SC4812T Lite 1X/EVDO @ 800 MHz CDMA BTS

TEST REPORT EXHIBIT

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A	Summary of RF Measurements
B	Modulation Characteristics
C	Spurious & Harmonic Emissions Radiated
D	Spurious & Harmonic Emissions Conducted
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F	Frequency Stability

Section A

Summary of RF Measurements

Summary of Radiated RF Measurements

Maximum Radiated RF Spur Levels for SC4812T LITE EVDO @ 800MHz CDMA BTS

Channel / Voltage	*Spurious Frequency (MHz)*	*Antenna Polarity*	*Measured Radiated Field Strength (dBuV/m)*	*Measured Radiated Field Strength (dBm) (Note 1)*	*Cable Loss (dB)*	*Antenna Gain (dB)*	*Equivalent Transmit Power (dBm)*	*(Pass/ Fail)*
770/ -48V DC	5611.11	H	50.4	-44.828	5.2	8.0	-44.6	Pass

Note:

1. Converting dBuV/M to dBm at 3 meters:
   (dBuV/M) + 9.542 – 104.77 = dBm
   Converting dBuV/M to dBm at 10 meters:
   (dBuV/M) + 20 – 104.77 = dBm

Francisco J Avalos 09.14.04

Signature Date

Francisco Avalos

Summary of Radiated RF Measurements

Maximum Radiated RF Spur Levels for SC4812T LITE 1X @ 800MHz CDMA BTS

Channel / Voltage	*Spurious Frequency (MHz)*	*Antenna Polarity*	*Measured Radiated Field Strength (dBuV/m)*	*Measured Radiated Field Strength (dBm) (Note 1)*	*Cable Loss (dB)*	*Antenna Gain (dB)*	*Equivalent Transmit Power (dBm)*	*(Pass/ Fail)*
1013 / 208V AC	1739.42	V	50.7	-44.528	5.2	8.0	-44.6	Pass

Note:

1. Converting dBuV/M to dBm at 3 meters:
   (dBuV/M) + 9.542 – 104.77 = dBm
   Converting dBuV/M to dBm at 10 meters:
   (dBuV/M) + 20 – 104.77 = dBm

Brian A. Daniel 4-3-03

Signature Date

Brian Daniel
Lead EMI Engineer

Summary of Conducted RF Measurements

SC4812T LITE EVDO @ 800MHz CDMA BTS

FCC Part 22

CHANNEL	VOLTAGE	FREQUENCY (GHz)	SPUR LEVEL MEASURED (dBµV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
770	-48V DC	7.720	75.80	-31.20	-13	Pass

Francisco J. Avalos 09.14.04

Signature Date

Francisco Avalos

Summary of Conducted RF Measurements

SC4812T LITE 1X @ 800MHz CDMA BTS

FCC Part 22

CHANNEL	VOLTAGE	FREQUENCY (GHz)	SPUR LEVEL MEASURED (dBµV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
777	-48V DC	9.82641	88.65	-18.35	-13	Pass

Brian M. Daniel 4-3-03

Signature Date

Brian Daniel
Lead EMI Engineer

Section B

Summary of Modulation Characteristics

SC4812T LITE EVDO@ 800MHz CDMA BTS

CHANNEL / VOLTAGE	TUNE FREQUENCY (MHz)	RHO Measured	RHO Specifications	PASS / FAIL
770 / -48V DC	893.1	0.99720	> 0.970	Pass
1020 / 27V DC	869.91	0.99718	> 0.970	Pass

The BTS was configured for maximum power out of 49.54 dBm and minimum power out of 36.5 dBm respectively. The output power was set respectively to 90 Watts or 4.5 Watts using a power meter.

Francisco J Avalos 09.14.04

Signature Date

Francisco Avalos

Summary of Modulation Characteristics

SC4812T LITE 1X @ 800MHz CDMA BTS

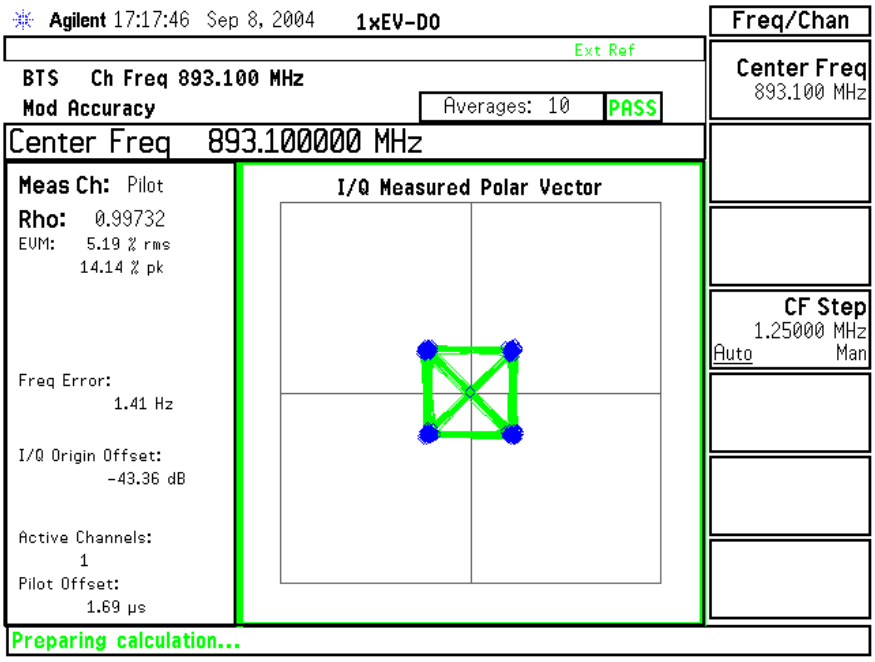
CHANNEL / VOLTAGE	TUNE FREQUENCY (MHz)	RHO Measured	RHO Specifications	PASS / FAIL
777 / -48V DC	893.31	0.98309	> 0.912	Pass
1013 / -48V DC	869.7	0.98328	> 0.912	Pass

The BTS was configured for maximum power out of 49.54 dBm and minimum power out of 26.0 dBm respectively. The output power was set respectively to 90 Watts or 400 mWatts using a power meter

