



Global Telecom Solutions Sector

APPLICANT: MOTOROLA

FCC ID: IHET5EG1

Radiated RF Measurements

Worst Case Radiated RF Spur Levels for SC4812ET @ 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 24 MAX LIMIT (dBm)	Pass/Fail
1013	1648.959	H	25.3	-69.928	-86.1	-81.15	- 13	Pass
1013	9082.764	V	42.9	-52.328	-65.4	-57.95	- 13	Pass
777	1786.341	H	46.07	-49.158	-57.72	-52.67	- 13	Pass
777	1786.341	V	44.25	-50.978	-59.52	-54.47	- 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
 Terry Schwenk

8/13/01
 Date



Global Telecom Solutions Sector

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Summary of Conducted RF Measurements

SC4812ET @800MHz


FCC Part 22

CHANNEL	FREQUENCY (MHz)	SPUR LEVEL MEASURED (dBμV)	SPUR LEVEL MEASURED (dBm)	FCC MAX LIMIT dBm
777	6952.559	83.83	-23.17	-13
1013	8420.436	83.42	-23.58	-13

FCC Max. Limit Per 47 CFR:

- “ =Transmitted Power (10 Log₁₀ (P_{watt})) - (43 + 10 Log₁₀ (P_{watt}))dBW
- “ =10 Log₁₀ (P_{watt}) - (43 + 10 Log₁₀ (P_{watt}))dBW
- “ =-43 dBW
- “ =-13 dBm

dBuV-107 = dBm



 Radiated Engineer Date

 Terry Schwenk 8/13/01



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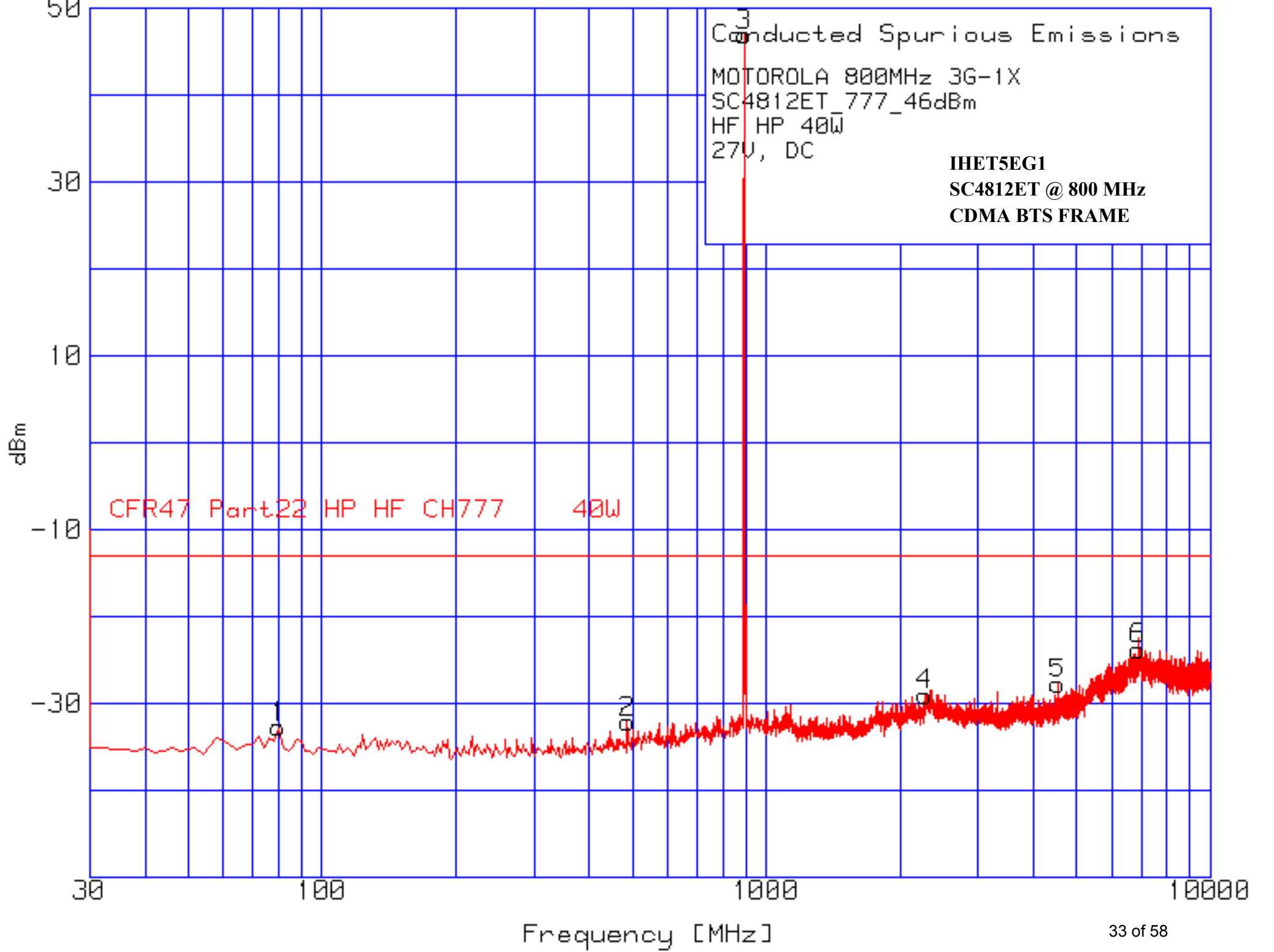
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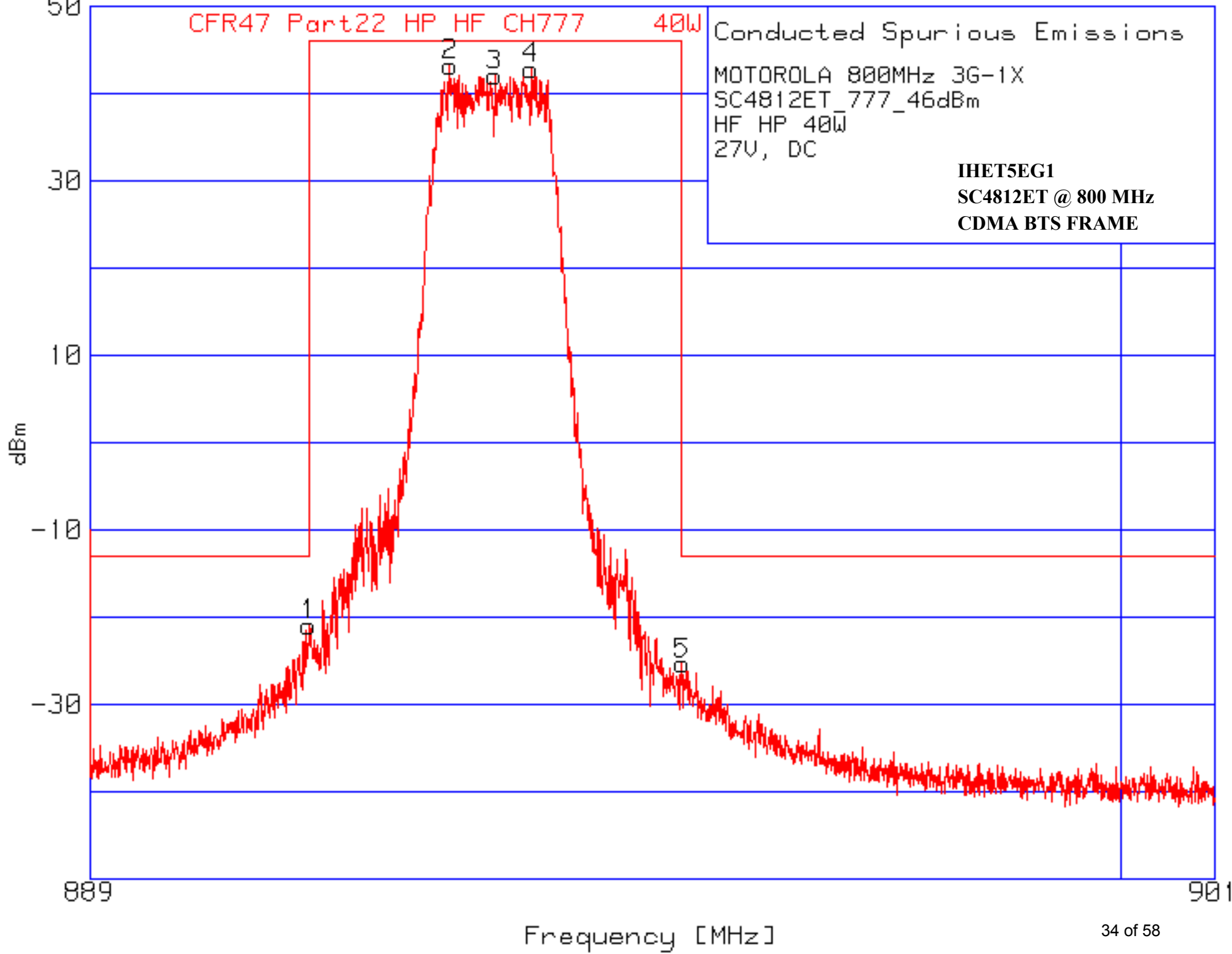
FCC ID: IHET5EG1

