



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

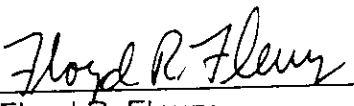
According to testing performed at TÜV Product Service, Inc., the above-mentioned unit is in compliance with the electromagnetic compatibility requirements defined in United States Standard 47 CFR Part 15, Subpart B, Paragraphs 15.107(b) and 15.109(b).

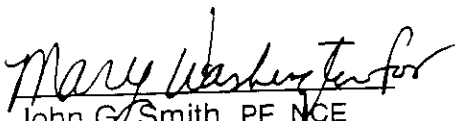
TÜV Product Service reports apply only to the specific sample tested under stated test conditions. It is the manufacturer's responsibility to assure the continued compliance of production units of this model. TÜV Product Service, Inc. shall have no liability for any deductions, inferences or generalizations 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

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.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

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

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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 | ☐ - Group 2 |
| ☐ - EN 55013 / 1990 | ☐ - Class A | ☐ - Class B |
| ☐ - 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 | ☐ - Group 2 |
| | ☐ - Class A | ☐ - Class B |
| ☐ - CISPR 22 (1993) | ☐ - Class A | ☐ - Class B |

Environmental Conditions In The Laboratory:

	<u>Actual</u>
Temperature:	: 23 °C
Relative Humidity:	: 50 %
Atmospheric Pressure:	: 1000 mBar

Power Supply Utilized:

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

Symbol Definitions:

- - Applicable
- - Not Applicable

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 μ H/250 μ H/50 Ω /0.25 μ F	3-4	262-263
☐ - LISN-3, 50 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	5-6	264, 265
☐ - LISN-2, 25 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	7	413
☐ - LISN-2, 25 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	7	--
☐ - FCC-LISN-50-25-2	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	112	553
☐ - FCC-LISN-50-25-2	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 50 μ H/250 μ H/50 Ω /0.25 μ F	113	552
☐ - 8012-50-R-12-BNC	Solar Electronics Co.	LISN, 50 μ H/50 Ω /0.1 μ F	--	266
☐ - 9252-50-R-24-BNC	Solar Electronics Co.	LISN, 50 μ H /250 μ H/50 Ω /0.25 μ F	941719	458
☒ - 9252-50-R-24-BNC	Solar Electronics Co.	LISN, 50 μ H /250 μ H/50 Ω /0.25 μ F	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:

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

Remarks:

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: _____

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	B21023	277
☐ - NM-7A, NM-17/27, NM-37/57, NM-67, CCA-7, and H/P 9836 HP-1B Computer	Eaton/Aitech	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/Aitech	Automated RFI Measurement System (ARMS), NO. 2	(multiple)	168, 170, 177, 178
☐ - H/P Spectrum Analyzer, Model 8558B, Display Section, HP Analyzer Section; H/P 85550A 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

Remarks: _____

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
☐ - AFD3-0102-18-ST	Miteq, Inc.	Pre-Amplifier (38 dB gain), 1 to 2 GHz	16429	366
☐ - AFD3-0205-40-ST	Miteq, Inc.	Pre-Amplifier (30 dB gain), 2 to 8 GHz	155382	367
☐ - AFS4-0801800-70-10P-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: _____

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 | |
| ☐ - _____ | |
| ☐ - _____ | |

Emissions Test Results:**Conducted Emissions, 10/150/450 kHz - 30 MHz**☒ - PASS☐ - FAIL☐ - NOT APPLICABLEMinimum 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 APPLICABLEMinimum 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: _____

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.

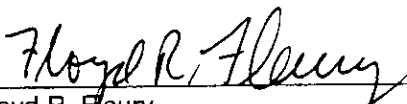
Equipment Received Date: 04 November 1996

Testing Start Date: 04 November 1996

Testing End Date: 04 November 1996

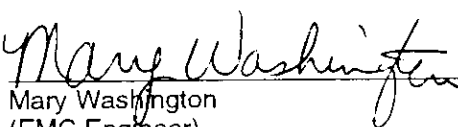
- TÜV PRODUCT SERVICE, INC. -

Responsible Engineer:



Floyd R. Fleury
(Senior EMC Engineer)

Responsible Engineer:



Mary Washington
(EMC Engineer)

Appendix A

Test Data Sheets
and
Test Setup Drawing(s)

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

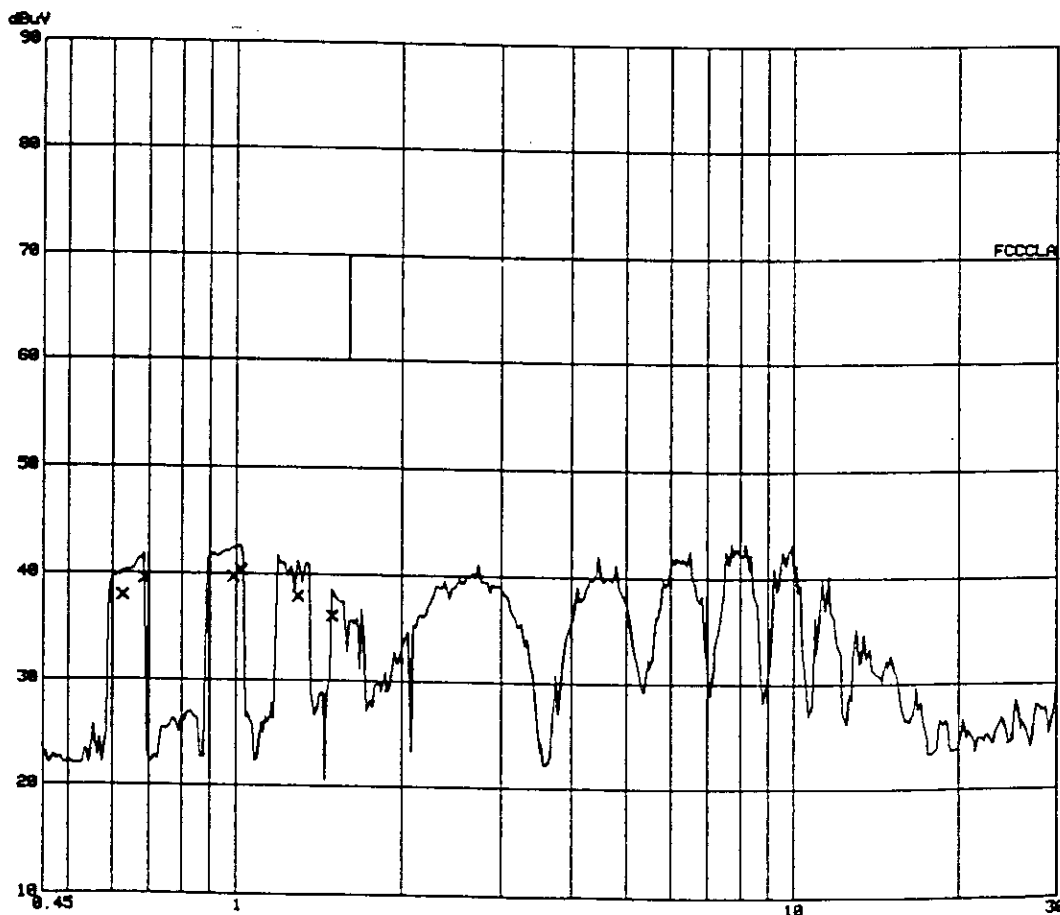
Scan Settings (2 Ranges)

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



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	20dB LSN

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**

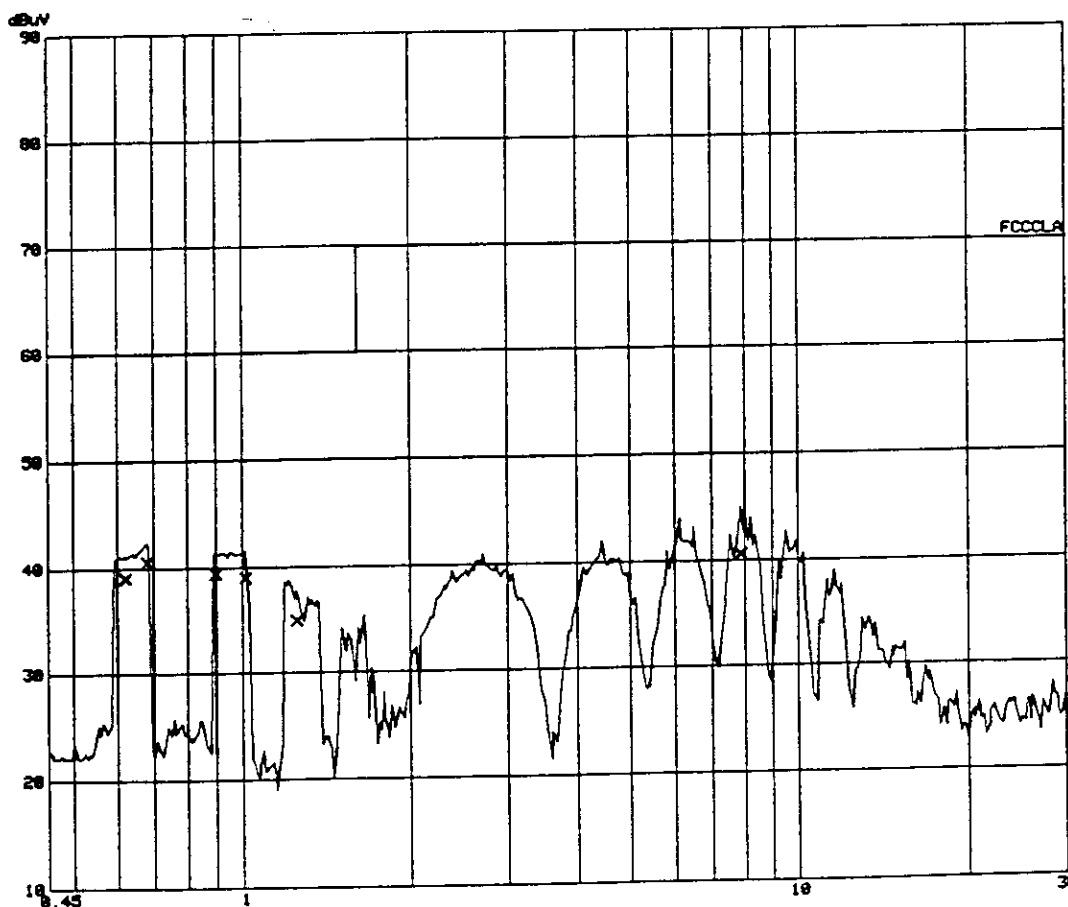
EUT: Model CDR-1901-1-B CDMA Repeater
 Manuf: Ortel Corporation
 Op Cond: Transmitting
 Operator: Mary Washington *MD*
 Test Spec: FCC Class A
 Comment: 120 Vac 60 Hz Line 2
 Mid Channel, CW
 Date: 04. Nov 96 09:44

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-B CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington^{MD}
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	40.5 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

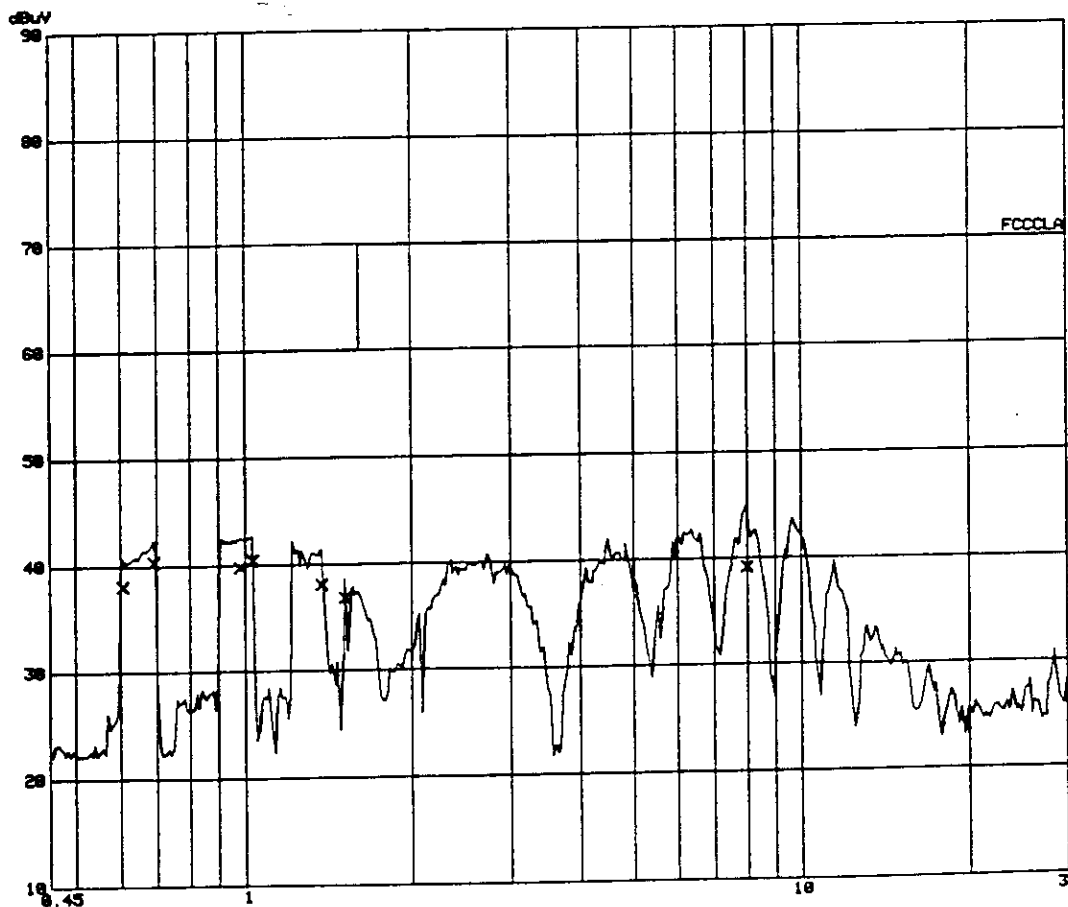
EUT: Model CDR-1901-1-B CDMA Repeater
 Manuf: Ortel Corporation
 Op Cond: Transmitting
 Operator: Mary Washington
 Test Spec: FCC Class A
 Comment: 120 Vac 60 Hz Line 1
 Mid Channel, CDMA
 Date: 04. Nov 96 10:01

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-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

* limit exceeded

17.2

TUV Product Service**POWERLINE CONDUCTED RFI**

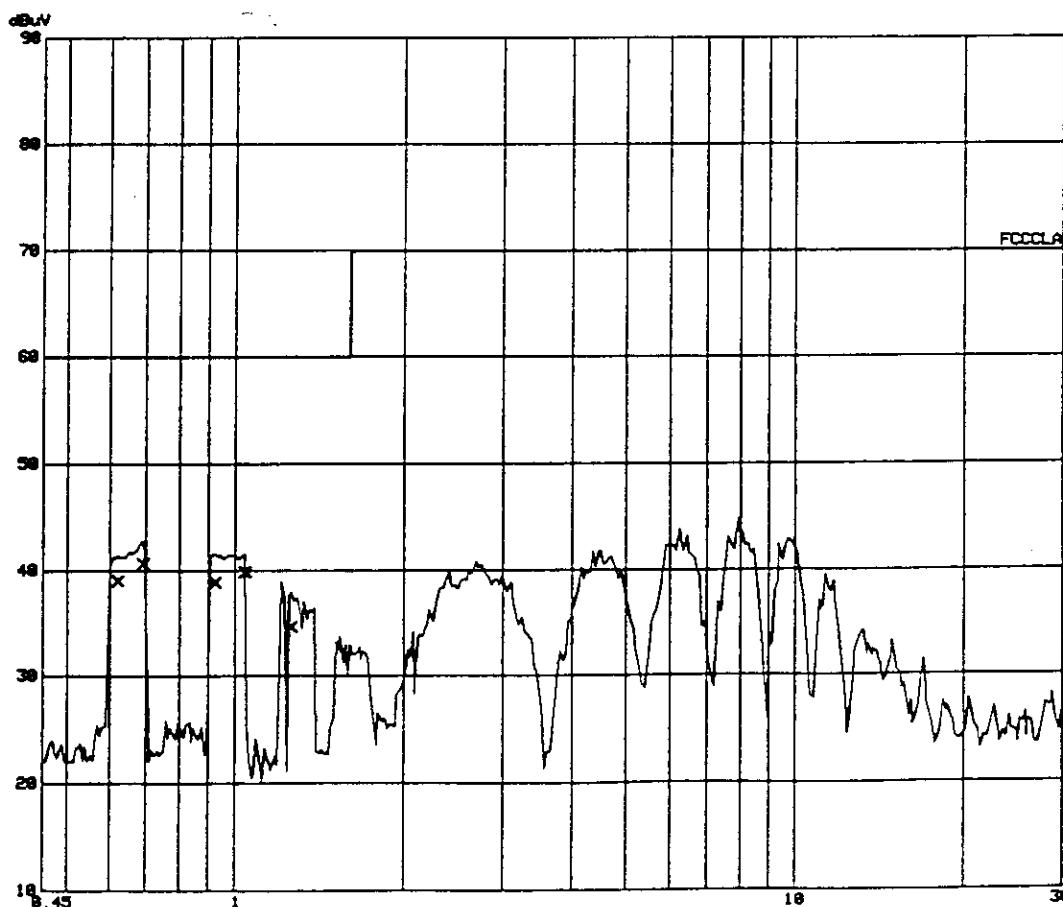
EUT: Model CDR-1901-1-B CDMA Repeater
 Manuf: Ortel Corporation
 Op Cond: Transmitting
 Operator: Mary Washington
 Test Spec: FCC Class A
 Comment: 120 Vac 60 Hz Line 2
 Mid Channel, CDMA
 Date: 04. Nov 96 09:54

Scan Settings (2 Ranges)

Frequencies			Receiver Settings					
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamplifier	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**

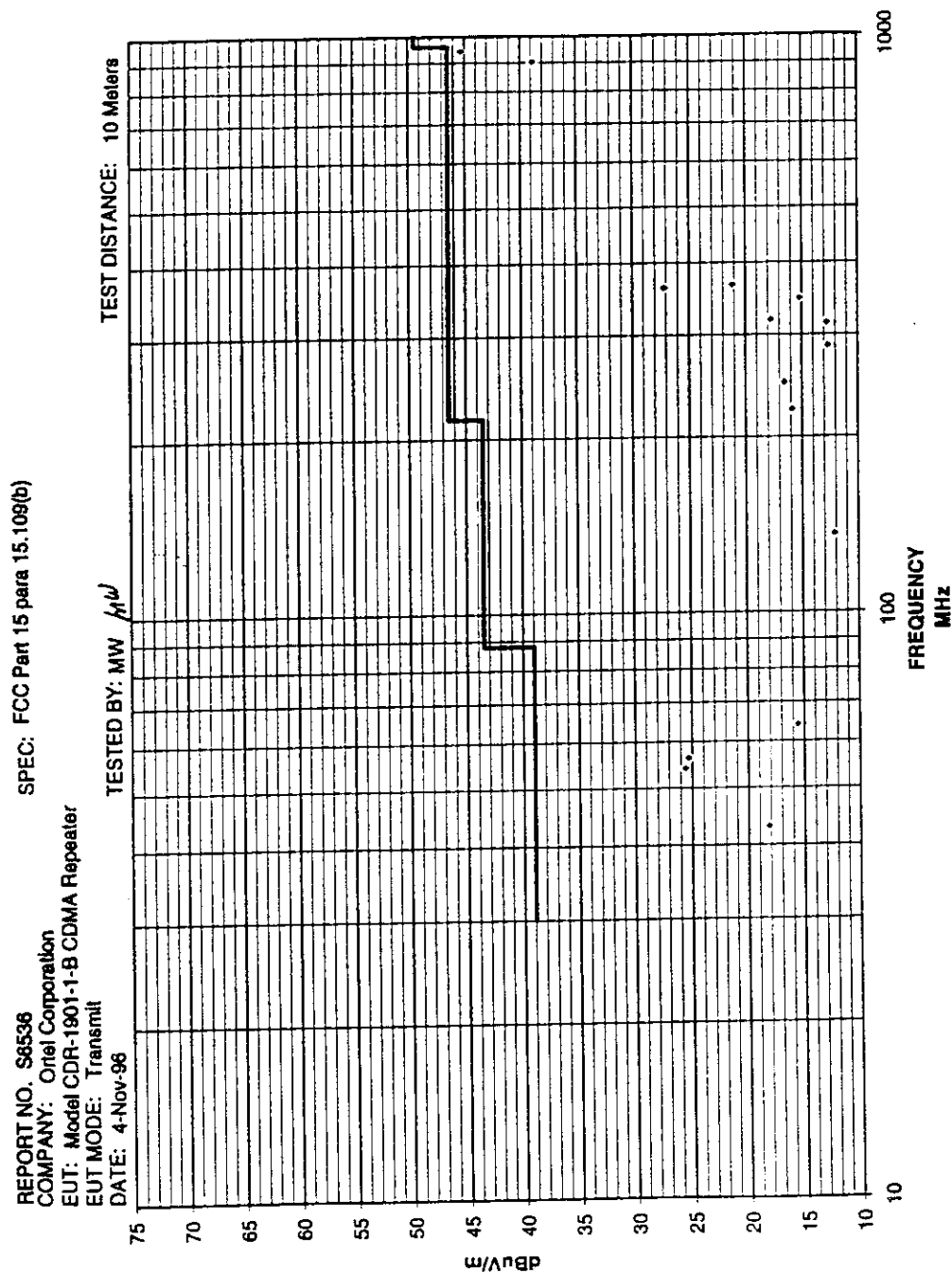
EUT: Model CDR-1901-1-B CDMA Repeater
Manuf: Ortel Corporation
Op Cond: Transmitting
Operator: Mary Washington *mw*
Test Spec: FCC Class A
Comment: 120 Vac 60 Hz Line 2
Mid Channel, CDMA
Date: 04. Nov 96 09:54

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

17.3

* limit exceeded



SPEC: FCC Part 15 para 15.109(b)

CUSTOMER: Ortel Corporation

TEST DIST: 10 Meters

EUT: Model CDR-1901-1-B CDMA Repeater

TEST SITE: 3

EUT MODE: Transmitt

BICONICAL: 235

DATE: 4-Nov-98 TESTED BY: MW (MWD)

LOG PERIODIC: 243

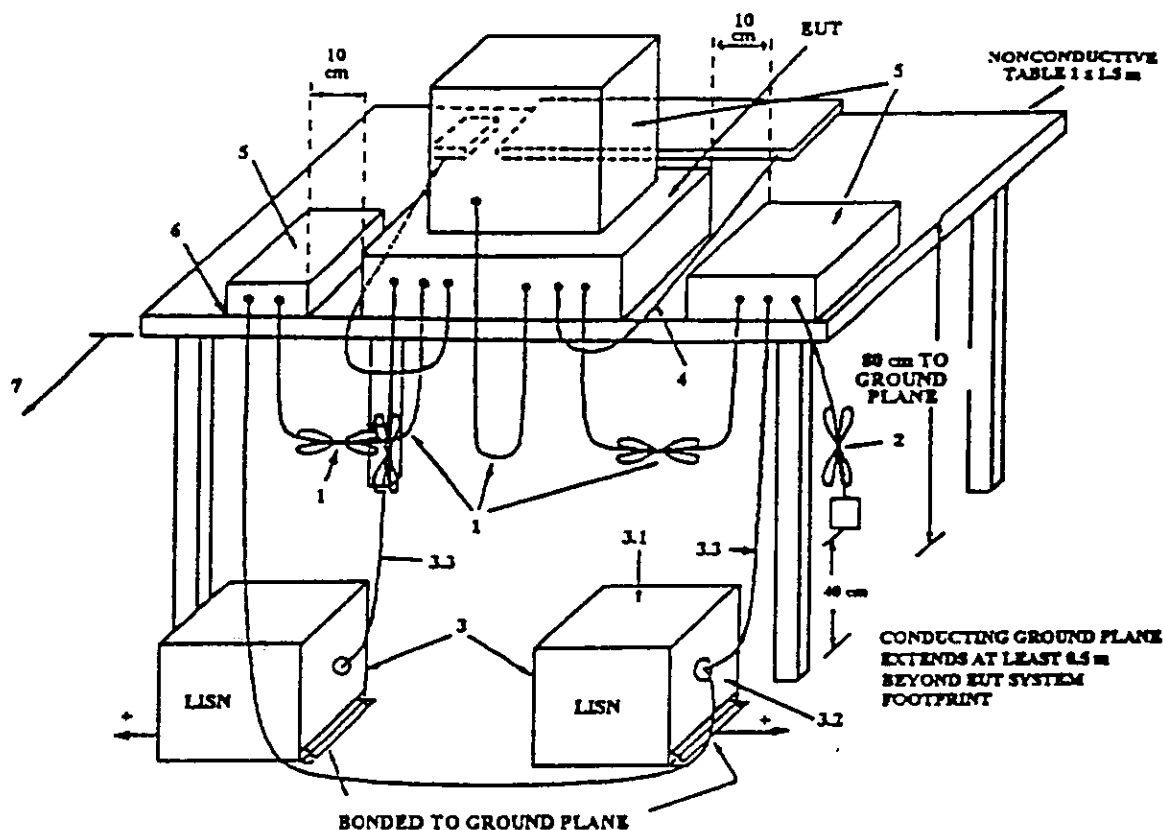
NOTES: Quasi-Peak with 120 KHz measurement bandwidth.

RCVP: VM-3757A

[illegible]

Conducted Emission Test Setup, 0.15 to 30 MHz

ELECTRICAL AND ELECTRONIC EQUIPMENT IN THE RANGE OF 9 kHz to 40 GHz

**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.

10 cm

10 cm

5 cm

20 cm TO GROUND PLANE

48 cm

CONDUCTING GROUND PLANE EXTENDS 0.5 m BEYOND EUT SYSTEM FOOTPRINT

1

2

3

4

5

6

7

8

EUT

NONCONDUCTIVE TABLE 1.5 x 1 METER

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.

Appendix B

Product Information Form(s)

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:		--	

Appendix C

Change History

Not Applicable

Appendix D

Testing Facilities

Certificates of Approval

VCCI (3), NVLAP, EN 45001



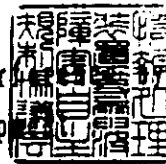
CERTIFICATE

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 Interference
Information Technology Equipment





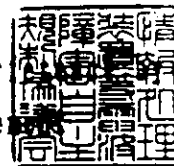
CERTIFICATE

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





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.

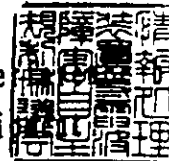
*This is to certify that the following measuring facility
has been registered in accordance with the Regulations
for Voluntary Control Measures, Article 8.*

Registration No. : R-212

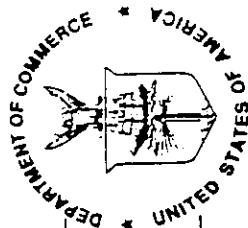
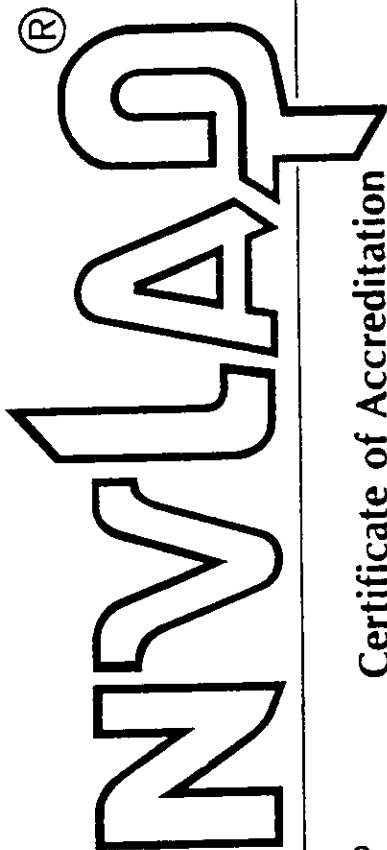
Date of Registration : December 26, 1994

This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inter-
Information Technology Equipment



United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation

ISO/IEC GUIDE 25:1990
ISO 9002:1987

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 (11-96)

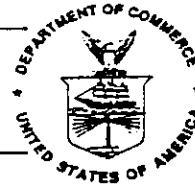
National Institute
of Standards and Technology



National Voluntary
Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation



Page: 1 of 2

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

A handwritten signature in dark ink, appearing to read "John G. Smith".

For the National Institute of Standards and Technology

NVLAP-01S (11-95)

Page D6 of D13

National Institute
of Standards and Technology



National Voluntary
Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation



Page: 2 of 2

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

A handwritten signature in dark ink, appearing to read "John F. Galt".

For the National Institute of Standards and Technology

NVLAP-015 (11-95)

Page D7 of D13



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

Page D8 of D13

United States Department of Commerce
National Institute of Standards and Technology

NVLAP[®]



ISO/IEC GUIDE 28:1990
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

James F. G...

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

NVLAP-01C (11-88)

National Institute
of Standards and Technology



National Voluntary
Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation



Page: 1 of 1

**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

<i>NVLAP Code</i>	<i>Designation</i>
-------------------	--------------------

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

A handwritten signature in dark ink, appearing to read "John G. Smith".

For the National Institute of Standards and Technology

NVLAP-015 (11-95)

Page D10 of D13



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.

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

Page D11 of D13



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

CERTIFICATE



**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

A handwritten signature in dark ink, appearing to be 'W. Kreinberg', is written over the printed name.

Dr. Wolfgang Kreinberg

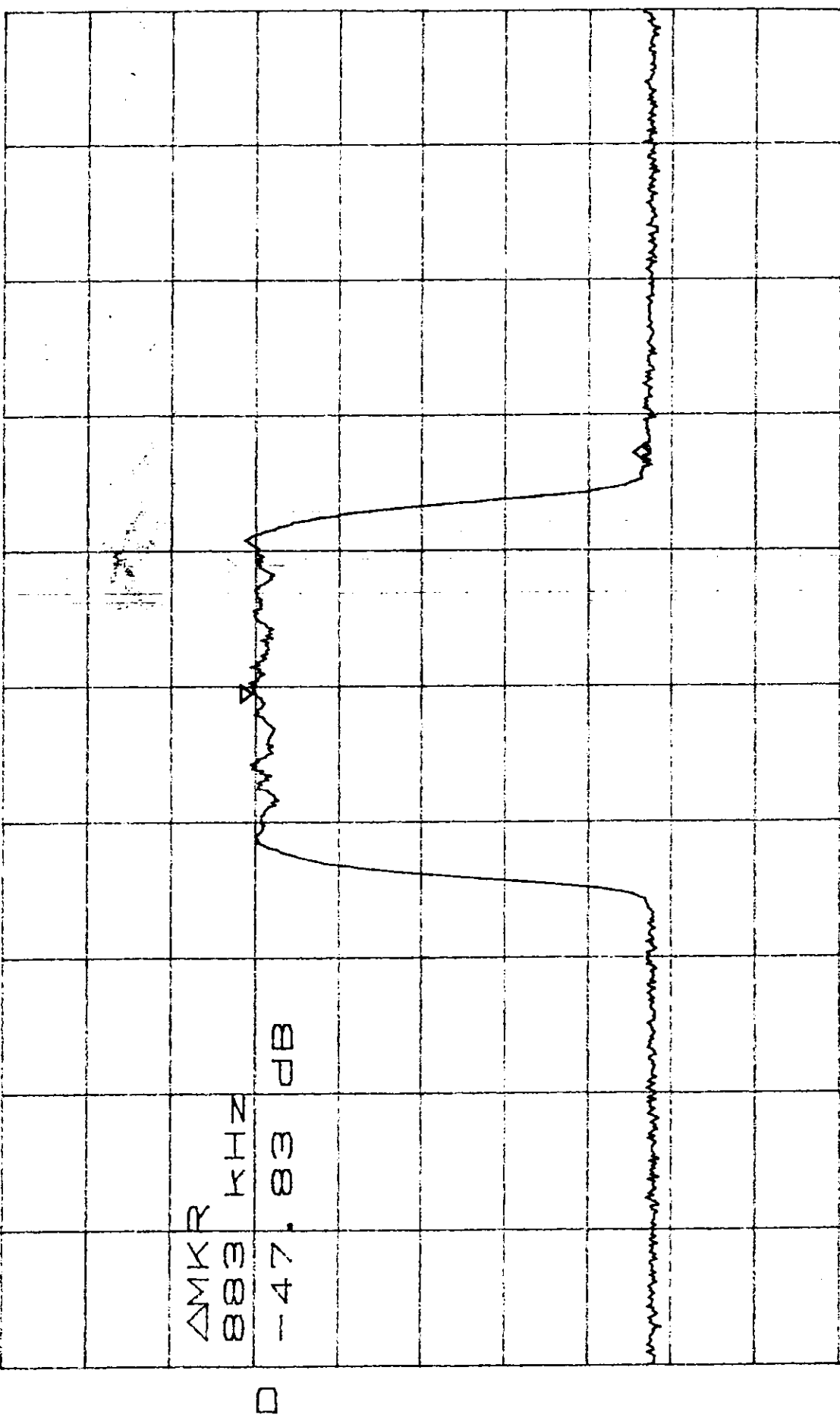
TÜV PRODUCT SERVICE GmbH, Ridlerstrasse 31, 80338 Munich, Germany

Appendix E

Supplemental Information

Not Applicable

CAMA #1 Low Band 425 Forward Path (DL) Emission of 883 kHz 10/31/96
 Ext Attn 41dB ATTN 10dB R_{Font} = 33dBm ΔMKR -47.83dB 883kHz
 RL -5.0dBm 10dB/



CENTER 1.951283GHz SPAN 5.000MHz
 *RBW 30kHz *VBW 100Hz SWP 4.20sec

CMA #1

Ext Attn 41dB

ATTEN 10dB

RL -5.0dBm

Fwd Path (DL)

