

# **SC4812ETL @ 800 MHz CDMA BTS FRAME**

## **TEST REPORT EXHIBIT**

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CDMA Systems Division*

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**FCC ID: IHET5AP2**

## **SECTION A**

# **SUMMARY OF RF MEASUREMENTS**

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5AP2

## Summary of Radiated RF Measurements

### Worst Case Radiated RF Spur Levels for SC4812ETL @ 800MHz

<i>Radiated Data</i>			<i>Substituted Power</i>				<i>Spec</i>	<i>Result</i>
<b>TX Channel</b>	<b>Spurious Frequency (MHz)</b>	<b>Antenna Polarity</b>	<b>Measured Radiated Field Strength (dBuV/M)</b>	<b>Measured Radiated Field Strength (dBm) (Note 1)</b>	<b>TX Antenna Terminal Voltage (dBm) (Note 2)</b>	<b>EDRP (dBm) (Note 3)</b>	<b>FCC Part 22 MAX LIMIT (dBm)</b>	<b>Pass/Fail</b>
777	1786.844	H	45.4	-49.828	-58.3	-53.35	-13	Pass

Notes:

1. Converting dBuV/M to dBm at 3 meters  
 $(\text{dBuV/M}) + 9.542 - 104.77 \text{ dB} = \text{dBm}$   
Converting dBuV/M to dBm at 10 meters  
 $(\text{dBuV/M}) + 20 - 104.77 \text{ dB} = \text{dBm}$
2. The same 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

12/17/00  
Date

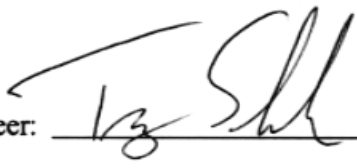
**APPLICANT: MOTOROLA**

**TRANSCEIVER TYPE: IHET5AP2**

## Summary of Conducted RF Measurements

**SC4812ETL @ 800MHz**

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBμV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm
777	2679.58	92.23	-14.77	-13

Engineer: 

12/17/00

Date



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## **SECTION B**

# **MODULATION CHARACTERISTICS**



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SECTION B

FCC ID: IHET5AP2

# MODULATION CHARACTERISTICS

## Maximum Power

Channel 1013  
869.70 MHz  
Maximum Power

IHET5AP2  
SC4812ETL @ 800 MHz  
CDMA BTS Frame

Fri Oct 27 2000 17:02

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

Results

$\rho$ (Waveform Quality Factor) :	0.98320	
$\tau$ (Time Alignment Error) :	0.92	$\mu$ s
	1	chip
Carrier Frequency Error :	-1.8	Hz
Carrier Feedthrough :	-33.13	dBc
Magnitude Error :	9.28	% rms
Phase Error :	5.42	deg. rms
Error Vector Magnitude :	13.16	% rms
PN Offset :	0	
Ext. Trigger Delay :	0.000	chip

Parameters

**PASS**

Frequency	:	869.700000 MHz
Reference Level	:	57.0 dBm
Attenuator	:	40.0 dB

OK...

Channel 777  
893.31 MHz  
Maximum Power

IHET5AP2  
SC4812ETL @ 800 MHz  
CDMA BTS Frame

Fri Oct 27 2000 16:52

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

Results

$\rho$ (Waveform Quality Factor) :	0.98219	
$\tau$ (Time Alignment Error) :	0.87	$\mu$ s
	1	chip
Carrier Frequency Error :	-2.4	Hz
Carrier Feedthrough :	-33.77	dBc
Magnitude Error :	9.51	% rms
Phase Error :	5.95	deg. rms
Error Vector Magnitude :	13.97	% rms
PN Offset :	0	
Ext. Trigger Delay :	0.000	chip

Parameters

**PASS**

Frequency : 893.310000 MHz  
Reference Level : 57.0 dBm  
Attenuator : 40.0 dB

OK...