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 1013

Maximum Power







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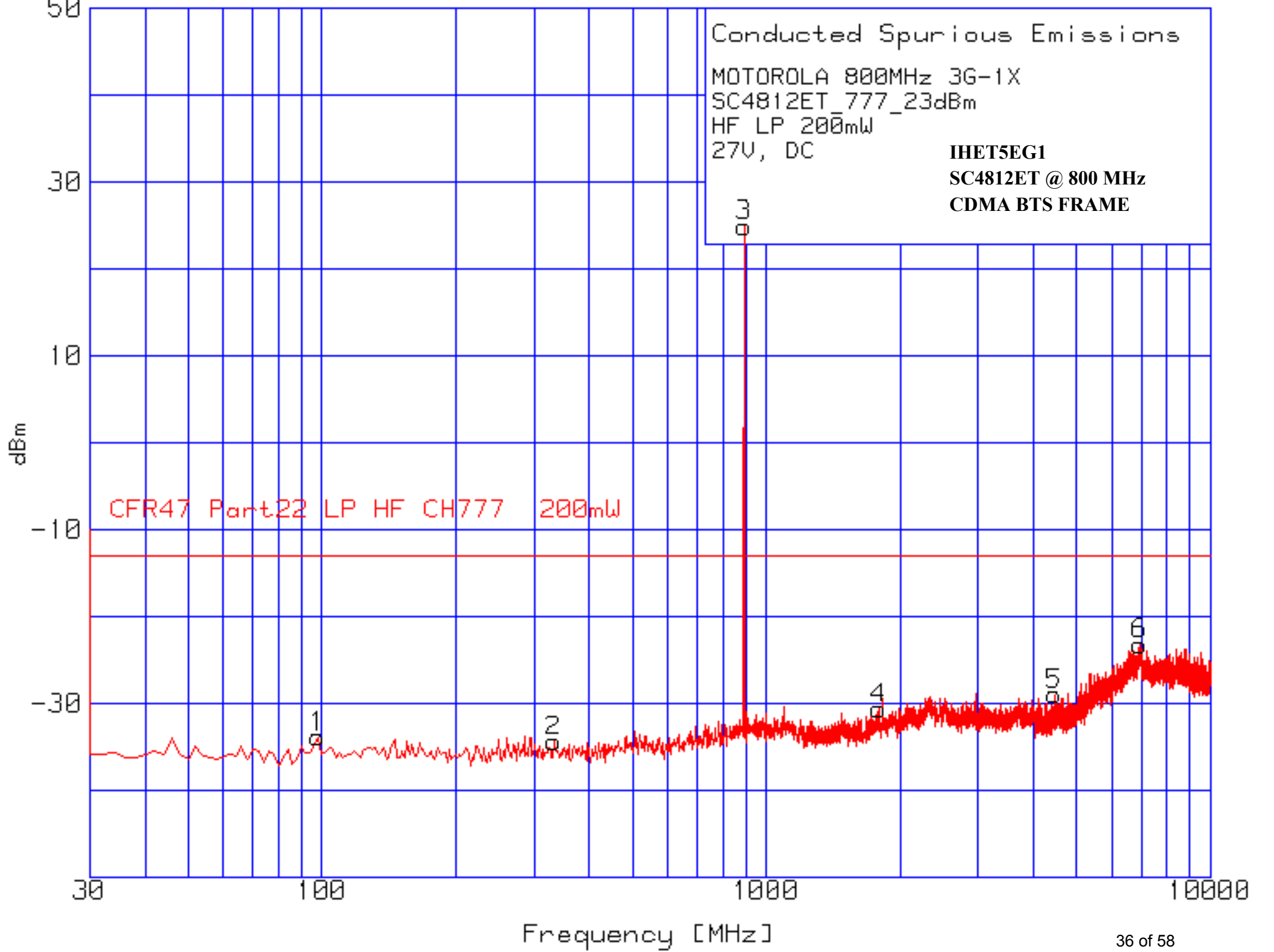
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FCC ID: IHET5EG1

