



***SC4812ETLite 1X/EVDO @ 1.9 GHz
CDMA BTS***

TEST REPORT EXHIBIT

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MOTOROLA

Global Telecom Solutions Sector

APPLICANT: MOTOROLA

FCC ID: IHET6ER1

Section A

Summary of RF Measurements



Summary of Radiated RF Measurements

Maximum Radiated RF Spur Level for SC4812ETLite EVDO @ 1.9 GHz CDMA BTS

<i>Radiated RF Measurements</i>					<i>Spec</i>	<i>Result</i>
<i>Channel</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>FCC Part 22/24 MAX LIMIT (dBm)</i>	<i>(Pass/Fail)</i>
25	12004.003	H	48.87	-46.36	-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:
2. $(\text{dBuV/M}) + 20 - 104.77 = \text{dBm}$

12.01.04

Signature

Date

Francisco Avalos



Summary of Radiated RF Measurements

Worst Case Radiated RF Spur Level for SC4812ETL @ 1.9GHz

Radiated Data			Substituted Power				Spec	Result
TX Channel	Spurious Frequency (MHz)	Antenna Polarity	Measured Radiated Field Strength (dBuV/m)	Measured Radiated Field Strength (dBm) (Note 1)	TX Antenna Terminal Voltage (dBm) (Note 2)	EDRP (dBm) (Note 3)	FCC Part 24 MAX LIMIT (dBm)	Pass/Fail
1175	16151.076	H	50.74	-44.48	-60	-48.25	-13	Pass

Notes:

1. Converting dBuV/M to dBm at 3 meters
(dBuV/M) +9.542-104.77dB=dBm
Converting dBuV/M to dBm at 10 meters
(dBuV/M) +20 -104.77dB=dBm
2. The same horn antenna and measurement system was used for EUT scan and during substitution method. After maximizing the receive antenna and adjusting signal generator power level to measure the same emission level with the spectrum analyzer as with the EUT. Signal generator output level was recorded for each of the spurious frequencies. Test cable was then disconnected from the transmit horn and was connected to the input of the S/A measuring the voltage at the terminals of the antenna.
3. This value was obtained by converting the Equivalent Isotropic Radiated Power (EIRP) to ideal half-wave dipole reference power - (Equivalent Di-Pole Radiated Power - EDRP) per (TIA-603, 2.2.12.2(i)(m))

 8/1/01
 Radiated Engineer Date



Summary of Conducted RF Measurements

SC4812ETLite EVDO @ 1.9 GHz CDMA BTS FCC Part 24

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBμV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
1175	13911.182	89.19	-17.81	-13	Pass

Francisco J. Avalos

12.01.04

Signature

Date

Francisco Avalos



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Summary of Conducted RF Measurements

SC4812ETL @ 1.9GHz

FCC Part 24 at 23 dBm output (Min power)

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dB μ V)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm	Pass/Fail
25	14575.063	88.77	-18.23	-13	Pass

Radiated Engineer

0/1/01

Date



Section B

Summary of Modulation Characteristics

SC4812ETLite EVDO @ 1.9 GHz CDMA BTS

CHANNEL	TUNE FREQUENCY (MHz)	RHO Measured	RHO Specifications	PASS / FAIL
25	1931.25	0.99805	> 0.970	Pass
1175	1988.75	0.99802	> 0.970	Pass

The BTS was configured for maximum power out of 46.00dBm and minimum power out of 36.5dBm depending on the configuration. The output power was set respectively to 40.0 Watts or 4.5 Watts using an HP437B power meter. The external attenuation was 46.0 dB for channel 25 and channel 1175.

