



TABLE OF CONTENTS

	Pages
1 GENERAL INFORMATION	3
1.1 Product Description	3
1.2 Related Submittal Grant	9
1.3 Tested System Details	9
1.4 Test Methodology	9
1.5 Test Facility	9
1.6 Part 2 Requirements	10
2 SYSTEM TEST CONFIGURATION	11
2.1 Justification	11
2.2 EUT Exercise Software	11
2.3 Special Accessories	11
2.4 Equipment Modifications	11
2.5 Configuration of Tested System	11
3 RADIATED EMISSION EQUIPMENT/DATA	12
Field Strength Calculation	15
4 CONDUCTED EMISSION, RF POWER OUTPUT, OCCUPIED BANDWIDTH, MODULATION CHARACTERISTICS, FREQUENCY STABILITY EQUIPMENT/DATA	16
5 ATTESTATION STATEMENT	70



1 GENERAL INFORMATION

1.1 Product Description

EUT Description	Wireless Intercom Master Station		
EUT Name	MS-700 Master Station		
Model No.:	MS-700	Serial No.:	102
Product Options:	1)Nine Frequency Splits for North America, Splits 4 through 12. 2)Two optional receivers (5 & 6) on one PWB Assy, installed in the EUT's		
Configurations to be tested:	Frequency Spilt TX12 and RX4; TX8, RX12; TX4, RX8		

Power Requirements

Voltage: 100-260 (If battery powered, make sure battery life is sufficient to complete testing.)

of Phases: single

Current .35 Current .25
 (Amps/phase(max)): (Amps/phase(nominal)):

Typical Installation and/or Operating Environment

Sound Stage, Theater, Film Set, News Set

EUT Power Cable

☐ Permanent OR ☒ Removable Length (in meters): 2.3

☐ Shielded OR ☐ Unshielded

☐ Not Applicable

EUT Interface Ports and Cables												
Interface				Shielding								
Type	Analog	Digital	Qty	Yes	No	Type	Termination	Connector Type	Port Termination	Length (in meters)	Removable	Permanent
EXAMPLE:												
RS232	☐	☒	2	☒	☐	Foil over braid	Coaxial	Metallized 9-pin D-Sub	Characteristic Impedance	6	☒	☐
RS232	☐	☒	1	☒	☐	Foil over braid		2.5 mm		1	☒	☐
Head Set	☒	☐	1	☒	☐	Foil over braid		1/4"Phone	50 Ohms	1	☒	☐
TX RF Out	☒	☐	1	☒	☐	1/4 Wave Ant	Y	BNC	50 Ohms	.1	☒	☐
RX RF In	☒	☐	1	☒	☐	1/4 Wave Ant	Y	BNC	50 Ohms	.1	☒	☐
AC Power	☒	☐	1	☐	☒	NEMA 5-15P	RFI Filter	IEC		2	☒	☐
IC1/IC2 TW	☒	☐	1	☒	☐	Braid Shield	Y	3 Pin XLR	200 Ohm	1.5	☒	☐
IC2	☒	☐	1	☒	☐	Braid Shield	Y	3 Pin XLR	200 Ohm	1.5	☒	☐
I/C1 4W	☒	☐	1	☒	☐	Braid Shield	Y	4 Pin XLR	600 Ohm	1.5	☒	☐
I/C2 4W	☒	☐	1	☒	☐	Braid Shield	Y	4 Pin XLR	600 Ohm	1.5	☒	☐
Program In	☒	☐	1	☒	☐	Braid Shield	Y	3 Pin XLR	200 Ohm	1.5	☒	☐
Aux Out	☐	☐	1	☒	☐	Braid Shield	Y	3 Pin XLR	200 Ohm	1.5	☒	☐
Mon Out Mon Out Mon CAS Aux Relay	☒	☐	111	☒	☐	Braid Shield Braid Shield Braid Shield		1/4"Phone 1/4" Phone 1/4" Phone D Conn	50 Ohm 50 Ohm 50 Ohm	1	☒	☐



EUT Operating Modes to be Tested

1. Six Receivers ON, TX OFF, ON: Low and High Power
2. TX Modulation ON and OFF

EUT System Components

Description	Model #	Serial #	FCC ID #
Wireless Intercom Master Station	MS-700	102	BFDQ700MS4



Support Equipment			
<i>Description</i>	<i>Model #</i>	<i>Serial #</i>	<i>FCC ID #</i>
Interface Program Box	QPA-1	001	N/A
PC	DOS version S/W	N/A	N/A
Oscillator Frequencies			
<i>Frequency</i>	<i>Derived Frequency</i>	<i>Component # / Location</i>	<i>Description of Use</i>
4.9152 Mhz	4.9152 Mhz	Y1, U4 on Master Station Control PWB Schematic 072-0177	Microcontroller Clock
540-810Mhz	540-810 Mhz	Q4, Q5 on Mother Board PWB Schematic 072-0174 Pg 2	RX1 LO VCO
540-810 Mhz	540-810 Mhz	Q10, Q11 on Mother Board PWB Schematic 072-0174 Pg 4	RX2 LO VCO
540-810 Mhz	540-810 Mhz	Q16, Q17 on Mother Board PWB Schematic 072-0174 Pg 6	RX3 LO VCO
540-810 Mhz	540-810 Mhz	Q22, Q23 on Mother Board PWB Schematic 072-0174 Pg 8	RX4 LO VCO
540-810 Mhz	540-810 Mhz	Q4, Q5 on Optional Receiver Schematic 072-0175	RX5 LO VCO
540-810 Mhz	540-810 Mhz	Q10, Q11 on Optional Receiver Schematic 072-0175	RX6 LO VCO
10.0 Mhz	10.0 Mhz	Y2, U6 on Mother Board PWB Schematic 072-0174 Pg 2	RX1 Synthesizer Reference
10.0 Mhz	10.0 Mhz	Y5, U18 on Mother Board PWB Schematic 072-0174 Pg 4	RX2 Synthesizer Reference
10.0 Mhz	10.0 Mhz	Y8, U32 on Mother Board PWB Schematic 072-0174 Pg 6	RX3 Synthesizer Reference
10.0 Mhz	10.0 Mhz	Y11, U46 on Mother Board PWB Schematic 072-0174 Pg 8	RX4 Synthesizer Reference
10.0 Mhz	10.0 Mhz	Y2, U6 on Optional Receiver PWB Schematic 072-0175 Pg1	RX5 Synthesizer Reference
10.0 Mhz	10.0 Mhz	Y5, U 18 on Optional Receiver PWB Schematic 072-0175 P3	RX6 Synthesizer Reference
59.3 Mhz	59.3 Mhz	Y1, Q3 on Mother Board PWB Schematic 072-0174 Pg 3	RX1 2nd LO
59.3 Mhz	59.3 Mhz	Y4, Q9 on Mother Board PWB Schematic 072-0174 Pg 4	RX2 2nd LO



Support Equipment			
<i>Description</i>	<i>Model #</i>	<i>Serial #</i>	<i>FCC ID #</i>
59.3 Mhz	59.3 Mhz	Y7, Q 15 on Mother Board PWB Schematic 072-0174 Pg 6	RX3 2nd LO
59.3 Mhz	59.3 Mhz	Y10, Q 21 on Mother Board PWB Schematic 072-0174 Pg 8	RX4 2nd LO
59.3 Mhz	59.3 Mhz	Y1 Q 3 on Optional Receiver PWB Schematic 072-0175 Pg 1	RX5 2nd LO
59.3 Mhz	59.3 Mhz	Y4, Q 9 on Optioanl Receiver PWB Schematic 072-0175 Pg	RX6 2nd LO
4.9152 Mhz	4.9152 Mhz	Y3, U14 on Mother Board PWB Schematic 072-0174 Pg 3	Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y6, U24 on Mother Board PWB Schematic 072-0174 Pg 5	Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y9, U38 on Mother Board PWB Schematic 072-0174 Pg 7	Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y12, U52 on Mother Board PWB Schematic 072-0174 Pg 9	Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y3, U14 on Optional Receiver PWB Schematic 072-0175 Pg 2	Decoder Reference
4.9152 Mhz	4.9152 Mhz	Y6, U24 on Optional Receiver PWB Schematic 072-0175 Pg 4	Decoder Reference
745.6- 1075.6 Mhz	745.6- 1075.6 Mhz.	Z1, Q1, Q2 on Master Station TX PWB Schematic 072-0176 Pg 1	TX UHF VCO Up conversion Frequencies
275.6-335.6 Mhz	275.6-335.6 Mhz	Z2, Q3, Q4 on Master Station TX PWB Schematic 072-0176 Pg1	TX UHF Modulator VCO
10 Mhz	10 Mhz	Y1, U1 on Master Station TX PWB Schematic 072-0176 Pg1	TX Synthesizer Reference
42 Khz	42 Khz	U98, on Master Station PWB Schematic 072-0174 Pg 23	Sub-carrier Oscillator



Power Supply			
Manufacturer	Model #	Serial #	Type
EOS	VLT60-3002S38	N/A	☒ Switched-mode: (Frequency) Boost 30 Khz, Converter 90 Khz

Power Line Filters		
Manufacturer	Model #	Location in EUT
CORCOM	3EGG1-1	Rear Panel

EMC Critical Detail -- Describe other EMC Design details used to reduce high frequency noise.
--

Complete (Top and Bottom)
 ground planes on PWBs, Ferrite beads, RF bypass capacitors
 RF Shields on each Receiver. RF Shield on Transmitter. Full Metal Enclosure with inner metal partitions at front and rear of mother board for RF barrier to front panel and rear panel PWB assembly and I/O connectors.

1 GENERAL INFORMATION (continued)

1.2 Related Submittal/Grant

None

1.3 Tested System Details

The FCC IDs for all equipment, plus descriptions of all cables used in the tested system are:

None

1.4 Test Methodology

Purpose of Test: To demonstrate compliance with the ANSI C63.4 setup.

Test Performed:

- X 1. 1051 Radiated Emission per FCC Part 2, Paragraph 2.1053
- X 2. Conducted Emissions, FCC Part 2, Paragraphs 2.
- X 3. RF Power Output, Part 2, Paragraph 2.1046
- X 4. Occupied Bandwidth, Part 2, Paragraph 2.1049
- X 5. Modulation Characteristics, Part 2, Paragraph 2.1047 and Part 74, Paragraph 74.861(a) and (b)
- X 6. Frequency Stability, Part 2, Paragraph 2.1055, and Part 74, Paragraph 74.861(e)(4)

Both Conducted and radiated testing were performed according to the procedures in FCC/ANSI C63.4 and CSA 108.8 - M1983. Radiated testing was performed at an antenna-to-EUT distance of 3 meters (1 - 10 GHz).

1.5 Test Facility

The open area test site and conducted measurement data were tested by:

TÜV PRODUCT SERVICE
10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone: 858 546 3999
Fax: 858 546 0364

The Test Site Data and performance comply with ANSI 63.4 and are registered with the FCC, 7435 Oakland Mills Rd, Columbia Maryland 21046. All Measurement Data is acquired according to the content of FCC Measurement Procedure and ANSI C63.4, unless supplemented with additional requirements as noted in the test report.

1.6 Part 2 Requirements

Range of operating power values - 50 mw or 250 mw via hi-low switch on panel

Maximum power rating - 250 mw

DC voltages applied to and dc currentes - 5 Vdc, <100 ma

Equipment employing digital modulation techniques - N/A

Equipment is an AM broadcast stereophonic exciter-generator - N/A

MS-700 Terse Specifications

Frequency Range:	470 – 740 MHz, in nine 30 MHz ranges
Rated RF Power Output:	50 mw minimum (70 mw, +/- 1.5 dB), switchable to 250 mw maximum (250 mw, +0, -2.5 dB)
Frequency Tolerance:	+/- 0.0025 %
Emission Designator:	164F8E
Control microprocessor:	Microchip 16C65A

2. SYSTEM TEST CONFIGURATION

2.1 Justification

The EUT was initially tested for FCC emission in the following configuration:

See Block Diagram.

2.2 EUT Exercise Software

None

2.3 Special Accessories

None

2.4 Modification

None

2.5 Configuration of Tested System

See Block Diagram.

3 RADIATED EMISSION EQUIPMENT/DATA

The following data lists the significant emission frequencies, measured levels, correction factor (which includes cable and antenna corrections), the corrected reading, and the limit.

See following page(s).

Low, mid and high channels tested. All emissions (spurious and harmonics) were greater than 20 dB below the limit. Frequency range investigated from lowest RF frequency generated up to the 10th harmonic.

RBW and VBW = 1 MHz for peak for fundamental and harmonics.

RBW and VBW = 30 kHz 20 video samples for average for fundamental.



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Field Strength Calculation

If a preamplifier was used during the Radiated Emission Testing, it is required that the amplifier gain must be subtracted from the Spectrum Analyzer (Meter) Reading. In addition, a correction factor for the antenna, cable used and a distance factor, if any, must be applied to the Meter Reading before a true field strength reading can be obtained. In the automatic measurement, these considerations are automatically presented as a part of the print out. In the case of manual measurements and for greater efficiency and convenience, instead of using these correlation factors for each meter reading, the specification limit was modified to reflect these correlation factors at each frequency value so that the meter readings can be compared directly to the modified specification limit. This modified specification limit is referred to as the "Corrected Meter Reading Limit" or simply the CMRL, which is the actual field strength present at the antenna. The quantity can be derived in the following manner:

$$\text{Corrected Meter Reading Limit (CMRL)} = \text{SAR} + \text{AF} + \text{CL} - \text{AG} - \text{DC}$$

Where, SAR = Spectrum Analyzer Reading

AF = Antenna Factor

CL = Cable Loss

AG = Amplifier Gain (if any)

DC = Distance Correction (if any)

Assume the following situation: A meter reading of 29.4 dBuV was obtained from a Class A computing device measured at 83 MHz. Assume an antenna factor of 9.2 dB, a cable loss of 1.4 dB and amplifier gain of 20.0 dB at 83 MHz. The final field strength would be determined as follows:

$$\text{CMRL} = 29.4 \text{ dBuV} + 9.2 \text{ dB} - 1.4 \text{ dB} - 20 \text{ dB/M} - 0.0 \text{ dB}$$

$$\text{CMRL} = 20.0 \text{ dBuV/M}$$

This result is well below the FCC and CSA Class A limit of 29.5 dbuV/m at 83 MHz.

For the manual mode of measurement, a table of corrected meter reading limit was used to permit immediate comparison of the meter reading to determine if the measure emission amplitude exceeded the specification limit at that specific frequency.



4 CONDUCTED EMISSION EQUIPMENT/DATA

See following page(s).



Emissions Test Conditions: CONDUCTED EMISSIONS; RF POWER OUTPUT; OCCUPIED BANDWIDTH; MODULATION CHARACTERISTICS AND FREQUENCY STABILITY: FCC Part 2, Paragraphs 2.1046; 2.1047(a);(b); 2.1049; 2.1051; 2.1055; Part 74, Paragraphs 74.861(e)(1); (e)(3); (e)(5); and (e)(6)(i)(ii)

The measurements were performed at the following test location :

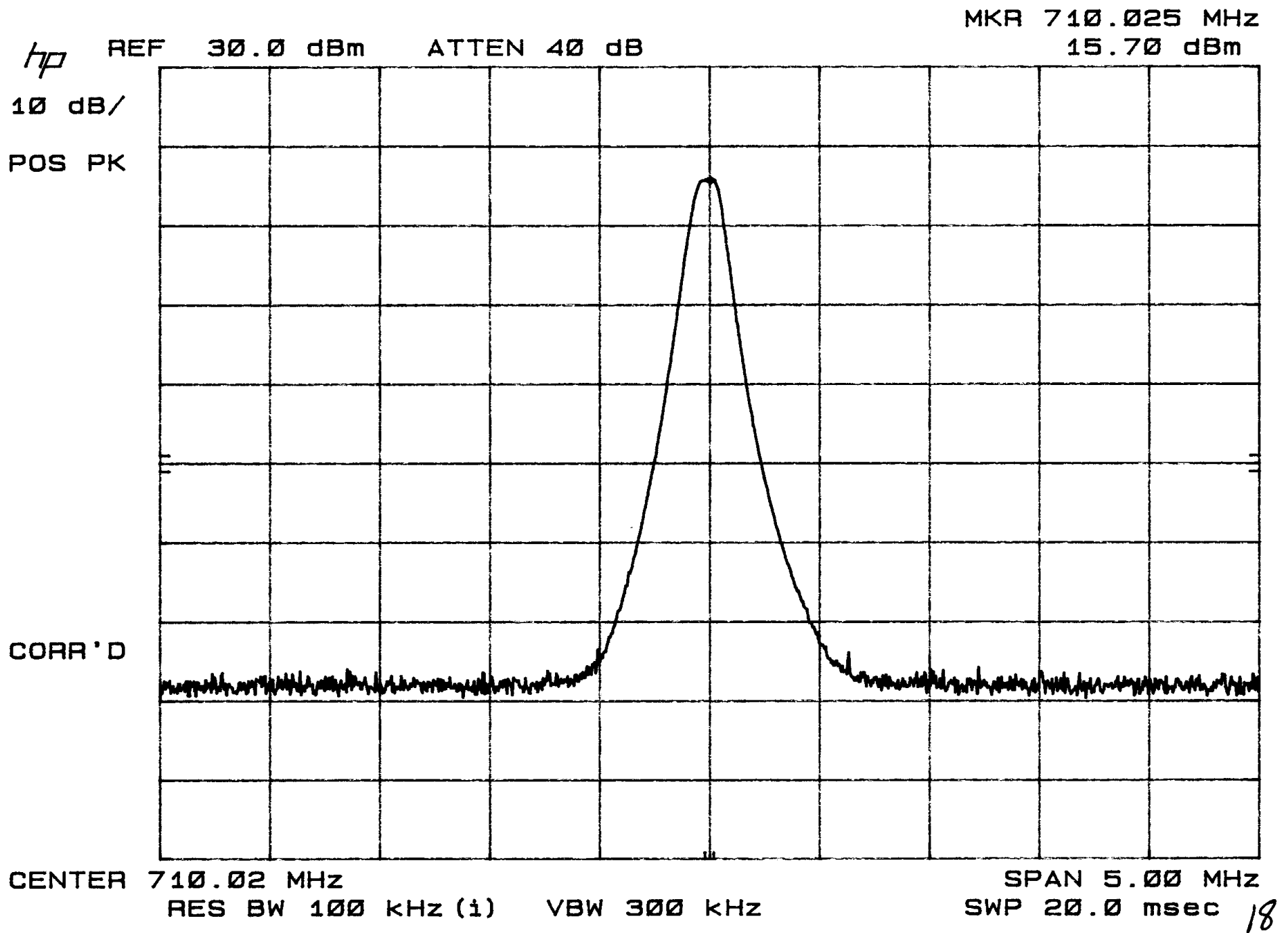
☐ - Test not applicable

■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber

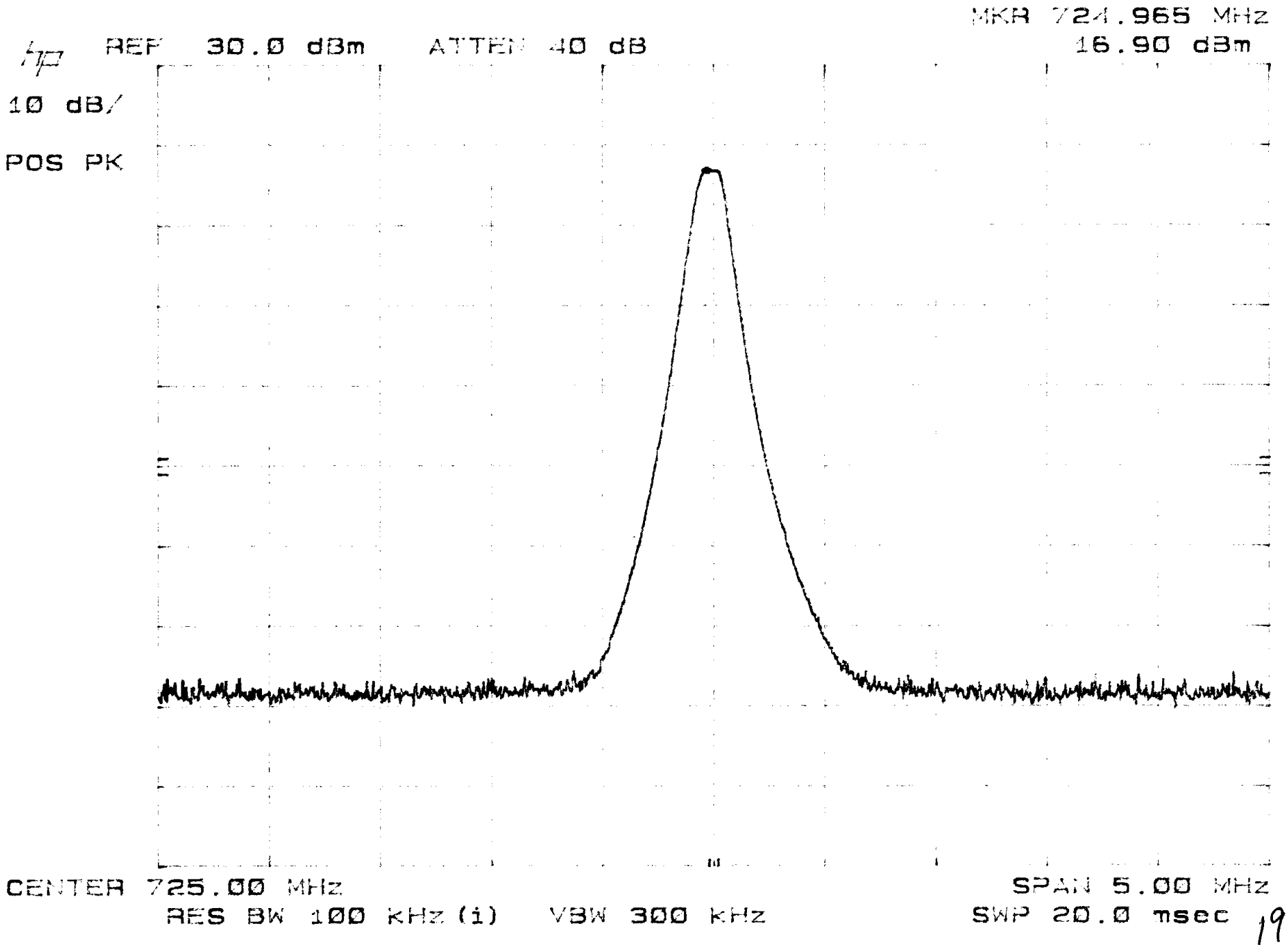
Test Equipment Used :

