TEST RESULT SUMMARY

FCC PART 22 SUBPART H

MANUFACTURER'S NAME	ADC Telecommunications
NAME OF EQUIPMENT	Digivance Long Range Coverage Solution 800 MHz System (A and B Band)
MODEL NUMBER	**DGVL-112110SYS** **DGVL-122110SYS**
MANUFACTURER'S ADDRESS	PO Box 1101 Minneapolis MN 55440
TEST REPORT NUMBER	NC201192
TEST DATE	12 & 26 March 2002

According to testing performed at TÜV Product Service Inc, the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in FCC Part 22 Subpart H.

It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical characteristics. Any modifications necessary for compliance made during testing on the above mentioned date(s) must be implemented in all production units for compliance to be maintained.

TÜV Product Service Inc, as an independent testing laboratory, declares that the equipment tested as specified above conforms to the requirements of FCC Part 22 Subpart H.

Date: 02 May 2002

Location: Taylors Falls MN USA

R. M. Johnson
Test Technician

J. T. Schneider
Chief Engineer

Not Transferable

EMC EMISSION - T E S T R E P O R T

Test Report File No.	:	**NC201192**	Date of issue:	02 May 2002
Model / Serial No.	:	**DGVL-112110SYS / DGVL-122110SYS /**		
Product Type	:	Digivance Long Range Coverage Solution 800 MHz System (A and B Band)		
Applicant	:	ADC Telecommunications		
Manufacturer	:	ADC Telecommunications		
License holder	:	ADC Telecommunications		
Address	:	PO Box 1101		
	:	Minneapolis MN 55440		
Test Result	:	■ **Positive** ☐ **Negative**		
Test Project Number Reference(s)	:	**NC201192**		
Total pages including Appendices		141		

TÜV Product Service Inc is a subcontractor to TÜV Product Service, GmbH according to the principles outlined in ISO/IEC Guide 25 and EN 45001. TÜV Product Service Inc reports apply only to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. TÜV Product Service Inc shall have no liability for any deductions, inferences or generalizations drawn by the client or others from TÜV Product Service Inc issued reports. This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

TÜV Product Service Inc and its professional staff hold government and professional organization certifications and are members of AAMI, ACIL, AEA, ANSI, IEEE, NVLAP, and VCCI

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

D I R E C T O R Y - EMISSIONS

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to following regulations:

☐ - EN 50081-1 / 1991

☐ - EN 55011 / 1991 ☐ - Group 1 ☐ - Group 2
☐ - Class A ☐ - Class B

☐ - EN 55013 / 1990

☐ - EN 55014 / 1987 ☐ - Household appliances and similar
☐ - Portable tools
☐ - Semiconductor devices

☐ - EN 55014 / A2:1990

☐ - EN 55014 / 1993 ☐ - Household appliances and similar
☐ - Portable tools
☐ - Semiconductor devices

☐ - EN 55015 / 1987

☐ - EN 55015 / A1:1990

☐ - EN 55015 / 1993

☐ - EN 55022 / 1987 ☐ - Class A ☐ - Class B

■ - FCC Part 22 Subpart H

☐ - BS

☐ - VCCI ☐ - Class A ☐ - Class B

☐ - FCC ☐ - Class A ☐ - Class B

☐ - AS 3548 (1992) ☐ - Class A ☐ - Class B

☐ - CISPR 11 (1990) ☐ - Group 1 ☐ - Group 2
☐ - Class A ☐ - Class B

☐ - CISPR 22 (1993) ☐ - Class A ☐ - Class B

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Environmental conditions in the lab:

	Actual
Temperature	: 21 °C
Relative Humidity	: 7 %
Atmospheric pressure	: 98.6 kPa
Power supply system	: 60 Hz - 115 V - 1-phase

Sign Explanations:

☐ - not applicable
■ - applicable

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

22.355 Frequency tolerance

The Frequency Tolerance measurements were performed at the following test location:

■ - ADC facility

Frequency tolerance data on next 2 pages

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

Frequency Tolerance Test for ADC Inc.
Digivance Long Range Coverage System
Model Numbers DGVL-112110SYS and DGVL-122110SYS.

EUT A-Band

Input Voltage	Carrier Frequency	Measured Frequency	Meets Requirements?
102 VAC	869.200 MHz	869.200 MHz	Yes
120 VAC	869.200 MHz	869.200 MHz	Yes
138 VAC	869.200 MHz	869.200 MHz	Yes
102 VAC	879.000 MHz	879.000 MHz	Yes
120 VAC	879.000 MHz	879.000 MHz	Yes
138 VAC	879.000 MHz	879.000 MHz	Yes
102 VAC	891.300 MHz	891.300 MHz	Yes
120 VAC	891.300 MHz	891.300 MHz	Yes
138 VAC	891.300 MHz	891.300 MHz	Yes
Temperature	**Carrier Frequency**	**Measured Frequency**	**Meets Requirements?**
-30 Deg. C	869.200 MHz	869.200 MHz	Yes
-20 Deg. C	869.200 MHz	869.200 MHz	Yes
-10 Deg. C	869.200 MHz	869.200 MHz	Yes
0 Deg. C	869.200 MHz	869.200 MHz	Yes
10 Deg. C	869.200 MHz	869.200 MHz	Yes
20 Deg. C	869.200 MHz	869.200 MHz	Yes
30 Deg. C	869.200 MHz	869.200 MHz	Yes
40 Deg. C	869.200 MHz	869.200 MHz	Yes
50 Deg. C	869.200 MHz	869.200 MHz	Yes
-30 Deg. C	879.000 MHz	879.000 MHz	Yes
-20 Deg. C	879.000 MHz	879.000 MHz	Yes
-10 Deg. C	879.000 MHz	879.000 MHz	Yes
0 Deg. C	879.000 MHz	879.000 MHz	Yes
10 Deg. C	879.000 MHz	879.000 MHz	Yes
20 Deg. C	879.000 MHz	879.000 MHz	Yes
30 Deg. C	879.000 MHz	879.000 MHz	Yes
40 Deg. C	879.000 MHz	879.000 MHz	Yes
50 Deg. C	879.000 MHz	879.000 MHz	Yes
-30 Deg. C	891.300 MHz	891.300 MHz	Yes
-20 Deg. C	891.300 MHz	891.300 MHz	Yes
-10 Deg. C	891.300 MHz	891.300 MHz	Yes
0 Deg. C	891.300 MHz	891.300 MHz	Yes
10 Deg. C	891.300 MHz	891.300 MHz	Yes
20 Deg. C	891.300 MHz	891.300 MHz	Yes
30 Deg. C	891.300 MHz	891.300 MHz	Yes
40 Deg. C	891.300 MHz	891.300 MHz	Yes
50 Deg. C	891.300 MHz	891.300 MHz	Yes

Note: EUT Host is specified for indoor use only with temperature range of 0 to +50º C and was tested within its range.

Note: EUT STM and LPA are specified with a temperature range of -30 to +50º C and were tested with their range.

Frequency Tolerance Test for ADC Inc.
Digivance Long Range Coverage System
Model Numbers DGVL-112110SYS and DGVL-122110SYS.

EUT B-Band

Input Voltage	Carrier Frequency	Measured Frequency	Meets Requirements?
102 VAC	880.200 MHz	880.200 MHz	Yes
120 VAC	880.200 MHz	880.200 MHz	Yes
138 VAC	880.200 MHz	880.200 MHz	Yes
102 VAC	887.000 MHz	887.000 MHz	Yes
120 VAC	887.000 MHz	887.000 MHz	Yes
138 VAC	887.000 MHz	887.000 MHz	Yes
102 VAC	893.800 MHz	893.800 MHz	Yes
120 VAC	893.800 MHz	893.800 MHz	Yes
138 VAC	893.800 MHz	893.800 MHz	Yes
Temperature	**Carrier Frequency**	**Measured Frequency**	**Meets Requirements?**
-30 Deg. C	880.200 MHz	880.200 MHz	Yes
-20 Deg. C	880.200 MHz	880.200 MHz	Yes
-10 Deg. C	880.200 MHz	880.200 MHz	Yes
0 Deg. C	880.200 MHz	880.200 MHz	Yes
10 Deg. C	880.200 MHz	880.200 MHz	Yes
20 Deg. C	880.200 MHz	880.200 MHz	Yes
30 Deg. C	880.200 MHz	880.200 MHz	Yes
40 Deg. C	880.200 MHz	880.200 MHz	Yes
50 Deg. C	880.200 MHz	880.200 MHz	Yes
-30 Deg. C	887.000 MHz	887.000 MHz	Yes
-20 Deg. C	887.000 MHz	887.000 MHz	Yes
-10 Deg. C	887.000 MHz	887.000 MHz	Yes
0 Deg. C	887.000 MHz	887.000 MHz	Yes
10 Deg. C	887.000 MHz	887.000 MHz	Yes
20 Deg. C	887.000 MHz	887.000 MHz	Yes
30 Deg. C	887.000 MHz	887.000 MHz	Yes
40 Deg. C	887.000 MHz	887.000 MHz	Yes
50 Deg. C	887.000 MHz	887.000 MHz	Yes
-30 Deg. C	893.800 MHz	893.800 MHz	Yes
-20 Deg. C	893.800 MHz	893.800 MHz	Yes
-10 Deg. C	893.800 MHz	893.800 MHz	Yes
0 Deg. C	893.800 MHz	893.800 MHz	Yes
10 Deg. C	893.800 MHz	893.800 MHz	Yes
20 Deg. C	893.800 MHz	893.800 MHz	Yes
30 Deg. C	893.800 MHz	893.800 MHz	Yes
40 Deg. C	893.800 MHz	893.800 MHz	Yes
50 Deg. C	893.800 MHz	893.800 MHz	Yes

Note: EUT Host is specified for indoor use only with temperature range of 0 to +50º C and was tested within its range.

Note: EUT STM and LPA are specified with a temperature range of -30 to +50º C and were tested with their range.

22.913 Effective Radiated Power Limit

The Effective Radiated Power Limit measurements were tested at the following test location:

☐ - Test not applicable

■ - ADC facility

This measurement was made as a direct conducted emission measurement. The output from the EUT antenna connector was connected directly to the spectrum analyzer, which was set up with a 1 MHz resolution bandwidth. The spectrum analyzer level was offset by 20 dB to compensate for the attenuator placed between the EUT and the analyzer, and by 2 dB for the measured cable loss between the EUT and the analyzer.

ERP data on following pages

Effective Isotropic Radiated Power Test for ADC Inc.
Digivance LRCS 800 MHz System
Models DGVI-112110SYS, DGVI-122110SYS

*Note: The EUT is a fixed repeater and not a base station.

This measurement was made as a direct conducted emission measurement. The output from the EUT antenna connector was connected to the spectrum analyzer. 6 CW signals were used across the bandwidth of the EUT. The output of each signal was set to the emission level of 5 watts. The Carrier Output, below, was conducted using a single CW signal generator. The spectrum analyzer level was offset to compensate for attenuators and cable loss between the EUT and the analyzer.

A CW signal was used at the low, mid and high parts of the selected band. The spectrum analyzer level was offset by 56.8 dB to compensate for attenuators and cable loss between the EUT and the analyzer.

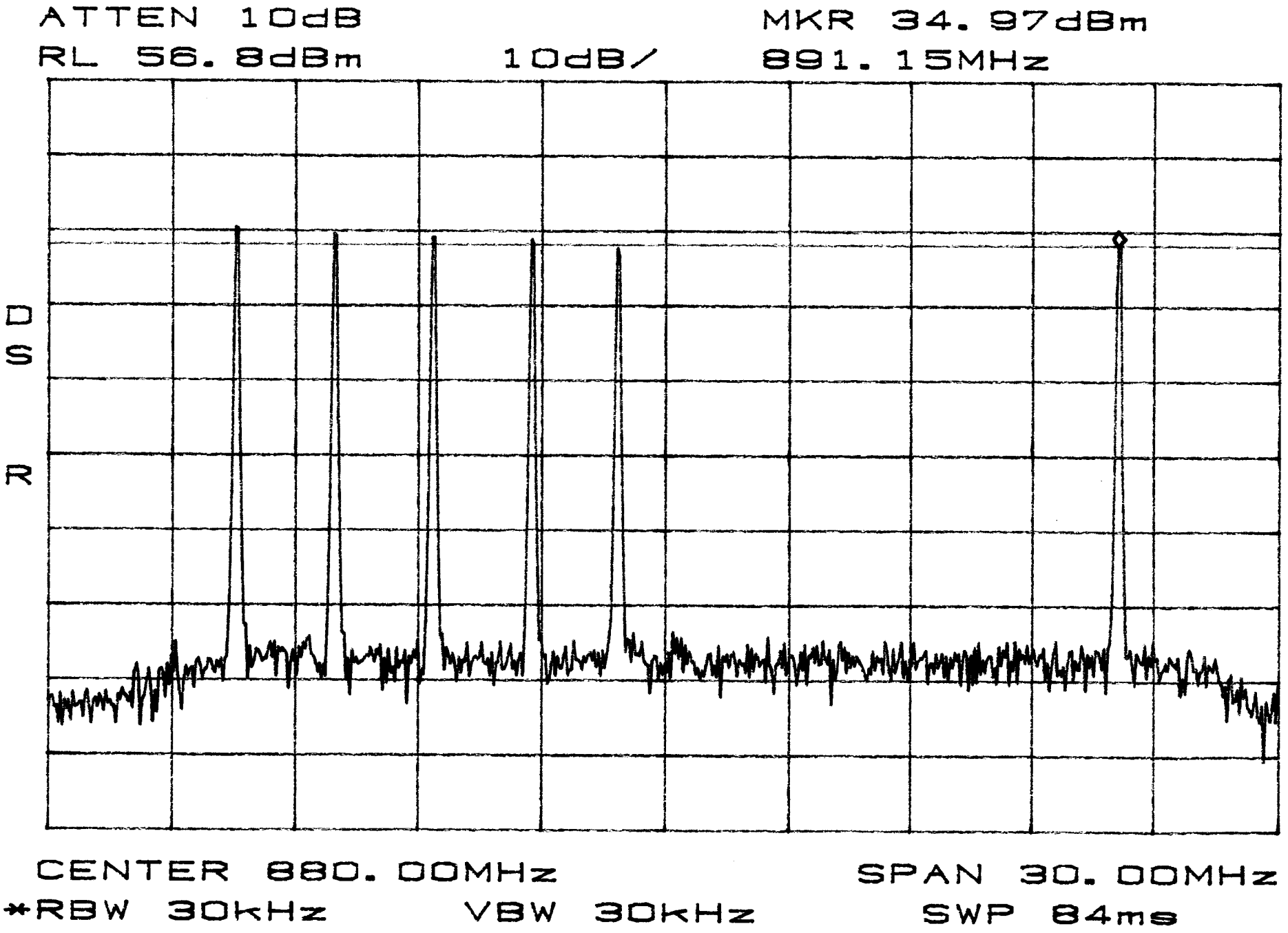
Band A

Carrier Frequency	Carrier Output
869.2 MHz	44.30 dBm
879.0 MHz	45.13 dBm
891.3 MHz	44.13 dBm

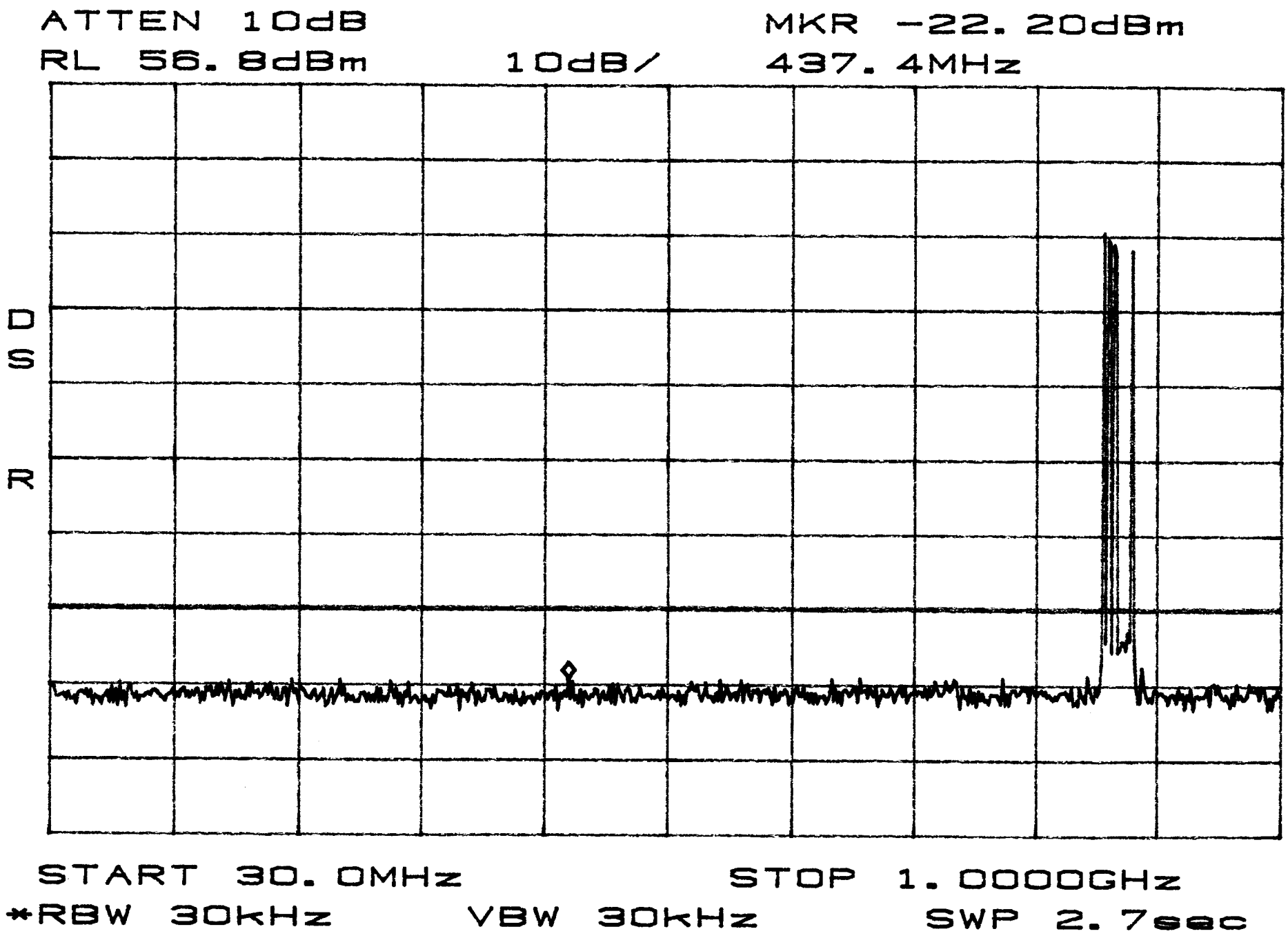
Band B

Carrier Frequency	Carrier Output
880.2 MHz	46.50 dBm
887.0 MHz	45.50 dBm
893.8 MHz	43.67 dBm