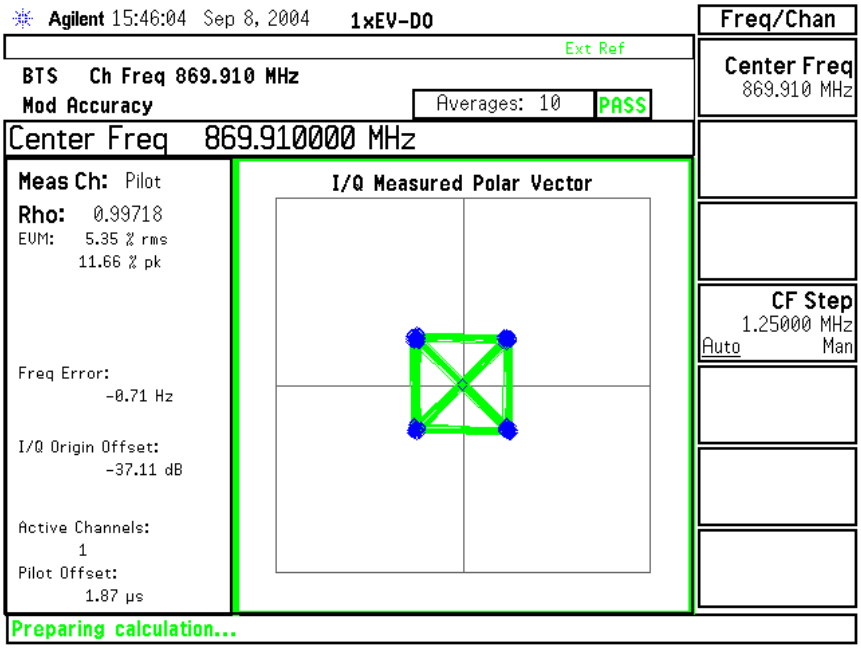
Signature Date

Brian Daniel
Lead EMI Engineer

27V DC-EVDO – Modulation Characteristics – 4.5 W

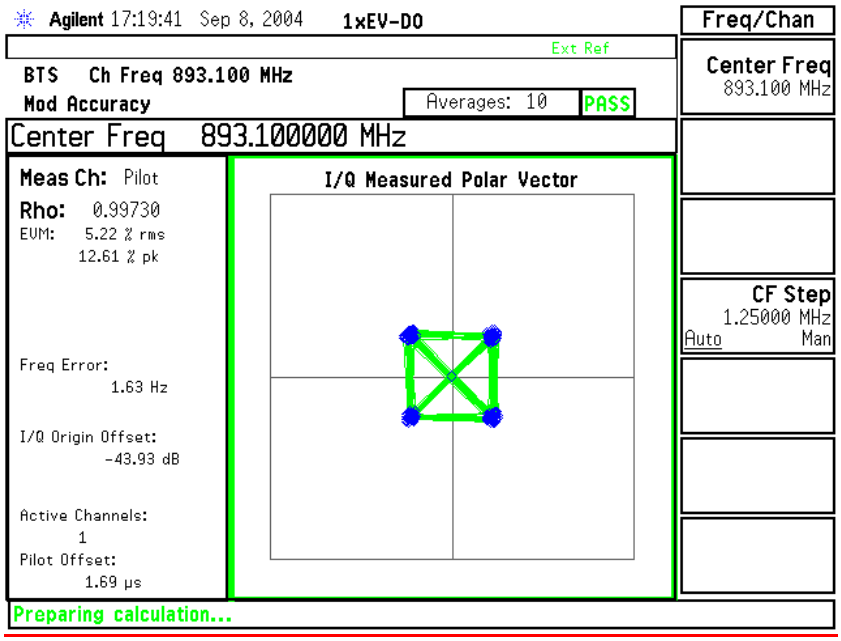


Channel 770 – 893.1 MHz

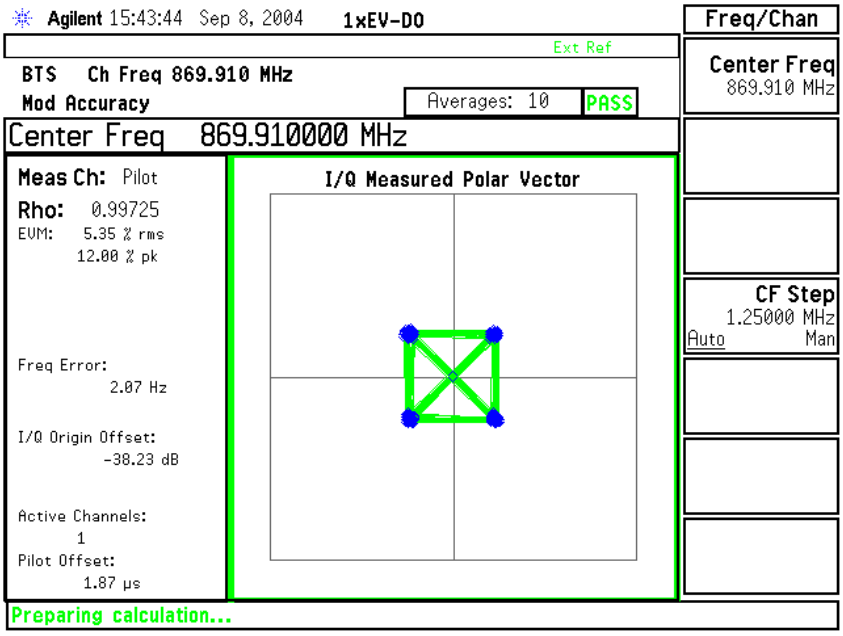


Channel 1020 – 869.91 MHz

27V DC-EVDO – Modulation Characteristics – 90 W

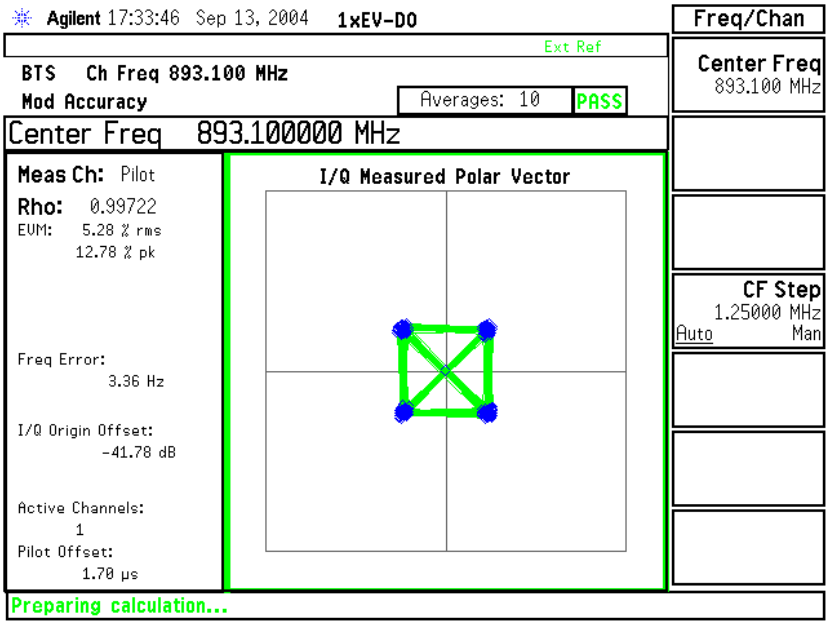


Channel 770 – 893.1 MHz

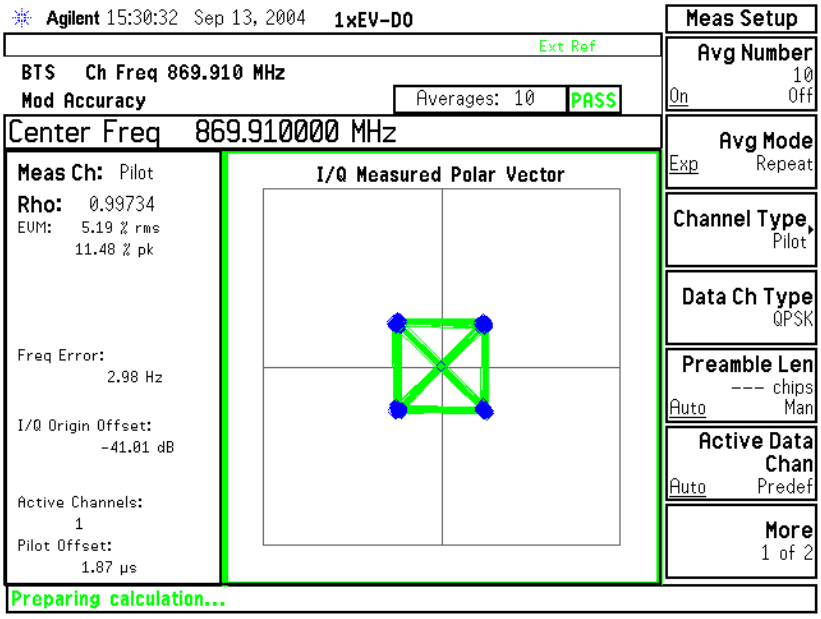


Channel 1020 – 869.91 MHz

-48V DC-EVDO – Modulation Characteristics – 4.5 W

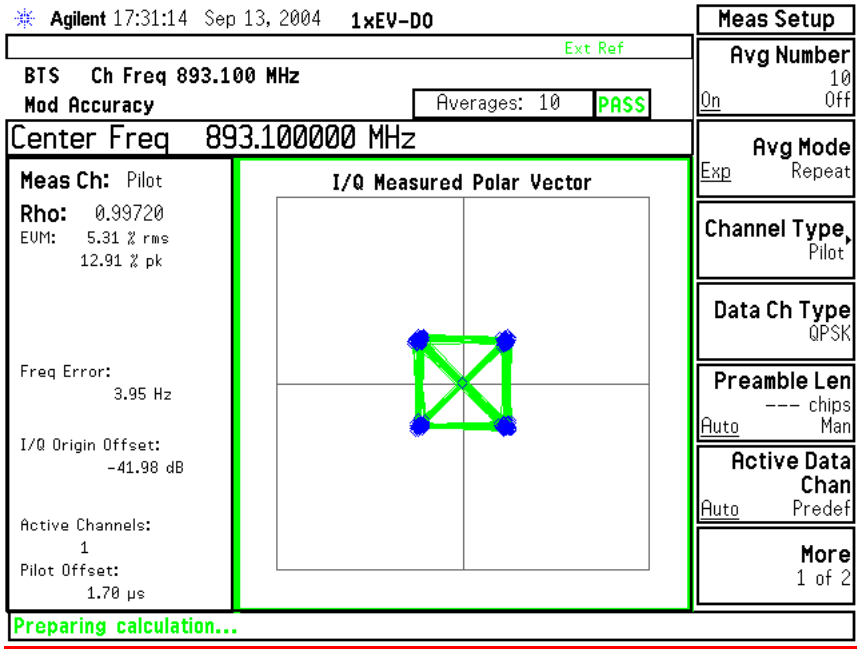


Channel 770 – 893.1 MHz

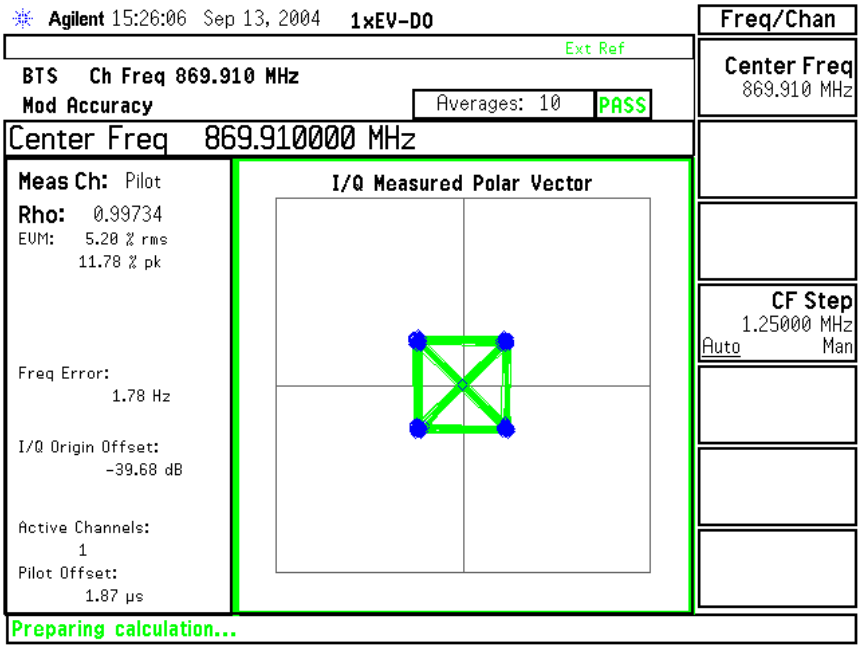


Channel 1020 – 869.91 MHz

-48V DC-EVDO – Modulation Characteristics – 90 W

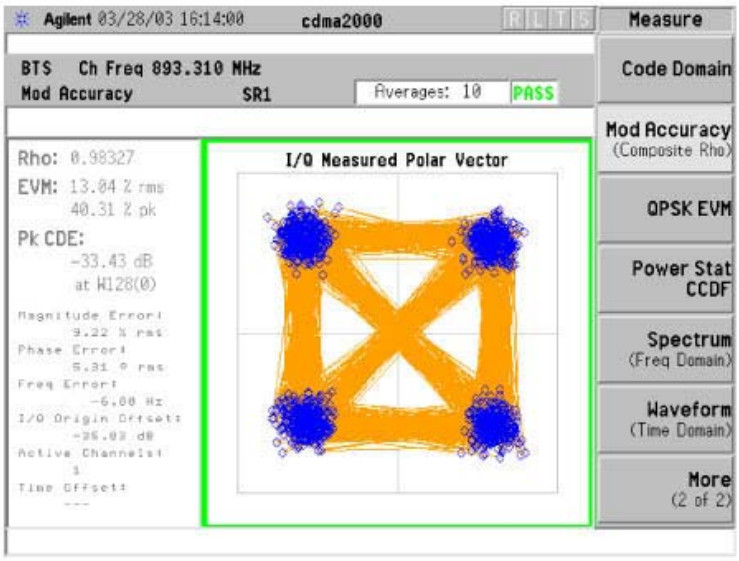


Channel 770 – 893.1 MHz

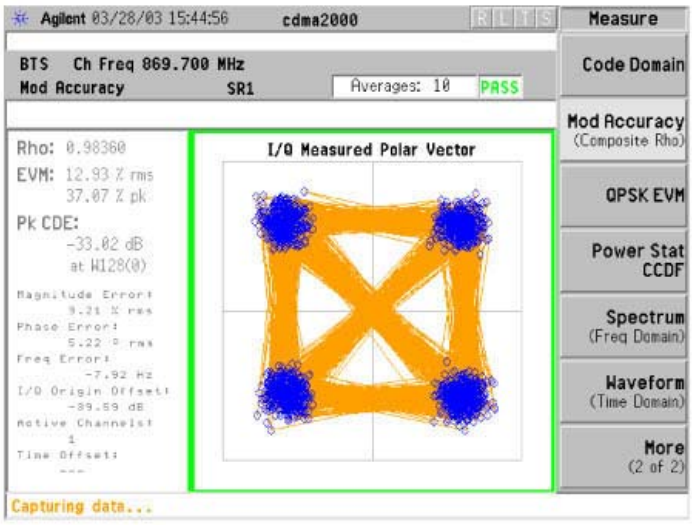


Channel 1020 – 869.91 MHz

27V DC -1X– Modulation Characteristics - 400mW

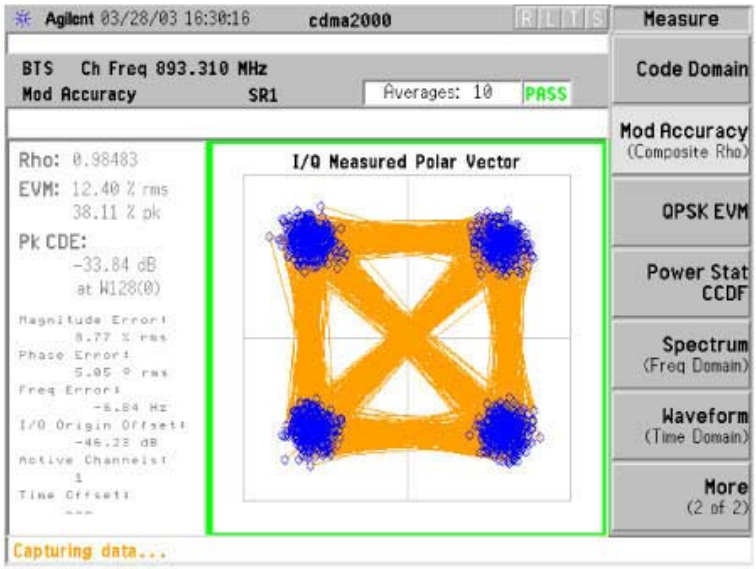


Channel 777 – 893.31 MHz

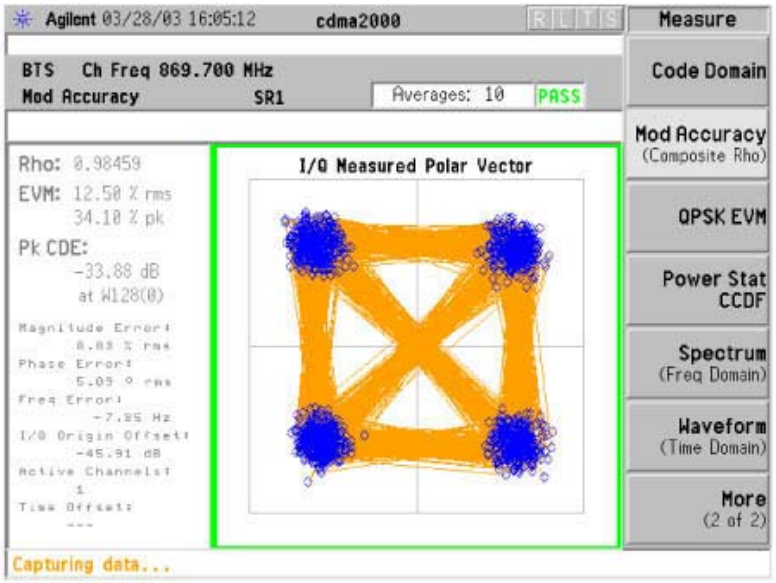


Channel 1013 – 869.7 MHz

27V DC-1X – Modulation Characteristics – 90W

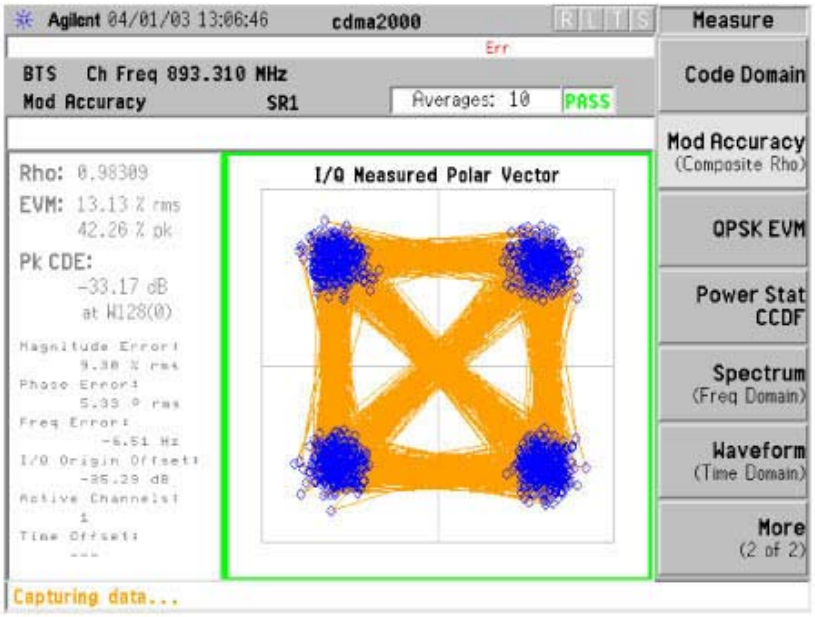


Channel 777 – 893.31 MHz

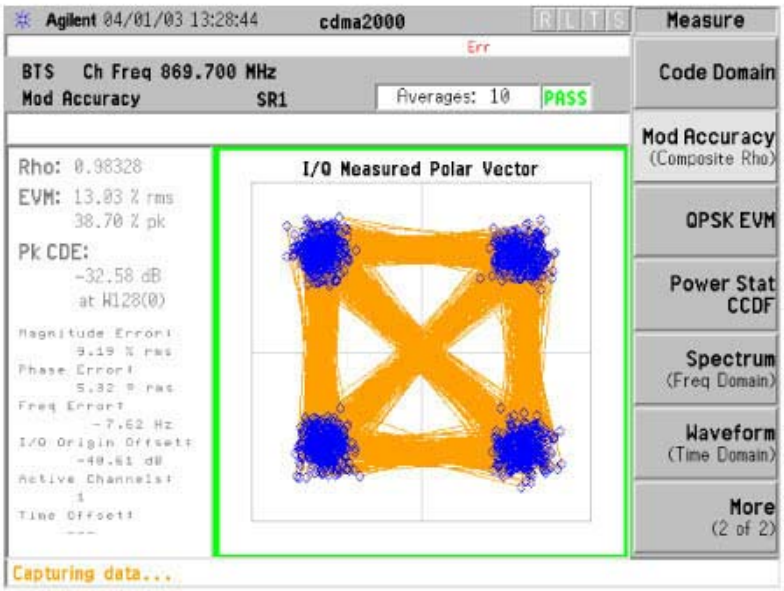


Channel 1013 – 869.7 MHz

-48V DC-1X – Modulation Characteristics - 400mW

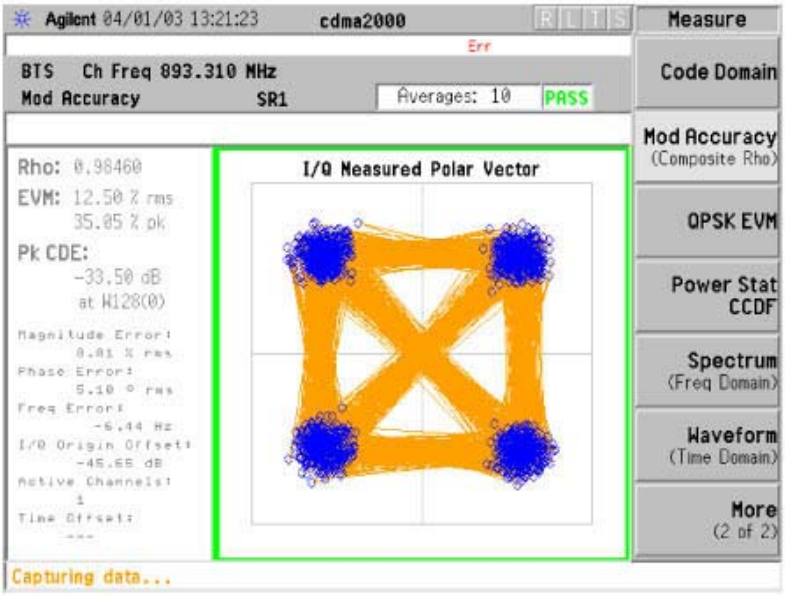


Channel 777 – 893.31 MHz

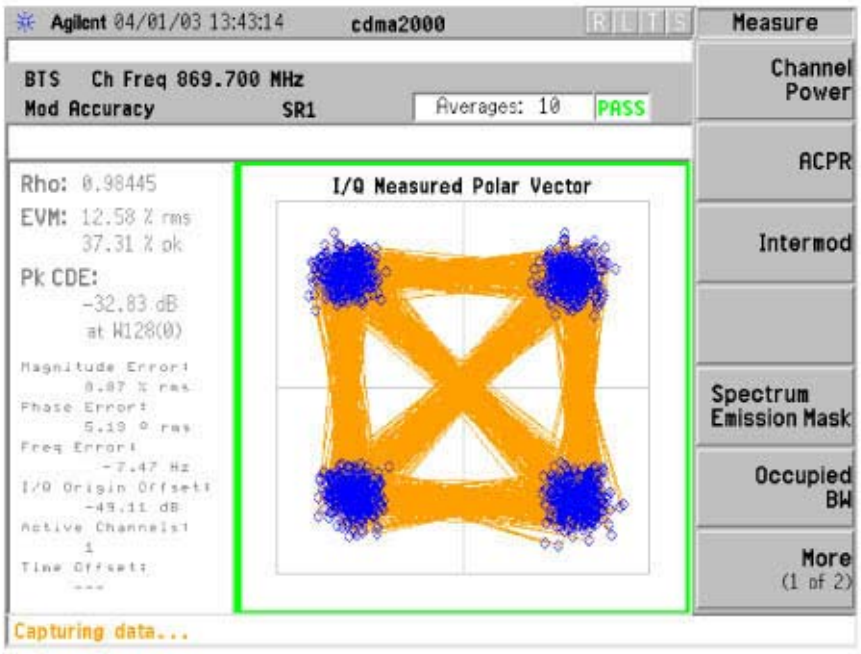


Channel 1013 – 869.7 MHz

-48V DC-1X – Modulation Characteristics – 90W



Channel 777 – 893.31 MHz



Channel 1013 – 869.7 MHz

Section C

Spurious and Harmonic Emissions Radiated

Radiated RF Measurements

Maximum Radiated RF Spur Levels for SC4812T LITE EVDO @ 800MHz CDMA BTS

Channel / Voltage	*Spurious Frequency (MHz)*	*Antenna Polarity*	*Measured Radiated Field Strength (dBuV/m)*	*Measured Radiated Field Strength (dBm) (Note 1)*	*Cable Loss (dB)*	*Antenna Gain (dB)*	*Equivalent Transmit Power (dBm)*	*(Pass/ Fail)*
1020 / -48V DC	4866.66	V	50.11	-45.118	7.6	8.9	-49.7	Pass
770/ -48V DC	5611.11	V	50.41	-44.818	6.4	8.6	-49.8	Pass

Note:

1. Converting dBuV/M to dBm at 3 meters:
   (dBuV/M) + 9.542 – 104.77 = dBm
   Converting dBuV/M to dBm at 10 meters:
   (dBuV/M) + 20 – 104.77 = dBm

09.14.04

Signature Date

Francisco Avalos

Radiated RF Measurements

Maximum Radiated RF Spur Levels for SC4812T LITE 1X @ 800MHz CDMA BTS

Channel / Voltage	*Spurious Frequency (MHz)*	*Antenna Polarity*	*Measured Radiated Field Strength (dBuV/m)*	*Measured Radiated Field Strength (dBm) (Note 1)*	*Cable Loss (dB)*	*Antenna Gain (dB)*	*Equivalent Transmit Power (dBm)*	*(Pass/ Fail)*
1013 / 27V DC	3478.84 – 27V	V	41.1	-54.128	7.6	8.9	-59.7	Pass
777 / 27V DC	2679.93	V	35.2	-60.028	6.4	8.6	-69.8	Pass

Note:

1. Converting dBuV/M to dBm at 3 meters:
   (dBuV/M) + 9.542 – 104.77 = dBm
   Converting dBuV/M to dBm at 10 meters:
(dBuV/M) + 20 – 104.77 = dBm

Signature Date

Brian Daniel
Lead EMI Engineer

Section C

Spurious and Harmonic Emissions Conducted

Conducted RF Measurements

SC4812T LITE EVDO@ 800MHz CDMA BTS

FCC Part 22

CHANNEL	VOLTAGE	FREQUENCY (GHz)	SPUR LEVEL MEASURED (dBµV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
1020	-48V DC	7.814	75.62	-31.38	-13	Pass
770	-48V DC	7.720	75.80	-31.20	-13	Pass

FCC Maximum Limit Per 47 CFR:

" = Transmitted Power (10 Log_{10} (P_{watt})) – (43 + 10 Log_{10} (P_{watt})) dBW

" = 10 Log_{10} (P_{watt}) - (43 + 10 Log_{10} (P_{watt})) dBW

" = -43 dBW

" = -13 dBm

Francisco J Avalos 09.14.04

Signature Date

Francisco Avalos

Conducted RF Measurements

SC4812T LITE 1X @ 800MHz CDMA BTS

FCC Part 22

CHANNEL	VOLTAGE	FREQUENCY (GHz)	SPUR LEVEL MEASURED (dBµV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
777	-48V DC	9.82641	88.65	-18.35	-13	Pass
1013	208V AC	9.56681	80.99	-26.01	-13	Pass

FCC Maximum Limit Per 47 CFR:

" = Transmitted Power (10 Log_{10} (P_{watt})) – (43 + 10 Log_{10} (P_{watt})) dBW

