800 MHz : RF POWER OUTPUT

Para. 2.985 (a) and 22.913 (a)

The RF power measured at the output terminals (antenna connector) is plotted against supply voltage variation and temperature variations at the highest and lowest power levels.

Exhibit	Supply Voltage (V)	Temperature	TX Freq	Output Power Level
6A2	**4.8**	**Varied**	**Mid Band**	**.4 W**
6A3	**Varied**	**+25 C**	**Mid Band**	**.4 W**

The measurements were made per IS-19B using a Hewlett Packard 8953DT North American Dual Mode Cellular Test System which includes the following equipment:

Hp8958A Cellular Interface
Hp6623A DC Power Supply
Hp8596E Spectrum Analyzer
Hp437B RF Power Meter
Hp8901B Modulation Analyzer
Hp8903B Audio Analyzer
Thermotron SM-8C Temperature Chamber

EFFECTIVE RADIATED POWER

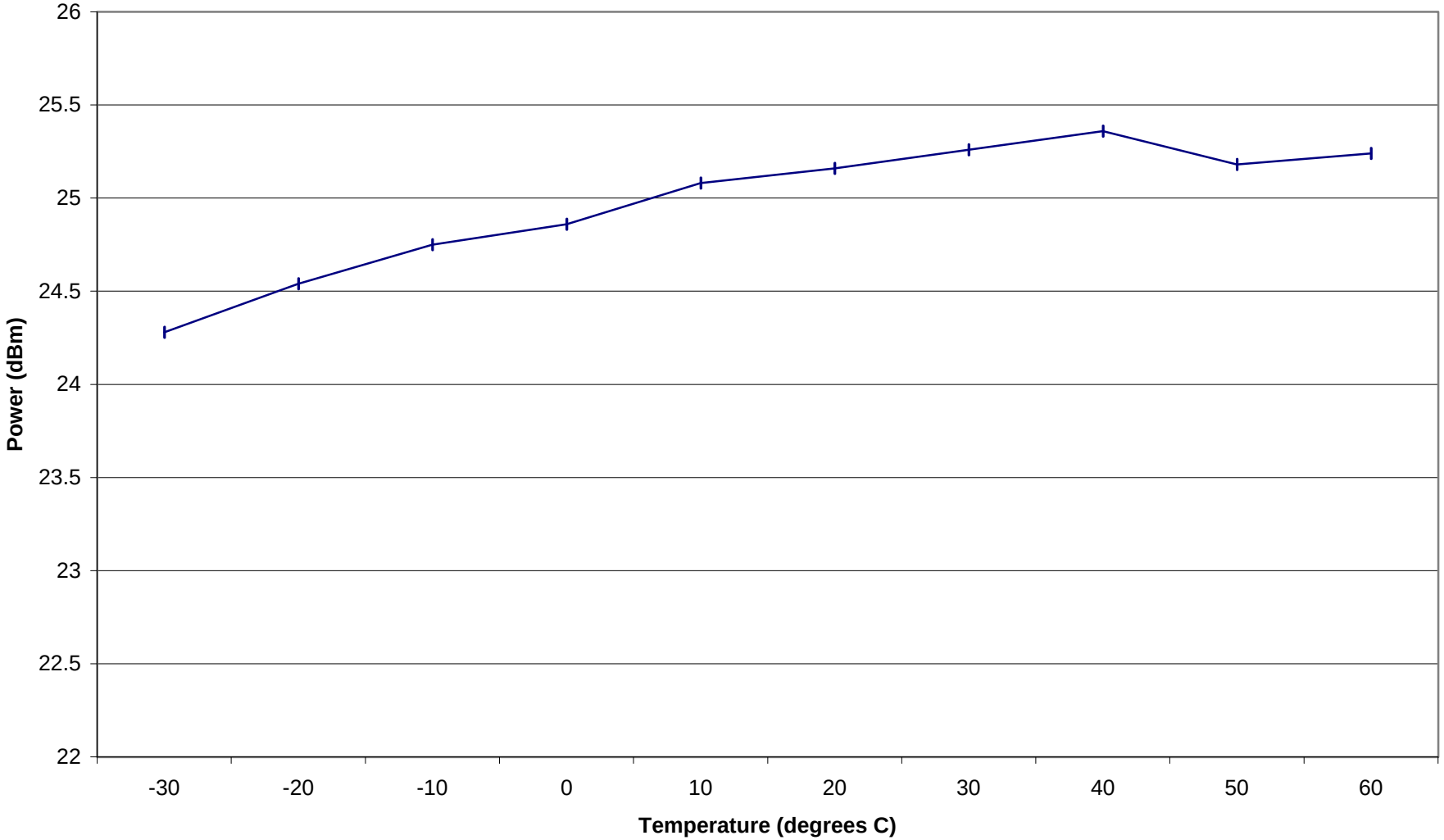
The following is a description of the substitution method used in accordance with IS-19B to obtain accurate ERP readings at the carrier fundamental frequency:

(1) EUT measurements are made at 3 m using calibrated antennas and equipment with known cable losses.
(2) A peak measurement is made by raising and lowering the antenna and rotating the EUT 360 degrees. Horizontal and Vertical Polarization data is recorded.
(3) A generator and dipole antenna are then substituted for the EUT. The dipole antenna is a half-wave dipole. If a dipole antenna cannot be used, then the designated antenna is referenced to a dipole antenna.
(4) Measurements are made through the dipole antenna at known power levels to determine the system calibration factors at a given frequency.
(5) At frequencies where no calibration data is taken, the value is interpolated between the closest data point above and below the transmit frequency. Calibration data is taken with a half-wave dipole antenna.

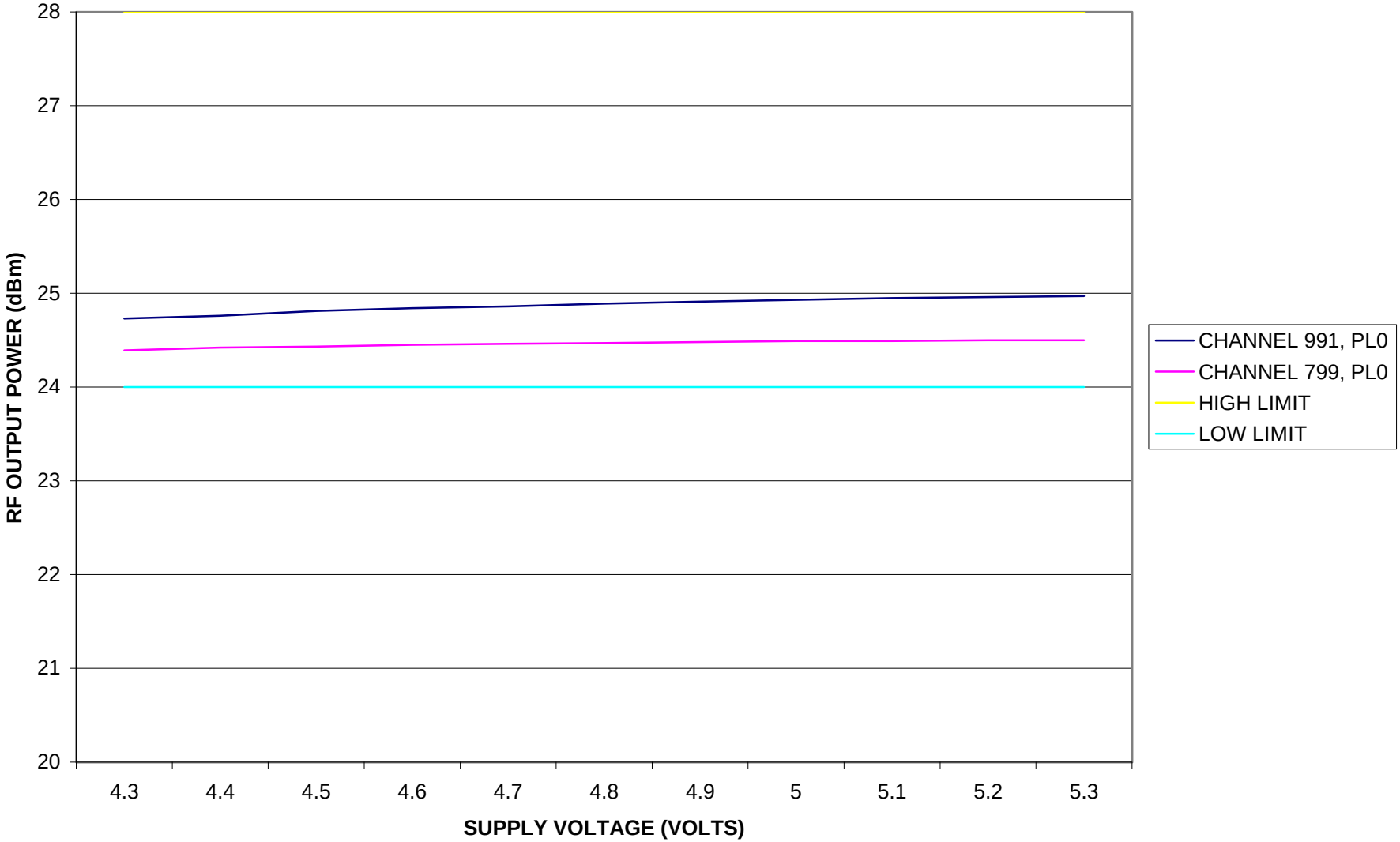
Measurements at a distance of 3 m from the source at the highest power level setting:

Frequency (MHz) / Channel No	Rated Output Pwr (W)	EIRP (dBm)
836.49	0.4	24.53

RF Output Power Vs. Temperature. Nominal voltage 4.8 volts. Frequency 835.86 MHz. Power 0.4 Watts.



RF OUTPUT POWER VS. SUPPLY VOLTAGE, PL0



800 MHz : MODULATION CHARACTERISTICS

Per 2.987 (a),(b),(d) and 22.915 (b)(4)

The frequency and amplitude response to audio inputs measured per IS-19B are shown on the following:

Exhibit #

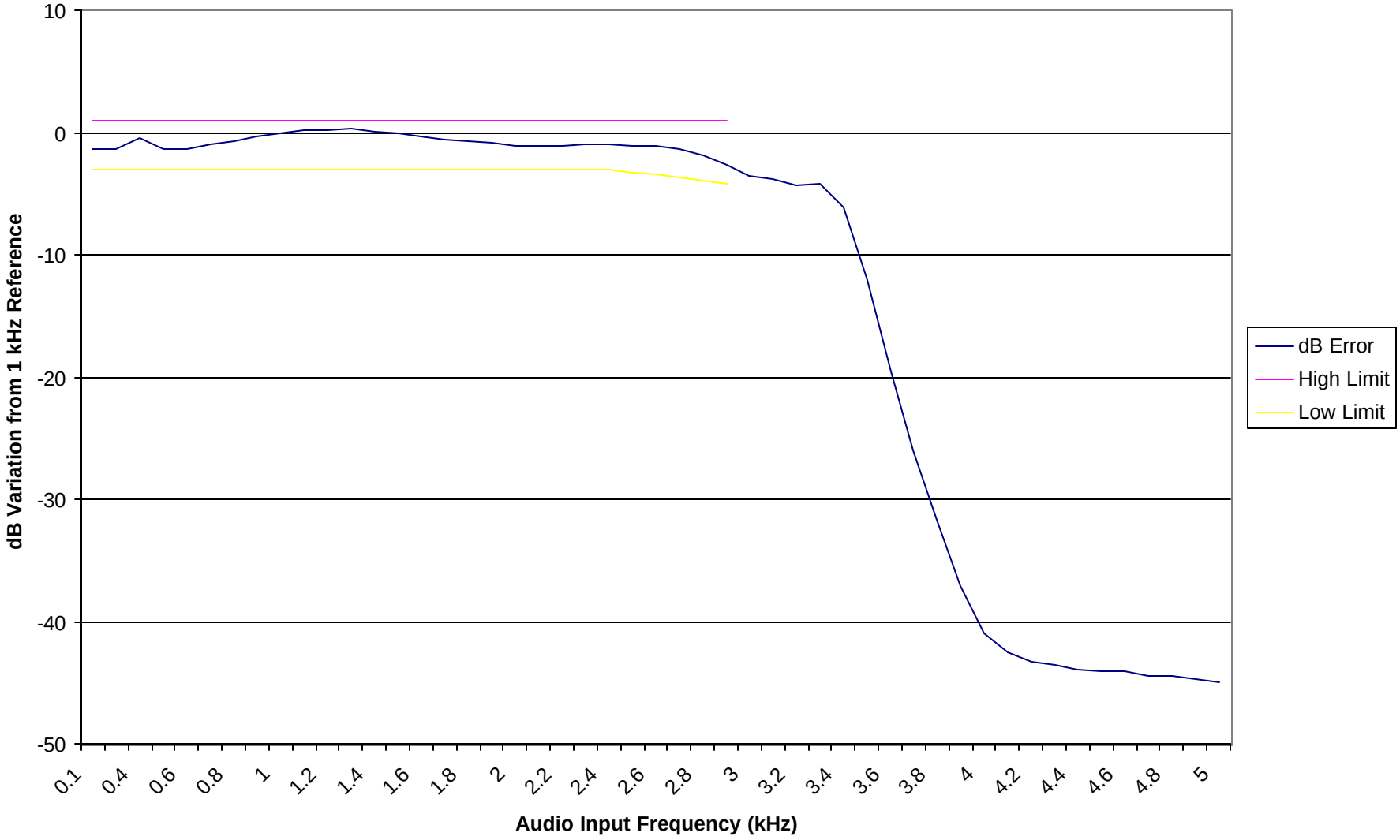
6B2	Transmit Audio Frequency Response	2.987 (a)
6B3	Post Limiter Filter Attenuation	22.915 (d)(1)
6B4	Modulation Limiting vs. Frequency	2.987 (b) and 22.915 (b)(1)
6B5	Modulation Limiting vs. Input Voltage	2.987 (b)

Note: As shown in Exhibit 6B3, the frequency range of 5.9 to 6.1kHz, the tone is attenuated approximately –50 to –60 dB from the reference.

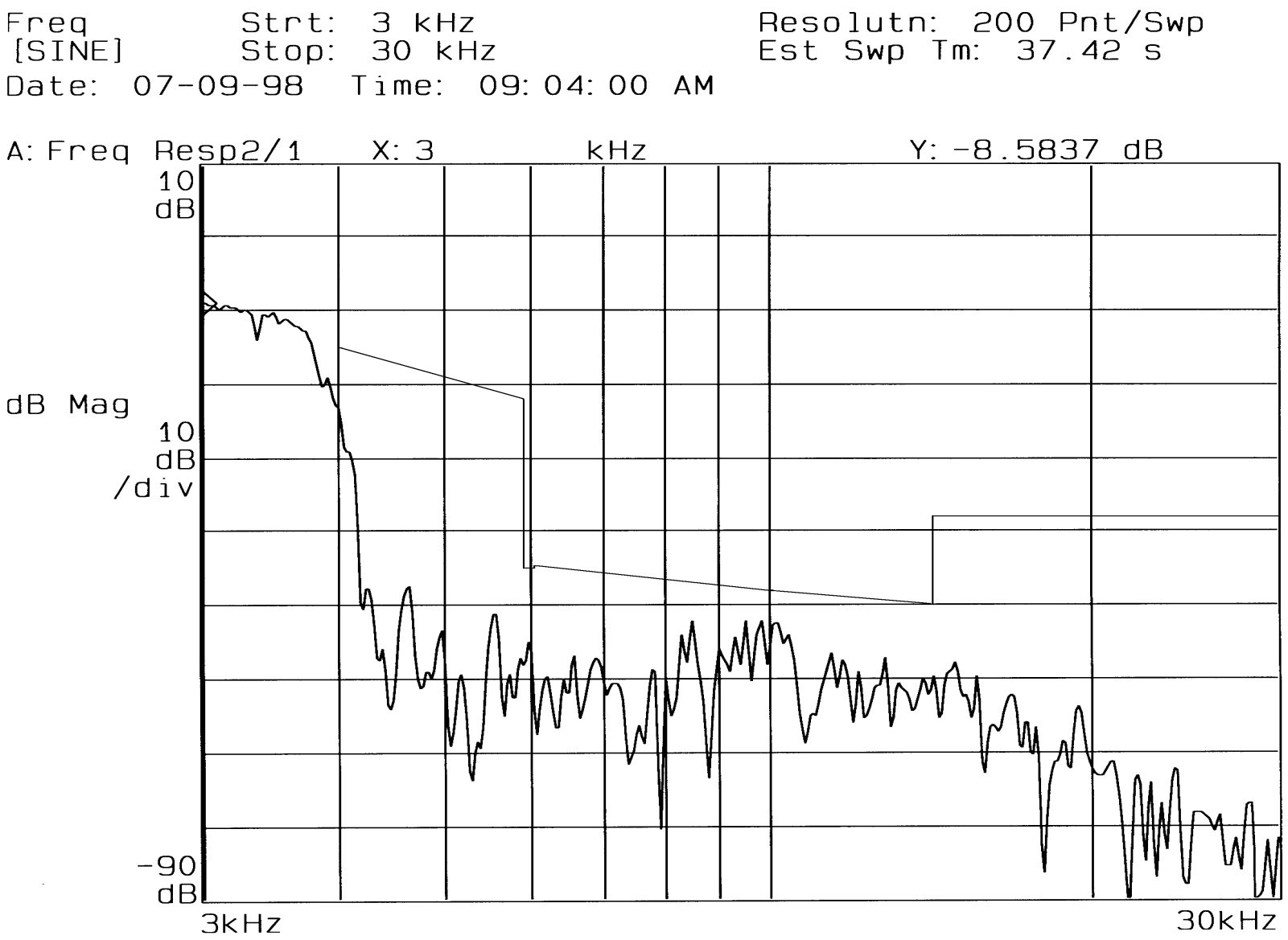
The measurements were made per IS-19B using a Hewlett Packard 8953DT North American Dual Mode Cellular Test System which includes the following equipment:

HP8958A Cellular Interface
HP 6623A DC Power Supply
HP 8596E Spectrum Analyzer
HP 437B RF Power Meter
HP 8901B Modulation Analyzer
HP 8903B Audio Analyzer
HP 35679 Signal Analyzer
B&KJ 2012 Breul & KJ Audio Analyzer (Exhibit 6B3 only)
Thermotron SM-8C Temperature Chamber

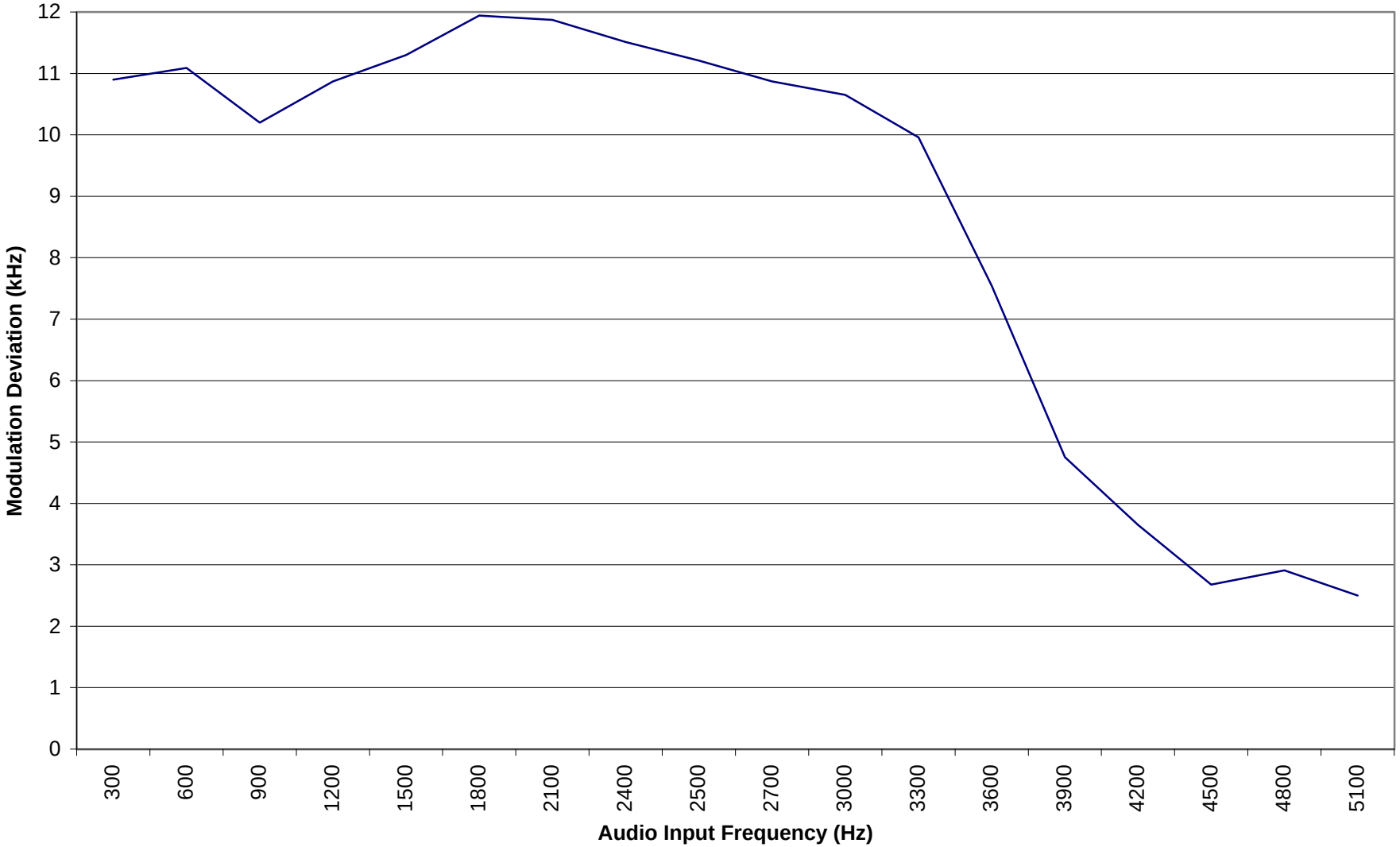
Transmit Audio Frequency Response, Carrier Frequency 836.49 MHz



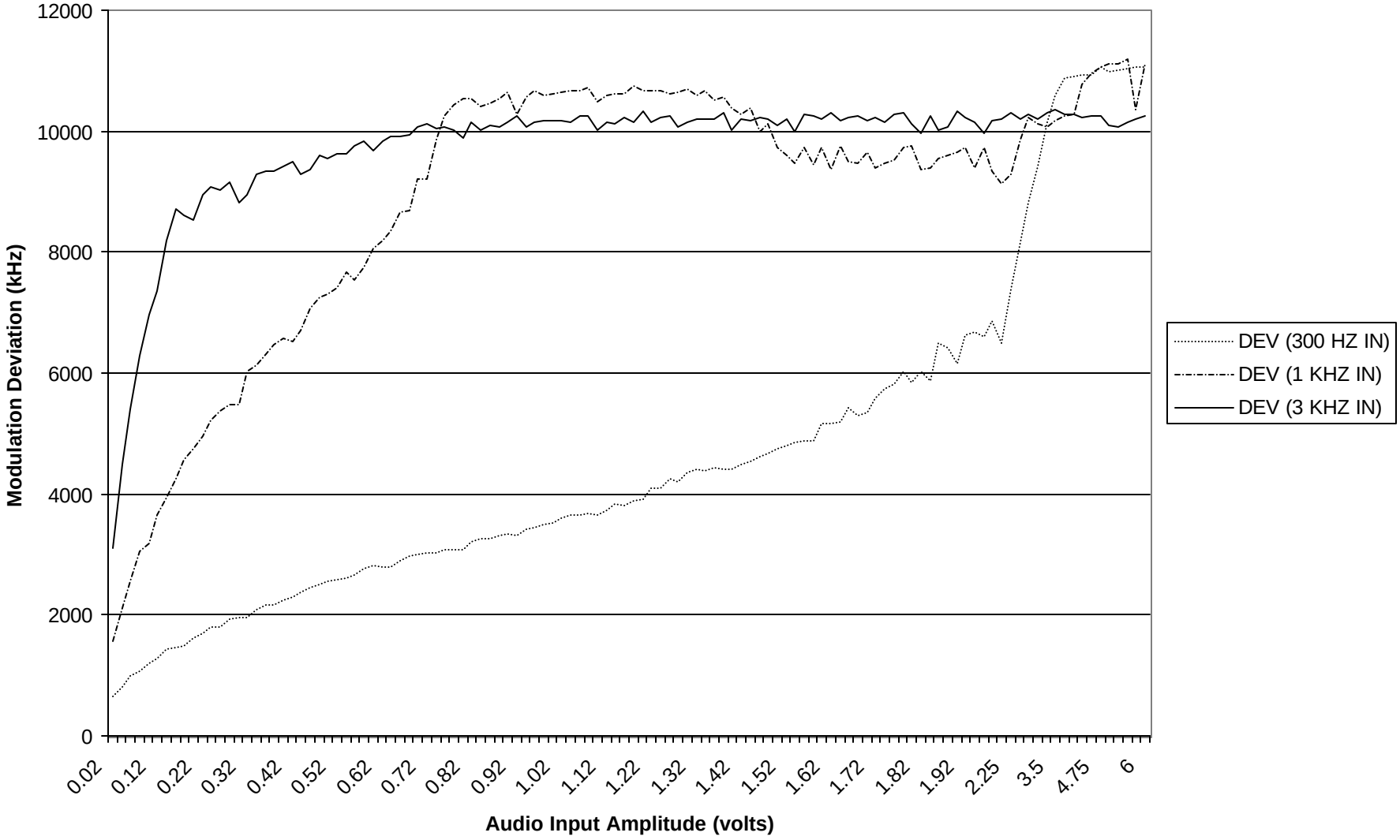
Post Limiter Filter Attenuation



Modulation Deviation Limiting Vs. Frequency



Modulation Deviation Limiting Vs. Audio Input Amplitude, AMPS Channel 383



800 MHz : OCCUPIED BANDWIDTH

Per 2.989 (c), (1) (h) and 22.917 (d)(1) the exhibits presented show the modulations that co-exist in a cellular system:

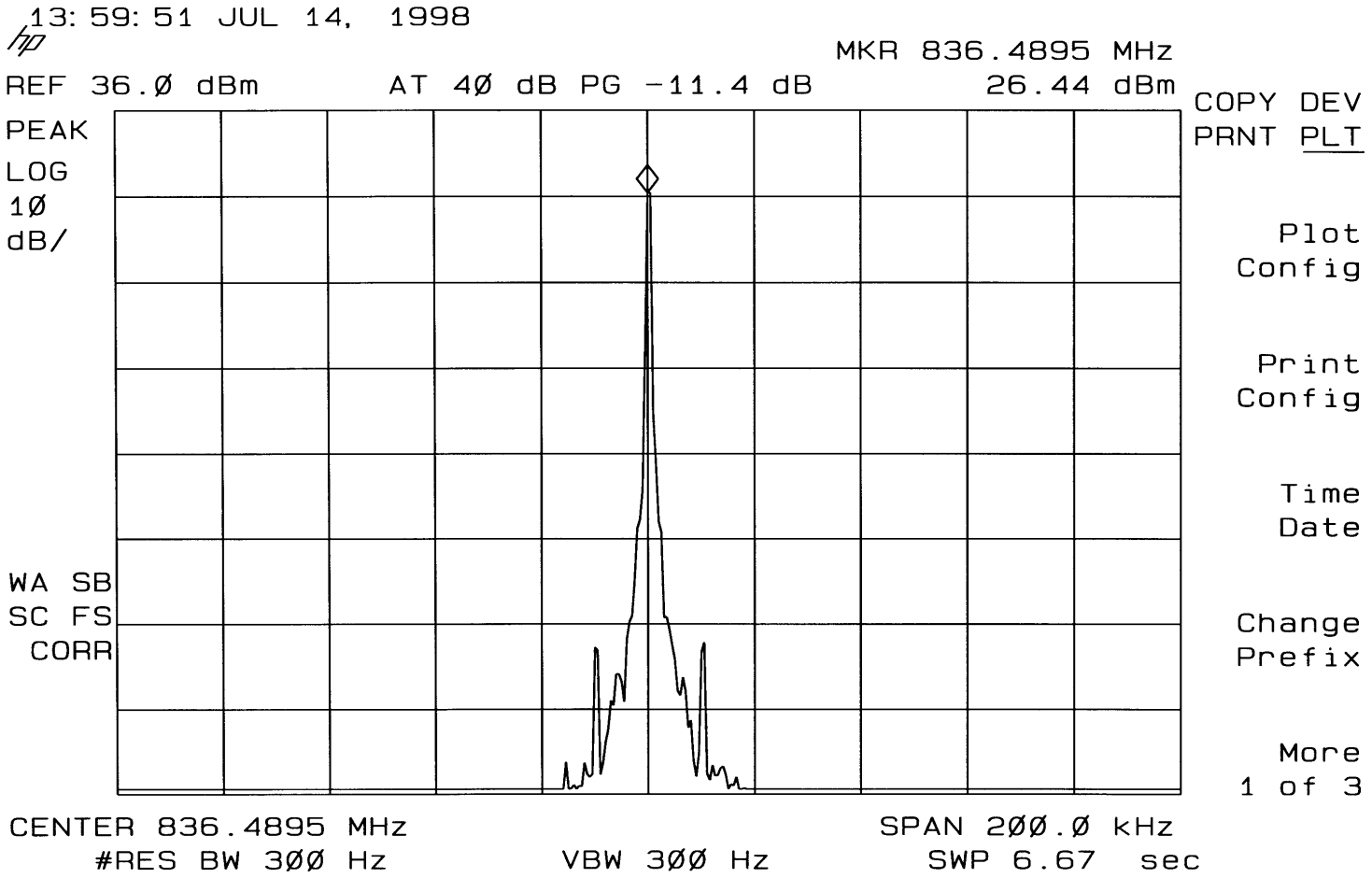
Exhibit #		Power Level
6C2	Unmodulated Carrier	0
6C3	SAT and Voice	0
6C4	SAT and Signal Tone	0
6C5	SAT and DTMF #3	0
6C6	SAT and 10kb/s Wideband Data	0
6C7	Unmodulated Carrier	7
6C8	SAT and Voice	7
6C9	SAT and Signal Tone	7
6C10	SAT and DTMF #3	7
6C11	SAT and 10 kb/s Wideband Data	7

All deviations are set independently of each other per Exhibit 10 and limits and nominal values per Exhibit 12

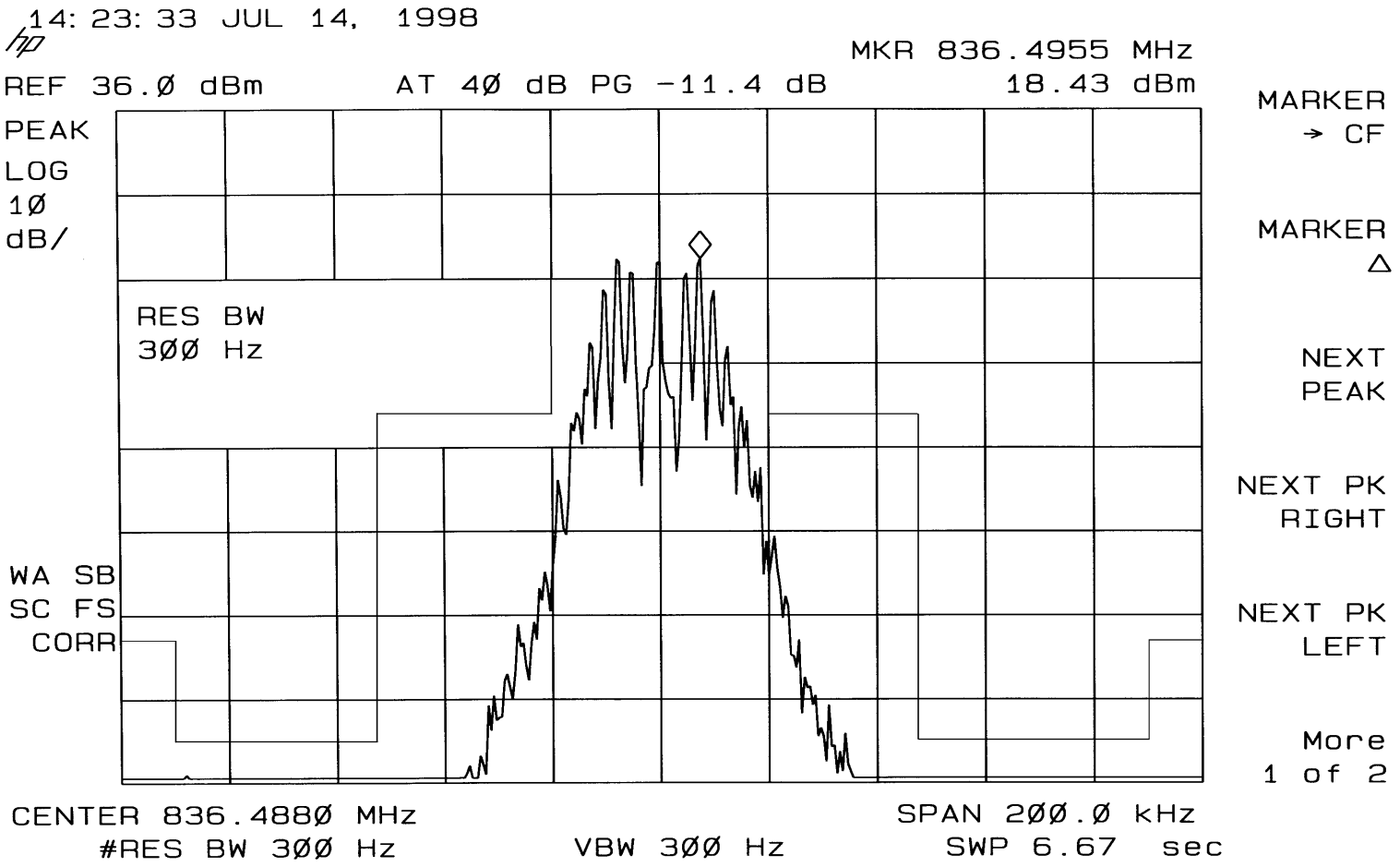
The measurements were made per IS-137A using a Hewlett Packard 8953DT North American Dual Mode Cellular Test System which includes the following equipment:

Hp 8958A	Cellular Interface
Hp 6623A	DC Power Supply
Hp 8596E	Spectrum Analyzer
Hp 437B RF	Power Meter
Hp 8901B	Modulation Analyzer
Hp 8903B	Audio Analyzer

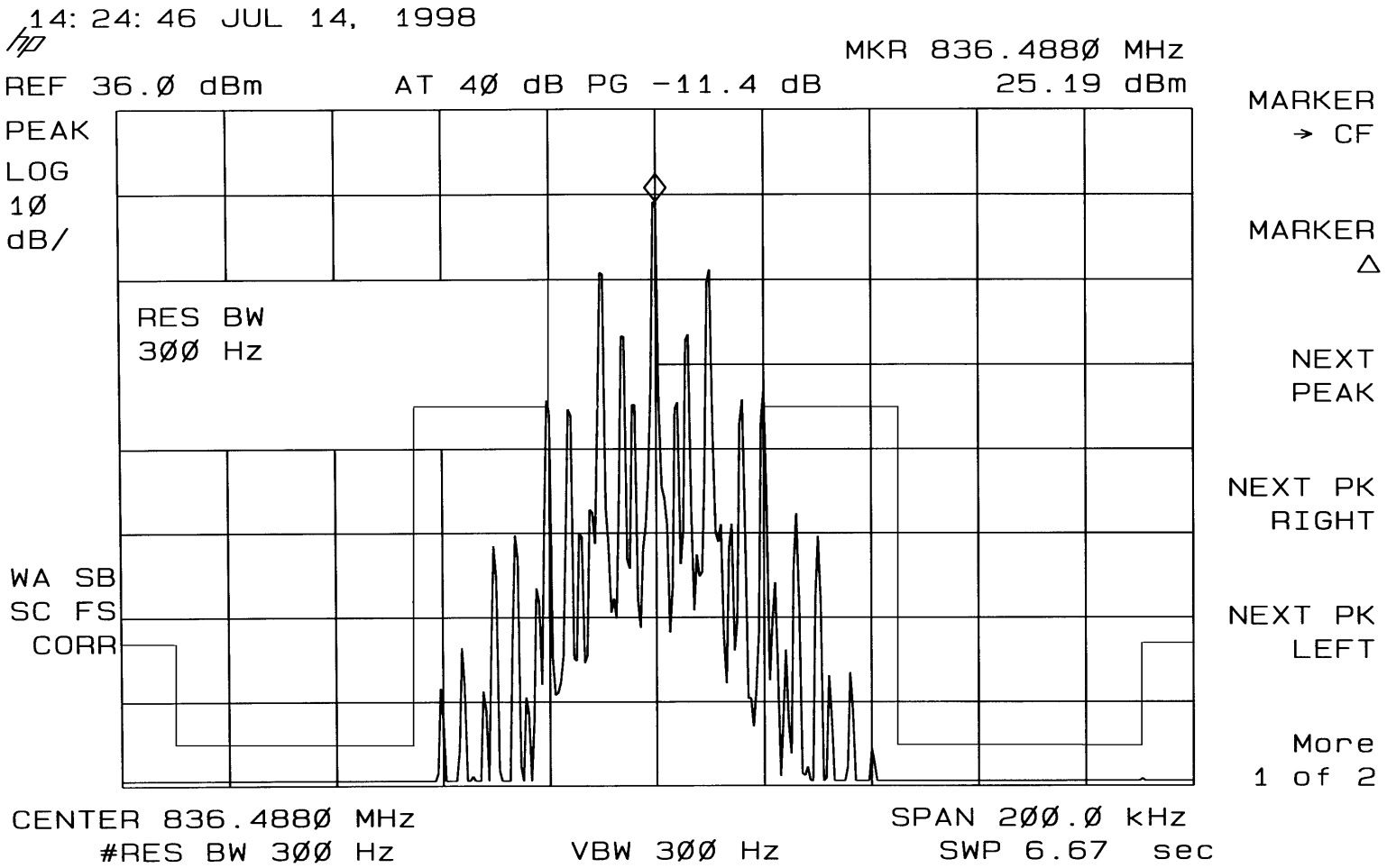
Thermotron SM-8C Temperature Chamber



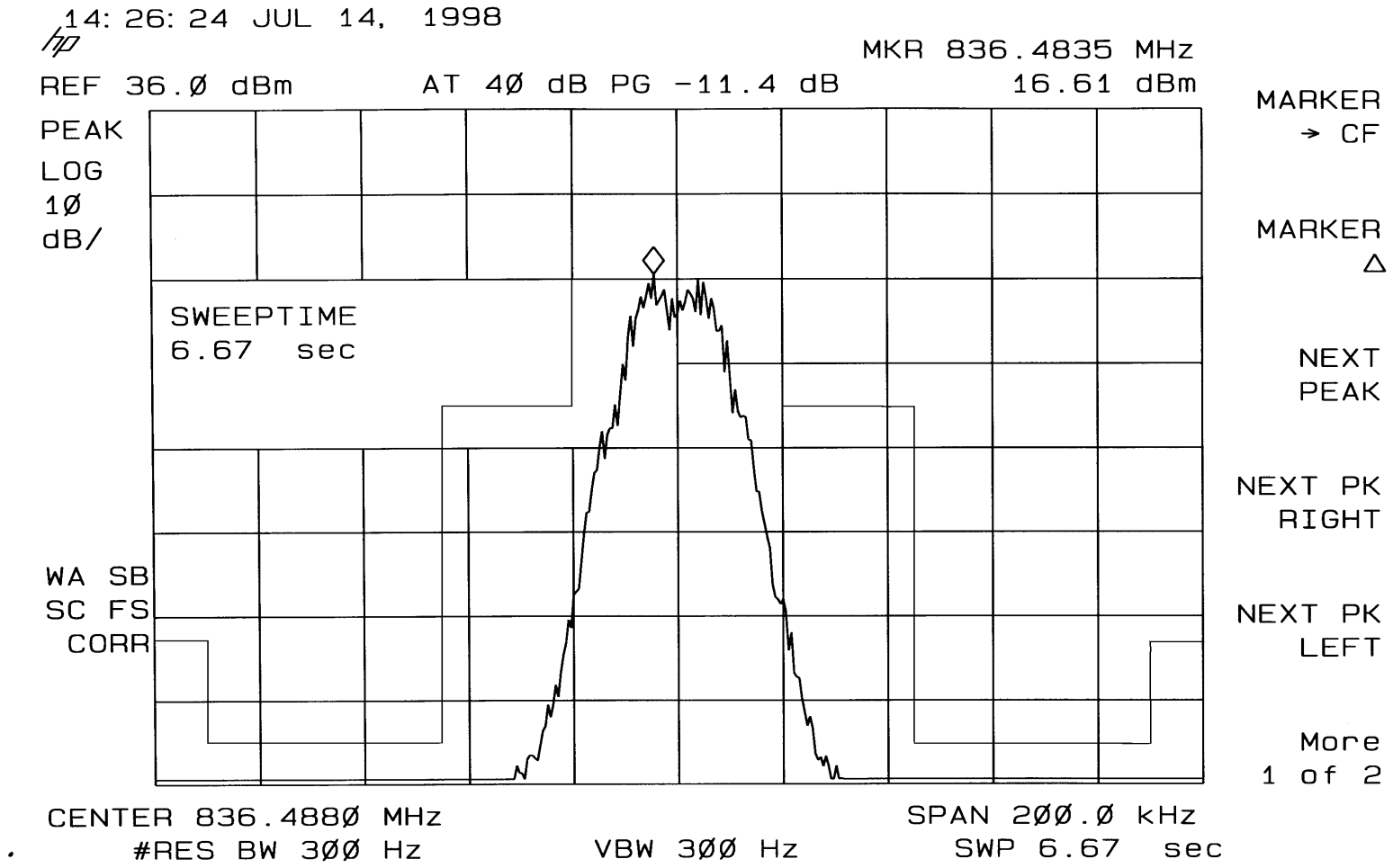
Unmodulated Carrier, Carrier Frequency 836.49 MHz, Power Level 0, Conducted RF Output Power 440.6 mW



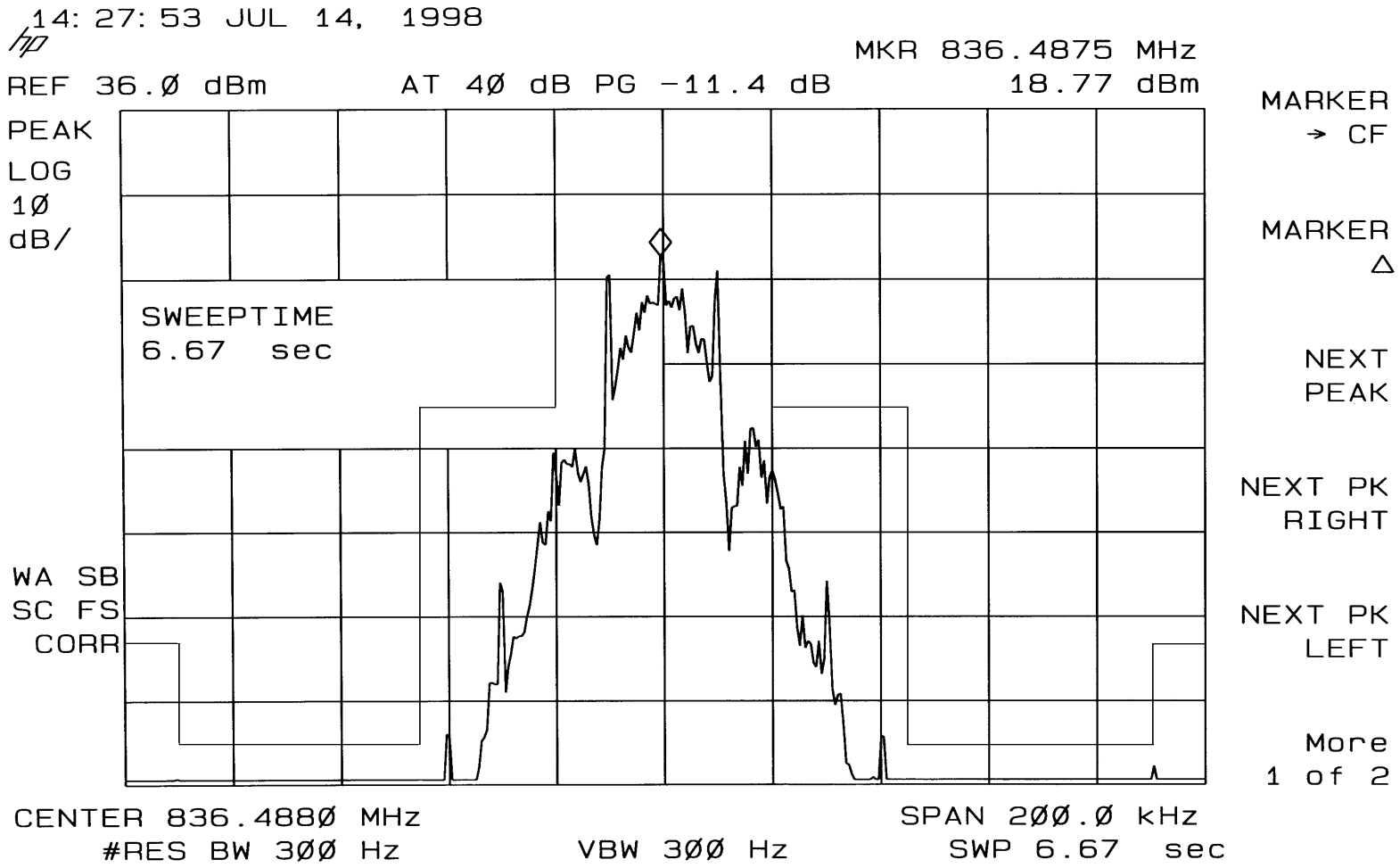
SAT & Voice, Carrier Frequency 836.49 MHz, Power Level 0



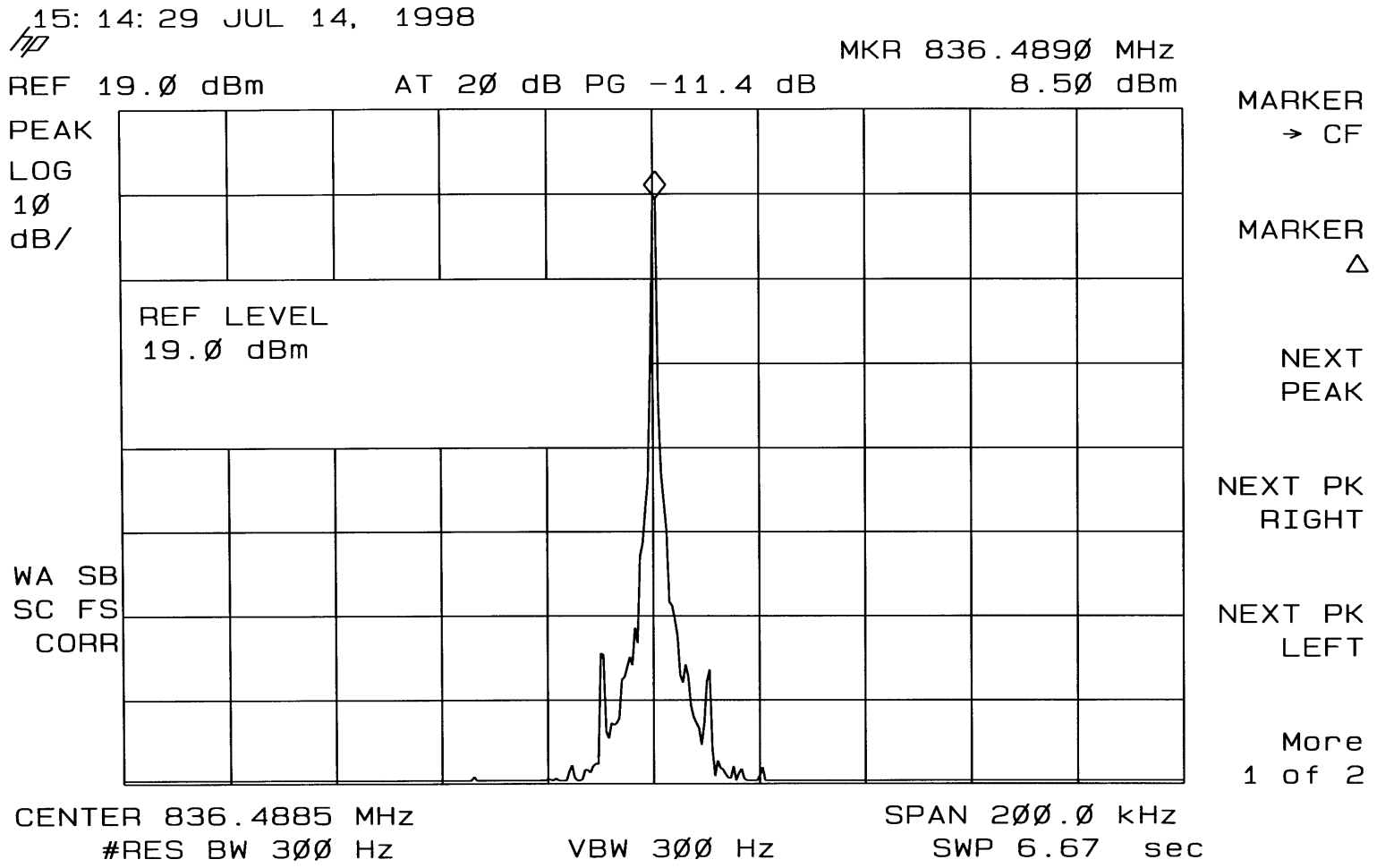
SAT & Signal Tone, Carrier Frequency 836.49 MHz, Power Level 0.



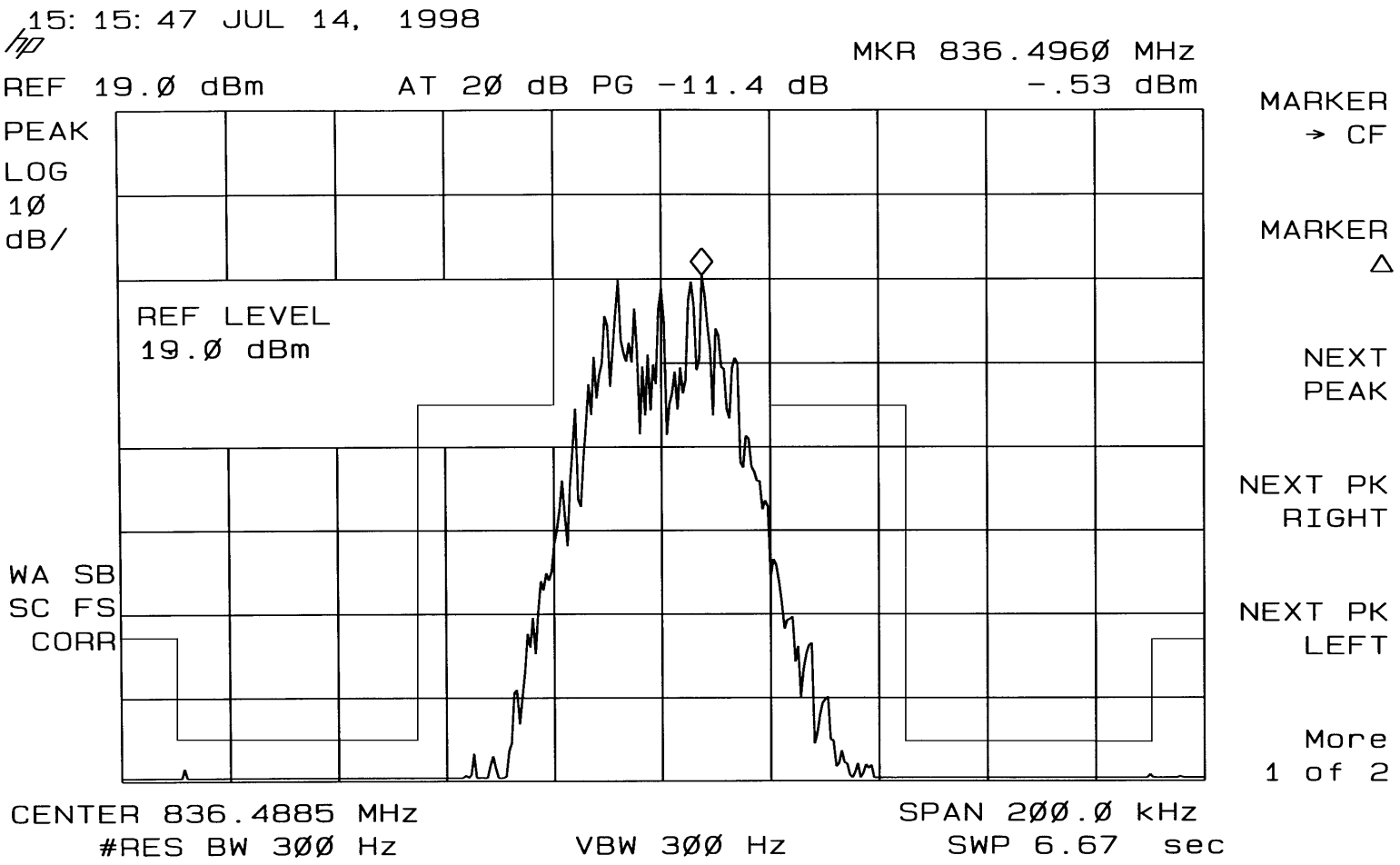
SAT & DTMF #3, Carrier Frequency 836.49 MHz, Power Level 0



