MEASUREMENT AND TECHNICAL REPORT

VEGA WIRELESS
9900 East Baldwin Place
El Monte, CA 91731-1342

DATE: 06 June 2001

This Report Concerns:	Original Grant: X Class II Change:
Equipment Type:	Master Station (Splits: TX12, RX4; TX8, RX12; and TX4, RX8)
Deferred grant requested per 47 CFR 0.457(d)(1)(ii)?	Yes: No: X **Defer until:**
Company Name **agrees to notify the Commission by:** **of the intended date of announcement of the product so that the grant can be issued on that date.**	N/A
Transition Rules Request per 15.37?	Yes: *No: X
(*) 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)	

Report Prepared by:

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

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

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

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

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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	☒ ☐

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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 #
Wirless Intercom Master Station	MS-700	102	BFDQ700MS4

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Support Equipment

Description	*Model #*	*Serial #*	*FCC ID #*
Interface Program Box	QPA-1	001	N/A
PC	DOS version S/W	N/A	N/A

Oscillator Frequencies

Frequency	*Derived Frequency*	*Component # / Location*	*Description of Use*
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

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Support Equipment

Description		*Model #*	*Serial #*	*FCC ID #*
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

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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.

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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. 1051Radiated 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 sterophonic 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.

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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:

Corrected Meter Reading Limit (CMRL) = SAR + AF + CL - AG - 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:

CMRL = 29.4 dBuV + 9.2dB = 1.4 dB - 20 dB/M - 0.0 dB

CMRL = 20.0 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.

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4 CONDUCTED EMISSION EQUIPMENT/DATA

See following page(s).

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Emissions Test Conditions: CONDUCTED EMISSIONS; RF POWER OUTPUT; OCCUPIED BANDWIDTH; MODULATION CHARACTERISTICS AND FREQUENCY STATILITY: 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: _____

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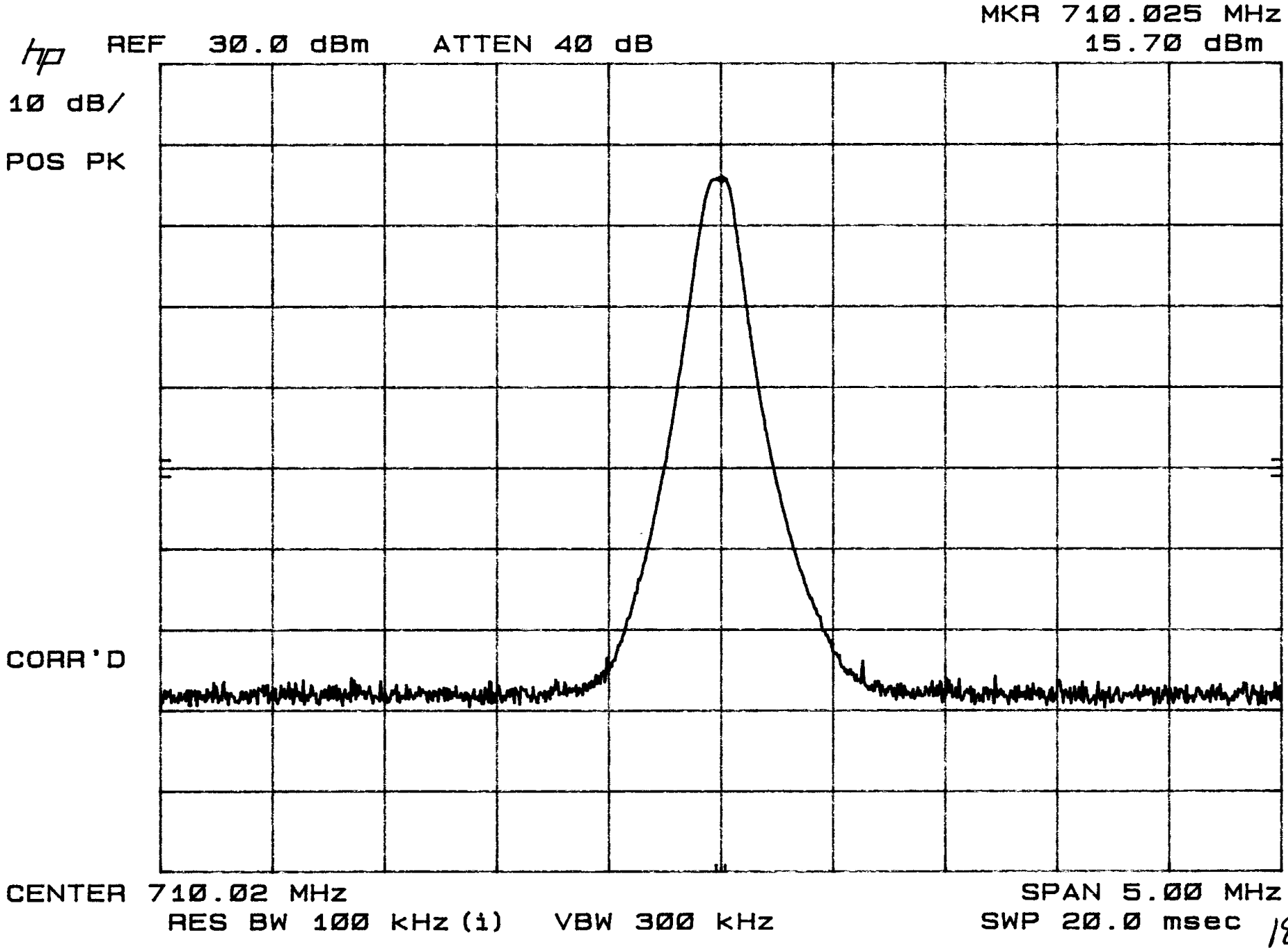
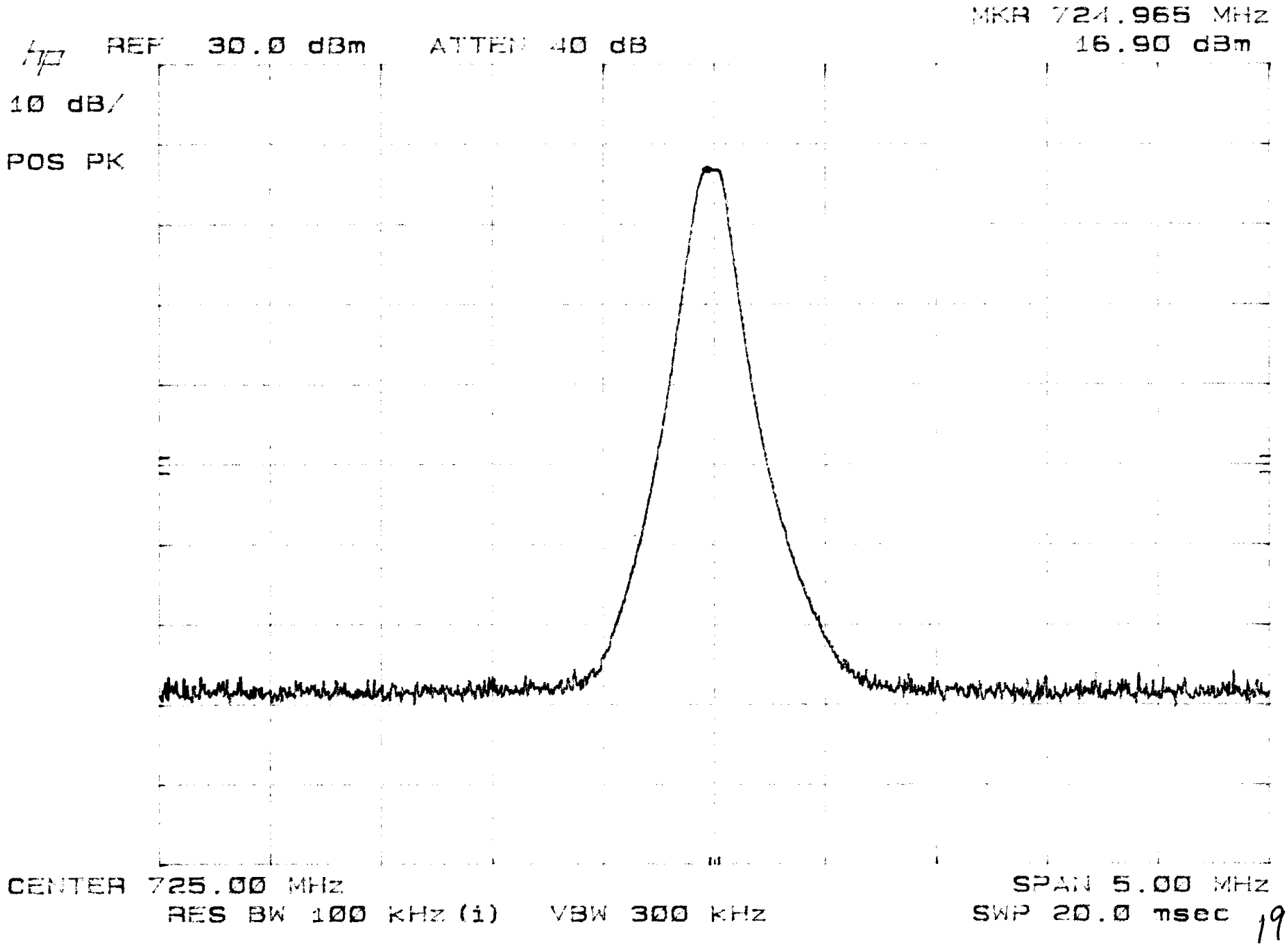
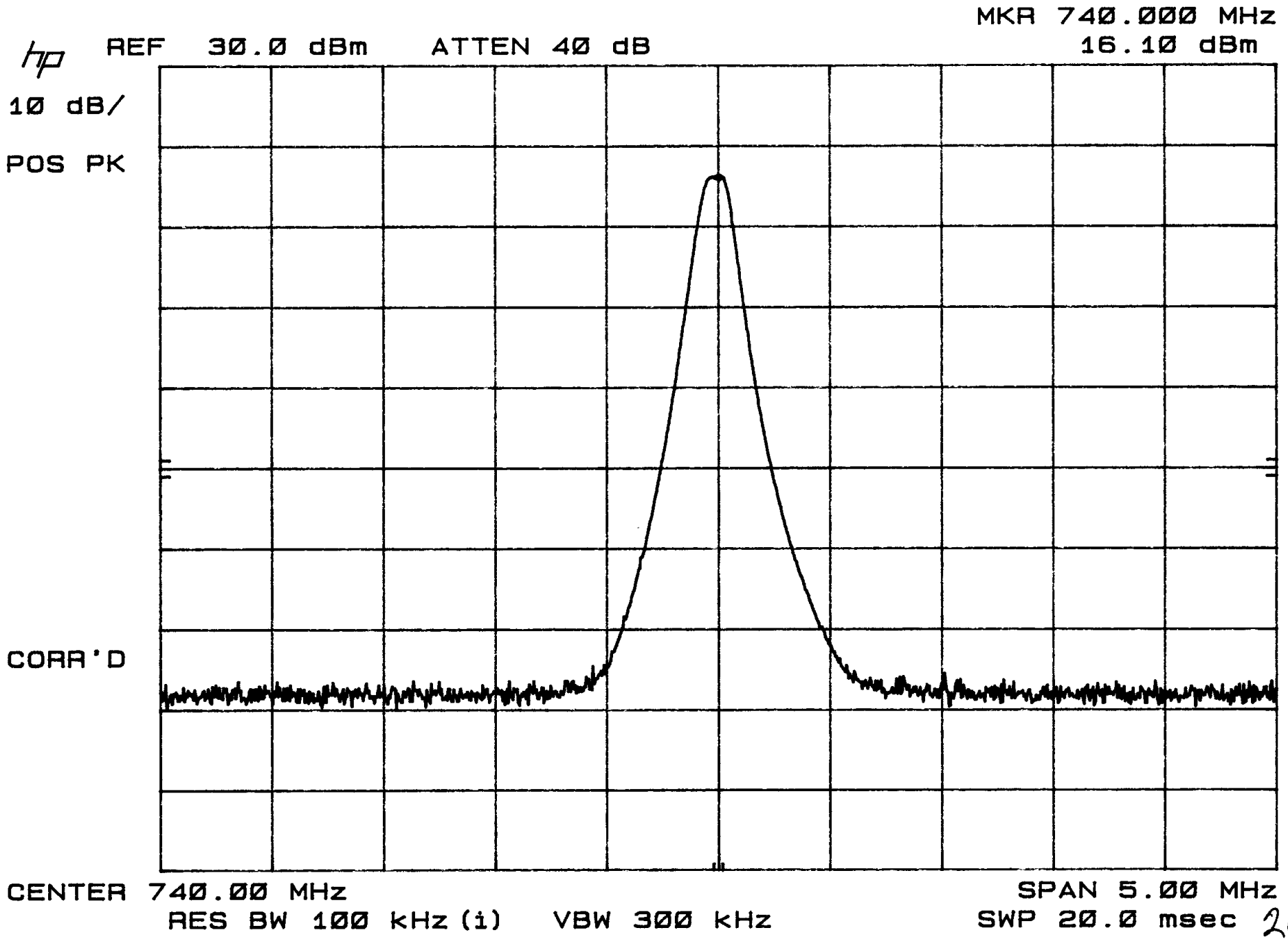
FCC PART 2, SECTION 2.1046 AND PART 74, SECTION 74.861(e)(1)(ii) RF OUTPUT POWER LOW POWER
PEAK POWER OUTPUT: 80 mW; LOW TRANSMIT 710.025 MHz Tx 12 Rx 4; S/N 102



FCC PART 2, SECTION 2.1046 AND PART 74, SECTION 74.861(e)(1)(ii) RF OUTPUT POWER LOW POWER
PEAK POWER OUTPUT: 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



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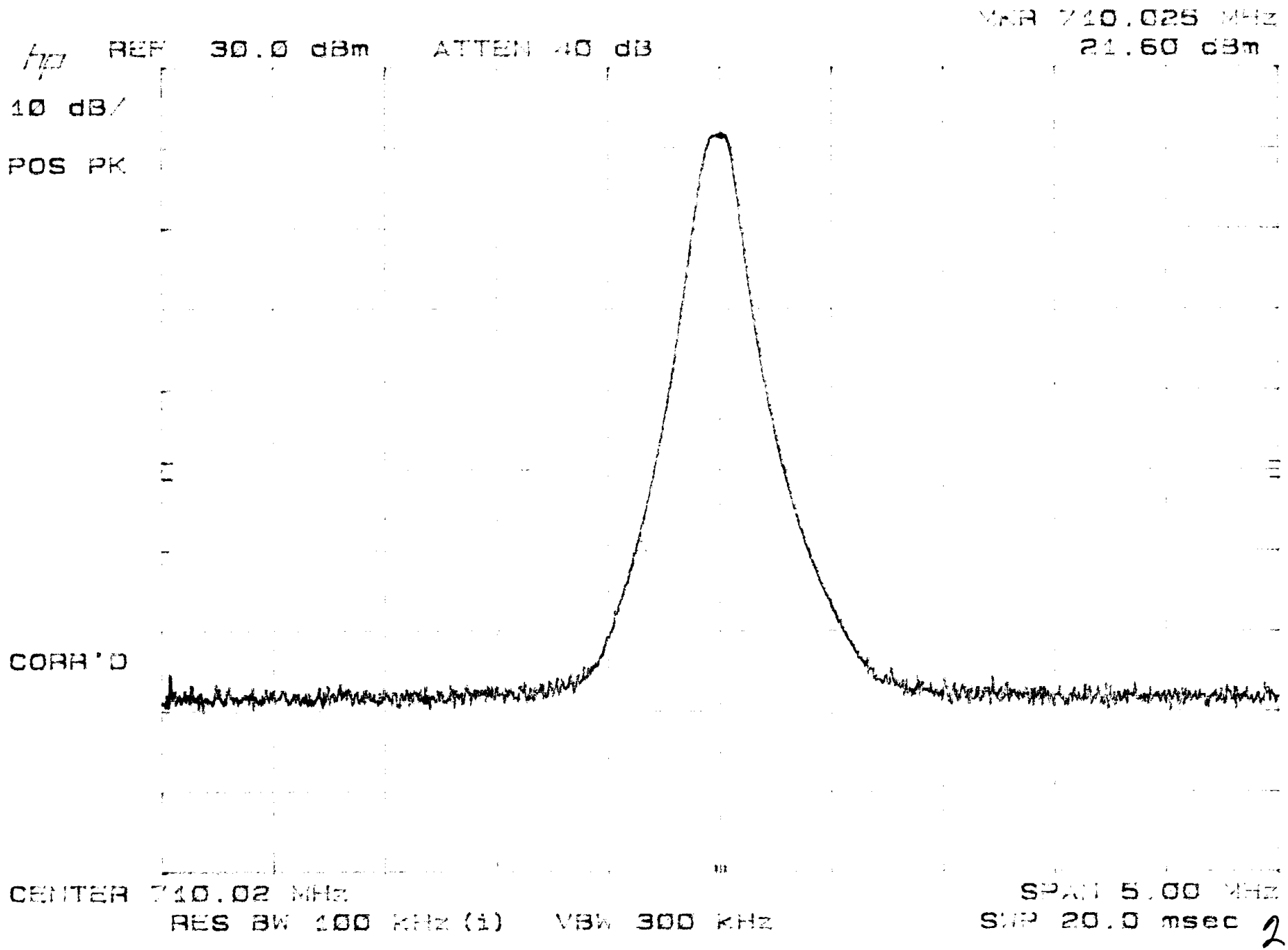
FCC PART 2, SECTION 2.1046 AND PART 74, SECTION 74.861(e)(1)(ii) RF OUTPUT POWER HIGH POWER
PEAK POWER OUTPUT: 290 mW; HIGH TRANSMIT 710.025 MHz Tx 12 Rx 4; S/N 102



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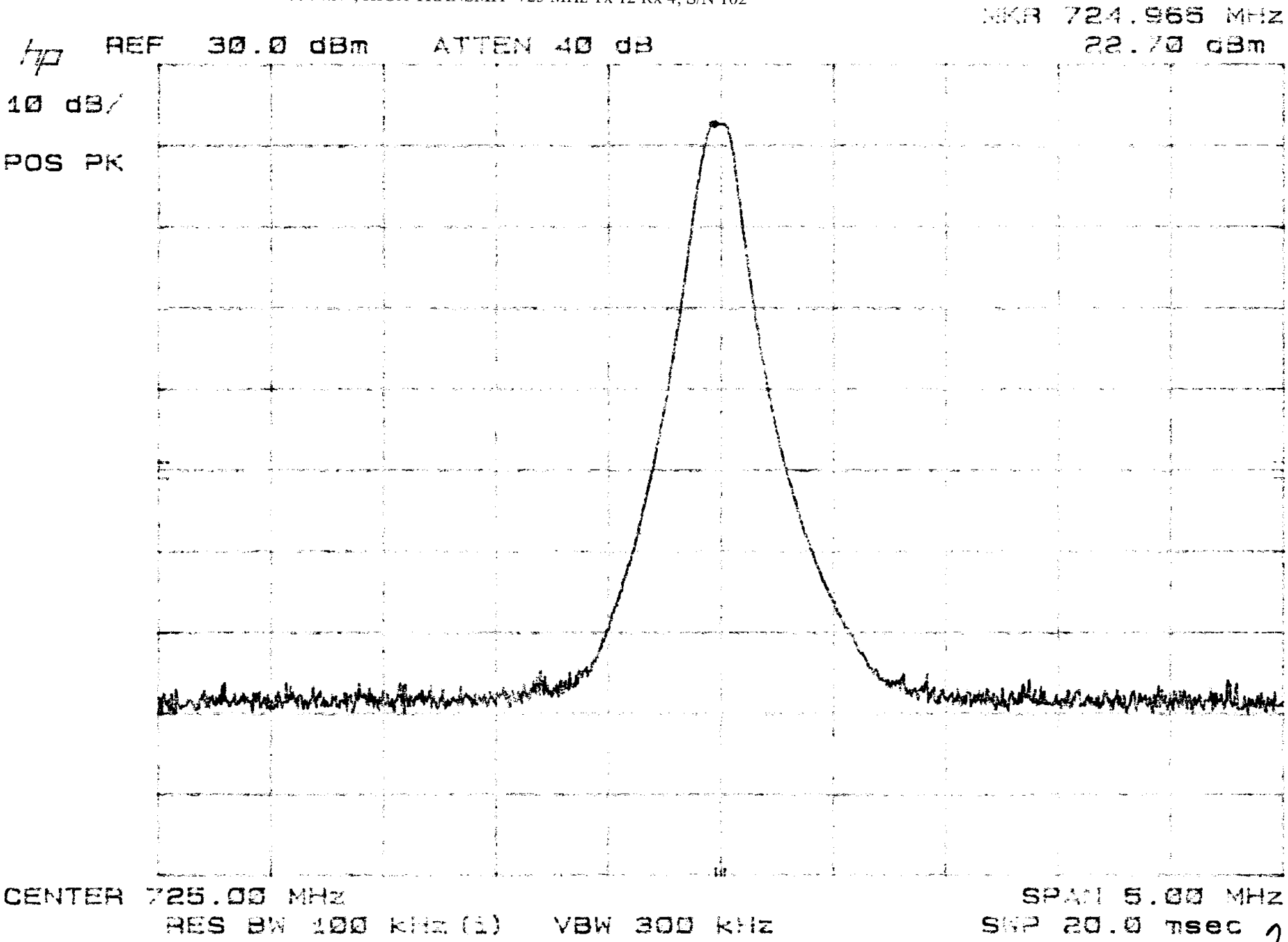
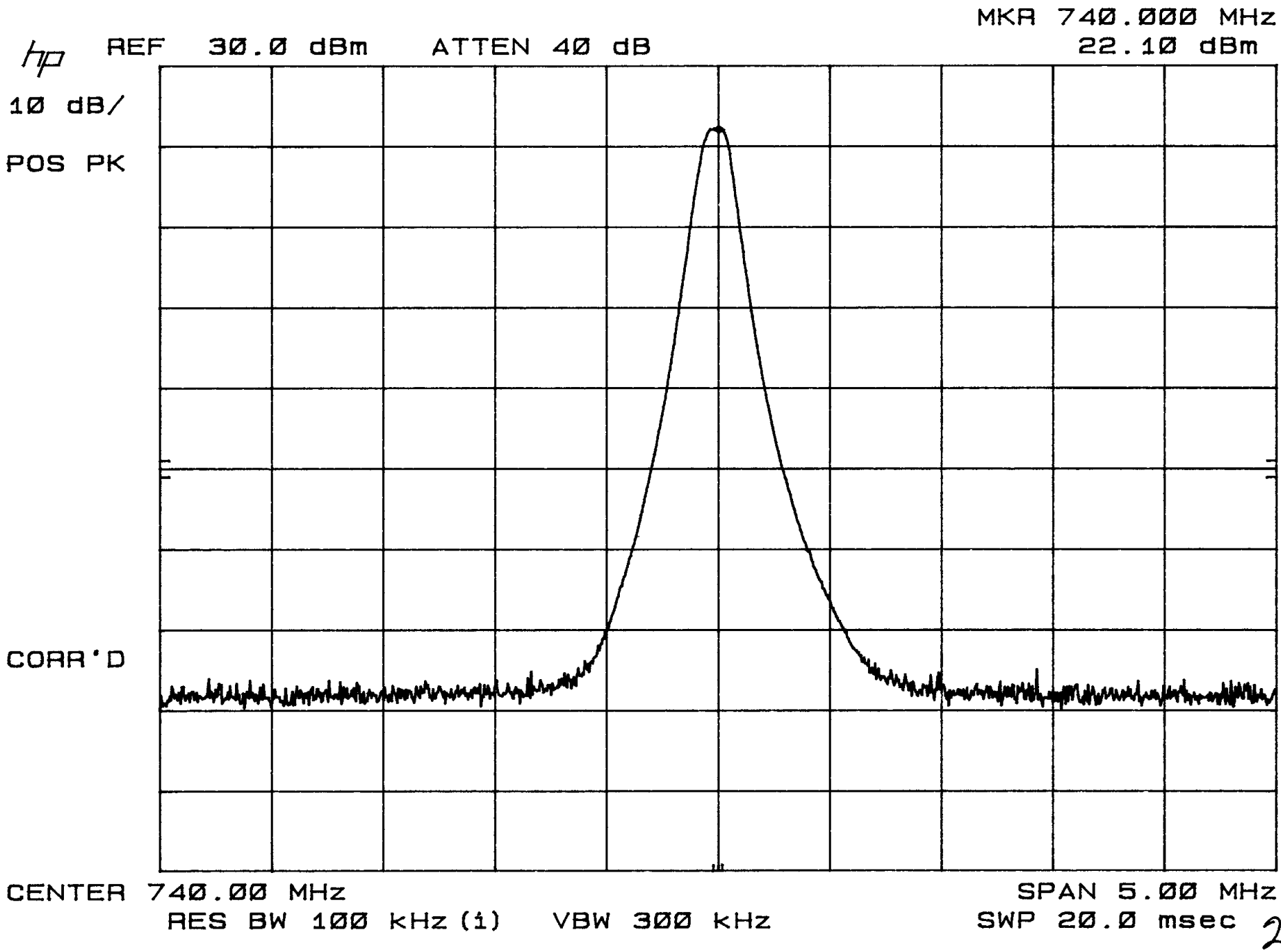
FCC PART 2, SECTION 2.1046 AND PART 74, SECTION 74.861(e)(1)(ii) RF OUTPUT POWER HIGH POWER
PEAK POWER OUTPUT: 330 mW; HIGH TRANSMIT 725 MHz Tx 12 Rx 4; S/N 102