Francisco J. Avalos

12.01.04

Signature

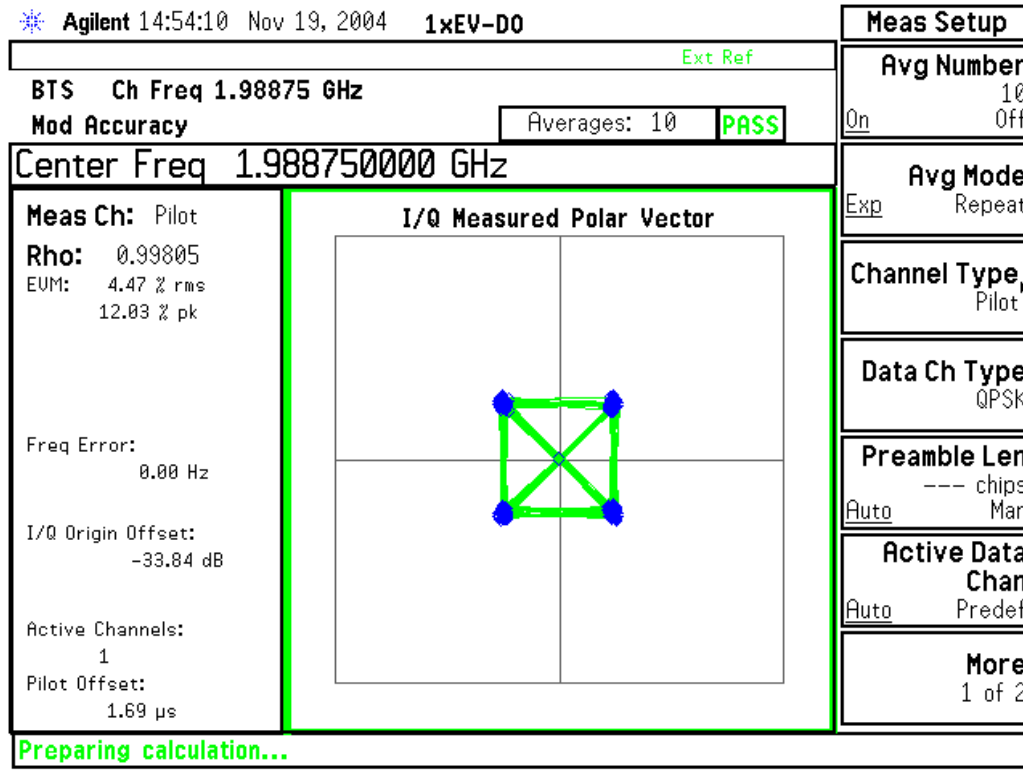
Date

Francisco Avalos



SC4812ETLite EVDO – Modulation Characteristics

High Power – 46.00dBm – 8PSK

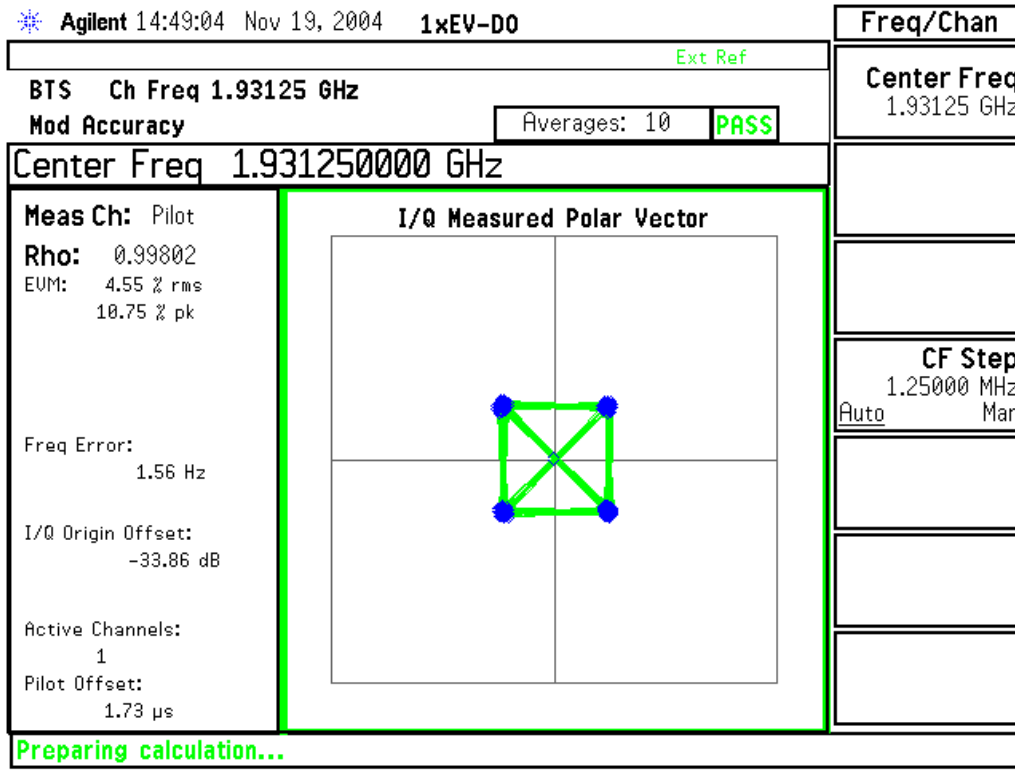


Channel 25 – 1931.25 MHz



SC4812ETLite EVDO – Modulation Characteristics

High Power– 46.00dBm – 16QAM

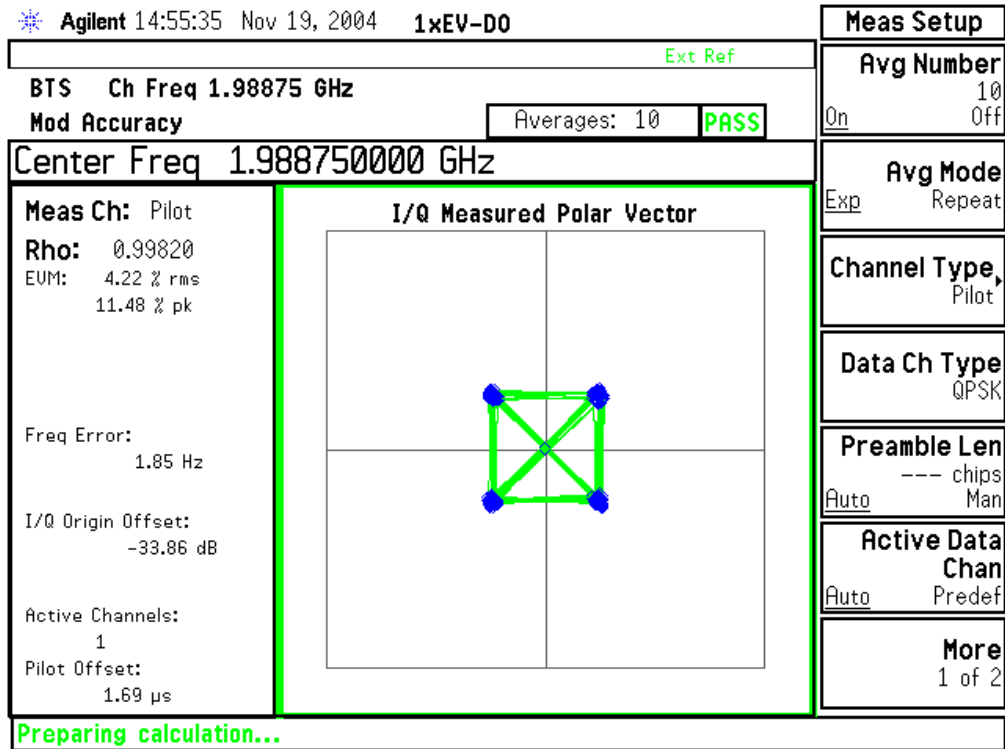


Channel 1175 – 1988.75 MHz



SC4812ETLite EVDO – Modulation Characteristics

Low Power– 36.5dBm – 8PSK

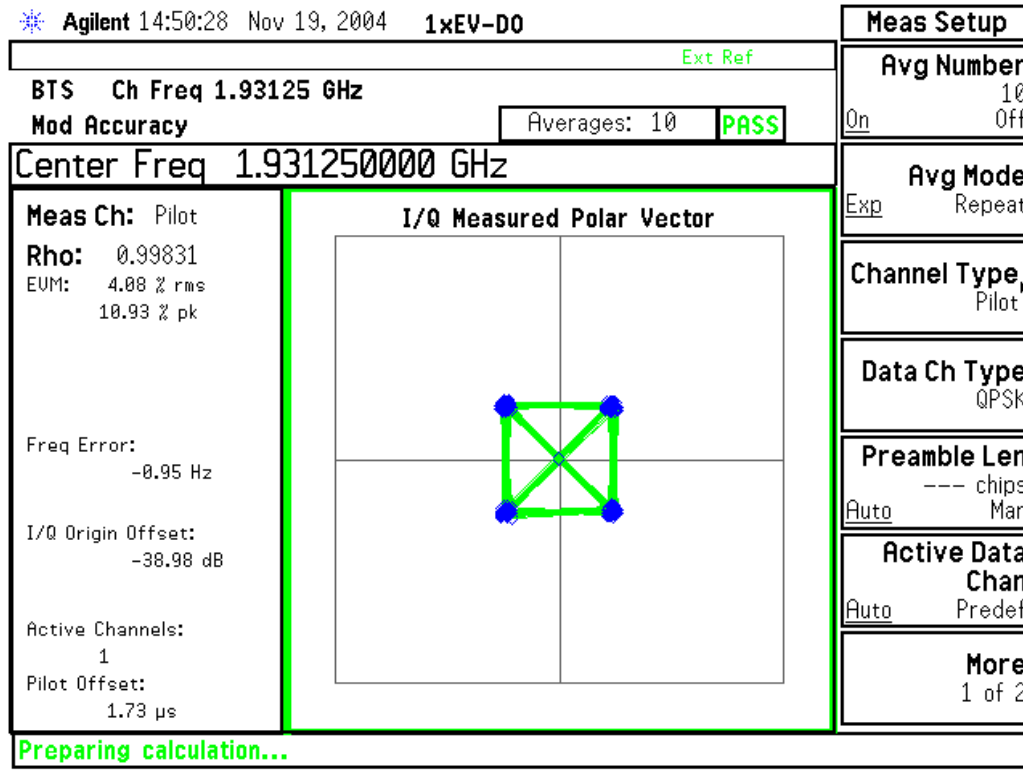


Channel 25 – 1931.25 MHz



SC4812ETLite EVDO – Modulation Characteristics

Low Power – 36.5dBm – 16QAM



Channel 1175 – 1988.75 MHz



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Summary of Modulation Characteristics

SC4812ETL @1.9GHz worst cases

CHANNEL	TUNE FREQUENCY (MHz)	RHO measured	RHO specifications	Pass/Fail
25	1931.25	0.9951	>0.912	Pass
1175	1988.75	0.9946	>0.912	Pass

The BTS was configured for maximum power out of 46.0 dBm and minimum power out of 23.0 dBm respectively. The output power was set respectively to 40.0 Watts or 200 mWatts using an HP437B power meter.

Engineer: Francisco Ovalos 8/3/01
Date



MOTOROLA

Cellular Infrastructure Group

FCC ID: IHET6ER1

Modulation Characteristics

