CDMA B-band

Report No. S6636-06

TÜV PRODUCT SERVICE

TEST RESULT SUMMARY

UNITED STATES STANDARD 47 CFR PART 15, SUBPART B

MANUFACTURER NAME	ORTEL CORPORATION
NAME OF EQUIPMENT	CDMA Repeater
MODEL NUMBER	CDR-1901-1-5
MANUFACTURER ADDRESS	2015 West Chestnut Street Alhambra, CA 91803
TEST REPORT NUMBER	S6636-06
TEST DATE	04 November 1996

According to testing performed at TÜV Product Service, Inc., the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in United States Standard 47 CFR Part 15, Subpart B, Paragraphs 15.107(b) and 15.109(b).

TÜV Product Service reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. 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.

As the responsible EMC Project/Division Managers, we hereby declare that the equipment tested at TÜV Product Service, Inc. as specified above conforms to the requirements of United States Standard 47 CFR Part 15, Radio Frequency Devices, Subpart B, Unintentional Radiators.

Date: 08 November 1996

Location: San Diego, California USA

Floyd R. Fleury
Responsible Engineer

John G. Smith, PE, NCE
EMC Division Manager

Not Transferable

TÜV PRODUCT SERVICE

EMC EMISSION - TEST REPORT
UNITED STATES STANDARD 47 CFR PART 15, SUBPART B

Test Report File No.	: **S6636-06**	Date of Issue:	08 November 1996
Model / Serial No.	: **CDR-1901-1-5 / 1**		
Product Type	: CDMA Repeater		
Applicant	: ORTEL CORPORATION		
Manufacturer	: ORTEL CORPORATION		
License holder	: ORTEL CORPORATION		
Address	: 2015 West Chestnut Street		
	: Alhambra, CA 91803		
Test Result	: ■ **Positive**	☐ **Negative**	
Test Project Number Reference(s)	: **S101663601-06**		
Total pages including Appendices	: 45		

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 reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. 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.

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 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

DIRECTORY - EMISSIONS

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

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EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to the following regulations:

☐ - EN 50081-1 / 1991

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

☐ - EN 55022 / 1994 — ☐ - Class A — ☐ - Class B

☐ - BS
☐ - VCCI — ☐ - Class 1 ITE — ☐ - Class 2 ITE

■ - FCC — ■ - Class A — ☐ - Class B

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

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

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

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Environmental Conditions In The Laboratory:

	Actual
Temperature:	: 23 °C
Relative Humidity:	: 50 %
Atmospheric Pressure:	: 1000 mBar

Power Supply Utilized:

Power supply system : 120 V / 60 Hz / 1ϕ

Symbol Definitions:

■ - Applicable
☐ - Not Applicable

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Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)* measurements were performed at the following test location:

☐ - **Test not applicable**

☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
■ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
☐ -	NM-7A, NM-17/27, NM-37/57, NM-67, CCA-7, and H/P 9836 HP-1B Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 1	(multiple)	156, 162-166
☐ -	NM-17/27, NM-37/57, CA-7, and H/P 9826 Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 2	(multiple)	168, 170, 177, 178
☐ -	H/P Spectrum Analyzer, Model 8568B; Display Section RF Analyzer Section; H/P 85650A, Quasi-Peak Adapter H/P Computer System, Model 310 with HP 85869A Software	Various	Automated RFI Measurement System (ARMS)	(multiple)	187, 188
☐ -	LISN-3, 50 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	3-4	262-263
☐ -	LISN-3, 50 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	5-6	264, 265
☐ -	LISN-2, 25 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	7	413
☐ -	LISN-2, 25 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	7	--
☐ -	FCC-LISN-50-25-2	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	112	553
☐ -	FCC-LISN-50-25-2	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	113	552
☐ -	8012-50-R-12-BNC	Solar Electronics Co.	LISN, 50 µH/50 Ω/0.1 µF	--	266
☐ -	9252-50-R-24-BNC	Solar Electronics Co.	LISN, 50 µH /250 µH/50 Ω/ 0.25 µF	941719	458
■ -	9252-50-R-24-BNC	Solar Electronics Co.	LISN, 50 µH /250 µH/50 Ω/ 0.25 µF	941720	457
☐ -	MDS-21	Rohde & Schwarz	Absorbing Clamp	821023	277
■ -	ESHS 20	Rohde & Schwarz	EMI Test Receiver	837055/001	428
☐ -	ESHS 30	Rohde & Schwarz	EMI Test Receiver	832354/004	459

Remarks: _____

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Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD)* measurements were performed at the following test location:

■ - Test not applicable

☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
☐ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - TR-1, Shielded Room, 16.5' x 10' x 7.5', Copper Screen Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Testing was performed at a test distance of :

☐ - 3 meters
☐ - 30 meters

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
☐ -	NM-7A, NM-17/27, NM-37/57, NM-67, CCA-7, and HP 9836 HP-1B Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 1	(multiple)	156, 162-166
☐ -	NM-17/27, NM-37/57, CA-7, and HP 9826 Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 2	(multiple)	168, 170, 177, 178
☐ -	AT-205/URM-6	Eaton/Ailtech	Loop Antenna	64090	201
☐ -	94593-1	Eaton/Ailtech	Loop Antenna	0264	205

NOT APPLICABLE

Remarks: _____

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Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location :

■ - Test not applicable

■ - Roof (Small Open Area Test Site)
☐ - Canyon #1 (10- and 30-Meter Open Area Test Site), Carroll Canyon, San Diego
☐ - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Testing was performed at a test distance of :

■ - 3 meters
☐ - 10 meters
☐ - 30 meters

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
■ -	NM-37/57A	Eaton/Ailtech	OATS measurement set (Roof)	0561-09261	420
	CCA-7			0773-03117	373
☐ -	NM-37/57	Eaton/Ailtech	OATS measurement set (Canyon)	0709-82078	171
	CCA-7			0187-0322	172
☐ -	HFH 2-Z2	Rohde & Schwarz	Antenna, Loop	880	208
■ -	3104	EMCO	Antenna, Biconical	3031	235
☐ -	3110	EMCO	Antenna, Biconical	1378	451
☐ -	94455-1	Eaton/Ailtech	Antenna, Biconical	0811	231
☐ -	3110B	EMCO	Antenna, Biconical	9508-2	491
☐ -	CBL6111	Chase	Antenna, Bilog	1013	460
☐ -	CBL6111	Chase	Antenna, Bilog	1291	461
☐ -	3146	EMCO	Antenna, Log Periodic Dipole	1597	242
■ -	3146	EMCO	Antenna, Log Periodic Dipole	106X	243
☐ -	3146	EMCO	Antenna, Log Periodic Dipole	1063	244
☐ -	7405	EMCO	Loop Probes	9104-1959	570
☐ -	8566B	Hewlett Packard	Spectrum Analyzer	2311A02209	404
☐ -	85662B	Hewlett Packard	Spectrum Analyzer Display	2309A04682	406
☐ -	ESVS 30	Rohde & Schwarz	EMI Test Receiver	830350/006	427
☐ -	ESVS 30	Rohde & Schwarz	EMI Test Receiver	833825/003	466

Remarks: _____

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Emissions Test Conditions: INTERFERENCE POWER

The *INTERFERENCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location :

■ - Test not applicable

☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
☐ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
☐ -	MDS-21	Rohde & Schwarz	Absorbing Clamp	821023	277
☐ -	NM-7A, NM-17/27, NM-37/57, NM-67, CCA-7, and H/P 9836 HP-1B Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 1	(multiple)	156, 162-166
☐ -	NM-17/27, NM-37/57, CA-7, and H/P 9826 Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 2	(multiple)	168, 170, 177, 178
☐ -	H/P Spectrum Analyzer, Model 8568B; Display Section RF Analyzer Section; H/P 85650A Quasi-Peak Adapter H/P Computer System, Model 310 with HP 85869A Software	Newlett Packard	Automated RFI Measurement System (ARMS)	2304A04531 2304A02500 2811A01325	187, 188
☐ -	ESVS 30	Rohde & Schwarz	EMI Test Receiver	830350/006	427
☐ -	ESVS 30	Rohde & Schwarz	EMI Test Receiver	830350/003	466

NOT APPLICABLE

Remarks: _____

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Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz - 18 GHz were performed in a horizontal and vertical polarization at the following test location :

■ - Test not applicable

☐ - Roof (Small Open Area Test Site)
☐ - Canyon #1 (10- and 30-Meter Open Area Test Site), Carroll Canyon, San Diego
☐ - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Testing was performed at a test distance of:

☐ - 1 meters
☐ - 3 meters
☐ - 10 meters

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
☐ -	8566B	Hewlett Packard	Spectrum Analyzer	2311A02209	407
☐ -	85662B	Hewlett Packard	Spectrum Analyzer Display	2309A04682	406
☐ -	3115	EMCO	Antenna, Double Ridge Guide	9412-4363	453
☐ -	3115	EMCO	Antenna, Double Ridge Guide	2495	251
☐ -	AFD3-01002-18-ST	Miteq, Inc.	Pre-Amplifier (38 dB gain), 1 to 2 GHz	16429	366
☐ -	AFD3-02003-40-ST	Miteq, Inc.	Pre-Amplifier (30 dB gain), 2 to 8 GHz	155382	367
☐ -	AFS4-08001800-70-10P-4	Miteq, Inc.	Pre-Amplifier (22 dB gain), 8 to 18 GHz	167	368
☐ -	91888-2	Eaton	Horn Antenna (1 to 2 GHz)	101	252
☐ -	91889-2	Eaton	Horn Antenna (2 to 3.6 GHz)	101	253
☐ -	91892-1	Eaton	Reflector Antenna (3.6 to 18 GHz)	--	254
☐ -	94613-1	Eaton	Horn Antenna (3.6 to 7.6 GHz)	--	255
☐ -	91891-2	Eaton	Horn Antenna (7.3 to 12 GHz)	--	256
☐ -	94614-1	Eaton	Horn Antenna (12 to 18 GHz)	--	257

NOT APPLICABLE

Remarks: _____

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Equipment Under Test (EUT) Test Operation Mode - Emissions Tests :

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

☐ - Standby

☐ - Test Program (H - Pattern)

☐ - Test Program (Color Bar)

☐ - Test Program (Customer Specified)

☐ - Practice Operation

☐ - Normal Operating Mode

■ - Transmit

Configuration of the equipment under test:

☐ - See Constructional Data Form in Appendix B - Page B2

■ - See Product Information Form(s) in Appendix B - Page B2

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

☐ - N/A Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables MPS.No.: _____

☐ - customer specific cables

☐ - _____

☐ - _____

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Emissions Test Results:

Conducted Emissions, 10/150/450 kHz - 30 MHz

■ - PASS ☐ - FAIL ☐ - NOT APPLICABLE

Minimum limit margin 17.2 dB at 1.03 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Radiated Emissions (Magnetic Field), 10 kHz - 30 MHz

☐ - PASS ☐ - FAIL ■ - NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Radiated Emissions (Electric Field), 30 MHz - 1000 MHz

■ - PASS ☐ - FAIL ☐ - NOT APPLICABLE

Minimum limit margin 1.2 dB at 943.73 MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Interference Power at the Mains and Interface Cables, 30 MHz - 300 MHz

☐ - PASS ☐ - FAIL ■ - NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

Equivalent Radiated Emissions, 1 GHz - 18 GHz

☐ - PASS ☐ - FAIL ■ - NOT APPLICABLE

Minimum limit margin _____ dB at _____ MHz

Maximum limit exceeding _____ dB at _____ MHz

Remarks: _____

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GENERAL REMARKS:

SUMMARY:

All tests according to the regulations cited on page 3 were

■ - Performed

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 3.

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

Statement of Measurement Uncertainty

The data and results referenced in this document are true and accurate. There may be some degree or level of measurement uncertainty. As EN 45001 does not allow recommendations to be included in the test report, the reader is encouraged to request a copy of the TÜV policy concerning pass or fail judgment with respect to possible measurement uncertainties.

Equipment Received Date: 04 November 1996

Testing Start Date: 04 November 1996

Testing End Date: 04 November 1996

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:

Floyd R. Fleury
(Senior EMC Engineer)

Responsible Engineer:

Mary Washington
(EMC Engineer)

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Appendix A

Test Data Sheets

and

Test Setup Drawing(s)

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TUV Product Service
POWERLINE CONDUCTED RFI

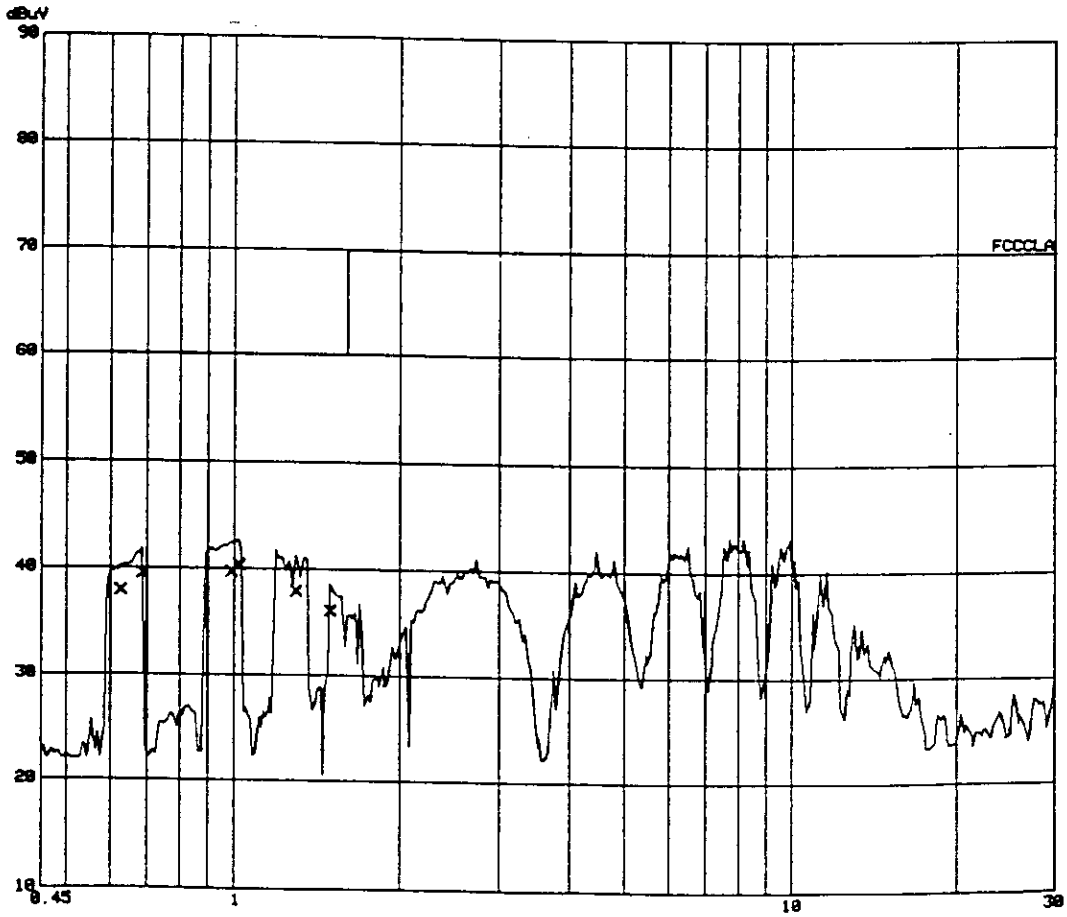
EUT: Model CDR-1901-1-B CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington mw
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 1
Mid Channel, CW
Date: 04. Nov 96 09:34

Scan Settings (2 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB



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TUV Product Service
POWERLINE CONDUCTED RFI

EUT: Model CDR-1901-1-B CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington MW
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 1
Mid Channel, CW
Date: 04. Nov 96 09:34

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB

Final Measurement Results:

Frequency MHz	QP Level dB	QP Limit dB
0.62500	38.0	60.0
0.68500	~~39.5~~ 41.0	60.0
0.98500	~~39.7~~ 42.0	60.0
1.02000	~~40.3~~ 42.6	60.0
1.29000	38.0	60.0
1.49000	36.1	60.0

* limit exceeded

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TUV Product Service
POWERLINE CONDUCTED RFI

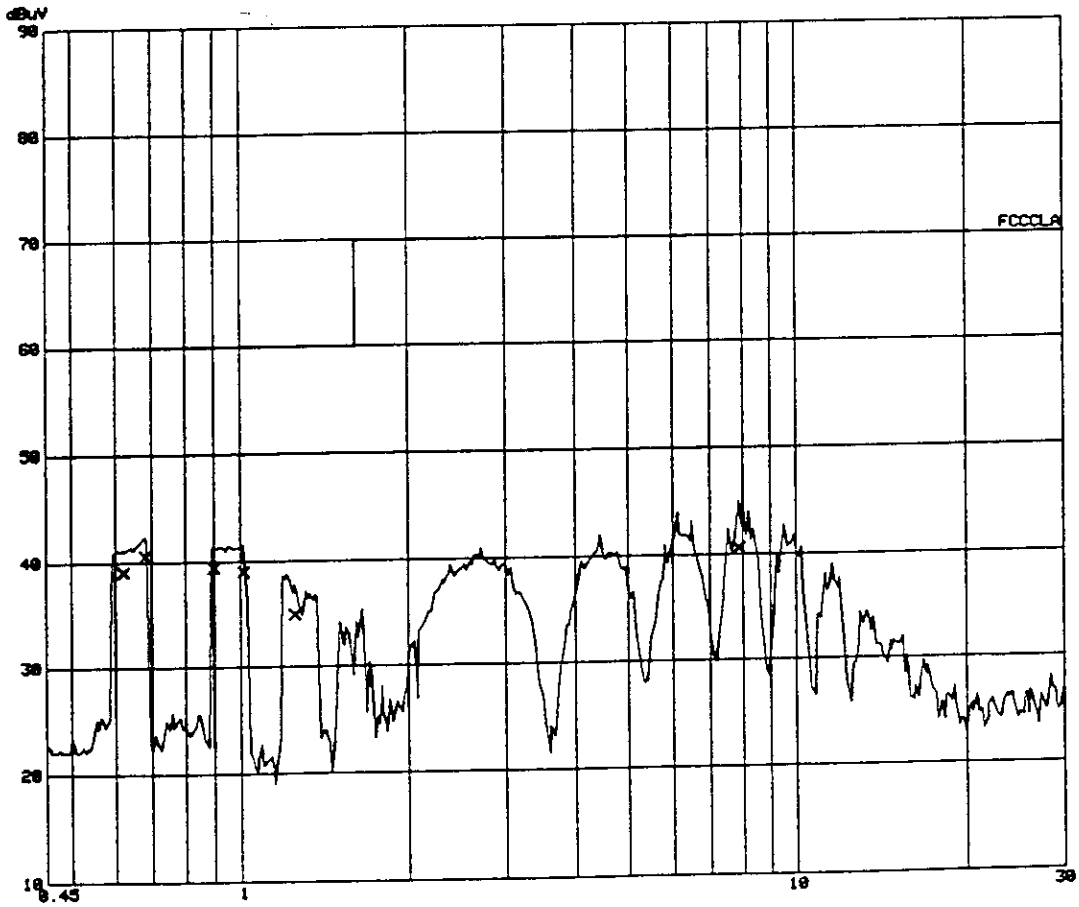
EUT: Model CDR-1901-1-B CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington MW
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 2
Mid Channel, CW
Date: 04. Nov 96 09:44

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB



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TUV Product Service
POWERLINE CONDUCTED RFI

EUT: Model CDR-1901-1-B CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington MW
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 2
Mid Channel, CW
Date: 04. Nov 96 09:44

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.62000	39.1	60.0
0.68000	~~40.6~~ 42.1	60.0
0.89500	~~39.3~~ 41.0	60.0
1.01000	39.0	60.0
1.25000	34.9	60.0
7.88000	~~40.5~~ 45.0	70.0

25

* limit exceeded

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TUV Product Service
POWERLINE CONDUCTED RFI

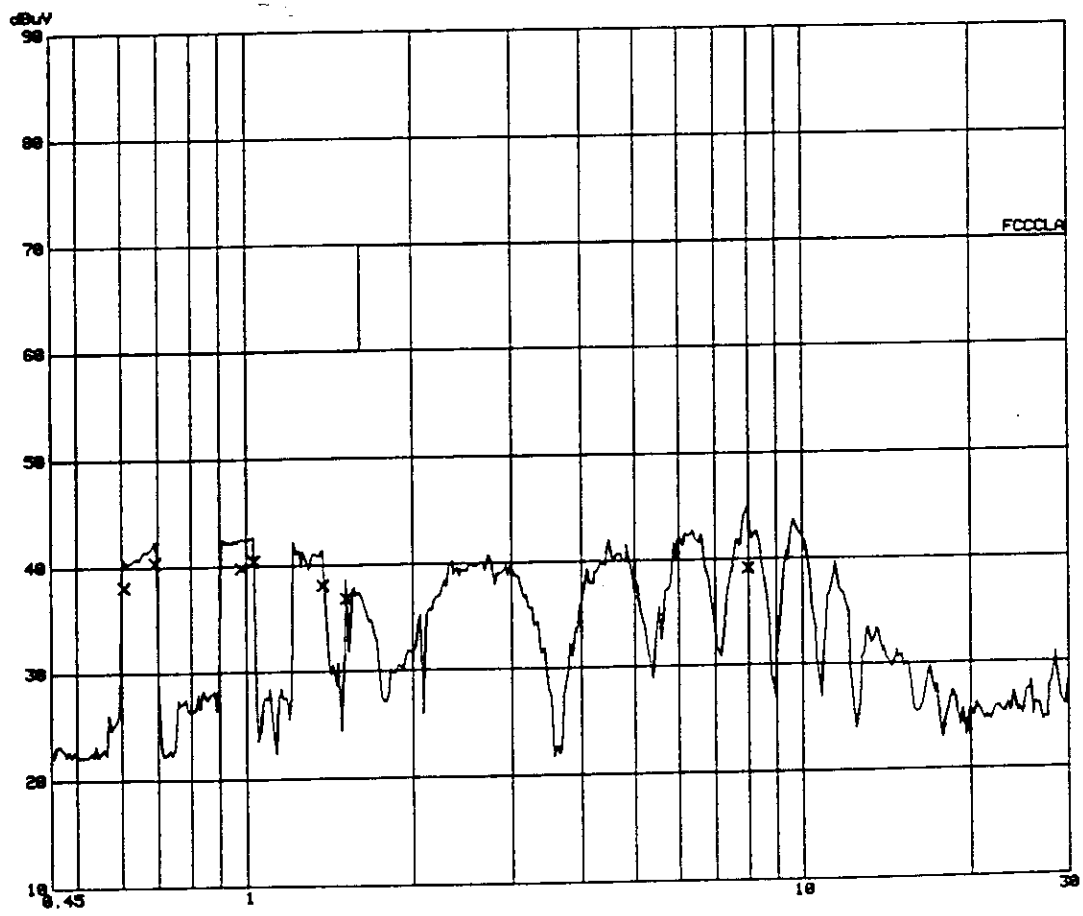
EUT: Model CDR-1901-1-B CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington mw
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 1
Mid Channel, CDMA
Date: 04. Nov 96 10:01

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB



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TUV Product Service
POWERLINE CONDUCTED RFI

EUT: Model CDR-1901-1-B CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 1
Mid Channel, CDMA
Date: 04. Nov 96 10:01

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.60500	38.1	60.0
0.69000	~~40.3~~ 42.0	60.0
0.98000	~~39.8~~ 42.4	60.0
1.03000	~~40.4~~ 42.8	60.0
1.37000	~~38.1~~ 38.1	60.0
1.51000	36.8	60.0
7.97000	39.1	70.0

17.2

* limit exceeded

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

TUV Product Service
POWERLINE CONDUCTED RFI

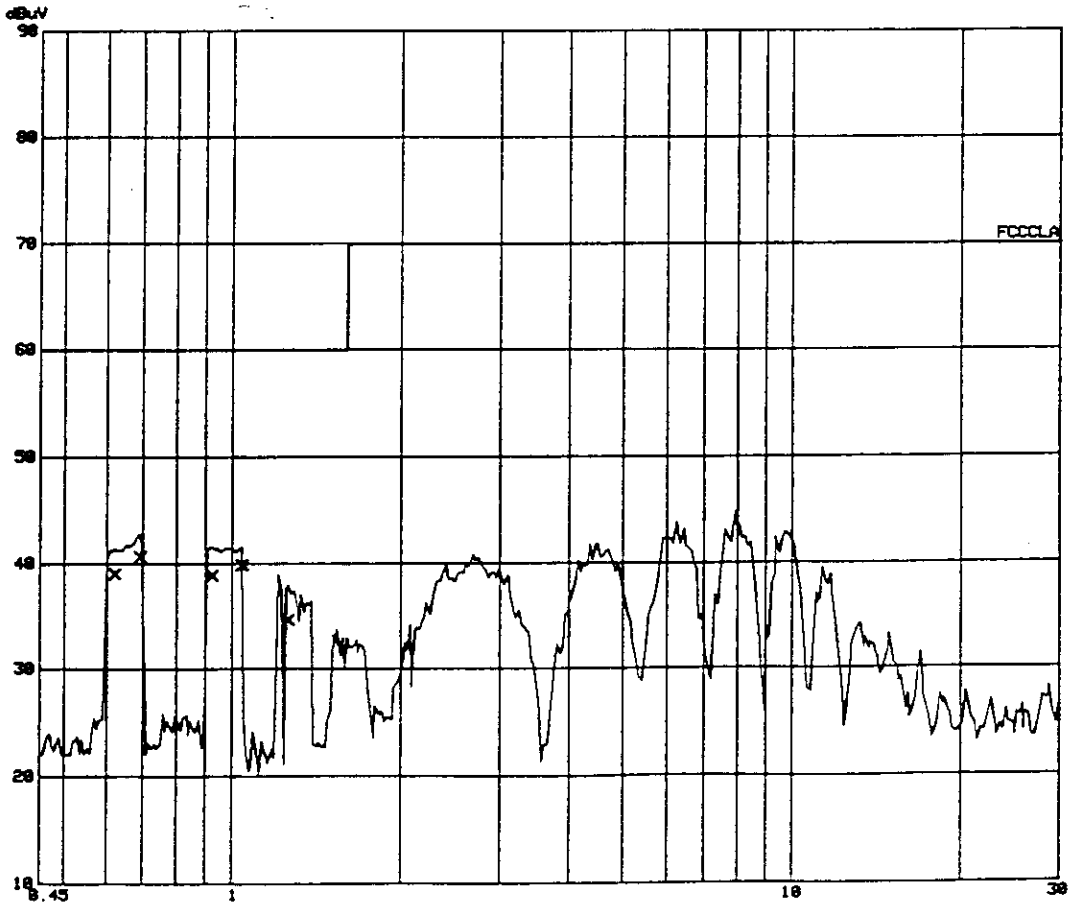
EUT: Model CDR-1901-1-8 CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 2
Mid Channel, CDMA
Date: 04. Nov 96 09:54

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

TUV Product Service
POWERLINE CONDUCTED RFI

EUT: Model CDR-1901-1-8 CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington MW
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 2
Mid Channel, CDMA
Date: 04. Nov 96 09:54

Final Measurement Results:

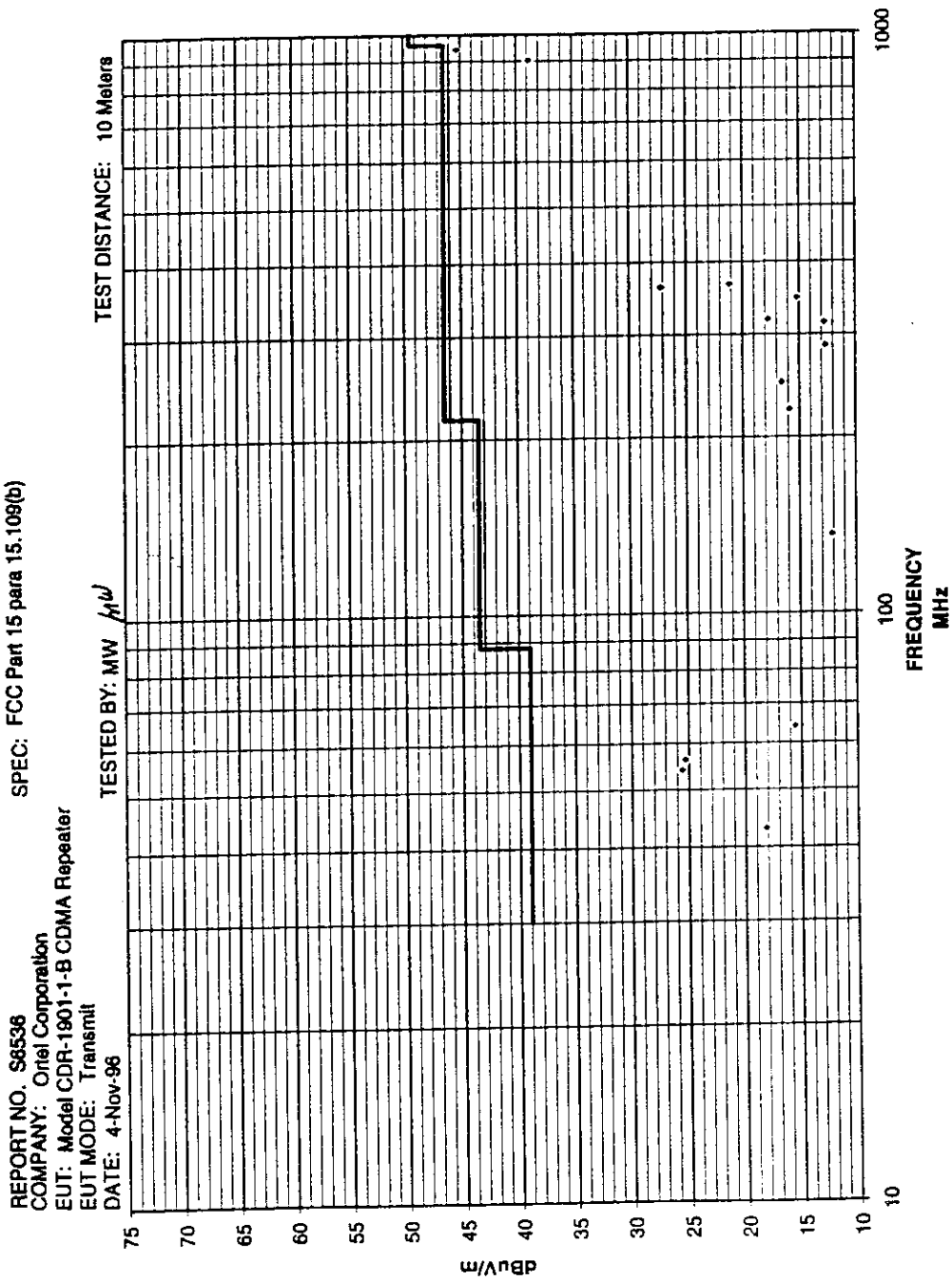
Frequency MHz	QP Level dBuV	QP Limit dBuV
0.62000	39.1	60.0
0.69000	~~40.7~~ 42.7	60.0
0.92000	38.9	60.0
1.04000	~~39.9~~ 41.6	60.0
1.26000	34.6	60.0

19.3

* limit exceeded

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

REPORT No: S8536 SPEC: FCC Part 15 para 15.109(b)

CUSTOMER: Ortel Corporation TEST DIST: 10 Meters

E U T: Model CDR-1901-1-B CDMA Repeater TEST SITE: 3

EUT MODE: Transmit BICONICAL: 235

DATE: 4-Nov-96 TESTED BY: MW LOG PERIODIC: 243

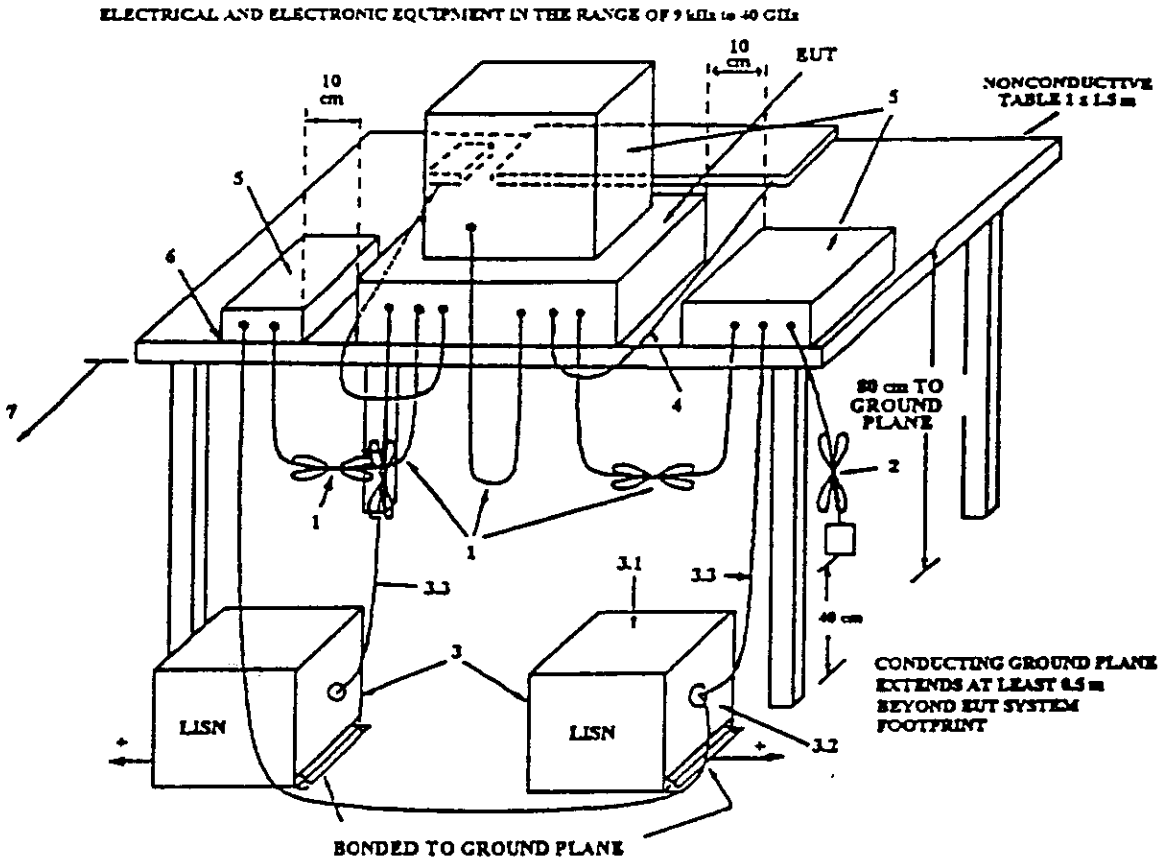
NOTES: Quasi-Peak with 120 KHz measurement bandwidth. RCVR: IM-37/57A

FREQUENCY (MHz)	VERTICAL measured (dBuv)	HORIZONTAL measured (dBuV)	CORRECTION FACTOR (dB/m)	MAXIMUM CORRECTED (dBuV/m)	SPECIFIED LIMIT (dBuV/m)	EUT MARGIN (dB)	EUT ROTATION (degrees)	ANTENNA HEIGHT (meters)	NOTE
43	7	4	11.2	18.2	39	-20.8			
54	14	9	11.6	25.6	39	-13.4	270	1.5	
56.25	14	11	11.3	25.3	39	-13.7	270	1.5	
64.1	6	4	9.6	15.6	39	-23.4			
136	-1	-6	13.2	12.2	43.5	-31.3			
222.9	3	-9	12.9	15.9	46.5	-30.6			
248	3	-4	13.6	16.6	46.5	-29.9			
260	-10	-8	14.8	6.8	46.5	-39.7			
287	-4	-3	15.7	12.7	46.5	-33.8			
314	-4	-4	16.8	12.8	46.5	-33.7			
318	1	-1	16.8	17.8	46.5	-28.7			
346	-2	-4	17.2	15.2	46.5	-31.3			
361.9	10	-4	17.2	27.2	46.5	-19.3			
365.9	4	2	17.2	21.2	46.5	-25.3			
903.72	12	12	26.9	38.9	46.5	-7.6			
943.73	13	18	27.3	45.3	46.5	-1.2	90	1.5	

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Conducted Emission Test Setup, 0.15 to 30 MHz



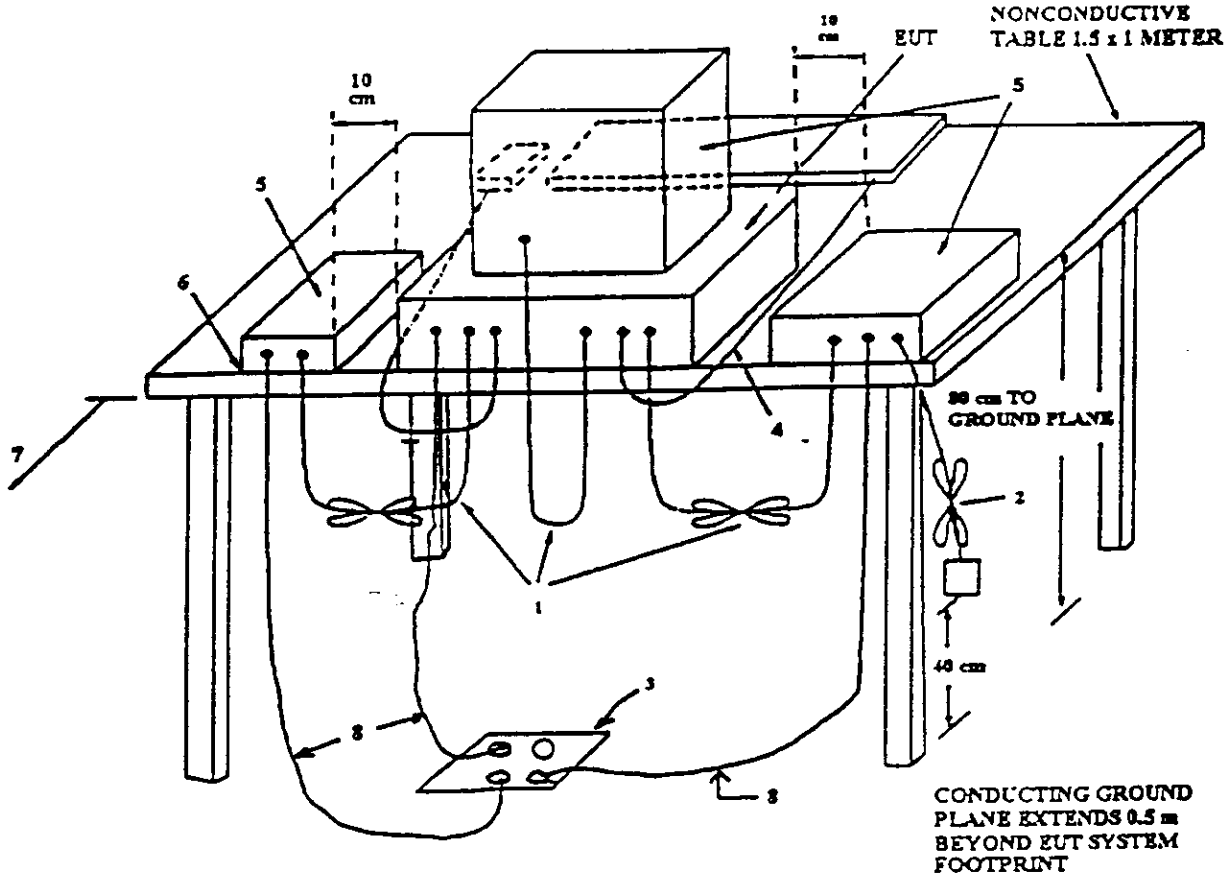
LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.
3. EUT connected to one LISN. Unused LISN connectors shall be terminated in 50 Ω. LISN can be placed on top of, or immediately beneath, ground plane.
   - 3.1 All other equipment powered from second LISN.
   - 3.2 Multiple outlet strip can be used for multiple power cords of non-EUT equipment.
   - 3.3 LISN at least 80 cm from nearest part of EUT chassis.
4. Cables of hand-operated devices, such as keyboards, mouses, etc., have to be placed as close as possible to the controller.
5. Non-EUT components being tested.
6. Rear of EUT, including peripherals, shall be all aligned and flush with rear of tabletop.
7. Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the floor ground plane.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Radiated Emission Test Setup, 30 to 1,000 MHz



LEGEND:

1. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth forming a bundle 30 to 40 cm long, hanging approximately in the middle between ground plane and table.
2. I/O cables that are connected to a peripheral shall be bundled in center. The end of the cable may be terminated if required using correct terminating impedance. The total length shall not exceed 1 m.
3. If LISNs are kept in the test setup for radiated emissions, it is preferred that they be installed under the ground plane with the receptacle flush with the ground plane.
4. Cables of hand-operated devices, such as keyboards, mouses, etc., have to be placed as close as possible to the controller.
5. Non-EUT components of EUT system being tested.
6. The rear of all components of the system under test shall be located flush with the rear of the table.
7. No vertical conducting wall used.
8. Power cords drape to the floor and are routed over to receptacle.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Appendix B

Product Information Form(s)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

CUSTOMER INFORMATION	
COMPANY NAME:	ORTEL CORPORATION
COMPANY ADDRESS:	2015 West Chestnut Street
	Alhambra, CA 91803
PHONE NUMBER:	818 293 3640
FAX NUMBER:	818 281 7913
CUSTOMER CONTACT:	Martin Keys
PRODUCT DESCRIPTION	
NAME, MODEL, SERIAL # OF EUT:	CDMA Repeater, Model CDR-1901-1-X (X denotes PCS band - A, B, C, D, E, or E.), S/N 1
DESCRIPTION OF EUT:	B-band
POWER INTERFACE	
FREQUENCY/AC/DC VOLTAGE:	50, 60 Hz, 115 Vac
PHASES/CURRENT:	1/1.3A (nominal)
POWER SUPPLY	
DESCRIPTION:	Internal to repeater, DC-DC
MANUFACTURER, MODEL #:	Vicor, VI-250-CU
SWITCHING FREQUENCY:	100 kHz
POWER WIRING	
HARD WIRED/FLEXIBLE:	Hard wired
SHIELDED/UNSHIELDED:	--
REMOVABLE/ATTACHED:	--
RFI SUPPRESSION	
BEFORE TEST:	PCBs housed in modular sections.
POWERLINE FILTER: MODEL #:	Little fuse, #848003:: European part number, 3A (UL, FCC, CSA approved)
CABINET SHIELDING:	Shielded
PLATING TYPE:	--
OPERATING MODE(S):	Normal
EUT CONFIGURATIONS:	--
INTERFACING, SIMULATOR OR MONITORING EQUIPMENT:	--
I/O PORTS:	2

Function	Cable Length	Type	Shield Termination
UL IN, DL out antenna	--	7/16" female	--
UL OUT, DL in antenna	--	7/16" female	--

BLOCK DIAGRAM:	--

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Appendix C

Change History

Not Applicable

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Appendix D

Testing Facilities

Certificates of Approval

VCCI (3), NVLAP, EN 45001

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

CERTIFICATE

Facility: Enclosure No. 1
(Conducted Interference Measurement)
Company : TÜV Product Service Inc.
Address : 7562 Trade Street, San Diego,
CA 92121 U.S.A.

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures, Article 8.

Registration No.: C-211
Date of Registration : December 26, 1994
This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inter
Information Technology Equip

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

CERTIFICATE

Facility: Enclosure No. 2
(Conducted Interference Measurement)
Company : TÜV Product Service Inc.
Address : 7562 Trade Street, San Diego,
CA 92121 U.S.A.

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures, Article 8.

Registration No.: C-212
Date of Registration : December 26, 1994
This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inter
Information Technology Equip

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

CERTIFICATE

Facility: Carroll Canyon Site
(Radiation 3, 10, 30meter site)

Company : TÜV Product Service Inc.

Address : 7562 Trade Street, San Diego,
CA 92121 U.S.A.

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures, Article 8.

Registration No.: R-212
Date of Registration : December 26, 1994
This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inte
Information Technology Equi

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Certificate of Accreditation

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

TUV PRODUCT SERVICE, INC.
SAN DIEGO, CA

is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS
MIL-STD-462

December 31, 1996
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 100268-0

NVLAP-01C (11-95)

TÜV PRODUCT SERVICE

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY, MIL-STD 462 **NVLAP LAB CODE 100268-0**

TUV PRODUCT SERVICE, INC.
10040 Mesa Rim Road
San Diego, CA 92121
Mr. John G. Smith
Phone: 619-546-3999 Fax: 619-546-0364

Military Standard 462, Measurement of Electromagnetic Interference Characteristics

NVLAP Code	*Designation*
Conducted Emissions:	
12/A01	MIL-STD-462 Method CE01
12/A04	MIL-STD-462 Method CE02
12/A06	MIL-STD-462 Method CE03
12/A08	MIL-STD-462 Method CE04
12/A10	MIL-STD-462 Method CE06
12/A12	MIL-STD-462 Method CE07
Conducted Susceptibility:	
12/B01	MIL-STD-462 Method CS01
12/B02	MIL-STD-462 Method CS02
12/B04	MIL-STD-462 Method CS03/CS04/CS05/CS08

December 31, 1996
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (11-95)

National Institute of Standards and Technology — NVLAP® — National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY, MIL-STD 462 **NVLAP LAB CODE 100268-0**

TUV PRODUCT SERVICE, INC.

Military Standard 462, Measurement of Electromagnetic Interference Characteristics

NVLAP Code	*Designation*
12/B05	MIL-STD-462 Method CS06
12/B06	MIL-STD-462 Method CS07
12/B07	MIL-STD-462 Method CS09
Radiated Emissions:	
12/D01	MIL-STD-462 Method RE01
12/D02	MIL-STD-462 Method RE02
12/D03	MIL-STD-462 Method RE03
Radiated Susceptibility:	
12/E01	MIL-STD-462 Method RS01
12/E02	MIL-STD-462 Method RS02
12/E03	MIL-STD-462 Method RS03 (Consult laboratory for field strengths available)
12/E04	MIL-STD-462 Method RS03 employing RADHAZ procedures for high level testing (Consult laboratory for field strengths available)

December 31, 1996

Effective through

For the National Institute of Standards and Technology

NVLAP-01S (11-95)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV
PRODUCT SERVICE

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-0001

January 19, 1996

Mr. John G. Smith
TUV Product Service, Inc.
10040 Mesa Rim Road
San Diego, CA 92121

NVLAP Lab Code: 100268-0

Dear Mr. Smith:

I am pleased to inform you that continuing accreditation for specific test methods in Electromagnetic Compatibility, MIL-STD-462 is granted to your organization under the National Voluntary Laboratory Accreditation Program (NVLAP). This accreditation is effective until December 31, 1996, provided that your organization continues to comply with accreditation requirements contained in the NVLAP Procedures.

Your Certificate of Accreditation is enclosed along with a statement of your Scope of Accreditation. You may reproduce these documents in their entirety and announce your organization's accreditation status using the NVLAP logo in business publications, the trade press, and other business oriented literature. Accreditation does not relieve your organization from observing and complying with any applicable existing laws and/or regulations.

We are pleased to have you participate in NVLAP and look forward to your continued association with this program. If you have any questions concerning your NVLAP accreditation, please direct them to Jeffrey Horlick, Senior Program Manager, Laboratory Accreditation Program, National Institute of Standards and Technology, Bldg. 411, Room A162, Gaithersburg, MD 20899; (301) 975-4016.

Sincerely,

James L. Cigler, Chief
Laboratory Accreditation Program

Enclosure(s)

NIST

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Certificate of Accreditation

TUV PRODUCT SERVICE, INC.
SAN DIEGO, CA

is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS
FCC

December 31, 1996
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 100268-0

NVLAP-01C (11-88)

TÜV PRODUCT SERVICE

National Institute of Standards and Technology **NVLAP®** National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 100268-0

TUV PRODUCT SERVICE, INC.
10040 Mesa Rim Road
San Diego, CA 92121
Mr. John G. Smith
Phone: 619-546-3999 Fax: 619-546-0364

NVLAP Code	*Designation*
12/F01	FCC Method - 47 CFR Part 15 - Digital Devices
12/F01a	Conducted Emissions, Power Lines, 450 KHz to 30 MHz
12/F01b	Radiated Emissions

December 31, 1996
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (11-95)

TÜV PRODUCT SERVICE

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-0001

January 19, 1996

Mr. John G. Smith
TUV Product Service, Inc.
10040 Mesa Rim Road
San Diego, CA 92121

NVLAP Lab Code: 100268-0

Dear Mr. Smith:

I am pleased to inform you that continuing accreditation for specific test methods in Electromagnetic Compatibility & Telecommunications, FCC is granted to your organization under the National Voluntary Laboratory Accreditation Program (NVLAP). This accreditation is effective until December 31, 1996, provided that your organization continues to comply with accreditation requirements contained in the NVLAP Procedures.

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We are pleased to have you participate in NVLAP and look forward to your continued association with this program. If you have any questions concerning your NVLAP accreditation, please direct them to Jeffrey Horlick, Senior Program Manager, Laboratory Accreditation Program, National Institute of Standards and Technology, Bldg. 411, Room A162, Gaithersburg, MD 20899; (301) 975-4016.

Sincerely,

James L. Cigler, Chief
Laboratory Accreditation Program

Enclosure(s)

NIST

TÜV
PRODUCT SERVICE

FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road
Columbia, MD 21046
Telephone: 301-725-1585 (ext-218)
Facsimile: 301-344-2050

July 10, 1996

IN REPLY REFER TO
31040/SIT
1300F2

TUV Product Service
10040 Mesa Rim Road
San Diego, CA 92121-2912

Attention: John G. Smith

Re: Measurement facility located at Carroll Canyon, Site No. 2
(3 and 10 meters)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is published periodically and is also available on the Laboratory's Public Access Link as described in the enclosed Public Notice.

Sincerely,

Thomas W. Phillips
Electronics Engineer
Customer Service Branch

Enclosure:
PAL PN

TÜV
PRODUCT SERVICE

CERTIFICATE

TÜV
PRODUCT SERVICE

CERTIFICATE OF COMPLIANCE OF THE QUALITY SYSTEM WITH REQUIREMENTS MENTIONED BELOW

TÜV PRODUCT SERVICE GmbH certifies that

TÜV PRODUCT SERVICE Inc., USA

in the facilities

Test Laboratories
10040 Mesa Rim Road, San Diego CA 92121

for the following areas:

Services for EMC and Product Safety Testing

has established and is operating a quality system which meets the requirement(s) of the internal quality management system of TÜV PRODUCT SERVICE GmbH which is based on EN 45001:05/90.

Munich, 18 May, 1995

TÜV PRODUCT SERVICE GmbH

For the Executive Committee of TÜV PRODUCT SERVICE

Dr. Wolfgang Kreinberg

TÜV PRODUCT SERVICE GmbH, Ridlerstrasse 31, 80339 Munich, Germany

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Appendix E

Supplemental Information

Not Applicable

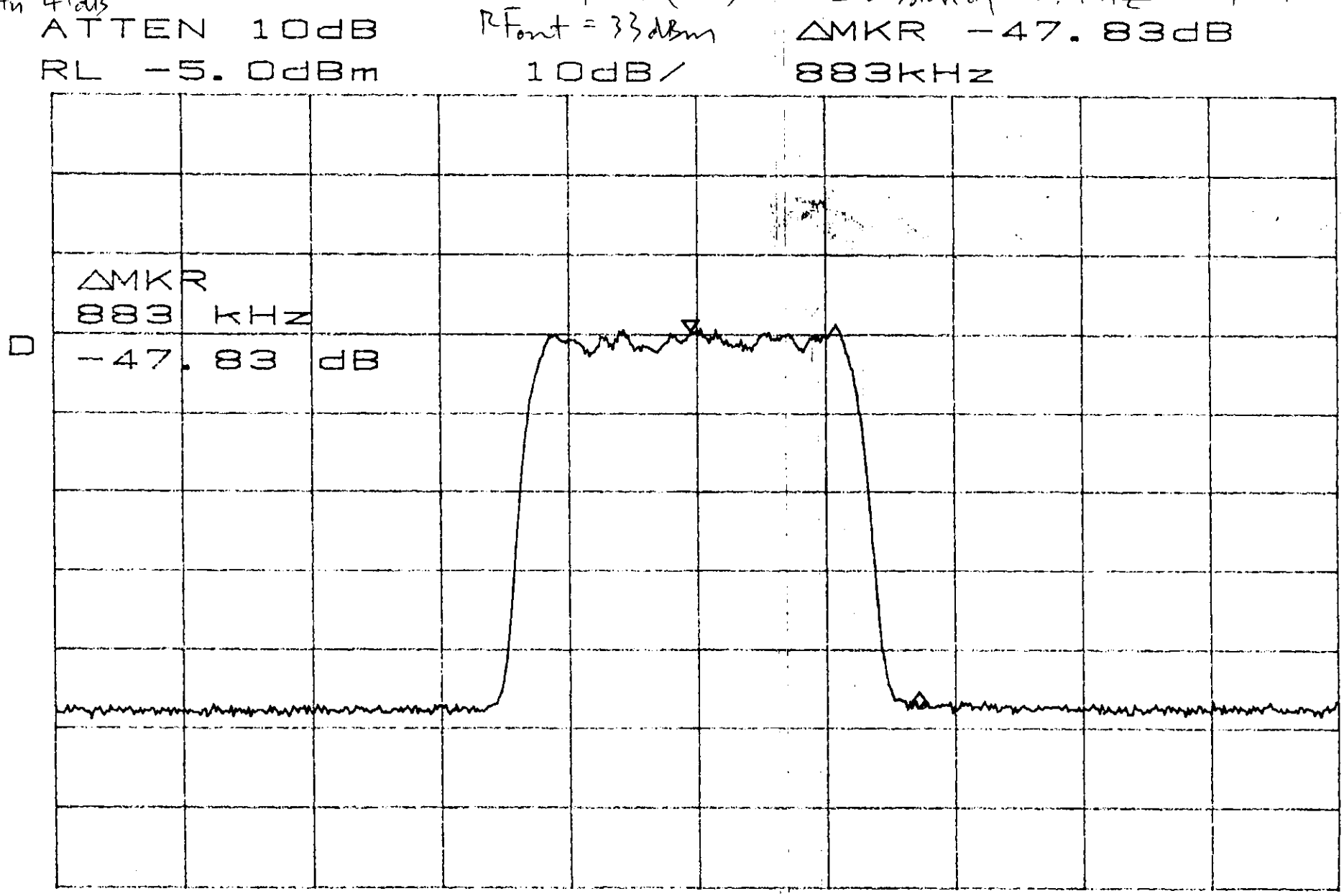
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

CDMA #1 Low Band 425
Ext Attn 41dB

Forward Path (DL)
RFout = 33dBm

Emission of 883 kHz

10/31/96

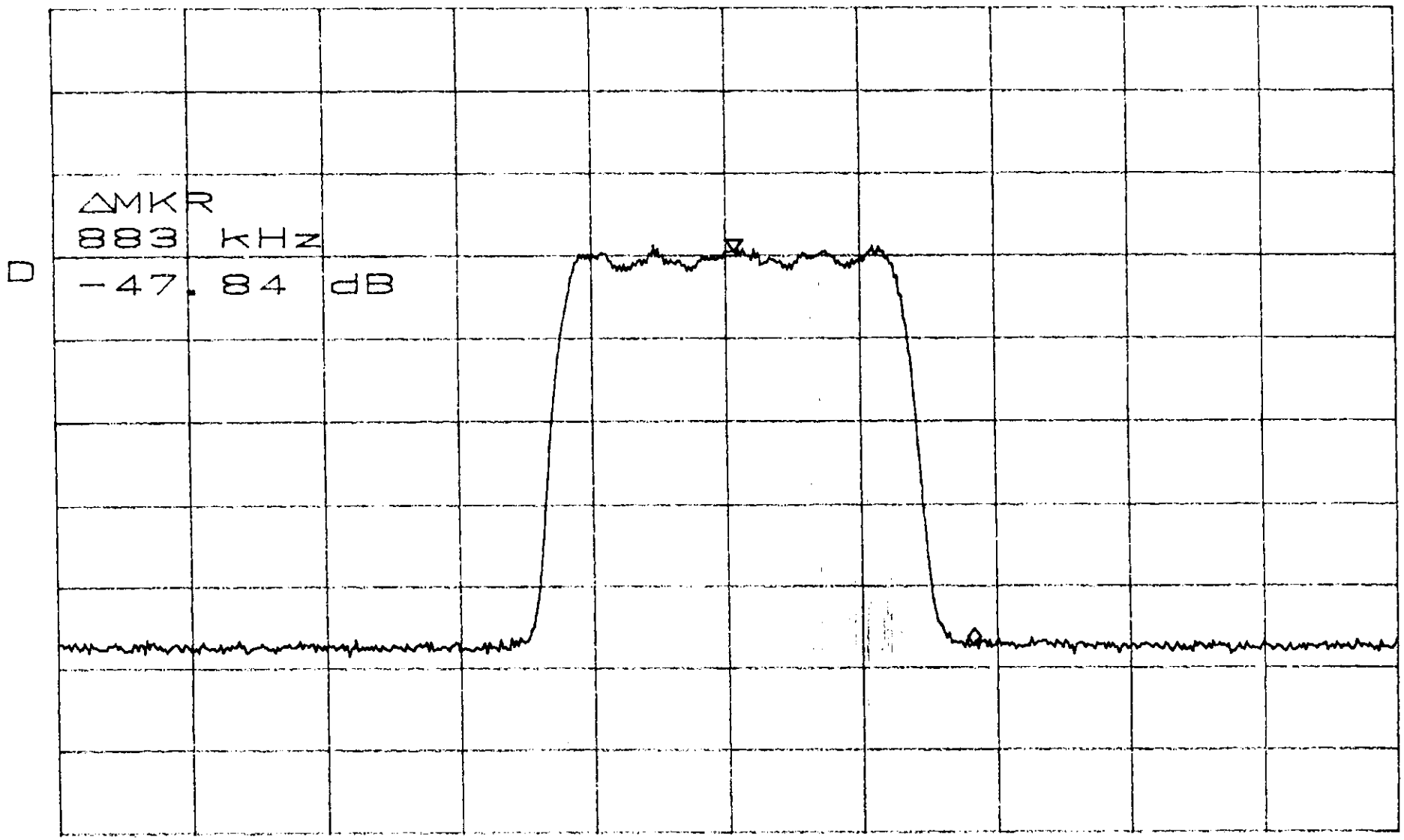


CDMA #1
Ext Attn 41dB

Fwd Path (DL)
RFout = 33 dBm

Mid Band 550 10/31/96

ATTEN 10dB
RL -5.0dBm
10dB/
ΔMKR -47.84dB
883kHz



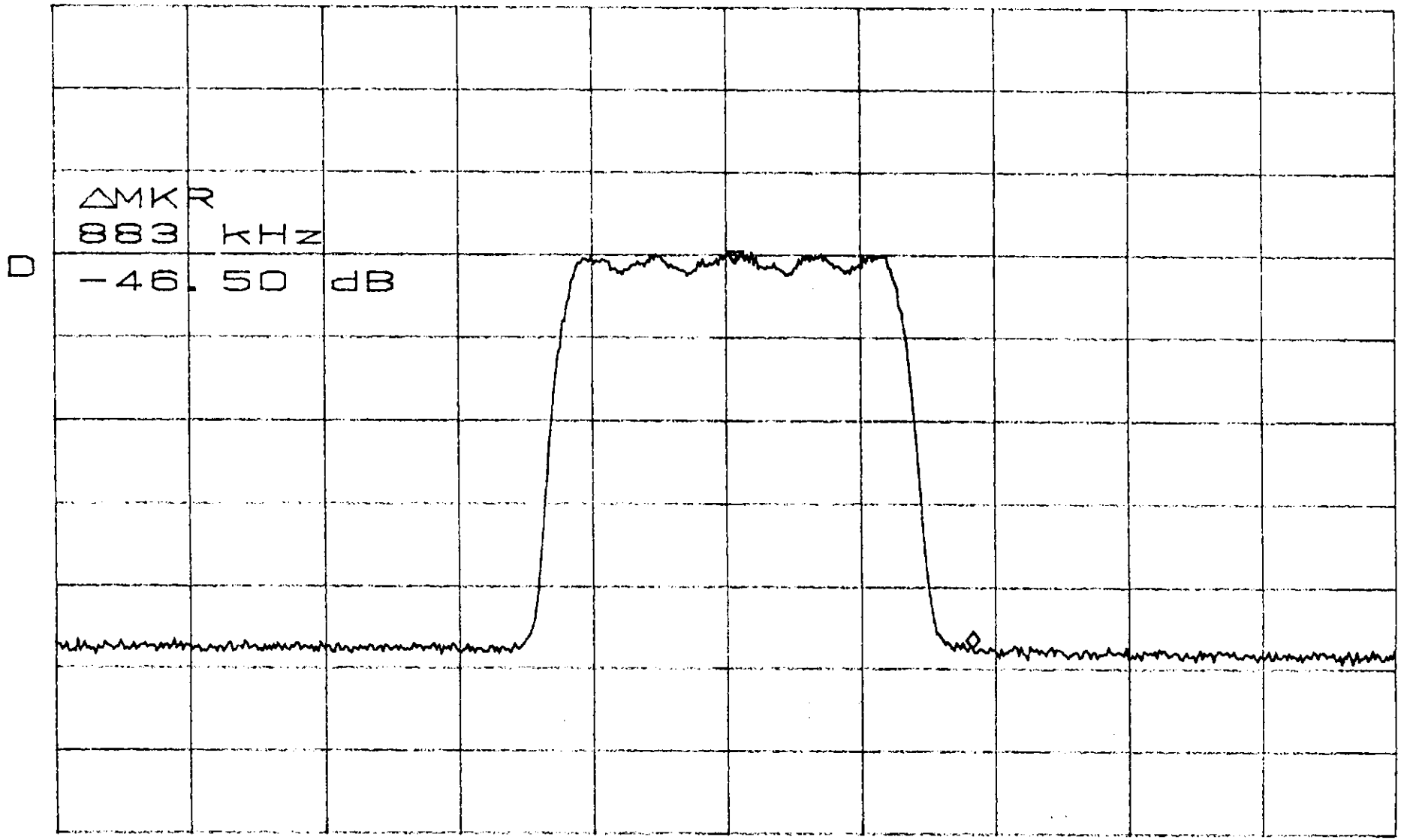
CENTER 1.957500GHz
SPAN 5.000MHz
*RBW 30kHz
*VBW 100Hz
SWP 4.20sec

CDMA #1
Ext Attn 41 dB

Fwd Path (DL)
RFout = 33 dBm

Upper Band 685 10/31/96

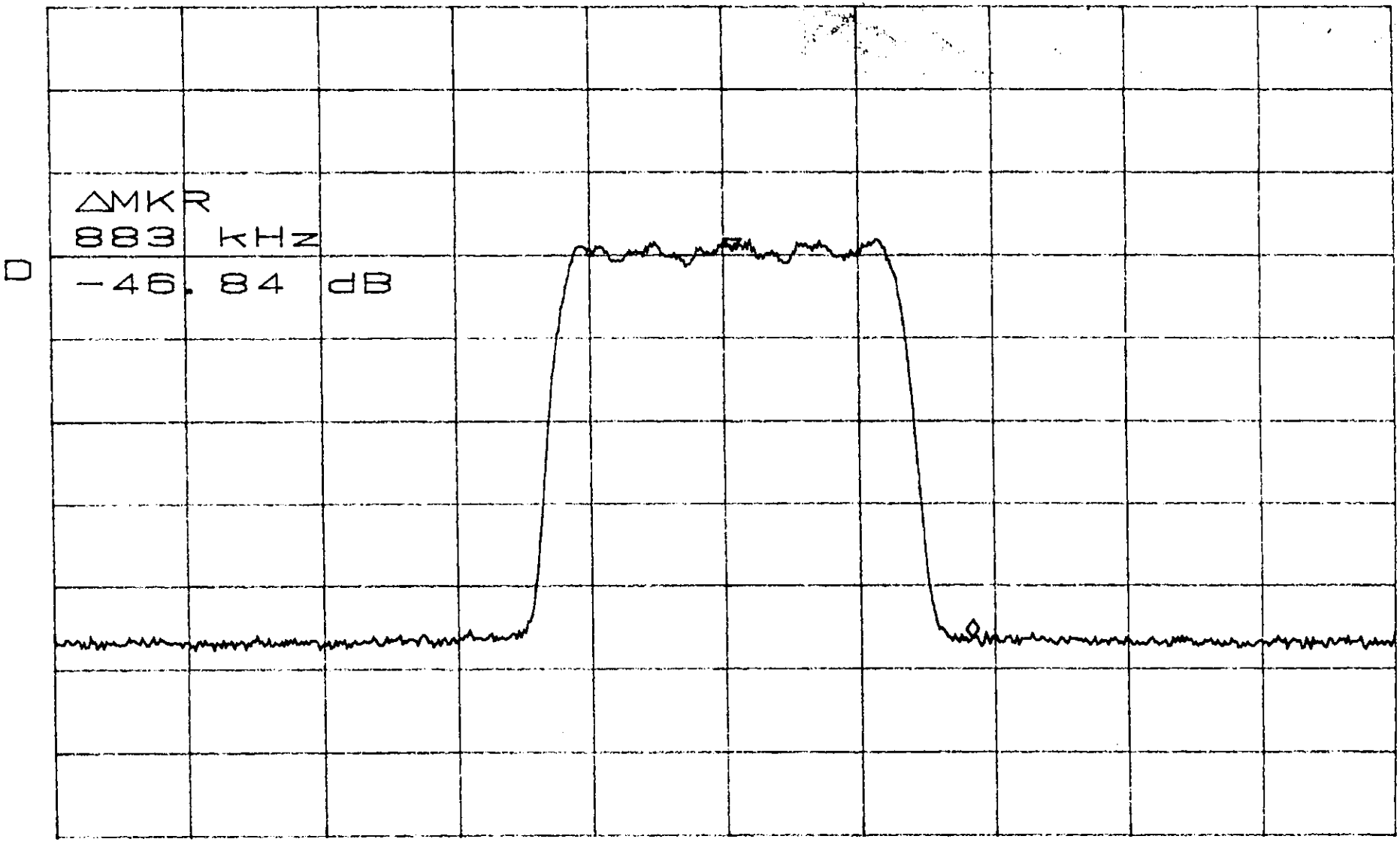
ATTEN 10dB
RL -5.0dBm
10dB/
ΔMKR -46.50dB
883kHz



CENTER 1.964250GHz
SPAN 5.000MHz
*RBW 30kHz
*VBW 100Hz
SWP 4.20sec

CDMA #1 Low Band 425 Reverse Path (UL) Emission of 883 kHz 10/28/96

ext Attn 41dB ATTEN 10dB RL −5.0dBm RFout = 33dBm 10dB/ ΔMKR −46.84dB 883kHz



CENTER 1.871250GHz SPAN 5.000MHz

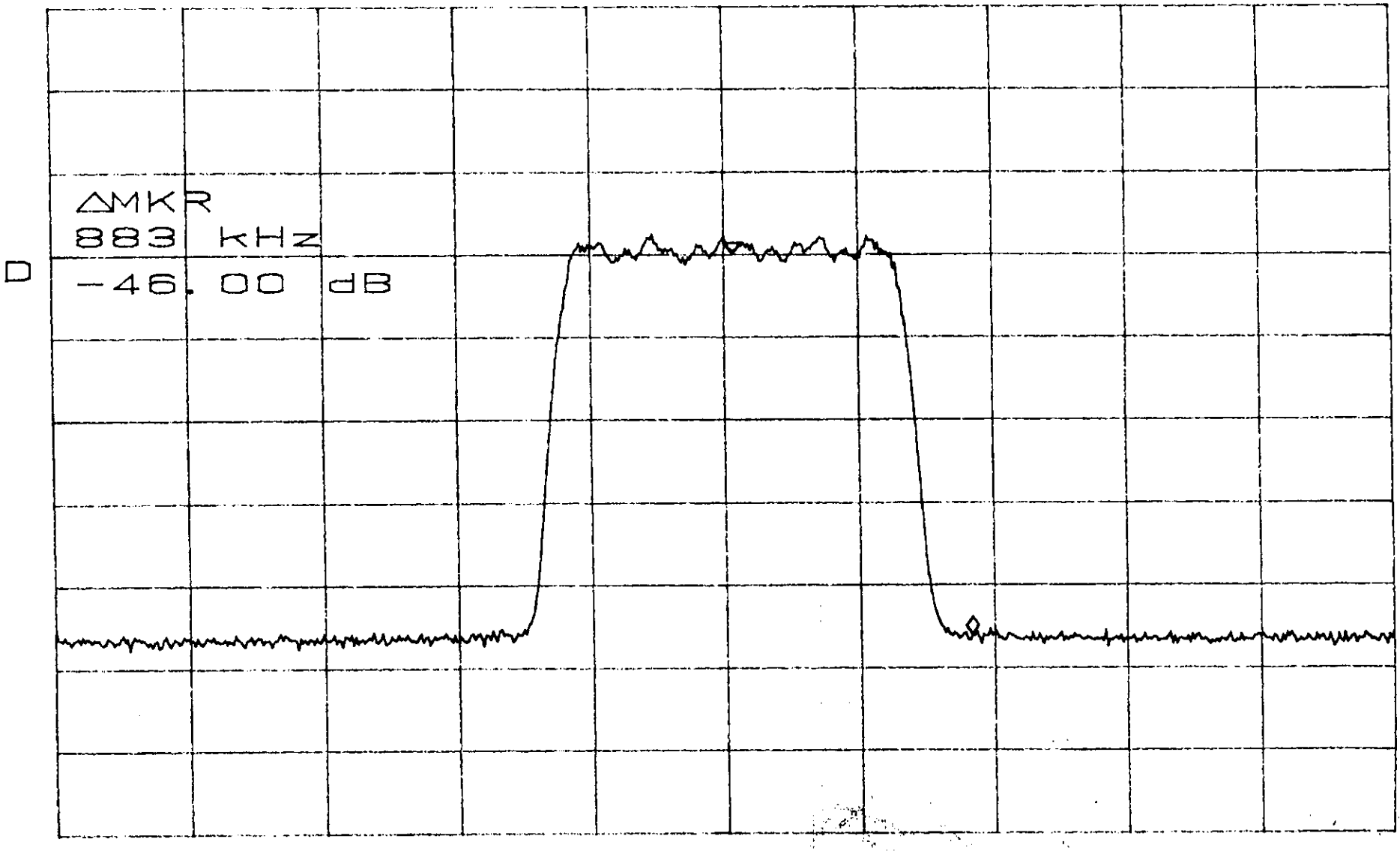
*RBW 30kHz *VBW 100Hz SWP 4.20sec

CDMA #1 Mid Band 550 Reverse Path (UL) 10/28/96

+ Attn 41 dB

ATTEN 10dB ΔMKR −46.00dB

RL −5.0dBm 10dB/ 883kHz



CENTER 1.877500GHz SPAN 5.000MHz

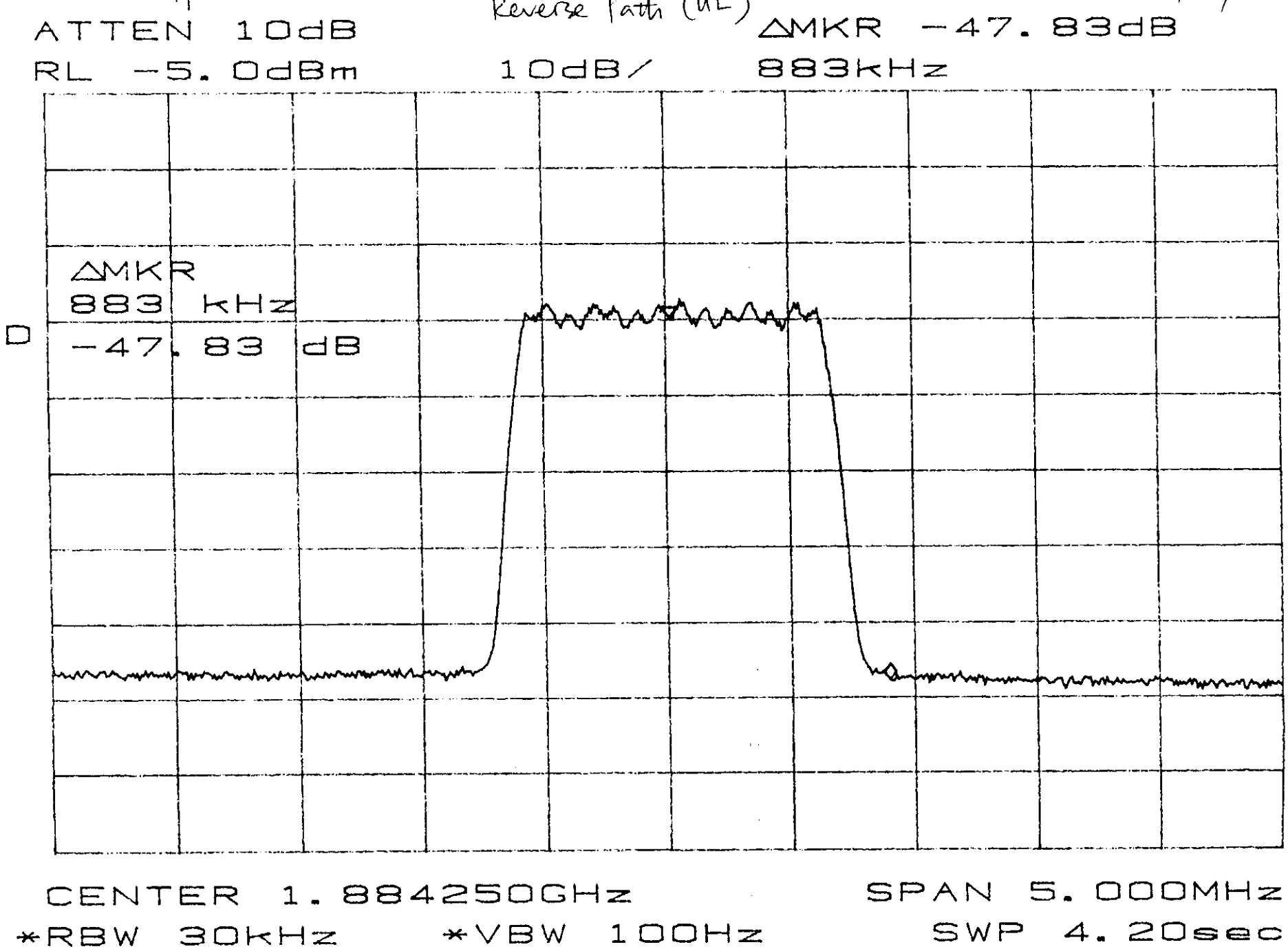
*RBW 30kHz *VBW 100Hz SWP 4.20sec

CDMA #1
+ Attn 41 dB

Upper Band 685

Reverse Path (UL)

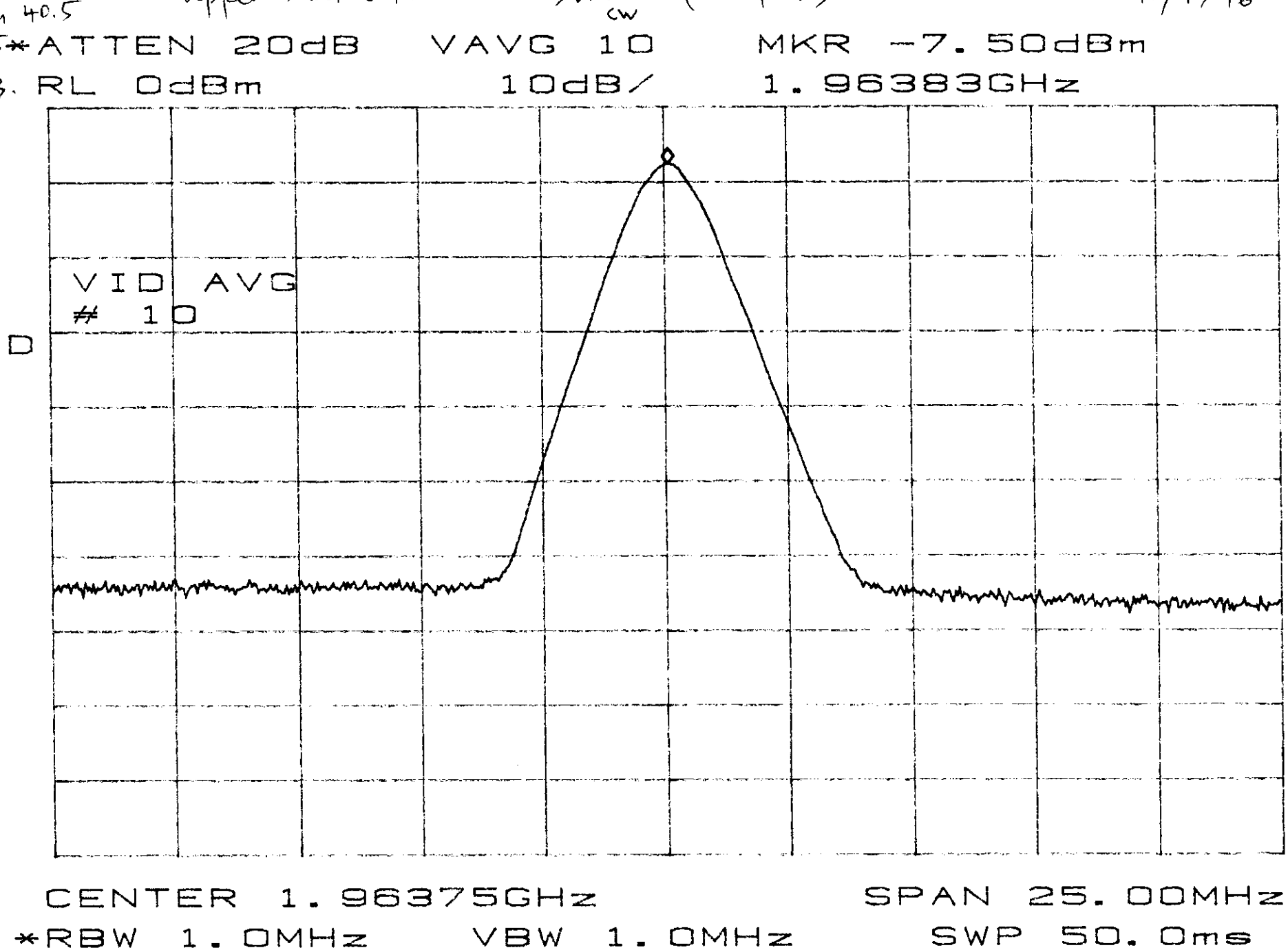
10/28/96



CDMA #1
Ext Attn 40.5
RFin=-55
RFout=33.

Upper Band 675 Dn Link (Fwd Path) CW

11/1/96



cable cal. out

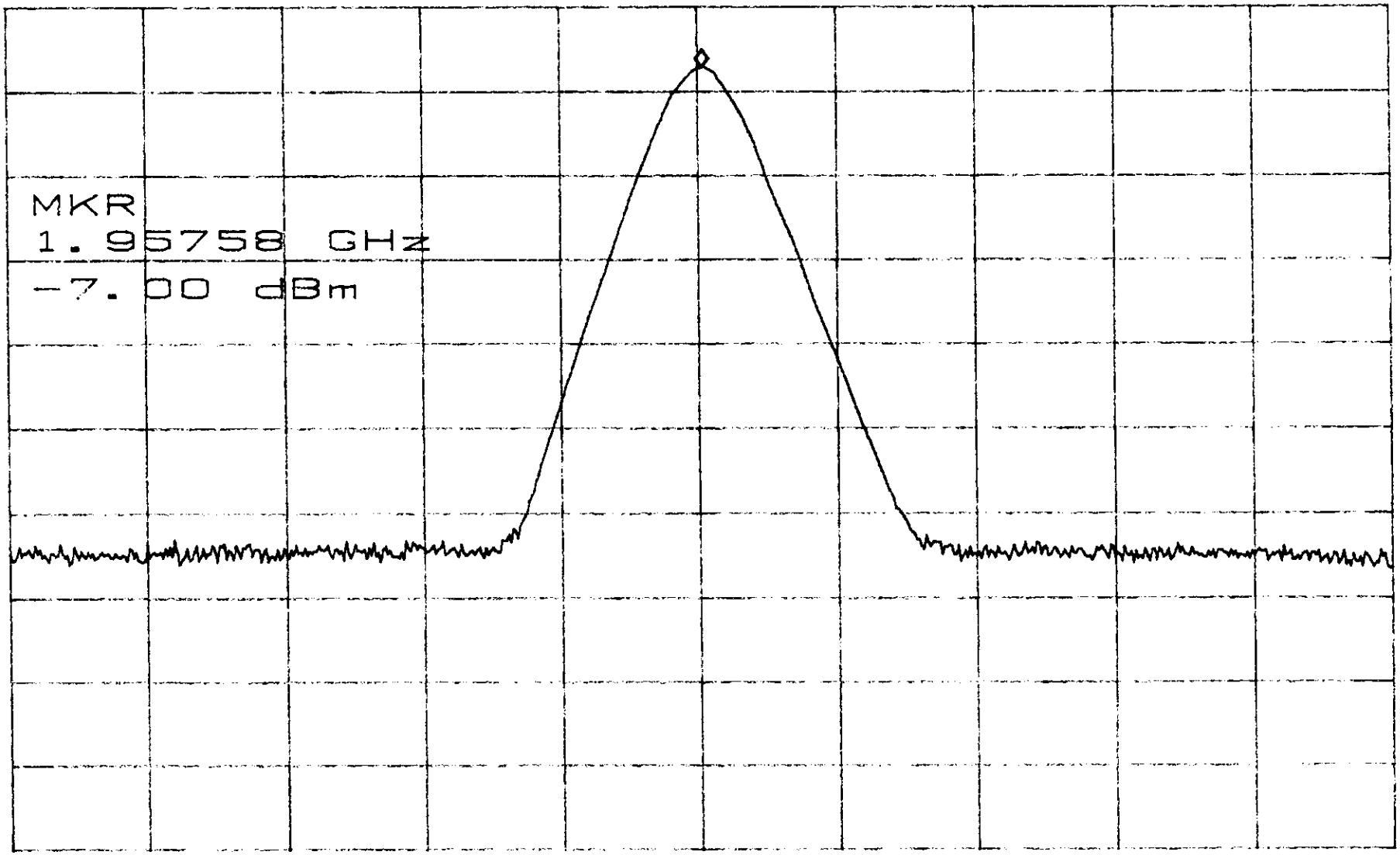
Spec. Analyzer : HP8563E
Sig. Gen : RFS 835.8011.58

CDMA #1
ext Attn 40.5 dB Mid Band 550 Dn Link (Fwd Path) CW 11/1/96

F_{in} = -55

F_{out} = 33.5

*ATTEN 20dB VAVG 10 MKR -7.00dBm
RL 0dBm 10dB/ 1.95758GHz



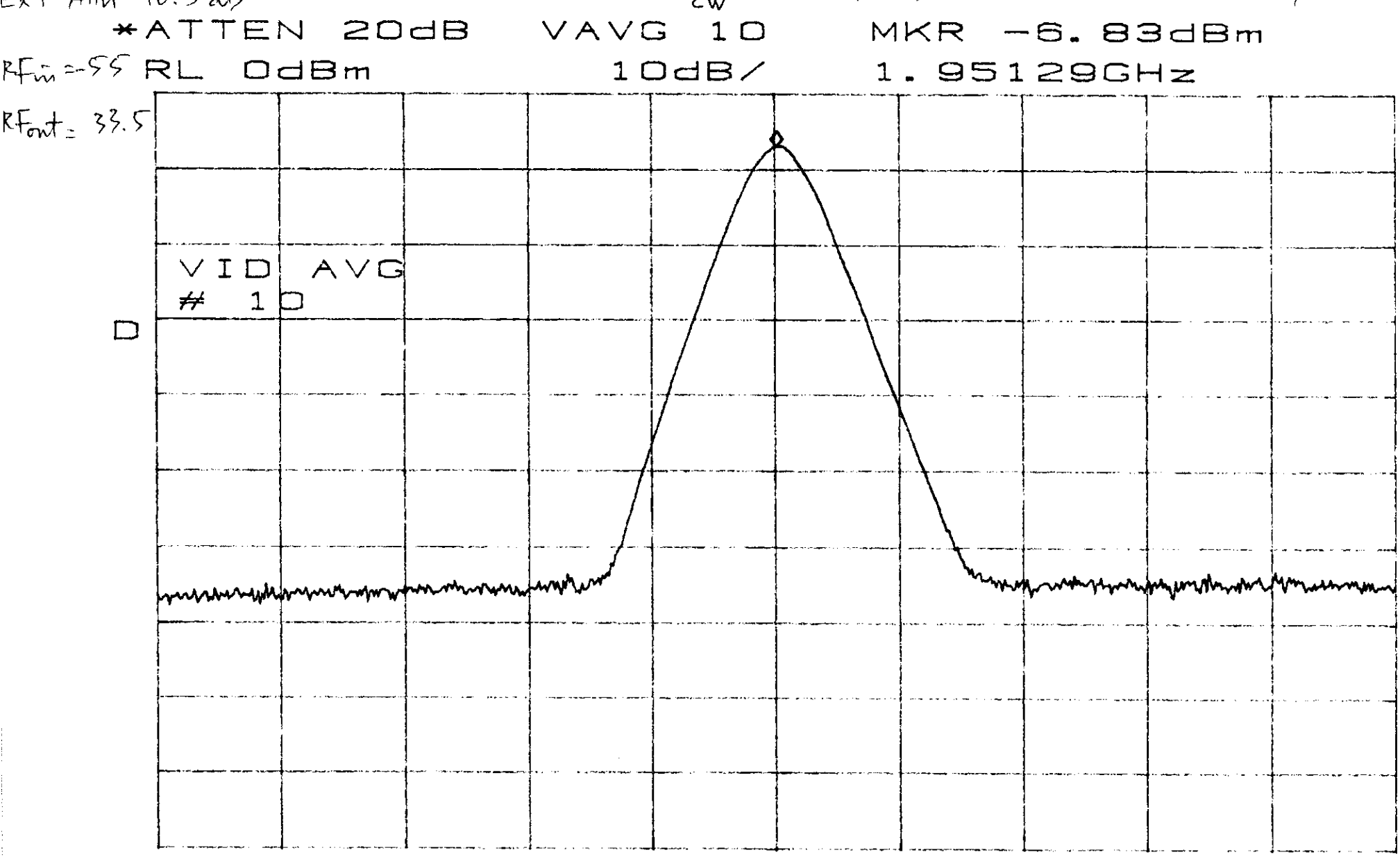
D

CENTER 1.95750GHz SPAN 25.00MHz
*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms

Cable cal. out

Spec. Analyzer : HP 8563E
Sig Gen : R&S 835.8011.58

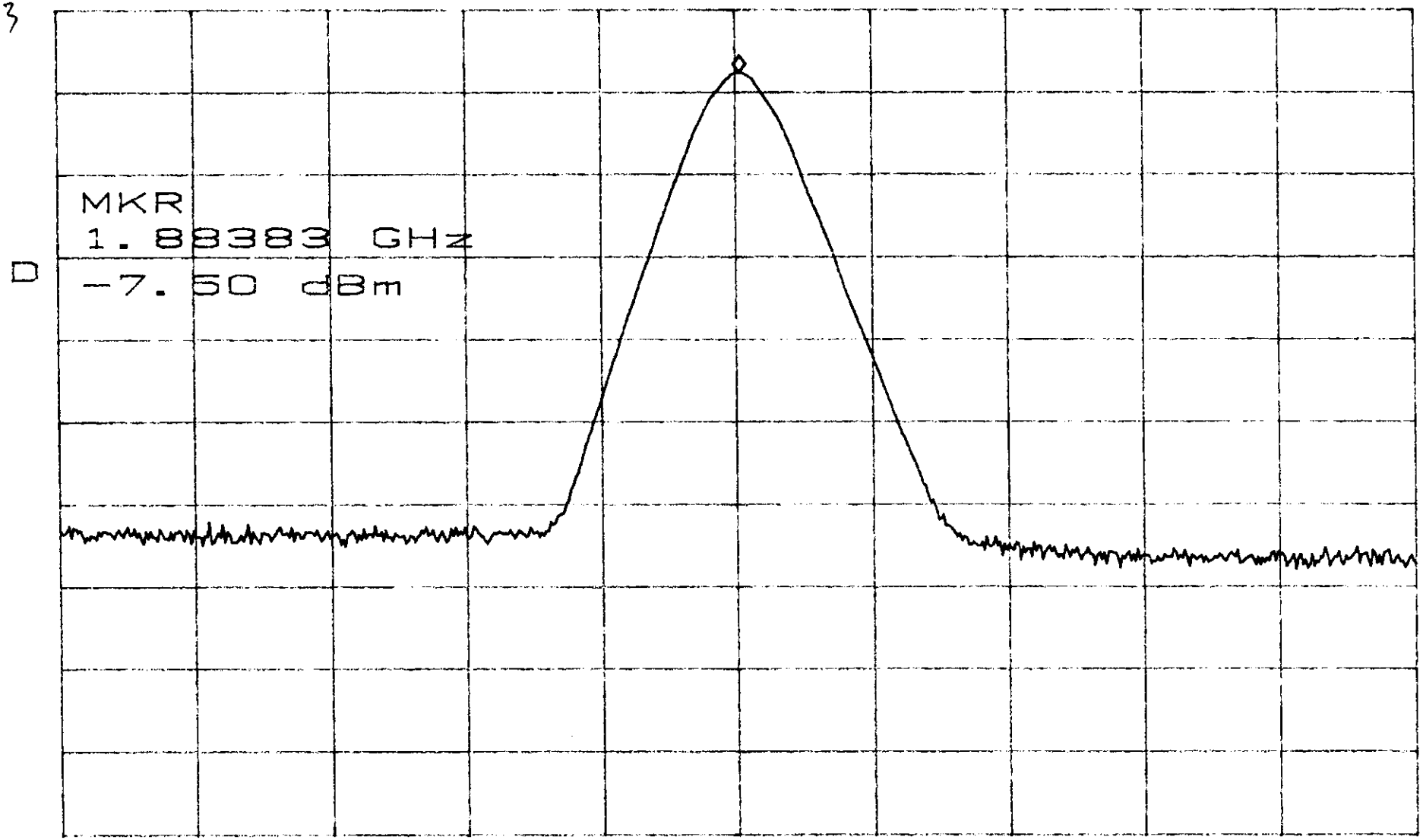
CDMA #1
Ext Attn 40.5 dB Low Band = 425 Dn Link (Fwd Path) 11/1/96
CW



Cable Cal. out.