FCC PART 2, SECTION 2.1046 AND PART 74, SECTION 74.861(e)(1)(ii) RF OUTPUT POWER HIGH POWER
PEAK POWER OUTPUT: 290 mW; HIGH TRANSMIT 740 MHz Tx 12 Rx 4; S/N 102



Modulation Characteristics FCC. Part 2, Para. 2.1047(a)

Frequency Response

Customer: VEGA WIRELESS Date: 02/12/01

EUT: MASTER STATION MS-700
S/N 104 Tx 4 Rx 8 1785MHz (M10) HIGH PWR

Carrier Frequency:

NOTES:

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

Audio Frequency (Hz)	Deviation noted on Spectrum Anaylzer (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
2500Hz	15
10Hz	0

Modulation Characteristics

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

Modulation Limiting

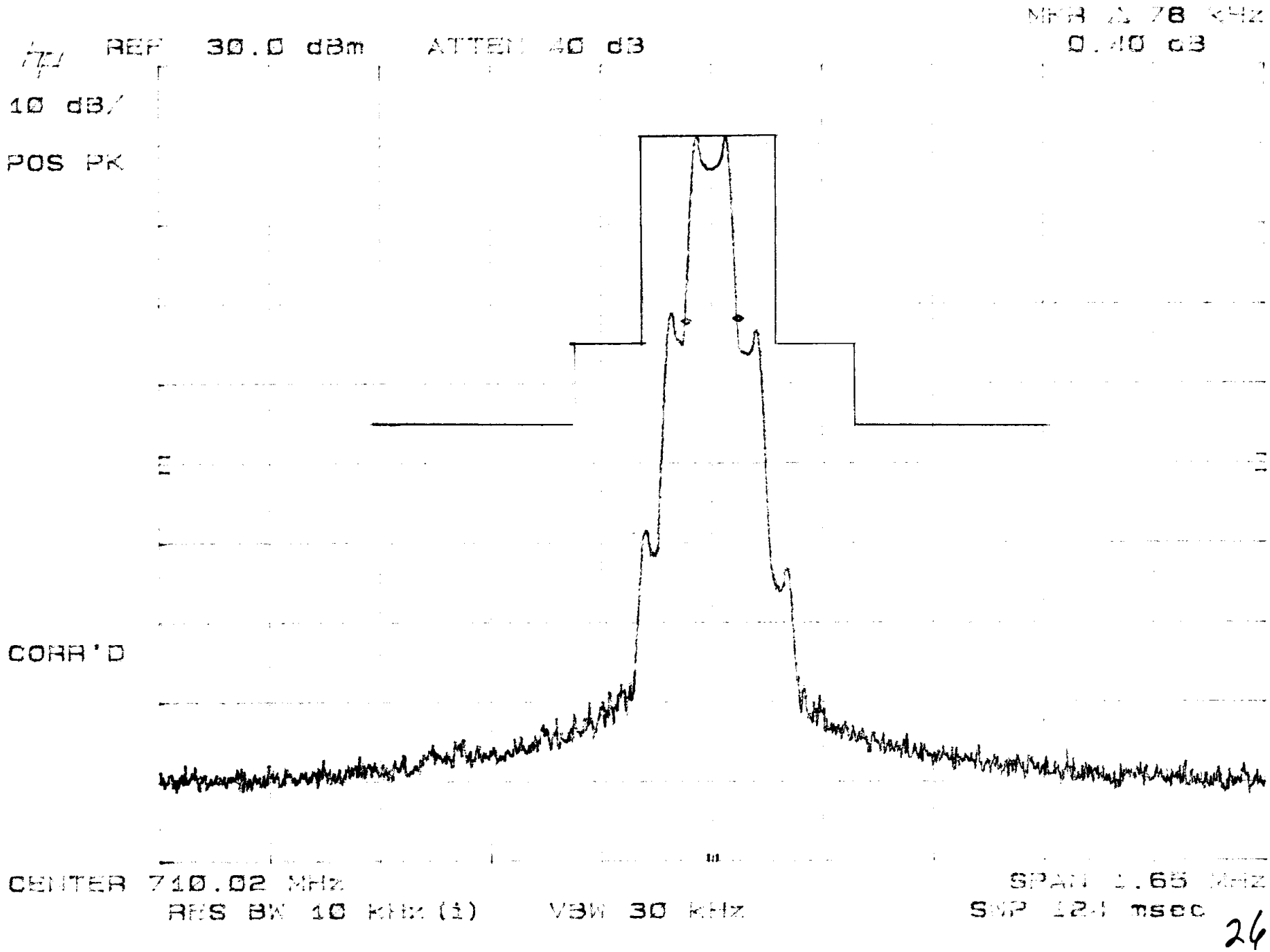
Customer: VEGA WIRELESS Date: 02/13/01

Eut: MS-700 MASTER STATION
S/N 1011 TX-1 RX-3 485MHz (MID) HIGH POWER
Carrier Frequency:

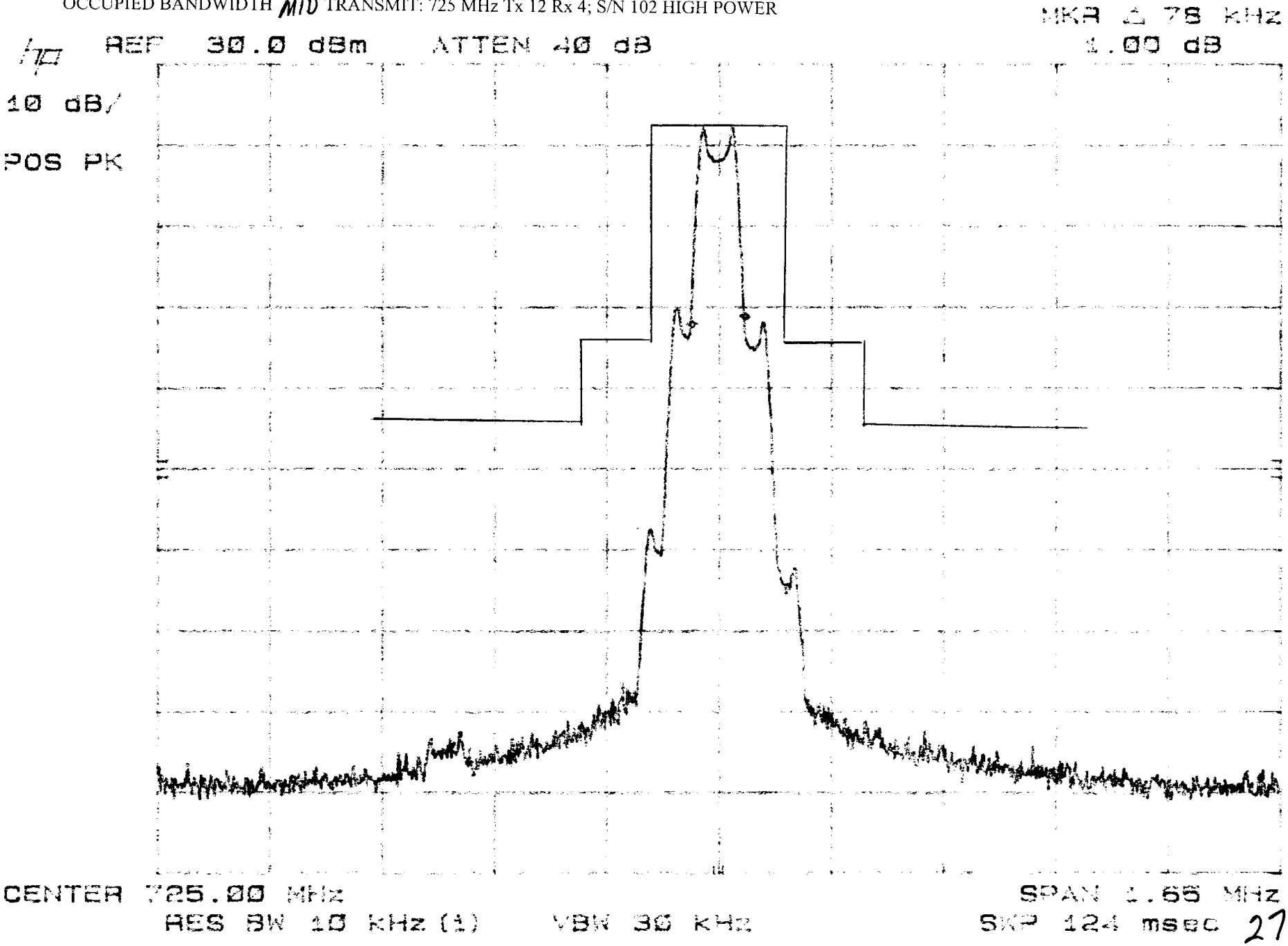
NOTES:

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

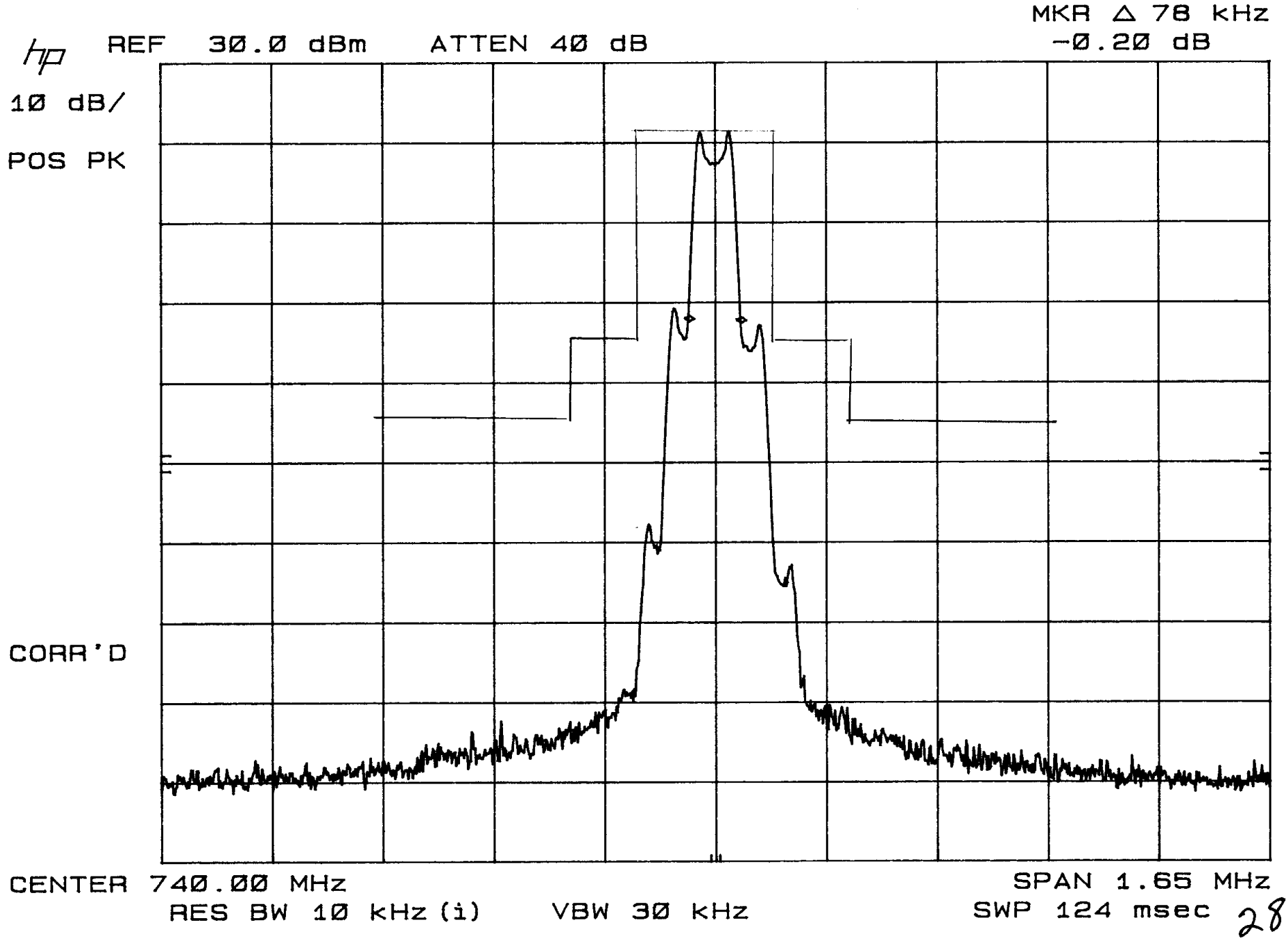
FCC PART 2, SECTION 2.1049; PART 74, SECTION 74.861(e)(5) AND SECTION 74.861(e)(6)(i)(ii)
OCCUPIED BANDWIDTH LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 *HIGH* POWER



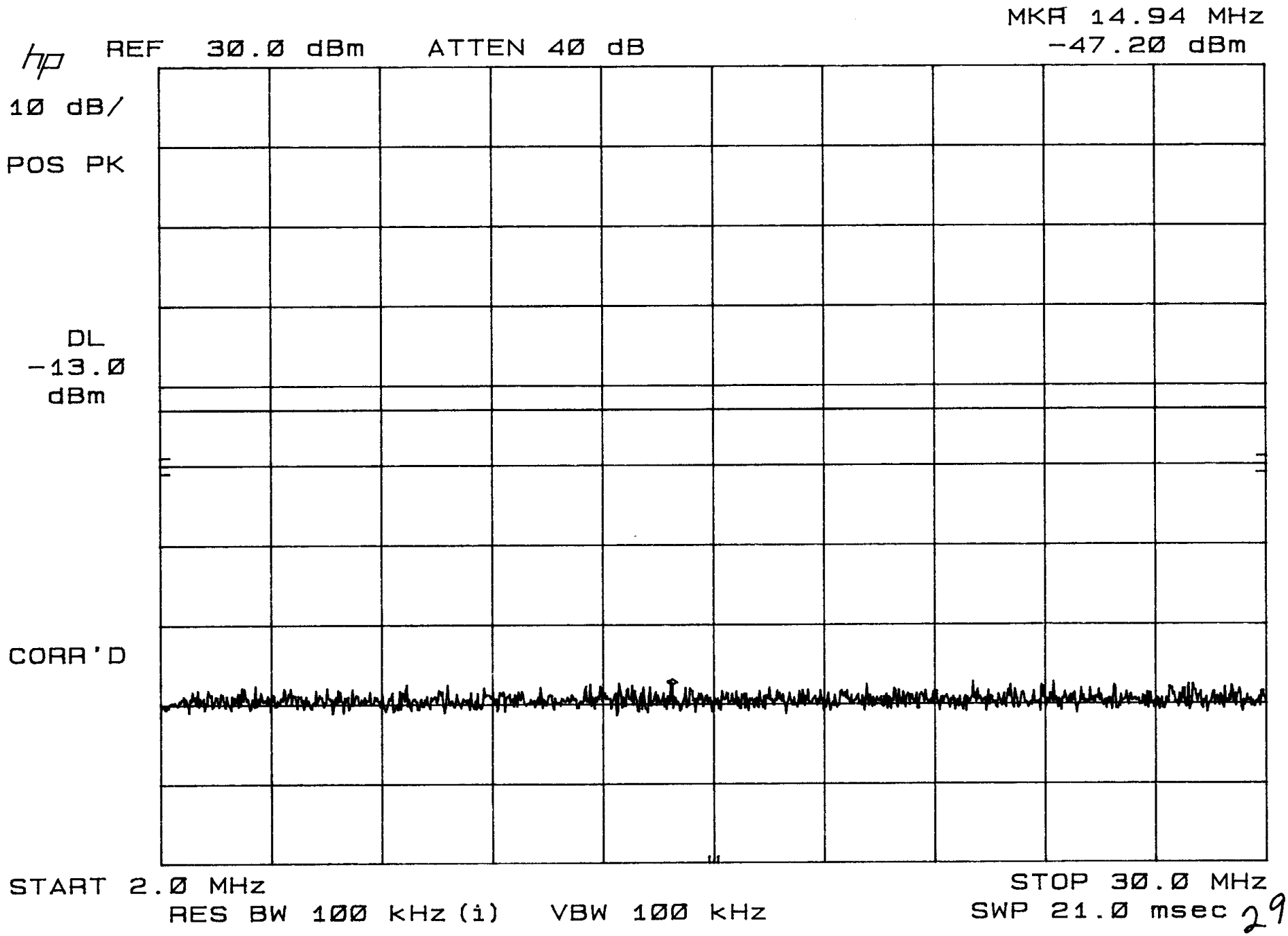
FCC PART 2, SECTION 2.1049; PART 74, SECTION 74.861(e)(5) AND SECTION 74.861(e)(6)(i)(ii)
OCCUPIED BANDWIDTH MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 HIGH POWER



FCC PART 2, SECTION 2.1049; PART 74, SECTION 74.861(e)(5) AND SECTION 74.861(e)(6)(i)(ii)
OCCUPIED BANDWIDTH HIGH TRANSMIT: 740 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: 710.025 MHz Tx 12 Rx 4; S/N 102 LOW POWER



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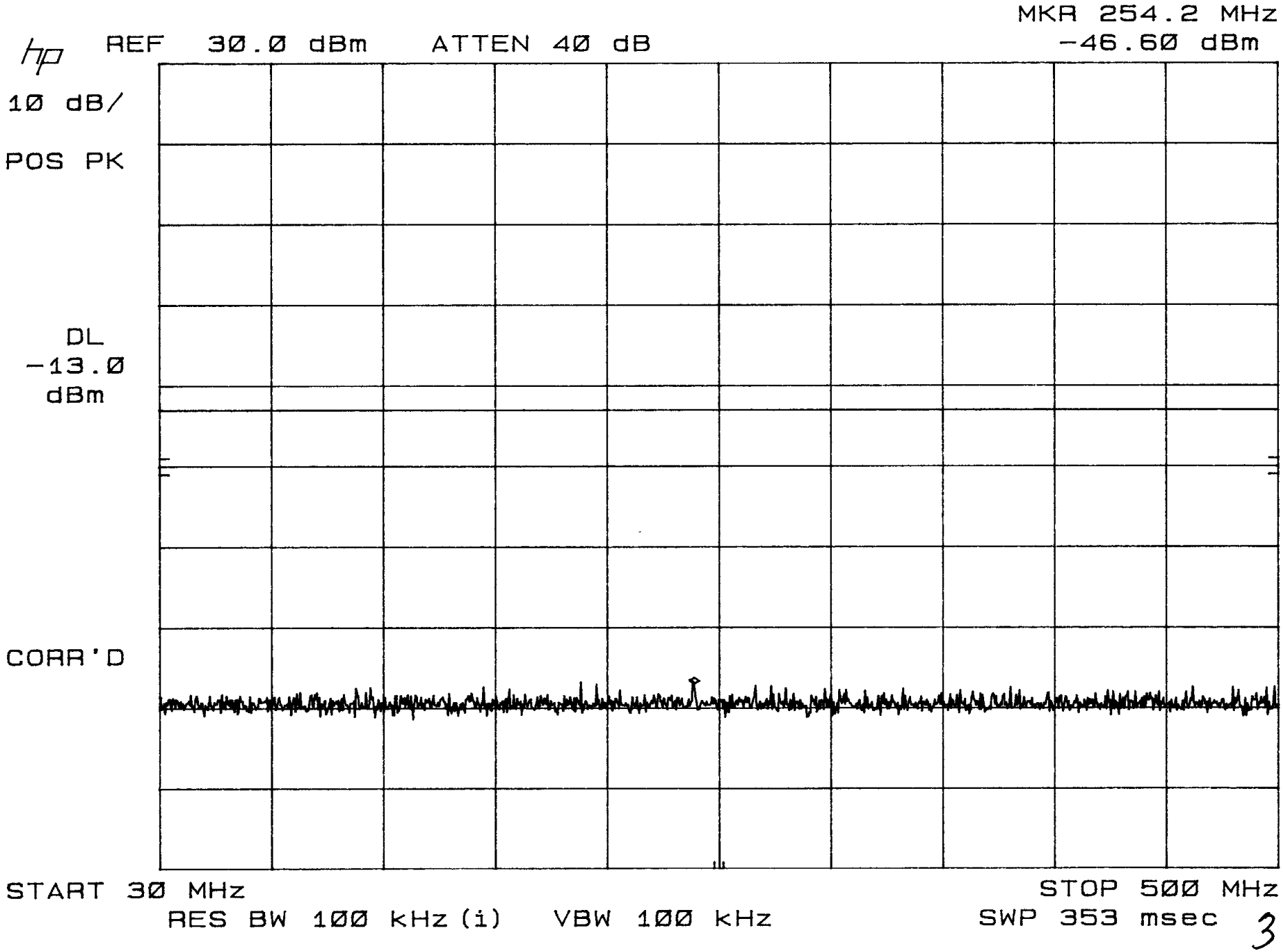

