FCC Part 24 Subpart E
EMI TEST REPORT

of

E.U.T. : Radio Port

FCC ID. : PJHRADIOPORTB1990

MODEL : B1990

for

APPLICANT : Syncomm Technology Corp.
ADDRESS : 3F, No. 121, Huan-Si Rd., Chung-Li, Taoyuan Hsien, Taiwan, R.O.C.

Test Performed by

ELECTRONICS TESTING CENTER, TAIWAN
NO. 8 LANE 29, WENMIMG ROAD,
LOSHAN TSUN, KWEISHAN HSIANG,
TAOYUAN, TAIWAN, R.O.C.

Tel:(03)3280026-32
Fax:(03)3280034
Report Number : ET89R-03-027

TEST REPORT CIRTIFICATION

Applicant : Syncomm Technology Corp.
3F, No. 121, Huan-Si Rd., Chung-Li, Taoyuan Hsien, Taiwan, R.O.C.

Manufacturer : Syncomm Technology Corp.
5F, No. 25-1, Jilin Rd., Chung-Li, Taoyuan Hsien, Taiwan, R.O.C.

Description of EUT :

a) Type of EUT	: Radio Port
b) Trade Name	: Syncomm
c) Model No.	: B1990
d) FCC ID	: PJHRADIOPORTB1990
e) Operating Frequency	: Transmit 1930-1990 MHz; Receive 1850-1910 MHz
f) Power Supply	: DC 190V

Regulation Applied : FCC Rules and Regulations Part 24 Subpart E (1997)

I HEREBY CERTIFY THAT: The data shown in this report were made in accordance with the procedures given in Part 2 and the energy emitted by the device was founded to be within the limits applicable. I assume full responsibility for accuracy and completeness of these data.

Issued Date : May 02, 2001

Test Engineer : S. S. Liou

Approve & Authorized Signer : Will Yauo

Will Yauo, Supervisor
EMI Test Site of ELECTRONICS
TESTING CENTER, TAIWAN

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1. GENERAL INFORMATION

1.1 Product Description

a) Type of EUT : Radio Port
b) Trade Name : Syncomm
c) Model No. : B1990
d) FCC ID : PJHRADIOPORTB1990
e) Operating Frequency : Transmit 1930-1990 MHz; Receive 1850-1910 MHz
f) Power Supply : DC 190V

1.2 Characteristics of Device:

* RF Output Power at antenna terminal is 800 mW (+29 dBm). The output power is controllable in four steps, from 100 mW to 800 mW.
* The channel spacing shall be 300KHz. The port shall receive on the low band, 1850 to 1910MHz, and transmit on the high band, 1930 to 1990MHz of the duplex frequency allocation.

1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in chapter 13 of ANSI C63.4, and FCC CFR 47 2.1046, 2.1047, 2.1049, 2.1051, 2.1053, 2.1055 and 2.1057.

1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the roof top of Building at No.34, Lin 5, Ding Fu Tsun, Linkou Hsiang, Taipei Hsien, Taiwan, R.O.C.

This site has been fully described in a report submitted to your office, and accepted in a letter dated Feb. 10 , 2000.

2. REQUIREMENTS OF PROVISIONS

2.1 Definition

Intentional radiator:
A device that intentionally generates and emits radio frequency energy by radiation or induction.

2.2 Frequencies Available

According to sec. 24.229 of Part 24, the following frequencies are available for operations :

Block A: 1850-1865 MHz paired with 1930-1945 MHz
Block B: 1870-1885 MHz paired with 1950-1965 MHz
Block C: 1895-1910 MHz paired with 1975-1990 MHz
Block D: 1865-1870 MHz paired with 1945-1950 MHz
Block E: 1885-1890 MHz paired with 1965-1970 MHz
Block F: 1890-1895 MHz paired with 1970-1975 MHz

2.3 Requirements For Measurement

(1) RF Output Power

For transmitters, the power output shall be measured at the RF output terminals.

(2) Modulation Characteristics

For Voice Modulated Communication Equipment, a curve or equivalent data showing the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be submitted.

(3) Occupied Bandwidth

Other than signle sideband or independent sideband Transmitter when moolulated by a 2500 Hz tone at an input level 16 dB greater than that necessary to produce 50 percent modulation.

(4) Spurious Emissions at Antenna Terminals

The radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminal when properly loaded with a suitable artificial antenna.

(5) Field Strength of Spurious Emissions

Measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation.

(6) Frequencies Tolerance

a) The frequency stability shall be measured with variation of ambient temperature.

b) The frequency stability shall be measured with variation of primary supply voltage.

2.4 Labeling Requirement

Each equipment for which a type acceptance application is filed on or after May 1,1981, shall bear an identification plate or label pursuant to § 2.925 （Identification of equipment） and § 2.926（FCC identifier）.

2.5 User Information

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

3. OUTPUT POWER MEASUREMENT

3.1 Provision Applicable

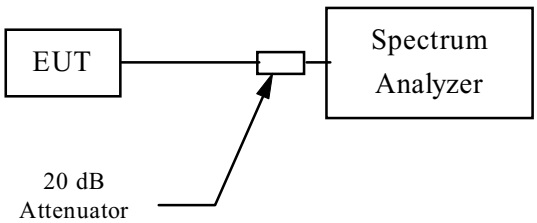
According to § 24.232 (a), base ststions are limited to 1640 watts peak equivalent isotropically radiated power (e.i.r.p.) with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter exceed 100 watts.

3.2 Measurement Procedure

A. Conducted measured

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT as shown in figure 1 without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range and make sure the instrument is operated in its linear range.
3. Set spectrum analyzer RBW to 1M kHz and VBW to 1 MHz., and adjust spectrum analyzer center frequency at the highest amplitude appearing on spectral display. Then set spectrum analyzer frequency span to 5MHz.
4. Measure the highest amplitude appearing on spectral display and record the level as result data.
5. Repeat above procedures until all frequencies measured were complete.

Figure 1 : Output power measurement configuration



B. EIRP

1. Setup the configuration per figure 2 and 3 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power as measured in above conducted output power measurement.

2. Adjust the analyzer for each frequency measured on a 1 MHz frequency span and 100 kHz resolution bandwidth.

3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 °, and record the highest value indicated on spectrum analyzer as reference value.

4. Repeat step 3 until all frequencies need to be measured were complete.

5. Repeat step 4 with search antenna in vertical polarized orientations.

6. Replace the EUT with a tuned dipole antenna (horn antenna for above 1 GHz) relative to each frequency in horizontally polarized orientation and as the same polarized orientation with search antenna. Connect the tuned dipole antenna to a standard signal generator (SG) via a low loss cable. Power on the SG and tune the right frequency in measuring as well as set SG at a appreciated output level. Rise and lower the search antenna to get the highest value on spectrum analyzer, and then hold this position. Adjust the SG output to get a value as close as that derived from step 3 on spectrum analyzer. Record this value for result calculated.

7. Repeat step 6 until all frequencies need to be measured were complete.

8. Repeat step 7 with both dipole antenna (horn antenna for above 1 GHz) and search antenna in vertical polarized orientations.

Figure 2 : Frequencies measured below 1 GHz configuration

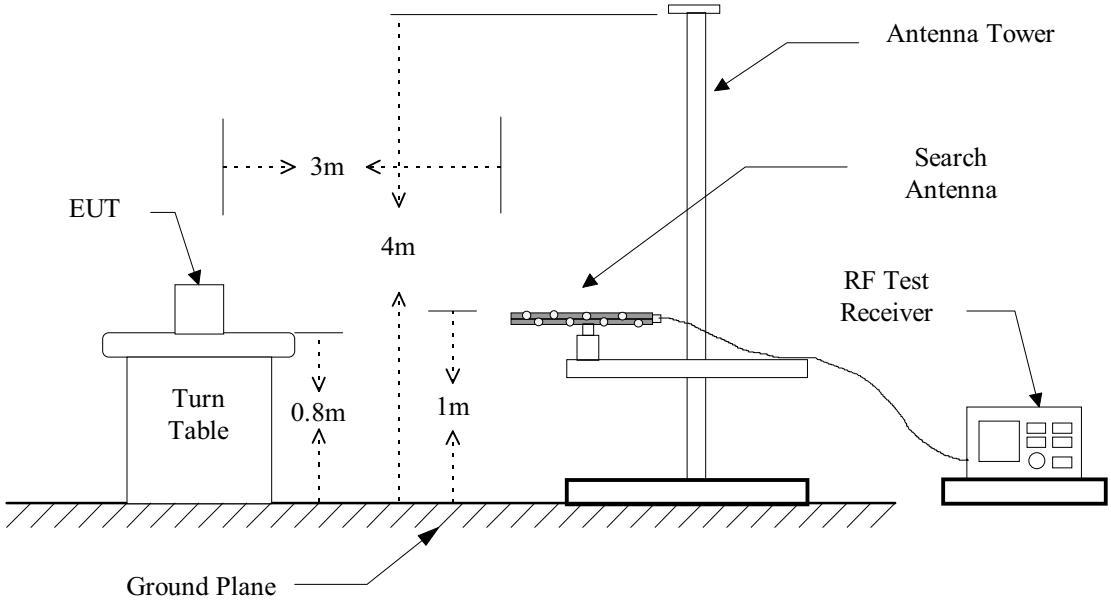
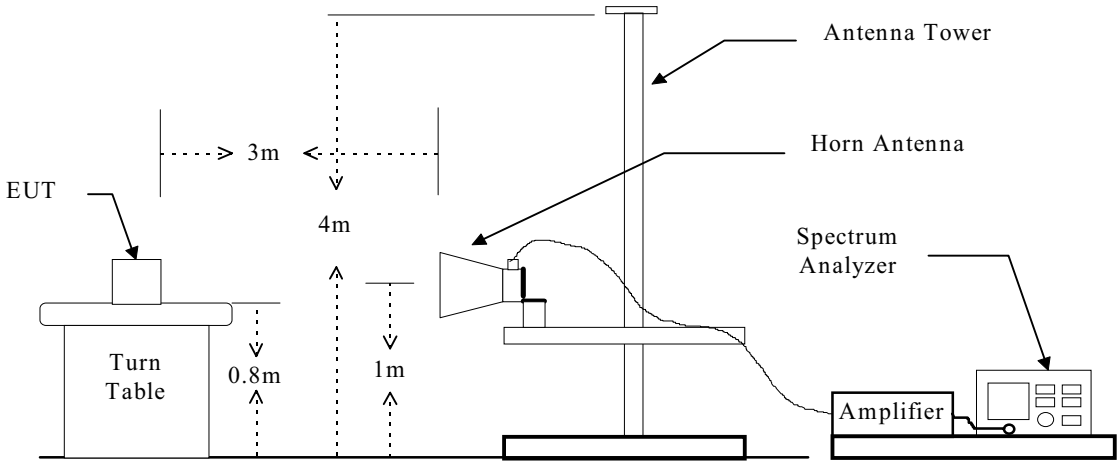


Figure 3 : Frequencies measured above 1 GHz configuration



3.3 Test Data

A. Conducted measured

Operated mode : Transmitting Test Date : Feb. 09, 2001
Temperature : 20 ℃ Humidity : 65 %

CH	Frequency (MHz)	SA Reading (dBm)	Cable Loss (dB)	Result (dBm)	Output Power (W)	Limit (W)
1	1930.000	26.2	0.5	26.7	0.468	100
300	1960.000	28.8	0.5	29.3	0.851	100
600	1990.000	27.2	0.5	27.7	0.589	100

Note: Result = SA Reading + Cable Loss
Pease find Appendix 1 for plotted graphs.

B. EIRP

Operated mode : Transmitting Test Date : Feb. 09, 2001
Temperature : 20 ℃ Humidity : 65 %

*** SG @ 0 dBm**

Frequency (MHz)	SA Reading (dBuV)	SG Reading (dBuV)	Cable Loss (dB)	Antenna Gain (dB)	dBi corrected factor	Result (dBm)	EIRP (W)	Limit (W)
1930.100	101.2	74.1	-1.8	9.4	-2	32.7	1.9	1640
1960.130	101.5	73.5	-1.8	9.4	-2	33.6	2.3	1640
1990.000	101.0	72.9	-1.8	9.4	-2	33.7	2.3	1640

The result is calculated as following equation :

Result = SA Reading – SG Reading + 0 + Cable Loss + Antenna Gain + dBi Corrected factor

$$W = \log^{-1}\left[\frac{\text{Result(dBm)}}{10}\right] /1000$$

3.4 Output Power Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8568B	Dec. 21, 2001
Pre-selector	Hewlett-Packard	85685A	Jan. 01, 2002
Quasi Peak Detector	Hewlett-Packard	85650A	Jan. 01, 2002
Log periodic Antenna	EMCO	3146	Nov. 02, 2001
Dipole Antenna	EMCO	3121C	Sep. 22, 2001
Spectrum Analyzer	Hewlett-Packard	8564E	Apr. 18, 2002
20 dB Attenuator	Weinschel Engineering	1	N/A
Horn Antenna	EMCO	3115	May 09, 2001
Biconical Antenna	EMCO	3110B	Nov. 02, 2001
Preamplifier	Hewlett-Packard	8449B	May. 09, 2001
Preamplifier	Hewlett-Packard	8447D	Sep. 29, 2001
Synthesized Signal Generator	Hewlett-Packard	83732B	Aug. 08,2001

4. MODULATION CHARACTERISTICS

4.1 Provisions Applicable

According to § 2.1047 (a), for Voice Modulated Communication Equipment, the frequency response of the audio modulating circuit over a range of 100 to 5000 Hz shall be measured.

4.2 Measurement Result

For the equipment under test, it only transmits and receives digital signals. The measurement of modulation characteristics is not applicable.

5. EMISSION BANDWIDTH

5.1 Provisions Applicable

According to § 24.238 (b), the emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

5.2 Measurement Method

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.

