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Global Telecom Solutions Sector

APPLICANT: MOTOROLA

FCC ID: IHET5EE1

SC4812T Lite 1X/EVDO @ 800 MHz CDMA BTS

TEST REPORT EXHIBIT

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Section A

Summary of RF Measurements

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Summary of Radiated RF Measurements

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

<i>Channel / Voltage</i>	<i>Spurious Frequency (MHz)</i>	<i>Antenna Polarity</i>	<i>Measured Radiated Field Strength (dBuV/m)</i>	<i>Measured Radiated Field Strength (dBm) (Note 1)</i>	<i>Cable Loss (dB)</i>	<i>Antenna Gain (dB)</i>	<i>Equivalent Transmit Power (dBm)</i>	<i>(Pass/ Fail)</i>
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:
 $(\text{dBuV/M}) + 9.542 - 104.77 = \text{dBm}$
Converting dBuV/M to dBm at 10 meters:
 $(\text{dBuV/M}) + 20 - 104.77 = \text{dBm}$

09.14.04

Signature

Date

Francisco Avalos



Summary of Radiated RF Measurements

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

<i>Channel / Voltage</i>	<i>Spurious Frequency (MHz)</i>	<i>Antenna Polarity</i>	<i>Measured Radiated Field Strength (dBuV/m)</i>	<i>Measured Radiated Field Strength (dBm) (Note 1)</i>	<i>Cable Loss (dB)</i>	<i>Antenna Gain (dB)</i>	<i>Equivalent Transmit Power (dBm)</i>	<i>(Pass/ Fail)</i>
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:
 $(\text{dBuV/M}) + 9.542 - 104.77 = \text{dBm}$
Converting dBuV/M to dBm at 10 meters:
 $(\text{dBuV/M}) + 20 - 104.77 = \text{dBm}$



Signature

Date

Brian Daniel
Lead EMI Engineer



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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

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Date

Francisco Avalos



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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

 4-3-03

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Date

Brian Daniel
Lead EMI Engineer

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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.

09.14.04

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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

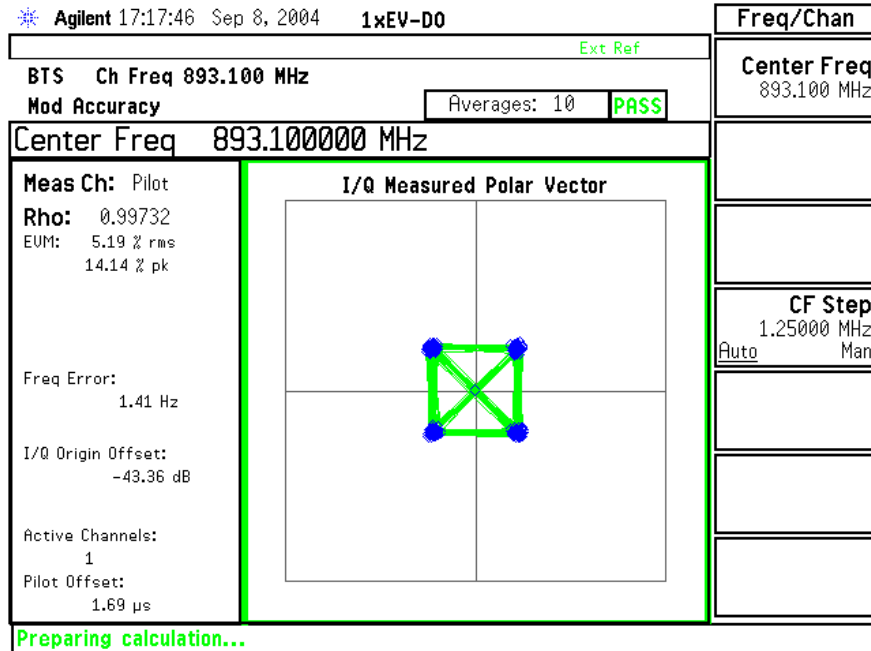
The BTS was configured for maximum power out of 49.54 dBm and minimum power out of 26.0 dBm respectively. The output power was set respectively to 90 Watts or 400 mWatts using a power meter


Signature Date

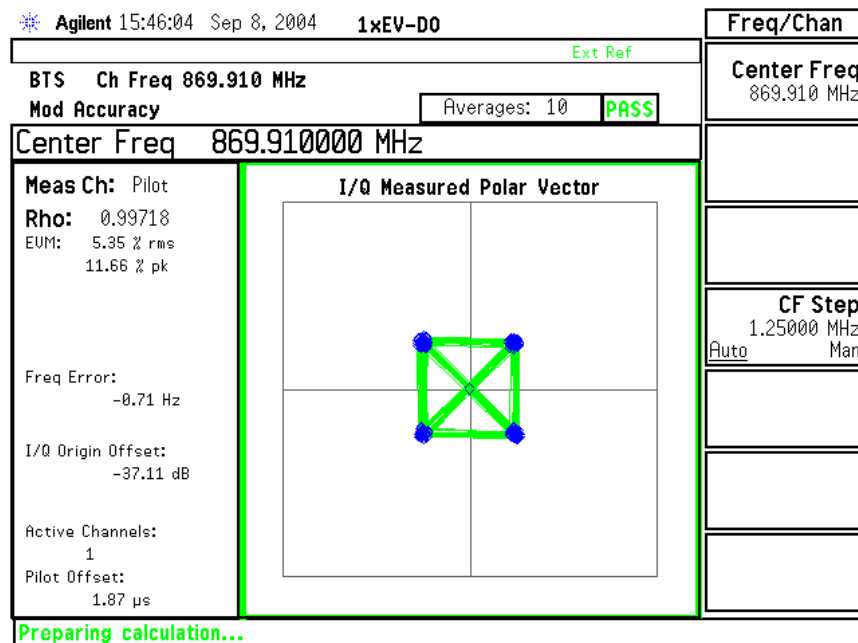
Brian Daniel
Lead EMI Engineer



27V DC-EVDO – Modulation Characteristics – 4.5 W



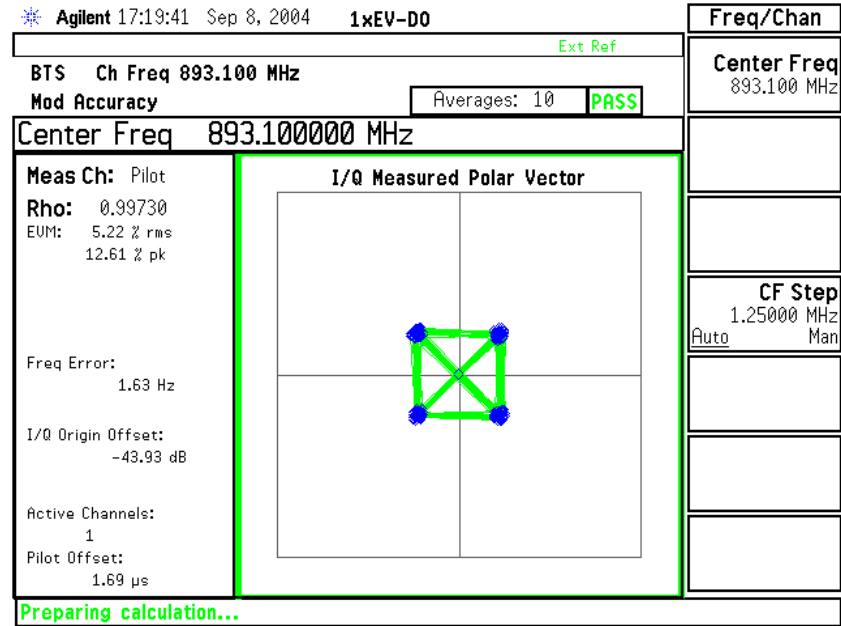
Channel 770 – 893.1 MHz



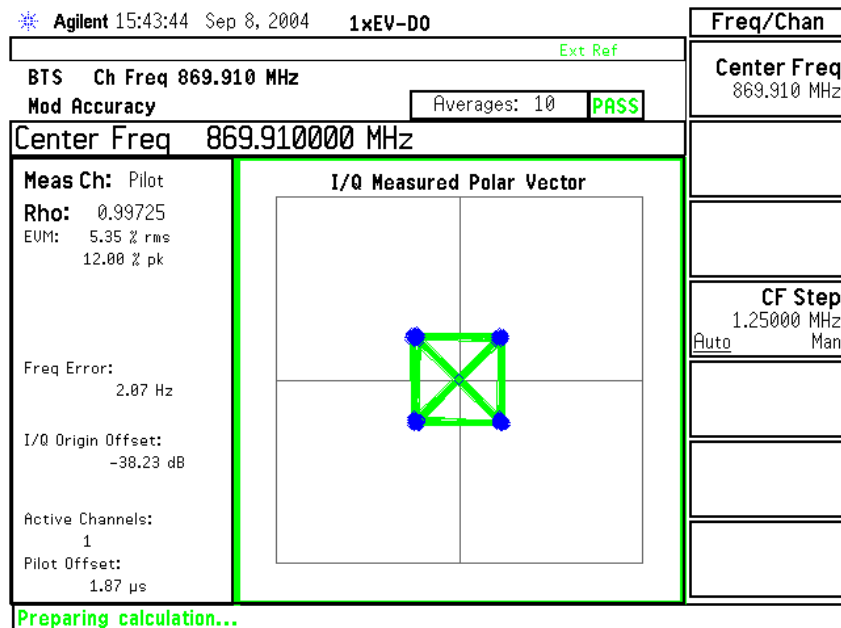
Channel 1020 – 869.91 MHz



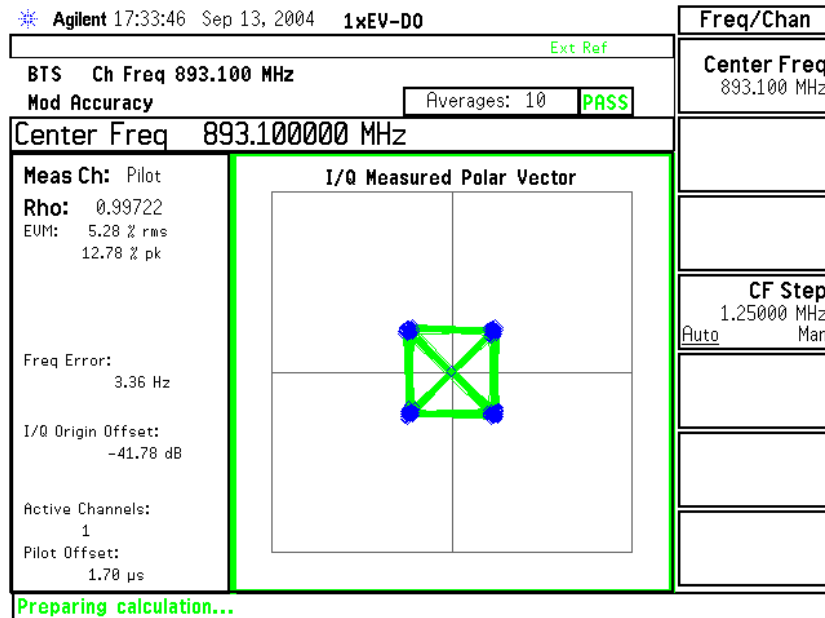
27V DC-EVDO – Modulation Characteristics – 90 W



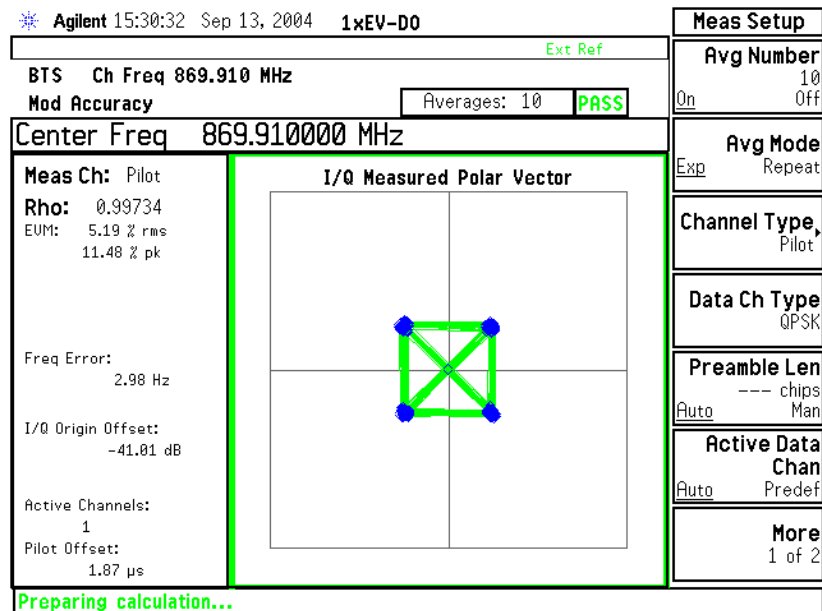
Channel 770 – 893.1 MHz



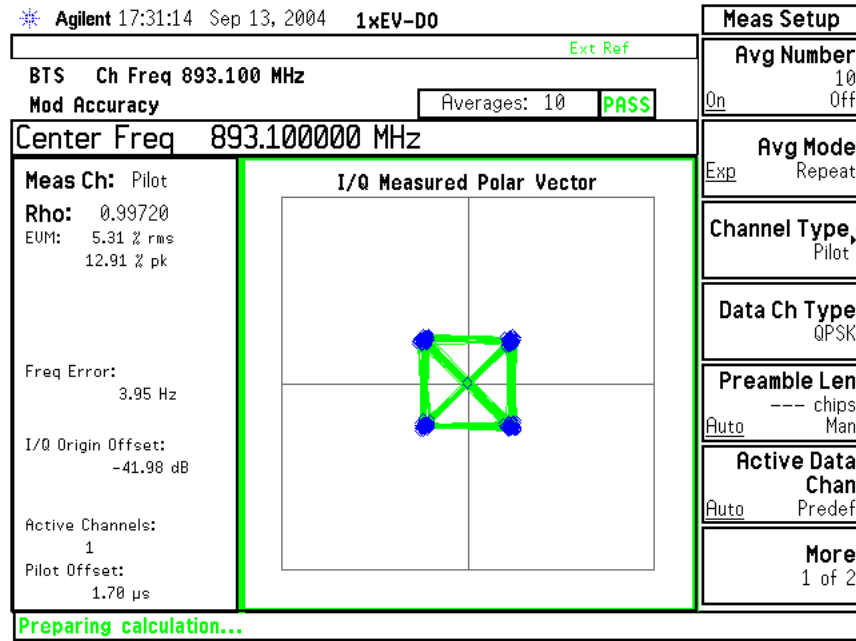
Channel 1020 – 869.91 MHz

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

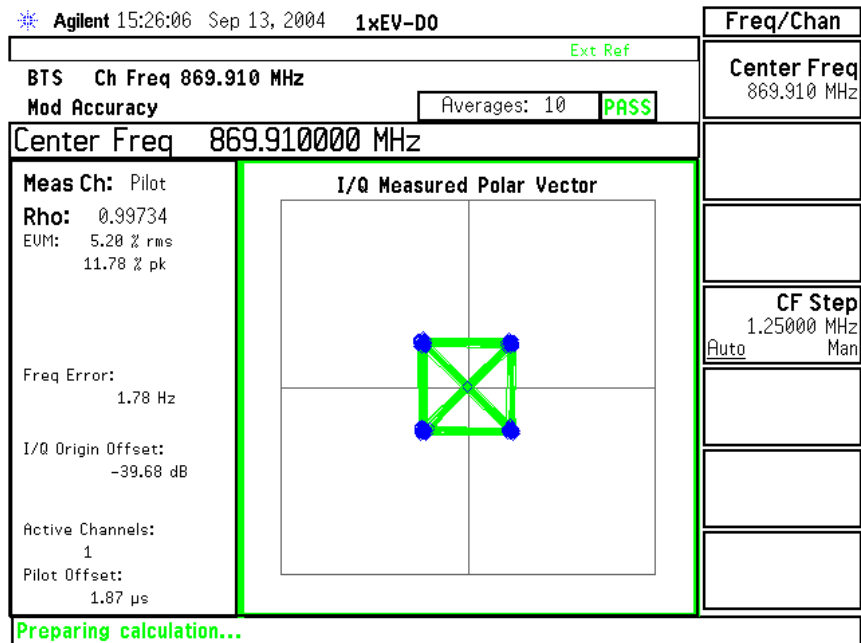
Channel 770 – 893.1 MHz



Channel 1020 – 869.91 MHz

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

Channel 770 – 893.1 MHz



Channel 1020 – 869.91 MHz



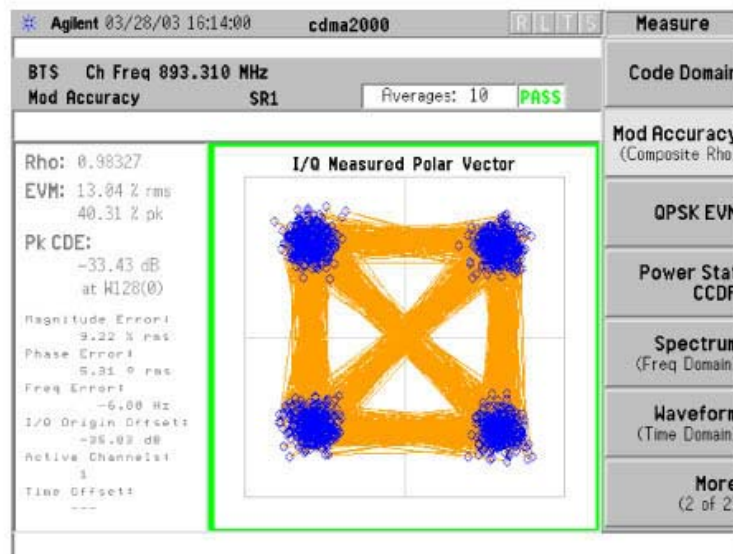
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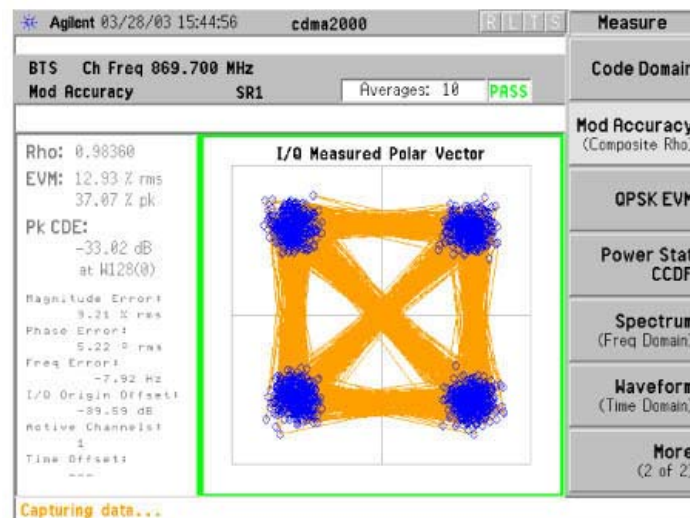
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27V DC -1X- Modulation Characteristics - 400mW



