CALIFORNIA AMPLIFIER TEST REPORT

FOR THE

ECCO MUSTANG CELLULAR AMPLIFIER, 520038

FCC PART 24

COMPLIANCE

DATE OF ISSUE: AUGUST 28, 2003

PREPARED FOR:

California Amplifier
460 Calle San Pablo
Camarillo, CA 93012

P.O. No.: 29582
W.O. No.: 80997

PREPARED BY:

Mary Ellen Clayton
CKC Laboratories, Inc.
5473A Clouds Rest
Mariposa, CA 95338

Date of test: August 25-27, 2003

Report No.: FC03-056

TABLE OF CONTENTS

ADMINISTRATIVE INFORMATION

DATE OF TEST:	August 25-27, 2003
DATE OF RECEIPT:	August 25, 2003
PURPOSE OF TEST:	To demonstrate the compliance of the Ecco Mustang Cellular Amplifier, 520038 with the requirements for FCC Part 24 devices.
TEST METHOD:	FCC Part 24
FREQUENCY RANGE TESTED:	150 kHz - 1000 MHz
MANUFACTURER:	California Amplifier 460 Calle San Pablo Camarillo, CA 93012
REPRESENTATIVE:	Shawn Aleman
TEST LOCATION:	CKC Laboratories, Inc. 5473A Clouds Rest Mariposa, CA 95338

SUMMARY OF RESULTS

As received, the California Amplifier Bidirectional Amplifier, 520038 was found to be fully compliant with the following standards and specifications:

United States

- FCC Part 24

CONDITIONS FOR COMPLIANCE

No modifications to the EUT were necessary to comply.

APPROVALS

Steve Behm, Director of Engineering Services

QUALITY ASSURANCE:

Joyce Walker, Quality Assurance Administrative Manager

Mike Wilkinson, Lab Manager

TEST PERSONNEL:

Randy Clark, EMC Engineer

EQUIPMENT UNDER TEST (EUT) DESCRIPTION

The EUT tested by CKC Laboratories was representative of a production unit

EQUIPMENT UNDER TEST

Bidirectional Amplifier
Manuf: California Amplifier
Model: 520038
Serial: 001
FCC ID: Pending

PERIPHERAL DEVICES

The EUT was tested with the following peripheral device(s):

Power Divider
Manuf: Anaren
Model: 40276
Serial: 600D-7949
FCC ID: NA

ESG
Manuf: Agilent
Model: E4437B
Serial: US39260124
FCC ID: DoC

ESG
Manuf: Agilent
Model: E4437B
Serial: US39260294
FCC ID: DoC

DC Power Supply
Manuf: Topward Electric Instruments Co., Ltd.
Model: TPS-2000
Serial: 920035
FCC ID: NA

MEASUREMENT UNCERTAINTY

TEST	HIGHEST UNCERTAINTY
Radiated Emissions	+/- 2.94 dB
Conducted Emissions	+/- 1.56 dB

Note: Reported uncertainties represent expanded uncertainties expressed at approximately the 95% confidence level using a coverage factor of k=2. Statements of compliance are based on the nominal values only.

TEMPERATURE AND HUMIDITY DURING TESTING

The temperature during testing was within +15°C and + 35°C.
The relative humidity was between 20% and 75%.

FCC 2.1033(c)(3) USER'S MANUAL
The necessary information is contained in a separate document.

FCC 2.1033 (c)(4) TYPE OF EMISSIONS
CDMA – 1M25F9W and GSM – 280kGXW

FCC 2.1033(c)(5) FREQUENCY RANGE
1850-1910 MHz and 1930-1990 MHz.

FCC 2.1033(c)(6) OPERATING POWER
19 dBm

FCC 2.1033(c)(7) MAXIMUM POWER RATING
2 Watts

FCC 2.1033(c)(8) DC VOLTAGES
6V, 1.5A maximum

FCC 2.1033(c)(9) TUNE-UP PROCEDURE
Levels are factory set and the customer has no control over it.

FCC 2.1033(c)(10) SCHEMATICS AND CIRCUITRY DESCRIPTION
The necessary information is contained in a separate document.

FCC 2.1033(c)(11) LABEL AND PLACEMENT
The necessary information is contained in a separate document.

FCC 2.1033(c)(12) SUBMITTAL PHOTOS
The necessary information is contained in a separate document.

FCC 2.1033(c)(13) MODULATION INFORMATION
QPSK up to 64 QAM

FCC 2.1033(c)(14)/2.1046/24.232 - RF POWER OUTPUT

Equipment is a bi-directional amplifier repeater for broadband PCS. The downstream input is connected to a signal generator through a power divider. The input to the amplifier is set such that the maximum power output is achieved at the customer supplied antenna connectors. Maximum Allowable Power Output is 19dBm.

Block Tested: A-F
Modulation Tested: GSM and CDMA
Frequency Range Investigated: Carrier.

The measured CDMA channel power at the customer provided antenna terminals is shown in the table below.

Block	Upstream 1850-1910 MHz	Downstream 1930-1990MHz
A	19.0 dBm	19.0 dBm
B	19.0 dBm	19.0 dBm
C	19.0 dBm	19.0 dBm
D	19.0 dBm	19.0 dBm
E	19.0 dBm	19.0 dBm
F	19.0 dBm	19.0 dBm

The measured GSM channel power at the customer provided antenna terminals is shown in the table below.

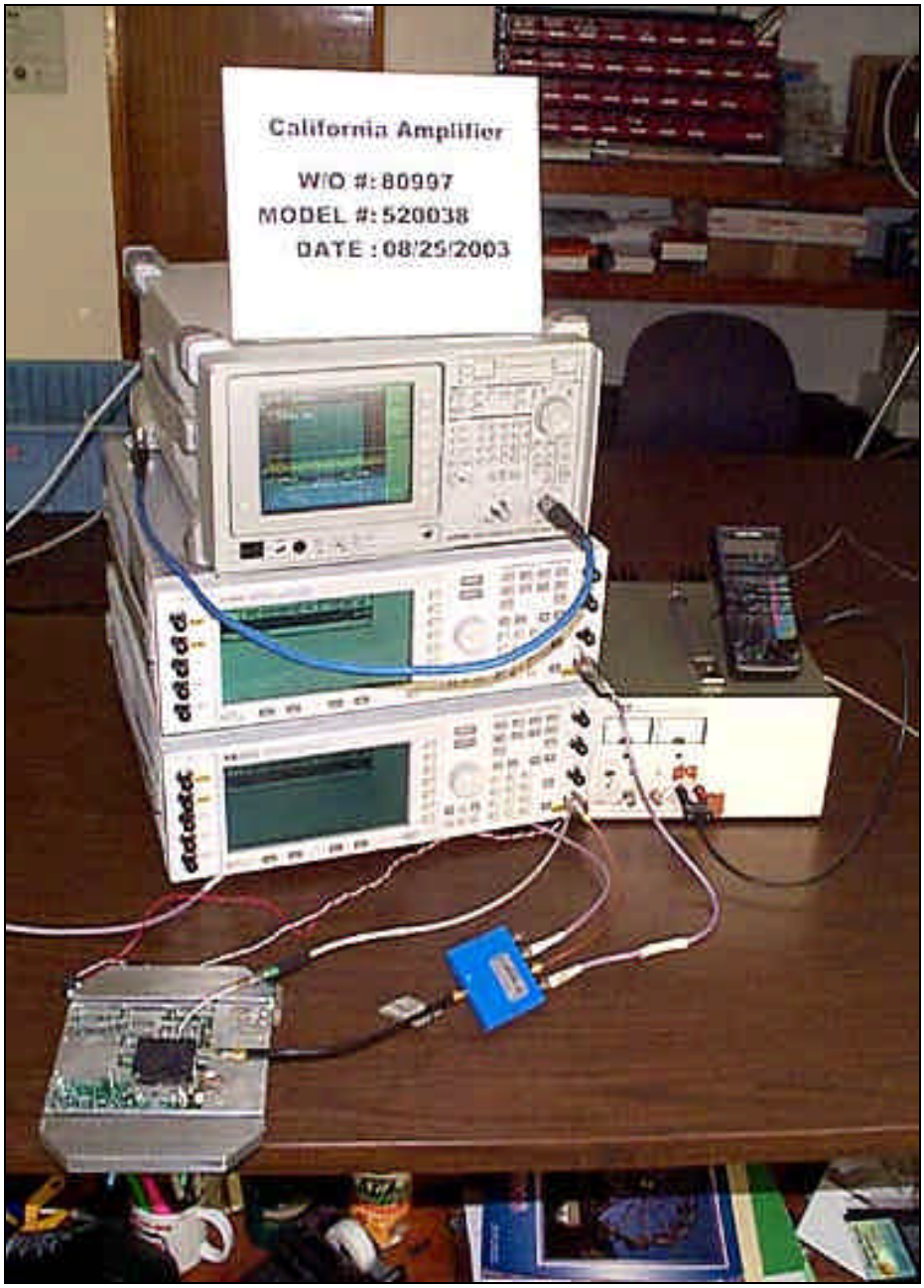
Block	Upstream 1850-1910 MHz	Downstream 1930-1990MHz
A	19.0 dBm	19.0 dBm
B	19.0 dBm	19.0 dBm
C	19.0 dBm	19.0 dBm
D	19.0 dBm	19.0 dBm
E	19.0 dBm	19.0 dBm
F	19.0 dBm	19.0 dBm

Using the maximum power output of the EUT for both GSM and CDMA modulations, the EIRP is calculated by adding the gain of the antenna.
EIRP = Power Output + 8.5 dBi

	Upstream 1850-1910 MHz	Downstream 1930-1990MHz
Maximum Power Output	19.0	19.0
Antenna Gain (dBi)	8.5	8.5
Maximum EIRP (dBm)	27.5	27.5
Maximum EIRP (Watts)	0.56	0.56
24.232 Limit (Watts)	2.0	2.0
Result	Pass	Pass

Test Equipment

Description	*Asset #*	*Manufacturer*	*Model #*	*Serial #*	*Cal Date*	*Cal Due*
Spectrum Analyzer, 9kHz to 26.5 GHz	02111	HP	8593EM	3624A00159	5/12/03	5/11/05
Cable-HF	P01403	Semiflex	58758-23	0038	1/21/03	1/21/04



Direct Connect

FCC 2.1055(d)/24.235 Frequency Stability Under Voltage Variations

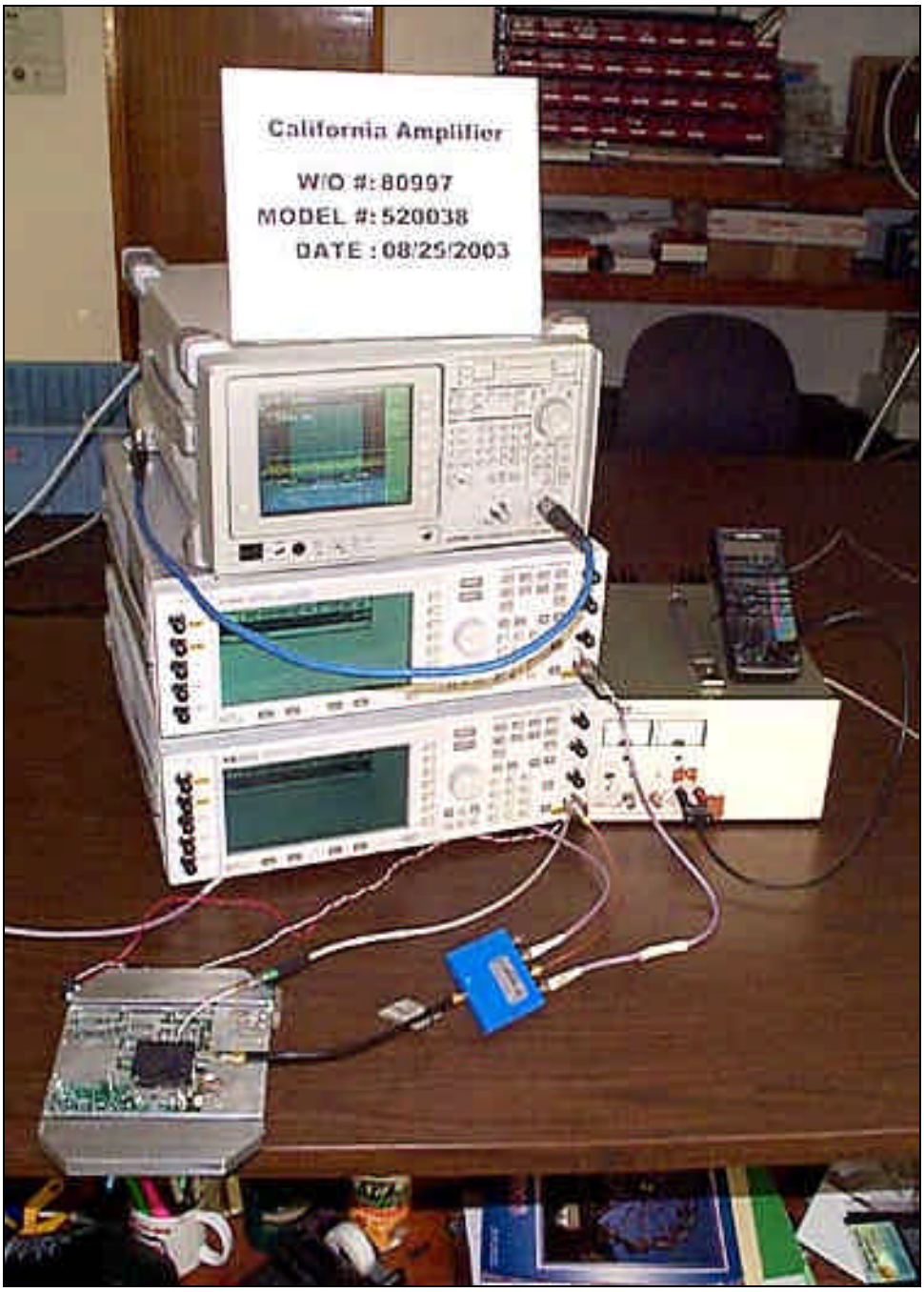
Equipment is a bi-directional amplifier repeater for broadband PCS. The signal input is connected to the signal generators through a power divider. The input to the amplifier is set such that the maximum power output is achieved at the customer supplied antenna connectors. Maximum Allowable Power Output is 19dBm.

Frequency stability under voltage variations. Since voltage variations of ±15% of the nominal DC input voltage would be destructive to the equipment under test, voltage variations are performed within the manufacturer's declared input voltage range. The manufacturer's declared operating voltage is 6.00 ±0.20 VDC. This method was agreed upon between CKC Laboratories, Inc. and California Amplifier prior to test.

Results of test: The equipment demonstrated frequency stability sufficient to keep the transmit frequency within the authorized channel block.

Test Equipment

Description	*Asset #*	*Manufacturer*	*Model #*	*Serial #*	*Cal Date*	*Cal Due*
Spectrum Analyzer, 9kHz to 26.5 GHz	02111	HP	8593EM	3624A00159	5/12/03	5/11/05
Cable-HF	P01403	Semiflex	58758-23	0038	1/21/03	1/21/04



Direct Connect

FCC 2.1033(c)(14)/2.1047(a) - MODULATION CHARACTERISTICS - AUDIO FREQUENCY RESPONSE

Not applicable to this unit.