Spec. Analyzer : HP8563E
Sig. Gen : R&S 835.8011.58

CDMA #1 Upper Band 675 Uplink (Rev. Path) 11/1/96
Ext Attn 40.5
RF_{in} = -55
RF_{out} = 33



CW

Cable Cal. out

Spec. Analyzer: HP 8563E
Sig. Gen : R&S 835.8011.58

CDMA #1
Ext Attn 40.5

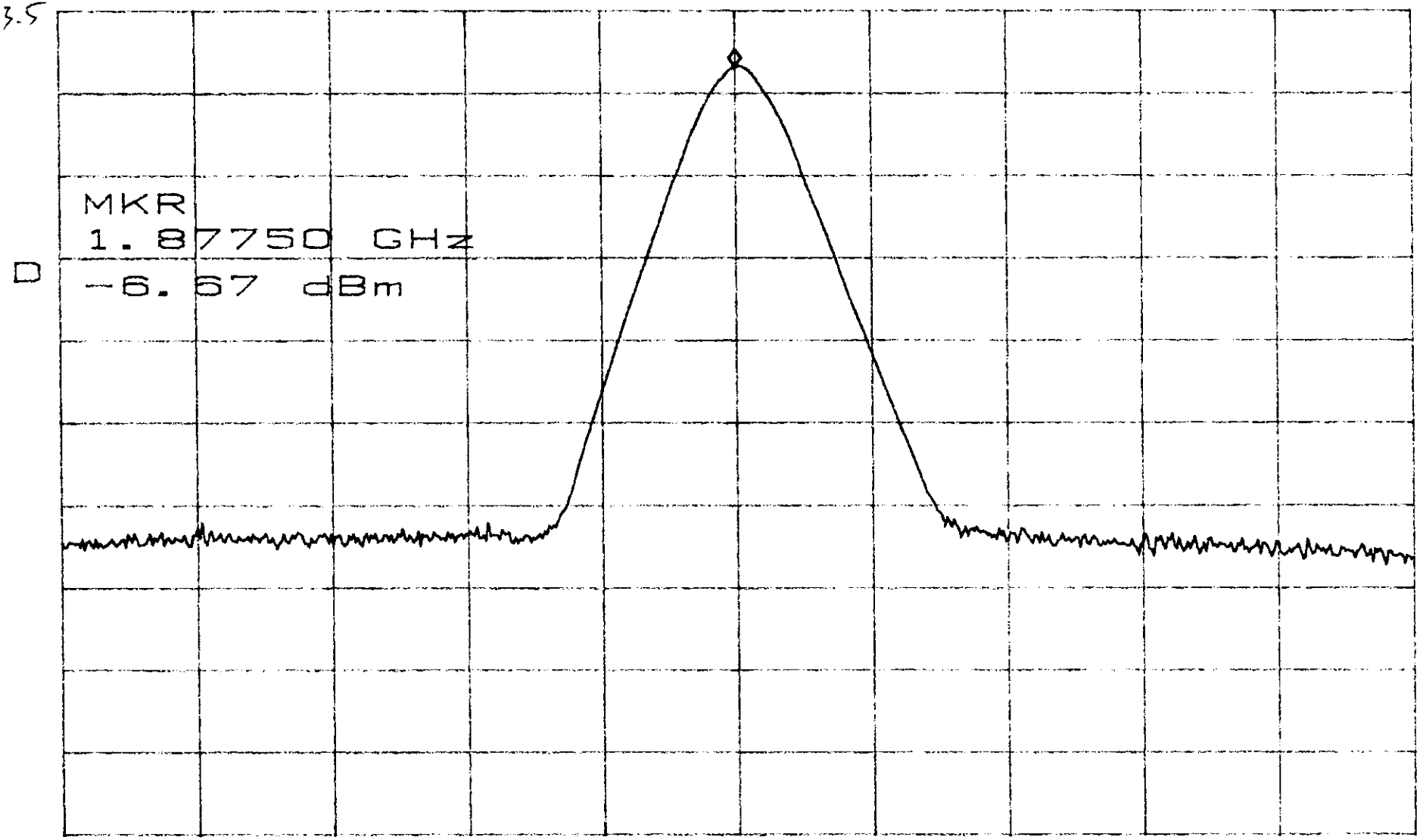
Mid Band 550

Uplink CW (Rev. Path)

11/1/96

$RF_{in} = -55$

$RF_{out} = 33.5$



Cable cal'd out

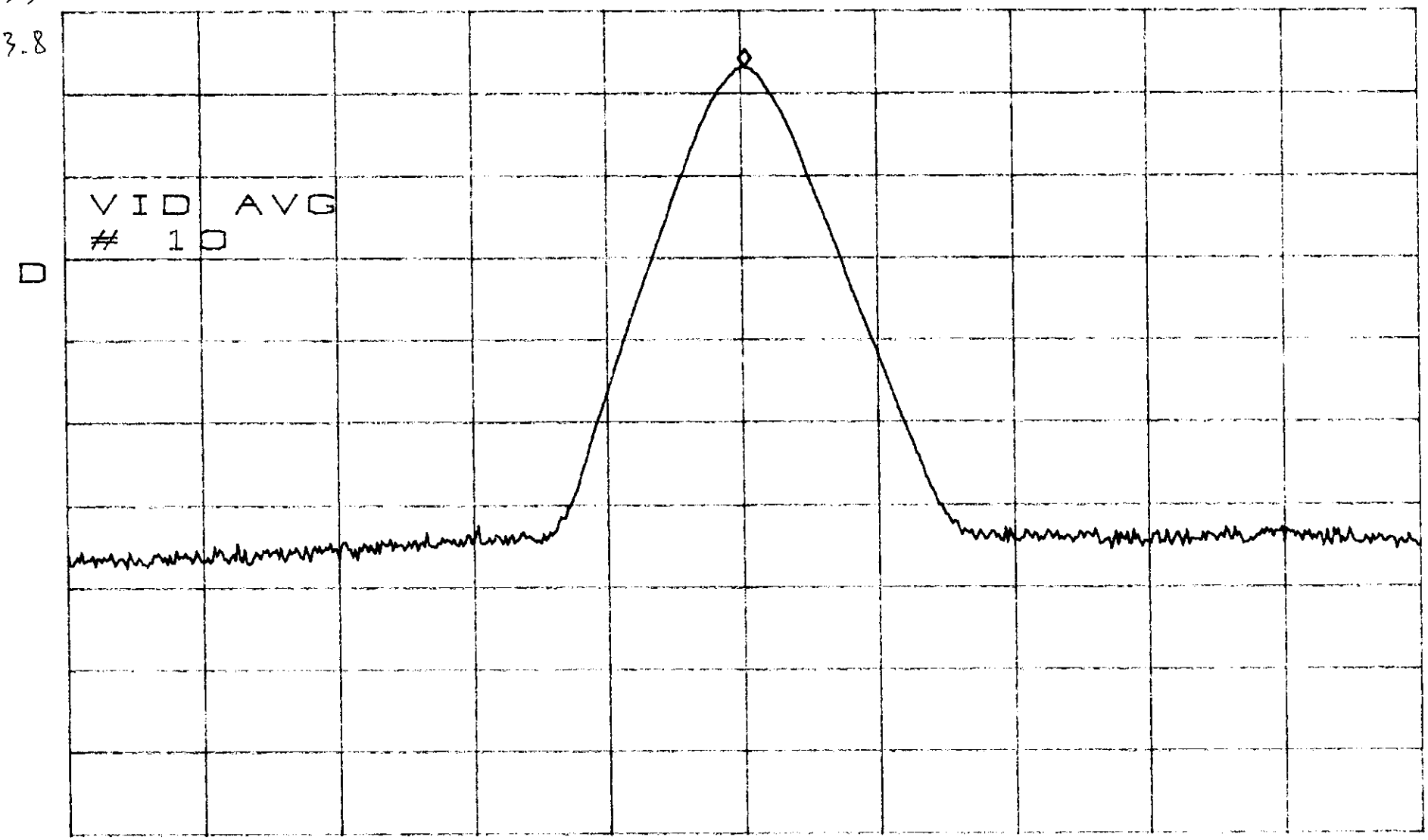
Spec. Analyzer : HP 8563E
Sig. Gen : R&S 835.8011.58

CDMA #1 Lower Band 425 uplink (Rev. Path) CW 11/1/96

Ext Attn 40.5

RF$_{in}$ = -55

RF$_{out}$ = 33.8



CENTER 1.87125GHz SPAN 25.00MHz

*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms

Cable cal. out.

Spec. Analyzer : HP8563E

Sig. Gen : R&S 835.8011.58

FAX

TÜV PRODUCT SERVICE
10040 Mesa Rim Rd.
San Diego, CA 92121

CDMA

TÜV PRODUCT SERVICE

Date	11/08/96
Number of pages including cover sheet	2

To: Ortel Corporation	
	Martin Kies
CC:	
Fax Number	**(818) 281-7913**

From: TÜV PS San Diego	
	Mary Washington
Phone	**(619)-546-3999**
Fax Number	**(619)-546-0364**

REMARKS

X Urgent | For your review | Reply ASAP | Please comment

MESSAGE:

Dear Martin, (all CDMA signal unless otherwise noted)

The following items were discussed between Tim Maguire at the FCC and myself:

2.985 RF Output Power - RBW = 1 or 3 MHz, VBW = same as RBW . Video averaging over 10 sweeps. Low , mid and high channels. UL + DL (6 plots)

2.989 Occupied Bandwidth - RBW = 30 kHz and VBW = 30 or 100 kHz, 5 MHz span and video averaging over 10 sweeps. Low and high channels. UL + DL (4 plots)

2.991 Spurious Emissions at Antenna Terminals - RBW and VBW = 1 MHz. Low and high channels. UL + DL (4 plots)

24.238 Bandedges/Emission Limits - For: (1) fundamental use RBW and VBW = 30 kHz and span of 5 **MHz, (2) Below the fundamental use RBW and VBW = 1 % of fundamental, and on the high side of the frequency block use RBW and VBW = 1 MHz. Low and high channels.** UL + DL (12 plots)

span = 1 MHz → 1 or 5 MHz span

± 1 MHz from fundamental

Intermodulation Test - 3 tone test. Take two channels close to 1951 and one channel close to 1963. Looking at how these three frequencies act together. Strongest intermod are of the third order. Third order = second harmonic of 1951 - 1963. Use CDMA signal. If you can't, you may use CW. But, give him a call first. RBW depends on the intermodulation that you are looking at, outside the frequency block use 1 RBW and inside the frequency block use 1 % of fundamental or 30 kHz.

UL, DL

↳ try CW first!!!

RBW - 30 kHz
VBW = 30 or 100 kHz

Input/Output Plots - RBW, VBW and span = same as occupied bandwidth. Video averaging over 10 sweeps. Low and high channels. UL + DL (8 plots)

Tim informed me that we may call him with any questions; but, he will be out of the office on Monday, 11/11. If you have any questions, please contact me.

Mary

Also, ① the technical writer just informed that there is not a block ~~digr~~ diagram in the product info. form ~~for the~~ CDMA repeater. Could you please Provide one ASAP.[2]

② Internal/External photos - TUV to do or Ortel?

Author: Tim Maguire <TMAGUIRE@fcc.gov> at internet
Date: 2/11/97 1:04 PM
Priority: Normal
TO: Martin Kies at ORTEL-HQ
Subject: CDMA A and B Band Status -Reply
---------- Message Contents ----------

Hi Martin:

I was out of the office yesterday, but I'm granting your unit as I'm e-mailing.

After evaluating the intermod data, I think it would be a good idea to perform this test with actual signals in the future. The levels obtained were fairly close to the limit and the use of an actual signal will better represent the device.

Regards,

Tim

↳ 3 tone CDMA signal for intermod (used CW for A + B)
See if can use CDMA next time

TUV Product Service
POWERLINE CONDUCTED RFI

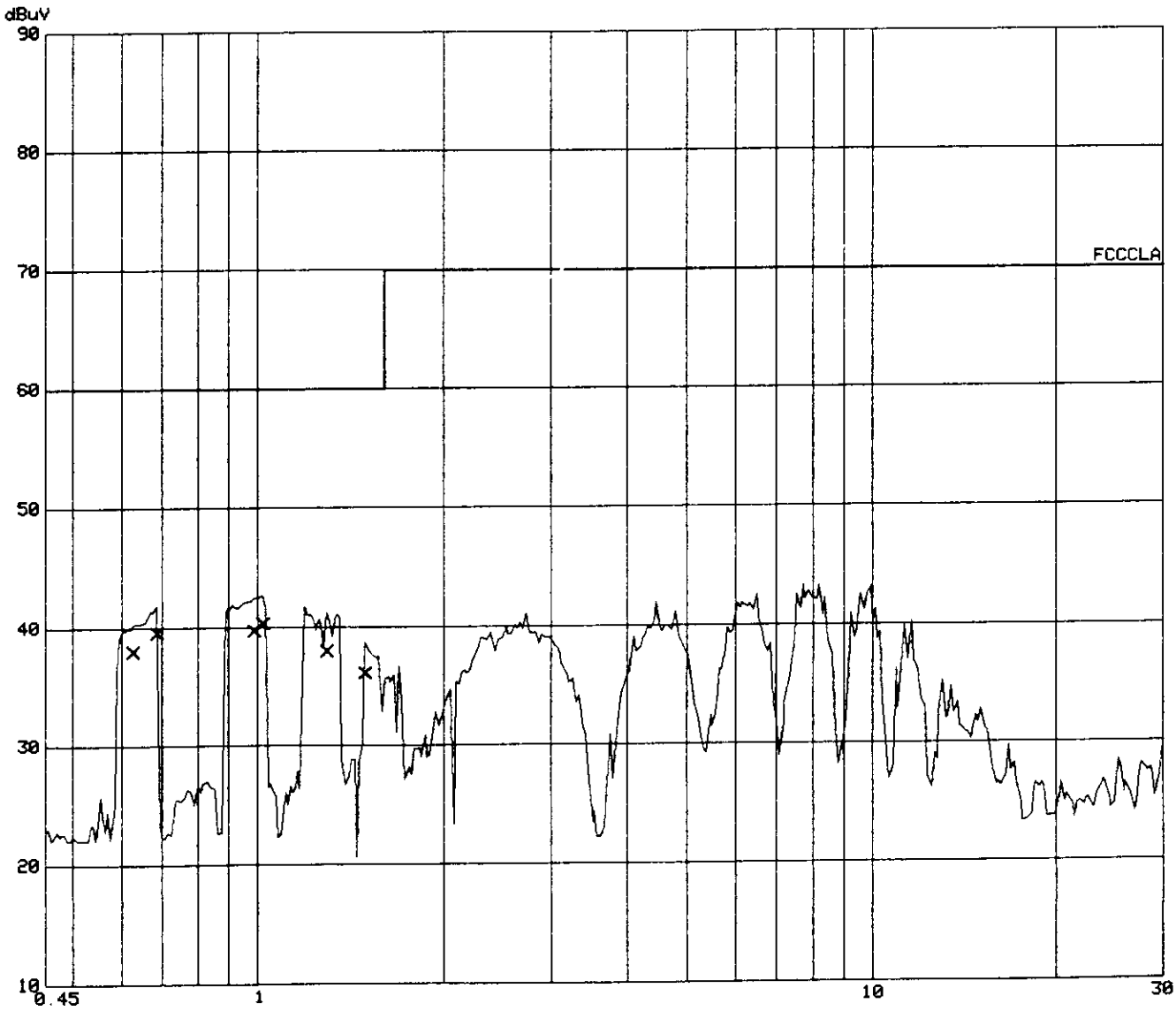
EUT: Model CDR-1901-1-X CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington mw
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 1
Mid Channel, CW
Date: 04. Nov 96 09:34

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB



TUV Product Service
POWERLINE CONDUCTED RFI

EUT: Model CDR-1901-1-X CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington MW
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 1
Mid Channel, CW
Date: 04. Nov 96 09:34

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB

Final Measurement Results:

Frequency MHz	QP Level dB	QP Limit dB
0.62500	38.0	60.0
0.68500	~~39.5~~ 41.0	60.0
0.98500	~~39.7~~ 42.0	60.0
1.02000	~~40.3~~ 42.6	60.0
1.29000	38.0	60.0
1.49000	36.1	60.0

* limit exceeded

TUV Product Service
POWERLINE CONDUCTED RFI

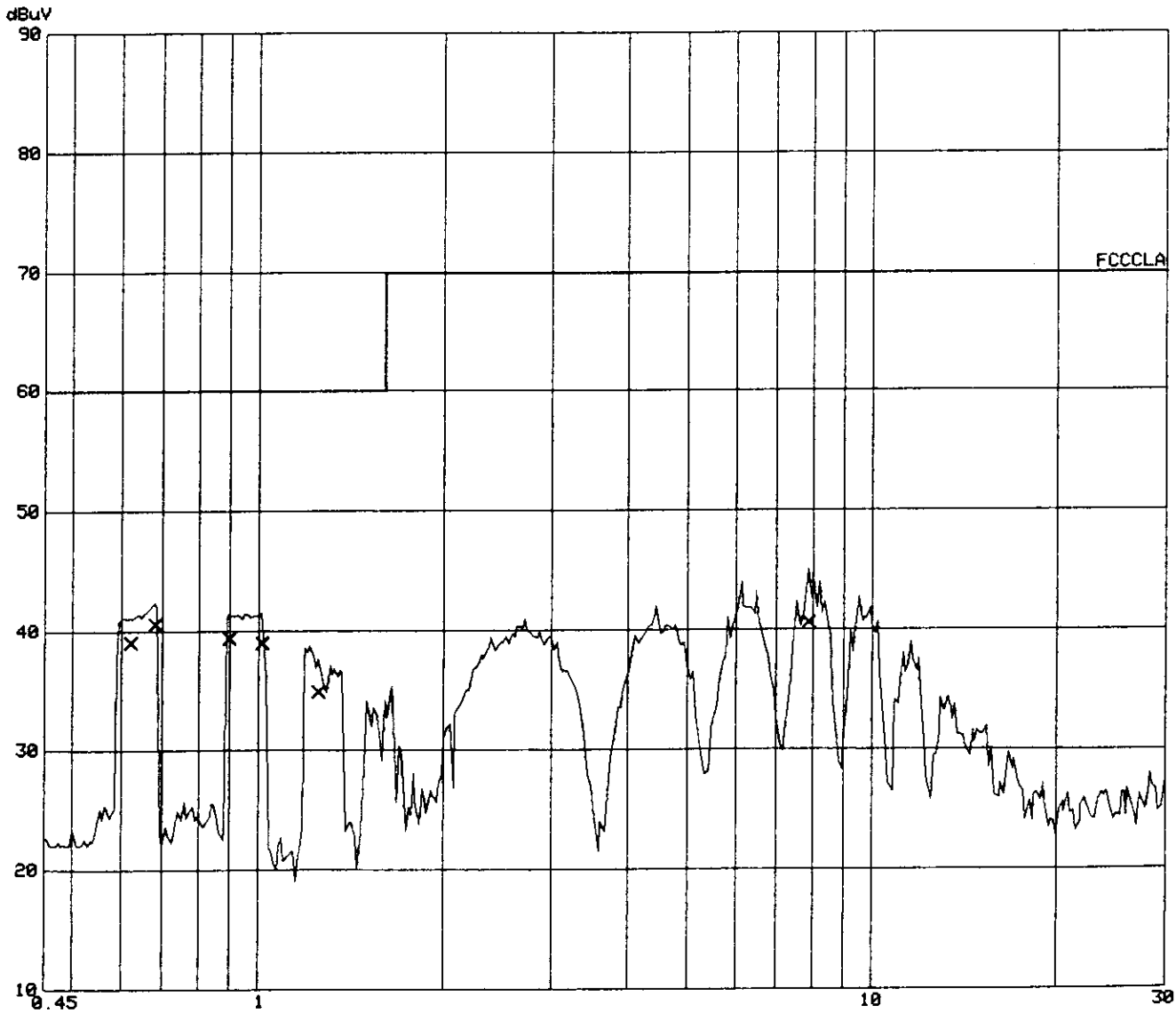
EUT: Model CDR-1901-1-X CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 2
Mid Channel, CW
Date: 04. Nov 96 09:44

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB



TUV Product Service
POWERLINE CONDUCTED RFI

EUT: Model CDR-1901-1-X CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington MW
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 2
Mid Channel, CW
Date: 04. Nov 96 09:44

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.62000	39.1	60.0
0.68000	~~40.6~~ 42.1	60.0
0.89500	~~39.3~~ 41.0	60.0
1.01000	39.0	60.0
1.25000	34.9	60.0
7.88000	~~40.5~~ 45.0	70.0

* limit exceeded

TUV Product Service
POWERLINE CONDUCTED RFI

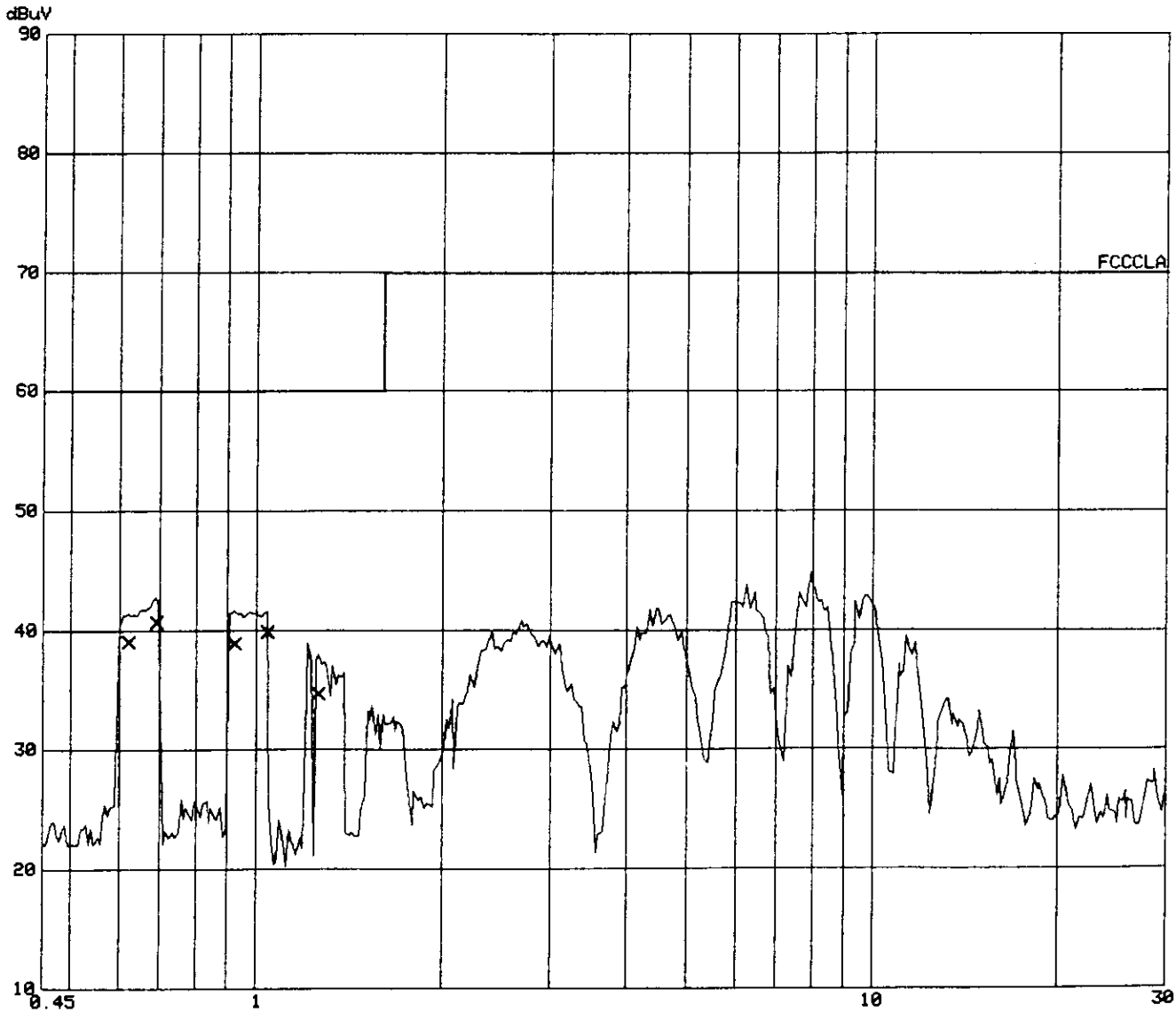
EUT: Model CDR-1901-1-X CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington MW
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 2
Mid Channel, CDMA
Date: 04. Nov 96 09:54

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

Final Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB



TUV Product Service
POWERLINE CONDUCTED RFI

EUT: Model CDR-1901-1-X CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington MW
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 2
Mid Channel, CDMA
Date: 04. Nov 96 09:54

Final Measurement Results:

Frequency MHz	QP Level dBuV	QP Limit dBuV
0.62000	39.1	60.0
0.69000	~~40.7~~ 42.7	60.0
0.92000	38.9	60.0
1.04000	~~39.9~~ 41.6	60.0
1.26000	34.6	60.0

* limit exceeded

TUV Product Service
POWERLINE CONDUCTED RFI

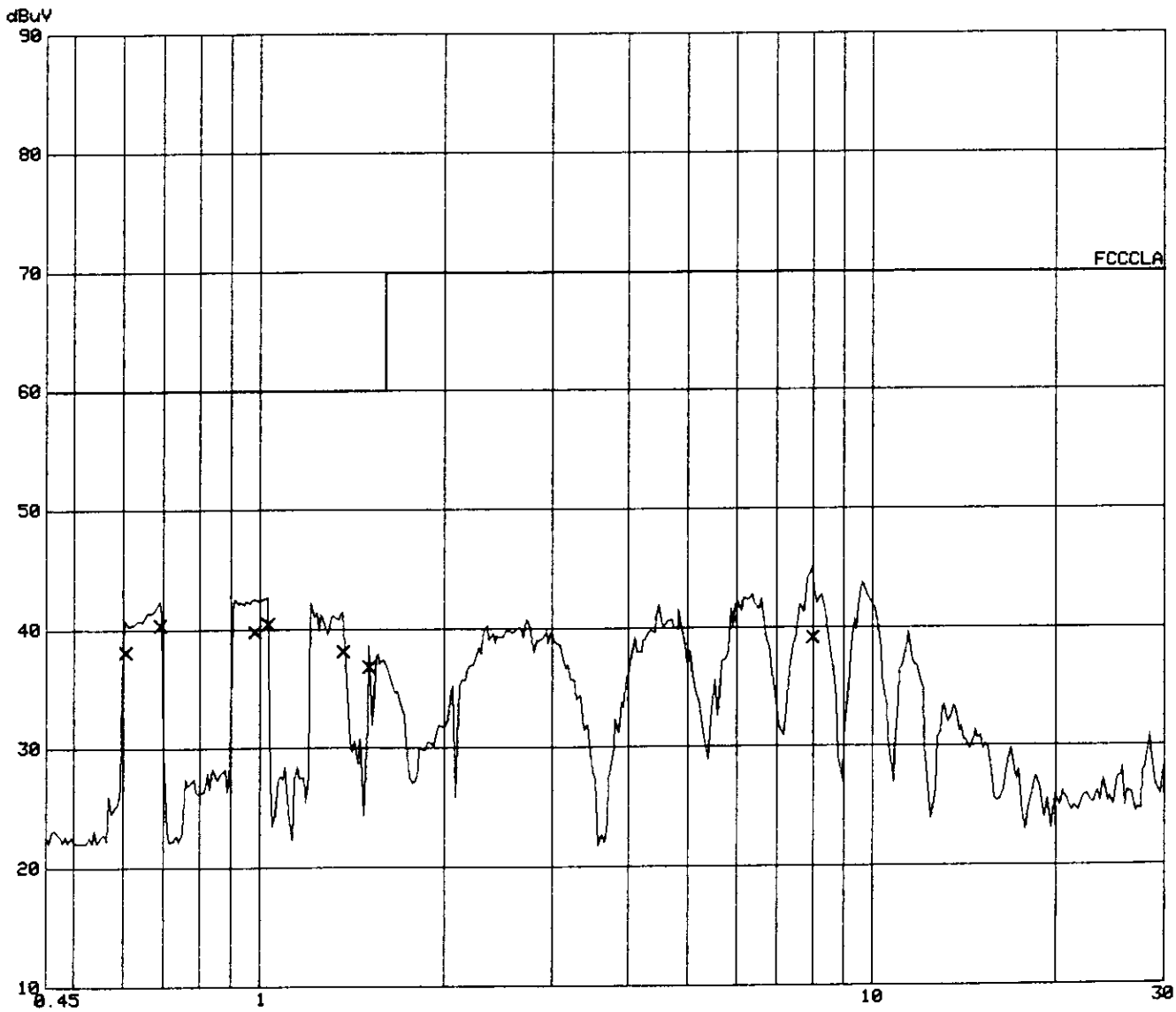
UT:	Model CDR-1901-1-X CDMA Repeater
anuf:	Ortel Corporation
p Cond:	Transmitting
perator:	Mary Washington mw
est Spec:	FCC Class A
omment:	120 Vac 60 Hz Line 1
	Mid Channel, CDMA
ate:	04. Nov 96 10:01

can Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp	OpRge
450k	1M	5k	10k	PK	50ms	AUTO	LN OFF	30dB
1M	30M	10k	10k	PK	5ms	AUTO	LN OFF	60dB

Transducer No.	Start	Stop	Name
1	148.5k	30M	20dBLISN

inal Measurement: x QP
Meas Time: 1 s
Subranges: 25
Acc Margin: 25dB



TUV Product Service
POWERLINE CONDUCTED RFI

UT:	Model CDR-1901-1-X CDMA Repeater
anuf:	Ortel Corporation
p Cond:	Transmitting
perator:	Mary Washington
est Spec:	FCC Class A
omment:	120 Vac 60 Hz Line 1
	Mid Channel, CDMA
ate:	04. Nov 96 10:01

inal Measurement Results:

requency MHz	QP Level dBuV	QP Limit dBuV
0.60500	38.1	60.0
0.69000	~~40.3~~ 42.0	60.0
0.98000	~~39.8~~ 42.4	60.0
1.03000	~~40.4~~ 42.8	60.0
1.37000	~~38.1~~ 38.1	60.0
1.51000	36.8	60.0
7.97000	39.1	70.0

* limit exceeded

REPORT No: S6536 SPEC: FCC Part 15 para 15.109(b)

CUSTOMER: Ortel Corporation TEST DIST: 10 Meters

E U T: Model CDR-1901-1-X CDMA Repeater TEST SITE: 3

EUT MODE: Transmit BICONICAL: 235

DATE: 4-Nov-96 TESTED BY: MW LOG PERIODIC: 243

NOTES: Quasi-Peak with 120 KHz measurement bandwidth. RCVR: IM-37/57A

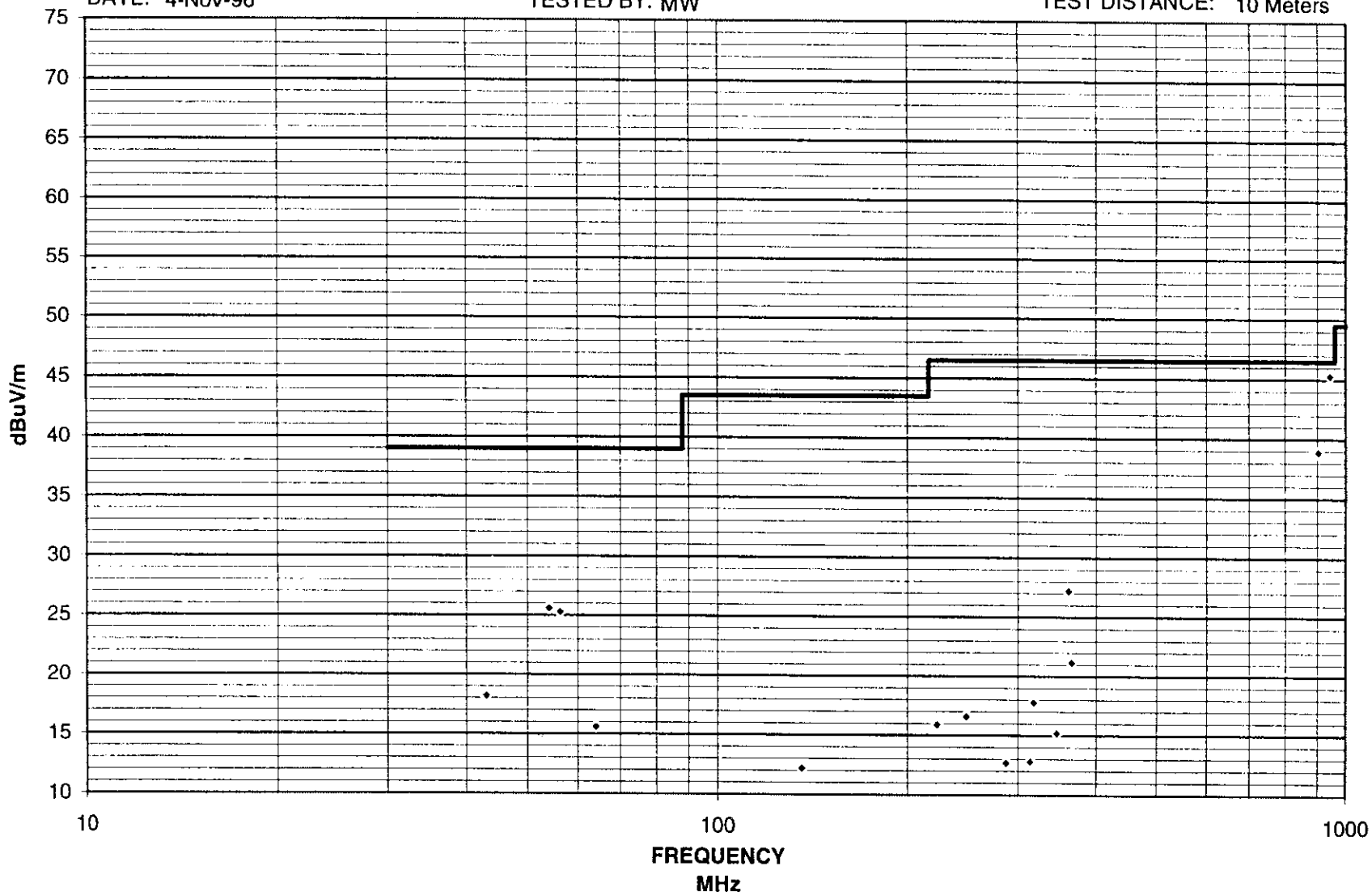
FREQUENCY (MHz)	VERTICAL measured (dBuv)	HORIZONTAL measured (dBuV)	CORRECTION FACTOR (dB/m)	MAXIMUM CORRECTED (dBuV/m)	SPECIFIED LIMIT (dBuV/m)	EUT MARGIN (dB)	EUT ROTATION (degrees)	ANTENNA HEIGHT (meters)	NOTE
43	7	4	11.2	**18.2**	39	-20.8			
54	14	9	11.6	**25.6**	39	-13.4	270	1.5	
56.25	14	11	11.3	**25.3**	39	-13.7	270	1.5	
64.1	6	4	9.6	**15.6**	39	-23.4			
136	-1	-6	13.2	**12.2**	43.5	-31.3			
222.9	3	-9	12.9	**15.9**	46.5	-30.6			
248	3	-4	13.6	**16.6**	46.5	-29.9			
260	-10	-8	14.8	**6.8**	46.5	-39.7			
287	-4	-3	15.7	**12.7**	46.5	-33.8			
314	-4	-4	16.8	**12.8**	46.5	-33.7			
318	1	-1	16.8	**17.8**	46.5	-28.7			
346	-2	-4	17.2	**15.2**	46.5	-31.3			
361.9	10	-4	17.2	**27.2**	46.5	-19.3			
365.9	4	2	17.2	**21.2**	46.5	-25.3			
903.72	12	12	26.9	**38.9**	46.5	-7.6			
943.73	13	18	27.3	**45.3**	46.5	-1.2	90	1.5	

REPORT NO. S6536
COMPANY: Ortel Corporation
EUT: Model CDR-1901-1-X CDMA Repeater
EUT MODE: Transmit
DATE: 4-Nov-96

SPEC: FCC Part 15 para 15.109(b)

TESTED BY: MW

TEST DISTANCE: 10 Meters



DATE: 11/5/96

TEST: Radiated Spurious/Harmonics Emissions

CUSTOMER: Ortel Corporation

EUT: Model CDR-1901-1-X, CDMA Repeater

SPECIFICATION: FCC Part 2, Paragraph 2.993

Frequency MHz	Peak Vertical dBµV	Peak Horizontal dBµV	Distance Factor dB	Correction Factor dB/m	Gain dB	Emission Level dBµV/m	Limit dBµV/m
f_o=1951.25	36.2	32.4	0	23.68	0	59.88	—
3.9025	25.2	25.5	↓	22.81	↓	48.31	64.71
5.8537	31.3	32.8	↓	22.18	↓	54.48	↓
f_o=1957.50	36.2	35.8	0	23.68	0	59.88	—
3.915	25.4	26.1	↓	22.81	↓	48.91	64.71
5.8725	31.1	31.6	↓	22.18	↓	53.78	↓
f_o=1963.75	44.4	40.5	0	23.68	0	68.08	—
3927.5	26.6	25.8	↓	22.81	↓	49.41	72.91
5891.25	31.8	32.5	↓	22.18	↓	54.68	↓
f_o=							

NOTES:

1. Resolution bandwidth and video bandwidth was 1 MHz.
2. Limit = emission level of fundamental - 43 + 10log(A)
3. No emissions were detectable, except the fundamental.

DATE: 11/5/96

TEST: Radiated Spurious/Harmonics Emissions

CUSTOMER: Orkel Corporation

EUT: Model CDR-1901-1-X, CDMA Repeater

SPECIFICATION: FCC Part 2, Paragraph 2.993

Frequency MHz	Peak Vertical dBµV	Peak Horizontal dBµV	Distance Factor dB	Correction Factor dB/m	Gain dB	Emission Level dBµV/m	Limit dBµV/m
f_o=1883.75	50.4	48.5	0	27.95	0	78.35	—
3767.5	26.0	26.6	↓	22.4	↓	49.0	83.18
5651.25	27.1	26.7	↓	24.47	↓	51.57	↓
f_o=1877.5	51.2	48.7	0	27.95	0	79.15	
3755.0	27.1	25.6	↓	22.4	↓	49.5	85.15
5632.5	25.9	27.9	↓	24.47	↓	52.37	↓
f_o=1871.25	46.80	43.70	0	27.95	0	74.75	
3742.5	23.80	25.30	↓	22.4	↓	47.70	78.59
5613.75	25.70	25.50	↓	24.47	↓	49.97	↓
f_o=							

NOTES:

1. Resolution bandwidth and video bandwidth was 1 MHz.
2. Limit = emission level of f_o − 43 + 10 log P

CDMA A-band

TÜV PRODUCT SERVICE
10040 Mesa Rim Road
San Diego, CA 92121-2912
Phone 619 546 3999
FAX 619 546 0364

TÜV PRODUCT SERVICE

29 January 1997

Mr. Tim Maguire
Federal Communications Commission
Equipment Authorization Division
Application Processing Branch
7435 Oakland Mills Road
Columbia, MD 21046

Re: (1) Ortel Corporation
(2) FCC ID: LB41901CDMA
(3) Replacement pages for Report S6636-08
(4) Additional data for the A band

Dear Mr. Maguire,

Enclosed are the replacement pages for Report No. S6636-08 and the additional data of the A band. I have enclosed the corrected 731 to reflect the appropriate frequency range. Also, the testing that was performed by Ortel for Report No. S6636-08 included an external 41 dB of attenuation. If you have any questions, please contact me.

→ A-band only has no ext atten } for Ortel part 2 plots
B-band data has 41dB ext atten }

Sincerely,

Mary Washington

Mary Washington
EMC Engineer

Author: Martin Kies at ORTEL-HQ
Date: 1/31/97 4:03 PM
Priority: Normal
TO: tmaguire@fcc.gov at internet
TO: mwashington@tuvps.com at internet
TO: Martin Kies
Subject: Addendum: Some Minor Corrections to A-band Packet
---------- Message Contents ----------

The FCC form 731, page 2, section 4, should be checked "YES". Ortel requests confidentiality for all bills of material, schematics, semiconductor devices used, and operating manual.

Mary, please let me know if you need an additional copy of the confidentiality statement signed by Robert Mielke on July 5, 1996.

Thanks,

Martin

---------- Reply Separator ----------
Subject: Some Minor Corrections to A-band Packet
Author: Martin Kies at ORTEL-HQ
Date: 1/31/97 3:45 PM

Tim:

I just received a copy of the A-band CDMA packet from TUV also. I quickly looked through it and noticed several minor mistakes:

--page 1 of 12 should have a "Model / Serial No." of CDR-1901-1-A for A-band repeater

--page TD8 of TD58 should have no external attenuation. To recap, B-band Ortel in house plots have 41 dB external attenuation, A-band Ortel in house plots do not have external attenuation.

--page B2 of B3 customer contact should be "Martin Kies"

--page B2 of B3 "PRODUCT DESCRIPTION" should read "CDMA Repeater, Model CDR-1901-1-A" for A-band repeater

--page B2 of B3 of "POWER INTERFACE" should read "single phase, 1.3 A nominal current"

As you can see, I have also notified Mary. If there are any additional questions, please let me know.

Thanks,

Martin

Author: Martin Kies at ORTEL-HQ
Date: 1/31/97 3:45 PM
Priority: Normal
TO: tmaguire@fcc.gov at internet
TO: mwashington@tuvps.com at internet
CC: Martin Kies
Subject: Some Minor Corrections to A-band Packet

---------- Message Contents ----------

Tim:

I just received a copy of the A-band CDMA packet from TUV also. I quickly looked through it and noticed several minor mistakes:

--page 1 of 12 should have a "Model / Serial No." of CDR-1901-1-A for A-band repeater

--page TD8 of TD58 should have no external attenuation. To recap, B-band Ortel in house plots have 41 dB external attenuation, A-band Ortel in house plots do not have external attenuation.

--page B2 of B3 customer contact should be "Martin Kies"

--page B2 of B3 "PRODUCT DESCRIPTION" should read "CDMA Repeater, Model CDR-1901-1-A" for A-band repeater

--page B2 of B3 of "POWER INTERFACE" should read "single phase, 1.3 A nominal current"

As you can see, I have also notified Mary. If there are any additional questions, please let me know.

Thanks,

Martin

SECTION III

Bureau Use Only

1.(a) INSTEAD OF APPLICANT, FCC IS AUTHORIZED TO MAIL ORIGINAL GRANT TO (See instructions):

Firm Name, number, street, city, state, and ZIP Code: TÜV Product Service, 10040 Mesa Rim Road, San Diego, CA, 92121

(b) NAME AND TITLE OF PERSON AT ABOVE ADDRESS TO RECEIVE GRANT:
Floyd Fleury, Senior EMC Engineer

2. INFORMATION CONTACT, IF DIFFERENT FROM ITEM 5, PAGE 1 (See instructions):

Firm Name, contact person, number, street, city, state, and ZIP Code: TÜV Product Service, Floyd Fleury, 10040 Mesa Rim Road, San Diego, CA, 92121

3.(a) TELEPHONE NUMBER (include area code and extension - USA ONLY):
619 546 3999

3.(b) FAX NUMBER (include area code and extension - USA ONLY):
619 546 0364

4. Does this application include a request for confidentiality for any portion(s) of the data contained in this application pursuant to 47 CFR 0.459 of the Commission's Rules? (See instructions) ☐ Yes ☒ No

5. Does the applicant desire the Commission to defer grant of this application pursuant to 47 CFR 0.457(d)(1)(ii)? (See instructions) ☐ Yes ☒ No

6. Kind of equipment authorization requested (check ONE box only): ☐ Certification ☒ Type Acceptance ☐ Type Approval ☐ Notification

7.(a) Kind of equipment:

(b) Equipment will be operated under FCC Rule Part (s):

8. Application is for (Check ONE box only):

☒ 1 Original equipment
☐ 2 Change in identification of presently authorized equipment*
☐ 3 Class II permissive change or modification of presently authorized equipment

*If box 2 is checked, complete items 9(a) and (b).

9.(a) FCC ID before change in identification:

(b) Grant date of FCC ID in 9(a) above:

10. EQUIPMENT SPECIFICATIONS:

(a) Frequency range in MHz	(b) Rated RF power output in watts	(c) Frequency tolerance %, Hz, ppm	(d) Emission designator	(e) Microporcessor model number
Uplink - 1850-1865 MHz 1870 - 1885 MHz Downlink - 1930-1945 MHz 1950 - 1965 MHz	2.8	--	Repeater	S87C751-2A2B

11. Type of equipment tested: ☒ Production ☐ Pre-Production ☐ Prototype

12.(a) Is the equipment, or section(s) thereof, subject to more than one equipment authorization? If YES, complete itmes 12(b), (c), (d), or (e) as appropriate. ☐ Yes ☒ No

(b) Additional equipment authroization(s) required for equipment: ☐ Certification ☐ Type Acceptance ☐ Type Approval ☐ Notification

(c) Granted FCC ID or FCC ID listed on RX or RX section application:

(d) Granted FCC ID or FCC ID listed on TX or TX section application:

(e) Granted FCC ID or FCC ID listed on other device application:

TÜV PRODUCT SERVICE

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TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

EMC EMISSION - TEST REPORT
UNITED STATES STANDARD 47 CFR PARTS 2 and 24

Test Report File No. : **S7037-01** Date of Issue: 23 January 1997

A

Model / Serial No. : **CDR-1901-1-B / ----**

Product Type : CDMA Repeater

Applicant : ORTEL CORPORATION

Manufacturer : ORTEL CORPORATION

License holder : ORTEL CORPORATION

Address : 2015 West Chestnut Street

: Alhambra, CA 91803

Test Result : ■ **Positive*** ☐ **Negative**

Test Project Number Reference(s) : **S101703701-01**

Total pages - Test Report : 12

(*) Data records TD3 and TD4. Data records TD9 through TD58 were tested by ORTEL CORPORATION - see page TD6 for summary of results.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego. CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

DIRECTORY - EMISSIONS
Test Report

Technical Documentation

Appendicies

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to the following regulations:

☐ - EN 50081-1 / 1991

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

☐ - EN 55022 / 1994 — ☐ - Class A — ☐ - Class B

☐ - BS
☐ - VCCI — ☐ - Class 1 ITE — ☐ - Class 2 ITE

■ - FCC, Part 2, Paragraphs 2.885, 2.989, 2.991, and 2.993 and Part 24, Paragraph 24.238 (see Technical Documentation section for data)

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

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

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

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Environmental Conditions In The Laboratory:

	Actual
Temperature:	: 23 °C
Relative Humidity:	: 50 %
Atmospheric Pressure:	: 1000 mBar

Power Supply Utilized:

Power supply system : 120 V / 60 Hz / 1ϕ

Symbol Definitions:

■ - Applicable
□ - Not Applicable

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Emissions Test Conditions: CONDUCTED EMISSIONS (Interference Voltage)

The *CONDUCTED EMISSIONS (INTERFERENCE VOLTAGE)* measurements were performed at the following test location:

■ - Test not applicable

☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
☐ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
☐ -	NM-7A, NM-17/27, NM-37/57, NM-67, CCA-7, and H/P 9836 HP-1B Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 1	(multiple)	156, 162-166
☐ -	NM-17/27, NM-37/57, CA-7, and H/P 9826 Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 2	(multiple)	168, 170, 177, 178
☐ -	H/P Spectrum Analyzer, Model 8568B; Display Section RF Analyzer Section, H/P 85650A, Quasi-Peak Adapter H/P Computer System, Model 310 with HP 85685A Software	Various	Automated RFI Measurement System (ARMS)	(multiple)	187, 188
☐ -	LISN-3, 50 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	3-4	262-263
☐ -	LISN-3, 50 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	5-6	264, 265
☐ -	LISN-2, 25 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	7	413
☐ -	LISN-2, 25 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	7	--
☐ -	FCC-LISN-50-25-2	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	112	553
☐ -	FCC-LISN-50-25-2	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 µH/250 µH/50 Ω/0.25 µF	113	552
☐ -	8012-50-R-12-BNC	Solar Electronics Co.	LISN, 50 µH/50 Ω/0.1 µF	--	266
☐ -	9252-50-R-24-BNC	Solar Electronics Co.	LISN, 50 µH /250 µH/50 Ω/ 0.25 µF	941719	458
☐ -	9252-50-R-24-BNC	Solar Electronics Co.	LISN, 50 µH /250 µH/50 Ω/ 0.25 µF	941720	457
☐ -	MDS-21	Rohde & Schwarz	Absorbing Clamp	821023	277
☐ -	ESHS 20	Rohde & Schwarz	EMI Test Receiver	837055/001	428
☐ -	ESHS 30	Rohde & Schwarz	EMI Test Receiver	832354/004	459

NOT APPLICABLE

Remarks: _____

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Emissions Test Conditions: RADIATED EMISSIONS (Magnetic Field)

The *RADIATED EMISSIONS (MAGNETIC FIELD)* measurements were performed at the following test location:

■ - **Test not applicable**

☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
☐ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - TR-1, Shielded Room, 16.5' x 10' x 7.5', Copper Screen Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Testing was performed at a test distance of :

☐ - 3 meters
☐ - 30 meters

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
☐ -	NM-7A, NM-17/27, NM-37/57, NM-67, CCA-7, and HP 9836 HP-1B Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 1	(multiple)	156, 162-166
☐ -	NM-17/27, NM-37/57, CA-7, and HP 9826 Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 2	(multiple)	168, 170, 177, 178
☐ -	AT-205/URM46	Eaton/Ailtech	Loop Antenna	64090	201
☐ -	94593-1	Eaton/Ailtech	Loop Antenna	0264	205

NOT APPLICABLE

Remarks: _____

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *RADIATED EMISSIONS (ELECTRIC FIELD)* measurements, in the frequency range of 30 MHz-1000 MHz, were tested in a horizontal and vertical polarization at the following test location :

■ - Test not applicable

☐ - Roof (Small Open Area Test Site)
☐ - Canyon #1 (10- and 30-Meter Open Area Test Site), Carroll Canyon, San Diego
☐ - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Testing was performed at a test distance of :

☐ - 3 meters
☐ - 10 meters
☐ - 30 meters

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
☐ -	NM-37/57A	Eaton/Ailtech	OATS measurement set (Roof)	0561-09261	420
	CCA-7			0773-03117	373
☐ -	NM-37/57	Eaton/Ailtech	OATS measurement set (Canyon)	0709-82078	171
	CCA-7			0187-0322	172
☐ -	HFH 2-Z2	Rohde & Schwarz	Antenna, Loop	880	208
☐ -	3104	EMCO	Antenna, Biconical	3031	235
☐ -	3110	EMCO	Antenna, Biconical	1378	451
☐ -	94455-1	Eaton/Ailtech	Antenna, Biconical	0811	231
☐ -	3110B	EMCO	Antenna, Biconical	9508-2	491
☐ -	CBL6111	Chase	Antenna, Bilog	1013	460
☐ -	CBL6111	Chase	Antenna, Bilog	1291	461
☐ -	3146	EMCO	Antenna, Log Periodic Dipole	1597	242
☐ -	3146	EMCO	Antenna, Log Periodic Dipole	106X	243
☐ -	3146	EMCO	Antenna, Log Periodic Dipole	1063	244
☐ -	7405	EMCO	Loop Probes	9104-1959	570
☐ -	8566B	Hewlett Packard	Spectrum Analyzer	2311A02209	404
☐ -	85662B	Hewlett Packard	Spectrum Analyzer Display	2309A04682	406
☐ -	ESVS 30	Rohde & Schwarz	EMI Test Receiver	830350/006	427
☐ -	ESVS 30	Rohde & Schwarz	EMI Test Receiver	833825/003	466

NOT APPLICABLE

Remarks: _____

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TÜV PRODUCT SERVICE

Emissions Test Conditions: INTERFERENCE POWER

The *INTERFERENCE POWER* measurements were performed by using the absorbing clamp on the mains and interface cables in the frequency range 30 MHz - 300 MHz at the following test location :

■ - Test not applicable

☐ - SR-2, Shielded Room, 12' x 24' x 10', Metal Chamber
☐ - SR-3, Shielded Room, 12' x 20' x 8', Metal Chamber
☐ - SR-4, Shielded Room, 10' x 17' x 8', Copper Screen Chamber
☐ - SR-5, Shielded Room, 16' x 28' x 15', Metal, Semi-Anechoic Chamber
☐ - CSR-1, Shielded Room, 10' x 7' x 7', Metal Chamber

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
☐ -	MDS-21	Rohde & Schwarz	Absorbing Clamp	821023	277
☐ -	NM-7A, NM-17/27, NM-37/57, NM-67, CCA-7, and H/P 9836 HP-1B Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 1	(multiple)	156, 162-166
☐ -	NM-17/27, NM-37/57, CA-7, and H/P 9826 Computer	Eaton/Ailtech	Automated RFI Measurement System (ARMS), NO. 2	(multiple)	168, 170, 177, 178
☐ -	H/P Spectrum Analyzer, Model 8568B; Display Section 8566 Analyzer Section; H/P 85650A Quasi-Peak Adapter H/P Computer System, Model 310 with HP 85869A Software	Hewlett Packard	Automated RFI Measurement System (ARMS)	2304A04531 2304A02500 2811A01325	187, 188
☐ -	ESVS 30	Rohde & Schwarz	EMI Test Receiver	830350/006	427
☐ -	ESVS 30	Rohde & Schwarz	EMI Test Receiver	830350/003	466

NOT APPLICABLE

Remarks: _____

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TÜV PRODUCT SERVICE

Emissions Test Conditions: RADIATED EMISSIONS (Electric Field)

The *EQUIVALENT RADIATED EMISSIONS* measurements in the frequency range 1 GHz - 18 GHz were performed in a horizontal and vertical polarization at the following test location :

☐ - **Test not applicable**

■ - Roof (Small Open Area Test Site)
☐ - Canyon #1 (10- and 30-Meter Open Area Test Site), Carroll Canyon, San Diego
☐ - Canyon #2 (3- and 10-Meter Open Area Test Site), Carroll Canyon, San Diego

Testing was performed at a test distance of:

☐ - 1 meters
■ - 3 meters
☐ - 10 meters

Test Equipment Used :

	Model Number	Manufacturer	Description	Serial Number	Prop. No.
■ -	8566B	Hewlett Packard	Spectrum Analyzer	2311A02209	407
■ -	85662B	Hewlett Packard	Spectrum Analyzer Display	2309A04682	406
☐ -	3115	EMCO	Antenna, Double Ridge Guide	9412-4363	453
■ -	3115	EMCO	Antenna, Double Ridge Guide	2495	251
■ -	AFD3-0102-13-ST	Miteq, Inc.	Pre-Amplifier (38 dB gain), 1 to 2 GHz	16429	366
■ -	AFD3-0208-40-ST	Miteq, Inc.	Pre-Amplifier (30 dB gain), 2 to 8 GHz	155382	367
■ -	AFS4-08001800-70-10P-4	Miteq, Inc.	Pre-Amplifier (22 dB gain), 8 to 18 GHz	167	368
☐ -	91888-2	Eaton	Horn Antenna (1 to 2 GHz)	101	252
☐ -	91889-2	Eaton	Horn Antenna (2 to 3.6 GHz)	101	253
☐ -	91892-1	Eaton	Reflector Antenna (3.6 to 18 GHz)	--	254
☐ -	94613-1	Eaton	Horn Antenna (3.6 to 7.6 GHz)	--	255
☐ -	91891-2	Eaton	Horn Antenna (7.3 to 12 GHz)	--	256
☐ -	94614-1	Eaton	Horn Antenna (12 to 18 GHz)	--	257

Remarks: Data records TD2 and TD3.

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Equipment Under Test (EUT) Test Operation Mode - Emissions Tests :

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

☐ - Standby

☐ - Test Program (H - Pattern)

☐ - Test Program (Color Bar)

☐ - Test Program (Customer Specified)

☐ - Practice Operation

☐ - Normal Operating Mode

■ - Downlink/uplink mode

Configuration of the equipment under test:

☐ - See Constructional Data Form in Appendix B - Page B2

■ - See Product Information Form(s) in Appendix B - Page B2

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

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - _____ Type : _____

☐ - unshielded power cable

☐ - unshielded cables

☐ - shielded cables MPS.No.: _____

☐ - customer specific cables

☐ - _____

☐ - _____

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GENERAL REMARKS:

(*) Data records TD9 through TD58, Part 2, Paragraphs 2.885, 2.989, and 2.991 and Part 24, Paragraph 24.238 were tested by ORTEL CORPORATION (see Technical Documentation section pages TD5 through TD58 for summary of tests).

(**) Data records TD2 and TD3 were performed by TÜV Product Service. See Technical Documentation section, page TD6 for ORTEL CORPORATION's declaration of data.

SUMMARY:

All tests according to the regulations cited on page 3 were

■ - Performed*

☐ - **Not** Performed

The Equipment Under Test

■ - **Fulfills** the general approval requirements cited on page 3.**

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

Statement of Measurement Uncertainty

The data and results referenced in this document are true and accurate. There may be some degree or level of measurement uncertainty. As EN 45001 does not allow recommendations to be included in the test report, the reader is encouraged to request a copy of the TÜV policy concerning pass or fail judgment with respect to possible measurement uncertainties.

Equipment Received Date: 21 January 1997

Testing Start Date: 21 January 1997

Testing End Date: 21 January 1997

- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:

Floyd R. Fleury
(Senior EMC Engineer)

Responsible Engineer:

Mary Washington
(EMC Engineer)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

Technical Documentation

Test Data Sheets

and

Test Setup Drawing(s)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Radiated Emissions - Data Records TD3 and TD4 - tests performed by TÜV Product Service.
See photographs for test setup.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

REPORT NO: S7037 DATE: 21 Jan 97

TEST: Radiated Spurious/Harmonics Emissions

CUSTOMER: Ortel Corporation

EUT: CDMA Repeater Model CDR-1901-1-A S/N 4

SPECIFICATION: FCC Part 2, Paragraph 2.993

S.V

Frequency MHz	Peak Vertical dBµV	Peak Horizontal dBµV	Distance Factor dB	Correction Factor dB/m	Emission Level dBµV/m	Limit dBµV/m	EUT Margin dB
f_o=1931.25							
3862.54	47.8	51.6	0	11.34	62.94	84.4	-21.46
5793.75	*56.8	*58.6	↓	18.32	76.92	↓	-7.48
7725.00	*53.3	*53.9	↓	22.78	76.68	↓	-7.72
9656.2	*44.7	*44.4	↓	33.02	77.72	↓	-6.68
f_o=1932.5							
3875.0	49.4	50.1	0	11.34	61.44	84.4	-22.96
5812.54	*54.2	*53.7	↓	18.32	72.52	↓	-11.88
7750.0	*54.4	*54.0	↓	22.78	77.18	↓	-7.22
f_o=1943.15							
3887.5	47.0	48.8	0	11.34	60.14	84.4	-24.26
5831.2	*52.4	*53.3	↓	18.32	71.62	↓	-12.78
7775.0	*54.3	*54.7	↓	22.78	77.48	↓	-7.22 (6.92)

NOTES:
1. RBW = 1MHz; VBW = 1MHz
2. Receive antenna = Model 3115 P/N 251
3. Amplifier = P/N 366, 367, 368
4. (*) Noise floor readings.
5. Downlink (forward path)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

REPORT NO: S7037 DATE: 21 Jun 97

TEST: Radiated Spurious/Harmonics Emissions

CUSTOMER: Ortel Corporation

EUT: CDMA Repeater model CDMA-1901-1-A S/N 4

SPECIFICATION: FCC Part 2 Paragraph 2.993 B.V.

Frequency MHz	Peak Vertical dBµV	Peak Horizontal dBµV	Distance Factor dB	Correction Factor dB/m	Emission Level dBµV/m	Limit dBµV/m	EUT Margin dB
fc=1851.25							
3702.5	47.2	47.9	0	8.54	56.44	84.4	-27.96
5553.75	48.5	48.4	↓	14.9	63.4	↓	-21.0
7405.0	54.0	54.0	↓	20.88	74.88	↓	-9.52
fc=1857.5							
3715.0	48.0	48.0	0	8.54	56.54	84.4	-27.86
5572.5	48.8	49.2	↓	14.9	64.1	↓	-20.3
7430.0	53.4	53.8	↓	20.88	74.68	↓	-9.72
fc=1863.75							
3727.58	49.2	48.1	0	8.54	57.74	84.4	-26.66
5591.2	47.7	47.9	↓	14.9	62.8	↓	-21.6
7455.0	54.7	54.7	↓	20.88	75.58	↓	-8.82

NOTES:
1. RBW = 1MHz; VBW = 1MHz
2. Receive antenna = Model 3115, P/N 251
3. Amplifier = P/N 306, 307, 368
4. (*) Noise floor readings.
5. ~~Downlink~~ Uplink (reverse path).

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Conducted Emissions - Data Records TD9 through TD58 - tests performed by ORTEL CORPORATION.

Equipment used:

Equipment	Manufacturer	Model
Signal Generator	Rohde & Schwarz	835.8011.58
Signal Generator	Hewlett Packard	8648C
Arbitrary Waveform Generator	Sony Tektronix	AWG-2021
Spectrum Analyzer	Hewlett Packard	8563E

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Making Light *Work* For You
ORTEL®
CORPORATION

January 22, 1997

FEDERAL COMMUNICATIONS COMMISSION
Equipment Authorization Division, Applications Processing Branch
7435 Oakland Mills Road
Columbia, MD 21046

Re: CDMA Test Data Submitted to the FCC (A-band)
FCC ID: LB41901CDMA

The test data measured by Ortel for the CDMA repeater is in accordance as outlined per the FCC requirements in Parts 2.985, 2.989, 2.991, and 24.238. Additionally, the data for intermodulation and input/output spreading were also in accordance to the guidelines set forth by the FCC via fax and verbal communication.

Sincerely,

Dat Ton
Test Engineer

File: "CDMATYPE.DOC"

FCC Part 2.985: RF Output Power

DUT: Model CDR-1901-1-A (A-Band CDMA Repeater)
S/N: CDMA#4
Test Date: 1/17/97

FCC ID: LB4-1901CDMA
Company: Ortel Corporation

****RF Output Power Measured with Power Meter**
(HP Model: 438A Ortel Asset Number: 8L034349)

UPLINK:

Channel	Frequency (MHz)	Output Power (dBm)
25	1851.25	32.95
150	1857.50	33.01
275	1863.75	33.01

DOWNLINK:

Channel	Frequency (MHz)	Output Power (dBm)
25	1931.25	33.04
150	1937.50	33.10
275	1943.75	33.08

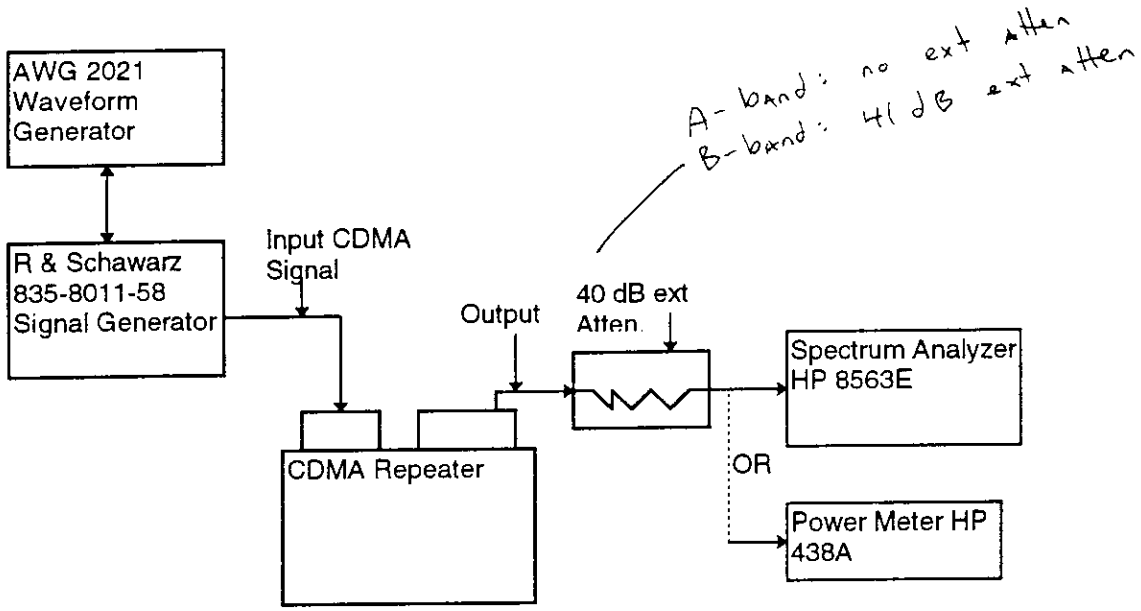
****Per FCC request to use power meter.**

File: CDMA_FCC.XLS

Tab: A-Band

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Test Setup for CDMA Repeater



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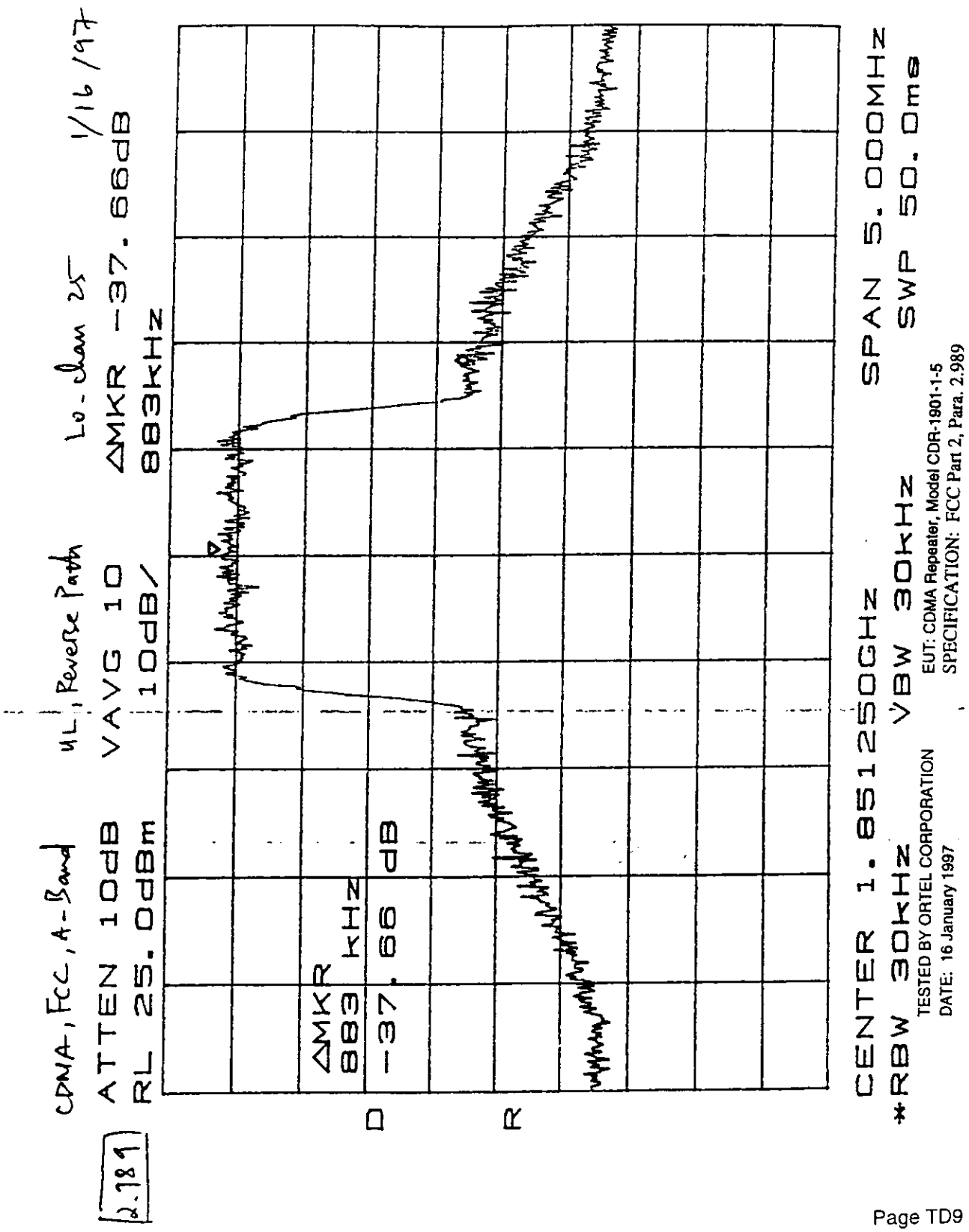
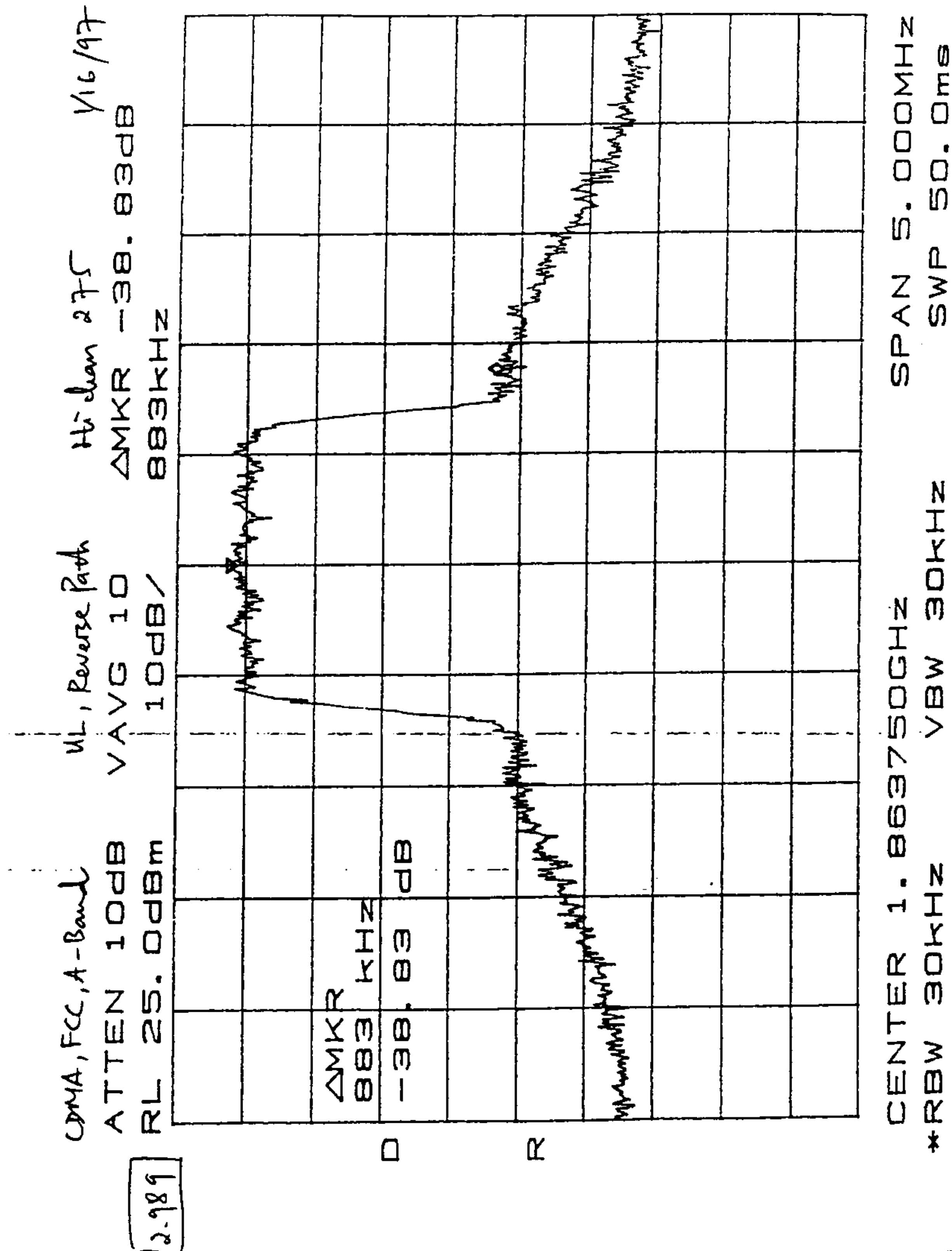


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

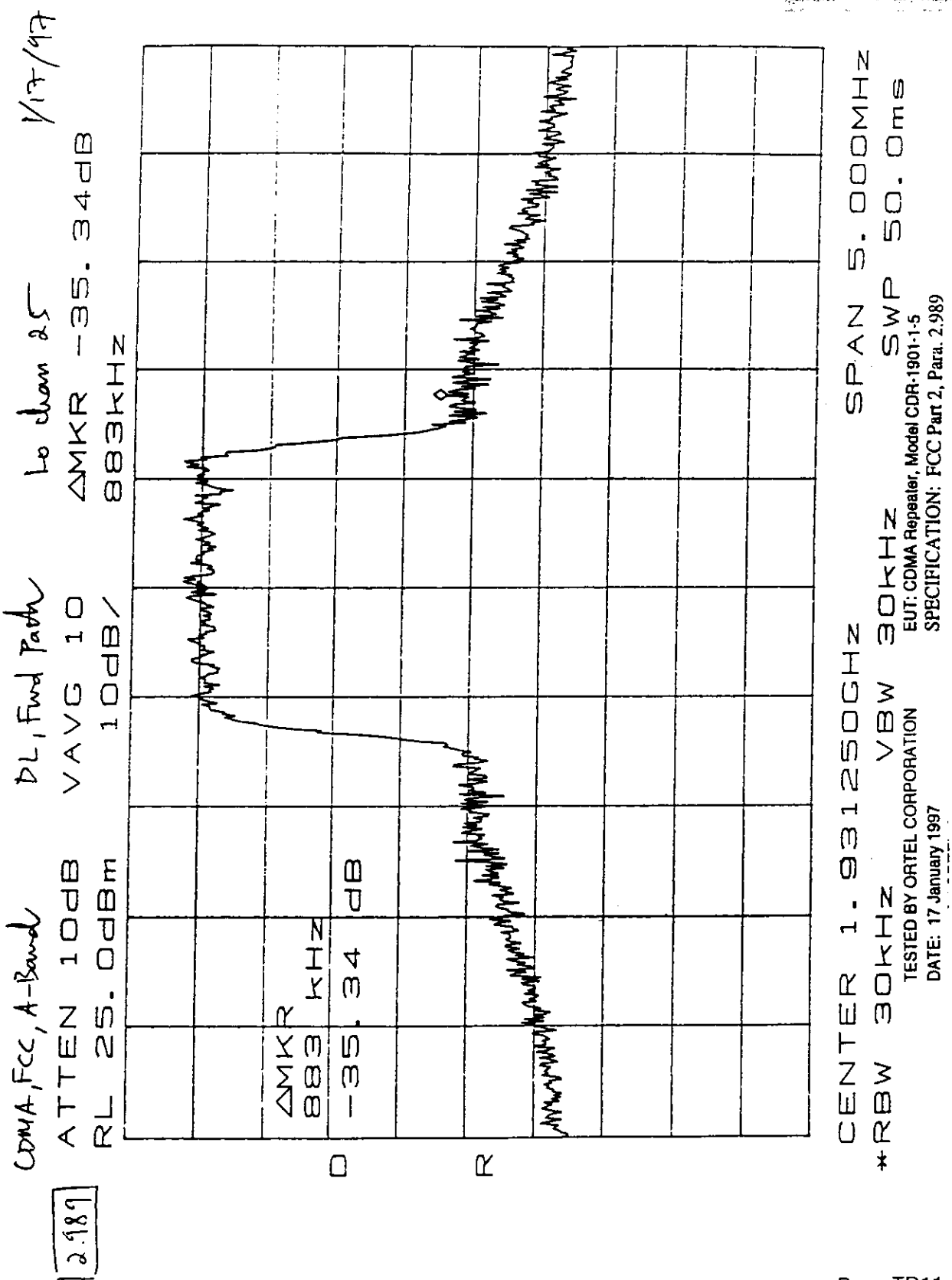
TÜV PRODUCT SERVICE



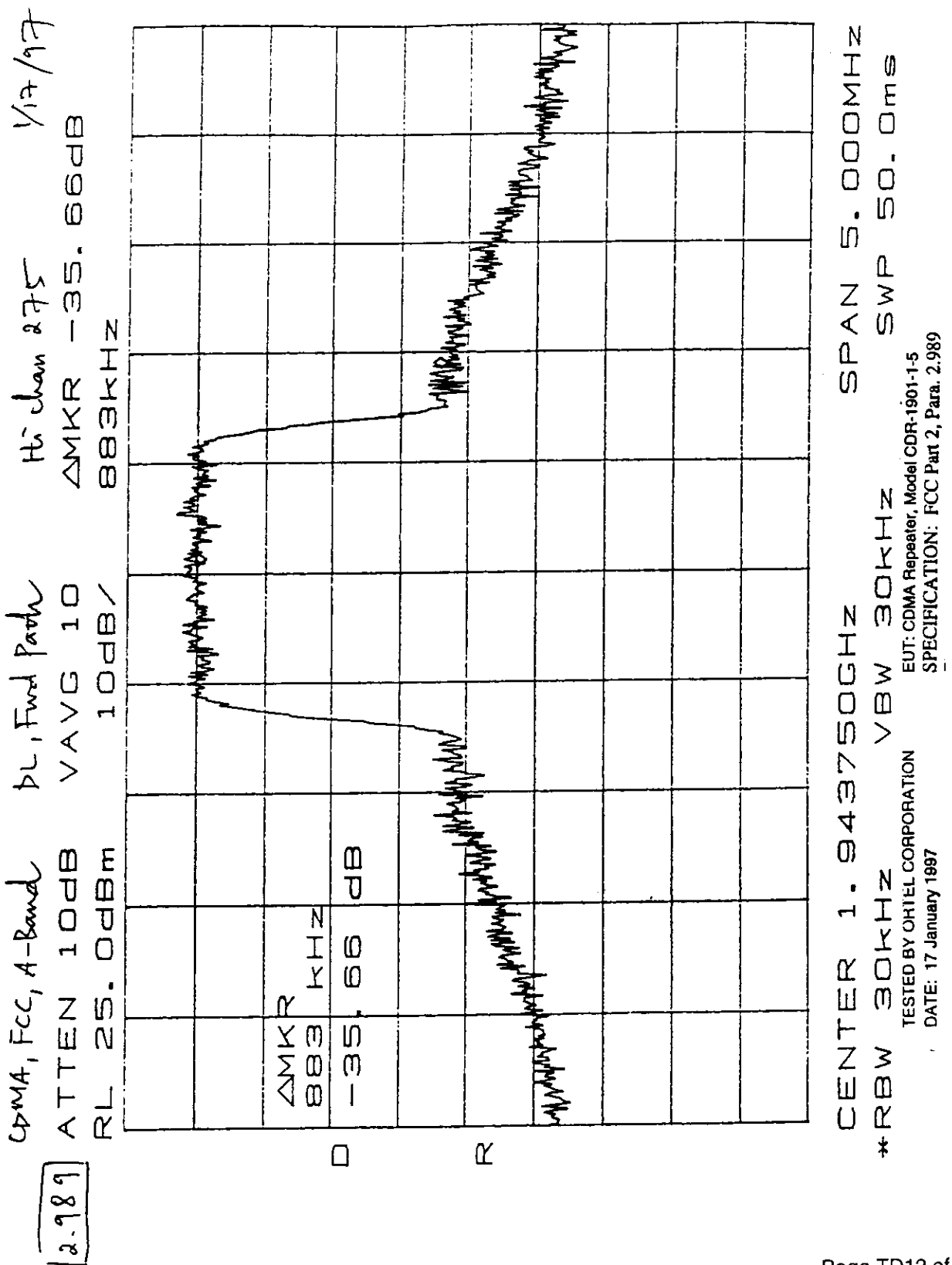
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.989