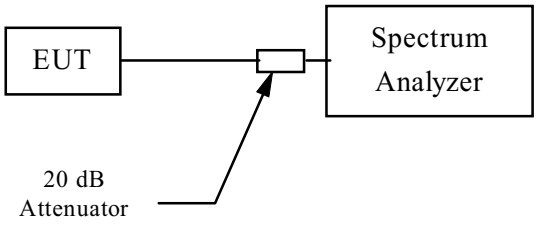
2. Position the EUT as shown in figure 4, and Install new batteries in the EUT. Turn on the EUT ant set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.

3. Set spectrum analyzer RBW to 30kHz and VBW to 100kHz., and adjust spectrum analyzer center frequency at the highest amplitude appearing on spectral display. Then set spectrum analyzer frequency span to 2MHz.

4. Use the Display Line function to show the 26 dB attenuated points below the highest peak value.

5. Use markers to show the emission bandwidth.

Figure 4 : Emission bandwidth measurement configuration



5.3 Occupied Bandwidth Test Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8564E	Apr. 18, 2002
20 dB Attenuator	Weinschel Engineering	1	N/A
Plotter	Hewlett-Packard	7440A	N/A

5.4 Bandwidth Measured

Emission Bandwidth Plotted

Please refer to Appendix 1 for plotted data.

6. SPURIOUS EMISSIONS AT ANTENNA TERMINALS

6.1 Provisions Applicable

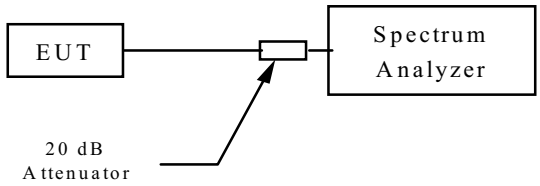
According to § 2.1051, the radio frequency voltage or power generated within the equipment and appearing on a spurious frequency shall be checked at the equipment output terminal when properly loaded with a suitable artificial antenna.

According to § 24.238 (a), on any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (P) dB.

6.2 Measurement Procedure

1. Setup the configure per figure 4, adjusting the input voltage to produce the maximum power.
2. Adjust the analyzer frequency span from 30 MHz to 1 GHz, record any frequency attenuated less than 43 + 10 log (P) dB relative to the permitted emission. Then repeat the measurement mentioned above by adjusting the analyzer frequency span from 1 GHz to 10 GHz and from 10 GHz to 30 GHz.
3. Adjust the analyzer for each frequency measured above on a 2 MHz frequency span and 1MHz resolution bandwidth. Record the highest value on spectrum analyzer.

Figure 5 : Conducted spurious emission measurement configuration



6.3 Measurement Equipment

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8564E	Apr. 18, 2002
20 dB Attenuator	Weinschel Engineering	1	N/A
Plotter	Hewlett-Packard	7440A	N/A

6.3 Measurement Data

Spurious emission

1) Channel 1 : 1930 MHz
   the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (0.468) dB = 39.7 dB
2) Channel 300 : 1960 MHz
   the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (0.851) dB = 42.3 dB
3) Channel 600 : 1990 MHz
   the power of any emission shall be attenuated below the transmitter power (P) by at least 43 + 10 log (0.589) dB = 40.7 dB

The emission power level is attenuated below the transmitter power by at least the level calculated above.

Please refer to Appendix 2 for plotted graphs.

7. FIELD STRENGTH OF EMISSION

7.1 Provisions Applicable

According to § 2.1053 (a), Measurements shall be made to detect spurious emission that may be radiated directly from the cabinet, control circuits, power leads, or intermediate circuit elements under normal condition of installation and operation. Information submitted shall include the relative radiated power of spurious emission with reference to the rated power output of the transmitter, assuming all emissions are radiated from a halfwave dipole antenna.

According to § 15.109 (b), the field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following::

Frequency of Emission (MHz)	Field Strength (microvolts/meter)
30-88	90 (39.0 dB μ V/m)
88-216	150 (43.5 dB μ V/m)
216-960	210 (46.4 dB μ V/m)
Above 960	300 (49.5 dB μ V/m)

7.2 Measurement Procedure

1. Setup the configuration per figure 6 and 7 for frequencies measured below and above 1 GHz respectively, adjusting the input voltage to produce the maximum power as measured in chapter 3.
2. Adjust the analyzer for each frequency measured on a 1 MHz frequency span and 100 kHz resolution bandwidth.
3. The search antenna is to be raised and lowered over a range from 1 to 4 meters in horizontally polarized orientation. Position the highness when the highest value is indicated on spectrum analyzer, then change the orientation of EUT on test table over a range from 0 ° to 360 °, and record the highest value indicated on spectrum analyzer as reference value.
4. Repeat step 3 until all frequencies need to be measured were complete.
5. Repeat step 4 with search antenna in vertical polarized orientations.

Figure 6 : Frequencies measured below 1 GHz configuration

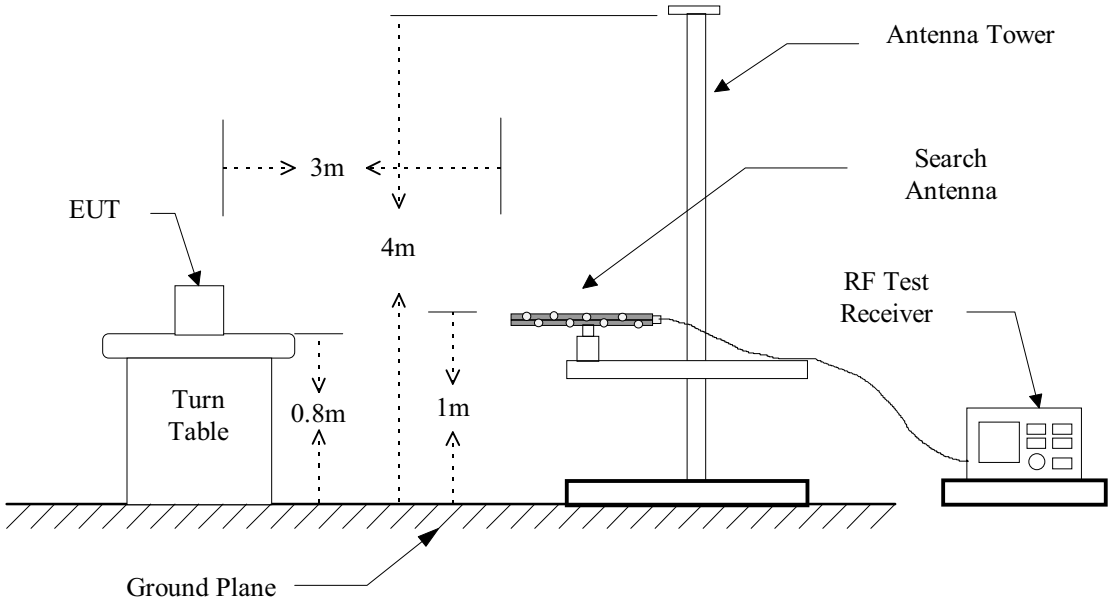
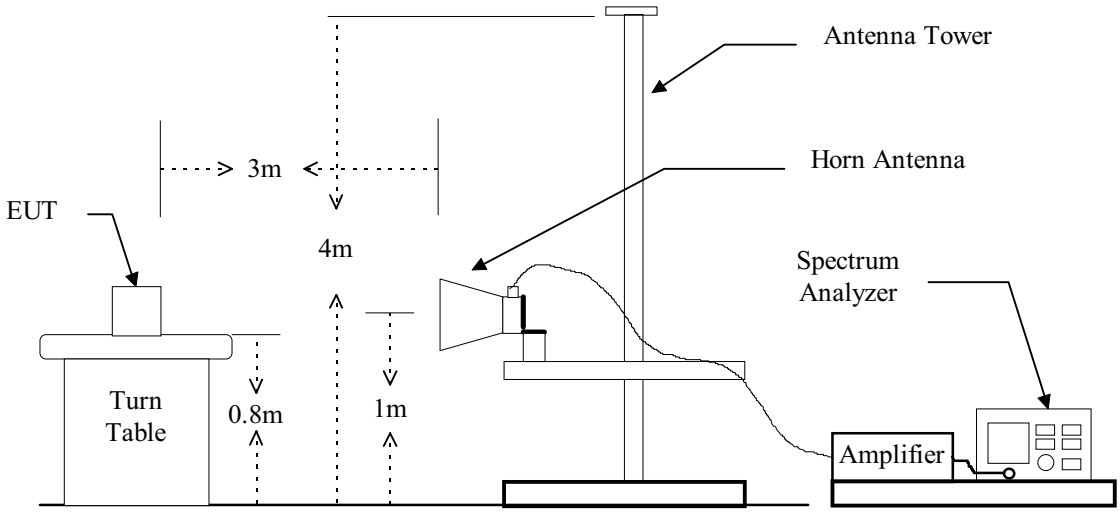


Figure 7 : Frequencies measured above 1 GHz configuration



7.3 Measuring Instrument

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8568B	Dec. 21, 2001
Pre-selector	Hewlett-Packard	85685A	Jan. 01, 2002
Quasi Peak Detector	Hewlett-Packard	85650A	Jan. 01, 2002
Spectrum Analyzer	Hewlett-Packard	8564E	Apr. 18, 2002
Horn Antenna	EMCO	3115	May 09, 2001
Log periodic Antenna	EMCO	3146	Nov. 02, 2001
Biconical Antenna	EMCO	3110	Nov. 02, 2001
Preamplifier	Hewlett-Packard	8449B	May. 09, 2001
Preamplifier	Hewlett-Packard	8447D	Dec. 29, 2001

Measuring instrument setup in frequency band measured is as following :

Frequency Band (MHz)	Instrument	Function	Resolution bandwidth	Video Bandwidth
30 to 1000	Spectrum Analyzer	Peak	100 kHz	100 kHz
Above 1000	Spectrum Analyzer	Peak	1 MHz	1 MHz

7.4 Measurement Data

Operated mode : Transmitting Test Date : Feb. 09, 2001
Temperature : 20 ℃ Humidity : 65 %

Emission Frequency	**Meter Reading** (dB μ V)		**Corr'd Factor**	**Results** (dB μ V/m)		**AH** (m)		**DRT** degree		**Limit** @ 10 m	**Margin**
(MHz)	**Hor.**	**Ver.**	(dB)	**Hor.**	**Ver.**	**Hor.**	**Ver.**	**Hor.**	**Ver.**	(dB μ V/m)	(dB)
38.386	31.1	45.6	-12.4	18.7	33.2	1.8	1.2	165	188	39.0	-5.8
153.664	38.0	30.1	-10.0	28.0	20.1	2.3	1.2	189	172	43.5	-15.5
161.336	43.5	35.5	-9.9	33.6	25.6	2.2	1.0	157	180	43.5	-9.9
166.550	38.2	34.1	-9.6	28.6	24.5	1.7	1.1	204	169	43.5	-14.9
196.829	34.0	27.1	-8.0	26.0	19.1	2.2	1.6	188	193	43.5	-17.5
211.221	37.6	27.4	-7.4	30.2	20.0	2.1	1.4	165	200	43.5	-13.3

● The system amplitude accuracy of the measurement made during the radiated emission test was ± 4dB.
Note: 1. AH means antenna height, DRT means degrees of rotation of turntable.
2. Remark "---" means that the emissions level is too low to be measured.

7.5 Photos of Radiation Measuring Setup

Please see Setup Photos in Exhibit F.

8 CONDUCTED EMISSION MEASUREMENT

8.1 Standard Applicable

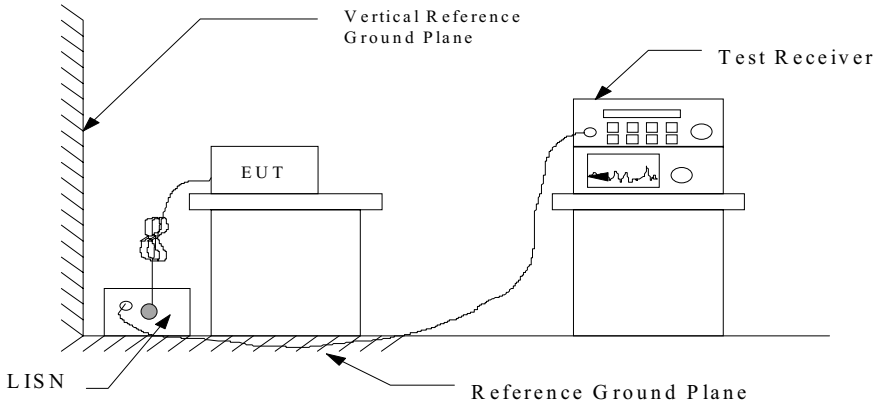
According to § 15.107(b), the radio frequency voltage shall not exceed the limits in the following table:

Frequency of Emission (MHz)	Conducted Limit (microvolts)
0.45-1.705	1000 (60.0 dB μ V)
1.705-30.0	3000 (69.5 dB μ V)

8.2 Measurement Procedure

1. Setup the configuration per figure 8.
2. A preliminary scan with a spectrum monitor is performed to identify the frequency of emission that has the highest amplitude relative to the limit by operating the EUT in selected modes of operation, typical cable positions, and with a typical system configuration.
3. Record the 6 or 8 highest emissions relative to the limit.
4. Measure each frequency obtained from step 3 by a test receiver set on quasi peak detector function, and then record the accuracy frequency and emission level. If all emissions measured in the specified band are attenuated more than 20 dB from the limit, this step would be ignored, and the peak detector function would be used.
5. Confirm the highest three emissions with variation of the EUT cable configuration and record the final data.
6. Repeat all above procedures on measuring each operation mode of EUT.

Figure 8 : Conducted emissions measurement configuration



8.3 Conducted Emission Data

A.