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SECTION B

FCC ID: IHET5AP2

# MODULATION CHARACTERISTICS

## Minimum Power

Channel 1013  
869.70 MHz  
Minimum Power

IHET5AP2  
SC4812ETL @ 800 MHz  
CDMA BTS Frame

Fri Oct 27 2000 16:58

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

Results

$\rho$ (Waveform Quality Factor) :	0.98321	
$\tau$ (Time Alignment Error) :	0.92	$\mu\text{s}$
	1	chip
Carrier Frequency Error :	-2.6	Hz
Carrier Feedthrough :	-33.64	dBc
Magnitude Error :	9.24	% rms
Phase Error :	5.54	deg. rms
Error Vector Magnitude :	13.27	% rms
PN Offset :	0	
Ext. Trigger Delay :	0.000	chip

Parameters

Frequency : 869.700000 MHz  
Reference Level : 34.0 dBm  
Attenuator : 20.0 dB

**PASS**

OK...

Channel 777  
893.31 MHz  
Minimum Power

IHET5AP2  
SC4812ETL @ 800 MHz  
CDMA BTS Frame

Fri Oct 27 2000 16:55

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

Results

$\rho$ (Waveform Quality Factor) :	0.98284	
$\tau$ (Time Alignment Error) :	0.87	$\mu$ s
	1	chip
Carrier Frequency Error :	0.3	Hz
Carrier Feedthrough :	-39.36	dBc
Magnitude Error :	9.32	% rms
Phase Error :	5.43	deg. rms
Error Vector Magnitude :	13.20	% rms
PN Offset :	0	
Ext. Trigger Delay :	0.000	chip

Parameters

**PASS**

Frequency	:	893.310000 MHz
Reference Level	:	34.0 dBm
Attenuator	:	20.0 dB

OK...



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## **SECTION C**

# **SPURIOUS & HARMONIC EMISSIONS RADIATED**

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5AP2

## Radiated RF Measurements

### Worst Case Radiated RF Spur Levels for SC4812ETL @ 800 MHz

<i>Radiated Data</i>			<i>Substituted Power</i>				<i>Spec</i>	<i>Result</i>
<b>TX Channel</b>	<b>Spurious Frequency (MHz)</b>	<b>Antenna Polarity</b>	<b>Measured Radiated Field Strength (dBuV/M)</b>	<b>Measured Radiated Field Strength (dBm) (Note 1)</b>	<b>TX Antenna Terminal Voltage (dBm) (Note 2)</b>	<b>EDRP (dBm) (Note 3)</b>	<b>FCC Part 22 MAX LIMIT (dBm)</b>	<b>Pass/Fail</b>
777	1786.844	H	45.4	-49.828	-58.3	-53.35	-13	Pass
777	2680.217	V	33.7	-61.528	-70.9	-65.25	-13	Pass
1013	1739.55	H	40.2	-55.028	-64.2	59.35	-13	Pass
1013	1739.353	V	29.1	-66.128	-76.2	-71.35	-13	Pass

Notes:

1. Converting dBuV/M to dBm at 3 meters  
 $(\text{dBuV/M}) + 9.542 - 104.77 \text{ dB} = \text{dBm}$   
 Converting dBuV/M to dBm at 10 meters  
 $(\text{dBuV/M}) + 20 - 104.77 \text{ dB} = \text{dBm}$
2. The same 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.
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Radiated Engineer

12/17/00

Date



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## **SECTION D**

# **SPURIOUS & HARMONIC EMISSIONS CONDUCTED**

**NOTE:** The plots for conducted spurious and harmonic emissions are measured in peak mode. The higher (than 46.0 dBm) levels measured in peak mode are expected, due to typical CDMA peak to average performance. The average power level was set to 46.0 dBm using an HP438A power meter.

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5AP2

## Conducted RF Measurements

SC4812ETL @ 800MHz

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBμV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm
777	2679.58	92.23	-14.77	-13
1013	2609.767	91.61	-15.39	-13

FCC Max. Limit Per 47 CFR:

“ =Transmitted Power ( $10 \log_{10} (P_{\text{watt}})$ ) - ( $43 + 10 \log_{10} (P_{\text{watt}})$ )dBW

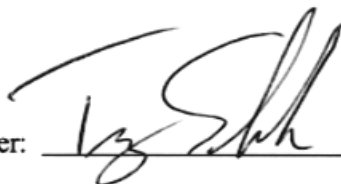
“ = $10 \log_{10} (P_{\text{watt}})$  - ( $43 + 10 \log_{10} (P_{\text{watt}})$ )dBW