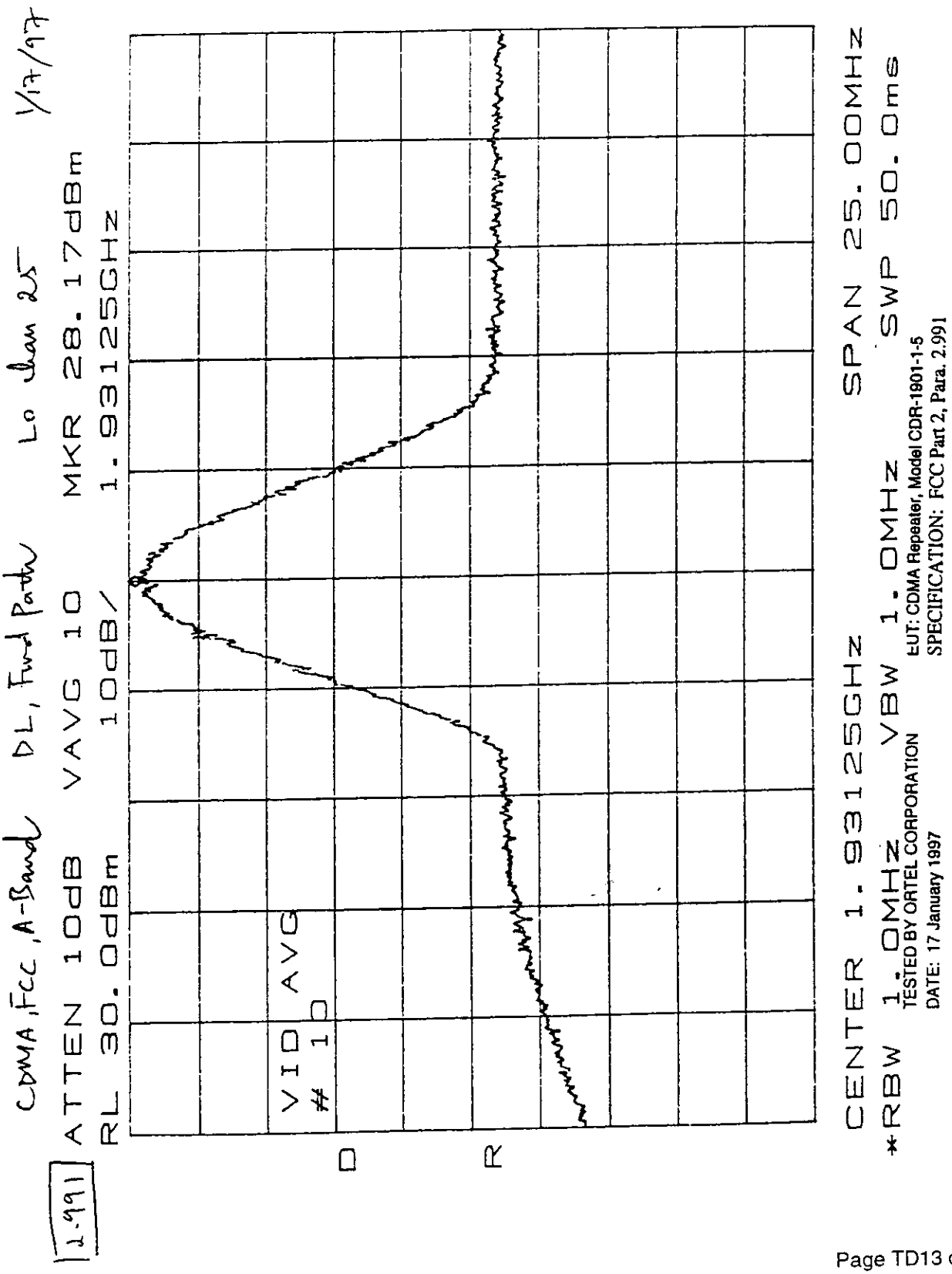
TESTED BY ORTEL CORPORATION
DATE: 16 January 1997

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

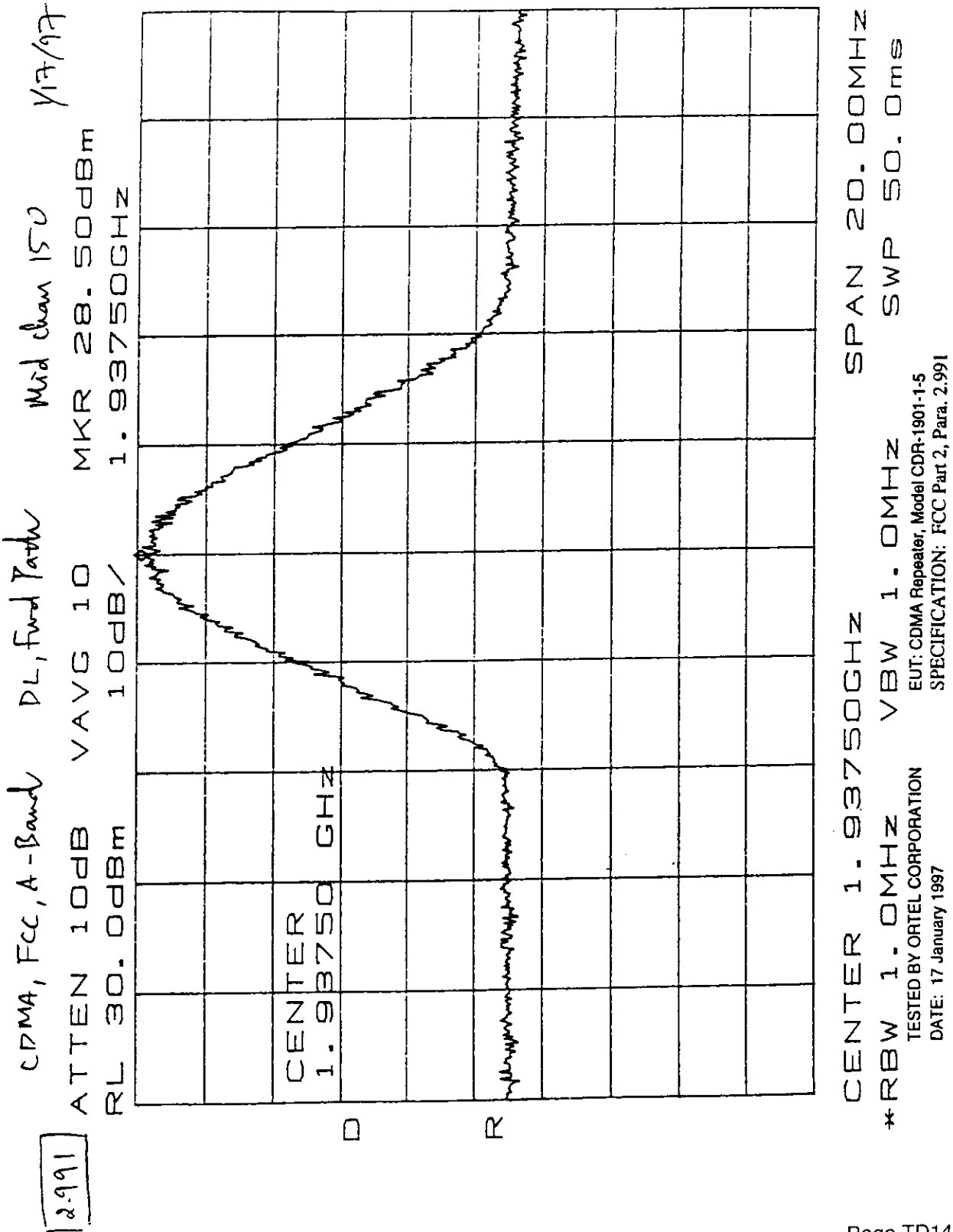


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego. CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

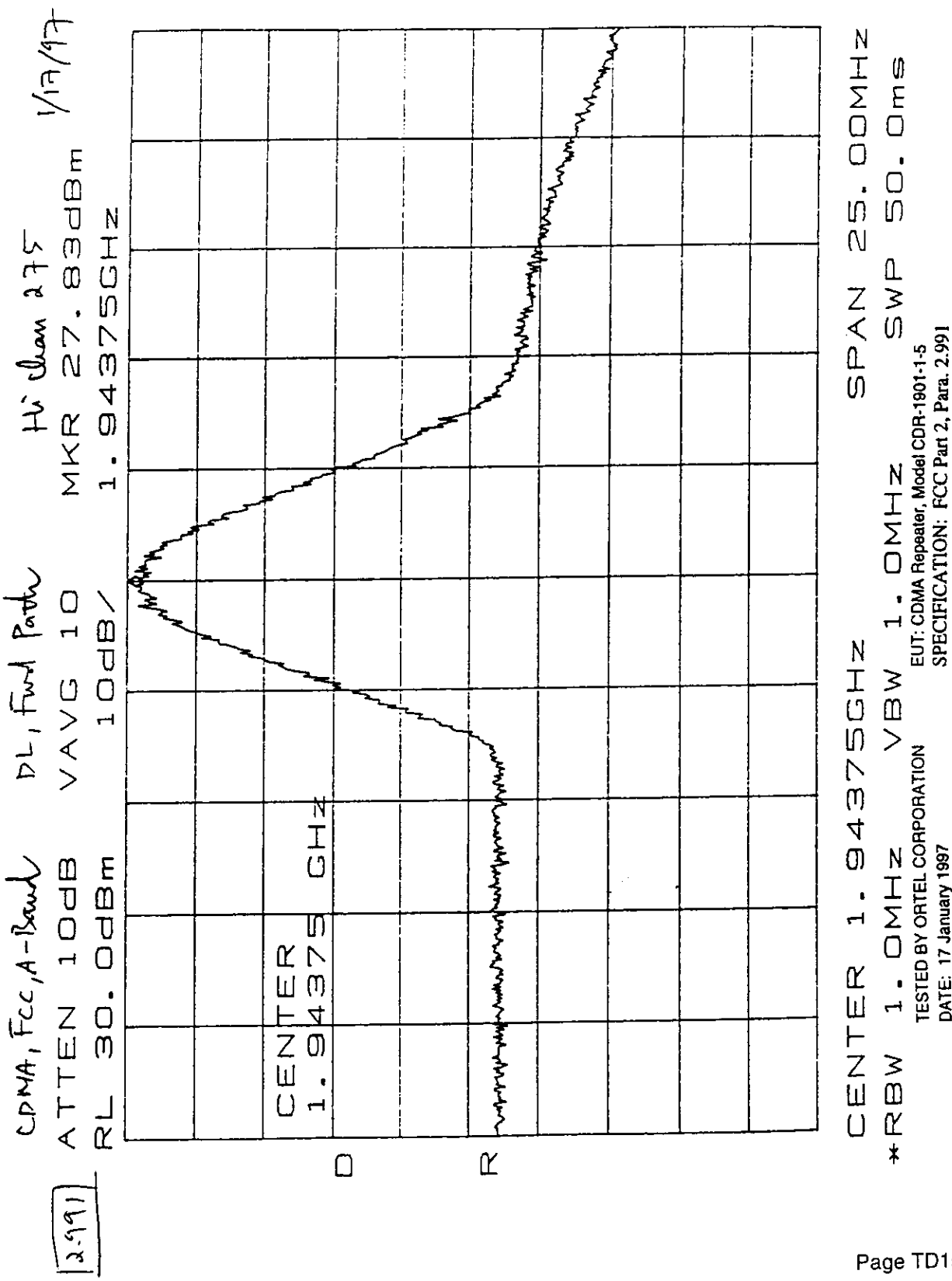

CDMA, Fcc, A-Band DL, Fwd Path Hi Chan #25 1/17/97
ATTEN 10dB VAVG 10 ΔMKR -35.66dB
RL 25.0dBm 10dB/ 883kHz
ΔMKR 883 kHz -35.66 dB
CENTER 1.94375GHz SPAN 5.000MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms
TESTED BY OHTEL CORPORATION
DATE: 17 January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.989
2.989



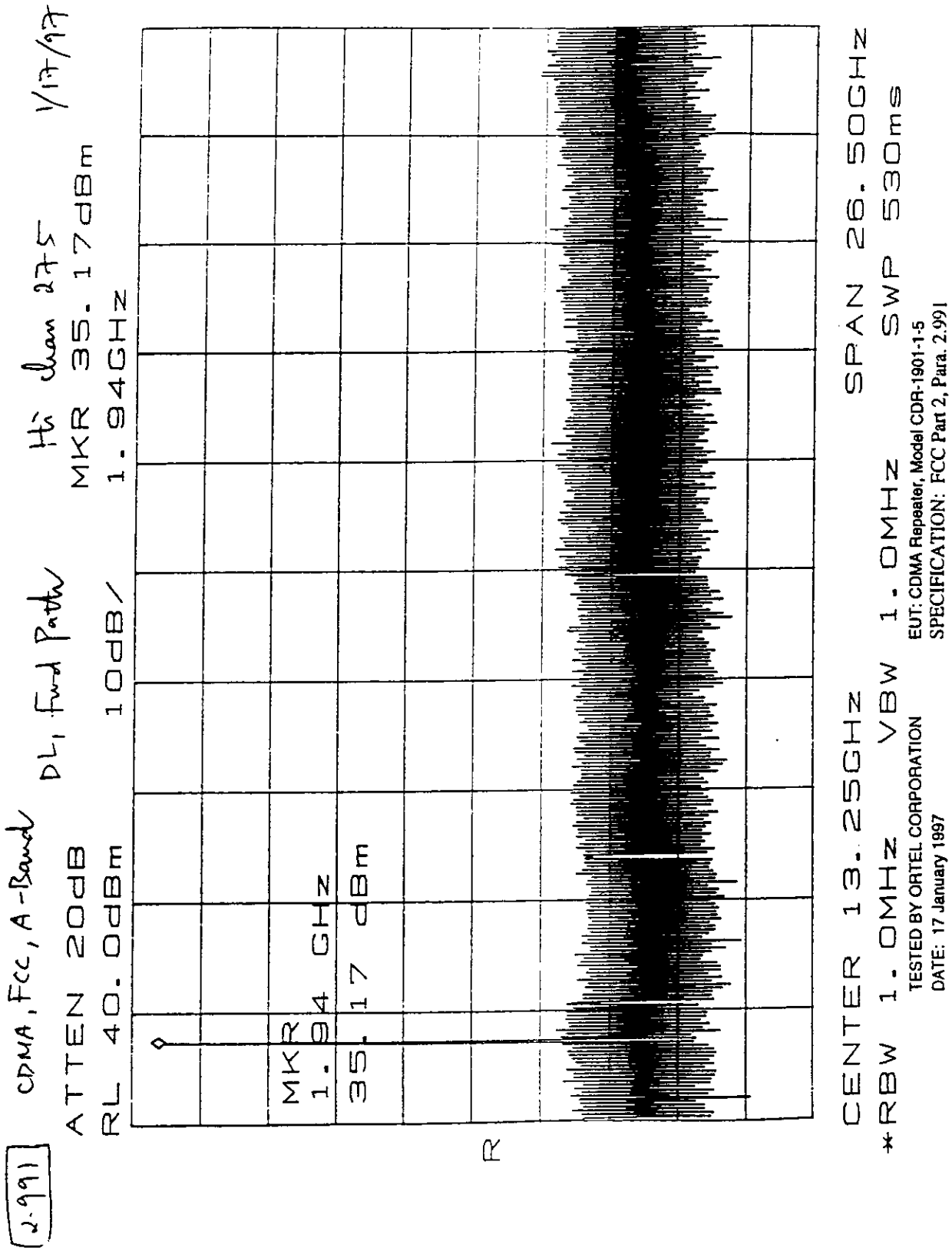
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



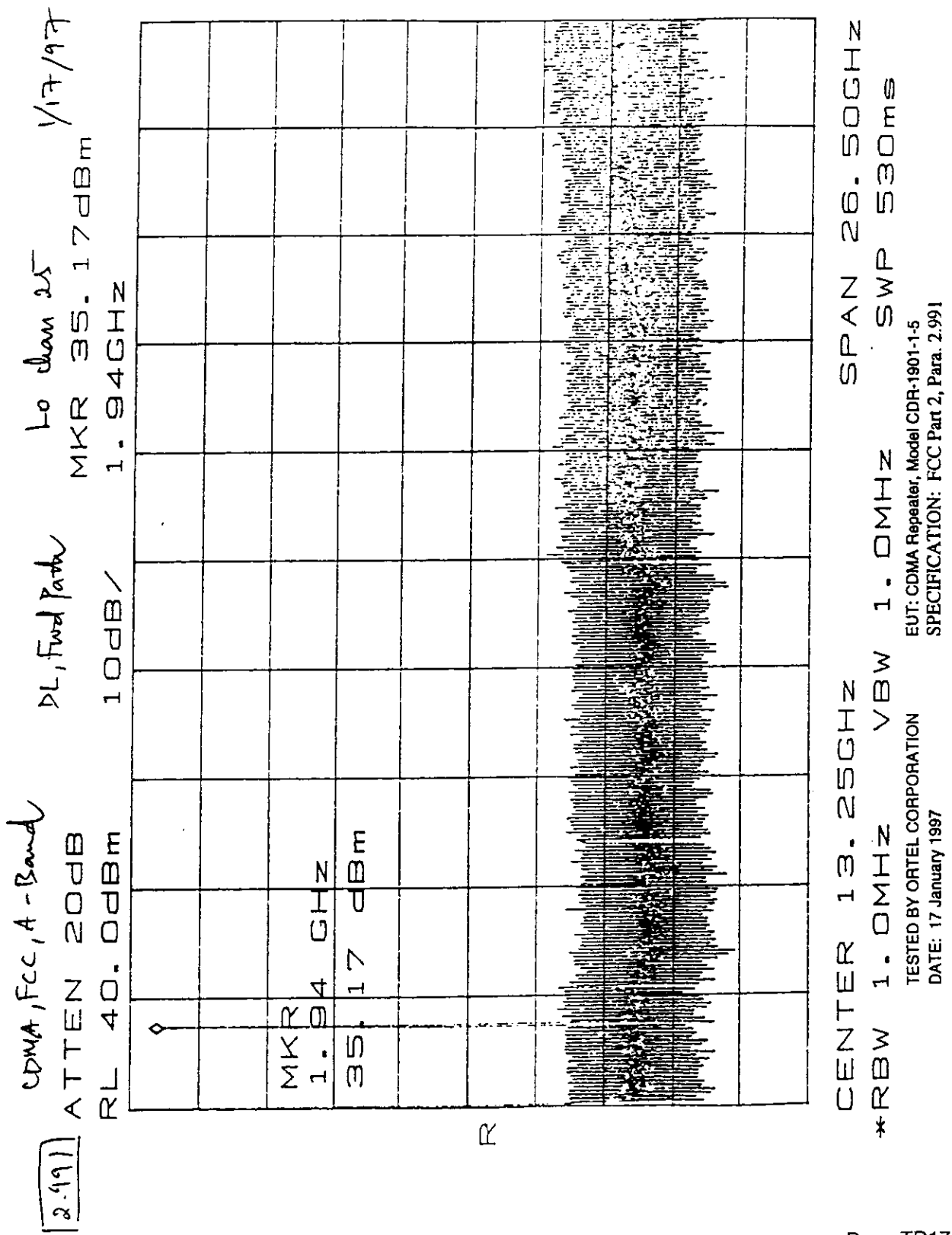
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



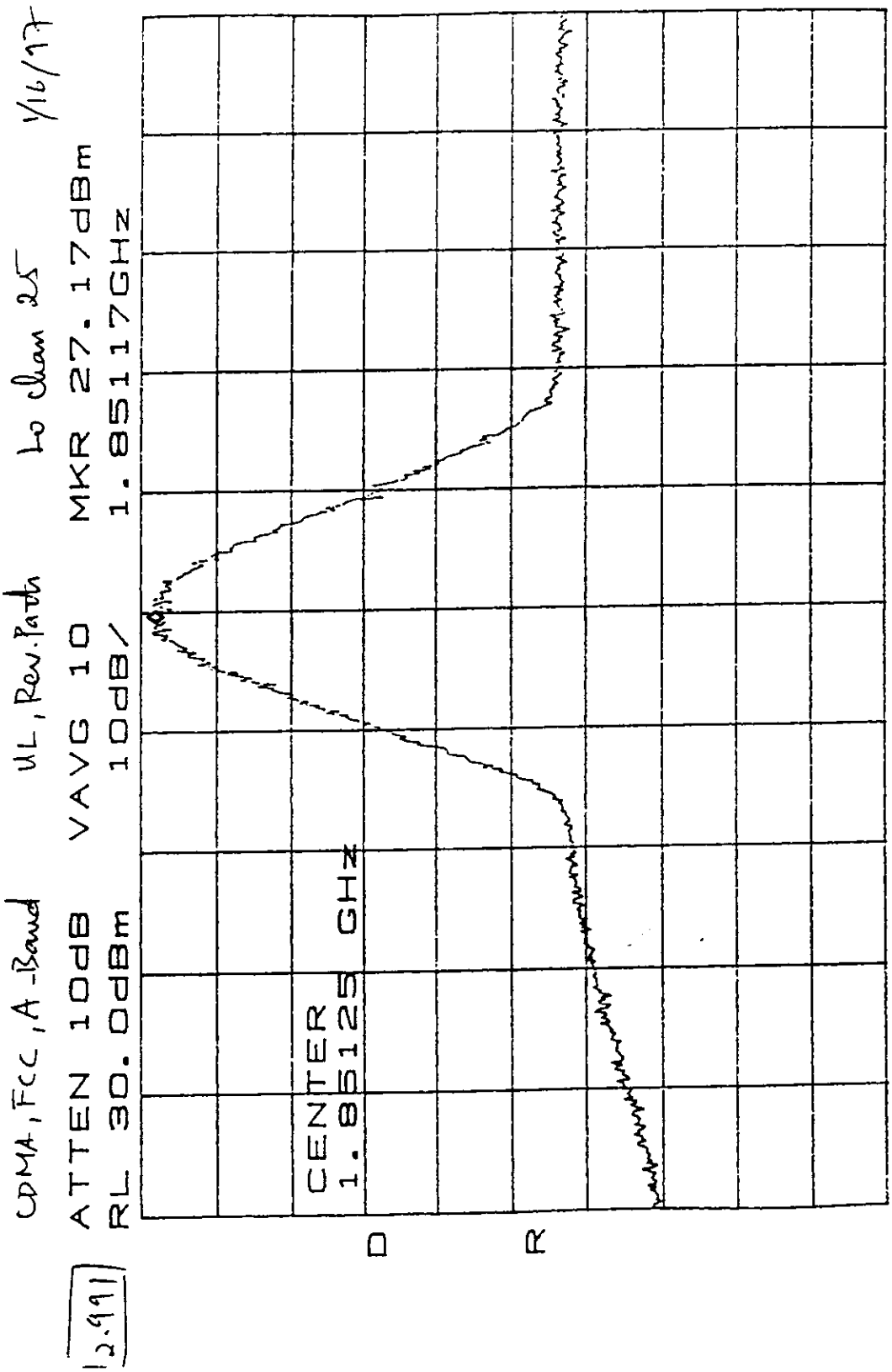
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego. CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

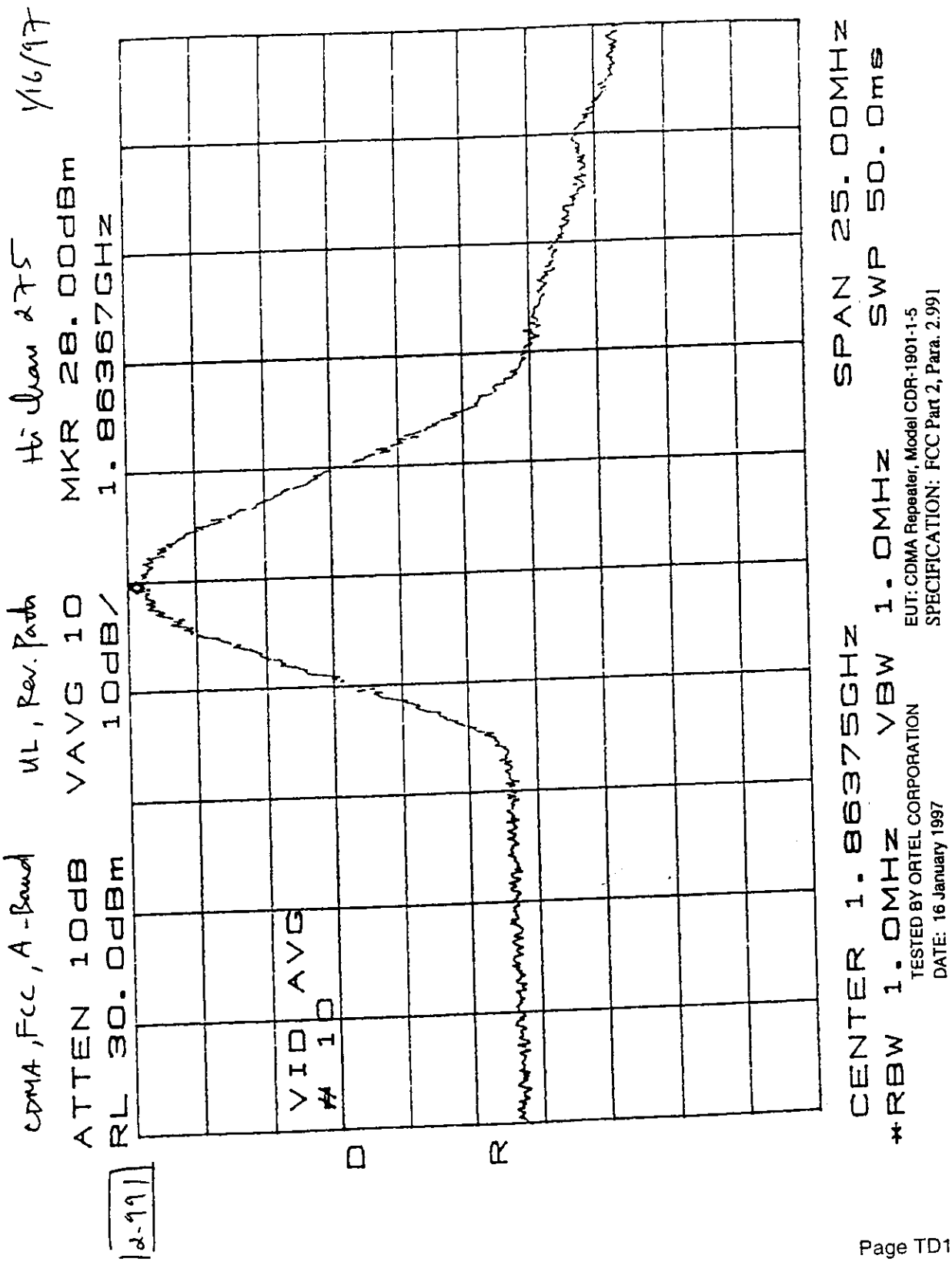


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

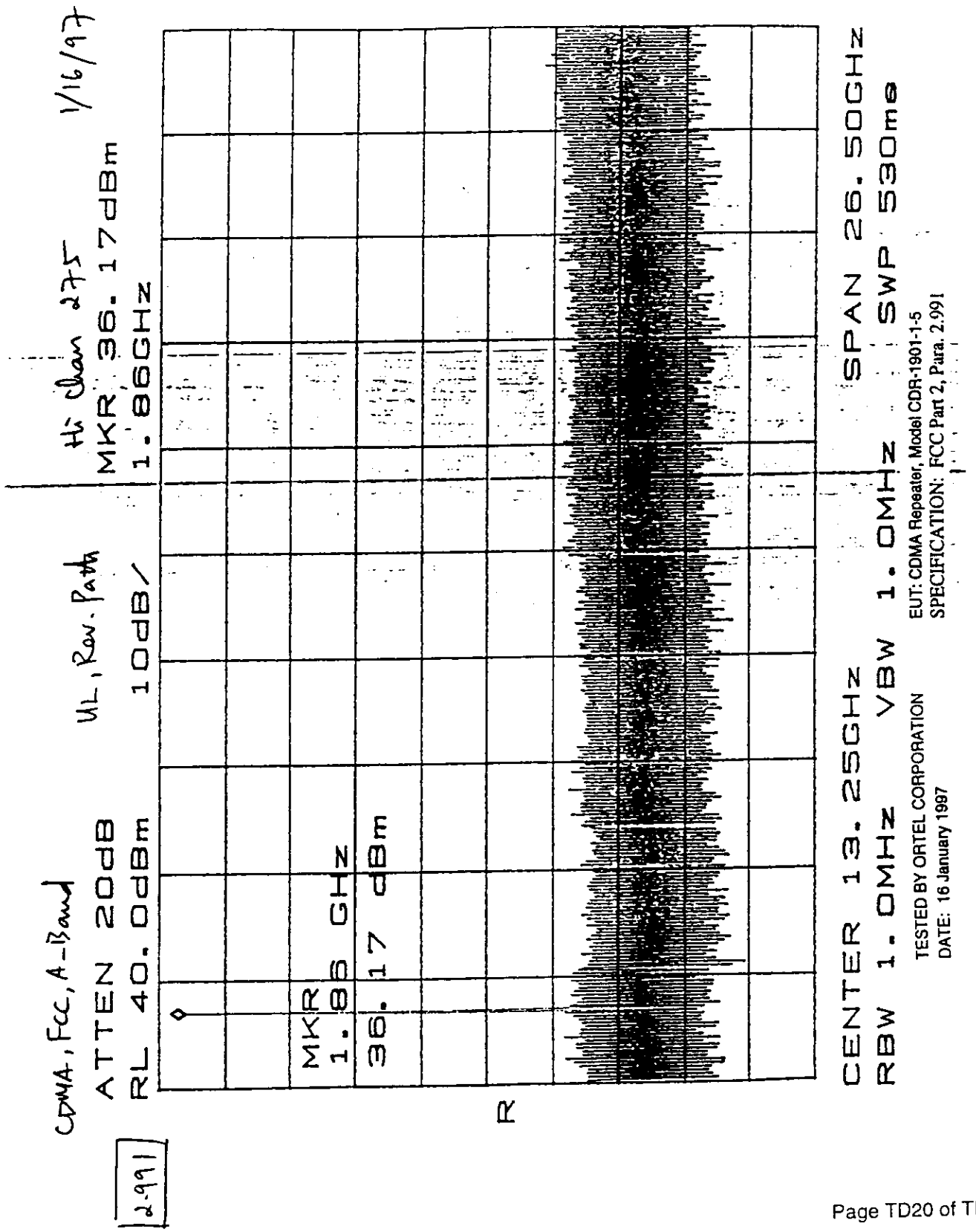


TESTED BY ORTEL CORPORATION
DATE: 16 January 1997

EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.991

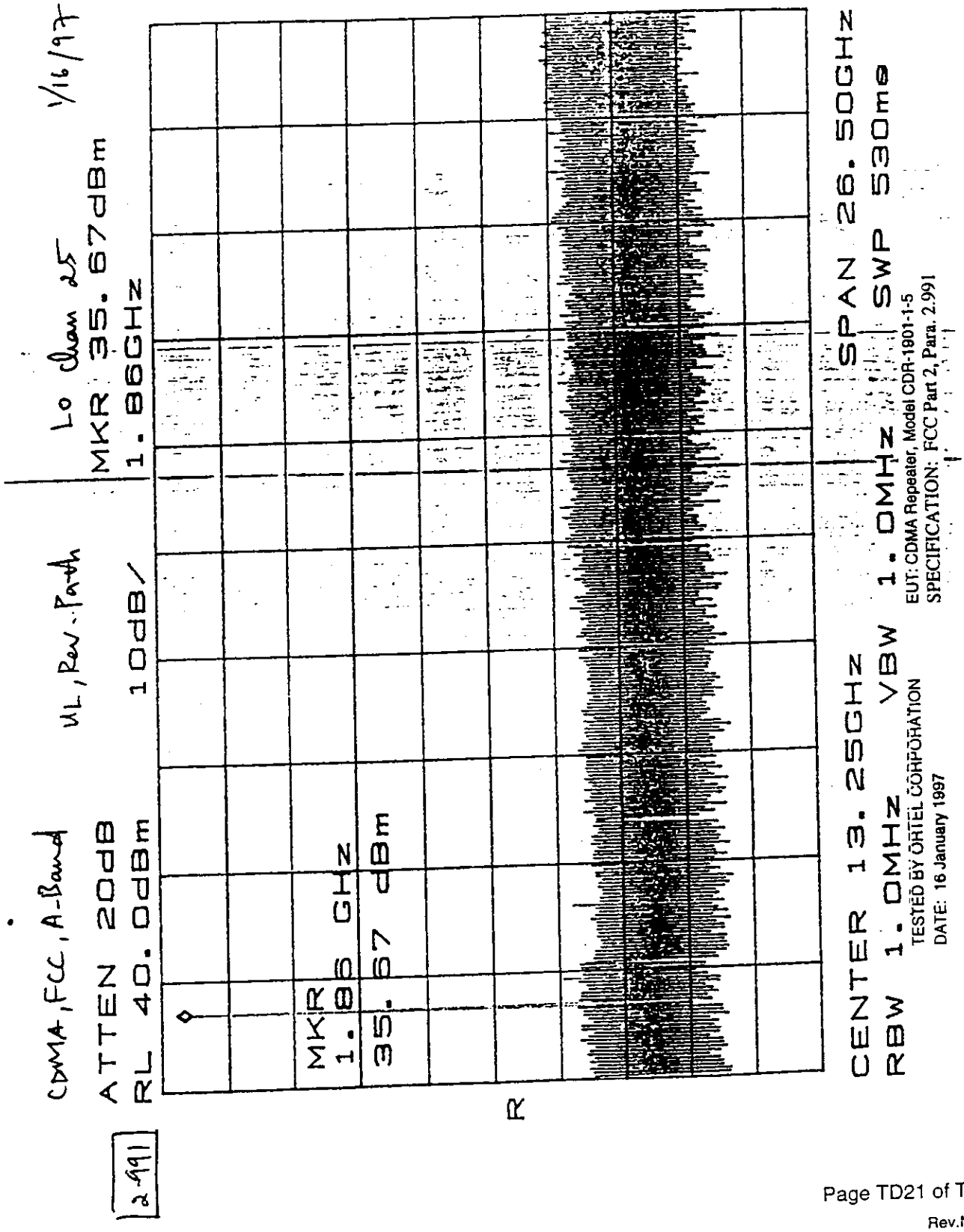


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

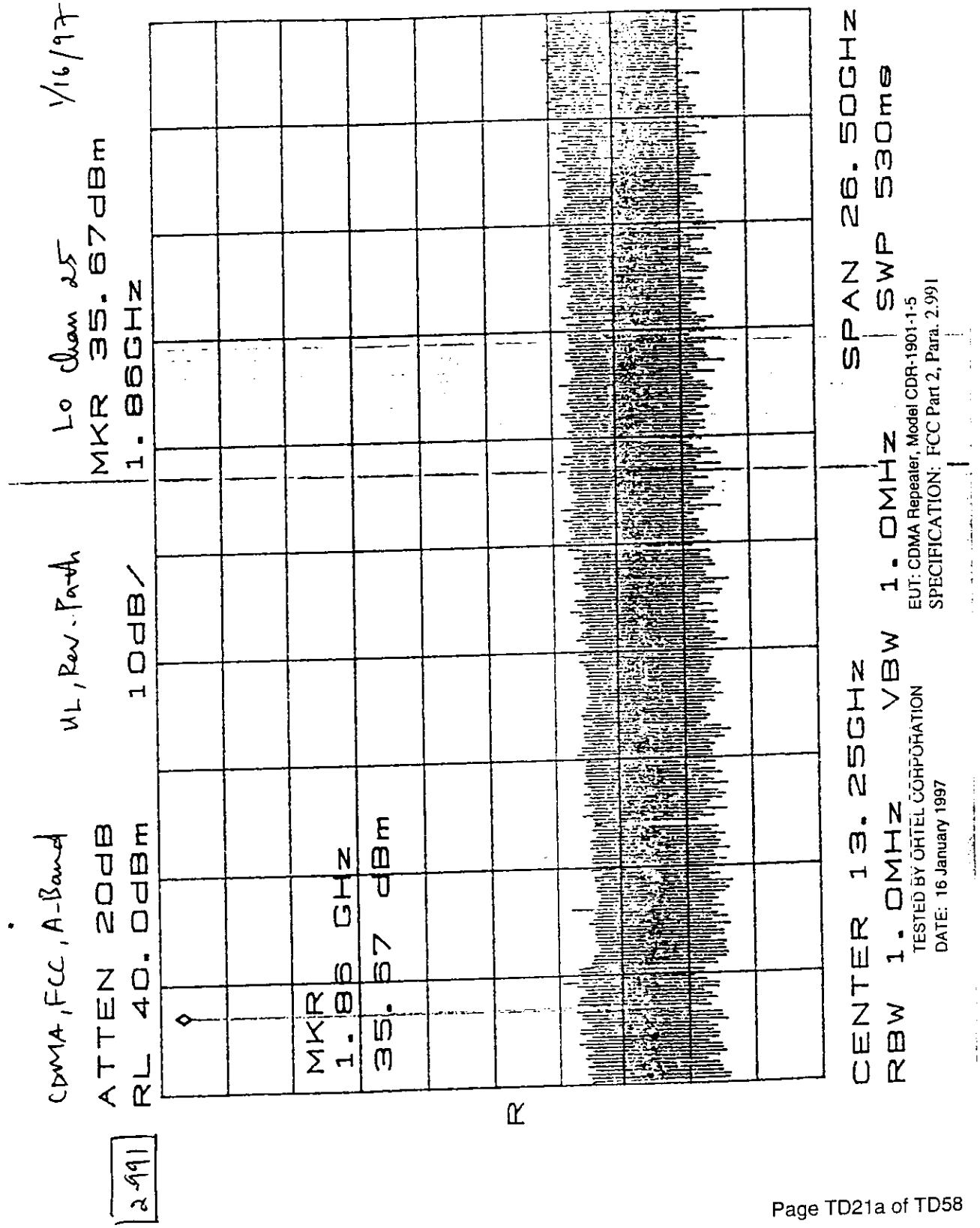


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

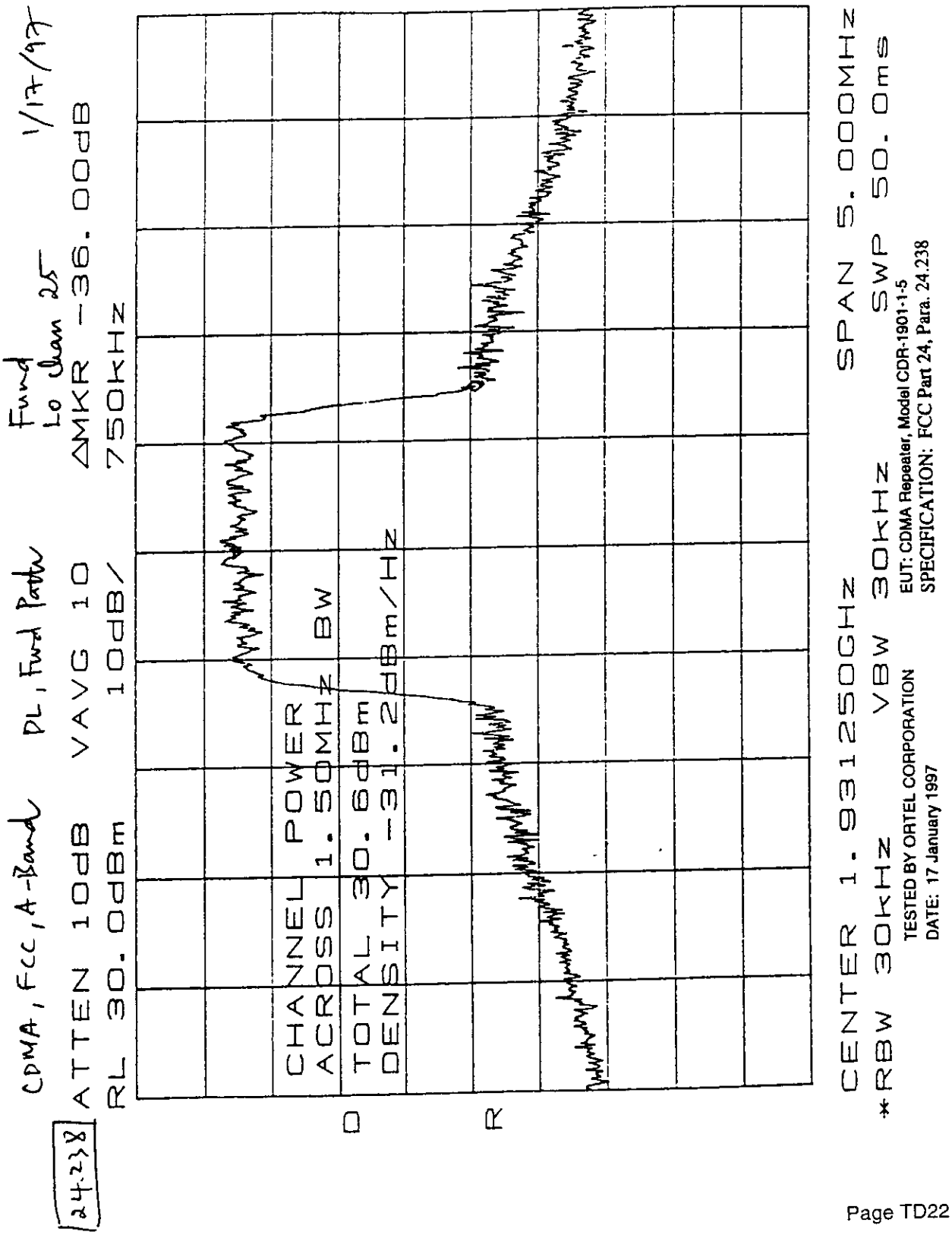
TÜV PRODUCT SERVICE



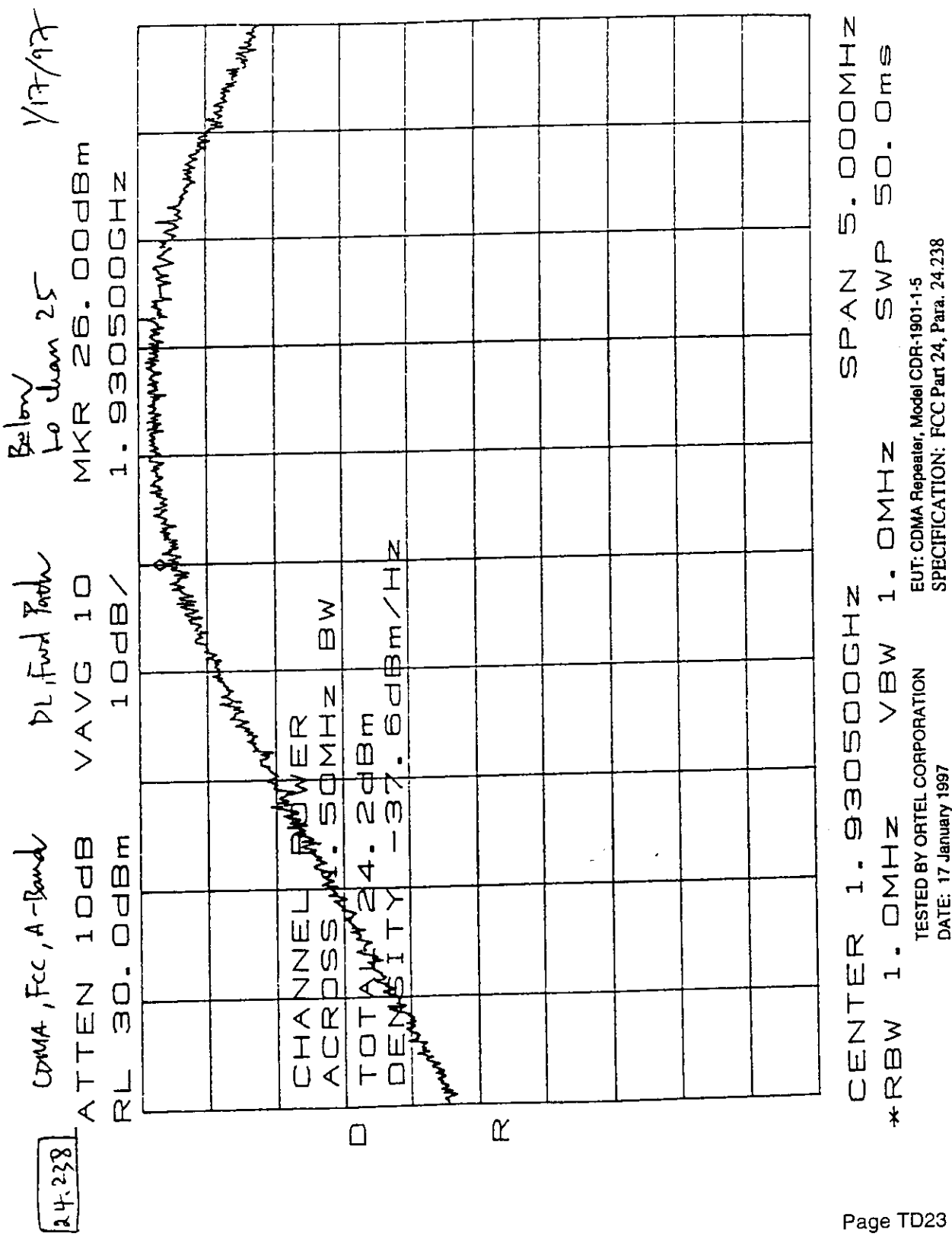
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



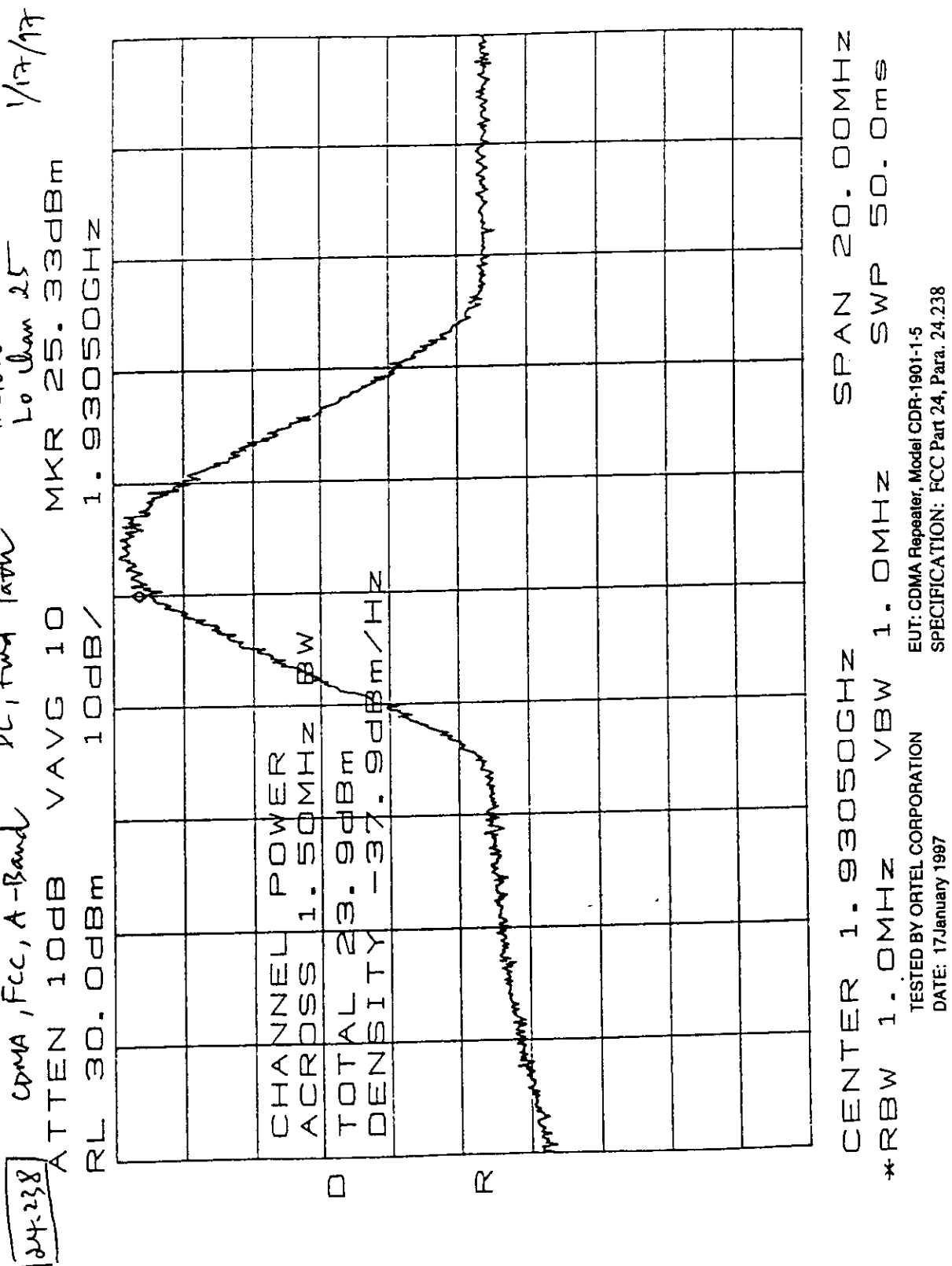
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



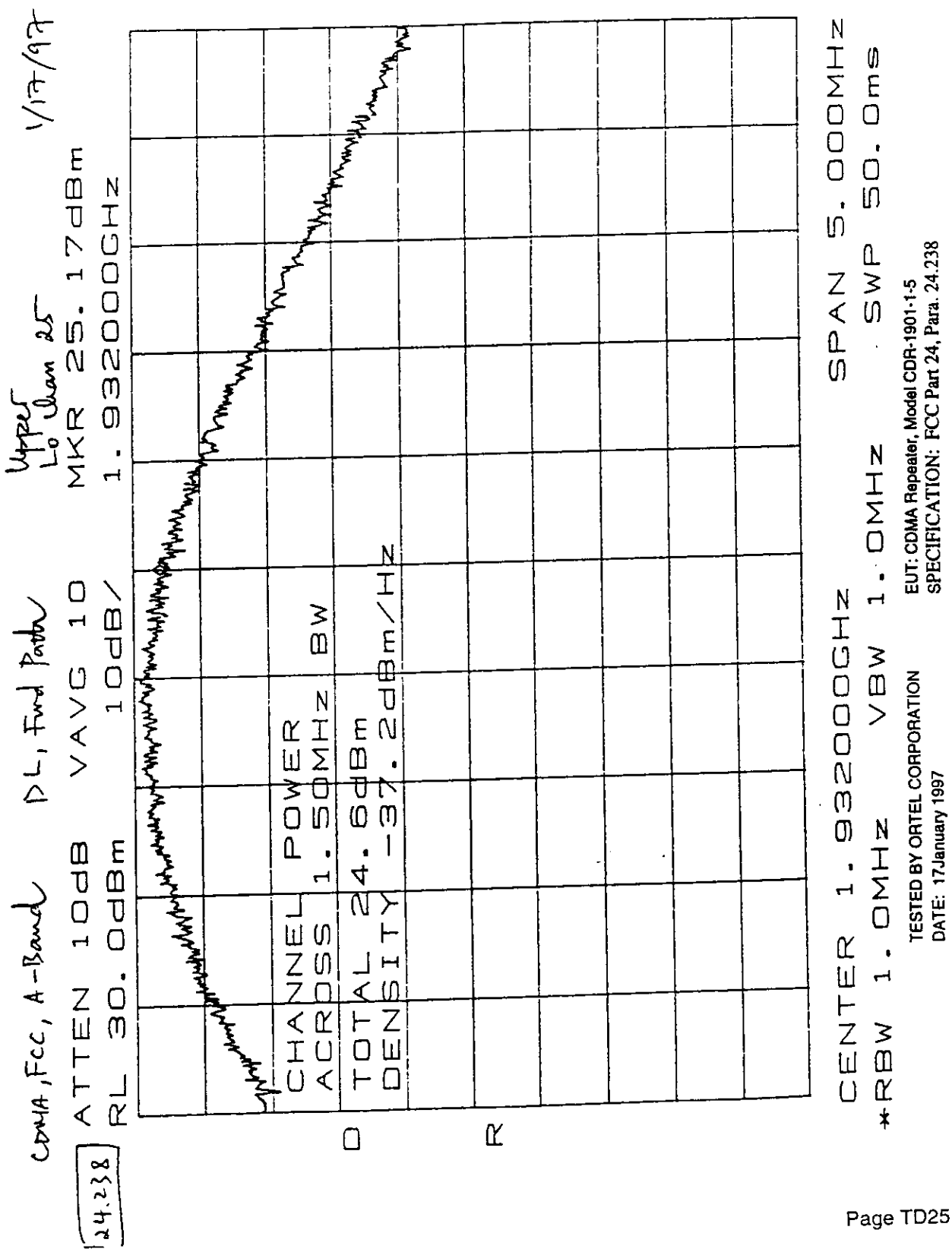
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



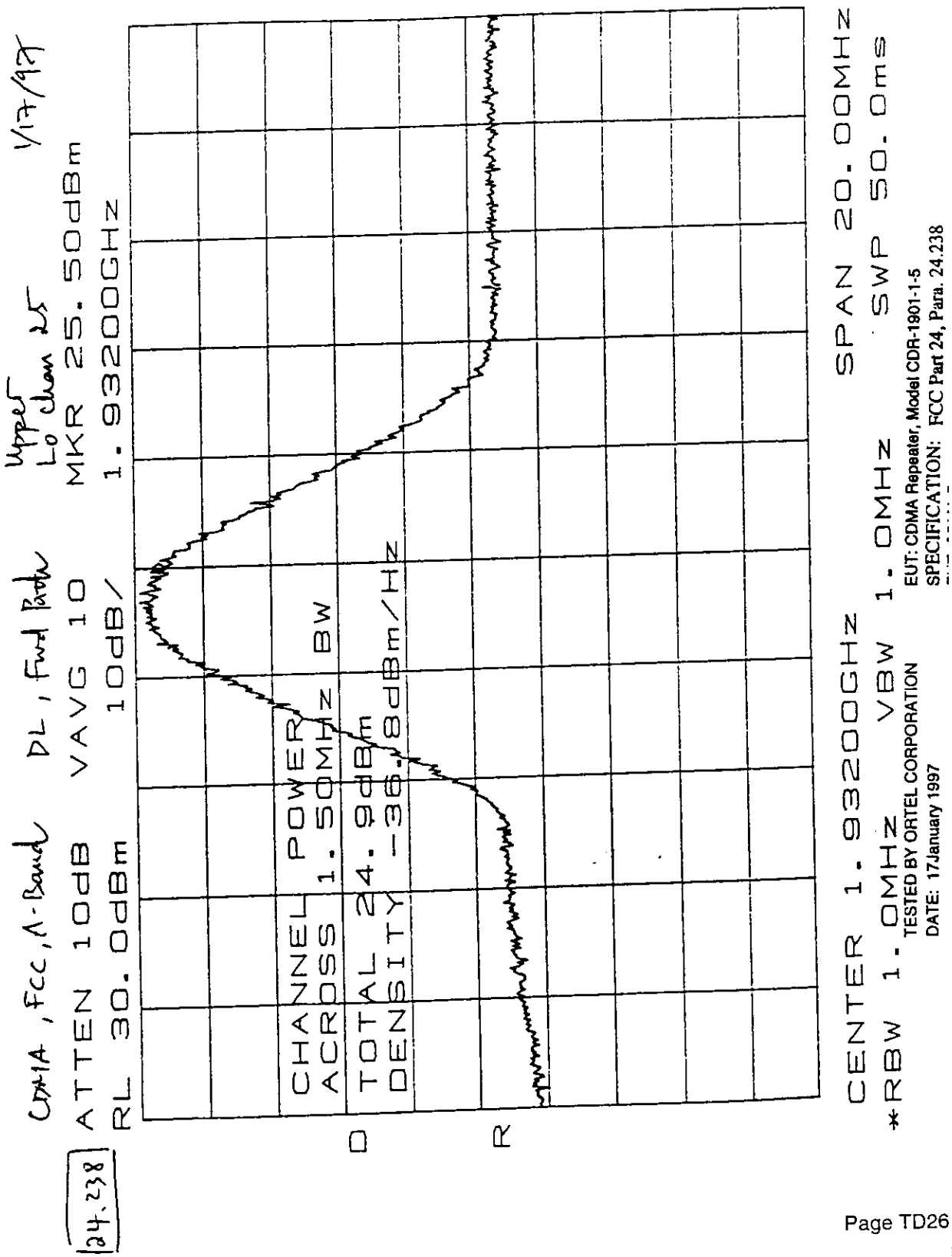
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



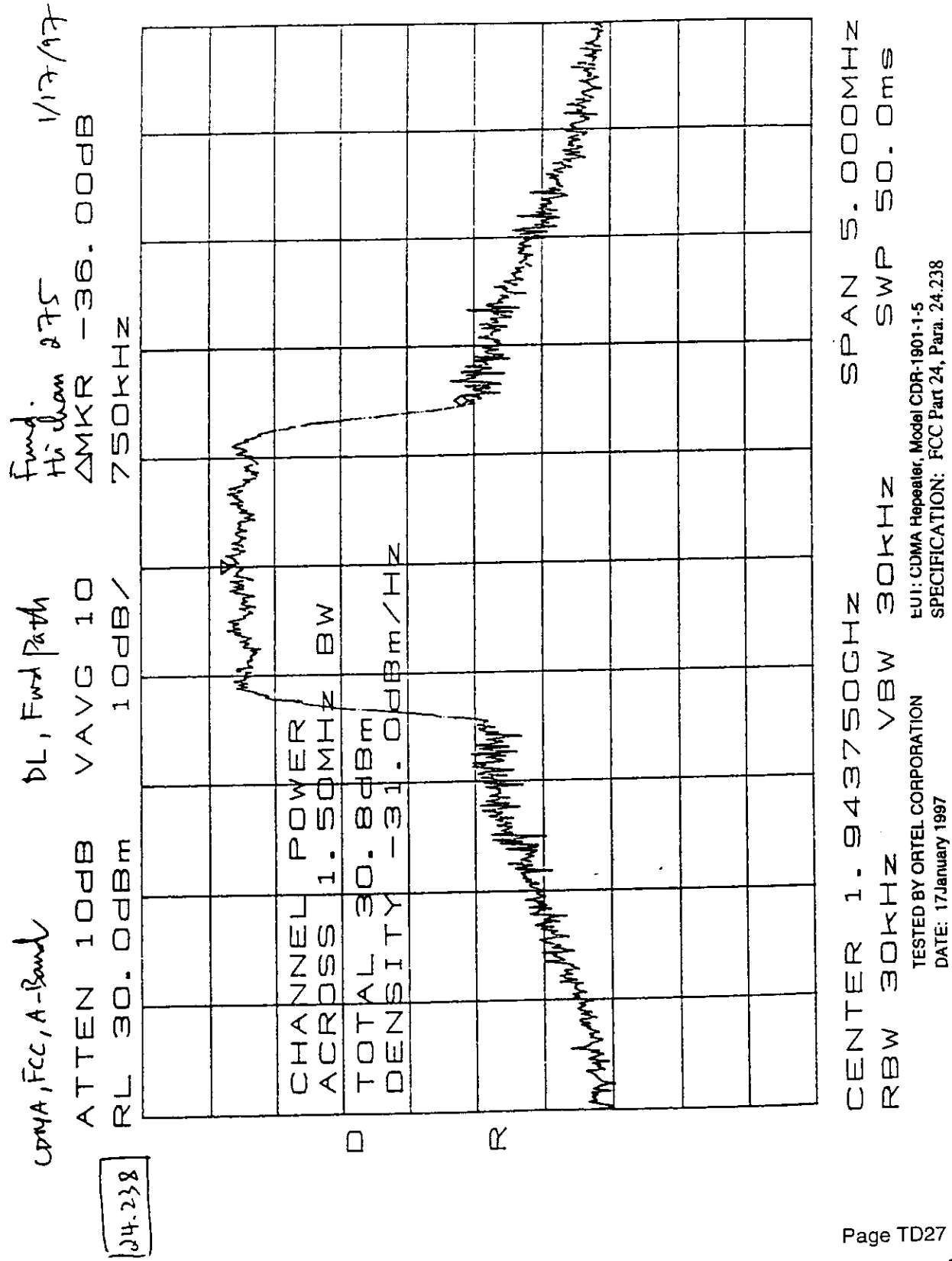
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



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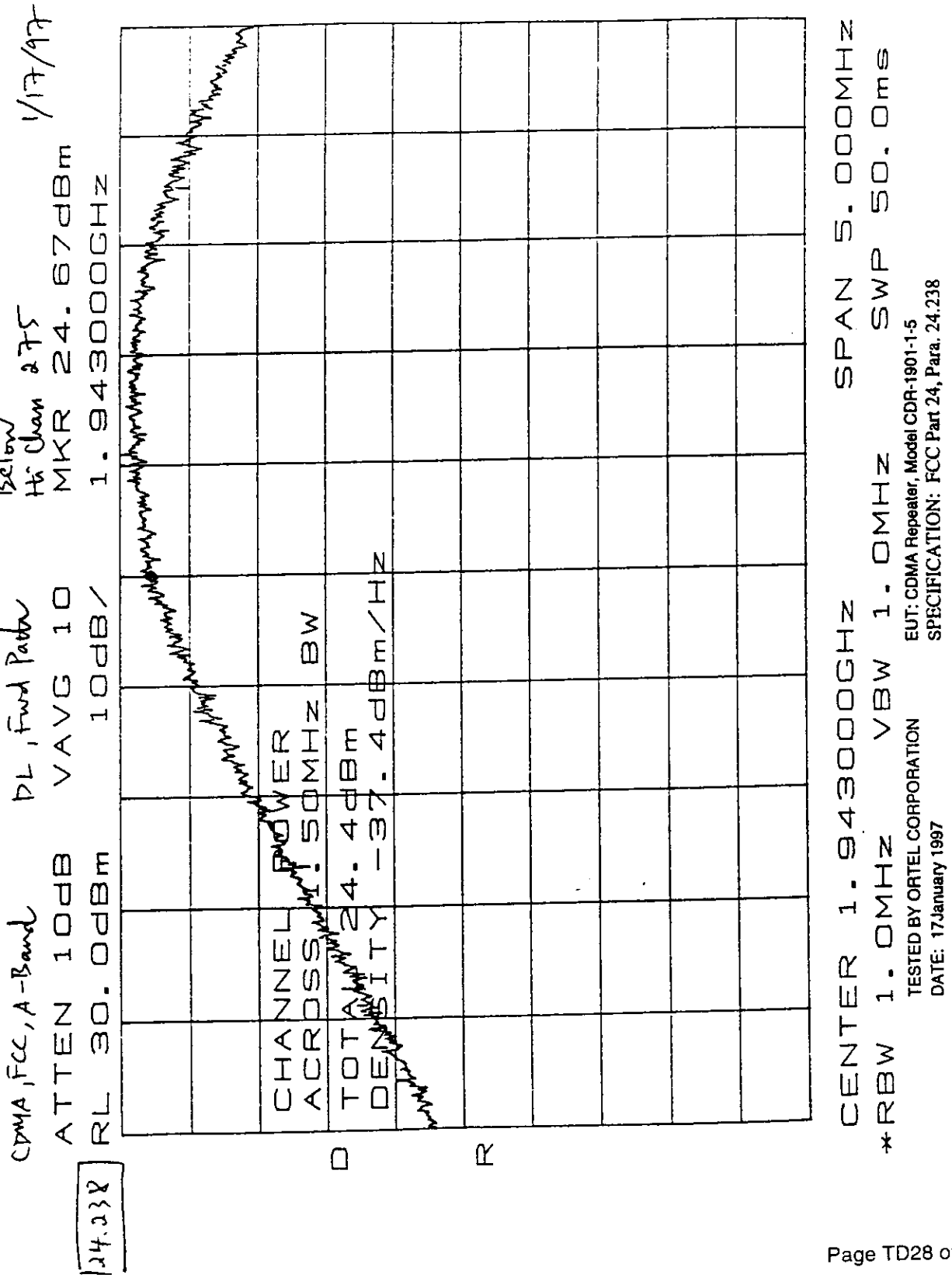
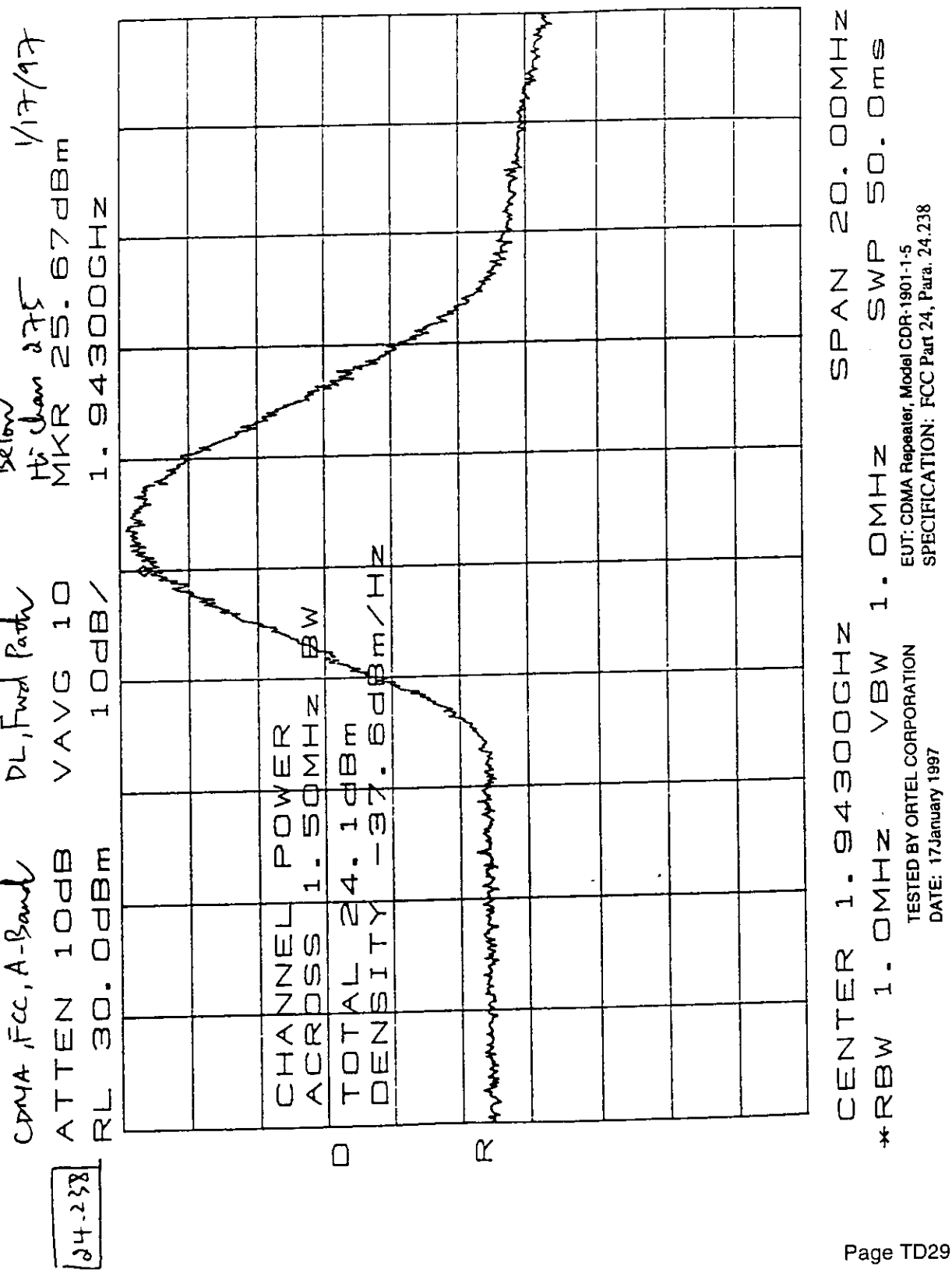
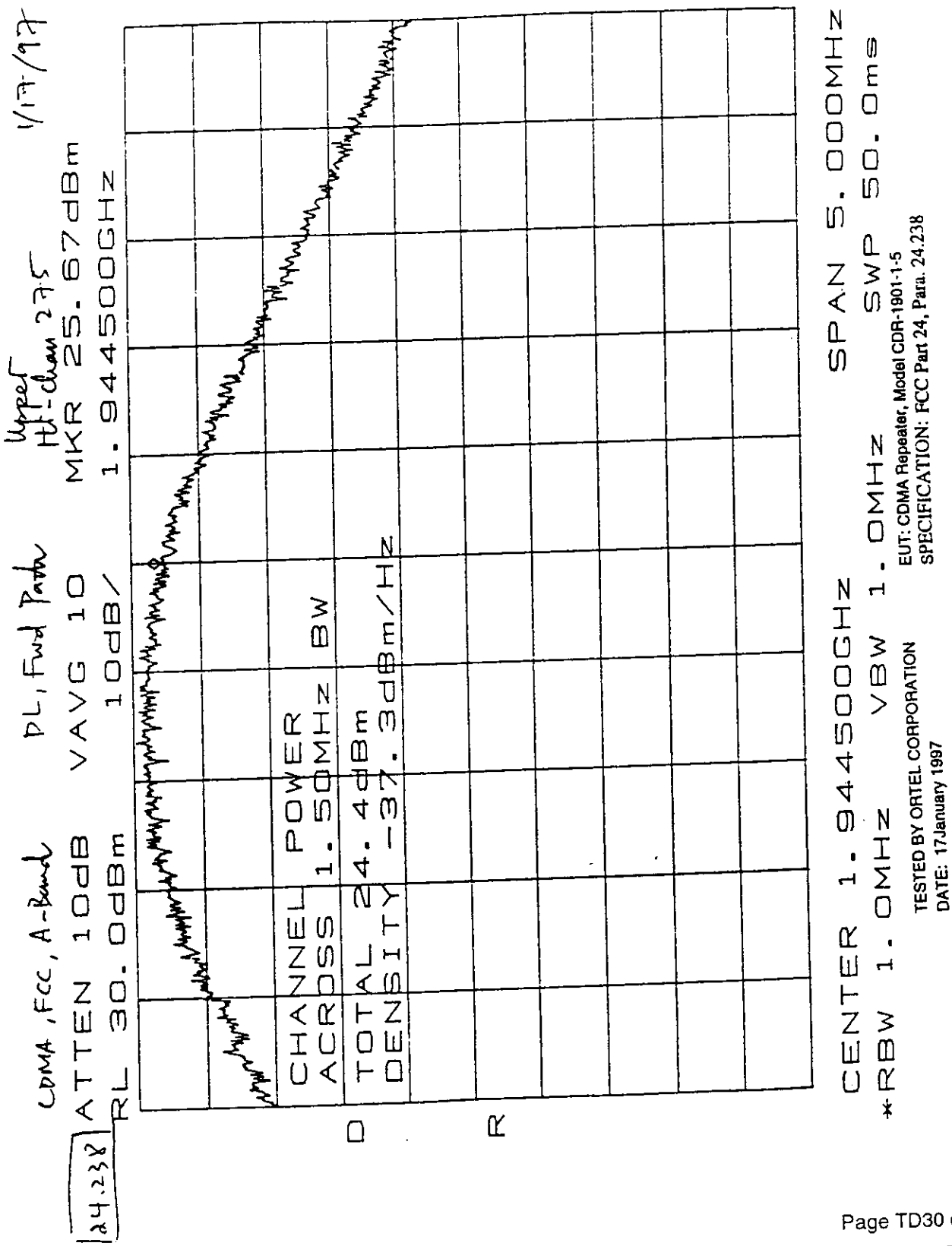
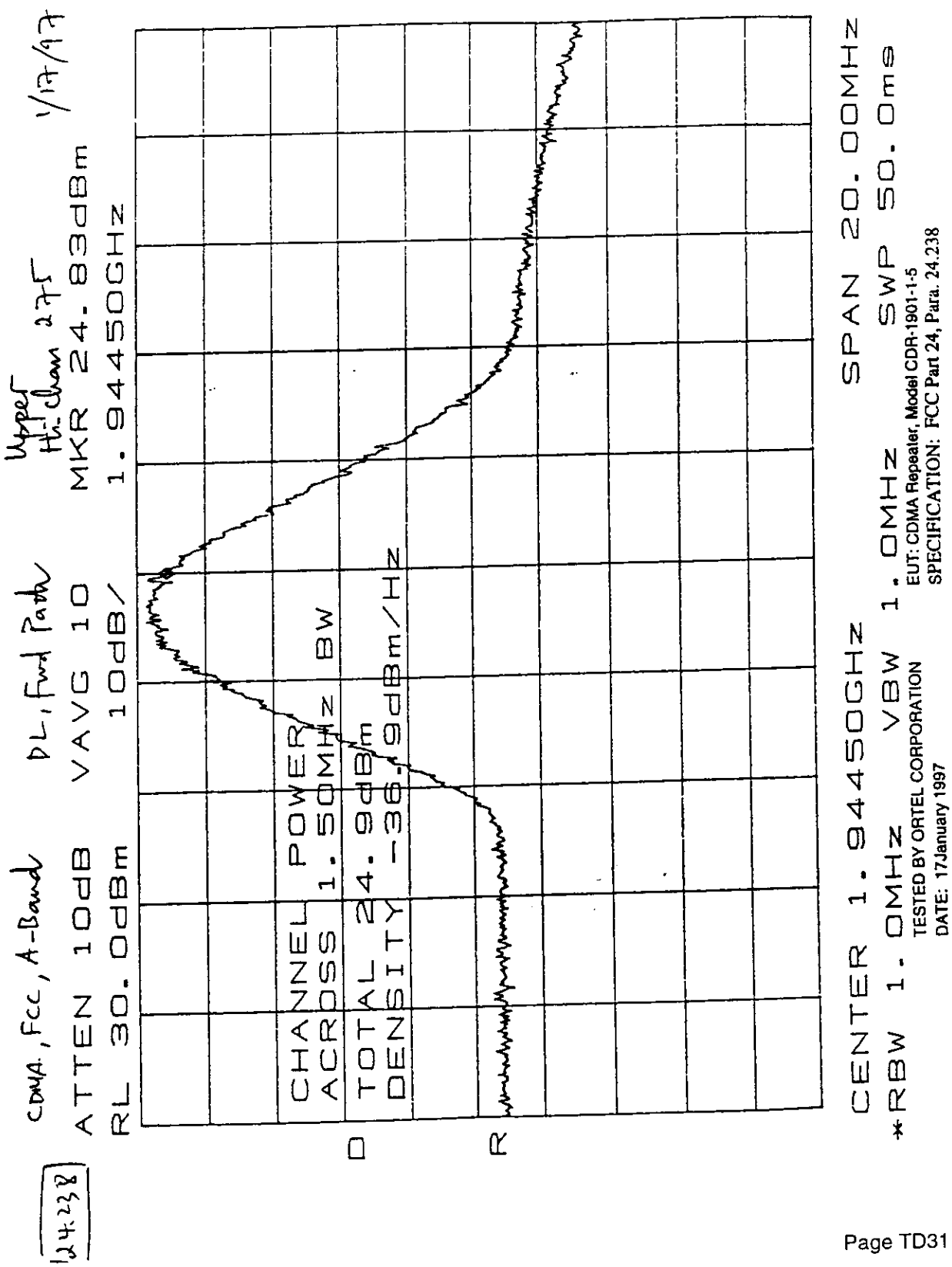

CDMA, FCC, A-Band
DL, Fwd Path
Below Hi Chan 275
1/17/97
ATTEN 10dB
VAVG 10
MKR 24.67dBm
RL 30.0dBm
10dB/
1.943000GHz
CHANNEL POWER
ACROSS 1.50MHz BW
TOT 24.4dBm
DENSITY -37.4dBm/Hz
CENTER 1.943000GHz
SPAN 5.000MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238
24.238



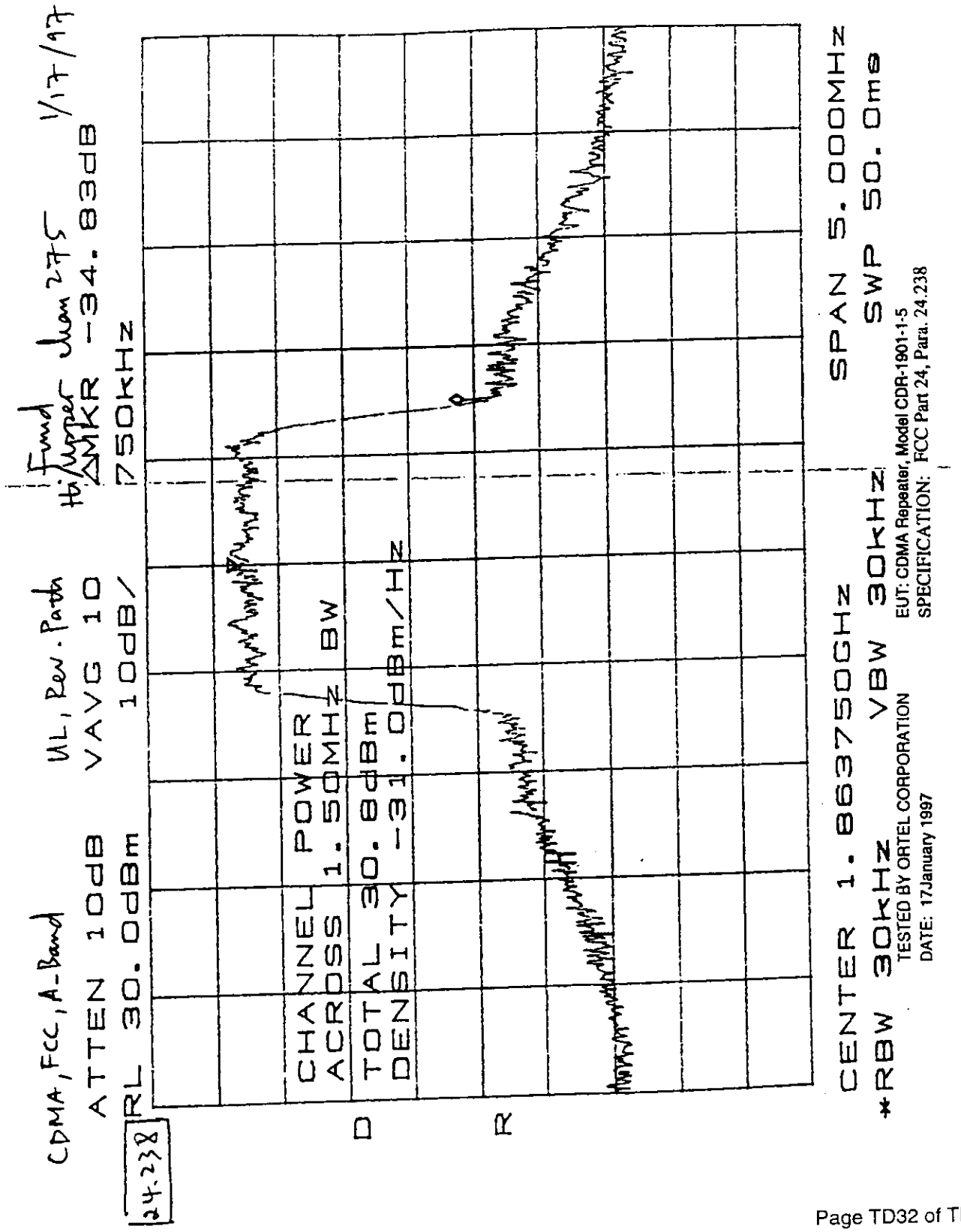
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



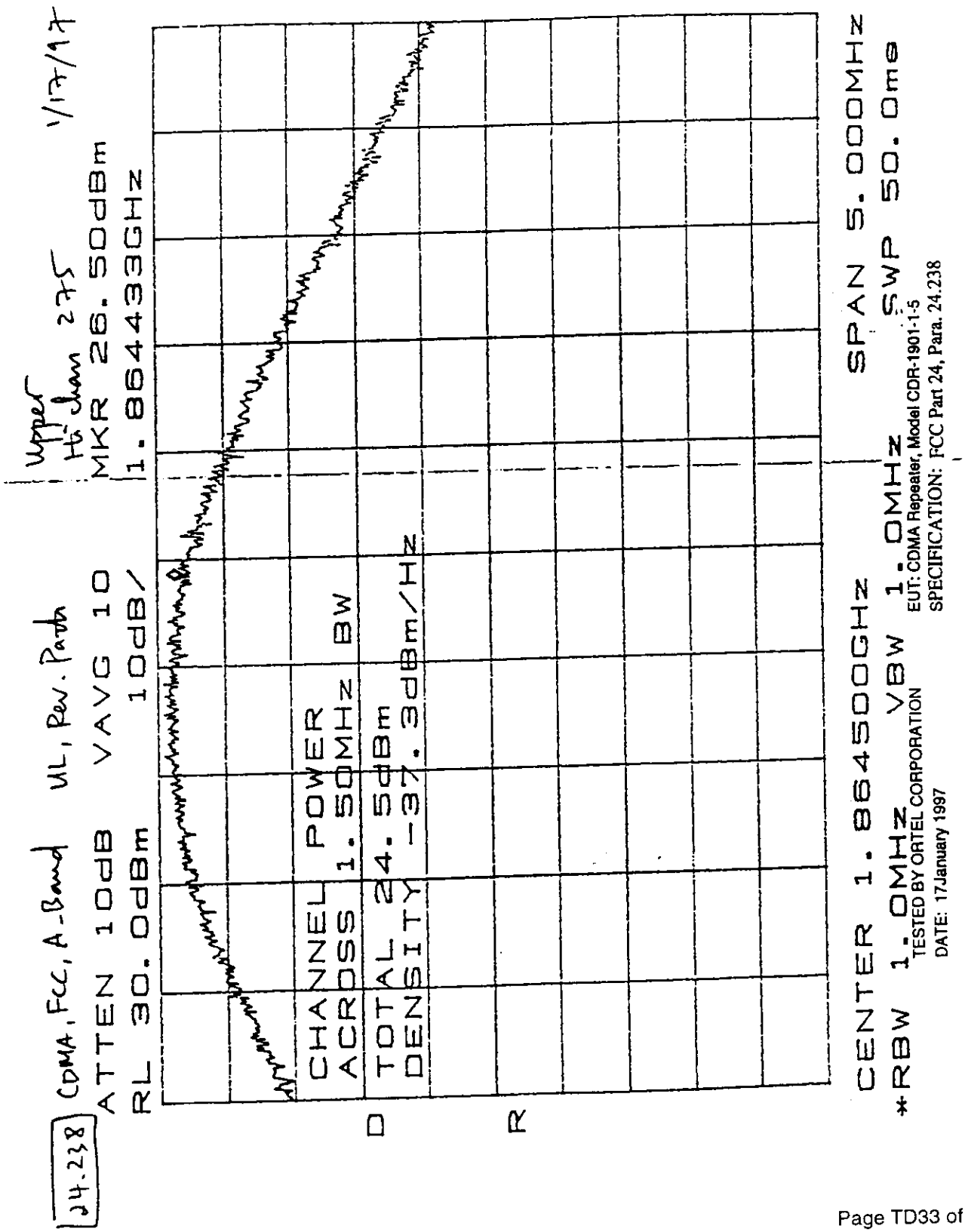
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