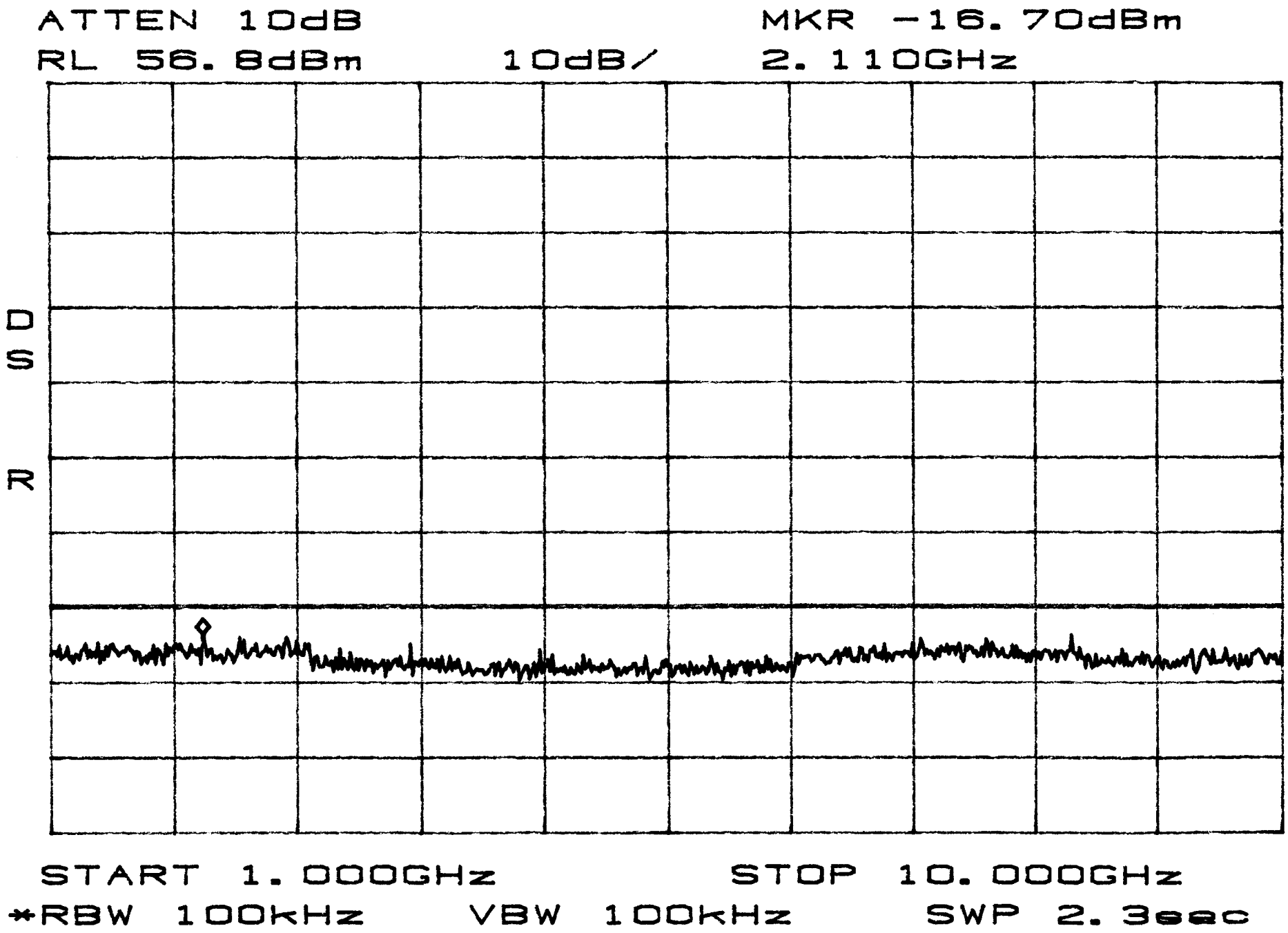
EIRP Band A
6 CW signals @ 5 watts per



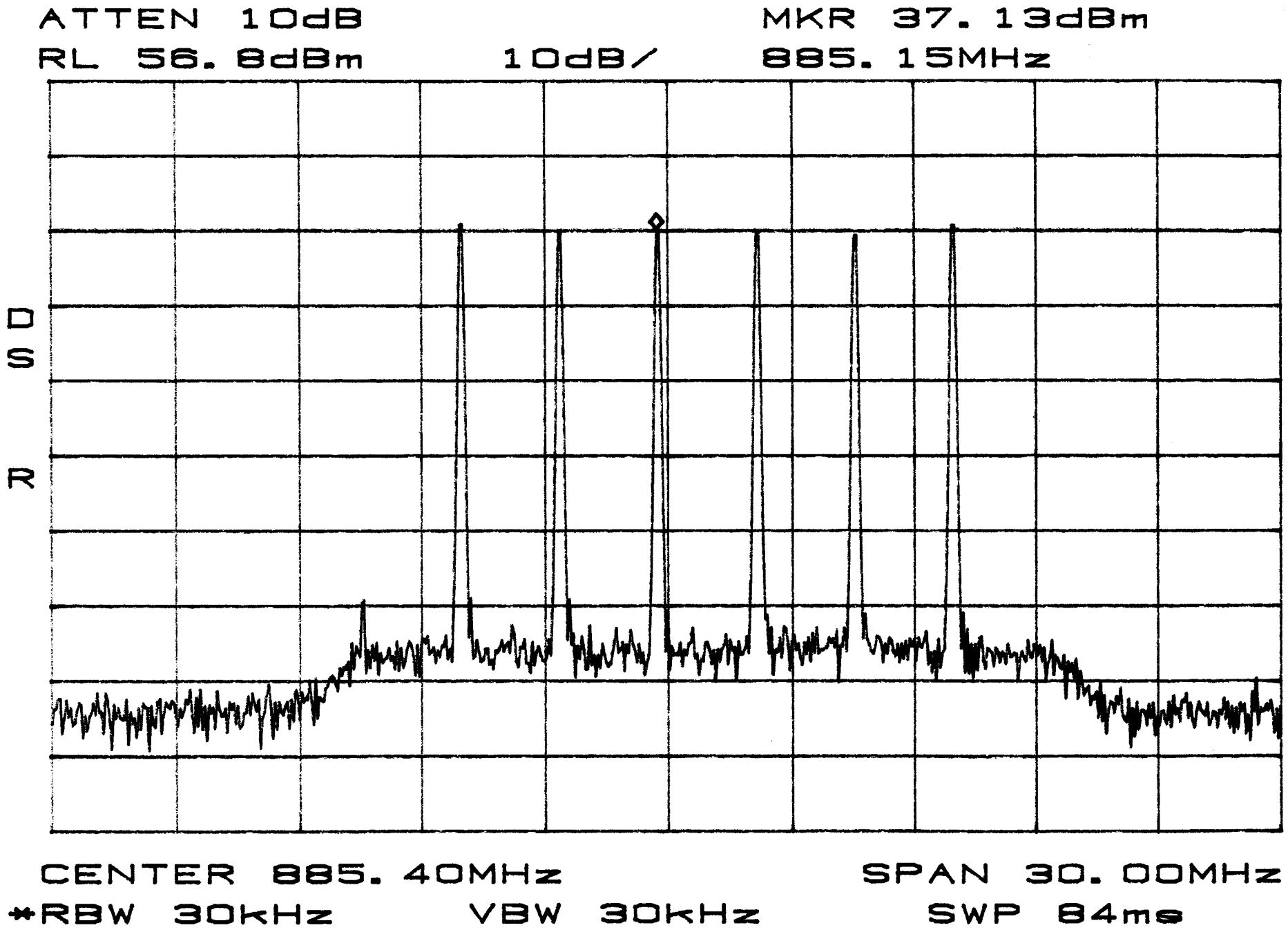
EIRP Band A
6 CW signals @ 5 watts per



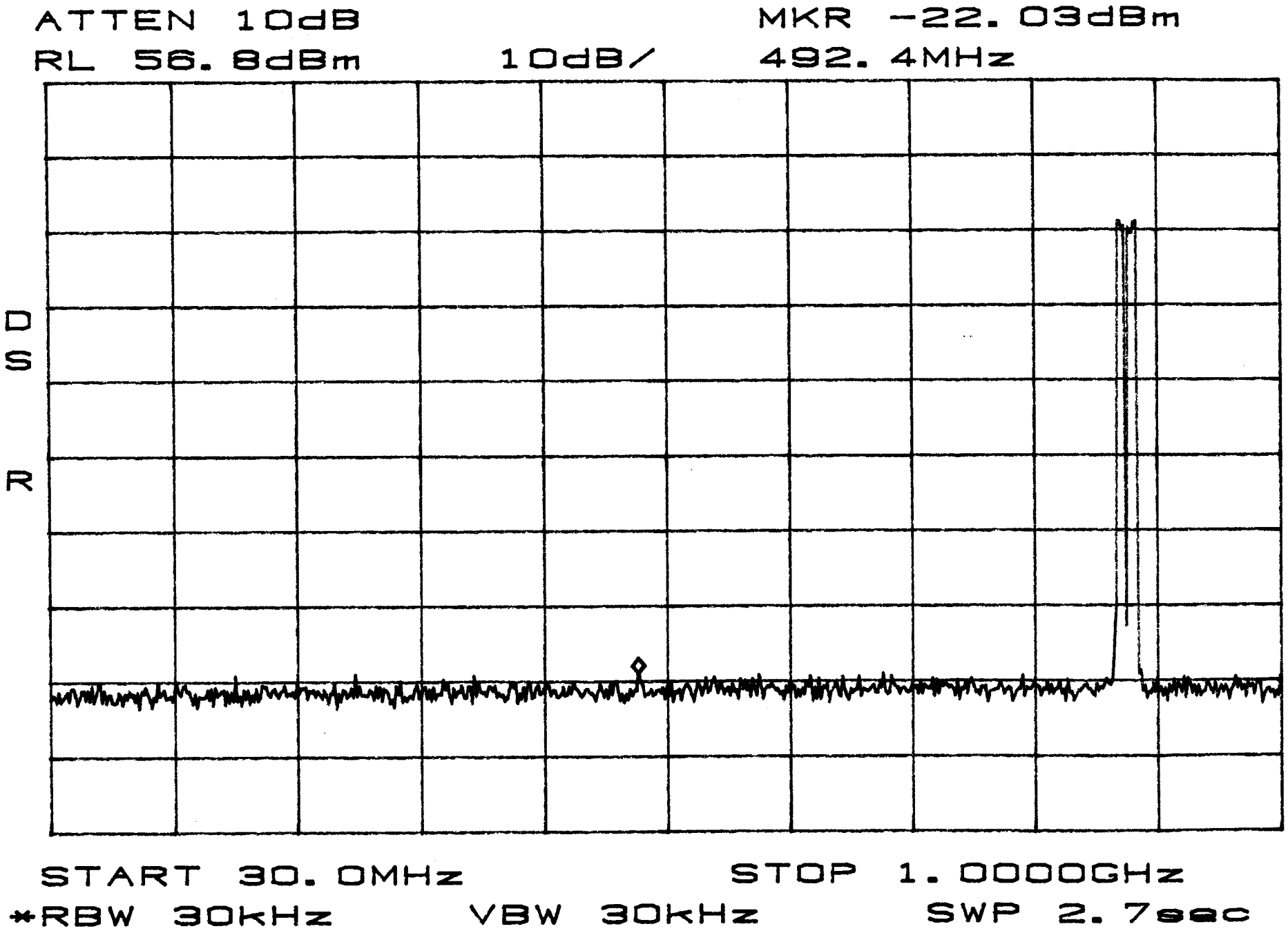
EIRP BAND A
6 CW signals @ 5 watts per



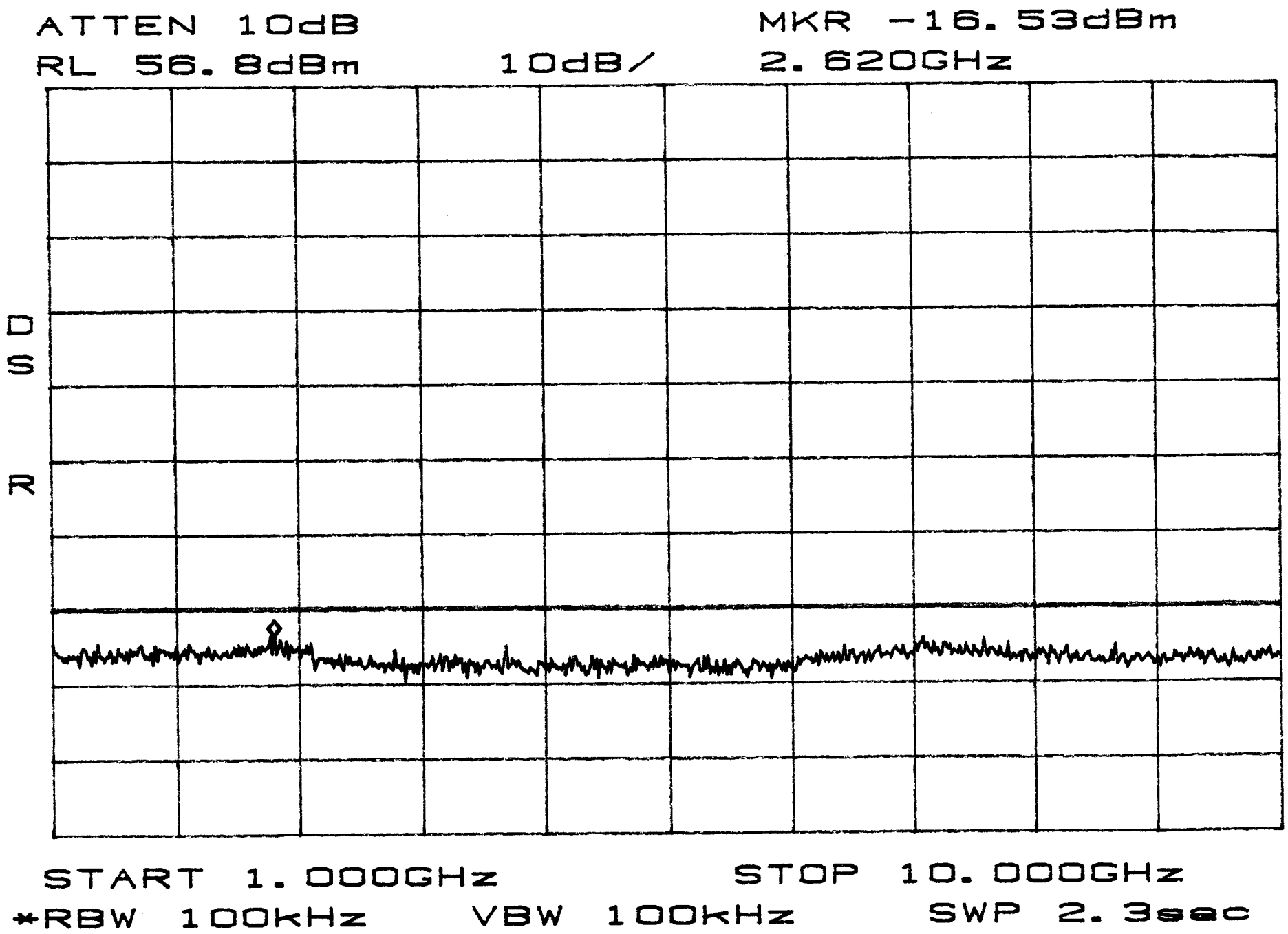
EIRP BAND B
6 CW signals @ 5 watts per



EIRP BAND B
6 CW signals @ 5 watts per



EIRP BAND B
6 CW signals @ 5 watts per



22.915 Modulation requirements

The Modulation requirement measurements were performed at the following test location :

■ - Test not applicable

☐ - Wild River Lab Large Test Site
☐ - Wild River Lab Small Test Site (Open Area Test Site)
☐ - Oakwood Lab (Open Area Test Site)
☐ - Wild River Lab Screen Room
☐ - New Brighton Lab Shielded Room

The instantaneous frequency deviation measurements and the audio filter characteristics measurements are not applicable to this device – it is an amplifier.

22.917 Emission Limitations for cellular

The Emission limitations for cellular measurements were performed at the following test location:

■ - Wild River Lab Large Test Site (Open Area Test Site)
■ - Wild River Lab Large Test Site (Open Area Test Site)

at a test distance of:

■ - 3 meters
☐ - 10 meters

TÜV PRODUCT SERVICE INC 19333 Wild Mountain Road Taylors Falls MN 55084-1758 Tel: 651 638 0297 Fax: 651 638 0298 Rev.No 1.0

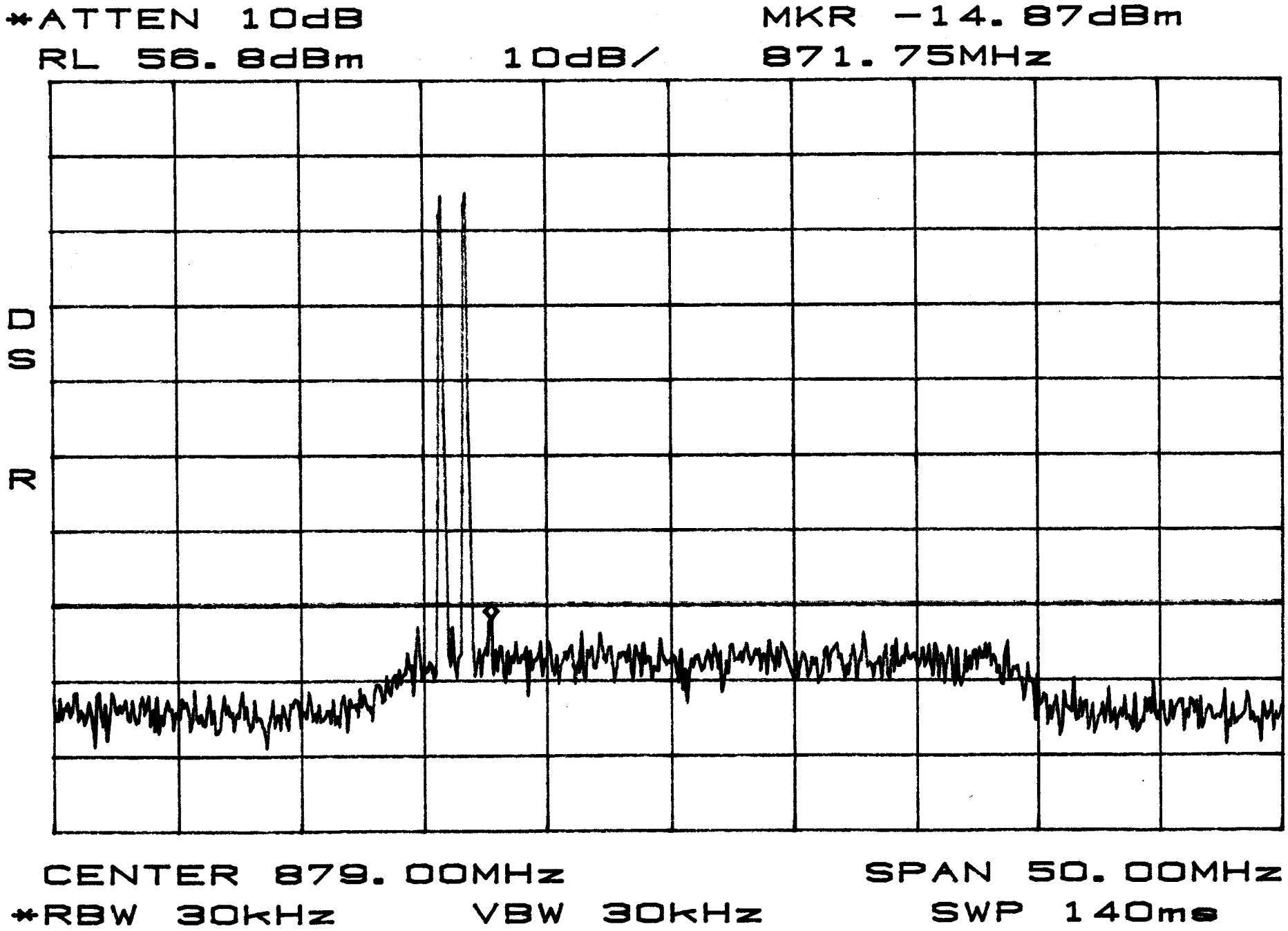
Inter-Modulation Test for ADC Inc.
Digivance Long Range Coverage System
Model Numbers DGVL-112110SYS and DGVL-122110SYS.

The intermodulation product test was performed for each bandwidth setting of the EUT. Two tests were performed with each modulation type. Test 1 was with two signals input into the EUT at lower end channels. Test 2 was with two signals, one at a lower end channel and one at a higher end channel. The modulation types tested were CDMA, TDMA, and FM (1 kHz @ 8 kHz deviation). An investigation was made from 30 MHz to the 10^{th} harmonic of the highest fundamental frequency (~10 GHz).

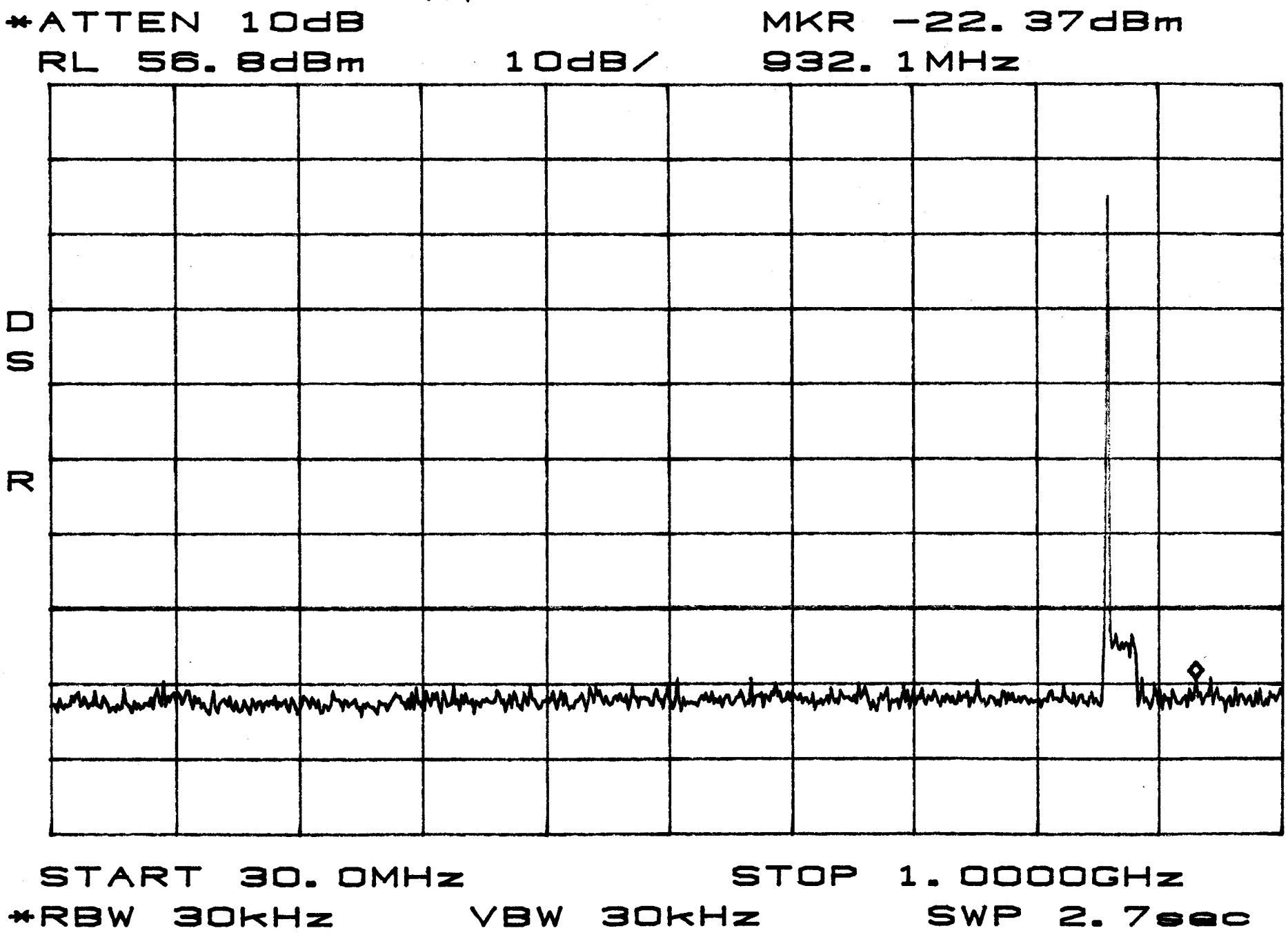
Results:

Pass (see plots)