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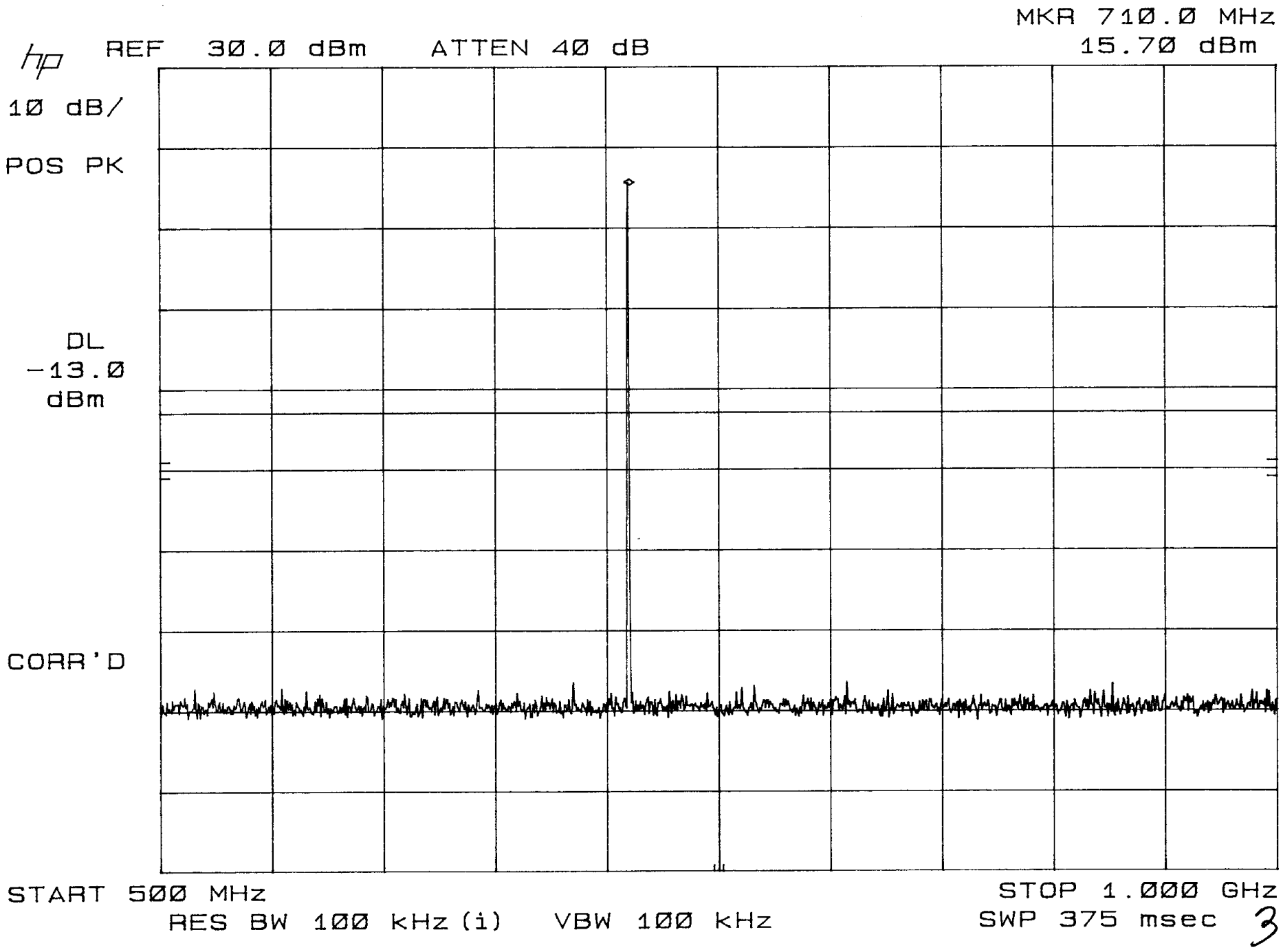
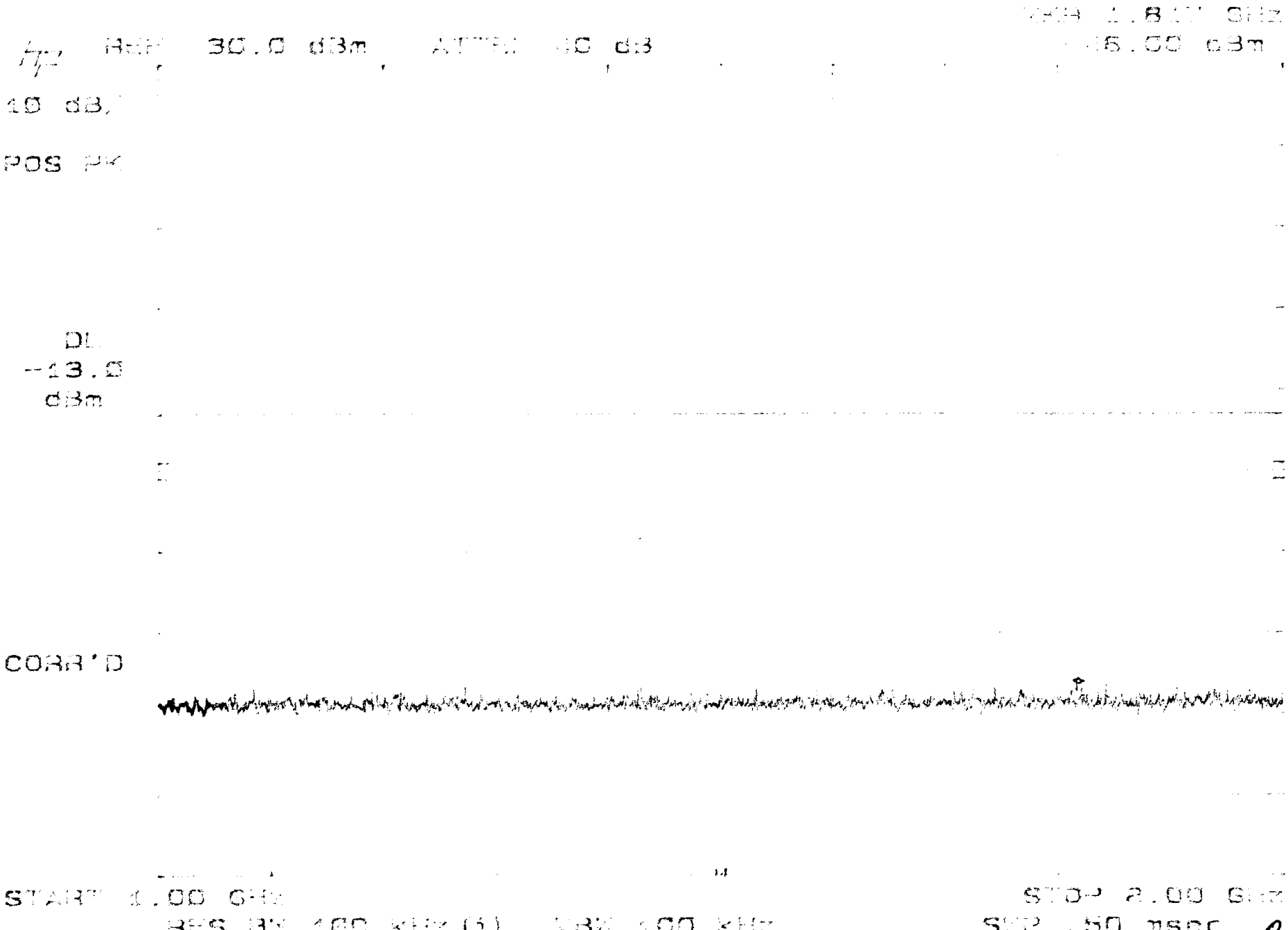
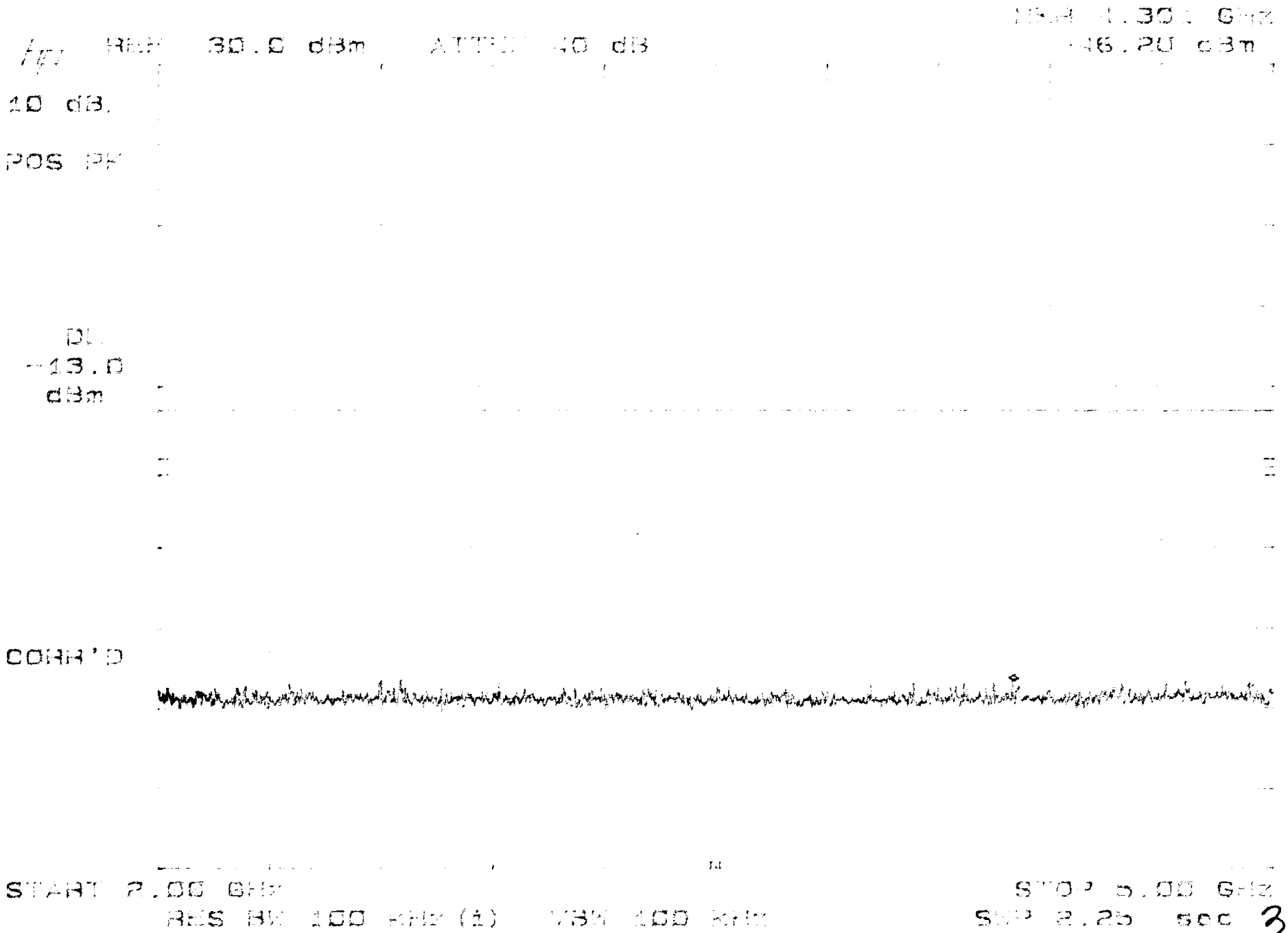
LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 LOW POWER



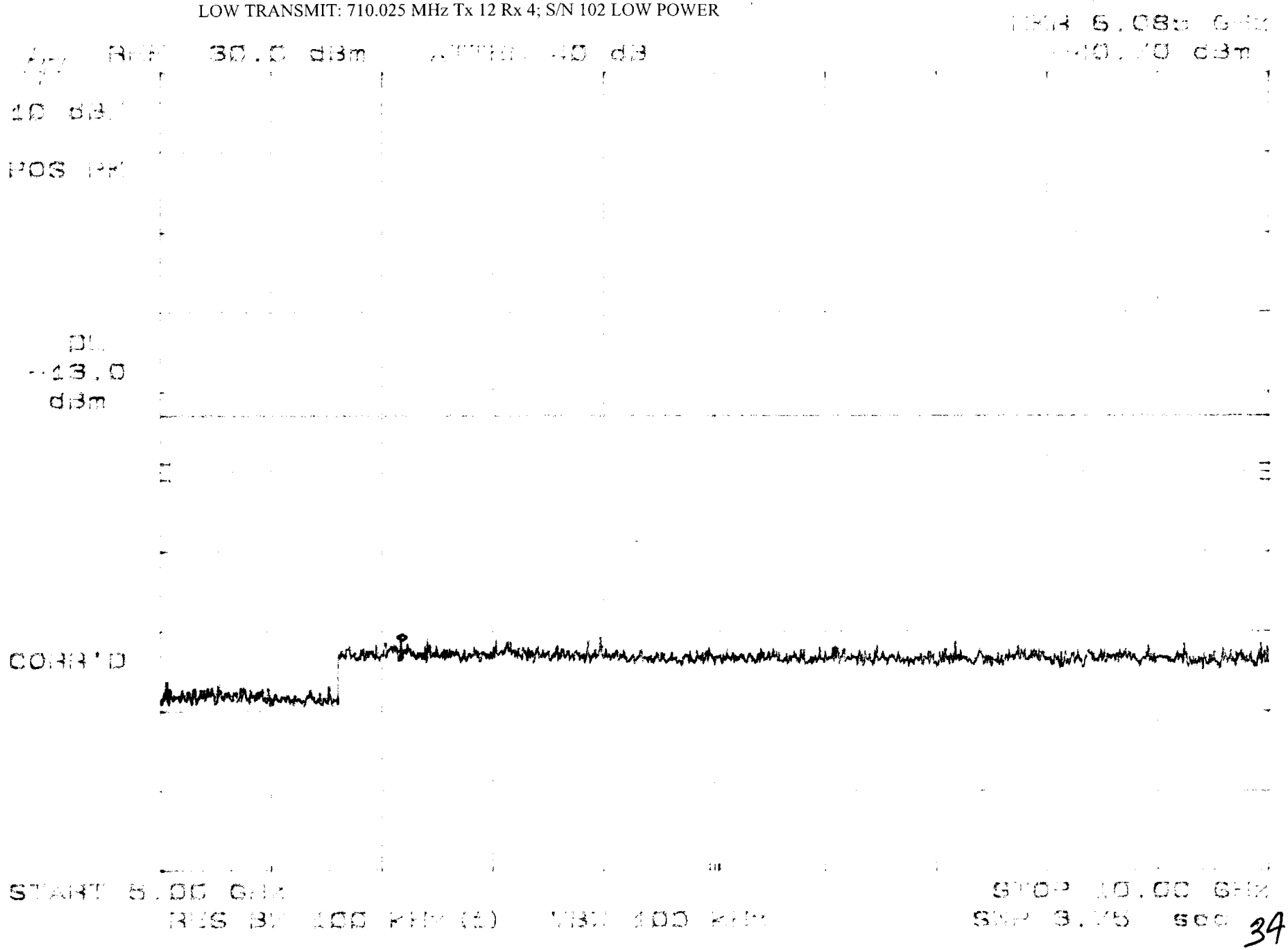
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 LOW POWER



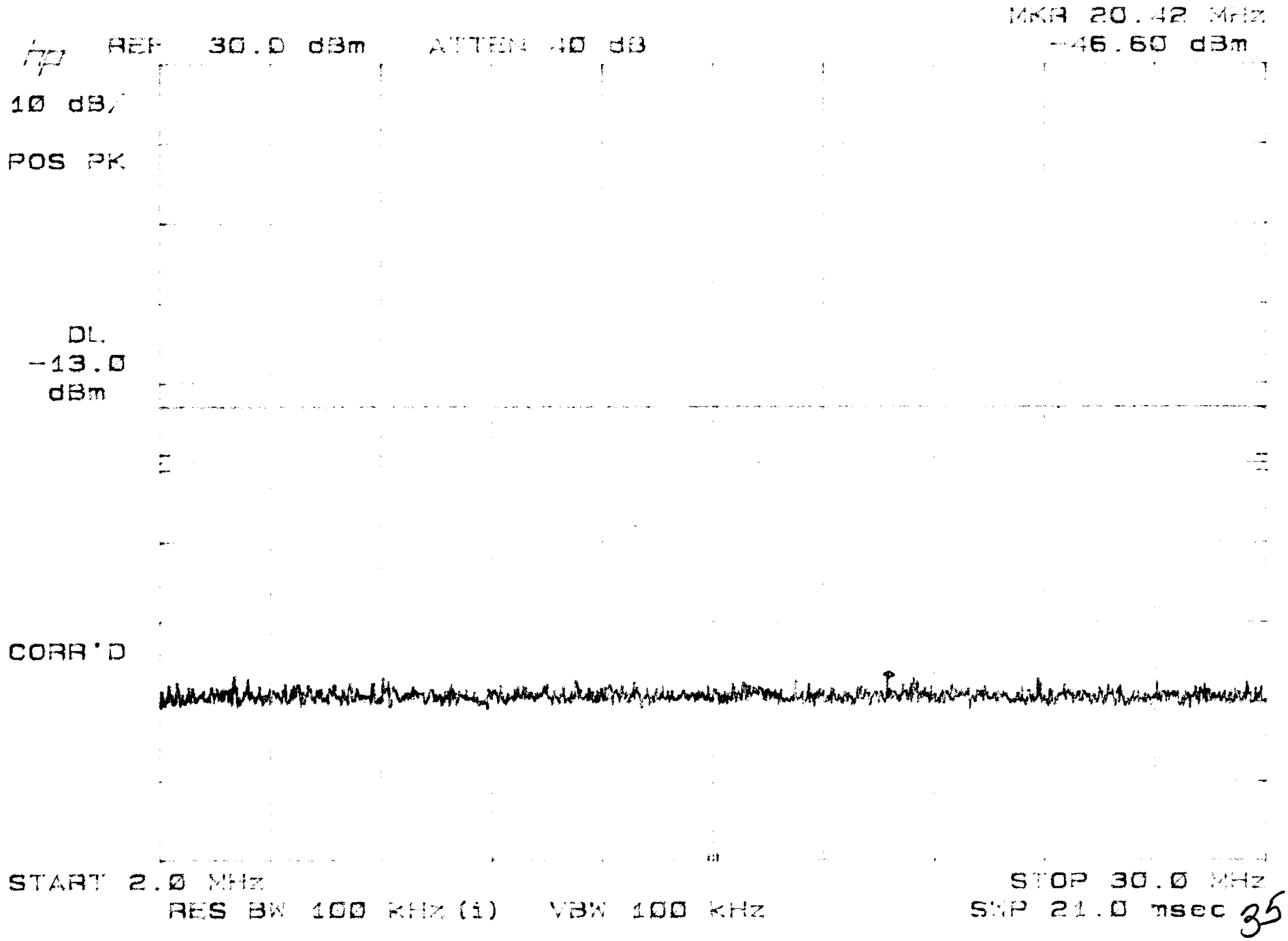
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: 710.025 MHz Tx 12 Rx 4; S/N 102 LOW POWER



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 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