Spectrum Analyzer, Hewlett Packard, Model 8566B, S/N 2618A02913, Prop # 744, Cal 09/01
Spectrum Analyzer, Hewlett Packard, Model 8568B, S/N 2304A02500, Prop #: 187, Cal 11/01
Modulation Meter, Cal 12/01
Peak Power Meter, Hewlett Packard, Model 8900D, S/N 3607U00653, Prop # 802, Cal 03/01
Oscillator, Cal 12/01

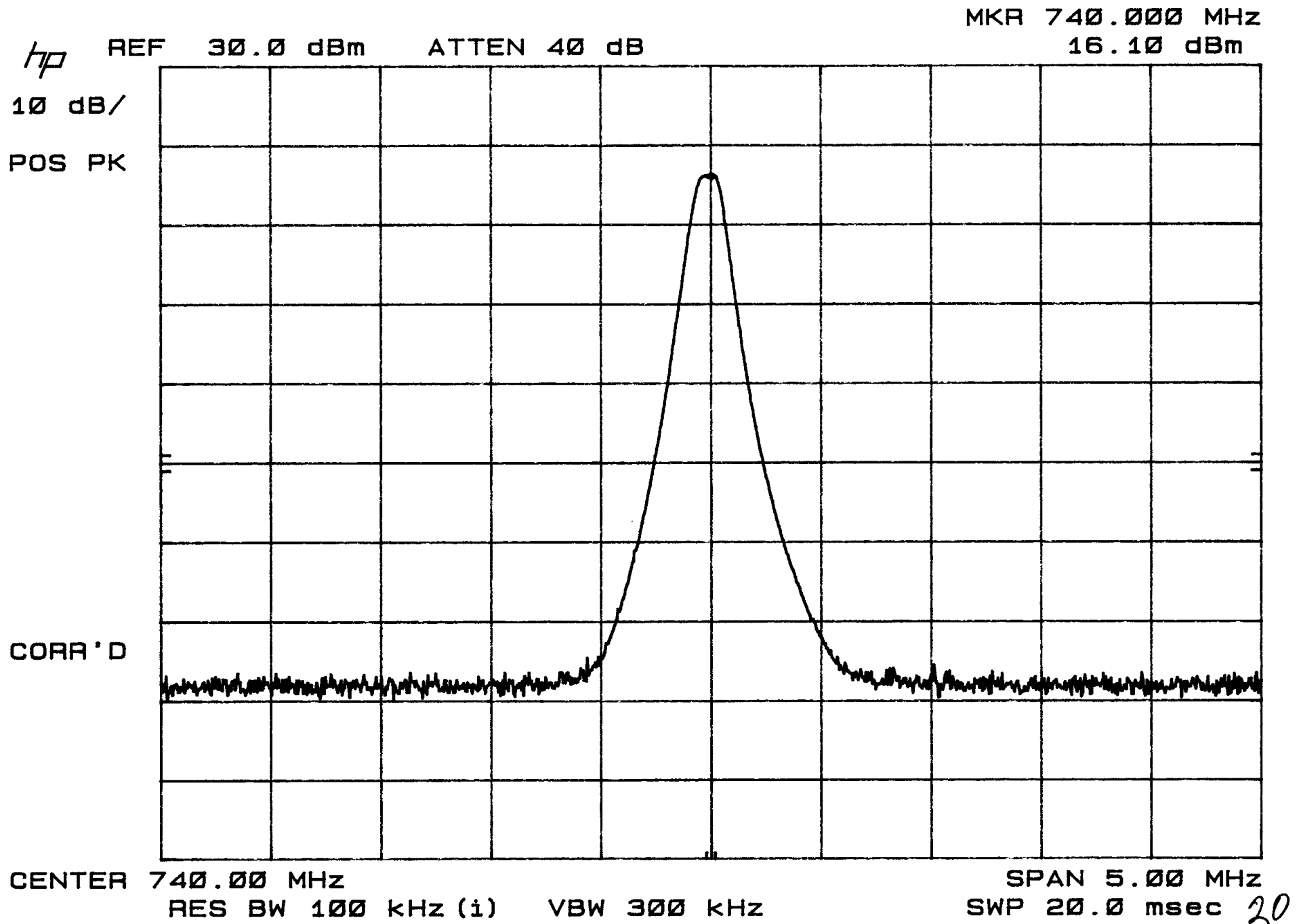
Remarks: _____

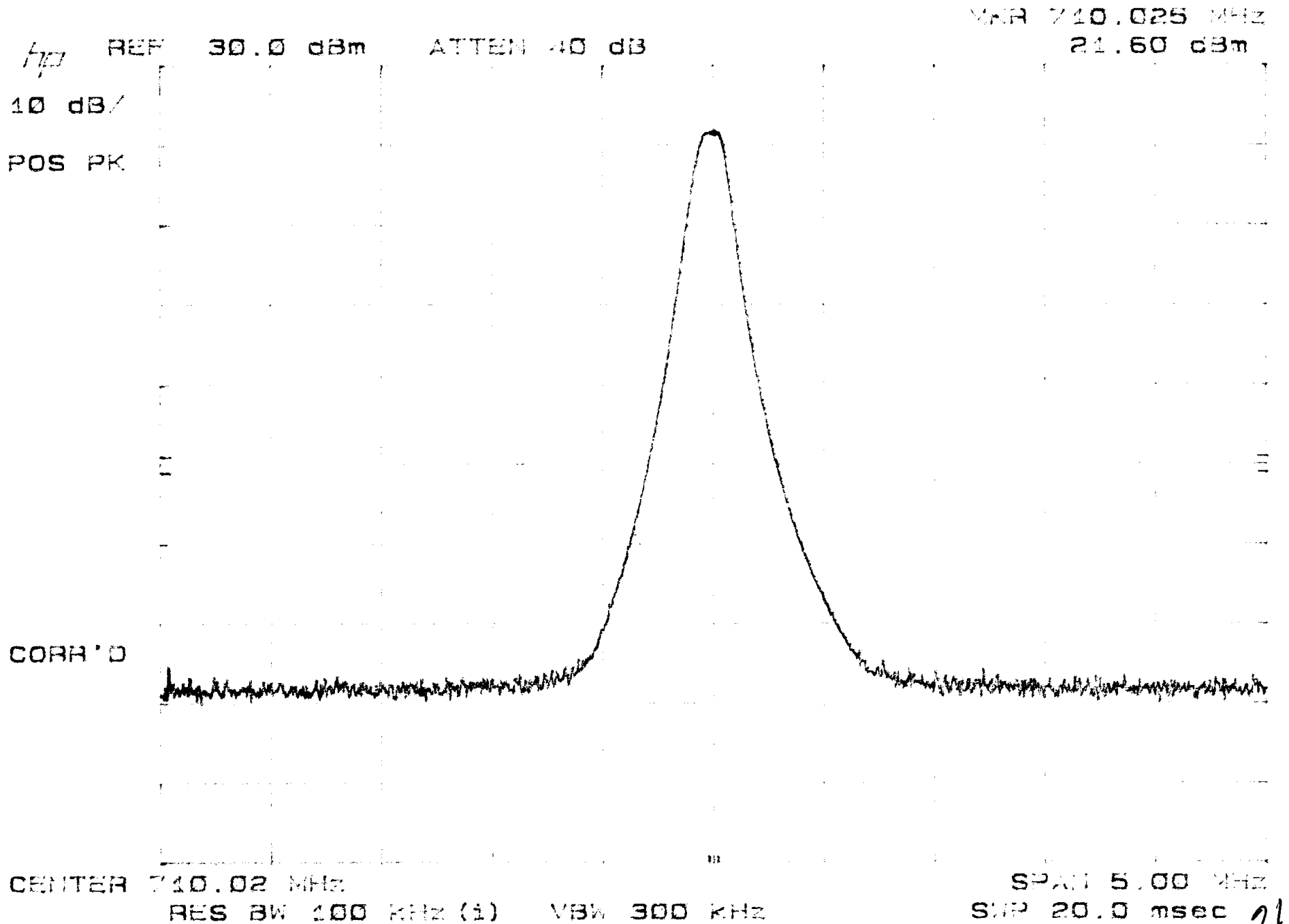


FCC PART 2, SECTION 2.1046 AND PART 74, SECTION 74.861(e)(1)(ii) RF OUTPUT POWER LOW POWER
PEAK POWER OUTPUT: 110 mW MID TRANSMIT 725 MHz Tx 12 Rx 4; S/N 102



FCC PART 2, SECTION 2.1046 AND PART 74, SECTION 74.861(e)(1)(ii) RF OUTPUT POWER LOW POWER
PEAK POWER OUTPUT: 100 mW; HIGH TRANSMIT 740 MHz Tx 12 Rx 4; S/N 102





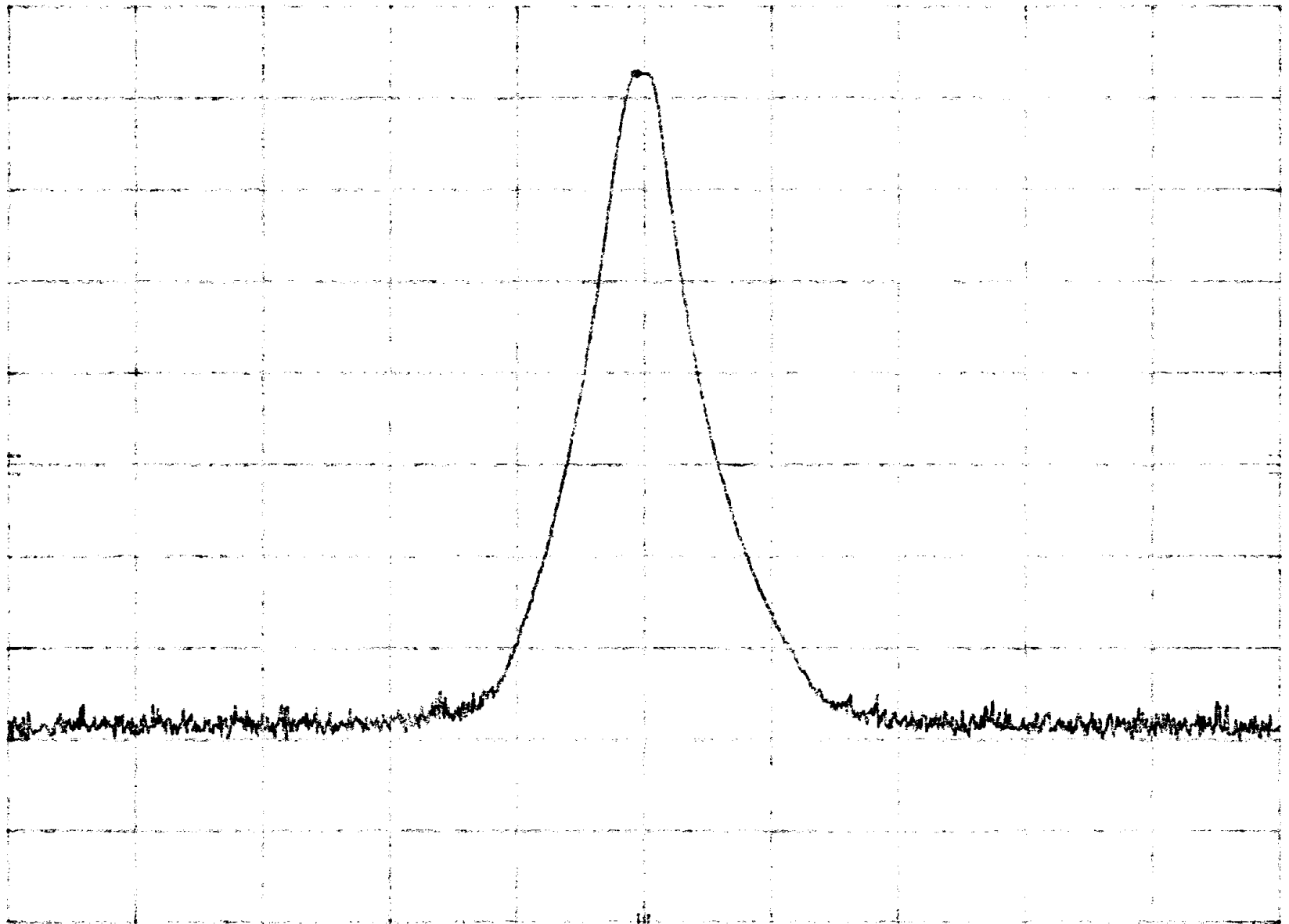
FCC PART 2, SECTION 2.1046 AND PART 74, SECTION 74.861(e)(1)(ii) RF OUTPUT POWER HIGH POWER
PEAK POWER OUTPUT: 330 mW; HIGH TRANSMIT 725 MHz Tx 12 Rx 4; S/N 102

NKR 724.965 MHz
22.70 dBm

hp REF 30.0 dBm ATTEN 40 dB

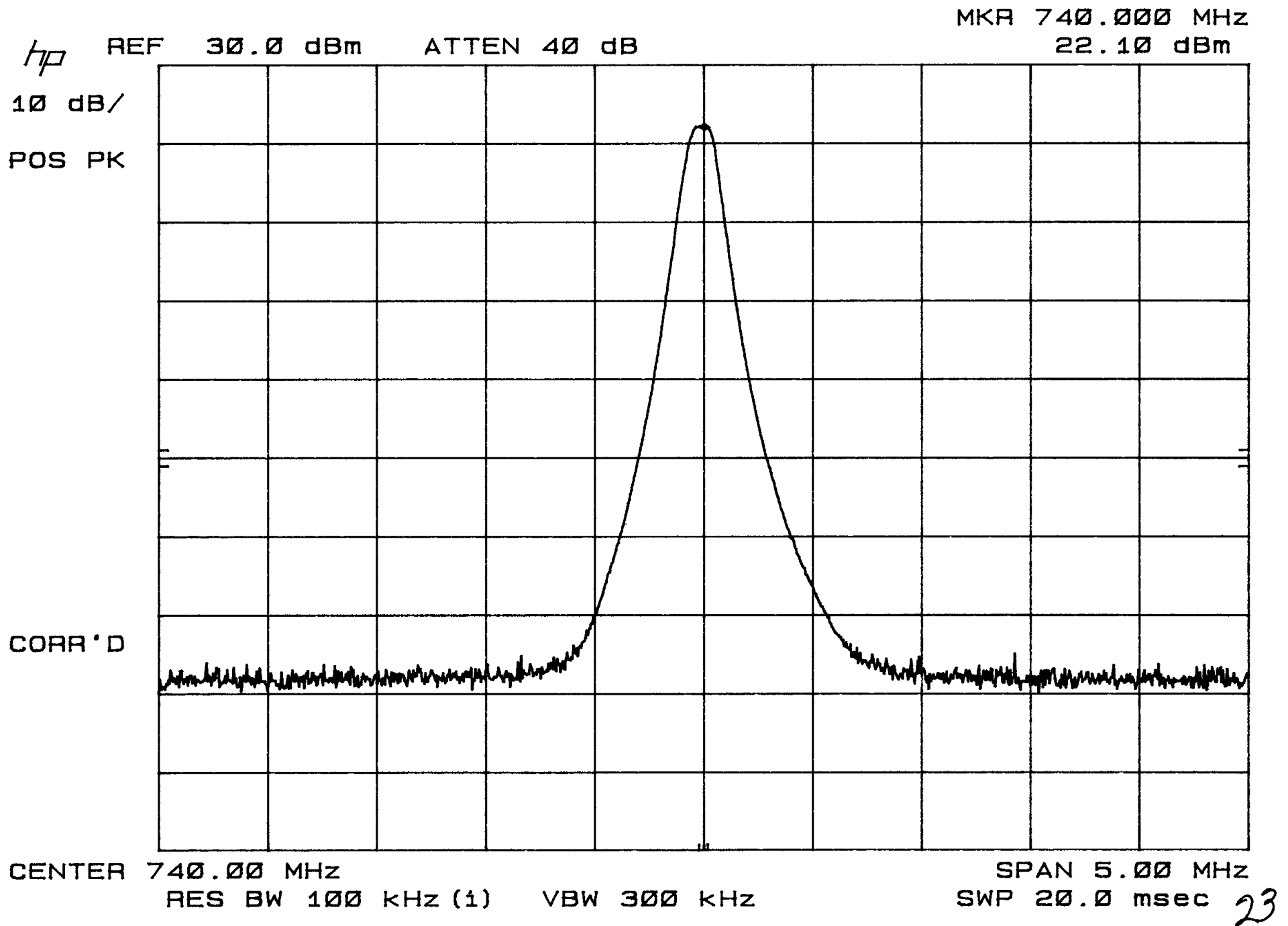
10 dB/

POS PK



CENTER 725.00 MHz
RES BW 100 kHz (1) VBW 300 kHz

SPAN 5.00 MHz
SWP 20.0 msec



Modulation Characteristics

Frequency Response

FCC Part 2, Para. 2.1047(a)

Customer: VEGA WIRELESS

Date: 02/12/01

EUT: MASTER STATION MS-700

SIN 104 Tx 4 Rx 8

185 MHz (MID)

HIGH POWER

Carrier Frequency:

NOTES:

DEV (Ref) on spectrum analyzer after applying modulation (kHz):

Audio Frequency (Hz)	Deviation noted on Spectrum Analyzer (kHz)
20	6.5
30	7
40	7
50	7.5
60	8
70	8
80	7
90	6.5
100	6
200	6.5
300	7
400	7
500	7
600	7.5
700	7.5
800	7.5
900	8
1000	8
2000	12
4000	19
6000	22
8000	23
10000	23
12000	23
14000	18
16000	13
18000	9
20000	7

2500 Hz

15

10 Hz

6

Modulation Characteristics

FCC Part 2, Para. 2.1047(b) &
Part 74, Para. 74.861(e)(3)