Operation Mode : CH1

Test Date : Feb. 09, 2001 Temperature : 26 ℃ Humidity: 65 %

Emission Frequency (MHz)	**Meter Reading** (dB μ V)		**LISN Factor** (dB)	**Results** (dB μ V)		**Limit** (dB μ V)	**Margins** (dB)
	VA	**VB**		**VA**	**VB**		
0.4697	38.8	30.5	0.2	39.0	30.7	60.0	-21.0
1.8793	46.5	45.5	0.3	46.8	45.8	69.5	-22.7
2.8251	59.0	60.3	0.3	59.3	60.6	69.5	-8.9
9.8794	51.9	53.1	0.5	52.4	53.6	69.5	-15.9
15.7562	49.0	41.2	0.8	49.8	42.0	69.5	-19.7
19.7471	49.3	43.5	0.9	50.2	44.4	69.5	-19.3
22.7945	48.2	48.5	1.0	49.2	49.5	69.5	-20.0

B.

Operation Mode : CH300

Test Date : Feb. 09, 2001 Temperature : 26 ℃ Humidity: 65 %

Emission Frequency (MHz)	**Meter Reading** (dB μ V)		**LISN Factor** (dB)	**Results** (dB μ V)		**Limit** (dB μ V)	**Margins** (dB)
	VA	**VB**		**VA**	**VB**		
0.4697	38.5	30.1	0.2	38.7	30.3	60.0	-21.3
1.8793	46.2	44.5	0.3	46.5	44.8	69.5	23.0
2.8251	59.1	60.3	0.3	59.4	60.6	69.5	-8.9
9.8794	51.8	52.7	0.5	52.3	53.2	69.5	-16.3
15.7562	49.1	40.6	0.8	49.9	41.4	69.5	-19.6
19.7471	49.2	43.4	0.9	50.1	44.3	69.5	-19.4
22.7945	48.4	49.0	1.0	49.4	50.0	69.5	-19.5

C.

Operation Mode : CH600

Test Date : Feb. 09, 2001 Temperature : 26 ℃ Humidity: 65 %

Emission Frequency (MHz)	**Meter Reading** (dB μ V)		**LISN Factor** (dB)	**Results** (dB μ V)		**Limit** (dB μ V)	**Margins** (dB)
	VA	**VB**		**VA**	**VB**		
0.4697	38.9	31.3	0.2	39.1	31.5	60.0	-20.9
1.8793	46.6	44.8	0.3	46.9	45.1	69.5	-22.6
2.8251	59.4	46.2	0.3	59.7	46.5	69.5	-9.8
9.8794	52.1	61.3	0.5	52.6	61.8	69.5	-7.7
15.7562	49.1	41.2	0.8	49.9	42.0	69.5	-19.6
19.7471	49.8	43.8	0.9	50.7	44.7	69.5	-18.8
22.7945	48.5	49.0	1.0	49.5	50.0	69.5	-19.5

● The system amplitude accuracy of the measurement made during the conducted emission test was ± 3dB.

Note : Limit shown in above table is quasi peak value, and data is measured with quasi peak function detector.

The full frequency range scanning test data is shown in Appendix 3

8.4 Result Data Calculation

The result data is calculated by adding the LISN Factor to the measured reading. The basic equation with a sample calculation is as follows:

RESULT = READING + LISN FACTOR

Assume a receiver reading of 45.7 dB μ V is obtained, and LISN Factor is 0.2 dB, then the total of field strength is 45.9 dB μ V.

RESULT = 45.7 + 0.2 = 45.9 dB μ V
Level in μ V = Common Antilogarithm[(45.9 dB μ V)/20]
= 22.9 μ V

8.5 Conducted Measurement Equipment

The following test equipment are used during the conducted test .

Equipment	Manufacturer	Model No.	Serial No.	Next Cal. Date
RF Test Receiver	Rohde and Schwarz	ESH3	894718/018	Jan/03/2002
Spectrum Monitor	Rohde and Schwarz	EZM	861960/024	N/A
Line Impedance Stabilization network	Rohde and Schwarz	ESH2-Z5	881362/009	Jul/30/2001
Line Impedance Stabilization network	Shibasoku	563	M-54354001	Jul/30/2001
Plotter	Hewlett-Packard	7440A	----	N/A
Shielded Room	Riken	----	----	N/A

Note: The standards used to perform this calibration are traceable to NML/ROC and NIST/USA.

8.6 Photos of Conduction Measuring Setup

Please see Setup Photos in Exhibit F.

9. FREQUENCY STABILITY MEASUREMENT

9.1 Provisions Applicable

According to § 2.1055 (a)(1), the frequency stability shall be measured with variation of ambient temperature from -30℃ to +50℃ centigrade.

According to § 24.235, the frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

9.2 Measurement Procedure

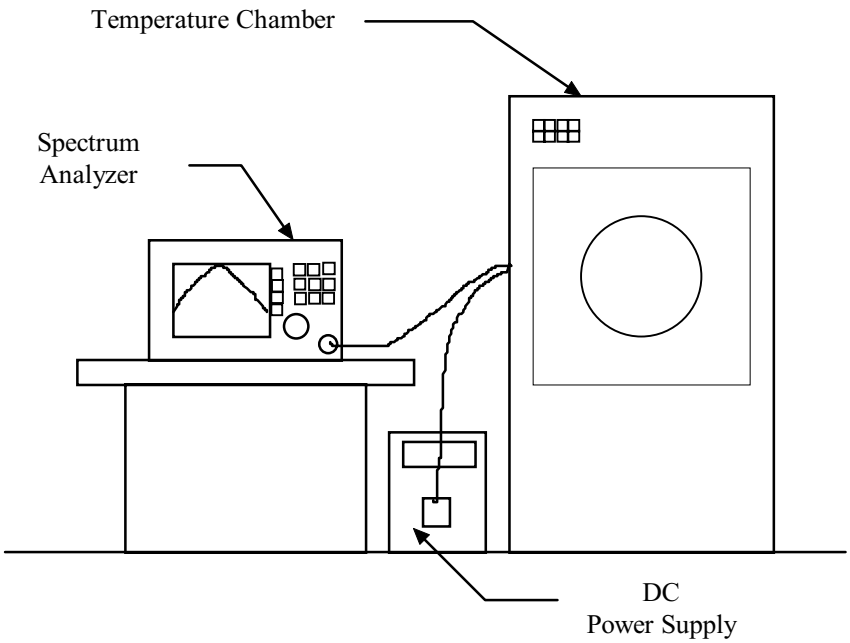
1. Setup the configuration per figure 9 for frequency stability measurement. Set the temperature of chamber to 20℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize.

2. Turn on EUT and set SA center frequency to the right frequency needs to be measured. Then set SA RBW to 30 kHz, VBW to 100kHz and frequency span to 500 kHz. Record the frequencies after the EUT is turned on for 2, 5 and 10 minutes.

3. Set the temperature of chamber to 50℃. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. While maintaining a constant temperature inside the chamber, turn the EUT on and measure the EUT operating frequency.

4. Repeat step 2 with a 10℃ decreased per stage until the lowest temperature -30℃ is measured, record all measurement frequencies.

Figure 9 : Frequency stability measurement configuration



9.3 Measurement Instrument

Equipment	Manufacturer	Model No.	Next Cal. Date
Spectrum Analyzer	Hewlett-Packard	8564E	Apr. 18, 2001
20 dB Attenuator	Weinschel Engineering	1	N/A
Temperature Chamber	ACS	EOS 200T	Jan. 10, 2002

9.4 Measurement Data

Operated mode : CH1 Test Date : Feb. 16, 2001

Reference Frequency :		1.930200000 GHz					
Environment Tempture (℃)	Power Supplied (Vdc)	Frequency Deviation Measured With Time Elapse					
		2 minute		5 minute		10 minute	
		(GHz)	(%)	(GHz)	(%)	(GHz)	(%)
50	190	1.930199783	-0.000011	1.930199813	-0.000010	1.930199821	-0.000009
40	190	1.930199820	-0.000009	1.930199845	-0.000008	1.930199861	-0.000007
30	190	1.930199833	-0.000009	1.930199862	-0.000007	1.930199875	-0.000006
20	190	1.930200000	0.000000	1.930200210	0.000011	1.930200259	0.000013
10	190	1.930200120	0.000006	1.930200139	0.000007	1.930200211	0.000011
0	190	1.930200183	0.000009	1.930200198	0.000010	1.930200221	0.000011
-10	190	1.930200218	0.000011	1.930200245	0.000013	1.930200261	0.000014
-20	190	1.930200234	0.000012	1.930200259	0.000013	1.930200267	0.000014
-30	190	1.930200241	0.000013	1.930200266	0.000014	1.930200272	0.000014

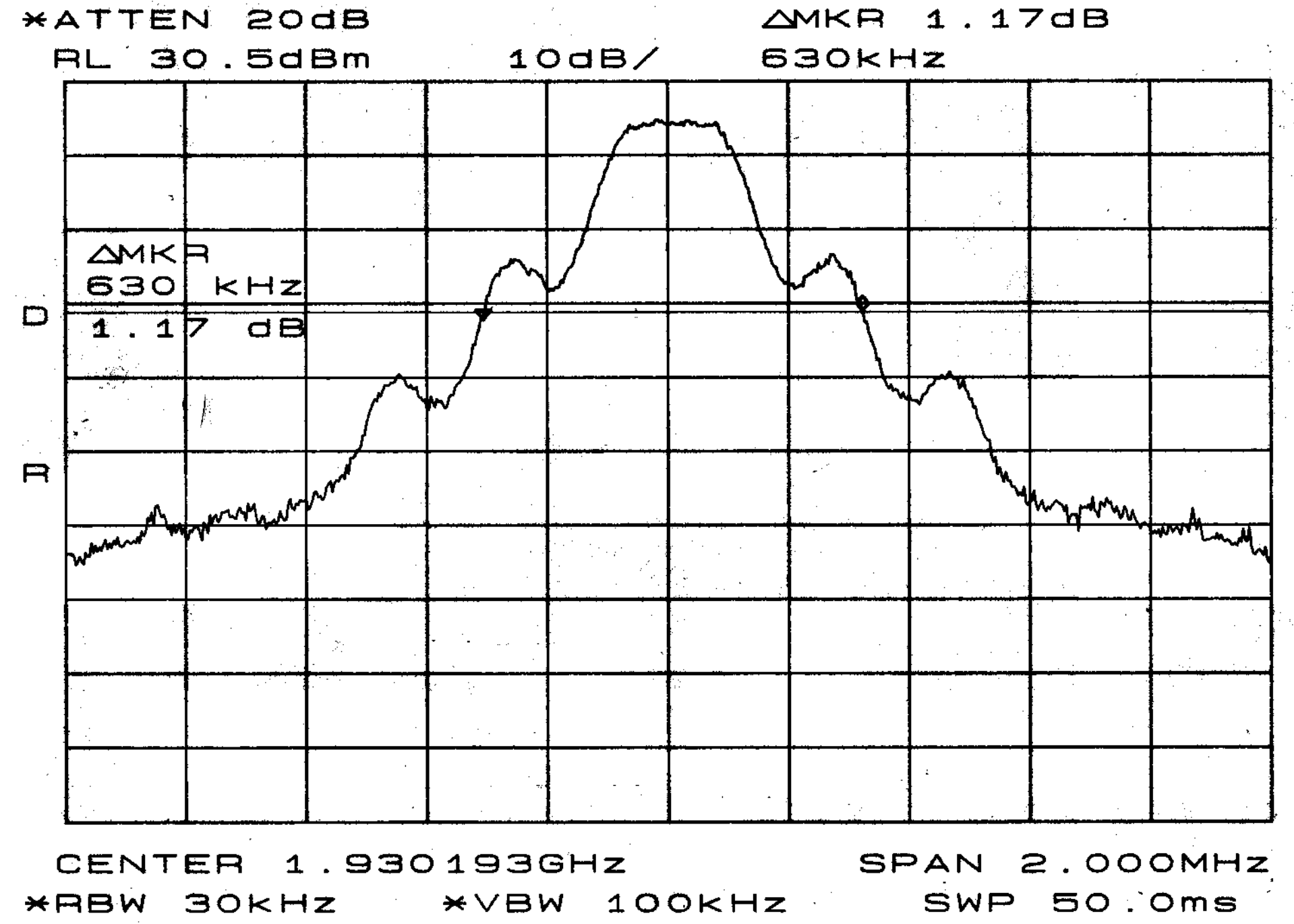
Operated mode : CH300 Test Date : Feb. 16, 2001

