



SC4812ETL 1X @ 800 MHz CDMA BTS

TEST REPORT EXHIBIT

Index

<u>Section</u>	<u>Description</u>
A	Summary of RF Measurements
B	Modulation Characteristics
C	Spurious & Harmonic Emissions Radiated
D	Spurious & Harmonic Emissions Conducted
E	Occupied Bandwidth
F	Frequency Stability

1. The results and data presented herein are based on tests conducted at an ISO Guide 25 Accredited Test Laboratory. (UL Project No. 02NK40683 EMC Test Report) All details related to test equipment, calibration and environmental conditions are in the referenced report.
2. Results listed apply only to the SC4812ETL CDMA BTS



Global Telecom Solutions Sector

APPLICANT: MOTOROLA
FCC ID: IHET5CS1

Section A

Summary of RF Measurements



Summary of Radiated RF Measurements

Worst Case Radiated RF Spur Level for SC4812ETL 1X @ 800MHz CDMA BTS

<i>Radiated</i>				<i>Substituted Power</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>Tx Antenna Terminal Voltage (dBm) (Note 2)</i>	<i>EDRP (dBm) (Note 3)</i>	<i>FCC Part 22/24 MAX LIMIT (dBm)</i>	<i>(Pass/Fail)</i>
777	1786	V	36.6	-58.628	-63.8	-58.95	-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:
 $(\text{dBuV/M}) + 20 - 104.77 = \text{dBm}$
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)).

Signature

10.09.02

Date

Terry Schwenk



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Summary of Conducted RF Measurements

SC4812ETL 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	113.5872	86.76	-20.24	-13	Pass

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Date

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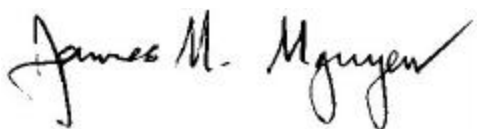
Section B

Summary of Modulation Characteristics

SC4812ETL 1X @ 800MHz CDMA BTS

CHANNEL / FILTER TYPE	TUNE FREQUENCY (MHz)	RHO Measured	RHO Specifications	PASS / FAIL
777 / Long Filter	893.31	.98335	> 0.912	Pass
1013 / Long Filter	869.7	.98288	> 0.912	Pass
777 / Short Filter	893.31	.99593	> 0.912	Pass
1013 / Short Filter	869.7	.99576	> 0.912	Pass

The BTS was configured for maximum power out of 47.78 dBm and minimum power out of 26.0 dBm respectively. The output power was set respectively to 60.0 Watts or 400 mWatts using an HP437B power meter



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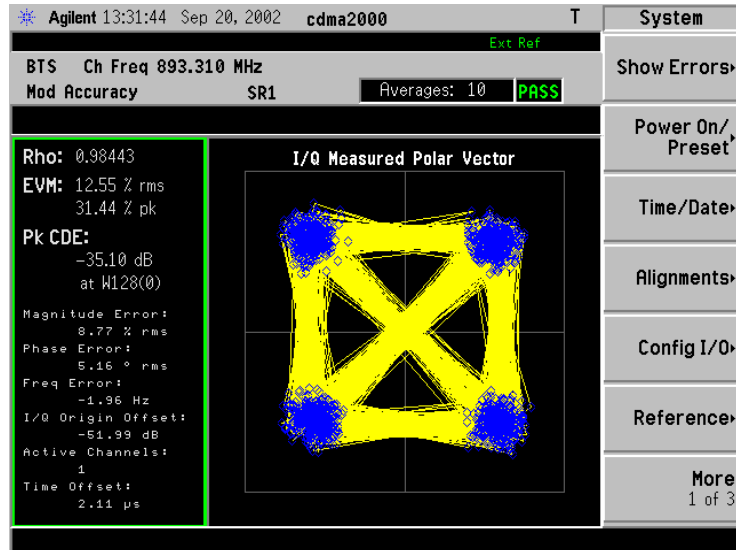
Date

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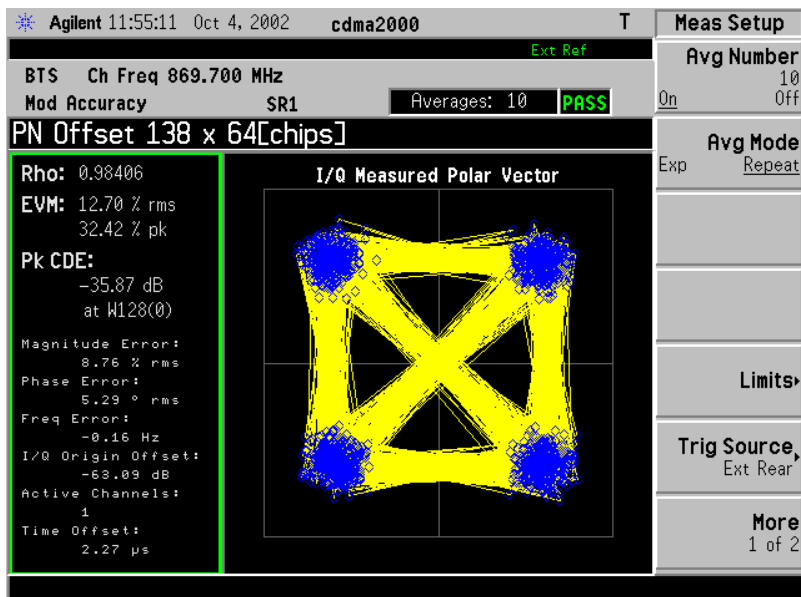


