

-48V SC4812T @ 800 MHz CDMA BTS FRAME

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



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FCC ID: IHET5CR1

SECTION A

SUMMARY OF RF MEASUREMENTS

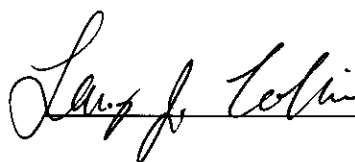
Summary of Radiated RF Measurements

WORST TRANSMIT RADIATED RF SPUR LEVEL FOR -48V SC4812T @ 800 MHz CDMA BTS

SPUR FREQUENCY (GHz)	DISTANCE MEASURED (meters)	SPUR LEVEL MEASURED (dBμV/meter)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm
1.78662	3	64.89	-30.34	-13

FCC Max. Limit Per 47 CFR 22.917:

- “ =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

 10.14.02

Radiated Engineer

Date

Summary of Conducted RF Measurements

—48V SC4812T @ 800 MHz CDMA BTS

SPUR LEVEL MEASURED (dBm)	FREQUENCY (GHz)	SPUR LEVEL SPEC (dBm Max)
-39.15	8.697000	-13.0



Conducted Engineer

10-14-02

Date



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SECTION B

MODULATION CHARACTERISTICS



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SECTION B

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MODULATION CHARACTERISTICS

CDMA Transmitter Channel 1013

Maximum Power

CDMA ANALYZER

0.9965

Time Offset

1.66

Frequency Error

-50 13.2 50

Carrier Feedthru

-44.3

Tune Freq

MHz

Input Atten

Input Port

Anl Special

Synth Ref

CDMA TB

PN Offset

Even Sec In

Meas Intvl

Gain

Anl Dir

Analyzer

Dual Event

Tris Event

To Screen

More



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SECTION B

FCC ID: IHET5CR1

MODULATION CHARACTERISTICS

CDMA Transmitter Channel 1013

Mid Power



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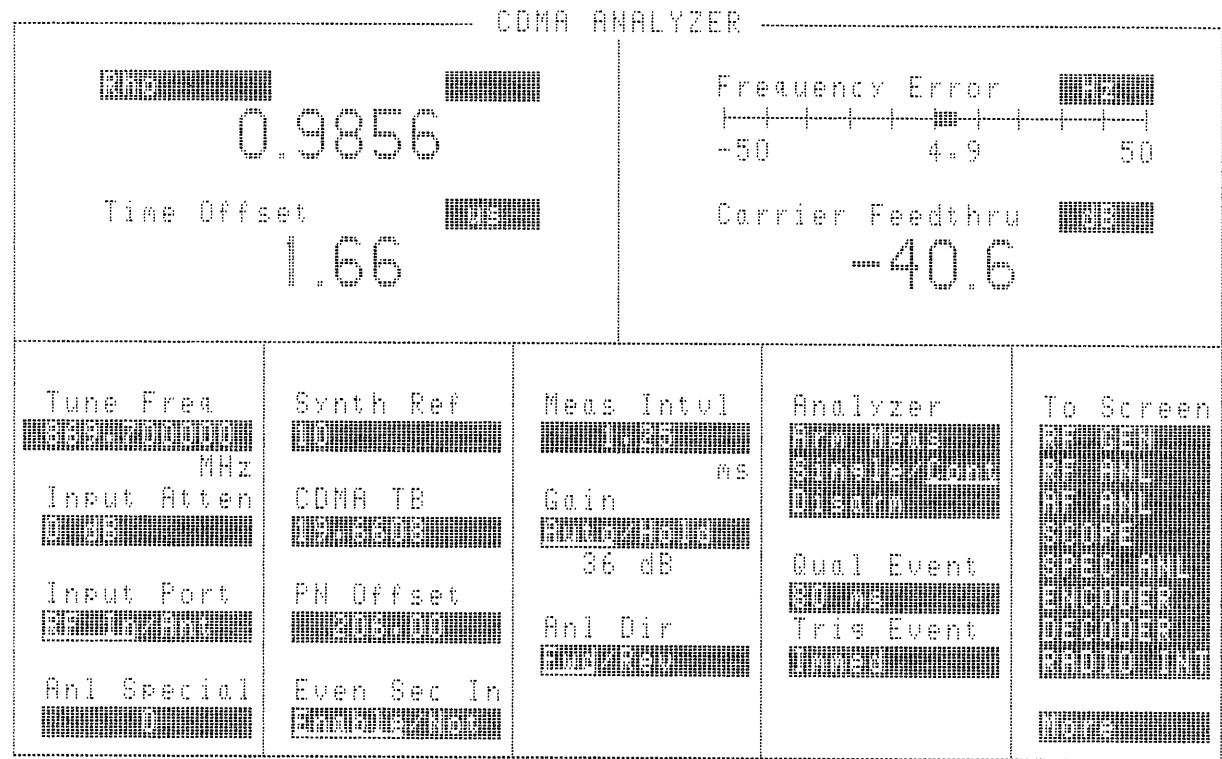
SECTION B

FCC ID: IHET5CR1

MODULATION CHARACTERISTICS

CDMA Transmitter Channel 1013

Minimum Power





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SECTION B

FCC ID: IHET5CR1

MODULATION CHARACTERISTICS

CDMA Transmitter Channel 777

Maximum Power

CDMA ANALYZER				
0.9970		Frequency Error -50 5.9 50		
Time Offset 1.65		Carrier Feedthru -40.7		
Tune Freq MHz	Synth Ref	Meas Intvl ns	Analyzer	To Screen
Input Atten	CDMA TB	Gain 30 dB	Qual Event	More
Input Port	PN Offset	Anl Dir	Tris Event	
Anl Special	Even Sec In			



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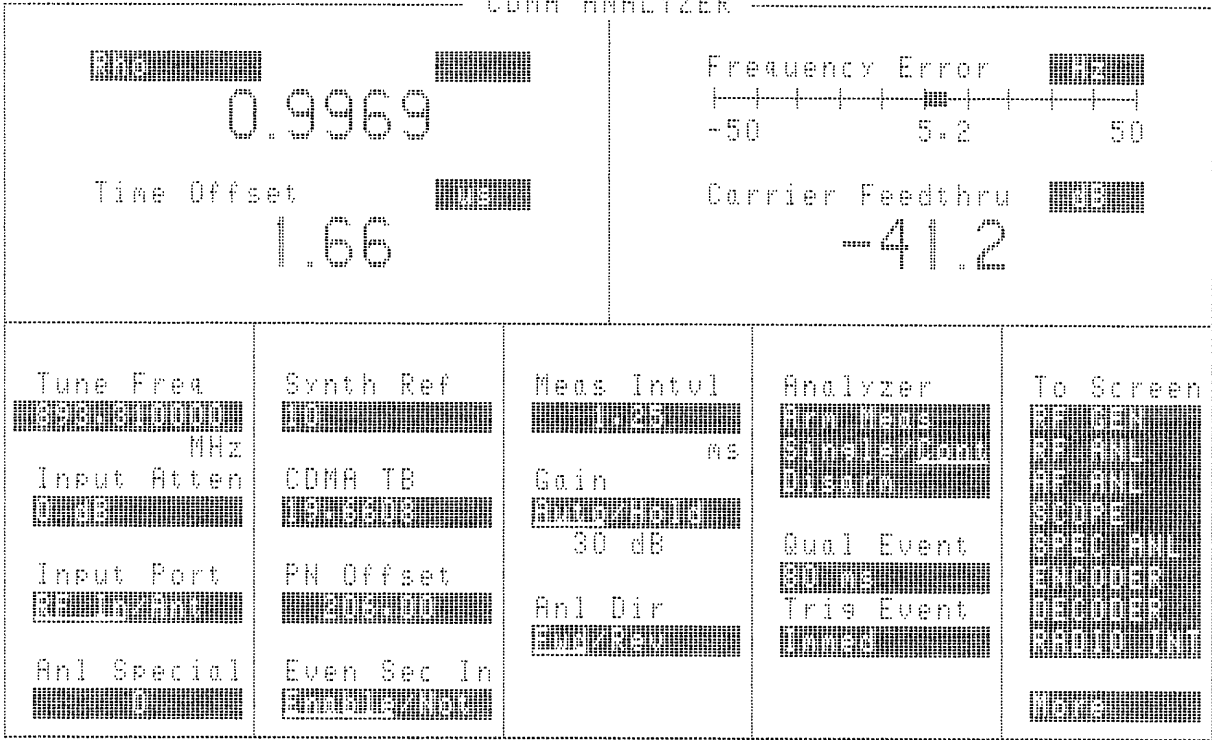
SECTION B

FCC ID: IHET5CR1

MODULATION CHARACTERISTICS

CDMA Transmitter Channel 777

Mid Power





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SECTION B

FCC ID: IHET5CR1

MODULATION CHARACTERISTICS

CDMA Transmitter Channel 777

Minimum Power

CDMA ANALYZER

0.9868

Time Offset

1.65

Frequency Error

-50

4.1

50

Carrier Feedthru

-39.8

Tune Freq

888.800000
MHz

Input Atten

0 dB

Input Port

EXT/INT

Anl Special

0

Synth Ref

10

CDMA TB

15.8808

PN Offset

208.08

Even Sec In

EXT/INT

Meas Intvl

1.85
ms

Gain

AUTO/HOLD
36 dB

Anl Dir

AUTO/REF

Analyzer

Fv. Type
Single/Tone
Display

Qual Event

80 ms

Tris Event

100 ms

To Screen

PF FEN
PF FNL
PF FNL
SCOPE
SPEC FNL
ENCODER
DECODER
RADIO INT

More



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FCC ID: IHET5CR1

SECTION C

SPURIOUS & HARMONIC EMISSIONS RADIATED

Radiated RF Measurements

WORST RADIATED RF SPUR LEVELS FOR -48V SC4812T @ 800 MHz CDMA BTS

TRANSMIT CHANNEL	SPUR FREQUENCY (GHz)	MEASURED SIGNAL LEVEL dBuV/meter	MEASURED Signal Level (dBm)	FCC, Part 22 MAX LIMIT (dBm)
1013V 1013H	1.7394 2.609	63.513 63.46	-31.72 -31.77	-13 -13
777V 777H	1.78662 1.78662	64.89 64.89	-30.34 -30.41	-13 -13

Converting dBuV/meter to dBm when Part 22 is done at 3 meters.

1. $(\text{dBuV/M} / 20) * (\text{Inverse Log}) = \text{uV/M}$
2. $\text{Log}(\text{uV/M} / 57735) * 20 = \text{dBm}$

Example 42.52 dBuV/m to dBm

$$(-31.72 \text{ dBuV/m} / 20) * (\text{Inverse Log}) = 63.513 \text{ uV/M}$$

$$\text{Log}(64.89 \text{ uV/m} / 57735) * 20 = -30.41 \text{ dBm}$$

If the test is done at 10 meters, the first formula would remain the same. The 2nd is as follows

$$\text{Log}[(\text{uV/m} * 1 / (3 * 57735) / 10)] * 20 \text{ dBm}$$

Larry J. Collins

10-11-02

Radiated Engineer

Date



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FCC ID: IHET5CR1

SECTION D

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

NOTE: The plots for conducted spurious and harmonic emissions are measured in peak mode. The higher (than 49.5 dBm) levels measured in peak mode are expected, due to typical CDMA peak to average performance. The average power level was set to 49.5 dBm using an HP438A power meter.



