TEST RESULT SUMMARY

FCC PART 22 SUBPART H
Class II Permissive Change

MANUFACTURER'S NAME	ADC Inc.
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	NC302675
TEST DATE	05 June 2003

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: 17 June 2003

Location: Taylors Falls MN USA

T. K. Swanson
Technical Writer/Technician

J. T. Schneider
Tested By

Not Transferable

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

Test Report File No.	:	**NC302675** Date of issue: 17 June 2003
Model No.	:	**DGVL-112110SYS** **DGVL-122110SYS**
Product Type	:	Digivance Long Range Coverage Solution 800 MHz System (A and B Band)
Applicant	:	ADC Inc.
Manufacturer	:	ADC Inc.
License holder	:	ADC Inc.
Address	:	PO Box 1101
	:	Minneapolis MN 55440
Test Result	:	■ **Positive** ☐ **Negative**
Test Project Number Reference(s)	:	**NC302675**
Total pages including Appendices		58

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

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 – Class II Permissive Change

☐ - 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

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Environmental conditions in the lab:

	Actual
Temperature	: 22 °C
Relative Humidity	: 50 %
Atmospheric pressure	: 98.5 kPa
Power supply system	: 60 Hz - 115 V - 1-phase

Sign Explanations:

☐ - not applicable
■ - applicable

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22.355 Frequency tolerance

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

☐ - ADC facility

■ - Test Not Applicable for Class II Permissive Change

22.913 Effective Radiated Power Limit

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

☐ - Test not applicable

☐ - ADC facility

■ - Test Not Applicable for Class II Permissive Change

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:

■ - ADC facility

See Following Pages

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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

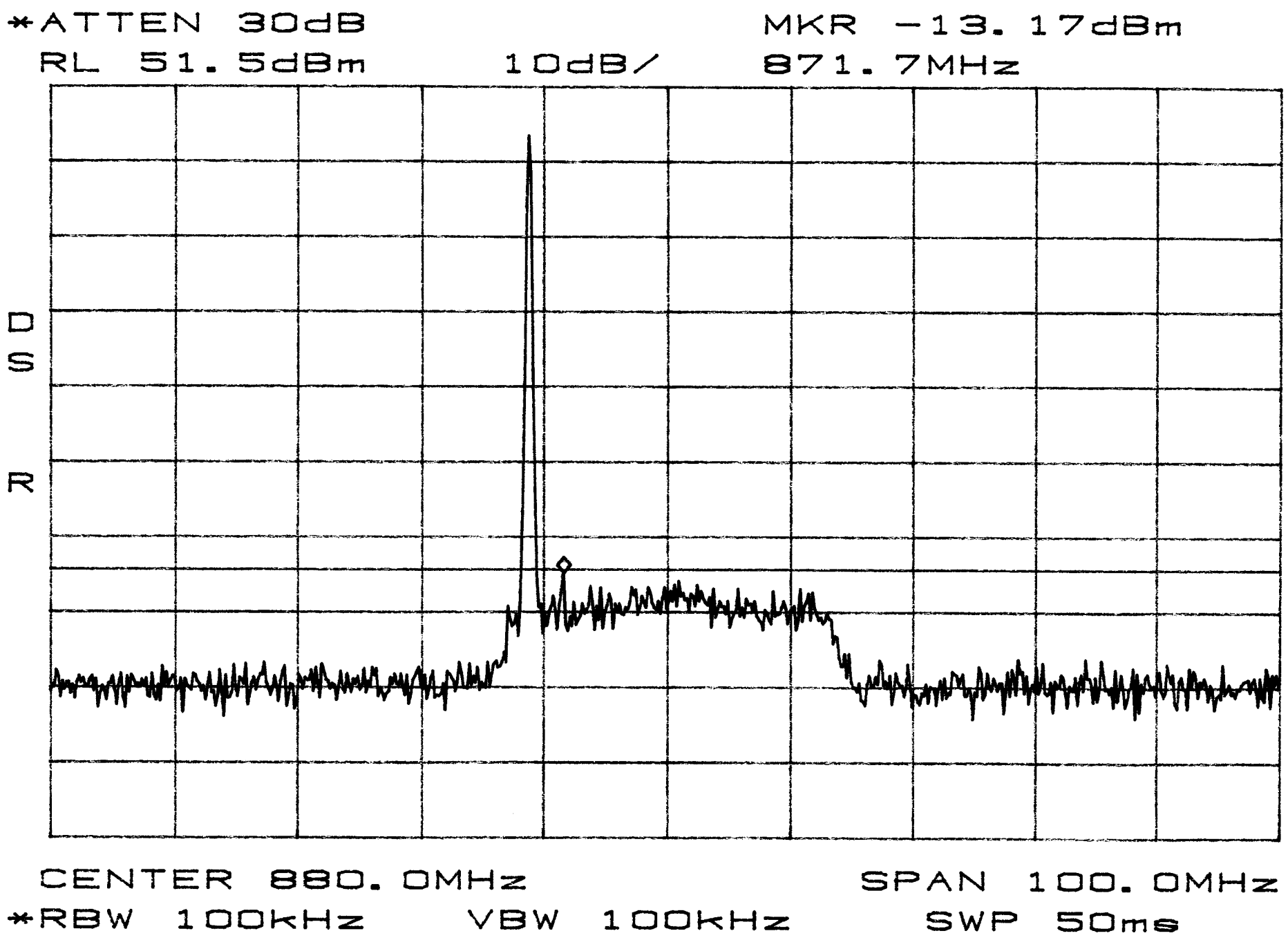
$$(19\text{dBm} - [43 + 10\log(0.08\text{W})])$$

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.

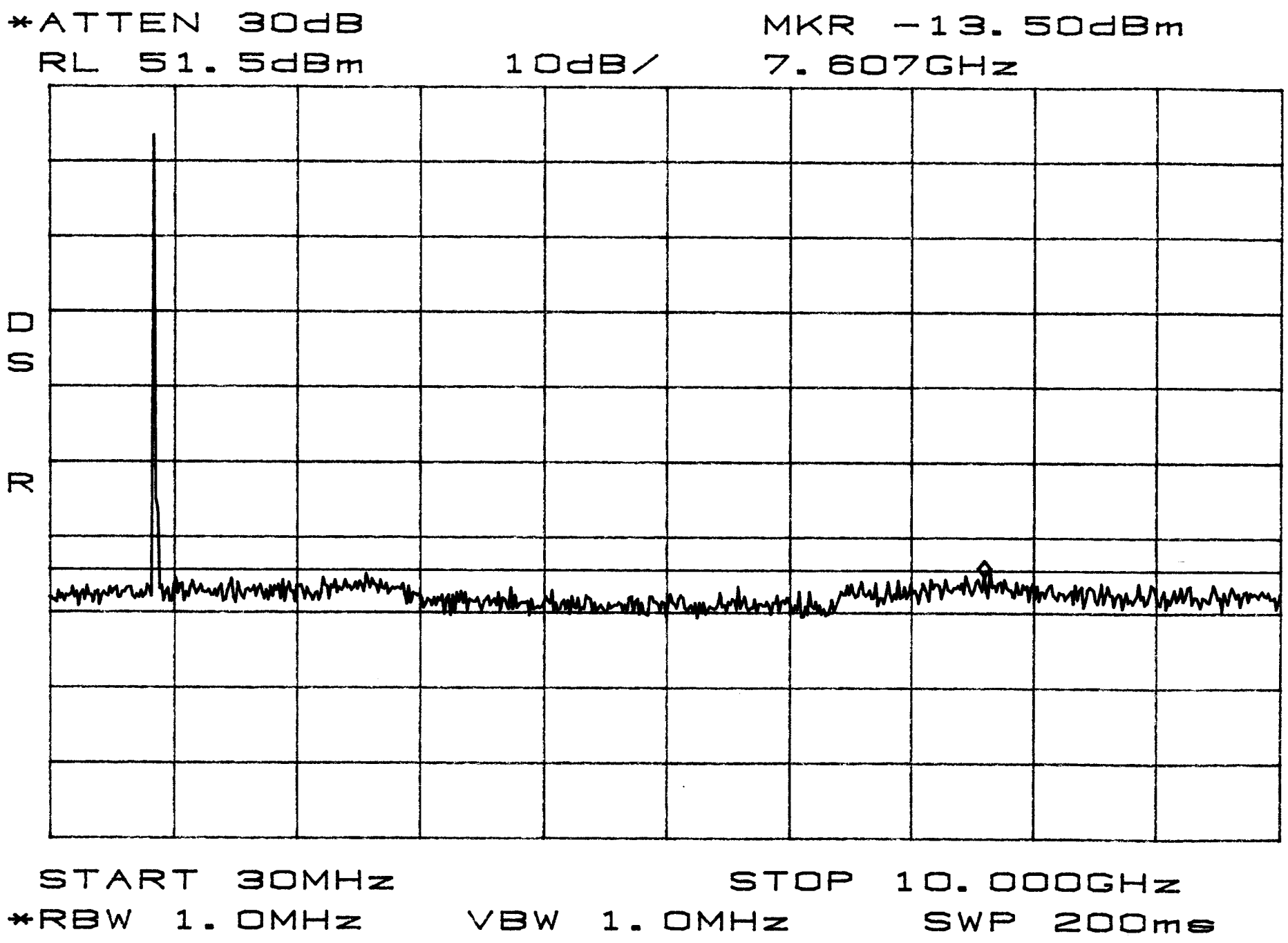
Results:

Pass (see plots)