R_{Foot} = 33 dBm

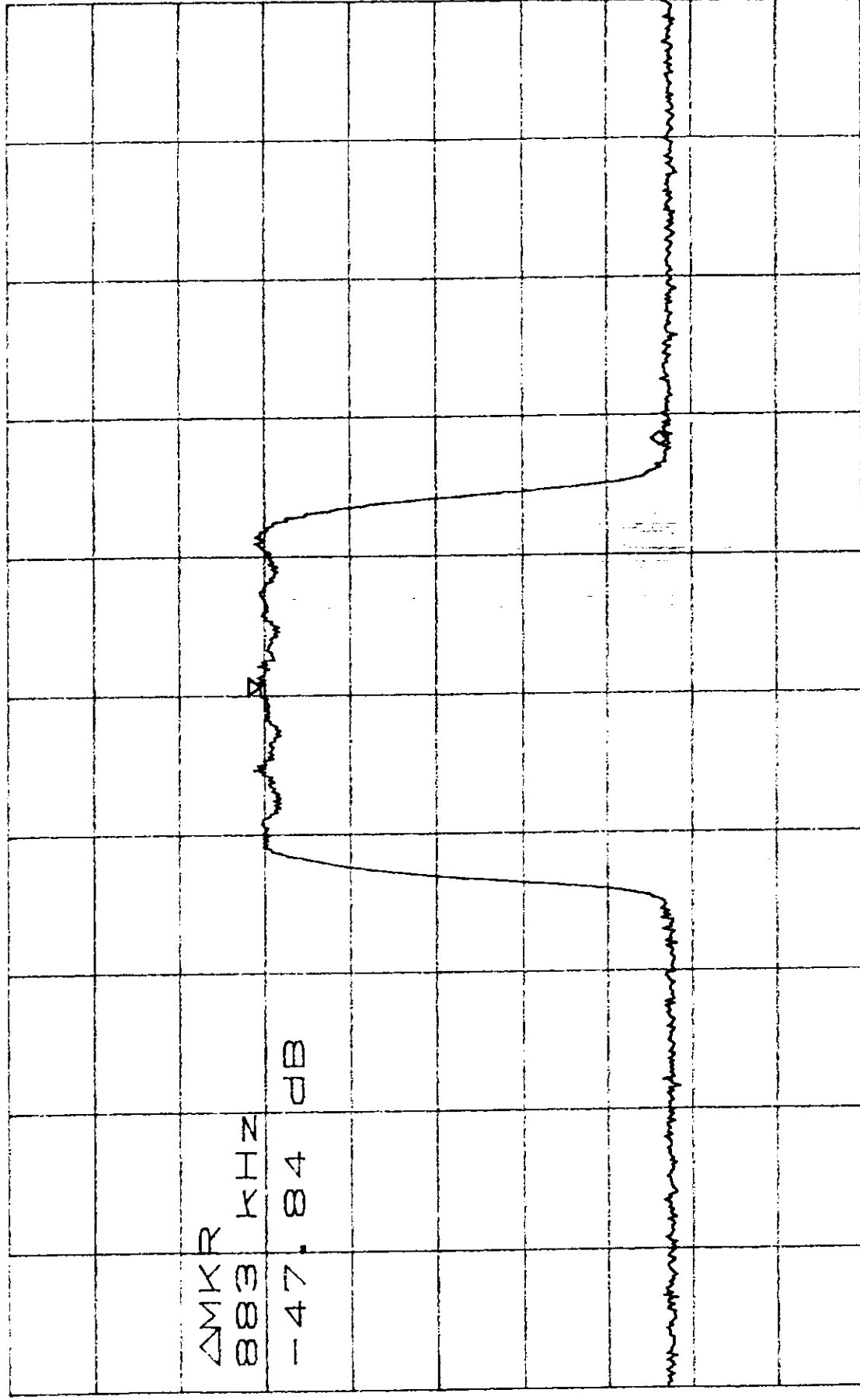
10dB/

Mid Band 550

Δ MKR -47.84dB

883kHz

10/31/96



CENTER 1.957500GHz

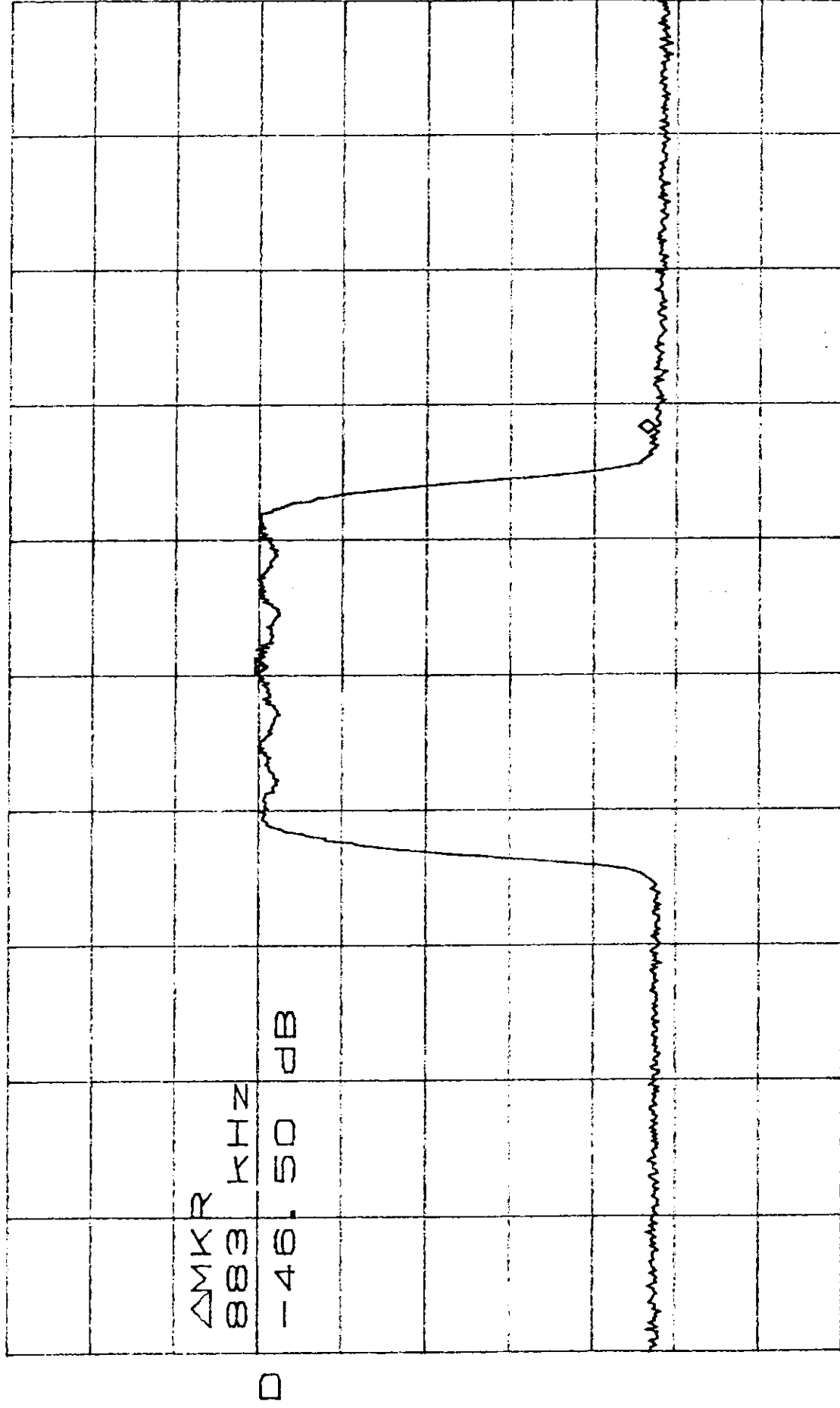
SPAN 5.000MHz

*RBW 30kHz

*VBW 100Hz

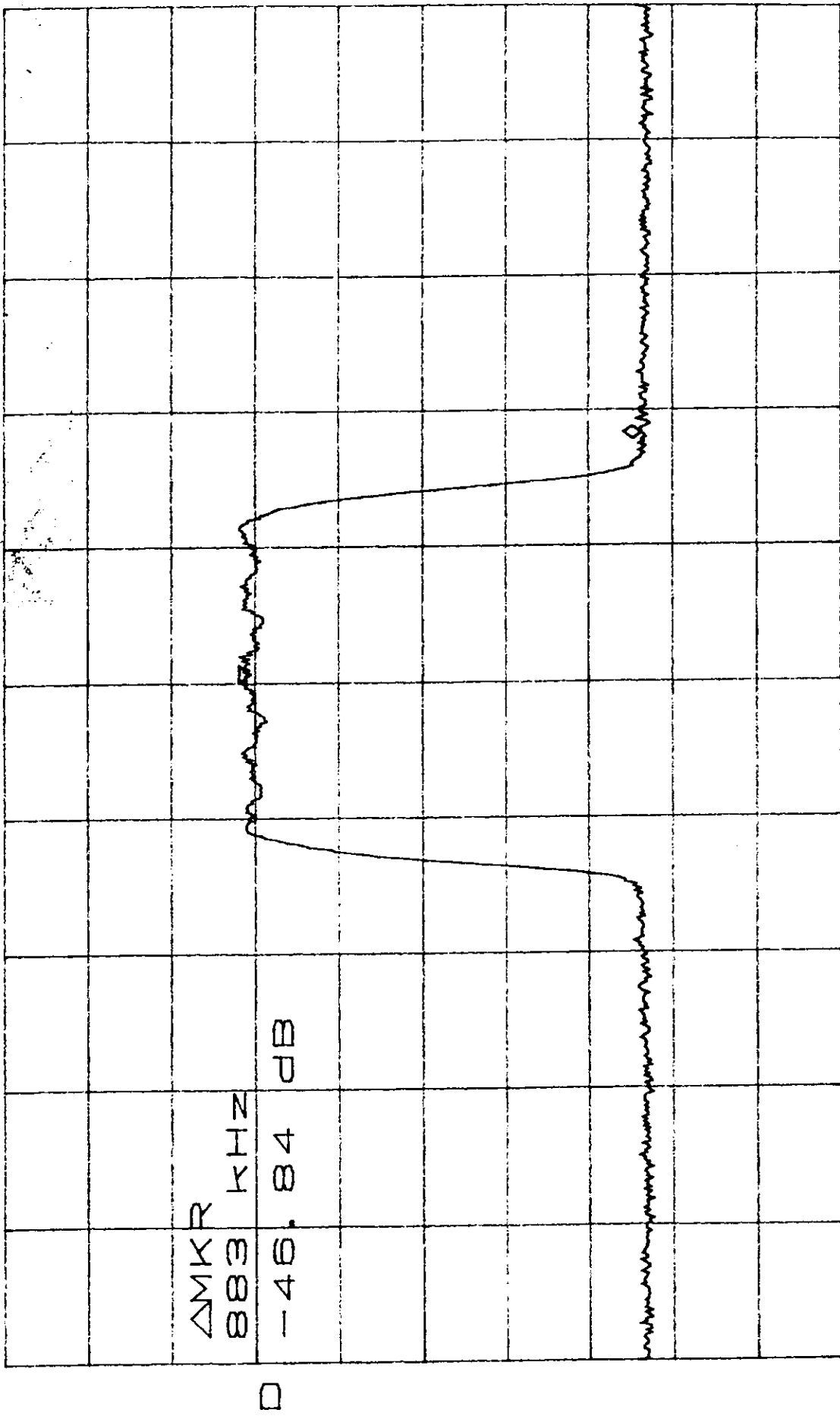
SWP 4.20sec

(DMA #1) 41dB Upper Band 685 10/31/96
 Ext Attn 41dB
 ATTN 10dB RFout = 33.0dBm
 RL -5.0dBm 10dB/ 883kHz
 ΔMKR -46.50dB



CENTER 1.964250GHZ SPAN 5.000MHZ
 *RBW 30kHz *VBW 100kHz SWP 4.20sec

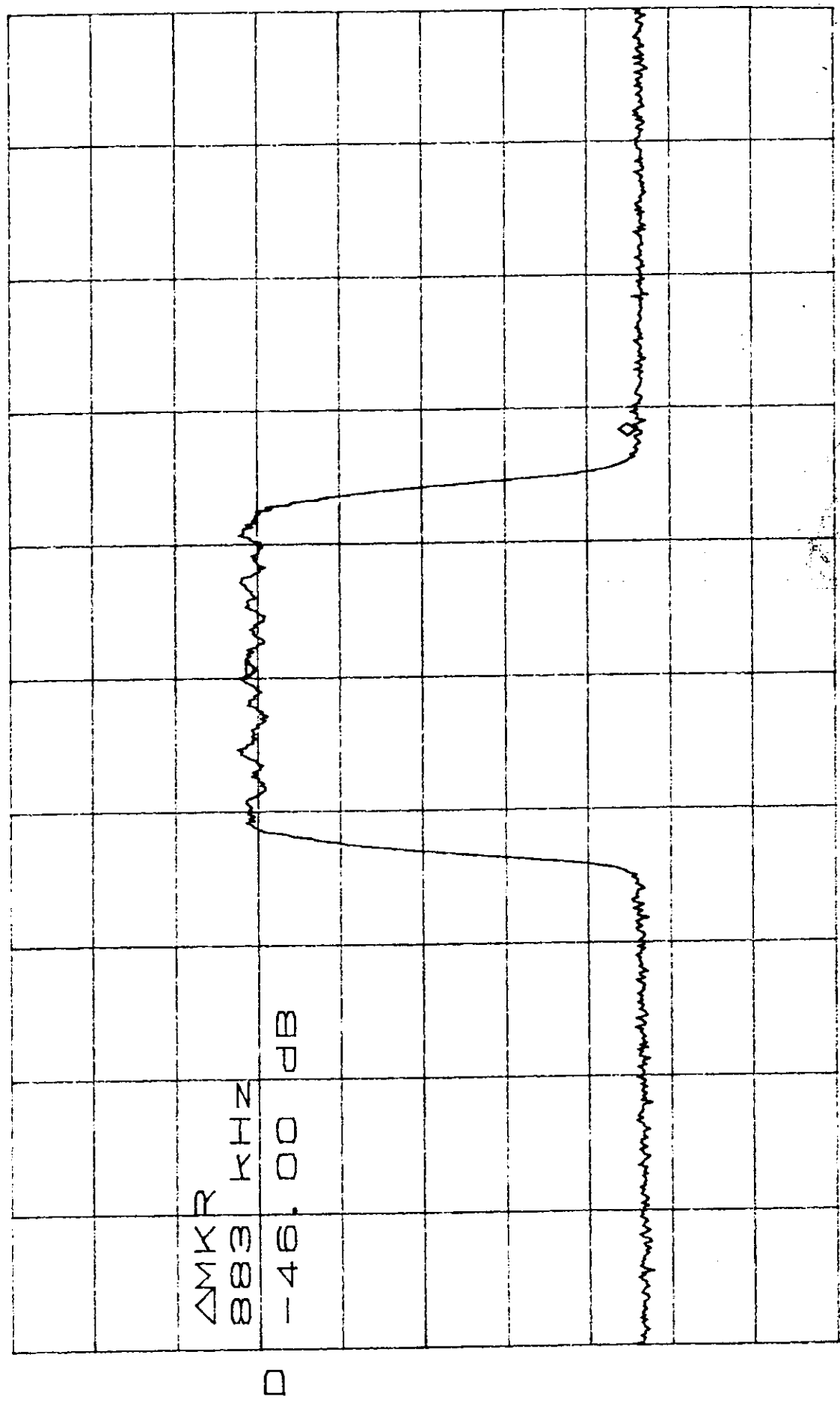
CDMA #1 Low Band 425
 x1 Att 10dB
 41dB
 RL -5.0dBm
 Reverse Path (UL)
 RFAUT = 33dBm
 10dB/
 Emission of 883 kHz
 ΔMKR -46.84dB
 883kHz



CENTER 1.871250GHZ
 *RBW 30kHz
 *VBW 100Hz
 SPAN 5.000MHZ
 SWP 4.20sec

COMA #1 Mid Band 550
 x1 Attn 10dB
 41dB
 ATTN 10dB
 RL -5.0dBm
 Reverse Path (UL)
 ΔMKR -46.00dB
 883kHz
 10dB/

10/28/96



CENTER 1.877500GHZ SPAN 5.000MHZ
 *RBW 30KHZ *VBW 100HZ SWP 4.20sec

CDMA #1
+ ATT 41dB

Upper Band 685

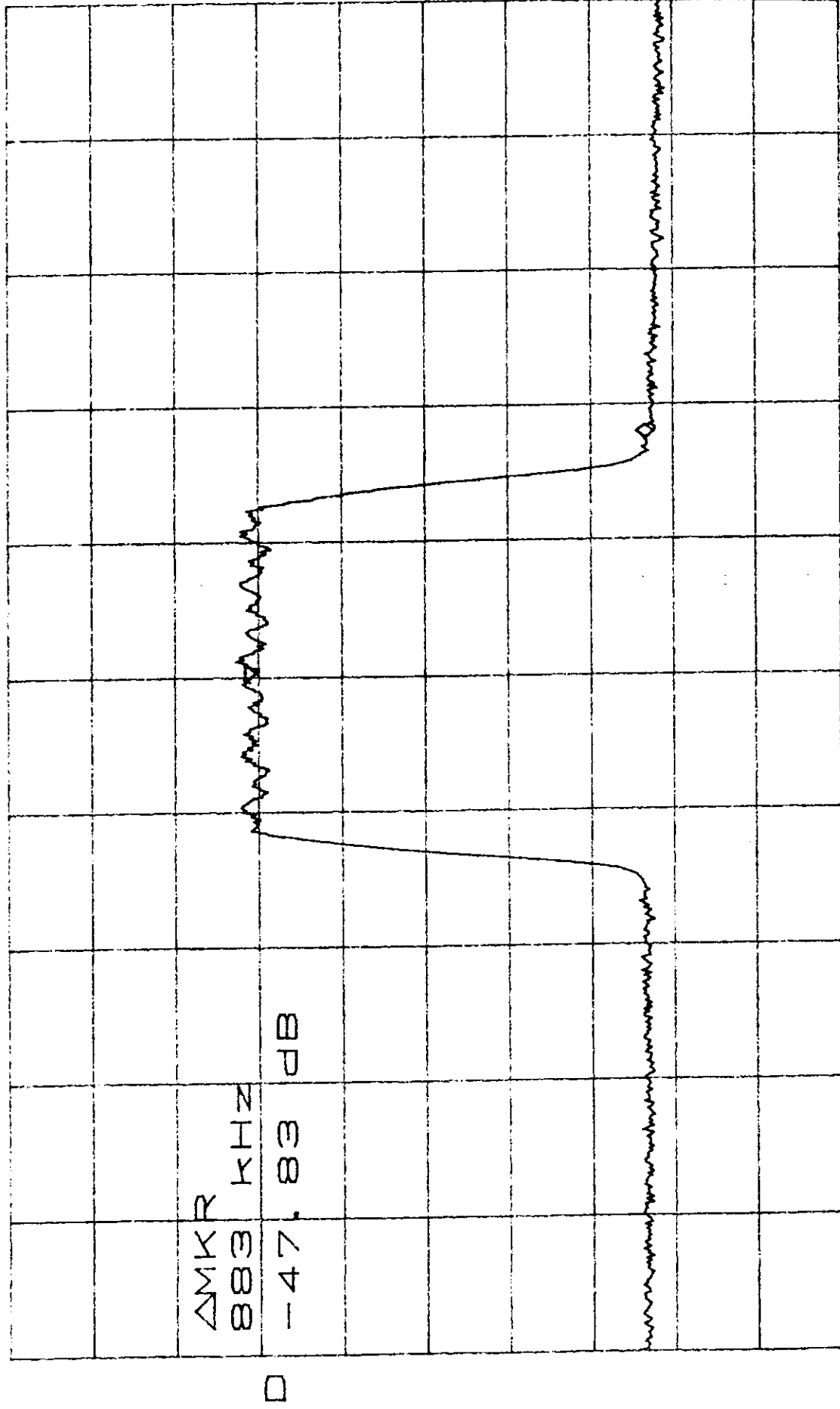
10/28/96

Reverse Path (UL) Δ MKR -47.83dB

ATTEN 10dB

RL -5.0dBm

10dB/ 883kHz



CENTER 1.884250GHZ

SPAN 5.000MHZ

*RBW 30kHz

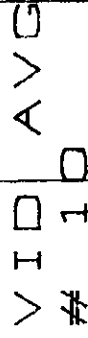
*VBW 100HZ

SWP 4.20sec

11/1/96

W
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N
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EMTO



NHMOSS. ZAS

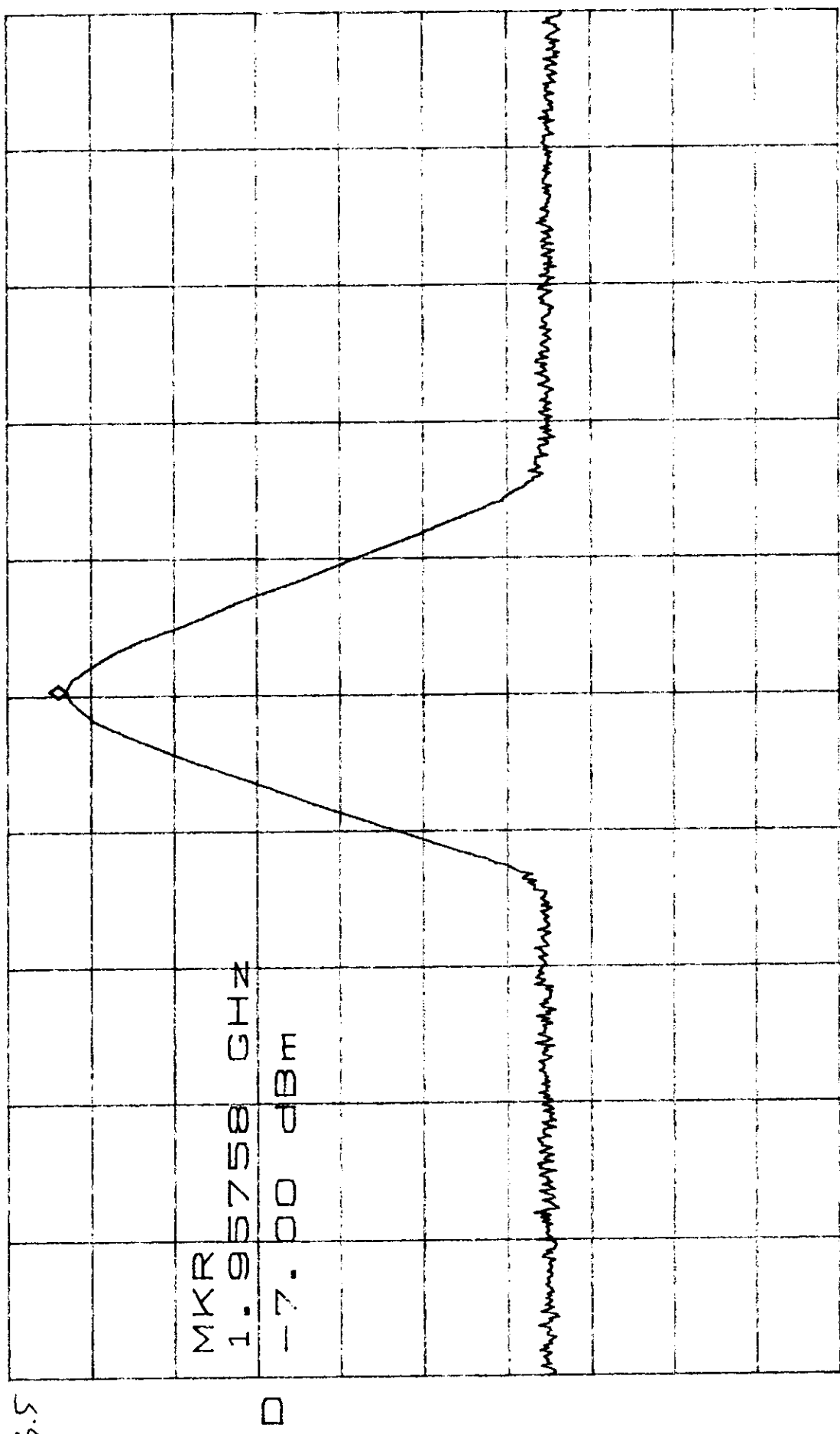
SWP 50.000

Cable Cal. out

Spec. Analyzer: HP 8563E

Gen: 835.8011.58

CDMA #1 40.5 dB Mid Band 550 Du Link (Fwd Path) 11/1/96
 *ATTEN 20dB VAVG 10 MKR -7.00dBm
 f_{in} = -55 RL 0dBm 1.95758GHz
 f_{out} = 33.5

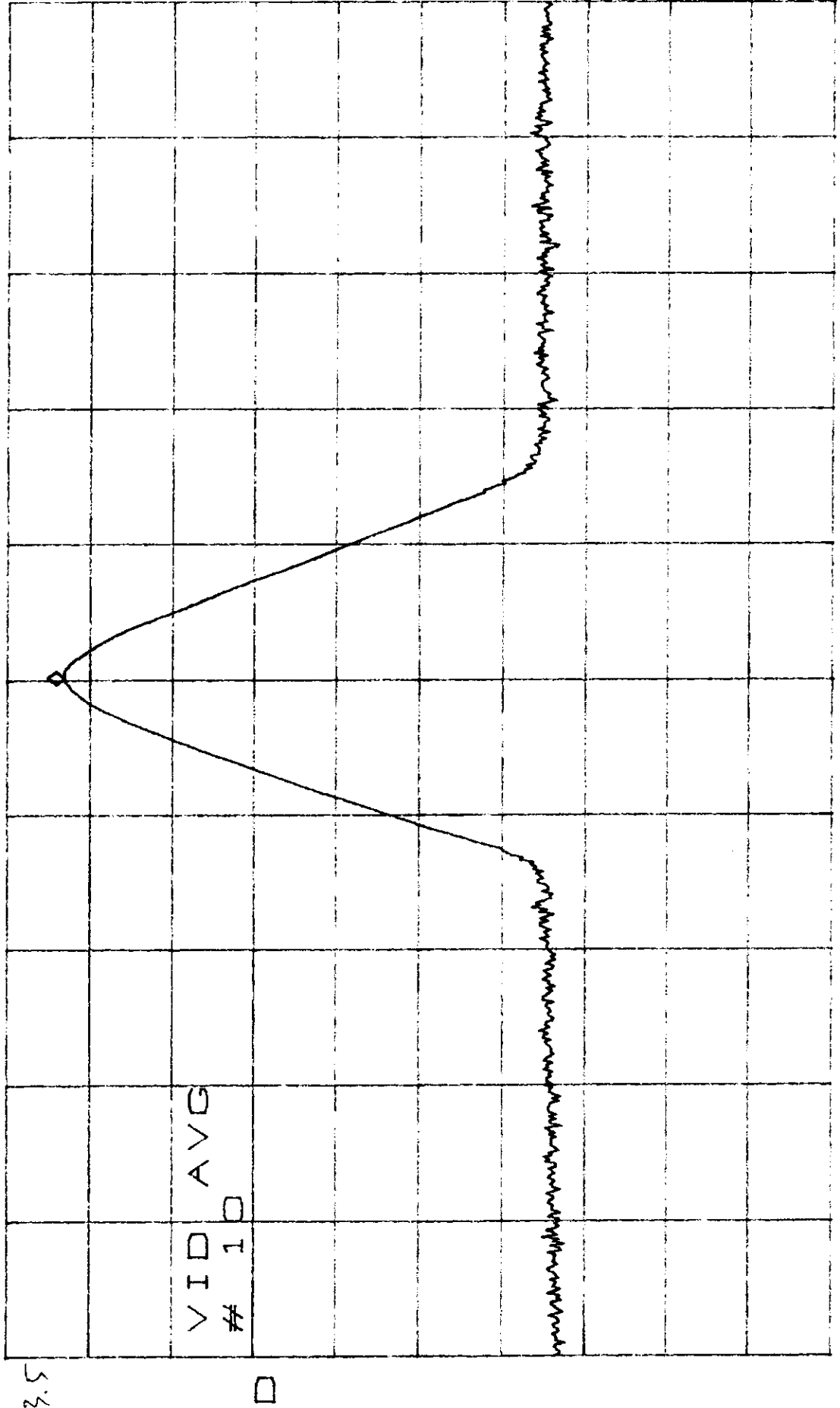


CENTER 1.95750GHz SPAN 25.00MHz
 *RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
 Cable cal. out Spec. Analyzer: HP 8563E
 Sig Gen : RFS 835.8011.58

(DMA #1) 11/1/96
 Ext Attn 40.5 dB
 Low Band = 425
 *ATTEN 20dB VAVG 10 MKR -6.83dBm
 RF_{in} = 55 RL 0dBm 1.95129GHz
 RF_{out} = 33.5

Dn Link (Fwd Path)

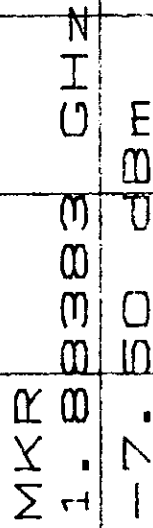
VAVG 10
 10dB/



CENTER 1.95125GHz SPAN 25.00MHz
 *RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
 Cable Cal. out.
 Spec. Analyzer: HP8563E
 Sig. Gen: K4S 835 8011.58

11/1/96

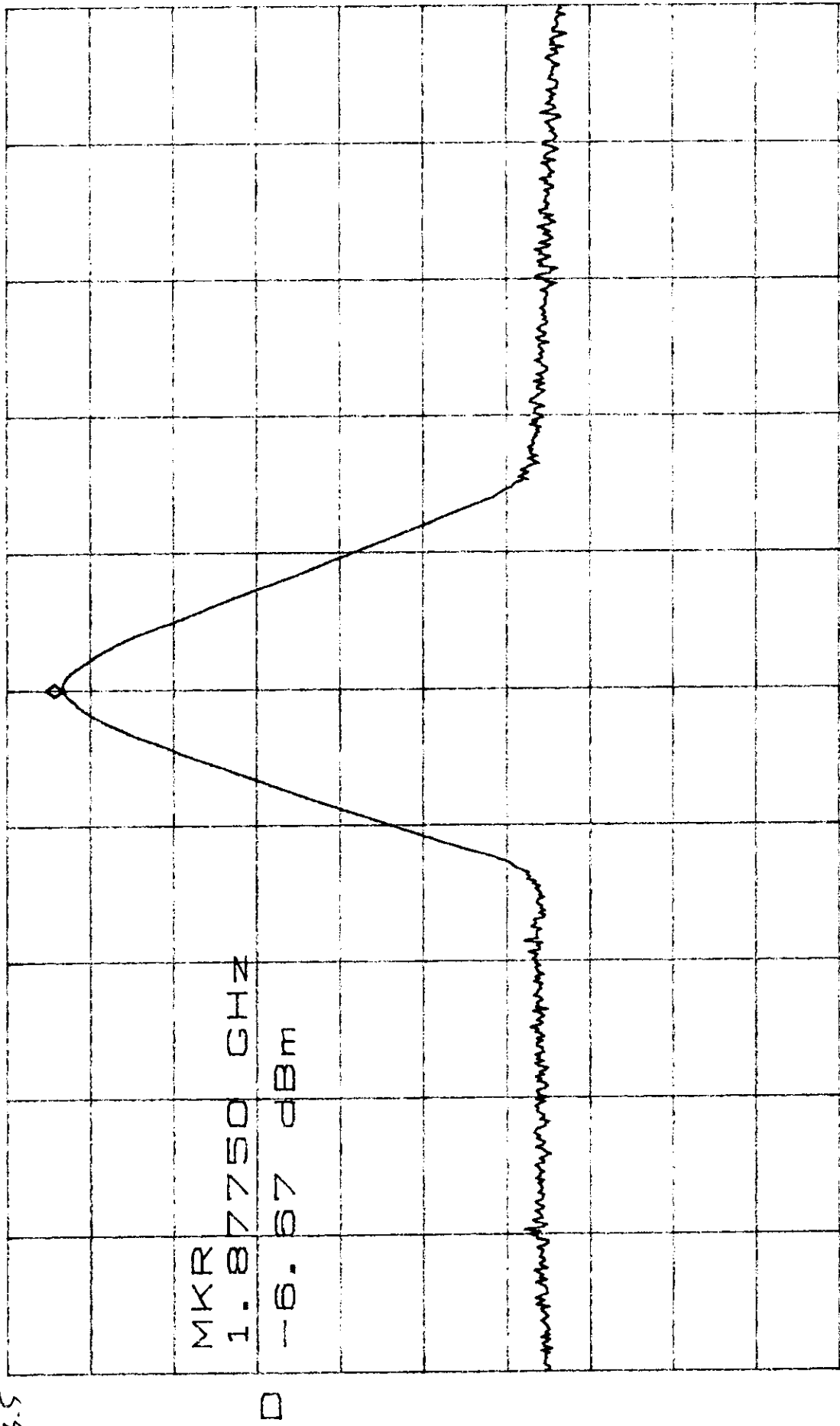
10dB / 1.88383GHz



Cable Cal. ent

Cable Cal. ent

CDMA #1
 Ext Attn 40.5
 *ATTEN 20dB
 RL 0dBm
 RF_{in} = -55
 RF_{out} = 33.5
 Mid Band 550
 VAVG 10
 10dB/
 MKR 1.87750GHz
 MKR -6.67dBm
 up Link (Rev. Pattern)
 11/1/96



CENTER 1.87750GHz
 *RBW 1.0MHz
 Cable Loss
 Spec. Analyzer : HP 8563E
 Sig. Gen : RFS 835.8011.58
 VBW 1.0MHz
 SWP 50.0ms
 SPAN 25.00MHz

11/1/96

uplink (Rev. Path)

Lower Band 425

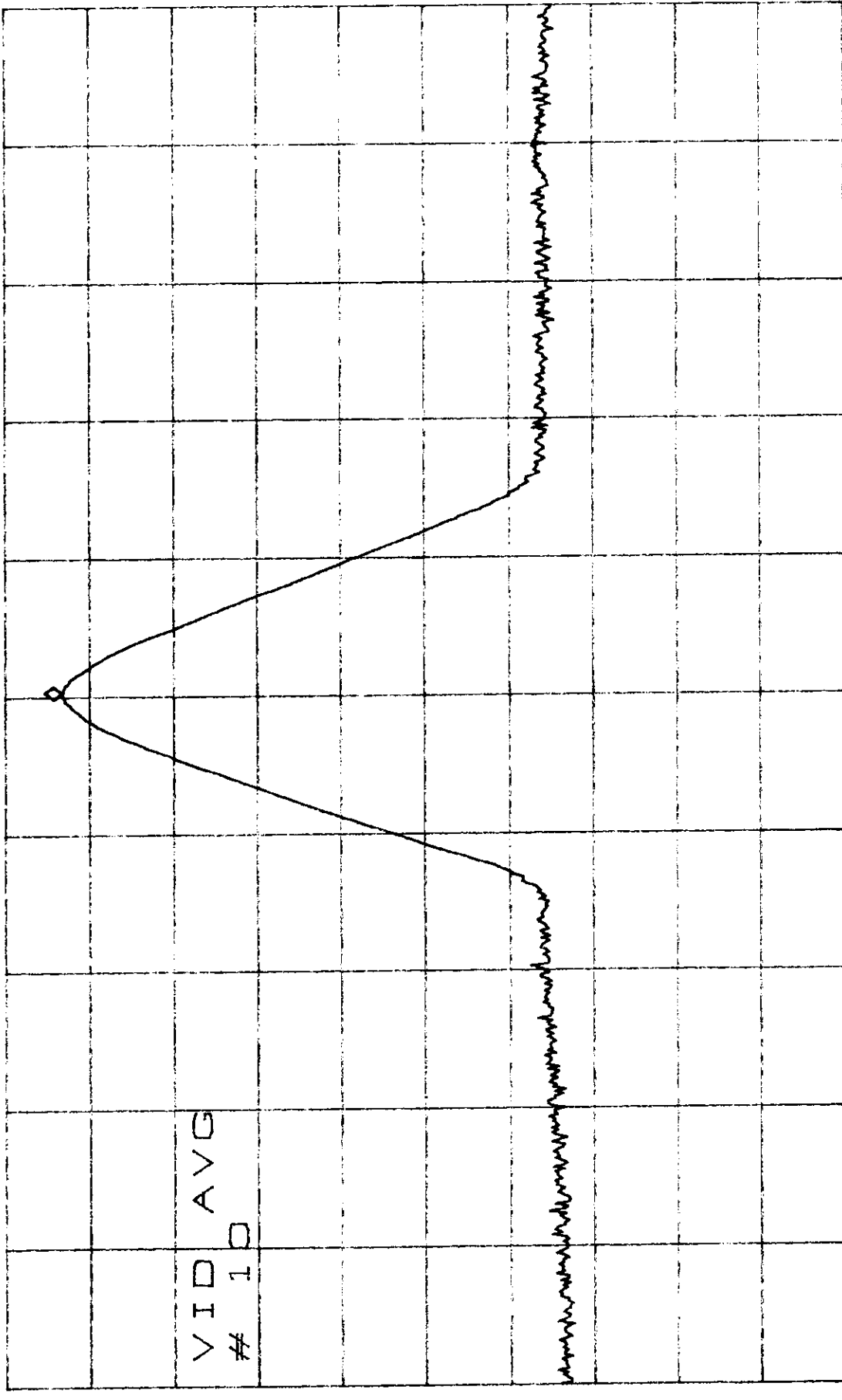
MKR -6.67dBm

VAVG 10

ATTEN 20dB

1.87133GHz

0dBm



RFout = 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 : RFS 835.8011.58

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

CDMA

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, 6 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)

6 span = 1 MHz → 1 of 5 MHz span

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!!!

+ 1 MHz from fundamentals

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, the technical writer just informed that there is not a block diagram in the product info. form for the CDMA repeater. Could you please provide one ASAP?