" = 10 Log_{10} (P_{watt}) - (43 + 10 Log_{10} (P_{watt})) dBW

" = -43 dBW

" = -13 dBm

Brian M. Daniel 4-3-03

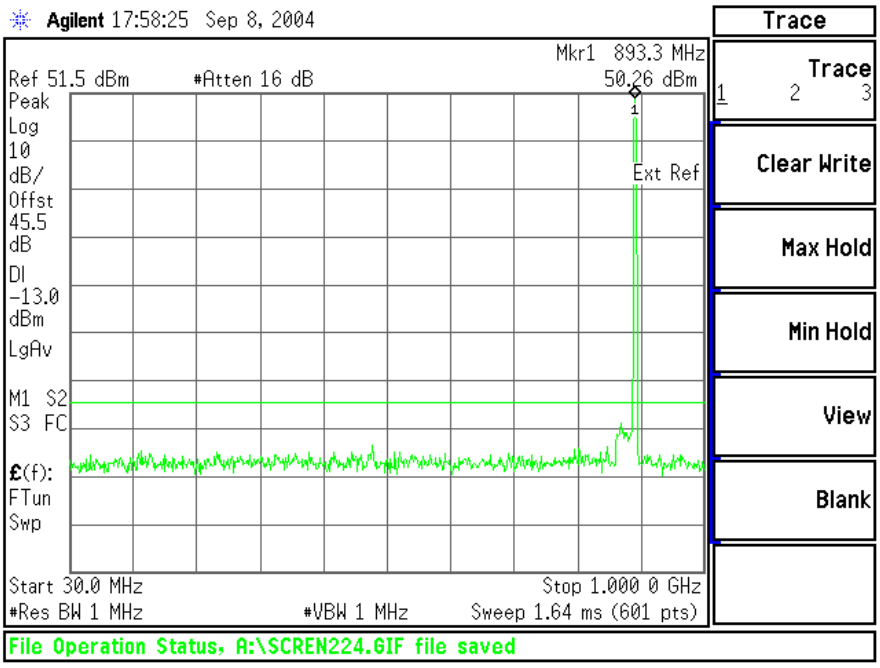
Signature Date

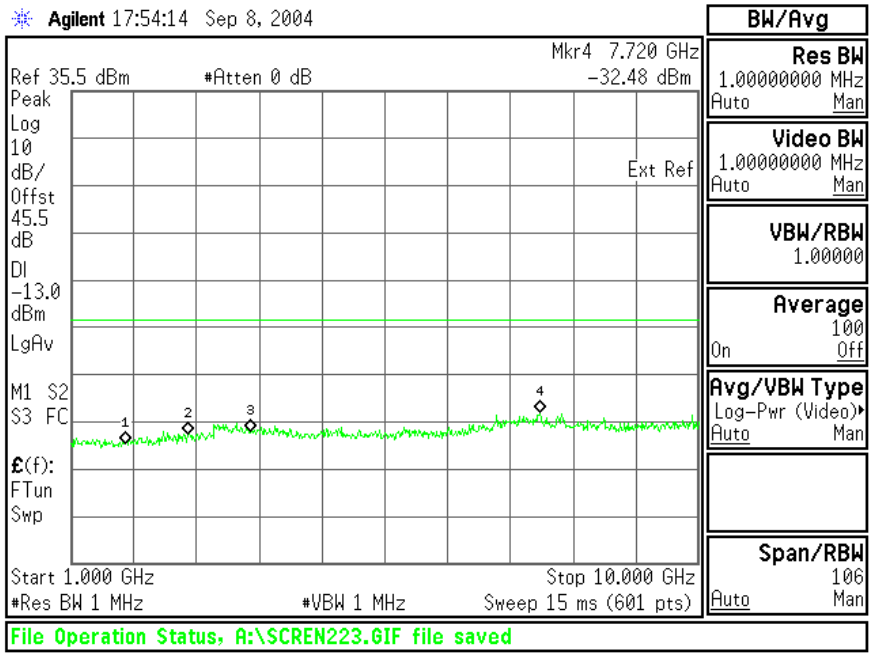
Brian Daniel

Lead EMI Engineer

Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 770 – Maximum Power 49.54 dBm – 27V DC

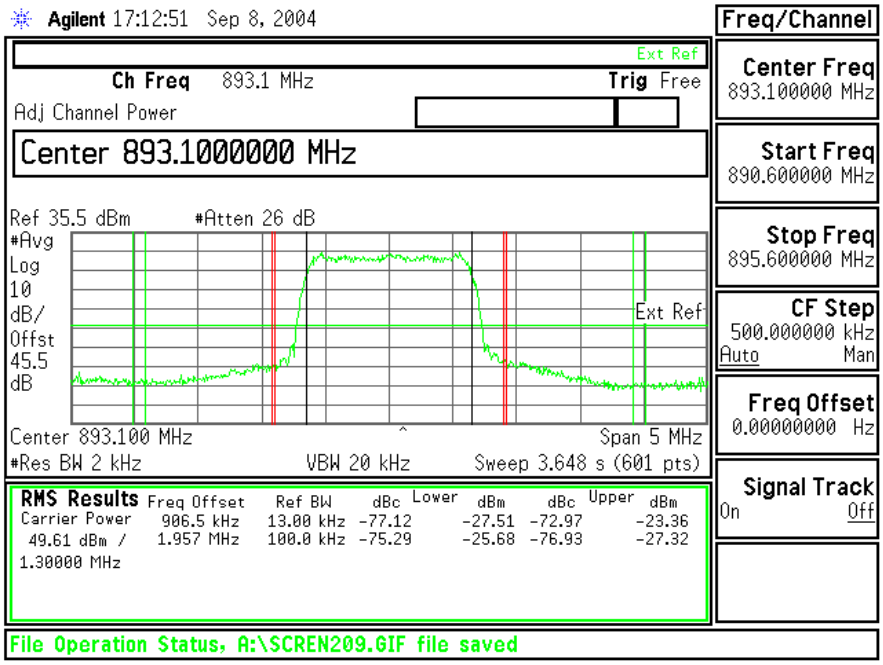




Spurious and Harmonic Emissions Conducted

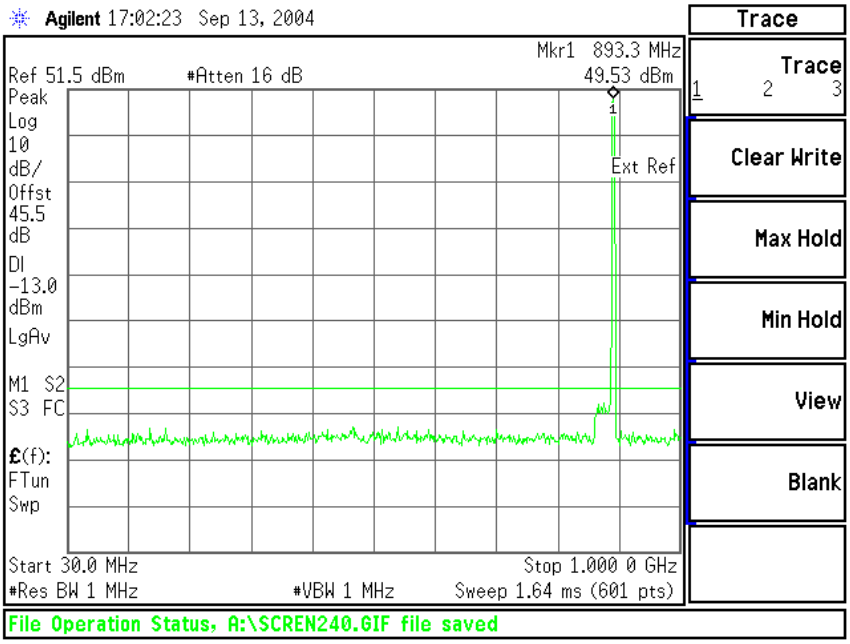
CDMA EVDO Channel 770 – Maximum Power 49.54 dBm – 27V DC

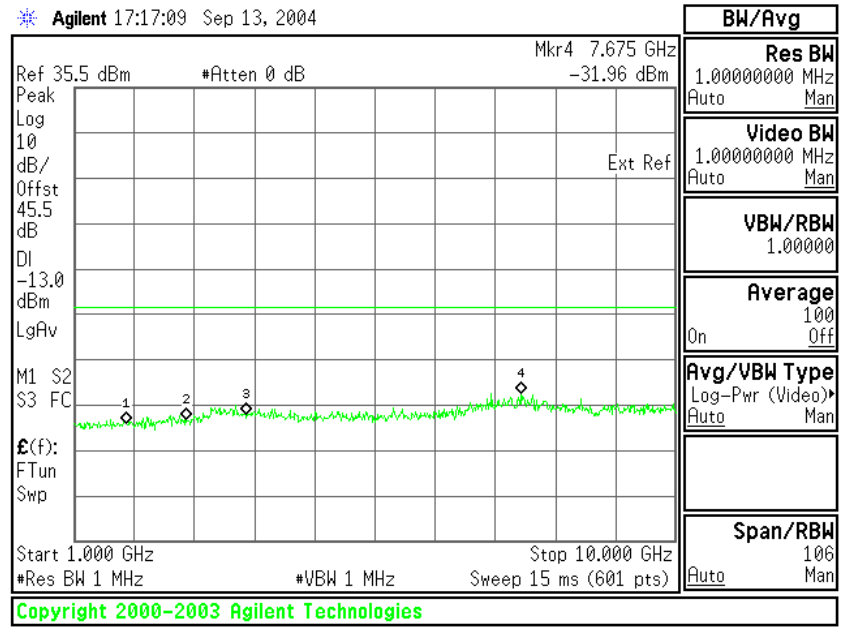
(Continued)



Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 770 – Maximum Power 49.54 dBm – -48V DC

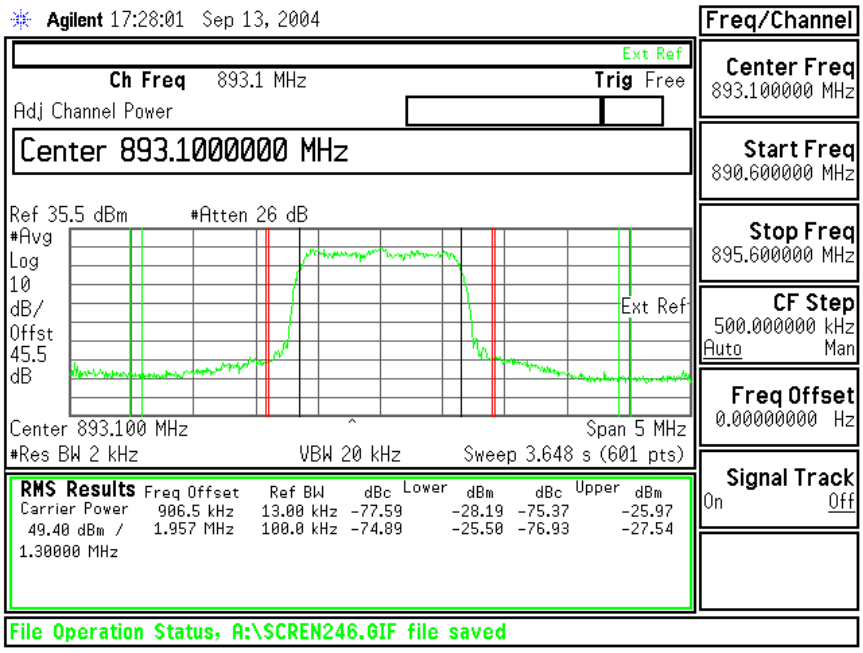




Spurious and Harmonic Emissions Conducted

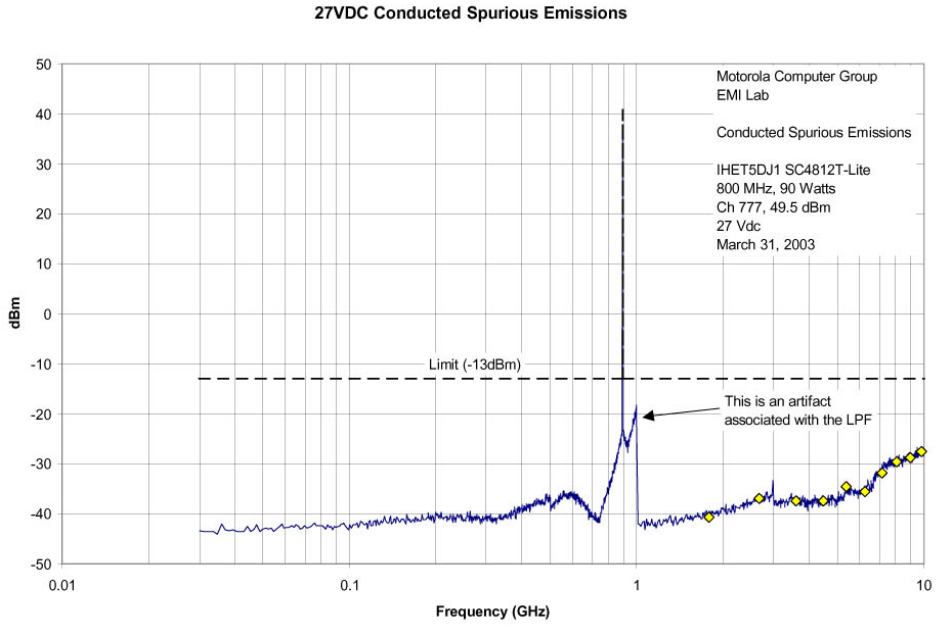
CDMA EVDO Channel 770 – Maximum Power 49.54 dBm – -48V DC

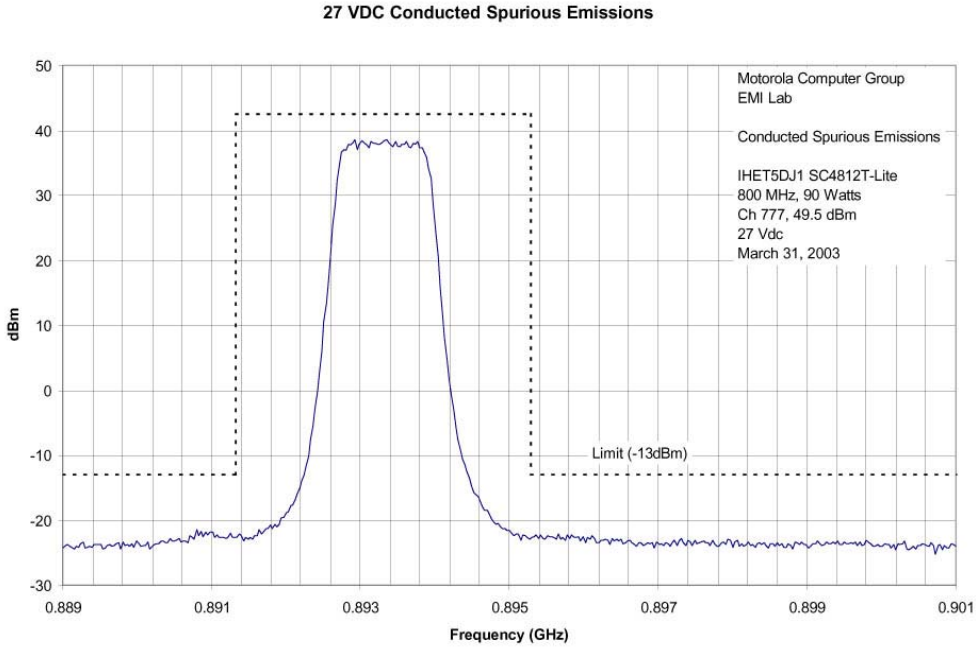
(Continued)



Spurious and Harmonic Emissions Conducted

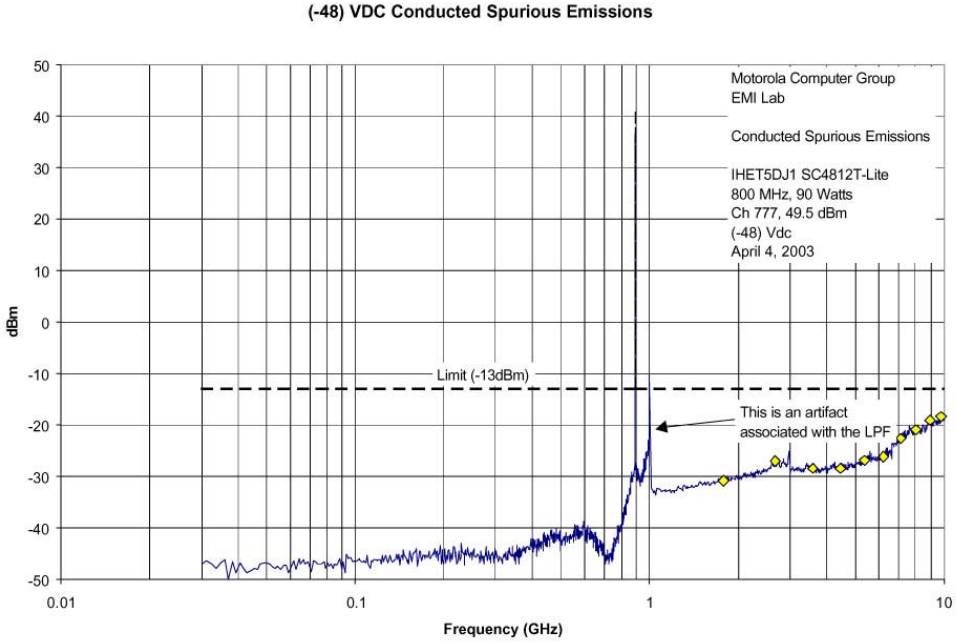
CDMA 1X Channel 777 – Maximum Power – 27V DC

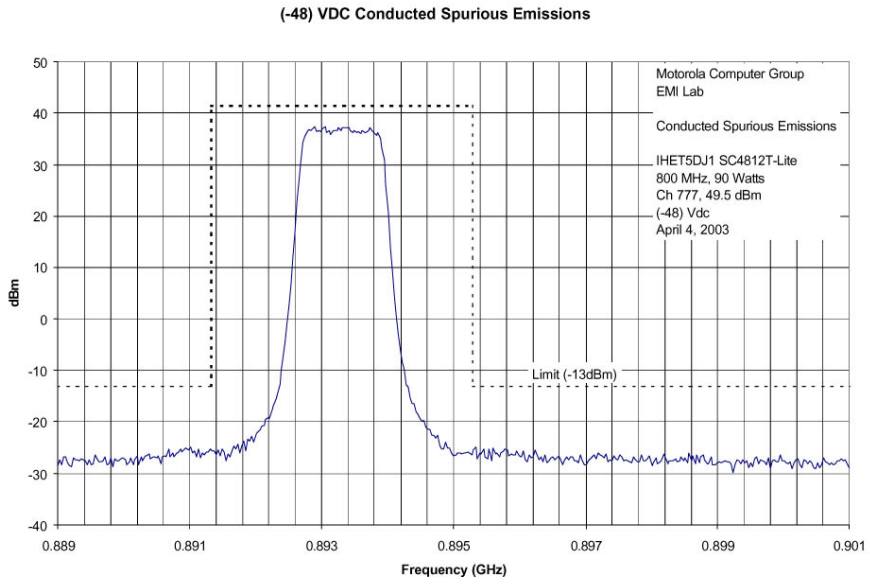




Spurious and Harmonic Emissions Conducted

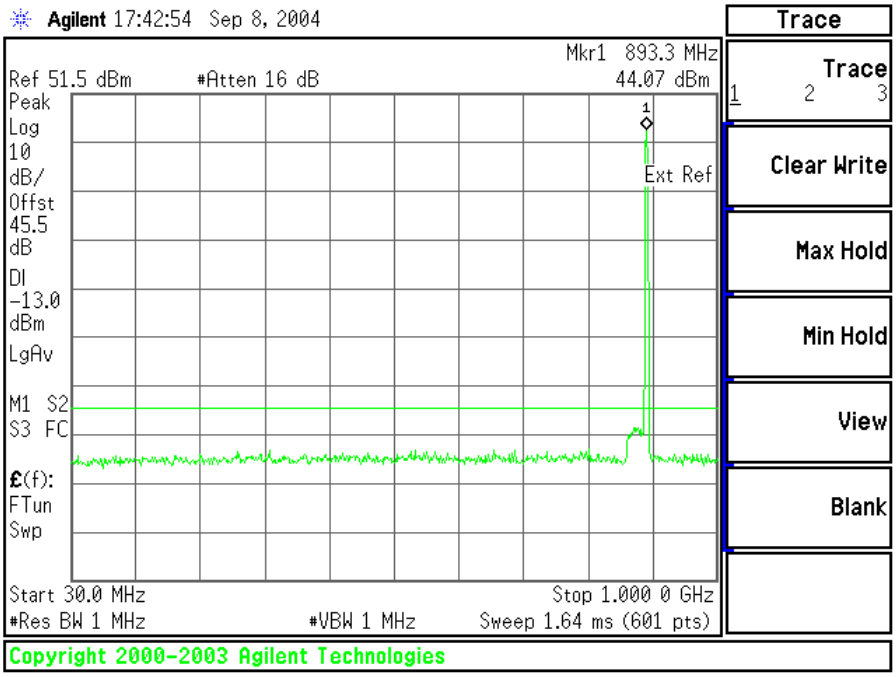
CDMA 1X Channel 777 – Maximum Power – -48V DC

