Marstech Limited

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Telephone (416) 246-1116, Fax (416) 246-1020

Authorized by: Professional Engineers Ontario

Engineering & Administrative

CERTIFICATED UL AGENCY

Testing For FCC Submissions/Verifications

Approved Test Facility

Qualified Facility

TEST REPORT

REPORT DATE:	06 May 2003	REPORT NO:	22309D
CONTENTS:	See Table of Contents		
SUBMITTOR:	ATLINKS USA, Inc. 101 West 103rd Street Indianapolis, IN 46290-1102 USA		
SUBJECT:	Model No:	21105XXX-A	
	FCC ID:	G9H2-1105A	
TEST SPECIFICATION	CFR 47 FCC Part 15 FCC DA 00-705 "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems." NOTE: Tests Conducted Are "Type" Tests.		
DATE SAMPLE RECEIVED:	07 April 2003	DATE TESTED:	21 & 29 April 2003 and 01, 05 & 06 May 2003
RESULTS:	Equipment tested complies with referenced specification. Please also note that the Model 21105XXX-A meets the new rules (150KHz to 30MHz) FCC Power Line Conducted Limits.		
ALTERATIONS	None		
Tested by:	Edward Chang	Approved by:	Robert G. Marshall, P. Eng.
		Date:	Sept 18/03

REGISTERED PROFESSIONAL ENGINEER R. G. MARSHALL

TECHNICAL REPORT - FCC 2.1033(b)

Applicant

ATLINKS USA, Inc.
101 West 103rd Street
Indianapolis, IN
46290-1102 USA

FCC Identifier

G9H2-1105A

Manufacturer

1. Tecom Co. Ltd.
   Science Based Industrial Park, 23 R & D Road 2, Hsinchu, Taiwan

2. Honor Tone Ltd.
   Unit 1, Dongmen Industrial Estate, Danshui Town, Huiyang, Guangdong, China

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EXHIBIT D

[FCC Ref. 2.1033(b)(6)]

"Report of Measurements"

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TEST REPORT CONTAINING:

PRODUCT DESCRIPTION

The Model 21105XXX-A is a 2.4GHz single line, spread spectrum, frequency hopping, cordless telephone with caller ID and stuttered dial tone features, that operates from 2401.92 to 2478.816 MHz. The antenna used for the base and the handset are permanently attached to the EUT.

A complete frequency list is shown on the following pages.

NOTE: 1. The base and handset use 90 Channels.

Table of Tx & Rx Frequency Channels

Channel	Frequency
(000)	2401.920
(001)	2402.784
(002)	2403.648
(003)	2404.512
(004)	2405.376
(005)	2406.240
(006)	2407.104
(007)	2407.968
(008)	2408.832
(009)	2409.696
(010)	2410.560
(011)	2411.424
(012)	2412.288
(013)	2413.152
(014)	2414.016
(015)	2414.880
(016)	2415.744
(017)	2416.608
(018)	2417.472
(019)	2418.336
(020)	2419.200
(021)	2420.064
(022)	2420.928
(023)	2421.792
(024)	2422.656
(025)	2423.520
(026)	2424.384
(027)	2425.248
(028)	2426.112
(029)	2426.976

Channel	Frequency
(030)	2427.840
(031)	2428.704
(032)	2429.568
(033)	2430.432
(034)	2431.296
(035)	2432.160
(036)	2433.024
(037)	2433.888
(038)	2434.752
(039)	2435.616

(040)	2436.480
(041)	2437.344
(042)	2438.208
(043)	2439.072
(044)	2439.936
(045)	2440.800
(046)	2441.664
(047)	2442.528
(048)	2443.392
(049)	2444.256
(050)	2445.120
(051)	2445.984
(052)	2446.848
(053)	2447.712
(054)	2448.576
(055)	2449.440
(056)	2450.304
(057)	2451.168
(058)	2452.032
(059)	2452.896

Channel	Frequency
(060)	2453.760
(061)	2454.624
(062)	2455.488
(063)	2456.352
(064)	2457.216
(065)	2458.080
(066)	2458.944
(067)	2459.808
(068)	2460.672
(069)	2461.536
(070)	2462.400
(071)	2463.264
(072)	2464.128
(073)	2464.992
(074)	2465.856
(075)	2466.720
(076)	2467.584
(077)	2468.448
(078)	2469.312
(079)	2470.176
(080)	2471.040

(081)	2471.904
(082)	2472.768
(083)	2473.632
(084)	2474.496
(085)	2475.360
(086)	2476.224
(087)	2477.088
(088)	2477.952
(089)	2478.816

FCC ID: G9H2-1105A
Marstech Report No. 22309D
EXHIBIT D(1)-3

TEST FACILITY AND EQUIPMENT LIST

FACILITIES

Radiated — ANSI C63.4 (FCC OET/55) open field 3 metre test range. This test range is protected from the cold and moisture by a non-conductive enclosure.

Conducted — 2.5m Anechoic Chamber

EQUIPMENT

Anritsu 2601A Spectrum Analyzer
Advantest R3261A Spectrum Analyzer
Hewlett-Packard RF generator # 8640 B with an 002 doubler
A.H. Systems biconical antenna; ..... 20 MHz to 330 MHz
A.H. Systems log periodic antenna; ..... 300 MHz to 1.8 GHz
Compliance Design P950 Preamp (16 dB) ... 25 MHz to 1.0 GHz

NOTE:

The Anritsu 2601A Spectrum Analyzer and the Advantest R3261A Spectrum Analyzer are calibrated annually, and that calibration is directly traceable to the National Research Council of Canada. (NRC) This equipment is only used by qualified technicians and only for the purpose of EMI measurements. The three metre test range has been carefully evaluated to the ANSI document C63.4 and will be remeasured for reflections and losses every three years.

ADDITIONAL TEST EQUIPMENT LIST

1. Spectrum Analyzer: HP 8591EM, S/N 3639A00995, (9KHz - 1.8GHz), Calibrated April 2003
2. Spectrum Analyzer: ANRITSU 2601A, S/N MT64544, (10KHz - 2.2GHz), Calibrated May 2003
3. Spectrum Analyzer: IFR AN940, S/N 635001039, (9KHz - 26.5GHz), Calibrated March 2003
4. Preamp: HP 8449B, S/N 3008A00378, (1 - 26.5GHz), Calibrated August 2002
5. Horn Antenna: Q-PAR 6878/24, S/N 1721, (1.5-18GHz)
6. Horn Antenna: A. H. Systems SAS 572, S/N 164 (18 - 26.5GHz)
7. Line Impedance Stabilization Network.: Marstech, Cal. July 2002

FEDERAL COMMUNICATIONS COMMISSION

Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046

August 22, 2003

Registration Number: 90578

Electrohome Electronics Ltd.
809 Wellington St. N.
Kitchener, Ontario, N2G 4J6
Canada
Attention: Tuat Huynh

Re: Measurement facility located at Roseville
3 meter site
Date of Renewal: August 22, 2003

Dear Sir or Madam:

Your request for renewal of the registration of the subject measurement facility has been received. The information submitted has been placed in your file and the registration has been renewed. The name of your organization will remain on the list of facilities whose measurement data will be accepted in conjunction with applications for Certification under Parts 15 or 18 of the Commission's Rules. Please note that the file must be updated for any changes made to the facility and the registration must be renewed at least every three years.

Measurement facilities that have indicated that they are available to the public to perform measurement services on a fee basis may be found on the FCC website www.fcc.gov under E-Filing, OET Equipment Authorization Electronic Filing, Test Firms.

Sincerely,

Ms. Phyllis Parrish
Information Technician

FCC ID: G9H2-1105A
Marstech Report No. 22309D
EXHIBIT D(1)-6

15.107 (a) POWER LINE CONDUCTED INTERFERENCE

Requirements:

Frequency of Emission (MHZ)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

Test Procedure:

ANSI STANDARD C63.4-1992. using a 50uH LISN. Both lines were observed with the EUT transmitting. The bandwidth of the spectrum analyzer was 9KHz QP with an appropriate sweep speed. The ambient temperature of the EUT was 24°C with a humidity of 60%.

The spectrum was scanned from 0.15 to 30MHz.

Test Data:

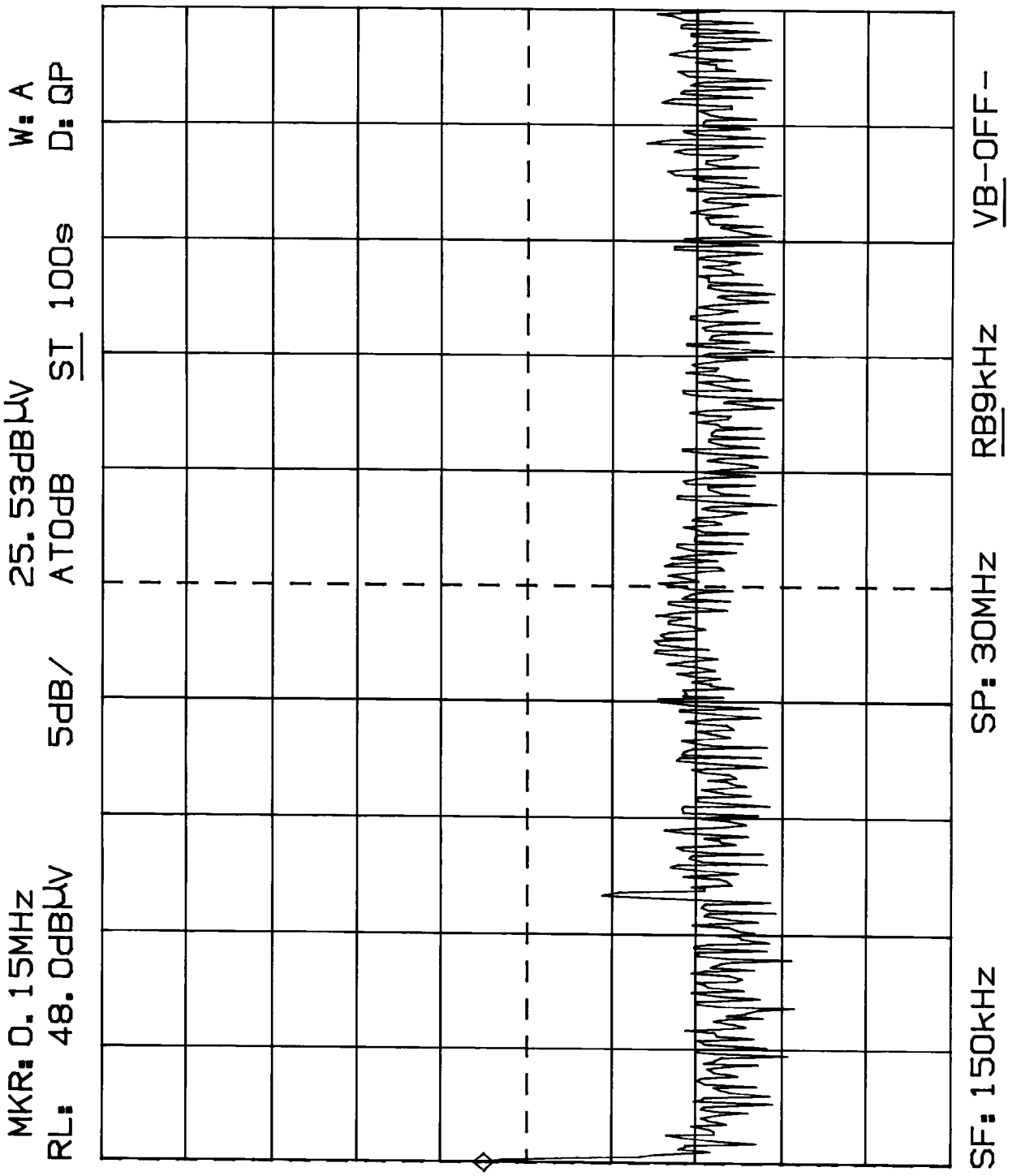
The highest emission read for LINE was 25.53 dBμV@ 0.15 MHz.
The highest emission read for NEUTRAL was 25.18 dBμV@ 0.15 MHz.

The graphs on Exhibit D(1)-8 and -9 represent the emissions taken for this device.

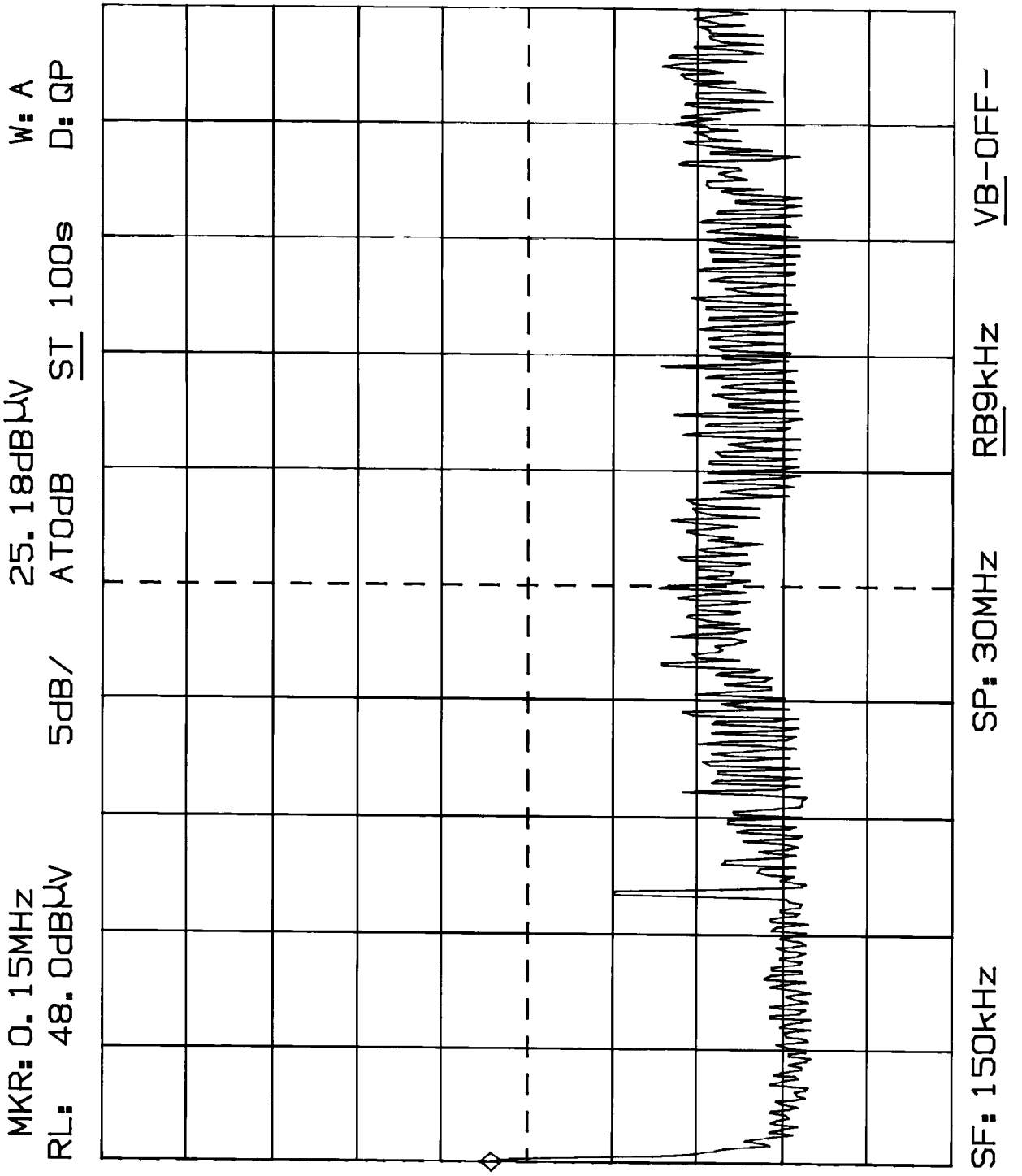
Test Results:

Both lines were observed. The measurements indicate that the unit DOES appear to meet the FCC requirements for this class of equipment.

POWER LINE CONDUCTED EMISSIONS
MODEL 21105XXX-A; LINE



POWER LINE CONDUCTED EMISSIONS
MODEL 21105XXX-A; NEUTRAL



15.205(c)/15.209 SPURIOUS RADIATED EMISSIONS IN RESTRICTED BANDS

Procedure

The test procedure used was ANSI STANDARD C63.4-1992 and DA-00-705 using an appropriate spectrum analyzer, as listed in the Test Equipment List. The bandwidth (RBW) of the spectrum analyzer was 100KHz/120KHz up to 1GHz with an appropriate sweep speed. The RBW above 1.0GHz was = 1.0MHz. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The ambient temperature of the EUT was 24˚C with a humidity of 60%.

