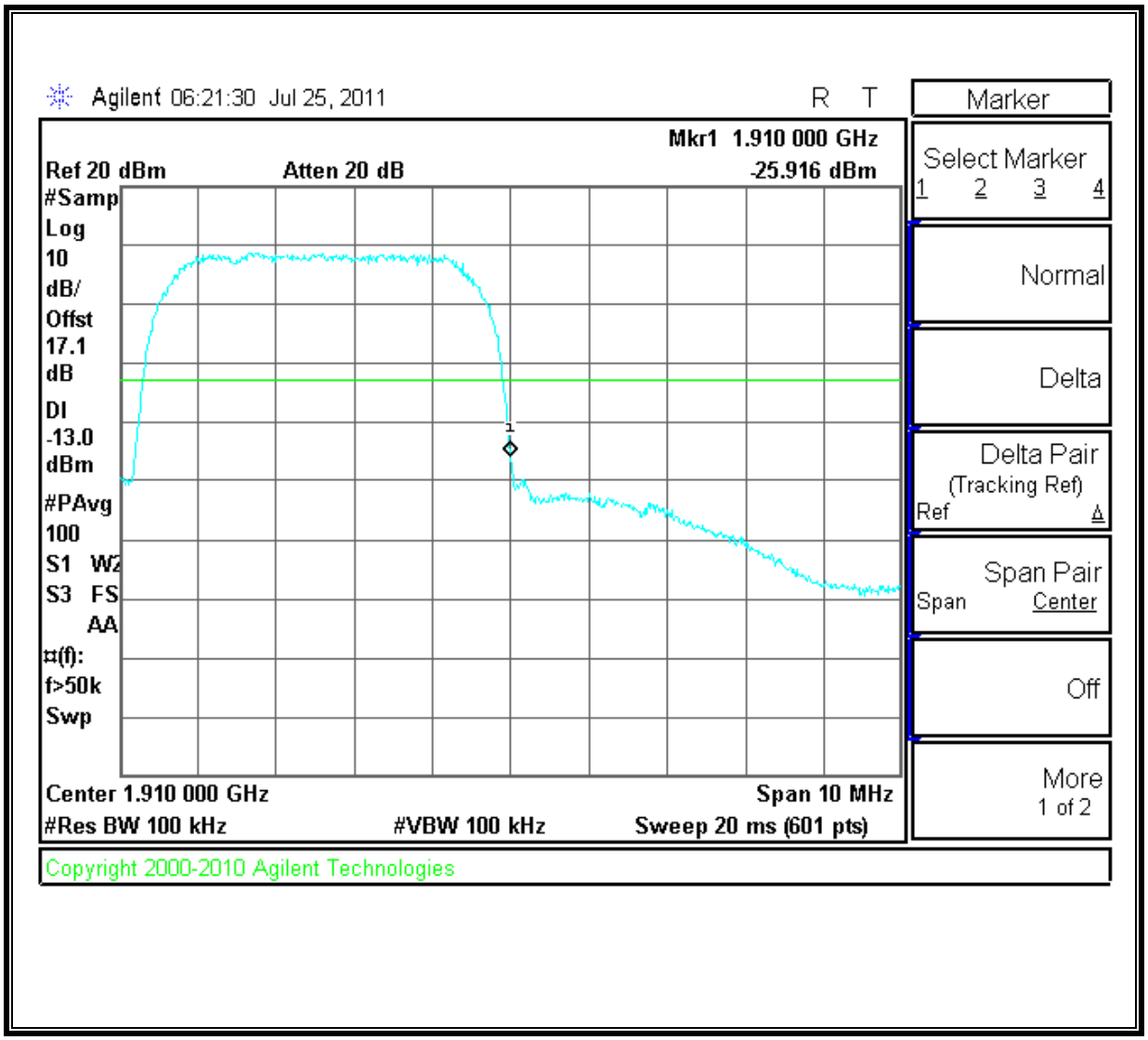
High Channel Band Edge



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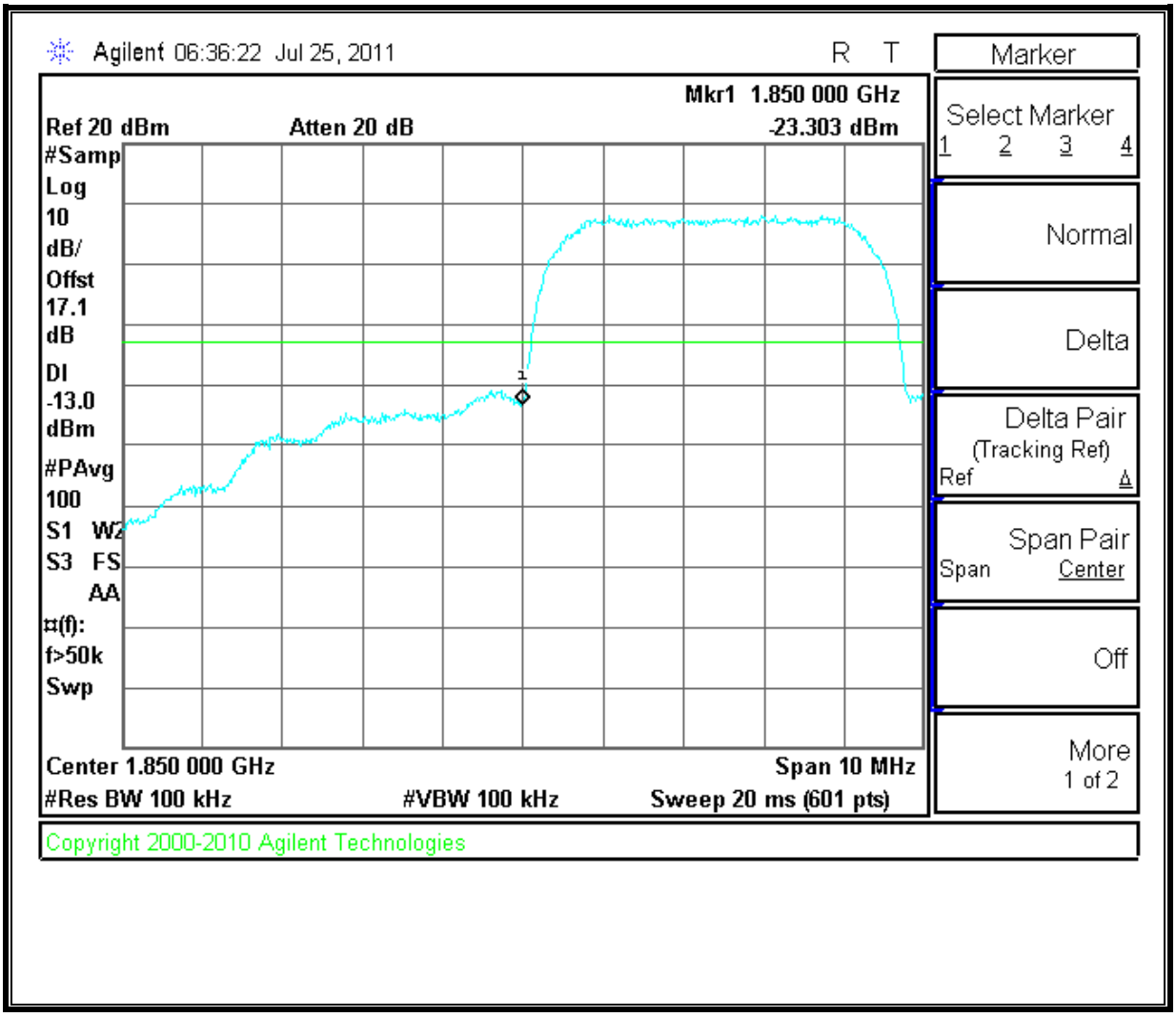
UMTS HSDPA (PCS Band)

Low Channel Band Edge



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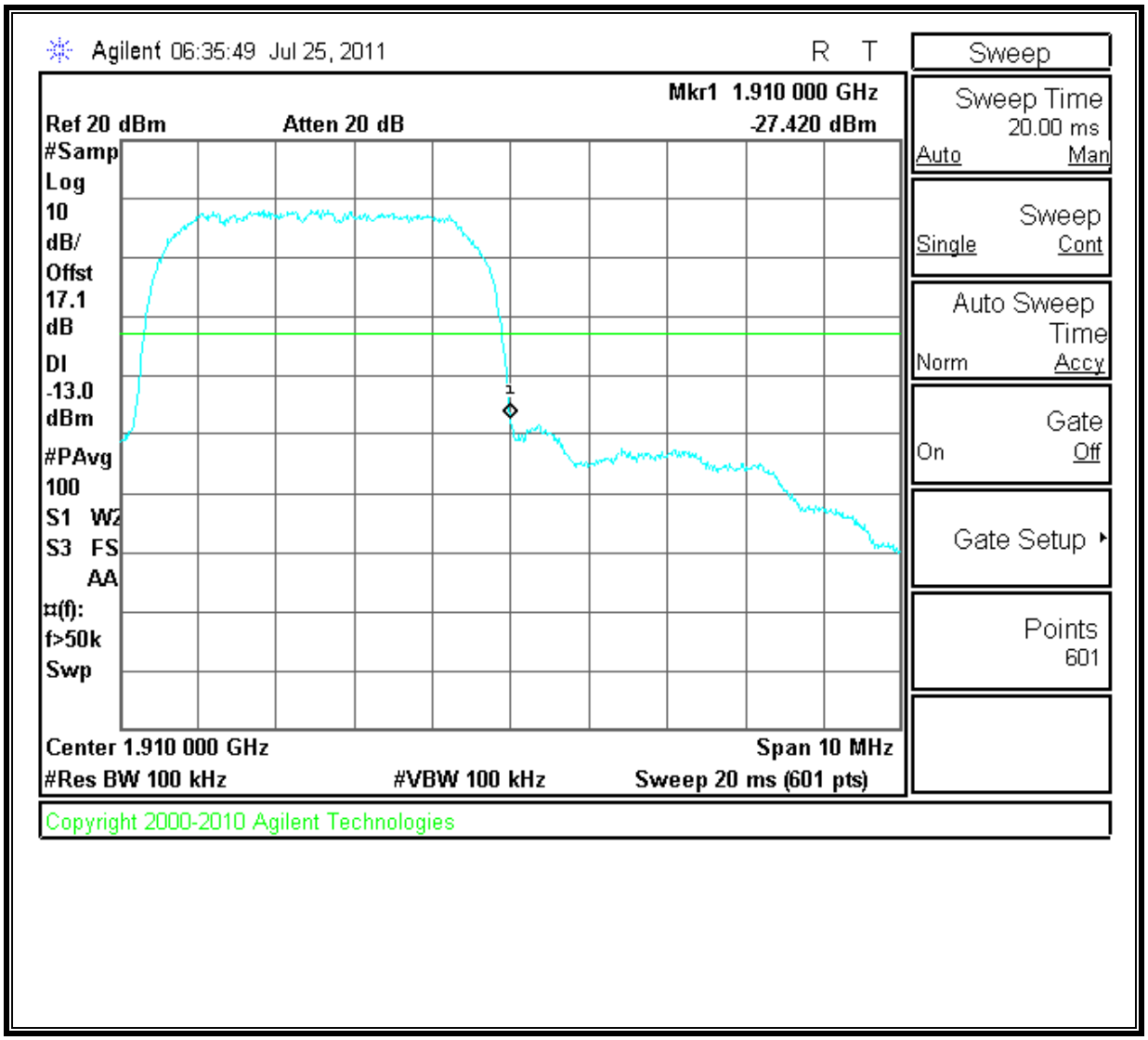
High Channel Band Edge



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8.3. OUT OF BAND EMISSIONS

RULE PART(S)

FCC: §2.1051, §22.901, §22.917, §24.238
IC: RSS-132, 4.5; RSS-133, 6.5

LIMITS

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

TEST PROCEDURE

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

For each out of band emissions measurement:

- Set display line at -13 dBm
- Set RBW & VBW to 100 kHz for the measurement below 1 GHz, and 1 MHz for the measurement above 1 GHz.

MODES TESTED

- 1xRTT – RC2, SO9
- CDMA2000 1xEV-DO Revision A (Rev. A)
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

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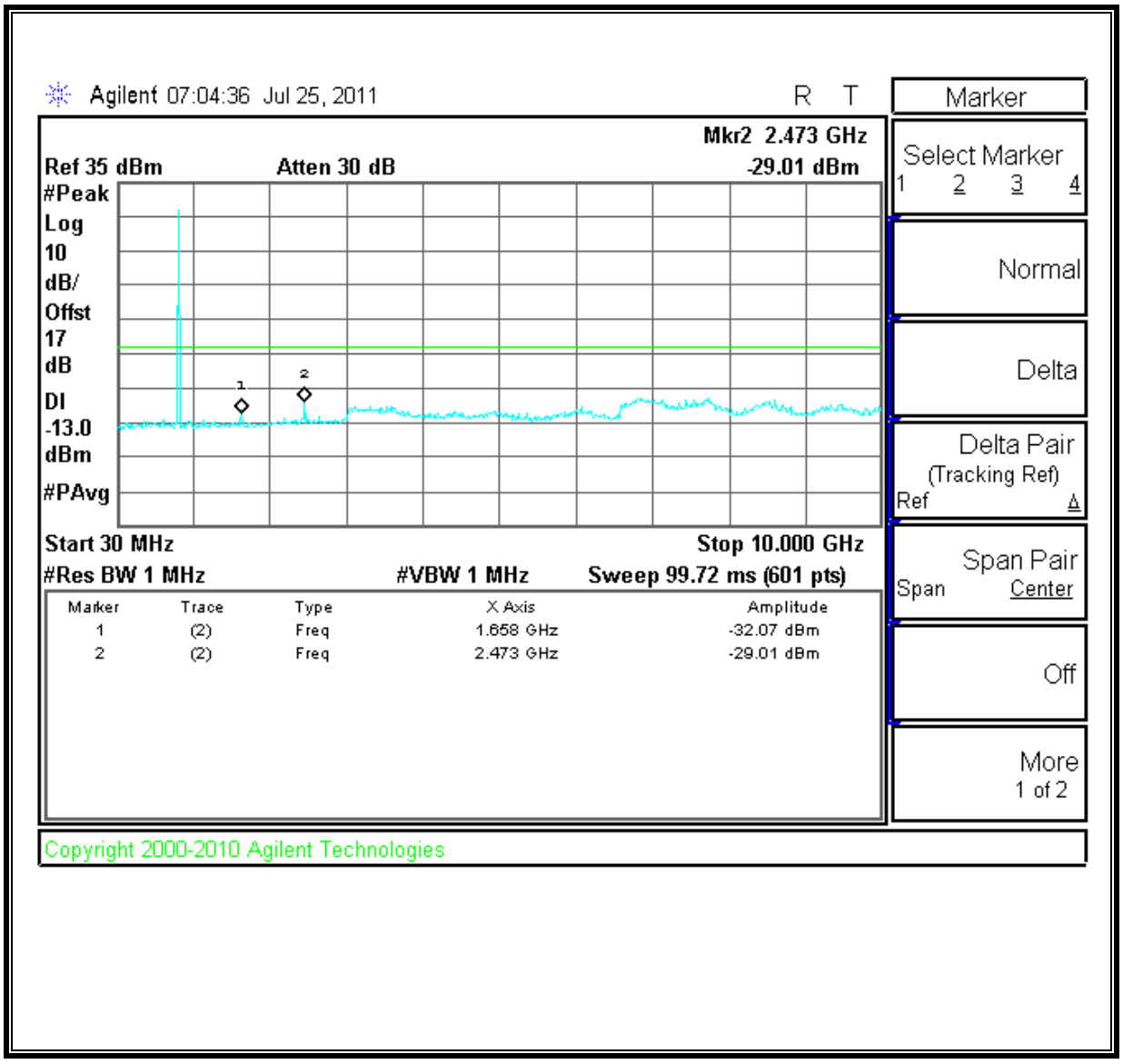
1xRTT Mode (Cellular Band)

LOW CHANNEL



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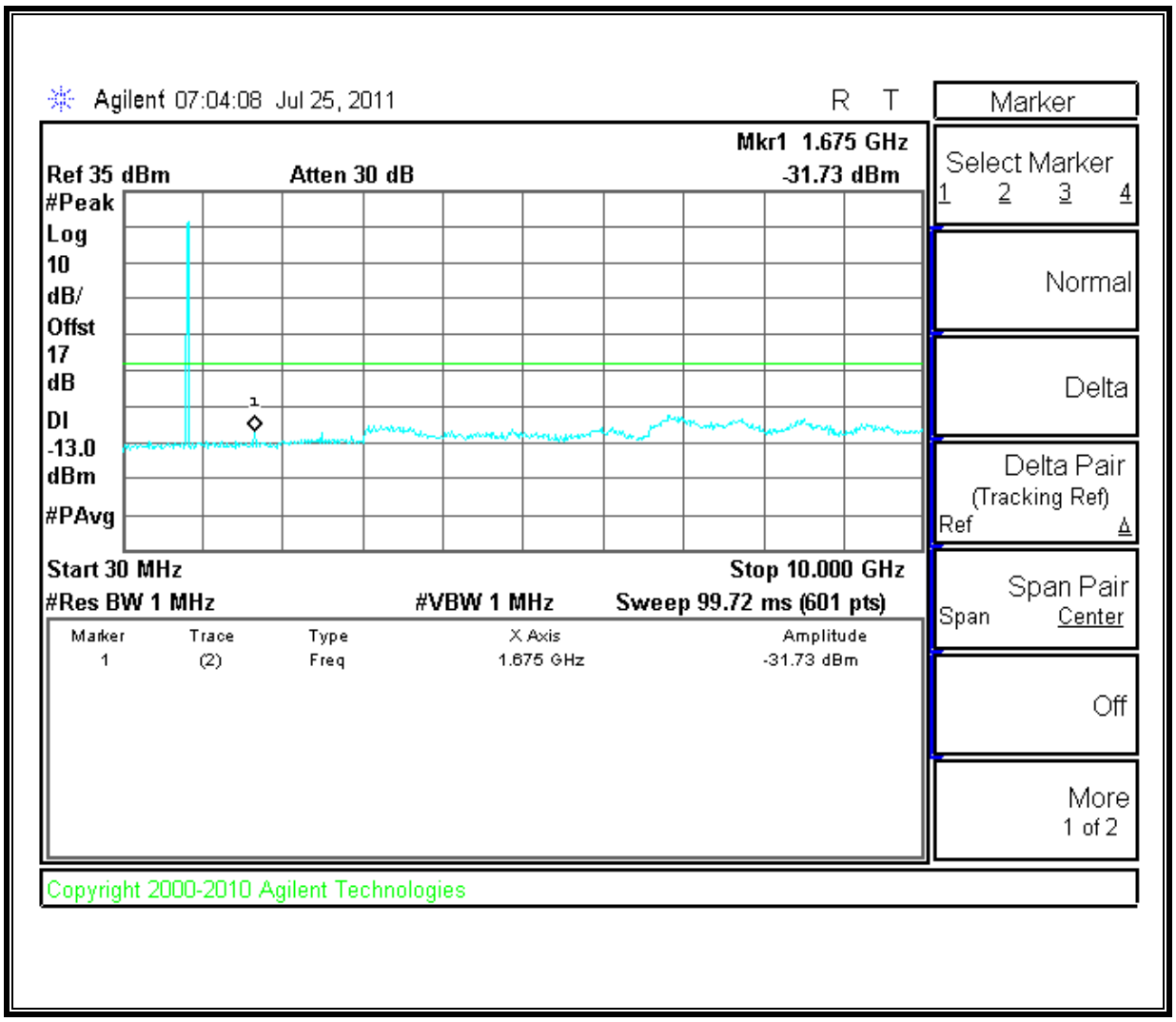
MID CHANNEL



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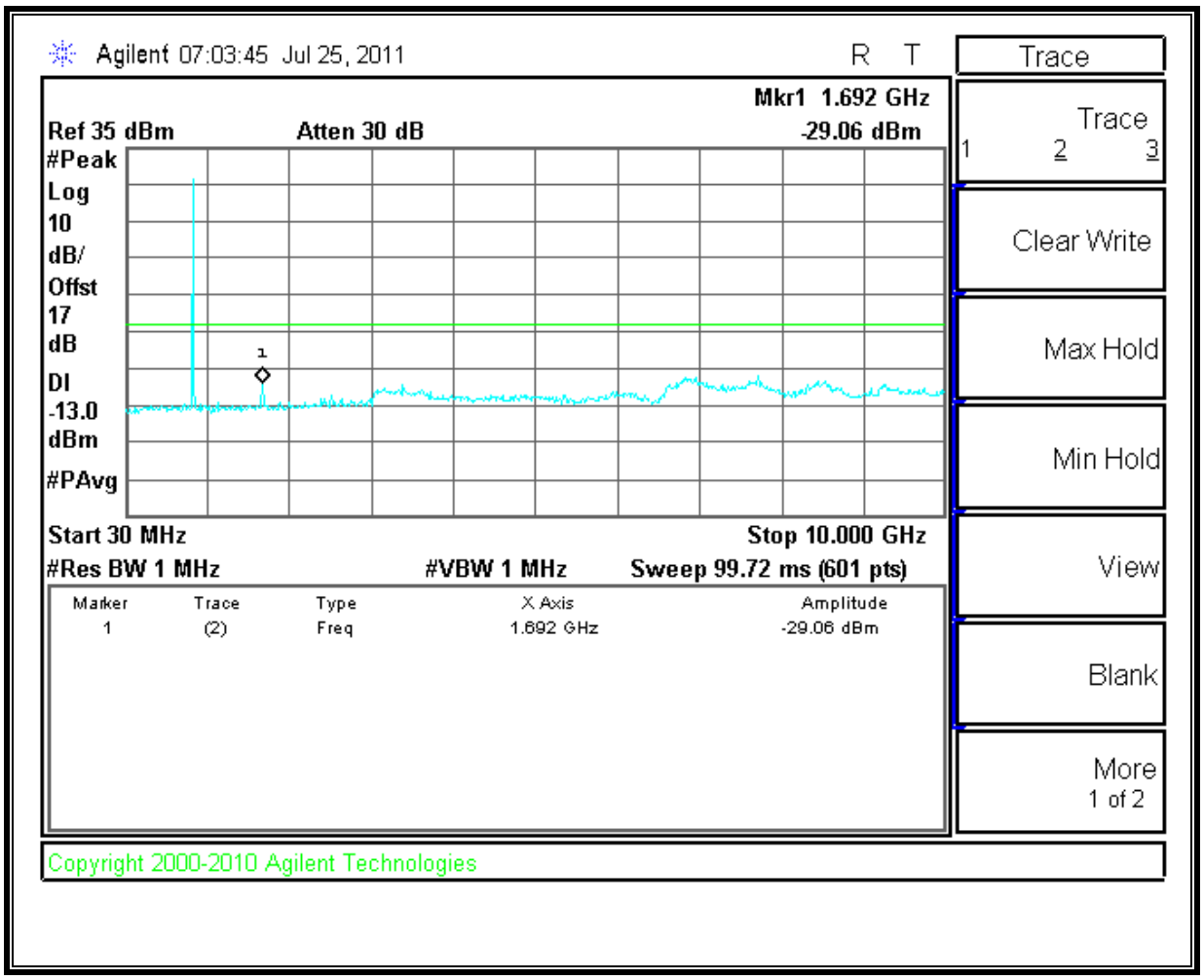
High Channel



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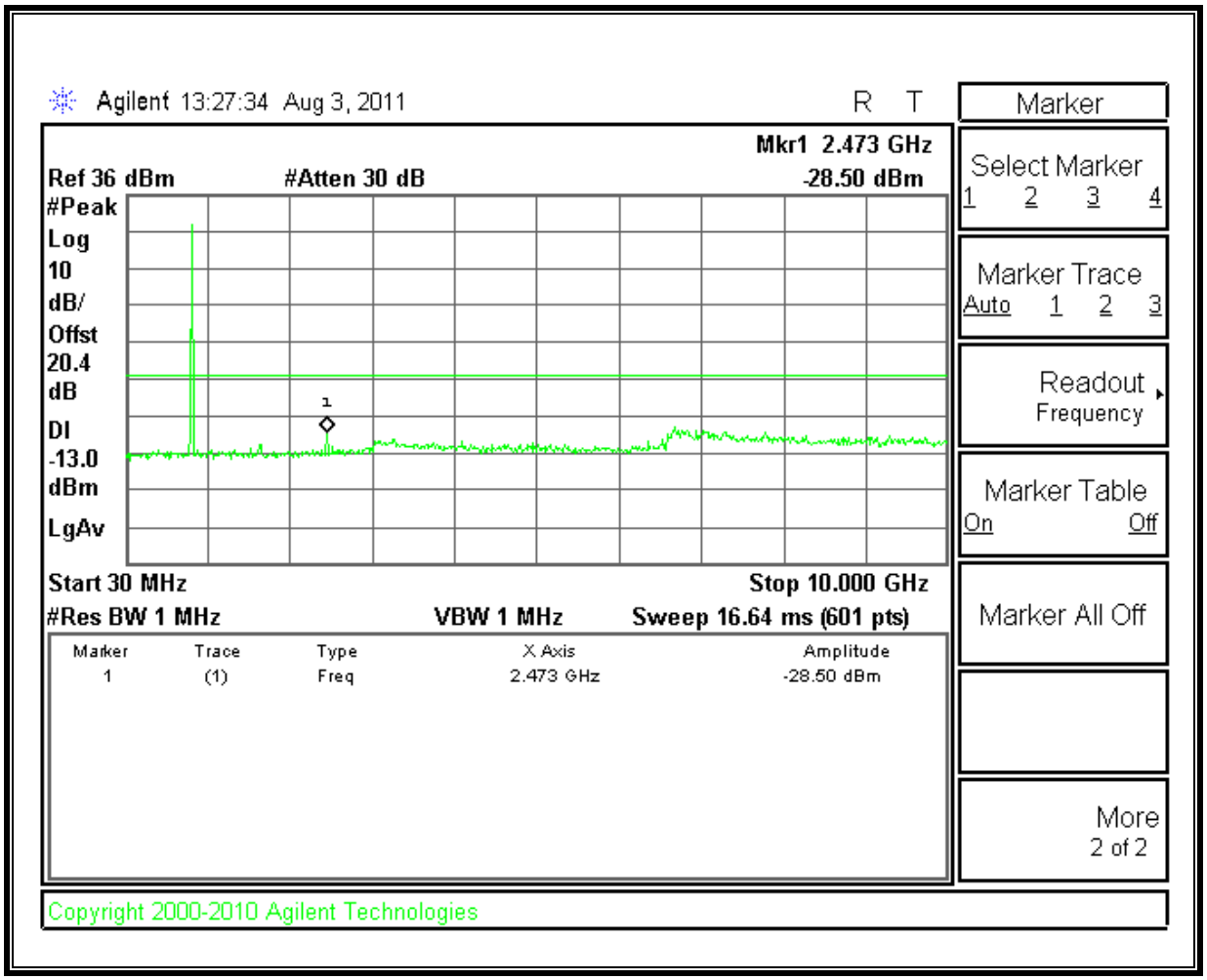
CDMA2000 1xEV-DO Revision A (Rev. A) Mode (Cellular Band)

LOW CHANNEL



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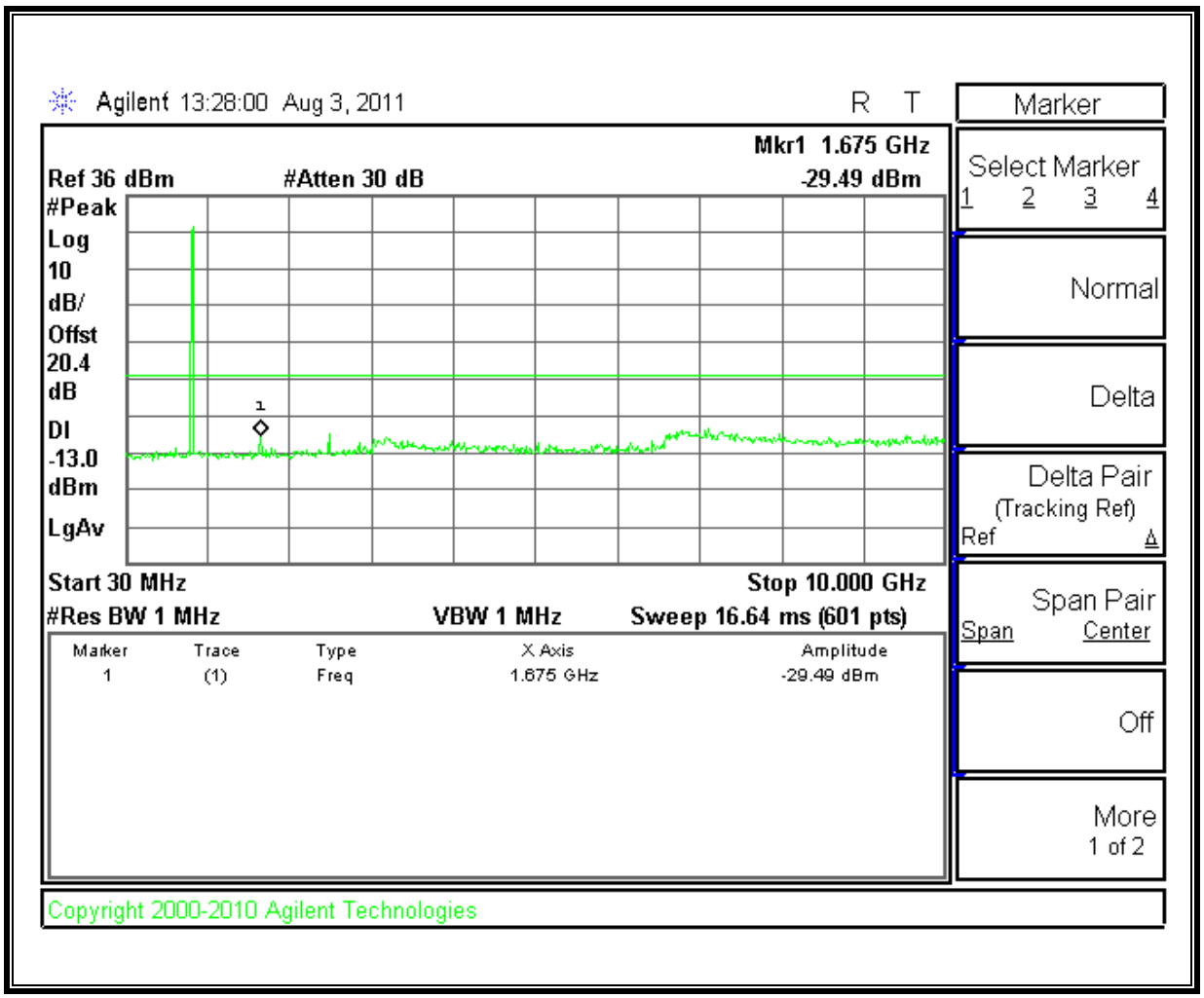
MID CHANNEL



