

## **SC4812ETL @ 1.9 GHz CDMA BTS**

# **TEST REPORT EXHIBIT**

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**MOTOROLA**

*Cellular Infrastructure Group*

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**FCC ID: IHET6AP1**

## **SECTION A**

# **Summary of RF Measurements**

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET6AP1

## Summary of Radiated RF Measurements

### WORST TRANSMIT RADIATED RF SPUR LEVEL FOR SC4812ETL @1.9 GHz BTS

SPUR FREQUENCY (MHz)	DISTANCE MEASURED (meters)	SPUR LEVEL MEASURED (dB $\mu$ V/meter)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm
75.5487	10	24.93	-59.84	-55.27

Engineer: \_\_\_\_\_

Date

*[Handwritten Signature]* 10/2/00

**APPLICANT: MOTOROLA**

**TRANSCEIVER TYPE: IHET6API**

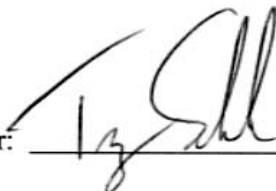
## Summary of Conducted RF Measurements

**SC4812ETL @1.9GHz**

**FCC Part 24 at 46 dBm output (Max power)**

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dB $\mu$ V/meter)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm
25	5793.149	88.91	-18.09	-13

Engineer: \_\_\_\_\_



10/2/00

Date



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FCC ID: IHET6AP1

## **SECTION B**

# **Modulation Characteristics**

## **Maximum Power**

Channel 25  
Maximum Power

IHET6AP1  
SC4812ETL 1.9GHz  
CDMA BTS

Tue Sep 12 2000 11:48

Waveform Quality (CDMA FWD Link, 9600/14400bps)

Results

$\rho$ (Waveform Quality Factor) :	0.98003	
$\tau$ (Time Alignment Error) :	1.04	$\mu$ s
:	1	chip
Carrier Frequency Error :	-2.6	Hz
Carrier Feedthrough :	-36.82	dBc
Magnitude Error :	10.03	% rms
Phase Error :	5.90	deg. rms
Error Vector Magnitude :	14.29	% rms
PN Offset :	0	
Ext. Trigger Delay :	0.000	chip

Parameters

Frequency	:	25 Ch (1931.250MHz)
Reference Level	:	17.0 dBm
Attenuator	:	30.0 dB

**PASS**

OK...

Waveform Quality (CDMA FWD Link, 9600/14400bps)

Results

$\rho$  (Waveform Quality Factor) : 0.97965  
 $\tau$  (Time Alignment Error) : 0.93  $\mu$ s  
: 1 chip  
Carrier Frequency Error : -3.2 Hz  
Carrier Feedthrough : -32.32 dBc  
Magnitude Error : 10.08 % rms  
Phase Error : 6.08 deg. rms  
Error Vector Magnitude : 14.53 % rms  
PN Offset : 0  
Ext. Trigger Delay : 0.000 chip

Parameters

**PASS**

Frequency : 1.988750000 GHz  
Reference Level : 17.0 dBm  
Attenuator : 30.0 dB

CENTER  
1.988750000 GHz

OK...



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**FCC ID: IHET6AP1**

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# **Modulation Characteristics**

## **Minimum Power**



Tue Sep 12 2000 11:33

Waveform Quality (CDMA FWD Link, 9600/14400bps)

Results

$\rho$ (Waveform Quality Factor) :	0.98006
$\tau$ (Time Alignment Error) :	1.04 $\mu$ s
	1 chip
Carrier Frequency Error :	-1.8 Hz
Carrier Feedthrough :	-38.47 dBc
Magnitude Error :	9.97 % rms
Phase Error :	5.95 deg. rms
Error Vector Magnitude :	14.30 % rms
PN Offset :	0
Ext. Trigger Delay :	0.000 chip

Parameters

Frequency :	25 Ch (1931.250MHz)
Reference Level :	5.0 dBm
Attenuator :	20.0 dB

**PASS**

OK...

Waveform Quality (CDMA FWD Link, 9600/14400bps)

Results

$\rho$  (Waveform Quality Factor) : 0.98359  
 $\tau$  (Time Alignment Error) : 1.02  $\mu$ s  
: 1 chip  
Carrier Frequency Error : 2.0 Hz  
Carrier Feedthrough : -28.55 dBc  
Magnitude Error : 9.06 % rms  
Phase Error : 6.02 deg. rms  
Error Vector Magnitude : 13.78 % rms  
PN Offset : 0  
Ext. Trigger Delay : 0.000 chip

Parameters

Frequency : 1.988750000 GHz  
Reference Level : 4.0 dBm  
Attenuator : 20.0 dB

**PASS**



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**FCC ID: IHET6AP1**

## **SECTION C**

# **Spurious & Harmonic Emissions Radiated**

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET6AP1

## Radiated RF Measurements

**WORST CASE RADIATED RF SPUR LEVEL FOR SC4812ETL @ 1.9GHz**

**Radiated 30-1000 MHz FCC 47 CFR part 15 Class B and part 24 measured at 10 Meter**

**Radiated 1 – 20 GHz FCC 47 CFR part 15 Class B and part 24 measured at 3 Meters**


Spur Frequency (MHz)	Axis	Measured Signal Level dBm	Specification 47 CFR Part 15 Class B dBm	Pass/Fail
75.5487	Vertical	-59.84	-55.27	Pass

Converting dBuV/meter to dBm when at 3 meters.

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

Converting dBuV/meter to dBm when at 10 meters.

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

  
Radiated Engineer

  
Date



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FCC ID: IHET6AP1

## **SECTION D**

# **Spurious & Harmonic Emissions Conducted**

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET6API

## Conducted RF Measurements

SC4812ETL @1.9GHz

FCC Part 24 at 46 dBm output (Max power)

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBμV/meter)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm
25	5793.149	88.91	-18.09	-13
1175	5966.237	88.42	-18.58	-13

FCC Max. Limit Per 47 CFR:

“ =Transmitted Power (10 Log<sub>10</sub> (P<sub>watt</sub>)) - (43 + 10 Log<sub>10</sub> (P<sub>watt</sub>))dBW

“ =10 Log<sub>10</sub> (P<sub>watt</sub>) - (43 + 10 Log<sub>10</sub> (P<sub>watt</sub>))dBW

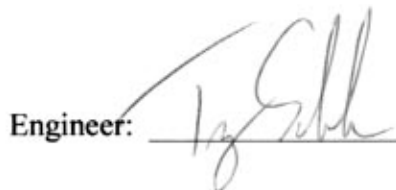
“ =-43 dBW

“ =-13 dBm

Conversion from dBuV to dBm:

dBuV-107 = dBm

Engineer: \_\_\_\_\_



10/2/00  
Date



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*Cellular infrastructure group*

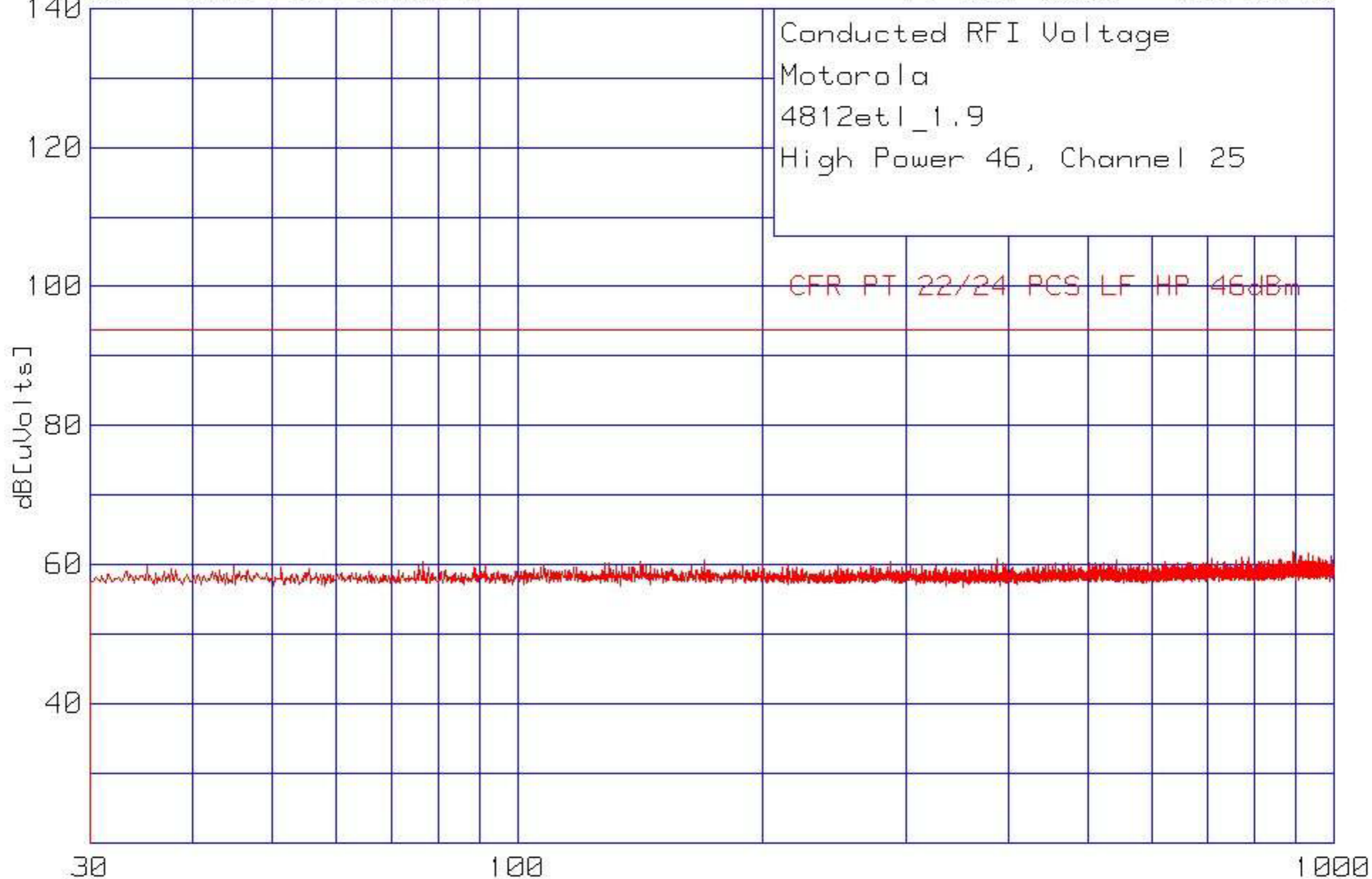
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FCC ID: IHET6AP1