Requirements:

Emissions that fall in the restricted bands (15.205) must be less than 54dBμV/m

Test Data:

Refer to Exhibit D(1)-11 to D(1)-14

15.205(c)/15.209 FIELD STRENGTH OF RADIATED EMISSIONS INCLUDING RESTRICTED BANDS

BASE UNIT

Frequency Band MHz	Meter Reading (Peak) @3m dBμV/M	Meter Reading (Average) @3m dBμV/M	Antenna and Polarization	Cable & Antenna Factor	Peak F. S. dBμV/M	Average F. S dBuV/M	Average FCC Limit	Margin dB
Channel 1								
2401.92	**84.00**	---	**Horn V**	**33.08**	**117.08**	---	---	---
4803.84	32.00	6.00	Horn V	38.28	70.28	44.28	54.00	-9.72
7205.76	23.00	4.00	Horn H	43.94	66.94	47.94	54.00	-6.06
9607.68	27.00	---	Horn H	46.96	73.96	---	97.08	-23.12
12009.60	17.00	2.00	Horn H	48.00	65.00	50.00	54.00	-4.00
14411.52	---							
16813.44	---							
Channel 45								
2439.936	**83.00**	---	**Horn V**	**33.20**	116.20	---	---	---
4879.872	32.00	6.00	Horn H	38.47	70.47	44.47	54.00	-9.53
7319.808	22.00	2.00	Horn H	44.06	66.06	46.06	54.00	-7.94
9759.744	27.00	---	Horn H	47.06	74.06	---	96.20	-22.14
12199.68	19.00	2.00	Horn H	48.38	67.38	50.38	54.00	-3.62

1. If the peak meets the average limit, nothing further is required.
2. If the peak exceeds the average limit, then an average measurement is required (may be calculated) and must be below the average limit and also:
3. The peak measurement cannot exceed the average limit +20dB.

15.205(c)/15.209 FIELD STRENGTH OF RADIATED EMISSIONS INCLUDING RESTRICTED BANDS

BASE UNIT

Frequency Band MHz	Meter Reading (Peak) @3m dBμV/M	Meter Reading (Average) @3m dBμV/M	Antenna and Polarization	Cable & Antenna Factor	Peak F. S. dBμV/M	Average F. S dBuV/M	Average FCC Limit	Margin dB
Channel 90								
2478.816	**82.00**	**---**	**Horn V**	**33.23**	**115.23**	**---**	**---**	**---**
2483.50	31.00	4.00	Horn V	33.89	64.89	37.89	54.00	-16.11
2484.50	30.60	3.50	Horn V	33.89	64.49	37.39	54.00	-16.61
2486.50	27.80	2.00	Horn V	33.89	61.69	35.89	54.00	-18.11
2487.50	26.00	2.00	Horn V	33.89	59.89	35.89	54.00	-18.11
4957.632	32.00	2.00	Horn H	40.30	72.30	42.30	54.00	-11.70
7436.448	23.00	3.00	Horn H	44.38	67.38	47.38	54.00	-6.62
9915.264	27.00	---	Horn H	47.14	74.14	---	95.23	-21.09
12394.080	19.00	2.00	Horn H	48.76	67.76	50.76	54.00	-3.24
14872.892	---							
17351.712	---							

1. If the peak meets the average limit, nothing further is required.
2. If the peak exceeds the average limit, then an average measurement is required (may be calculated) and must be below the average limit and also:
3. The peak measurement cannot exceed the average limit +20dB.

15.205(c)/15.209 **FIELD STRENGTH OF RADIATED EMISSIONS INCLUDING RESTRICTED BANDS**

HANDSET UNIT

Frequency Band MHz	Meter Reading (Peak) @3m dBμV/M	Meter Reading (Average) @3m dBμV/M	Antenna and Polarization	Cable & Antenna Factor	Peak F. S. dBμV/M	Average F. S dBuV/M	Average FCC Limit	Margin dB
Channel 1								
2401.92	**73.00**	**---**	**Horn V**	**33.08**	**106.08**	---	---	---
4803.840	24.00	3.00	Horn H	38.28	62.28	41.28	54.00	-12.72
7205.760	24.00	2.00	Horn H	43.94	67.94	45.94	54.00	-8.06
9607.680	---	---						
12009.600	---							
Channel 45								
2439.936	**78.00**	**---**	**Horn V**	**33.20**	111.20	---	---	---
4879.872	26.00	3.00	Horn H	38.47	64.47	41.47	54.00	-12.53
7319.808	27.00	3.00	Horn H	44.06	71.06	47.06	54.00	-6.94
9759.744	---							
12199.680	---							

1. If the peak meets the average limit, nothing further is required.
2. If the peak exceeds the average limit, then an average measurement is required (may be calculated) and must be below the average limit and also:
3. The peak measurement cannot exceed the average limit +20dB.

15.205(c)/15.209 FIELD STRENGTH OF RADIATED EMISSIONS INCLUDING RESTRICTED BANDS

HANDSET UNIT

Frequency Band MHz	Meter Reading (Peak) @3m dBμV/M	Meter Reading (Average) @3m dBμV/M	Antenna and Polarization	Cable & Antenna Factor	Peak F. S. dBμV/M	Average F. S dBuV/M	Average FCC Limit	Margin dB
Channel 90								
2478.816	**80.00**	**---**	**Horn V**	**33.23**	**113.23**	**---**	**---**	**---**
2483.50	27.00	1.00	Horn V	33.89	60.89	34.89	54.00	-19.11
2484.50	26.00	0.00	Horn V	33.89	59.89	33.89	54.00	-20.11
2486.50	23.80	0.00	Horn V	33.89	57.69	33.89	54.00	-20.11
2487.50	21.00	0.00	Horn V	33.89	54.89	33.89	54.00	-20.11
4957.632	28.00	3.00	Horn H	40.30	68.30	43.30	54.00	-10.70
7436.448	27.00	3.00	Horn H	44.38	71.38	44.38	54.00	-9.62
9915.264	---							
12394.080	---							

1. If the peak meets the average limit, nothing further is required.
2. If the peak exceeds the average limit, then an average measurement is required (may be calculated) and must be below the average limit and also:
3. The peak measurement cannot exceed the average limit +20dB.

15.247(a)(1) HOPPING CHANNEL SEPARATION

Requirements:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater.

Measurement Procedure

1. Position the EUT without connection to the Spectrum Analyzer (SA). Turn on the EUT and connect it to the SA. Then set it to any one convenient frequency within its operating range.

2. By using the MaxHold function record the separation of two adjacent channels.

3. Measure the frequency difference of these two adjacent channels by SA MARK function and then plot the result on the SA screen.

4. Repeat above procedures until all frequencies measured were complete.

Measurement Data - Refer Exhibit D(1)-16 to 21 for plotted data

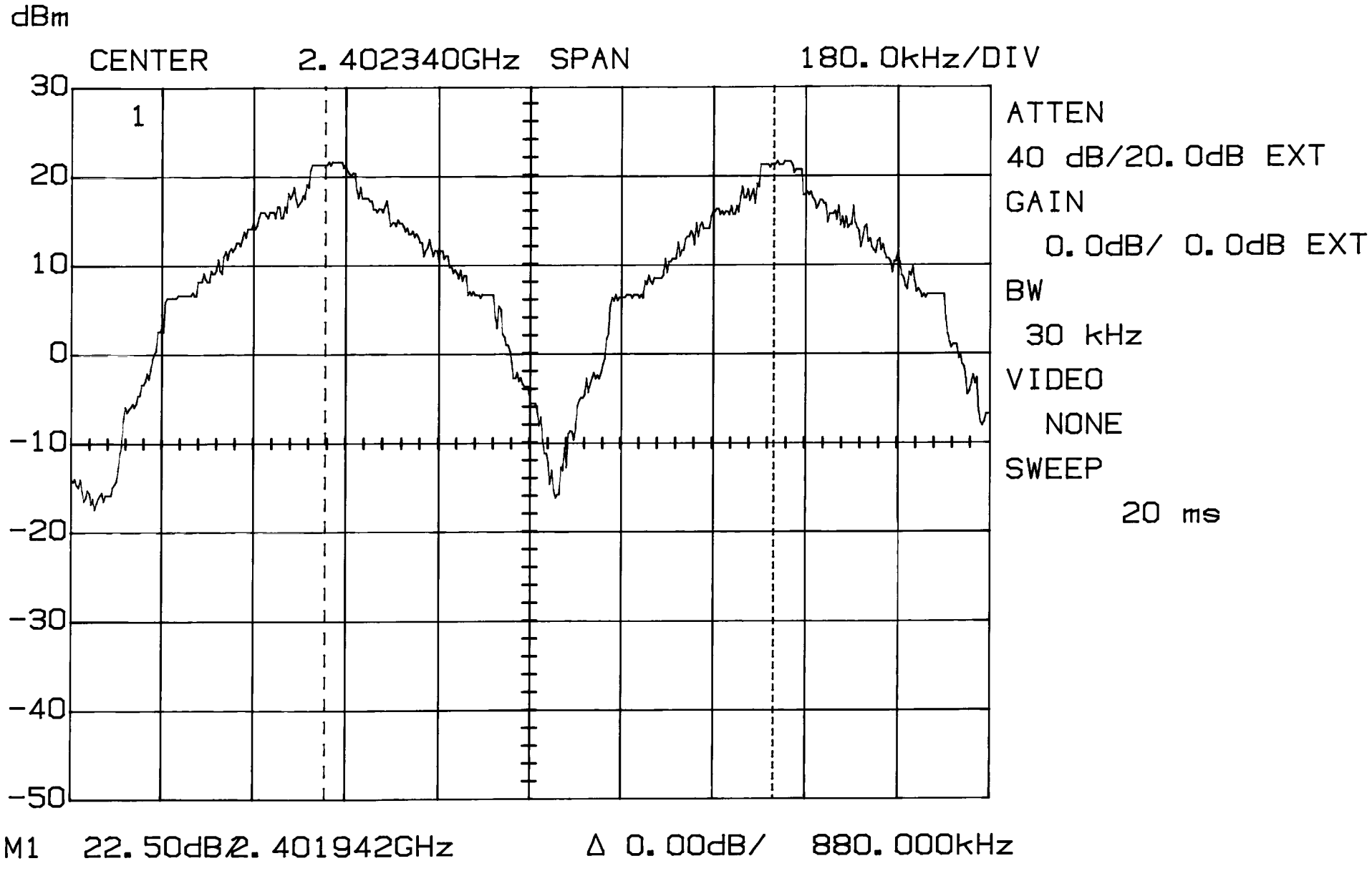
Base Unit

Channel 1:	Adjacent Hopping Channel Separation is 880 kHz.
Channel 45:	Adjacent Hopping Channel Separation is 880 kHz.
Channel 90:	Adjacent Hopping Channel Separation is 880 kHz.

Handset Unit

Channel 1:	Adjacent Hopping Channel Separation is 881 kHz.
Channel 45:	Adjacent Hopping Channel Separation is 879 kHz.
Channel 90:	Adjacent Hopping Channel Separation is 880 kHz.