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

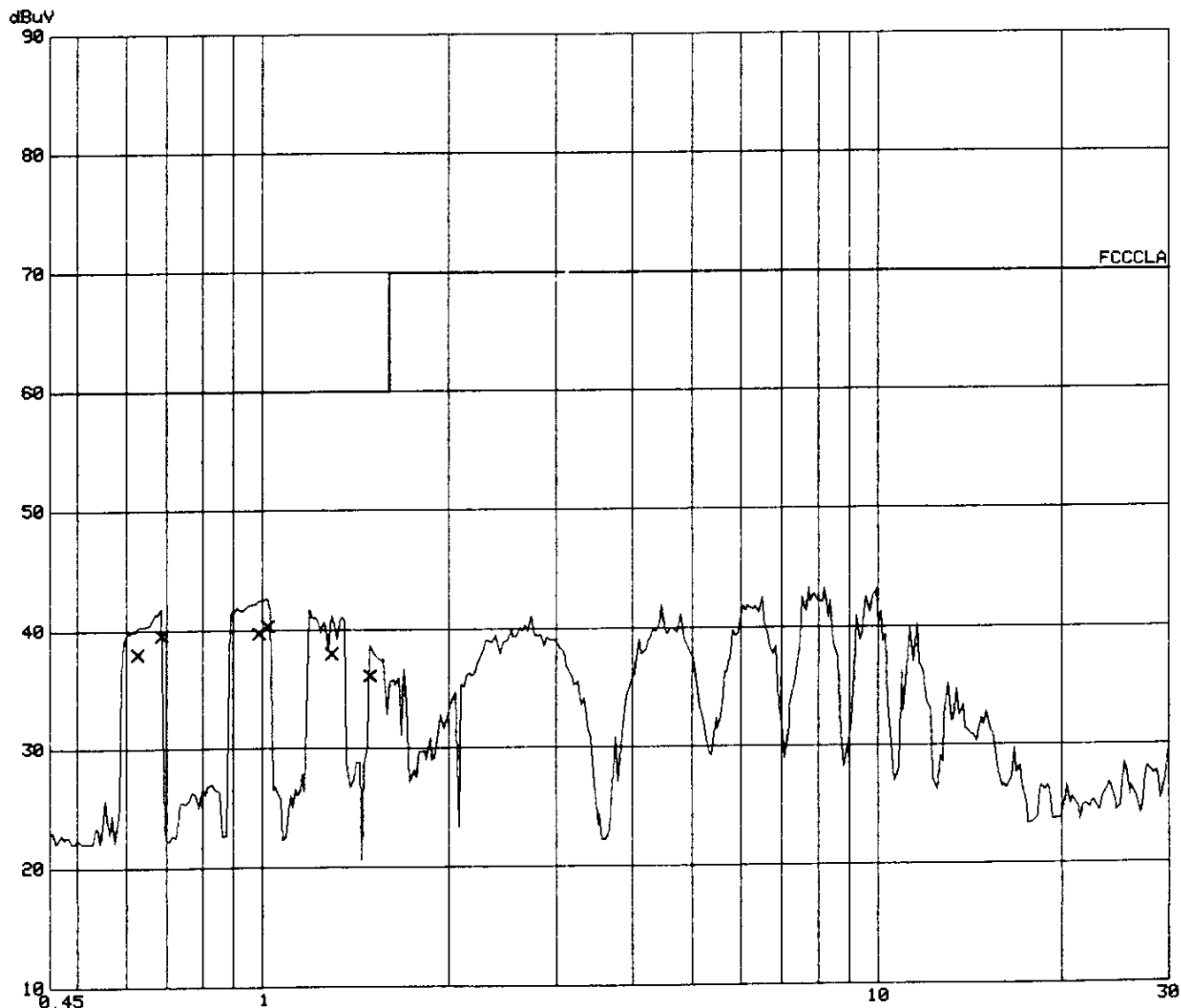
Scan Settings (2 Ranges)

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 *MW*
 Test Spec: FCC Class A
 Comment: 120 Vac 60 Hz Line 2
 Mid Channel, CW
 Date: 04. Nov 96 09:44

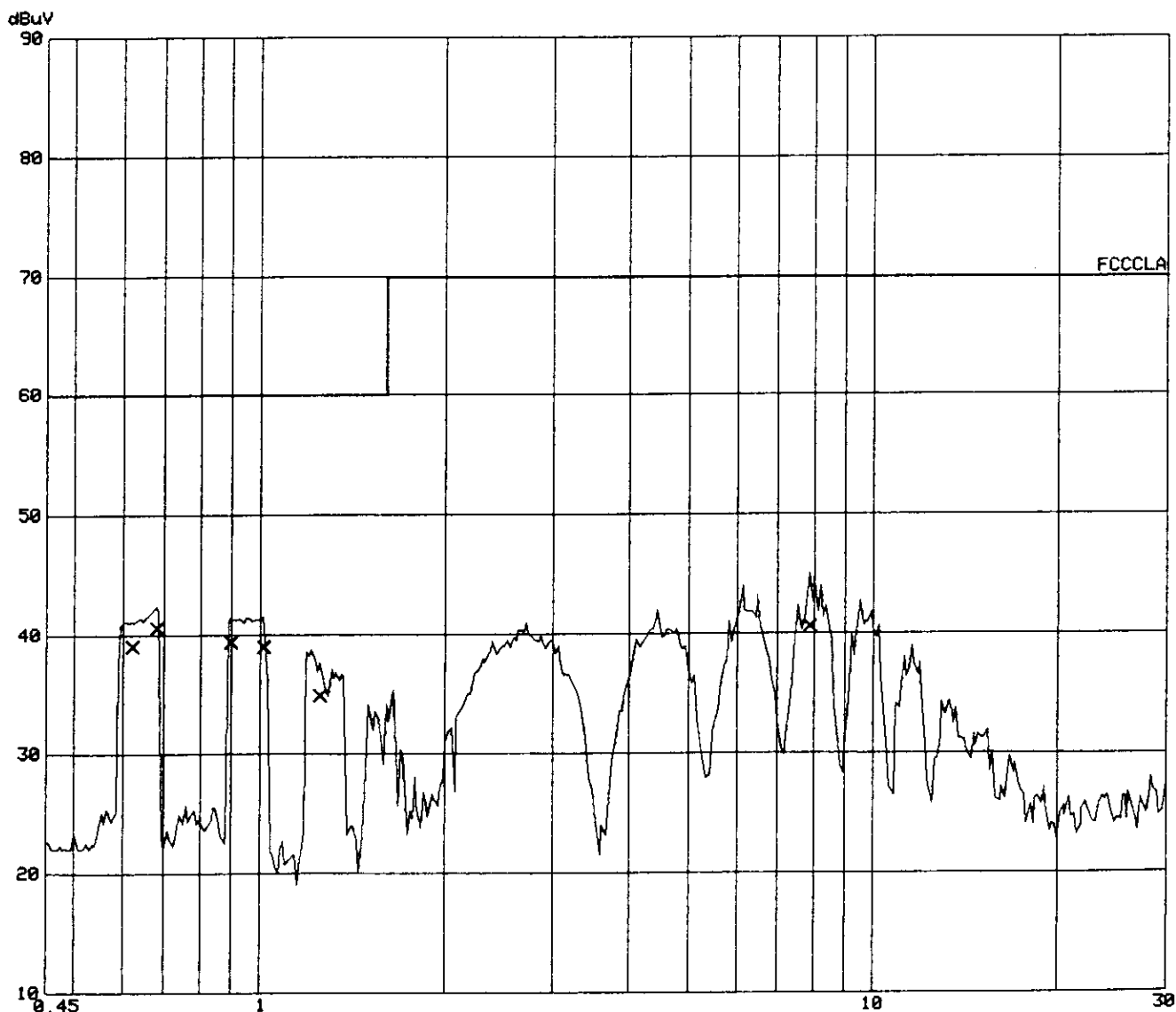
Scan Settings (2 Ranges)

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	20dB LISN

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 *m*
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
 Test Spec: FCC Class A
 Comment: 120 Vac 60 Hz Line 2
 Mid Channel, CDMA
 Date: 04. Nov 96 09:54

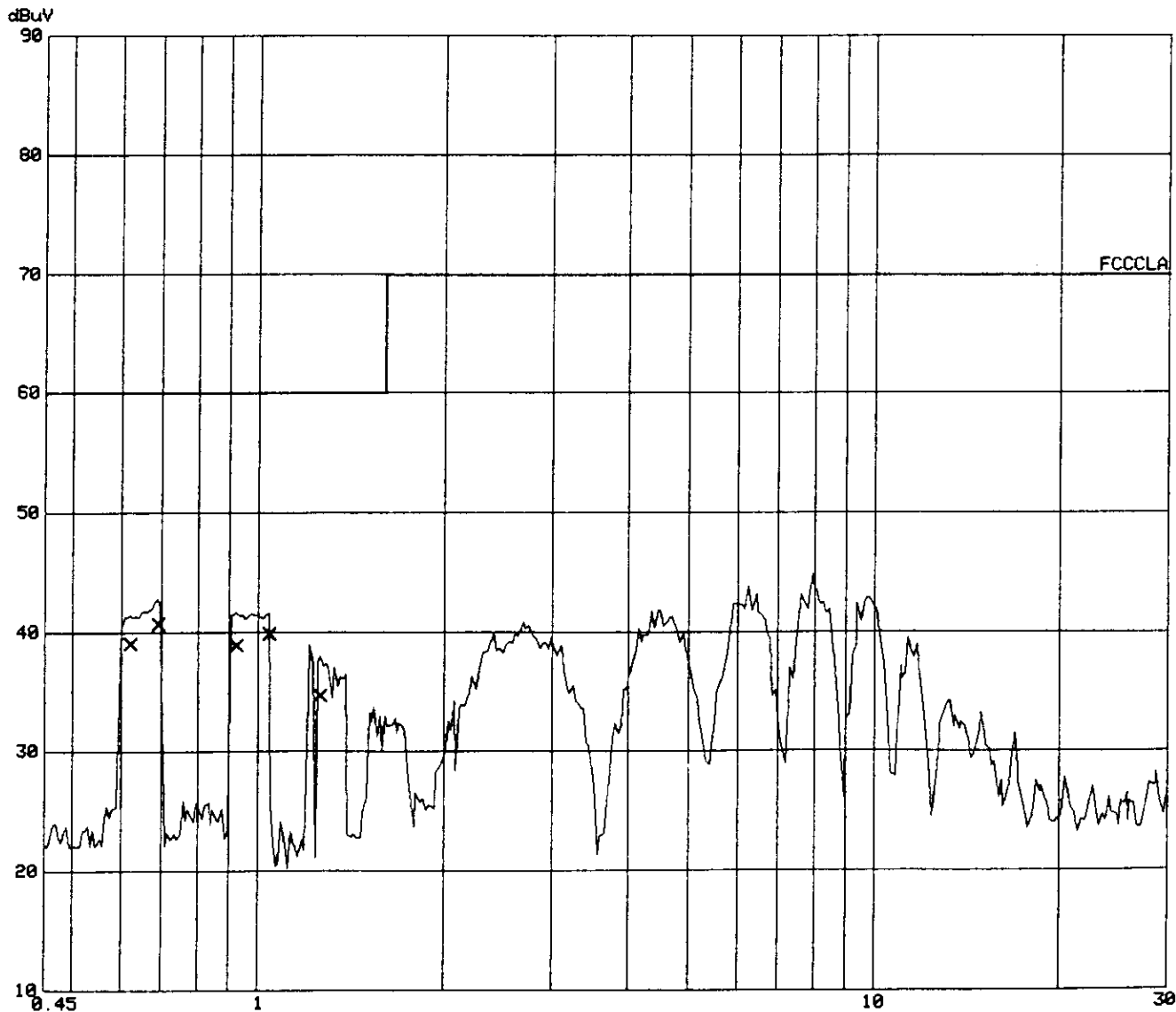
Scan Settings (2 Ranges)

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
 operator: Mary Washington
 est Spec: FCC Class A
 omment: 120 Vac 60 Hz Line 1
 Mid Channel, CDMA
 ate: 04. Nov 96 10:01

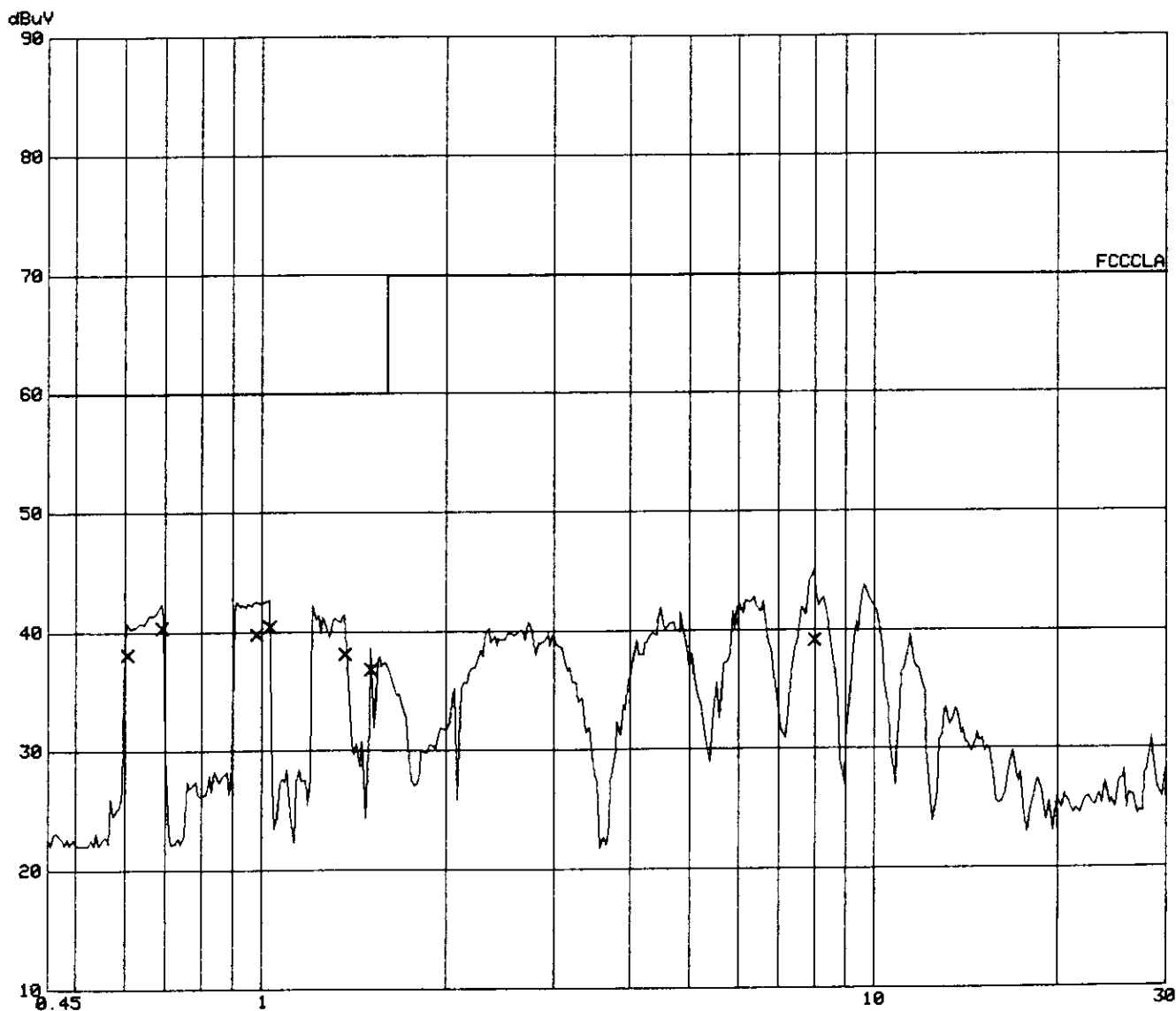
Scan Settings (2 Ranges)

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



FUV 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

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

* limit exceeded

SPEC: FCC Part 15 para 15.109(b)

TEST DIST: 10 Meters

TEST SITE: 3

BICONICAL: 235

LOG PERIODIC: 243

RCVR: JM-37/57A

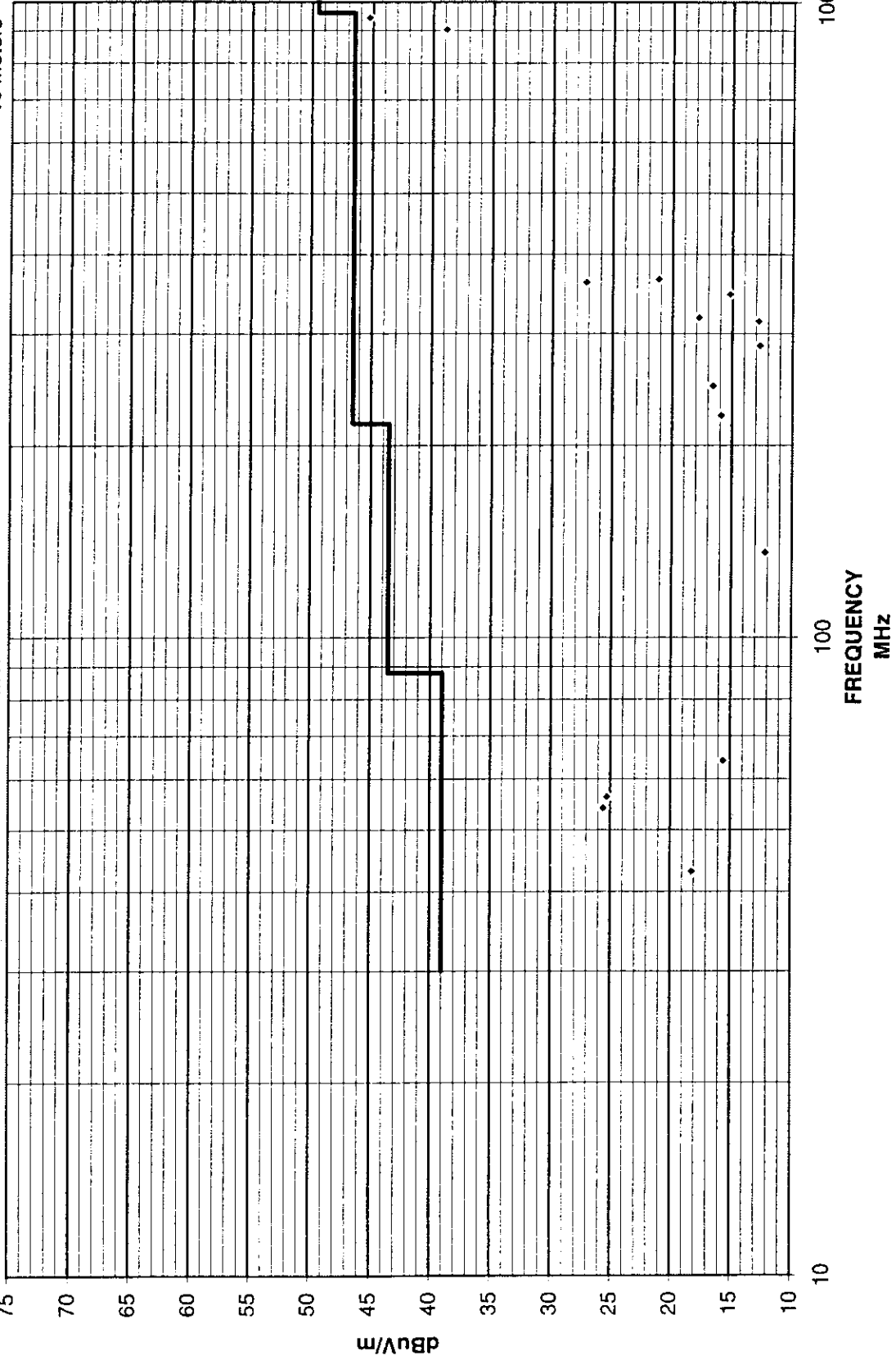
[illegible]

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
$f_c = 1951.25$	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	32.3	↓	22.18	↓	54.48	↓
$f_c = 1957.50$	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	↓
$f_c = 1963.75$	44.4	40.5	0	23.68	0	68.08	—
3.927.5	26.6	25.8	↓	22.81	↓	49.41	72.91
5.891.25	31.8	32.5	↓	22.18	↓	54.68	↓
$f_c =$							

NOTES:

- Resolution bandwidth and video bandwidth was 1 MHz.
- Limit = emission level of fundamental - 43 + 12 log 10
- No emissions were detectable, except the fundamental.

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
$f_c = 1887.5$	50.4	48.5	0	27.95	0	78.35	—
3767.5	26.0	26.4	↓	22.4	↓	49.0	83.18
5651.25	27.1	26.7	↓	24.47	↓	51.57	↓
$f_c = 1872.5$	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	↓
$f_c = 1871.25$	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	↓
$f_c =$							

NOTES:

- Resolution bandwidth and video bandwidth was 1 MHz.
- Limit = emission level at f_3 - 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



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
B-band data has 41dB ext atten } part 2 plots

Sincerely,

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: mwashtington@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: mwashtington@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, TÜV Product Service number, street, 10040 Mesa Rim Road city, San Diego state, CA and ZIP Code 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, TÜV Product Service contact person, Floyd Fleury number, street, 10040 Mesa Rim Road city, San Diego state, CA and ZIP Code 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			9.(a) FCC ID before change in identification:	
*If box 2 is checked, complete items 9(a) and (b).			(b) Grant date of FCC ID in 9(a) above:	
10. EQUIPMENT SPECIFICATIONS:				
(a) Frequency range in MHz Uplink - 1850-1865 MHz 1870 - 1885 MHz Downlink - 1930-1945 MHz 1950 - 1965 MHz	(b) Rated RF power output in watts 2.8	(c) Frequency tolerance % , Hz, ppm --	(d) Emission designator Repeater	(e) Microprocessor model number 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 items 12(b), (c), (d), or (e) as appropriate. ☐ Yes ☒ No				
(b) Additional equipment authorization(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:	



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	AC/DC Power Supply	
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	Schematics	
	LNA/Splitter DL	
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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

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

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 : S101703701-01

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, 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.

This report is the confidential property of the client. As a mutual protection to our clients, the public and ourselves, extracts from the test report shall not be reproduced except in full without our written approval. This report shall not be used by the client to claim product endorsement by NVLAP or any agency of the US government.

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



DIRECTORY - EMISSIONS **Test Report**

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Technical Documentation

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--	------------

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Supplemental Information	



EMISSIONS TEST REGULATIONS :

The emissions tests were performed according to the following regulations:

☐ - EN 50081-1 / 1991

☐ - EN 55011 / 1991

☐ - EN 55013 / 1990

☐ - EN 55014 / 1987

☐ - EN 55014 / A2:1990

☐ - EN 55014 / 1993

☐ - EN 55015 / 1987

☐ - EN 55015 / A1:1990

☐ - EN 55015 / 1993

☐ - EN 55022 / 1987

☐ - EN 55022 / 1994

☐ - BS

☐ - VCCI

■ - 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)

☐ - CISPR 11 (1990)

☐ - CISPR 22 (1993)

☐ - Group 1

☐ - Class A

☐ - Household appliances and similar

☐ - Portable tools

☐ - Semiconductor devices

☐ - Household appliances and similar

☐ - Portable tools

☐ - Semiconductor devices

☐ - Class A

☐ - Class A

☐ - Class 1 ITE

☐ - Class A

☐ - Group 1

☐ - Class A

☐ - Class A

☐ - Group 2

☐ - Class B

☐ - Class B

☐ - Class B

☐ - Class 2 ITE

☐ - Class B

☐ - Group 2

☐ - Class B

☐ - Class B



Environmental Conditions In The Laboratory:

	<u>Actual</u>
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

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 810 with HP 85663A Software	Various	Automated RFI Measurement System (ARMS)	(multiple)	187, 188
☐ - LISN-3, 50 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 3-4 50 μ H/250 μ H/50 Ω /0.25 μ F		262-263
☐ - LISN-3, 50 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 5-6 50 μ H/250 μ H/50 Ω /0.25 μ F		264, 265
☐ - LISN-2, 25 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 7 50 μ H/250 μ H/50 Ω /0.25 μ F		413
☐ - LISN-2, 25 A	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 7 50 μ H/250 μ H/50 Ω /0.25 μ F		--
☐ - FCC-LISN-50-25-2	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 112 50 μ H/250 μ H/50 Ω /0.25 μ F		553
☐ - FCC-LISN-50-25-2	Fischer Custom Communications, Inc.	Power Mains Network (LISN), 113 50 μ H/250 μ H/50 Ω /0.25 μ F		552
☐ - 8012-50-R-12-BNC	Solar Electronics Co.	LISN, 50 μ H/50 Ω /0.1 μ F	--	266
☐ - 9252-50-R-24-BNC	Solar Electronics Co.	LISN, 50 μ H/250 μ H/50 Ω /0.25 μ F	941719	458
☐ - 9252-50-R-24-BNC	Solar Electronics Co.	LISN, 50 μ H/250 μ H/50 Ω /0.25 μ F	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: _____



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 P/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 P/P 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

Remarks: _____

**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 CCA-7	Eaton/Ailtech	OATS measurement set (Roof)	0561-09261	420
☐	NM-37/57 CCA-7	Eaton/Ailtech	OATS measurement set (Canyon)	0773-03117	373
☐	HFH 2-Z2	Rohde & Schwarz	Antenna, Loop	0709-82078	171
☐	3104	EMCO	Antenna, Biconical	0187-0322	172
☐	3110	EMCO	Antenna, Biconical	880	208
☐	94455-1	Eaton/Ailtech	Antenna, Biconical	3031	235
☐	3110B	EMCO	Antenna, Biconical	1378	451
☐	CBL6111	Chase	Antenna, Bilog	0811	231
☐	CBL6111	Chase	Antenna, Bilog	9508-2	491
☐	3146	EMCO	Antenna, Log Periodic Dipole	1013	460
☐	3146	EMCO	Antenna, Log Periodic Dipole	1291	461
☐	3146	EMCO	Antenna, Log Periodic Dipole	1597	242
☐	7405	EMCO	Loop Probes	106X	243
☐	8566B	Hewlett Packard	Spectrum Analyzer	1063	244
☐	85662B	Hewlett Packard	Spectrum Analyzer Display	9104-1959	570
☐	ESVS 30	Rohde & Schwarz	EMI Test Receiver	2311A02209	404
☐	ESVS 30	Rohde & Schwarz	EMI Test Receiver	2309A04682	406
				830350/006	427
				833825/003	466

Remarks: _____

**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	B21023	277
☐ - NM-7A, NM-17/27, NM-37/57, NM-67, CCA-7, and H/P 9836 HP-1B Computer	Eaton/Aitech	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/Aitech	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 85850A 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

Remarks: _____



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.



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 | |
| ☐ - _____ | |
| ☐ - _____ | |



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

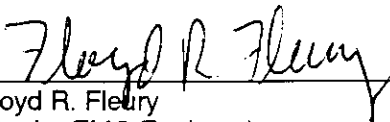
- ☒ - **Fulfills** the general approval requirements cited on page 3.**
- ☐ - **Does not** fulfill the general approval requirements cited on page 3.

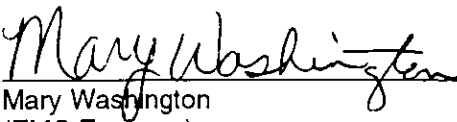
Statement of Measurement Uncertainty

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)



Technical Documentation

Test Data Sheets
and
Test Setup Drawing(s)



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

REPORT NO: S7037 DATE: 21 Jan 97
TEST: Radiated Spurious/Harmonics Emission
CUSTOMER: Ortel Corporation
EUT: CDMA Repeater Model CDR-1901-1-A S/N 4
SPECIFICATION: FCC Part 2, Paragraph 2.993

S. V

[illegible]

NOTES:

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

6. ✓

NOTES:

1. RBW = 1 MHz; VBW = 1 MHz
2. Receive antenna = Model 3115, P/V 251
3. Amplifier = P/V 306, 307, 308
4. (*) Noise floor readings.
5. Downlink Uplink (reverse path).



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



Jan-22-97 12:58P Ortel Purchasing.

818 281 7913

2.02



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,

A handwritten signature in black ink, appearing to read 'Dat Ton', written over a horizontal line.

Dat Ton
Test Engineer

File: "CDMATYPE.DOC"

Page TD6 of TD58

Rev.No 1.0

FCC Part 2.985: RF Output Power

DUT: Model CDR-1901-I-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:

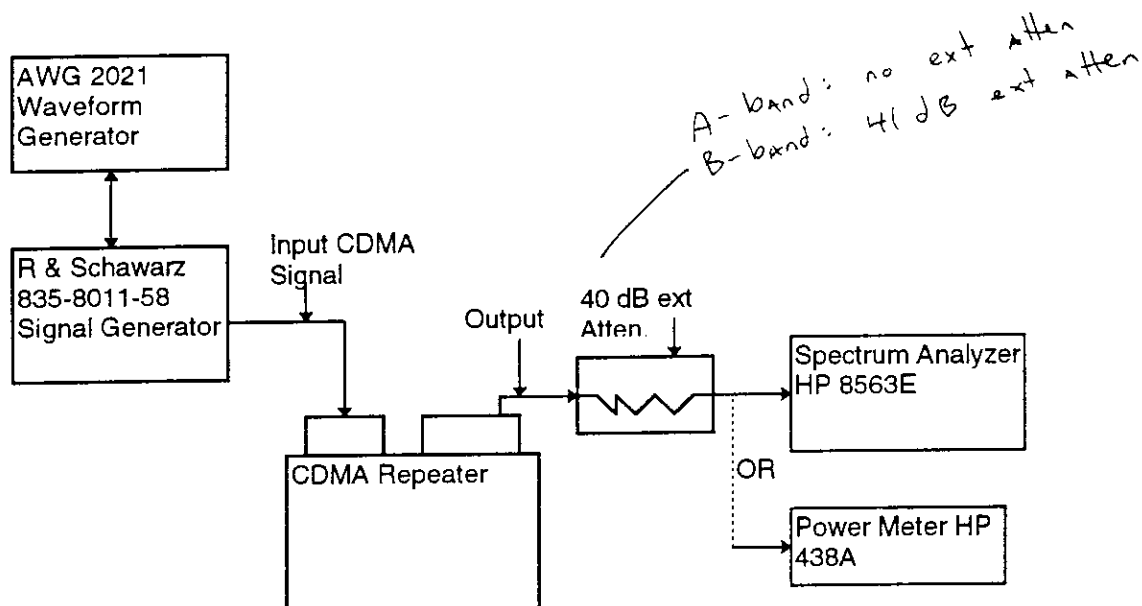
Channel	Frequency (MHz)	Output Power (dBm)
25	1851.25	32.95
150	1857.50	33.01
275	1863.75	33.01

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.**

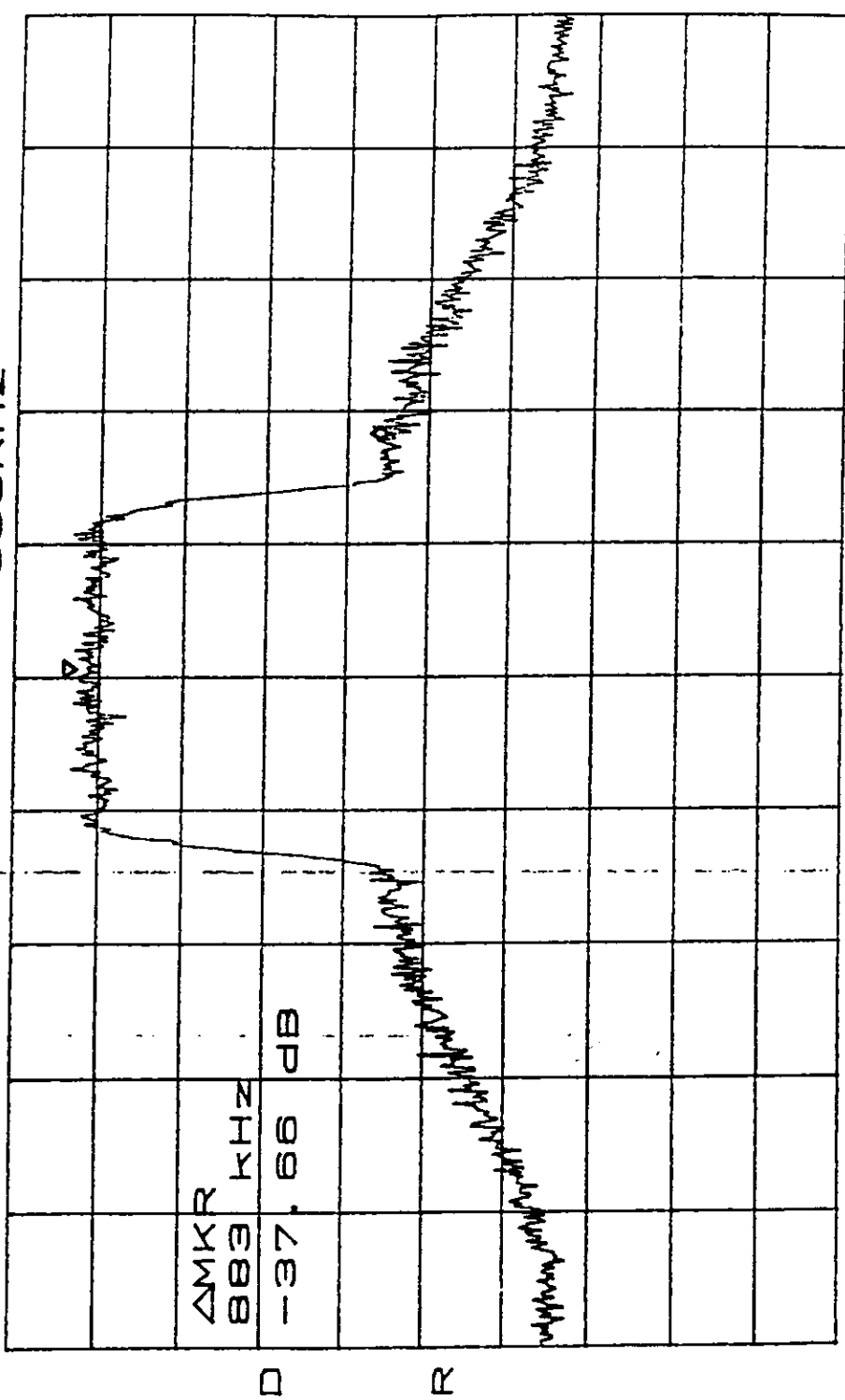
Test Setup for CDMA Repeater





CDMA, FCC, A-Band
ATTEN 10dB
RL 25.0dBm
uL, Reverse Path
VAVG 10
10dB/
Lo-Jan 25
ΔMKR -37.66dB
883kHz
1/16/97

2.189

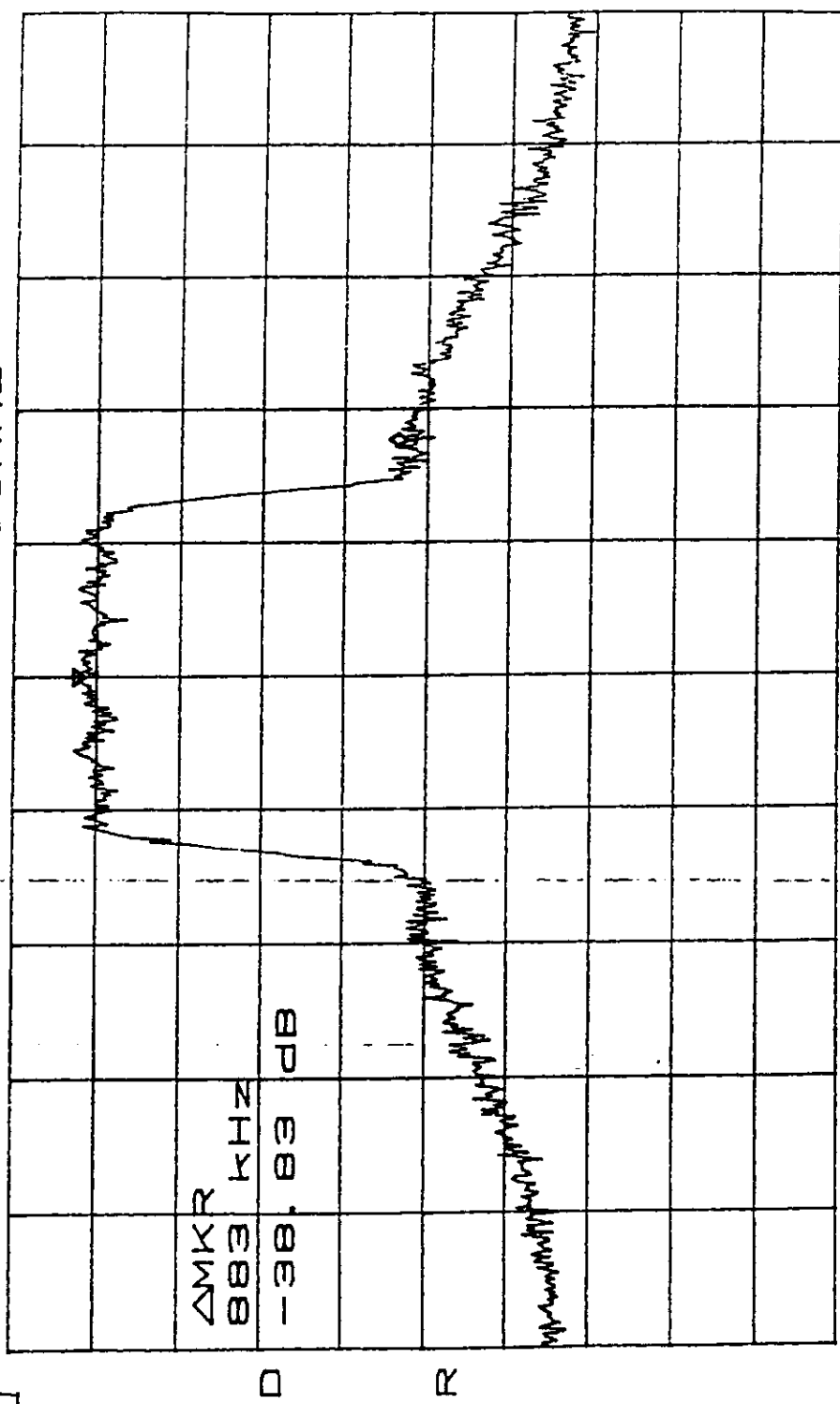


CENTER 1.851250GHZ
*RBW 30KHZ
SPAN 5.000MHZ
VBW 30KHZ
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.989
TESTED BY ORTEL CORPORATION
DATE: 16 January 1997



CDMA, FCC, A-Band
ATTEN 10dB
RL 25.0dBm
UL, Reverse Path
VAVG 10
10dB/
Hi Chan 275
ΔMKR -38.83dB
883kHz