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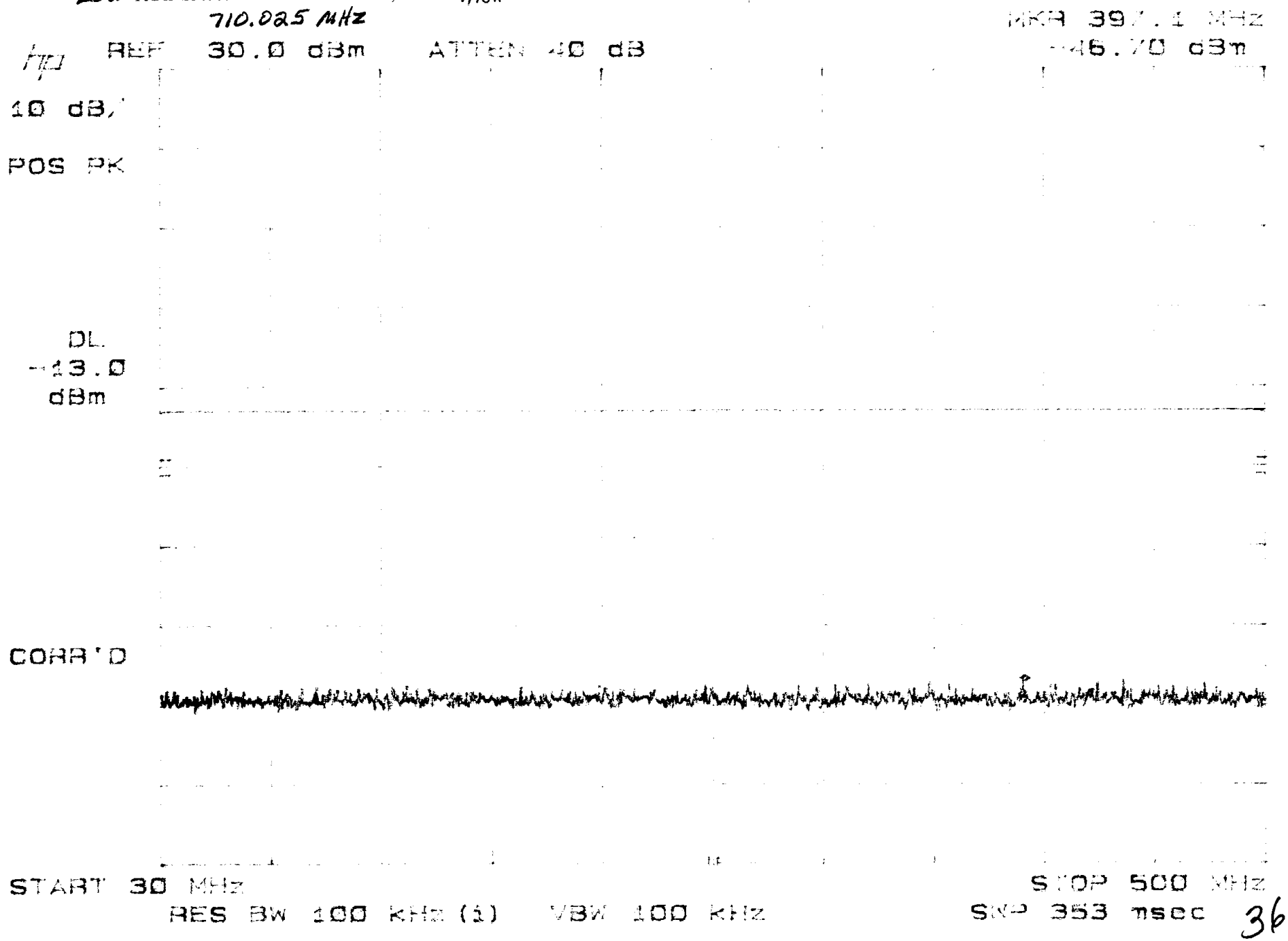
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS

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

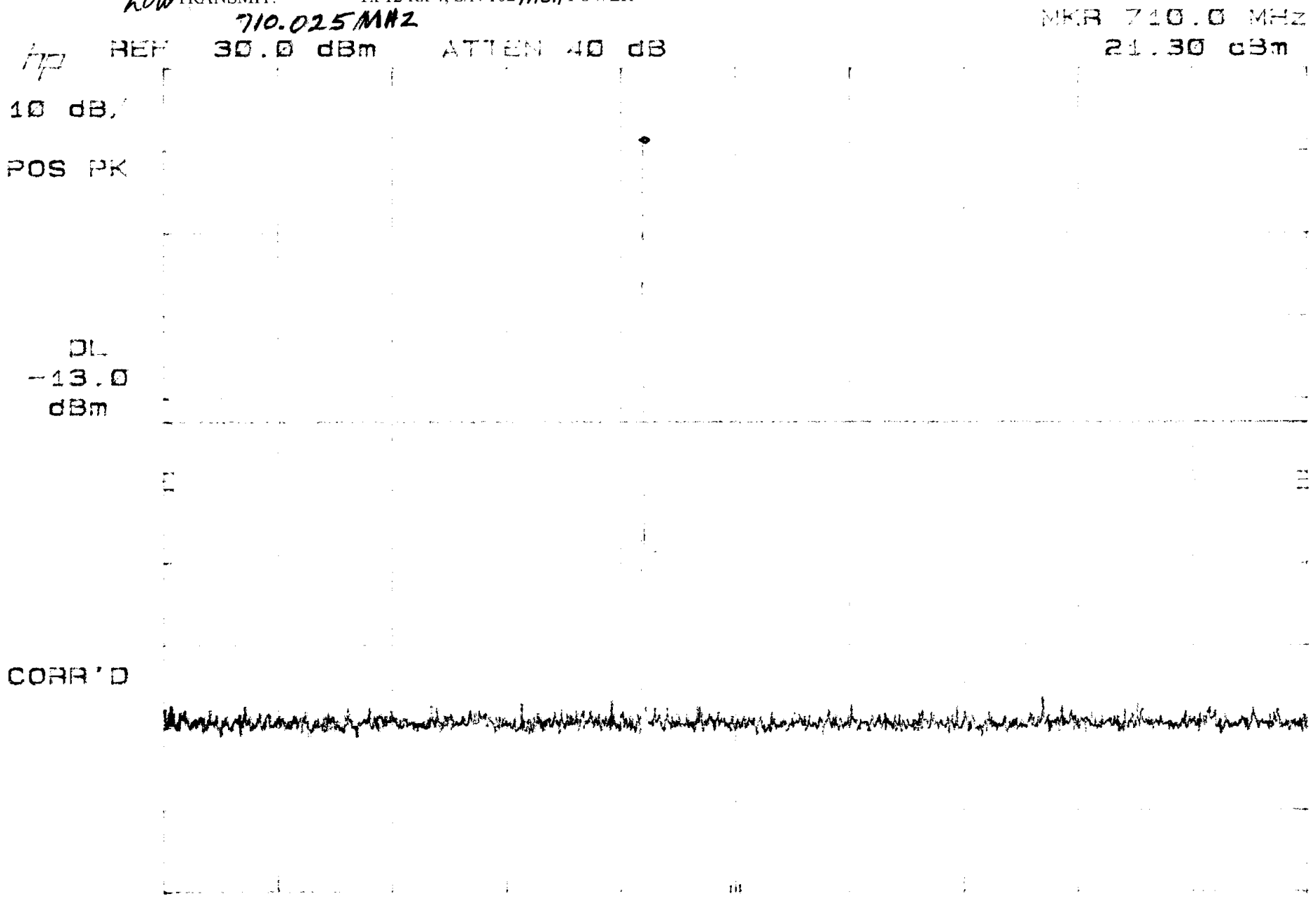
710.025 MHz



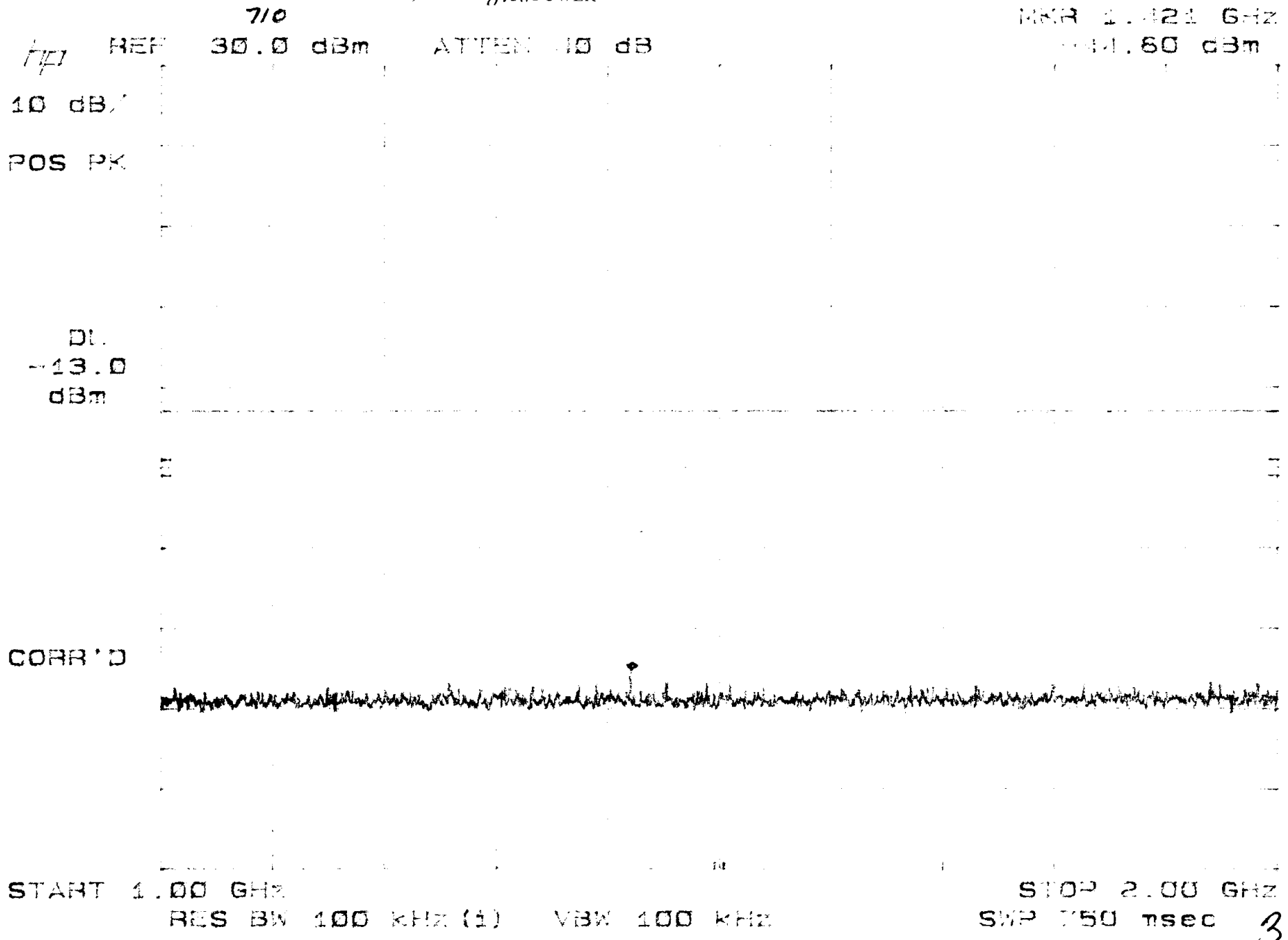
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS

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

710.025 MHz



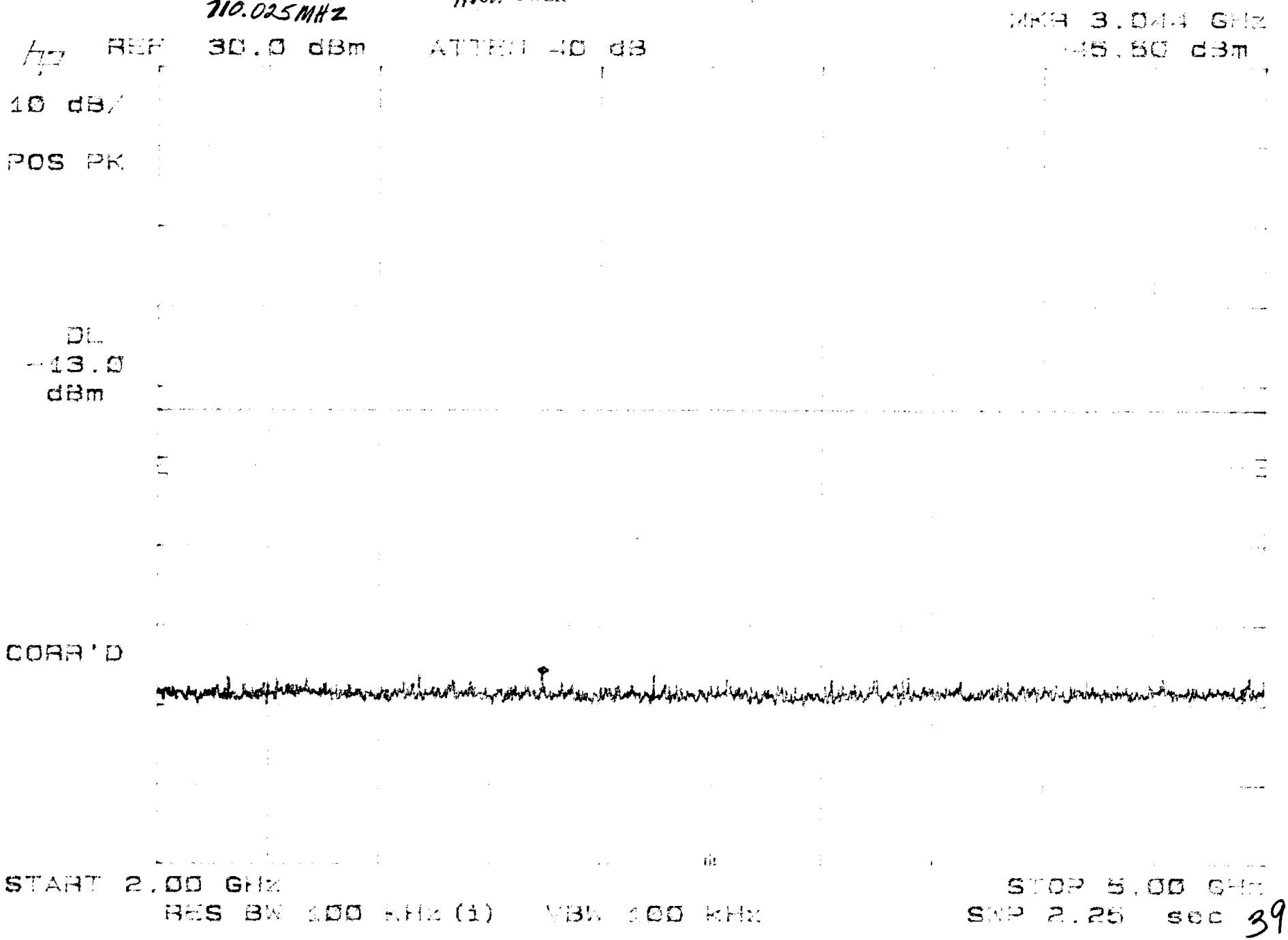
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
LOW TRANSMIT: 710 MHz Tx 12 Rx 4; S/N 102 HIGH POWER



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

710.025MHz

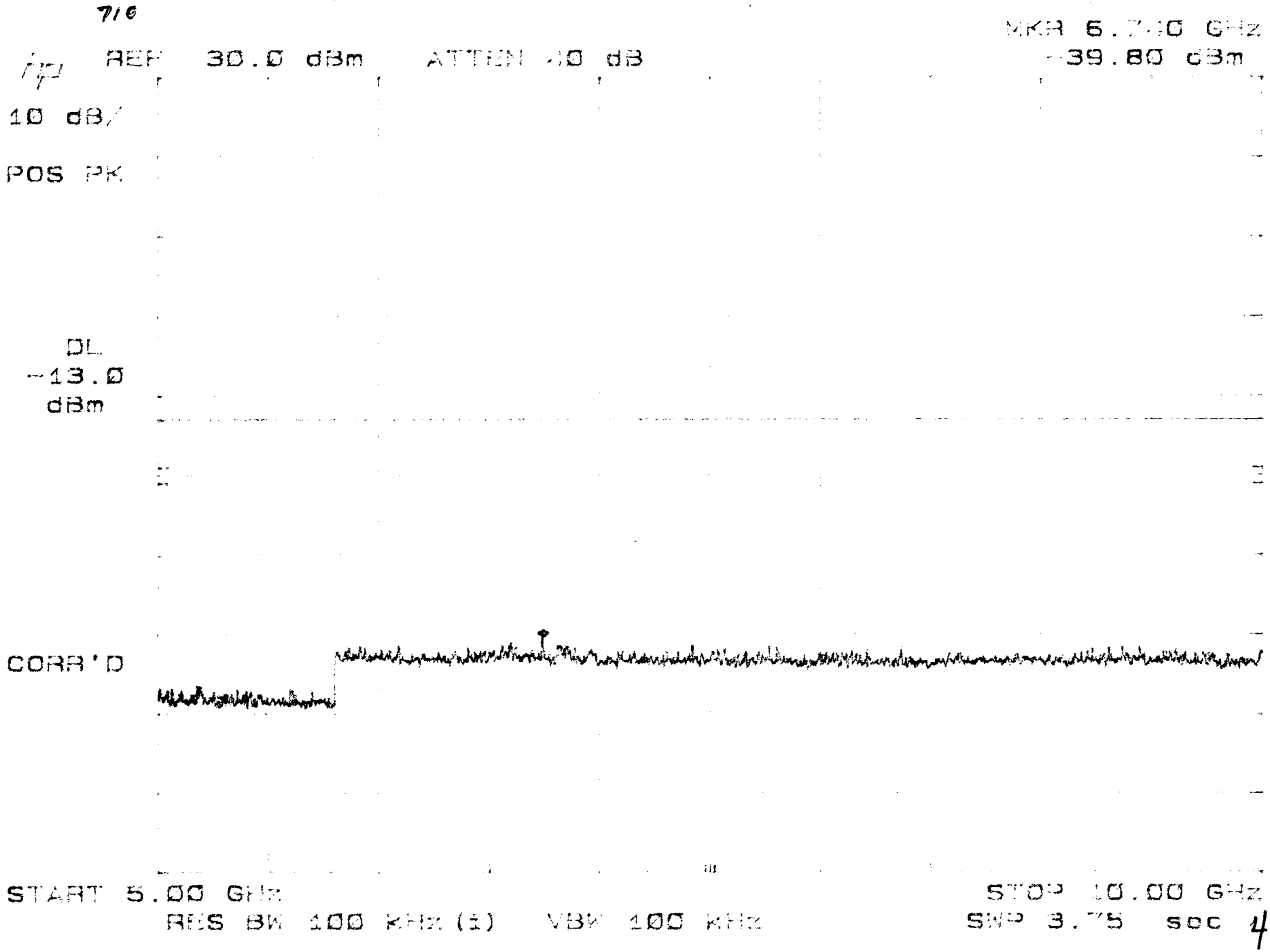


39

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

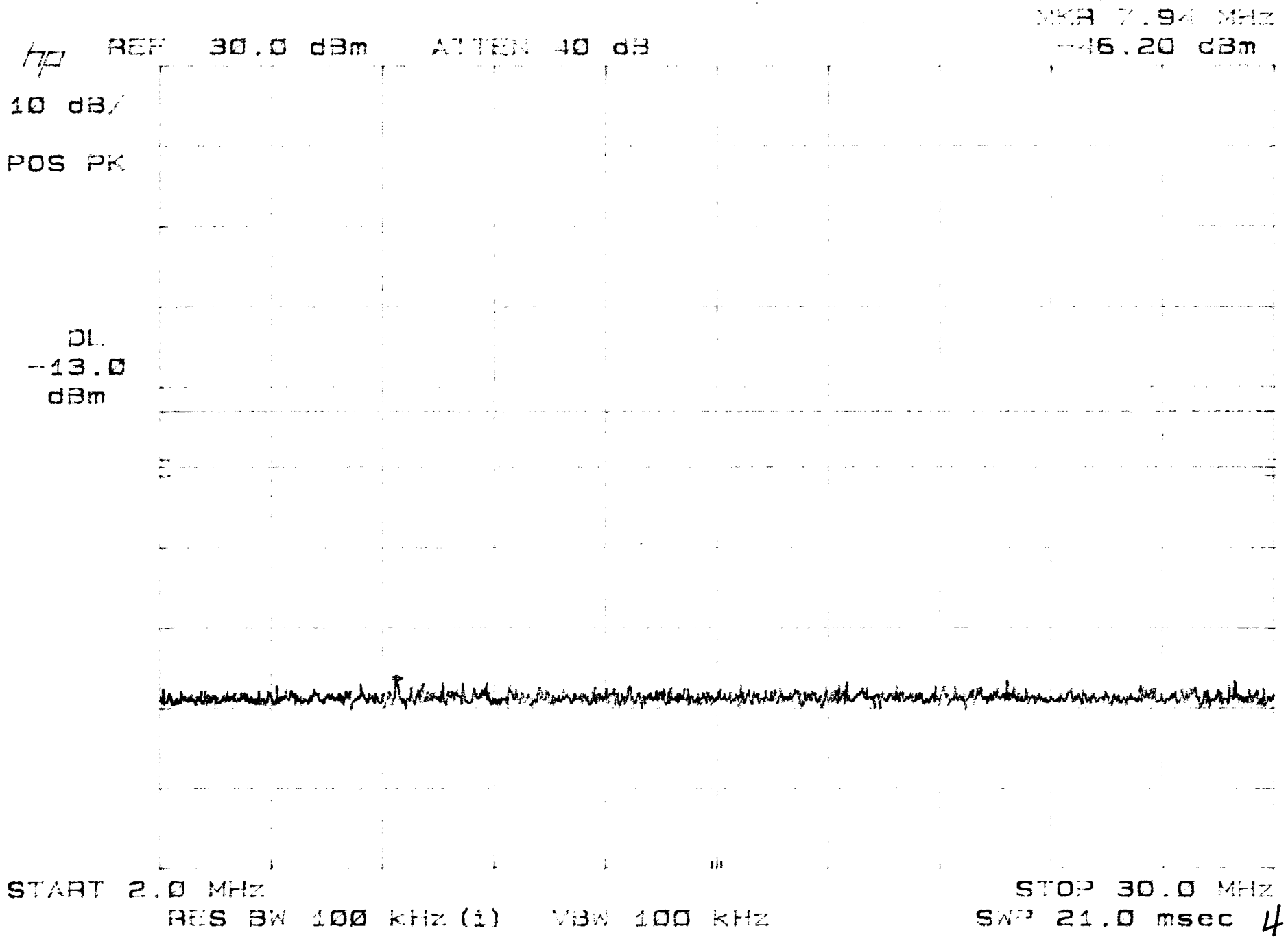
LOW TRANSMIT: MHz Tx 12 Rx 4; S/N 102 HIGH POWER