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SECTION D

FCC ID: IHET5CR1

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 1013

Maximum Power

13:49:58 AUG 26, 2002

~~12~~

MKR 869.700 MHz

REF 47.0 dBm

#AT 0 dB

36.31 dBm

PEAK

LOG

10

dB/

OFFST

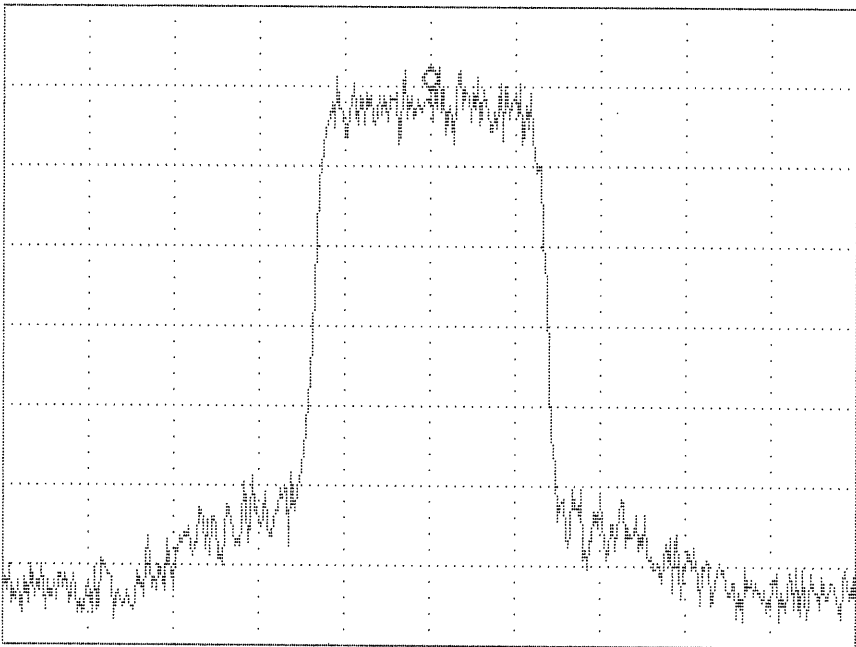
73.0

dB

WA SB

SC FC

CORR



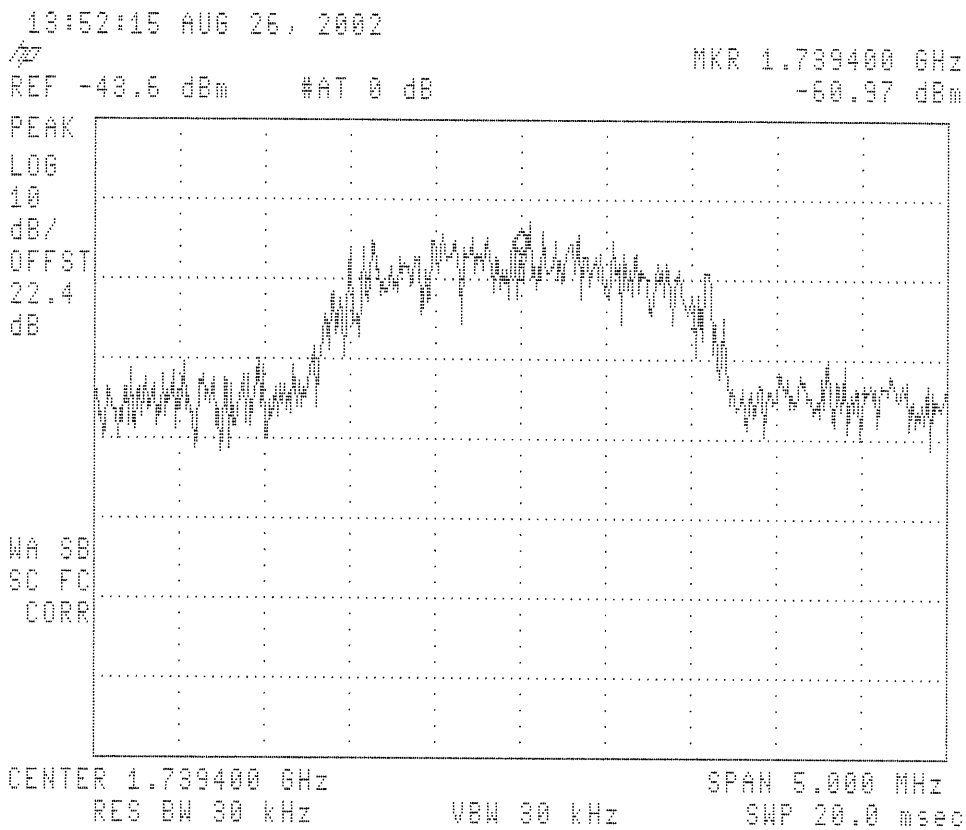
CENTER 869.700 MHz

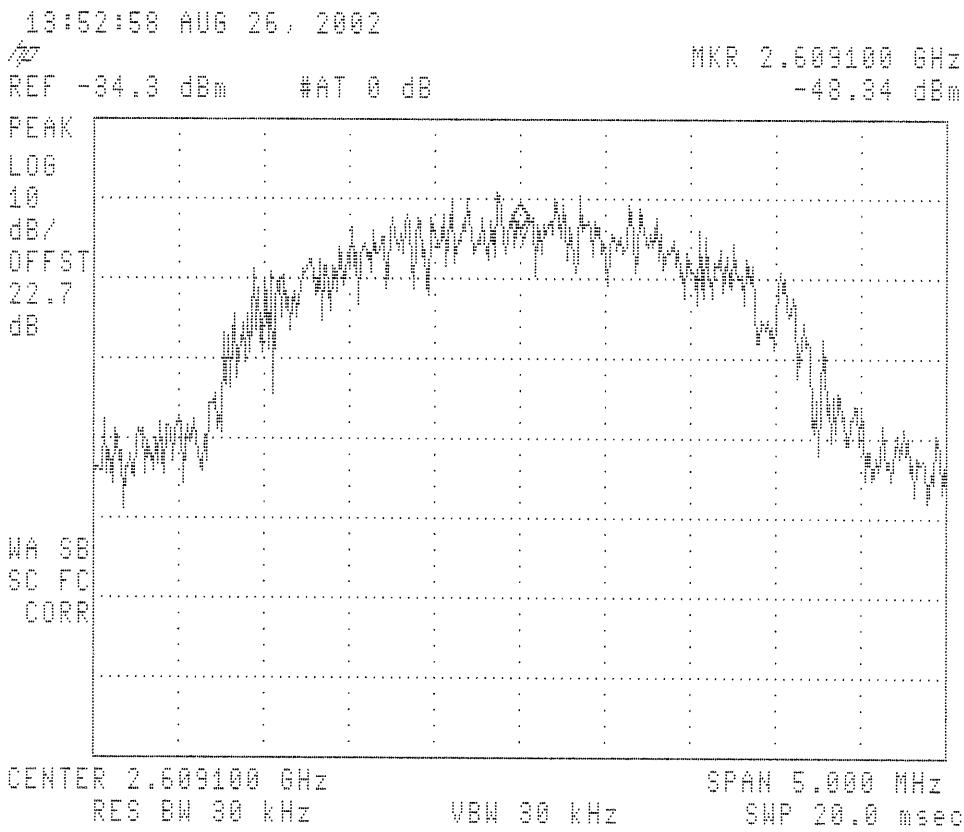
RES BW 30 kHz

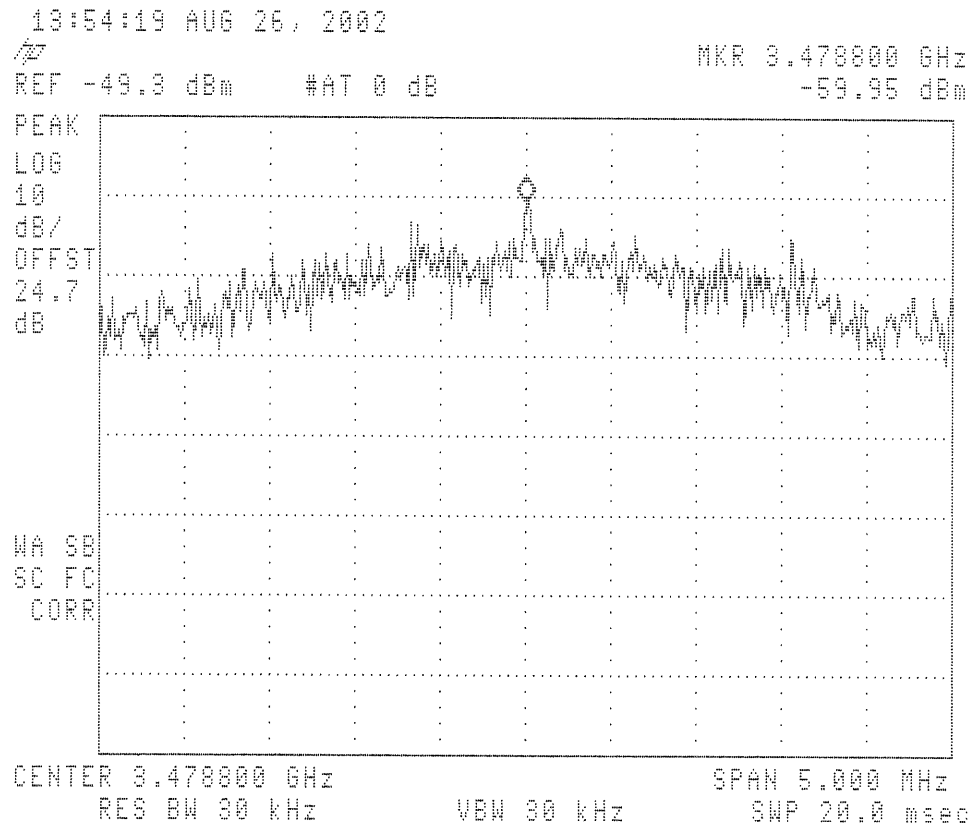
VBW 30 kHz

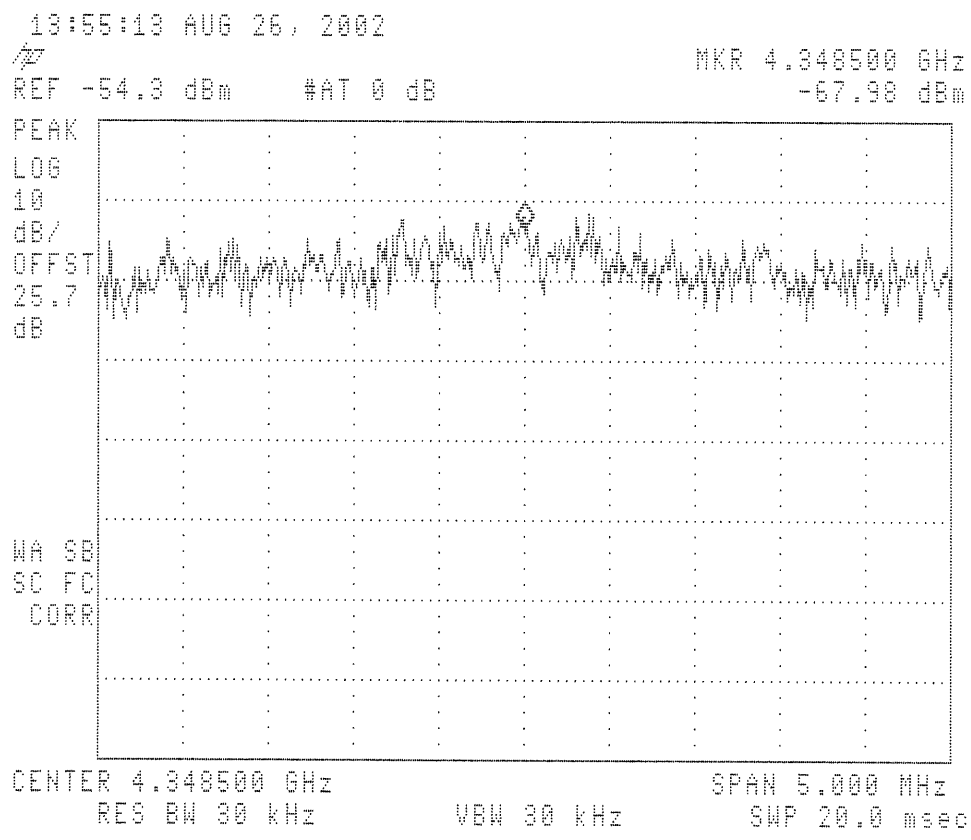
SPAN 5.000 MHz

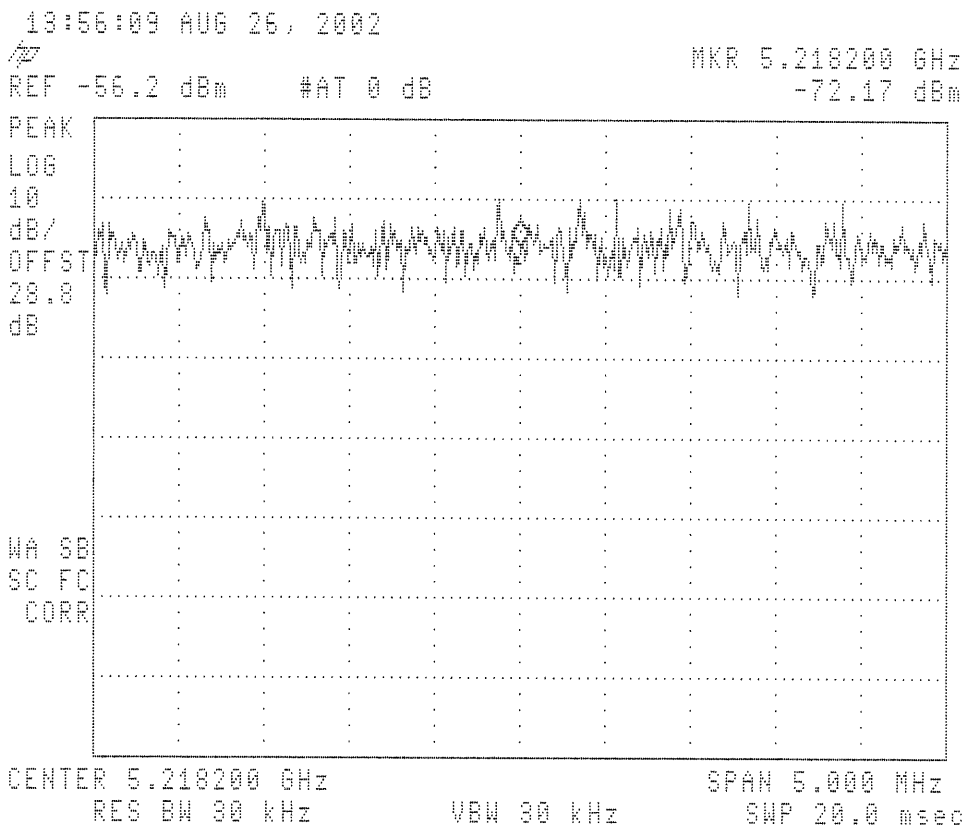
SWP 20.0 msec











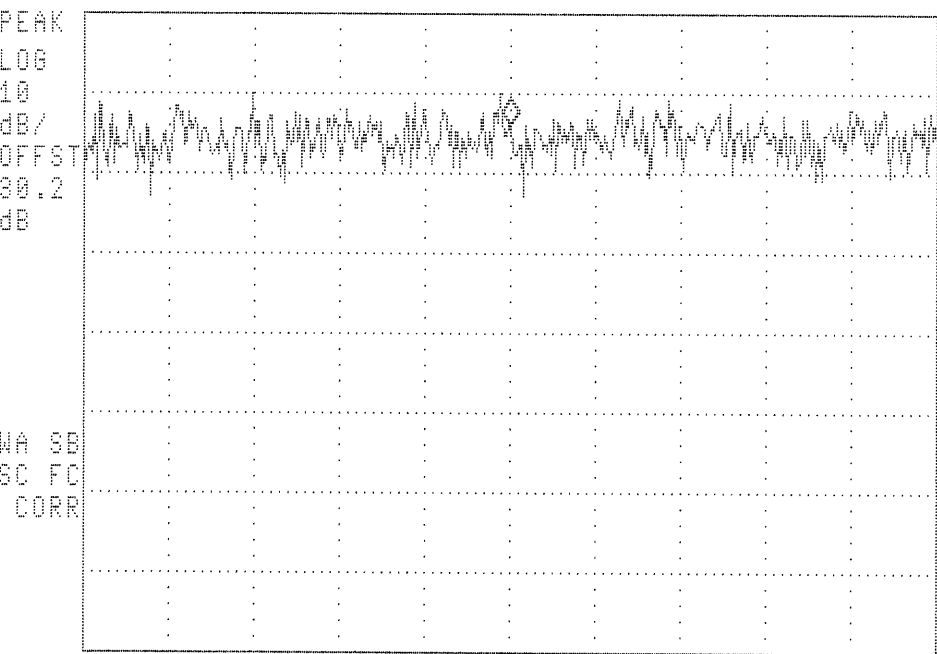
13:57:16 AUG 26, 2002



MKR 6.087900 GHz

REF -54.8 dBm #AT 0 dB

-69.06 dBm



CENTER 6.087900 GHz

SPAN 5.000 MHz

RES BW 30 kHz

VBW 30 kHz

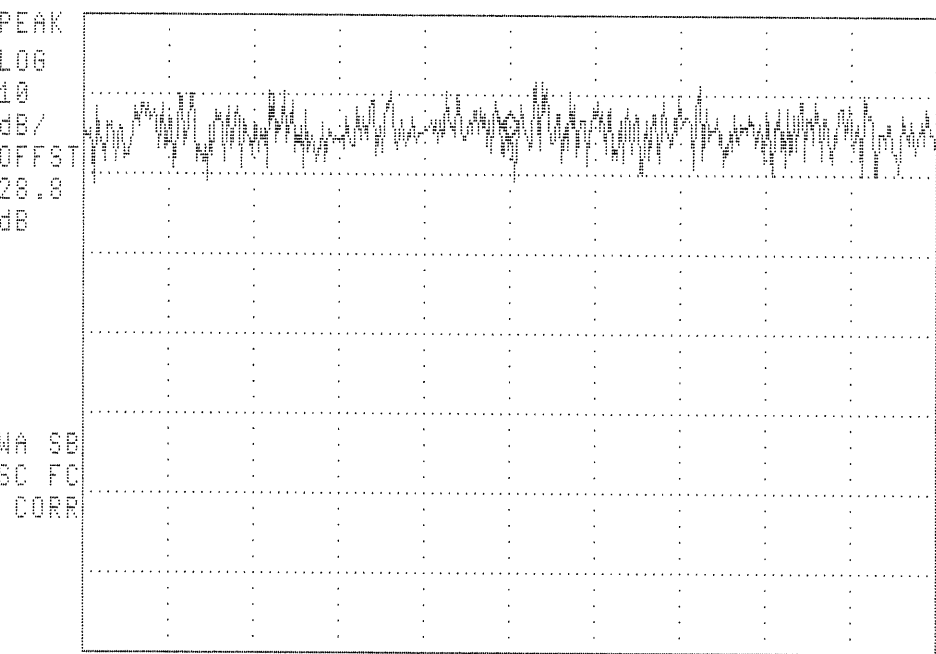
SWP 20.0 msec

13:57:59 AUG 26, 2002

~~17~~

REF -50.2 dBm #AT 0 dB

MKR 6.957600 GHz
-64.95 dBm



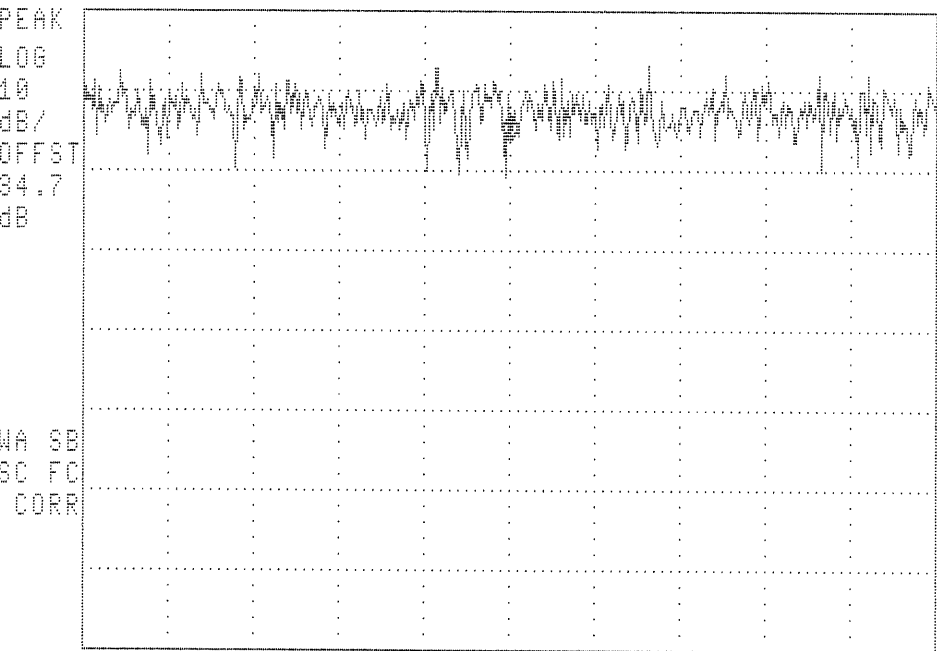
CENTER 6.957600 GHz SPAN 5.000 MHz
RES BW 30 kHz VBW 30 kHz SWP 20.0 msec

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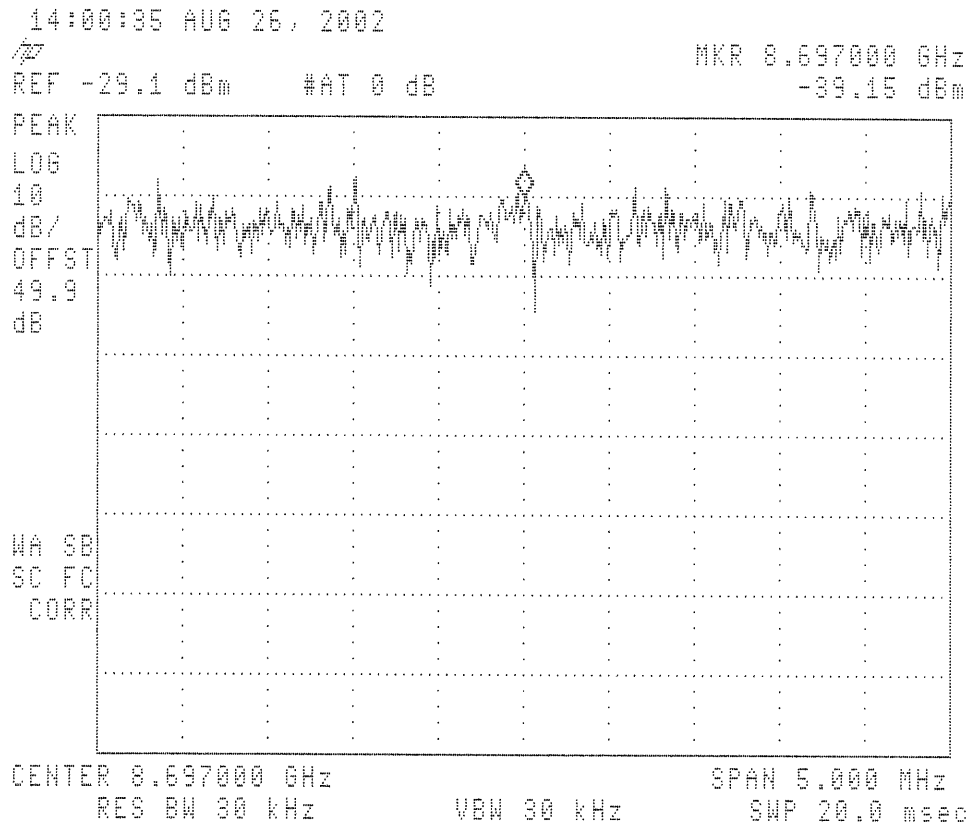
~~12~~

MKR 7.827300 GHz
-60.84 dBm

REF -44.3 dBm #AT 0 dB



CENTER 7.827300 GHz SPAN 5.000 MHz
RES BW 30 kHz VBW 30 kHz SWP 20.0 msec





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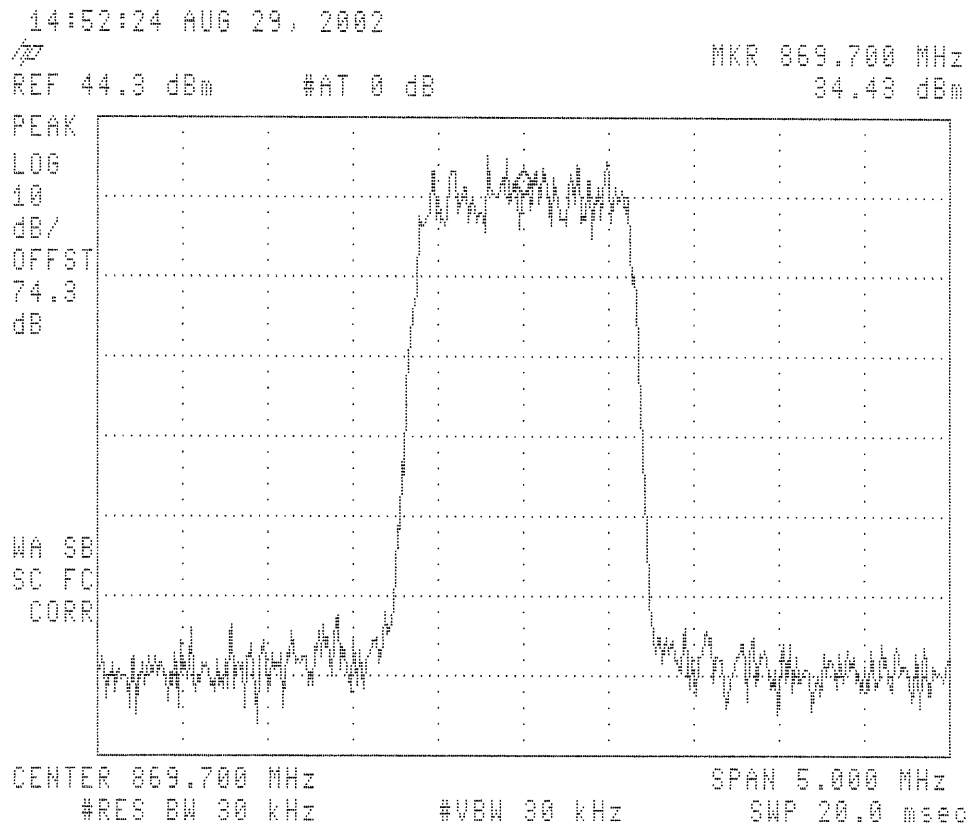
SECTION D

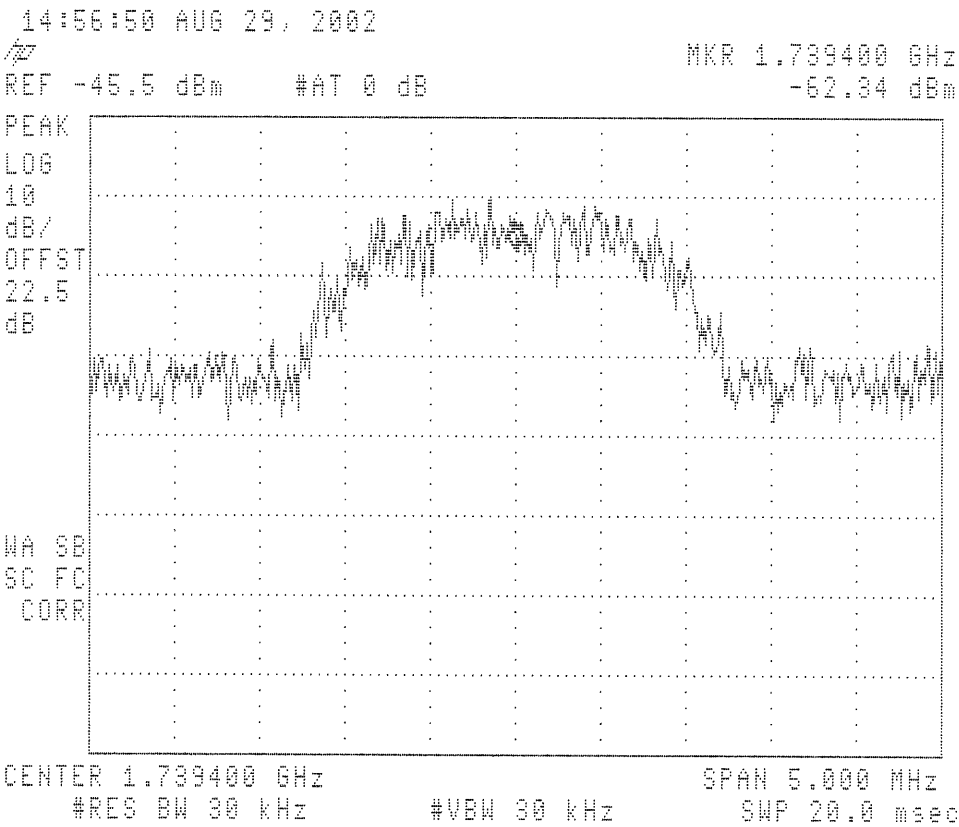
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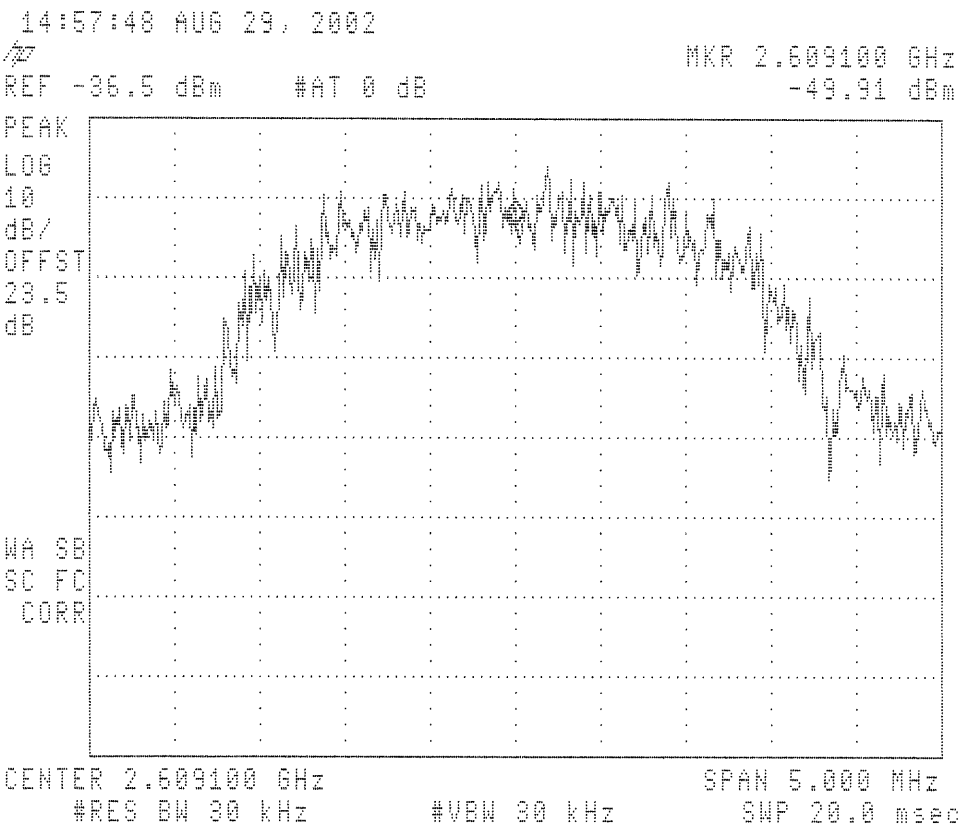
SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 1013

Mid Power







300R

14 = 59 = 14 000 29, 2902

MKR 3.478800 GHz

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[illegible]

PEAK

LOG

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de/

OFFST

24.