2.989

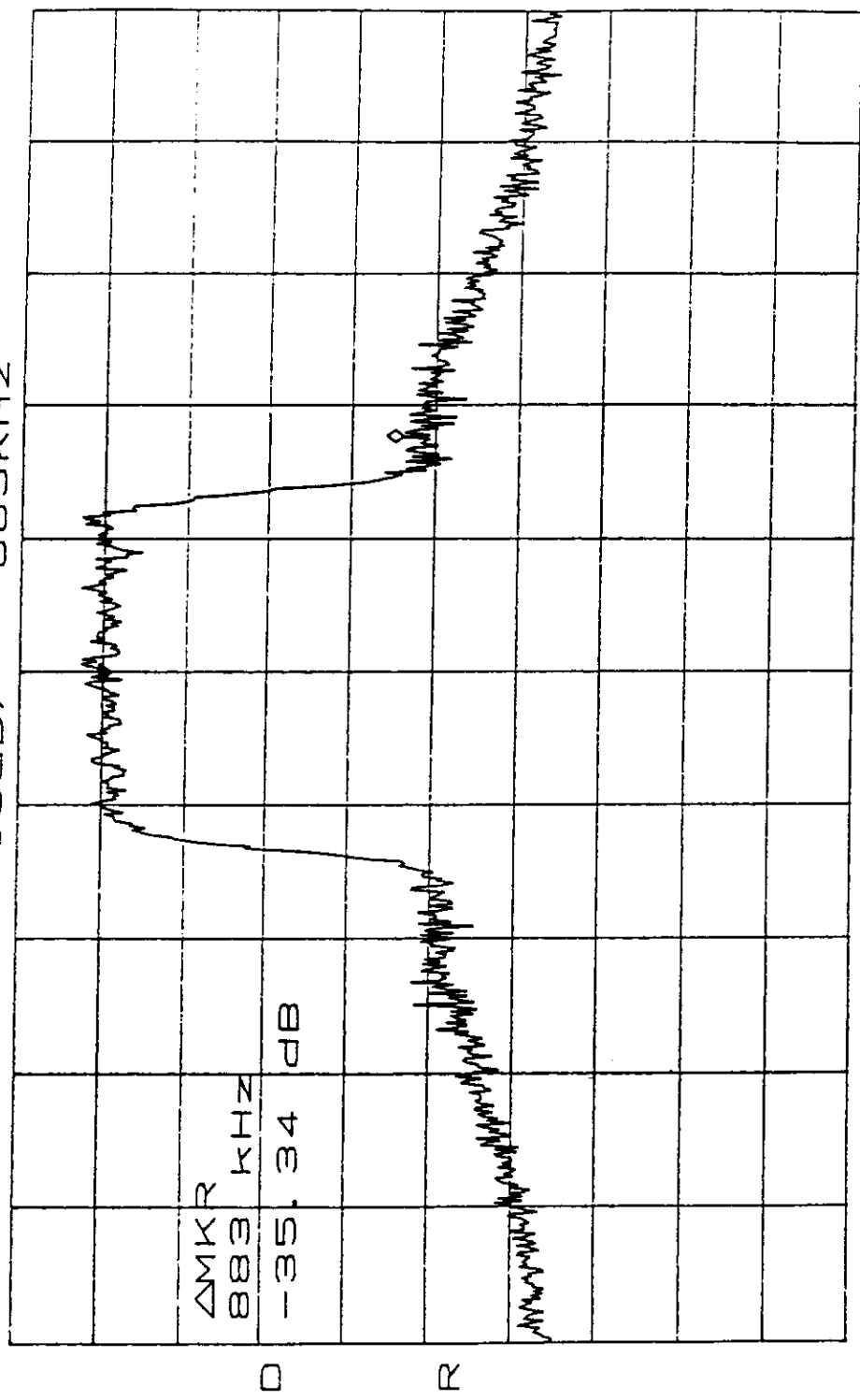


CENTER 1.863750GHZ
*RBW 30KHZ
SPAN 5.000MHZ
VBW 30KHZ
SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 16 January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.989



CDMA, FCC, A-Band
ATTEN 10dB
RL 25.0dBm
DL, Fund Path
VAVG 10
10dB/
Lo chan 25
ΔMKR -35.34dB
883kHz

1/17/97



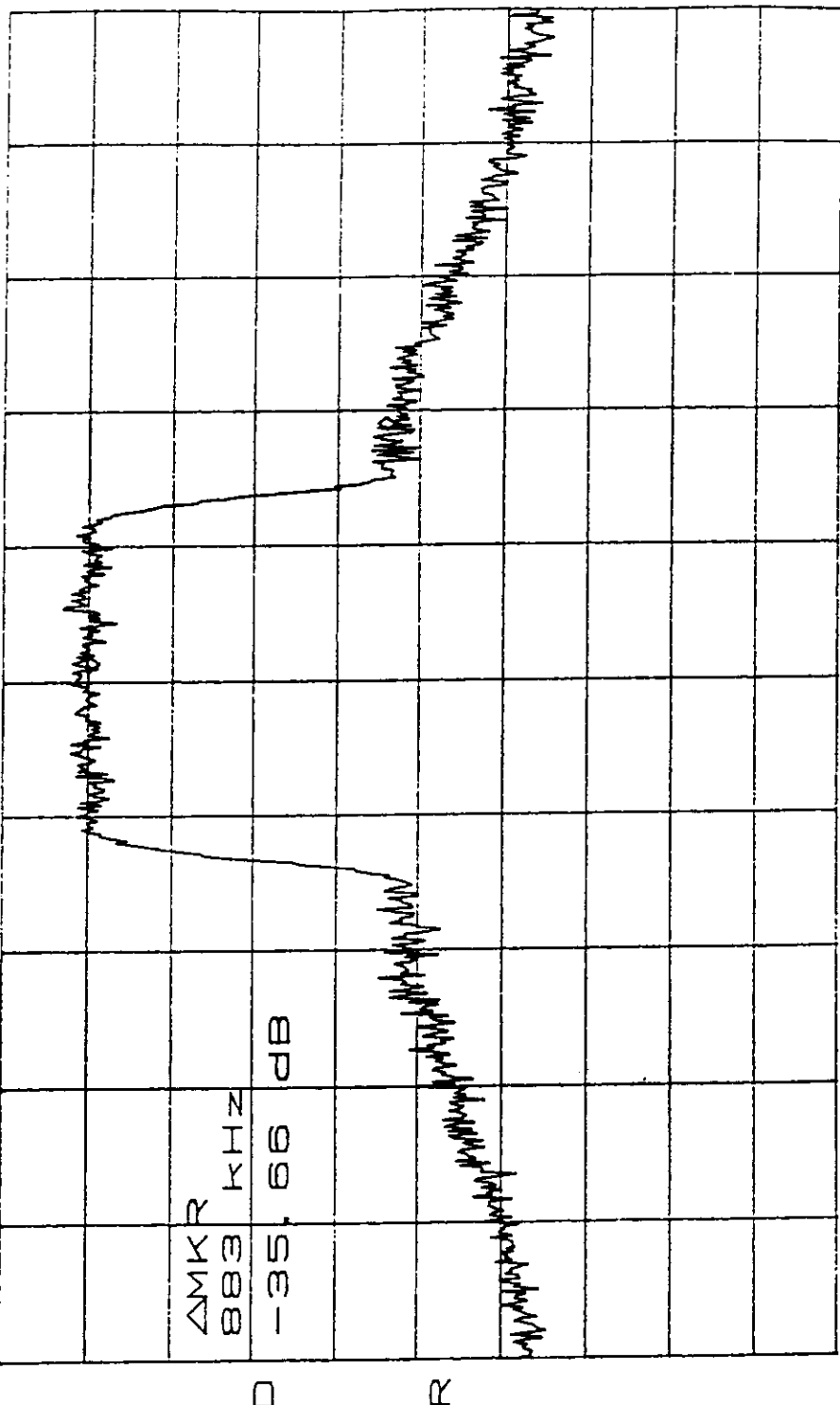
CENTER 1.931250GHZ
*RBW 30kHz
SPAN 5.000MHz
VBW 30kHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.989
DATE: 17 January 1997

2.189



CDMA, FCC, A-Band
ATTEN 10dB
RL 25.0dBm
BL, Fwd Path
VAVG 10
10dB/
Hi Chan 275
ΔMKR -35.66dB
883kHz

2.989



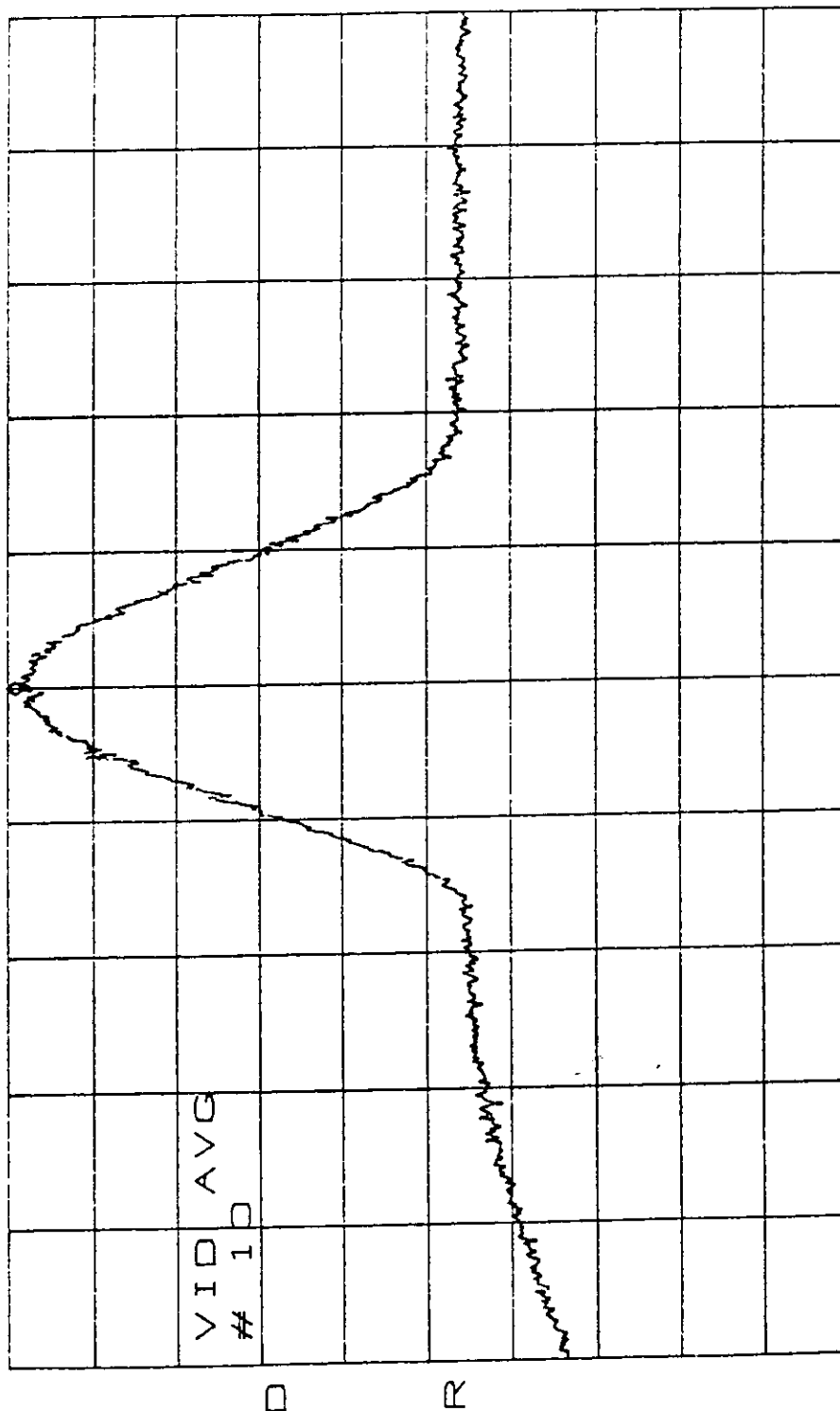
CENTER 1.943750GHz
*RBW 30kHz
VSW 30kHz
SPAN 5.000MHz
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.989
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997



1/17/97

CDMA, FCC, A-Band DL, Fund Path Lo Chan 25
 ATTN 10dB VAVG 10 MKR 28.17dBm
 RL 30.0dBm 10dB/ 1.93125GHz

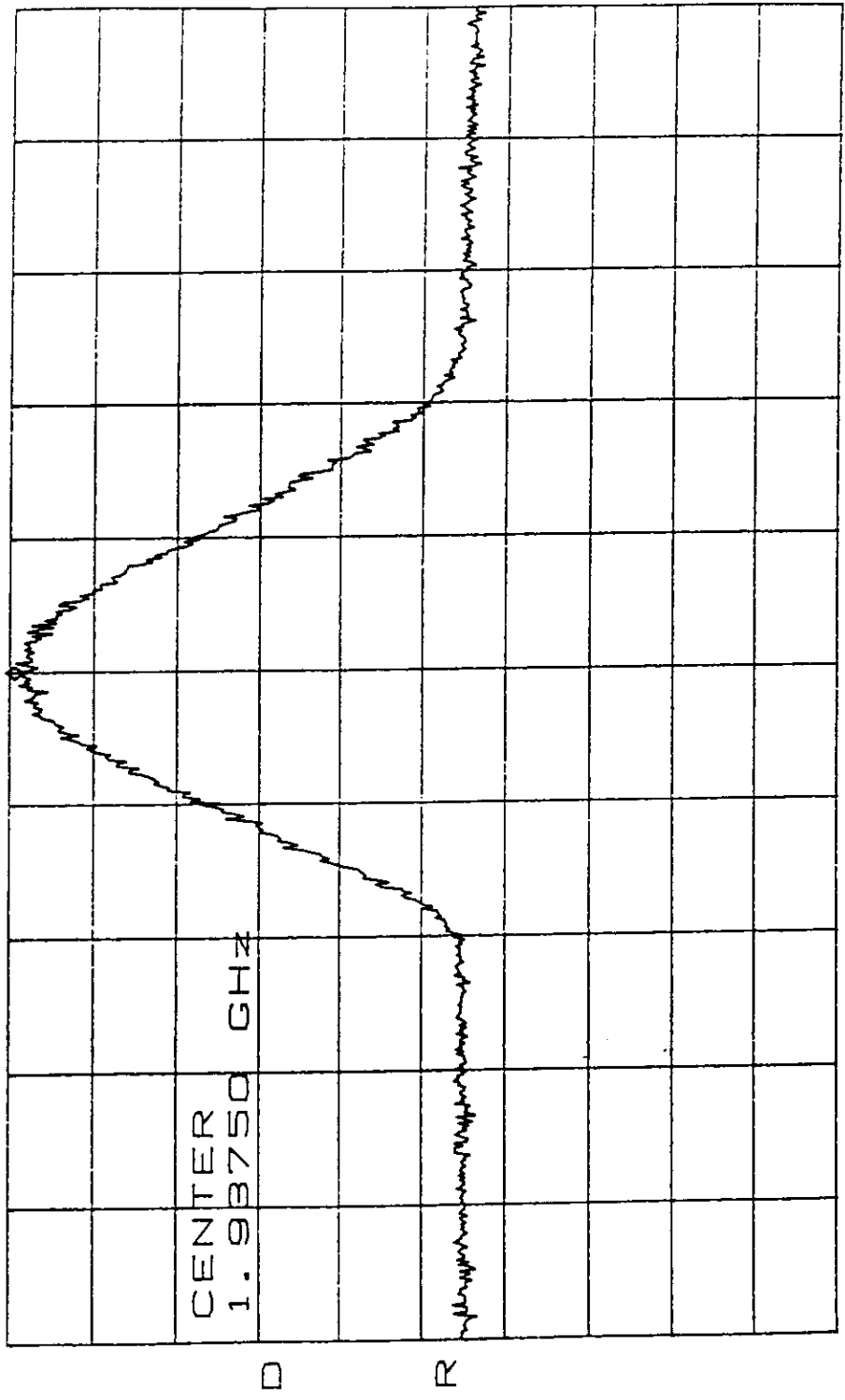
1.991



CENTER 1.93125GHz SPAN 25.00MHz
 *RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 DATE: 17 January 1997 SPECIFICATION: FCC Part 2, Para. 2.991



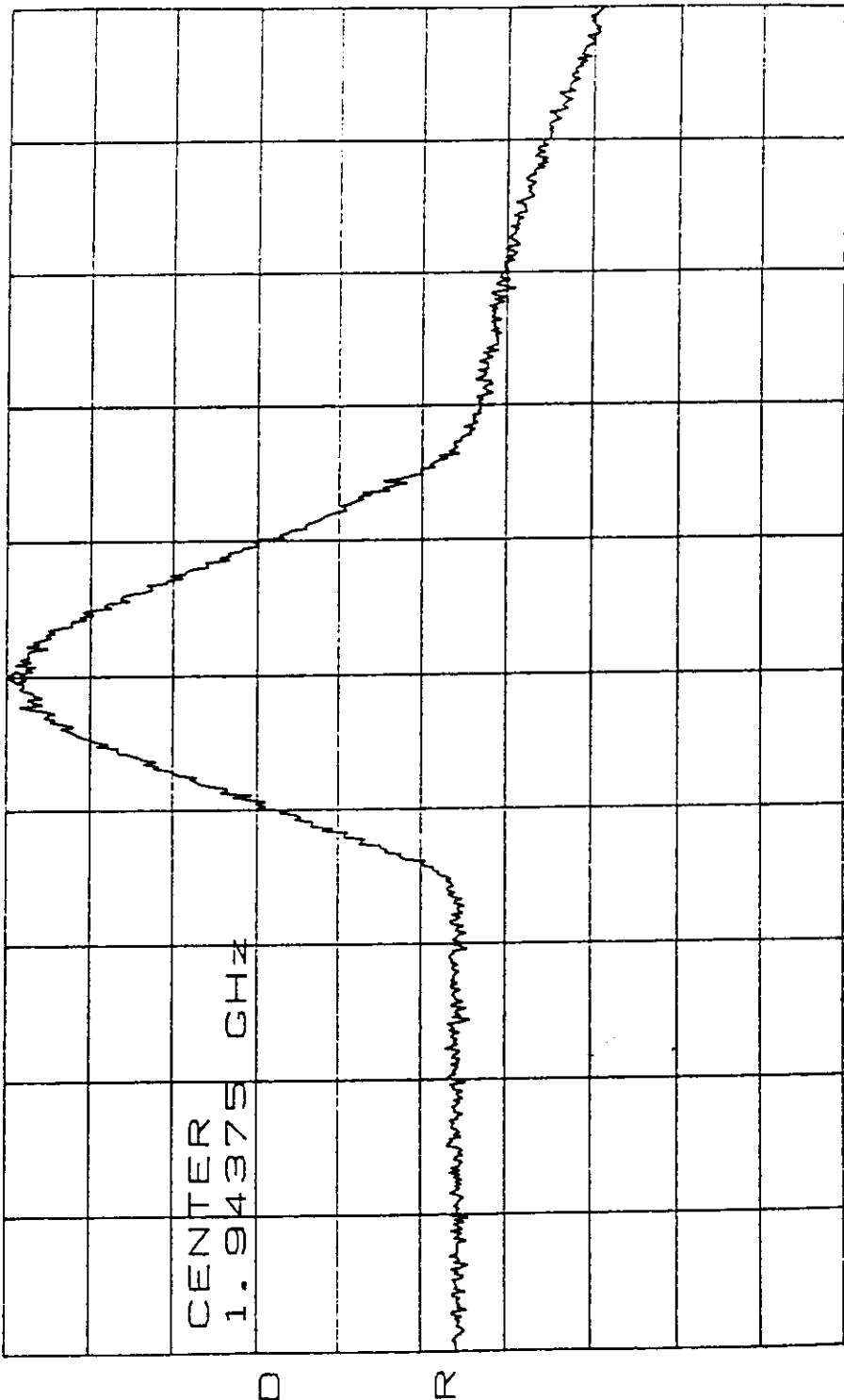
CDMA, FCC, A-Band DL, Fund Path Mid Chan 150
ATTEN 10dB VAVG 10 MKR 28.50dBm
RL 30.00dBm 1.93750GHz
2.991 1/17/97



CENTER 1.93750GHz SPAN 20.00MHz
*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.991



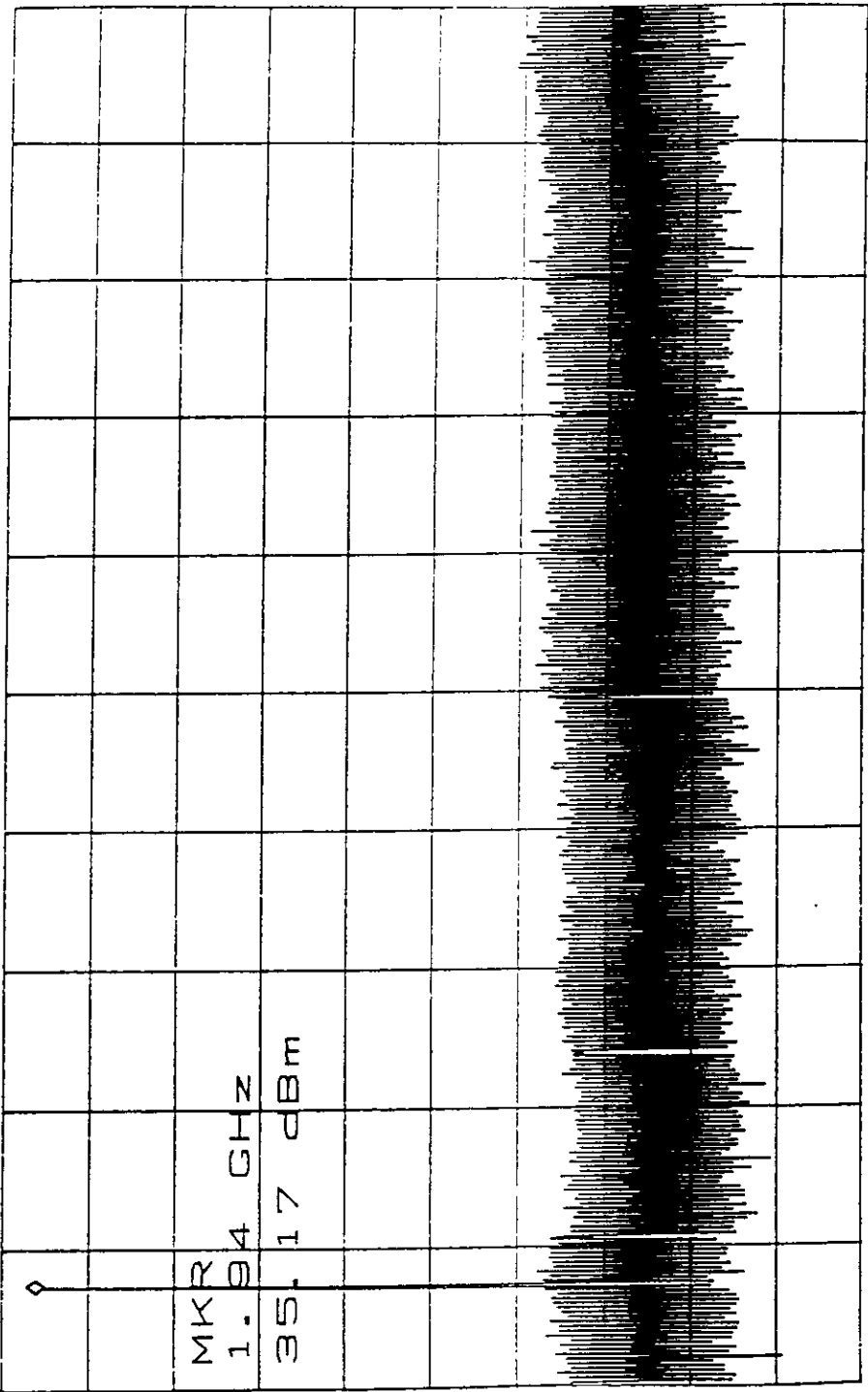
CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
DL, Full Path
VAVG 10
10dB/
Hi Chan 275
MKR 27.83dBm
1.94375GHz
1/17/97



CENTER 1.94375GHz
*RBW 1.0MHz
SPAN 25.00MHz
VBW 1.0MHz
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.991
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997



CDMA, FCC, A-Band
ATTEN 20dB
RL 40.0dBm
DL, Fund Path
10dB/
Hi Chan 275
MKR 35.17dBm
1.94GHz
1/17/97

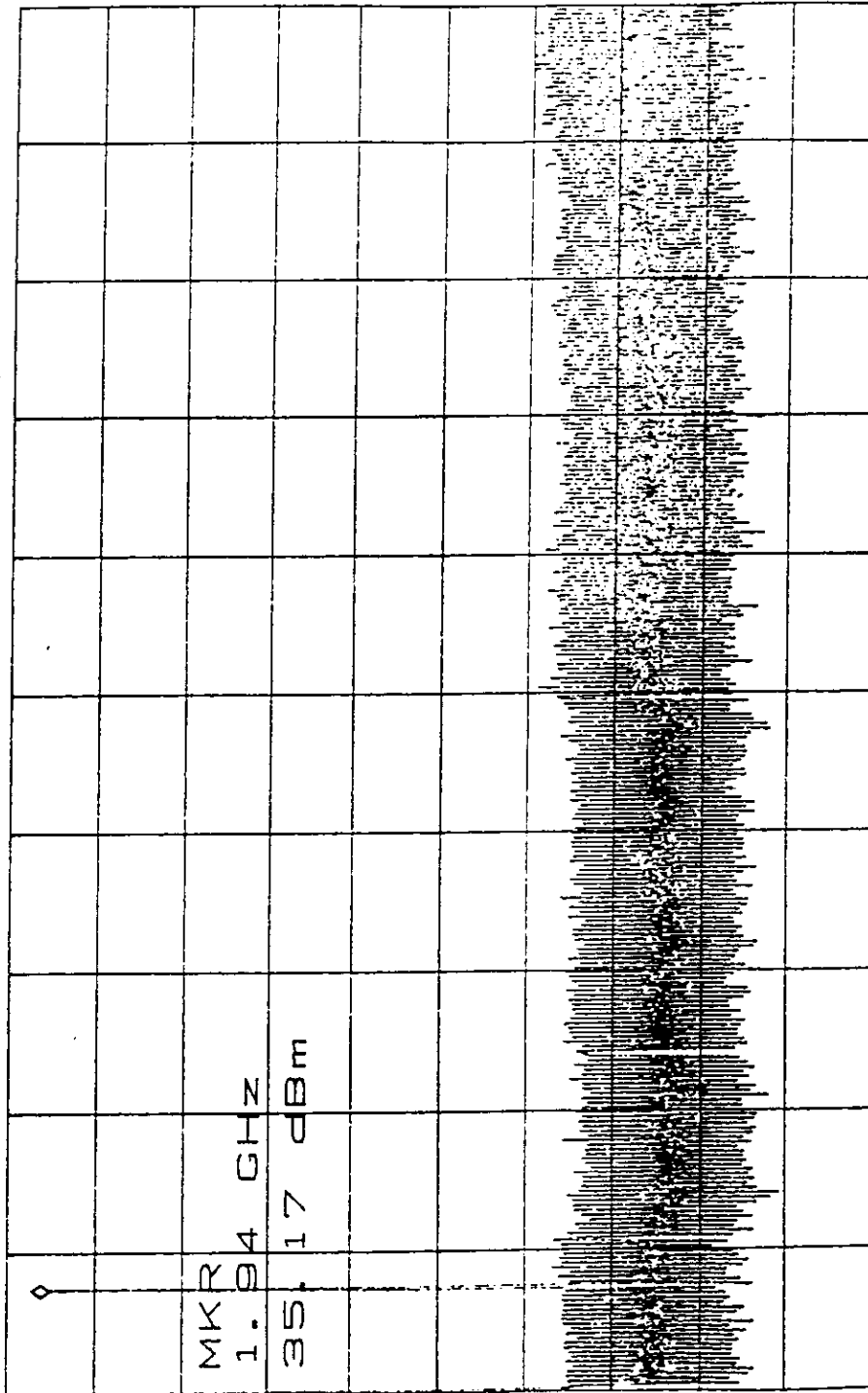


CENTER 13.25GHz
*RBW 1.0MHz VBW 1.0MHz
SPAN 26.50GHz SWP 530ms
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.991



CDMA, FCC, A-Band
 ATTN 20dB
 RL 40.0dBm
 DL, Fwd Path
 10dB/
 Lo chan 25
 MKR 35.17dBm
 1.94GHz

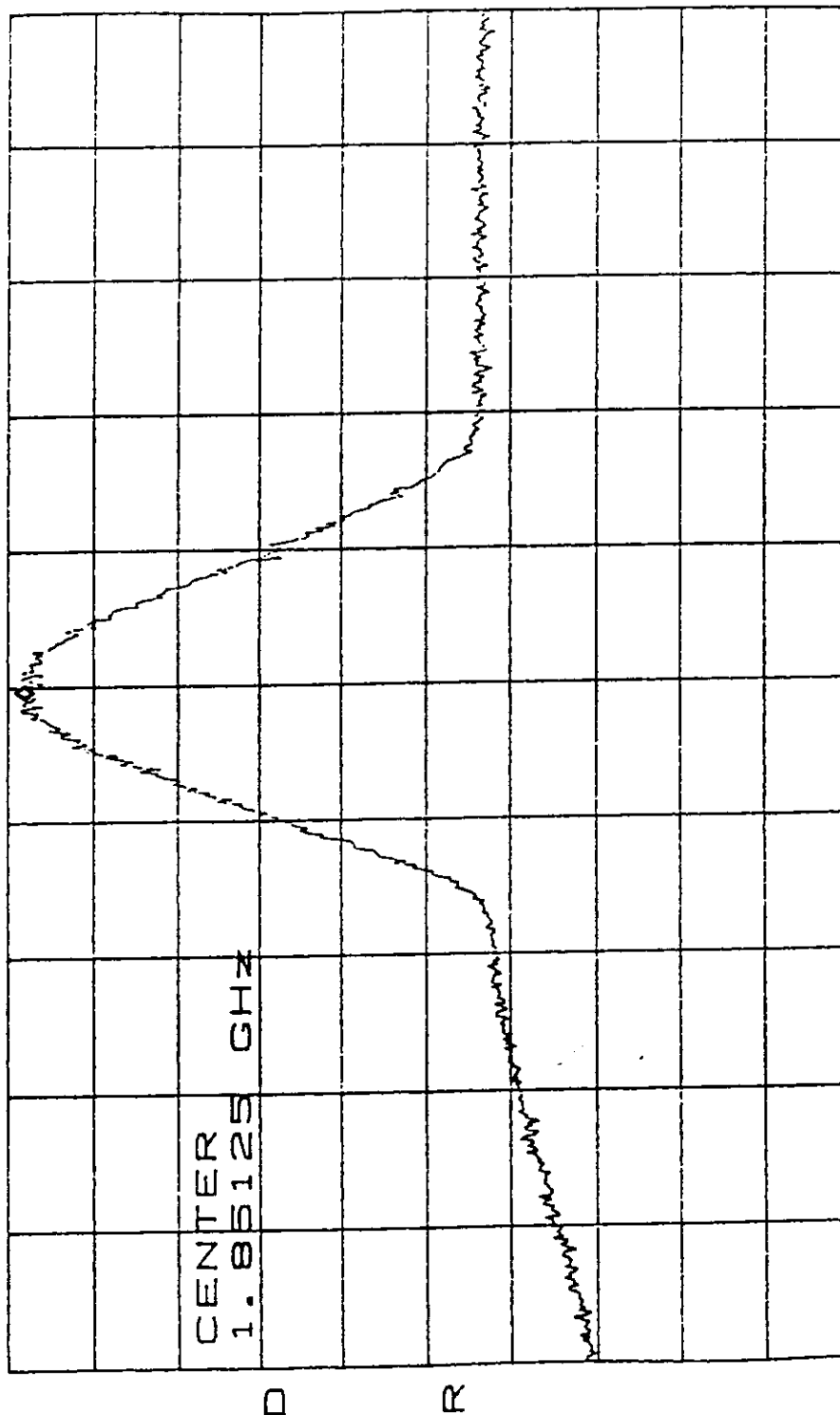
2.991



R

CENTER 13.25GHz
 *RBW 1.0MHz VBW 1.0MHz SWP 530ms
 SPAN 26.50GHz
 EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 2.991
 TESTED BY ORTEL CORPORATION
 DATE: 17 January 1997

4/16/97



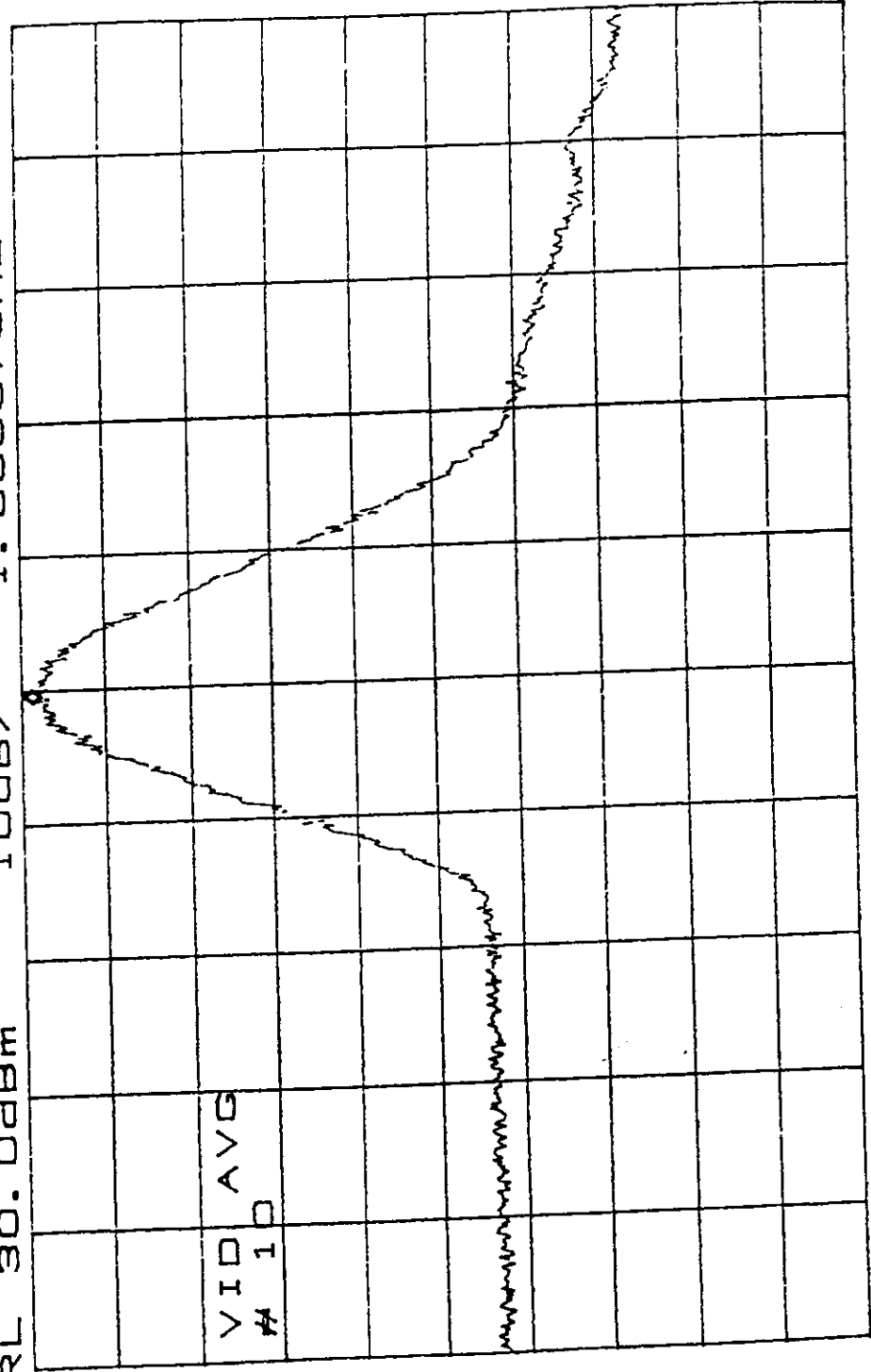
CENTER 1.05125GHZ SPAN 25.00MHZ
 **RBW 1.0MHZ VBW 1.0MHZ SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 DATE: 16 January 1997 SPECIFICATION: FCC Part 2, Para. 2.991



1/16/97

CDMA, FCC, A-Band
UL, Rev. Path
Hi Chan 275
MKR 28.00dBm
1.86367GHz

ATTEN 10dB
RL 30.0dBm
VAVG 10
10dB/



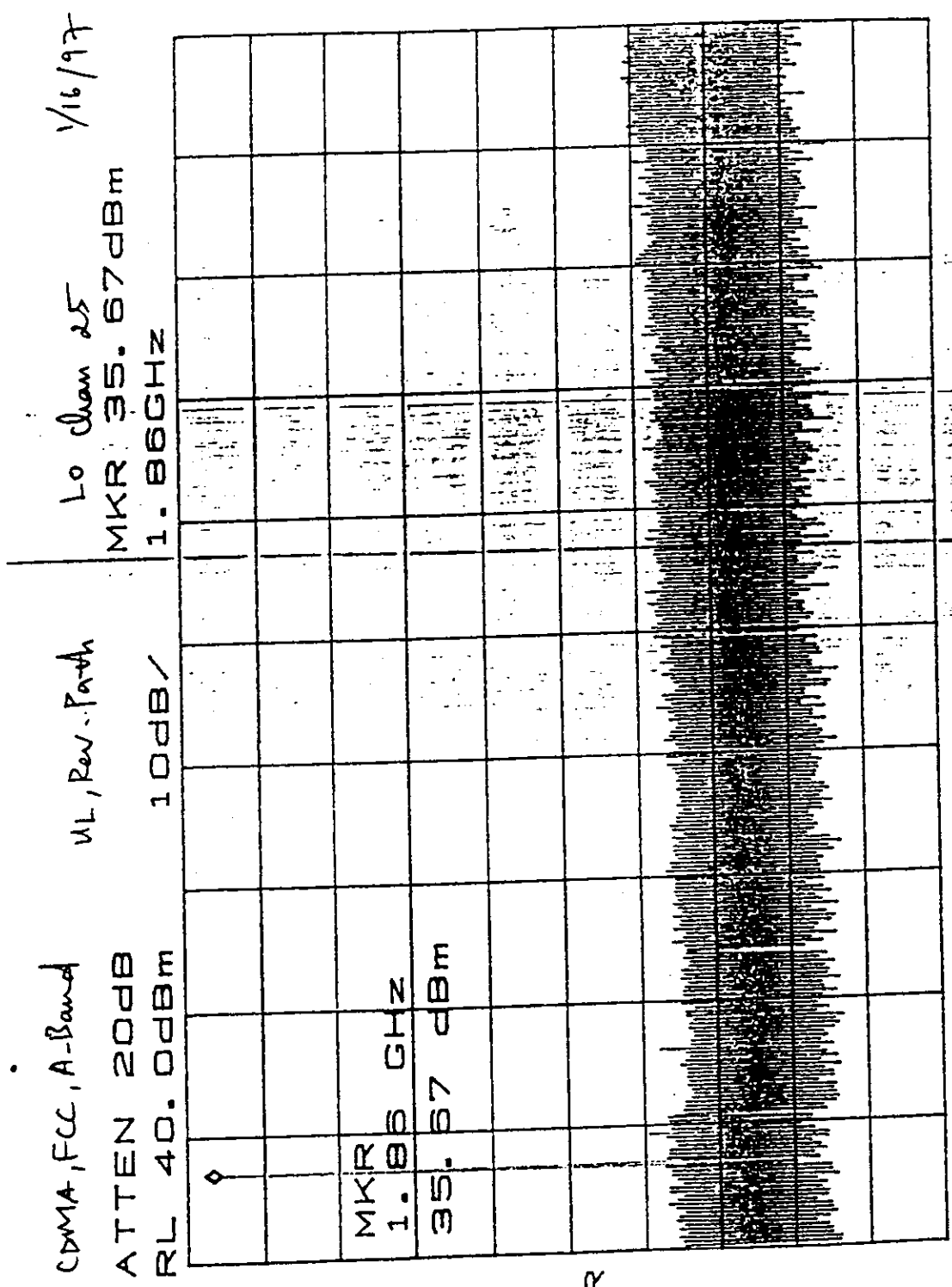
CENTER 1.86375GHz
SPAN 25.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.991
DATE: 16 January 1997