Modulation Characteristics

60W High Power – Long Filter



Channel 777 – 893.31 MHz

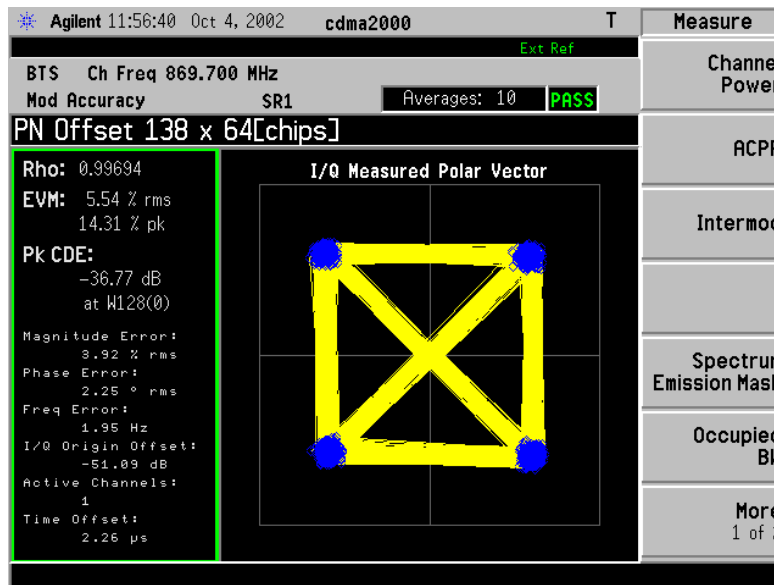
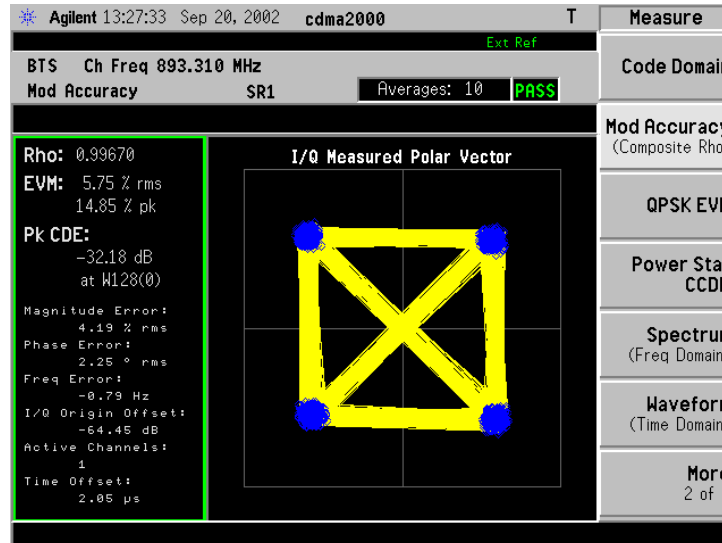