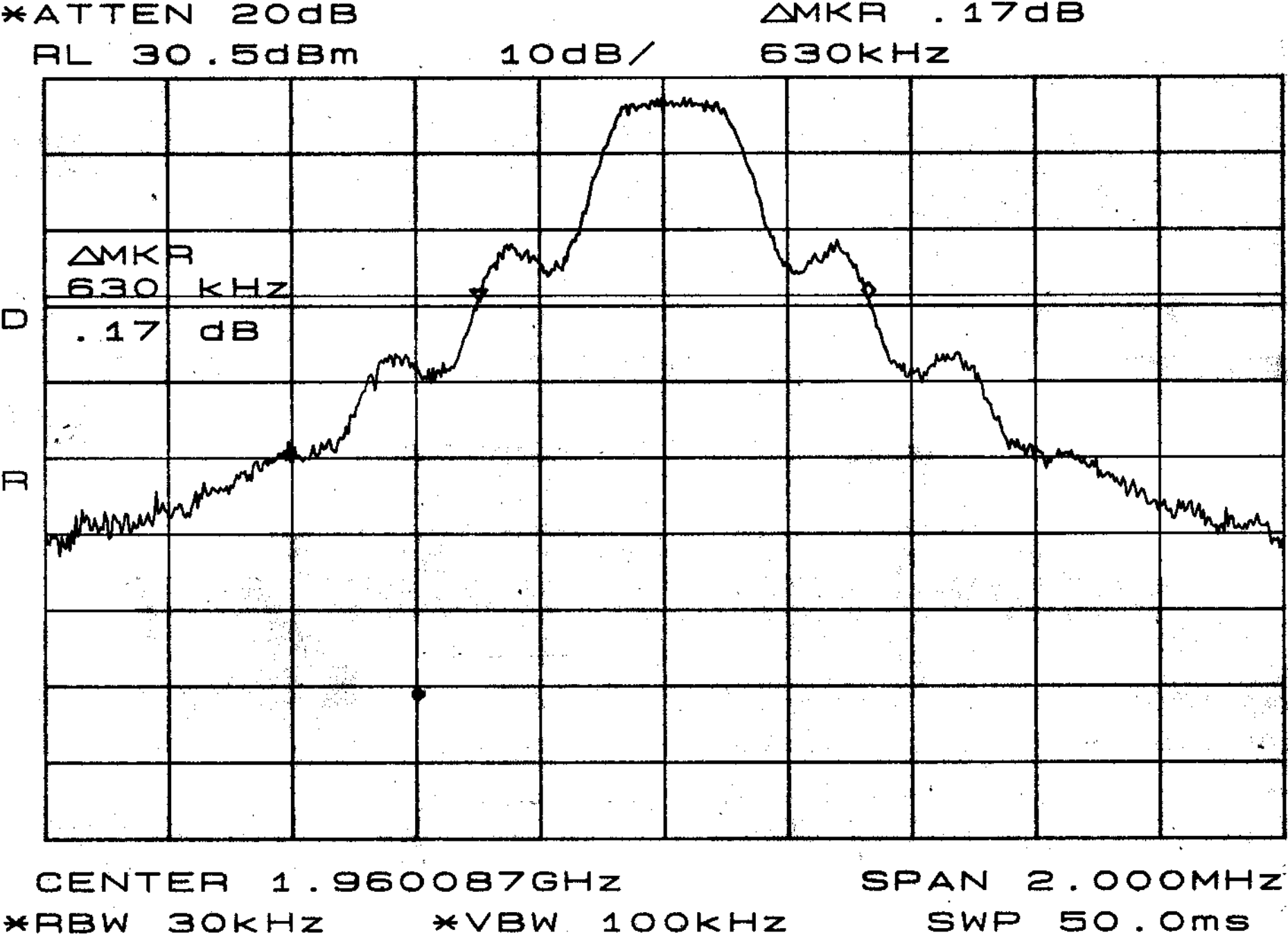
Reference Frequency :		1.960100000 GHz					
Environment Tempture (℃)	Power Supplied (Vdc)	Frequency Deviation Measured With Time Elapse					
		2 minute		5 minute		10 minute	
		(GHz)	(%)	(GHz)	(%)	(GHz)	(%)
50	190	1.960099753	-0.000013	1.960099822	-0.000009	1.960099845	-0.000008
40	190	1.960099783	-0.000011	1.960099845	-0.000008	1.960099853	-0.000007
30	190	1.960099851	-0.000008	1.960099875	-0.000006	1.960099887	-0.000006
20	190	1.960100000	0.000000	1.960100158	0.000008	1.960100189	0.000010
10	190	1.960100186	0.000009	1.960100203	0.000010	1.960100234	0.000012
0	190	1.960100234	0.000012	1.960100256	0.000013	1.960100279	0.000014
-10	190	1.960100268	0.000014	1.960100284	0.000014	1.960100304	0.000016
-20	190	1.960100286	0.000015	1.960100305	0.000016	1.960100315	0.000016
-30	190	1.960100295	0.000015	1.960100312	0.000016	1.960100323	0.000016

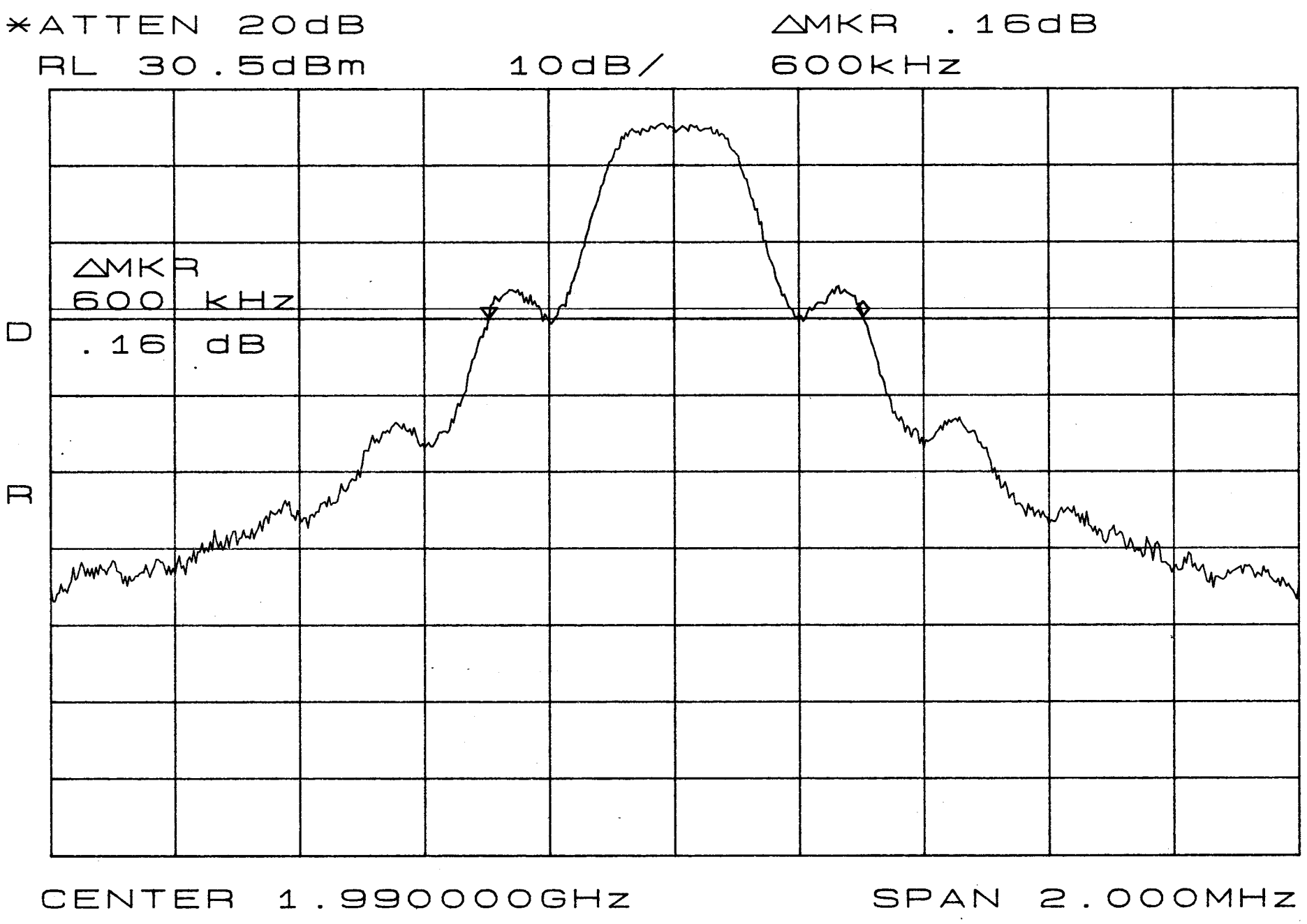
Operated mode : CH600 Test Date : Feb. 16, 2001

Reference Frequency :		1.990000000 GHz					
Environment Tempture	Power Supplied	Frequency Deviation Measured With Time Elapse					
		2 minute		5 minute		10 minute	
(℃)	(Vdc)	(GHz)	(%)	(GHz)	(%)	(GHz)	(%)
50	190	1.989999762	-0.000012	1.989999783	-0.000011	1.989999811	-0.000009
40	190	1.989999805	-0.000010	1.989999841	-0.000008	1.989999860	-0.000007
30	190	1.989999865	-0.000007	1.989999885	-0.000006	1.989999901	-0.000005
20	190	1.990000000	0.000000	1.990000153	0.000008	1.990000204	0.000010
10	190	1.990000176	0.000009	1.990000190	0.000010	1.990000224	0.000011
0	190	1.990000206	0.000010	1.990000254	0.000013	1.990000273	0.000014
-10	190	1.990000234	0.000012	1.990000268	0.000013	1.990000281	0.000014
-20	190	1.990000276	0.000014	1.990000291	0.000015	1.990000315	0.000016
-30	190	1.990000285	0.000014	1.990000301	0.000015	1.990000328	0.000016