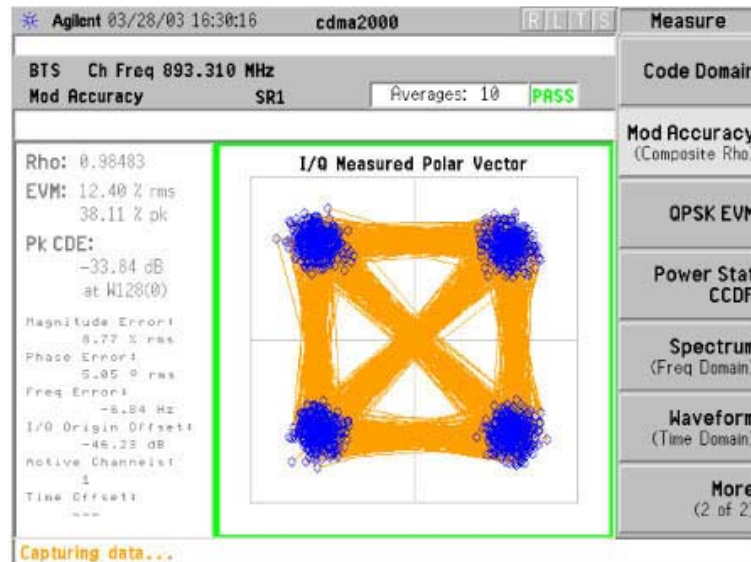
Channel 777 – 893.31 MHz



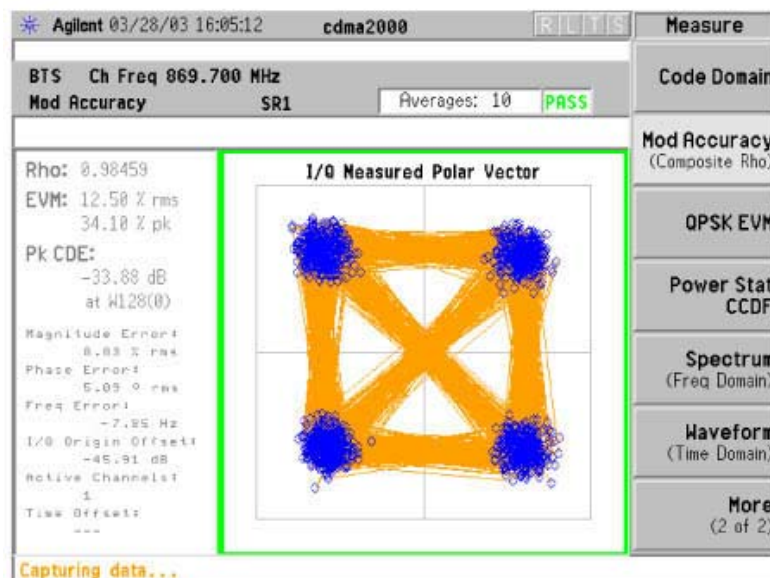
Channel 1013 – 869.7 MHz



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



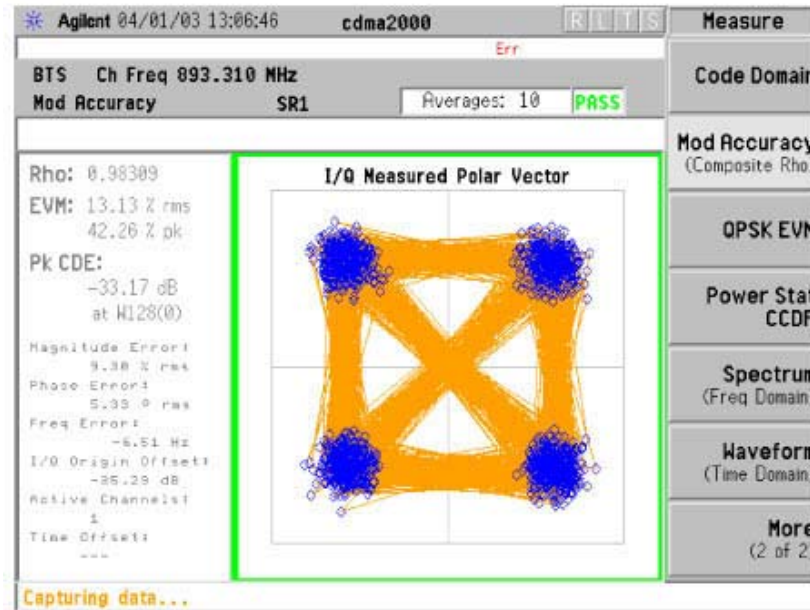
Channel 777 – 893.31 MHz



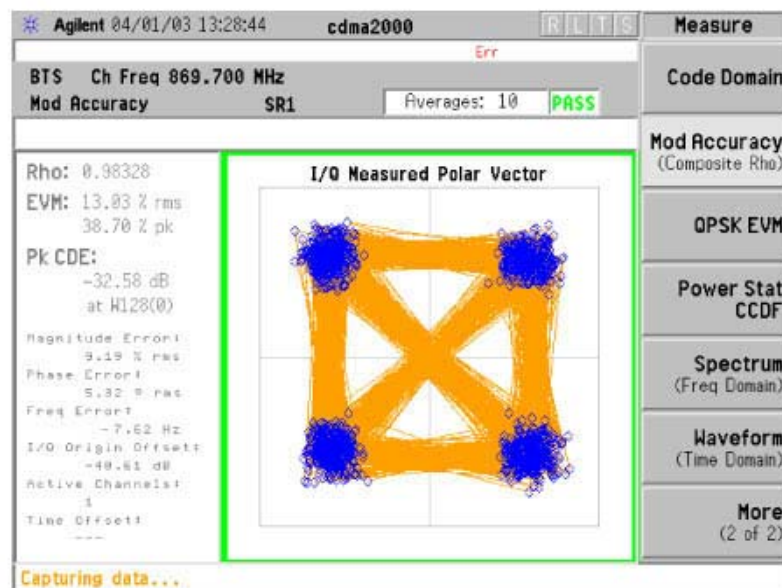
Channel 1013 – 869.7 MHz



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



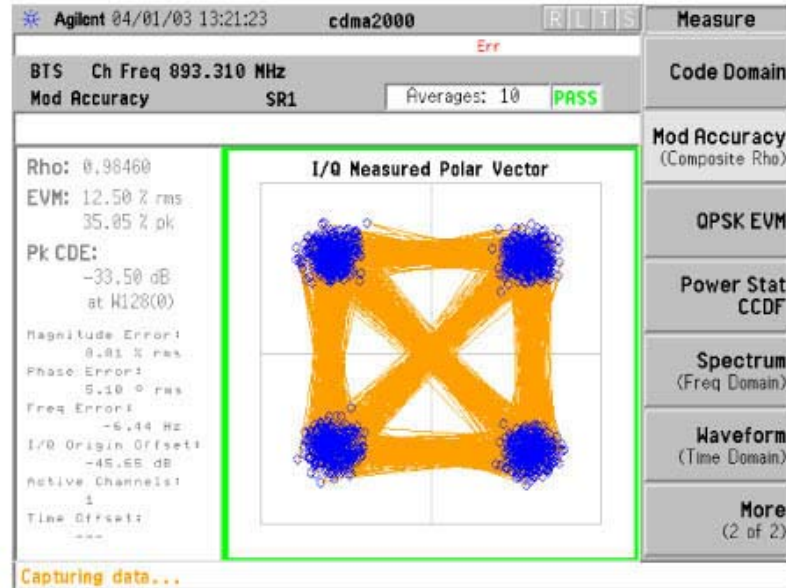
Channel 777 – 893.31 MHz



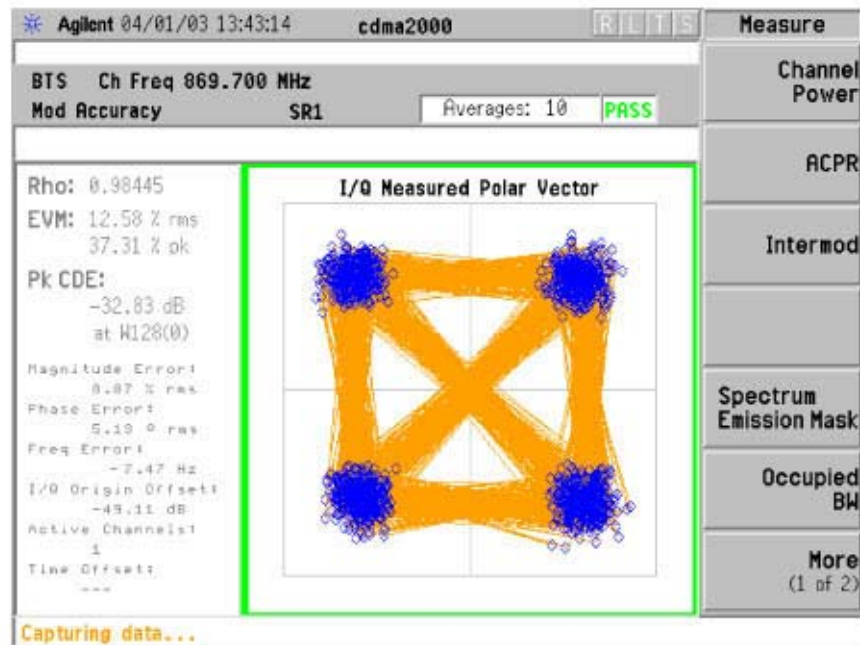
Channel 1013 – 869.7 MHz



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



Channel 777 – 893.31 MHz



Channel 1013 – 869.7 MHz



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Section C

Spurious and Harmonic Emissions Radiated

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Radiated RF Measurements

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

<i>Channel / Voltage</i>	<i>Spurious Frequency (MHz)</i>	<i>Antenna Polarity</i>	<i>Measured Radiated Field Strength (dBuV/m)</i>	<i>Measured Radiated Field Strength (dBm) (Note 1)</i>	<i>Cable Loss (dB)</i>	<i>Antenna Gain (dB)</i>	<i>Equivalent Transmit Power (dBm)</i>	<i>(Pass/ Fail)</i>
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:
 $(\text{dBuV/M}) + 9.542 - 104.77 = \text{dBm}$
Converting dBuV/M to dBm at 10 meters:
 $(\text{dBuV/M}) + 20 - 104.77 = \text{dBm}$

09.14.04

Signature

Francisco Avalos

Date



Radiated RF Measurements

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

<i>Channel / Voltage</i>	<i>Spurious Frequency (MHz)</i>	<i>Antenna Polarity</i>	<i>Measured Radiated Field Strength (dBuV/m)</i>	<i>Measured Radiated Field Strength (dBm) (Note 1)</i>	<i>Cable Loss (dB)</i>	<i>Antenna Gain (dB)</i>	<i>Equivalent Transmit Power (dBm)</i>	<i>(Pass/ Fail)</i>
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:

$$(\text{dBuV/M}) + 9.542 - 104.77 = \text{dBm}$$

Converting dBuV/M to dBm at 10 meters:

$$(\text{dBuV/M}) + 20 - 104.77 = \text{dBm}$$



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Brian Daniel
Lead EMI Engineer



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Section C

Spurious and Harmonic Emissions Conducted

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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 ($10 \log_{10} (P_{\text{watt}})$) - ($43 + 10 \log_{10} (P_{\text{watt}})$) dBW
- “ = $10 \log_{10} (P_{\text{watt}}) - (43 + 10 \log_{10} (P_{\text{watt}}))$ dBW
- “ = -43 dBW
- “ = -13 dBm

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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 $(10 \log_{10} (P_{\text{watt}})) - (43 + 10 \log_{10} (P_{\text{watt}}))$ dBW
- “ = $10 \log_{10} (P_{\text{watt}}) - (43 + 10 \log_{10} (P_{\text{watt}}))$ dBW
- “ = -43 dBW
- “ = -13 dBm