HOPPING CHANNEL SEPARATION
Base - Channel 1
MODEL 21105XXX-A



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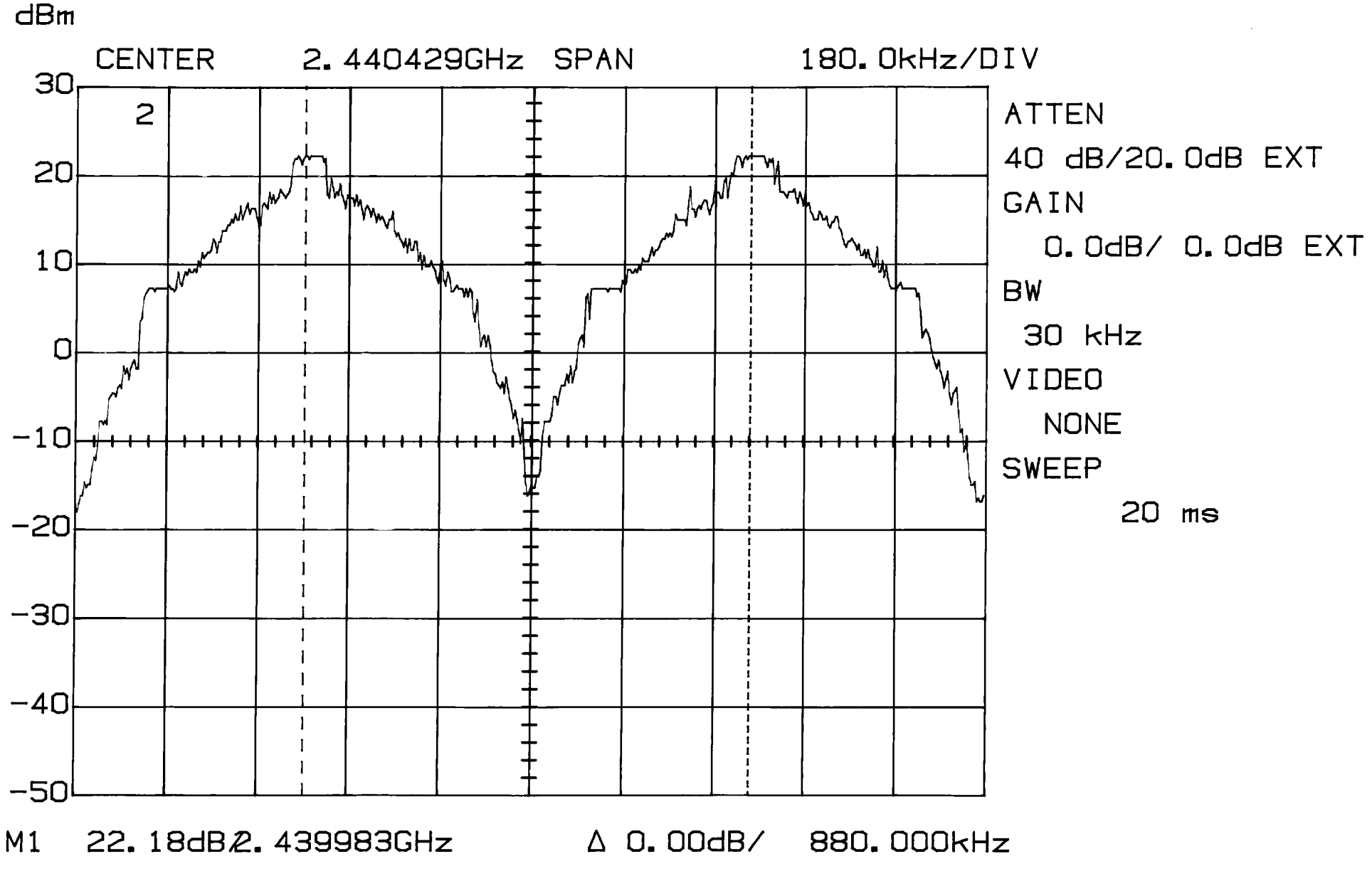
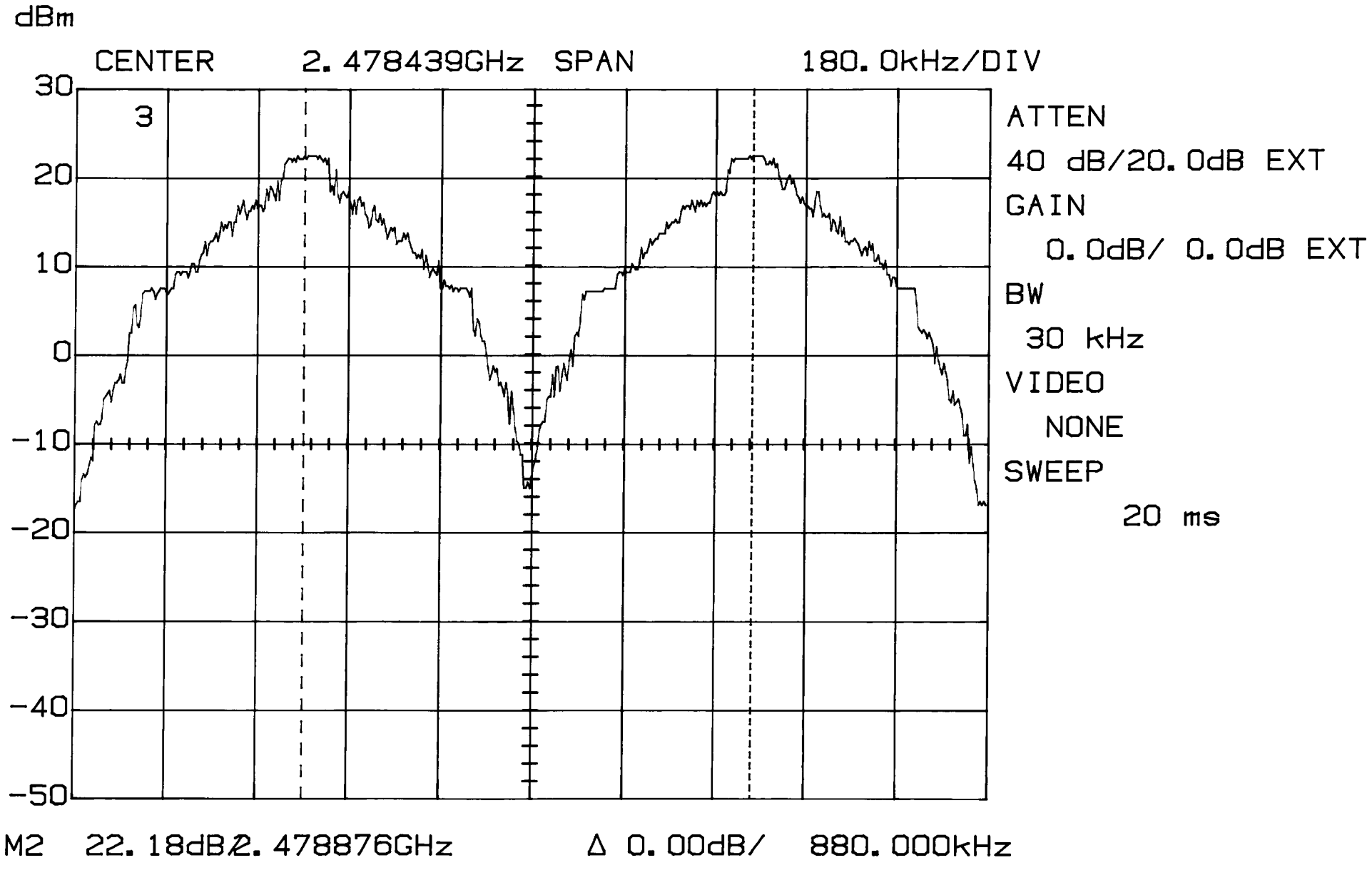
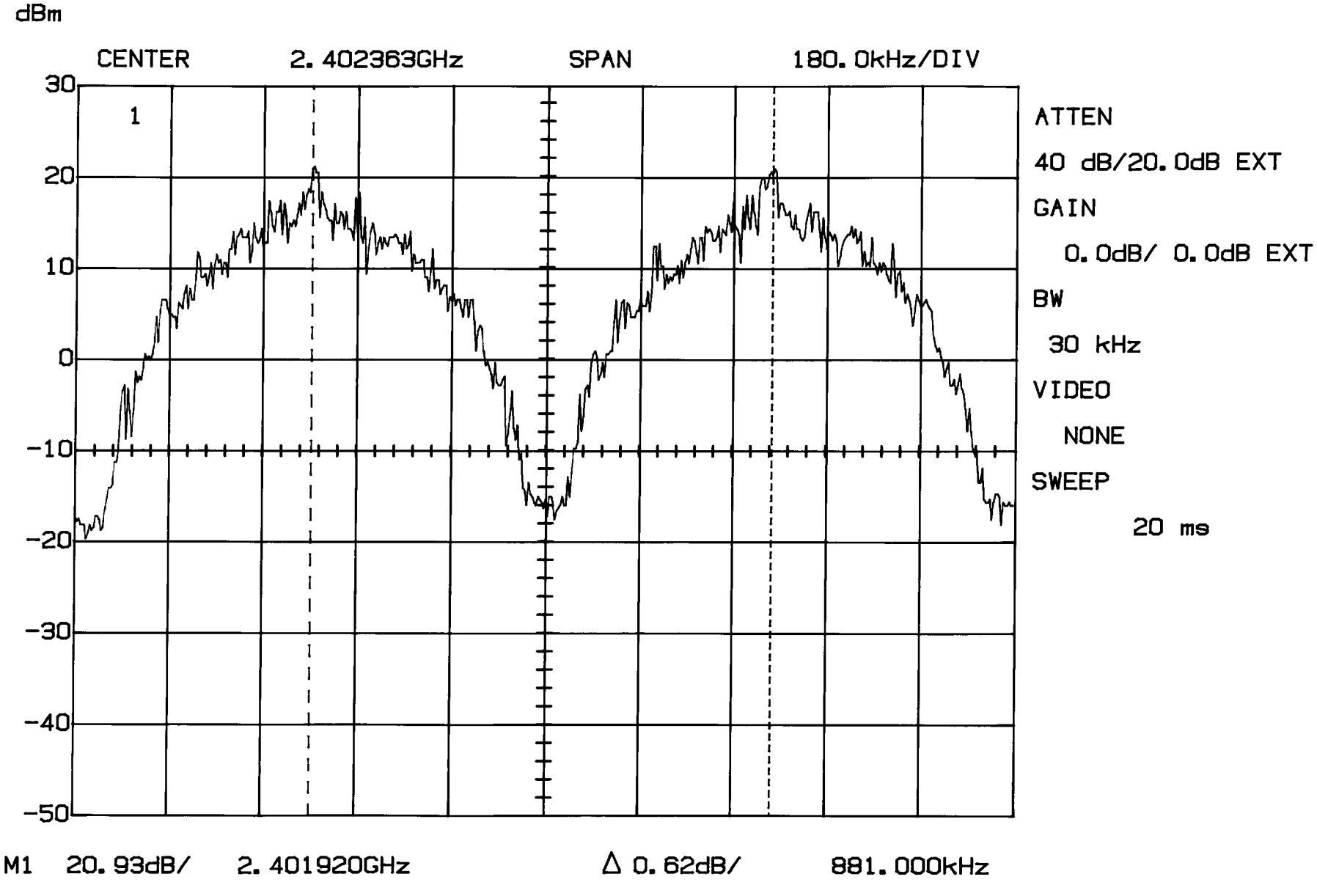
HOPPING CHANNEL SEPARATION
Base - Channel 45
MODEL 21105XXX-A



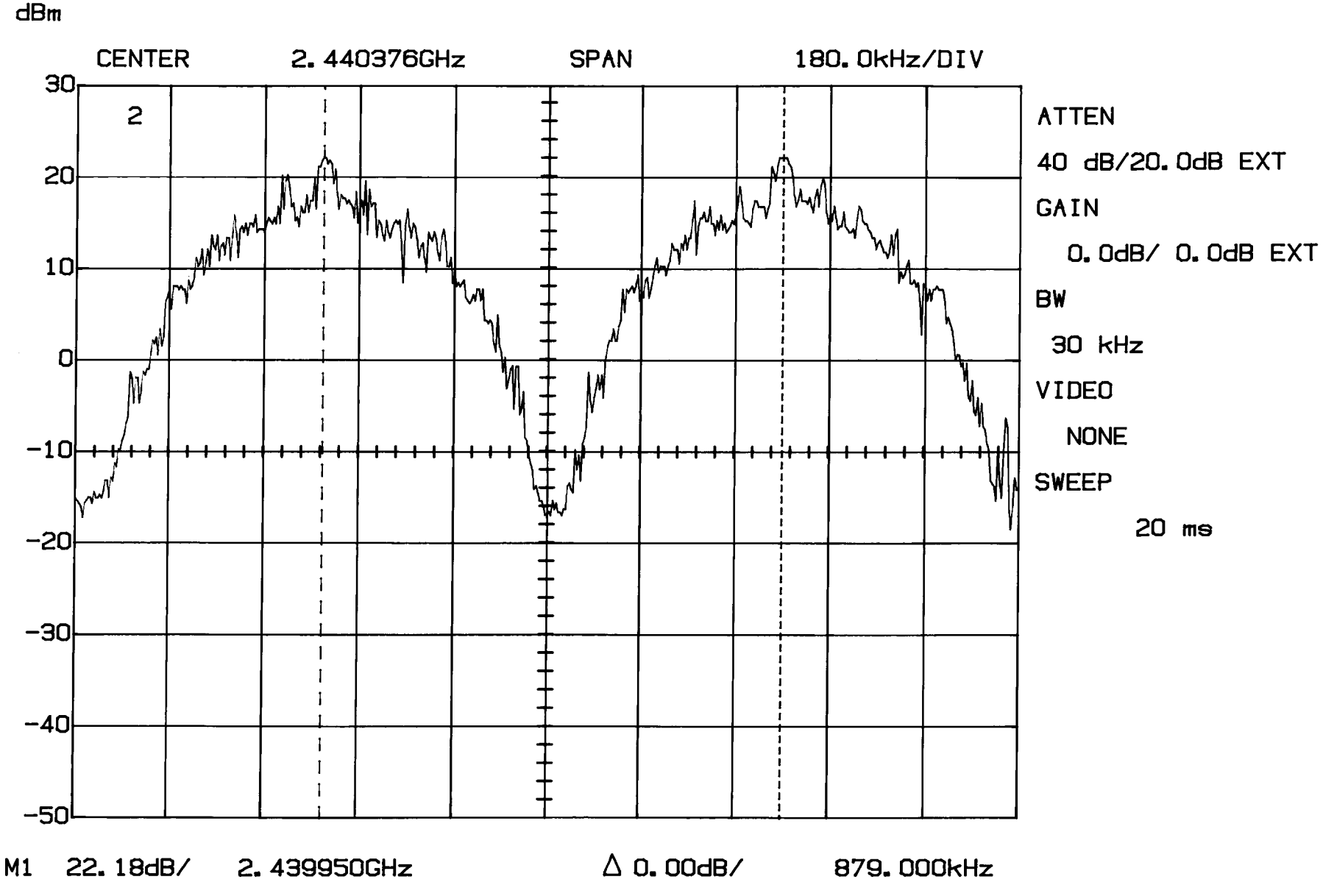
HOPPING CHANNEL SEPARATION
Base - Channel 90
MODEL 21105XXX-A



HOPPING CHANNEL SEPARATION
Handset - Channel 1
MODEL 21105XXX-A

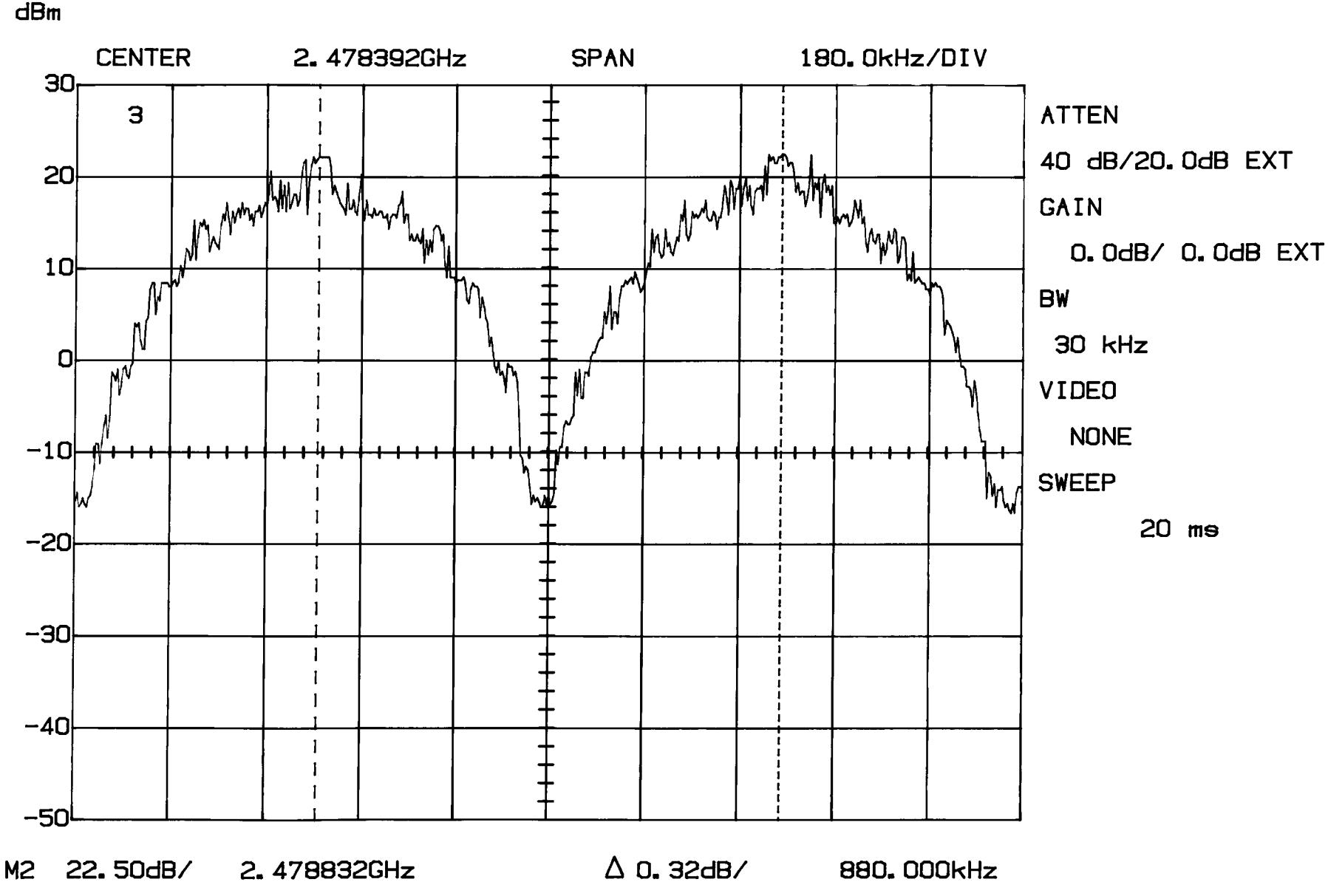


HOPPING CHANNEL SEPARATION
Handset - Channel 45
MODEL 21105XXX-A



11:49:22 05-01-2003

HOPPING CHANNEL SEPARATION
Handset - Channel 90
MODEL 21105XXX-A



12:51:57 05-01-2003

15.247(a)(1)(ii) FREQUENCY HOPPING SYSTEMS

NUMBER OF HOPPING FREQUENCIES USED

Requirements:

Frequency hopping systems operating in the 2400-2483.5 MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems which use fewer than 75 hopping frequencies may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels are used.

Measurement Procedure

1. Position the EUT without connection to Spectrum Analyzer (SA). Turn on the EUT and connect its antenna terminal to SA via a low loss cable and set it to any one measured frequency within its operating range and ensure that the SA is operated in its linear range.
2. Set the SA on MaxHold Mode, and then keep the EUT in hopping mode. Record all of the signals from each channel until each one has been recorded.
3. Set the SA on View mode and plot the results on SA screen.
4. Repeat the above procedures until all frequencies measured are complete.

Measurement Data

The base has 90 hopping frequencies and the handset has 90 hopping frequencies. **Refer Exhibit D(1)-23 and -24 for plotted data.**

CHANNEL BANDWIDTH [15.247(a)]

Requirements:

The 20dB bandwidth of the hopping channel is less than 1 MHz.