716

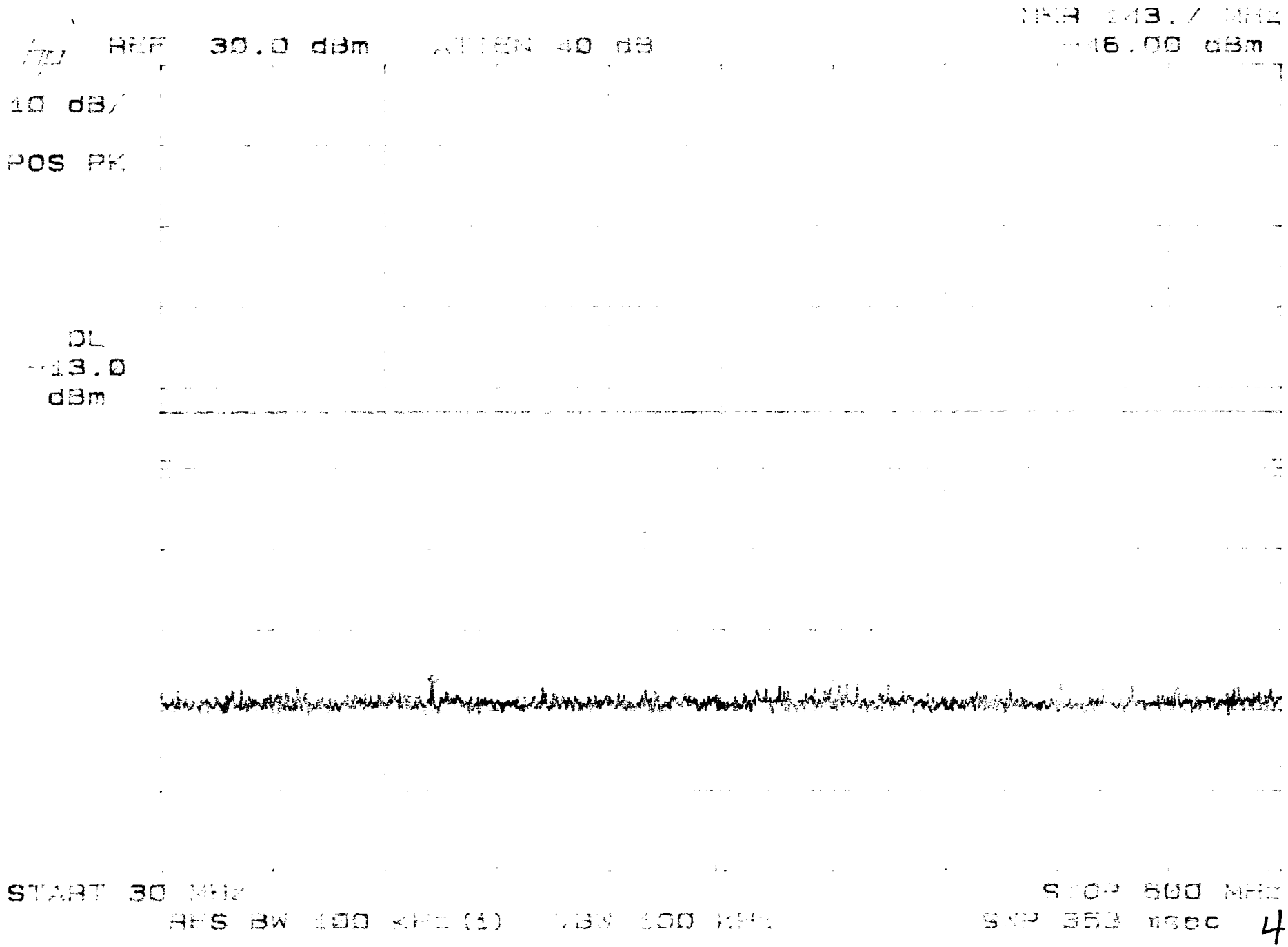


40

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

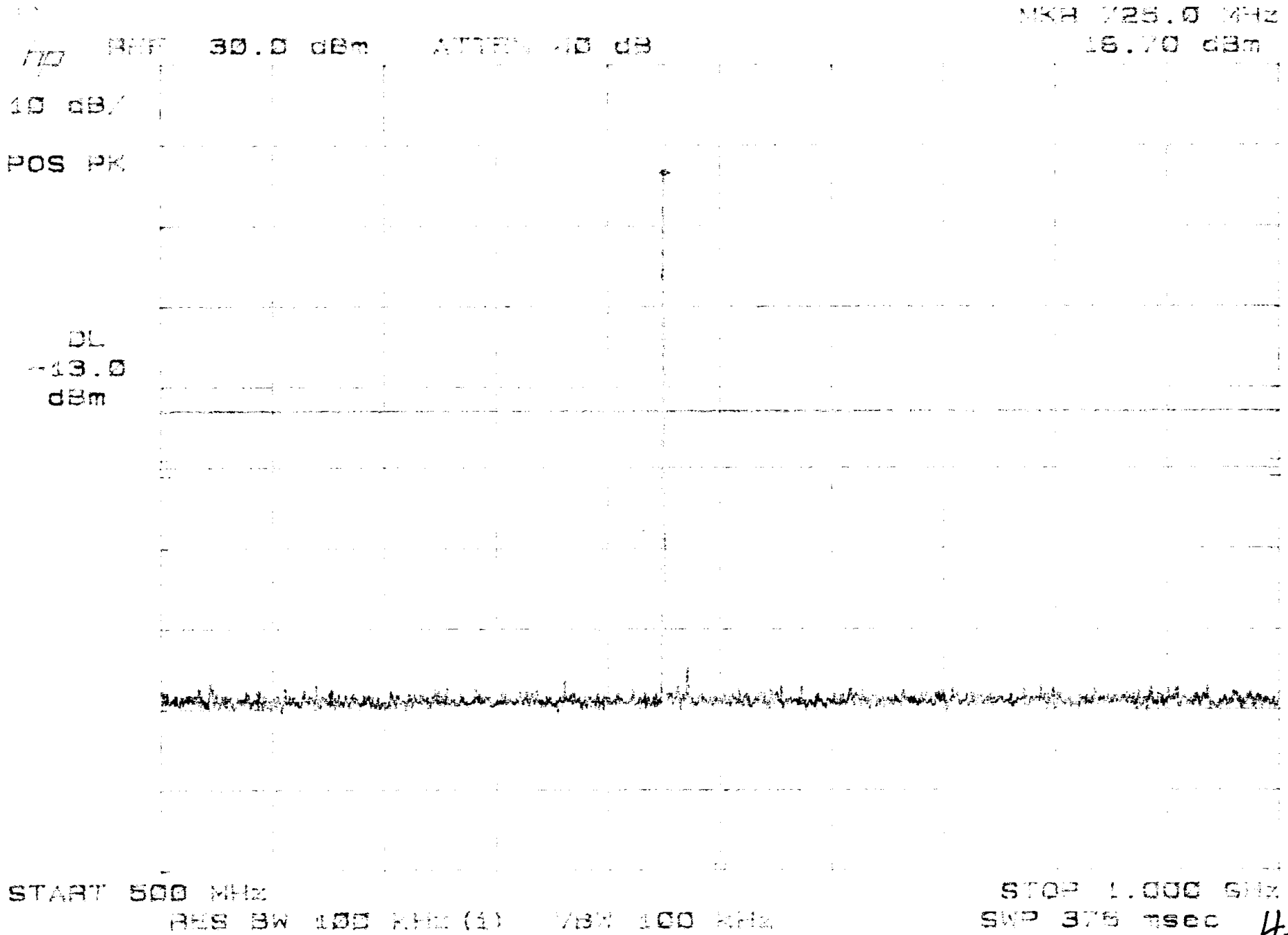


FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MLQ TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER

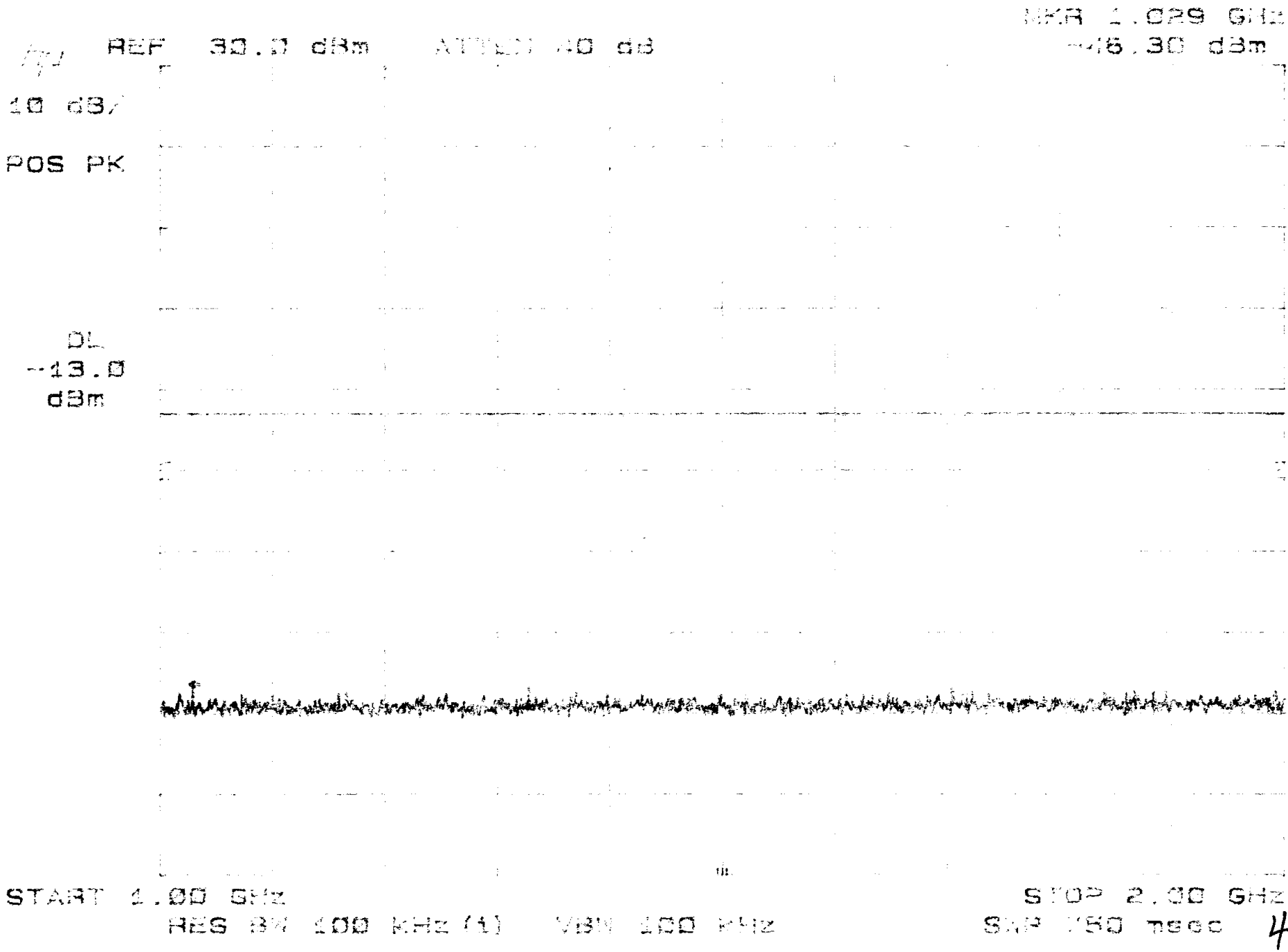


42

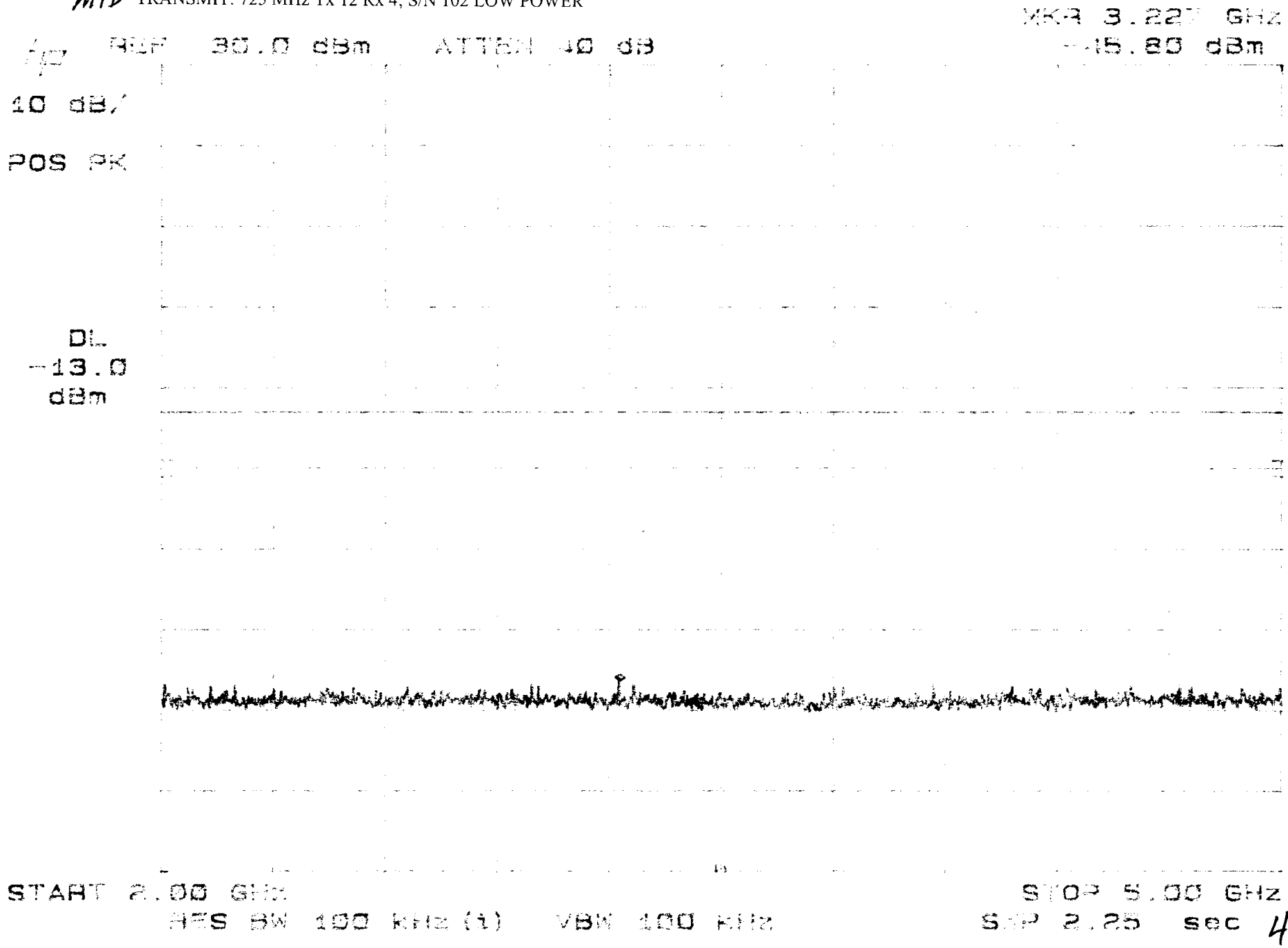
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MLQ TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER