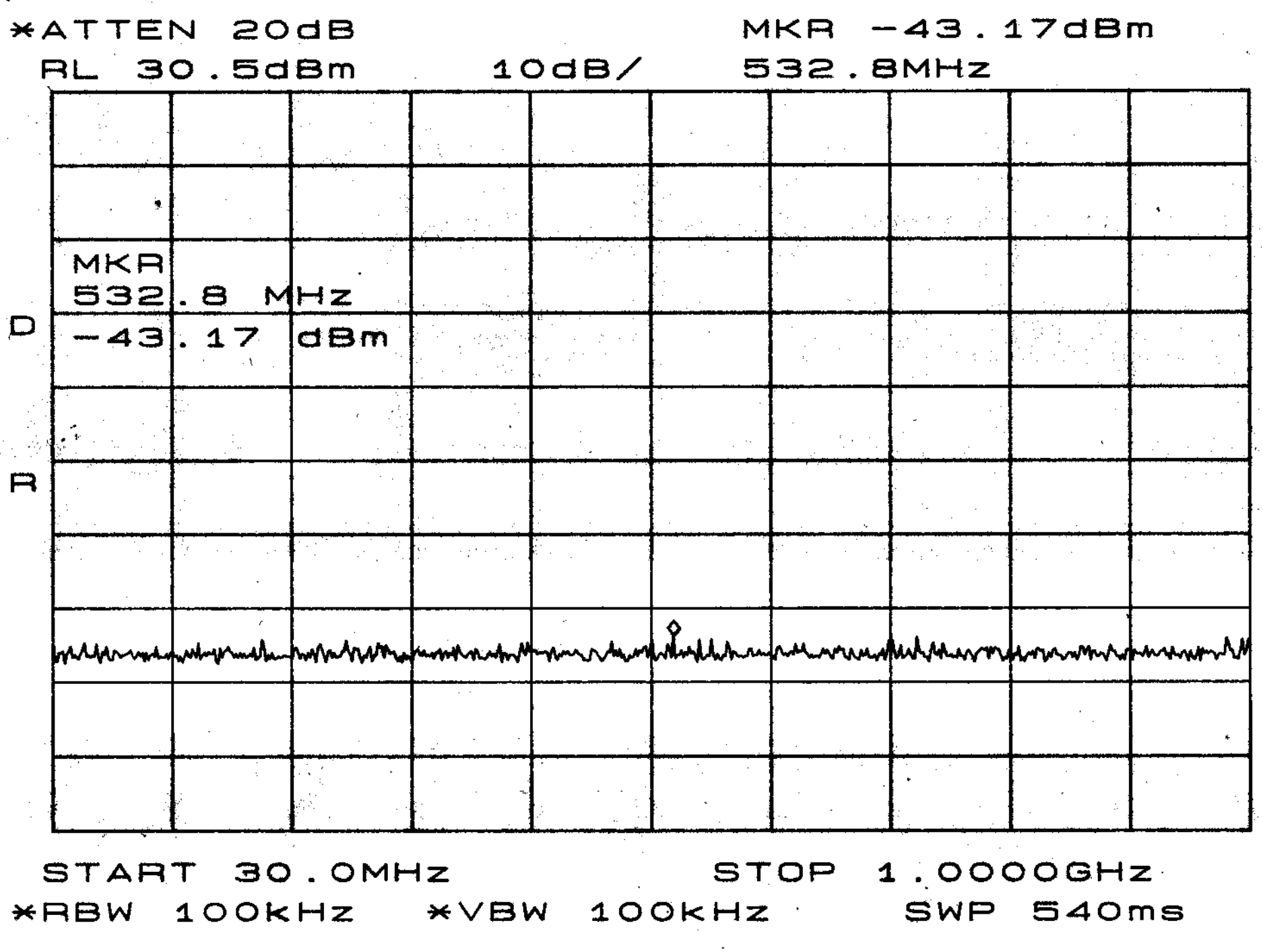
Appendix 1

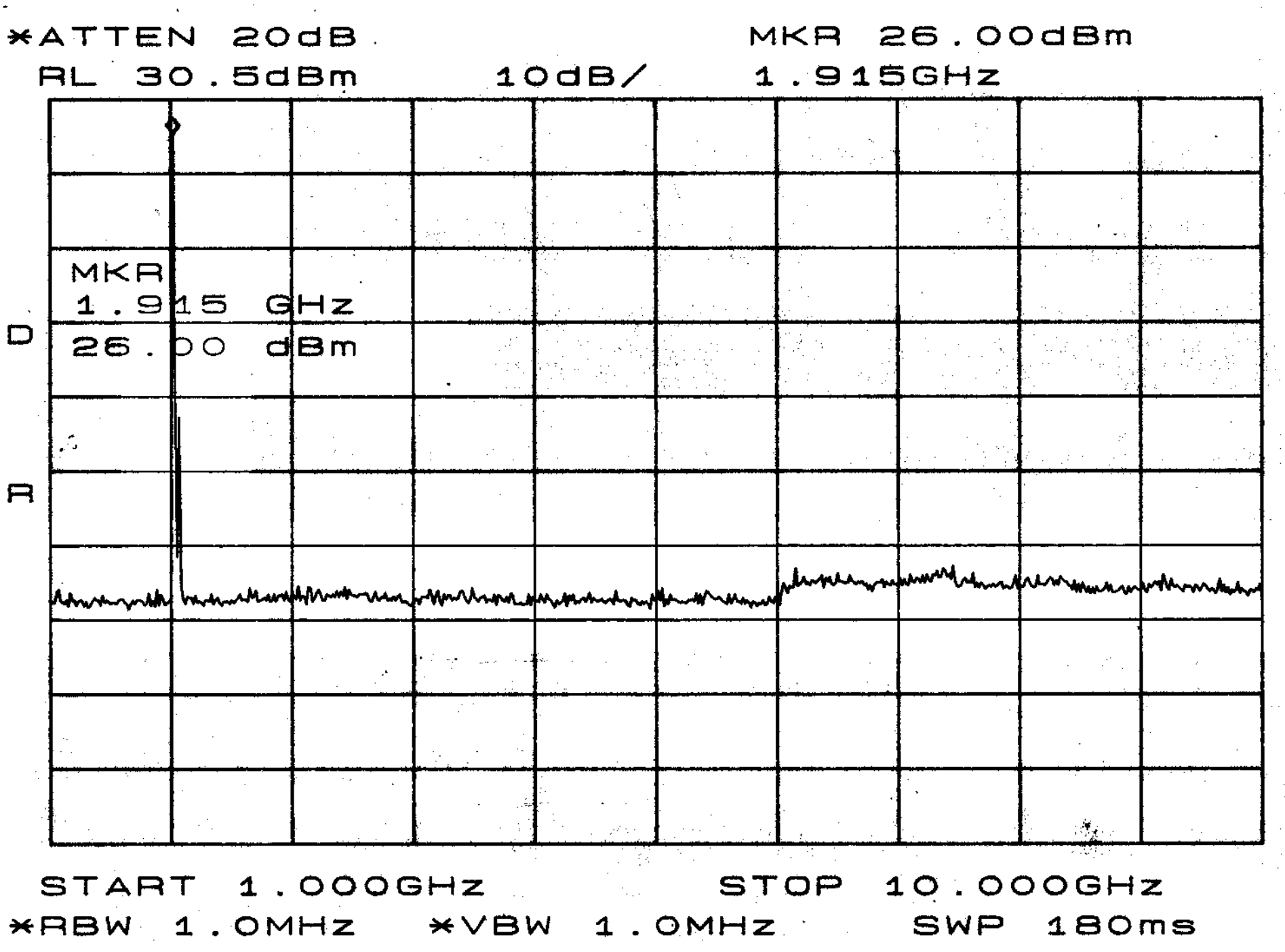

*ATTEN 20dB
ΔMKR 1.17dB
RL 30.5dBm
10dB/
630kHz
ΔMKR
630 kHz
1.17 dB
D
R
CENTER 1.930193GHz
SPAN 2.000MHz
*RBW 30kHz
*VBW 100kHz
SWP 50.0ms

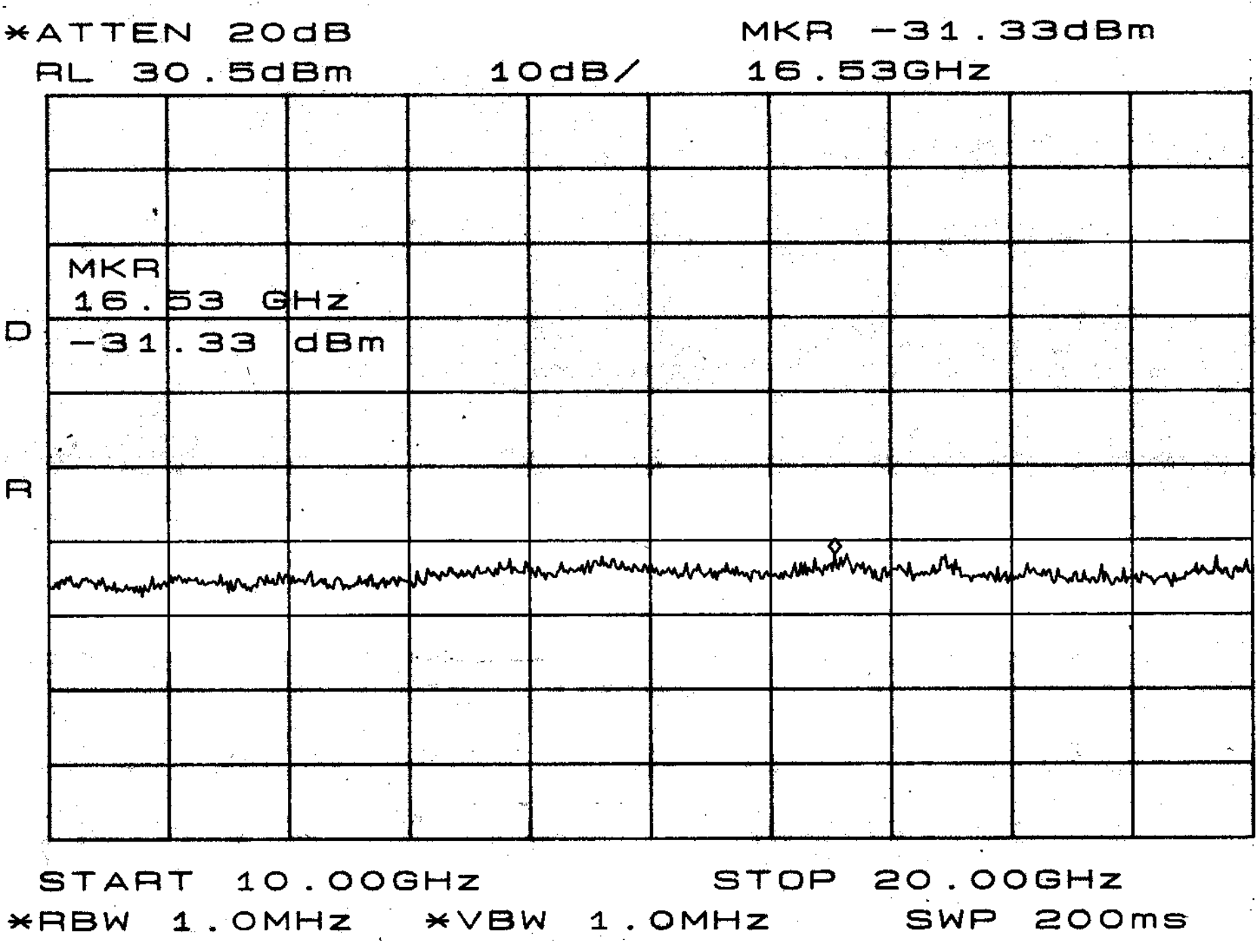

*ATTEN 20dB
ΔMKR .17dB
RL 30.5dBm
10dB/
630kHz
ΔMKR
630 kHz
.17 dB
D
R
CENTER 1.960087GHz
SPAN 2.000MHz
*RBW 30kHz
*VBW 100kHz
SWP 50.0ms

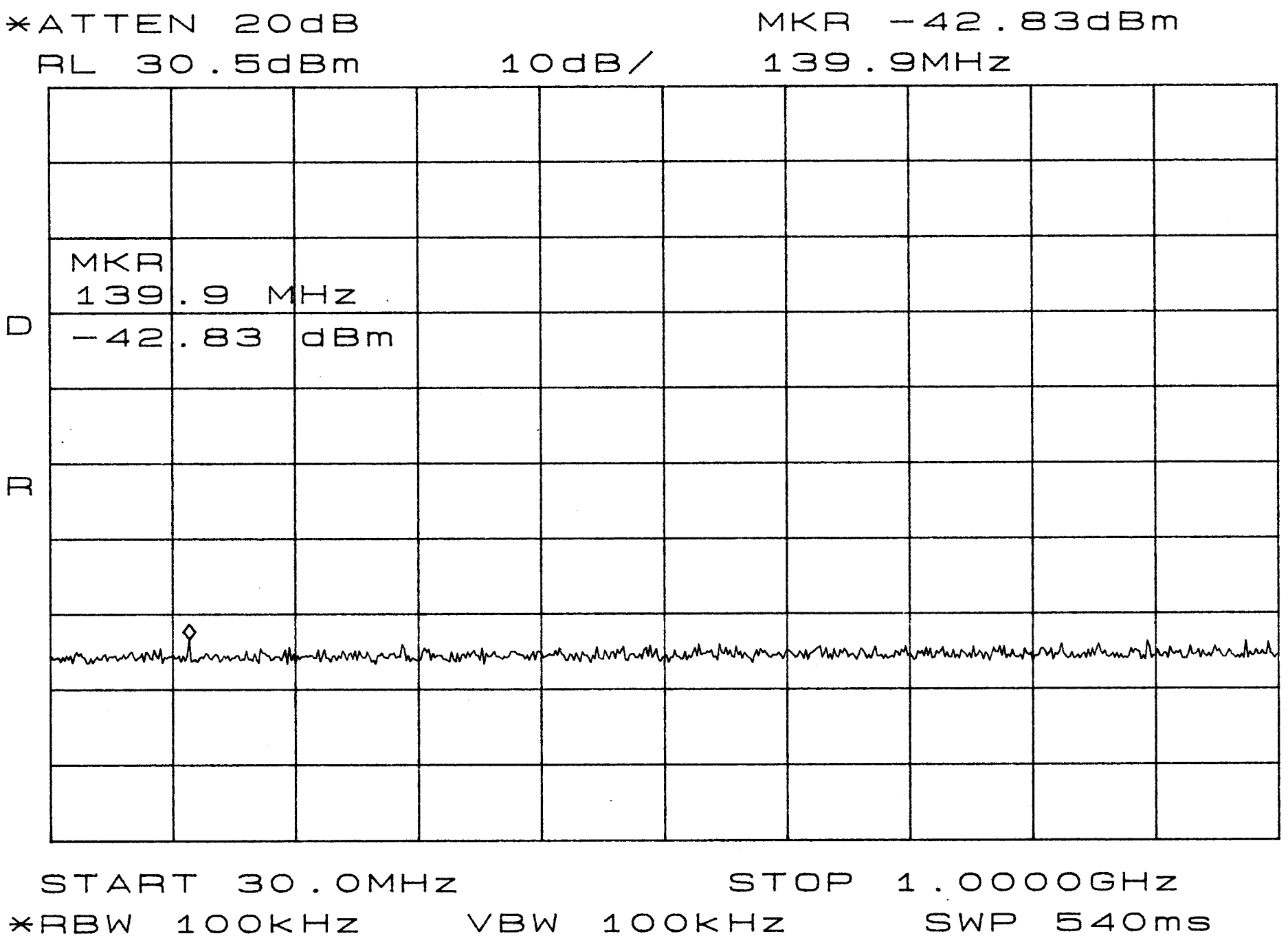

*ATTEN 20dB
ΔMKR .16dB
RL 30.5dBm
10dB/
600kHz
ΔMKR
600 kHz
.16 dB
D
R
CENTER 1.990000GHz
SPAN 2.000MHz
*RBW 30kHz
*VBW 100kHz
SWP 50.0ms