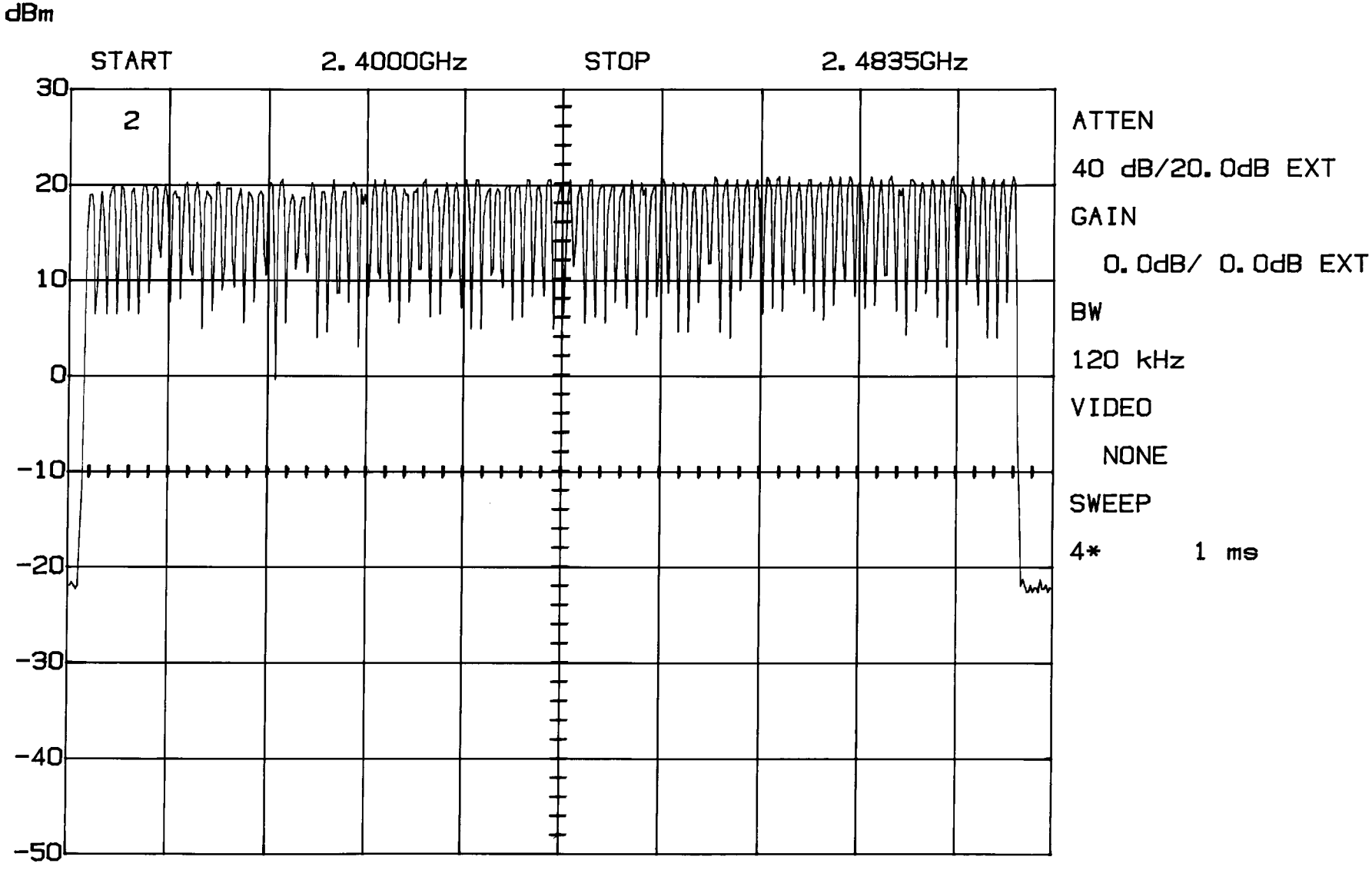
Measurement Procedure

1. Position the EUT without connection to the Spectrum Analyzer (SA). Turn on the EUT and connect it to the SA. Then set it to any one convenient frequency within its operating range. Set a reference level on the SA equal to the highest peak value.
2. Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
3. Repeat above procedures until all frequencies measured were complete.

Measurement Data - Refer Exhibit D(1)-25 to -30 for plotted data

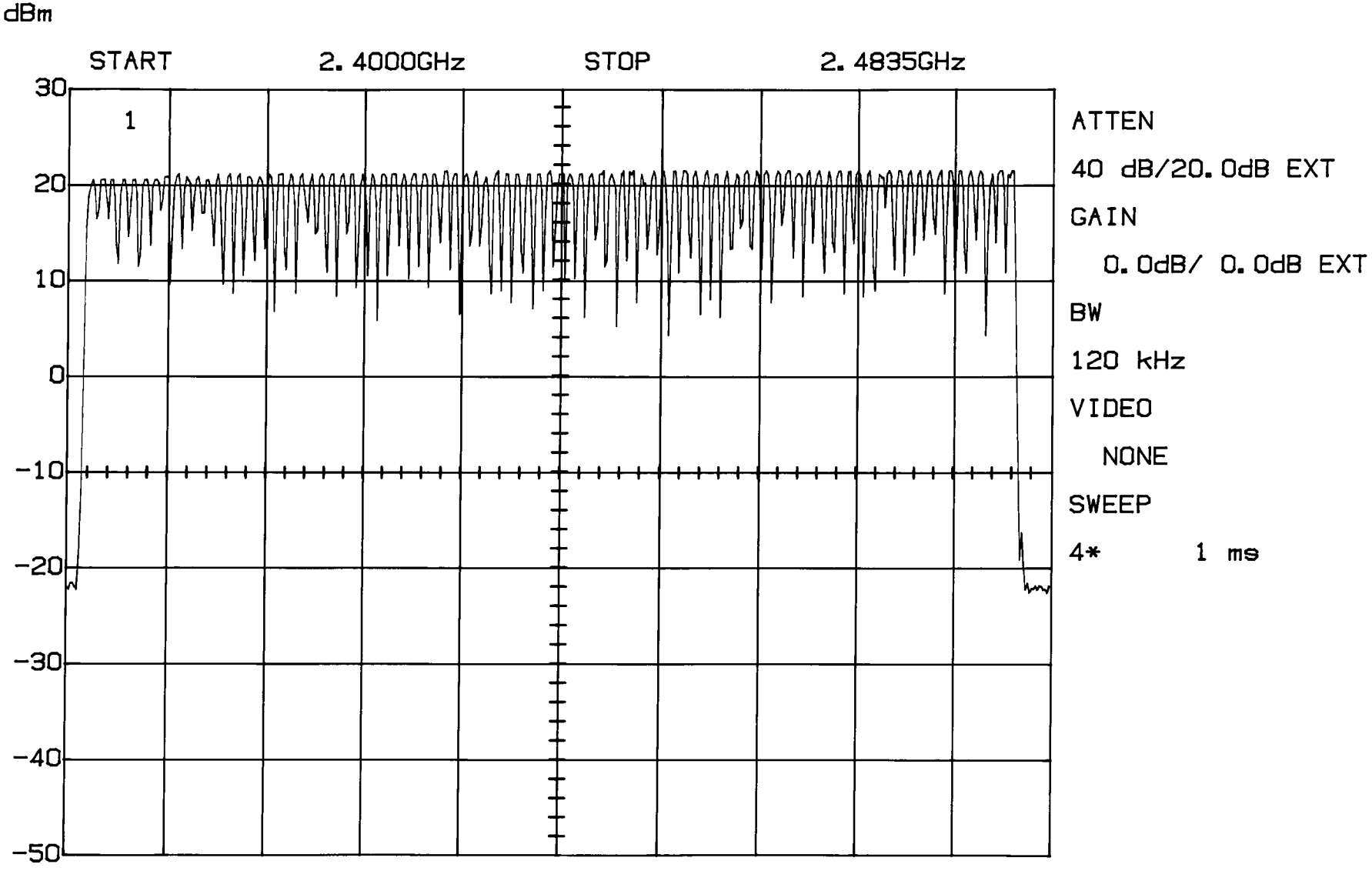
Base	Channel 1:	Channel Bandwidth is 686 kHz
	Channel 45:	Channel Bandwidth is 702 kHz
	Channel 90:	Channel Bandwidth is 698 kHz
Handset Unit	Channel 1:	Channel Bandwidth is 679 kHz
	Channel 45:	Channel Bandwidth is 678 kHz
	Channel 90:	Channel Bandwidth is 676 kHz

HOPPING FREQUENCY (Handset)
MODEL 21105XXX-A



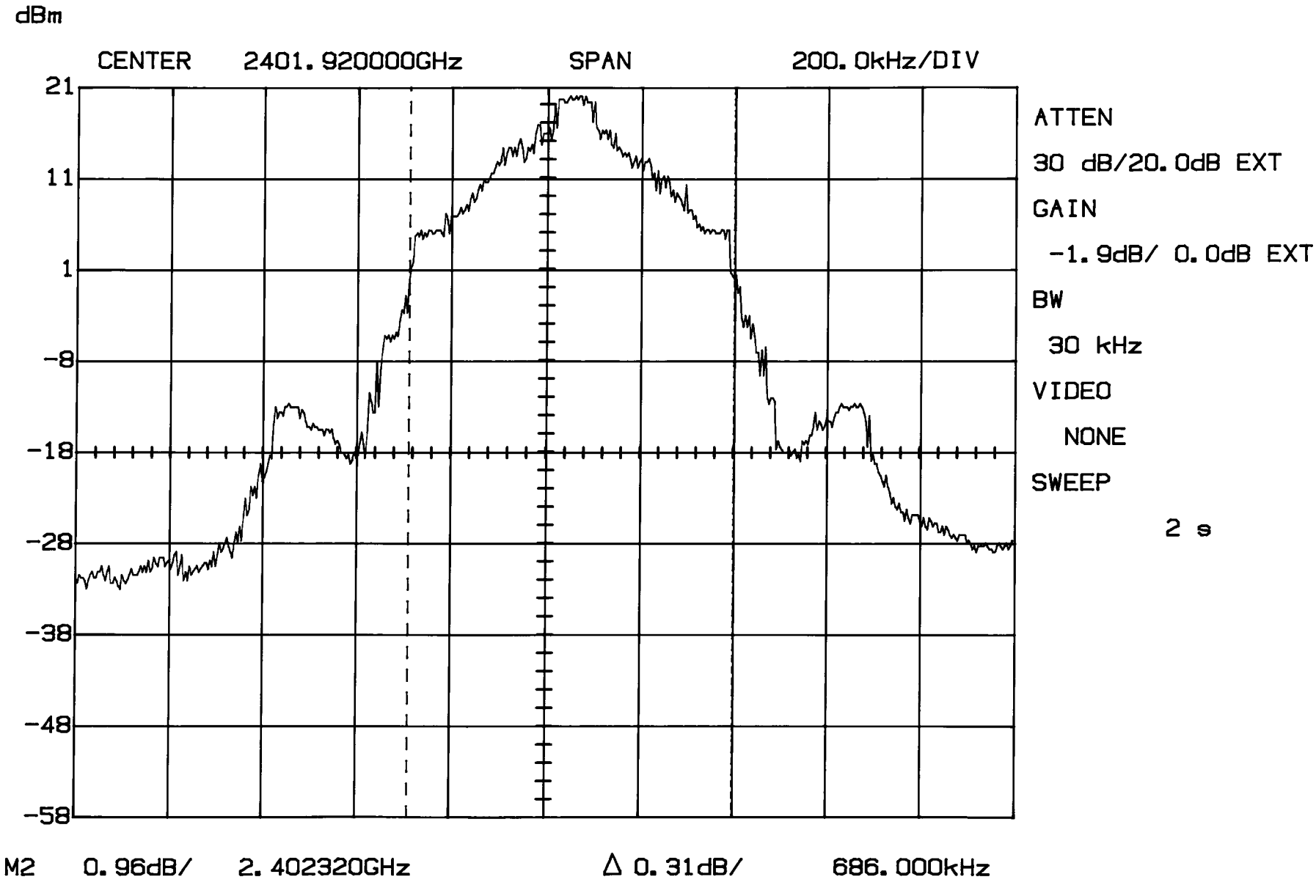
16: 07: 06 04-25-2003

HOPPING FREQUENCY (Base)
MODEL 21105XXX-A

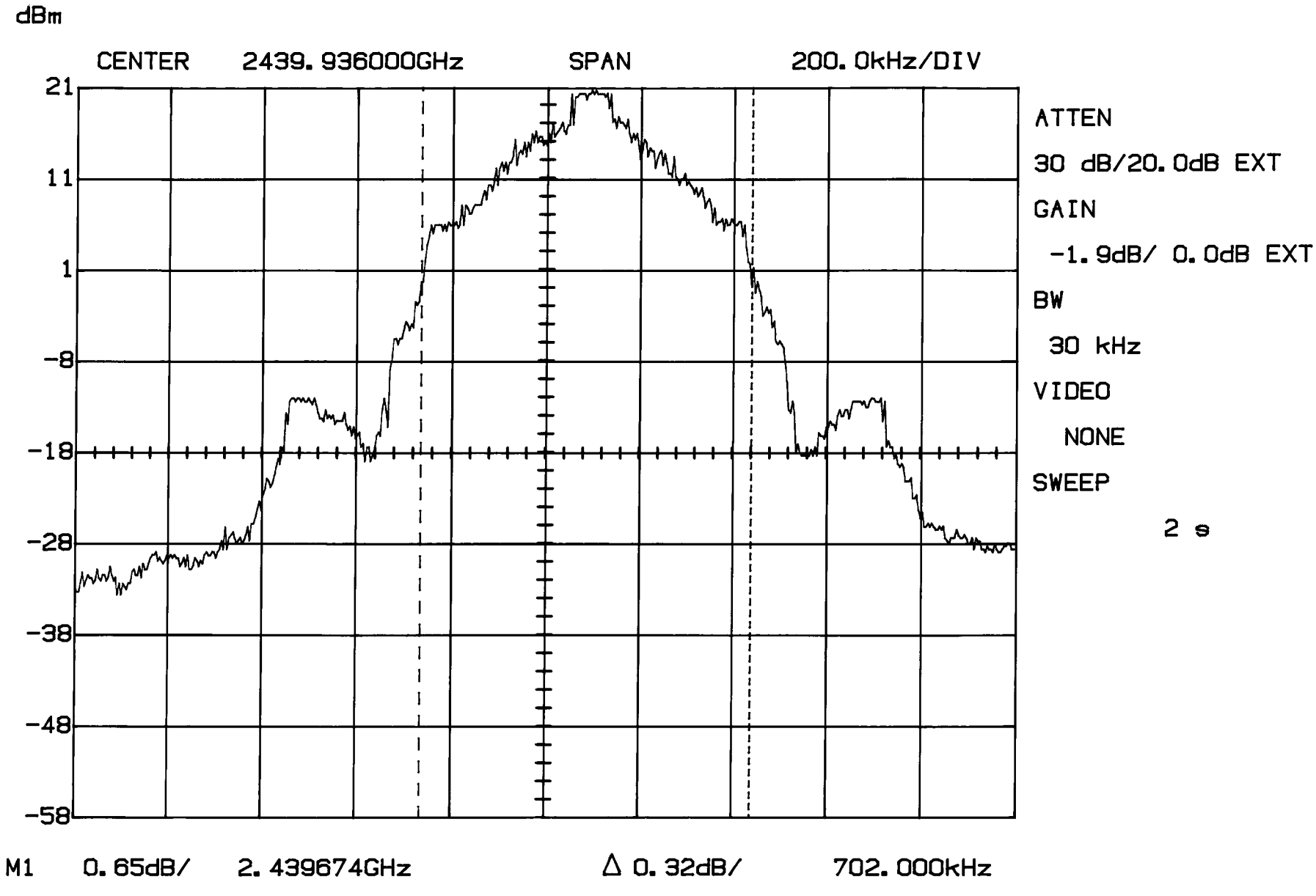


15: 22: 36 04-25-2003

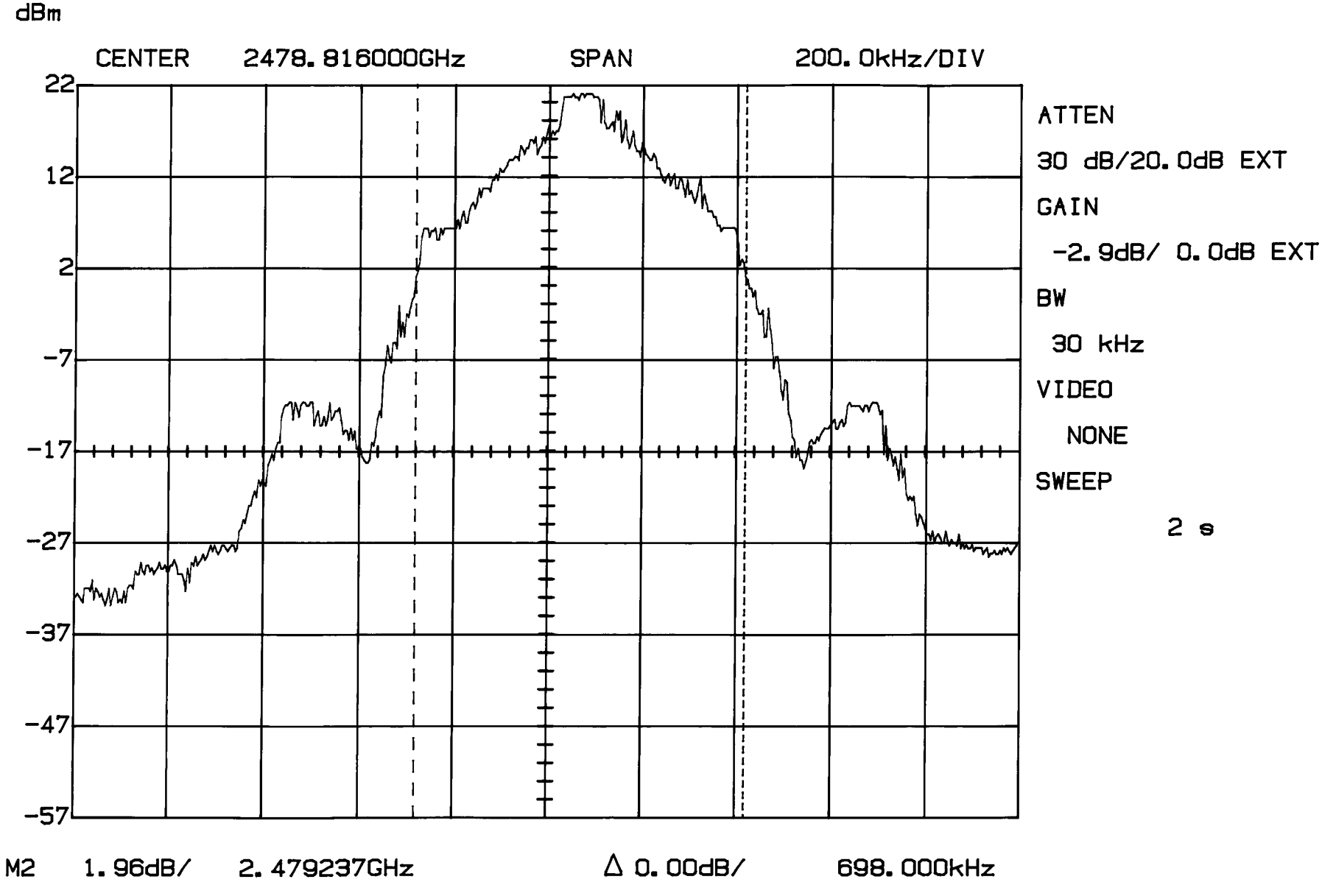
20 dB BANDWIDTH (Base) - CH1
MODEL 21105XXX-A