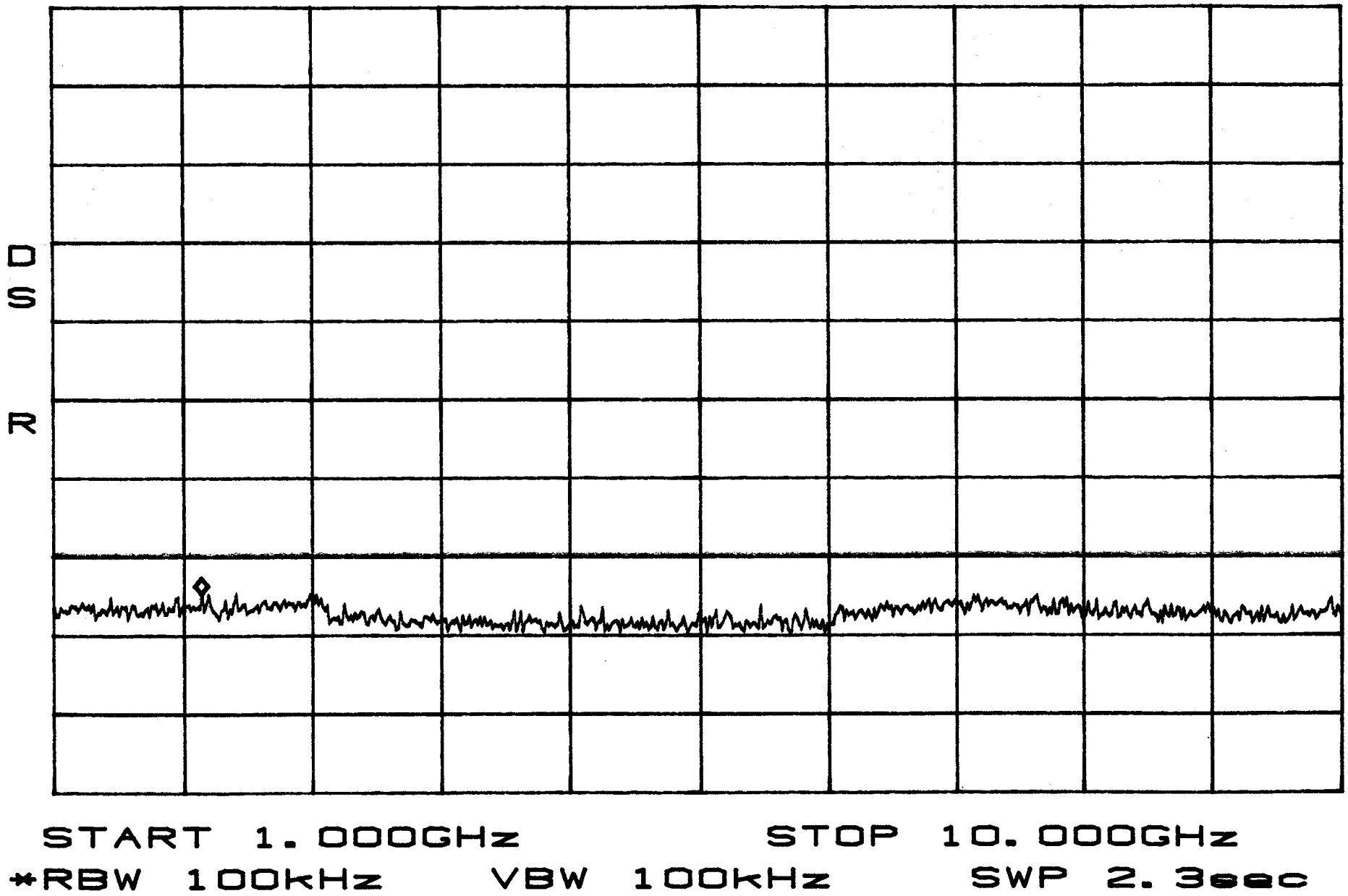
Intermodulation BAND A
Close
FM



Intermodulation BAND A
Close
FM

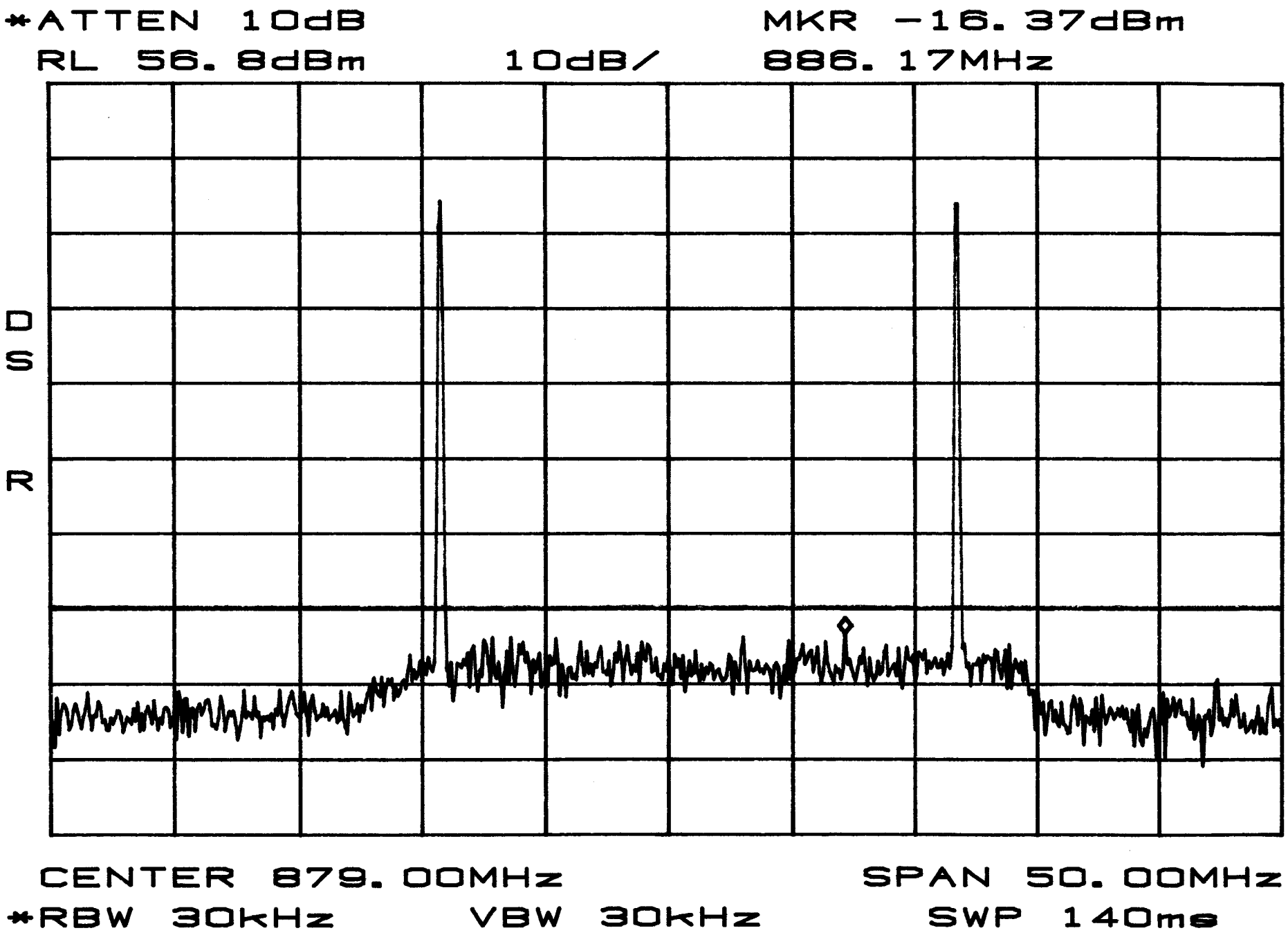


Intermodulation BAND A
Close
FM

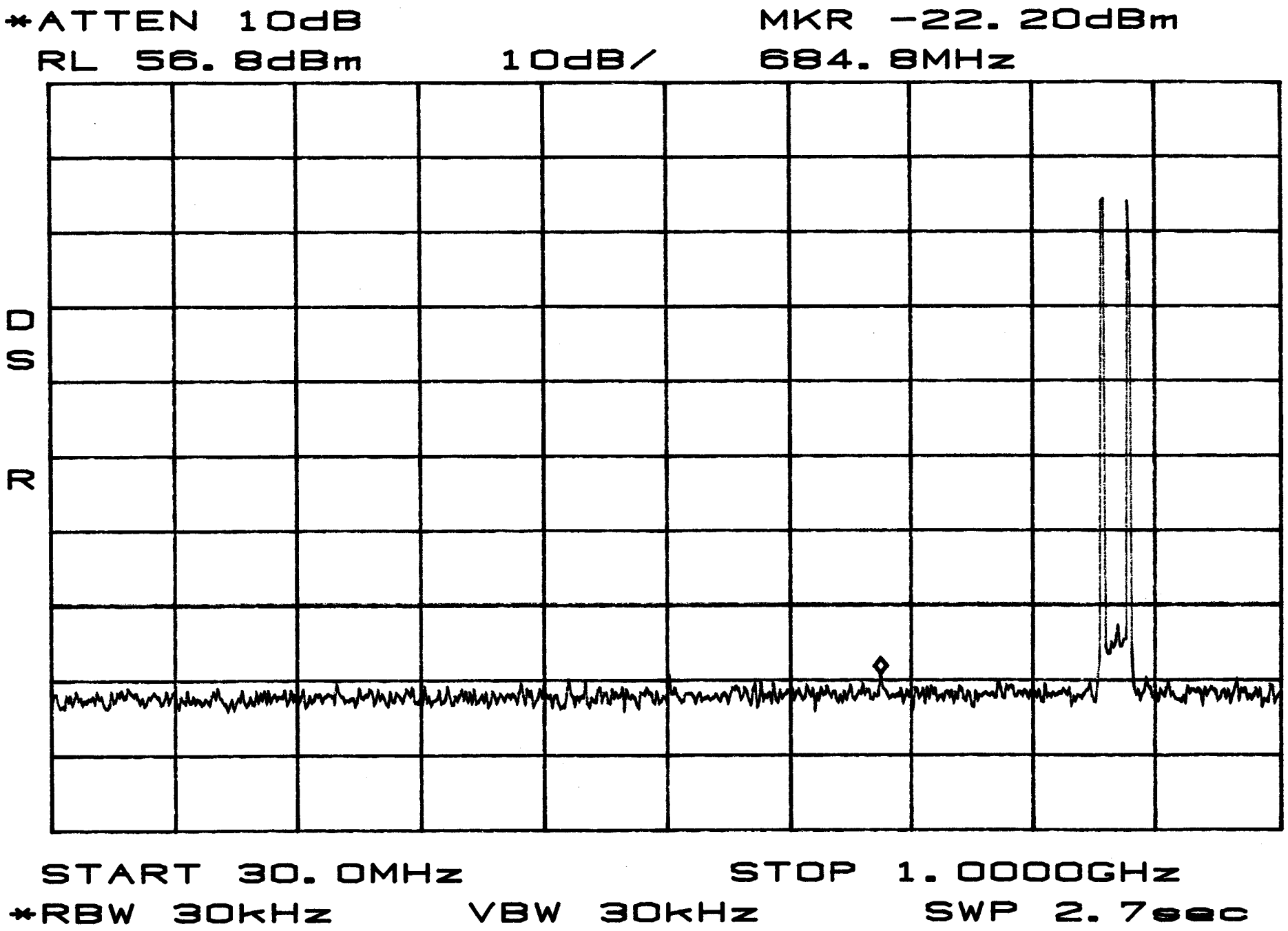


Intermodulation
Apart
FM

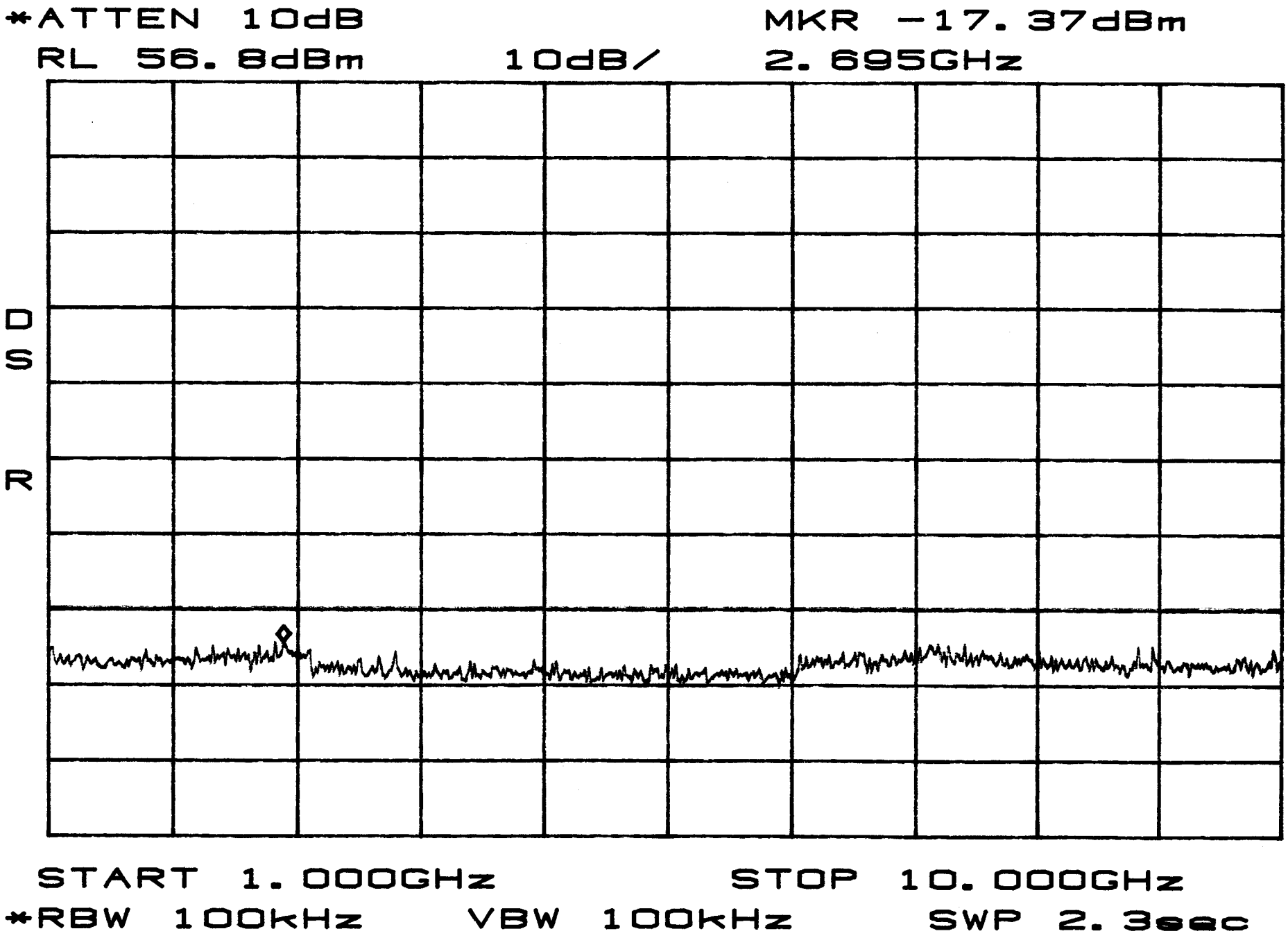
BAND A



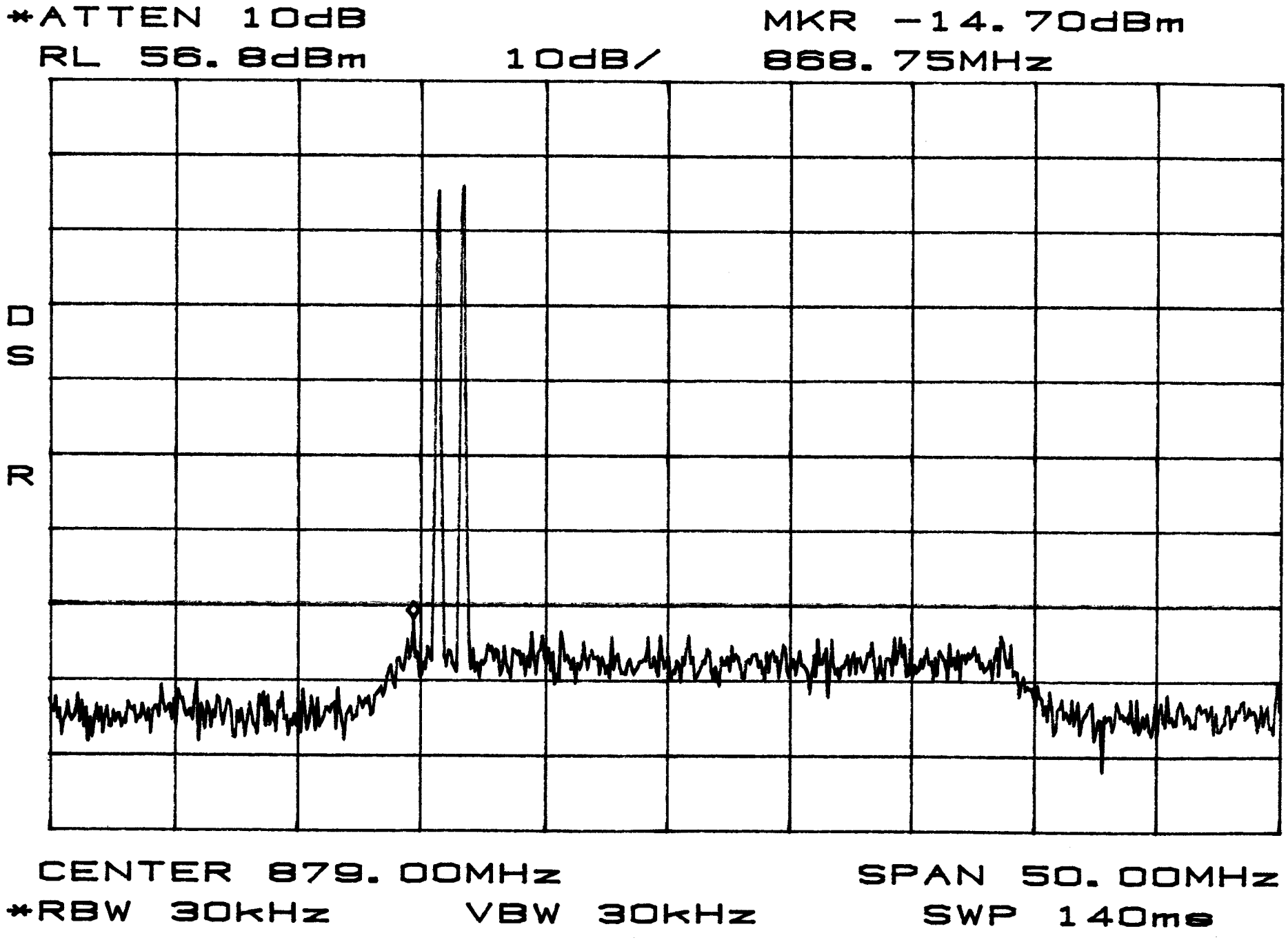
+Inter modulation Band A
Apart
FM



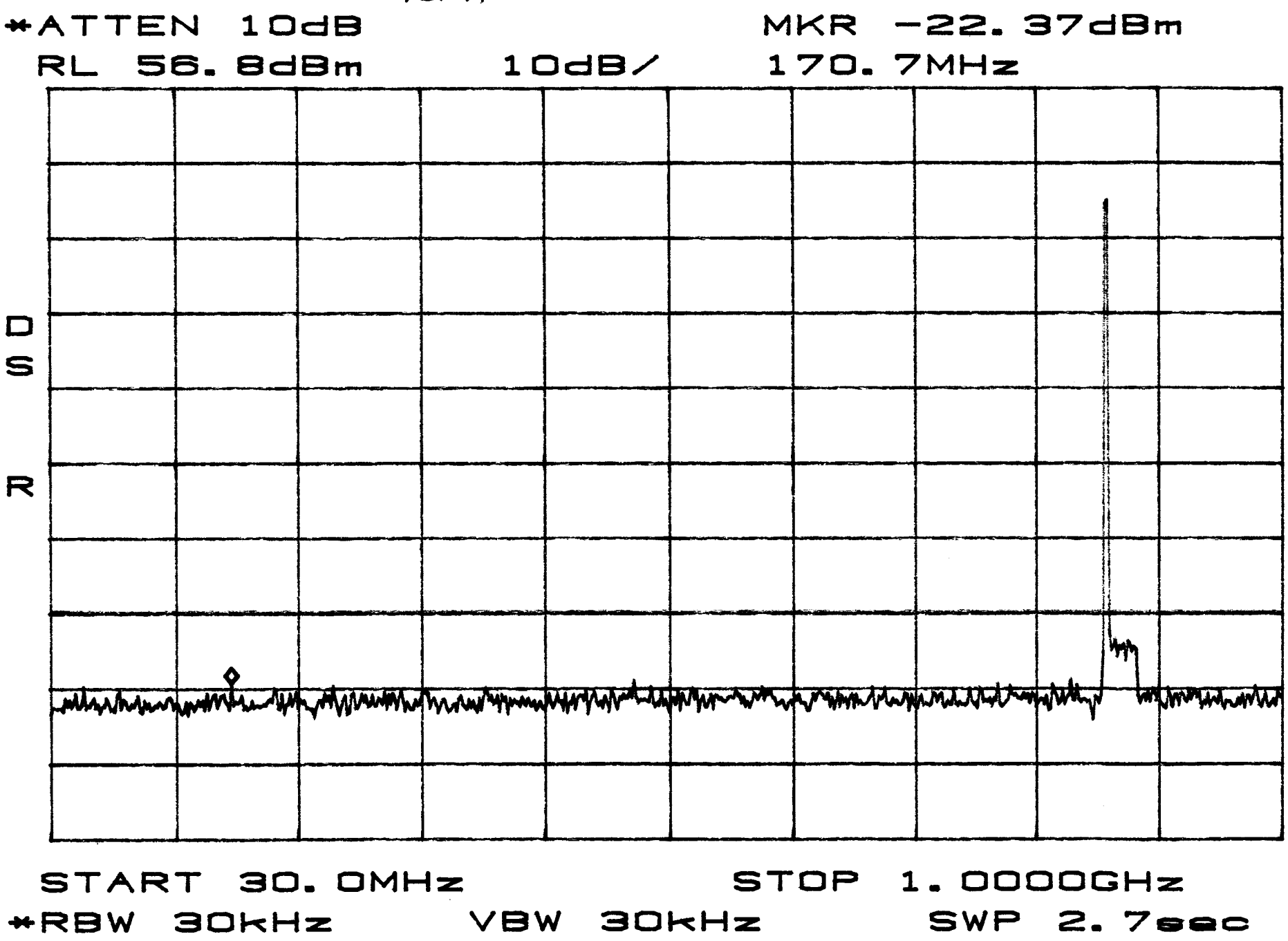
+Intermodulation Band A
Apart
FM



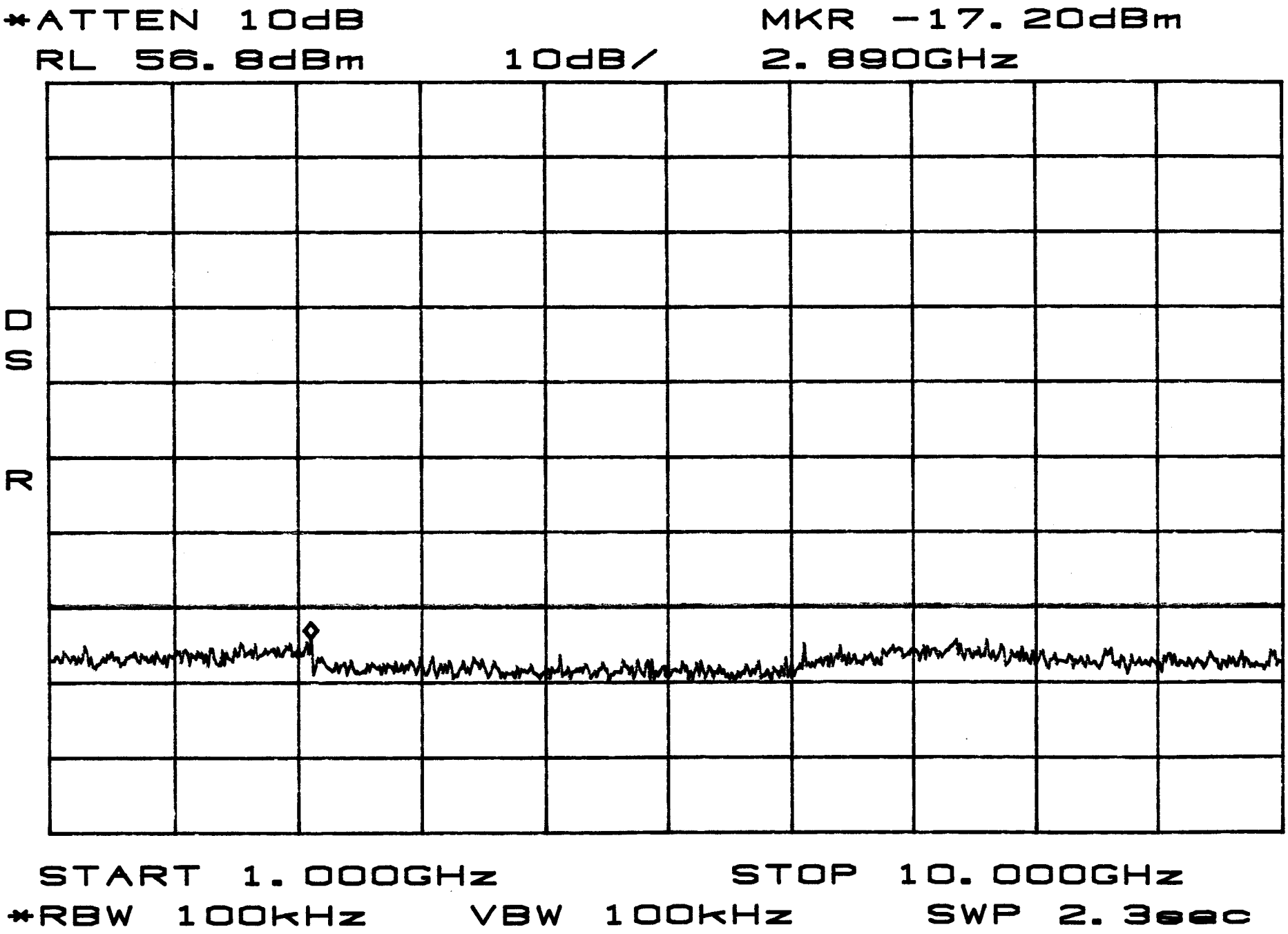
Intermodulation BAND A
Close
TDMA



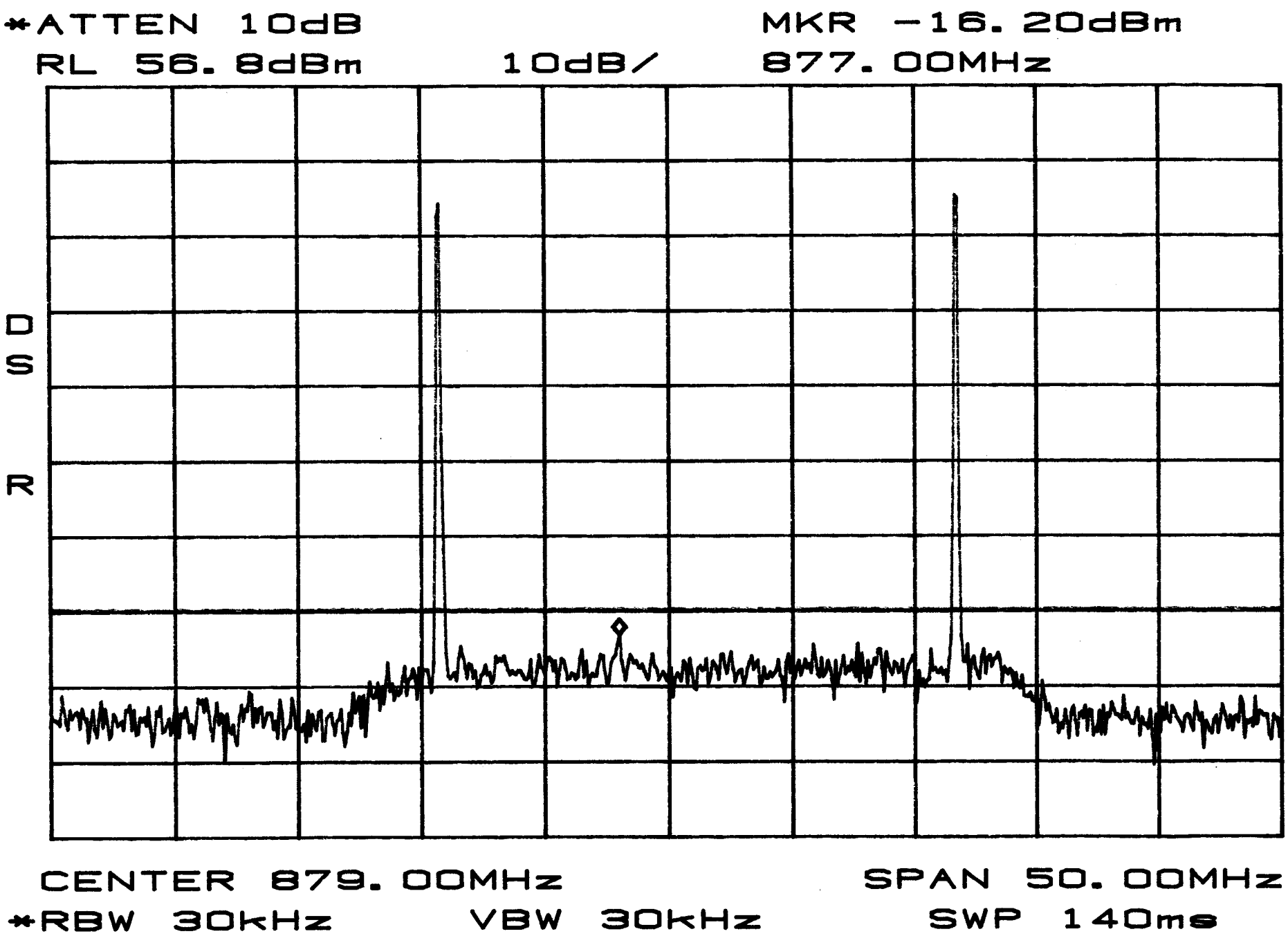
Intermodulation BAND A
Close
TDMA



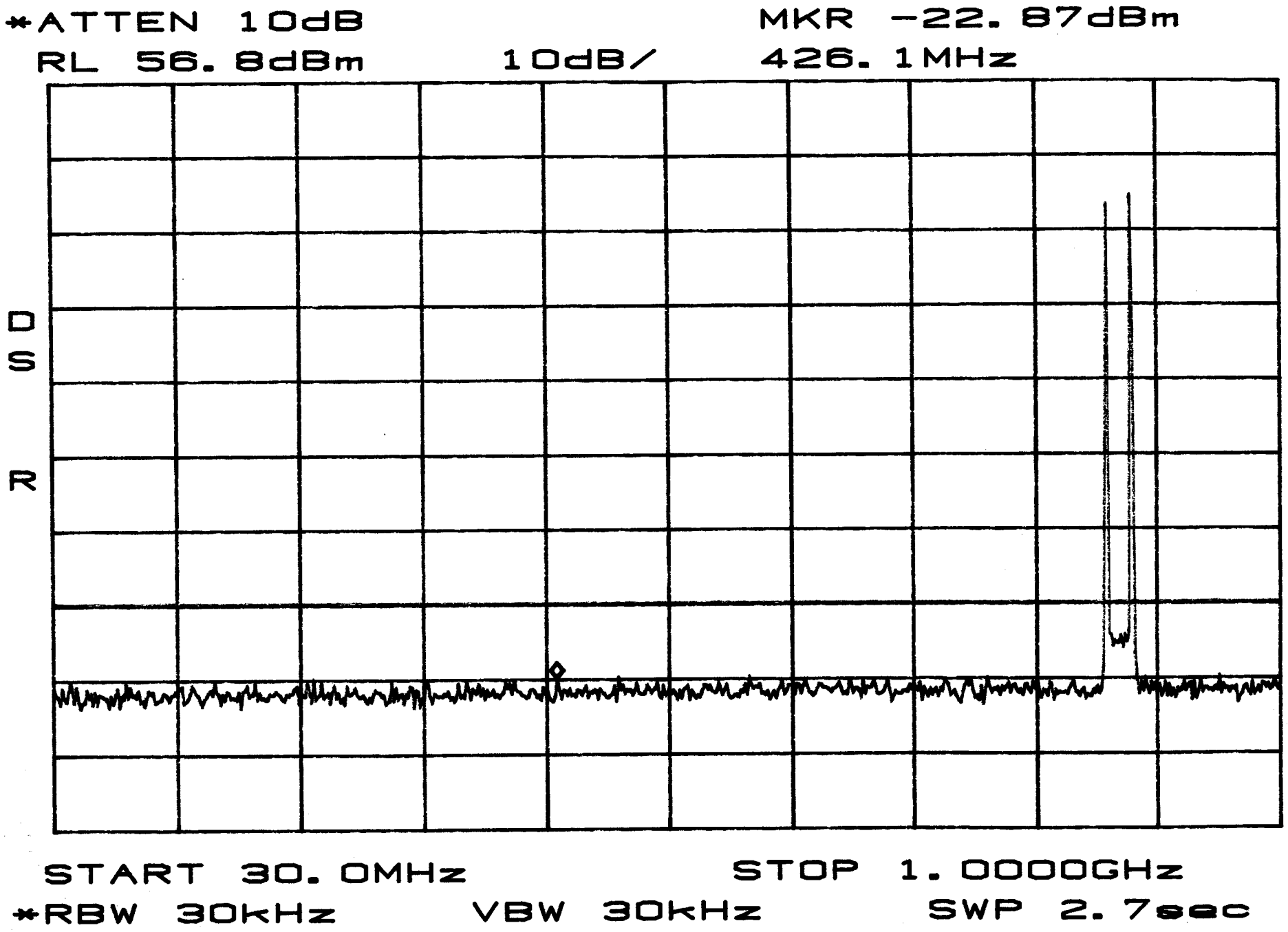
Intermodulation BAND A