“ =-43 dBW

“ =-13 dBm

dBuV-107 = dBm

Engineer:



12/17/00

Date



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SECTION D

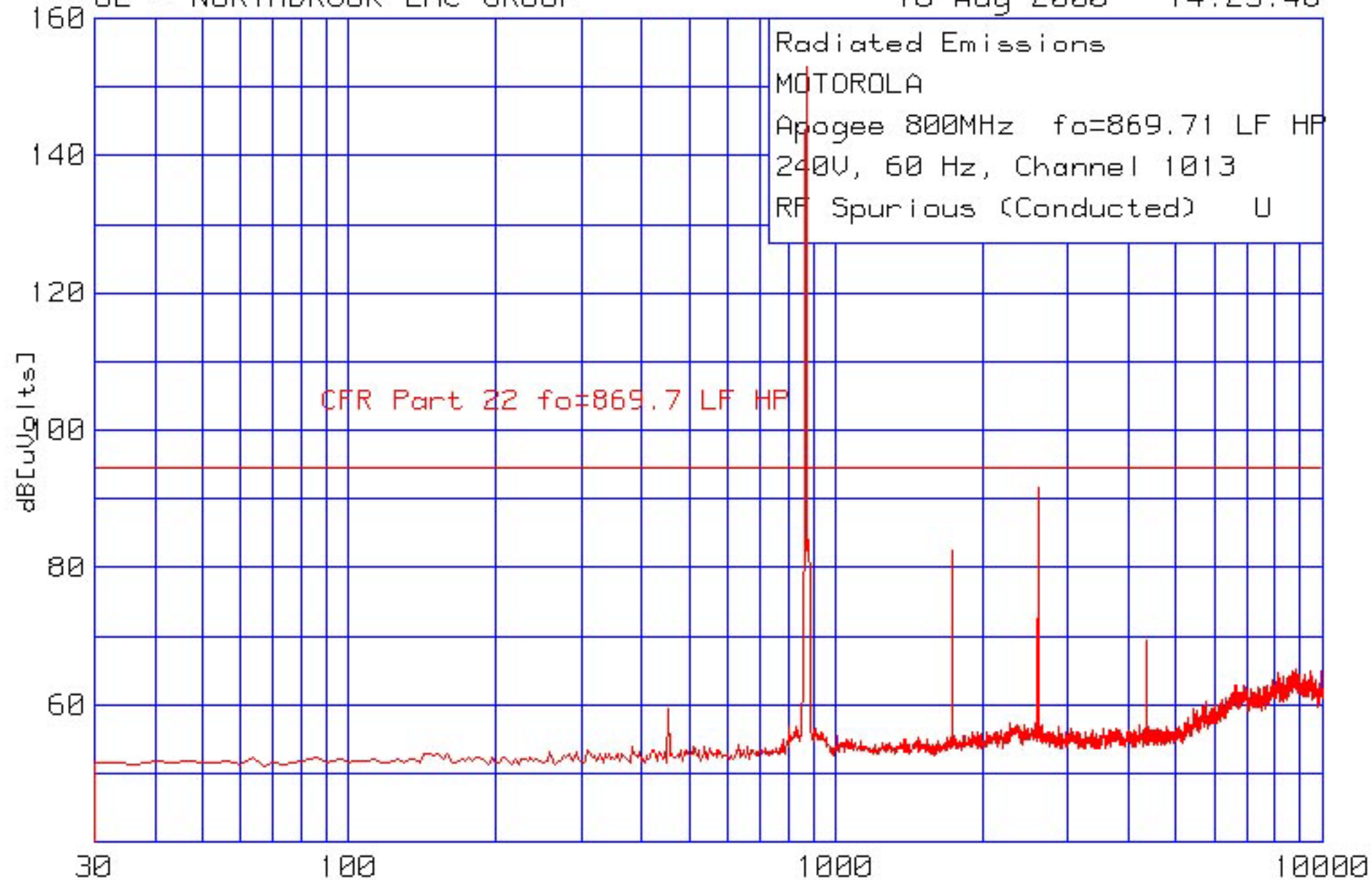