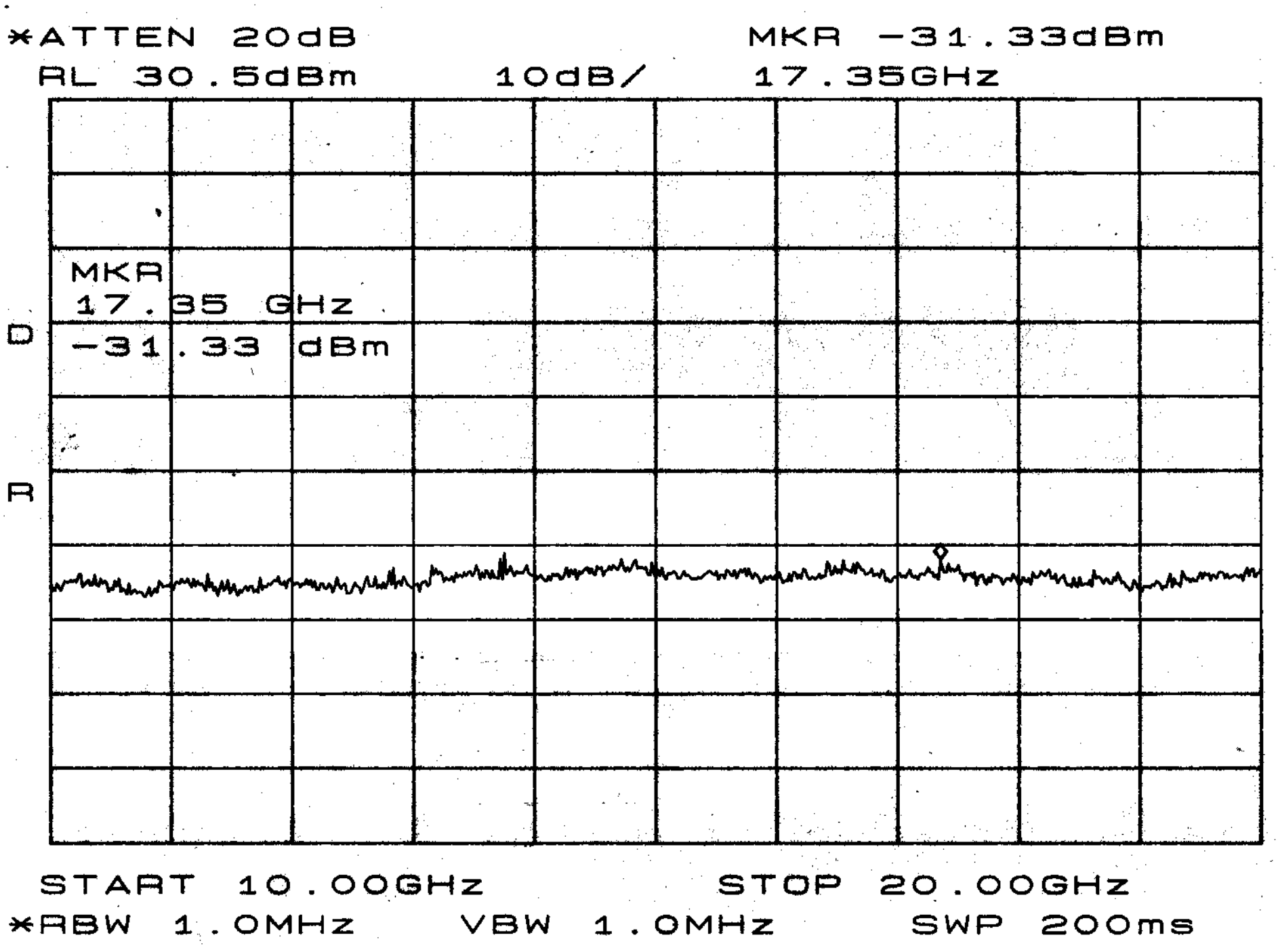
Appendix 2

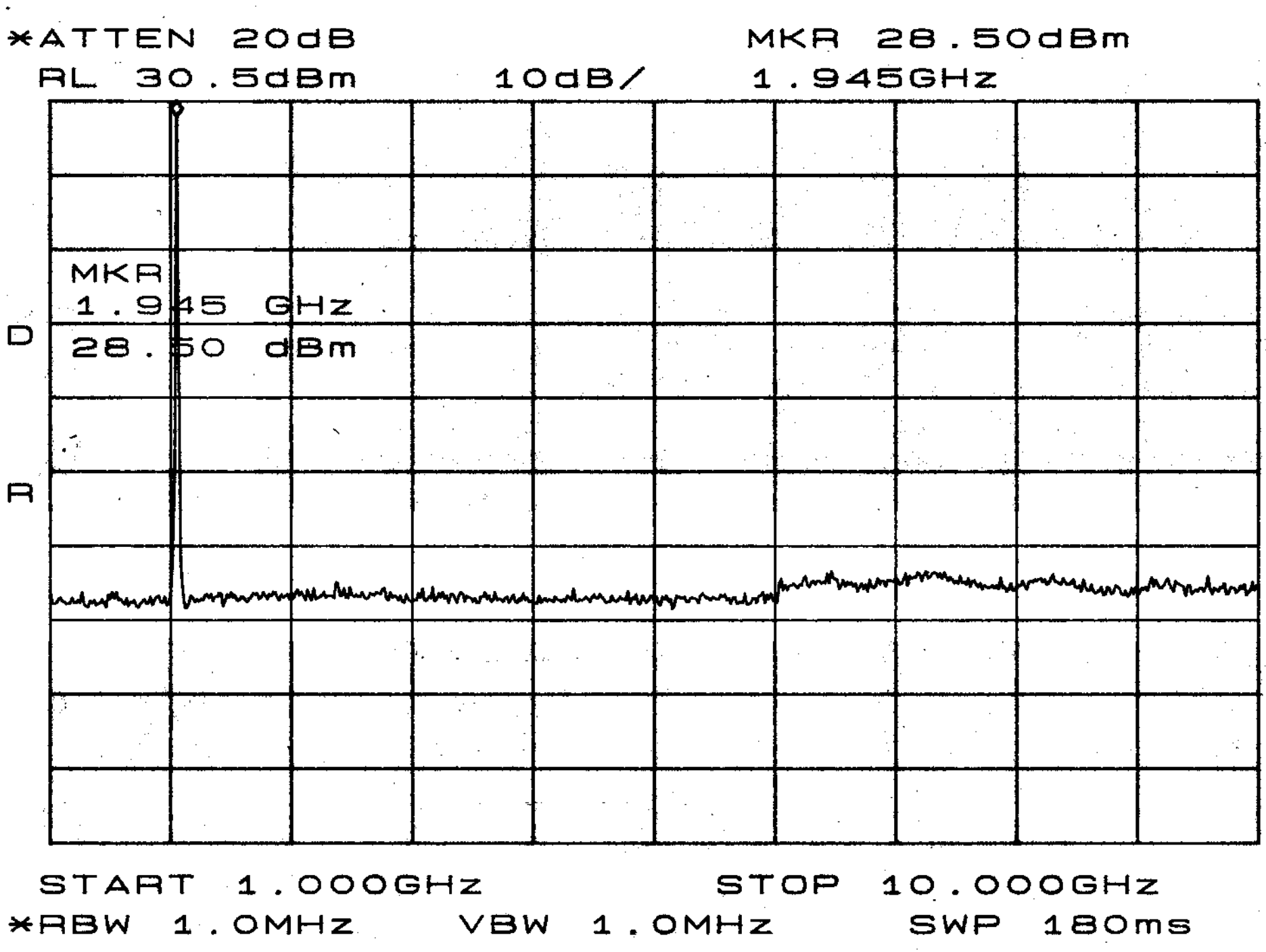

*ATTEN 20dB
MKR -43.17dBm
RL 30.5dBm
10dB/
532.8MHz
MKR
532.8 MHz
-43.17 dBm
D
R
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
*VBW 100kHz
SWP 540ms

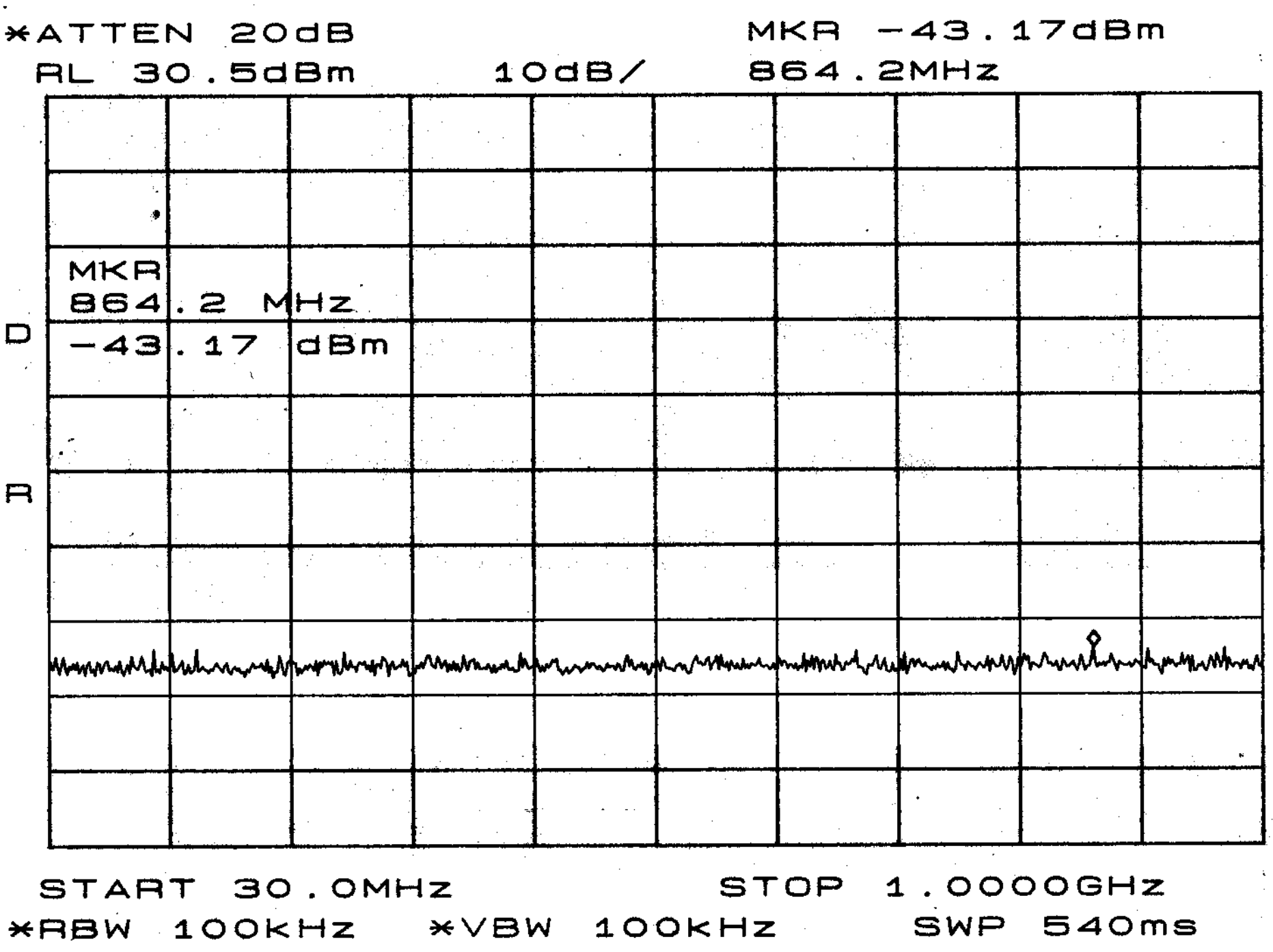

*ATTEN 20dB
MKR 26.00dBm
RL 30.5dBm
10dB/
1.915GHz
MKR
1.915 GHz
26.00 dBm
D
R
START 1.000GHz
STOP 10.000GHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 180ms

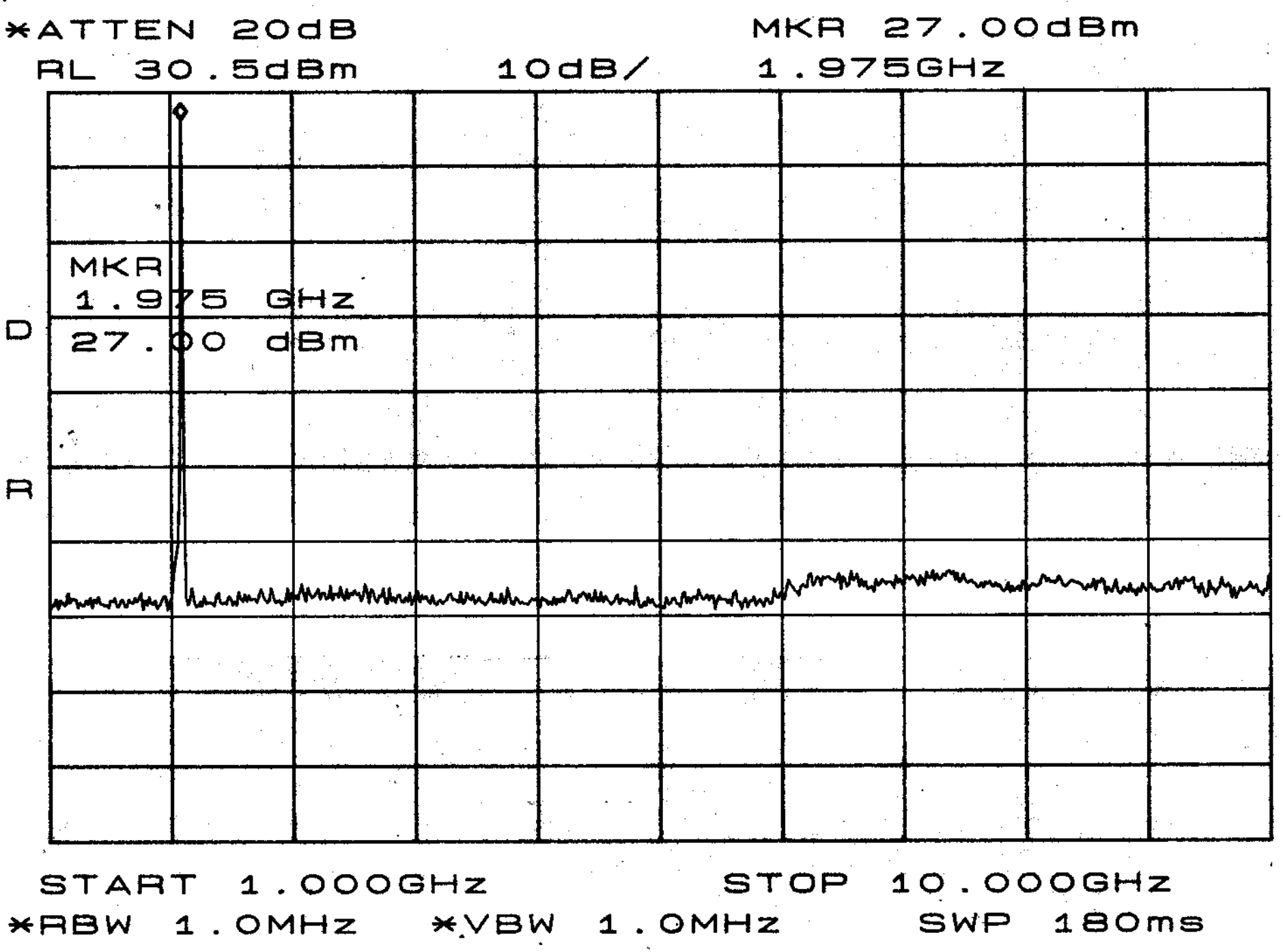

*ATTEN 20dB
MKR -31.33dBm
RL 30.5dBm
10dB/
16.53GHz
MKR
16.53 GHz
-31.33 dBm
D
R
START 10.00GHz
STOP 20.00GHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 200ms