Maximum Power

SC4812ETLite 1.9GHz 3G-1X 46dBm
E6380A Cell Site Test Set: 07/18/01 09:37:00 am

L

CDMA ANALYZER

Rho **0.9952**
Time Offset **0.06** us

Freq Err **Hz**
-50 -0.2 50
Carrier Feedthru **-28.3** dB

Tune Freq
1931.250000
MHz

Input Atten
Auto/Hold
5 dB

Input Port
RF In/Ant

Find PN
Auto/Manual

PN Offset
32

Even Sec In
Enable/Not

Meas Intvl
1.25
ms

Gain
Auto/Hold
12 dB

Anl Dir
Fwd/Rev

Anl Special
Normal

Analyzer
Arm Meas
Single/Cont
Disarm

Qual Event
80 ms

Tris Event
80 ms

SC4812ETLite 1.9GHz 3G-1X 46dBm
E6380A Cell Site Test Set: 07/18/01 10:18:00 am

L

CDMA ANALYZER

<p>Rho</p> <p>0.9946</p> <p>Time Offset us</p> <p>-0.18</p>		<p>Frea Err Hz</p> <p>-50 -1.7 50</p> <p>Carrier Feedthru dB</p> <p>-28.8</p>	
<p>Tune Freq</p> <p>1988.750000 MHz</p> <p>Input Atten</p> <p>Auto/Hold</p> <p>5 dB</p> <p>Input Port</p> <p>RF In/Ant</p>	<p>Find PN</p> <p>Auto/Manual</p> <p>PN Offset</p> <p>32</p> <p>Even Sec In</p> <p>Enable/Not</p>	<p>Meas Intvl</p> <p>1.25 ms</p> <p>Gain</p> <p>Auto/Hold</p> <p>12 dB</p> <p>Anl Dir</p> <p>Fwd/Rev</p> <p>Anl Special</p> <p>Normal</p>	<p>Analyzer</p> <p>Arm Meas</p> <p>Single/Cont</p> <p>Disarm</p> <p>Qual Event</p> <p>80 ms</p> <p>Tris Event</p> <p>80 ms</p>