 4-3-03

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Date

Brian Daniel
Lead EMI Engineer



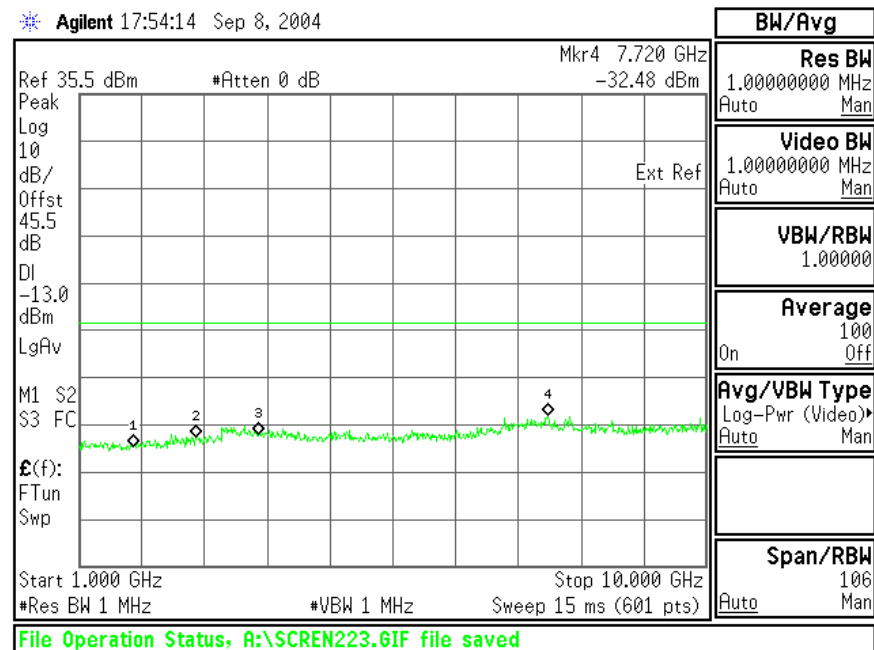
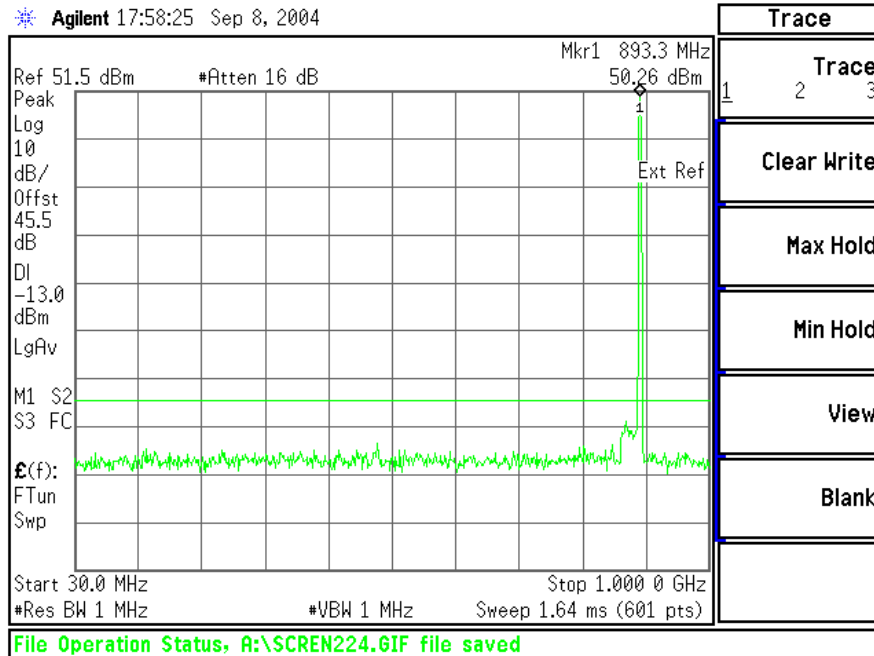
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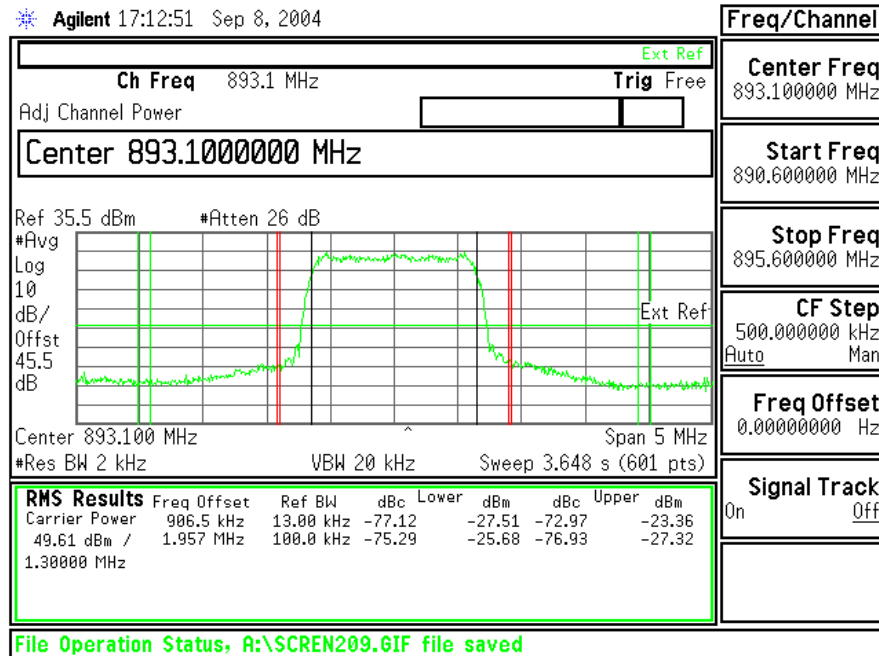
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Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 770 – Maximum Power 49.54 dBm – 27V DC





Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 770 – Maximum Power 49.54 dBm – 27V DC
(Continued)





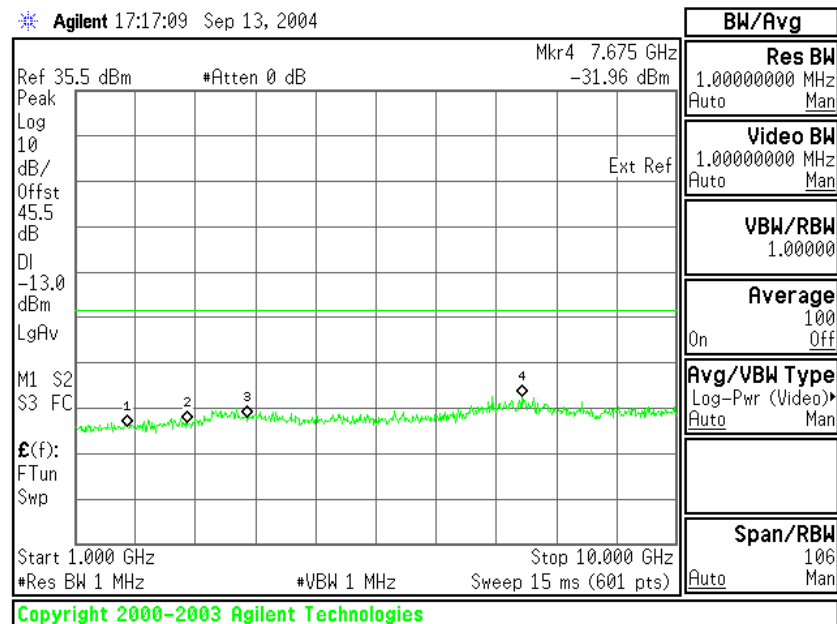
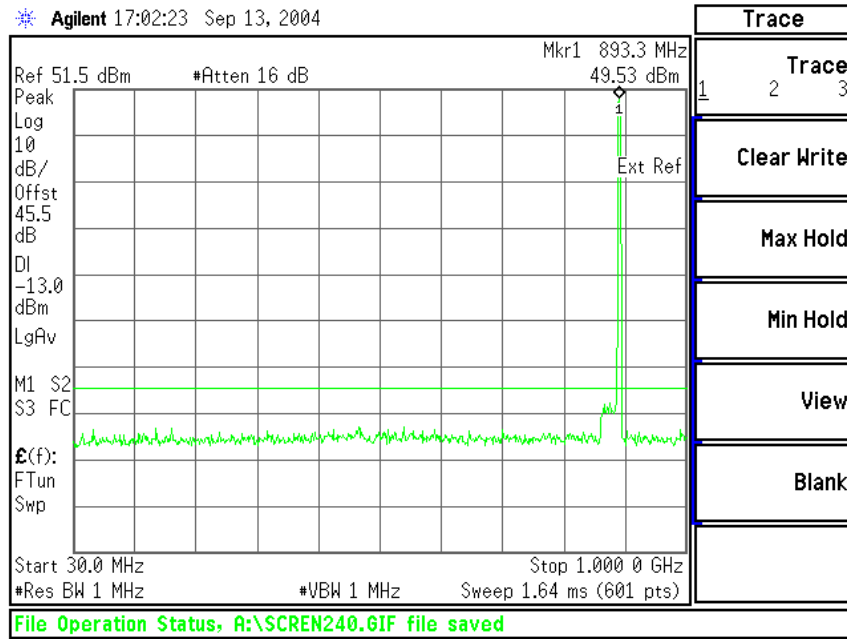
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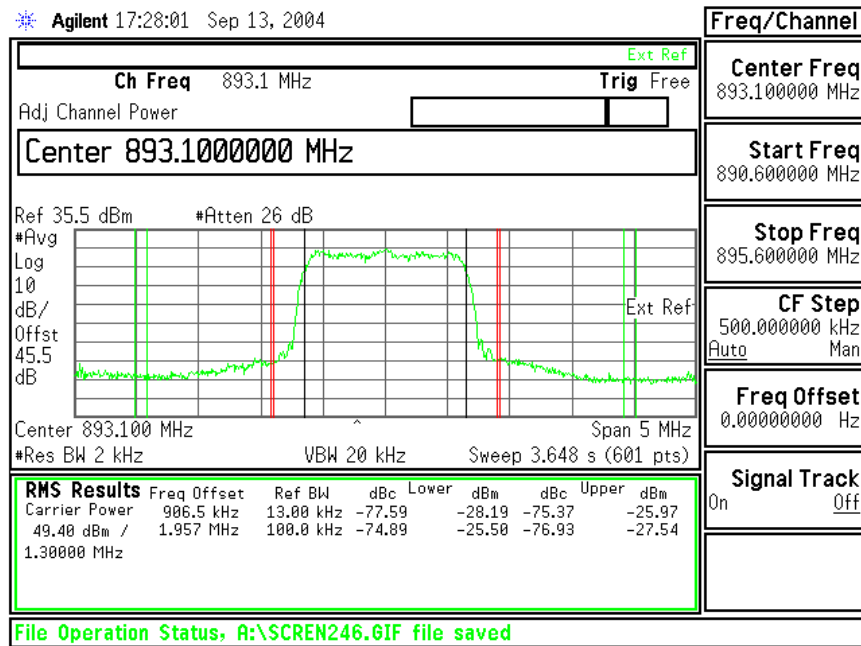
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Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 770 – Maximum Power 49.54 dBm – -48V DC





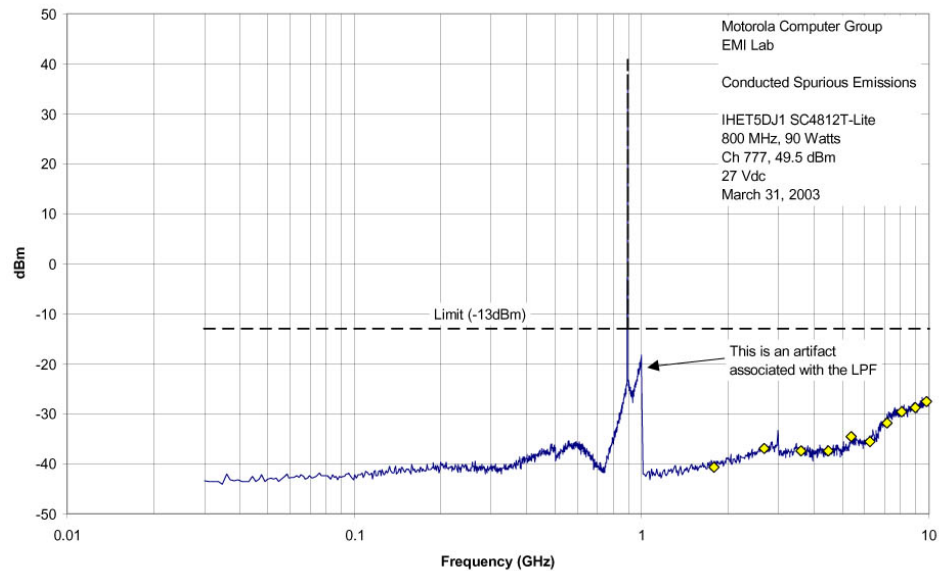
Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 770 – Maximum Power 49.54 dBm – -48V DC
(Continued)



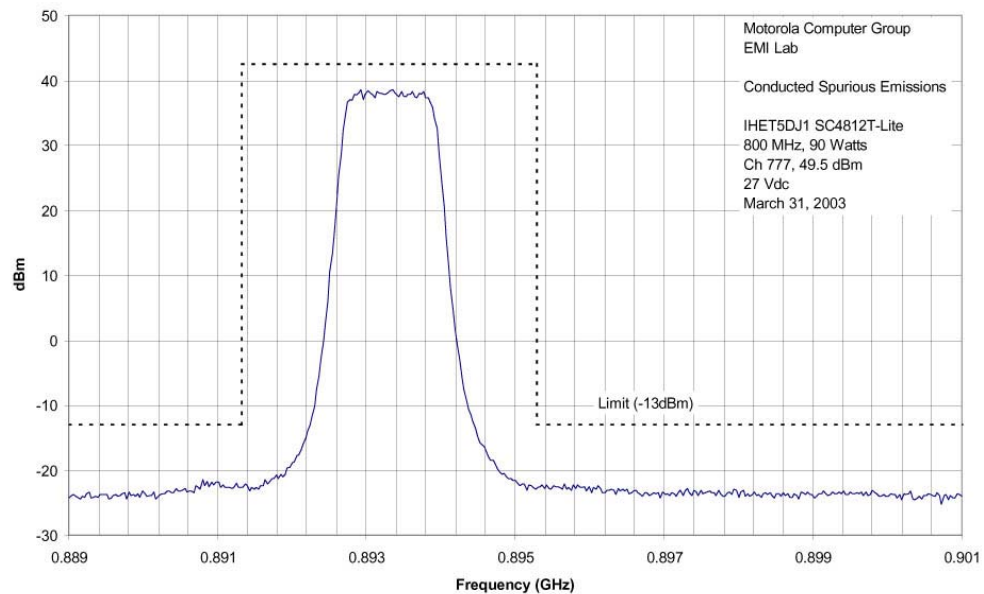


Spurious and Harmonic Emissions Conducted CDMA 1X Channel 777 – Maximum Power – 27V DC

27VDC Conducted Spurious Emissions



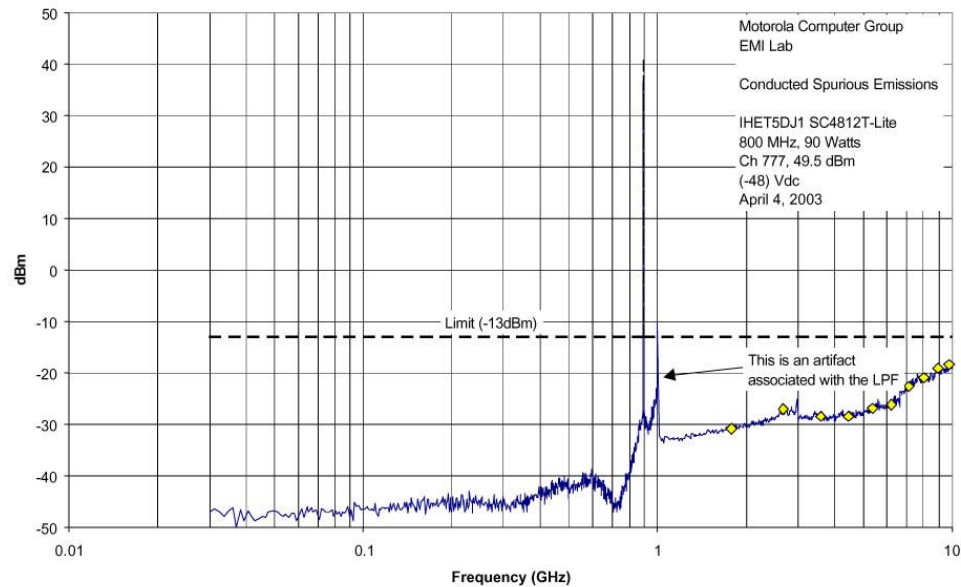
27 VDC Conducted Spurious Emissions



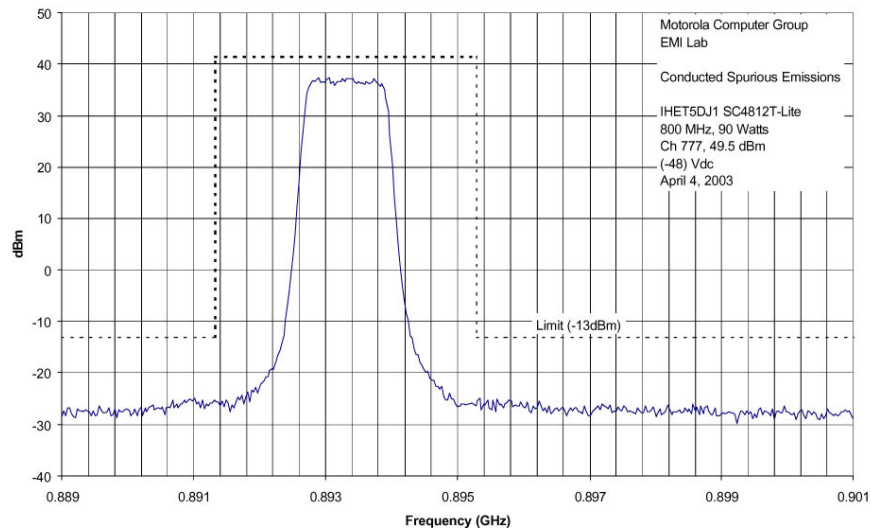


Spurious and Harmonic Emissions Conducted CDMA 1X Channel 777 – Maximum Power – -48V DC