Channel 1013 – 869.7 MHz



Modulation Characteristics

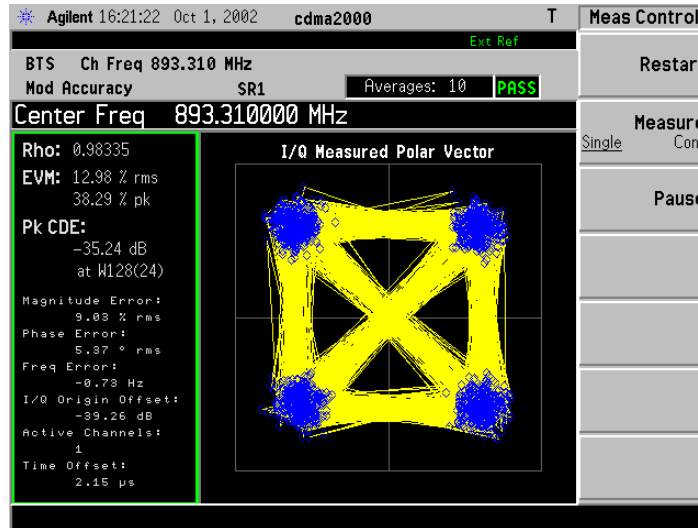
60W High Power – Short Filter



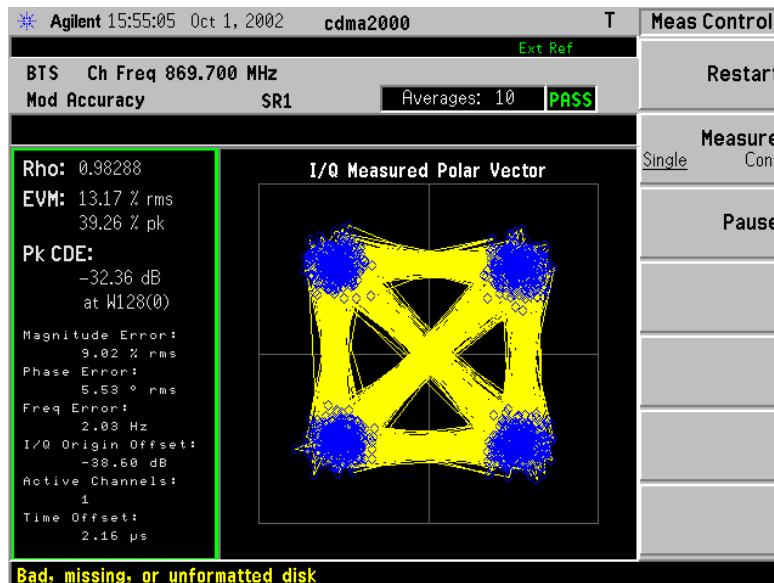


Modulation Characteristics

400mW Low Power – Long Filter



Channel 777 – 893.31 MHz

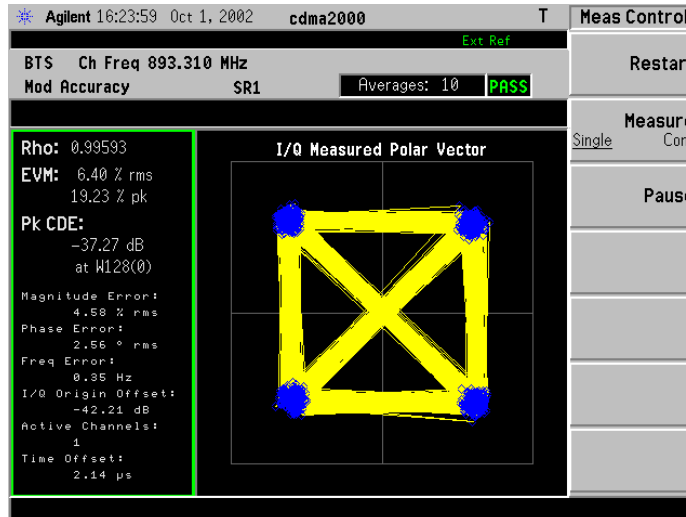


Channel 1013 – 869.7 MHz

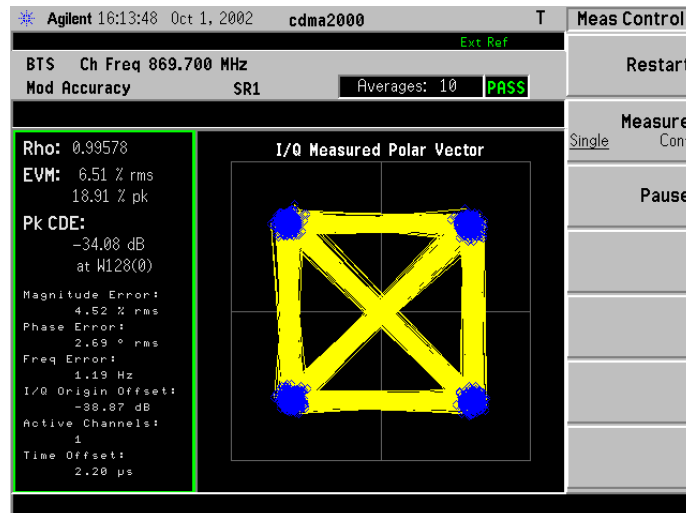


Modulation Characteristics

400mW Low Power – Short Filter



Channel 777 – 893.31 MHz



Channel 1013 – 869.7 MHz



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Section C

Spurious and Harmonic Emissions Radiated



Radiated RF Measurements

Worst Case Radiated RF Spur Levels for SC4812ETL 1X @ 800MHz CDMA BTS

Radiated				Substituted Power			Spec	Result
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 22/24 MAX LIMIT (dBm)	(Pass/Fail)
1013	1739	H	31.8	-63.428	-68.3	-63.45	-13	Pass
777	1786	V	36.6	-58.628	-63.8	-58.95	-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:
 $(\text{dBuV/M}) + 20 - 104.77 = \text{dBm}$
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)).

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Section C

Spurious and Harmonic Emissions Conducted



Conducted RF Measurements

SC4812ETL 1X @ 800MHz CDMA BTS

FCC Part 22

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBmV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT (dBm)	PASS / FAIL
777	61.1022	84.61	-22.39	-13	Pass
1013	113.5872	86.76	-20.24	-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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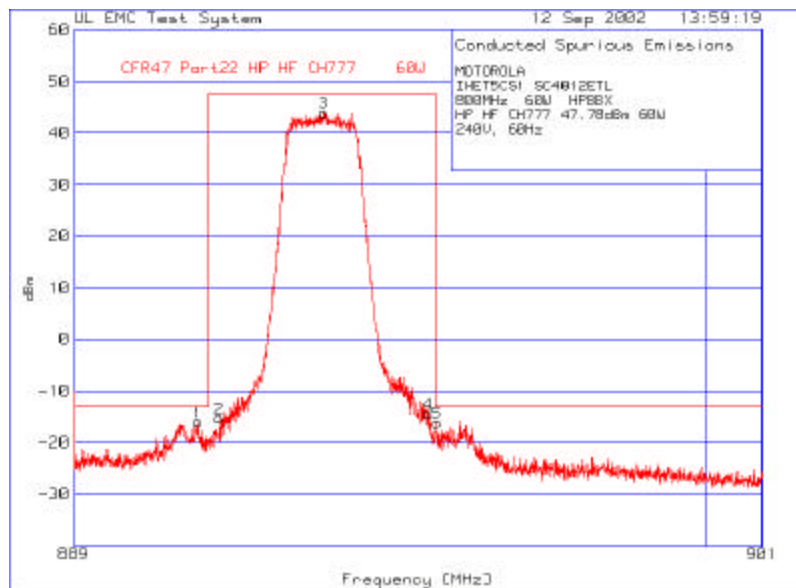
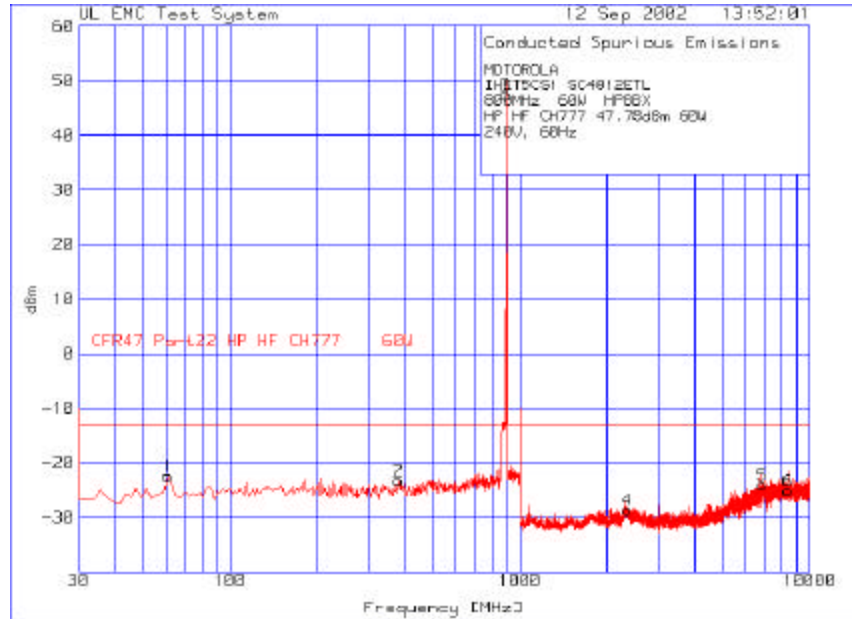
Signature