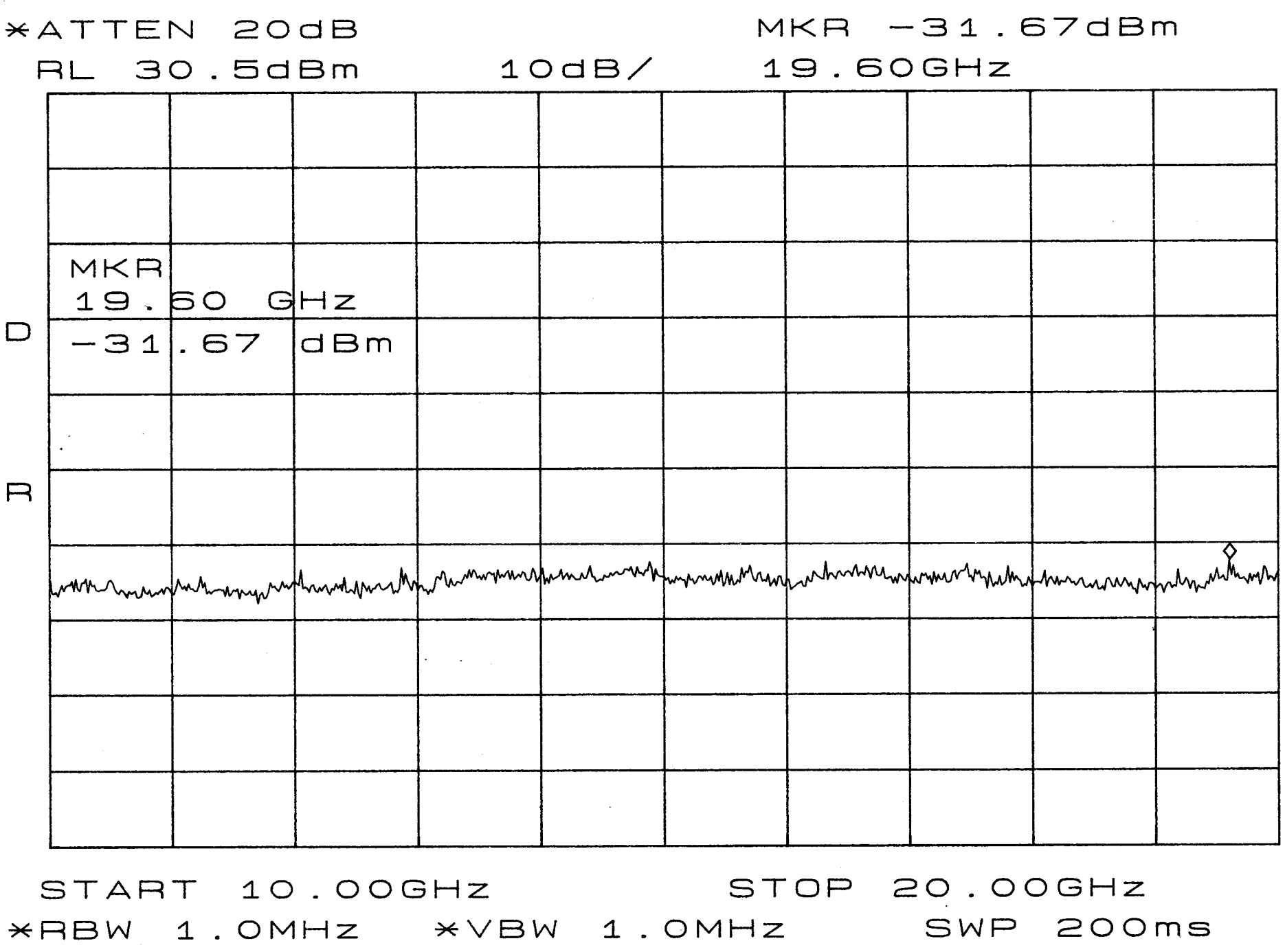

*ATTEN 20dB
MKR -42.83dBm
RL 30.5dBm
10dB/
139.9MHz
MKR
139.9 MHz
-42.83 dBm
D
R
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
VBW 100kHz
SWP 540ms


*ATTEN 20dB
MKR -31.33dBm
RL 30.5dBm
10dB/
17.35GHz
MKR
17.35 GHz
-31.33 dBm
D
R
START 10.00GHz
STOP 20.00GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 200ms

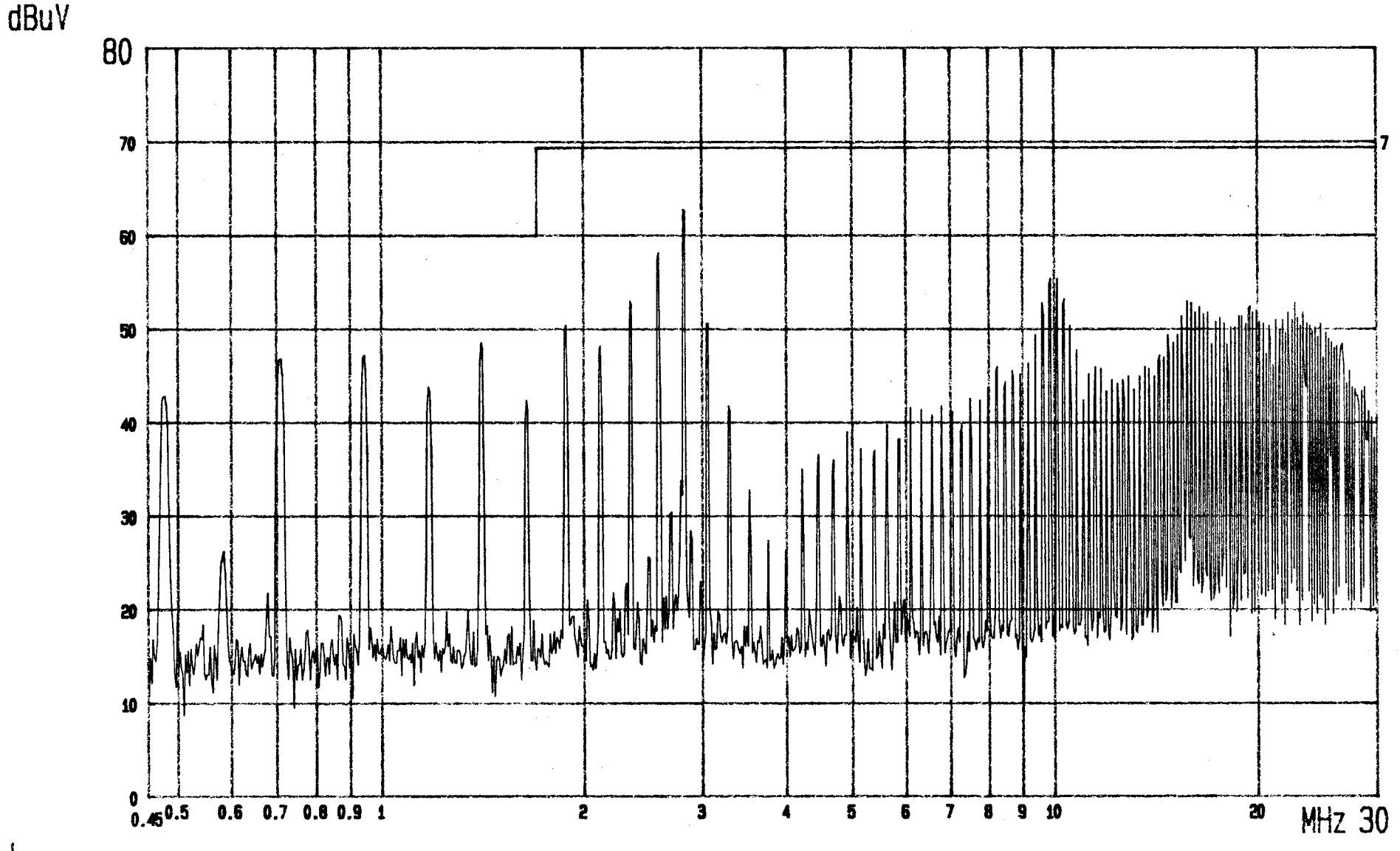

*ATTEN 20dB
MKR 28.50dBm
RL 30.5dBm
10dB/
1.945GHz
MKR
1.945 GHz
28.50 dBm
D
R
START 1.000GHz
STOP 10.000GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 180ms


*ATTEN 20dB
MKR -43.17dBm
RL 30.5dBm
10dB/
864.2MHz
MKR
864.2 MHz
-43.17 dBm
D
R
START 30.0MHz
STOP 1.0000GHz
*RBW 100kHz
*VBW 100kHz
SWP 540ms

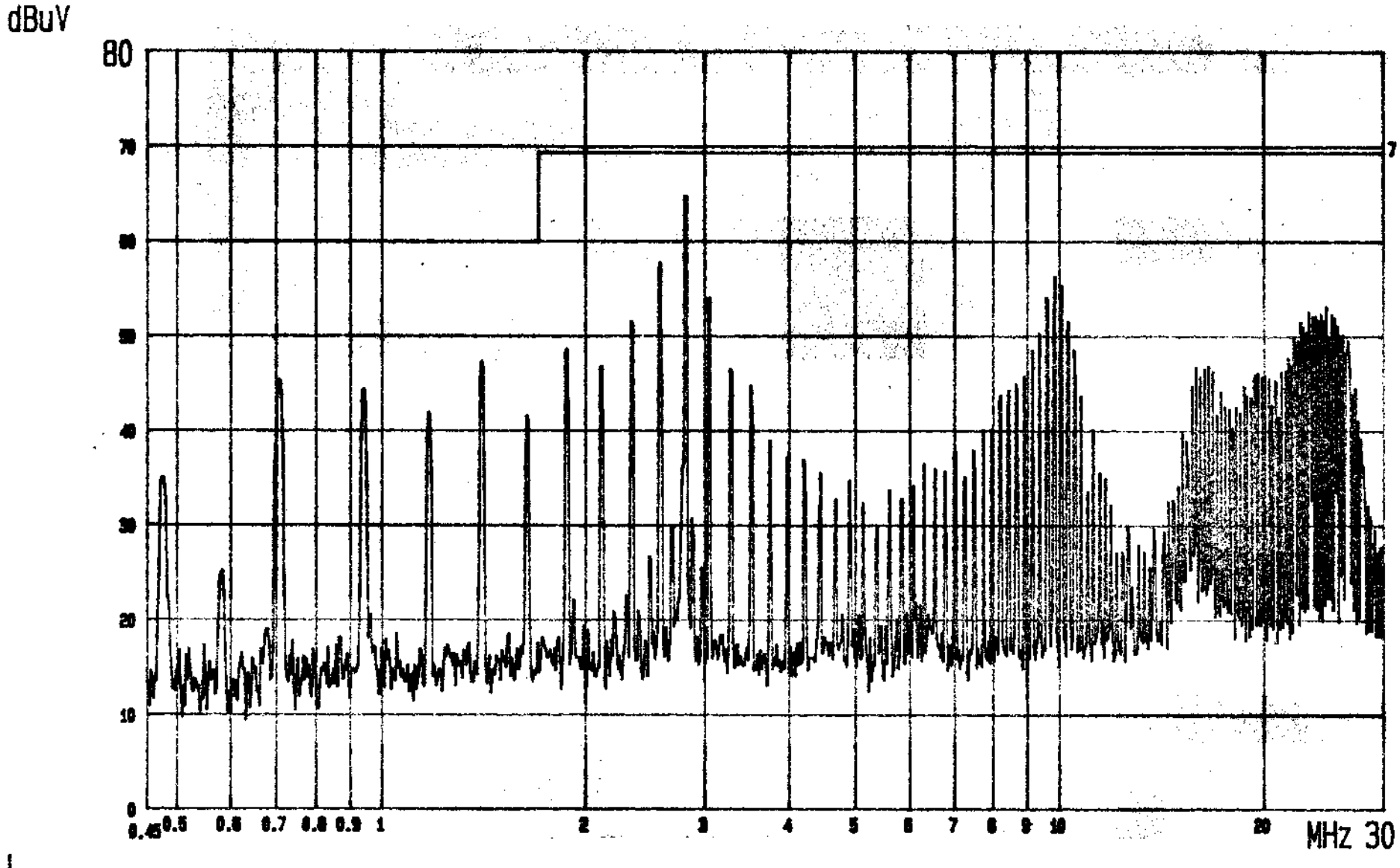

*ATTEN 20dB
MKR 27.00dBm
RL 30.5dBm
10dB/
1.975GHz
MKR
1.975 GHz
27.00 dBm
D
R
START 1.000GHz
STOP 10.000GHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 180ms


*ATTEN 20dB
MKR -31.67dBm
RL 30.5dBm
10dB/
19.60GHz
MKR
19.60 GHz
-31.67 dBm
D
R
START 10.00GHz
STOP 20.00GHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 200ms