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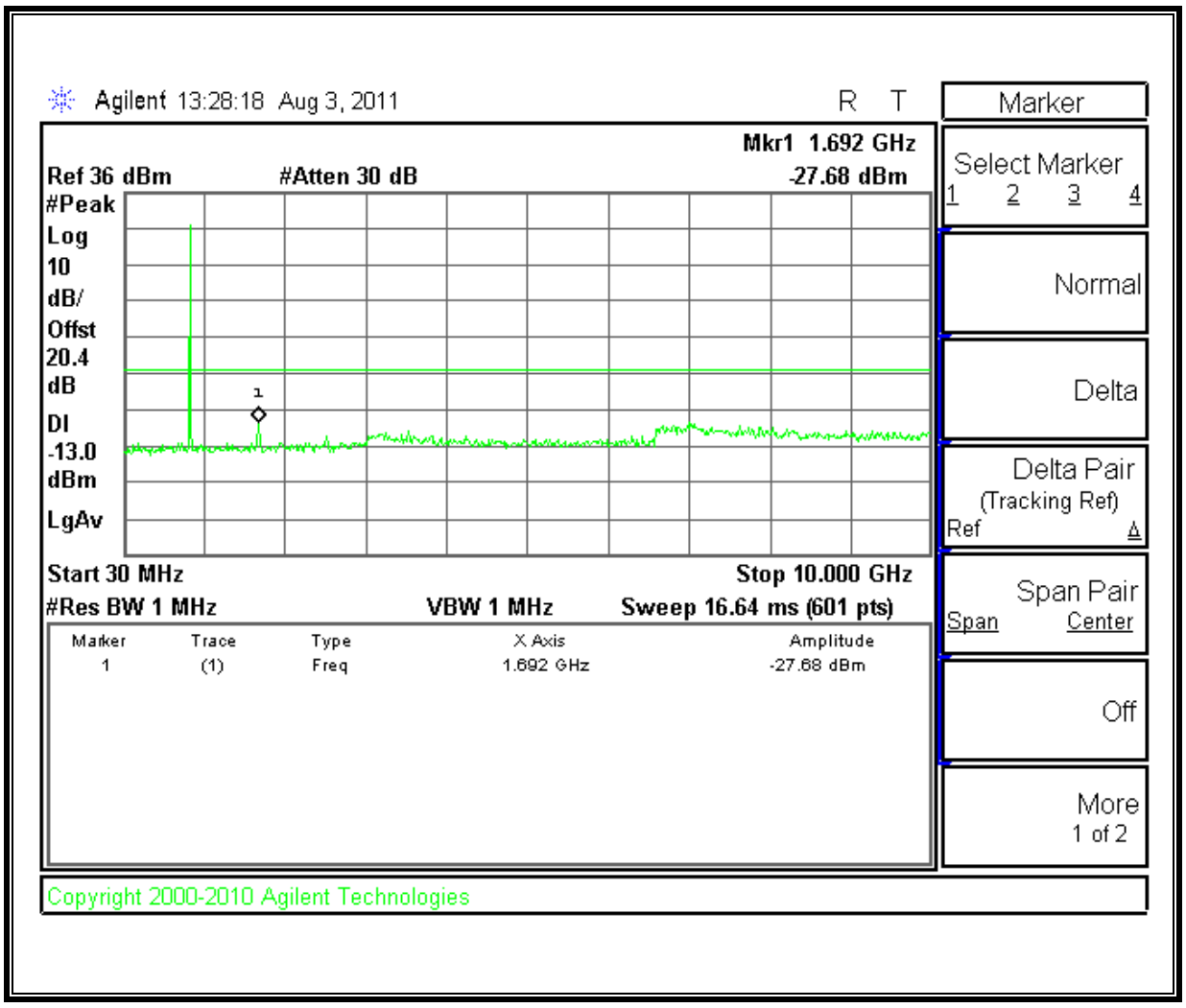
HIGH CHANNEL



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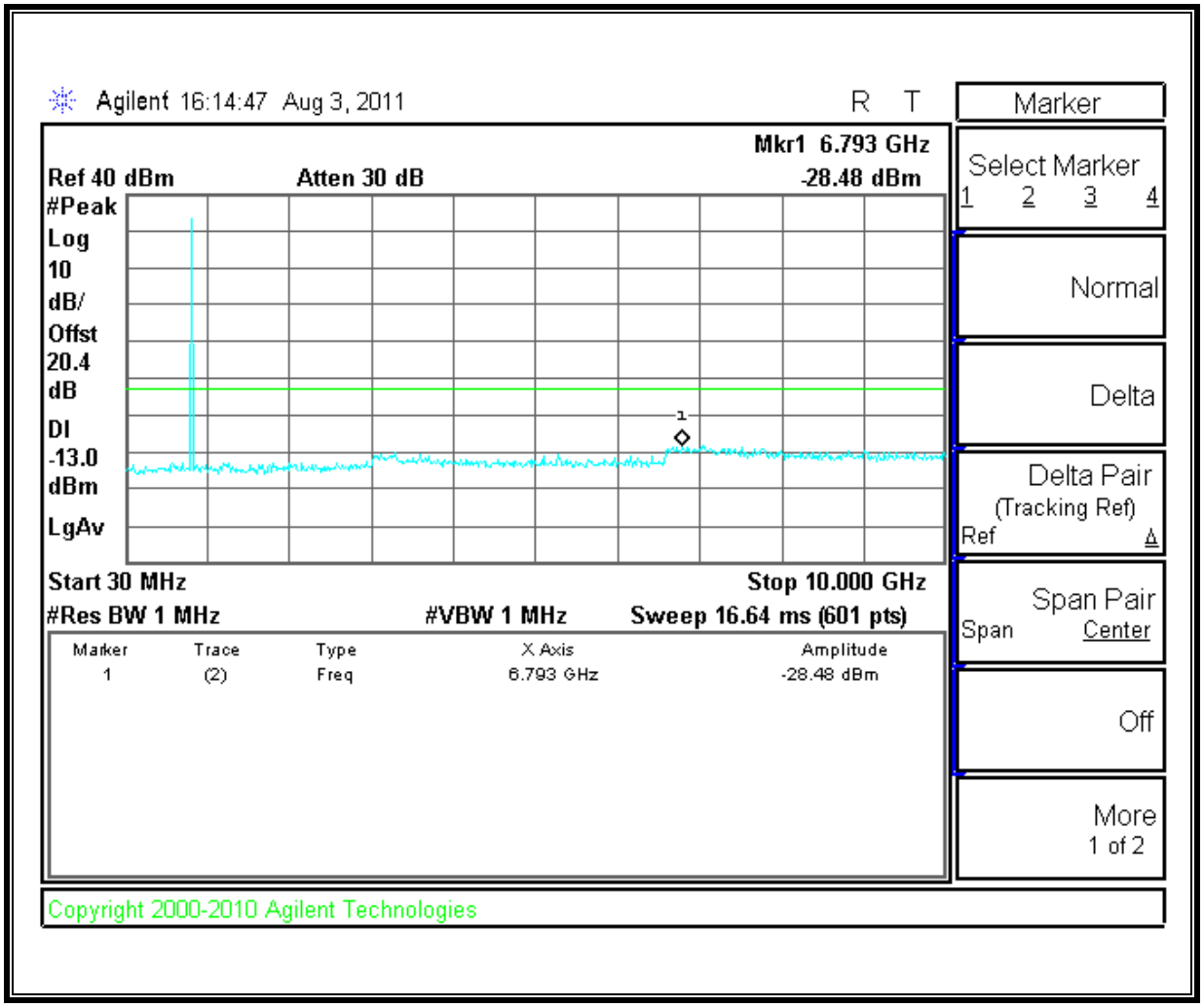
GPRS Mode (Cellular Band)

LOW Channel



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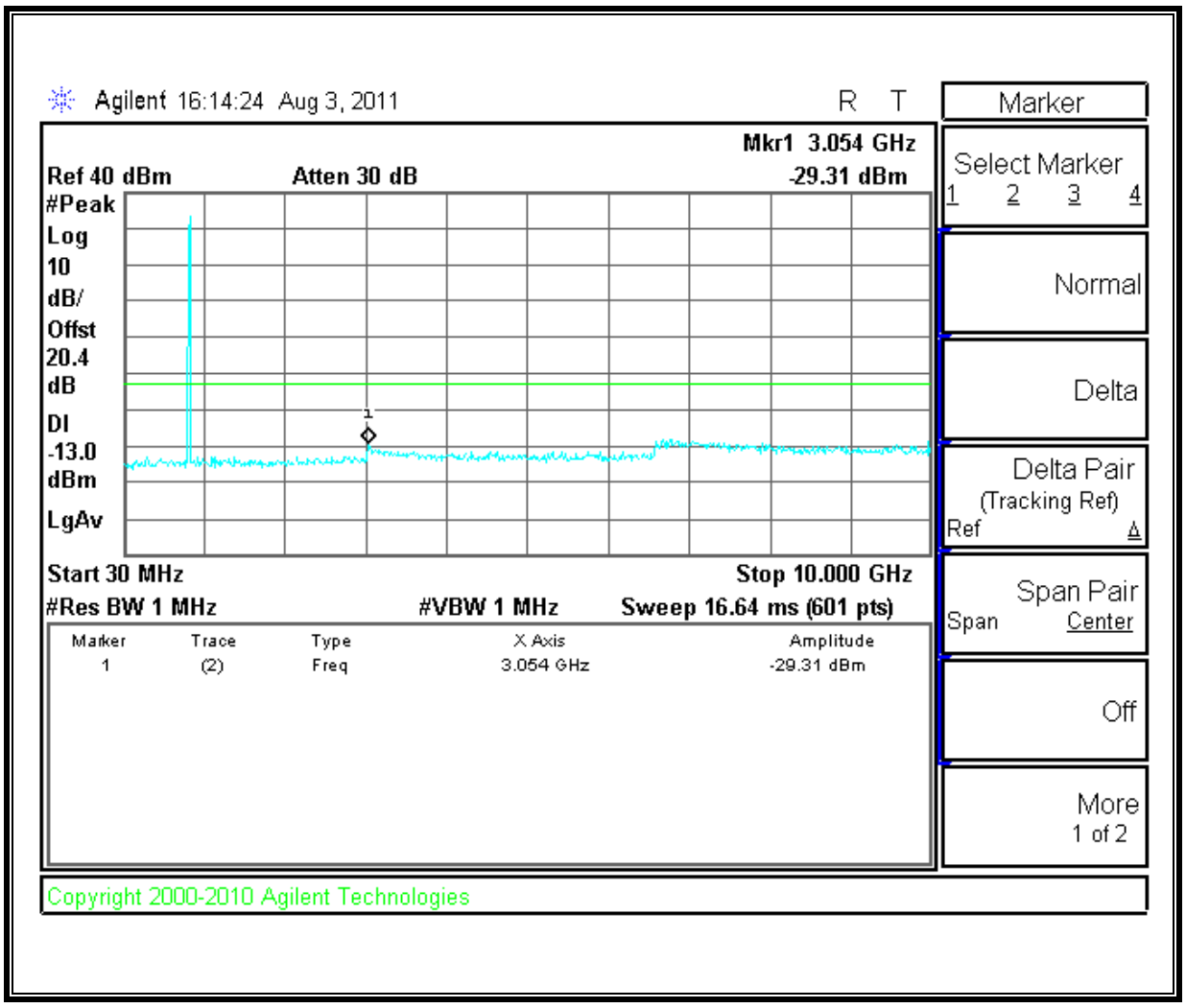
MID CHANNEL



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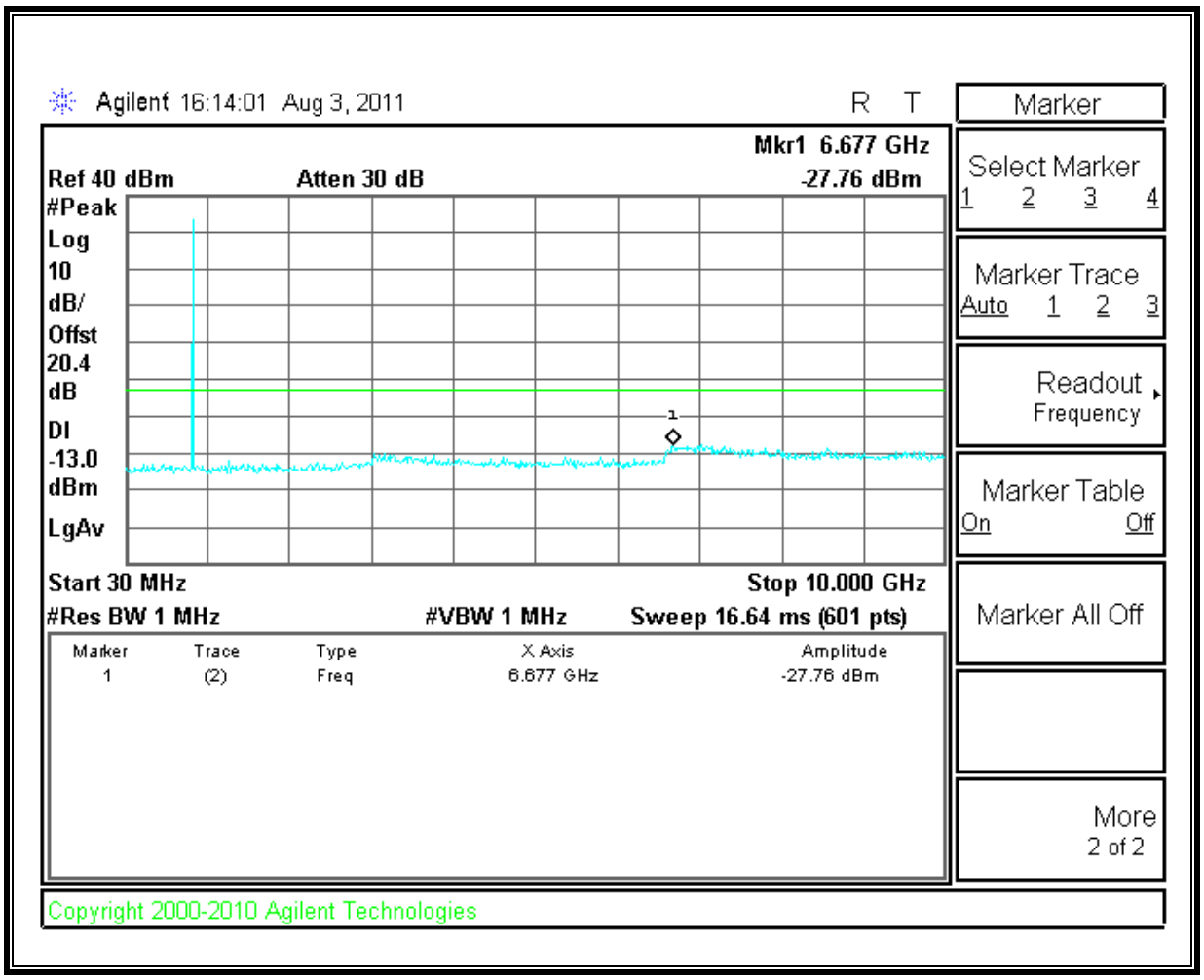
HIGH CHANNEL



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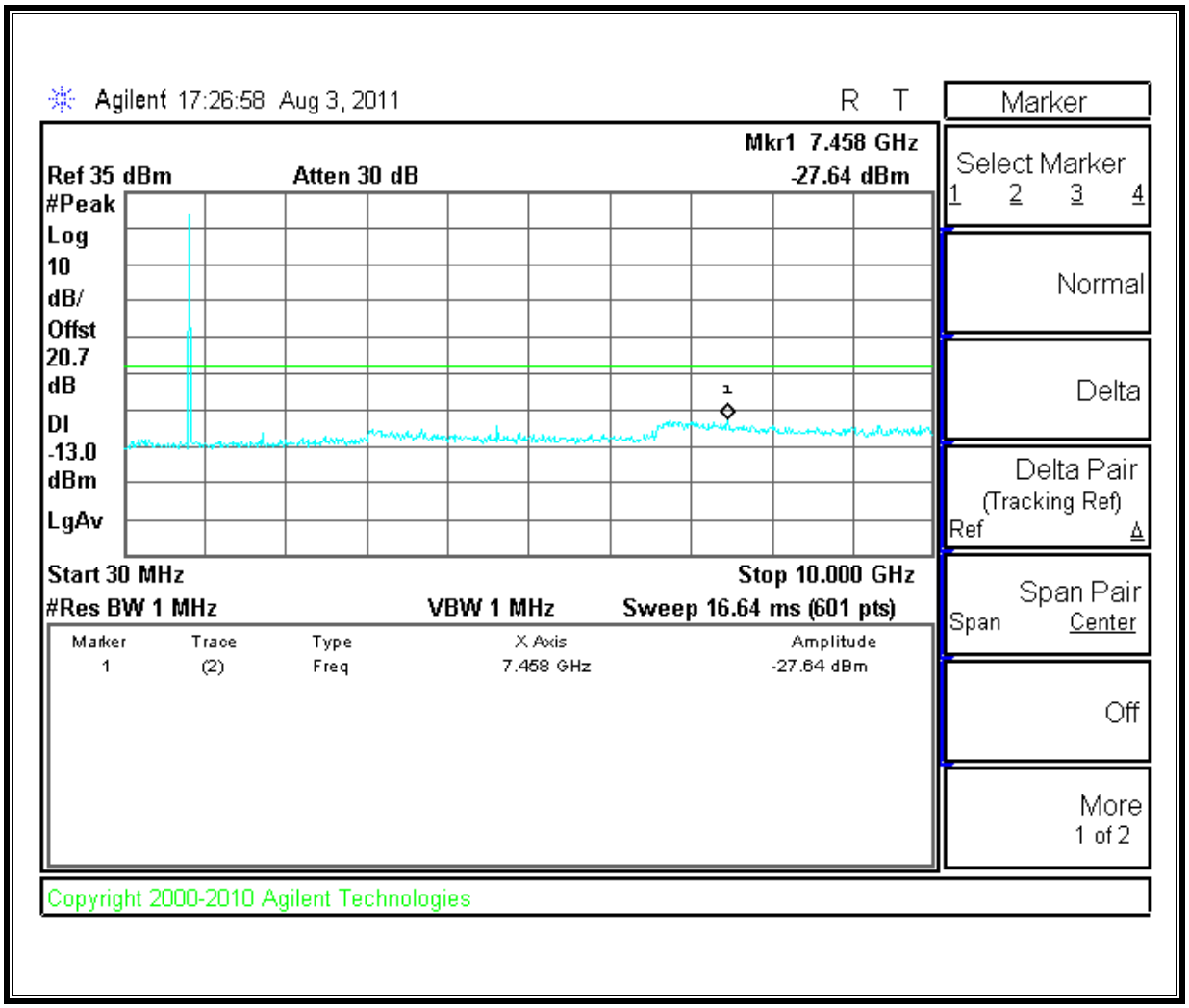
EGPRS Mode (Cellular Band)

LOW CHANNEL



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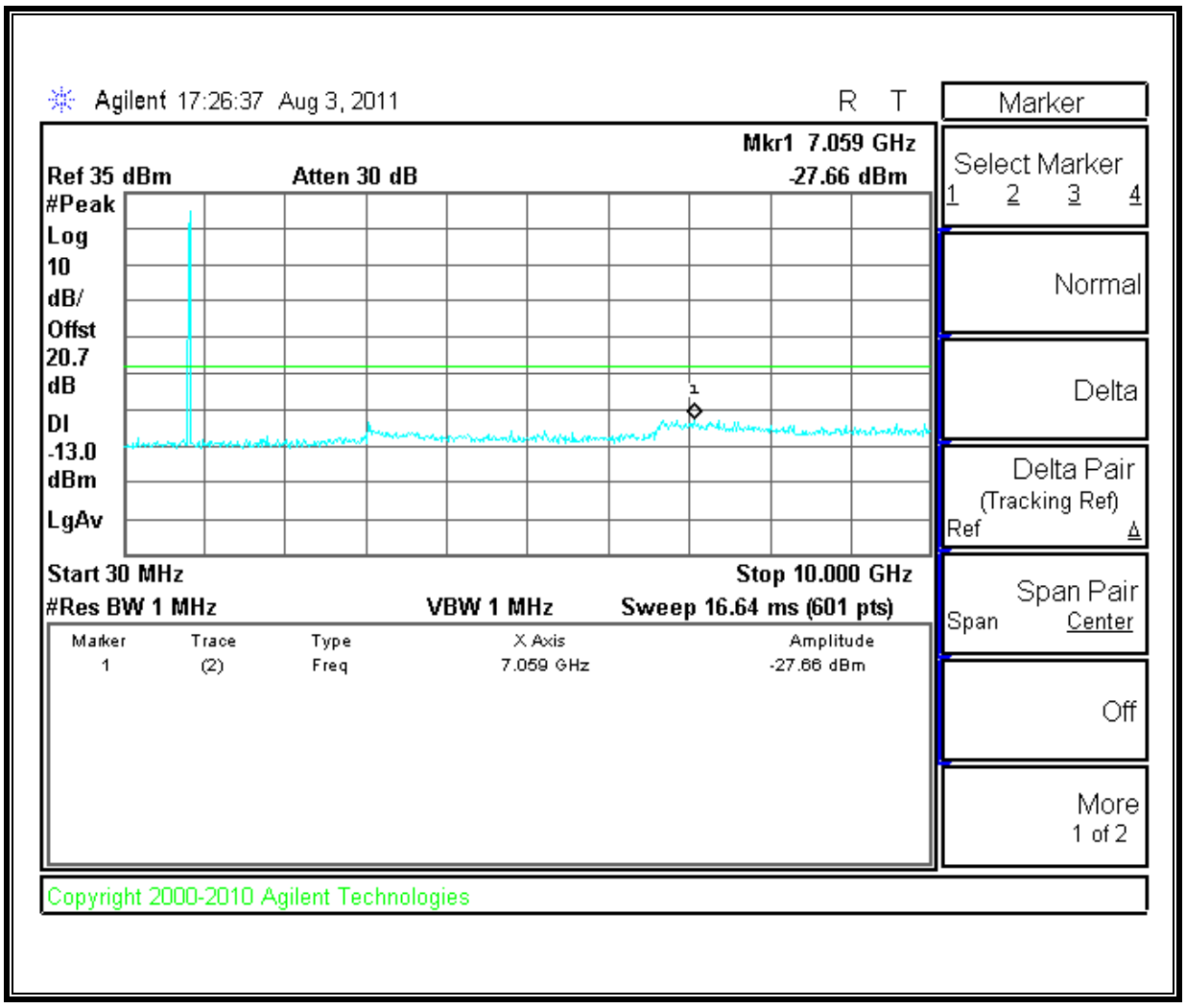
MID CHANNEL



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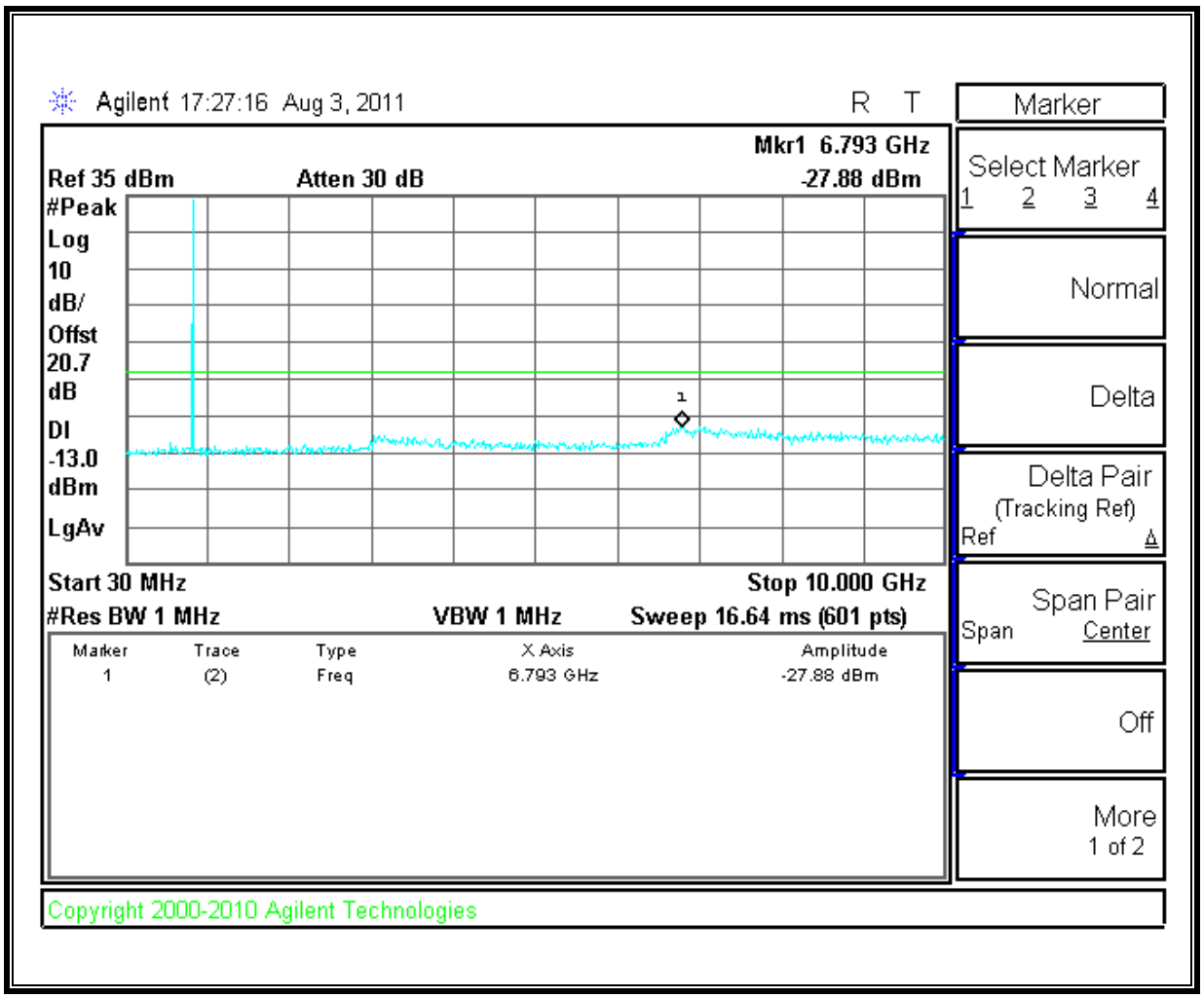
HIGH CHANNEL



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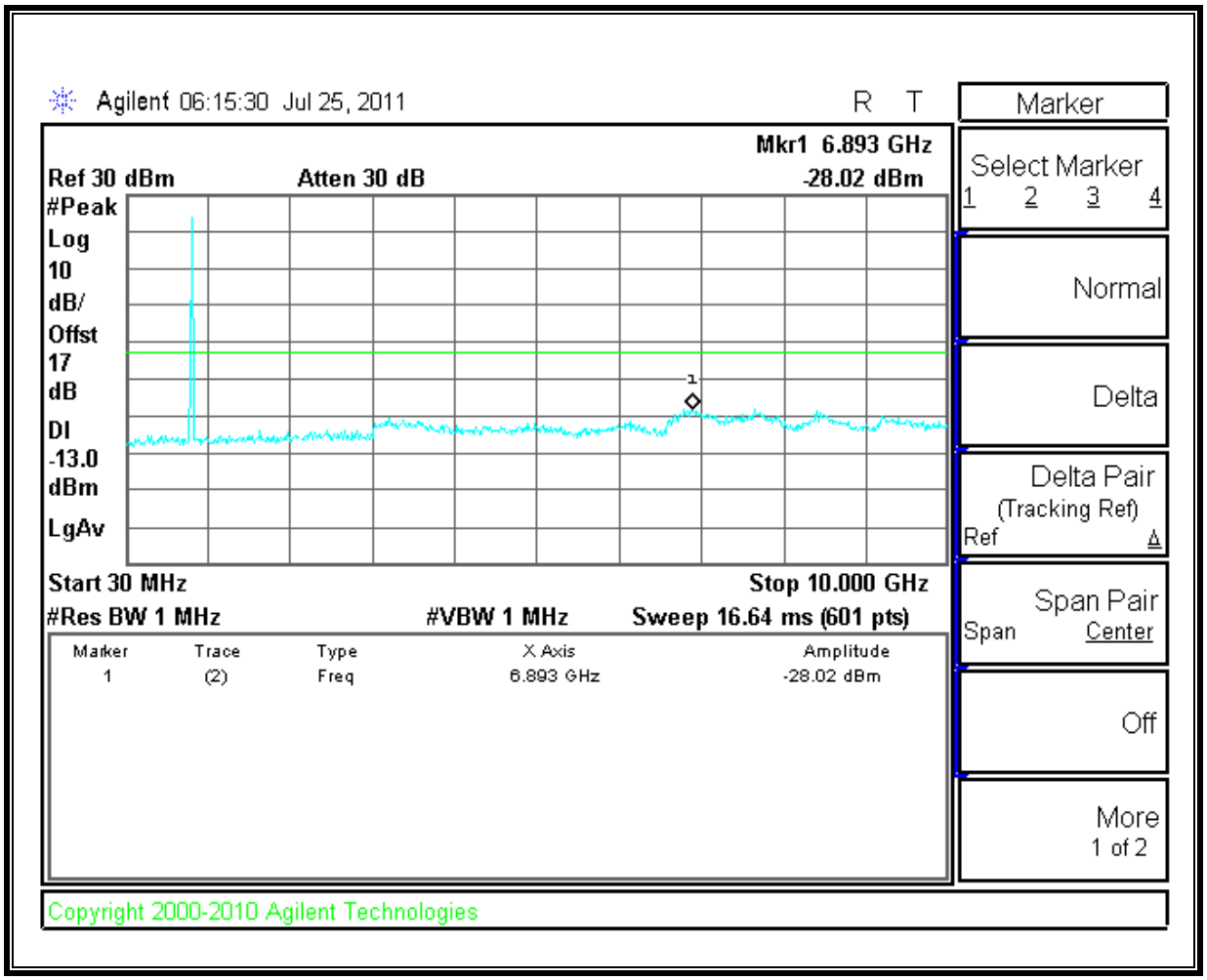
UMTS REL 99 Mode (Cellular Band)