[illegible]

SC FC

CORR

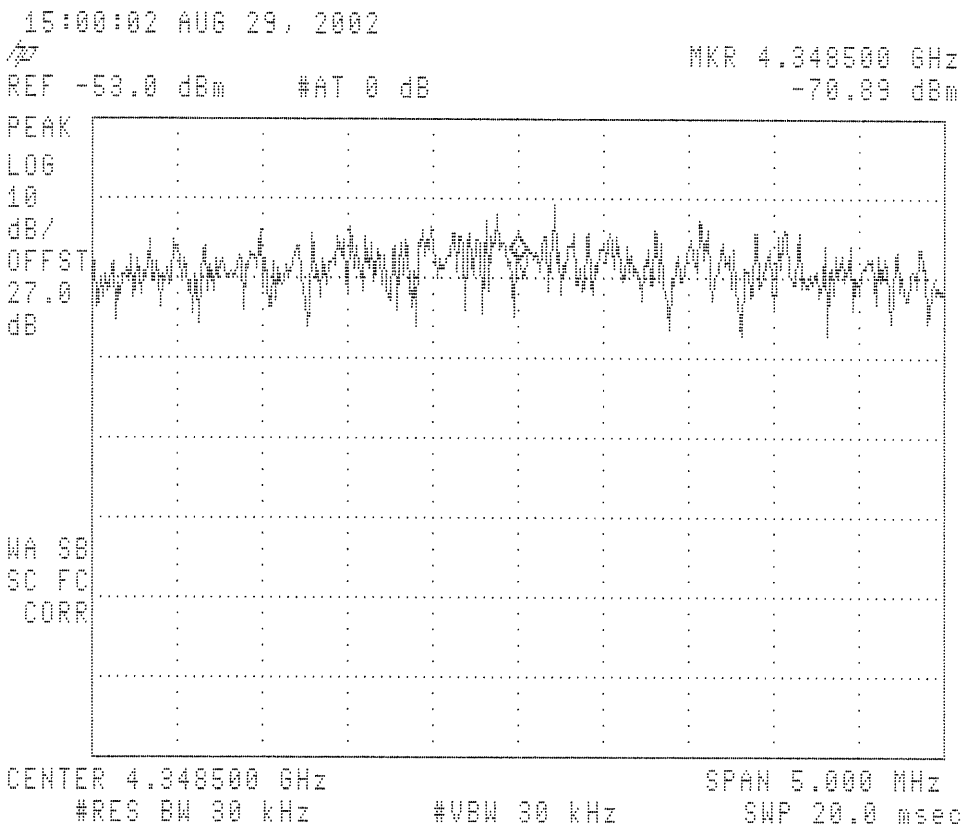
CENTER 3.478800 GHz

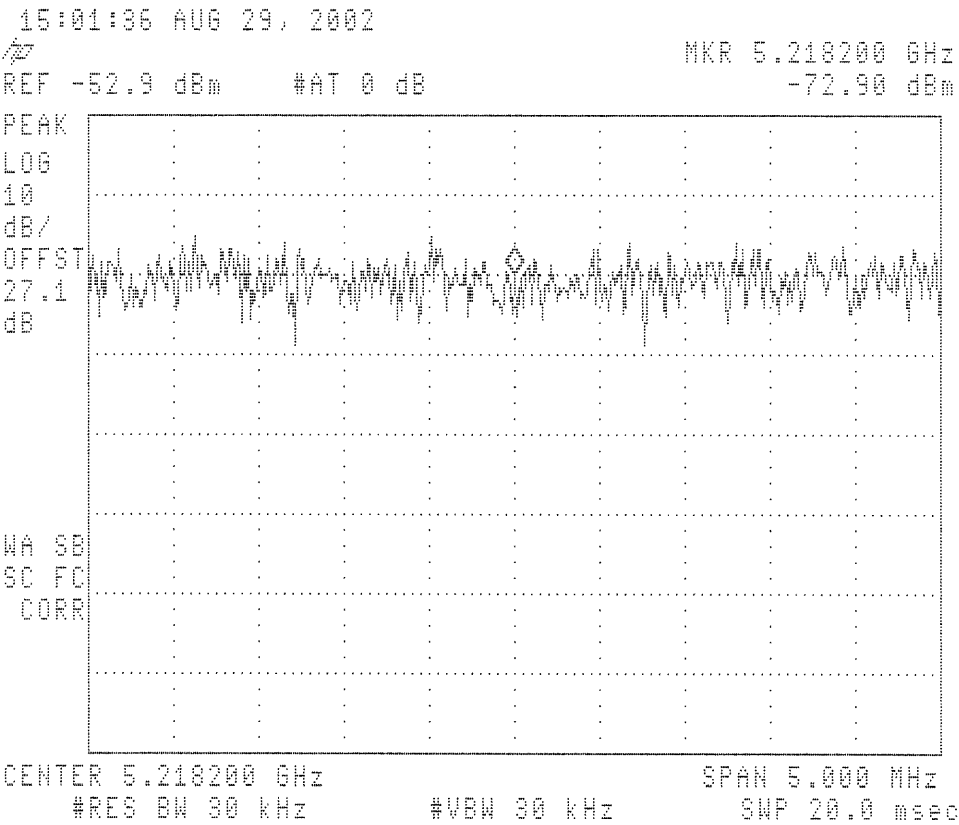
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#RES BN 30 kHz
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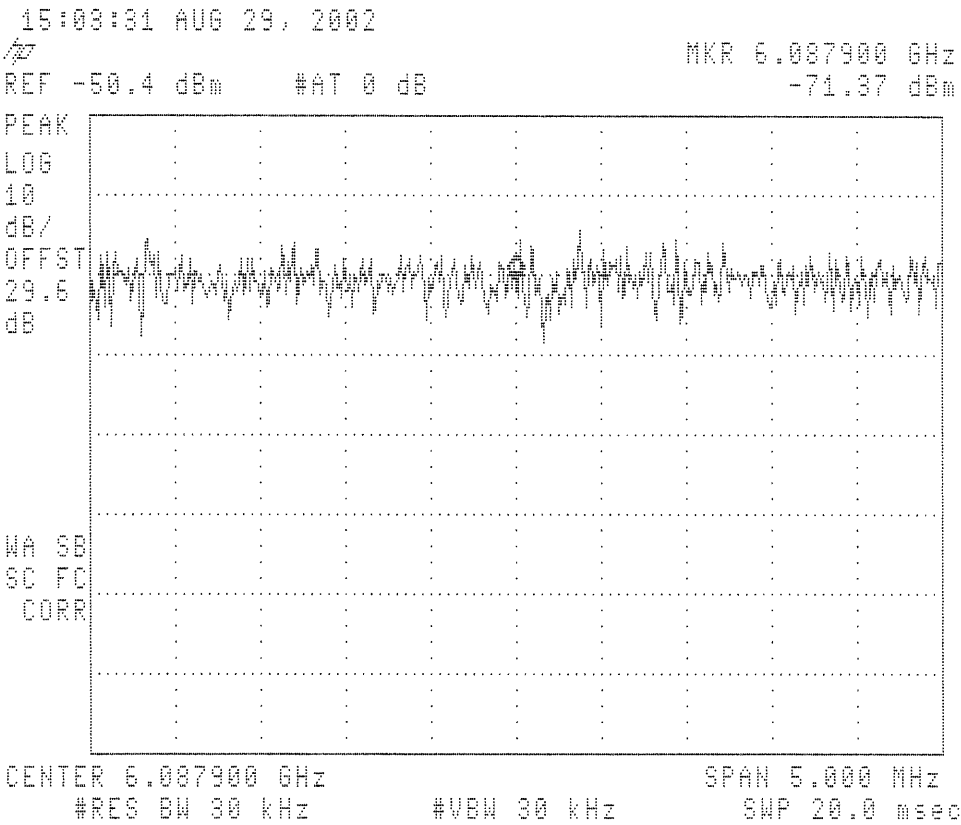
SPAN 5.000 MHz

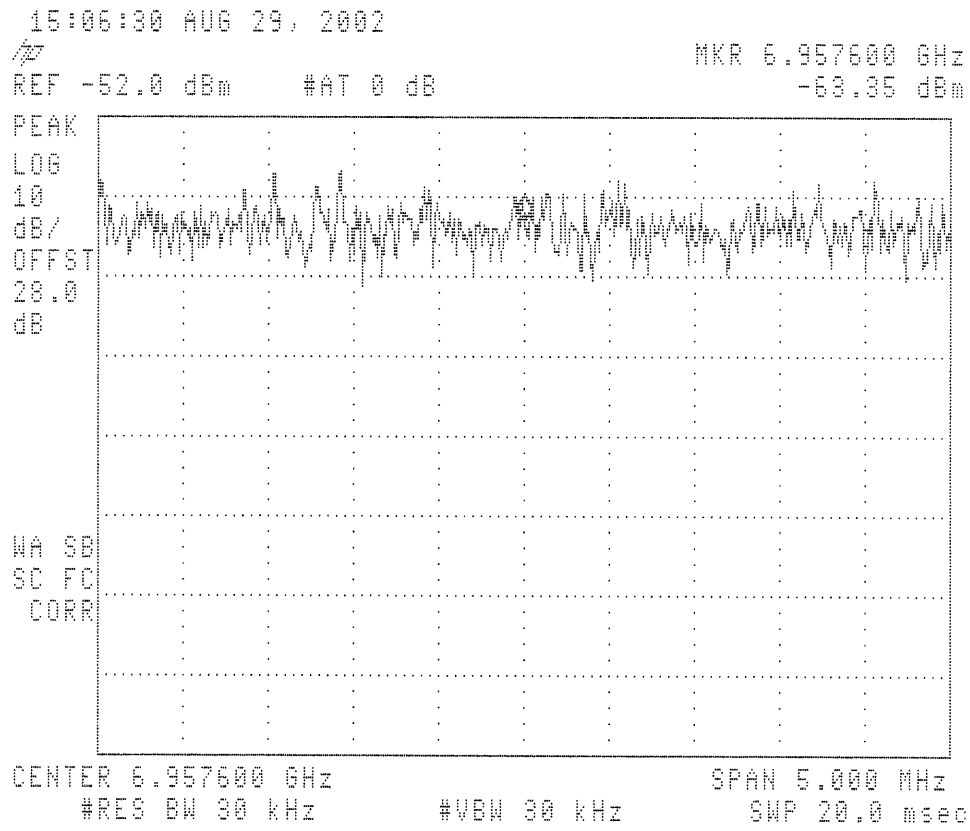
#VBW 30 kHz

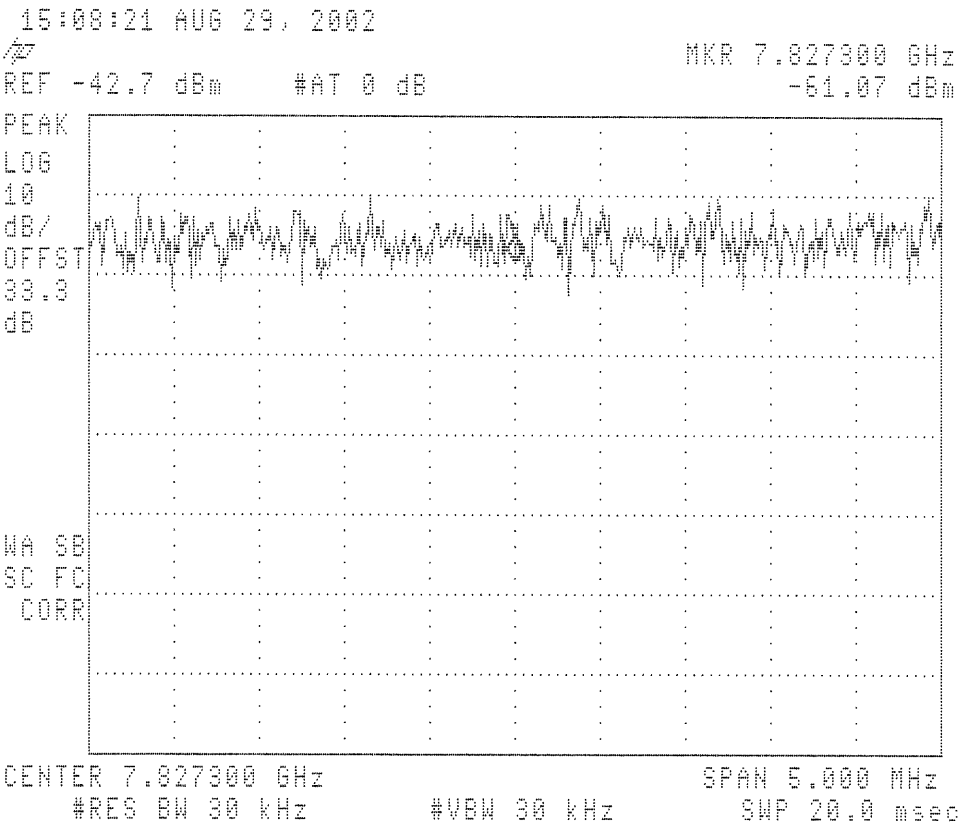
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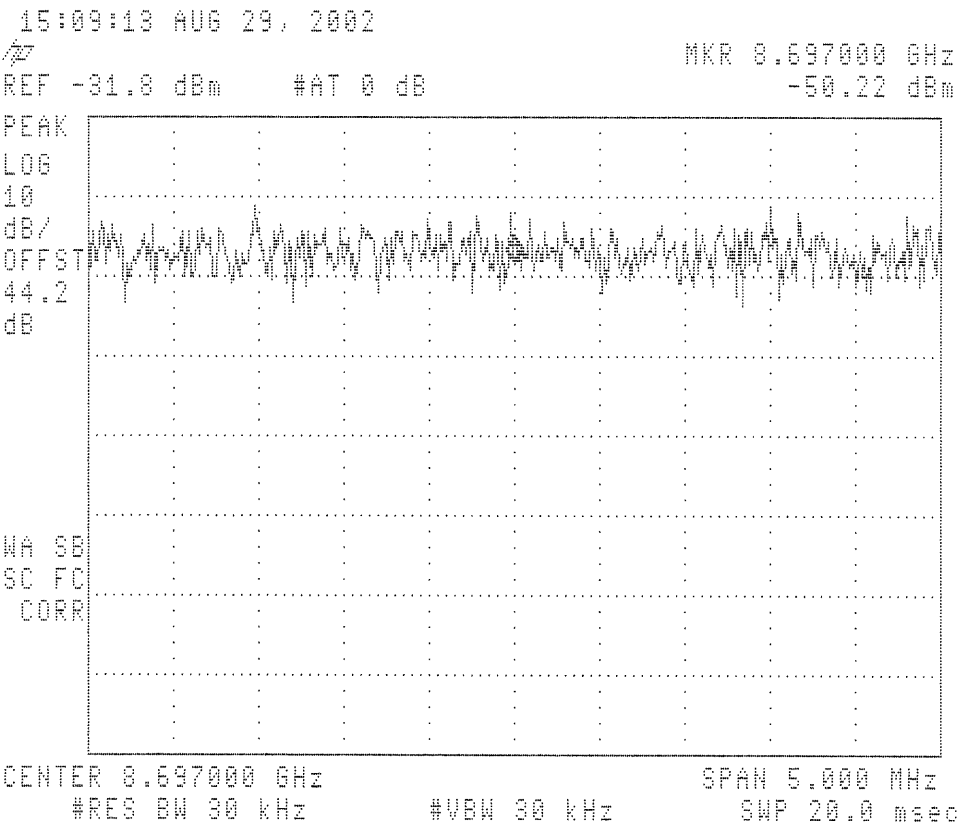














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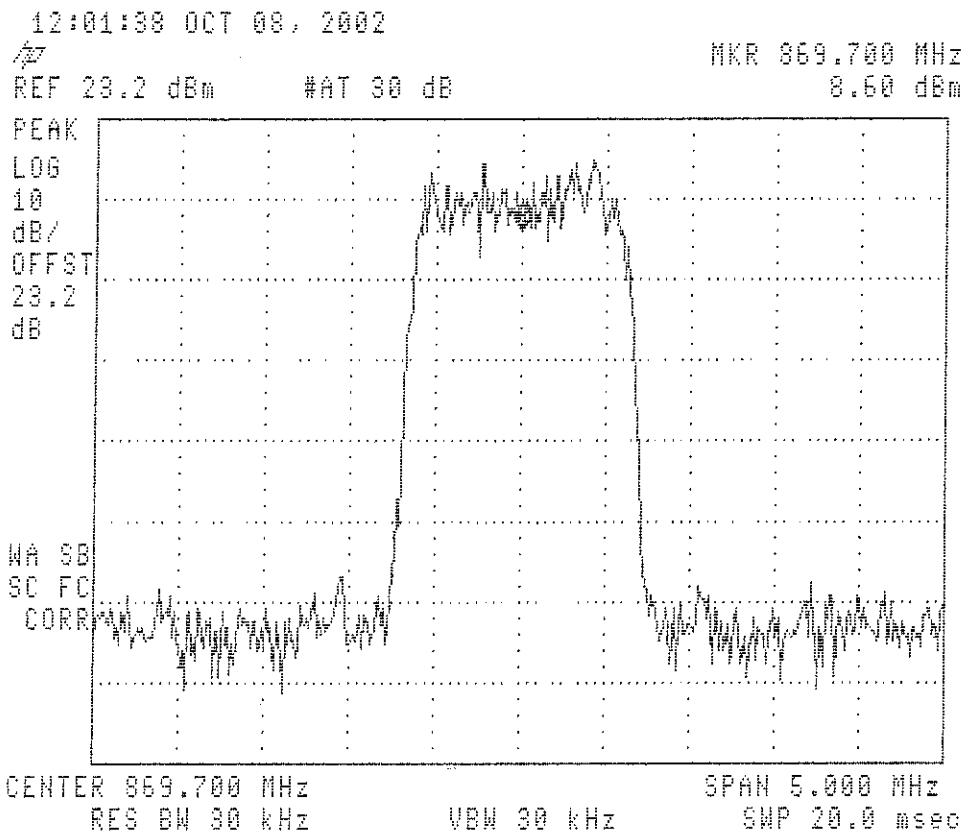
SECTION D

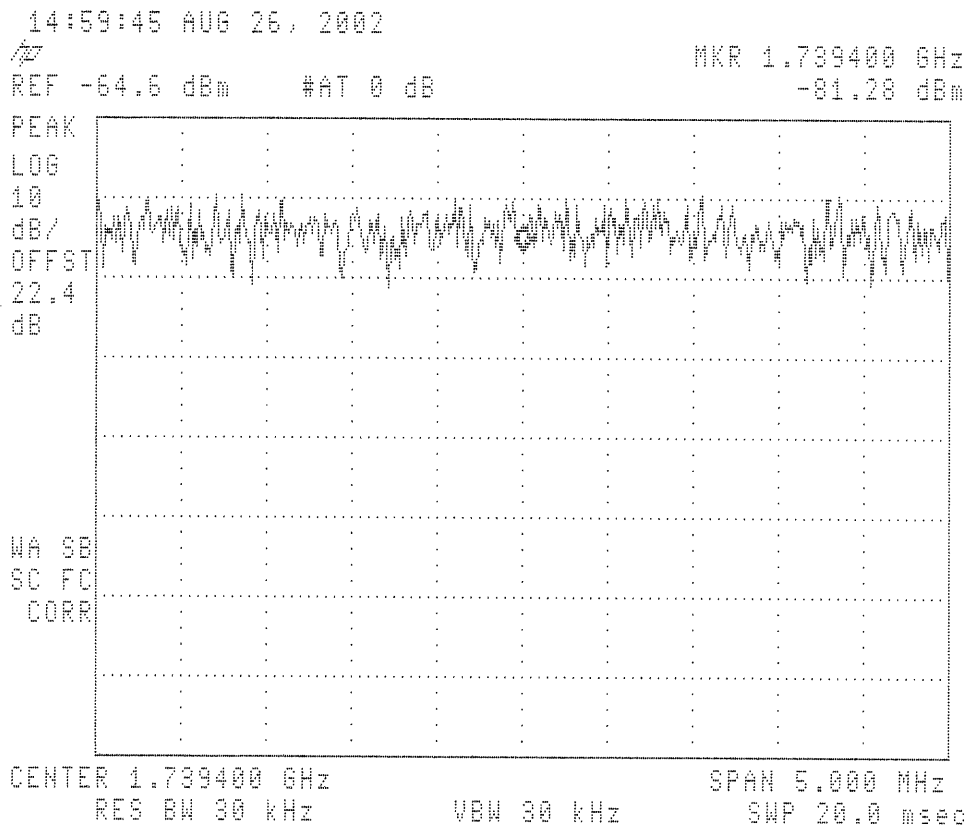
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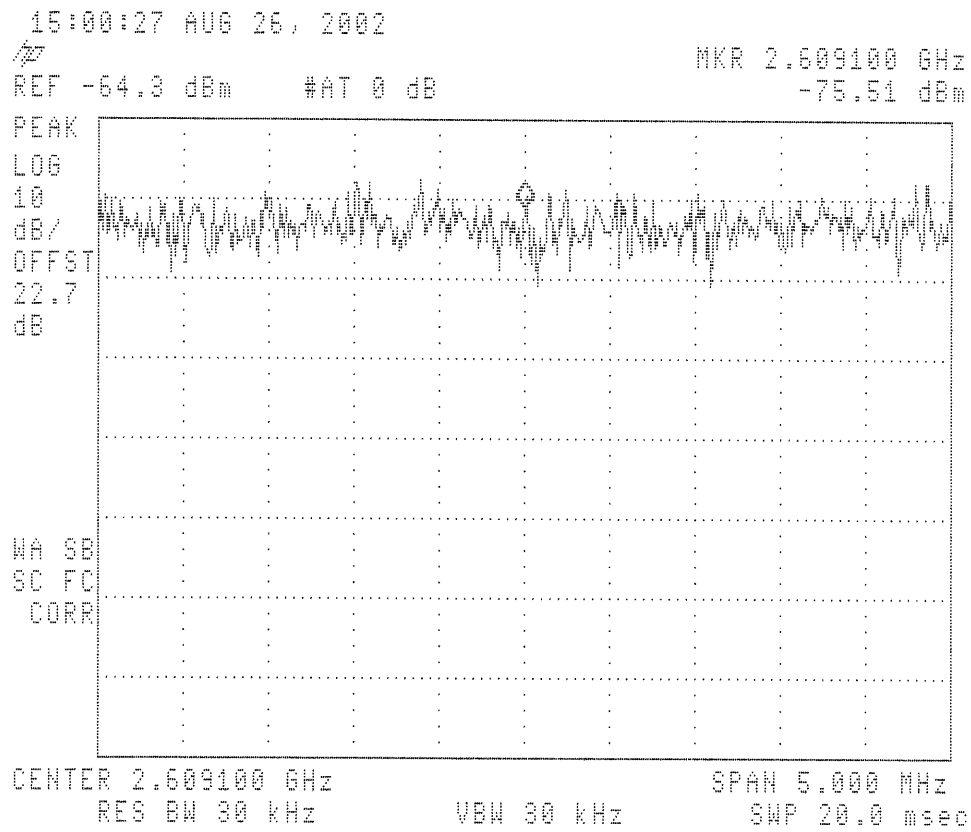
SPURIOUS & HARMONIC EMISSIONS CONDUCTED