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 1013

Minimum Power



Conducted Spurious Emissions

MOTOROLA 800MHz 3G-1X

SC4812ET_777_23dBm

HF LP 200mW

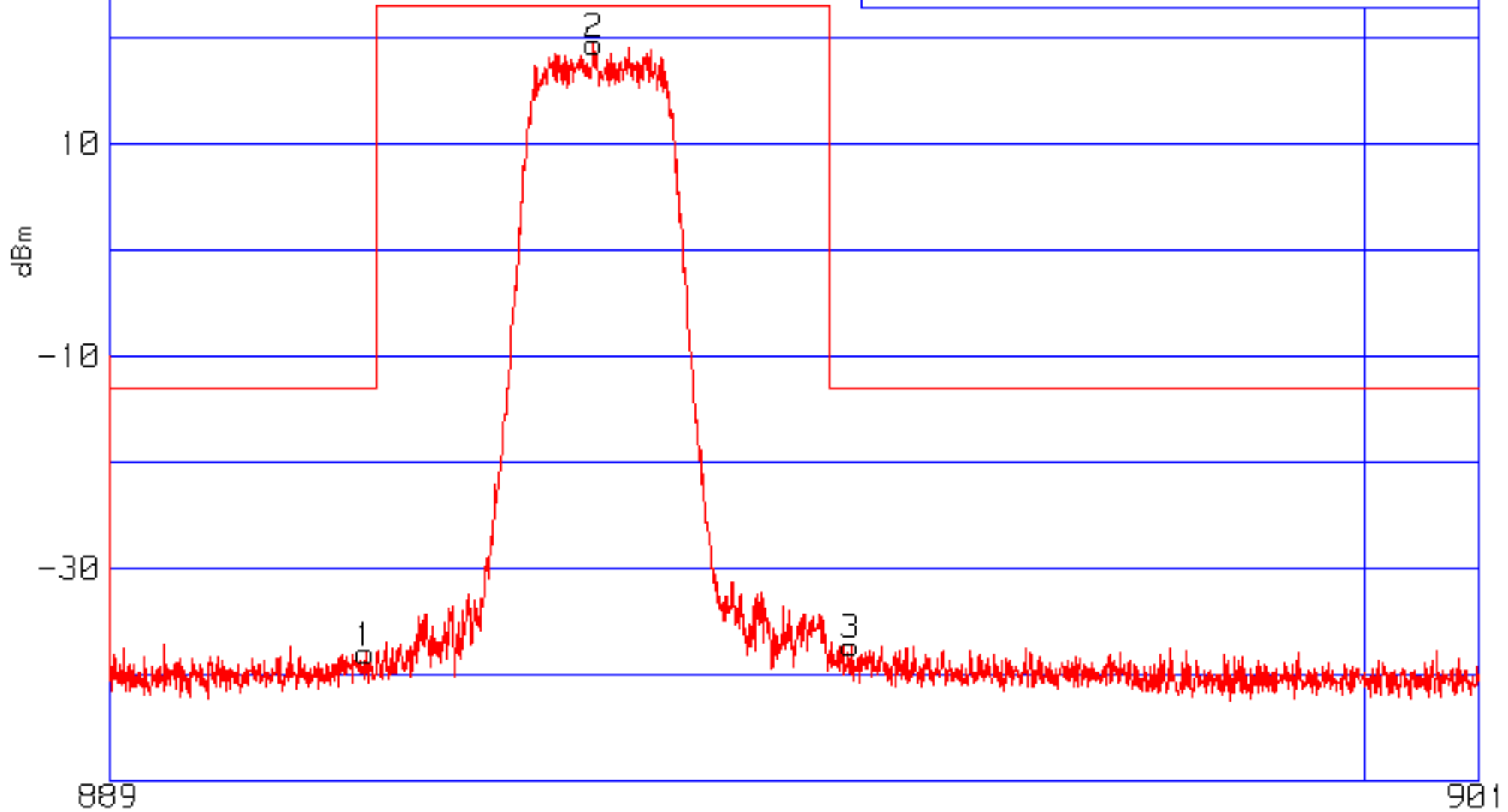
27V, DC

IHET5EG1

SC4812ET @ 800 MHz

CDMA BTS FRAME

CFR47 Part22 LP HF CH777 200mW





MOTOROLA

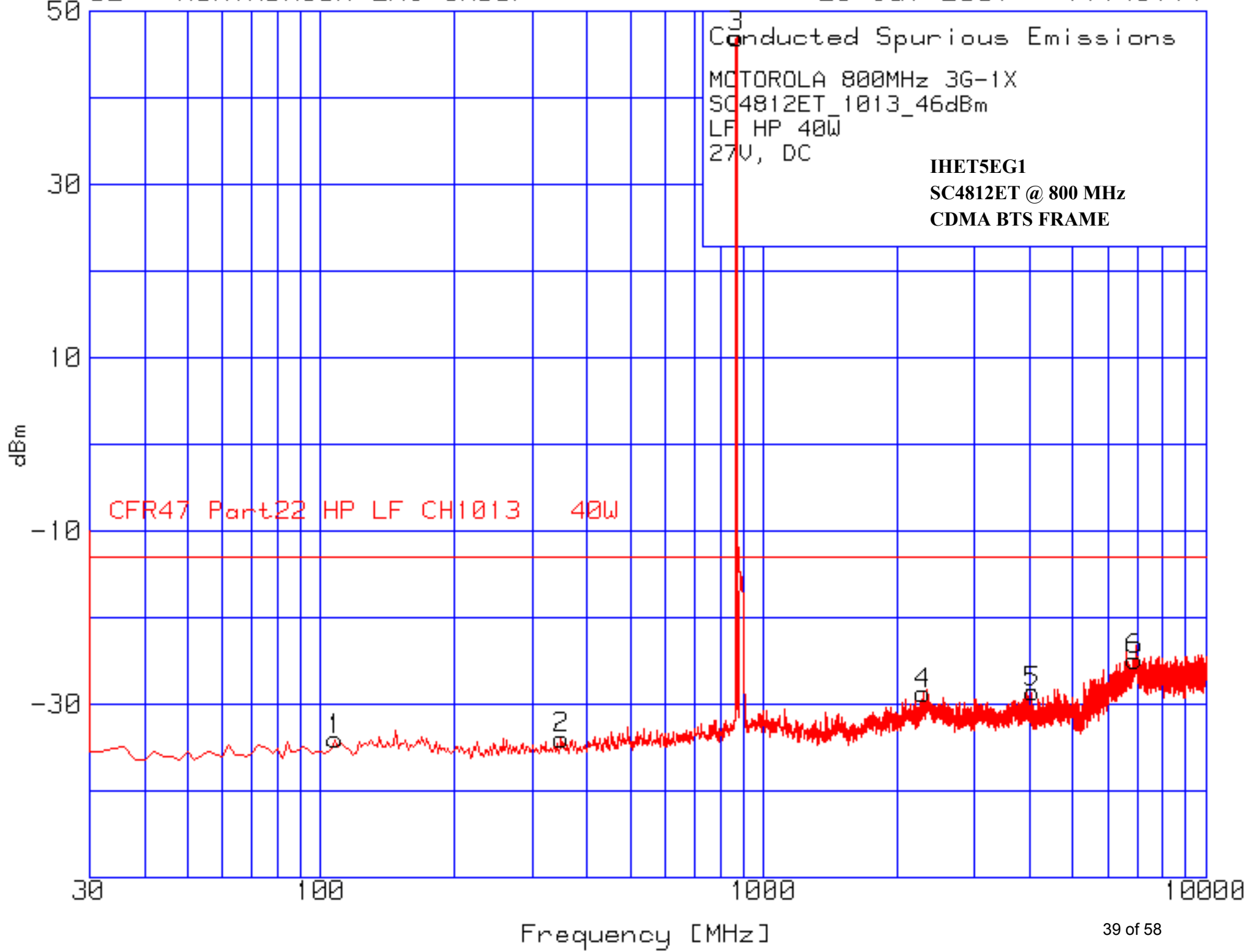
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FCC ID: IHET5EG1

