

SC480 1X-EVDO with cPAs @ 800 MHz CDMA BTS

TEST REPORT EXHIBIT

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Global Telecom Solutions Sector

FCC ID: IHET5EJ1

Section A

Summary of RF Measurements

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Summary of Radiated RF Measurements

Maximum Radiated RF Spur Level for SC480 EVDO @ 800MHz CDMA BTS

Radiated RF Measurements					Spec	Result
Channel	Spurious Frequency (MHz)	Antenna Polarity	Measured Radiated Field Strength (dBuV/m)	Measured Radiated Field Strength (dBm) (Note 1)	FCC Part 22/24 MAX LIMIT (dBm)	(Pass/Fail)
1020	4350.14	V	49.30	-45.93	-13	Pass

Maximum Radiated RF Spur Level for SC480 1X @ 800MHz CDMA BTS

Radiated RF Measurements					Spec	Result
Channel	Spurious Frequency (MHz)	Antenna Polarity	Measured Radiated Field Strength (dBuV/m)	Measured Radiated Field Strength (dBm) (Note 1)	FCC Part 22/24 MAX LIMIT (dBm)	(Pass/Fail)
1013	4347.339	V	58.88	-36.35	-13	Pass

Notes:

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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Summary of Conducted RF Measurements

SC480 EVDO @ 800MHz CDMA BTS
FCC Part 22

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBmV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
1020	6966.393	85.12	-21.88	-13	Pass

SC480 1X @ 800MHz CDMA BTS

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBmV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
1013	6959.192	85.66	-21.34	-13	Pass



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Section B

Summary of Modulation Characteristics

SC480 EVDO @ 800MHz CDMA BTS

CHANNEL	TUNE FREQUENCY (MHz)	RHO Measured	RHO Specifications	PASS / FAIL
770	893.10	.99659	> 0.970	Pass
1020	869.91	.99732	> 0.970	Pass

SC480 1X @ 800MHz CDMA BTS

CHANNEL	TUNE FREQUENCY (MHz)	RHO Measured	RHO Specifications	PASS / FAIL
777	893.31	.98094	> 0.912	Pass
1013	869.7	.98298	> 0.912	Pass

The BTS was configured for maximum power out of 43.00 dBm and minimum power out of 36.5 dBm respectively. The output power was set respectively to 20.0 Watts or 4.5 Watts using an HP437B power meter

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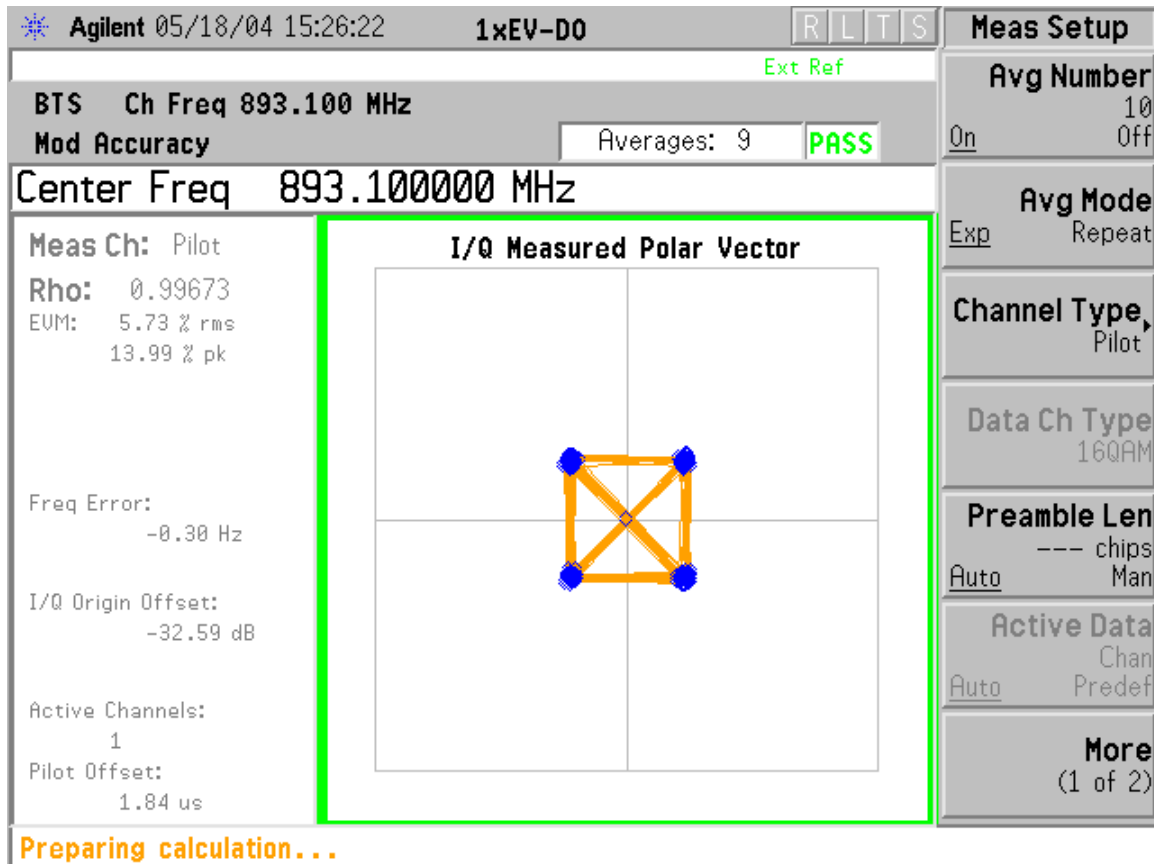
Signature

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SC480 EVDO – Modulation Characteristics