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

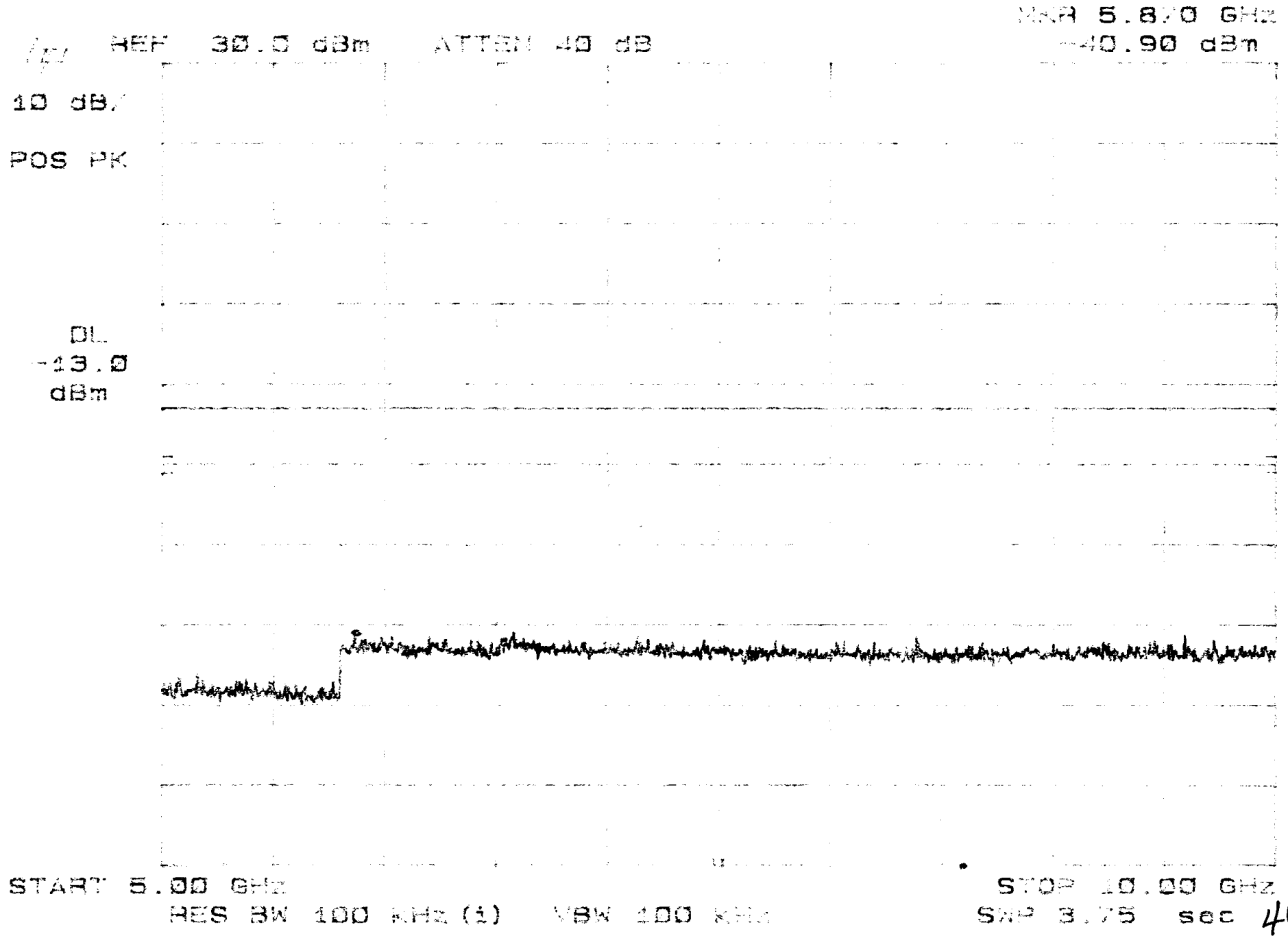


FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER

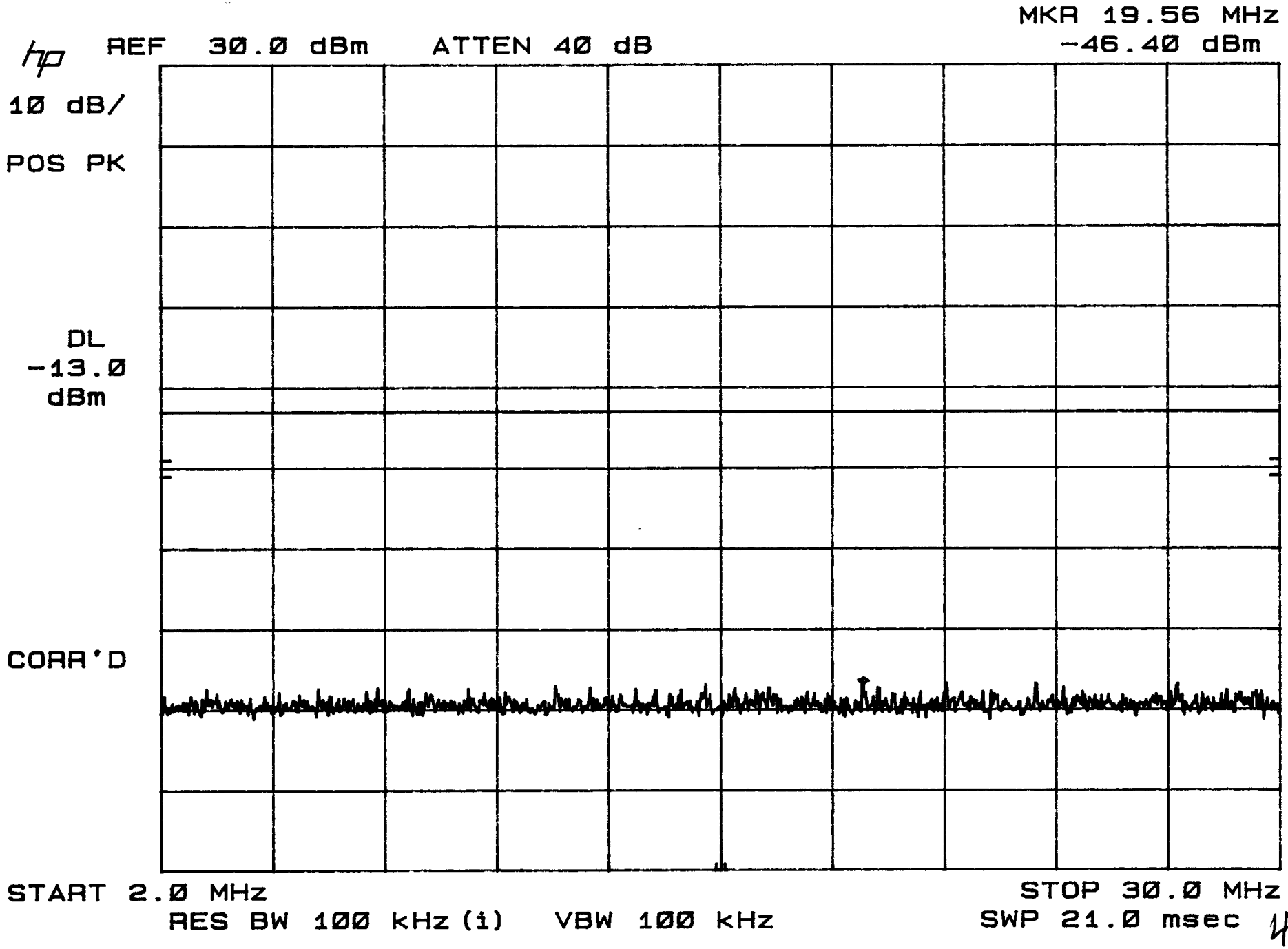


45

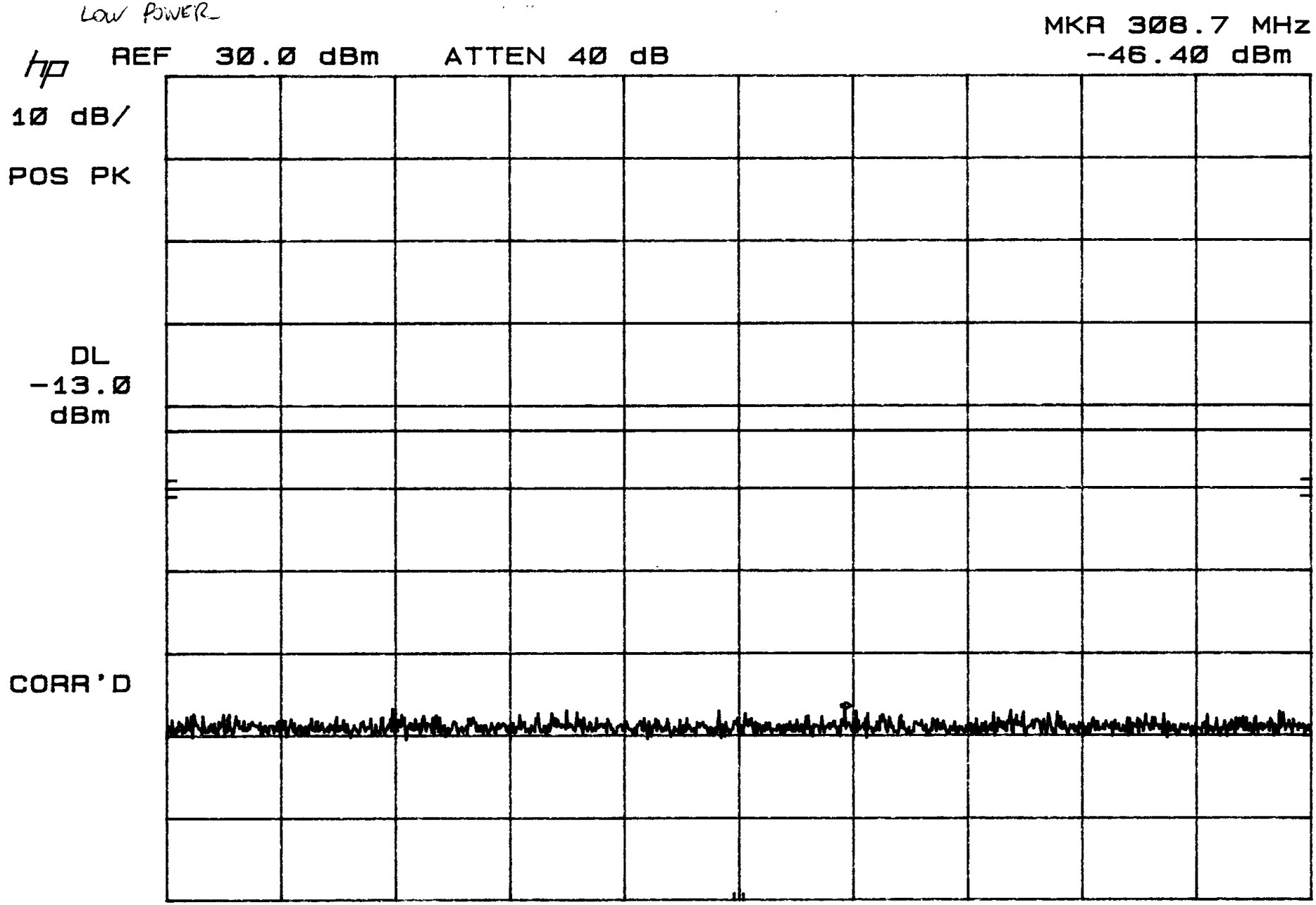
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
MID TRANSMIT: 725 MHz Tx 12 Rx 4; S/N 102 LOW POWER



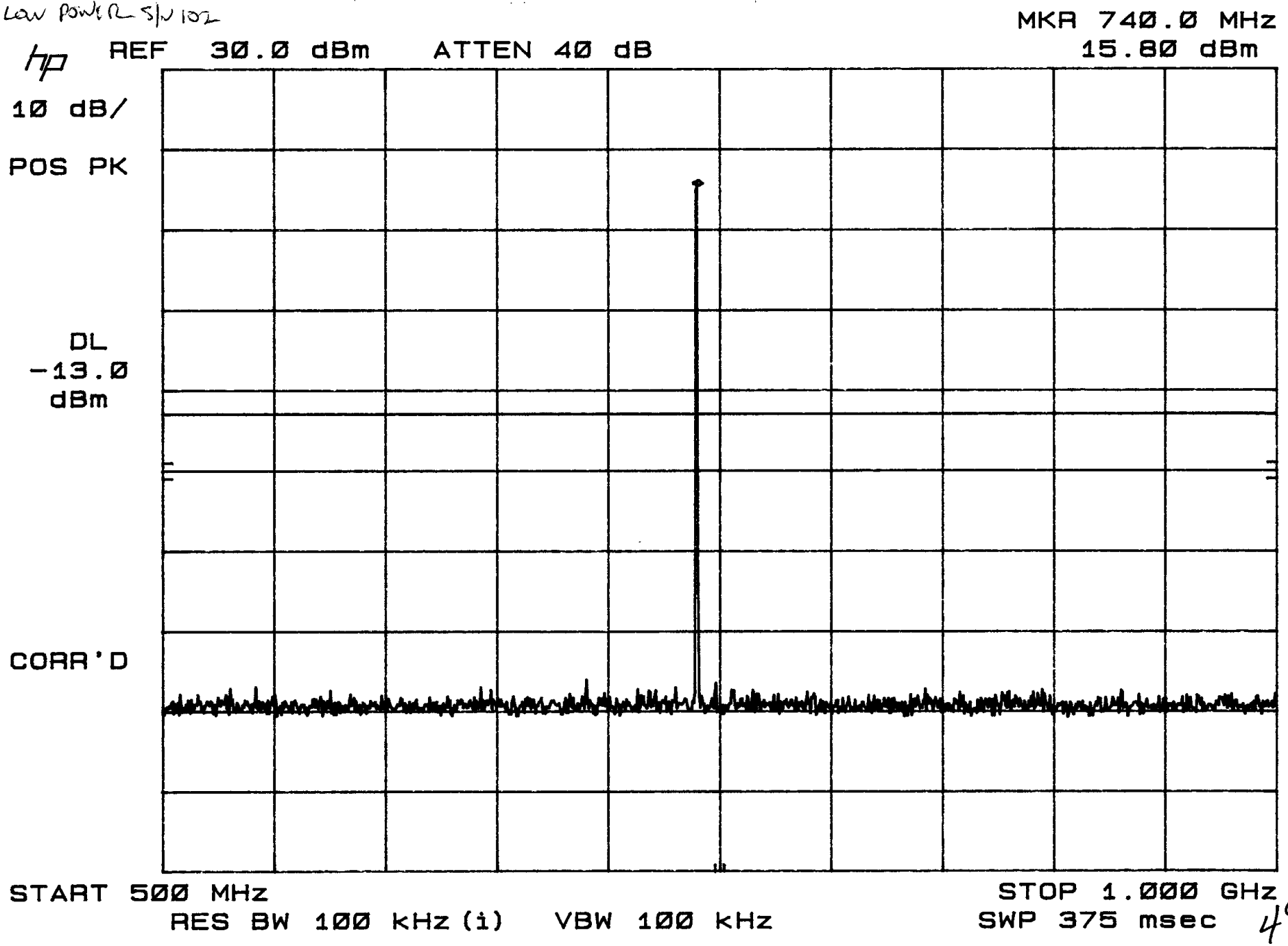
FCC PART 2, SECTION 2.1051; PART 74, SECTION 74.861(e)(6)(iii) CONDUCTED SPURIOUS
HIGH TRANSMIT: 740 MHz Tx 12 Rx 4; S/N 102 LOW POWER



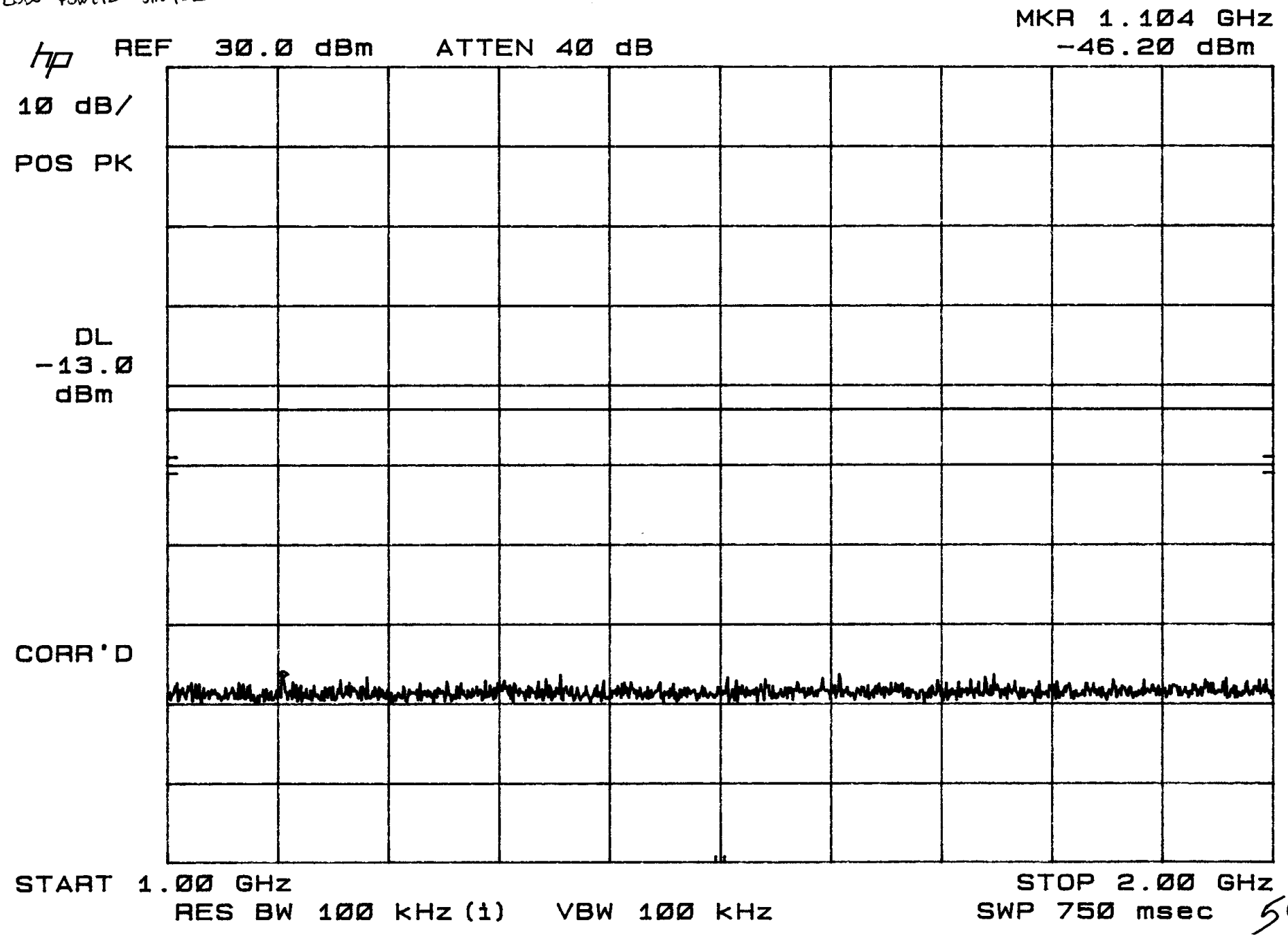
CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx12 Rx4
LOW POWER



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

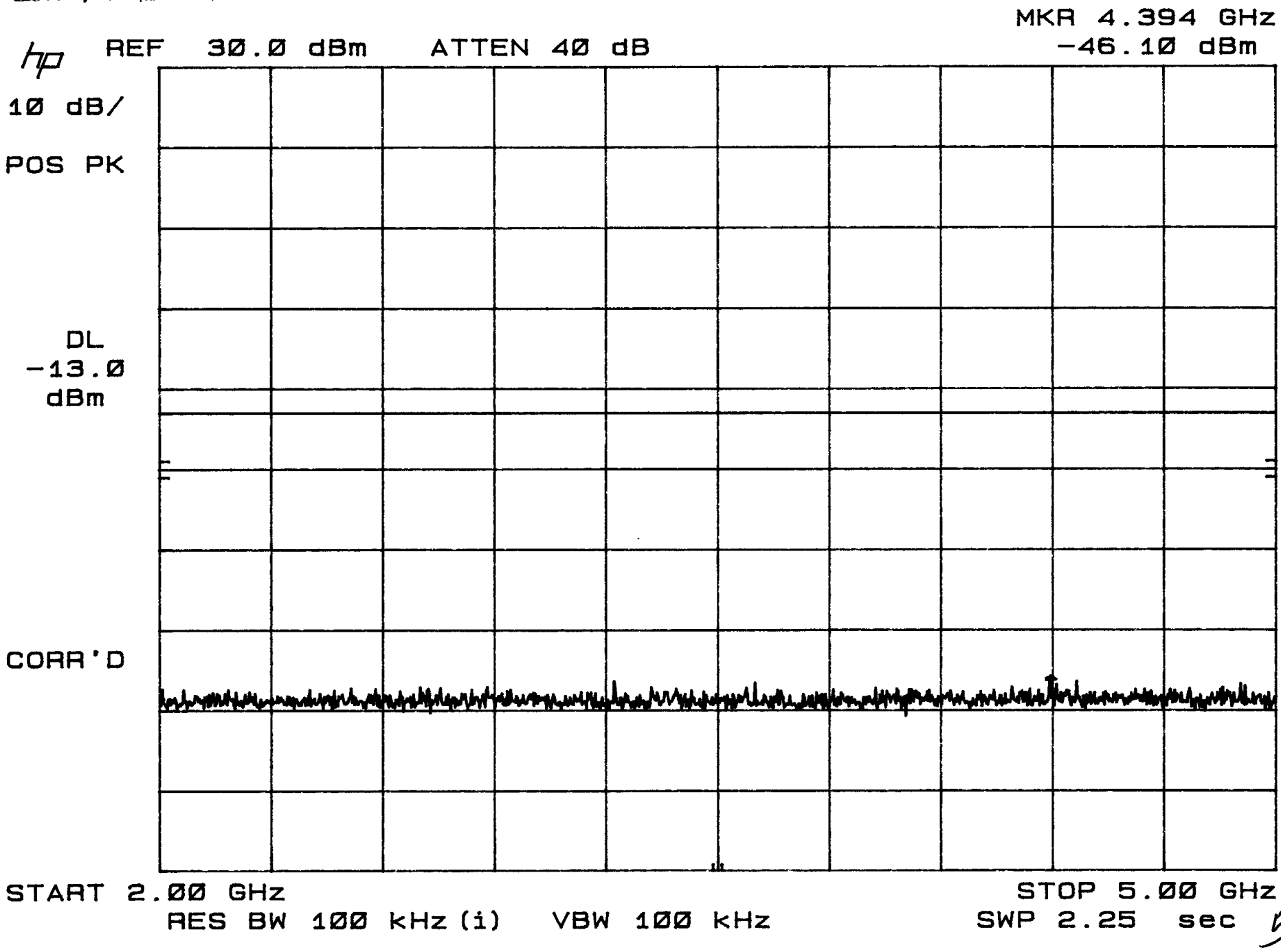


CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx12 Rx4
LOW POWER 3IN102



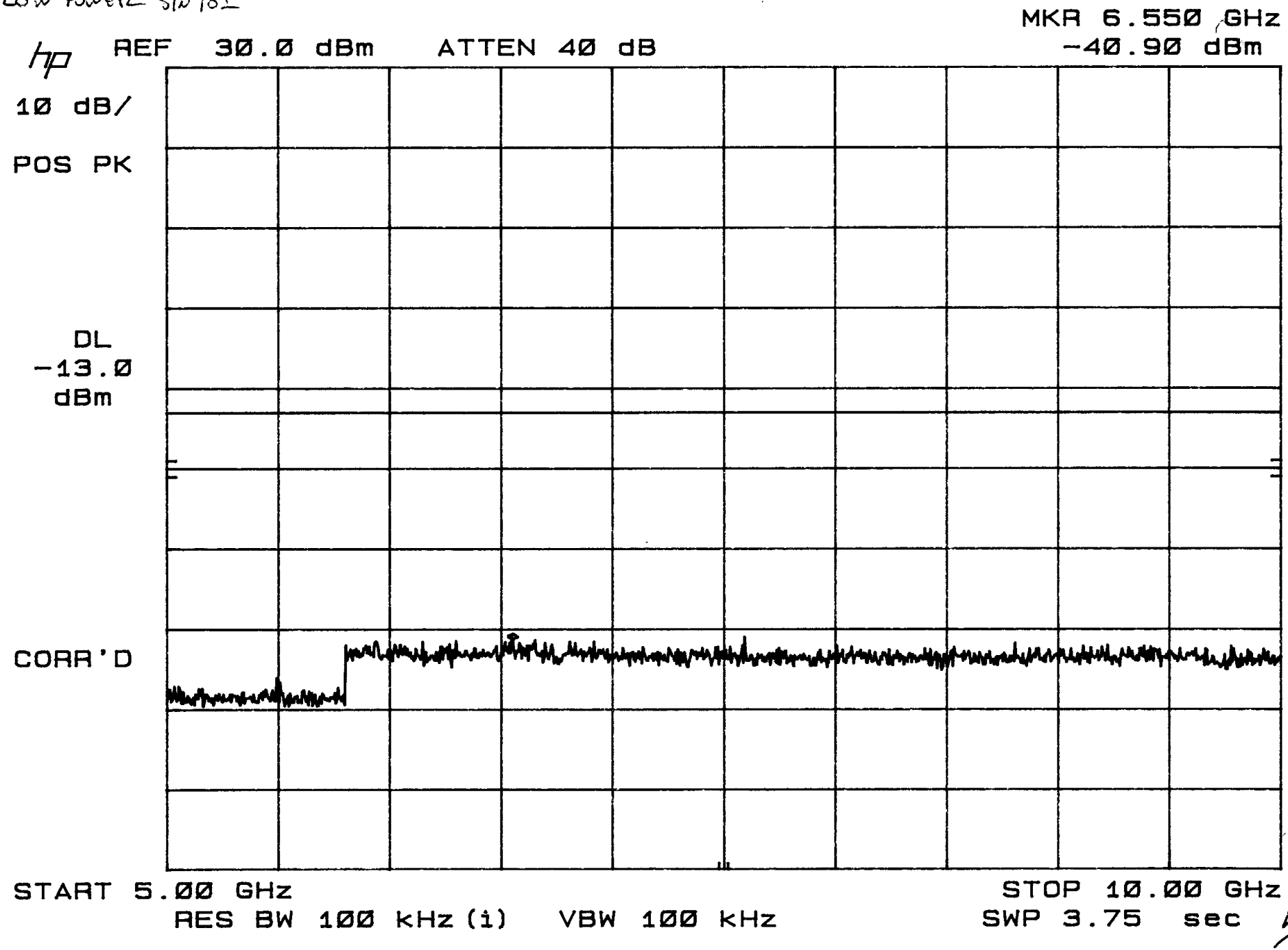
CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 Rx 4
LOW POWER S/N 102