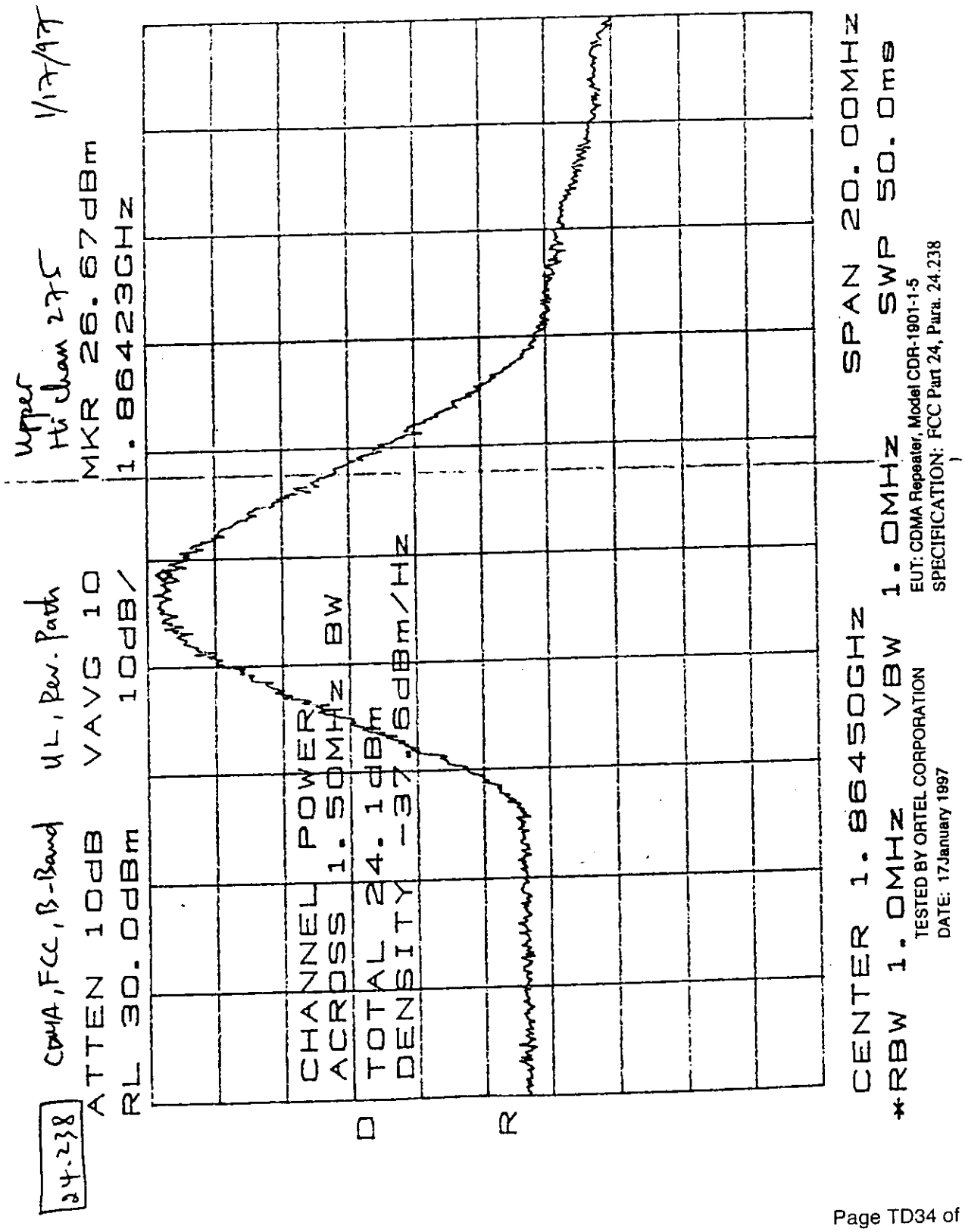


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

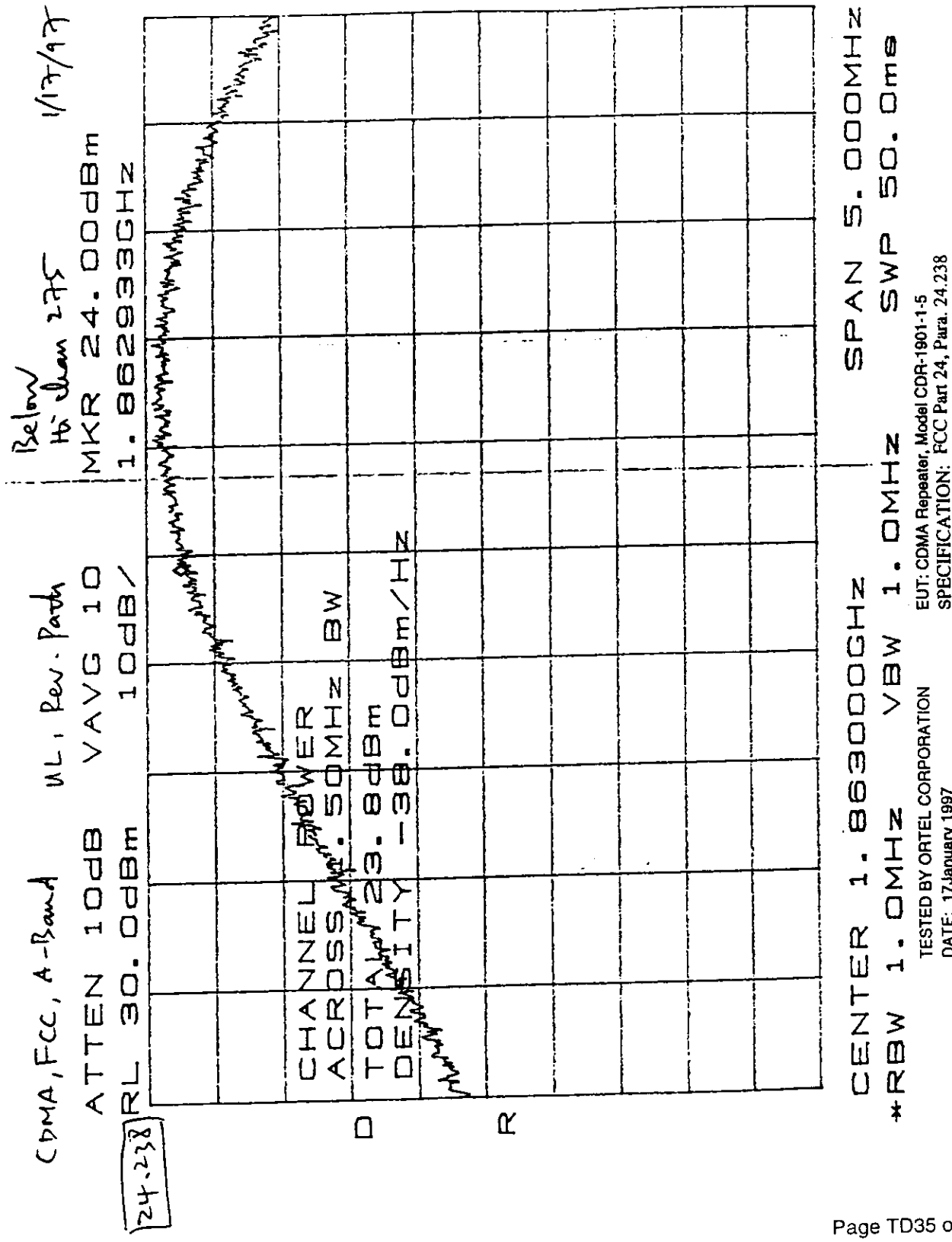


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

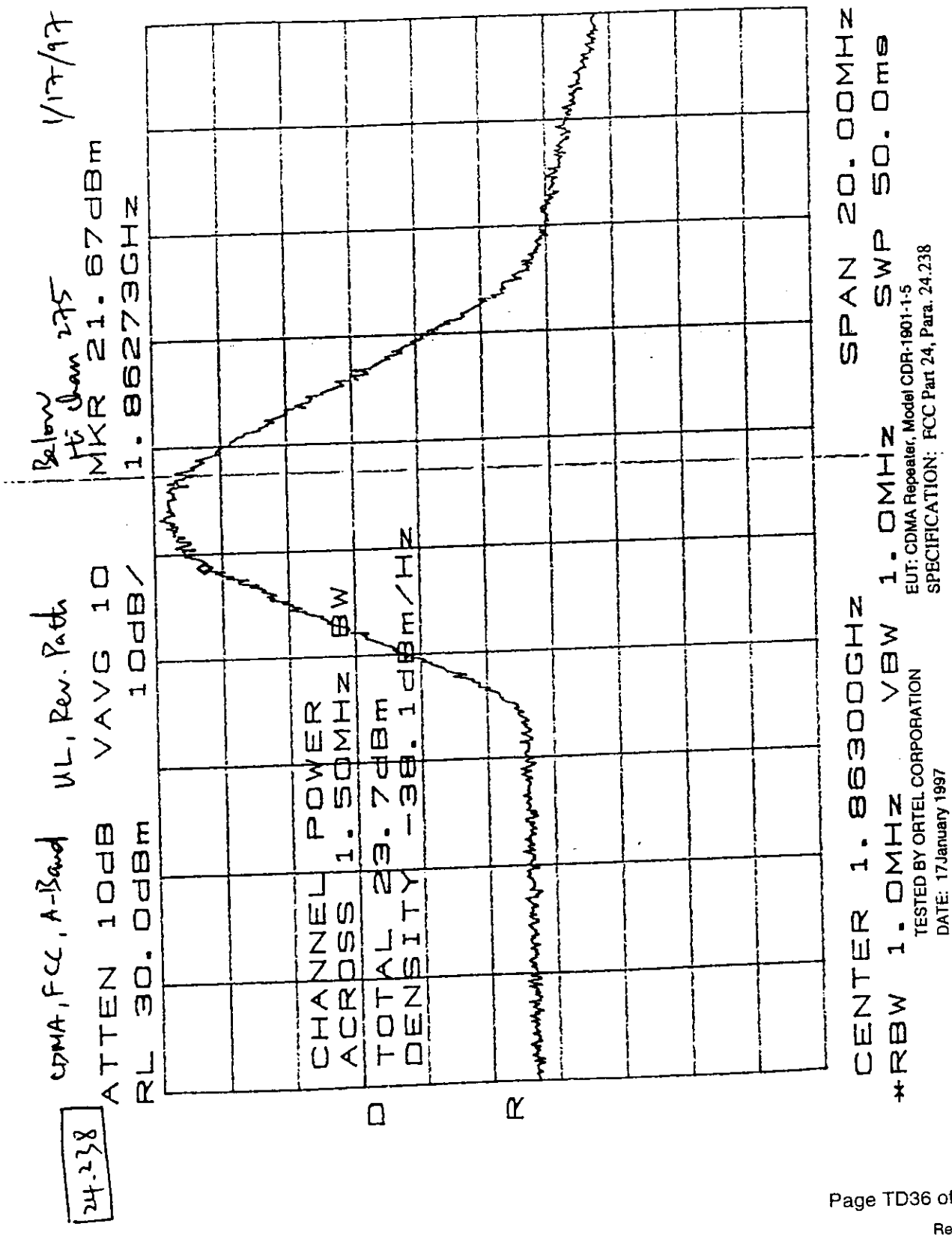

1/17/97
Upper
Hi Chan 275
MKR 26.50dBm
1.864433GHz
CDMA, Fcc, A-Band UL, Rev. Path
ATTEN 10dB VAVG 10
RL 30.0dBm 10dB/
CHANNEL POWER
ACROSS 1.50MHz BW
TOTAL 24.5dBm
DENSITY -37.3dBm/Hz
SPAN 5.000MHz
CENTER 1.864500GHz VBW 1.0MHz SWP 50.0ms
*RBW 1.0MHz
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
24.238



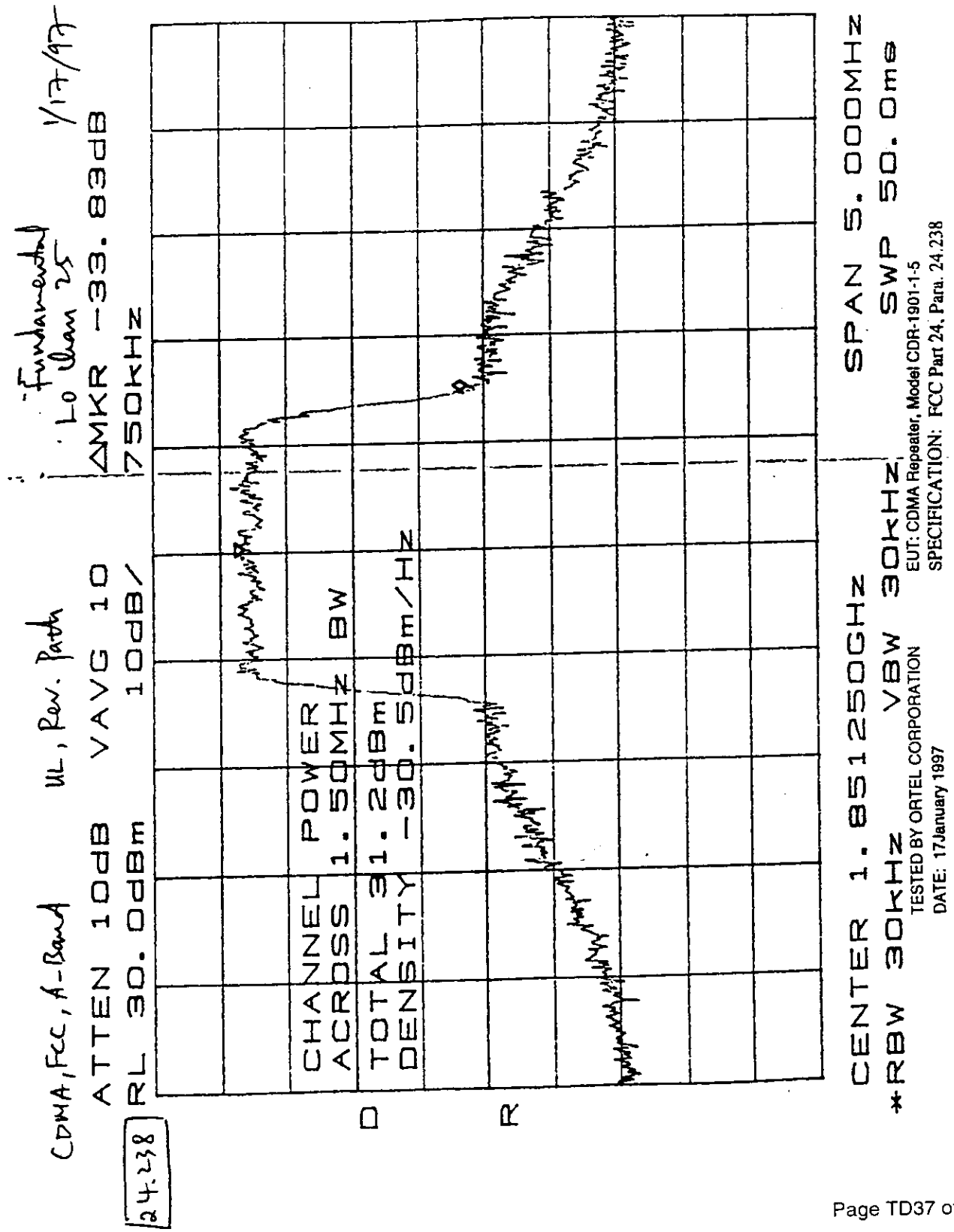
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

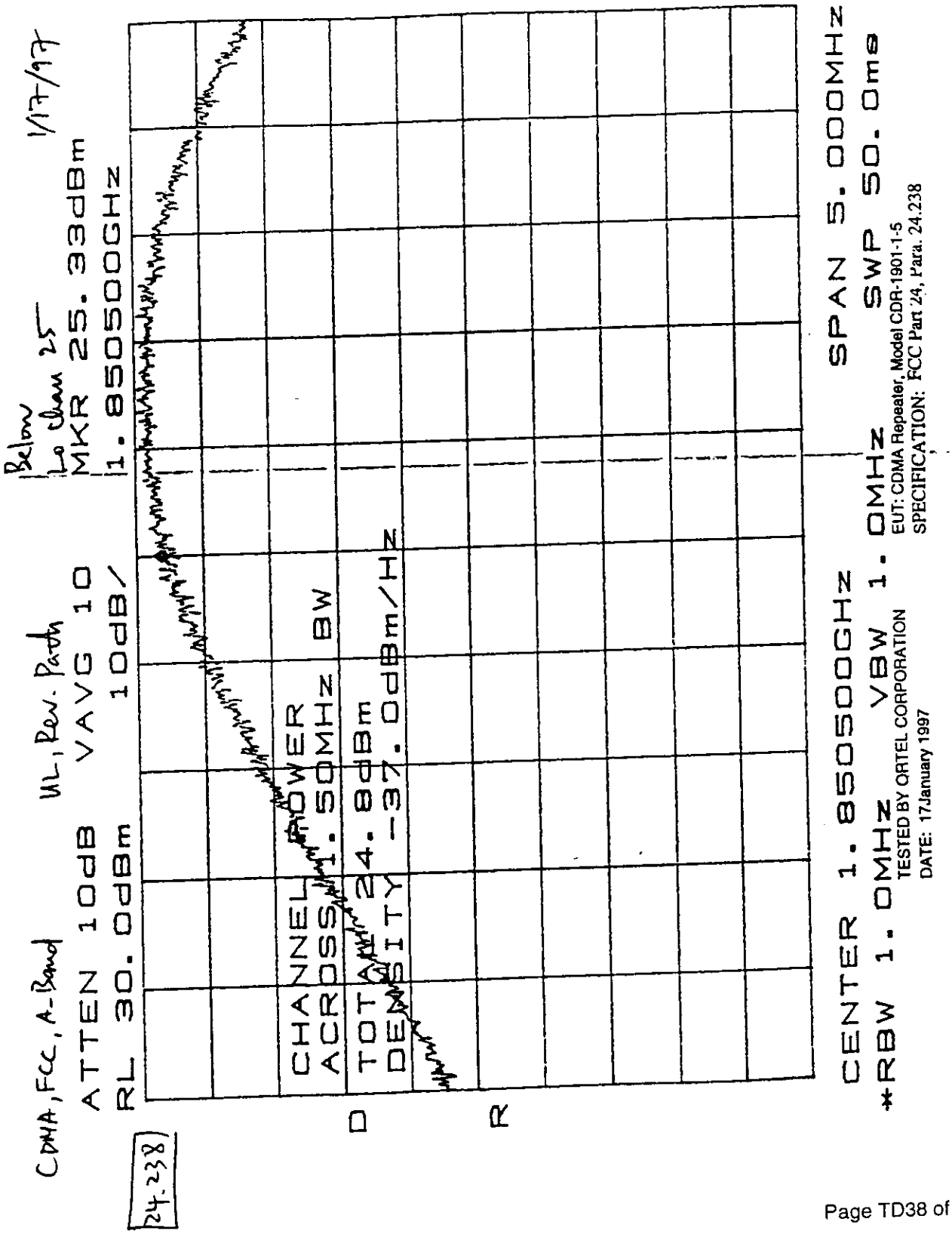


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

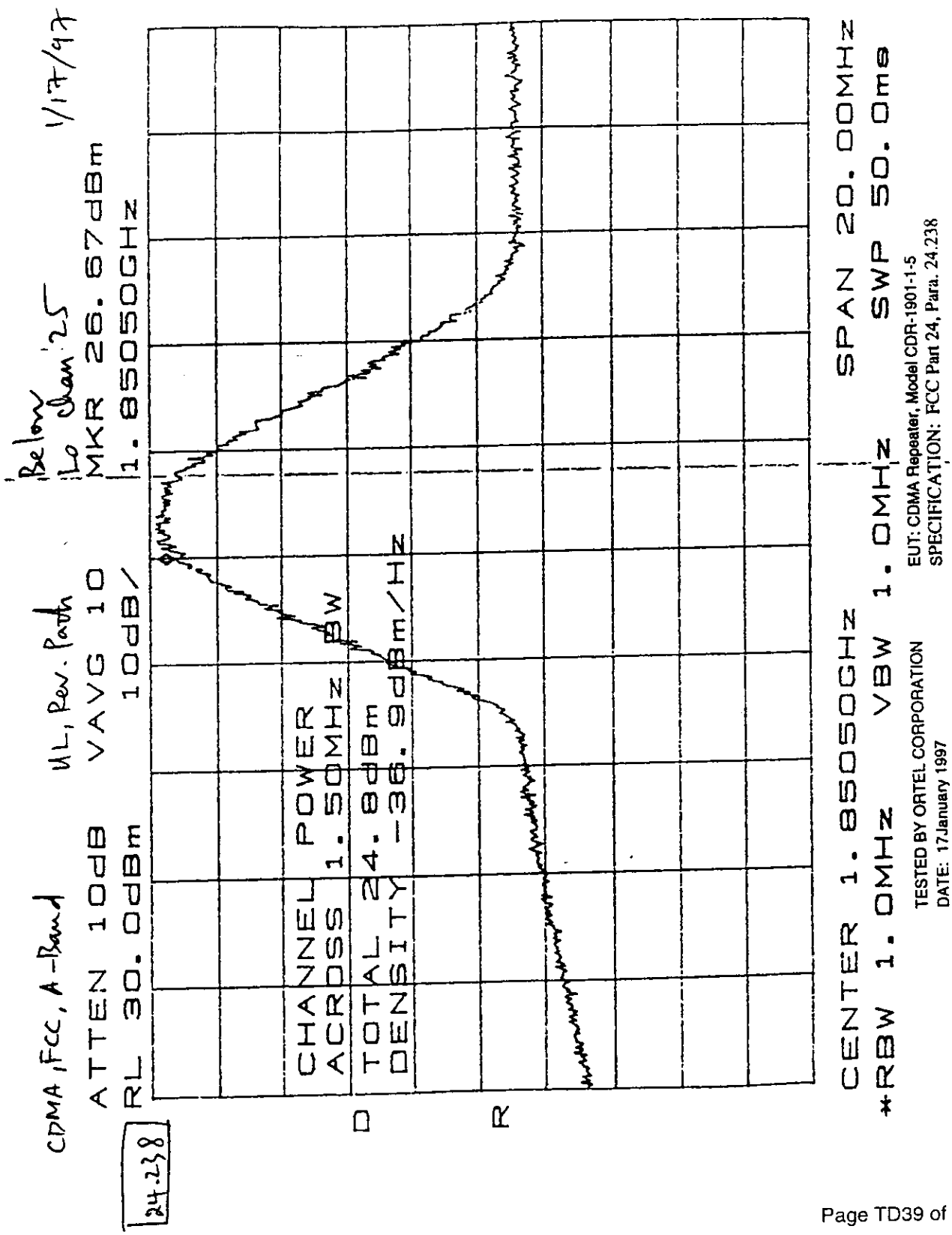


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

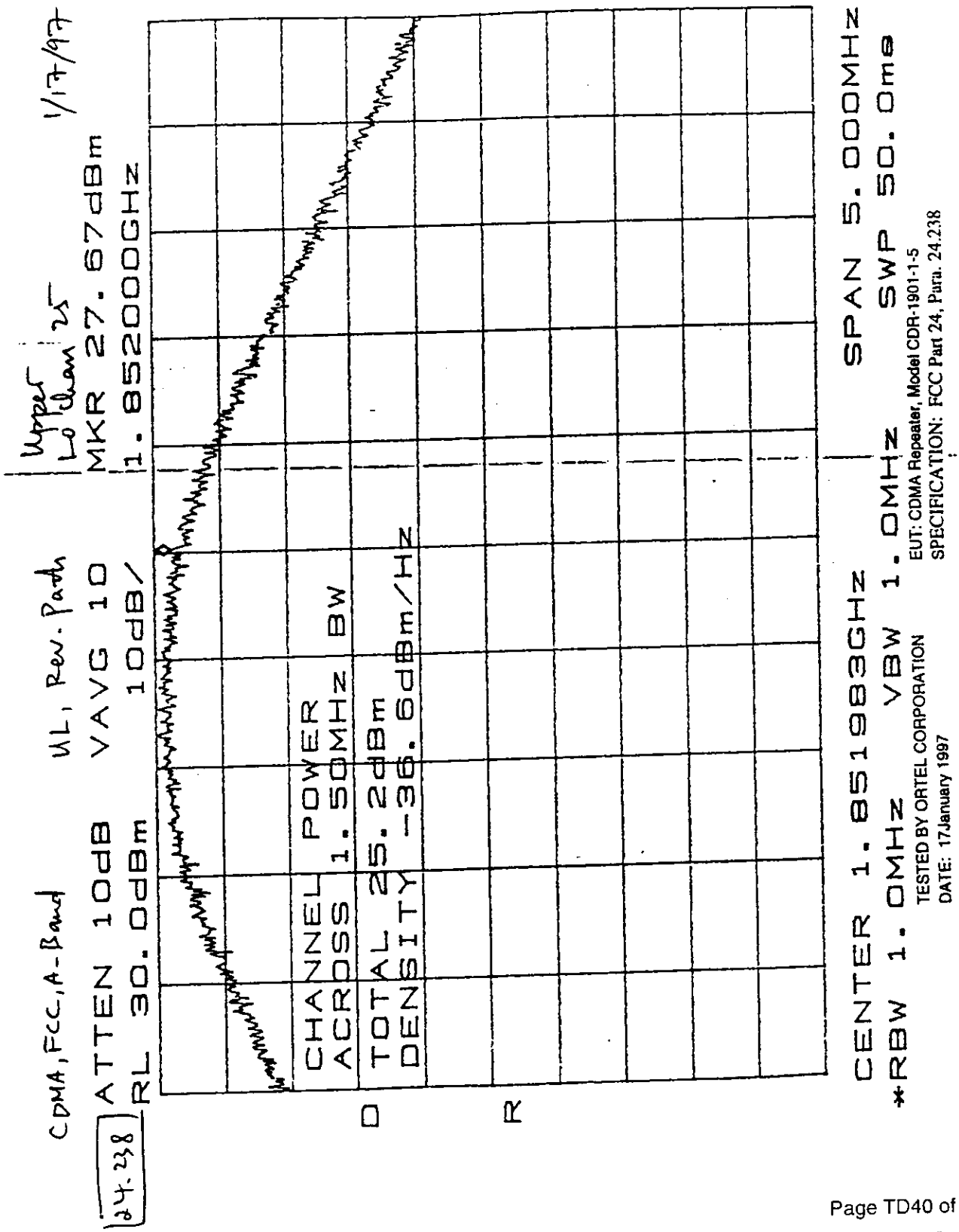

CDMA, Fcc, A-Band
UL, Rev. Path
ATTEN 10dB
RL 30.0dBm
VAVG 10
10dB/
24.238
CHANNEL POWER
ACROSS 1.50MHz BW
TOTAL 31.2dBm
DENSITY -30.5dBm/Hz
Fundamental
Lo Ulan 25
1/17/97
ΔMKR -33.83dB
750kHz
CENTER 1.851250GHz
*RBW 30kHz
VBW 30kHz
SPAN 5.000MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238


CDMA, FCC, A-Band
WL, Rev. Path
ATTEN 10dB
RL 30.0dBm
VAVG 10
10dB/
Below
Lo Chan 25
MKR 25.33dBm
1.850500GHz
1/17/97
CHANNEL POWER
ACROSS 1.50MHz BW
TOTAL 24.8dBm
DENSITY -37.0dBm/Hz
CENTER 1.850500GHz
*RBW 1.0MHz
VBW 1.0MHz
SPAN 5.000MHz
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238
TESTED BY QRTEL CORPORATION
DATE: 17January 1997
24.238

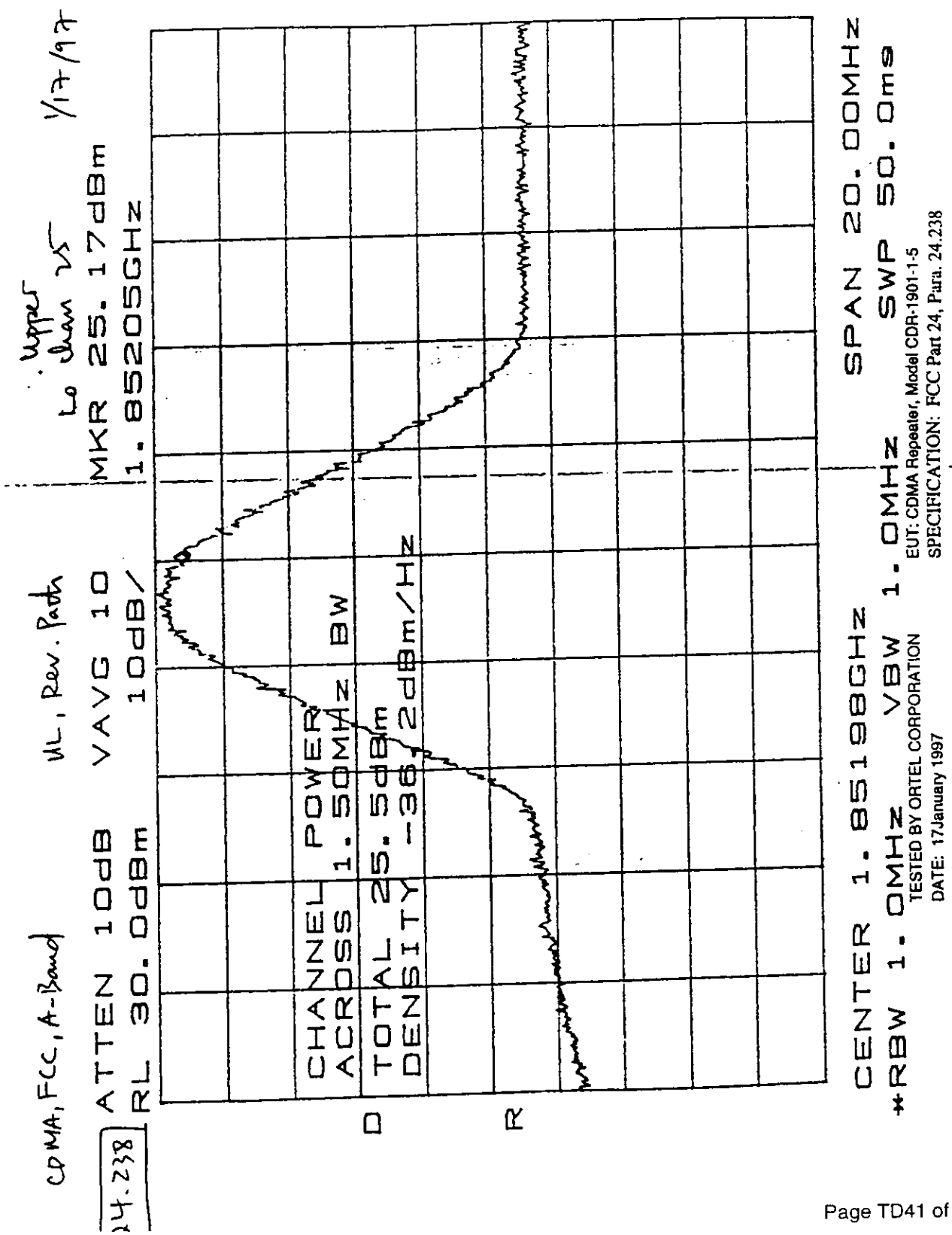
TÜV PRODUCT SERVICE



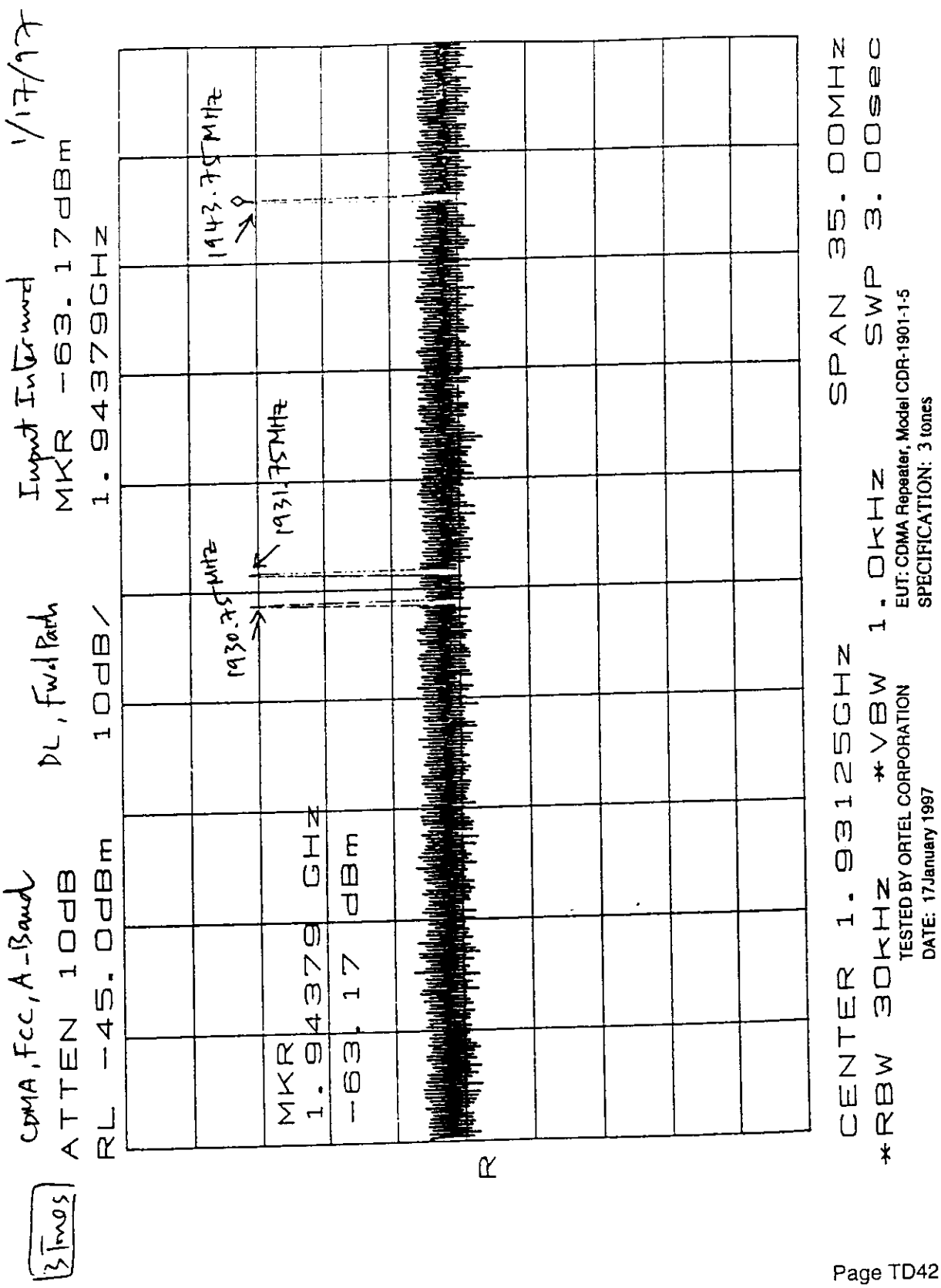
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



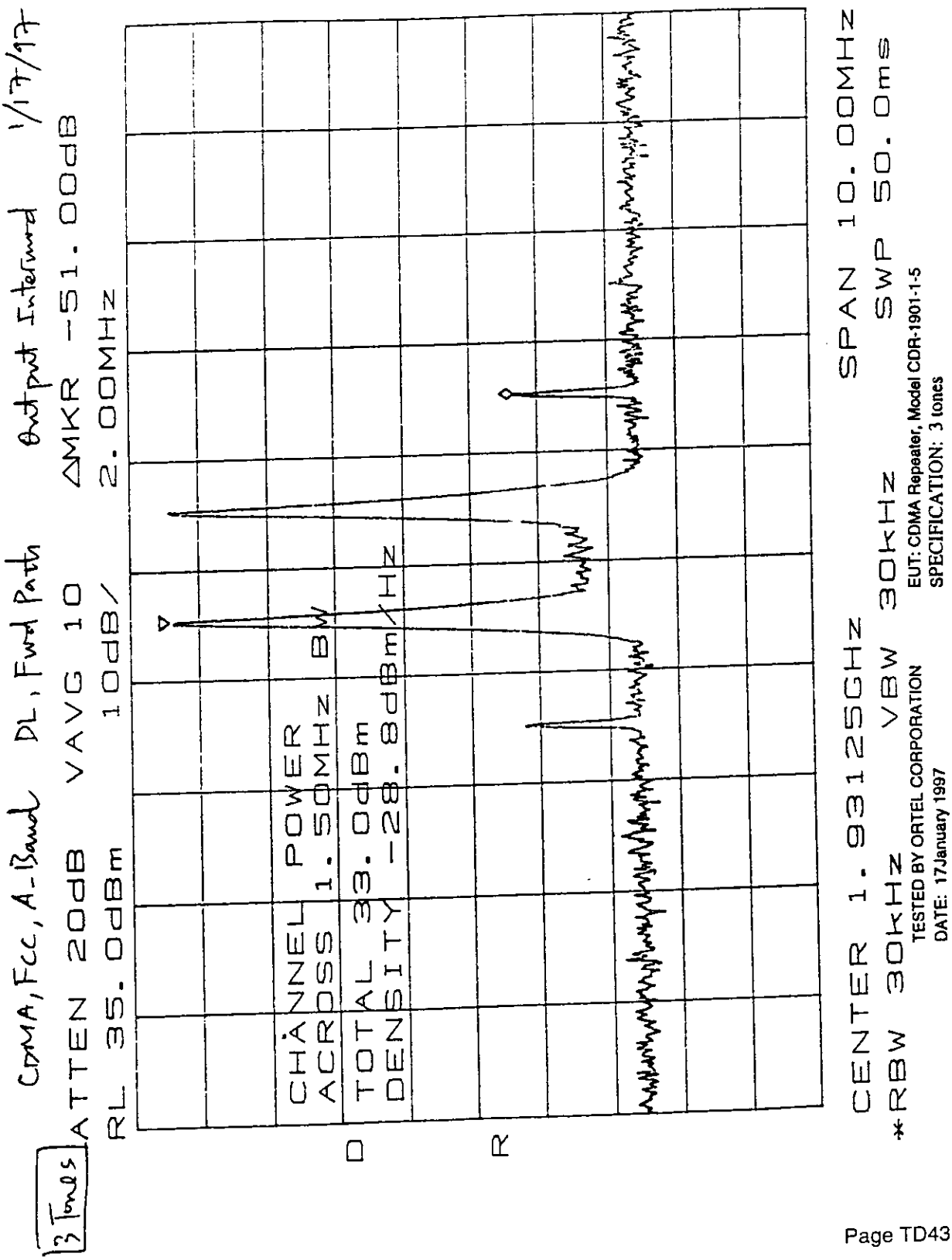
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



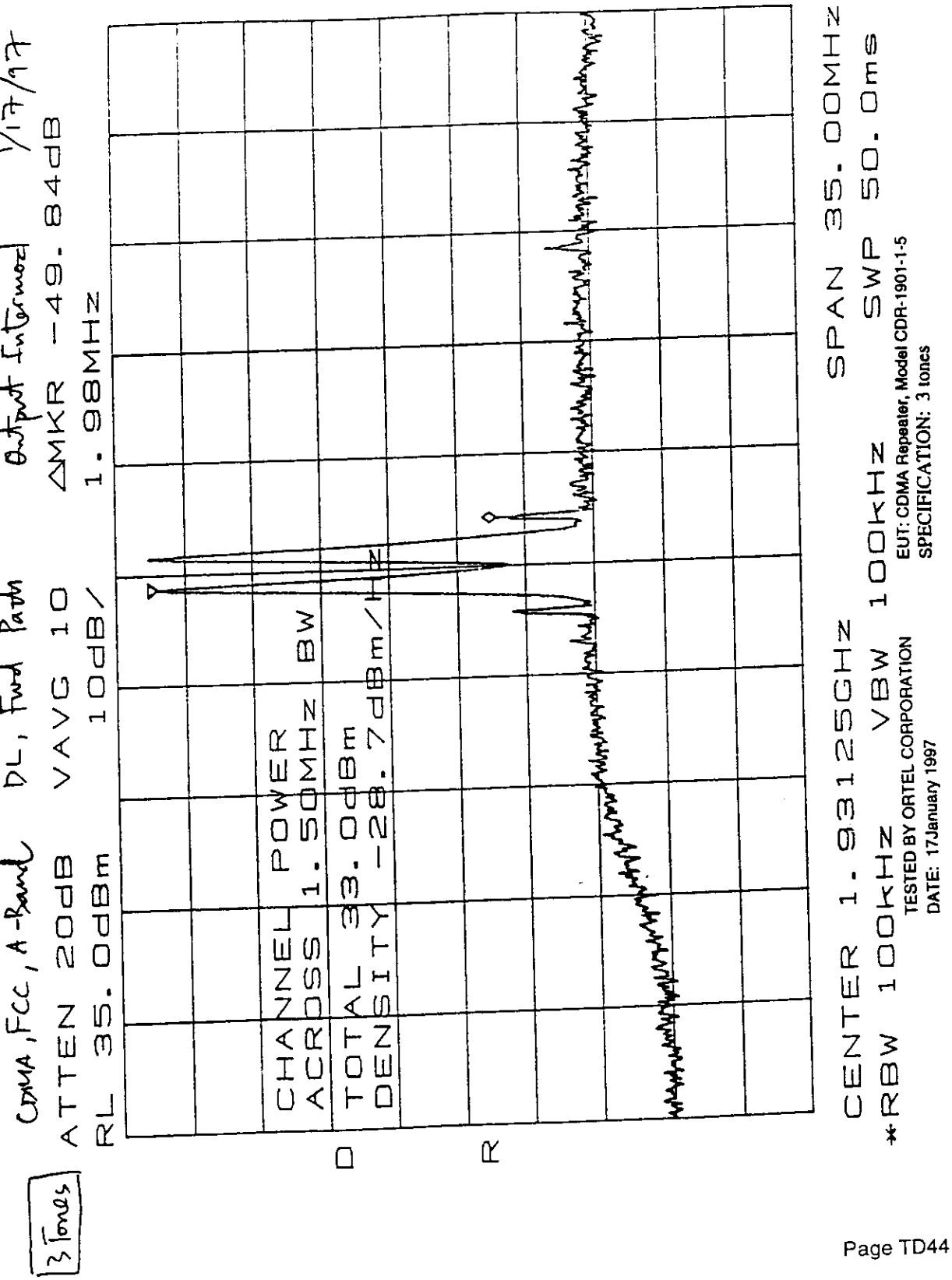
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

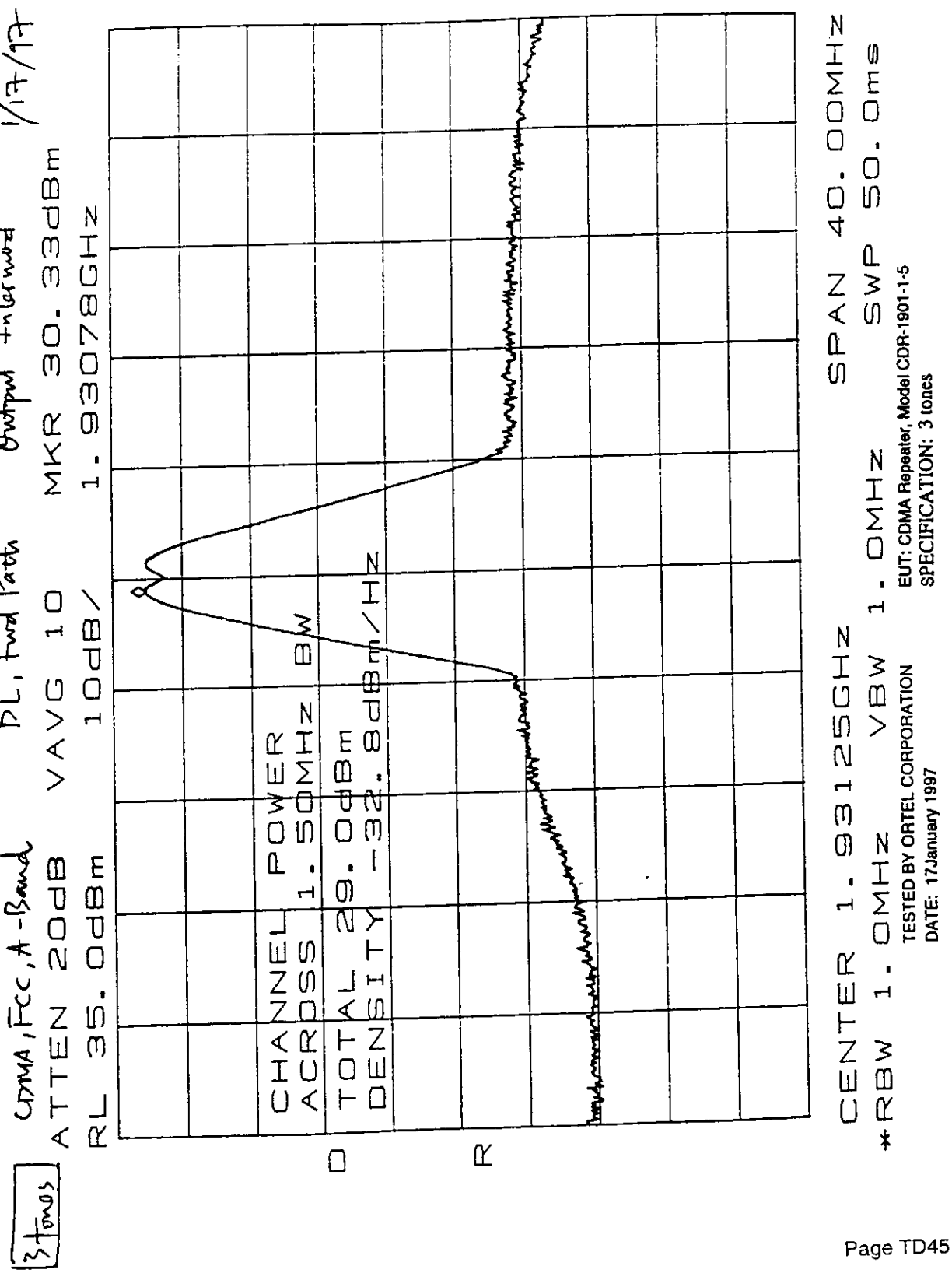


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364


CDMA, Fcc, A-Band DL, Fwd Path Output Intermod 1/17/97
ATTEN 20dB VAVG 10 ΔMKR -49.84dB
RL 35.0dBm 10dB/ 1.98MHz
CHANNEL POWER
ACROSS 1.50MHz BW
TOTAL 33.0dBm
DENSITY -28.7dBm/Hz
CENTER 1.93125GHz VBW 100kHz SPAN 35.00MHz
*RBW 100kHz SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: 3 tones
3 Tones



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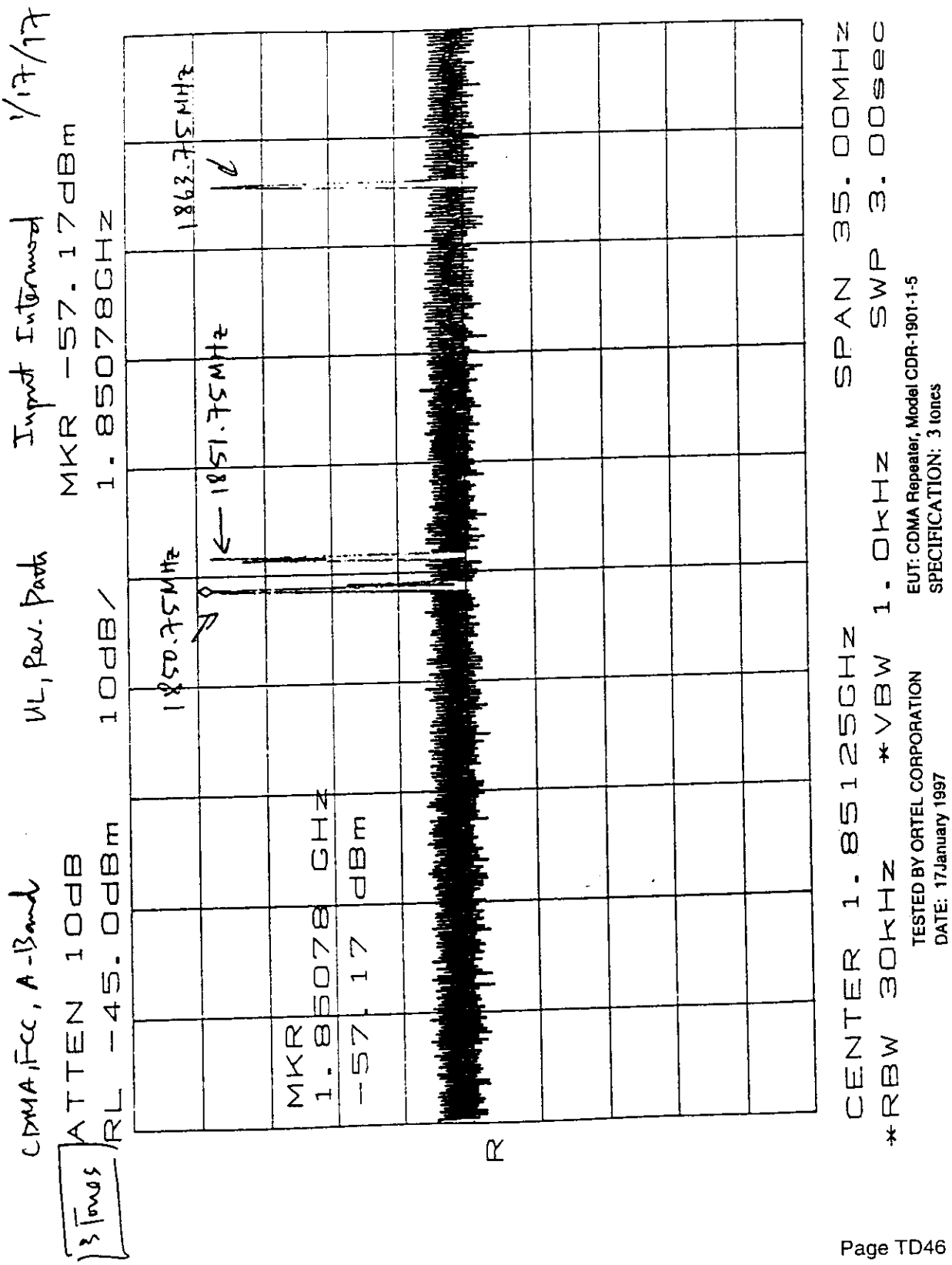
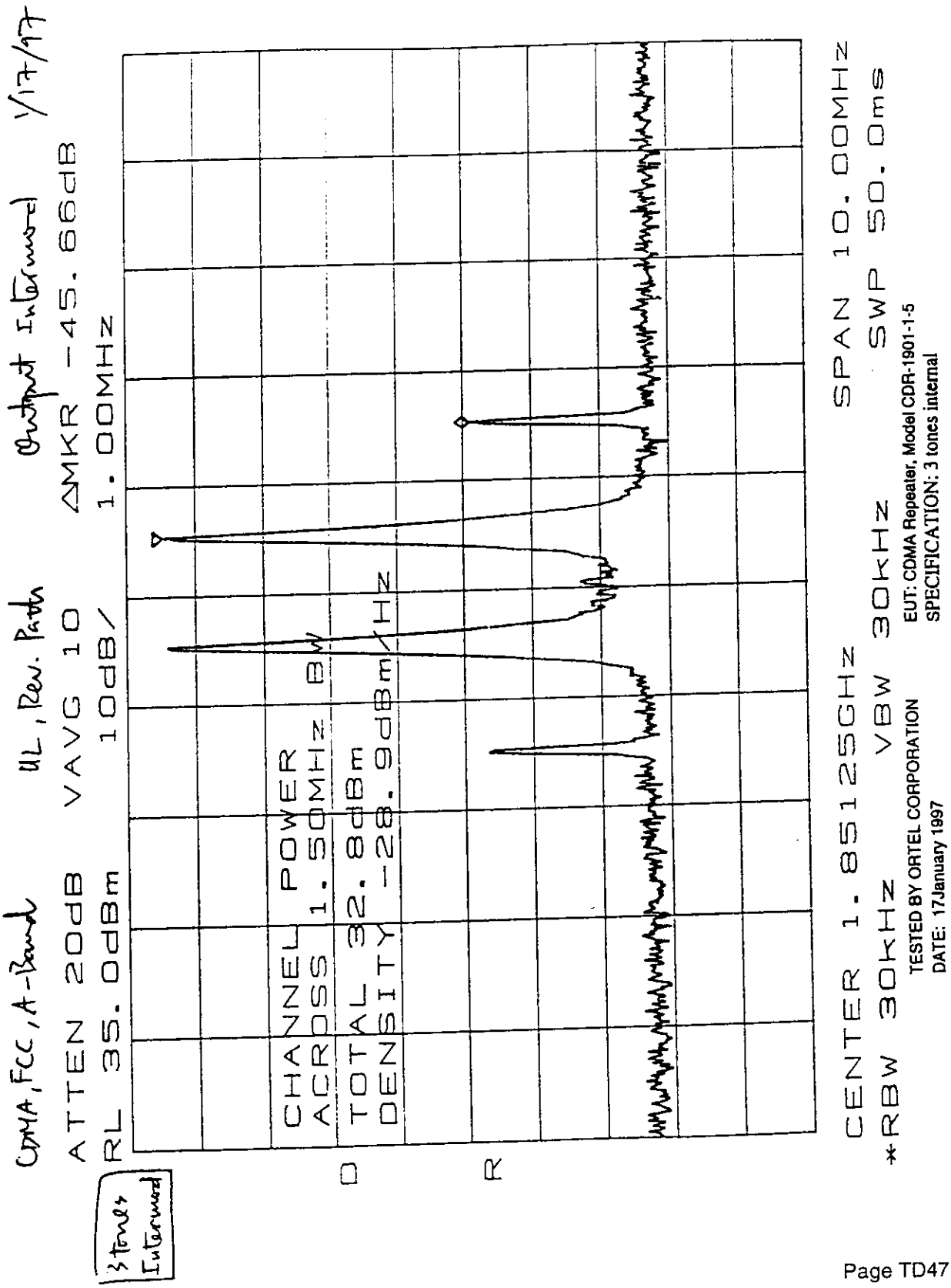
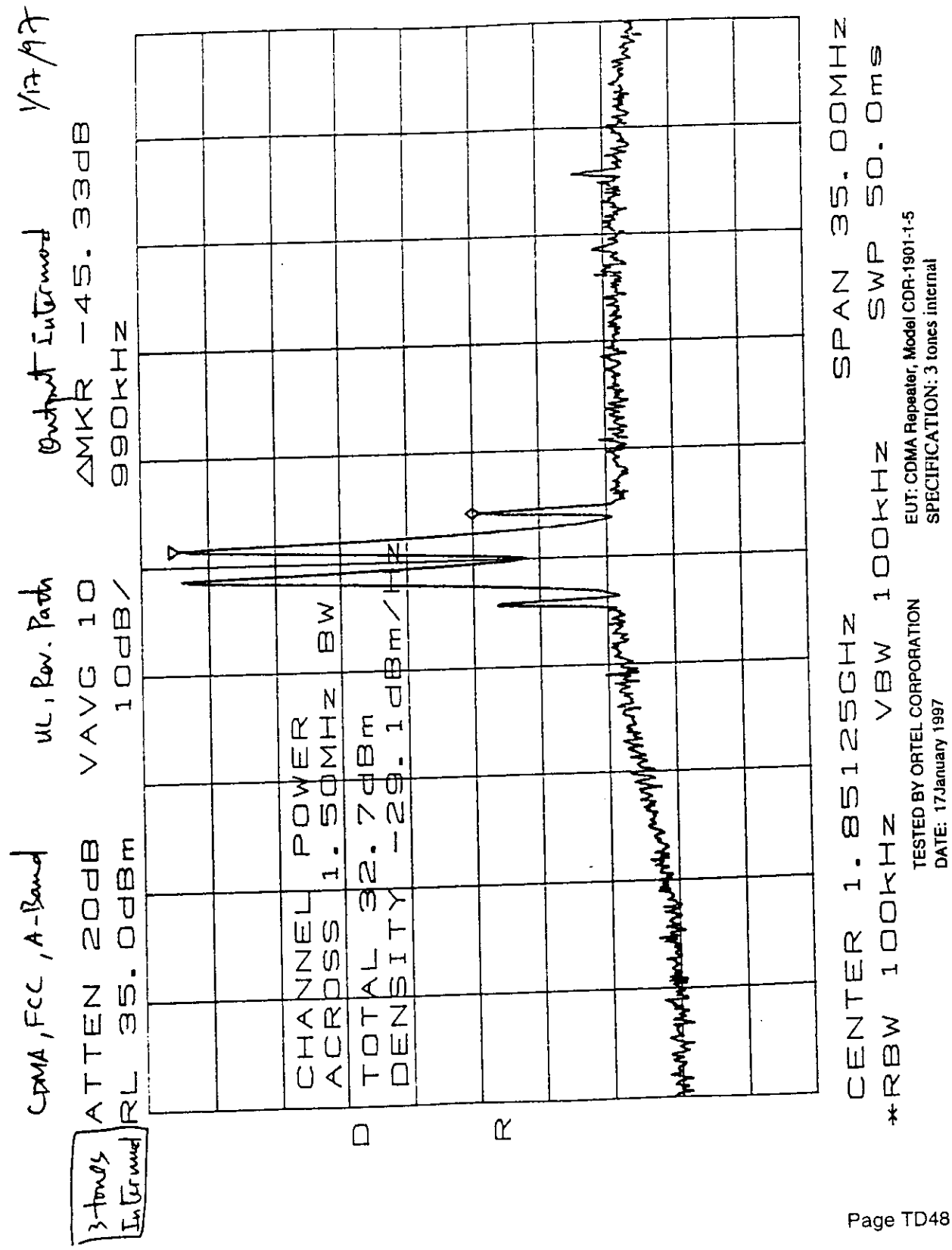


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



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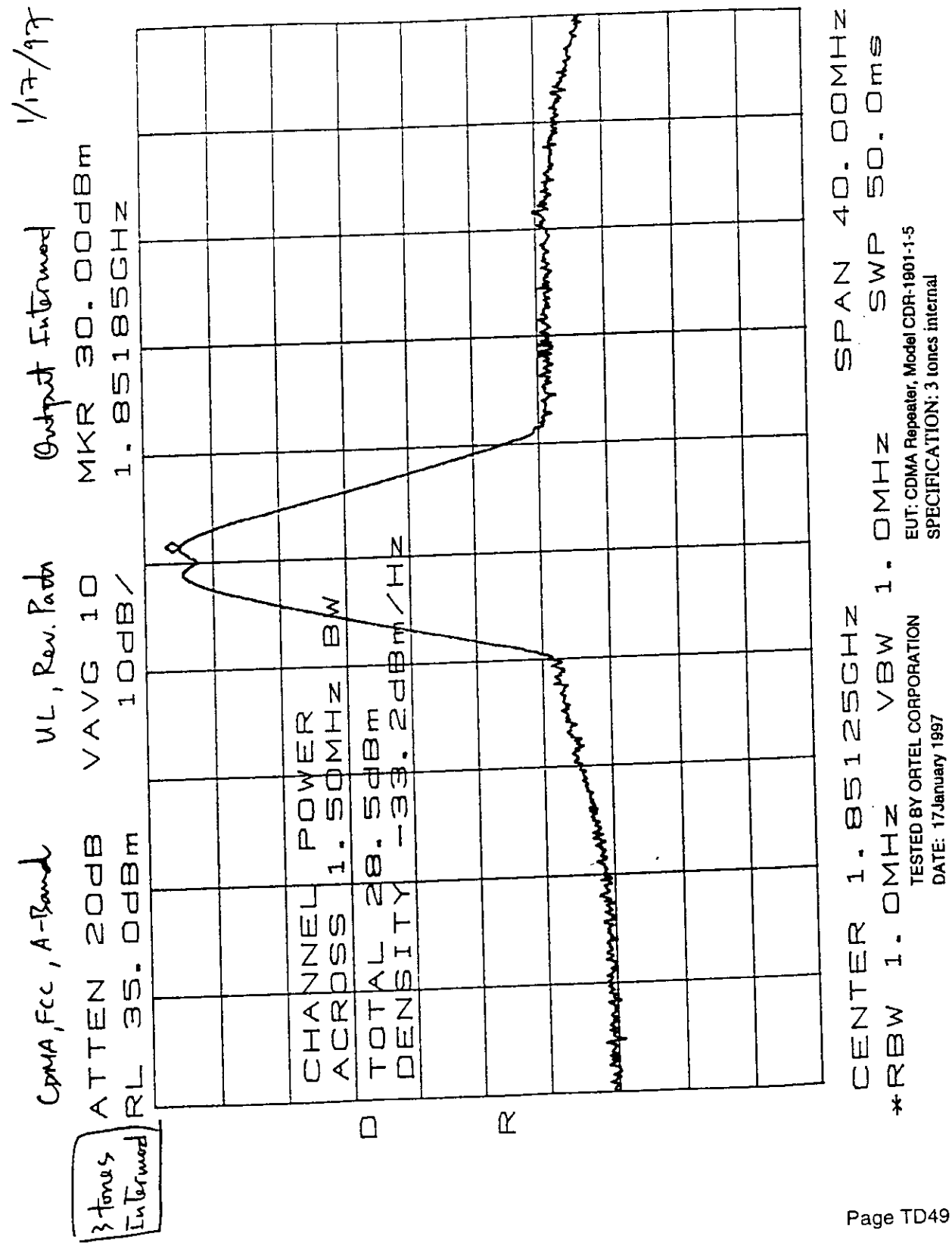
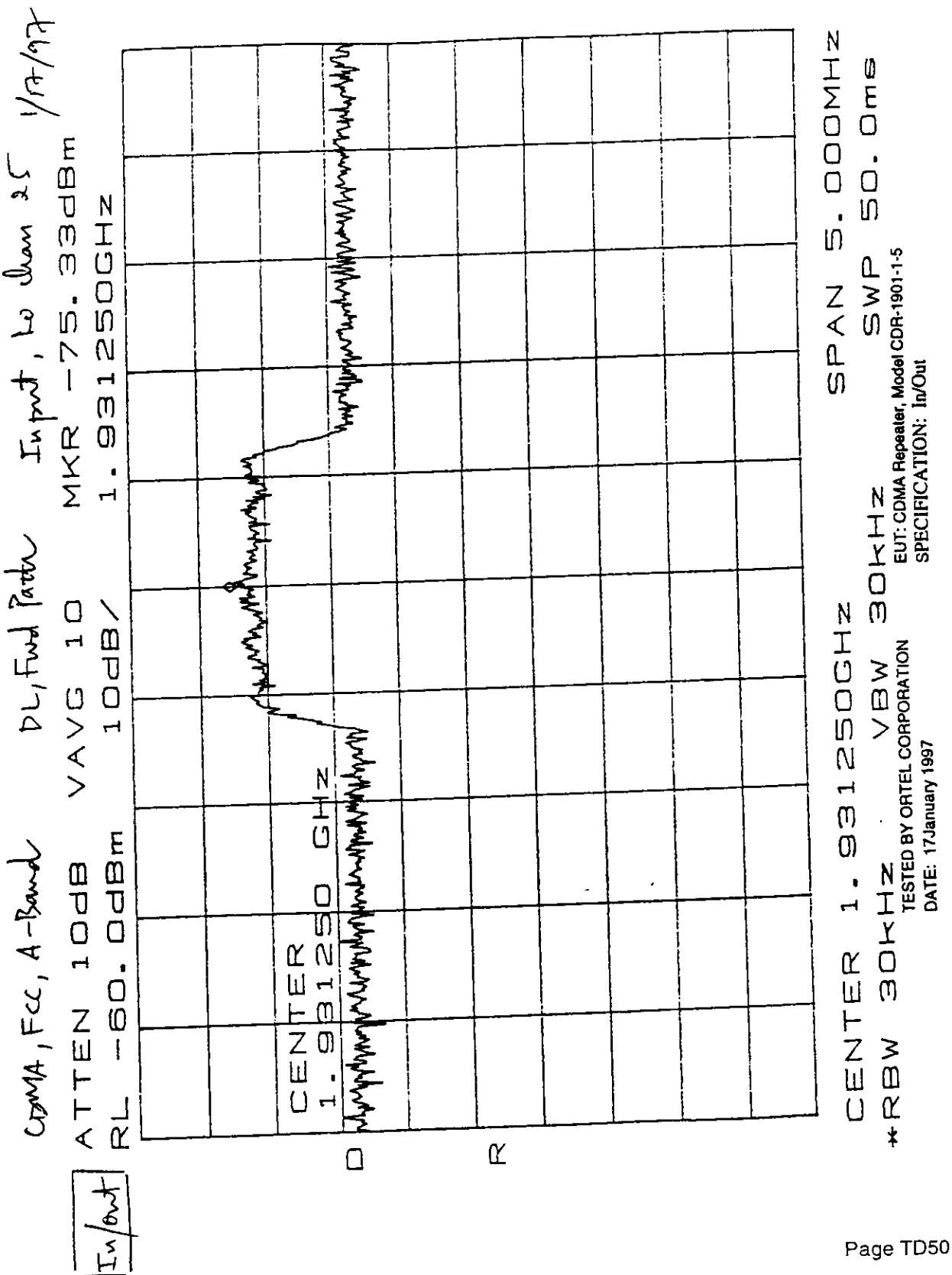
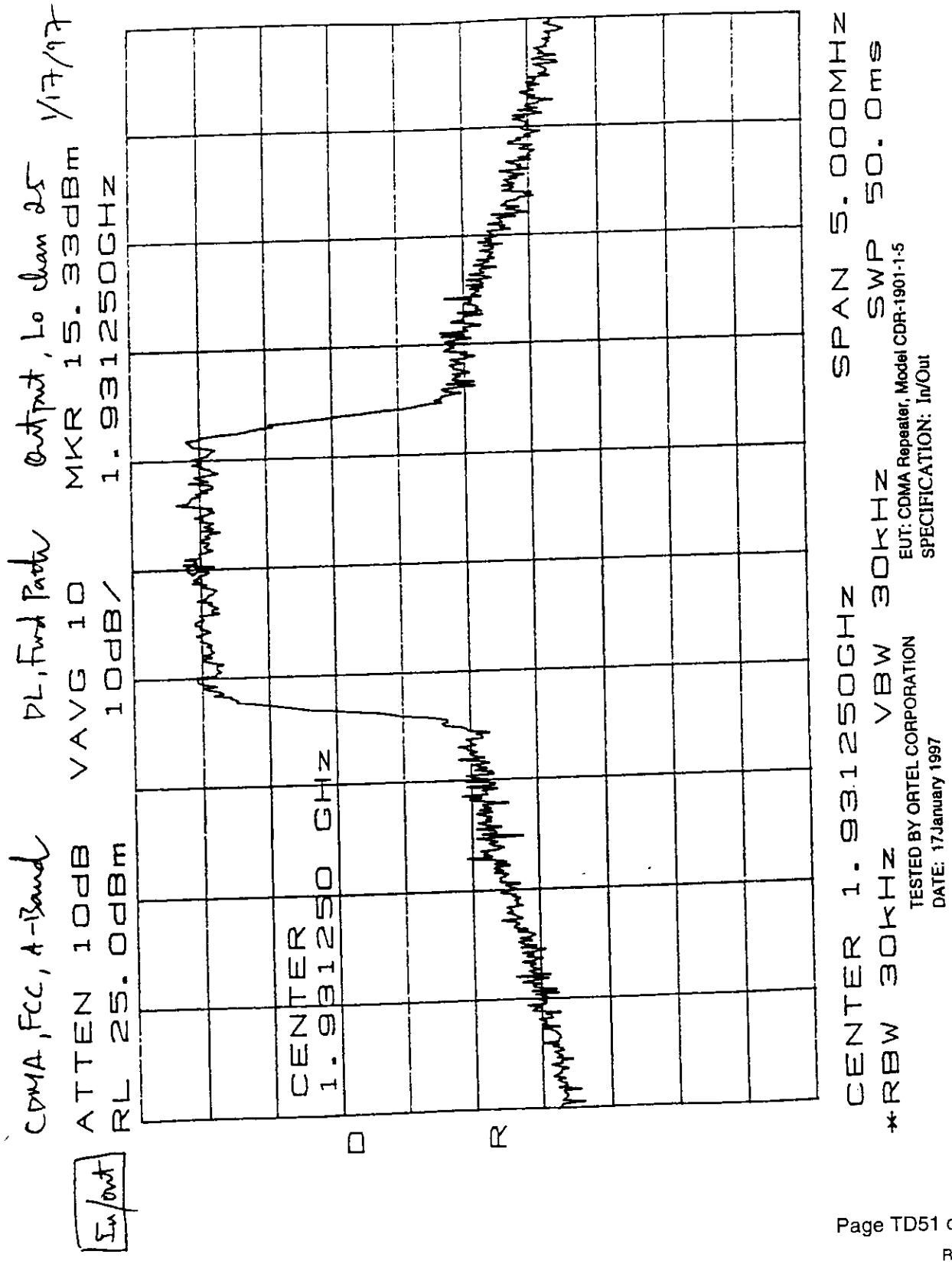


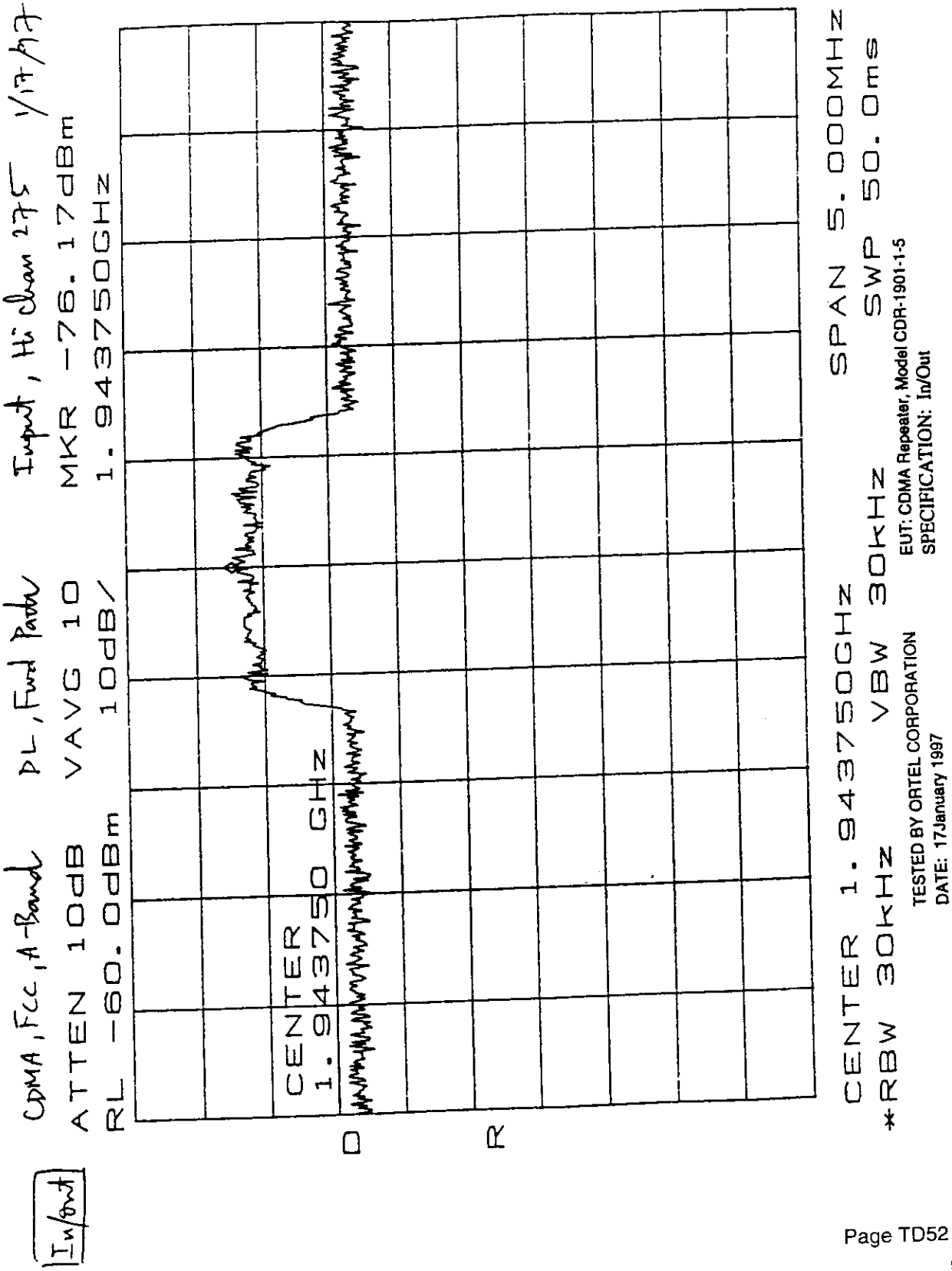
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



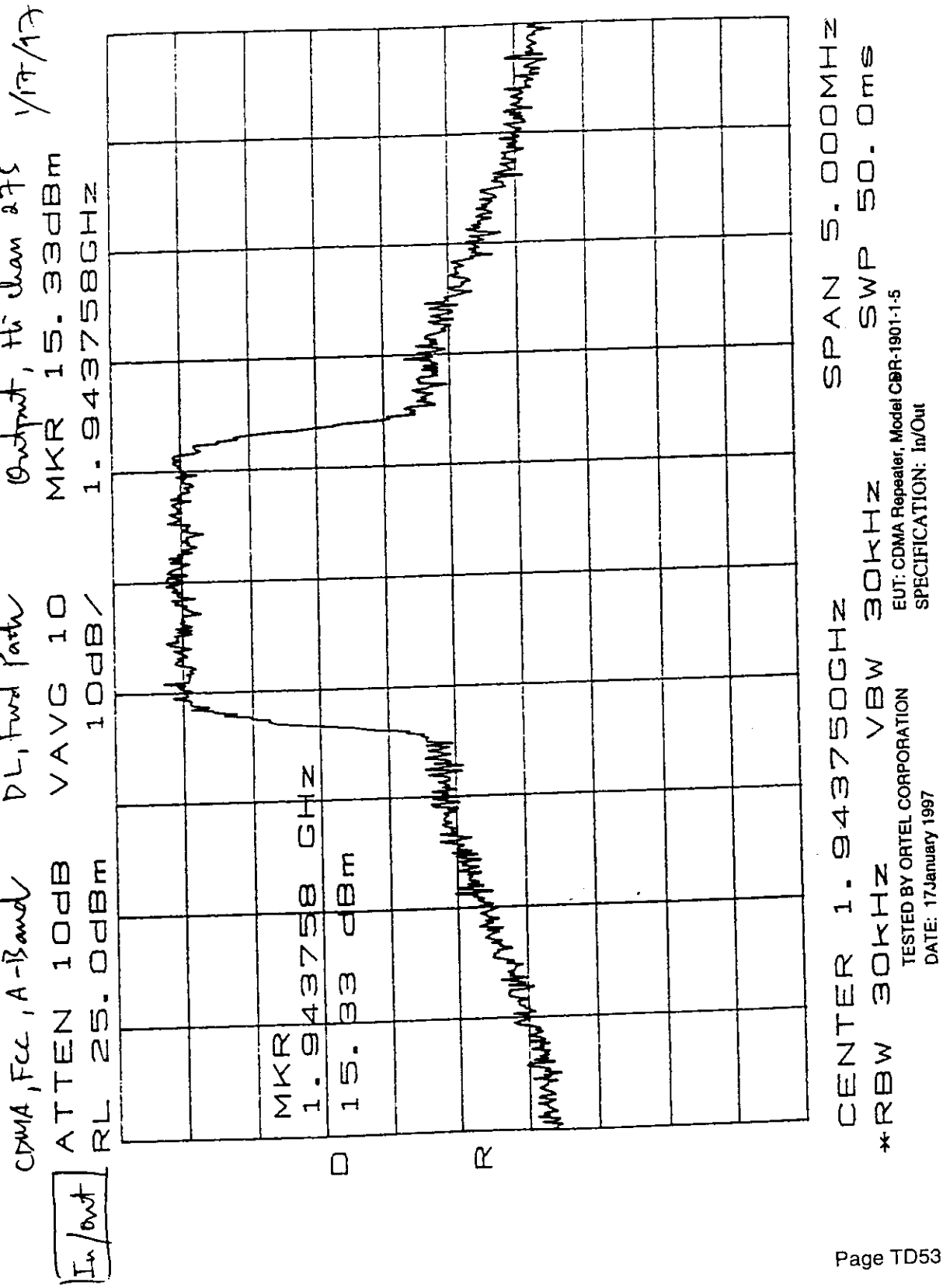
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



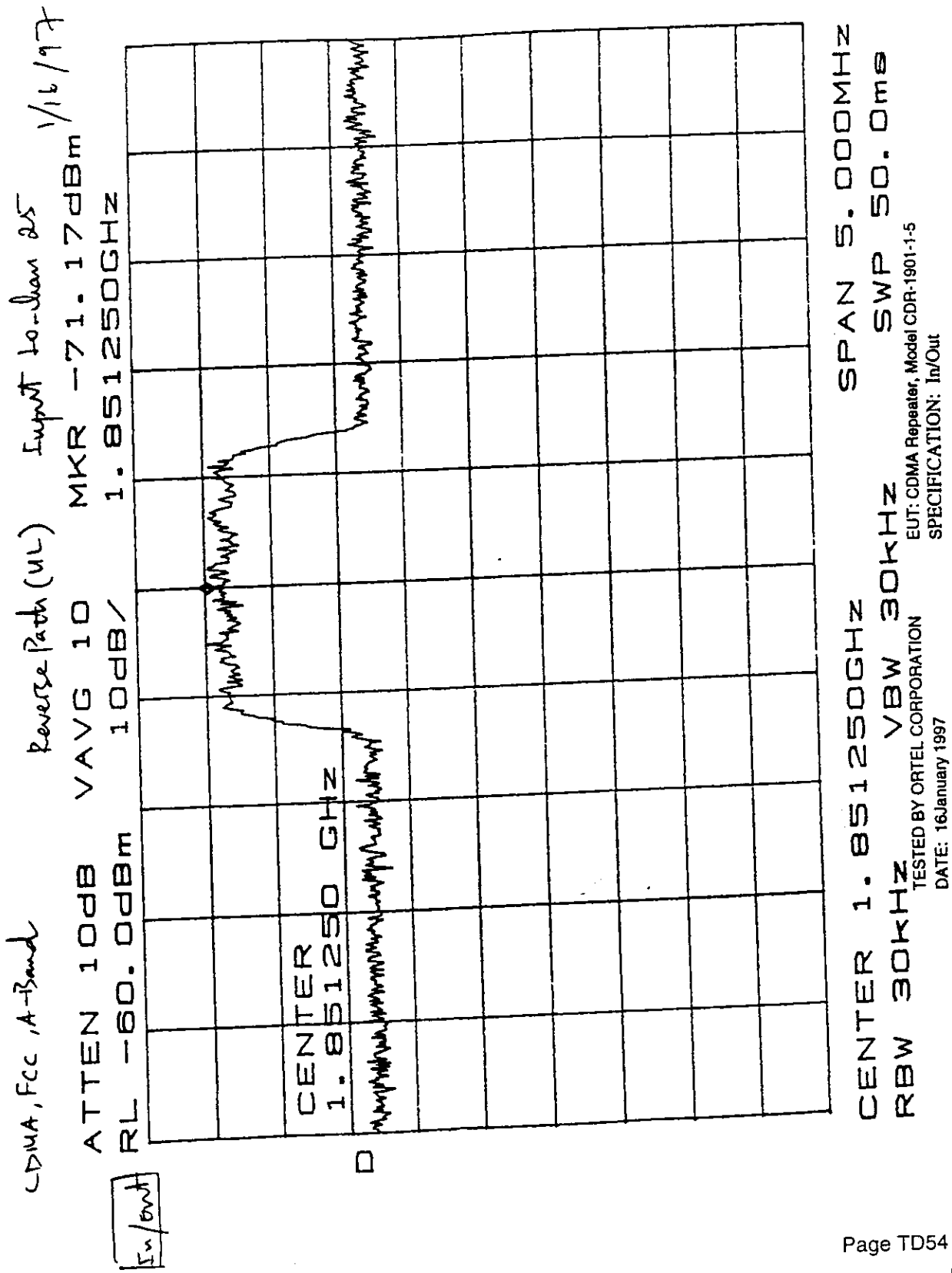
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



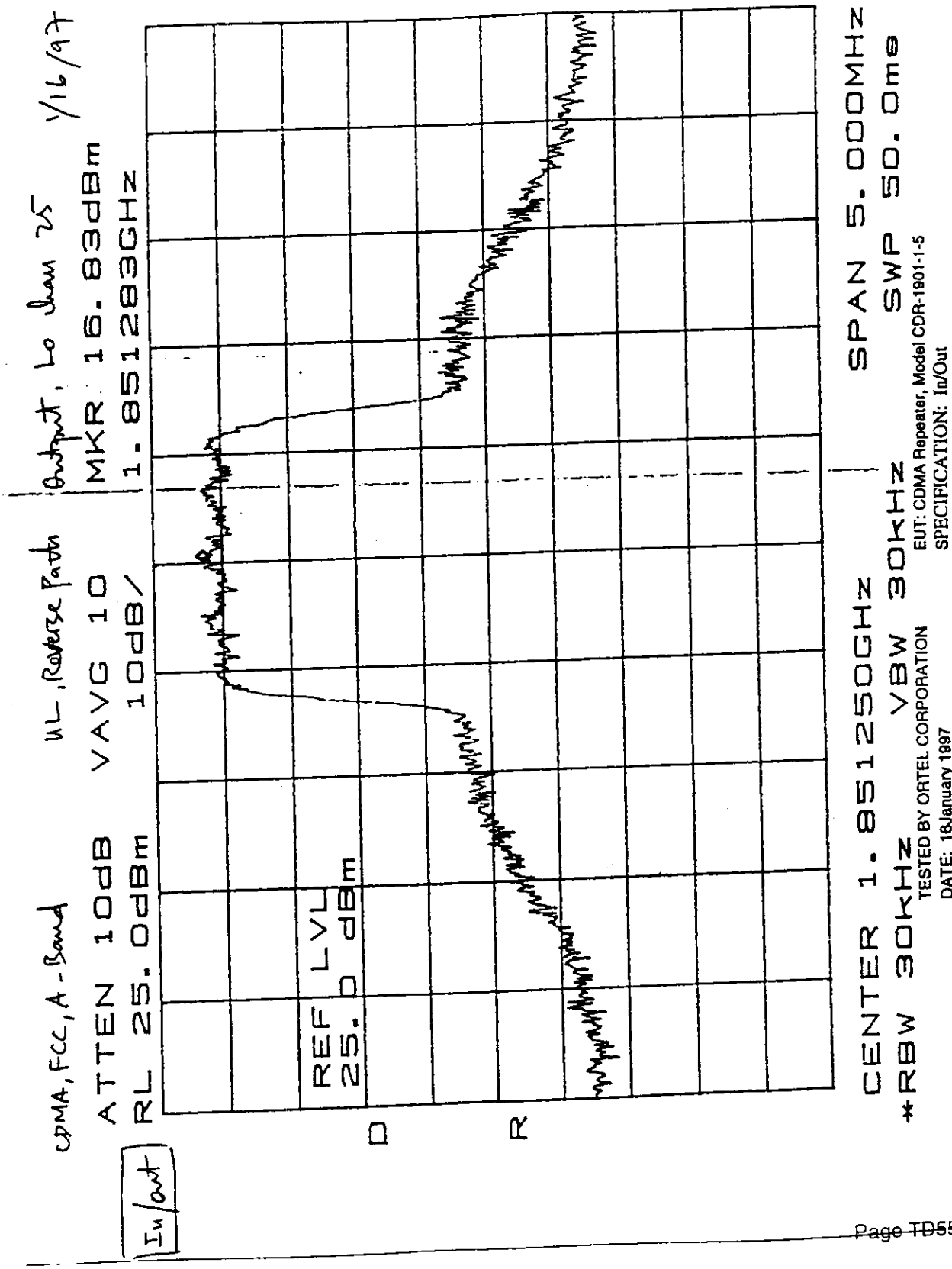
TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

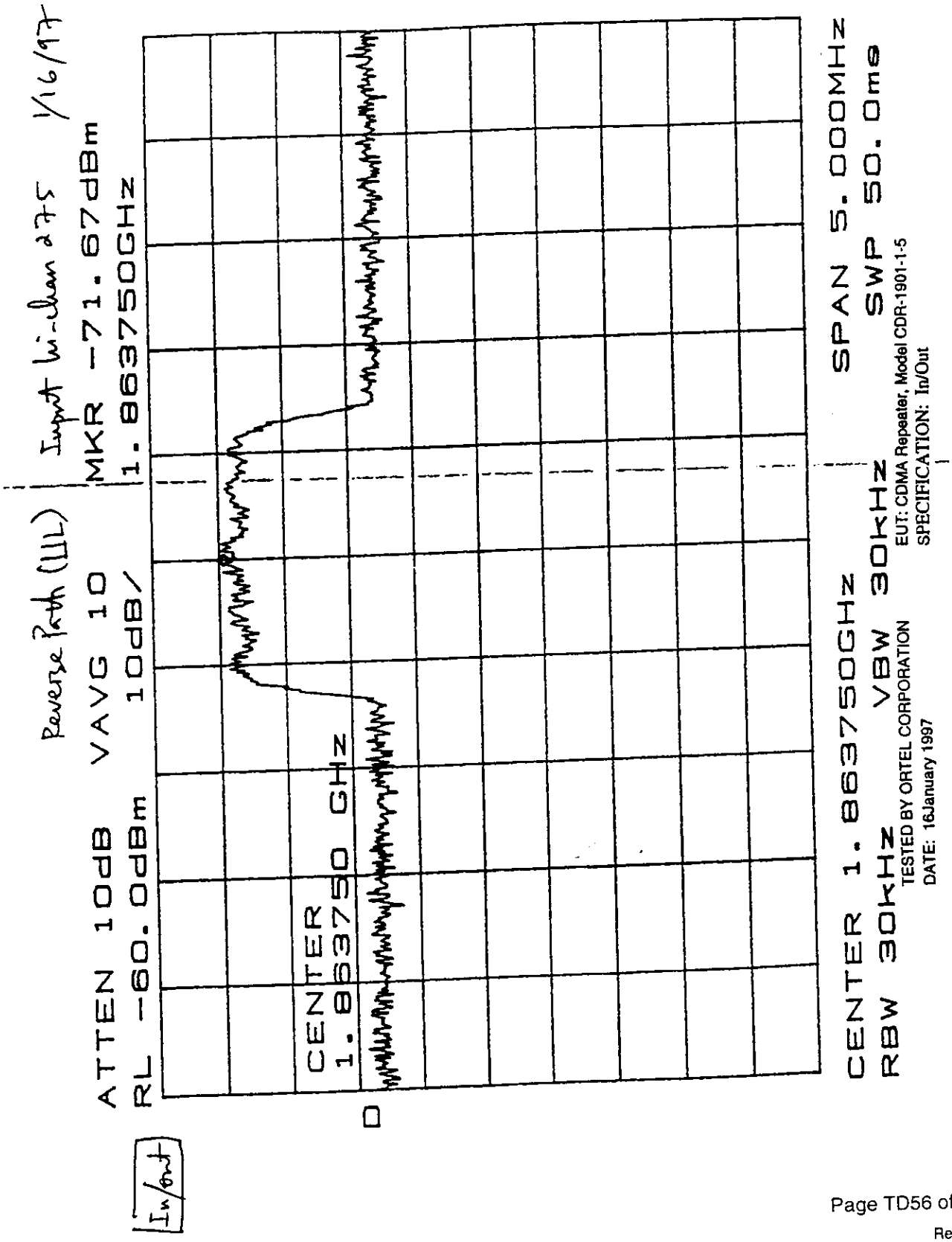


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

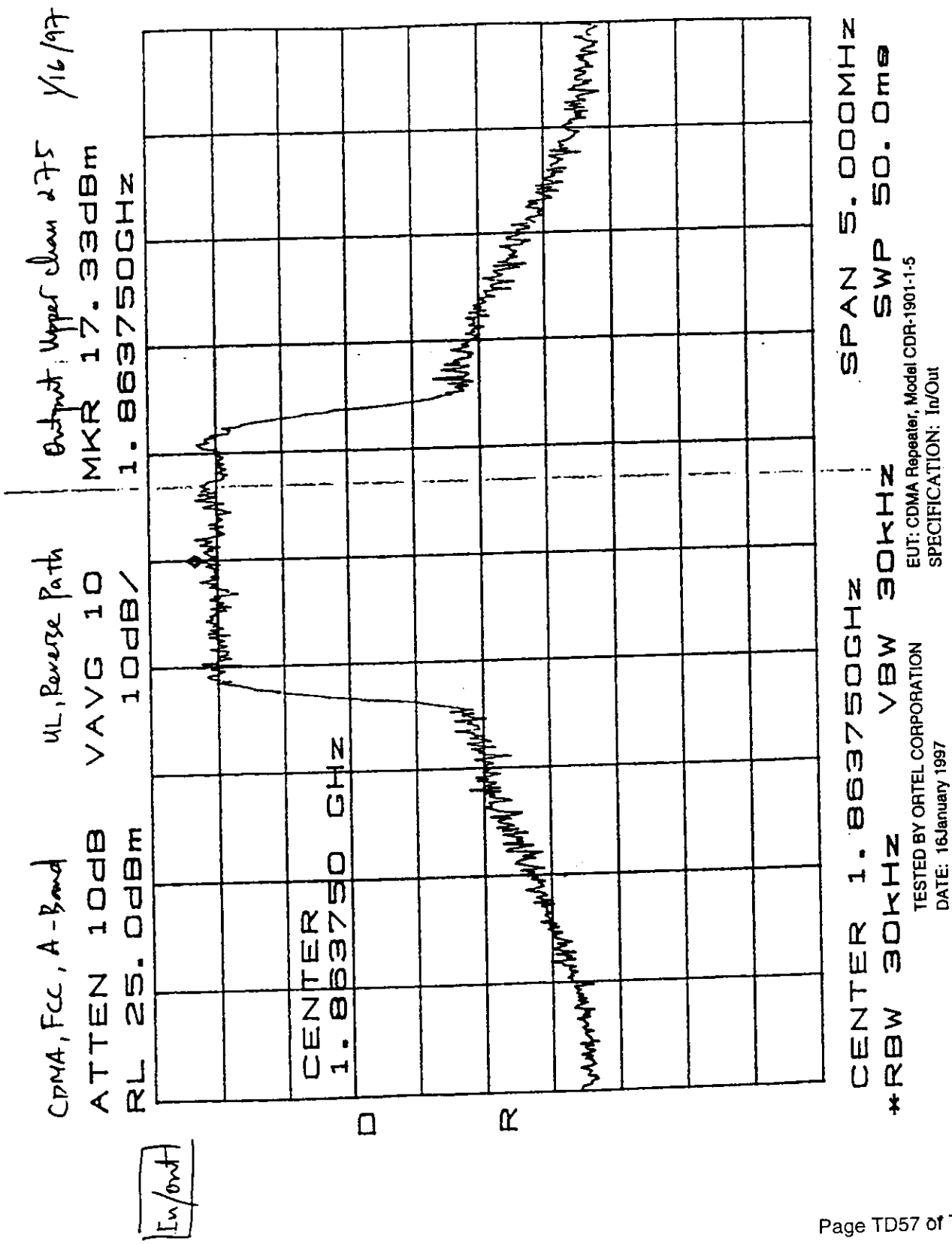


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE



TÜV PRODUCT SERVICE



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TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Appendix A

Test Setups
(Photographs)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Appendix B

Product Information Form(s)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

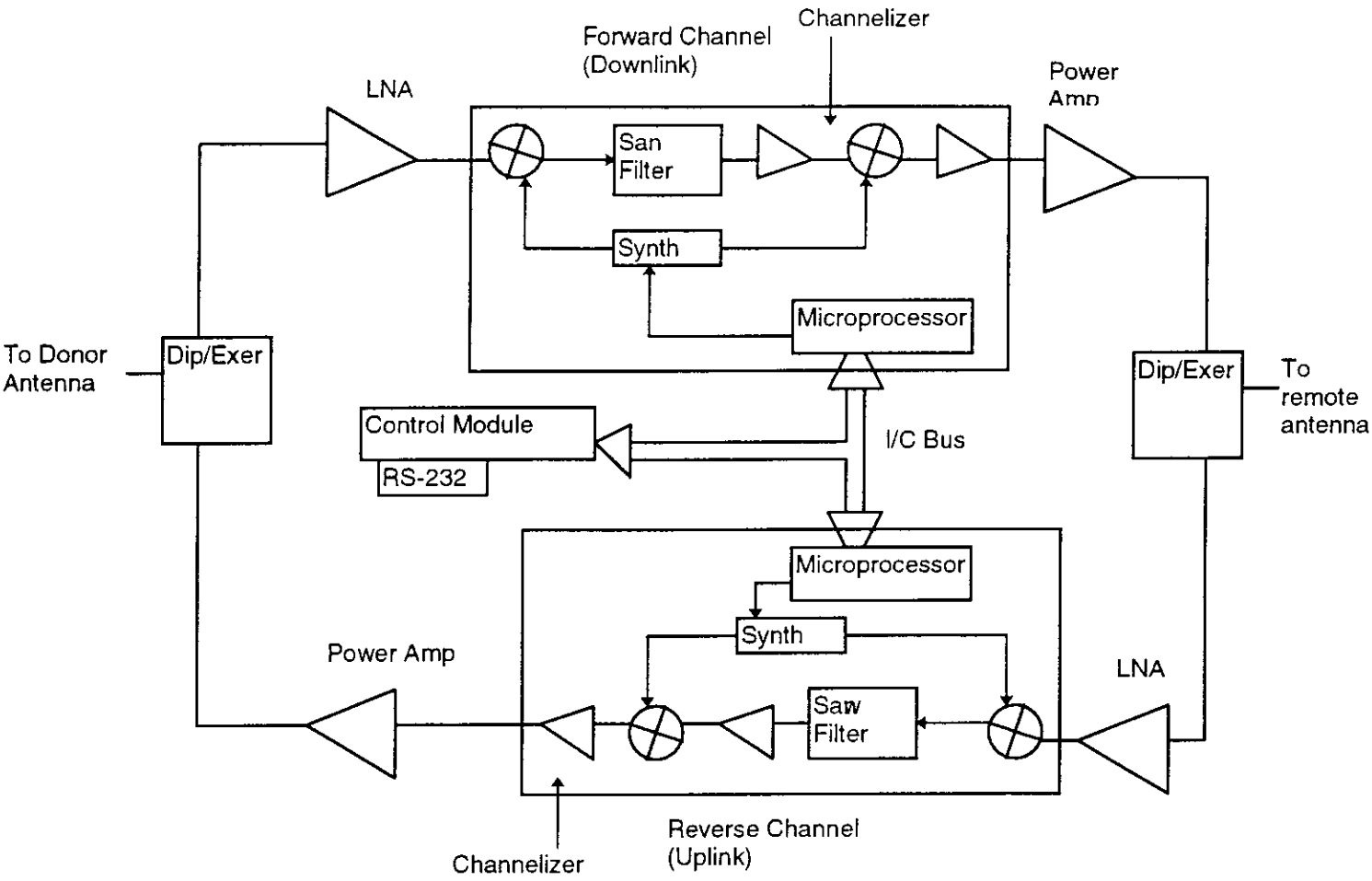
TÜV PRODUCT SERVICE

CUSTOMER INFORMATION	
COMPANY NAME:	ORTEL CORPORATION
COMPANY ADDRESS:	2015 West Chestnut Street
	Alhambra, CA 91803
PHONE NUMBER:	818 293 3640
FAX NUMBER:	818 281 7913
CUSTOMER CONTACT:	Martin ~~Keys~~ Kies
PRODUCT DESCRIPTION	
NAME, MODEL, SERIAL # OF EUT:	CDMA Repeater, Model CDR-1901-1-5 A
DESCRIPTION OF EUT:	A-band CDMA repeater
POWER INTERFACE	
FREQUENCY/AC/DC VOLTAGE:	AC-DC 50, 60 Hz/115 Vac
PHASES/CURRENT:	~~1/1-3 nominal amps~~ 1Ø, 1.3A nominal
POWER SUPPLY	
DESCRIPTION:	Internal to repeater DC-DC
MANUFACTURER, MODEL #:	Vicor, VI-250-CU
SWITCHING FREQUENCY:	100 kHz
POWER WIRING	
HARD WIRED/FLEXIBLE:	Hard wired
SHIELDED/UNSHIELDED:	--
REMOVABLE/ATTACHED:	--
RFI SUPPRESSION	
BEFORE TEST:	PCB housed in modular section.
POWERLINE FILTER: MODEL #:	Little fuse #848003 European part number, 3A, (UL, FCC, CSA approved)
CABINET SHIELDING:	Shielded
PLATING TYPE:	--
OPERATING MODE(S):	Normal
EUT CONFIGURATIONS:	--
INTERFACING, SIMULATOR OR MONITORING EQUIPMENT:	--
I/O PORTS:	2 - 2 physically the same.