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 777

Maximum Power

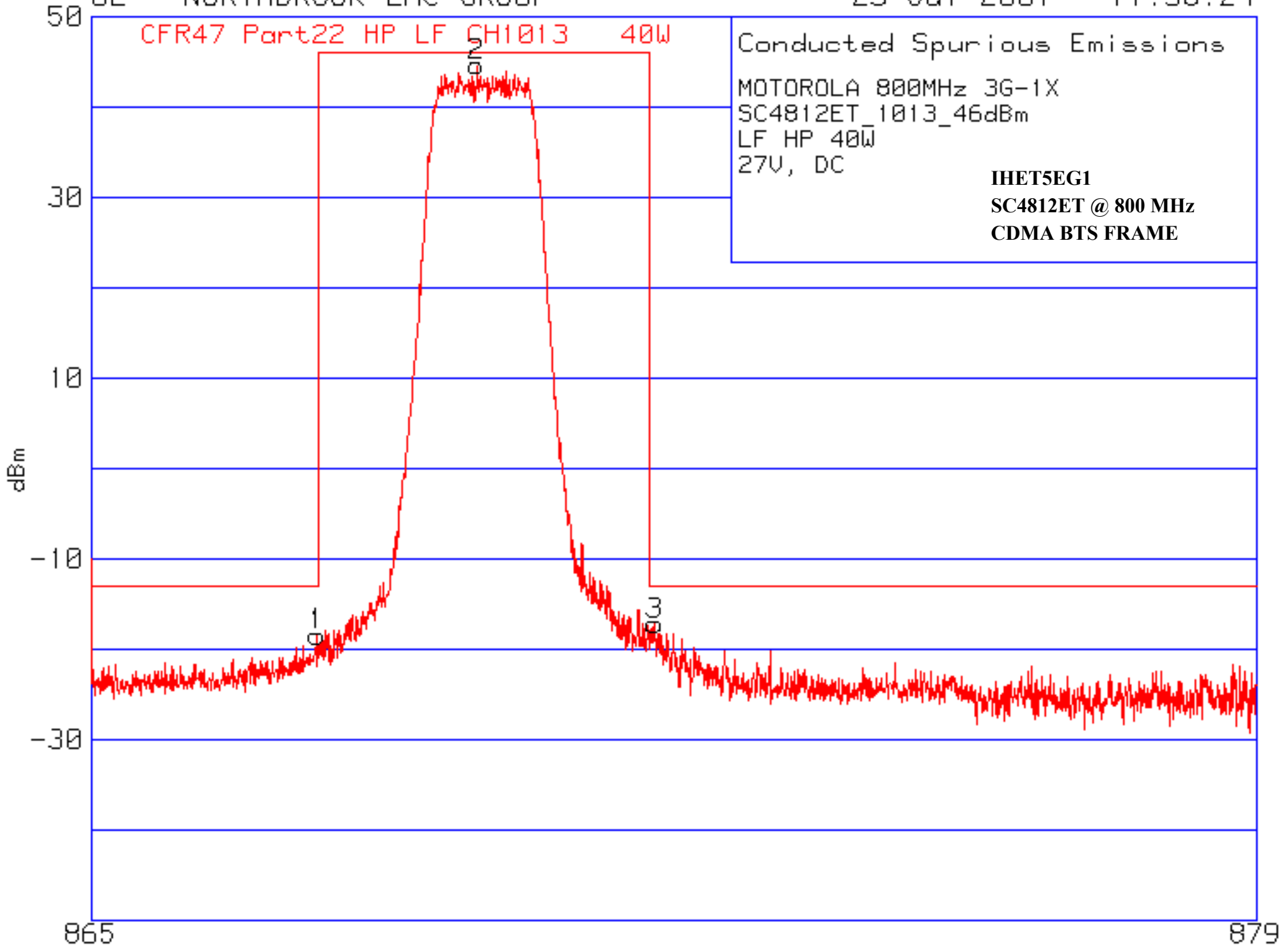


CFR47 Part22 HP LF CH1013 40W

Conducted Spurious Emissions

MOTOROLA 800MHz 3G-1X
SC4812ET_1013_46dBm
LF HP 40W
27V, DC

IHET5EG1
SC4812ET @ 800 MHz
CDMA BTS FRAME





MOTOROLA

Global Telecom Solutions Sector

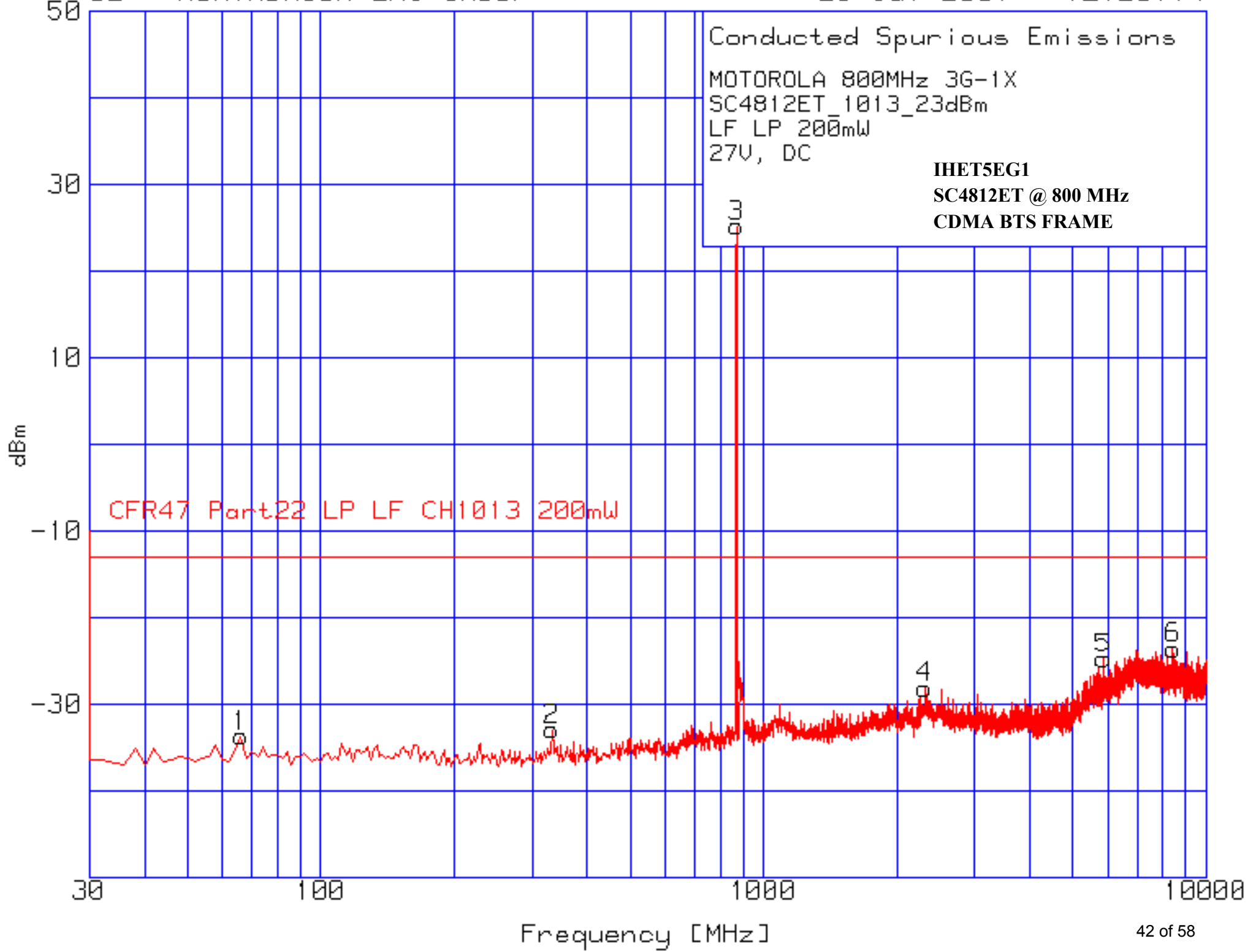
SECTION D

FCC ID: IHET5EG1

SPURIOUS & HARMONIC EMISSIONS CONDUCTED

CDMA Transmitter Channel 777

Minimum Power



Conducted Spurious Emissions

MOTOROLA 800MHz 3G-1X

SC4812ET_1013_23dBm

LF LP 200mW

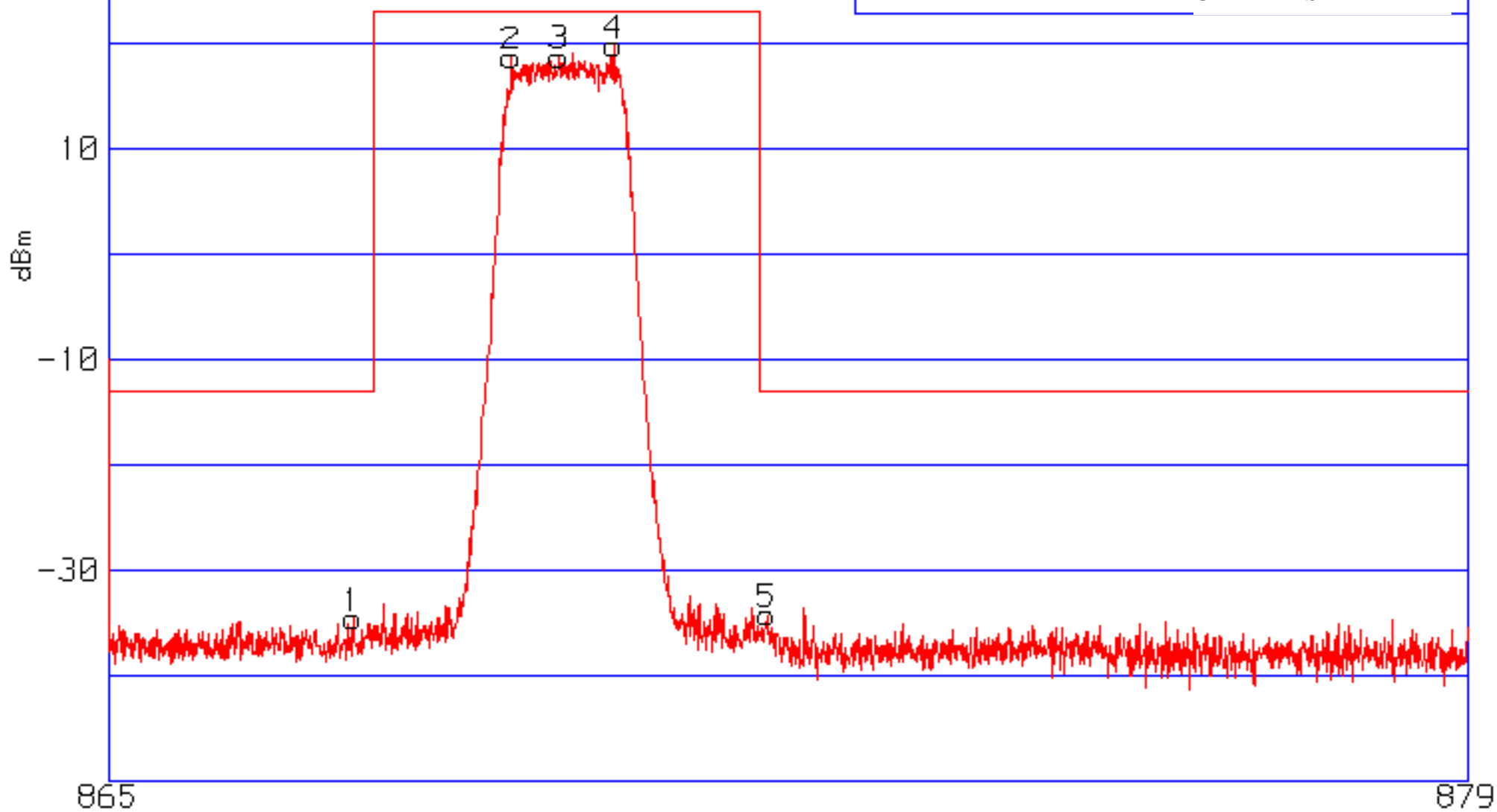
27V, DC

IHET5EG1

SC4812ET @ 800 MHz

CDMA BTS FRAME

CFR47 Part22 LP LF CH1013 200mW





SECTION E OCCUPIED BANDWIDTH

NOTE: The BTS was configured for maximum power out of 46.00 dBm and minimum power out of 36.5 dBm respectively. The max and min output power was set to 40.0 Watts or 4.5 Watts 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:

$$\text{Power (measured in 30 kHz bandwidth)} + 10 \log (1.30 \text{ MHz} / 30 \text{ kHz})$$

Example: $29.63 \text{ dBm} + 16.37 \text{ dB} = 46.00 \text{ dBm}$

The occupied bandwidth is measured in a 30 kHz resolution bandwidth. The summary is listed below.