Modulation Limiting

Customer: VEGA WIRELESS

Date: 02/13/01

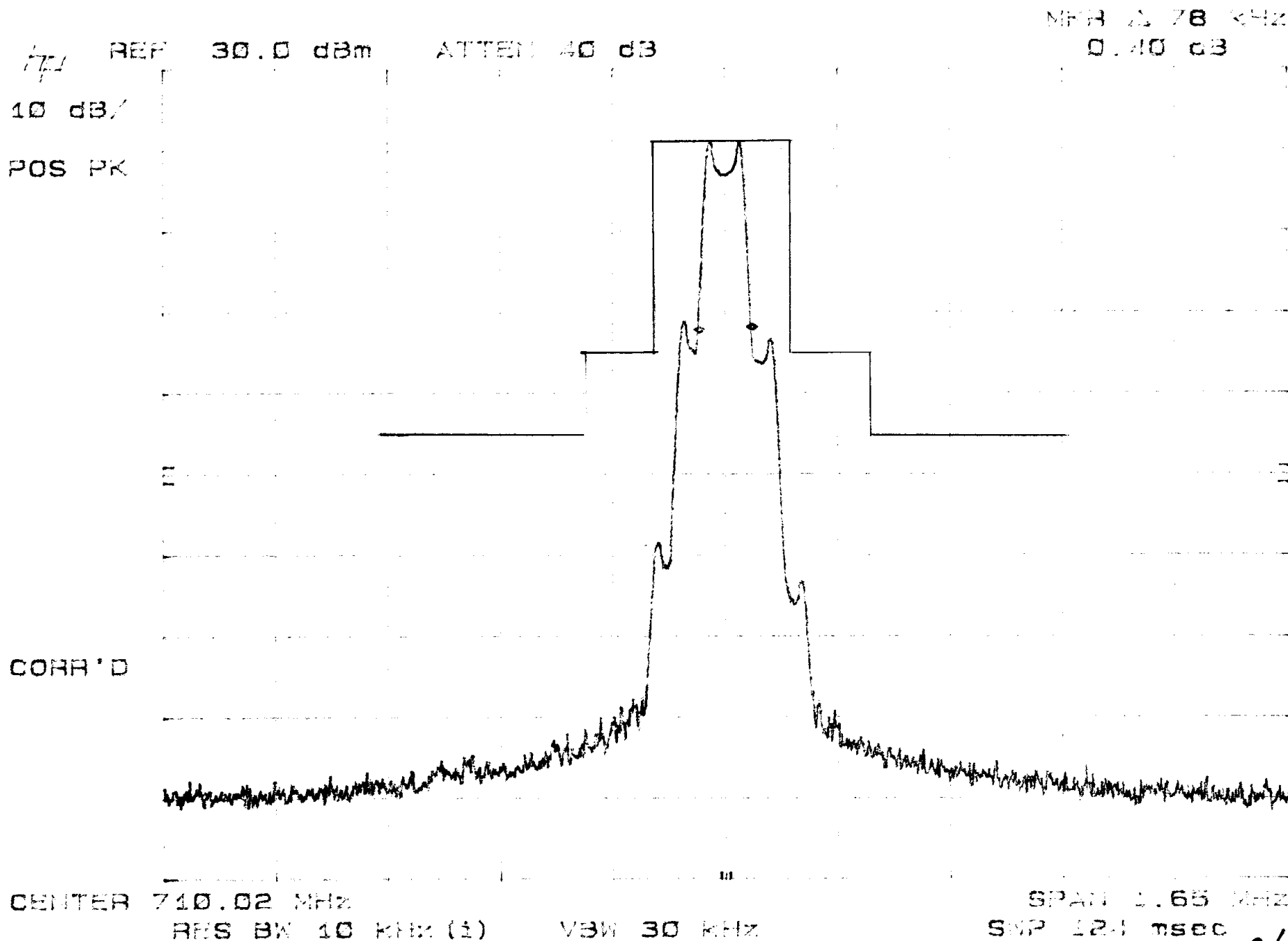
Eut: MS-700 MASTER STATION

S/N 104 TX+RX 475 MHz (min) HIGH POWER

Carrier Frequency:

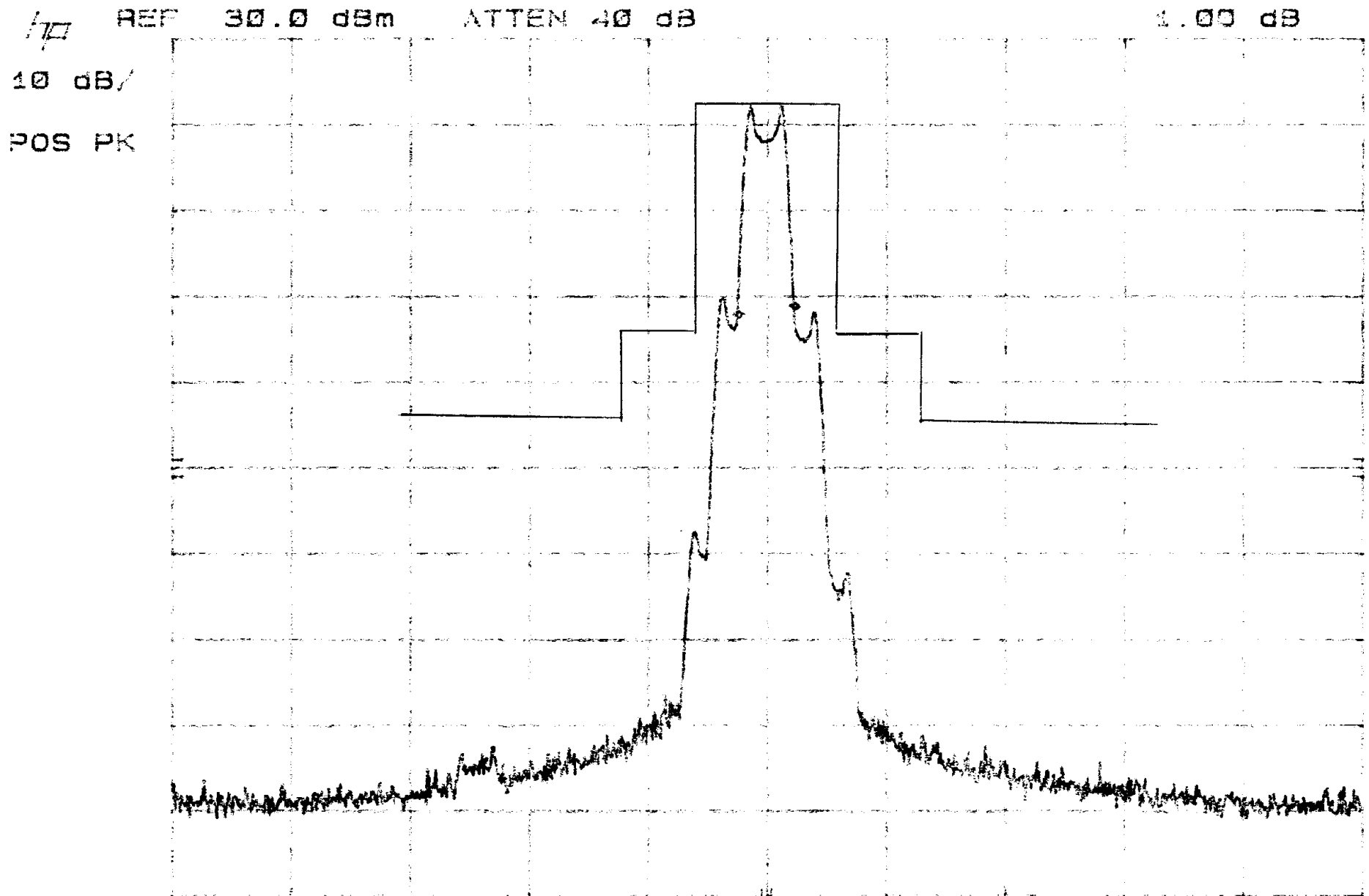
NOTES:

Audio Input Level (dBm)	Audio Input Frequency (Hz)							
	300		1.0K		2.5K		3.0K	
	+ Peak	- Peak	+ Peak	- Peak	+ Peak	- Peak	+ Peak	- Peak
+16	18	19.5	21.5	23.5	23	25	23	25
+10	13.5	14.5	16	17.5	23	25	23	24.5
0	9	9.5	10.5	11	16	17	17.5	19
-10	6.5	7	7	7	10	11	11	12
-20	5	5	5.5	5.5	7	7.5	7.5	8
-30	4.5	4.5	4.5	4.5	5.5	5.5	5.5	6
-40	4	4	4	4	4.5	4.5	4.5	5



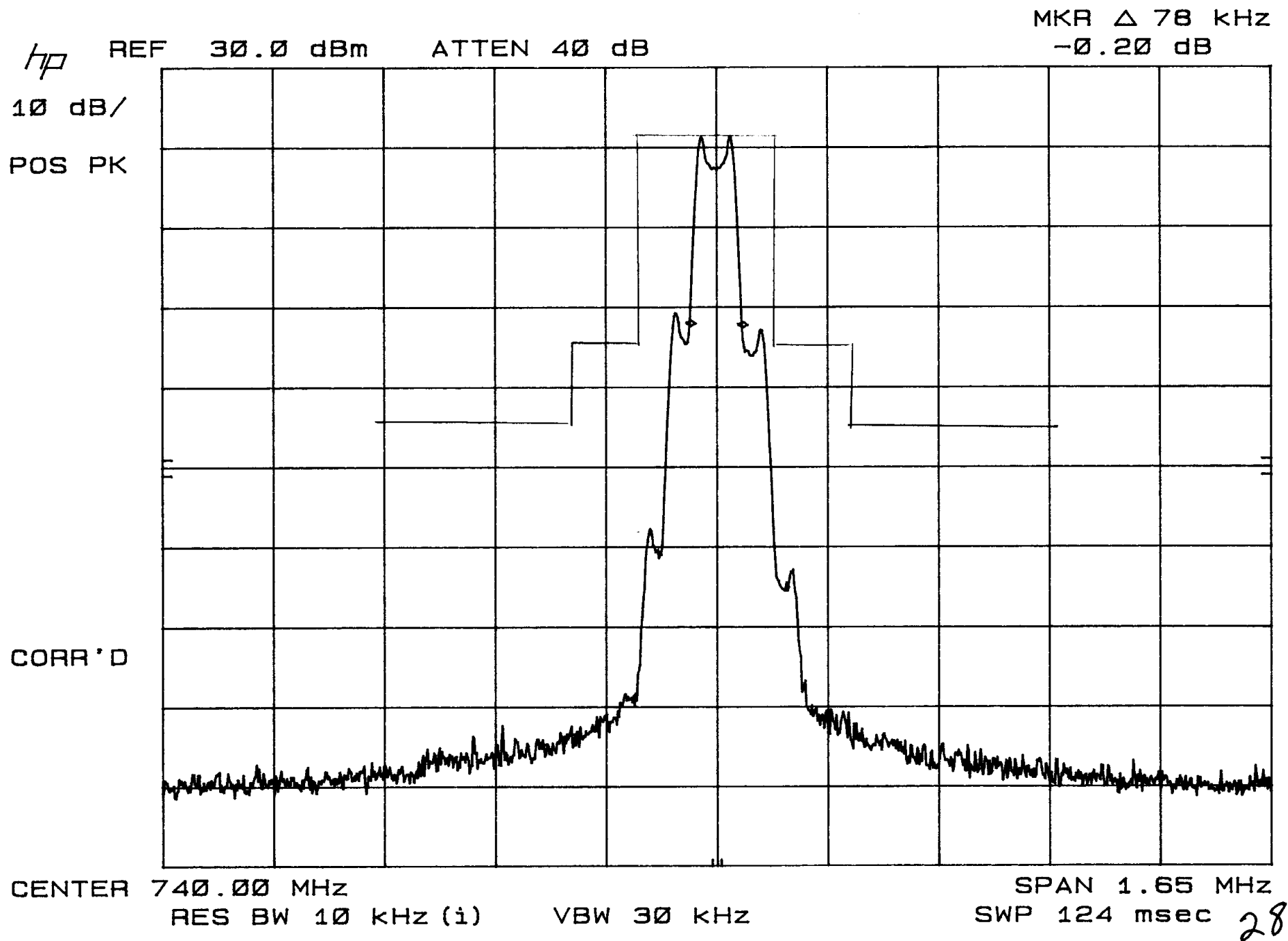
FCC PART 2, SECTION 2.1049; PART 74, SECTION 74.861(e)(5) AND SECTION 74.861(e)(6)(i)(ii)
OCCUPIED BANDWIDTH *MID* TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