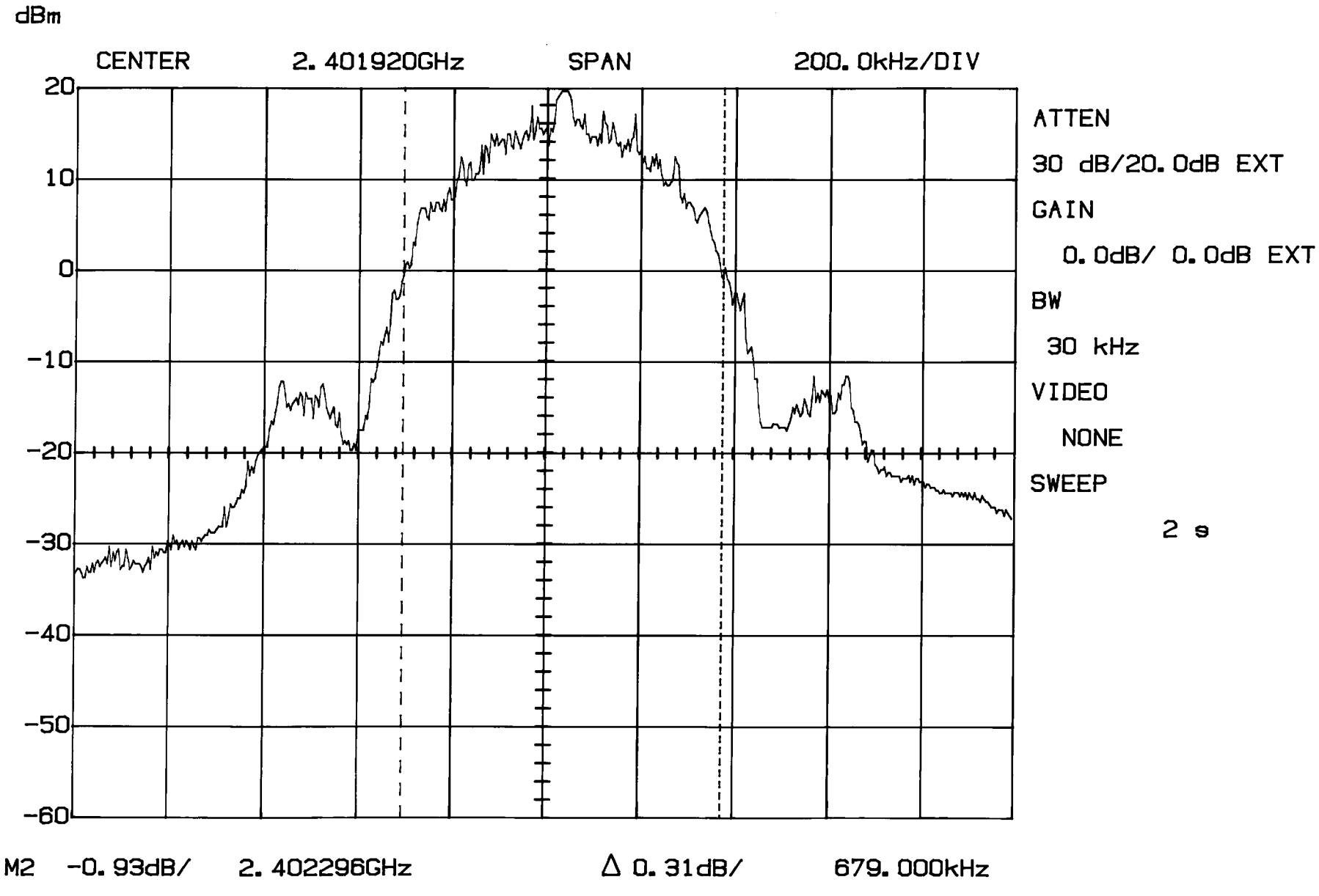
20 dB BANDWIDTH (Base) - CH45
MODEL 21105XXX-A



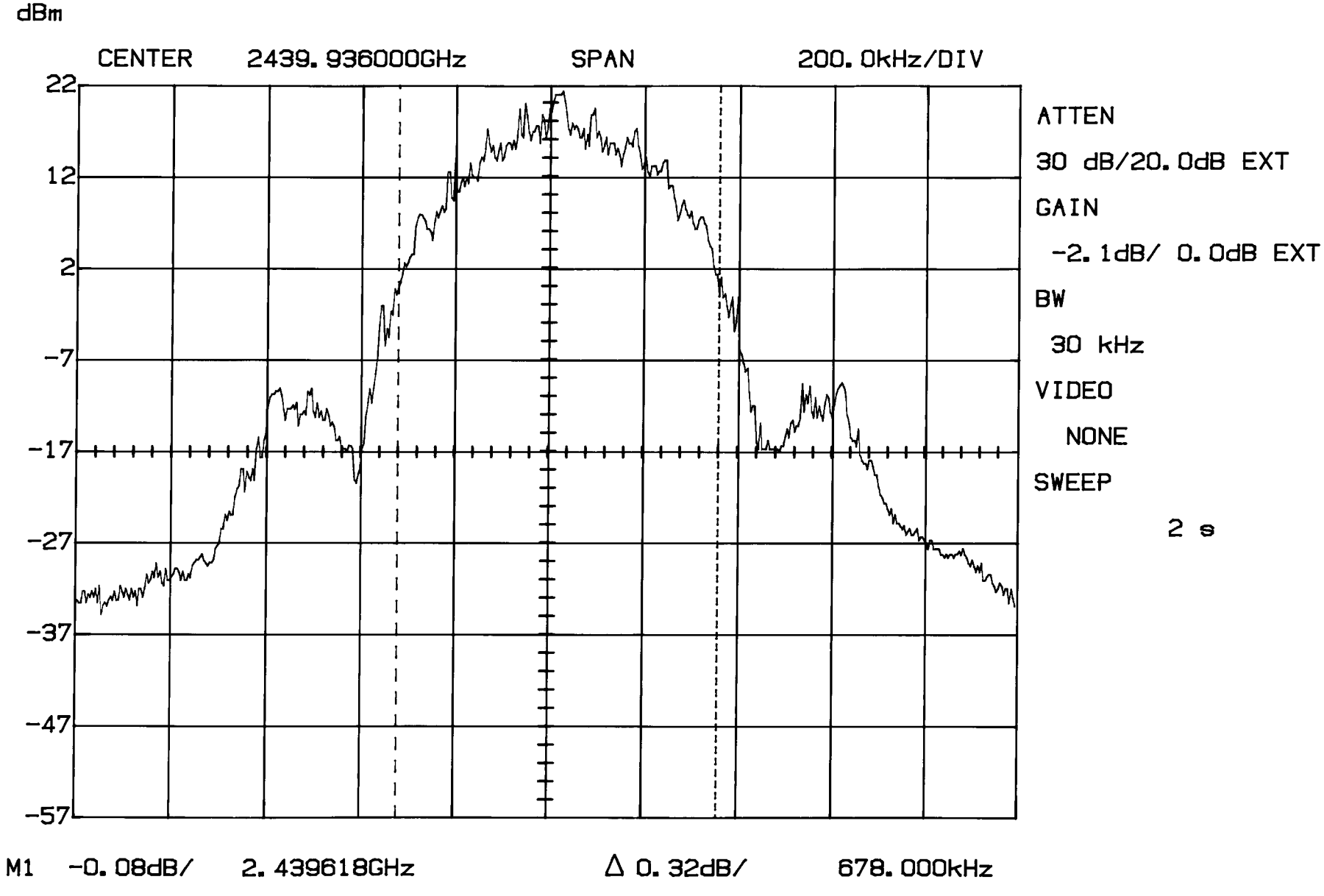
20 dB BANDWIDTH (Base) - CH 90
MODEL 21105XXX-A



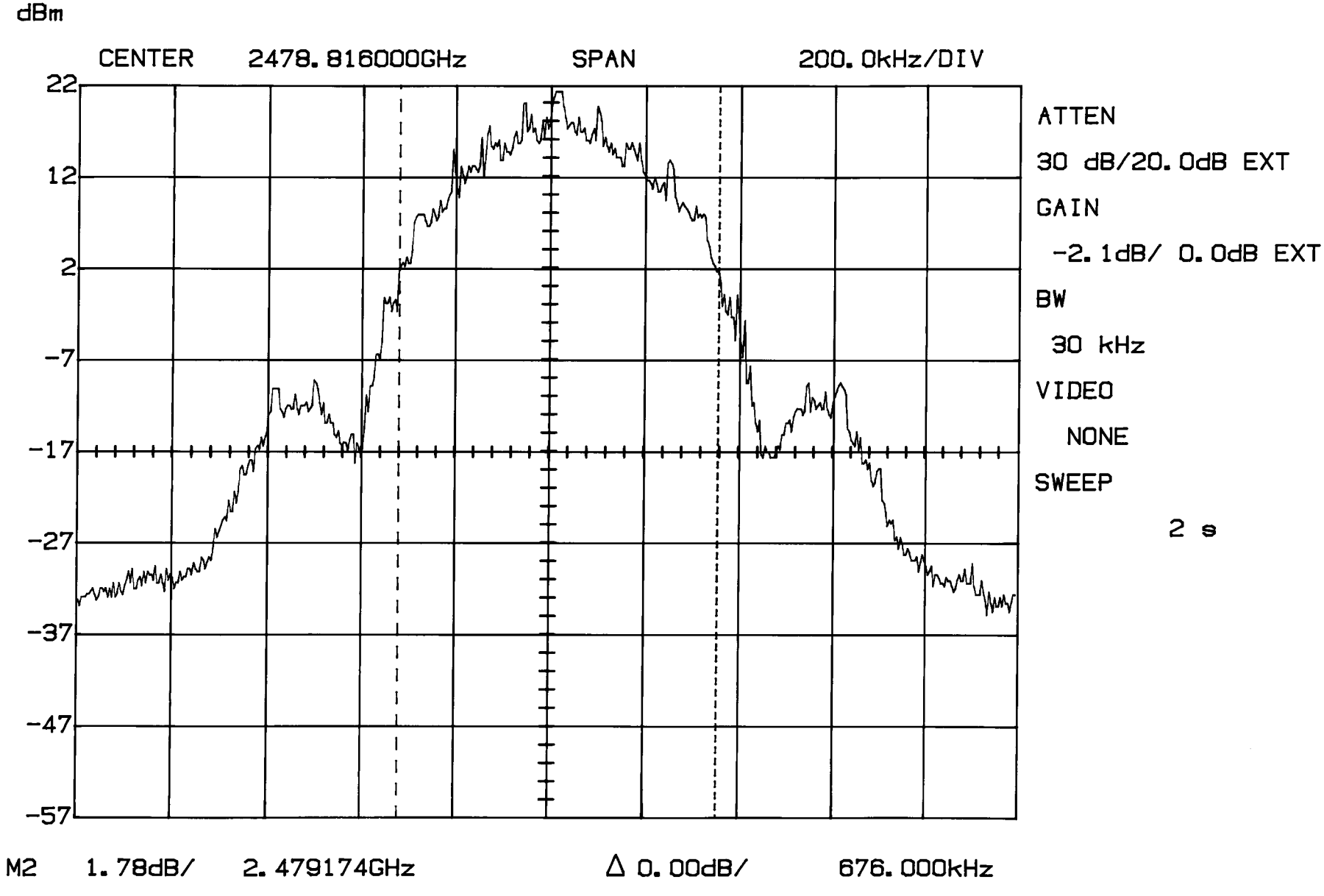
20 dB BANDWIDTH (Handset) - CH1
MODEL 21105XXX-A



20 dB BANDWIDTH (Handset) - CH45
MODEL 21105XXX-A



20 dB BANDWIDTH (Handset) - CH90
MODEL 21105XXX-A



FCC ID: G9H2-1105A
Marstech Report No. 22309D
EXHIBIT D(1)-30

15.247(a)(1)(ii) FREQUENCY HOPPING SYSTEMS (continued)

DWELL TIME ON EACH CHANNEL

Requirements:

The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a (0.4 x 90=) 36 second period.

Measurement Procedure

1. Position the EUT without connection to Spectrum Analyzer (SA). Turn on the EUT and connect its antenna terminal to SA via a low loss cable and set it to any one measured frequency within its operating range and ensure that the SA is operated in its linear range.

2. Adjust the centre frequency of SA on any frequency to be measured and set SA to zero span mode. Set RBW and VBW of SA to proper value.

3. Measure the time duration of one transmission on the measured frequency and then plot the result with the time difference of this time duration.