# **SPURIOUS & HARMONIC EMISSIONS CONDUCTED**

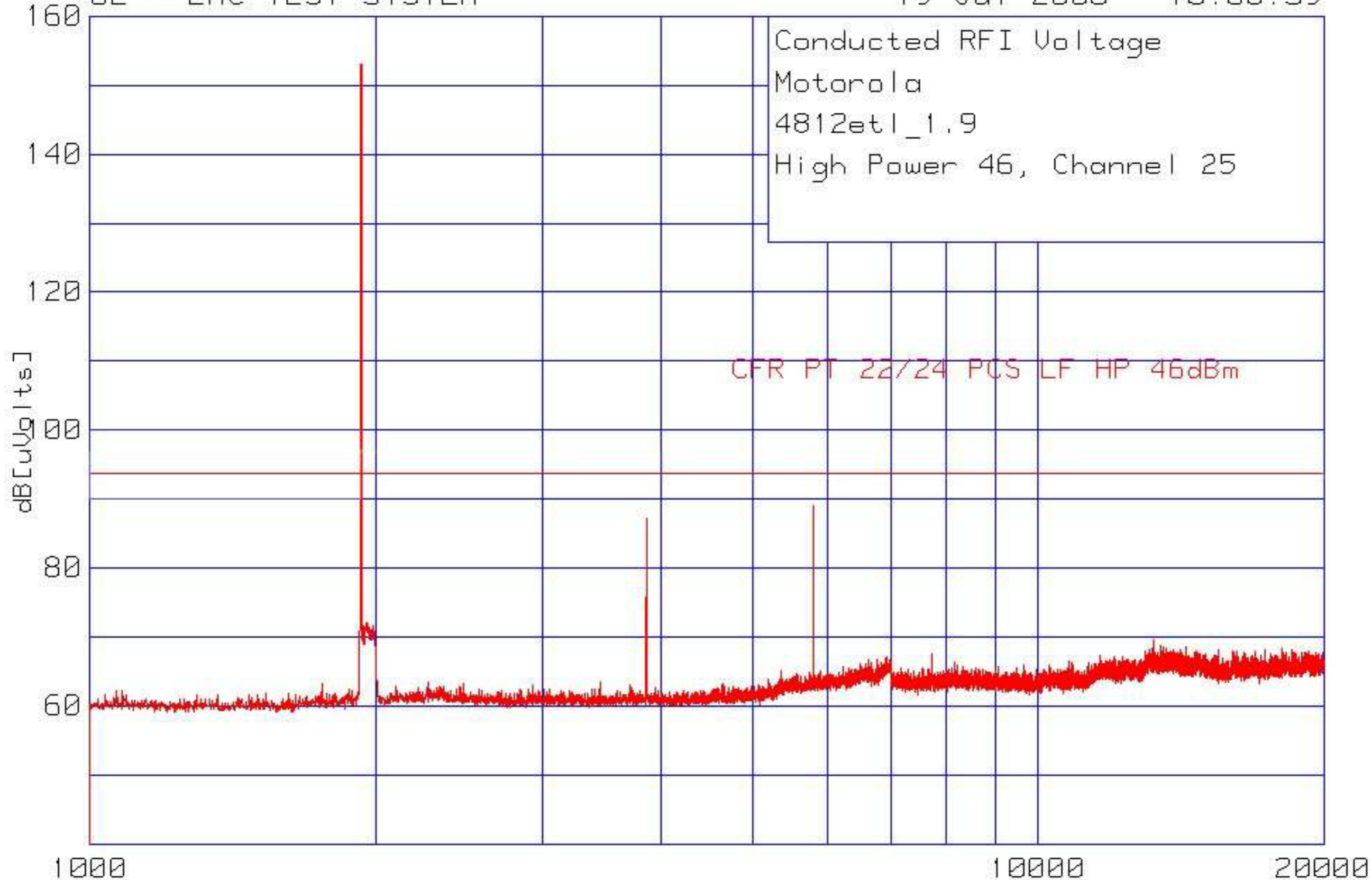
## **CDMA Transmitter Channel 25**

### **Maximum Power**

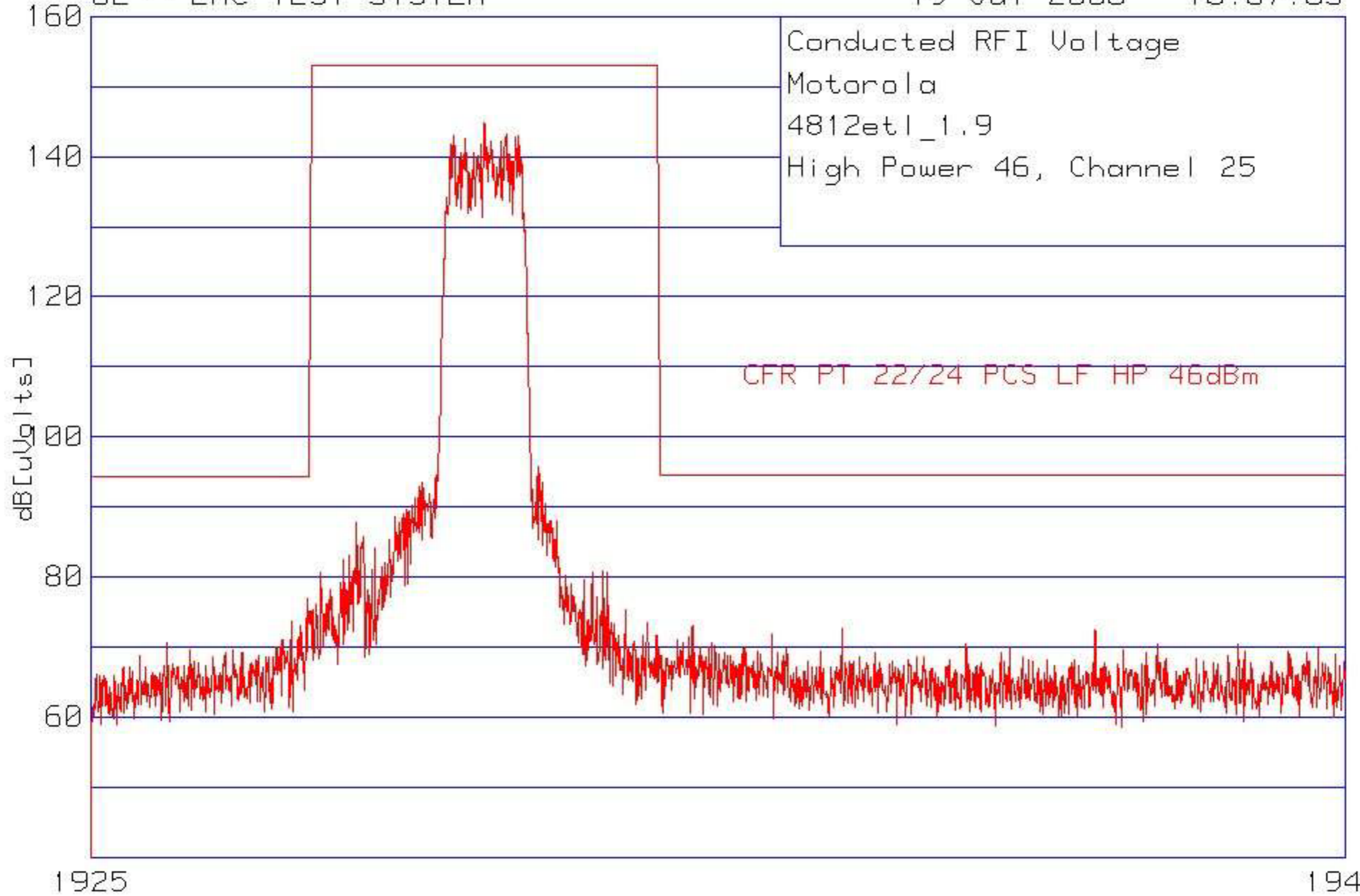


IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS





IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



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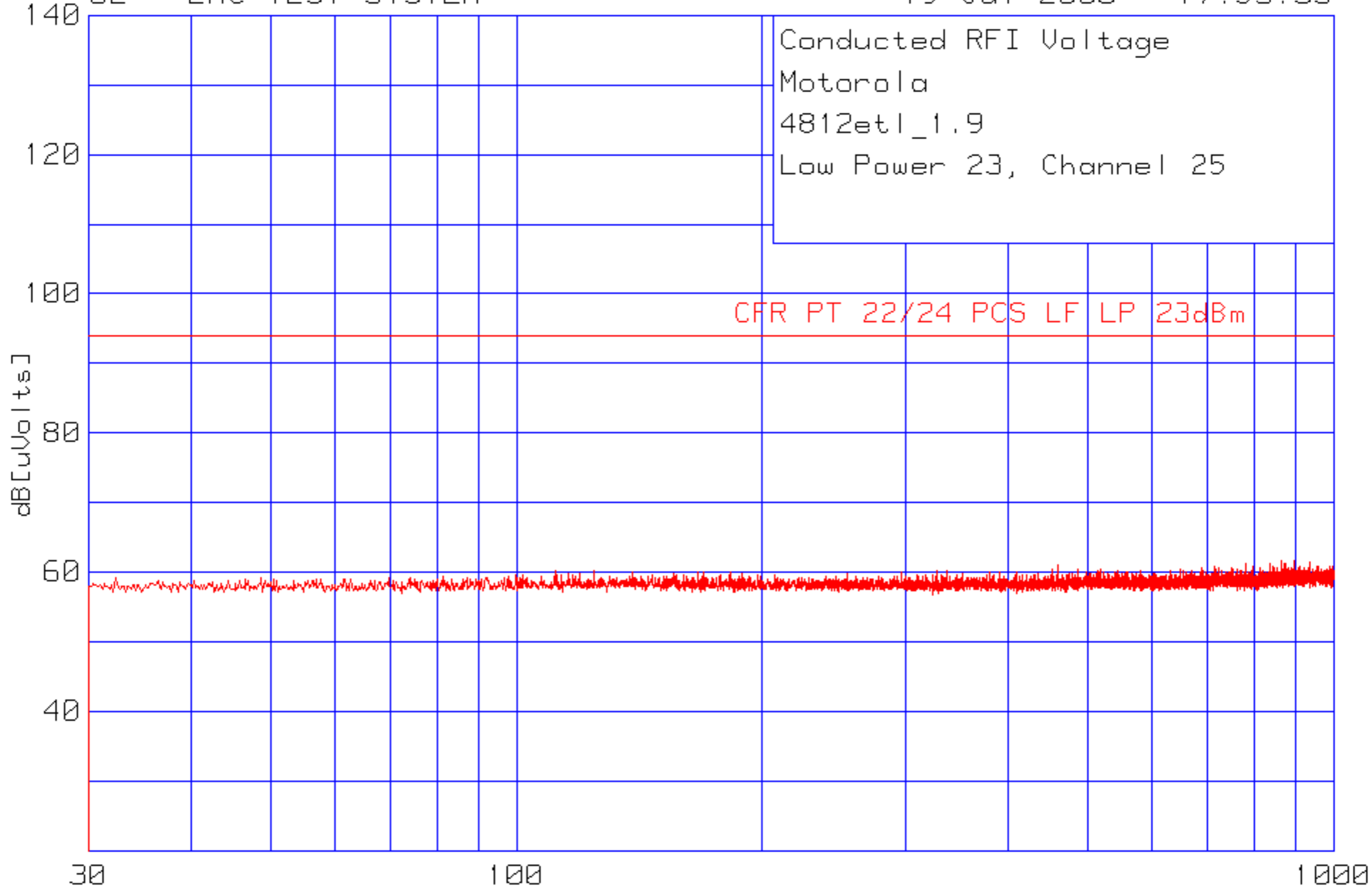
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FCC ID: IHET6AP1