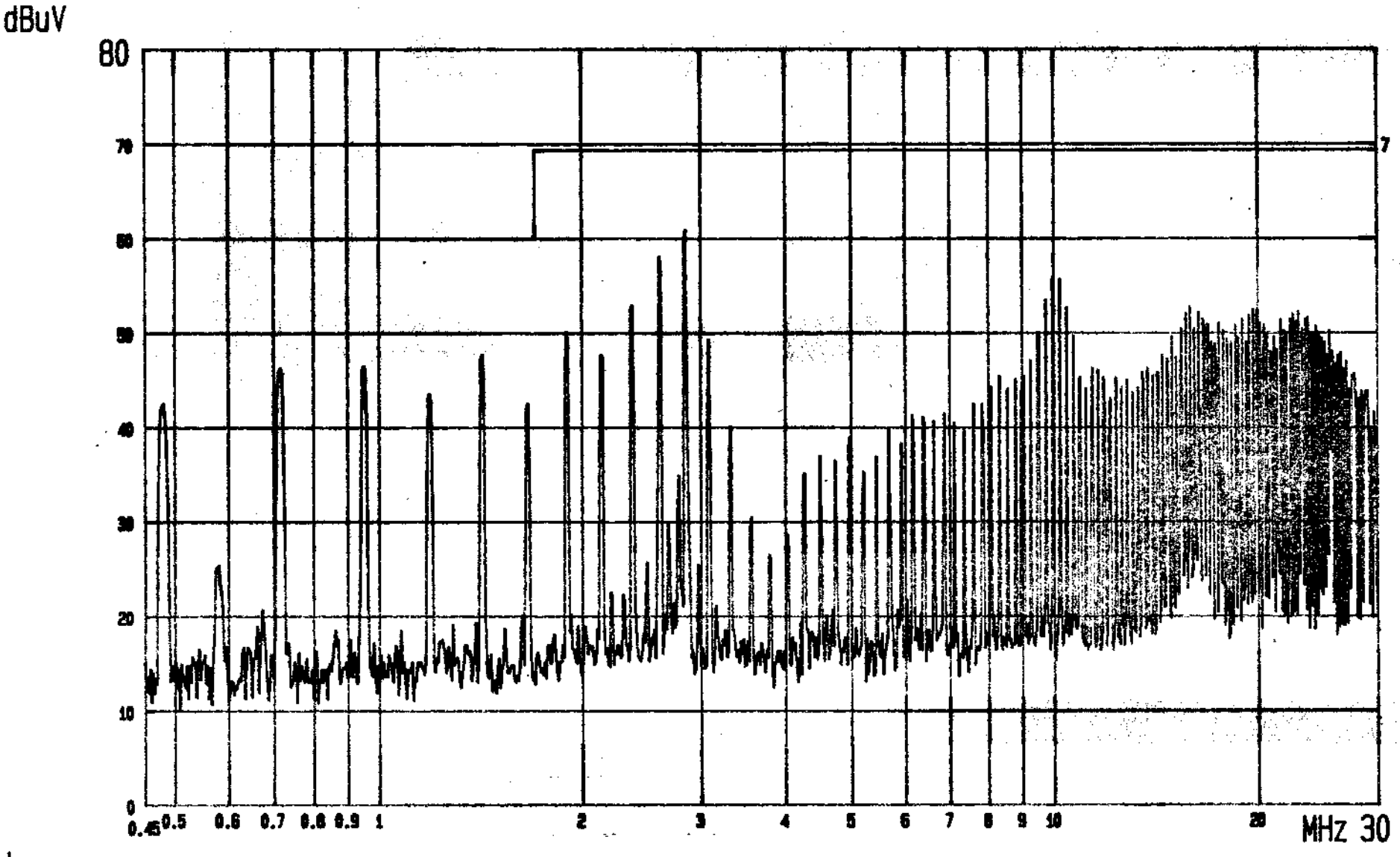
Appendix 3



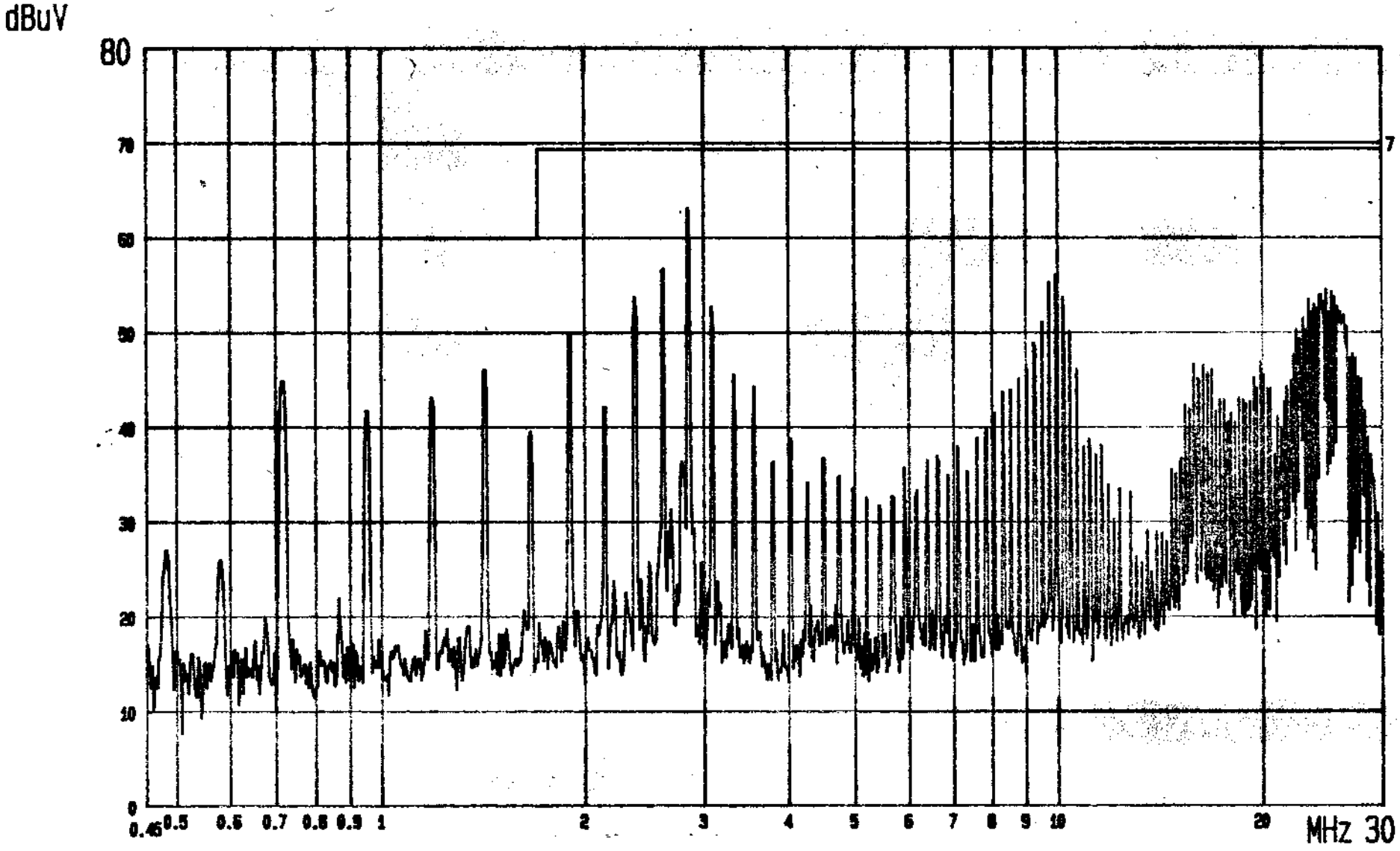
FCC CONDUCTED TEST EUT: RADIO PORT 7: QP CLASS A LIMIT
MODEL: B1990 MODE: CH001 POWER: DC 190V LISN: Va ETC EMI LAB



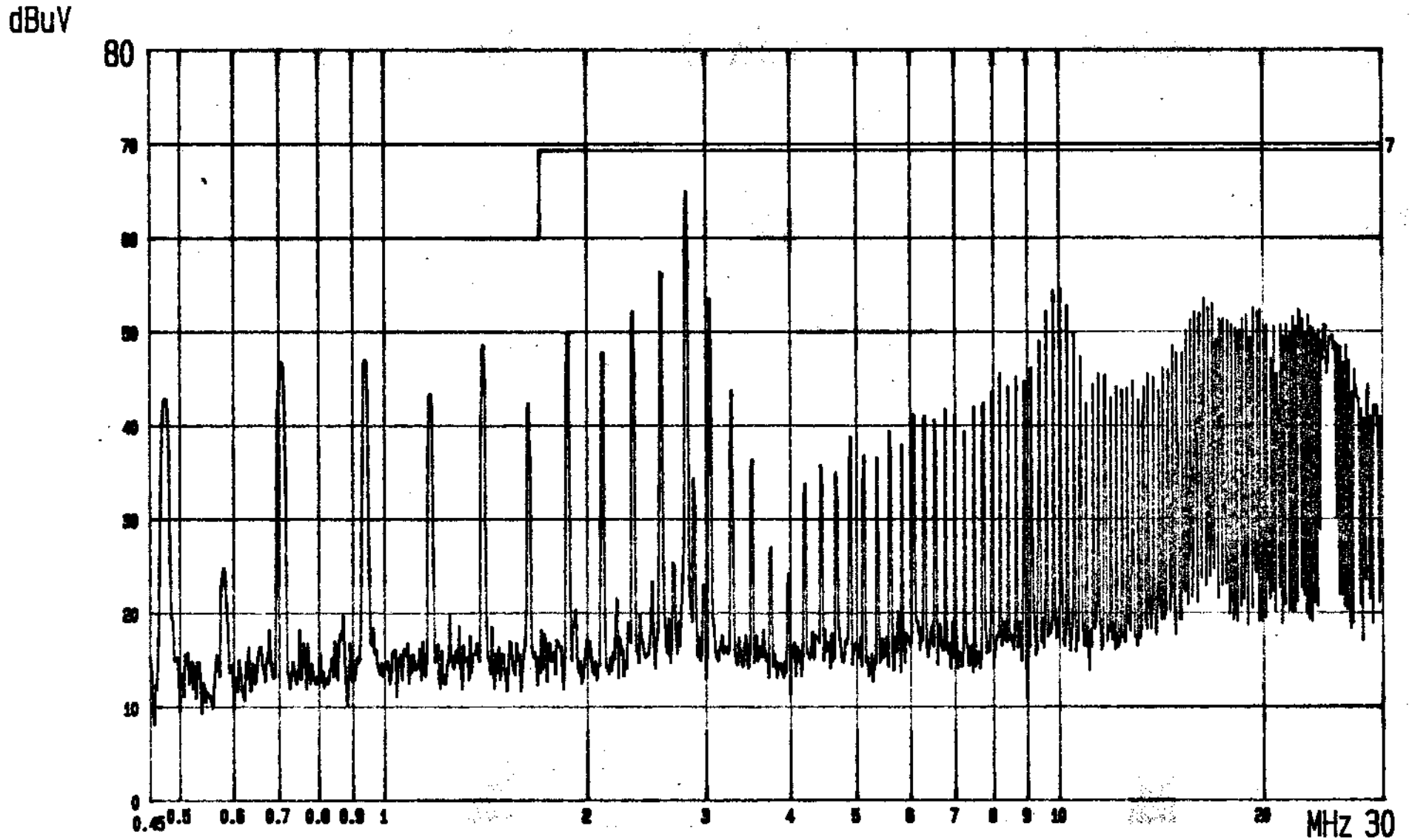
FCC CONDUCTED TEST EUT: RADIO PORT 7: QP CLASS A LIMIT
MODEL: B1990 MODE: CH001 POWER: DC 190V LISN: Vb ETC EMI LAB



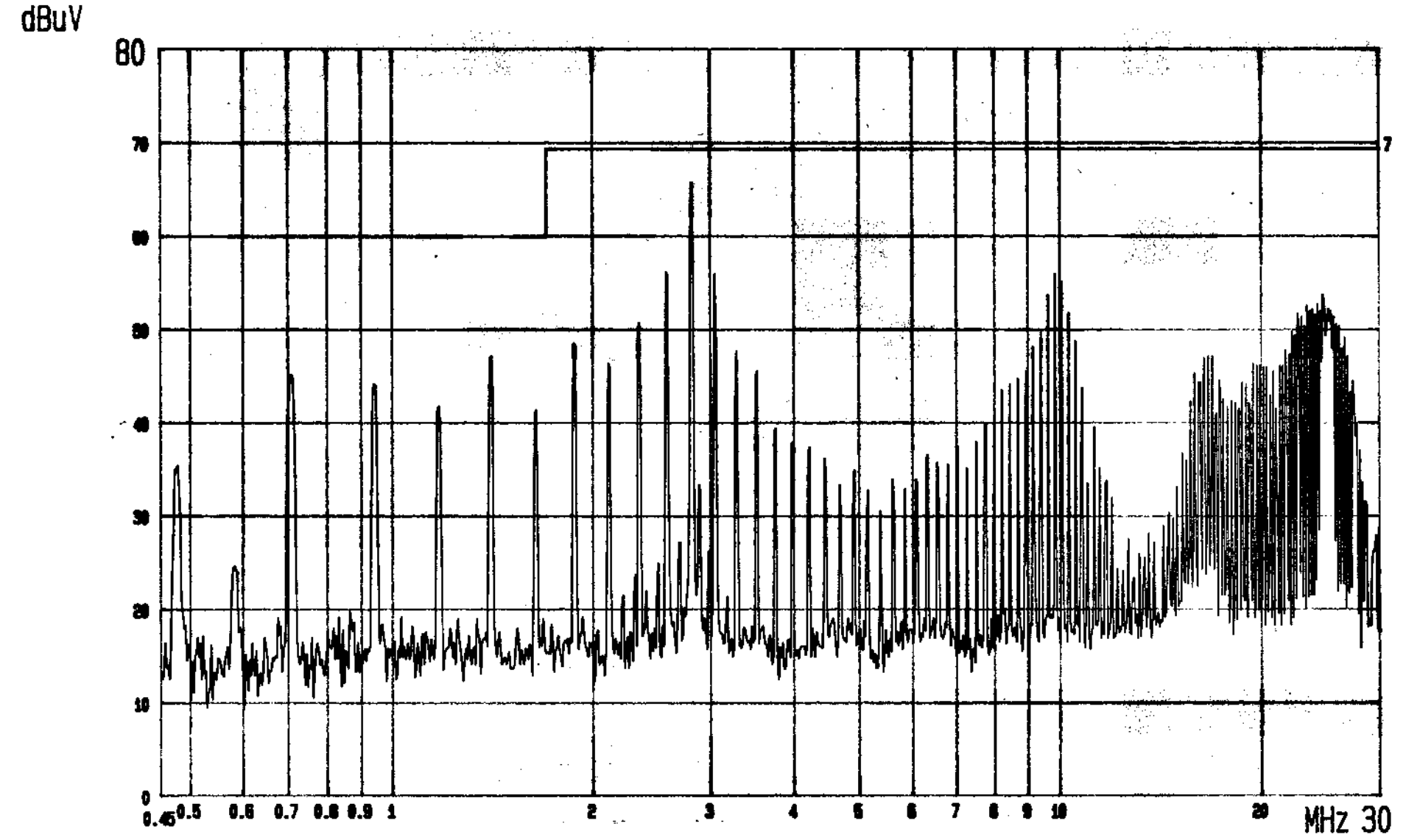
FCC CONDUCTED TEST EUT: RADIO PORT 7: QP CLASS A LIMIT
MODEL: B1990 MODE: CH300 POWER: DC 190V LISN: Va ETC EMI LAB



FCC CONDUCTED TEST EUT: RADIO PORT 7: QP CLASS A LIMIT
MODEL: B1990 MODE: CH300 POWER: DC 190V LISN: Vb ETC EMI LAB



FCC CONDUCTED TEST EUT: RADIO PORT 7: QP CLASS A LIMIT
MODEL: B1990 MODE: CH600 POWER: DC 190V LISN: Va ETC EMI LAB



FCC CONDUCTED TEST EUT: RADIO PORT 7: QP CLASS A LIMIT
MODEL: B1990 MODE: CH600 POWER: DC 190V LISN: Vb ETC EMI LAB