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



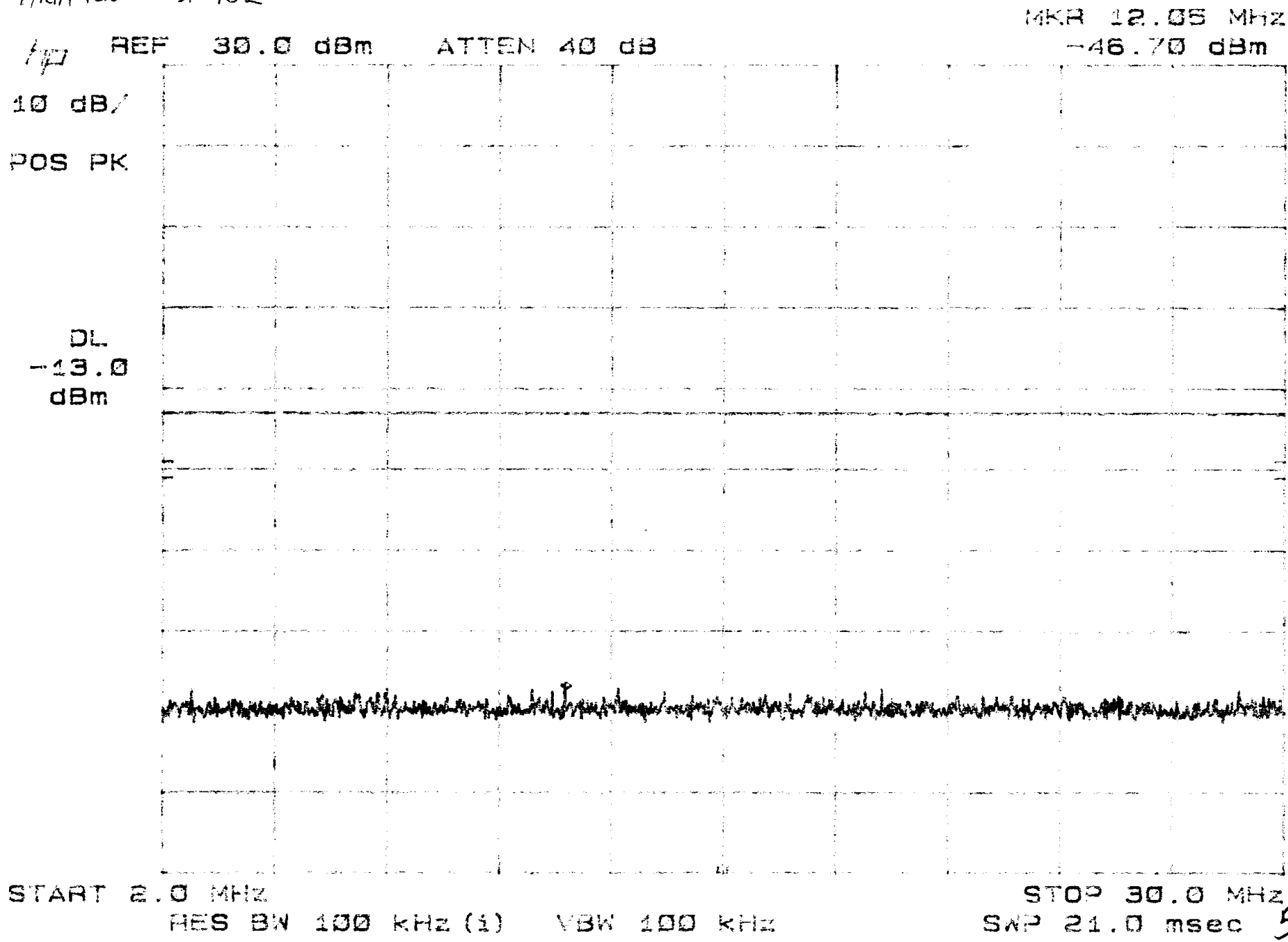
51

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



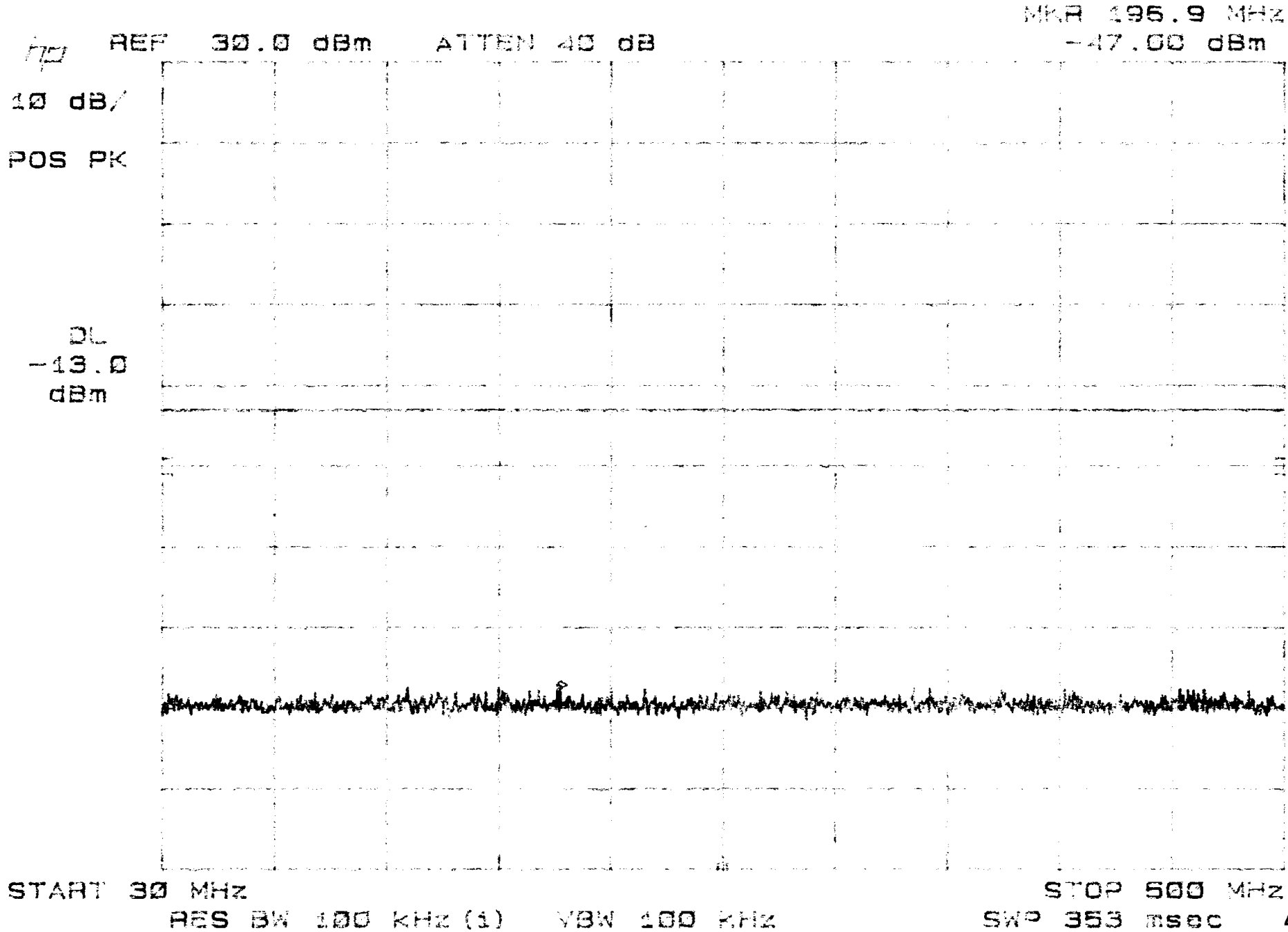
CONDUCTED SPURIOUS
MID TRANSMIT 725 MHz Tx 12 Rx 4
HIGH POWER S/N 102

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



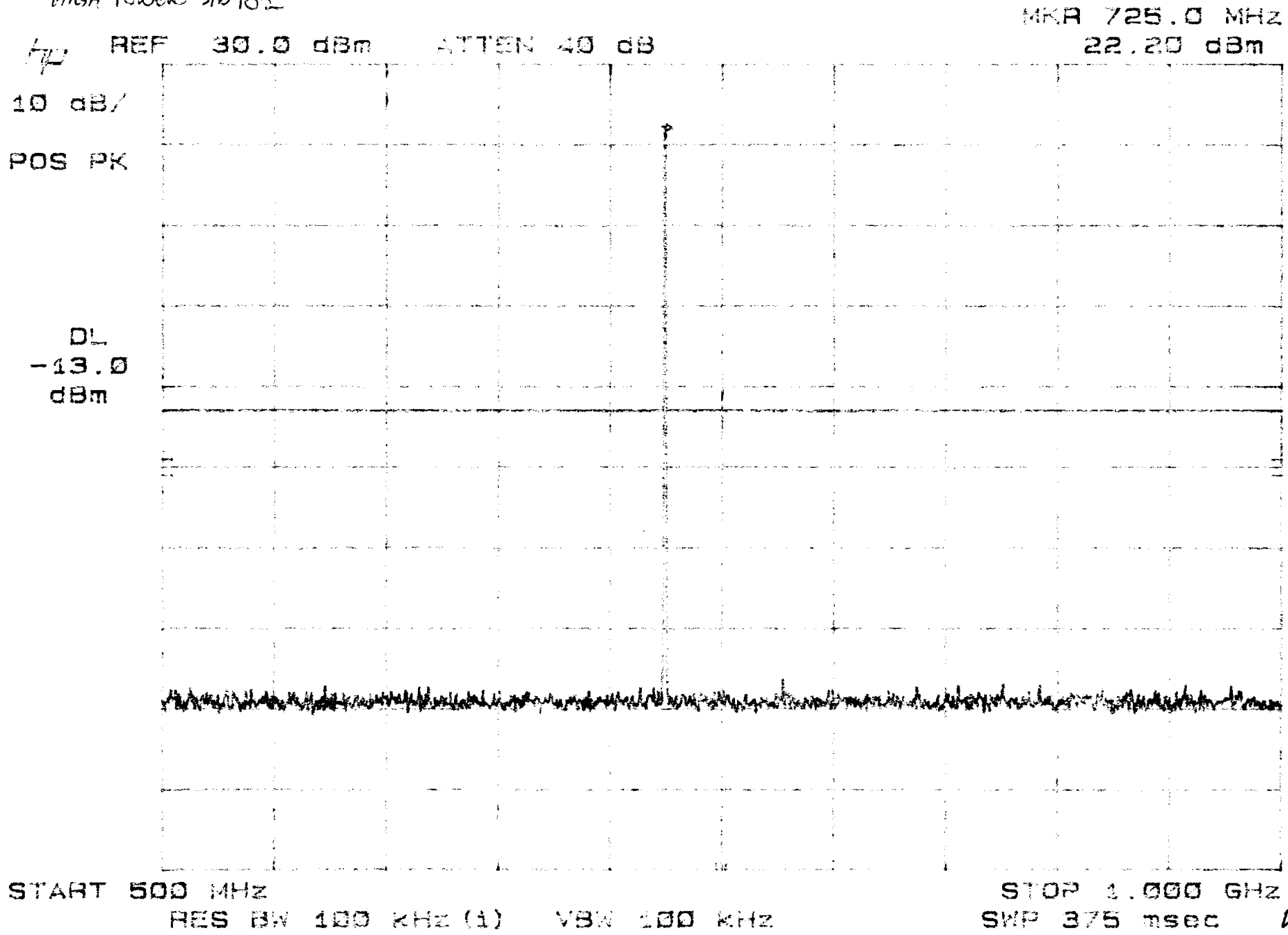
CONDUCTED SPURIOUS
MID TRANSMIT 725 MHz Tx 12 Rx 4
HIGH POWER S/N 102

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



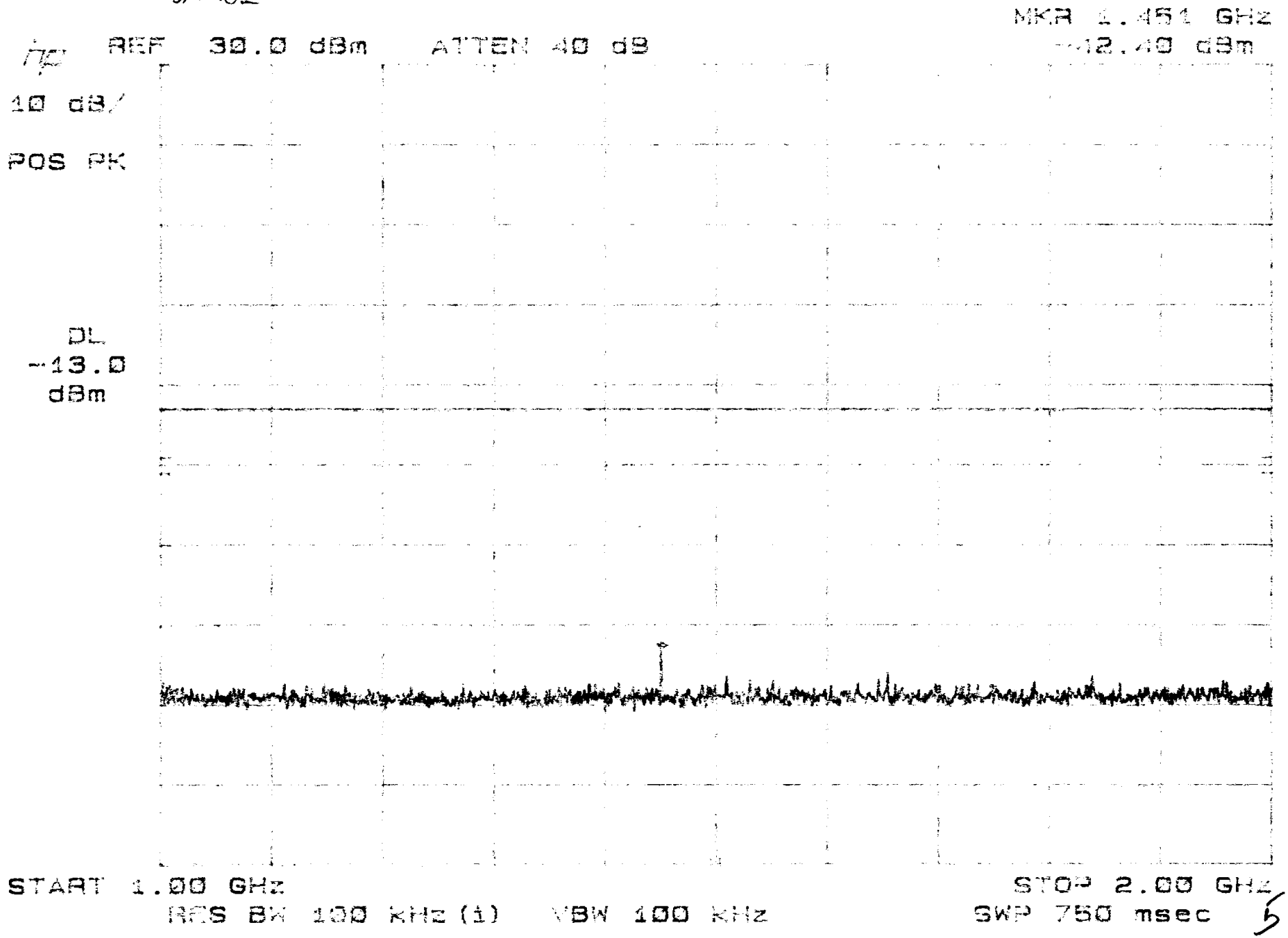
CONDUCTED SPURIOUS
MID TRANSMIT 725MHz Tx12 Rx4
HIGH POWER S/N 102

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 SPURRIOUS
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



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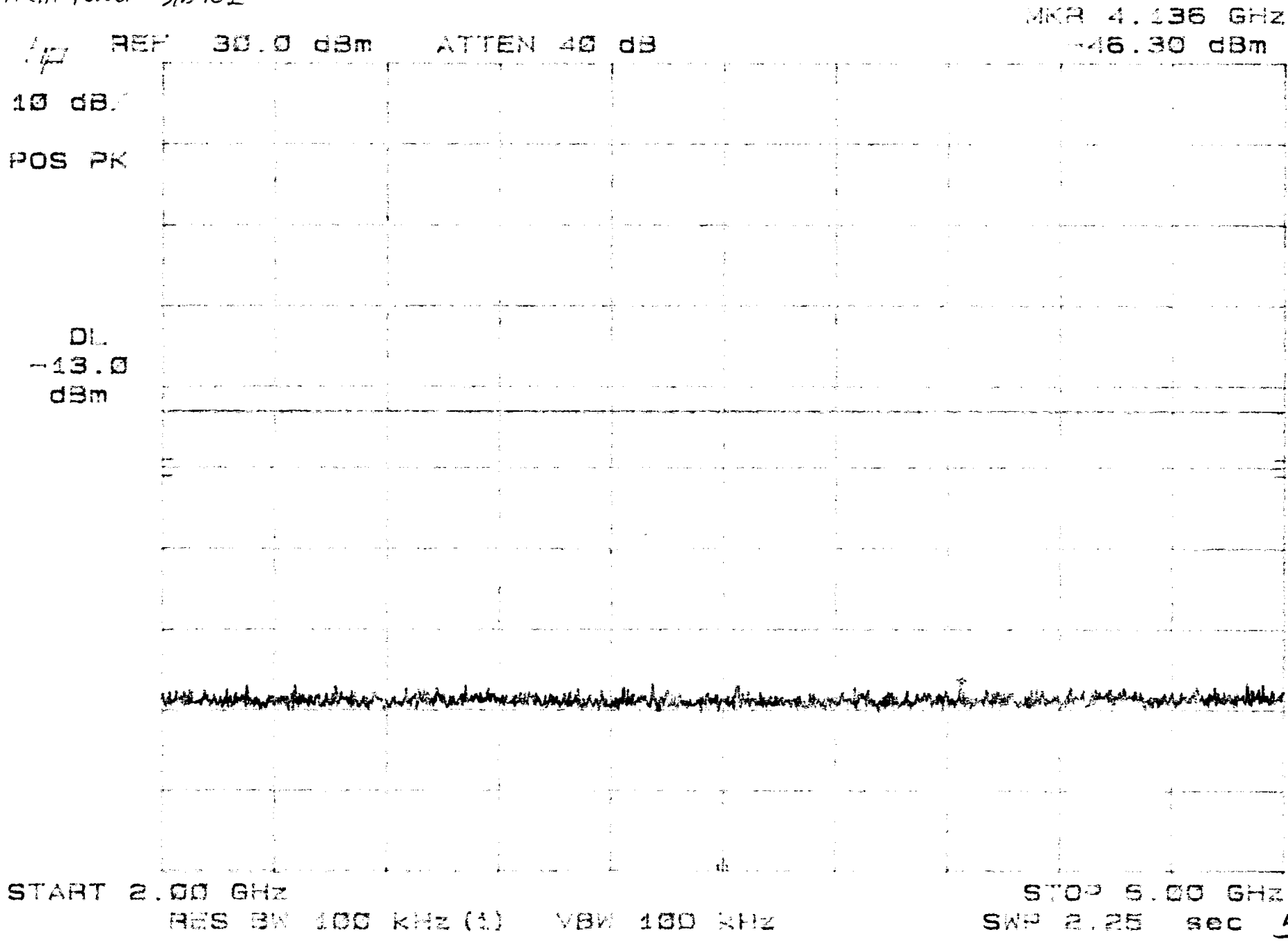
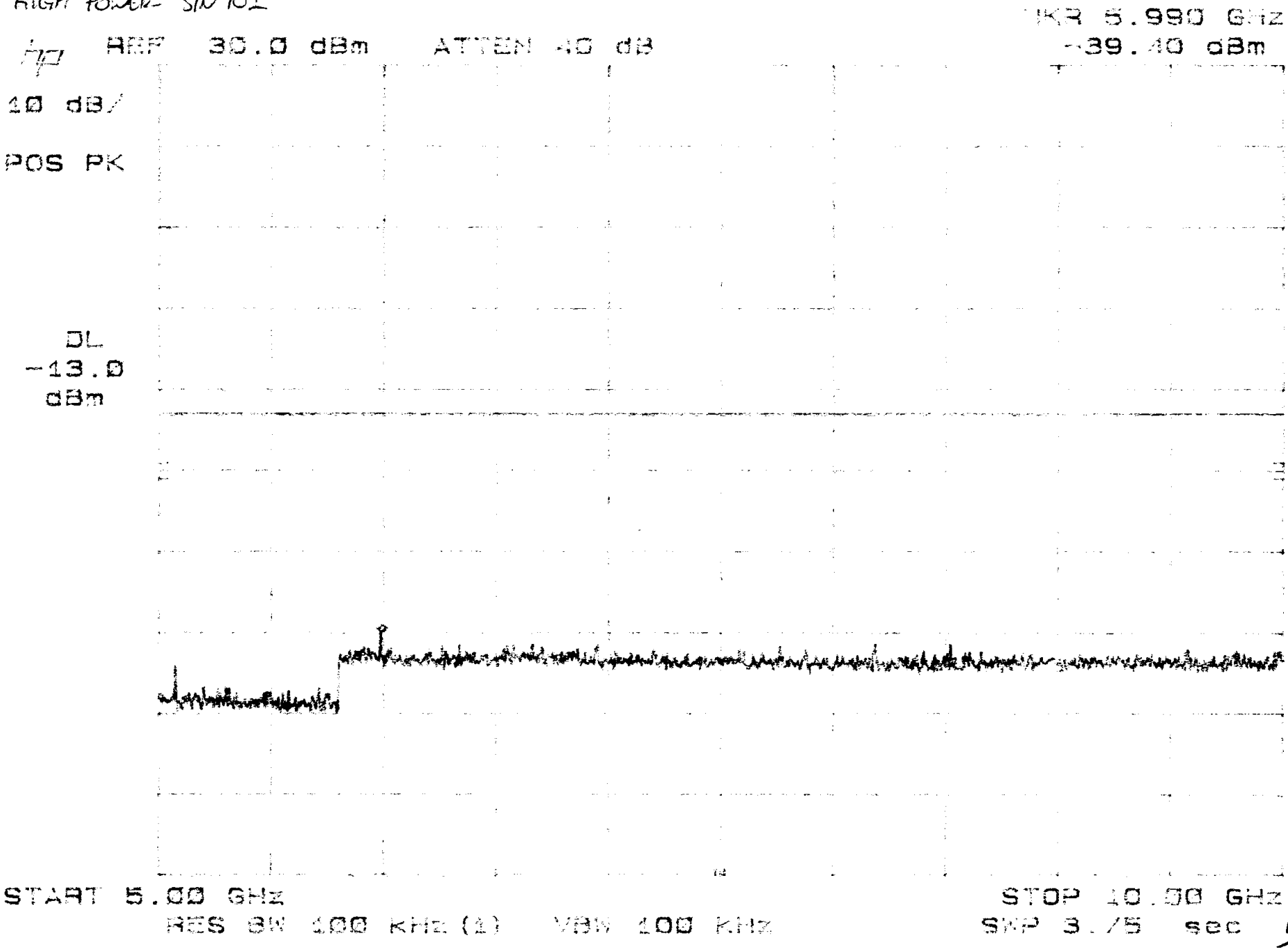
CONDUCTED SPURIOUS
MID TRANSMIT 725MHz Tx12 Rx4
HIGH POWER S/N 102