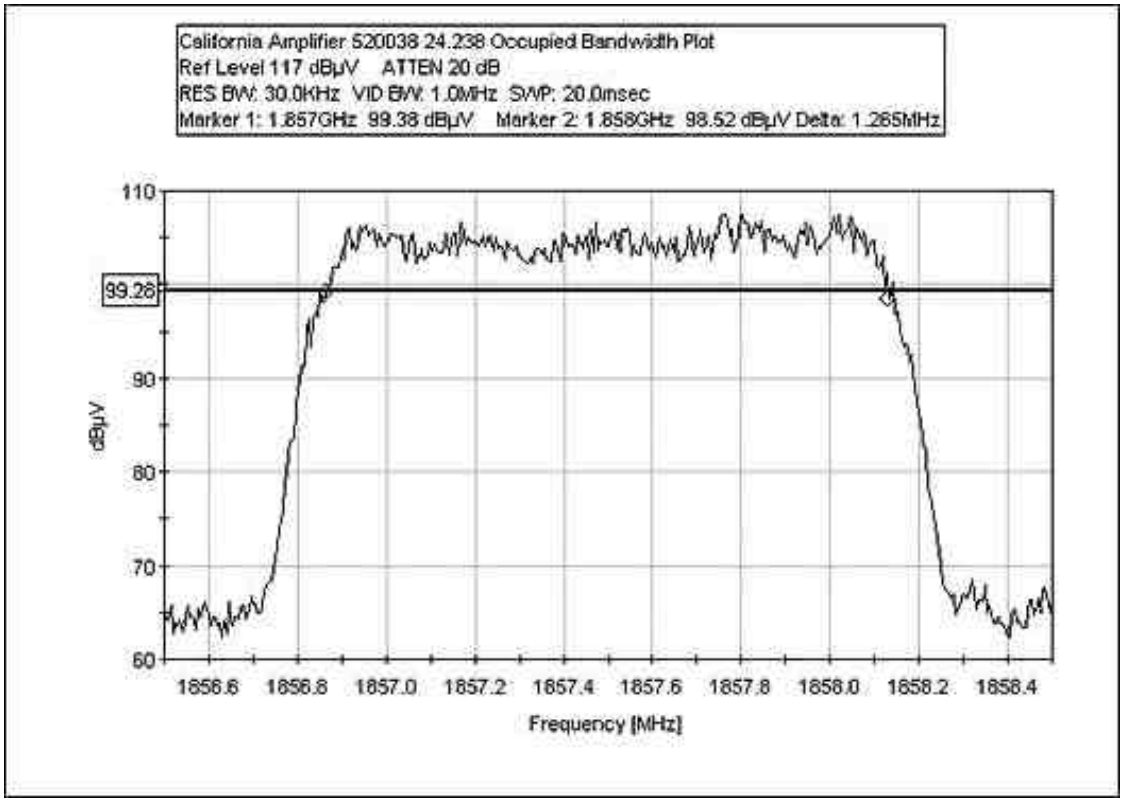
FCC 2.1033(c)(14)/2.1047(b) MODULATION CHARACTERISTICS – Modulation Limiting Response

Not applicable to this unit.

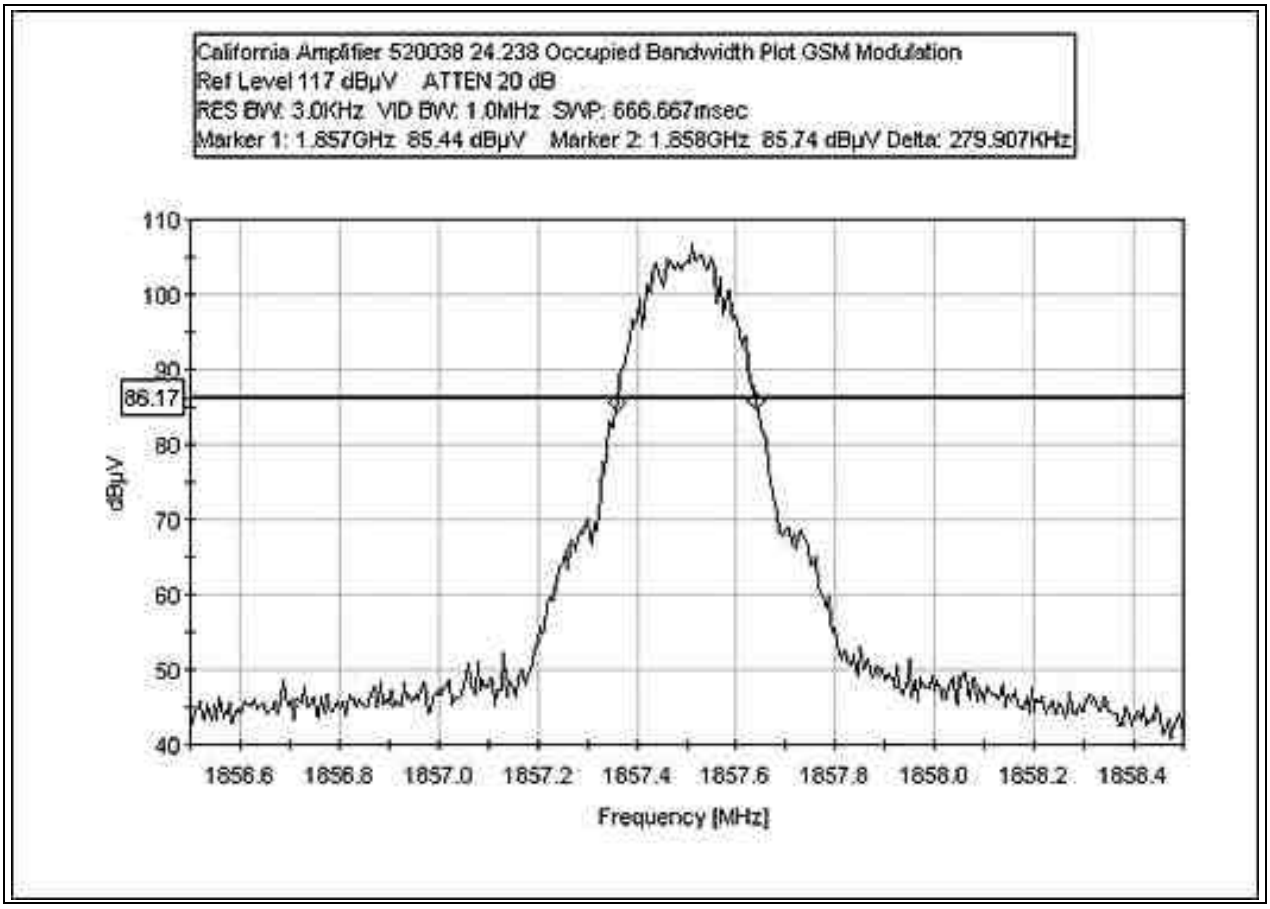
FCC 2.1033(c)(14)/2.1049(i)- OCCUPIED BANDWIDTH

Test Conditions: Equipment is a bi-directional amplifier repeater for broadband PCS. The signal input is connected to the signal generators through a power divider. The input to the amplifier is set such that the maximum power output is achieved at the customer supplied antenna connectors. Maximum Allowable Power Output is 19dBm. CDMA – RBW = 100 kHz, GSM – RBW = 3 kHz.

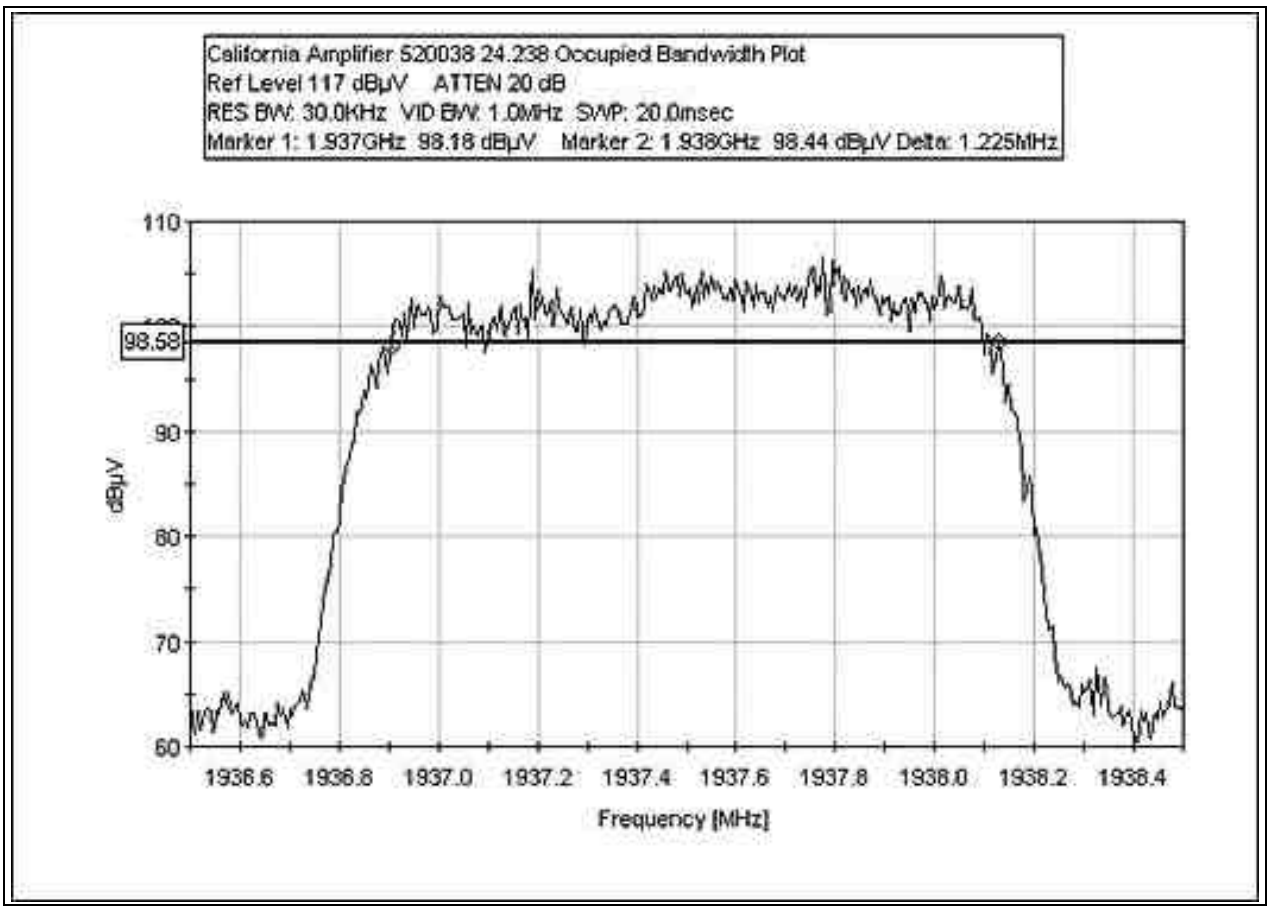
OCCUPIED BANDWIDTH PLOT - UPSTREAM CDMA



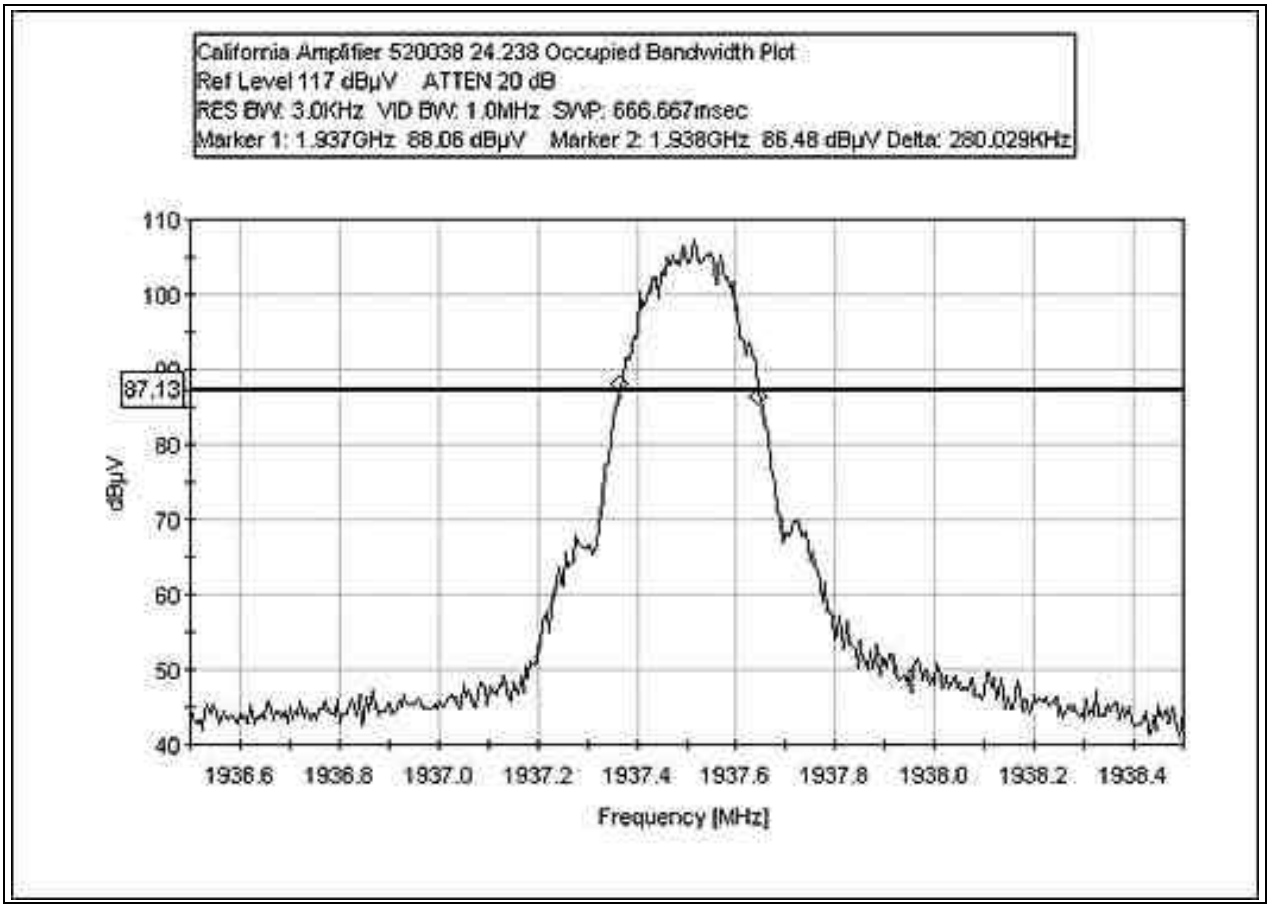
OCCUPIED BANDWIDTH PLOT - UPSTREAM GSM



OCCUPIED BANDWIDTH PLOT - DOWNSTREAM CDMA



OCCUPIED BANDWIDTH PLOT - DOWNSTREAM GSM



Test Equipment

Description	*Asset #*	*Manufacturer*	*Model #*	*Serial #*	*Cal Date*	*Cal Due*
Spectrum Analyzer, 9kHz to 26.5 GHz	02111	HP	8593EM	3624A00159	5/12/03	5/11/05
Cable-HF	P01403	Semiflex	58758-23	0038	1/21/03	1/21/04

FCC 2.1033(c)(14)/2.1051/24.238 - SPURIOUS EMISSIONS AT ANTENNA TERMINAL

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **California Amplifier**
Specification: **24.238 Block F**
Work Order #: **80997** Date: 08/26/2003
Test Type: **Antenna Terminals** Time: 11:30:44
Equipment: **Bidirectional Amplifier** Sequence#: 3
Manufacturer: California Amplifier Tested By: Randal Clark
Model: 520038
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Bidirectional Amplifier*	California Amplifier	520038	001

Support Devices:

Function	Manufacturer	Model #	S/N
Power Divider	Anaren	40276	600D-7949
ESG	Agilent	E4437B	US39260124
ESG	Agilent	E4437B	US39260294
DC Power Supply	Topward Electric Instruments Co., Ltd	TPS-2000	920035

Test Conditions / Notes:

Equipment is a bi-directional amplifier repeater for broadband PCS. The signal input is connected to the signal generators through a power divider. The input to the amplifier is set such that the maximum power output is achieved at the customer supplied antenna connectors. Maximum Allowable Power Output is 19dBm. Intermodulation Attenuation Test (3 Signal Method) Blocks Tested: A-F Downstream Modulation Tested: CDMA. RBW=1MHz and VBW=1MHz except in the 1MHz bandwidth outside of the assigned block where RBW=100kHz and VBW=1MHz. Three input signals are chosen such that in the 15 MHz channel blocks the lowest and highest channels are selected in addition to the third lowest channel. In the 5 MHz channel blocks the lowest and highest channels are selected in addition to the second lowest channel. Frequency Range tested: 20 MHz – 20 GHz. **No EUT Emissions detected within 20dB of the limit.**

Transducer Legend:

T1=Cable HF P-1403

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1965.500M	72.0	+1.9				+0.0	73.9	94.0 Block C Downstream	-20.1	None
2	1998.800M	72.0	+1.9				+0.0	73.9	94.0 Block C Downstream	-20.1	None
3	2001.300M	71.9	+1.9				+0.0	73.8	94.0 Block C Downstream	-20.2	None