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Cellular Infrastructure Group

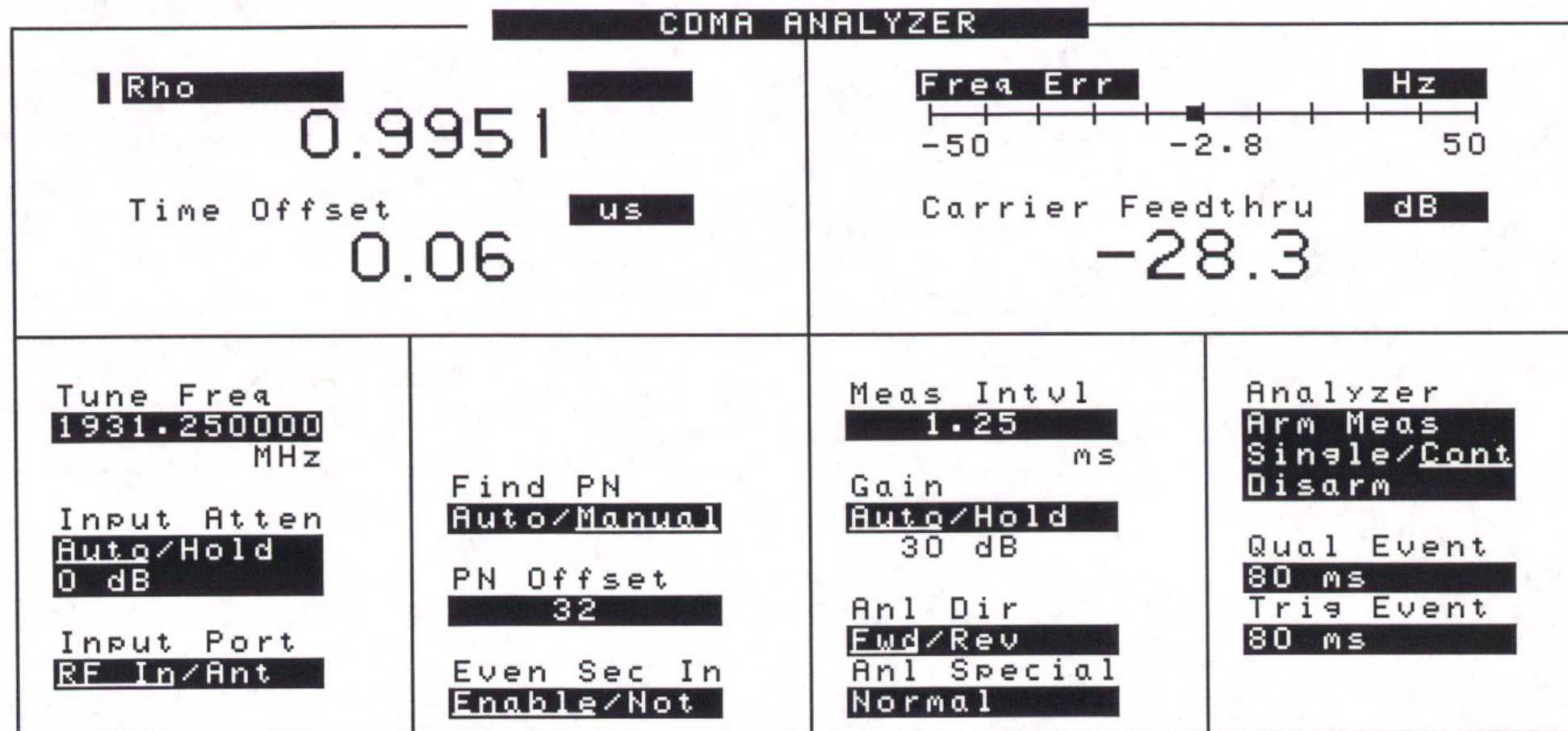
FCC ID: IHET6ER1

Modulation Characteristics

Minimum Power

SC4812ETLite 1.9GHz 3G-1X 23dBm
E6380A Cell Site Test Set: 07/18/01 09:46:00 am

L



SC4812ETLite 1.9GHz 3G-1X 23dBm
E6380A Cell Site Test Set: 07/18/01 10:07:00 am

L

CDMA ANALYZER

<p>Rho</p> <p>0.9954</p> <p>Time Offset us</p> <p>-0.18</p>		<p>Freq Err Hz</p> <p>-50 -0.2 50</p> <p>Carrier Feedthru dB</p> <p>-31.0</p>	
<p>Tune Freq</p> <p>1988.750000 MHz</p> <p>Input Atten</p> <p>Auto/Hold</p> <p>0 dB</p> <p>Input Port</p> <p>RF_In/Ant</p>	<p>Find PN</p> <p>Auto/Manual</p> <p>PN Offset</p> <p>32</p> <p>Even Sec In</p> <p>Enable/Not</p>	<p>Meas Intvl</p> <p>1.25 ms</p> <p>Gain</p> <p>Auto/Hold</p> <p>30 dB</p> <p>Anl Dir</p> <p>Fwd/Rev</p> <p>Anl Special</p> <p>Normal</p>	<p>Analyzer</p> <p>Arm Meas</p> <p>Single/Cont</p> <p>Disarm</p> <p>Qual Event</p> <p>80 ms</p> <p>Tris Event</p> <p>80 ms</p>