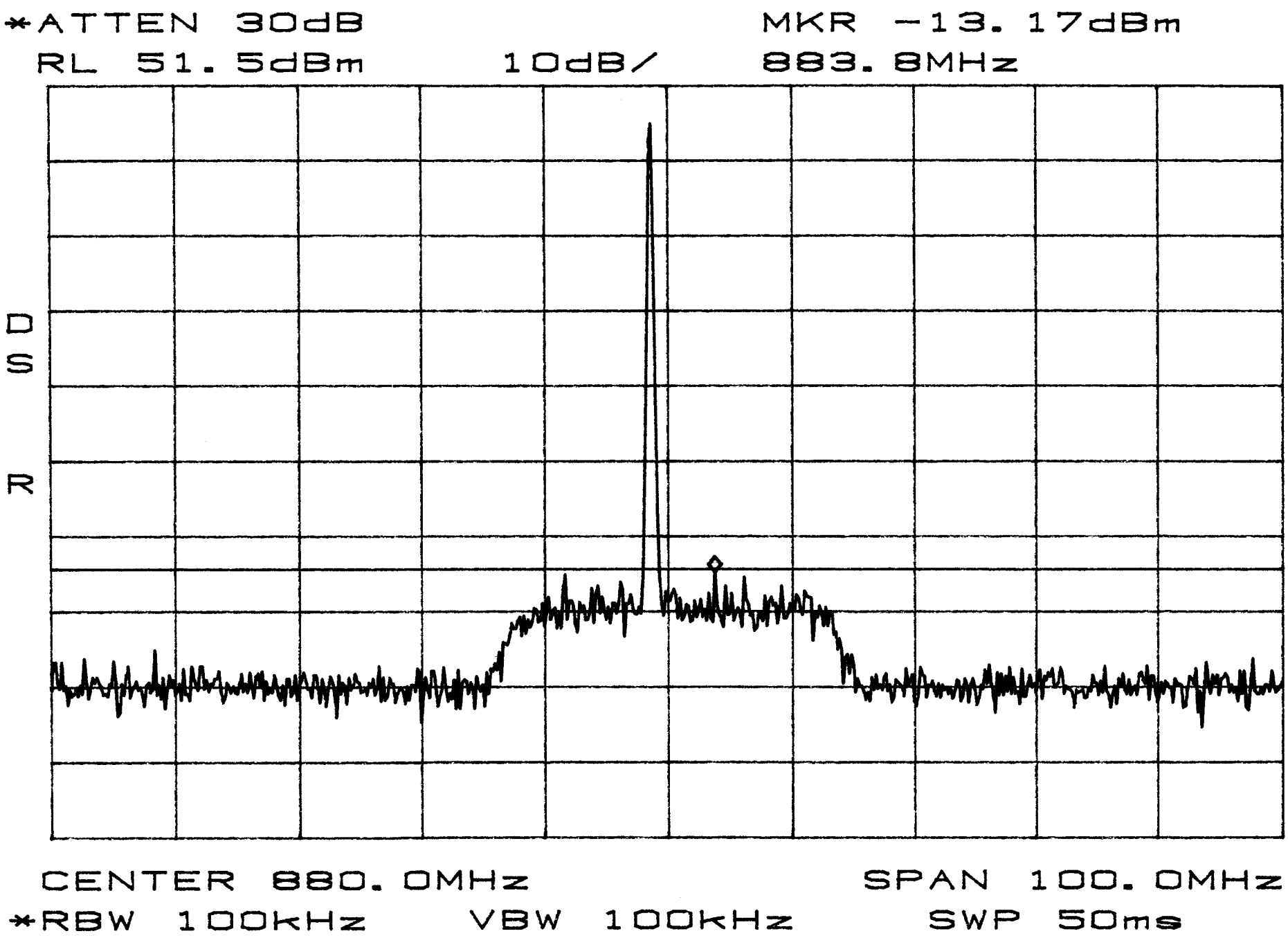
Conducted Emissions Band A
Low



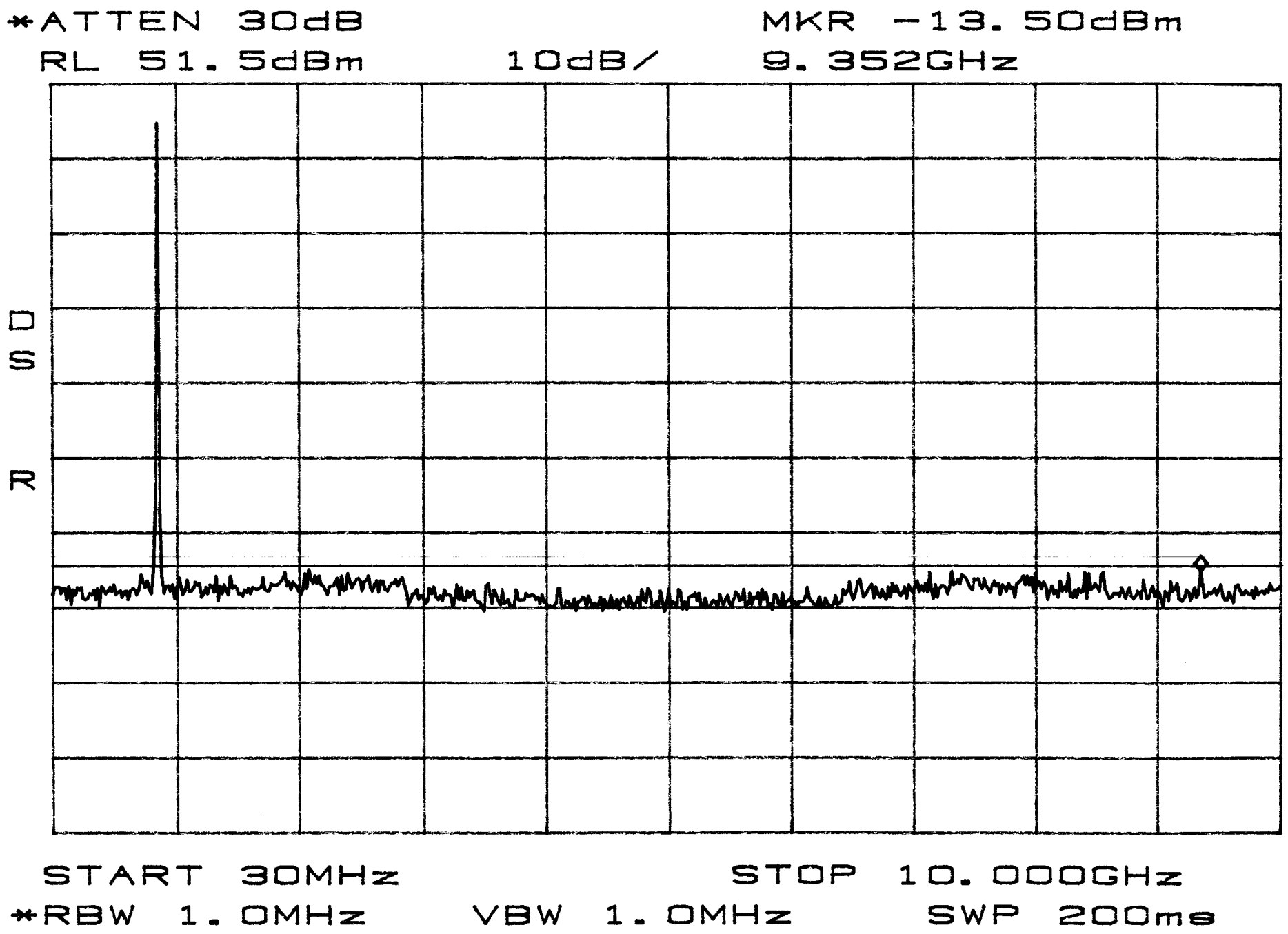
Conducted Emissions Band A
Low



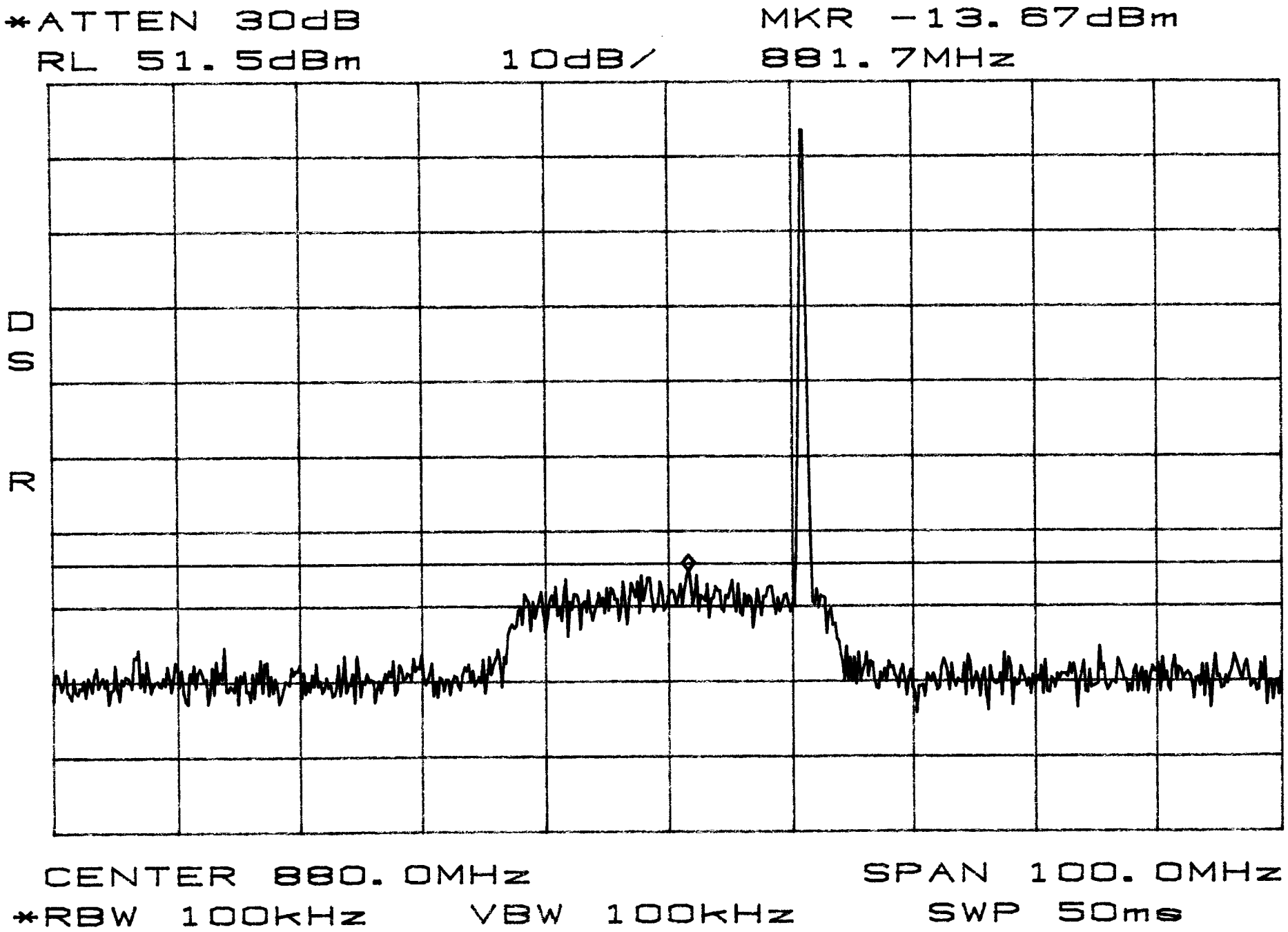
Conducted Emissions Band A
Mid



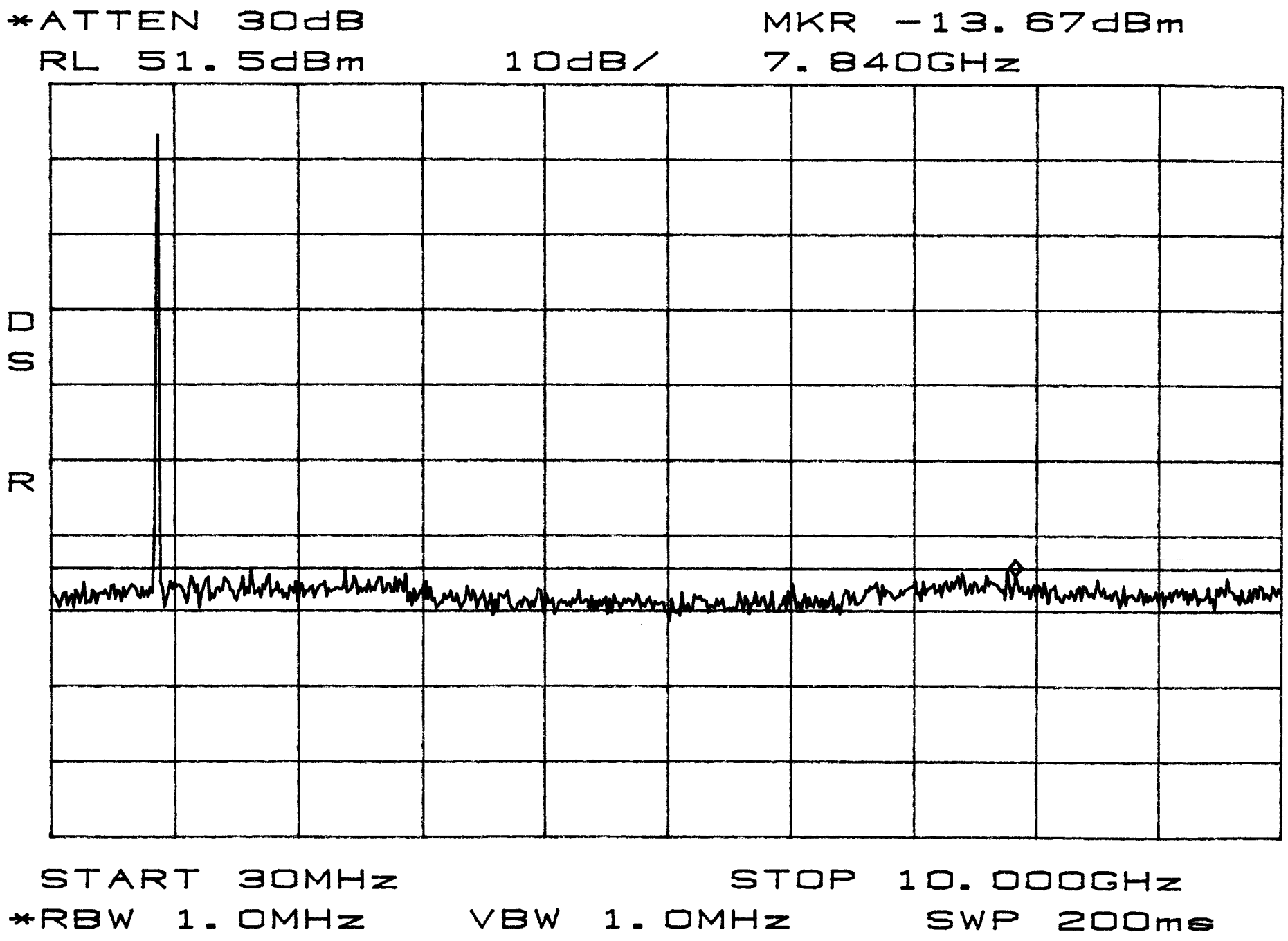
Conducted Emissions Band A
Mid



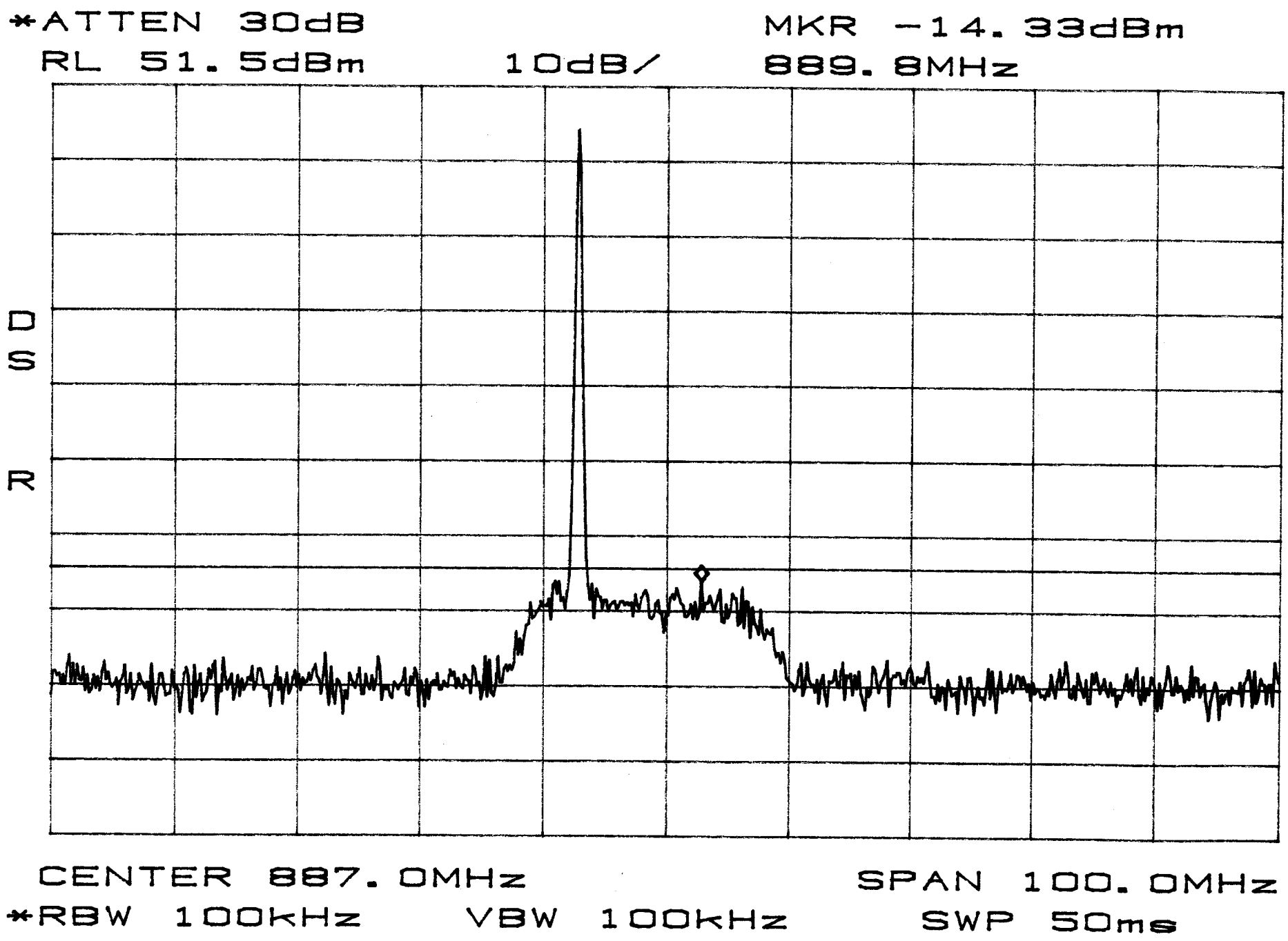
Conducted Emissions Band A
High



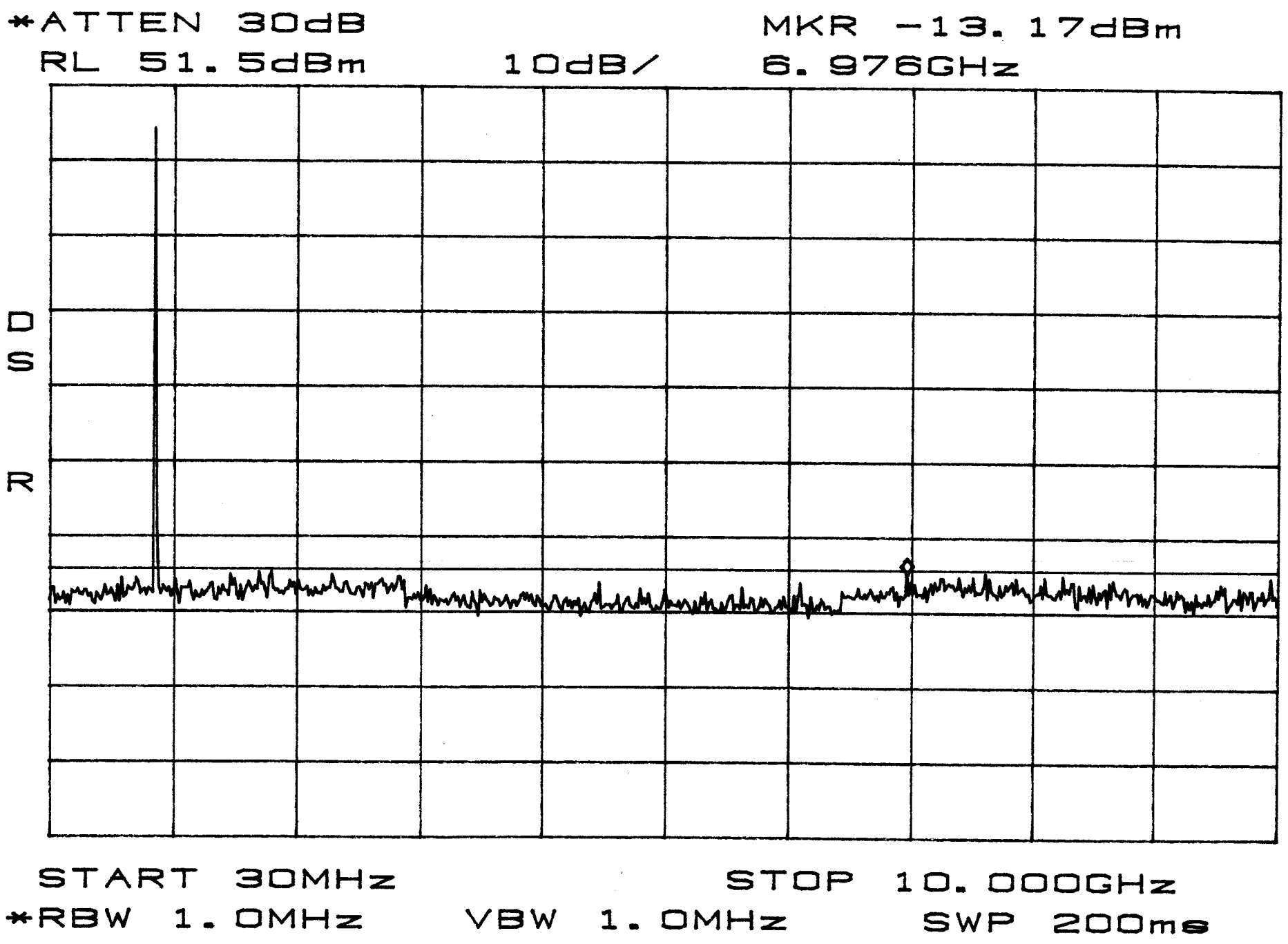
Conducted Emissions Band A
High



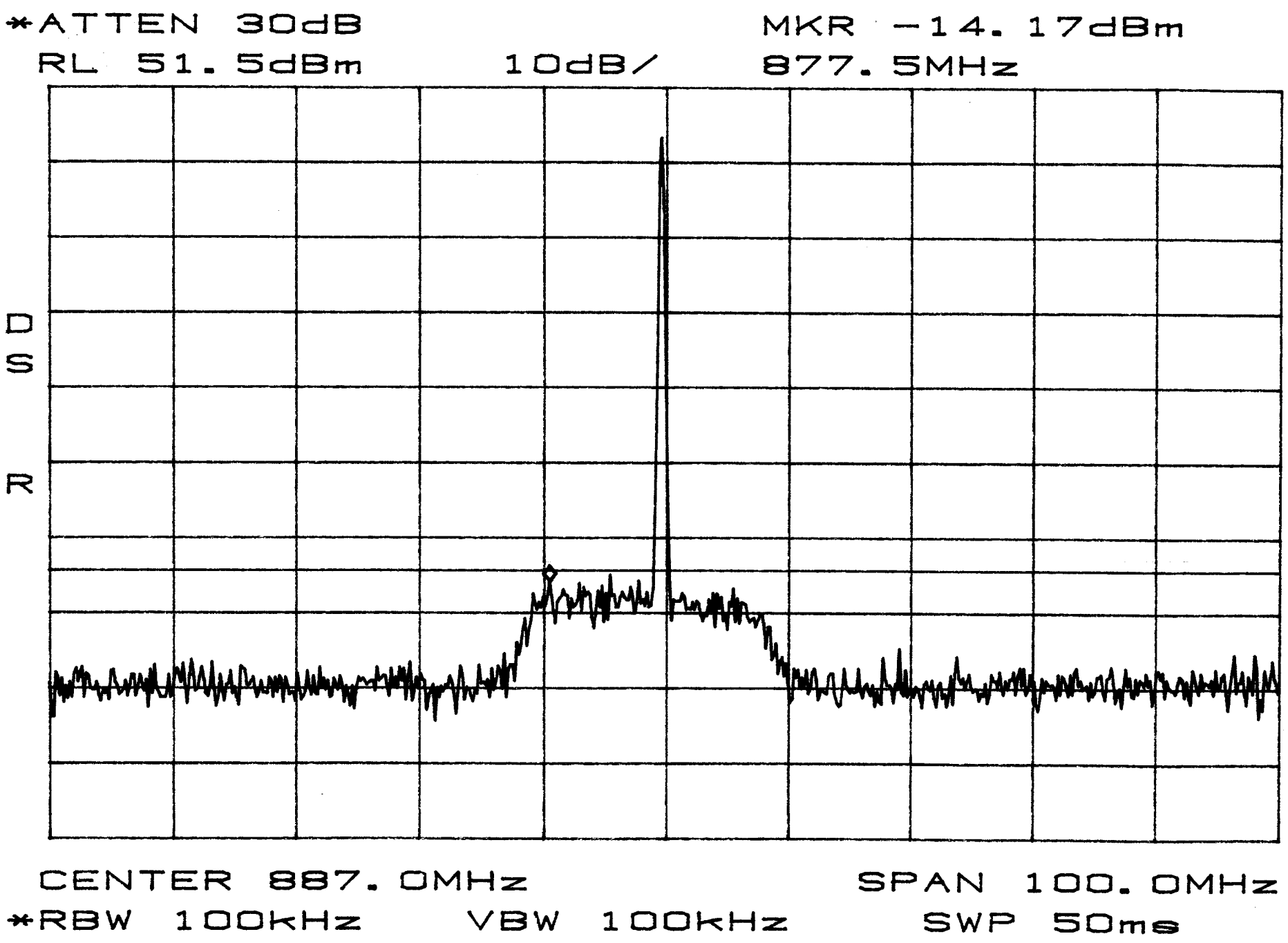
Conducted Emissions Band B
Low



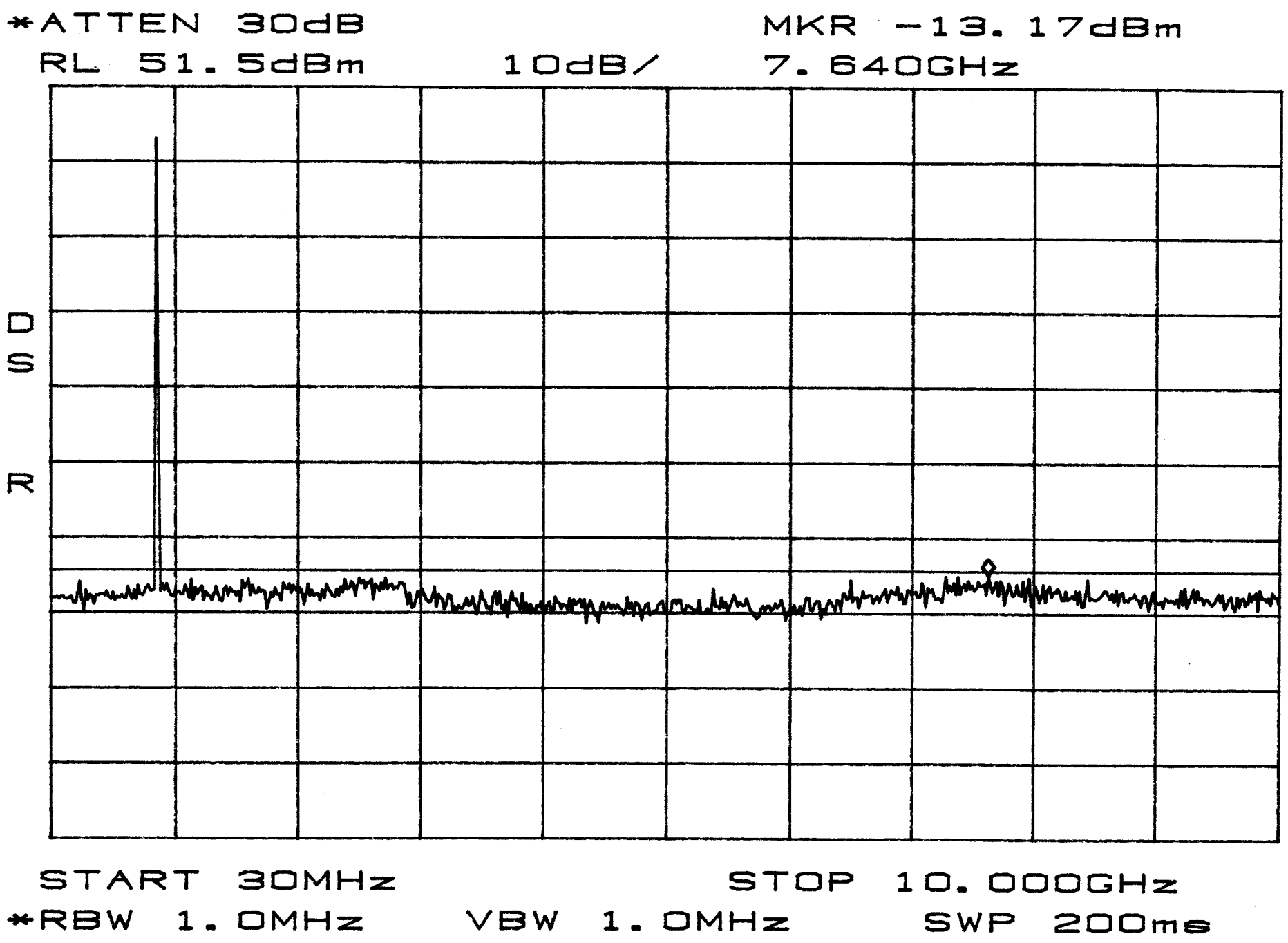
Conducted Emissions Band B
Low



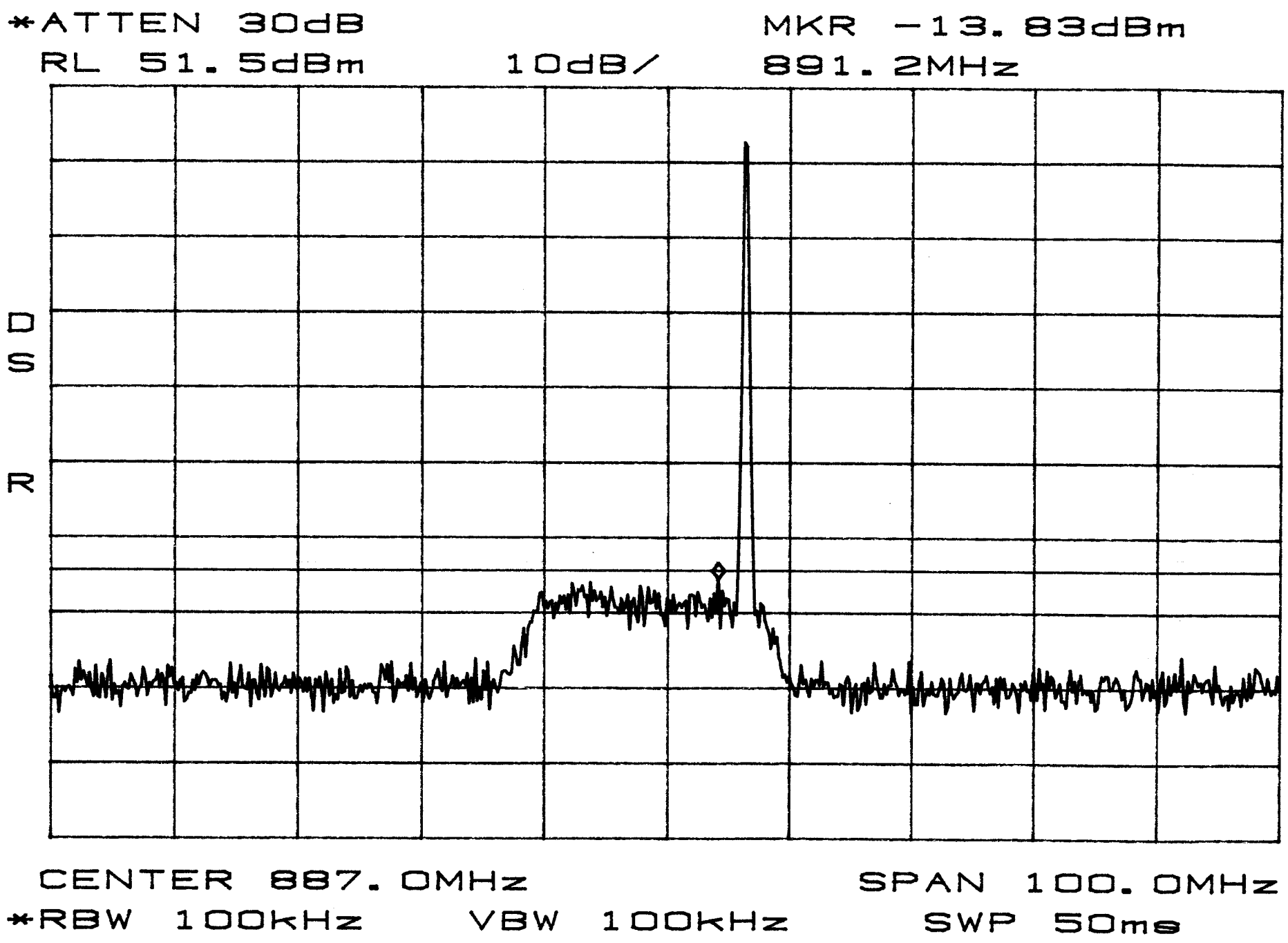
Conducted Emissions Band B
Mid



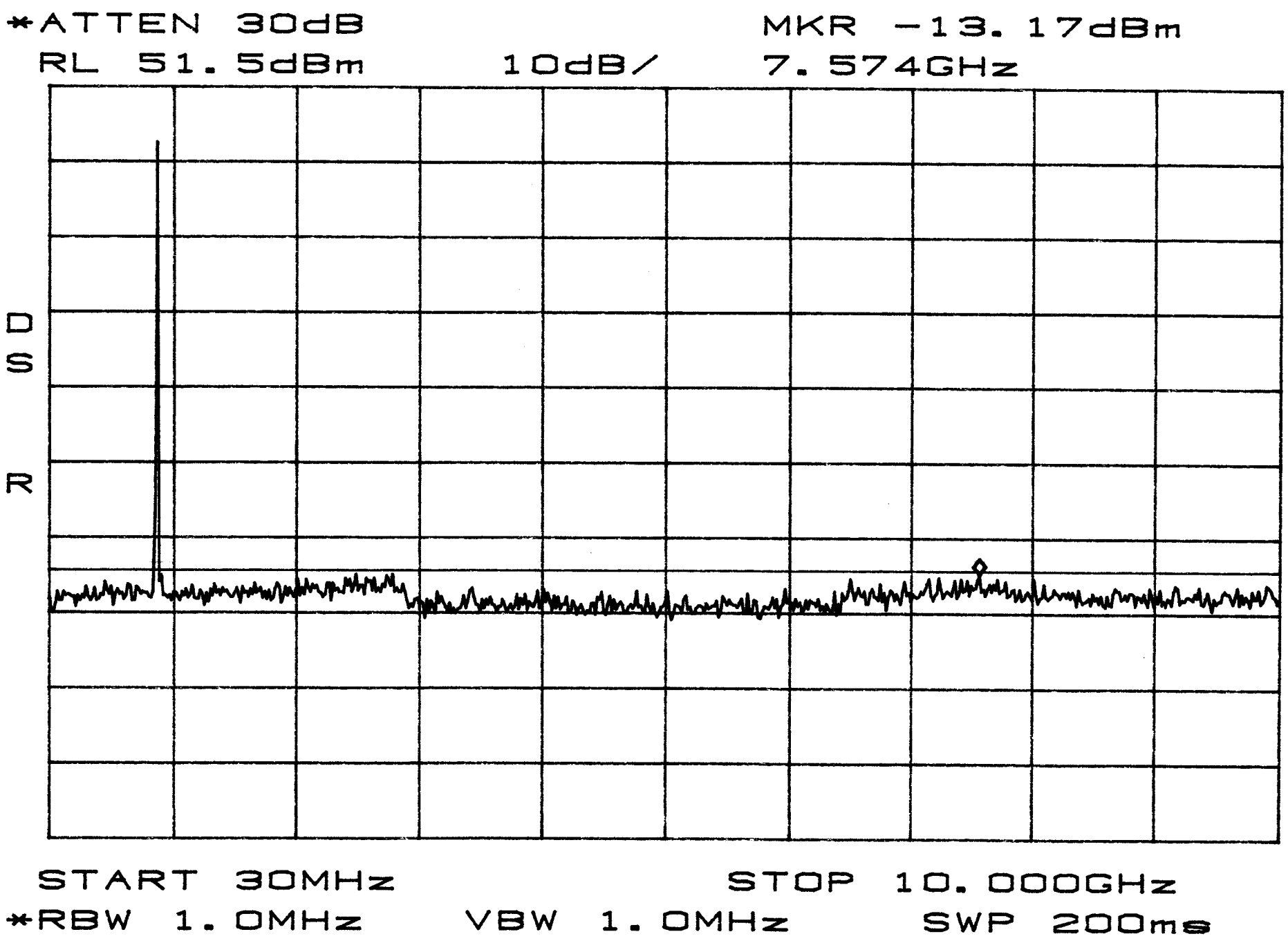
Conducted Emissions Band B
Mid



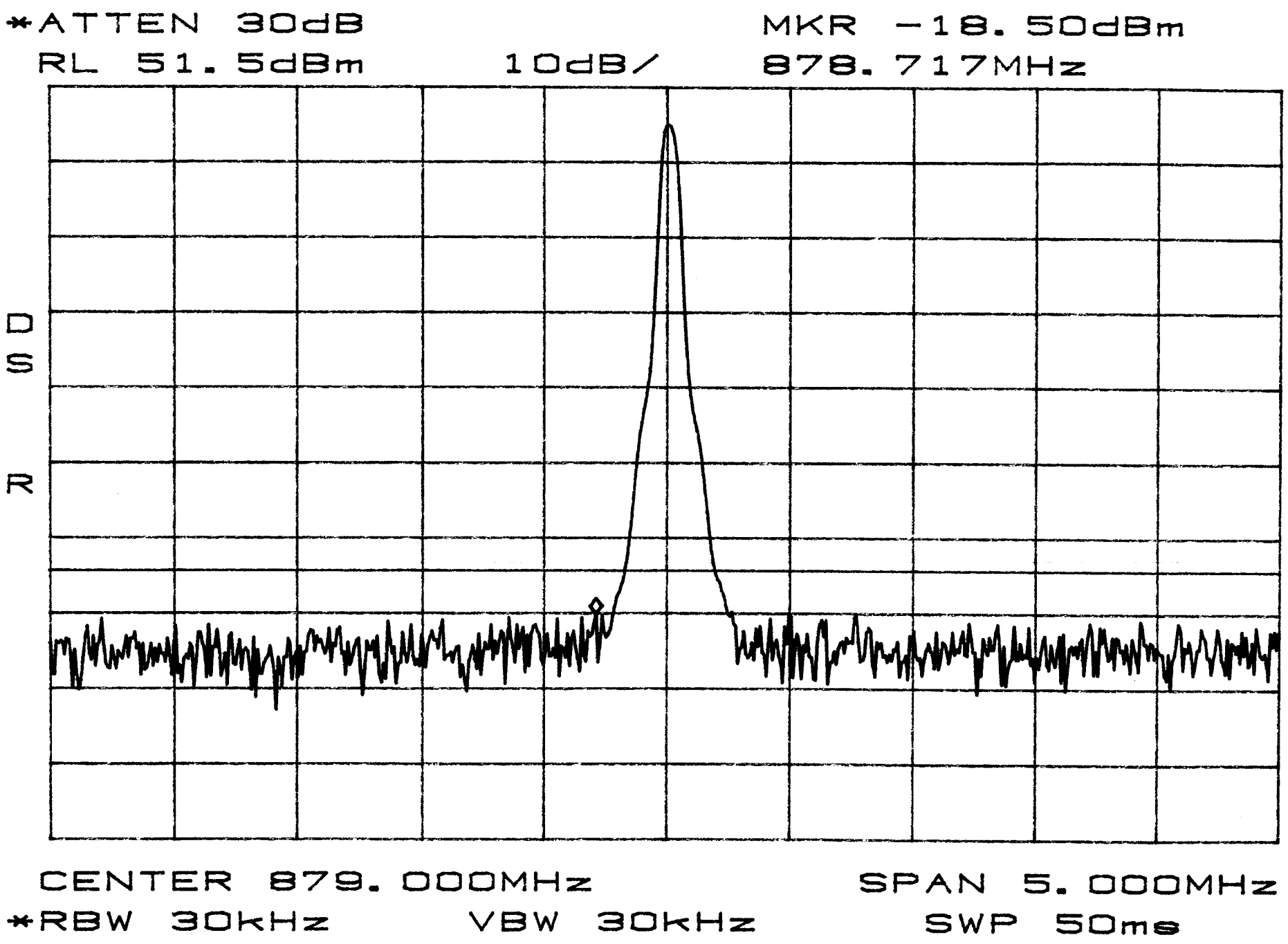
Conducted Emissions Band B
High



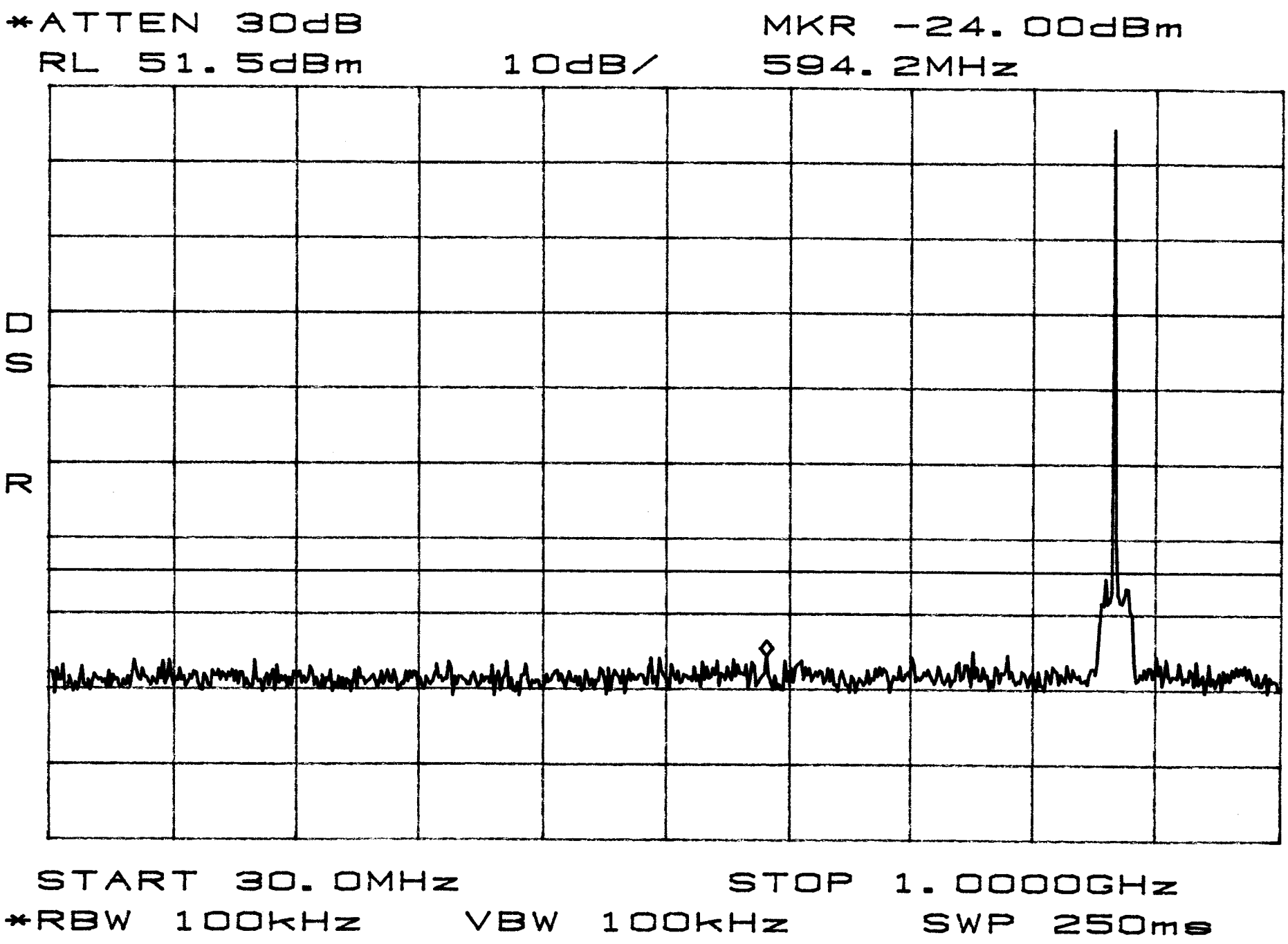
Conducted Emissions Band B
High



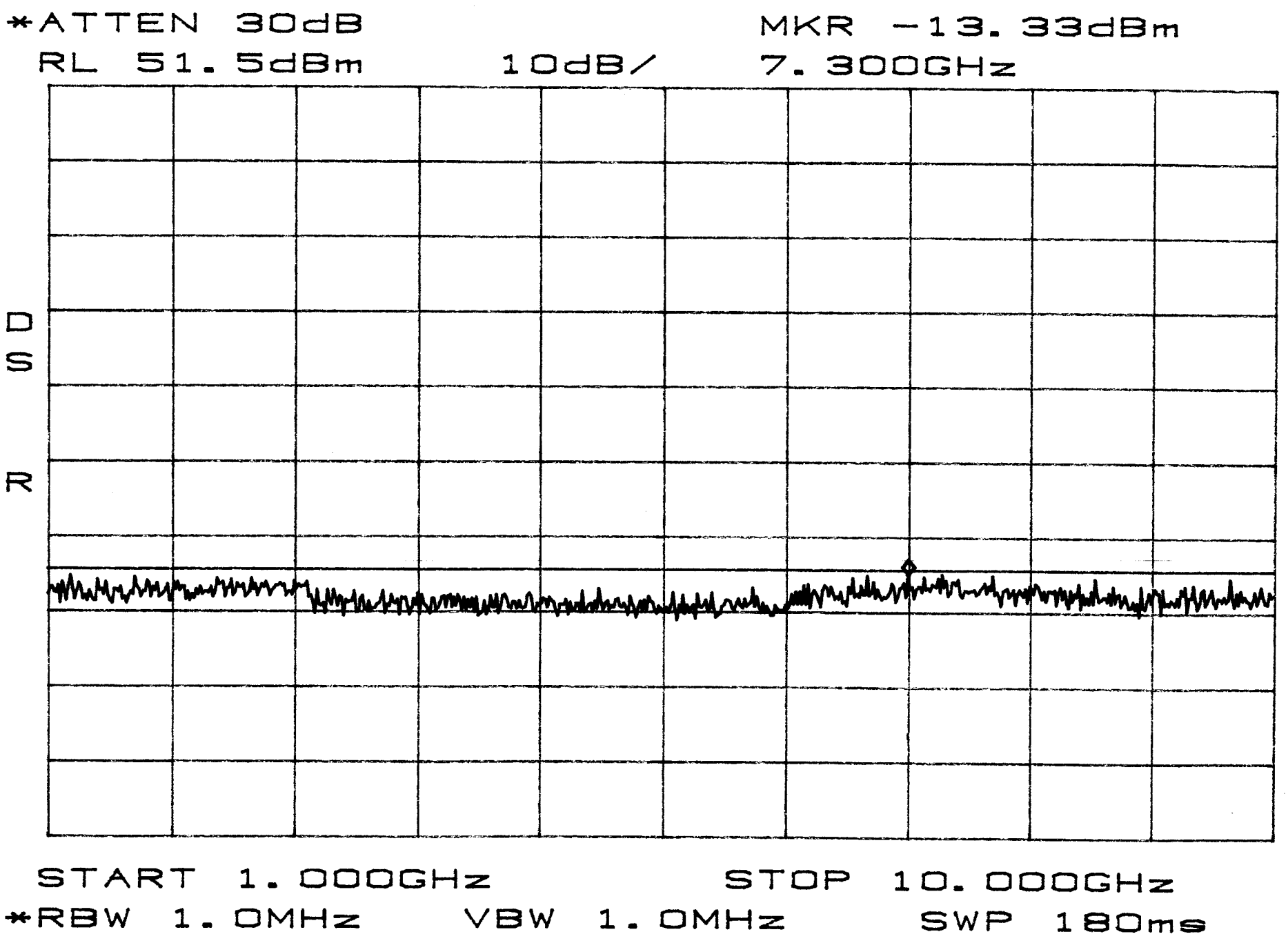
Conducted Emissions Band A
FM



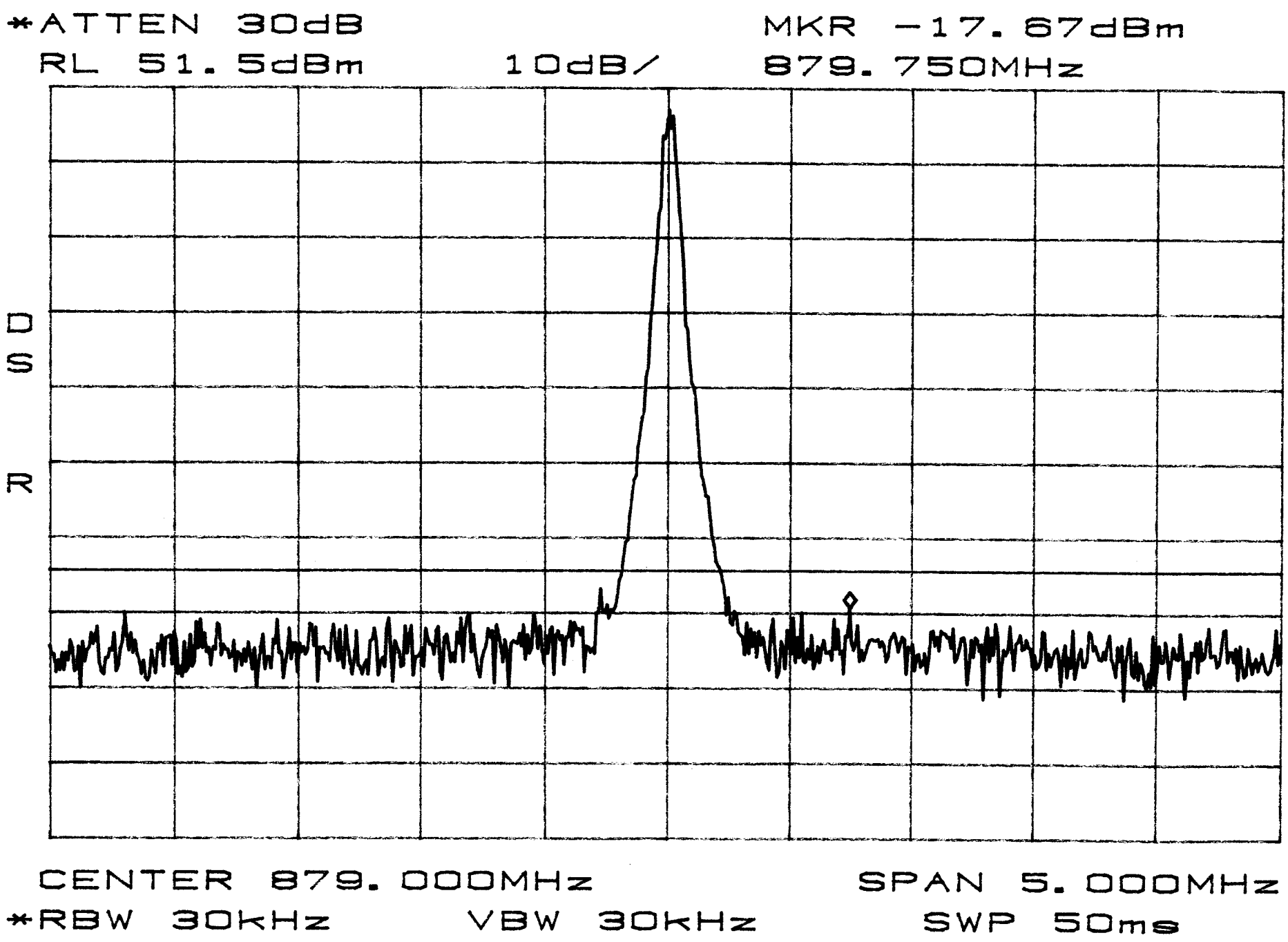
Conducted Emissions Band A
FM



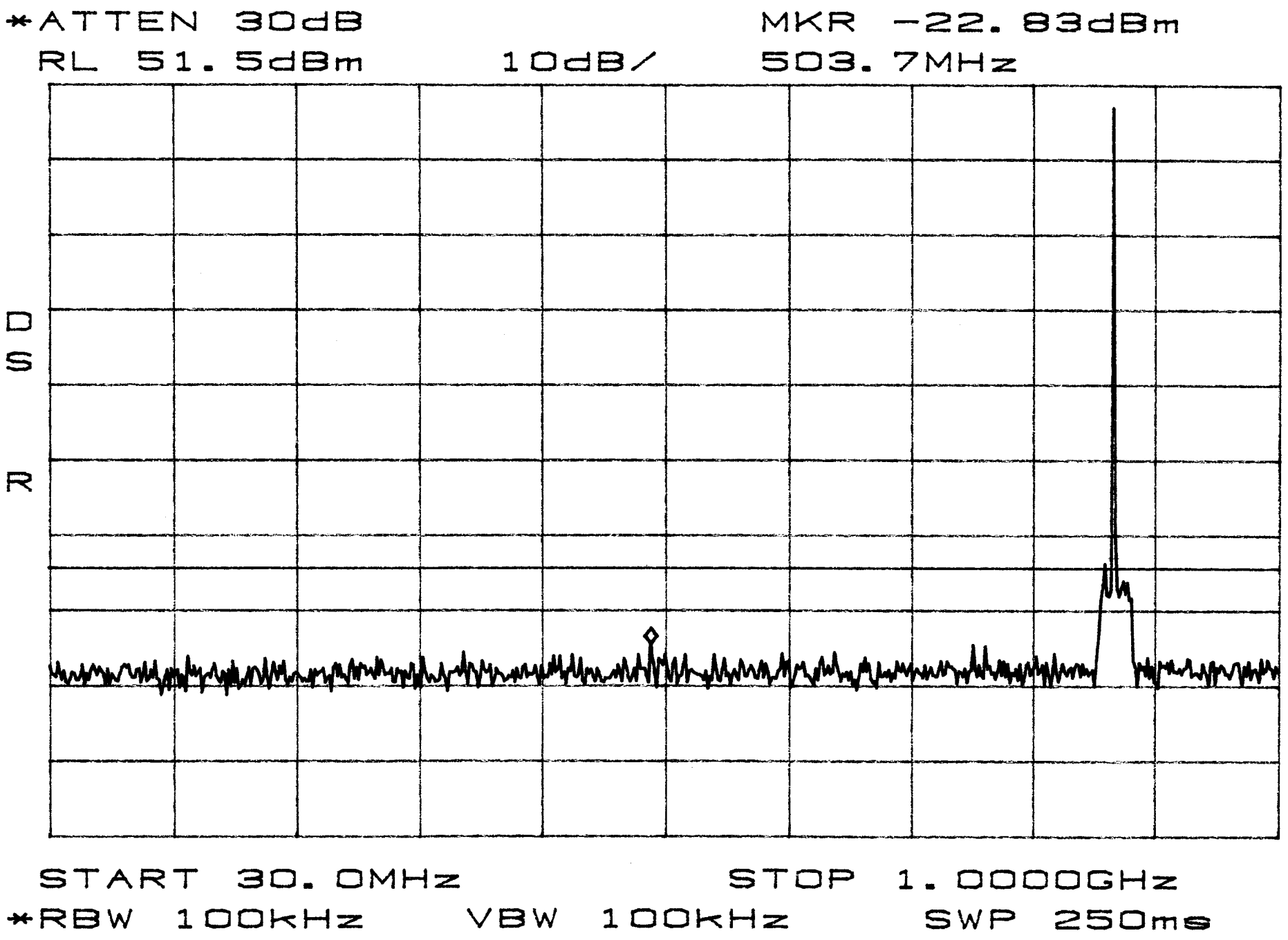
Conducted Emissions Band A
FM



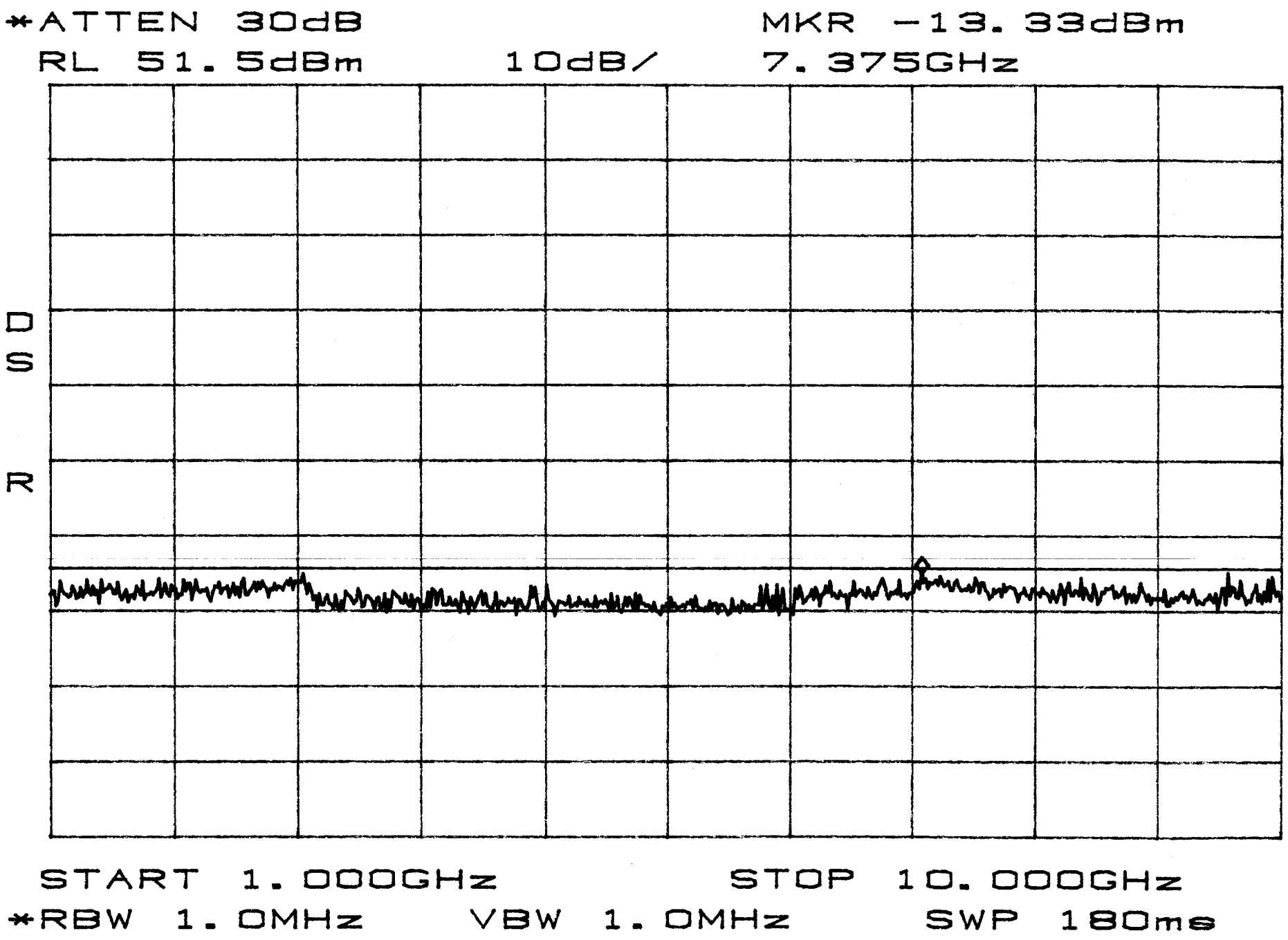
Conducted Emissions Band A
TDMA



Conducted Emissions Band A
TDMA

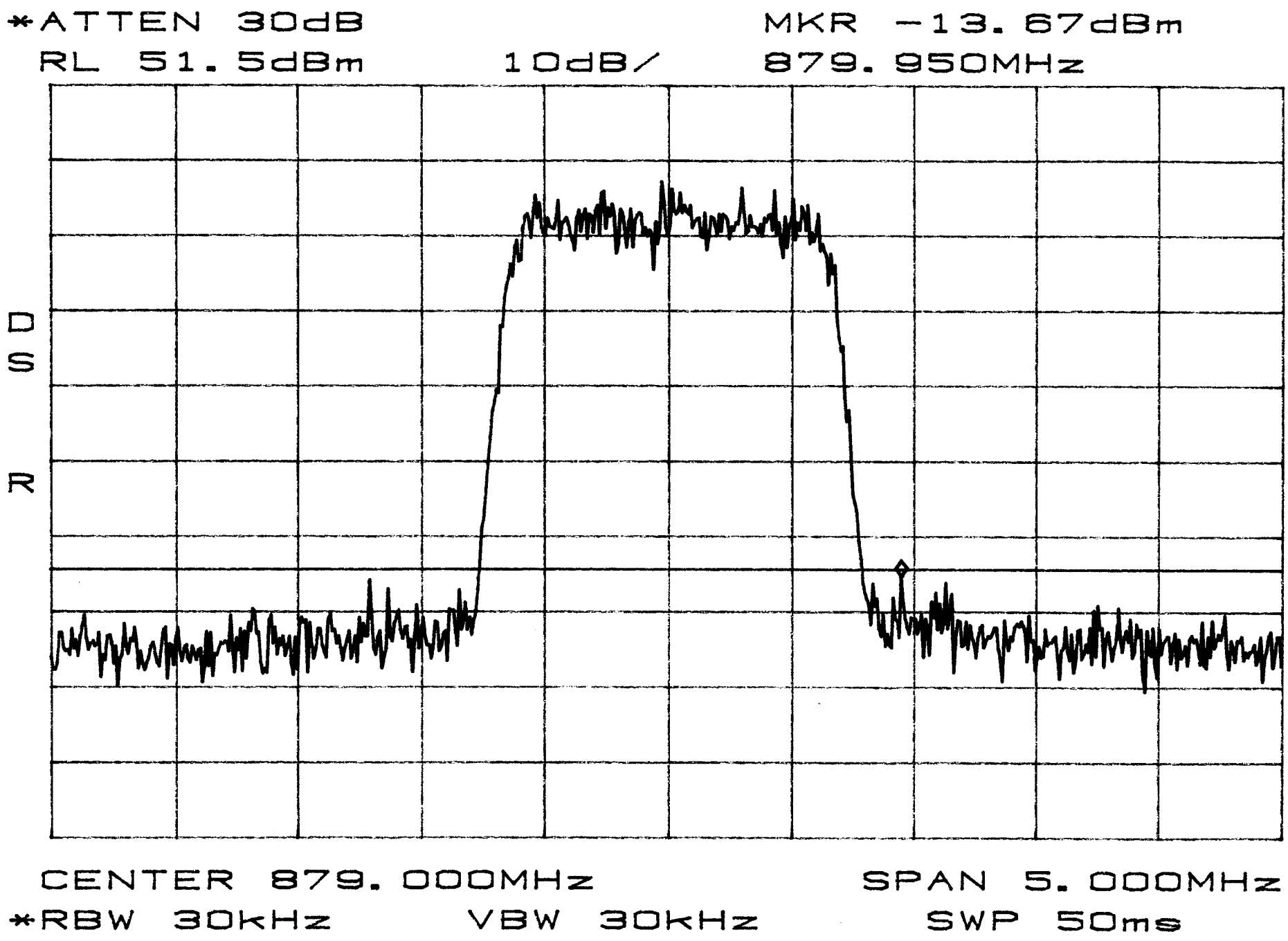


Conducted Emissions Band A
TDMA

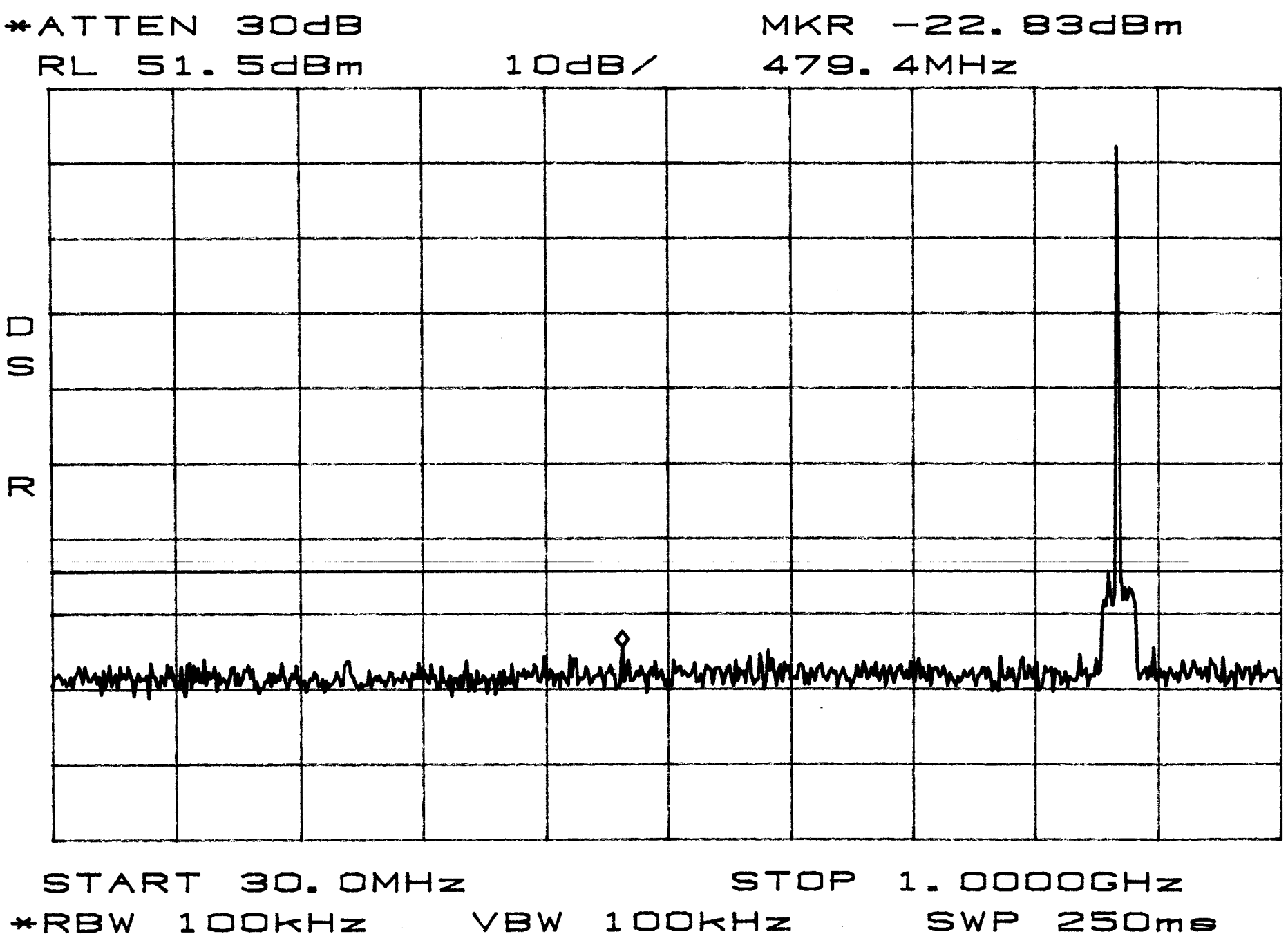


Conducted Emissions Band A

CDMA

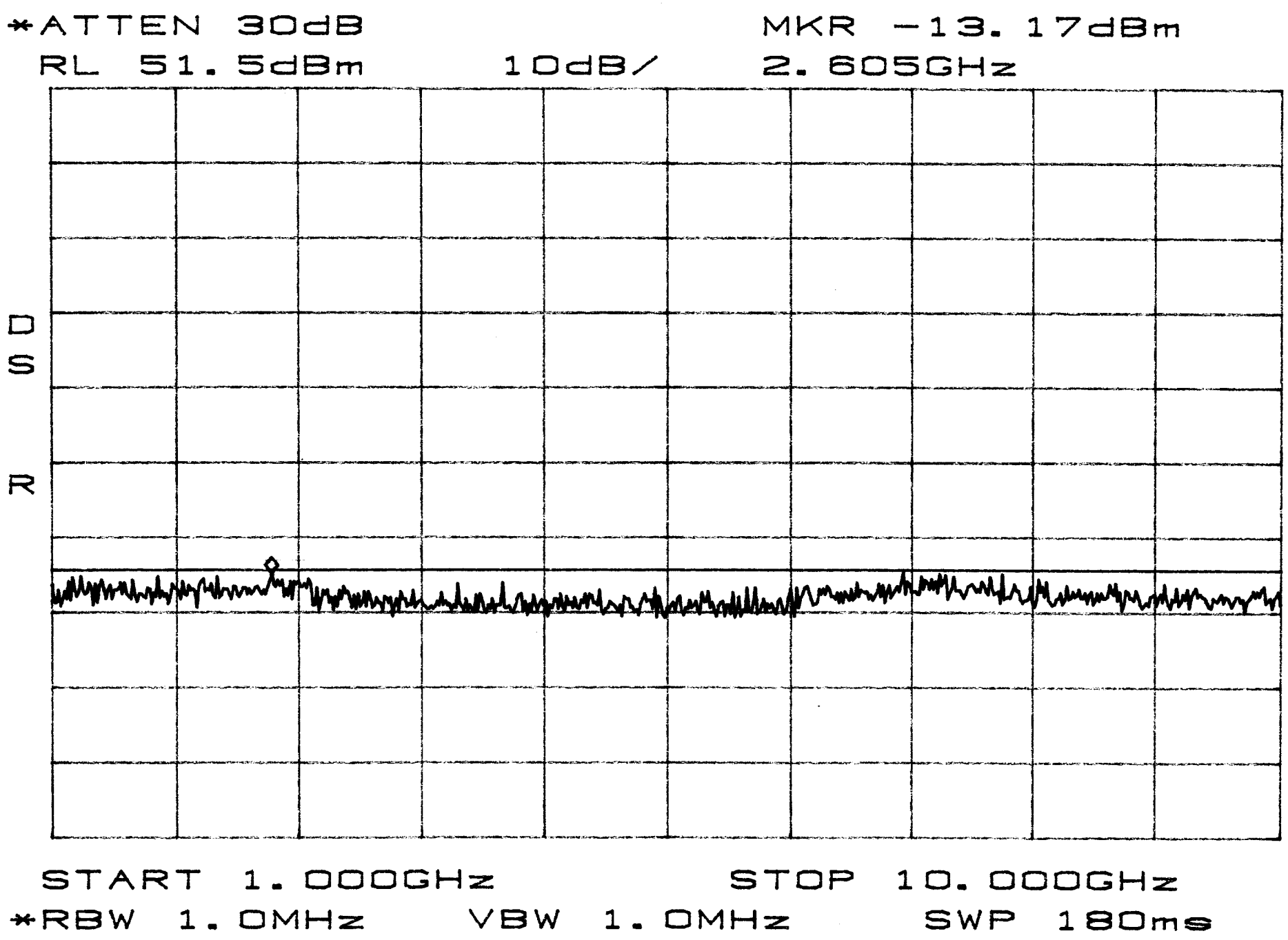


Conducted Emissions Band A
CDMA

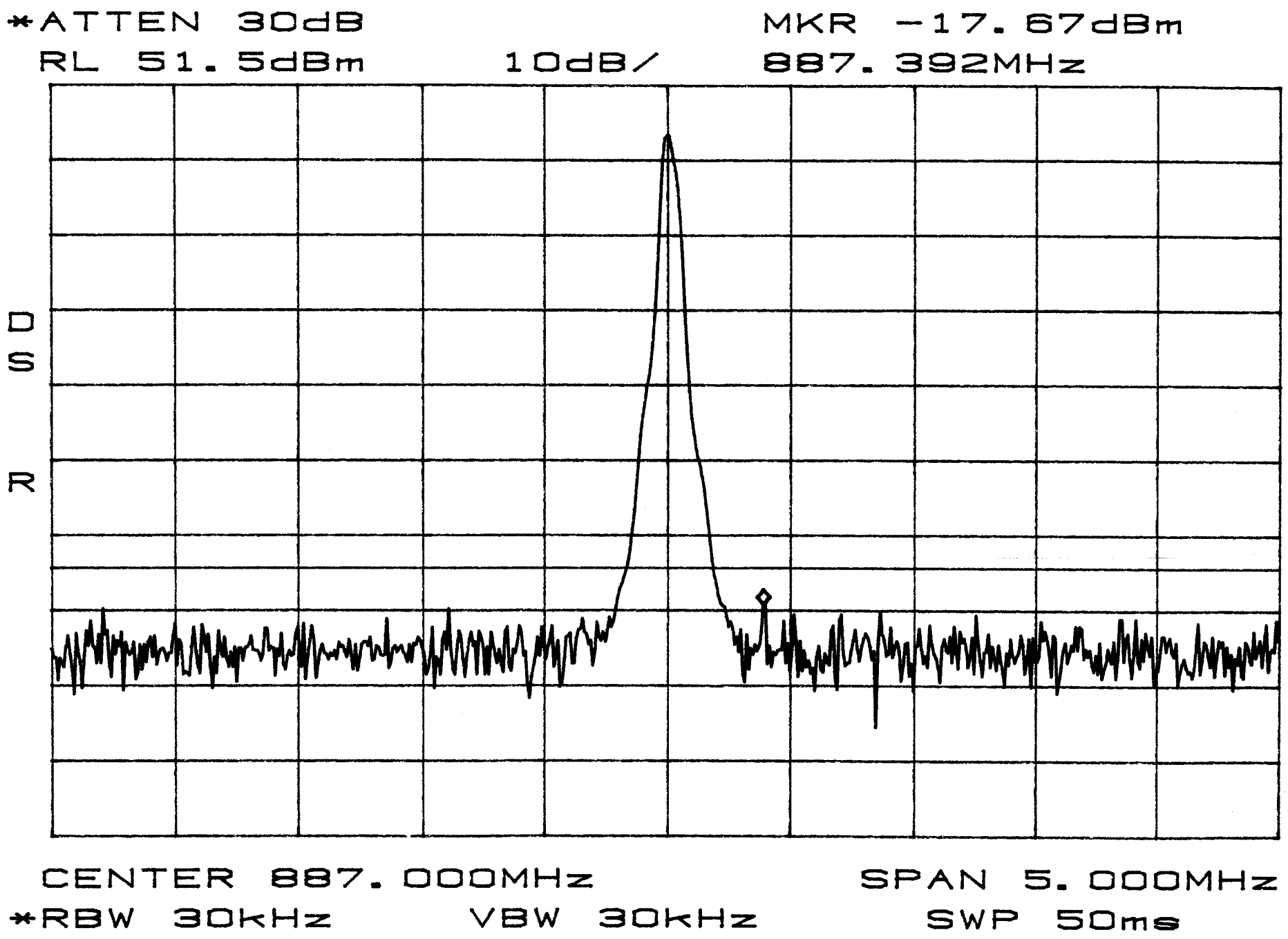


Conducted Emissions Band A

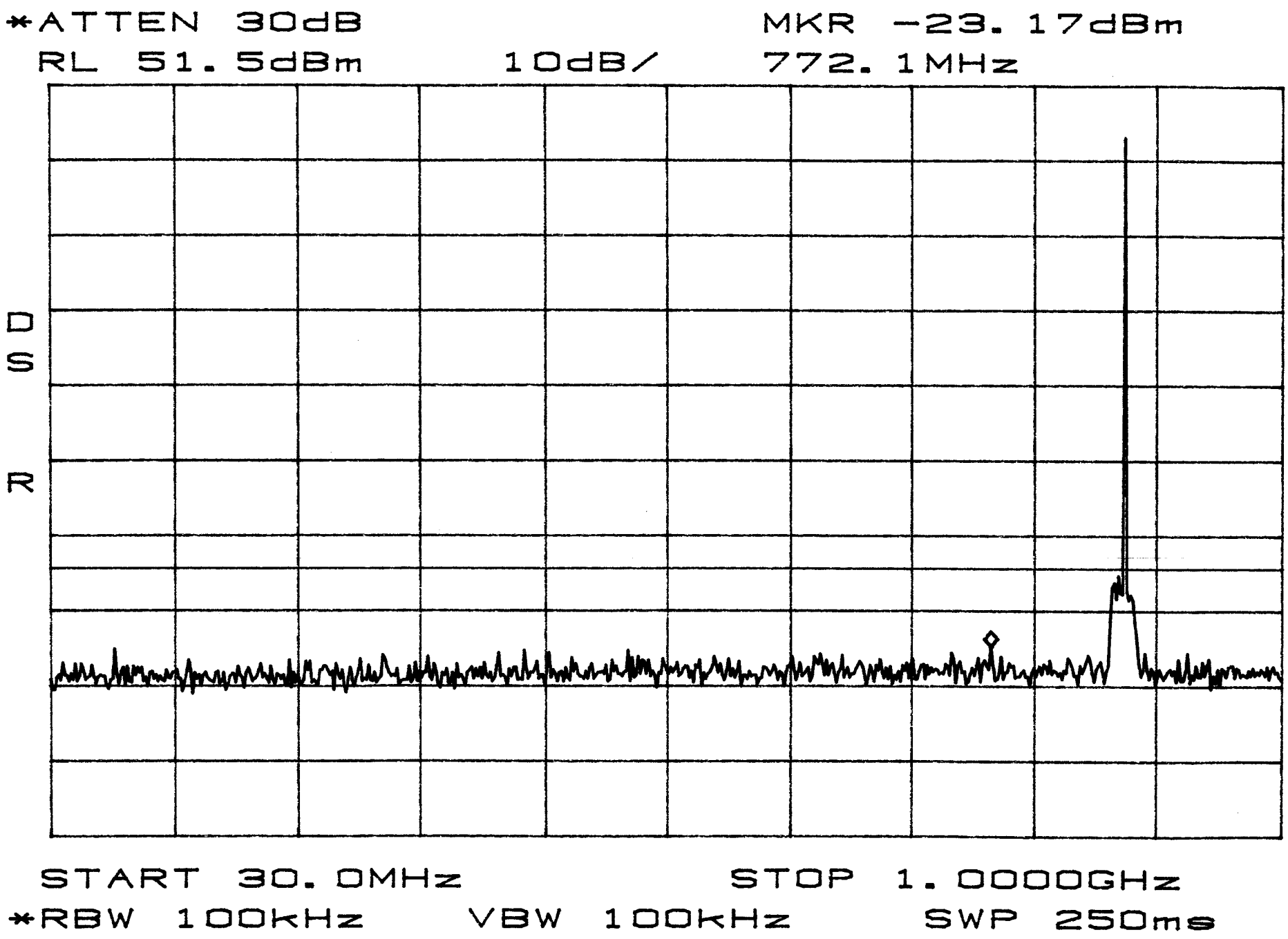
CDMA



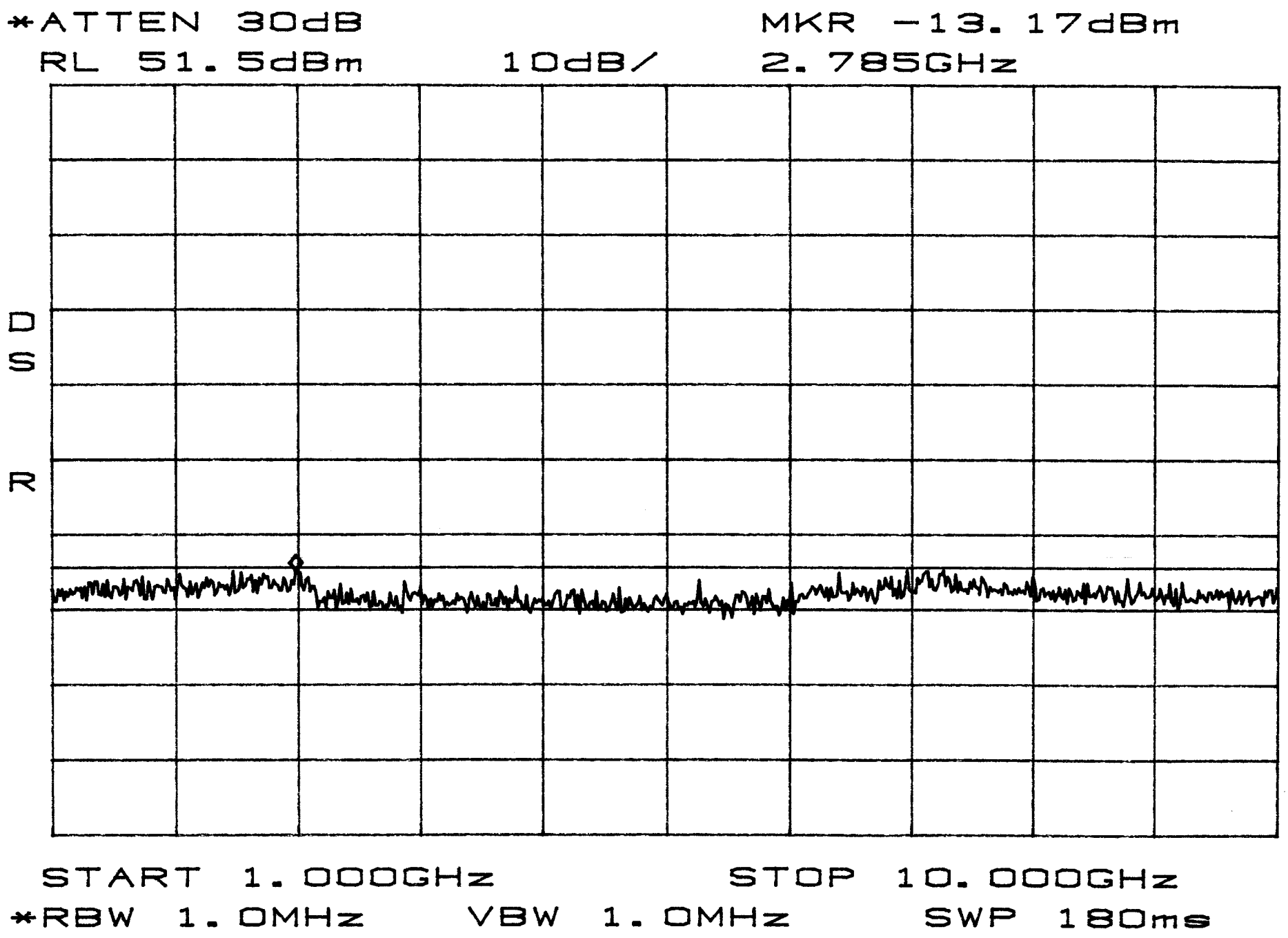
Conducted Emissions Band B
FM



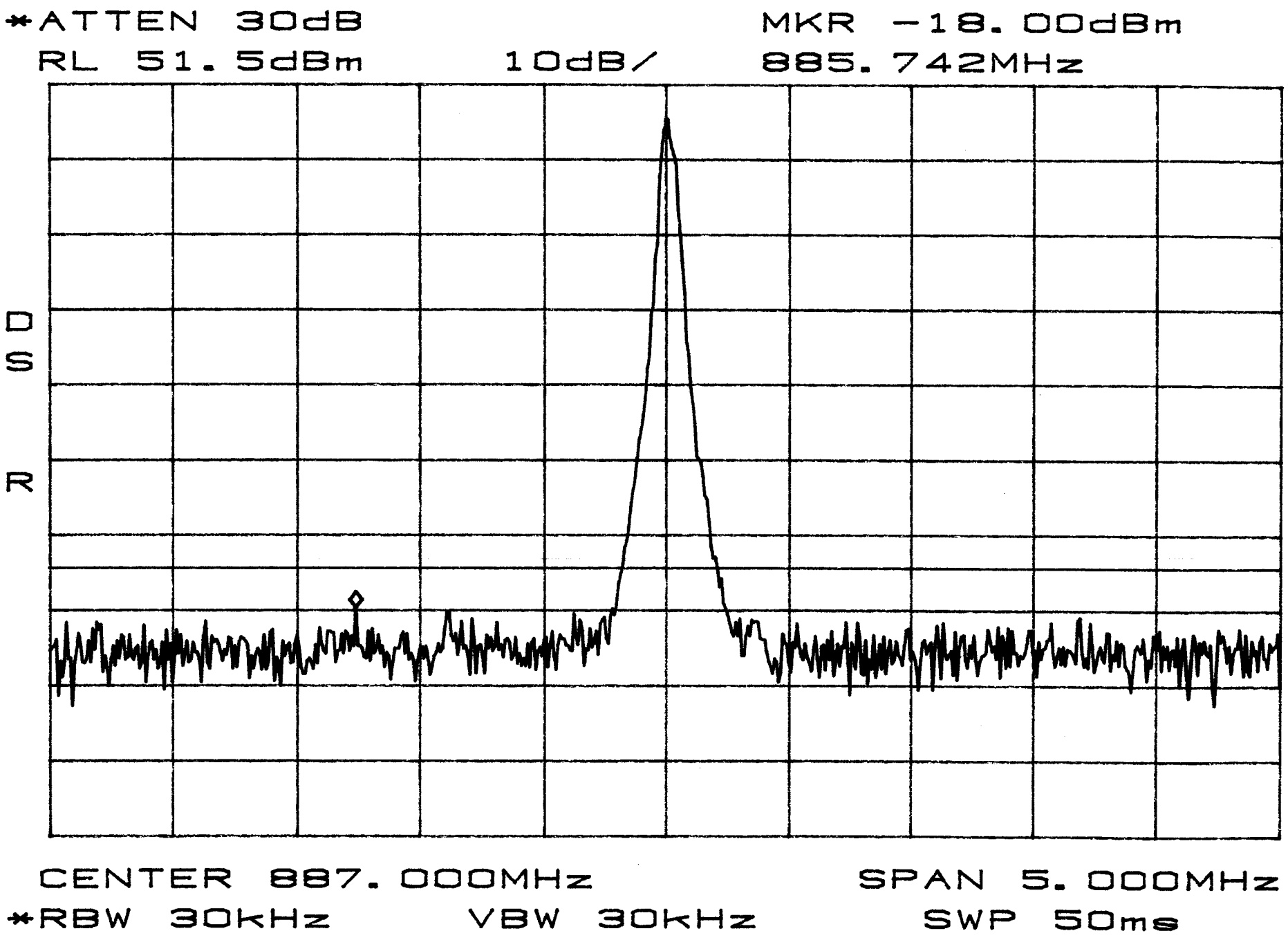
Conducted Emissions Band B
FM



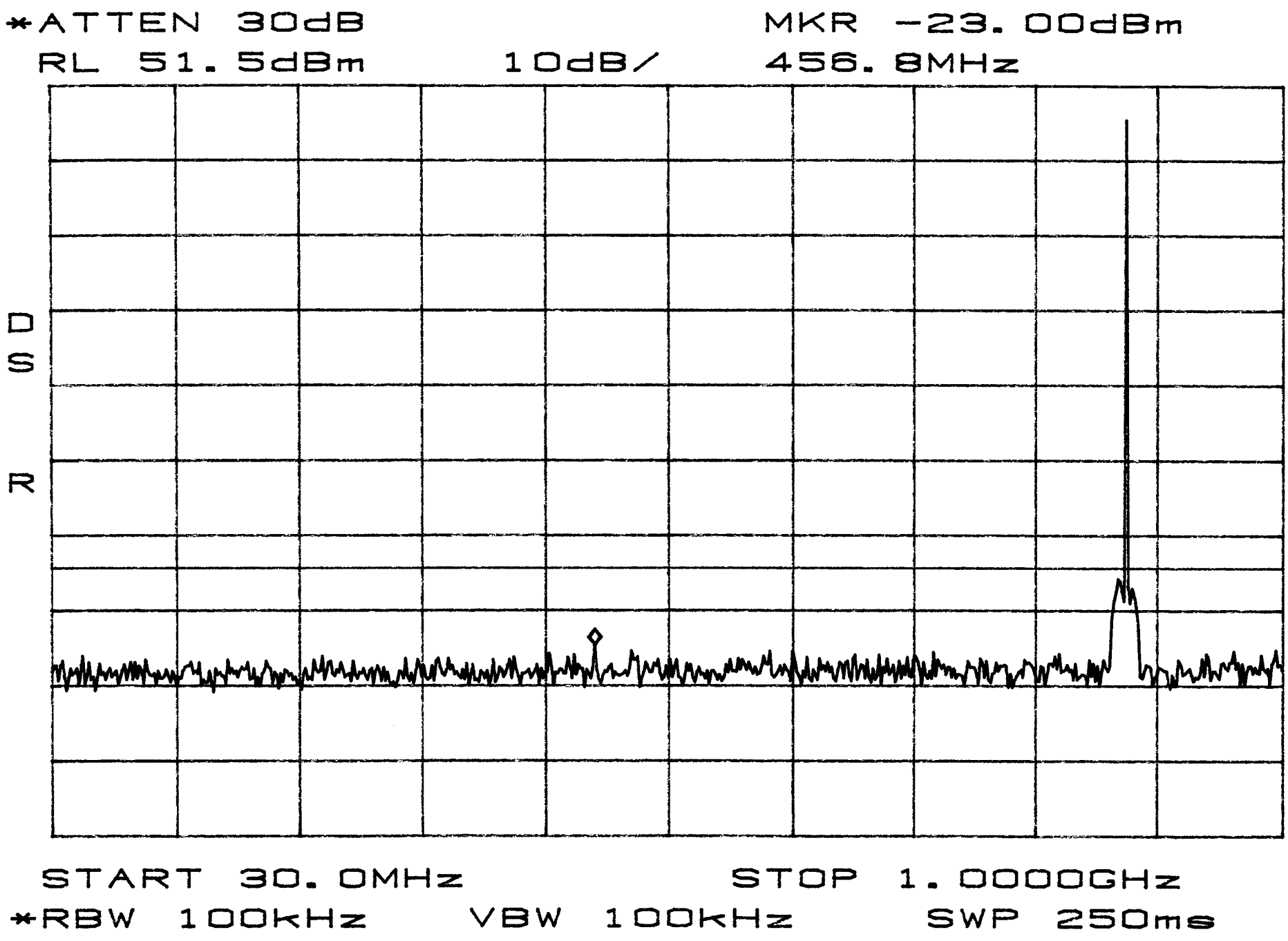