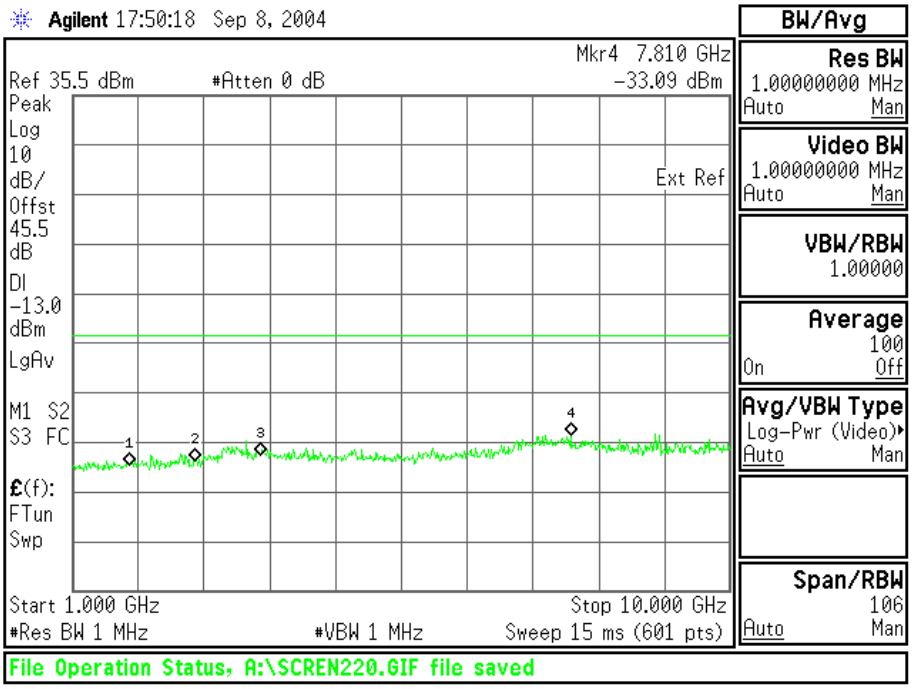




Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 770 – Minimum Power 36.5 dBm – 27V DC

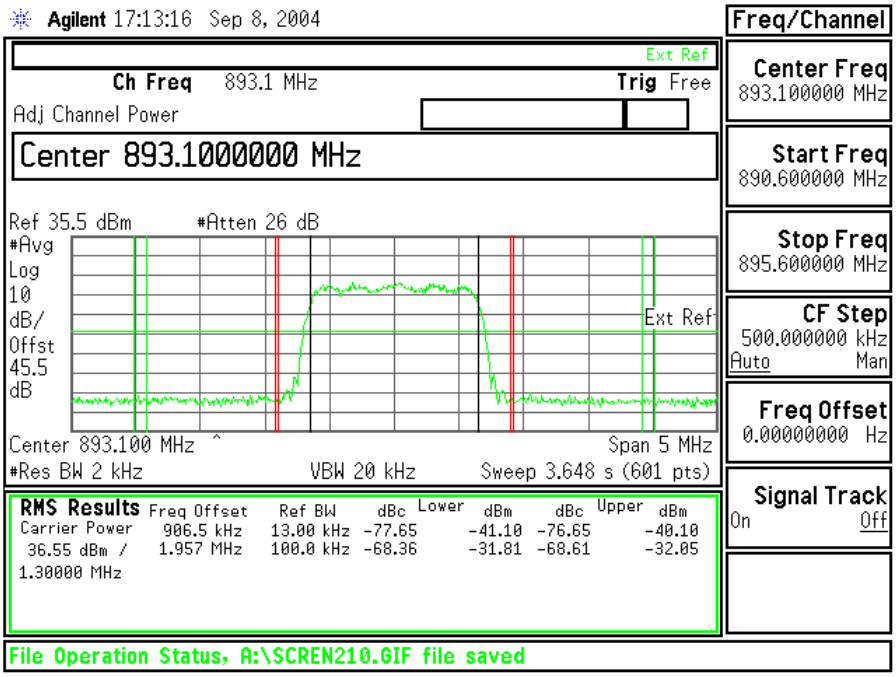




Spurious and Harmonic Emissions Conducted

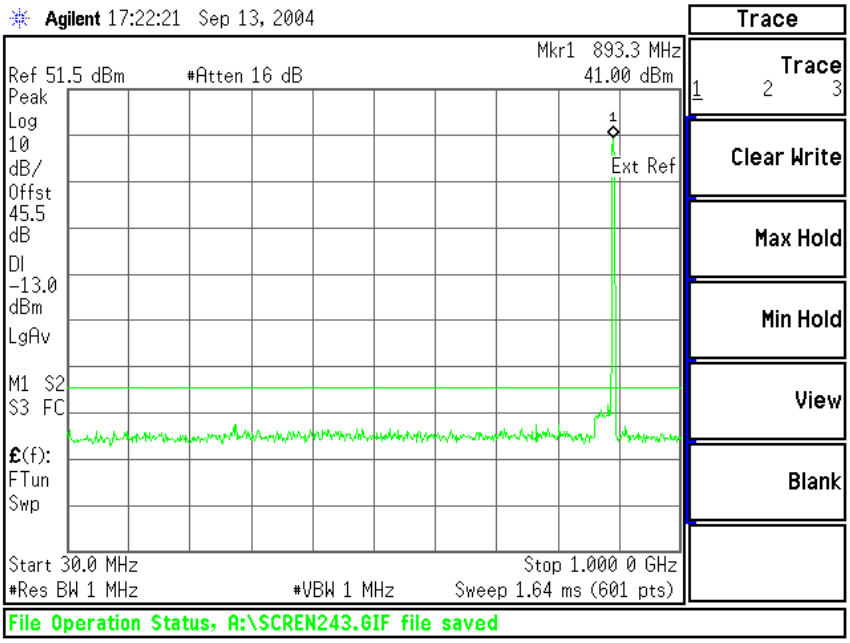
CDMA EVDO Channel 770 – Minimum Power 36.5 dBm – 27V DC

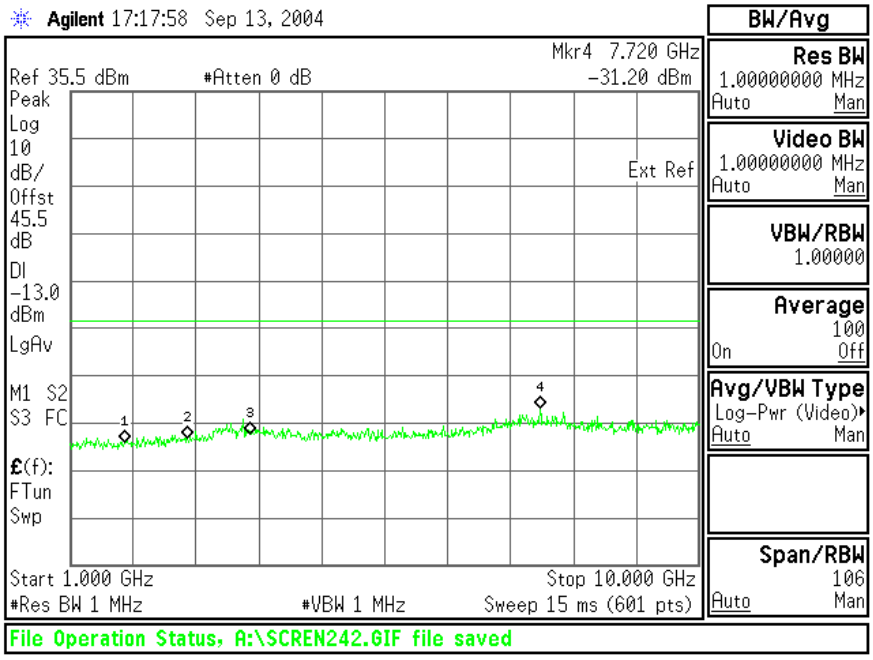
(Continued)



Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 770 – Minimum Power 36.5 dBm– -48V DC





Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 770 – Minimum Power 36.5 dBm – -48V DC

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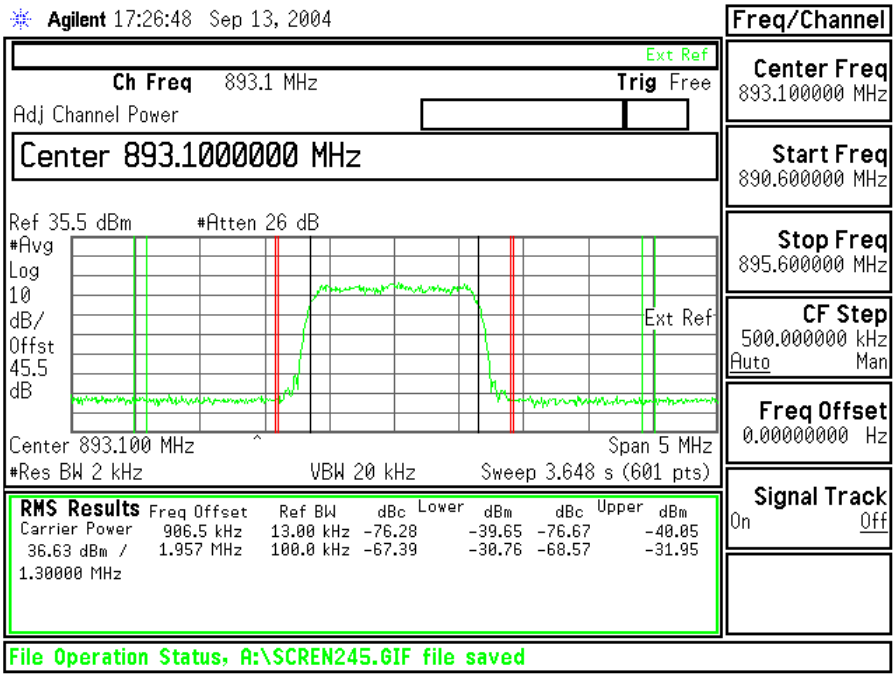
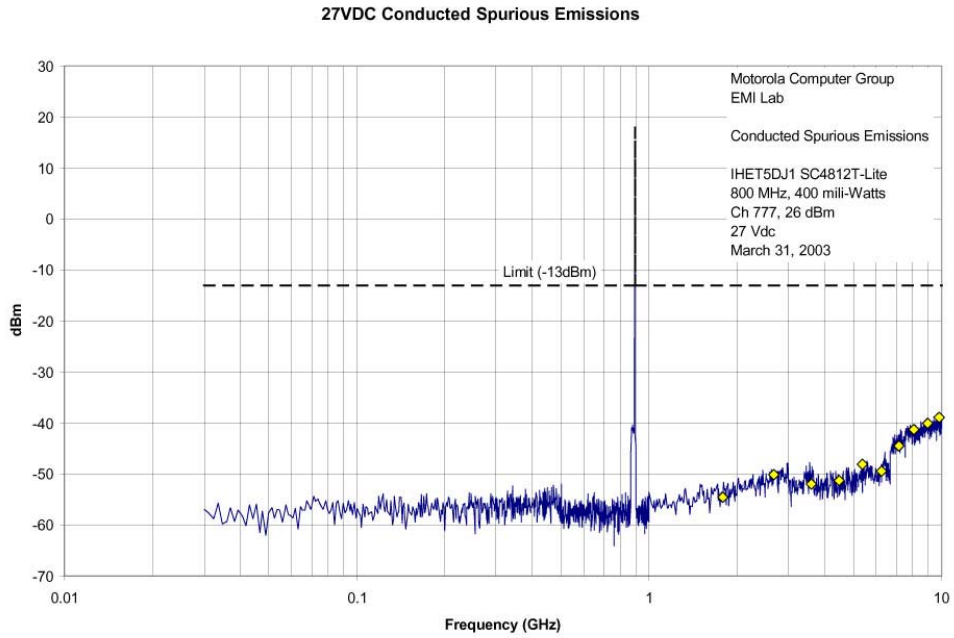
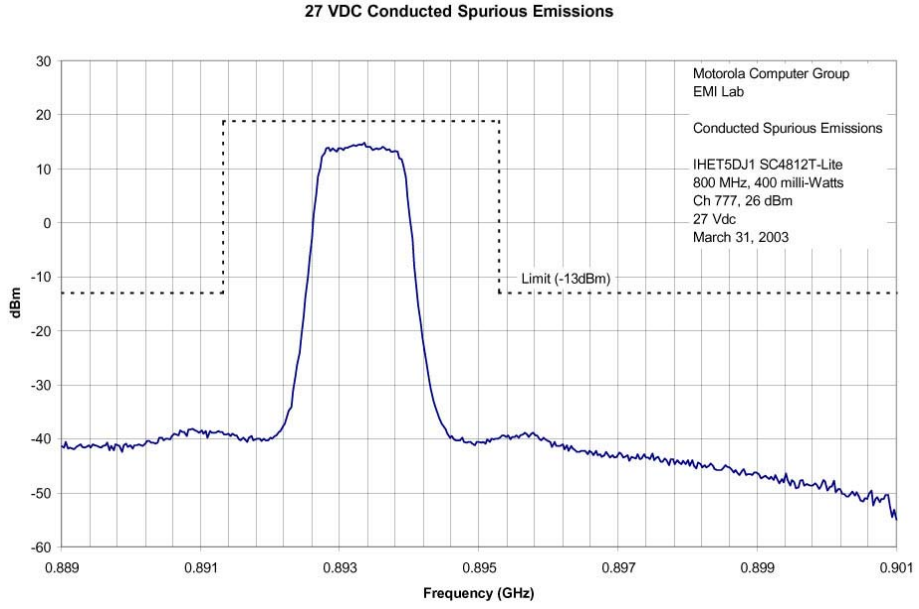


Spurious and Harmonic Emissions Conducted

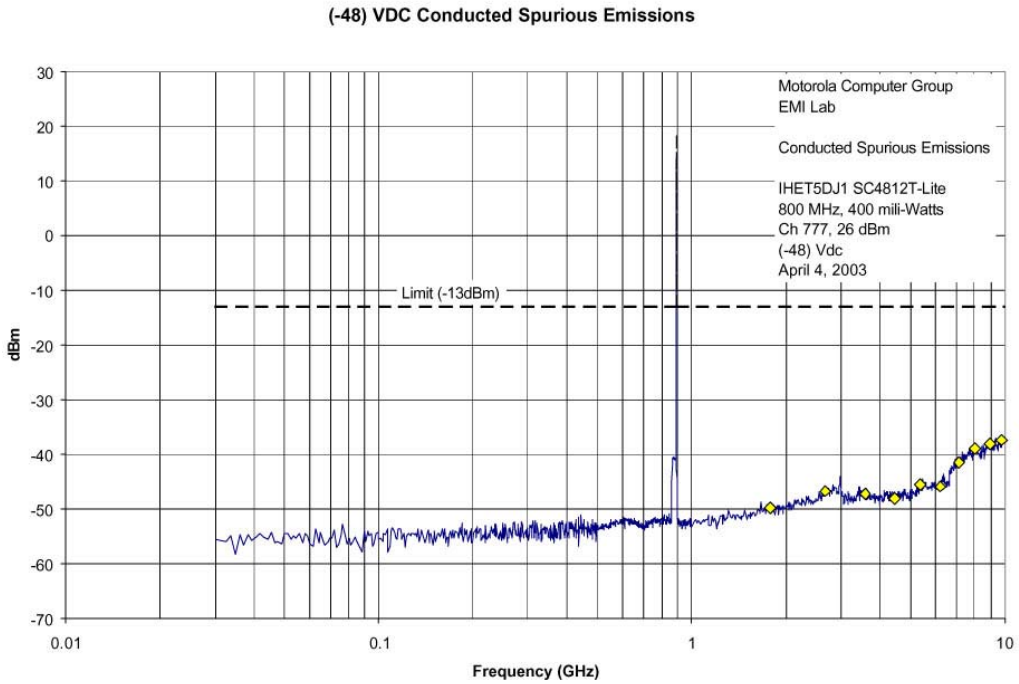
CDMA 1X Channel 777 – Minimum Power – 27V DC