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Section C

Spurious and Harmonic Emissions Radiated



Radiated RF Measurements

Maximum Radiated RF Spur Levels for SC4812ETLite EVDO @ 1.9 GHz CDMA BTS

<i>Radiated RF Measurements</i>					<i>Spec</i>	<i>Result</i>
<i>Channel</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>FCC Part 22/24 MAX LIMIT (dBm)</i>	<i>(Pass/Fail)</i>
25	12004.003	H	48.87	-46.36	-13	Pass
1175	3951.904	H	48.46	-46.77	-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:
 $(\text{dBuV/M}) + 20 - 104.77 = \text{dBm}$

12.01.04

Signature

Date

Francisco Avalos



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APPLICANT: MOTOROLA

FCC ID: IHET5EE1

Section D

Spurious and Harmonic Emissions Conducted



Conducted RF Measurements

SC4812ETLite EVDO @ 1.9 GHz CDMA BTS FCC Part 24

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBμV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
1175	13911.182	89.19	-17.81	-13	Pass
25	13903.98	89.08	-17.92	-13	Pass

FCC Maximum Limit Per 47 CFR:

- “ = Transmitted Power (10 Log₁₀(P_{watt})) - (43 + 10 Log₁₀(P_{watt})) dBW
- “ = 10 Log₁₀(P_{watt}) - (43 + 10 Log₁₀(P_{watt})) dBW
- “ = -43 dBW
- “ = -13 dBm

12.01.04

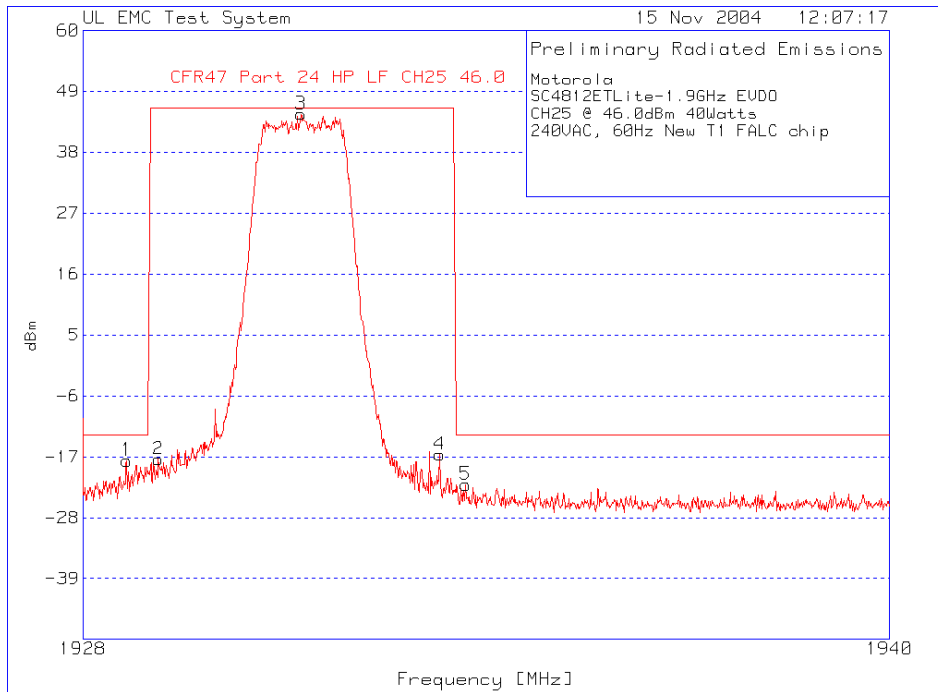
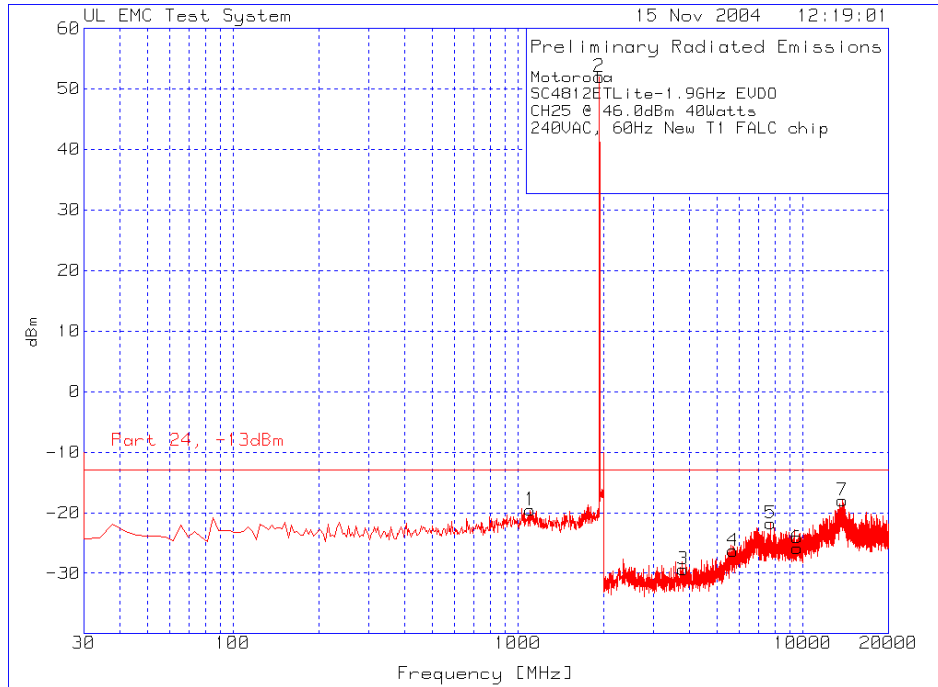
Signature