Conducted Emissions Band B
FM



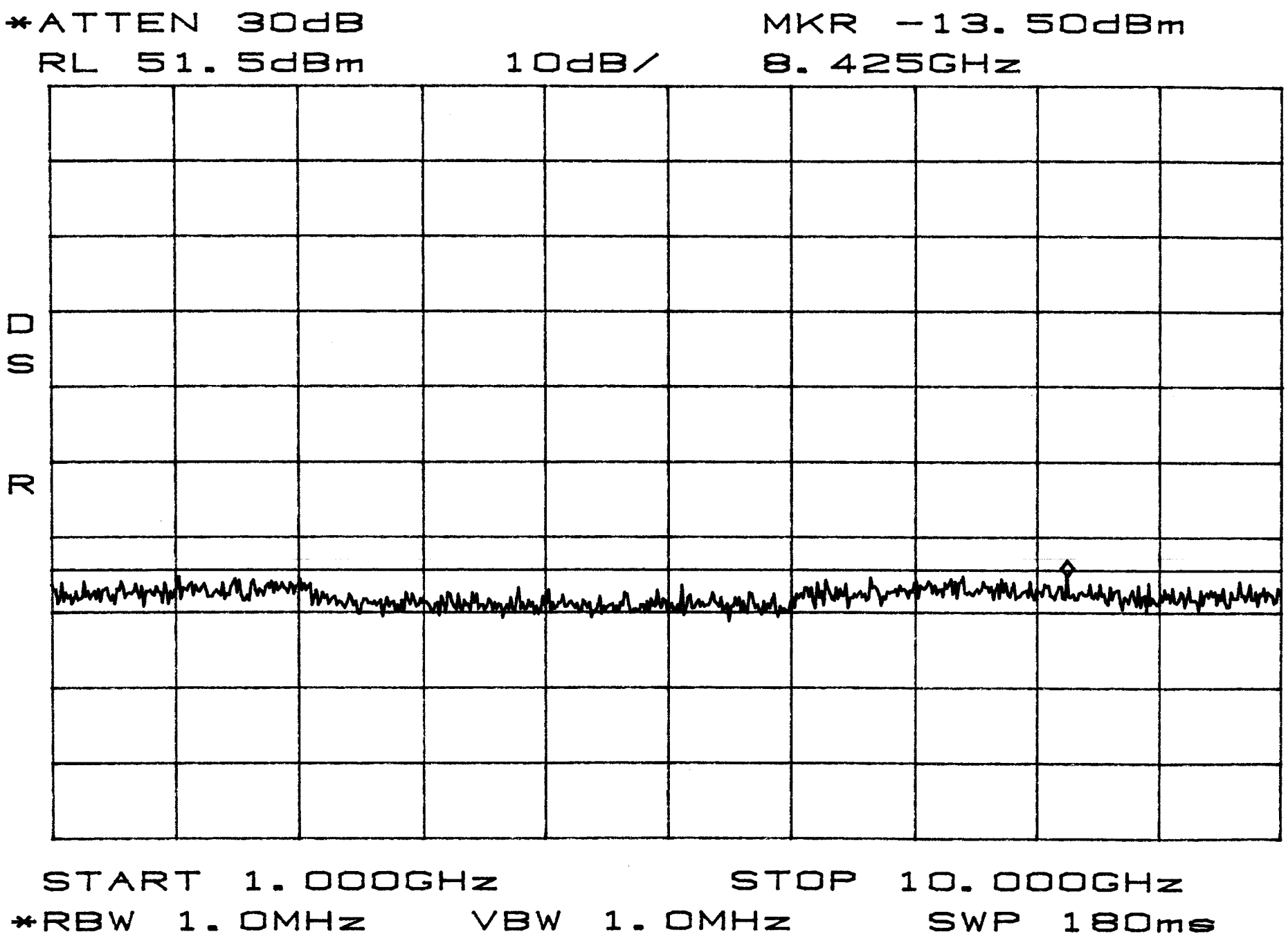
Conducted Emissions Band B
TDMA



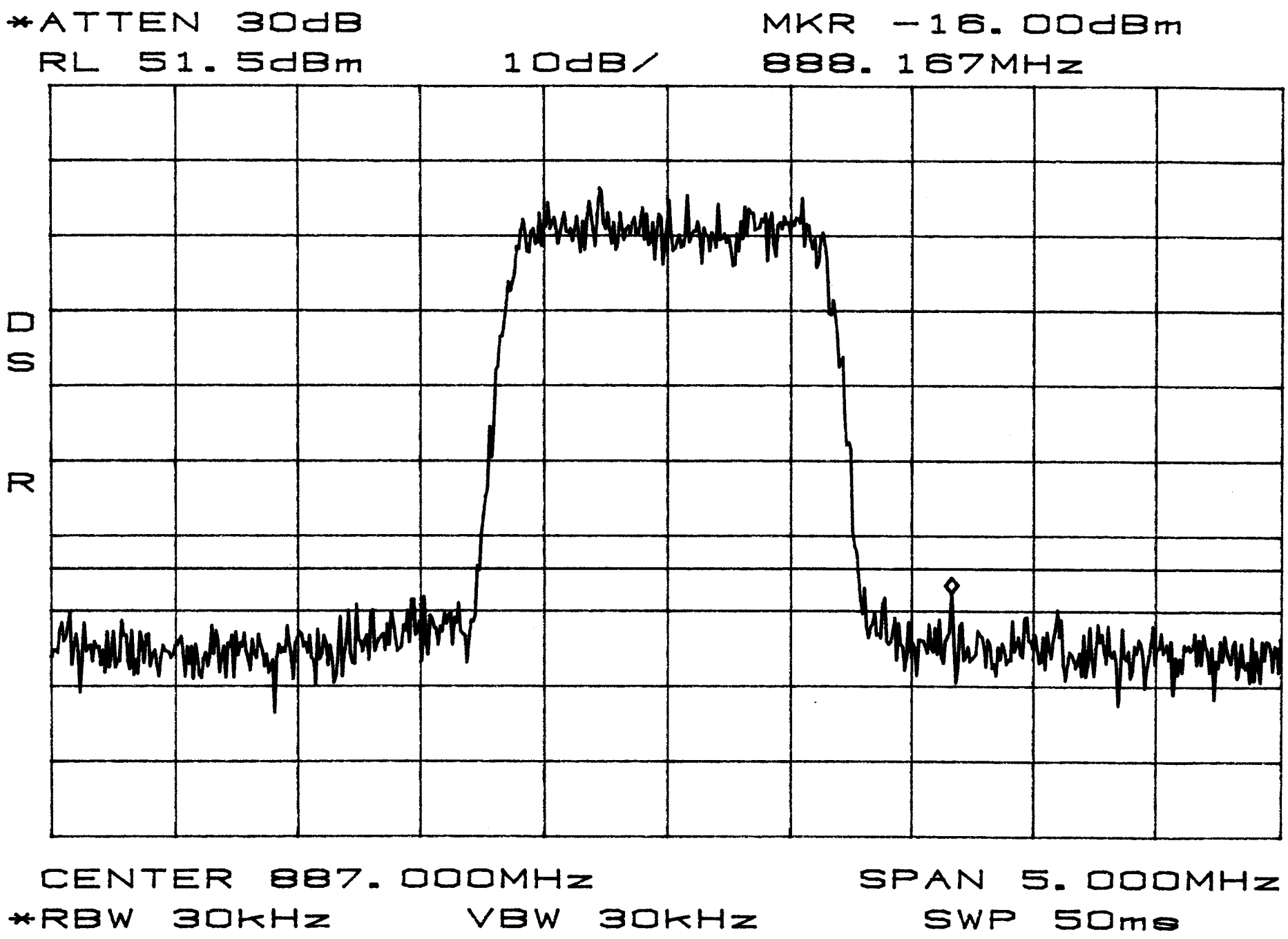
Conducted Emissions Band B
TDMA



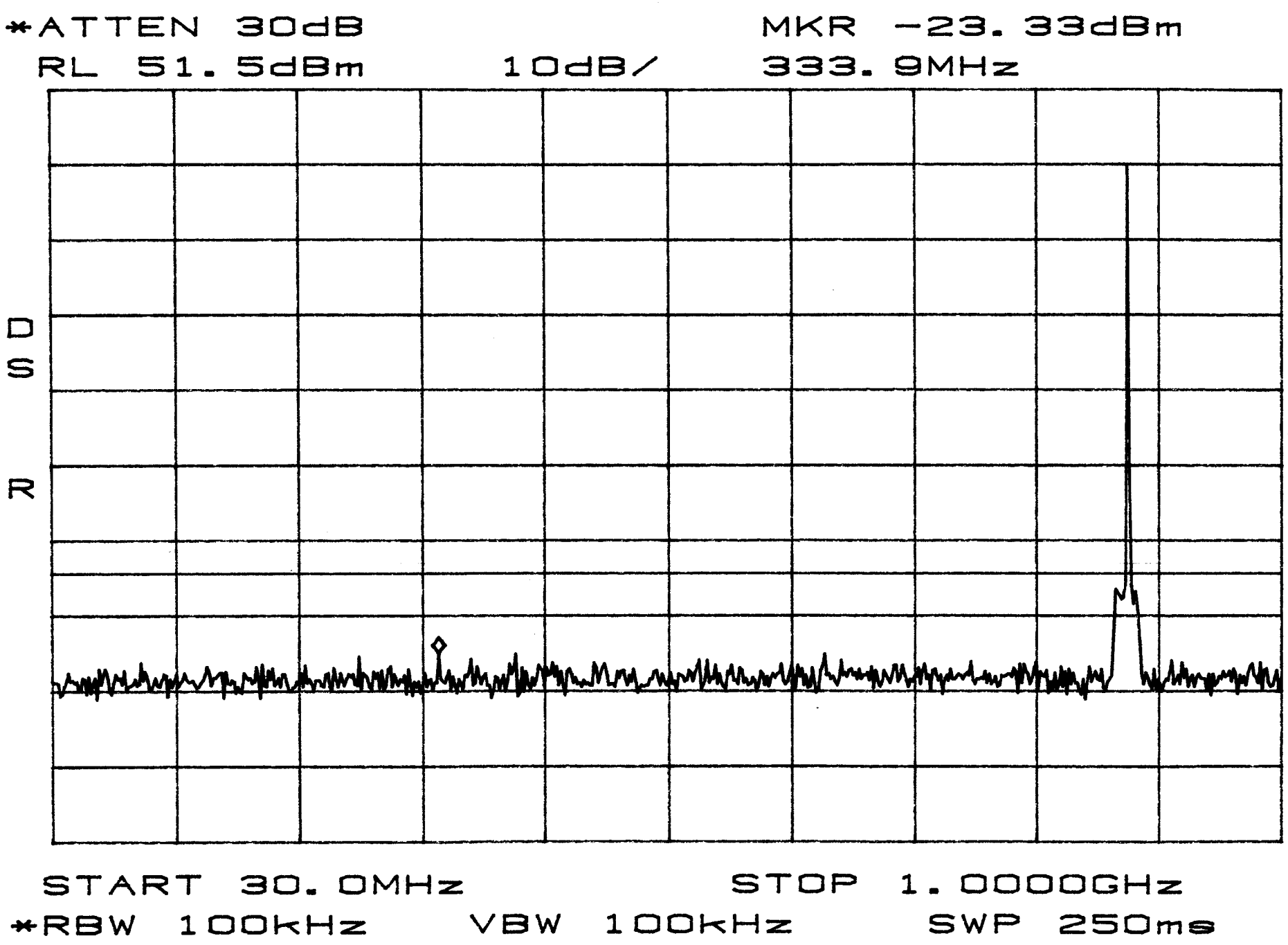
Conducted Emissions Band B
TDMA



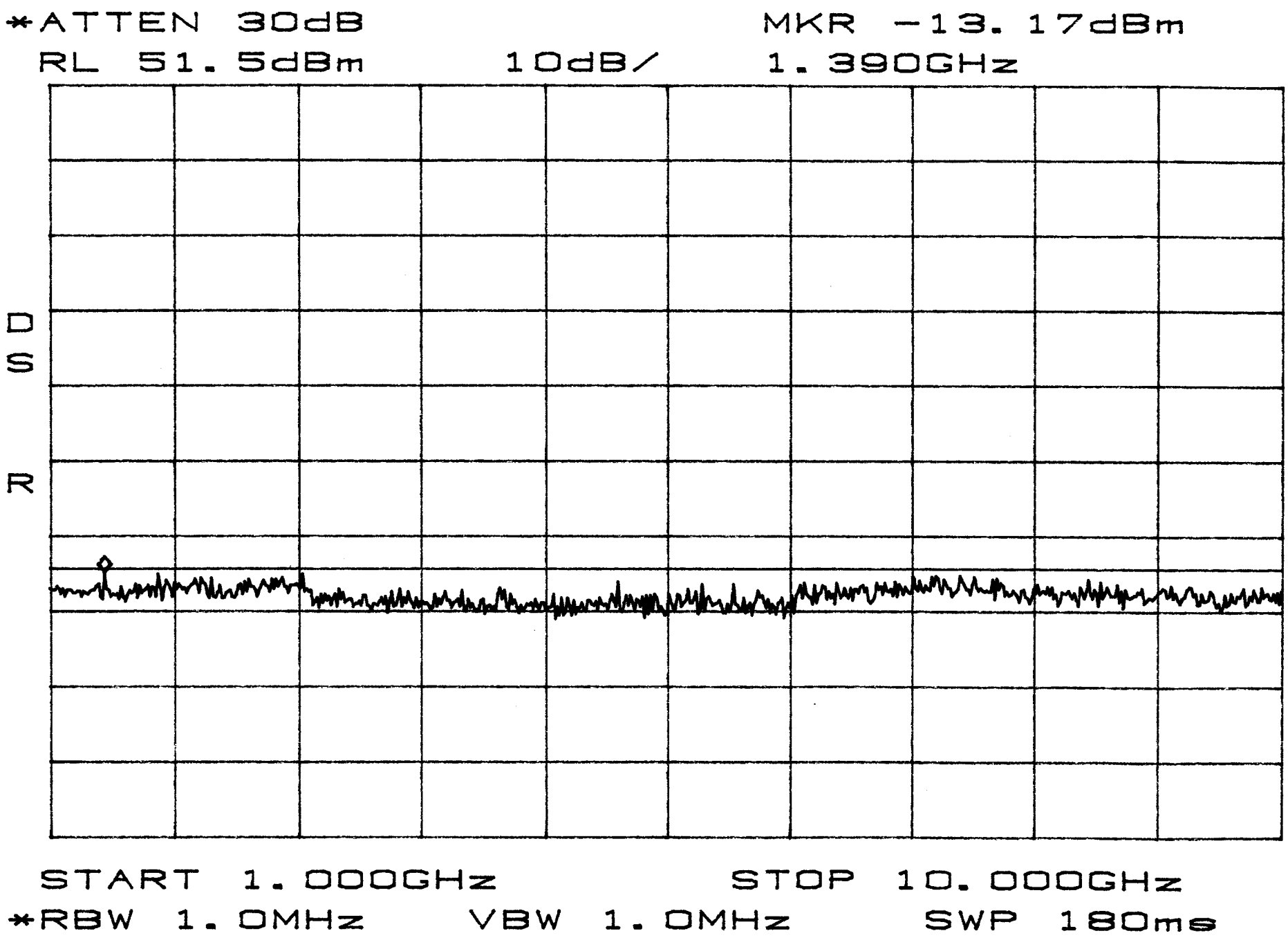
Conducted Emissions Band B
CDMA



Conducted Emissions Band B
CDMA



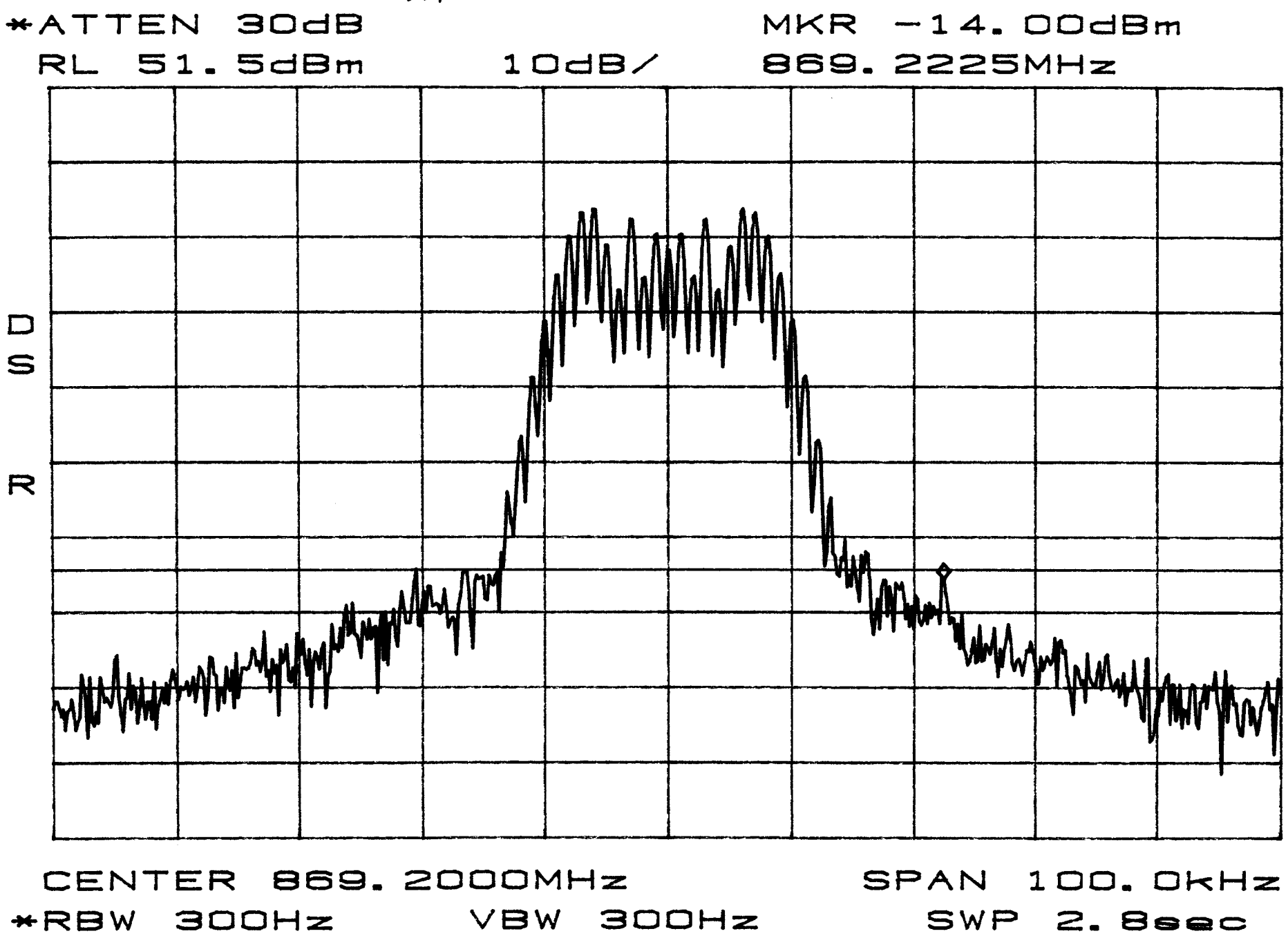
Conducted Emissions Band B
CDMA



Conducted Emissions Band A

Band Edge

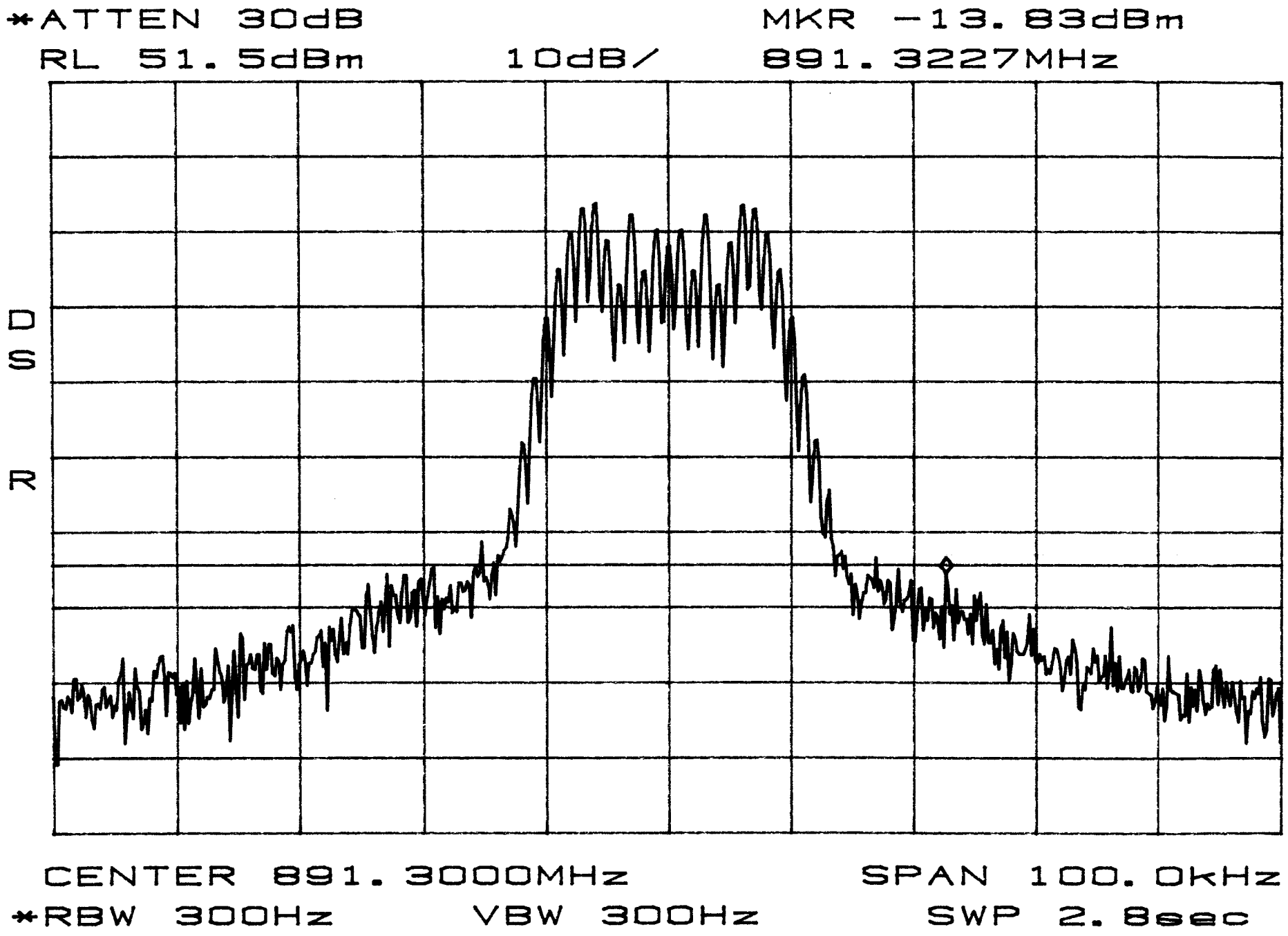
FM



Conducted Emissions Band A

Band Edge

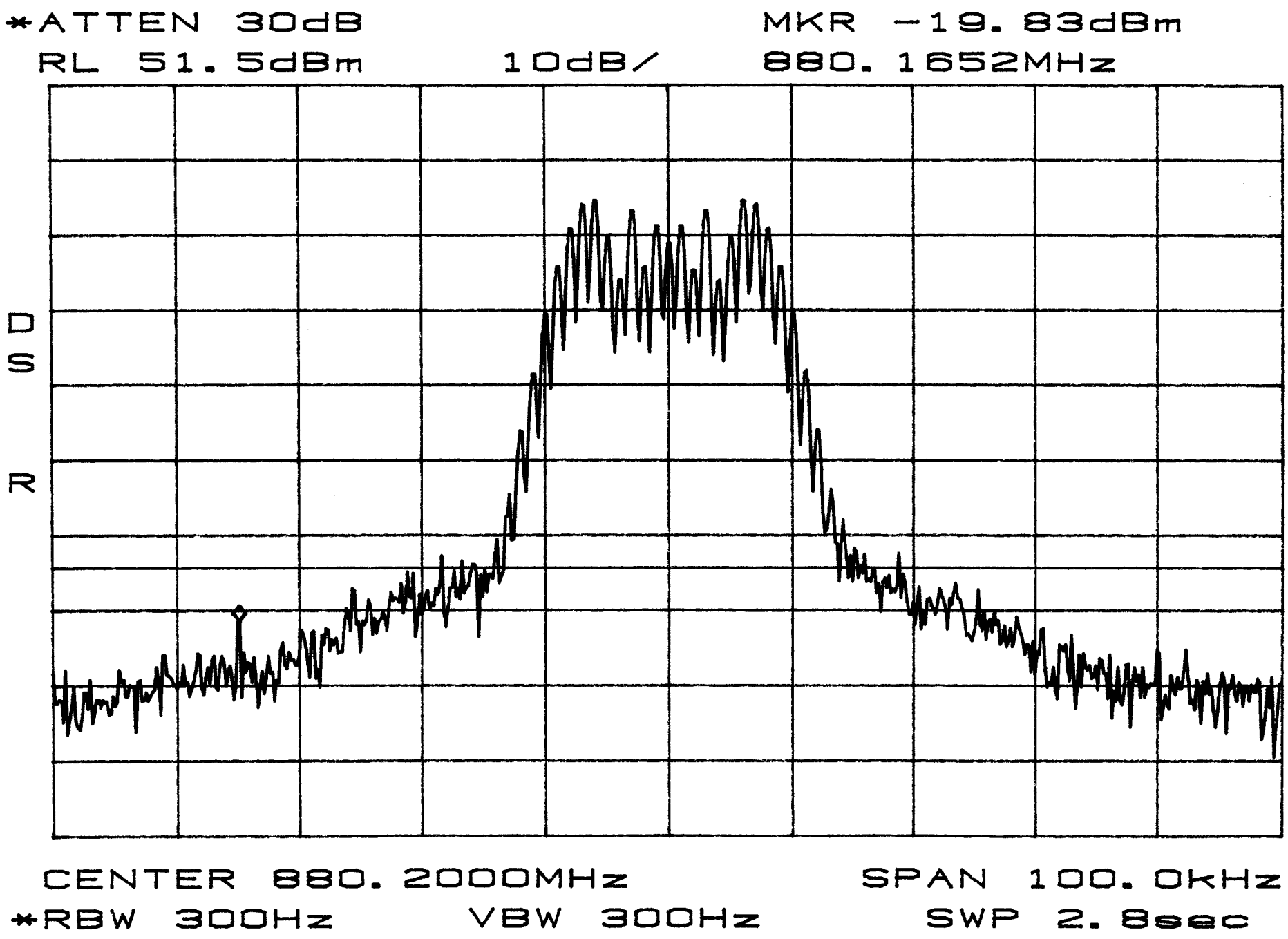
FM



Conducted Emissions Band B

Band Edge

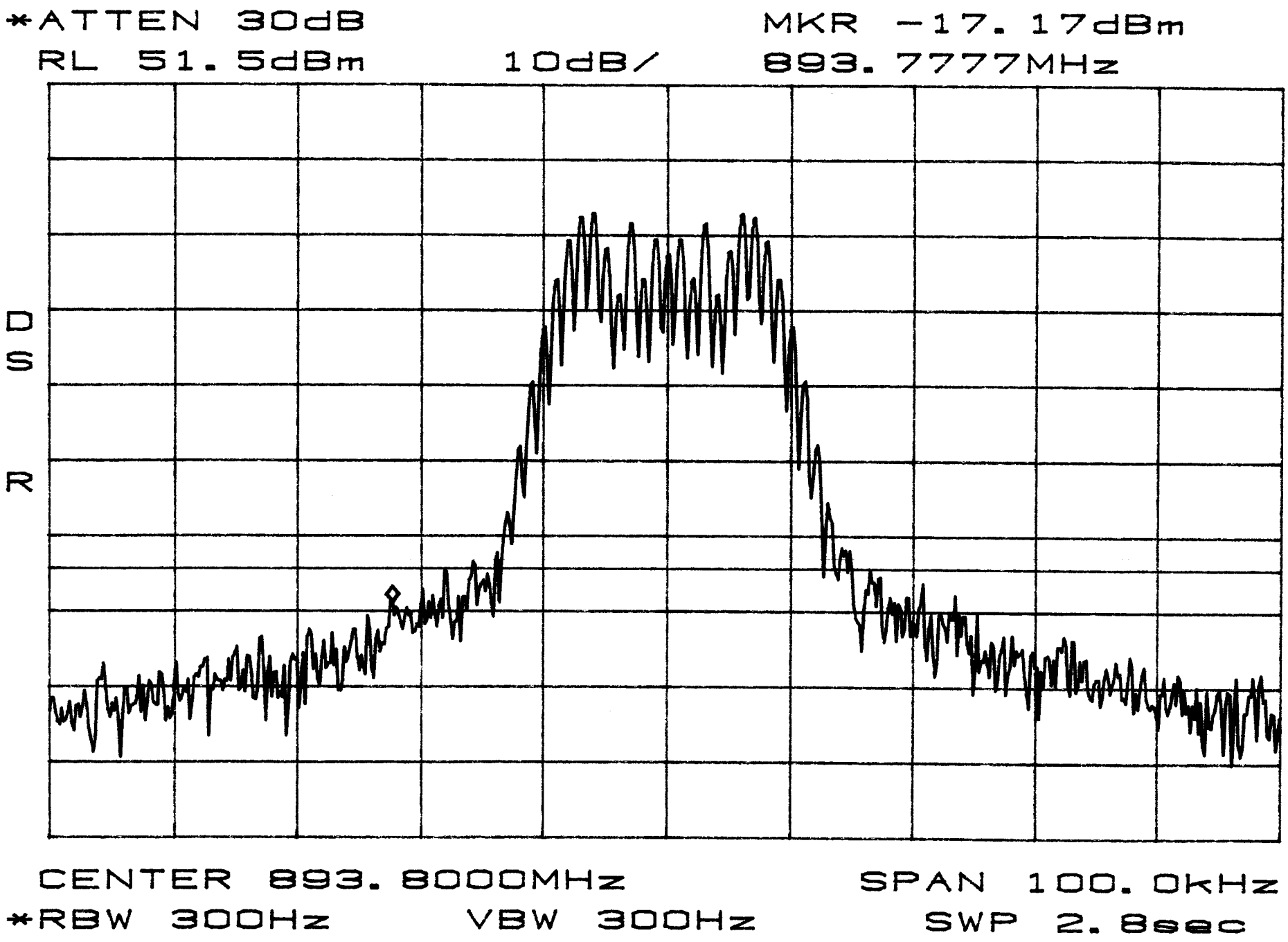
FM



Conducted Emissions Band B

Band Edge

FM



A radiated emission scan was also made with the EUT's antenna replaced with a termination to demonstrate case radiation compliance to the –13 dBm requirement at the 3 carrier frequencies. Radiated emissions from the EUT are measured in the frequency range of 30 to 9000 MHz using a spectrum analyzer and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection and measurements above 1000 MHz are made with a 1 MHz/6 dB bandwidth and peak detection. Table top equipment is placed on a 1.0 X 1.5 meter non-conducting table 80 centimeters above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. Interface cables that are closer than 40 centimeters to the ground plane are bundled in the center in a serpentine fashion so they are at least 40 centimeters from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screen room located outside the test area. The antenna is positioned 10 meters horizontally from the EUT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 meters, measurement