2.991

2.991



TESTED BY ORTEL CORPORATION
DATE: 16 January 1997



CENTER 13.25GHZ

SPAN 26.50GHZ

RBW 1.0MHZ

VBW 1.0MHZ

SWP 530m

TESTED BY ORTEL CORPORATION

EUT: CDMA Repeater, Model CDR-1901-1-5

DATE: 16 January 1997

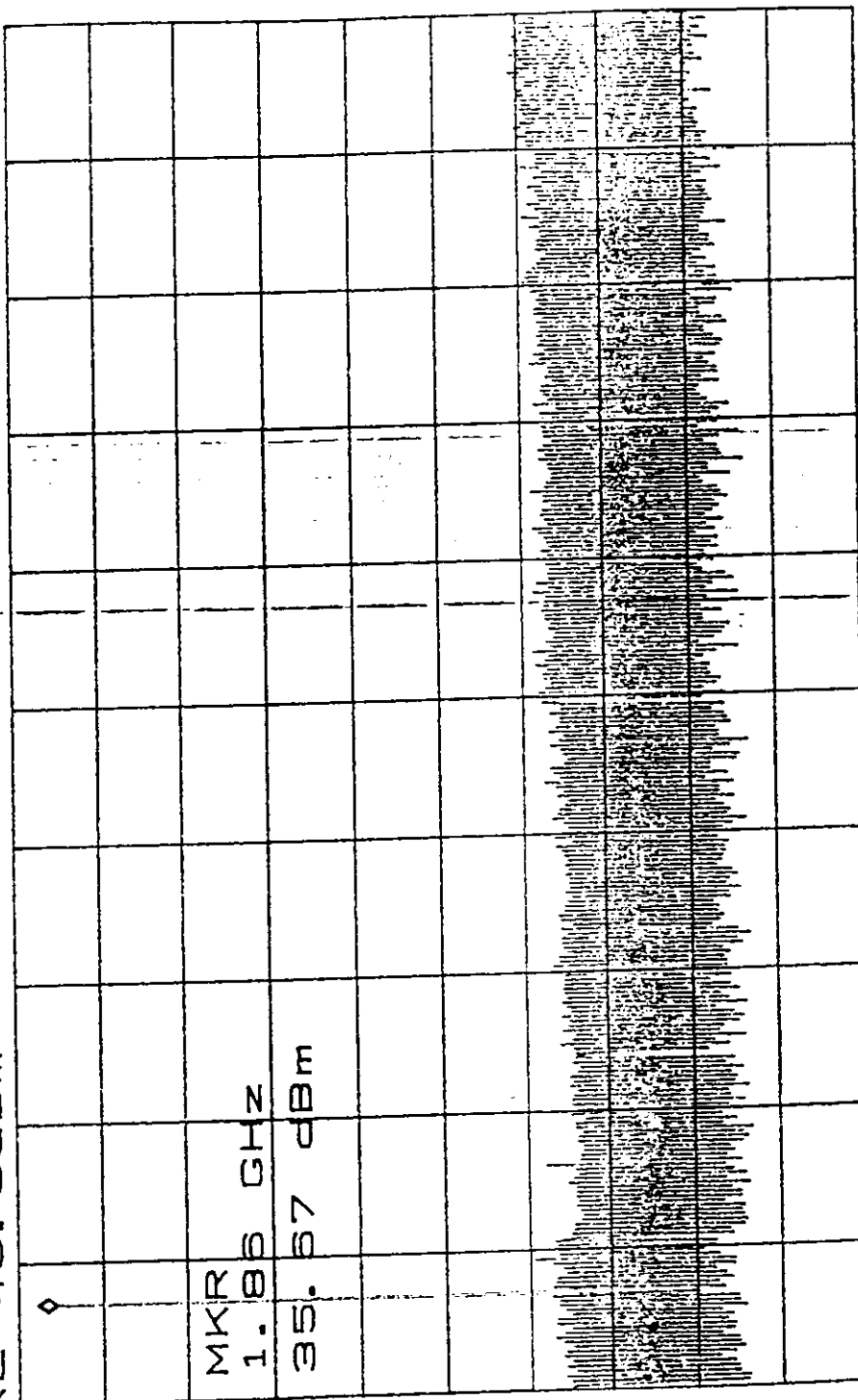
SPECIFICATION: FCC Part 2, Para. 2.991

R

2991



CDMA, FCC, A-Band
 ATTN 20dB
 RL 40.0dBm
 10dB/
 1.86GHz
 MKR 35.67dBm
 1/16/97



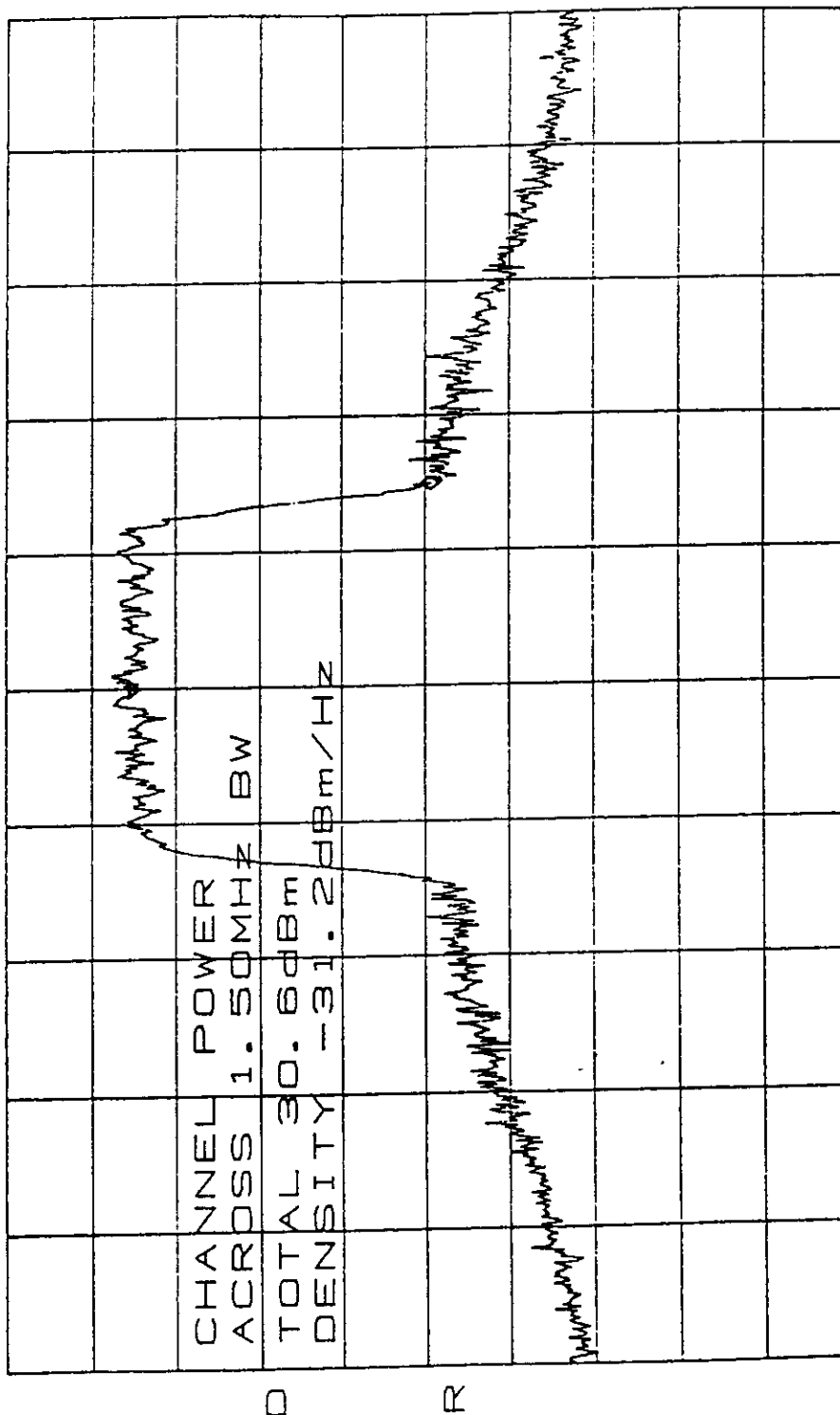
CENTER 13.25GHz
 RBW 1.0MHz
 VBW 1.0MHz
 SPAN 26.50GHz
 SWP 530ms
 EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 2.991
 TESTED BY ORTEL CORPORATION
 DATE: 16 January 1997

R

2991

CDMA, FCC, A-Band PL, Fund Path 1/17/97
 ATTN 10dB VAVG 10 ΔMKR -36.00dB
 RL 30.00dBm 10dB/ 750KHz

24.238



CENTER 1.931250GHZ SPAN 5.000MHZ
 *RBW 30KHz VBW 30KHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION
 DATE: 17 January 1997
 EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 24, Para. 24.238

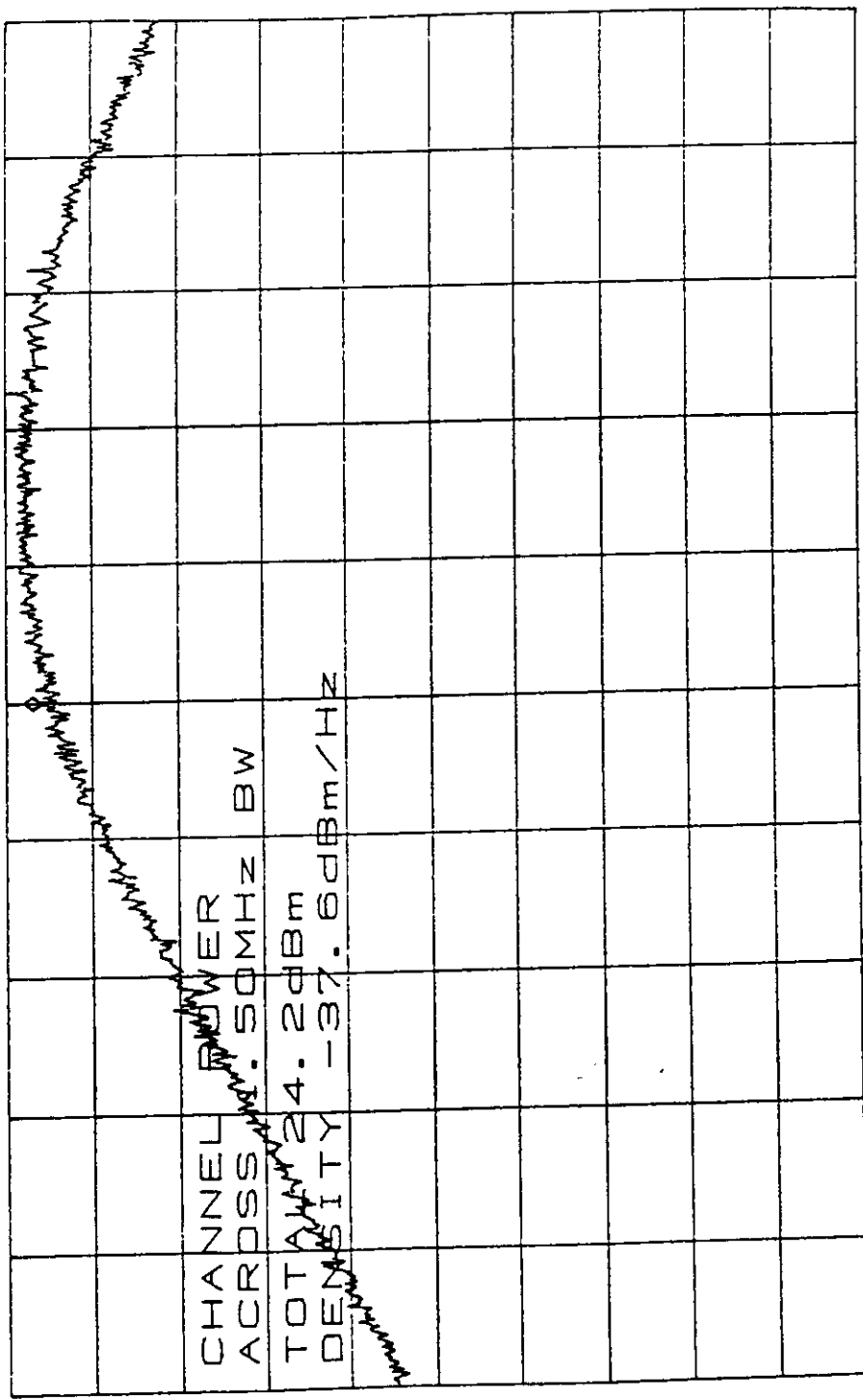


CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm

DL, Full Power
VAVG 10
10dB/

Below
Lo chan 25
MKR 26.00dBm
1.930500GHZ

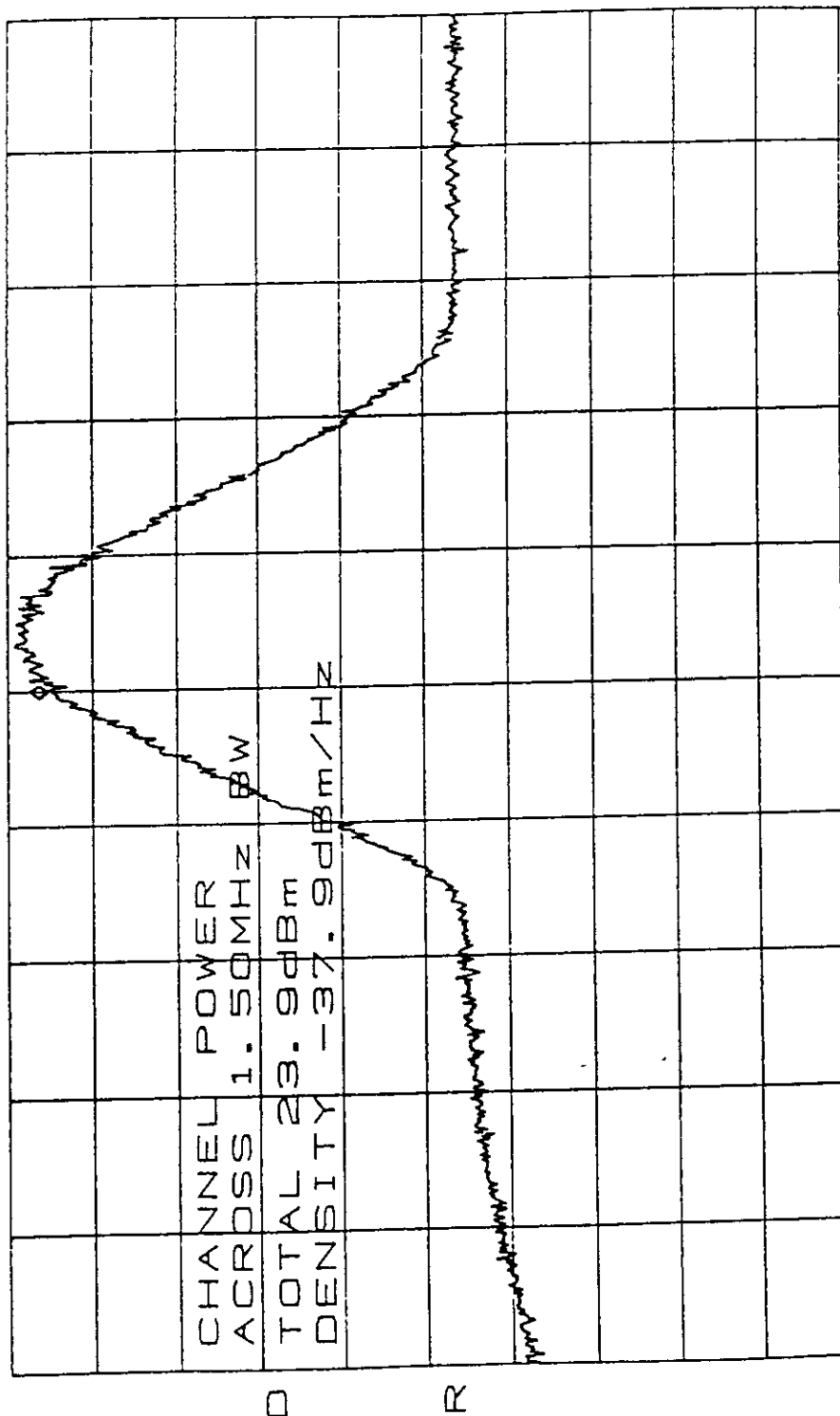
24.238



CENTER 1.930500GHZ SPAN 5.000MHZ
*RBW 1.0MHZ VBW 1.0MHZ SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238



24-238
 CDMA, FCC, A-Band
 ATTN 10dB
 RL 30.0dBm
 PL, Fund Path
 VAVG 10
 10dB/
 Below
 Lo Chan 25
 MKR 25.33dBm
 1.93050GHZ
 1/17/97

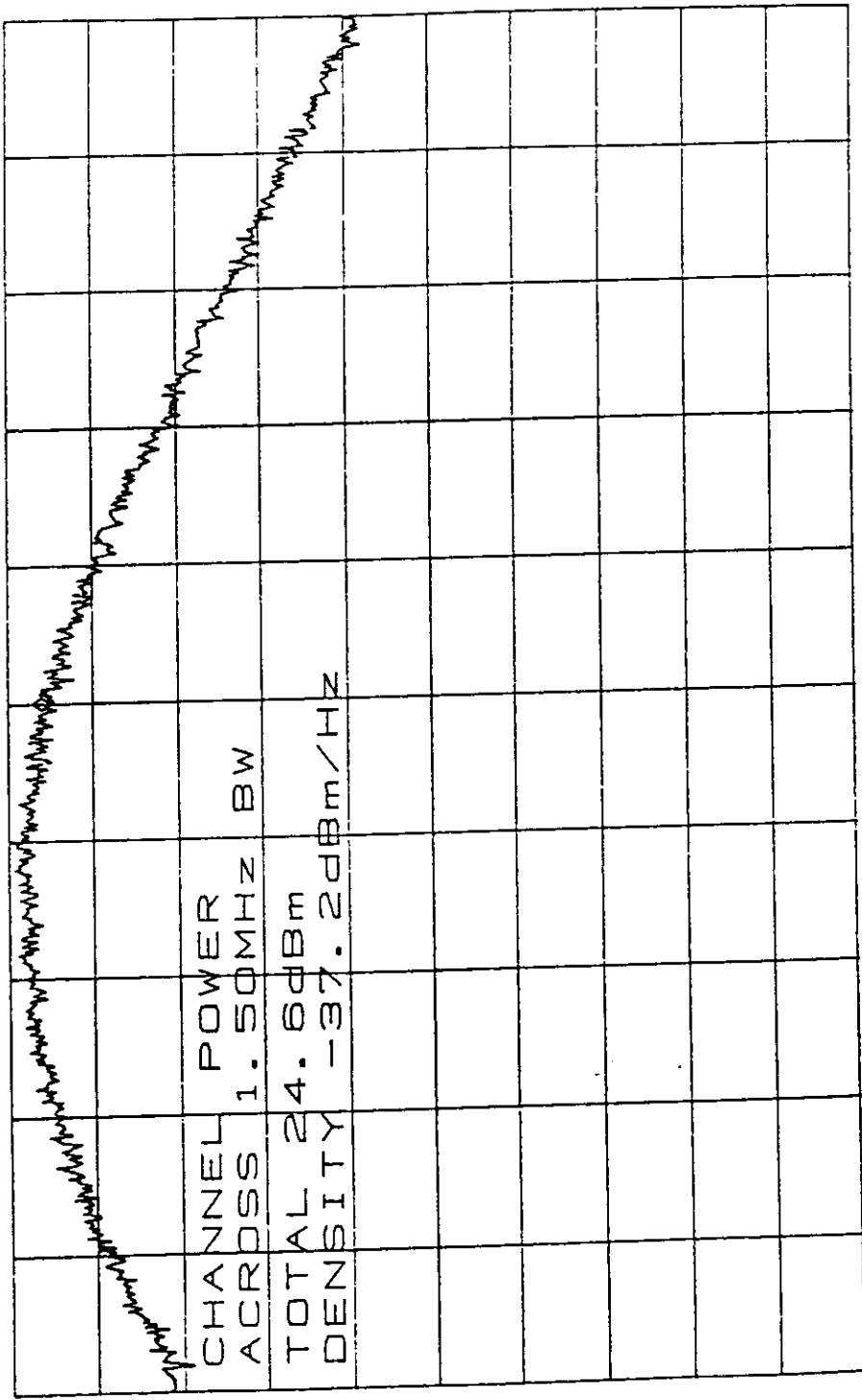


CENTER 1.93050GHZ
 *RBW 1.0MHz
 SPAN 20.00MHz
 VBW 1.0MHz
 SWP 50.0ms

TESTED BY ORTEL CORPORATION
 DATE: 17January 1997
 EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 24, Para. 24.238



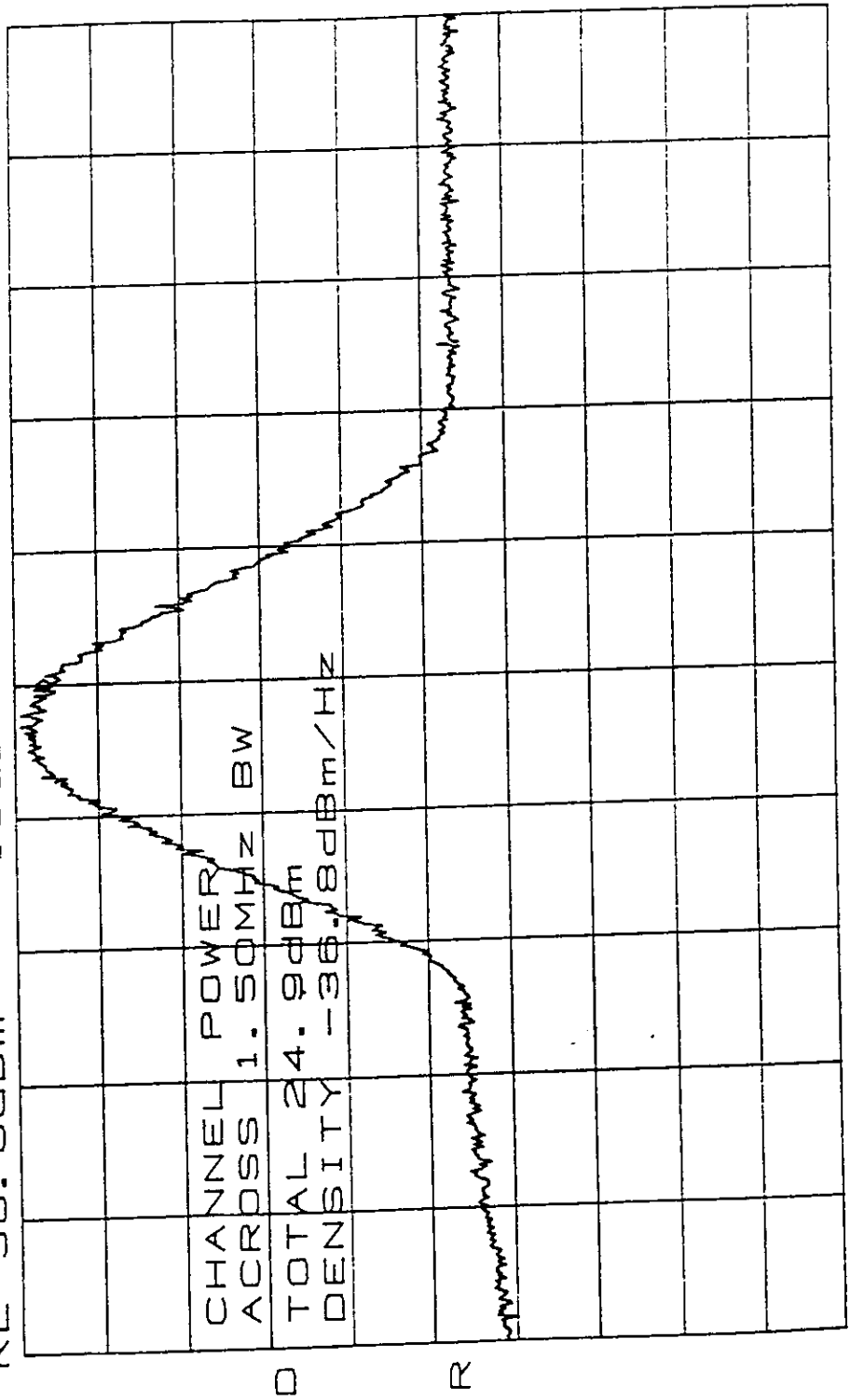
CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
DL, Find Path
VAVG 10
10dB/
Upper
Lo Chan 25
MKR 25.17dBm
1.932000GHZ
1/17/97



CENTER 1.932000GHZ
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



CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
DL, Fwd Path
VAVG 10
10dB/
Upper
Lo Chan 25
MKR 25.50dBm
1.93200GHz
1/7/97



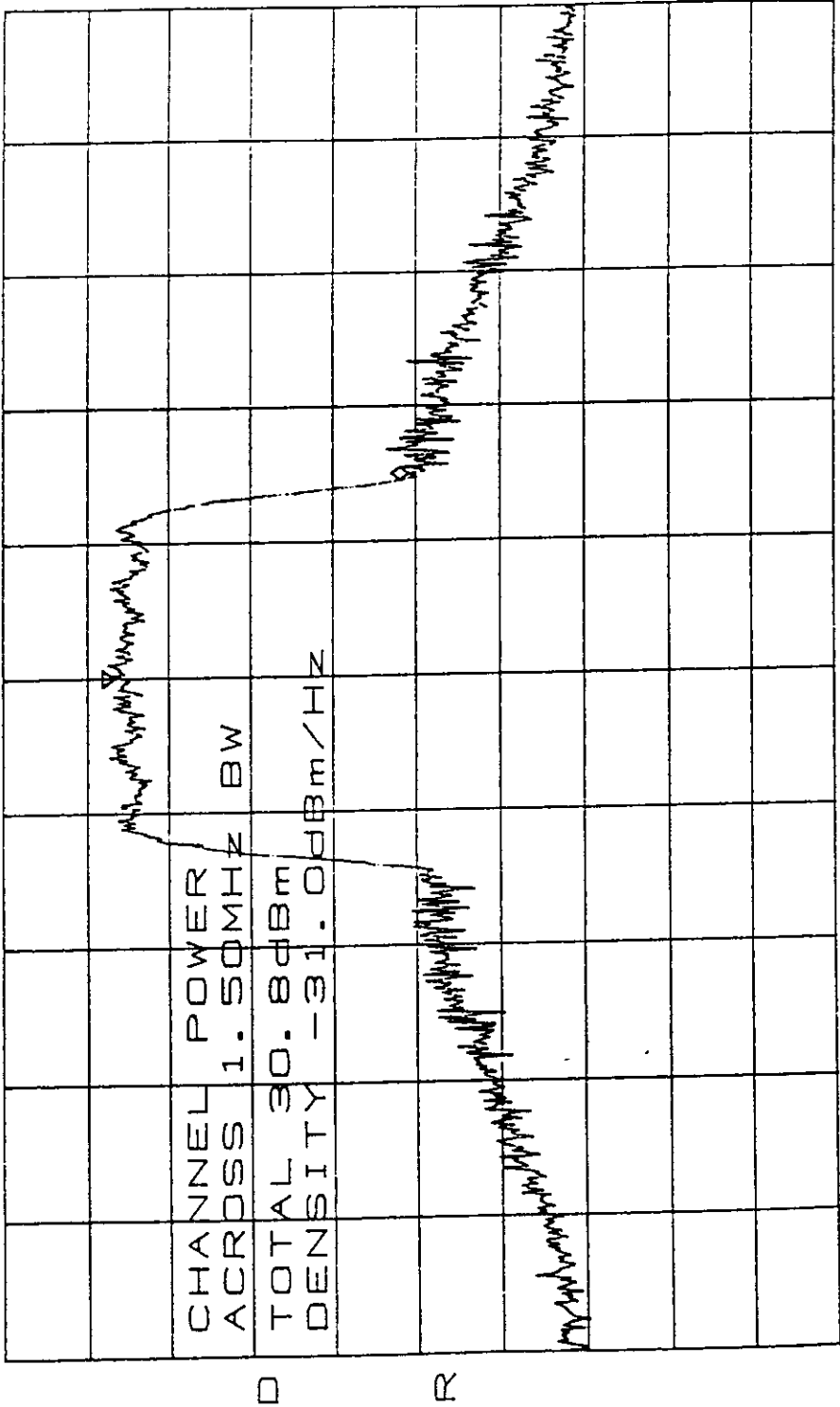
CENTER 1.93200GHz
*RBW 1.0MHz
SPAN 20.00MHz
VSW 1.0MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238

24.238



CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
DL, Fwd Path
VAVG 10
10dB/
Fund. H/dian 275
ΔMKR -36.00dB
750KHZ
1/17/97

24.238

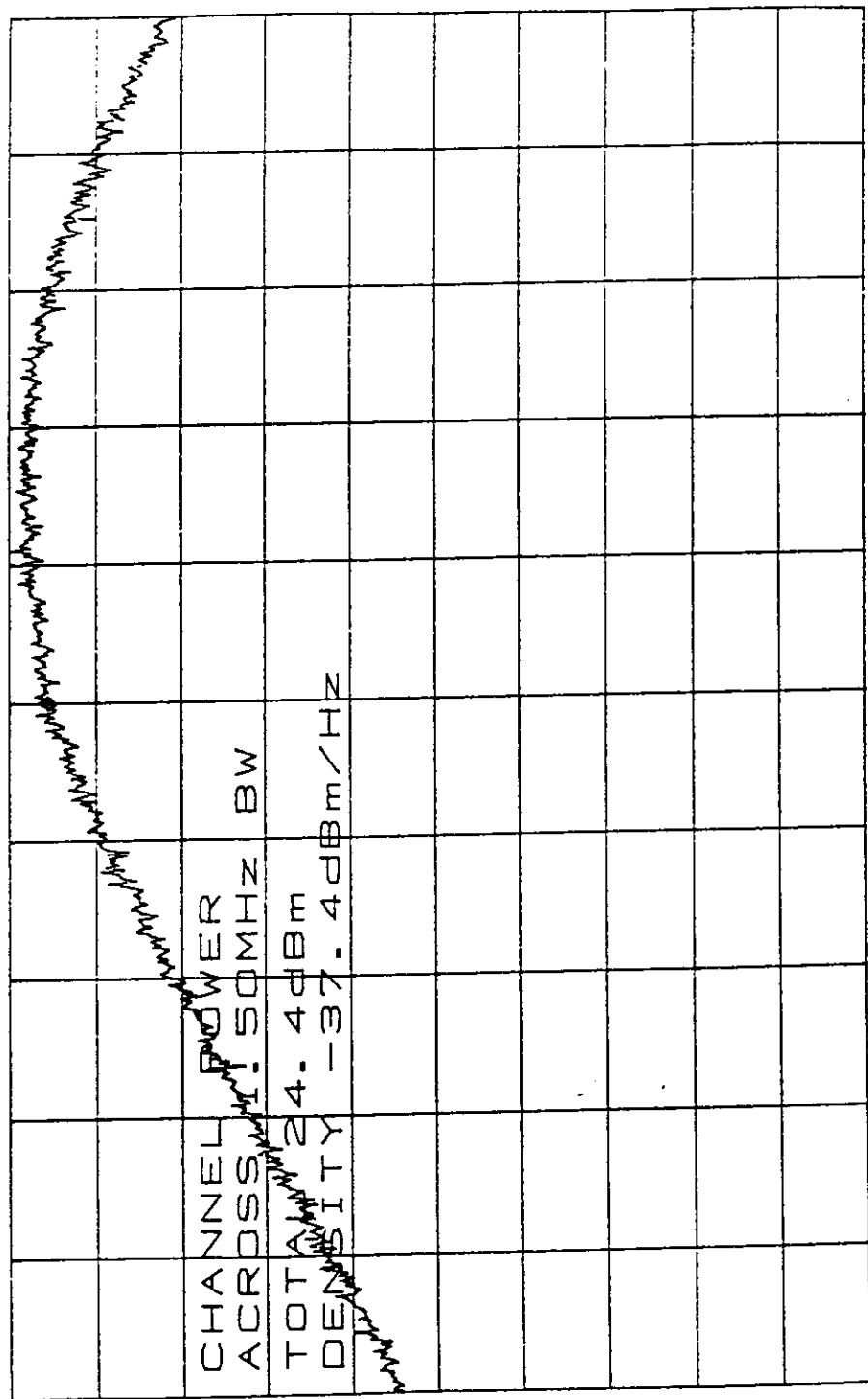


CENTER 1.943750GHZ
RBW 30KHZ
SPAN 5.000MHZ
VBW 30KHZ
SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUI: CDMA Repeater Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238



CDMA, FCC, A-Band
ATTE 10dB
RL 30.0dBm
DL, Fund Pwr
VAVG 10
10dB/
Below
Hi Chan 275
MKR 24.67dBm
1.943000GHZ
1/17/97

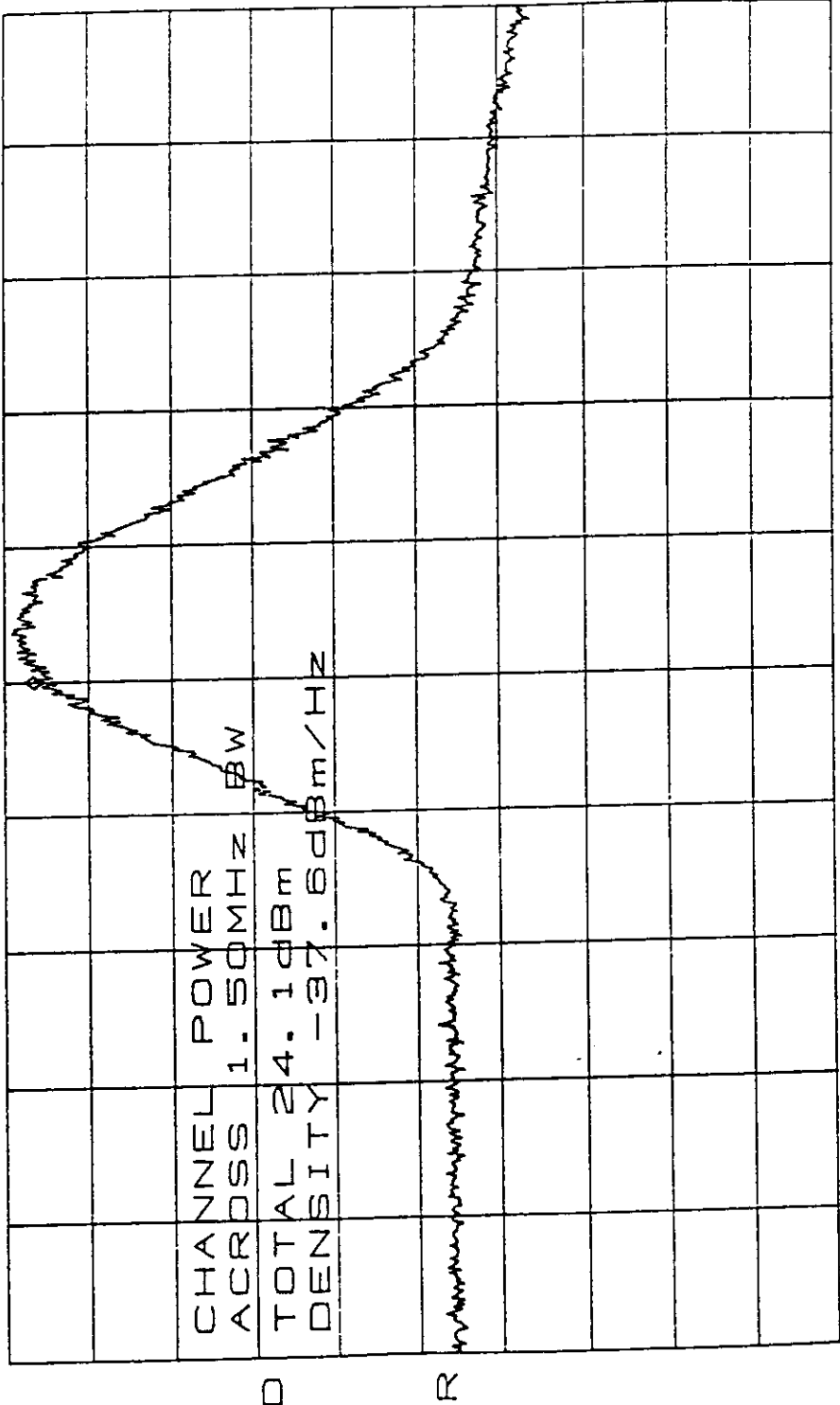
24.238



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



CDMA FCC, A-Band
ATTEN 10dB
RL 30.0dBm
DL, Fwd Path
VAVG 10
10dB/
Below
Hi Chan 275
MKR 25.67dBm
1.94300GHz
1/7/97