Date

Francisco Avalos

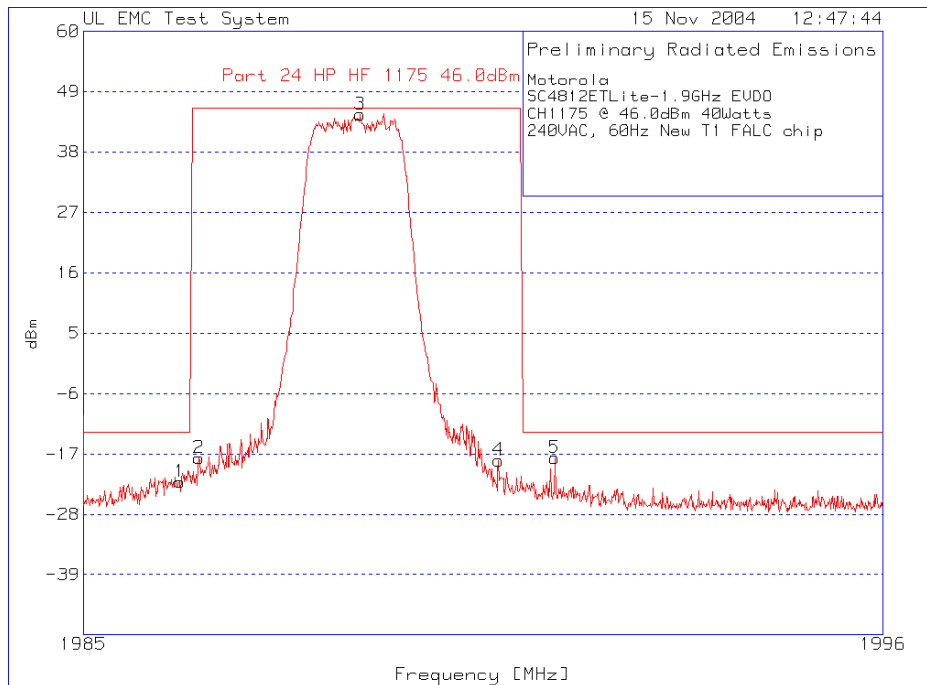
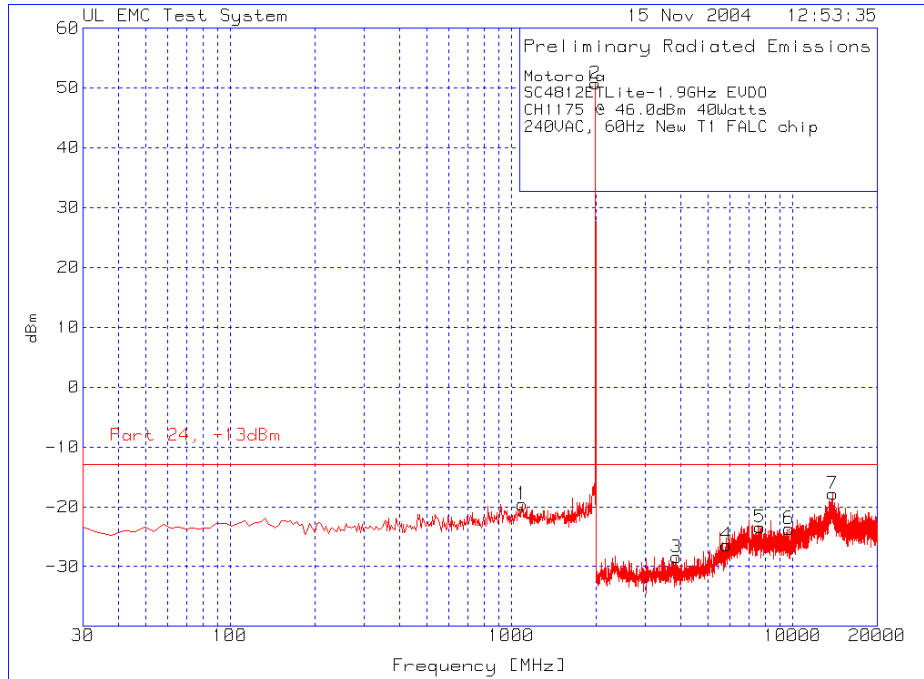