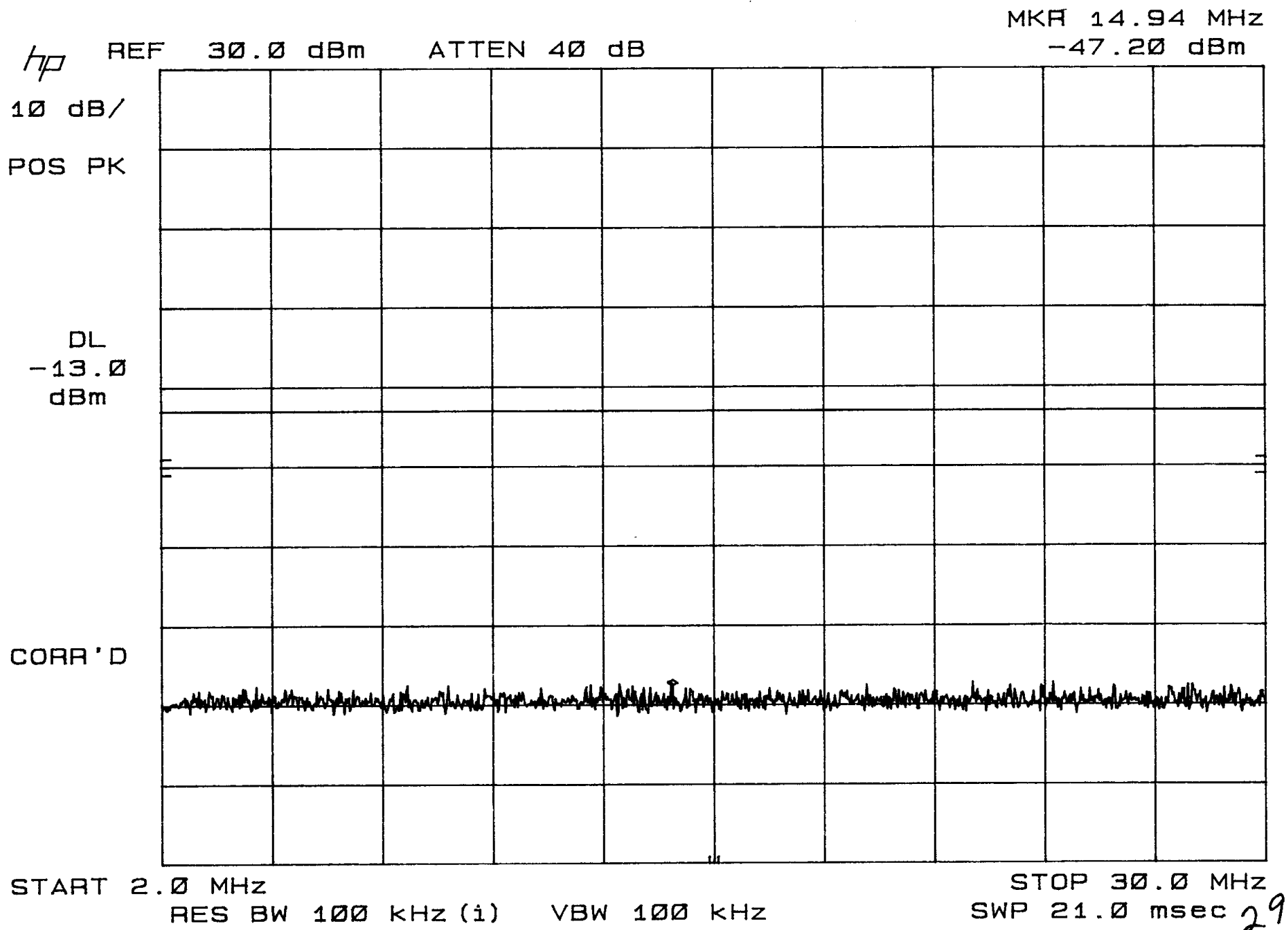
MKR Δ 78 KHZ
1.00 dB



CENTER 725.00 MHz
RES BW 10 KHZ (1) VBN 30 KHZ

SPAN 1.65 MHz
SKP 124 msec 27





MKR 254.2 MHz
-46.60 dBm

hp REF 30.0 dBm ATTN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

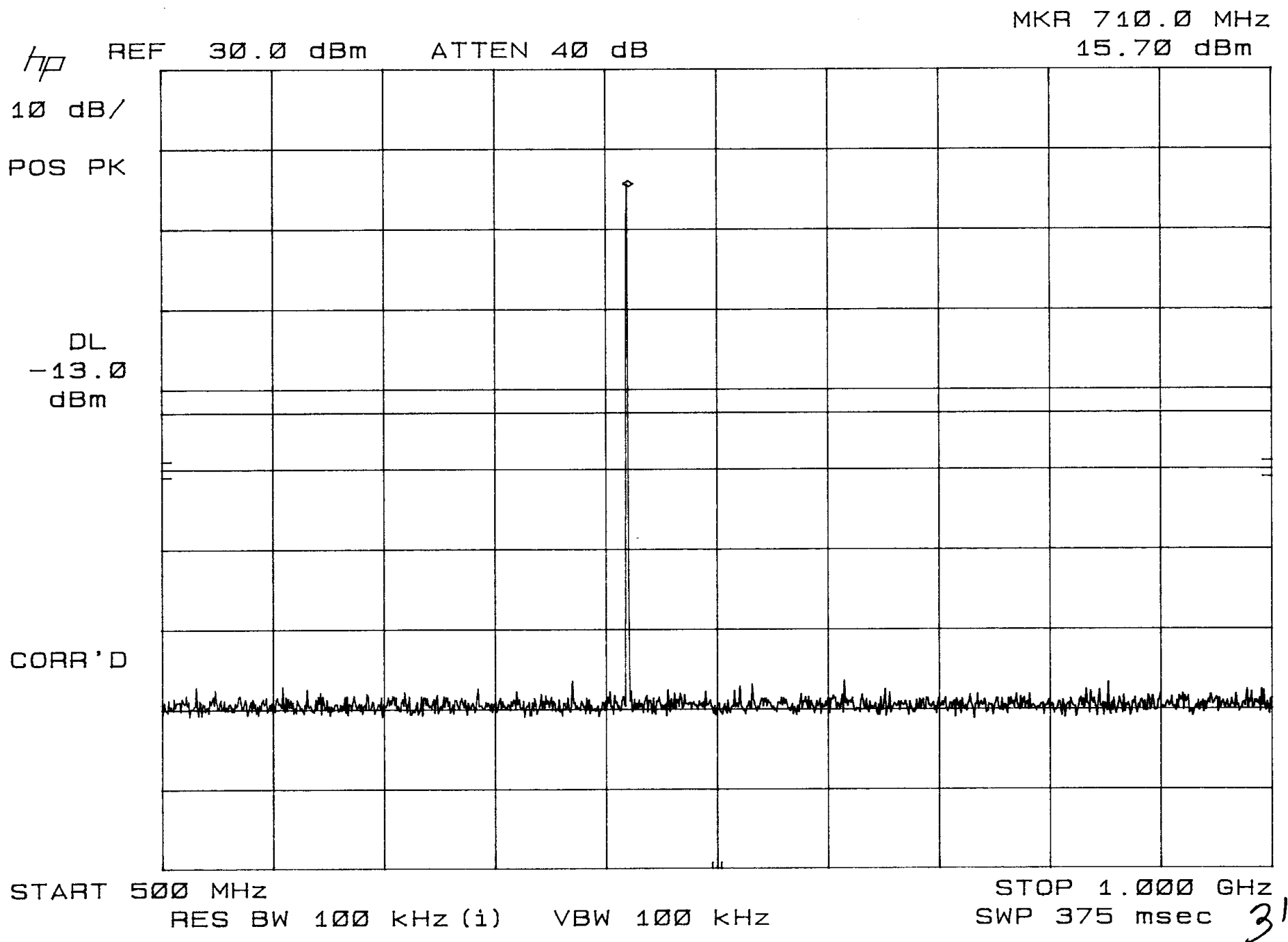
CORR'D

START 30 MHz

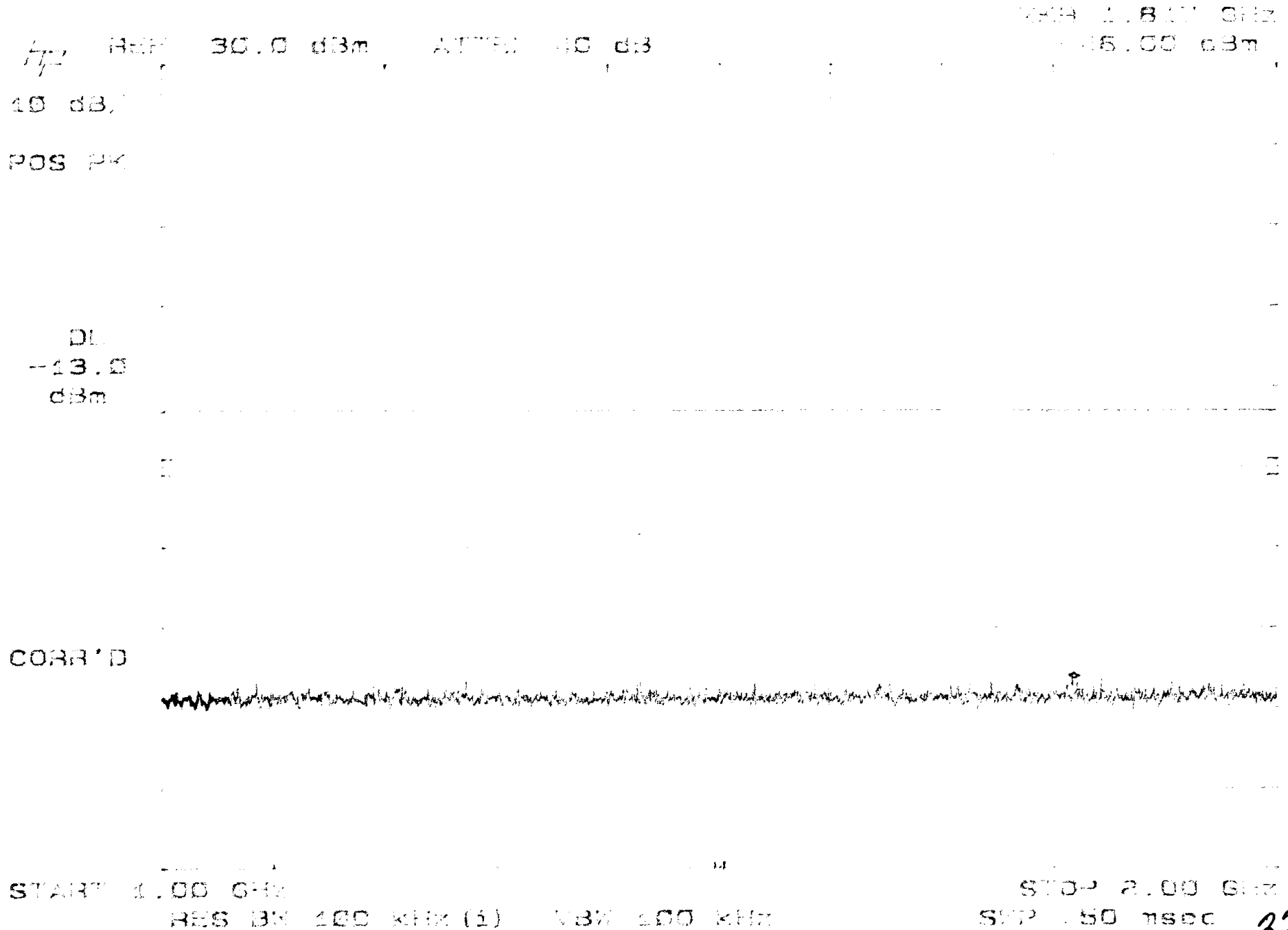
RES BW 100 kHz (i) VBW 100 kHz

STOP 500 MHz
SWP 353 msec

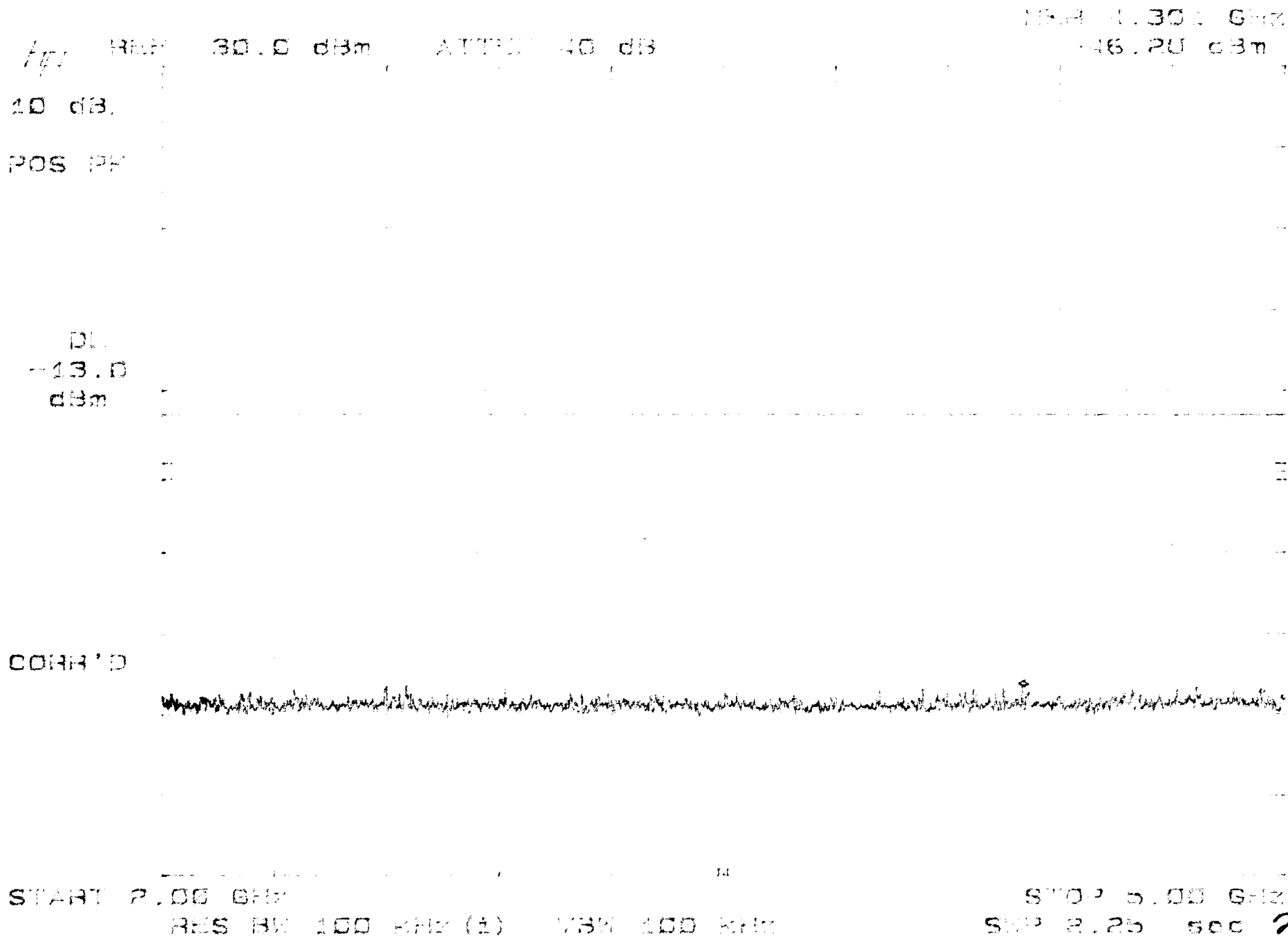
30



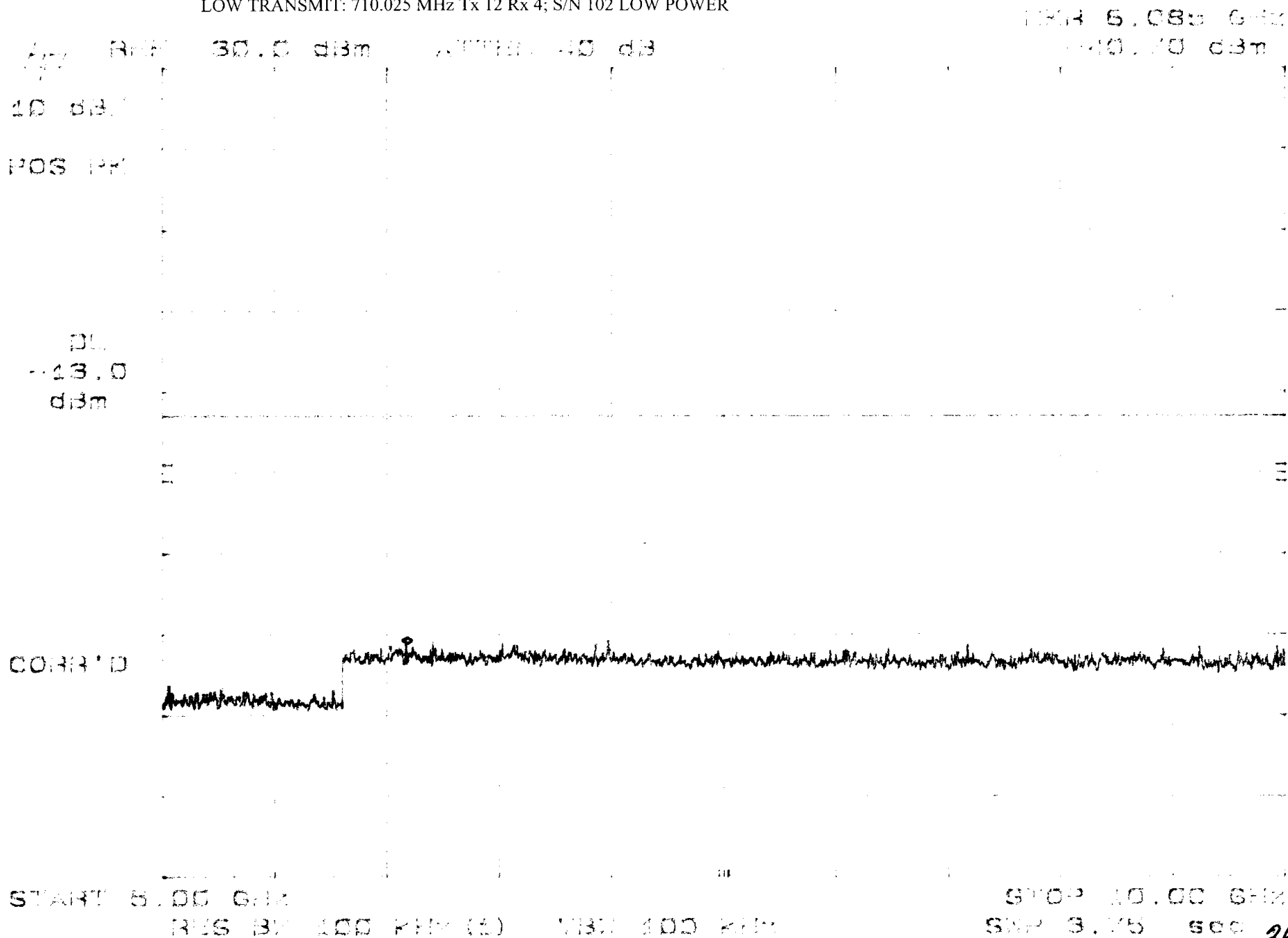
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 LOW POWER



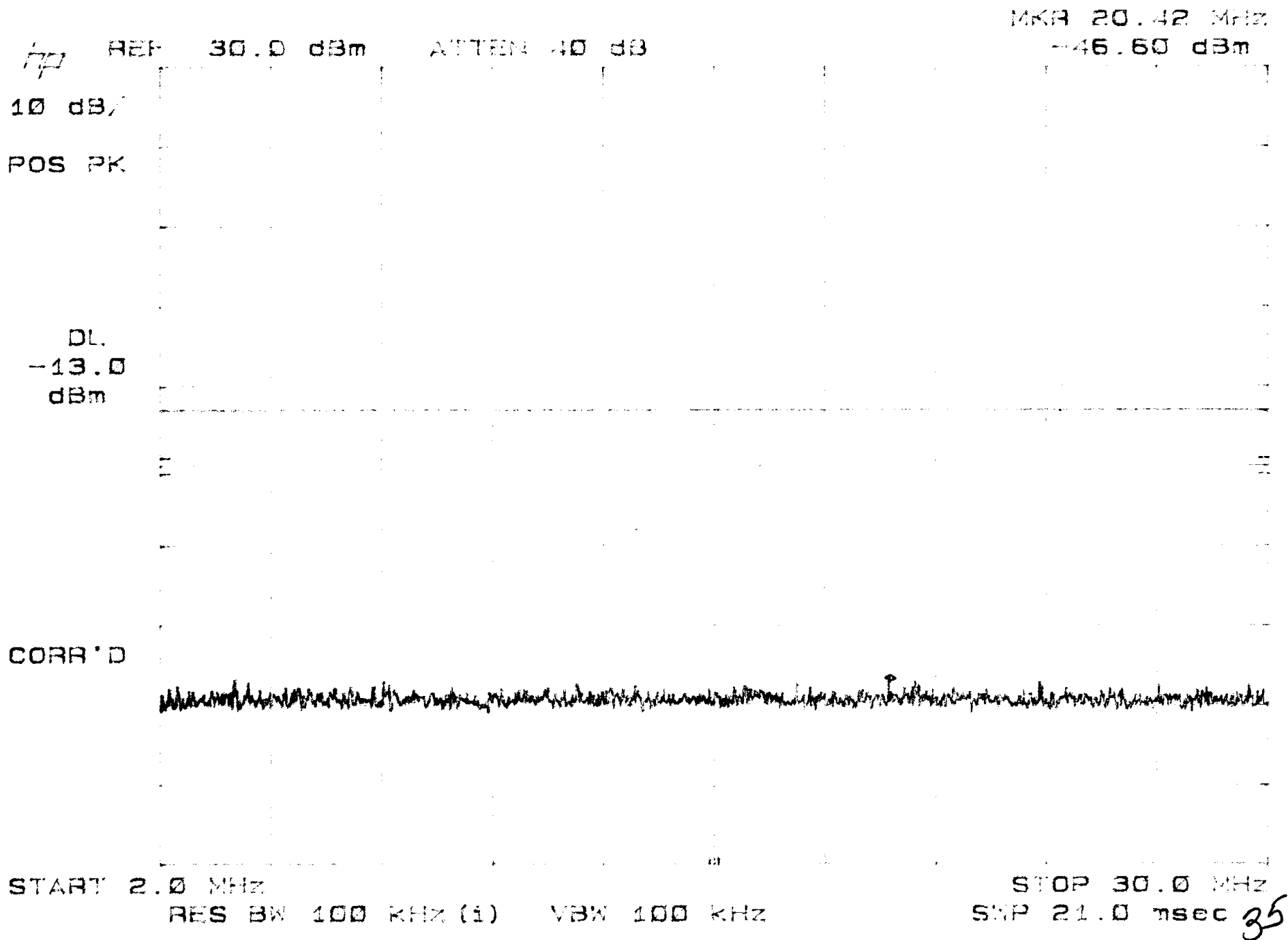
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 LOW POWER



FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 LOW POWER



FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 *HIGH* POWER



FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
Low TRANSMIT: Tx 12 Rx 4; S/N 102 HIGH POWER

710.025 MHz

MARK 397.1 MHz

HP REF 30.0 dBm ATTN 40 dB

-46.70 dBm

10 dB

POS PK

DL
-13.0
dBm

CORR'D

START 30 MHz

RES BW 100 KHz (1) VBW 100 KHz

STOP 500 MHz

SNP 353 msec

36

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS

LOW TRANSMIT: Tx 12 Rx 4; S/N 102 HIGH POWER

710.025 MHz

MR 710.0 MHz

hp REF 30.0 dBm ATTN 40 dB

21.30 dBm

10 dB

POS PK

DL
-13.0
dBm

CORR'D

START 500 MHz

RES BW 100 KHz (1) VBW 100 KHz

STOP 1.000 GHz
SWP 375 msec

37

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: MHz Tx 12 Rx 4; S/N 102 HIGH POWER

710

MARK 1.421 GHz

HFI REF 30.0 dBm ATTEN 10 dB

34.60 dBm

10 dB

POS PK

DL
-13.0
dBm

CORR'D

START 1.00 GHz

RES BW 100 KHz (1) VBW 100 KHz

STOP 2.00 GHz
SWP 750 msec

38

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: Tx 12 Rx 4; S/N 102 ~~HIGH~~ POWER

710.025 MHz

FREQ 3.044 GHz

REF 30.0 dBm ATTN 40 dB

45.80 dBm

10 dB/

POS PK

DL
-13.0
dBm

CORR'D

START 2.00 GHz

RES BW 100 kHz (1) VBW 100 kHz

STOP 5.00 GHz

SWP 2.25 sec 39

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: 12 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