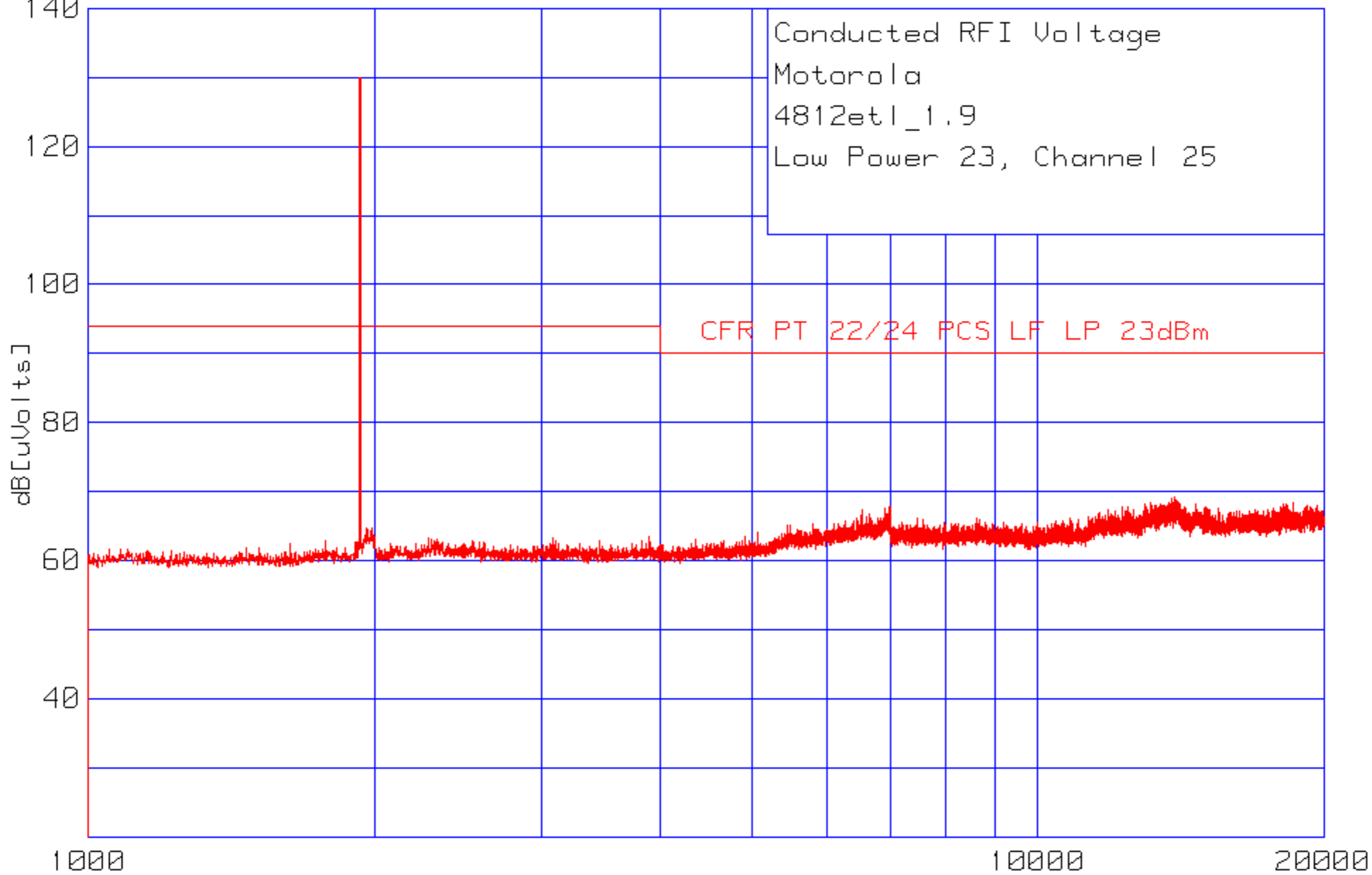
# **SPURIOUS & HARMONIC EMISSIONS CONDUCTED**

## **CDMA Transmitter Channel 25**

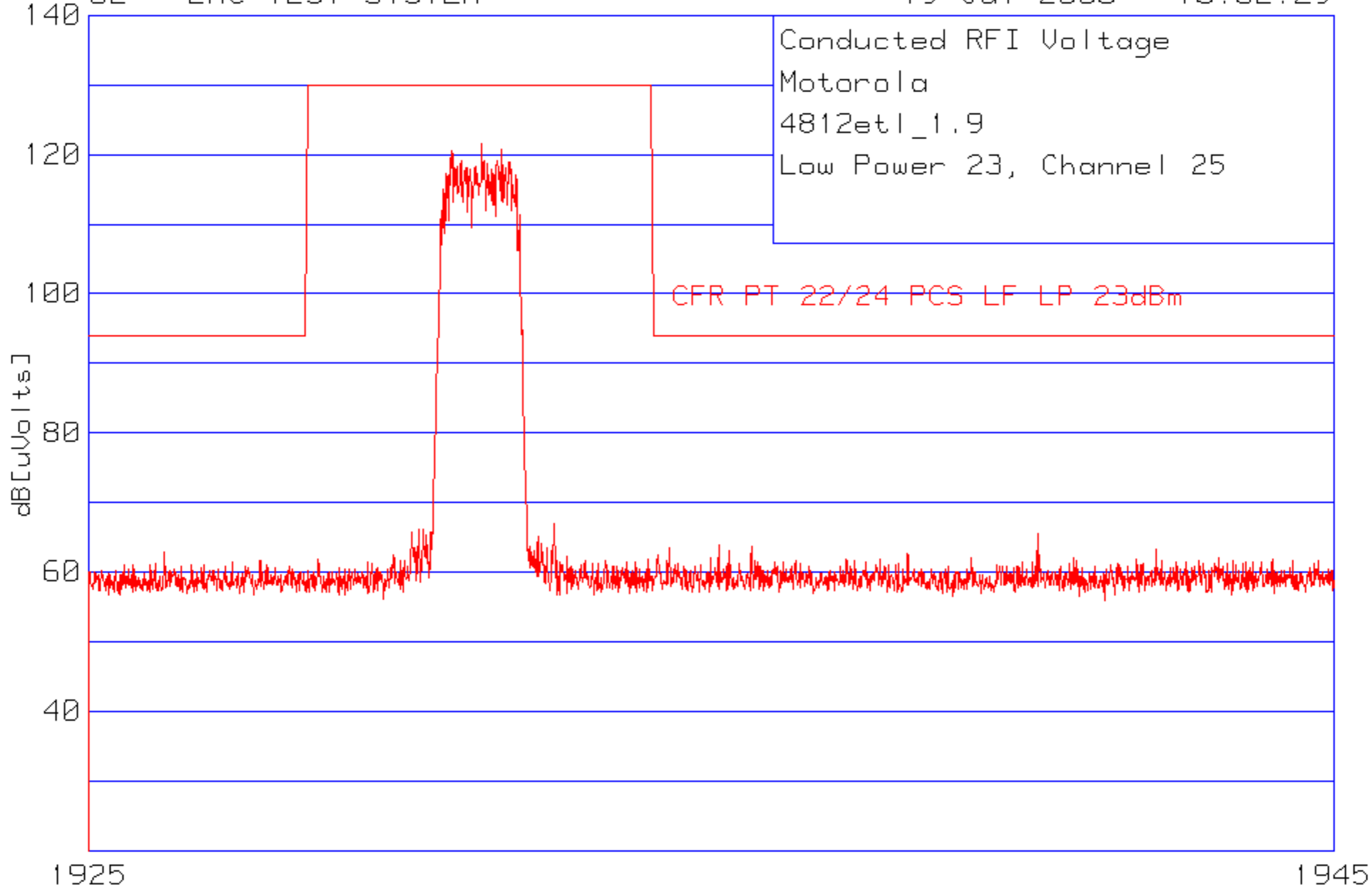
### **Minimum Power**



IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



**MOTOROLA**

*Network Systems Group  
CDMA Systems Division*

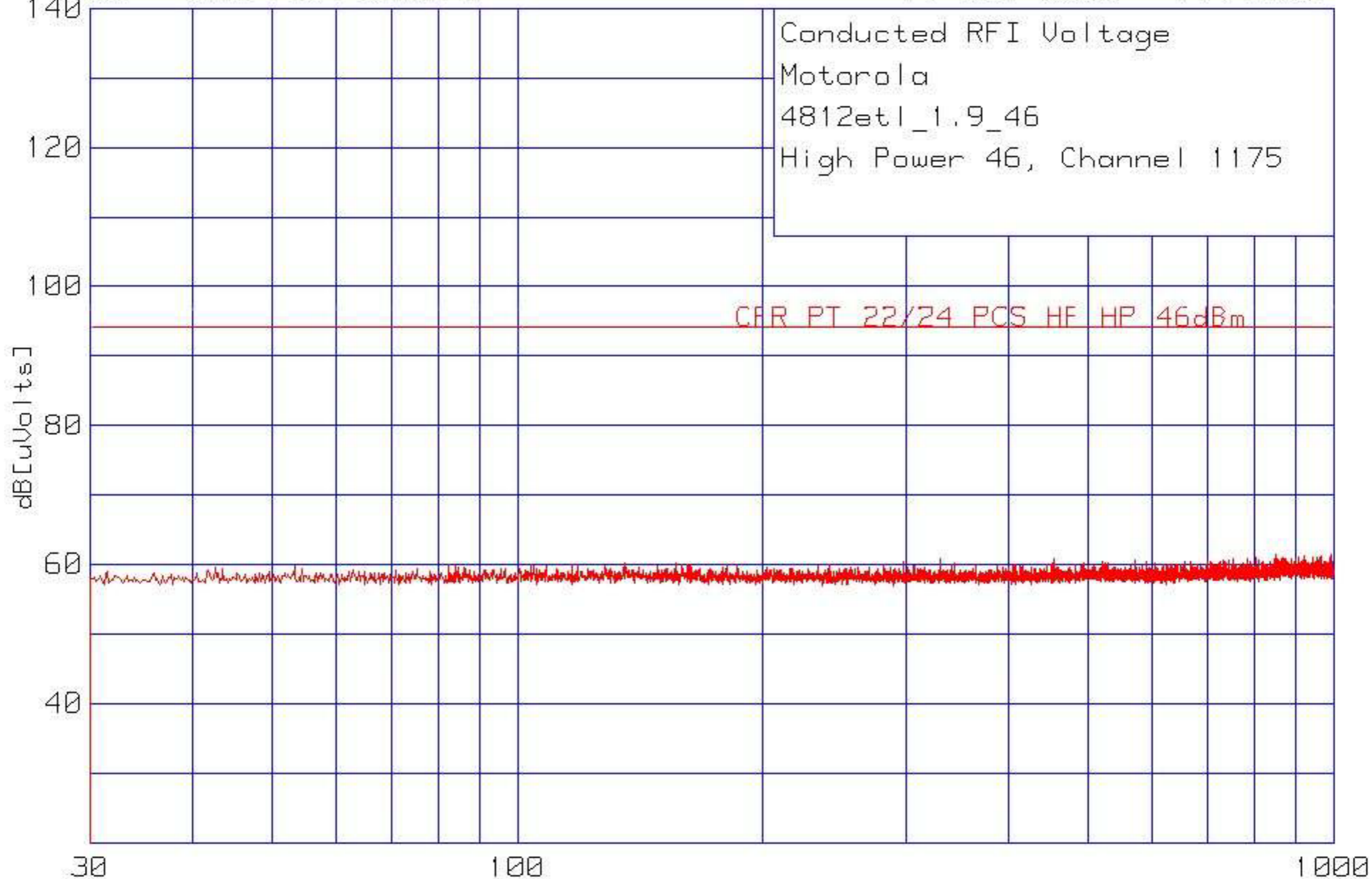
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FCC ID: IHET6AP1