Spurious and Harmonic Emissions Conducted CDMA EVDO Channel 25 – 46.00dBm – 8PSK



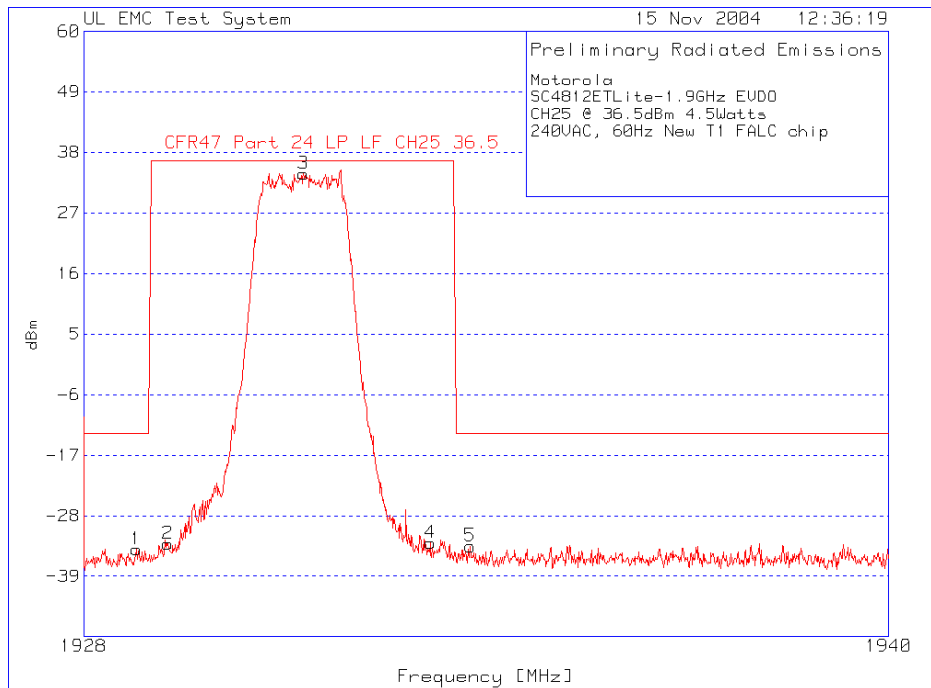
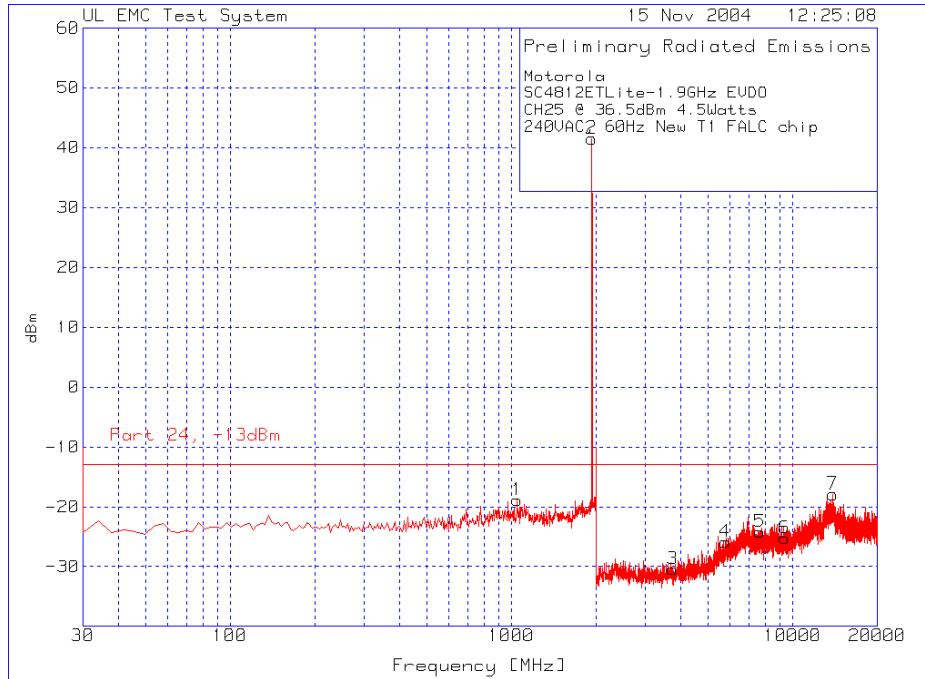


Spurious and Harmonic Emissions Conducted CDMA EVDO Channel 1175 – 46.00dBm – 16QAM