Close
TDMA



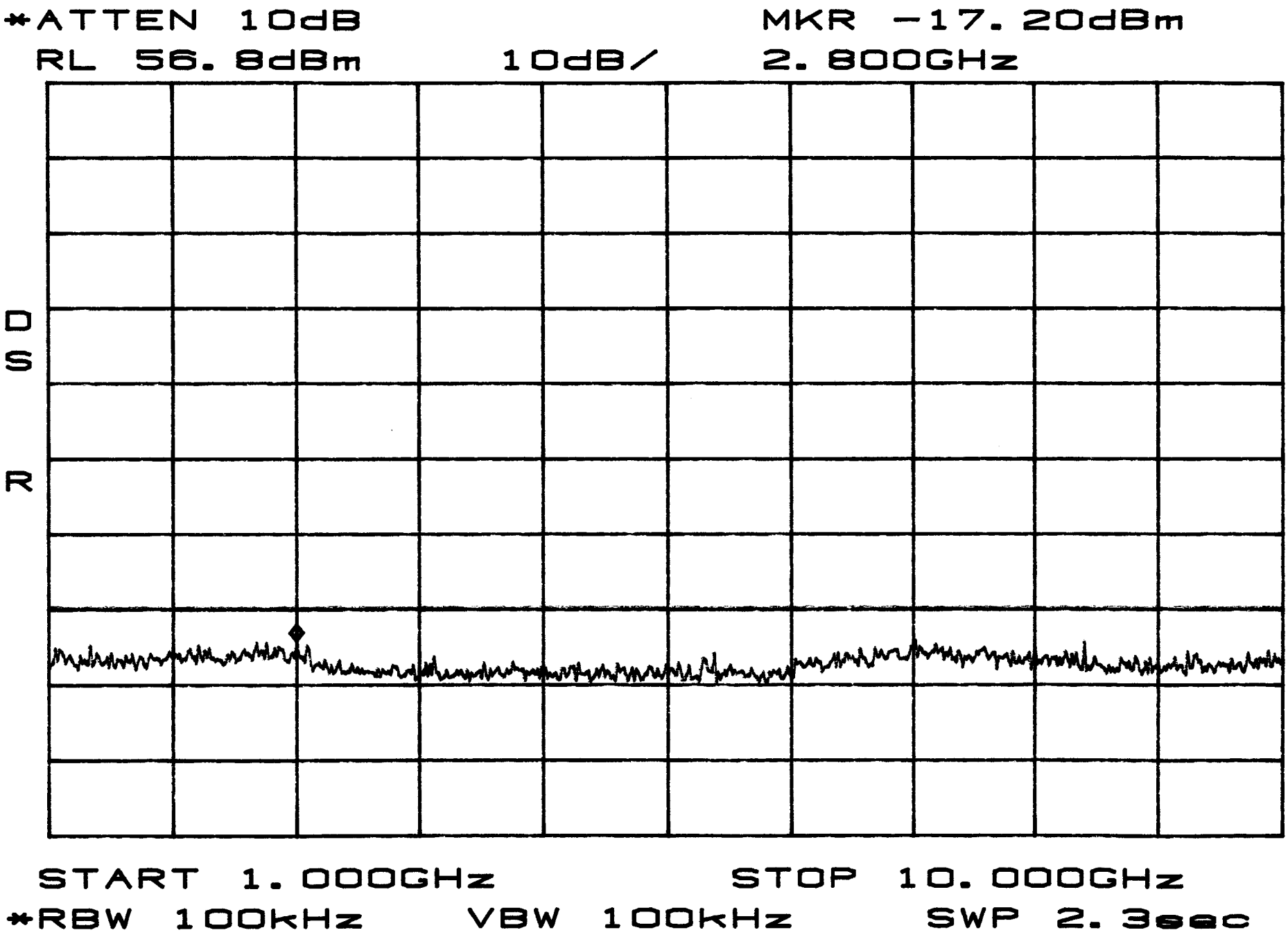
Intermodulation BAND A
Apart
TDMA



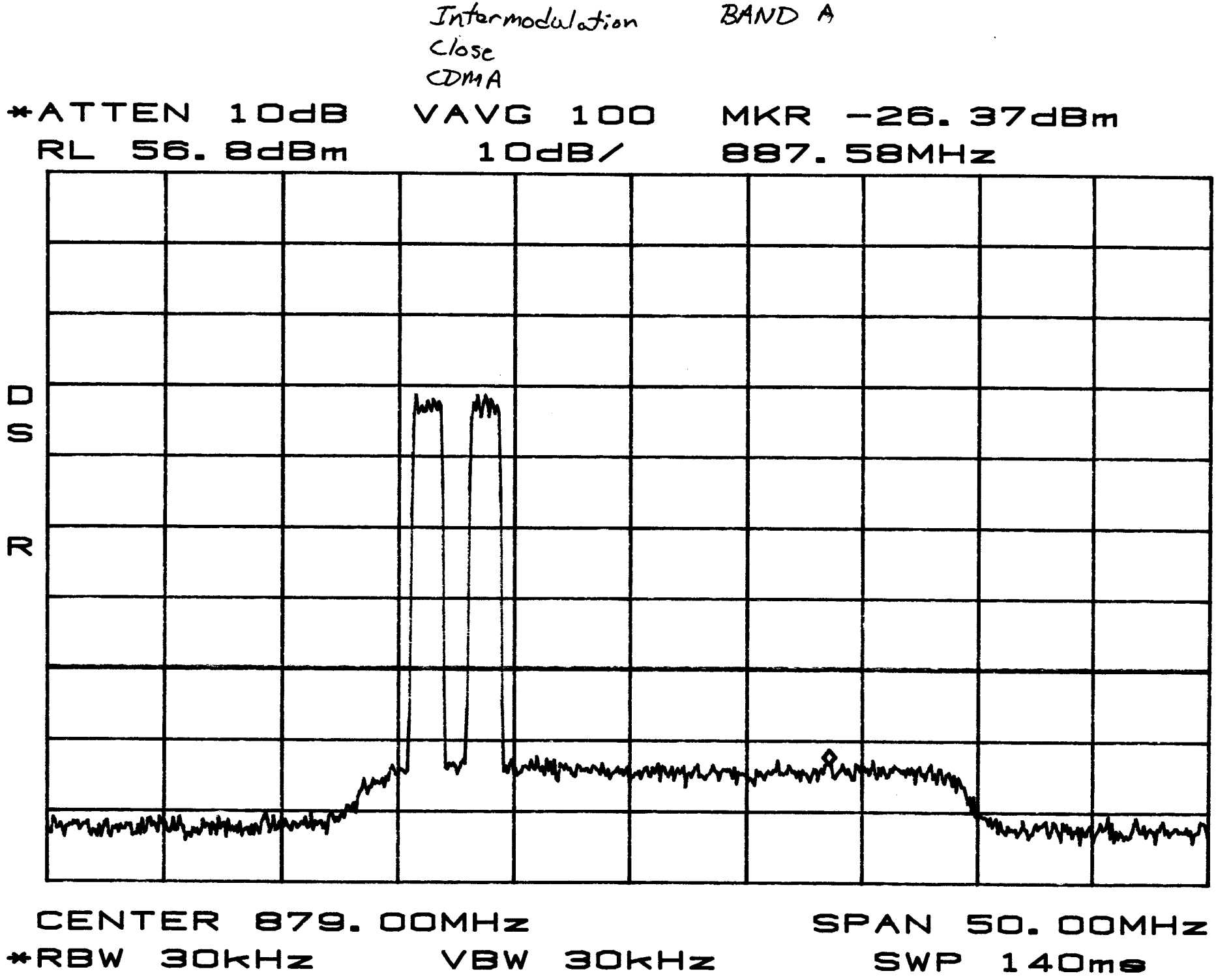
Intermodulation BAND A
Apart
TDMA



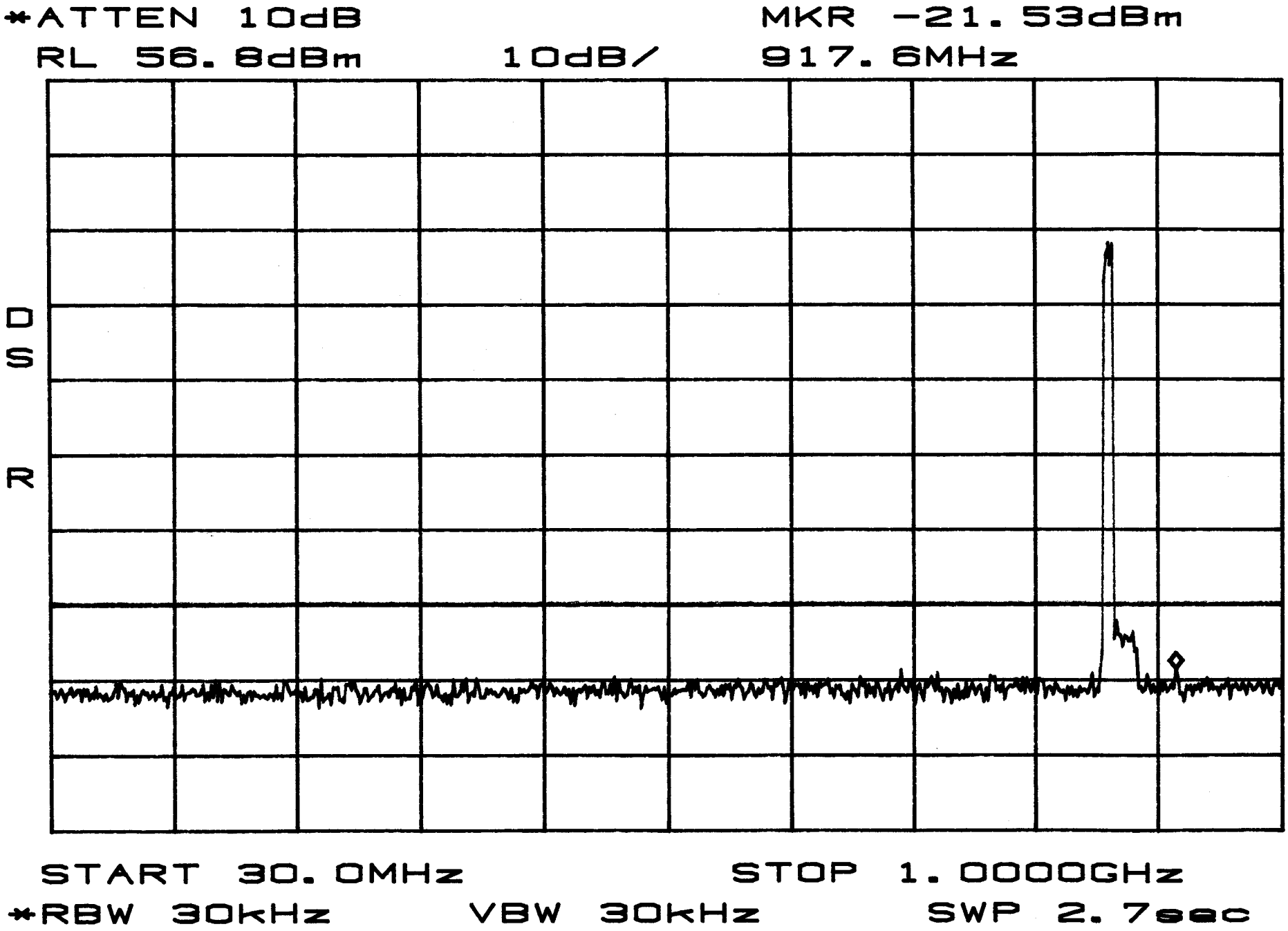
Intermodulation BAND A
Apart
TDMA



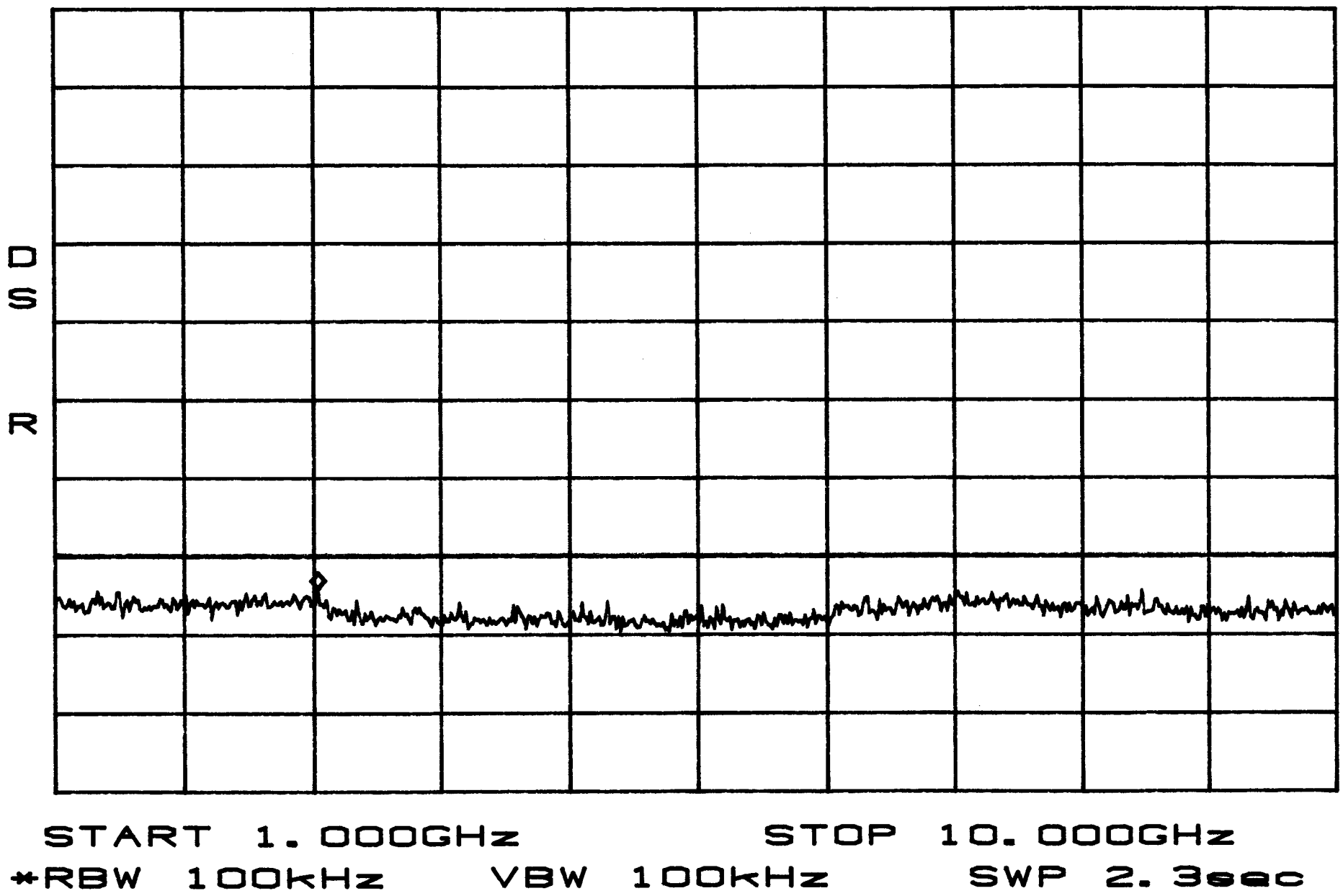
Intermodulation BAND A
Close
CDMA



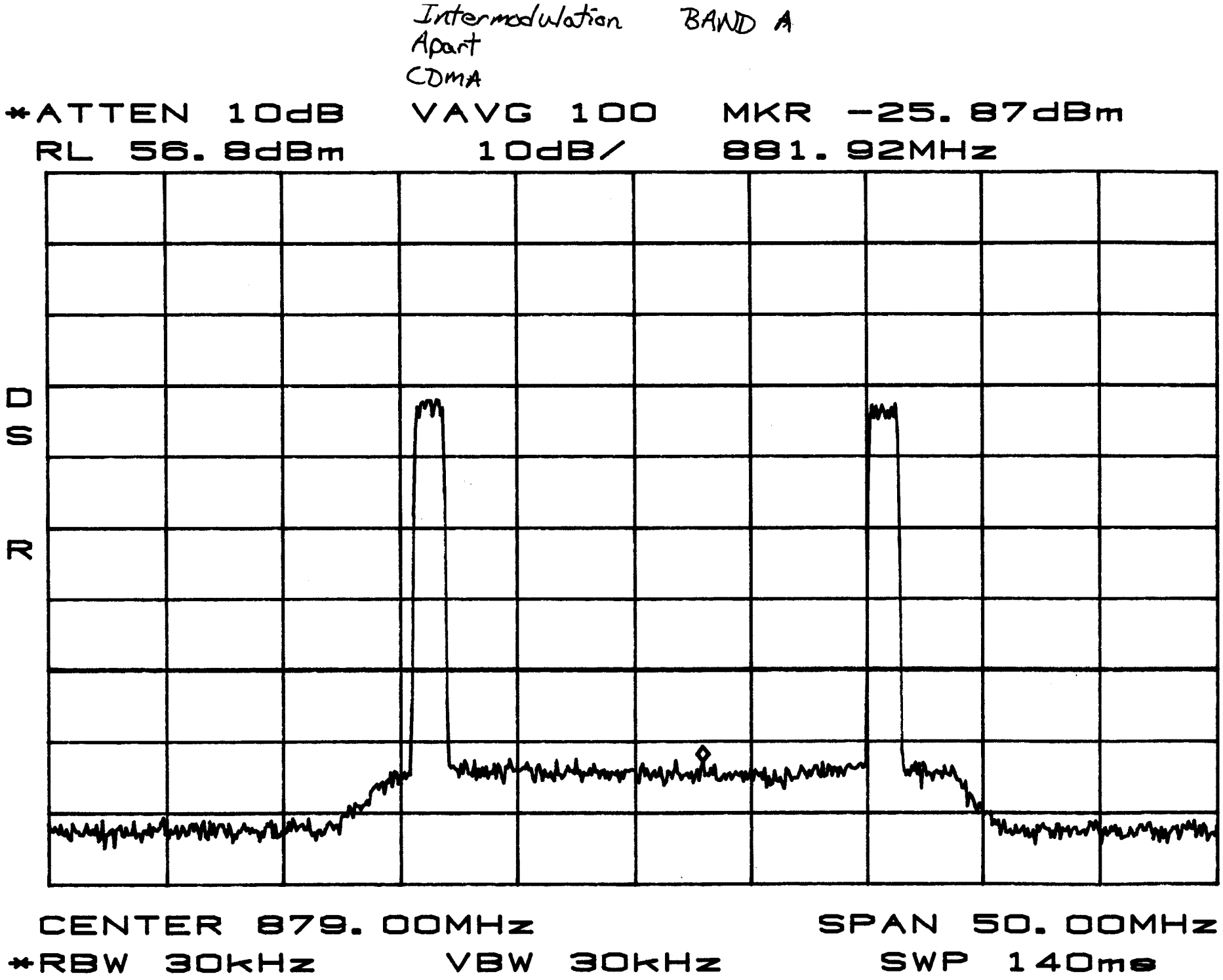
Intermodulation BAND A
Close
CDMA



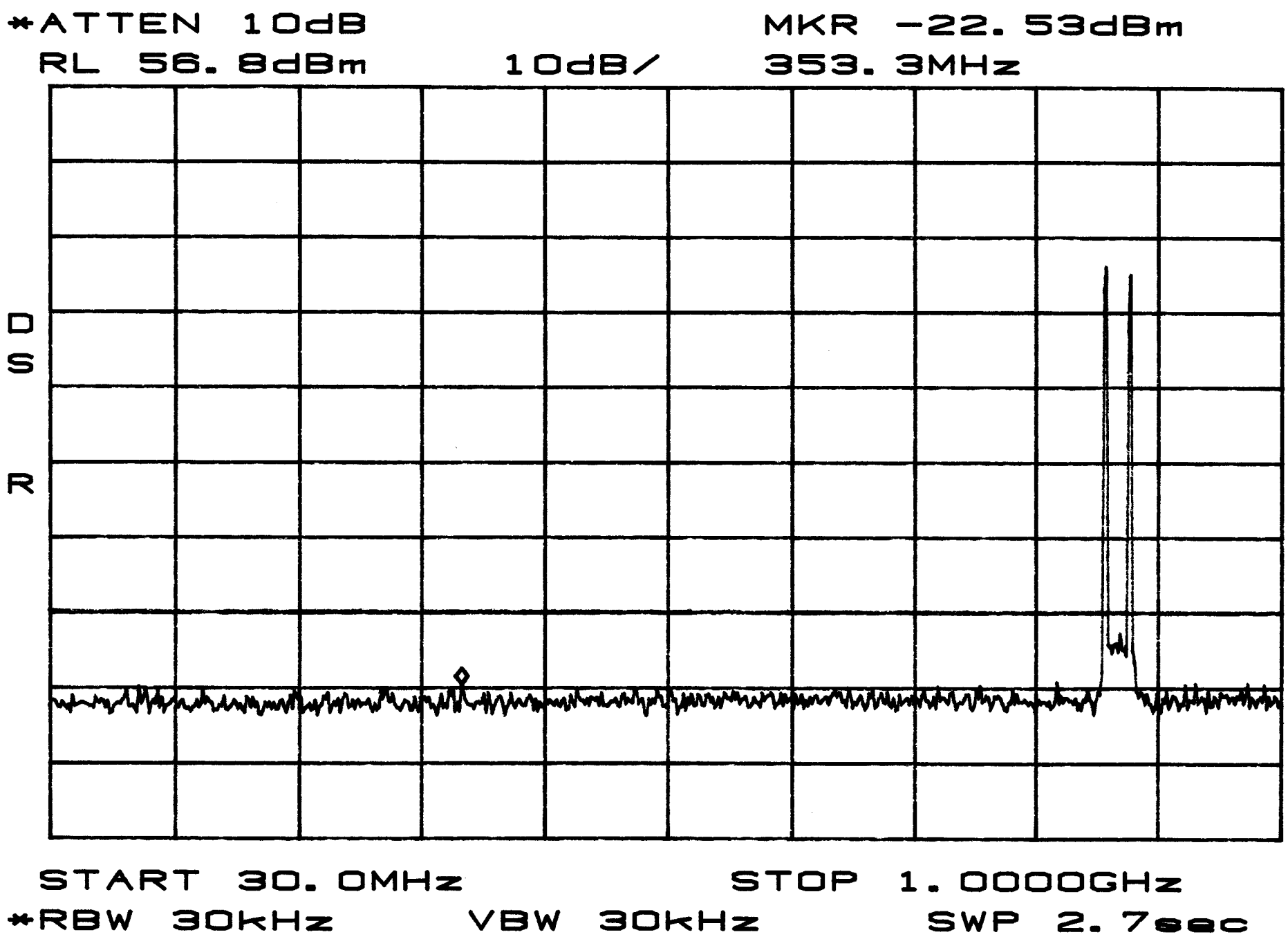
Intermodulation BAND A
Close
CDMA



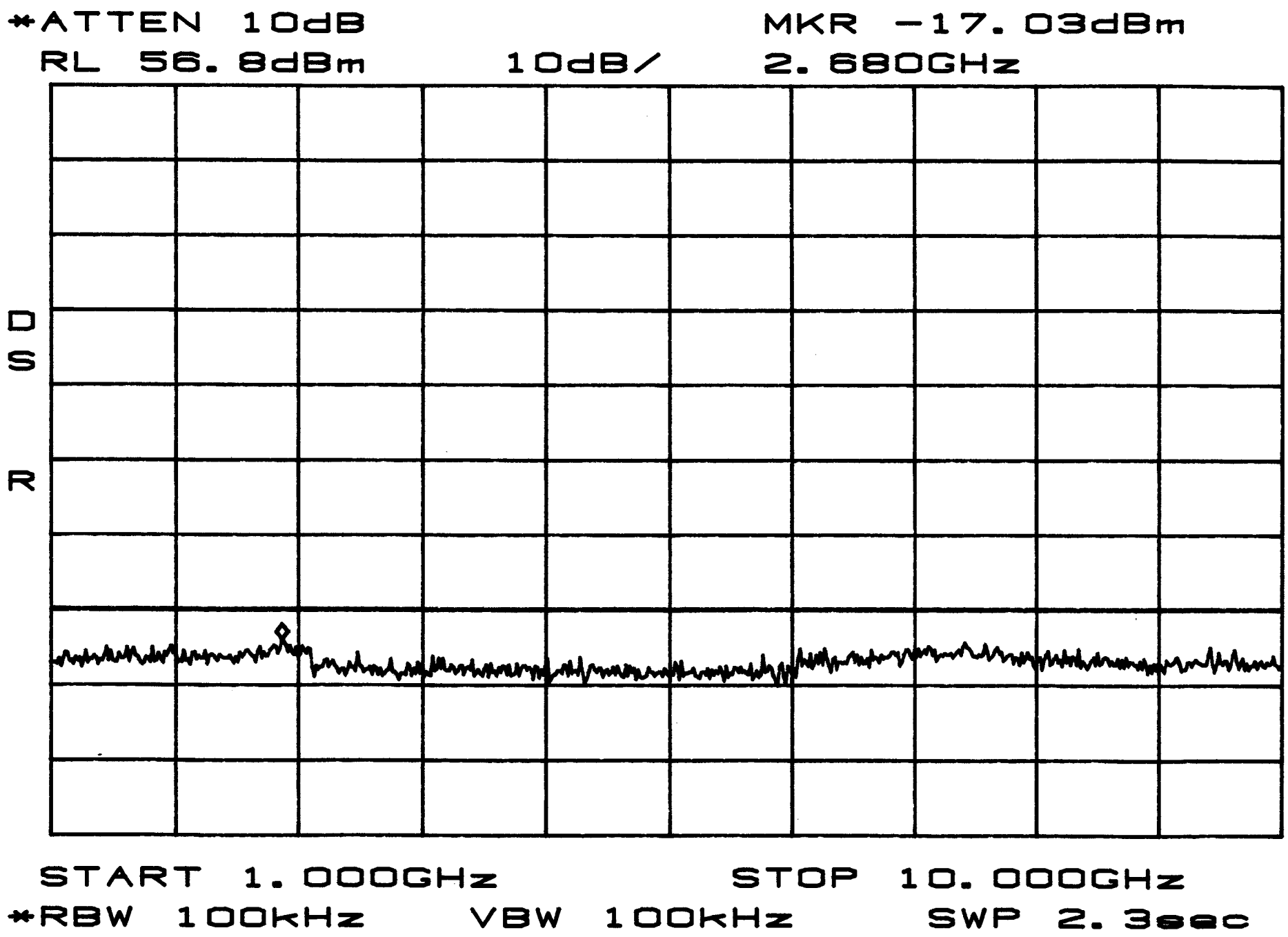
Intermodulation BAND A
Apart
CDMA



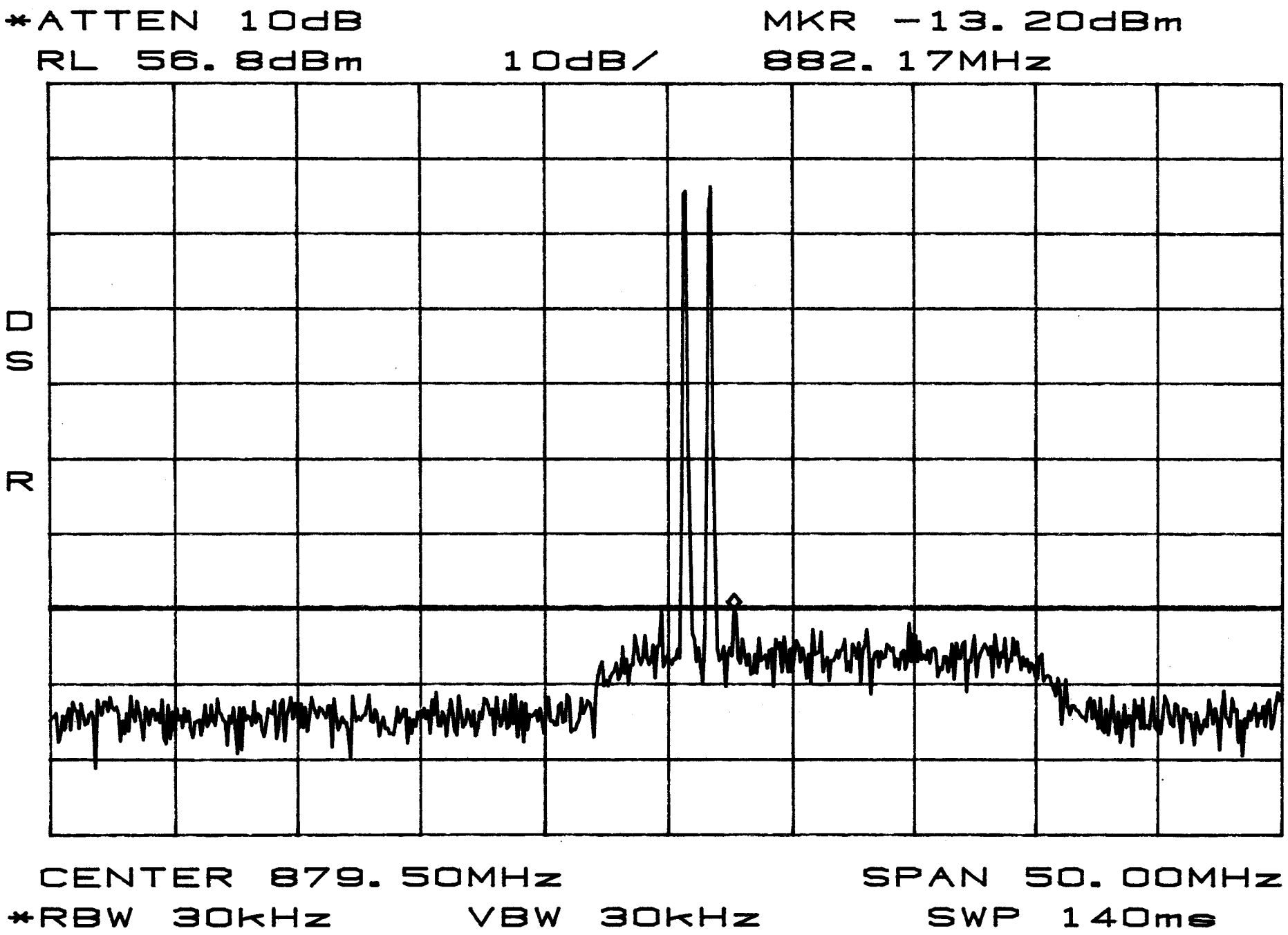
Intermodulation BAND A
Apart
CDMA



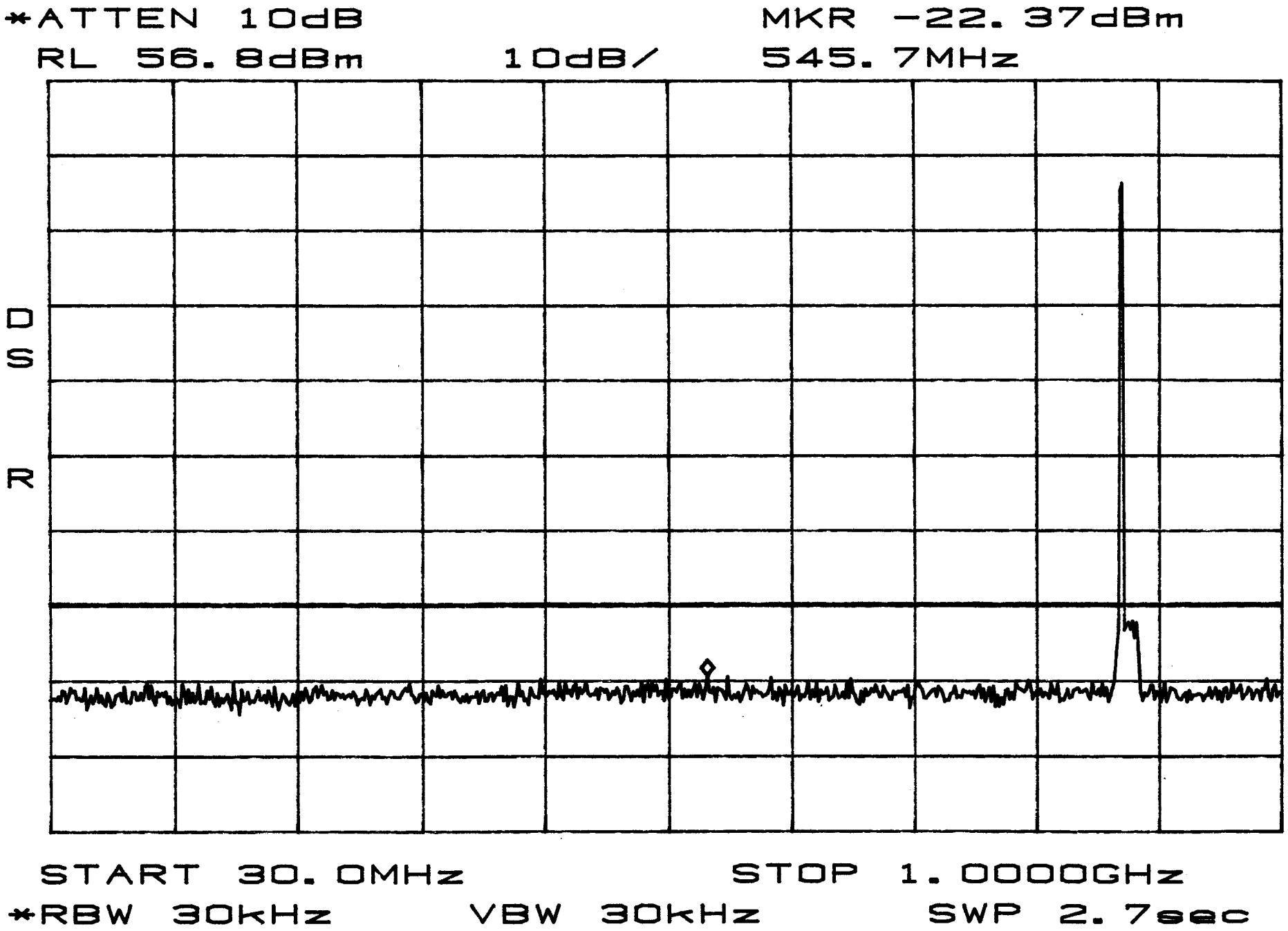