716

MKR 6.740 GHz

-39.80 dBm

REF 30.0 dBm ATTN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

CORR'D

START 5.00 GHz

RES BW 100 KHz (1) VBW 100 KHz

STOP 10.00 GHz

SWP 3.75 sec 40

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER

MKR 7.94 MHz

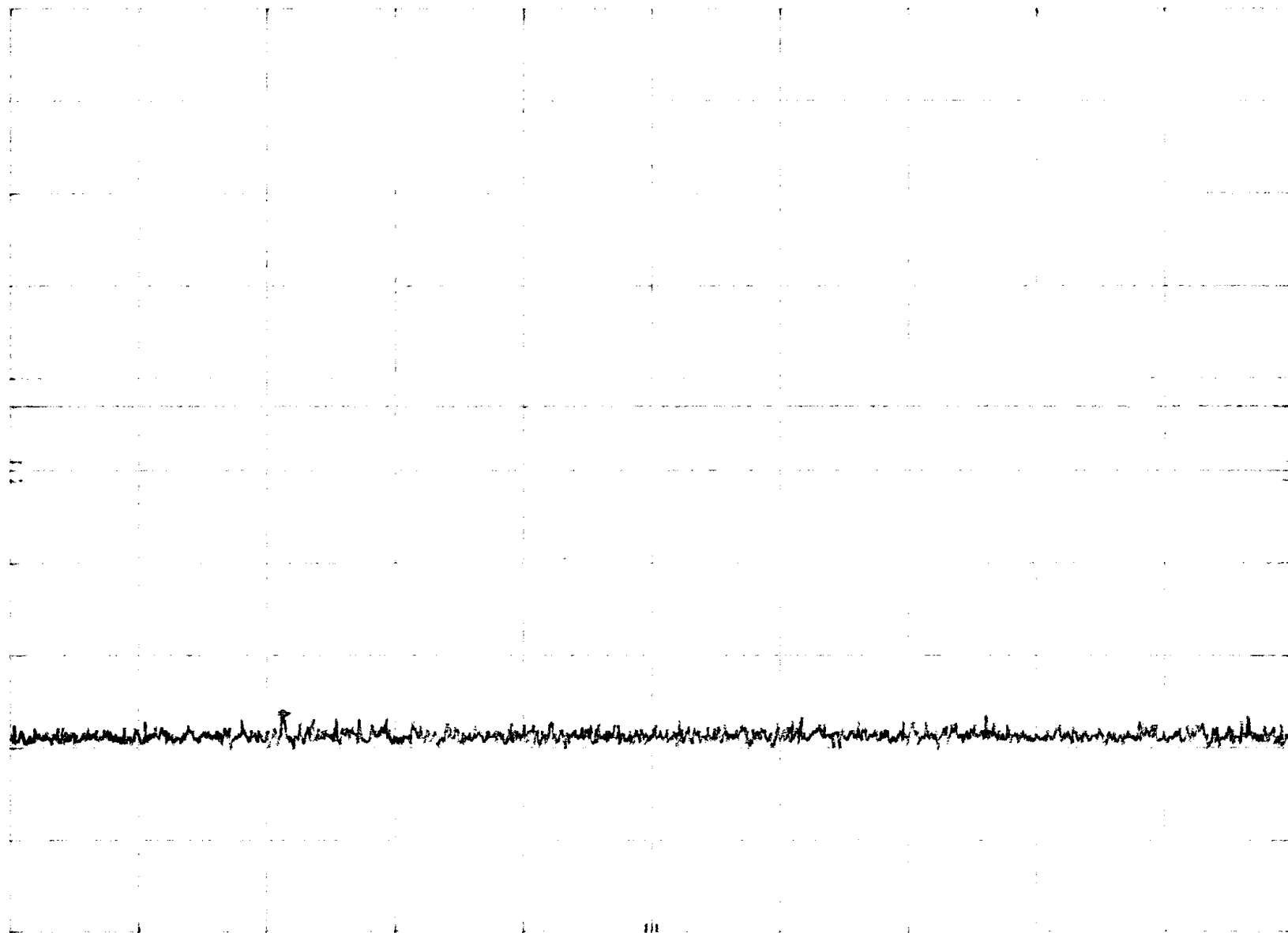
-46.20 dBm

HP REF 30.0 dBm ATTEN 40 dB

10 dB/

POS PK

DL
-13.0
dBm



START 2.0 MHz

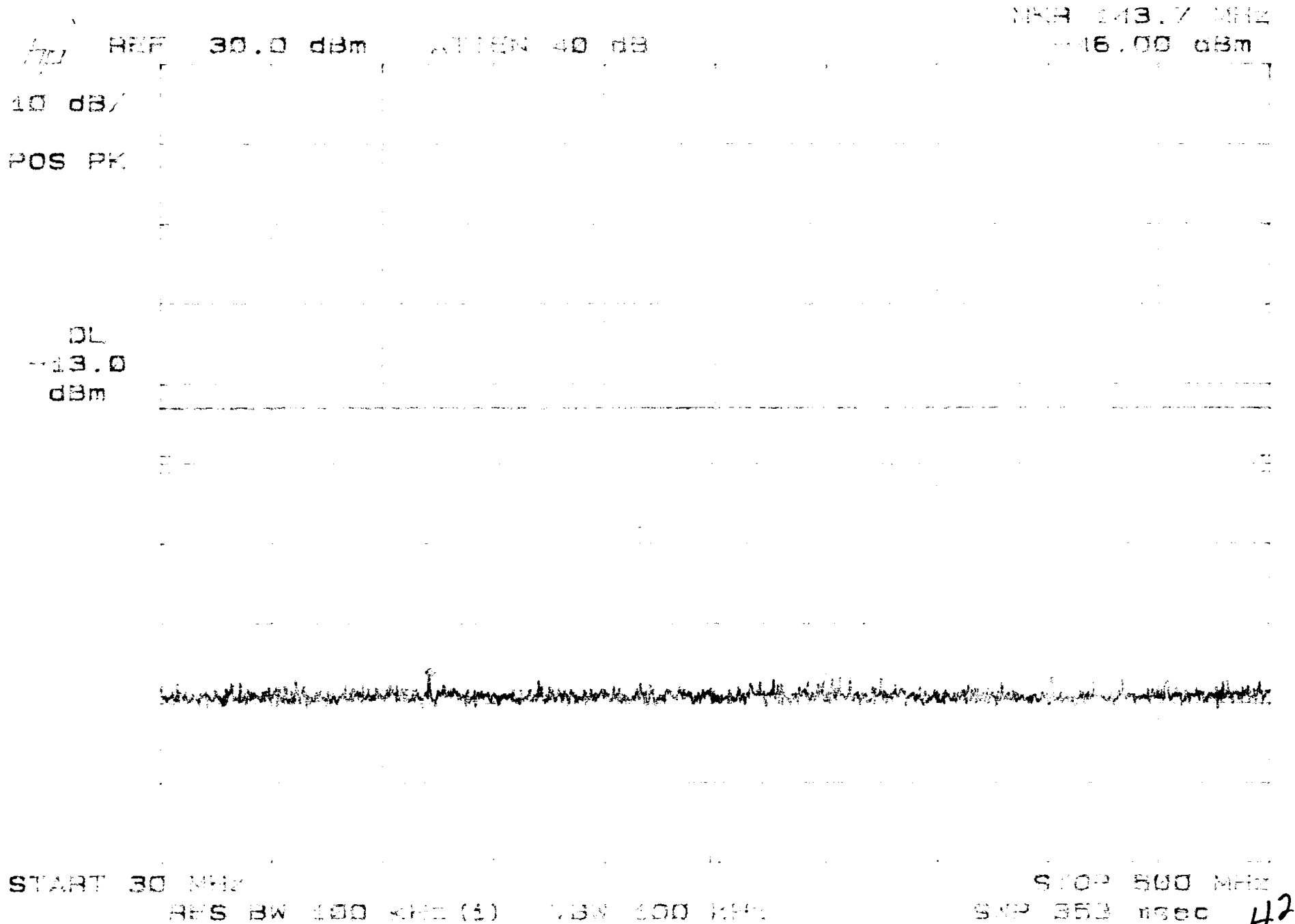
RES BW 100 KHz (1) VBW 100 KHz

STOP 30.0 MHz

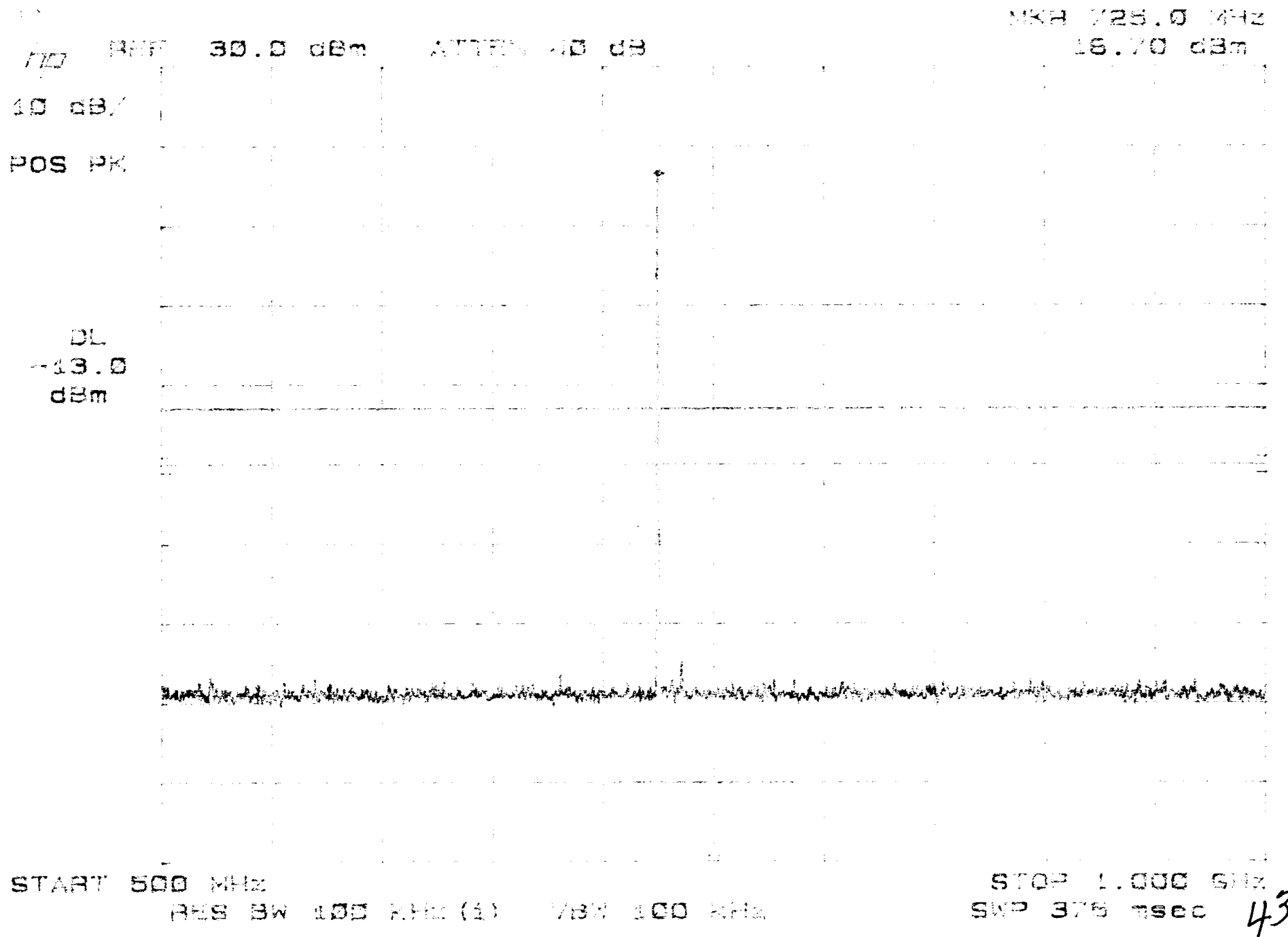
SWP 21.0 msec

41

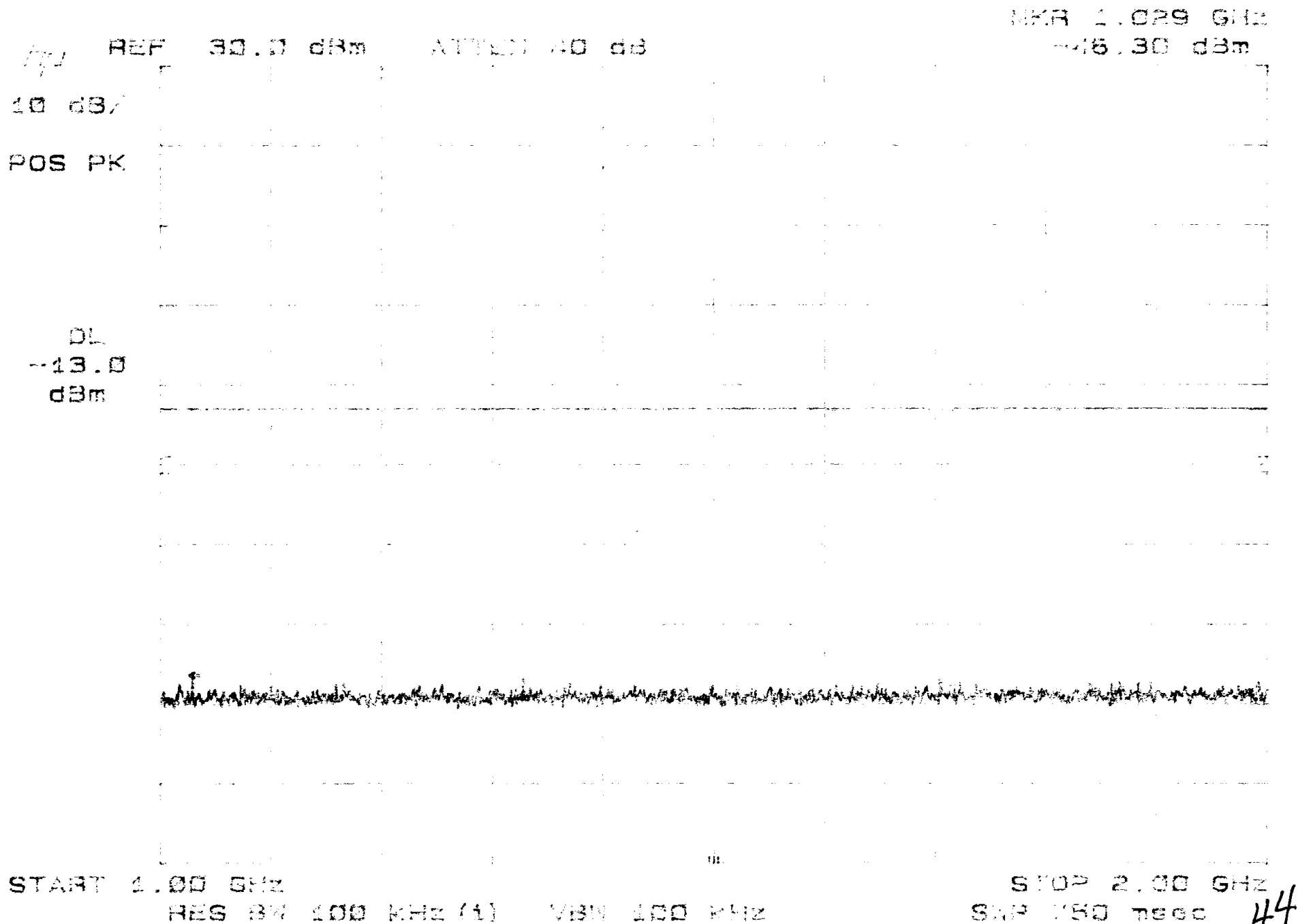
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER



FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MLD TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER



FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER



FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER

YKR 3.227 GHz

-15.80 dBm

REF 30.0 dBm ATTEN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

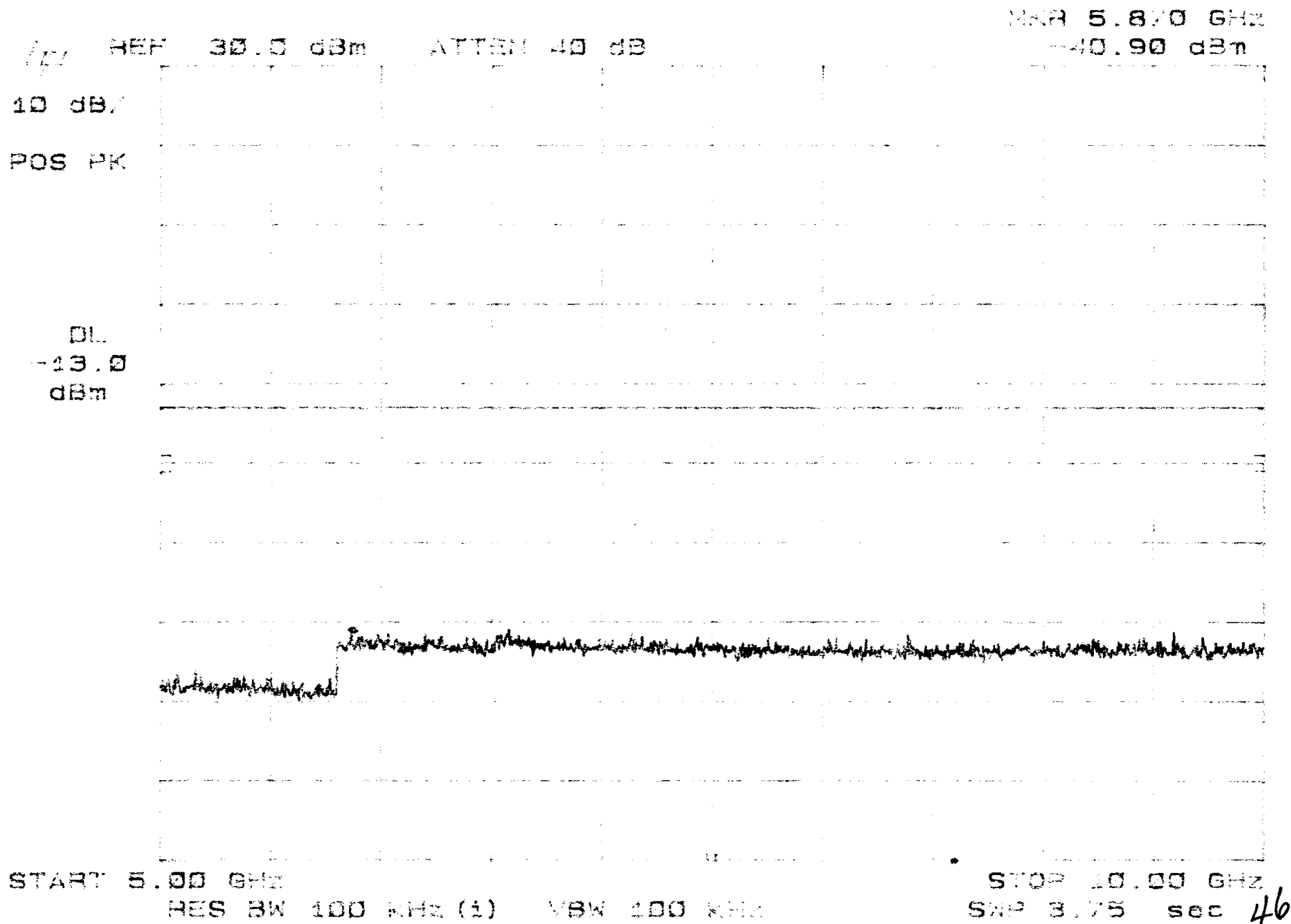
START 2.00 GHz

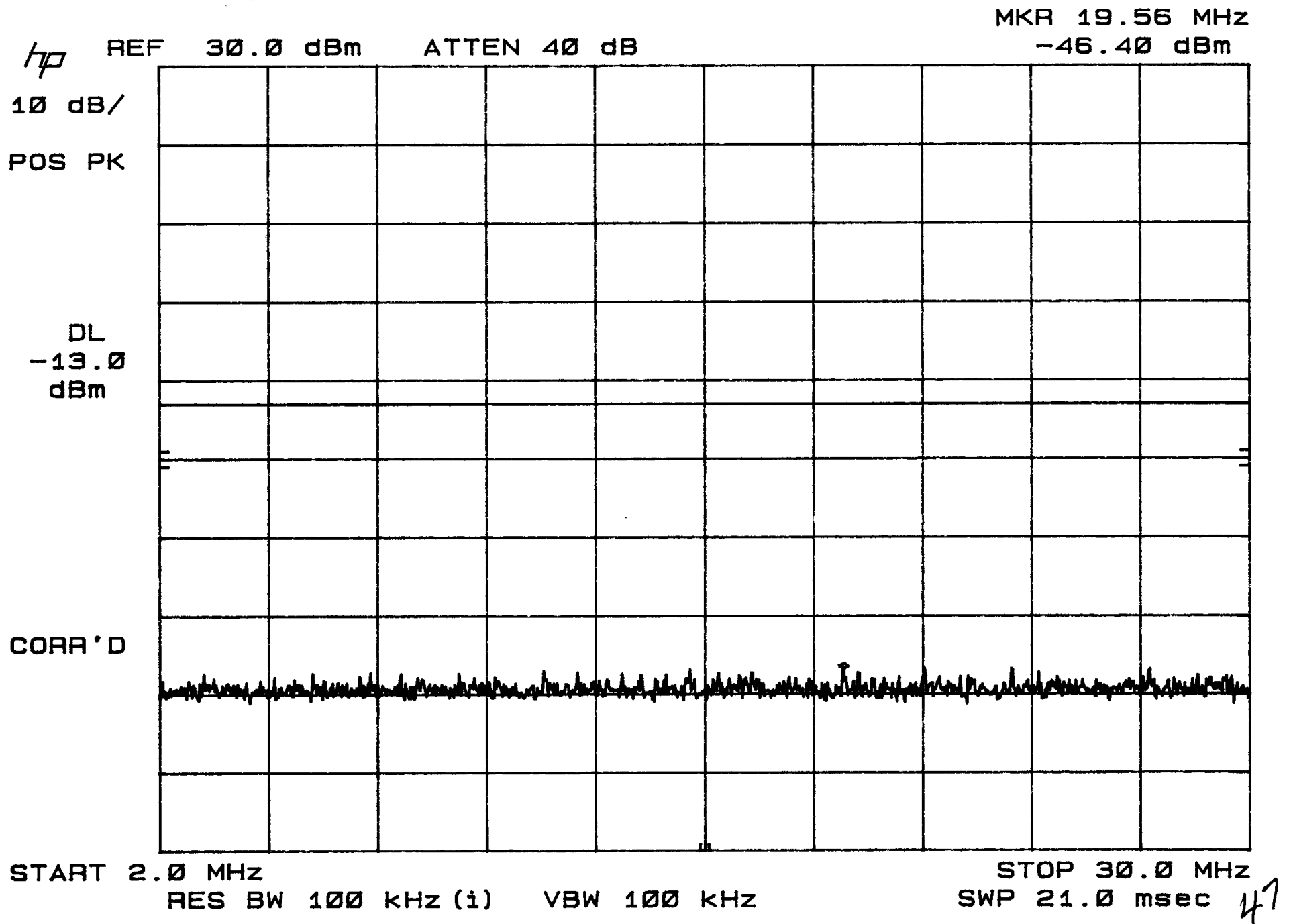
RES BW 100 kHz (1) VBW 100 kHz

STOP 5.00 GHz

SWP 2.25 sec 45

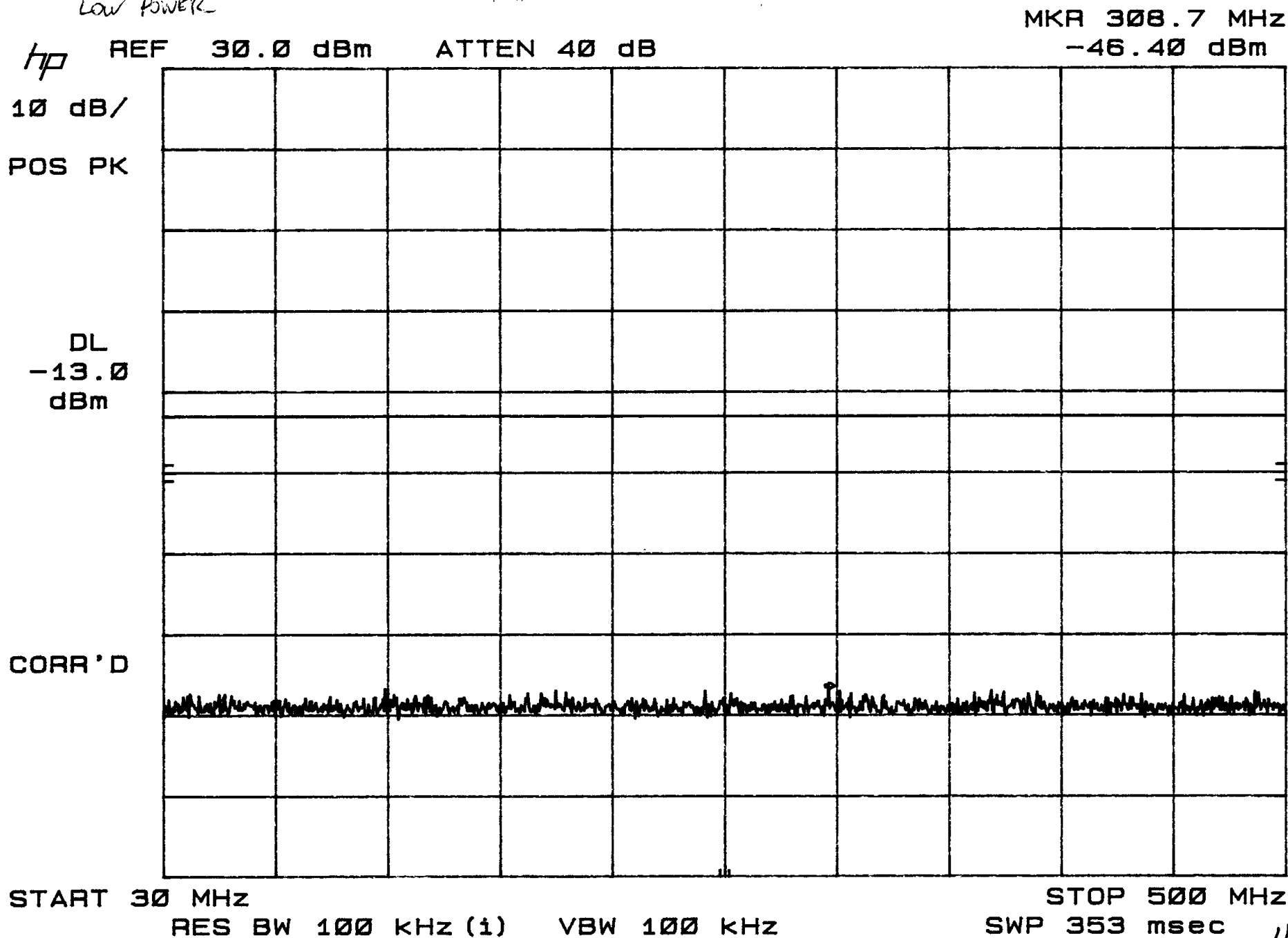
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER





CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx12 Rx4
LOW POWER

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS



CONDUCTED SPURIOUS

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS

HIGH TRANSMIT 740MHz Tx12 Rx4

Low power S/N 102

MKR 740.0 MHz

15.80 dBm

hp

REF 30.0 dBm

ATTEN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

CORR'D

START 500 MHz

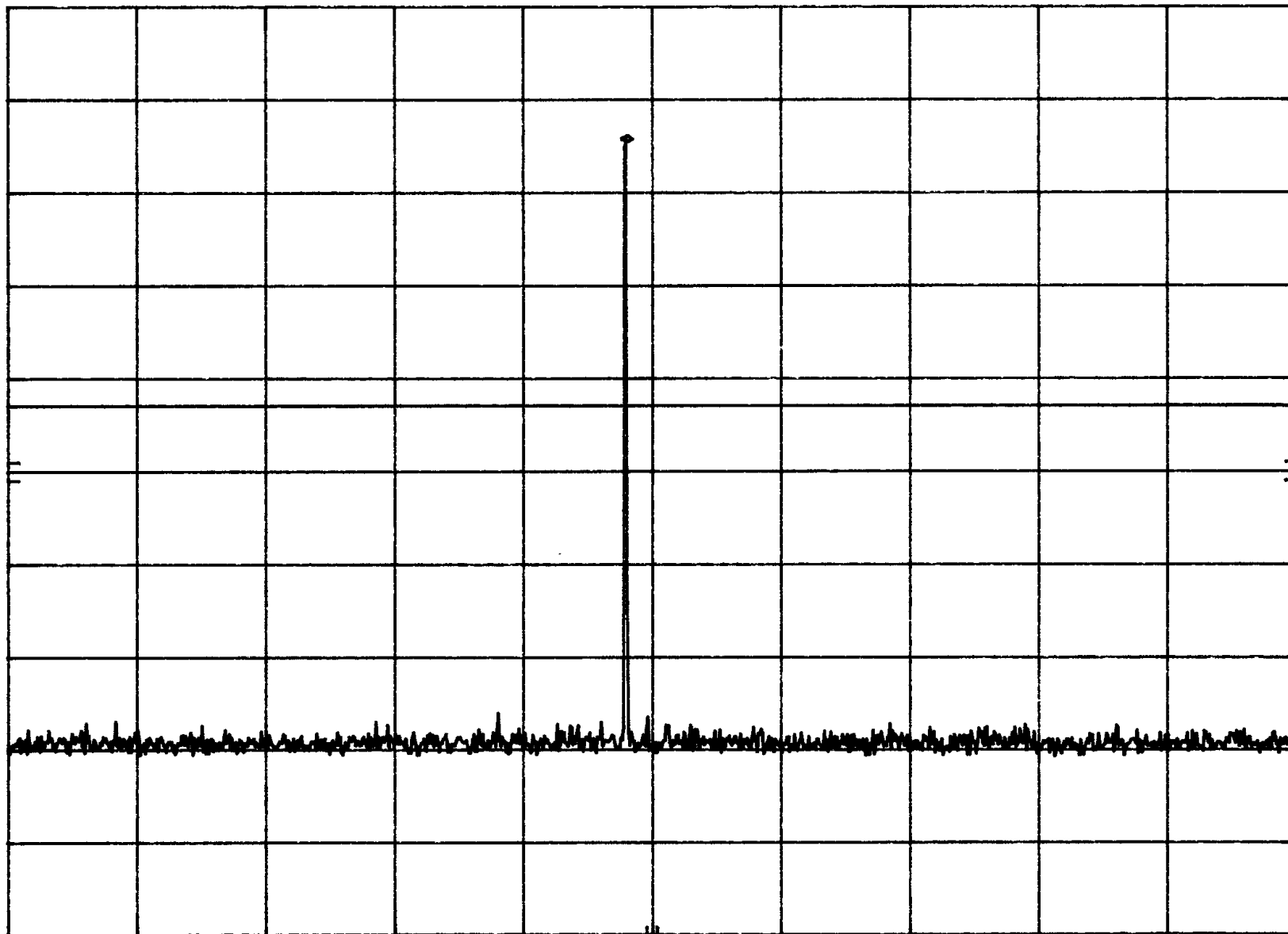
RES BW 100 kHz (i)

VBW 100 kHz

STOP 1.000 GHz

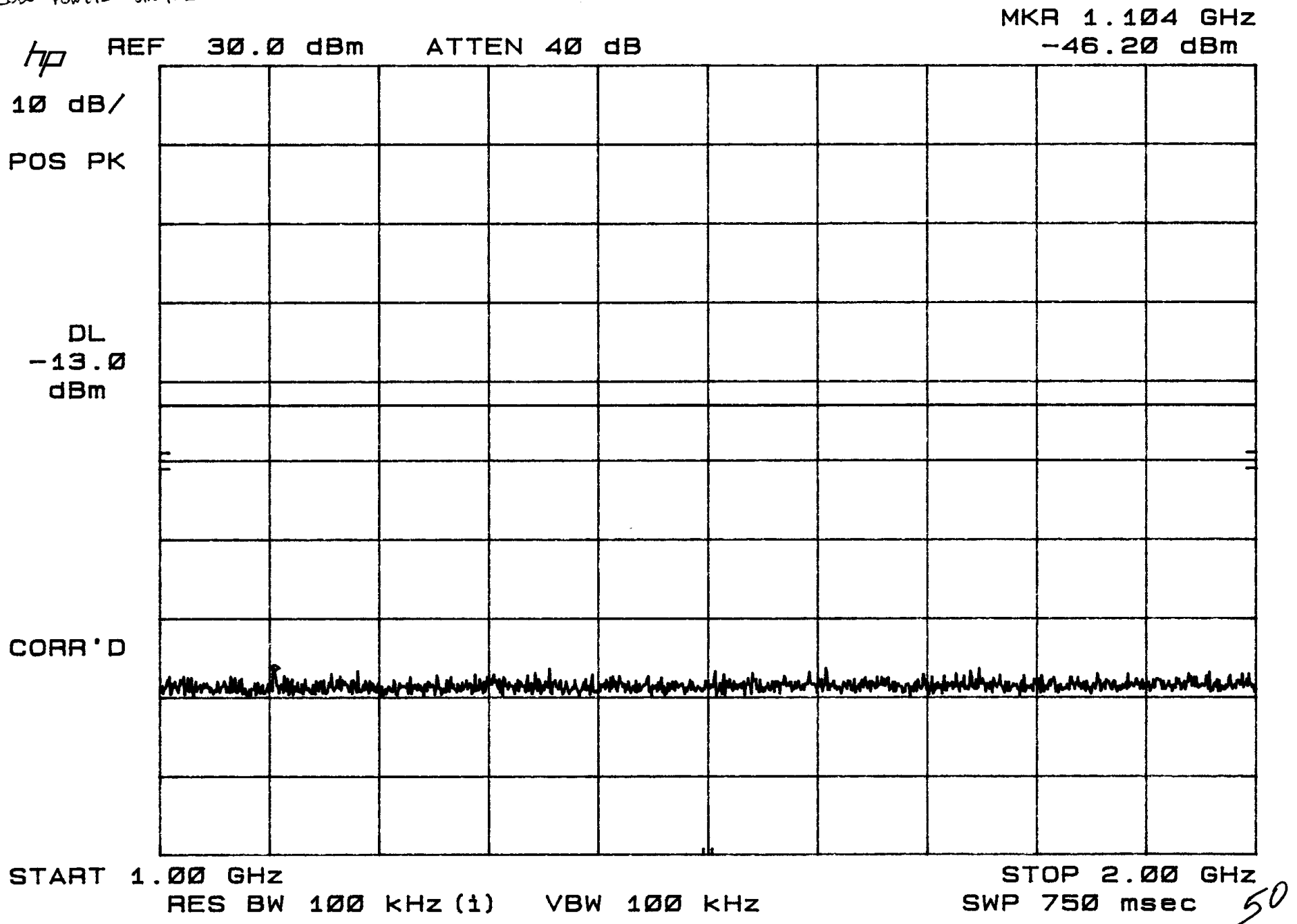
SWP 375 msec

49



CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx12 Rx4
LOW POWER SIN102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS



CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 R x 4
LOW POWER S/N 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS

MKR 4.394 GHz
-46.10 dBm

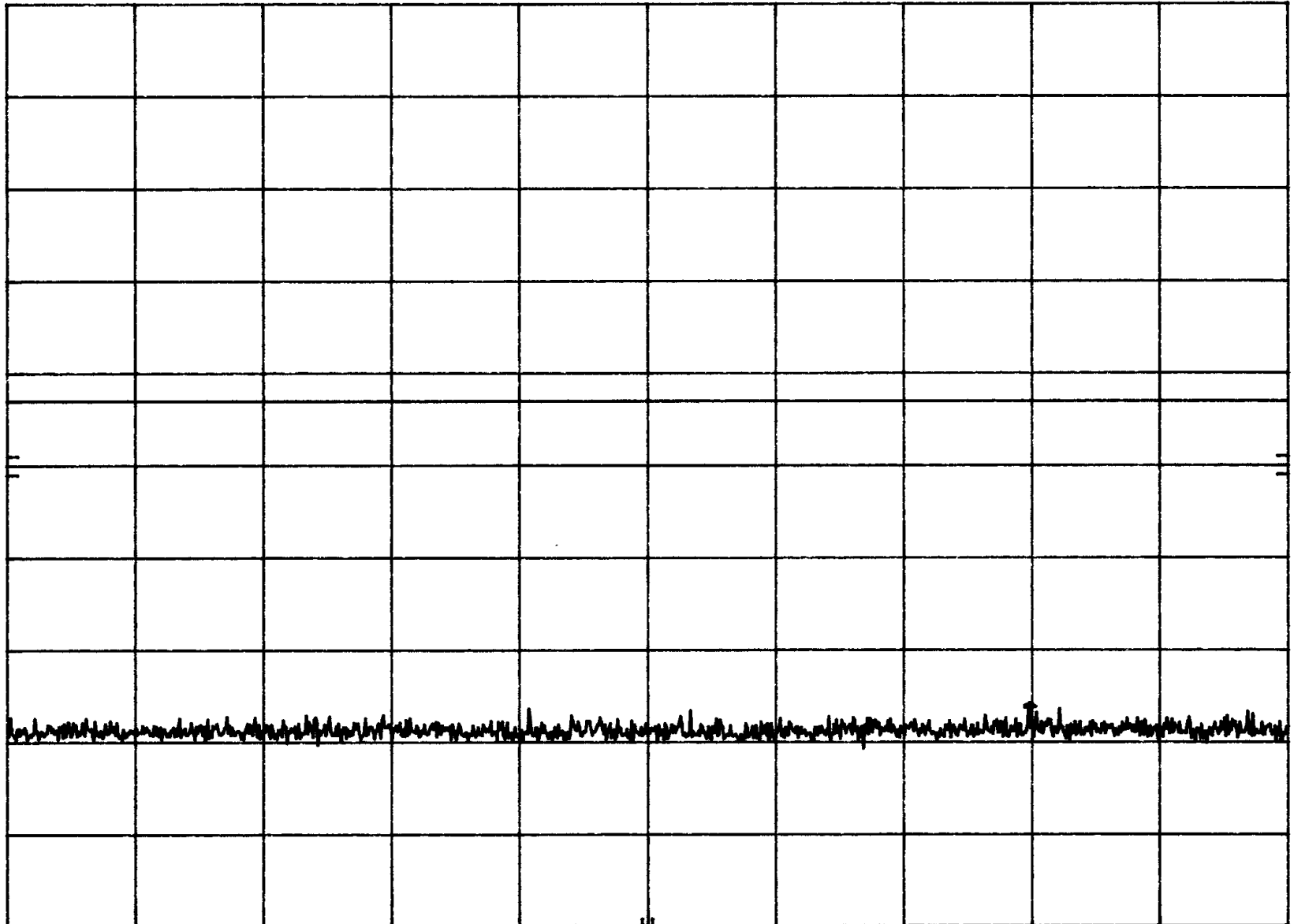
hp REF 30.0 dBm ATTEN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

CORR'D



START 2.00 GHz

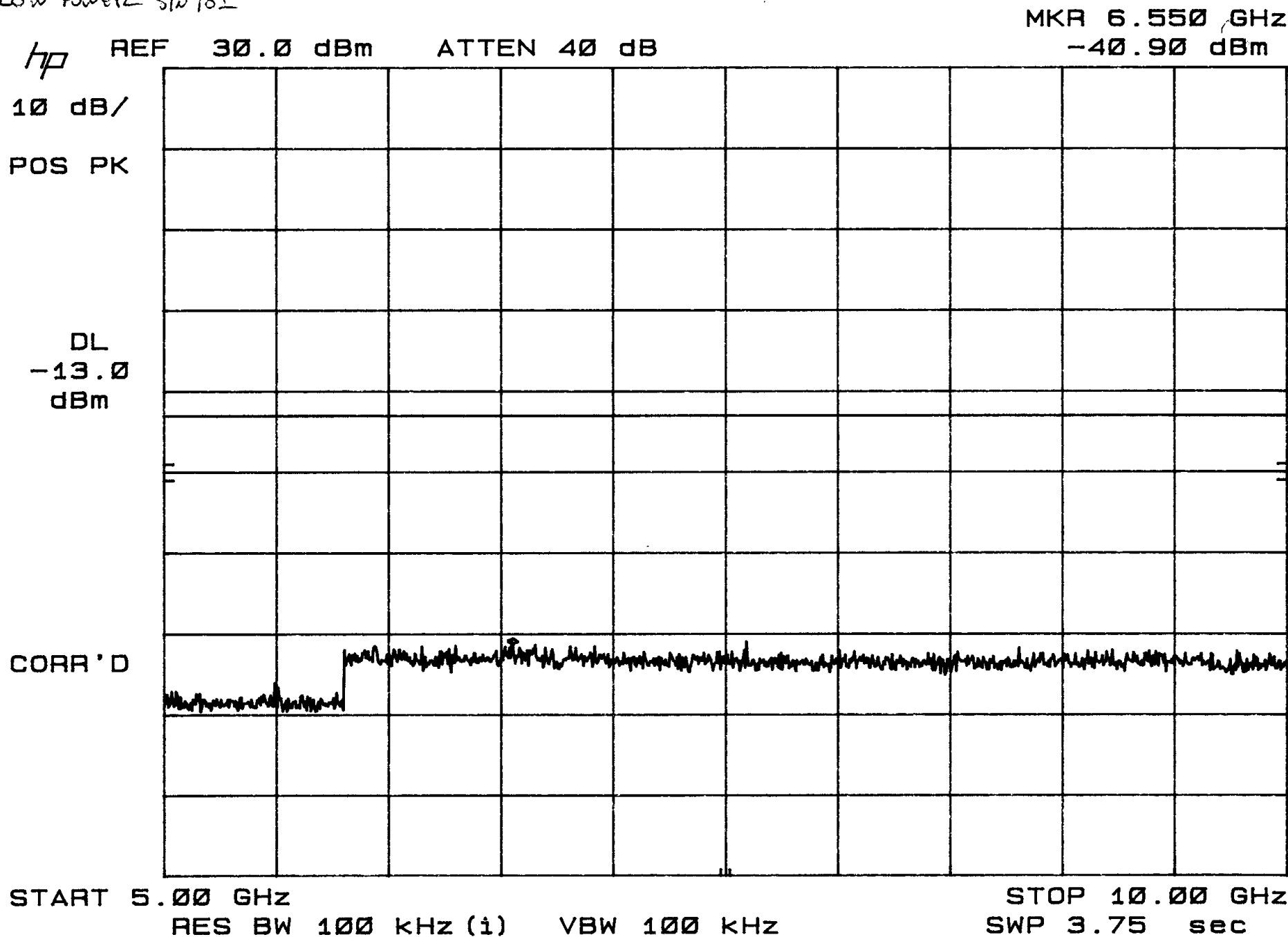
RES BW 100 kHz (i) VBW 100 kHz

STOP 5.00 GHz
SWP 2.25 sec

51

CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx R Rx4
LOW POWER S/N 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS



CONDUCTED SPURIOUS

MID TRANSMIT 725 MHz Tx 12 Rx 4

HIGH POWER S/N 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

MKR 12.05 MHz

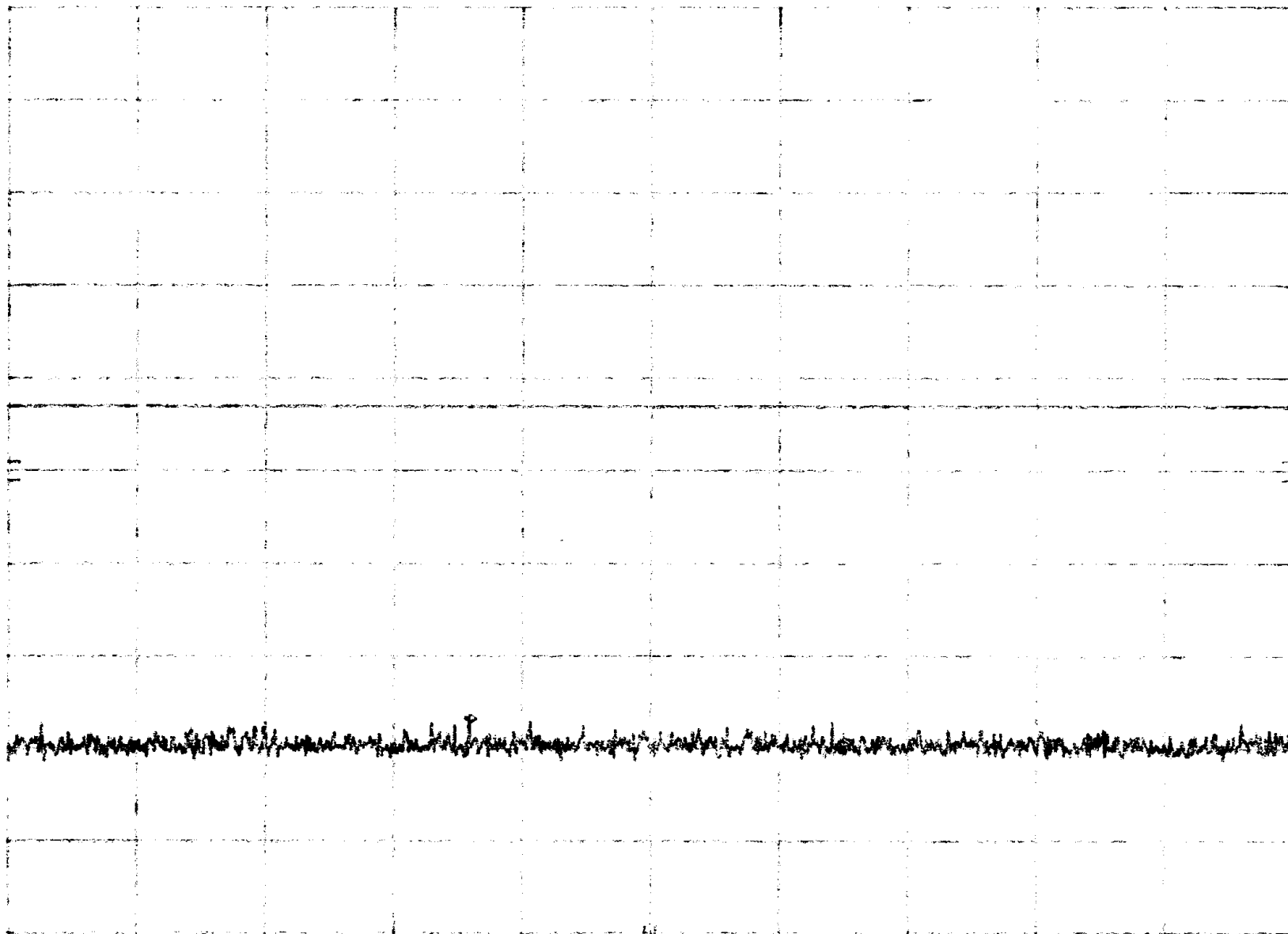
-46.70 dBm

HP REF 30.0 dBm ATTEN 40 dB

10 dB/

POS PK

DL
-13.0
dBm



START 2.0 MHz

RES BW 100 KHz (1) VBW 100 KHz

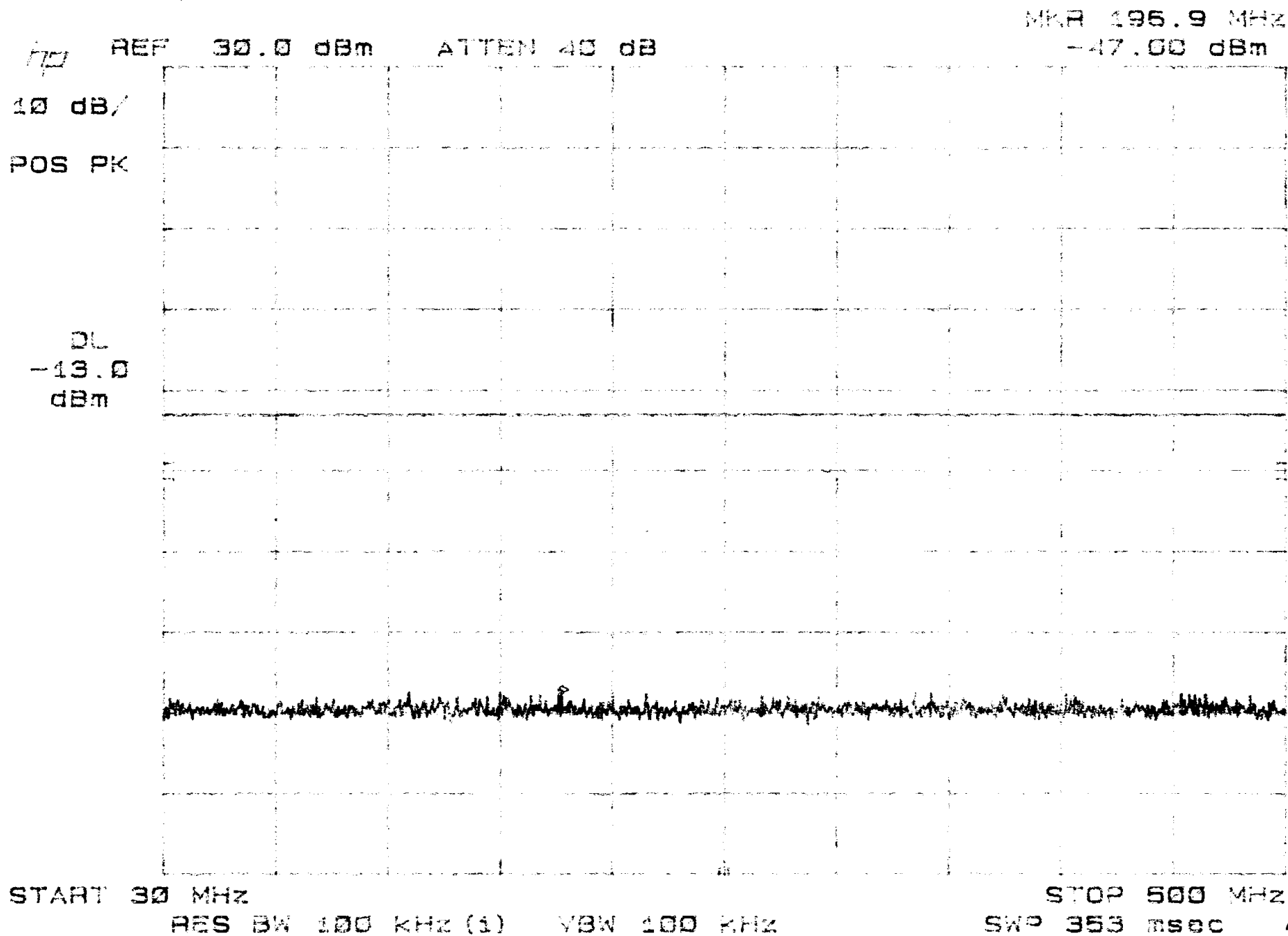
STOP 30.0 MHz

SWP 21.0 msec

53

CONDUCTED SPURIOUS
MID TRANSMIT 725 MHz Tx 12 Rx 4
HIGH POWER S/N 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER
MID



CONDUCTED SPURIOUS

M/D TRANSMIT 725 MHz Tx 12 Rx 4

HIGH POWER S/N 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
M/D TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

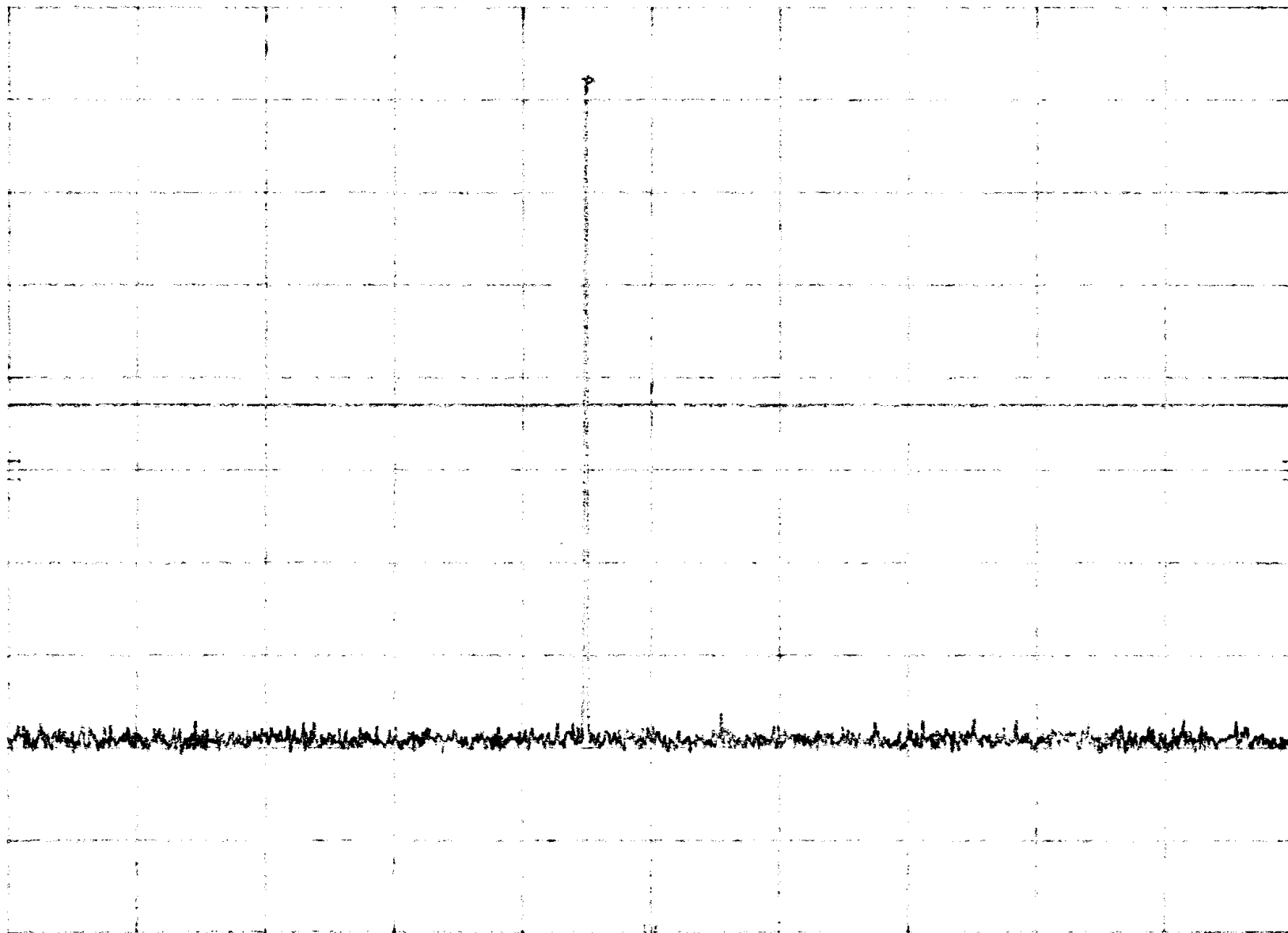
MKR 725.0 MHz
22.20 dBm

HP REF 30.0 dBm ATTN 40 dB

10 dB/

POS PK

DL
-13.0
dBm



START 500 MHz

RES BW 100 KHz (1) VBW 100 KHz

STOP 1.000 GHz
SWP 375 msec

55

CONDUCTED SPURIOUS

MID TRANSMIT 725 MHz Tx 12 Rx 4

HIGH POWER S/N 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

MKR 1.451 GHz

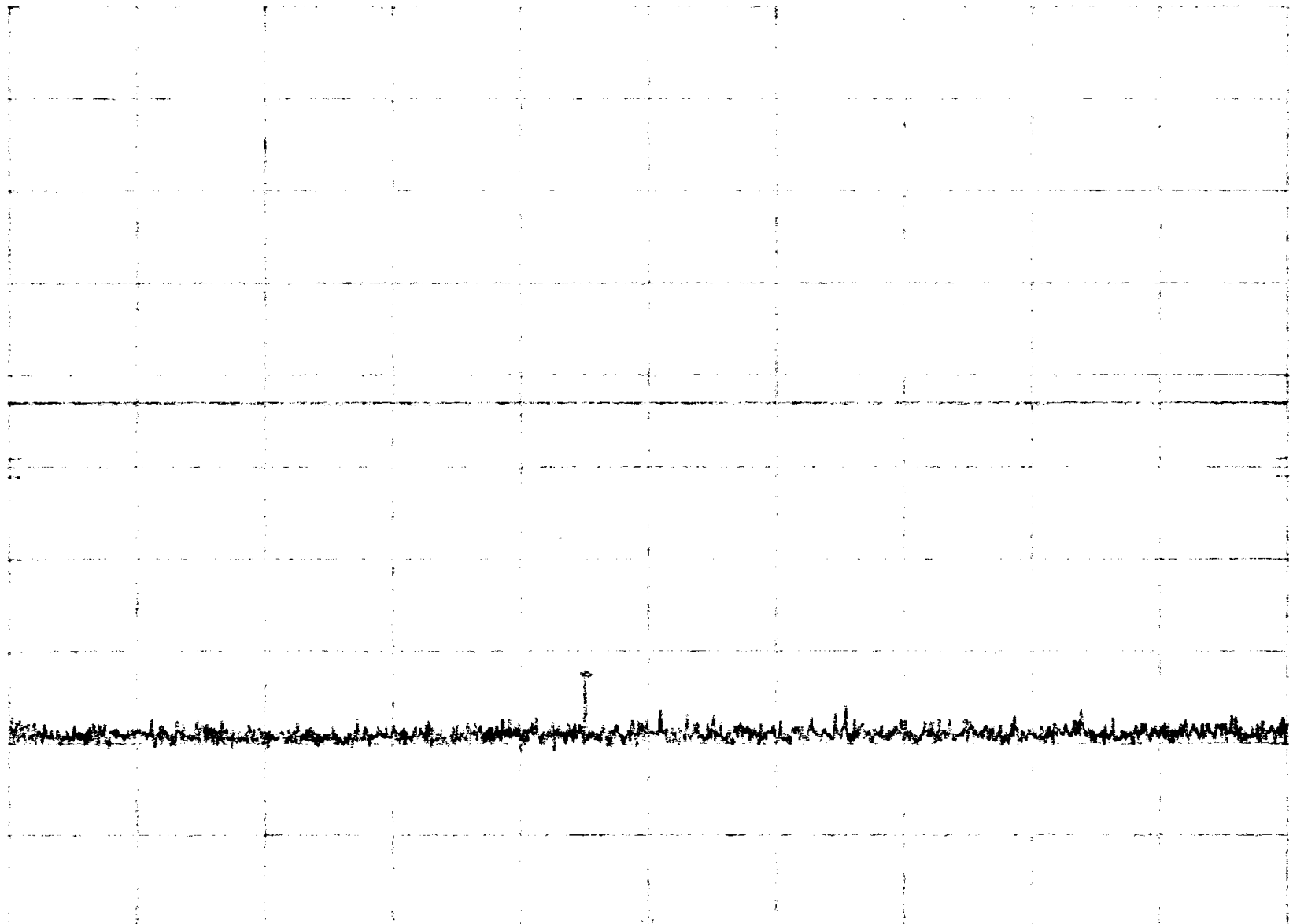
-12.40 dBm

REF 30.0 dBm ATTN 40 dB

10 dB/

POS PK

DL
-13.0
dBm



START 1.00 GHz

RES BW 100 kHz (1) VBW 100 kHz

STOP 2.00 GHz

SWP 750 msec

56

CONDUCTED SPURIOUS
M10 TRANSMIT 725 MHz Tx 12 Rx 4

HIGH POWER S/N 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
M10 TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER

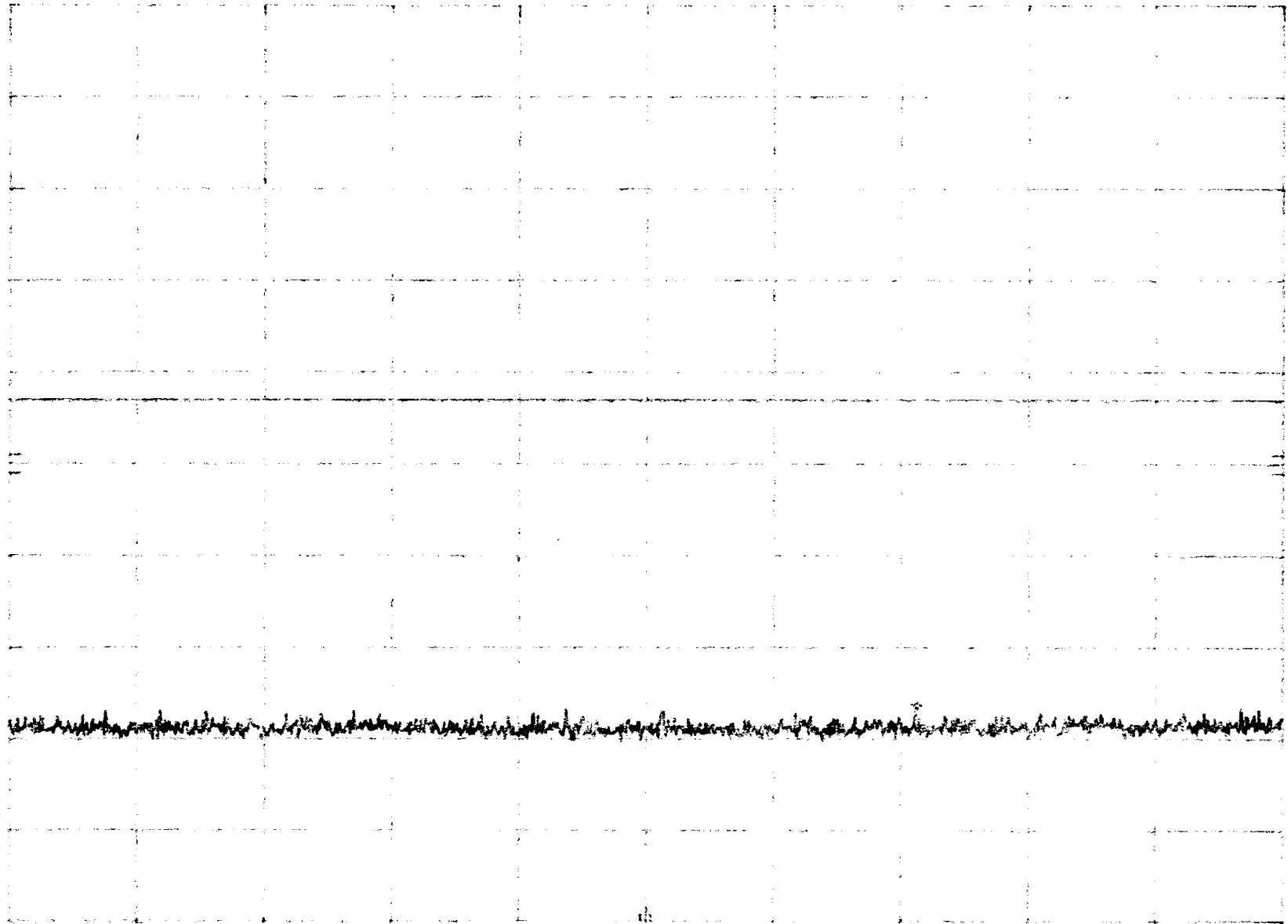
MARK 4.136 GHz
-46.30 dBm

1p REF 30.0 dBm ATTN 40 dB

10 dB

POS PK

DL
-13.0
dBm



START 2.00 GHz

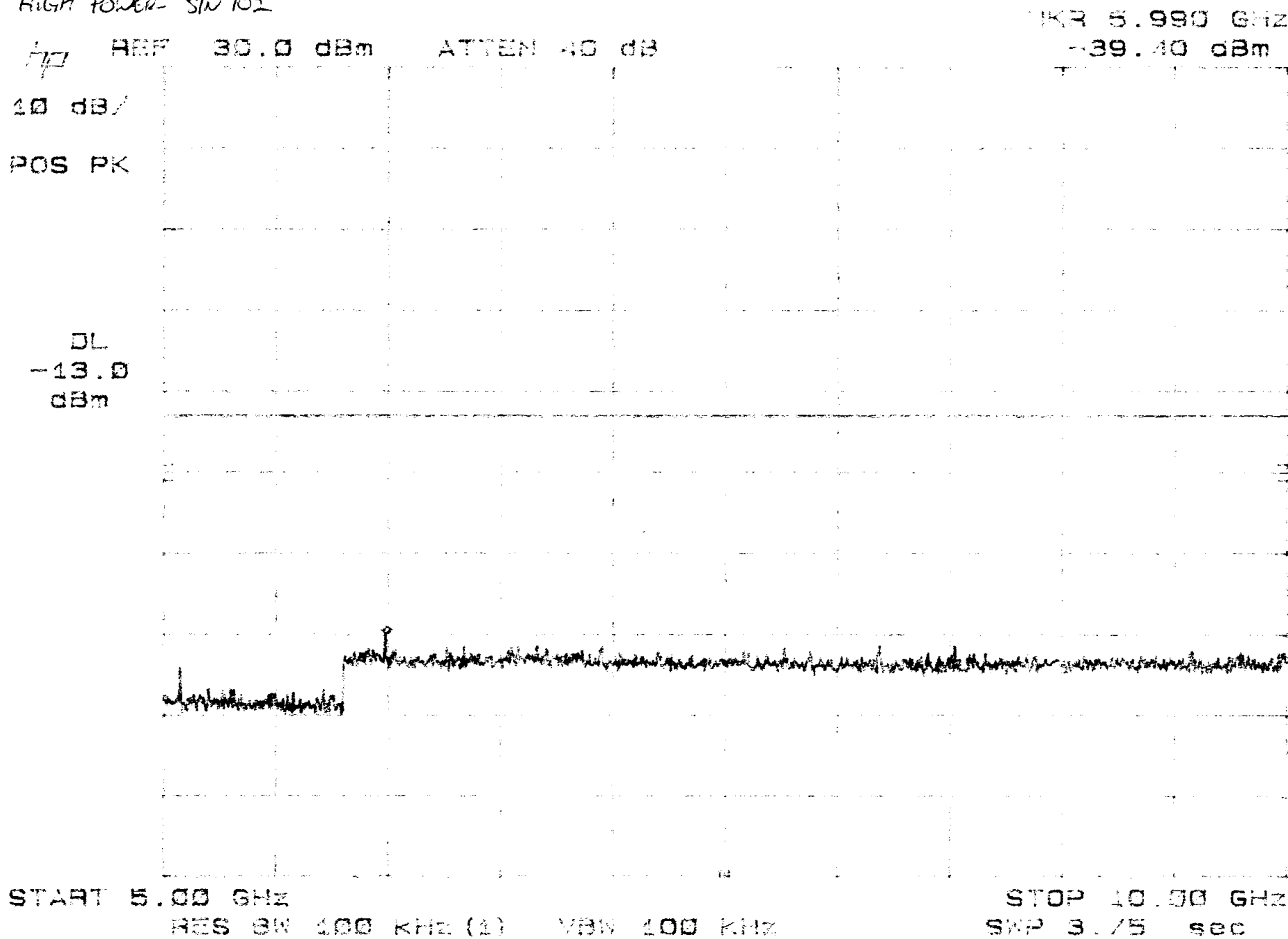
RES BW 100 KHz (1) VBW 100 KHz

STOP 5.00 GHz
SWP 2.25 sec

57

CONDUCTED SPURIOUS
MID TRANSMIT 725 MHz Tx 12 Rx 4
HIGH POWER S/N 102

FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER



CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 Rx 4
HIGH POWER SIN 102

2.1051 74.861(e)(6)(iii)