4	1966.800M	71.6	+1.9		+0.0	73.5	94.0 Block C Downstream	-20.5	None
5	1938.800M	71.3	+1.9		+0.0	73.2	94.0 Block B Downstream	-20.8	None
6	1941.800M	71.1	+1.9		+0.0	73.0	94.0 Block B Downstream	-21.0	None
7	1963.500M	71.0	+1.9		+0.0	72.9	94.0 Block C Downstream	-21.1	None
8	1973.000M	70.8	+1.9		+0.0	72.7	94.0 Block B Downstream	-21.3	None
9	1976.000M	70.5	+1.9		+0.0	72.4	94.0 Block B Downstream	-21.6	None
10	1956.500M	69.3	+1.9		+0.0	71.2	94.0 Block A Downstream	-22.8	None
11	1954.000M	69.2	+1.9		+0.0	71.1	94.0 Block A Downstream	-22.9	None
12	1948.500M	68.4	+1.9		+0.0	70.3	94.0 Block B Downstream	-23.7	None
13	1992.000M	66.5	+1.9		+0.0	68.4	94.0 Block C Downstream	-25.6	None
14	1973.800M	66.4	+1.9		+0.0	68.3	94.0 Block C Downstream	-25.7	None
15	1966.800M	63.9	+1.9		+0.0	65.8	94.0 Block B Downstream	-28.2	None
16	1966.500M	62.7	+1.9		+0.0	64.6	94.0 Block A Downstream	-29.4	None
17	1963.250M	61.5	+1.9		+0.0	63.4	94.0 Block E Downstream	-30.6	None
18	1943.500M	60.9	+1.9		+0.0	62.8	94.0 Block D Downstream	-31.2	None
19	1923.500M	60.7	+1.9		+0.0	62.6	94.0 Block A Downstream	-31.4	None
20	990.880M	61.1	+0.0		+0.0	61.1	94.0 Block E Downstream	-32.9	None

21	1968.800M	58.7	+1.9		+0.0	60.6	94.0 Block A Downstream	-33.4	None
22	1006.000M	58.7	+1.3		+0.0	60.0	94.0 Block C Downstream	-34.0	None
23	968.500M	60.0	+0.0		+0.0	60.0	94.0 Block B Downstream	-34.0	None
24	961.250M	59.9	+0.0		+0.0	59.9	94.0 Block D Downstream	-34.1	None
25	3905.000M	56.9	+2.7		+0.0	59.6	94.0 Block B Downstream	-34.4	None
26	3897.000M	56.1	+2.7		+0.0	58.8	94.0 Block D Downstream	-35.2	None
27	3935.880M	56.0	+2.7		+0.0	58.7	94.0 Block E Downstream	-35.3	None
28	1953.880M	56.7	+1.9		+0.0	58.6	94.0 Block D Downstream	-35.4	None
29	5916.250M	55.0	+3.4		+0.0	58.4	94.0 Block F Downstream	-35.6	None
30	997.000M	57.8	+0.0		+0.0	57.8	94.0 Block F Downstream	-36.2	None
31	5903.000M	54.4	+3.4		+0.0	57.8	94.0 Block E Downstream	-36.2	None
32	3946.250M	55.0	+2.7		+0.0	57.7	94.0 Block F Downstream	-36.3	None
33	5934.300M	54.2	+3.4		+0.0	57.6	94.0 Block C Downstream	-36.4	None
34	1967.880M	55.6	+1.9		+0.0	57.5	94.0 Block F Downstream	-36.5	None
35	3865.300M	54.5	+2.6		+0.0	57.1	94.0 Block A Downstream	-36.9	None
36	3964.800M	54.2	+2.7		+0.0	56.9	94.0 Block C Downstream	-37.1	None
37	1495.000M	55.0	+1.6		+0.0	56.6	94.0 Block B Downstream	-37.4	None

38	1477.800M	55.0	+1.6	+0.0	56.6	94.0	Block A Downstream	-37.4	None
39	1522.800M	54.7	+1.6	+0.0	56.3	94.0	Block C Downstream	-37.7	None
40	1512.500M	53.6	+1.6	+0.0	55.2	94.0	Block F Downstream	-38.8	None
41	943.500M	54.9	+0.0	+0.0	54.9	94.0	Block A Downstream	-39.1	None
42	1507.380M	52.6	+1.6	+0.0	54.2	94.0	Block E Downstream	-39.8	None
43	1973.630M	51.9	+1.9	+0.0	53.8	94.0	Block E Downstream	-40.2	None
44	1487.630M	51.8	+1.6	+0.0	53.4	94.0	Block D Downstream	-40.6	None
45	1978.750M	51.3	+1.9	+0.0	53.2	94.0	Block F Downstream	-40.8	None

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **California Amplifier**
Specification: **24.238 Block C (Upstream)**
Work Order #: **80997** Date: 08/26/2003
Test Type: **Antenna Terminals** Time: 10:37:20
Equipment: **Bidirectional Amplifier** Sequence#: 2
Manufacturer: California Amplifier Tested By: Randal Clark
Model: 520038
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Bidirectional Amplifier*	California Amplifier	520038	001

Support Devices:

Function	Manufacturer	Model #	S/N
Power Divider	Anaren	40276	600D-7949
ESG	Agilent	E4437B	US39260124
ESG	Agilent	E4437B	US39260294
DC Power Supply	Topward Electric Instruments Co., Ltd	TPS-2000	920035

Test Conditions / Notes:

Equipment is a bi-directional amplifier repeater for broadband PCS. The signal input is connected to the signal generators through a power divider. The input to the amplifier is set such that the maximum power output is achieved at the customer supplied antenna connectors. Maximum Allowable Power Output is 19dBm. Intermodulation Attenuation Test (3 Signal Method) Blocks Tested: A-F Upstream. Modulation Tested: CDMA. RBW=1MHz and VBW=1MHz except in the 1MHz bandwidth outside of the assigned block where RBW=100kHz and VBW=1MHz Three input signals are chosen such that in the 15 MHz channel blocks the lowest and highest channels are selected in addition to the third lowest channel. In the 5 MHz channel blocks the lowest and highest channels are selected in addition to the second lowest channel. Frequency Range tested: 20 MHz – 20 GHz. **No EUT Emissions detected within 20dB of the limit.**

Transducer Legend:

T1=Cable HF P-1403

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1886.800M	70.0	+1.8				+0.0	71.8	94.0	-22.2	None
									Block C Upstream		
2	1884.300M	69.6	+1.8				+0.0	71.4	94.0	-22.6	None
									Block C Upstream		
3	1868.500M	66.3	+1.8				+0.0	68.1	94.0	-25.9	None
									Block B Upstream		
4	5603.800M	64.3	+3.2				+0.0	67.5	94.0	-26.5	None
									Block D Upstream		
5	1842.000M	65.3	+1.8				+0.0	67.1	94.0	-26.9	None
									Block A Upstream		

6	5617.000M	63.8	+3.2		+0.0	67.0	94.0	-27.0	None
							Block B Upstream		
7	1918.500M	64.9	+1.9		+0.0	66.8	94.0	-27.2	None
							Block C Upstream		
8	5569.000M	63.0	+3.2		+0.0	66.2	94.0	-27.8	None
							Block A Upstream		
9	1874.300M	63.9	+1.8		+0.0	65.7	94.0	-28.3	None
							Block C Upstream		
10	1861.500M	63.7	+1.8		+0.0	65.5	94.0	-28.5	None
							Block B Upstream		
11	7548.000M	61.4	+3.8		+0.0	65.2	94.0	-28.8	None
							Block E Upstream		
12	1873.800M	62.4	+1.8		+0.0	64.2	94.0	-29.8	None
							Block A Upstream		
13	7570.000M	59.9	+3.8		+0.0	63.7	94.0	-30.3	None
							Block F Upstream		
14	12.100M	63.2	+0.0		+0.0	63.2	94.0	-30.8	None
							Block B Upstream		
15	1887.000M	61.4	+1.8		+0.0	63.2	94.0	-30.8	None
							Block B Upstream		
16	7489.000M	58.5	+3.8		+0.0	62.3	94.0	-31.7	None
							Block B Upstream		
17	1893.300M	60.2	+1.8		+0.0	62.0	94.0	-32.0	None
							Block B Upstream		
18	7468.800M	58.2	+3.8		+0.0	62.0	94.0	-32.0	None
							Block D Upstream		
19	5725.500M	58.6	+3.3		+0.0	61.9	94.0	-32.1	None
							Block C Upstream		
20	854.000M	61.3	+0.0		+0.0	61.3	94.0	-32.7	None
							Block B Upstream		
21	5694.000M	57.4	+3.3		+0.0	60.7	94.0	-33.3	None
							Block C Upstream		
22	1904.500M	58.8	+1.8		+0.0	60.6	94.0	-33.4	None
							Block E Upstream		
23	9.950M	60.3	+0.0		+0.0	60.3	94.0	-33.7	None
							Block C Upstream		
24	1853.000M	58.5	+1.8		+0.0	60.3	94.0	-33.7	None
							Block E Upstream		
25	5679.500M	56.9	+3.3		+0.0	60.2	94.0	-33.8	None
							Block F Upstream		
26	3745.000M	57.3	+2.6		+0.0	59.9	94.0	-34.1	None
							Block B Upstream		
27	3773.300M	56.7	+2.6		+0.0	59.3	94.0	-34.7	None
							Block E Upstream		
28	1893.380M	56.9	+1.8		+0.0	58.7	94.0	-35.3	None
							Block E Upstream		
29	3735.000M	55.9	+2.6		+0.0	58.5	94.0	-35.5	None
							Block D Upstream		
30	3705.000M	55.9	+2.6		+0.0	58.5	94.0	-35.5	None
							Block A Upstream		

31	3783.300M	55.8	+2.6		+0.0	58.4	94.0	-35.6	None
							Block F Upstream		
32	1880.880M	56.6	+1.8		+0.0	58.4	94.0	-35.6	None
							Block E Upstream		
33	5661.300M	54.4	+3.3		+0.0	57.7	94.0	-36.3	None
							Block E Upstream		
34	891.600M	57.6	+0.0		+0.0	57.6	94.0	-36.4	None
							Block C Upstream		
35	1860.880M	55.4	+1.8		+0.0	57.2	94.0	-36.8	None
							Block D Upstream		
36	3817.000M	54.3	+2.6		+0.0	56.9	94.0	-37.1	None
							Block C Upstream		
37	1882.000M	54.9	+1.8		+0.0	56.7	94.0	-37.3	None
							Block F Upstream		
38	1902.000M	52.8	+1.8		+0.0	54.6	94.0	-39.4	None
							Block F Upstream		
39	1876.880M	52.1	+1.8		+0.0	53.9	94.0	-40.1	None
							Block D Upstream		
40	1928.800M	49.0	+1.9		+0.0	50.9	94.0	-43.1	None
							Block C Upstream		

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **California Amplifier**
Specification: **24.238 Block F**
Work Order #: **80997** Date: 08/26/2003
Test Type: **Antenna Terminals** Time: 14:08:20
Equipment: **Bidirectional Amplifier** Sequence#: 4
Manufacturer: California Amplifier Tested By: Randal Clark
Model: 520038
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Bidirectional Amplifier*	California Amplifier	520038	001

Support Devices:

Function	Manufacturer	Model #	S/N
Power Divider	Anaren	40276	600D-7949
ESG	Agilent	E4437B	US39260124
ESG	Agilent	E4437B	US39260294
DC Power Supply	Topward Electric Instruments Co., Ltd	TPS-2000	920035
Modulation Input	HP	204D	1105A02034
Signal Generator	HP	8673C	2822A00551

Test Conditions / Notes:

Equipment is a bi-directional amplifier repeater for broadband PCS. The signal input is connected to the signal generators through a power divider. The input to the amplifier is set such that the maximum power output is achieved at the customer supplied antenna connectors. Maximum Allowable Power Output is 19dBm. Intermodulation Attenuation Test (3 Signal Method) Blocks Tested: A-F Downstream. Modulation Tested: GSM. RBW=1MHz and VBW=1MHz except in the 1MHz bandwidth outside of the assigned block where RBW=100kHz and VBW=1MHz Three input signals are chosen such the lowest and highest channels in the block are selected in addition to the third lowest channel. Frequency Range tested: 20 MHz – 20 GHz.

Transducer Legend:

T1=Cable HF P-1403

Measurement Data: Reading listed by margin. Test Distance: None

#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1961.750M	74.4	+1.9				+0.0	76.3	94.0 Block E Downstream	-17.7	None
2	1966.500M	74.3	+1.9				+0.0	76.2	94.0 Block F Downstream	-17.8	None
3	1941.750M	72.1	+1.9				+0.0	74.0	94.0 Block D Downstream	-20.0	None

4	1949.300M	72.1	+1.9		+0.0	74.0	94.0 Block B Downstream	-20.0	None
5	1978.630M	71.7	+1.9		+0.0	73.6	94.0 Block F Downstream	-20.4	None
6	1969.630M	71.5	+1.9		+0.0	73.4	94.0 Block F Downstream	-20.6	None
7	1962.000M	71.2	+1.9		+0.0	73.1	94.0 Block C Downstream	-20.9	None
8	1973.380M	70.6	+1.9		+0.0	72.5	94.0 Block E Downstream	-21.5	None
9	1944.630M	69.1	+1.9		+0.0	71.0	94.0 Block D Downstream	-23.0	None
10	1964.630M	68.9	+1.9		+0.0	70.8	94.0 Block E Downstream	-23.2	None
11	2003.000M	68.9	+1.9		+0.0	70.8	94.0 Block C Downstream	-23.2	None
12	1953.380M	68.6	+1.9		+0.0	70.5	94.0 Block D Downstream	-23.5	None
13	1936.800M	68.5	+1.9		+0.0	70.4	94.0 Block B Downstream	-23.6	None
14	1958.000M	68.1	+1.9		+0.0	70.0	94.0 Block A Downstream	-24.0	None
15	1978.300M	67.7	+1.9		+0.0	69.6	94.0 Block B Downstream	-24.4	None
16	1971.000M	65.8	+1.9		+0.0	67.7	94.0 Block E Downstream	-26.3	None
17	1976.000M	65.1	+1.9		+0.0	67.0	94.0 Block F Downstream	-27.0	None
18	1951.000M	65.0	+1.9		+0.0	66.9	94.0 Block D Downstream	-27.1	None
19	1937.880M	62.2	+1.9		+0.0	64.1	94.0 Block D Downstream	-29.9	None
20	1966.000M	62.1	+1.9		+0.0	64.0	94.0 Block B Downstream	-30.0	None

21	1957.130M	60.4	+1.9		+0.0	62.3	94.0 Block D Downstream	-31.7	None
22	1947.000M	60.4	+1.9		+0.0	62.3	94.0 Block A Downstream	-31.7	None
23	1925.800M	59.9	+1.9		+0.0	61.8	94.0 Block A Downstream	-32.2	None
24	1982.130M	59.8	+1.9		+0.0	61.7	94.0 Block F Downstream	-32.3	None
25	1963.000M	59.3	+1.9		+0.0	61.2	94.0 Block F Downstream	-32.8	None
26	1917.000M	57.6	+1.9		+0.0	59.5	94.0 Block A Downstream	-34.5	None
27	1971.500M	57.5	+1.9		+0.0	59.4	94.0 Block A Downstream	-34.6	None
28	1928.300M	57.0	+1.9		+0.0	58.9	94.0 Block A Downstream	-35.1	None
29	1495.300M	56.5	+1.6		+0.0	58.1	94.0 Block B Downstream	-35.9	None
30	3945.130M	55.0	+2.7		+0.0	57.7	94.0 Block F Downstream	-36.3	None
31	3934.880M	54.9	+2.7		+0.0	57.6	94.0 Block E Downstream	-36.4	None
32	3875.300M	54.9	+2.7		+0.0	57.6	94.0 Block A Downstream	-36.4	None
33	3895.130M	54.5	+2.7		+0.0	57.2	94.0 Block D Downstream	-36.8	None
34	1522.800M	55.5	+1.6		+0.0	57.1	94.0 Block C Downstream	-36.9	None
35	3964.500M	54.2	+2.7		+0.0	56.9	94.0 Block C Downstream	-37.1	None
36	3914.800M	54.2	+2.7		+0.0	56.9	94.0 Block B Downstream	-37.1	None
37	1477.800M	54.2	+1.6		+0.0	55.8	94.0 Block A Downstream	-38.2	None

38	997.300M	54.8	+0.0		+0.0	54.8	94.0 Block F Downstream	-39.2	None
39	1507.380M	53.1	+1.6		+0.0	54.7	94.0 Block E Downstream	-39.3	None
40	1512.750M	52.5	+1.6		+0.0	54.1	94.0 Block F Downstream	-39.9	None
41	942.000M	53.5	+0.0		+0.0	53.5	94.0 Block A Downstream	-40.5	None
42	1487.380M	51.5	+1.6		+0.0	53.1	94.0 Block D Downstream	-40.9	None
43	1992.000M	49.9	+1.9		+0.0	51.8	94.0 Block C Downstream	-42.2	None
44	1973.500M	48.8	+1.9		+0.0	50.7	94.0 Block C Downstream	-43.3	None
45	1936.800M	64.7	+1.9		+0.0	66.6	119.0 Block A Downstream	-52.4	None

Test Location: CKC Laboratories •5473A Clouds Rest • Mariposa, CA 95338 • 1-800-500-4EMC (4362)

Customer: **California Amplifier**
Specification: **24.238 Block F (Upstream)**
Work Order #: **80997** Date: 08/26/2003
Test Type: **Antenna Terminals** Time: 15:18:37
Equipment: **Bidirectional Amplifier** Sequence#: 5
Manufacturer: California Amplifier Tested By: Randal Clark
Model: 520038
S/N: 001

***Equipment Under Test* (* = EUT):**

Function	Manufacturer	Model #	S/N
Bidirectional Amplifier*	California Amplifier	520038	001

Support Devices:

Function	Manufacturer	Model #	S/N
Power Divider	Anaren	40276	600D-7949
ESG	Agilent	E4437B	US39260124
ESG	Agilent	E4437B	US39260294
DC Power Supply	Topward Electric Instruments Co., Ltd	TPS-2000	920035
Modulation Input	HP	204D	1105A02034
Signal Generator	HP	8673C	2822A00551

Test Conditions / Notes:

Equipment is a bi-directional amplifier repeater for broadband PCS. The signal input is connected to the signal generators through a power divider. The input to the amplifier is set such that the maximum power output is achieved at the customer supplied antenna connectors. Maximum Allowable Power Output is 19dBm. Intermodulation Attenuation Test (3 Signal Method) Blocks Tested: A-F Upstream. Modulation Tested: GSM. RBW=1MHz and VBW=1MHz except in the 1MHz bandwidth outside of the assigned block where RBW=100kHz and VBW=1MHz. Three input signals are chosen such the lowest and highest channels in the block are selected in addition to the third lowest channel. Frequency Range tested: 20 MHz – 20 GHz.