scans are made with both horizontal and vertical antenna polarizations and the EUT are rotated 360 degrees. The field strength levels were measured per ANSI C63.4. The EUT is then replaced with a tuned dipole antenna (below 1 GHz) or horn antenna (above 1 GHz). The substitute antenna was placed in the same polarization as the test antenna. A signal generator was used to generate a signal level that matched the highest level measured from the EUT. The signal generator level minus the cable loss from the signal generator to the substitute antenna plus the substitute antenna gain equals the spurious power level. The highest emission frequency is listed below.

Frequency MHz	dBuV/m(from EUT)	Substitution power level - dBm
426.0	70.2	-26.0

Case Radiation data is on the following pages:

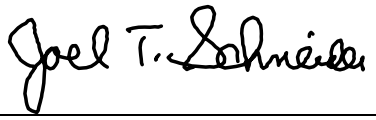
Radiated Electromagnetic Emissions

Test Report #:	**2675 Run 02**	Test Area:	OW 3m			
Test Method:	N/A	Test Date:	05-Jun-2003			
EUT Model #:	DGVL-112110SYS & DGVL-122110SYS	EUT Power:	40 VDC			
EUT Serial #:				Temperature:	22	°C
Manufacturer:	ADC TELECOMMUNICATIONS			Relative Humidity:	50	%
EUT Description:	CELLULAR A & B BAND SYSTEM			Air Pressure:	98.5	kPa
Notes:	SEE MEASUREMENT SUMMARY FOR FINAL dBm LEVELS			Page:	1 of 6	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	erp dBm	LIMIT dBm
30.50	60.8 Pk	0.5 / 20.6 / 28.3	53.5	V / 1.0 / 0.0	See Measurement	-13
58.95	66.7 Qp	0.7 / 11.8 / 28.2	51.1	V / 1.0 / 0.0	Summary – Pages 5&6	-13
79.63	58.3 Pk	0.9 / 7.5 / 28.2	38.5	V / 1.0 / 0.0	"	-13
103.40	58.6 Qp	1.0 / 9.2 / 28.2	40.6	V / 1.0 / 0.0	"	-13
142.00	72.3 Qp	1.1 / 8.9 / 28.3	54.0	V / 1.0 / 0.0	"	-13
156.20	55.2 Qp	1.3 / 9.2 / 28.2	37.4	V / 1.0 / 0.0	"	-13
178.50	54.3 Qp	1.3 / 9.1 / 28.3	36.4	V / 1.0 / 0.0	"	-13