Function	Cable Length	Type	Shield Termination
UL in DL out antenna	--	7/16" female	
UL out, DL in antenna	--	7/16" female	

BLOCK DIAGRAM:	See page B3.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Appendix C

Change History

Not Applicable

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Appendix D

Testing Facilities

Certificates of Approval

VCCI (3), NVLAP, EN 45001

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

CERTIFICATE

Facility: Enclosure No. 1
(Conducted Interference Measurement)
Company : TÜV Product Service Inc.
Address : 7562 Trade Street, San Diego,
CA 92121 U.S.A.

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures, Article 8.

Registration No.: C-211
Date of Registration : December 26, 1994
This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inter
Information Technology Equip

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

CERTIFICATE

Facility: Enclosure No. 2
(Conducted Interference Measurement)
Company : TÜV Product Service Inc.
Address : 7562 Trade Street, San Diego,
CA 92121 U.S.A.

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures, Article 8.

Registration No.: C-212
Date of Registration : December 26, 1994
This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inter
Information Technology Equip

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

CERTIFICATE

Facility: Carroll Canyon Site
(Radiation 3, 10, 30meter site)

Company : TÜV Product Service Inc.

Address : 7562 Trade Street, San Diego,
CA 92121 U.S.A.

This is to certify that the following measuring facility has been registered in accordance with the Regulations for Voluntary Control Measures, Article 8.

Registration No.: R-212
Date of Registration : December 26, 1994
This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inte
Information Technology Equi

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Certificate of Accreditation

TUV PRODUCT SERVICE, INC.
SAN DIEGO, CA

is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS
FCC

December 31, 1997
Effective through

For the National Institute of Standards and Technology
NVLAP Lab Code: 100268-0

NVLAP-01C (11-95)

TÜV PRODUCT SERVICE

TÜV PRODUCT SERVICE

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-0001

December 19, 1996

Mr. John G. Smith
TUV Product Service, Inc.
10040 Mesa Rim Road
San Diego, CA 92121

NVLAP Lab Code: 100268-0

Dear Mr. Smith:

I am pleased to inform you that continuing accreditation for specific test methods in Electromagnetic Compatibility & Telecommunications, FCC is granted to your organization under the National Voluntary Laboratory Accreditation Program (NVLAP). This accreditation is effective until December 31, 1997, provided that your organization continues to comply with accreditation requirements contained in the NVLAP Procedures.

Your Certificate of Accreditation is enclosed along with a statement of your Scope of Accreditation. You may reproduce these documents in their entirety and announce your organization's accreditation status using the NVLAP logo in business publications, the trade press, and other business-oriented literature. Accreditation does not relieve your organization from observing and complying with any applicable existing laws and/or regulations.

We are pleased to have you participate in NVLAP and look forward to your continued association with this program. If you have any questions concerning your NVLAP accreditation, please direct them to Jon Crickenberger, Sr. Program Manager, Laboratory Accreditation Program, National Institute of Standards and Technology, Building 820, Room 282, Gaithersburg, MD 20899-0001; (301) 975-4016.

Sincerely,

James L. Cigler, Chief
Laboratory Accreditation Program

Enclosure(s)

NIST

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

National Institute of Standards and Technology

NVLAP®

National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

NVLAP LAB CODE 100268-0

TUV PRODUCT SERVICE, INC.
10040 Mesa Rim Road
San Diego, CA 92121
Mr. John G. Smith
Phone: 619-546-3999 Fax: 619-546-0364

NVLAP Code	*Designation / Description*
International Special Committee on Radio Interference (CISPR) Methods	
12/CIS22	IEC/CISPR 22:1993: Limits and methods of measurement of radio disturbance characteristics of information technology equipment
Federal Communications Commission (FCC) Methods	
12/F01	FCC Method - 47 CFR Part 15 - Digital Devices
12/F01a	Conducted Emissions, Power Lines, 450 KHz to 30 MHz
12/F01b	Radiated Emissions

December 31, 1997

Effective through

For the National Institute of Standards and Technology

NVLAP-01S (11-95)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Certificate of Accreditation

TUV PRODUCT SERVICE, INC.
SAN DIEGO, CA

is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. Accreditation is awarded for specific services, listed on the Scope of Accreditation for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS
MIL-STD-462

December 31, 1997

Effective through

For the National Institute of Standards and Technology

NVLAP Lab Code: 100268-0

NVLAP-01C (11-96)

TÜV PRODUCT SERVICE

TÜV
PRODUCT SERVICE

UNITED STATES DEPARTMENT OF COMMERCE
National Institute of Standards and Technology
Gaithersburg, Maryland 20899-0001

December 19, 1996

Mr. John G. Smith
TUV Product Service, Inc.
10040 Mesa Rim Road
San Diego, CA 92121

NVLAP Lab Code: 100268-0

Dear Mr. Smith:

I am pleased to inform you that continuing accreditation for specific test methods in Electromagnetic Compatibility, MIL-STD-462 is granted to your organization under the National Voluntary Laboratory Accreditation Program (NVLAP). This accreditation is effective until December 31, 1997, provided that your organization continues to comply with accreditation requirements contained in the NVLAP Procedures.

Your Certificate of Accreditation is enclosed along with a statement of your Scope of Accreditation. You may reproduce these documents in their entirety and announce your organization's accreditation status using the NVLAP logo in business publications, the trade press, and other business-oriented literature. Accreditation does not relieve your organization from observing and complying with any applicable existing laws and/or regulations.

We are pleased to have you participate in NVLAP and look forward to your continued association with this program. If you have any questions concerning your NVLAP accreditation, please direct them to Jon Crickenberger, Sr. Program Manager, Laboratory Accreditation Program, National Institute of Standards and Technology, Building 820, Room 282, Gaithersburg, MD 20899-0001; (301) 975-4016.

Sincerely,

James L. Cigler, Chief
Laboratory Accreditation Program

Enclosure(s)

NIST

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

National Institute of Standards and Technology NVLAP® National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY, MIL-STD 462 **NVLAP LAB CODE 100268-0**

TUV PRODUCT SERVICE, INC.
10040 Mesa Rim Road
San Diego, CA 92121
Mr. John G. Smith
Phone: 619-546-3999 Fax: 619-546-0364

Military Standard 462, Measurement of Electromagnetic Interference Characteristics

NVLAP Code	*Designation*
Conducted Emissions:	
12/A01	MIL-STD-462 Method CE01
12/A04	MIL-STD-462 Method CE02
12/A06	MIL-STD-462 Method CE03
12/A08	MIL-STD-462 Method CE04
12/A10	MIL-STD-462 Method CE06
12/A12	MIL-STD-462 Method CE07
Conducted Susceptibility:	
12/B01	MIL-STD-462 Method CS01
12/B02	MIL-STD-462 Method CS02
12/B04	MIL-STD-462 Method CS03/CS04/CS05/CS08

December 31, 1997
Effective through

For the National Institute of Standards and Technology

NVLAP-01S (11-95)

National Institute of Standards and Technology NVLAP® National Voluntary Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation

ELECTROMAGNETIC COMPATIBILITY, MIL-STD 462 **NVLAP LAB CODE 100268-0**

TUV PRODUCT SERVICE, INC.

Military Standard 462, Measurement of Electromagnetic Interference Characteristics

NVLAP Code	*Designation*
12/B05	MIL-STD-462 Method CS06
12/B06	MIL-STD-462 Method CS07
12/B07	MIL-STD-462 Method CS09
Radiated Emissions:	
12/D01	MIL-STD-462 Method RE01
12/D02	MIL-STD-462 Method RE02
12/D03	MIL-STD-462 Method RE03
Radiated Susceptibility:	
12/E01	MIL-STD-462 Method RS01
12/E02	MIL-STD-462 Method RS02
12/E03	MIL-STD-462 Method RS03 (Consult laboratory for field strengths available)
12/E04	MIL-STD-462 Method RS03 employing RADHAZ procedures for high level testing (Consult laboratory for field strengths available)

December 31, 1997

Effective through

For the National Institute of Standards and Technology

NVLAP-01S (11-95)

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

FEDERAL COMMUNICATIONS COMMISSION

7435 Oakland Mills Road
Columbia, MD 21046
Telephone: 301-725-1585 (ext-218)
Facsimile: 301-344-2050

July 10, 1996

IN REPLY REFER TO
31040/SIT
1300F2

TUV Product Service
10040 Mesa Rim Road
San Diego, CA 92121-2912

Attention: John G. Smith

Re: Measurement facility located at Carroll Canyon, Site No. 2
(3 and 10 meters)

Gentlemen:

Your submission of the description of the subject measurement facility has been reviewed and found to be in compliance with the requirements of Section 2.948 of the FCC Rules. The description has, therefore, been placed on file and the name of your organization added to the Commission's list of facilities whose measurement data will be accepted in conjunction with applications for certification or notification under Parts 15 or 18 of the Commission's Rules. Our list will also indicate that the facility complies with the radiated and AC line conducted test site criteria in ANSI C63.4-1992. Please note that this filing must be updated for any changes made to the facility, and at least every three years the data on file must be certified as current.

Per your request, the above mentioned facility has been also added to our list of those who perform these measurement services for the public on a fee basis. This list is published periodically and is also available on the Laboratory's Public Access Link as described in the enclosed Public Notice.

Sincerely,

Thomas W. Phillips
Electronics Engineer
Customer Service Branch

Enclosure:
PAL PN

TÜV
PRODUCT SERVICE

CERTIFICATE

TÜV
PRODUCT SERVICE

CERTIFICATE OF COMPLIANCE OF THE QUALITY SYSTEM WITH REQUIREMENTS MENTIONED BELOW

TÜV PRODUCT SERVICE GmbH certifies that

TÜV PRODUCT SERVICE Inc., USA

in the facilities

Test Laboratories
10040 Mesa Rim Road, San Diego CA 92121

for the following areas:

Services for EMC and Product Safety Testing

has established and is operating a quality system which meets the requirement(s) of the internal quality management system of TÜV PRODUCT SERVICE GmbH which is based on EN 45001:05/90.

Munich, 18 May, 1995

TÜV PRODUCT SERVICE GmbH

For the Executive Committee of TÜV PRODUCT SERVICE

Dr. Wolfgang Kreinberg

TÜV PRODUCT SERVICE GmbH, Ridlerstrasse 31, 80339 Munich, Germany

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Appendix E

Supplemental Information

Not Applicable

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

FCC Part 2, Paragraph 2.983(d)(9)
Preliminary Operator's Manual

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

FCC Part 2, Para. 2.983(D)(9)

Preliminary Operator's Manual

MirrorCell Channel Selective CDMA Repeater

Model CDR1901

Making Light *Work* For You
ORTEL®
CORPORATION

2015 West Chestnut Street
Alhambra, California 91803
(818) 281-3636
Fax: (818) 281-8231

2 PRODUCT LABELING

Figure 2.1 FCC ID Label

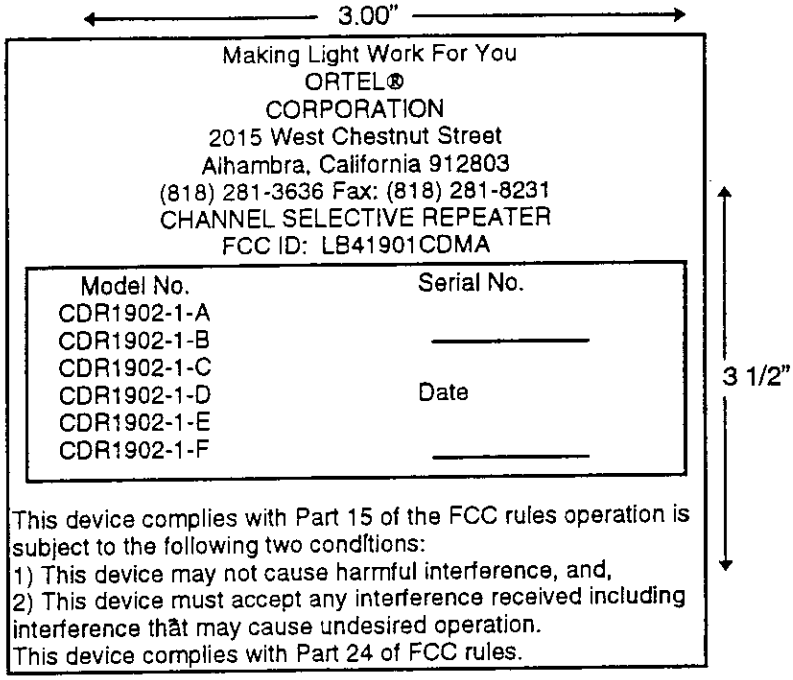
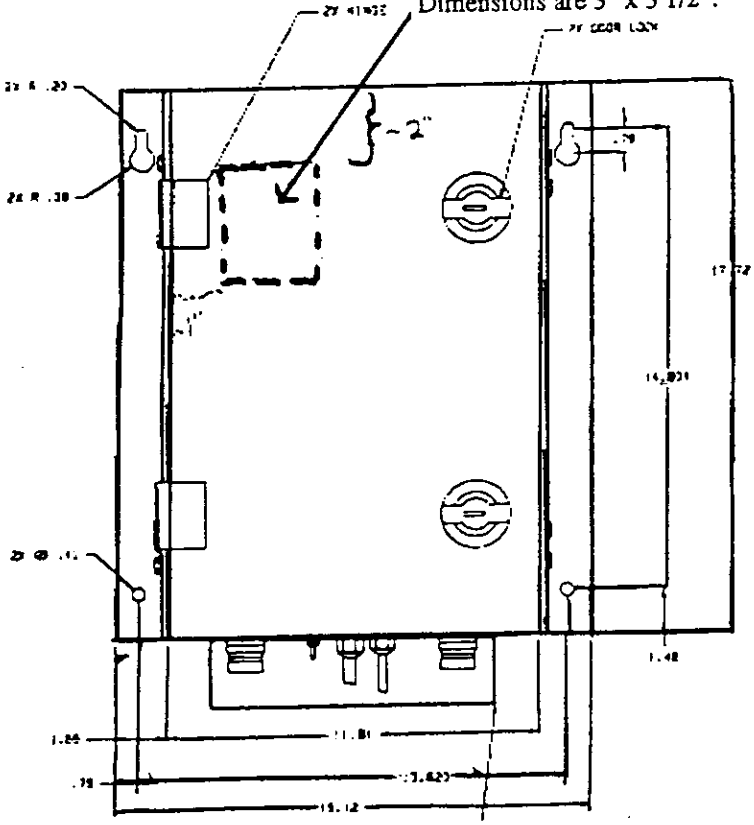


Figure 2.2 Location of Label FCC Label is located on the inside front door with approximate location shown below. Dimensions are 3" x 3 1/2".



3. SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT CDMA Reapeater, Model CDR-1901-1-B was initially tested for FCC emission in the following configuration:

See Block Diagram.

3.2 EUT Exercise Software

None

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

3.3 Special Accessories

None

3.4 Modification

None

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TÜV PRODUCT SERVICE

3.5 Configuration of Tested System

See Block Diagram

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Figure 3.1 Configuration of Tested System

See Block Diagram.

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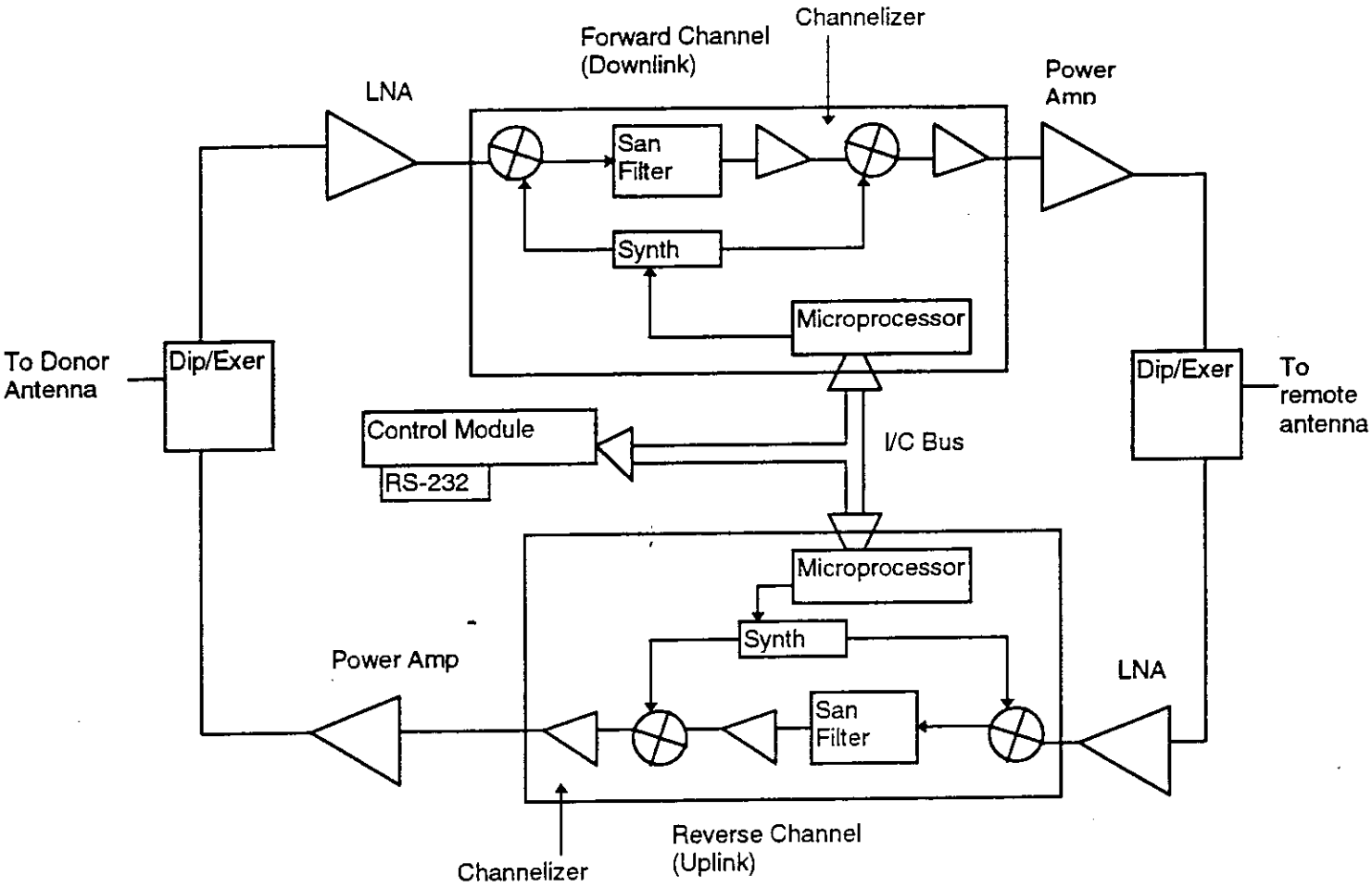
4 BLOCK DIAGRAM OF EUT CDMA Repeater, Model CDR-1901-1-B

4.1 Block Diagram Description

CDMA Repeater, Model CDR-1901-1-B

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Figure 4.1 Block Diagram of EUT CDMA Repeater, Model CDR-1901-1-B



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5 CONDUCTED MEASUREMENT PHOTOS

Photographs not available. Data provided by ORTEL without photographs.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

6 CONDUCTED EMISSION DATA

ORTEL CORPORATION
CDMA Repeater, Model CDR-1901-1-B

See following page(s).

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

3. SYSTEM TEST CONFIGURATION

3.1 Justification

The EUT CDMA Reapeater, Model CDR-1901-1-B was initially tested for FCC emission in the following configuration:

See Block Diagram.

3.2 EUT Exercise Software

None

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

3.3 Special Accessories

None

3.4 Modification

None

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

3.5 Configuration of Tested System

See Block Diagram

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Figure 3.1 Configuration of Tested System

See Block Diagram.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

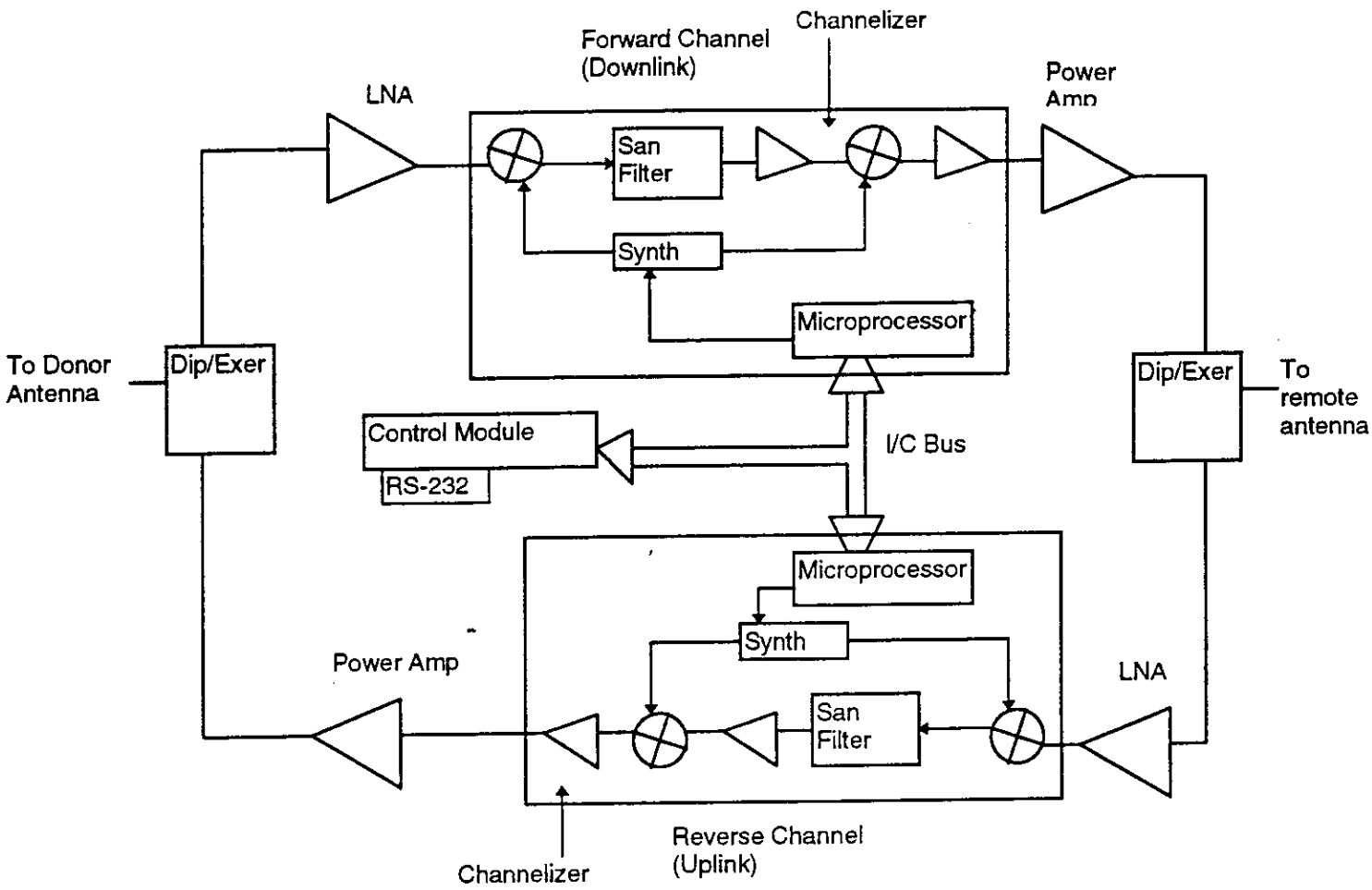
4 BLOCK DIAGRAM OF EUT CDMA Repeater, Model CDR-1901-1-B

4.1 Block Diagram Description

CDMA Repeater, Model CDR-1901-1-B

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Figure 4.1 Block Diagram of EUT CDMA Repeater, Model CDR-1901-1-B



5 CONDUCTED MEASUREMENT PHOTOS

Photographs not available. Data provided by ORTEL without photographs.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

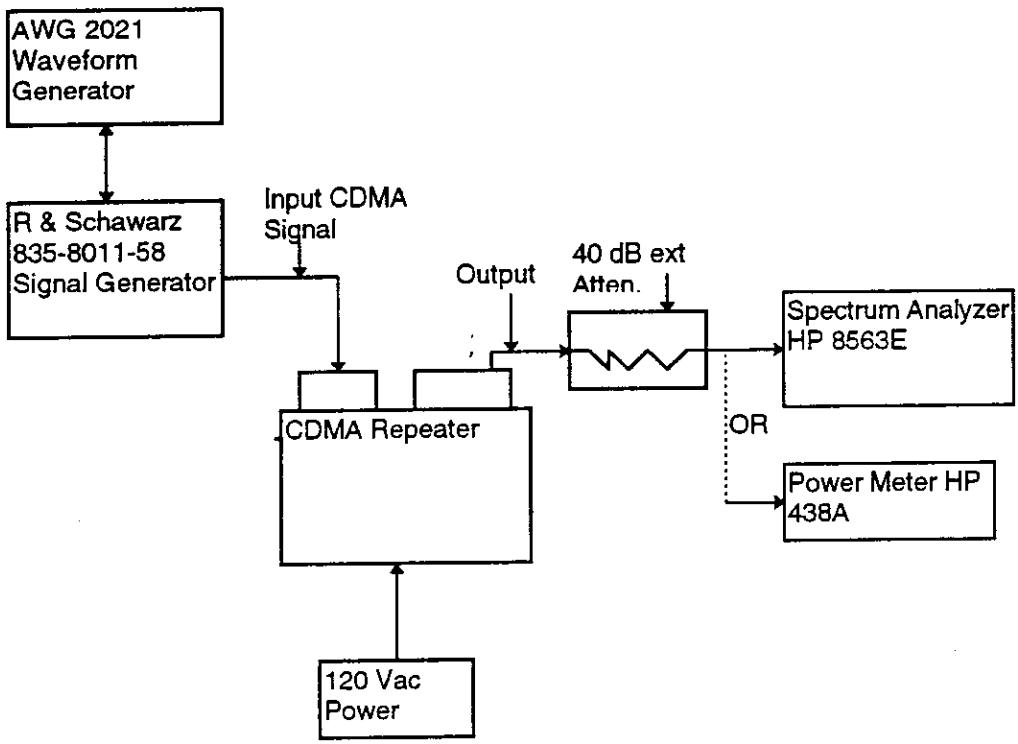
6 CONDUCTED EMISSION DATA

ORTEL CORPORATION
CDMA Repeater, Model CDR-1901-1-B

See following page(s).

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

Test Setup for CDMA Repeater



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TÜV PRODUCT SERVICE

FCC Part 2.985: RF Output Power

DUT: Model CDR-1901-1-B (B-Band CDMA Repeater)
S/N: CDMA#1
Test Date: 11/13/96

FCC ID: LB4-1901CDMA
Company: Ortel Corporation

****RF Output Power Measured with Power Meter**
(HP Model: 438A Ortel Asset Number: 8L034349)

UPLINK:

Channel	Frequency (MHz)	Power Meter (dBm)	Output Power (dBm)
425	1871.25	-5.58	34.42
550	1877.50	-6.10	33.90
675	1883.75	-6.87	33.13

DOWNLINK:

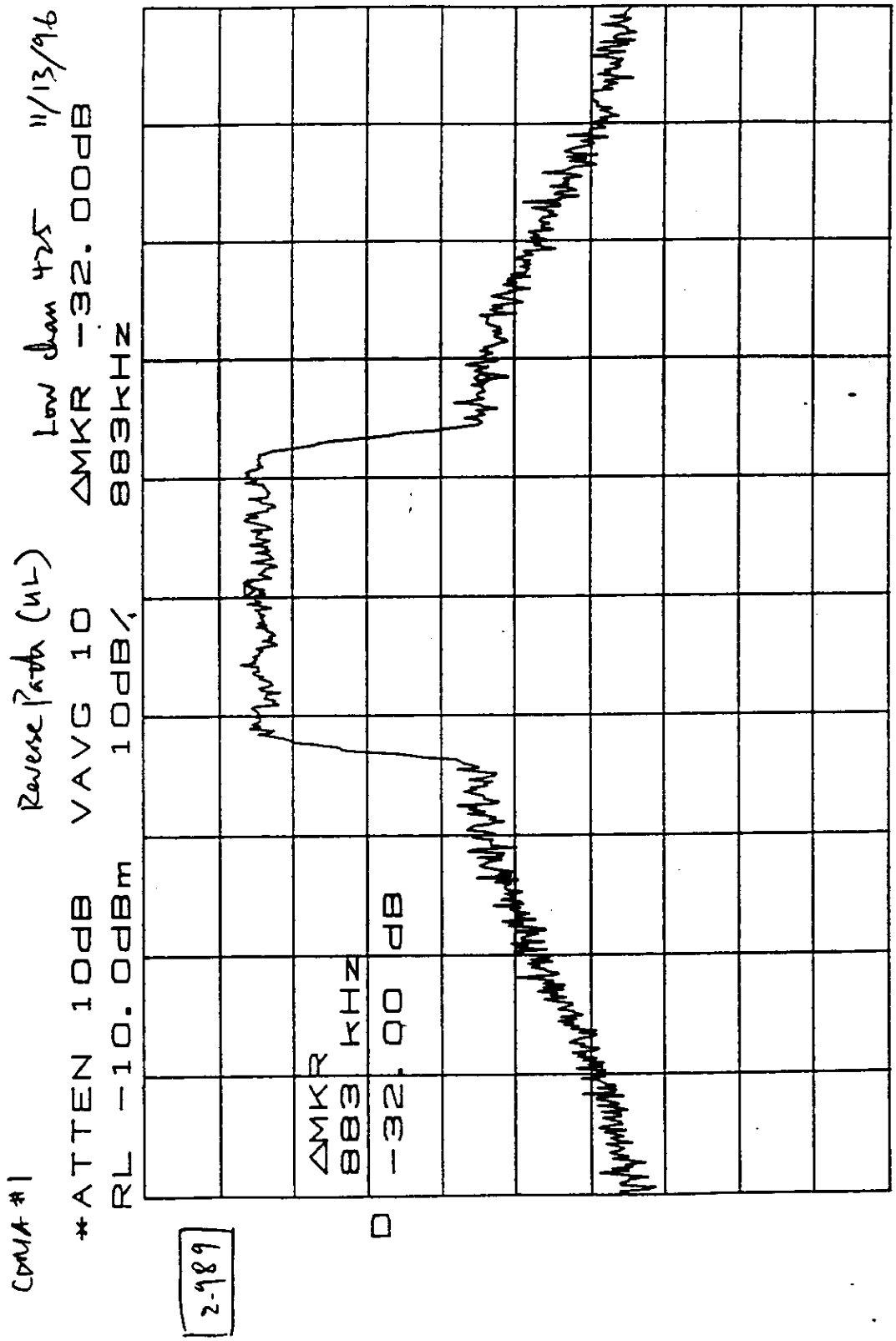
Channel	Frequency (MHz)	Power Meter (dBm)	Output Power (dBm)
425	1951.25	-6.67	33.33
550	1957.50	-6.41	33.59
675	1963.75	-6.76	33.24

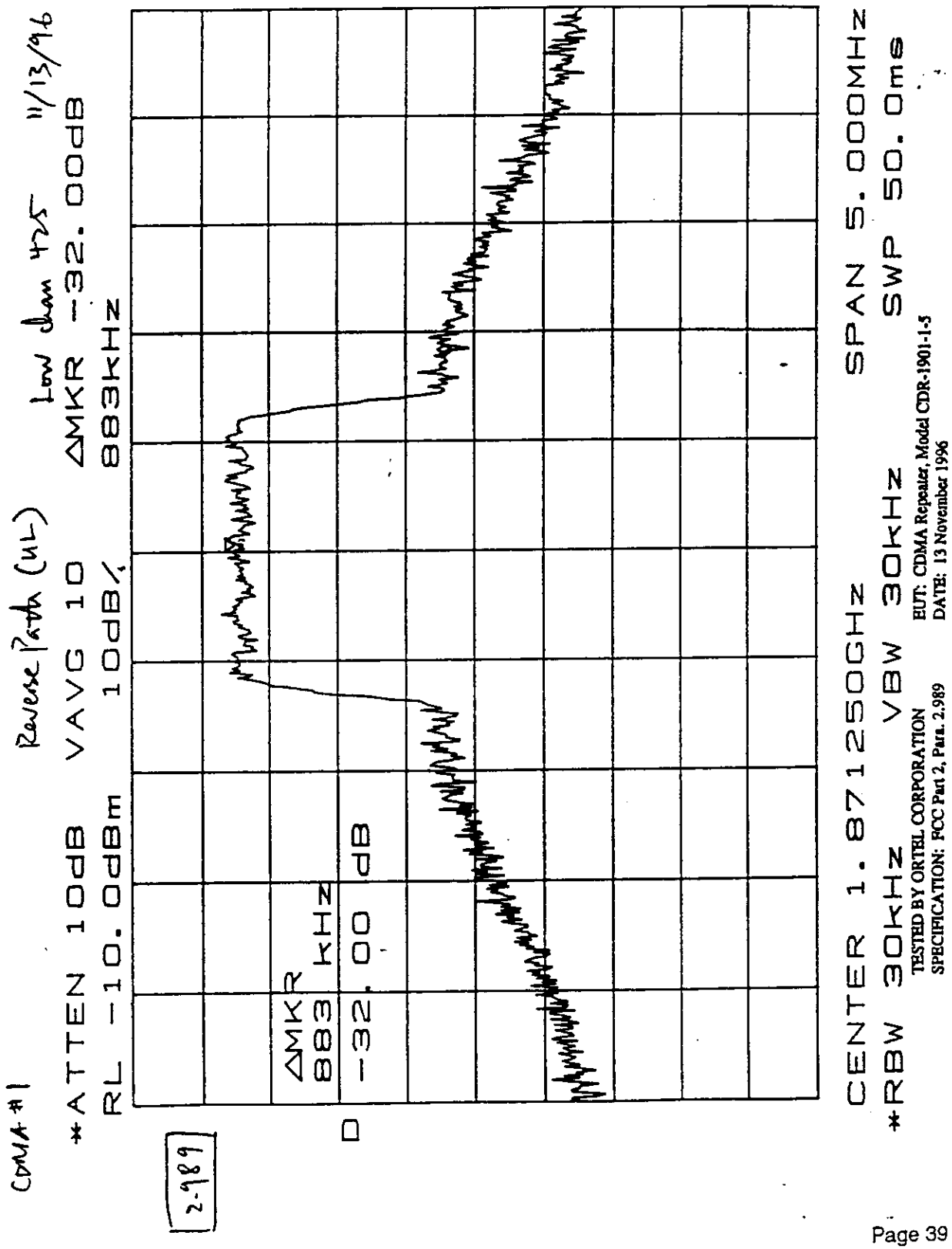
****Per FCC request to use power meter.**

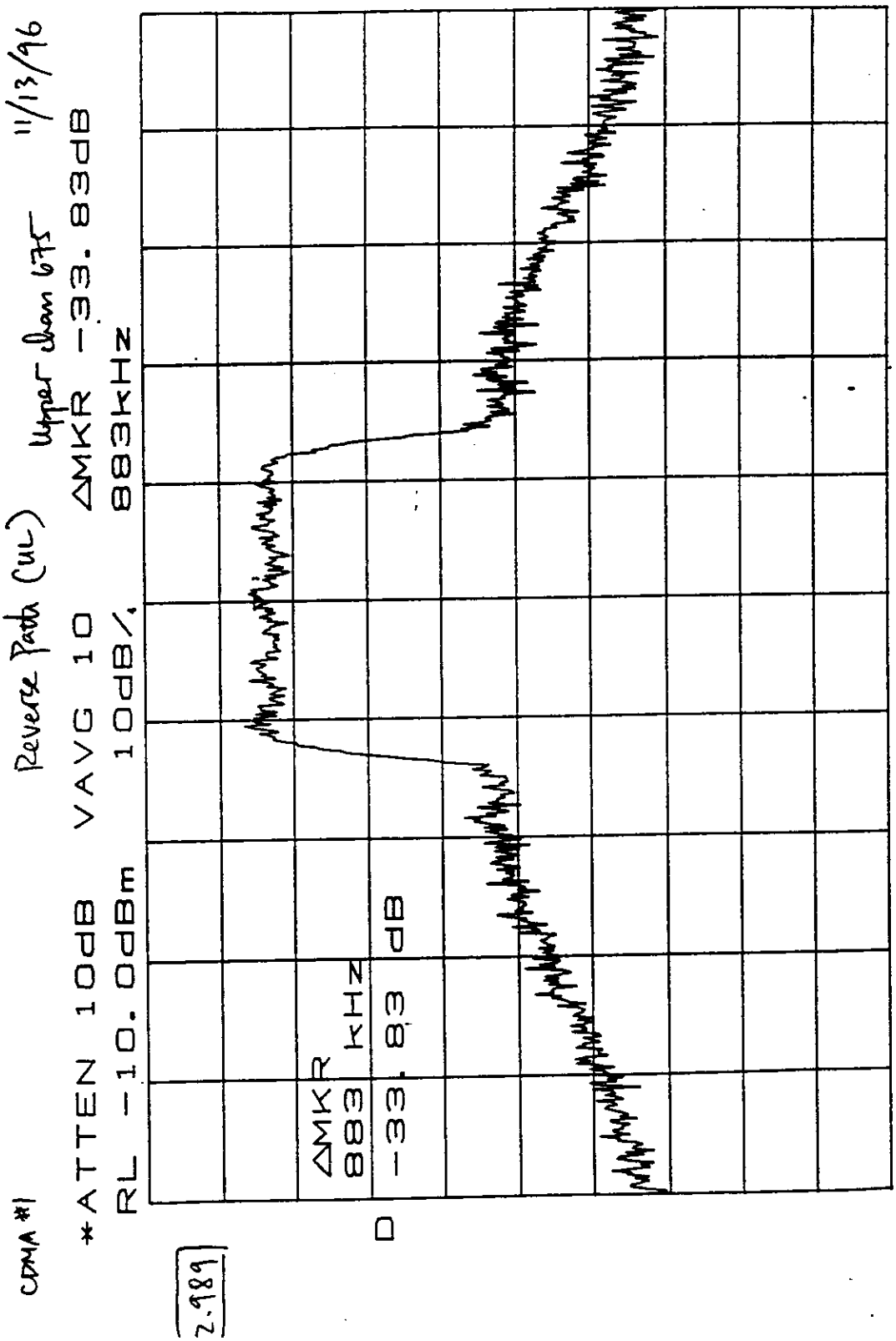
File: CDMA_FCC.XLS

Tab: B-Band

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364


CDMA #1
Reverse Path (ML)
Low Chan 425
11/13/96
*ATTEN 10dB
VAVG 10
ΔMKR -32.00dB
RL -10.0dBm
10dB/
883kHz
ΔMKR
883 kHz
-32.00 dB
CENTER 1.871250GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 2.989
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996
2-989


CDMA #1
Reverse Path (UL)
Low Chan 425
11/13/96
*ATTEN 10dB
RL -10.0dBm
VAVG 10
10dB/
ΔMKR -32.00dB
883kHz
ΔMKR
883 kHz
-32.00 dB
CENTER 1.871250GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 2.989
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996
2-989



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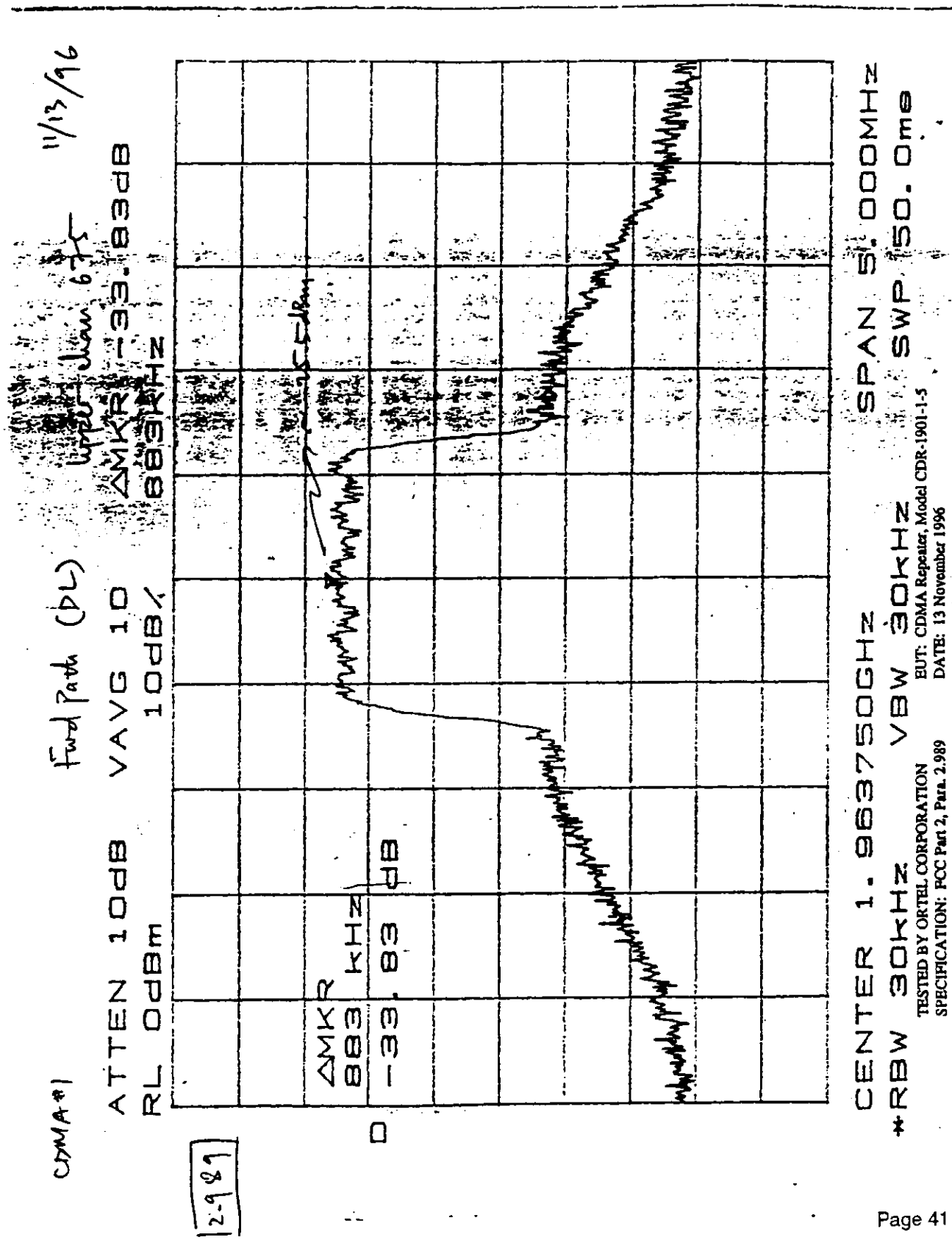
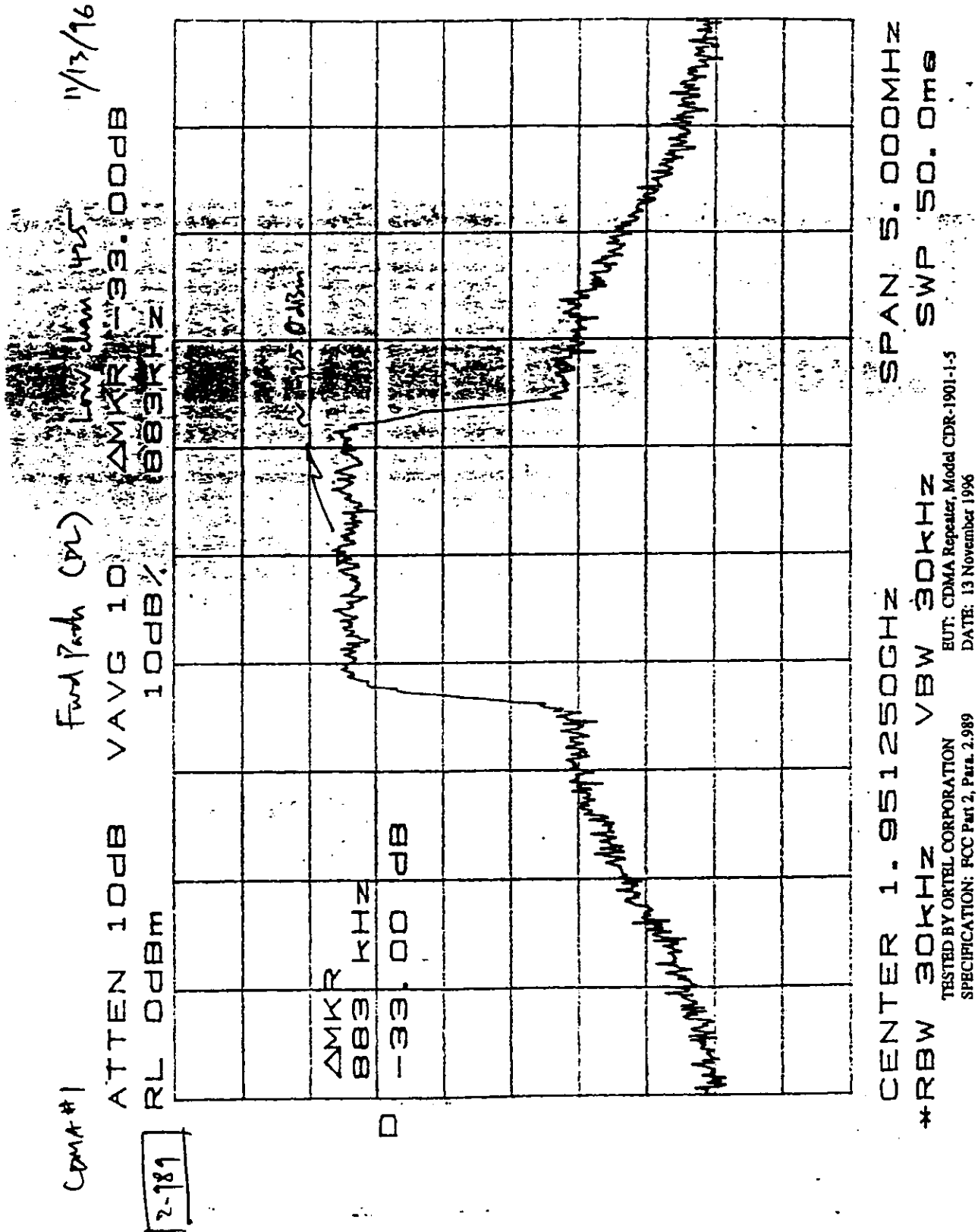

CDMA#1
Fwd Path (DL)
ATTEN 10dB
RL 0dBm
VAVG 10
10dB/
ΔMKR -33.83dB
888kHz
11/13/96
Limit Line 6dB
ΔMKR
888 kHz
-33.83 dB
0
CENTER 1.963750GHz
SPAN 5.000MHz
*RBW 30kHz
VBW 30kHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 2.989
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996
12-9-97



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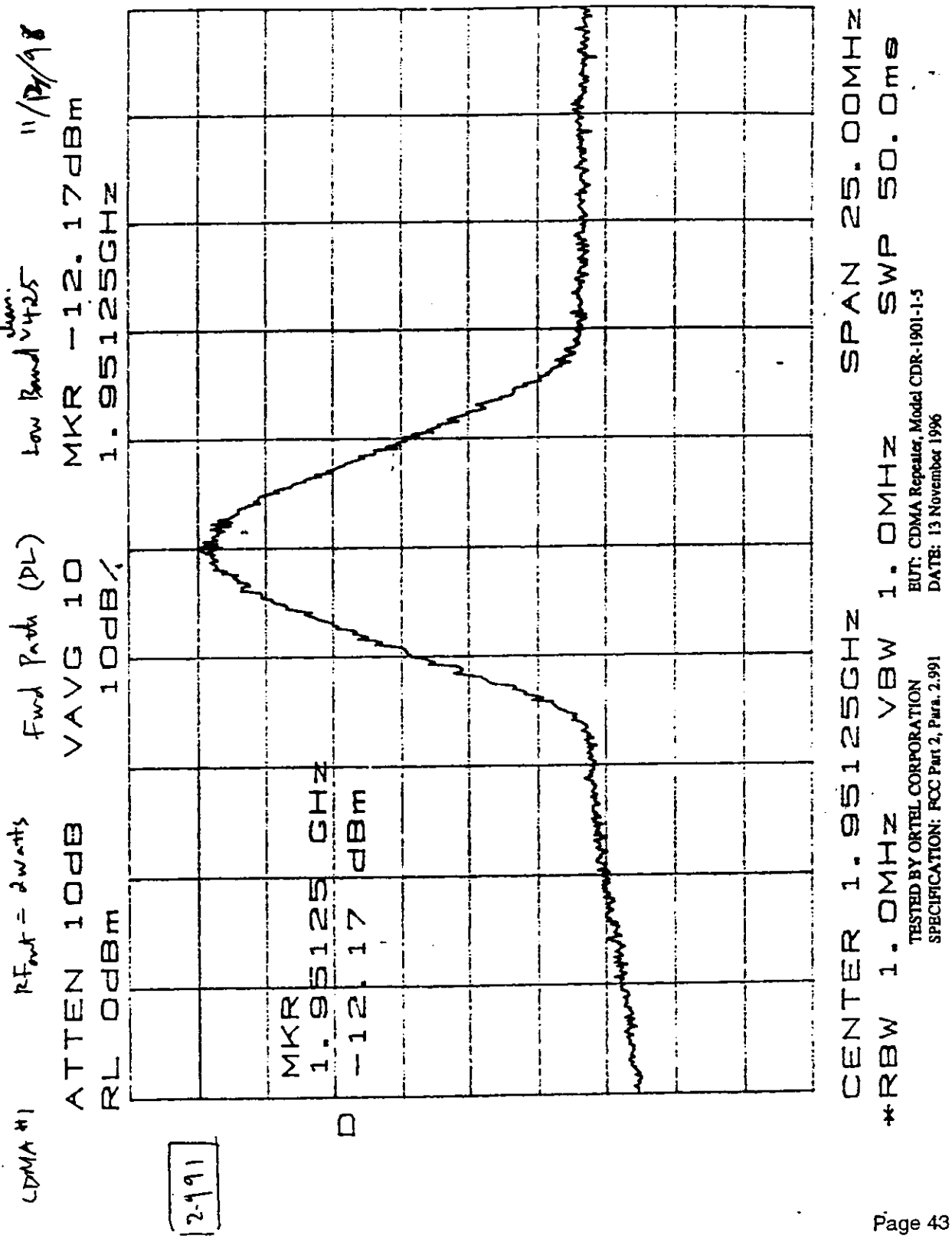
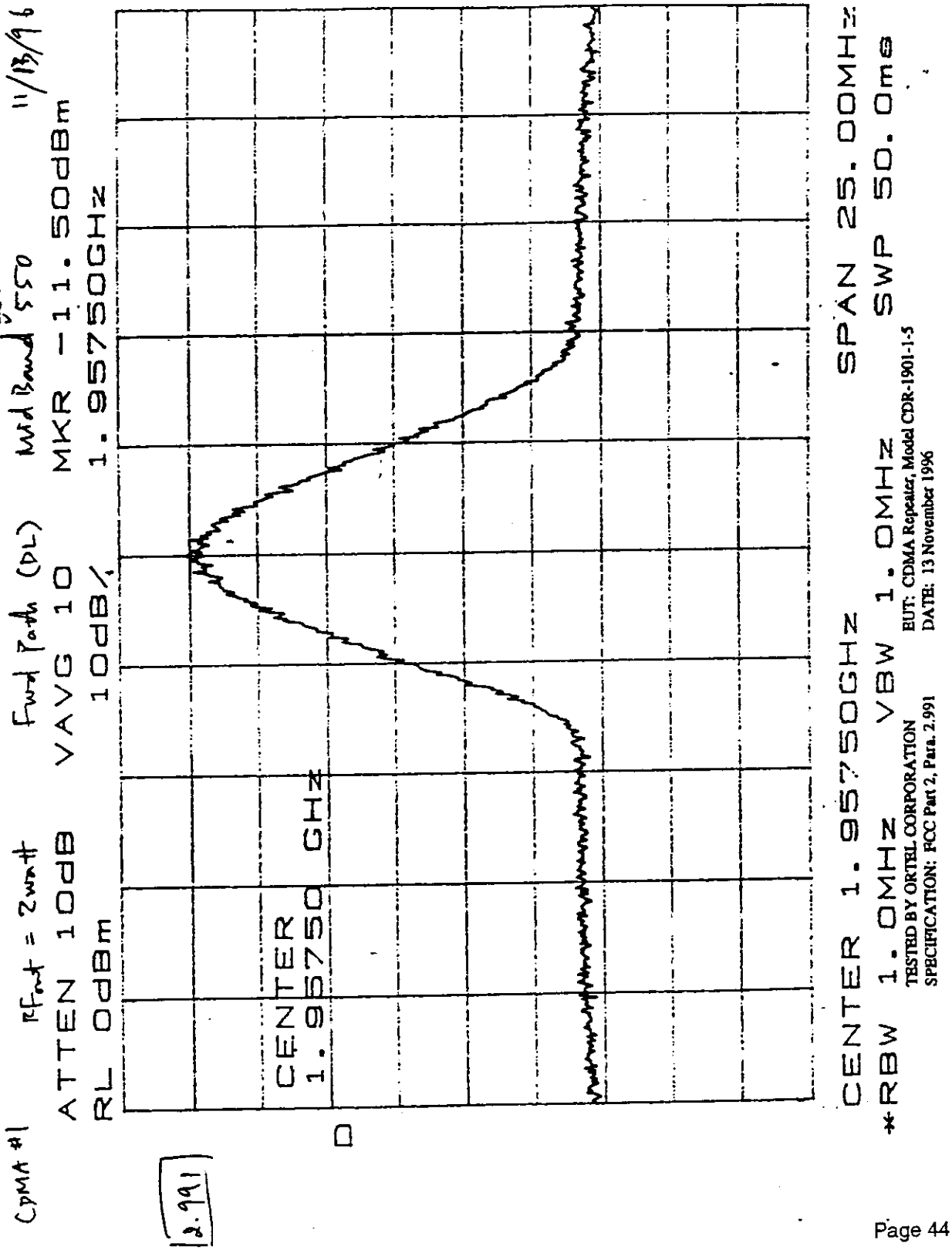
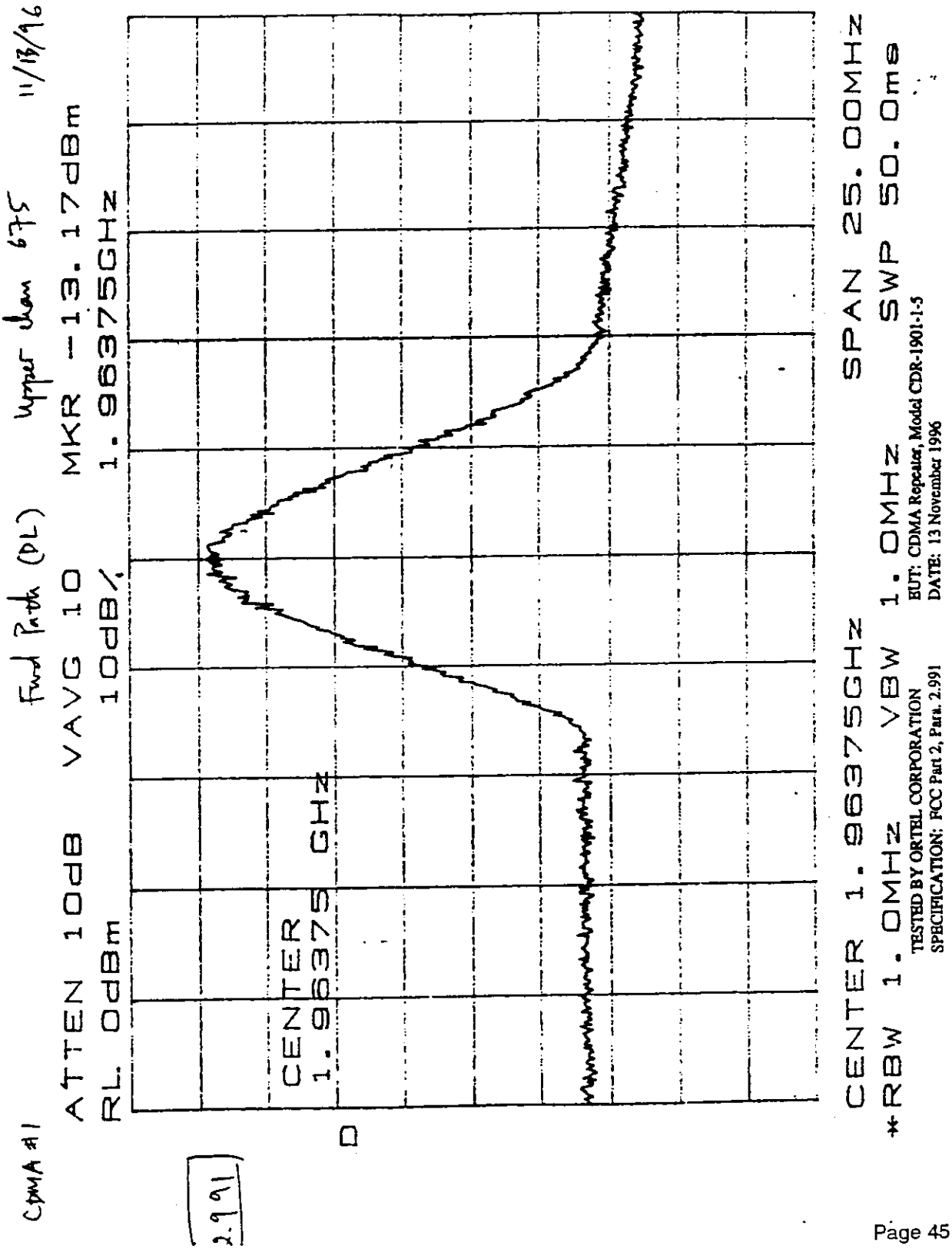

CDMA #1
RFout = 2 watts
Fwd Path (PL)
Low Band Jun. 1425
11/19/98
ATTEN 10dB
RL 0dBm
VAVG 10
10dB/
MKR -12.17dBm
1.95125GHz
MKR 1.95125 GHz
-12.17 dBm
CENTER 1.95125GHz
SPAN 25.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 2.991
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996
2.1911

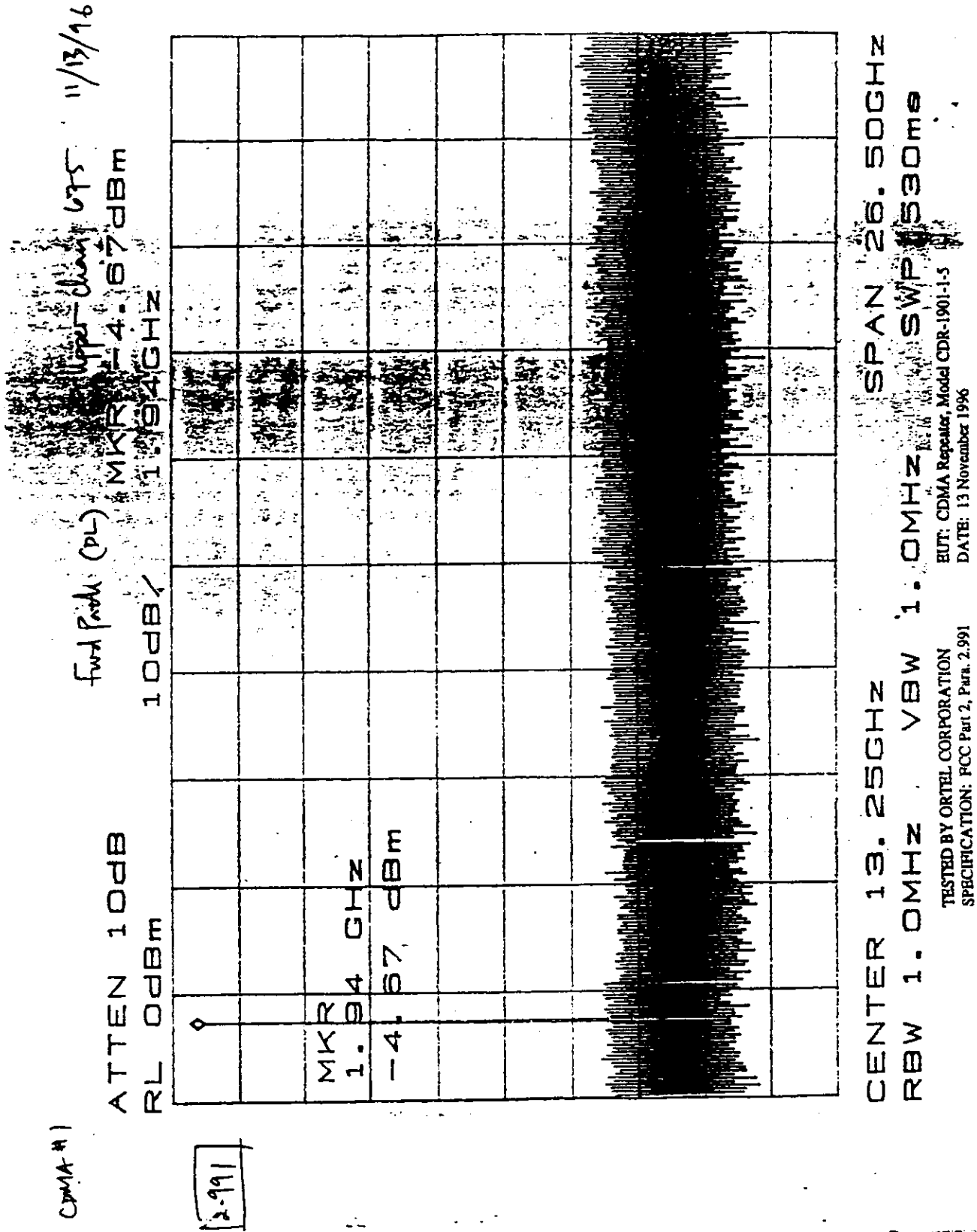


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE



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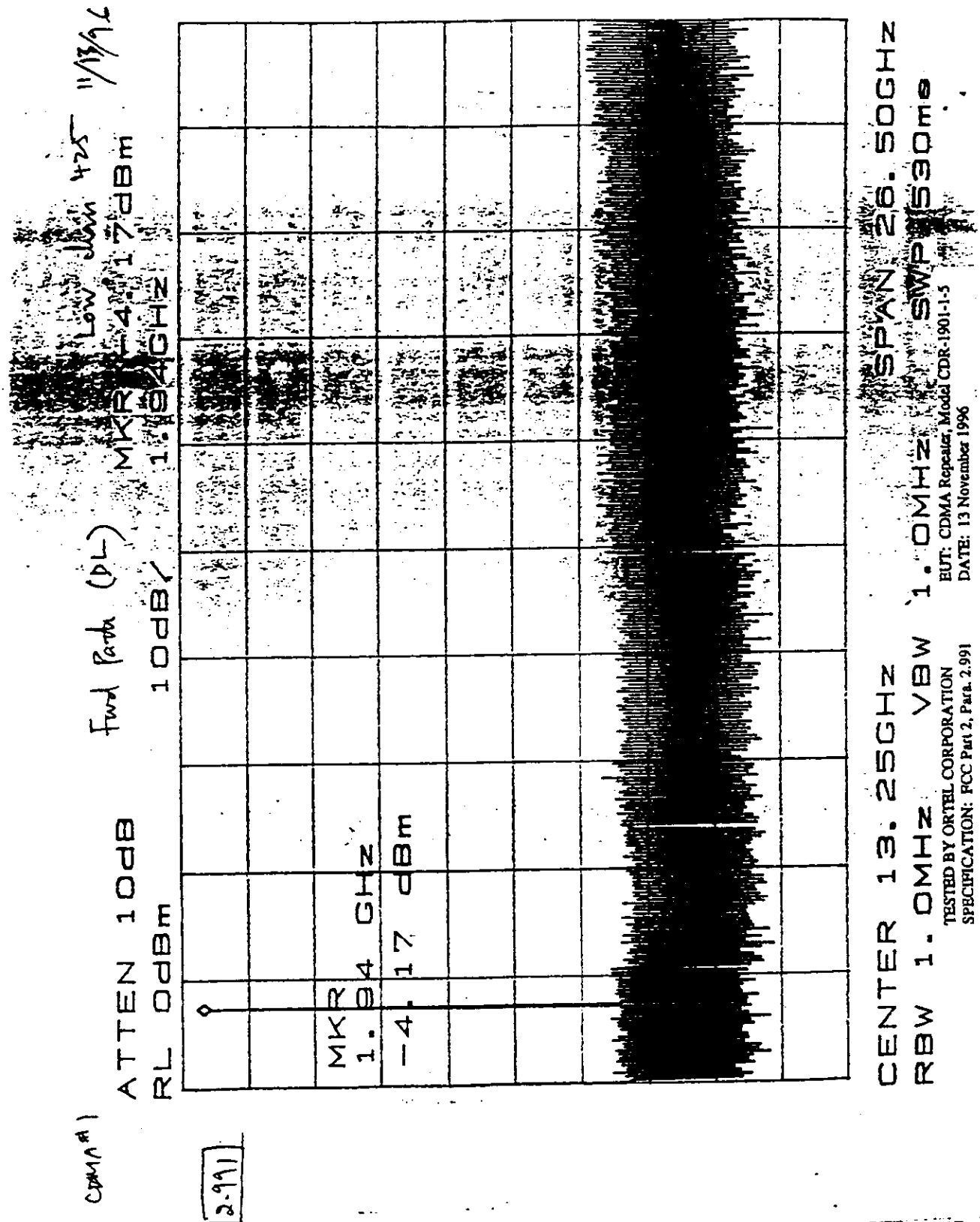
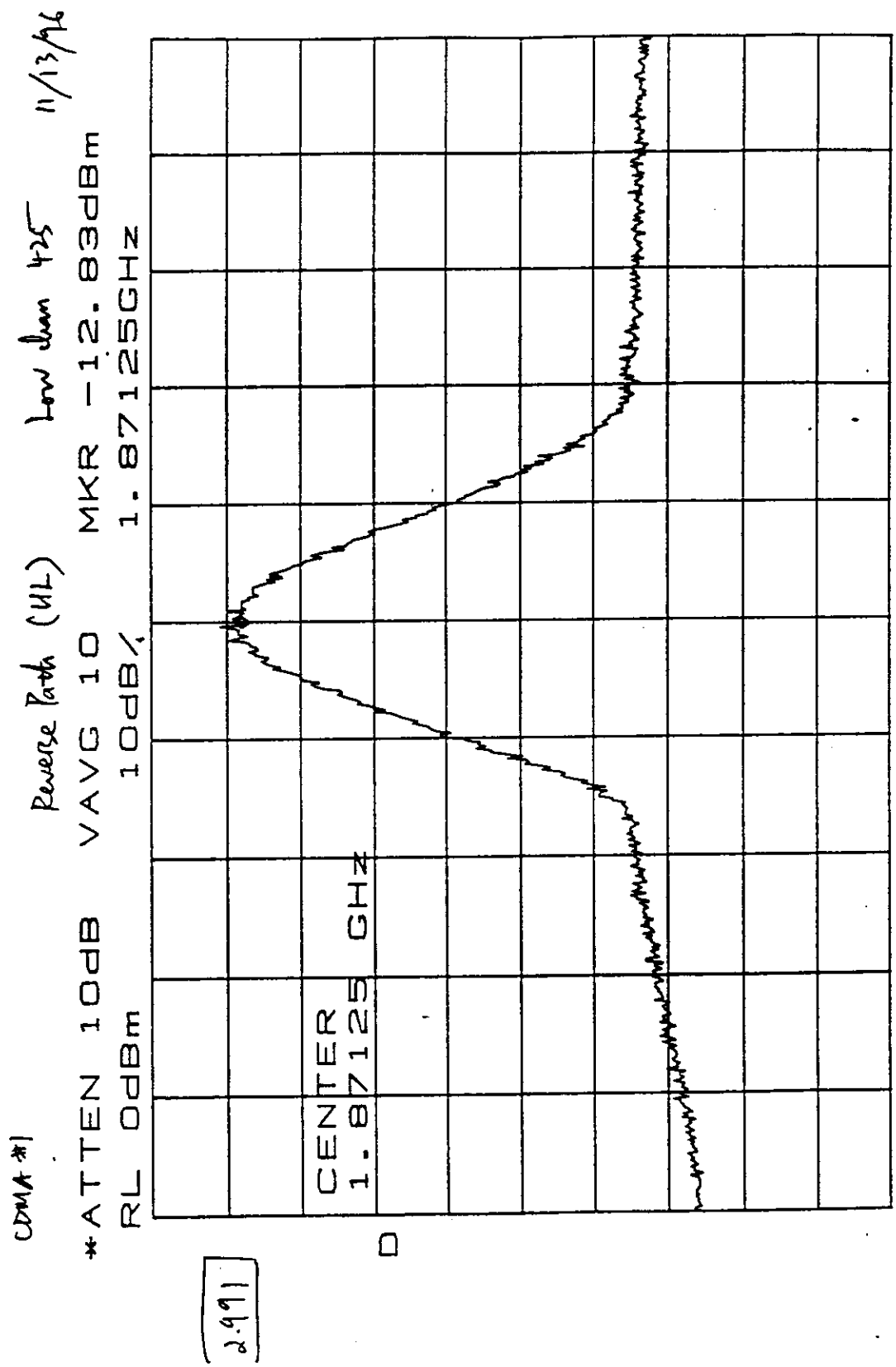


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



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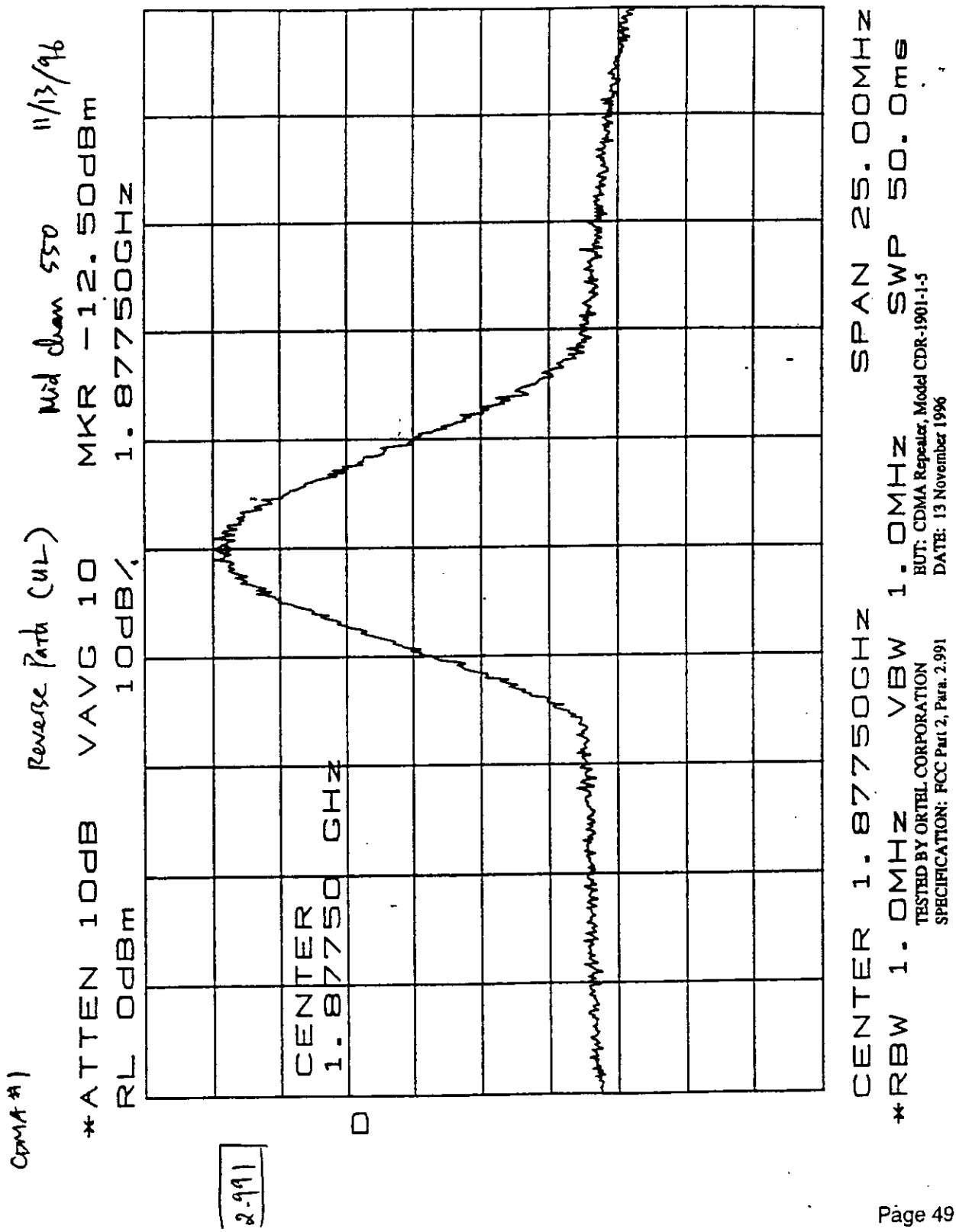
TÜV PRODUCT SERVICE



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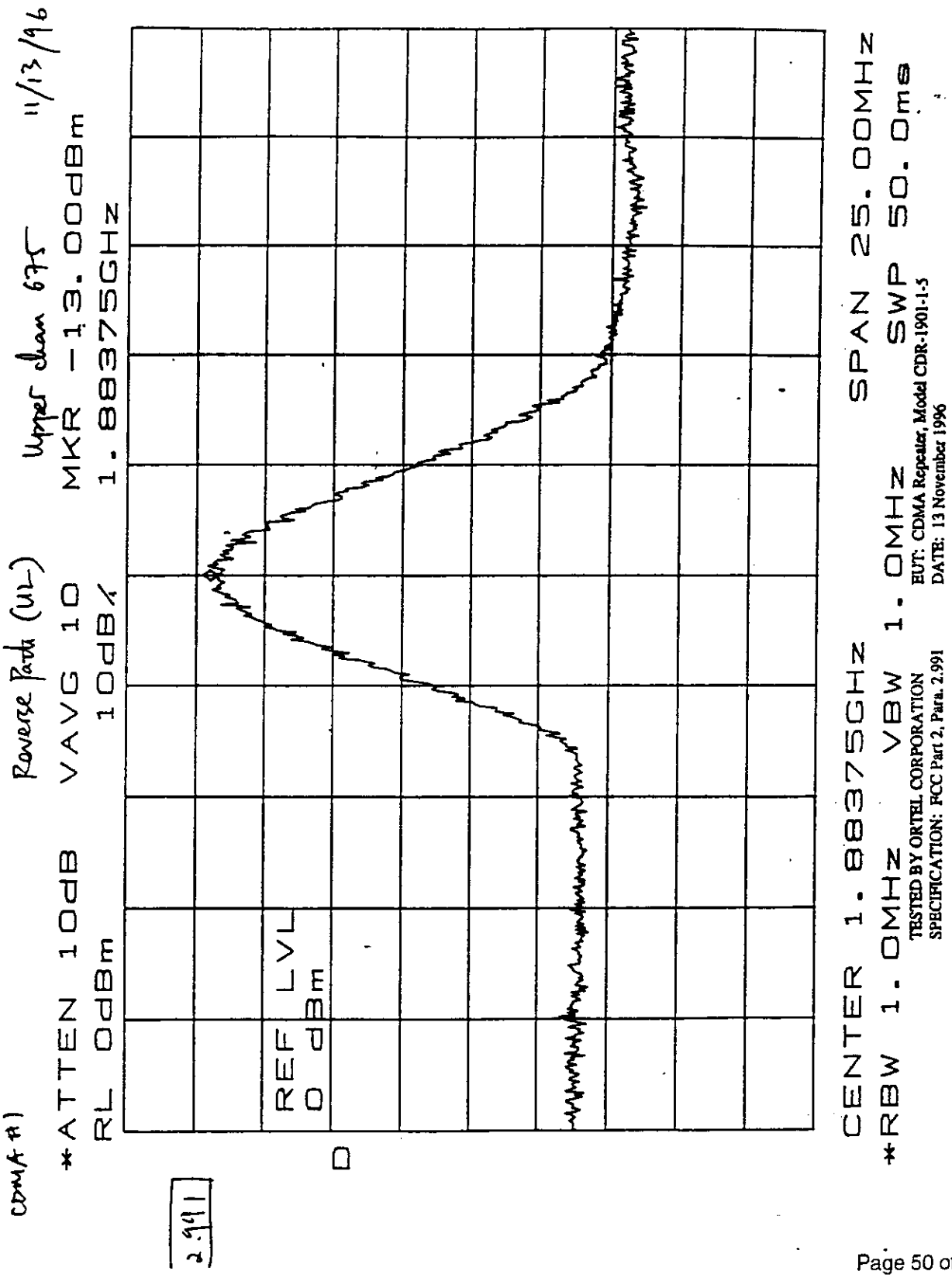
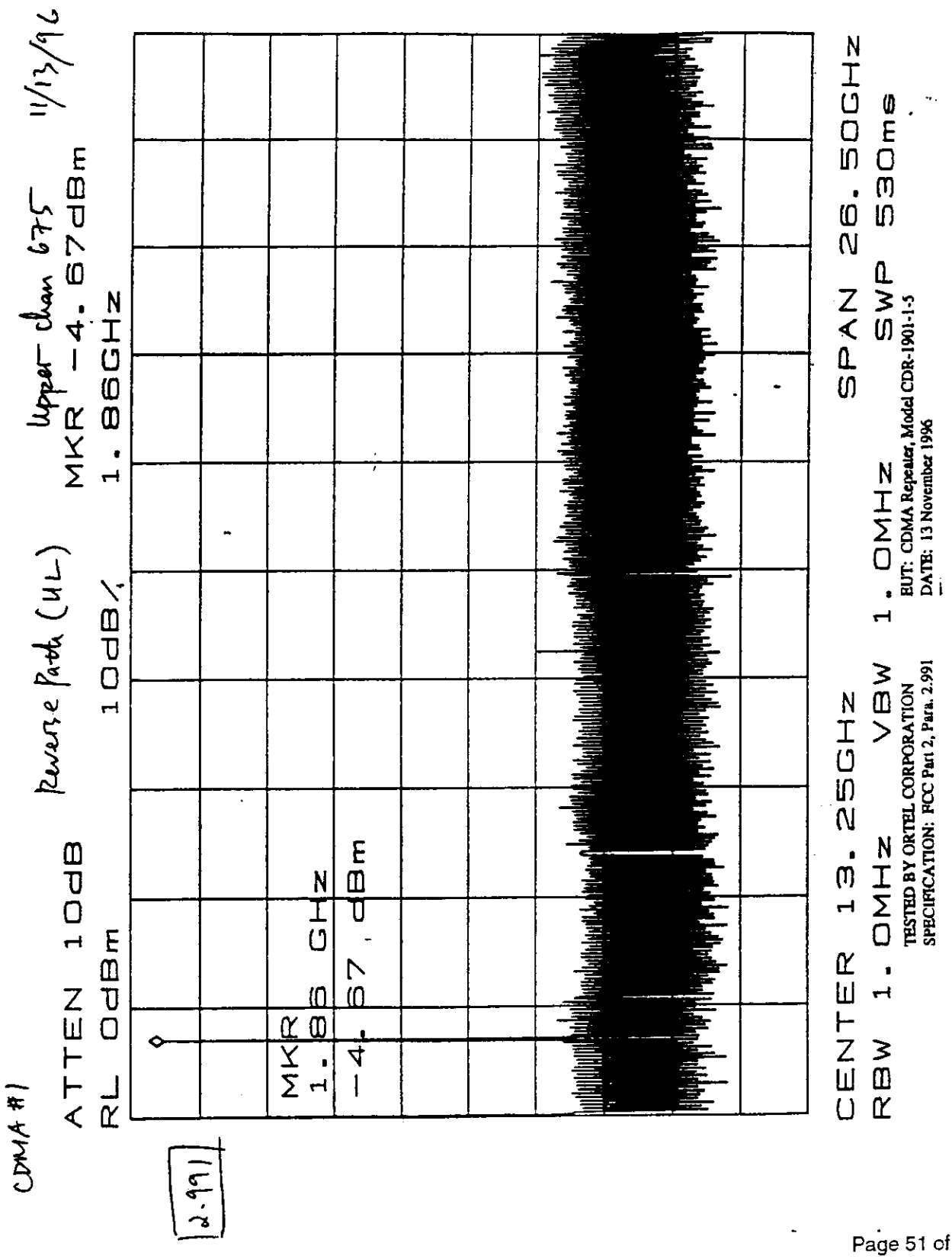