SC4812ET EVDO @ 800MHz SUMMARY OF OCCUPIED BANDWIDTH

CHANNEL	Power Level (dBm)	FREQUENCY (MHz)	MEASURED (MHz)	FCC LIMIT (MHz)	Pass / Fail
1020	36.5	869.91	1.2716	1.30	Pass
770	46.0	893.10	1.2725	1.30	Pass

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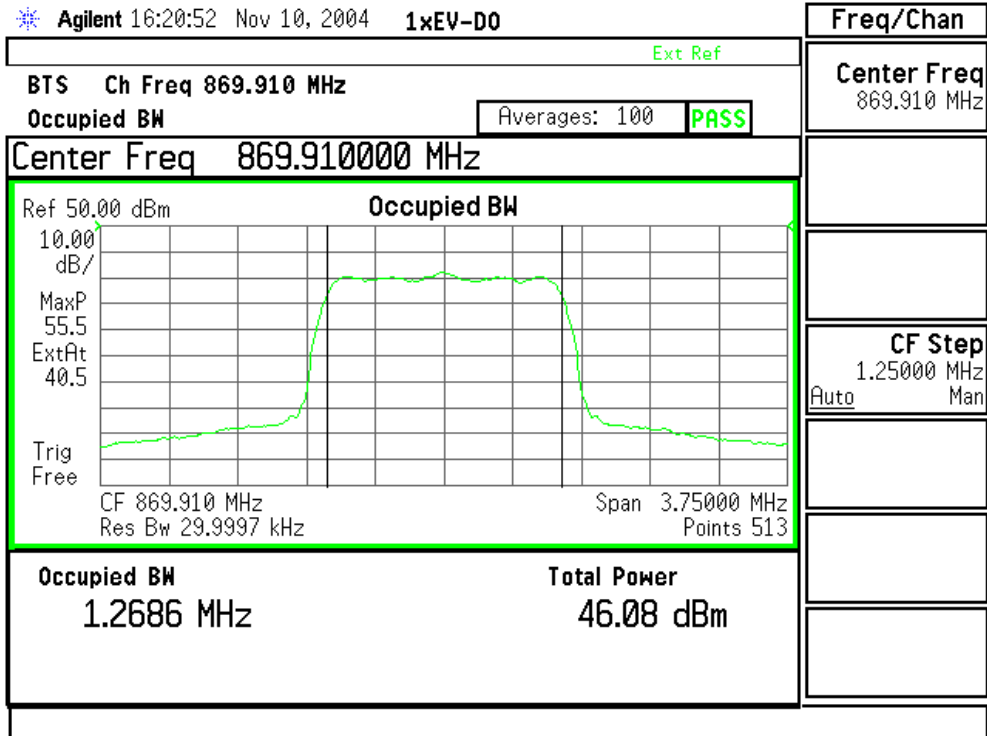
Signature

Date

Francisco Avalos



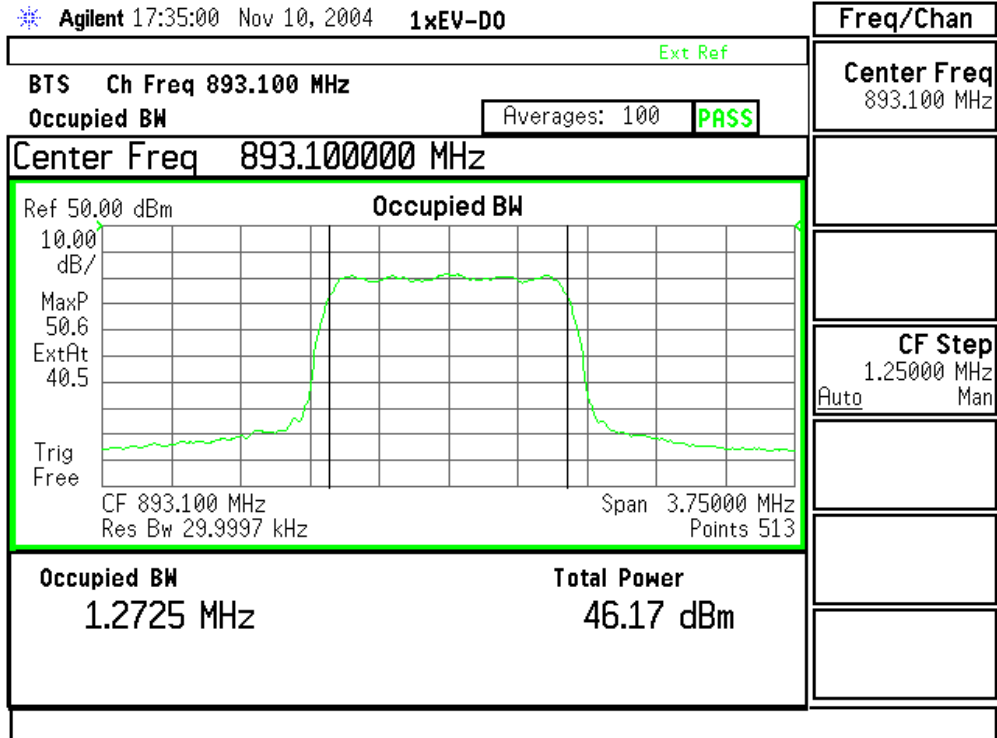
SC4812ET EVDO – Occupied Bandwidth – 46.00 dBm – 8PSK



Channel 1020 – 869.91 MHz



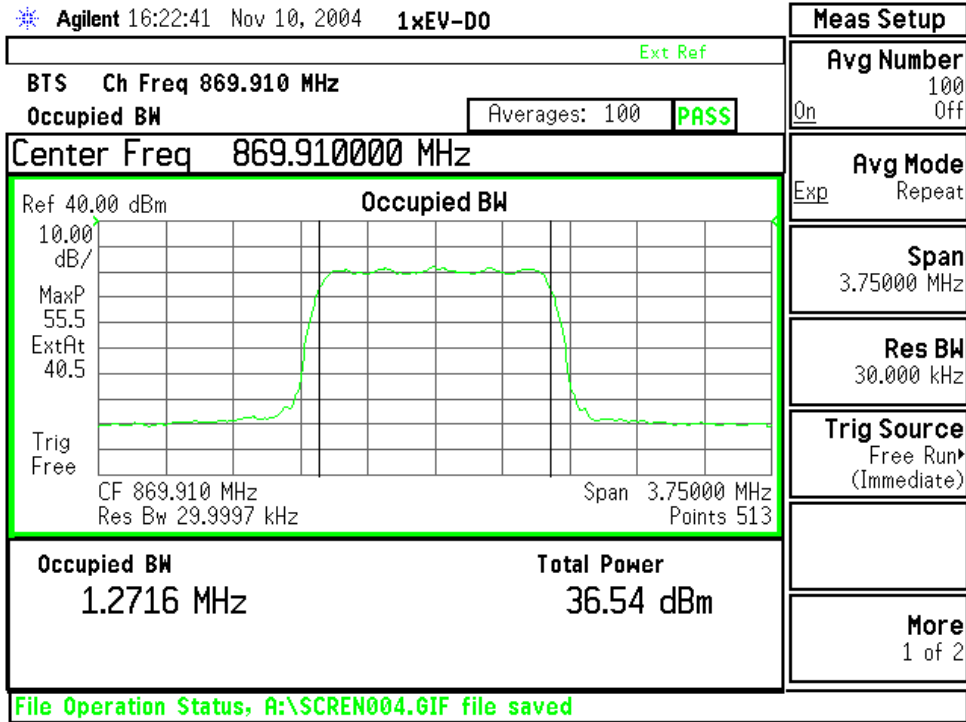
SC4812ET EVDO – Occupied Bandwidth – 46.00 dBm – 16QAM



Channel 770 – 893.1 MHz



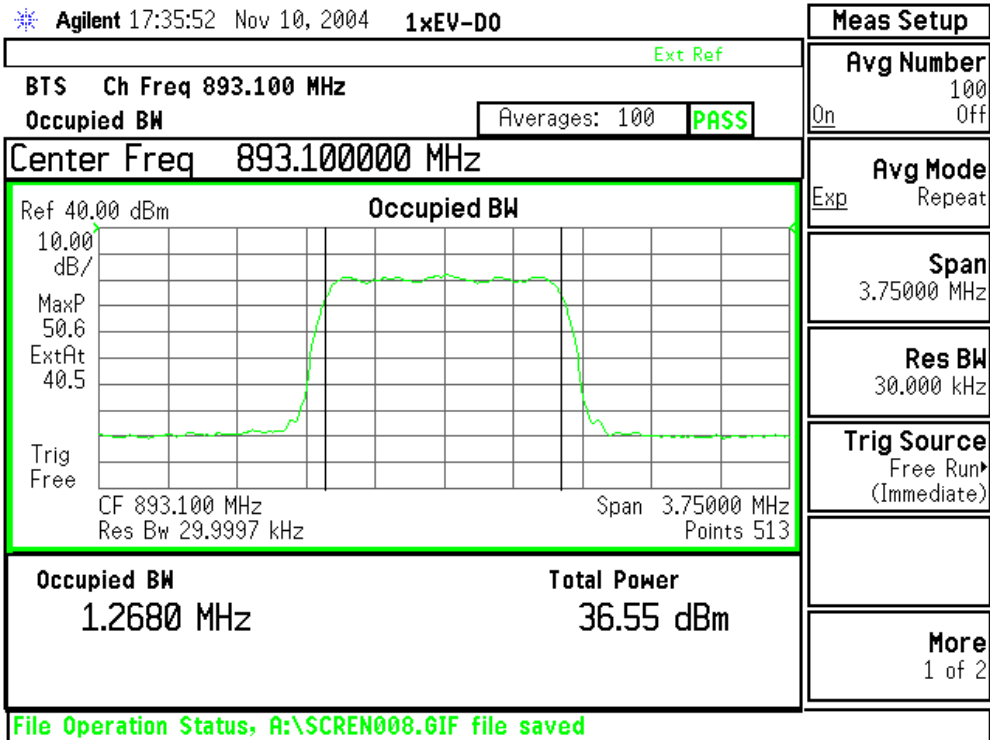
SC4812T EVDO – Occupied Bandwidth – 36.5 dBm – 8PSK