Intermodulation BAND A
Apart
CDMA



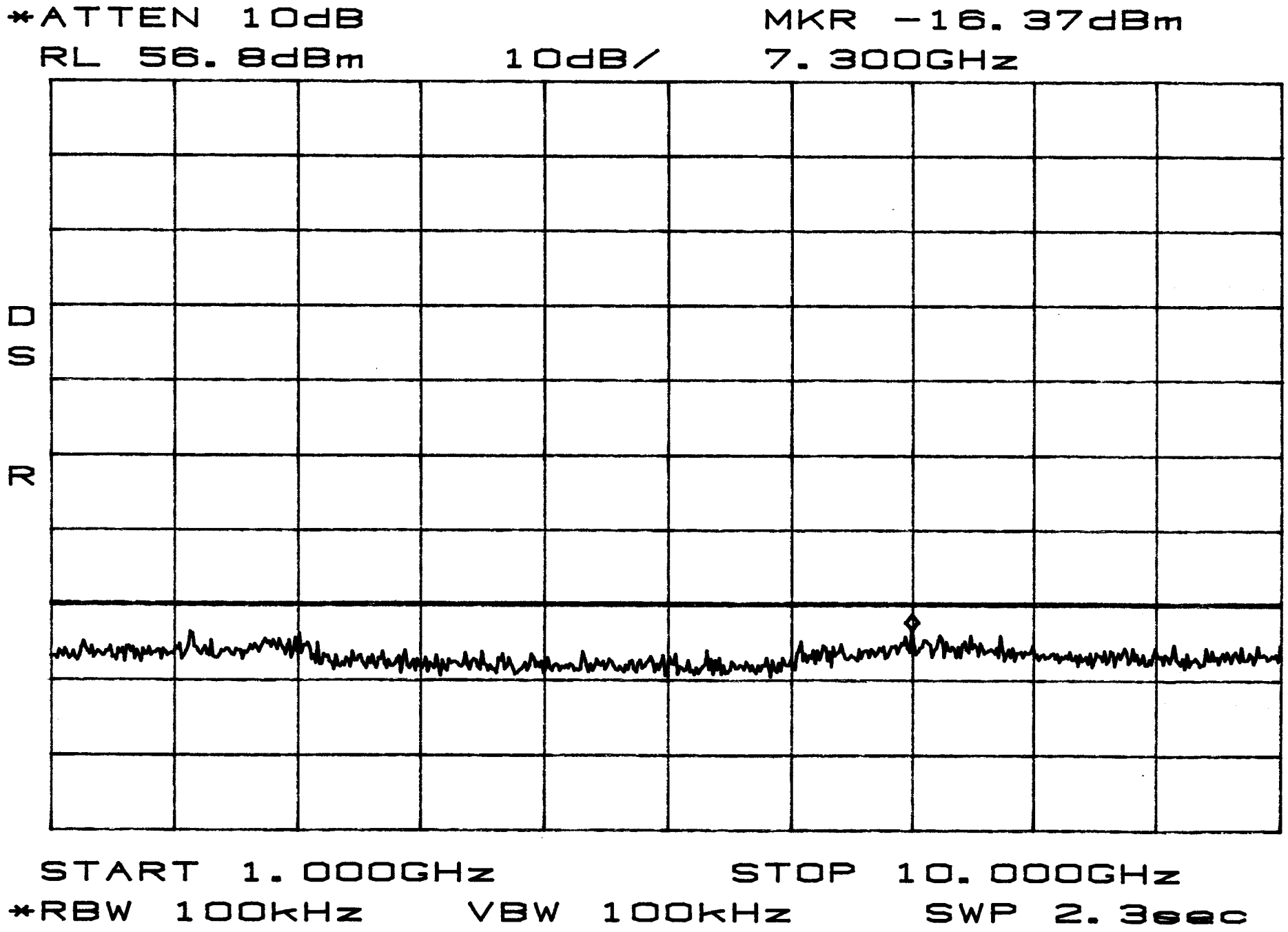
Intermodulation BAND B
Close
FM



Intermodulation BAND B
Close
FM

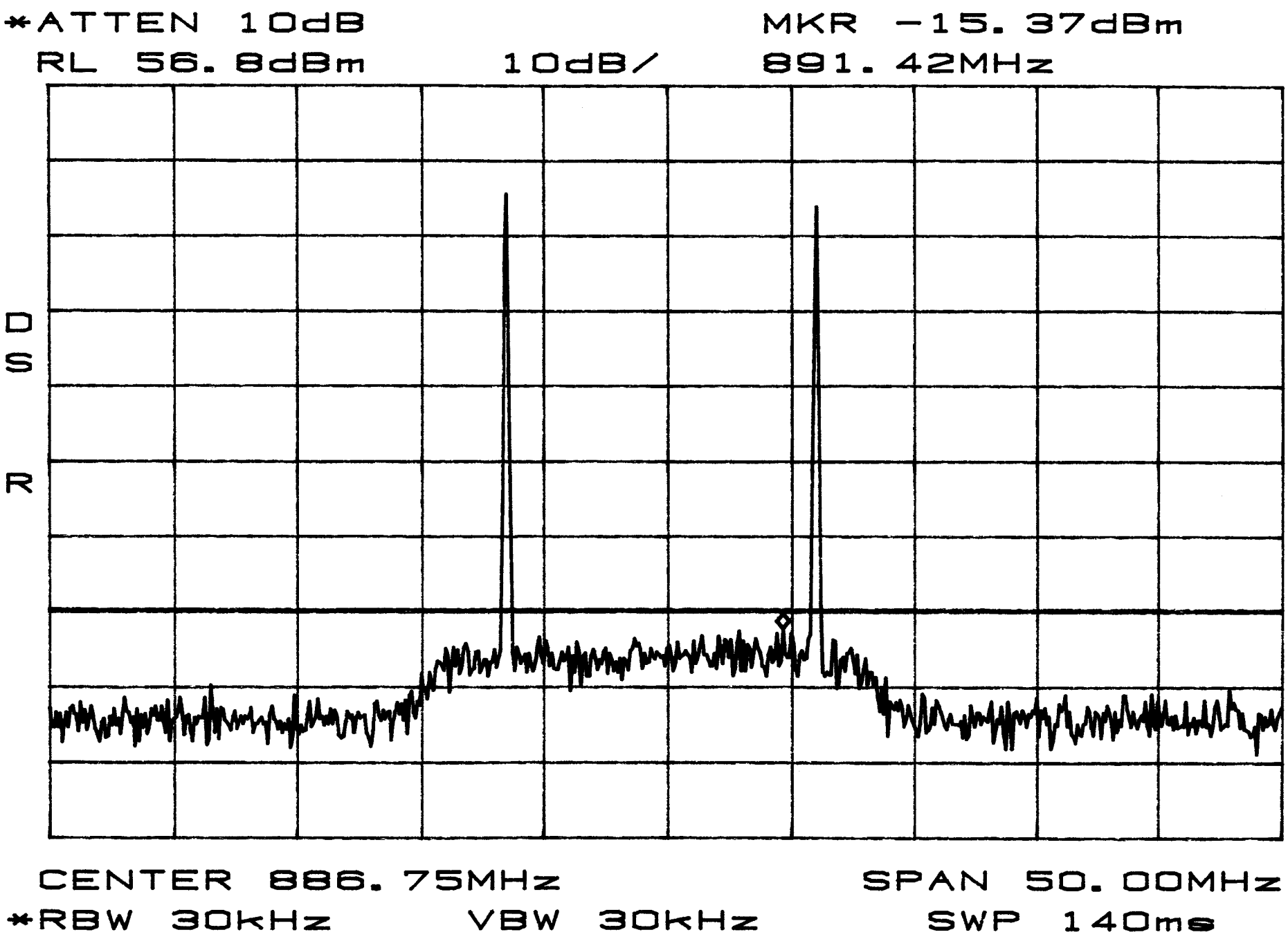


Intermodulation BAND B
Close
FM

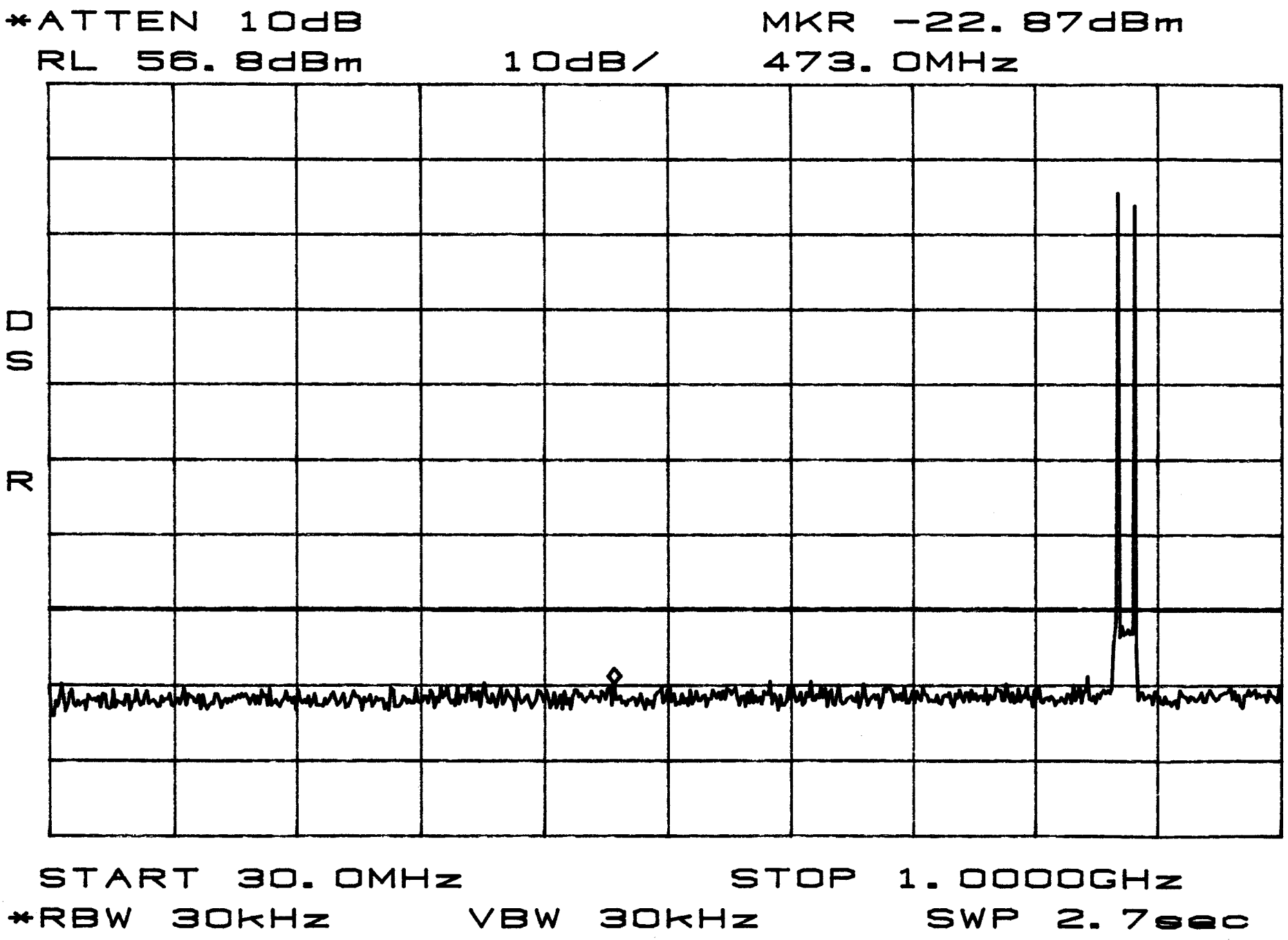


Intermodulation
Apart
FM

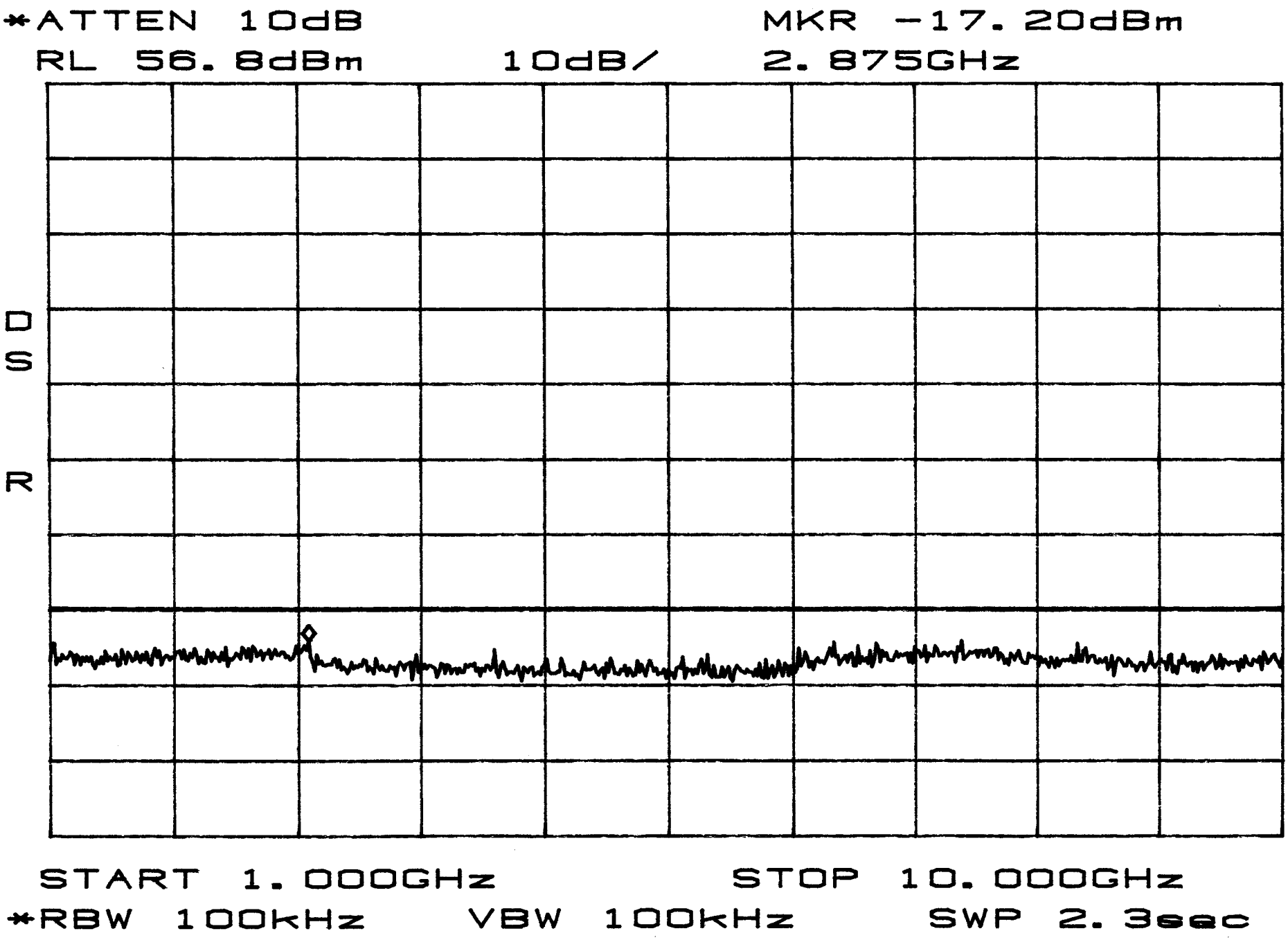
BAND B



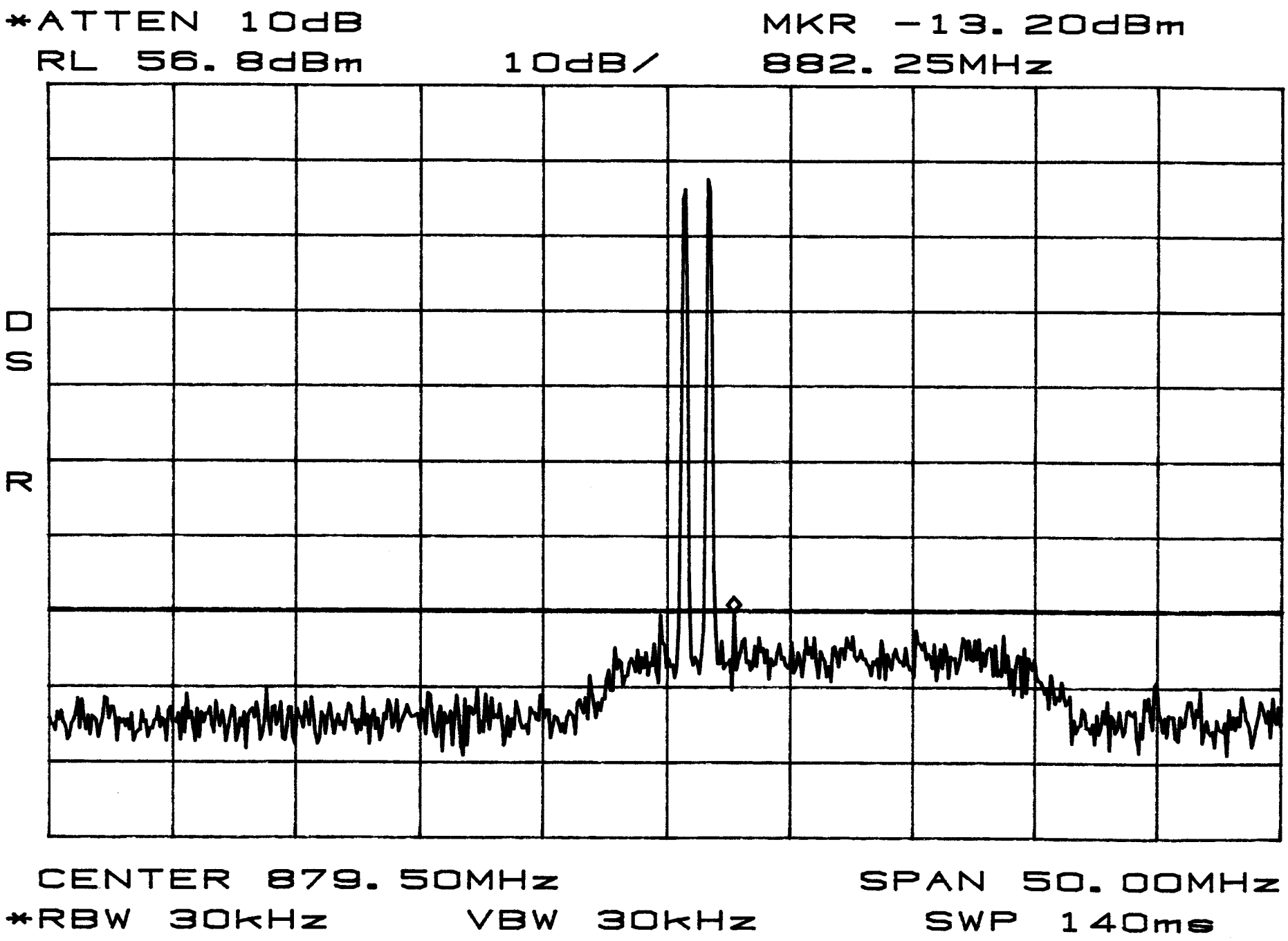
Apart
FM


*ATTEN 10dB
MKR -22.87dBm
RL 56.8dBm
10dB/
473.0MHz
D
S
R
START 30.0MHz
STOP 1.0000GHz
*RBW 30kHz
VBW 30kHz
SWP 2.7sec

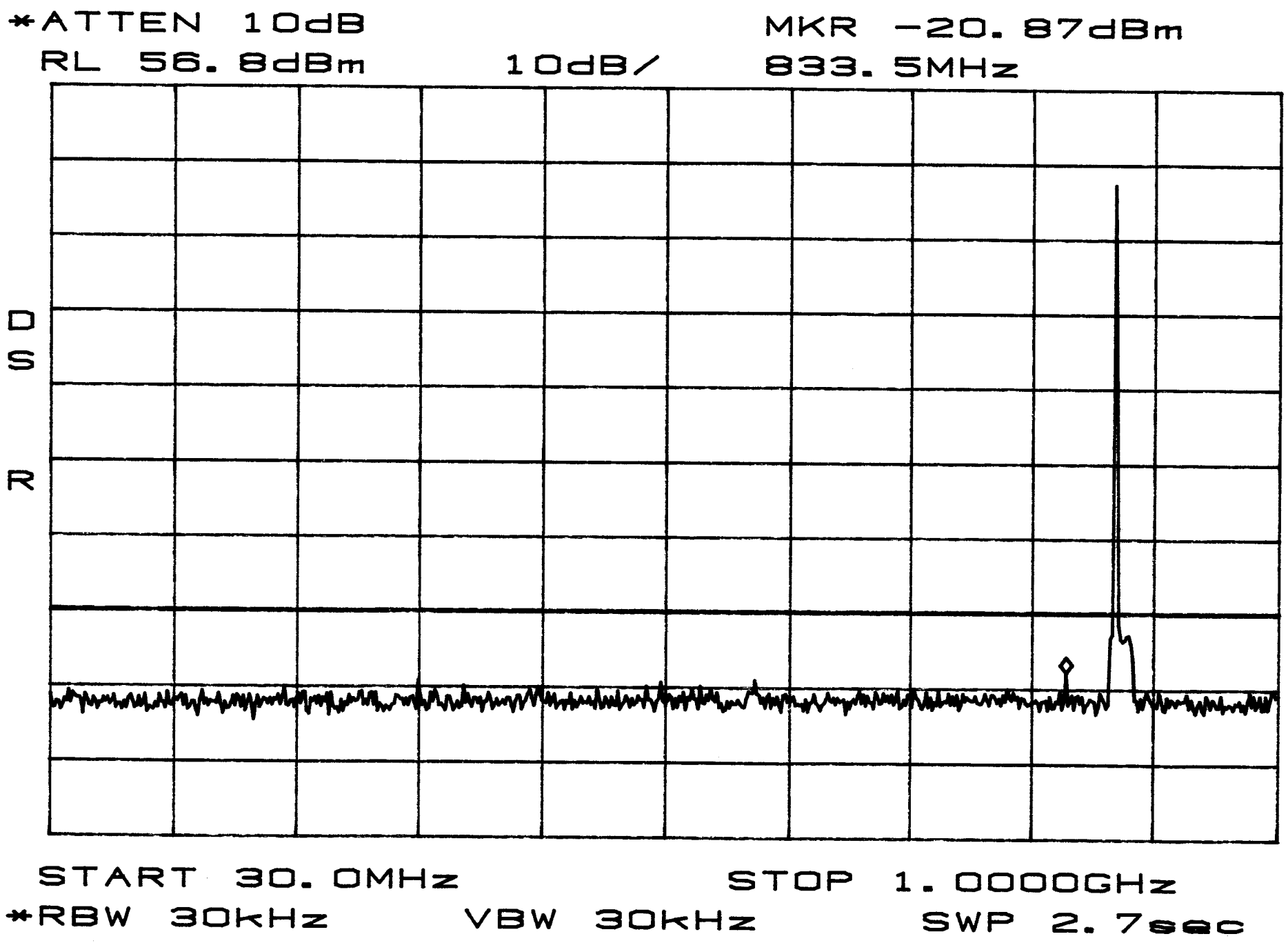
Apart
FM


*ATTEN 10dB
MKR -17.20dBm
RL 56.8dBm
10dB/
2.875GHz
D
S
R
START 1.000GHz
STOP 10.000GHz
*RBW 100kHz
VBW 100kHz
SWP 2.3sec