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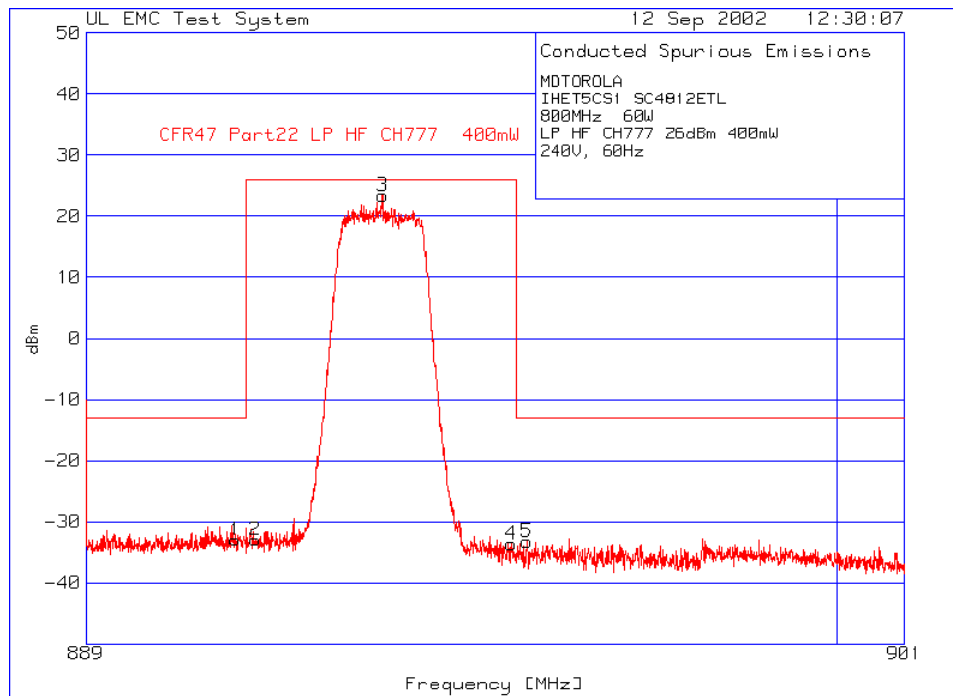
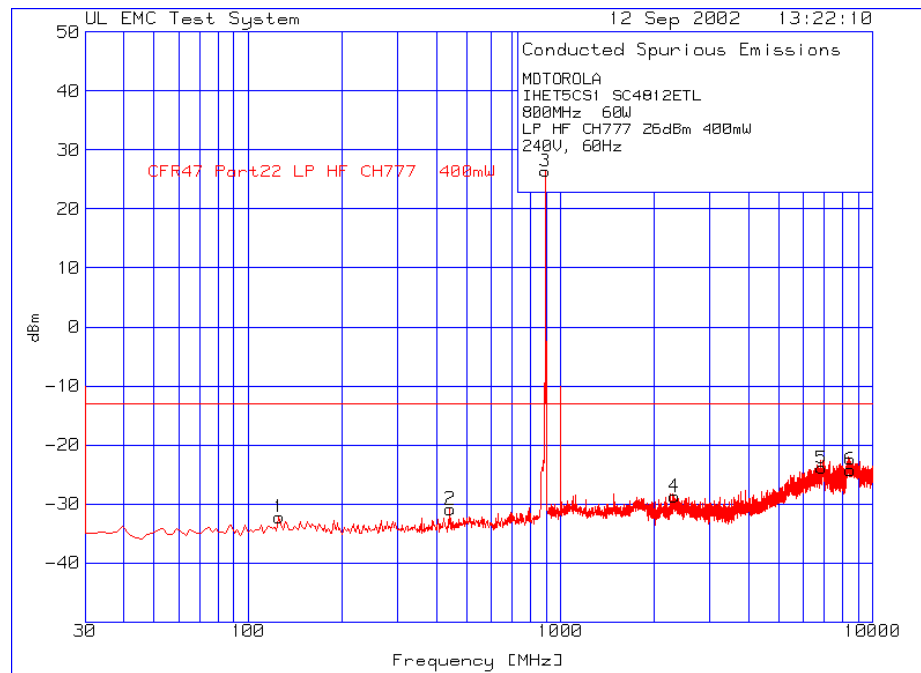