# **SPURIOUS & HARMONIC EMISSIONS CONDUCTED**

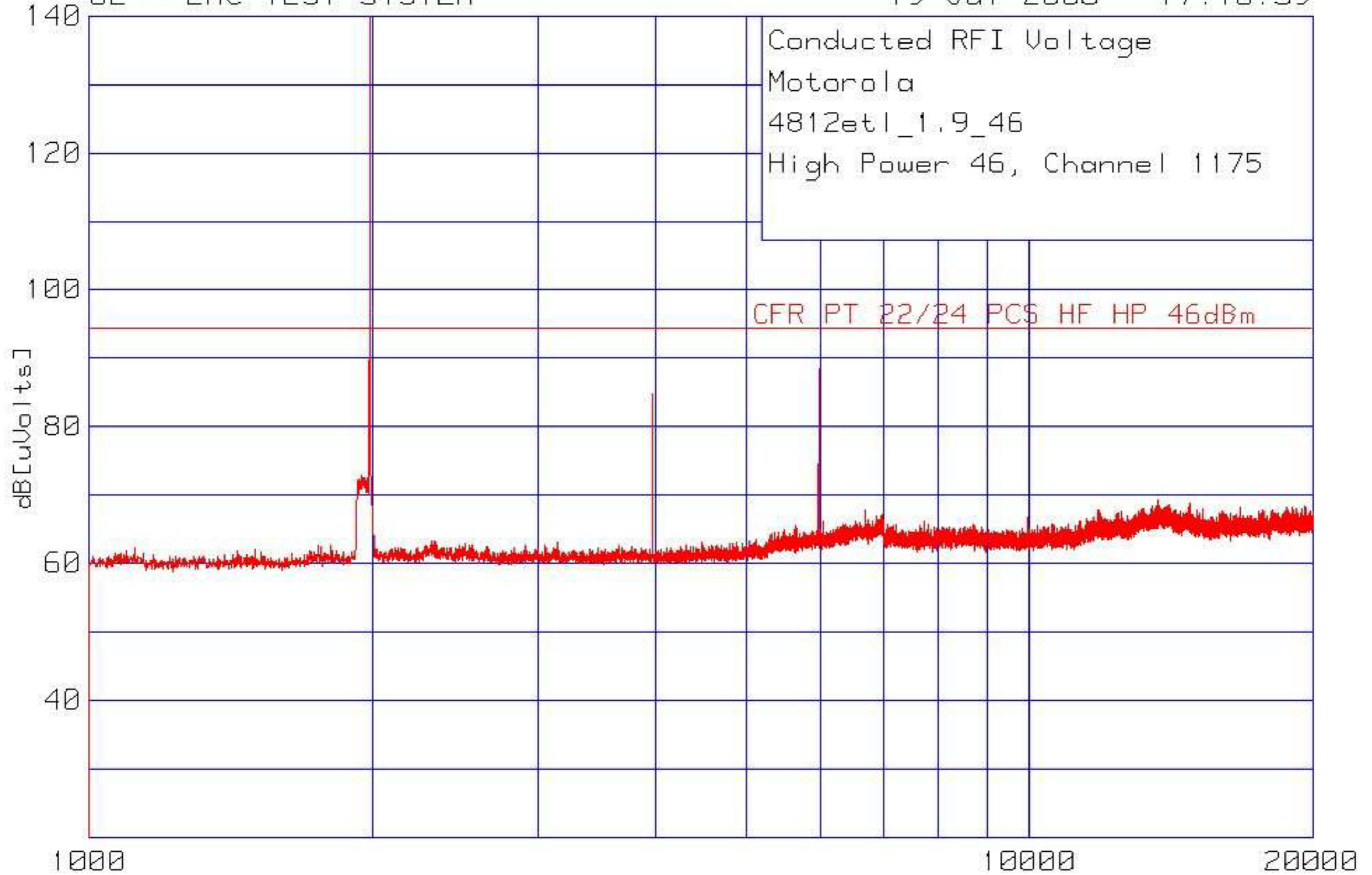
## **CDMA Transmitter Channel 1175**

### **Maximum Power**

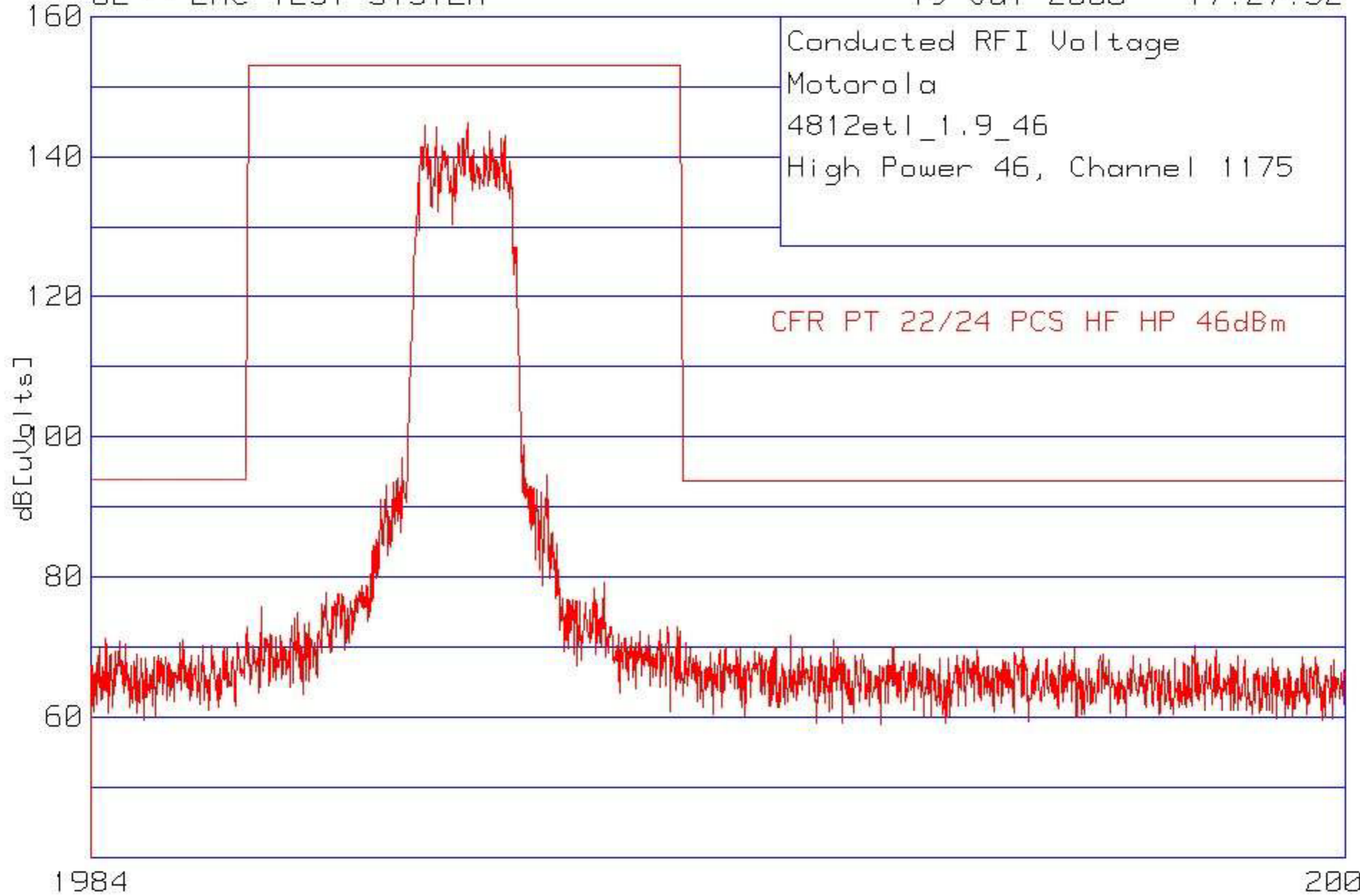


IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS





IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



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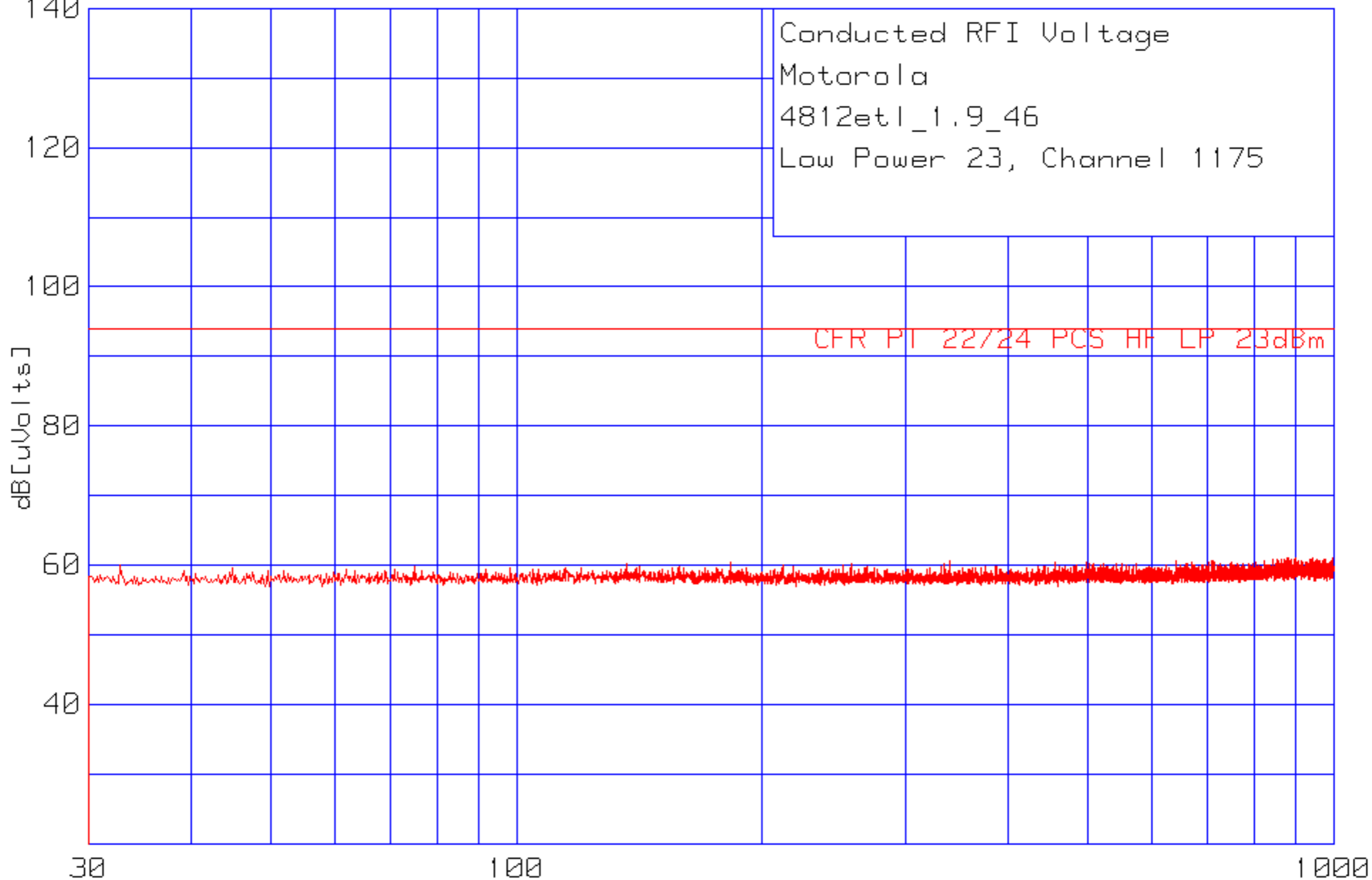
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FCC ID: IHET6AP1

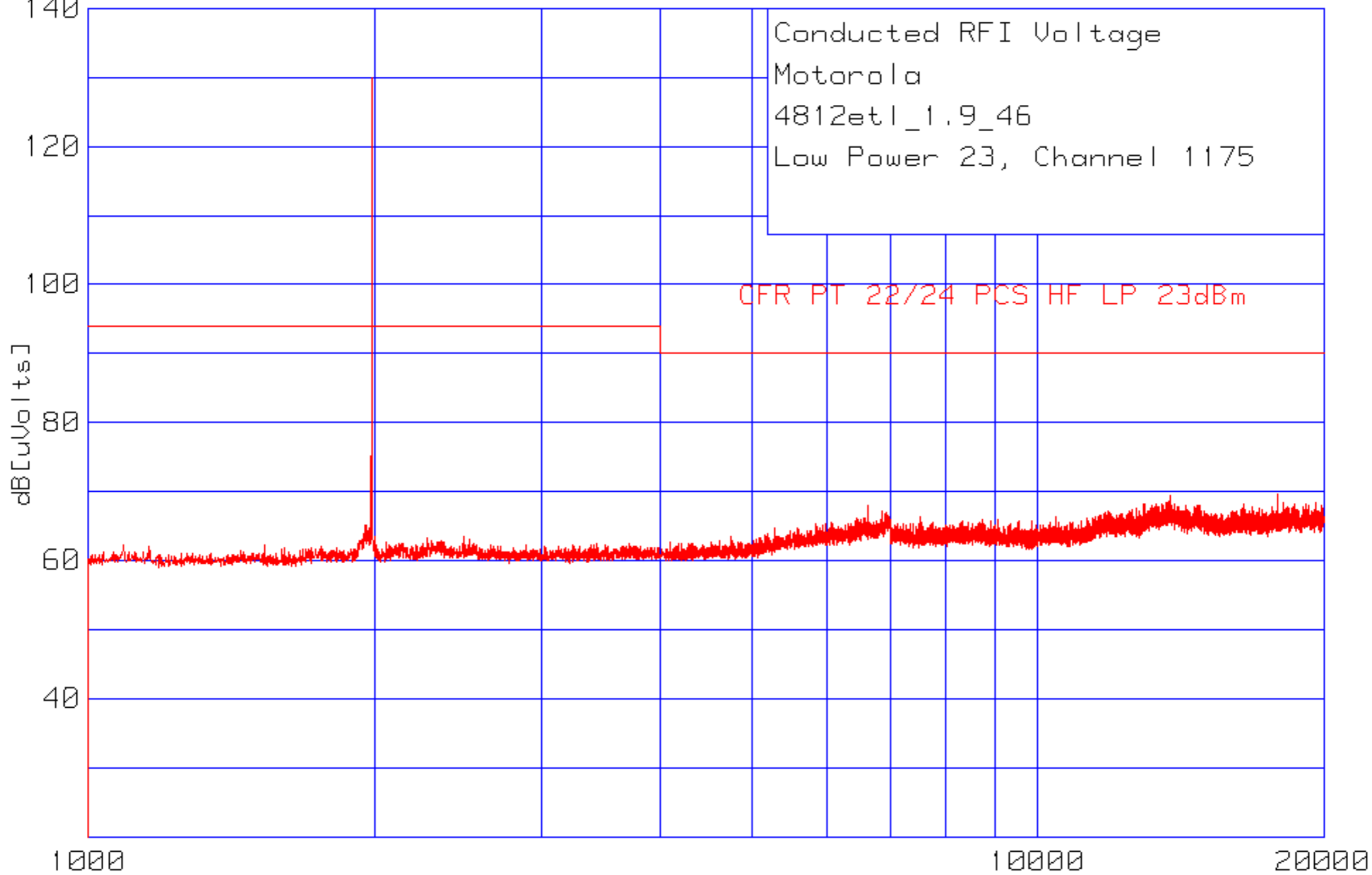
# **SPURIOUS & HARMONIC EMISSIONS CONDUCTED**