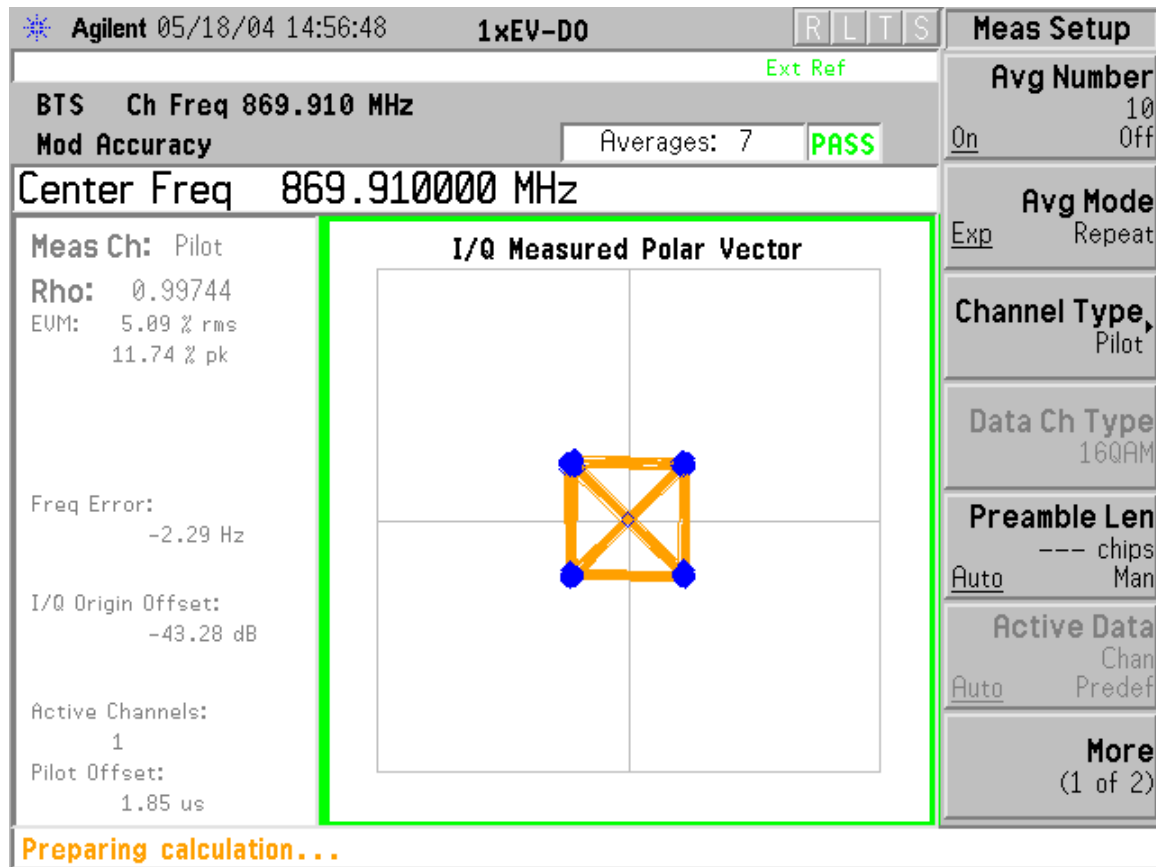
High Power with cPA – 43.00 dBm – 8PSK



Channel 770 – 893.1 MHz

SC480 EVDO – Modulation Characteristics

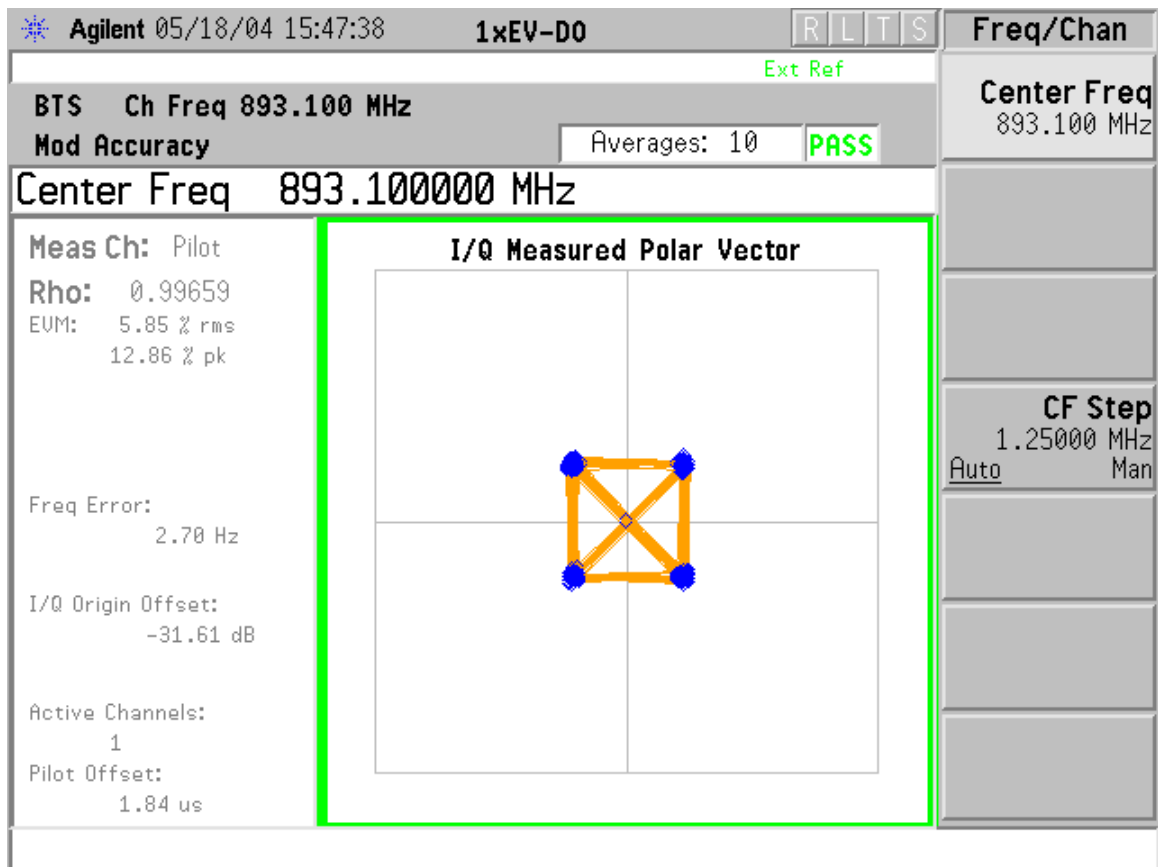
High Power with CPA – 43.00 dBm – 16QAM



Channel 1020 – 869.91 MHz

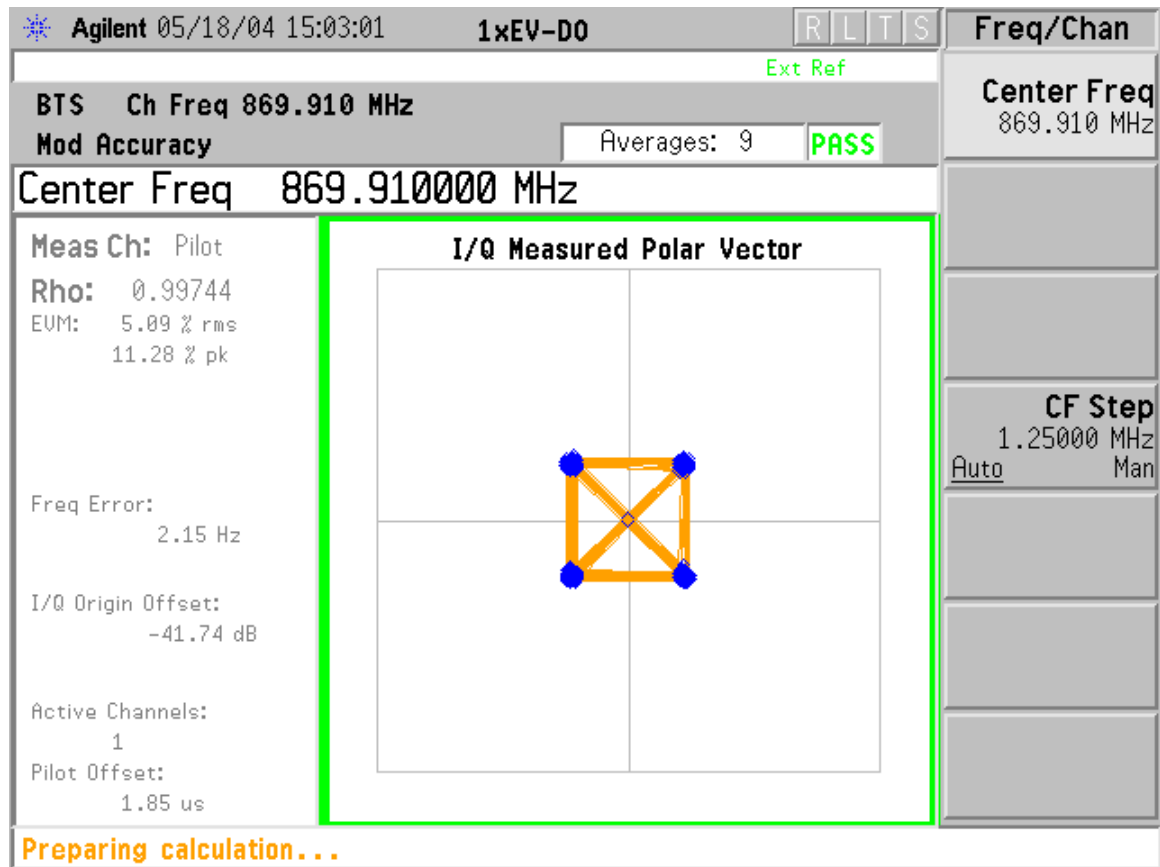
SC480 EVDO – Modulation Characteristics

Low Power with cPA – 36.5 dBm – 8PSK



SC480 EVDO – Modulation Characteristics

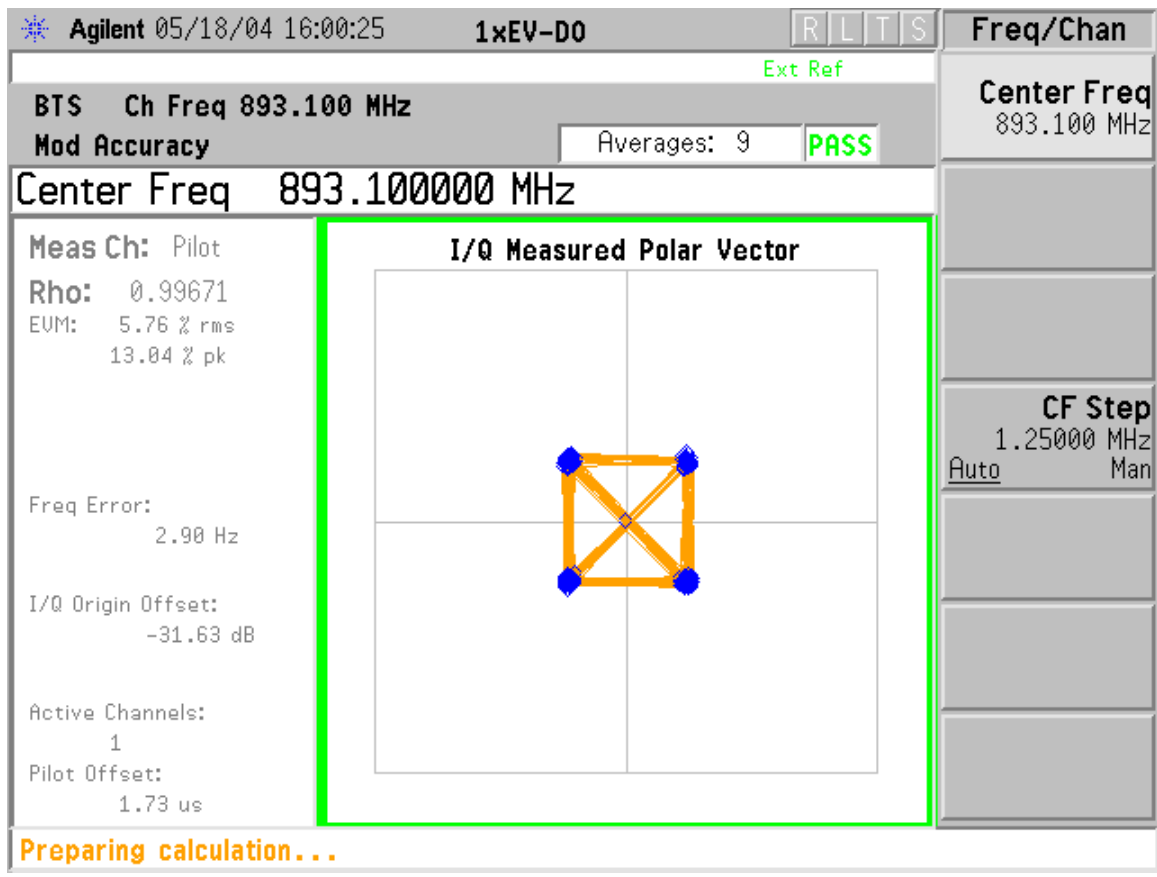
Low Power with cPA– 36.5 dBm – 16QAM



Channel 1020 – 869.91 MHz

SC480 EVDO – Modulation Characteristics

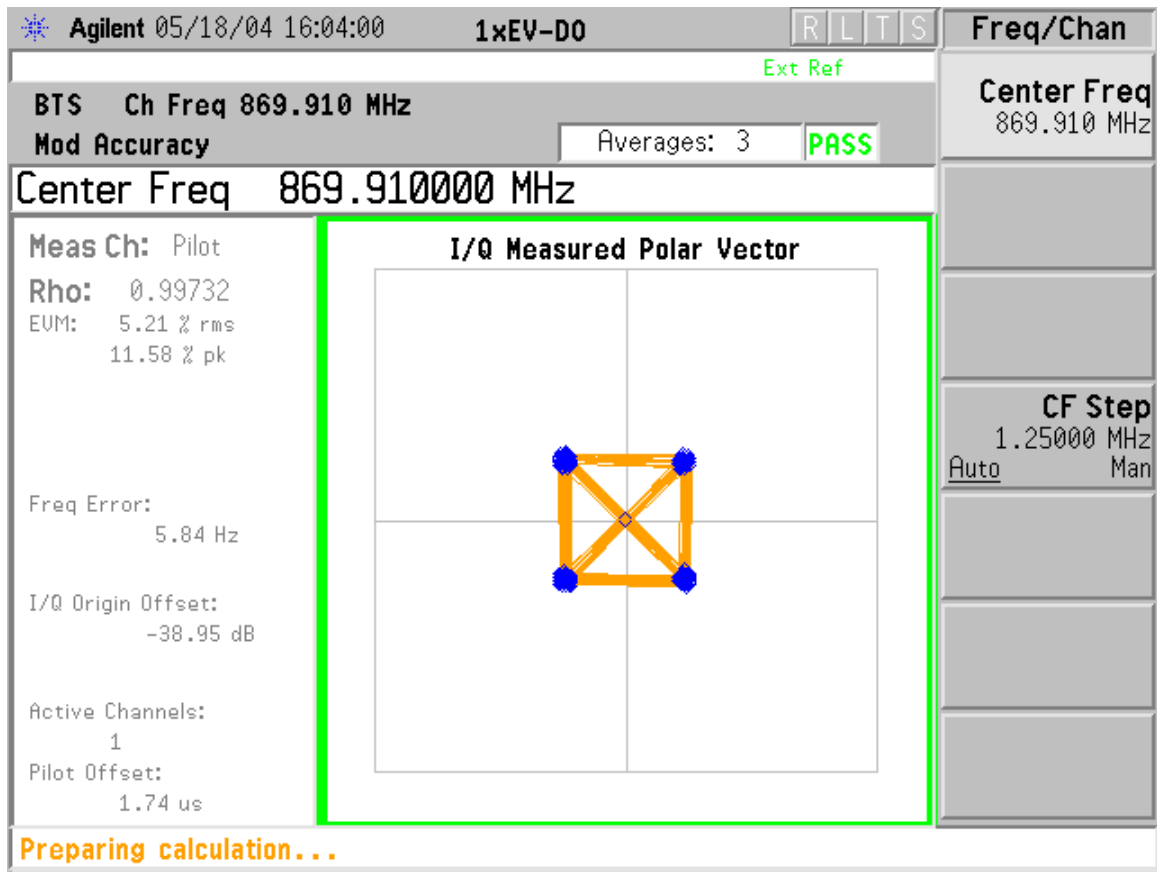
Low Power with Core – -6.0 dBm – 8PSK



Channel 770 – 893.1 MHz

SC480 EVDO – Modulation Characteristics

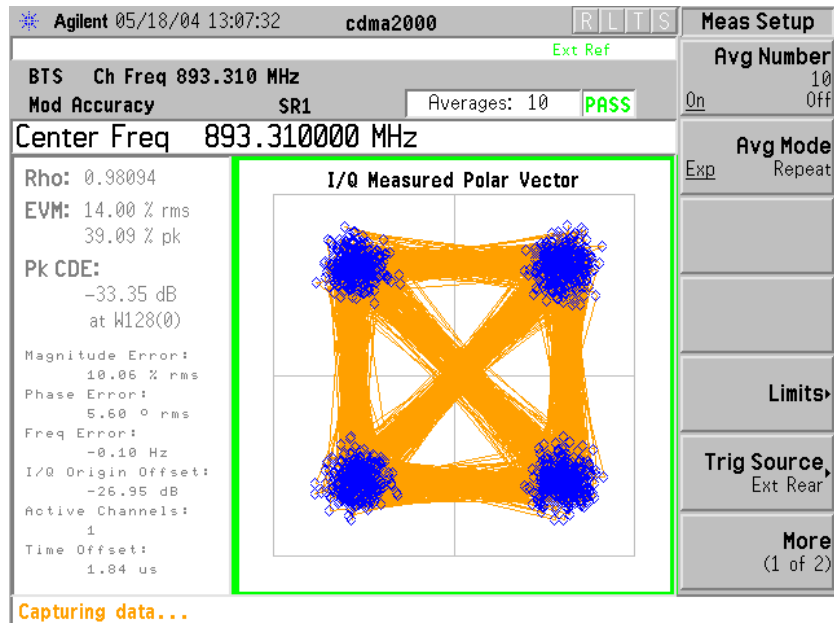
Low Power with Core – -6.0 dBm – 16QAM



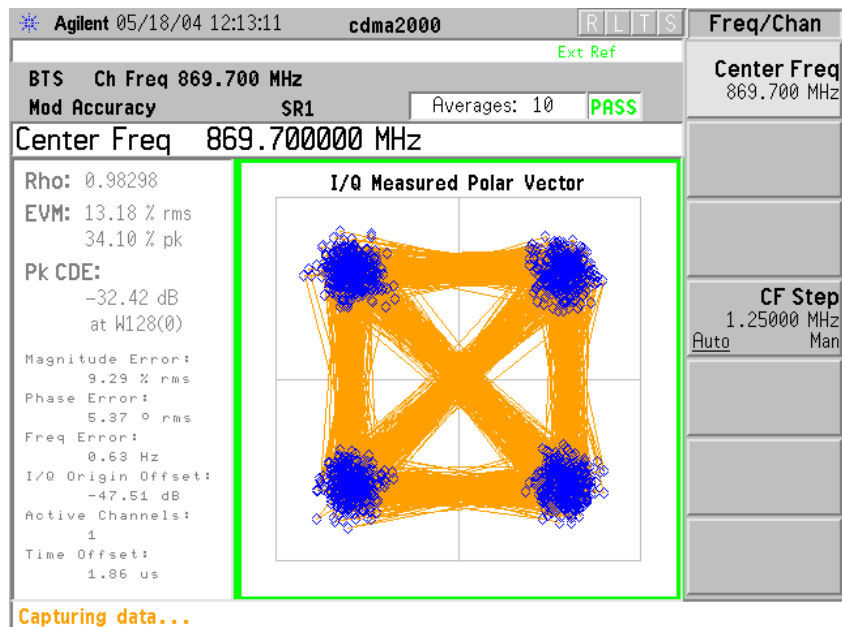
Channel 1020 – 869.91 MHz

SC480 1X – Modulation Characteristics

High Power with cPAs– 43.00 dBm



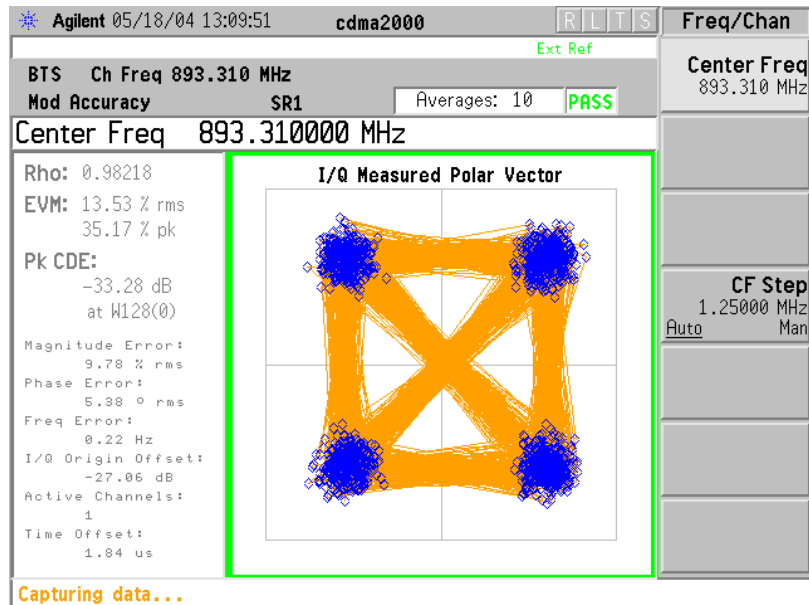
Channel 777 – 893.31 MHz



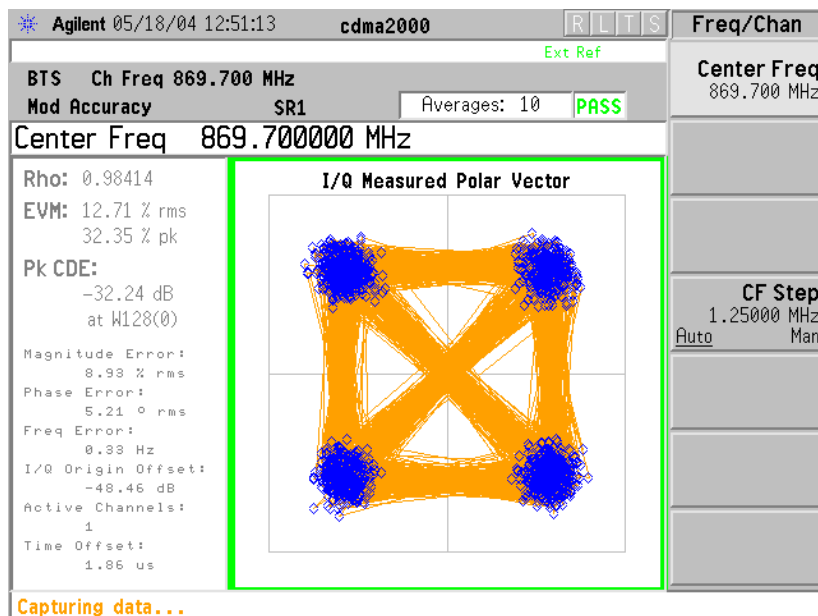
Channel 1013 – 869.7 MHz

SC480 1X – Modulation Characteristics

Low Power with cPA – 26.0 dBm



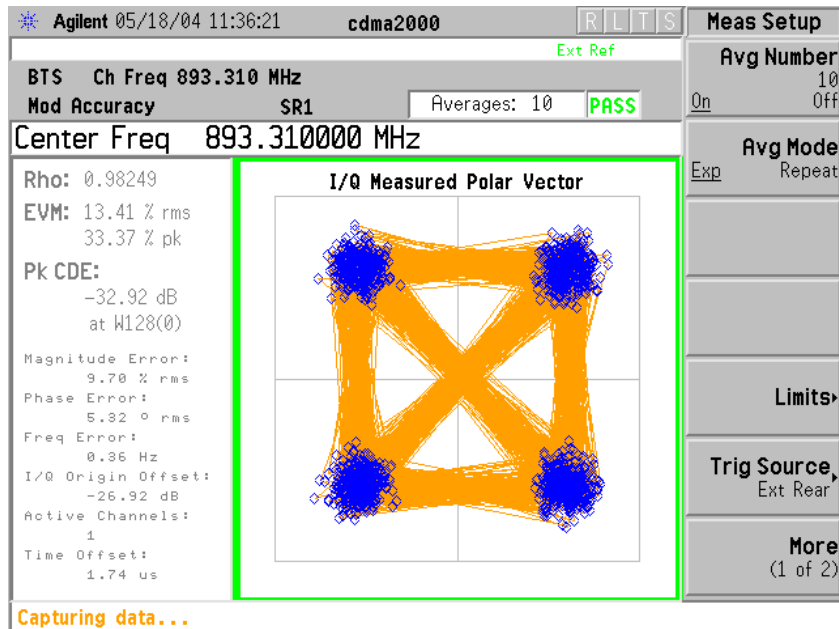
Channel 777 – 893.31 MHz



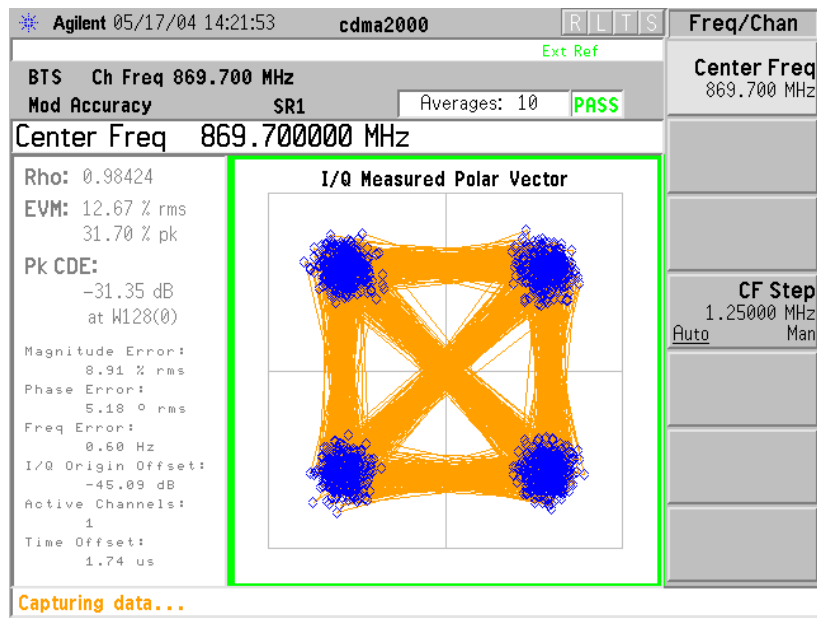
Channel 1013 – 869.7 MHz

SC480 1X – Modulation Characteristics

Low Power with Core – -6.0 dBm



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 SC480 EVDO @ 800MHz CDMA BTS

Radiated RF Measurements					Spec	Result
Channel	Spurious Frequency (MHz)	Antenna Polarity	Measured Radiated Field Strength (dBuV/m)	Measured Radiated Field Strength (dBm) (Note 1)	FCC Part 22/24 MAX LIMIT (dBm)	(Pass/Fail)