Spurious and Harmonic Emissions Conducted CDMA Channel 777 – Maximum Power



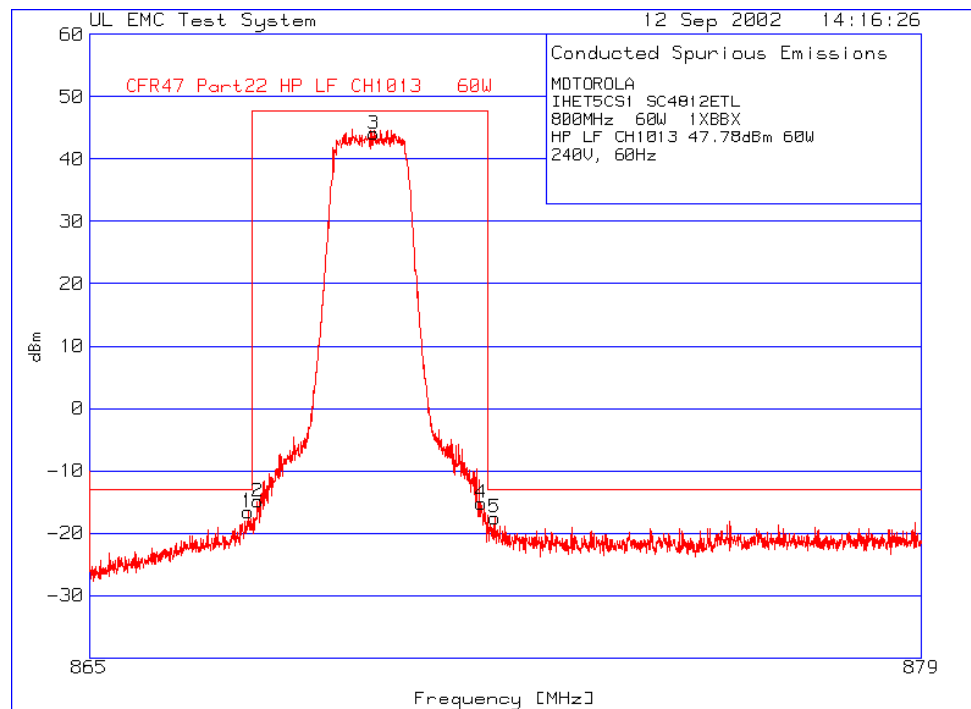
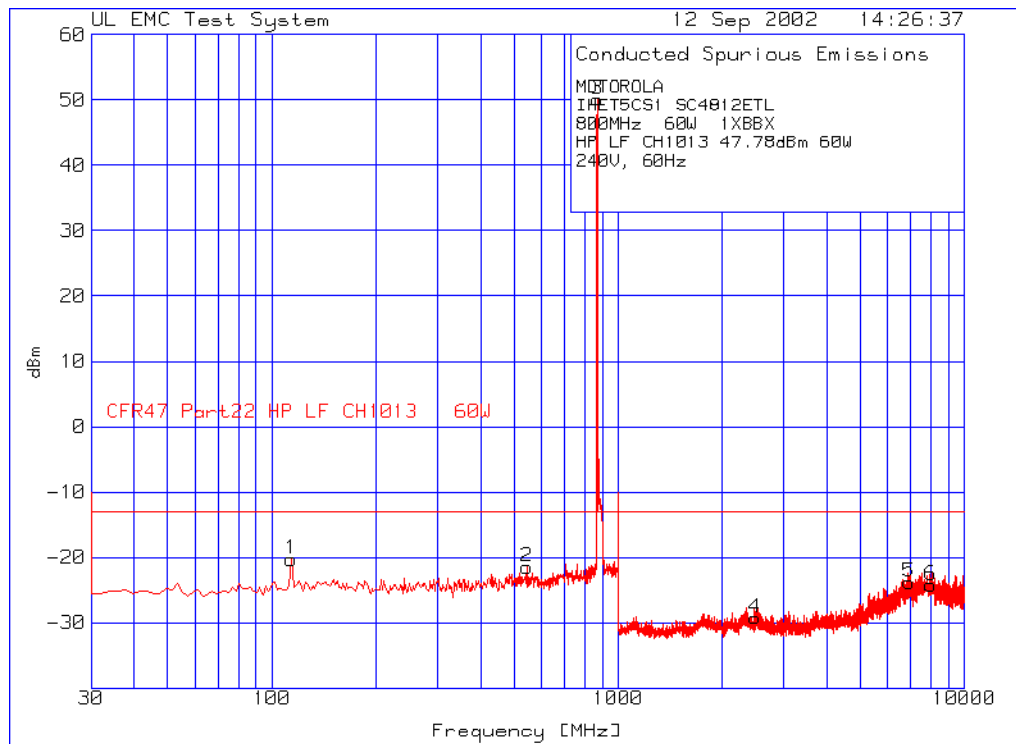


Spurious and Harmonic Emissions Conducted CDMA Channel 777 – Minimum Power



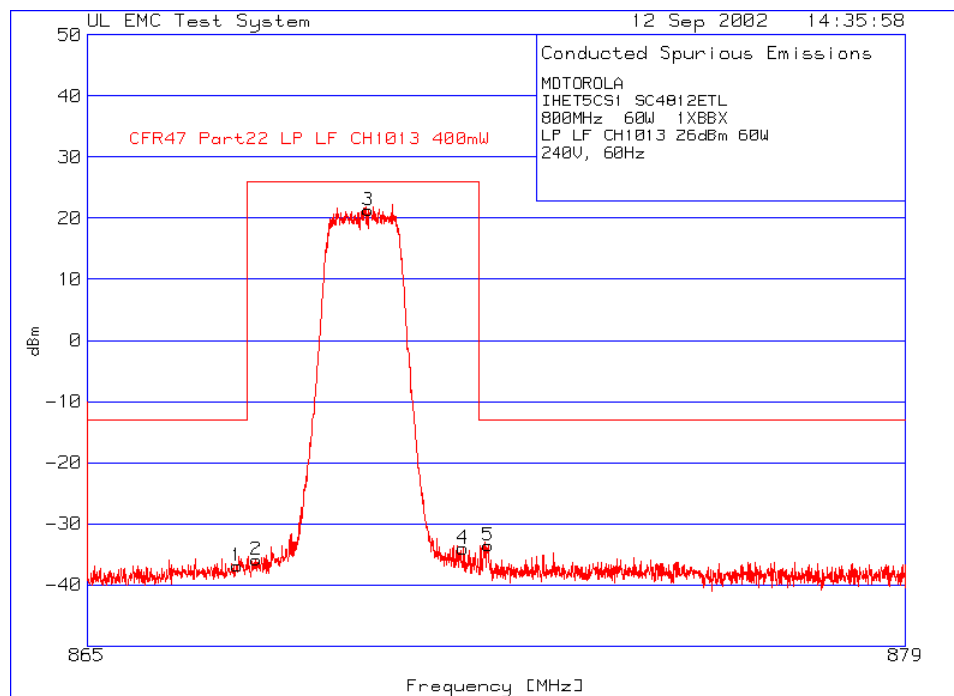
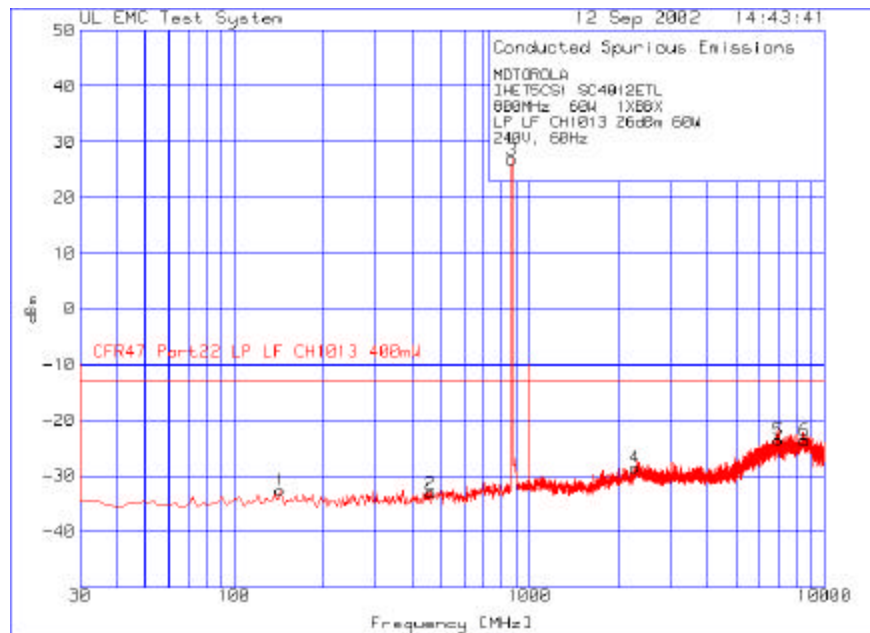