## **CDMA Transmitter Channel 1175**

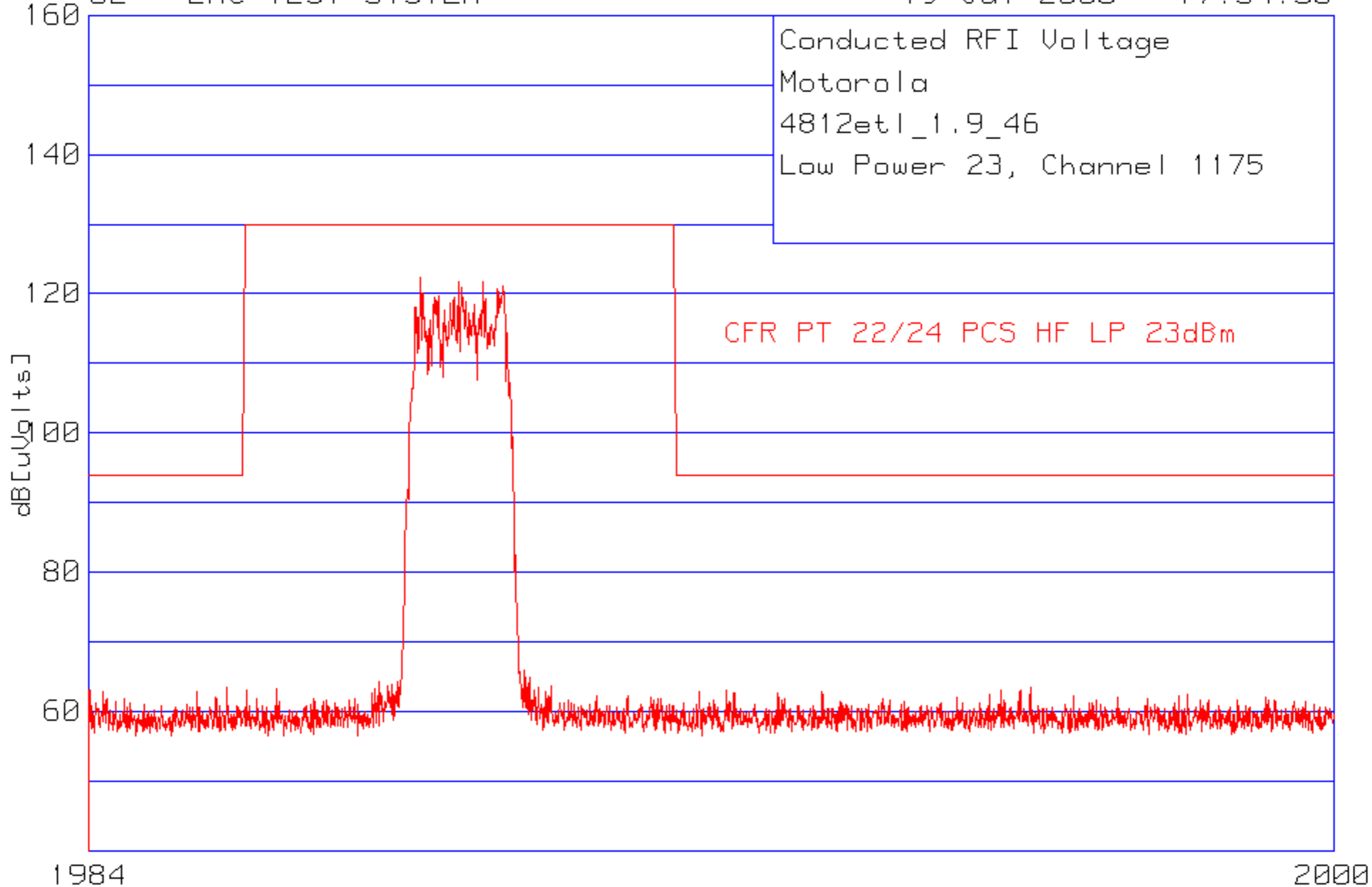
### **Minimum Power**



IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



Conducted RFI Voltage  
Motorola  
4812et1\_1.9\_46  
Low Power 23, Channel 1175

CFR PT 22/24 PCS HF LP 23dBm

IHET6AP1  
SC4812ETL 1.9 GHz  
CDMA BTS



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**FCC ID: IHET6AP1**

## **SECTION E**

# **Occupied Bandwidth**

## **Maximum Power**

Channel 25  
Maximum Power

IHET6AP1  
SC4812ETL 1.9GHz  
CDMA BTS

Mon Sep 11 2000 17:27

REF 32.0 dBm  
10 dB/

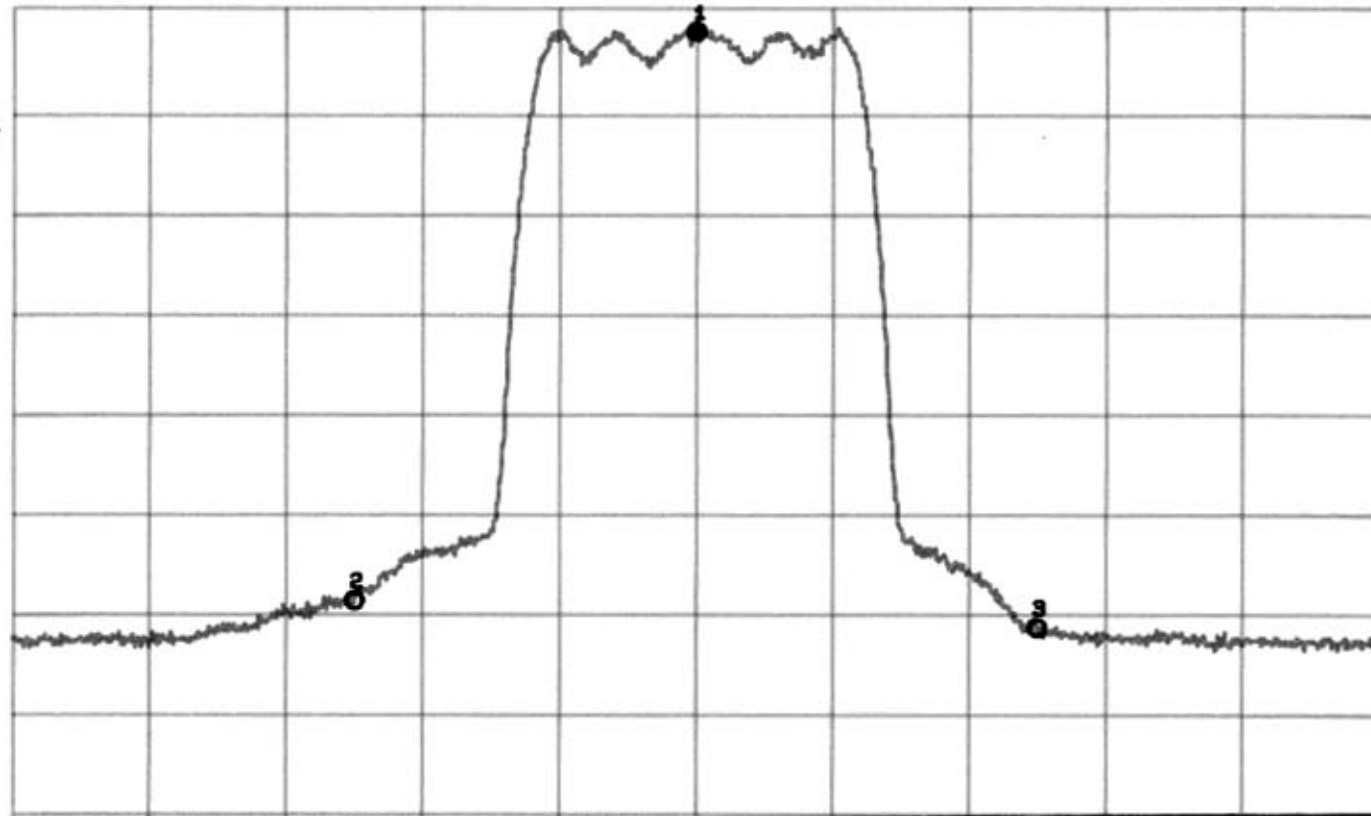
A\_Avg

B\_Blank

MKR 1.931250 GHz  
29.71 dBm

LOF

200  
200



Multi Marker List

Marker	Frequency (GHz)	Power (dBm)
1:	1.931250	29.71
2:	1.930000	-26.82
3:	1.932500	-29.56

CENTER 1.931250 GHz

SPAN 5.00 MHz

\*RBW 30 kHz

\*VBW 100 kHz

\*SWP 50 ms

\*ATT 30 dB

EXT



Channel 1175  
Maximum Power

IHET6AP1  
SC4812ETL 1.9GHz  
CDMA BTS

Mon Sep 11 2000 17:46

REF 32.0 dBm  
10 dB/

A\_Avg

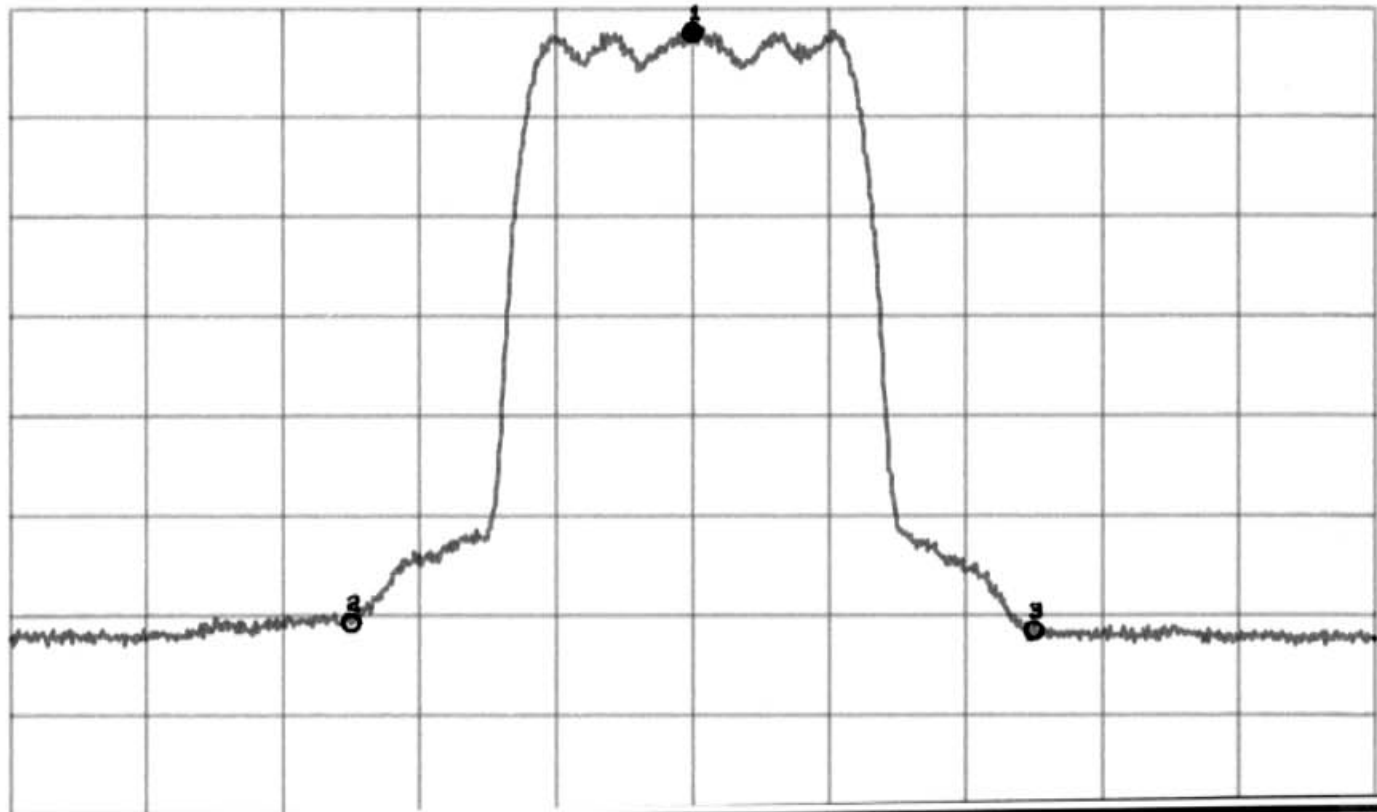
B\_Blank

MKR 1.988750 GHz

29.81 dBm

LOF

200  
200



Multi Marker List

Marker	Frequency (GHz)	Power (dBm)
1:	1.988750	29.81
2:	1.987500	-28.99
3:	1.990000	-29.73