Transducer Legend:

T1=Cable HF P-1403

Measurement Data: Reading listed by margin. Test Distance: None

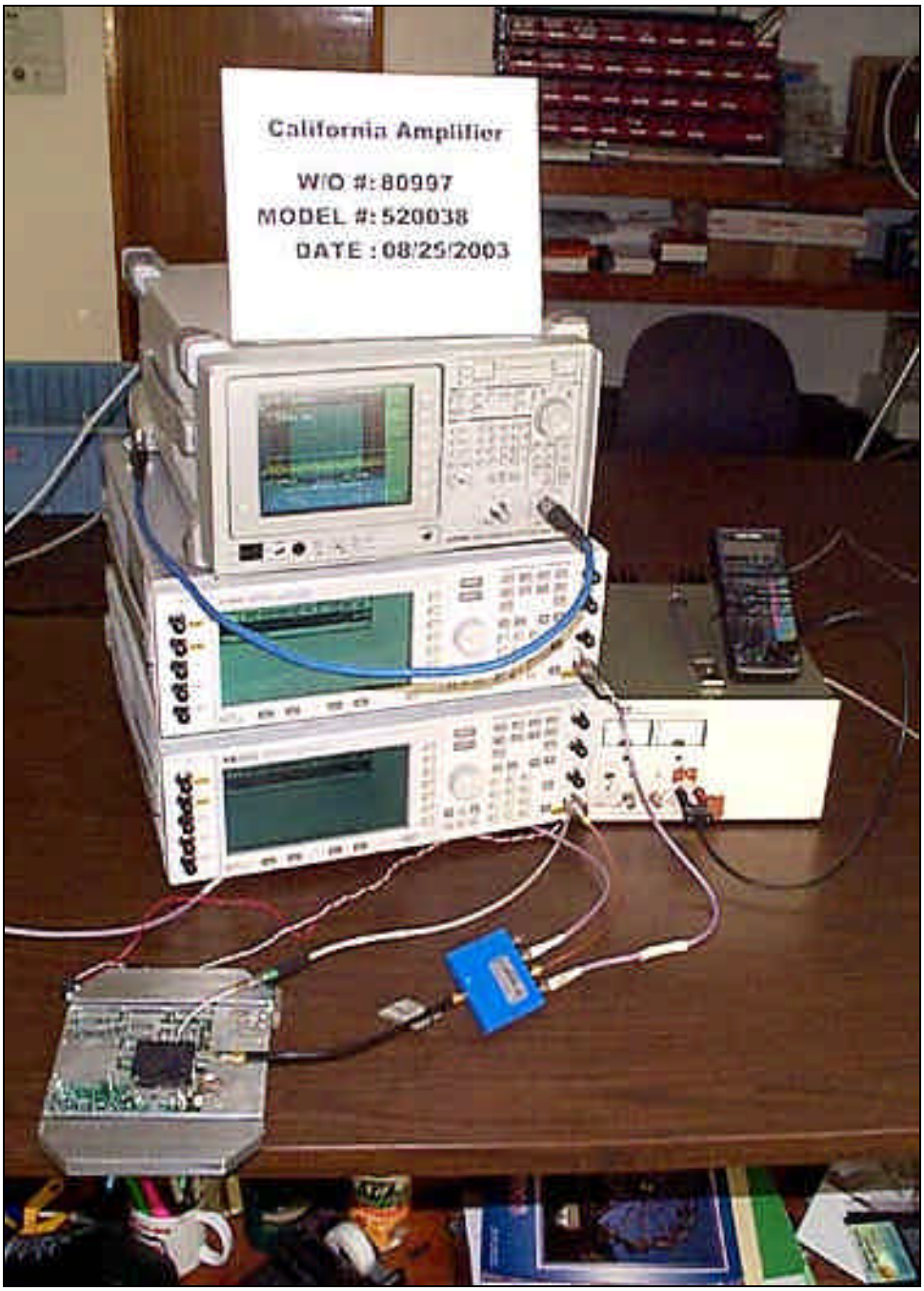
#	Freq MHz	Rdng dBµV	T1 dB	dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	1882.000M	73.4	+1.8				+0.0	75.2	94.0	-18.8	None
									Block C Upstream		
2	1886.880M	73.0	+1.8				+0.0	74.8	94.0	-19.2	None
									Block F Upstream		
3	1861.630M	72.5	+1.8				+0.0	74.3	94.0	-19.7	None
									Block D Upstream		
4	1857.300M	72.3	+1.8				+0.0	74.1	94.0	-19.9	None
									Block B Upstream		

5	1837.000M	71.8	+1.8		+0.0	73.6	94.0	-20.4	None
							Block A Upstream		
6	1881.380M	71.5	+1.8		+0.0	73.3	94.0	-20.7	None
							Block E Upstream		
7	1873.630M	71.0	+1.8		+0.0	72.8	94.0	-21.2	None
							Block D Upstream		
8	1898.500M	67.2	+1.8		+0.0	69.0	94.0	-25.0	None
							Block F Upstream		
9	1878.000M	67.2	+1.8		+0.0	69.0	94.0	-25.0	None
							Block A Upstream		
10	1897.800M	66.3	+1.8		+0.0	68.1	94.0	-25.9	None
							Block B Upstream		
11	1893.630M	66.0	+1.8		+0.0	67.8	94.0	-26.2	None
							Block E Upstream		
12	1857.380M	65.8	+1.8		+0.0	67.6	94.0	-26.4	None
							Block D Upstream		
13	1866.000M	65.2	+1.8		+0.0	67.0	94.0	-27.0	None
							Block A Upstream		
14	1877.250M	65.1	+1.8		+0.0	66.9	94.0	-27.1	None
							Block D Upstream		
15	1882.880M	64.6	+1.8		+0.0	66.4	94.0	-27.6	None
							Block F Upstream		
16	1843.300M	63.9	+1.8		+0.0	65.7	94.0	-28.3	None
							Block B Upstream		
17	1896.000M	63.3	+1.8		+0.0	65.1	94.0	-28.9	None
							Block F Upstream		
18	5565.500M	61.8	+3.2		+0.0	65.0	94.0	-29.0	None
							Block A Upstream		
19	5600.750M	60.7	+3.2		+0.0	63.9	94.0	-30.1	None
							Block D Upstream		
20	1868.000M	62.0	+1.8		+0.0	63.8	94.0	-30.2	None
							Block C Upstream		
21	1823.000M	61.7	+1.8		+0.0	63.5	94.0	-30.5	None
							Block A Upstream		
22	1902.630M	61.3	+1.8		+0.0	63.1	94.0	-30.9	None
							Block F Upstream		
23	5625.500M	59.4	+3.3		+0.0	62.7	94.0	-31.3	None
							Block B Upstream		
24	1848.300M	60.5	+1.8		+0.0	62.3	94.0	-31.7	None
							Block A Upstream		
25	7415.800M	57.5	+3.8		+0.0	61.3	94.0	-32.7	None
							Block A Upstream		
26	5700.500M	57.3	+3.3		+0.0	60.6	94.0	-33.4	None
							Block C Upstream		
27	7470.750M	56.3	+3.8		+0.0	60.1	94.0	-33.9	None
							Block D Upstream		
28	3714.800M	56.5	+2.6		+0.0	59.1	94.0	-34.9	None
							Block A Upstream		
29	3734.880M	55.8	+2.6		+0.0	58.4	94.0	-35.6	None
							Block D Upstream		

30	3775.250M	55.6	+2.6		+0.0	58.2	94.0	-35.8	None
							Block E Upstream		
31	1911.500M	55.5	+1.9		+0.0	57.4	94.0	-36.6	None
							Block B Upstream		
32	5675.380M	53.6	+3.3		+0.0	56.9	94.0	-37.1	None
							Block F Upstream		
33	5661.000M	53.3	+3.3		+0.0	56.6	94.0	-37.4	None
							Block E Upstream		
34	1922.800M	54.0	+1.9		+0.0	55.9	94.0	-38.1	None
							Block C Upstream		
35	877.250M	55.3	+0.0		+0.0	55.3	94.0	-38.7	None
							Block F Upstream		
36	3785.000M	52.7	+2.6		+0.0	55.3	94.0	-38.7	None
							Block F Upstream		
37	852.300M	55.3	+0.0		+0.0	55.3	94.0	-38.7	None
							Block B Upstream		
38	839.880M	54.9	+0.0		+0.0	54.9	94.0	-39.1	None
							Block D Upstream		

Test Equipment

Description	***Asset #***	***Manufacturer***	***Model #***	***Serial #***	***Cal Date***	***Cal Due***
Spectrum Analyzer, 9kHz to 26.5 GHz	02111	HP	8593EM	3624A00159	5/12/03	5/11/05
Cable-HF	P01403	Semiflex	58758-23	0038	1/21/03	1/21/04

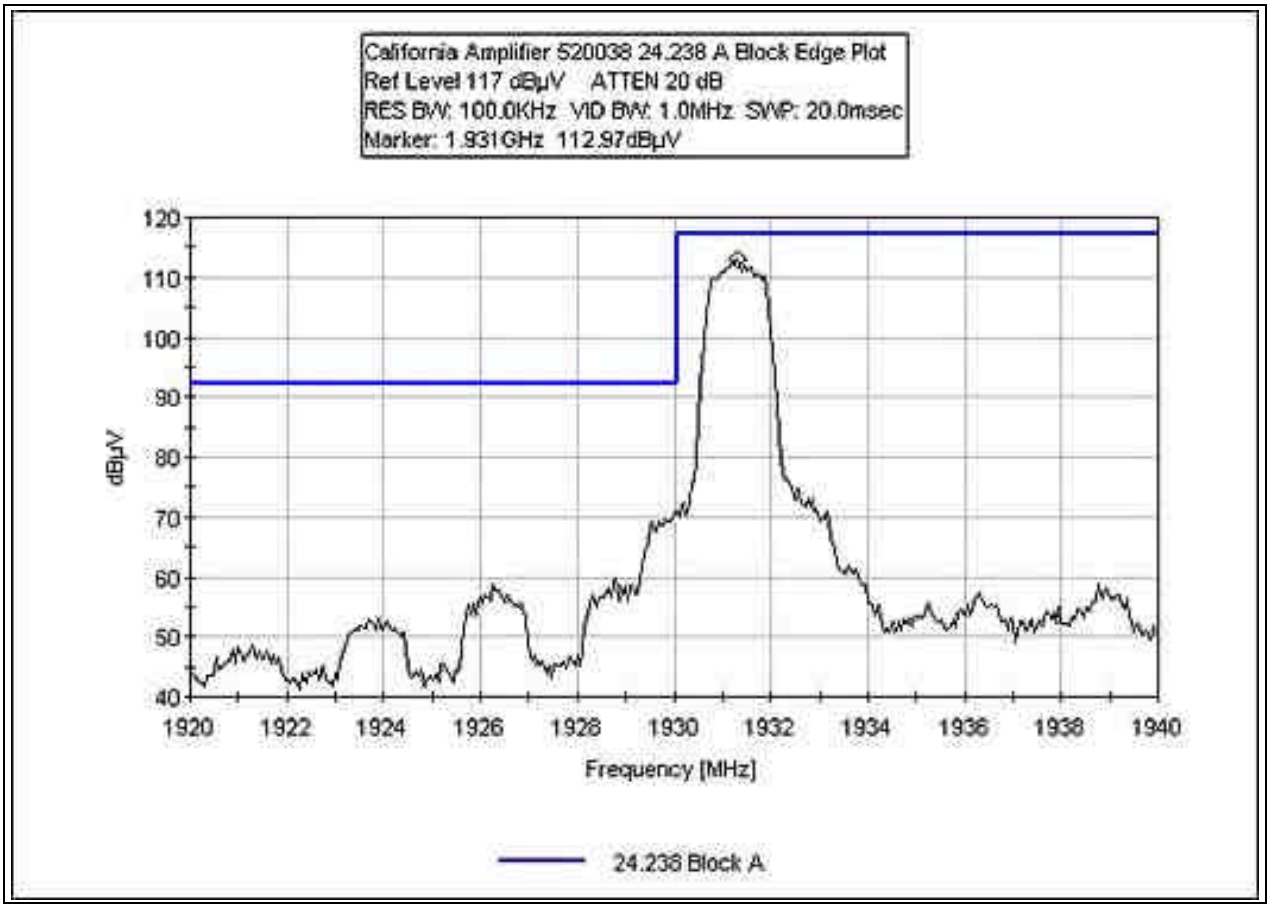


Direct Connect

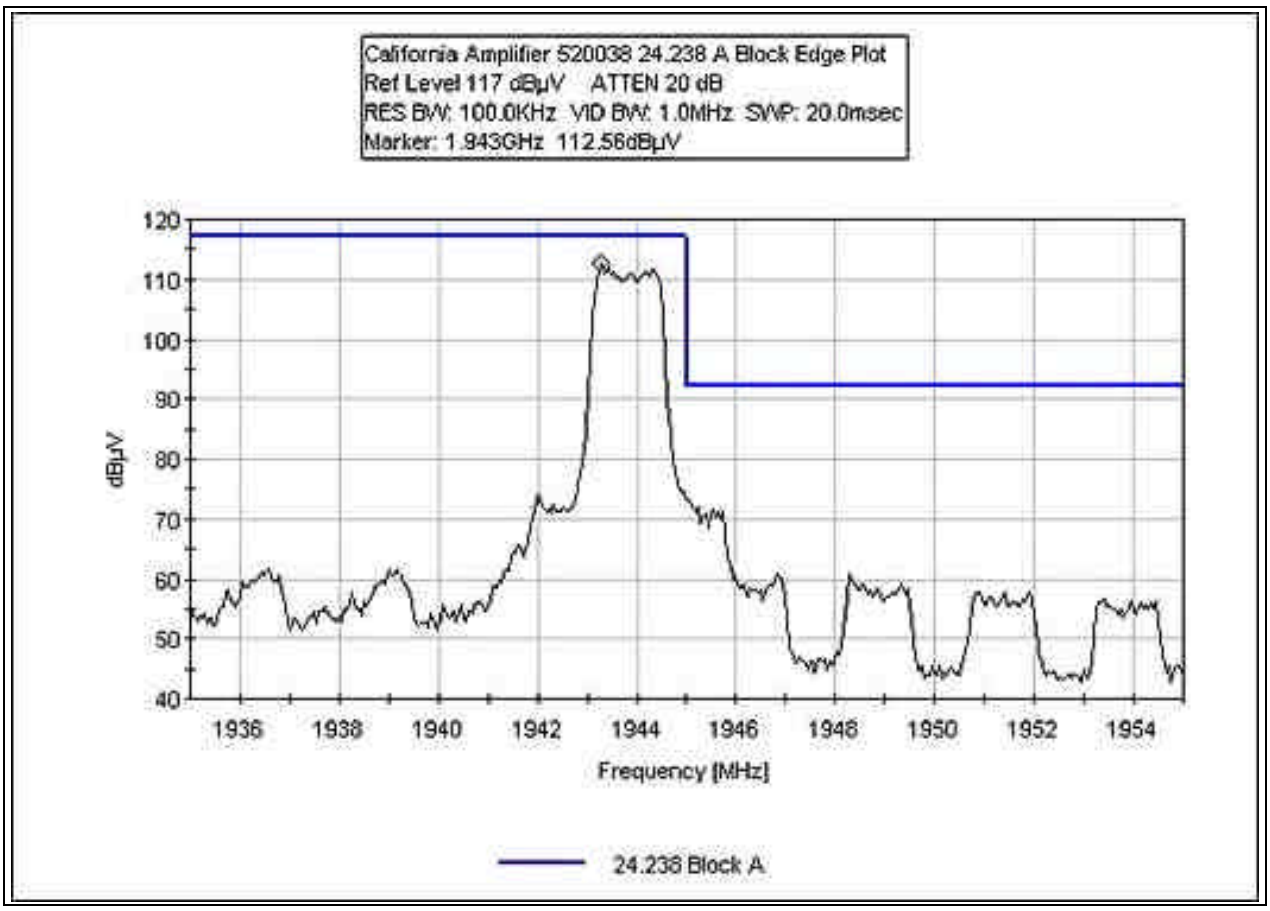
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238A LO

Test Setup: Equipment is a bi-directional amplifier repeater for broadband PCS. The signal input is connected to the signal generators through a power divider. The input to the amplifier is set such that the maximum power output is achieved at the customer supplied antenna connectors. Maximum Allowable Power Output is 19dBm.