213.00	64.8 Qp	1.4 / 10.8 / 28.2	48.7	V / 1.0 / 0.0	"	-13
225.85	46.3 Qp	1.4 / 11.1 / 28.2	30.5	V / 1.0 / 0.0	"	-13
284.00	76.5 Qp	1.6 / 12.8 / 28.3	62.6	V / 1.0 / 0.0	"	-13
323.70	39.6 Qp	1.7 / 13.7 / 28.2	26.8	V / 1.0 / 0.0	"	-13
355.00	58.3 Qp	1.8 / 15.0 / 28.2	46.9	V / 1.0 / 0.0	"	-13
426.00	73.8 Qp	2.0 / 16.9 / 28.1	64.6	V / 1.0 / 0.0	"	-13
497.00	66.0 Qp	2.2 / 17.4 / 28.1	57.5	V / 1.0 / 0.0	"	-13
548.60	36.8 Qp	2.3 / 18.8 / 28.1	29.7	V / 1.0 / 0.0	"	-13
568.00	59.7 Qp	2.3 / 18.3 / 28.1	52.2	V / 1.0 / 0.0	"	-13
639.00	56.9 Qp	2.5 / 19.8 / 28.0	51.2	V / 1.0 / 0.0	"	-13
653.70	31.5 Qp	2.5 / 19.8 / 28.0	25.8	V / 1.0 / 0.0	"	-13
710.00	63.5 Qp	2.6 / 20.4 / 28.0	58.5	V / 1.0 / 0.0	"	-13
781.00	41.0 Qp	2.7 / 21.7 / 27.9	37.5	V / 1.0 / 0.0	"	-13
801.90	32.7 Qp	2.7 / 21.9 / 27.9	29.6	V / 1.0 / 0.0	"	-13
852.00	49.1 Qp	2.9 / 22.3 / 27.7	46.6	V / 1.0 / 0.0	"	-13
909.75	58.2 Qp	2.9 / 23.0 / 27.7	56.4	V / 1.0 / 0.0	"	-13
994.00	56.4 Qp	3.2 / 22.7 / 27.7	54.5	V / 1.0 / 0.0	"	-13

Tested by: J. T. SCHNEIDER

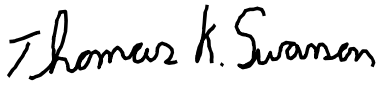
Printed



Signature

Reviewed by: T. K. Swanson

Printed



Signature

Radiated Electromagnetic Emissions

Test Report #:	**2675 Run 02**	Test Area:	OW 3m			
Test Method:	N/A	Test Date:	05-Jun-2003			
EUT Model #:	DGVL-112110SYS & DGVL-122110SYS	EUT Power:	40 VDC			
EUT Serial #:				Temperature:	22	°C
Manufacturer:	ADC TELECOMMUNICATIONS			Relative Humidity:	50	%
EUT Description:	CELLULAR A & B BAND SYSTEM			Air Pressure:	98.5	kPa
Notes:	SEE MEASUREMENT SUMMARY FOR FINAL dBm LEVELS			Page:	2 of 6	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	erp dBm	LIMIT dBm
1064.95	55.9 Pk	3.3 / 23.1 / 27.7	54.6	V / 1.0 / 0.0	See Measurement	-13