(-48) VDC Conducted Spurious Emissions

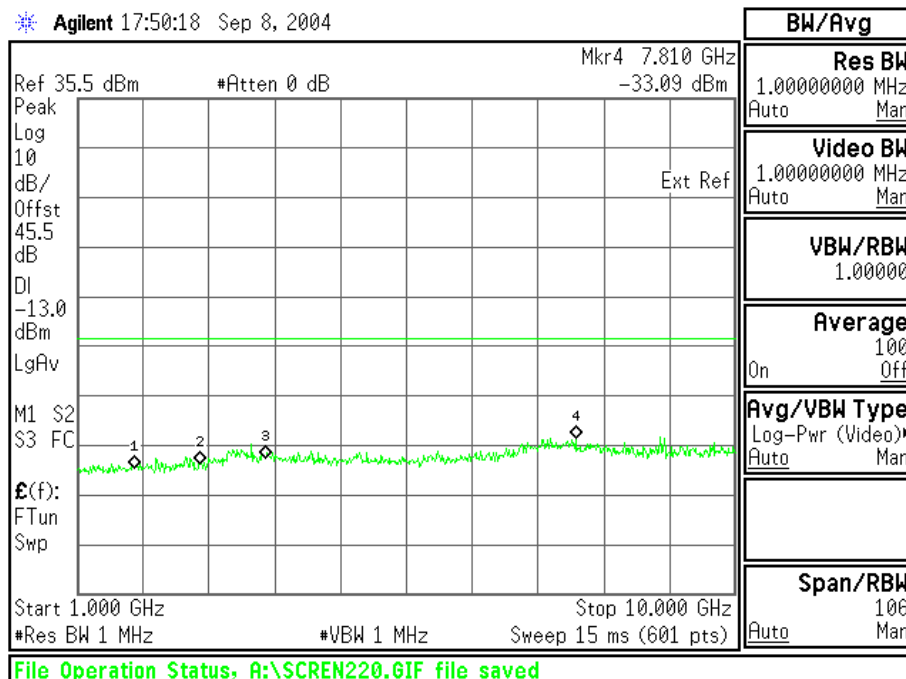
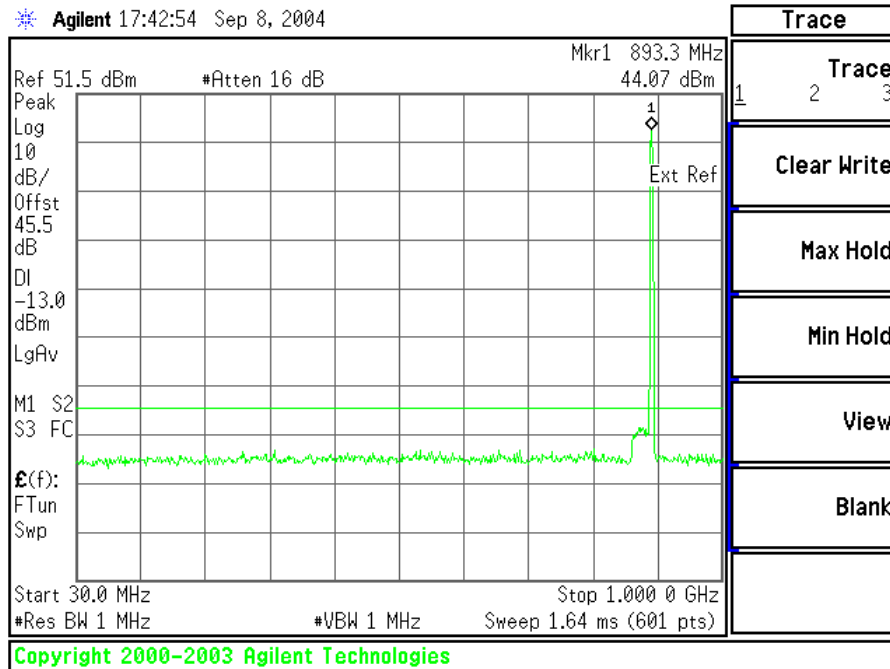


(-48) VDC Conducted Spurious Emissions



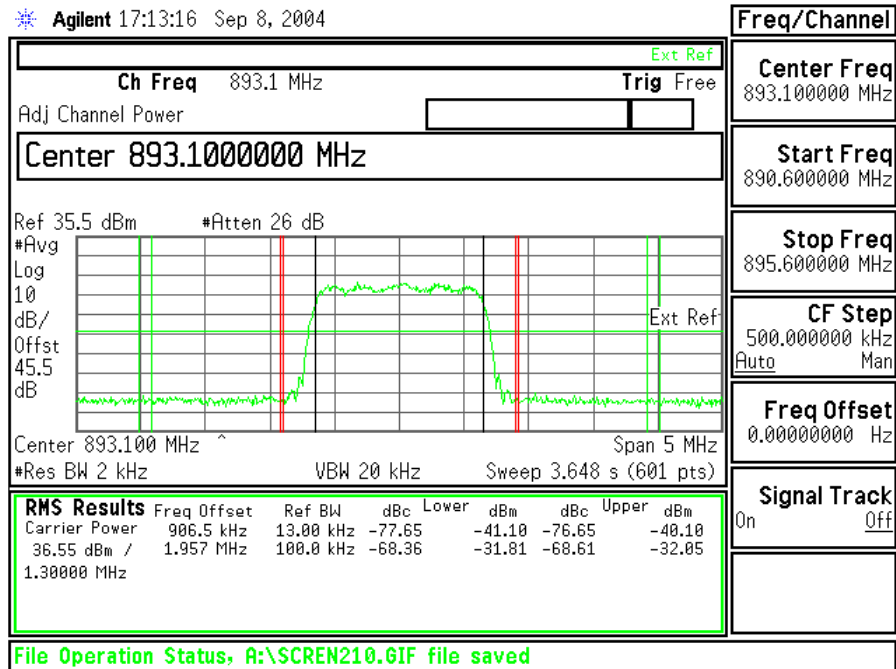


Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 770 – Minimum Power 36.5 dBm – 27V DC



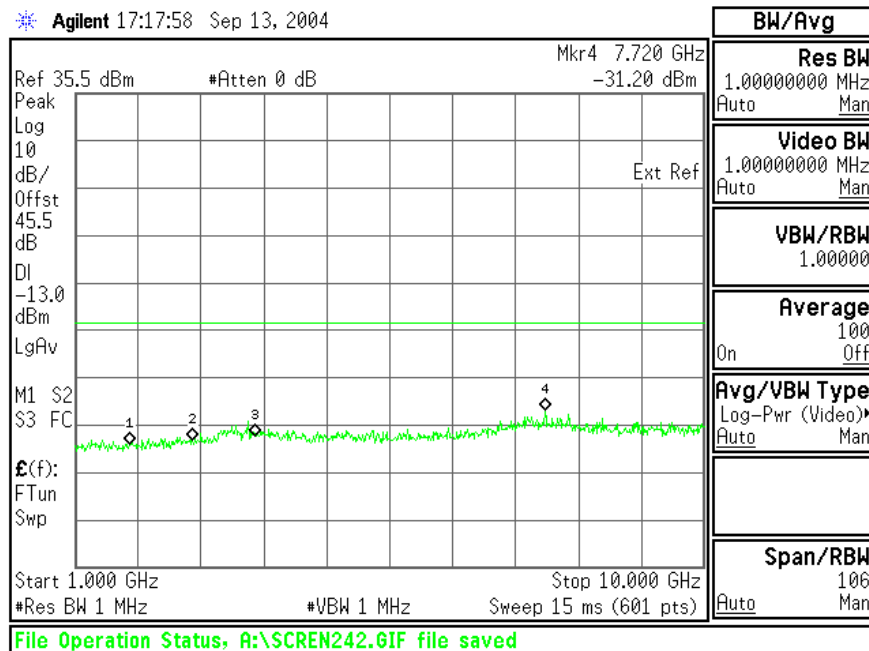
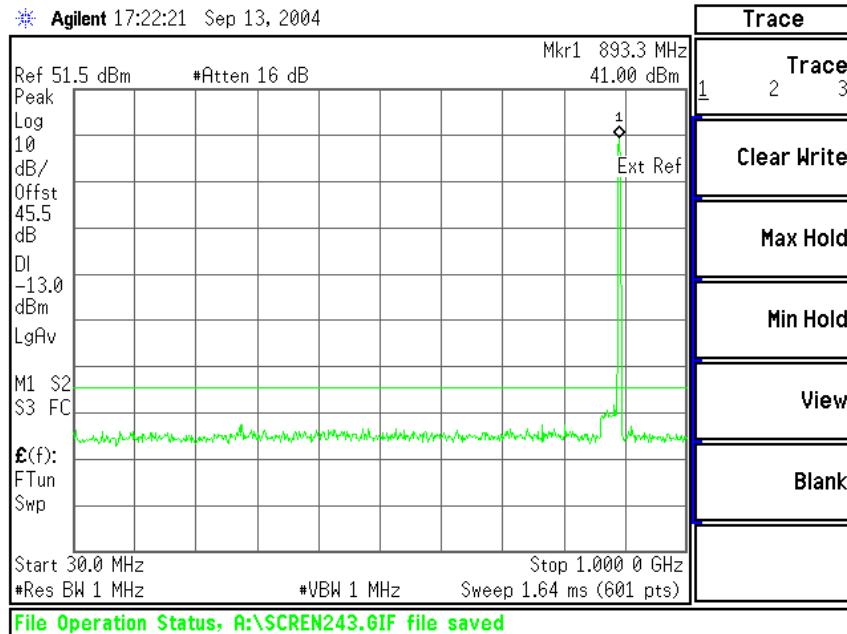


Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 770 – Minimum Power 36.5 dBm – 27V DC
(Continued)





Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 770 – Minimum Power 36.5 dBm– -48V DC





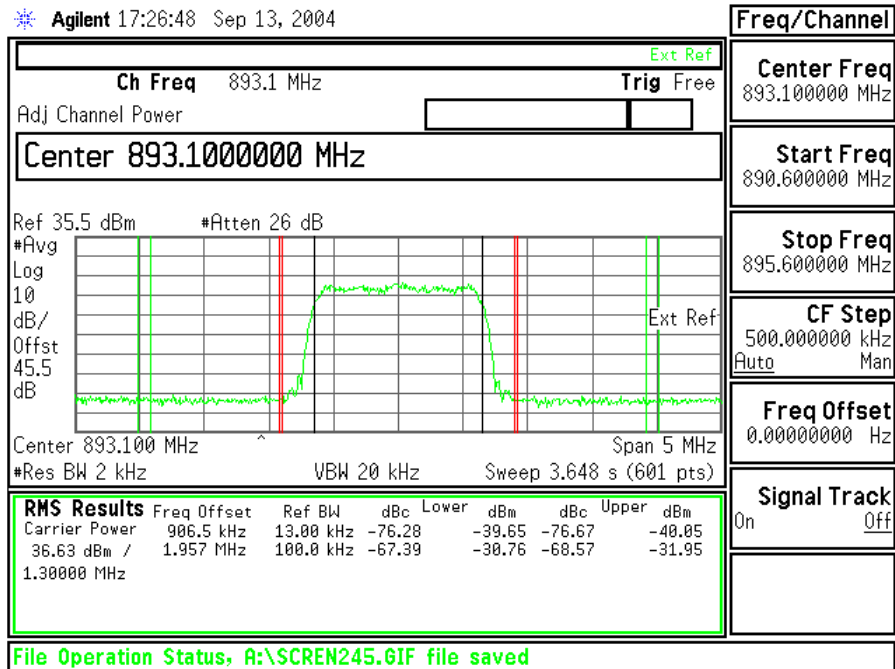
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Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 770 – Minimum Power 36.5 dBm – -48V DC
(Continued)





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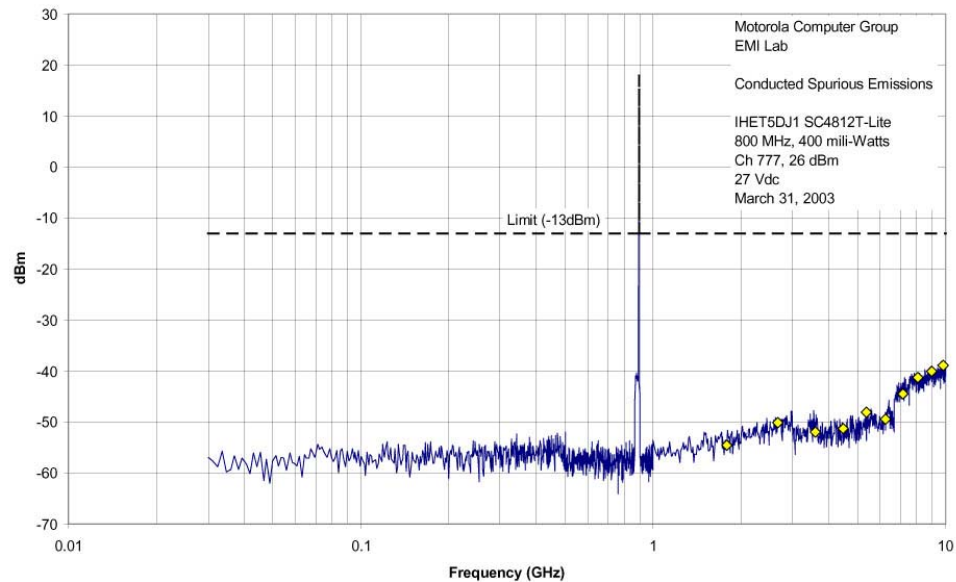
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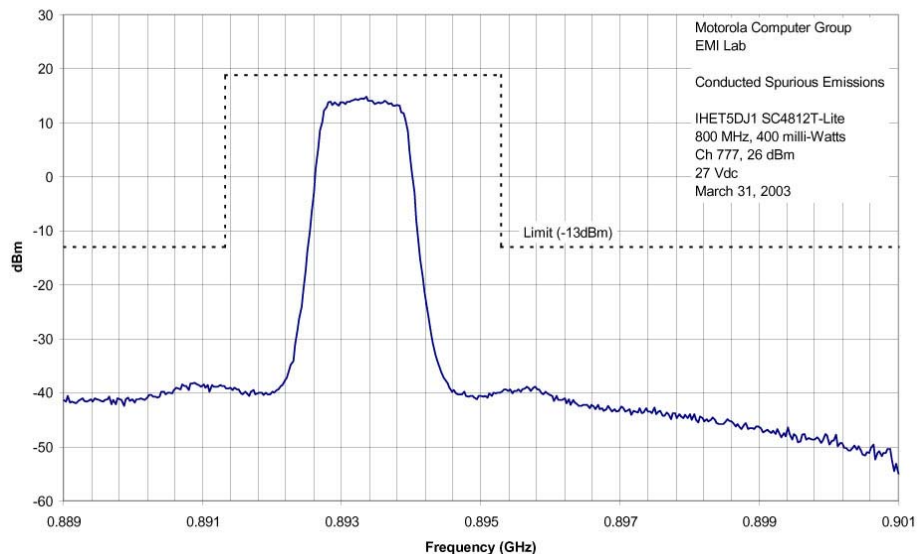
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Spurious and Harmonic Emissions Conducted
CDMA 1X Channel 777 – Minimum Power – 27V DC

27VDC Conducted Spurious Emissions



27 VDC Conducted Spurious Emissions



Spurious and Harmonic Emissions Conducted



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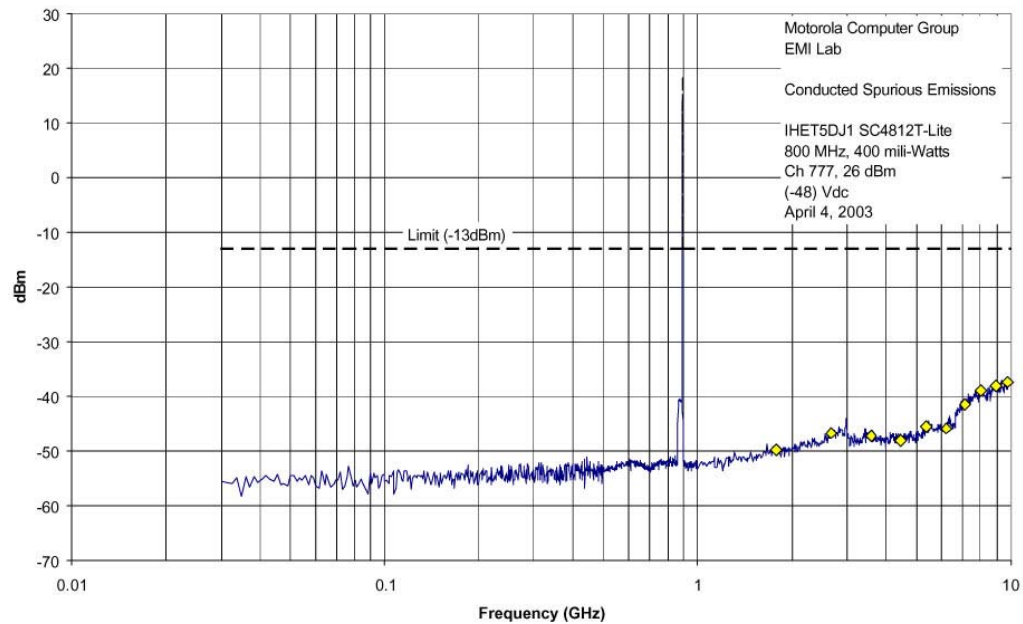
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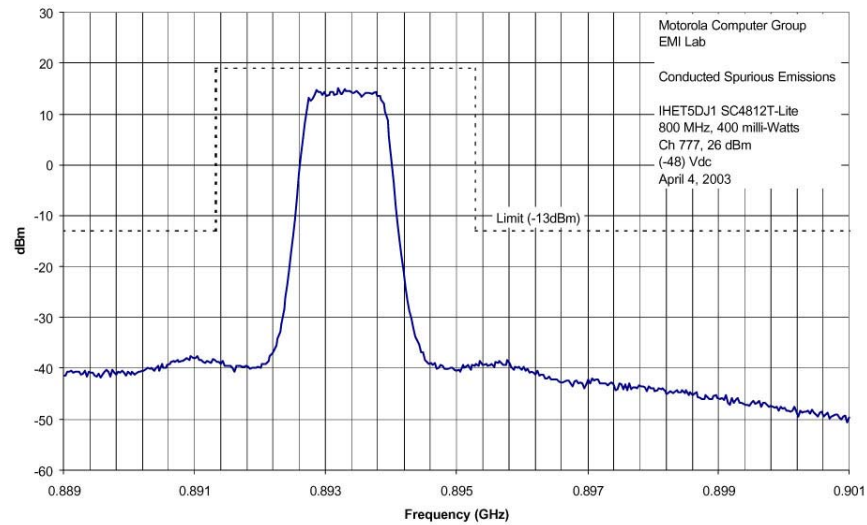
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CDMA Channel 777 – Minimum Power – -48V DC