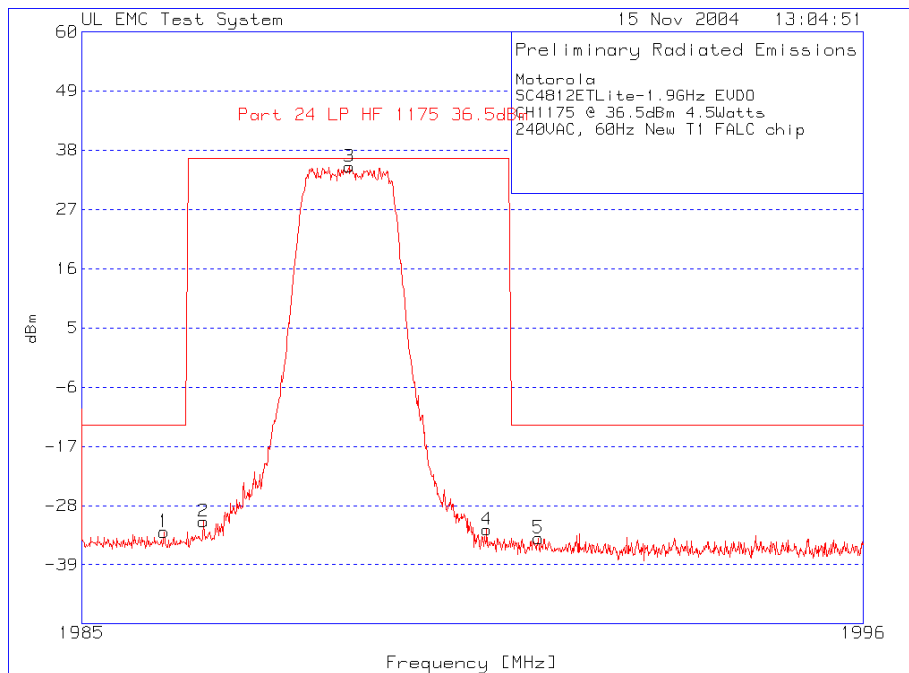
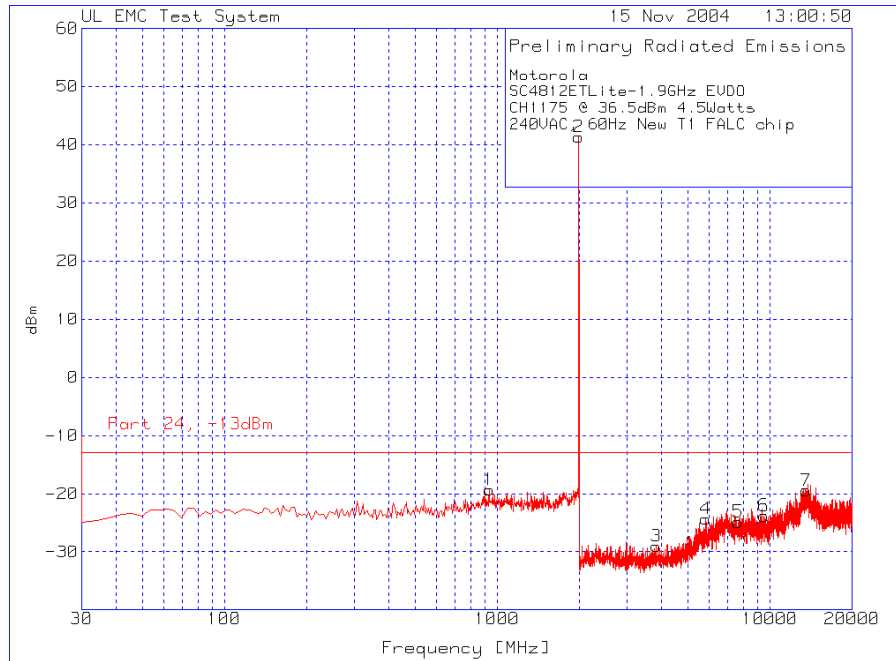
Spurious and Harmonic Emissions Conducted CDMA EVDO Channel 25 – 36.5 dBm – 8PSK





Spurious and Harmonic Emissions Conducted

CDMA EVDO Channel 1175 – 36.5 dBm – 16QAM






Radiated RF Measurements

Worst Case Radiated RF Spur Levels for SC4812ETL @ 1.9GHz

TX Channel	Radiated Data		Substituted Power				Spec	Result
	Spurious Frequency (MHz)	Antenna Polarity	Measured Radiated Field Strength (dBuV/m)	Measured Radiated Field Strength (dBm) (Note 1)	TX Antenna Terminal Voltage (dBm) (Note 2)	EDRP (dBm) (Note 3)	FCC Part 24 MAX LIMIT (dBm)	Pass/Fail
1175	16151.076	H	50.74	-44.48	-60	-48.25	-13	Pass
1175	3977.5	V	50.28	-44.94	-54.4	-48.85	-13	Pass
25	7396.698	H	43.76	-51.46	-63.1	-55.75	-13	Pass
25	3862.5	V	49.65	-45.57	-54.4	-48.75	-13	Pass

Notes:

1. Converting dBuV/M to dBm at 3 meters
(dBuV/M) +9.542-104.77dB=dBm
Converting dBuV/M to dBm at 10 meters
(dBuV/M) +20 -104.77dB=dBm
2. The same horn antenna and measurement system was used for EUT scan and during substitution method. After maximizing the receive antenna and adjusting signal generator power level to measure the same emission level with the spectrum analyzer as with the EUT. Signal generator output level was recorded for each of the spurious frequencies. Test cable was then disconnected from the transmit horn and was connected to the input of the S/A measuring the voltage at the terminals of the antenna.
3. This value was obtained by converting the Equivalent Isotropic Radiated Power (EIRP) to ideal half-wave dipole reference power - (Equivalent Di-Pole Radiated Power - EDRP) per (TIA-603, 2.2.12.2(i)(m))



Radiated Engineer

8/1/01
Date



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Global Telecom Solutions Sector

APPLICANT: MOTOROLA

FCC ID: IHET6ER1

Summary of Conducted RF Measurements

SC4812ETL @1.9GHz

FCC Part 24 at 23 dBm output (Min power)

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBμV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm	PASS/FAIL
25	14575.063	88.77	-18.23	-13	PASS
1175	13704.197	88.08	-18.92	-13	PASS

FCC Max. Limit Per 47 CFR:

- “ =Transmitted Power (10 Log₁₀ (P_{watt})) - (43 + 10 Log₁₀ (P_{watt}))dBW
- “ =10 Log₁₀ (P_{watt}) - (43 + 10 Log₁₀ (P_{watt}))dBW
- “ =-43 dBW
- “ =-13 dBm

dBuV-107 = dBm

Engineer:  Date: 8/1/01
Terry Schwenk