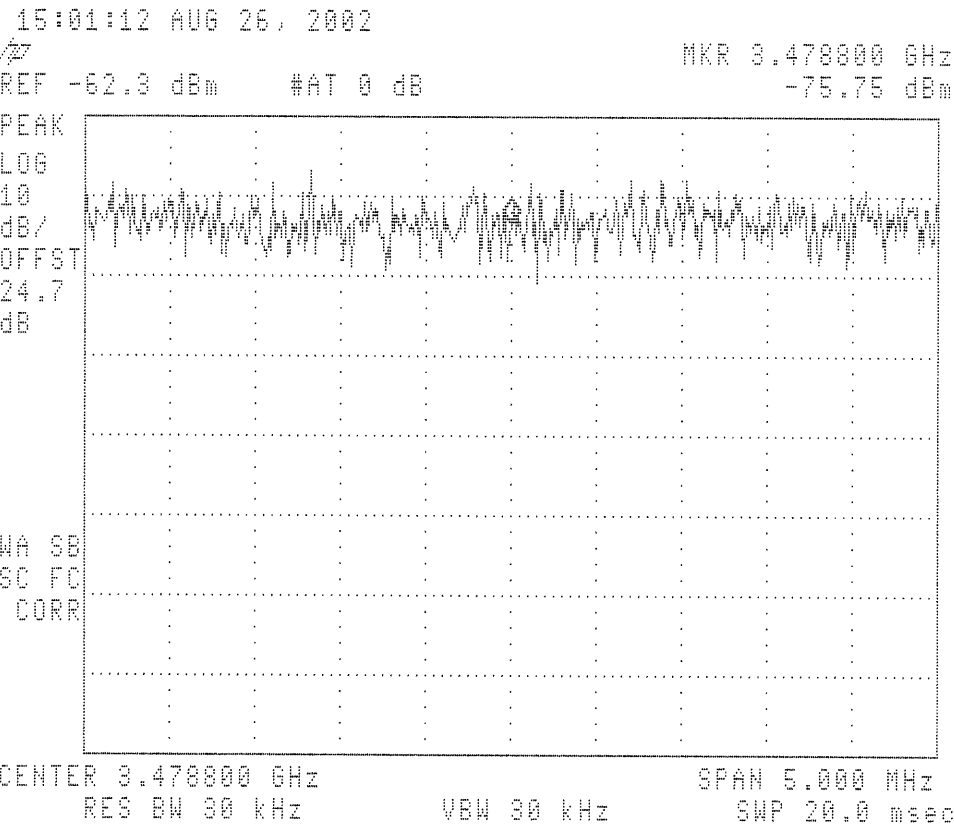
CDMA Transmitter Channel 1013

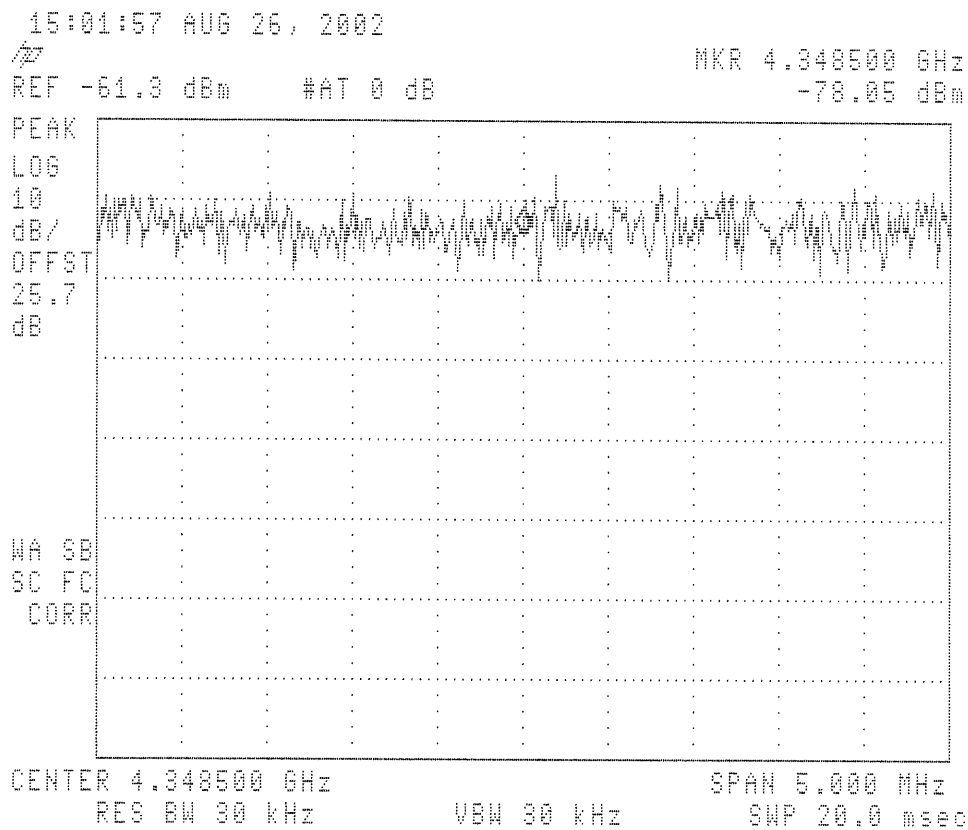
Minimum Power

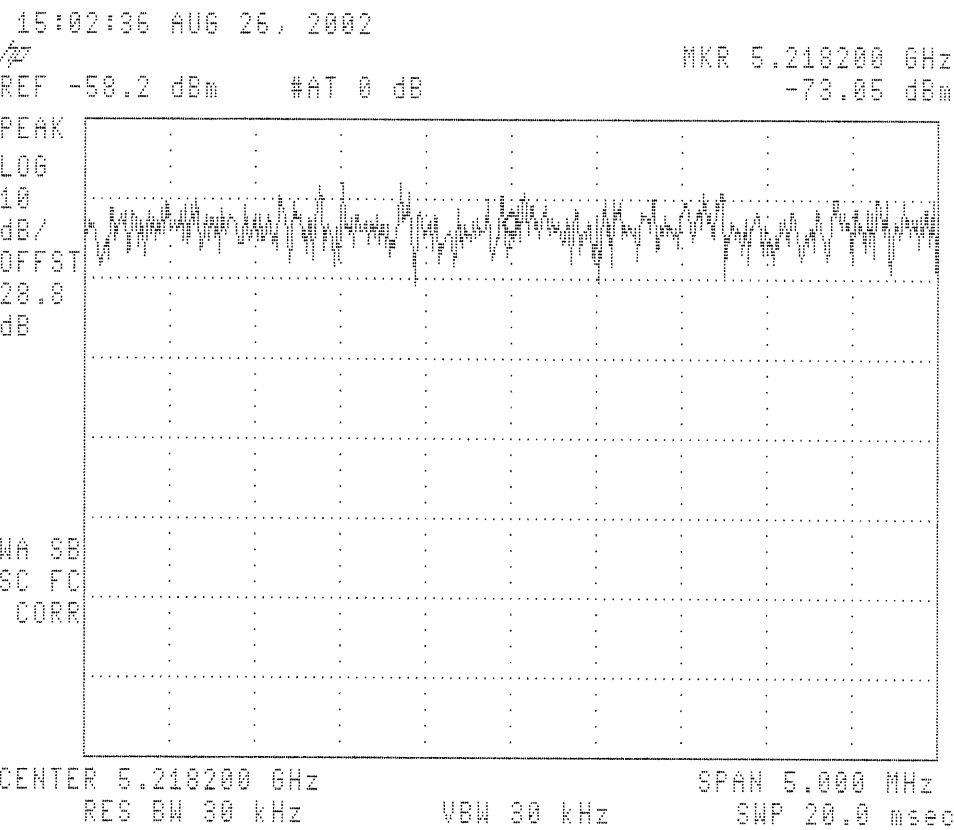


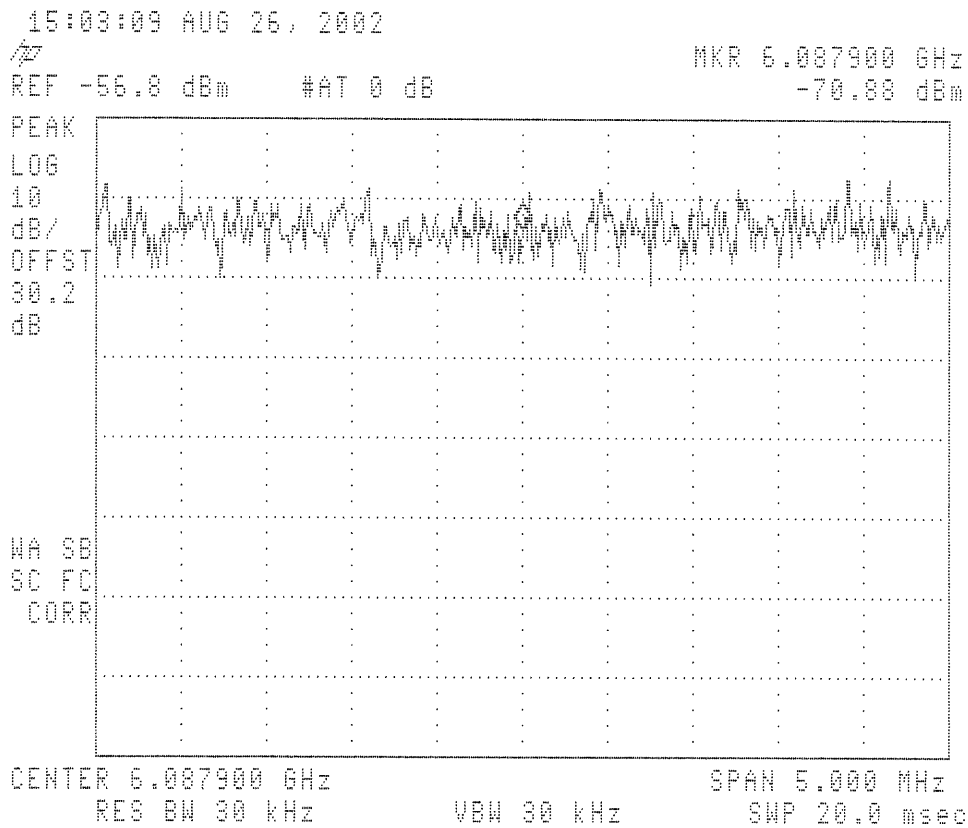




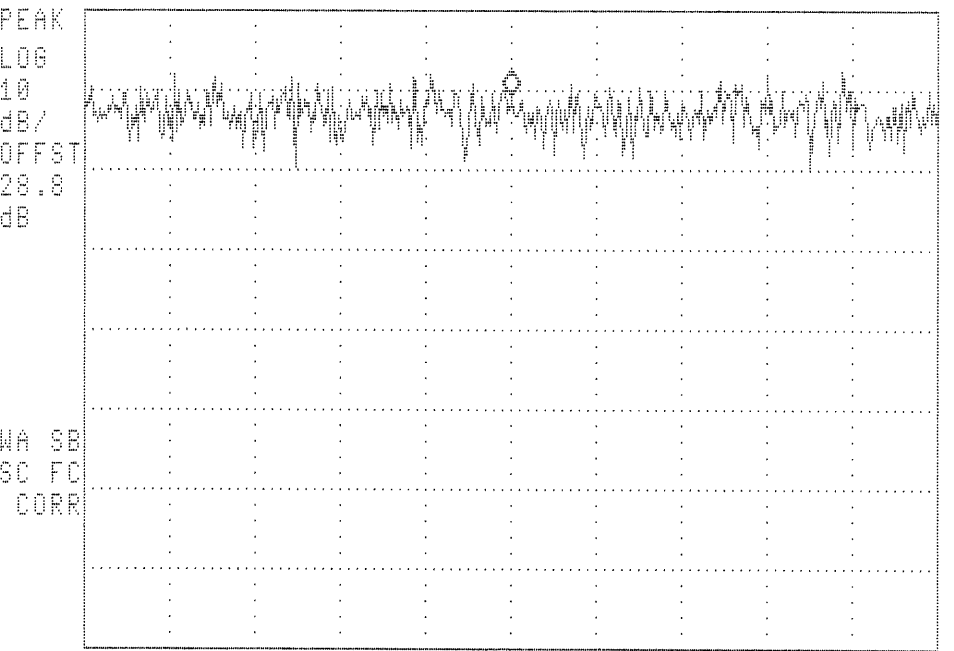








15:04:02 AUG 26, 2002
MKR 6.957600 GHz
REF -52.2 dBm #AT 0 dB -63.03 dBm



CENTER 6.957600 GHz SPAN 5.000 MHz
RES BW 30 kHz VBW 30 kHz SWP 20.0 msec

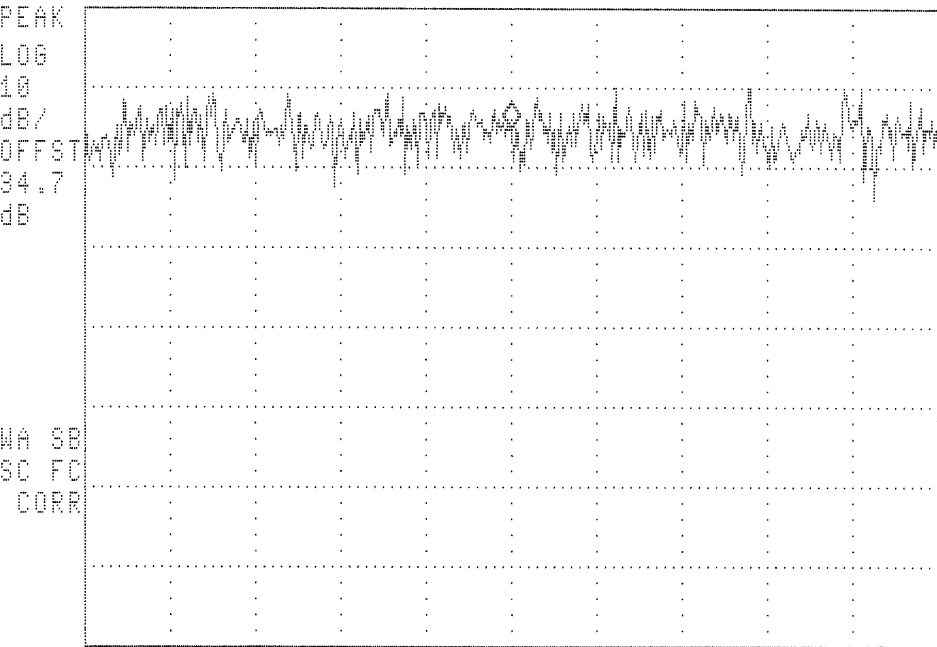
15:04:50 AUG 26, 2002

/Z

MKR 7.827300 GHz

REF -41.3 dBm #AT 0 dB

-56.52 dBm



CENTER 7.827300 GHz

SPAN 5.000 MHz

RES BW 30 kHz

VBW 30 kHz

SWP 20.0 msec

15:05:34 AUG 26, 2002

~~77~~

MKR 8.697000 GHz

REF -26.1 dBm #AT 0 dB

-44.61 dBm

PEAK

LOG

10

dB/

OFFST

49.9

dB

WA SB

SC FC

CORR

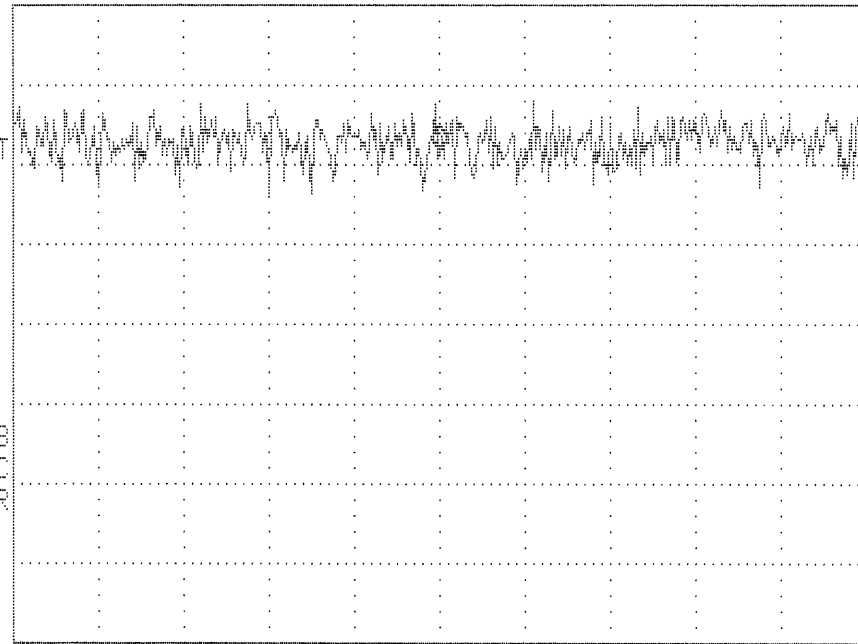
CENTER 8.697000 GHz

RES BW 30 kHz

VBW 30 kHz

SPAN 5.000 MHz

SWP 20.0 msec





MOTOROLA

Global Telecom Solutions Sector

SECTION D

FCC ID: IHET5CR1

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 777

Maximum Power

15:28:46 AUG 30, 2002

~~17~~

REF 45.0 dBm

#AT 30 dB

MKR 893.310 MHz

38.35 dBm

PEAK

LOG

10

dB/

OFFST

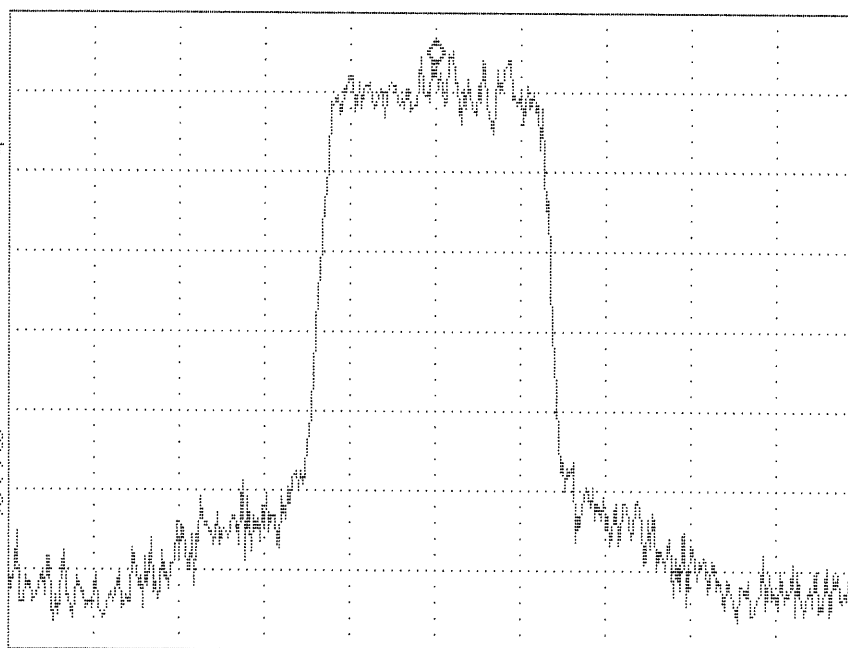
40.0

dB

WA SB

SC FC

CORR



CENTER 893.310 MHz

#RES BW 30 kHz

#VBW 30 kHz

SPAN 5.000 MHz

SWP 20.0 msec