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



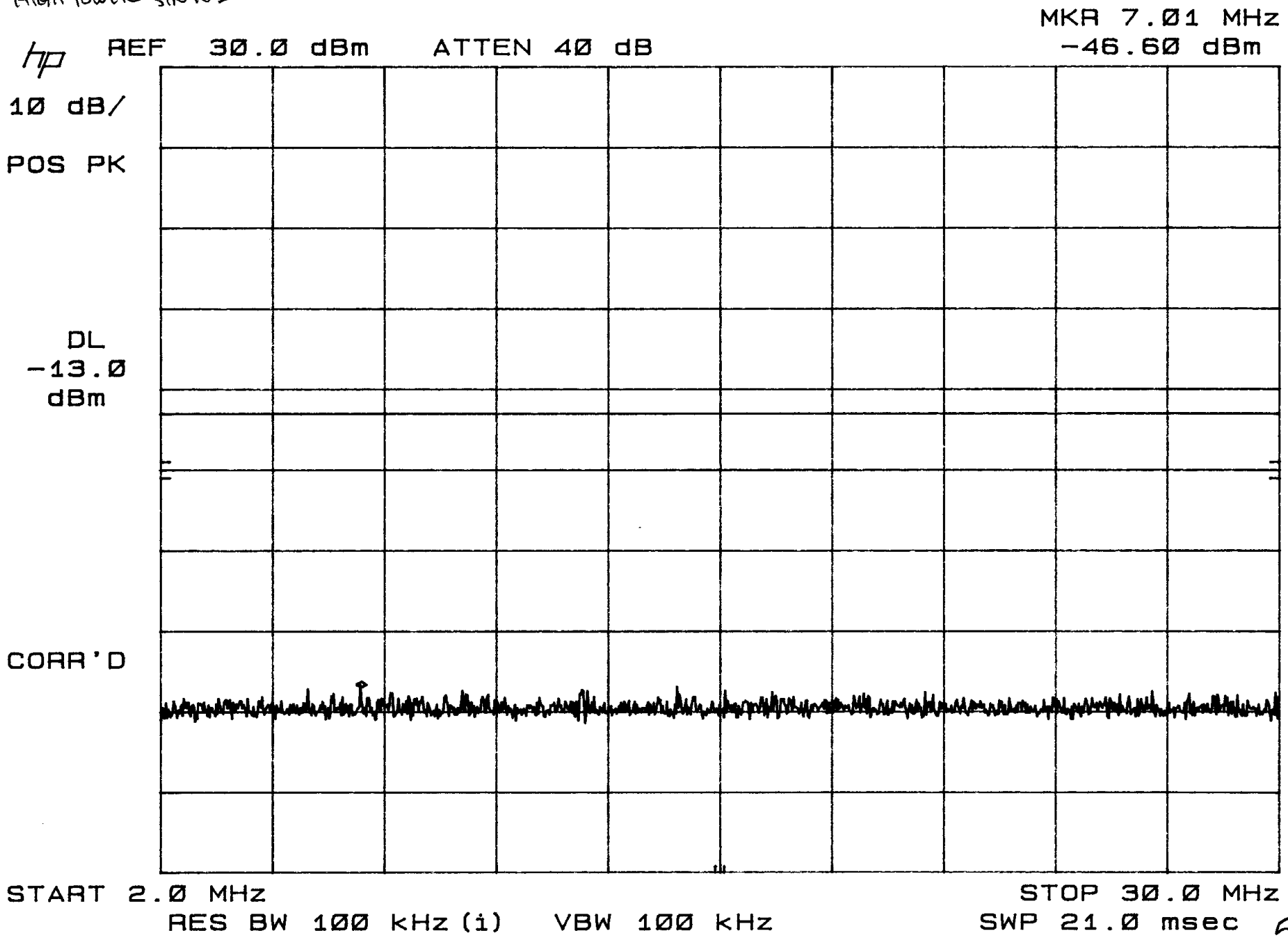
CONDUCTED SPURIOUS
MID TRANSMIT 725 MHz Tx 12 Rx 4
HIGH POWER- S/N 102

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



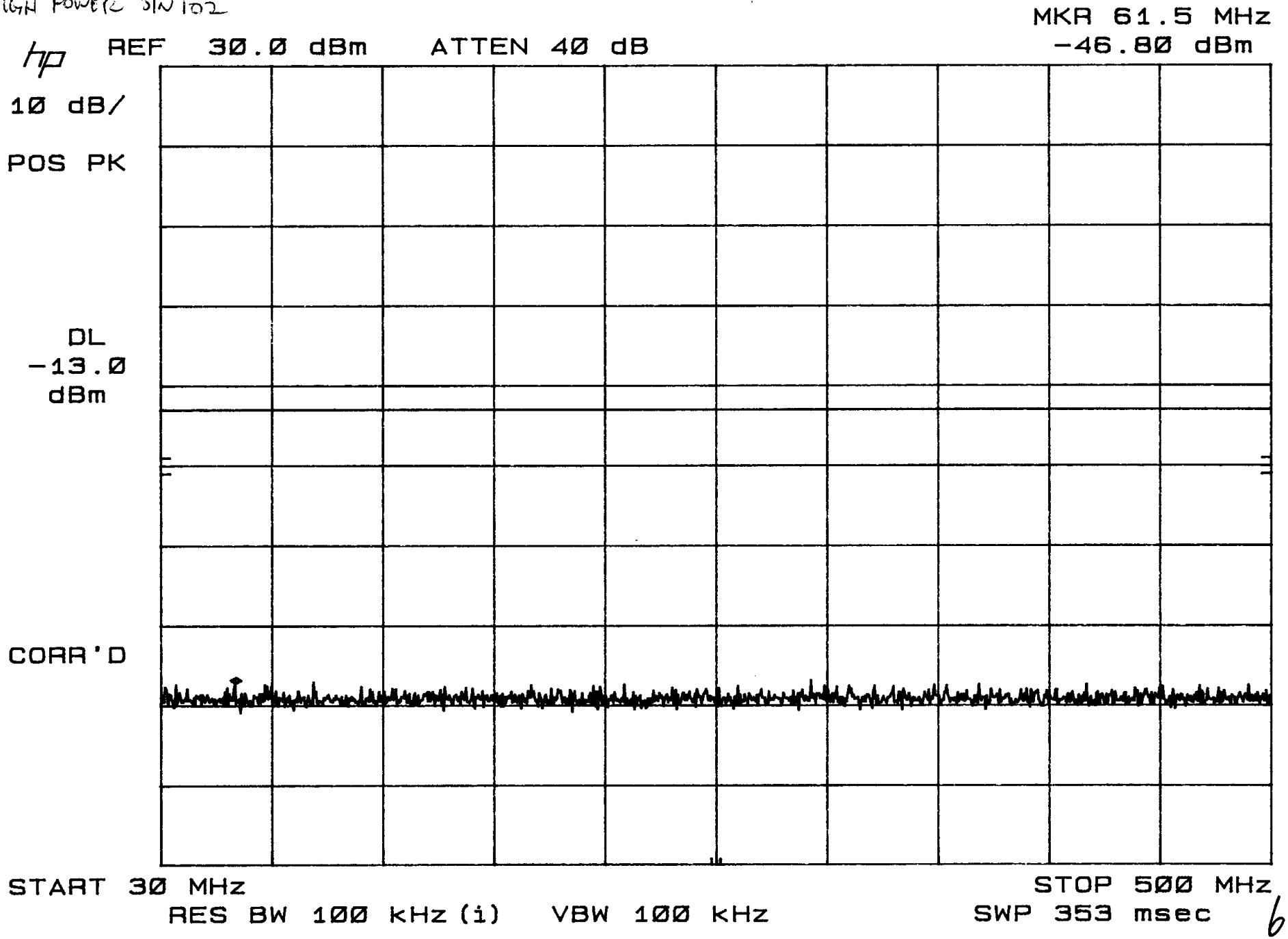
CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 Rx 4
HIGH POWER S/N 102

2.1051 74.861(e)(6)(iii)



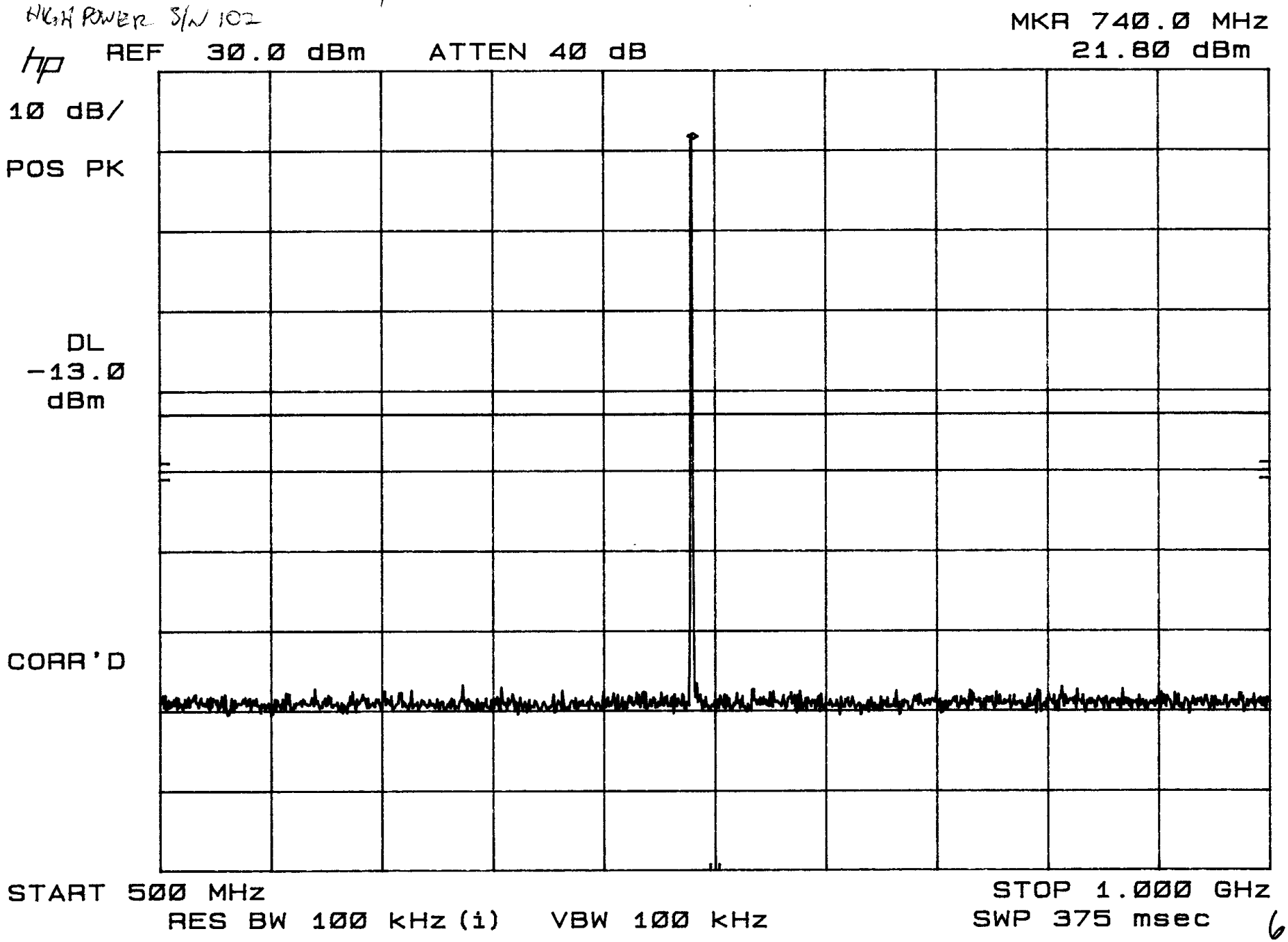
CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 Rx 4
HIGH POWER S/N 102

2.1051 · 74.861(e)(6)(iii)



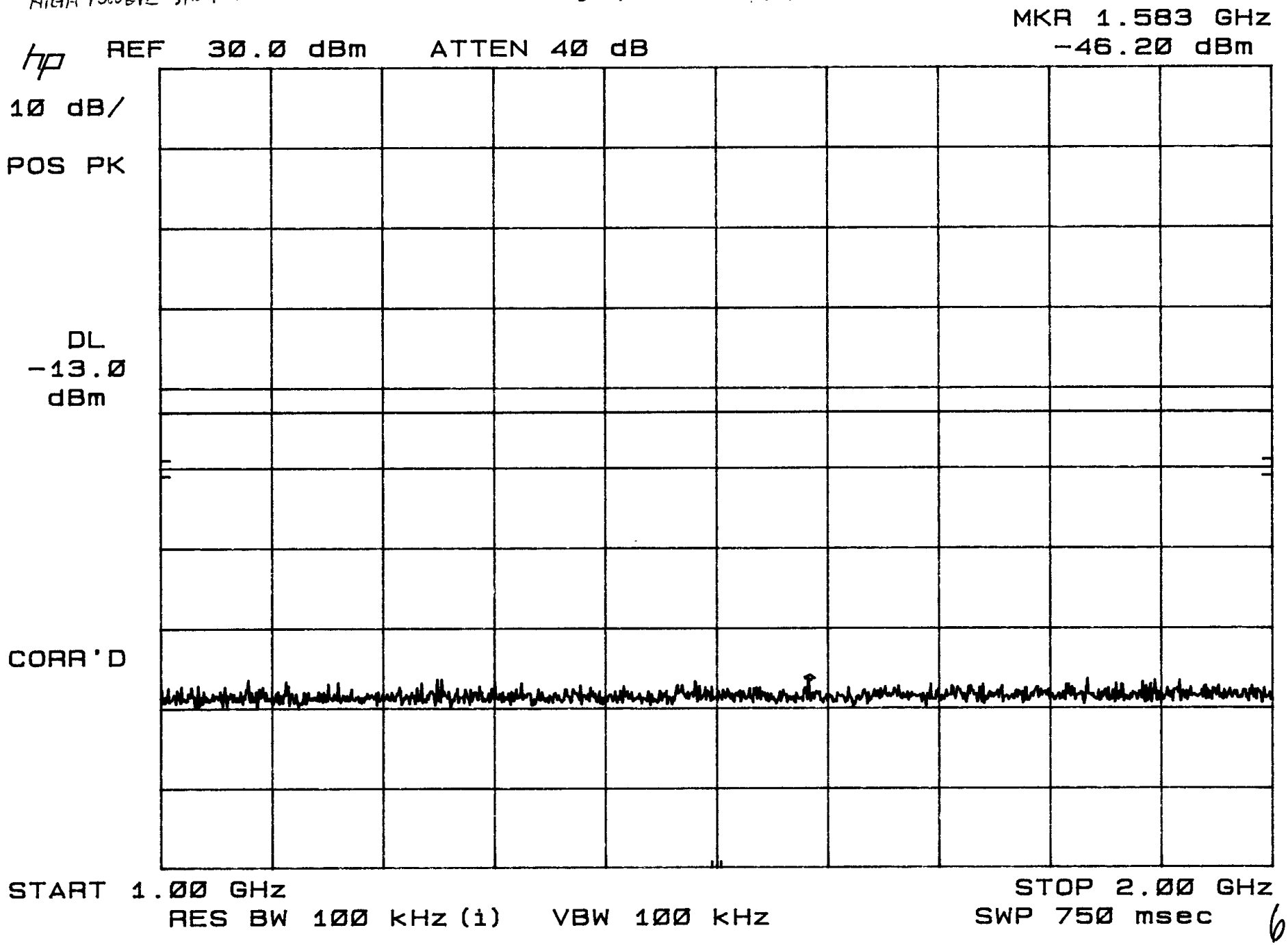
CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 RxH
HIGH POWER S/N 102

2.1051 74.861(e)(6)(ii)



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

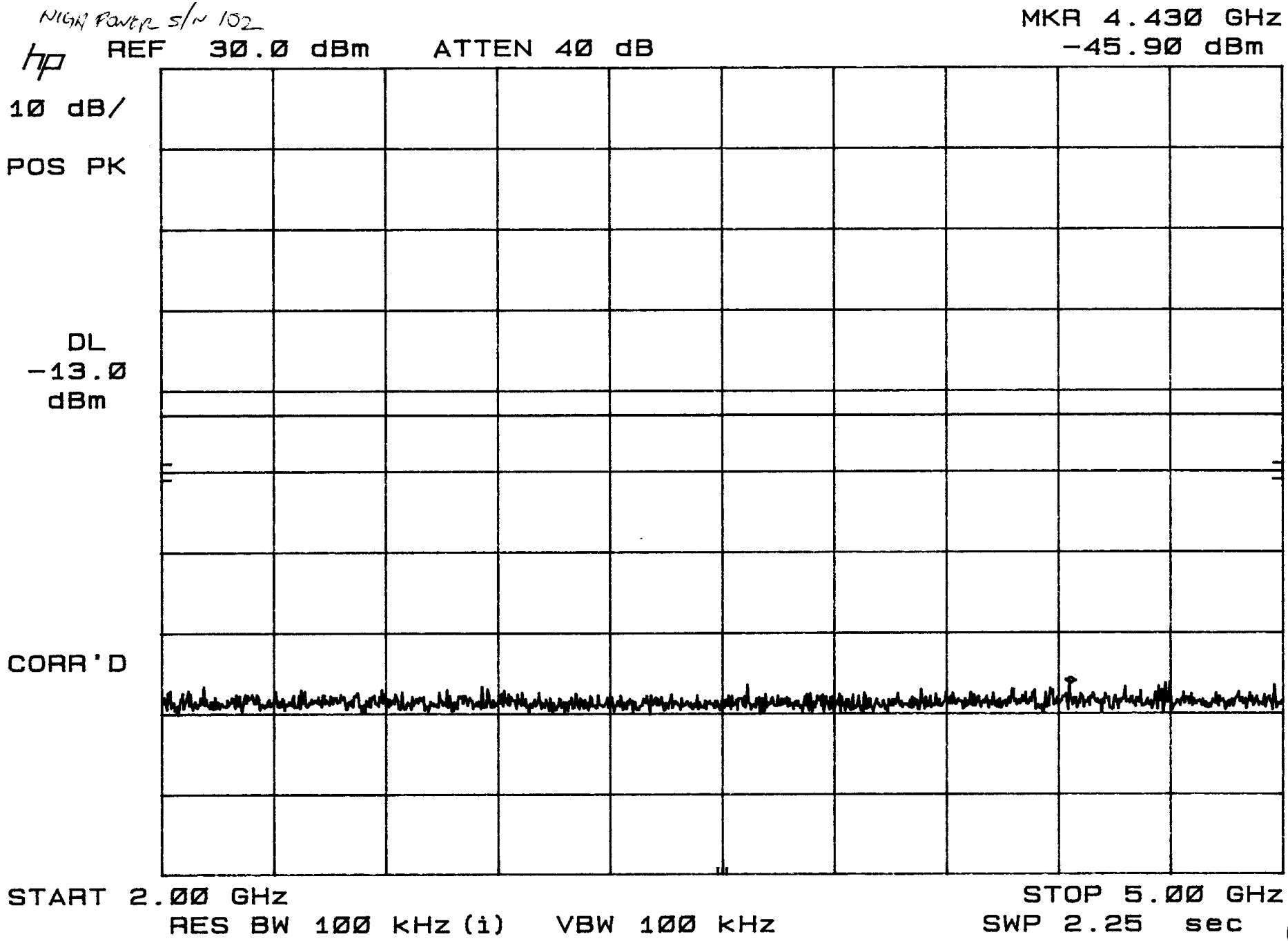
2.1051 74.861(e)(6)(iii)



CONDUCTED SPURIOUS
HIGH TRANSMIT 740 MHz Tx 12 Rx 4

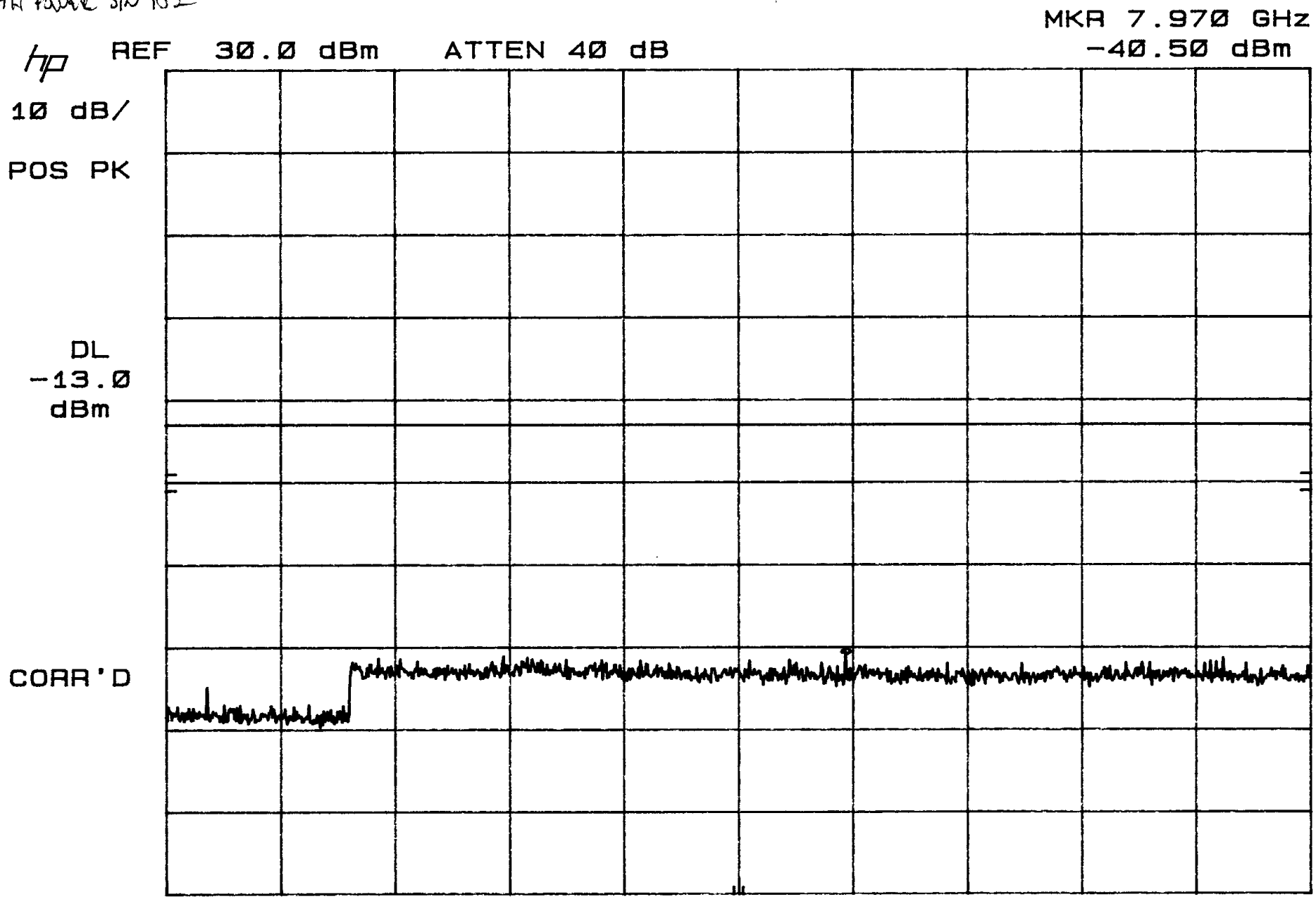
2.1051 74.861(e)(6)(iii)

HIGH POWER S/N 102



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

2.1051 74.861(e)(6)(iii)



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

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"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
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"20:04:10",-1728,35.7
"20:05:15",-1984,35.71
"20:06:19",-1920,35.69
"20:07:24",-2240,35.68
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"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

3/20/01
9:00

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

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:

Jim Owen
(EMC Engineer)

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

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.