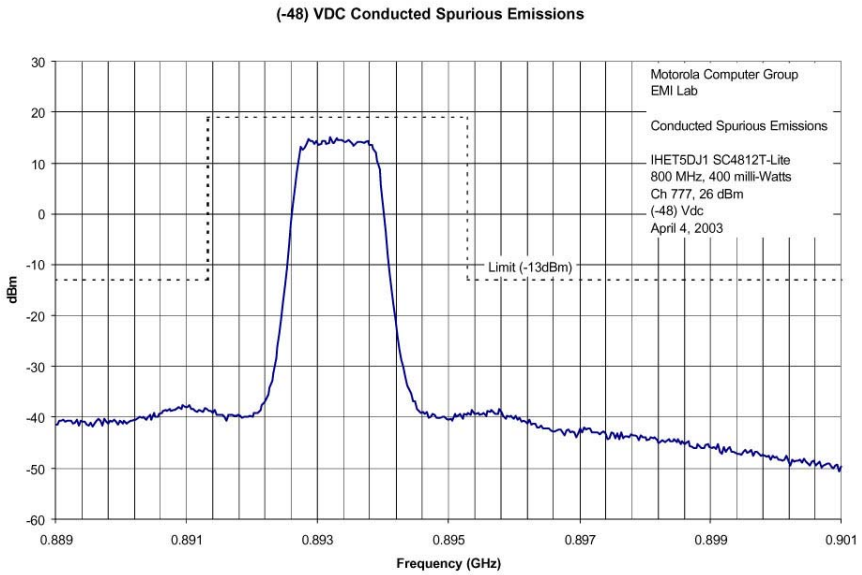




Spurious and Harmonic Emissions Conducted

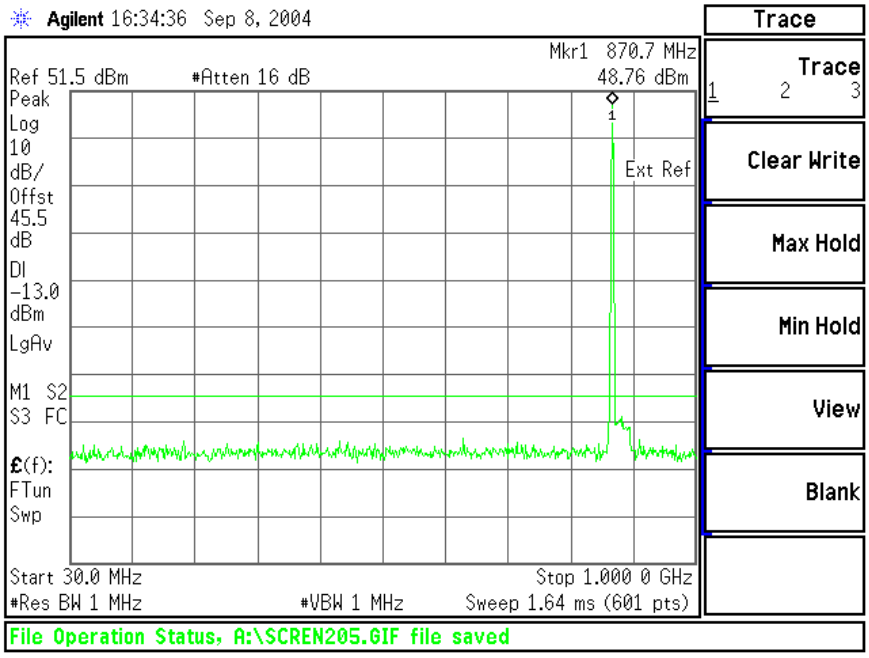
CDMA Channel 777 – Minimum Power – -48V DC

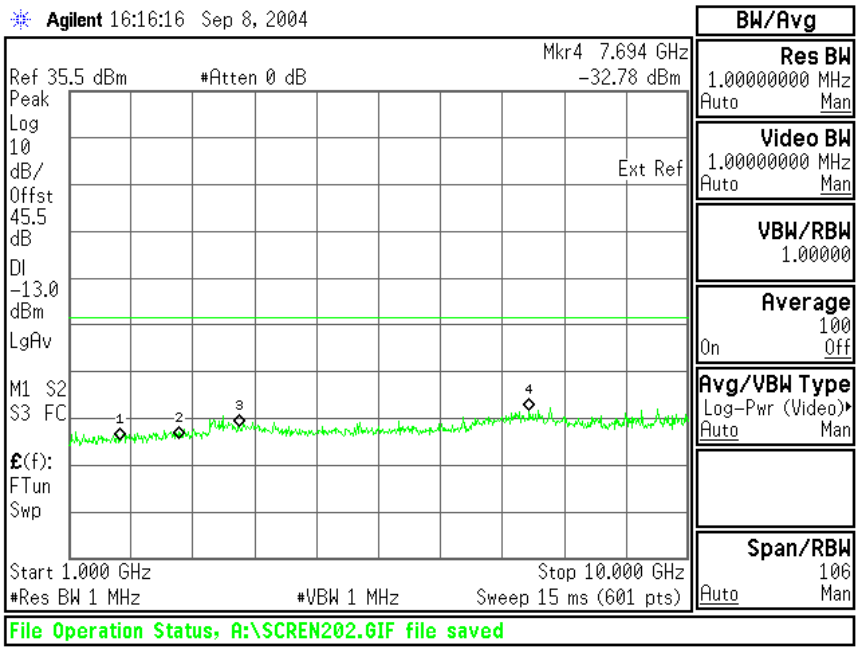




Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 1020 – Maximum Power 49.54 dBm – 27V DC

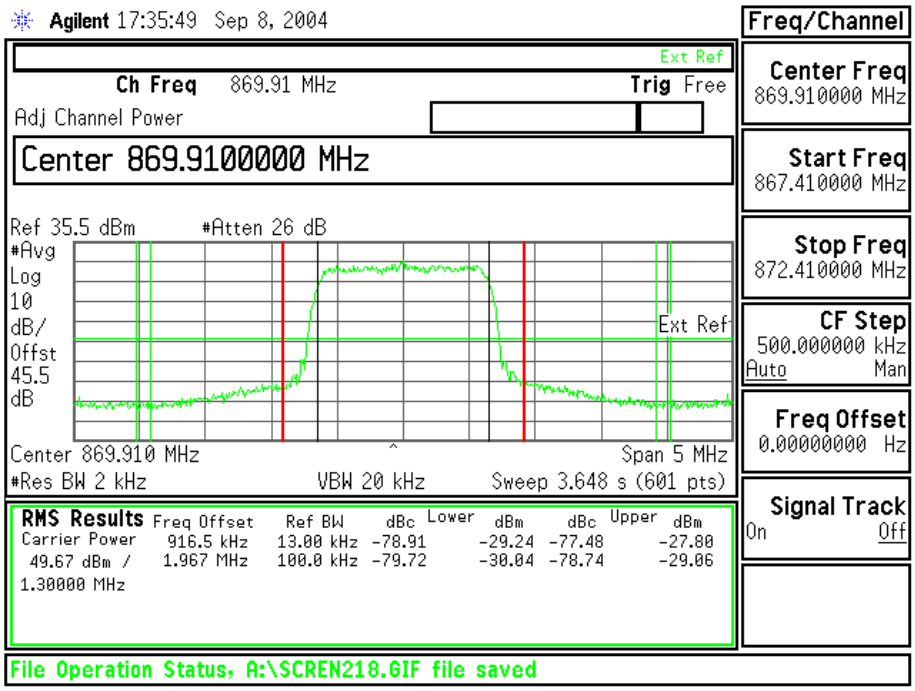




Spurious and Harmonic Emissions Conducted

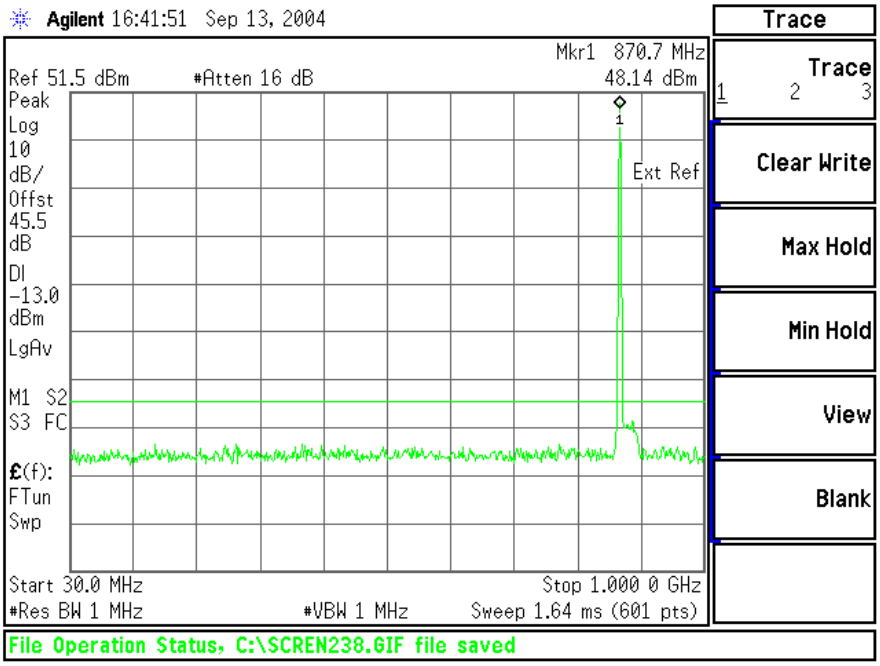
CDMA EVDO Channel 1020 – Maximum Power 49.54 dBm – 27V DC

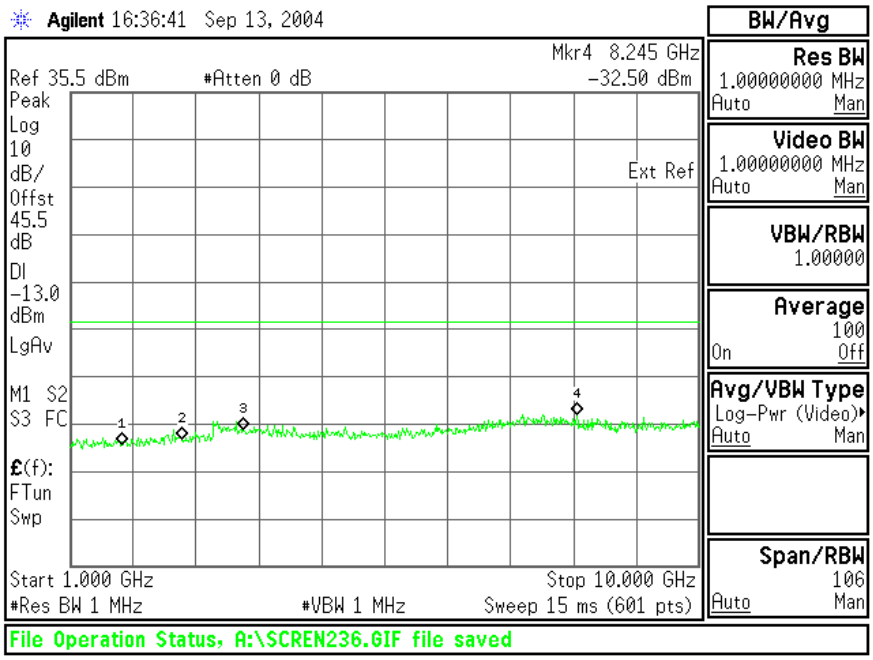
(Continued)



Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 1020 – Maximum Power 49.54 dBm– -48V DC

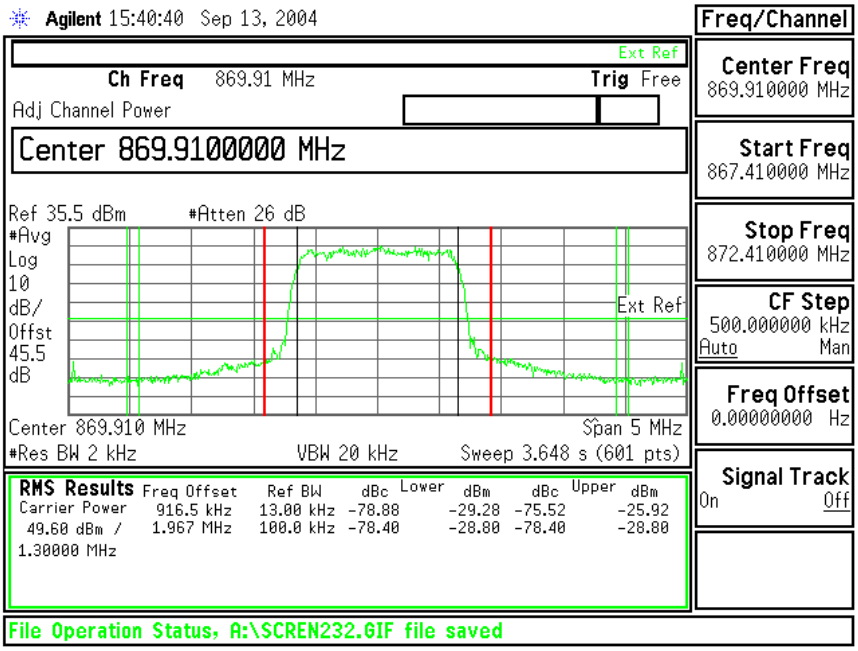




Spurious and Harmonic Emissions Conducted

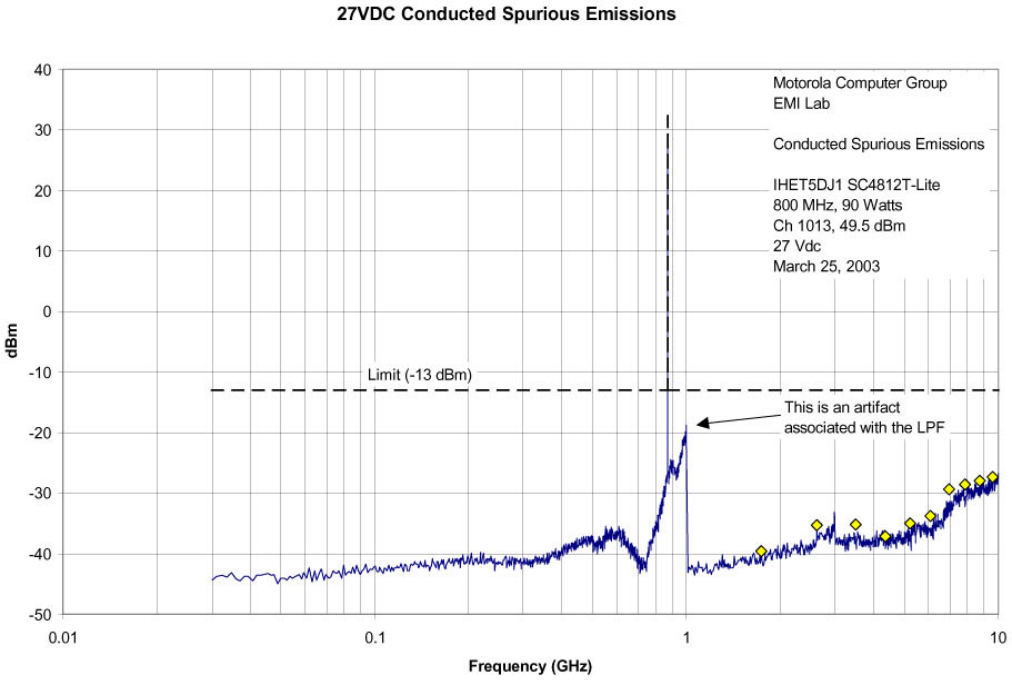
CDMA EVDO Channel 1020 – Maximum Power 49.54 dBm – -48V DC

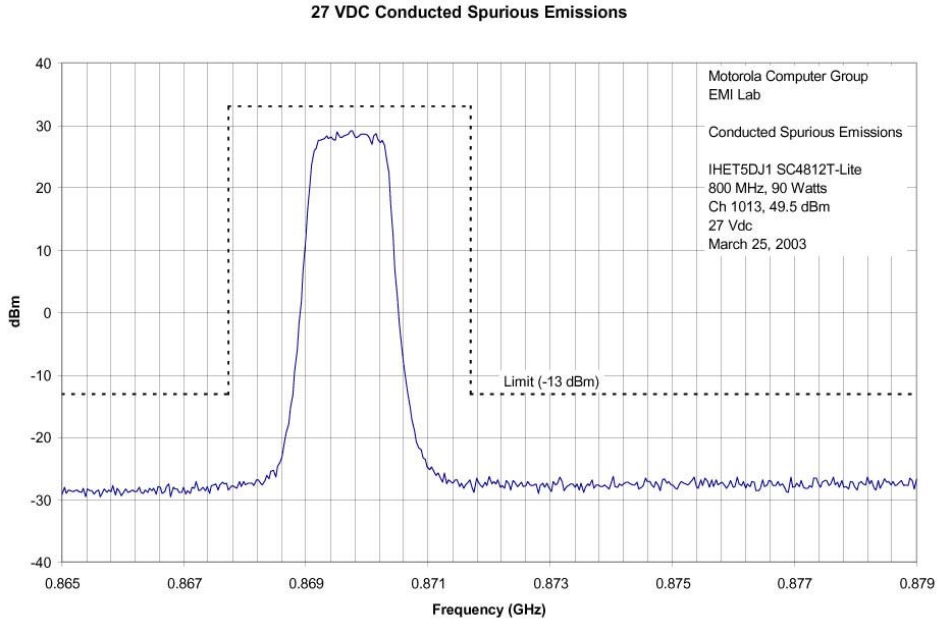
(Continued)



Spurious and Harmonic Emissions Conducted

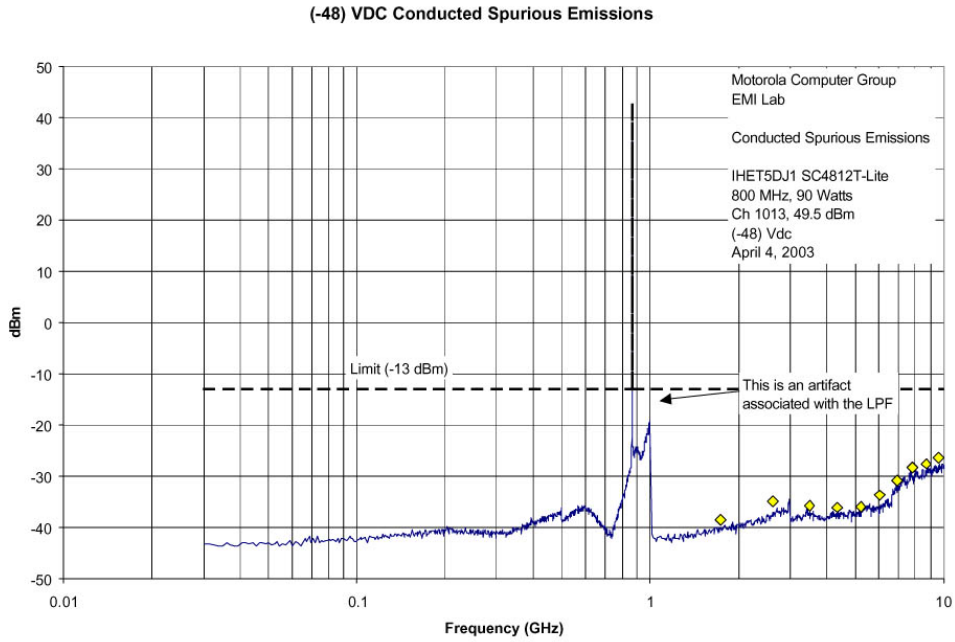
CDMA 1X Channel 1013 – Maximum Power – 27V DC