1136.15	48.2 Pk	3.2 / 23.9 / 27.7	47.6	V / 1.0 / 0.0	Summary – Pages 5&6	-13
1206.90	47.8 Pk	3.3 / 24.0 / 27.7	47.5	V / 1.0 / 0.0	"	-13
1278.10	45.0 Pk	3.6 / 24.8 / 27.8	45.6	V / 1.0 / 0.0	"	-13
1349.15	54.1 Pk	3.6 / 25.8 / 27.9	55.6	V / 1.0 / 0.0	"	-13
1491.15	40.4 Pk	3.8 / 27.0 / 28.0	43.2	V / 1.0 / 0.0	"	-13
1633.20	42.6 Pk	4.0 / 27.8 / 28.0	46.3	V / 1.0 / 0.0	"	-13
1737.90	41.7 Pk	4.1 / 28.2 / 28.0	46.0	V / 1.0 / 0.0	"	-13
79.95	51.2 Qp	0.9 / 7.5 / 28.2	31.4	V / 1.0 / 90.0	"	-13
103.40	68.9 Qp	1.0 / 9.2 / 28.2	50.9	V / 1.0 / 90.0	"	-13
178.50	57.0 Qp	1.3 / 9.1 / 28.3	39.1	V / 1.0 / 90.0	"	-13
781.00	52.5 Qp	2.7 / 21.7 / 27.9	49.0	V / 1.0 / 90.0	"	-13
1738.08	55.5 Pk	4.1 / 28.2 / 28.0	59.8	V / 1.0 / 90.0	"	-13
79.95	57.8 Qp	0.9 / 7.5 / 28.2	37.9	V / 1.0 / 180.0	"	-13
142.00	77.4 Qp	1.1 / 8.9 / 28.3	59.1	V / 1.0 / 180.0	"	-13
156.20	59.4 Qp	1.3 / 9.2 / 28.2	41.6	V / 1.0 / 180.0	"	-13
213.00	68.2 Qp	1.4 / 10.8 / 28.2	52.2	V / 1.0 / 180.0	"	-13
225.85	52.1 Qp	1.4 / 11.1 / 28.2	36.4	V / 1.0 / 180.0	"	-13
568.00	61.4 Qp	2.3 / 18.3 / 28.1	53.9	V / 1.0 / 180.0	"	-13
639.00	58.6 Qp	2.5 / 19.8 / 28.0	52.9	V / 1.0 / 180.0	"	-13
781.00	55.7 Qp	2.7 / 21.7 / 27.9	52.2	V / 1.0 / 180.0	"	-13
852.00	50.4 Qp	2.9 / 22.3 / 27.7	47.9	V / 1.0 / 180.0	"	-13
1207.07	50.5 Pk	3.3 / 24.0 / 27.7	50.2	V / 1.0 / 180.0	"	-13
30.50	60.9 Qp	0.5 / 20.6 / 28.3	53.7	V / 1.0 / 270.0	"	-13

Tested by: J. T. SCHNEIDER

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Joel T. Schneider

Signature

Reviewed by: T. K. Swanson

Printed

Thomas K. Swanson

Signature

Radiated Electromagnetic Emissions

Test Report #:	**2675 Run 02**	Test Area:	OW 3m			
Test Method:	N/A	Test Date:	05-Jun-2003			
EUT Model #:	DGVL-112110SYS & DGVL-122110SYS	EUT Power:	40 VDC			
EUT Serial #:				Temperature:	22	°C