2.991



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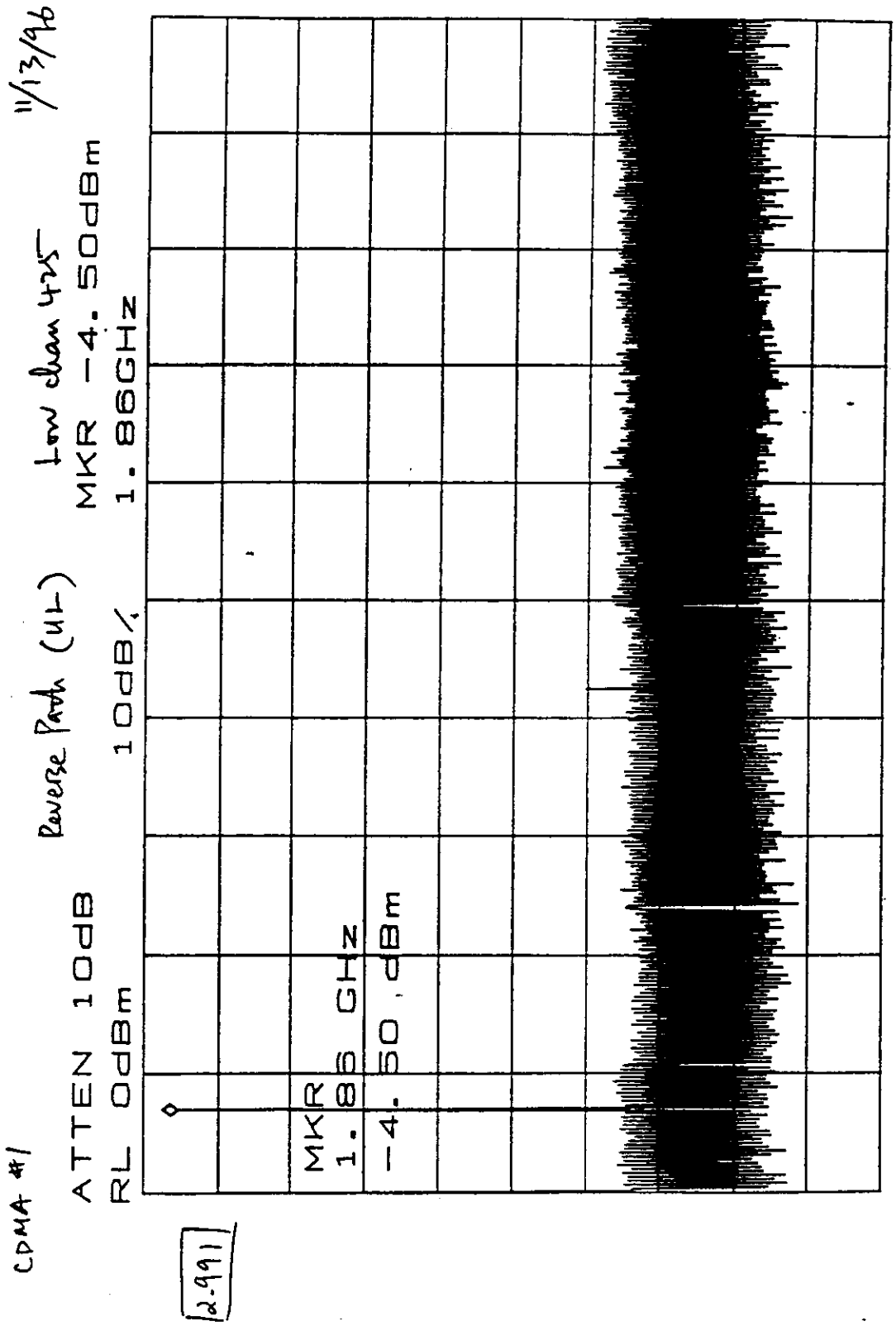
TÜV PRODUCT SERVICE



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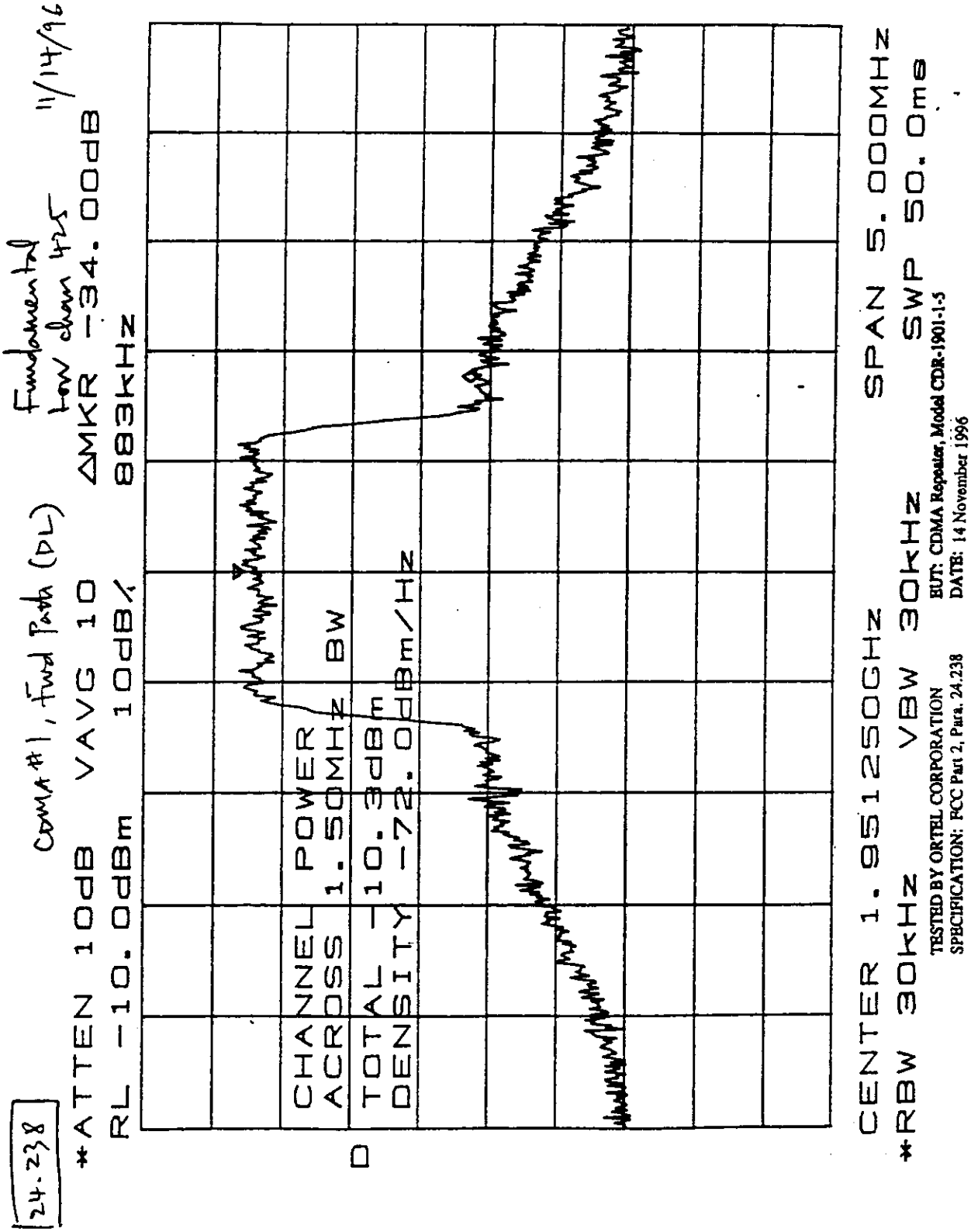

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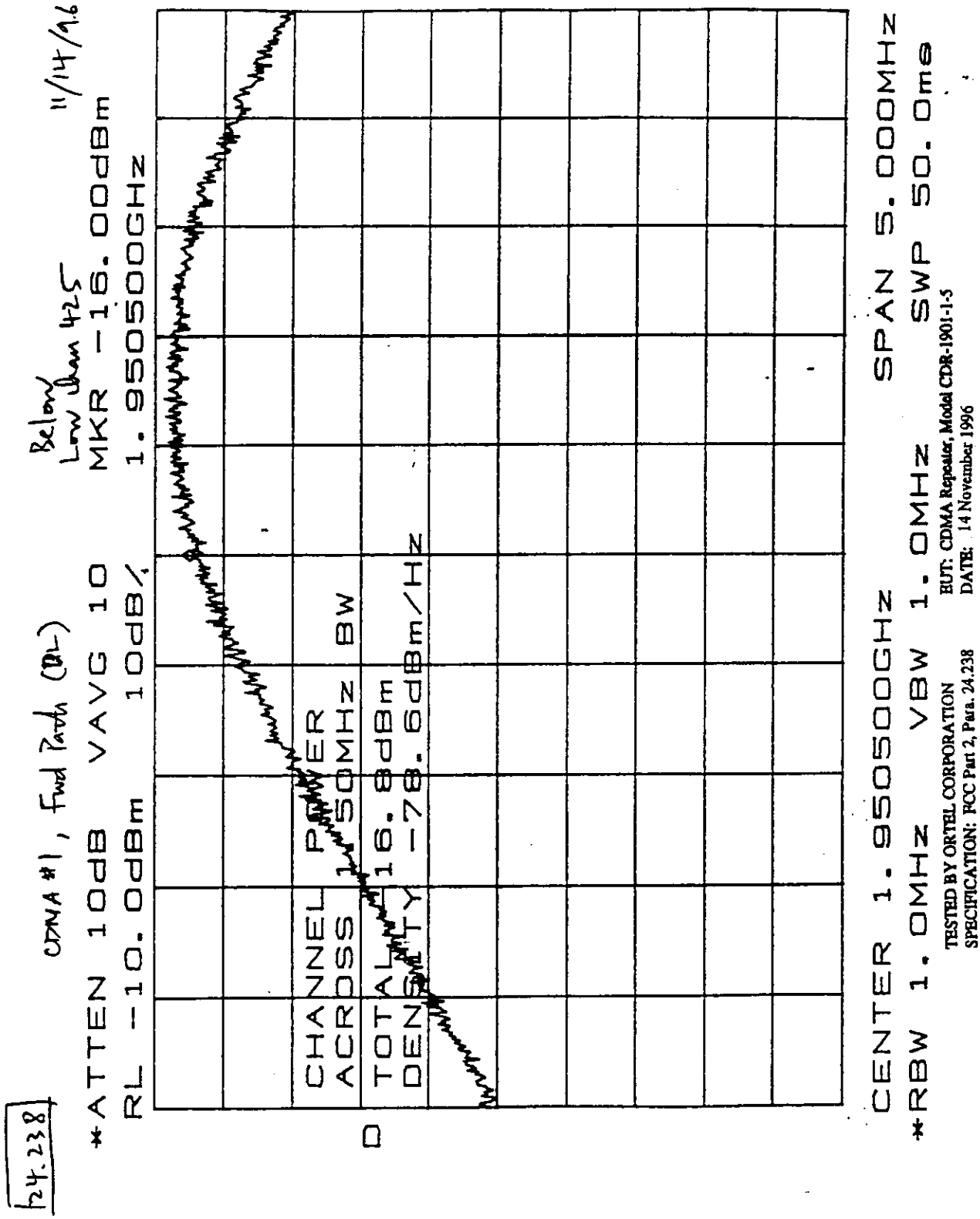
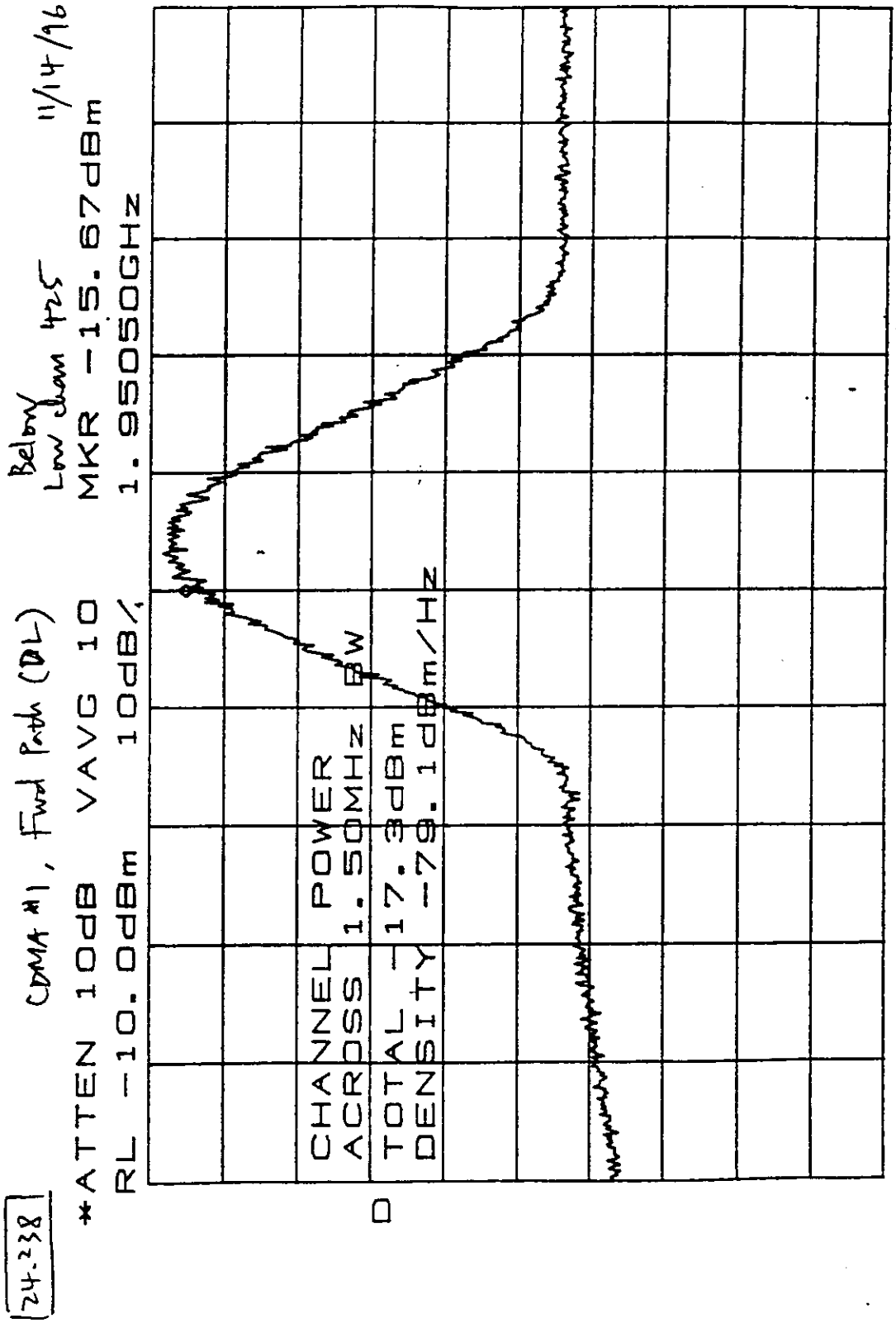
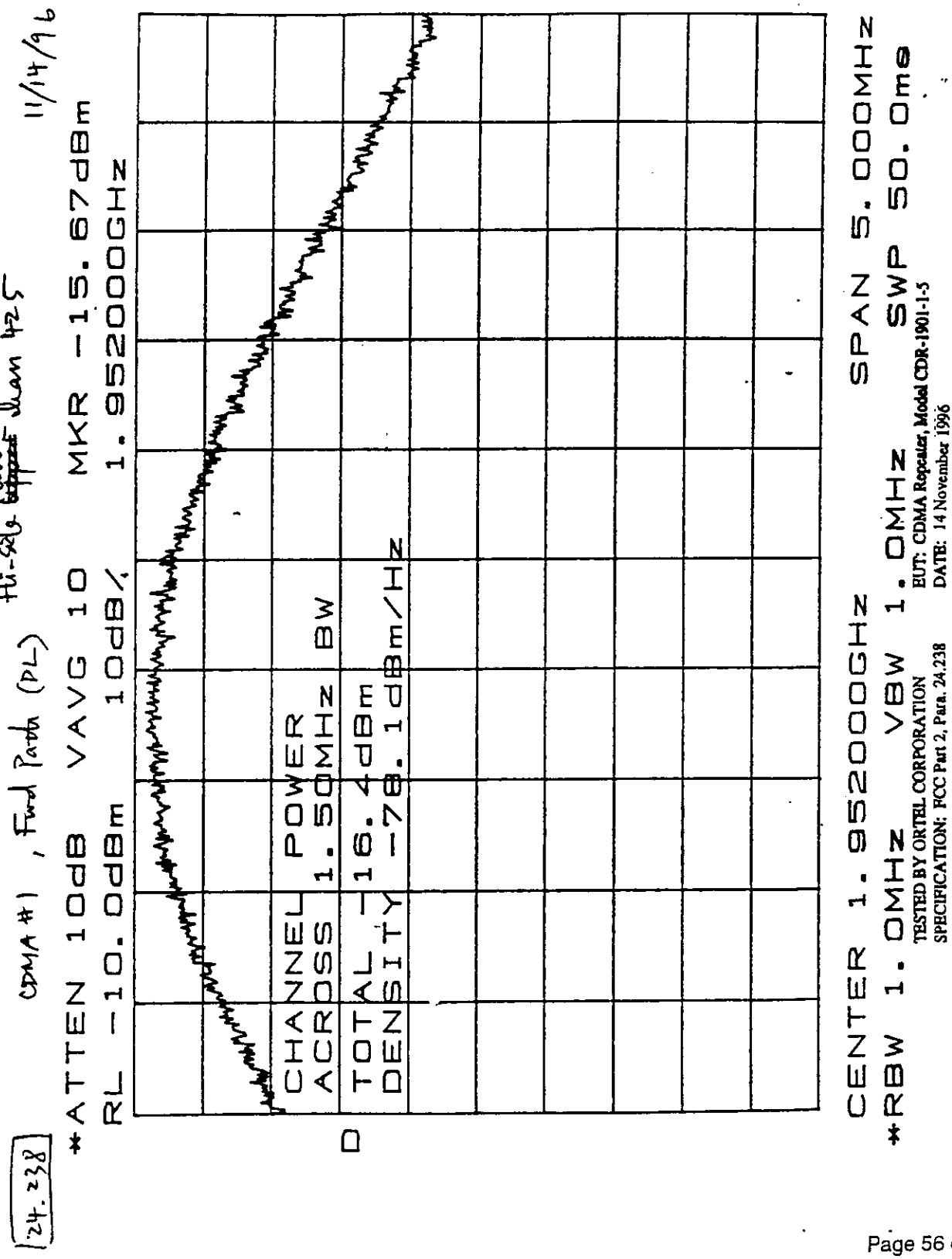

24.238
CDMA #1, Fwd Path (BL)
11/14/96
Below Low Limit 42.5
*ATTEN 10dB VAVG 10
MKR -16.00dBm
RL -10.0dBm 10dB/ 1.950500GHz
CHANNEL POWER
ACROSS 1.50MHz BW
TOTAL 16.8dBm
DENSITY -78.6dBm/Hz
0
CENTER 1.950500GHz SPAN 5.000MHz
*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 24.238
EUT: CDMA Repeater, Modal CDR-1901-1-5
DATE: 14 November 1996



TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 24.238

EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



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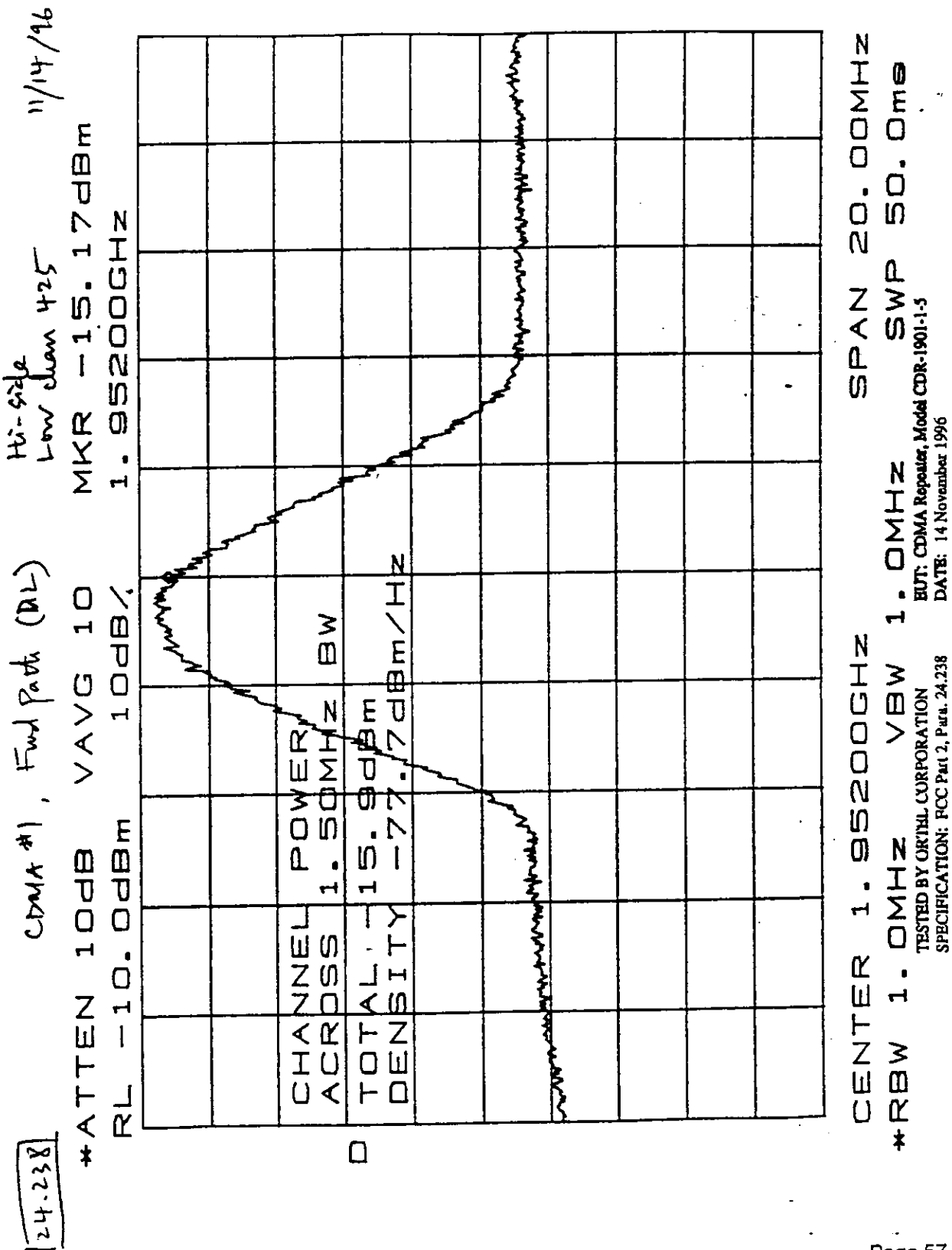

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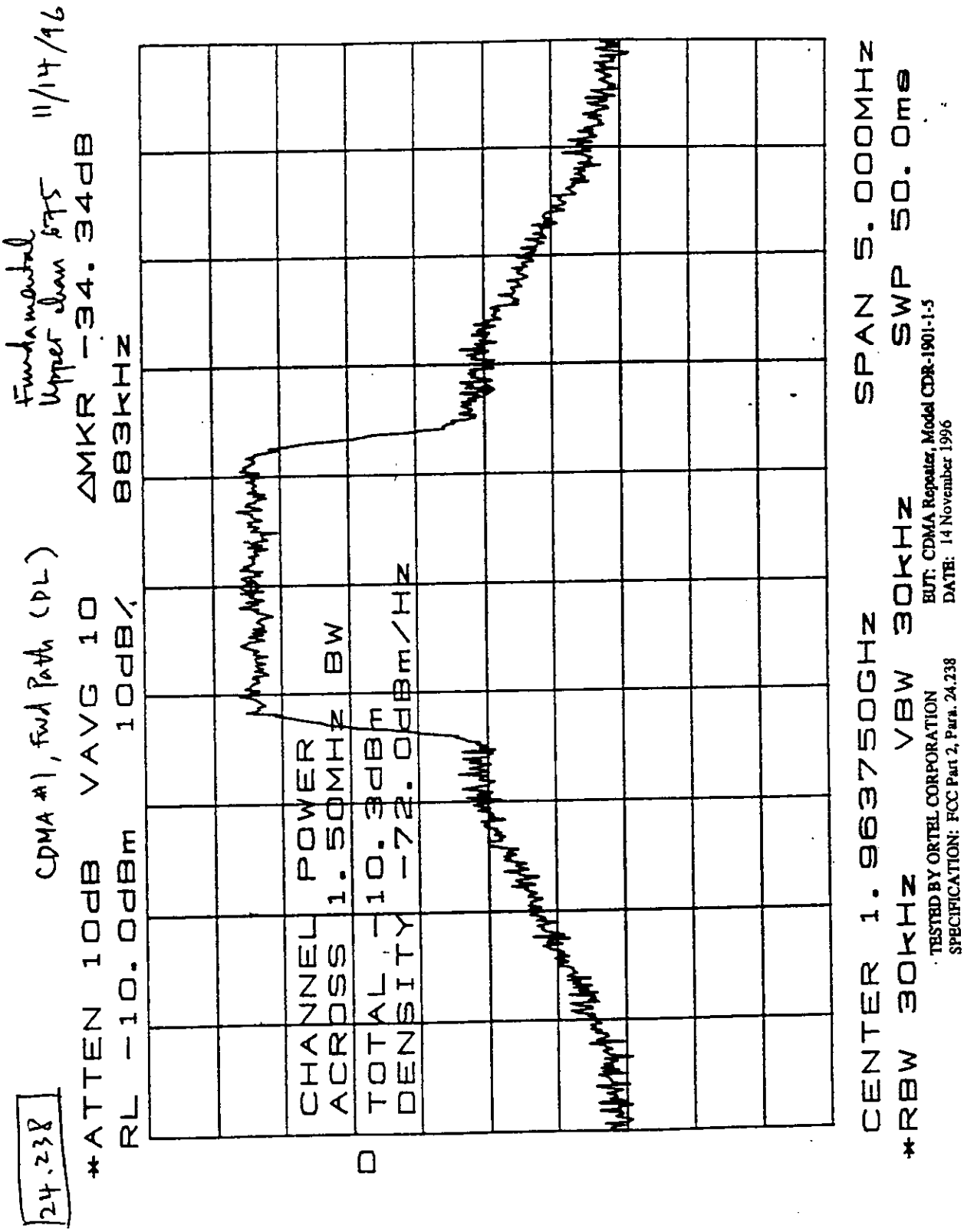
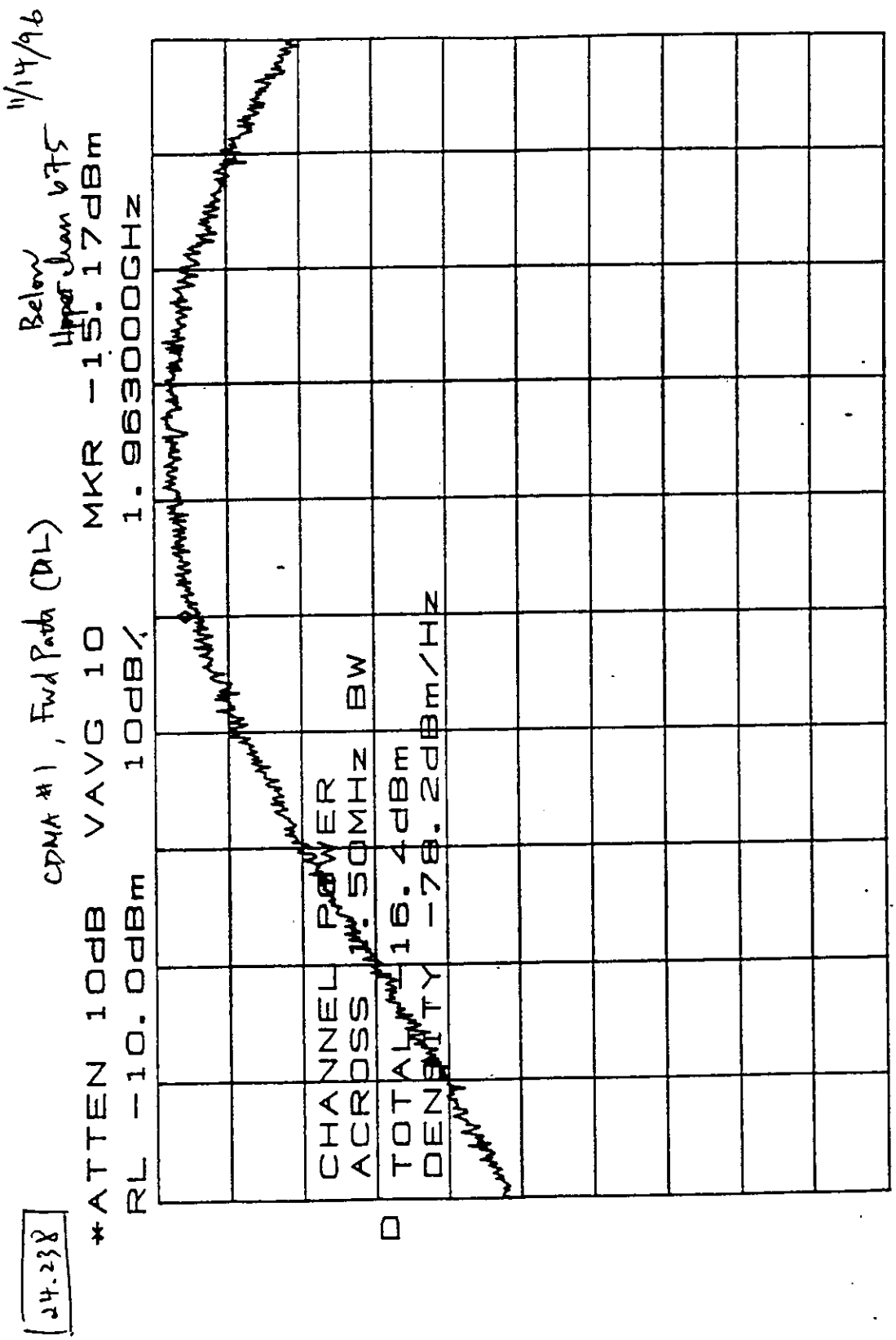

24.238
CDMA #1, Fwd Path (DL)
Fundamental
Upper Chan 875
11/14/96
*ATTEN 10dB
RL -10.0dBm
VAVG 10
10dB/
ΔMKR -34.34dB
883kHz
CHANNEL POWER
ACROSS 1.50MHz BW
TOTAL -10.3dBm
DENSITY -72.0dBm/Hz
0
CENTER 1.963750GHz
*RBW 30kHz
VBW 30kHz
SPAN 5.000MHz
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 24.238

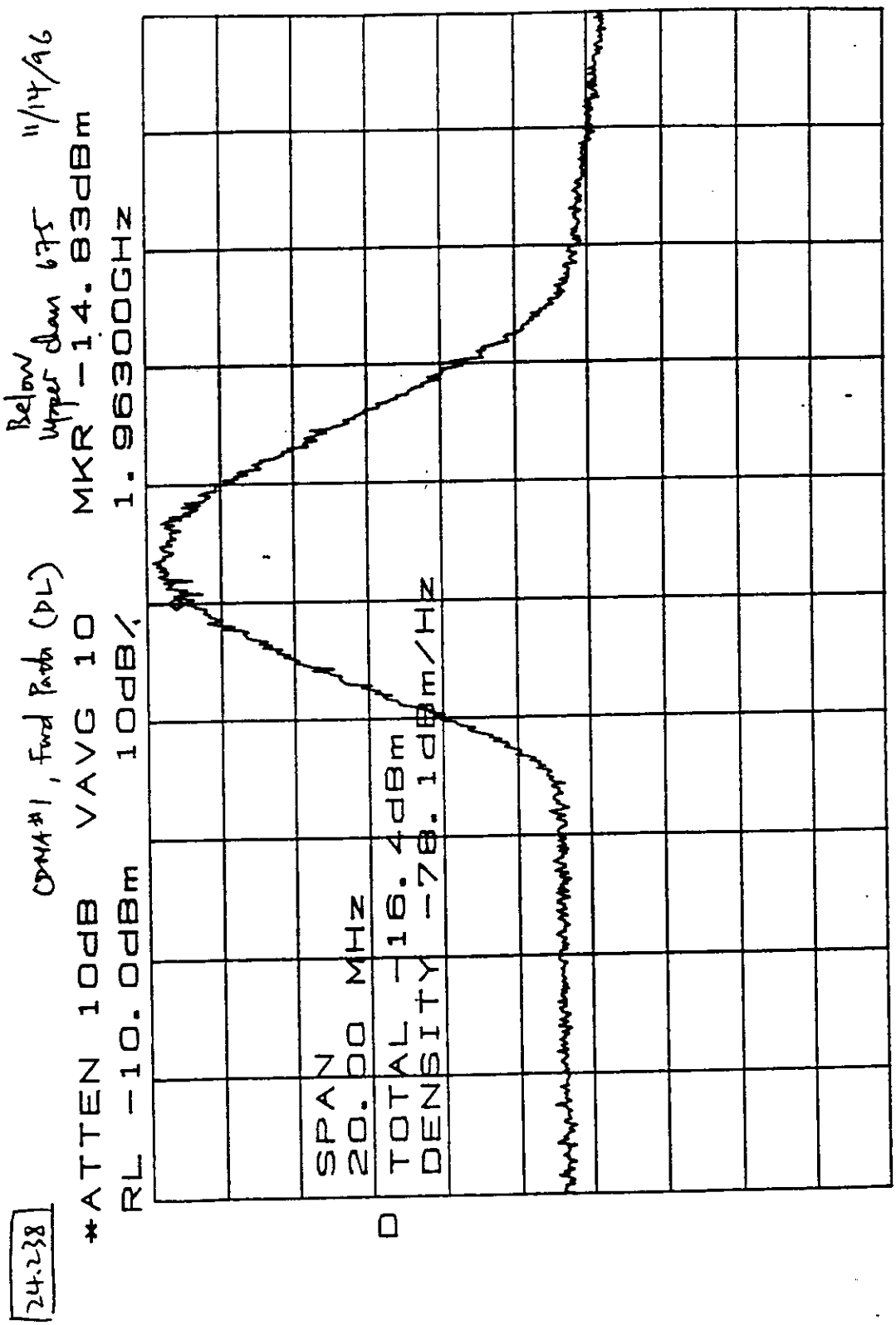
TÜV PRODUCT SERVICE



TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 24.238

EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



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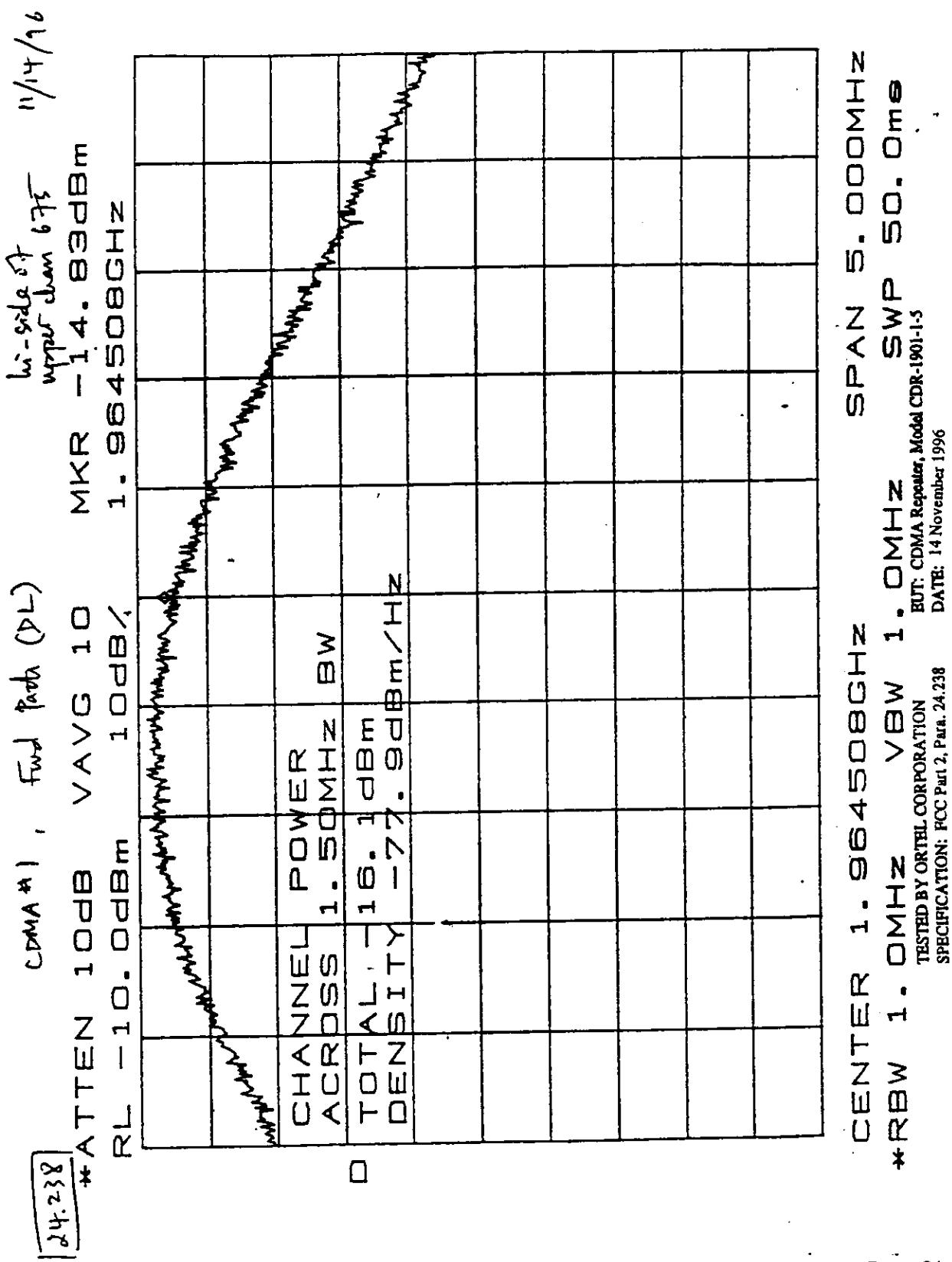

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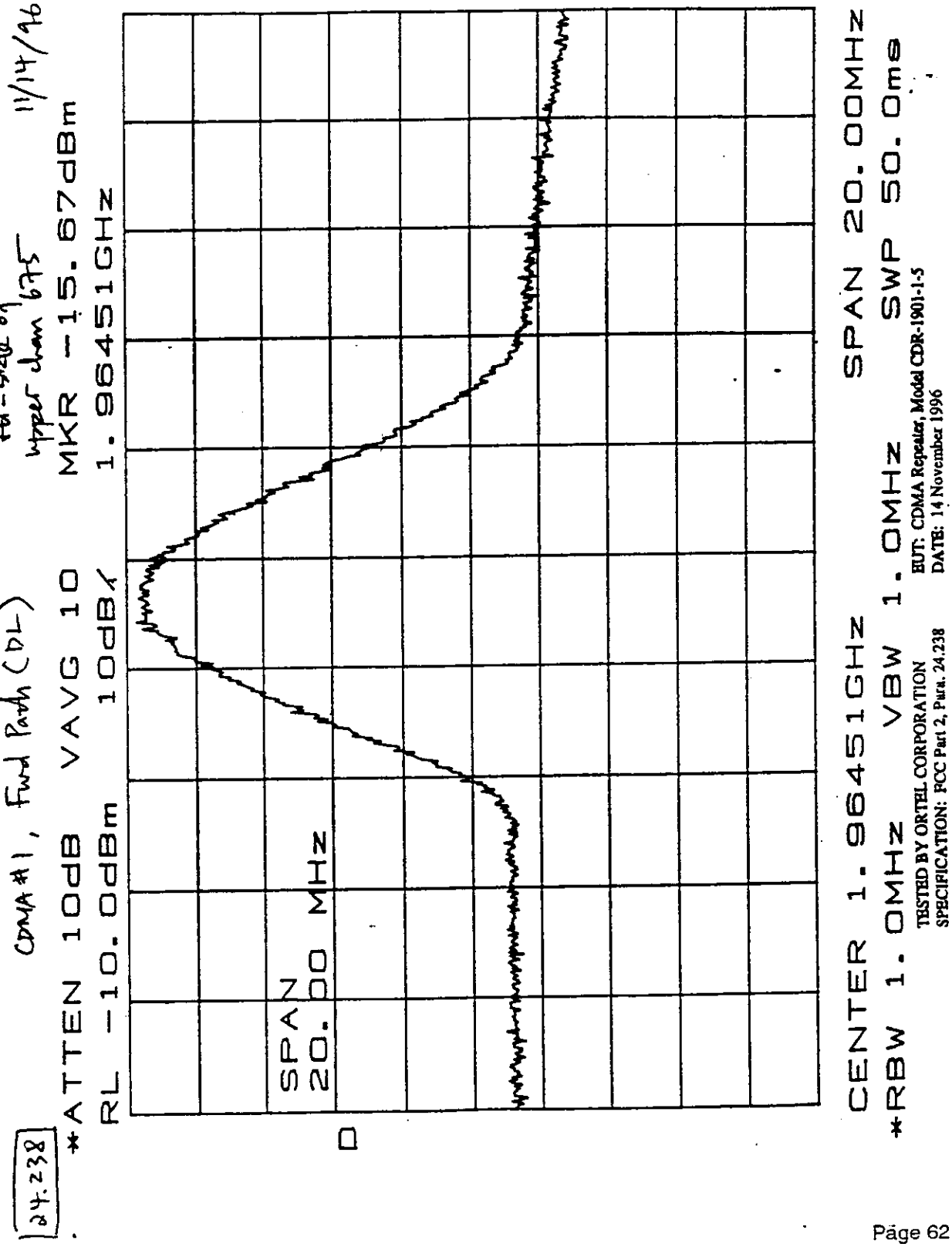

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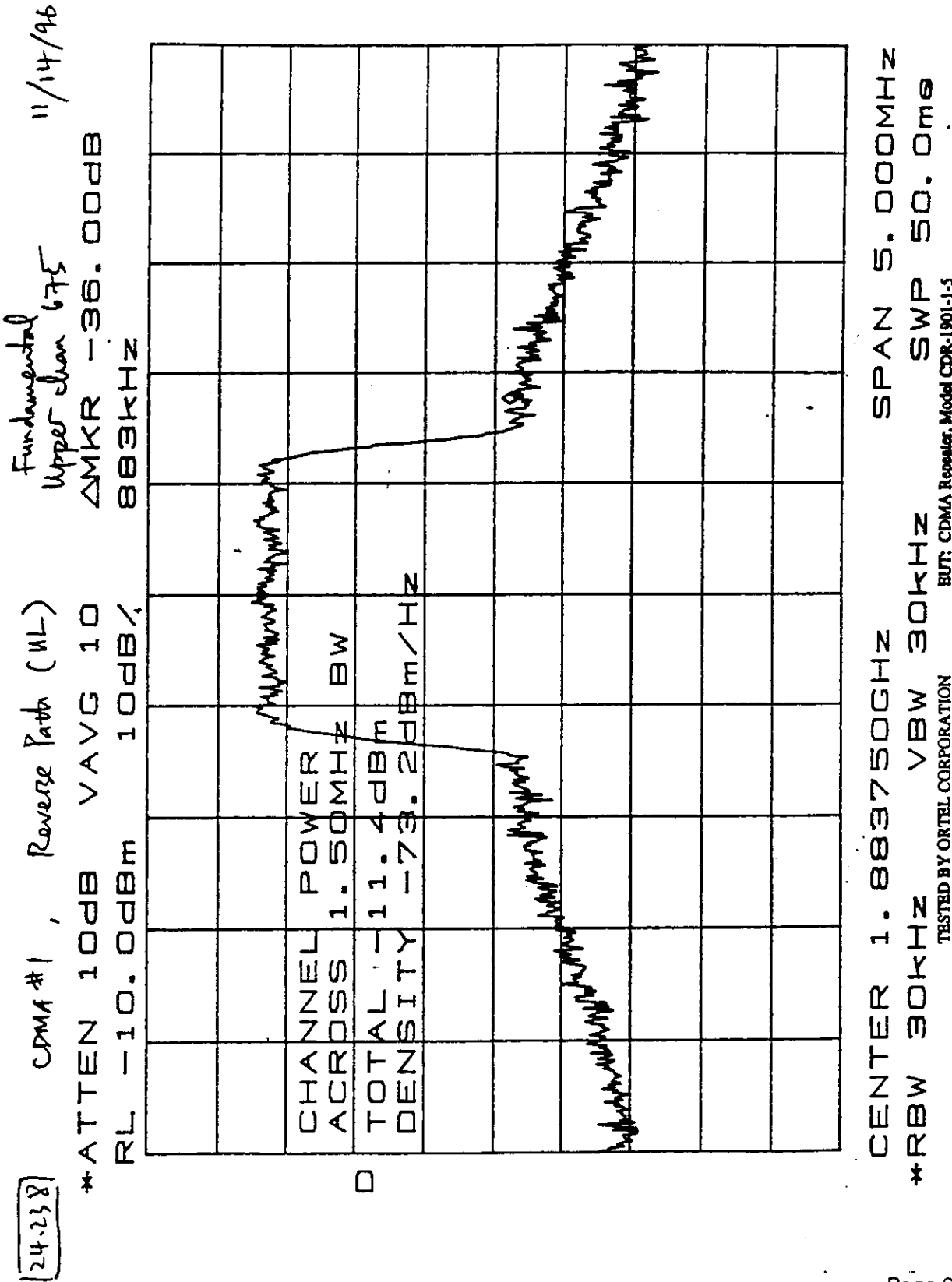
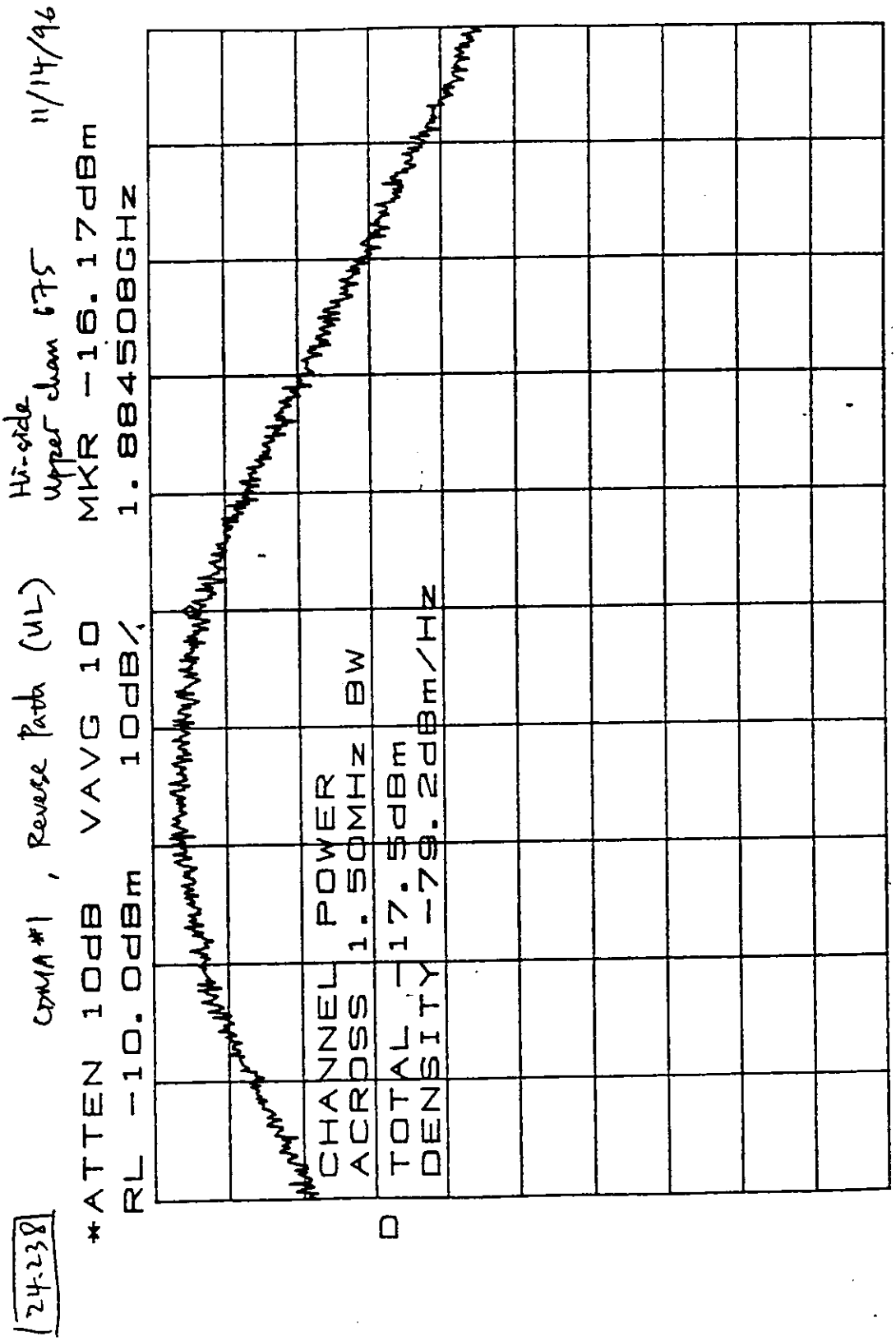


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



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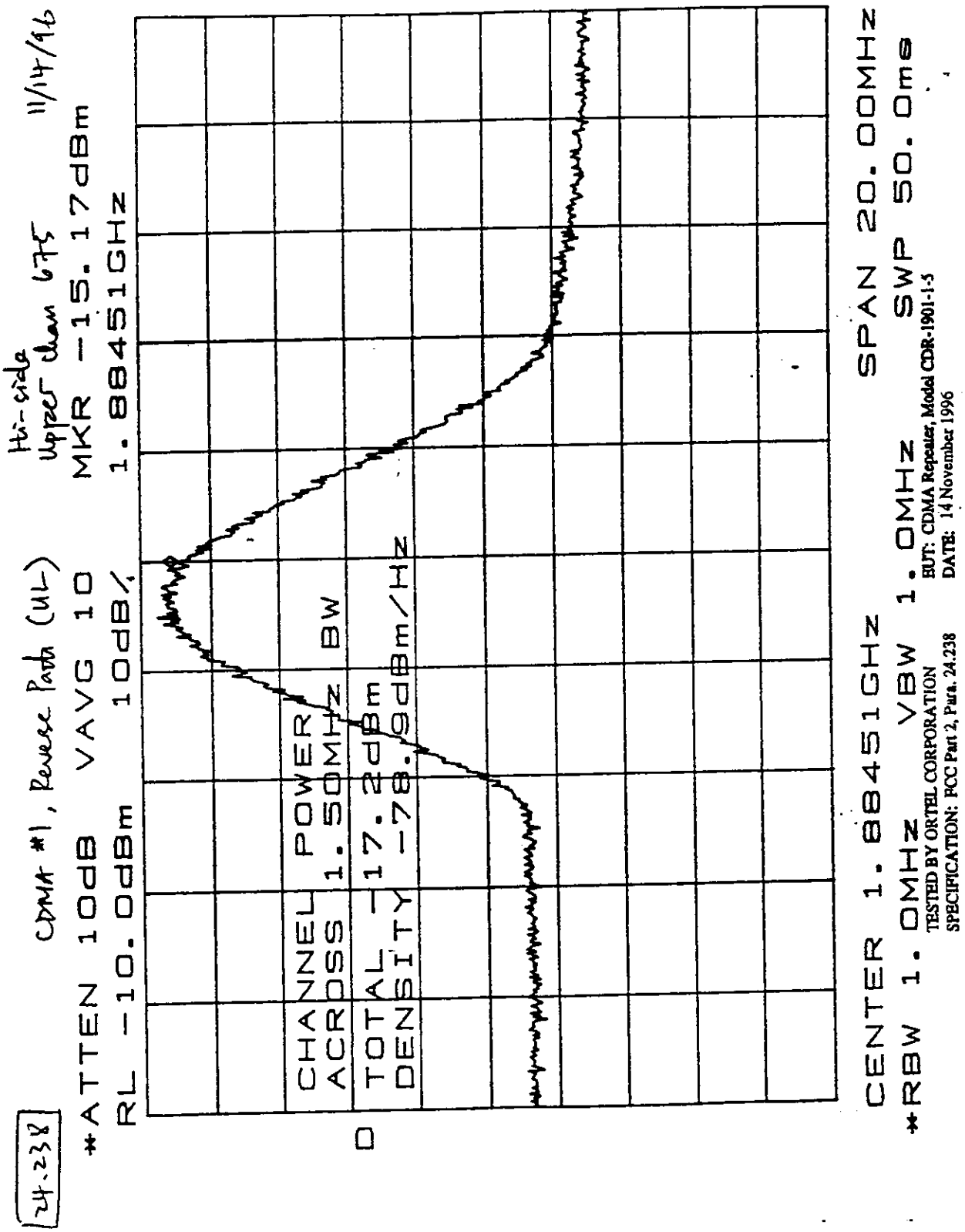
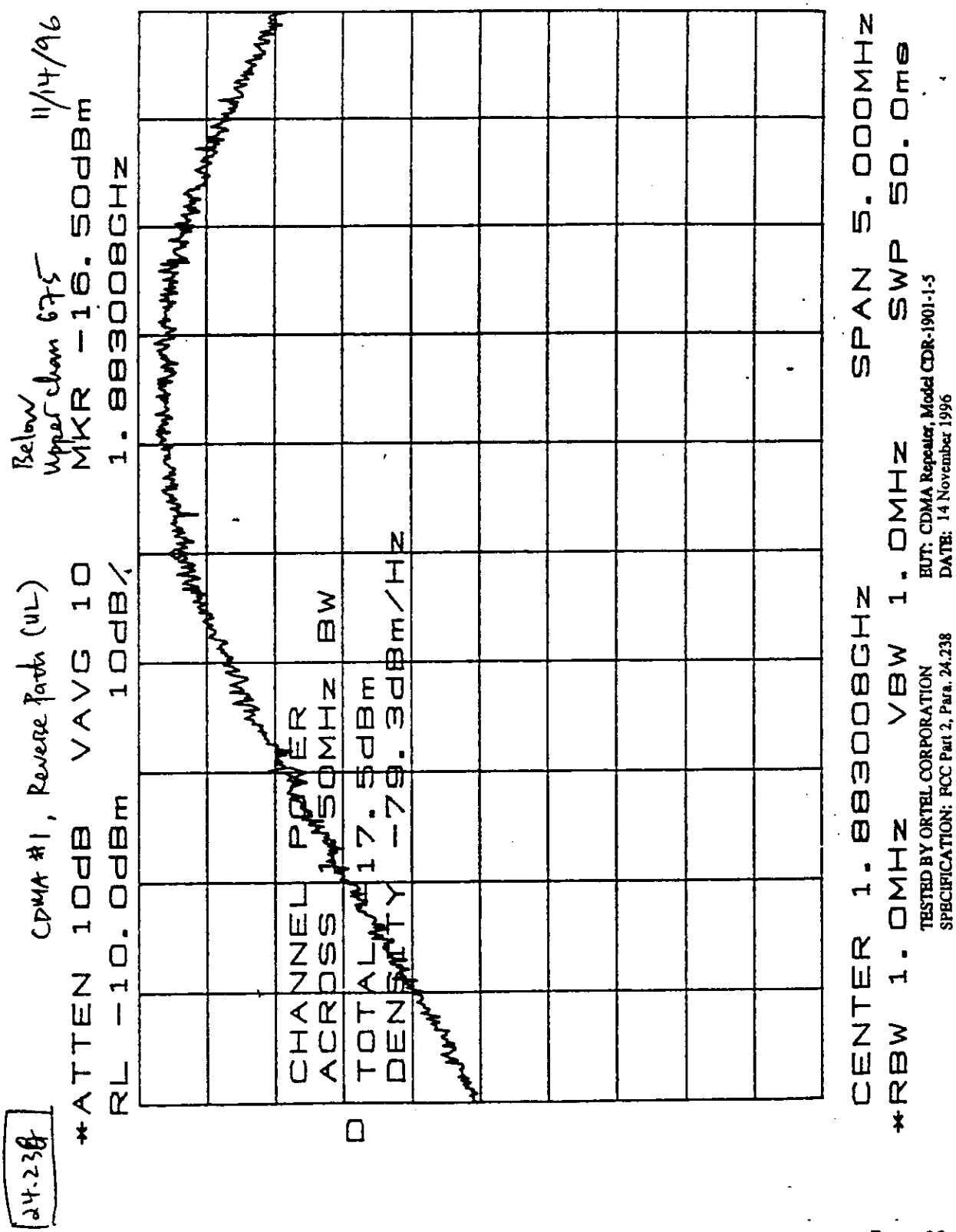


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



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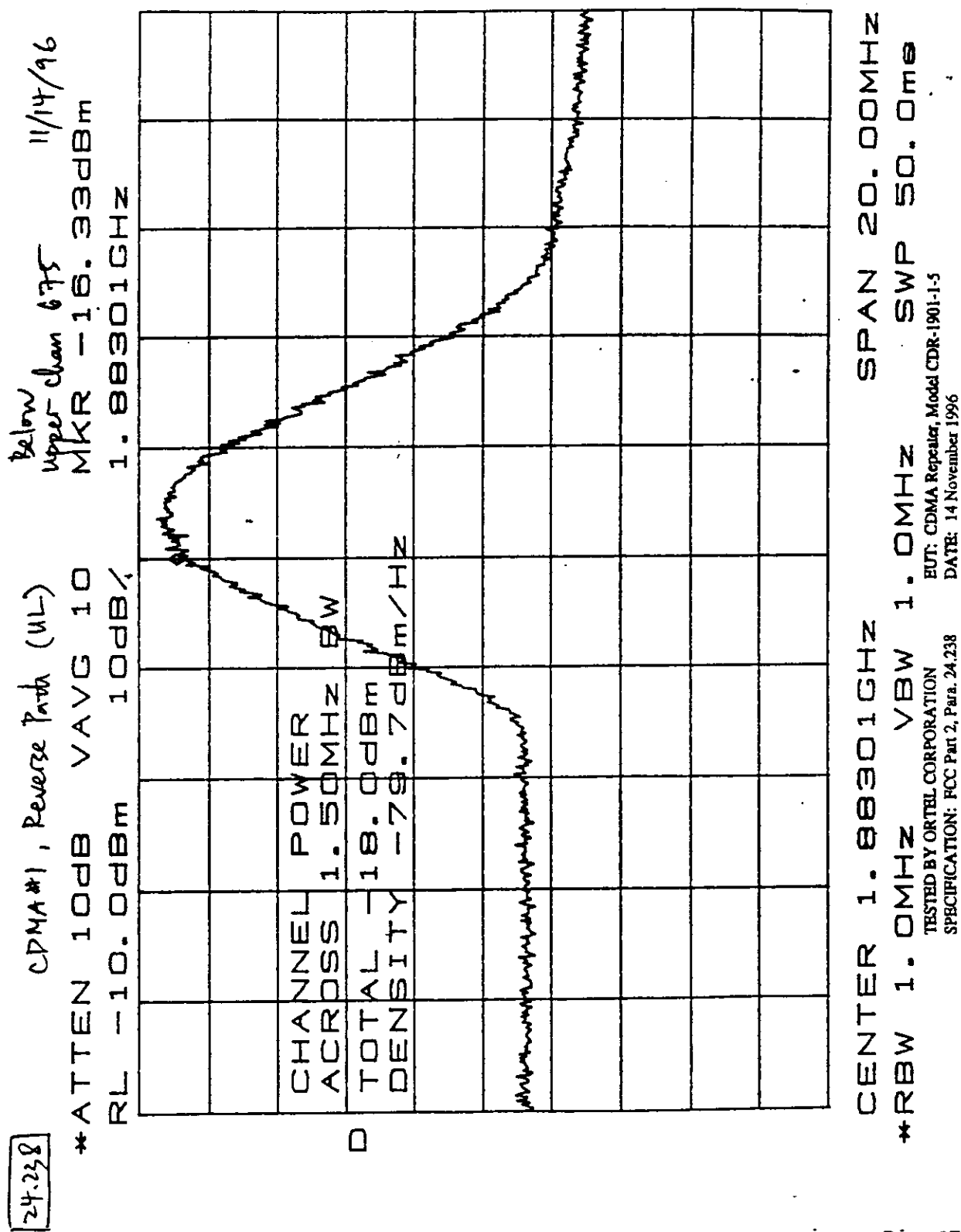
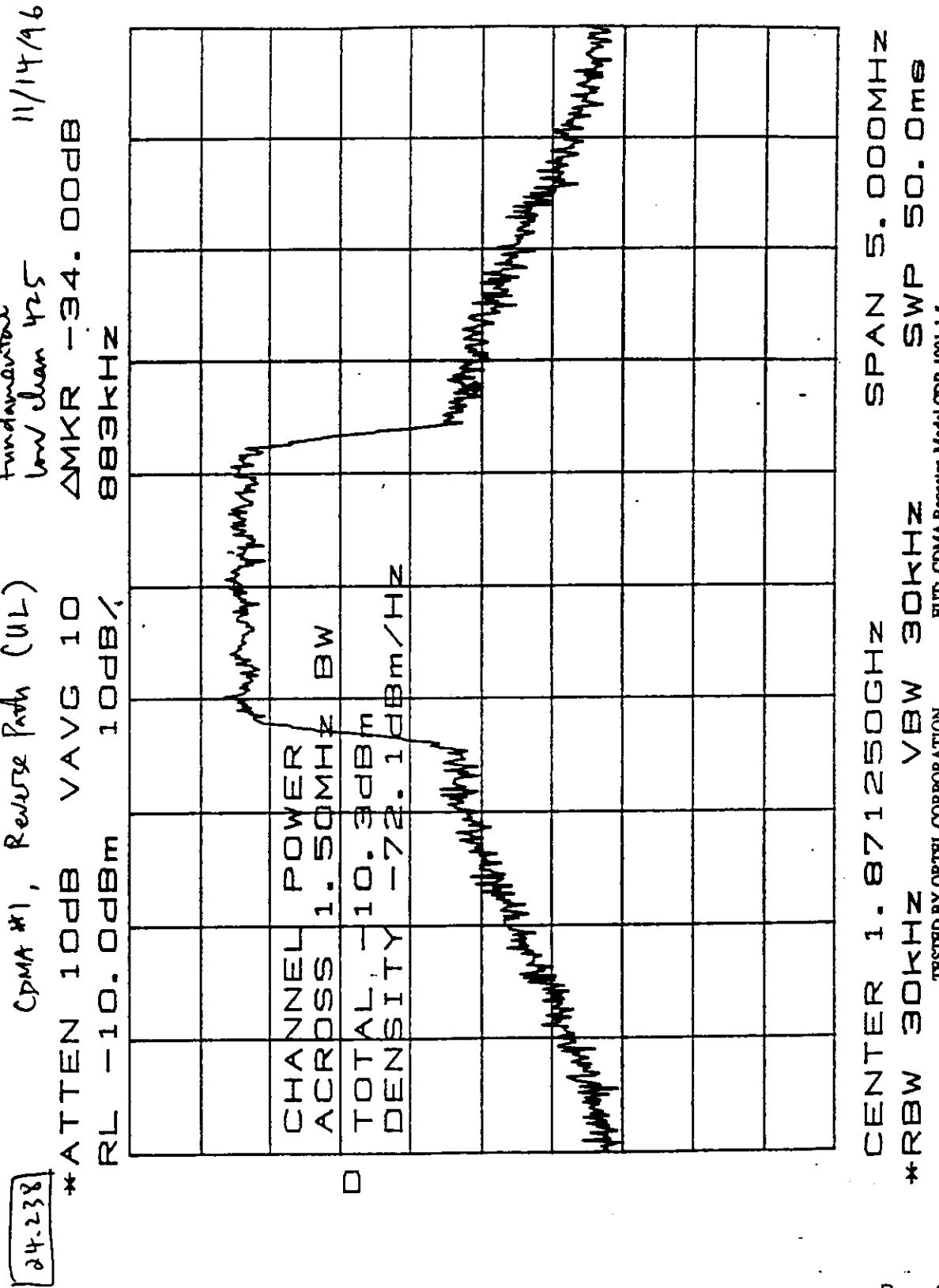
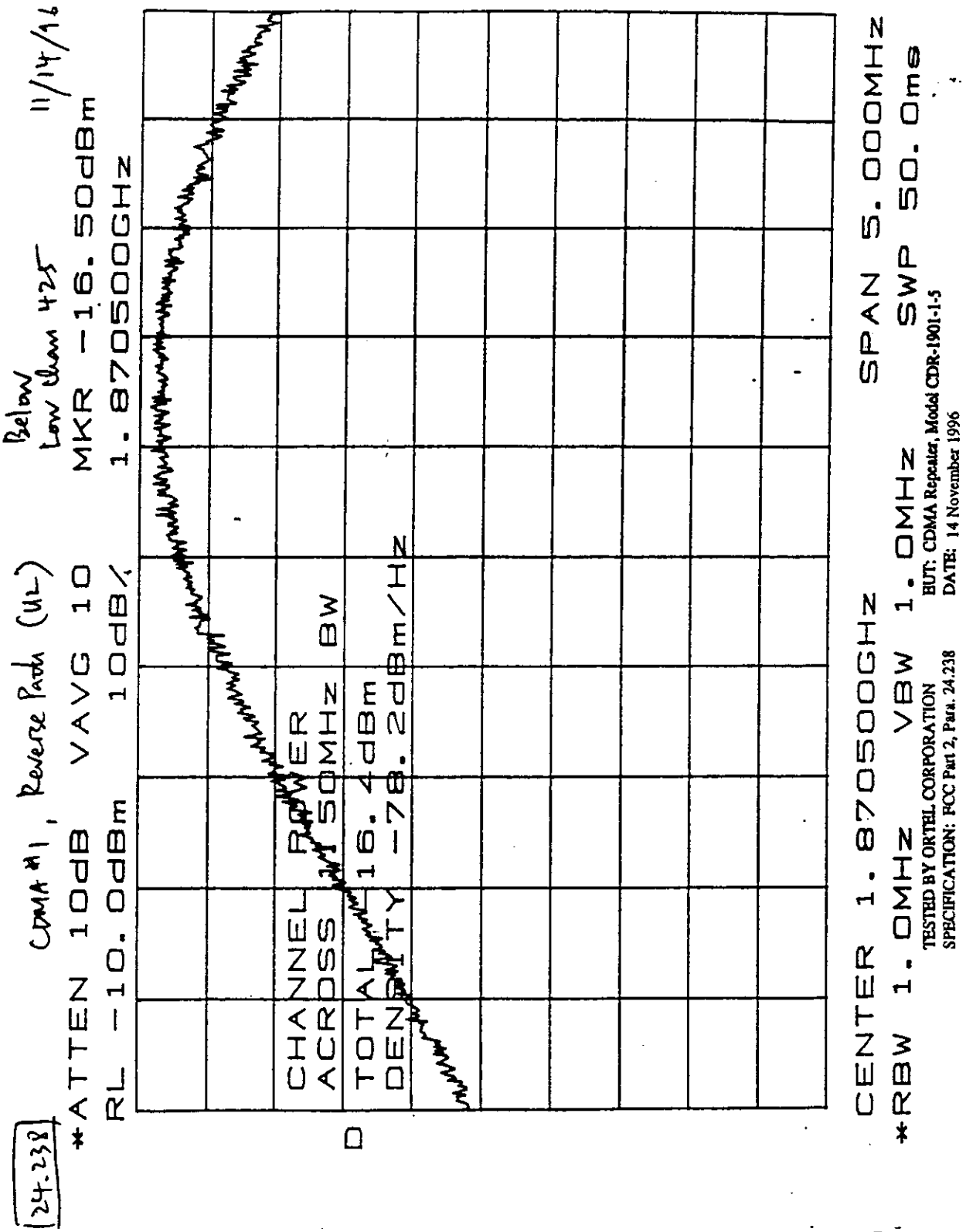
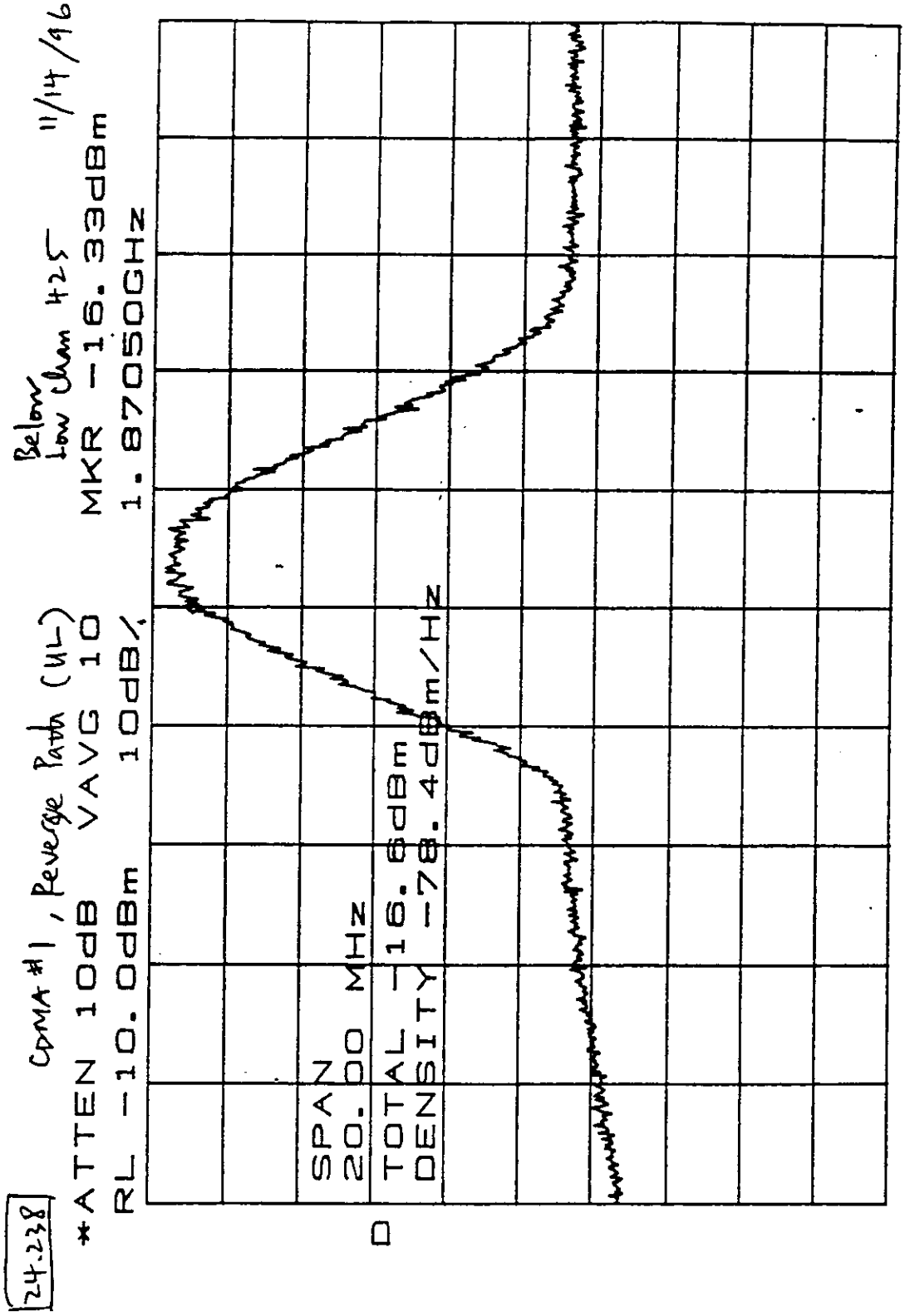
TÜV PRODUCT SERVICE




24.238
CDMA #1, Reverse Path (UL)
Fundamental
Low Chan 425
11/14/96
*ATTEN 10dB
RL -10.0dBm
VAVG 10
10dB/
ΔMKR -34.00dB
883kHz
CHANNEL POWER
ACROSS 1.50MHz BW
TOTAL -10.3dBm
DENSITY -72.1dBm/Hz
0
CENTER 1.87125GHz
*RBW 30kHz
VBW 30kHz
SPAN 5.000MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 24.238
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996


24.238
CDMA #1, Reverse Path (UL)
Below Low Chan 425
11/14/96
*ATTEN 10dB
RL -10.0dBm
VAVG 10
10dB/
MKR -16.50dBm
1.870500GHz
CHANNEL POWER
ACROSS 1.250MHz BW
TOTAL 16.4dBm
DENSITY -78.2dBm/Hz
CENTER 1.870500GHz
*RBW 1.0MHz
VBW 1.0MHz
SPAN 5.000MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 24.238
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996



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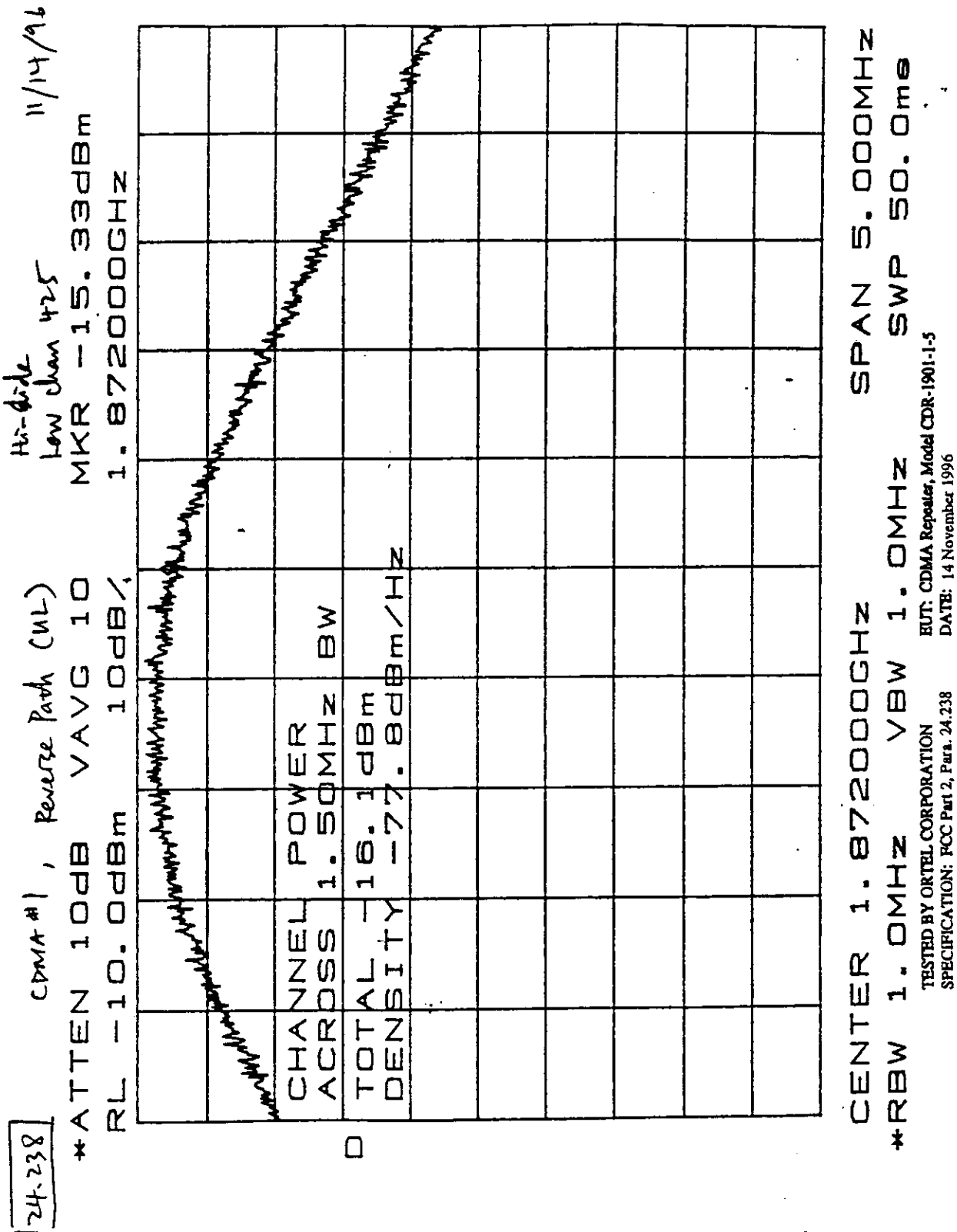
TÜV PRODUCT SERVICE



24.238

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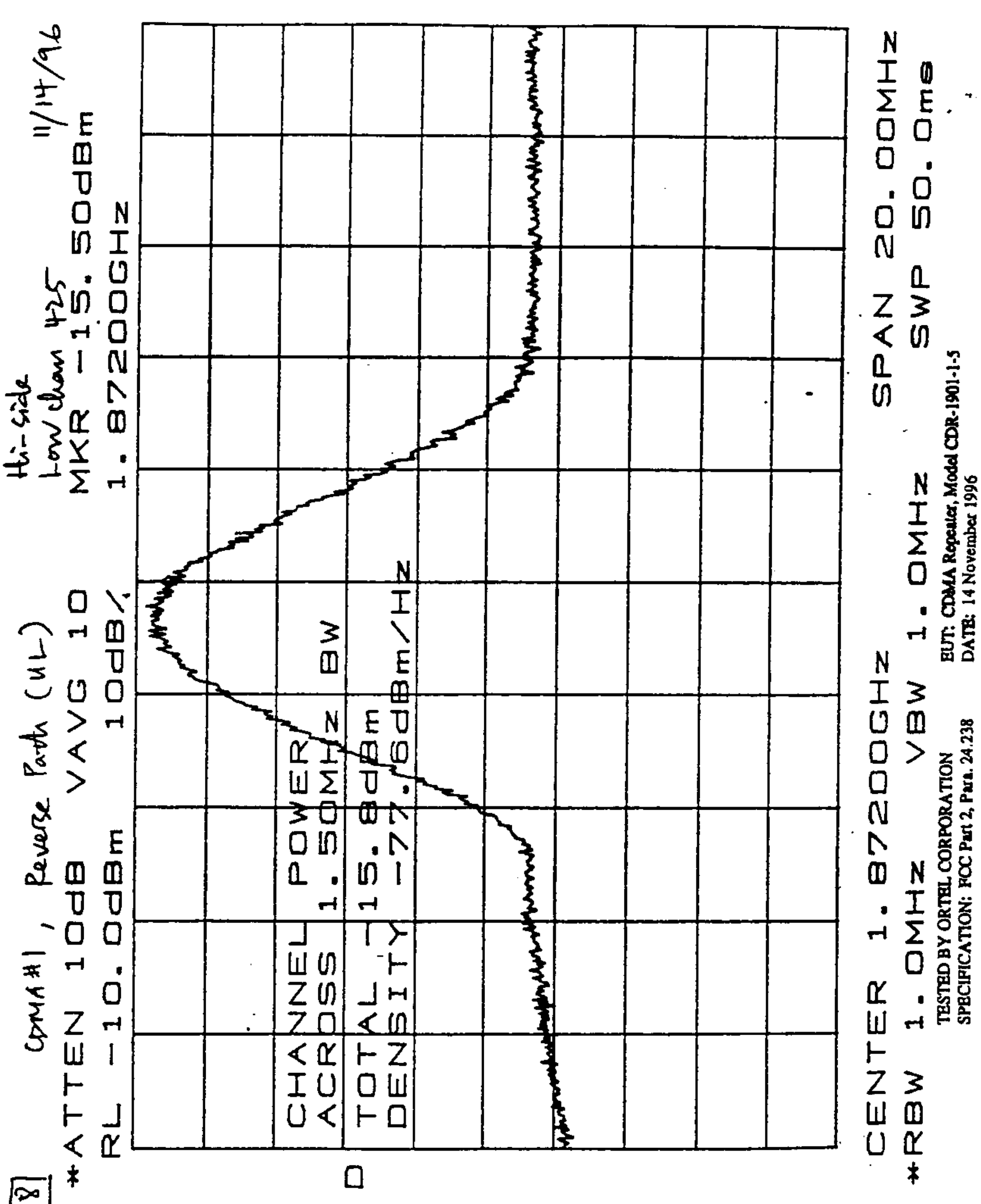
TÜV PRODUCT SERVICE