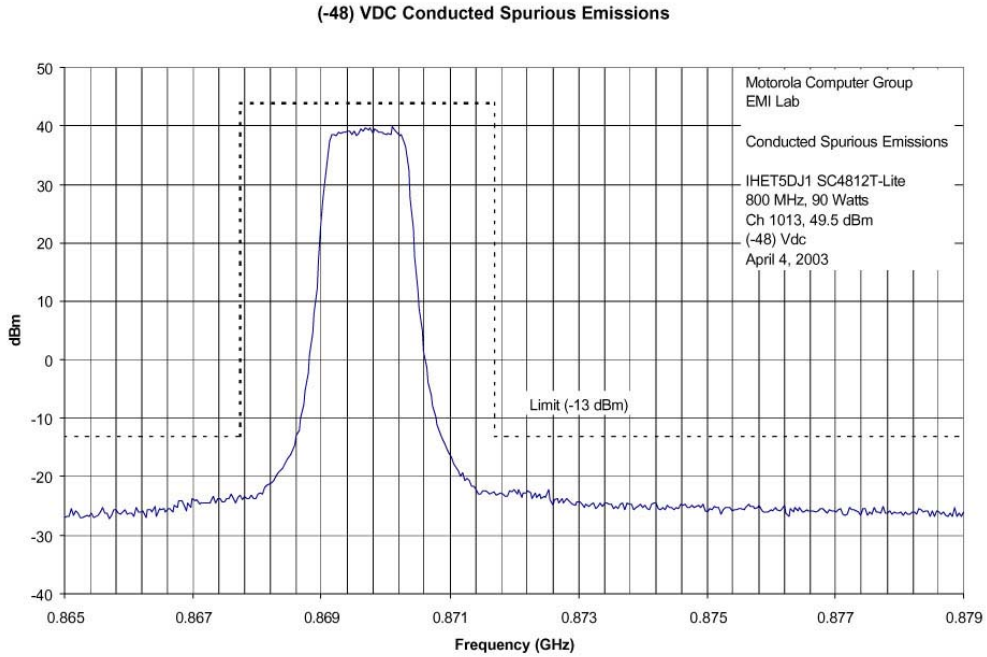




Spurious and Harmonic Emissions Conducted

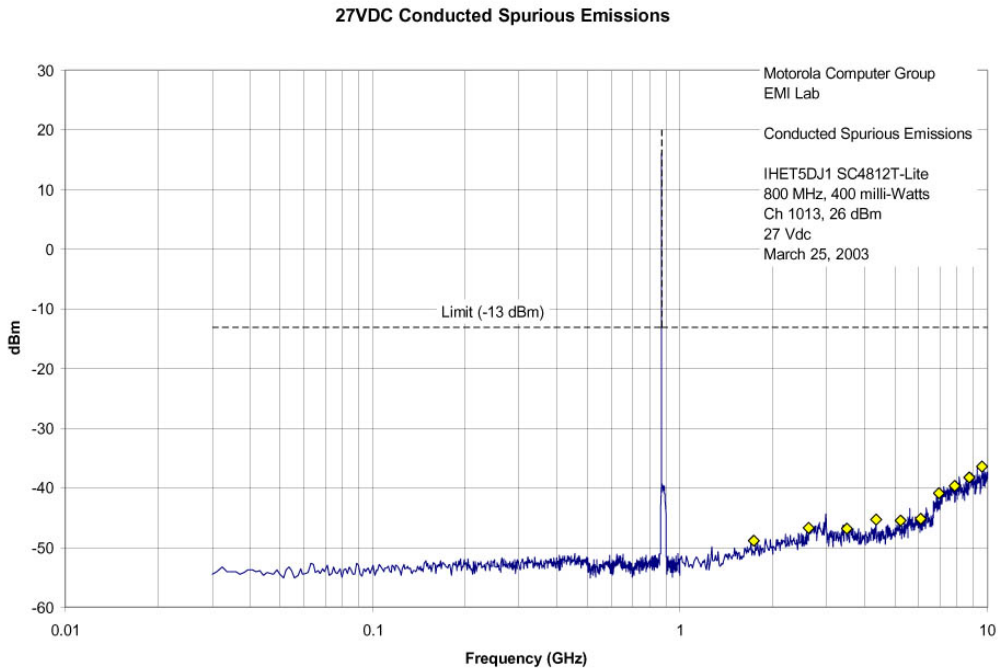
CDMA 1X Channel 1013 – Maximum Power – -48V DC

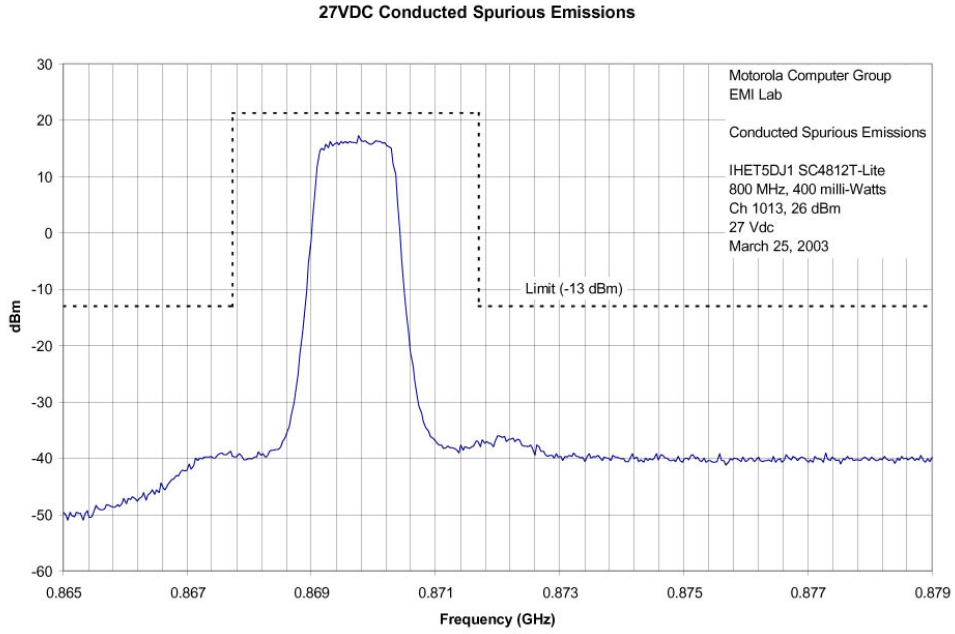




Spurious and Harmonic Emissions Conducted

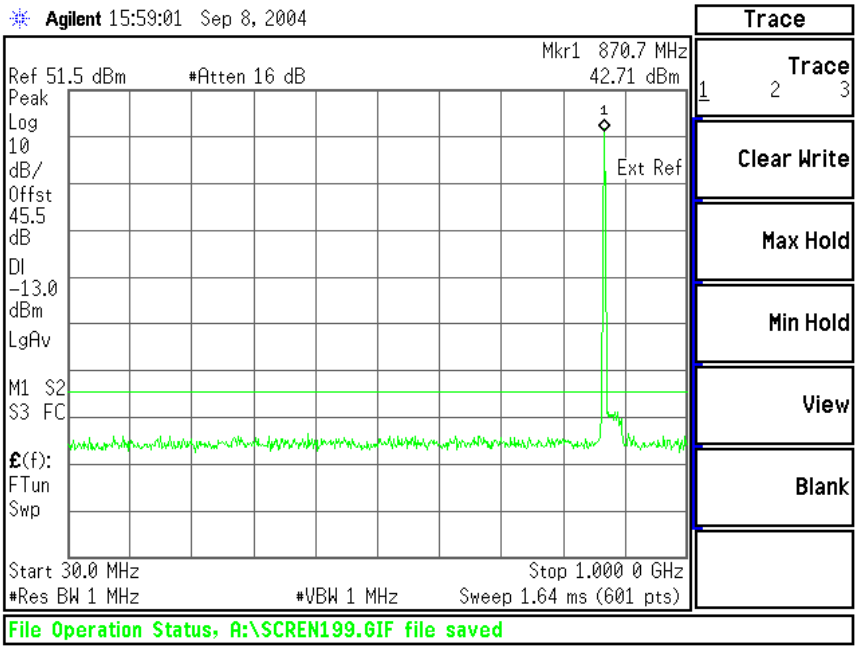
CDMA Channel 1013 – Minimum Power – 27V DC

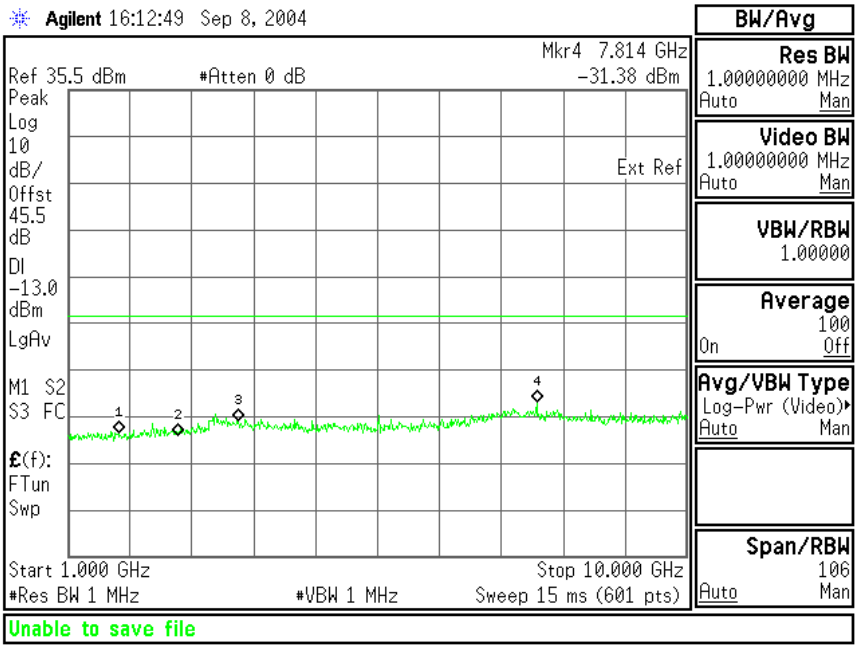




Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 1020 – Minimum Power 36.5 dBm – 27V DC

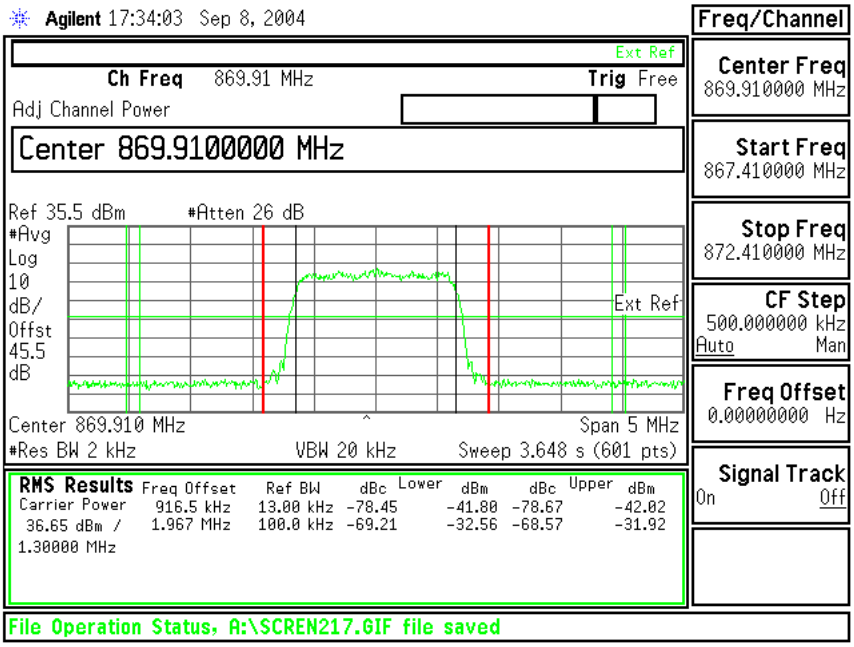




Spurious and Harmonic Emissions Conducted

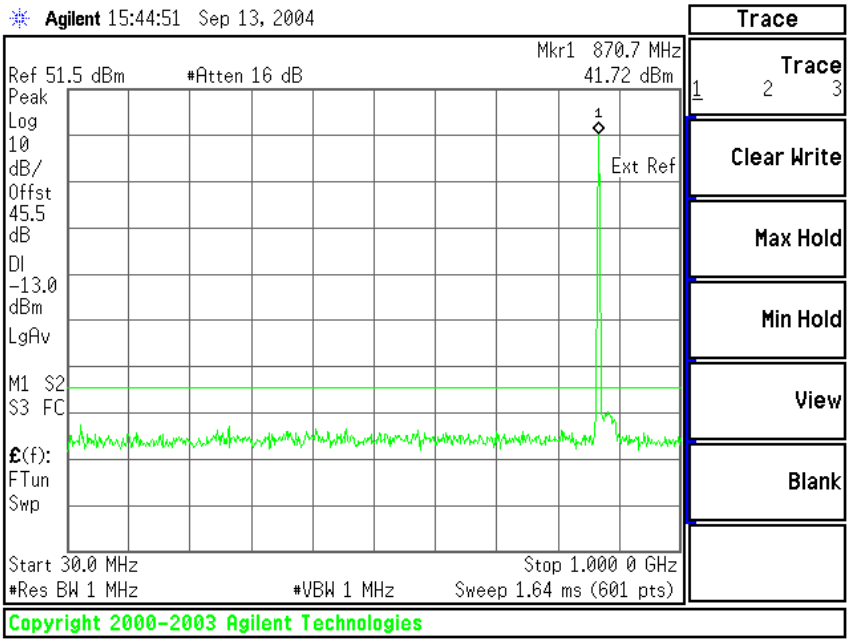
CDMA EVDO Channel 1020 – Minimum Power 36.5 dBm – 27V DC

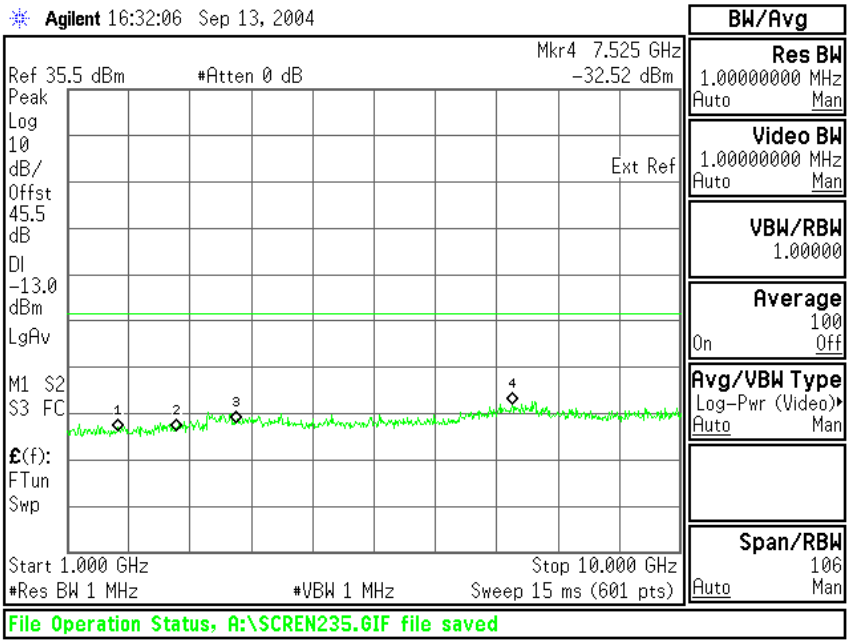
(Continued)



Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 1020 – Minimum Power 36.5 dBm – -48V DC

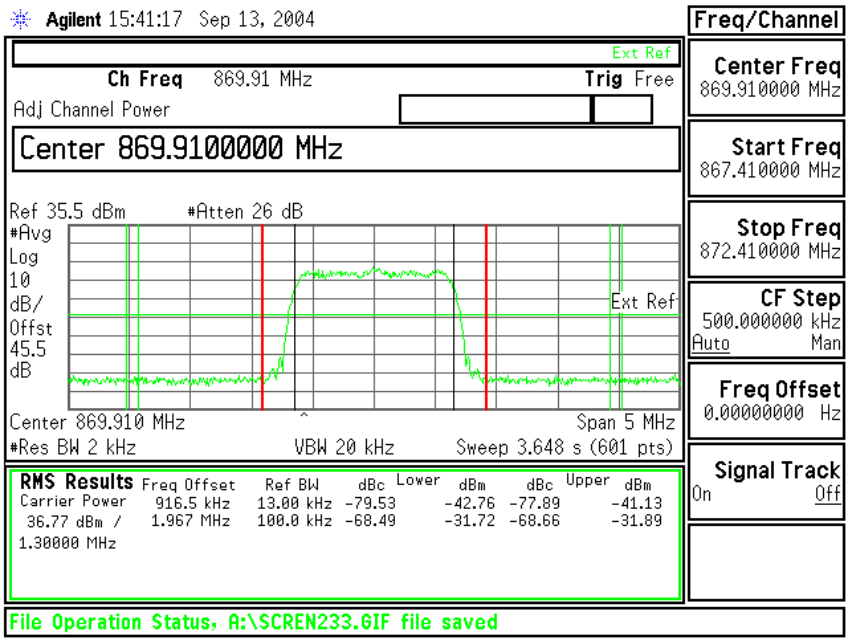




Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 1020 – Minimum Power 36.5 dBm – -48V DC

(Continued)



SECTION E
OCCUPIED BANDWIDTH

Note: The BTS was configured for maximum power out of 49.54 dBm and minimum power out of 36.5 dBm respectively. The output power was set respectively to 90 Watts 4.5 Watts using a power meter

The following formula is used to obtain the correct power reference point from which the OBW of the CDMA signal is obtained. See example calculation below:

Power (measured in 30 kHz bandwidth) + 10 log (1.2288 MHz / 30 kHz)

Example: 23.88 dBm + 16.12 dB = 40.0 dBm

The occupied bandwidth is measured in a 30 kHz resolution bandwidth. The summary is listed below.