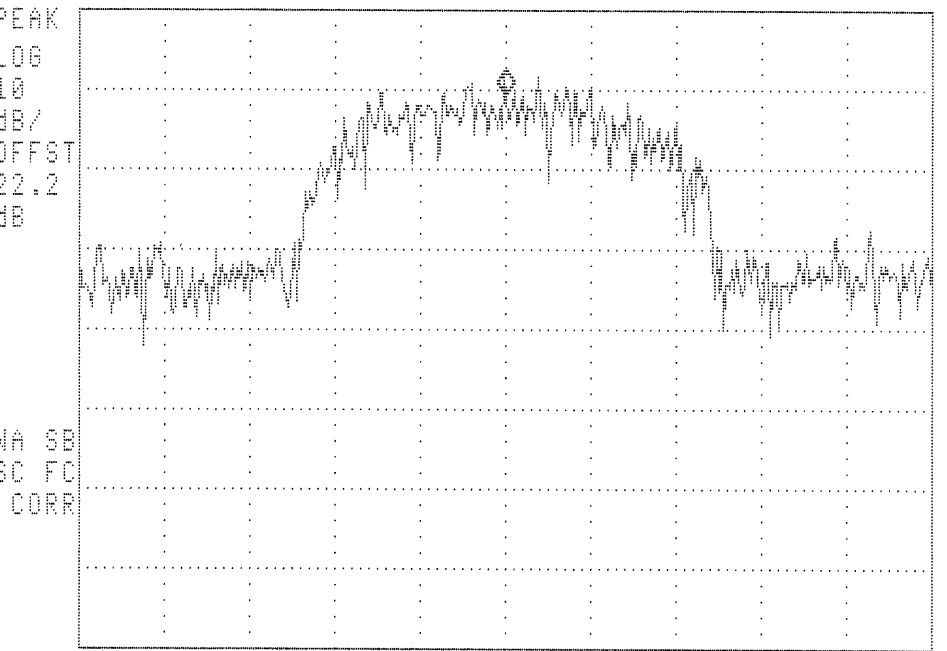
14:13:49 AUG 26, 2002

~~17~~

MKR 1.786620 GHz

REF -44.8 dBm #AT 0 dB

-55.50 dBm



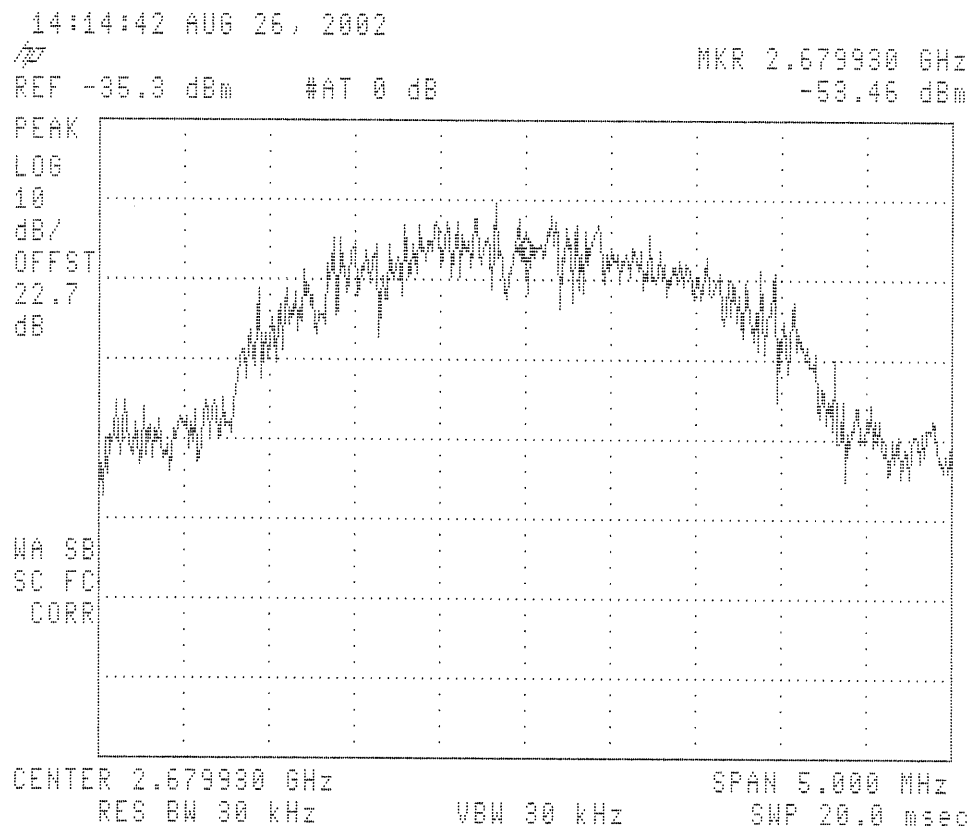
CENTER 1.786620 GHz

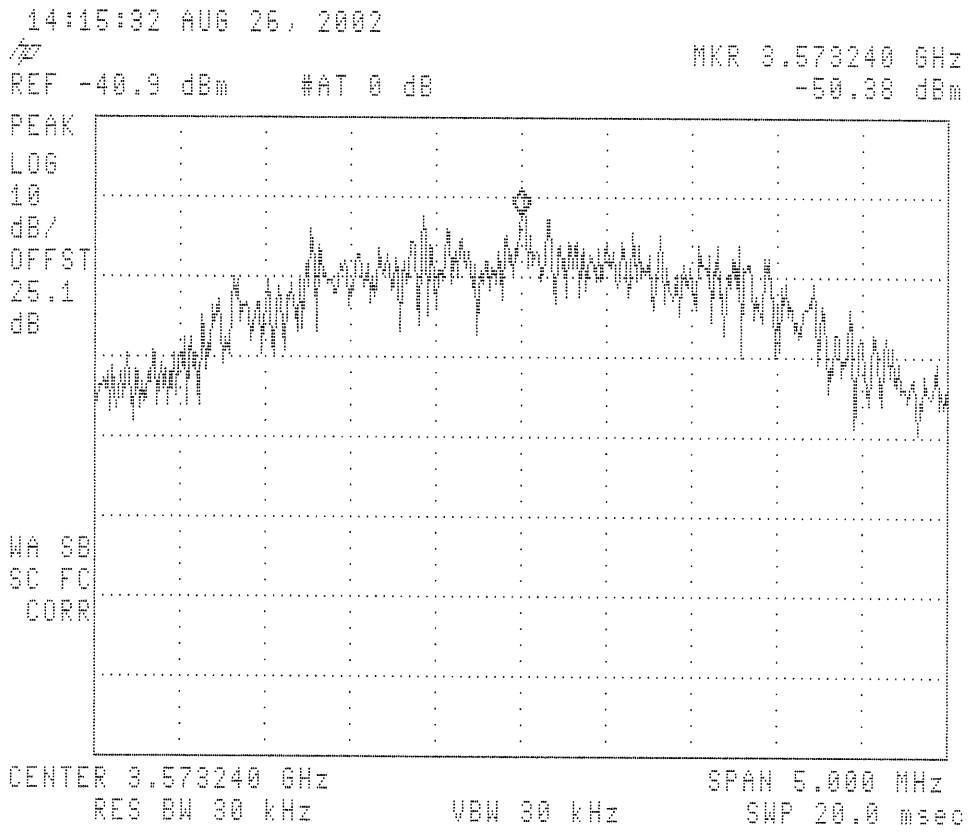
SPAN 5.000 MHz

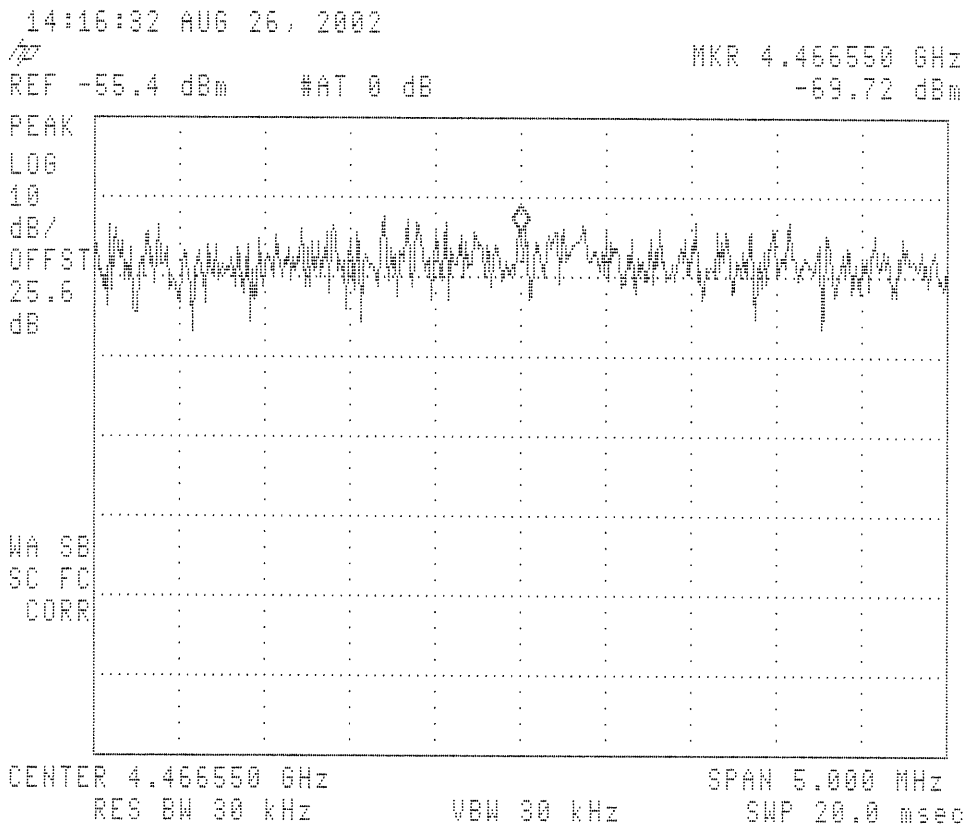
RES BW 30 kHz

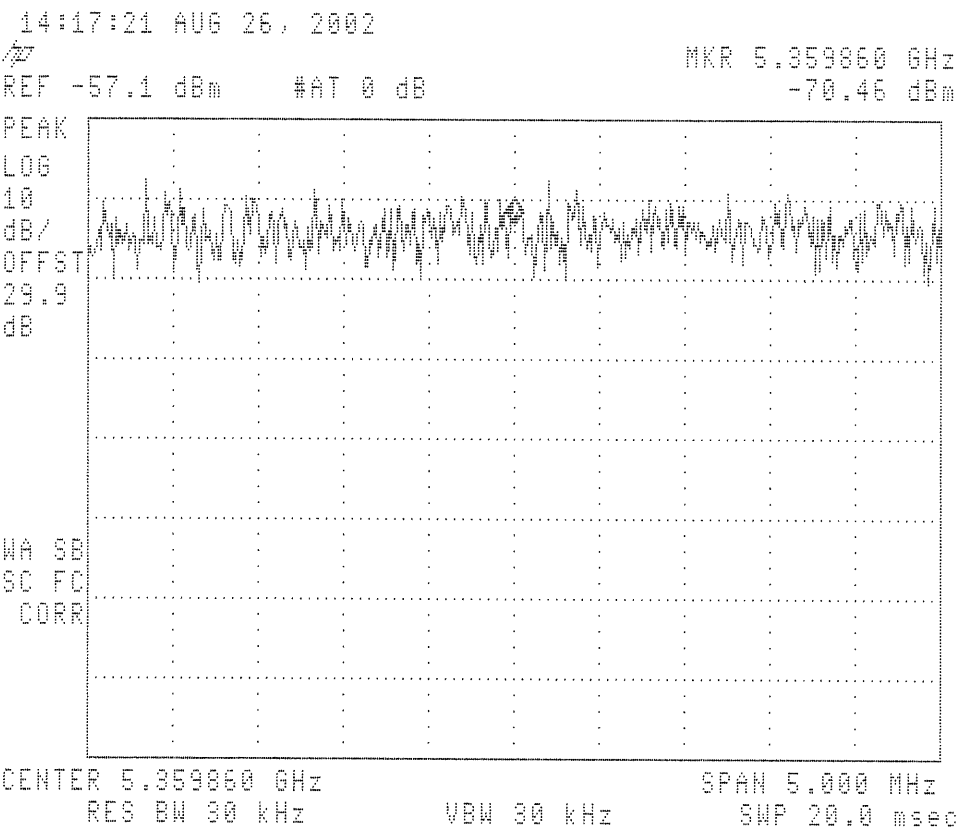
VBW 30 kHz

SWP 20.0 msec

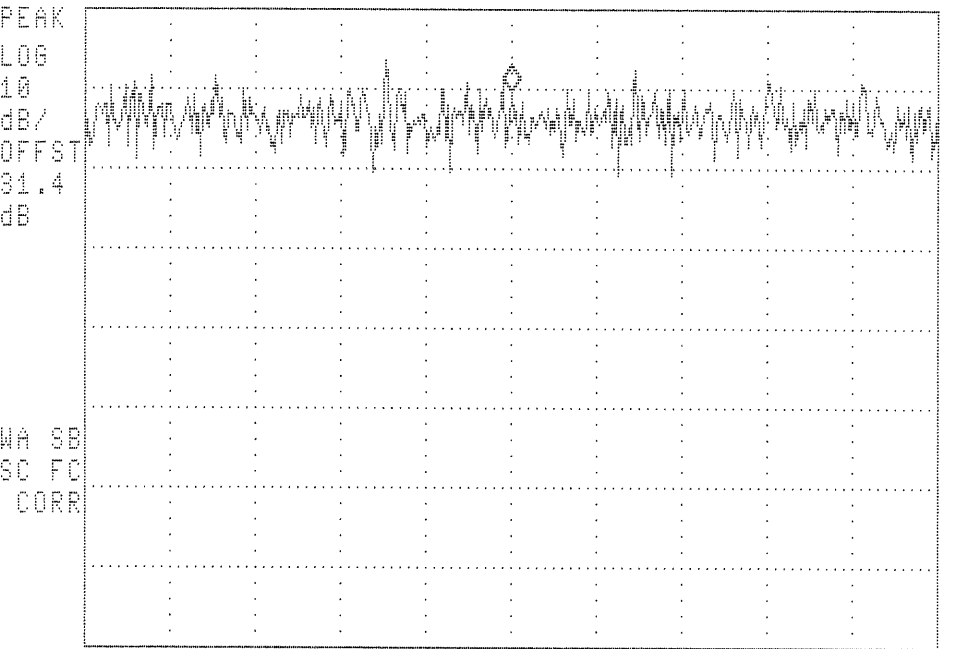




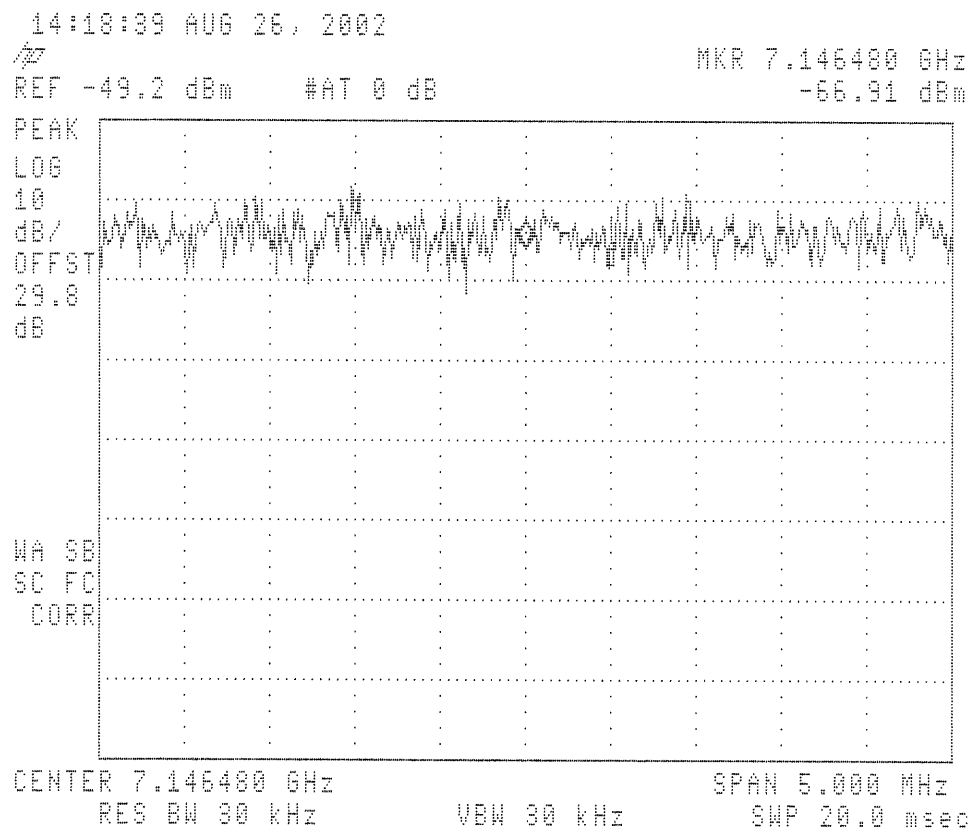


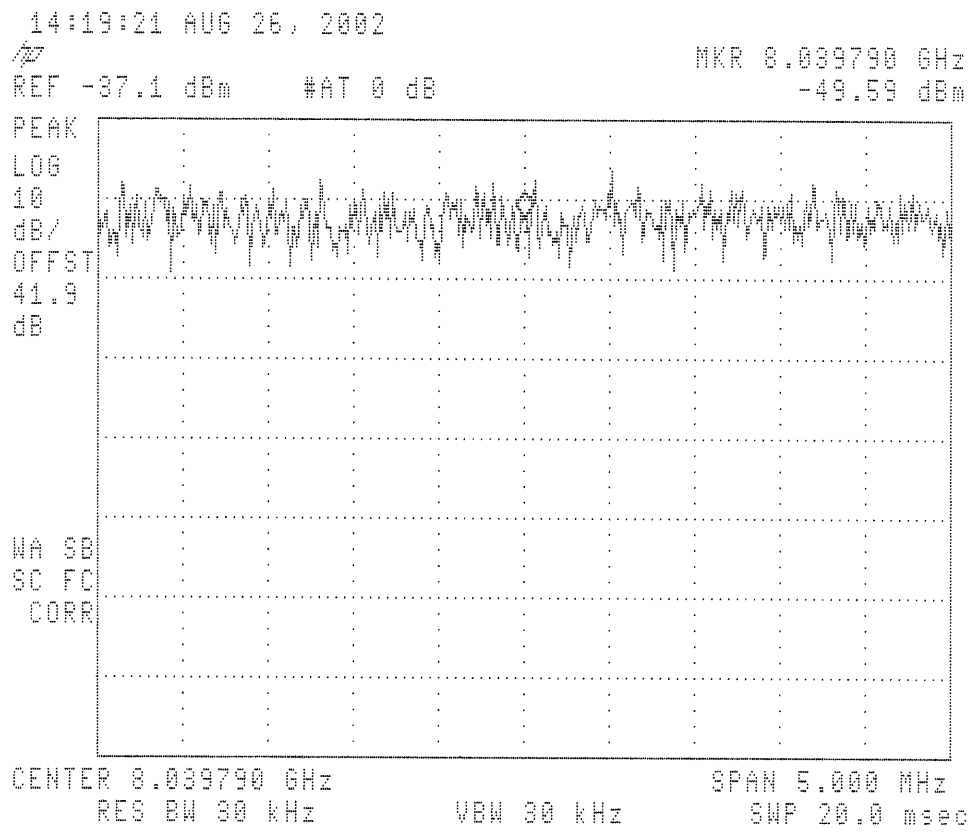


14:17:55 AUG 26, 2002
/Z MKR 6.253170 GHz
REF -55.6 dBm #AT 0 dB -66.06 dBm



CENTER 6.253170 GHz SPAN 5.000 MHz
RES BW 30 kHz VBW 30 kHz SWP 20.0 msec





14:20:08 AUG 26, 2002

~~17~~

MKR 8.933100 GHz

REF -32.2 dBm #AT 0 dB

-45.60 dBm

PEAK

LOG

10

dB/

OFFS

46.8

dB

WA SB

SC FC

CORR

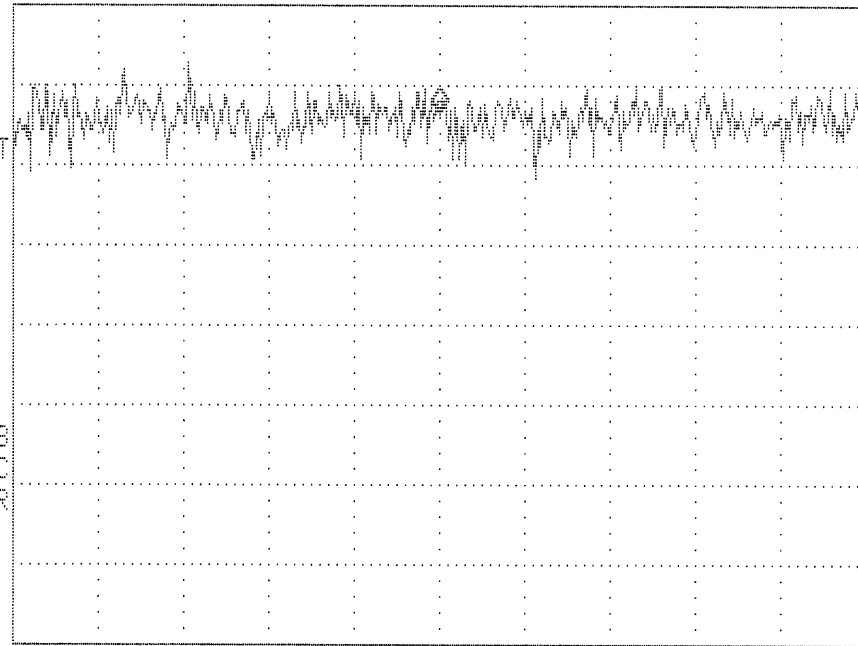
CENTER 8.933100 GHz

RES BW 30 kHz

VBW 30 kHz

SPAN 5.000 MHz

SWP 20.0 msec





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SECTION D

FCC ID: IHET5CR1

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 777

Mid Power

11:33:46 AUG 26, 2002

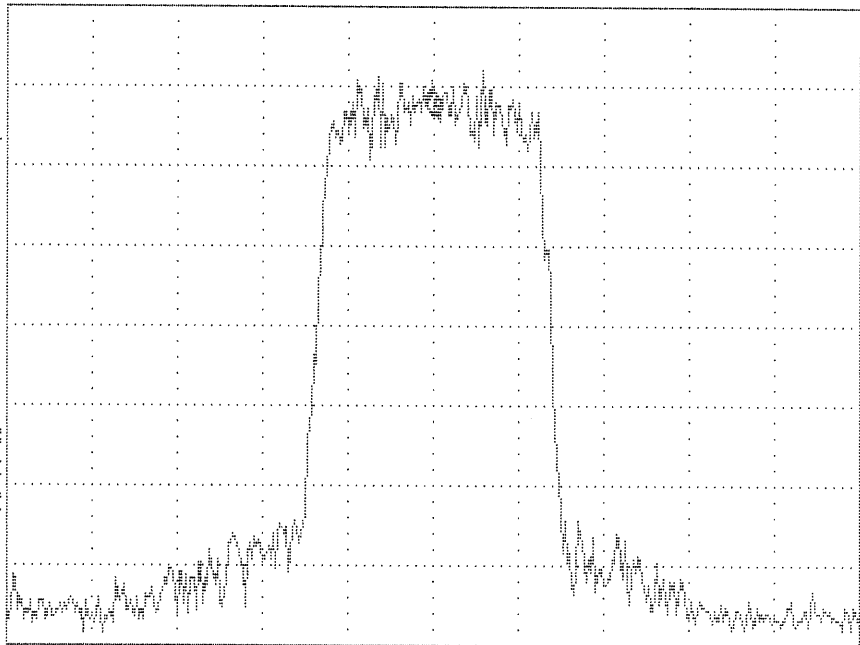
~~12~~

REF 48.7 dBm #AT 0 dB

MKR 893.310 MHz
34.86 dBm

PEAK
LOG
10
dB/
OFFST
68.7
dB

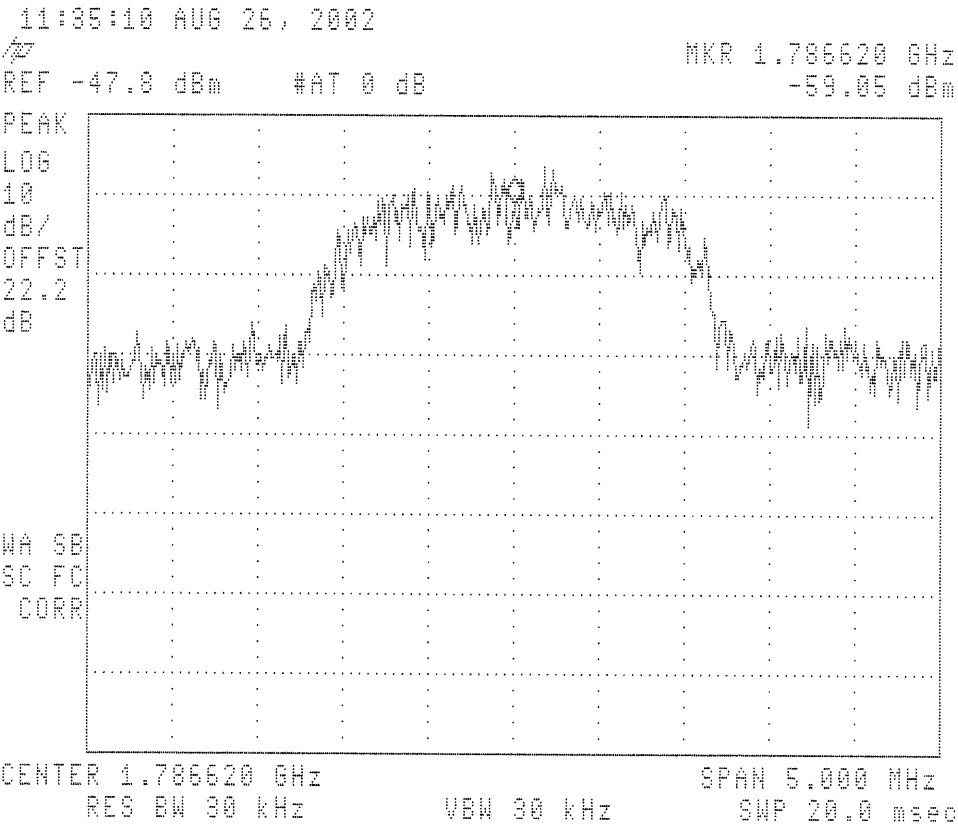
WA SB
SC FC
CORR

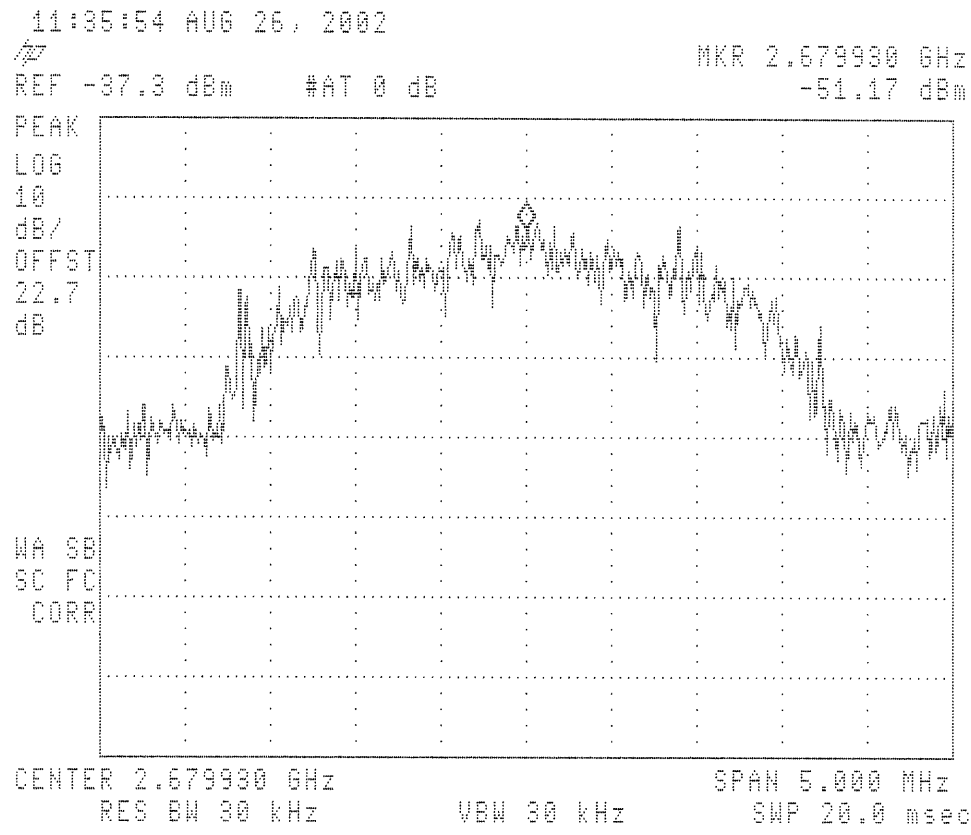