Channel 1020 – 869.91 MHz



SC4812ET EVDO – Occupied Bandwidth – 36.5 dBm – 16QAM



Channel 770 – 893.1 MHz



Global Telecom Solutions Sector

APPLICANT: MOTOROLA

FCC ID: IHET5EG1

OCCUPIED BANDWIDTH

SC4812ET

NOTE: The BTS was configured for maximum power out of 46.0 dBm and minimum power out of 23.0 dBm respectively. The max and min output power was set to 40.0 Watts or 200 mWatts respectively using an HP437B power meter.

The following formula is used to obtain the correct set power reference point from which the OBW of the CDMA signal is obtained. See example calculation below:

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

$$\text{Example: } 29.88\text{dBm} + 16.12\text{dB} = 46.0\text{dBm}$$

The occupied bandwidth is measured in a 30 kHz resolution bandwidth. The summary is listed below.

CHANNEL/POWER	FREQUENCY (MHz)	MEASURED (MHz)	FCC LIMIT (MHz)	PASS/FAIL
1013/MAX	869.7	1.225	1.25	Pass
777/MAX	893.31	1.225	1.25	Pass
1013/MIN	869.7	1.225	1.25	Pass
777/MIN	893.31	1.225	1.25	Pass

Engineer: Francisco Avalos

Signature: Francisco Avalos 8/29/01

Date



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OCCUPIED BANDWIDTH

Maximum Power

+ATTEN 40dB
RL 42.0dBm

VAVG 200
10dB/

ΔMKR , 33dB
1.225MHz

POWER=46.0dBm

MEASURE

SINGLE
MEASURE

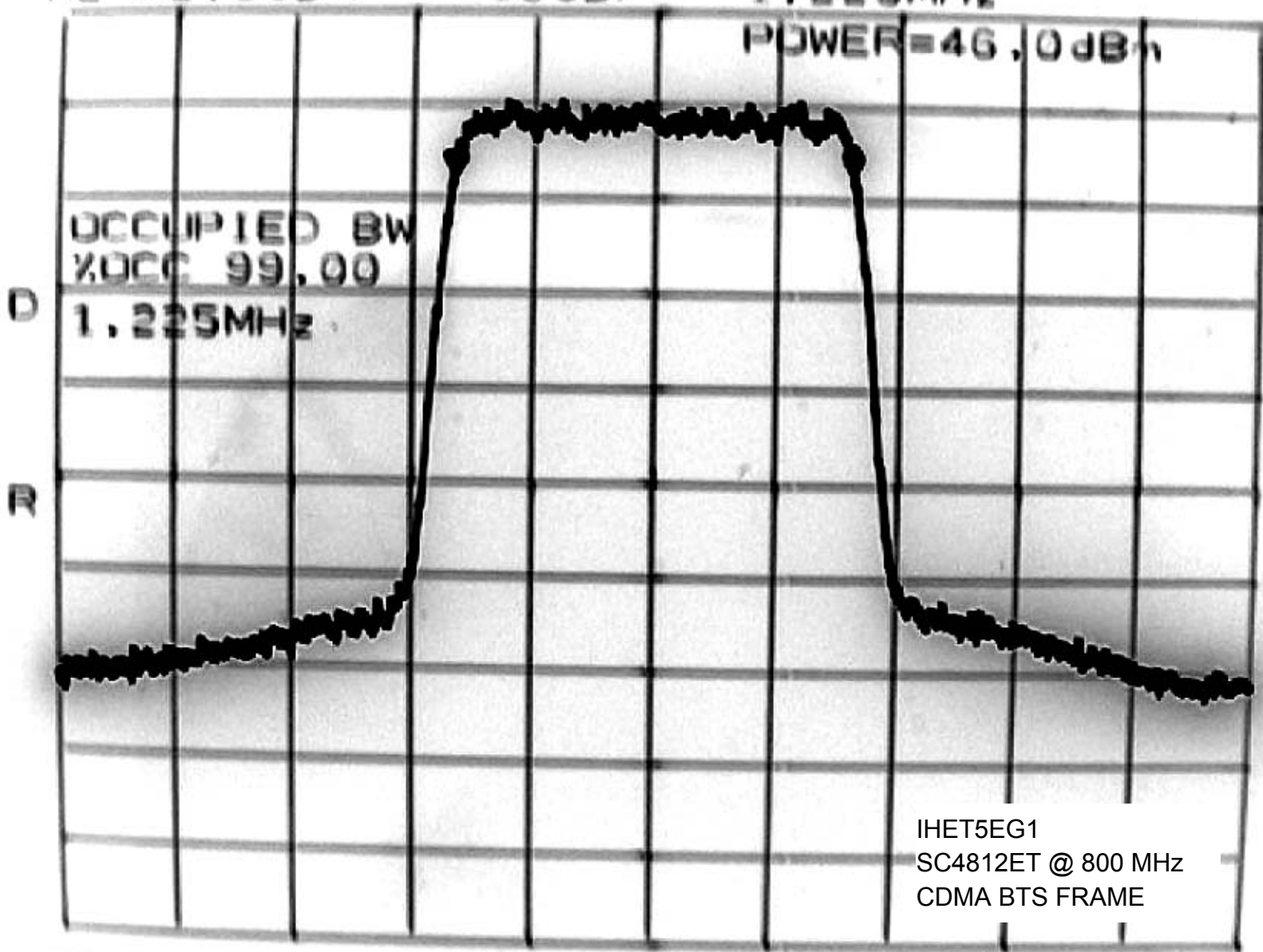
CONT
MEASURE

CHANNEL
PWR MENU

CHAN UP
>>>>

CHAN DN
<<<<

PREV
MENU



OCCUPIED BW
%OCC 99.00
1.225MHz

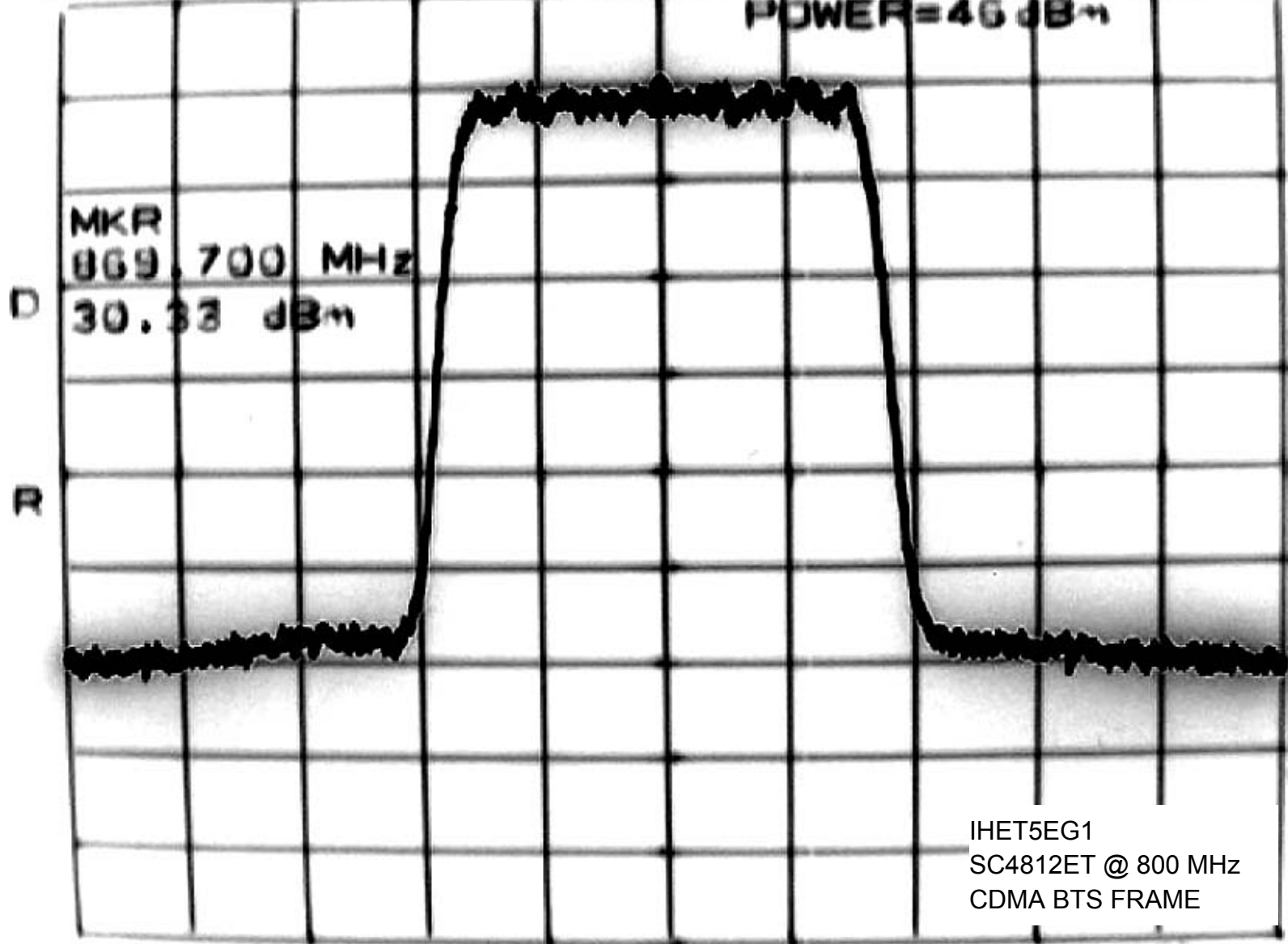
IHET5EG1
SC4812ET @ 800 MHz
CDMA BTS FRAME