CENTER 1988.750 MHz

SPAN 5.00 MHz

\*RBW 30 KHz

\*VBW 100 KHz

\*SWP 50 ms

\*ATT 30 dB



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**FCC ID: IHET6AP1**

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# **Occupied Bandwidth**

## **Minimum Power**

Channel 25  
Minimum Power

IHET6AP1  
SC4812ETL 1.9GHz  
CDMA BTS

Mon Sep 11 2000 17:08

REF 12.6 dBm  
10 dB/

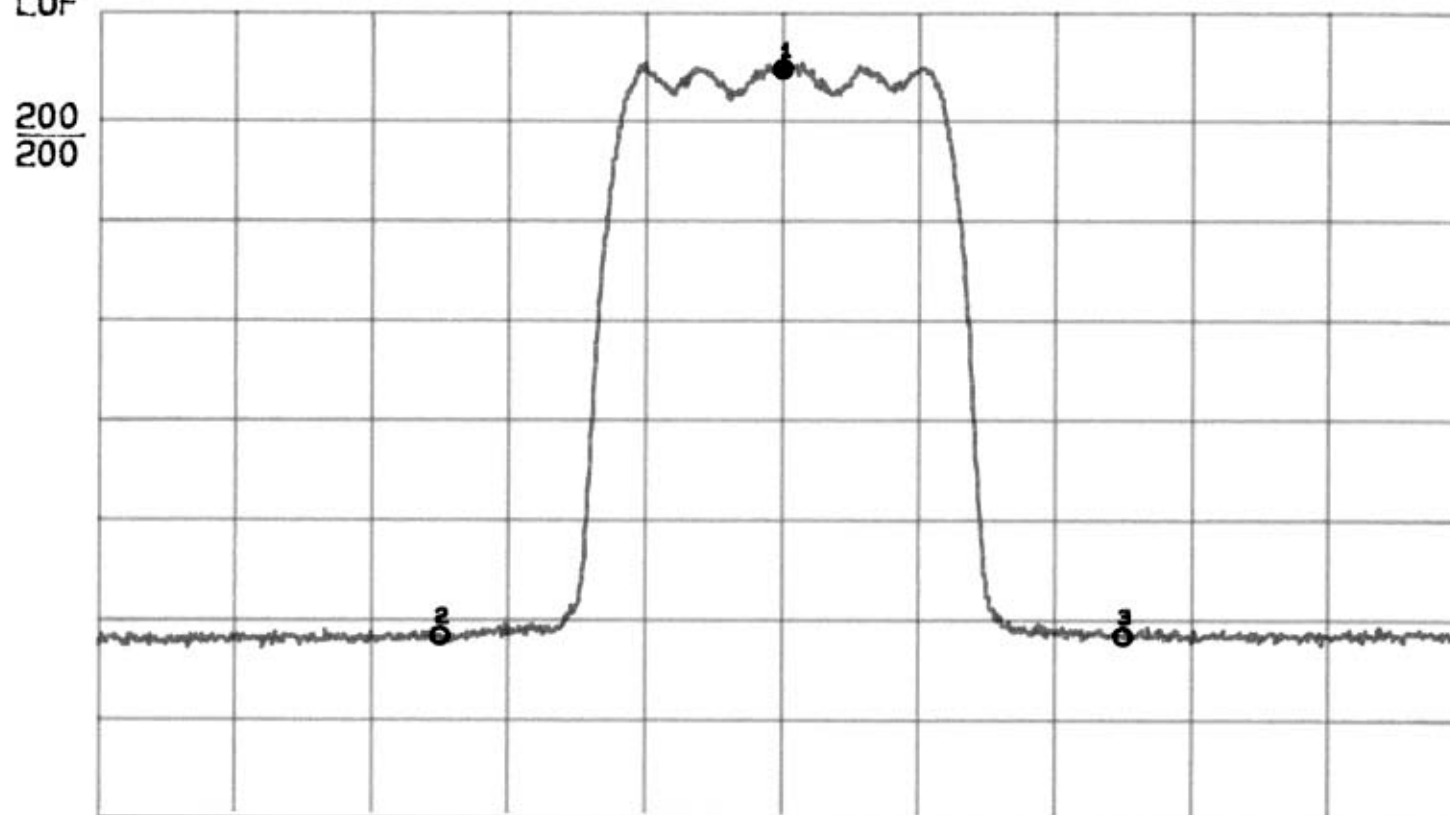
A\_Avg

B\_Blank

MKR 1.931250 GHz

7.03 dBm

LOF



Multi Marker List

	1:	1.931250 GHz	7.03 dBm
	2:	1.930000 GHz	-49.13 dBm
EXT	3:	1.932500 GHz	-49.10 dBm

CENTER 1.931250 GHz

SPAN 5.00 MHz

\*RBW 30 kHz

\*VBW 100 kHz

\*SWP 50 ms

\*ATT 20 dB

Channel 1175  
Minimum Power

IHET6AP1  
SC4812ETL 1.9GHz  
CDMA BTS

Mon Sep 11 2000 18:03

REF 12.6 dBm  
10 dB/

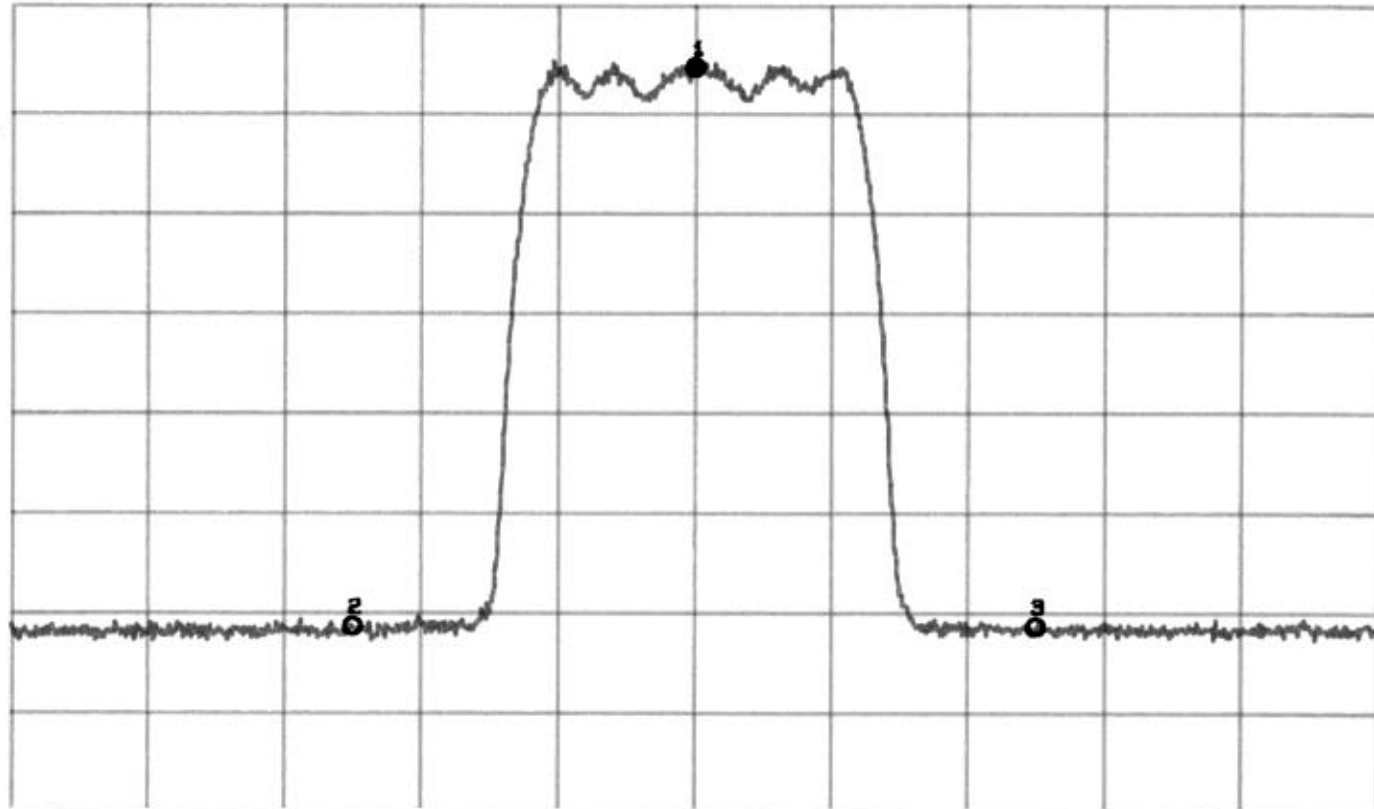
A\_Avg

B\_Blank

MKR 1.988750 GHz  
6.53 dBm

LOF

200  
200



Multi Marker List

Marker	Frequency (GHz)	Power (dBm)
1:	1.988750	6.53
2:	1.987500	-48.81
3:	1.990000	-49.03

CENTER 1988.750 MHz

SPAN 5.00 MHz

\*RBW 30 kHz

\*VBW 100 kHz

\*SWP 50 ms

\*ATT 20 dB



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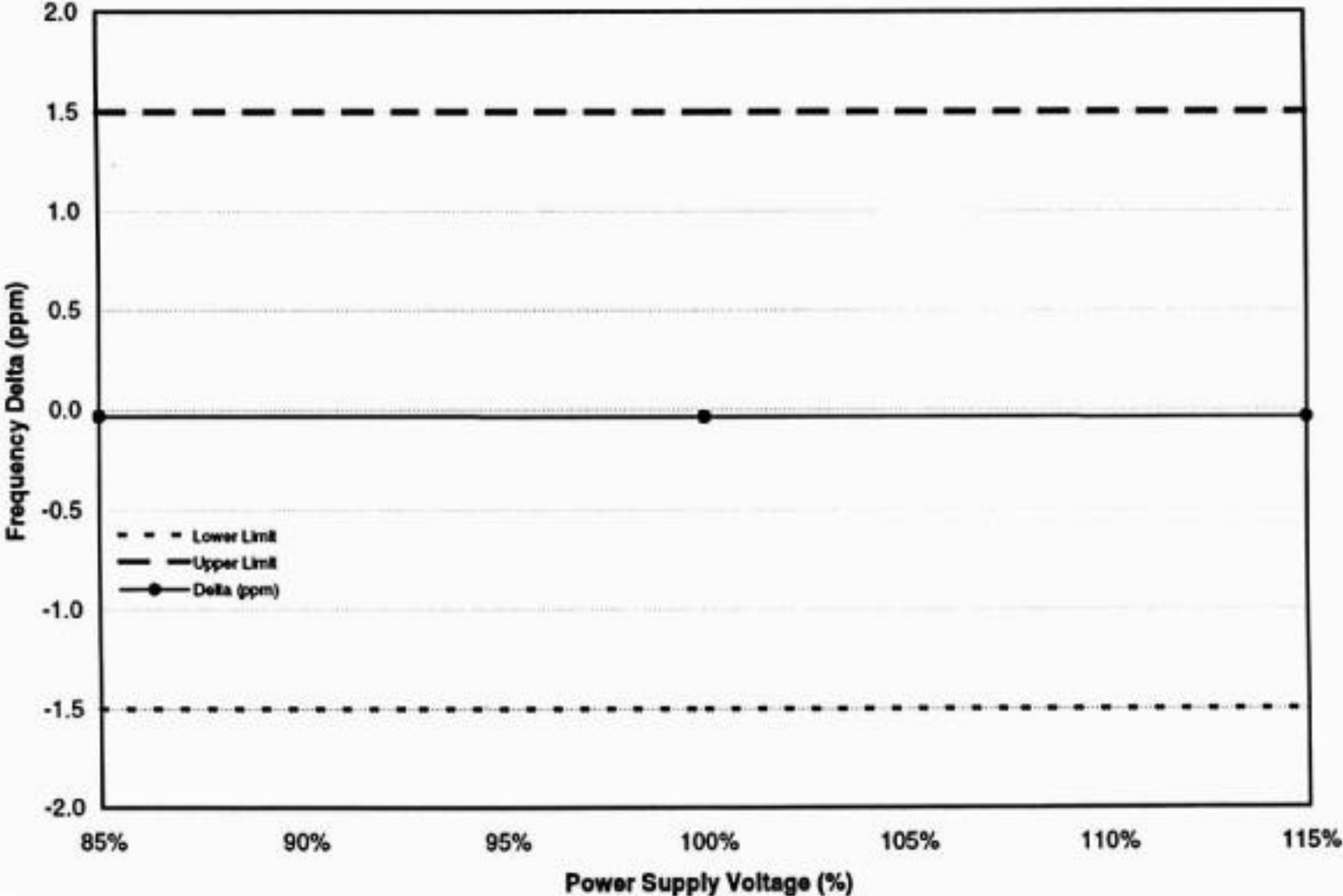
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**FCC ID: IHET6AP1**