MKR 7.01 MHz
-46.60 dBm

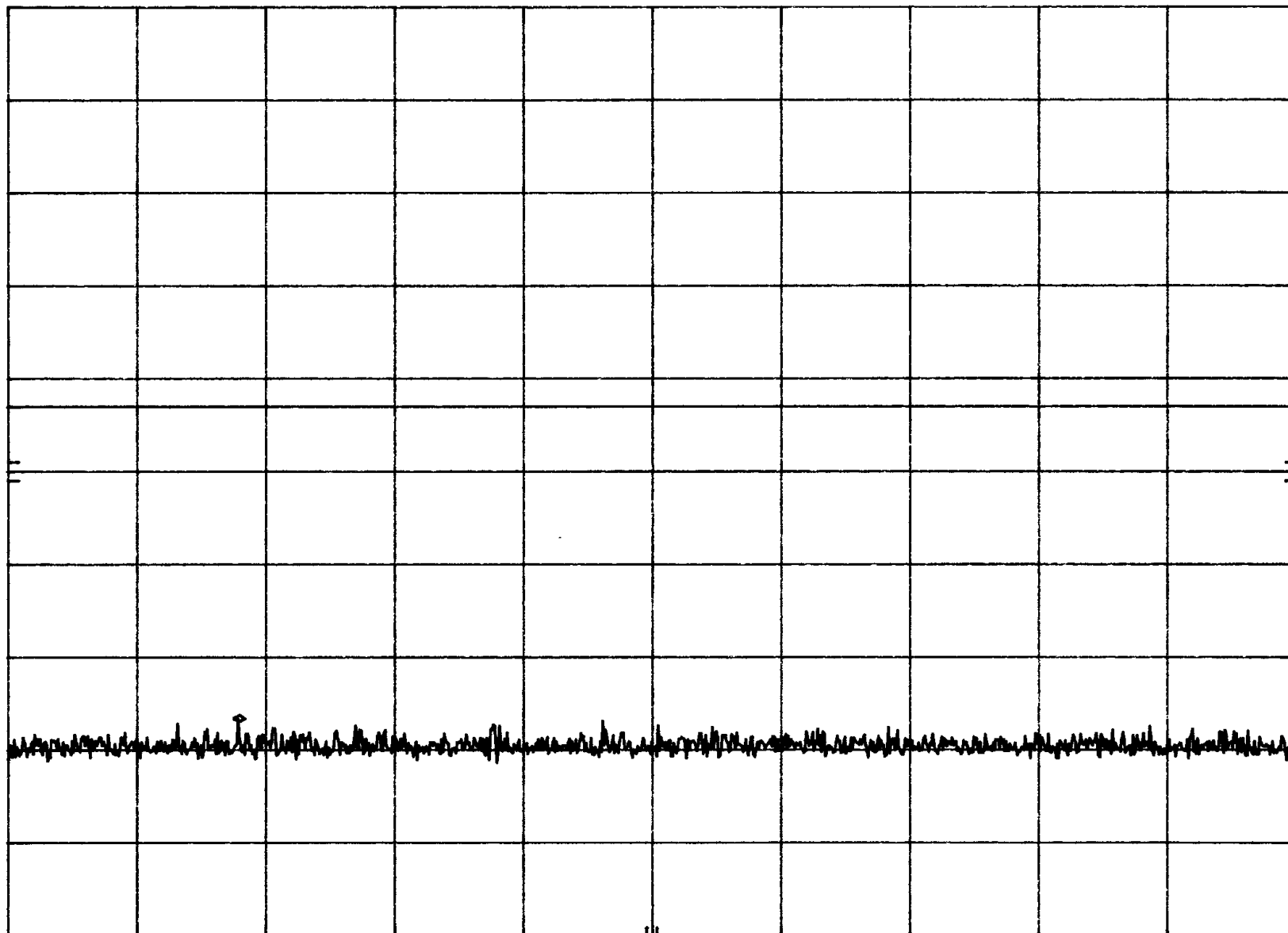
hp REF 30.0 dBm ATTN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

CORR'D



START 2.0 MHz

RES BW 100 kHz (i) VBW 100 kHz

STOP 30.0 MHz
SWP 21.0 msec

59

CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 Rx 4
HIGH POWER SIN 102

2.1051 74.861(6)(iii)

MKR 61.5 MHz
-46.80 dBm

hp REF 30.0 dBm ATTEN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

CORR'D

START 30 MHz

RES BW 100 kHz (1)

VBW 100 kHz

STOP 500 MHz

SWP 353 msec

60

CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 Rx 4
HIGH POWER S/N 102

2.1051 74.861(e)(6)(iii)

MKR 740.0 MHz
21.80 dBm

HP REF 30.0 dBm ATTEN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

CORR'D

START 500 MHz
RES BW 100 kHz (1) VBW 100 kHz

STOP 1.000 GHz
SWP 375 msec

61

CONDUCTED SPURIOUS
HIGH TRANS MIT 740 MHz Tx12 Rx4
HIGH POWER S/N 102

2.1051 74.861(e)(6)(iii)

MKR 1.583 GHz
-46.20 dBm

hp

REF 30.0 dBm

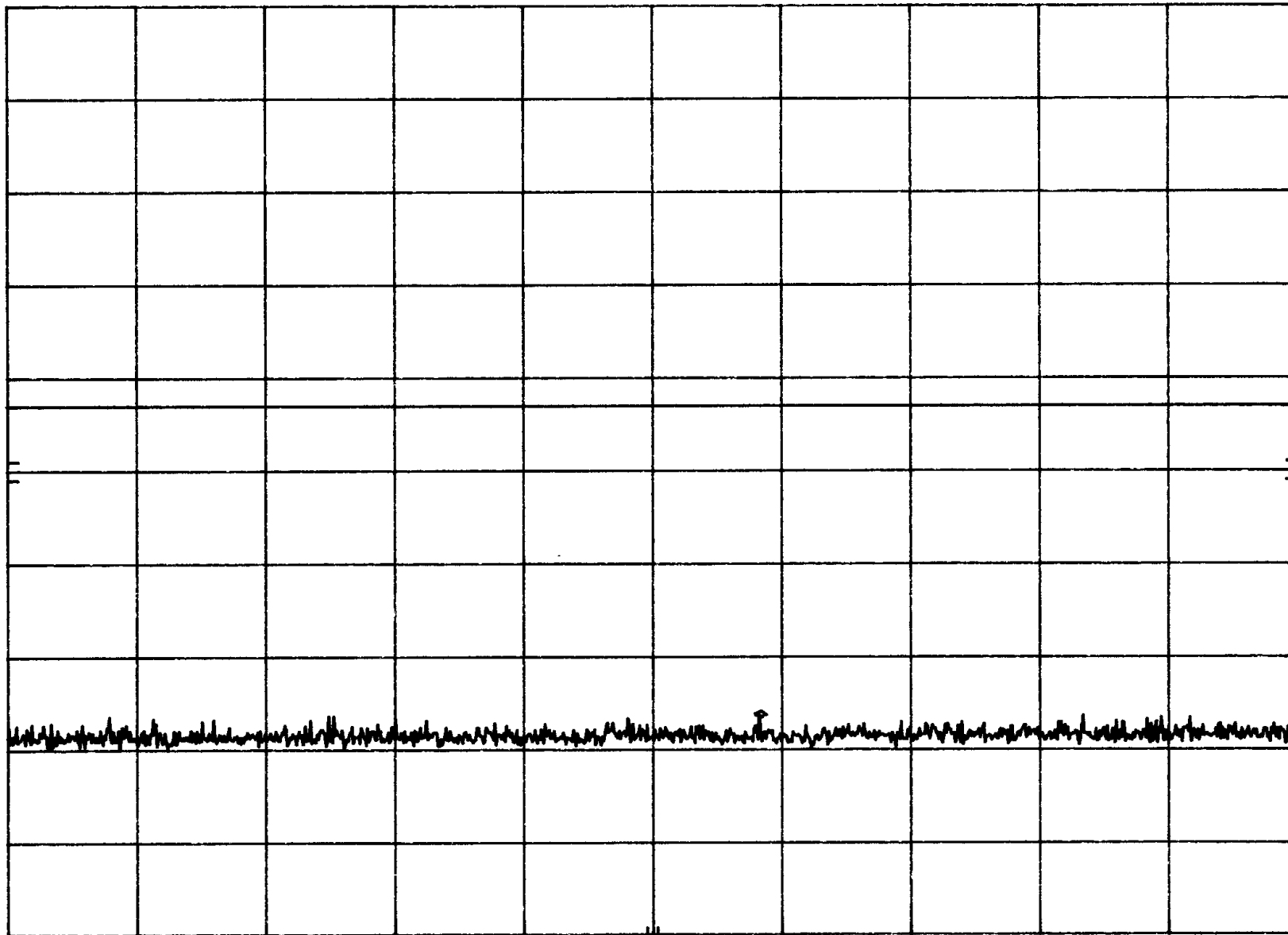
ATTEN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

CORR'D



START 1.00 GHz

RES BW 100 kHz (1)

VBW 100 kHz

STOP 2.00 GHz

SWP 750 msec

62

CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 Rx 4

2.1051

74.861(e)(6)(ii)

HIGH POWER S/N 102

MKR 4.430 GHz

hp REF 30.0 dBm ATTN 40 dB

-45.90 dBm

10 dB/

POS PK

DL
-13.0
dBm

CORR'D

START 2.00 GHz

RES BW 100 kHz (i)

VBW 100 kHz

STOP 5.00 GHz

SWP 2.25 sec

63

CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx12 Rx4
HIGH POWER S/W 102

2.1051 74.861(e)(6)(ii)

MKR 7.970 GHz
-40.50 dBm

hp REF 30.0 dBm ATTN 40 dB

10 dB/

POS PK

DL
-13.0
dBm

CORR'D

START 5.00 GHz
RES BW 100 kHz (i) VBW 100 kHz

STOP 10.00 GHz
SWP 3.75 sec

64

*Frequency
Stability 2.1055*

Vega Wireless Masterstation - 704.000MHz Reference
February 6, 2001
TUV Product Service - San Diego

"11:50:08",-4096,-32.22
"11:51:13",-3072,-32.19
"11:52:18",-2304,-32.23
"11:53:23",-2240,-32.22
"11:54:28",-1920,-32.26
"11:55:33",-1664,-32.19
"11:56:37",-1728,-32.24
"11:57:42",-1600,-32.26
"11:58:47",-1728,-32.25
"11:59:51",-1600,-32.24
"13:00:06",-4608,-23.008
"13:01:11",-2944,-22.98
"13:02:15",-1984,-23.047
"13:03:20",-1216,-23.016
"13:04:25",-1152,-23.03
"13:05:29",-1152,-22.984
"13:06:34",-1216,-22.996
"13:07:39",-1024,-22.998
"13:08:44",-448,-23.029
"13:09:49",384,-23.034
"14:10:03",-1152,-13.466
"14:11:08",-576,-13.443
"14:12:13",704,-13.437
"14:13:18",1344,-13.491
"14:14:23",1600,-13.456
"14:15:27",1600,-13.418
"14:16:32",1664,-13.417
"14:17:37",1536,-13.407
"14:18:41",1664,-13.427
"14:19:46",1472,-13.455
"15:20:01",1472,-3.853
"15:21:06",1472,-3.832
"15:22:10",1344,-3.811
"15:23:15",1472,-3.821
"15:24:20",1280,-3.813
"15:25:25",1280,-3.842
"15:26:29",1152,-3.841
"15:27:34",1344,-3.826
"15:28:39",1152,-3.79
"15:29:44",1088,-3.802
"16:29:58",1408,5.581

"16:31:03",1152,5.6
"16:32:08",960,5.581
"16:33:13",1088,5.603
"16:34:17",704,5.621
"16:35:22",640,5.603
"16:36:27",512,5.644
"16:37:32",384,5.62
"16:38:36",384,5.636
"16:39:41",128,5.655
"17:39:56",704,14.664
"17:41:01",448,14.696
"17:42:05",448,14.728
"17:43:10",64,14.744
"17:44:15",192,14.728
"17:45:20",-384,14.739
"17:46:24",-256,14.767
"17:47:29",-256,14.81
"17:48:34",-320,14.819
"17:49:39",-512,14.856
"18:49:53",-2048,26.439
"18:50:58",-704,26.456
"18:52:03",-1280,26.477
"18:53:08",3392,26.459
"18:54:13",-64,26.491
"18:55:17",-2304,26.477
"18:56:22",-3392,26.527
"18:57:27",-3264,26.52
"18:58:31",-1216,26.546
"18:59:36",-320,26.537
"19:59:51",-1536,35.66
"20:00:56",-1664,35.62
"20:02:00",-2048,35.66
"20:03:05",-1920,35.67
"20:04:10",-1728,35.7
"20:05:15",-1984,35.71
"20:06:19",-1920,35.69
"20:07:24",-2240,35.68
"20:08:29",-2176,35.72
"20:09:34",-2048,35.71
"21:09:48",-2240,45.51
"21:10:53",-1600,45.54
"21:11:58",-2048,45.51
"21:13:03",-2112,45.54
"21:14:08",-1984,45.53
"21:15:13",-2048,45.56
"21:16:17",-2176,45.54
"21:17:22",-2048,45.57
"21:18:27",-2240,45.58
"21:19:32",-1984,45.58

3/20/21
JCO

Vega Wireless Masterstation
485 MHz

Time Seq	Delta	Freq Ref.	Temp	Volt1	Volt2	Volt3
1:00:11	896	-31.18		5.451	14.922	-15.115
1:01:19	1088	-31.24		5.451	14.919	-15.118
1:02:27	1216	-31.32		5.452	14.917	-15.12
1:03:35	1312	-31.32		5.452	14.915	-15.122
1:04:43	1216	-31.3		5.452	14.912	-15.124
1:05:51	1408	-31.36		5.452	14.911	-15.125
1:06:59	1504	-31.35		5.452	14.909	-15.127
1:08:07	1504	-31.38		5.452	14.907	-15.127
1:09:14	1504	-31.38		5.452	14.906	-15.129
1:10:22	1600	-31.39		5.452	14.904	-15.13
2:10:40	288	-22.226		5.45	14.964	-15.063
2:11:48	512	-22.32		5.45	14.959	-15.069
2:12:56	800	-22.259		5.451	14.954	-15.073
2:14:04	992	-22.264		5.451	14.948	-15.077
2:15:12	1088	-22.394		5.451	14.944	-15.08
2:16:20	1216	-22.276		5.451	14.939	-15.083
2:17:28	1312	-22.281		5.452	14.935	-15.086
2:18:36	1408	-22.291		5.452	14.931	-15.088
2:19:43	1600	-22.224		5.452	14.927	-15.089
2:20:51	1600	-22.233		5.452	14.924	-15.092
3:21:09	1504	-12.869		5.451	14.941	-15.071
3:22:17	1696	-12.794		5.451	14.936	-15.075
3:23:25	1696	-12.913		5.451	14.931	-15.079
3:24:33	1792	-12.802		5.452	14.926	-15.083
3:25:41	1888	-12.87		5.452	14.921	-15.086
3:26:49	1984	-12.911		5.452	14.916	-15.088
3:27:57	1984	-12.816		5.452	14.9	-15.125
3:29:04	1984	-12.891		5.452	14.896	-15.126
3:30:12	1888	-12.854		5.452	14.893	-15.127
3:31:20	1888	-12.842		5.452	14.889	-15.129
4:31:38	1888	-3.198		5.451	14.892	-15.152
4:32:46	1984	-3.144		5.451	14.887	-15.154
4:33:54	1984	-3.245		5.452	14.881	-15.157
4:35:02	1888	-3.222		5.452	14.876	-15.16
4:36:10	1984	-3.201		5.452	14.871	-15.161
4:37:18	1792	-3.164		5.452	14.867	-15.162
4:38:26	1888	-3.165		5.452	14.862	-15.165
4:39:34	1792	-3.133		5.452	14.858	-15.166
4:40:42	1792	-3.112		5.452	14.854	-15.167
4:41:50	1792	-3.164		5.452	14.851	-15.168
5:42:08	1792	6.117		5.451	14.859	-15.158
5:43:15	1792	6.086		5.452	14.853	-15.161
5:44:23	1600	6.14		5.452	14.848	-15.162
5:45:31	1504	6.163		5.452	14.844	-15.164
5:46:39	1312	6.184		5.452	14.839	-15.165
5:47:47	1312	6.178		5.452	14.835	-15.167
5:48:55	1216	6.181		5.452	14.832	-15.168
5:50:03	1216	6.218		5.452	14.828	-15.169
5:51:11	1216	6.228		5.452	14.825	-15.17

67

Vega Wireless Masterstation
485 MHz

Time Seq	Delta Freq	Ref. Temp	Volt1	Volt2	Volt3
5:52:19	992	6.186	5.452	14.822	-15.17
6:52:37	1088	15.165	5.451	14.828	-15.163
6:53:45	800	15.21	5.451	14.824	-15.165
6:54:53	704	15.196	5.451	14.82	-15.166
6:56:01	608	15.226	5.451	14.816	-15.168
6:57:09	512	15.277	5.451	14.812	-15.168
6:58:17	384	15.282	5.451	14.808	-15.169
6:59:25	384	15.284	5.451	14.805	-15.17
7:00:33	288	15.272	5.451	14.801	-15.171
7:01:41	192	15.314	5.451	14.798	-15.171
7:02:49	0	15.365	5.451	14.795	-15.173
8:03:12	-1088	34.5	5.448	14.724	-15.169
8:04:20	-1216	34.49	5.448	14.712	-15.17
8:05:23	0	24.24	5.451	14.797	-15.162
8:06:31	-96	24.033	5.451	14.796	-15.167
8:07:39	-96	24.003	5.451	14.793	-15.168
8:08:46	-384	23.898	5.451	14.789	-15.169
8:09:54	-512	23.909	5.451	14.785	-15.17
8:11:02	-608	23.93	5.451	14.782	-15.171
8:12:10	-704	23.987	5.45	14.778	-15.172
8:13:18	-800	24.053	5.45	14.775	-15.172
9:13:36	-1216	36.45	5.45	14.767	-15.164
9:14:44	-1408	36.44	5.45	14.763	-15.168
9:15:52	-1504	36.45	5.449	14.759	-15.17
9:17:00	-1600	36.46	5.449	14.756	-15.171
9:18:08	-1600	36.46	5.449	14.752	-15.172
9:19:16	-1600	36.44	5.449	14.748	-15.172
9:20:24	-1792	36.44	5.449	14.745	-15.173
9:21:32	-1792	36.44	5.449	14.741	-15.173
9:22:40	-1888	36.46	5.448	14.738	-15.173
9:23:48	-1888	36.58	5.448	14.735	-15.174
10:24:06	-1984	46.17	5.448	14.728	-15.171
10:25:14	-1984	46.21	5.447	14.71	-15.17
10:26:22	-2112	46.21	5.447	14.707	-15.172
10:27:30	-1984	46.2	5.447	14.706	-15.172
10:28:38	-2208	46.23	5.447	14.7	-15.172
10:29:45	-2112	46.25	5.446	14.701	-15.172
10:30:53	-2208	46.24	5.446	14.703	-15.173
10:32:01	-2208	46.29	5.446	14.7	-15.173
10:33:09	-2208	46.26	5.446	14.693	-15.173
10:34:18	-2208	46.03	5.446	14.689	-15.173

Vega Wireless Masterstation
485 MHz
Voltage Frequency Stability Part 2.1055(d)(1)

Frequency	Voltage	Delta Frequency
484.998280 MHz	115 Vac (nominal)	Reference
484.998342 MHz	97.75 Vac (85%)	62 Hz
484.998240 MHz	132.25 Vac (115%)	-40 Hz

Equipment Used:

HP 6843A AC Power Source PN: 580
HP 8568B Spectrum Analyzer PN: 187/188

Date Performed: April 4, 2001
Performed by: J Owen



5. ATTESTATION STATEMENT

SUMMARY:

All tests per CFR 47, FCC Part 2, Paragraphs 2.1046; 2.1047(a);(b); 2.1049; 2.1051; 2.1053; 2.1055; Part 74, Paragraph 74.861(e)(1); (e)(3); (e)(5); and (e)(6) were

■ - Performed

The Equipment Under Test

■ - **Fulfills** the requirements of CFR 47, FCC Part 2, Paragraphs 2.1046; 2.1047(a);(b); 2.1049; 2.1051; 2.1053; 2.1055; Part 74, Paragraph 74.861(e)(1); (e)(3); (e)(5); and (e)(6).

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:

A handwritten signature in black ink, appearing to read 'Jim Owen', written in a cursive style.

Jim Owen
(EMC Engineer)

4/12/01

**Q700 MASTER STATION FREQUENCY STABILITY TEST
VERSUS POWER SUPPLY VARIATIONS**

Unit # 102 Master Station TX12

Nominal Operating Frequency = 725.000000 MHz

①

Tolerance is .005% = .00005 = +/-36.25kHz

85%	97 VAC	724.999817 MHz
100% Nominal Voltage	115 VAC	724.999862 MHz
115%	132 VAC	724.999769 MHz

UNIT #103 Master Station TX8

Nominal operating frequency = 605.000000 MHz

Tolerance is .005% = .00005 = +/-30.25kHz

②

85%	97VAC	605.001613 MHz
100% Nominal Voltage	115 VAC	605.001683 MHz
115%	132 VAC	605.001575 MHz

UNIT #104 Master Station TX4

Nominal operating frequency = 485.000000 MHz

③

Tolerance is .005% = .00005 = +/-24.25kHz

85%	97 VAC	485.000213 MHz
100%	115 VAC	485.000143 MHz
115%	132 VAC	485.000102 MHz

I certify that the above frequency measurements were made on the Master Stations with a calibrated HP53131A Frequency Counter.

James E. Pigg

Director of Engineering VEGA Holdings, Inc.

71