Spurious and Harmonic Emissions Conducted CDMA Channel 1013 – Maximum Power





Spurious and Harmonic Emissions Conducted CDMA Channel 1013 – Minimum Power





SECTION E

OCCUPIED BANDWIDTH

NOTE: The BTS was configured for maximum power out of 47.78 dBm and minimum power out of 26.0 dBm respectively. The max and min output power was set to 60.0 Watts or 400 mWatts 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:

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

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.

CHANNEL / Filter Type	Power Level (dBm)	FREQUENCY (MHz)	MEASURED (MHz)	FCC LIMIT (MHz)	Pass / Fail
777 / Long Filter	26.0	893.31	1.2238	1.30	Pass
1013 / Long Filter	26.0	869.7	1.2223	1.30	Pass
777 / Short Filter	26.0	893.31	1.2732	1.30	Pass
1013 / Short Filter	47.78	869.7	1.2814	1.30	Pass

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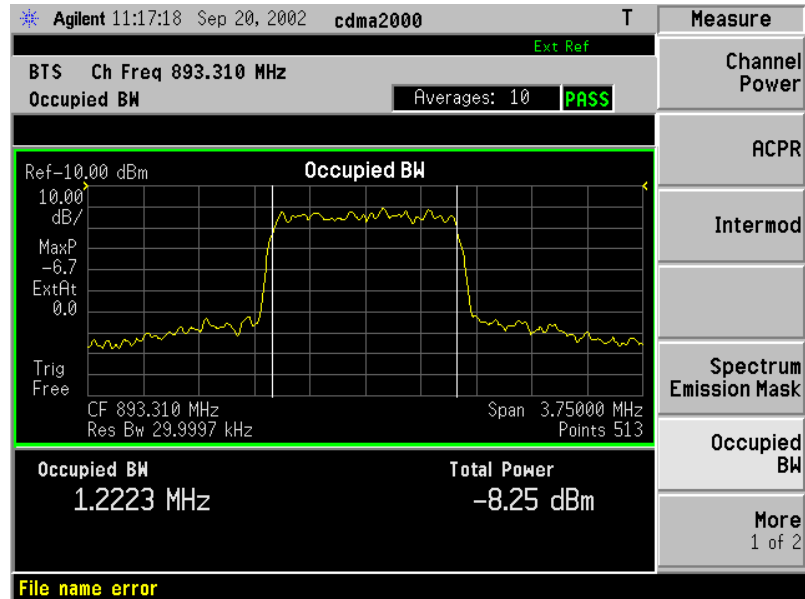
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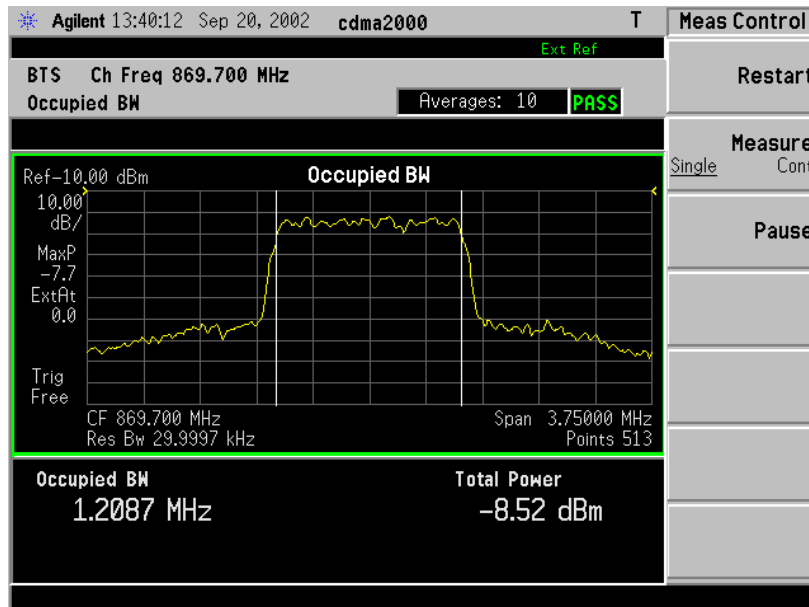
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Occupied Bandwidth – 47.78 dBm – Long Filter