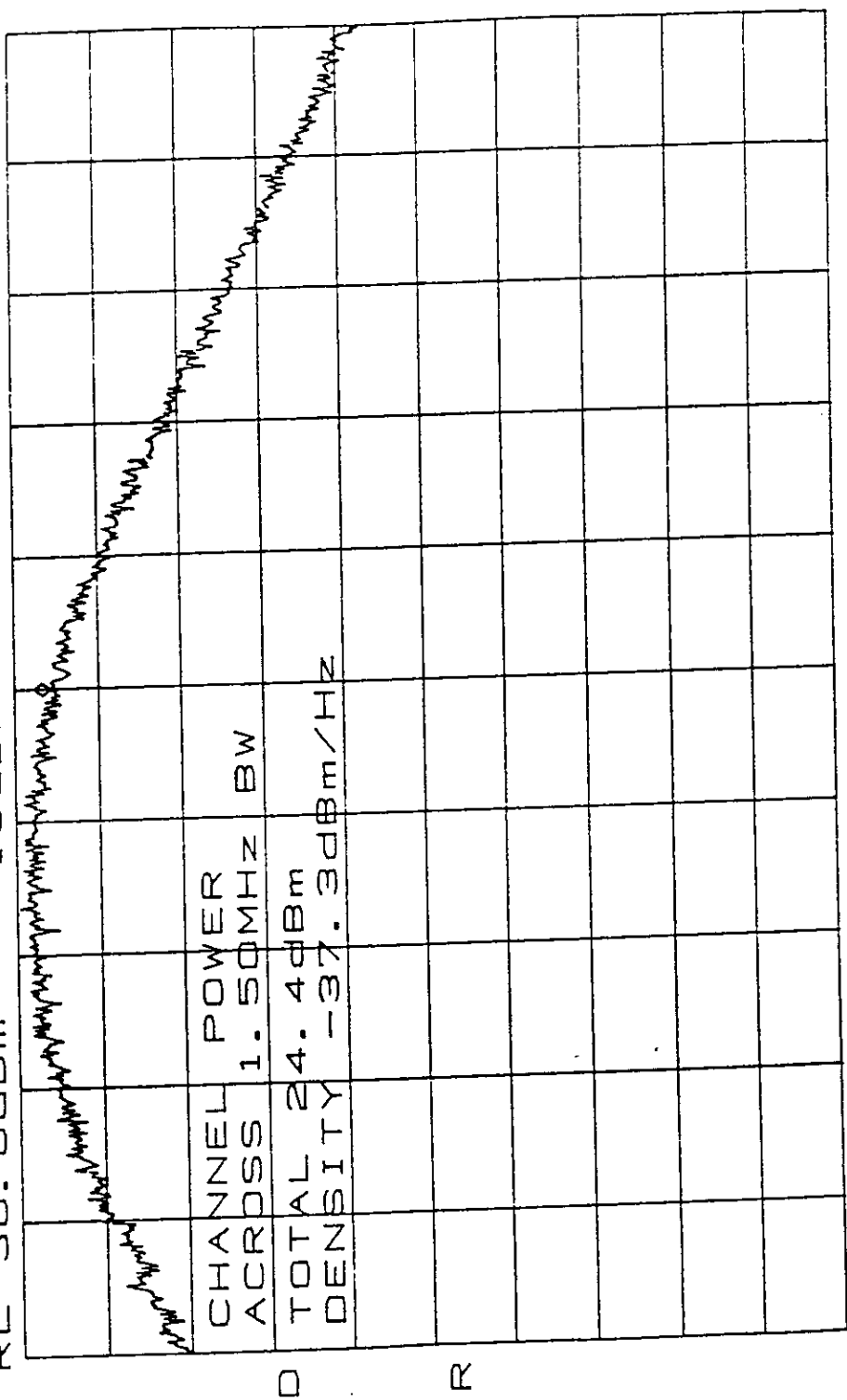


CENTER 1.94300GHz
*RBW 1.0MHz
SPAN 20.00MHz
VBW 1.0MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238

24-238

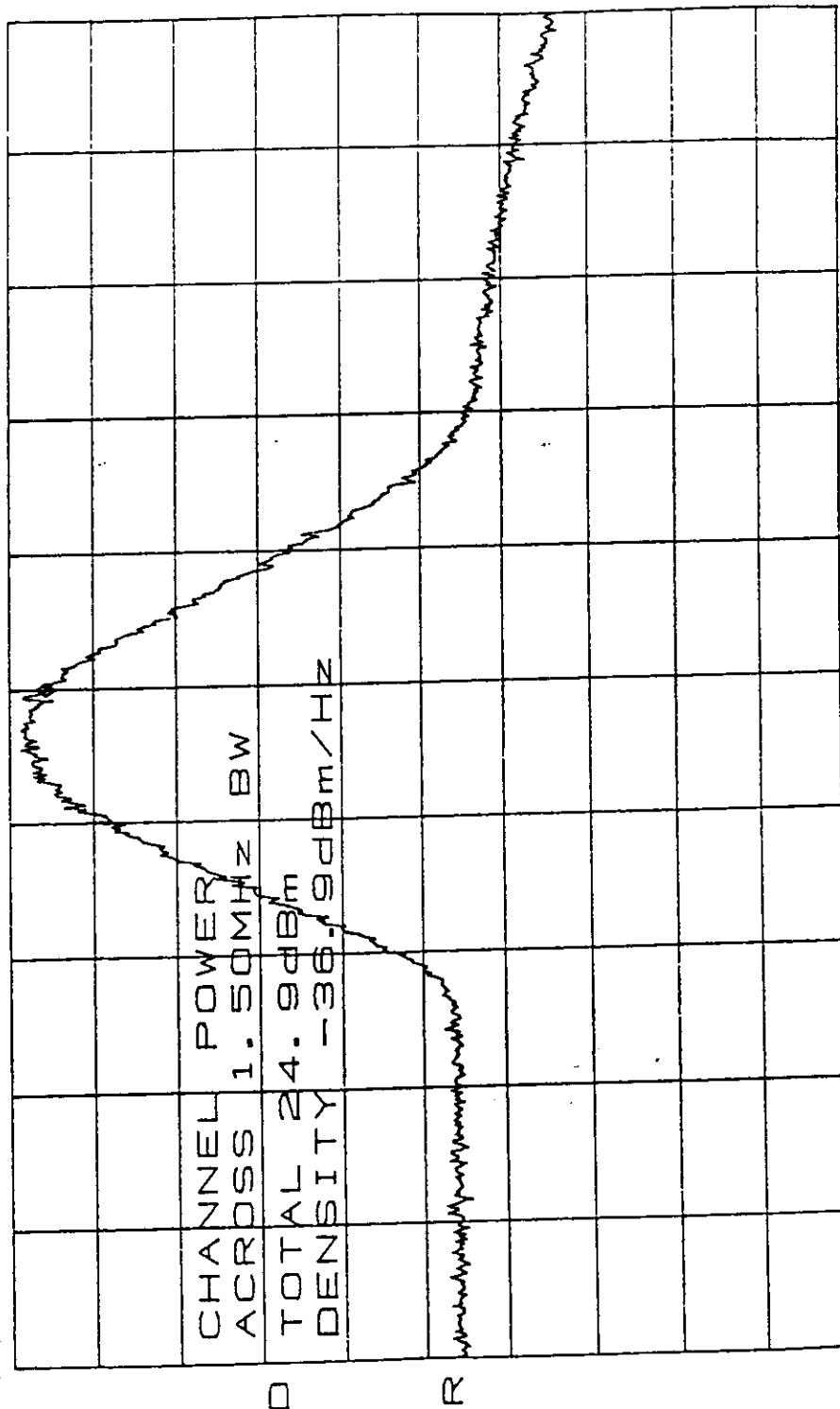


CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
Upper
HF-Chan 275
MKR 25.67dBm
1.944500GHz
1/17/97



CENTER 1.944500GHz 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

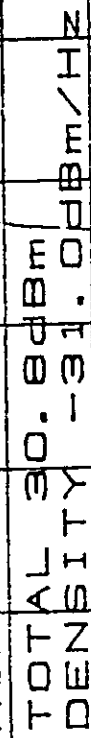
CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
DL, Fwd Path
VAVG 10
10dB/
Upper
Hi Chan 275
MKR 24.83dBm
1.94450GHz
1/17/97



CENTER 1.94450GHz
*RBW 1.0MHz
VSW 1.0MHz
SPAN 20.00MHz
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

7505YH N

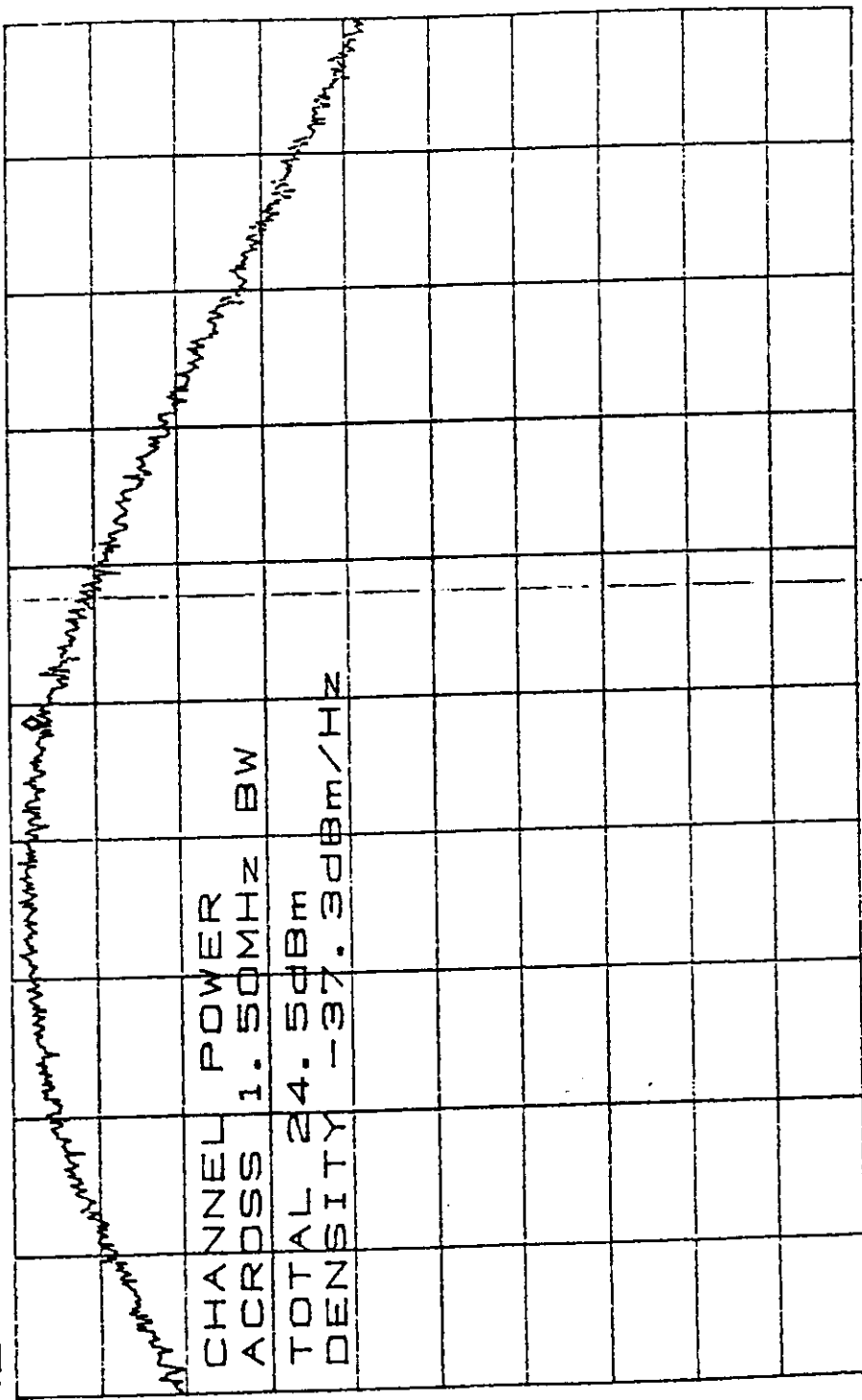


TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238



Upper
Hi Chan 275
MKR 26.50dBm
1.864433GHz

CDMA, FCC, A-Band UL, Rev. Path
ATTEN 10dB VAVG 10
RL 30.0dBm 10dB/

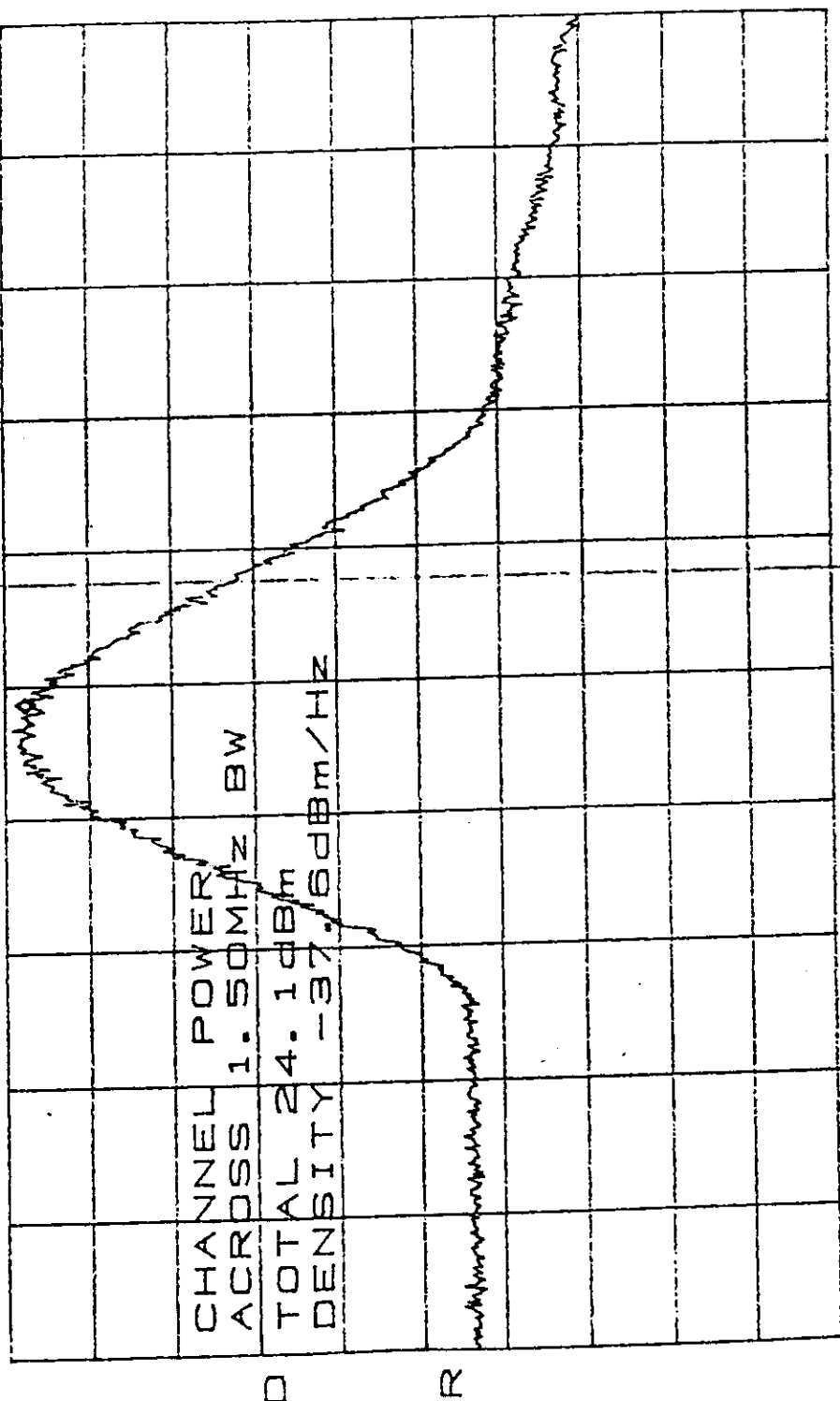


CENTER 1.864500GHz SPAN 5.000MHz
*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238

24.238



24-238
CDMA, FCC, B-Band
ATTEN 10dB
RL 30.0dBm
UL, Rev. Path
VAVG 10
10dB/
Upper
Hi Chan 275
MKR 26.67dBm
1.86423GHz
1/17/97

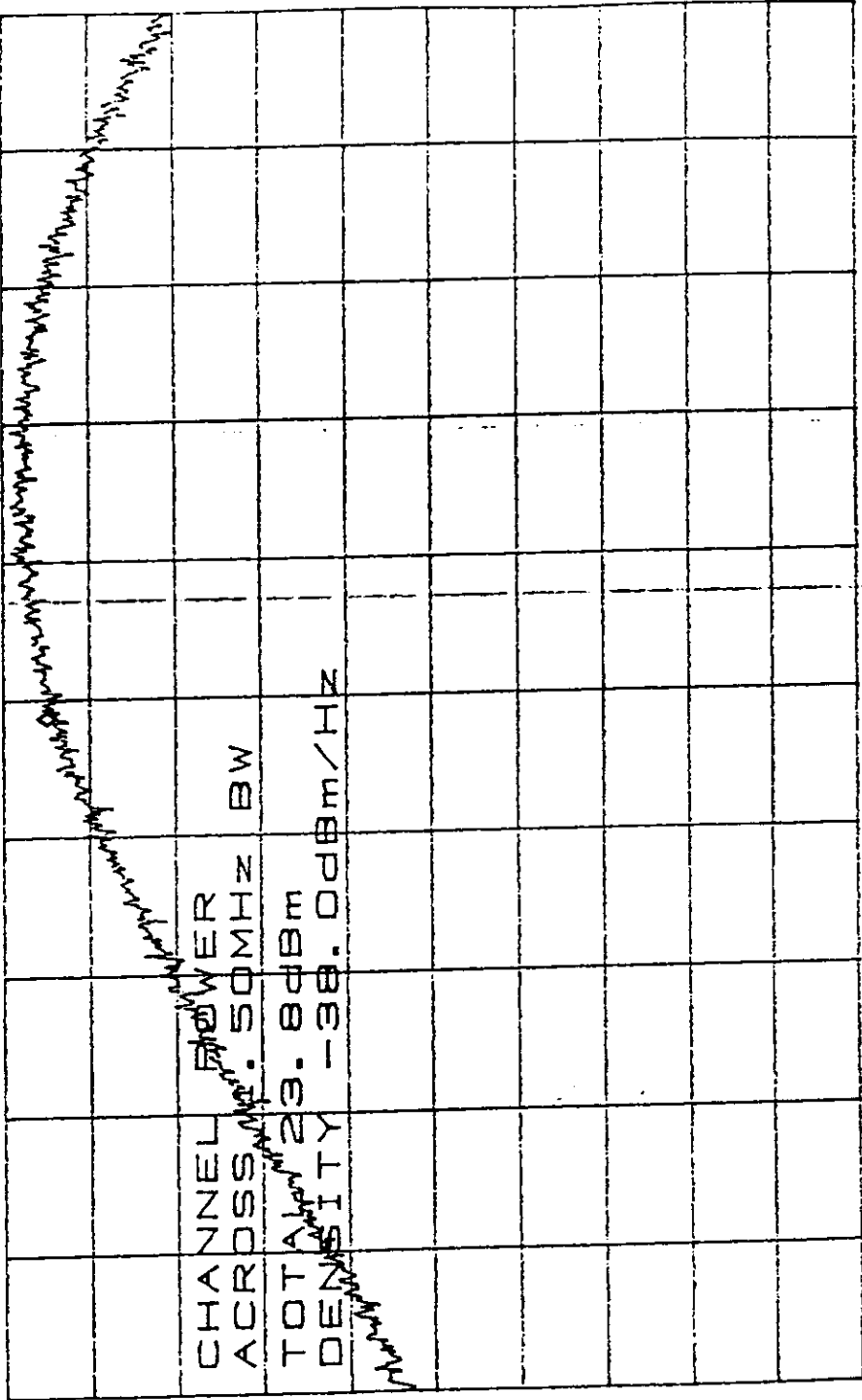


CENTER 1.86450GHz
*RBW 1.0MHz
VSW 1.0MHz
SPAN 20.00MHz
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997



CDMA, FCC, A-Band
ATTN 10dB
RL 30.0dBm
UL, Rev. Path
VAVG 10
10dB/
Below
H₀ Chan 275
MKR 24.00dBm
1.862933GHz

24.238



CENTER 1.863000GHz
*RBW 1.0MHz VBW 1.0MHz
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



24.238

CDMA, FCC, A-Band

UL, Rev. Path

ATTEN 10dB

RL 30.0dBm

VAVG 10

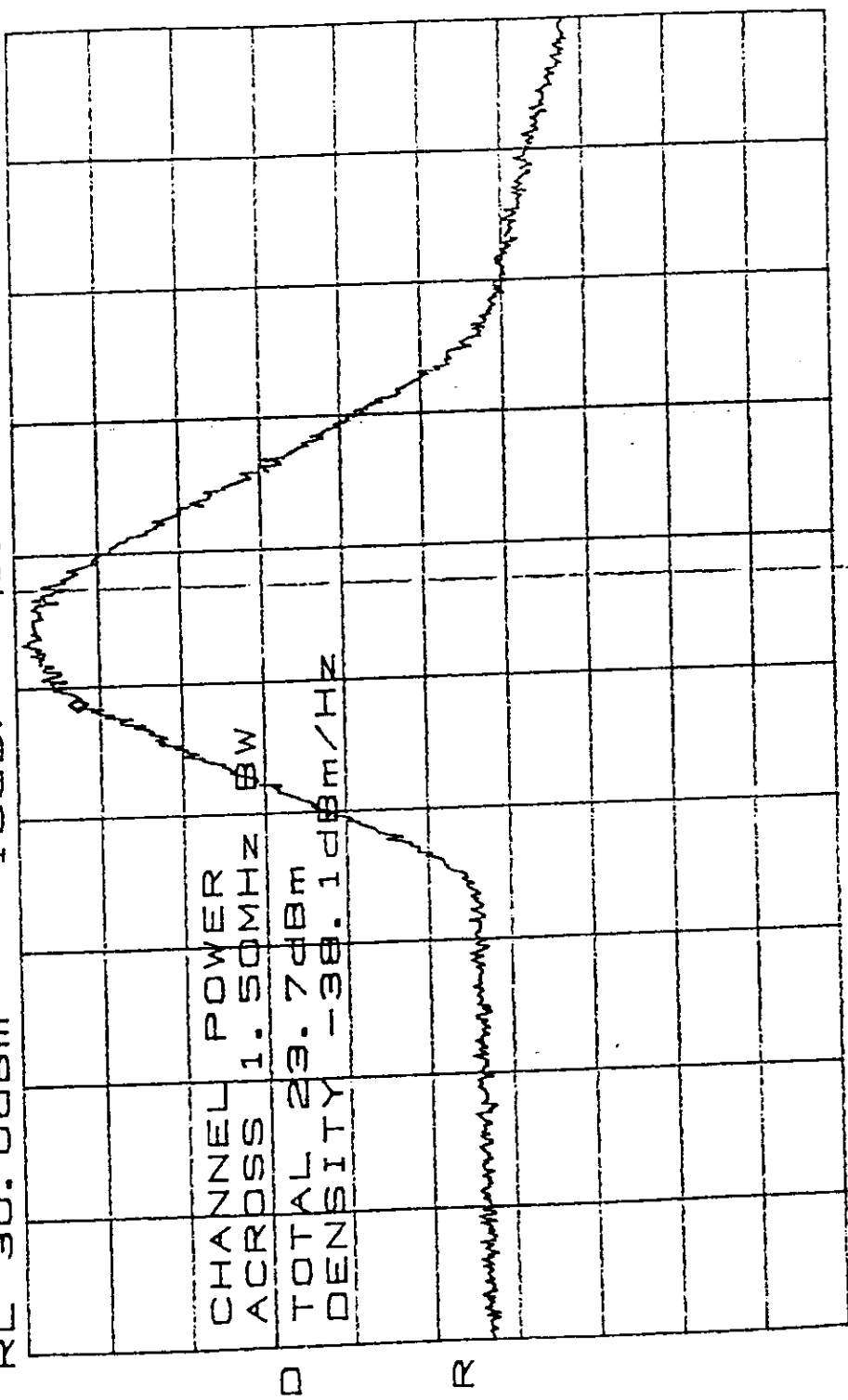
10dB/

Below Hi Jam 275

MKR 21.67dBm

1.86273GHz

1/17/97



CENTER 1.863000GHz

*RBW 1.0MHz

SPAN 20.00MHz

VBW 1.0MHz

SWP 50.0ms

TESTED BY ORTEL CORPORATION

EUT: CDMA Repeater, Model CDR-1901-1-5

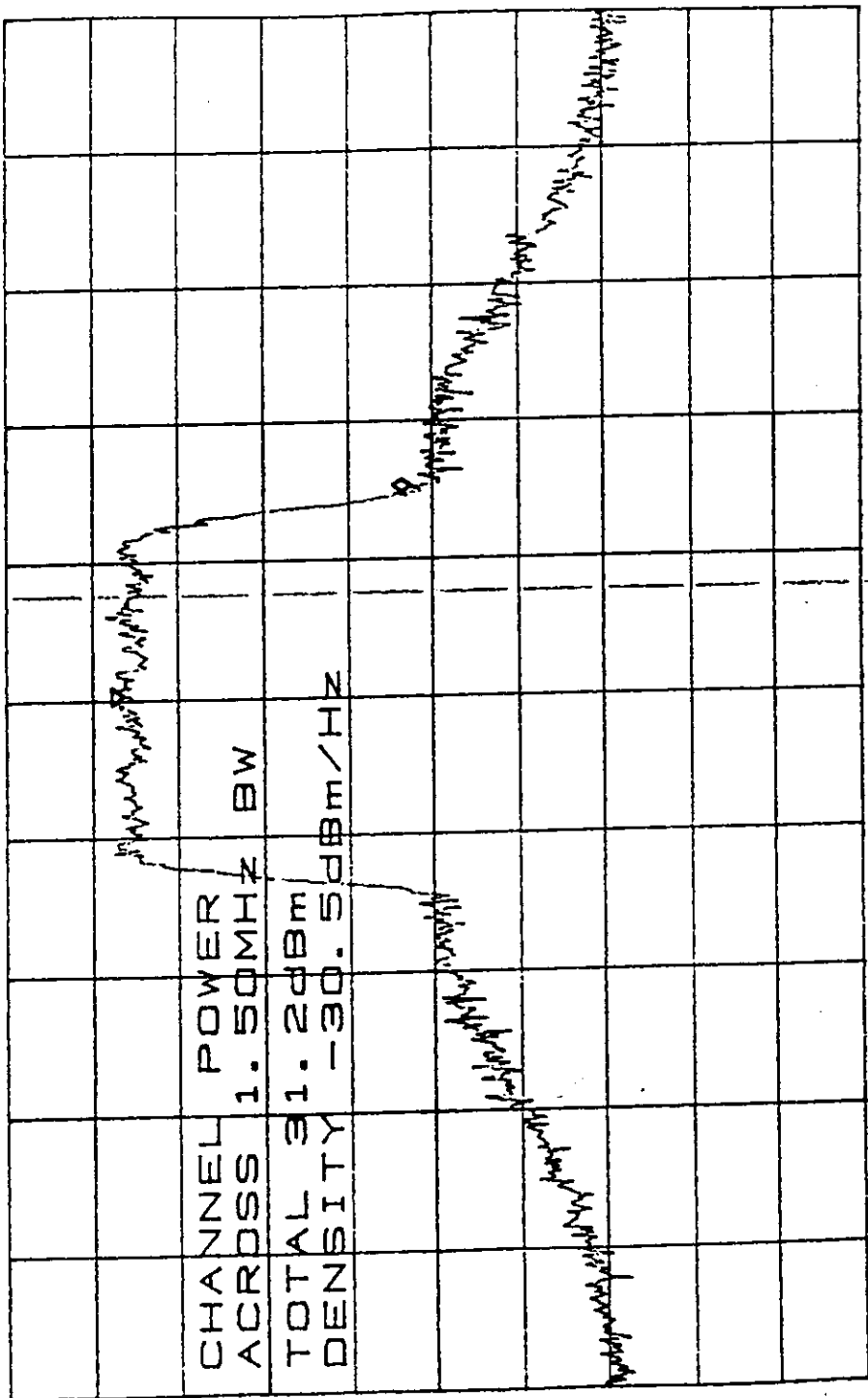
DATE: 17 January 1997

SPECIFICATION: FCC Part 24, Para. 24.238



CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
UL, Rev. Path
VAVG 10
10dB/
Fundamental
LO Chan 25
1/17/97
ΔMKR -33.83dB
750kHz

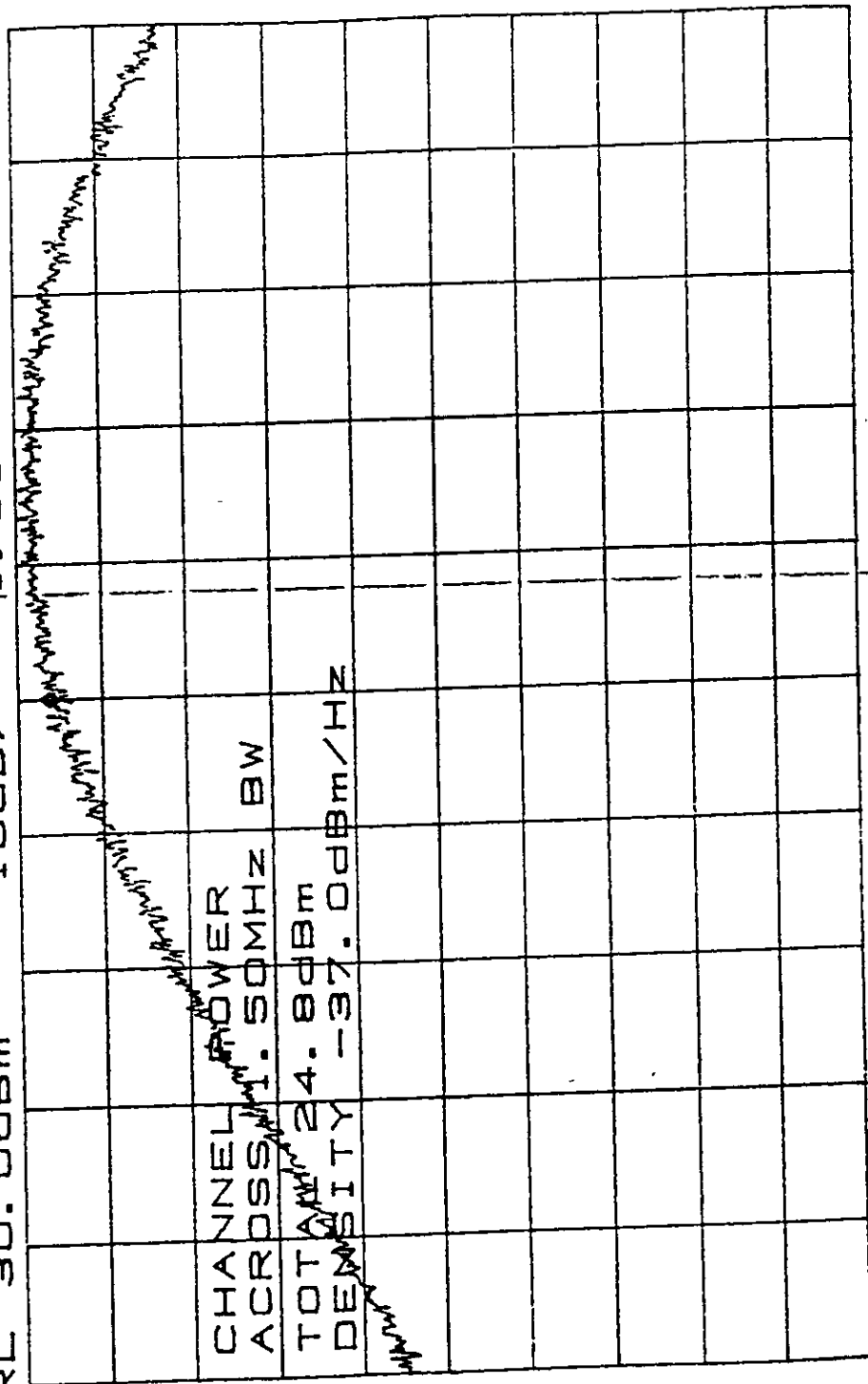
24.238



CENTER 1.851250GHZ
*RBW 30KHZ
VSW 30KHZ
SPAN 5.000MHZ
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238
TESTED BY ORTEL CORPORATION
DATE: 17January 1997



CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
UL, Rev. Patch
VAVG 10
10dB/
Below
Lo Chan 25
MKR 25.33dBm
1.850500GHZ
1/17/97

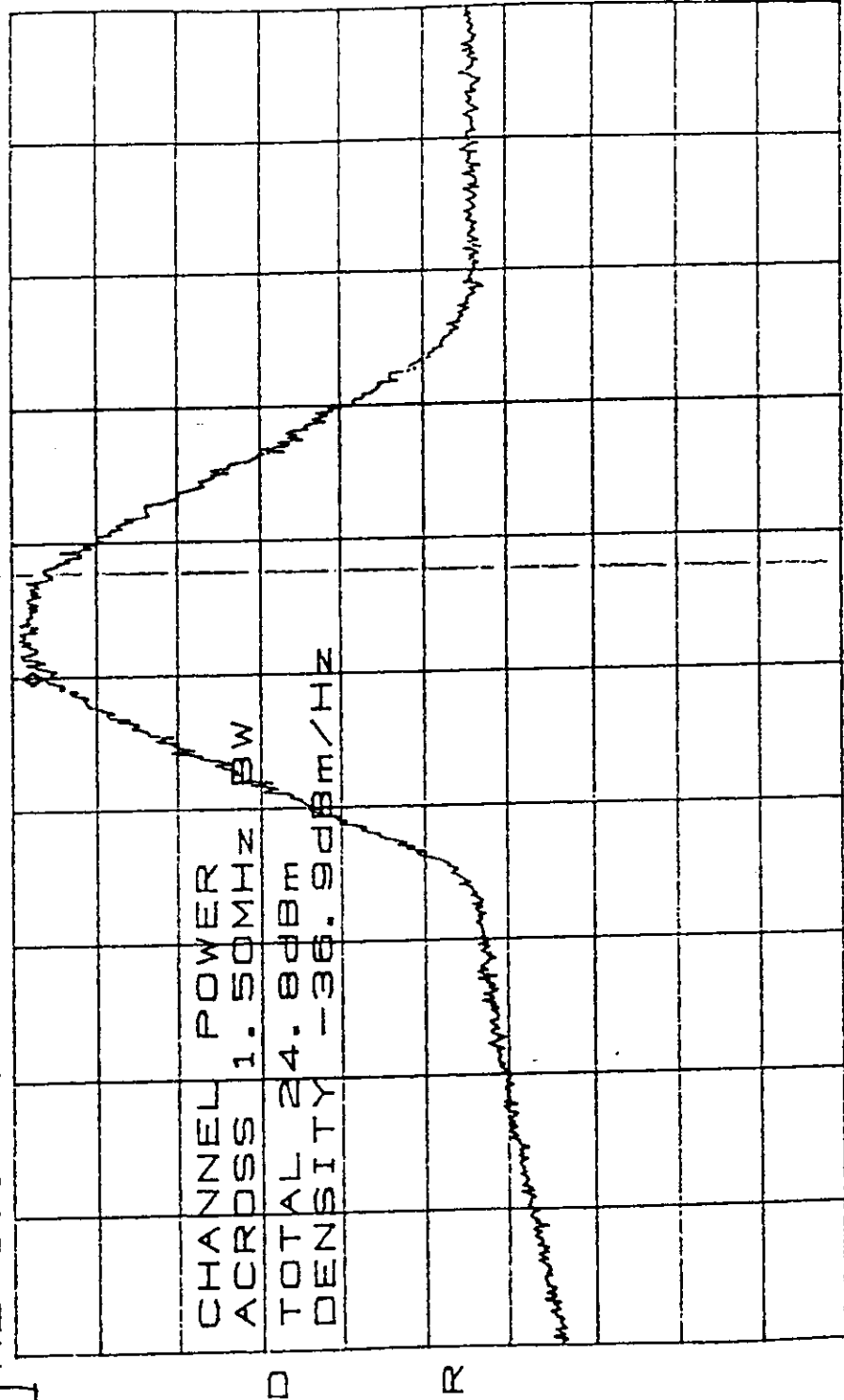


CENTER 1.850500GHZ
*RBW 1.0MHz
VSW 1.0MHz
SPAN 5.000MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238



CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
UL, Rev. Path
VAVG 10
10dB/
Below
Lo Chan 25
MKR 26.67dBm
1.85050GHz
1/17/97