LOW CHANNEL



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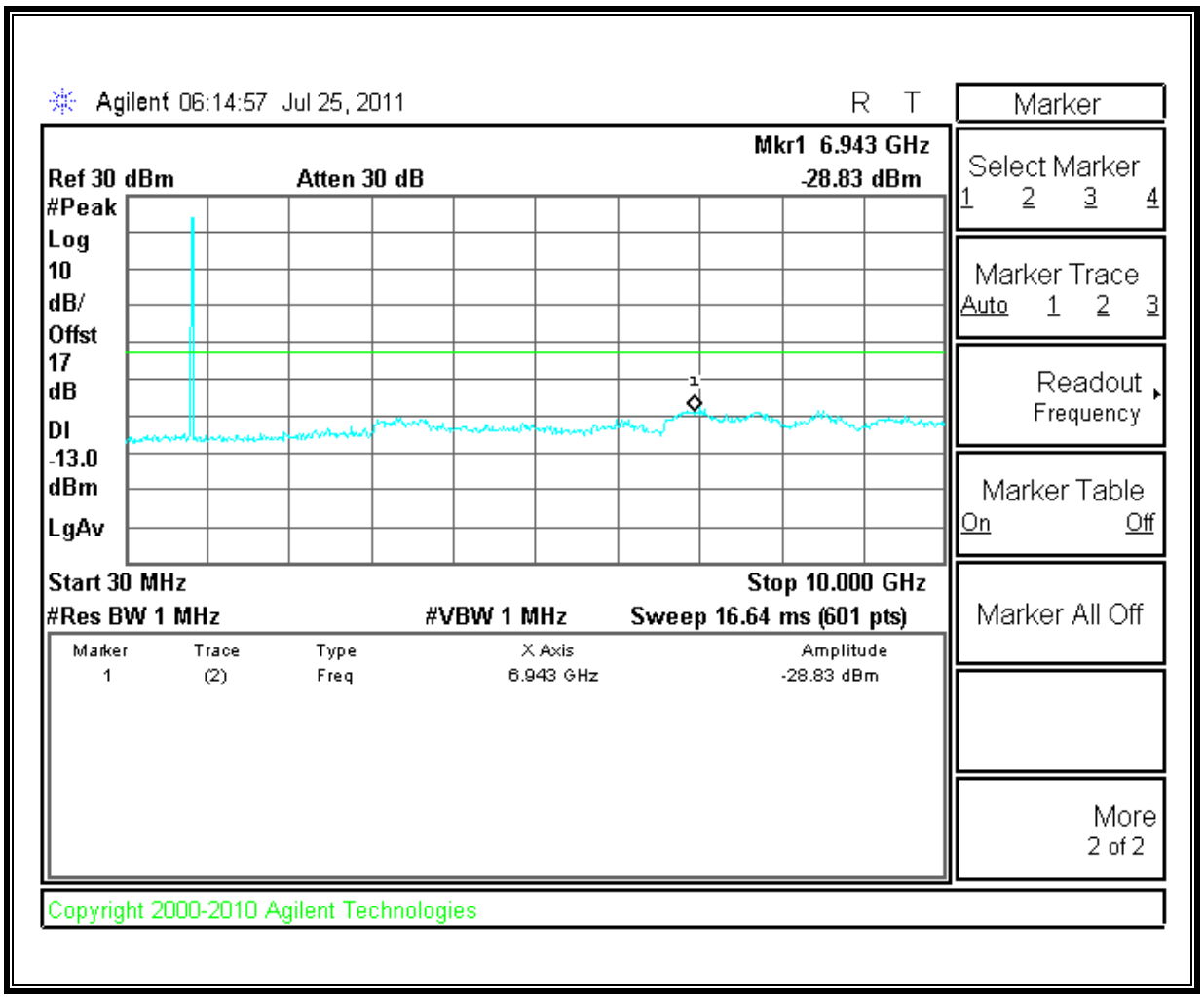
MID CHANNEL



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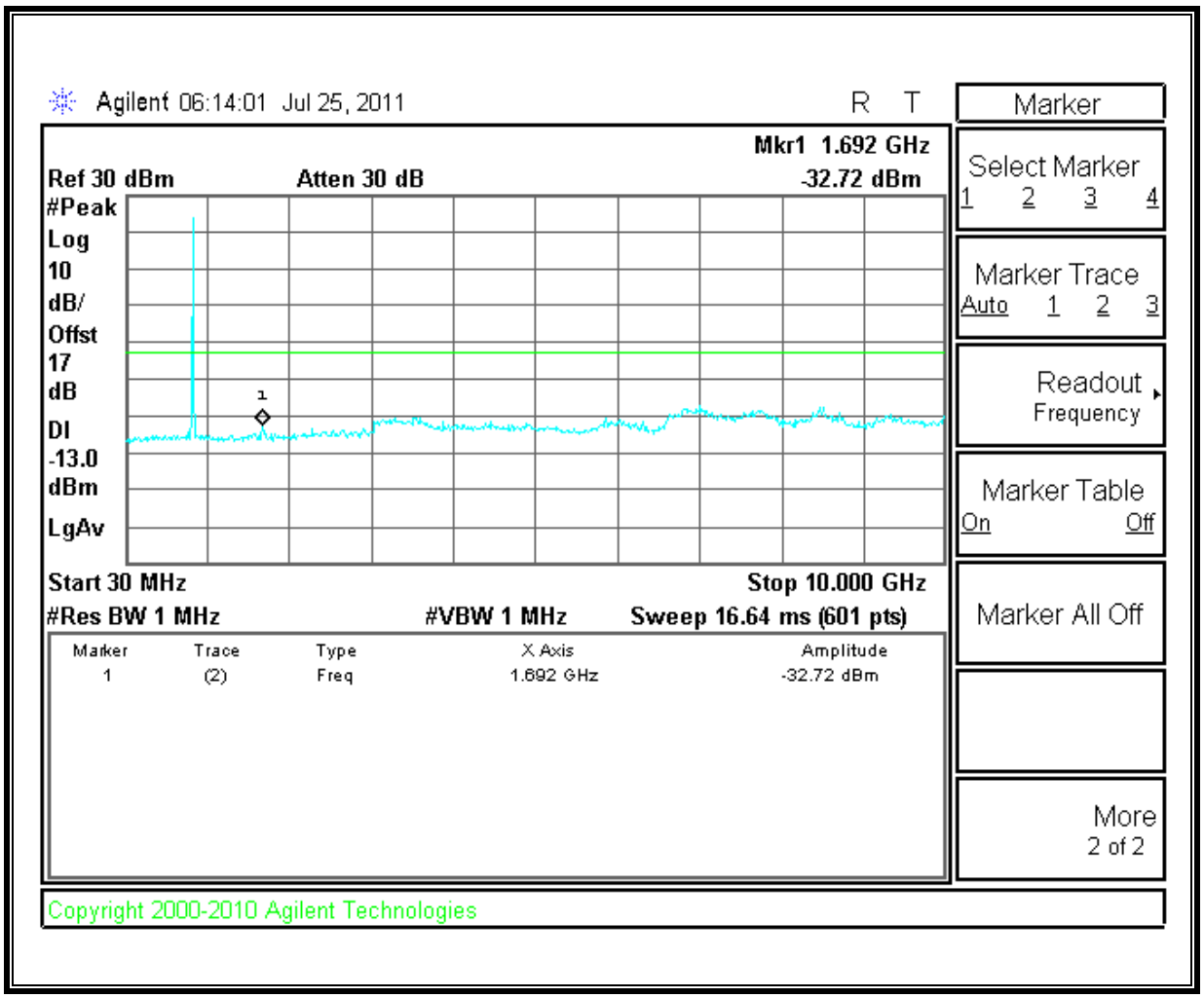
HIGH CHANNEL



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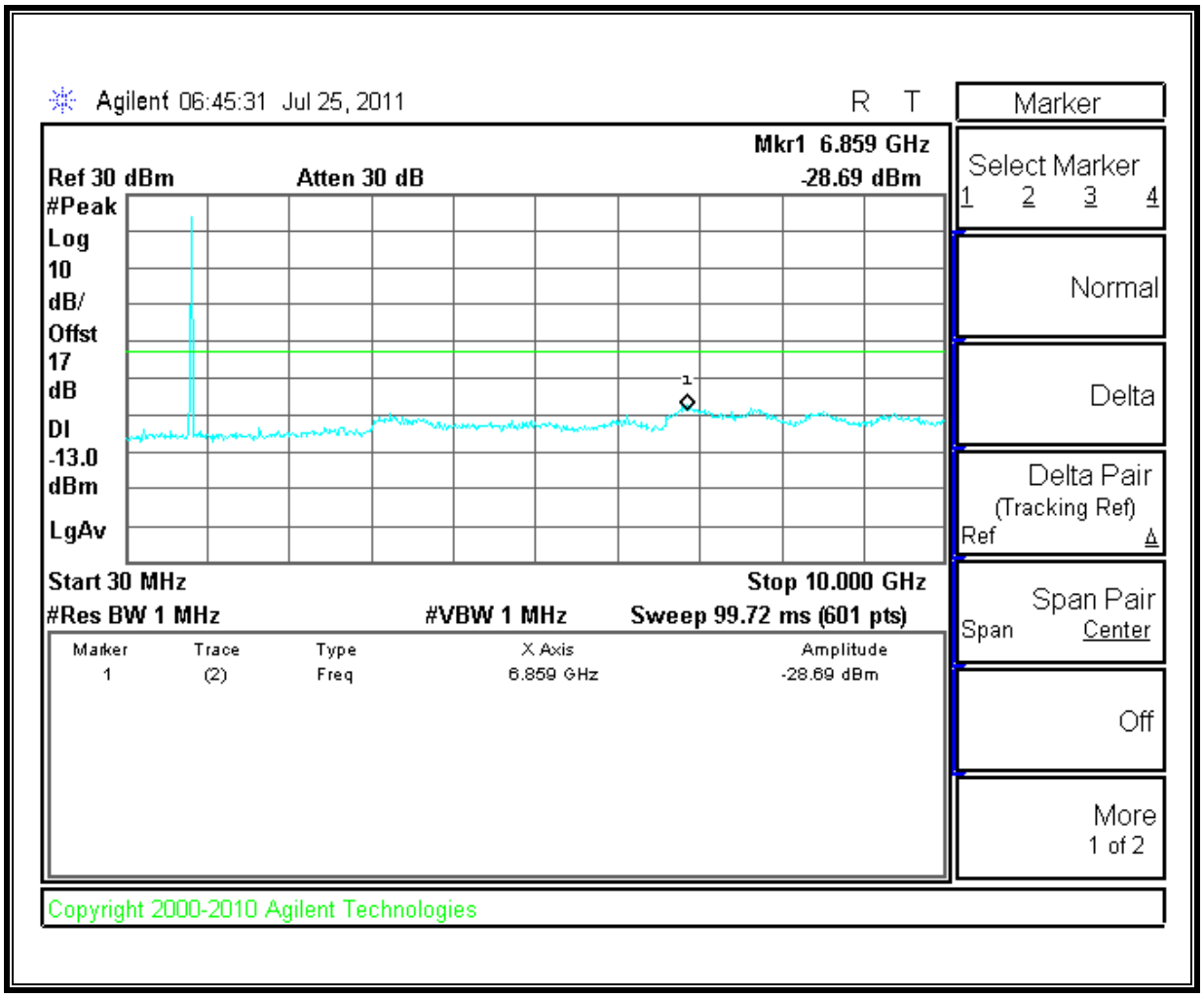
UMTS HSDPA Mode (Cellular Band)

LOW CHANNEL



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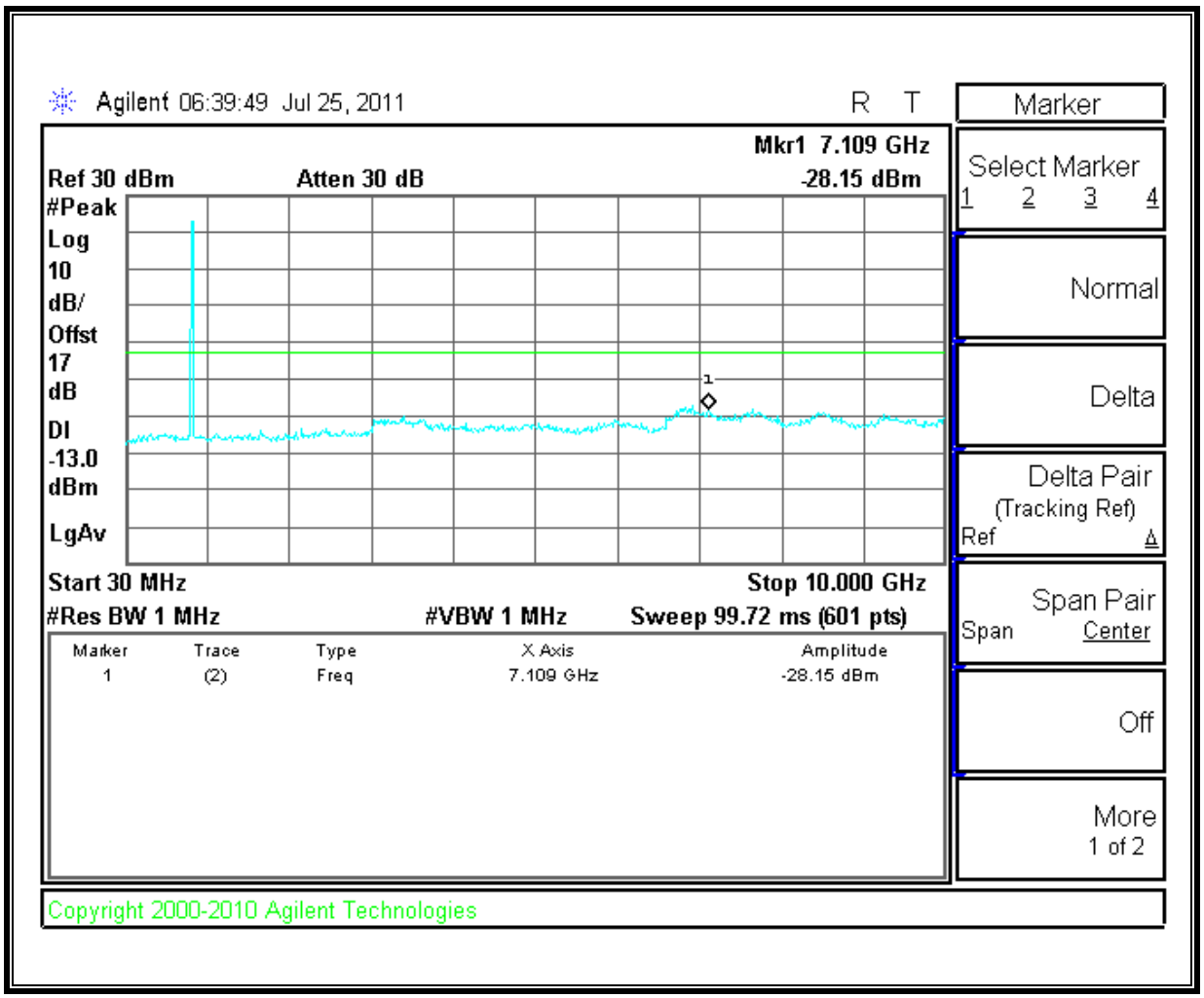
MID CHANNEL



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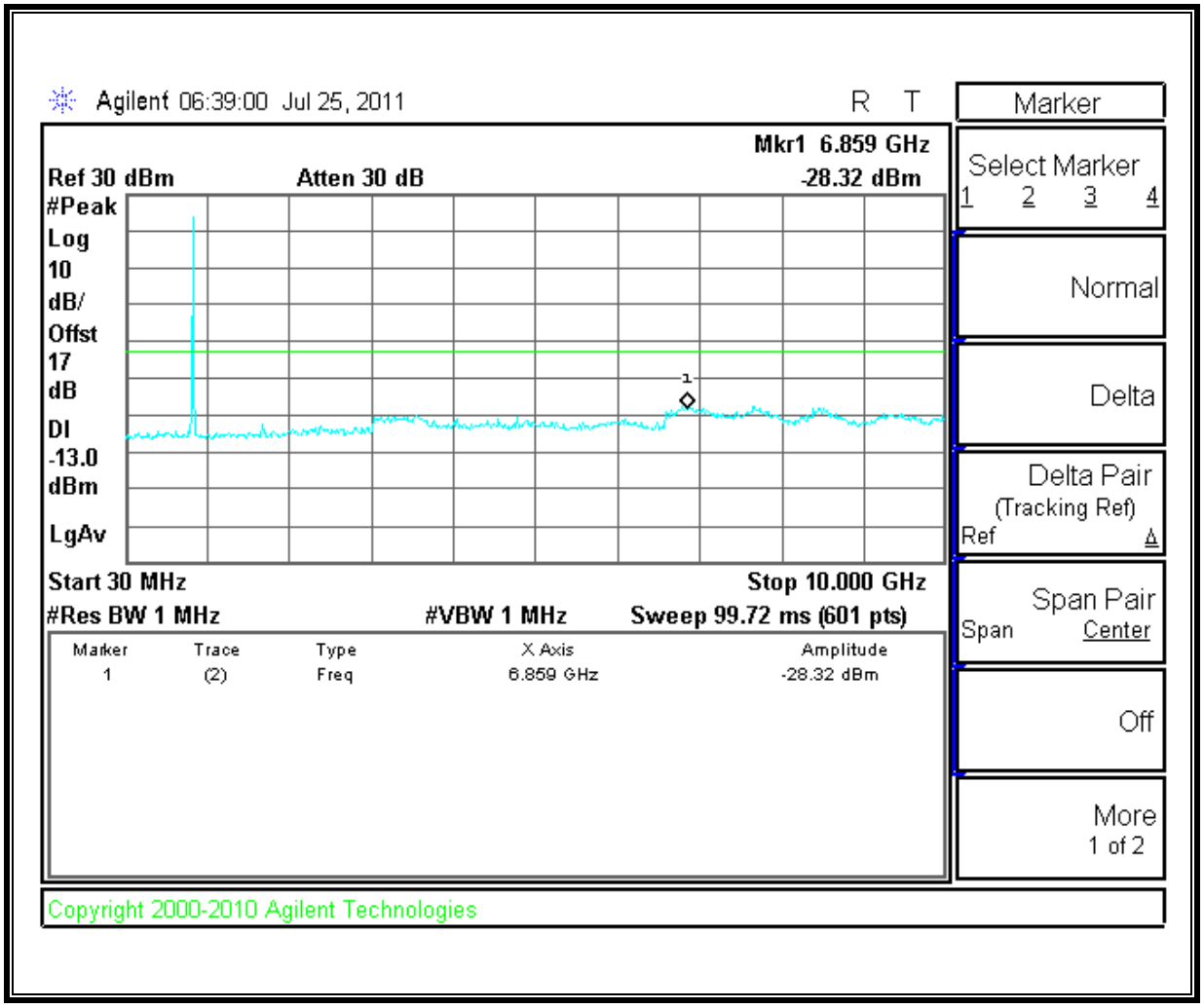
HIGH CHANNEL



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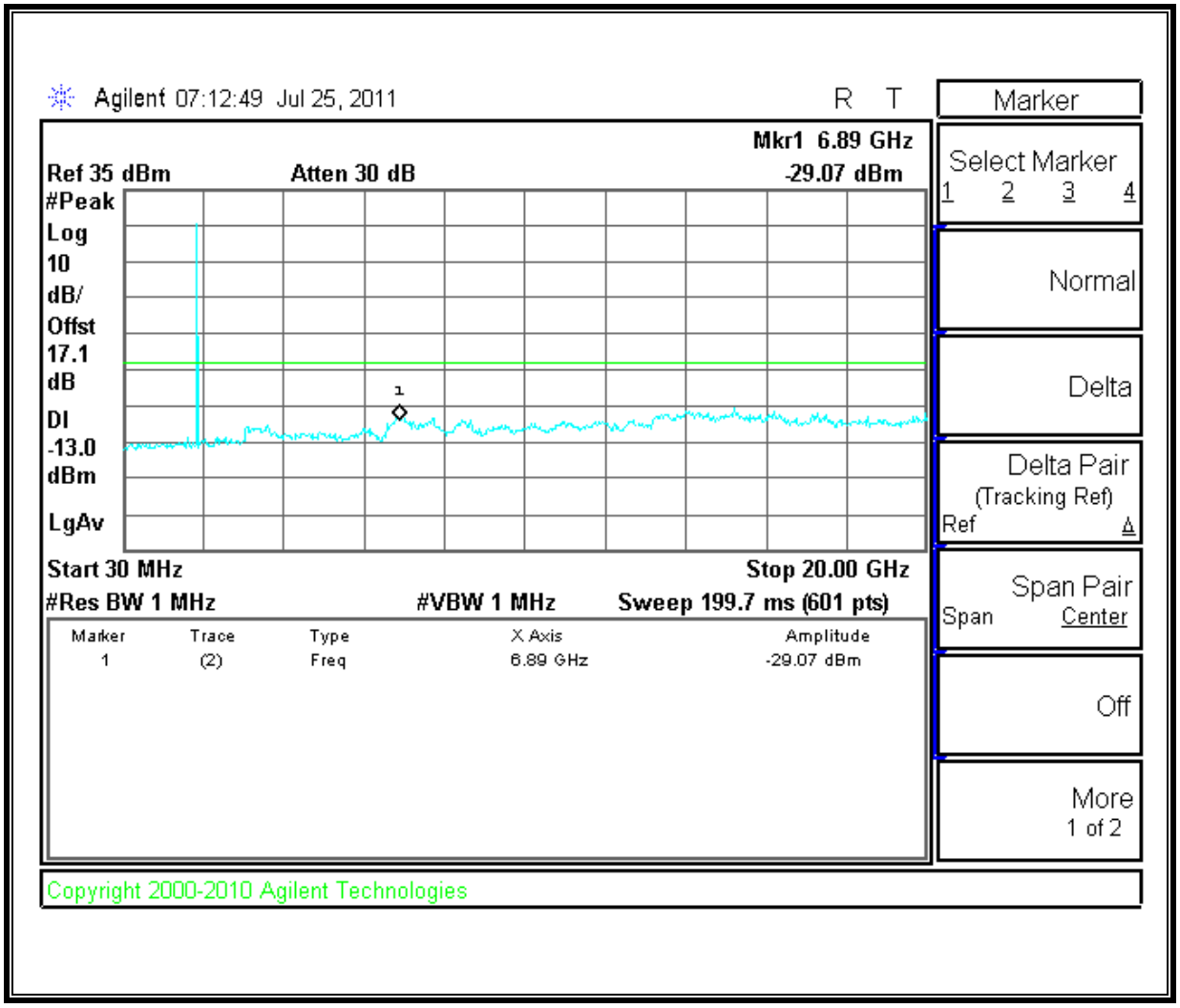
1xRTT Mode (PCS Band)

LOW CHANNEL



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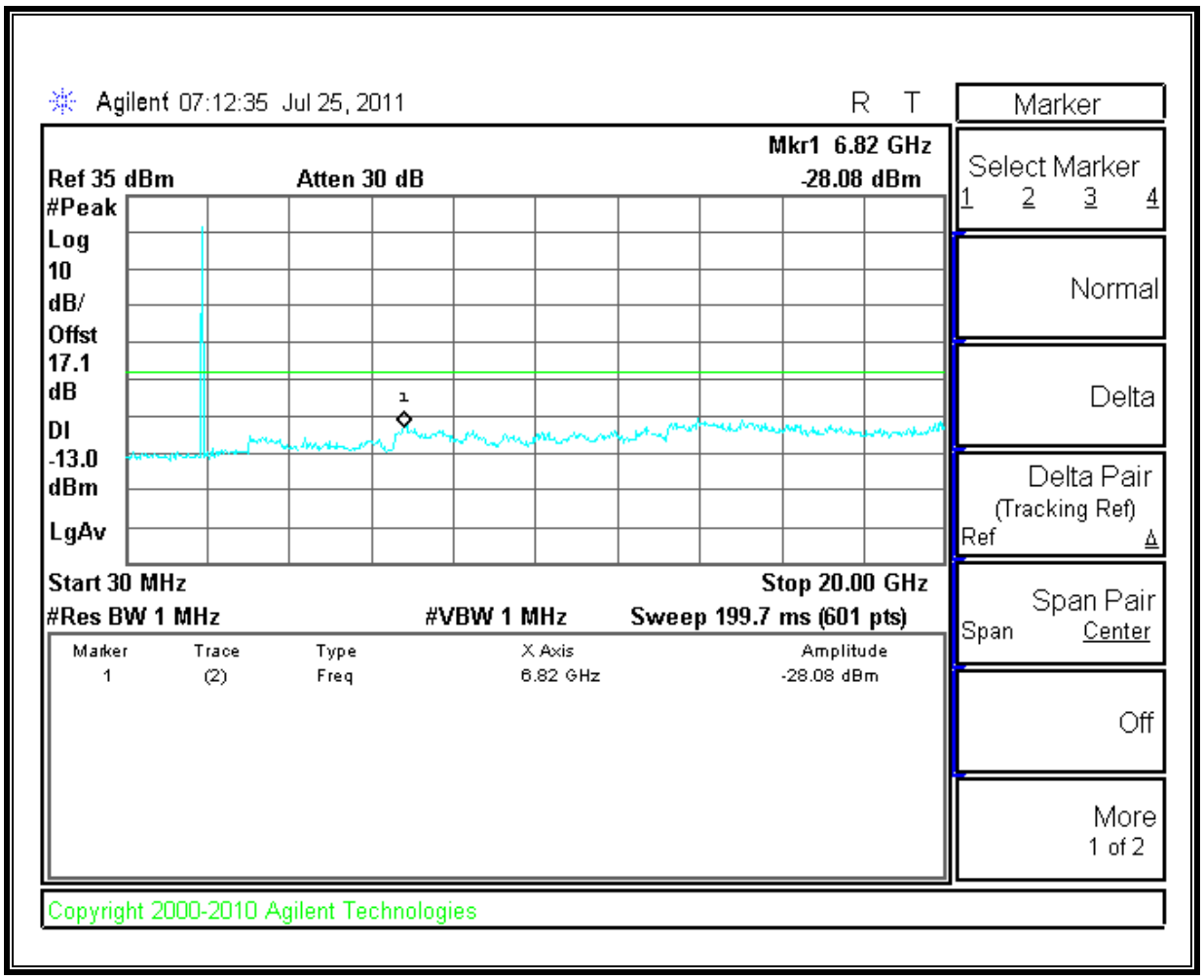
MID CHANNEL



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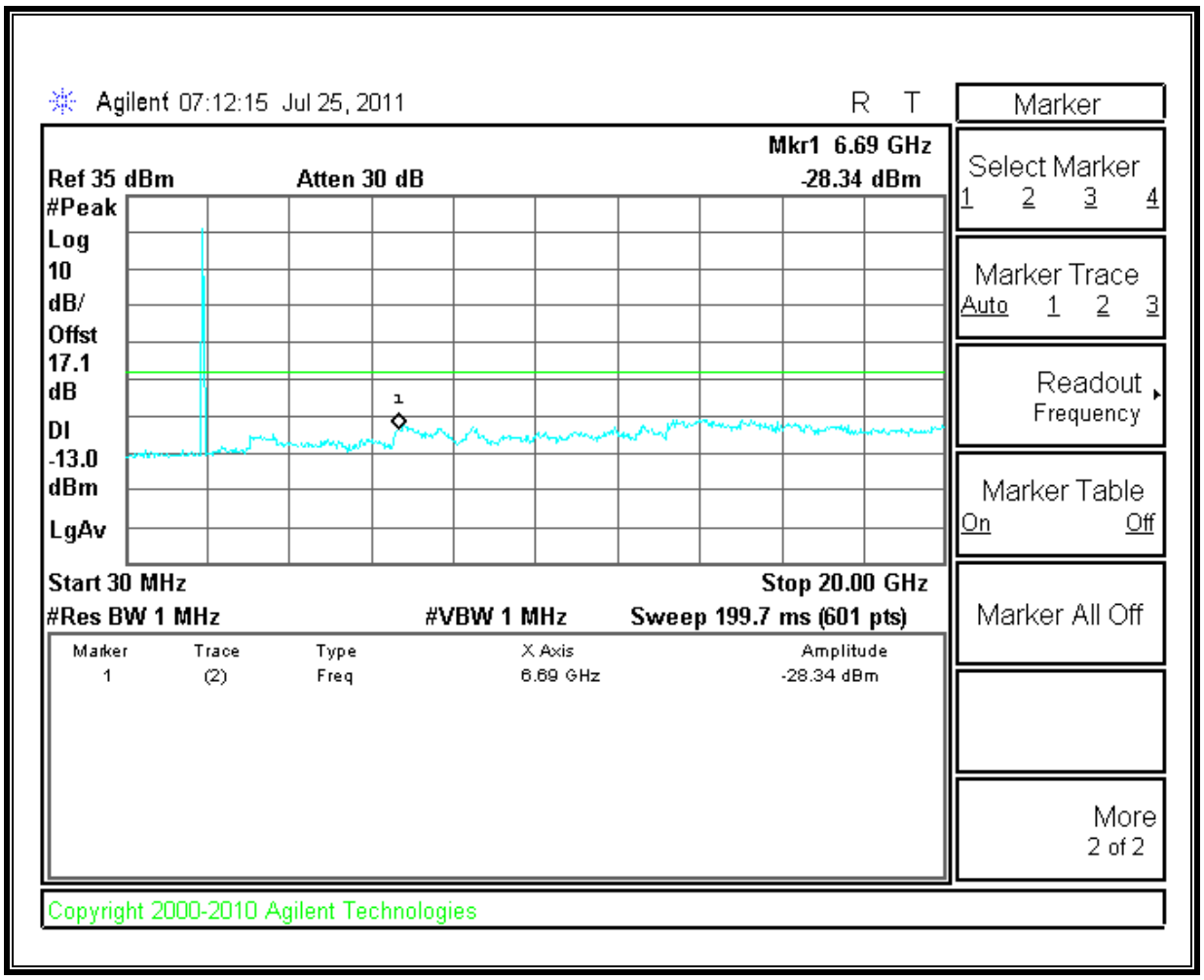
HIGH CHANNEL