Manufacturer:	ADC TELECOMMUNICATIONS			Relative Humidity:	50	%
EUT Description:	CELLULAR A & B BAND SYSTEM			Air Pressure:	98.5	kPa
Notes:	SEE MEASUREMENT SUMMARY FOR FINAL dBm LEVELS			Page:	3 of 6	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	erp dBm	LIMIT dBm
284.00	82.9 Qp	1.6 / 12.8 / 28.3	69.1	V / 1.0 / 270.0	See Measurement	-13
639.00	62.9 Qp	2.5 / 19.8 / 28.0	57.2	V / 1.0 / 270.0	Summary – Pages 5&6	-13
1278.07	47.3 Pk	3.6 / 24.8 / 27.8	47.9	V / 1.0 / 270.0	"	-13
284.00	83.5 Qp	1.6 / 12.8 / 28.3	69.7	V / 1.0 / 260.0	"	-13
710.00	65.7 Qp	2.6 / 20.4 / 28.0	60.7	V / 3.0 / 0.0	"	-13
323.70	44.8 Qp	1.7 / 13.7 / 28.2	32.0	V / 3.0 / 180.0	"	-13
355.00	59.2 Qp	1.8 / 15.0 / 28.2	47.8	V / 3.0 / 180.0	"	-13
355.00	62.2 Qp	1.8 / 15.0 / 28.2	50.9	V / 3.0 / 270.0	"	-13
710.00	68.6 Qp	2.6 / 20.4 / 28.0	63.6	V / 2.5 / 0.0	"	-13
225.85	54.6 Qp	1.4 / 11.1 / 28.2	38.8	H / 3.0 / 0.0	"	-13
355.00	65.1 Qp	1.8 / 15.0 / 28.2	53.8	H / 3.0 / 0.0	"	-13
79.95	60.6 Qp	0.9 / 7.5 / 28.2	40.8	H / 3.0 / 90.0	"	-13
426.00	76.4 Qp	2.0 / 16.9 / 28.1	67.2	H / 3.0 / 270.0	"	-13
426.00	79.4 Qp	2.0 / 16.9 / 28.1	70.2	H / 2.1 / 270.0	"	-13
355.00	66.5 Qp	1.8 / 15.0 / 28.2	55.2	H / 1.0 / 0.0	"	-13
568.00	62.3 Qp	2.3 / 18.3 / 28.1	54.9	H / 1.0 / 0.0	"	-13
639.00	63.8 Qp	2.5 / 19.8 / 28.0	58.1	H / 1.0 / 0.0	"	-13
225.85	57.2 Qp	1.4 / 11.1 / 28.2	41.5	H / 1.0 / 90.0	"	-13
497.00	68.4 Qp	2.2 / 17.4 / 28.1	59.9	H / 1.0 / 90.0	"	-13
710.00	72.5 Qp	2.6 / 20.4 / 28.0	67.5	H / 1.0 / 90.0	"	-13
909.75	64.1 Qp	2.9 / 23.0 / 27.7	62.3	H / 1.0 / 90.0	"	-13
SIGNAL GENERATOR/CABLE LOSS LEVEL = -20 DBM - 6 DB DIPOLE FACTOR = -26 DBM SUBSTITUTION LEVEL AT 426						
ABOVE READINGS TAKEN AT 869 MHZ XMIT FREQUENCY						
NO HIGHER LEVELS WITH 879 MHZ XMIT FREQUENCY						