FCC ID: IHET5AP2

# **SPURIOUS & HARMONIC EMISSIONS CONDUCTED**

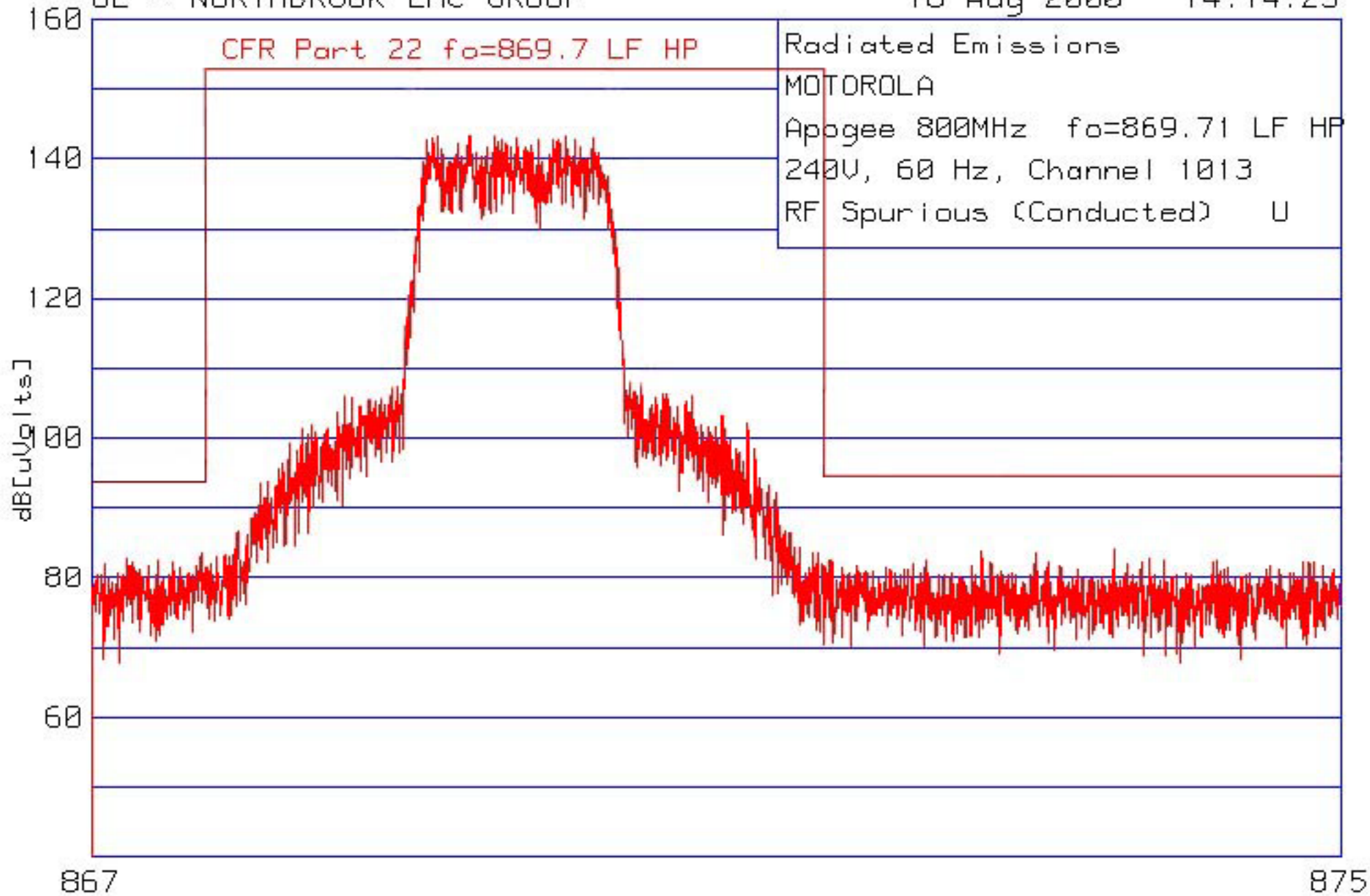
## **CDMA Transmitter Channel 1013**

### **Maximum Power**





IHET5AP2  