## **SECTION F**

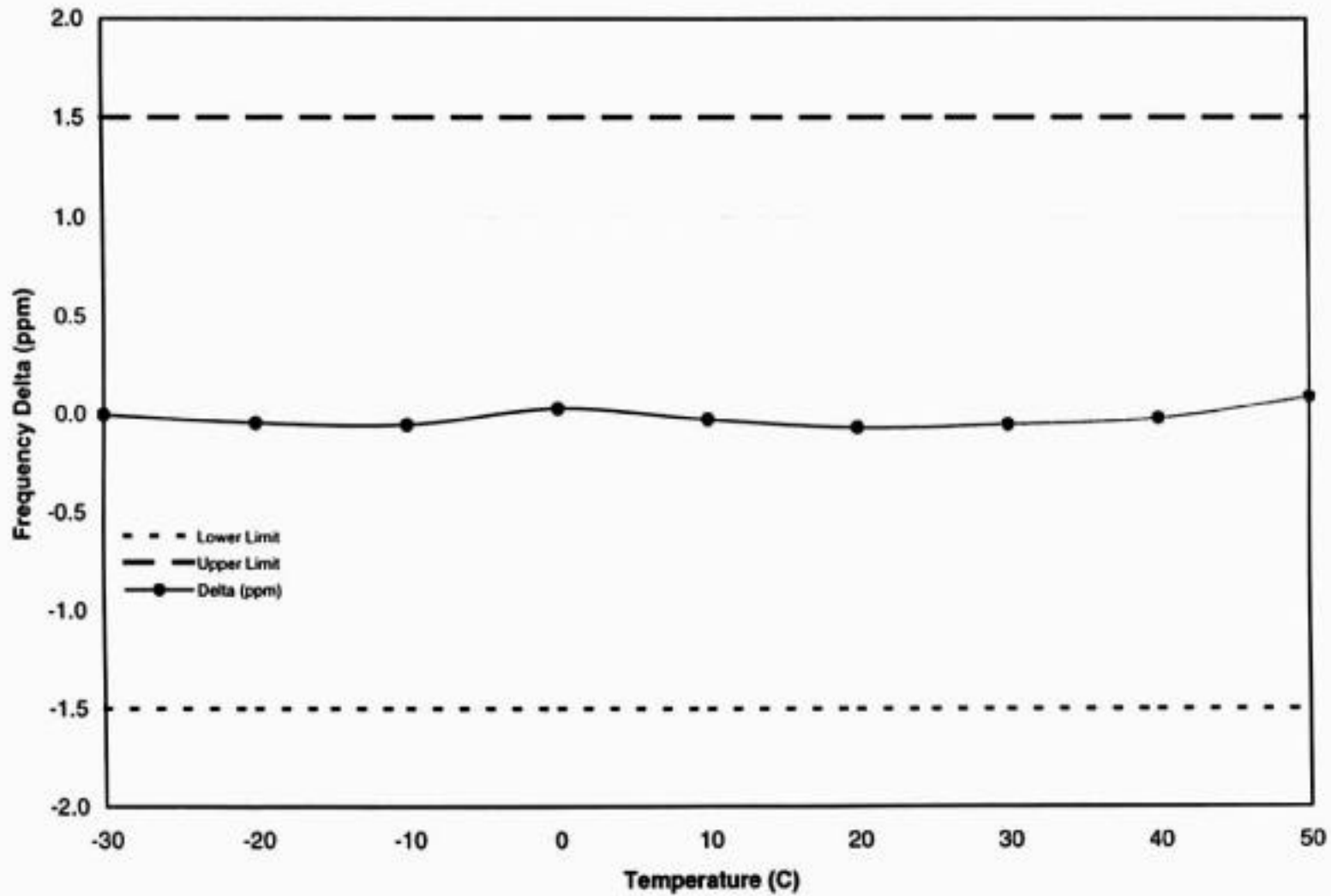
# **Frequency Stability**

### Frequency Stability with Varying Supply Voltage - CSM1



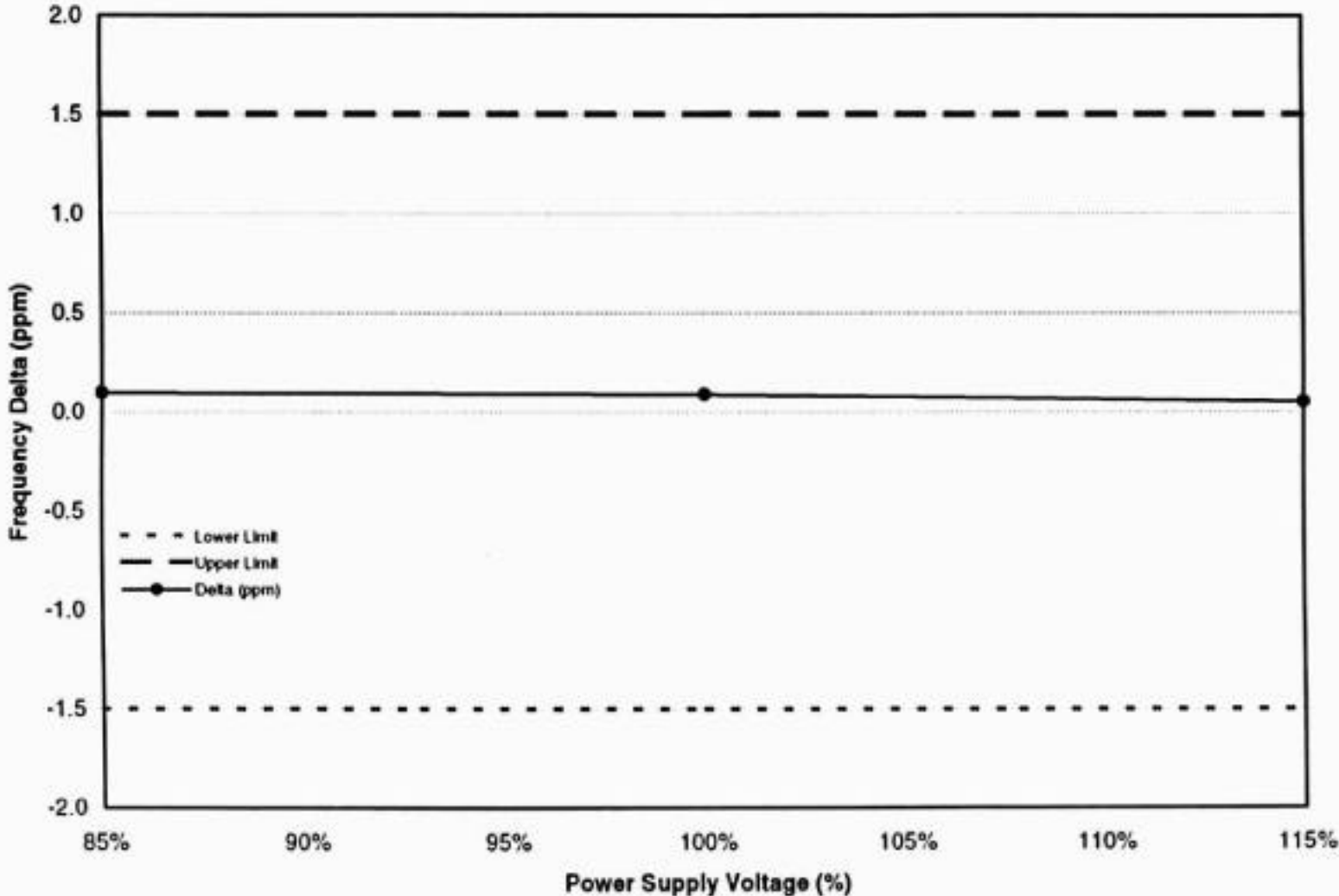
IHET6AP1  
SC4812ET Lite 1.9GHz  
CDMA BTS

### Frequency Stability Over Temperature - CSM1



IHET6AP1  
SC4812ET Lite 1.9GHz  
CDMA BTS

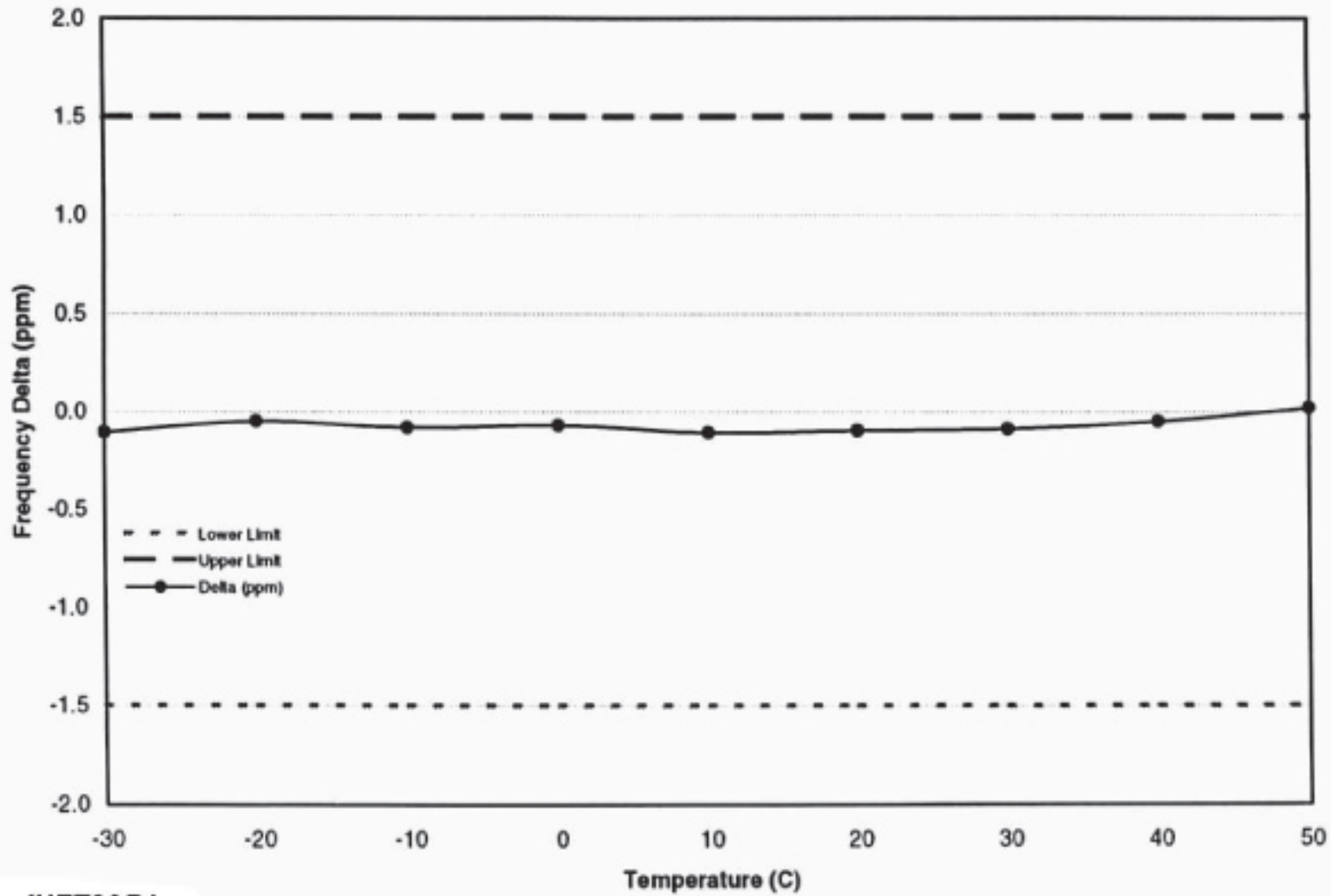
### Frequency Stability with Varying Supply Voltage - CSM2



IHET6AP1  
SC4812ET Lite 1.9GHz  
CDMA BTS



### Frequency Stability Over Temperature - CSM2



IHET6AP1  
SC4812ET Lite 1.9GHz  
CDMA BTS