1020	4350.14	V	49.30	-45.93	-13	Pass
770	4464.986	V	47.67	-47.56	-13	Pass

Maximum Radiated RF Spur Levels for SC480 1X @ 800MHz CDMA BTS

Radiated RF Measurements					Spec	Result
Channel	Spurious Frequency (MHz)	Antenna Polarity	Measured Radiated Field Strength (dBuV/m)	Measured Radiated Field Strength (dBm) (Note 1)	FCC Part 22/24 MAX LIMIT (dBm)	(Pass/Fail)
1013	4347.339	V	58.88	-36.35	-13	Pass
777	4464.986	V	51.85	-43.38	-13	Pass

Notes:

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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Section C

Spurious and Harmonic Emissions Conducted

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Conducted RF Measurements

SC480 EVDO @ 800MHz CDMA BTS FCC Part 22

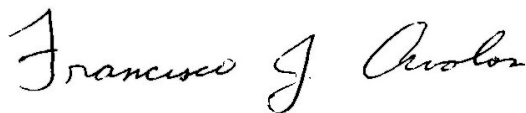
CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBmV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
1020	6966.393	85.12	-21.88	-13	Pass
770	199.1183	83.99	-23.01	-13	Pass

SC480 1X @ 800MHz CDMA BTS FCC Part 22

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBmV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
1013	6959.192	85.66	-21.34	-13	Pass
777	350.7415	84.07	-22.93	-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



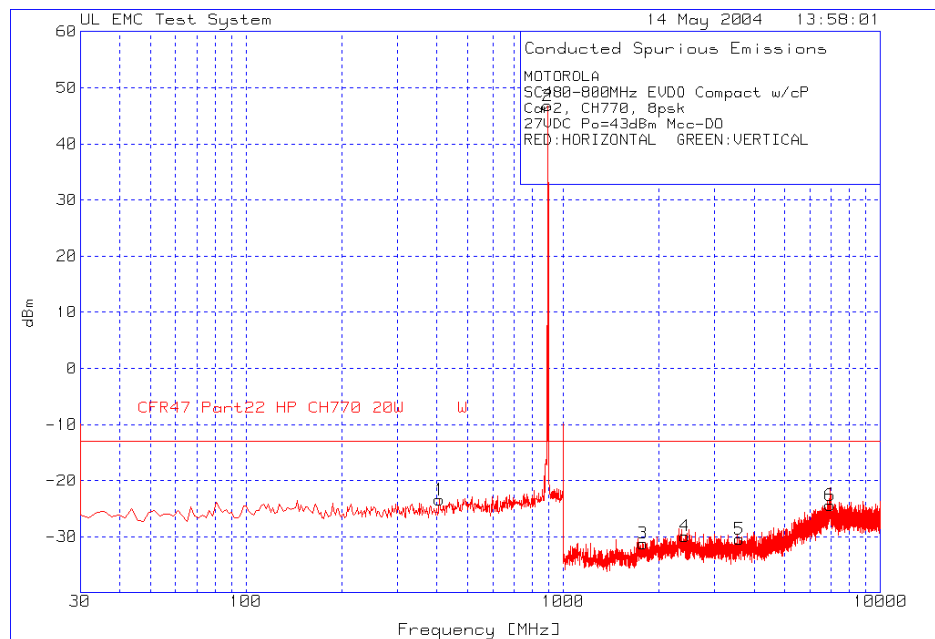
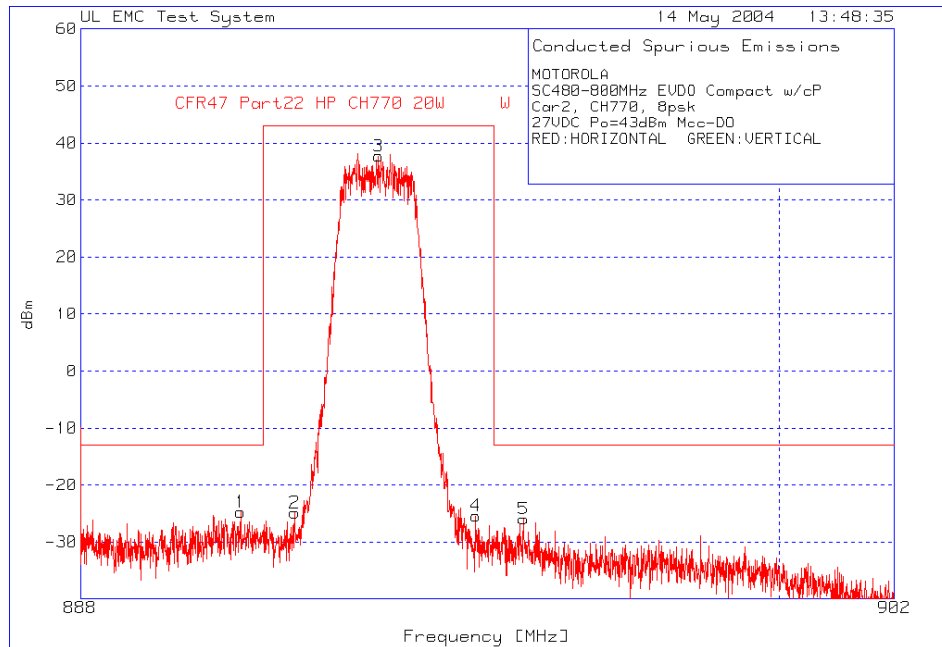
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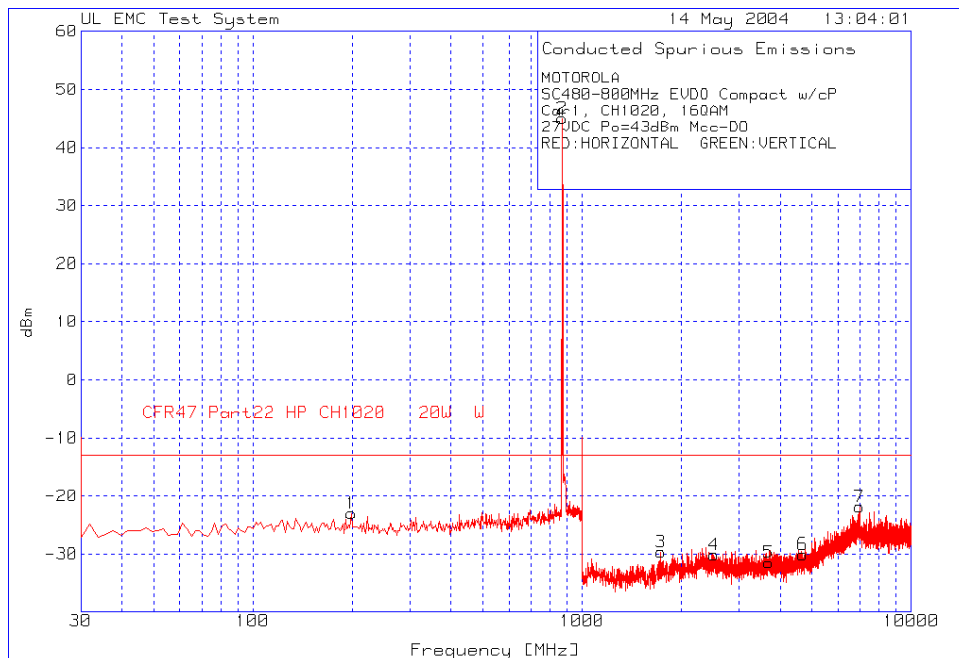
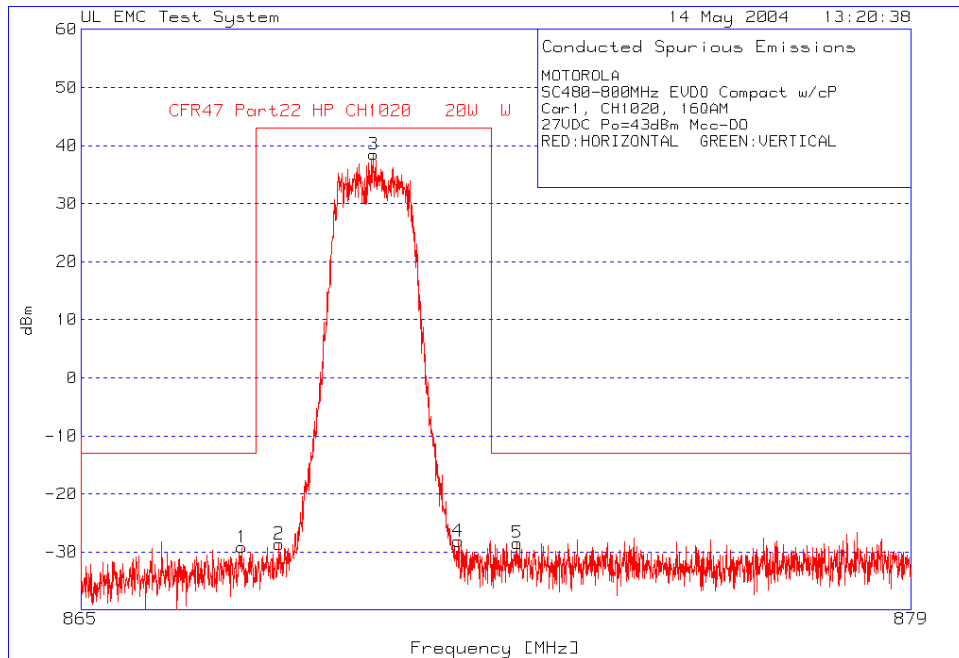
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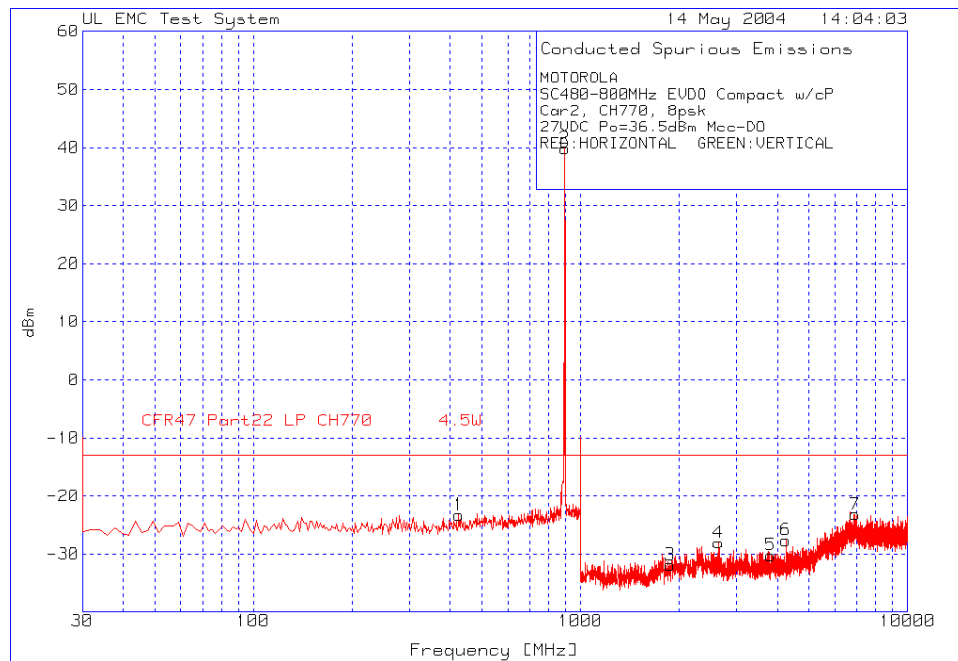
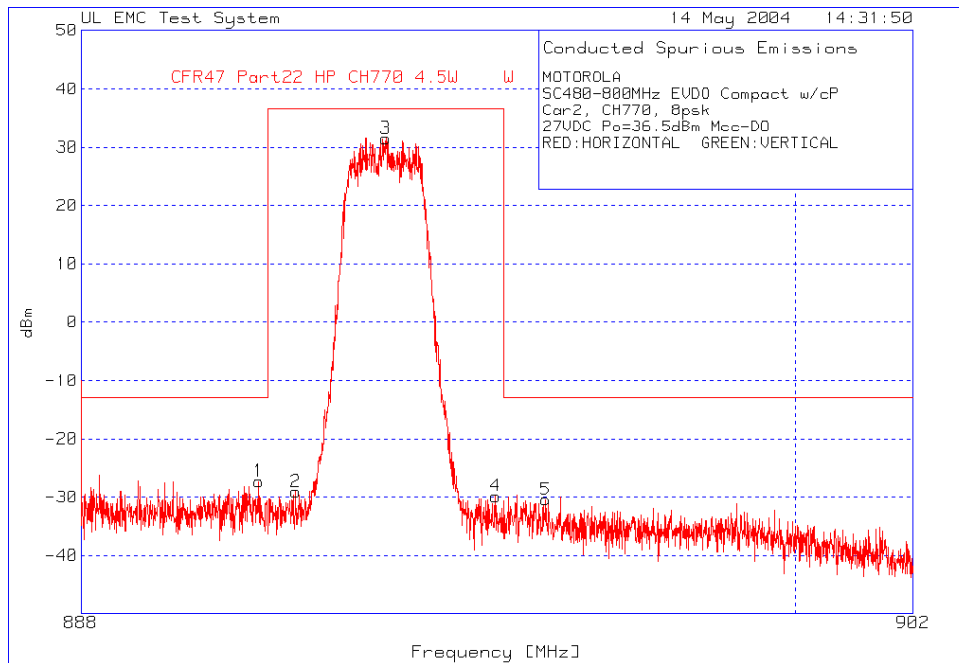
Spurious and Harmonic Emissions Conducted CDMA EVDO Channel 770 – 43.00 dBm – 8PSK