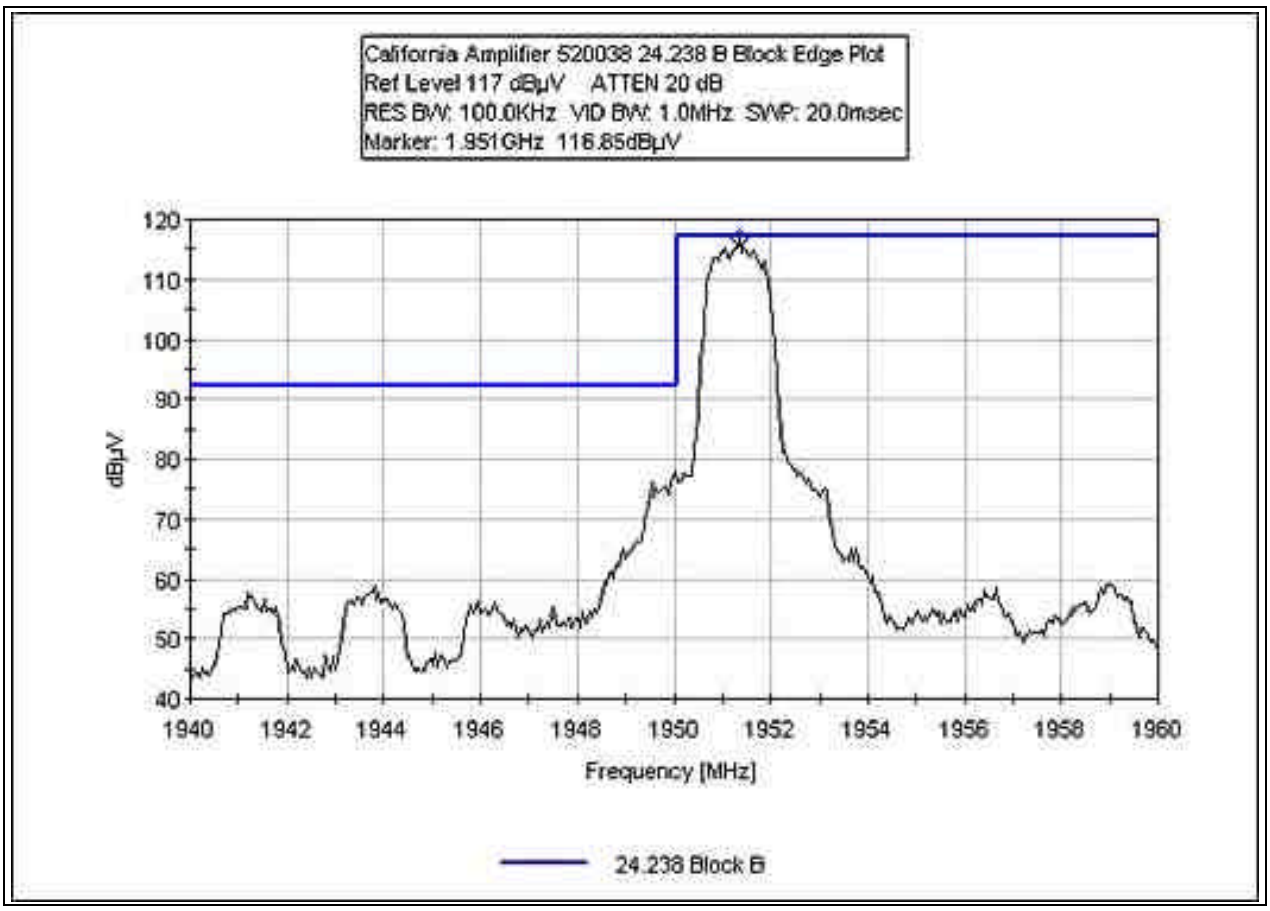
Block edge measurements are performed on the worst case modulation: CDMA. Input channels are selected such that the highest and lowest channels are used.



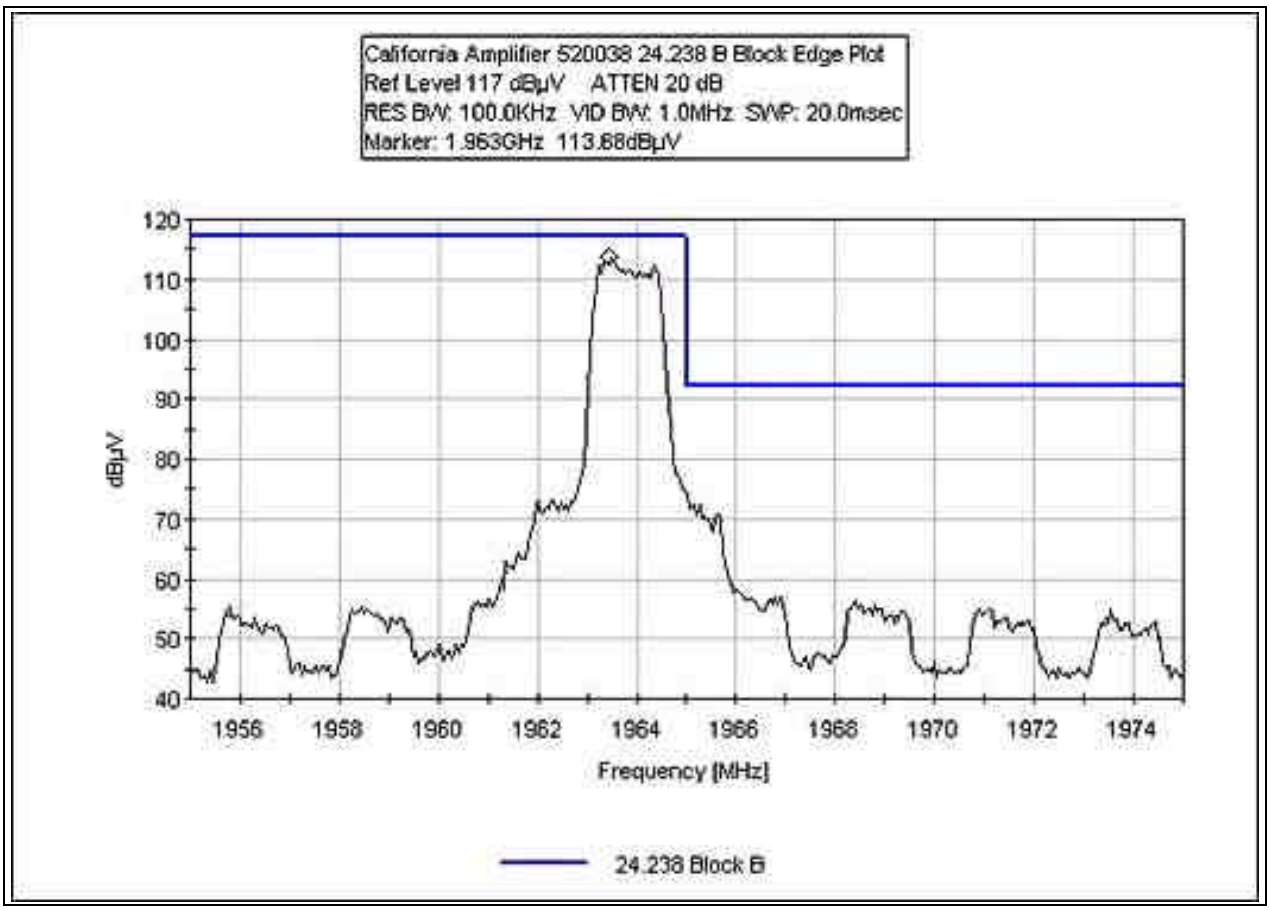
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238A HIGH



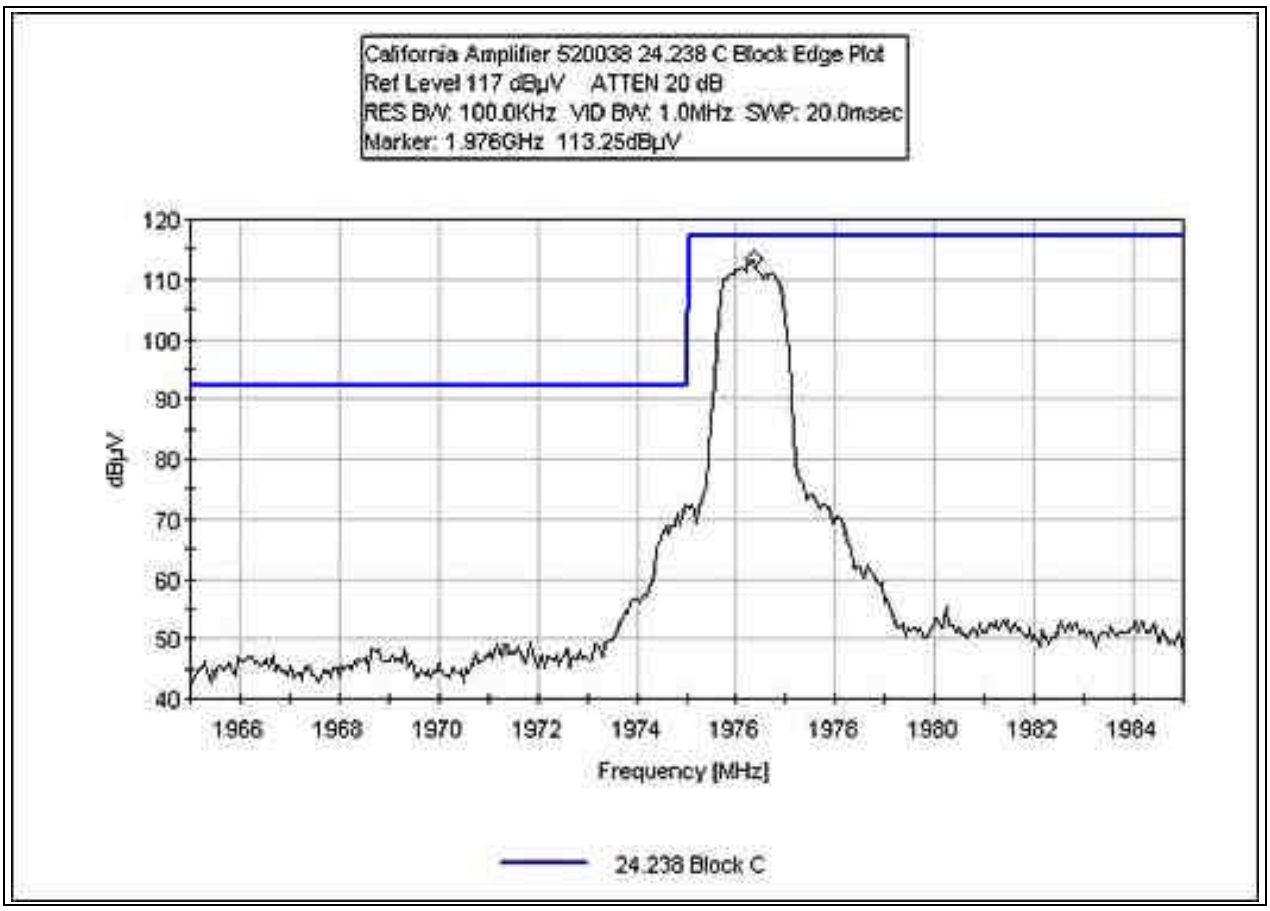
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238B LOW



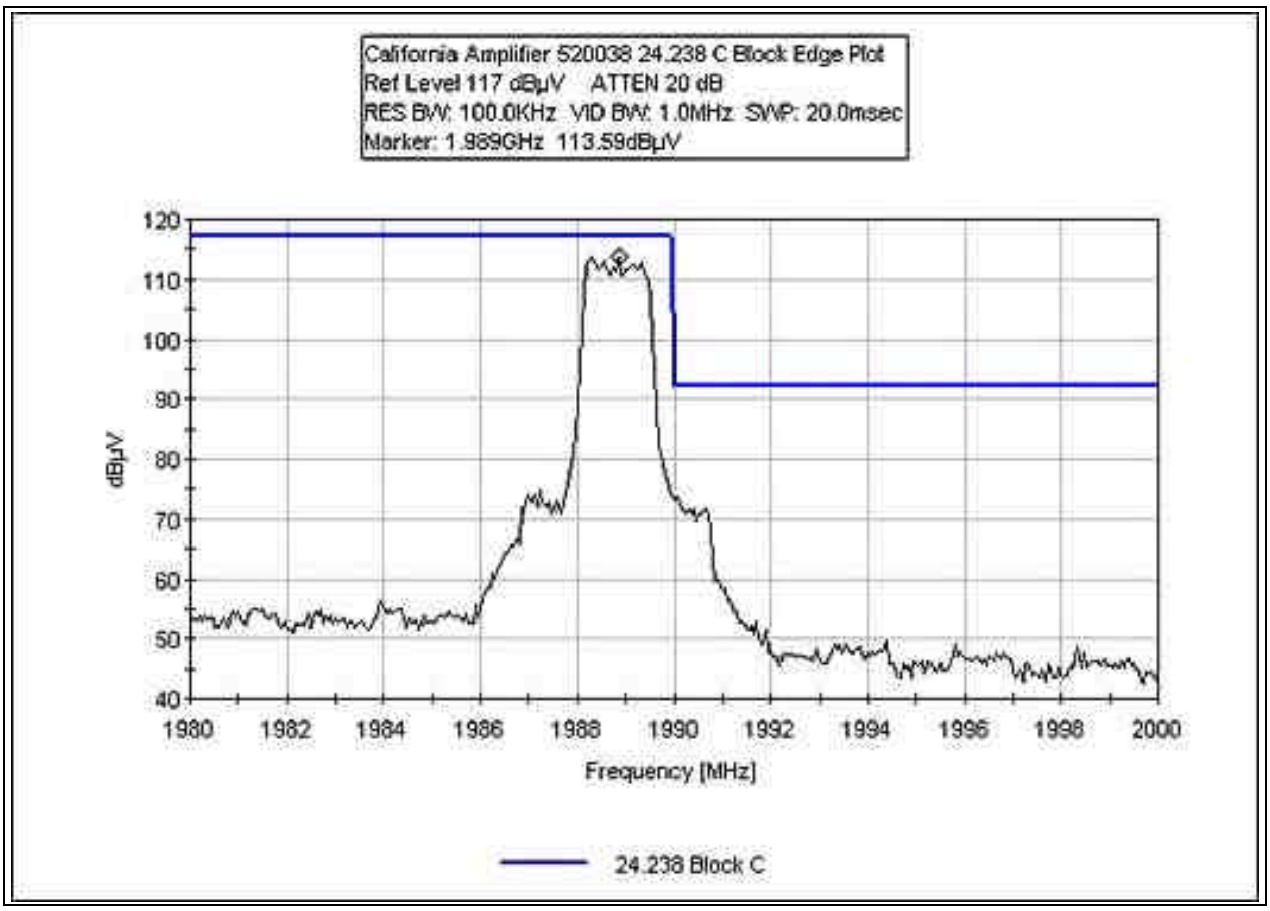
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238B HIGH