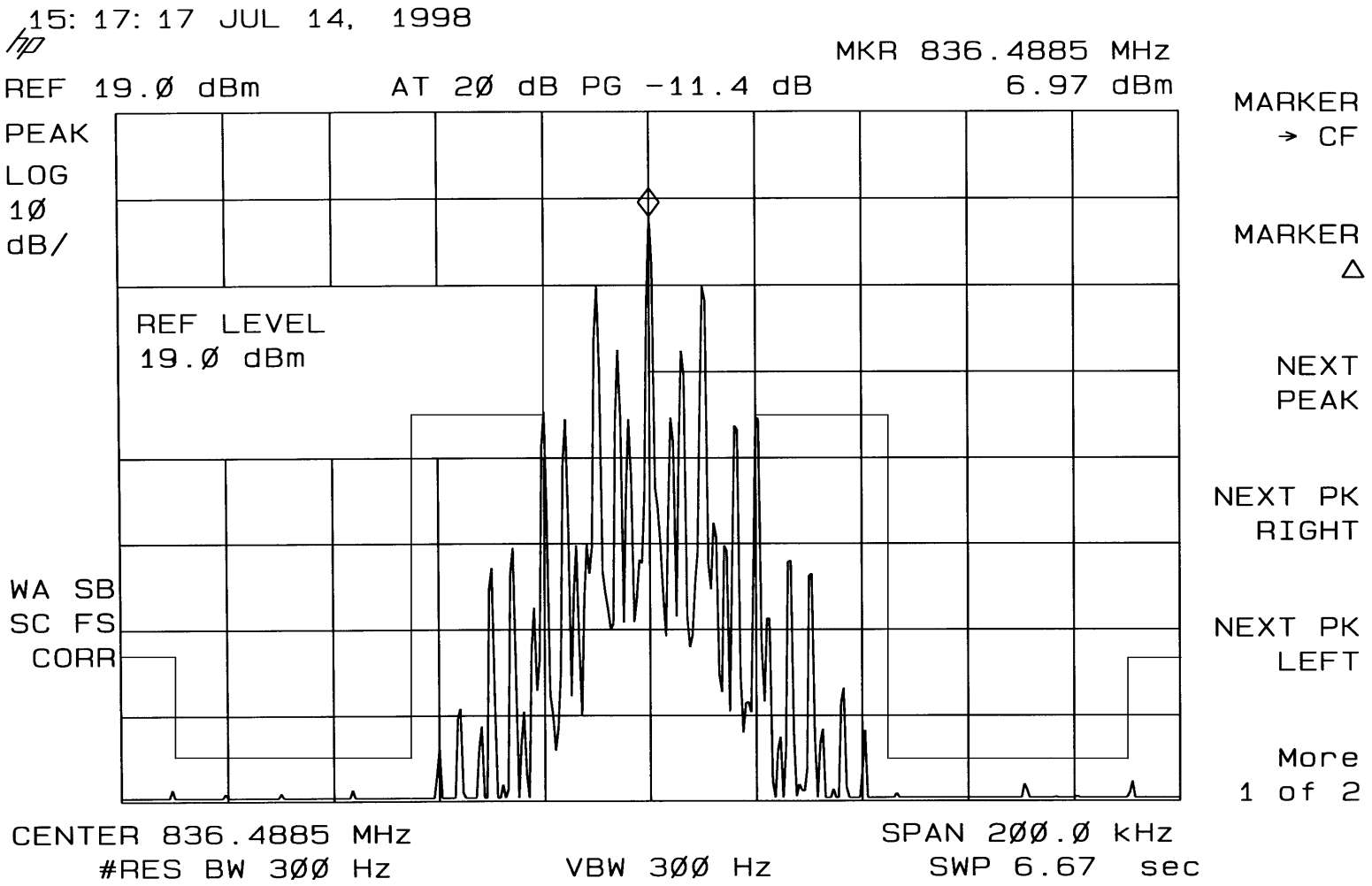
10 kbit/s Wideband Data, Carrier Frequency 836.49 MHz, Power Level 0



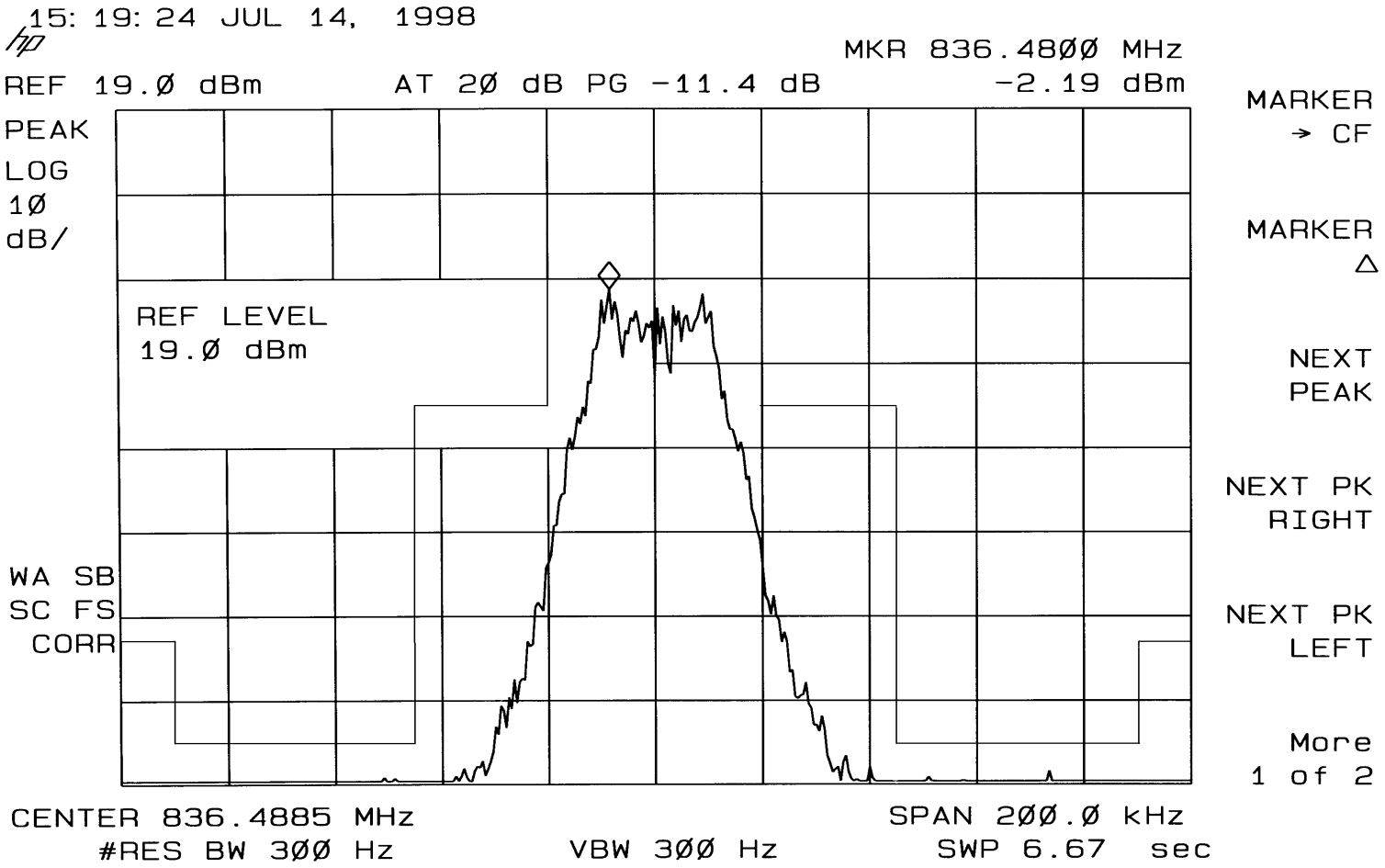
Unmodulated Carrier, Carrier Frequency 836.49 MHz, Power Level 7, Conducted RF Output Power 7.08 mW.



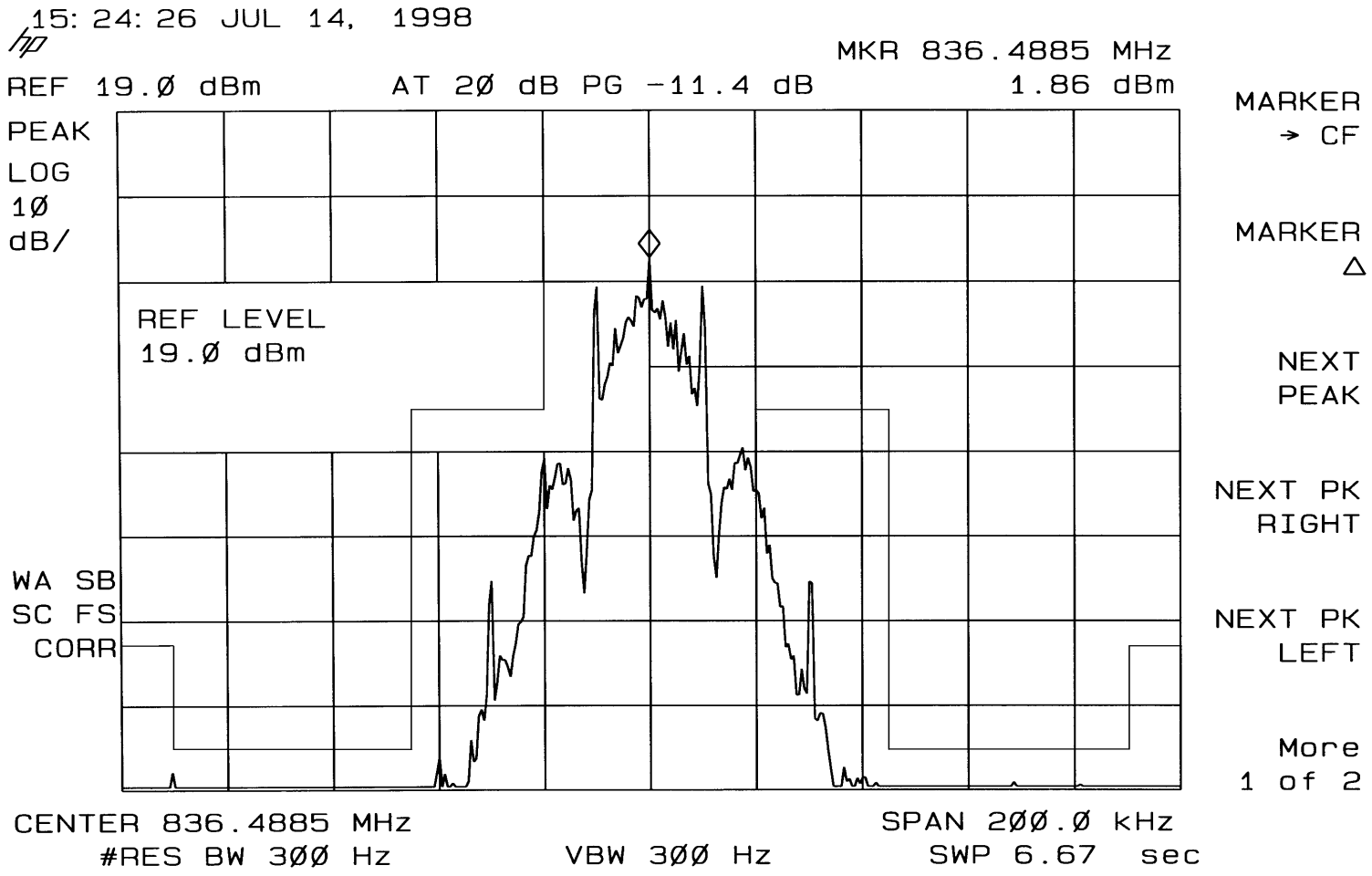
SAT & Voice, Carrier Frequency 836.49 MHz, Power Level 7



SAT & Signal Tone, Carrier Frequency 836.49 MHz, Power Level 7



SAT & DTMF #3, Carrier Frequency 836.49 MHz, Power Level 7



10 kbit/s Wideband Data, Carrier Frequency 836.49 MHz, Power Level 7

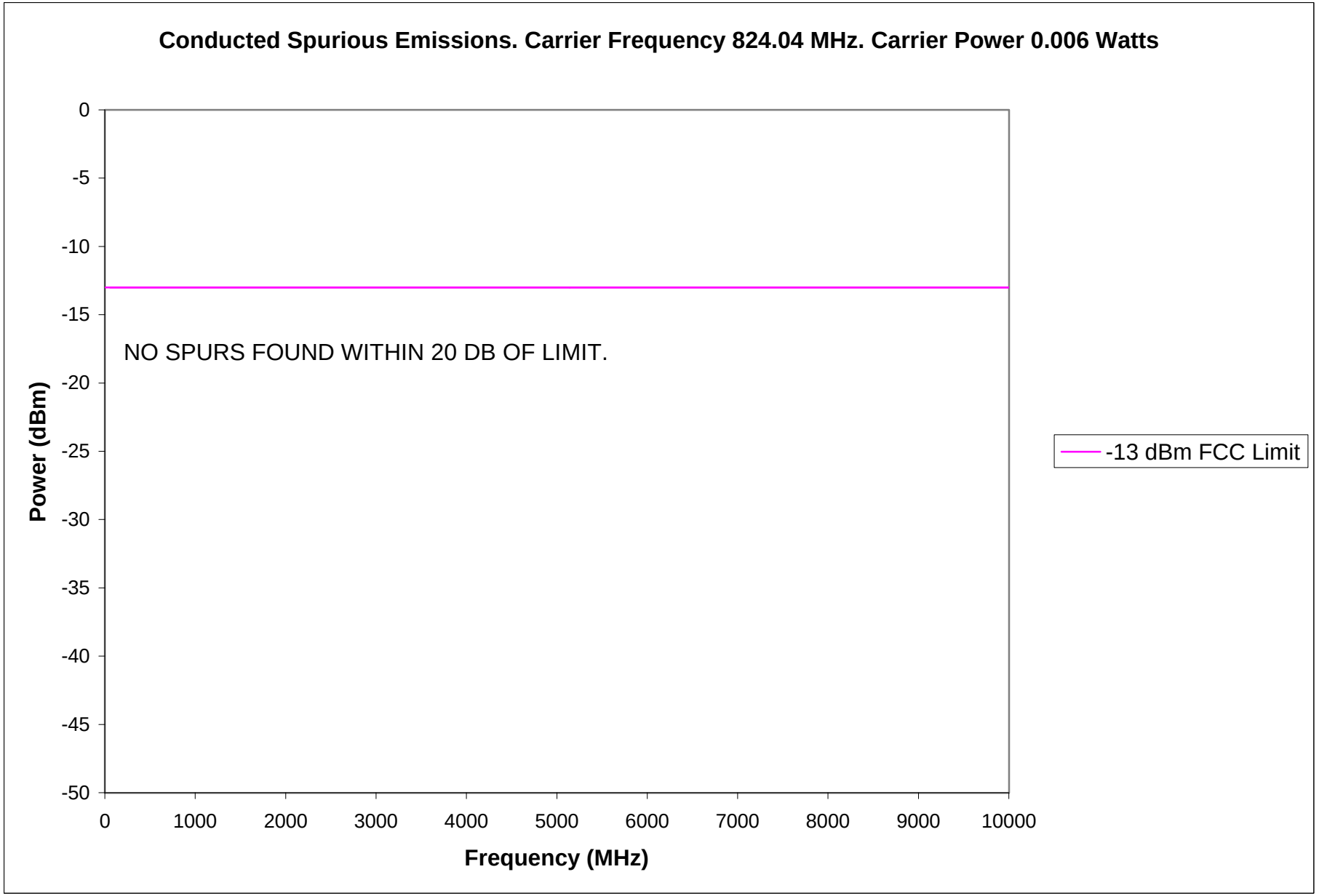
800 MHz : SPURIOUS EMISSIONS (CONDUCTED)

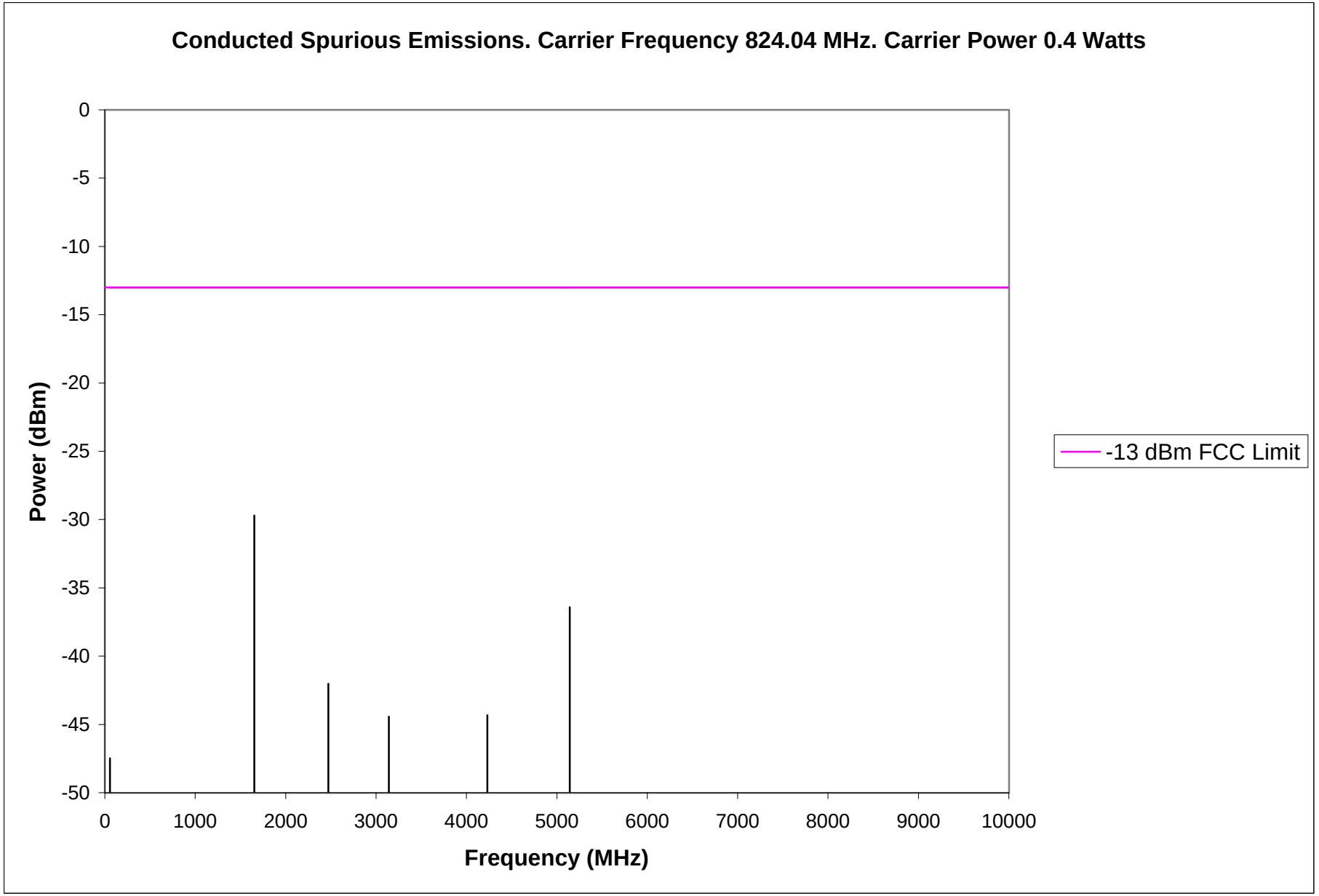
Per 2.991 Spurious emissions at the antenna terminals (conducted) when properly loaded with an appropriate artificial antenna were measured per IS-19B.

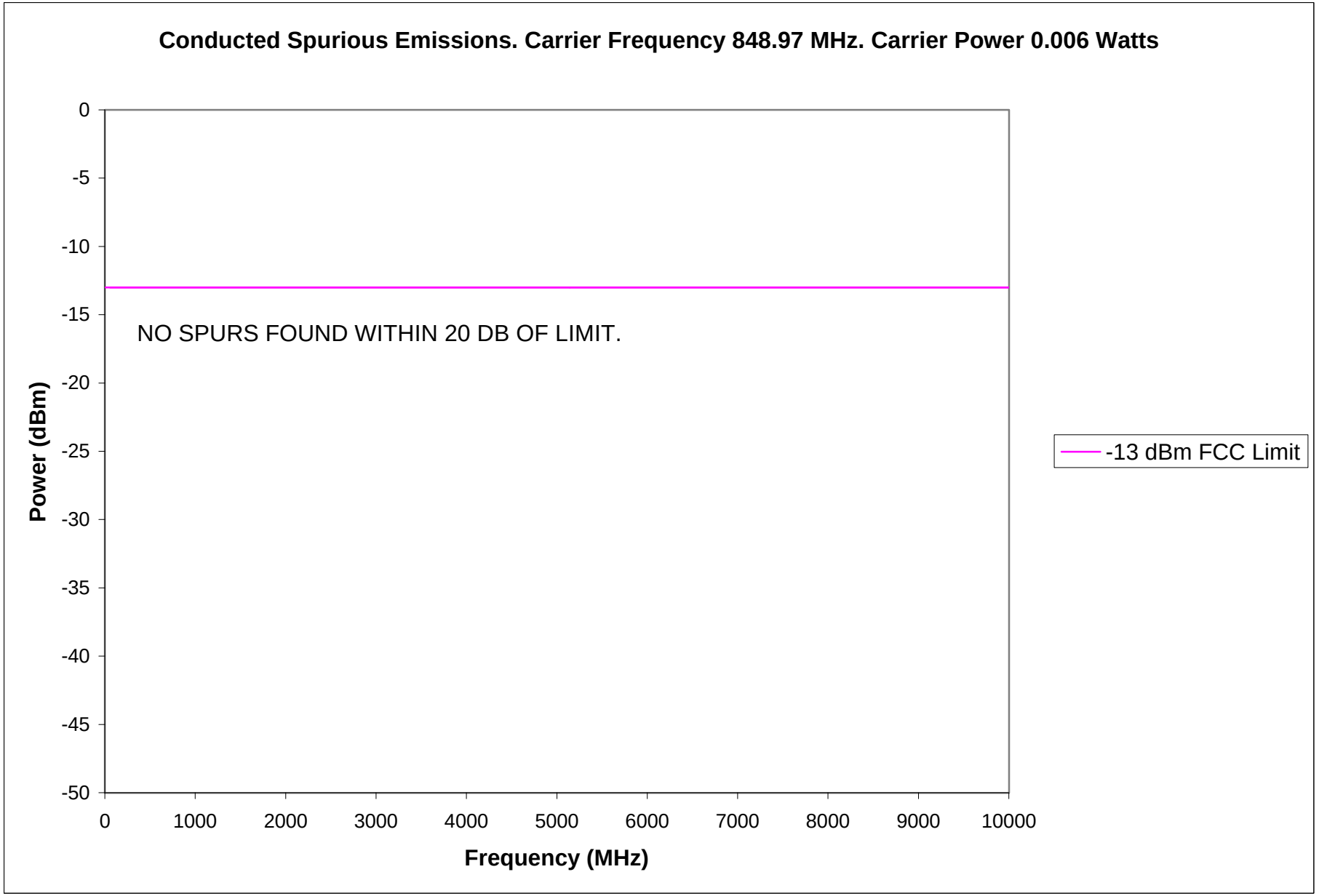
EXHIBIT #	FREQUENCY	Output Power
6D2	824.04	.006
6D3	824.04	.4
6D4	848.97	.006
6D5	848.97	.4

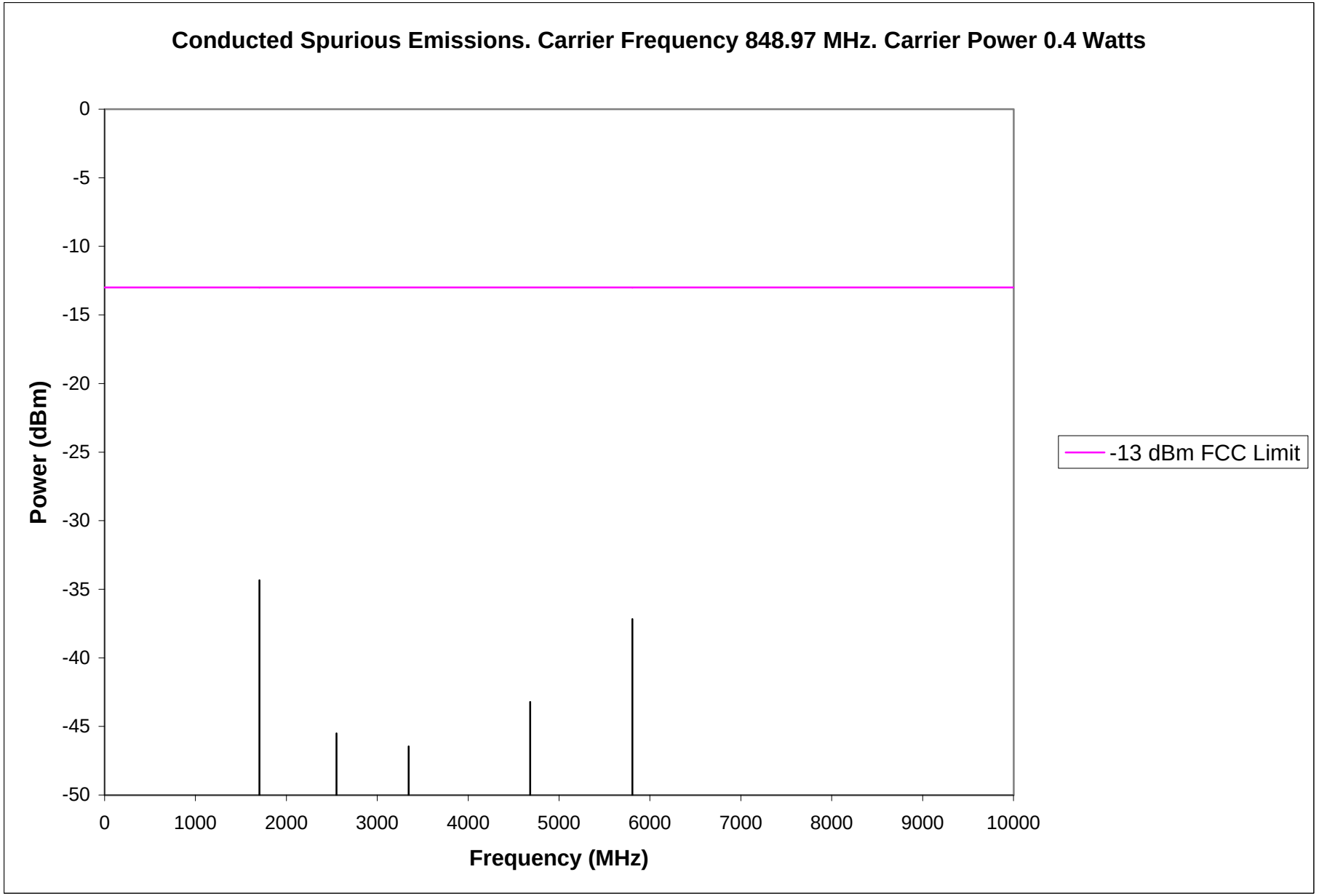
The measurements were made per IS-19B using the following equipment:

Hp 8958A	Cellular Interface
Hp 8901B	Modulation Analyzer
Hp 8559A	Spectrum Analyzer