Spurious and Harmonic Emissions Conducted CDMA EVDO Channel 1020 – 43.00 dBm – 16QAM

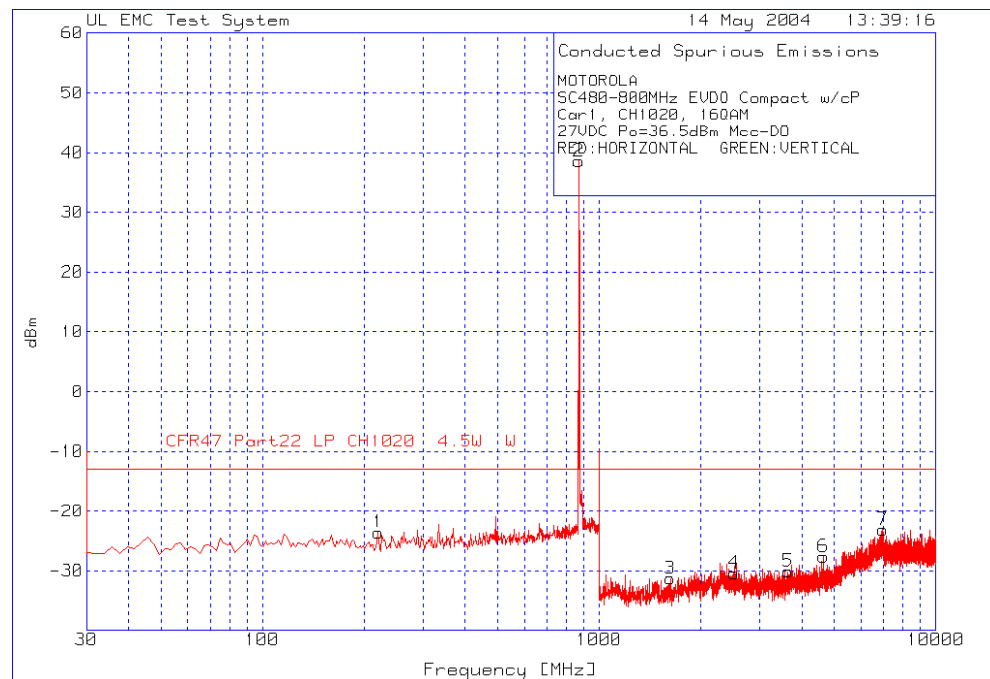
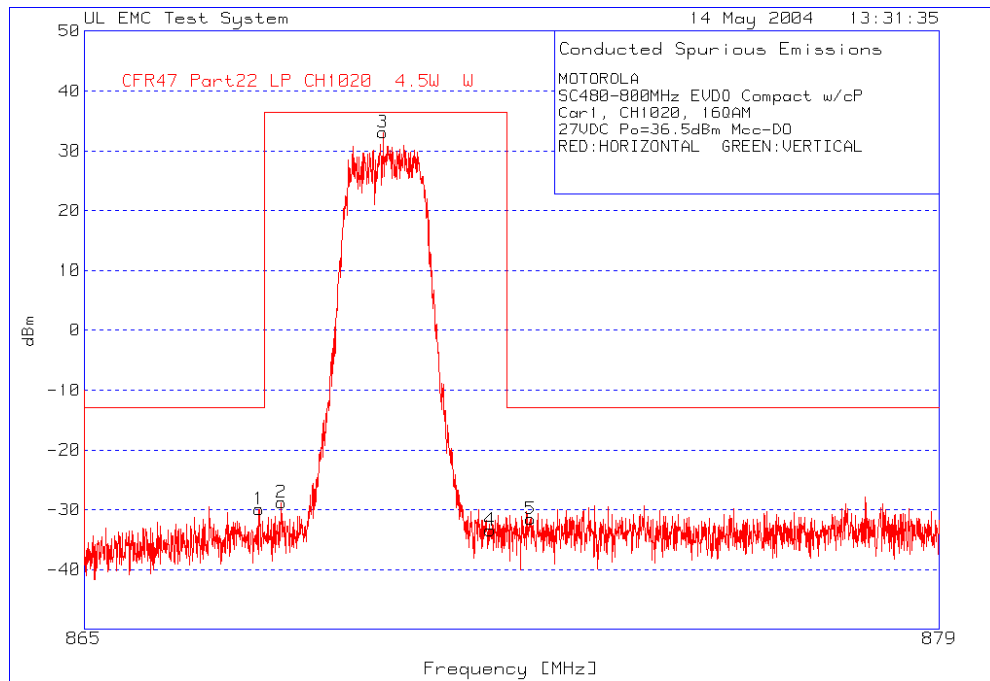


Spurious and Harmonic Emissions Conducted CDMA EVDO Channel 770 – 36.5 dBm – 8PSK

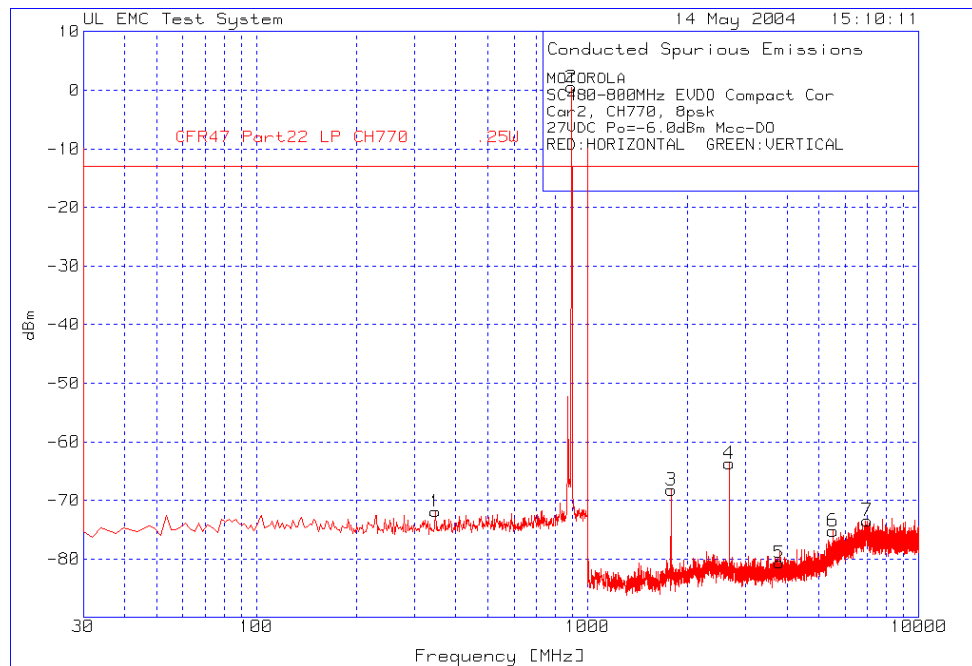
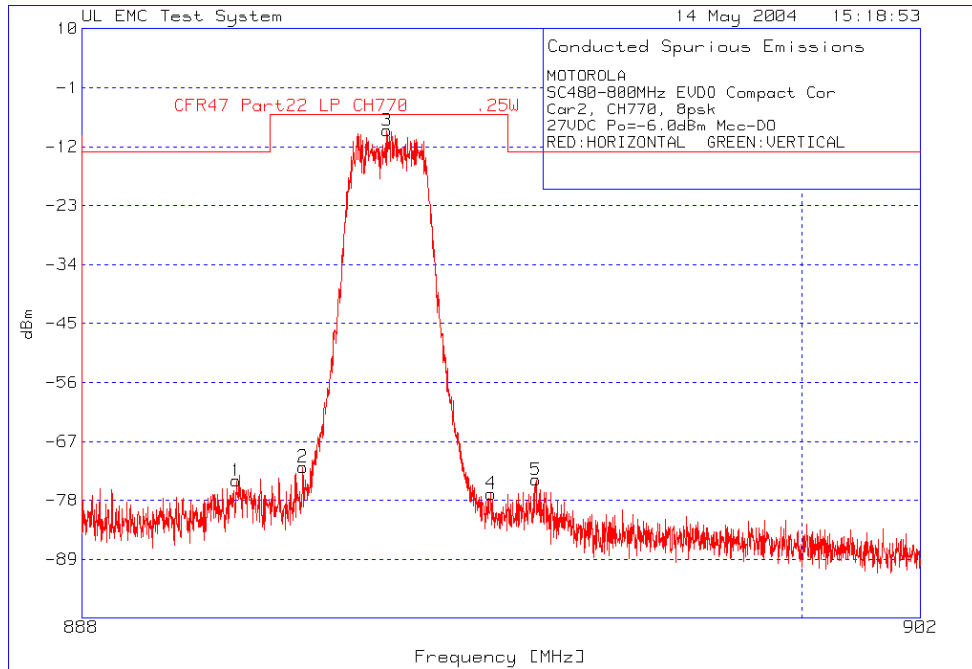


Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 1020 – 36.5 dBm – 16QAM

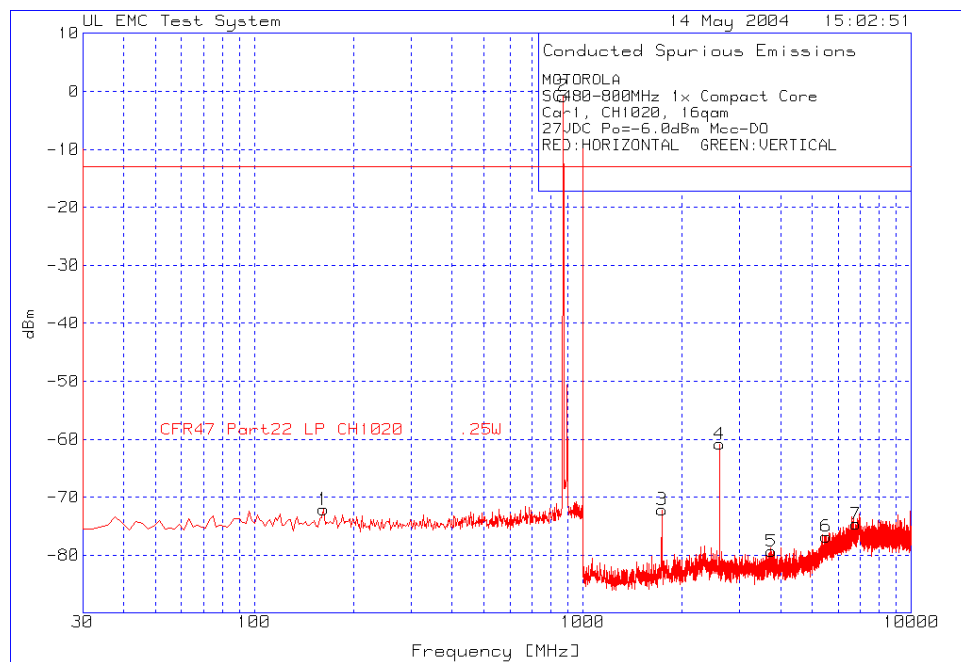
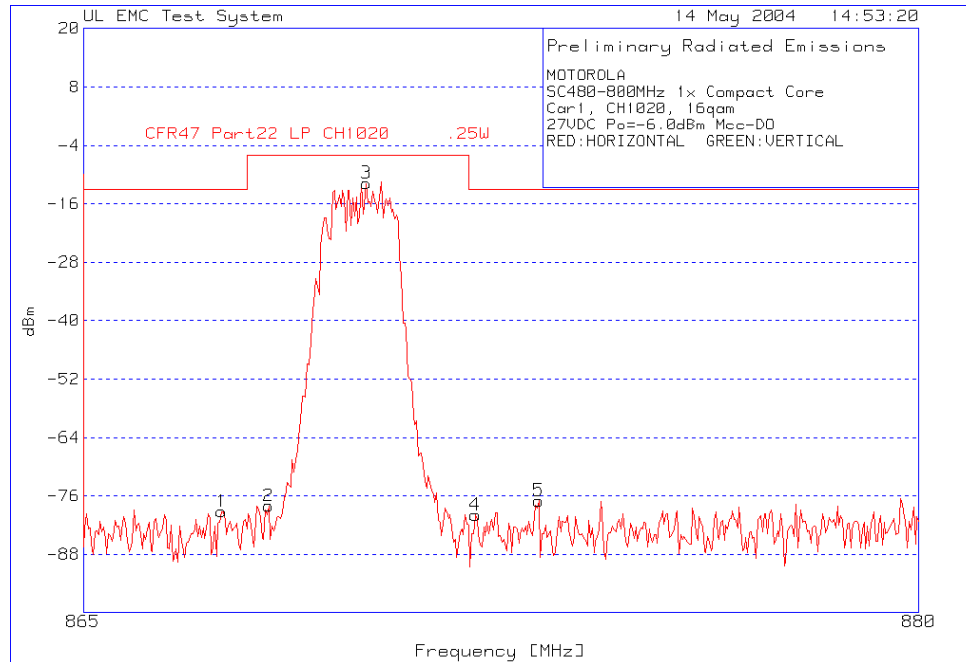


Spurious and Harmonic Emissions Conducted CDMA EVDO Channel 770 – -6.0 dBm – 8PSK

