

SC300 @ 800 MHz CDMA BTS FRAME

TEST REPORT EXHIBIT

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MOTOROLA

*Network Systems Group
CDMA Systems Division*

FCC ID: IHET5AP1

SECTION A

SUMMARY OF RF MEASUREMENTS

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5AP1

Summary of Radiated RF Measurements

Worst Case Radiated RF Spur Levels for SC300 @ 800MHz

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 22 MAX LIMIT (dBm)	Pass/Fail
777	2680.1	V	55.8	-39.42	-48.02	-42.37	-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

1/24/01
Date

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5AP1

Summary of Conducted RF Measurements

SC300 @ 800MHz

FCC Part 22 at 40 dBm output (Max power)

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBμV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm
1013	2609.767	87.79	- 19.21	-13

Engineer: 1/3 Shh

1/26/01
Date



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SECTION B

MODULATION CHARACTERISTICS



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SECTION B

FCC ID: IHET5AP1

MODULATION CHARACTERISTICS

Maximum Power

Channel 1013
869.70 MHz
Maximum Power

IHET5AP1
SC300 @800 MHz
CDMA BTS

Mon Oct 30 2000

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

Results

ρ (Waveform Quality Factor)	:	0.99176
τ (Time Alignment Error)	:	4.78 μ s
	:	6 chip
Carrier Frequency Error	:	0.5 Hz
Carrier Feedthrough	:	-30.08 dBc
Magnitude Error	:	6.78 % rms
Phase Error	:	3.62 deg. rms
Error Vector Magnitude	:	9.24 % rms
PN Offset	:	0
Ext. Trigger Delay	:	0.000 chip

Parameters

Frequency	:	869.700000 MHz
Reference Level	:	52.0 dBm
Attenuator	:	40.0 dB

PASS

OK...

Channel 777
893.31 MHz
Maximum Power

IHET5AP1
SC300 @800 MHz
CDMA BTS

Mon Oct 30 2000

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

Results

ρ (Waveform Quality Factor)	:	0.99213	
τ (Time Alignment Error)	:	4.75	μ s
	:	6	chip
Carrier Frequency Error	:	0.5	Hz
Carrier Feedthrough	:	-36.98	dBc
Magnitude Error	:	6.61	% rms
Phase Error	:	3.50	deg. rms
Error Vector Magnitude	:	8.99	% rms
PN Offset	:	0	
Ext. Trigger Delay	:	0.000	chip

Parameters

Frequency : 893.310000 MHz
Reference Level : 52.0 dBm
Attenuator : 40.0 dB

PASS

OK...



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SECTION B

FCC ID: IHET5AP1

MODULATION CHARACTERISTICS

Minimum Power

Mon Oct 30 2000

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

Results

ρ (Waveform Quality Factor)	:	0.98610	
τ (Time Alignment Error)	:	4.83	μ s
	:	6	chip
Carrier Frequency Error	:	-0.1	Hz
Carrier Feedthrough	:	-21.99	dBc
Magnitude Error	:	8.73	% rms
Phase Error	:	4.69	deg. rms
Error Vector Magnitude	:	11.87	% rms
PN Offset	:	0	
Ext. Trigger Delay	:	0.000	chip

Parameters

Frequency	:	869.700000 MHz
Reference Level	:	35.0 dBm
Attenuator	:	20.0 dB

PASS

OK...

Channel 777
893.31 MHz
Minimum Power

IHET5AP1
SC300 @800 MHz
CDMA BTS

Mon Oct 30 2000

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

Results

ρ (Waveform Quality Factor)	:	0.99202	
τ (Time Alignment Error)	:	4.76	μs
	:	6	chip
Carrier Frequency Error	:	0.9	Hz
Carrier Feedthrough Magnitude Error	:	-36.58	dBc
Phase Error	:	6.63	% rms
Error Vector Magnitude	:	3.52	deg. rms
PN Offset	:	9.03	% rms
Ext. Trigger Delay	:	0	
	:	0.000	chip

Parameters

Frequency	:	893.310000 MHz
Reference Level	:	52.0 dBm
Attenuator	:	40.0 dB

PASS

OK...