(-48) VDC Conducted Spurious Emissions



(-48) VDC Conducted Spurious Emissions





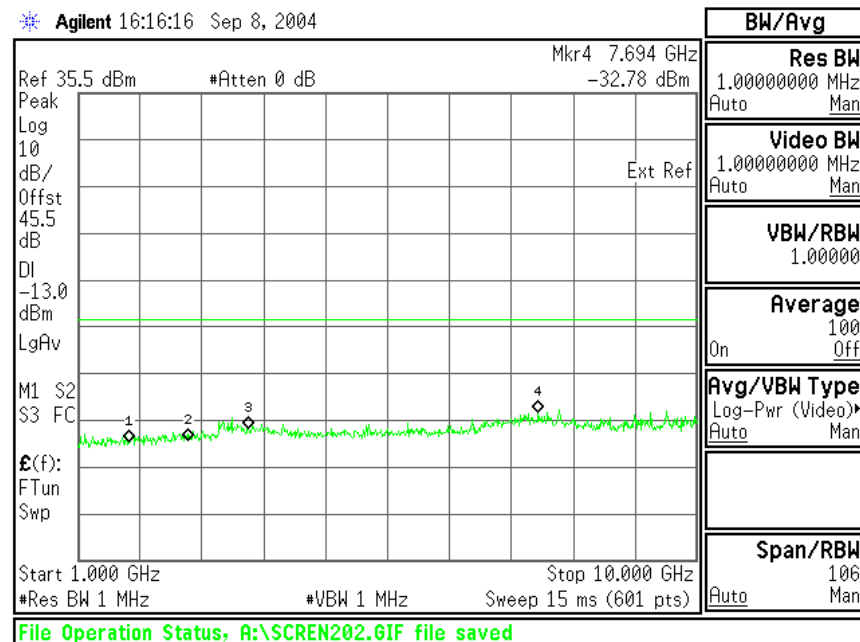
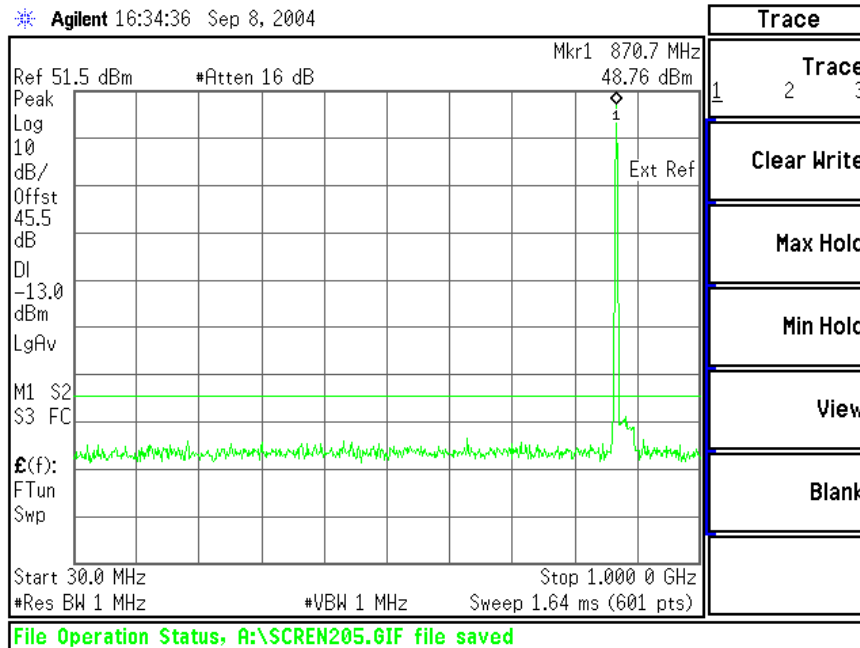
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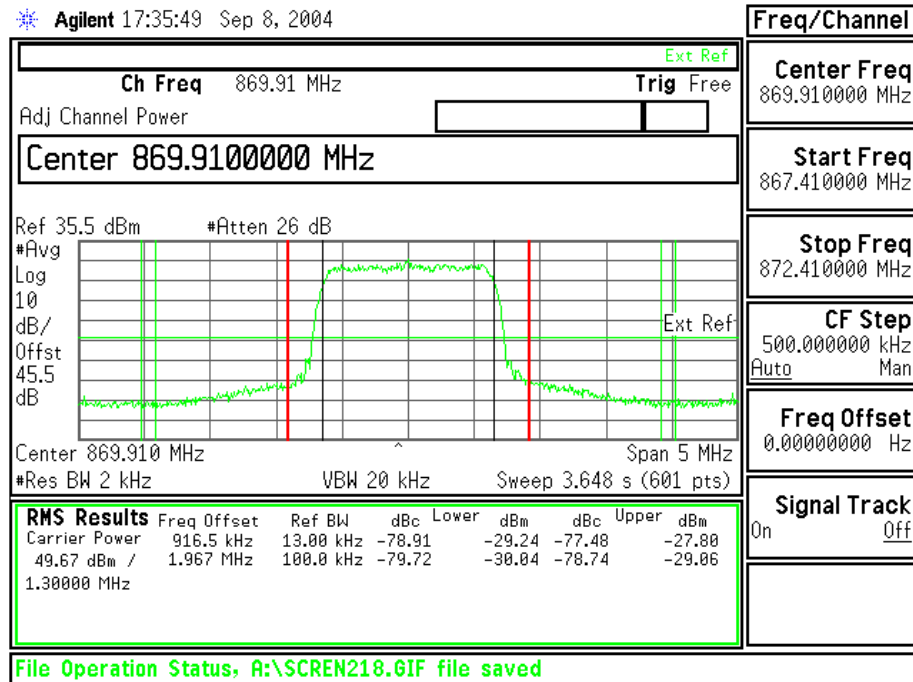
FCC ID: IHET5EE1

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)





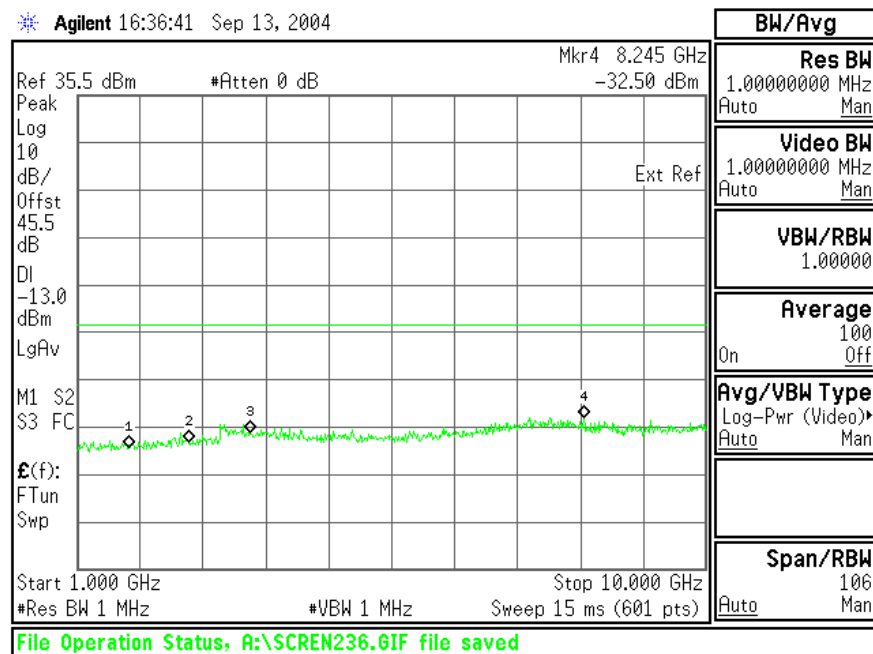
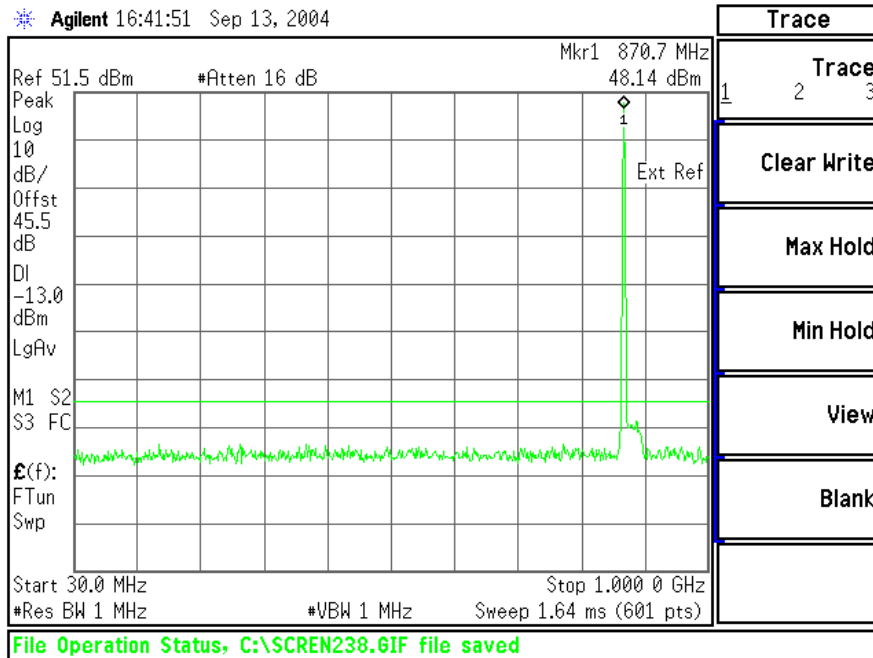
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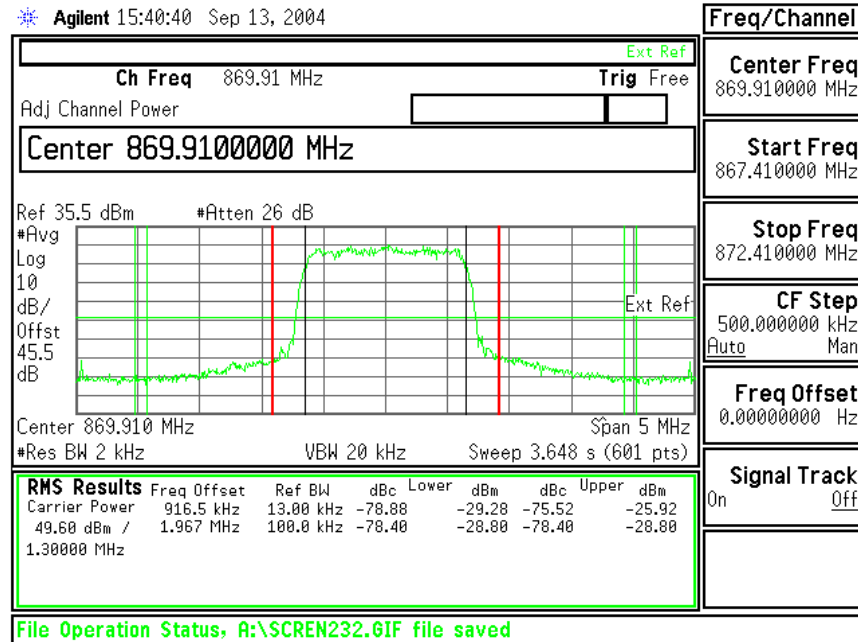
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Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 1020 – Maximum Power 49.54 dBm – -48V DC





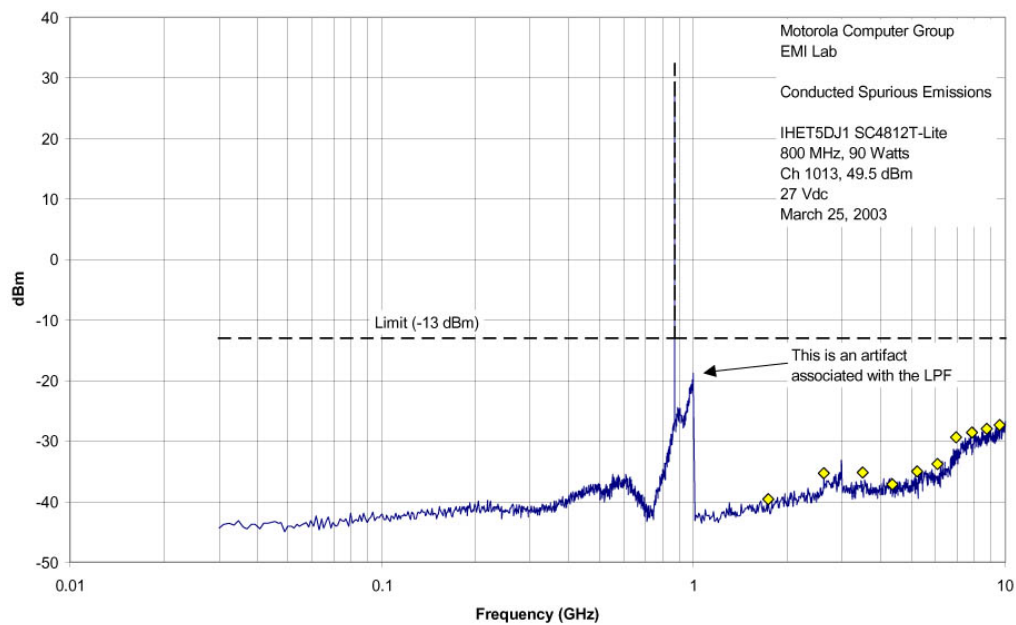
Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 1020 – Maximum Power 49.54 dBm – -48V DC
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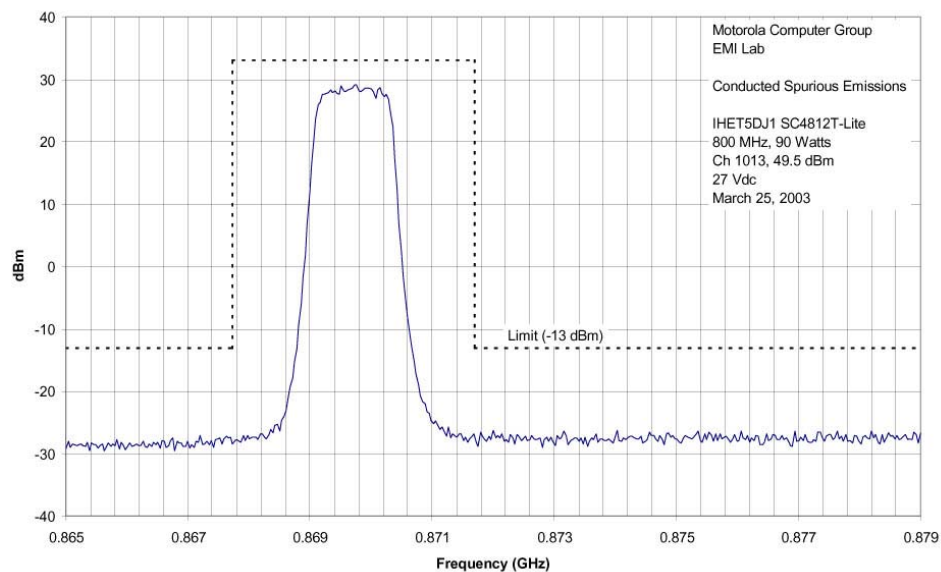