Tested by: J. T. SCHNEIDER

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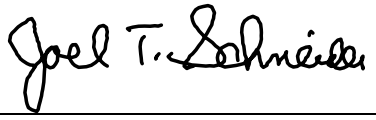
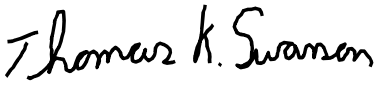


Signature

Reviewed by: T. K. Swanson

Printed



Signature

Radiated Electromagnetic Emissions

Test Report #:	**2675 Run 02**	Test Area:	OW 3m			
Test Method:	N/A	Test Date:	05-Jun-2003			
EUT Model #:	DGVL-112110SYS & DGVL-122110SYS	EUT Power:	40 VDC			
EUT Serial #:				Temperature:	22	°C
Manufacturer:	ADC TELECOMMUNICATIONS			Relative Humidity:	50	%
EUT Description:	CELLULAR A & B BAND SYSTEM			Air Pressure:	98.5	kPa
Notes:	SEE MEASUREMENT SUMMARY FOR FINAL dBm LEVELS			Page:	4 of 6	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	erp dBm	LIMIT dBm
284.00	83.6 Qp	1.6 / 12.8 / 28.3	69.7	V / 1.0 / 270.0	See Measurement	-13
2840.10	38.3 Pk	5.7 / 31.1 / 27.6	47.6	H / 1.0 / 0.0	Summary – Pages 5&6	-13
5112.00	39.4 Pk	8.2 / 35.1 / 40.8	41.8	H / 3.0 / 0.0	"	-13
ABOVE READINGS WITH 891.5 MHZ XMIT FREQUENCY						
5679.95	39.7 Pk	8.9 / 36.0 / 40.9	43.7	H / 1.0 / 0.0	"	-13
5988.00	43.5 Pk	9.7 / 36.4 / 41.0	48.5	V / 1.0 / 0.0	"	-13
639.00	67.6 Qp	2.5 / 19.8 / 28.0	61.9	V / 1.0 / 0.0	"	-13
639.00	69.9 Qp	2.5 / 19.8 / 28.0	64.2	V / 1.2 / 0.0	"	-13
909.80	71.0 Qp	2.9 / 23.0 / 27.7	69.2	V / 1.5 / 75.0	"	-13
568.00	67.8 Qp	2.3 / 18.3 / 28.1	60.3	V / 1.2 / 270.0	"	-13
ABOVE READINGS AT 880 MHZ XMIT FREQUENCY						
NO HIGHER LEVELS WITH 887 MHZ XMIT FREQUENCY						
NO HIGHER LEVELS WITH 894 MHZ XMIT FREQUENCY						
SCANNED 30-9000 MHZ, 360 DEGREES, 1-4 METERS HIGH, VERT. AND HOR. POLARIZATION.						

Tested by: J. T. SCHNEIDER

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Joel T. Schneider

Signature

Reviewed by: T. K. Swanson

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Thomas K. Swanson

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Radiated Electromagnetic Emissions

Test Report #:	**2675 Run 02**	Test Area:	OW 3m			
Test Method:	N/A	Test Date:	05-Jun-2003			
EUT Model #:	DGVL-112110SYS & DGVL-122110SYS	EUT Power:	40 VDC			
EUT Serial #:				Temperature:	22	°C
Manufacturer:	ADC TELECOMMUNICATIONS			Relative Humidity:	50	%
EUT Description:	CELLULAR A & B BAND SYSTEM			Air Pressure:	98.5	kPa
Notes:	SEE MEASUREMENT SUMMARY FOR FINAL dBm LEVELS			Page:	5 of 6	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	erp dBm	LIMIT dBm
********** **MEASUREMENT SUMMARY** **********						
30.50	60.9 Qp	0.5 / 20.6 / 28.3	53.7	V / 1.0 / 270.0	-42.5	-13
58.95	66.7 Qp	0.7 / 11.8 / 28.2	51.1	V / 1.0 / 0.0	-45.1	-13
79.63	58.3 Pk	0.9 / 7.5 / 28.2	38.5	V / 1.0 / 0.0	-57.7	-13
79.95	60.6 Qp	0.9 / 7.5 / 28.2	40.8	H / 3.0 / 90.0	-55.4	-13
103.40	68.9 Qp	1.0 / 9.2 / 28.2	50.9	V / 1.0 / 90.0	-45.3	-13
142.00	77.4 Qp	1.1 / 8.9 / 28.3	59.1	V / 1.0 / 180.0	-37.1	-13
156.20	59.4 Qp	1.3 / 9.2 / 28.2	41.6	V / 1.0 / 180.0	-54.6	-13
178.50	57.0 Qp	1.3 / 9.1 / 28.3	39.1	V / 1.0 / 90.0	-57.1	-13
213.00	68.2 Qp	1.4 / 10.8 / 28.2	52.2	V / 1.0 / 180.0	-44.0	-13
225.85	57.2 Qp	1.4 / 11.1 / 28.2	41.5	H / 1.0 / 90.0	-54.7	-13
284.00	83.6 Qp	1.6 / 12.8 / 28.3	69.7	V / 1.0 / 270.0	-26.5	-13
323.70	44.8 Qp	1.7 / 13.7 / 28.2	32.0	V / 3.0 / 180.0	-64.2	-13
355.00	66.5 Qp	1.8 / 15.0 / 28.2	55.2	H / 1.0 / 0.0	-41.0	-13
426.00	79.4 Qp	2.0 / 16.9 / 28.1	70.2	H / 2.1 / 270.0	-26.0	-13
497.00	68.4 Qp	2.2 / 17.4 / 28.1	59.9	H / 1.0 / 90.0	-36.3	-13
548.60	36.8 Qp	2.3 / 18.8 / 28.1	29.7	V / 1.0 / 0.0	-66.5	-13
568.00	67.8 Qp	2.3 / 18.3 / 28.1	60.3	V / 1.2 / 270.0	-35.9	-13
639.00	69.9 Qp	2.5 / 19.8 / 28.0	64.2	V / 1.2 / 0.0	-32.0	-13
653.70	31.5 Qp	2.5 / 19.8 / 28.0	25.8	V / 1.0 / 0.0	-70.4	-13
710.00	72.5 Qp	2.6 / 20.4 / 28.0	67.5	H / 1.0 / 90.0	-28.7	-13
781.00	55.7 Qp	2.7 / 21.7 / 27.9	52.2	V / 1.0 / 180.0	-44.0	-13
801.90	32.7 Qp	2.7 / 21.9 / 27.9	29.6	V / 1.0 / 0.0	-66.6	-13

Tested by: J. T. SCHNEIDER

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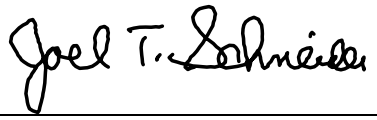
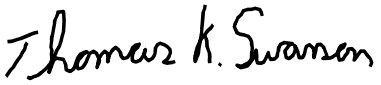


Signature

Reviewed by: T. K. Swanson

Printed



Signature

Radiated Electromagnetic Emissions

Test Report #:	**2675 Run 02**	Test Area:	OW 3m			
Test Method:	N/A	Test Date:	05-Jun-2003			
EUT Model #:	DGVL-112110SYS & DGVL-122110SYS	EUT Power:	40 VDC			
EUT Serial #:				Temperature:	22	°C
Manufacturer:	ADC TELECOMMUNICATIONS			Relative Humidity:	50	%
EUT Description:	CELLULAR A & B BAND SYSTEM			Air Pressure:	98.5	kPa
Notes:	SEE MEASUREMENT SUMMARY FOR FINAL dBm LEVELS			Page:	6 of 6	

FREQ (MHz)	LEVEL (dBuV)	CABLE / ANT / PREAMP (dB) (dB/m) (dB)	FINAL (dBuV)	POL / HGT / AZ (m) (DEG)	erp dBm	LIMIT dBm
********** **MEASUREMENT SUMMARY CONTINUED**********						
852.00	50.4 Qp	2.9 / 22.3 / 27.7	47.9	V / 1.0 / 180.0	-48.3	-13
909.80	71.0 Qp	2.9 / 23.0 / 27.7	69.2	V / 1.5 / 75.0	-27.0	-13
994.00	56.4 Qp	3.2 / 22.7 / 27.7	54.5	V / 1.0 / 0.0	-41.7	-13
1064.95	55.9 Pk	3.3 / 23.1 / 27.7	54.6	V / 1.0 / 0.0	-41.6	-13
1136.15	48.2 Pk	3.2 / 23.9 / 27.7	47.6	V / 1.0 / 0.0	-48.6	-13
1207.07	50.5 Pk	3.3 / 24.0 / 27.7	50.2	V / 1.0 / 180.0	-46.0	-13
1278.07	47.3 Pk	3.6 / 24.8 / 27.8	47.9	V / 1.0 / 270.0	-48.3	-13
1349.15	54.1 Pk	3.6 / 25.8 / 27.9	55.6	V / 1.0 / 0.0	-40.6	-13
1491.15	40.4 Pk	3.8 / 27.0 / 28.0	43.2	V / 1.0 / 0.0	-53.0	-13
1633.20	42.6 Pk	4.0 / 27.8 / 28.0	46.3	V / 1.0 / 0.0	-49.9	-13
1738.08	55.5 Pk	4.1 / 28.2 / 28.0	59.8	V / 1.0 / 90.0	-36.4	-13
2840.10	38.3 Pk	5.7 / 31.1 / 27.6	47.6	H / 1.0 / 0.0	-48.6	-13
5112.00	39.4 Pk	8.2 / 35.1 / 40.8	41.8	H / 3.0 / 0.0	-54.4	-13
5679.95	39.7 Pk	8.9 / 36.0 / 40.9	43.7	H / 1.0 / 0.0	-52.5	-13
5988.00	43.5 Pk	9.7 / 36.4 / 41.0	48.5	V / 1.0 / 0.0	-47.7	-13

Tested by: J. T. SCHNEIDER

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Joel T. Schneider

Signature

Reviewed by: T. K. Swanson

Printed

Thomas K. Swanson

Signature

Equipment Under Test (EUT) Test Operation Mode - Emission tests :

The device under test was operated under the following conditions during emissions testing:

☐ - Standby

☐ - Test program (H - Pattern)

☐ - Test program (color bar)

☐ - Test program (customer specific)

☐ - Practice operation

☐ - Normal Operating Mode

■ - Max composite in and out.

Configuration of the device under test:

The following peripheral devices and interface cables were connected during the measurement:

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

■ - unshielded power cable

■ - unshielded cables

■ - shielded cables MPS.No.: _____

☐ - customer specific cables

☐ - _____

☐ - _____

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

DEVIATIONS FROM STANDARD:

None

GENERAL REMARKS:

SUMMARY:

The requirements according to the technical regulations are

■ - met

☐ - **not** met.

The device under test does

■ - fulfill the general approval requirements mentioned on page 3.

☐ - **not** fulfill the general approval requirements mentioned on page 3.

Testing Start Date: 05 June 2003

Testing End Date: 05 June 2003

- TÜV PRODUCT SERVICE INC -

Thomas K. Swanson

Reviewed By:
T. K. Swanson

Joel T. Schneider

Tested By:
J. T. Schneider

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

Test Equipment List

	TUV ID	Model Number	Manufacturer	Description	Serial Number	Cal Due
■ -	3932	8566B	Hewlett-Packard	Spectrum Analyzer	2115A00853	9-03-03
■ -	3931	85662A	Hewlett-Packard	Analyzer Display	2112A02220	9-03-03
■ -	2682	85650A	Hewlett-Packard	Quasi-Peak Adapter	2811A01127	2-08-04
■ -	3203	EM-6917B	Electro-Metrics	Biconicalog Periodic	101	3-04-04
■-	3927	ZHL-1042J-SMA	Mini-Circuits	Preamplifier	D113001-16	2-28-04
■ -	2074	3115	Electro-Mechanics (EMCO)	Ridge Guide Antenna	2504	10-15-03
■ -	2478	AWT-18037	Avantek	Preamplifier 8-18 GHz	1001-9226	4-17-04
■ -	2477	AFT-8434	Avantek	Preamplifier 4-8 GHz	2613A92801	4-17-04
■ -	2396	2520	Wavetek	Signal Generator	6271013	6-05-03
■ -	3236	UHAP-10dB	Schwarzbeck	Dipole Antenna 300-1000	164	N/A

All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST) and is calibrated annually. Equipment labeled CNR (Calibration Not Required) is verified and compensated for with NIST traceable calibrated equipment.

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

Appendix A

Product Information Form

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

Form

EMC Test Plan and Constructional Data Form

PRODUCT SERVICE

PLEASE COMPLETE THIS DOCUMENT IN FULL, ENTERING N/A IF THE FIELD IS NOT APPLICABLE.

Applicant -- ***NOTE: This information will be input into your test report as shown below.***
Press the F1 key at any time to get HELP for the current field selected.

Company:	ADC Inc.		
Address:	P.O. Box 1101		
	Minneapolis, MN 55440-1101		
Contact:	Mark F. Miska	Position:	Compliance Engineer
Phone:	952-917-0326	Fax:	952-917-0181
E-mail Address:	mark.miska@adc.com		

General Equipment Description -- ***NOTE: This information will be input into your test report as shown below.***

EUT Description	Transports RF between a remote antenna and a customer provided base station.		
EUT Name	Digivance Long Range Coverage Solution 800 MHz System (A and B Band)		
Model No.:	DGVL-112110SYS and DGVL-122110SYS	Serial No.:	None
Product Options:	Receive Diversity		
Configurations to be tested:	800 MHz A Band and B Band Version with Diversity option		

Test Objective

- ☐ EMC Directive 89/336/EEC (EMC) Std: _____
- ☐ Machinery Directive 89/392/EEC (EMC Std: _____
- ☐ Medical Device Directive 93/42/EEC (EMC) Std: _____
- ☐ Vehicle Directive 72/245/EEC (EMC) Std: _____
- ☐ FDA Reviewers Guidance for Premarket Notification Submissions (EMC)

- ☒ FCC: Class ☐ A ☐ B Part 22
- ☐ VCCI: Class ☐ A ☐ B
- ☐ BCIQ: Class ☐ A ☐ B
- ☐ Canada: Class ☐ A ☐ B
- ☐ Australia: Class ☐ A ☐ B
- ☐ Other: _____

TÜV Product Service Certification Requested

- ☐ Attestation of Conformity (AoC)
- ☐ Certificate of Conformity (CoC)
- ☐ International EMC Mark (IEM)
- ☐ Compliance Document

Protection Class (N/A for vehicles) ☐ Class I ☐ Class II ☐ Class III

(Press **F1** when field is selected to show additional information on Protection Class.)

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

Attendance

Test will be: ☒ Attended by the customer ☐ Unattended by the customer

Failure - *Complete this section if testing will not be attended by the customer.*

If a failure occurs, TUV Product Service should:

☐ Call contact listed above, if not available then stop testing. (After hrs phone): _____

☐ Continue testing to complete test series.

☐ Continue testing to define corrective action.

☐ Stop testing.

EUT Specifications and Requirements

Length: 19 Width: 51" Height: 27 Weight: 62 LB

Power Requirements

Regulations require testing to be performed at typical power ratings in the countries of intended use. (i.e., European power is typically 230 VAC 50 Hz or 400 VAC 50 Hz, single and three phase, respectively)

Voltage: 115 VAC (If battery powered, make sure battery life is sufficient to complete testing.)

# of Phases: 1

Current (Amps/phase(max)): 2.5 Current (Amps/phase(nominal)): 1.5

Other _____

Other Special Requirements

none

Typical Installation and/or Operating Environment

(ie. Hospital, Small Business, Industrial/Factory, etc.)

Host indoor only with STM and LPA indoor or outdoor. System is typically employed as a Microcell.

EUT Power Cable

☐ Permanent OR ☒ Removable Length (in meters): 1

☐ Shielded OR ☒ Unshielded

☐ Not Applicable

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

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*	☒ Removable ☐ Permanent
RF "N" type	☒	☐	5	☒	☐	Braid	Coaxial	N	50 Ohms	>3	☒ ☐
Alarm	☒	☐	1	☐	☒	Not Specified	N/A	6 Pin Standoff		>3	☒ ☐
Alarm	☒	☐	1	☐	☒	Not Specified	N/A	4 Pin Standoff		>3	☒ ☐
Fiber	☐	☒	3	☐	☒	N/A	N/A	SC	N/A	>3	☒ ☐
9 Pin Din	☐	☒	4	☒	☐	Not Specified	AC Coupled	Din		>3	☒ ☐
Net in	☐	☒	1	☐	☒	Not Specified	N/A	Cat 5		>3	☒ ☐
Net out	☐	☒	1	☐	☒	Not Specified	N/A	Cat 5		3	☒ ☐
DC power block	☒	☐	1	☐	☒	None		Terminal		>3	☒ ☐
AC power	☒	☐	1	☐	☒	None				<3	☒ ☐
STM to Amp Interconnect	☒	☒	1	☒	☒	Varied	Chassis	Special		.3	☒ ☐
Battery Connection	☐	☐	1	☐	☒	N/A	N/A	2 Pin Standoff		<1	☒ ☐
	☐	☐		☐	☐						☐ ☐

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

EUT Software.

Revision Level: Version 0.00.00.12

Description: Digivance Element Management System (DEMS). System Management and Interface Matching Software.

EUT Operating Modes to be Tested -- list the operating modes to be used during test. It is recommended the equipment be tested while operating in a typical operation mode. FCC testing of personal computers and/or peripherals requires that a simple program generate a complete line of upper case H's. Provide a general description of all software, firmware, and PLD algorithms used in the equipment. List all code modules as described above, with the revision level used during testing. Consult with your TÜV Product Service Representative if additional assistance is required.

1. Max composite in and out
2.
3.

EUT System Components -- List and describe all components which are part of the EUT. For FCC testing a minimum configuration is required. (ie. Mouse, Printer, Monitor, External Disk Drive, Motherboard, etc.)

Description	Model #	Serial #	FCC ID #
Host Unit	DGVL-102010HU	None	
STM A Band	DGVL-112101STM	None	
STM B Band	DGVL-122010STM	None	
Amp	DGVL-102000LPA	None	
Digivance LRCS 800 MHz System Model DGVL-112110SYS and DGVL-122110SYS consist of the HU, STM, and LPA.			

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

Support Equipment -- List and describe all support equipment which is not part of the EUT. (i.e. peripherals, simulators, etc)

Description	*Model #*	*Serial #*	*FCC ID #*
Signal Generator	HP E4432B	MC22109	
DC Power Supply	Xantrex HPD 60-5	MC27884	

Oscillator Frequencies

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

Power Supply

Manufacturer	*Model #*	*Serial #*	*Type*
ADC			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____
			☐ Switched-mode: (Frequency) _____ ☐ Linear ☐ Other: _____

Power Line Filters

Manufacturer	*Model #*	*Location in EUT*
None		

EMC Test Plan and Constructional Data Form

TÜV PRODUCT SERVICE

Critical EMI Components (Capacitors, ferrites, etc.)

Description	*Manufacturer*	*Part # or Value*	*Qty*	*Component # / Location*
None				

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

None

(PLEASE INSERT "**ELECTRONIC SIGNATURE**" BELOW IF POSSIBLE)

Authorization Signatures

Mark F. Miller — 6-16-03

Customer authorization to perform tests according to this test plan. — Date

Test Plan/CDF Prepared By (please print) — Date

Reviewed by TÜV Product Service Associate — Date