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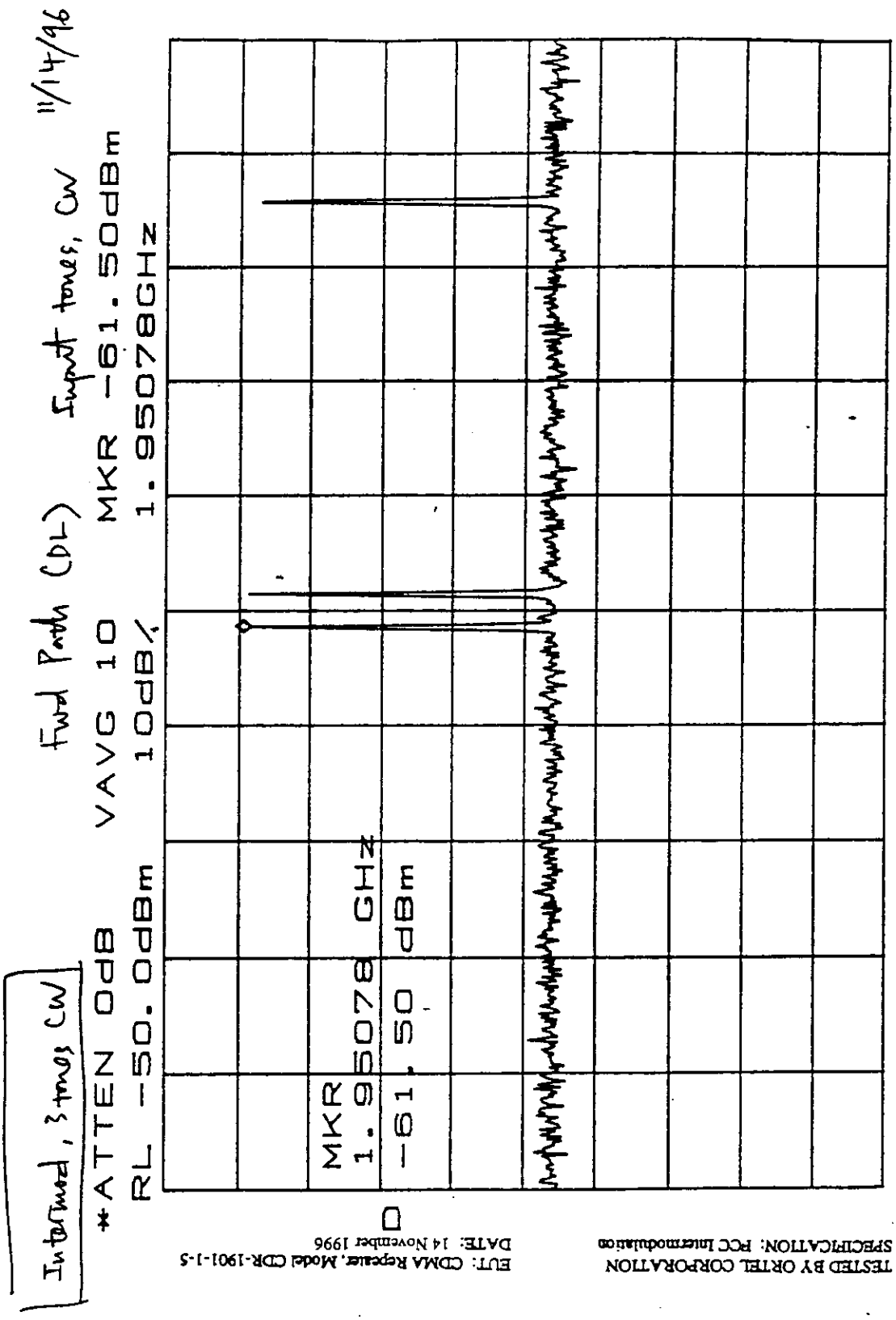
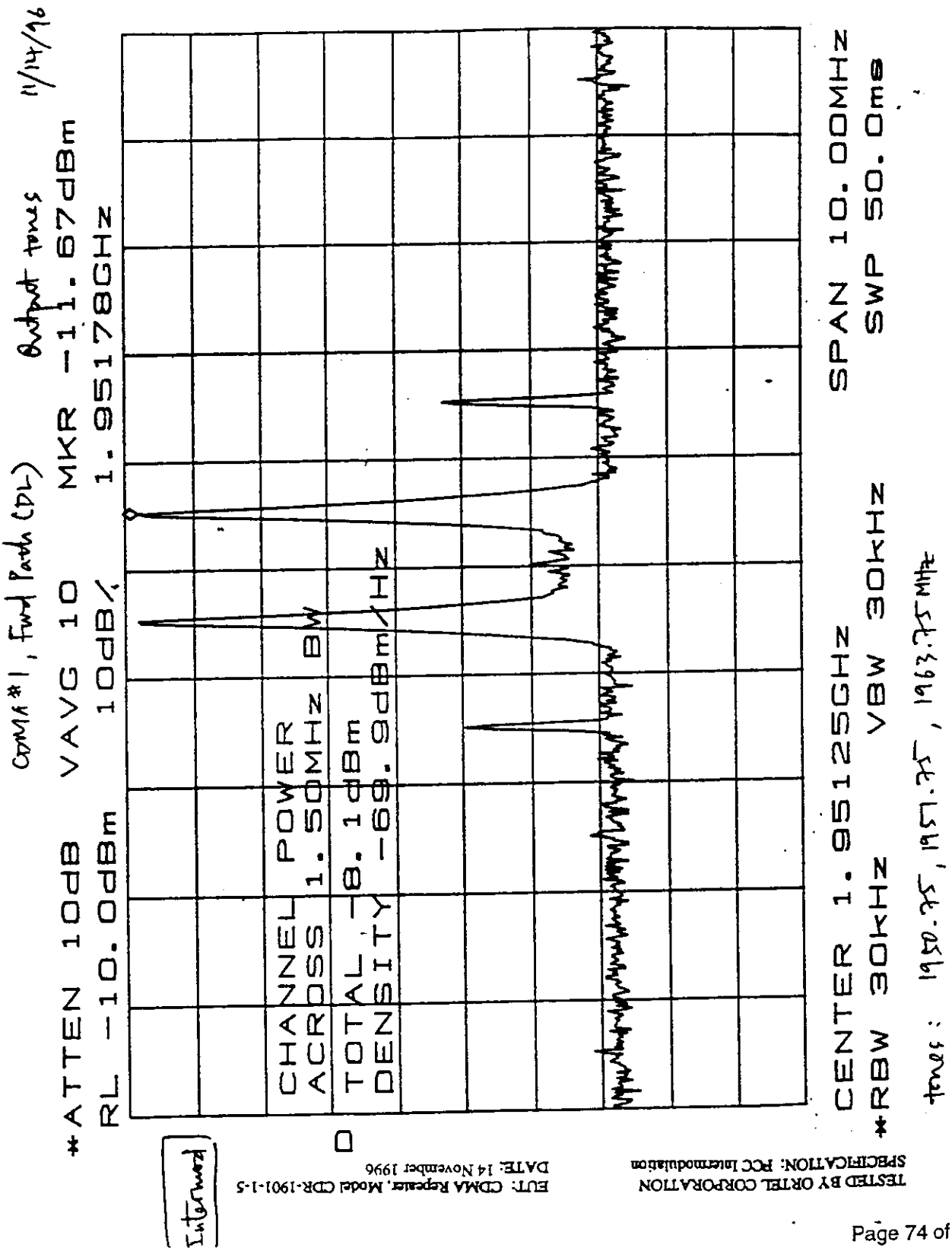

Intermod, 3 tones CW
Fwd Path (DL) Input tones, CW 11/14/96
*ATTEN 0dB VAVG 10 MKR -61.50dBm
RL -50.0dBm 10dB/ 1.950780GHz
MKR 1.95078 GHz -61.50 dBm
D
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Intermodulation
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996
CENTER 1.951250GHz SPAN 35.00MHz
*RBW 30kHz VBW 30kHz SWP 98.0ms
tones: 1950.75, 1951.75, 1963.75 MHz



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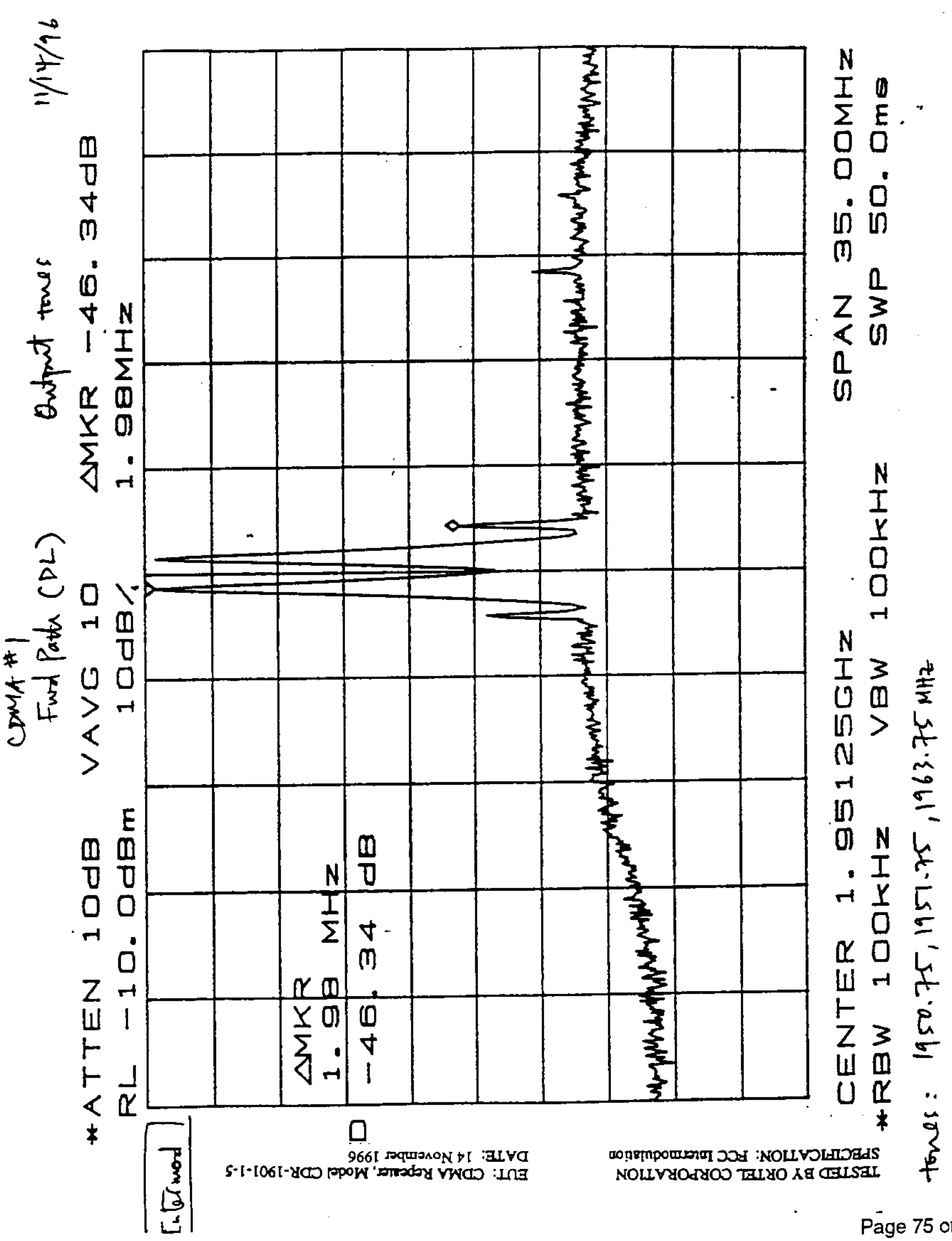
TÜV PRODUCT SERVICE



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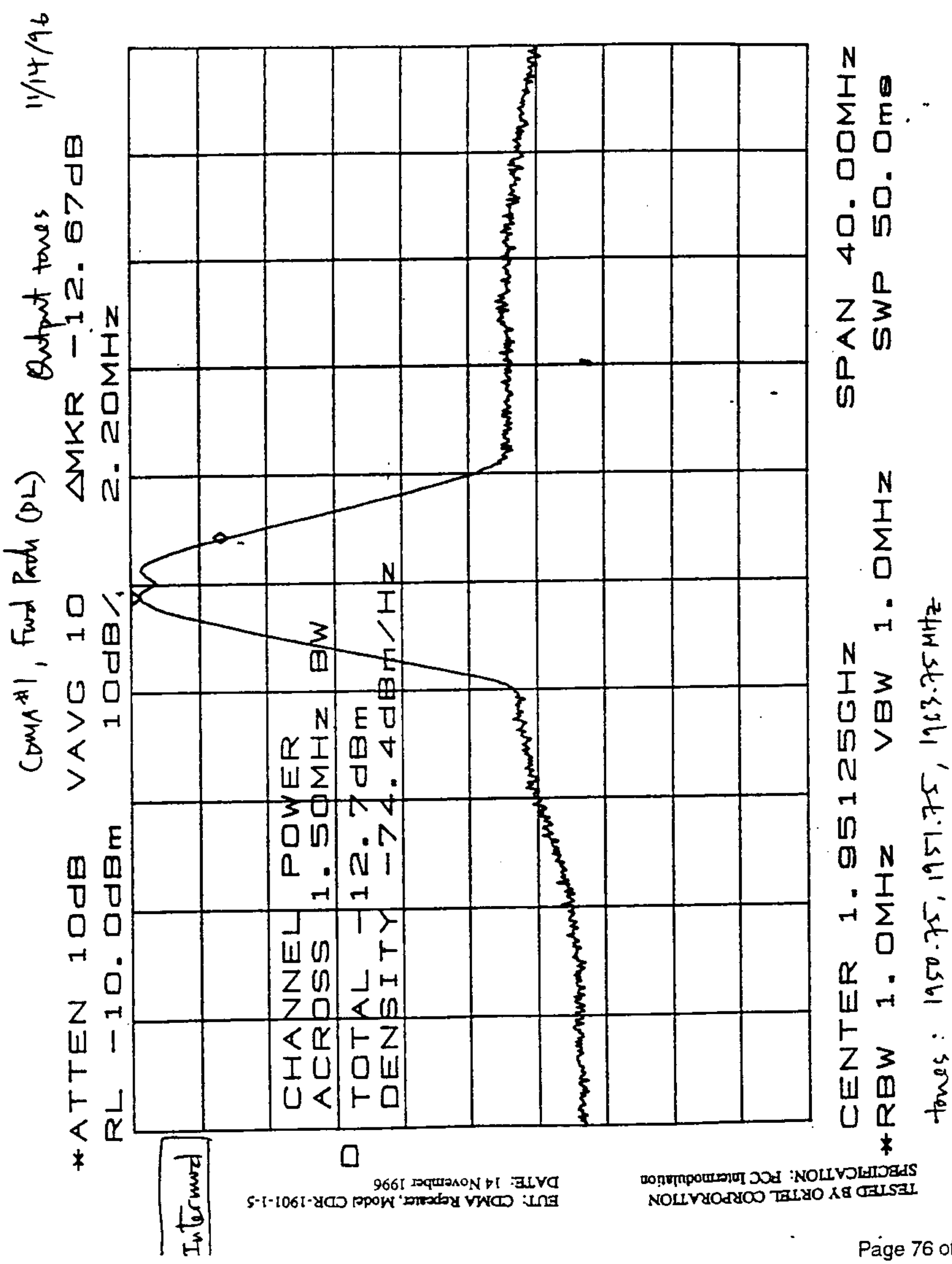
TÜV PRODUCT SERVICE


CDMA#1, Fwd Path (DL)
Output tones
11/14/96
*ATTEN 10dB
RL -10.0dBm
VAVG 10
10dB/
ΔMKR -12.67dB
2.20MHz
CHANNEL POWER
ACROSS 1.50MHz BW
TOTAL -12.7dBm
DENSITY -74.4dBm/Hz
CENTER 1.95125GHz
SPAN 40.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms
tones: 1950.75, 1951.75, 1963.75, 1963.75MHz
Intermod
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Intermodulation

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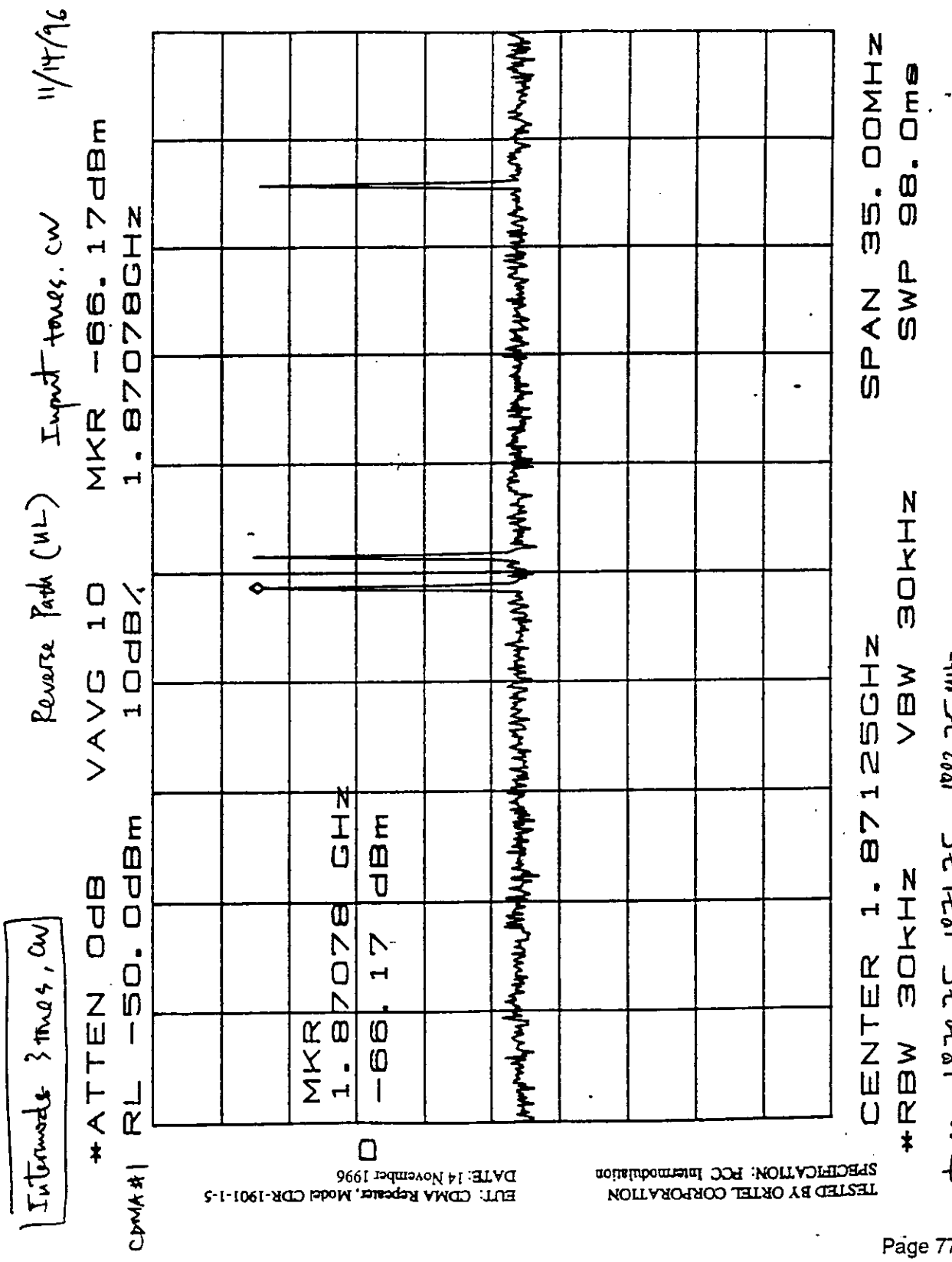

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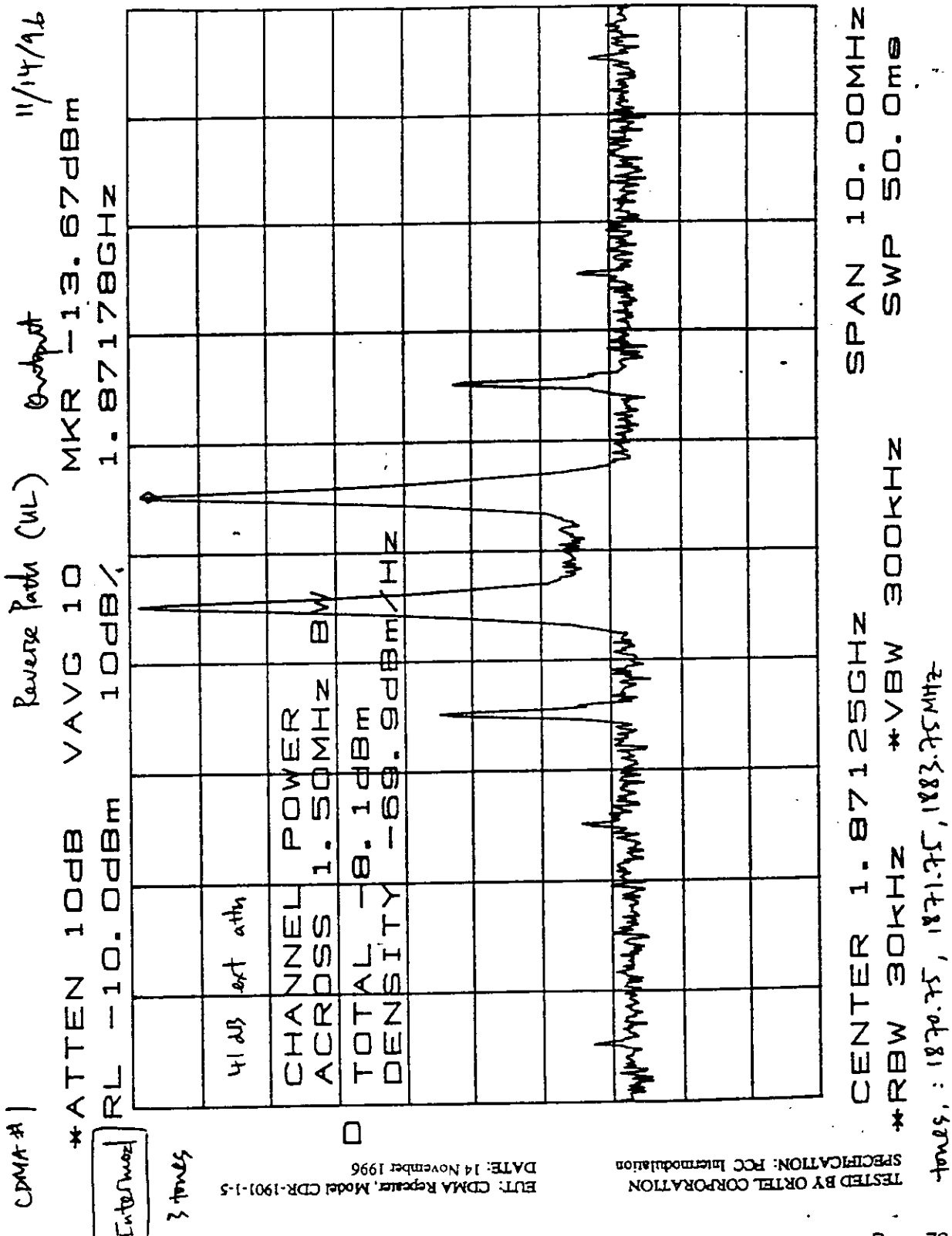
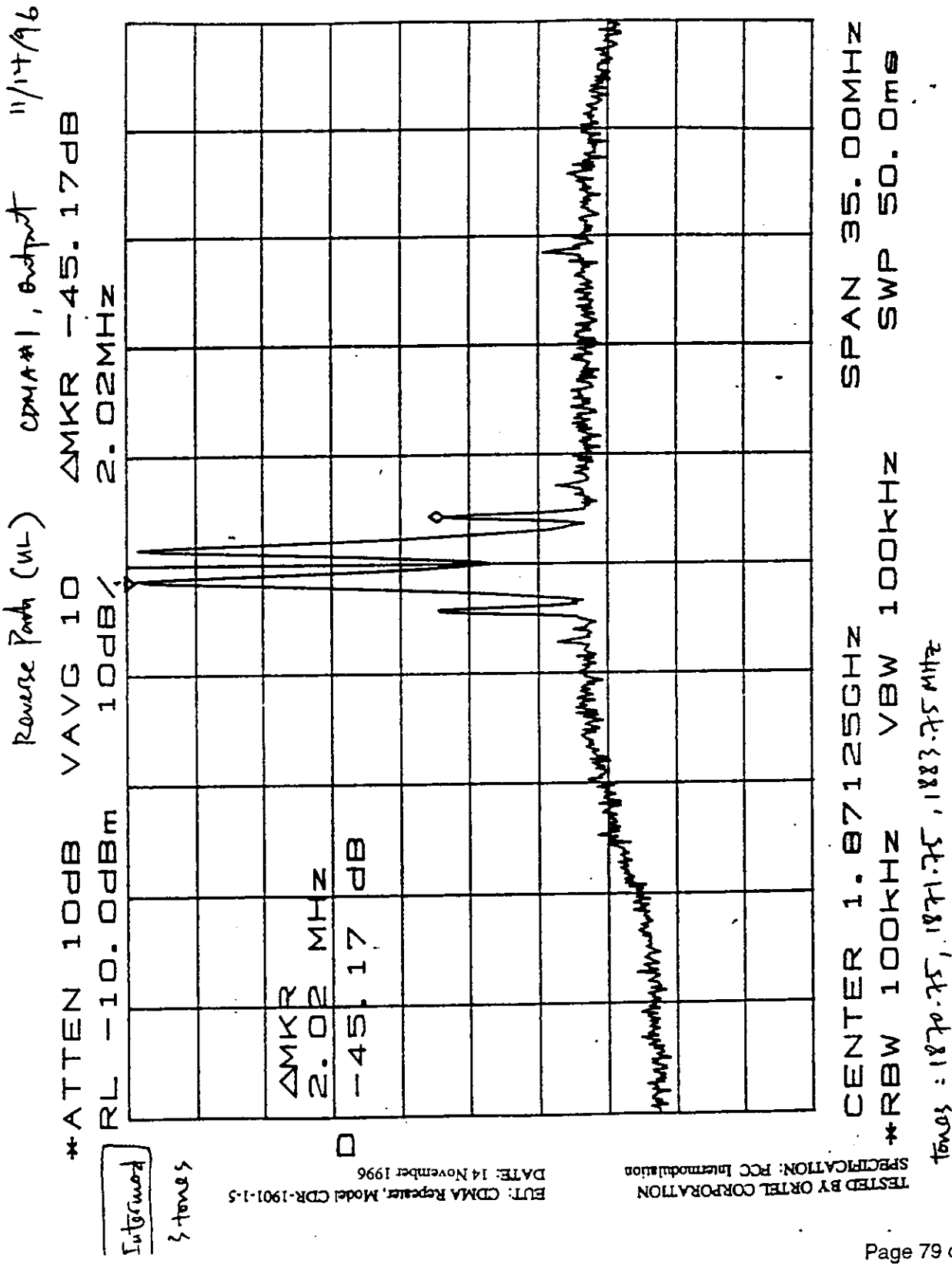

CDMA #1
*ATTEN 10dB
RL -10.0dBm
VAVG 10
10dB/
Reverse Path (WL)
MKR -13.67dBm
1.87178GHz
11/14/96
41 dB ext attn
CHANNEL POWER
ACROSS 1.50MHz BW
TOTAL -8.1dBm
DENSITY -69.9dBm/Hz
CENTER 1.87125GHz
*RBW 30kHz
*VBW 300kHz
SPAN 10.00MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: PCC Intermodulation
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996

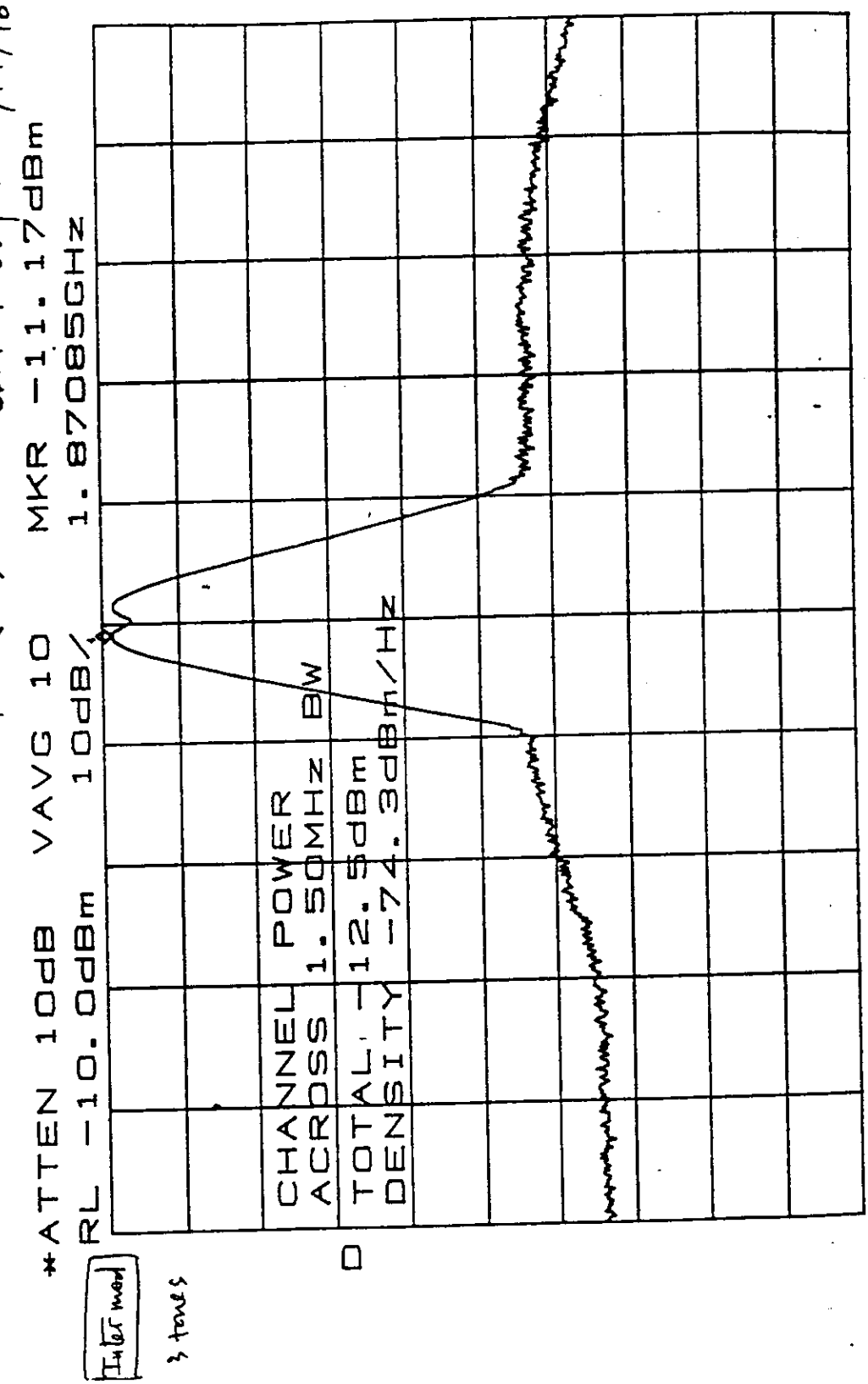

Reverse Path (UL) CDMA#1, output 11/14/96
*ATTEN 10dB VAVG 10 ΔMKR -45.17dB
RL -10.0dBm 10dB/ 2.02MHz
ΔMKR
2.02 MHz
-45.17 dB
CENTER 1.87125GHz SPAN 35.00MHz
*RBW 100kHz VBW 100kHz SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: PCC Intermodulation
EUT: CDMA Repeater, Model CDR-1901-1.5
DATE: 14 November 1996
Intermod
3 tones

TÜV PRODUCT SERVICE

TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Intermodulation

EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996

Reverse Path (UL)



11/14/96

Inter mod

3 tones

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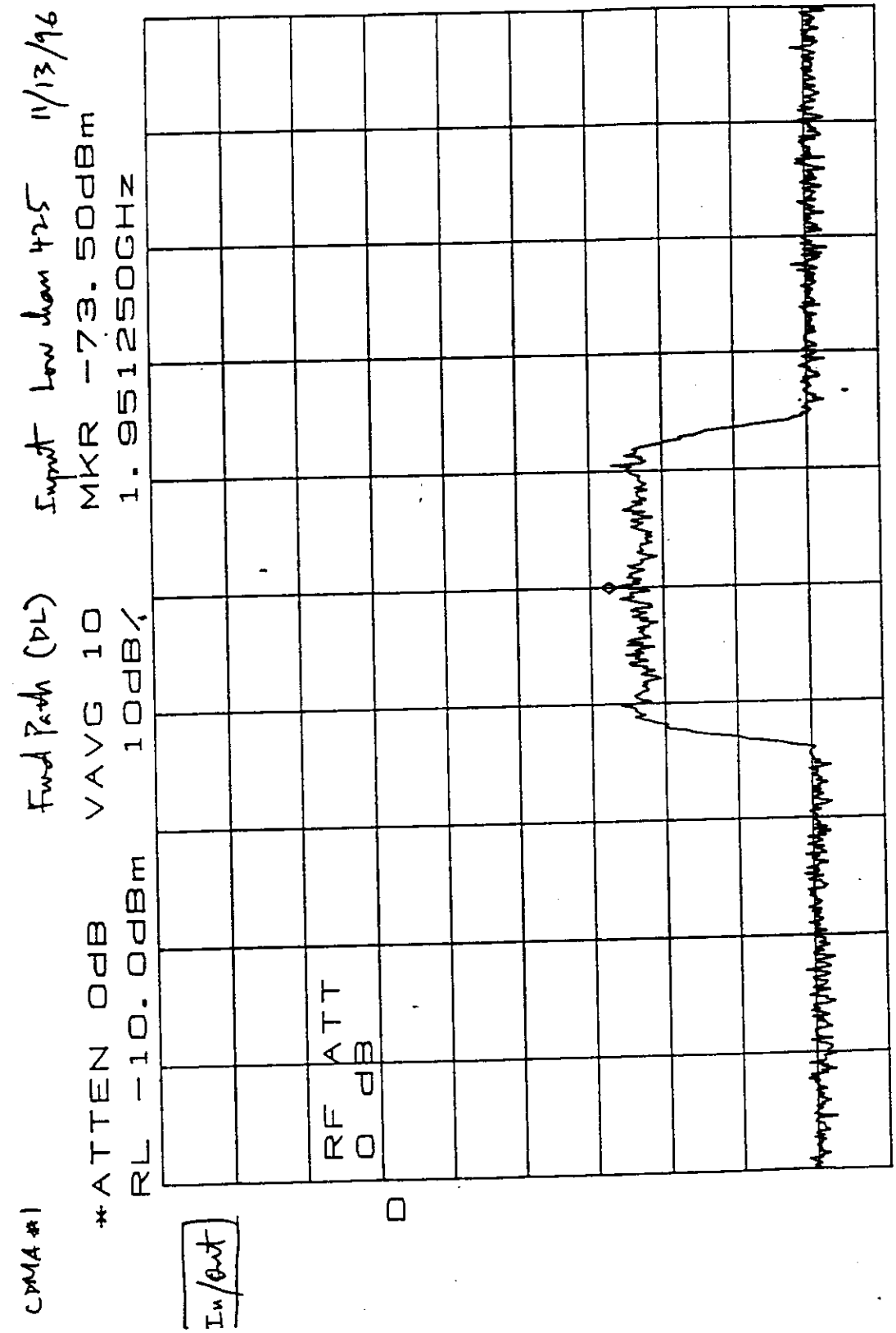

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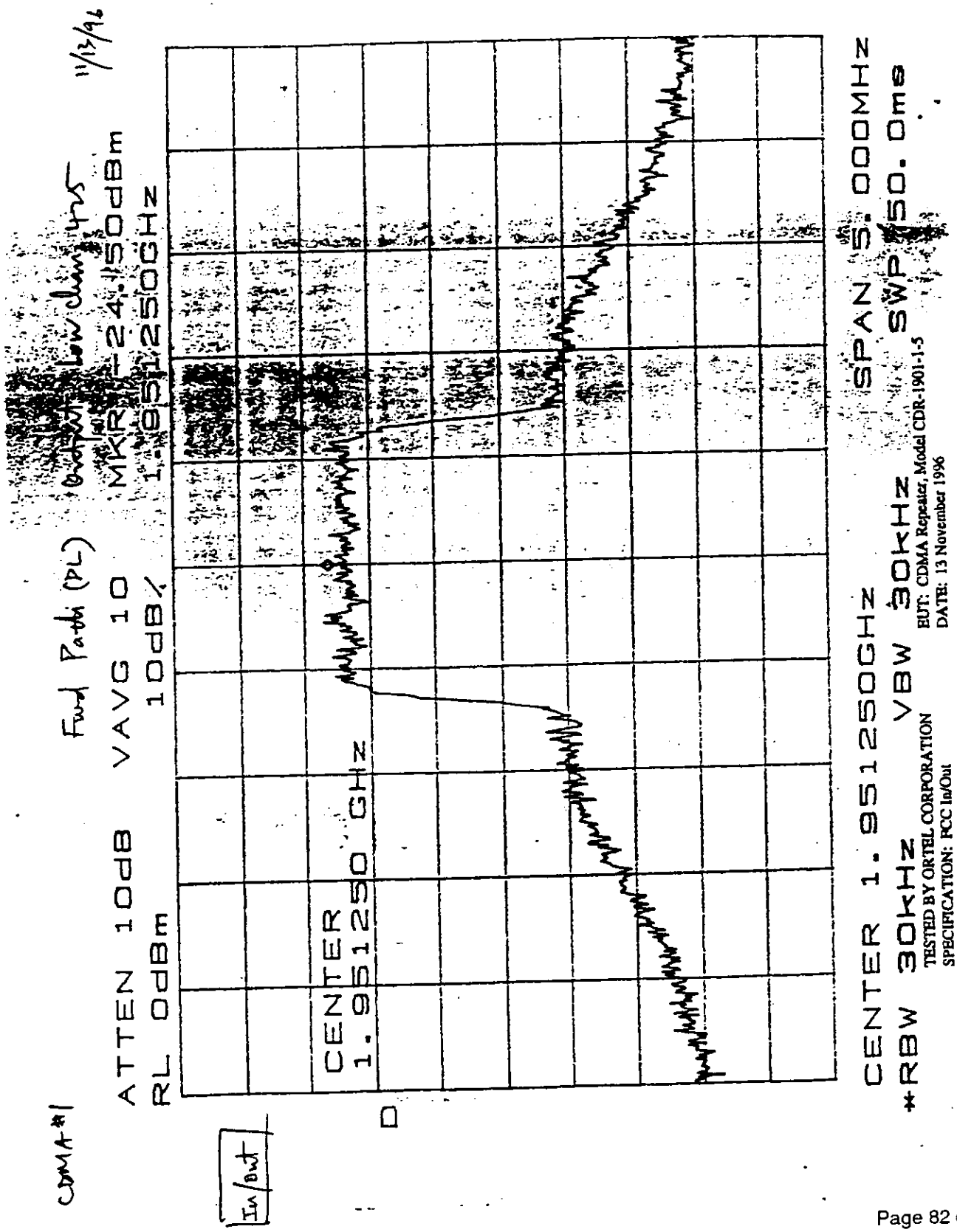

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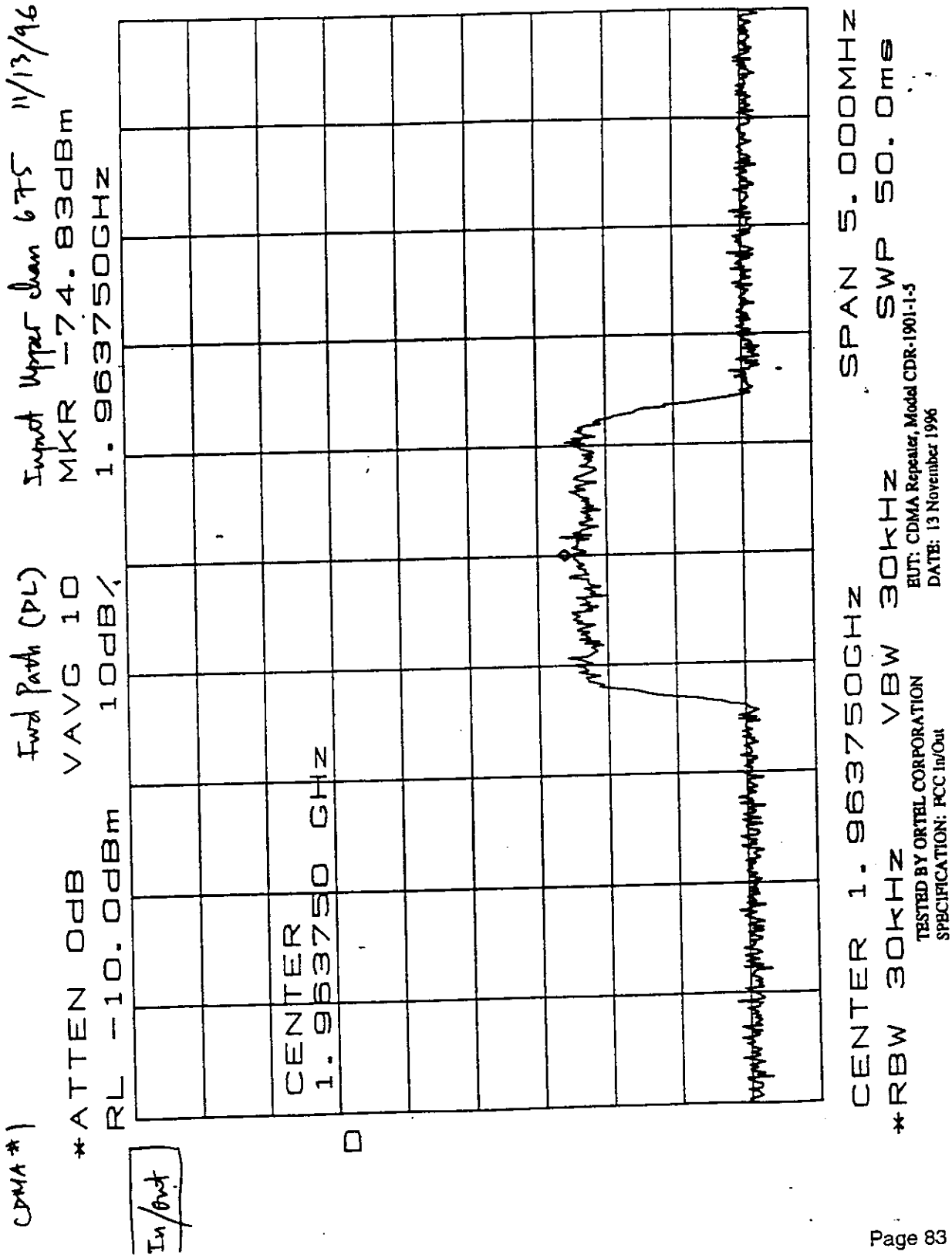
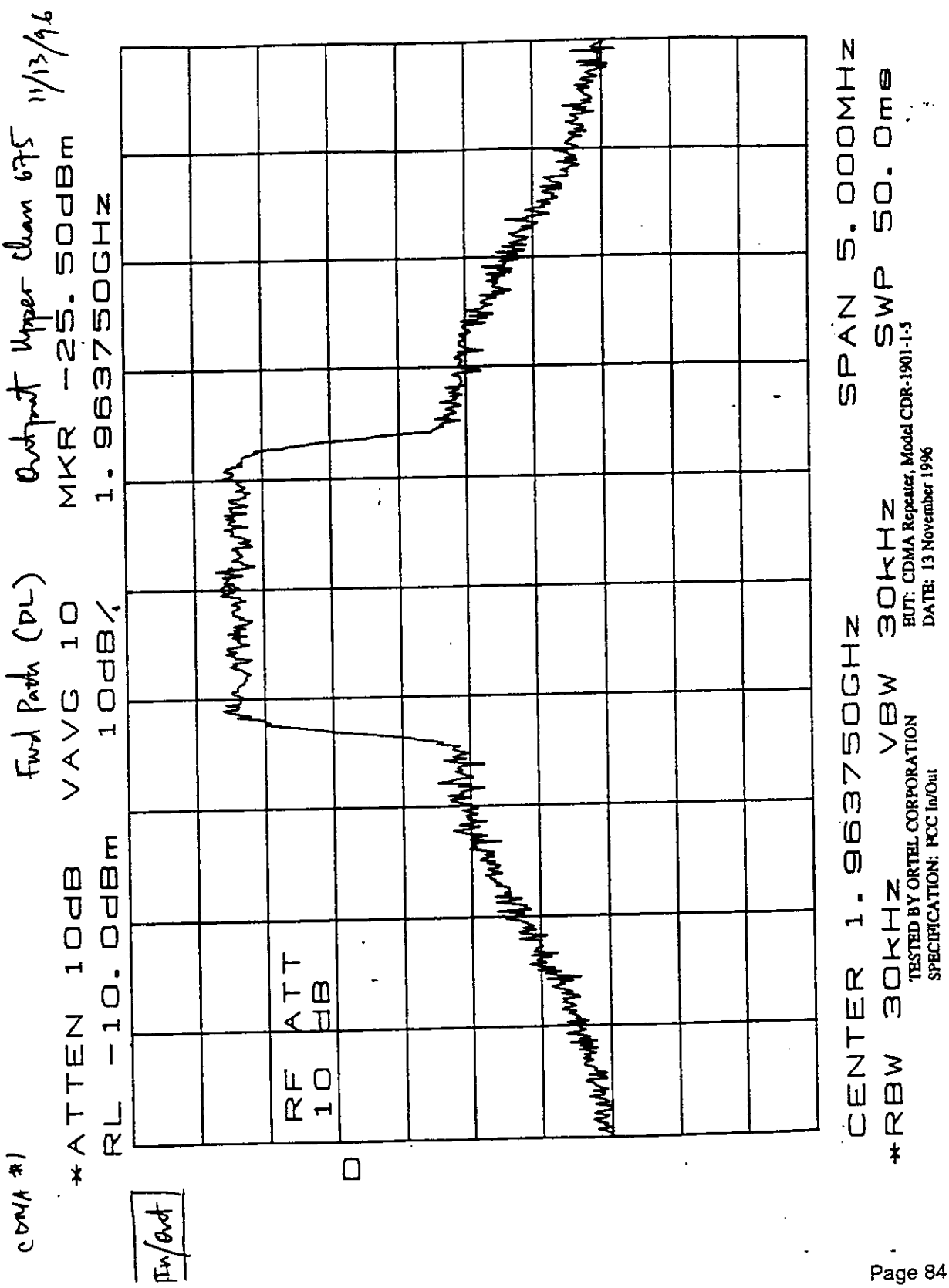
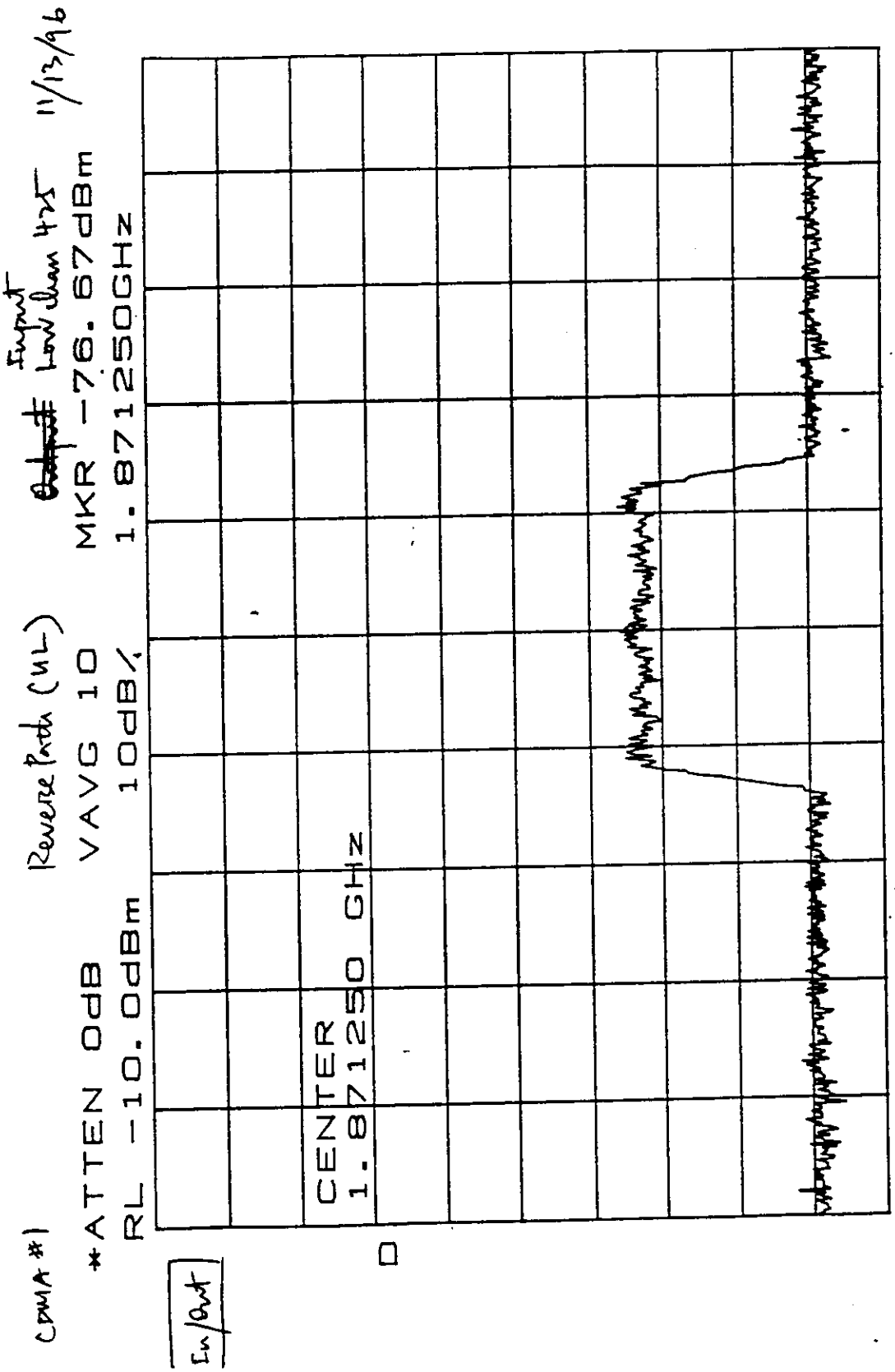
TÜV PRODUCT SERVICE




Fwd Path (DL) Output Upper Chan 675 11/13/96
*ATTEN 10dB VAVG 10
RL -10.0dBm 10dB/
MKR -25.50dBm
1.963750GHz
RF ATT
10 dB
0
CENTER 1.963750GHz SPAN 5.000MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC In/Out
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996
In/out
comb #1

TÜV PRODUCT SERVICE



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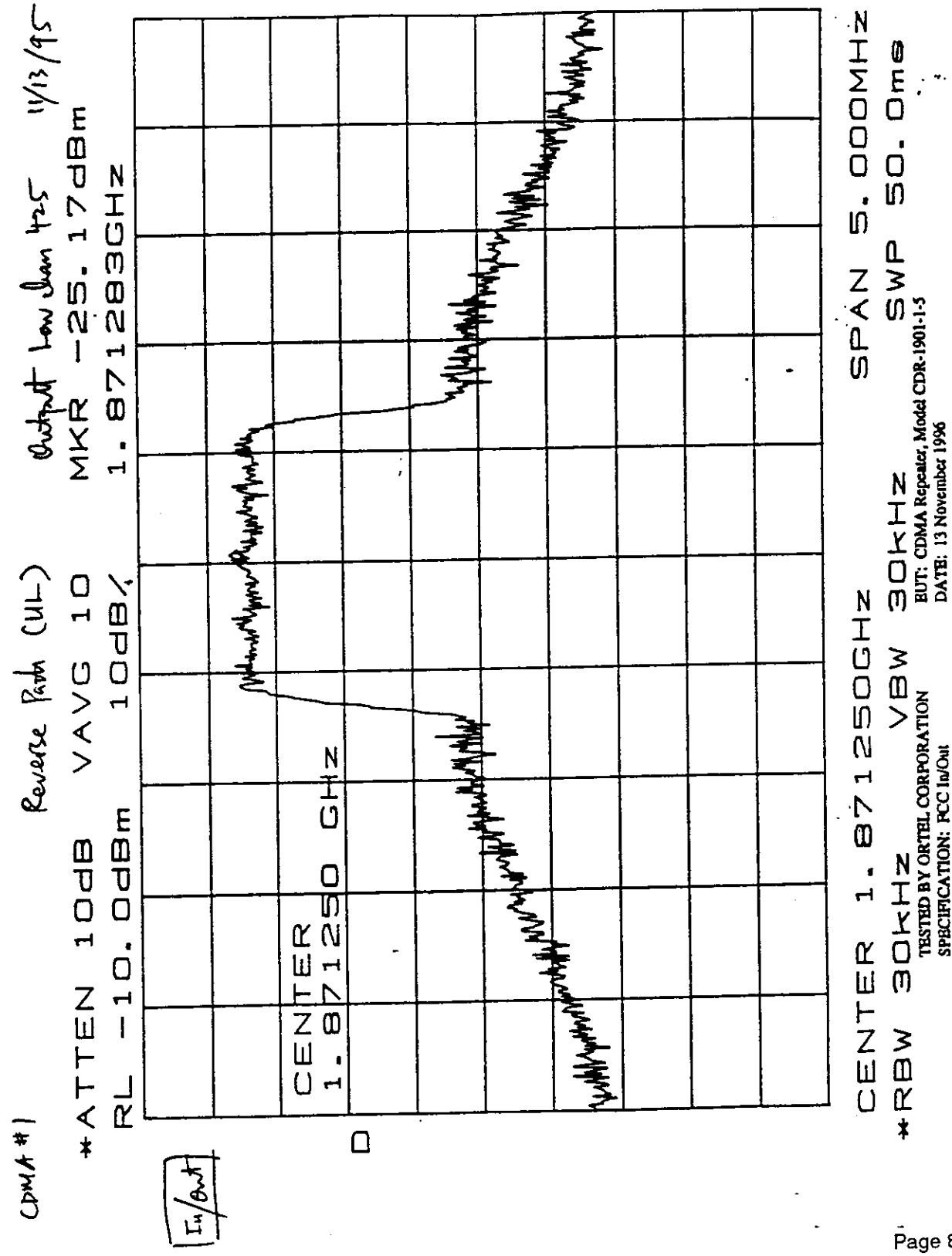
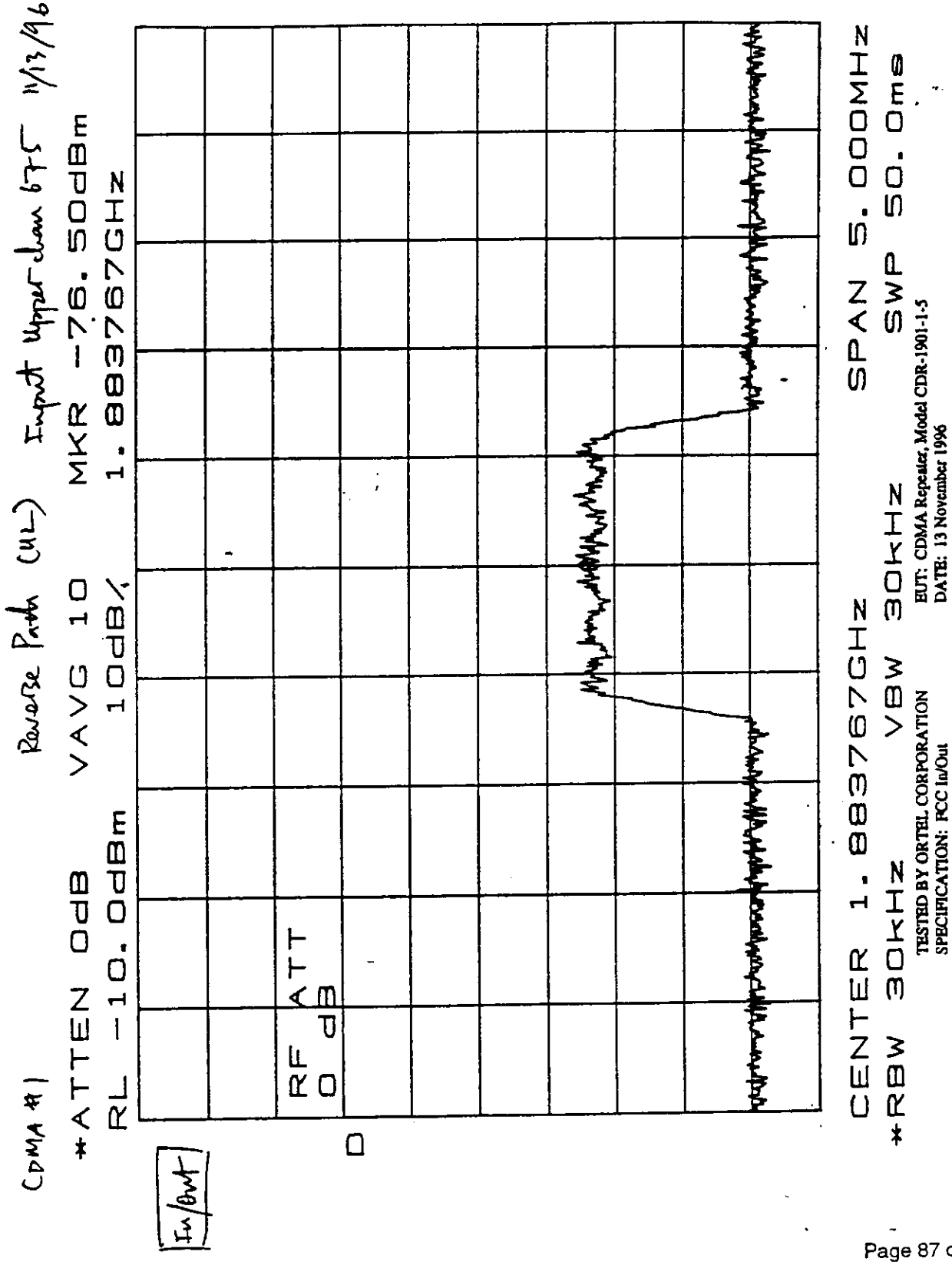


TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364



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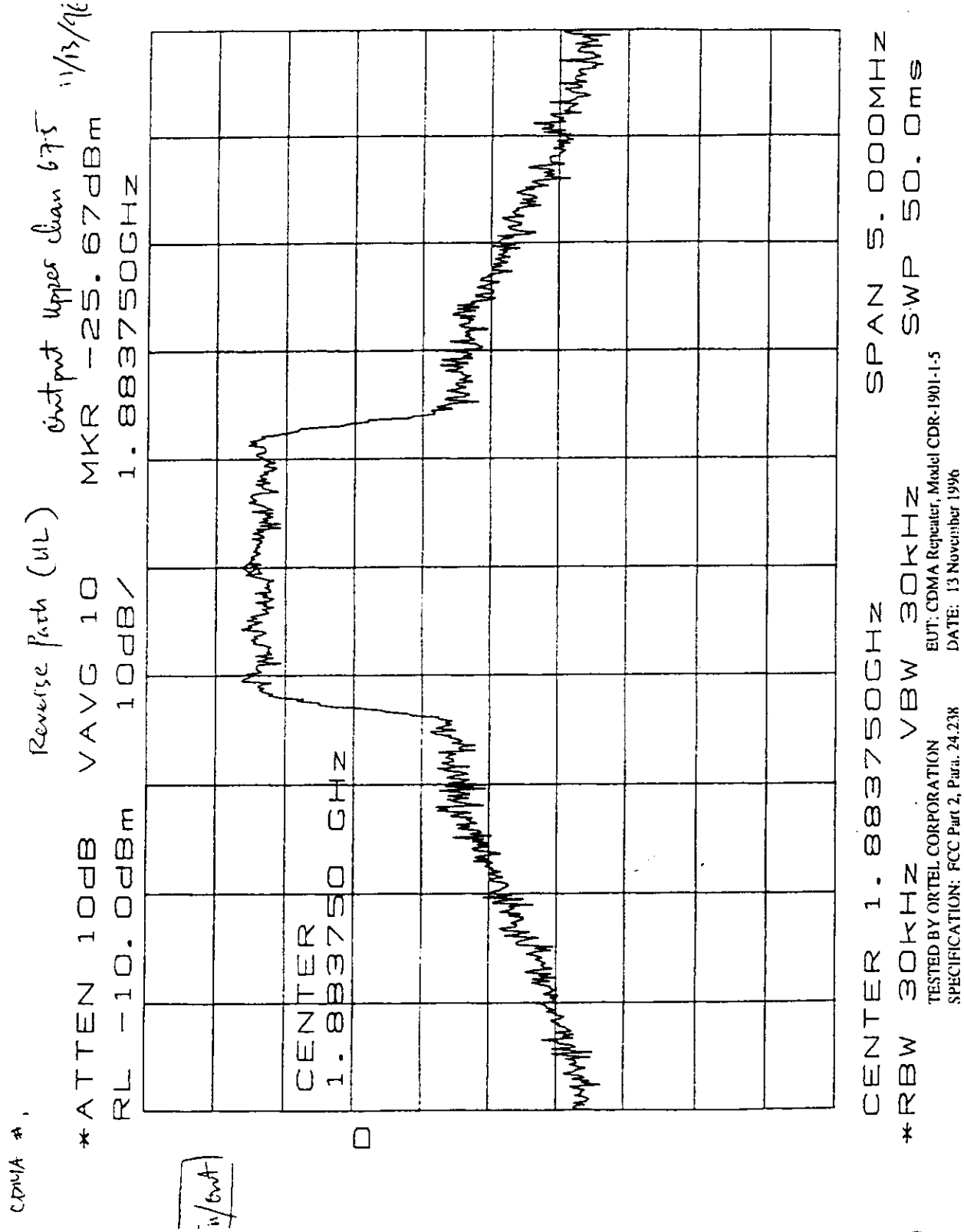
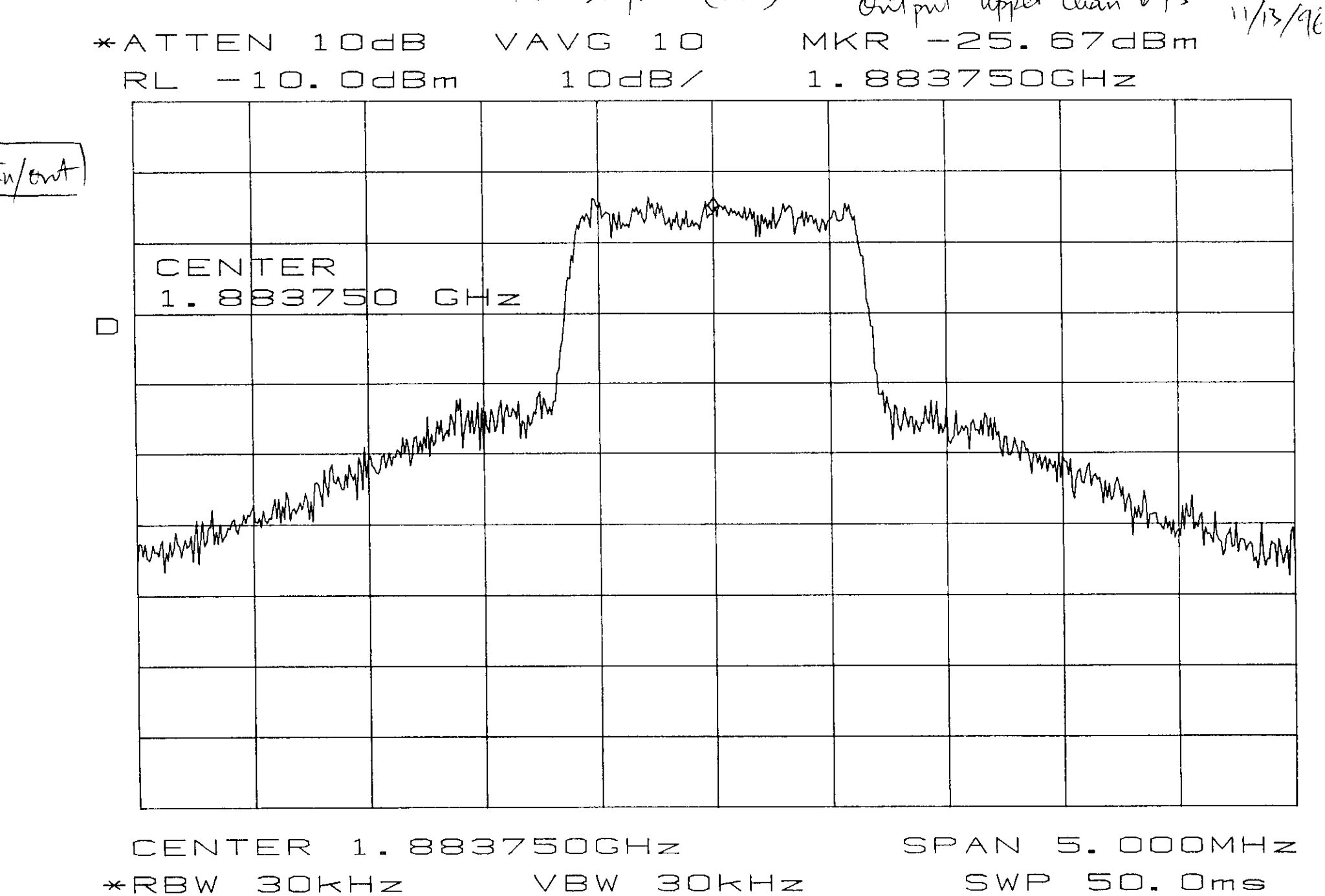

Reverse Path (UL)
output upper chan 675
11/13/96
*ATTEN 10dB VAVG 10
RL -10.0dBm 10dB/
MKR -25.67dBm
1.883750GHz
CENTER 1.883750 GHz
SPAN 5.000MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms
CENTER 1.883750GHz
*RBW 30kHz
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 24.238
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996
CDMA #1
11/13/96

CDMA #1

Reverse Path (UL)

Output Upper chan 675

11/13/96



7 RADIATED MEASUREMENT PHOTOS

ORTEL CORPORATION
CDMA Repeater, Model CDR-1901-1-B

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8 RADIATED EMISSION DATA

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

See following page(s).

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

REPORT NO: S6636 DATE: 25 NOV 96
TEST: Radiated Spurious/Harmonics Emissions
CUSTOMER: Ortel Corporation
EUT: Model CDR-1901-X CDMA Repeater
SPECIFICATION: FCC Part 2, Paragraph 2.993 mw

Frequency MHz	Peak Vertical dBµV	Peak Horizontal dBµV	Distance Factor dB	Correction Factor dB/m	Emission Level dBµV/m	Limit dBµV/m	EUT Margin dB
f_c = 1883.75							
3762.5	26.0	26.6	0	22.4	49.0	84.4	-35.4
5651.25	27.1	26.7	↓	24.47	51.57	↓	-32.83
f_c = 1877.5							
3755.0	27.1	25.6	0	22.4	49.5	84.4	-34.9
5632.5	25.9	27.9	↓	24.47	52.37	↓	-32.03
f_c = 1871.25							
~~3742.5~~	~~23.8~~	~~25.3~~	~~0~~	~~22.4~~	~~47.7~~	~~84.4~~	
~~5613.75~~	~~25.7~~	~~25.5~~	~~↓~~	~~24.47~~	~~49.97~~	↓	
3742.5	23.8	25.3	0	22.4	47.7	84.4	-36.7
5613.75	25.7	25.5	↓	24.47	49.97	↓	-34.43

NOTES:
1. RBW = 1MHz; VBW = 1MHz
2. Receive antenna = Model 3115, P/N 251
3. Amplifier : None
4. No emissions were detectable except the fundamental.

revised

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

DATE: 11/5/96

TEST: Radiated Spurious/Harmonics Emissions

CUSTOMER: Ortel Corporation

EUT: Model CDR-1901-1-X, CDMA Repeater

SPECIFICATION: FCC Part 2, Paragraph 2.993 (d)

Frequency MHz	Peak Vertical dBµV	Peak Horizontal dBµV	Distance Factor dB	Correction Factor dB/m	Gain dB	Emission Level dBµV/m	Limit dBµV/m
f=1951.25	36.2	32.4	0	23.68	0	59.88	—
3.9025	25.2	25.5	↓	22.81	↓	48.31	64.71
5.8537	31.3	32.8	↓	22.18	↓	54.98	↓
f=1957.50	36.2	35.8	0	23.68	0	59.88	—
3.915	25.4	24.1	↓	22.81	↓	48.91	64.71
5.8725	31.1	31.6	↓	22.18	↓	53.78	↓
f=1963.75	44.4	40.5	0	23.68	0	68.08	—
3.9275	24.6	25.8	↓	22.81	↓	49.91	72.91
5891.25	31.8	32.5	↓	22.18	↓	54.68	↓
f=							

NOTES:
1. Resolution bandwidth and video bandwidth was 1 MHz.
2. No emissions were detectable except the fundamental.

TÜV PRODUCT SERVICE 10040 Mesa Rim Road San Diego, CA 92121-2912 Phone 619 546 3999 FAX 619 546 0364

TÜV PRODUCT SERVICE

REPORT NO: S6636 DATE: 05 Nov 96
TEST: Radiated Spurious Harmonics EMissions
CUSTOMER: Ortel Corporation
EUT: Model CDR-1901-1-X CDMA Repeater
SPECIFICATION: Fcc Part 2, Paragraph 2.993 MO

Frequency MHz	Peak Vertical dBµV	Peak Horizontal dBµV	Distance Factor dB	Correction Factor dB/m	Emission Level dBµV/m	Limit dBµV/m	EUT Margin dB
f=1951.25							
3.9025	25.2	25.5	0	22.81	48.31	84.4	36.09
5.8537	31.3	32.3	↓	22.18	54.48	↓	29.92
f=1957.5							
3915	25.9	26.1	0	22.81	48.91	84.4	35.49
5.8725	31.1	31.6	↓	22.18	53.78	↓	30.62
f=1963.75							
3927.5	26.6	25.8	0	22.81	49.41	84.4	34.99
5.8913.25	31.8	32.5	↓	22.18	54.68	↓	29.72

NOTES:
1. RBW = 1MHz: VBW = 1MHz
2. Receive antenna = Model 3115, P/N 251
3. Amplifier
4. _____

revised

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TÜV PRODUCT SERVICE

DATE: 11/5/96

TEST: Radiated Spurious/Harmonics Emissions

CUSTOMER: Orkel Corporation

EUT: Model CDR-1901-1-X, CDMA Repeater

SPECIFICATION: FCC Part 2, Paragraph 2.993 mD

Frequency MHz	Peak Vertical dBµV	Peak Horizontal dBµV	Distance Factor dB	Correction Factor dB/m	Gain dB	Emission Level dBµV/m	Limit dBµV/m
f=1882.5	50.4	48.5	0	27.95	0	78.35	—
3762.5	26.0	26.6	↓	22.4	↓	49.0	83.18
5651.25	27.1	26.7	↓	24.47	↓	51.57	↓
f=1877.5	51.2	48.7	0	27.95	0	79.15	—
3755.0	27.1	25.6	↓	22.4	↓	49.5	85.15
5632.5	25.9	27.9	↓	24.47	↓	52.37	↓
f=1877.25	46.80	43.70	0	27.95	0	74.75	—
3792.5	23.80	25.20	↓	22.4	↓	47.70	78.59
5688.75	25.70	25.50	↓	24.47	↓	49.97	↓
f=							

NOTES:
1. Resolution bandwidth and video bandwidth was 1 MHz.
2. No emissions were detectable except the fundamental

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8.2 Field Strength Calculation

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

Corrected Meter Reading Limit (CMLR) = SAR + AF + CL - AG - DC

Where, SAR = Spectrum Analyze Reading
AF = Antenna Factor
CL = Cable Loss
AG = Amplifier Gain (if any)
DC = Distance Correction (if any)

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

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

CMLR = 20.0 dBuV/M

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

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

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9 PHOTOS OF TESTED EUT

The following photos are attached:

System Interface Module (SIMS)

Figure 8.1 External View CDMA Repeater (A)
Figure 8.2 External View CDMA Repeater (B)
Figure 8.3 Uplink/Downlink Amplifier External View
Figure 8.4 Uplink/Downlink Amplifier Internal View
Figure 8.5 Internal View Controller Module
Figure 8.6 Exterior View of DC-DC Power Supply
Figure 8.7 DC/DC Converter Internal View
Figure 8.8 DC/DC Converter Close-up Internal View
Figure 8.9 Channelizer External View
Figure 8.10 Channelizer Internal View
Figure 8.11 Channelizer Close-up Internal View
Figure 8.12 Channelizer Close-up Internal View
Figure 8.13 Channelizer Back Panel
Figure 8.14 AC/DC Power Supply Internal View
Figure 8.15 Exterior View of Downlink Duplexer
Figure 8.16 Exterior View of Uplink Duplexer
Figure 8.17 Interior View of Downlink Duplexer
Figure 8.18 Interior View of Uplink Duplexer
Figure 8.19 Exterior View of LNA Splitter
Figure 8.20 Exterior View of Uplink LNA Splitter
Figure 8.21 Interior View of LNA Splitter

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Figure 8.1 External View CDMA Repeater (A)

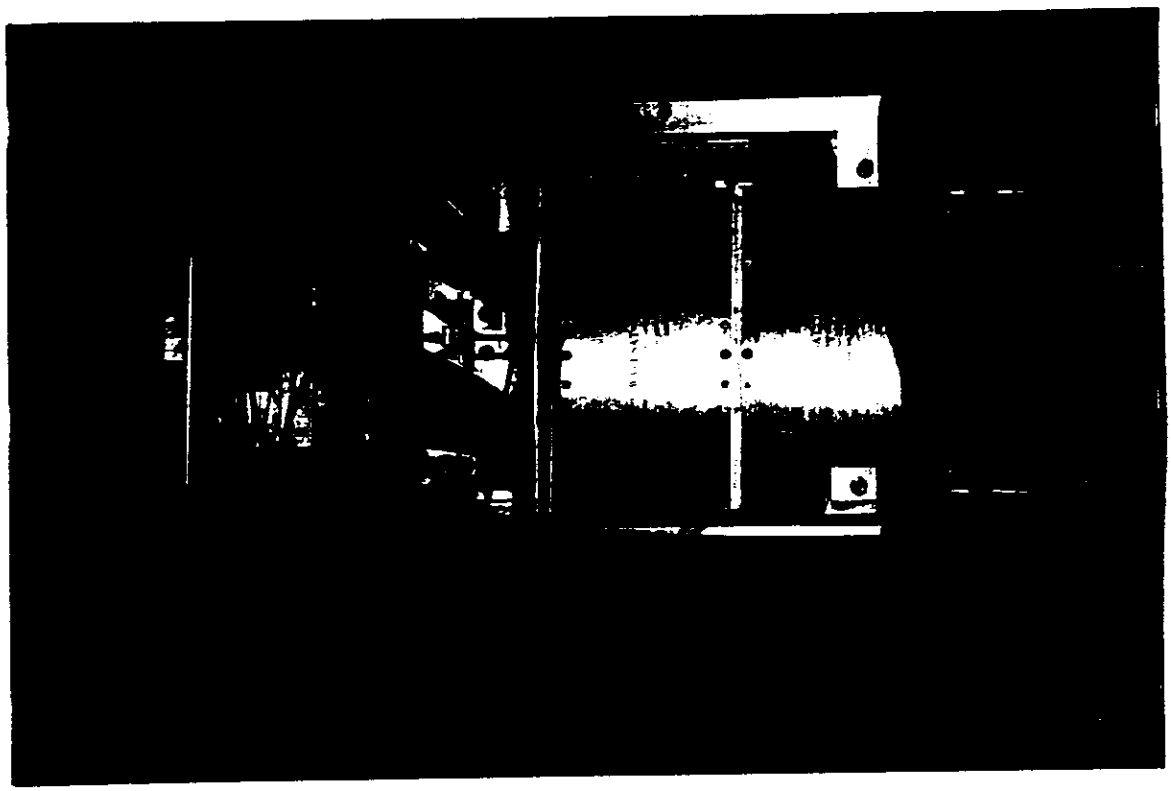

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Figure 8.2 External View CDMA Repeater (B)

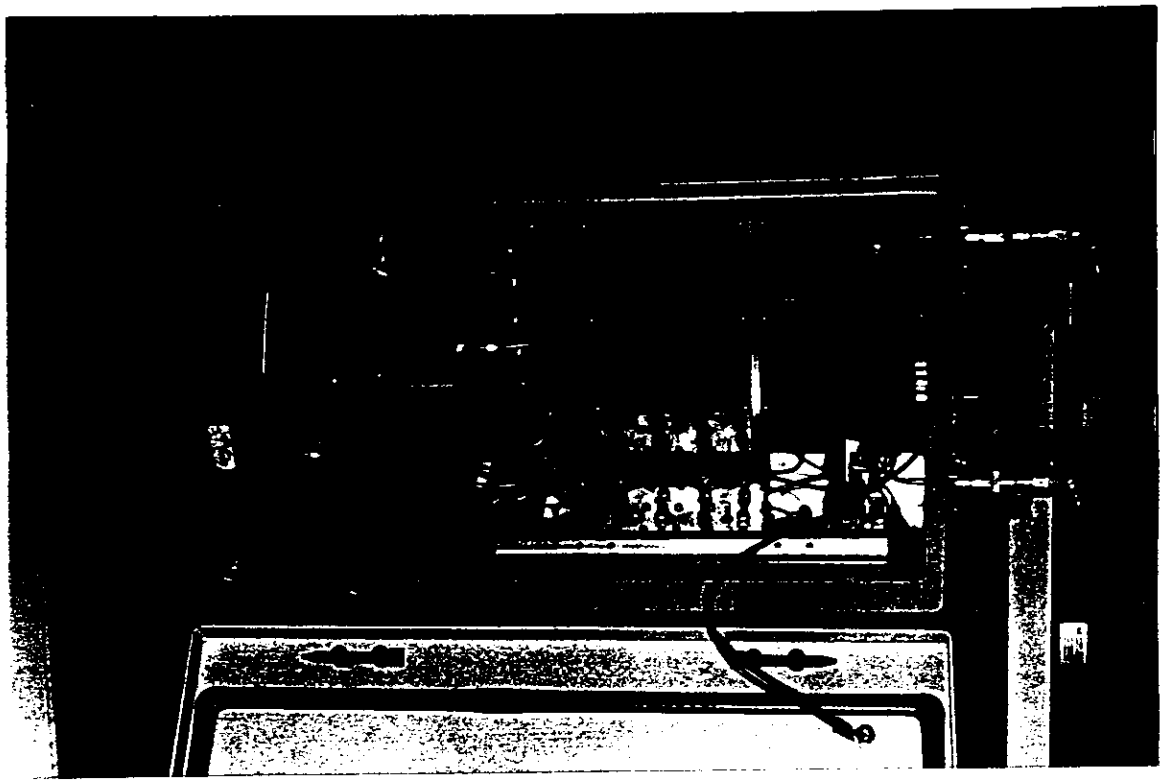

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Figure 8.3 Uplink/Downlink Amplifier External View

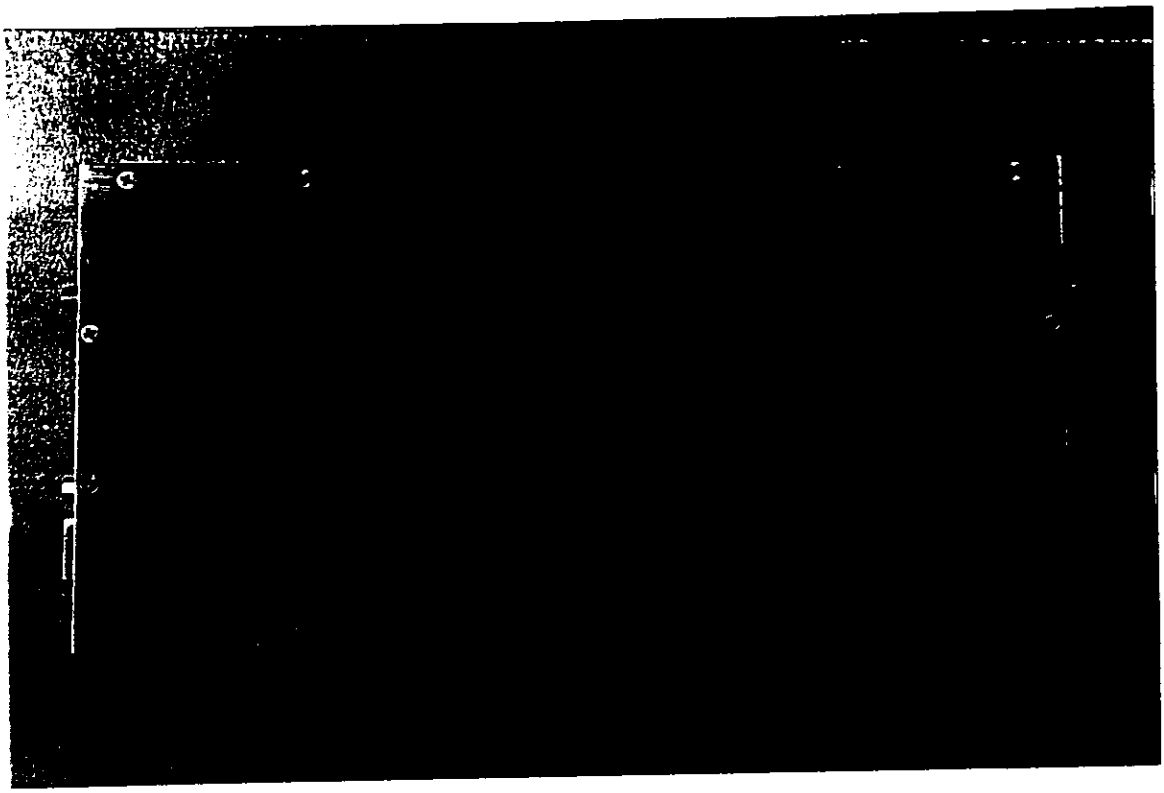

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Figure 8.4 Uplink/Downlink Amplifier Internal View

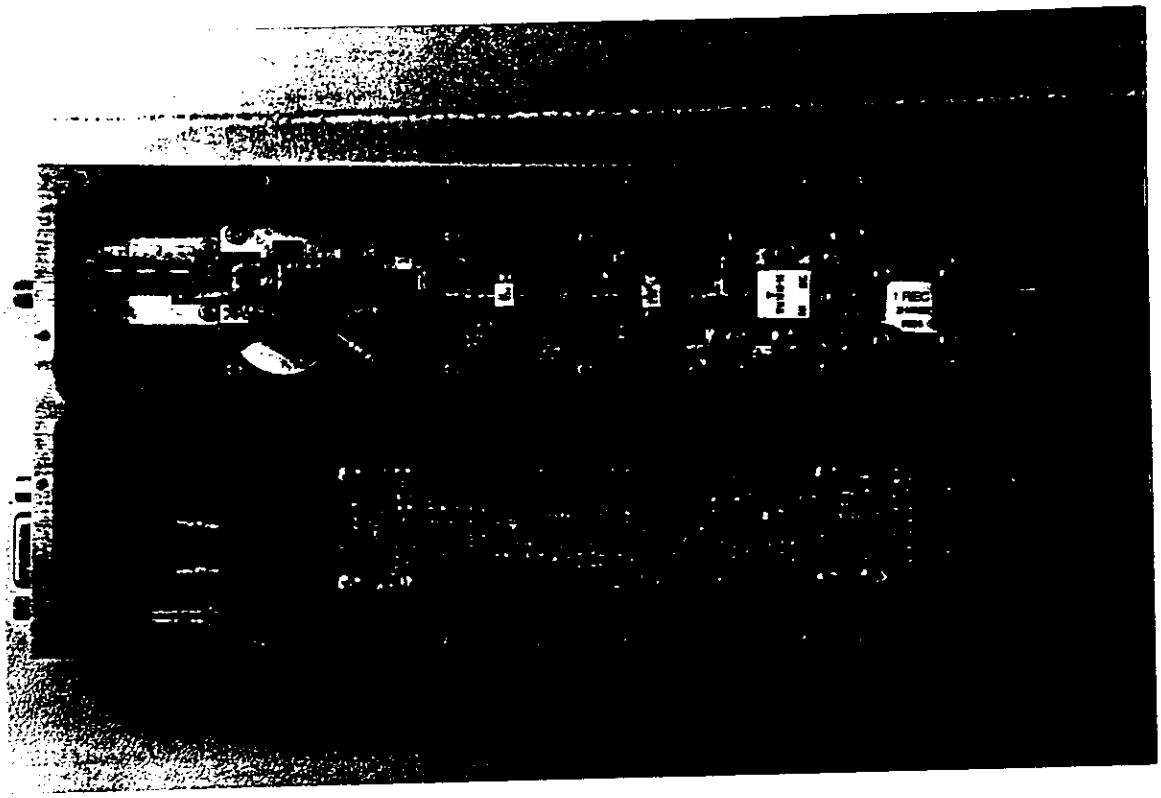

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Figure 8.5 Internal View Controller Module

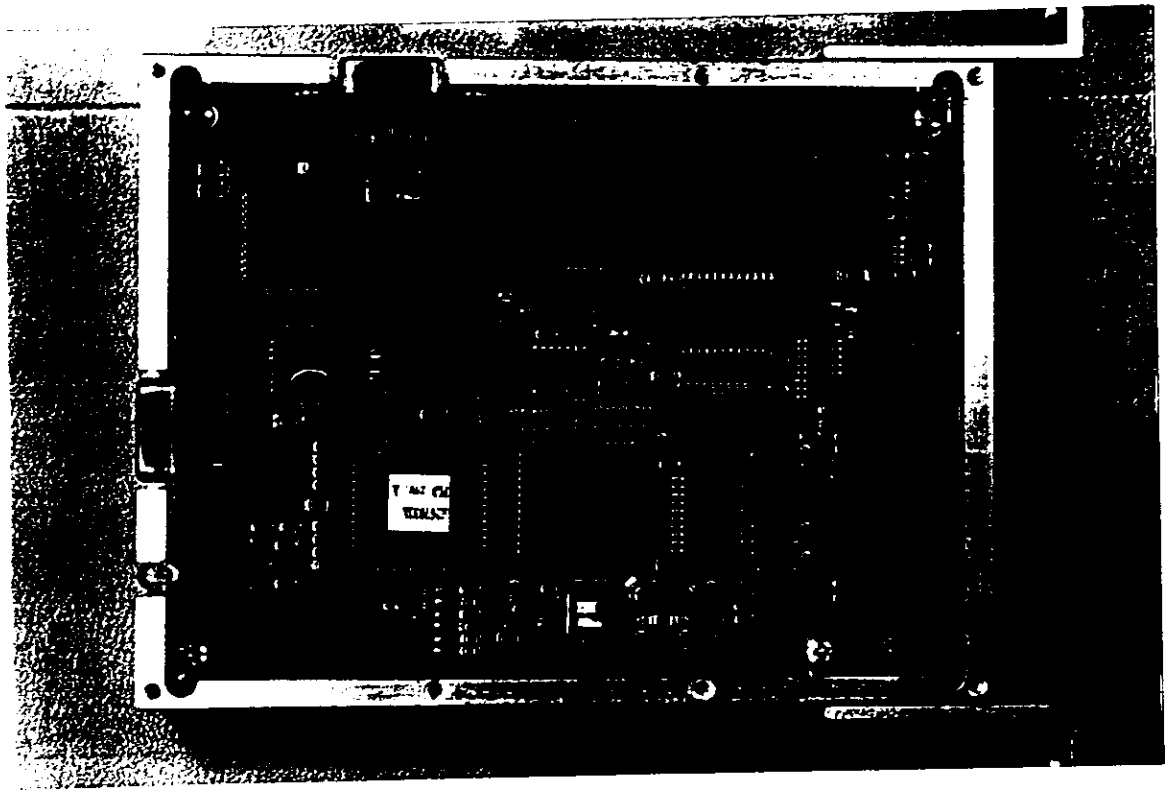

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Figure 8.6 Exterior View of DC-DC Power Supply