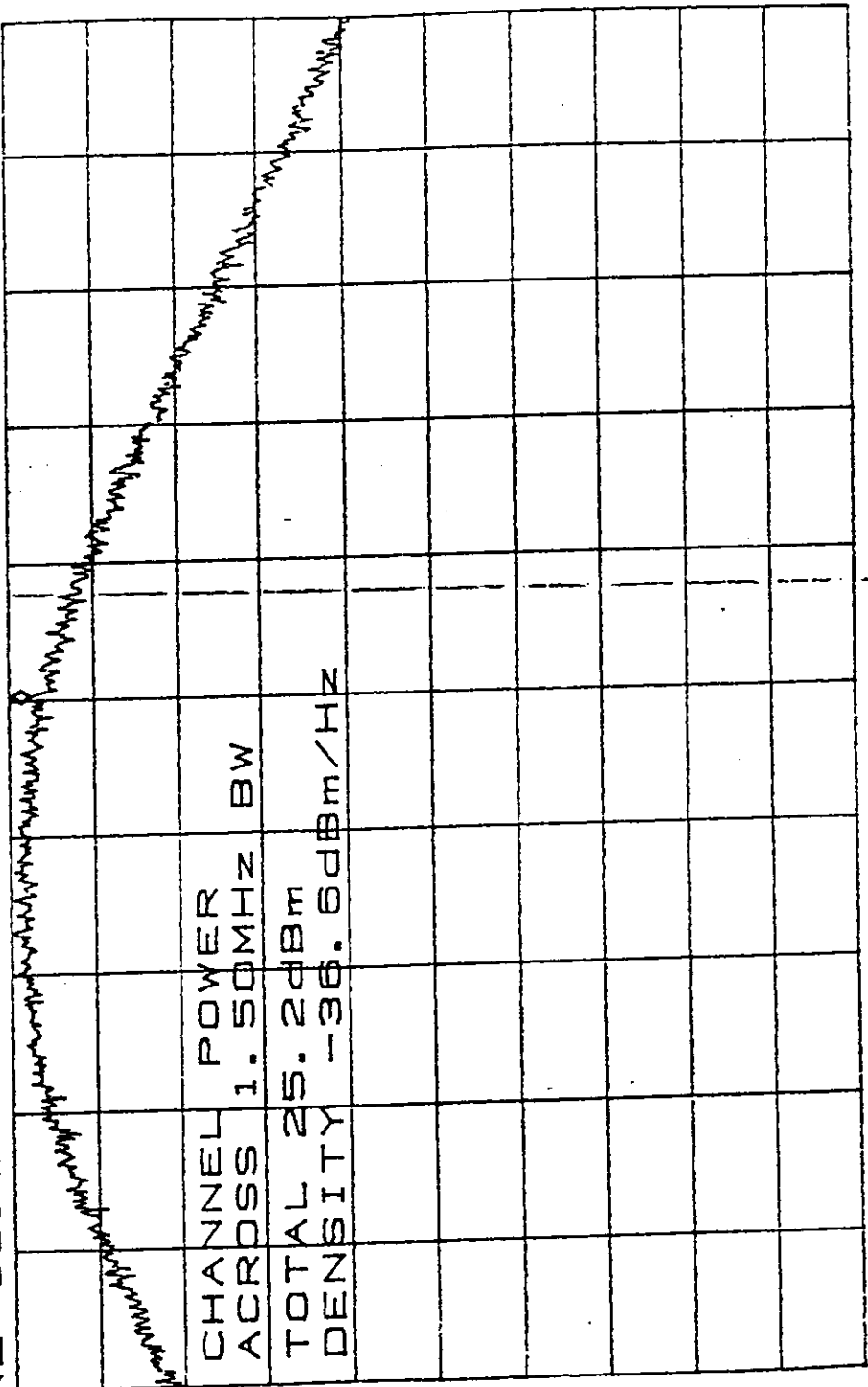
24.238



CENTER 1.85050GHz
*RBW 1.0MHz VBW 1.0MHz
SPAN 20.00MHz SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238



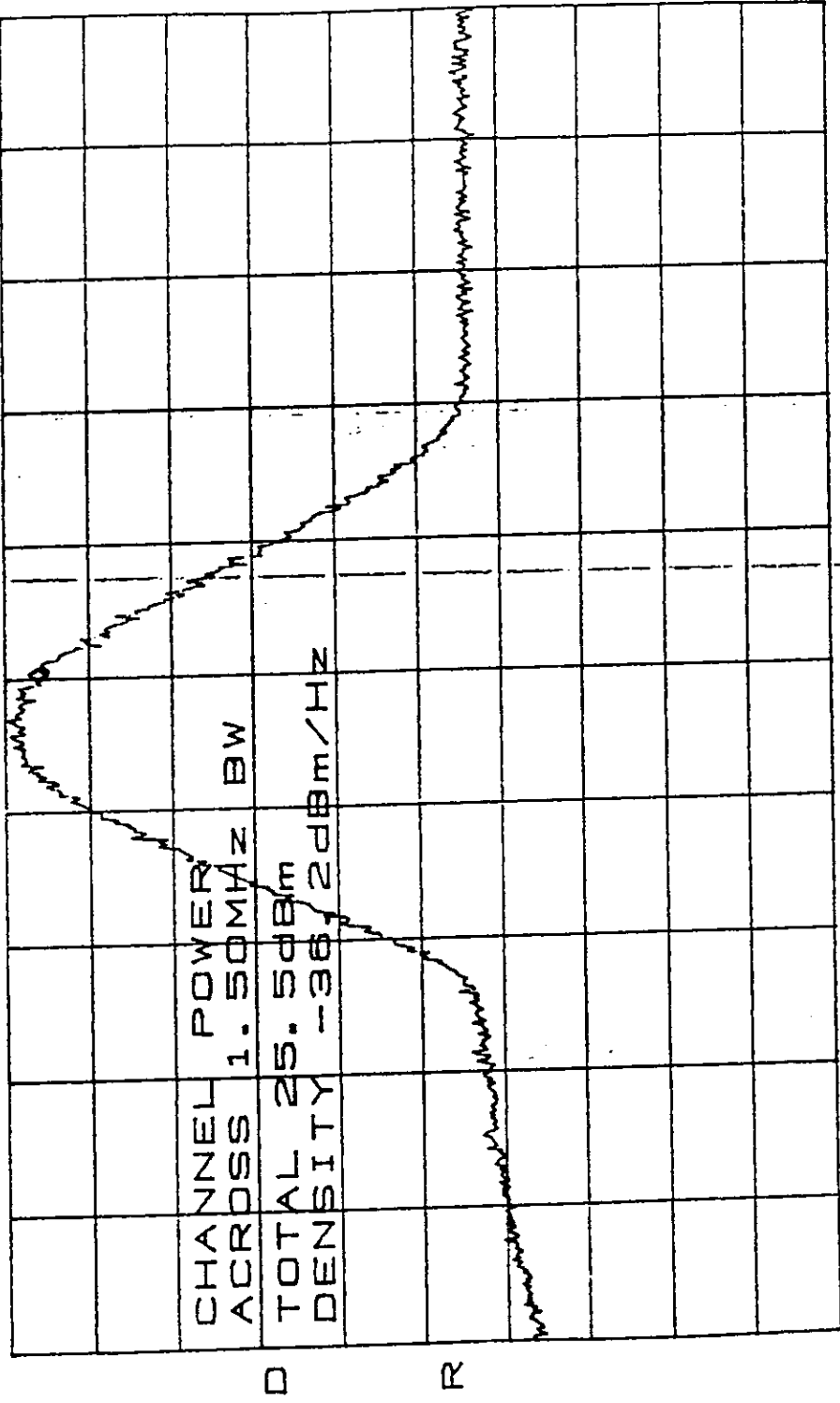
CDMA, FCC, A-Band
ATTEN 10dB
RL 30.0dBm
UL, Rev. Path
VAVG 10
10dB/
Upper
Lo Chan 25
MKR 27.67dBm
1.852000GHZ
1/17/97



CENTER 1.851983GHZ
*RBW 1.0MHZ
SPAN 5.000MHZ
VSW 1.0MHZ
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997



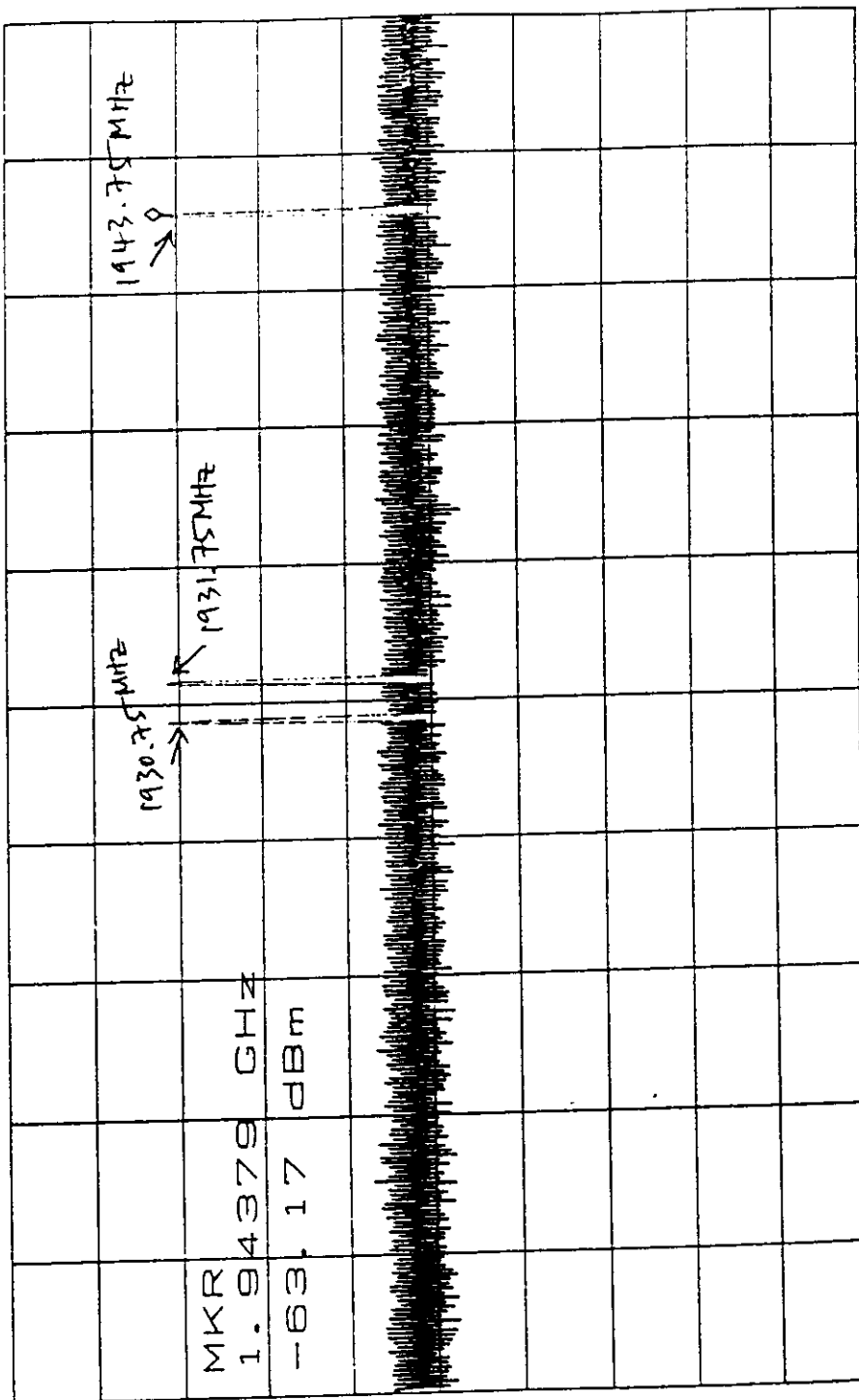
CDMA, FCC, A-Band
14.238
ATTEN 10dB
RL 30.0dBm
UL, Rev. Path
VAVG 10
10dB/
Upper
Lo Chan 25
MKR 25.17dBm
1.85205GHz
1/17/97



CENTER 1.85198GHz
*RBW 1.0MHz
VSW 1.0MHz
SPAN 20.00MHz
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 24, Para. 24.238
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997



CDMA, FCC, A-Band
 ATTN 10dB
 RL -45.00dBm
 DL, Fwd Path
 10dB/
 Input Intermod
 MKR -63.17dBm
 1.94379GHz
 1/17/97



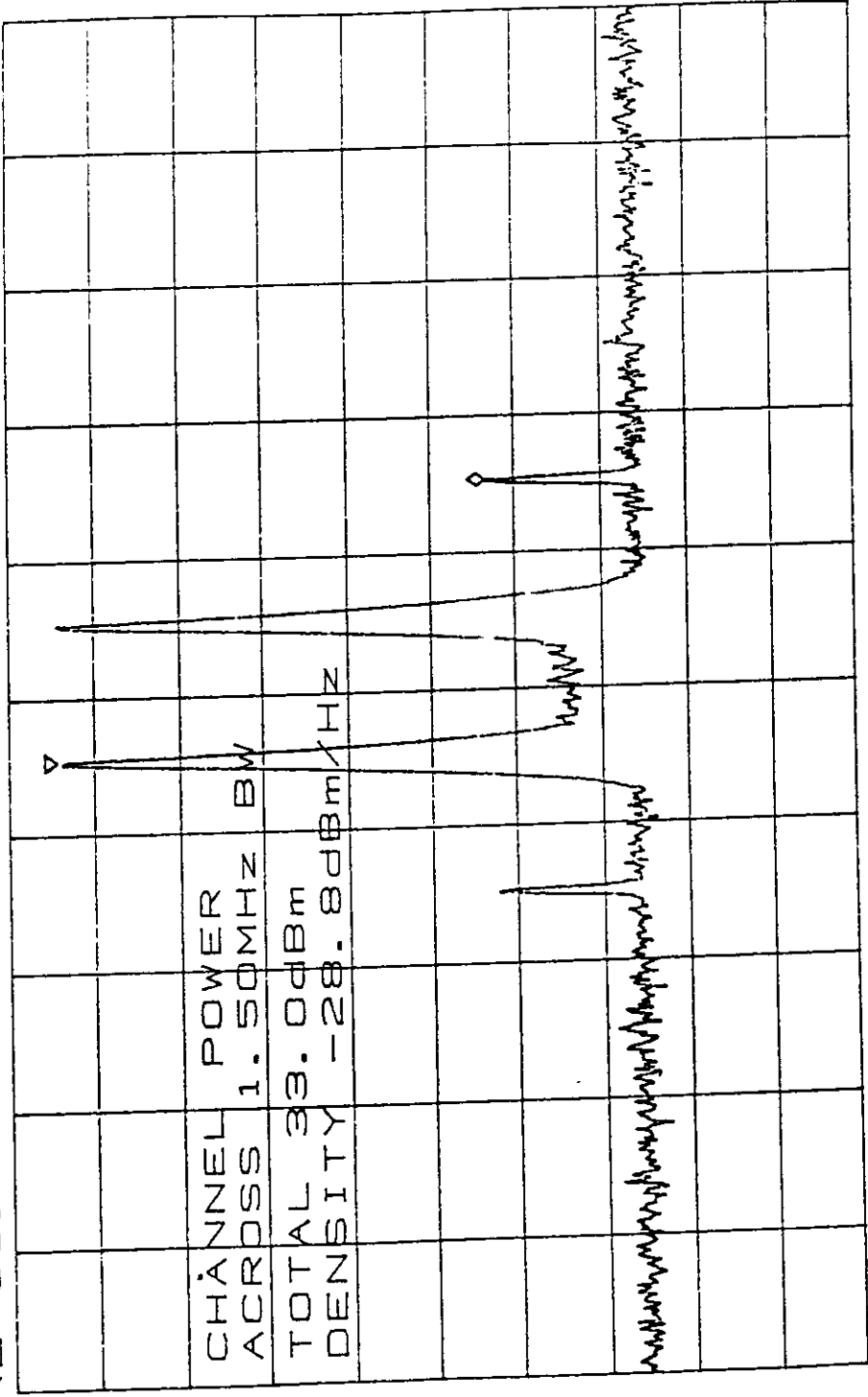
R

CENTER 1.93125GHz
 *RBW 30kHz
 *VBW 1.0kHz
 SPAN 35.00MHz
 SWP 3.00sec
 TESTED BY ORTEL CORPORATION
 DATE: 17 January 1997
 EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: 3 tones



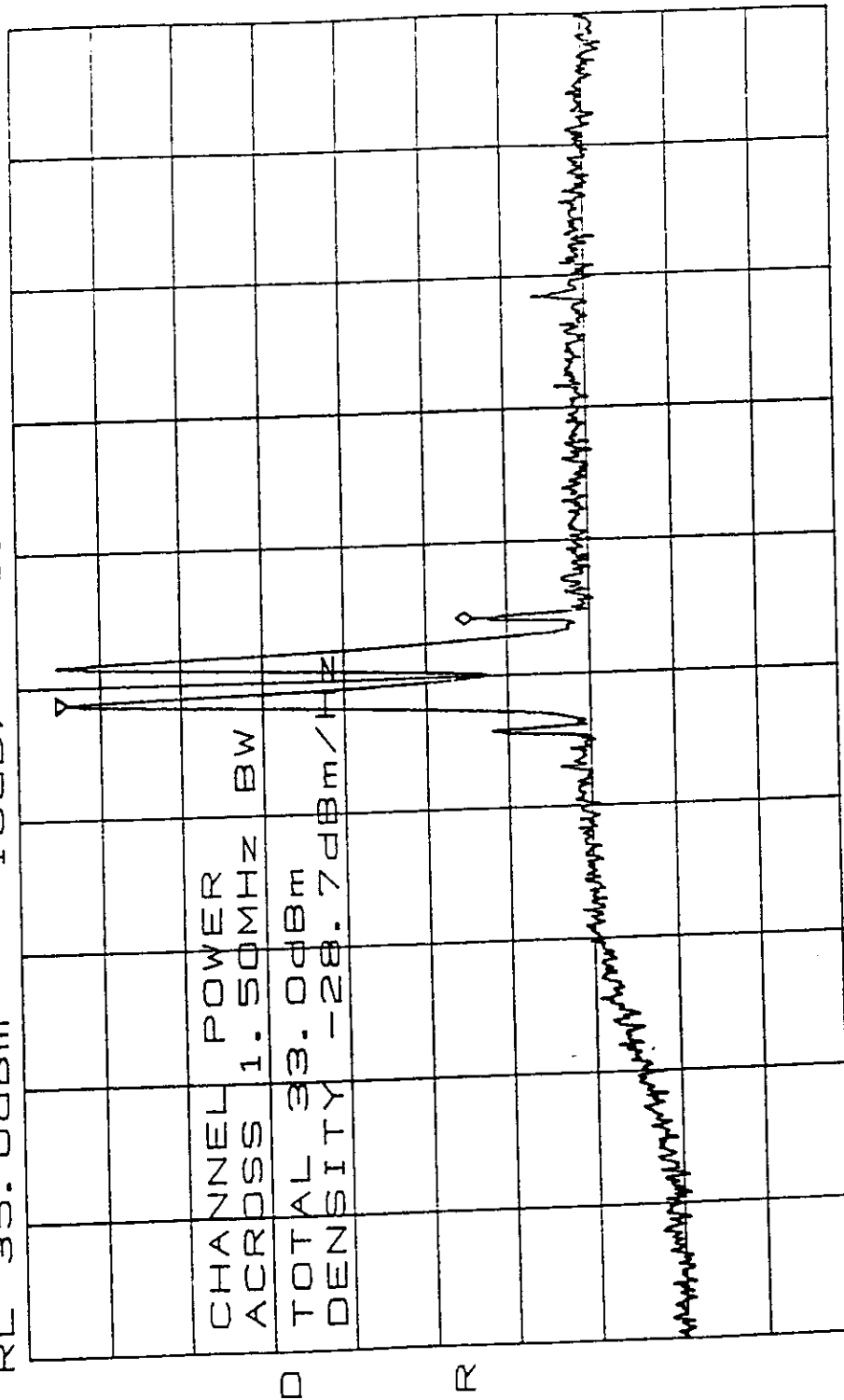
CDMA, FCC, A-Band DL, Fwd Path Output Intermod 1/17/97
ATTEN 20dB VAVG 10 ΔMKR -51.00dB
RL 35.0dBm 10dB/ 2.00MHz

3 Tones



CENTER 1.93125GHz SPAN 10.00MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 17 January 1997 SPECIFICATION: 3 tones

CDMA, FCC, A-Band DL, Fund Path
 ATTN 20dB VAVG 10
 RL 35.0dBm 10dB/
 Output Intermod 1/17/97
 ΔMKR -49.84dB
 1.98MHz

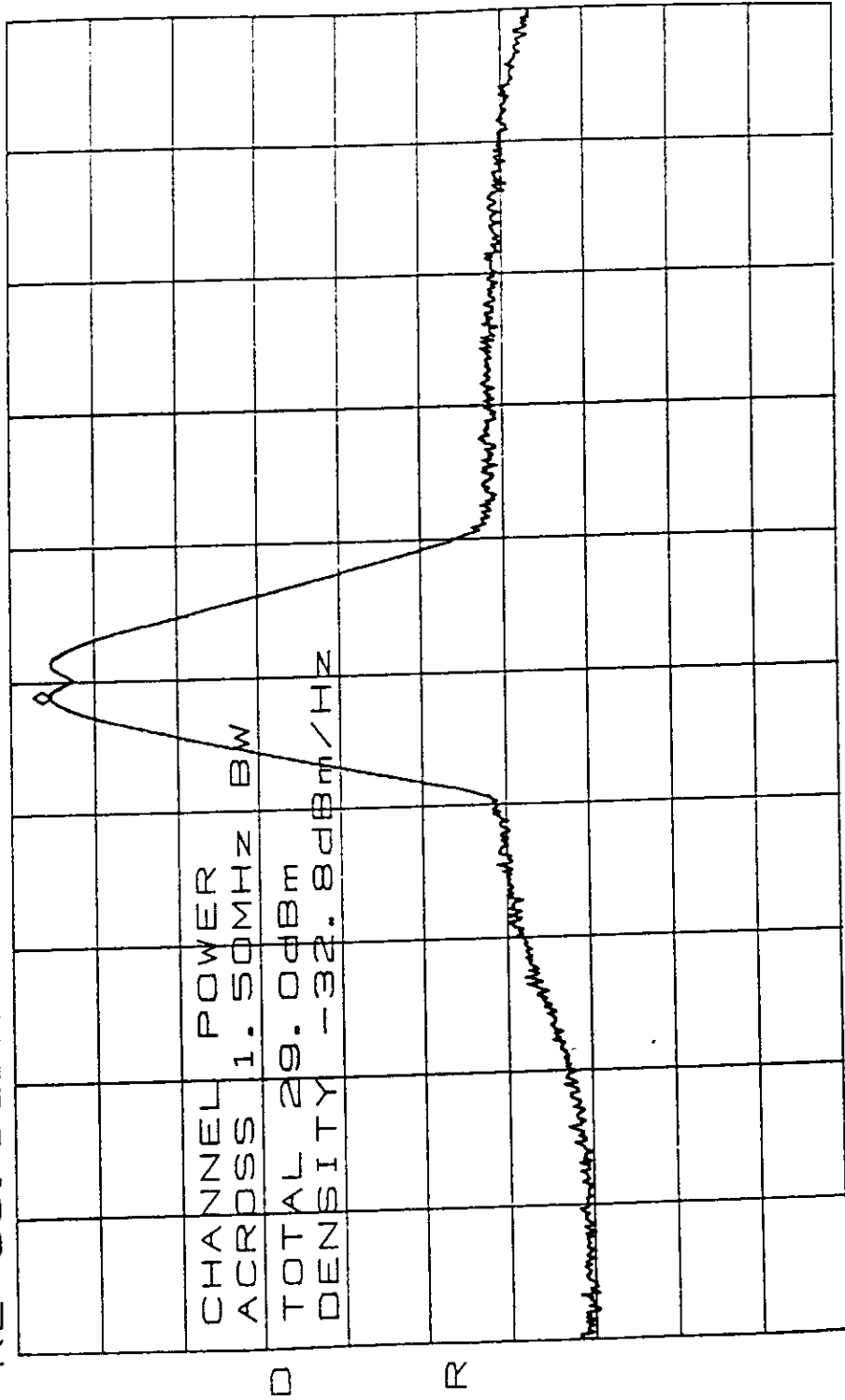


CENTER 1.93125GHz
 *RBW 100kHz VBW 100kHz
 SPAN 35.00MHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION
 DATE: 17January 1997
 EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: 3 tones

3 Tones



CDMA, FCC, A-Band
ATTEN 20dB
RL 35.0dBm
DL, Fwd Path
VAVG 10
10dB/
Output Intermod
1/17/97
MKR 30.33dBm
1.93078GHz

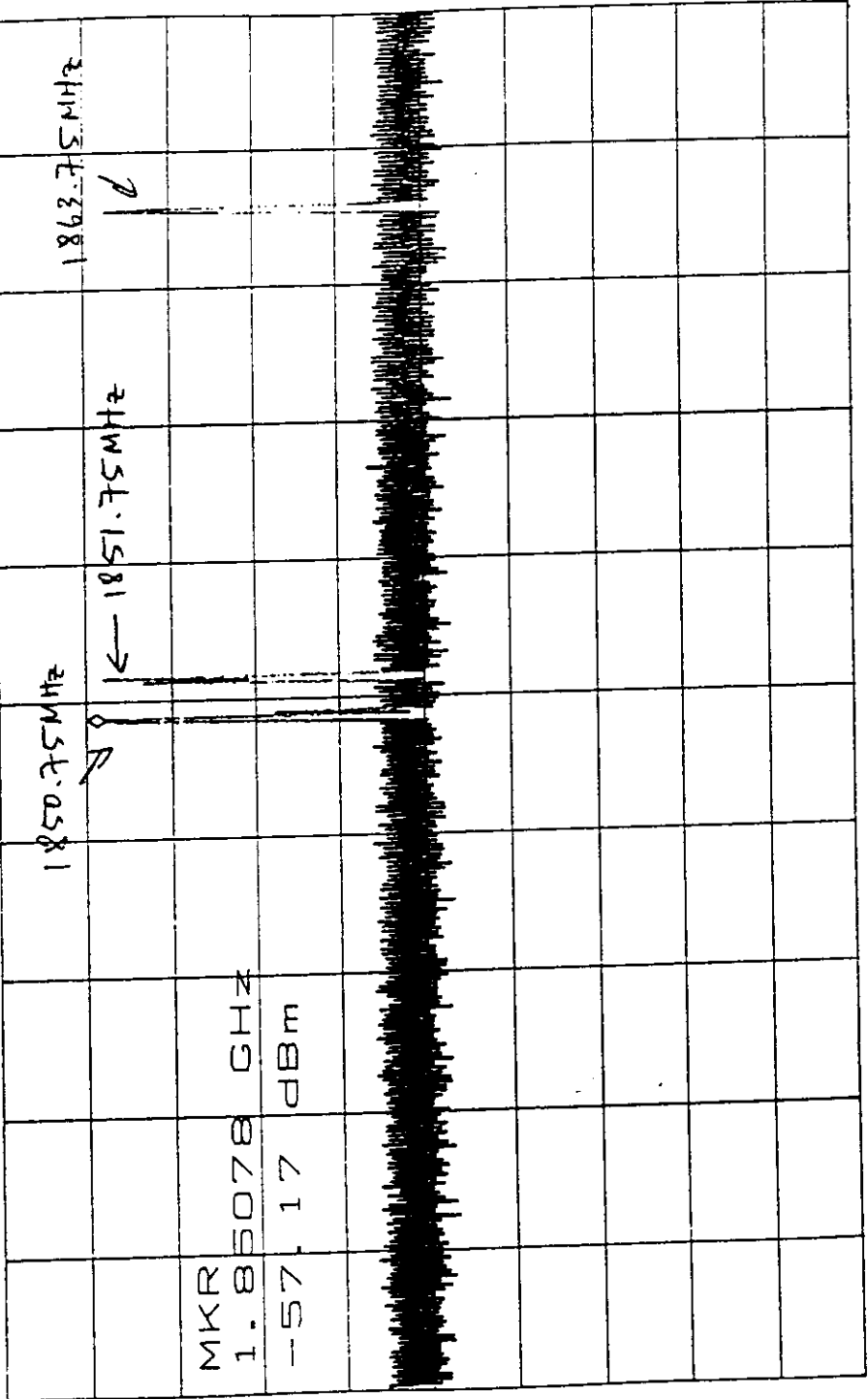


CENTER 1.93125GHz
*RBW 1.0MHz
SPAN 40.00MHz
VBW 1.0MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: 3 tones

3 tones



CDMA, FCC, A-Band
ATTEN 10dB
RL -45.0dBm
UL, Rev. Path
10dB/
Input Intermod
MKR -57.17dBm
1.85078GHz
1/17/97

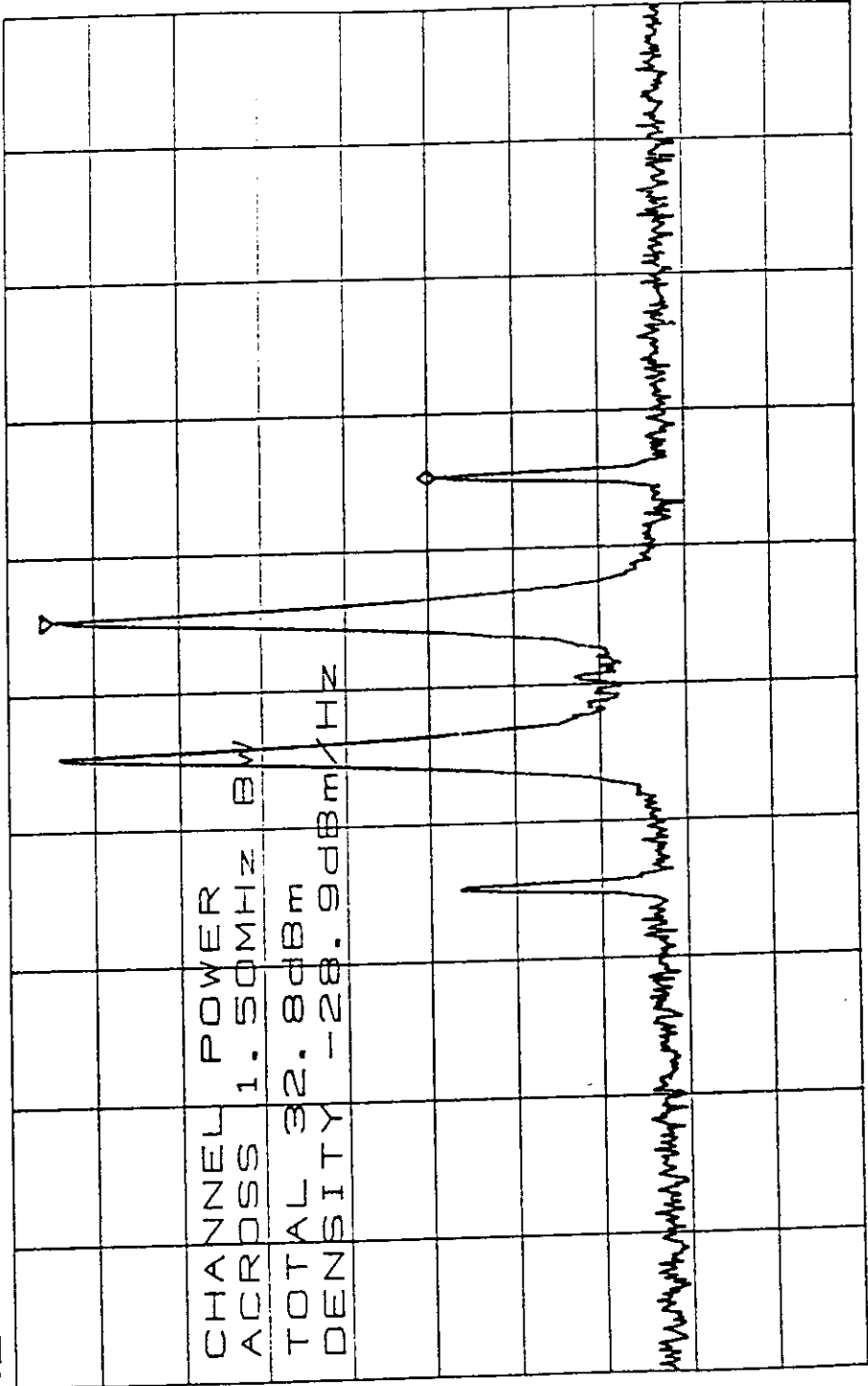


CENTER 1.85125GHz
*RBW 30kHz
*VBW 1.0kHz
SPAN 35.00MHz
SWP 3.00sec
TESTED BY ORTEL CORPORATION
DATE: 17 January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: 3 tones



CDMA, FCC, A-Band
ATTEN 20dB
RL 35.0dBm
UL, Rev. Path
VAVG 10
10dB/
Output Intermod
1/17/97
AMKR -45.66dB
1.00MHz

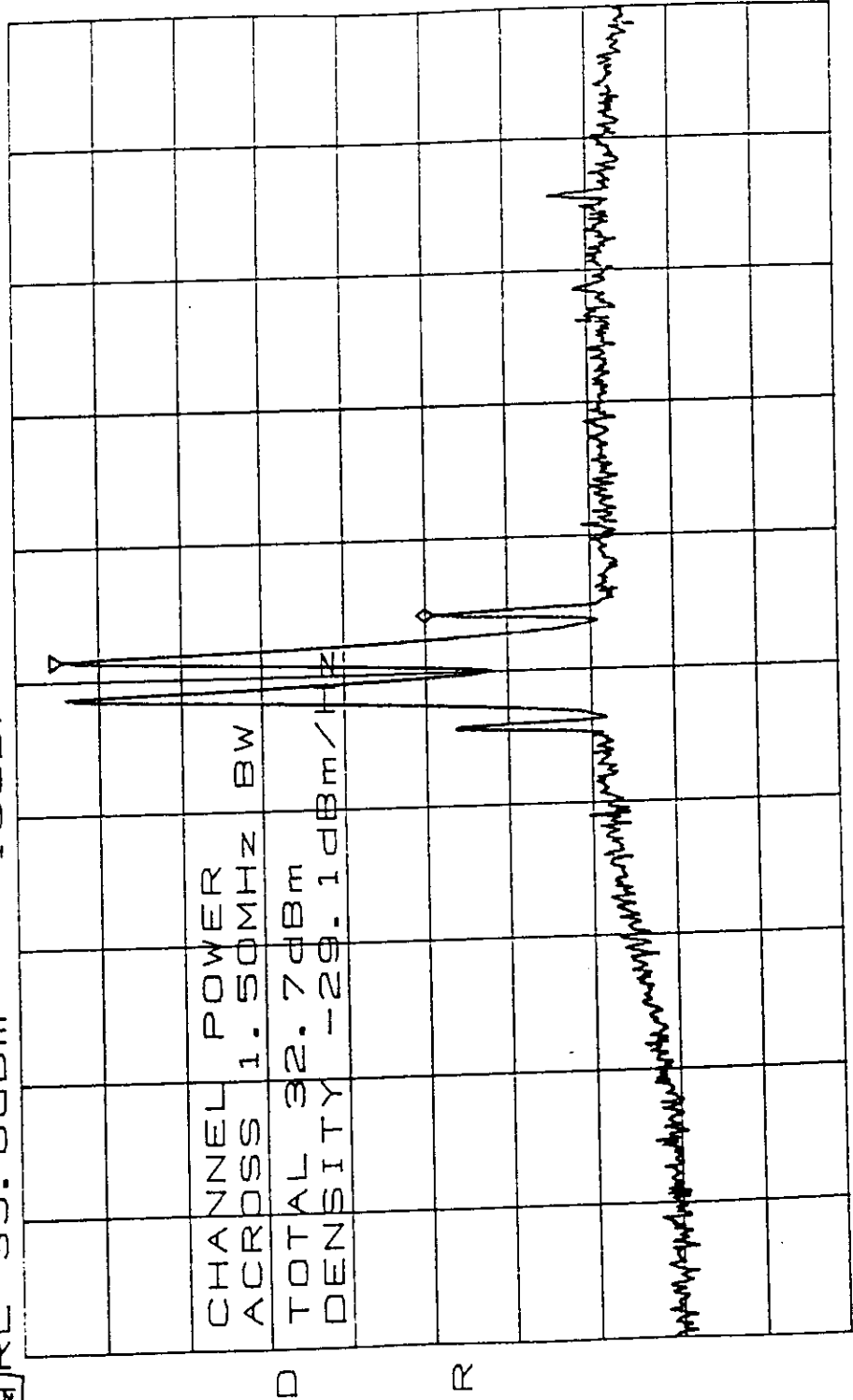
3 tones
Intermod



CENTER 1.85125GHz
*RBW 30kHz
SPAN 10.00MHz
VW 30kHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 17 January 1997
SPECIFICATION: 3 tones internal



CPMA, FCC, A-Band
ATTEN 20dB
RL 35.0dBm
3-tones
Intermod
UL, Rev. Patch
VAVG 10
10dB/
Output Intermod
1/17/97
ΔMKR -45.33dB
990kHz



CENTER 1.85125GHz
*RBW 100kHz
SPAN 35.00MHz
VBW 100kHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
DATE: 17January 1997
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: 3 tones internal