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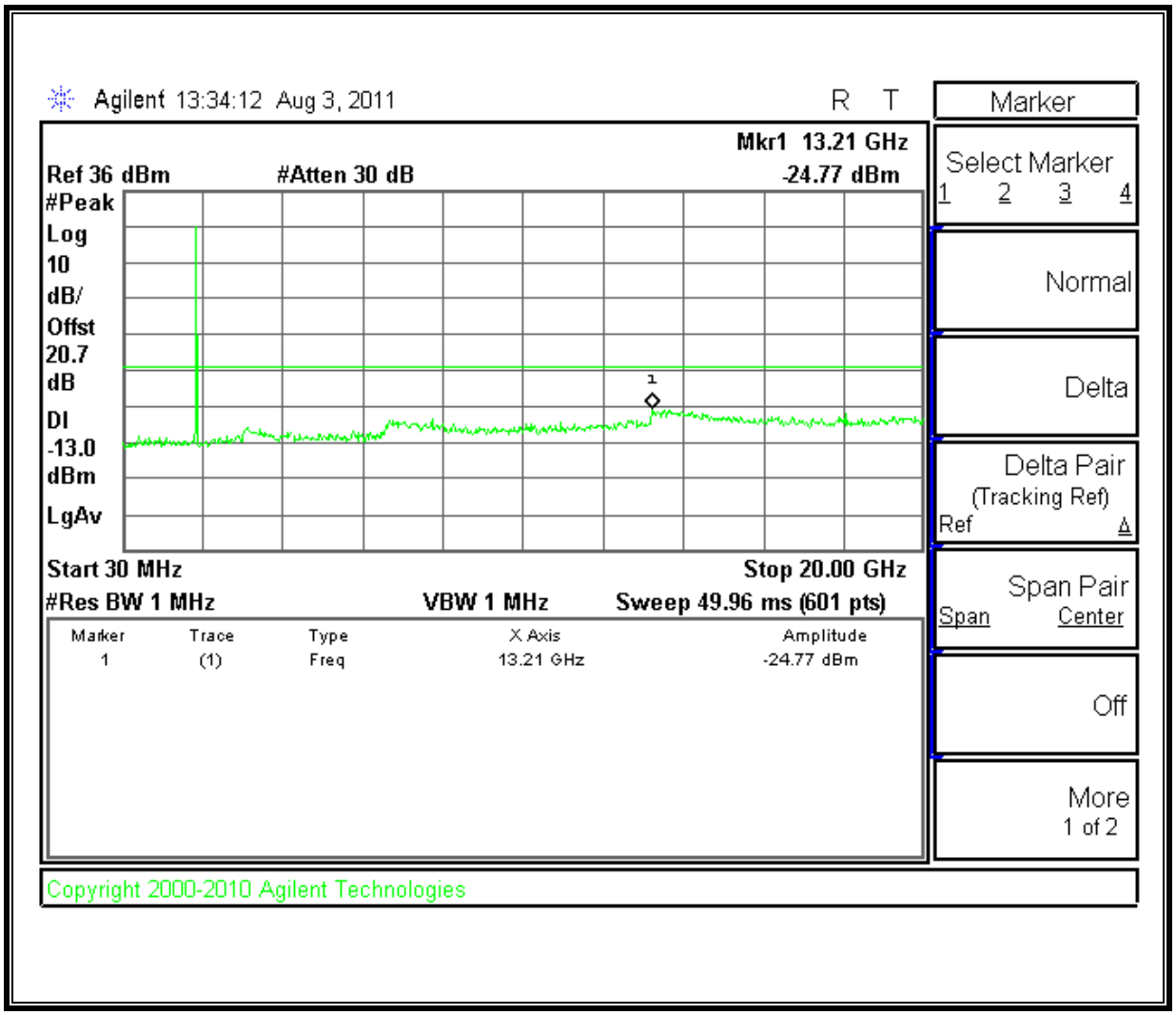
CDMA2000 1xEV-DO Revision A (Rev. A) Mode (PCS Band)

LOW Channel



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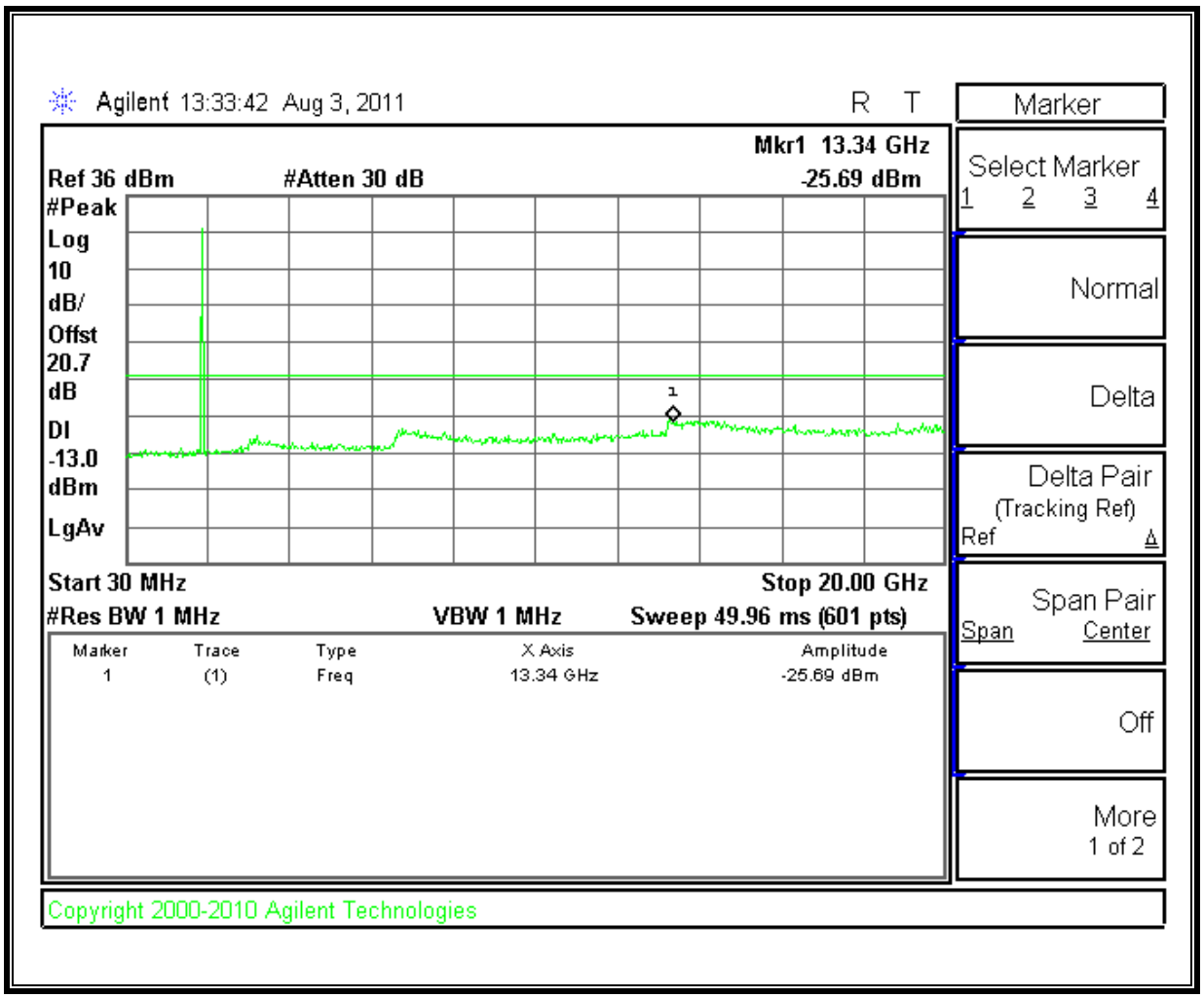
MID CHANNEL



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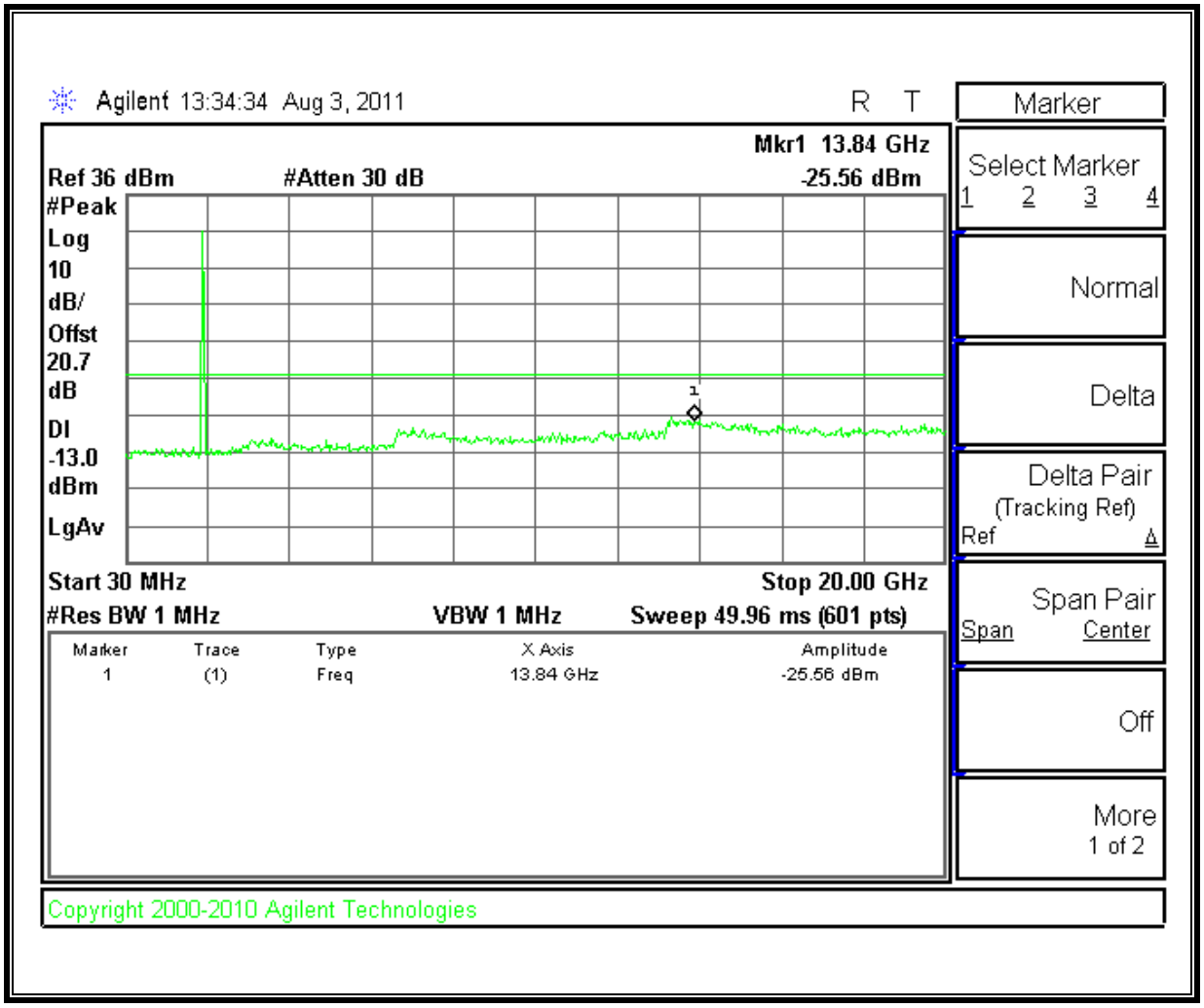
HIGH CHANNEL



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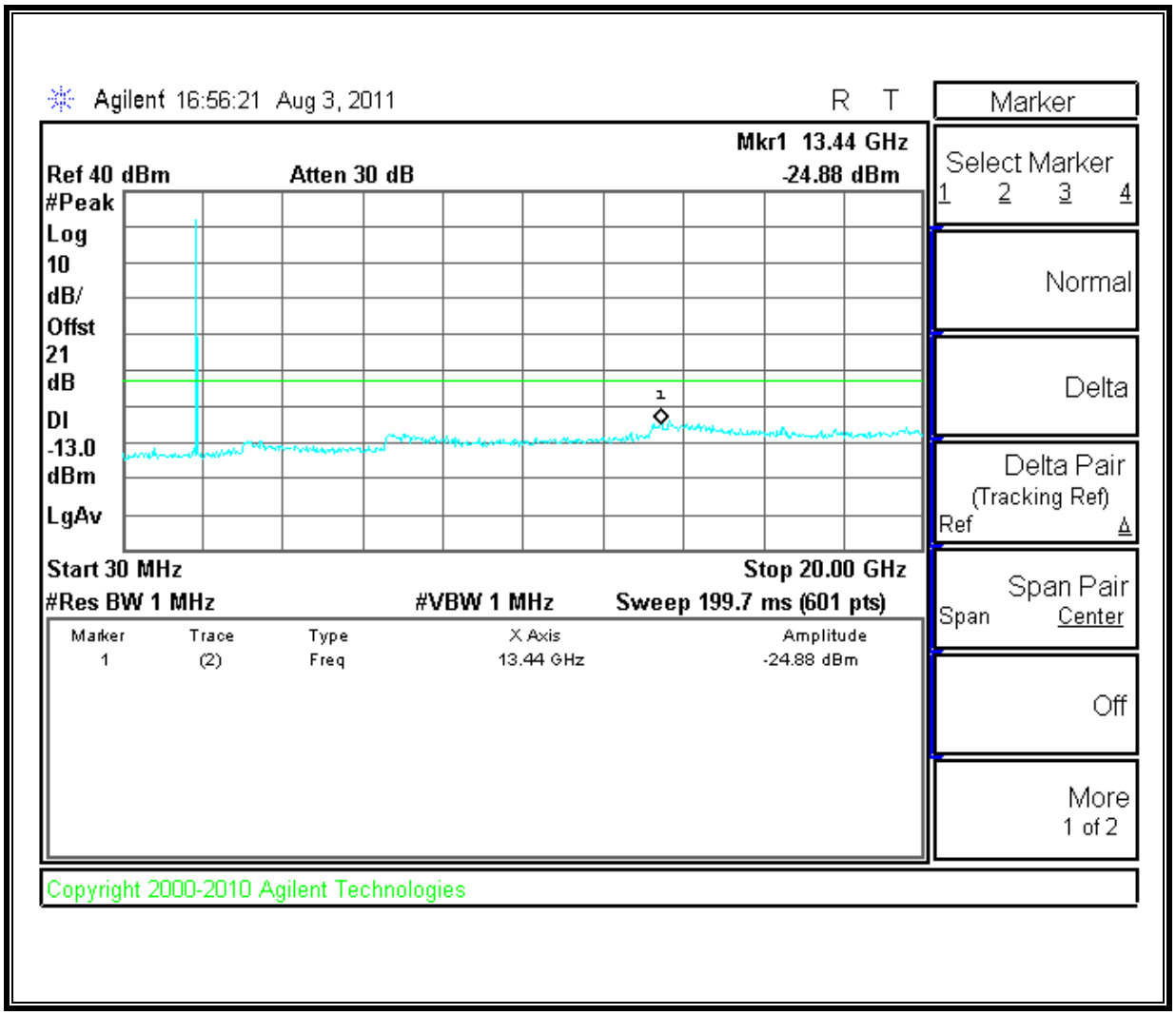
GPRS Mode (PCS Band)

LOW Channel



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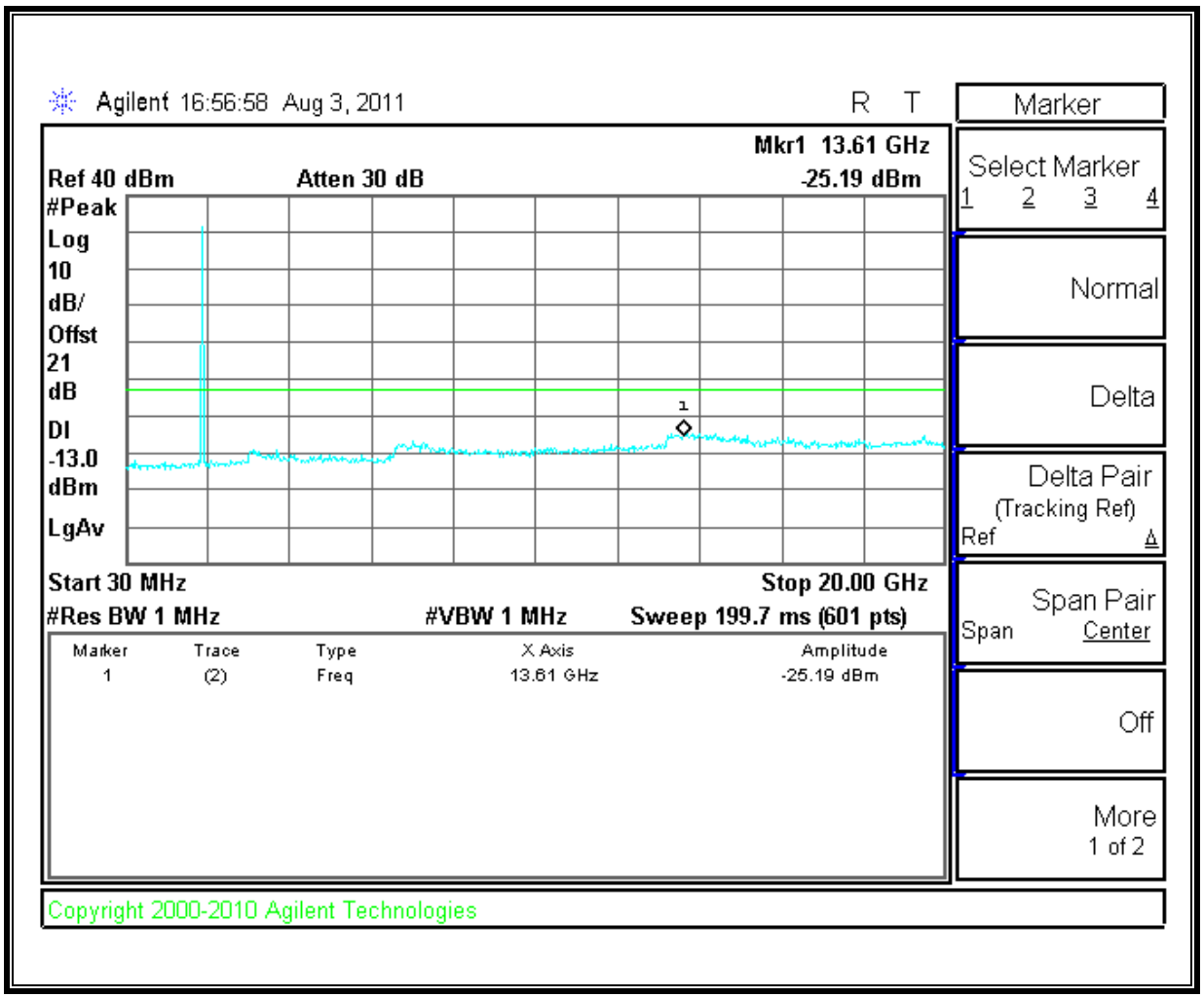
MID CHANNEL



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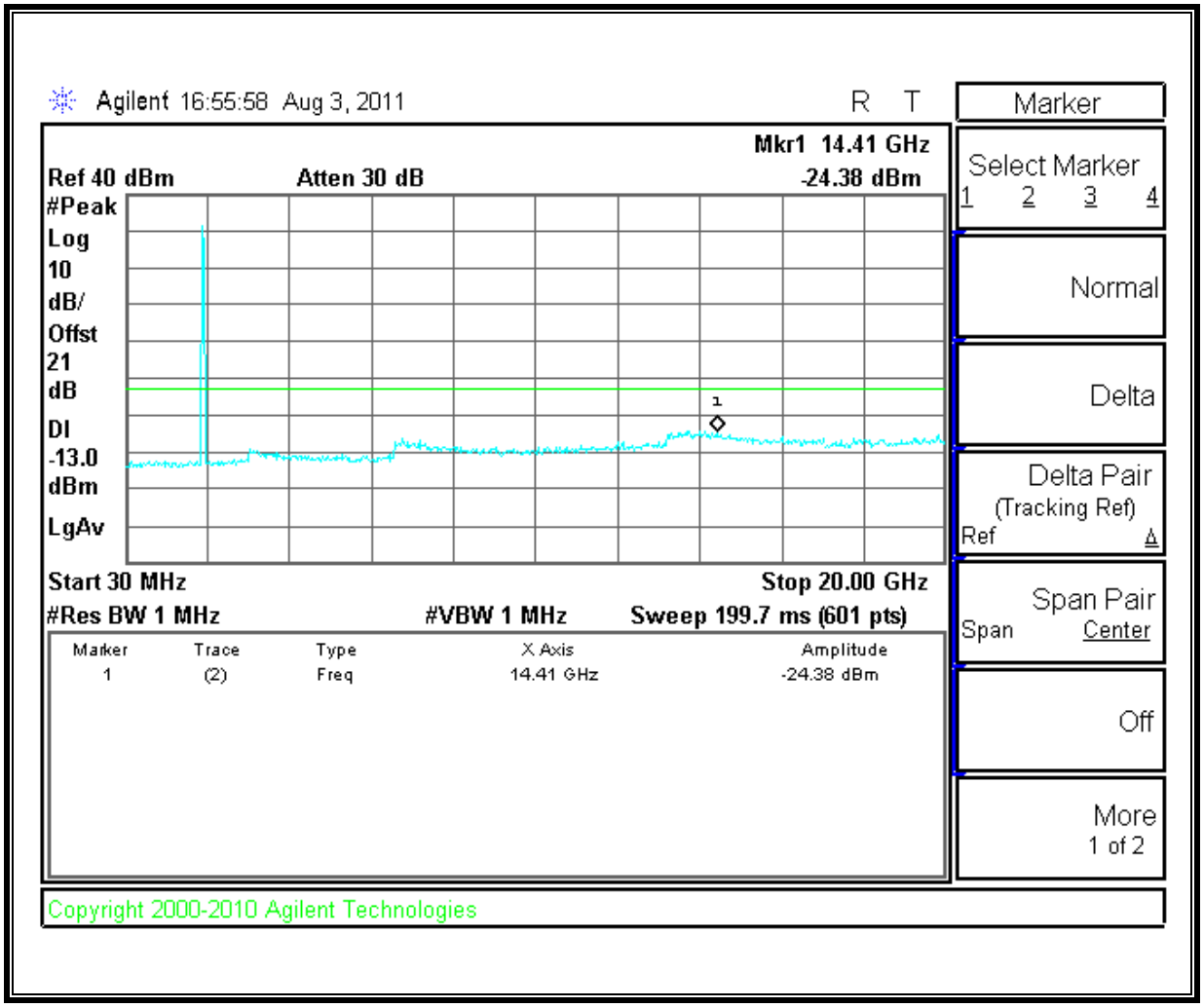
HIGH CHANNEL



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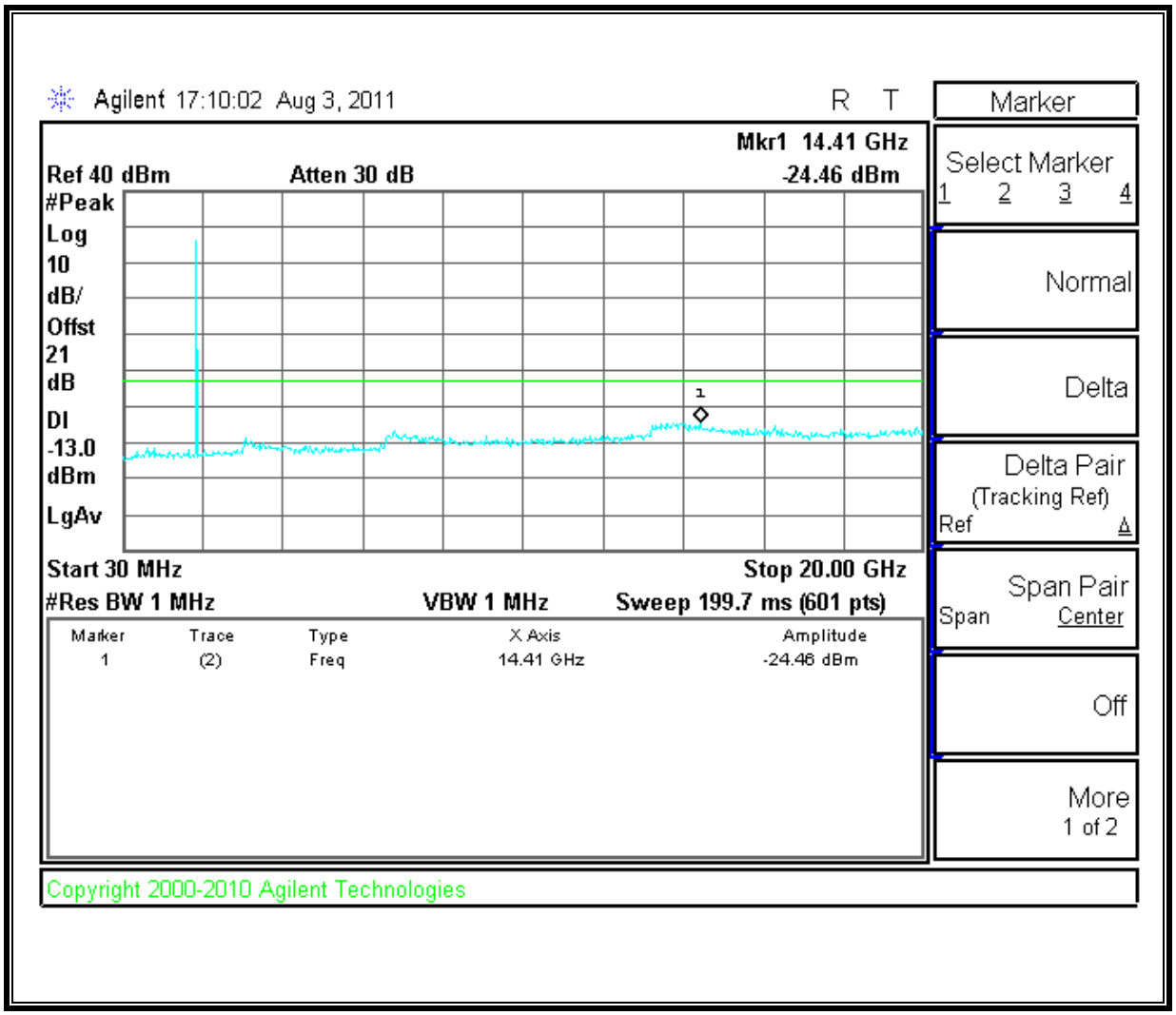
EGPRS Mode (PCS Band)

LOW Channel



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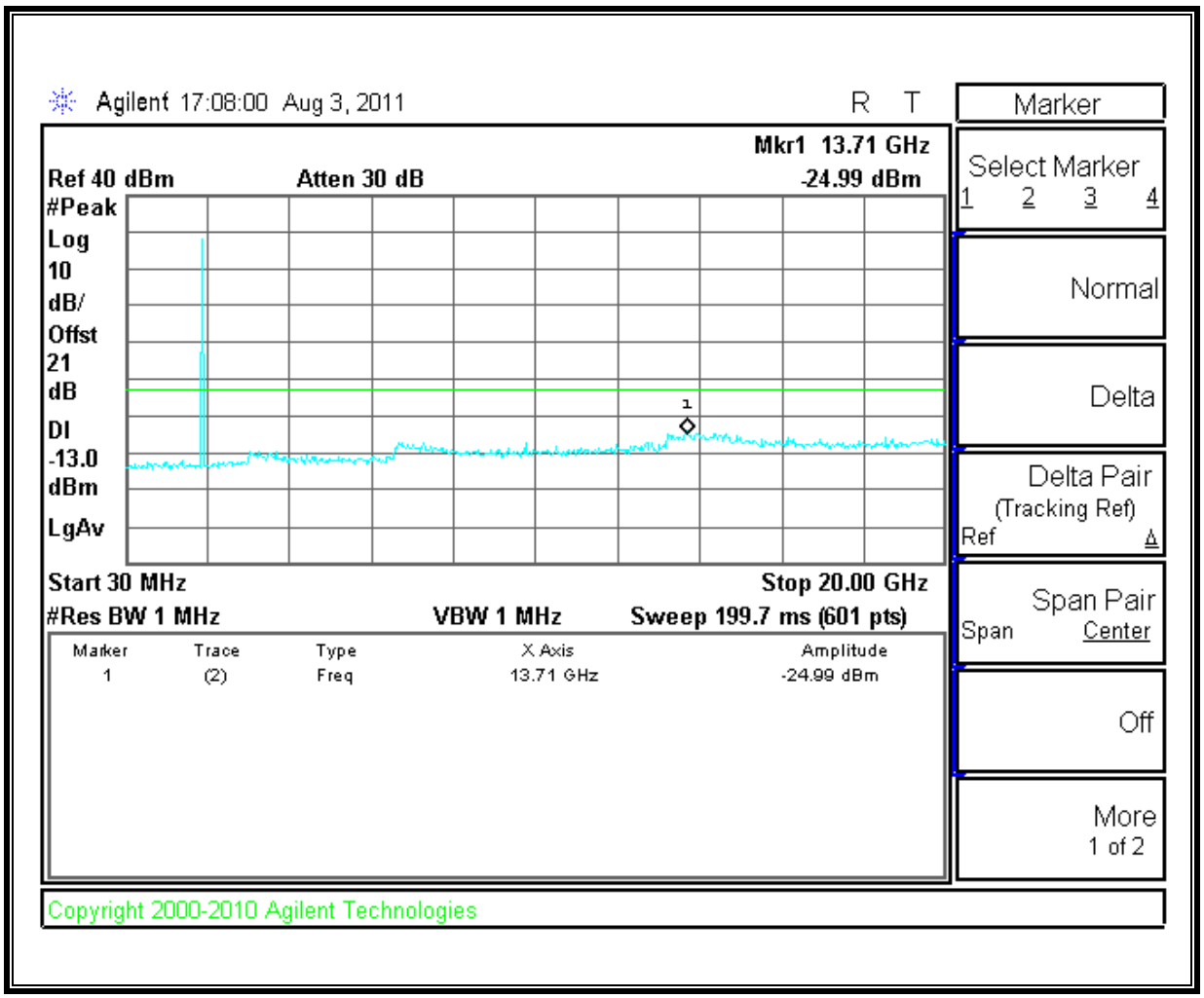
MID CHANNEL