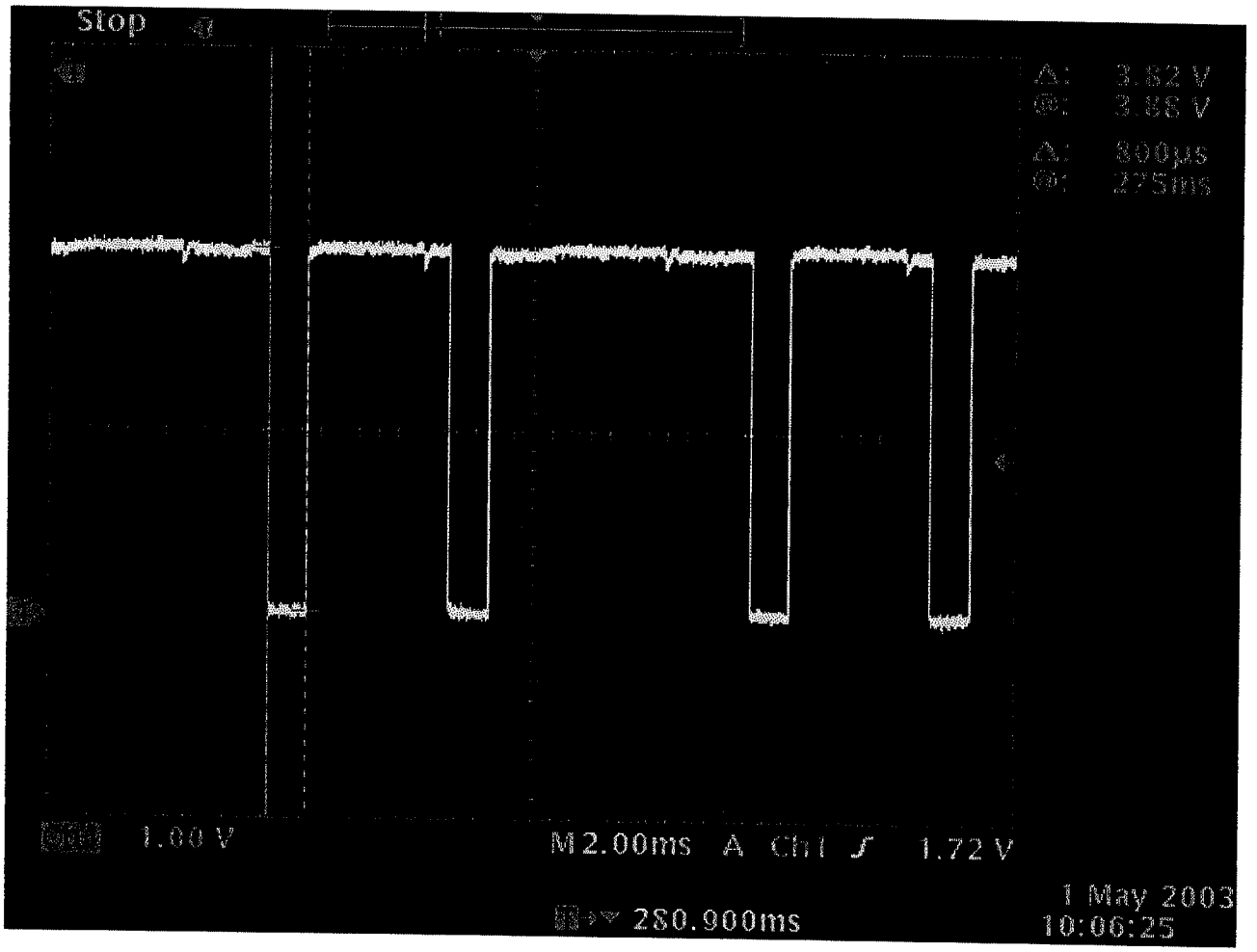
4. Repeat the above procedures until all frequencies measured were complete.

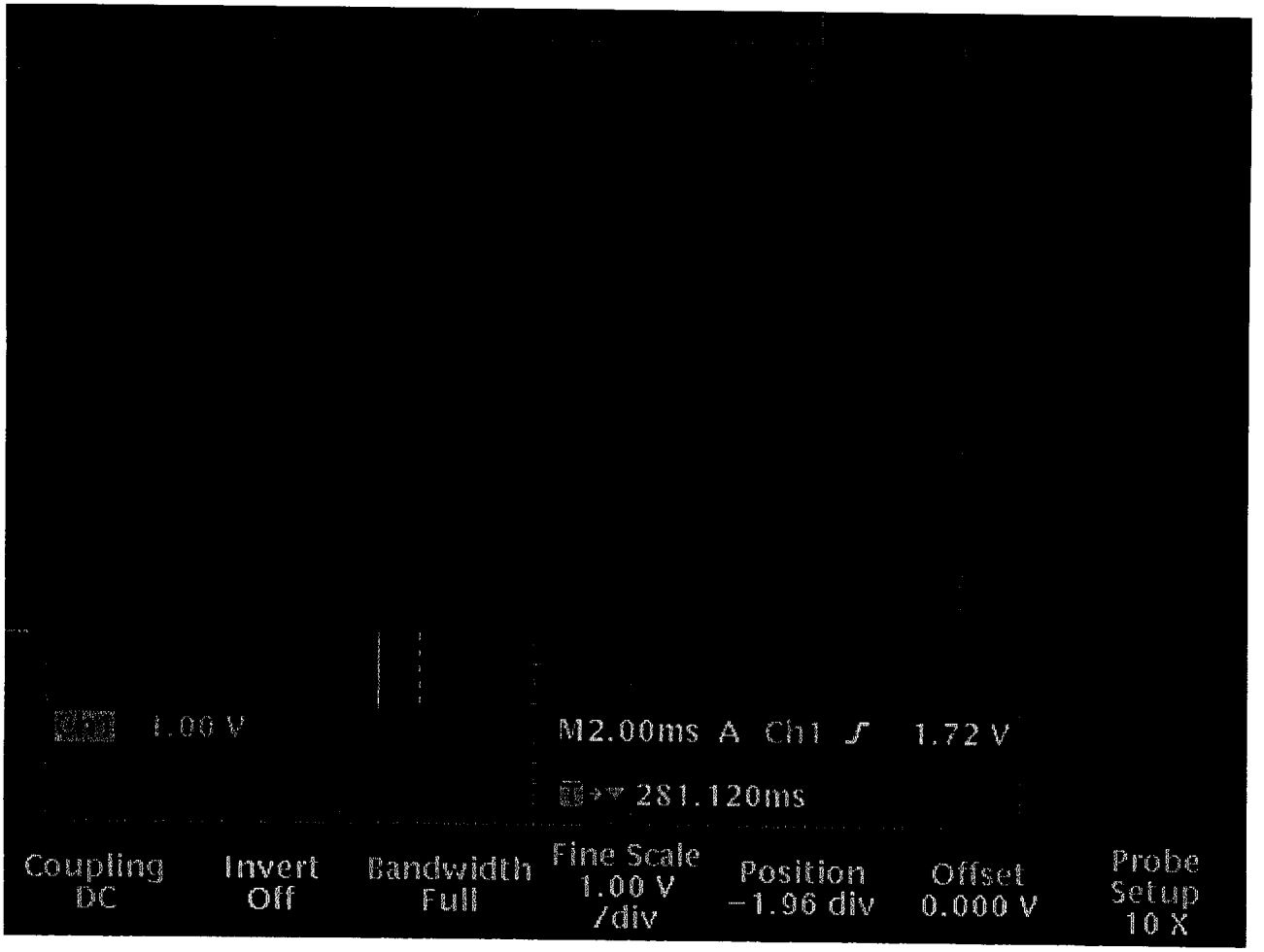
Measurement Data -

Channel number:	90 Channels
Frame length:	10 ms
Maximum number of TX slot in base:	4
Maximum number of TX slot in handset:	2
TX time per slot in base:	840uS
TX time per slot in handset:	800uS

The dwell time of base in 36 seconds period per channel:
840uS * 4 slot * 36 second / 10 ms / 90 channel = 134.4 mS / channel

The dwell time of handset in 36 seconds period per channel:
800uS * 2 slot * 36 second / 10 ms / 90 channel = 64 mS / channel


Stop
Δ: 3.62 V
@: 3.88 V
Δ: 300µs
@: 2.75ms
1.00 V
M2.00ms A Ch1 ƒ 1.72 V
280.900ms
1 May 2003
10:06:25


1.00 V
M2.00ms A Ch1 1.72 V
281.120ms
Coupling DC
Invert Off
Bandwidth Full
Fine Scale 1.00 V /div
Position −1.96 div
Offset 0.000 V
Probe Setup 10 X

15.247(b) (1) MAXIMUM PEAK OUTPUT POWER

Requirements:

For frequency hopping systems in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHZ band: 1 Watt. For all other frequency hopping systems in the 2400-2483.5 band: 0.125 Watt. If transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Measurement Procedure

1. Position the EUT without connection to Spectrum Analyzer (SA). Turn on the EUT and connect its antenna terminal to SA via a low loss cable and set it to any one measured frequency within its operating range and ensure that the SA is operated in its linear range.

2. Set RBW of SA to 5MHz and VBW to NONE.

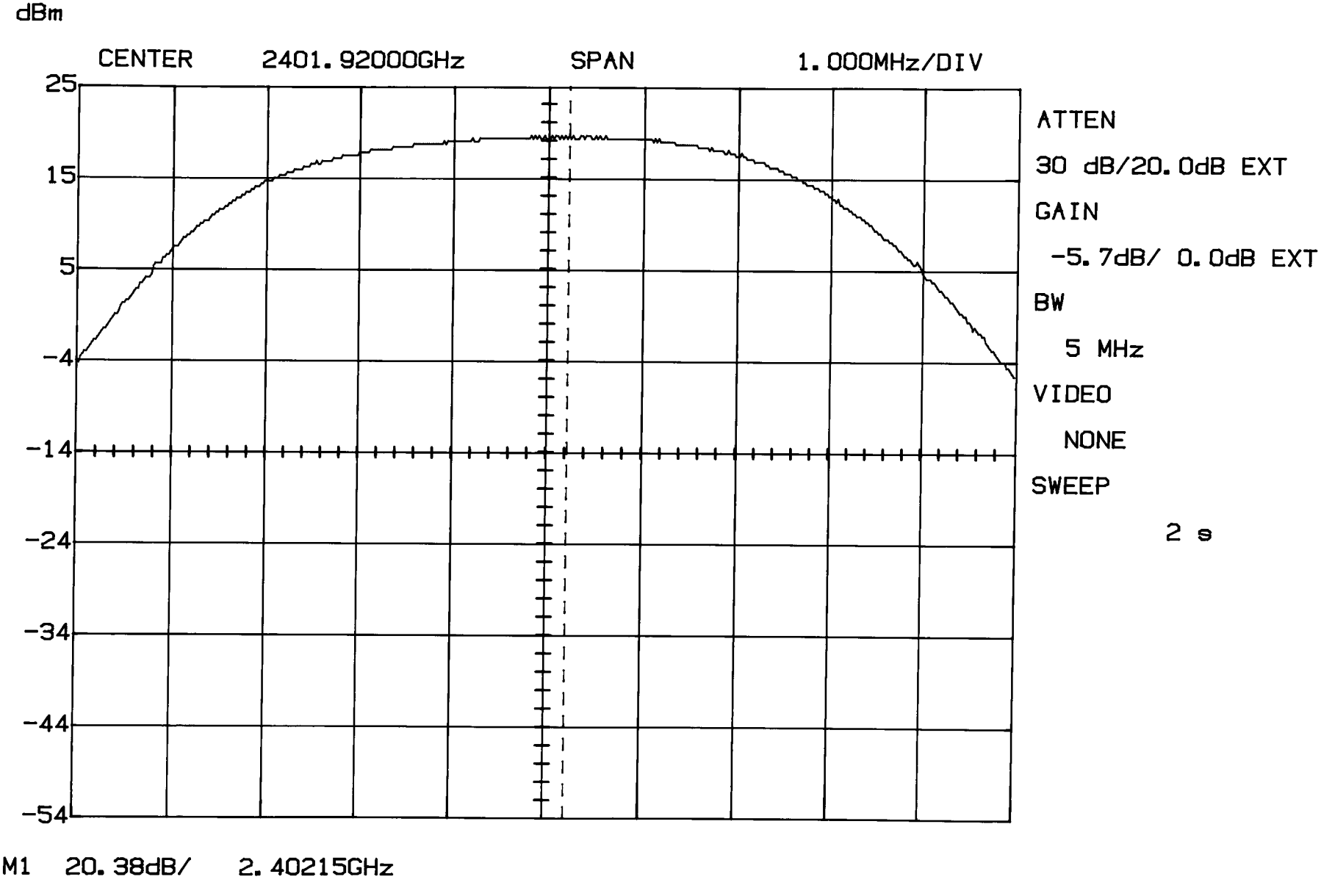
3. Measure the highest amplitude appearing on spectral display and record the level to calculate result data.

4. Repeat the above procedures until all frequencies measured were complete.

Measurement Data - **Refer Exhibit D(1)-35 to -40 for plotted data**

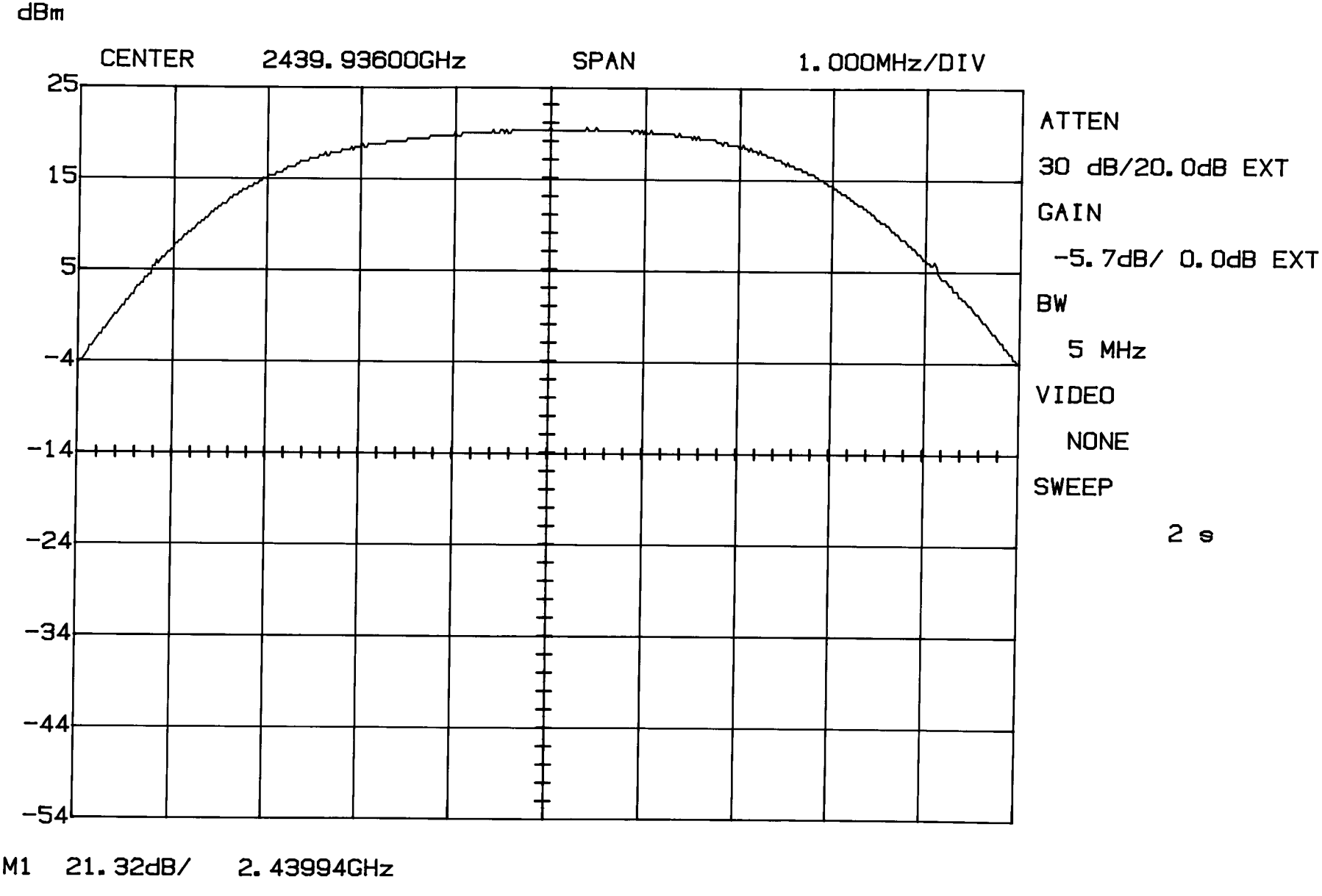
Base	Channel 1:	Output Peak Power is 20.38 dBm = 109.14 mW
	Channel 45:	Output Peak Power is 21.32 dBm = 135.52 mW
	Channel 90:	Output Peak Power is 21.63 dBm = 145.55 mW
Handset Unit	Channel 1:	Output Peak Power is 20.07 dBm = 101.62 mW
	Channel 45:	Output Peak Power is 21.32 dBm = 135.52 mW
	Channel 90:	Output Peak Power is 21.63 dBm = 145.55 mW