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SECTION C

Spurious & Harmonic Emissions Radiated

APPLICANT: MOTOROLA

TRANSCIVER TYPE: IHET5AP1

Radiated RF Measurements

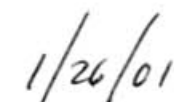
Worst Case Radiated RF Spur Levels for SC300 @ 800MHz

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 22 MAX LIMIT (dBm)	Pass/Fail
777	2680.1	V	55.8	-39.42	-48.02	-42.37	-13	Pass
777	4465.112	H	38.9	-56.33	-76.3	-69.15	-13	Pass
1013	2609.65	V	48.4	-46.83	-56.6	-51.05	-13	Pass
1013	3477.435	H	45.4	-49.83	-54.9	-48.95	-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 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


 Date



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FCC ID: IHET5AP1

SECTION D

Spurious & Harmonic Emissions Conducted

APPLICANT: MOTOROLA

TRANSCEIVER TYPE: IHET5AP1

Conducted RF Measurements

SC300 @ 800MHz

FCC Part 22 at 40 dBm output (Max power)

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBμV/meter)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm
777	2679.58	86.69	- 20.31	-13
1013	2609.767	87.79	- 19.21	-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

Conversion from dBuV to dBm:

$\text{dBuV} - 107 = \text{dBm}$

Engineer:



Date

1/26/01



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SECTION D

FCC ID: IHET5AP1

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 1013

Maximum Power

CFR Part 22 fo=869.7 LF HP

Conducted Spurious RF Emission

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SGNL5739A_1013_40

120V, 60 Hz

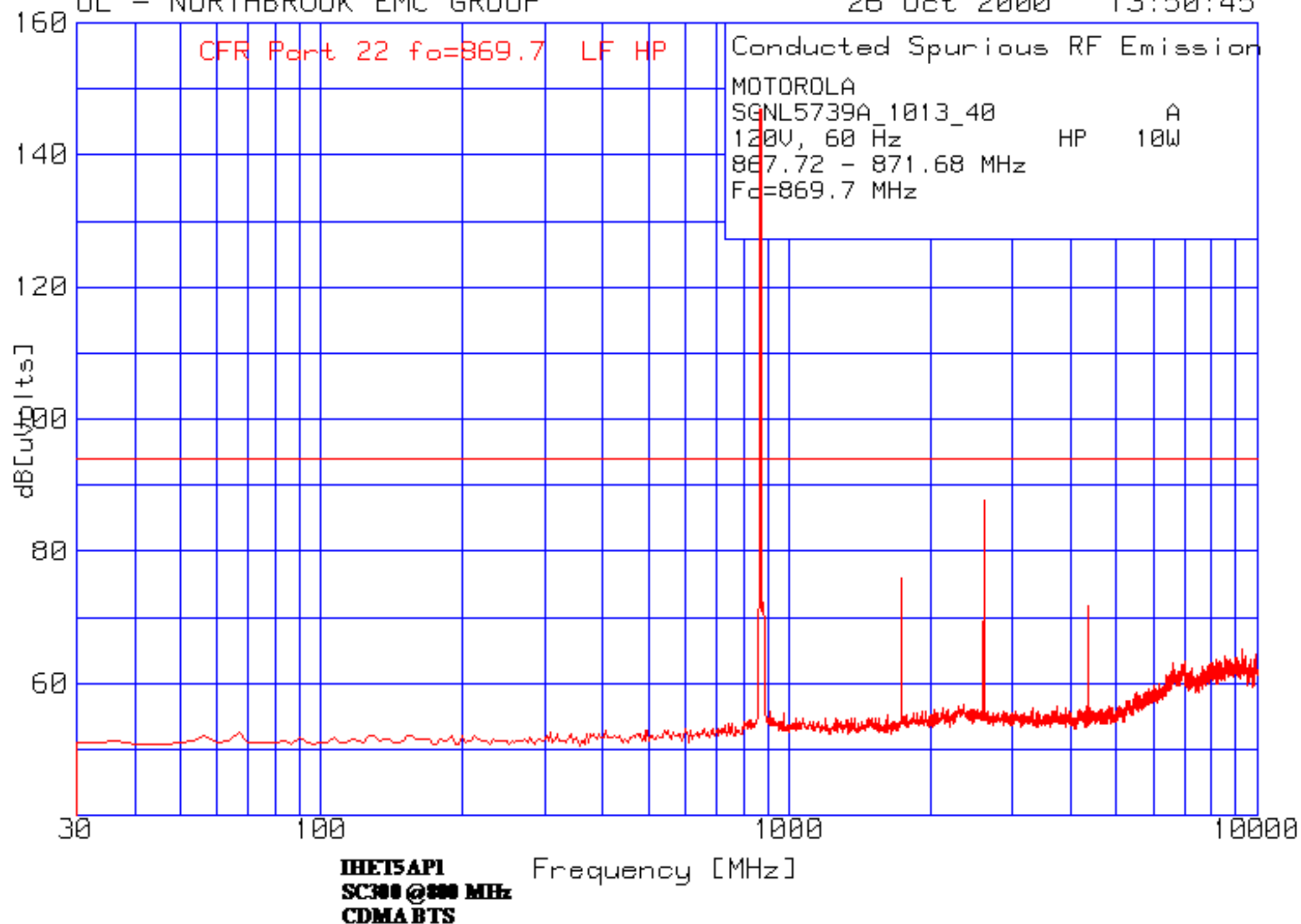
HP

A

10W

867.72 - 871.68 MHz

Fc=869.7 MHz



CFR Part 22 fo=869.7 LF HP

Conducted Spurious RF Emission

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SGNL5739A_1013_40

120V, 60 Hz

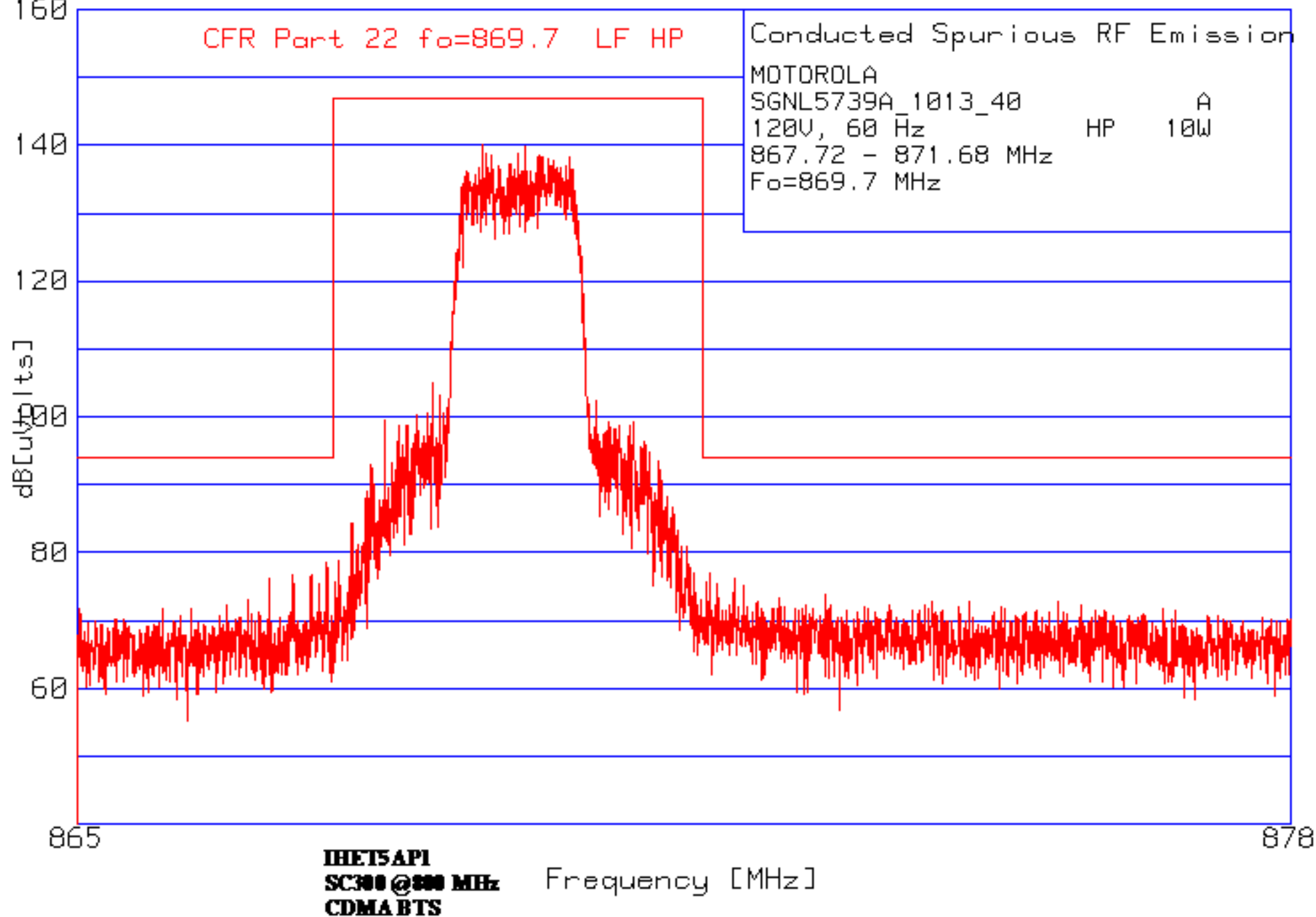
HP

A

10W

867.72 - 871.68 MHz

Fo=869.7 MHz



IHET5API
SC300 @800 MHz
CDMA BTS

Frequency [MHz]