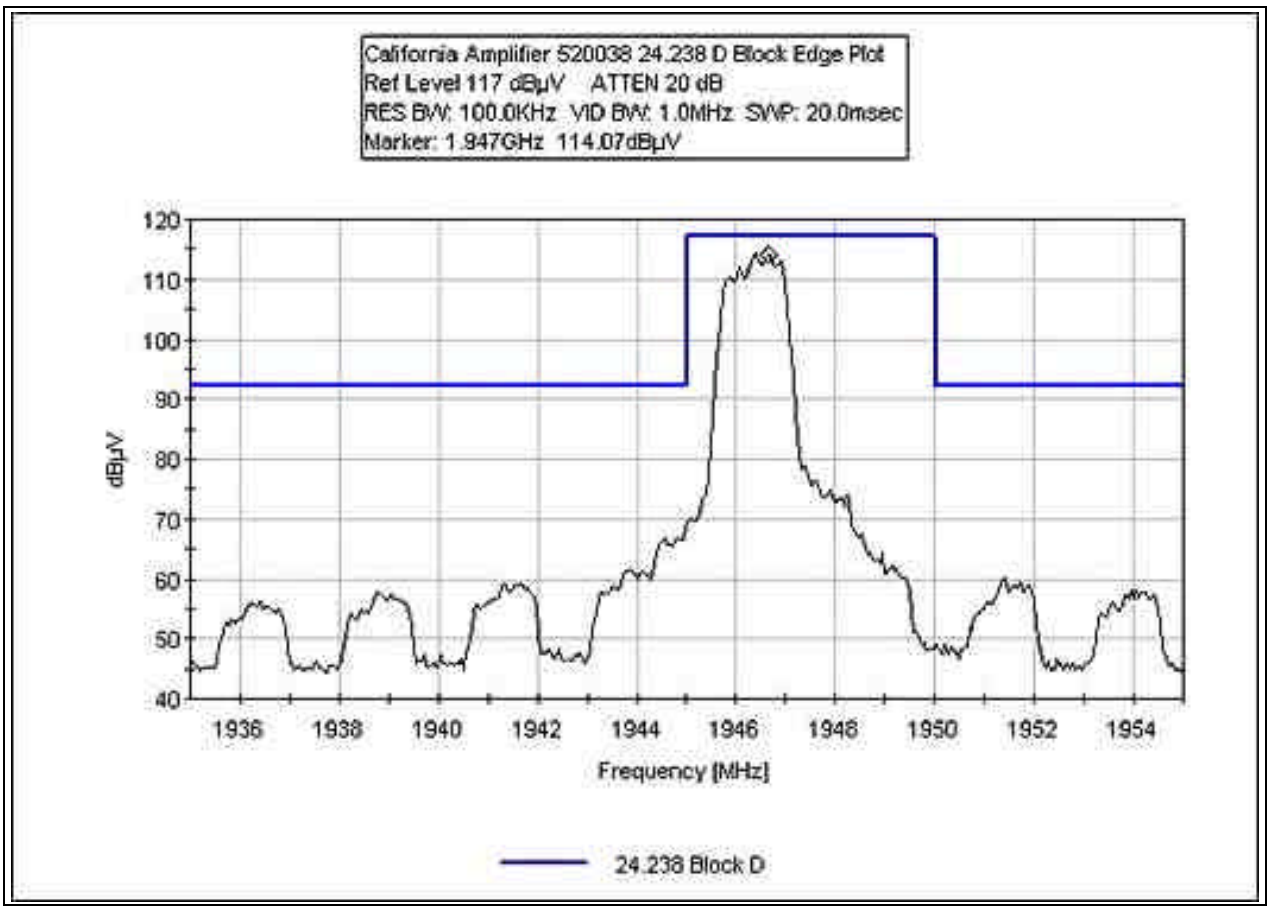
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238C LOW



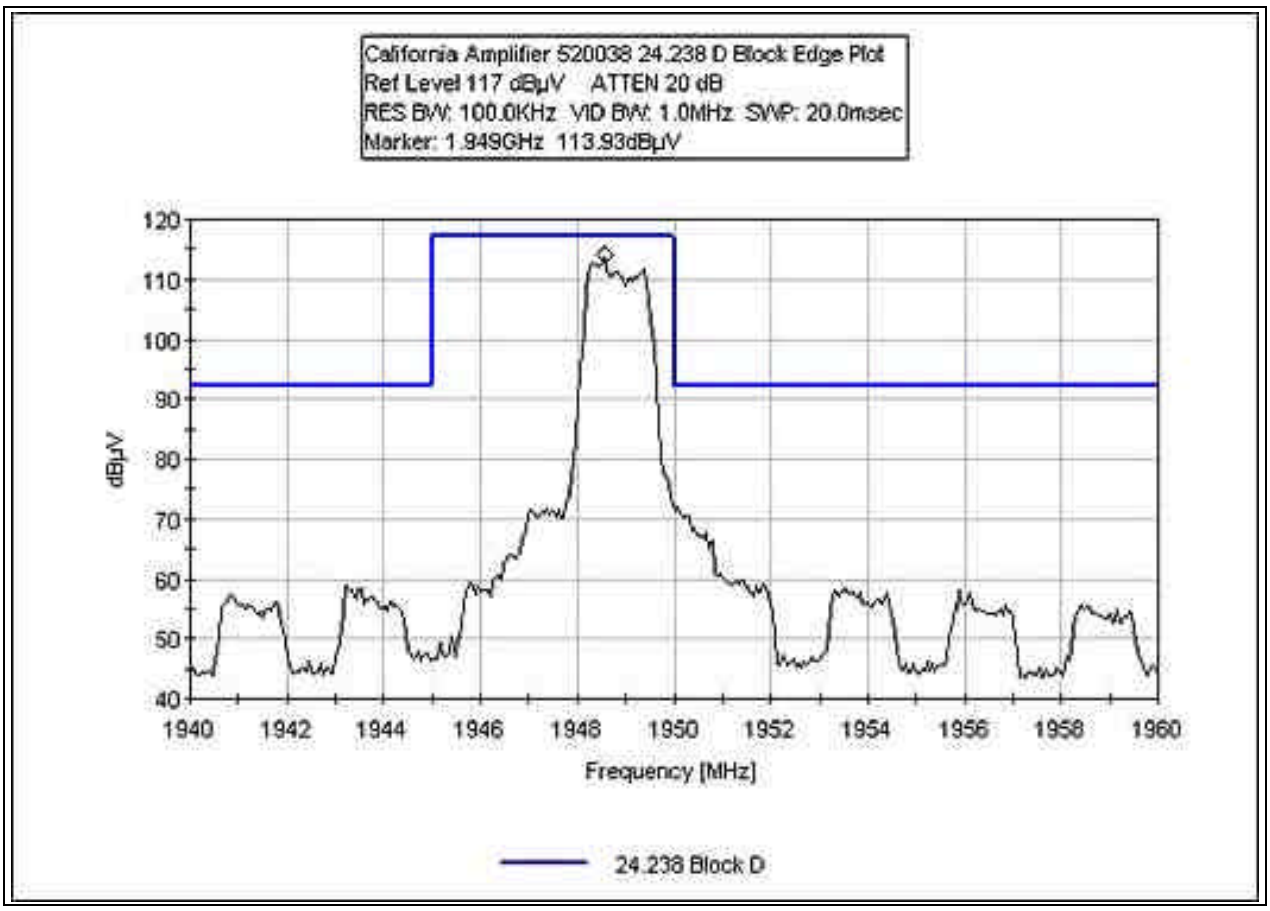
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238C HIGH



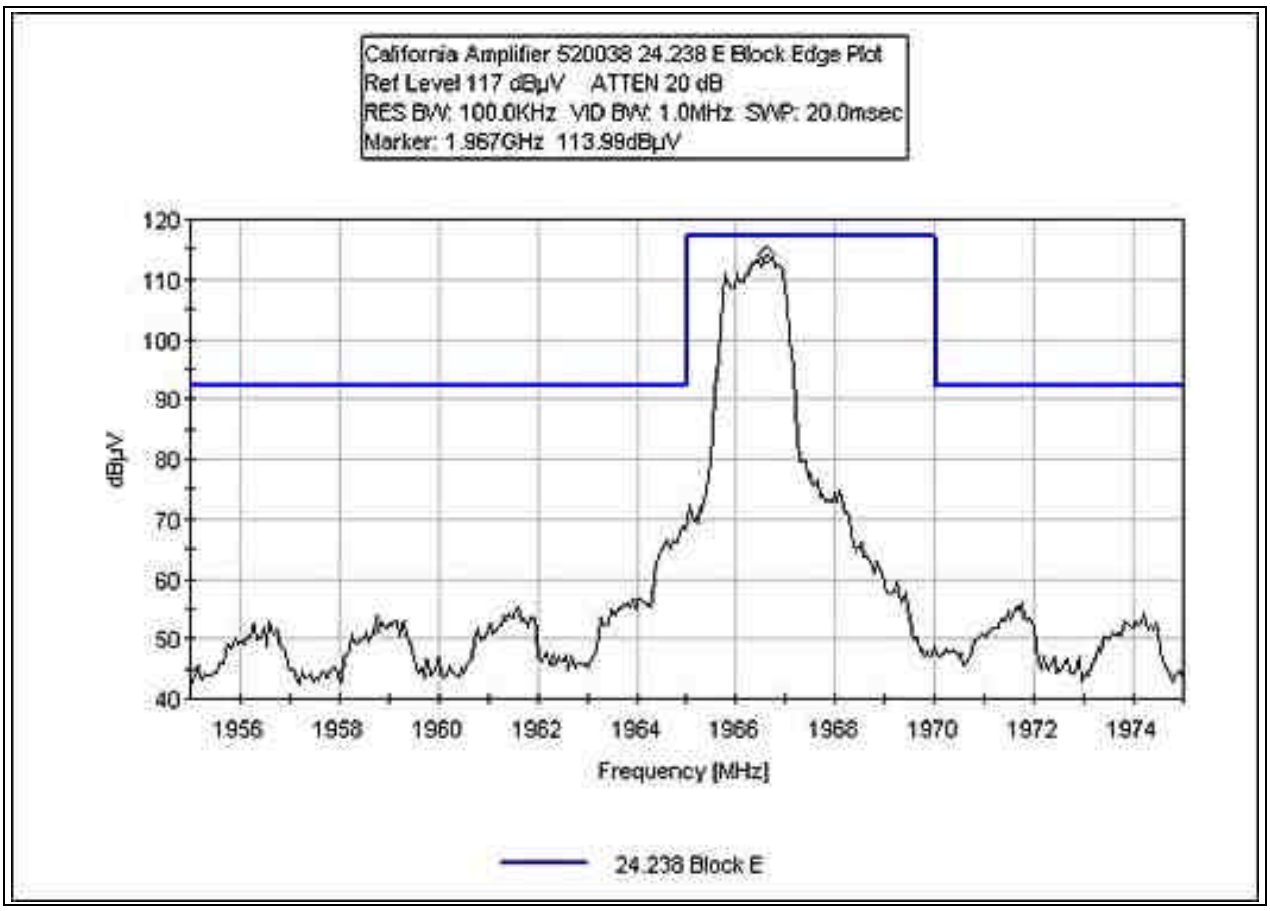
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238D LOW



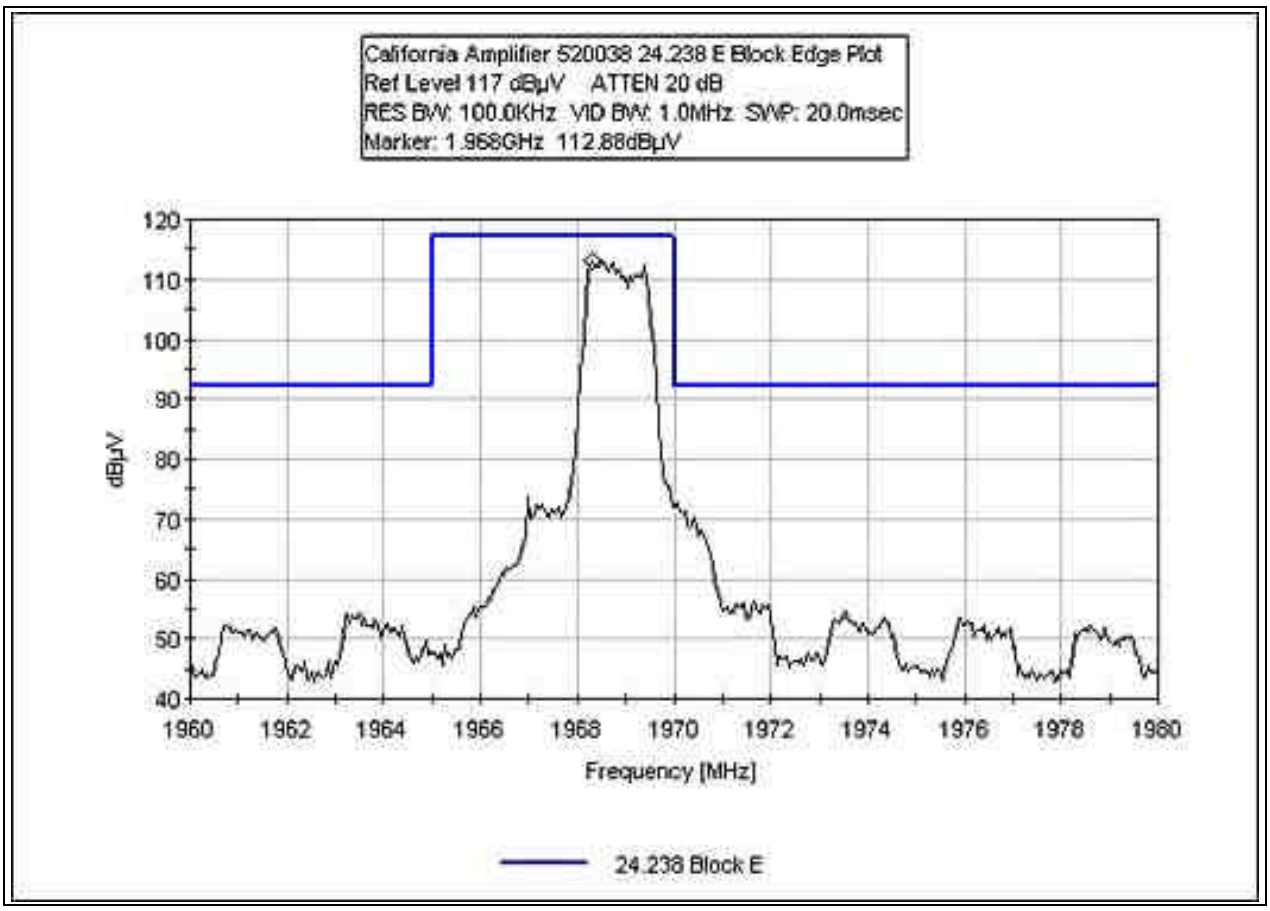
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238D HIGH