MAXIMUM PEAK POWER
Base - Channel 1
MODEL 21105XXX-A



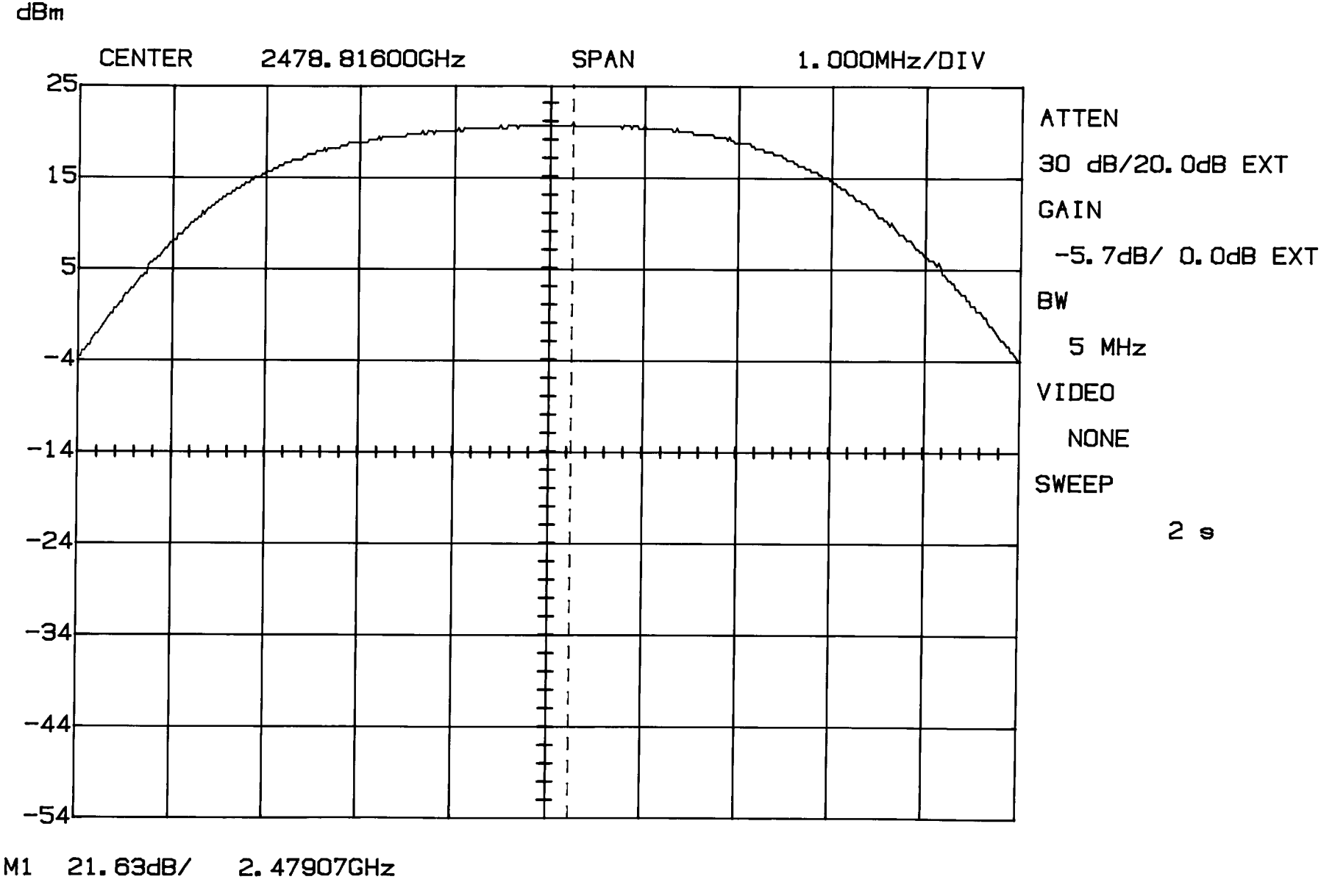
11:09:09 04-28-2003

MAXIMUM PEAK POWER
Base - Channel 45
MODEL 21105XXX-A



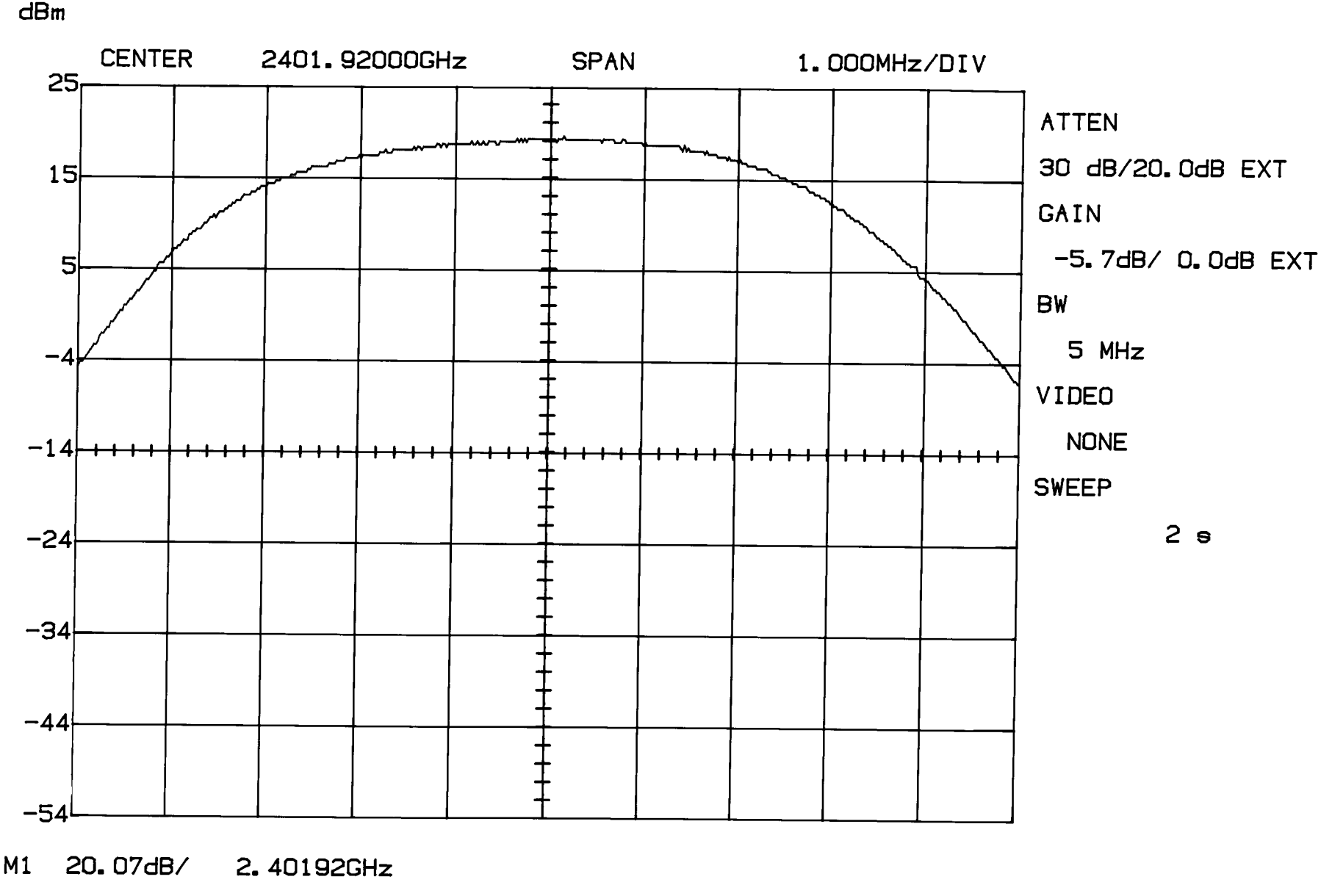
11:09:36 04-28-2003

MAXIMUM PEAK POWER
Base - Channel 90
MODEL 21105XXX-A



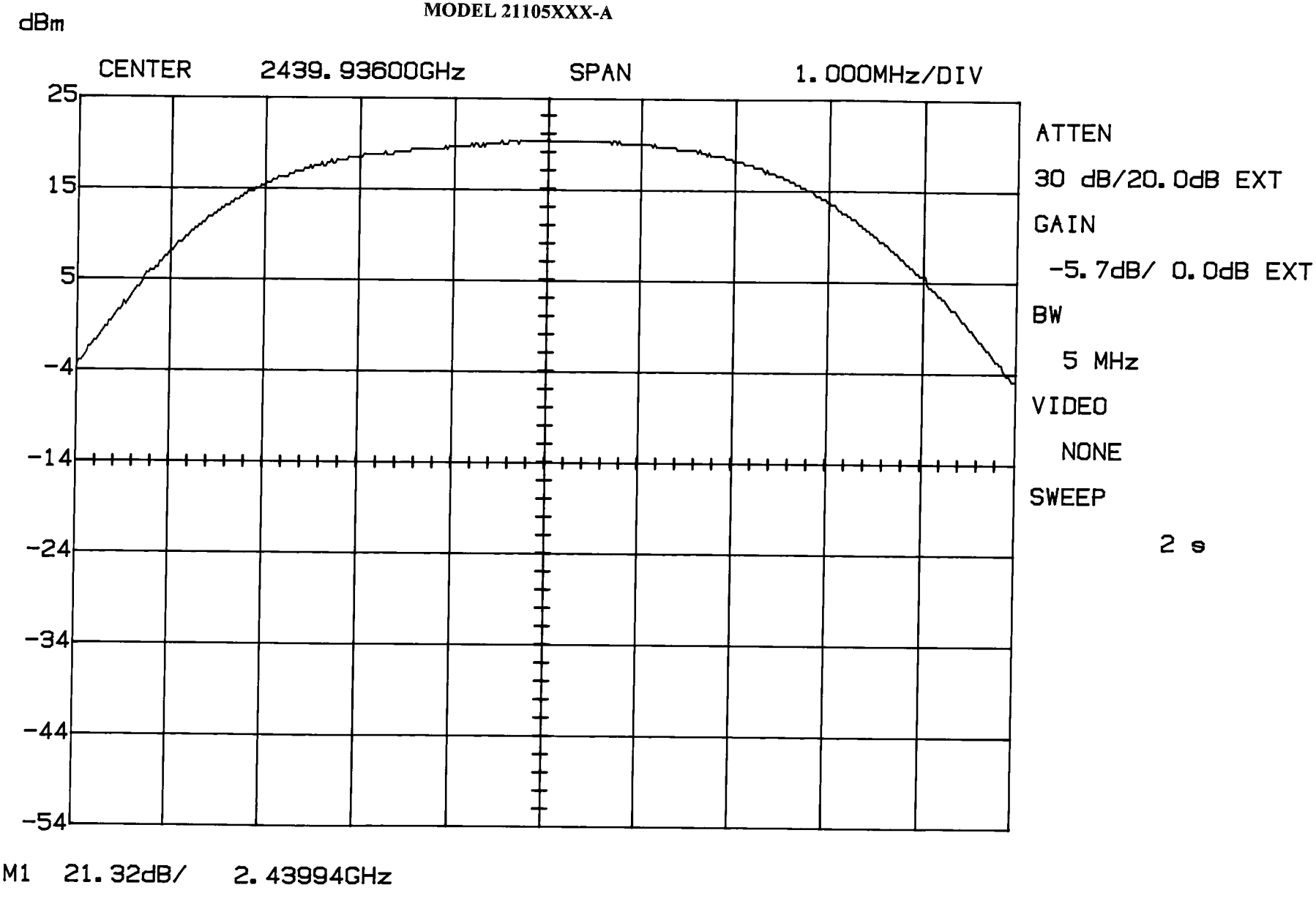
11:01:07 04-28-2003

MAXIMUM PEAK POWER
Handset - Channel 1
MODEL 21105XXX-A



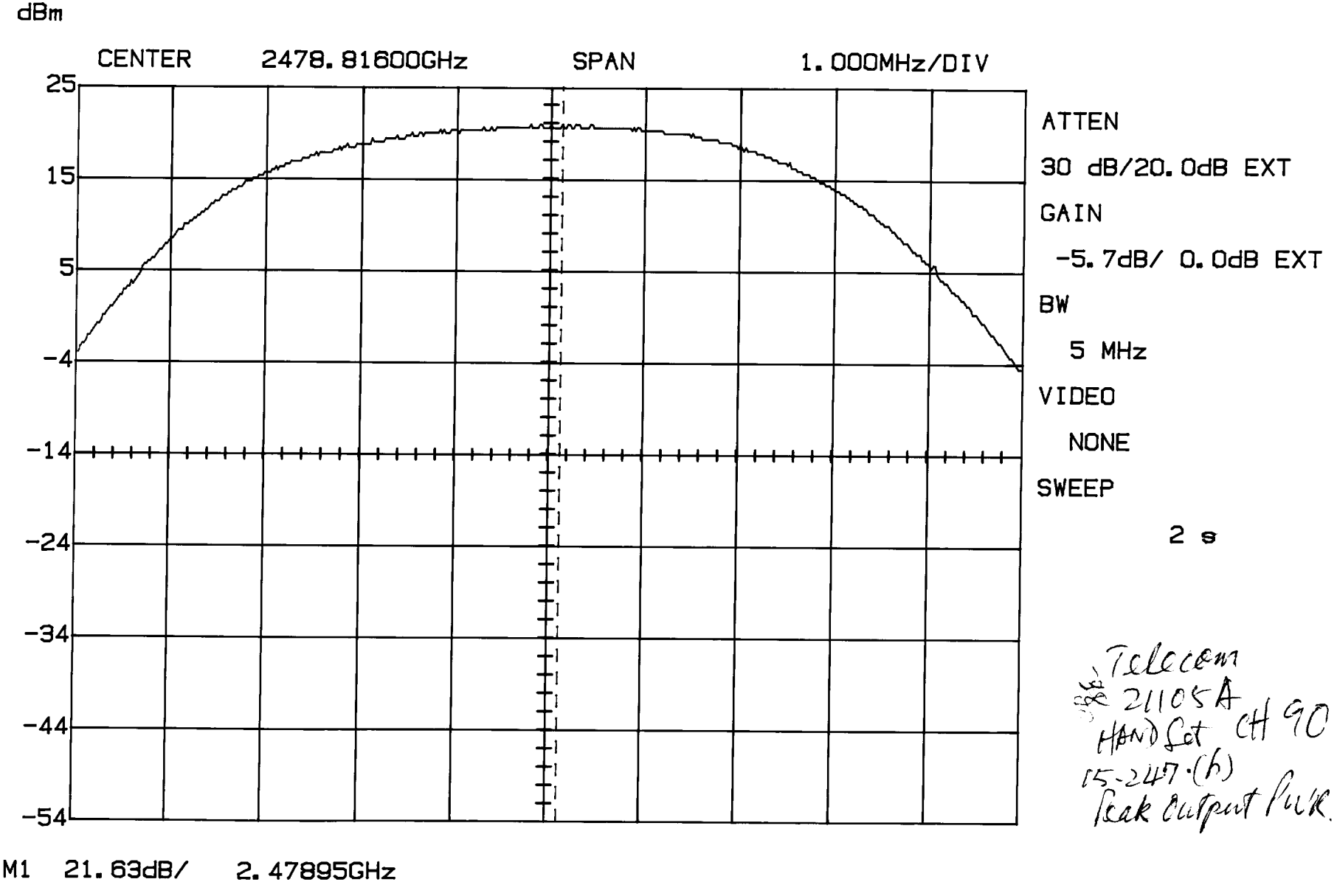
10: 48: 12 04-28-2003

MAXIMUM PEAK POWER
Handset - Channel 45
MODEL 21105XXX-A



10:51:54 04-28-2003

MAXIMUM PEAK POWER
Handset - Channel 90
MODEL 21105XXX-A



Telecom
21105A
Handset CH 90
15-247.(b)
Peak Output Pwr.

15.247(c) BANDWIDTH OF BAND EDGE MEASUREMENT

Requirements:

In any 100 kHz bandwidth outside these frequency bands, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power.

Measurement Procedure

1. Position the EUT without connection to Spectrum Analyzer (SA). Turn on the EUT and connect its antenna terminal to SA via a low loss cable and set it to any one measured frequency within its operating range and ensure that the SA is operated in its linear range.