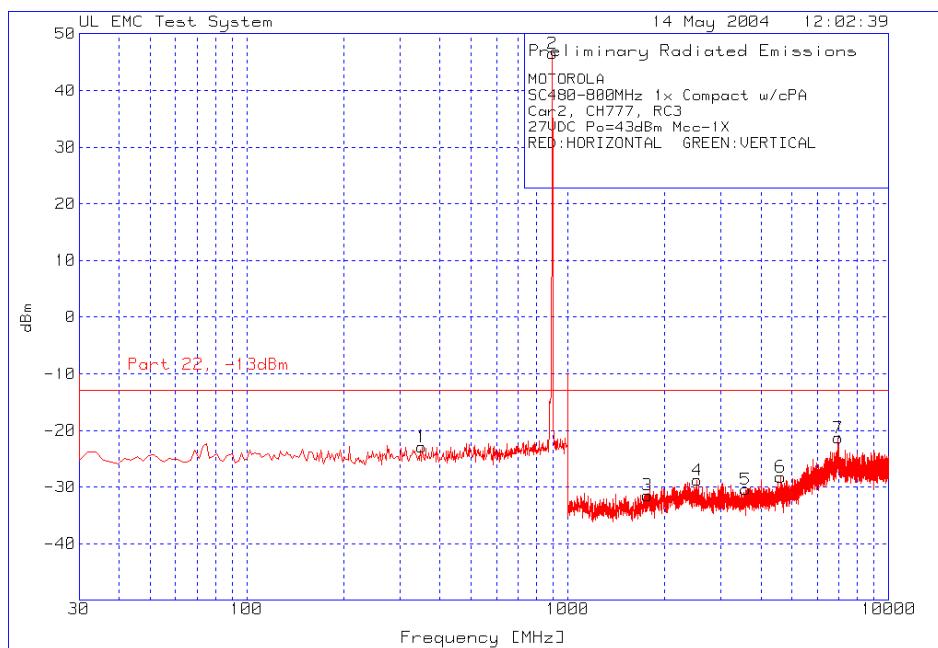
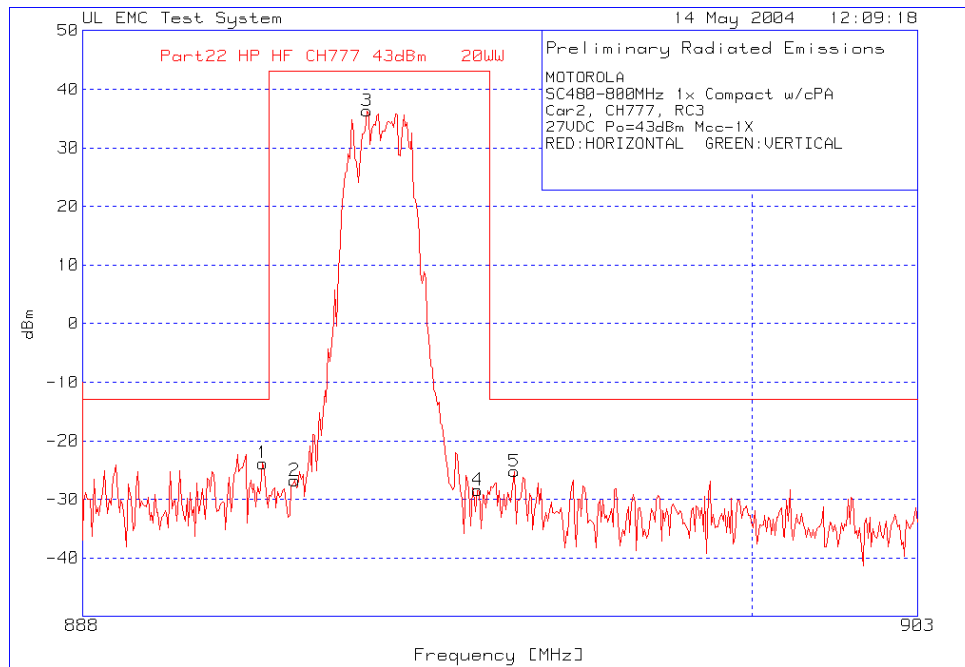


Spurious and Harmonic Emissions Conducted

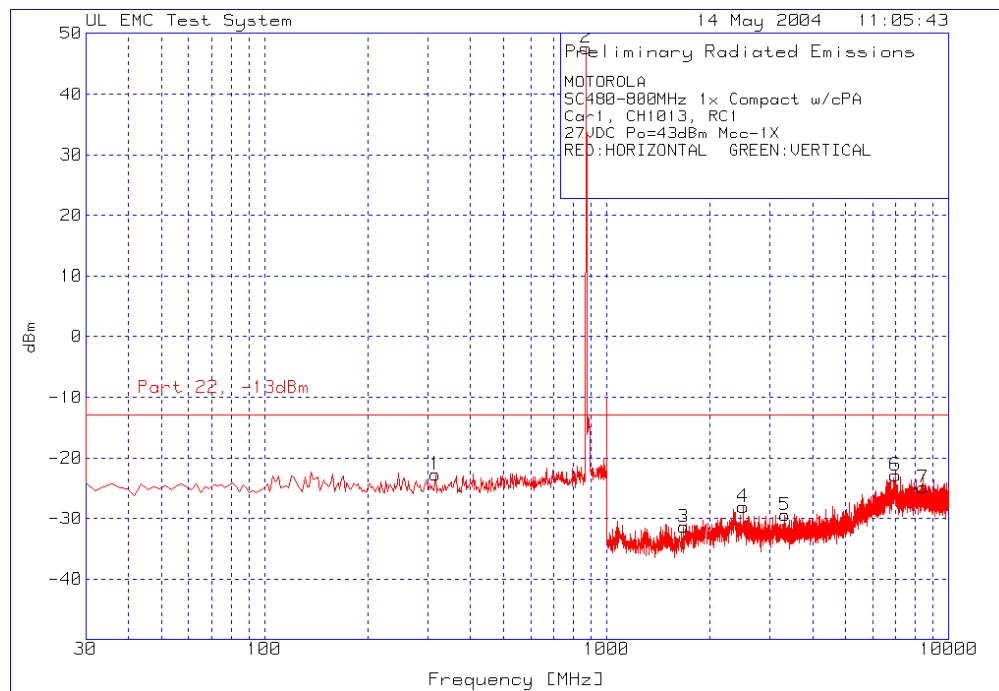
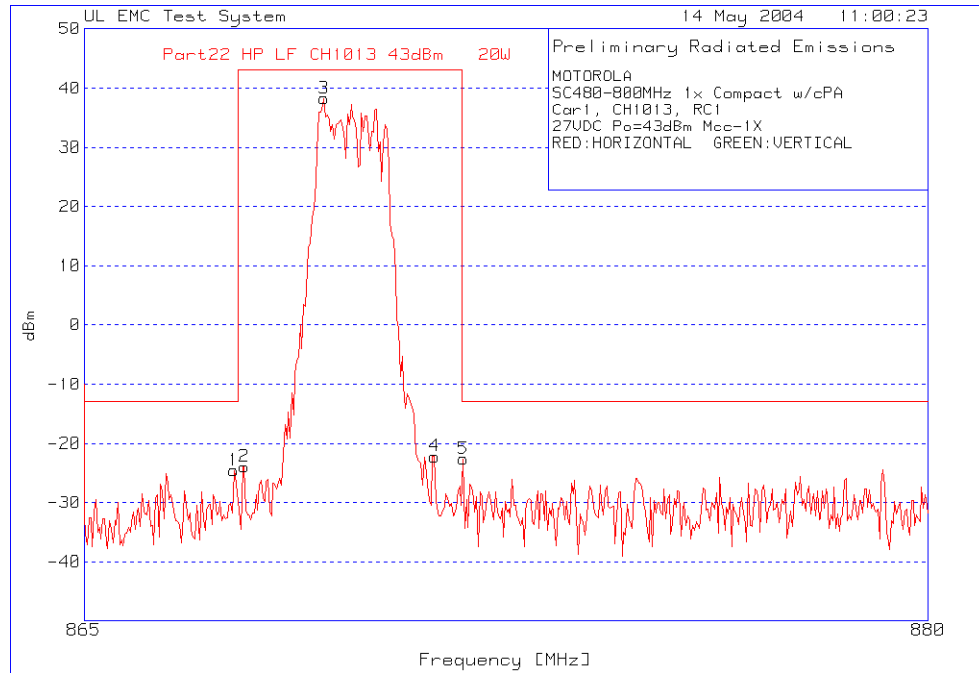
CDMA EVDO Channel 1020 – -6.0 dBm – 16QAM



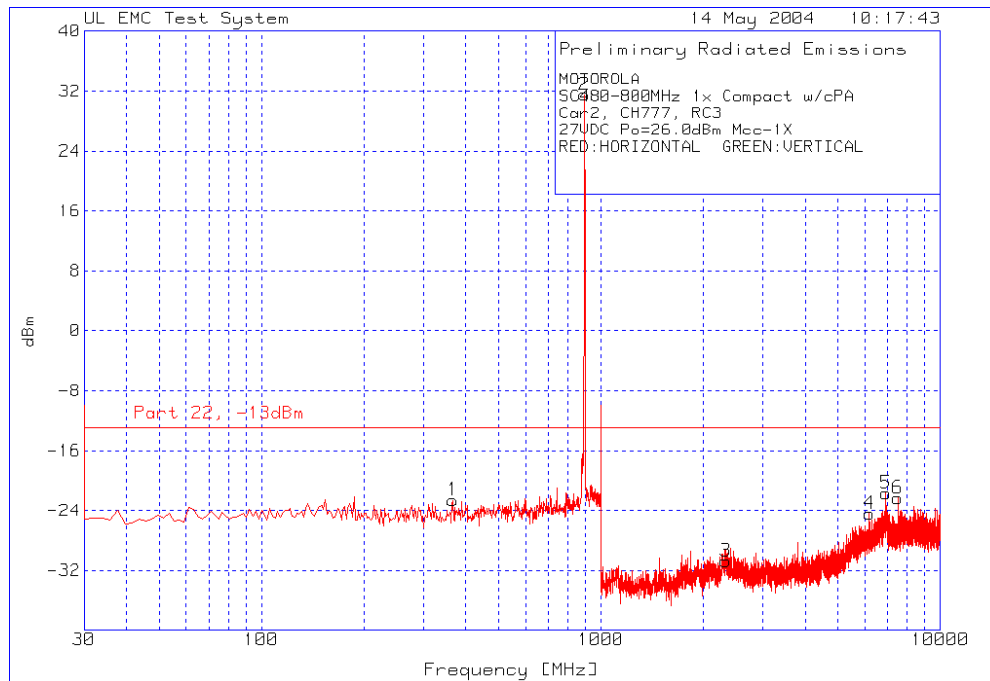
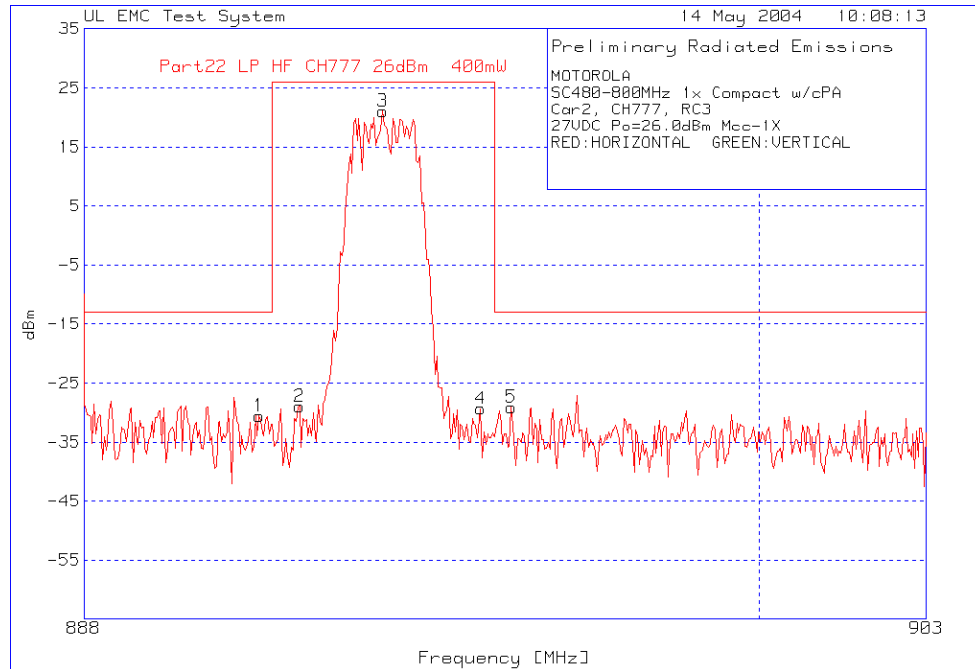
Spurious and Harmonic Emissions Conducted CDMA 1X Channel 777 – 43.0 dBm



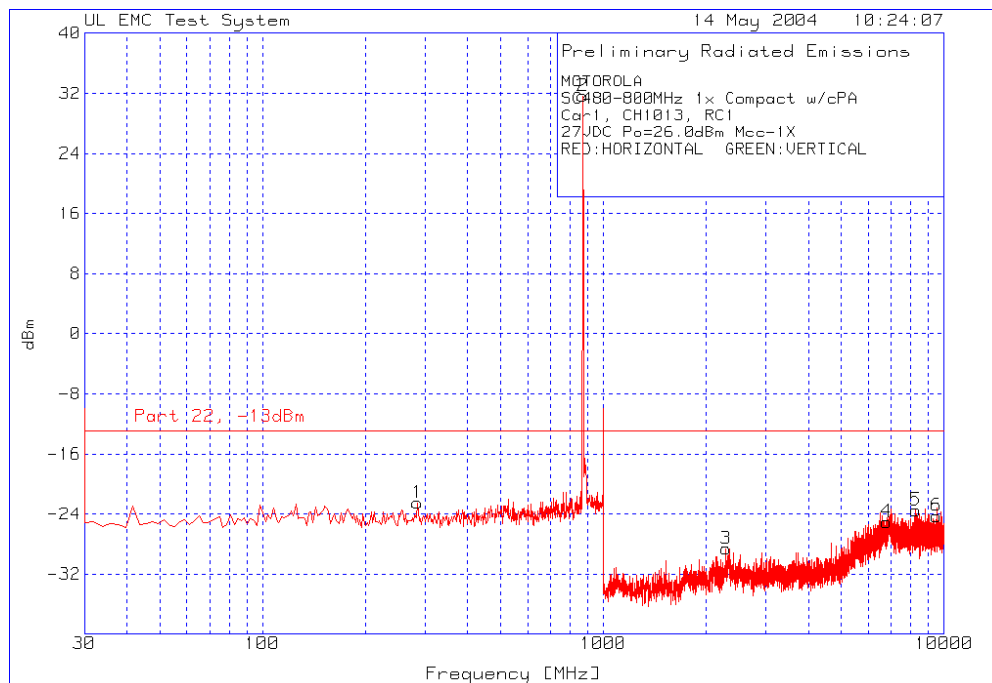
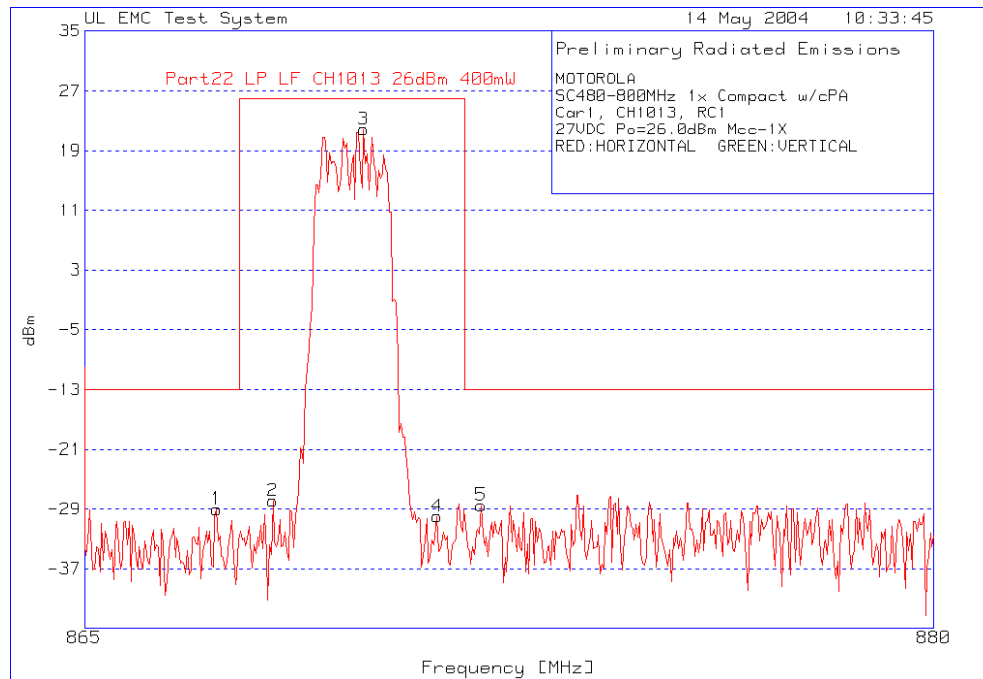
Spurious and Harmonic Emissions Conducted CDMA 1X Channel 1013 – 43.0 dBm