CENTER 893.310MHz
RBW 30kHz VBW 30kHz

SPAN 3.750MHz
SWP 50.0ms

ATTEN 40dB VAVG 200 MKR 30.33dBm
RL 42.0dBm 10dB/ 869.700MHz
POWER=46dBm

MARKER



MARKER
NORMAL

MARKER
DELTA

MARKER
1/DELTA

MKRNOISE
ON DEF

SIG TRK
ON DEF

MARKERS
OFF

MKR
869.700 MHz
30.33 dBm

IHET5EG1
SC4812ET @ 800 MHz
CDMA BTS FRAME

CENTER 869.700MHz SPAN 3.750MHz
RBW 30kHz VBW 30kHz SWP 50.0ms



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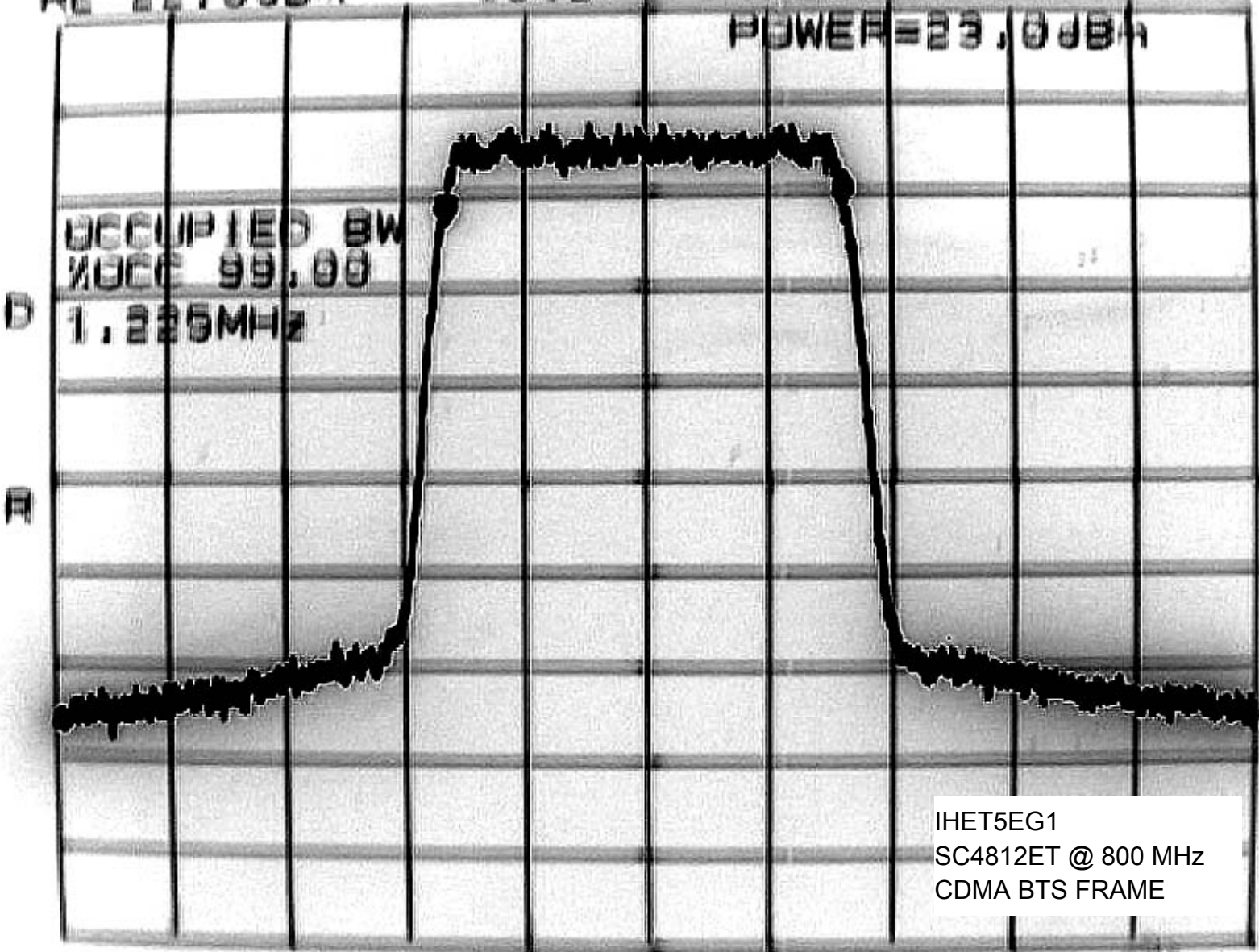
FCC ID: IHET5EG1