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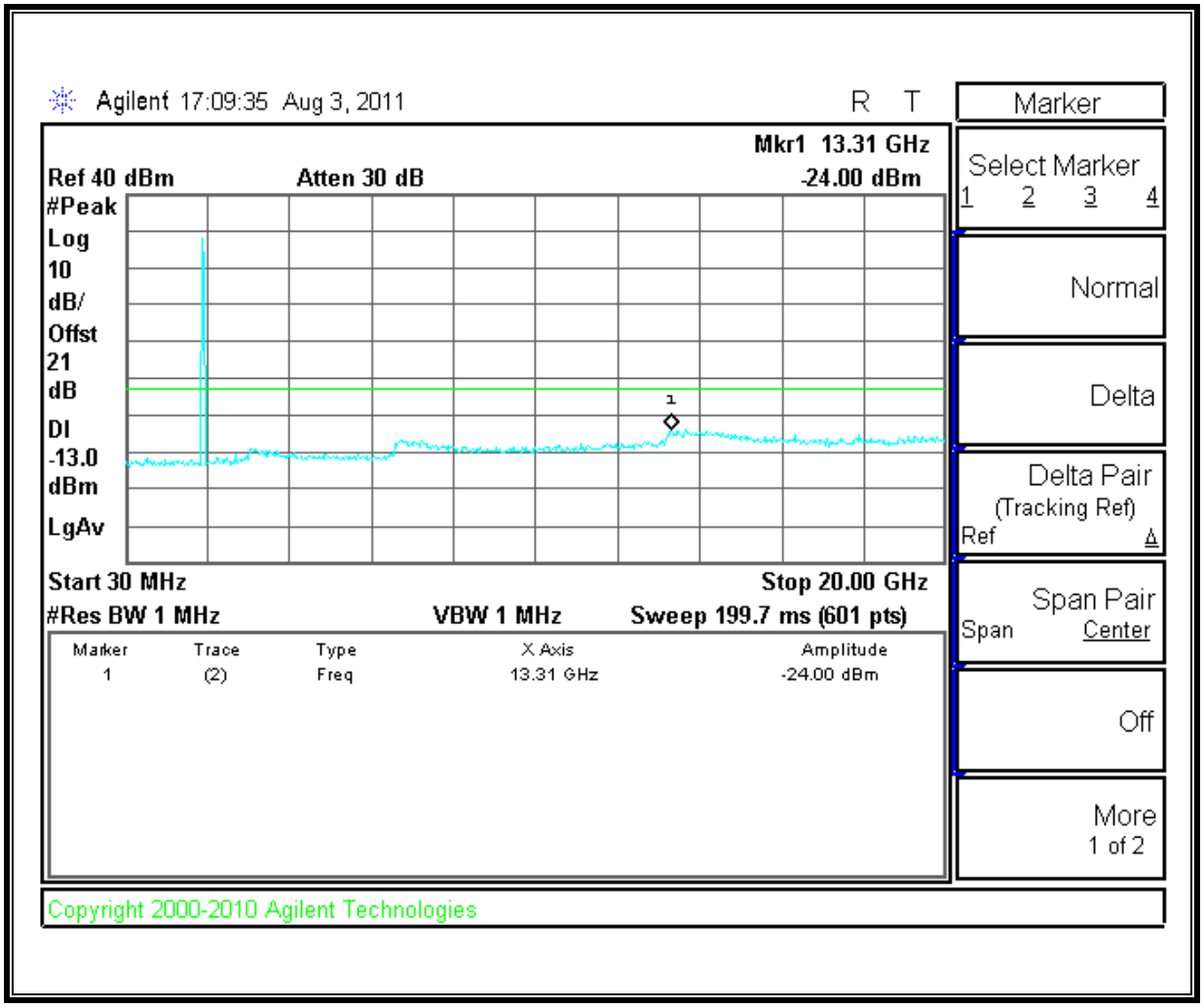
HIGH CHANNEL



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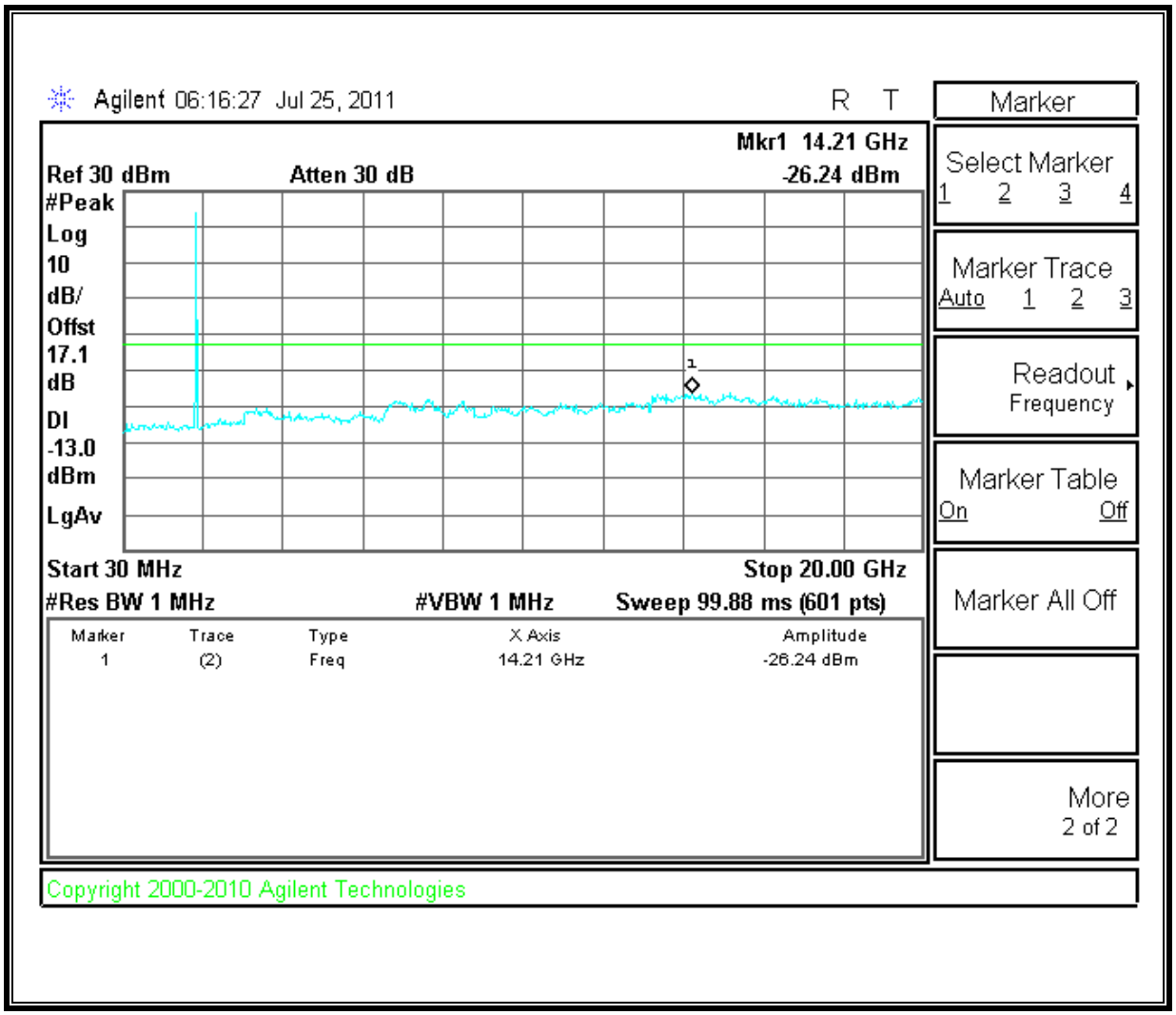
UMTS REL 99 (PCS Band)

LOW Channel



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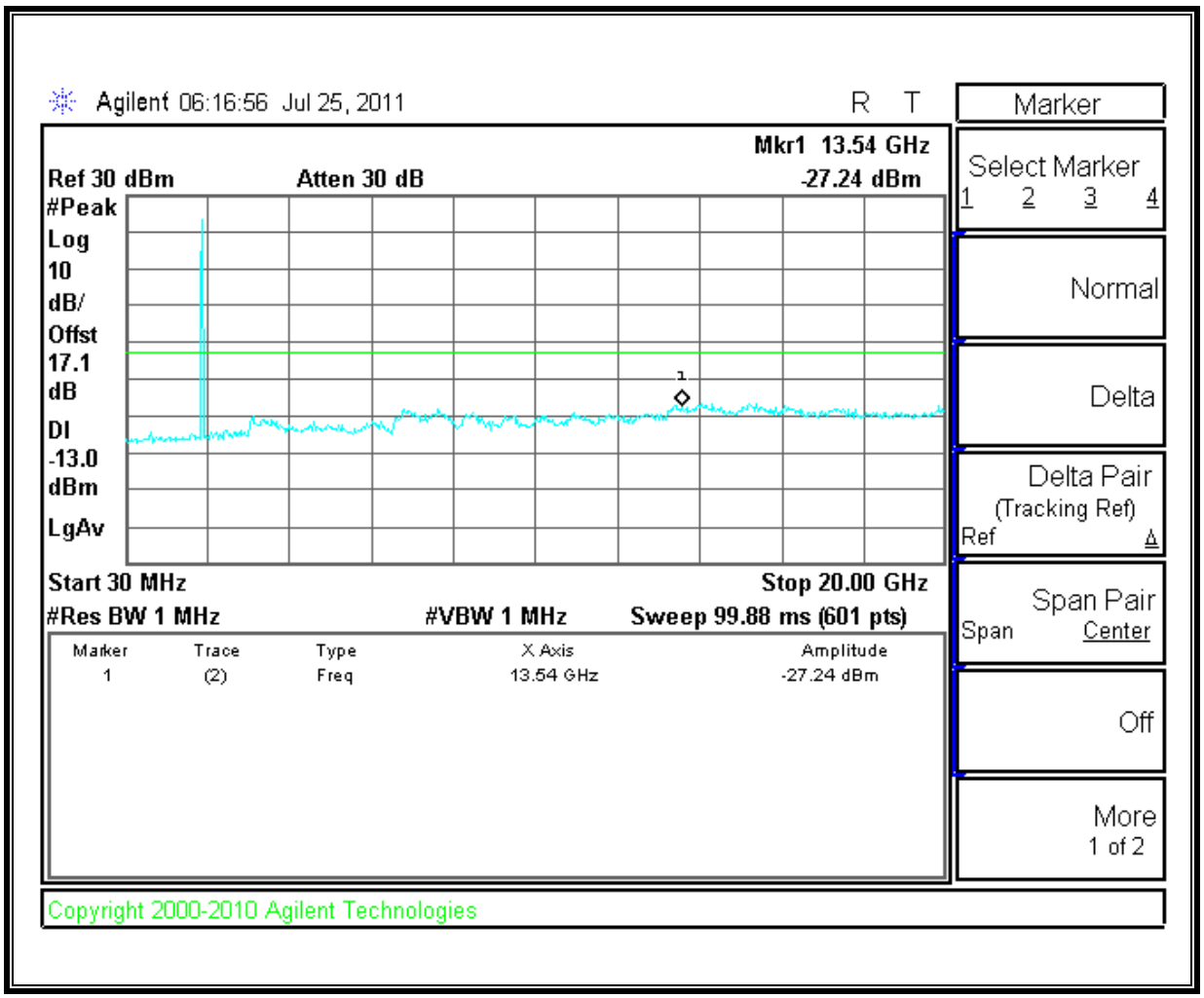
MID CHANNEL



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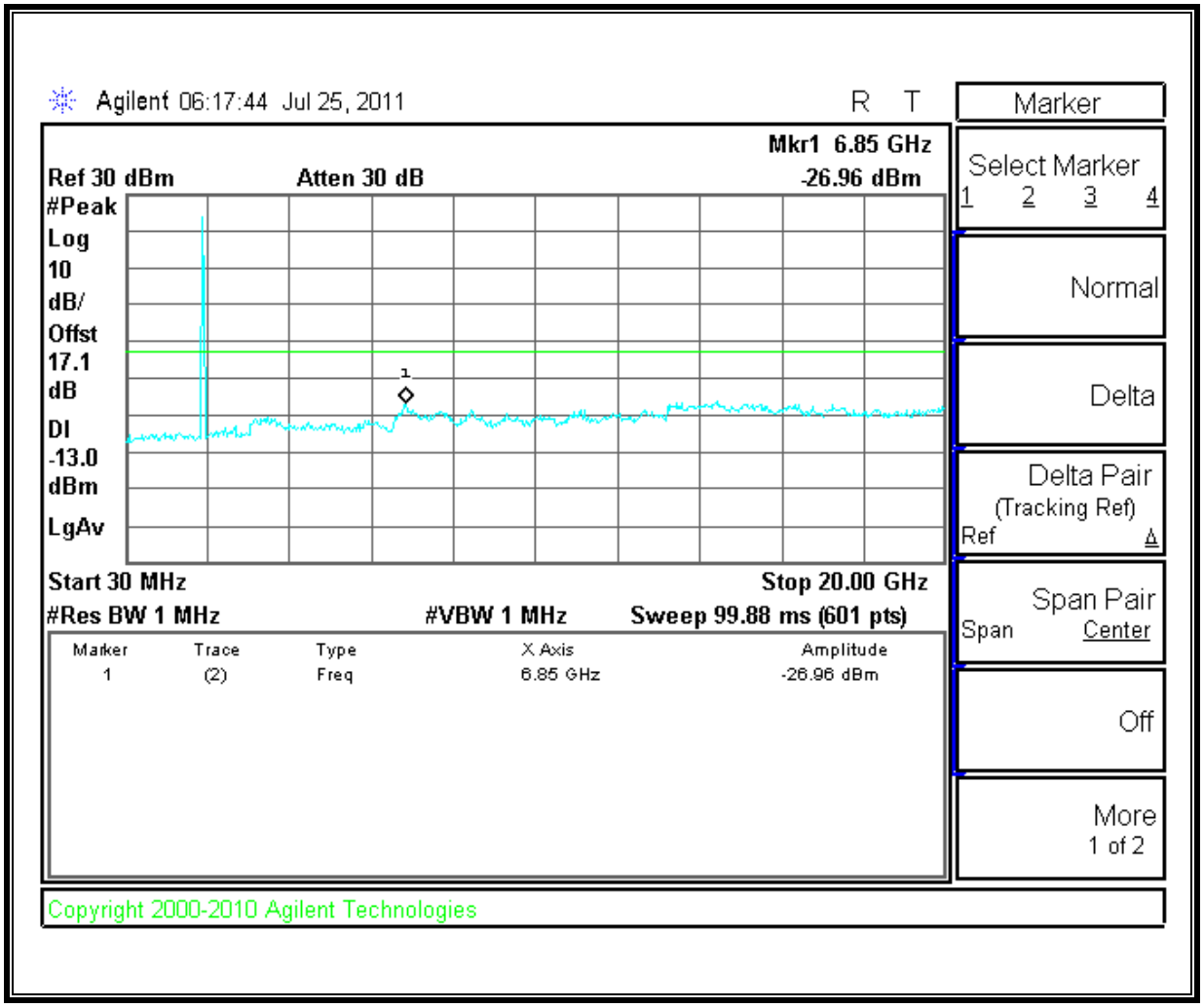
HIGH CHANNEL



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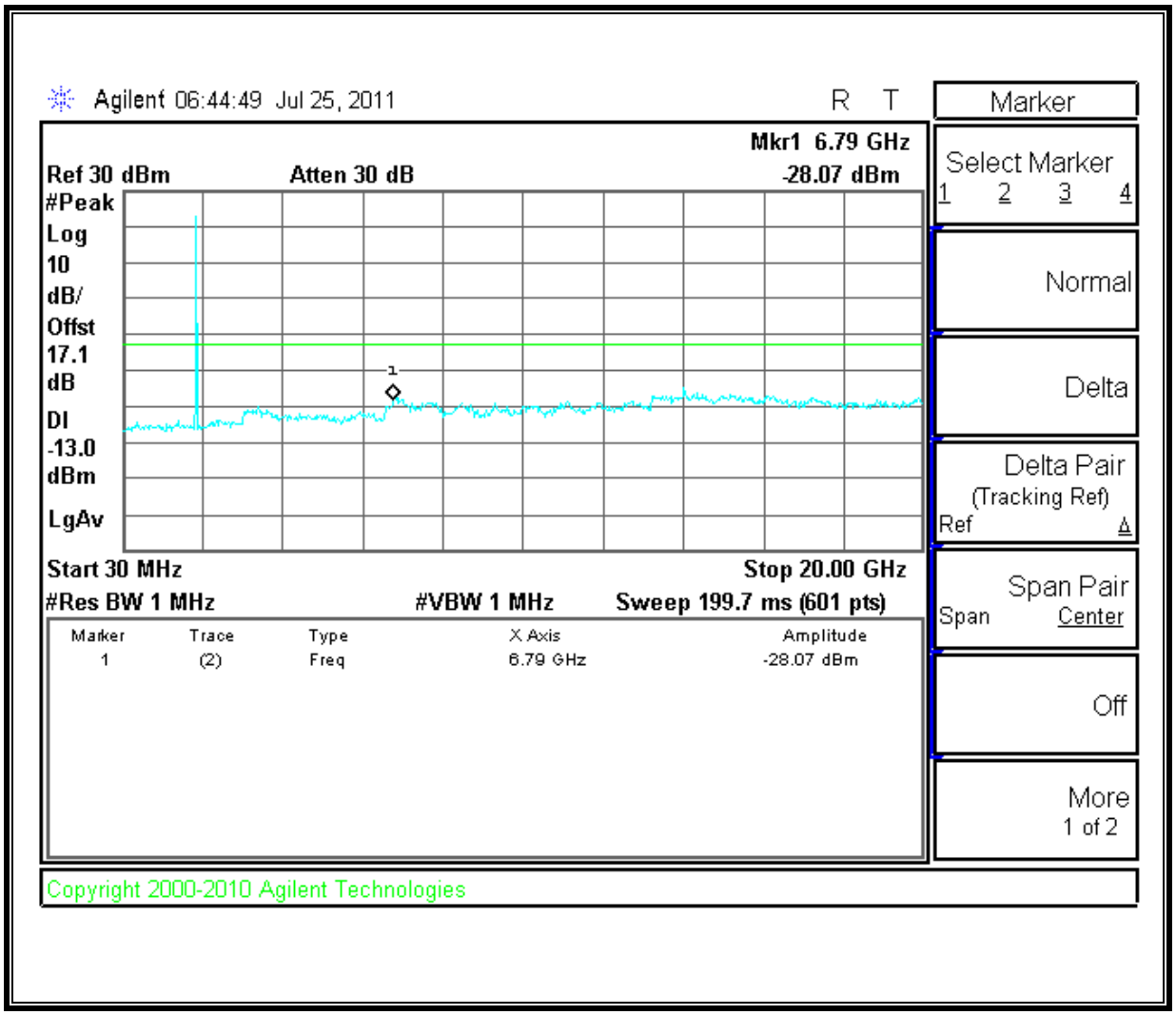
UMTS HSDPA (PCS Band)

LOW Channel



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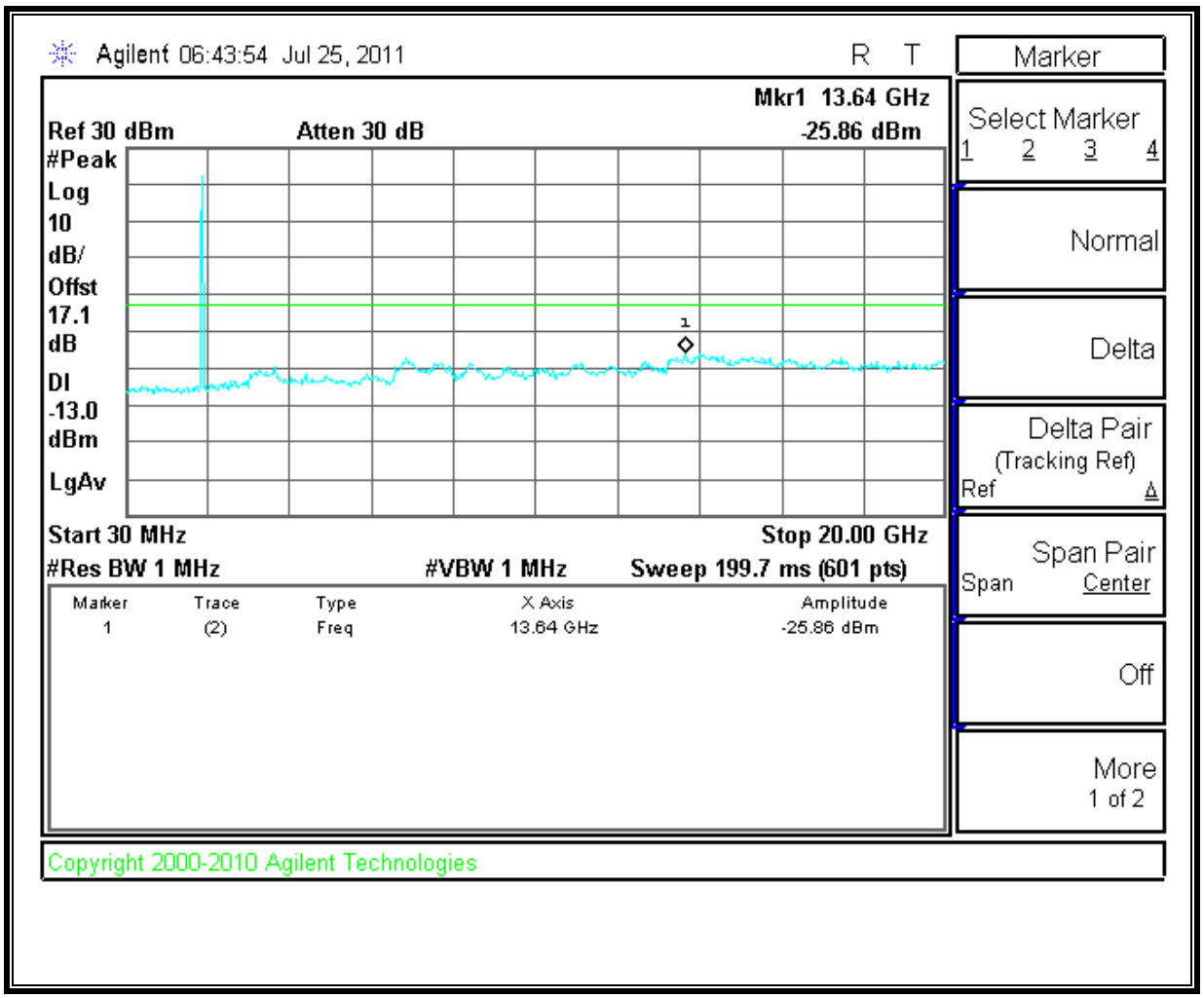
MID CHANNEL



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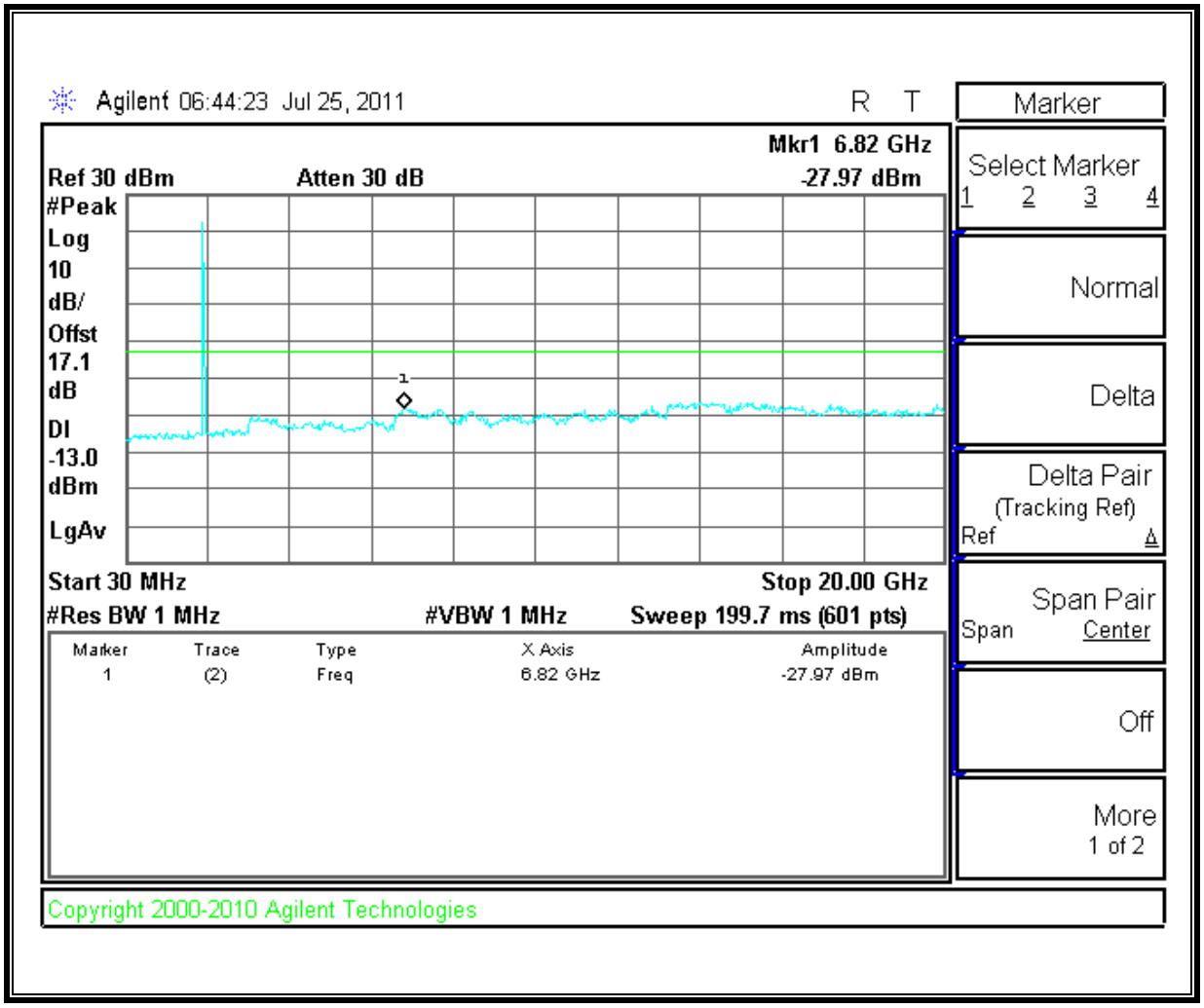
HIGH CHANNEL



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8.1. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055, §22.355, §24.235
RSS132 & RSS133

LIMITS

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

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

TEST PROCEDURE

Use Agilent 8960 with Frequency Error measurement capability.

- Temp. = −20° to +50°C
- Voltage = 3.80 Vdc (85% - 115%)

Frequency Stability vs Temperature:
The EUT is place inside a temperature chamber. The temperature is set to 20ºC and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured. The temperature is increased by 10 degrees, allowed to stabilize and soak, and then the measurement is repeated. This is repeated until +50ºC is reached.
Frequency Stability vs Voltage:
The peak frequency error is recorded (worst-case).

MODES TESTED

- CDMA2000 1xEV-DO Revision A (Rev. A)
- GPRS, EGPRS
- UMTS, HSDPA

RESULTS

See the following pages.