Spurious and Harmonic Emissions Conducted CDMA 1X Channel 777 – 26.0 dBm

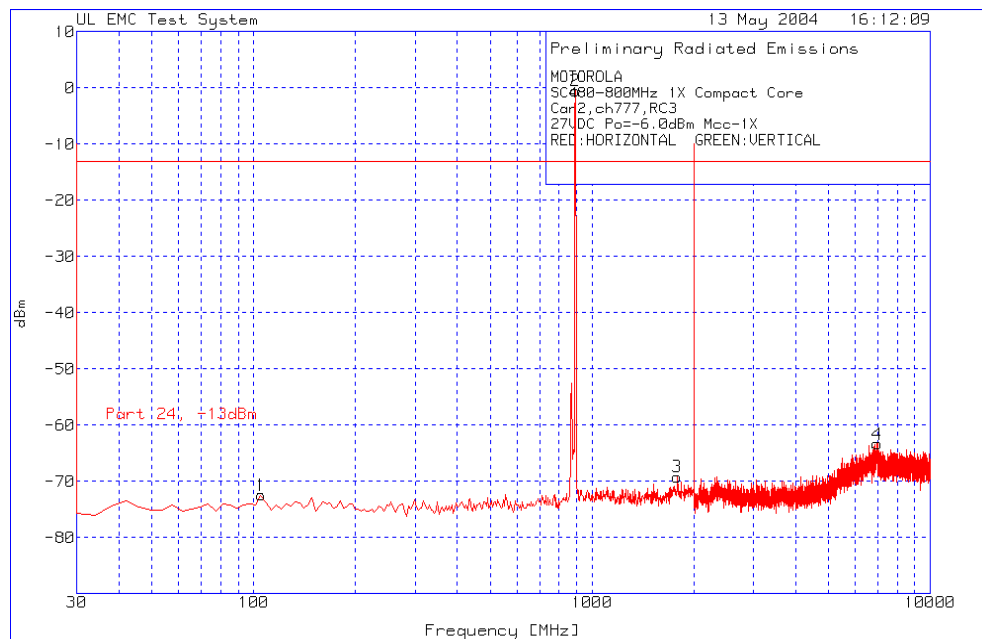
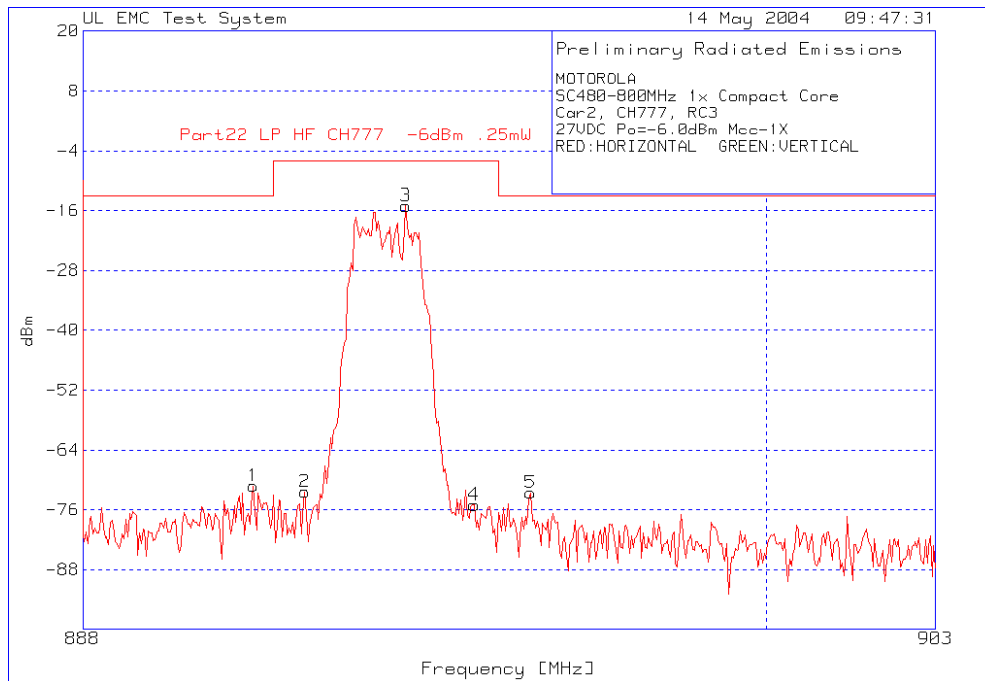


Spurious and Harmonic Emissions Conducted CDMA 1X Channel 1013 – 26.0 dBm

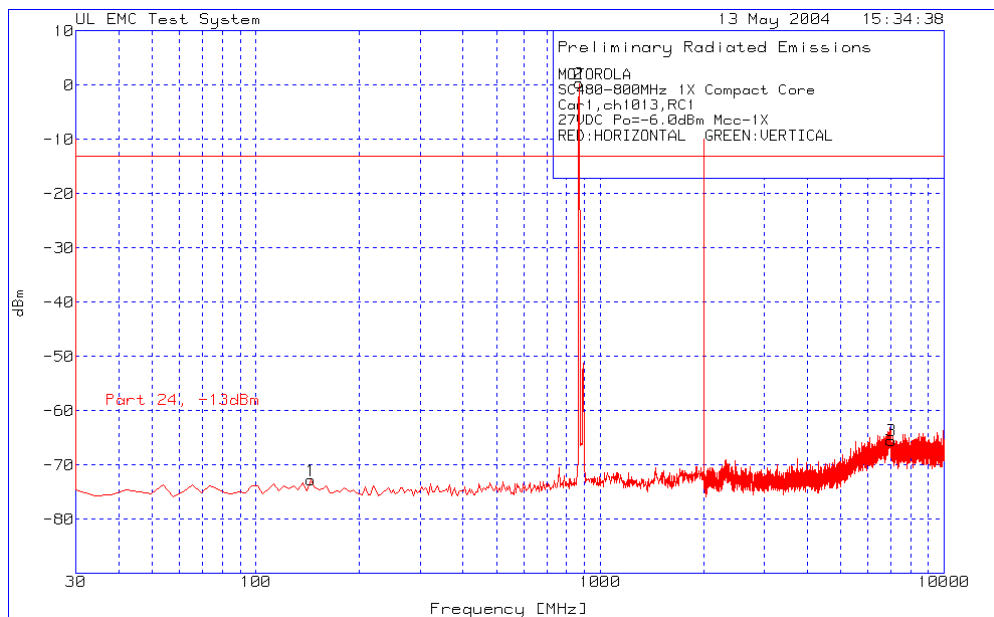
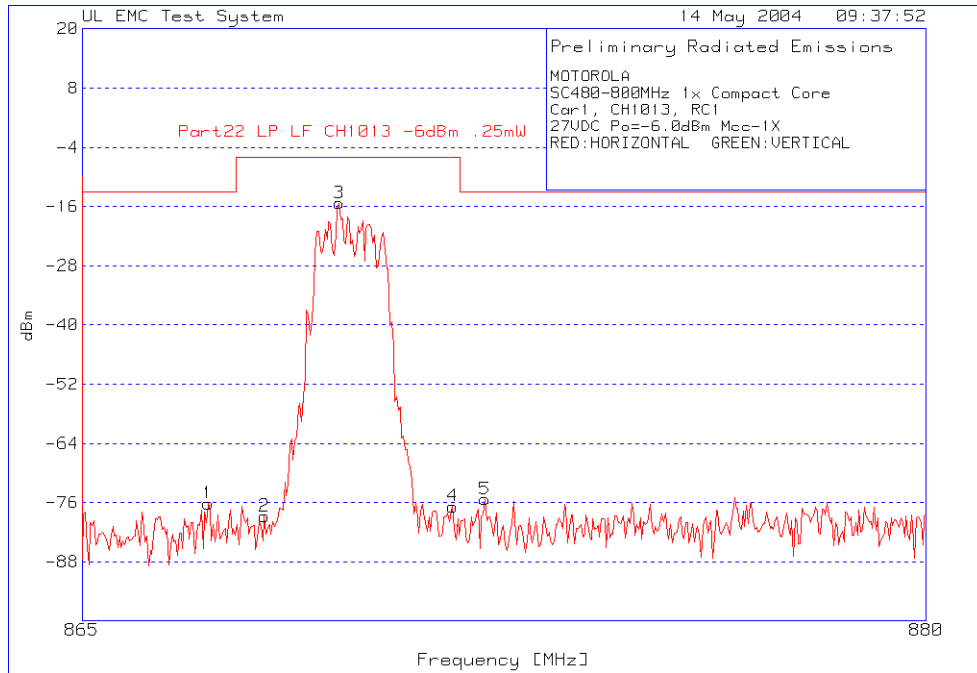


Spurious and Harmonic Emissions Conducted

CDMA 1X Channel 777 – -6.0 dBm



Spurious and Harmonic Emissions Conducted CDMA 1X Channel 1013 – -6.0 dBm



SECTION E

OCCUPIED BANDWIDTH

NOTE: The BTS was configured for maximum power out of 43.00 dBm and minimum power out of 36.5 dBm respectively. The max and min output power was set to 20.0 Watts or 4.5 Watts respectively using an HP437B 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 (1.30 MHz / 30 kHz)

Example: 26.63 dBm + 16.37 dB = 43.00 dBm

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

SC480 EVDO @ 800MHz SUMMARY OF OCCUPIED BANDWIDTH

CHANNEL	Power Level (dBm)	FREQUENCY (MHz)	MEASURED (MHz)	FCC LIMIT (MHz)	Pass / Fail
770	36.5	893.1	1.2691	1.30	Pass
1020	36.5	869.91	1.2695	1.30	Pass

SC480 1X @ 800 MHz SUMMARY OF OCCUPIED BANDWIDTH

CHANNEL	Power Level (dBm)	FREQUENCY (MHz)	MEASURED (MHz)	FCC LIMIT (MHz)	Pass / Fail
777	-6.0	893.31	1.2258	1.30	Pass
1013	26.0	869.7	1.2258	1.30	Pass