OCCUPIED BANDWIDTH

Minimum Power

ATTN 10dB BR01 NETA
BR01 800 MHz
BR01 1.225 MHz
POWER 1.000

MEASURE



OCCUPIED BW
99.99
1.225 MHz

SINGLE MEASURE

CONT MEASURE

CHANNEL PWR MENU

CHAN UP
WWW

CHAN DN
WWW

IHET5EG1
SC4812ET @ 800 MHz
CDMA BTS FRAME

PREV MENU

CENTER 800.310 MHz SPAN 3.750 MHz
RBW 30 kHz VBW 30 kHz SWP 50.0 Hz

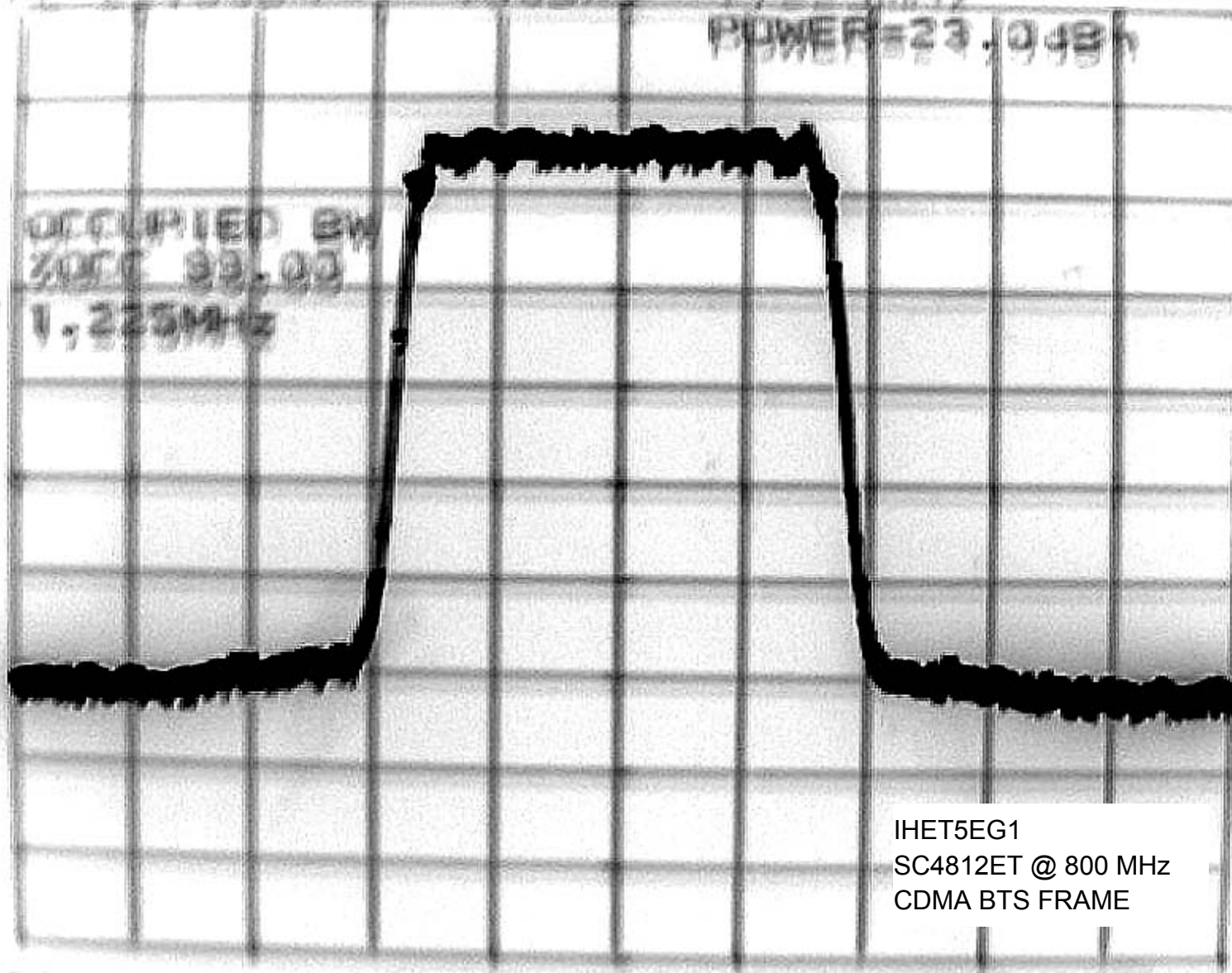
ATTEN 10dB
RL 22.0dBm

VAVG 200
10dB

AMKR -17.4dB
1.225MHz

POWER=23.04dBm

OCCUPIED BW
3000 99.00
1.225MHz



MEASURE

SINGLE MEASURE

CONT MEASURE

CHANNEL FREQ MEAS

CHAN 1 FREQ

CHAN 2 FREQ

IHET5EG1
SC4812ET @ 800 MHz
CDMA BTS FRAME

1.225 MHz

CENTER 850.700MHz
RBW 30kHz
VIEW 30kHz

SPAN 3.750MHz
BW 30.0ms



SECTION F

FREQUENCY STABILITY

MODE	27V POWER	WORST CASE Δ 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 Δ 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

04.12.04

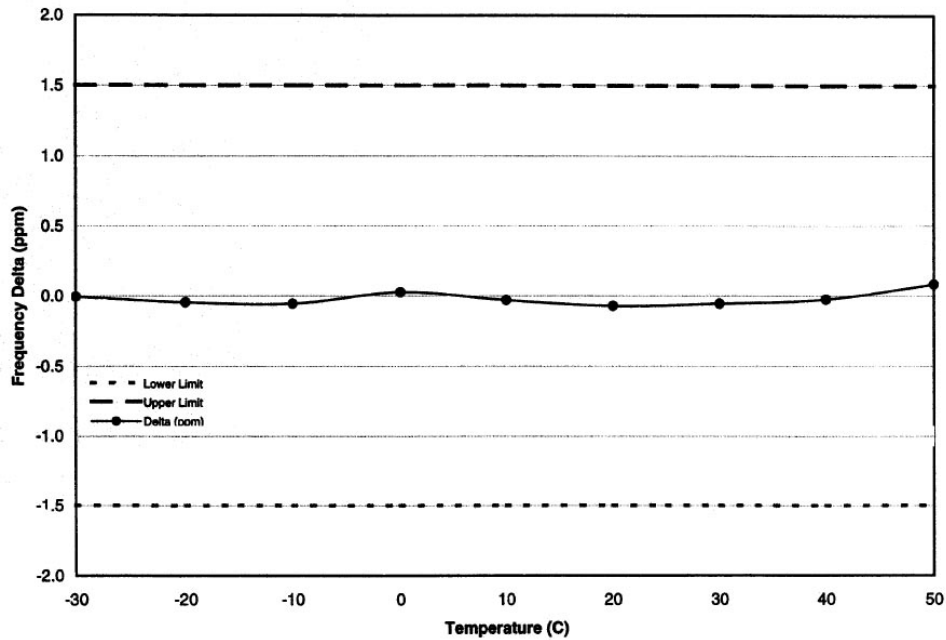
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Date

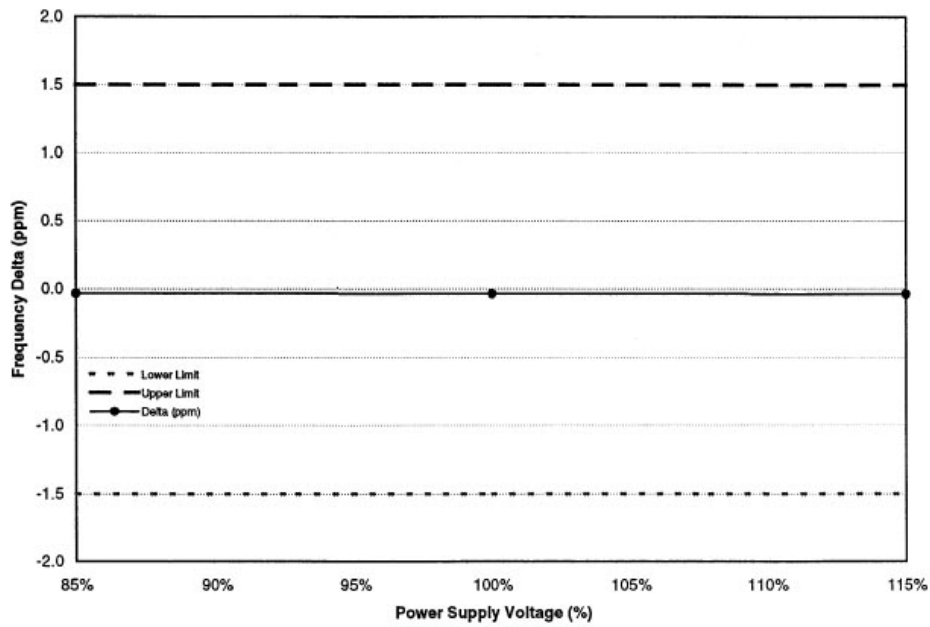
Terry Schwenk



Frequency Stability Over Temperature - CSM1

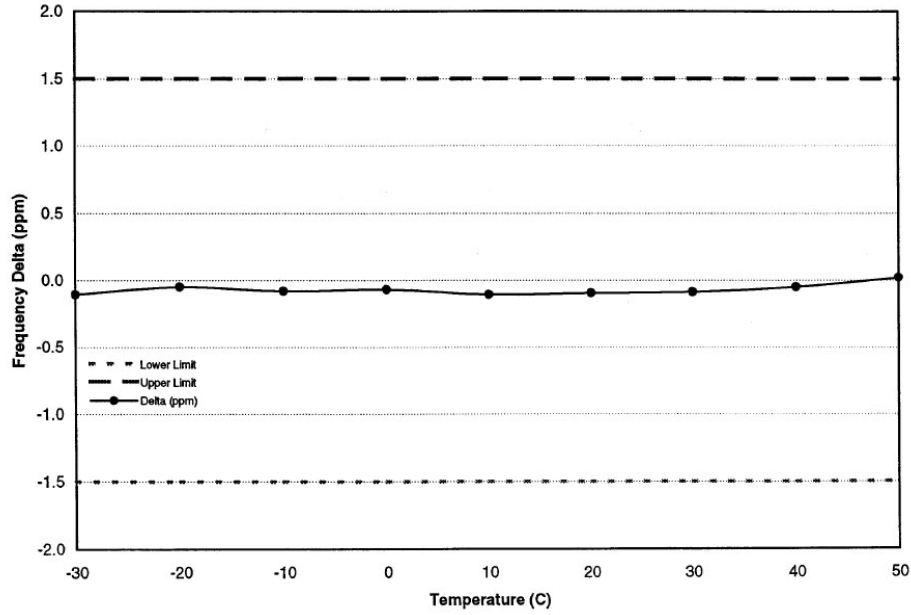


Frequency Stability with Varying Supply Voltage - CSM1





Frequency Stability Over Temperature - CSM2



Frequency Stability with Varying Supply Voltage - CSM2