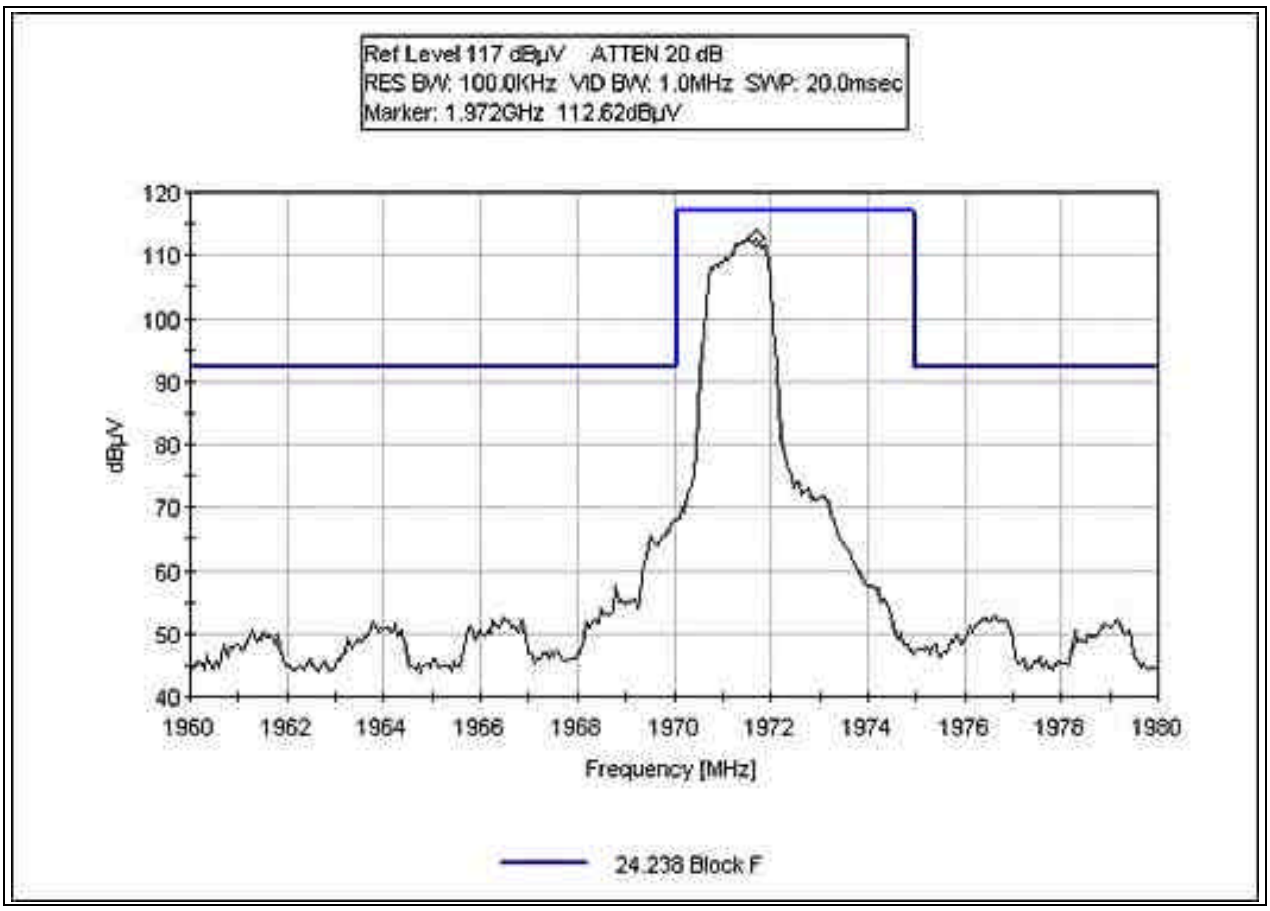
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238E LOW



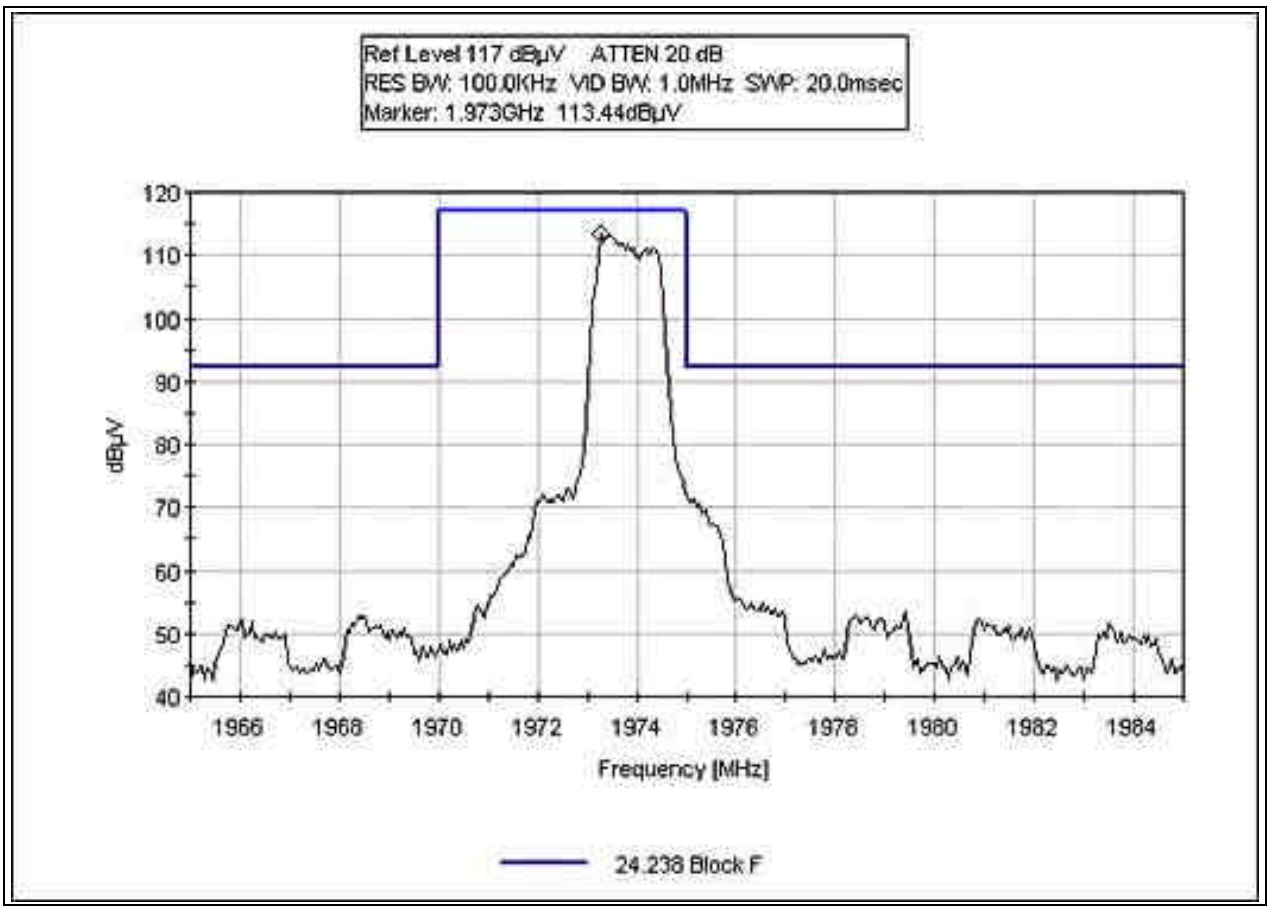
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238E HIGH



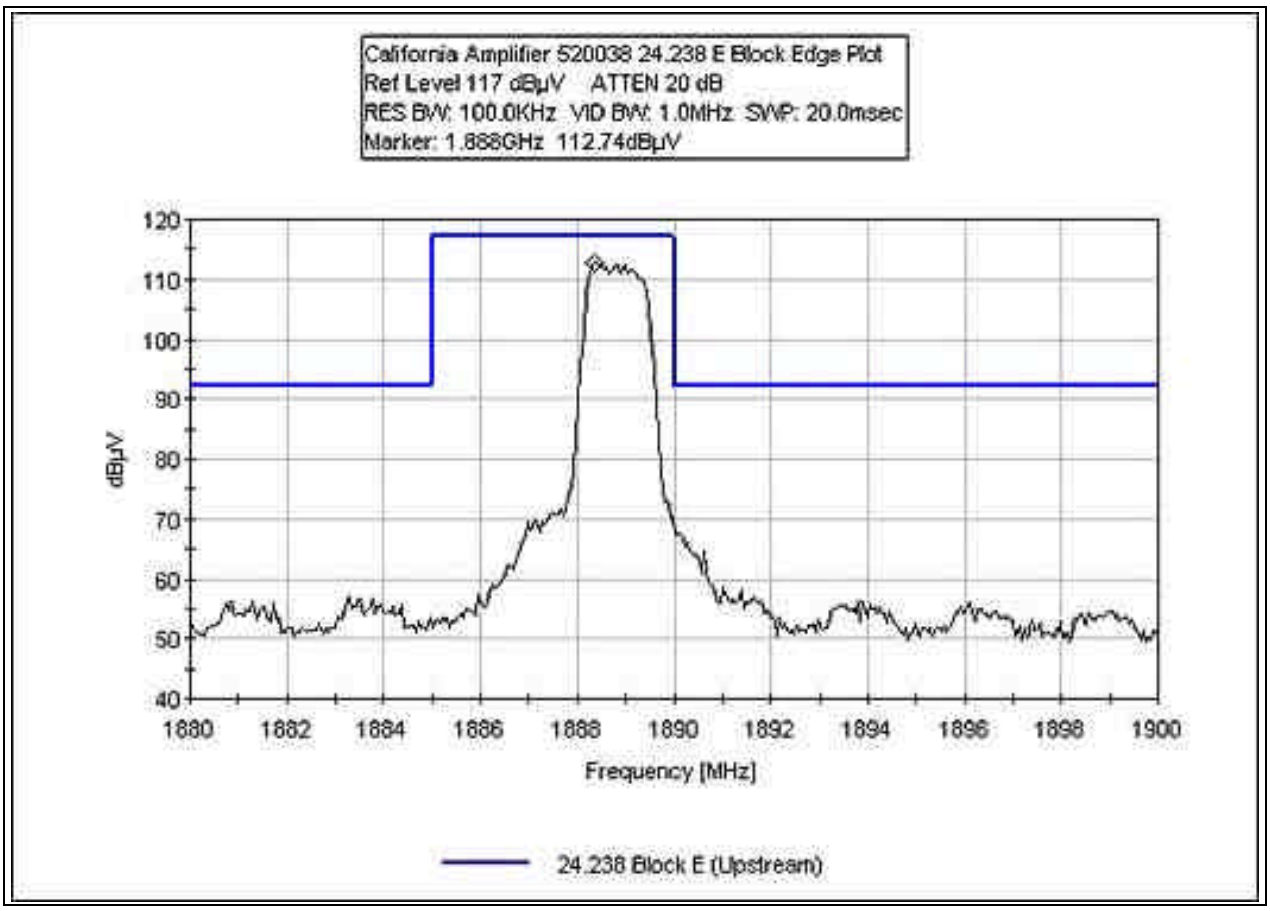
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238F LOW



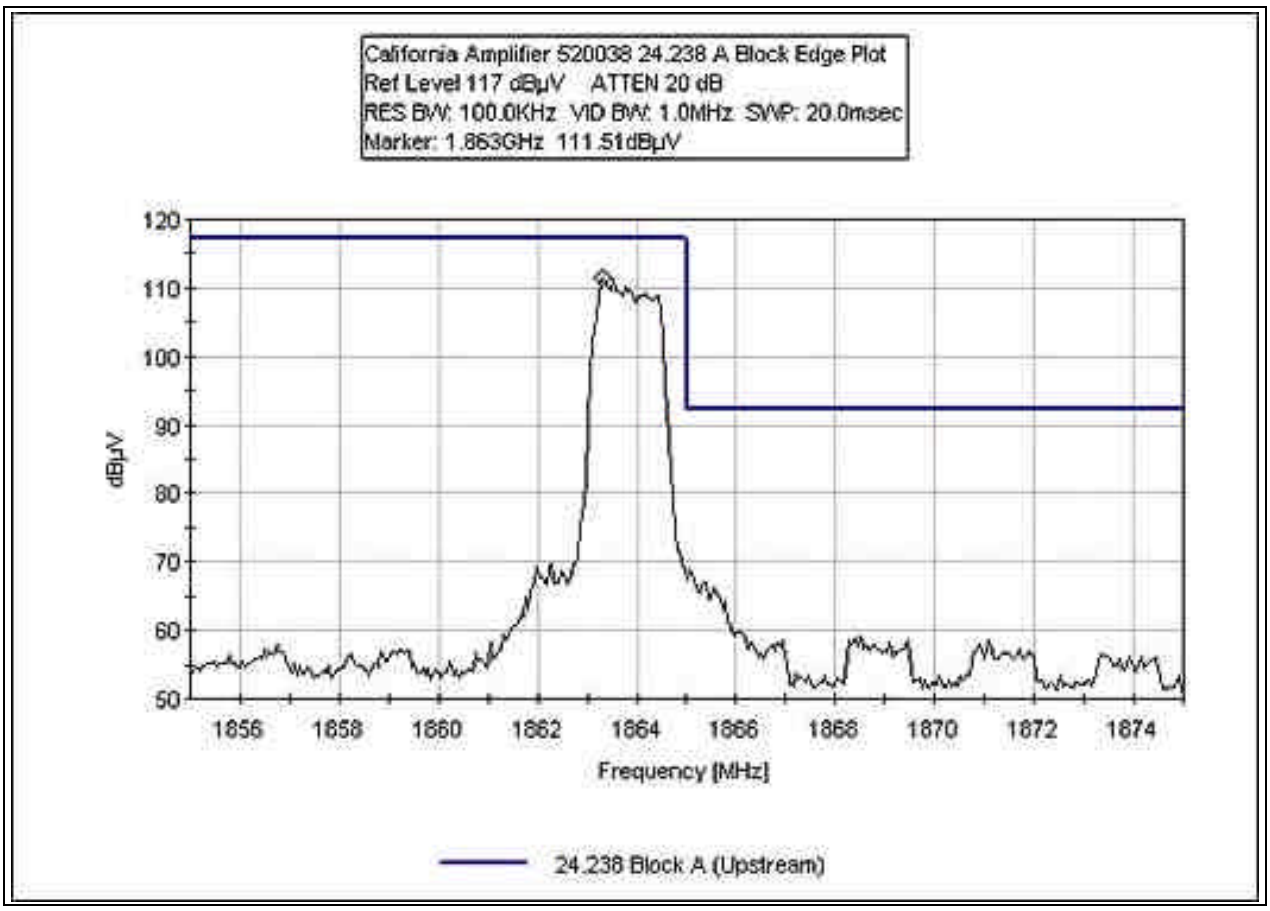
BLOCK EDGE PLOT - DOWNSTREAM CDMA 24.238F HIGH