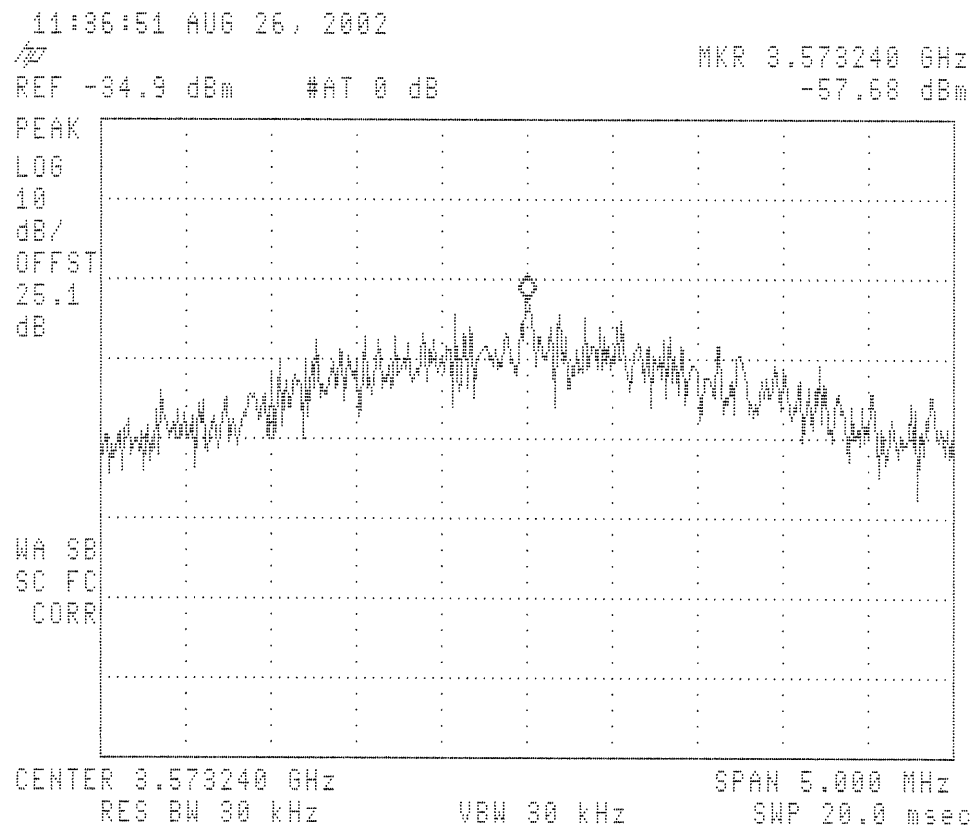
CENTER 893.310 MHz
RES BW 30 kHz

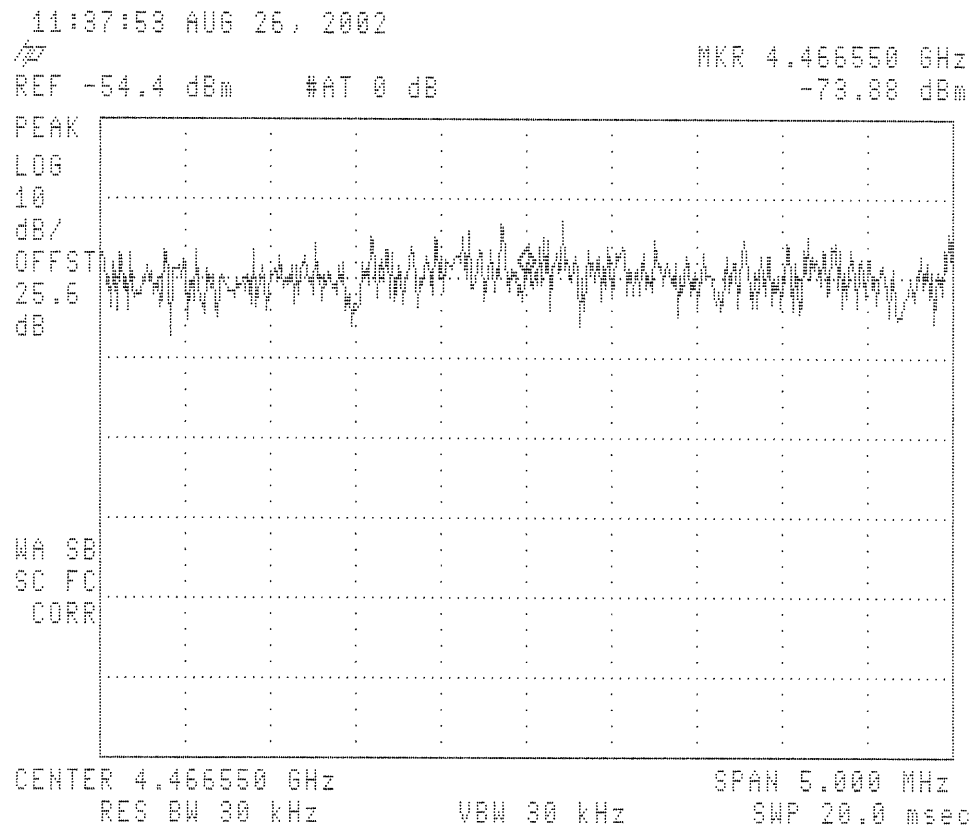
VBW 30 kHz

SPAN 5.000 MHz
SWP 20.0 msec

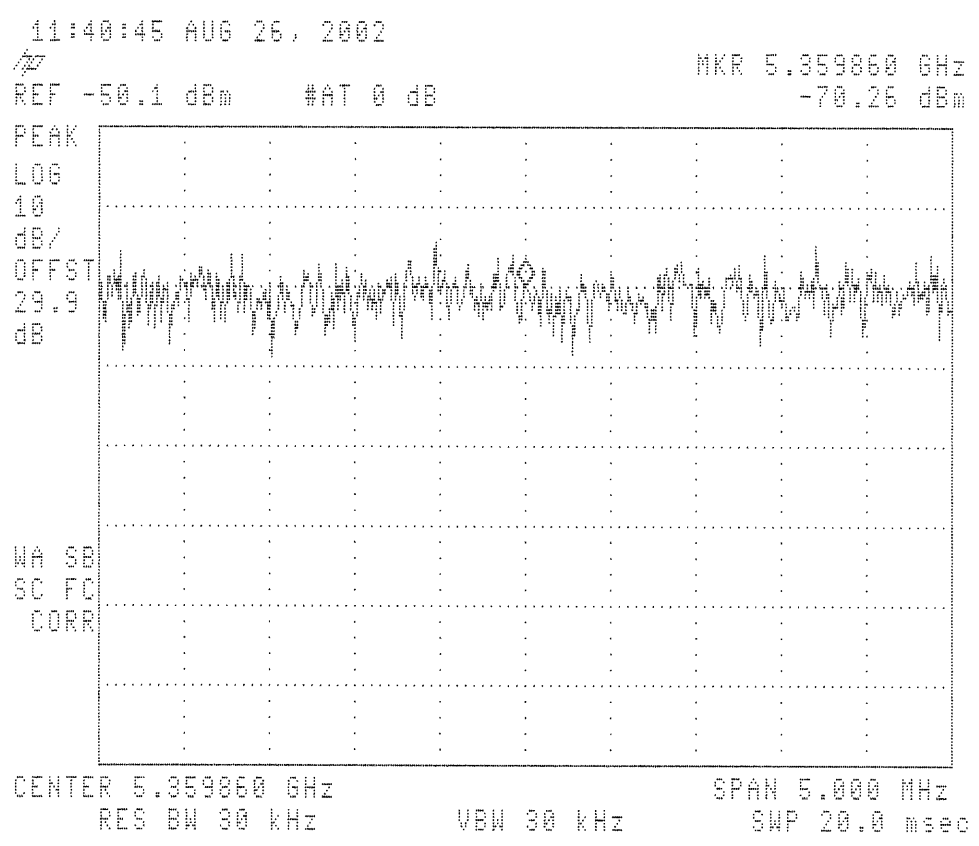


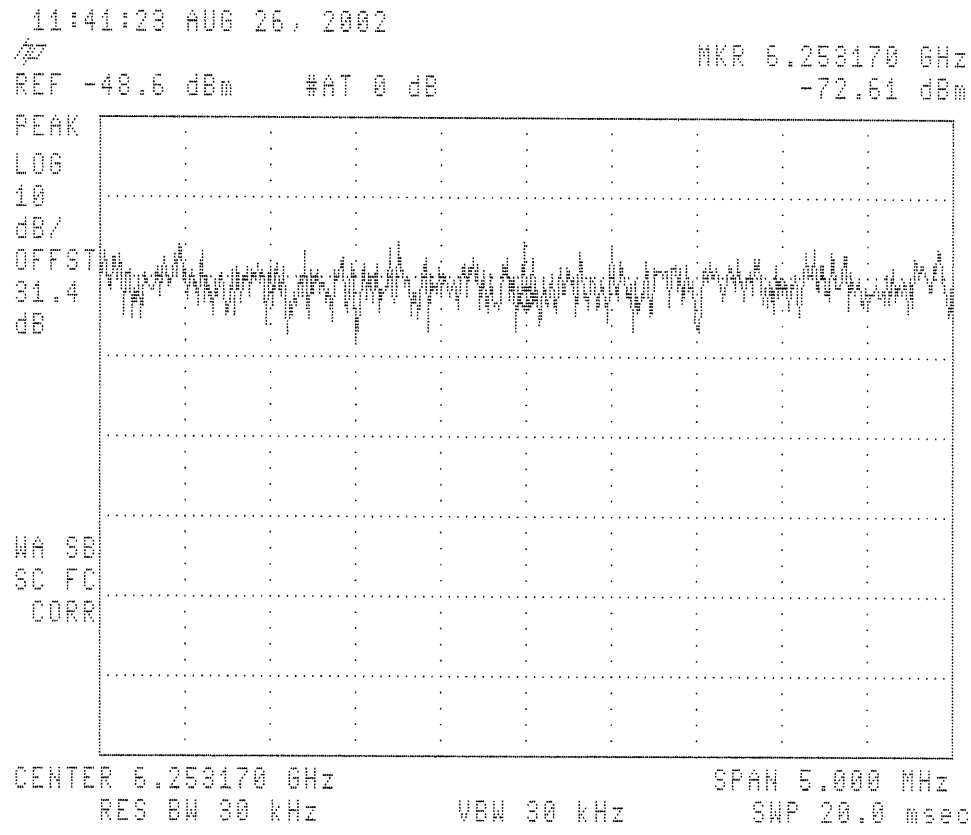






300R





11:42:21 AUG 26, 2002

~~7~~

MKR 7.146480 GHz

REF -40.2 dBm

#AT 0 dB

-63.89 dBm

PEAK

LOG

10

dB/

OFFST

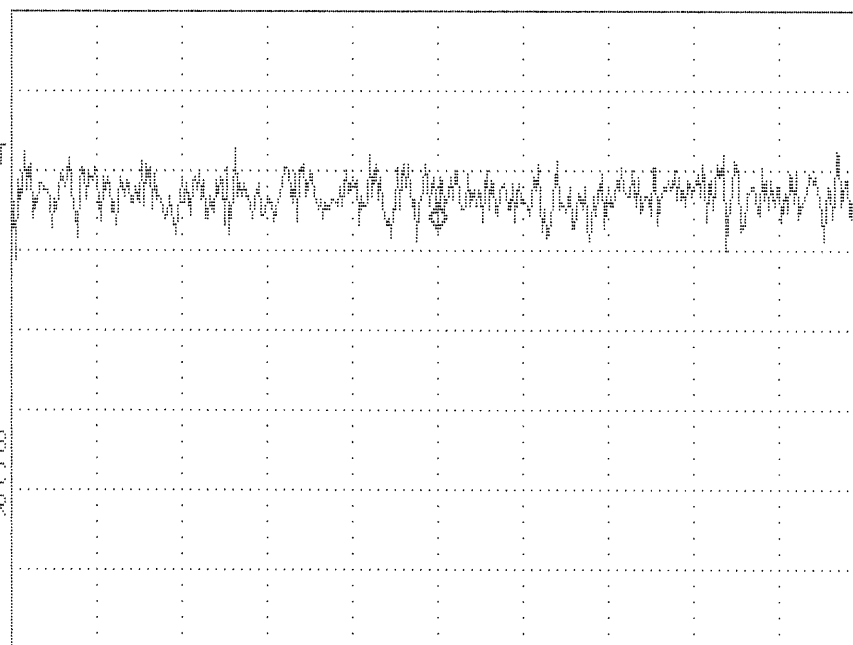
29.8

dB

WA SB

SC FC

CORR



CENTER 7.146480 GHz

SPAN 5.000 MHz

RES BW 30 kHz

VBW 30 kHz

SMP 20.0 msec

11:43:07 AUG 26, 2002

~~17~~

MKR 8.039790 GHz

REF -28.1 dBm

#AT 0 dB

-49.05 dBm

PEAK

LOG

10

dB/

OFFST

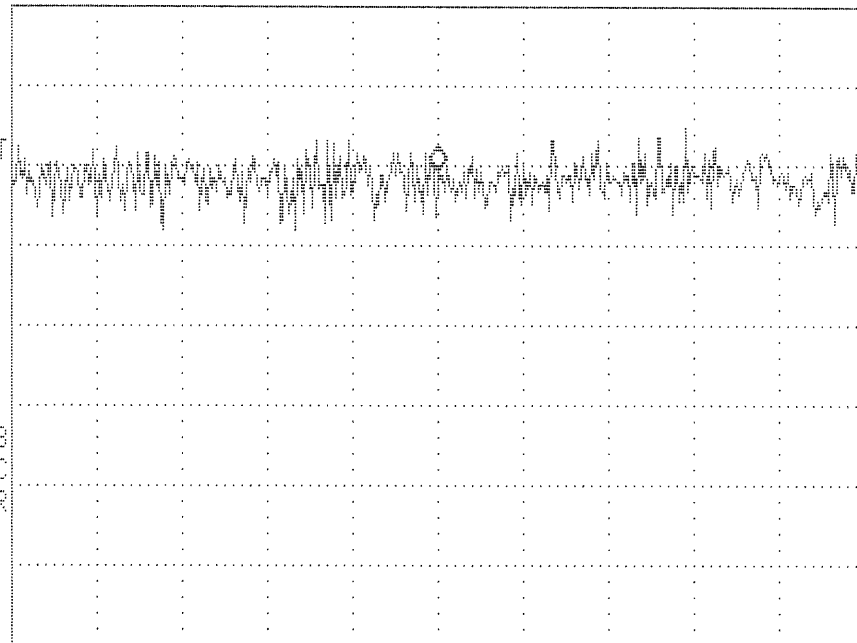
41.9

dB

WA SB

SC FC

CORR



CENTER 8.039790 GHz

RES BW 30 kHz

VBW 30 kHz

SPAN 5.000 MHz

SWP 20.0 msec

11:43:56 AUG 26, 2002

~~7~~

MKR 8.938100 GHz

REF -23.2 dBm #AT 0 dB

-43.48 dBm

PEAK

LOG

10

dB/

OFFST

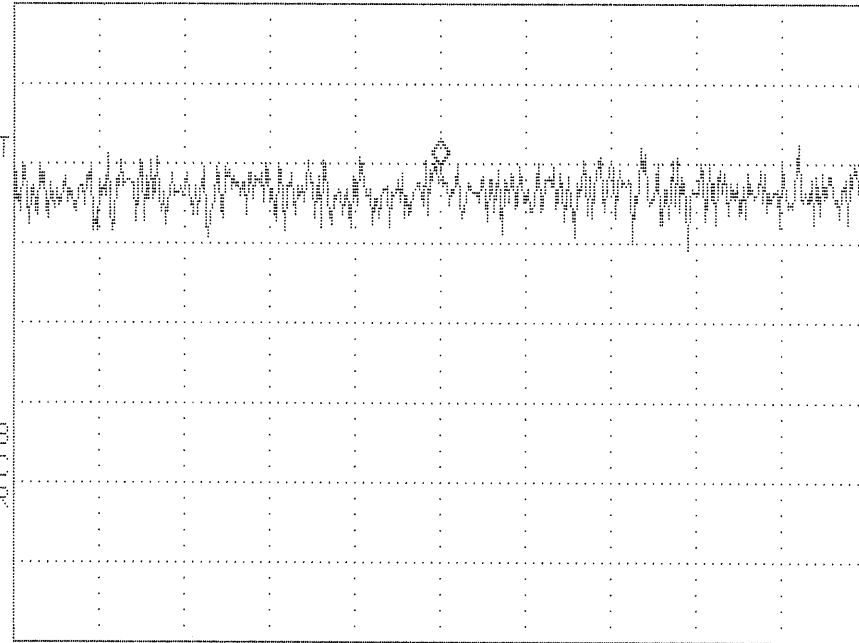
46.8

dB

NA SB

SC FC

CORR



CENTER 8.938100 GHz

RES BW 30 kHz

VBW 30 kHz

SPAN 5.000 MHz

SWP 20.0 msec



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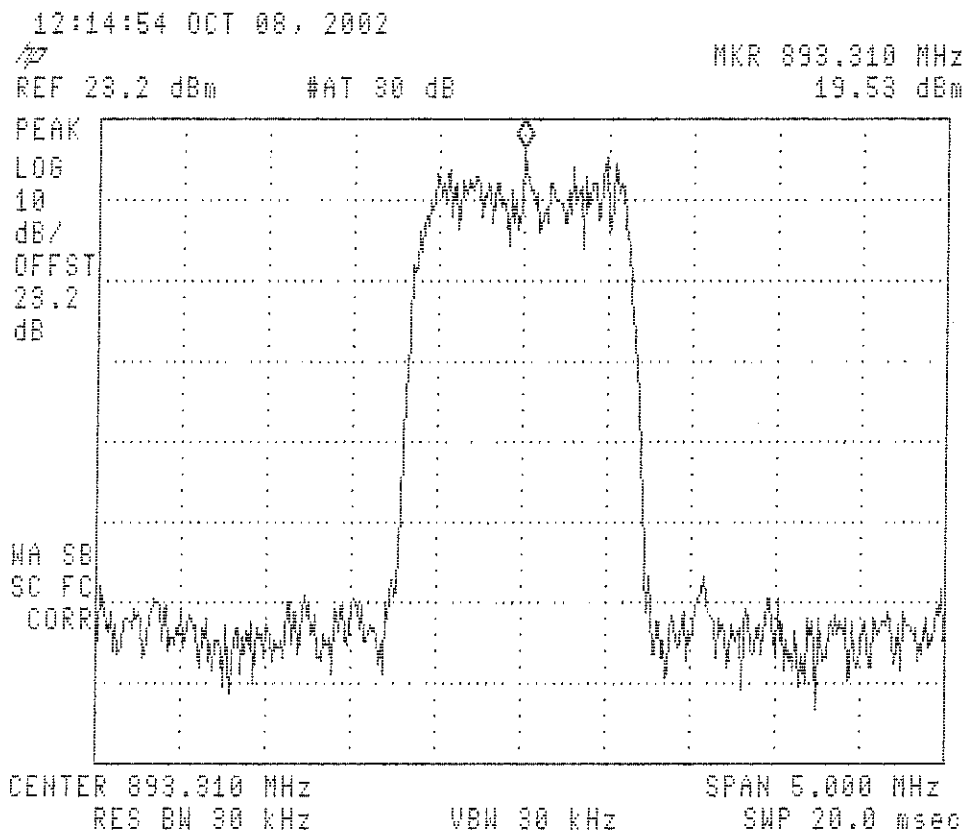
SECTION D

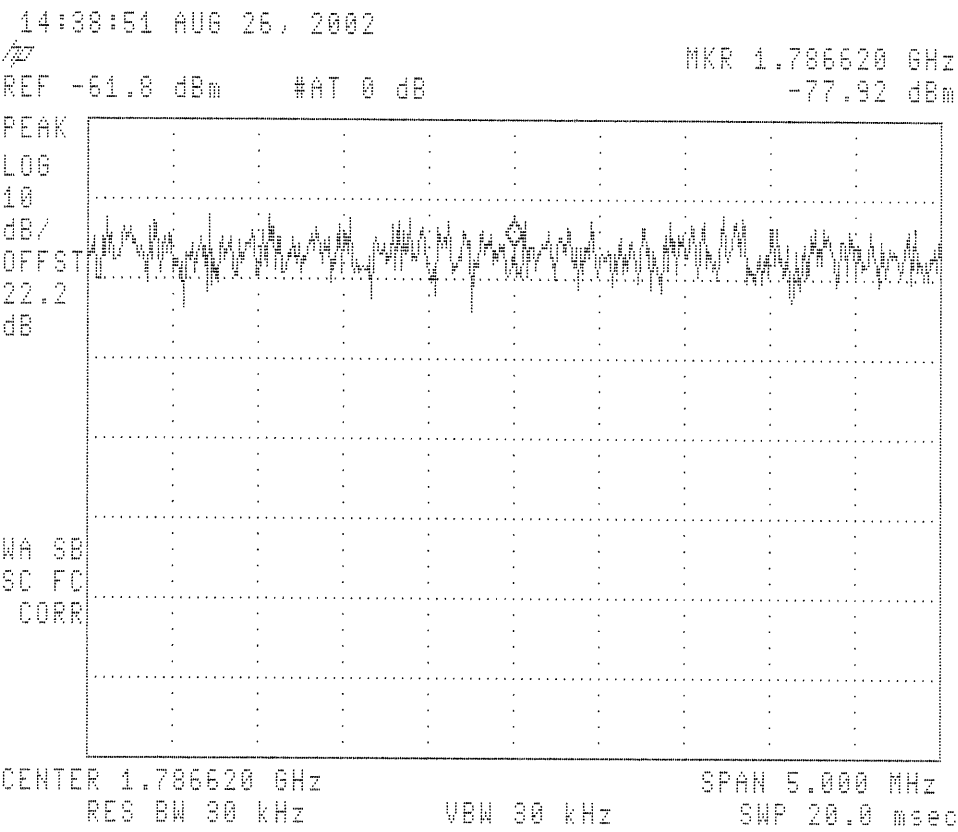
FCC ID: IHET5CR1

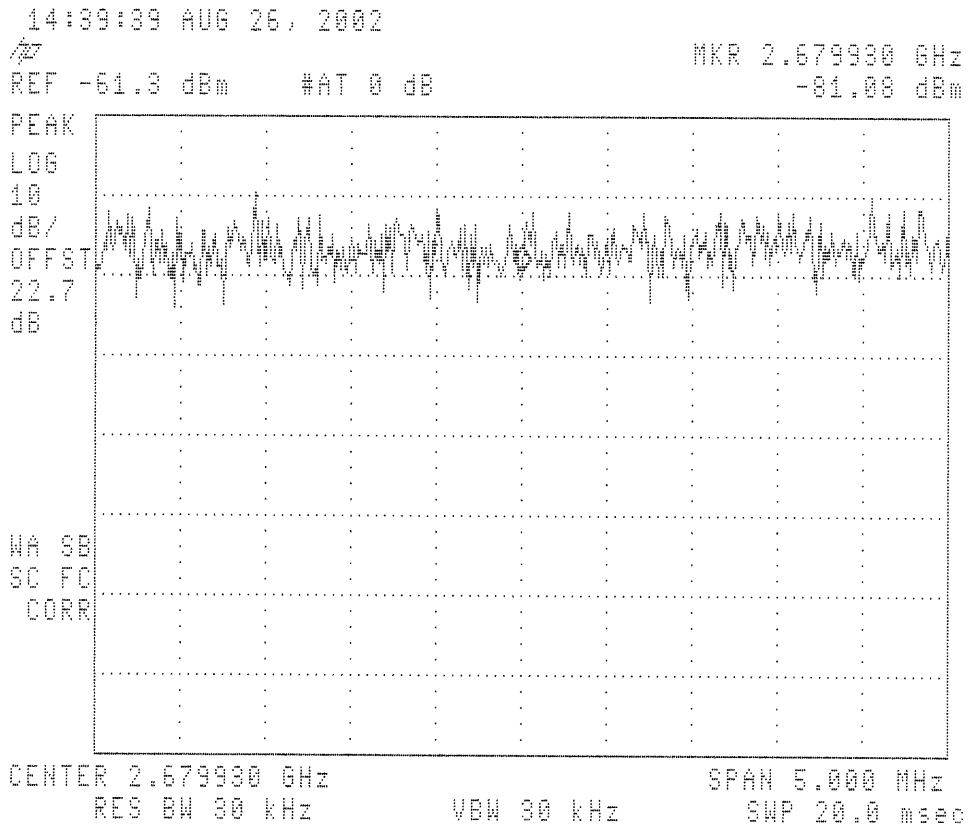
SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 777