Spurious and Harmonic Emissions Conducted CDMA 1X Channel 1013 – Maximum Power – 27V DC

27VDC Conducted Spurious Emissions



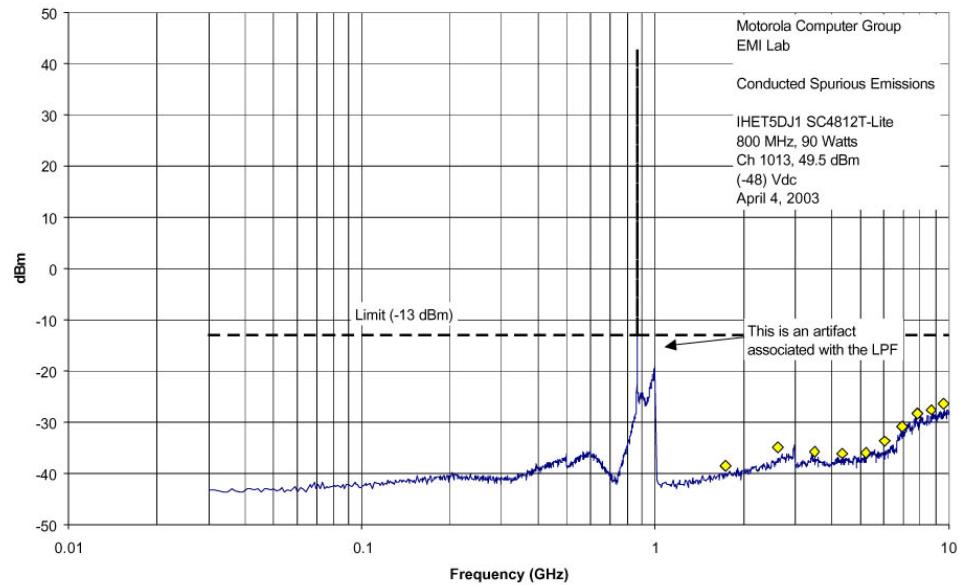
27 VDC Conducted Spurious Emissions



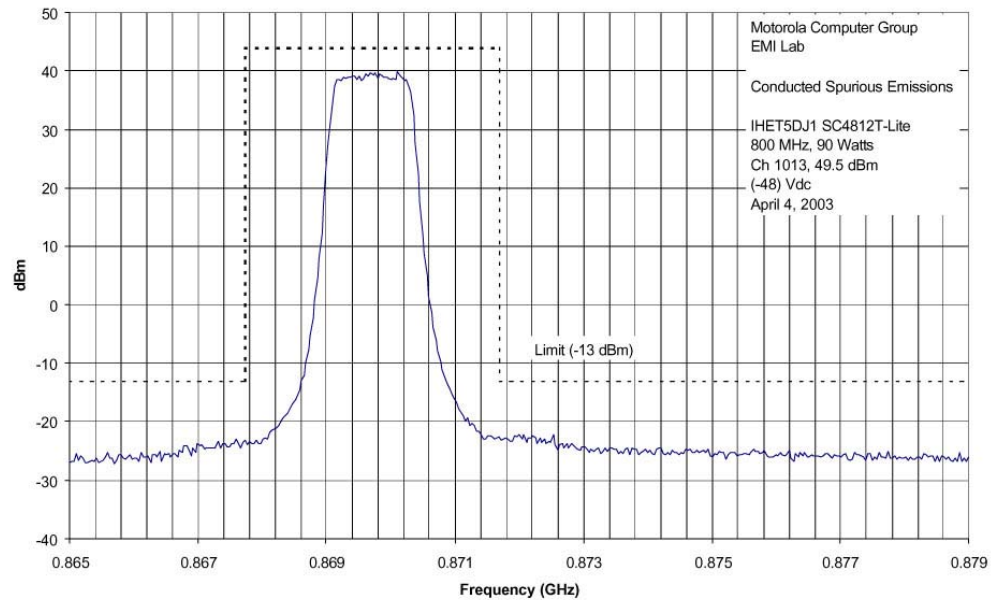


Spurious and Harmonic Emissions Conducted
CDMA 1X Channel 1013 – Maximum Power – -48V DC

(-48) VDC Conducted Spurious Emissions



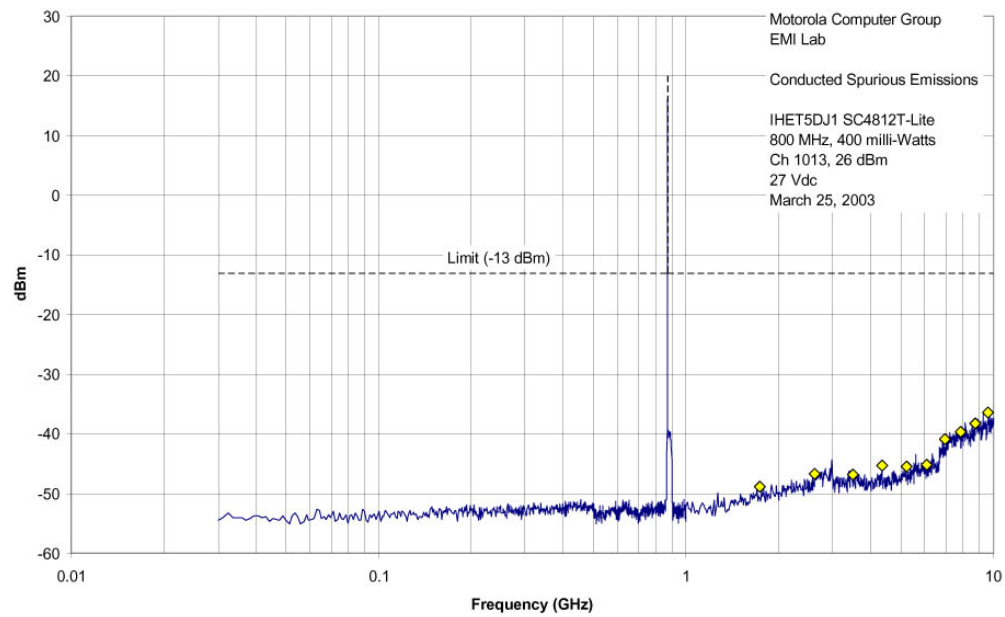
(-48) VDC Conducted Spurious Emissions



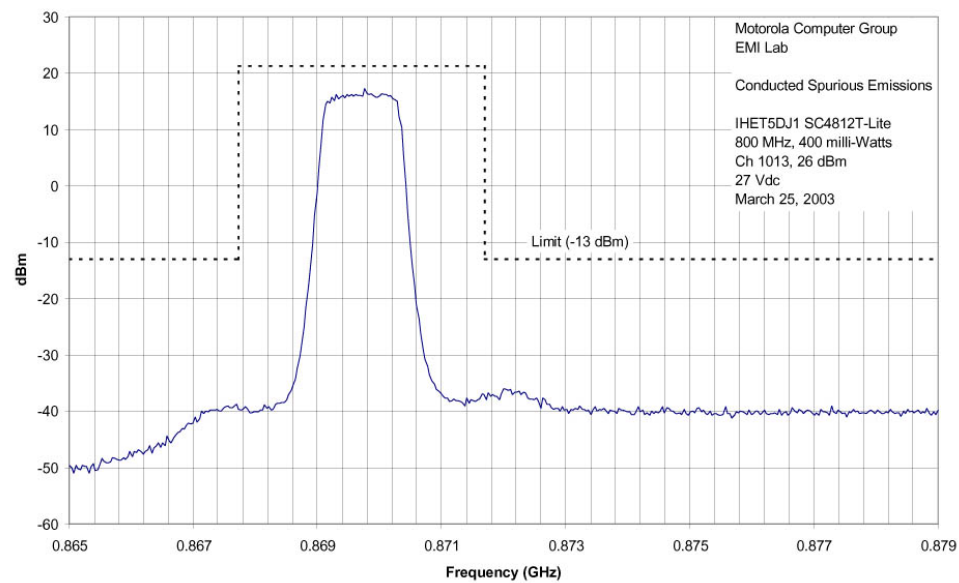


Spurious and Harmonic Emissions Conducted
CDMA Channel 1013 – Minimum Power – 27V DC

27VDC Conducted Spurious Emissions



27VDC Conducted Spurious Emissions





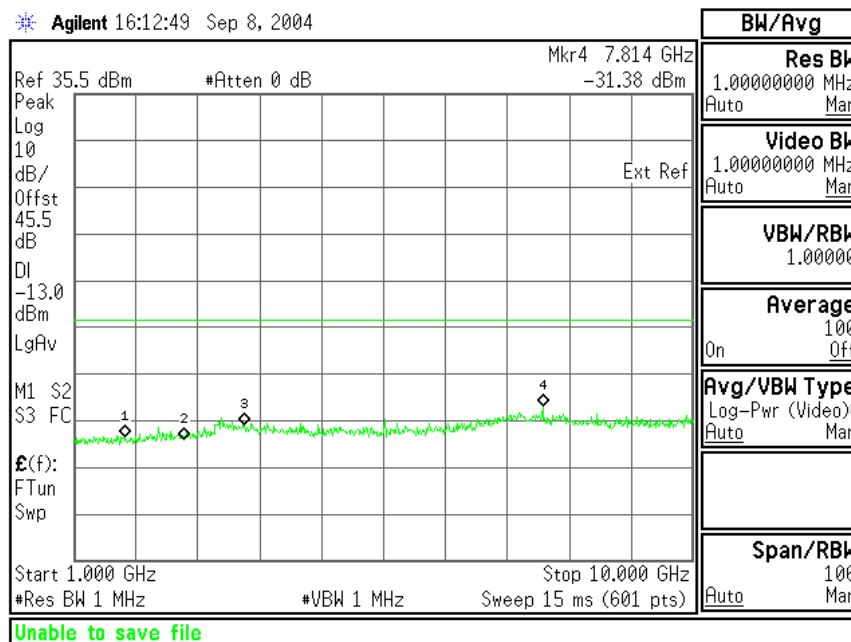
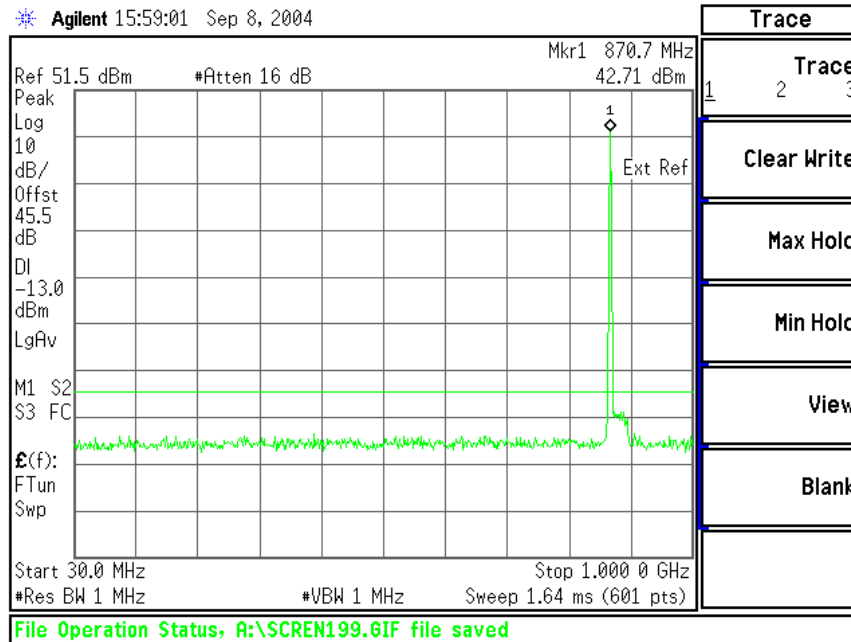
MOTOROLA

Global Telecom Solutions Sector

APPLICANT: MOTOROLA

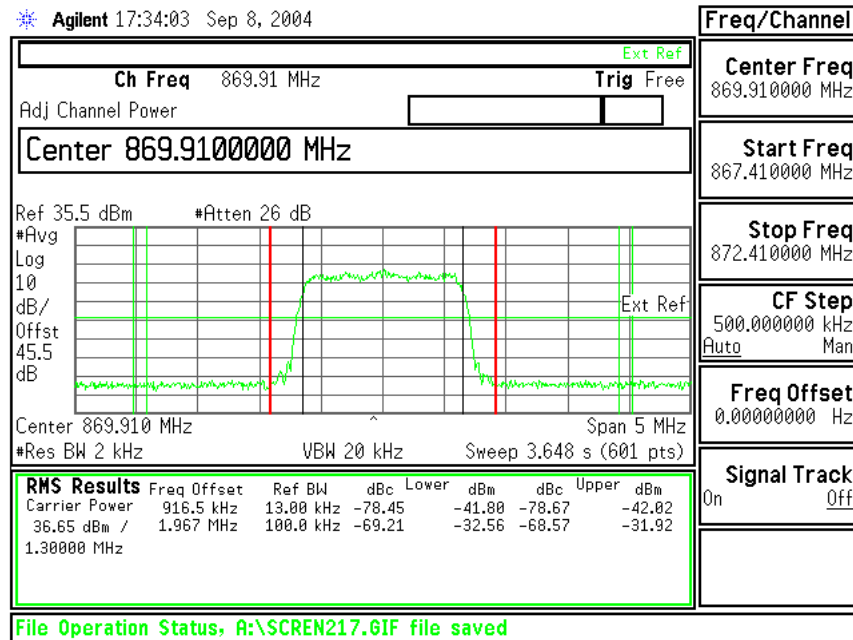
FCC ID: IHET5EE1

Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 1020 – Minimum Power 36.5 dBm – 27V DC



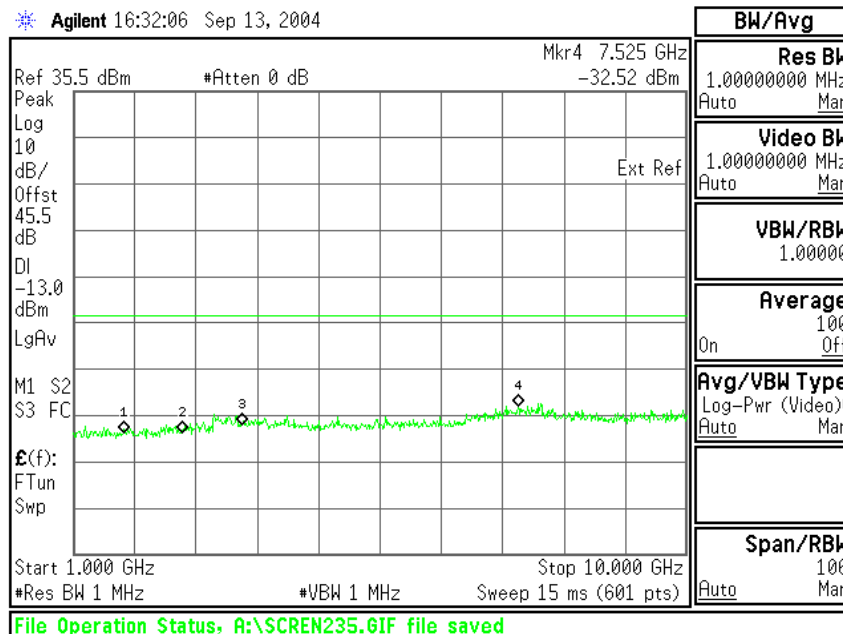
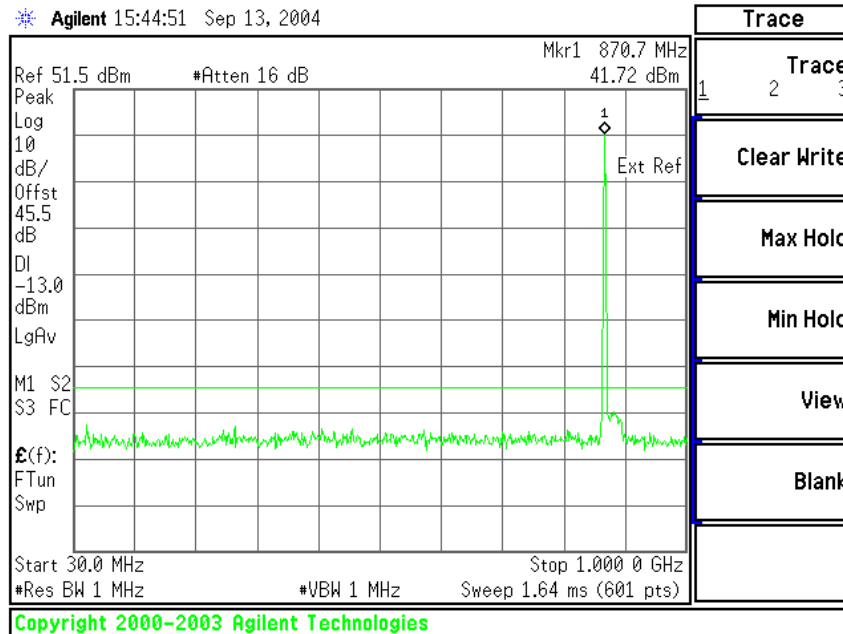


Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 1020 – Minimum Power 36.5 dBm – 27V DC
(Continued)





Spurious and Harmonic Emissions Conducted
CDMA EVDO Channel 1020 – Minimum Power 36.5 dBm – -48V DC





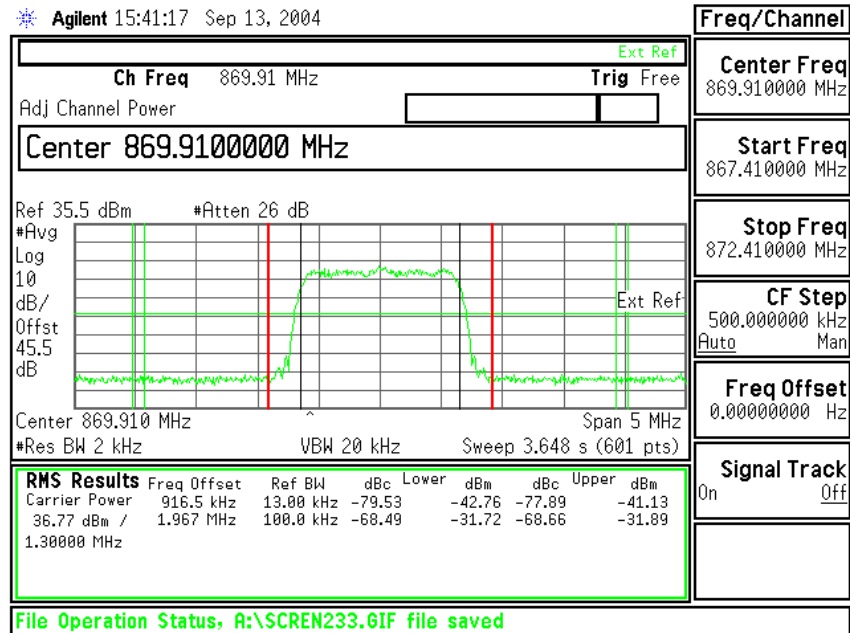
MOTOROLA

Global Telecom Solutions Sector

APPLICANT: MOTOROLA

FCC ID: IHET5EE1

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

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:

$$\text{Power (measured in 30 kHz bandwidth)} + 10 \log (1.2288 \text{ MHz} / 30 \text{ kHz})$$

Example: $23.88 \text{ dBm} + 16.12 \text{ dB} = 40.0 \text{ dBm}$

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

SC4812TLite 1X @ 800 MHz SUMMARY OF OCCUPIED BANDWIDTH

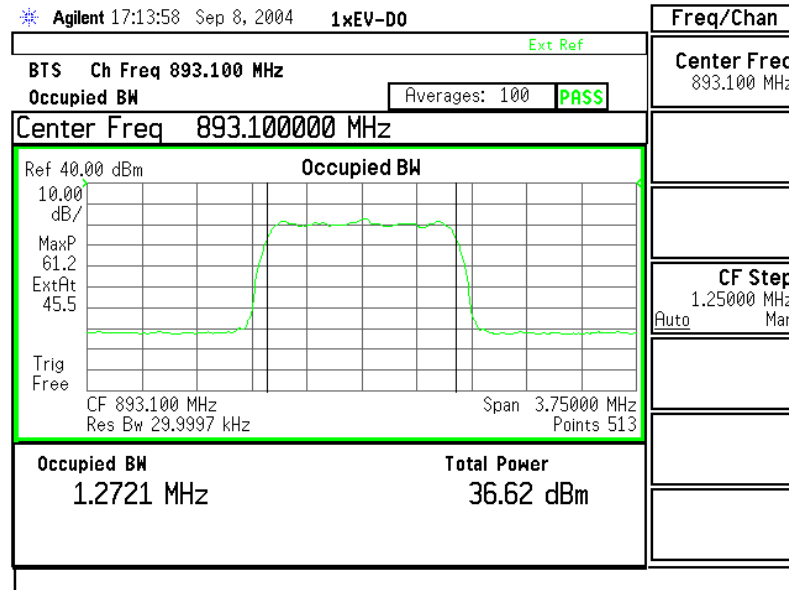
CHANNEL / VOLTAGE	Power Level (dBm)	FREQUENCY (MHz)	MEASURED (MHz)	FCC LIMIT (MHz)	Pass / Fail
777 / -48V DC	49.54	893.31	1.2340	1.30	Pass
1013 / -48V DC	26.0	869.7	1.2994	1.30	Pass