SC4812ETL @ 800MHz  
CDMA BTS



IHET5AP2  
SC4812ETL @ 800MHz  
CDMA BTS



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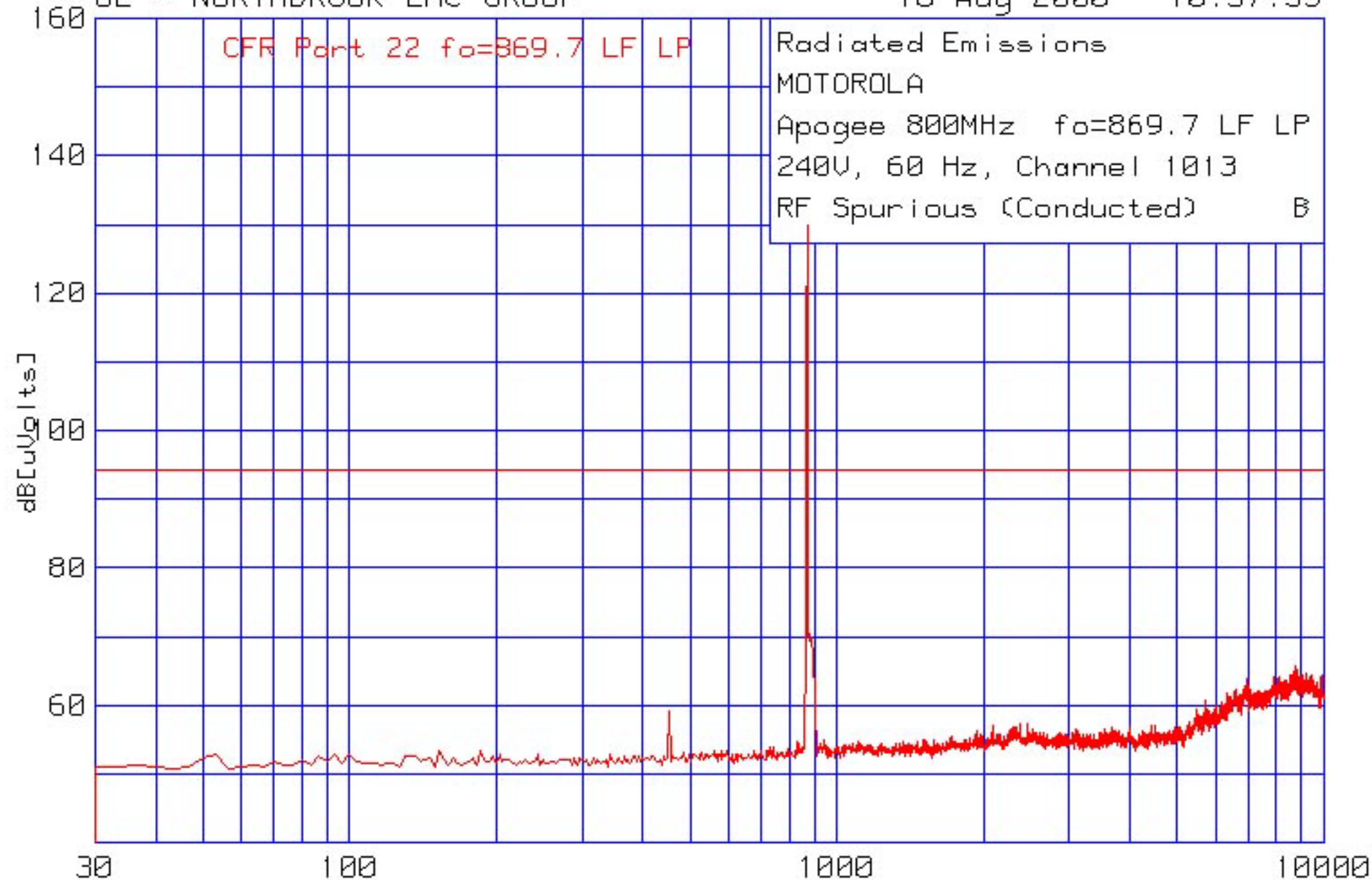
SECTION D