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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CELL CDMA2000 1xEV-DO Revision A (Rev. A) – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.520004Hz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.520004	0.000	2.5
3.80	40	836.520003	0.001	2.5
3.80	30	836.520003	0.001	2.5
3.80	***20***	***836.520004***	***0***	2.5
3.80	10	836.520002	0.002	2.5
3.80	0	836.520003	0.001	2.5
3.80	-10	836.519997	0.008	2.5
3.80	-20	836.519996	0.010	2.5
3.80	-30	836.519994	0.012	2.5

Reference Frequency: Cellular Mid Channel 836.520004MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
100.00%	20	836.520004	***0.000***	2.5
85.00%	20	836.520004	0.000	2.5
115.00%	20	836.520004	0.000	2.5

PCS, CDMA2000 1xEV-DO Revision A (Rev. A) – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.999993MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999994	-0.001	2.5
3.80	40	1879.999993	0.000	2.5
3.80	30	1879.999993	0.000	2.5
3.80	***20***	***1879.999993***	***0***	***2.5***
3.80	10	1879.999995	-0.001	2.5
3.80	0	1879.999995	-0.001	2.5
3.80	-10	1880.000006	-0.007	2.5
3.80	-20	1880.000005	-0.006	2.5
3.80	-30	1880.000006	-0.007	2.5

Reference Frequency: PCS Mid Channel 1879.999993MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1879.999993***	***0***	***2.5***
3.40	20	1879.999994	-0.001	2.5
4.20	20	1879.999993	0.000	2.5
3.0V (End Point)	20	1879.999993	0.000	2.5

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CELL GSM – MID CHANNEL (GPRS)

Reference Frequency: Cellular Mid Channel 836.519970Hz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.519970	0.000	2.5
3.80	40	836.519967	0.004	2.5
3.80	30	836.519960	0.012	2.5
3.80	***20***	***836.519970***	***0***	2.5
3.80	10	836.519986	-0.019	2.5
3.80	0	836.520022	-0.062	2.5
3.80	-10	836.519983	-0.016	2.5
3.80	-20	836.519974	-0.005	2.5
3.80	-30	836.519961	0.011	2.5

Reference Frequency: Cellular Mid Channel 836.519970MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
100.00%	20	836.519970	***0.000***	2.5
85.00%	20	836.519976	-0.007	2.5
115.00%	20	836.519979	-0.011	2.5

PCS, GSM – MID CHANNEL (GPRS)

Reference Frequency: PCS Mid Channel 1880.000053MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1879.999980	0.039	2.5
3.80	40	1879.999982	0.038	2.5
3.80	30	1879.999980	0.039	2.5
3.80	***20***	***1880.000053***	***0***	***2.5***
3.80	10	1880.000072	-0.010	2.5
3.80	0	1880.000076	-0.012	2.5
3.80	-10	1880.000033	0.011	2.5
3.80	-20	1879.999986	0.036	2.5
3.80	-30	1880.000050	0.002	2.5

Reference Frequency: PCS Mid Channel 1880.000053MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1880.000053***	***0***	***2.5***
3.40	20	1880.000055	-0.001	2.5
4.20	20	1880.000019	0.018	2.5
3.2V (End Point)	20	1879.999996	0.030	2.5

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CELL GSM – MID CHANNEL (EGPRS)

Reference Frequency: Cellular Mid Channel 836.519970Hz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.519965	0.006	2.5
3.80	40	836.519960	0.012	2.5
3.80	30	836.519980	-0.012	2.5
3.80	***20***	***836.519970***	***0***	2.5
3.80	10	836.520050	-0.096	2.5
3.80	0	836.520050	-0.096	2.5
3.80	-10	836.519965	0.006	2.5
3.80	-20	836.519960	0.012	2.5
3.80	-30	836.519965	0.006	2.5

Reference Frequency: Cellular Mid Channel 836.519970MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
100.00%	20	836.519970	***0.000***	2.5
85.00%	20	836.519976	-0.007	2.5
115.00%	20	836.519975	-0.006	2.5

PCS, GSM – MID CHANNEL (EGPRS)

Reference Frequency: PCS Mid Channel 1880.000017MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000002	0.008	2.5
3.80	40	1880.000050	-0.018	2.5
3.80	30	1879.999967	0.027	2.5
3.80	***20***	1880.000017	***0***	***2.5***
3.80	10	1880.000089	-0.038	2.5
3.80	0	1880.000100	-0.044	2.5
3.80	-10	1880.000025	-0.004	2.5
3.80	-20	1880.000030	-0.007	2.5
3.80	-30	1880.000020	-0.002	2.5

Reference Frequency: PCS Mid Channel 1880.000017MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply (Vdc)	Environment Temperature (ºC)	Frequency Deviation Measureed with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	1880.000017	***0***	***2.5***
3.40	20	1880.000040	-0.012	2.5
4.20	20	1880.000034	-0.009	2.5
3.2V (End Point)	20	1879.999996	0.011	2.5

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CELL UMTS, HSDPA – MID CHANNEL

Reference Frequency: Cellular Mid Channel 836.520024Hz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (ºC)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	836.520019	0.006	2.5
3.80	40	836.520023	0.001	2.5
3.80	30	836.520024	0.000	2.5
3.80	***20***	***836.520024***	***0***	2.5
3.80	10	836.520020	0.005	2.5
3.80	0	836.520021	0.004	2.5
3.80	-10	836.520021	0.004	2.5
3.80	-20	836.520026	-0.002	2.5
3.80	-30	836.520020	0.005	2.5

Reference Frequency: Cellular Mid Channel 836.520024MHz @ 20ºC Limit: to stay +- 2.5 ppm = 2091.300 Hz				
DC Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (ºC)	(MHz)	Delta (ppm)	Limit (ppm)
100.00%	20	836.520024	***0.000***	2.5
85.00%	20	836.520026	-0.002	2.5
115.00%	20	836.520020	0.005	2.5

PCS, HSDPA – MID CHANNEL

Reference Frequency: PCS Mid Channel 1879.999970MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (ºC)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	50	1880.000035	-0.035	2.5
3.80	40	1879.999964	0.003	2.5
3.80	30	1879.999964	0.003	2.5
3.80	***20***	***1879.999970***	***0***	***2.5***
3.80	10	1879.999954	0.009	2.5
3.80	0	1879.999970	0.000	2.5
3.80	-10	1880.000039	-0.037	2.5
3.80	-20	1879.999958	0.006	2.5
3.80	-30	1879.999956	0.007	2.5

Reference Frequency: PCS Mid Channel 1879.999970MHz @ 20ºC Limit: within the authorized block or +- 2.5 ppm = 4700.000 Hz				
Power Supply	Environment	Frequency Deviation Measureed with Time Elapse		
(Vdc)	Temperature (ºC)	(MHz)	Delta (ppm)	Limit (ppm)
3.80	***20***	***1879.999970***	***0***	***2.5***
3.40	20	1879.999965	0.003	2.5
4.20	20	1879.999967	0.002	2.5
3.2V (End Point)	20	1879.999996	-0.014	2.5

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9. RADIATED TEST RESULTS

9.1. RADIATED POWER (ERP & EIRP)

RULE PART(S)

FCC: §2.1046, §22.913, §24.232
RSS132 & RSS133

LIMITS

22.913(a) - The ERP of mobile transmitters and auxiliary test transmitters must not exceed 7 Watts.

24.232(c) - Mobile/portable stations are limited to 2 watts e.i.r.p. peak power and the equipment must employ means to limit the power to the minimum necessary for successful communications.

TEST PROCEDURE

ANSI / TIA / EIA 603C

MODES TESTED

- 1xRTT – RC2, SO9
- CDMA2000 1xEV-DO Revision A (Rev. A)
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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PORT A / PRIMARY

Mode	Channel	f (MHz)	ERP	
			dBm	mW
1xRTT (RC2,SO9)	1013	824.70	26.85	484.17
	384	836.52	27.00	501.19
	777	848.31	26.77	475.34
EVDO-REV A	1013	824.70	27.15	518.80
	384	836.52	26.90	489.78
	777	848.31	26.87	486.41

Mode	Channel	f (MHz)	ERP	
			dBm	mW
GPRS	128	824.20	31.97	1573.98
	190	836.60	31.33	1358.31
	251	848.80	31.27	1339.68
EGPRS	128	824.20	29.25	841.40
	190	836.60	29.00	794.33
	251	848.80	28.87	770.90

Mode	Channel	f (MHz)	ERP	
			dBm	mW
UMTS,REL 99	4357	826.40	26.05	402.72
	4405	836.00	25.60	363.08
	4455	846.00	26.27	423.64
UMTS, HSDPA	4357	826.40	26.55	451.86
	4405	836.00	25.90	389.05
	4455	846.00	26.09	406.44

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
1xRTT (RC2, SO9)	25	1851.25	27.17	521.19
	600	1880.00	26.49	445.66
	1175	1908.75	26.58	454.99
EVDO-REV A	25	1851.25	27.06	508.16
	600	1880.00	26.68	465.59
	1175	1908.75	26.48	444.63

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
GPRS	512	1850.20	27.16	520.00
	661	1880.00	27.48	559.76
	810	1909.80	27.78	599.79
EGPRS	512	1850.20	26.36	432.51
	661	1880.00	26.88	487.53
	810	1909.80	26.58	454.99

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS, REL 99	9662	1852.40	23.16	207.01
	9800	1880.00	23.28	212.81
	9938	1907.60	23.58	228.03
UMTS, HSDPA	9662	1852.40	23.26	211.84
	9800	1880.00	23.28	212.81
	9938	1907.60	23.68	233.35

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PORT B / SECONDARY

Mode	Channel	f (MHz)	ERP / EIRP	
			dBm	mW
1xRTT (RC2,SO9)	1013	824.70	23.35	216.27
	384	836.52	23.12	205.12
	777	848.31	22.87	193.64
1xRTT (RC2,SO9)	25	1851.25	22.59	181.55
	600	1880.00	22.48	177.01
	1175	1908.75	22.85	192.75

Mode	Channel	f (MHz)	ERP / EIRP	
			dBm	mW
EVDO - REV A	1013	824.70	23.75	237.14
	384	836.52	23.30	213.80
	777	848.31	23.27	212.32
EVDO - REV A	25	1851.25	23.20	208.93
	600	1880.00	23.35	216.27
	1175	1908.75	23.81	240.44

Mode	Channel	f (MHz)	ERP / EIRP	
			dBm	mW
GSM850 (Voice)	128	824.20	29.08	809.10
	190	836.60	28.81	760.33
	251	848.80	28.87	770.90
GSM1900 (Voice)	512	1850.20	27.16	520.00
	661	1880.00	25.88	387.26
	810	1909.80	26.78	476.43

Mode	Channel	f (MHz)	ERP / EIRP	
			dBm	mW
GPRS850 (Data)	128	824.20	29.10	812.83
	190	836.60	27.85	609.54
	251	848.80	28.08	642.69
GPRS1900 (Data)	512	1850.20	26.68	465.59
	661	1880.00	26.90	489.78
	810	1909.80	27.10	512.86

Mode	Channel	f (MHz)	ERP / EIRP	
			dBm	mW
EGPRS850	128	824.20	27.30	537.03
	190	836.60	27.15	518.80
	251	848.80	27.14	517.61
EGPRS1900	512	1850.20	24.48	280.54
	661	1880.00	25.00	316.23
	810	1909.80	24.70	295.12

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Mode	Channel	f (MHz)	ERP	
			dBm	mW
UMTS850, REL 99	4357	826.40	24.56	285.76
	4405	836.00	23.43	220.29
	4455	846.00	23.60	229.09
UMTS850, HSDPA	4357	826.40	24.55	285.10
	4405	836.00	24.00	251.19
	4455	846.00	24.67	293.09

Mode	Channel	f (MHz)	EIRP	
			dBm	mW
UMTS1900, REL 99	9662	1852.40	21.95	156.68
	9800	1880.00	21.57	143.55
	9938	1907.60	21.47	140.28
UMTS1900, HSDPA	9662	1852.40	21.30	134.90
	9800	1880.00	21.82	152.05
	9938	1907.60	20.92	123.59

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PORT A

1xRTT (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-01-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND 1xRTT

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	20.22	V	0.5	0.0	19.72	38.5	-18.7	
824.70	27.35	H	0.5	0.0	26.85	38.5	-11.6	
836.52	20.44	V	0.5	0.0	19.94	38.5	-18.5	
836.52	27.50	H	0.5	0.0	27.00	38.5	-11.5	
848.31	17.41	V	0.5	0.0	16.91	38.5	-21.5	
848.31	27.27	H	0.5	0.0	26.77	38.5	-11.7	

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CDMA2000 1xEV-DO Revision A (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-01-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND EvDO Rev A

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	19.42	V	0.5	0.0	18.92	38.5	-19.5	
824.70	27.65	H	0.5	0.0	27.15	38.5	-11.3	
836.52	18.84	V	0.5	0.0	18.34	38.5	-20.1	
836.52	27.40	H	0.5	0.0	26.90	38.5	-11.6	
848.31	18.31	V	0.5	0.0	17.81	38.5	-20.6	
848.31	27.37	H	0.5	0.0	26.87	38.5	-11.6	

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GPRS (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-03-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND GPRS

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	25.12	V	0.5	0.0	24.62	38.5	-13.8	
824.20	32.47	H	0.5	0.0	31.97	38.5	-6.5	
836.60	26.34	V	0.5	0.0	25.84	38.5	-12.6	
836.60	31.83	H	0.5	0.0	31.33	38.5	-7.1	
848.80	21.31	V	0.5	0.0	20.81	38.5	-17.6	
848.80	31.77	H	0.5	0.0	31.27	38.5	-7.2	

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EGPRS (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-03-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND EGPRS

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	23.82	V	0.5	0.0	23.32	38.5	-15.1	
824.20	29.75	H	0.5	0.0	29.25	38.5	-9.2	
836.60	21.94	V	0.5	0.0	21.44	38.5	-17.0	
836.60	29.50	H	0.5	0.0	29.00	38.5	-9.5	
848.80	19.51	V	0.5	0.0	19.01	38.5	-19.4	
848.80	29.37	H	0.5	0.0	28.87	38.5	-9.6	

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UMTS REL 99 (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND WCDMA Rel 99

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
826.40	21.92	V	0.5	0.0	21.42	38.5	-17.0	
826.40	26.55	H	0.5	0.0	26.05	38.5	-12.4	
836.00	21.64	V	0.5	0.0	21.14	38.5	-17.3	
836.00	26.10	H	0.5	0.0	25.60	38.5	-12.9	
846.00	19.51	V	0.5	0.0	19.01	38.5	-19.4	
846.00	26.77	H	0.5	0.0	26.27	38.5	-12.2	

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UMTS HSDPA (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND WCDMA HSDPA

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
826.40	21.02	V	0.5	0.0	20.52	38.5	-17.9	
826.40	27.05	H	0.5	0.0	26.55	38.5	-11.9	
836.00	20.04	V	0.5	0.0	19.54	38.5	-18.9	
836.00	26.40	H	0.5	0.0	25.90	38.5	-12.6	
846.00	19.01	V	0.5	0.0	18.51	38.5	-19.9	
846.00	26.59	H	0.5	0.0	26.09	38.5	-12.4	

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1xRTT (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 10-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND CDMA 1xRTT MODE

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.851	15.4	V	0.85	8.01	22.56	33.0	-10.4	
1.851	20.0	H	0.85	8.01	27.17	33.0	-5.8	
1.880	16.0	V	0.85	8.13	23.28	33.0	-9.7	
1.880	19.2	H	0.85	8.13	26.49	33.0	-6.5	
1.909	14.1	V	0.85	8.13	21.38	33.0	-11.6	
1.909	19.3	H	0.85	8.13	26.58	33.0	-6.4	

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CDMA2000 1xEV-DO Revision A (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-01-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND CDMA EVDO Rev A MODE

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.851	19.9	V	0.85	8.01	27.06	33.0	-5.9	
1.851	17.1	H	0.85	8.01	24.26	33.0	-8.7	
1.880	19.4	V	0.85	8.13	26.68	33.0	-6.3	
1.880	18.6	H	0.85	8.13	25.88	33.0	-7.1	
1.909	19.2	V	0.85	8.13	26.48	33.0	-6.5	
1.909	18.2	H	0.85	8.13	25.48	33.0	-7.5	

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GPRS (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-01-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND GPRS ERP

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.850	19.4	V	0.85	8.01	26.56	33.0	-6.4	
1.850	20.0	H	0.85	8.01	27.16	33.0	-5.8	
1.880	19.9	V	0.85	8.13	27.18	33.0	-5.8	
1.880	20.2	H	0.85	8.13	27.48	33.0	-5.5	
1.910	17.6	V	0.85	8.13	24.88	33.0	-8.1	
1.910	20.5	H	0.85	8.13	27.78	33.0	-5.2	

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EGPRS (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-01-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND EGPRS EIRP

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.850	16.7	V	0.85	8.01	23.86	33.0	-9.1	
1.850	19.2	H	0.85	8.01	26.36	33.0	-6.6	
1.880	16.1	V	0.85	8.13	23.38	33.0	-9.6	
1.880	19.6	H	0.85	8.13	26.88	33.0	-6.1	
1.910	16.5	V	0.85	8.13	23.78	33.0	-9.2	
1.910	19.3	H	0.85	8.13	26.58	33.0	-6.4	

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UMTS REL 99 (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND WCDMA Rel 99

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.852	16.0	V	0.85	8.01	23.16	33.0	-9.8	
1.852	15.2	H	0.85	8.01	22.36	33.0	-10.6	
1.880	16.0	V	0.85	8.13	23.28	33.0	-9.7	
1.880	14.8	H	0.85	8.13	22.08	33.0	-10.9	
1.908	16.3	V	0.85	8.13	23.58	33.0	-9.4	
1.908	15.0	H	0.85	8.13	22.28	33.0	-10.7	

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UMTS HSDPA (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter
Mode: TX, PCS BAND WCDMA HSDPA

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.852	16.1	V	0.85	8.01	23.26	33.0	-9.7	
1.852	15.0	H	0.85	8.01	22.16	33.0	-10.8	
1.880	16.0	V	0.85	8.13	23.28	33.0	-9.7	
1.880	14.6	H	0.85	8.13	21.88	33.0	-11.1	
1.908	16.4	V	0.85	8.13	23.68	33.0	-9.3	
1.908	15.8	H	0.85	8.13	23.08	33.0	-9.9	

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PORT B / SECONDARY

1xRTT (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 10-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter
Mode: TX, Port B, CELL BAND 1xRTT

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	18.42	V	0.5	0.0	17.92	38.5	-20.5	
824.70	23.85	H	0.5	0.0	23.35	38.5	-15.1	
836.52	17.34	V	0.5	0.0	16.84	38.5	-21.6	
836.52	23.62	H	0.5	0.0	23.12	38.5	-15.3	
848.31	15.22	V	0.5	0.0	14.72	38.5	-23.7	
848.31	23.37	H	0.5	0.0	22.87	38.5	-15.6	

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1xRTT (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 10-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter
Mode: TX, Port B PCS BAND CDMA 1xRTT MODE

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.851	12.4	V	0.85	8.01	19.56	33.0	-13.4	
1.851	15.4	H	0.85	8.01	22.59	33.0	-10.4	
1.880	12.6	V	0.85	8.13	19.88	33.0	-13.1	
1.880	15.2	H	0.85	8.13	22.48	33.0	-10.5	
1.909	12.5	V	0.85	8.13	19.78	33.0	-13.2	
1.909	15.6	H	0.85	8.13	22.85	33.0	-10.2	

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GSM (Cellular Band) Voice:

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-15-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter
Mode: TX, Port B, CELL BAND GSM only
Port B

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	22.92	V	0.5	0.0	22.42	38.5	-16.0	
824.70	29.58	H	0.5	0.0	29.08	38.5	-9.4	
836.52	21.64	V	0.5	0.0	21.14	38.5	-17.3	
836.52	29.31	H	0.5	0.0	28.81	38.5	-9.6	
848.31	21.51	V	0.5	0.0	21.01	38.5	-17.4	
848.31	29.37	H	0.5	0.0	28.87	38.5	-9.6	

Rev. 3.17.11

GSM (PCS Band) Voice:

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08-15-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND GSM only EIRP
Poret B

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.850	14.6	V	0.85	8.01	21.76	33.0	-11.2	
1.850	20.0	H	0.85	8.01	27.16	33.0	-5.8	
1.880	15.1	V	0.85	8.13	22.38	33.0	-10.6	
1.880	18.6	H	0.85	8.13	25.88	33.0	-7.1	
1.910	14.1	V	0.85	8.13	21.38	33.0	-11.6	
1.910	19.5	H	0.85	8.13	26.78	33.0	-6.2	

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UMTS, REL 99 (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08/15/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND WCDMA Rel 99, Voice only
Port B

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
826.40	24.20	V	0.5	0.0	23.70	38.5	-14.8	
826.40	25.06	H	0.5	0.0	24.56	38.5	-13.9	
836.00	22.92	V	0.5	0.0	22.42	38.5	-16.0	
836.00	23.93	H	0.5	0.0	23.43	38.5	-15.0	
846.00	22.49	V	0.5	0.0	21.99	38.5	-16.5	
846.00	24.10	H	0.5	0.0	23.60	38.5	-14.9	

Rev. 3.17.11

UMTS, HSDPA (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08/16/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND WCDMA HSDPA
Port B

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
826.40	20.62	V	0.5	0.0	20.12	38.5	-18.3	
826.40	25.05	H	0.5	0.0	24.55	38.5	-13.9	
836.00	20.44	V	0.5	0.0	19.94	38.5	-18.5	
836.00	24.50	H	0.5	0.0	24.00	38.5	-14.5	
846.00	20.41	V	0.5	0.0	19.91	38.5	-18.5	
846.00	25.17	H	0.5	0.0	24.67	38.5	-13.8	

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UMTS, REL 99 (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08/15/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter
Mode: TX, PCS BAND WCDMA Rel 99, Voice
Port B

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.852	14.8	V	0.85	8.01	21.95	33.0	-11.1	
1.852	12.5	H	0.85	8.01	19.65	33.0	-13.4	
1.880	14.3	V	0.85	8.13	21.57	33.0	-11.4	
1.880	11.5	H	0.85	8.13	18.77	33.0	-14.2	
1.908	14.2	V	0.85	8.13	21.47	33.0	-11.5	
1.908	9.4	H	0.85	8.13	16.67	33.0	-16.3	

Rev. 3.17.11

UMTS, HSDPA (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 08/16/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter
Mode: TX, PCS BAND WCDMA HSDPA
Port B

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.852	14.1	V	0.85	8.01	21.30	33.0	-11.7	
1.852	10.8	H	0.85	8.01	18.00	33.0	-15.0	
1.880	14.5	V	0.85	8.13	21.82	33.0	-11.2	
1.880	9.3	H	0.85	8.13	16.62	33.0	-16.4	
1.908	13.6	V	0.85	8.13	20.92	33.0	-12.1	
1.908	12.0	H	0.85	8.13	19.32	33.0	-13.7	

Rev. 3.17.11

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Cellular Band, EVDO – REV A

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 09/28/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND EVDO, Rev A
Port B

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.70	22.42	V	0.5	0.0	21.92	38.5	-16.5	
824.70	24.25	H	0.5	0.0	23.75	38.5	-14.7	
836.52	22.04	V	0.5	0.0	21.54	38.5	-16.9	
836.52	23.80	H	0.5	0.0	23.30	38.5	-15.2	
848.31	22.11	V	0.5	0.0	21.61	38.5	-16.8	
848.31	23.77	H	0.5	0.0	23.27	38.5	-15.2	

Rev. 3.17.11

PCS Band, EVDO – REV A

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 10-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND CDMA EVDO Rev A

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.851	14.4	V	0.85	8.01	21.56	33.0	-11.4	
1.851	16.0	H	0.85	8.01	23.20	33.0	-9.8	
1.880	13.3	V	0.85	8.13	20.58	33.0	-12.4	
1.880	16.1	H	0.85	8.13	23.35	33.0	-9.7	
1.909	13.6	V	0.85	8.13	20.88	33.0	-12.1	
1.909	16.5	H	0.85	8.13	23.81	33.0	-9.2	

Rev. 3.17.11

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GPRS (Cellular Band) Data:

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 09/29/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND GPRS
Port B

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	24.72	V	0.5	0.0	24.22	38.5	-14.2	
824.20	29.60	H	0.5	0.0	29.10	38.5	-9.4	
836.60	25.74	V	0.5	0.0	25.24	38.5	-13.2	
836.60	28.35	H	0.5	0.0	27.85	38.5	-10.6	
848.80	20.81	V	0.5	0.0	20.31	38.5	-18.1	
848.80	28.58	H	0.5	0.0	28.08	38.5	-10.4	

Rev. 3.17.11

EGPRS (Cellular Band)

High Frequency Substitution Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 09/29/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND EGPRS
Port B

Test Equipment:
Receiving: Sunol T130, and 3m Chamber N-type Cable (Setup this one for testing EUT)
Substitution: Dipole S/N: 00022117, 6ft SMA Cable (SN # 208947003) Warehouse.

f MHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Notes
824.20	23.22	V	0.5	0.0	22.72	38.5	-15.7	
824.20	27.80	H	0.5	0.0	27.30	38.5	-11.2	
836.60	21.34	V	0.5	0.0	20.84	38.5	-17.6	
836.60	27.65	H	0.5	0.0	27.15	38.5	-11.3	
848.80	19.81	V	0.5	0.0	19.31	38.5	-19.1	
848.80	27.64	H	0.5	0.0	27.14	38.5	-11.3	

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GPRS (PCS Band) Data:

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 09/29/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND GPRS EIRP
Port B

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.850	19.1	V	0.85	8.01	26.26	33.0	-6.7	
1.850	19.5	H	0.85	8.01	26.68	33.0	-6.3	
1.880	18.8	V	0.85	8.13	26.03	33.0	-7.0	
1.880	19.6	H	0.85	8.13	26.90	33.0	-6.1	
1.910	19.1	V	0.85	8.13	26.38	33.0	-6.6	
1.910	19.8	H	0.85	8.13	27.10	33.0	-5.9	

Rev. 3.17.11

EGPRS (PCS Band)

High Frequency Fundamental Measurement
Compliance Certification Services Chamber B

Company: Apple
Project #: 11U13896
Date: 09/29/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND EGPRS EIRP
Port B

Test Equipment:
Receiving: Horn T59, and Camber B SMA Cables
Substitution: Horn T60 Substitution, 6ft SMA Cable (208947003) Warehouse

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Cable Loss (dB)	Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
1.850	17.2	V	0.85	8.01	24.36	33.0	-8.6	
1.850	17.3	H	0.85	8.01	24.48	33.0	-8.5	
1.880	17.0	V	0.85	8.13	24.28	33.0	-8.7	
1.880	17.7	H	0.85	8.13	25.00	33.0	-8.0	
1.910	17.1	V	0.85	8.13	24.38	33.0	-8.6	
1.910	17.4	H	0.85	8.13	24.70	33.0	-8.3	

Rev. 3.17.11

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9.2. FIELD STRENGTH OF SPURIOUS RADIATION

RULE PART(S)

FCC: §2.1053, §22.917, §24.238
IC: RSS-132, 4.5; RSS-133, 6.5

LIMIT

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

TEST PROCEDURE

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

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

MODES TESTED:

PORT A and B

- 1xRTT – RC2, SO9
- CDMA2000 1xEV-DO Revision A (Rev. A)
- GPRS and EGPRS
- UMTS, REL 99 and HSDPA

RESULTS

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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PORT A:

1xRTT (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-01-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND CDMA20001xRTT

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-15.1	V	3.0	35.5	1.0	-49.6	-13.0	-36.6	
2.474	-14.6	V	3.0	35.4	1.0	-49.0	-13.0	-36.0	
3.299	-11.3	V	3.0	35.5	1.0	-45.8	-13.0	-32.8	
4.124	-8.8	V	3.0	35.2	1.0	-43.1	-13.0	-30.1	
1.649	-11.1	H	3.0	35.5	1.0	-45.6	-13.0	-32.6	
2.474	-14.7	H	3.0	35.4	1.0	-49.1	-13.0	-36.1	
4.124	-8.0	H	3.0	35.2	1.0	-42.3	-13.0	-29.3	
Mid Ch, (836.52MHz)									
1.673	-9.5	V	3.0	35.5	1.0	-44.0	-13.0	-31.0	
2.510	-14.2	V	3.0	35.4	1.0	-48.6	-13.0	-35.6	
4.183	-6.0	V	3.0	35.2	1.0	-40.2	-13.0	-27.2	
1.673	-7.9	H	3.0	35.5	1.0	-42.5	-13.0	-29.5	
2.510	-10.4	H	3.0	35.4	1.0	-44.8	-13.0	-31.8	
4.183	-4.2	H	3.0	35.2	1.0	-38.4	-13.0	-25.4	
High Ch, (848.31MHz)									
1.697	-7.8	V	3.0	35.5	1.0	-42.3	-13.0	-29.3	
2.545	-16.0	V	3.0	35.4	1.0	-50.5	-13.0	-37.5	
3.393	-10.2	V	3.0	35.5	1.0	-44.7	-13.0	-31.7	
4.242	-6.8	V	3.0	35.2	1.0	-41.0	-13.0	-28.0	
1.697	-5.7	H	3.0	35.5	1.0	-40.2	-13.0	-27.2	
2.545	-17.6	H	3.0	35.4	1.0	-52.0	-13.0	-39.0	
4.242	-6.0	H	3.0	35.2	1.0	-40.3	-13.0	-27.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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CDMA2000 1xEV-DO Revision A (Rev. A) (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-01-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND CDMA2000 EVDO Rev A

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-9.7	V	3.0	35.5	1.0	-44.2	-13.0	-31.2	
2.474	-6.0	V	3.0	35.4	1.0	-40.4	-13.0	-27.4	
3.299	-7.2	V	3.0	35.5	1.0	-41.7	-13.0	-28.7	
4.124	-0.1	V	3.0	35.2	1.0	-34.4	-13.0	-21.4	
1.649	-11.1	H	3.0	35.5	1.0	-45.6	-13.0	-32.6	
2.474	-1.7	H	3.0	35.4	1.0	-36.1	-13.0	-23.1	
3.299	-11.7	H	3.0	35.5	1.0	-46.3	-13.0	-33.3	
4.124	-4.9	H	3.0	35.2	1.0	-39.2	-13.0	-26.2	
Mid Ch, (836.52MHz)									
1.673	-6.4	V	3.0	35.5	1.0	-40.9	-13.0	-27.9	
2.510	-10.9	V	3.0	35.4	1.0	-45.3	-13.0	-32.3	
4.183	-8.1	V	3.0	35.2	1.0	-42.3	-13.0	-29.3	
1.673	-9.5	H	3.0	35.5	1.0	-44.1	-13.0	-31.1	
2.510	-6.8	H	3.0	35.4	1.0	-41.2	-13.0	-28.2	
4.183	-5.5	H	3.0	35.2	1.0	-39.7	-13.0	-26.7	
High Ch, (848.31MHz)									
1.697	-4.1	V	3.0	35.5	1.0	-38.6	-13.0	-25.6	
2.545	-10.4	V	3.0	35.4	1.0	-44.9	-13.0	-31.9	
3.393	-6.7	V	3.0	35.5	1.0	-41.2	-13.0	-28.2	
4.242	1.2	V	3.0	35.2	1.0	-33.0	-13.0	-20.0	
1.697	-2.8	H	3.0	35.5	1.0	-37.3	-13.0	-24.3	
2.545	-5.7	H	3.0	35.4	1.0	-40.1	-13.0	-27.1	
4.242	-5.5	H	3.0	35.2	1.0	-39.8	-13.0	-26.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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GPRS (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND GPRS