SC4812TLite EVDO @ 800 MHz SUMMARY OF OCCUPIED BANDWIDTH

CHANNEL / VOLTAGE	Power Level (dBm)	FREQUENCY (MHz)	MEASURED (MHz)	FCC LIMIT (MHz)	Pass / Fail
777 / -48V DC	36.5	893.1	1.2726	1.30	Pass
1013 / -48V DC	36.5	869.91	1.2698	1.30	Pass

Francisco J Avalos

09.14.04

Signature Date

Francisco Avalos

OCCUPIED BANDWIDTH

Note: The BTS was configured for maximum power out of 49.54 dBm and minimum power out of 26.0 dBm respectively. The output power was set respectively to 90 Watts or 400 mWatts using a power meter

The following formula is used to obtain the correct power reference point from which the OBW of the CDMA signal is obtained. See example calculation below:

Power (measured in 30 kHz bandwidth) + 10 log (1.2288 MHz / 30 kHz)

Example: 23.88 dBm + 16.12 dB = 40.0 dBm

The occupied bandwidth is measured in a 30 kHz resolution bandwidth. The summary is listed below.

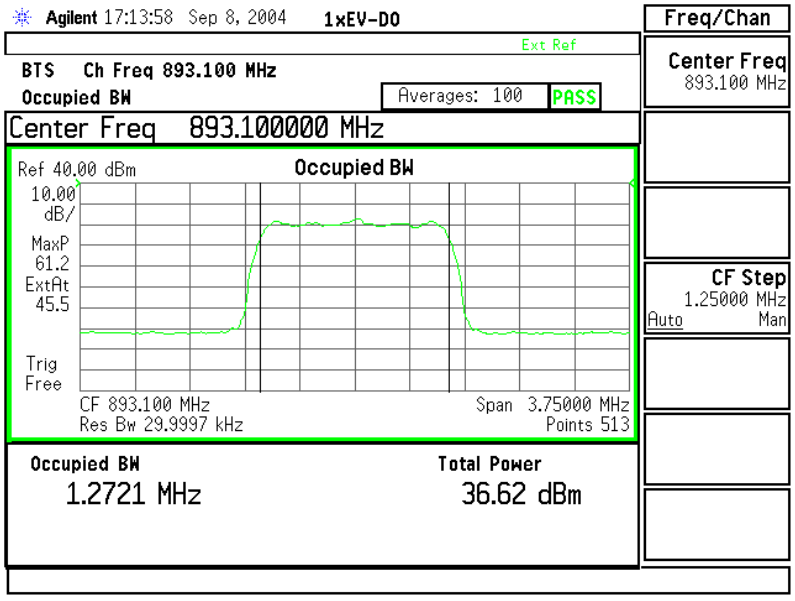
SC4812TLite 1X @ 800 MHz SUMMARY OF OCCUPIED BANDWIDTH

CHANNEL / VOLTAGE	Power Level (dBm)	FREQUENCY (MHz)	MEASURED (MHz)	FCC LIMIT (MHz)	Pass / Fail
777 / -48V DC	49.54	893.31	1.2340	1.30	Pass
1013 / -48V DC	26.0	869.7	1.2994	1.30	Pass