 4-3-03

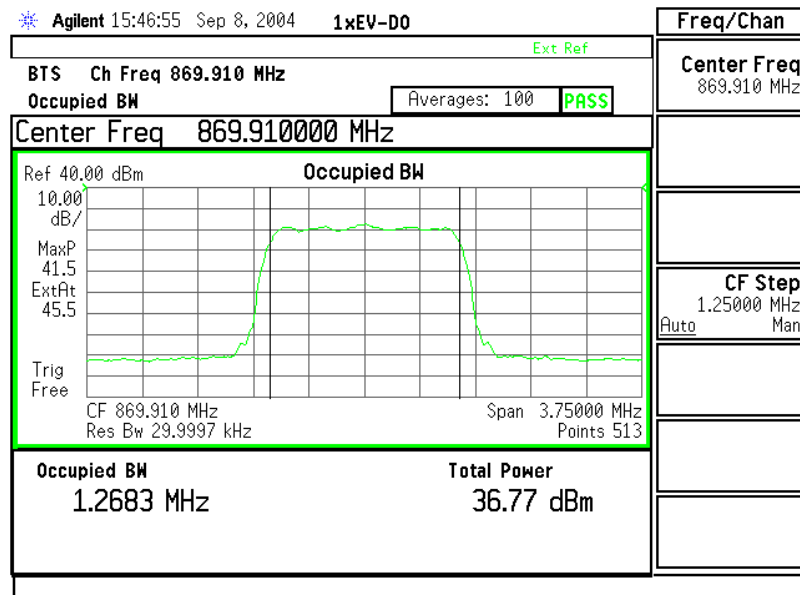
Signature

Date

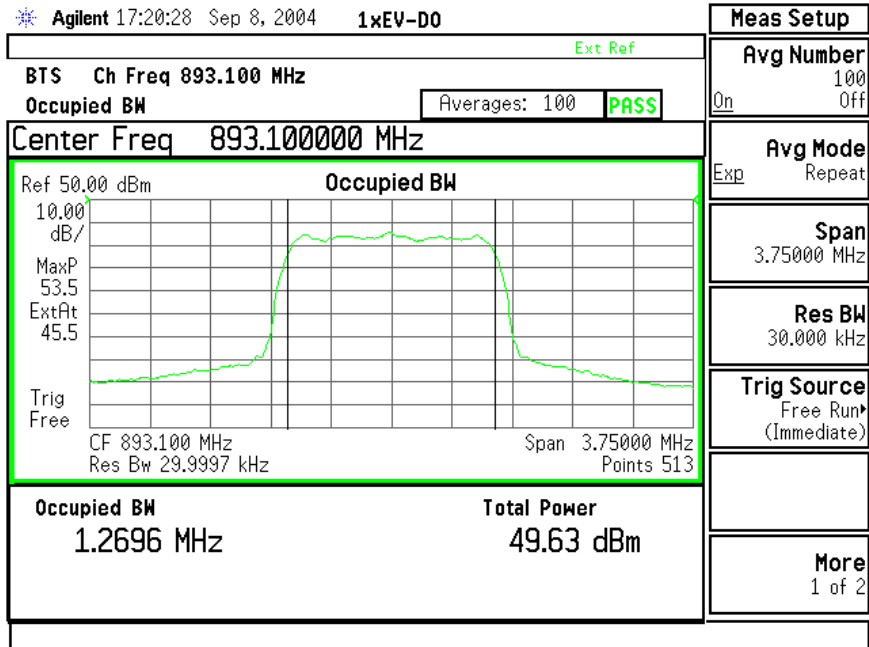
Brian Daniel
Lead EMI Engineer

**27V DC-EVDO – Occupied Bandwidth – 4.5W**

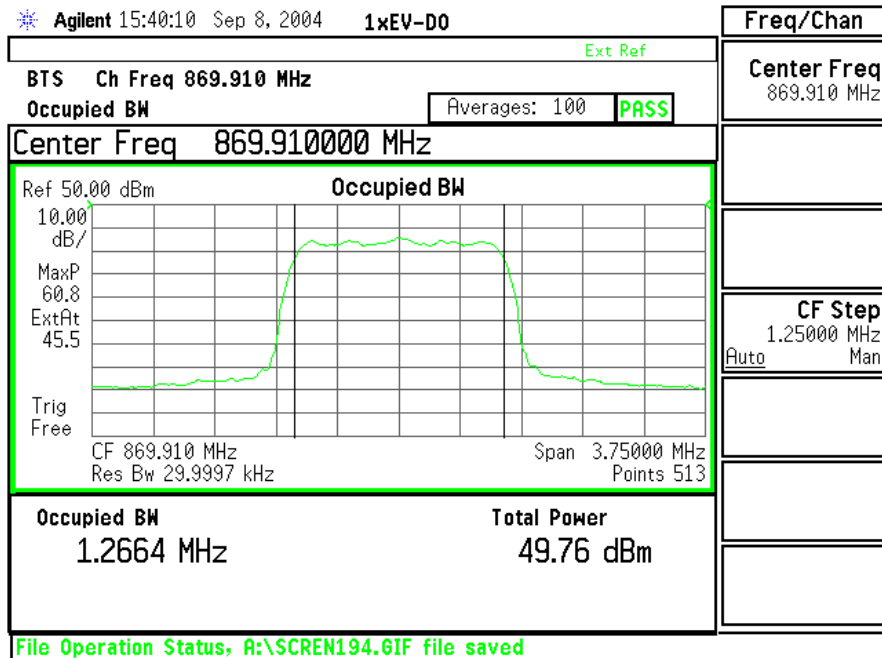
Channel 770– 893.1 MHz



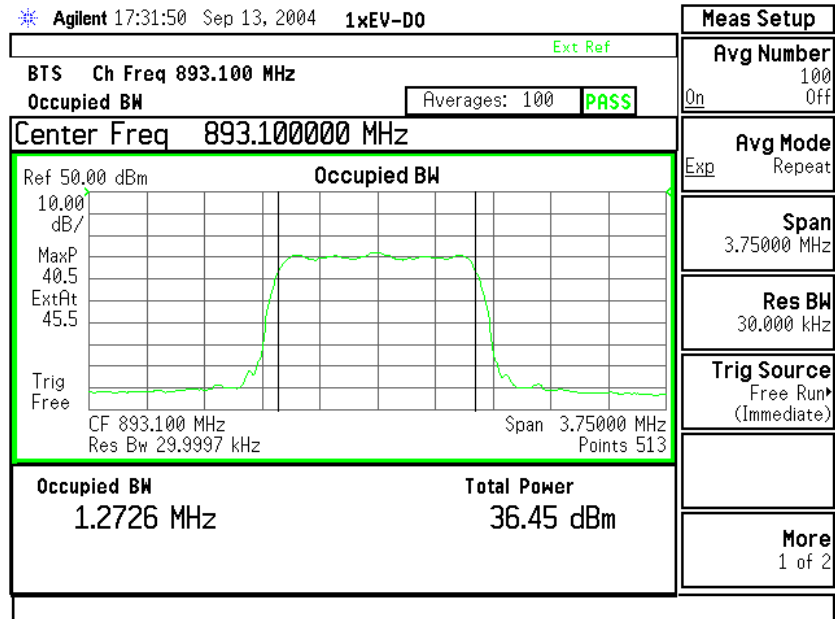
Channel 1020 – 869.91 MHz

**27V DC-EVDO – Occupied Bandwidth – 90W**

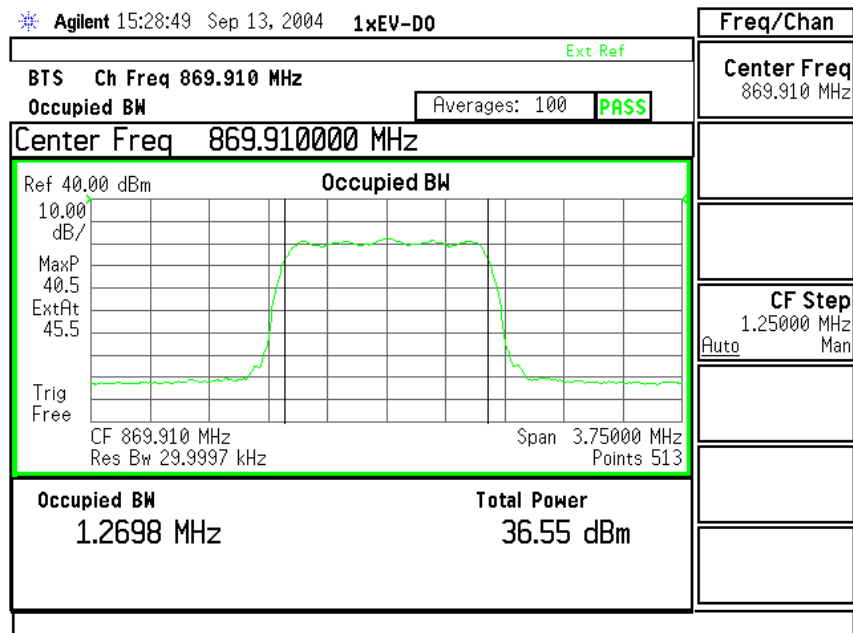
Channel 770– 893.1 MHz



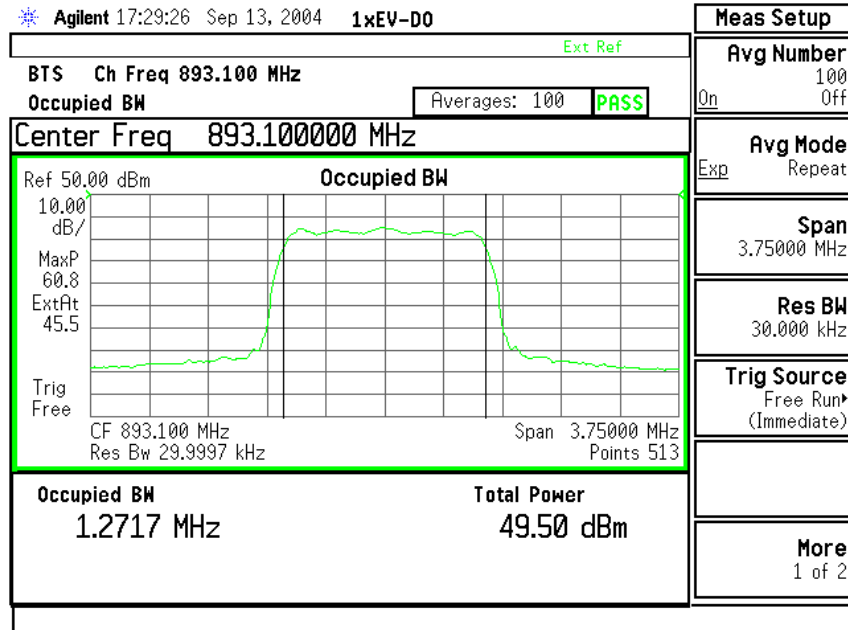
Channel 1020 – 869.91 MHz

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

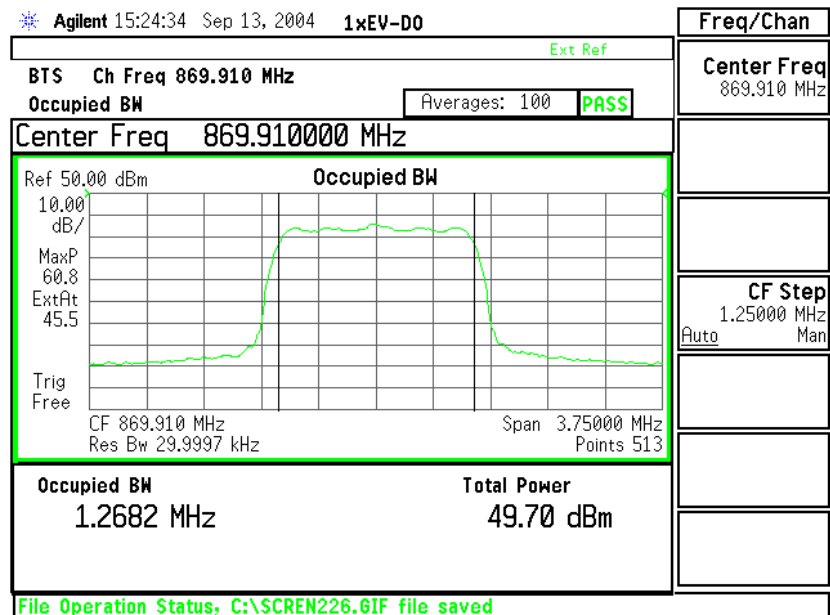
Channel 770– 893.1 MHz



Channel 1020 – 869.91 MHz

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

Channel 770– 893.1 MHz



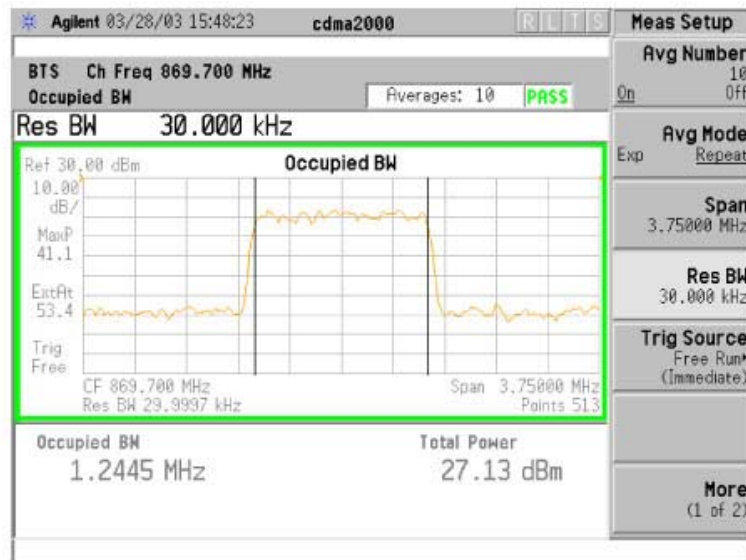
Channel 1020 – 869.91 MHz



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



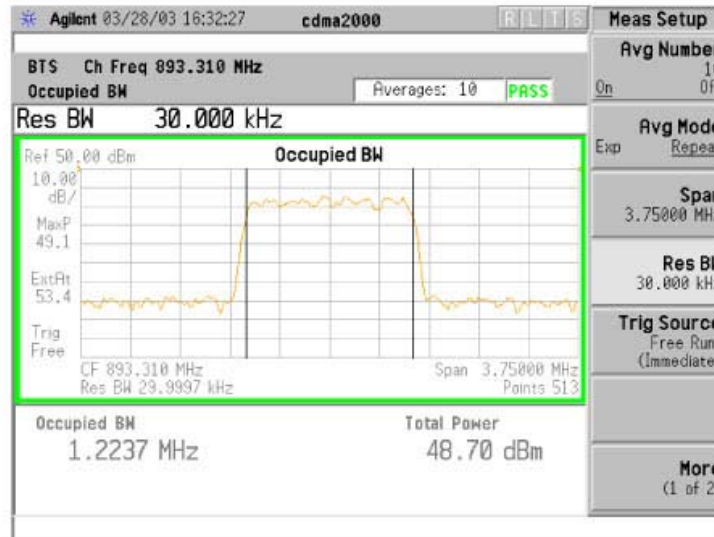
Channel 777 – 893.31 MHz



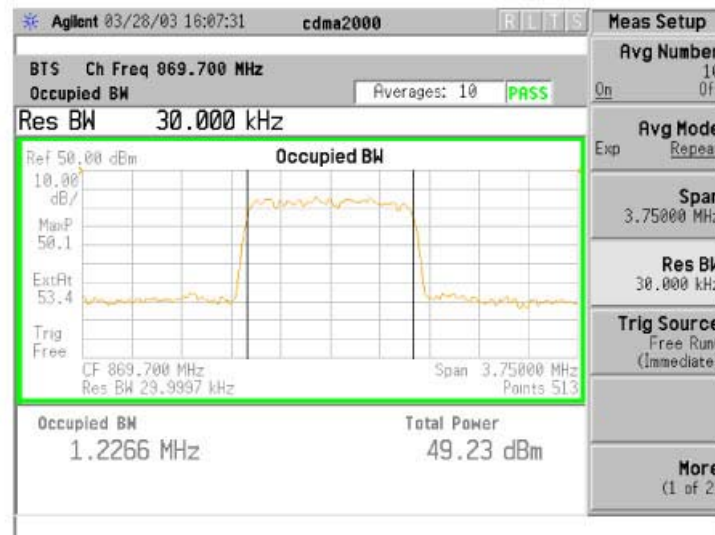
Channel 1013 – 869.7 MHz



27V DC-1X – Occupied Bandwidth – 90W



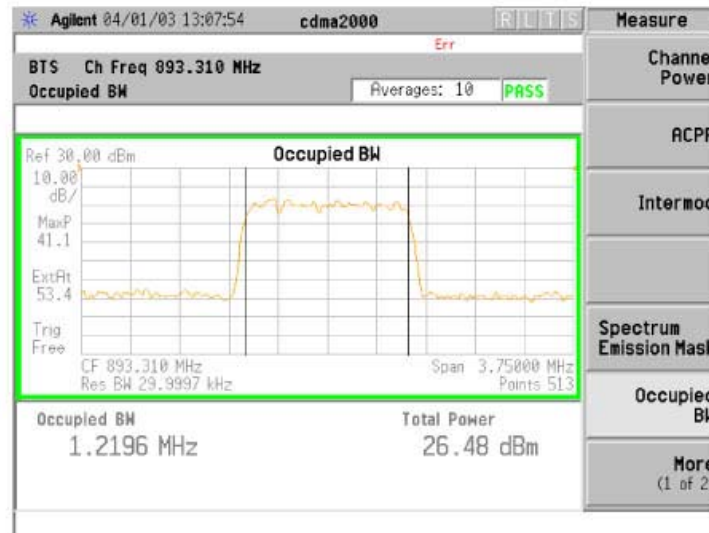
Channel 777 – 893.31 MHz



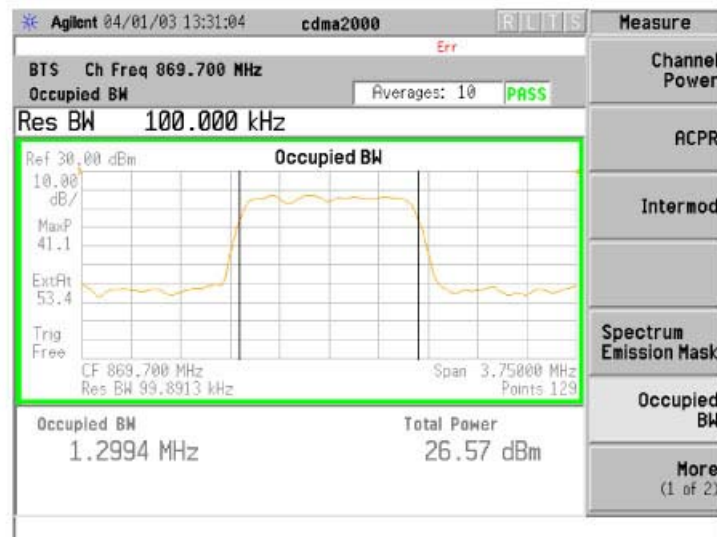
Channel 1013 – 869.7 MHz



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



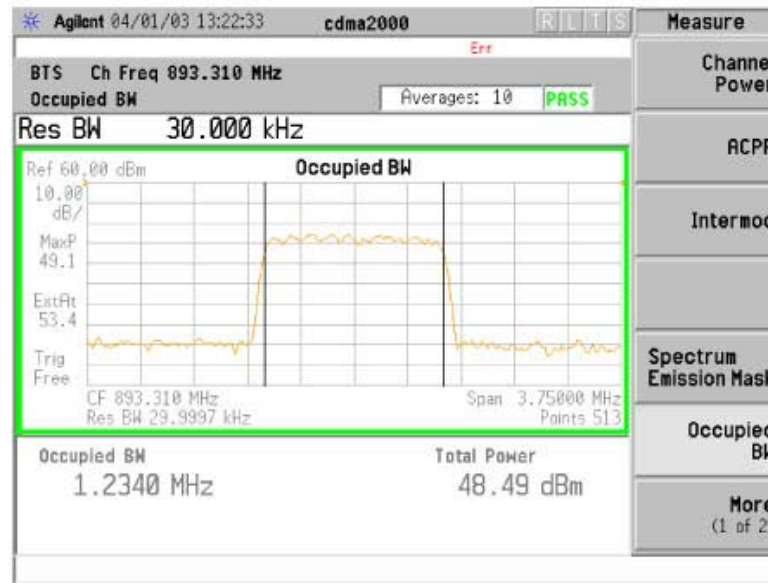
Channel 777 – 893.31 MHz



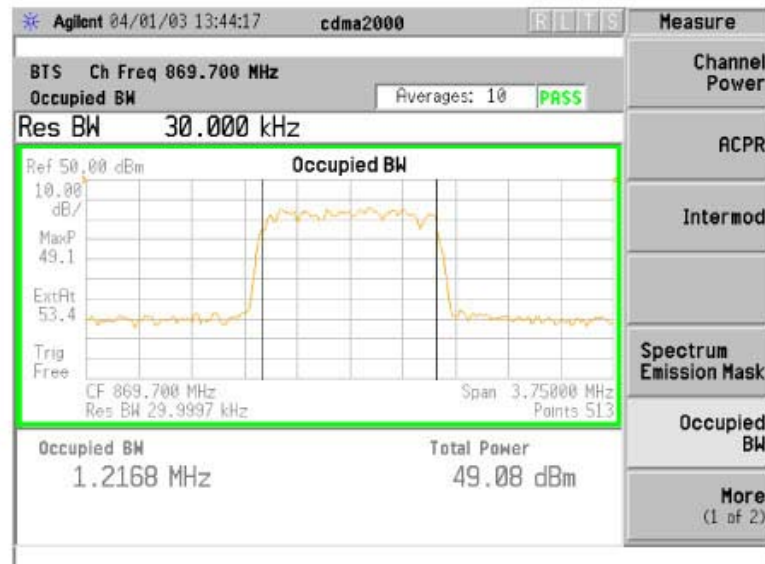
Channel 1013 – 869.7 MHz



-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	-30° to +50° C	<0.2	+/- 1.5 PPM MAX	Pass
CSM2	-30° to +50° C	<0.2	+/- 1.5 PPM MAX	Pass

04.01.03

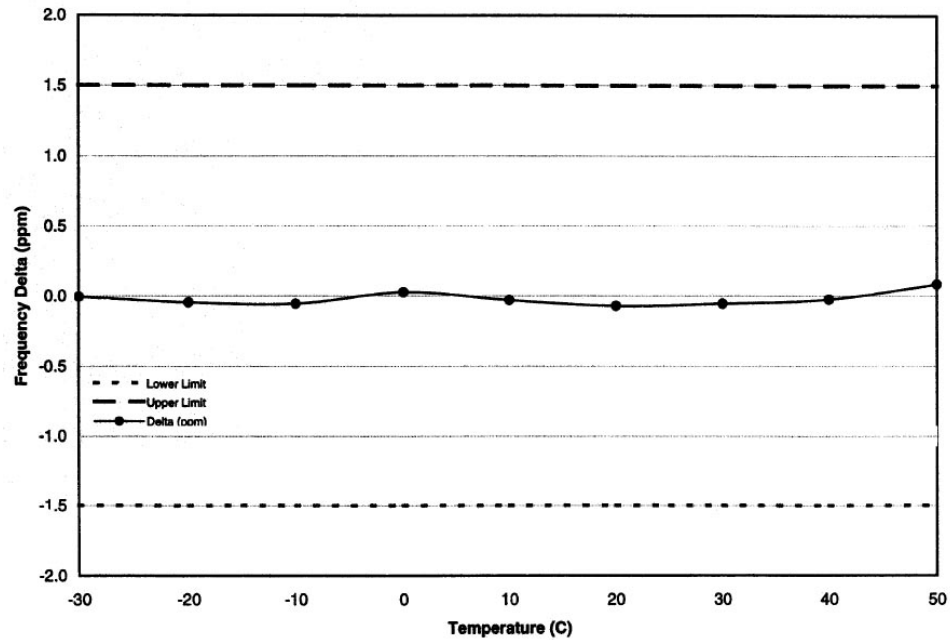
Signature

Date

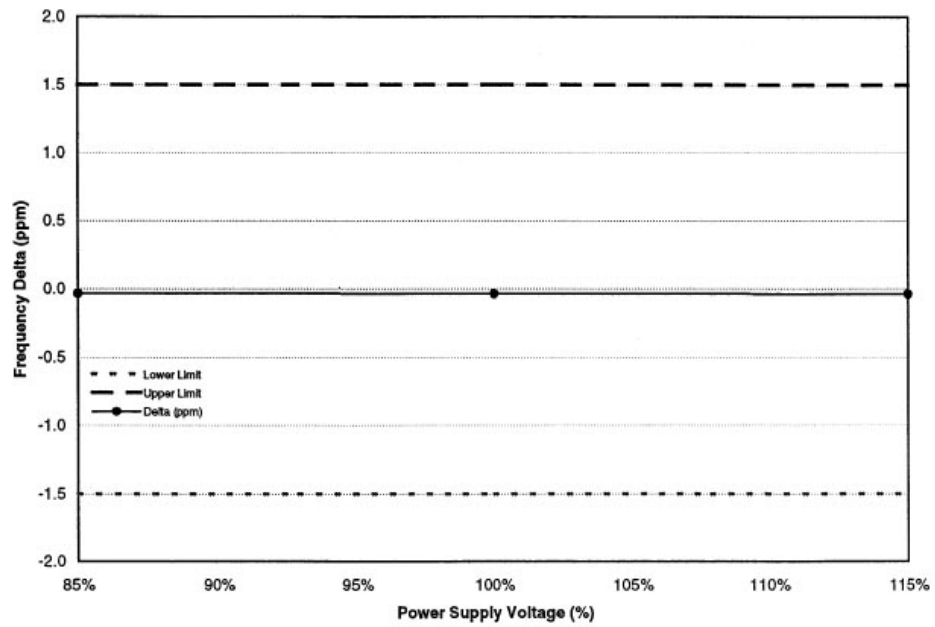
Terry Schwenk



Frequency Stability Over Temperature - CSM1

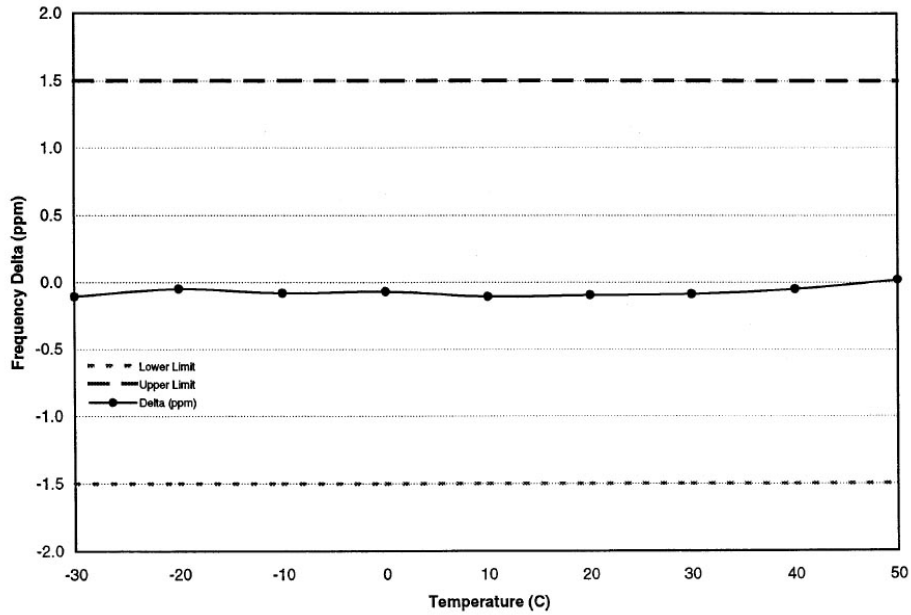


Frequency Stability with Varying Supply Voltage - CSM1





Frequency Stability Over Temperature - CSM2



Frequency Stability with Varying Supply Voltage - CSM2