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-21.7	V	3.0	35.5	1.0	-56.3	-13.0	-43.3	
2.473	-18.4	V	3.0	35.4	1.0	-52.8	-13.0	-39.8	
3.297	-13.9	V	3.0	35.5	1.0	-48.4	-13.0	-35.4	
1.648	-18.6	H	3.0	35.5	1.0	-53.1	-13.0	-40.1	
2.473	-21.5	H	3.0	35.4	1.0	-55.9	-13.0	-42.9	
3.297	-18.1	H	3.0	35.5	1.0	-52.6	-13.0	-39.6	
Mid Ch, (836.6MHz)									
1.673	-21.4	V	3.0	35.5	1.0	-55.9	-13.0	-42.9	
3.344	-15.4	V	3.0	35.5	1.0	-50.0	-13.0	-37.0	
4.180	-16.2	V	3.0	35.2	1.0	-50.4	-13.0	-37.4	
1.673	-18.5	H	3.0	35.5	1.0	-53.1	-13.0	-40.1	
3.344	-16.1	H	3.0	35.5	1.0	-50.6	-13.0	-37.6	
4.180	-15.2	H	3.0	35.2	1.0	-49.4	-13.0	-36.4	
High Ch, (848.8MHz)									
1.698	-20.4	V	3.0	35.5	1.0	-54.9	-13.0	-41.9	
3.395	-15.2	V	3.0	35.5	1.0	-49.7	-13.0	-36.7	
4.244	-14.7	V	3.0	35.2	1.0	-49.0	-13.0	-36.0	
1.698	-19.9	H	3.0	35.5	1.0	-54.4	-13.0	-41.4	
3.395	-17.0	H	3.0	35.5	1.0	-51.5	-13.0	-38.5	
4.244	-16.0	H	3.0	35.2	1.0	-50.3	-13.0	-37.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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EGPRS (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND EGPRS

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-23.2	V	3.0	35.5	1.0	-57.8	-13.0	-44.8	
3.297	-14.8	V	3.0	35.5	1.0	-49.3	-13.0	-36.3	
1.648	-20.4	H	3.0	35.5	1.0	-54.9	-13.0	-41.9	
3.297	-18.8	H	3.0	35.5	1.0	-53.3	-13.0	-40.3	
Mid Ch, (836.6MHz)									
1.673	-22.1	V	3.0	35.5	1.0	-56.6	-13.0	-43.6	
3.346	-15.7	V	3.0	35.5	1.0	-50.3	-13.0	-37.3	
1.673	-22.7	H	3.0	35.5	1.0	-57.3	-13.0	-44.3	
3.346	-17.4	H	3.0	35.5	1.0	-51.9	-13.0	-38.9	
High Ch, (848.8MHz)									
1.698	-21.5	V	3.0	35.5	1.0	-56.0	-13.0	-43.0	
3.395	-16.4	V	3.0	35.5	1.0	-50.9	-13.0	-37.9	
1.698	-20.4	H	3.0	35.5	1.0	-54.9	-13.0	-41.9	
3.395	-17.4	H	3.0	35.5	1.0	-51.9	-13.0	-38.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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UMTS REL 99 (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND WCDMA Rel 99

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-15.9	V	3.0	35.5	1.0	-50.4	-13.0	-37.4	
2.479	-18.3	V	3.0	35.4	1.0	-52.7	-13.0	-39.7	
4.132	-11.6	V	3.0	35.2	1.0	-45.9	-13.0	-32.9	
1.653	-13.0	H	3.0	35.5	1.0	-47.6	-13.0	-34.6	
2.479	-14.8	H	3.0	35.4	1.0	-49.2	-13.0	-36.2	
4.132	-10.9	H	3.0	35.2	1.0	-45.2	-13.0	-32.2	
Mid Ch, (836MHz)									
1.672	-14.1	V	3.0	35.5	1.0	-48.6	-13.0	-35.6	
3.344	-12.2	V	3.0	35.5	1.0	-46.8	-13.0	-33.8	
4.180	-8.3	V	3.0	35.2	1.0	-42.5	-13.0	-29.5	
1.672	-10.5	H	3.0	35.5	1.0	-45.1	-13.0	-32.1	
3.344	-17.1	H	3.0	35.5	1.0	-51.6	-13.0	-38.6	
4.180	-7.7	H	3.0	35.2	1.0	-41.9	-13.0	-28.9	
High Ch, (846MHz)									
1.692	-15.2	V	3.0	35.5	1.0	-49.7	-13.0	-36.7	
3.384	-13.1	V	3.0	35.5	1.0	-47.6	-13.0	-34.6	
4.230	-11.6	V	3.0	35.2	1.0	-45.8	-13.0	-32.8	
1.692	-11.7	H	3.0	35.5	1.0	-46.2	-13.0	-33.2	
2.538	-17.7	H	3.0	35.4	1.0	-52.2	-13.0	-39.2	
4.230	-8.3	H	3.0	35.2	1.0	-42.5	-13.0	-29.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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UMTS HSDPA (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	11U13896
Date:	08-02-11
Test Engineer:	Chin Pang
Configuration:	EUT with AC Adapter and Earphone
Mode:	TX, CELL BAND WCDMA HSDPA

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-15.2	V	3.0	35.5	1.0	-49.7	-13.0	-36.7	
2.479	-20.0	V	3.0	35.4	1.0	-54.4	-13.0	-41.4	
4.132	-13.8	V	3.0	35.2	1.0	-48.1	-13.0	-35.1	
1.653	-12.3	H	3.0	35.5	1.0	-46.9	-13.0	-33.9	
2.479	-15.0	H	3.0	35.4	1.0	-49.4	-13.0	-36.4	
4.132	-11.3	H	3.0	35.2	1.0	-45.6	-13.0	-32.6	
Mid Ch, (836MHz)									
1.672	-13.5	V	3.0	35.5	1.0	-48.0	-13.0	-35.0	
3.344	-12.6	V	3.0	35.5	1.0	-47.2	-13.0	-34.2	
4.180	-9.3	V	3.0	35.2	1.0	-43.5	-13.0	-30.5	
1.672	-8.0	H	3.0	35.5	1.0	-42.6	-13.0	-29.6	
3.344	-16.7	H	3.0	35.5	1.0	-51.2	-13.0	-38.2	
4.180	-8.0	H	3.0	35.2	1.0	-42.2	-13.0	-29.2	
High Ch, (846MHz)									
1.692	-13.9	V	3.0	35.5	1.0	-48.4	-13.0	-35.4	
3.384	-13.3	V	3.0	35.5	1.0	-47.8	-13.0	-34.8	
4.230	-7.7	V	3.0	35.2	1.0	-41.9	-13.0	-28.9	
1.692	-12.1	H	3.0	35.5	1.0	-46.6	-13.0	-33.6	
3.384	-14.5	H	3.0	35.5	1.0	-49.0	-13.0	-36.0	
4.230	-10.8	H	3.0	35.2	1.0	-45.0	-13.0	-32.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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1xRTT (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-01-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND CDMA2000 1xRTT

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1851.25MHz)									
3.703	-13.1	V	3.0	35.4	1.0	-47.4	-13.0	-34.4	
5.551	-9.1	V	3.0	35.4	1.0	-43.5	-13.0	-30.5	
7.401	-7.2	V	3.0	35.7	1.0	-41.9	-13.0	-28.9	
3.703	-15.0	H	3.0	35.4	1.0	-49.3	-13.0	-36.3	
5.551	-3.7	H	3.0	35.4	1.0	-38.1	-13.0	-25.1	
9.256	-6.9	H	3.0	35.6	1.0	-41.5	-13.0	-28.5	
Mid Ch, (1880.0MHz)									
3.760	-12.2	V	3.0	35.3	1.0	-46.6	-13.0	-33.6	
5.640	-9.8	V	3.0	35.4	1.0	-44.2	-13.0	-31.2	
7.520	-8.6	V	3.0	35.7	1.0	-43.3	-13.0	-30.3	
3.760	-14.3	H	3.0	35.3	1.0	-48.6	-13.0	-35.6	
5.640	-11.2	H	3.0	35.4	1.0	-45.7	-13.0	-32.7	
7.520	-10.9	H	3.0	35.7	1.0	-45.6	-13.0	-32.6	
High Ch, (1908.75MHz)									
3.818	-11.6	V	3.0	35.3	1.0	-45.9	-13.0	-32.9	
5.726	-10.7	V	3.0	35.4	1.0	-45.2	-13.0	-32.2	
7.635	-9.2	V	3.0	35.7	1.0	-43.9	-13.0	-30.9	
3.818	-13.8	H	3.0	35.3	1.0	-48.1	-13.0	-35.1	
5.726	-11.7	H	3.0	35.4	1.0	-46.1	-13.0	-33.1	
9.544	-6.6	H	3.0	35.6	1.0	-41.2	-13.0	-28.2	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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CDMA2000 1xEV-DO Revision A (Rev. A) (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-01-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND CDMA2000 EVDO Rev A

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1851.25MHz)									
5.554	-8.0	V	3.0	35.4	1.0	-42.4	-13.0	-29.4	
7.405	-3.2	V	3.0	35.7	1.0	-37.9	-13.0	-24.9	
9.256	0.6	V	3.0	35.6	1.0	-34.0	-13.0	-21.0	
5.554	2.3	H	3.0	35.4	1.0	-32.1	-13.0	-19.1	
7.405	-6.0	H	3.0	35.7	1.0	-40.7	-13.0	-27.7	
9.256	-2.9	H	3.0	35.6	1.0	-37.5	-13.0	-24.5	
Mid Ch, (1880.0MHz)									
5.640	-5.7	V	3.0	35.4	1.0	-40.1	-13.0	-27.1	
7.520	-2.6	V	3.0	35.7	1.0	-37.3	-13.0	-24.3	
9.400	0.1	V	3.0	35.6	1.0	-34.4	-13.0	-21.4	
5.640	4.4	H	3.0	35.4	1.0	-30.1	-13.0	-17.1	
7.520	-5.4	H	3.0	35.7	1.0	-40.1	-13.0	-27.1	
9.400	-4.1	H	3.0	35.6	1.0	-38.6	-13.0	-25.6	
High Ch, (1908.75MHz)									
5.726	-7.8	V	3.0	35.4	1.0	-42.3	-13.0	-29.3	
7.635	-2.4	V	3.0	35.7	1.0	-37.1	-13.0	-24.1	
9.544	0.3	V	3.0	35.6	1.0	-34.2	-13.0	-21.2	
3.818	-16.3	H	3.0	35.3	1.0	-50.6	-13.0	-37.6	
5.726	-0.4	H	3.0	35.4	1.0	-34.8	-13.0	-21.8	
9.544	-1.3	H	3.0	35.6	1.0	-35.9	-13.0	-22.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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GPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-03-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND GPRS

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2MHz)									
3.703	-10.3	V	3.0	35.4	1.0	-44.6	-13.0	-31.6	
5.554	-7.6	V	3.0	35.4	1.0	-42.0	-13.0	-29.0	
7.405	-10.0	V	3.0	35.7	1.0	-44.7	-13.0	-31.7	
3.703	-14.5	H	3.0	35.4	1.0	-48.8	-13.0	-35.8	
5.554	-10.8	H	3.0	35.4	1.0	-45.2	-13.0	-32.2	
Mid Ch, (1880.0MHz)									
3.760	-12.3	V	3.0	35.3	1.0	-46.7	-13.0	-33.7	
5.640	-9.4	V	3.0	35.4	1.0	-43.8	-13.0	-30.8	
9.400	-6.6	V	3.0	35.6	1.0	-41.1	-13.0	-28.1	
3.760	-13.7	H	3.0	35.3	1.0	-48.0	-13.0	-35.0	
5.640	-11.8	H	3.0	35.4	1.0	-46.3	-13.0	-33.3	
High Ch, (1909.8MHz)									
3.818	-12.6	V	3.0	35.3	1.0	-46.9	-13.0	-33.9	
5.726	-10.0	V	3.0	35.4	1.0	-44.5	-13.0	-31.5	
3.818	-12.1	H	3.0	35.3	1.0	-46.4	-13.0	-33.4	
5.726	-9.4	H	3.0	35.4	1.0	-43.8	-13.0	-30.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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EGPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	11U13896
Date:	08-03-11
Test Engineer:	Chin Pang
Configuration:	EUT with AC Adapter and Earphone
Mode:	TX, PCS BAND EGPRS

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2MHz)									
3.703	-9.4	V	3.0	35.4	1.0	-43.7	-13.0	-30.7	
5.554	-8.1	V	3.0	35.4	1.0	-42.5	-13.0	-29.5	
7.405	-6.7	V	3.0	35.7	1.0	-41.4	-13.0	-28.4	
3.703	-14.7	H	3.0	35.4	1.0	-49.0	-13.0	-36.0	
5.554	-12.0	H	3.0	35.4	1.0	-46.4	-13.0	-33.4	
Mid Ch, (1880.0MHz)									
3.760	-11.0	V	3.0	35.3	1.0	-45.4	-13.0	-32.4	
5.640	-10.0	V	3.0	35.4	1.0	-44.4	-13.0	-31.4	
7.520	-5.9	V	3.0	35.7	1.0	-40.6	-13.0	-27.6	
3.760	-14.5	H	3.0	35.3	1.0	-48.8	-13.0	-35.8	
5.640	-6.0	H	3.0	35.4	1.0	-40.5	-13.0	-27.5	
7.520	-8.2	H	3.0	35.7	1.0	-42.9	-13.0	-29.9	
High Ch, (1909.8MHz)									
3.818	-12.6	V	3.0	35.3	1.0	-46.9	-13.0	-33.9	
5.726	-10.7	V	3.0	35.4	1.0	-45.2	-13.0	-32.2	
3.818	-9.1	H	3.0	35.3	1.0	-43.4	-13.0	-30.4	
5.726	-10.2	H	3.0	35.4	1.0	-44.6	-13.0	-31.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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UMTS REL 99 (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND WCDMA Rel 99

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4MHz)									
3.705	-17.1	V	3.0	35.4	1.0	-51.4	-13.0	-38.4	
5.557	-11.8	V	3.0	35.4	1.0	-46.2	-13.0	-33.2	
7.410	-8.9	V	3.0	35.7	1.0	-43.6	-13.0	-30.6	
3.705	-16.0	H	3.0	35.4	1.0	-50.3	-13.0	-37.3	
5.557	-7.5	H	3.0	35.4	1.0	-41.9	-13.0	-28.9	
7.410	-9.4	H	3.0	35.7	1.0	-44.1	-13.0	-31.1	
Mid Ch, (1880.0MHz)									
3.760	-13.7	V	3.0	35.3	1.0	-48.1	-13.0	-35.1	
5.640	-10.9	V	3.0	35.4	1.0	-45.3	-13.0	-32.3	
7.520	-7.9	V	3.0	35.7	1.0	-42.6	-13.0	-29.6	
3.760	-9.3	H	3.0	35.3	1.0	-43.6	-13.0	-30.6	
5.640	-7.4	H	3.0	35.4	1.0	-41.9	-13.0	-28.9	
7.520	-7.6	H	3.0	35.7	1.0	-42.3	-13.0	-29.3	
High Ch, (1907.6MHz)									
3.815	-13.9	V	3.0	35.3	1.0	-48.2	-13.0	-35.2	
5.723	-11.0	V	3.0	35.4	1.0	-45.5	-13.0	-32.5	
7.630	-8.5	V	3.0	35.7	1.0	-43.2	-13.0	-30.2	
3.815	-12.3	H	3.0	35.3	1.0	-46.6	-13.0	-33.6	
5.723	-9.0	H	3.0	35.4	1.0	-43.4	-13.0	-30.4	
7.630	-8.9	H	3.0	35.7	1.0	-43.6	-13.0	-30.6	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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UMTS HSDPA (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08-02-11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND WCDMA HSDPA

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4MHz)									
3.705	-16.9	V	3.0	35.4	1.0	-51.2	-13.0	-38.2	
5.557	-13.1	V	3.0	35.4	1.0	-47.5	-13.0	-34.5	
7.410	-10.4	V	3.0	35.7	1.0	-45.1	-13.0	-32.1	
3.705	-17.2	H	3.0	35.4	1.0	-51.5	-13.0	-38.5	
5.557	-9.5	H	3.0	35.4	1.0	-43.9	-13.0	-30.9	
7.410	-10.5	H	3.0	35.7	1.0	-45.2	-13.0	-32.2	
Mid Ch, (1880.0MHz)									
3.760	-14.3	V	3.0	35.3	1.0	-48.7	-13.0	-35.7	
5.640	-11.1	V	3.0	35.4	1.0	-45.5	-13.0	-32.5	
7.520	-8.3	V	3.0	35.7	1.0	-43.0	-13.0	-30.0	
3.760	-11.0	H	3.0	35.3	1.0	-45.3	-13.0	-32.3	
5.640	-8.8	H	3.0	35.4	1.0	-43.3	-13.0	-30.3	
7.520	-7.6	H	3.0	35.7	1.0	-42.3	-13.0	-29.3	
High Ch, (1907.6MHz)									
3.815	-13.3	V	3.0	35.3	1.0	-47.6	-13.0	-34.6	
5.723	-11.8	V	3.0	35.4	1.0	-46.3	-13.0	-33.3	
7.630	-8.8	V	3.0	35.7	1.0	-43.5	-13.0	-30.5	
3.815	-13.5	H	3.0	35.3	1.0	-47.8	-13.0	-34.8	
5.723	-9.7	H	3.0	35.4	1.0	-44.1	-13.0	-31.1	
7.630	-9.8	H	3.0	35.7	1.0	-44.5	-13.0	-31.5	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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PORT B:

1xRTT (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	11U13896
Date:	08/08/11
Test Engineer:	Chin Pang
Configuration:	EUT with AC Adapter and Earphone
Mode:	TX, CELL BAND CDMA2000 1xRTT
	Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-11.5	V	3.0	35.5	1.0	-46.0	-13.0	-33.0	
2.474	-11.7	V	3.0	35.4	1.0	-46.1	-13.0	-33.1	
3.299	-8.6	V	3.0	35.5	1.0	-43.1	-13.0	-30.1	
1.649	-7.9	H	3.0	35.5	1.0	-42.4	-13.0	-29.4	
2.474	-12.1	H	3.0	35.4	1.0	-46.5	-13.0	-33.5	
4.124	-7.1	H	3.0	35.2	1.0	-41.4	-13.0	-28.4	
Mid Ch, (836.52MHz)									
1.673	-8.6	V	3.0	35.5	1.0	-43.1	-13.0	-30.1	
2.510	-11.0	V	3.0	35.4	1.0	-45.4	-13.0	-32.4	
4.183	-5.4	V	3.0	35.2	1.0	-39.6	-13.0	-26.6	
1.673	-6.3	H	3.0	35.5	1.0	-40.9	-13.0	-27.9	
2.510	-9.9	H	3.0	35.4	1.0	-44.3	-13.0	-31.3	
4.183	-5.6	H	3.0	35.2	1.0	-39.8	-13.0	-26.8	
High Ch, (848.31MHz)									
1.697	-5.4	V	3.0	35.5	1.0	-39.9	-13.0	-26.9	
3.393	-6.2	V	3.0	35.5	1.0	-40.7	-13.0	-27.7	
4.242	-7.6	V	3.0	35.2	1.0	-41.8	-13.0	-28.8	
1.697	-3.9	H	3.0	35.5	1.0	-38.4	-13.0	-25.4	
2.545	-10.4	H	3.0	35.4	1.0	-44.8	-13.0	-31.8	
4.242	-7.8	H	3.0	35.2	1.0	-42.1	-13.0	-29.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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GSM (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08/15/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND GSM
Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-17.7	V	3.0	35.5	1.0	-52.3	-13.0	-39.3	
2.473	-17.9	V	3.0	35.4	1.0	-52.3	-13.0	-39.3	
3.297	-19.4	V	3.0	35.5	1.0	-53.9	-13.0	-40.9	
1.648	-11.3	H	3.0	35.5	1.0	-45.8	-13.0	-32.8	
3.297	-18.1	H	3.0	35.5	1.0	-52.6	-13.0	-39.6	
4.121	-18.3	H	3.0	35.2	1.0	-52.6	-13.0	-39.6	
Mid Ch, (836.6MHz)									
1.673	-10.0	V	3.0	35.5	1.0	-44.5	-13.0	-31.5	
3.344	-13.9	V	3.0	35.5	1.0	-48.5	-13.0	-35.5	
4.180	-16.9	V	3.0	35.2	1.0	-51.1	-13.0	-38.1	
1.673	-10.0	H	3.0	35.5	1.0	-44.6	-13.0	-31.6	
3.344	-17.4	H	3.0	35.5	1.0	-51.9	-13.0	-38.9	
4.180	-17.2	H	3.0	35.2	1.0	-51.4	-13.0	-38.4	
High Ch, (848.8MHz)									
1.698	-10.6	V	3.0	35.5	1.0	-45.1	-13.0	-32.1	
3.395	-14.4	V	3.0	35.5	1.0	-48.9	-13.0	-35.9	
4.244	-15.5	V	3.0	35.2	1.0	-49.8	-13.0	-36.8	
1.698	-8.3	H	3.0	35.5	1.0	-42.8	-13.0	-29.8	
3.395	-17.7	H	3.0	35.5	1.0	-52.2	-13.0	-39.2	
4.244	-18.0	H	3.0	35.2	1.0	-52.3	-13.0	-39.3	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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UMTS REL 99 (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	11U13896
Date:	08/15/11
Test Engineer:	Chin Pang
Configuration:	EUT with AC Adapter and Earphone
Mode:	TX, CELL BAND WCDMA Rel 99, voice only
	Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-13.7	V	3.0	35.5	1.0	-48.2	-13.0	-35.2	
2.479	-17.2	V	3.0	35.4	1.0	-51.6	-13.0	-38.6	
4.132	-14.2	V	3.0	35.2	1.0	-48.5	-13.0	-35.5	
1.653	-10.2	H	3.0	35.5	1.0	-44.8	-13.0	-31.8	
2.479	-18.8	H	3.0	35.4	1.0	-53.2	-13.0	-40.2	
4.132	-14.5	H	3.0	35.2	1.0	-48.8	-13.0	-35.8	
Mid Ch, (836MHz)									
1.672	-11.0	V	3.0	35.5	1.0	-45.5	-13.0	-32.5	
3.344	-12.7	V	3.0	35.5	1.0	-47.3	-13.0	-34.3	
4.180	-13.7	V	3.0	35.2	1.0	-47.9	-13.0	-34.9	
1.672	-7.8	H	3.0	35.5	1.0	-42.4	-13.0	-29.4	
3.344	-12.6	H	3.0	35.5	1.0	-47.1	-13.0	-34.1	
4.180	-13.0	H	3.0	35.2	1.0	-47.2	-13.0	-34.2	
High Ch, (846MHz)									
1.692	-10.1	V	3.0	35.5	1.0	-44.6	-13.0	-31.6	
3.384	-14.2	V	3.0	35.5	1.0	-48.7	-13.0	-35.7	
4.230	-14.0	V	3.0	35.2	1.0	-48.2	-13.0	-35.2	
1.692	-7.4	H	3.0	35.5	1.0	-41.9	-13.0	-28.9	
3.384	-14.4	H	3.0	35.5	1.0	-48.9	-13.0	-35.9	
4.230	-13.7	H	3.0	35.2	1.0	-47.9	-13.0	-34.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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UMTS HSDPA (Cellular Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08/16/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, CELL BAND WCDMA HSDPA
Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (826.4MHz)									
1.653	-18.5	V	3.0	35.5	1.0	-53.0	-13.0	-40.0	
2.479	-8.6	V	3.0	35.4	1.0	-43.0	-13.0	-30.0	
4.132	-9.8	V	3.0	35.2	1.0	-44.1	-13.0	-31.1	
1.653	-14.2	H	3.0	35.5	1.0	-48.8	-13.0	-35.8	
2.479	-4.9	H	3.0	35.4	1.0	-39.3	-13.0	-26.3	
4.132	-8.0	H	3.0	35.2	1.0	-42.3	-13.0	-29.3	
Mid Ch, (836MHz)									
1.672	-13.9	V	3.0	35.5	1.0	-48.4	-13.0	-35.4	
2.508	-5.8	V	3.0	35.4	1.0	-40.2	-13.0	-27.2	
4.180	-7.1	V	3.0	35.2	1.0	-41.3	-13.0	-28.3	
1.672	-13.1	H	3.0	35.5	1.0	-47.7	-13.0	-34.7	
2.508	-11.8	H	3.0	35.4	1.0	-46.2	-13.0	-33.2	
4.180	-9.0	H	3.0	35.2	1.0	-43.2	-13.0	-30.2	
High Ch, (846MHz)									
1.692	-14.9	V	3.0	35.5	1.0	-49.4	-13.0	-36.4	
2.538	-14.1	V	3.0	35.4	1.0	-48.5	-13.0	-35.5	
4.230	-9.0	V	3.0	35.2	1.0	-43.2	-13.0	-30.2	
1.692	-13.0	H	3.0	35.5	1.0	-47.5	-13.0	-34.5	
2.538	-17.6	H	3.0	35.4	1.0	-52.1	-13.0	-39.1	
4.230	-10.6	H	3.0	35.2	1.0	-44.8	-13.0	-31.8	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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UMTS REL 99 (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08/16/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND WCDMA Rel 99, Voice
Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4MHz)									
3.705	-14.7	V	3.0	35.4	1.0	-49.0	-13.0	-36.0	
5.557	-10.4	V	3.0	35.4	1.0	-44.8	-13.0	-31.8	
7.410	-9.2	V	3.0	35.7	1.0	-43.9	-13.0	-30.9	
3.705	-17.2	H	3.0	35.4	1.0	-51.5	-13.0	-38.5	
5.557	-12.6	H	3.0	35.4	1.0	-47.0	-13.0	-34.0	
7.410	-5.5	H	3.0	35.7	1.0	-40.2	-13.0	-27.2	
Mid Ch, (1880.0MHz)									
3.760	-13.2	V	3.0	35.3	1.0	-47.6	-13.0	-34.6	
5.640	-8.0	V	3.0	35.4	1.0	-42.4	-13.0	-29.4	
7.520	-7.2	V	3.0	35.7	1.0	-41.9	-13.0	-28.9	
3.760	-14.0	H	3.0	35.3	1.0	-48.3	-13.0	-35.3	
5.640	-7.4	H	3.0	35.4	1.0	-41.9	-13.0	-28.9	
7.520	-8.4	H	3.0	35.7	1.0	-43.1	-13.0	-30.1	
High Ch, (1907.6MHz)									
3.815	-15.1	V	3.0	35.3	1.0	-49.4	-13.0	-36.4	
5.723	-7.7	V	3.0	35.4	1.0	-42.2	-13.0	-29.2	
7.630	-7.6	V	3.0	35.7	1.0	-42.3	-13.0	-29.3	
3.815	-14.8	H	3.0	35.3	1.0	-49.1	-13.0	-36.1	
5.723	-11.0	H	3.0	35.4	1.0	-45.4	-13.0	-32.4	
7.630	-9.3	H	3.0	35.7	1.0	-44.0	-13.0	-31.0	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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UMTS HSDPA (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 08/16/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND WCDMA HSDPA
Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1852.4MHz)									
3.705	-17.7	V	3.0	35.4	1.0	-52.0	-13.0	-39.0	
5.557	-10.4	V	3.0	35.4	1.0	-44.8	-13.0	-31.8	
7.410	-9.2	V	3.0	35.7	1.0	-43.9	-13.0	-30.9	
3.705	-17.8	H	3.0	35.4	1.0	-52.1	-13.0	-39.1	
5.557	-10.4	H	3.0	35.4	1.0	-44.8	-13.0	-31.8	
7.410	-10.7	H	3.0	35.7	1.0	-45.4	-13.0	-32.4	
Mid Ch, (1880.0MHz)									
3.760	-15.2	V	3.0	35.3	1.0	-49.6	-13.0	-36.6	
5.640	-12.5	V	3.0	35.4	1.0	-46.9	-13.0	-33.9	
7.520	-5.7	V	3.0	35.7	1.0	-40.4	-13.0	-27.4	
3.760	-16.9	H	3.0	35.3	1.0	-51.2	-13.0	-38.2	
5.640	-11.0	H	3.0	35.4	1.0	-45.5	-13.0	-32.5	
7.520	-9.4	H	3.0	35.7	1.0	-44.1	-13.0	-31.1	
High Ch, (1907.6MHz)									
3.815	-14.8	V	3.0	35.3	1.0	-49.1	-13.0	-36.1	
5.723	-9.7	V	3.0	35.4	1.0	-44.2	-13.0	-31.2	
7.630	-6.4	V	3.0	35.7	1.0	-41.1	-13.0	-28.1	
3.815	-16.9	H	3.0	35.3	1.0	-51.2	-13.0	-38.2	
5.723	-10.2	H	3.0	35.4	1.0	-44.6	-13.0	-31.6	
7.630	-9.0	H	3.0	35.7	1.0	-43.7	-13.0	-30.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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PORT B:

Cellular Band 1xRTT, 32(+SCH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	11U13896
Date:	09/29/11
Test Engineer:	Chin Pang
Configuration:	EUT with AC Adapter and Earphone
Mode:	TX, CELL BAND CDMA20001xRTT, 32(+SCH)
	Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.7MHz)									
1.649	-15.2	V	3.0	35.5	1.0	-49.7	-13.0	-36.7	
2.474	-15.5	V	3.0	35.4	1.0	-49.9	-13.0	-36.9	
4.124	-12.8	V	3.0	35.2	1.0	-47.1	-13.0	-34.1	
1.649	-16.0	H	3.0	35.5	1.0	-50.5	-13.0	-37.5	
2.474	-16.9	H	3.0	35.4	1.0	-51.3	-13.0	-38.3	
4.124	-10.3	H	3.0	35.2	1.0	-44.6	-13.0	-31.6	
Mid Ch, (836.52MHz)									
1.673	-15.1	V	3.0	35.5	1.0	-49.6	-13.0	-36.6	
2.510	-17.2	V	3.0	35.4	1.0	-51.6	-13.0	-38.6	
4.183	-8.9	V	3.0	35.2	1.0	-43.1	-13.0	-30.1	
1.673	-13.7	H	3.0	35.5	1.0	-48.3	-13.0	-35.3	
2.510	-16.8	H	3.0	35.4	1.0	-51.2	-13.0	-38.2	
4.183	-13.2	H	3.0	35.2	1.0	-47.4	-13.0	-34.4	
High Ch, (848.31MHz)									
1.697	-7.8	V	3.0	35.5	1.0	-42.3	-13.0	-29.3	
2.545	-16.0	V	3.0	35.4	1.0	-50.5	-13.0	-37.5	
3.393	-10.2	V	3.0	35.5	1.0	-44.7	-13.0	-31.7	
4.242	-6.8	V	3.0	35.2	1.0	-41.0	-13.0	-28.0	
1.697	-10.3	H	3.0	35.5	1.0	-44.8	-13.0	-31.8	
2.545	-19.9	H	3.0	35.4	1.0	-54.3	-13.0	-41.3	
4.242	-7.4	H	3.0	35.2	1.0	-41.7	-13.0	-28.7	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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PCS Band 1xRTT, 32(+SCH)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 09/29/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND CDMA2000 1xRTT, 32(+SCH)
Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1851.25MHz)									
3.703	-16.9	V	3.0	35.4	1.0	-51.2	-13.0	-38.2	
5.554	-14.3	V	3.0	35.4	1.0	-48.7	-13.0	-35.7	
7.405	-11.0	V	3.0	35.7	1.0	-45.7	-13.0	-32.7	
3.703	-17.8	H	3.0	35.4	1.0	-52.1	-13.0	-39.1	
5.554	-14.2	H	3.0	35.4	1.0	-48.6	-13.0	-35.6	
7.405	-10.5	H	3.0	35.7	1.0	-45.2	-13.0	-32.2	
Mid Ch, (1880.0MHz)									
3.760	-15.0	V	3.0	35.3	1.0	-49.4	-13.0	-36.4	
5.640	-12.7	V	3.0	35.4	1.0	-47.1	-13.0	-34.1	
7.520	-8.2	V	3.0	35.7	1.0	-42.9	-13.0	-29.9	
3.760	-16.5	H	3.0	35.3	1.0	-50.8	-13.0	-37.8	
5.640	-13.5	H	3.0	35.4	1.0	-48.0	-13.0	-35.0	
7.520	-9.7	H	3.0	35.7	1.0	-44.4	-13.0	-31.4	
High Ch, (1908.75MHz)									
3.818	-16.6	V	3.0	35.3	1.0	-50.9	-13.0	-37.9	
5.726	-11.8	V	3.0	35.4	1.0	-46.3	-13.0	-33.3	
7.635	-9.9	V	3.0	35.7	1.0	-44.6	-13.0	-31.6	
3.818	-15.1	H	3.0	35.3	1.0	-49.4	-13.0	-36.4	
5.726	-12.3	H	3.0	35.4	1.0	-46.7	-13.0	-33.7	
9.544	-6.3	H	3.0	35.6	1.0	-40.9	-13.0	-27.9	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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GPRS (CELL Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	11U13896
Date:	09/29/11
Test Engineer:	Chin Pang
Configuration:	EUT with AC Adapter and Earphone
Mode:	TX, CELL BAND GPRS
	Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-20.0	V	3.0	35.5	1.0	-54.6	-13.0	-41.6	
2.473	-19.5	V	3.0	35.4	1.0	-53.9	-13.0	-40.9	
3.297	-15.9	V	3.0	35.5	1.0	-50.4	-13.0	-37.4	
1.648	-18.9	H	3.0	35.5	1.0	-53.4	-13.0	-40.4	
2.473	-22.5	H	3.0	35.4	1.0	-56.9	-13.0	-43.9	
3.297	-17.4	H	3.0	35.5	1.0	-51.9	-13.0	-38.9	
Mid Ch, (836.6MHz)									
1.673	-20.6	V	3.0	35.5	1.0	-55.1	-13.0	-42.1	
3.346	-17.8	V	3.0	35.5	1.0	-52.4	-13.0	-39.4	
4.180	-15.2	V	3.0	35.2	1.0	-49.4	-13.0	-36.4	
1.673	-19.0	H	3.0	35.5	1.0	-53.6	-13.0	-40.6	
3.346	-16.9	H	3.0	35.5	1.0	-51.4	-13.0	-38.4	
4.183	-16.2	H	3.0	35.2	1.0	-50.4	-13.0	-37.4	
High Ch, (848.8MHz)									
1.698	-20.6	V	3.0	35.5	1.0	-55.1	-13.0	-42.1	
3.395	-16.1	V	3.0	35.5	1.0	-50.6	-13.0	-37.6	
4.244	-14.9	V	3.0	35.2	1.0	-49.2	-13.0	-36.2	
1.698	-21.1	H	3.0	35.5	1.0	-55.6	-13.0	-42.6	
3.395	-17.2	H	3.0	35.5	1.0	-51.7	-13.0	-38.7	
4.244	-16.8	H	3.0	35.2	1.0	-51.1	-13.0	-38.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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EGPRS (CELL Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	11U13896
Date:	09/29/11
Test Engineer:	Chin Pang
Configuration:	EUT with AC Adapter and Earphone
Mode:	TX, CELL BAND EGPRS
	Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 22

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (824.2MHz)									
1.648	-22.9	V	3.0	35.5	1.0	-57.5	-13.0	-44.5	
3.297	-16.7	V	3.0	35.5	1.0	-51.2	-13.0	-38.2	
1.648	-21.5	H	3.0	35.5	1.0	-56.0	-13.0	-43.0	
3.297	-19.6	H	3.0	35.5	1.0	-54.1	-13.0	-41.1	
Mid Ch, (836.6MHz)									
1.673	-23.0	V	3.0	35.5	1.0	-57.5	-13.0	-44.5	
3.346	-19.2	V	3.0	35.5	1.0	-53.8	-13.0	-40.8	
1.673	-23.3	H	3.0	35.5	1.0	-57.9	-13.0	-44.9	
3.346	-17.9	H	3.0	35.5	1.0	-52.4	-13.0	-39.4	
High Ch, (848.8MHz)									
1.698	-24.3	V	3.0	35.5	1.0	-58.8	-13.0	-45.8	
3.395	-18.6	V	3.0	35.5	1.0	-53.1	-13.0	-40.1	
1.698	-22.7	H	3.0	35.5	1.0	-57.2	-13.0	-44.2	
3.395	-17.7	H	3.0	35.5	1.0	-52.2	-13.0	-39.2	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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EGPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company:	Apple
Project #:	11U13896
Date:	09/29/11
Test Engineer:	Chin Pang
Configuration:	EUT with AC Adapter and Earphone
Mode:	TX, PCS BAND GPRS
	Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2MHz)									
3.700	-13.2	V	3.0	35.4	1.0	-47.5	-13.0	-34.5	
5.551	-7.6	V	3.0	35.4	1.0	-42.0	-13.0	-29.0	
3.700	-13.9	H	3.0	35.4	1.0	-48.2	-13.0	-35.2	
5.551	-11.0	H	3.0	35.4	1.0	-45.4	-13.0	-32.4	
Mid Ch, (1880.0MHz)									
3.760	-10.7	V	3.0	35.3	1.0	-45.1	-13.0	-32.1	
5.640	-9.5	V	3.0	35.4	1.0	-43.9	-13.0	-30.9	
3.760	-14.8	H	3.0	35.3	1.0	-49.1	-13.0	-36.1	
5.640	-13.9	H	3.0	35.4	1.0	-48.4	-13.0	-35.4	
High Ch, (1909.8MHz)									
3.820	-13.2	V	3.0	35.3	1.0	-47.5	-13.0	-34.5	
5.729	-9.1	V	3.0	35.4	1.0	-43.6	-13.0	-30.6	
3.820	-14.3	H	3.0	35.3	1.0	-48.6	-13.0	-35.6	
5.729	-11.7	H	3.0	35.4	1.0	-46.1	-13.0	-33.1	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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EGPRS (PCS Band)

Compliance Certification Services
Above 1GHz High Frequency Substitution Measurement

Company: Apple
Project #: 11U13896
Date: 09/29/11
Test Engineer: Chin Pang
Configuration: EUT with AC Adapter and Earphone
Mode: TX, PCS BAND EGPRS
Port B

Chamber	Pre-amplifer	Filter	Limit
5m Chamber B	T145 8449B	Filter 1	Part 24

f GHz	SG reading (dBm)	Ant. Pol. (H/V)	Distance (m)	Preamp (dB)	Filter (dB)	EIRP (dBm)	Limit (dBm)	Delta (dB)	Notes
Low Ch, (1850.2MHz)									
3.700	-11.9	V	3.0	35.4	1.0	-46.2	-13.0	-33.2	
5.551	-11.3	V	3.0	35.4	1.0	-45.7	-13.0	-32.7	
3.700	-13.1	H	3.0	35.4	1.0	-47.4	-13.0	-34.4	
5.551	-14.3	H	3.0	35.4	1.0	-48.7	-13.0	-35.7	
Mid Ch, (1880.0MHz)									
3.760	-10.7	V	3.0	35.3	1.0	-45.1	-13.0	-32.1	
5.640	-13.7	V	3.0	35.4	1.0	-48.1	-13.0	-35.1	
3.760	-15.0	H	3.0	35.3	1.0	-49.3	-13.0	-36.3	
5.640	-13.8	H	3.0	35.4	1.0	-48.3	-13.0	-35.3	
High Ch, (1909.8MHz)									
3.820	-13.6	V	3.0	35.3	1.0	-47.9	-13.0	-34.9	
5.729	-11.2	V	3.0	35.4	1.0	-45.7	-13.0	-32.7	
3.820	-14.8	H	3.0	35.3	1.0	-49.1	-13.0	-36.1	
5.729	-14.0	H	3.0	35.4	1.0	-48.4	-13.0	-35.4	

Rev. 03.03.09
Note: No other emissions were detected above the system noise floor.

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9.3. RECEIVER SPURIOUS EMISSIONS

LIMIT

RSS-Gen 7.2.2

Spurious Emission Limits for Receivers:

Spurious Frequency (MHz)	Field Strength (microvolts/m at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960	500

TEST PROCEDURE

The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (local oscillator frequency, intermediate frequency or carrier frequency),

or 30 MHz, whichever is the higher, to at least 3 times the highest tunable and local oscillator frequencies.

RESULTS

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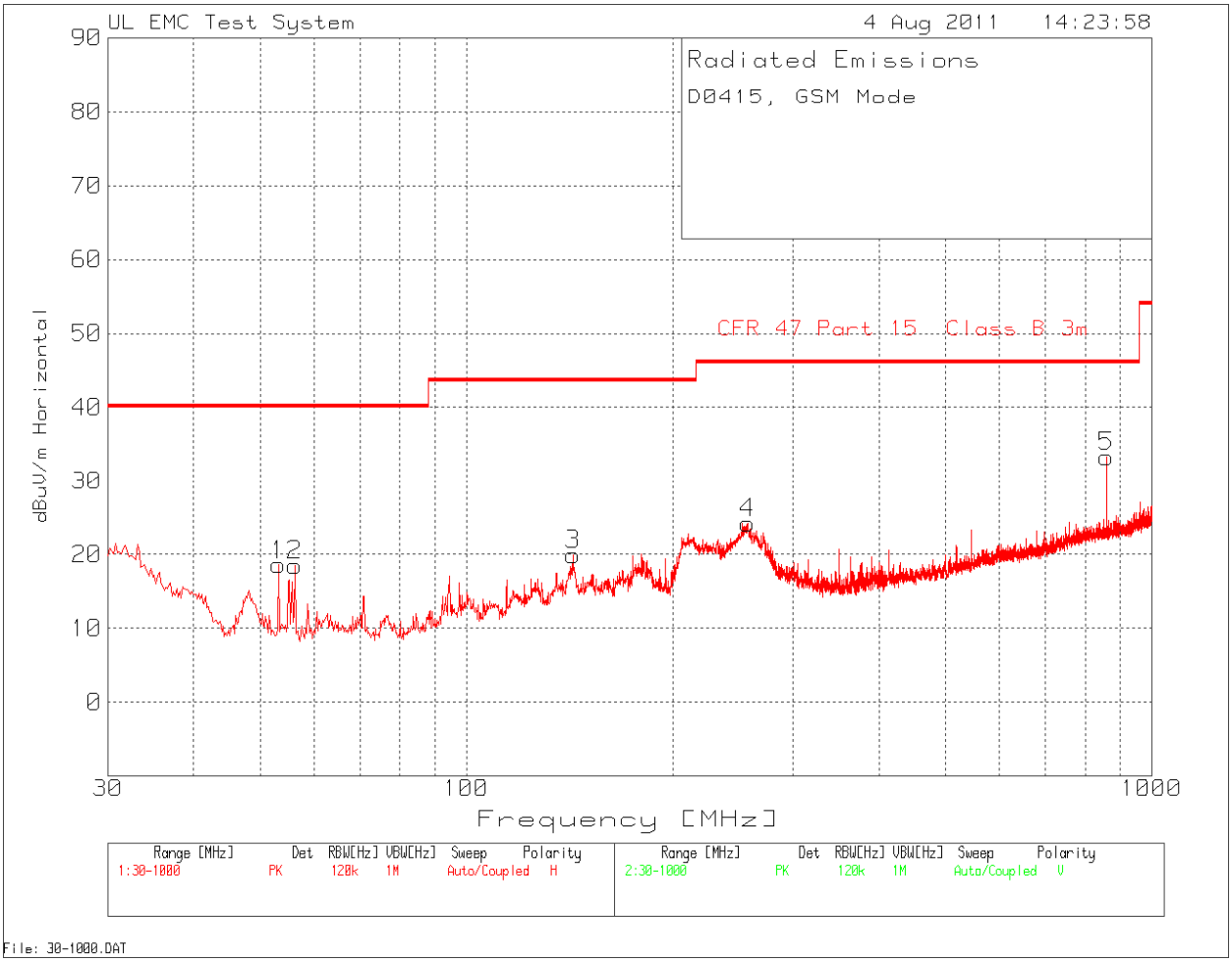
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



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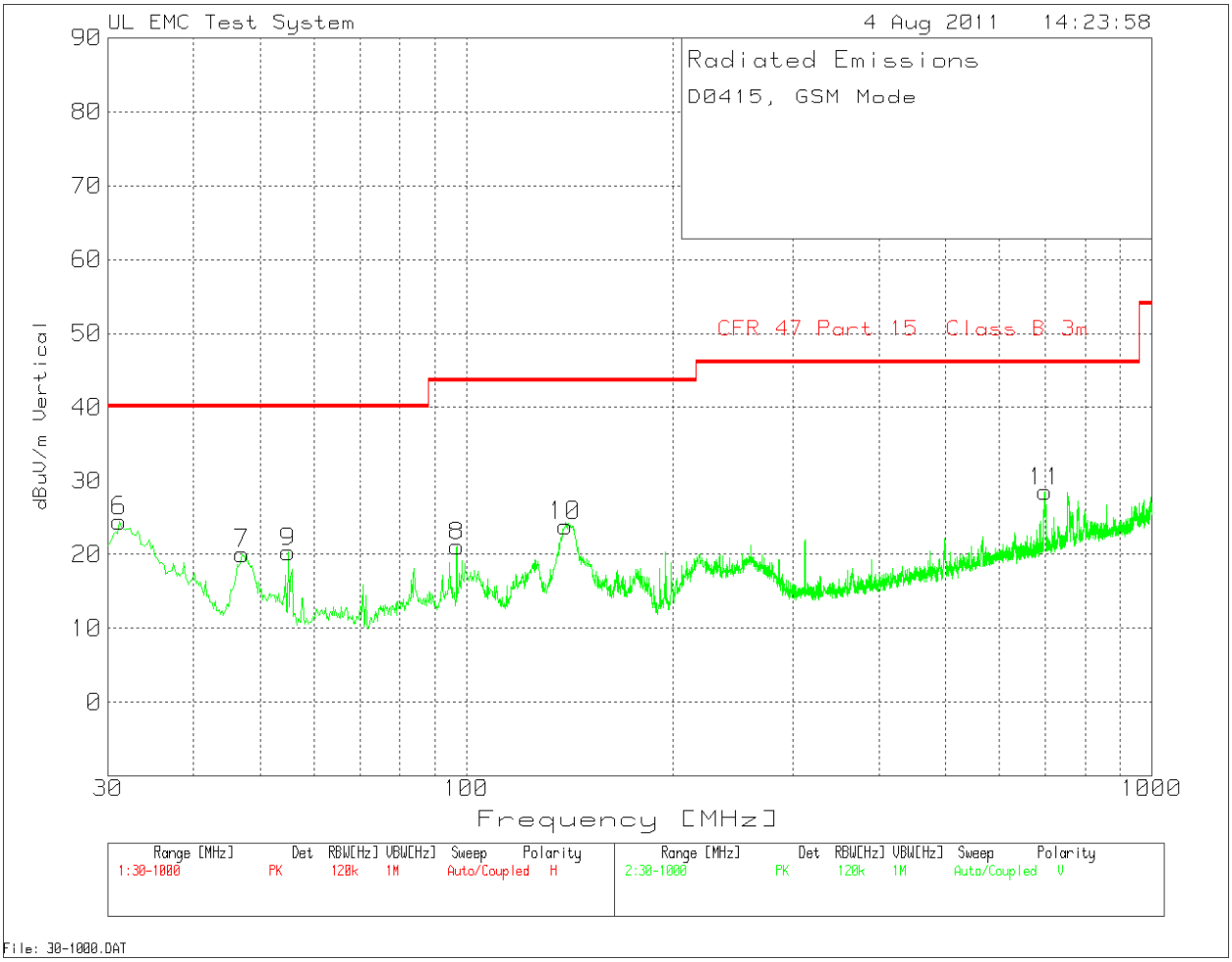
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)



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DATA

Range 1 30 - 1000MHz									
Frequency	Reading	Detector	Cable.TX [dB]	T10 PreAmp[dB]	factors.TXT	dBuV/m	Part 15B 3m	Margin	Polarity
53.2614	39.06	PK	1	-29.4	7.9	18.56	40	-21.44	Horz
56.1691	38.93	PK	1.1	-29.4	7.9	18.53	40	-21.47	Horz
143.0116	34.45	PK	1.7	-29.2	13	19.95	43.5	-23.55	Horz
257.3801	38.7	PK	2.2	-28.7	12	24.2	46	-21.8	Horz
859.4624	36.66	PK	4.1	-28.7	21.3	33.36	46	-12.64	Horz
Range 2 30 - 1000MHz									
Frequency	Reading	Detector	Cable.TX [dB]	T10 PreAmp[dB]	factors.TXT	dBuV/m	Part 15B 3m	Margin	Polarity
31.1631	33.3	PK	0.9	-29.5	19.8	24.5	40	-15.5	Vert
47.0584	38.64	PK	1	-29.4	9.8	20.04	40	-19.96	Vert
96.8765	39.64	PK	1.4	-29.3	9.3	21.04	43.5	-22.46	Vert
55.006	40.65	PK	1.1	-29.4	7.9	20.25	40	-19.75	Vert
139.3285	38.16	PK	1.7	-29.2	13.2	23.86	43.5	-19.64	Vert
698.5711	34.89	PK	3.7	-29.3	19.2	28.49	46	-17.51	Vert

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SPURIOUS EMISSIONS ABOVE 1000 MHz (WORST-CASE CONFIGURATION)

Note: No emissions were detected above the system noise floor.

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9.4. POWER LINE CONDUCTED EMISSION

LIMIT

RSS-Gen 7.2.2

Except when the requirements applicable to a given device state otherwise, for any licence-exempt radio communication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in Table 2. The tighter limit applies at the frequency range boundaries.

Table 2 – AC Power Lines Conducted Emission Limits

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

RESULTS

6 WORST EMISSIONS

Line-L1 .15 - 30MHz									
Test Frec	Meter Rea	Detector	LISN [dB]	Conducted	dB[uVolts	CISPR 11/	Margin	CISPR 11/	Margin
0.168	39.91	PK	0	0	39.91	65.1	-25.19	55.1	-15.19
0.168	5.36	Av	0	0	5.36	-	-	55.1	-49.74
0.249	33.96	PK	0	0	33.96	61.8	-27.84	51.8	-17.84
0.249	4.51	Av	0	0	4.51	-	-	51.8	-47.29
0.4245	30.36	PK	0	0	30.36	57.4	-27.04	47.4	-17.04
0.4245	0.25	Av	0	0	0.25	-	-	47.4	-47.15
Line-L2 .15 - 30MHz									
Test Frec	Meter Rea	Detector	LISN [dB]	Conducted	dB[uVolts	CISPR 11/	Margin	CISPR 11/	Margin
0.159	40.93	PK	0	0	40.93	65.5	-24.57	55.5	-14.57
0.159	6.31	Av	0	0	6.31	-	-	55.5	-49.19
0.1905	38.91	PK	0	0	38.91	64	-25.09	54	-15.09
0.1905	4.73	Av	0	0	4.73	-	-	54	-49.27
0.3435	35.49	PK	0	0	35.49	59.1	-23.61	49.1	-13.61
0.3435	2.66	Av	0	0	2.66	-	-	49.1	-46.44

COMPLIANCE CERTIFICATION SERVICES (UL CCS) FORM NO: CCSUP4031B
47173 BENICIA STREET, FREMONT, CA 94538, USA TEL: (510) 771-1000 FAX: (510) 661-0888
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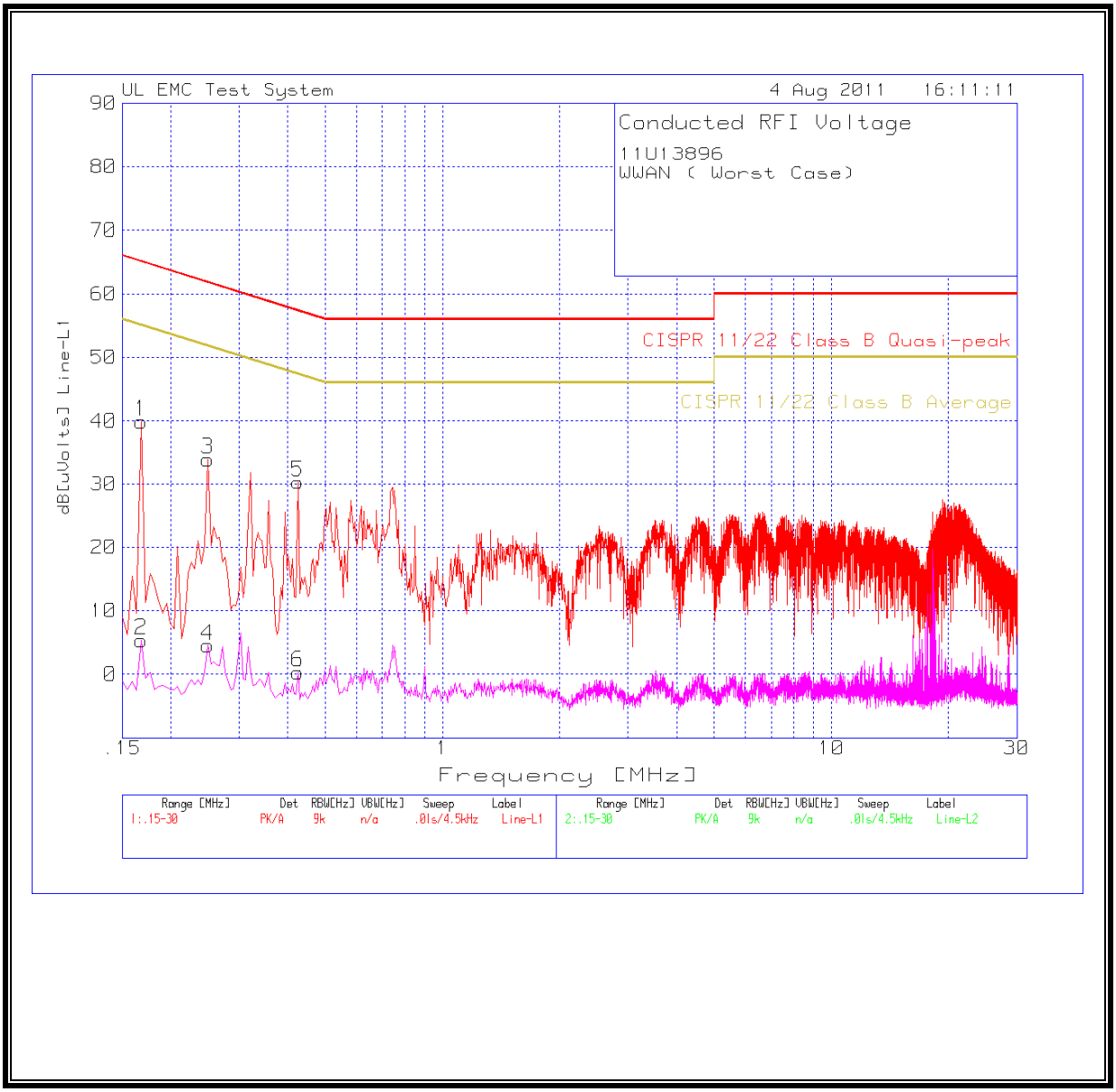
LINE 1 RESULTS



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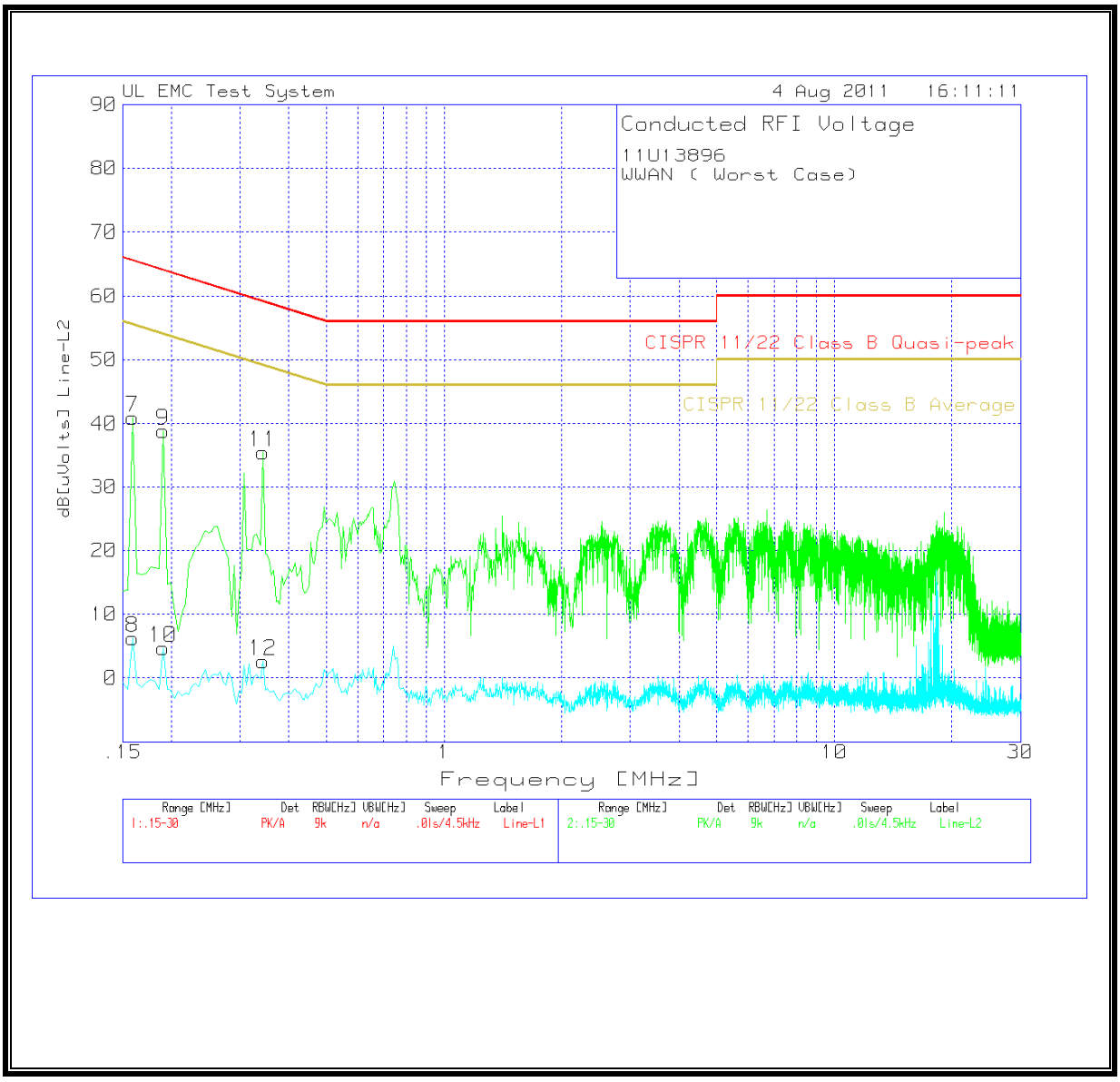
LINE 2 RESULTS



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