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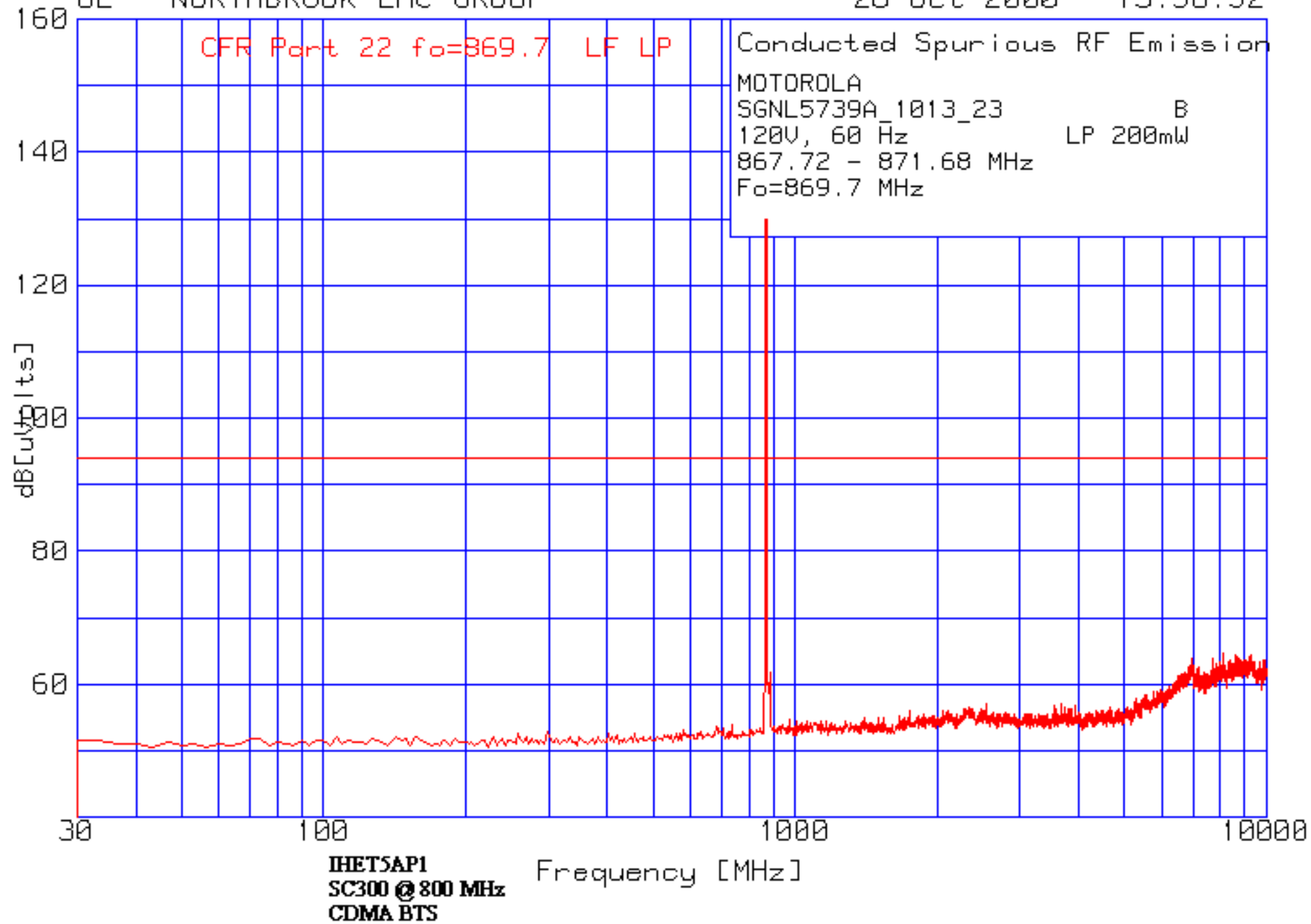
SECTION D

FCC ID: IHET5AP1

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 1013

Minimum Power



CFR Part 22 fo=869.7 LF LP

Conducted Spurious RF Emission

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SGNL5739A_1013_23

120V, 60 Hz

B

LP 200mW

867.72 - 871.68 MHz

Fo=869.7 MHz