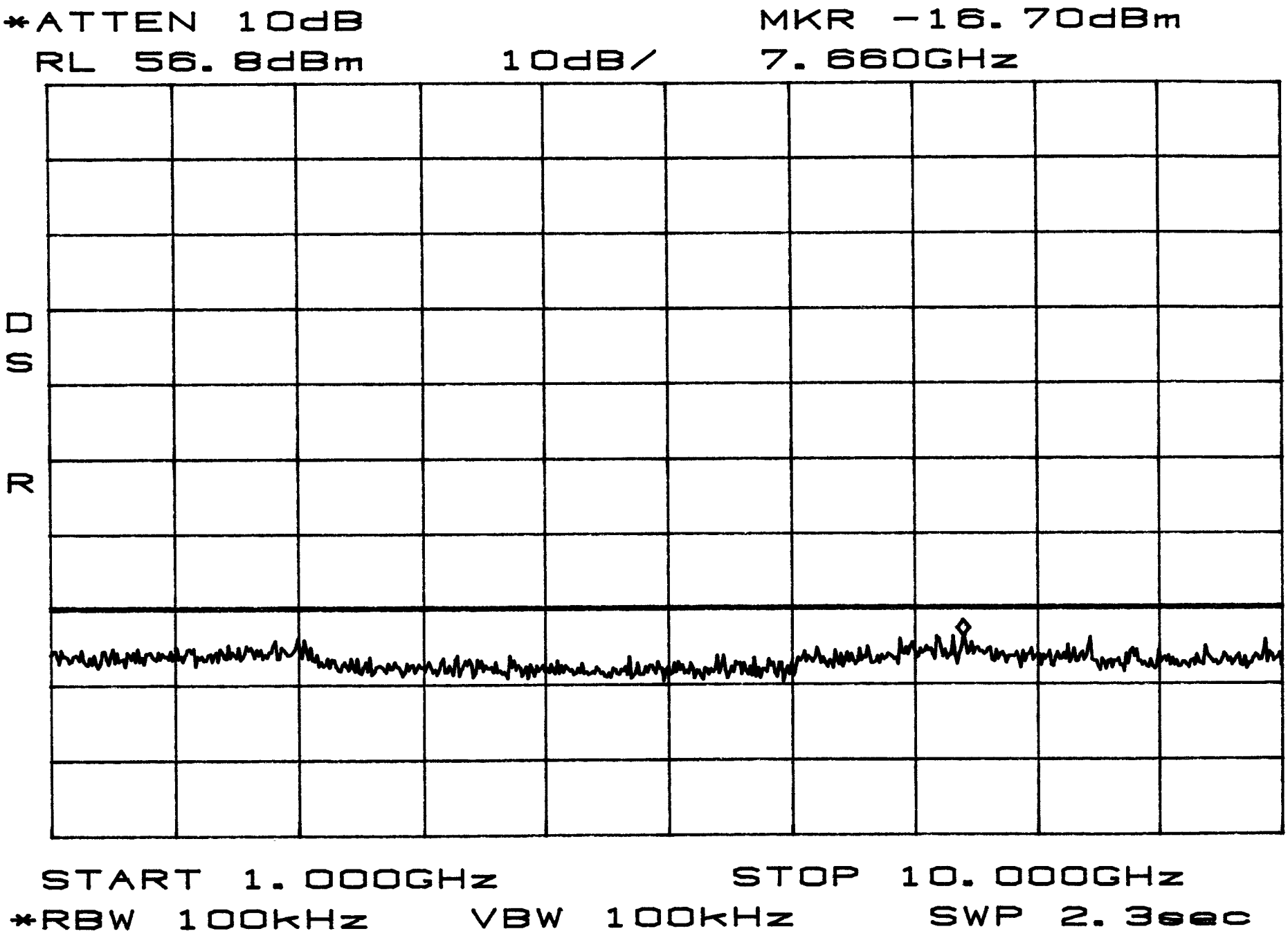
Intermodulation BAND B
Close
TDMA



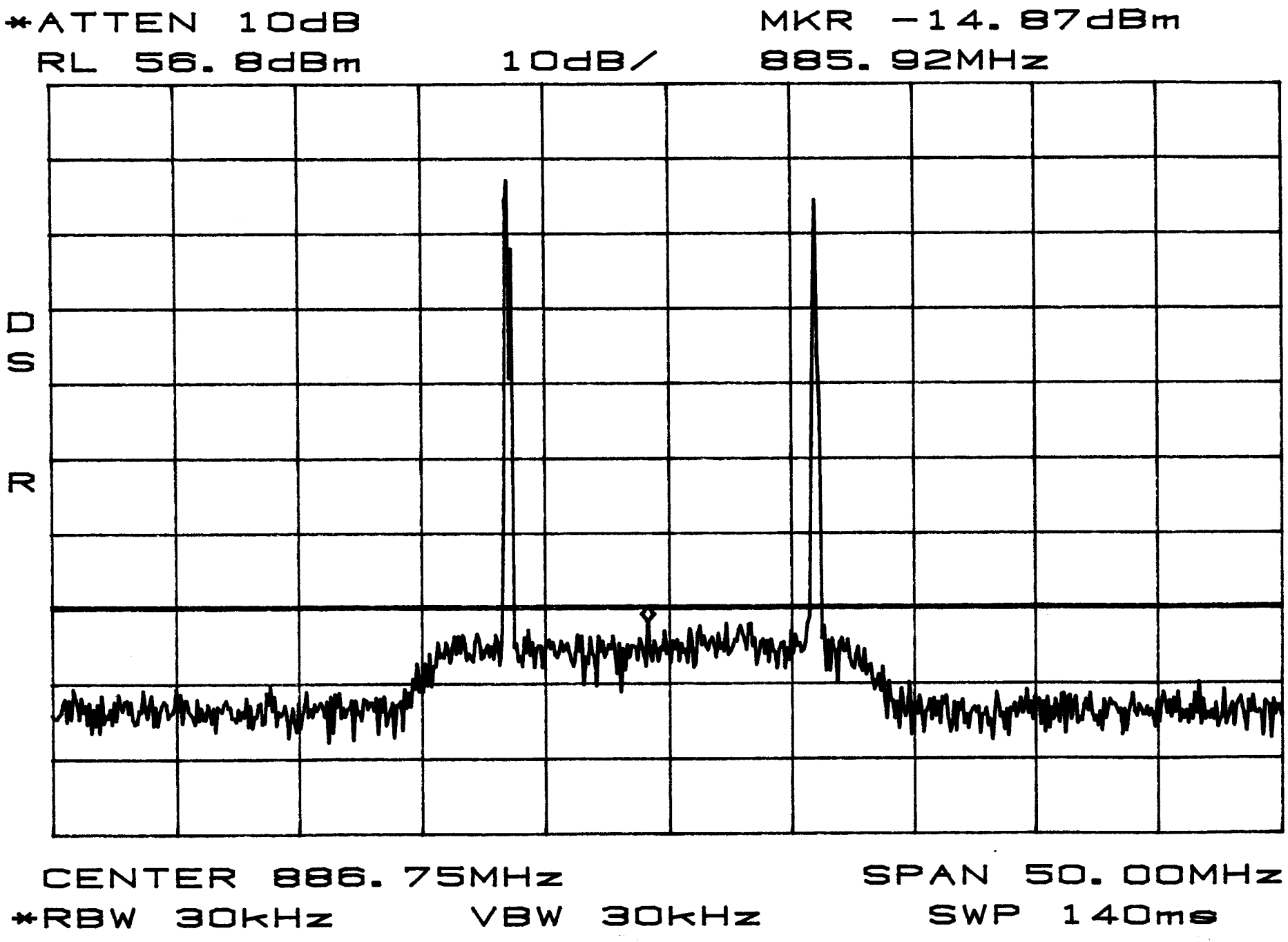
Intermodulation BAND B
Close
TDMA



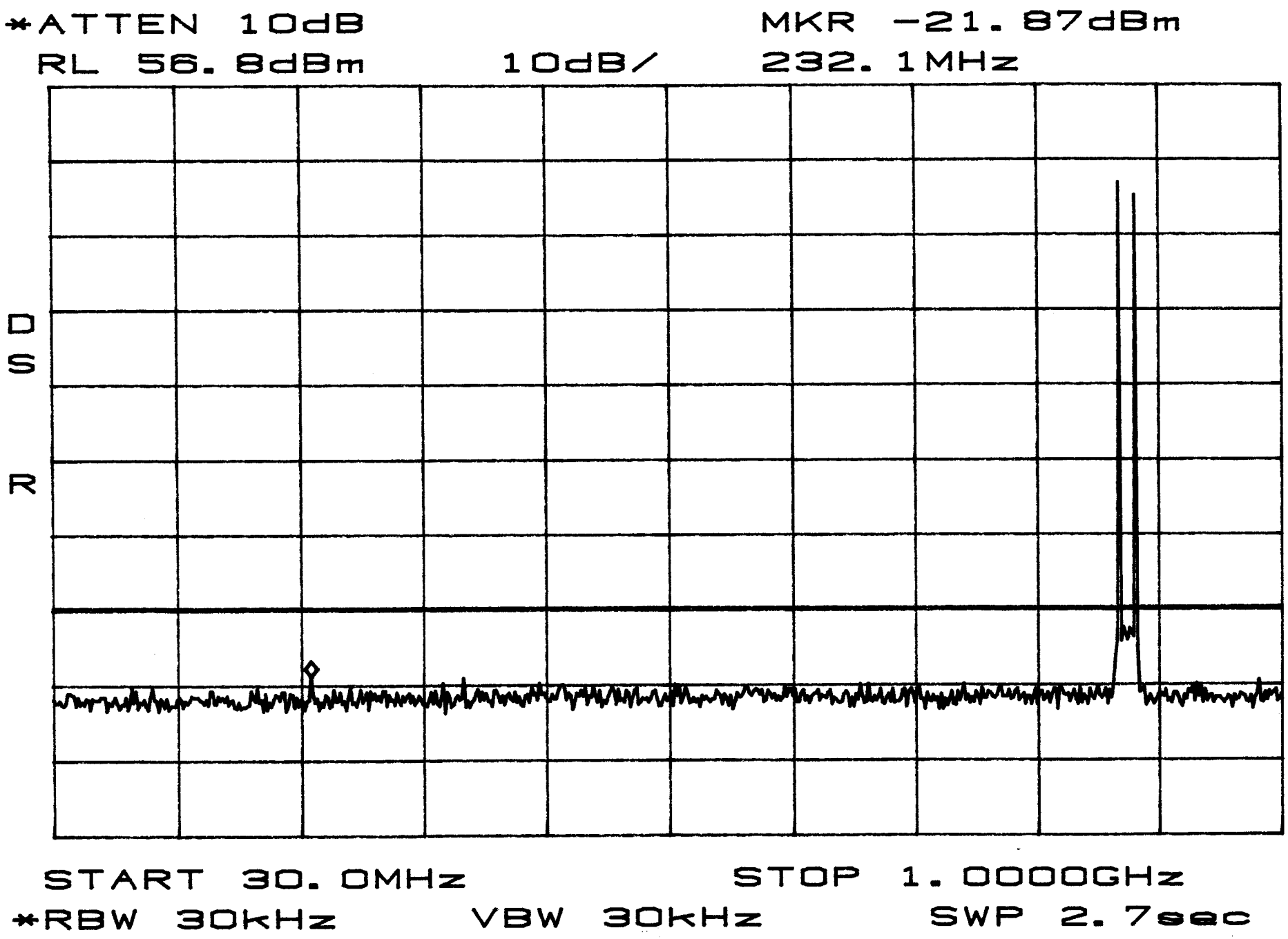
Intermodulation BAND B
Close
TDMA



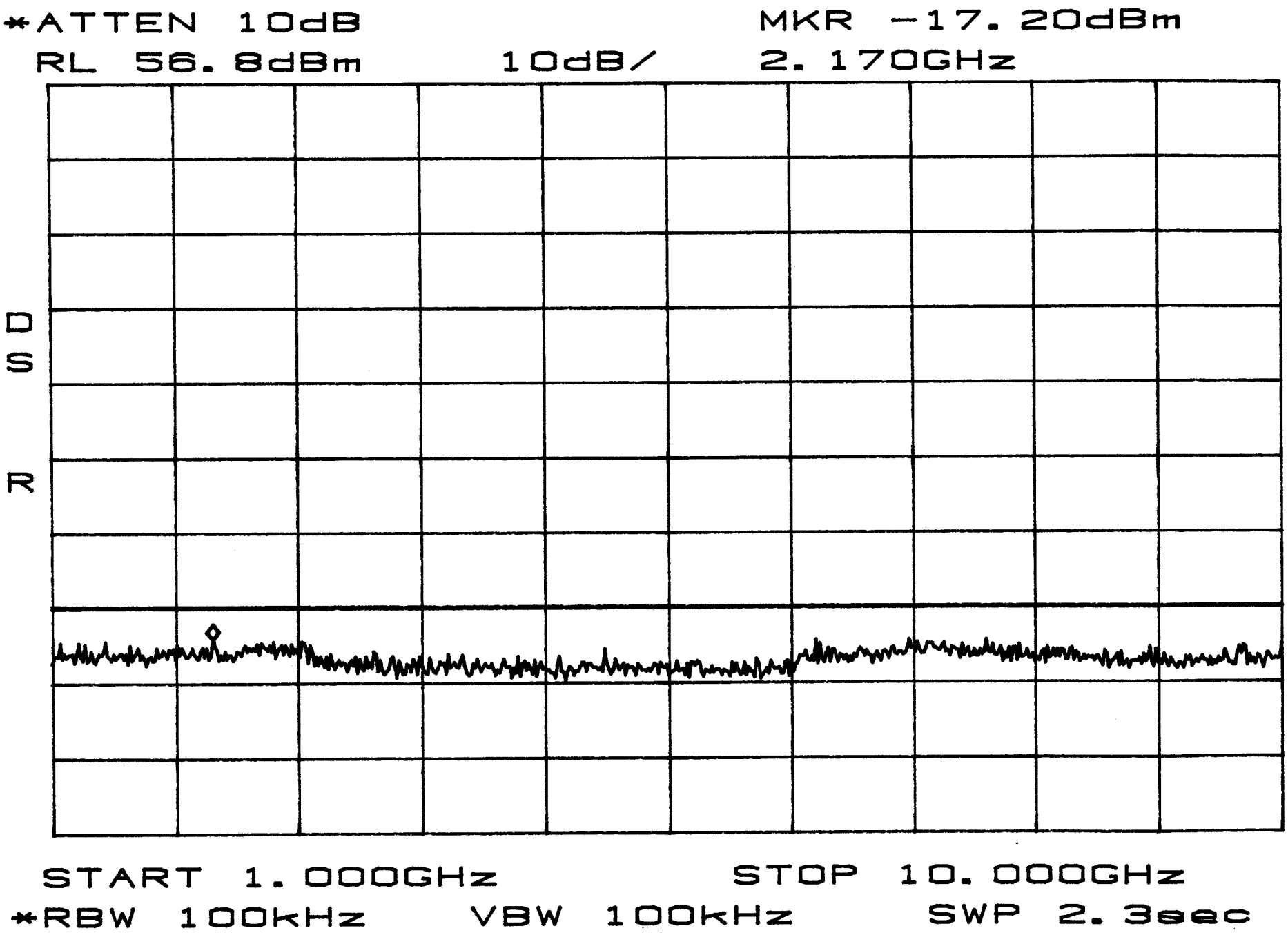
Intermodulation BAND B
Apart
TDMA



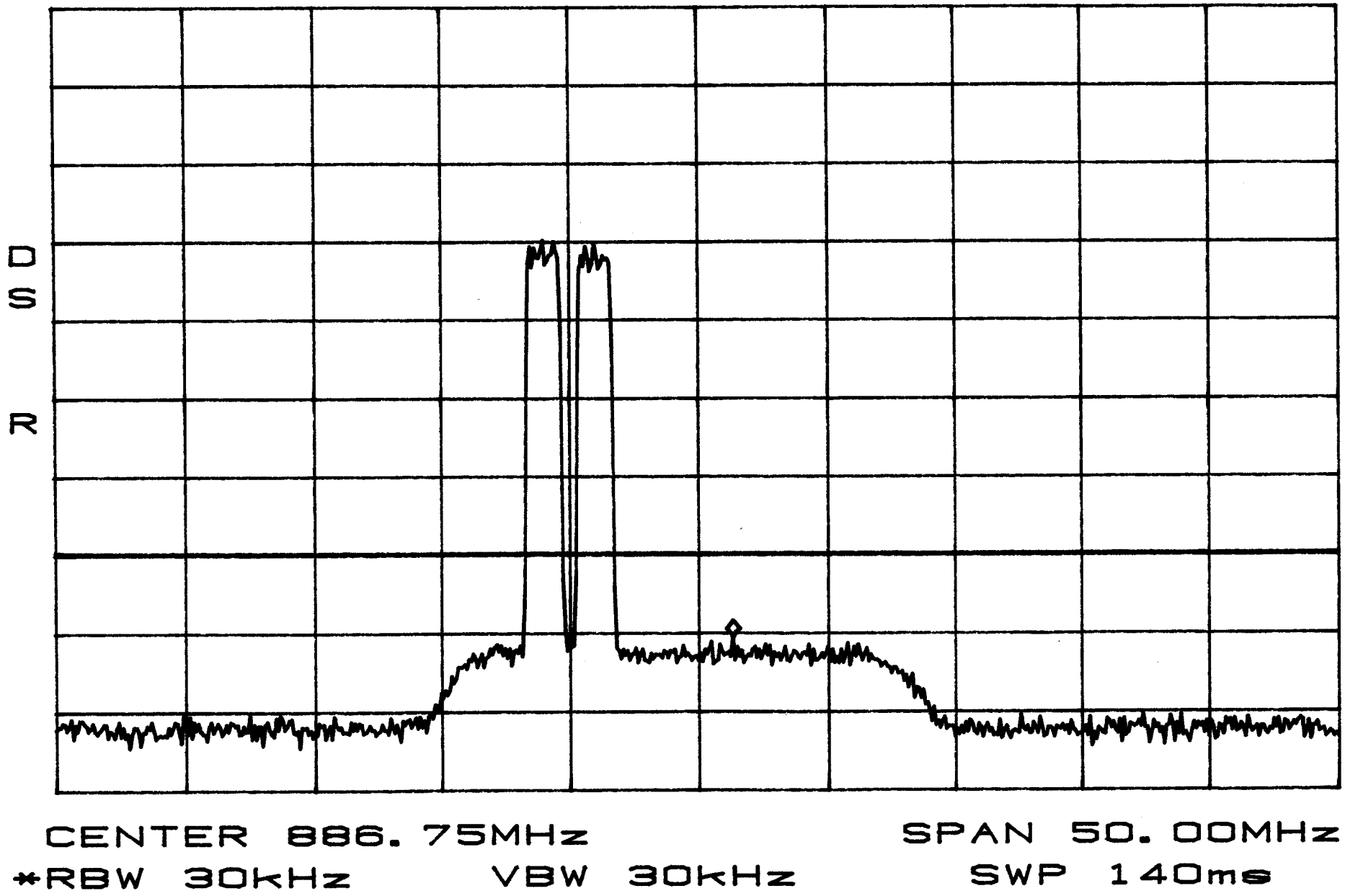
Intermodulation BAND B
Apart
TDMA



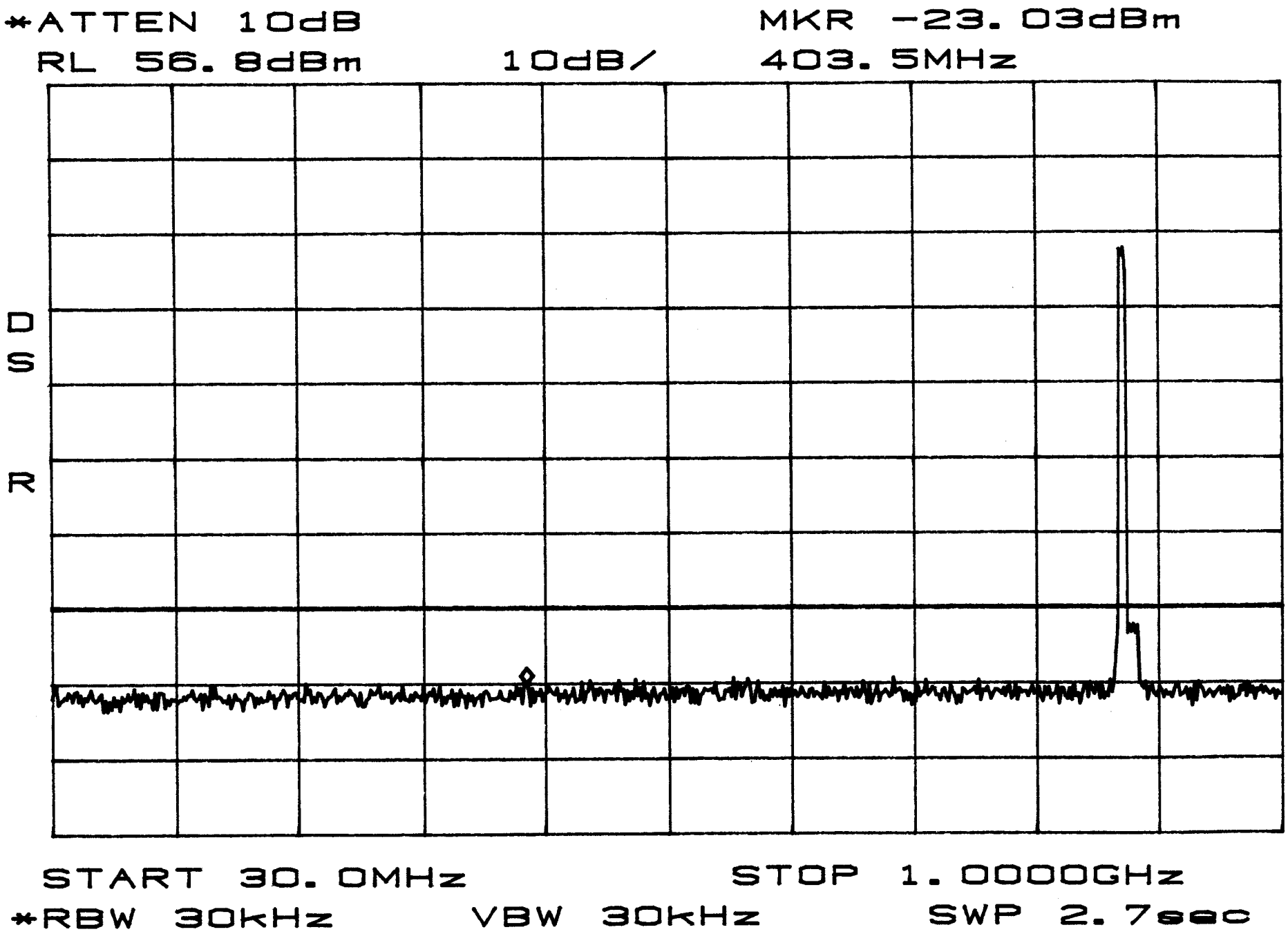
Intermodulation BAND B
Apart
TDMA



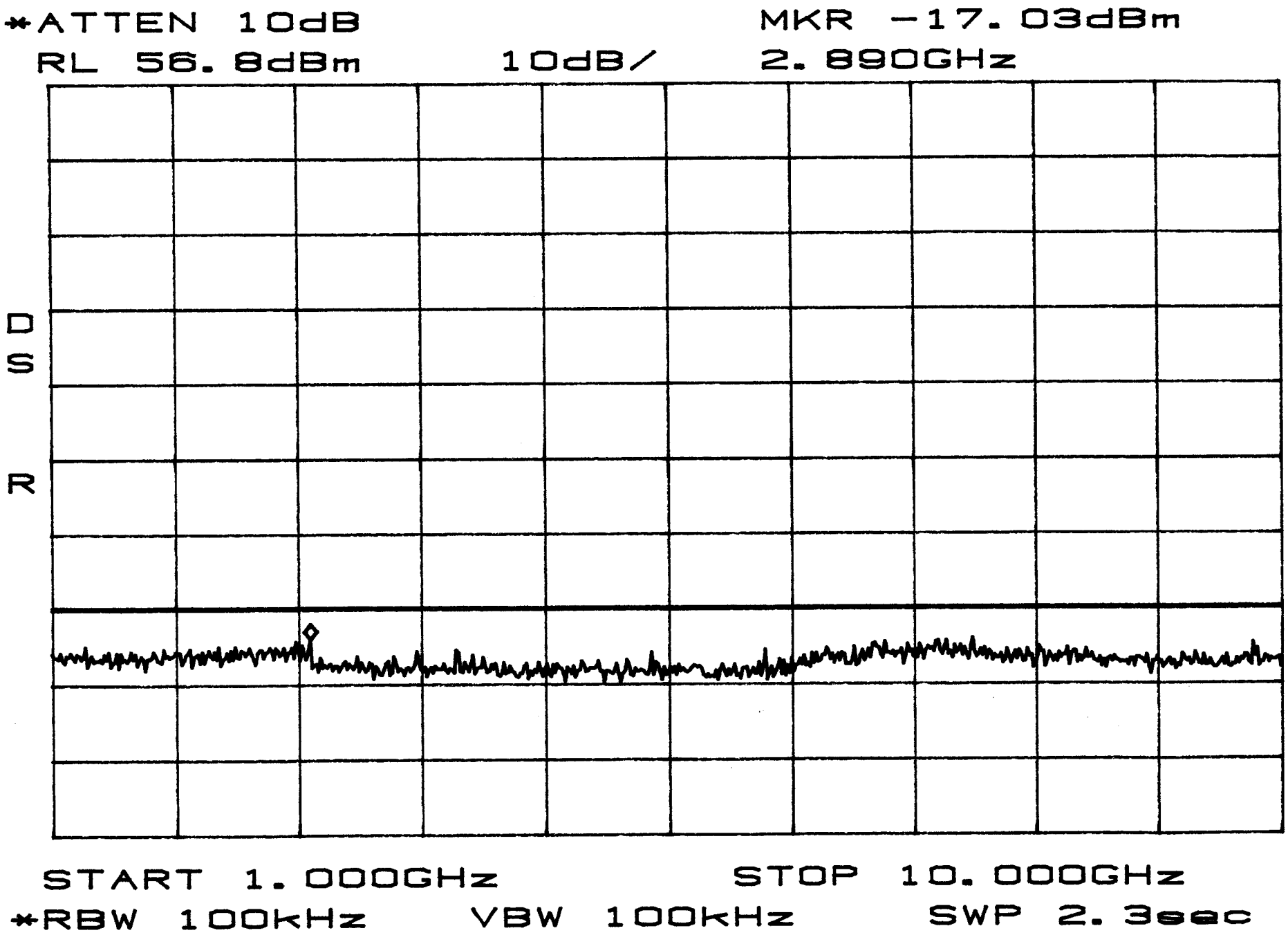
Intermodulation BAND B
Close
CDMA



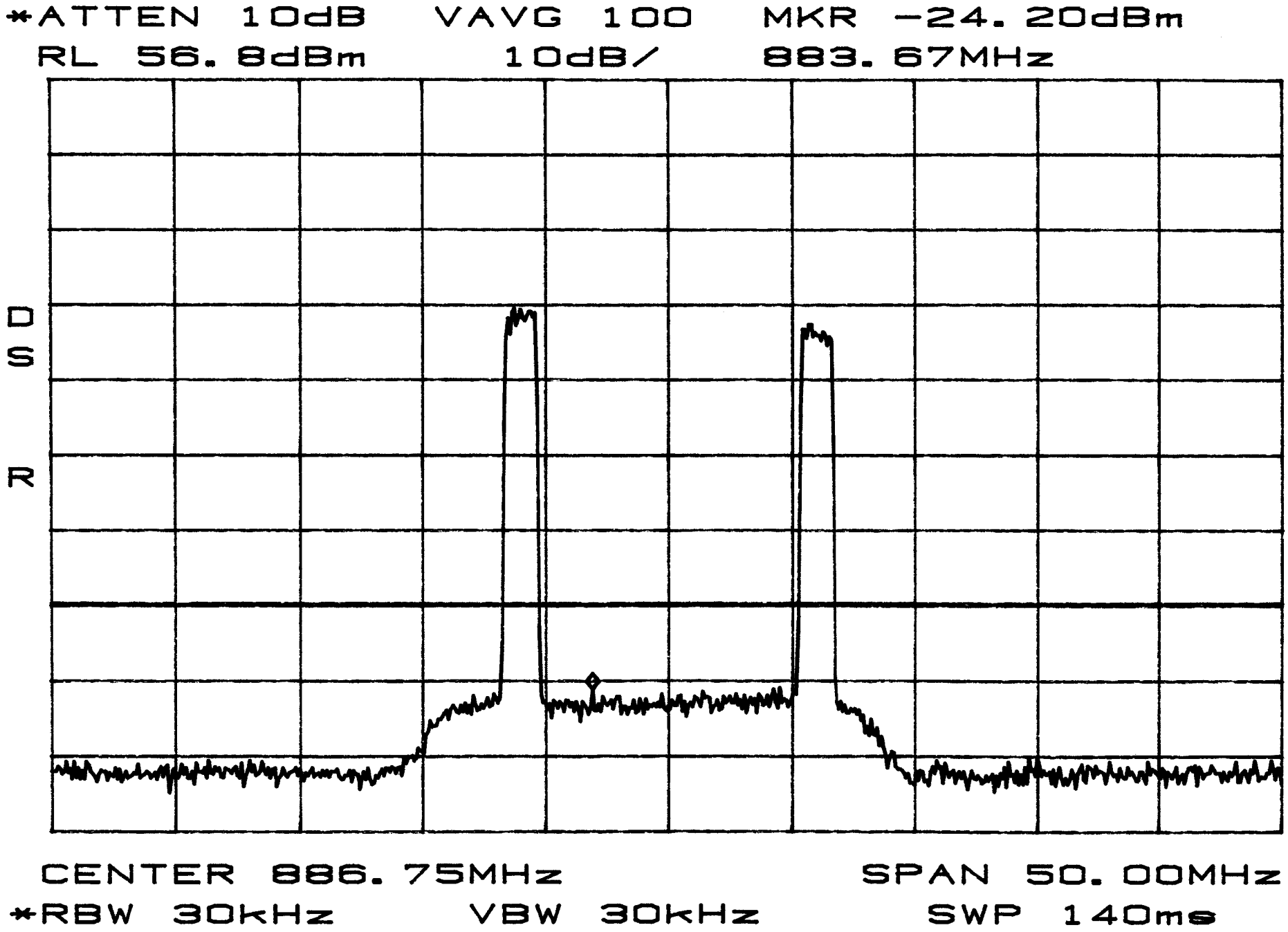
Intermodulation BAND B
Close
CDMA



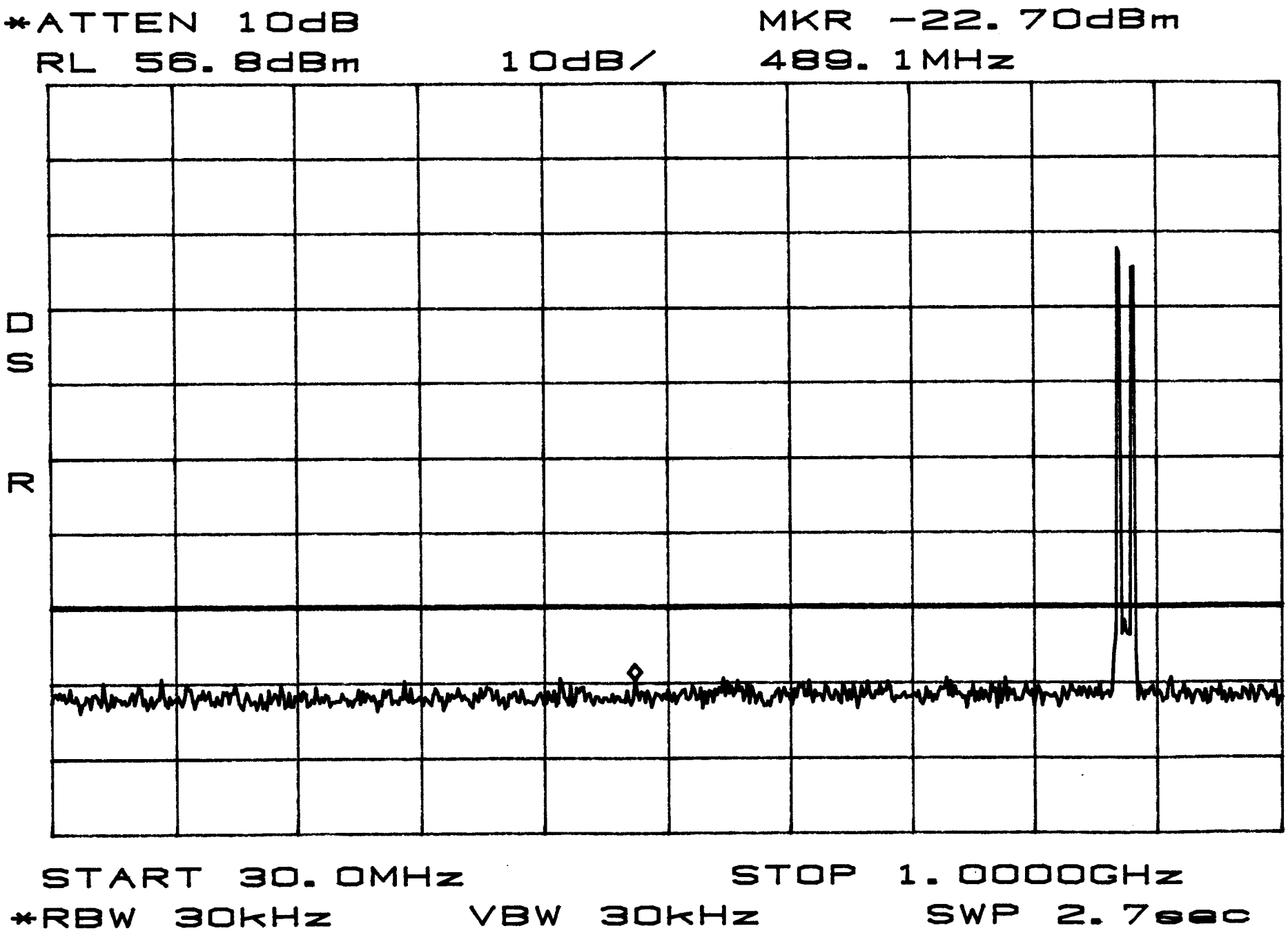
Intermodulation BAND B
Close
CDMA



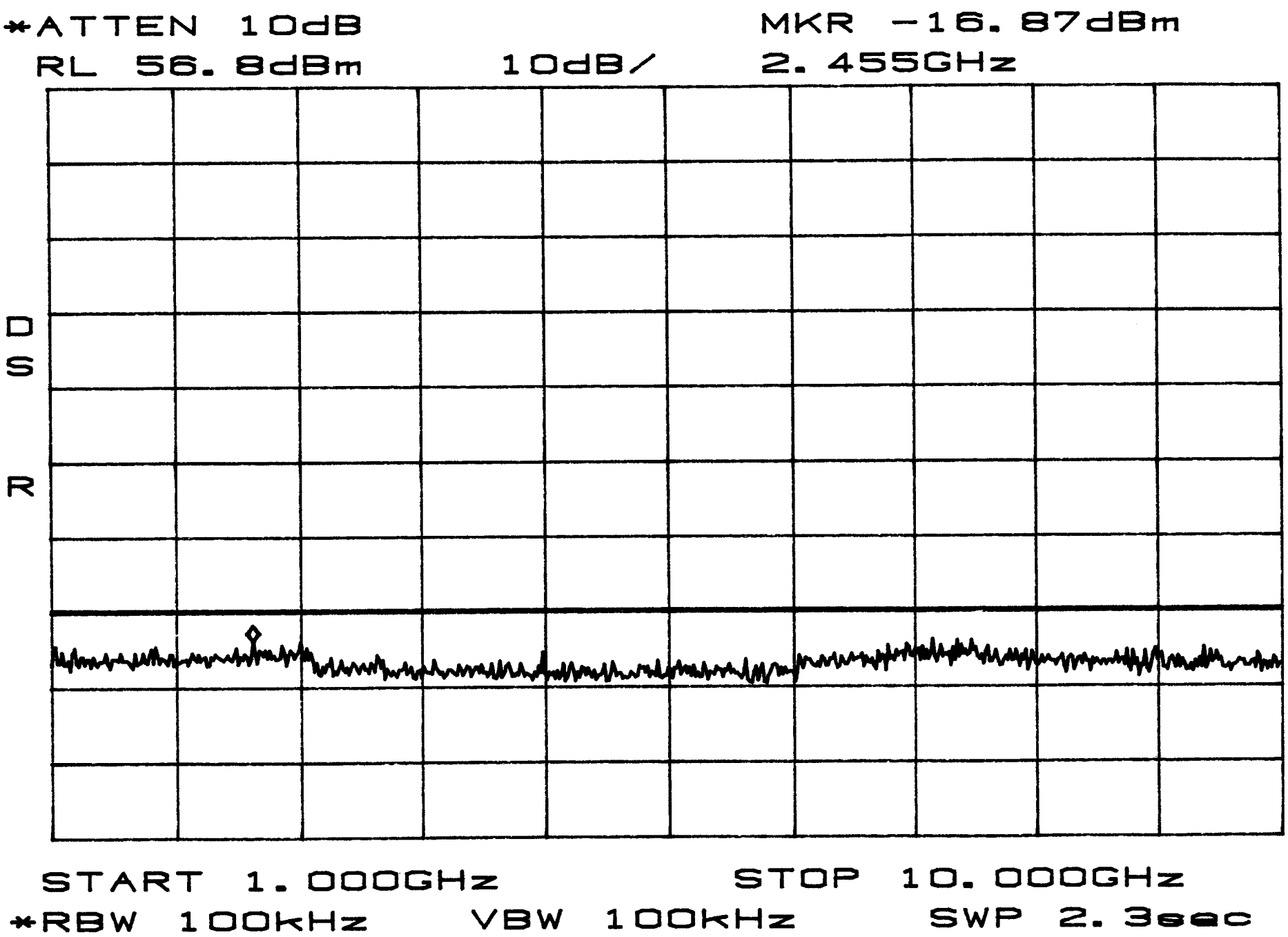
Intermodulation BAND B
Apart
CDMA



Intermodulation BAND B
Apart
CDMA



Intermodulation BAND B
Apart
CDMA



CDMA Mask Test for ADC Inc.
Digivance Long Range Coverage System
Model Numbers DGVL-112110SYS and DGVL-122110SYS.