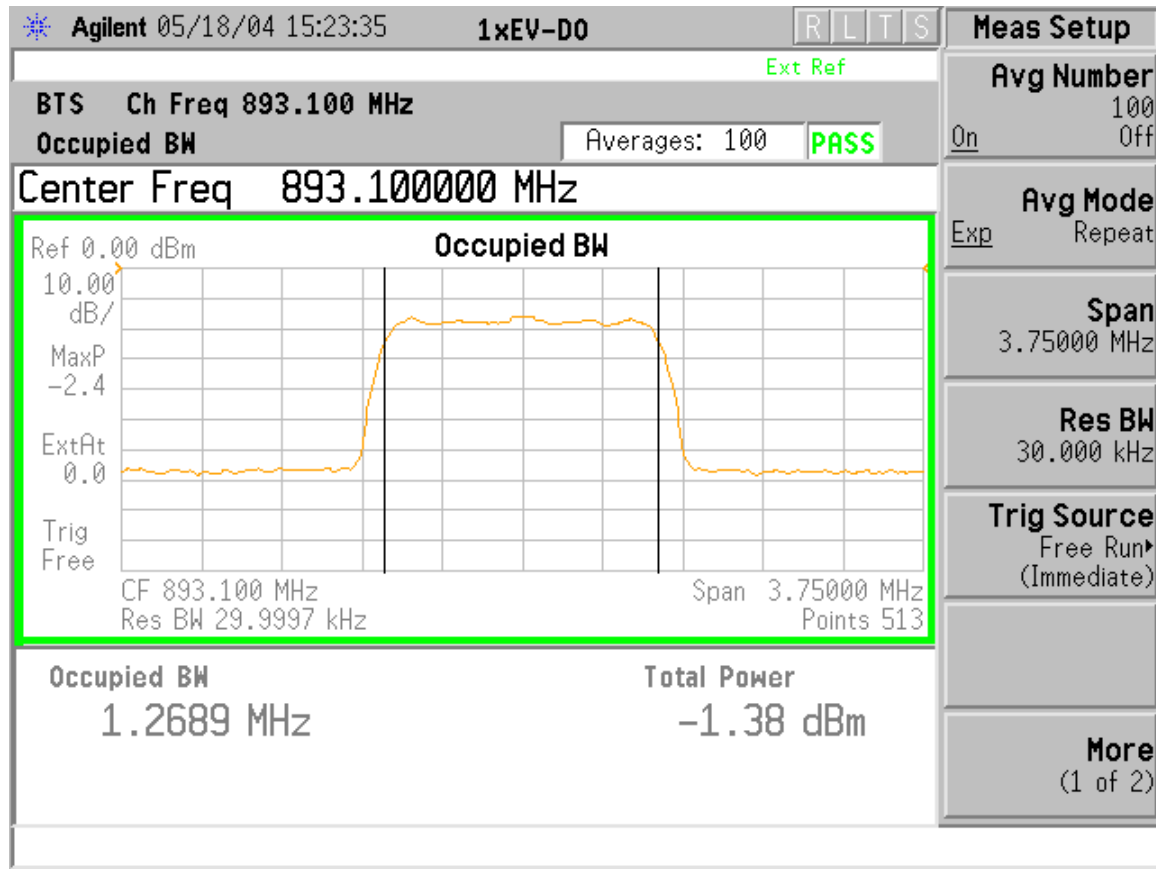
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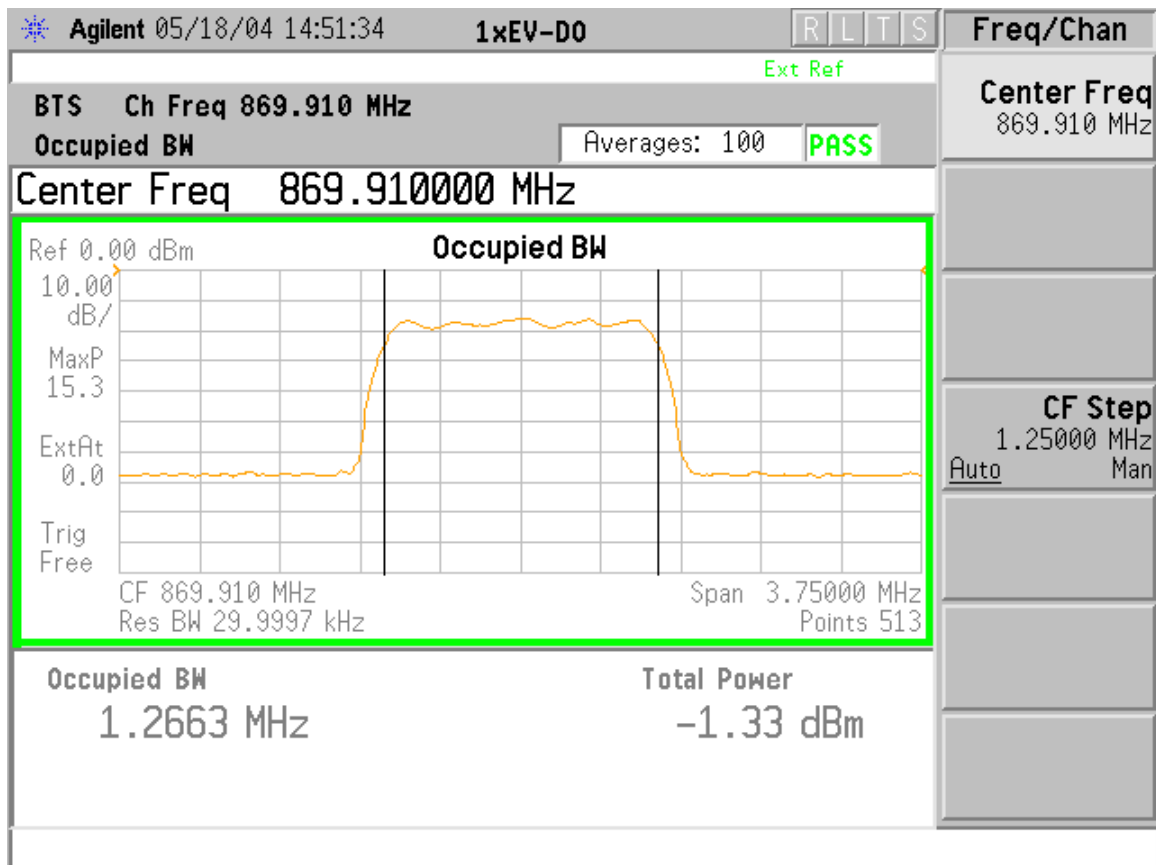
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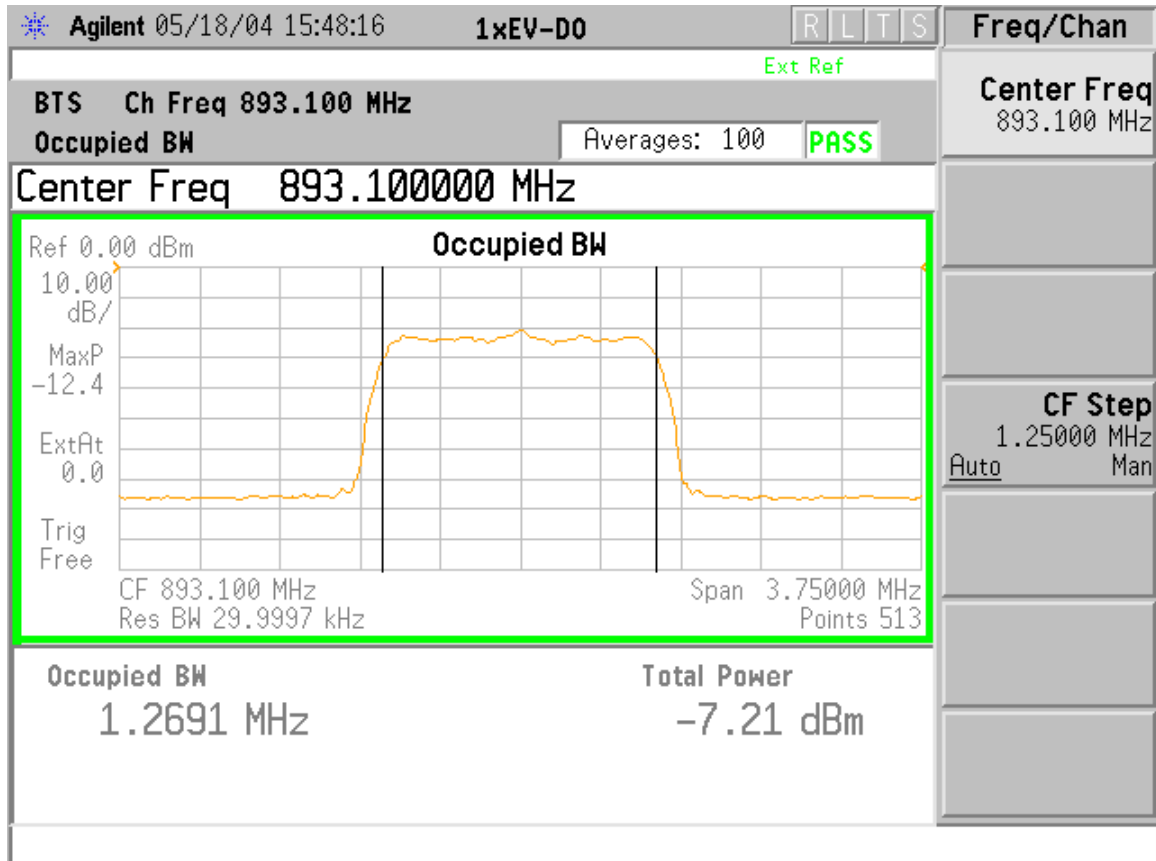
Date

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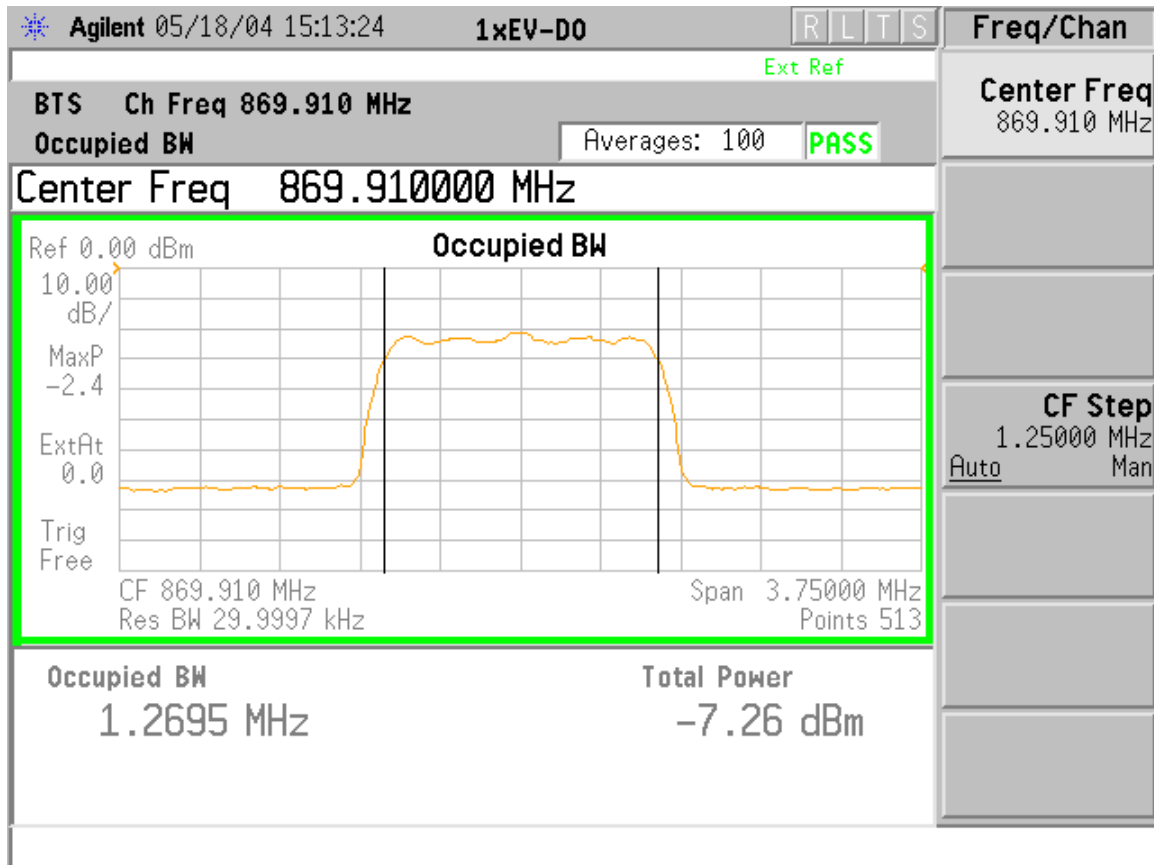
SC480 EVDO with cPA – Occupied Bandwidth – 43.00 dBm- 8PSK

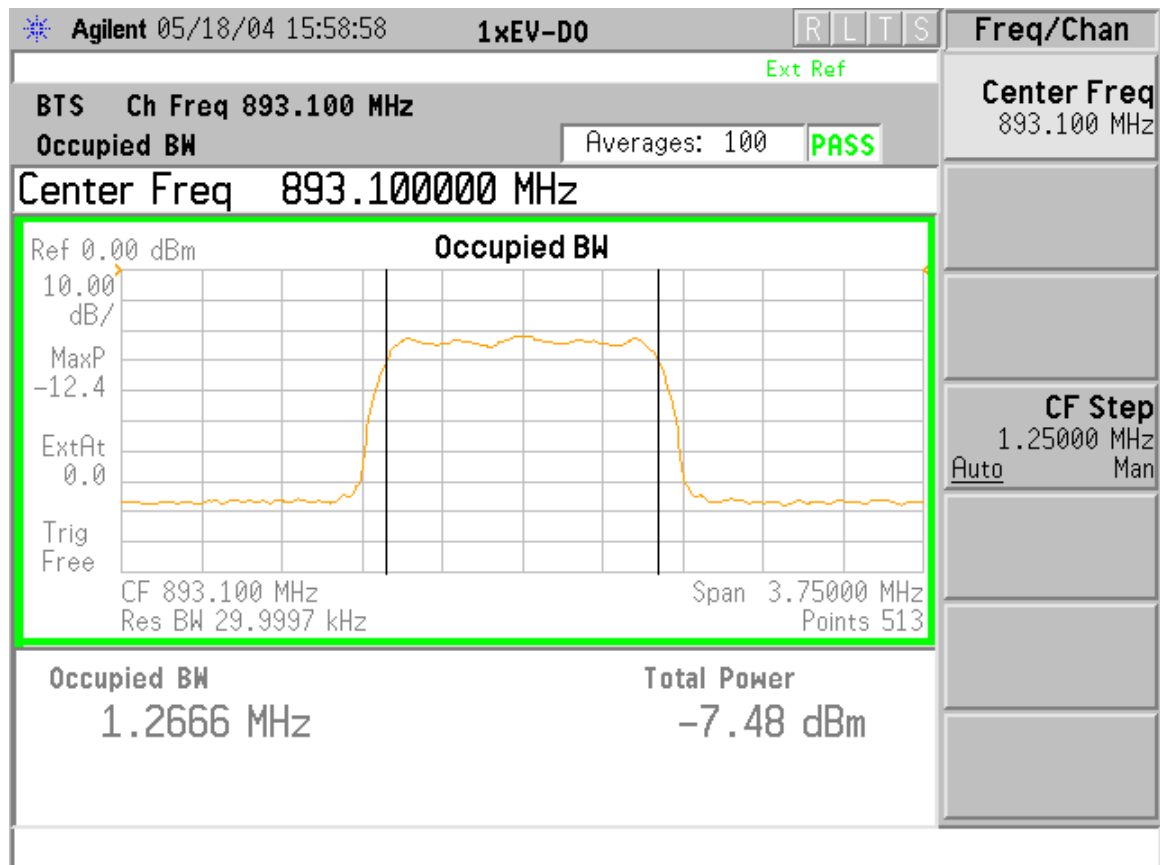
Channel 770 – 893.1 MHz

SC480 EVDO with cPA – Occupied Bandwidth – 43.00 dBm – 16QAM

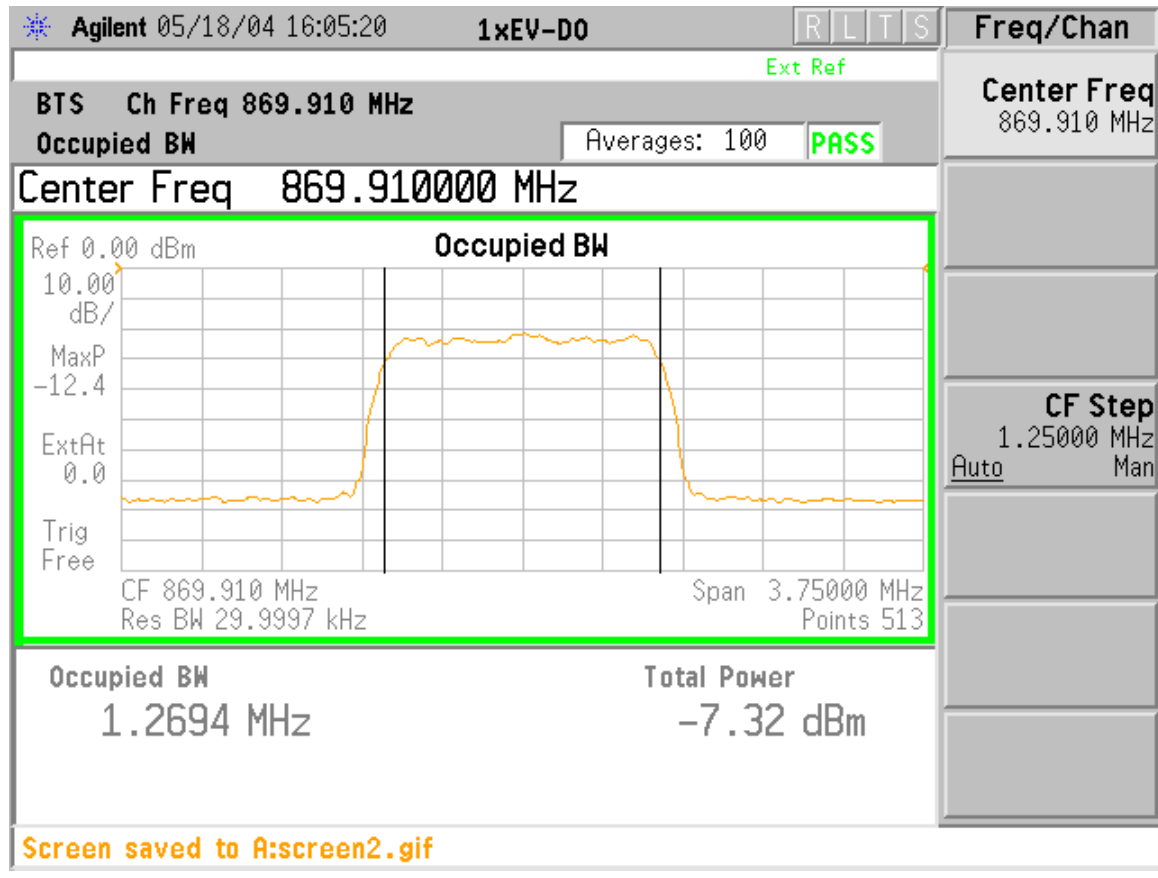
SC480 EVDO with cPA – Occupied Bandwidth – 36.5 dBm – 8PSK