800 MHz : SPURIOUS EMISSIONS (RADIATED)

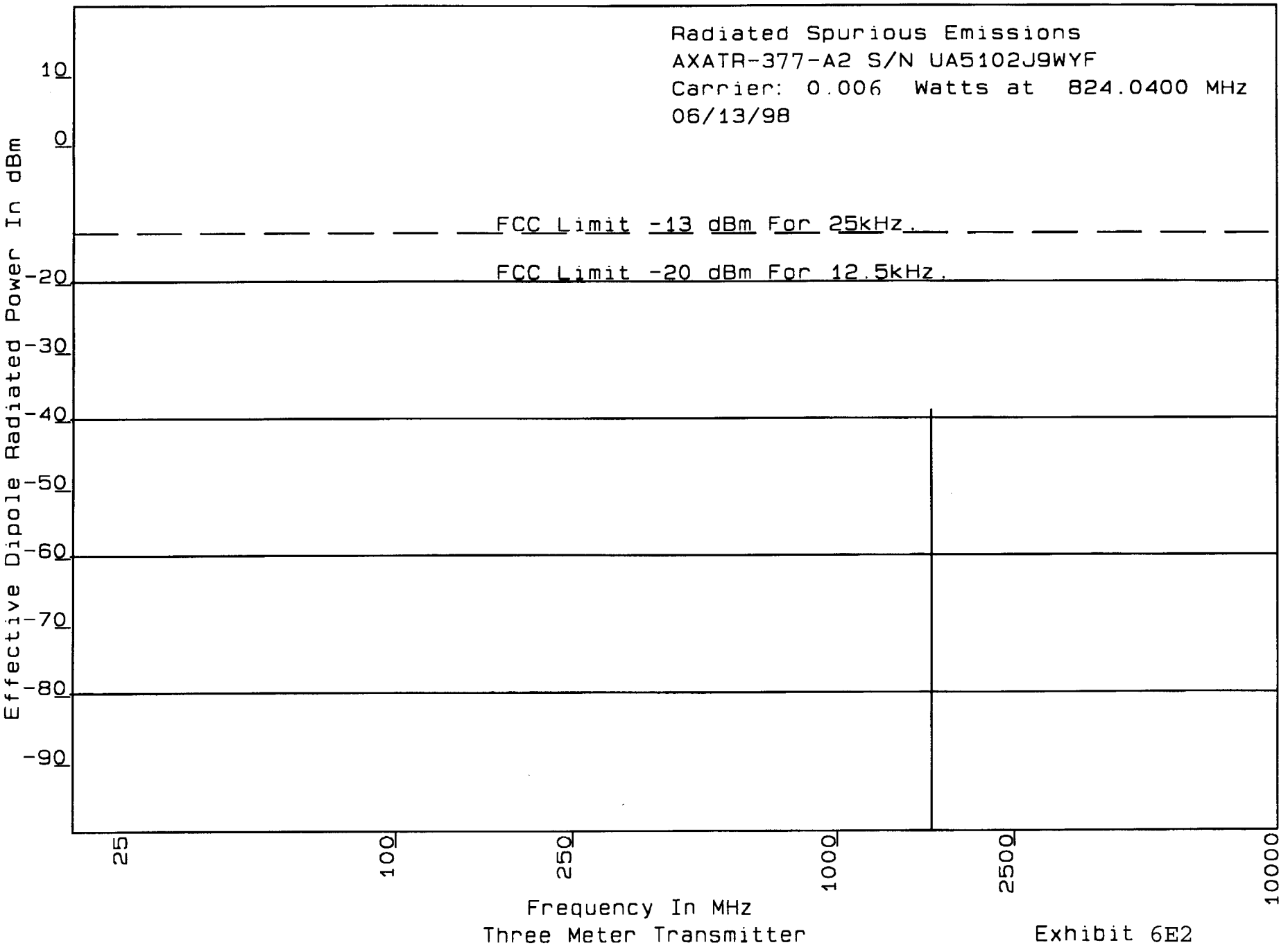
Per 2.993 and 22.917(e) field strength of spurious radiation was measured on Ericsson's 3 meter site in Lynchburg Va. The site and equipment are described in the site description and attenuation measurements for the Ericsson 3 meter site #2 filed with the FCC in Columbia, MD, on June 5th, 1997. The measurement procedure is per IS-19B but was done on a 3 meter test site. Results are shown on the following Exhibits:

Exhibit #	Frequency (MHz)	Watts (W)
6E2	824.04	.006
6E3	824.04	.4
6E4	836.49	.006
6E5	836.49	.4
6E6	848.97	.006
6E7	848.97	.4

Note: The spectrum was examined through the 10th harmonic of the carrier. No emissions were detectable above the 5th harmonic for which data was recorded.

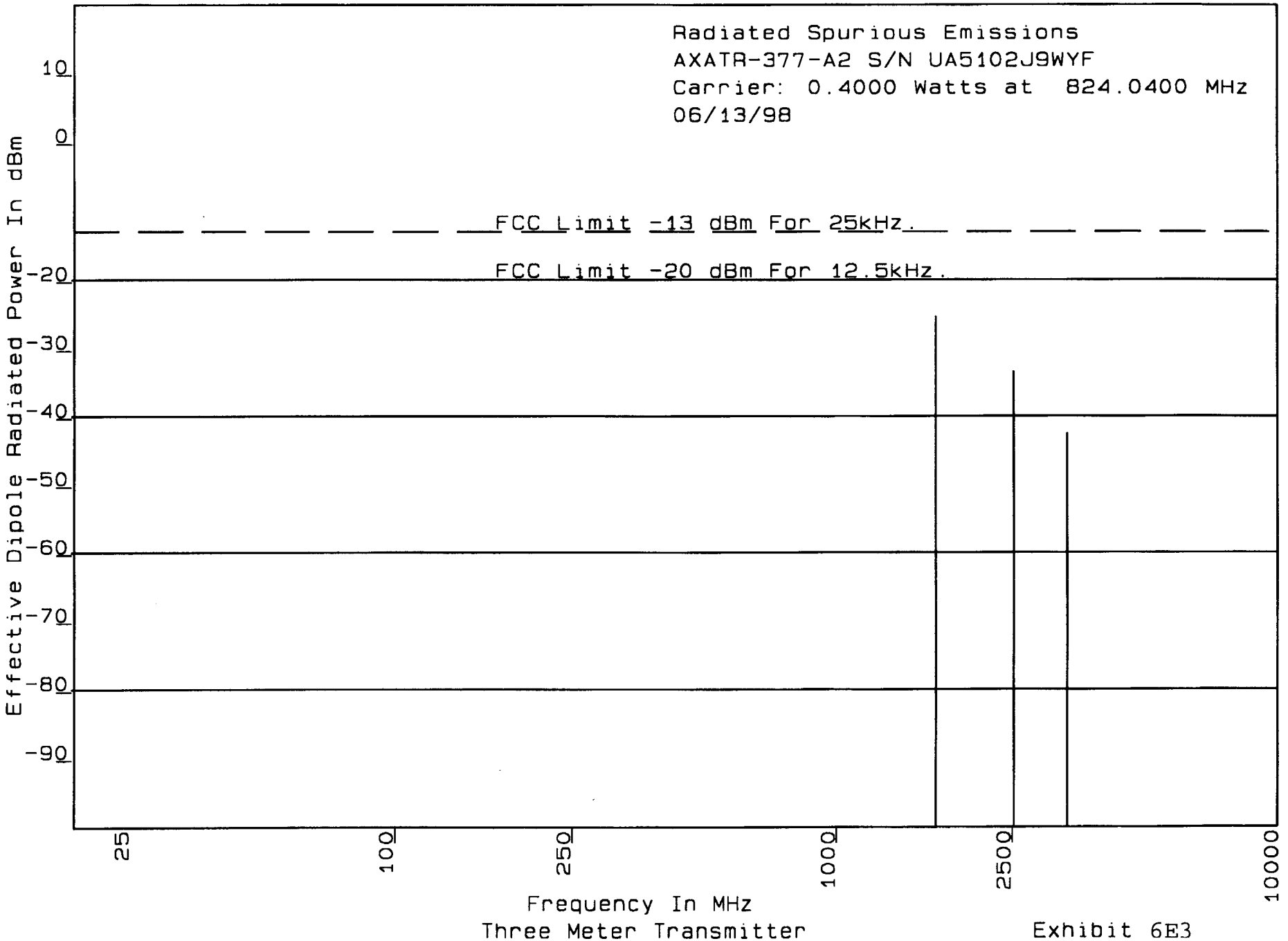
The measurements were made per IS-19B using the following equipment:

Hp 8566B Spectrum Analyzer
Hp 8559A Spectrum Analyzer



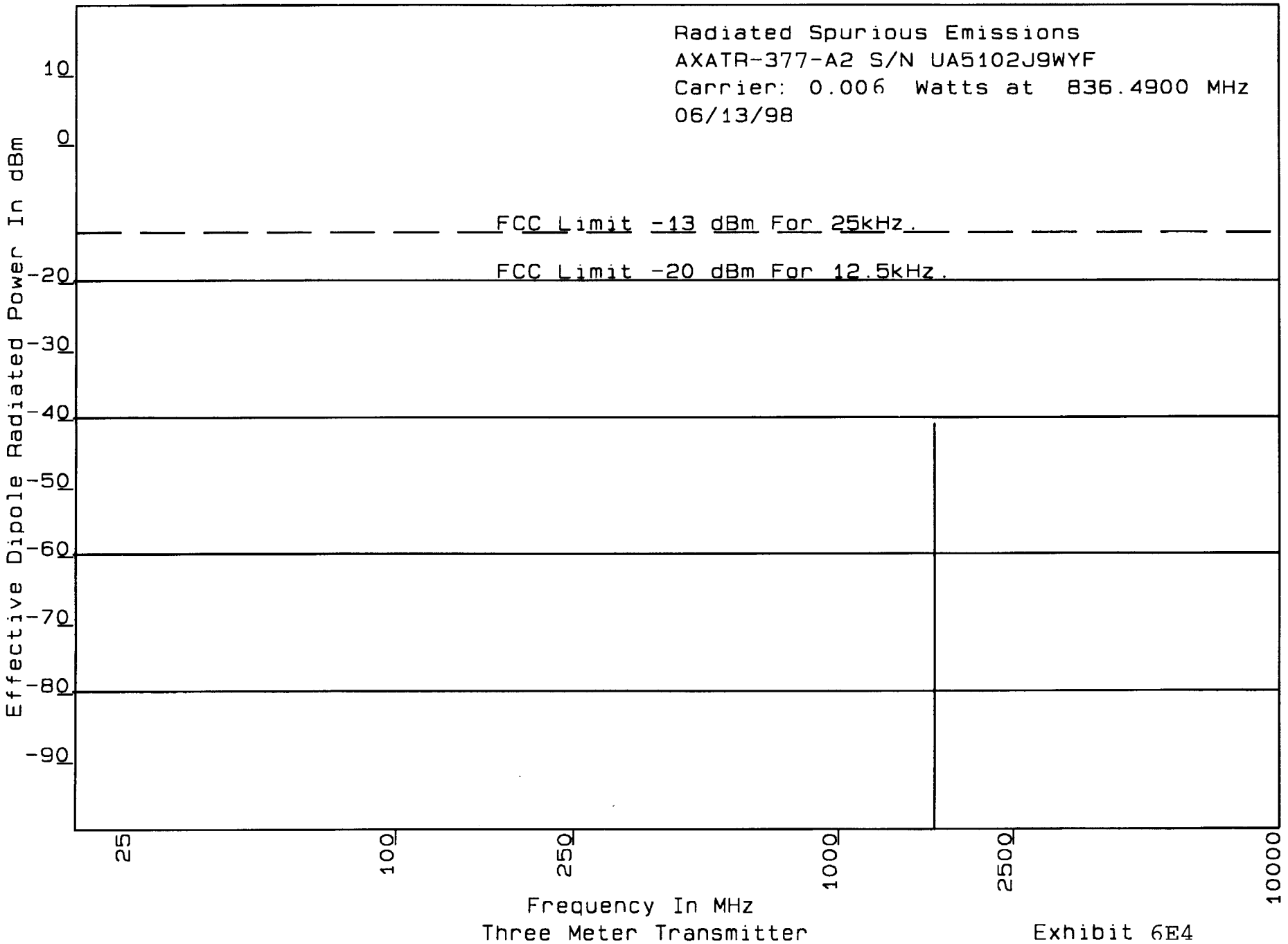
Three Meter Transmitter

Exhibit 6E2



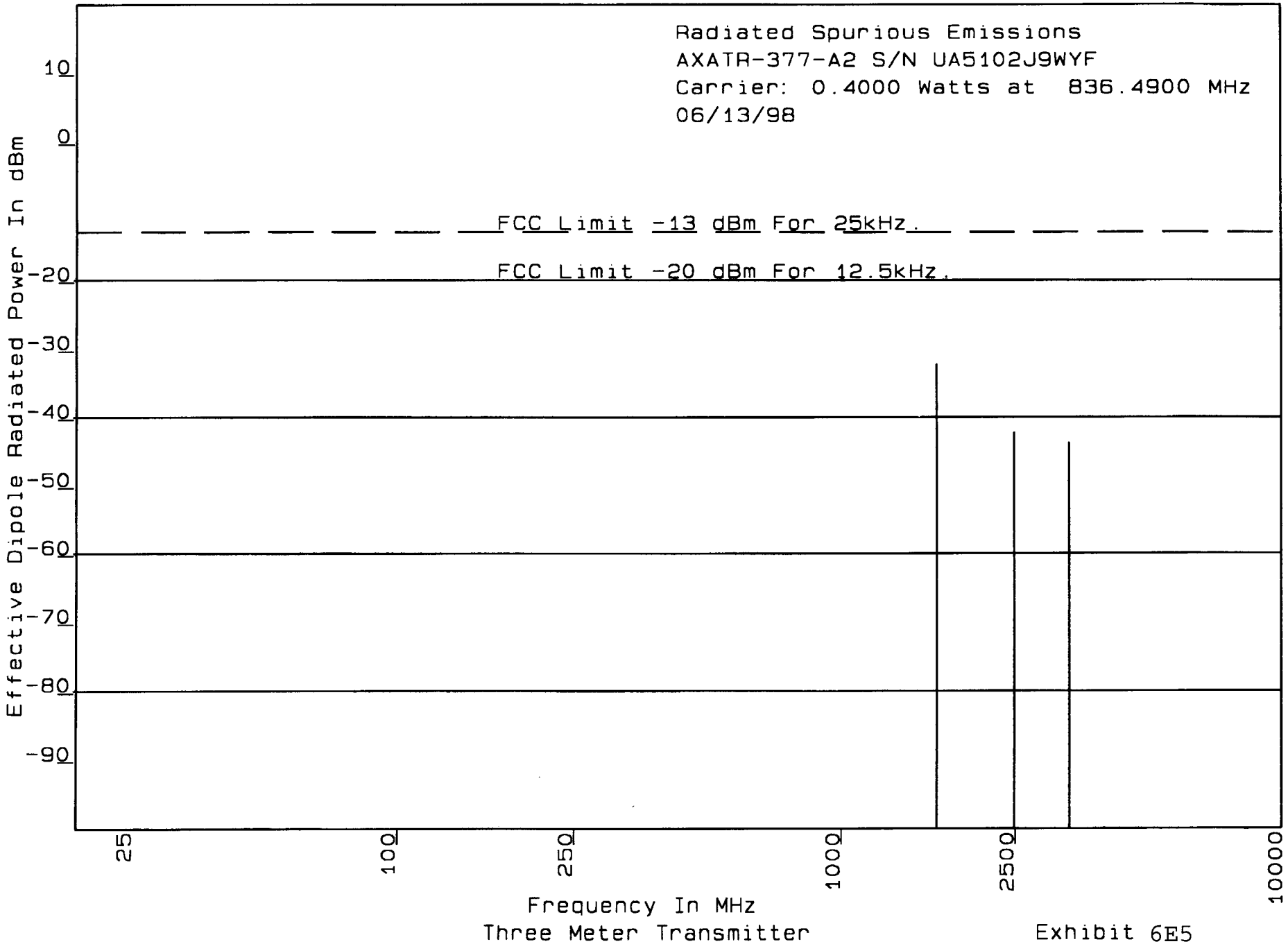
Three Meter Transmitter

Exhibit 6E3



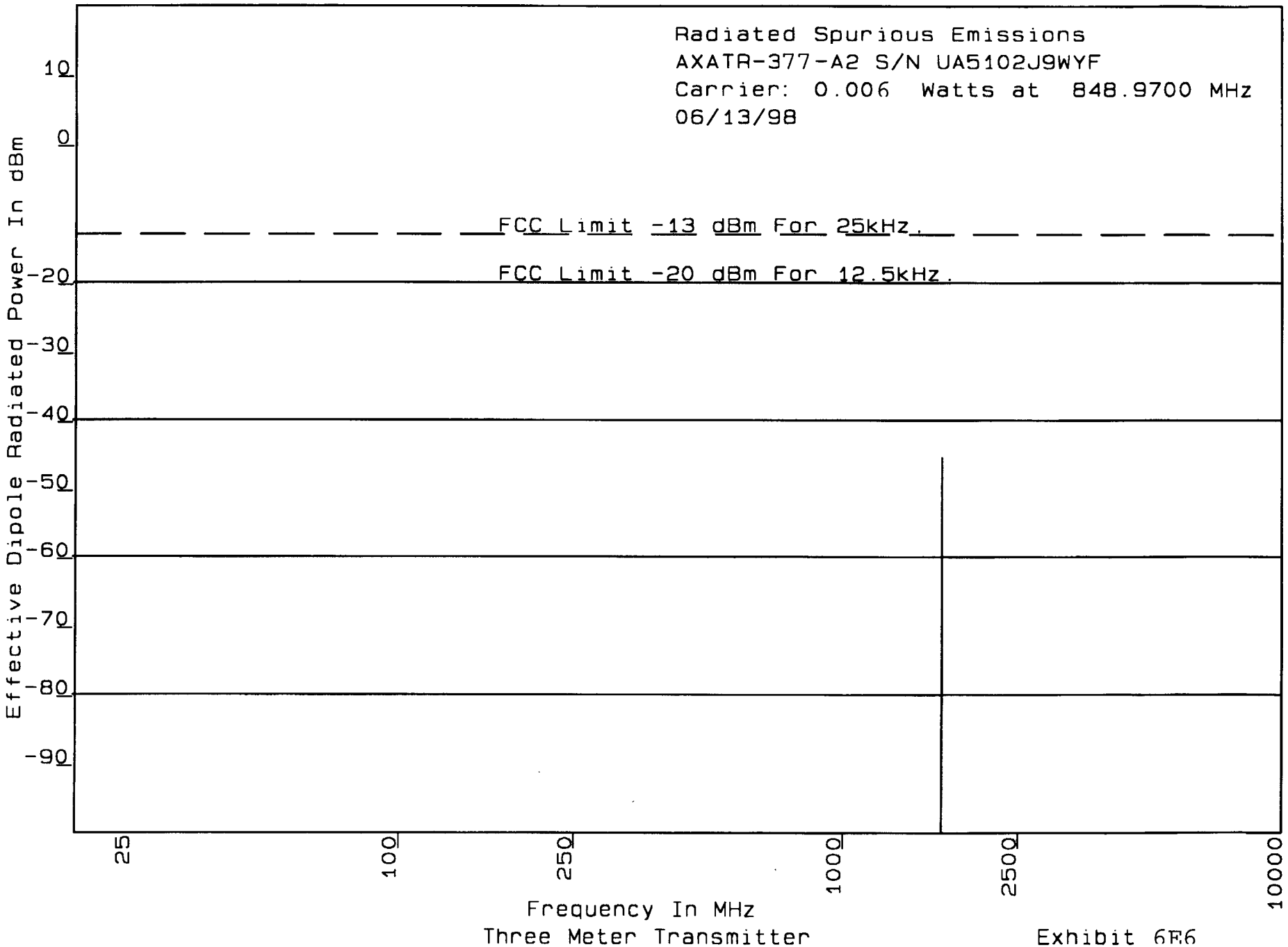
Three Meter Transmitter

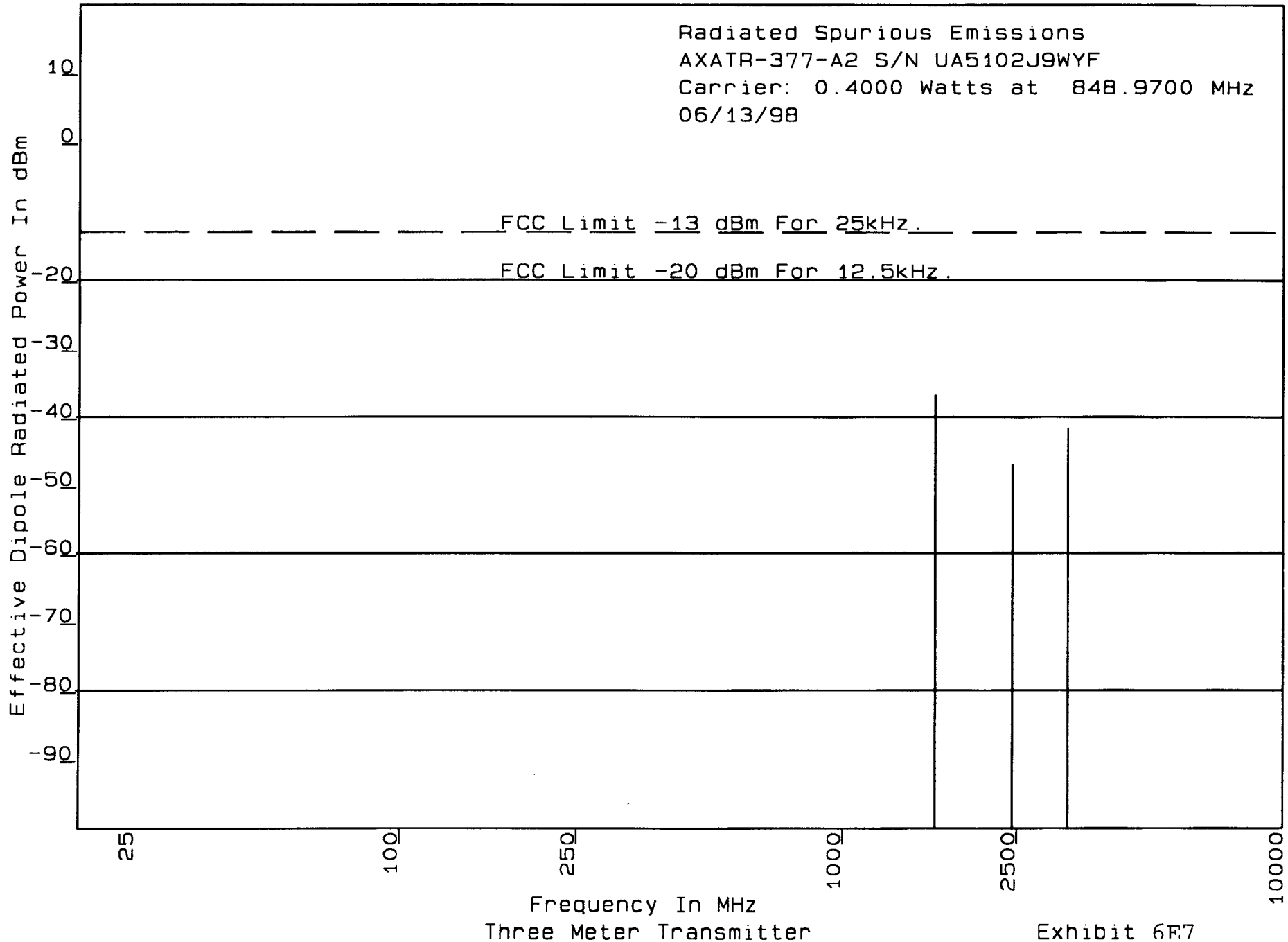
Exhibit 6E4



Three Meter Transmitter

Exhibit 6E5


Radiated Spurious Emissions
AXATR-377-A2 S/N UA5102J9WYF
Carrier: 0.006 Watts at 848.9700 MHz
06/13/98
FCC Limit -13 dBm For 25kHz.
FCC Limit -20 dBm For 12.5kHz.
Effective Dipole Radiated Power In dBm
10
0
-20
-30
-40
-50
-60
-70
-80
-90
25
100
250
1000
2500
10000
Frequency In MHz
Three Meter Transmitter
Exhibit 6F6



Three Meter Transmitter

Exhibit 6E7

800 MHz : FREQUENCY STABILITY

Per 2.995 (a)(1),(b),(d)(1)

Per 2.995 (a)(1),(b),(d)(1), variation of output frequency as a result of either temperature or voltage variation is shown in Exhibit 6F2.

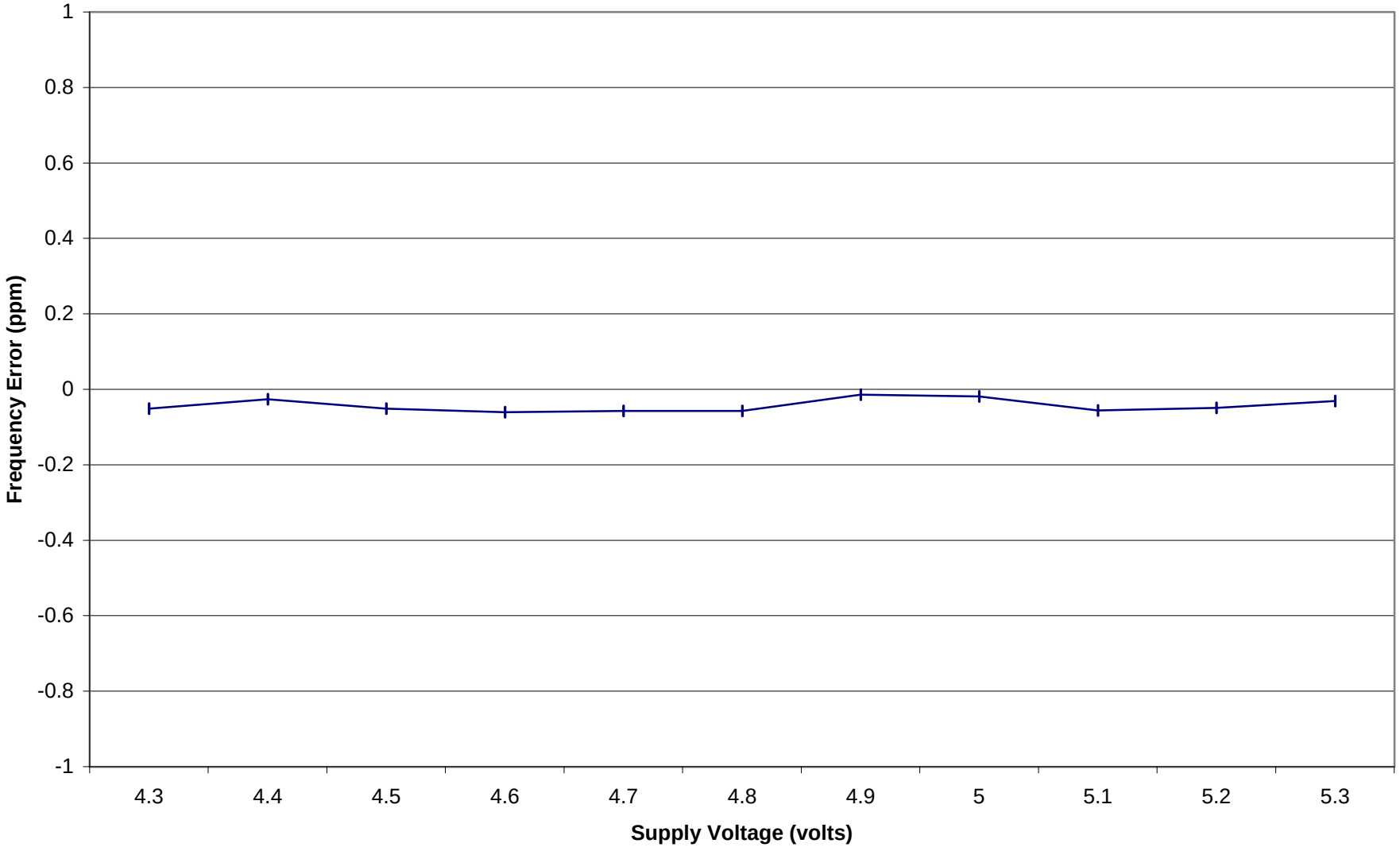
EXHIBIT #	Voltage	Title	Frequency
6F2	4.3 to 5.3 Volts (varied)	Frequency vs. Supply Voltage	Mid band
6F3	4.8 Volts	Frequency vs. Temperature	Mid band

Note: The manufacturers rated voltage for the battery is 4.3 VDC to 5.3 VDC.