FCC ID: IHET5AP2

# **SPURIOUS & HARMONIC EMISSIONS CONDUCTED**

## **CDMA Transmitter Channel 1013**

### **Minimum Power**



IHET5AP2  
SC4812ETL @ 800MHz  
CDMA BTS

CFR Part 22 fo=869.7 LF LP

Radiated Emissions

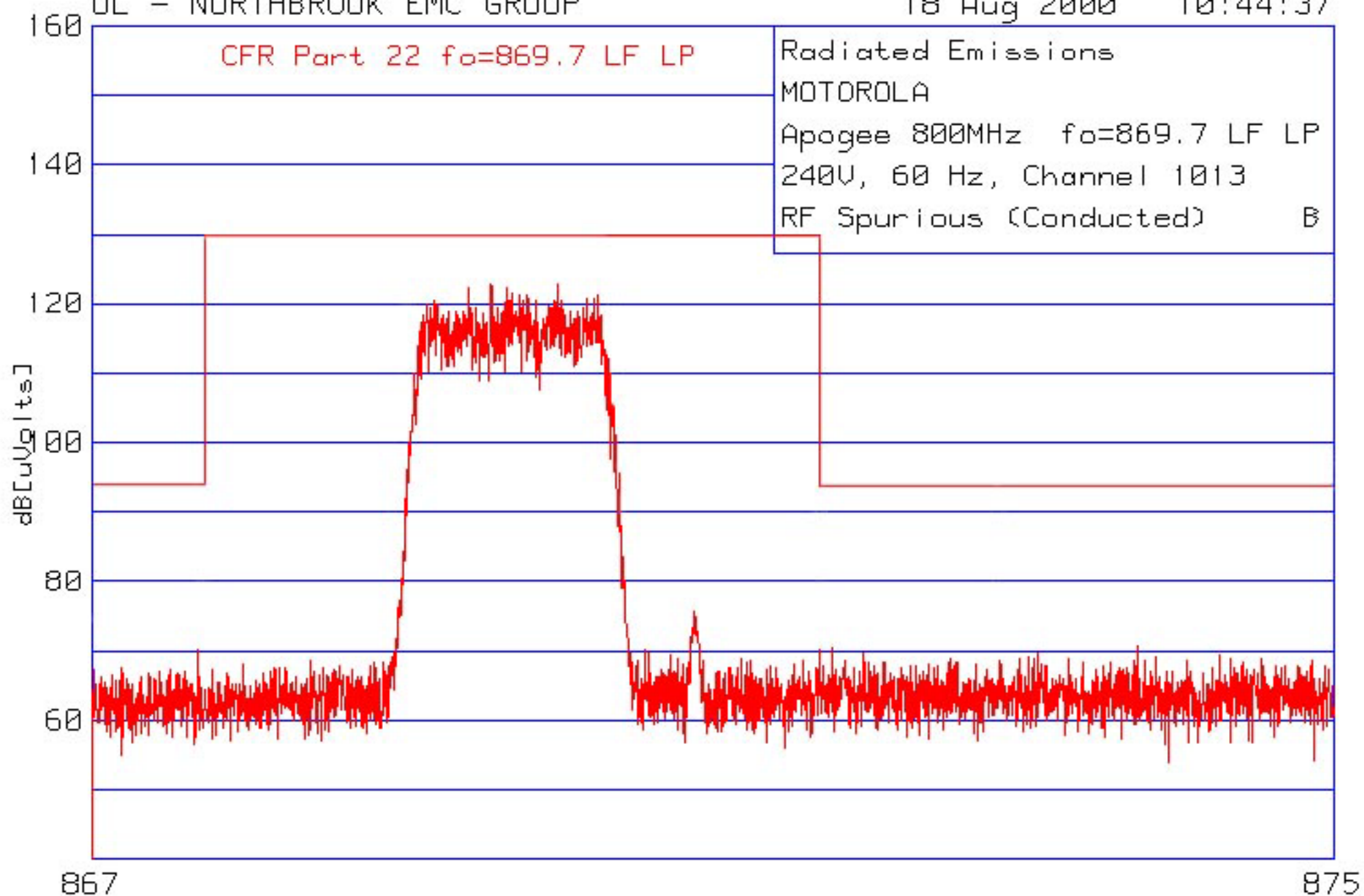
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Apogee 800MHz fo=869.7 LF LP

240V, 60 Hz, Channel 1013

RF Spurious (Conducted)

B



IHET5AP2  
SC4812ETL @ 800MHz  
CDMA BTS