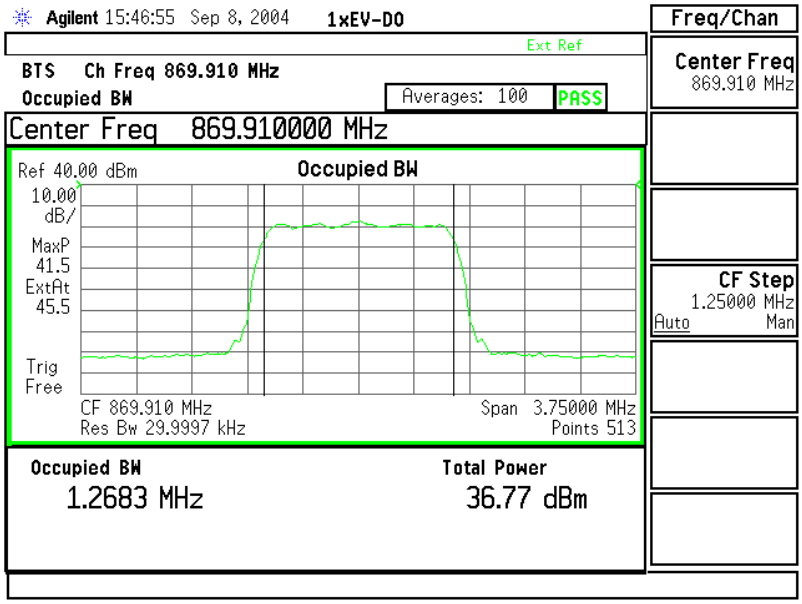
Signature Date

Brian Daniel
Lead EMI Engineer

27V DC-EVDO – Occupied Bandwidth – 4.5W

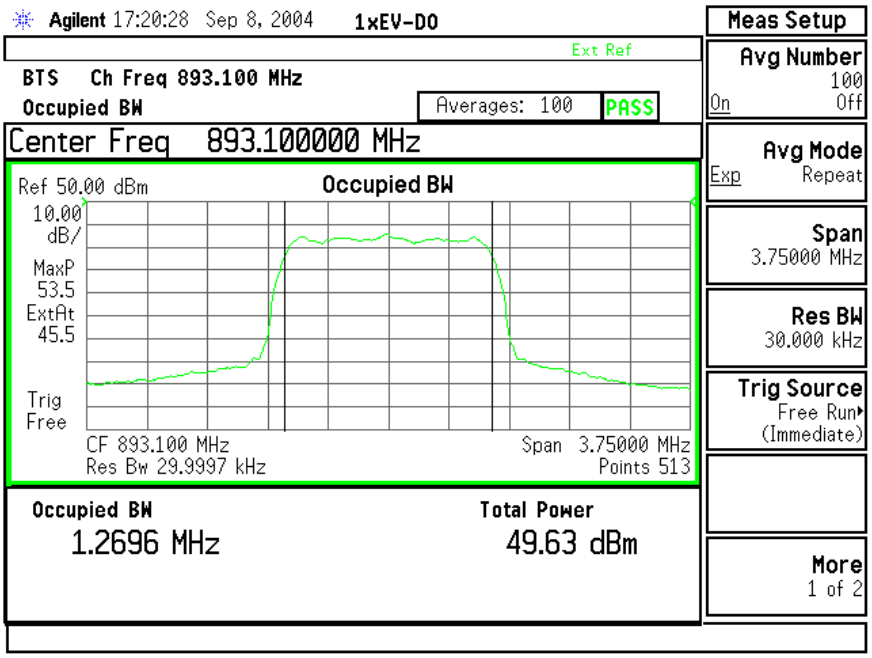


Channel 770– 893.1 MHz

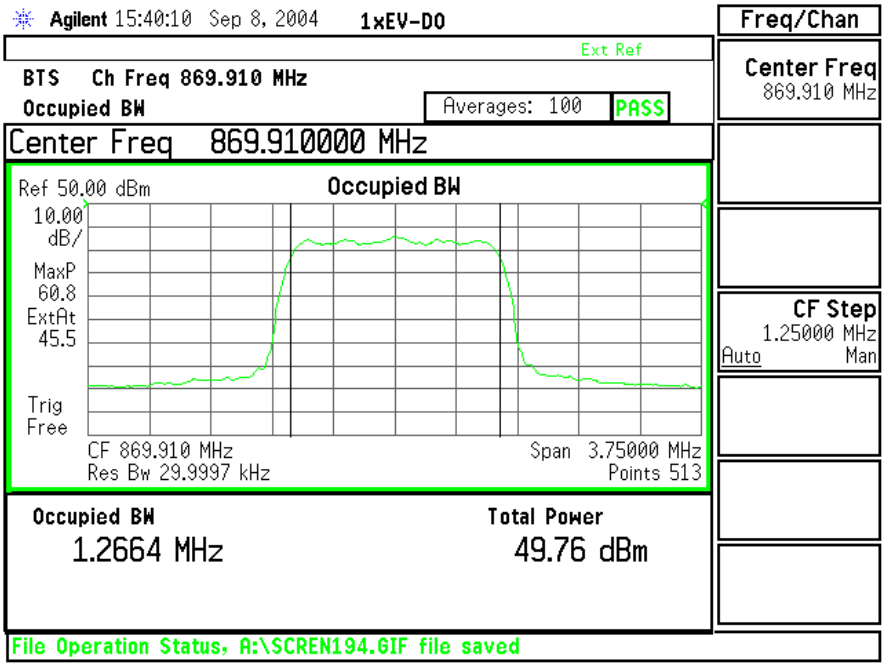


Channel 1020 – 869.91 MHz

27V DC-EVDO – Occupied Bandwidth – 90W

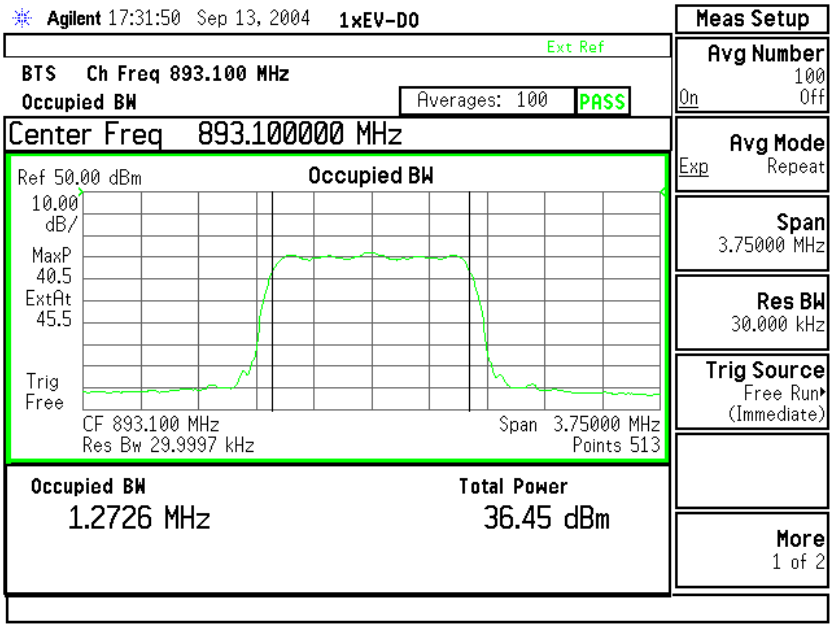


Channel 770– 893.1 MHz

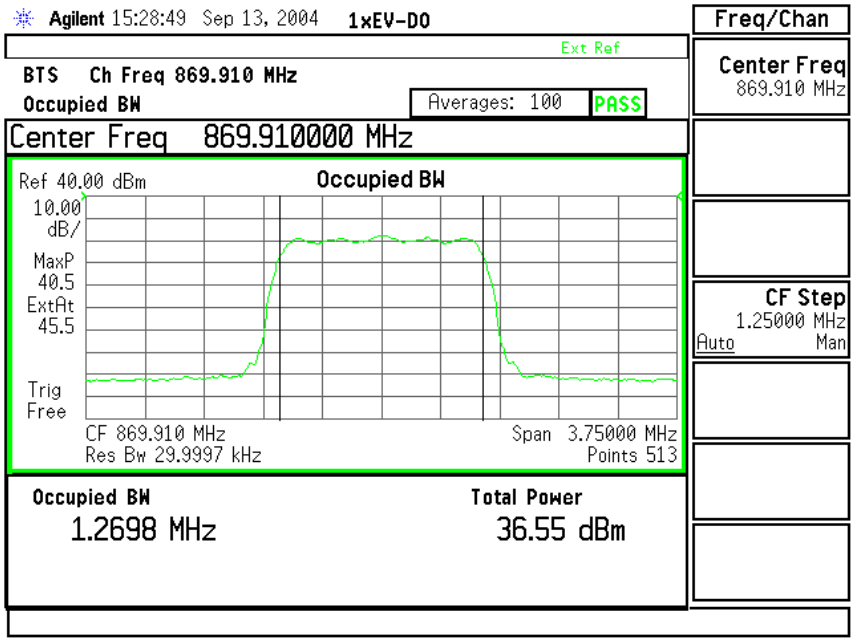


Channel 1020 – 869.91 MHz

-48V DC-EVDO – Occupied Bandwidth – 4.5W

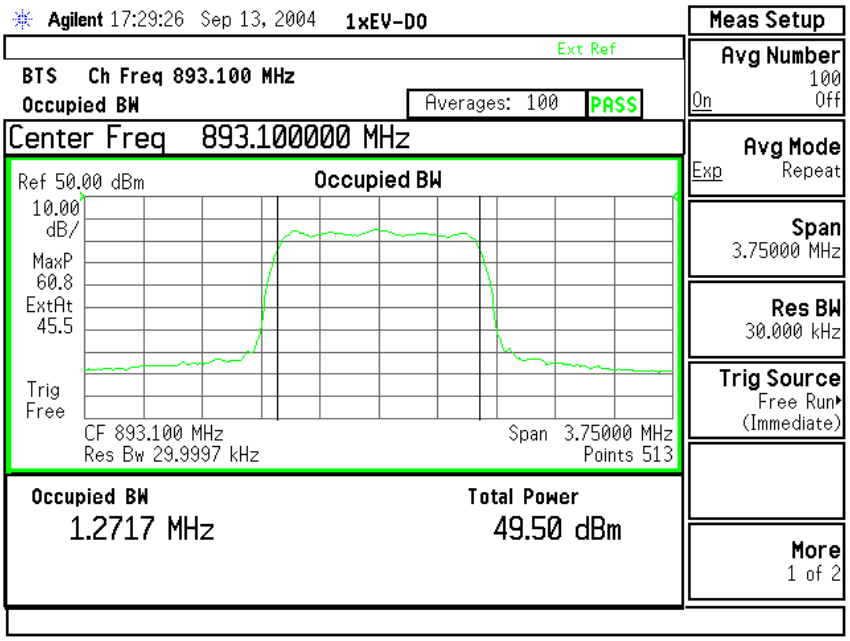


Channel 770– 893.1 MHz

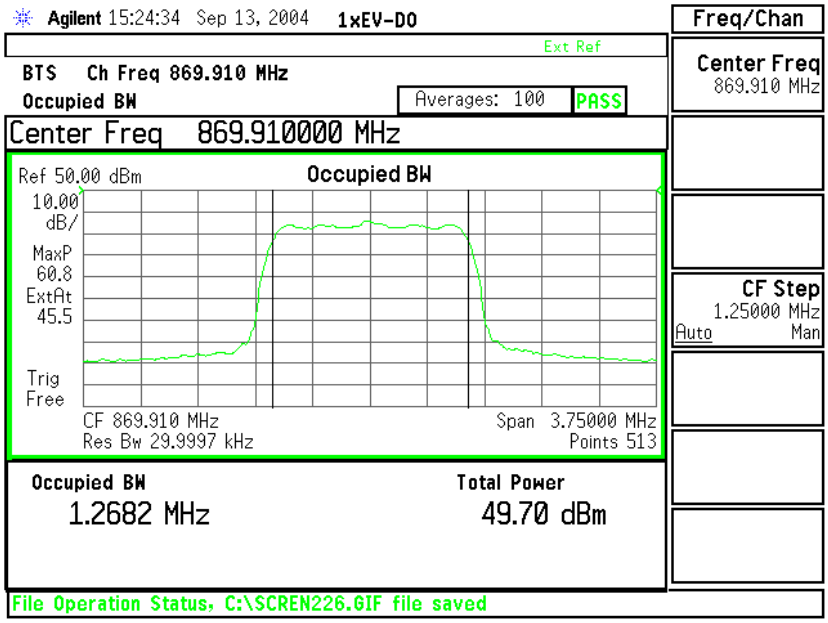


Channel 1020 – 869.91 MHz

-48V DC-EVDO – Occupied Bandwidth – 90W

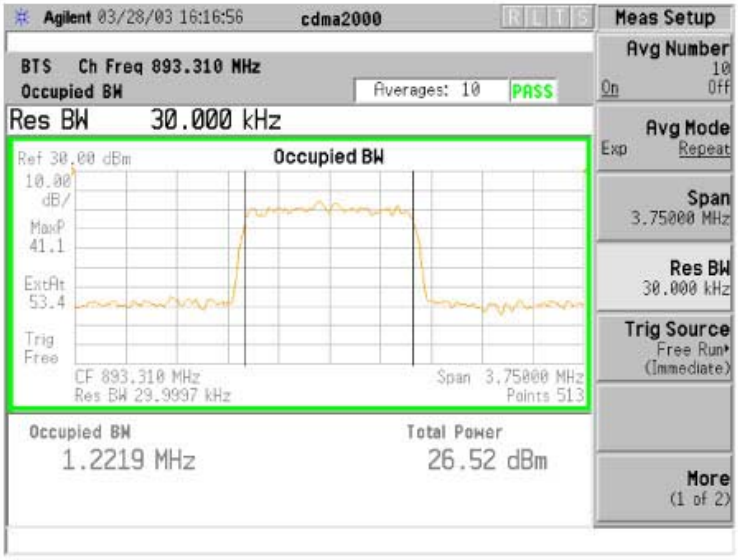


Channel 770– 893.1 MHz

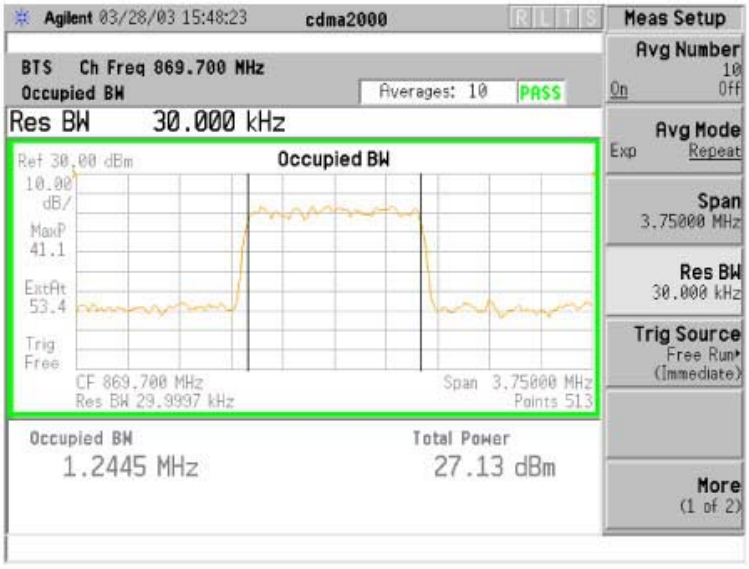


Channel 1020 – 869.91 MHz

27 V DC-1X – Occupied Bandwidth – 400mW

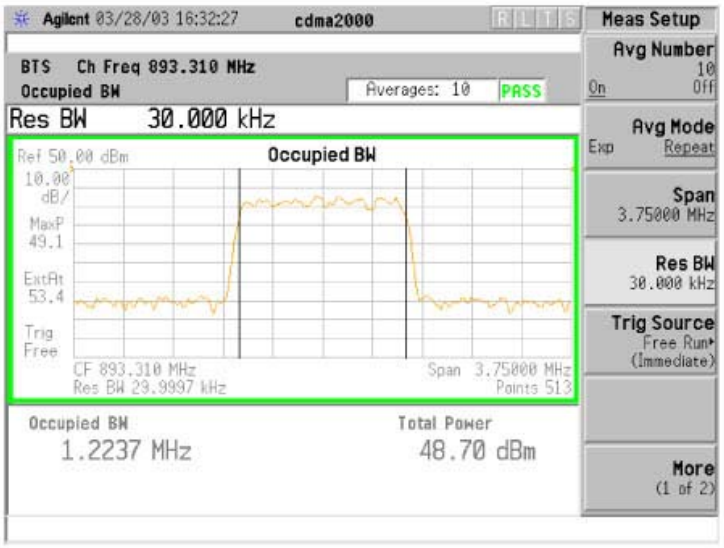


Channel 777 – 893.31 MHz

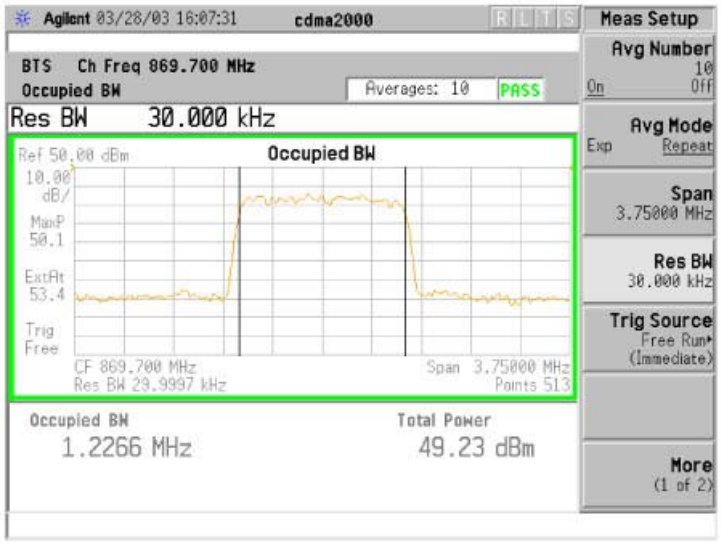


Channel 1013 – 869.7 MHz

27V DC-1X – Occupied Bandwidth – 90W

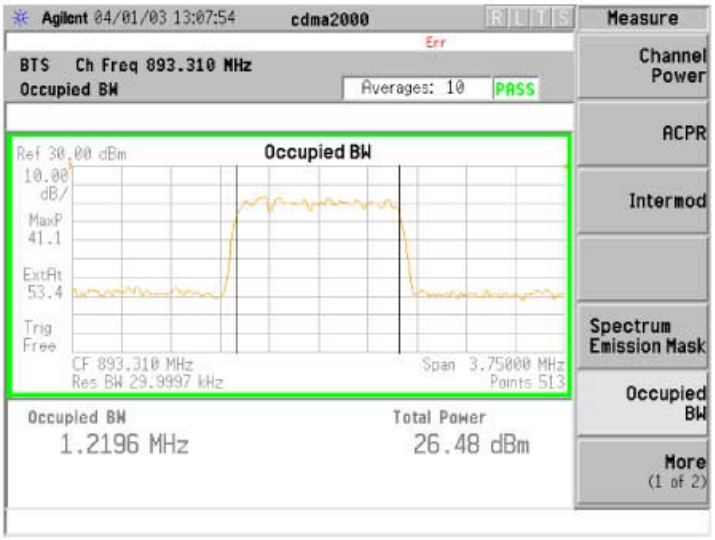


Channel 777 – 893.31 MHz

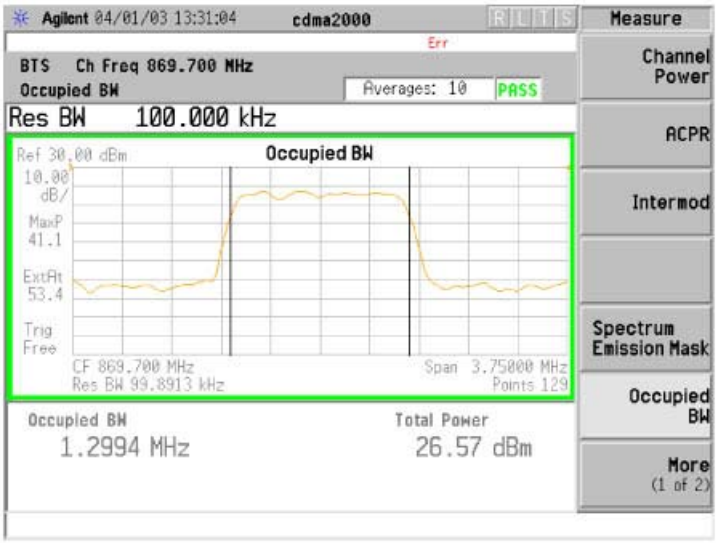


Channel 1013 – 869.7 MHz

-48V DC-1X – Occupied Bandwidth – 400mW

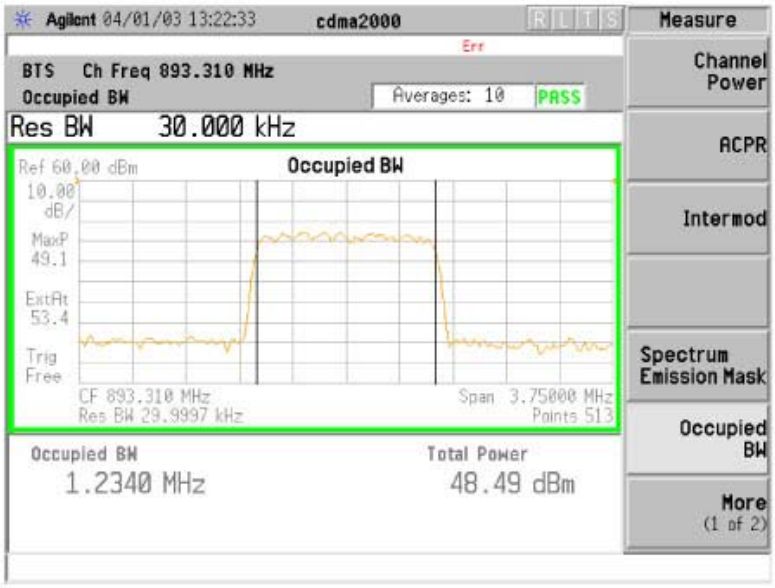


Channel 777 – 893.31 MHz

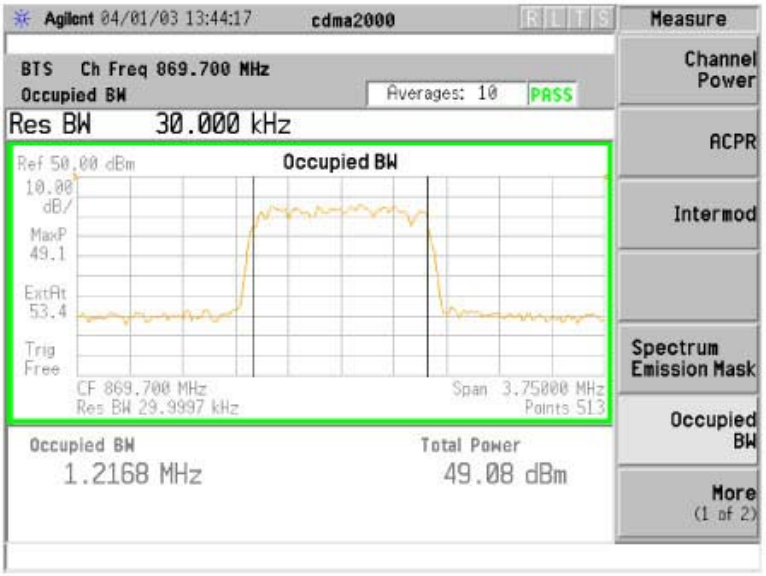


Channel 1013 – 869.7 MHz

-48V DC-1X – Occupied Bandwidth – 90W



Channel 777 – 893.31 MHz



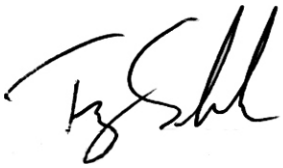
Channel 1013 – 869.7 MHz

SECTION F

FREQUENCY STABILITY

MODE	27V POWER	WORST CASE Δ PPM	FCC REQUIREMENT	Pass / Fail
CSM1	85-115%	<0.02	+/- 1.5 PPM MAX	Pass
CSM2	85-115%	<0.02	+/- 1.5 PPM MAX	Pass

MODE	TEMPERATURE	WORST CASE Δ PPM	FCC REQUIREMENT	Pass / Fail
CSM1	-30º to +50º C	<0.2	+/- 1.5 PPM MAX	Pass
CSM2	-30º to +50º C	<0.2	+/- 1.5 PPM MAX	Pass

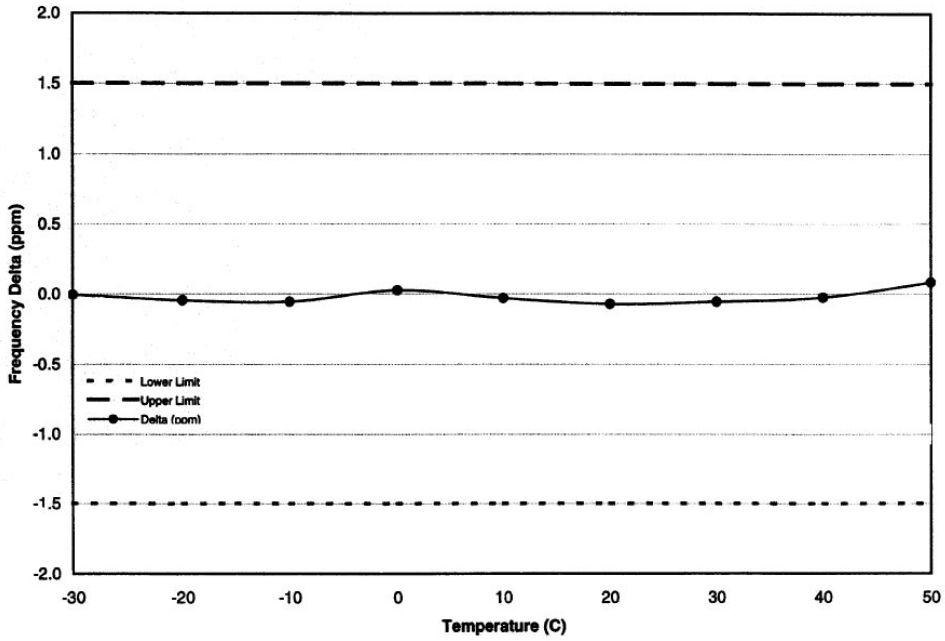


04.01.03

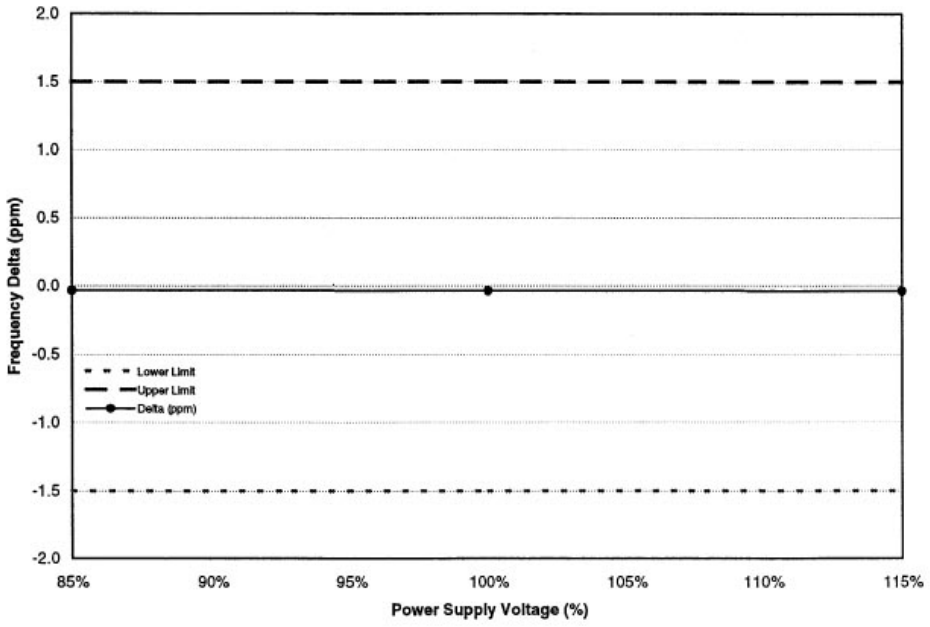
Signature Date

Terry Schwenk

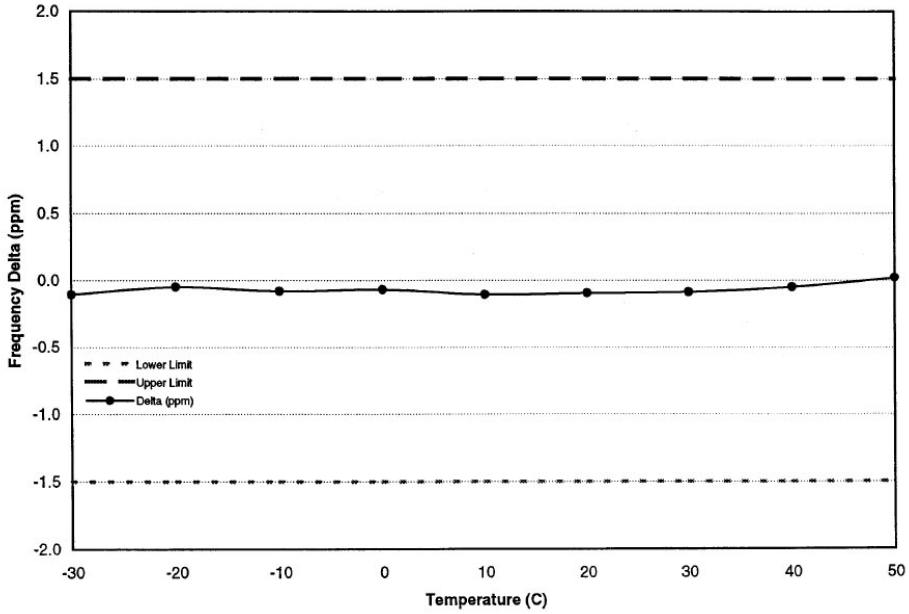
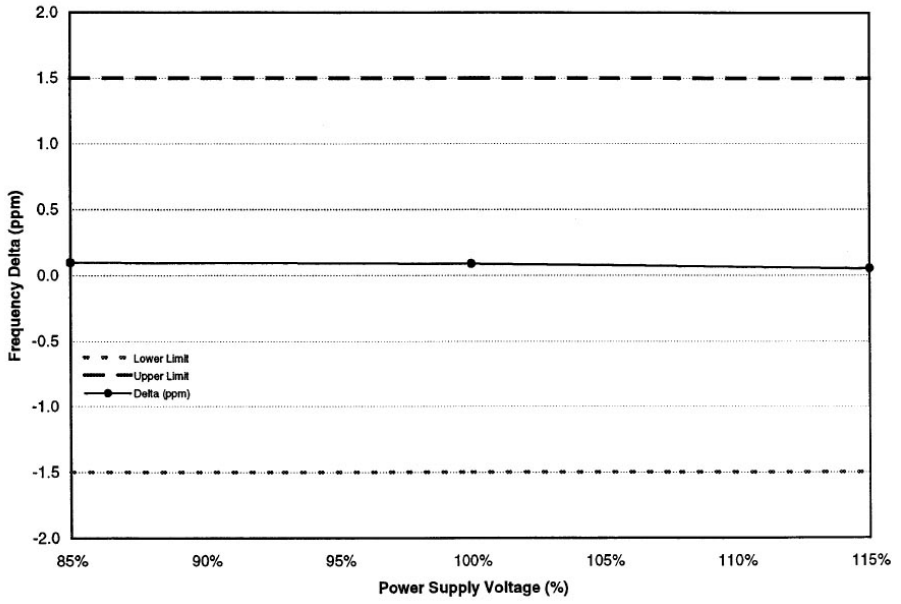
Frequency Stability Over Temperature - CSM1



Frequency Stability with Varying Supply Voltage - CSM1



Frequency Stability Over Temperature - CSM2



Frequency Stability with Varying Supply Voltage - CSM2