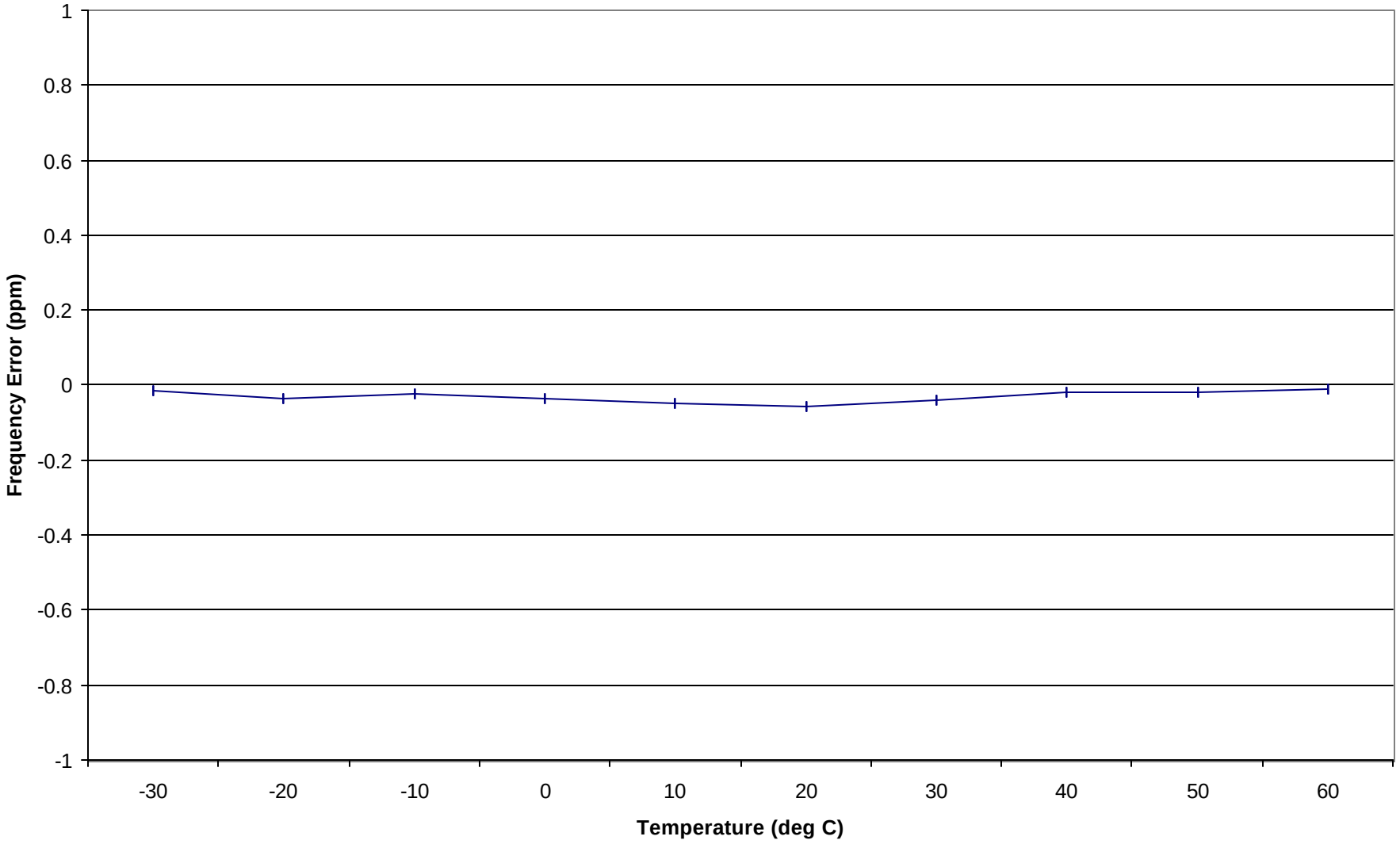
The measurements were made per IS-19B using a Hewlett Packard 8953DT North American Dual Mode Cellular Test System which includes the following equipment:

HP8958A Cellular Interface
HP 6623A DC Power Supply
HP 8596E Spectrum Analyzer
HP 437B RF Power Meter
HP 8901B Modulation Analyzer
HP 8903B Audio Analyzer
Thermotron SM-8C Temperature Chamber

Frequency Error vs. Supply Voltage, AMPS Channel 383, Power Level 0



Frequency Error vs. Temperature, AMPS Channel 383, Power level 0



1900 Mhz: RF POWER OUTPUT

Para. 2.985 (a)

The RF Power measured at the output terminals (antenna connector) is plotted against supply voltage variations at the highest and lowest power levels.

EXHIBIT	SUPPLY VOLTAGE (V)	POWER TEMPERATURE	TX LEVEL	FREQ	Output (Watts)
6G2	4.8Volts	Varied	0	Mid Band	1
6G3	Varied	+ 25 C	15	MidBand	.001

Output power was measured conducted, via a standard antenna connector.

The measurements were made using a Hewlett Packard 8922 M System Simulator with the following equipment:
Hewlett Packard 8922 M System Simulator
Hewlett Packard 8593 E Spectrum Analyzer
Hewlett Packard 8566 B Spectrum Analyzer

ESTIMATED ISOTROPIC RADIATED POWER

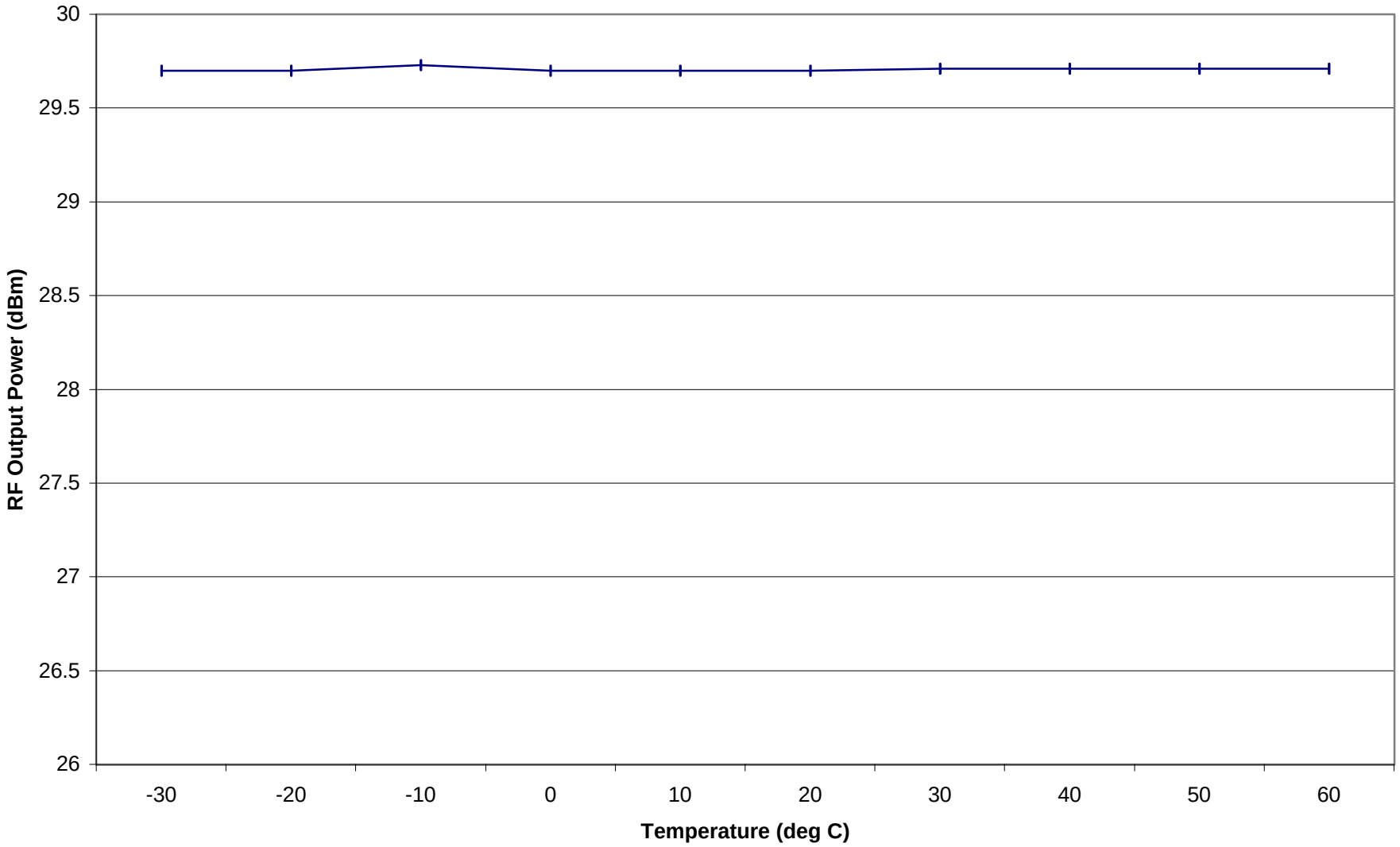
The following is a description of the substitution method used to obtain accurate EIRP readings at the carrier fundamental frequency:

(6) EUT measurements are made at 3 m using calibrated antennas and equipment with known cable losses.
(7) A peak measurement is made by raising and lowering the antenna and rotating the EUT 360 degrees. Horizontal and Vertical Polarization data is recorded.
(8) A generator and dipole antenna are then substituted for the EUT. The dipole antenna is a half-wave dipole. If a dipole antenna cannot be used, then the designated antenna is referenced to a dipole antenna.
(9) Measurements are made through the dipole antenna at known power levels to determine the system calibration factors at a given frequency.
(10) At frequencies where no calibration data is taken, the value is interpolated between the closest data point above and below the transmit frequency. Calibration data is taken with a half-wave dipole antenna.

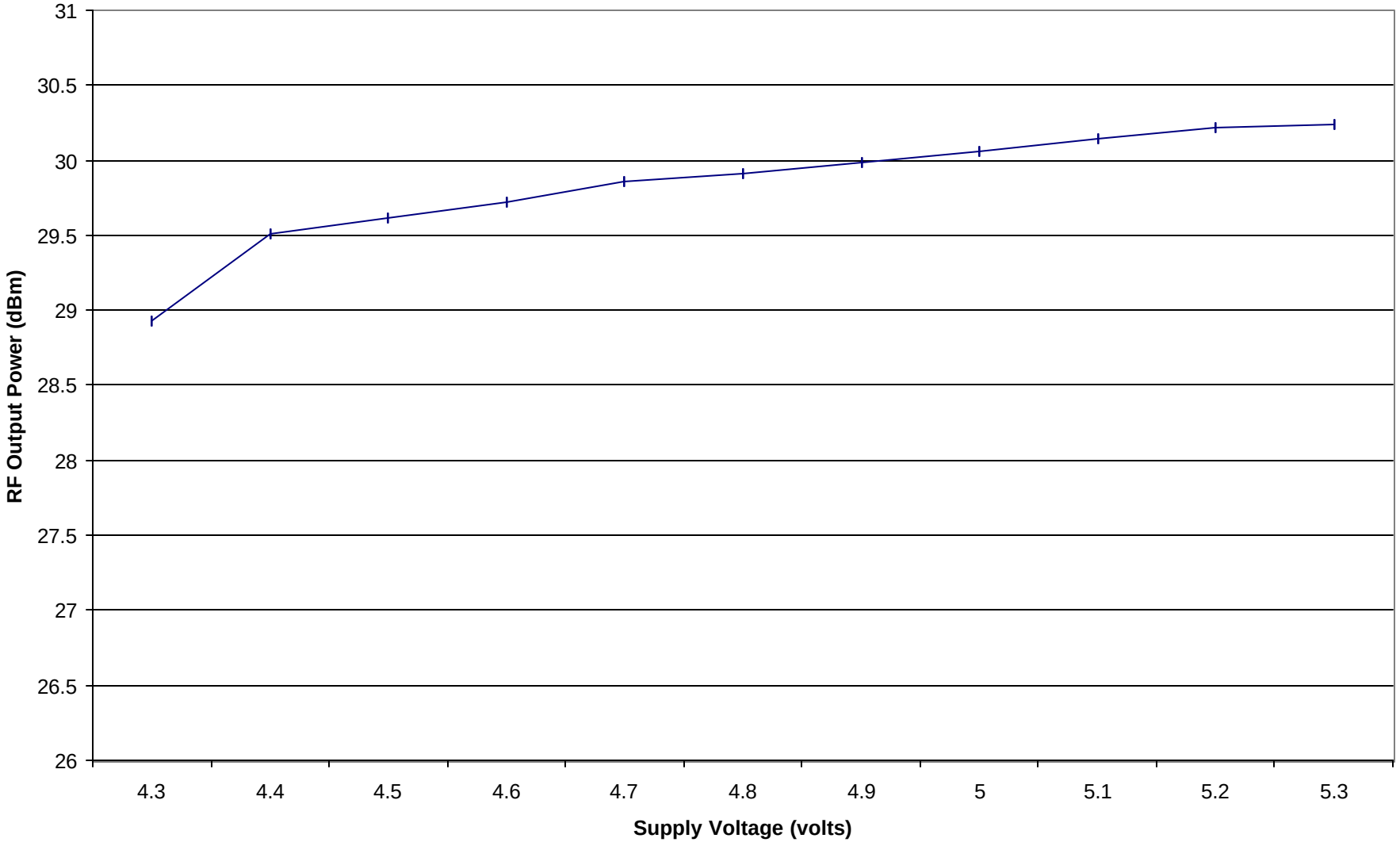
Measurements at a distance of 3 m from the source at the highest power level setting:

Frequency (MHz) / Channel No	Rated Output Pwr (W)	EIRP (dBm)
1879.8 /660	1.0	28.5

RF Output Power vs. Temperature, GSM Channel 660, Power Level 0



RF Output Power Vs. Supply Voltage, GSM Channel 660, Power Level 0



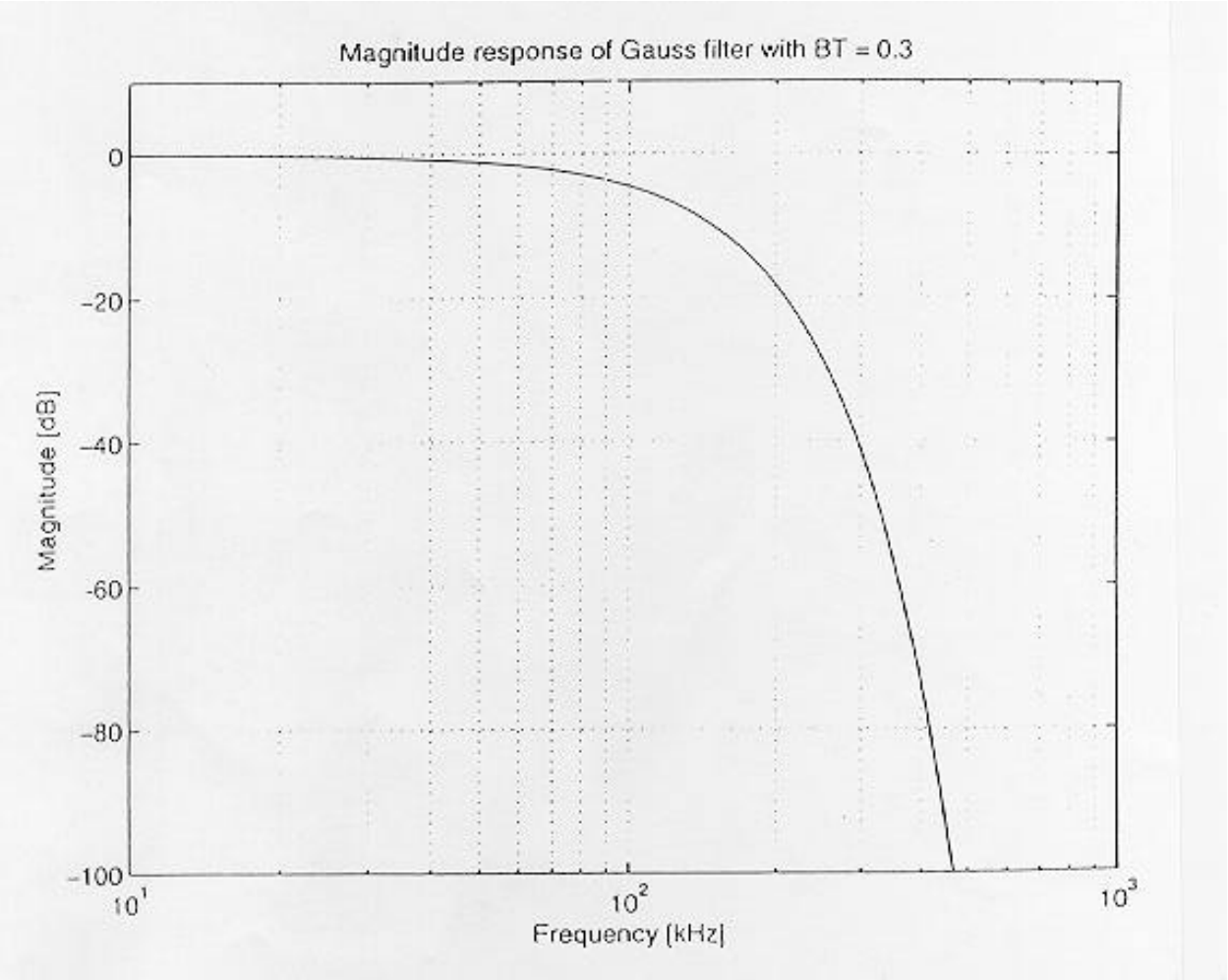
1900 MHz: MODULATION CHARACTERISTICS

Para: Part 2.987 (a)(b)(d) and 24

EXHIBIT

6H2	GAUSS FILTER CHARACTERISTICS (Modulation)
6H3	Modulation Characteristics
6H4	Differential Encoding

MODULATION CHARACTERISTIC



4. MODULATION

This chapter defines the theoretical requirements of the modulator. inclusive of the differential encoder. The modulator receives the bits from the encryption unit and produces an RF modulated signal. The information bits are first differentially encoded and then passed to the modulator. The modulation is GMSK (Gaussian Minimum Shift Keying) with a BT product of 0.3.

4.1 Modulation Format

4.1.1 Modulating Bit Rate

The modulating bit rate is 1/T = 1625/6 kb/s (approximately 270.833 b/s).

4.1.2 Start And Stop Of The Burst

The bits contained within a burst are defined in chapter 2. For the purpose of the modulator specification that follows the bits entering the differential encoder prior to the first bit of the burst and following the last bit of the burst are consecutive logical ones and are denoted by the term dummy bits which define the start and end points of the useful and active pans of the burst as shown in Figure 4.1. The actual state of these bits is left to the manufacturer's implementation subject to the requirement that all performance specifications of this volume are met. Nothing is specified about the actual phase of the modulator output signal outside of the useful pan of the burst. Figure 4.1 depicts the relationship between the active and useful part of the burst the tail bits and dummy bits {or a normal burst. The useful part of the burst lasts for 147 modulating bits.

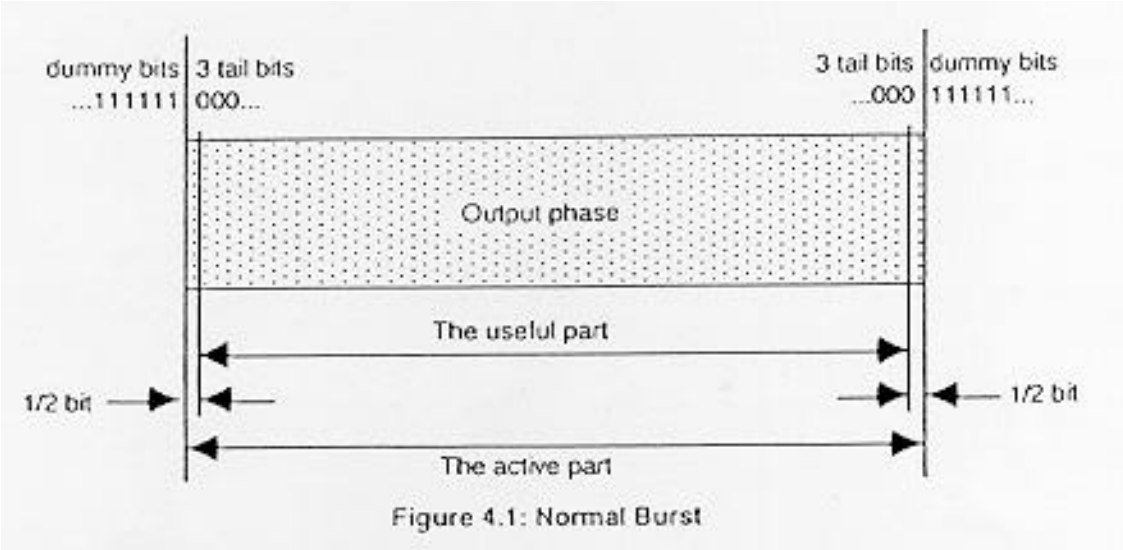


Figure 4.1: Normal Burst

4.1.3 Differential Encoding

Each data value di = (O,1) is differentially encoded The output of the differential encoder is:

$di = di \oplus di - 1$

where $\oplus$ denotes modulo-2 addition.

The modulating data value αI input to the modulator is:

$\alpha i = 1- 2di$

where $\alpha I \in \{-1, 1\}$

1900 Mhz: OCCUPIED BANDWIDTH

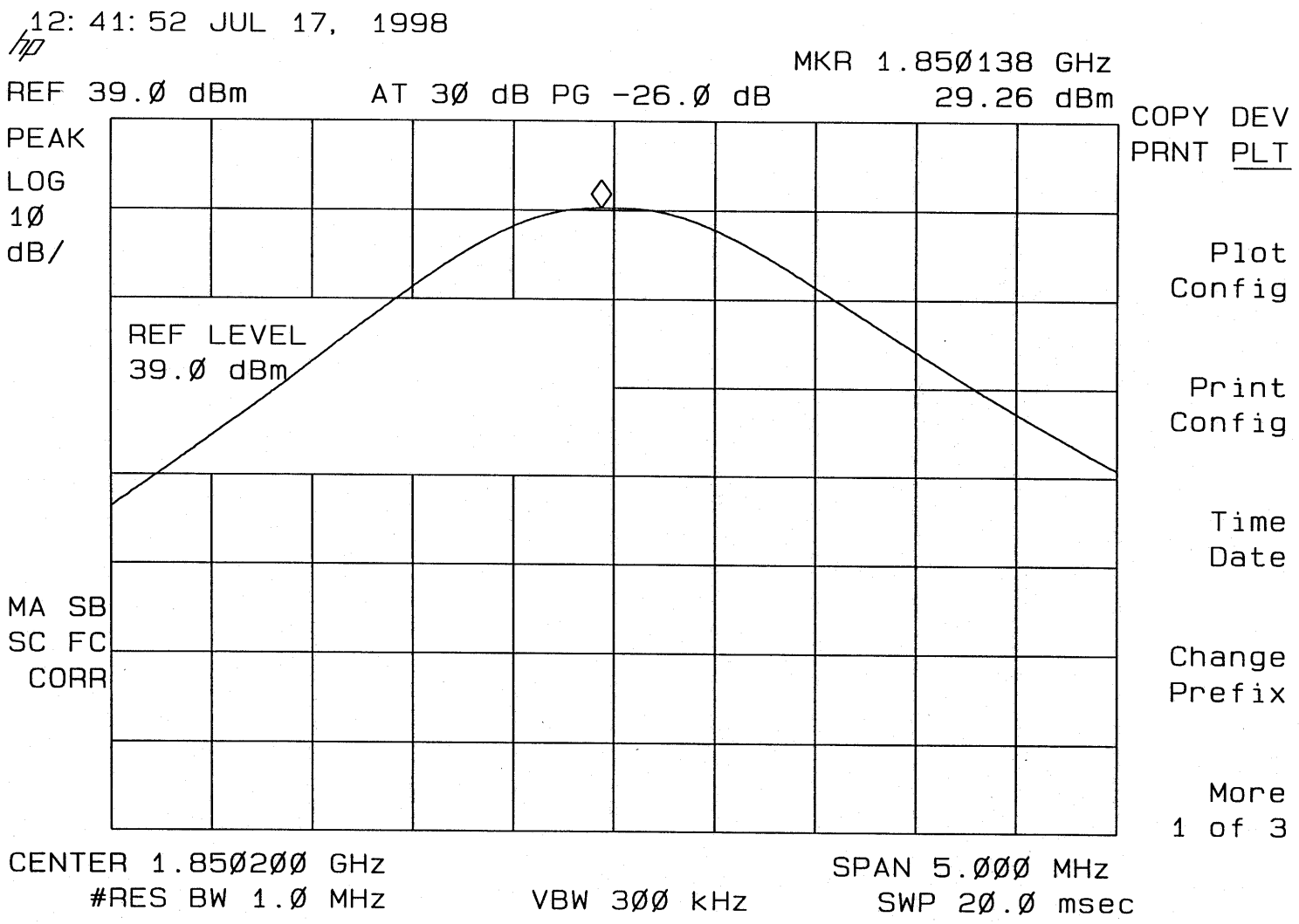
Para: 2.989 (c)(1)(h) and Part 24

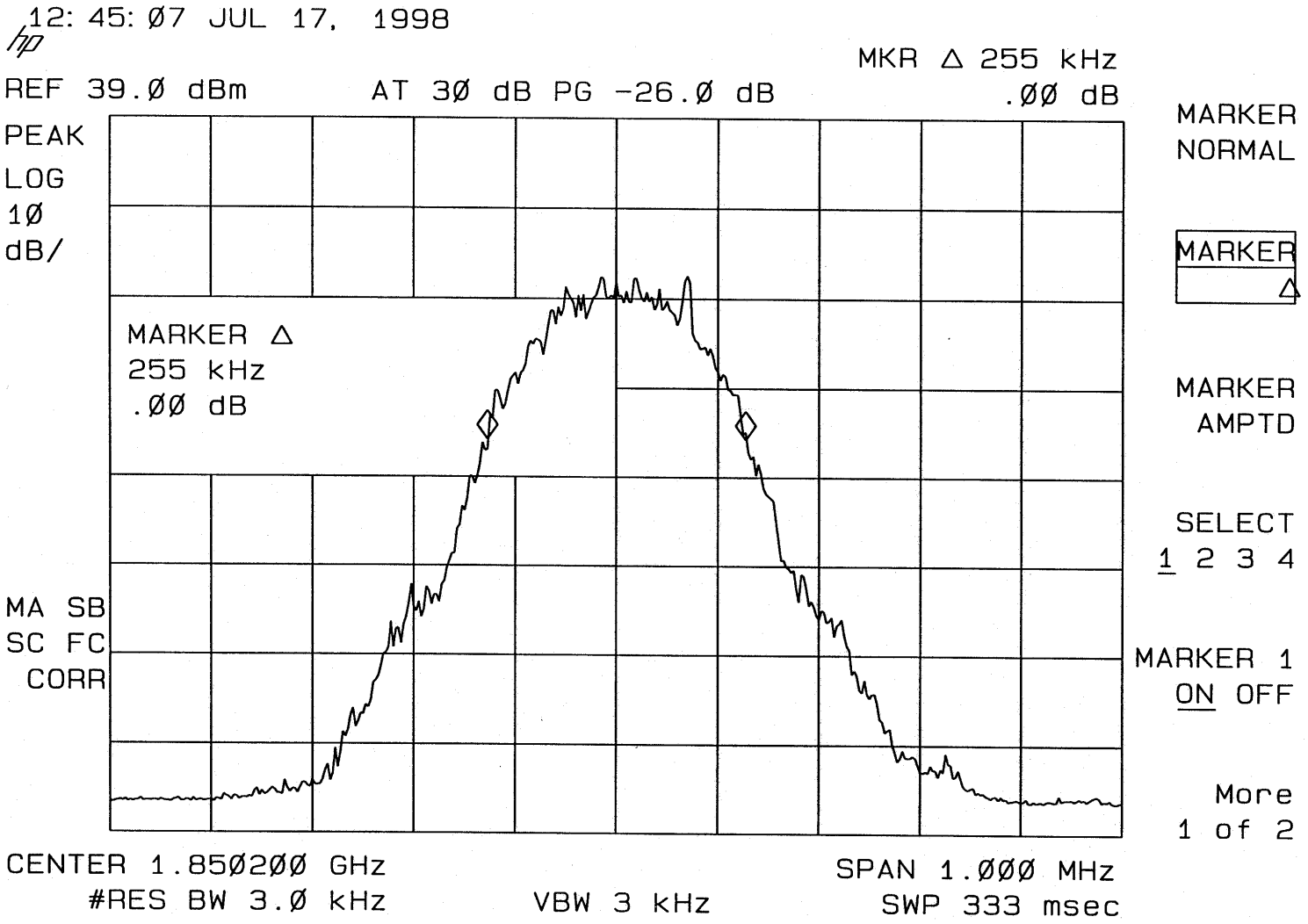
All the exhibits listed below are plots where the modulation condition is Psuedorandom Data (270.833 kb/s), operating in the GSM (TDMA) mode. All plots were taken while transmitting at Power level 0. Any frequency span not covered in the exhibits below was found to be unaffected by the transmitter/modulation.