Channel 777 – 893.31 MHz

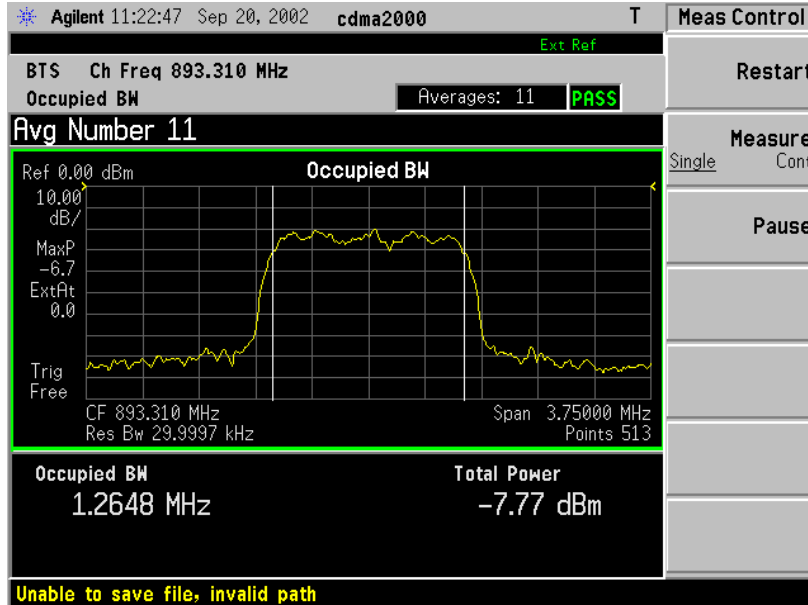


Channel 1013 – 869.7 MHz

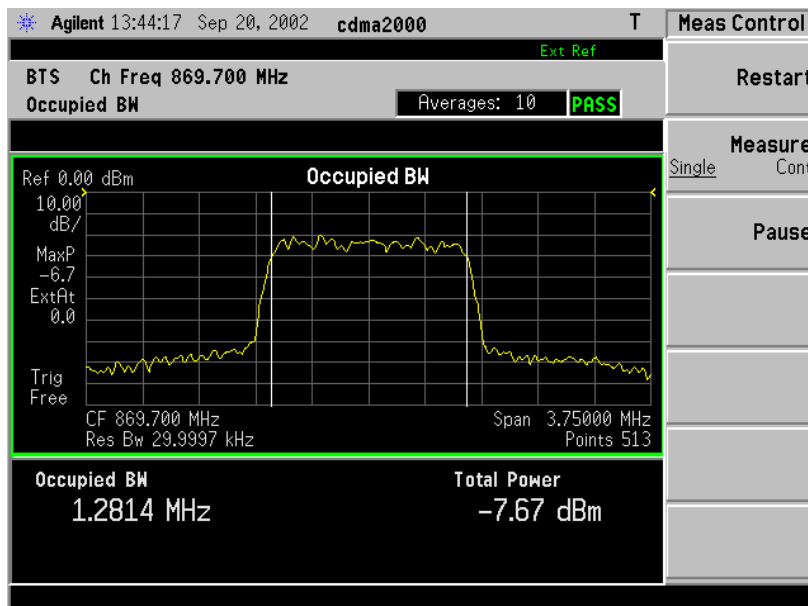


Occupied Bandwidth – 47.78 dBm – Short Filter

Channel 777 – 893.31 MHz



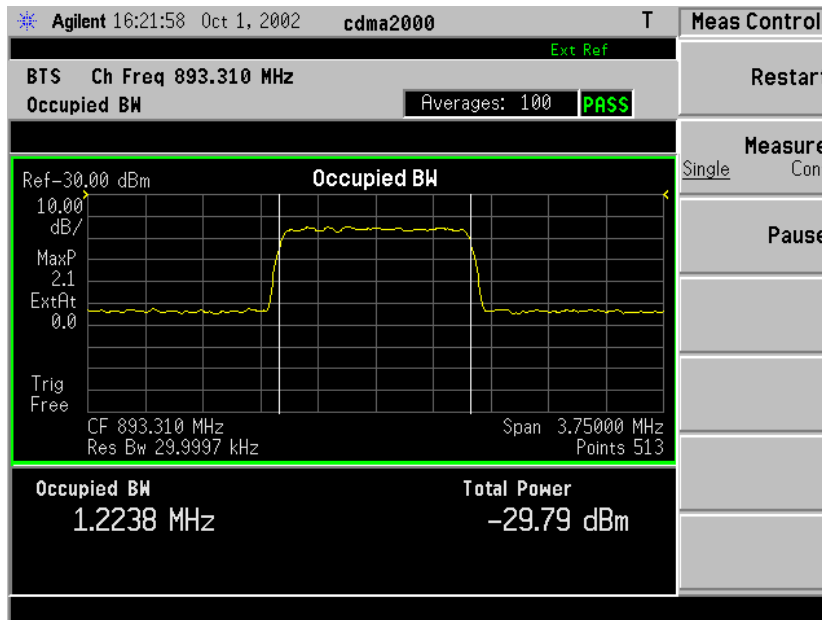
Channel 777 – 893.31 MHz



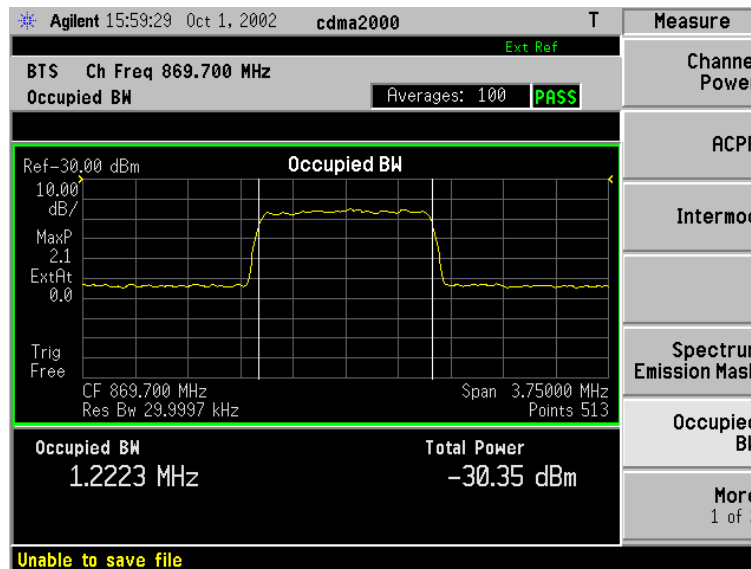
Channel 1013 – 869.7 MHz



Occupied Bandwidth – 26.0 dBm – Long Filter



Channel 777 – 893.31 MHz

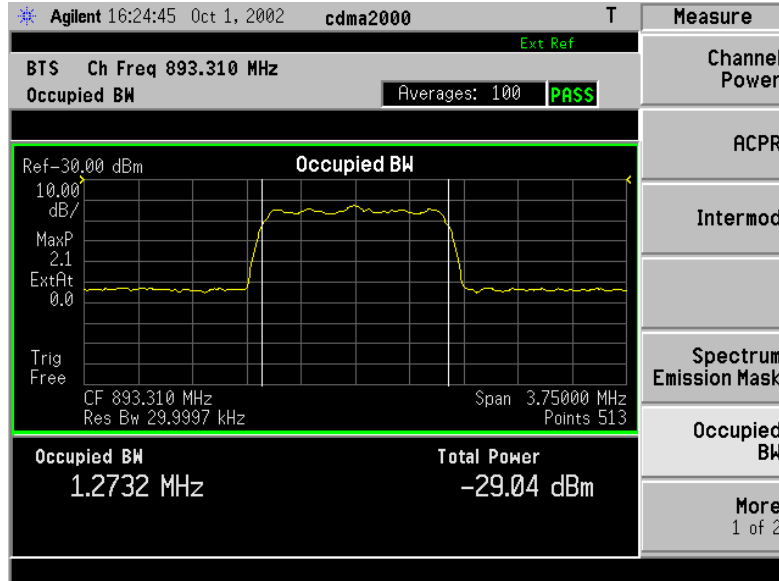


Channel 1013 – 869.7 MHz

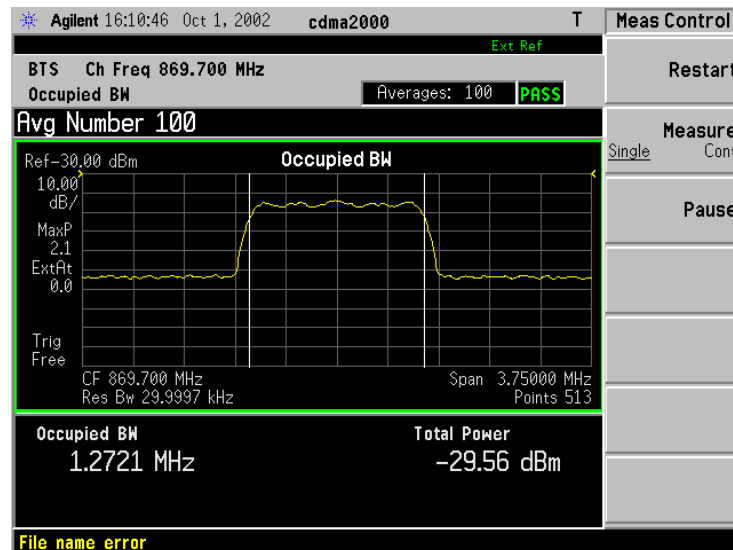