Minimum Power







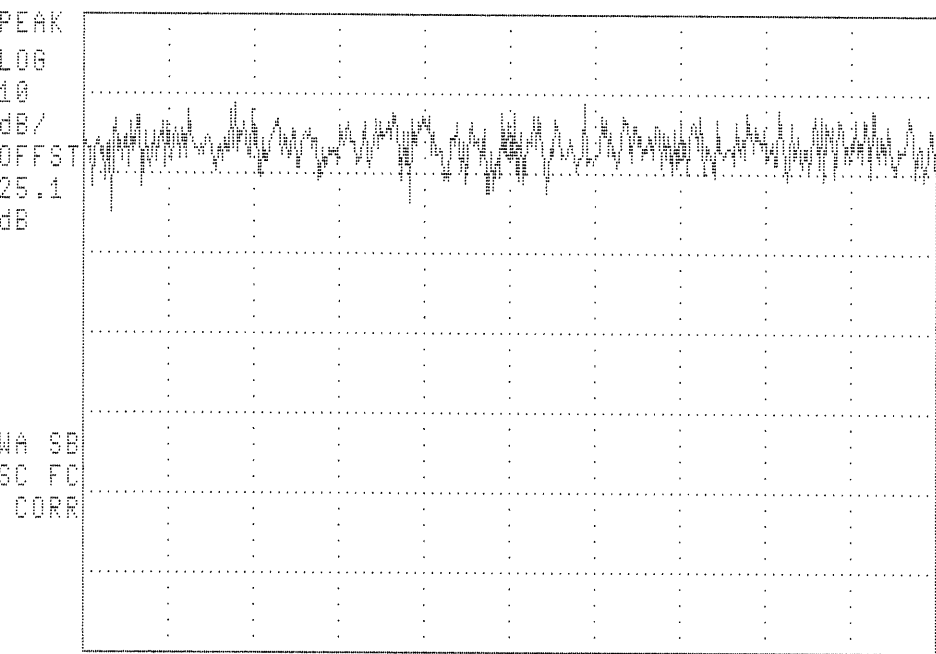
14:41:27 AUG 26, 2002

/Z

MKR 3.573240 GHz

REF -58.9 dBm #AT 0 dB

-77.35 dBm



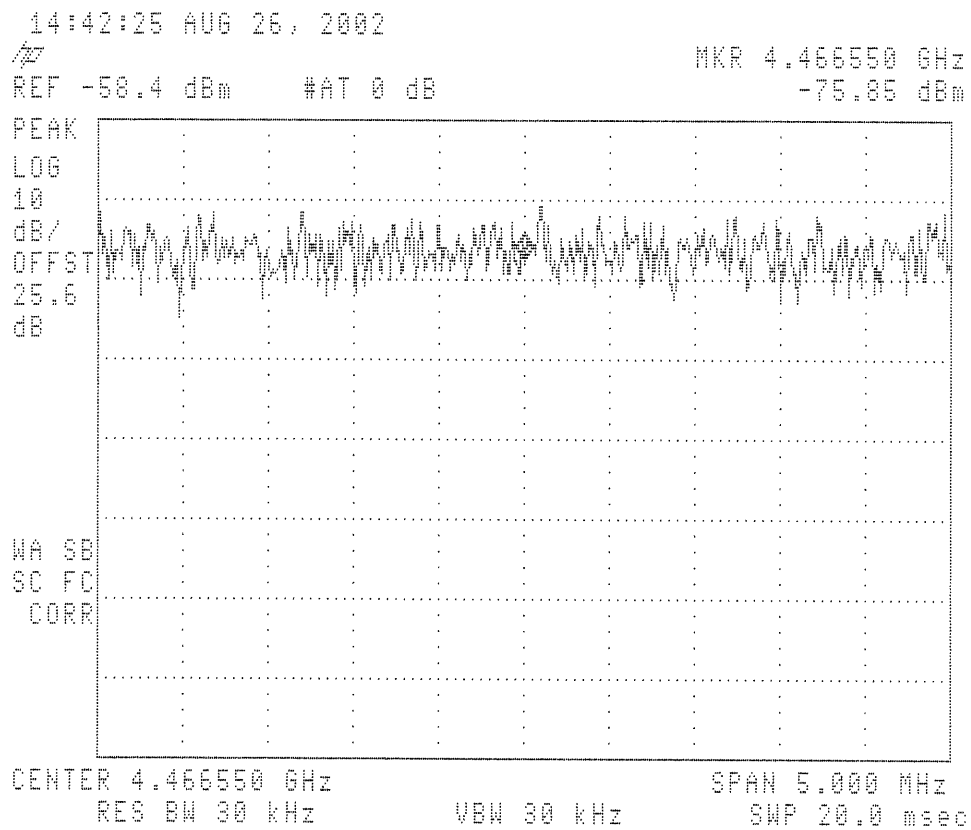
CENTER 3.573240 GHz

SPAN 5.000 MHz

RES BW 30 kHz

VBW 30 kHz

SWP 20.0 msec

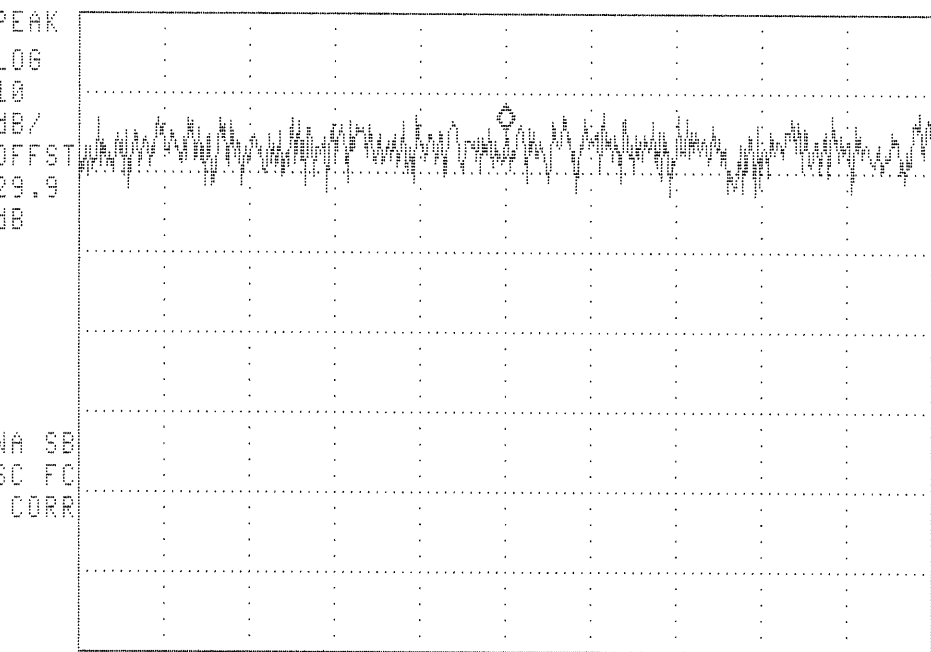


14:48:23 AUG 26, 2002

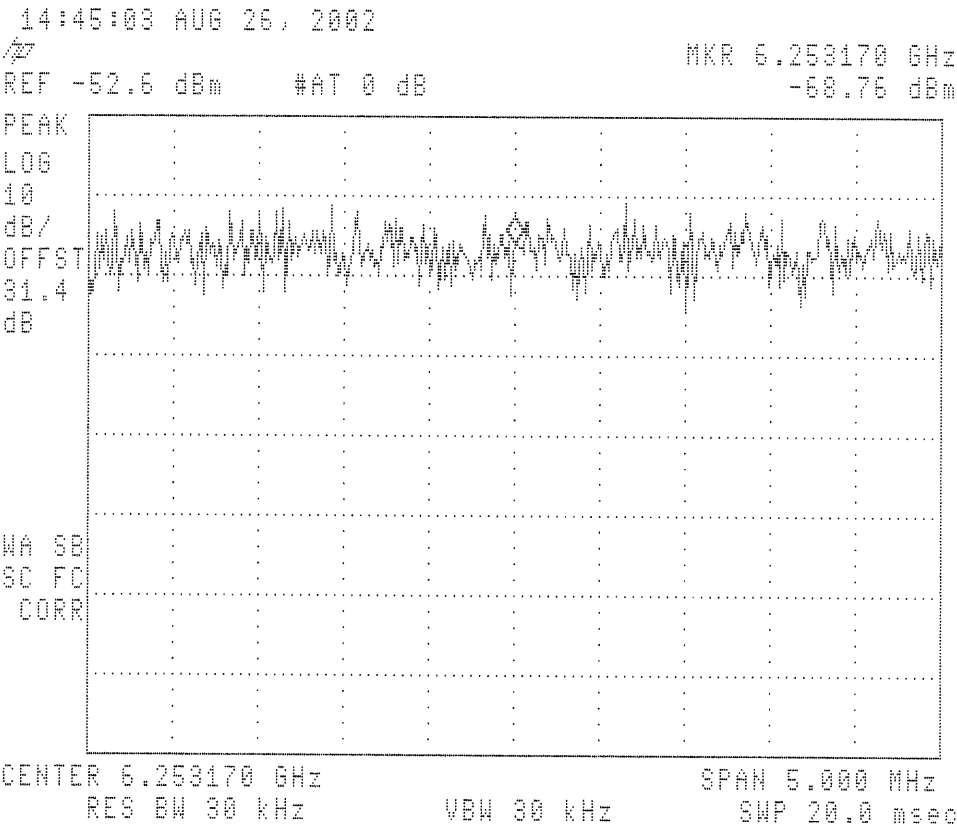
/Z

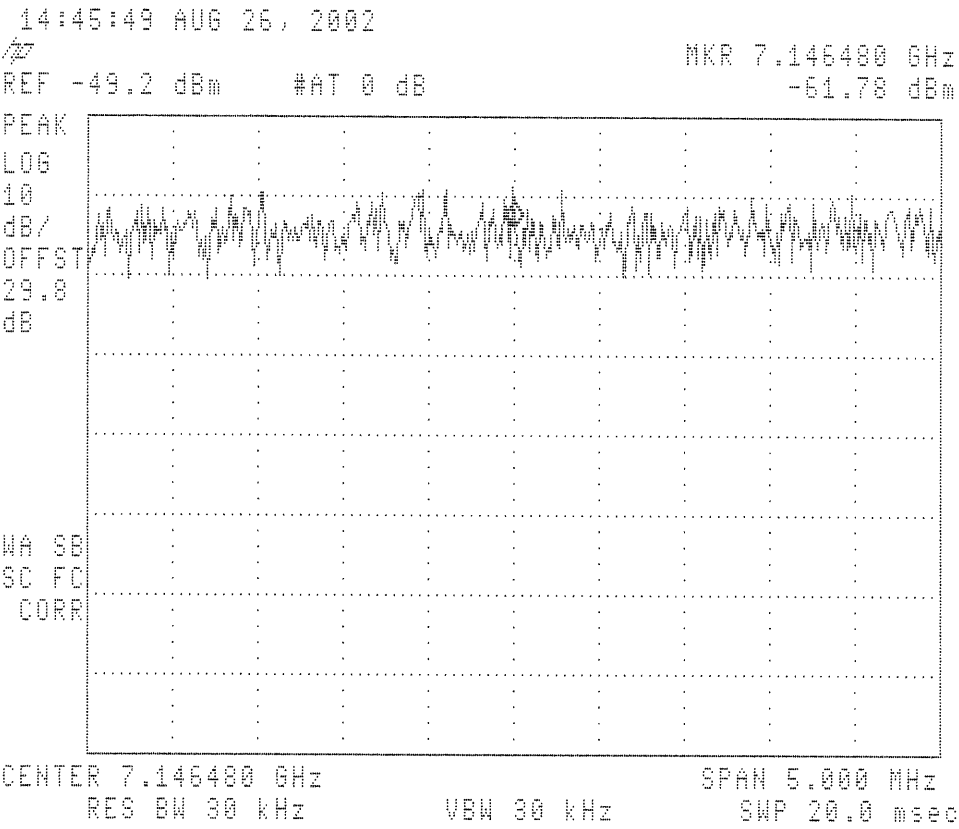
MKR 5.359860 GHz
-68.83 dBm

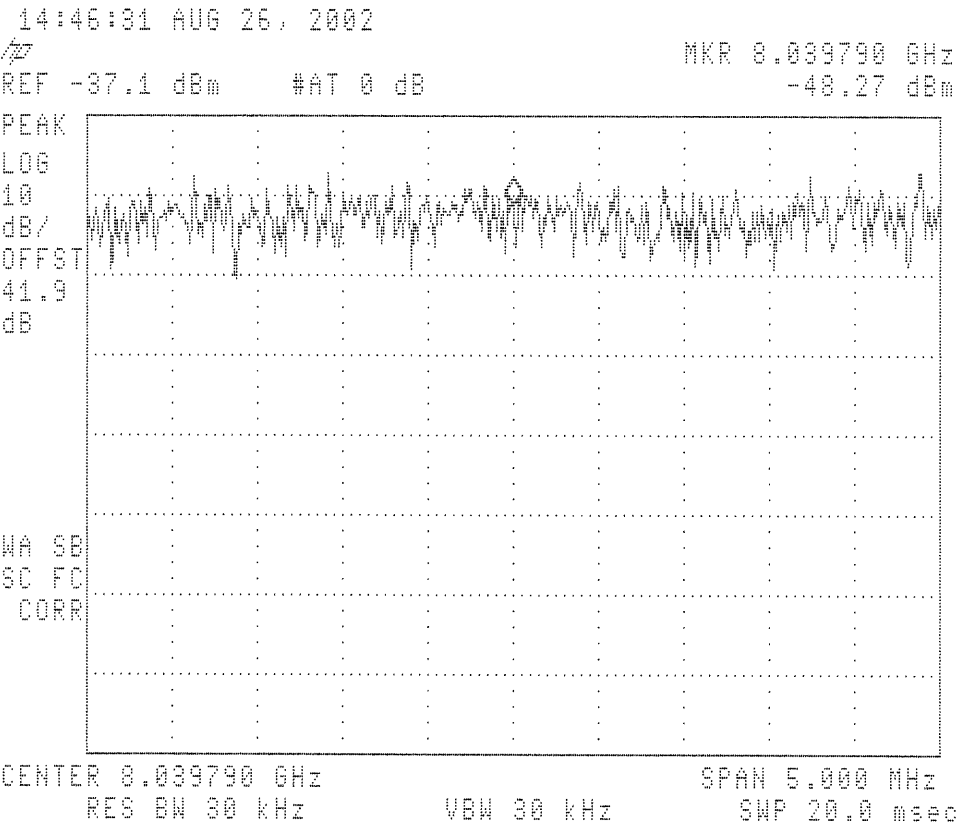
REF -54.1 dBm #AT 0 dB



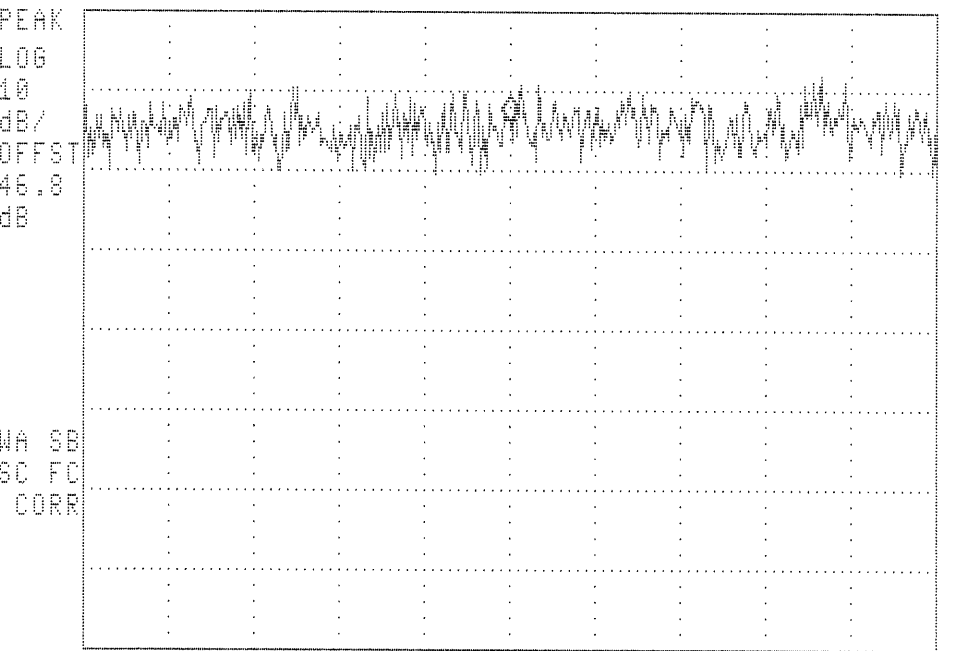
CENTER 5.359860 GHz SPAN 5.000 MHz
RES BW 30 kHz VBW 30 kHz SWP 20.0 msec







14:48:04 AUG 26, 2002
/Z
REF -32.2 dBm #AT 0 dB MKR 8.933100 GHz
-44.42 dBm



CENTER 8.933100 GHz SPAN 5.000 MHz
RES BW 30 kHz VBW 30 kHz SWP 20.0 msec



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FCC ID: IHET5CR1

SECTION E

OCCUPIED BANDWIDTH



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SECTION E

FCC ID: IHET5CR1

OCCUPIED BANDWIDTH

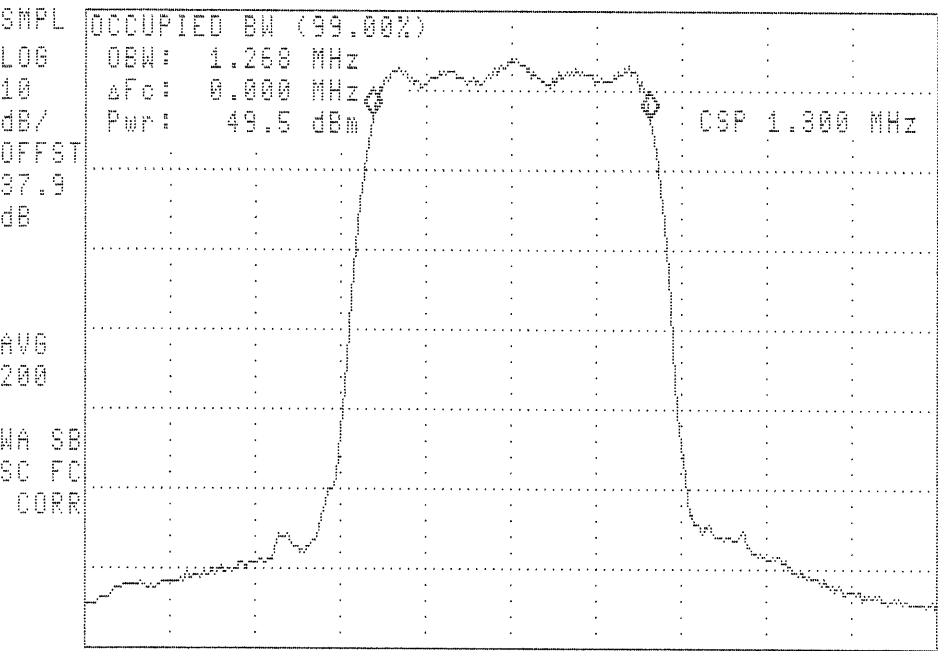
CDMA Transmitter Channel 1013

Maximum Power

11:18:38 SEP 18, 2002



REF 41.9 dBm #AT 30 dB



CENTER 869.700 MHz SPAN 3.900 MHz

#RES BW 30 kHz #VBW 30 kHz SWP 20.0 msec



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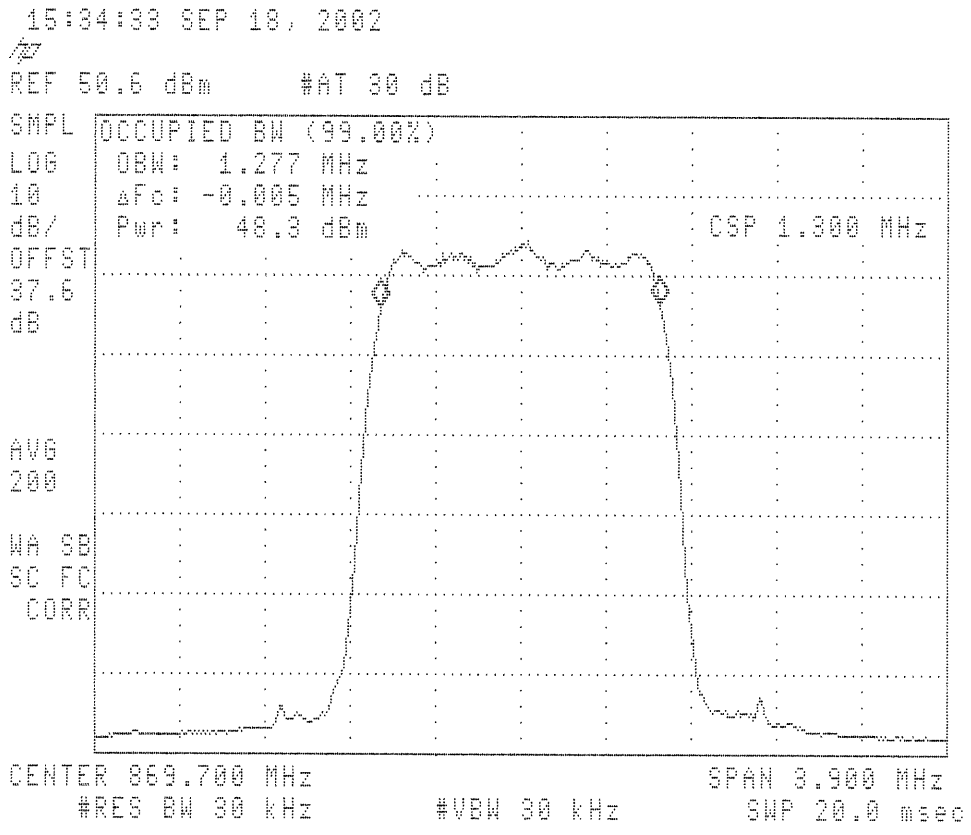
SECTION E