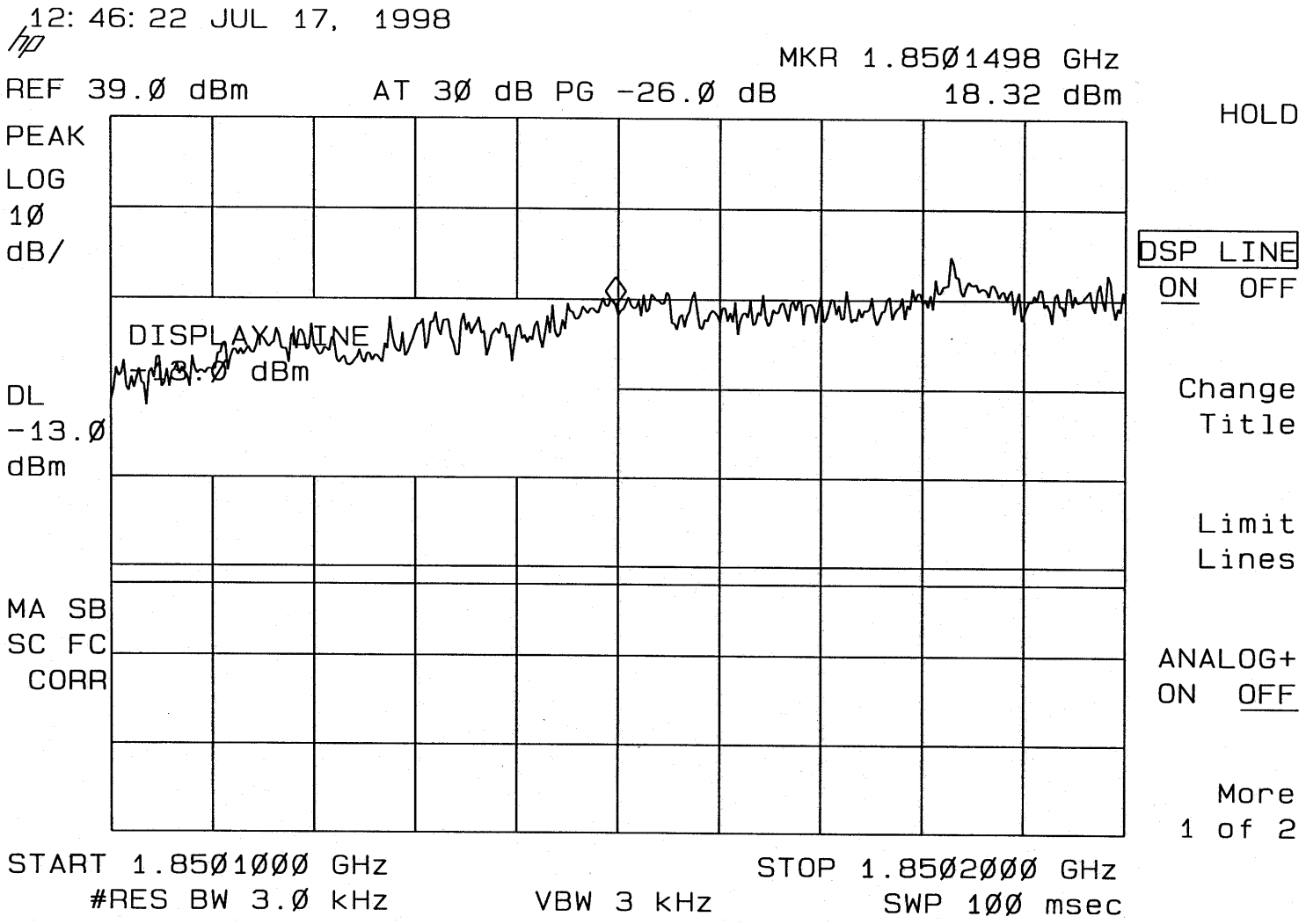
Exhibit	
Power Levels 0	Lower Channel (Channel 512) Frequency 1850.2 MHz
6I2	Plot showing 1 MHz Resolution bandwidth
6I3	Plot showing Emission Bandwidth
6I4	Plot showing 100 kHz span. Resolution bandwidth 1% of Necessary bandwidth. Center frequency is 1850.15MHz
6I5	Plot showing 100 kHz span. Resolution bandwidth 1% of Necessary bandwidth. Center frequency is 1850.05MHz
6I6	Plot showing 100 kHz span. Resolution bandwidth 1% of Necessary bandwidth. Center frequency is 1849.99 MHz.
	Upper Channel (Channel 810) Frequency 1909.8 MHz
6I7	Plot showing 1 MHz Resolution bandwidth
6I8	Plot showing Emission Bandwidth
6I9	Plot showing 100 kHz span. Resolution bandwidth 1% of Necessary bandwidth. Center frequency is 1909.85 MHz
6I10	Plot showing 100 kHz span. Resolution bandwidth 1% of Necessary bandwidth. Center frequency is 1909.95 MHz
6I11	Plot showing 100 kHz span. Resolution bandwidth 1% of Necessary bandwidth. Center frequency is 1910.00 MHz.

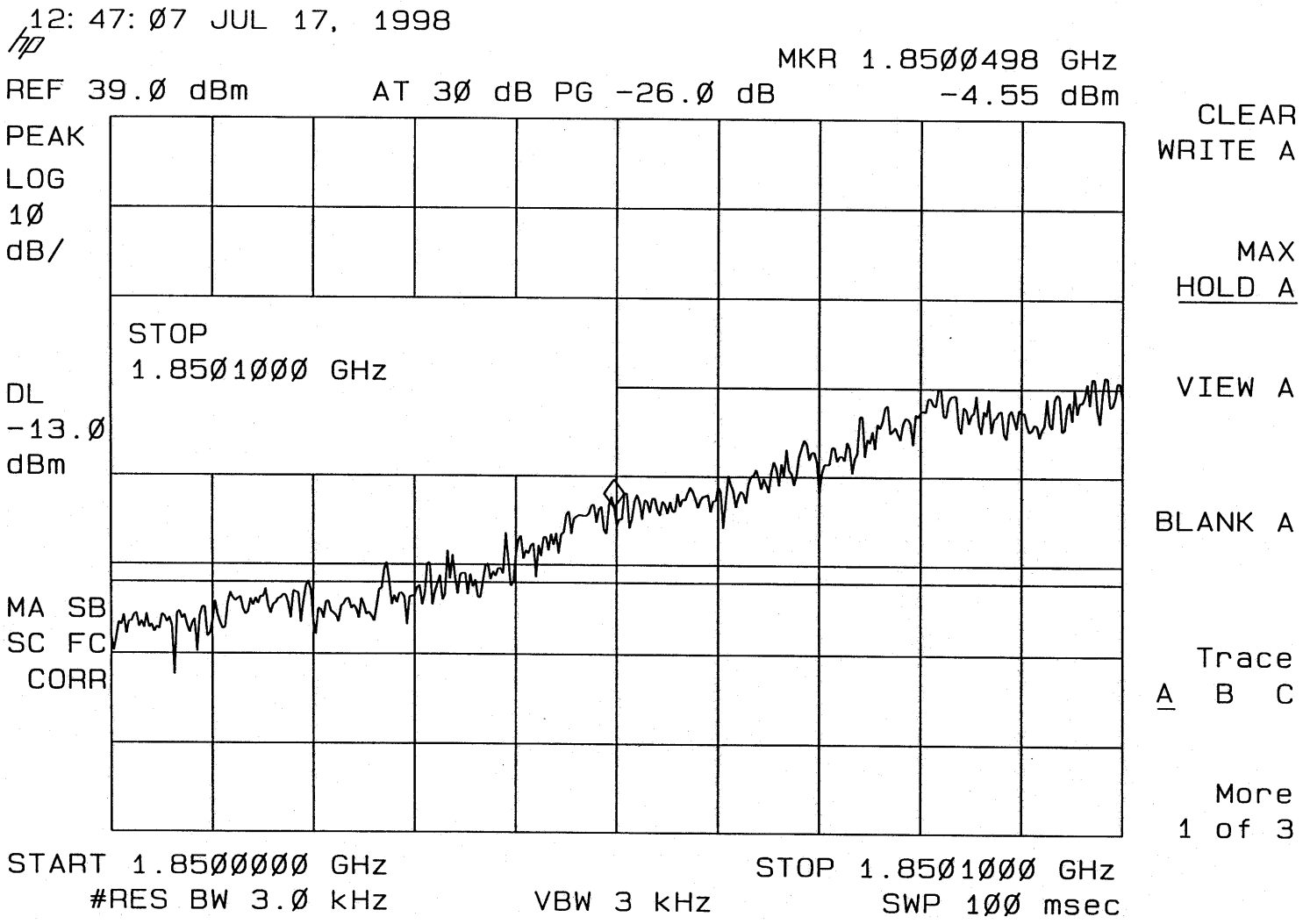
The measurements were made using a Hewlett Packard 8922 M System Simulator along with the following other equipment:

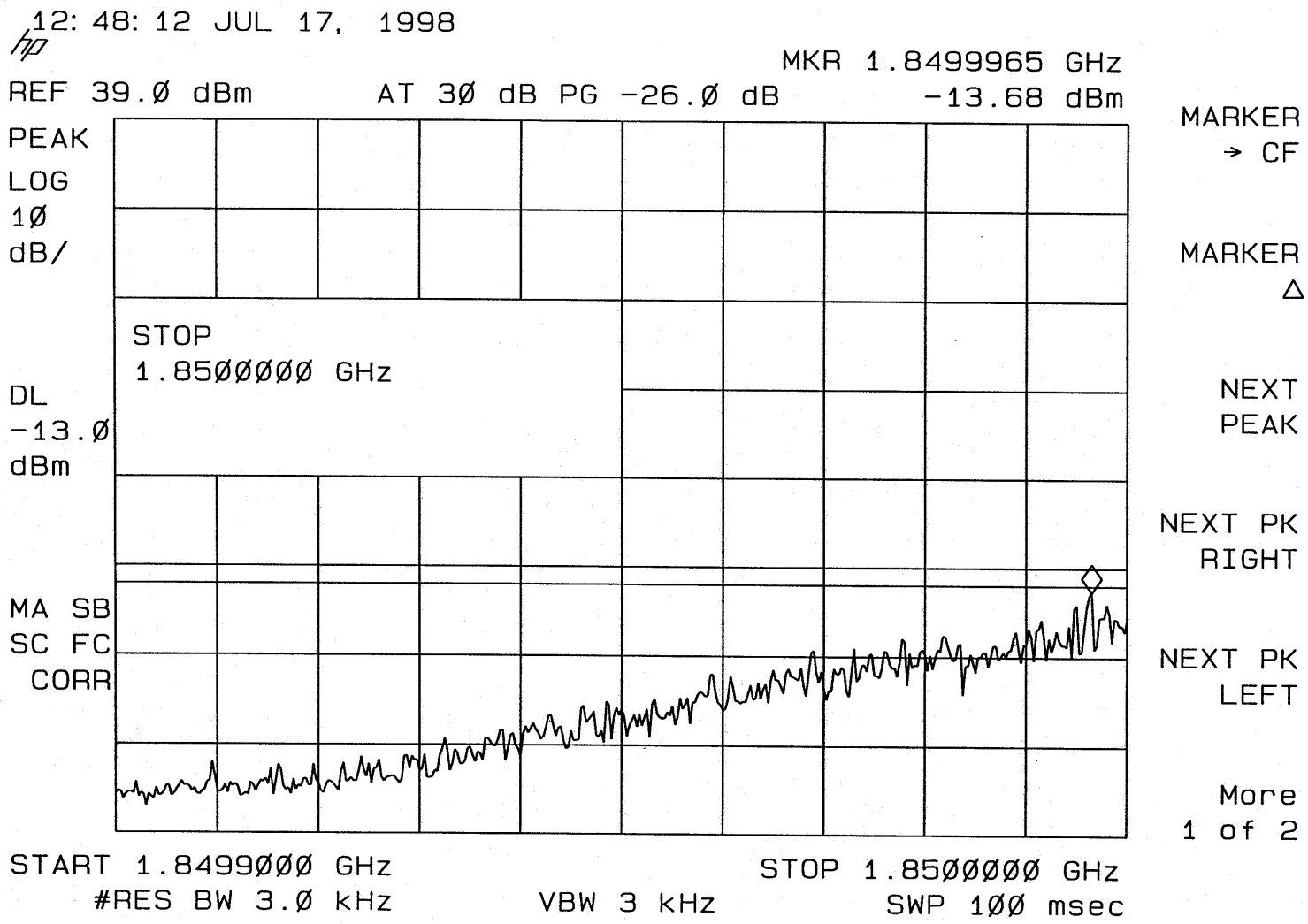
Hewlett Packard 8922 M System Simulator
Hewlett Packard 8593 E Spectrum Analyzer