Occupied Bandwidth – 26.0 dBm – Short Filter

Channel 777 – 893.31 MHz



Channel 777 – 893.31 MHz



Channel 1013 – 869.7 MHz



SECTION F

FREQUENCY STABILITY

MODE	27V POWER	WORST CASE ? 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 ? 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

Signature

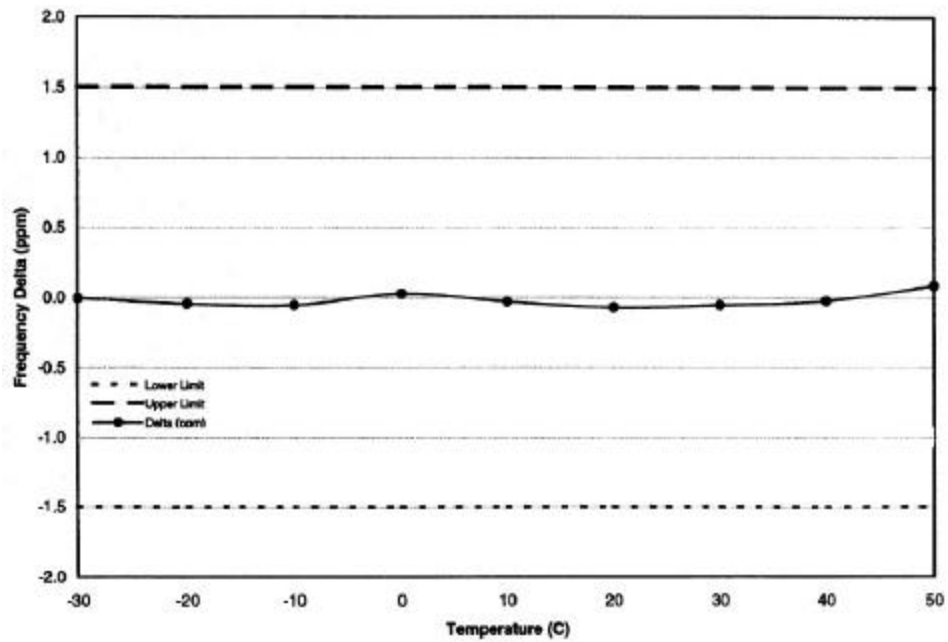
10.09.02

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Frequency Stability Over Temperature - CSM1



Frequency Stability with Varying Supply Voltage - CSM1