2. Set RBW to 120 kHz and suitable frequency span 500 KHz or 1000 kHz; VBW = none.

3. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

4. Repeat the above procedures until all frequencies measured were complete.

5. Note: Measurements made with hopping and modulation.

Measurement Data - **Refer Exhibit D(1)-42 to -45 for plotted data**

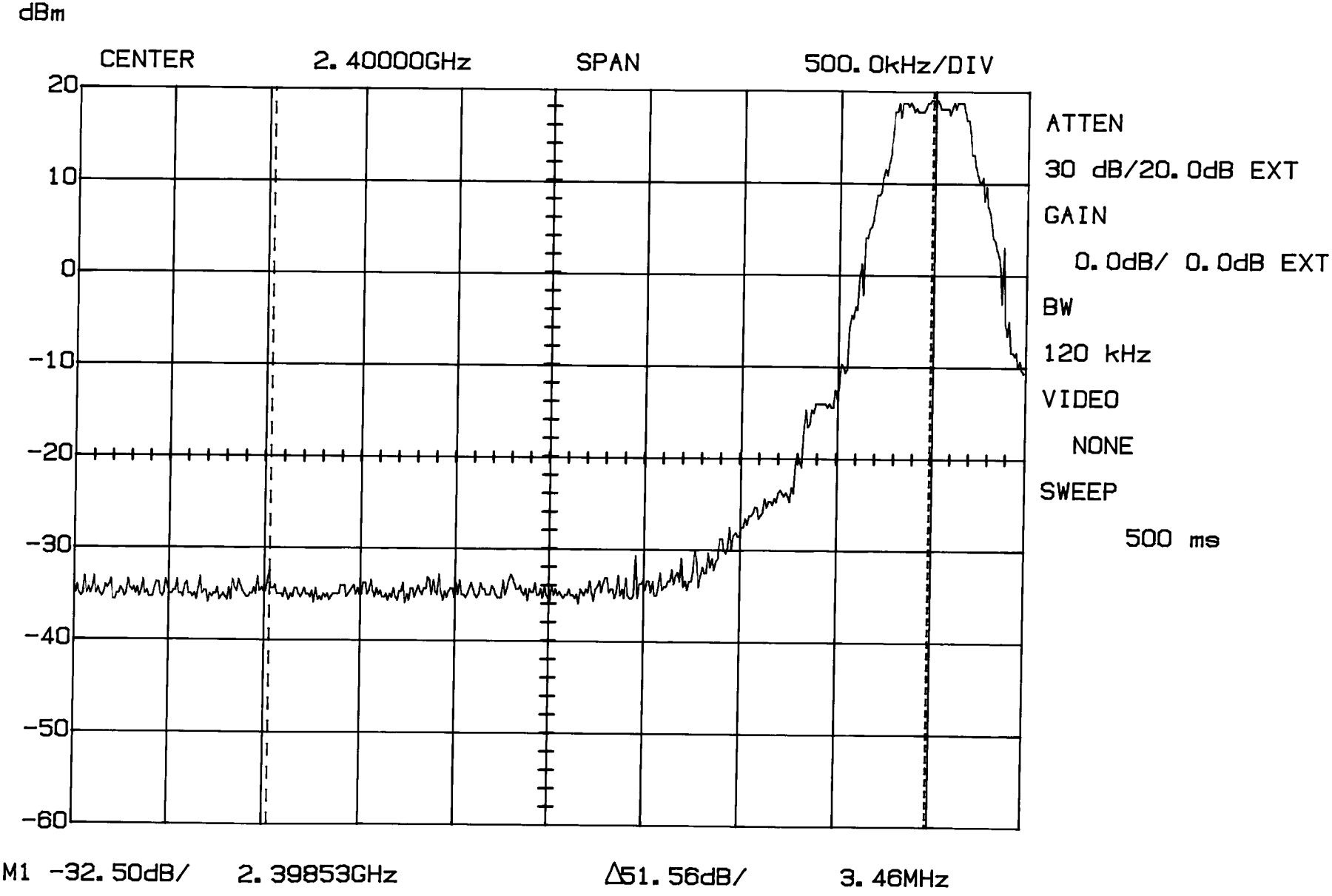
Base Unit
Channel 1: All emissions in this 100kHz bandwidth are attenuated more than 51.56 dB.

Channel 90: All emissions in this 100kHz bandwidth are attenuated more than 52.18 dB.

Handset Unit
Channel 1: All emissions in this 100kHz bandwidth are attenuated more than 51.87 dB.

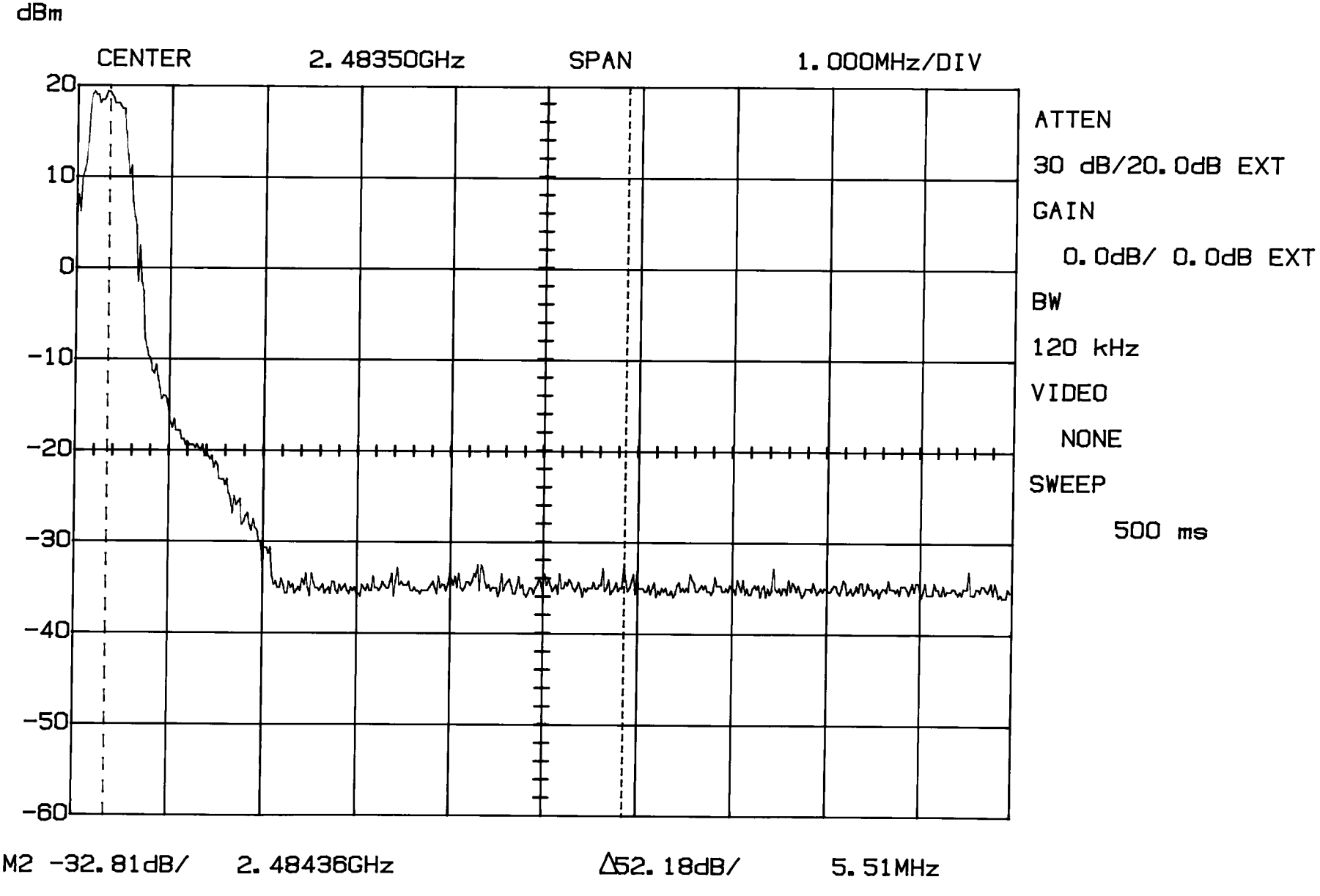
Channel 90: All emissions in this 100kHz bandwidth are attenuated more than 52.18 dB.

BAND EDGE - Base (CH1)
MODEL 21105XXX-A



08:44:46 04-28-2003

BAND EDGE - Base (CH90)
MODEL 21105XXX-A



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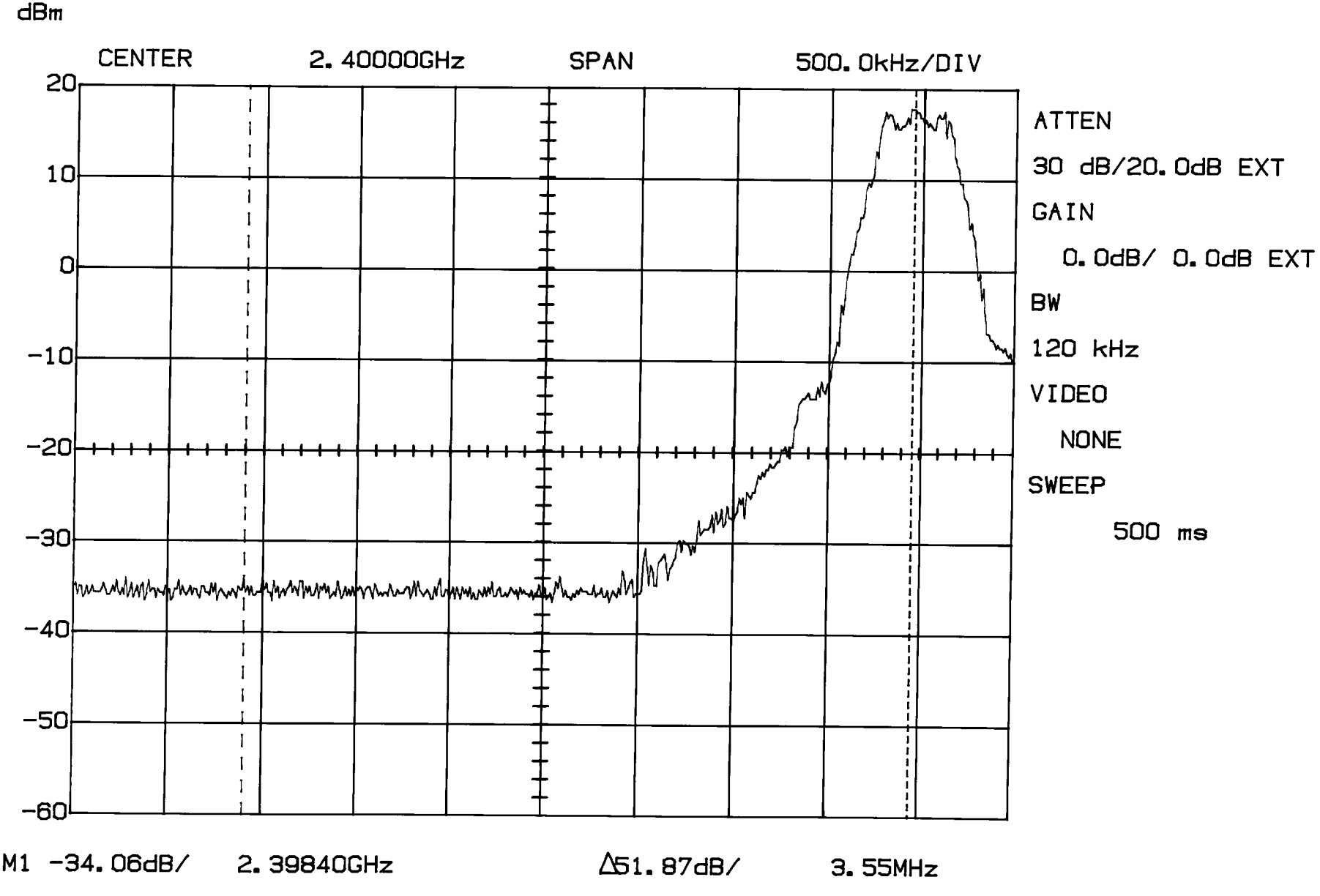
08:57:03 04-28-2003

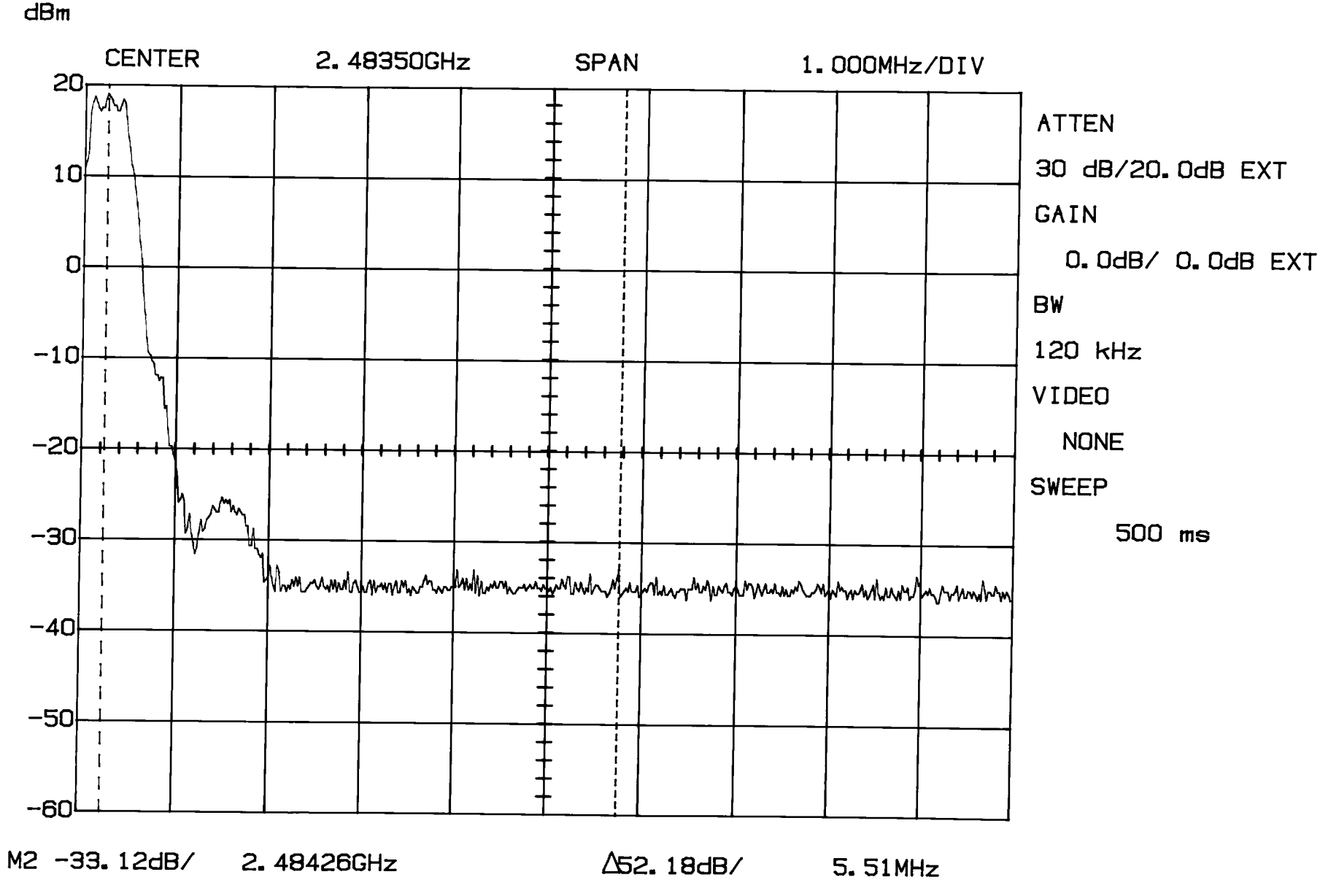
BAND EDGE - Handset (CH1)
MODEL 21105XXX-A



FCC ID: G9H2-1105A
Marstech Report No. 22309D
EXHIBIT D(1)-44

09:21:45 04-28-2003

BAND EDGE - Handset (CH90)
MODEL 21105XXX-A



09: 14: 11 04-28-2003

Part 15.247(g): Exhibit D(1)-47 provides information on how the system is designed while the transmitter is presented with a continuous voice stream and a description of the system transmitting short bursts.

Part 15.247(h): Exhibit D(1)-47 provides information concerning the avoidance of simultaneous occupancy of hopping frequencies by multiple transmitters, system synchronization procedure, frequency hopping algorithm, hopping tables, and dual slot diversity.

Part 15.247 (g). Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both transmitter and the receiver, must be designed to comply with all the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing a short transmission burst must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

In active mode (there is voice communication), the information (voice) are transmitted continuously.

In idle mode (there is no voice communication), the base will broadcast a pilot signal which is distributed in 16 channels.

Part15.247 (h). The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognized other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

We do not use co-ordination frequency system. The system will adjust its hopping sequence and hopping channel according to the operating mode.

In idle mode, the base will continue to check the pilot signal from other base. If the sequence of pilot signal is same, the base will change to another sequence to avoid the jamming.

In active mode, the base and handset will continue to check the jamming from other system. When a jamming is found, the jammed channel will be skipped, but the total number of channel will be kept greater than 15.