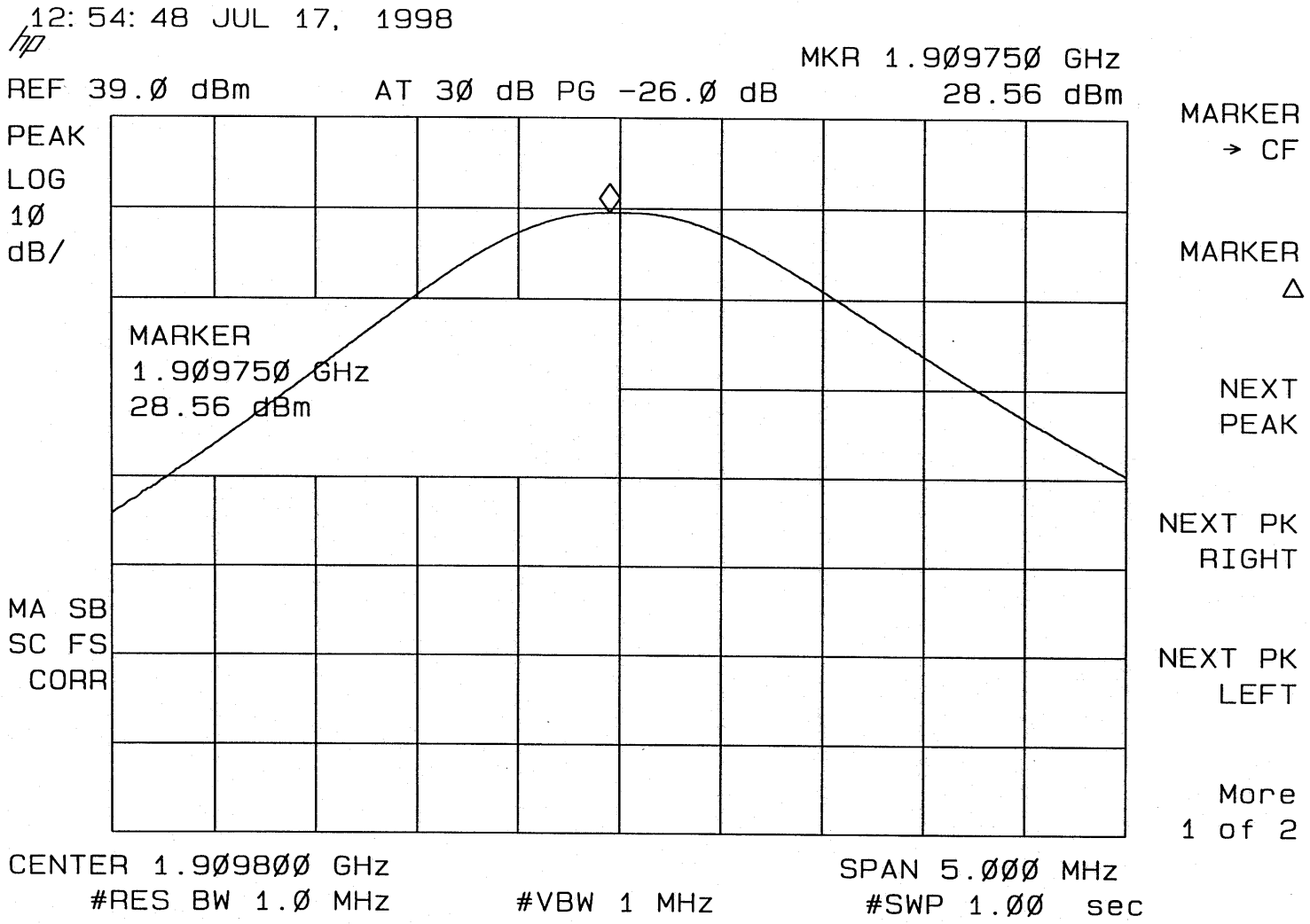


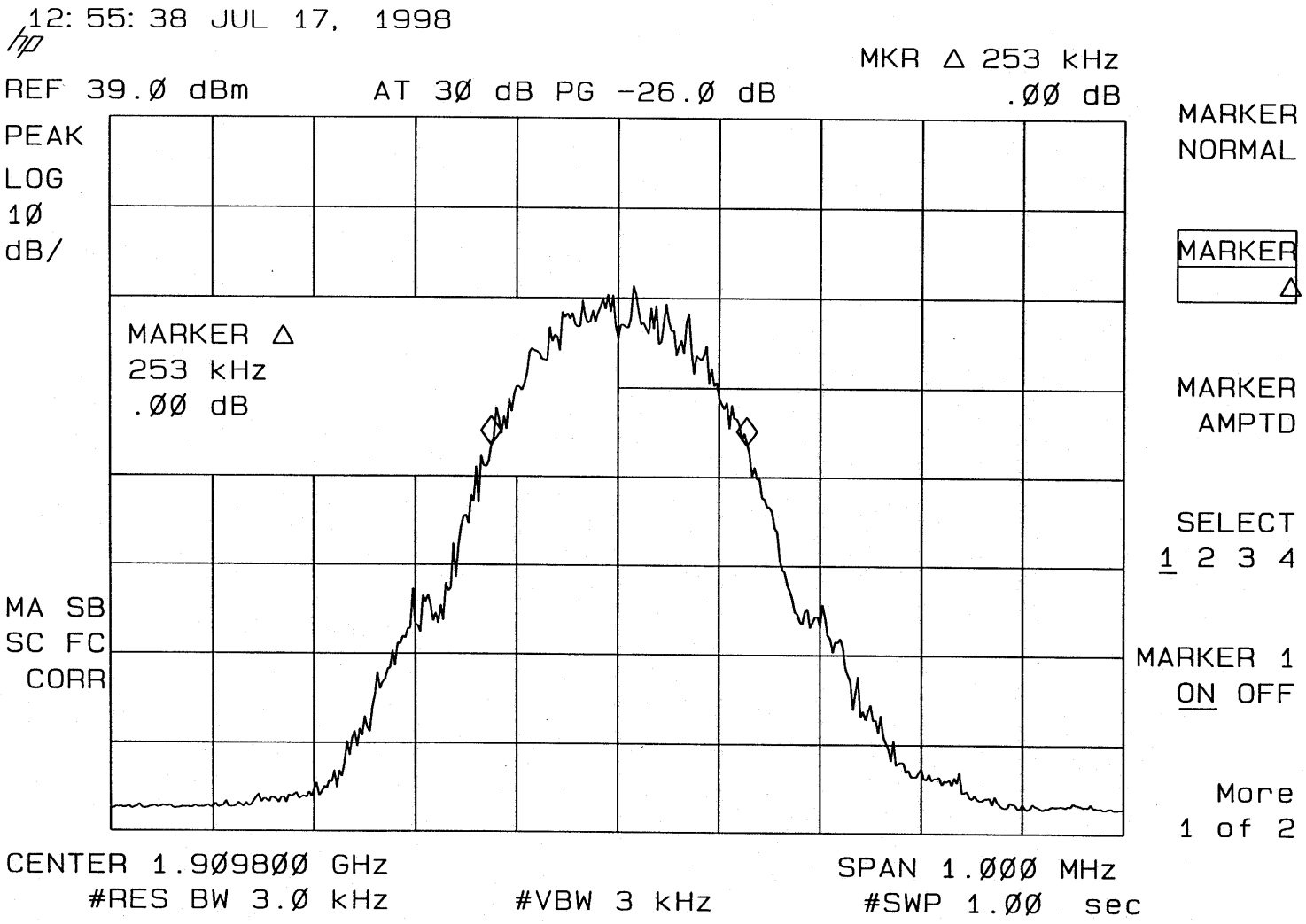


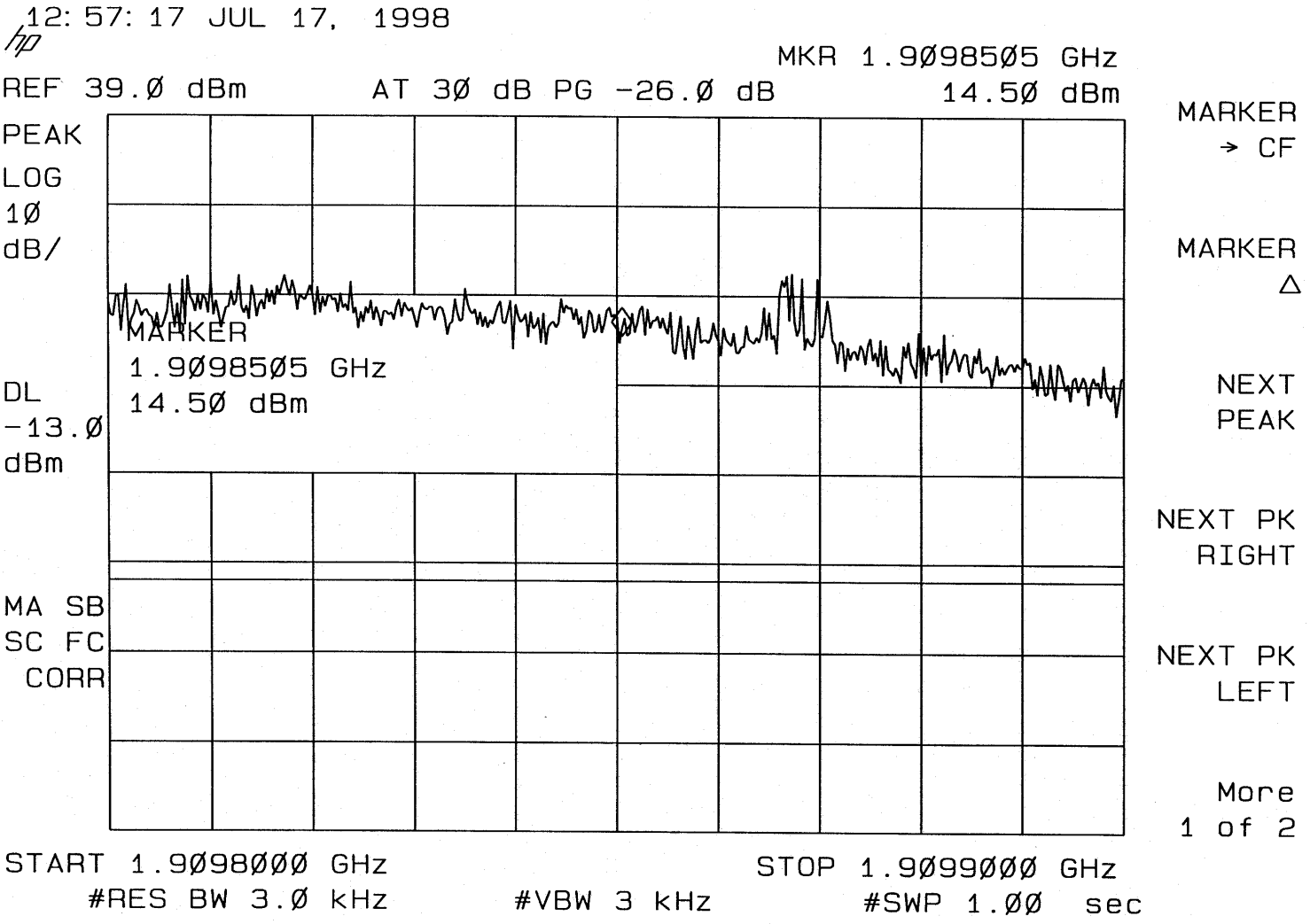


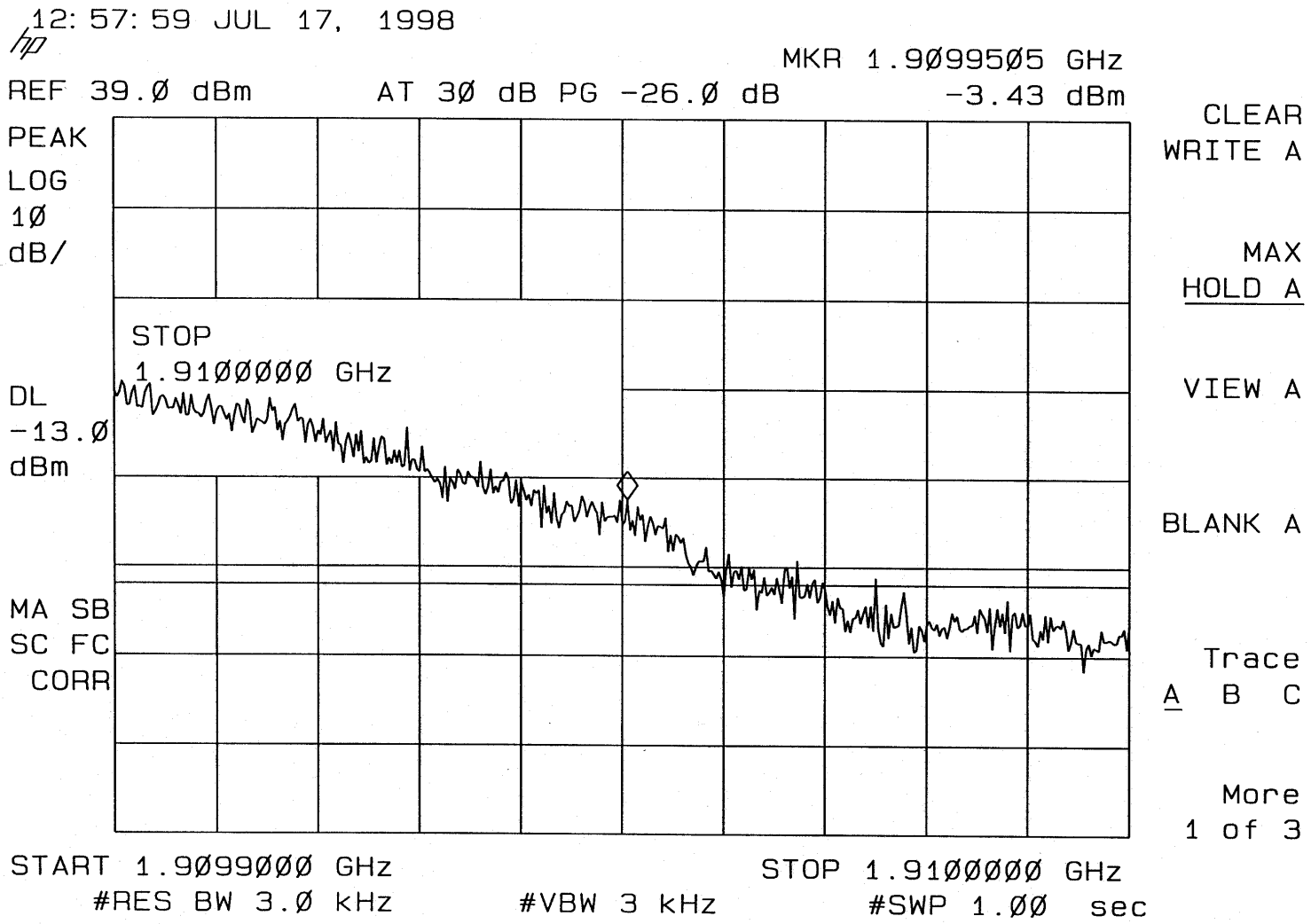


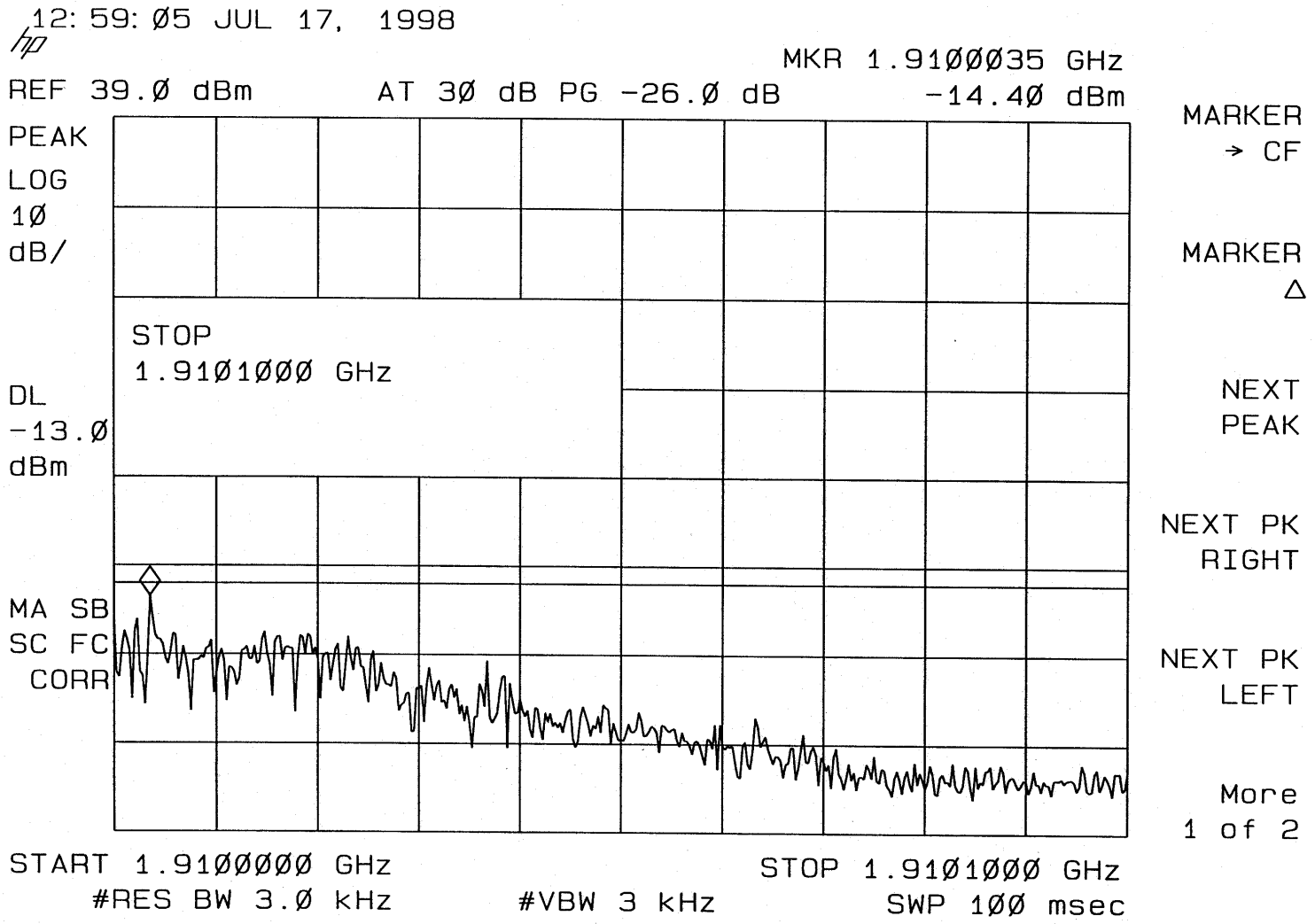












1900 Mhz: SPURIOUS EMISSIONS (Conducted)

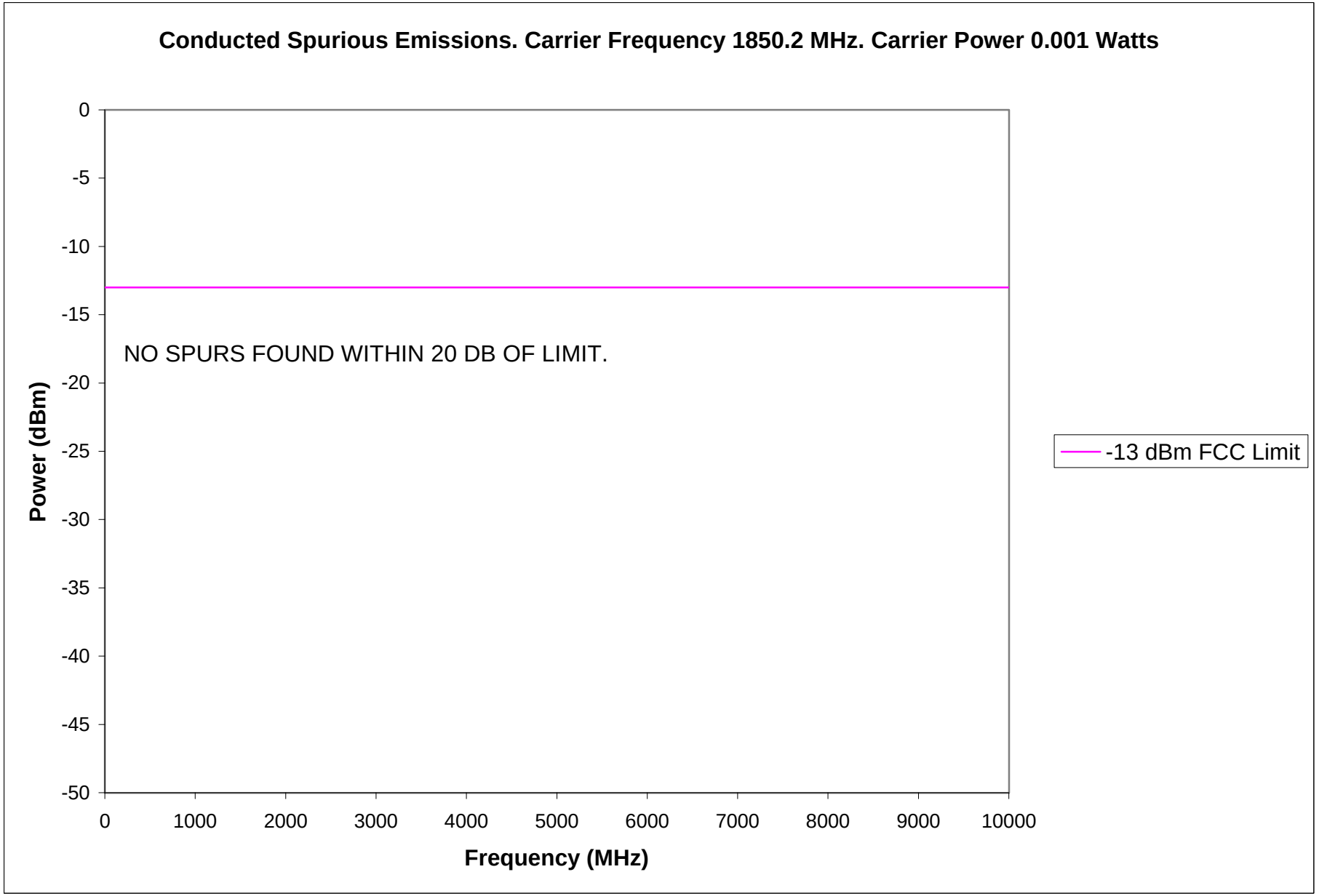
Para: 2.991 and Part 24

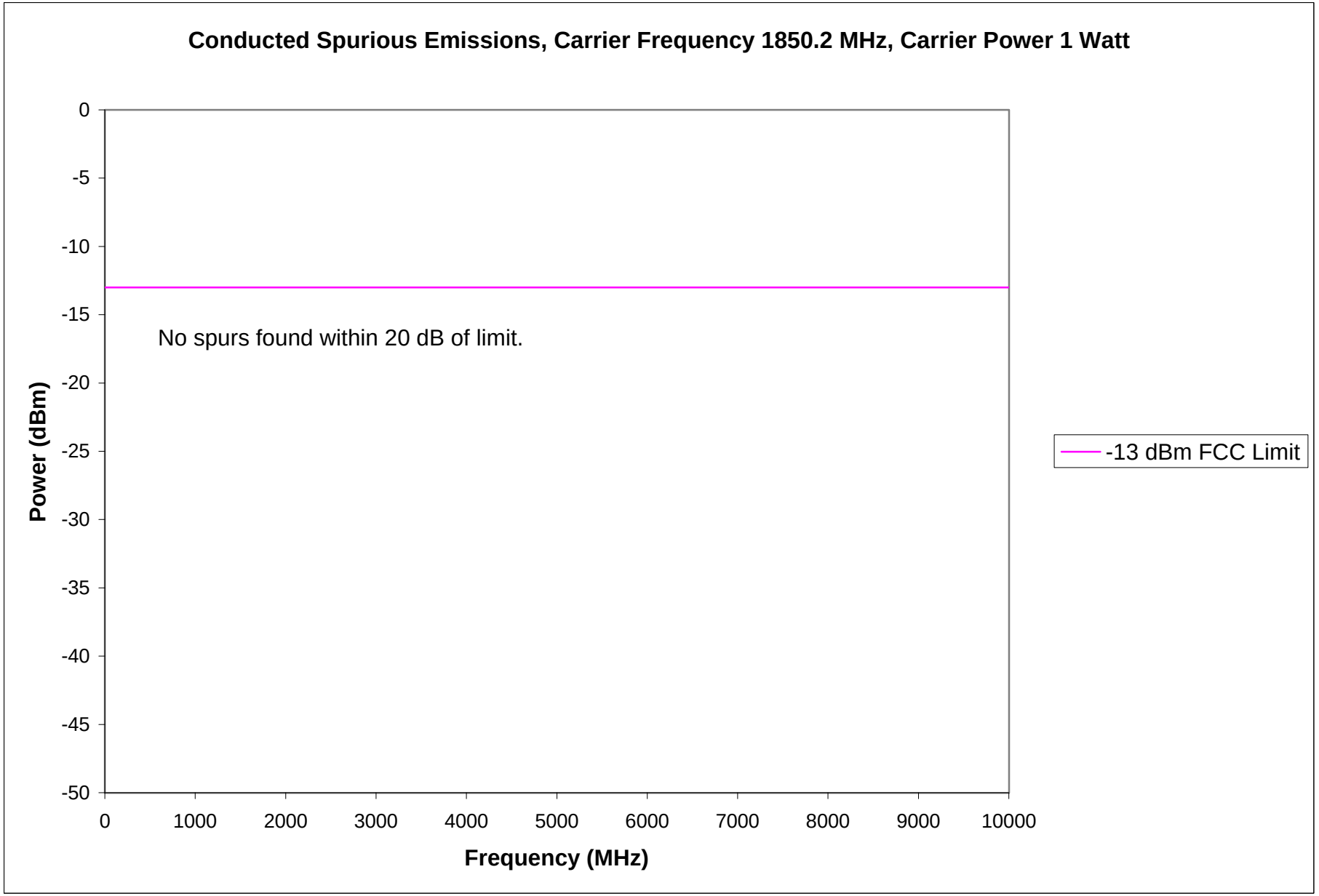
Per 2.991 Spurious emissions at the antenna terminals (conducted) when properly loaded with an appropriate artificial antenna were measured.

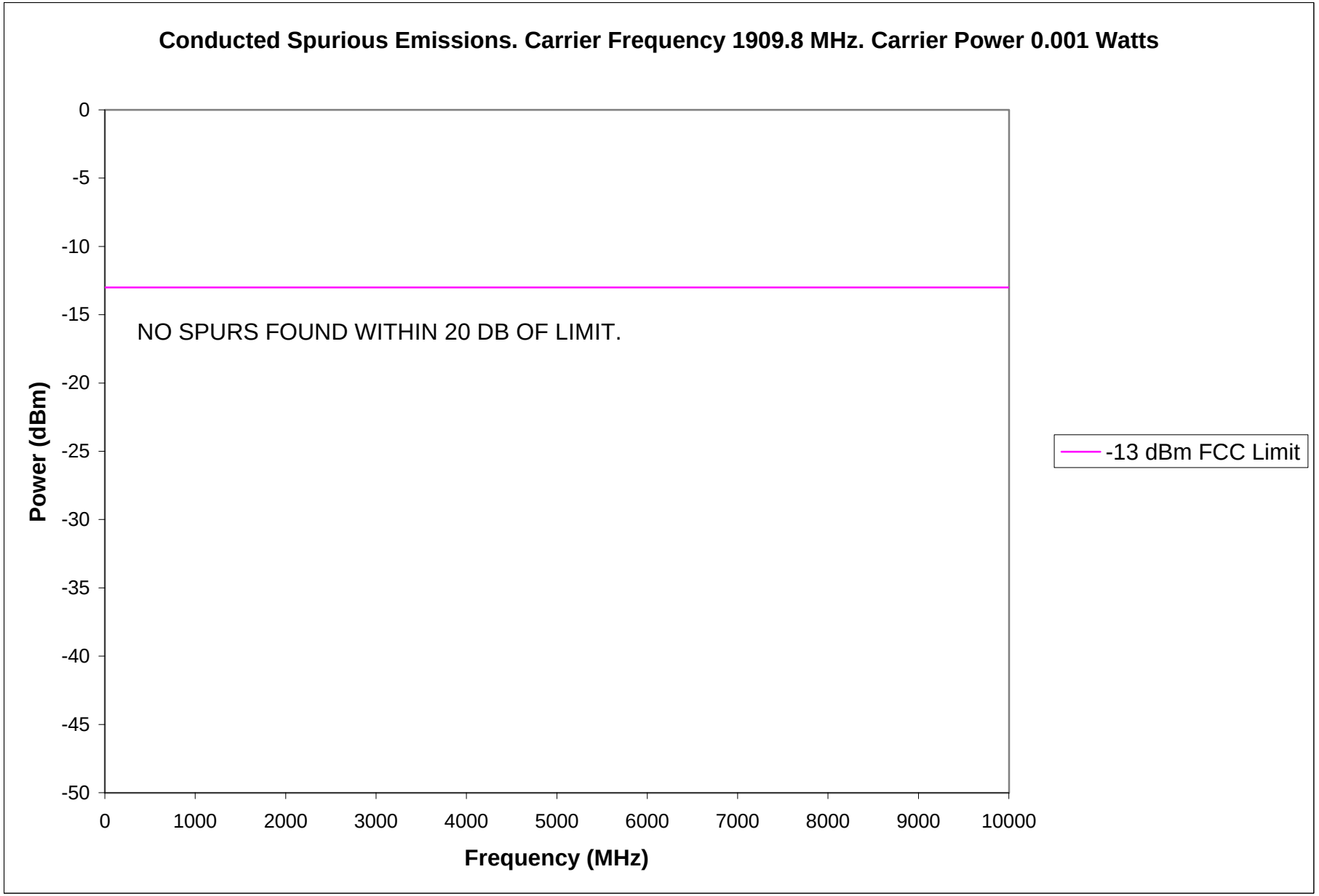
EXHIBIT	Frequency (MHz)	Output Power (W)
6J2	1850.2	.001
6J3	1850.2	1
6J4	1909.8	.001
6J5	1909.8	1

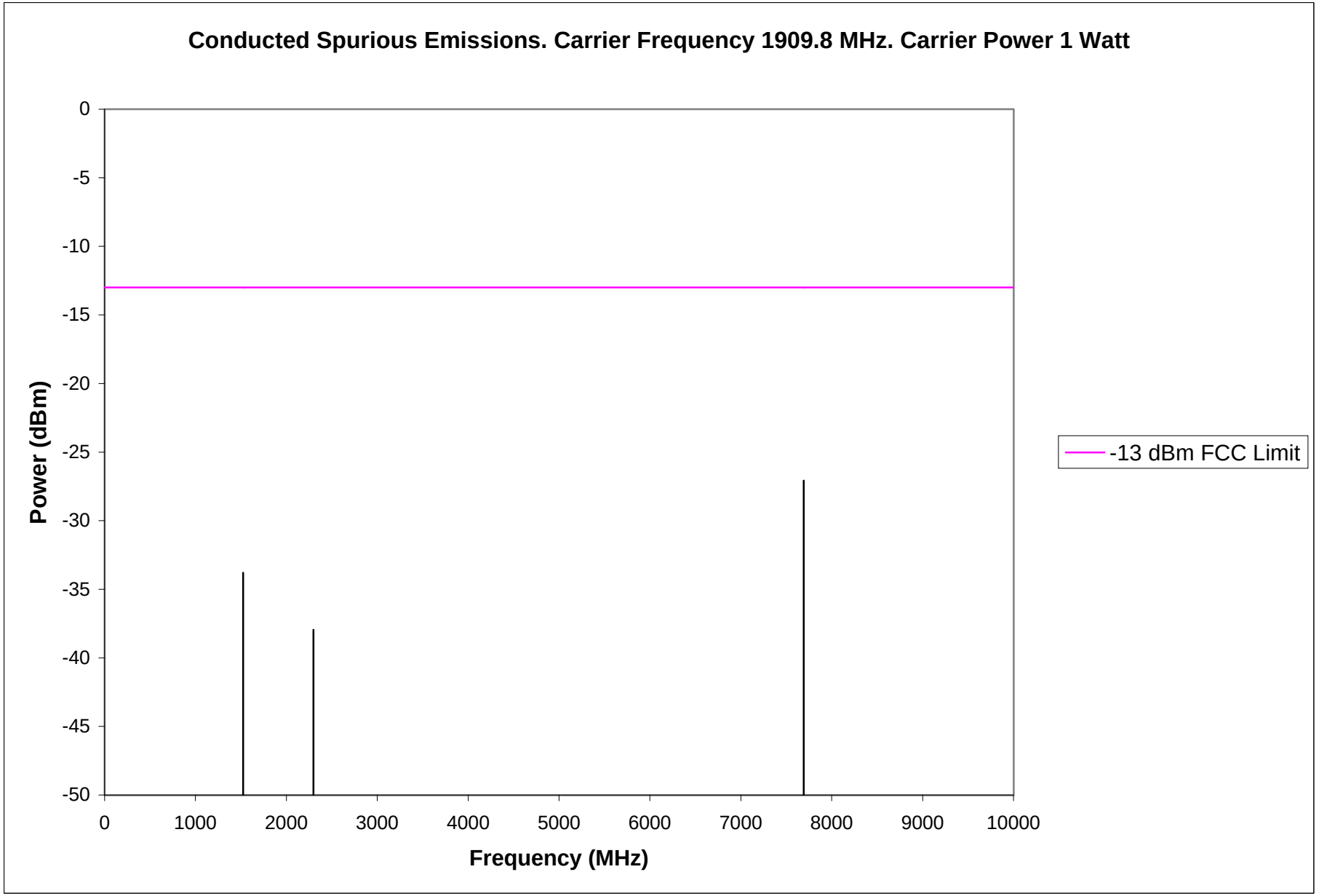
The measurements were made using the following equipment:

Hp 8593E	Spectrum Analyzer
Amr8801B	Cellular System Simulator









1900 Mhz: SPURIOUS EMISSIONS. RADIATED

Para: 2.993 and Part 24

Per 2.993 and Part 24, field strength of spurious radiation was measured on Ericsson's 3 meter site in Lynchburg, VA. The site and equipment are described in the site description and attenuation measurements for the Ericsson Inc. 3 meter radiation site #2 filed with the FCC in Columbia, MD on June 5, 1997. The measurement procedure is per IS-137A but done on a 3 meter test site. Results are shown on the following Exhibits:

EXHIBIT	Frequency (MHz)	Output Power (W)
6K2	1850.2	.001
6K3	1850.2	1
6K4	1879.8	.001
6K5	1879.8	1
6K6	1909.8	.001
6K7	1909.8	1

The measurements were made using a Hewlett Packard 8922 M System Simulator along with the following other equipment:

Hewlett Packard 8922 M System Simulator
Hewlett Packard 8593 E Spectrum Analyzer
Hewlett Packard 8566 B Spectrum Analyzer
Hewlett Packard 437 B Power Meter

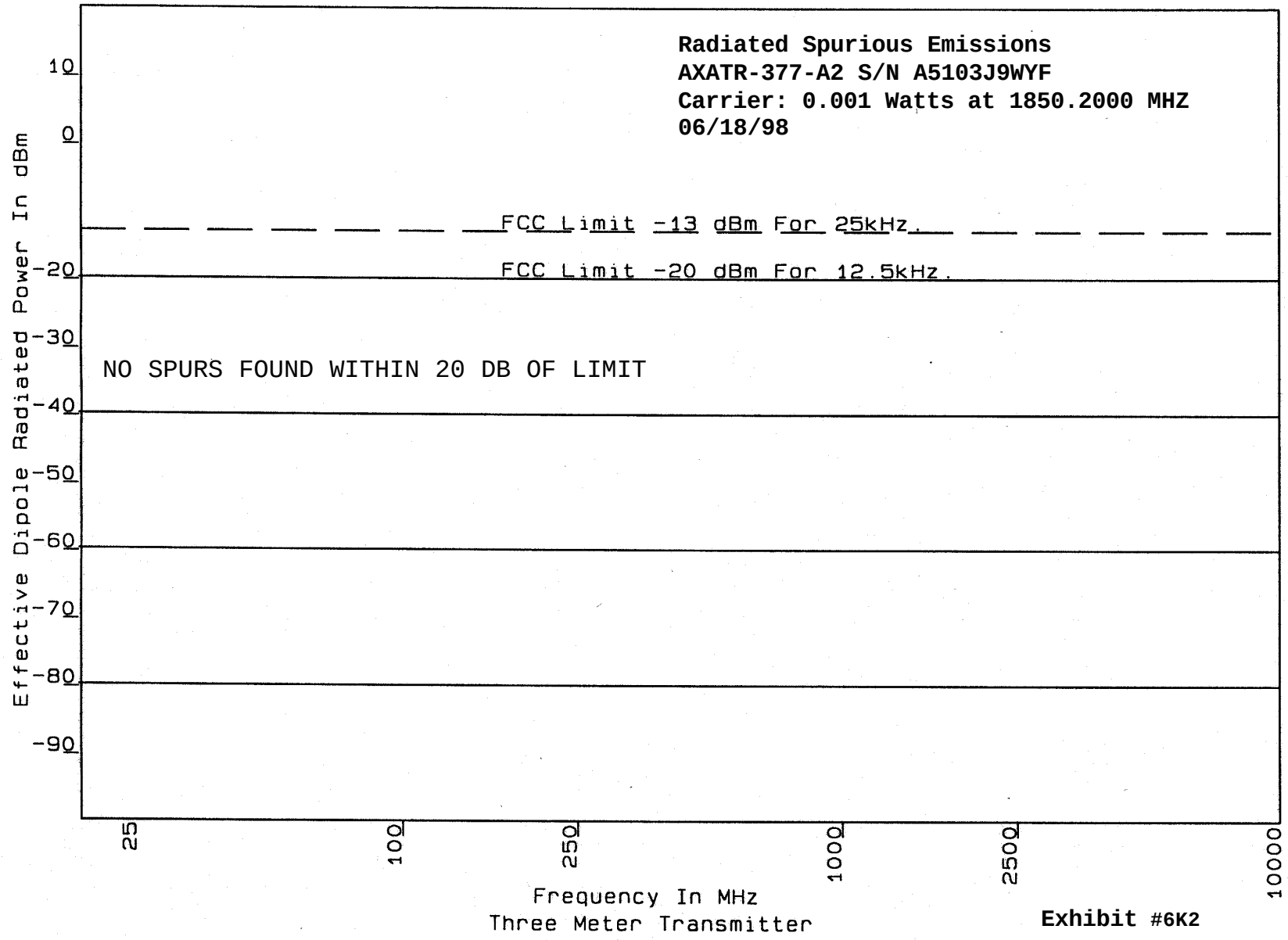

Radiated Spurious Emissions
AXATR-377-A2 S/N A5103J9WYF
Carrier: 0.001 Watts at 1850.2000 MHZ
06/18/98
FCC Limit -13 dBm For 25kHz.
FCC Limit -20 dBm For 12.5kHz.
NO SPURS FOUND WITHIN 20 DB OF LIMIT
Effective Dipole Radiated Power In dBm
10
0
-20
-30
-40
-50
-60
-70
-80
-90
25
100
250
1000
2500
10000
Frequency In MHz
Three Meter Transmitter