FCC ID: IHET5CR1

OCCUPIED BANDWIDTH

CDMA Transmitter Channel 1013

Mid Power





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SECTION E

FCC ID: IHET5CR1

OCCUPIED BANDWIDTH

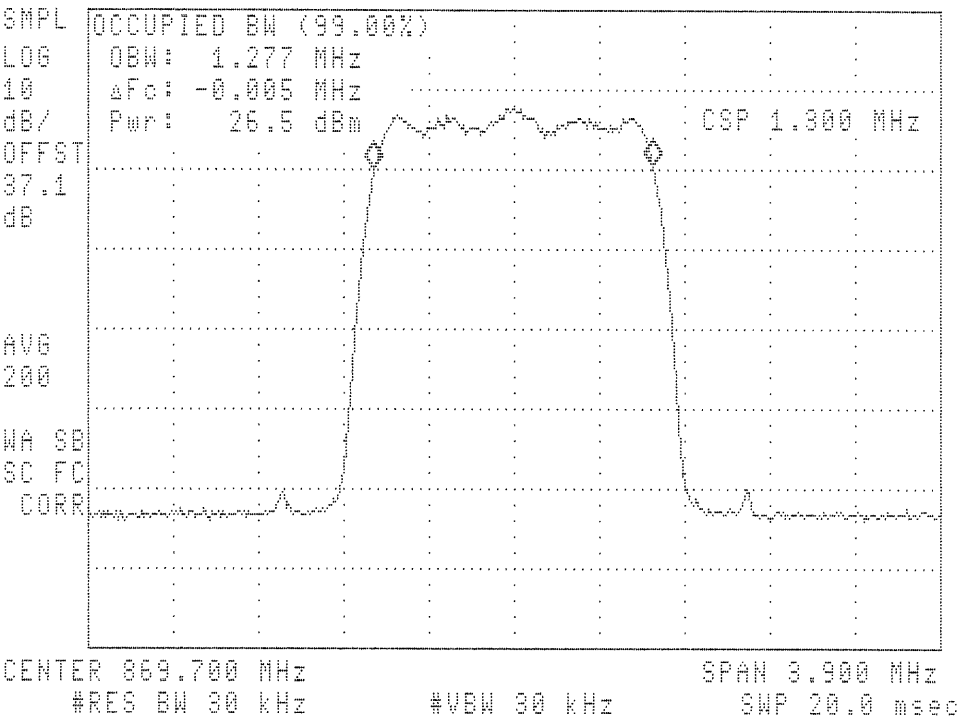
CDMA Transmitter Channel 1013

Minimum Power

14:25:27 SEP 18, 2002

~~17~~

REF 25.1 dBm #AT 30 dB





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Global Telecom Solutions Sector

SECTION E

FCC ID: IHET5CR1

OCCUPIED BANDWIDTH

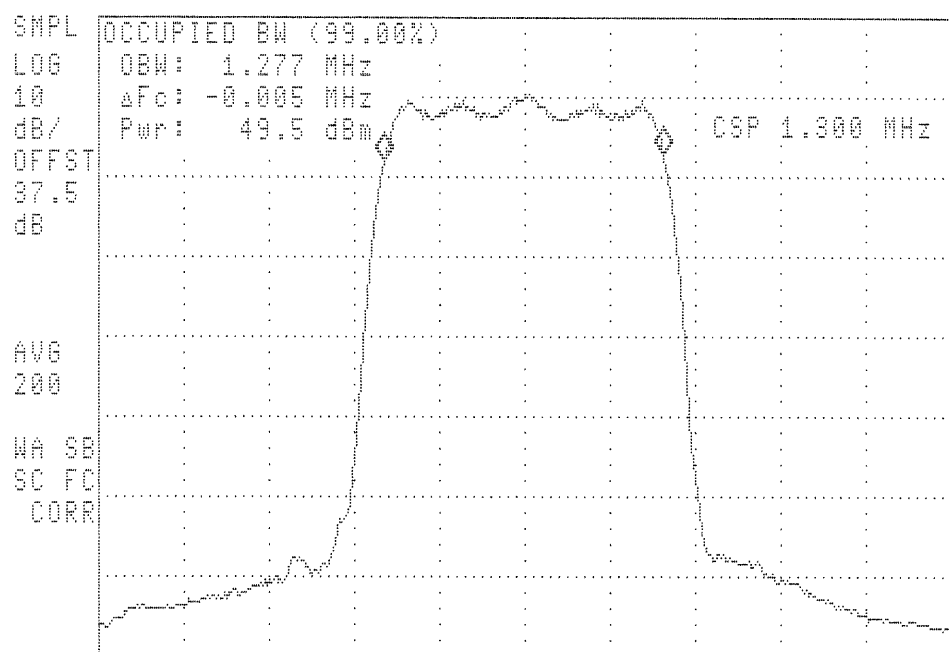
CDMA Transmitter Channel 777

Maximum Power

13:56:50 SEP 18, 2002

~~10~~

REF 45.5 dBm #AT 30 dB



CENTER 893.310 MHz

#RES BW 30 kHz

#VBW 30 kHz

SPAN 3.900 MHz

SWP 20.0 msec



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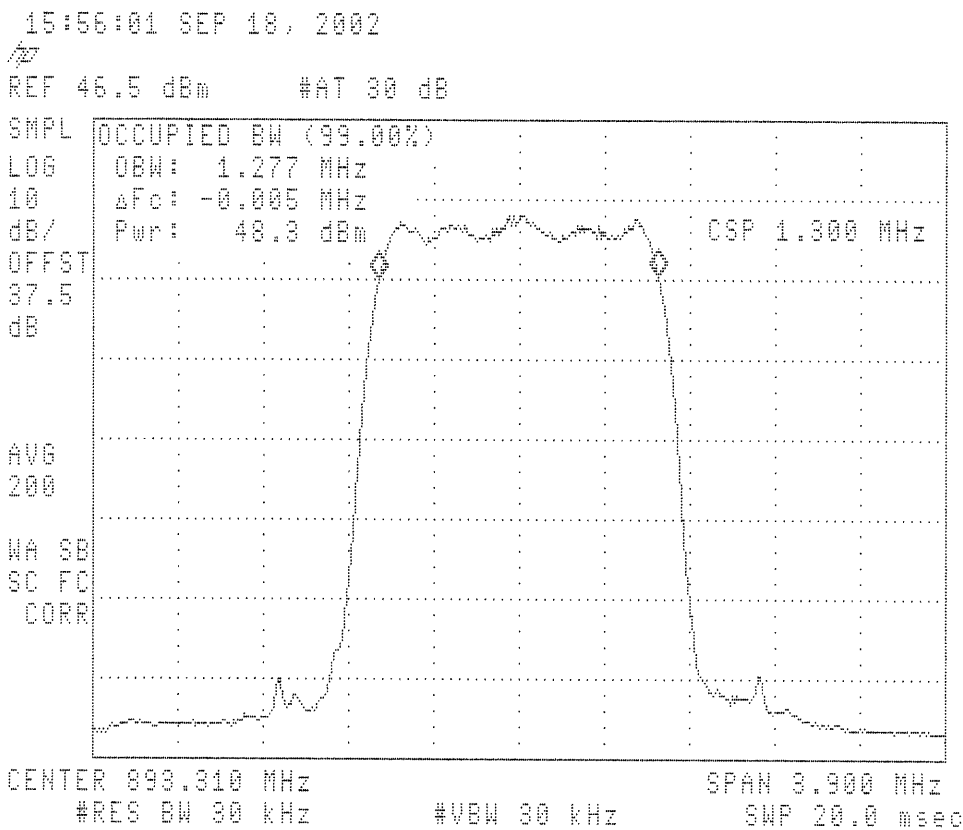
SECTION E

FCC ID: IHET5CR1

OCCUPIED BANDWIDTH

CDMA Transmitter Channel 777

Mid Power





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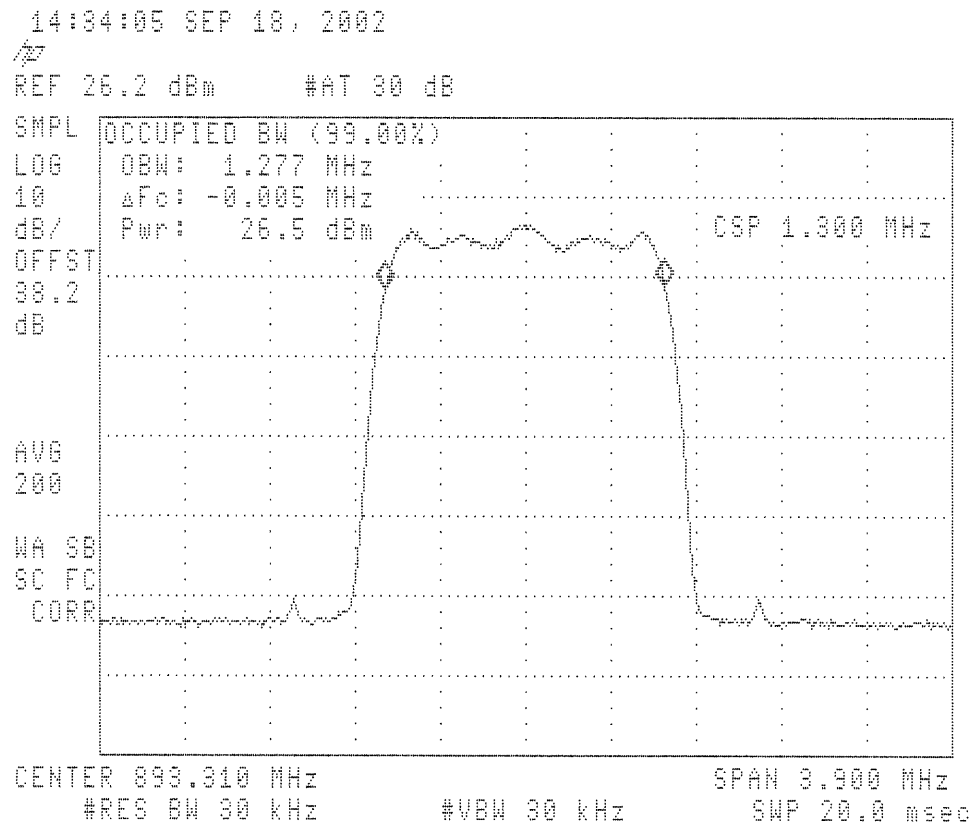
SECTION E

FCC ID: IHET5CR1

OCCUPIED BANDWIDTH

CDMA Transmitter Channel 777

Minimum Power





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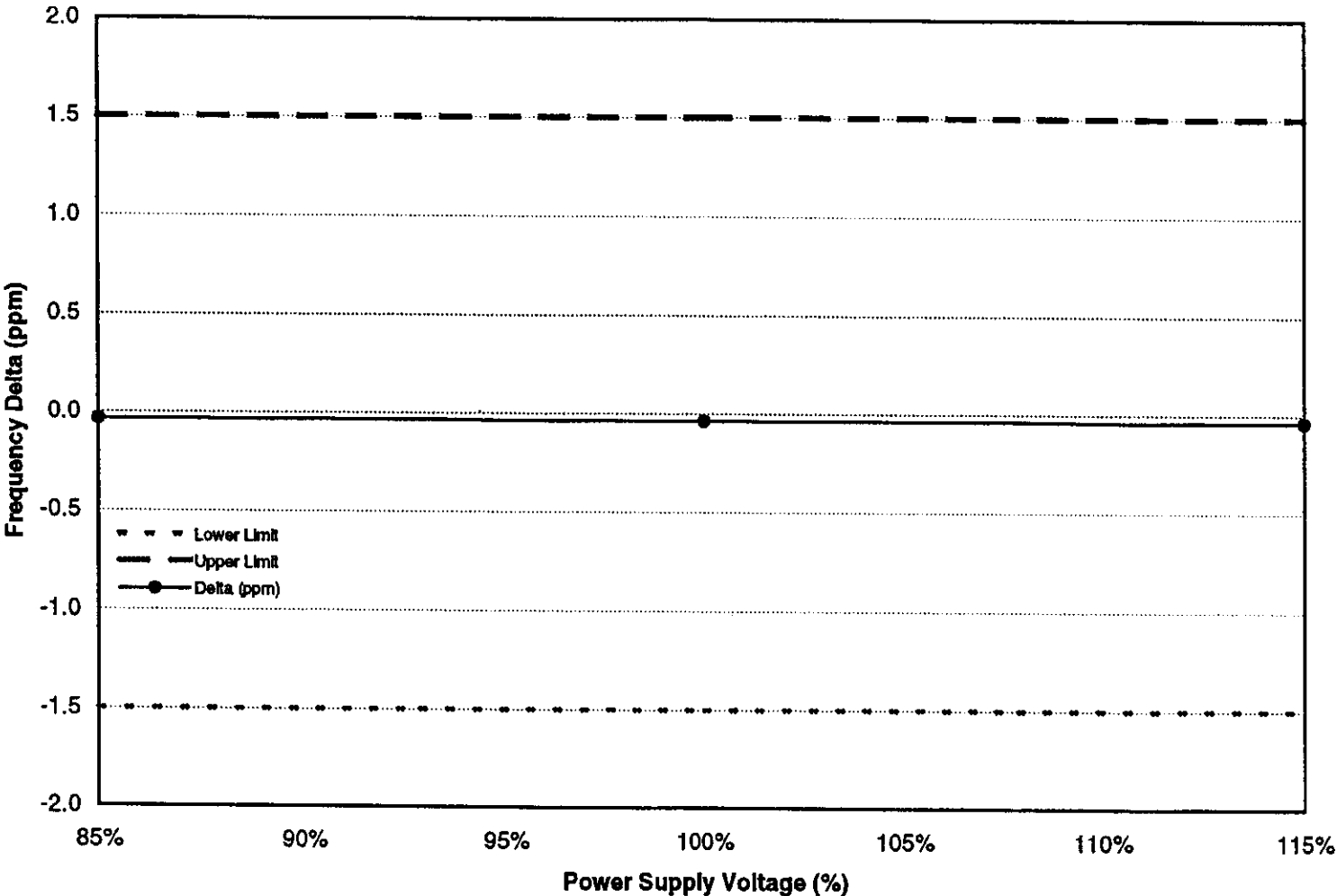
Global Telecom Solutions Sector

FCC ID: IHET5CR1

SECTION F

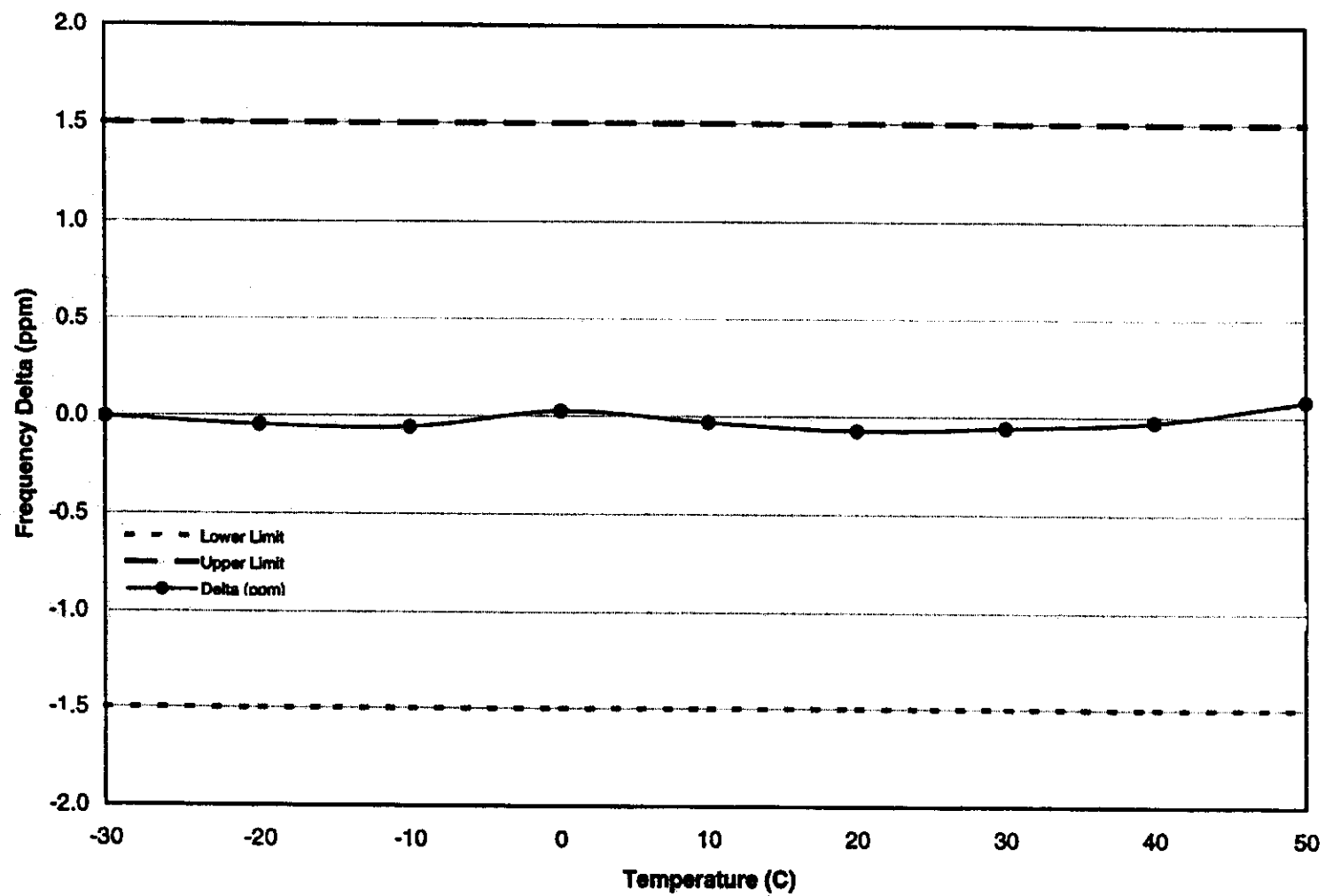
FREQUENCY STABILITY

Frequency Stability with Varying Supply Voltage - CSM1



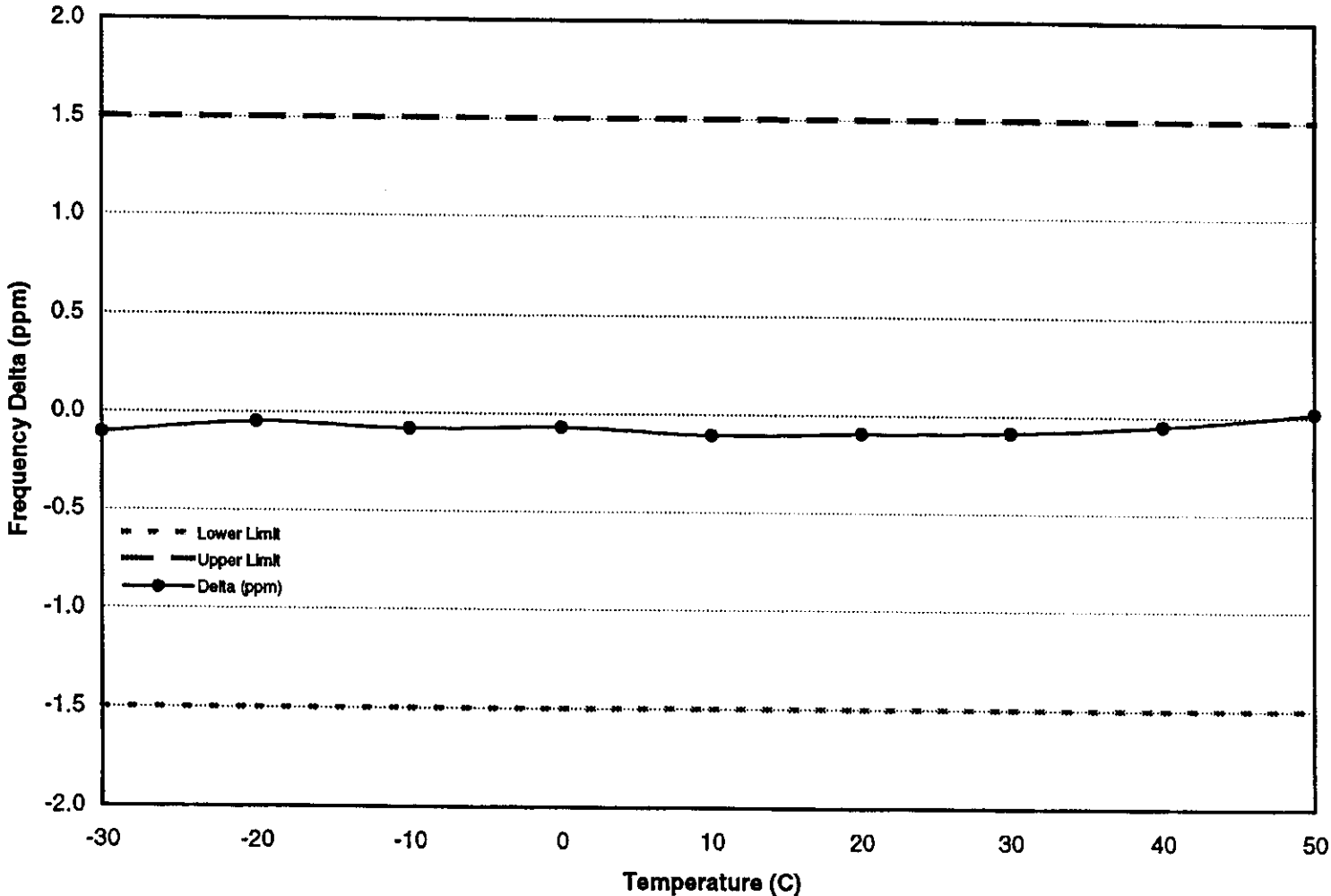
SC4812T @800 MHz
CDMA BTS Frame

Frequency Stability Over Temperature - CSM1



SC4812T @800 MHz
CDMA BTS Frame

Frequency Stability Over Temperature - CSM2



SC4812T @800 MHz
CDMA BTS Frame