Channel 770 – 893.1 MHz

SC480 EVDO with cPA – Occupied Bandwidth – 36.5 dBm – 16QAM

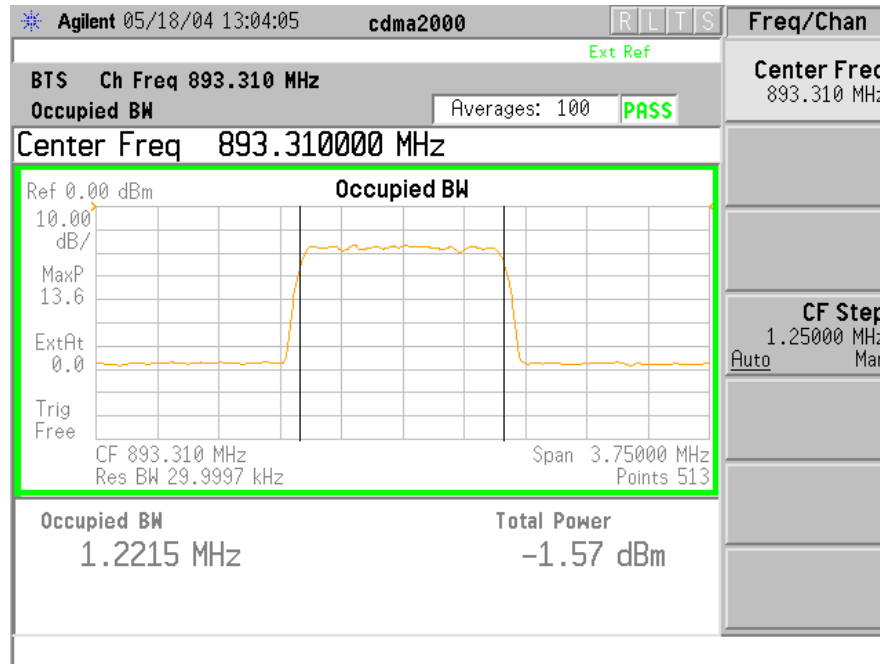
SC480 EVDO with Core – Occupied Bandwidth – -6.0 dBm – 8PSK

Channel 770 – 893.1 MHz

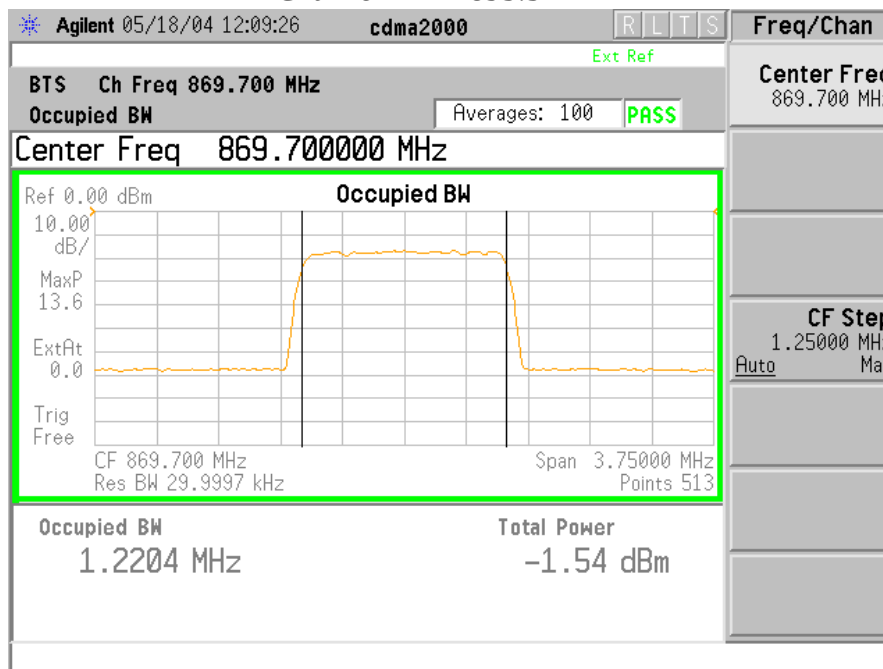
SC480 EVDO with Core – Occupied Bandwidth – -6.0 dBm – 16QAM

Channel 1020 – 869.91 MHz

SC480 1X with cPA – Occupied Bandwidth – 43.00 dBm

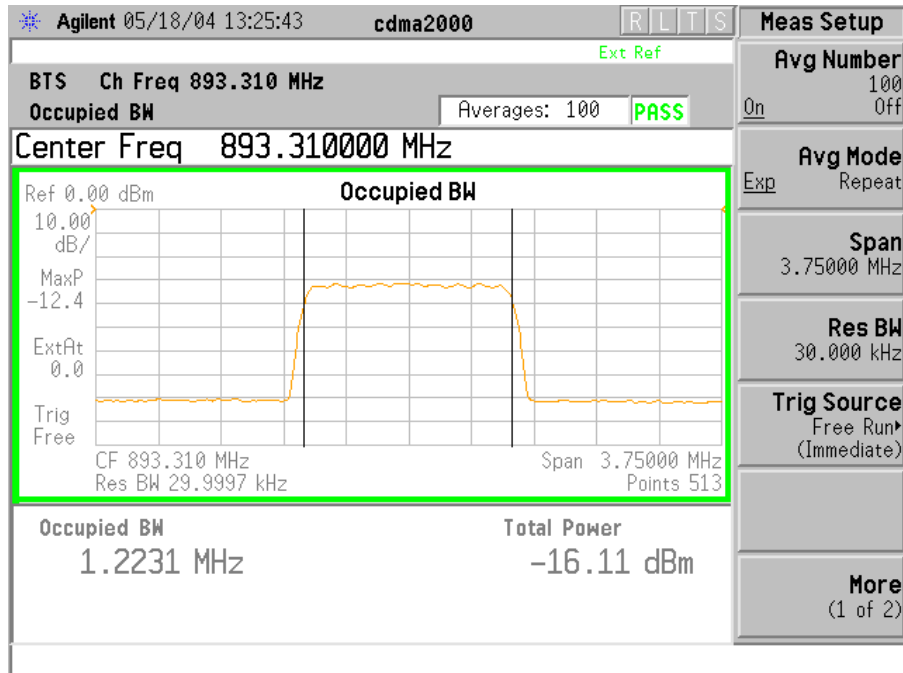


Channel 777 – 893.31 MHz

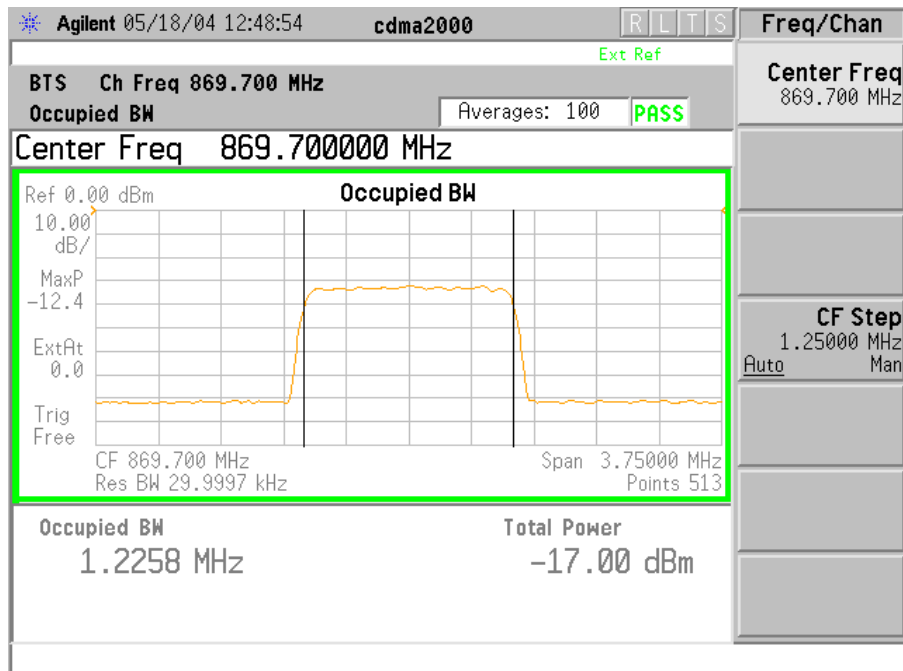


Channel 1020 – 869.7 MHz

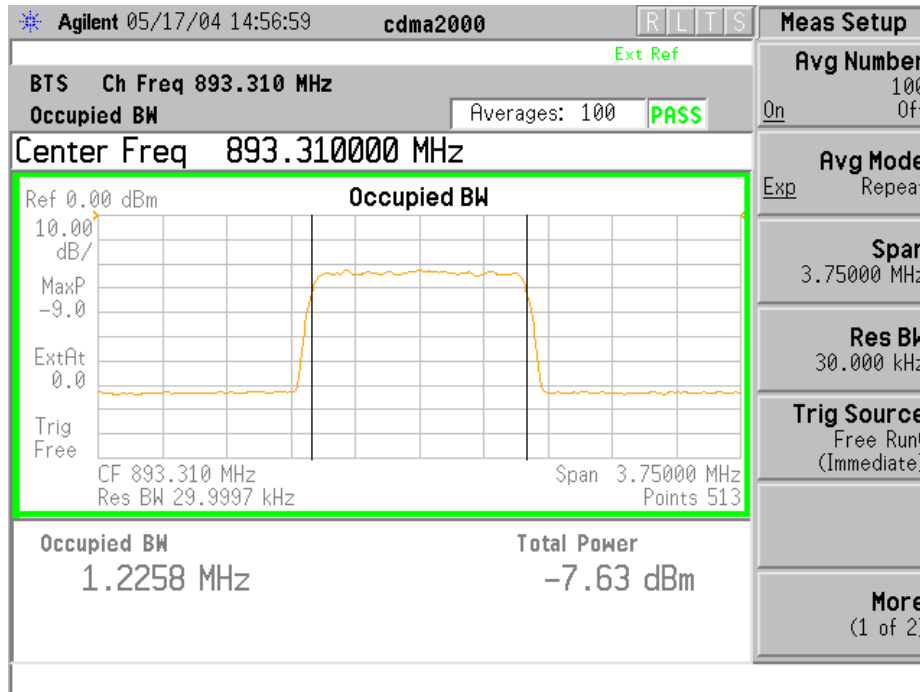
SC480 1X with cPA – Occupied Bandwidth – 26.0 dBm



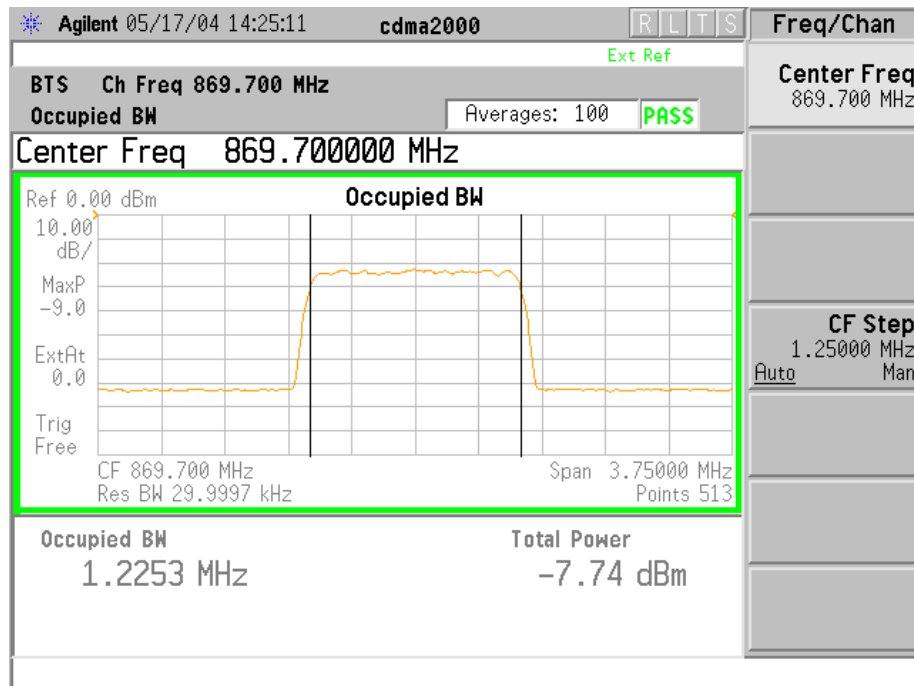
Channel 777 – 893.31 MHz



Channel 1013 – 869.7 MHz

SC480 1X with Core – Occupied Bandwidth – 26.0 dBm

Channel 777 – 893.31 MHz



Channel 1013 – 869.7 MHz

Section F

Maximum Permissible Exposure (MPE)

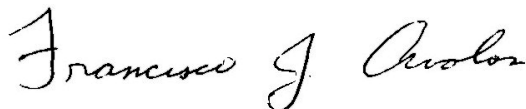
MPE Levels for Uncontrolled Environment

MPE Levels based on ANSI/IEEE C95.1-1992 and 47 CFR 1.1310, Table 1 requirements

Antenna	Antenna Gain	Uncontrolled Exposure Specification 0.58 mW/cm ²	Measured level at Specified distance	Published Uncontrolled Exposure Distance (Note 1)
DB786DC5N-XM	Unity	0.58 mW/cm ²	0.58 mW/cm ² @ 68 cm	1.25 m
DB786SD5N-XC	5.2dBd	0.58 mW/cm ²	0.58 mW/cm ² @ 107cm	1.25 m

Note 1: Warning Label will specify uncontrolled exposure boundary distance per ANSI C95.2

870/1500 = 0.58 mW/cm² uncontrolled limit



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SECTION G

FREQUENCY STABILITY

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

MODE	TEMPERATURE	WORST CASE Delta PPM	FCC REQUIREMENT	Pass / Fail
CSA	-30° to +50° C	<0.2	+/- 1.5 PPM MAX	Pass



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Terry Schwenk