Exhibit #6K2

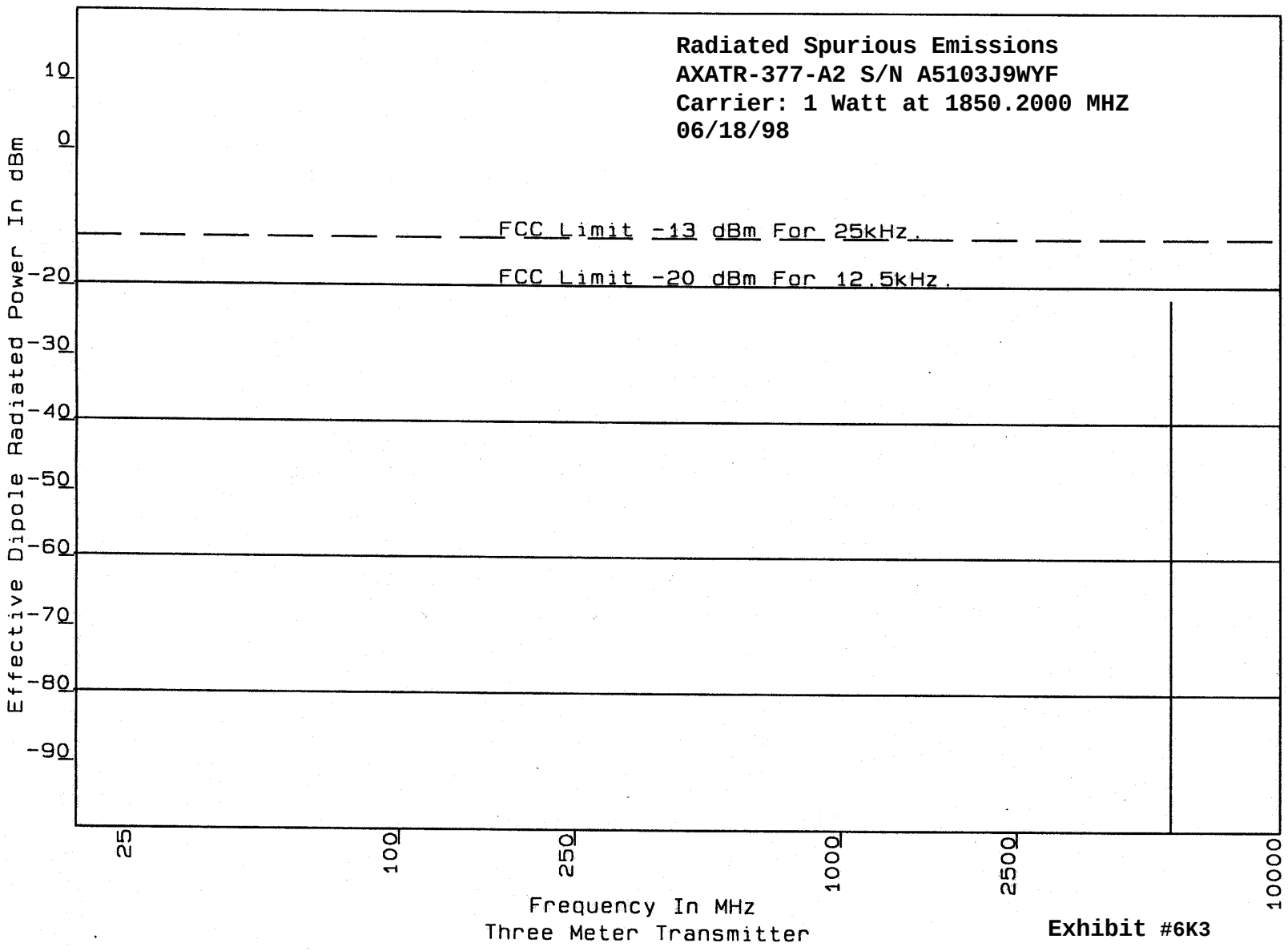

Radiated Spurious Emissions
AXATR-377-A2 S/N A5103J9WYF
Carrier: 1 Watt at 1850.2000 MHZ
06/18/98
FCC Limit -13 dBm For 25kHz.
FCC Limit -20 dBm For 12.5kHz.
Effective Dipole Radiated Power In dBm
10
0
-20
-30
-40
-50
-60
-70
-80
-90
25
100
250
1000
2500
10000
Frequency In MHz
Three Meter Transmitter

Exhibit #6K3

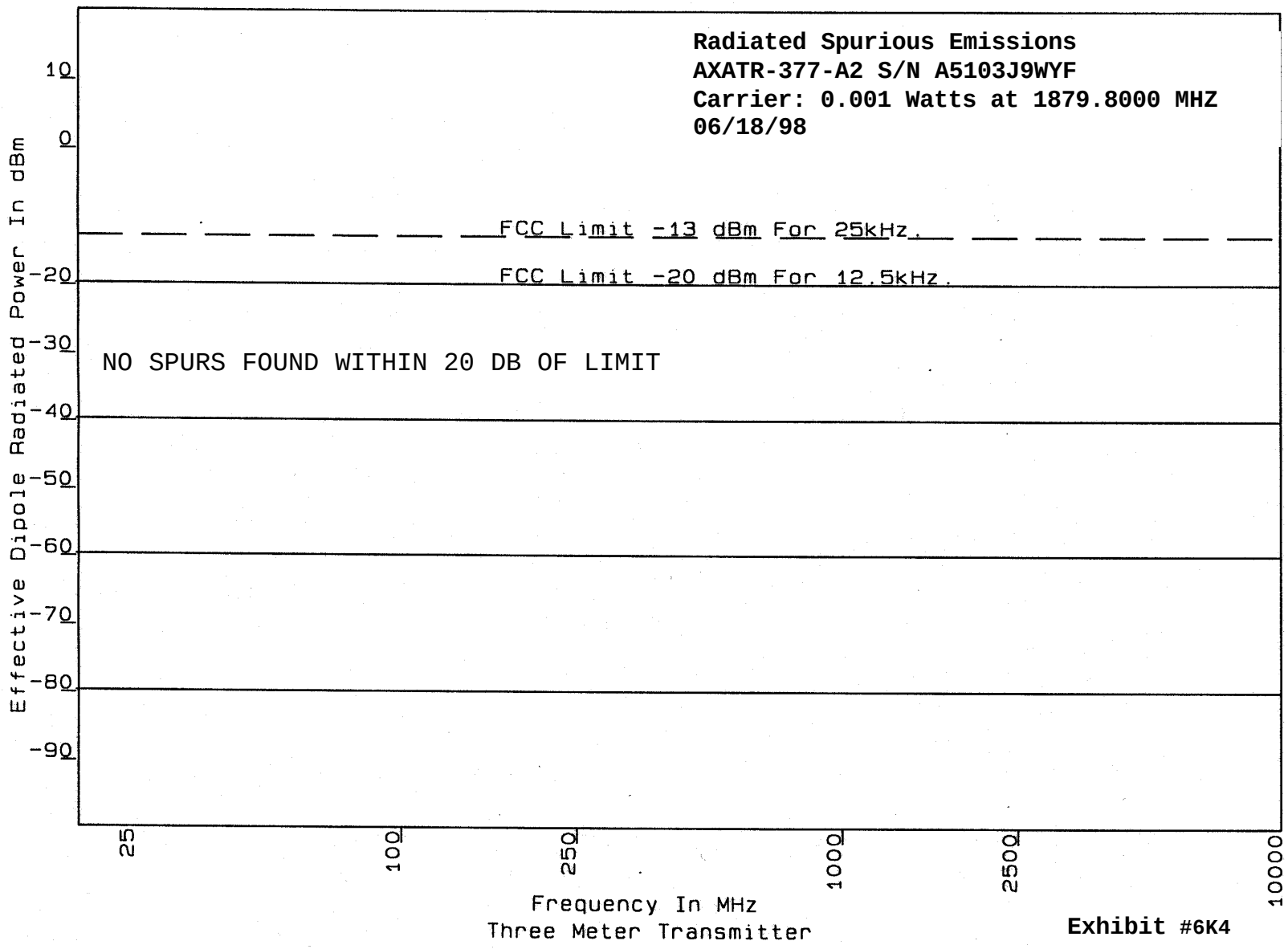

Radiated Spurious Emissions
AXATR-377-A2 S/N A5103J9WYF
Carrier: 0.001 Watts at 1879.8000 MHZ
06/18/98
FCC Limit -13 dBm For 25kHz.
FCC Limit -20 dBm For 12.5kHz.
NO SPURS FOUND WITHIN 20 DB OF LIMIT
Effective Dipole Radiated Power In dBm
10
0
-20
-30
-40
-50
-60
-70
-80
-90
25
100
250
1000
2500
10000
Frequency In MHz
Three Meter Transmitter

Exhibit #6K4

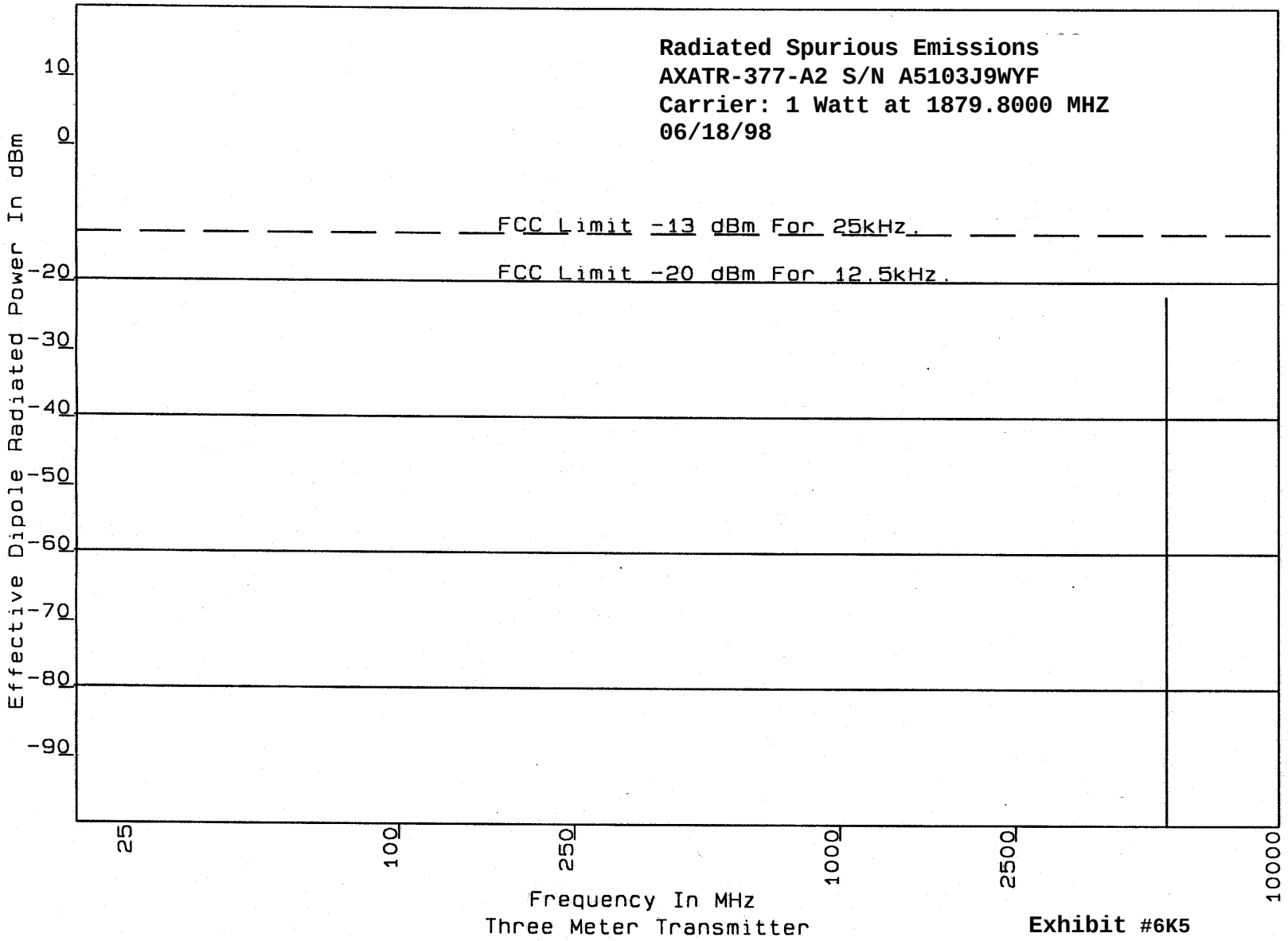

Radiated Spurious Emissions
AXATR-377-A2 S/N A5103J9WYF
Carrier: 1 Watt at 1879.8000 MHZ
06/18/98
FCC Limit -13 dBm For 25kHz.
FCC Limit -20 dBm For 12.5kHz.
Effective Dipole Radiated Power In dBm
10
0
-20
-30
-40
-50
-60
-70
-80
-90
25
100
250
1000
2500
10000
Frequency In MHz
Three Meter Transmitter

Exhibit #6K5

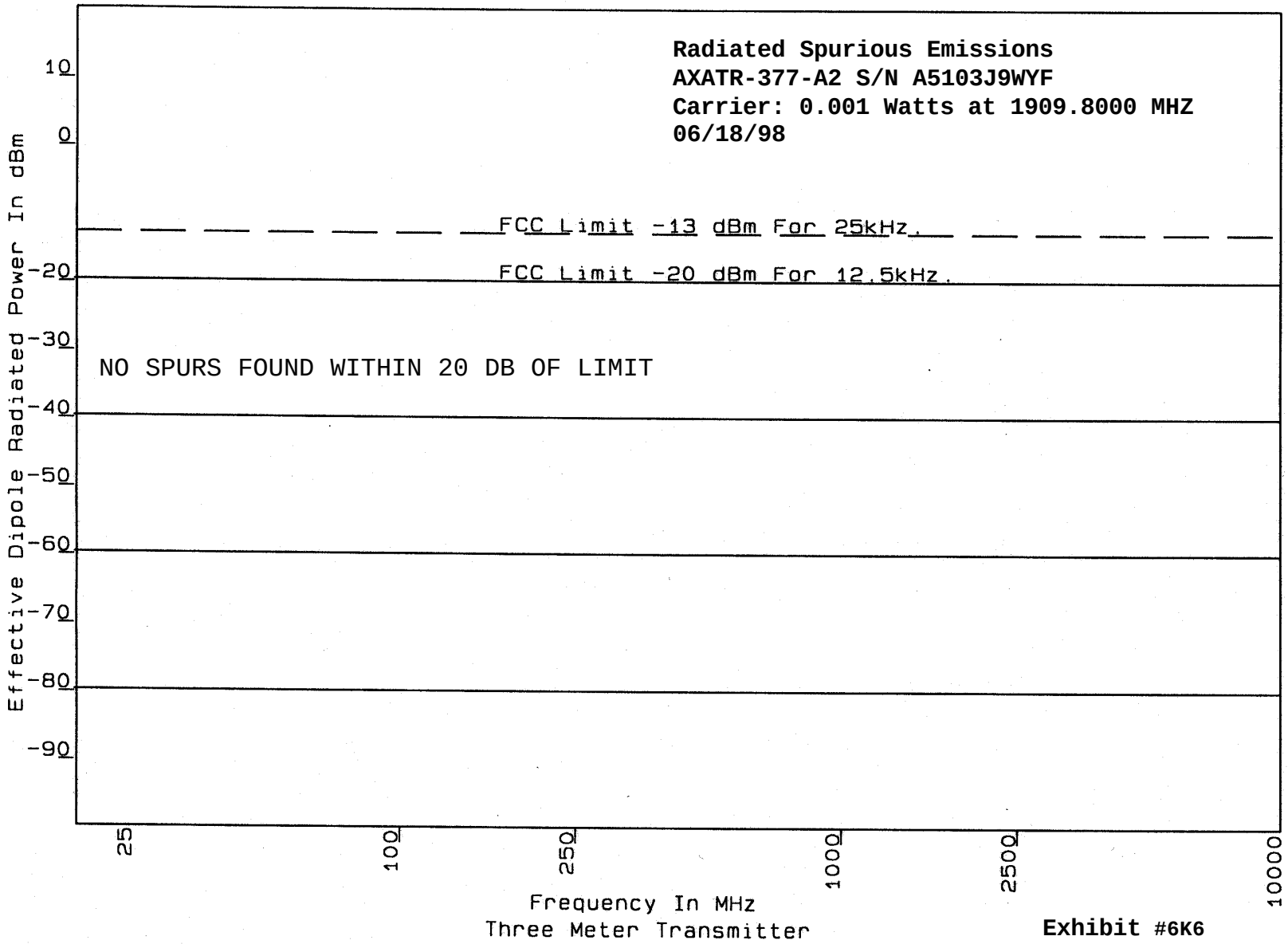

Radiated Spurious Emissions
AXATR-377-A2 S/N A5103J9WYF
Carrier: 0.001 Watts at 1909.8000 MHZ
06/18/98
FCC Limit -13 dBm For 25kHz.
FCC Limit -20 dBm For 12.5kHz.
NO SPURS FOUND WITHIN 20 DB OF LIMIT
Effective Dipole Radiated Power In dBm
10
0
-20
-30
-40
-50
-60
-70
-80
-90
25
100
250
1000
2500
10000
Frequency In MHz
Three Meter Transmitter

Exhibit #6K6

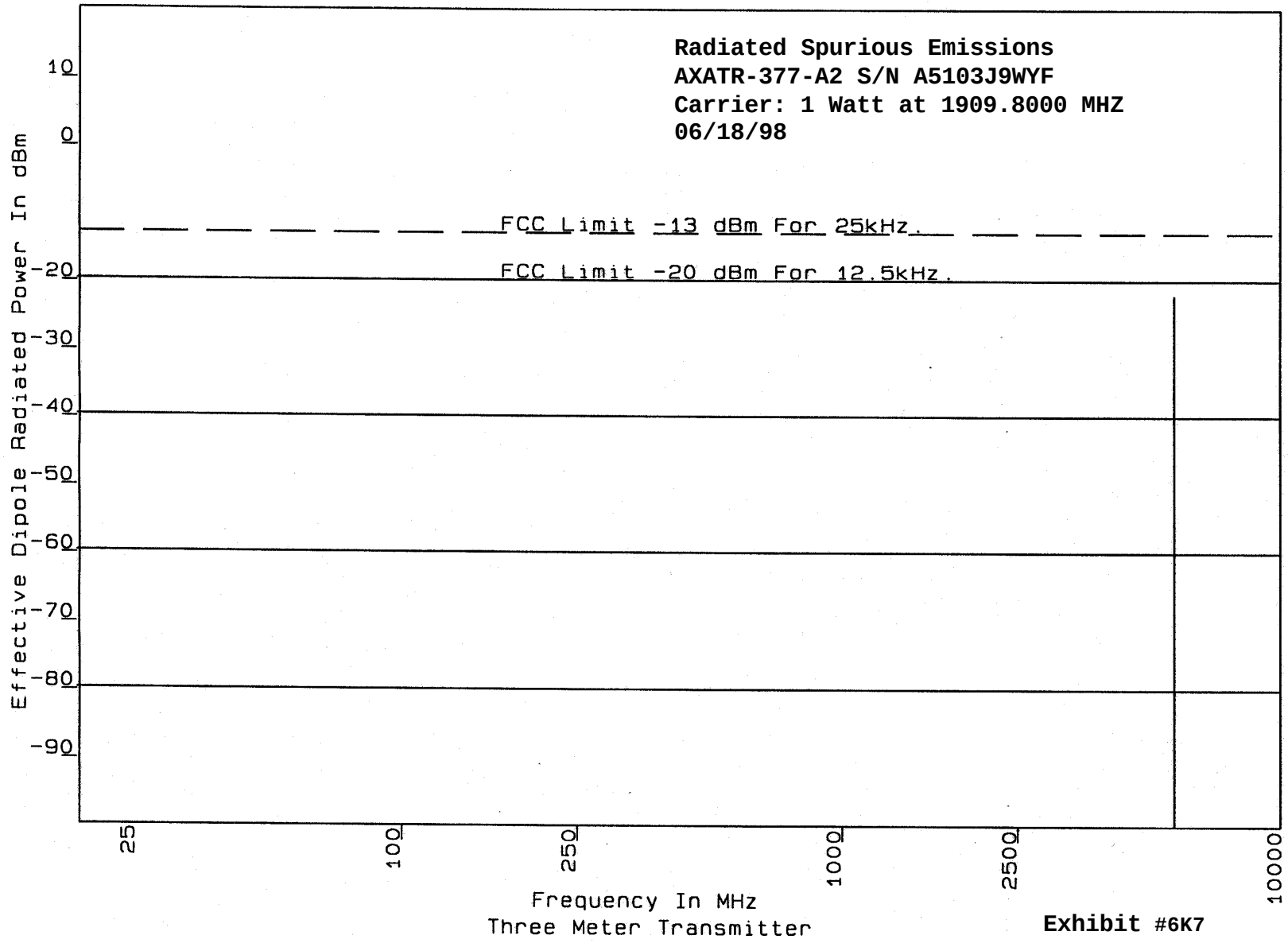

Radiated Spurious Emissions
AXATR-377-A2 S/N A5103J9WYF
Carrier: 1 Watt at 1909.8000 MHZ
06/18/98
FCC Limit -13 dBm For 25kHz.
FCC Limit -20 dBm For 12.5kHz.
Effective Dipole Radiated Power In dBm
10
0
-20
-30
-40
-50
-60
-70
-80
-90
25
100
250
1000
2500
10000
Frequency In MHz
Three Meter Transmitter

Exhibit #6K7

1900 Mhz: FREQUENCY STABILITY

Para: 2.995 (a1) (b) (d1)

Per 2.995 (a1,b.d1) variations of output frequency as a result of either temperature or voltage variations is shown in the following exhibits:

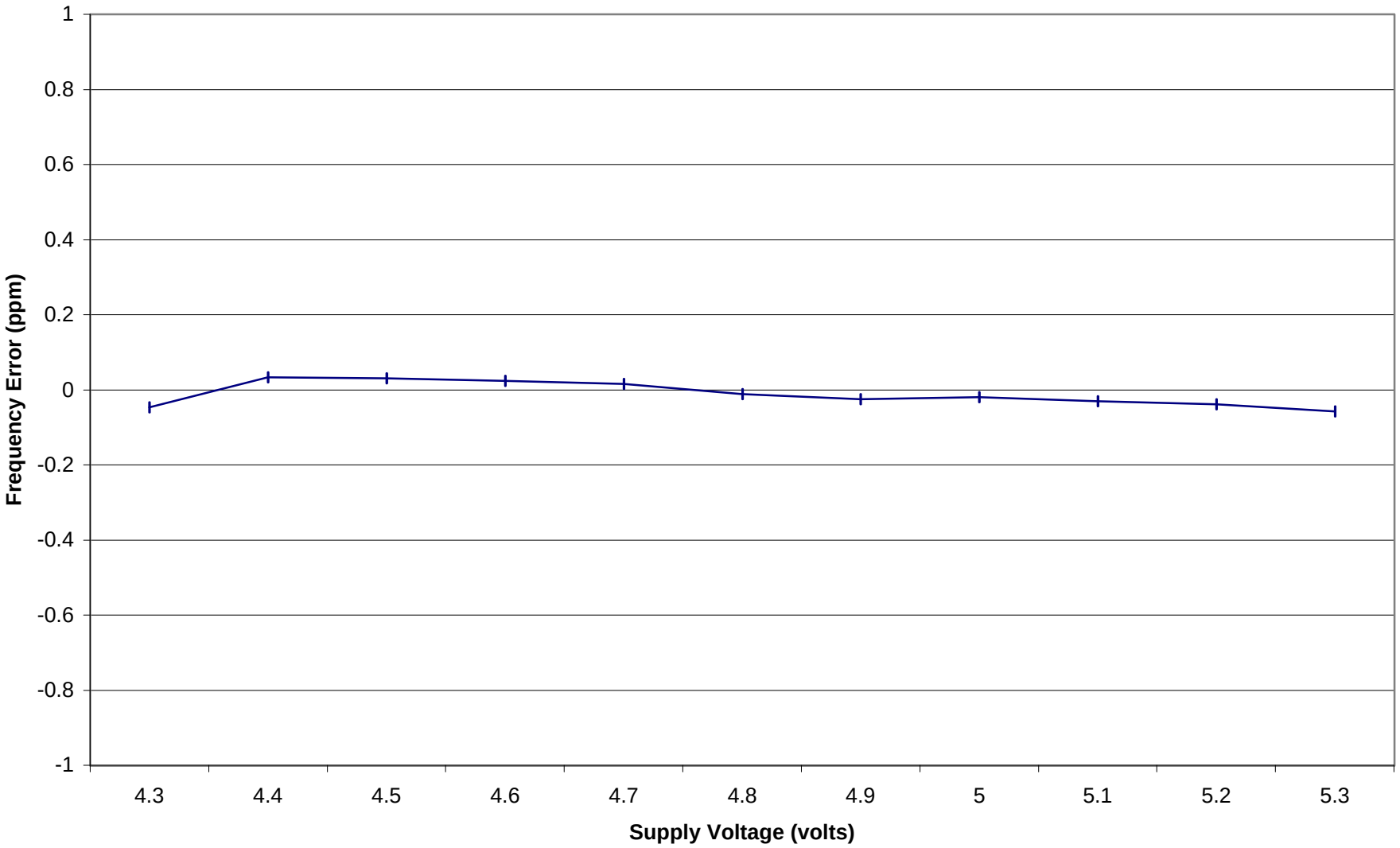
EXHIBITS	VOLTAGE	TEMPERATURE	FREQUENCY	Pwr Lvl
6L2	Varied	+ 25C	Mid Band	0
6L3	4.8	Varied	Mid Band	0

Manufacturer's rated limits are 4.3 to 5.3 V for the battery.

The measurements were made using a Hewlett Packard 8922 M System Simulator along with the following other equipment:

Hewlett Packard 8922 M System Simulator
Thermatron SM-8C Temperature Chamber

Frequency Error vs. Supply Voltage, GSM Channel 660, Power Level 0



Frequency Error vs. Temperature, GSM Channel 660, Power Level 0