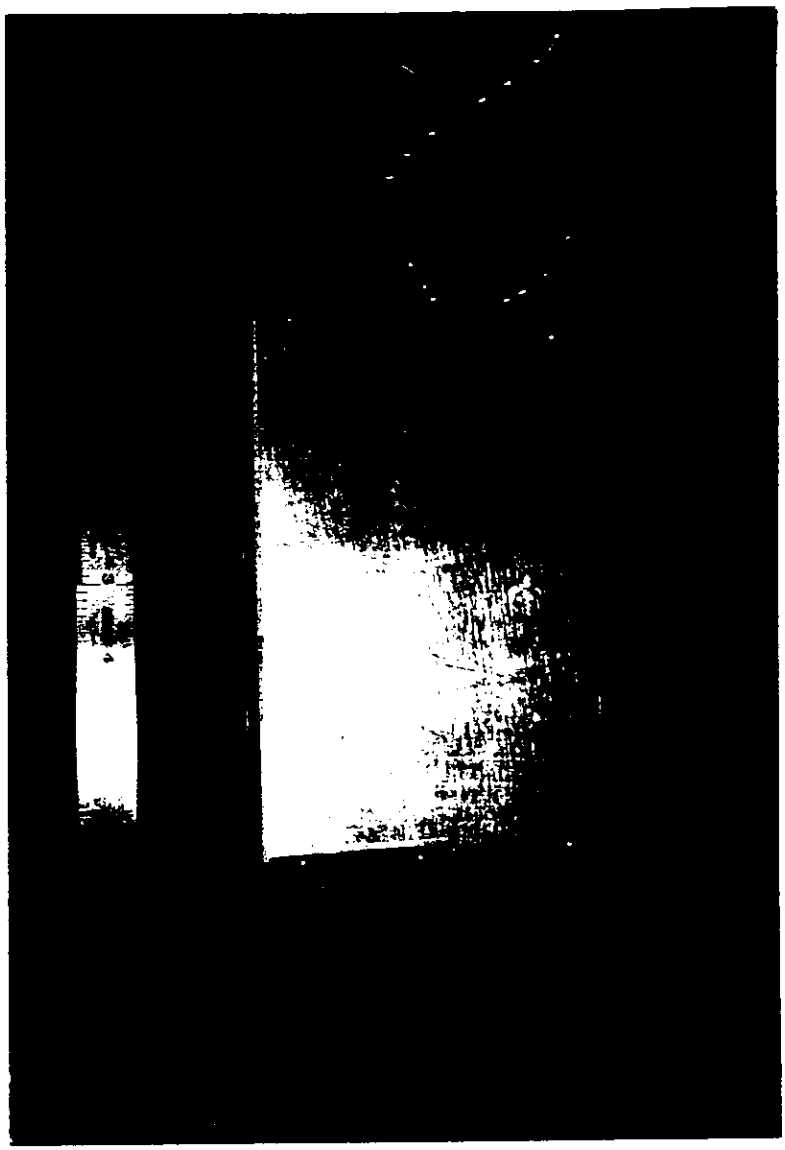

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Figure 8.7 DC/DC Converter Internal View

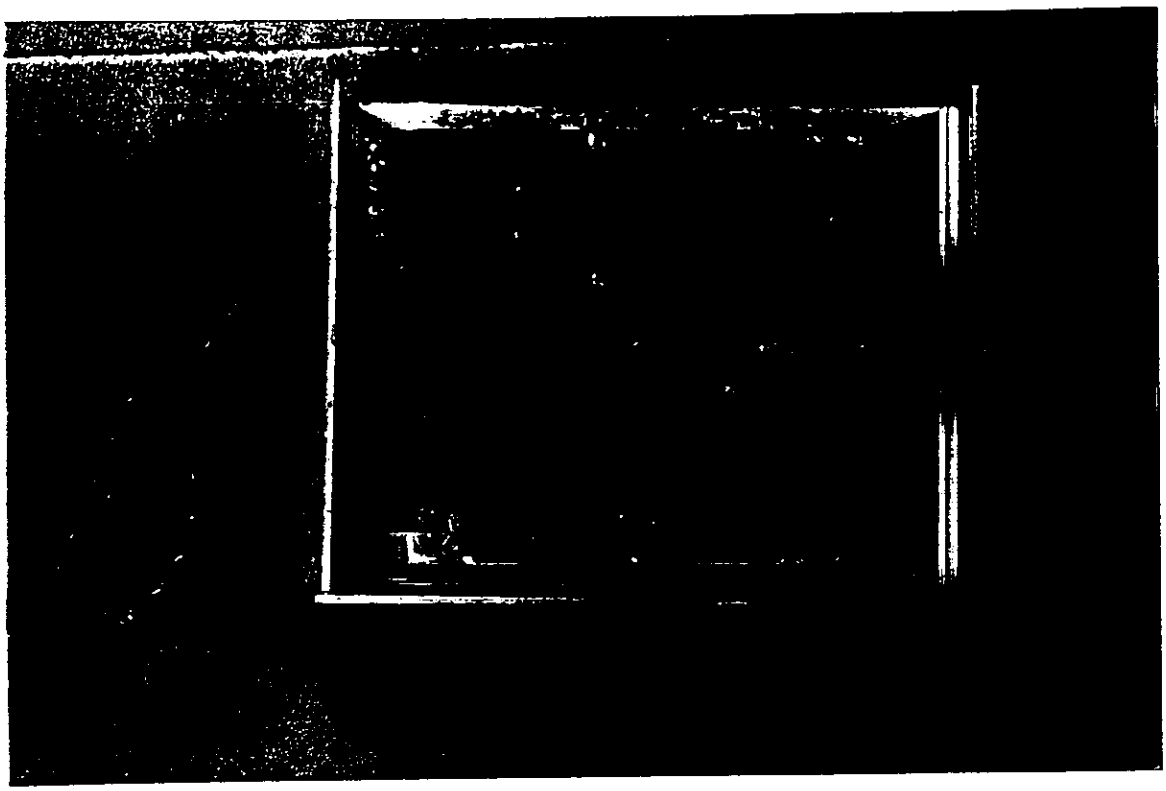

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Figure 8.8 DC/DC Converter Close-up Internal View

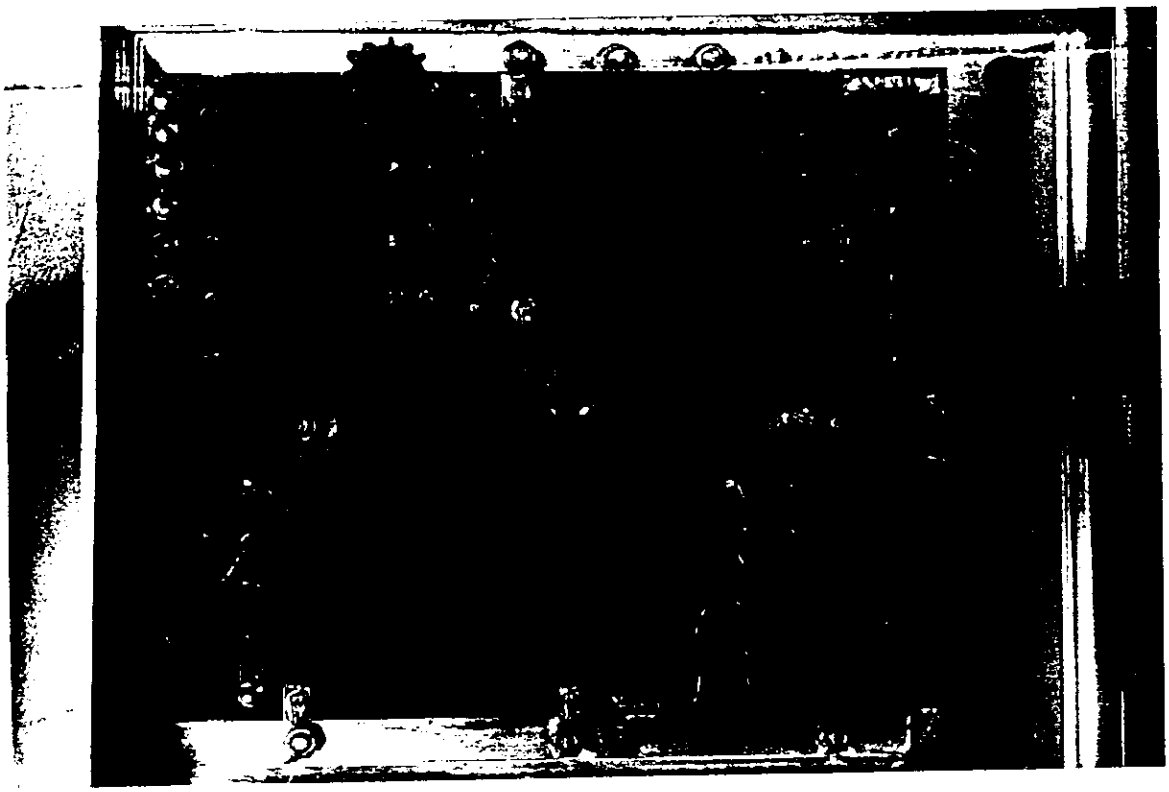

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Figure 8.9 Channelizer External View

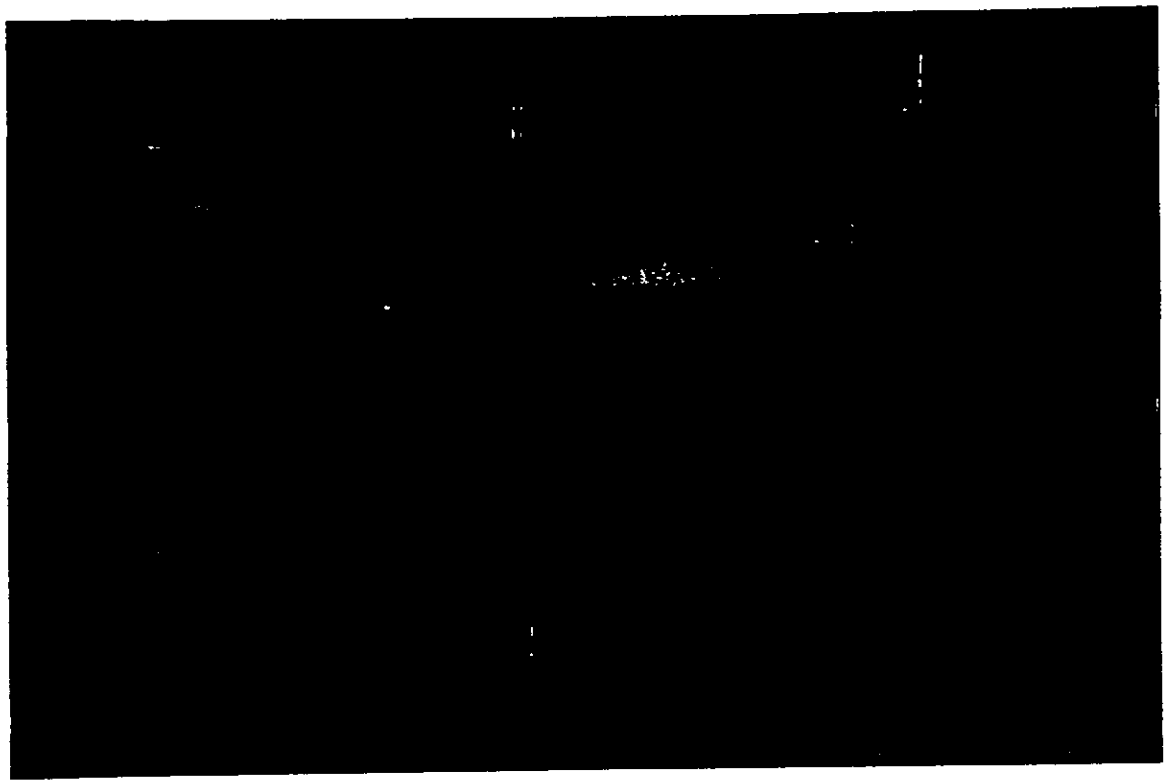

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Figure 8.10 Channelizer Internal View

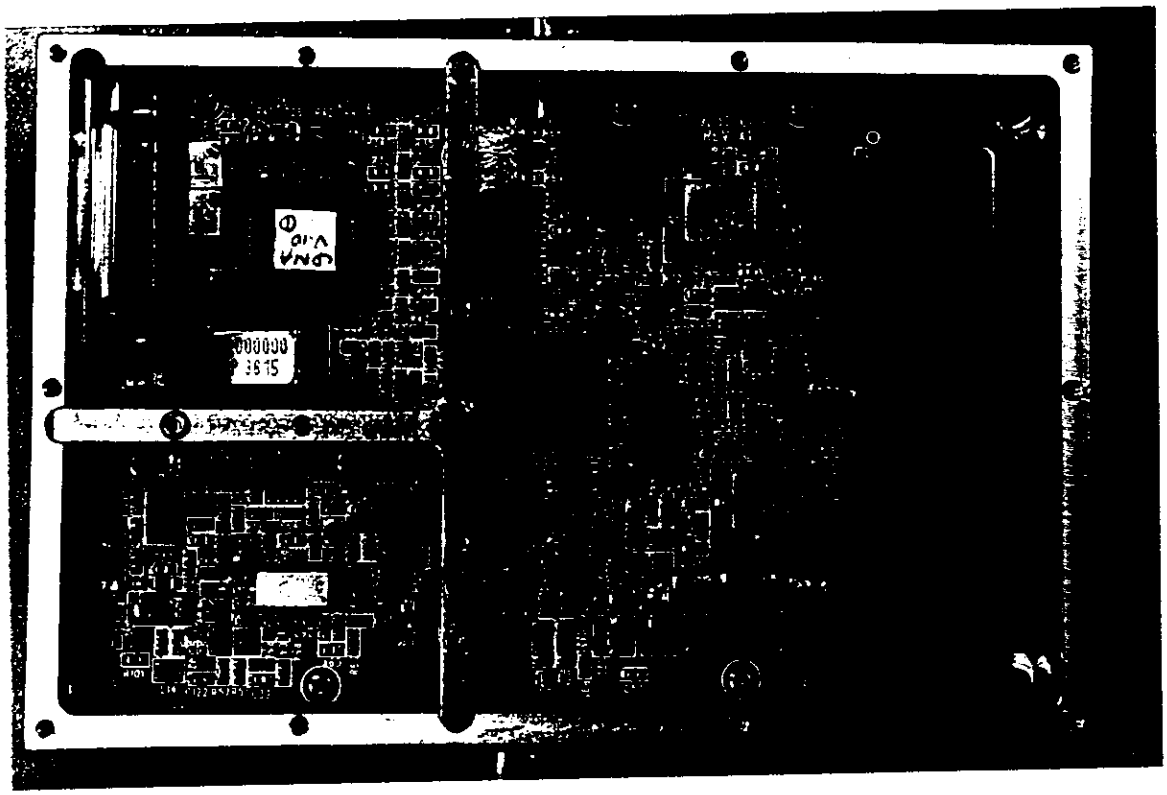

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Figure 8.11 Channelizer Close-up Internal View

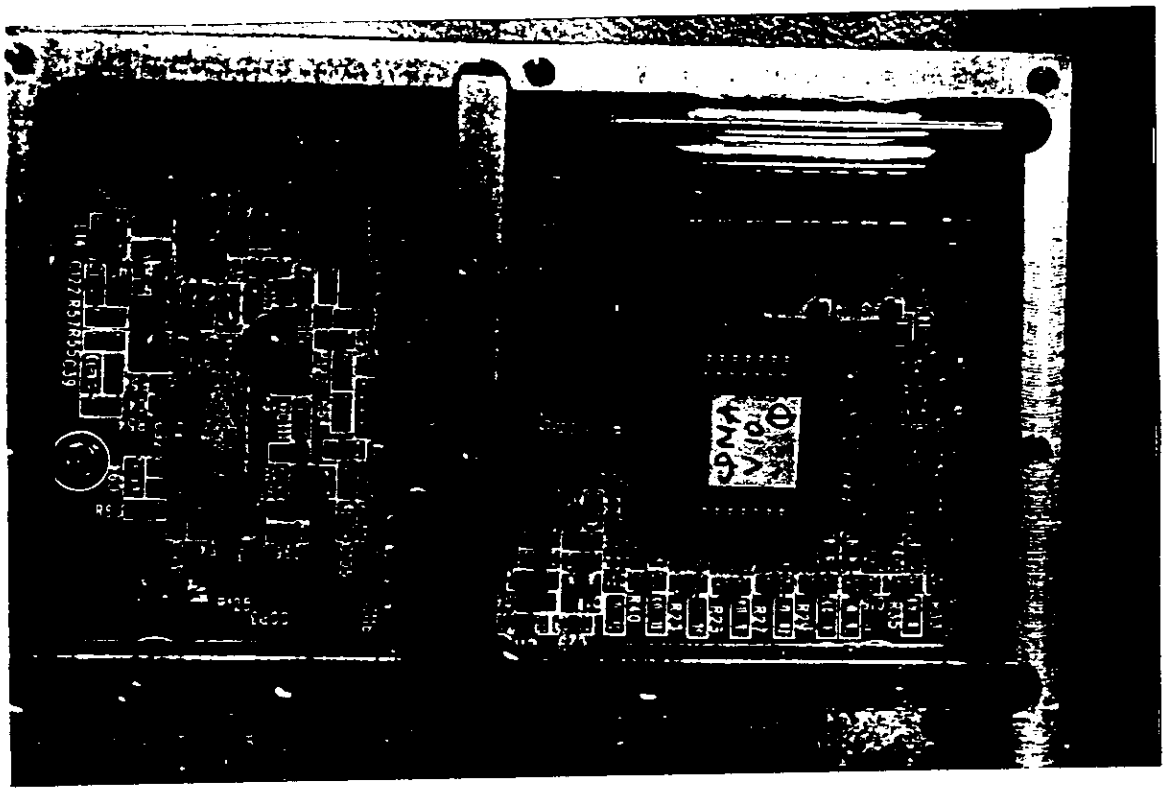

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Figure 8.12 Channelizer Close-up Internal View

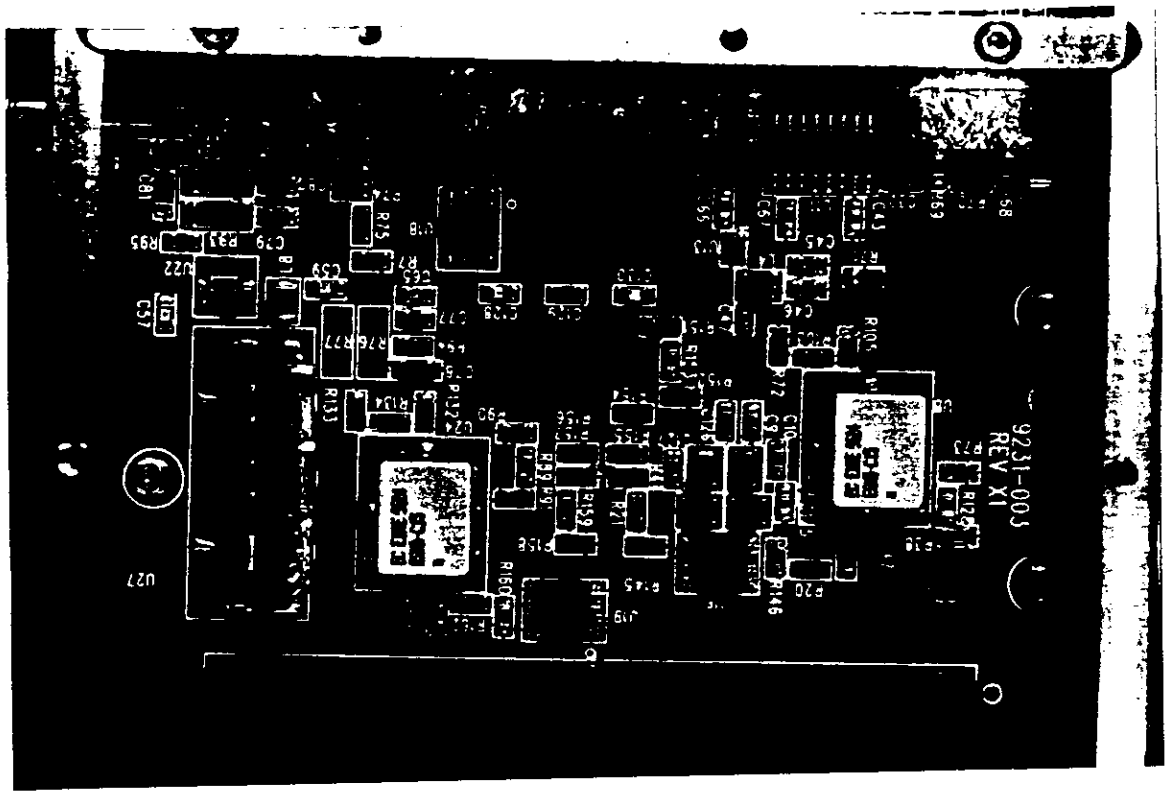

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Figure 8.13 Channelizer Back Panel

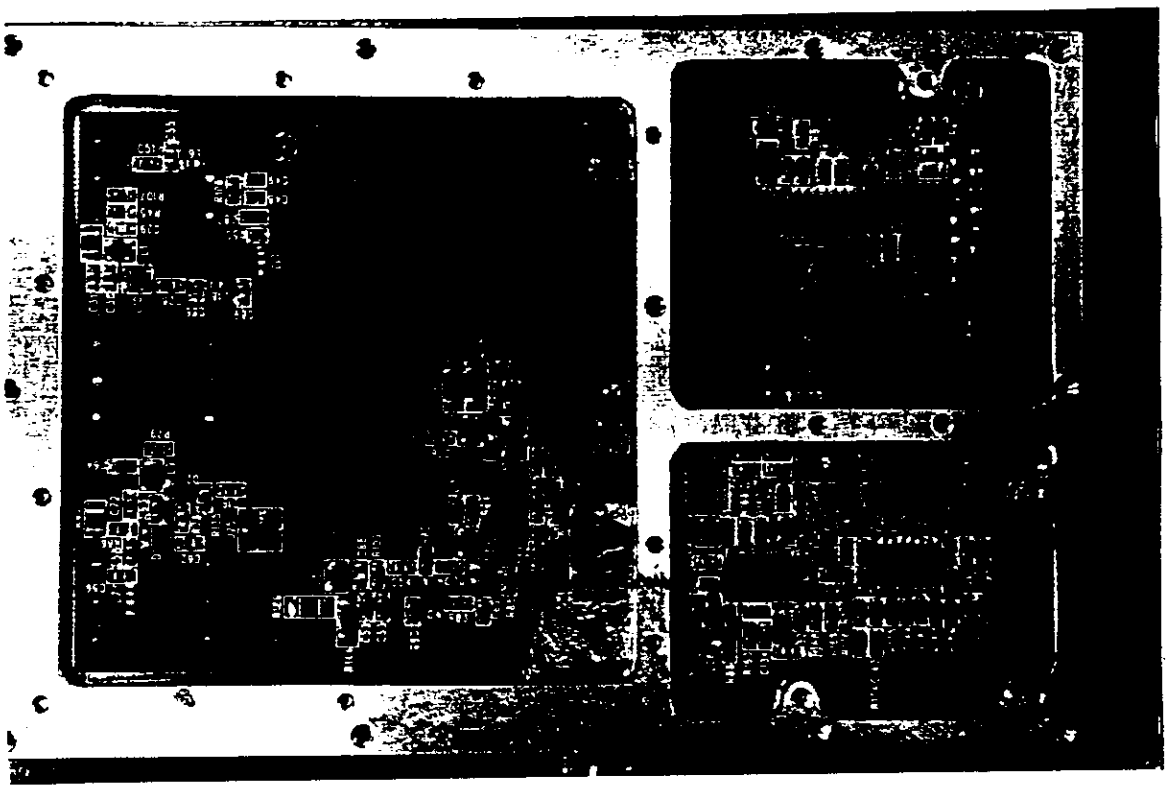

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Figure 8.14 AC/DC Power Supply Internal View

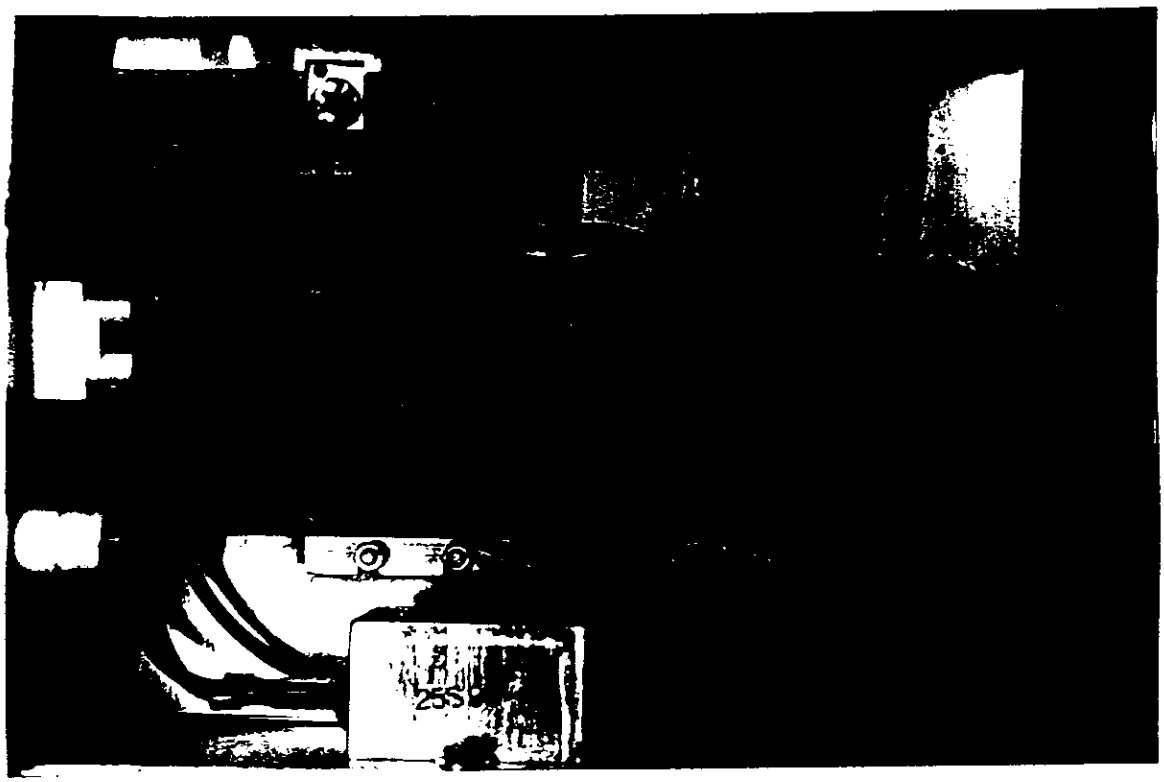

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Figure 8.15 Exterior View of Downlink Duplexer

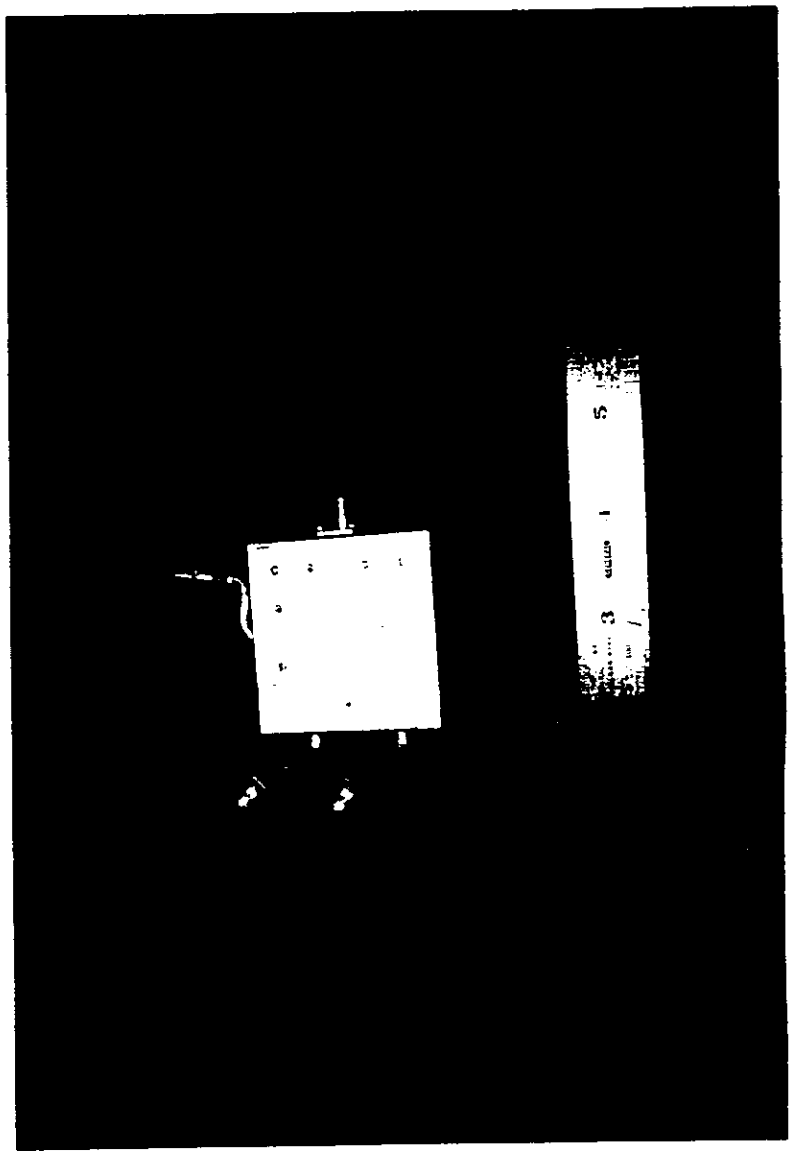

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Figure 8.16 Exterior View of Uplink Duplexer

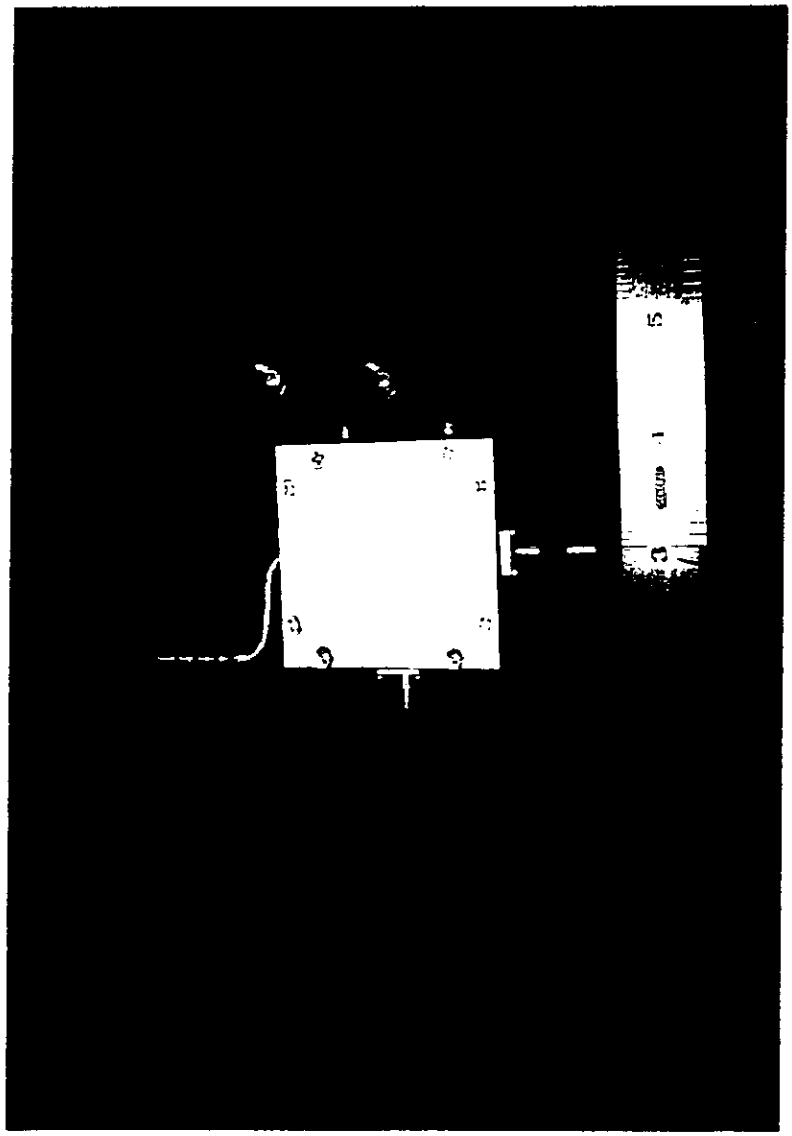

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Figure 8.17 Interior View of Downlink Duplexer

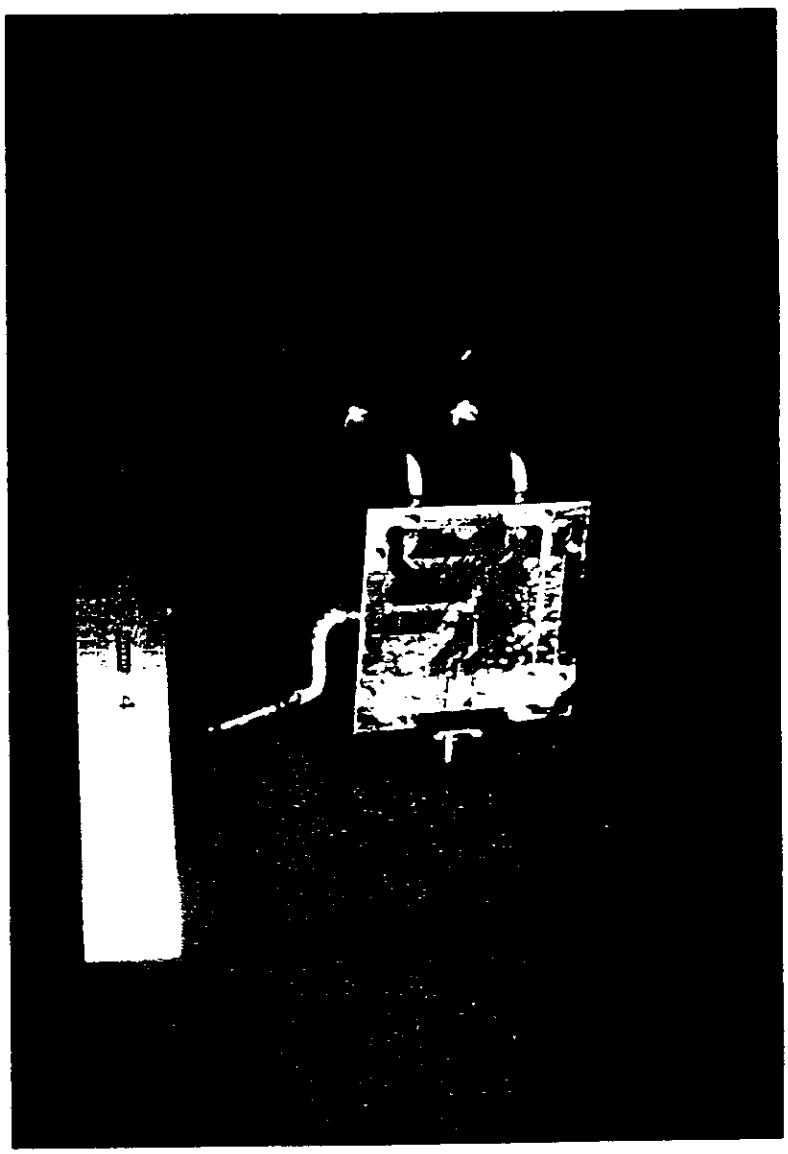

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Figure 8.18 Interior View of Uplink Duplexer

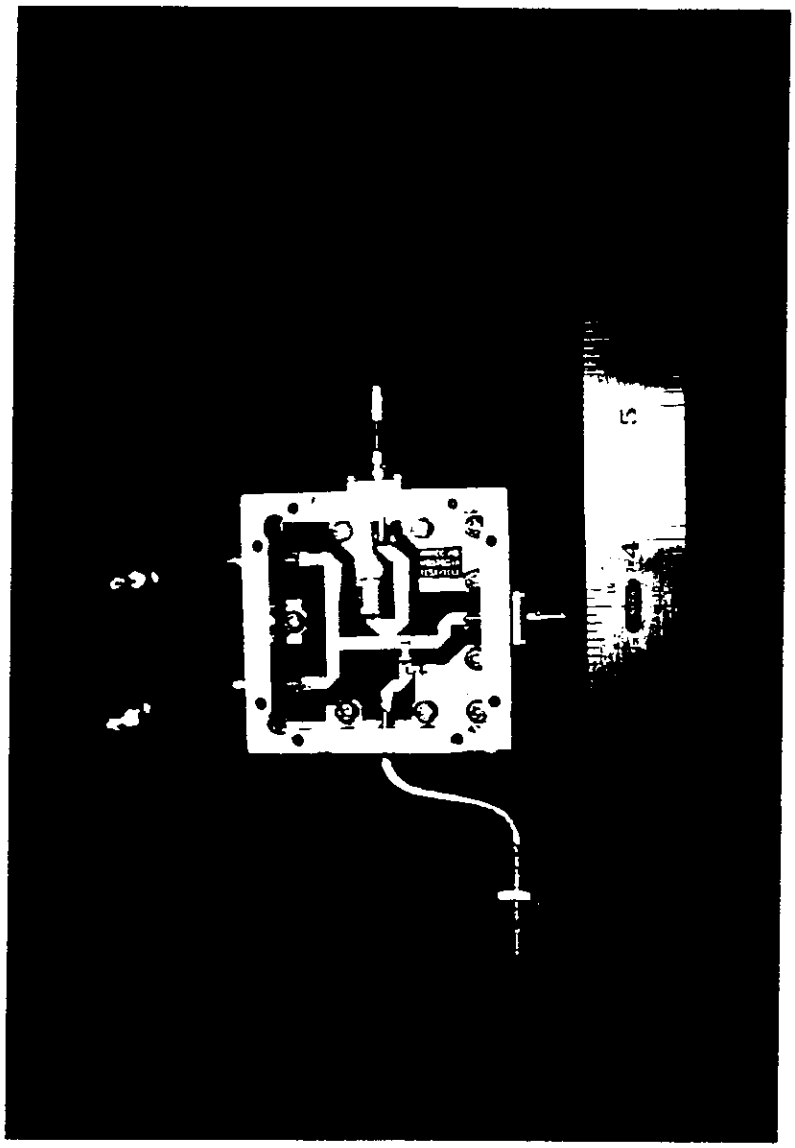

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Figure 8.19 Exterior View of LNA Splitter

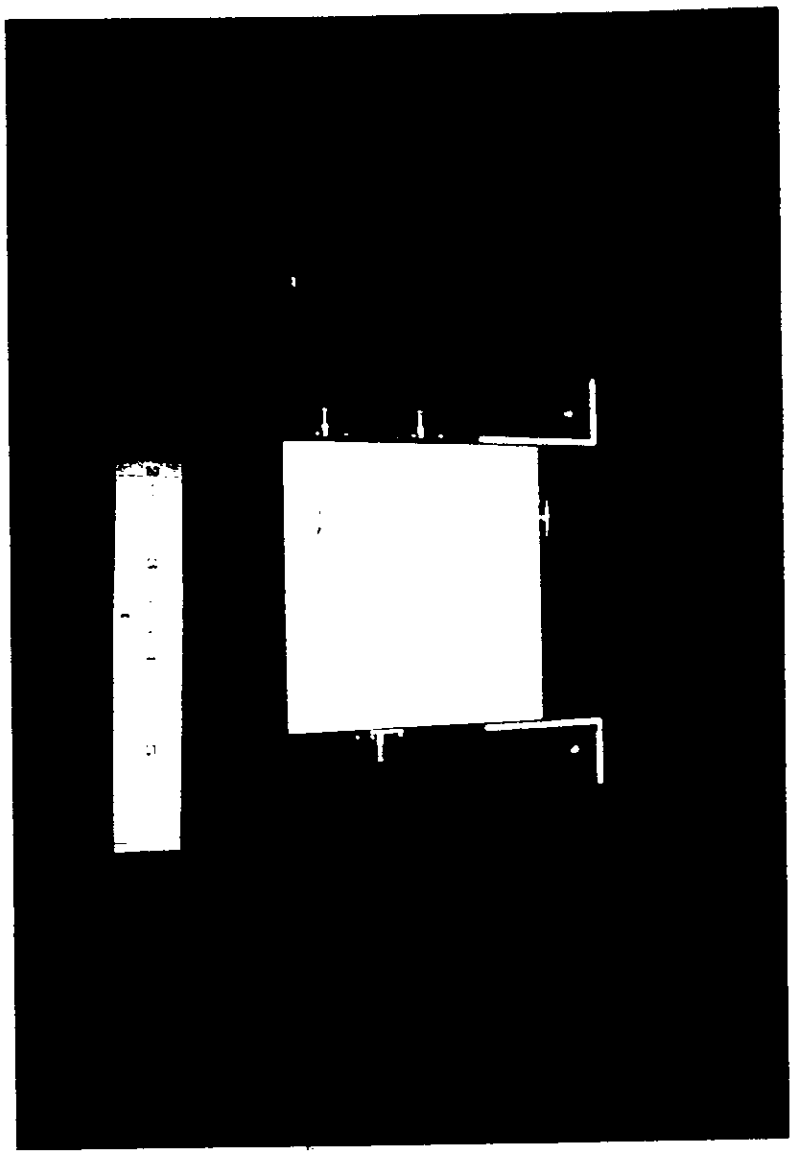

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Figure 8.20 Exterior View of Uplink LNA Splitter

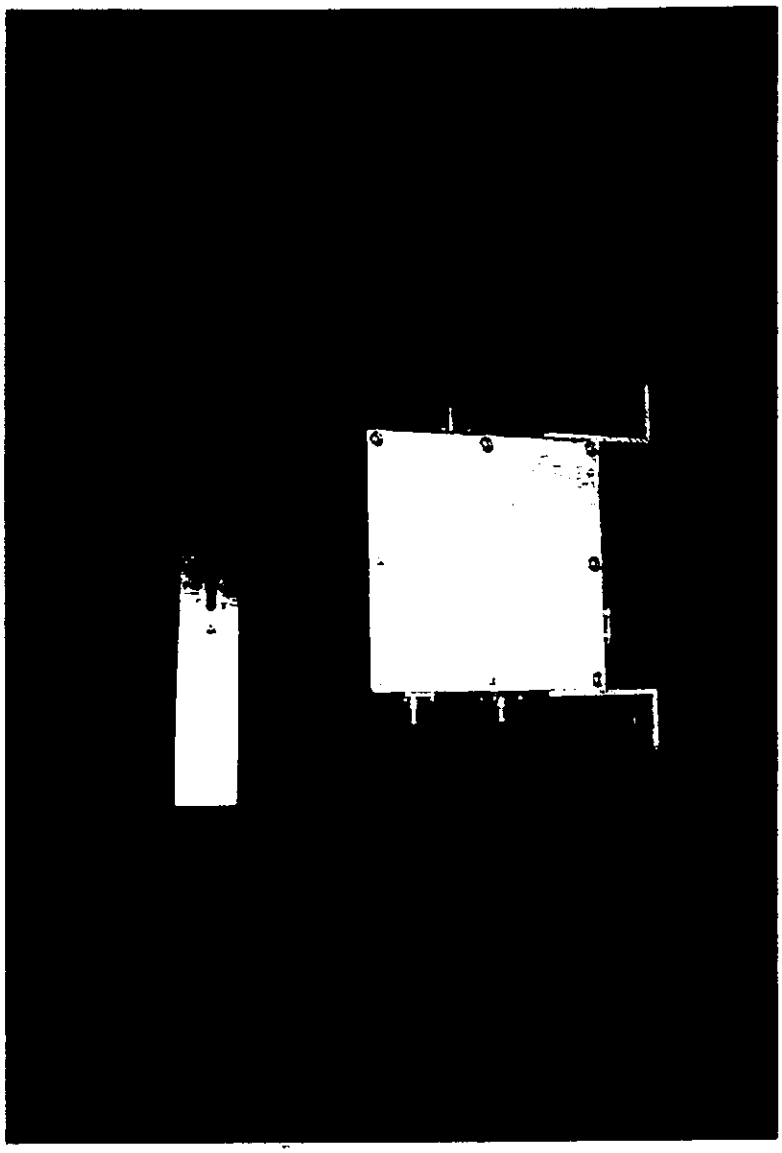

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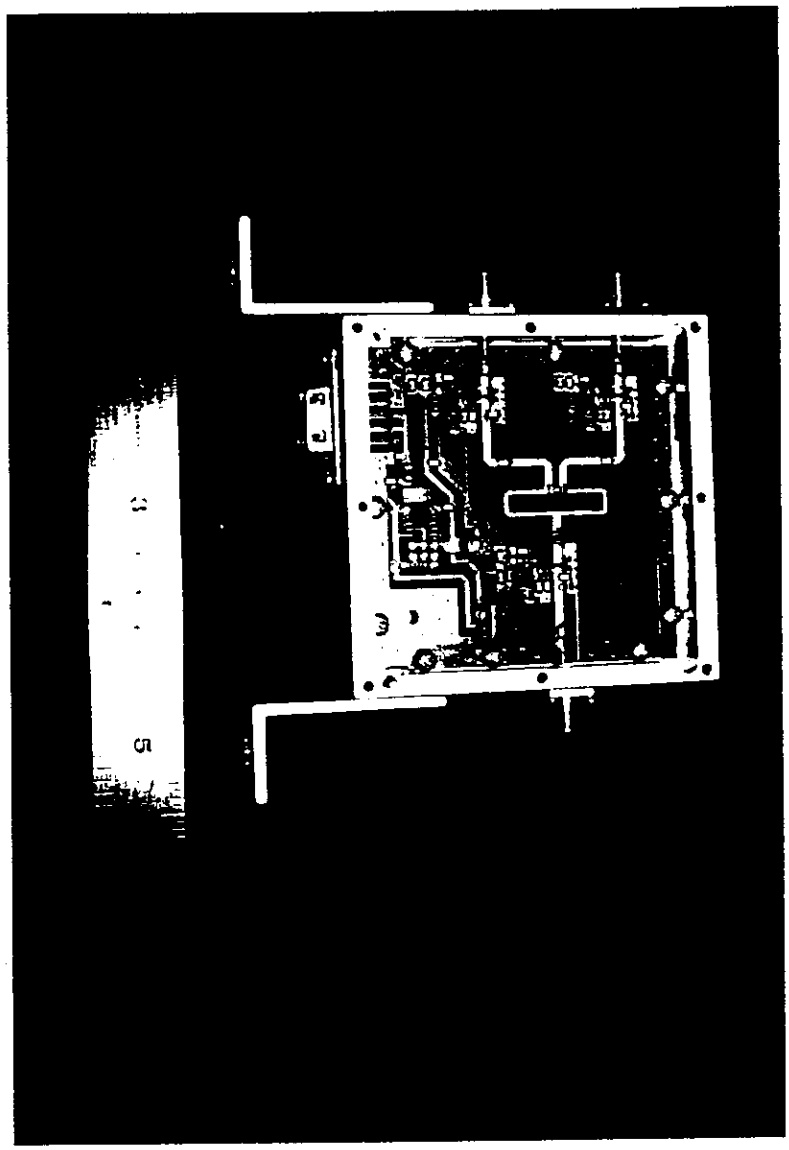
Figure 8.21 Interior View of LNA Splitter



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February 19, 1997

Tim C. Maguire
FEDERAL COMMUNICATIONS COMMISSION
Equipment Authorization Division, Applications Processing Branch
7435 Oakland Mills Road
Columbia, MD 21046

Dear Tim:

Per our phone conversation last week, you requested additional graphs from the CDMA type acceptance packet (FCC ID# LB41901CDMA). The graphs requested were externally amplified input plots for the input/output spreading plots.

There are eight plots enclosed: A/B band plots for low/high and UL/DL CDMA input channels. The amplification/amplifier was 20dB, by Mini Circuits, model ZFL-2000, part number 15542.

This should fulfill all remaining requirements for the type acceptance packet (even though I believe you already filed the completed paperwork). I have also forwarded copies of these graphs to Mary Washington at TÜV.

Feel free to call me at 818-293-3640 if you have any questions regarding the enclosed information.

Sincerely,

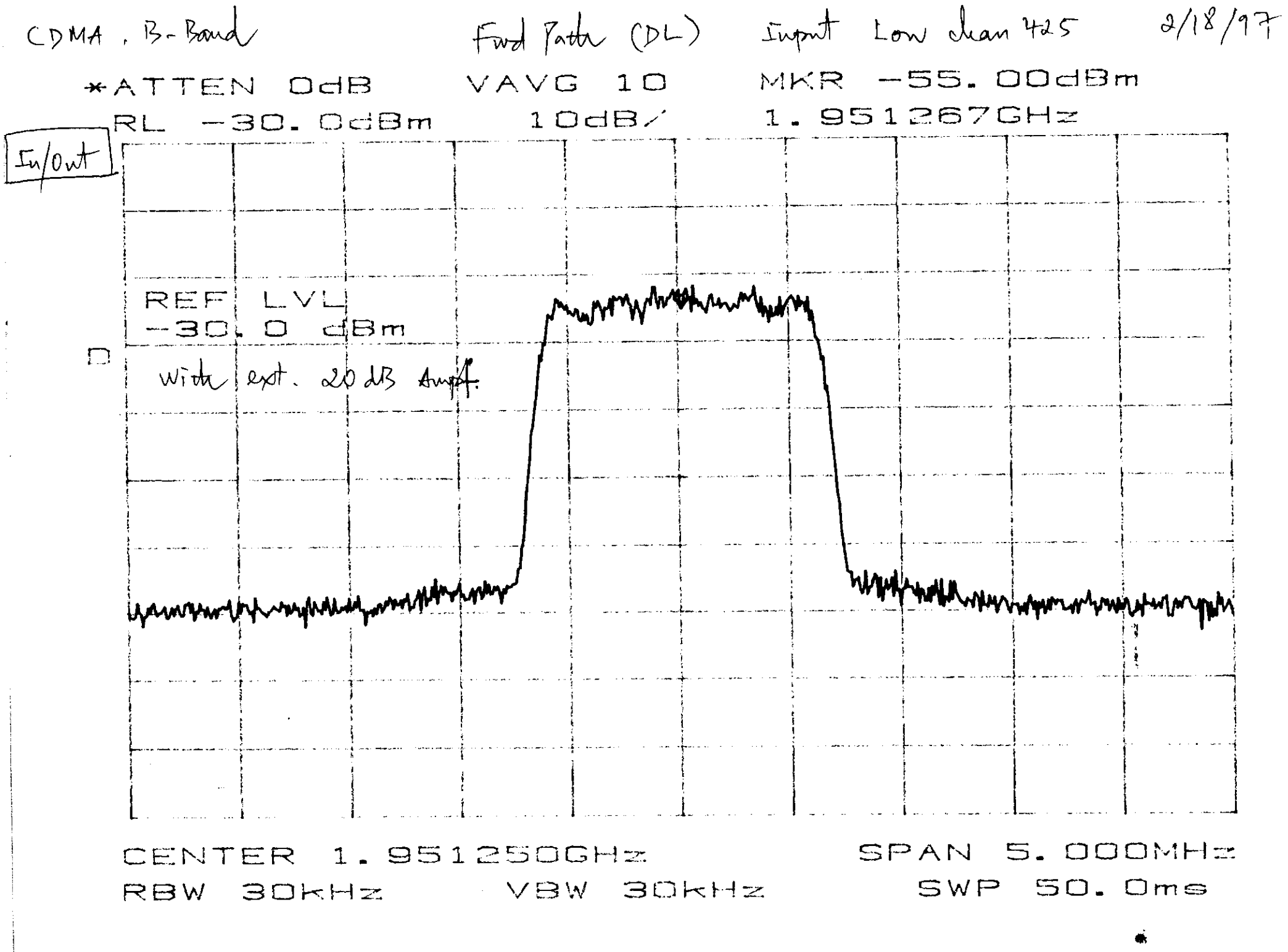
Martin Kies

Martin Kies
Quality Engineer

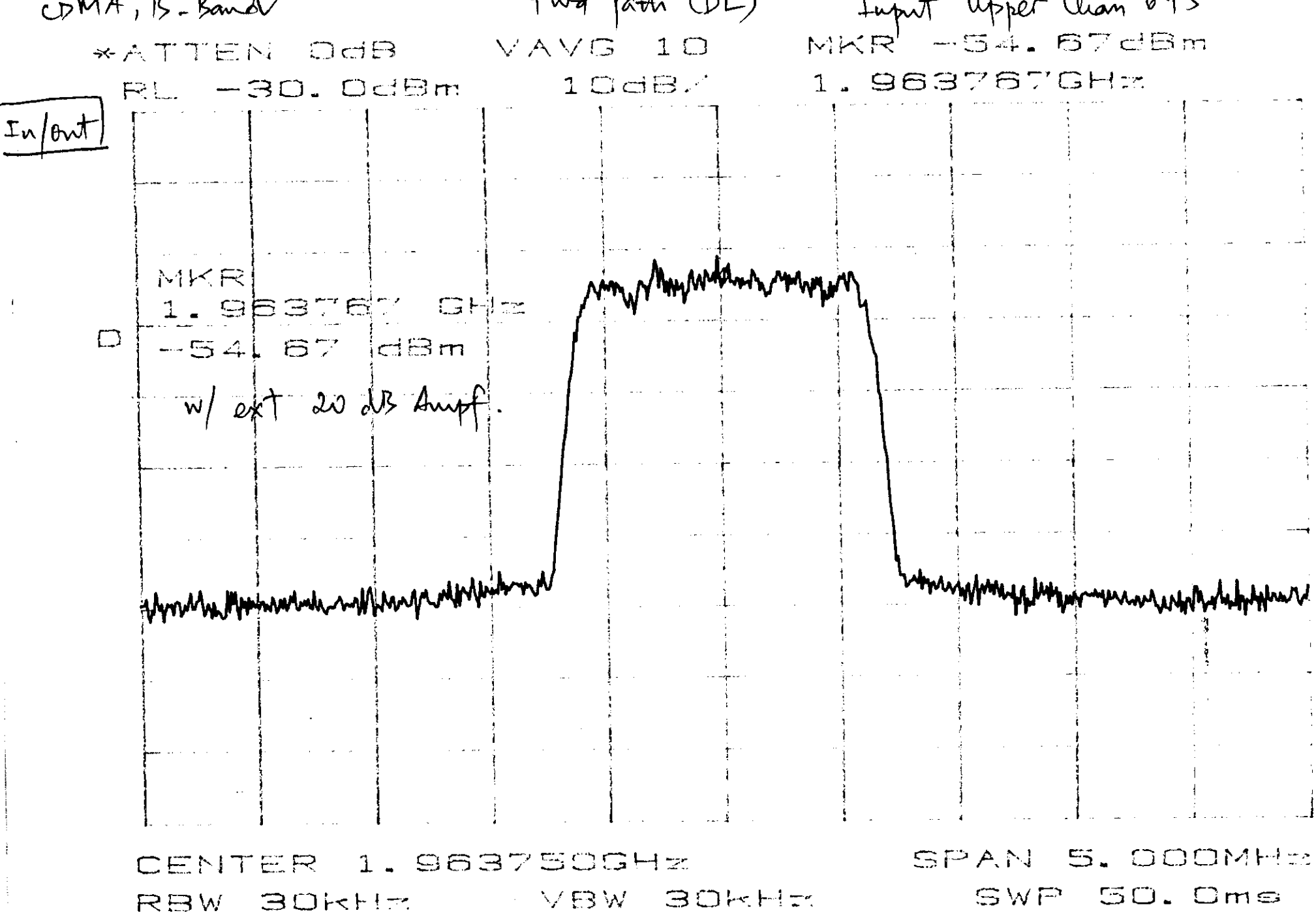
File: "CDMATYPE.DOC"

2015 West Chestnut Street, Alhambra, California 91803-1542 (818) 281-3636 Fax: (818) 281-8231

CDMA, B-Band Fwd Path (DL) Input Low Chan 425 2/18/97



CDMA, B-Band Fwd Path (DL) Input Upper Chan 675

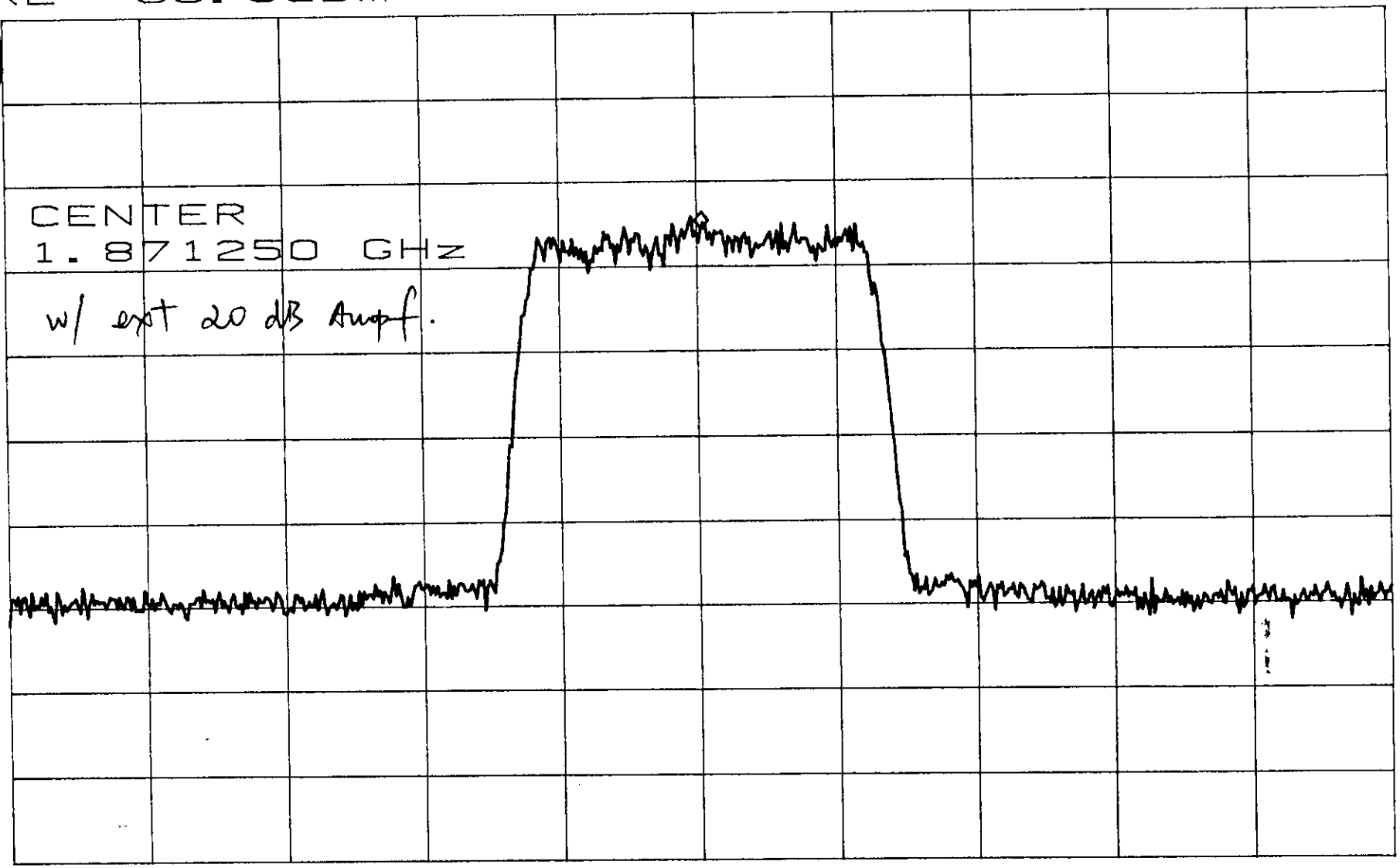


CDMA, B_Band Reverse Path (UL) Input low chan 425

*ATTEN 0dB VAVG 10 MKR −55.50dBm 2/18/97

RL −30.0dBm 10dB/ 1.871267GHz

In/out



CENTER 1.871250GHz SPAN 5.000MHz

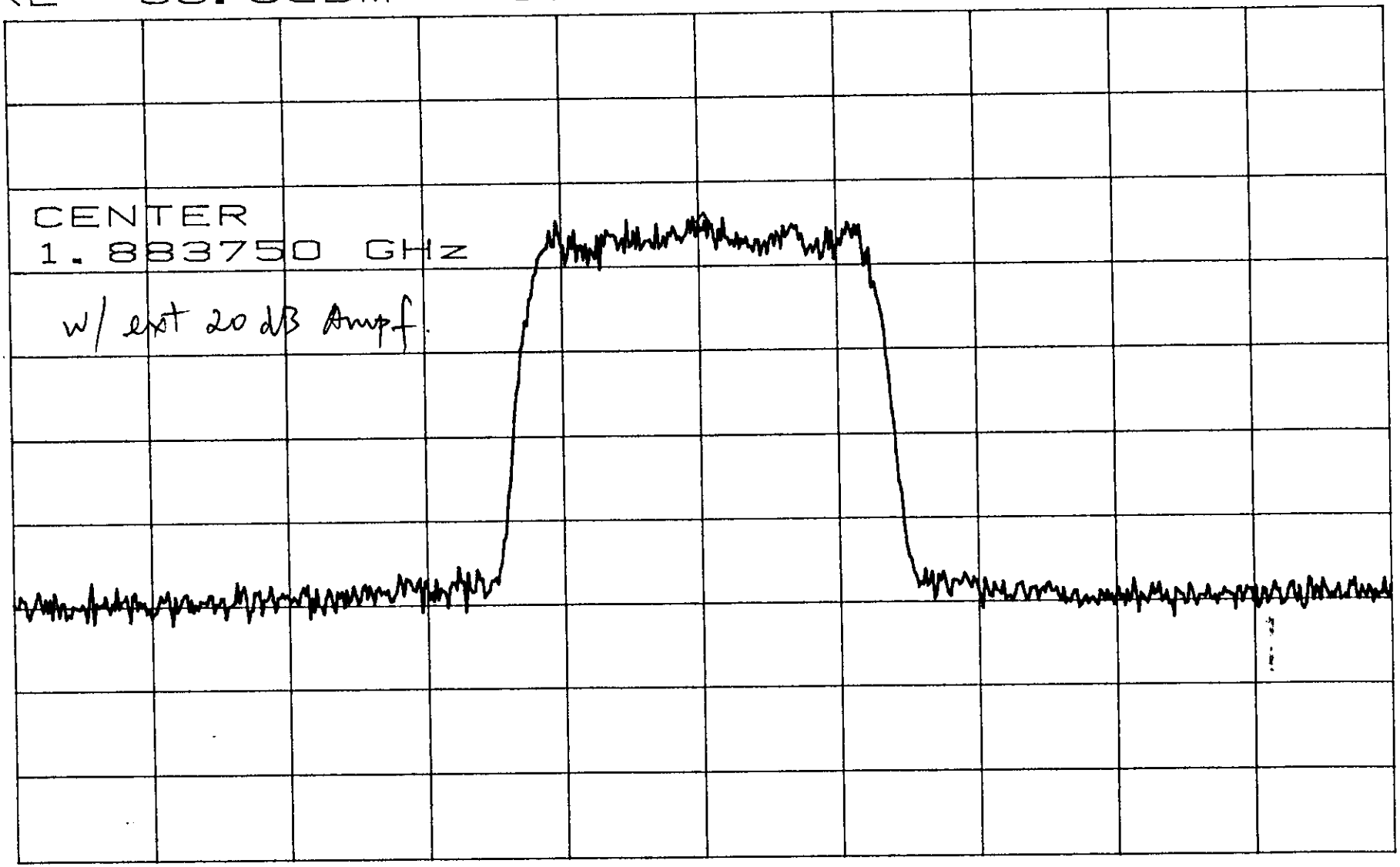
RBW 30kHz VBW 30kHz SWP 50.0ms

CDMA, B-Band Rev. Path (UL) Input Upper Chan 675 2/18/97

*ATTEN 0dB VAVG 10 MKR -55.67dBm

RL -30.0dBm 10dB/ 1.883767GHz

In/Out



CENTER 1.883750GHz SPAN 5.000MHz

RBW 30kHz VBW 30kHz SWP 50.0ms

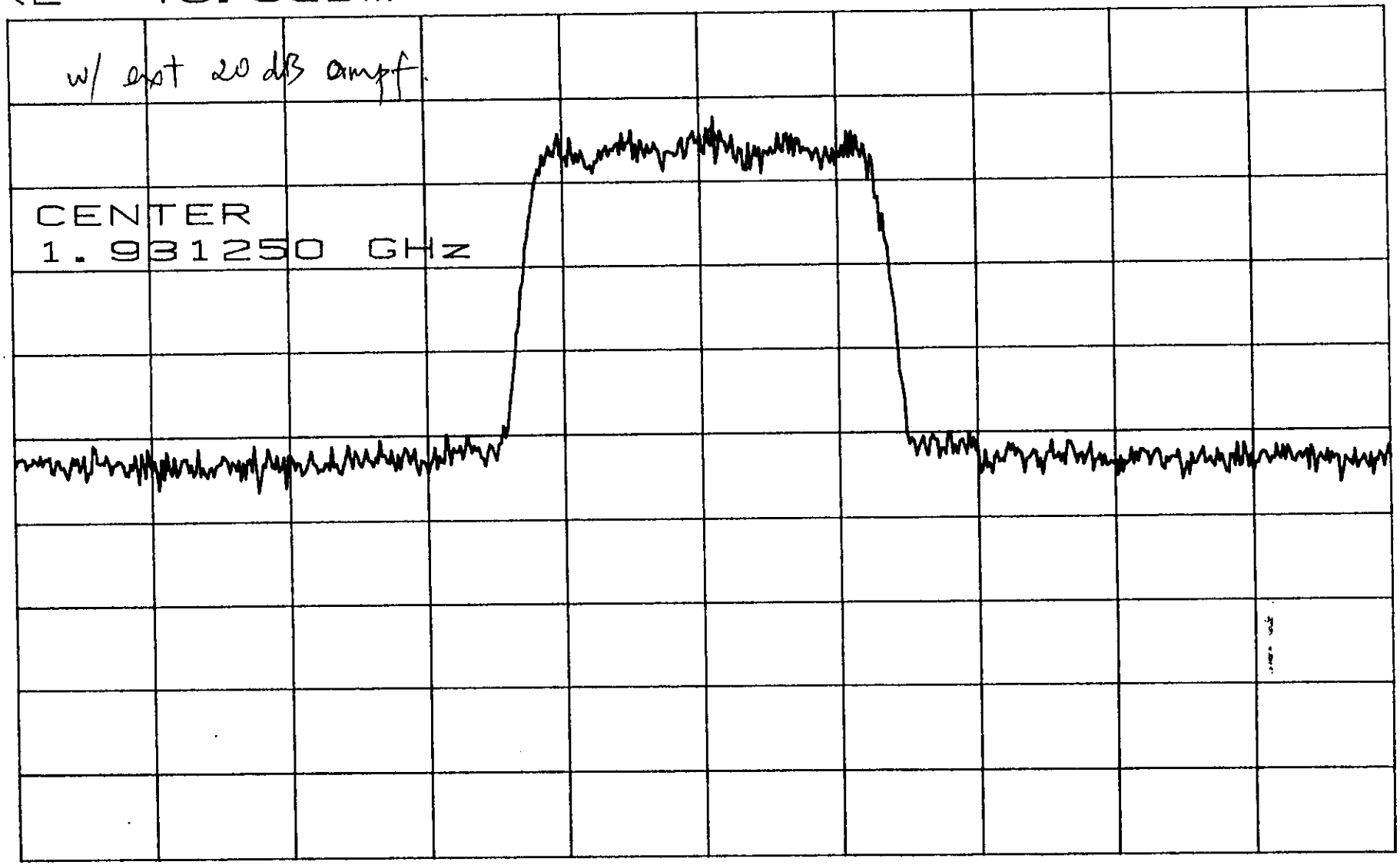
CDMA, A-Band DL, Fwd Path Input, LO chan 25 2/18/97

*ATTEN 10dB VAVG 10 MKR -55.67dBm

RL -40.0dBm 10dB/ 1.931292GHz

In/Out

w/ ext 20 dB ampf.



CENTER 1.931250GHz SPAN 5.000MHz

RBW 30kHz VBW 30kHz SWP 50.0ms

CDMA, A-Band DL, Fwd Path Input, Hi chan 275 2/18/97

*ATTEN 10dB VAVG 10 MKR -54.83dBm

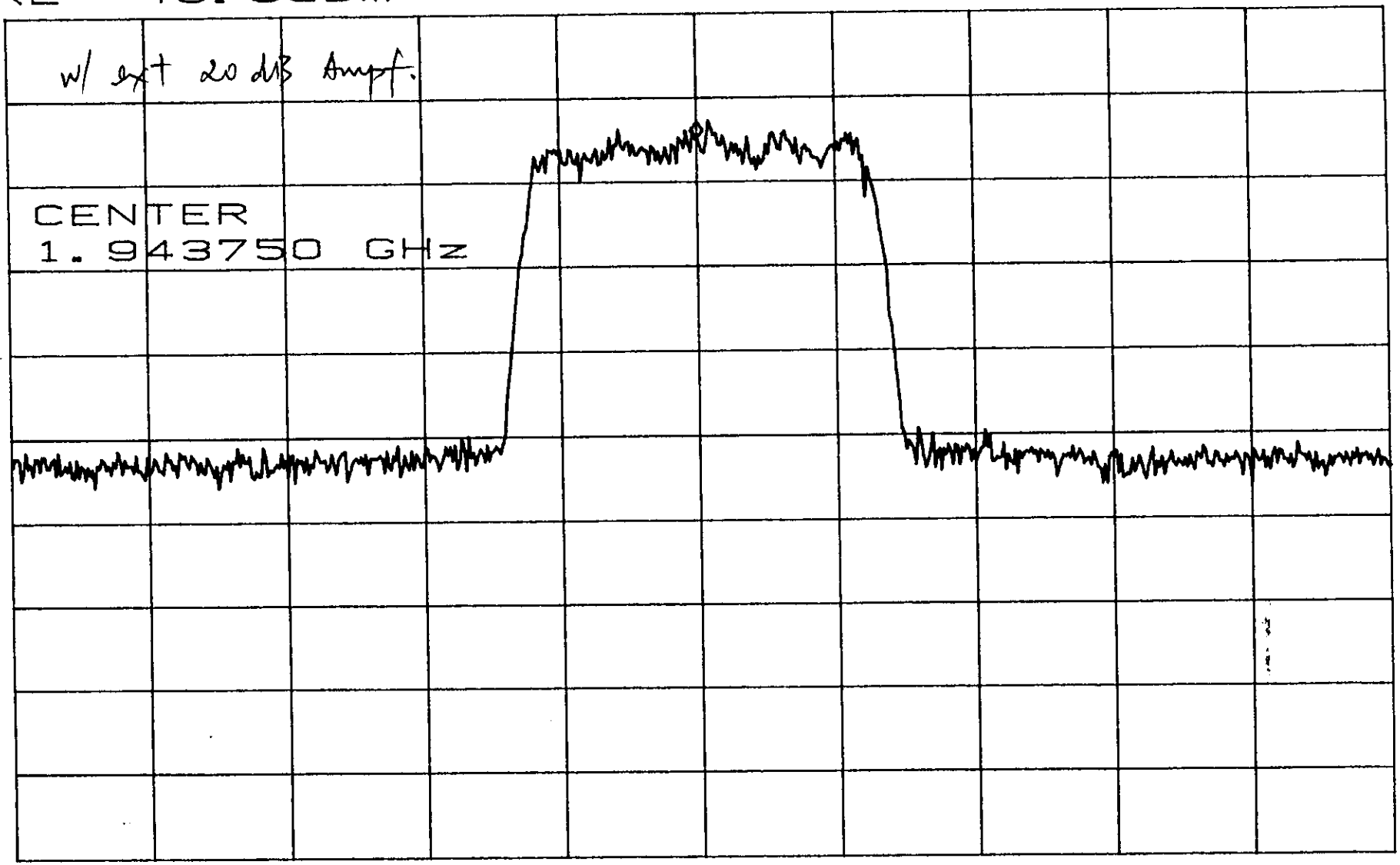
RL -40.0dBm 10dB/ 1.943750GHz

In/Out

w/ ext 20 dB Ampf.

CENTER
1.943750 GHz

D



CENTER 1.943750GHz SPAN 5.000MHz

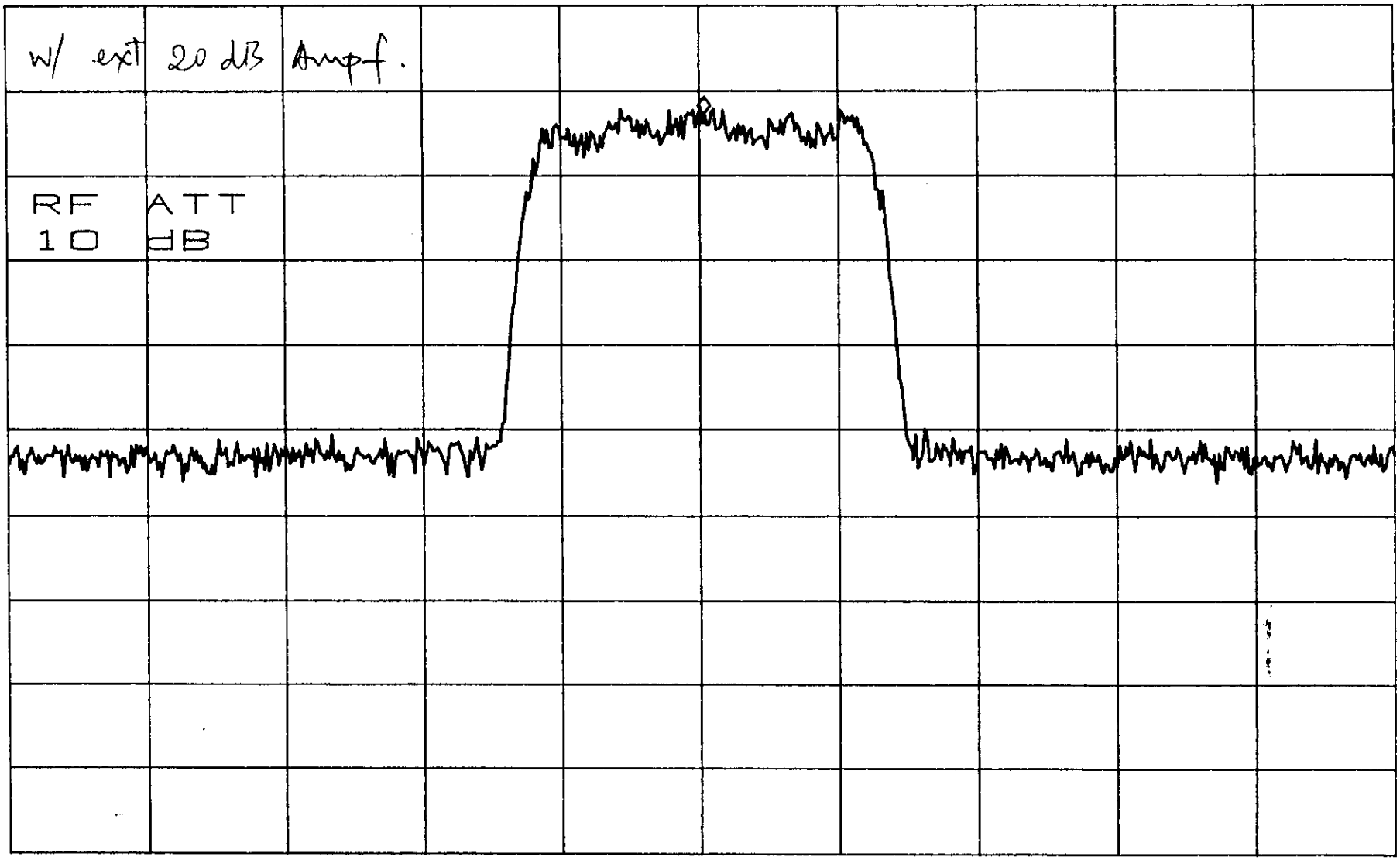
RBW 30kHz VBW 30kHz SWP 50.0ms

CDMA, A-Band Rev. Path (UL) Input Lo. chan 25 2/18/97

*ATTEN 10dB VAVG 10 MKR −52.67dBm

RL −40.0dBm 10dB/ 1.851267GHz

In/out



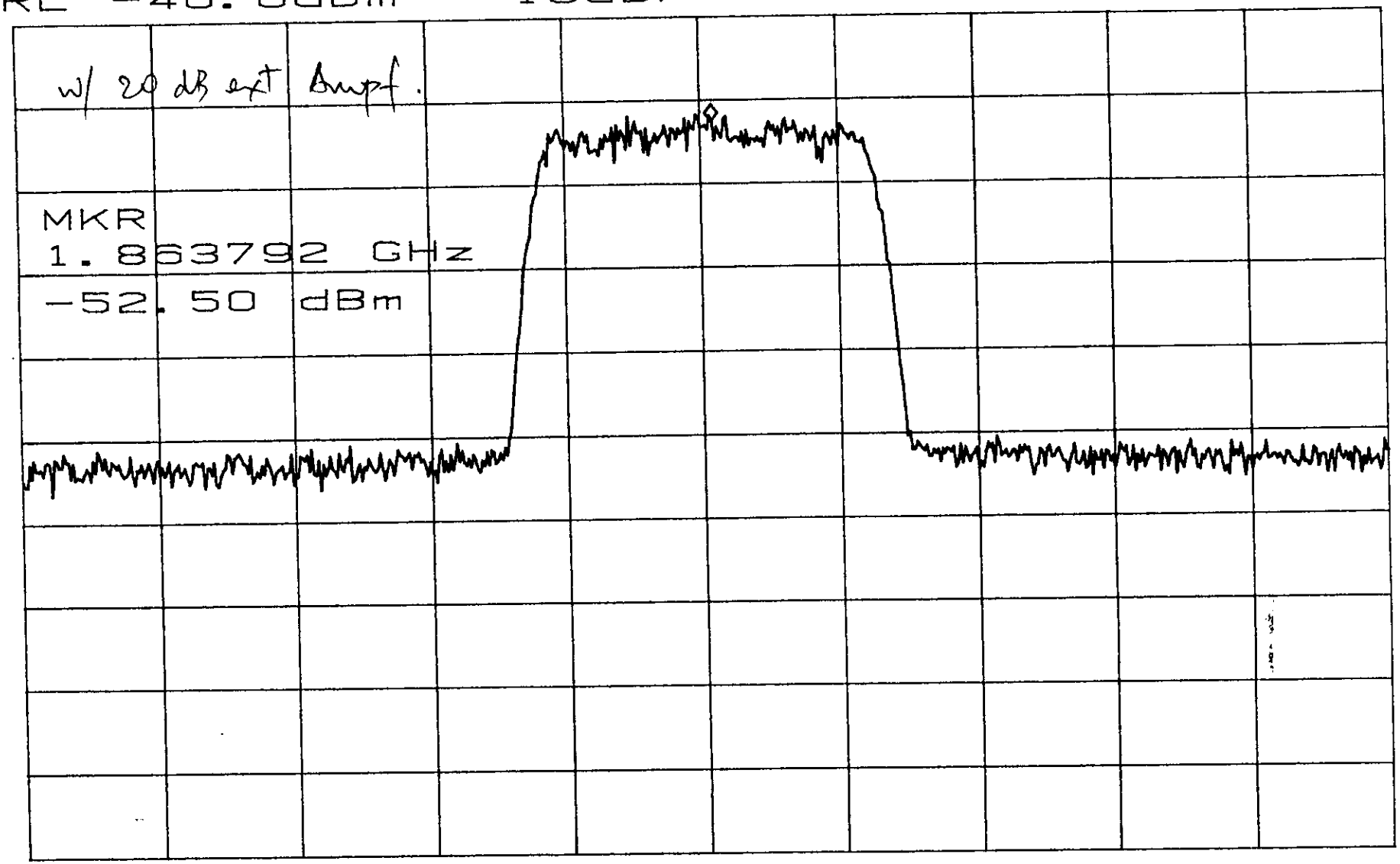
CENTER 1.851250GHz SPAN 5.000MHz

RBW 30kHz VBW 30kHz SWP 50.0ms

CDMA, A-Band Rev. Path (UL) Input Hi_chan 275 2/18/97

*ATTEN 10dB VAVG 10 MKR -52.50dBm

In/Out RL -40.0dBm 10dB/ 1.863792GHz



CENTER 1.863750GHz SPAN 5.000MHz

RBW 30kHz VBW 30kHz SWP 50.0ms

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November 22, 1996

Mary Washington
TÜV Product Service
10040 Mesa Rim Road
San Diego, CA 92121

Dear Mary:

This letter is in regards to your facsimiles dated 11/8/96 outlining the FCC testing requirements (per Tim Maguire) AND dated 11/15/96 outlining the FCC Part 2 requirements. All enclosed information is for the CDMA B-band unit (this is the same unit tested at TÜV on November 4 and 5, CDMA S/N #1).

Enclosed you will find two bound stacks of paperwork. On the front page of each stack are copies of each facsimile you transmitted to me. The order of the paperwork in each stack is approximate to the listing of items in each facsimile. Ortel requests FCC identifier "LB41901CDMA" for this product.

The enclosed items are completed to the guidelines specified by either TÜV or the FCC. All efforts by TÜV to quickly facilitate forwarding the required information to the FCC are appreciated by Ortel.

Feel free to call me at 818-293-3640 if you have any questions regarding the enclosed information.

Sincerely,

Martin Kies

Martin Kies
Quality Engineer

File: "CDMATYPE.DOC"

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November 18, 1996

Chief, Equipment Approval Services
Federal Communications Commissions
P.O. Box 35251
Pittsburgh, PA 15251-5315

Re: TUV Agent Authorization to Ortel Corporatoin
Product: CDMA Repeater (models CDR1901-1-X)

Dear Sir/Madam:

We, Ortel Corporation of 2015 West Chestnut Street, Alhambra, CA, 91803, hereby authorize TUV Product Service (10040 Mesa Rim Road, San Diego, CA, 92121, telephone (619)-546-3999) to act as our agent in all matters relating to Product applications for equipment authorization, including the signing of all documents relating to these matters. I further certify that the applicant nor any party to the application is subject to denial of Federal benefits, that includes FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. Section 862.

This authorization expires on November 18, 1997.

Sincerely,

Martin R. Kies

Martin R. Kies
Quality Engineer

Phone: (818)-293-3640
Fax: (818)-281-7913

2015 West Chestnut Street, Alhambra, California 91803-1542 (818) 281-3636 Fax: (818) 281-8231

FCC ID: LB41901CDMA

EXHIBIT 1

§ 2.983(a) Manufacturer's Declaration

The applicant for Type Acceptance is Ortel Corporation located at 2015 West Chestnut Street, Alhambra, California 91803. Ortel Corporation is also the manufacturer of the ~~MirrorCell™ CSR-1901-2 PCS Repeater~~ MirrorCell™ CDMA COR-1901-1 PCS Repeater

EXHIBIT 2

§ 2.983(b) Identification of Equipment

FCC ID: LB41901CDMA
Part Number: 1
Trade Name: MirrorCell™ CDMA

FCC ID: "LB41901CDMA"

EXHIBIT 3

§ 2.983(c) Quantity Production

Production will start at 10 units per month and range up to 100 (estimated) units per month.

EXHIBIT 4

§ 2.983(d)(1) Type(s) of Emission
Repeater

§ 2.983(d)(2) Frequency Range (~~A~~ B Band)
Downlink: ~~1930.2 - 1944.8 MHz~~ 1951.25 - 1963.75 MHz
Uplink: ~~1850.2 - 1864.8 MHz~~ 1871.25 - 1883.75 MHz

§ 2.983(d)(3) Operating Power
2 Watts

§ 2.983(d)(4) Maximum Power Rating
~~See Page 4-2.~~

§ 2.983(d)(5) DC Voltages and Currents
~~See Page 4-2.~~

§ 2.983(d)(6) Function of Active Circuit Device
~~See Pages 4-3 through 4-9.~~

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2015 West Chestnut Street
Alhambra, California 91803
(818)281-3636 Fax: (818)281-8231

CHANNEL SELECTIVE REPEATER
FCC ID LB41901CDMA

MODEL NO	SERIAL NO
☐ CDR1902-1-A	_____
☐ CDR1902-1-B	
☐ CDR1902-1-C	DATE
☐ CDR1902-1-D	
☐ CDR1902-1-E	_____
☐ CDR1902-1-F	

This device complies with part 15 of the FCC rules operation is subject to the following two conditions
(1) This device may not cause harmful interference, and
(2) This device must accept any interference received including interference that may cause undesired operation.