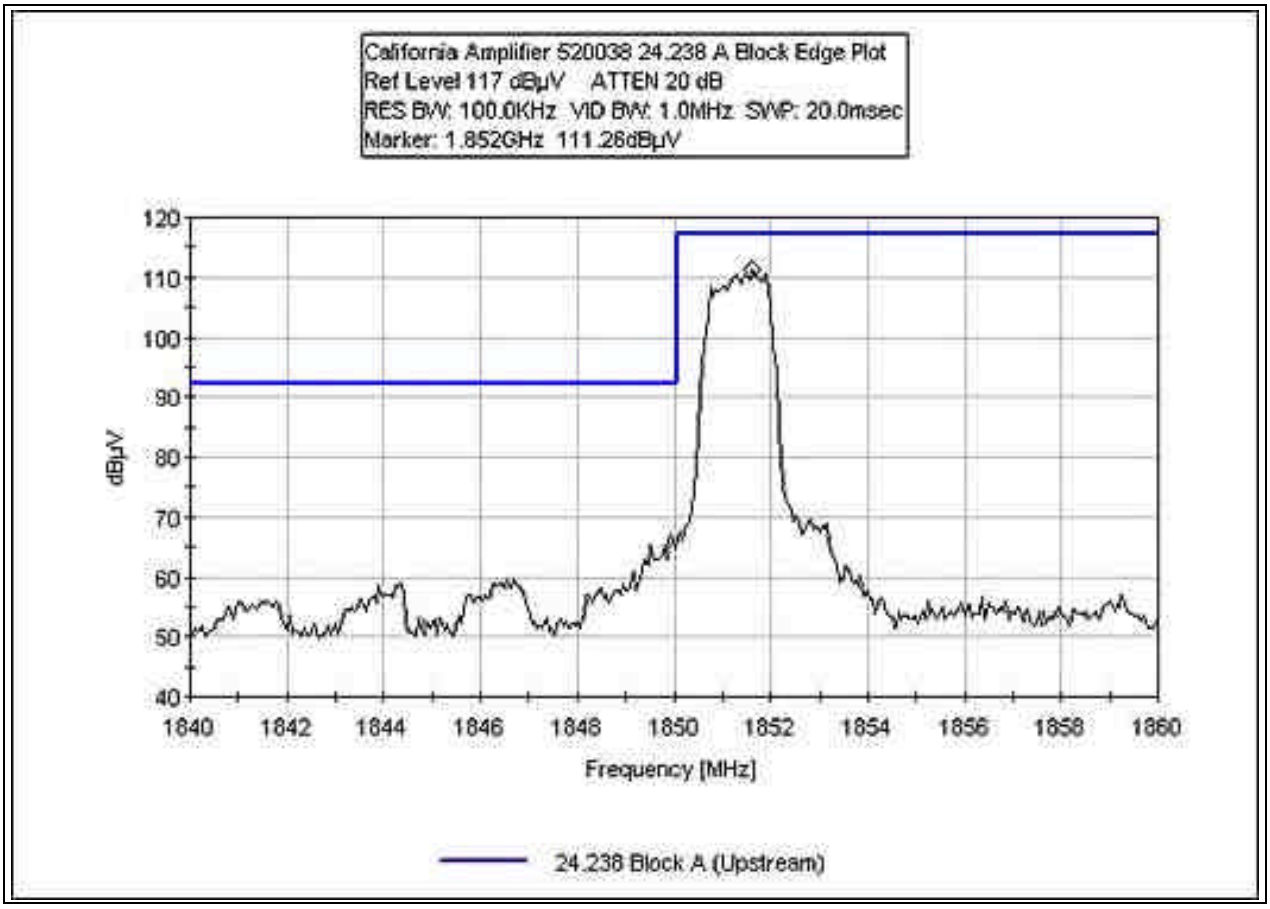
BLOCK EDGE PLOT - UPSTREAM CDMA E HIGH



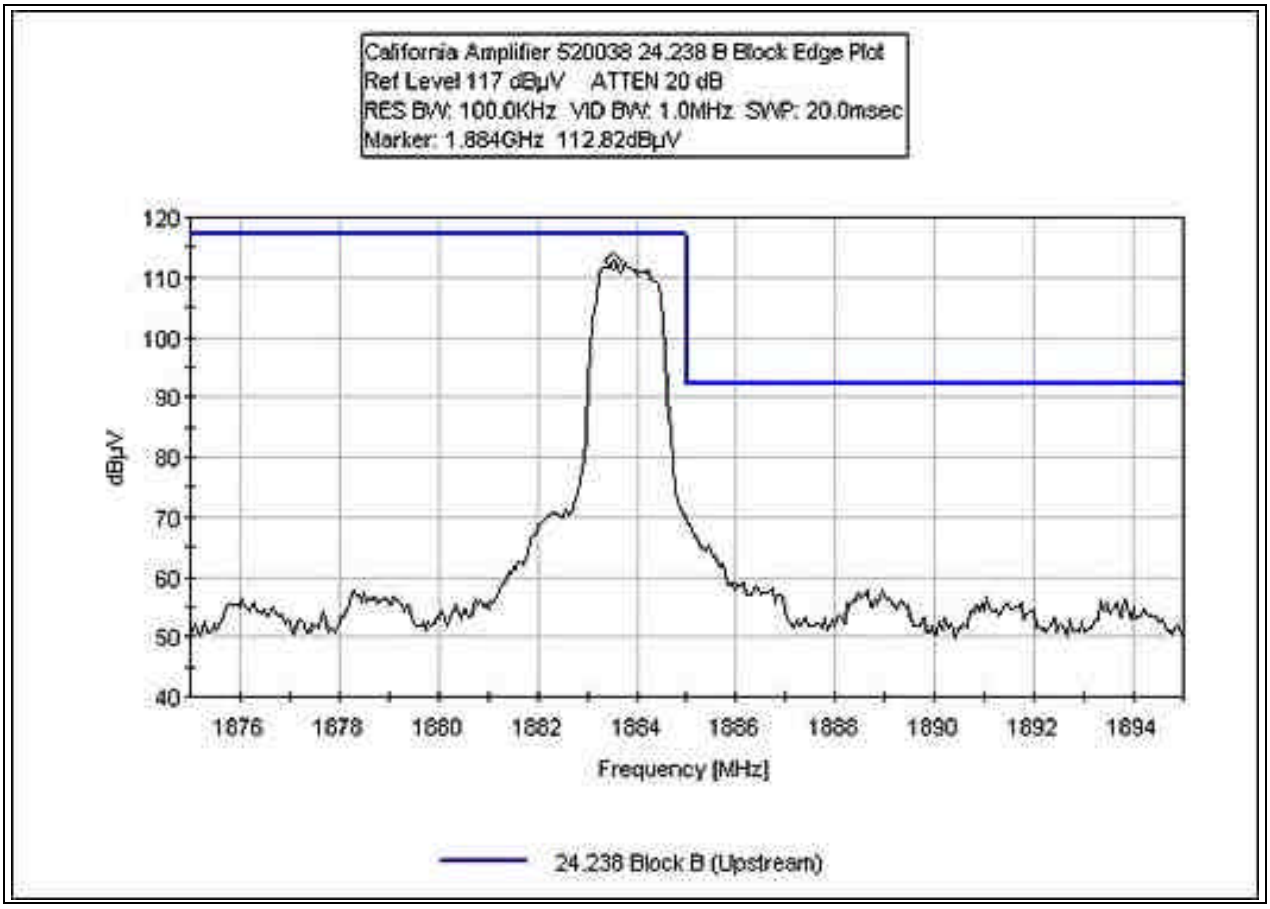
BLOCK EDGE PLOT - UPSTREAM CDMA A HIGH



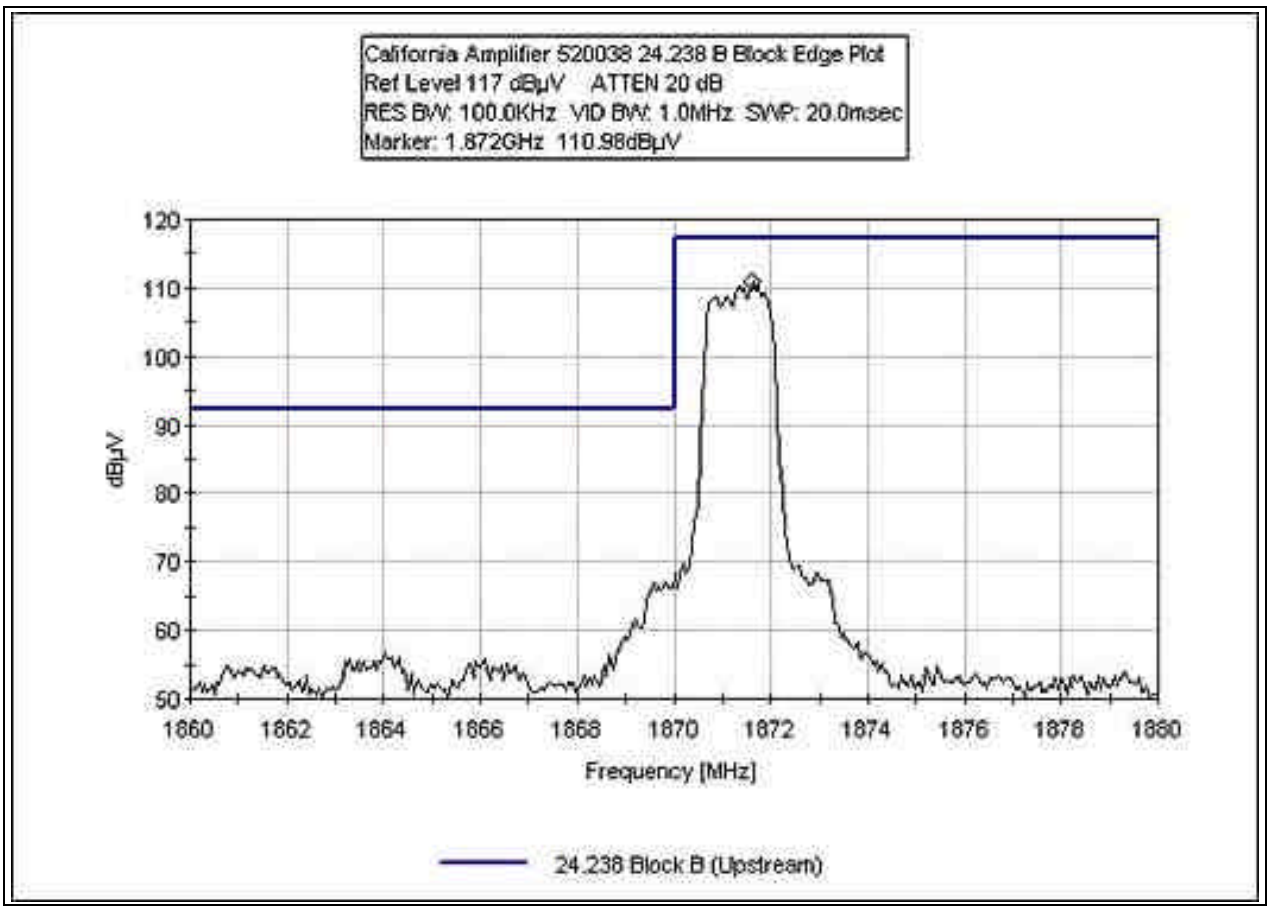
BLOCK EDGE PLOT - UPSTREAM CDMA A LOW



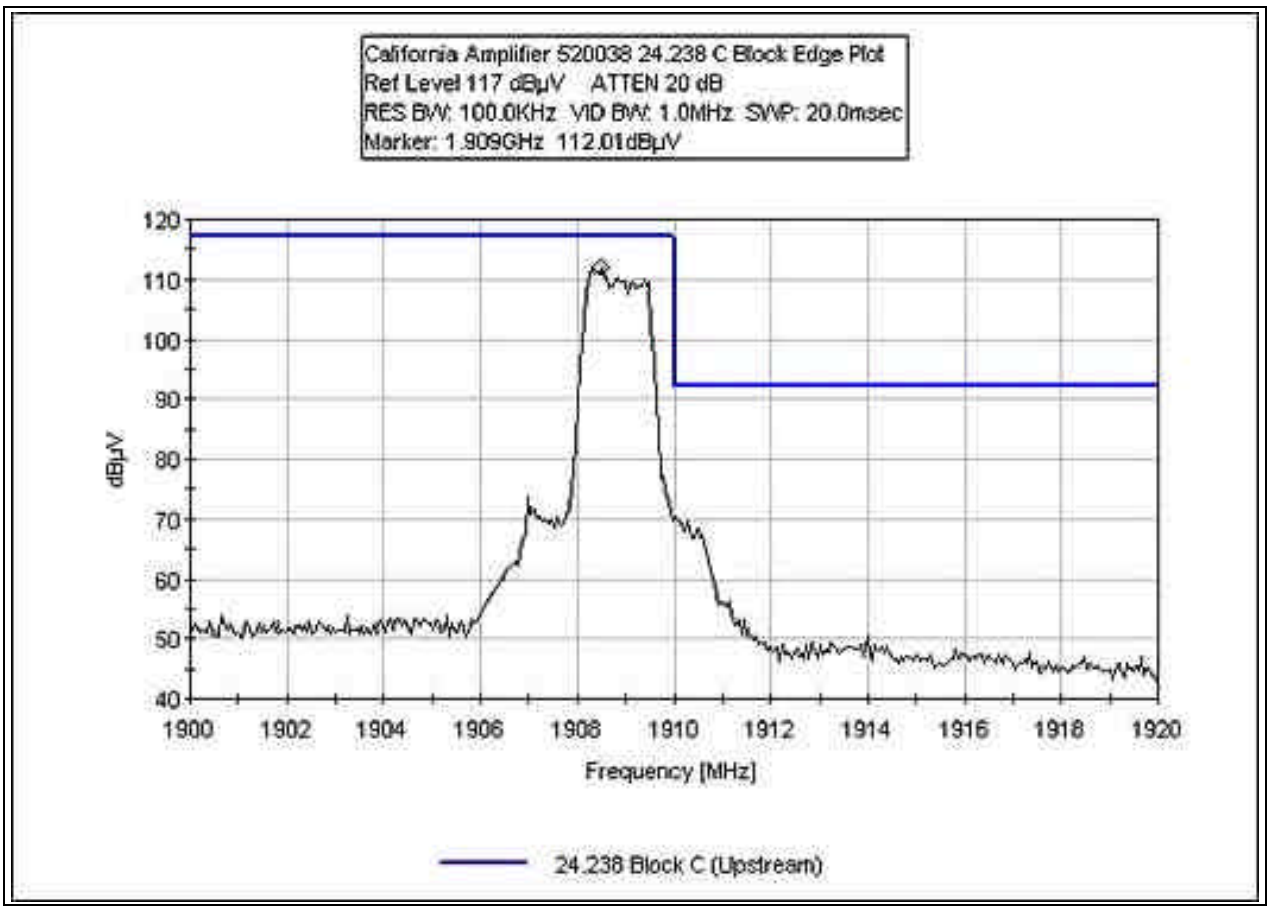
BLOCK EDGE PLOT - UPSTREAM CDMA B HIGH



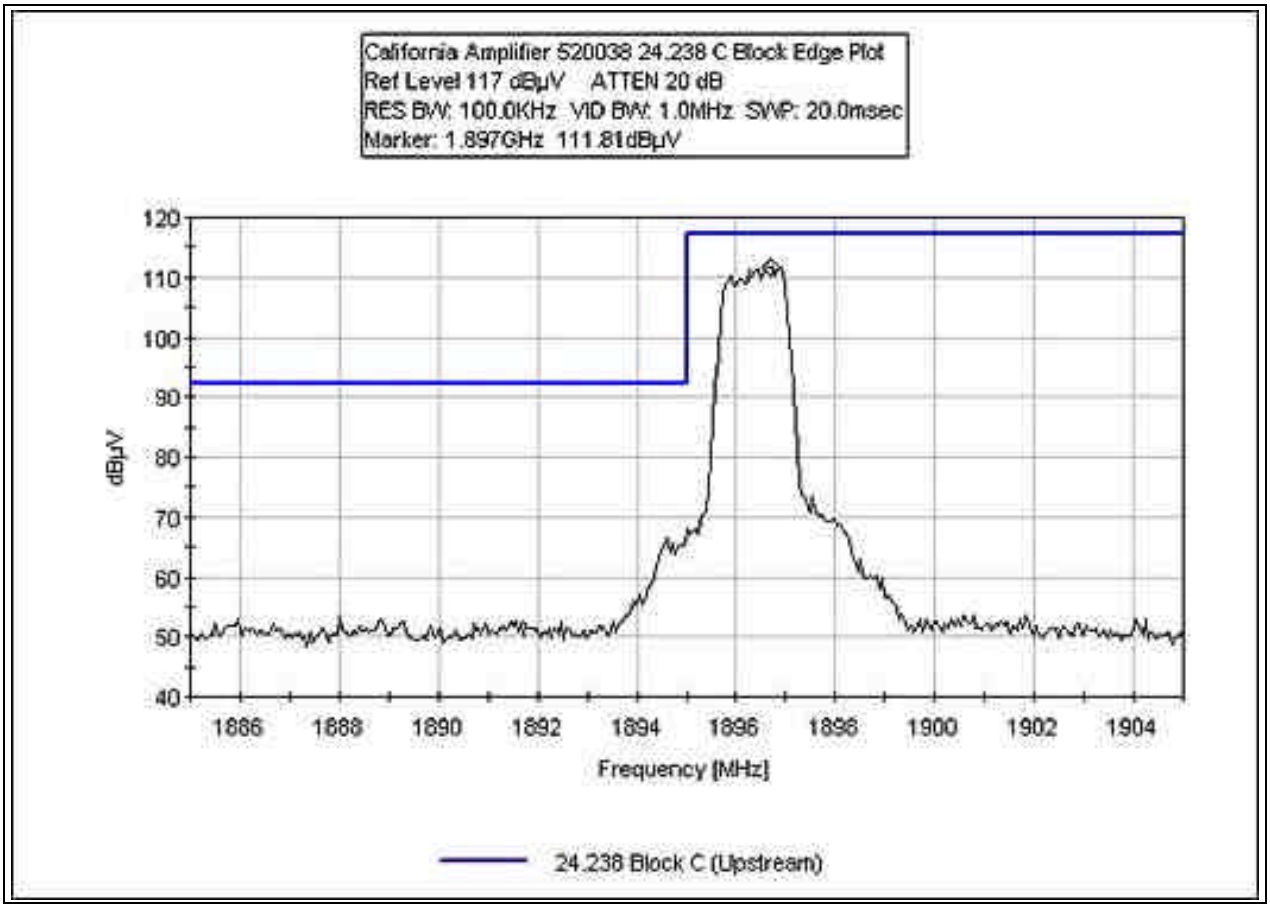
BLOCK EDGE PLOT - UPSTREAM CDMA B LOW



BLOCK EDGE PLOT - UPSTREAM CDMA C HIGH



BLOCK EDGE PLOT - UPSTREAM CDMA C LOW



BLOCK EDGE PLOT - UPSTREAM CDMA D HIGH