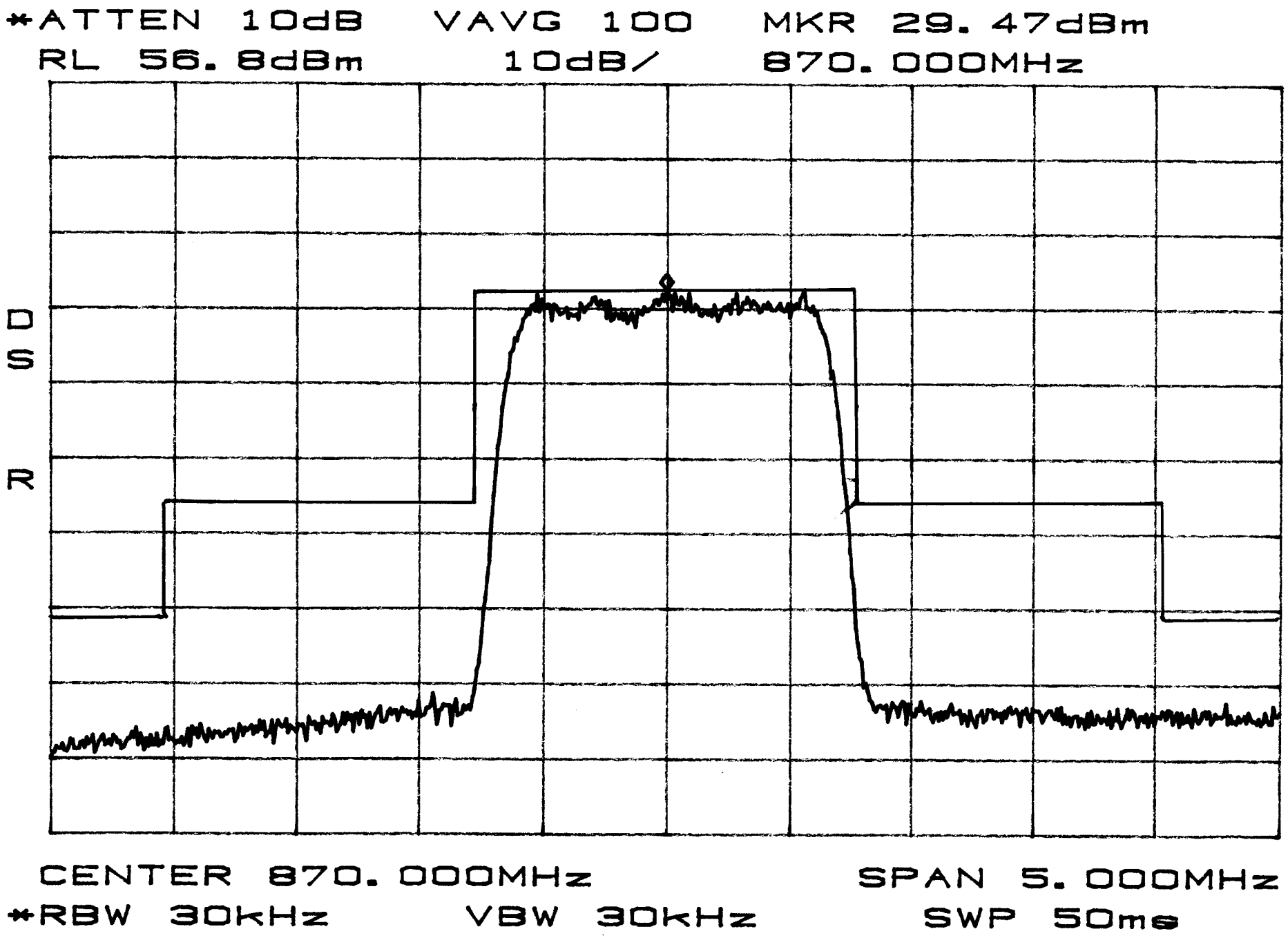
For the CDMA modulation type emission mask test, the average value of the center frequency will be 16.23dB down from the CW peak power. On any frequency removed from the center carrier frequency by up to 750 kHz the emissions are at or below 16.23dB below the peak power. On any frequency between 750 kHz and 1.98 MHz the emissions are below 45dB below the peak power. On any frequency removed from the carrier frequency by more than 1.98 MHz the emissions are below 60dB below the peak power. The test was performed at the low, mid, and high parts of the respective A and B Cellular bands.

Results:

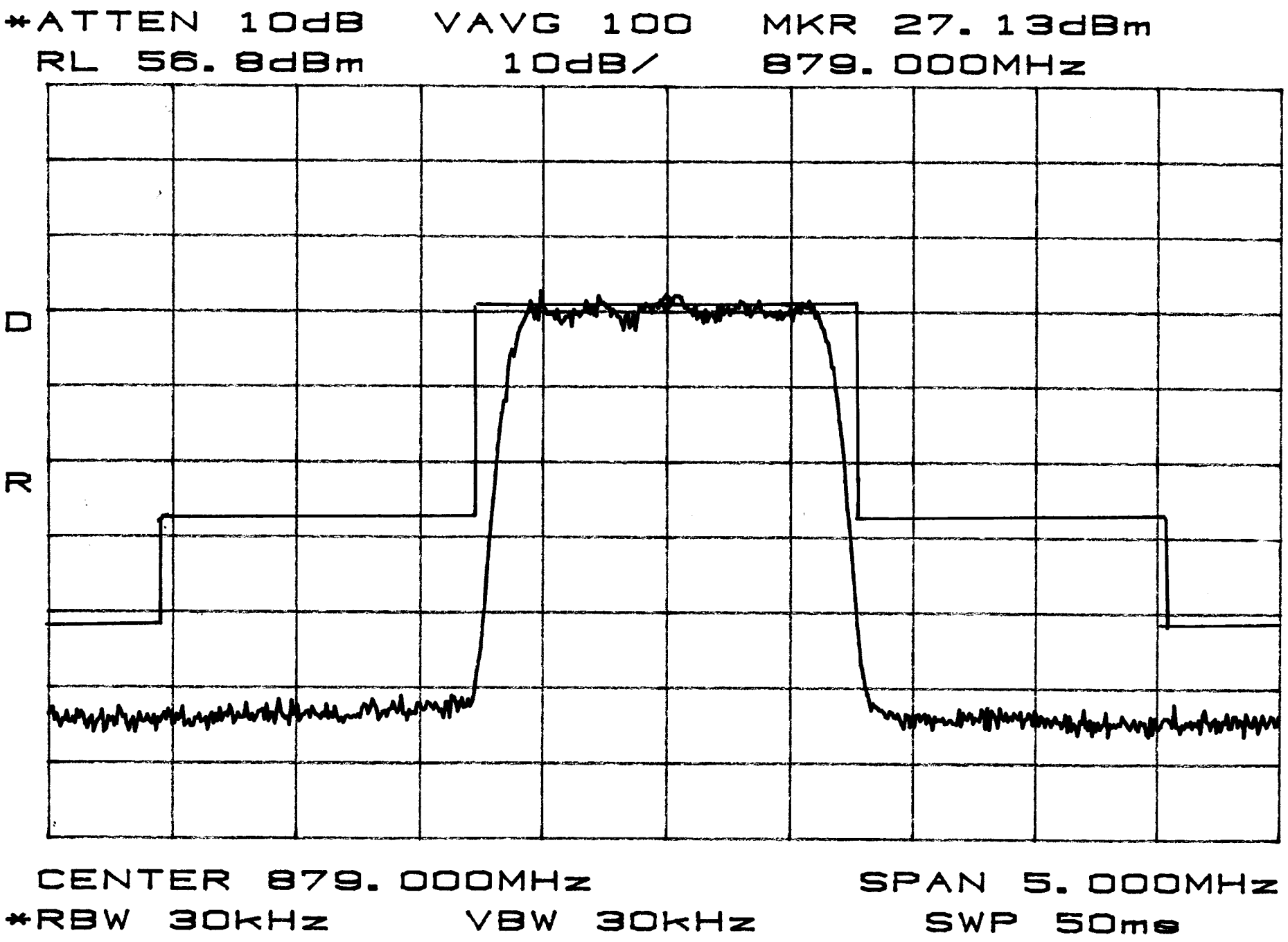
Pass (see plots)

CDMA MASK BAND A

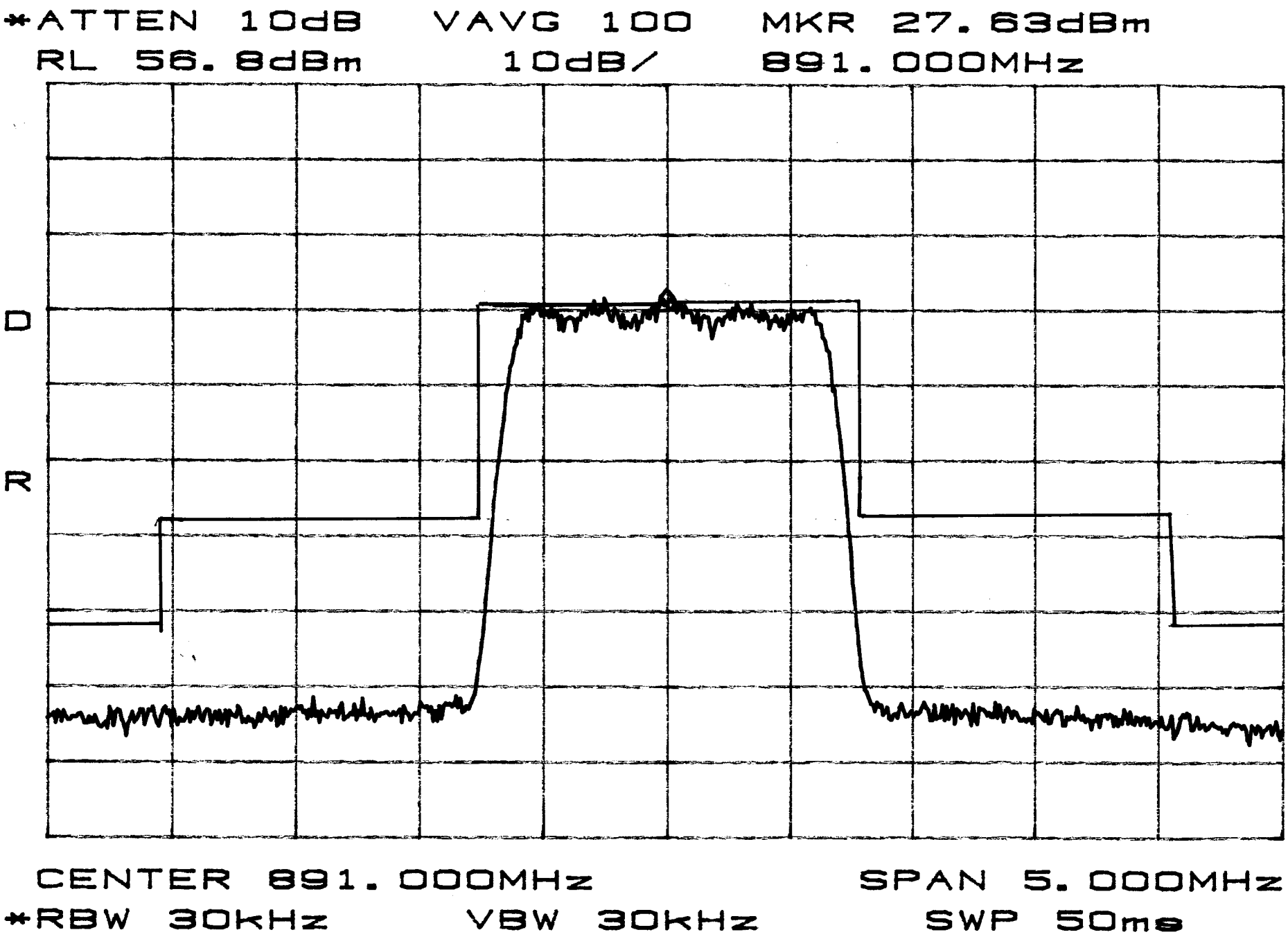
Low



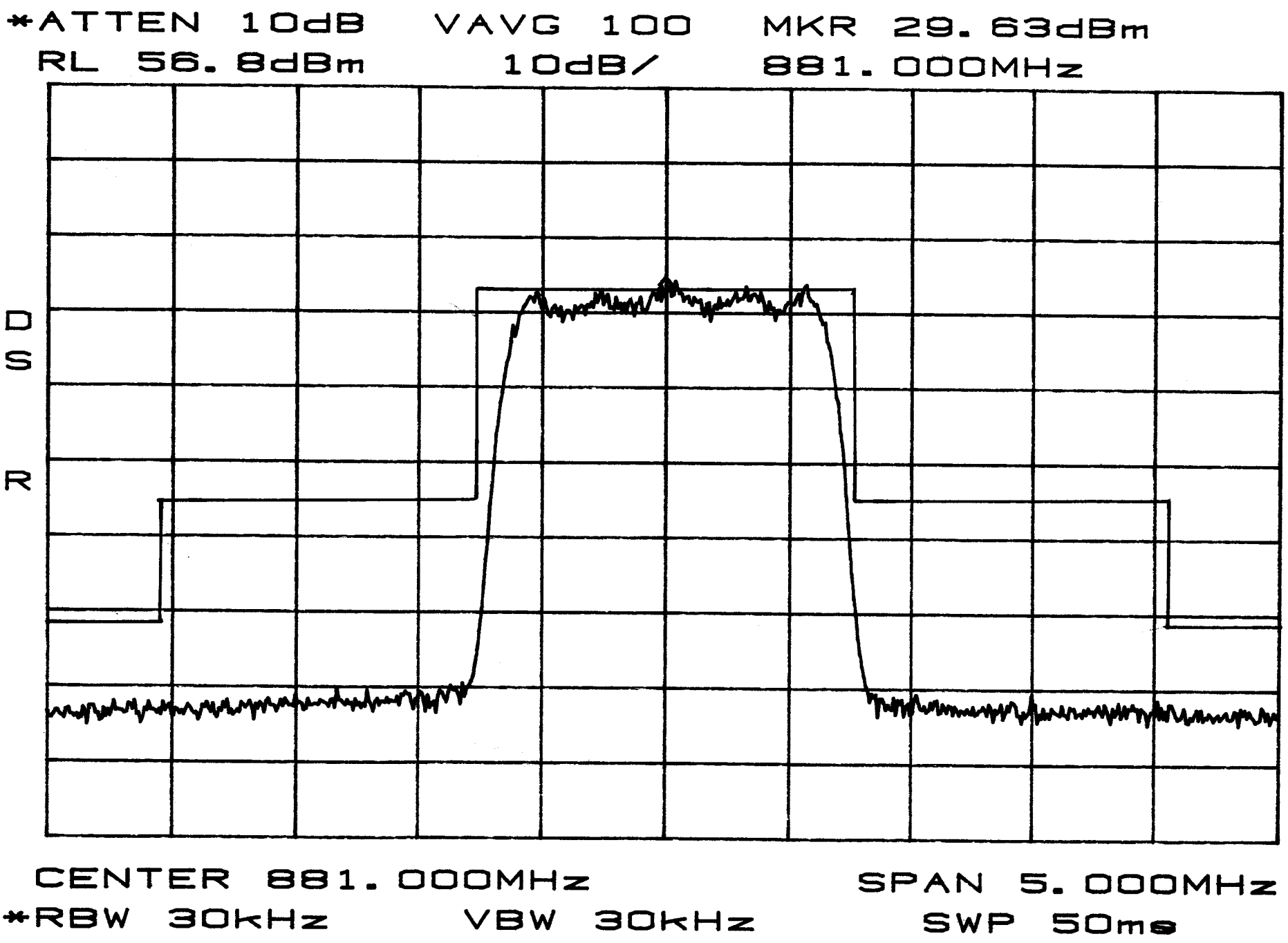
CDMA MASK BAND A
Mid



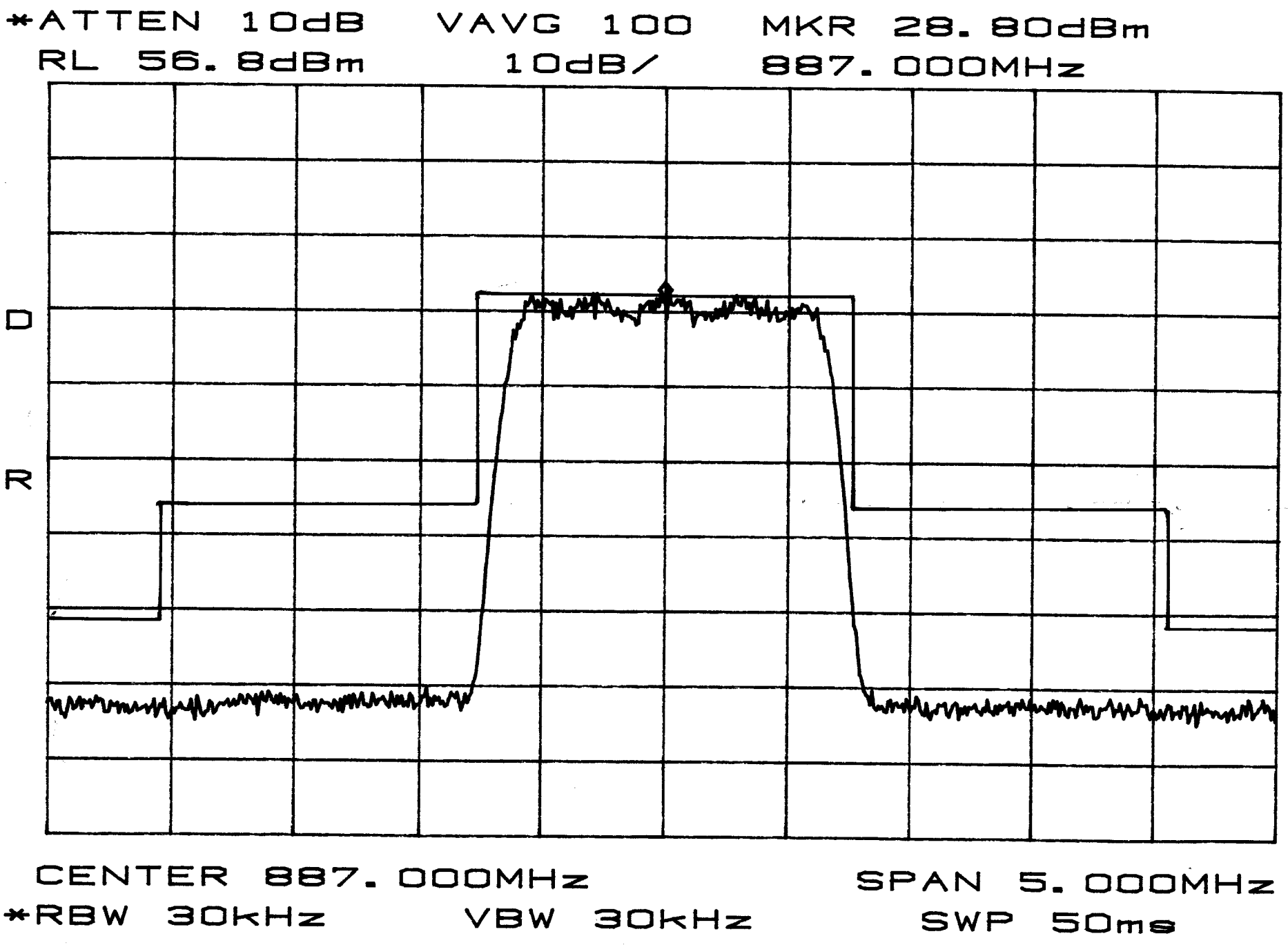
CDMA MASK BAND A
High



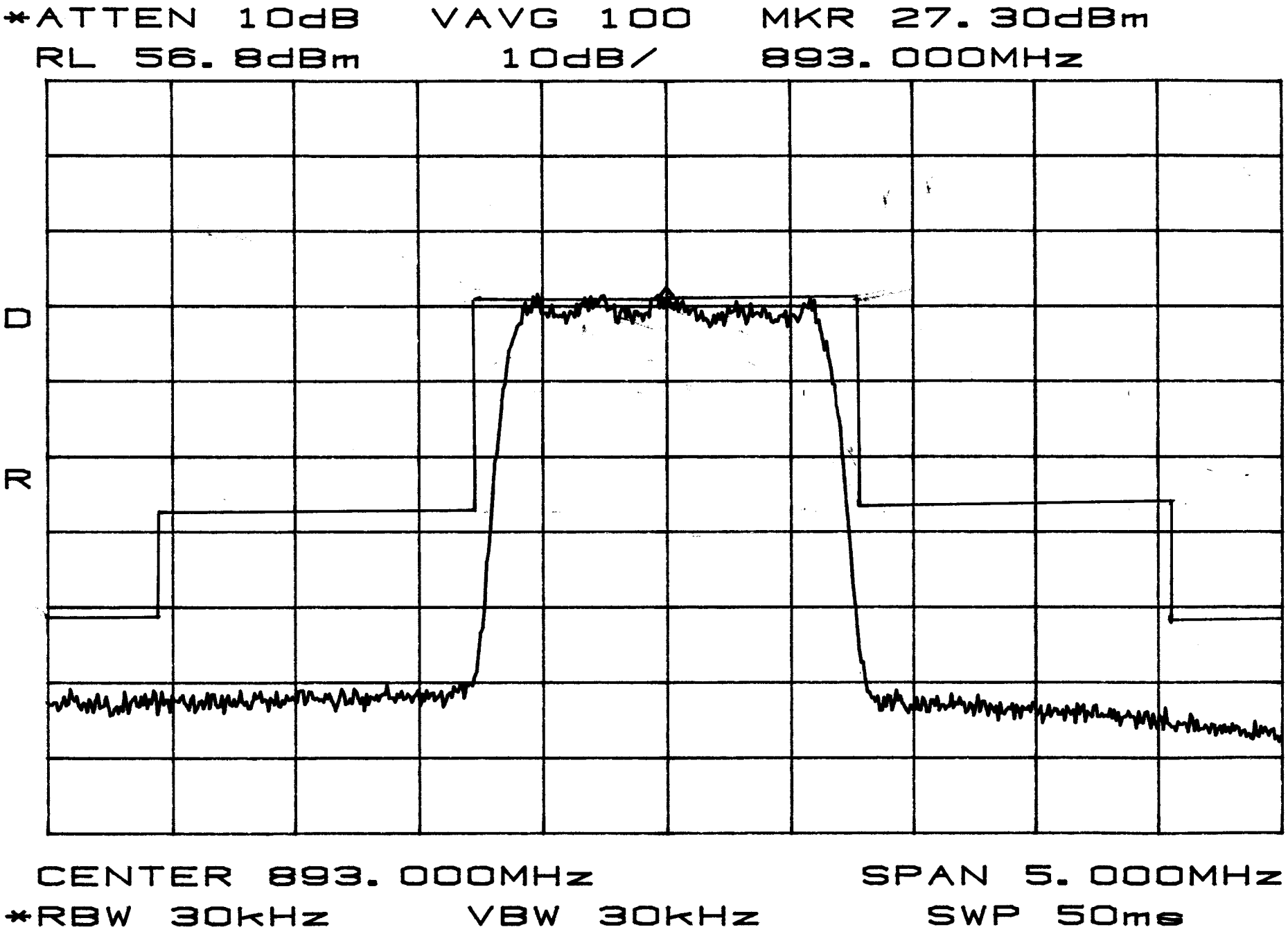
CDMA MASK BAND B
Low



CDMA MASK BAND B
Mid



CDMA MASK BAND B
High



Conducted Emission Limits Test for ADC Inc.
Digivance Long Range Coverage System
Model Numbers DGVL-112110SYS and DGVL-122110SYS.

The out of band emissions were measured directly from the EUT antenna output with a spectrum analyzer from 30 MHz to the 10^{th} harmonic of the highest carrier frequency. Test signals used: CW, FM (1 kHz @ 8 kHz deviation), TDMA, and CDMA. The different signals were input one at a time to the EUT. In all cases, the out of band emissions were less than –13dBm from the equation

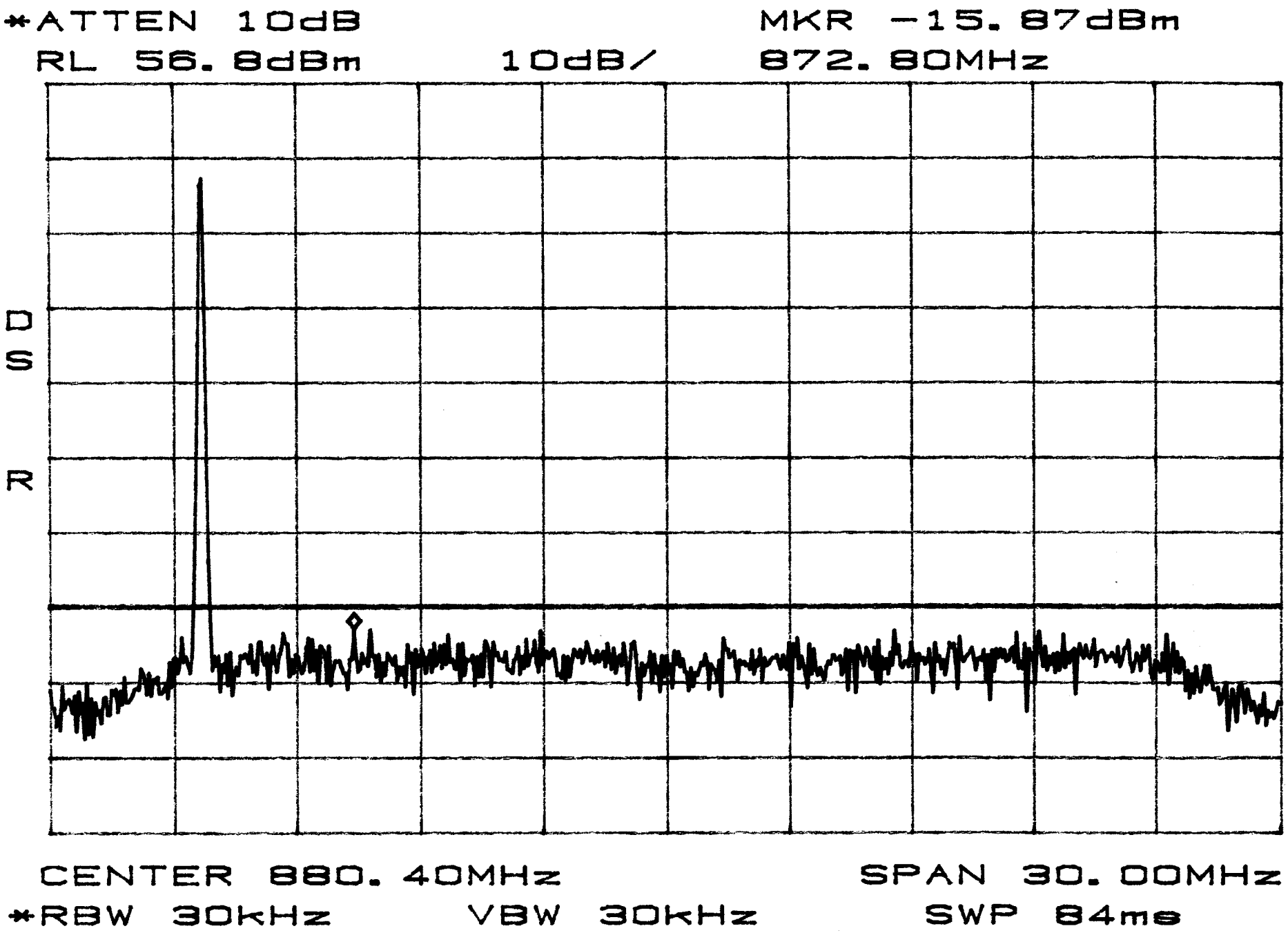
$$(19\text{dBm} - [43 + 10\log(0.08\text{W})])$$

Band edge compliance is also demonstrated using a FM signal at the upper and lower limits of the band and a resolution bandwidth of 300 Hz.

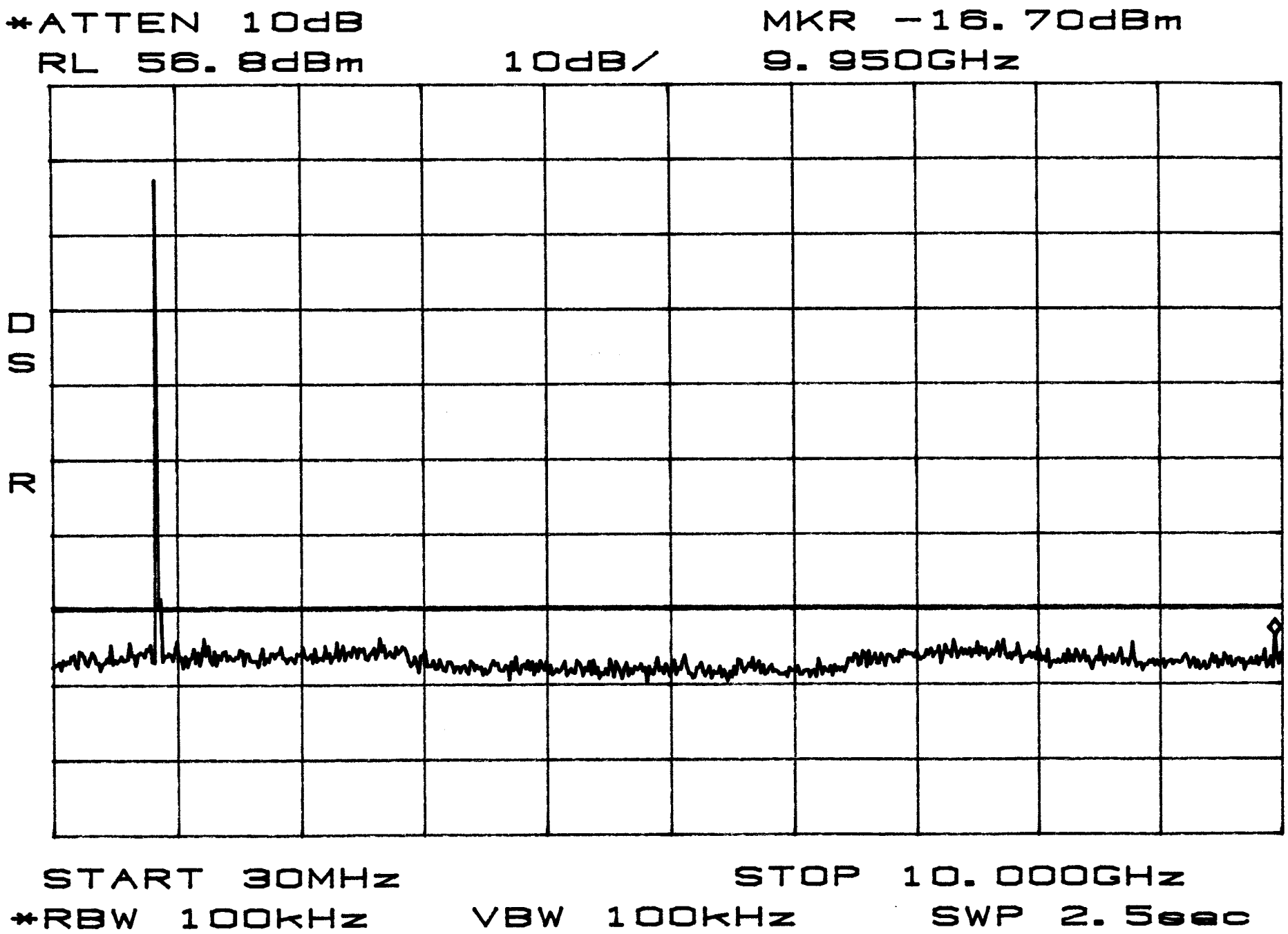
Results:

Pass (see plots)

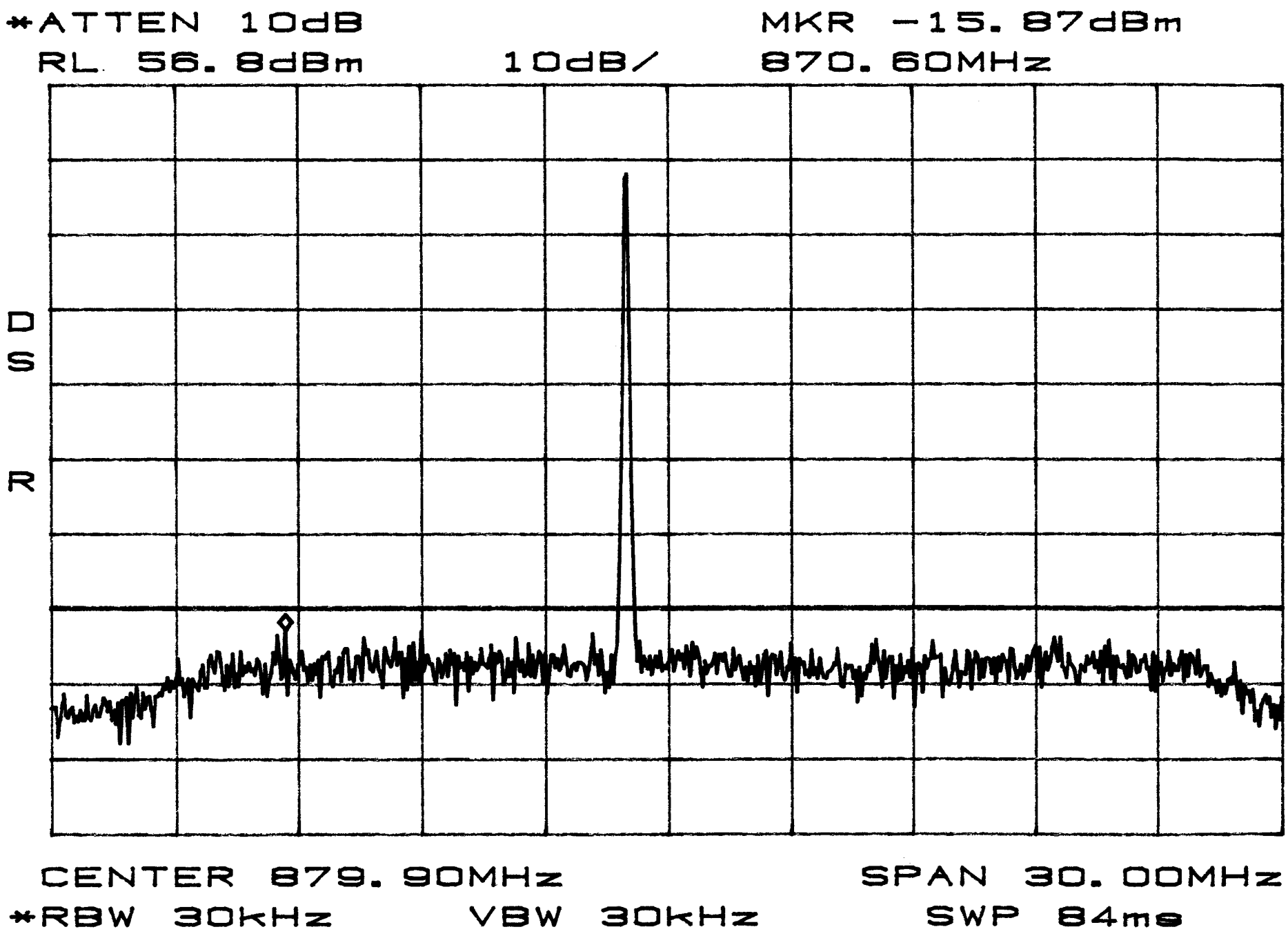
Conducted Emissions Band A
Low



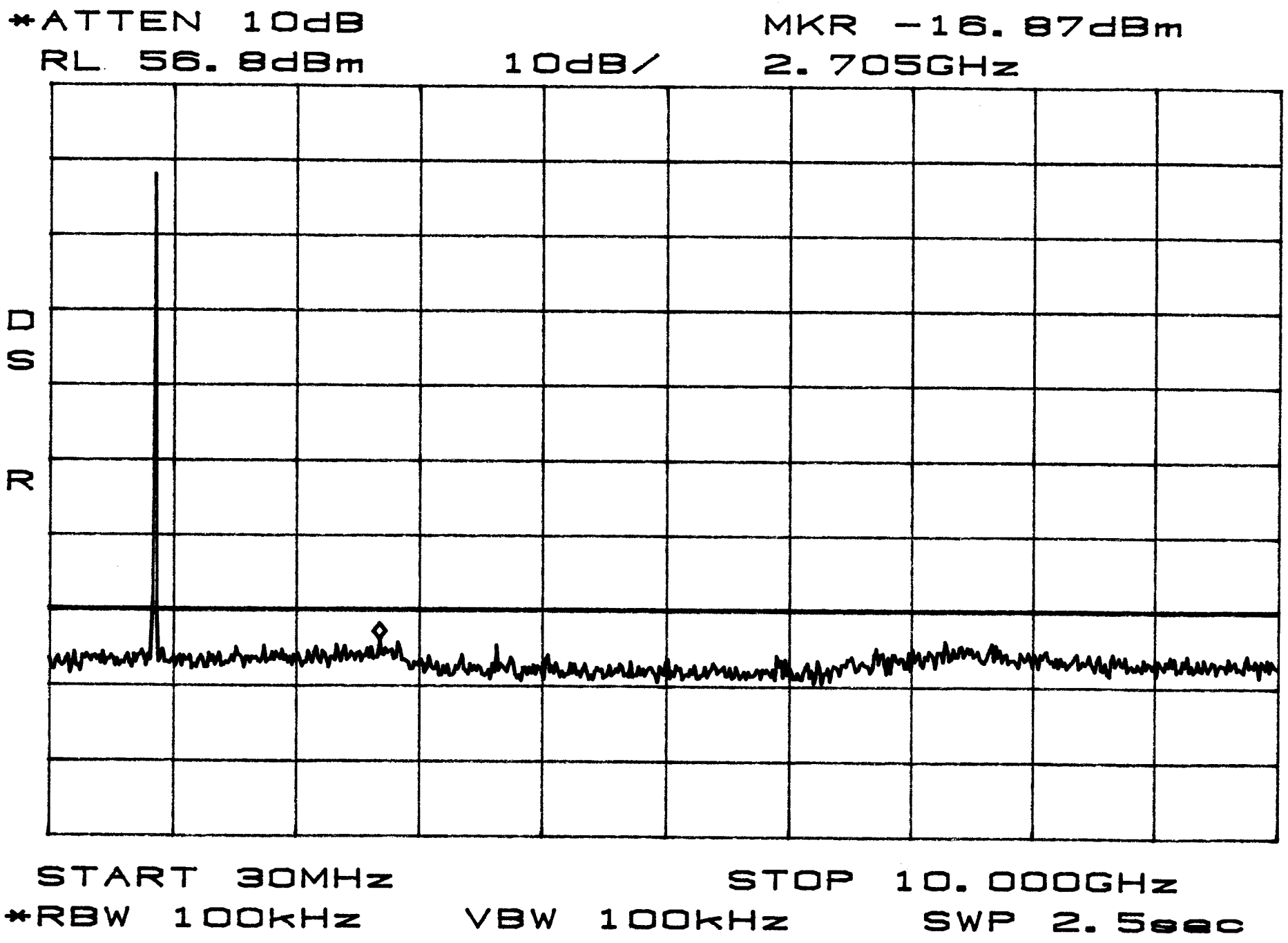
Conducted Emissions Band A
Low



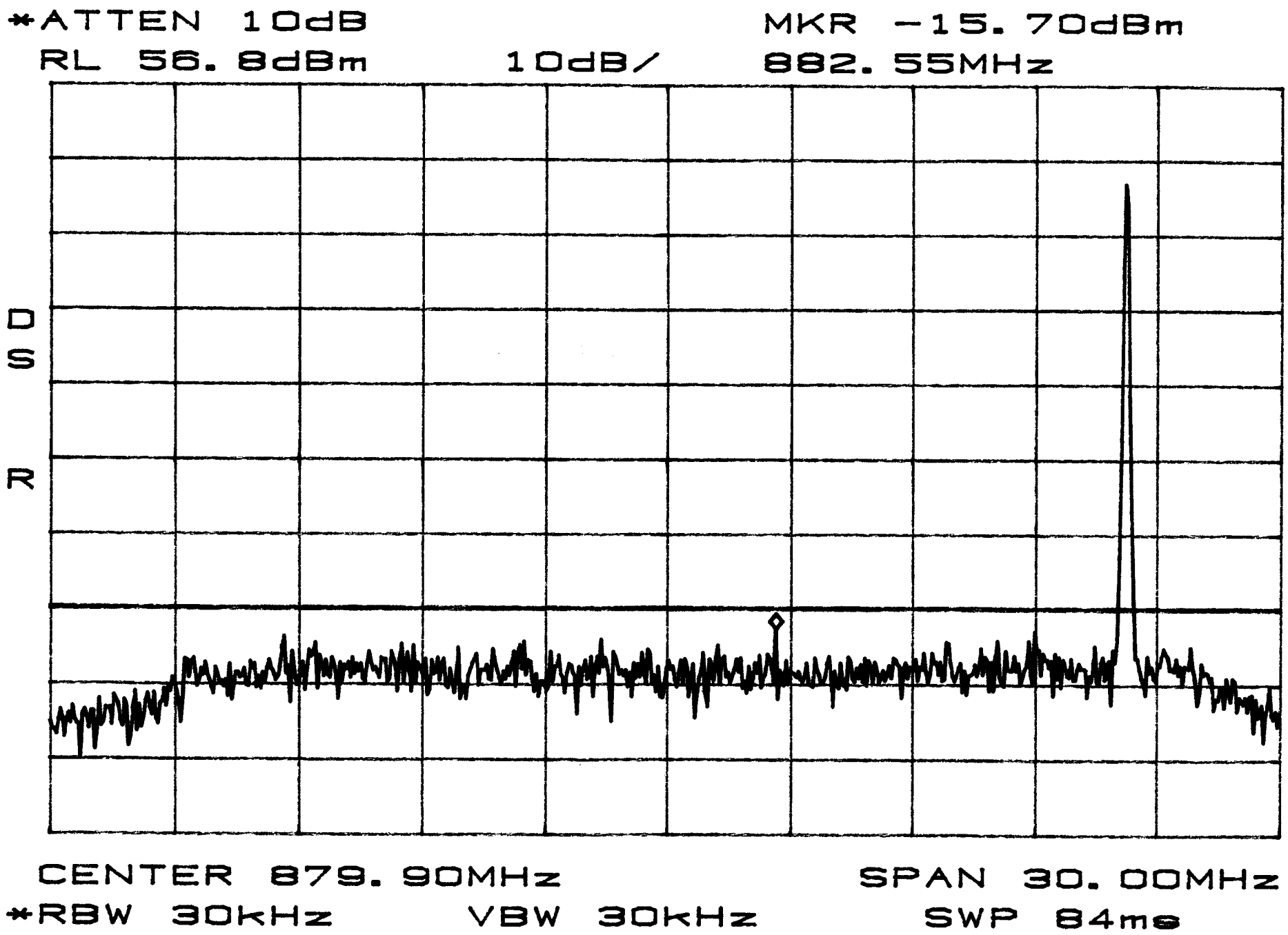
Conducted Emissions Band A
Mid



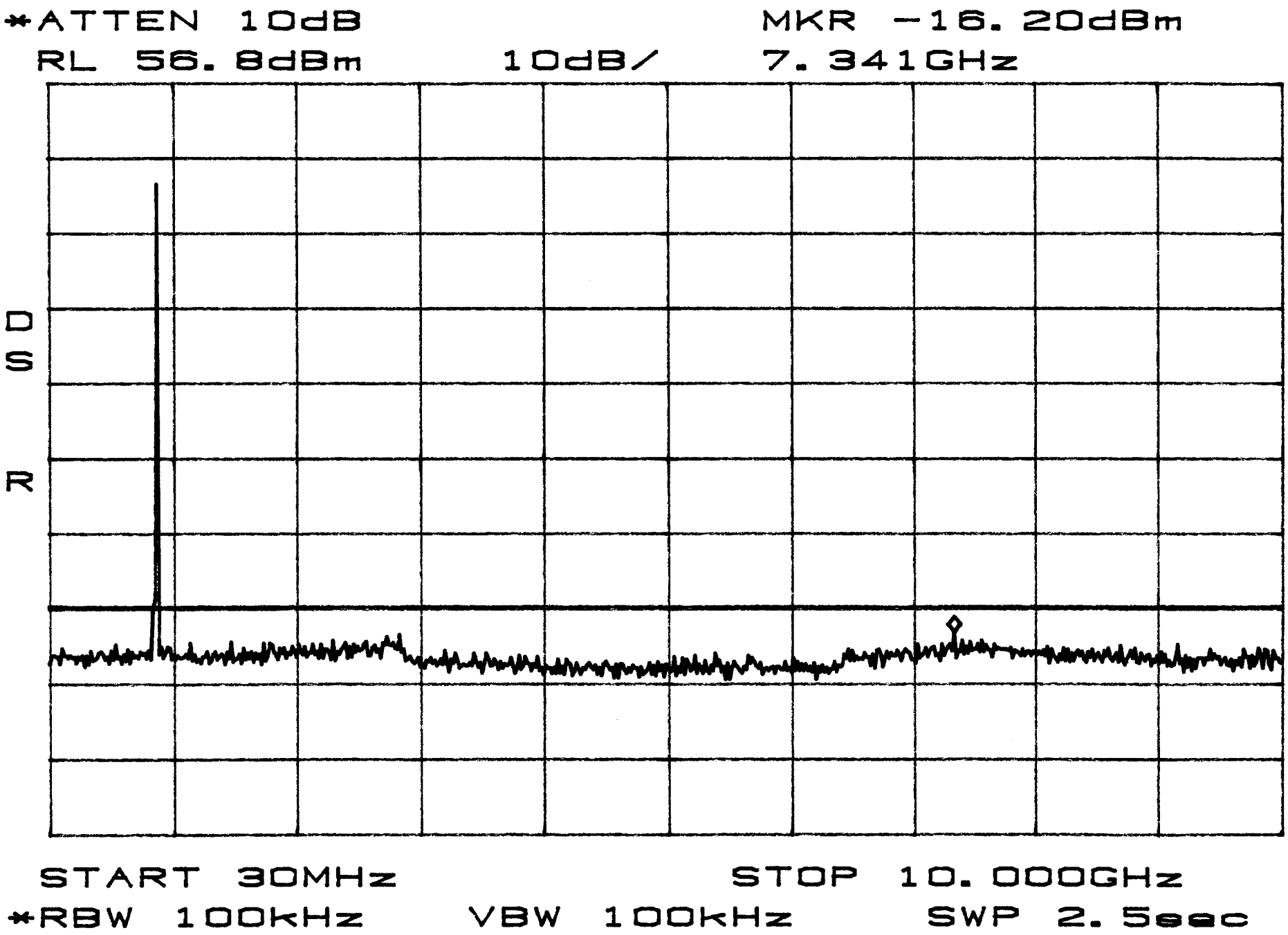
Conducted Emissions Band A
Mid



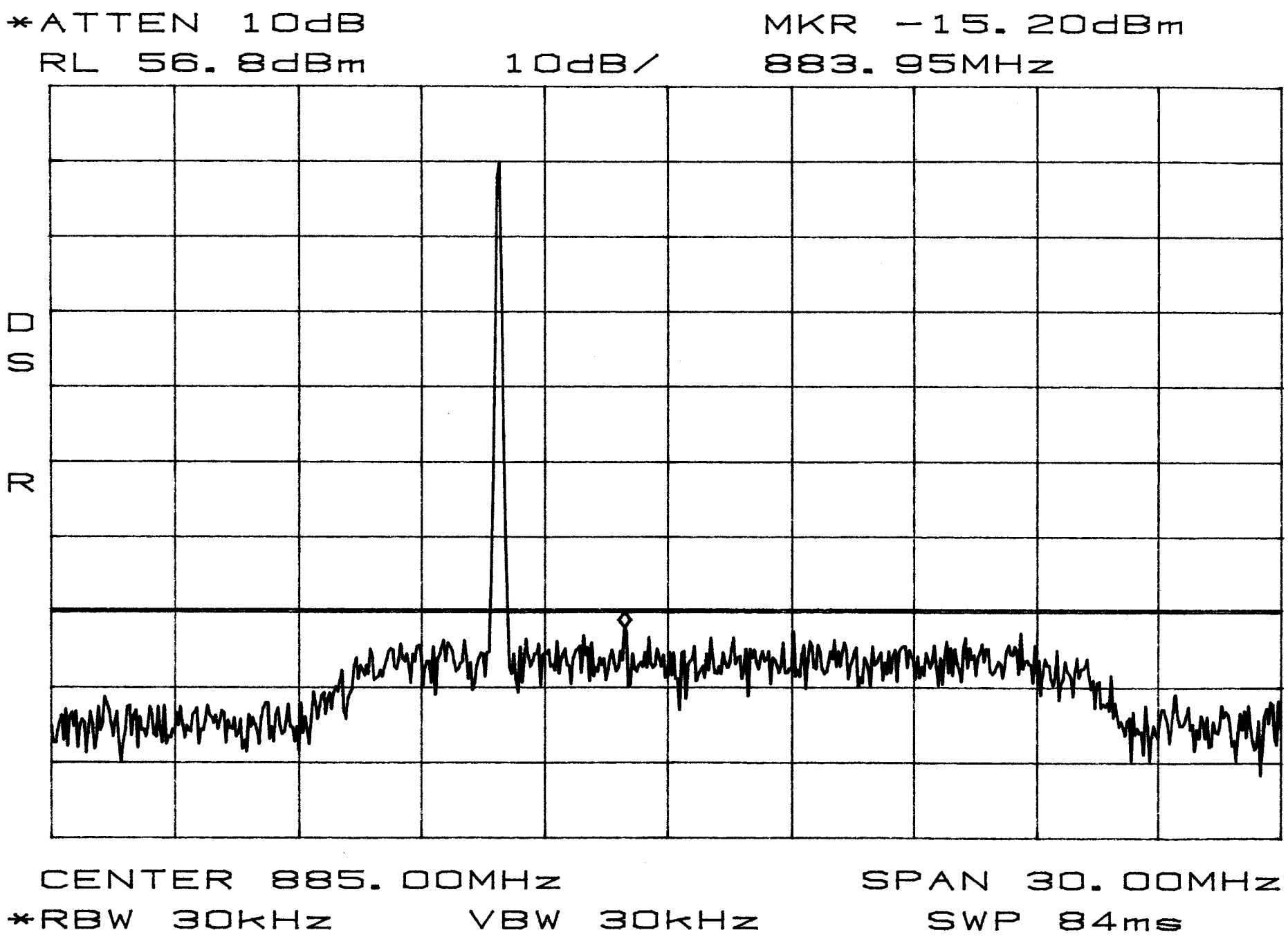
Conducted Emissions Band A
High



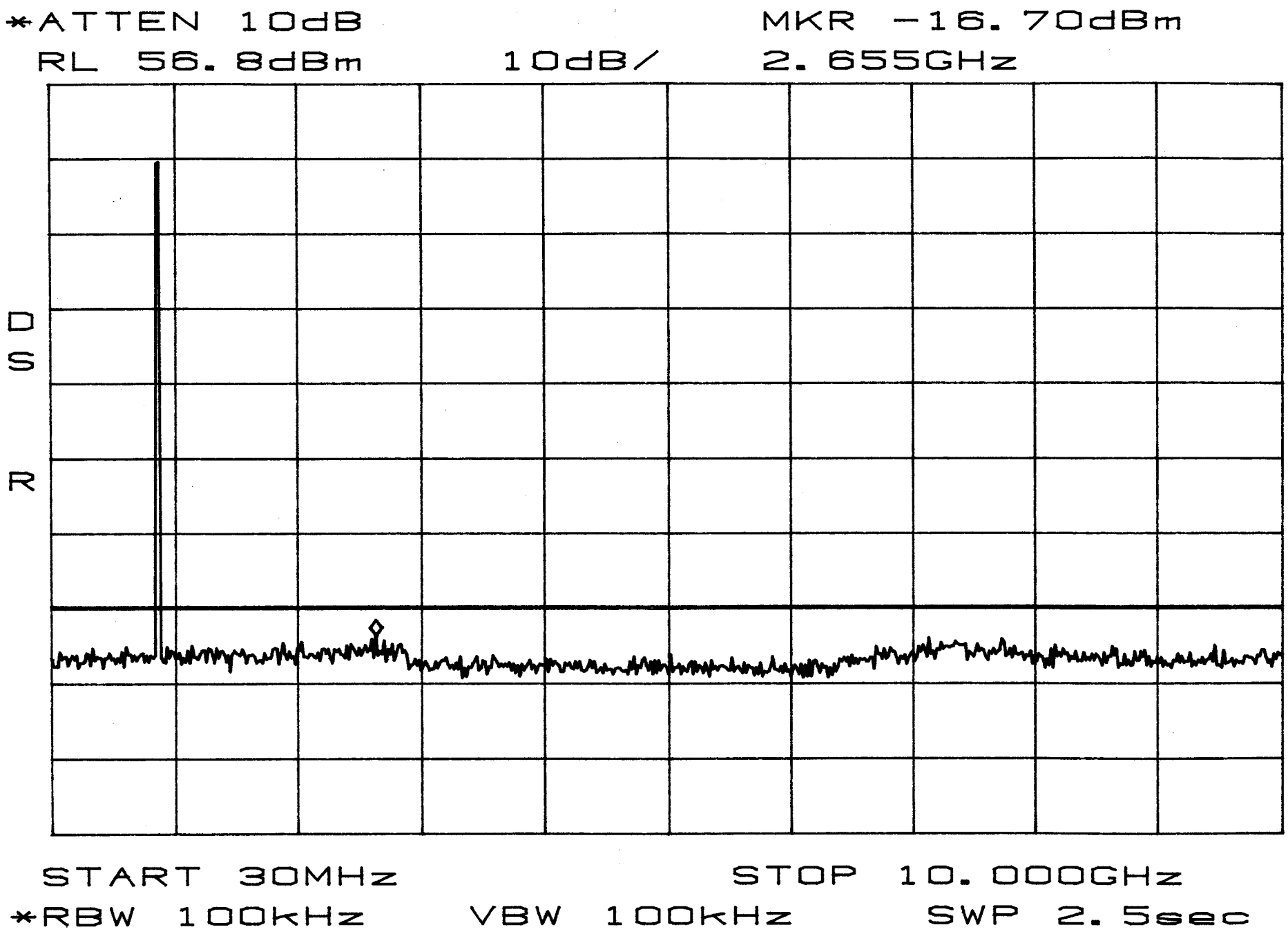
Conducted Emissions Band A
High



Conducted Emissions Band B
Low



Conducted Emissions Band B
Low



Conducted Emissions Band B
Mid