1/17/97

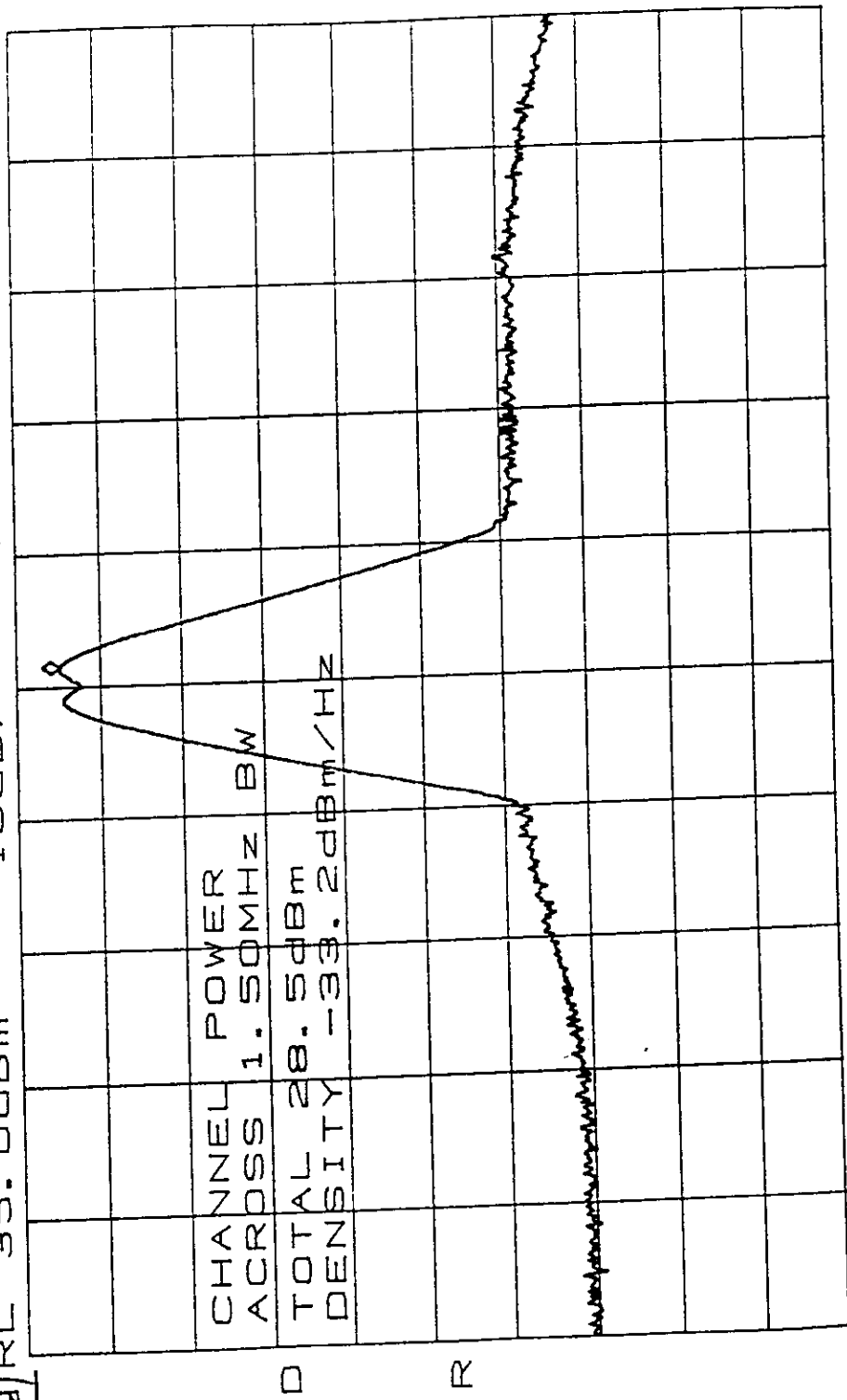
Output Interned

UL, Rev. Patch

CDMA, FCC, A-Band

ATTEN 20dB VAVG 10 MKR 30.00dBm
RL 35.00dBm 10dB/ 1.85185GHz

3 tones
Interned

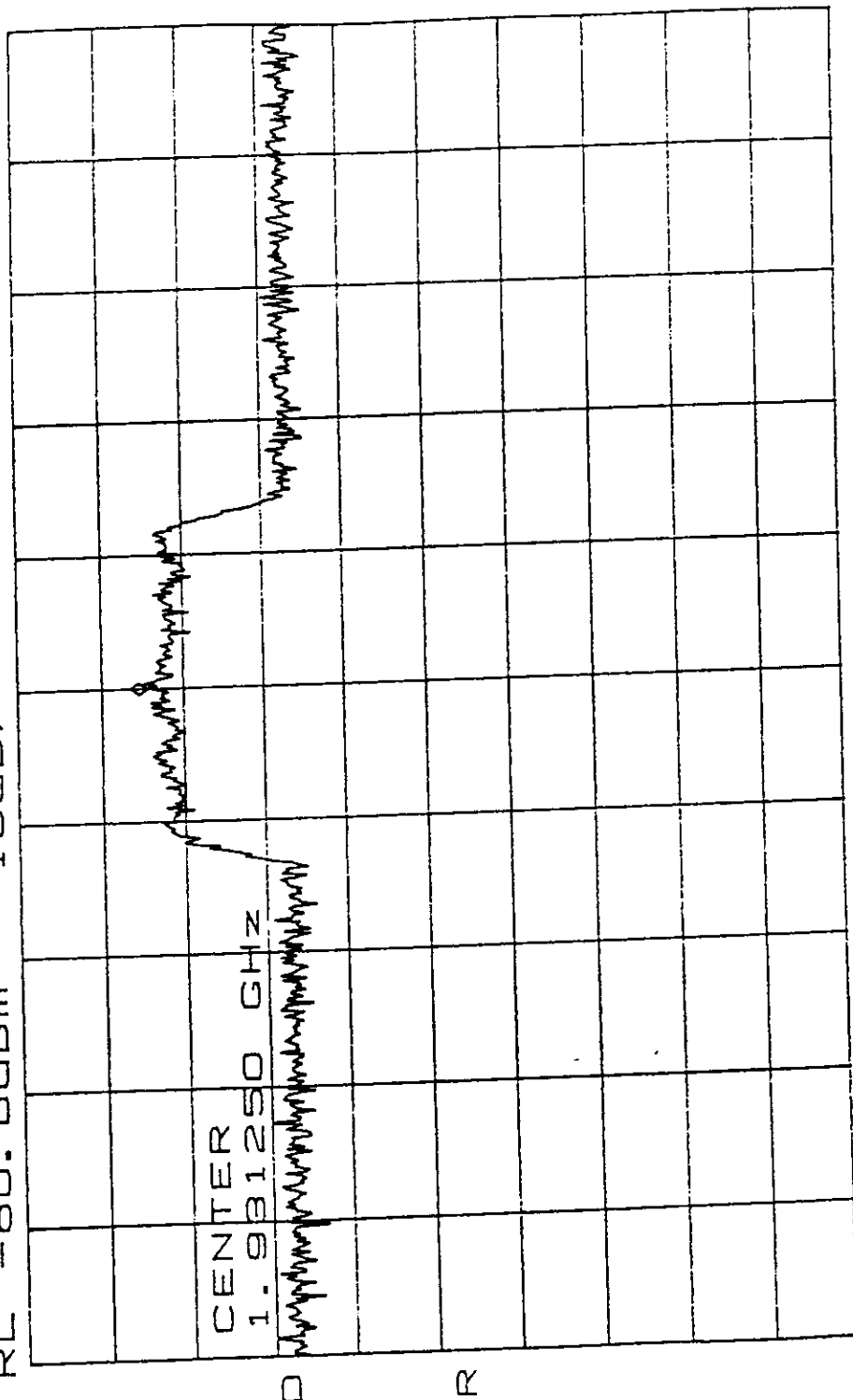


CENTER 1.85125GHz SPAN 40.00MHz
*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 17 January 1997 SPECIFICATION: 3 tones internal



CDMA, FCC, A-Band
ATTEN 10dB
RL -60.0dBm
DL, Fwd Path
VAVG 10
10dB/
Input, Lo Chan 25
MKR -75.33dBm
1.931250GHz
1/17/97

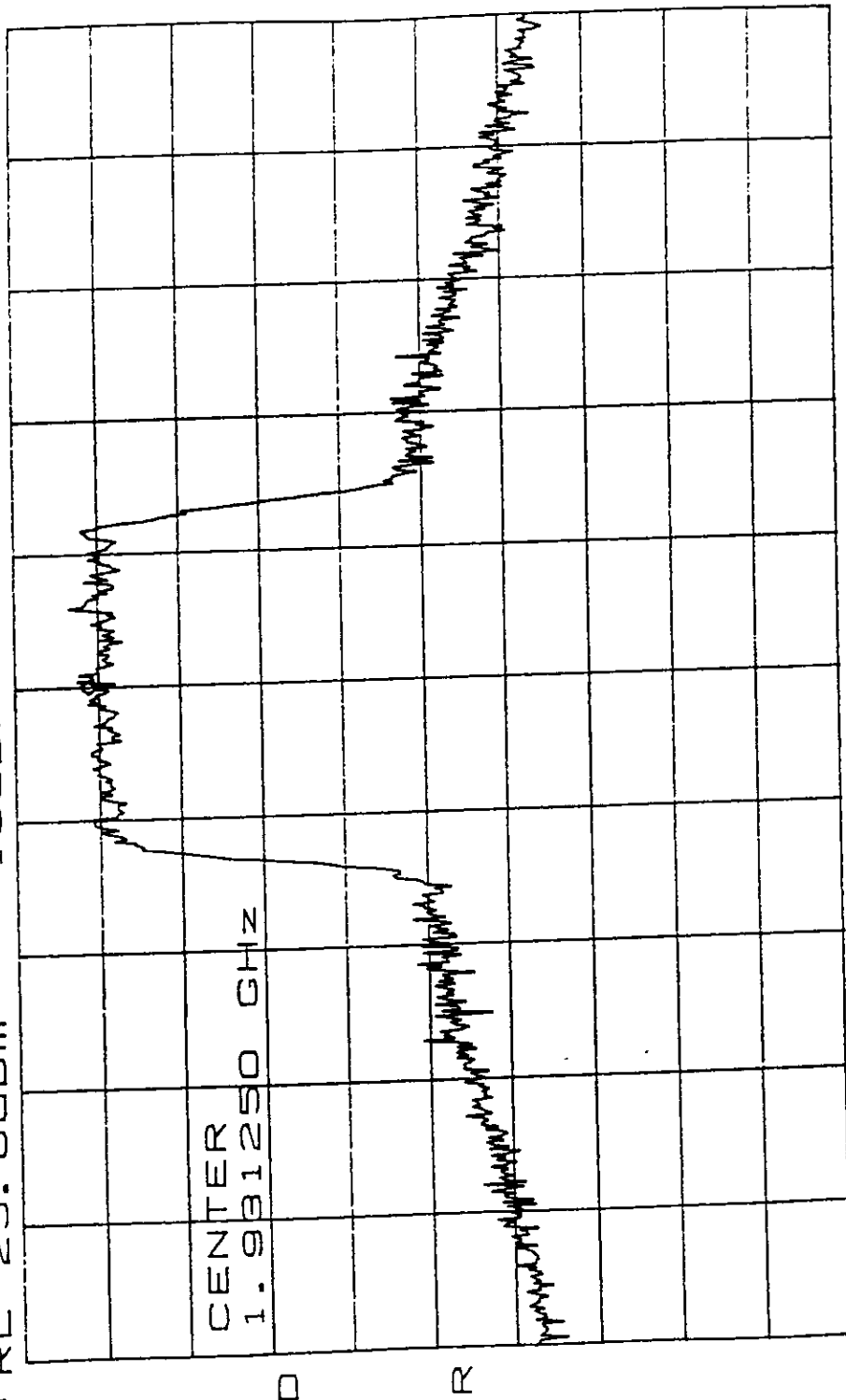
In/out



CENTER 1.931250GHz
*RBW 30kHz
SPAN 5.000MHz
VSW 30kHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 17 January 1997
SPECIFICATION: In/Out

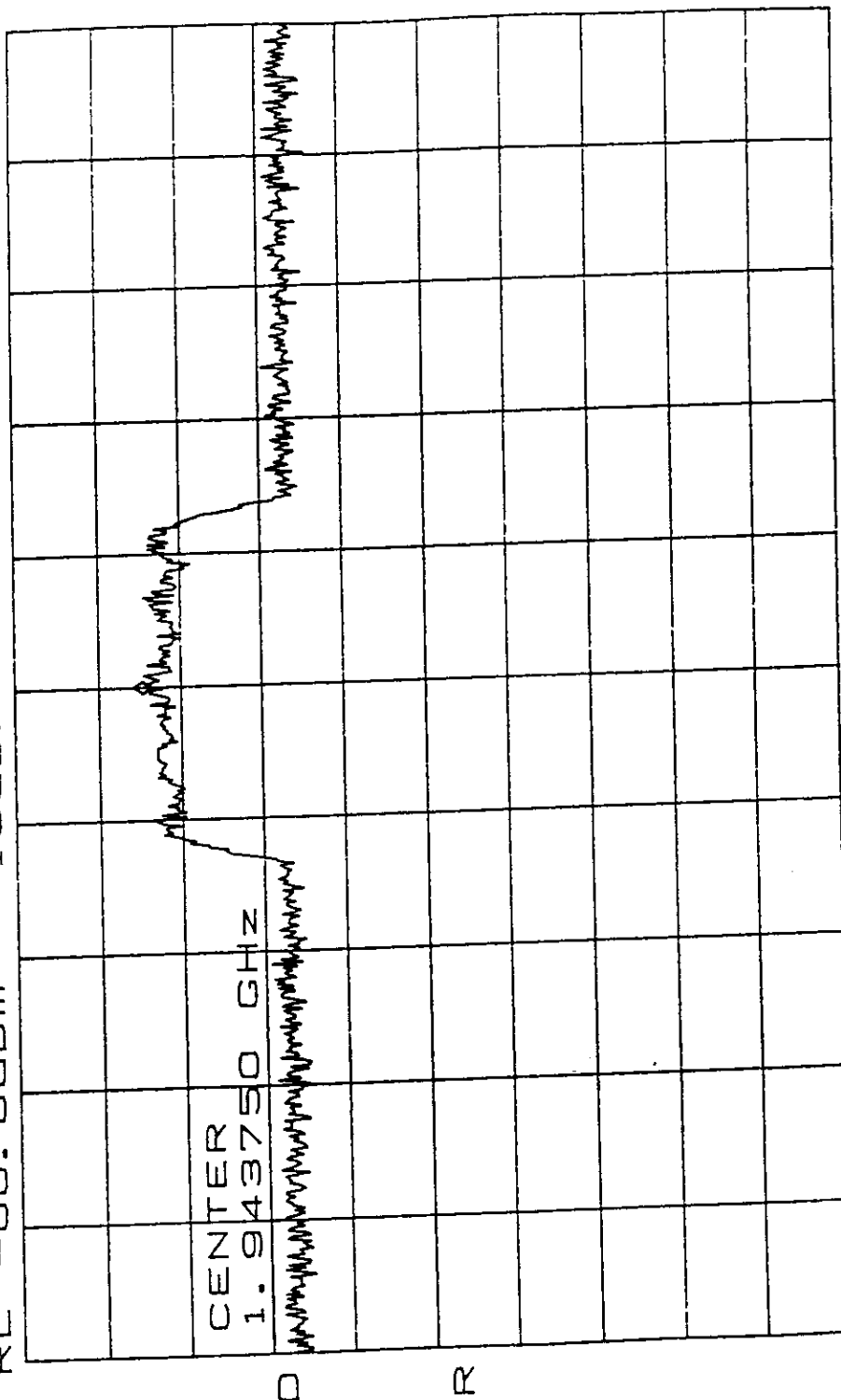
CDMA, FCC, A-Band
 ATTN 10dB
 RL 25.0dBm
 DL, Feed Path
 VAVG 10
 10dB/
 Output, Lo chan 25
 MKR 15.33dBm
 1.931250GHz
 1/17/97

In/out



CENTER 1.931250GHz
 *RBW 30KHZ
 VBW 30KHZ
 SPAN 5.000MHZ
 SWP 50.0ms
 EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: In/Out
 TESTED BY ORTEL CORPORATION
 DATE: 17January 1997

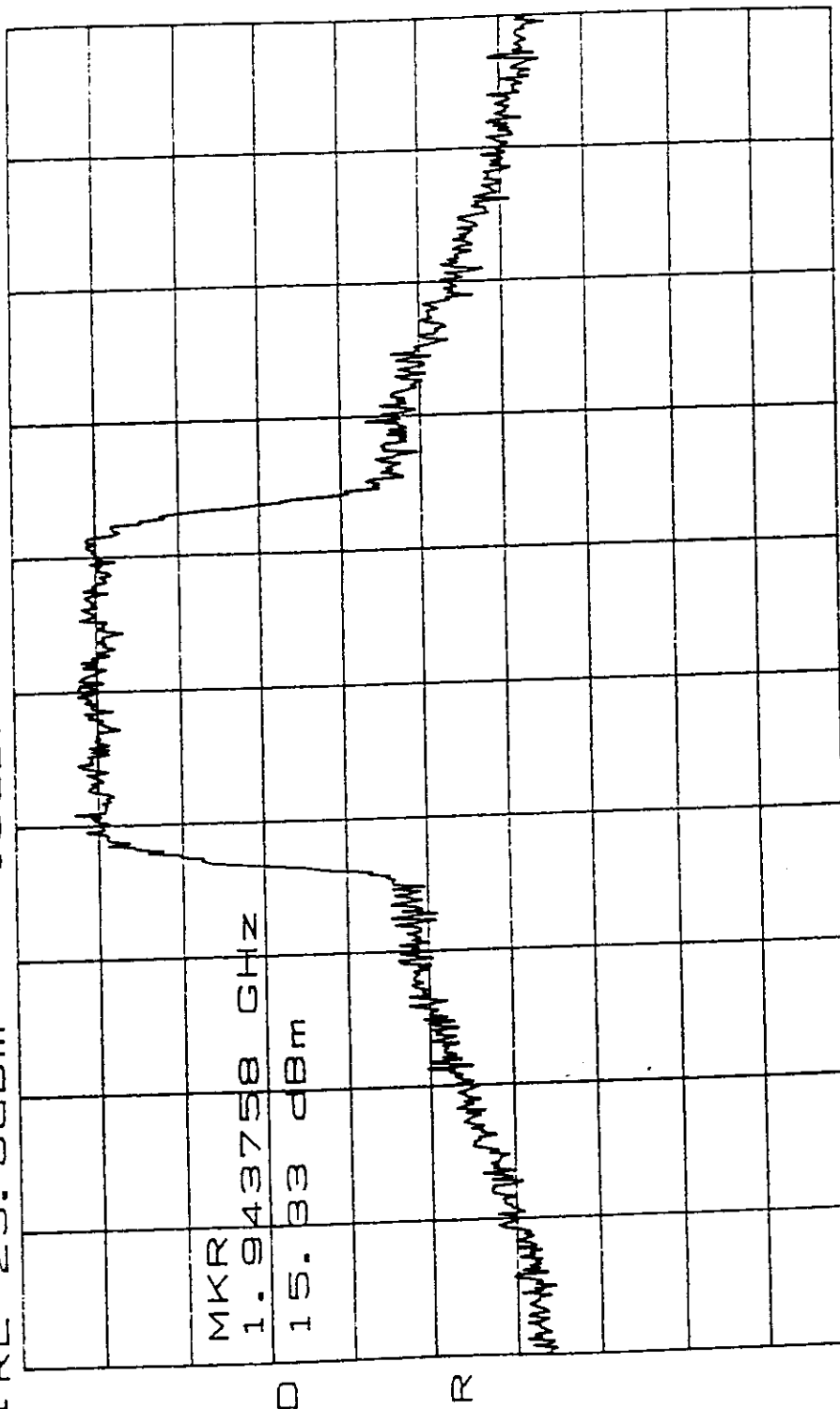
CDMA, FCC, A-Band PL, Fund Patch Input, Hi Chan 275 1/17/97
 ATTN 10dB VAVG 10 MKR -76.17dBm
 RL -60.0dBm 10dB/ 1.943750GHz



CENTER 1.943750GHz SPAN 5.000MHz
 *RBW 30KHz VBW 30KHz SWP 50.0ms
 EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: In/Out
 TESTED BY ORTEL CORPORATION
 DATE: 17 January 1997

In/Out

CDMA, FCC, A-Band
 ATTN 10dB
 RL 25.0dBm
 DL, Full Path
 VAVG 10
 10dB/
 Output, Hi Chan 275
 MKR 15.33dBm
 1.943758GHz
 1/17/97

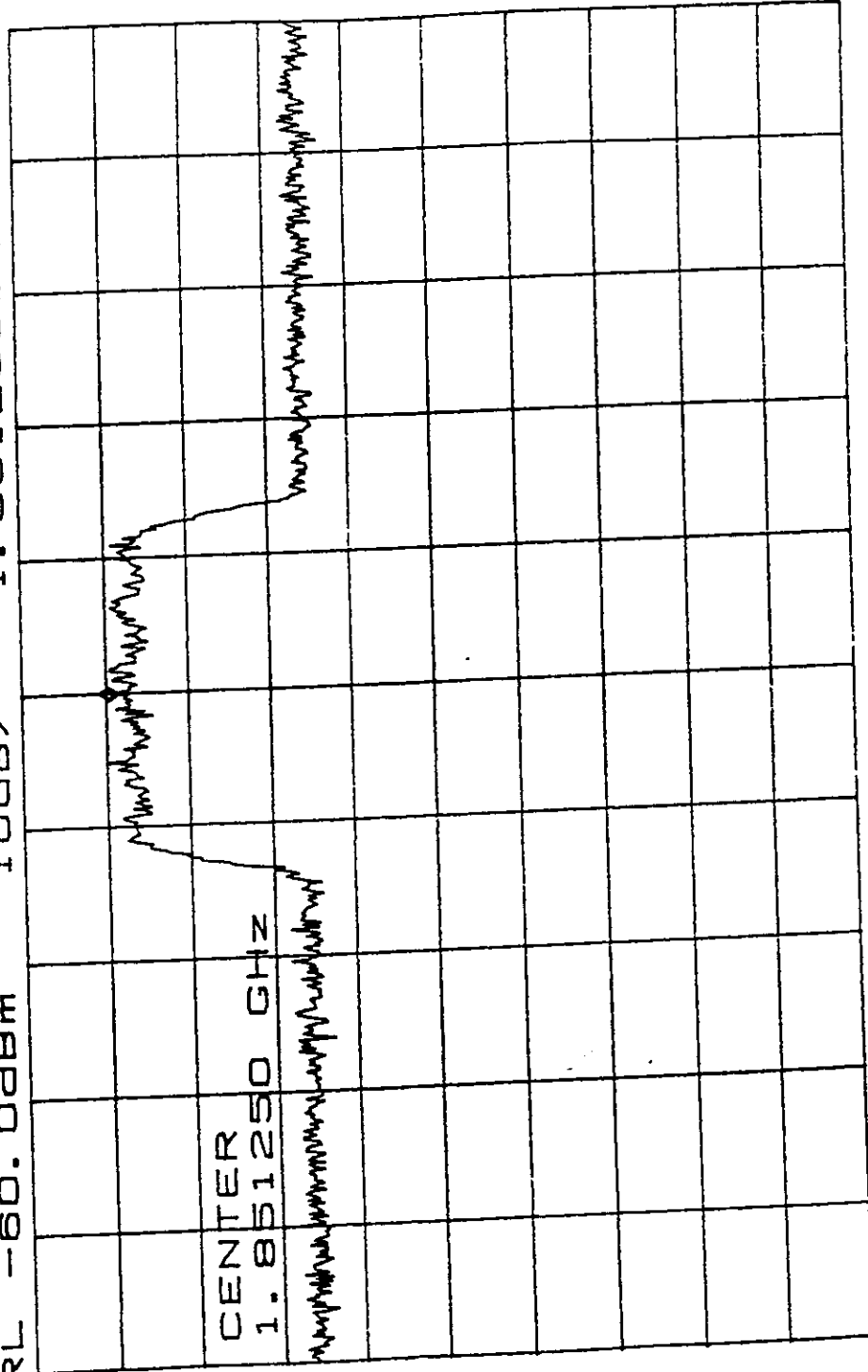


CENTER 1.943750GHZ
 *RBW 30KHZ
 VBW 30KHZ
 SPAN 5.000MHZ
 SWP 50.0ms
 EUT: CDMA Repeater, Model CBR-1901-1.5
 SPECIFICATION: In/Out
 TESTED BY ORTEL CORPORATION
 DATE: 17January 1997



CDMA, FCC, A-Band
Reverse Path (UL) Input to Chan 25 1/16/97
ATTEN 10dB VAVG 10 MKR -71.17dBm
RL -60.0dBm 10dB/ 1.851250GHz

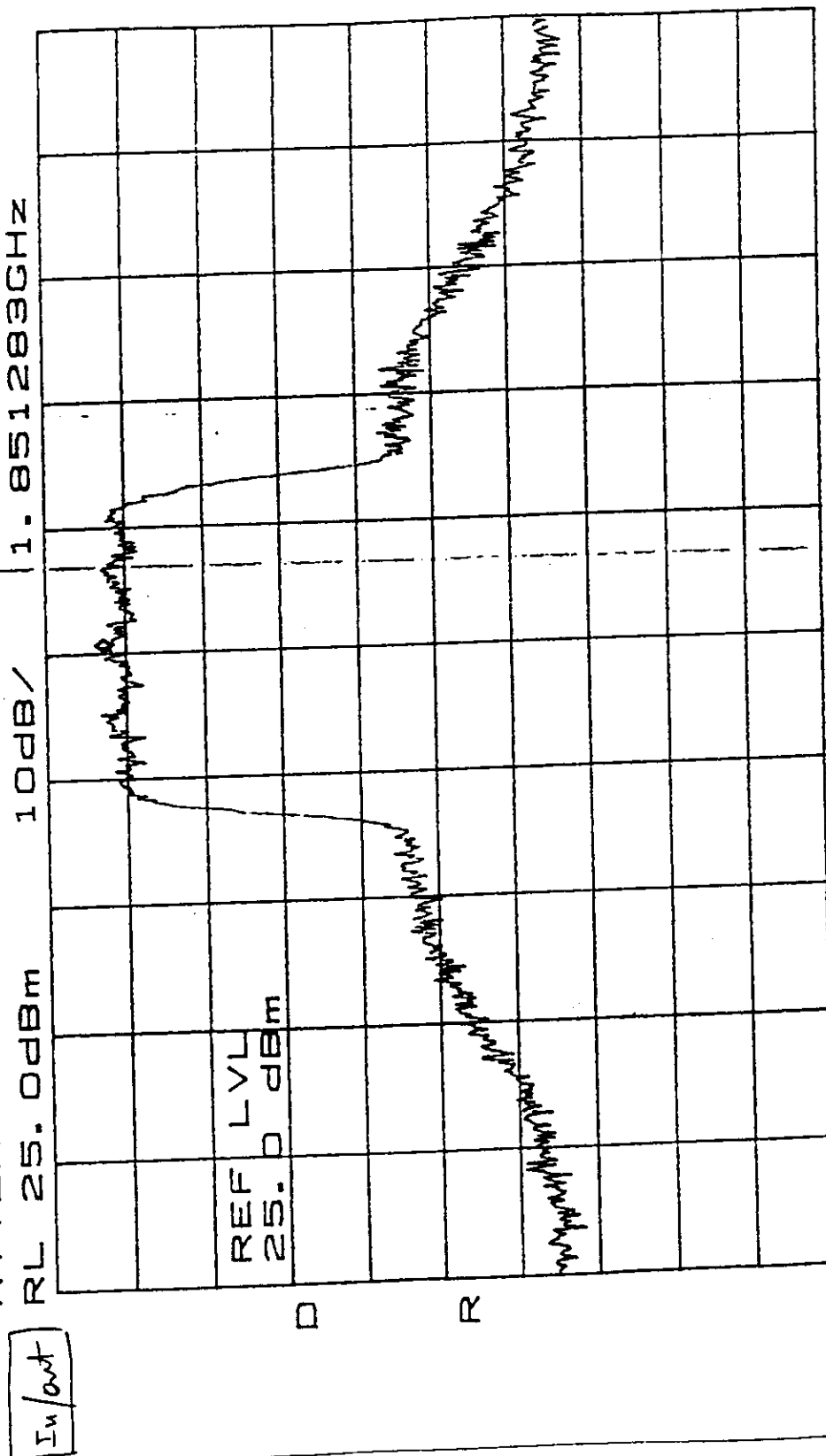
In/Out



CENTER 1.851250GHz SPAN 5.000MHz
RBW 30kHz VBW 30kHz SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 16 January 1997 SPECIFICATION: In/Out



CDMA, FCC, A-Band
 ATTN 10dB
 RL 25.0dBm
 UL, Reverse Path
 VAVG 10
 10dB/
 Output, Lo Chan 25
 MKR 16.83dBm
 1.851283GHz
 1/16/97



CENTER 1.851250GHz
 *RBW 30KHz
 VBW 30KHz
 SPAN 5.000MHz
 SWP 50.0ms
 EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: In/Out
 TESTED BY ORTEL CORPORATION
 DATE: 18 January 1997



Input hi-channel 275 1/16/97

Reverse Path (ULL)

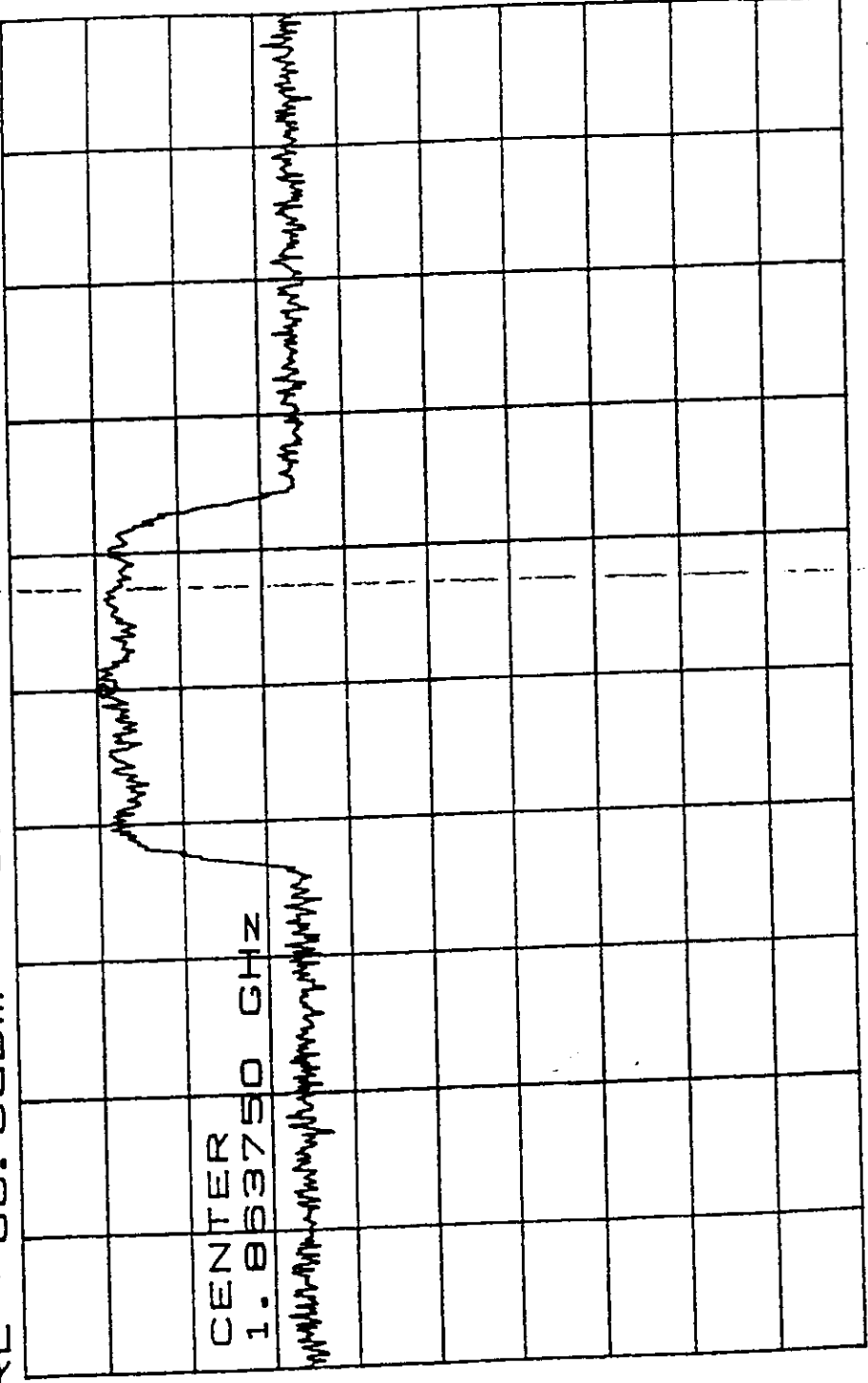
MKR -71.67dBm

1.863750GHZ

ATTEN 10dB VAVG 10

RL -60.0dBm 10dB/

In/out



CENTER 1.863750 GHZ

SPAN 5.000MHZ

SWP 50.0ms

CENTER 1.863750GHZ

VBW 30KHZ

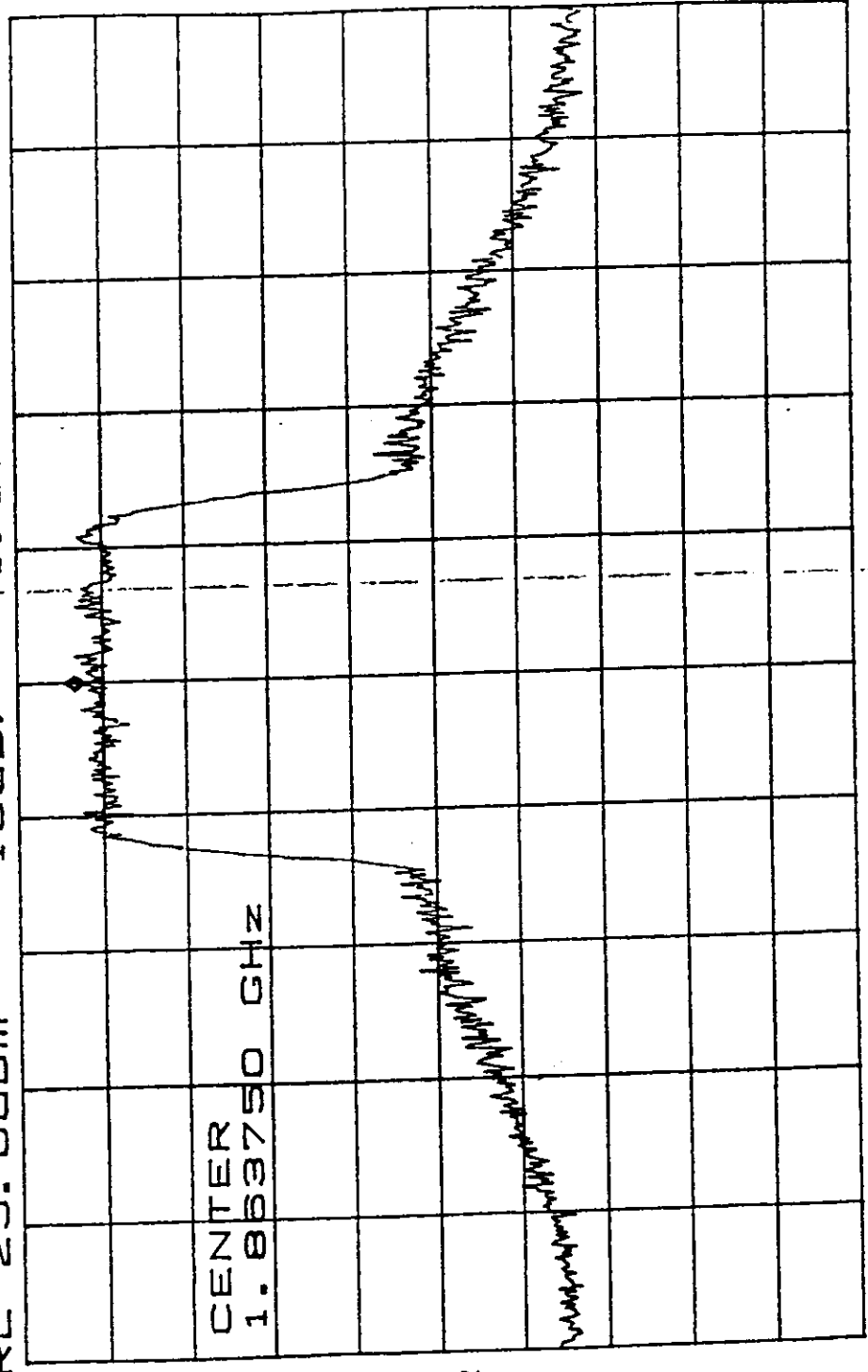
RBW 30KHZ

EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: In/Out

TESTED BY ORTEL CORPORATION
DATE: 16January 1997



CDMA, FCC, A-Band
ATTEN 10dB
RL 25.0dBm
UL, Reverse Path
VAVG 10
10dB/
Output: Upper Chan 275
MKR 17.33dBm
1.863750GHZ
1/16/97



CENTER 1.863750GHZ
*RBW 30KHZ
VBW 30KHZ
SPAN 5.000MHZ
SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1.5
SPECIFICATION: In/Out
TESTED BY ORTEL CORPORATION
DATE: 16 January 1997

In/out



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Appendix A

Test Setups
(Photographs)

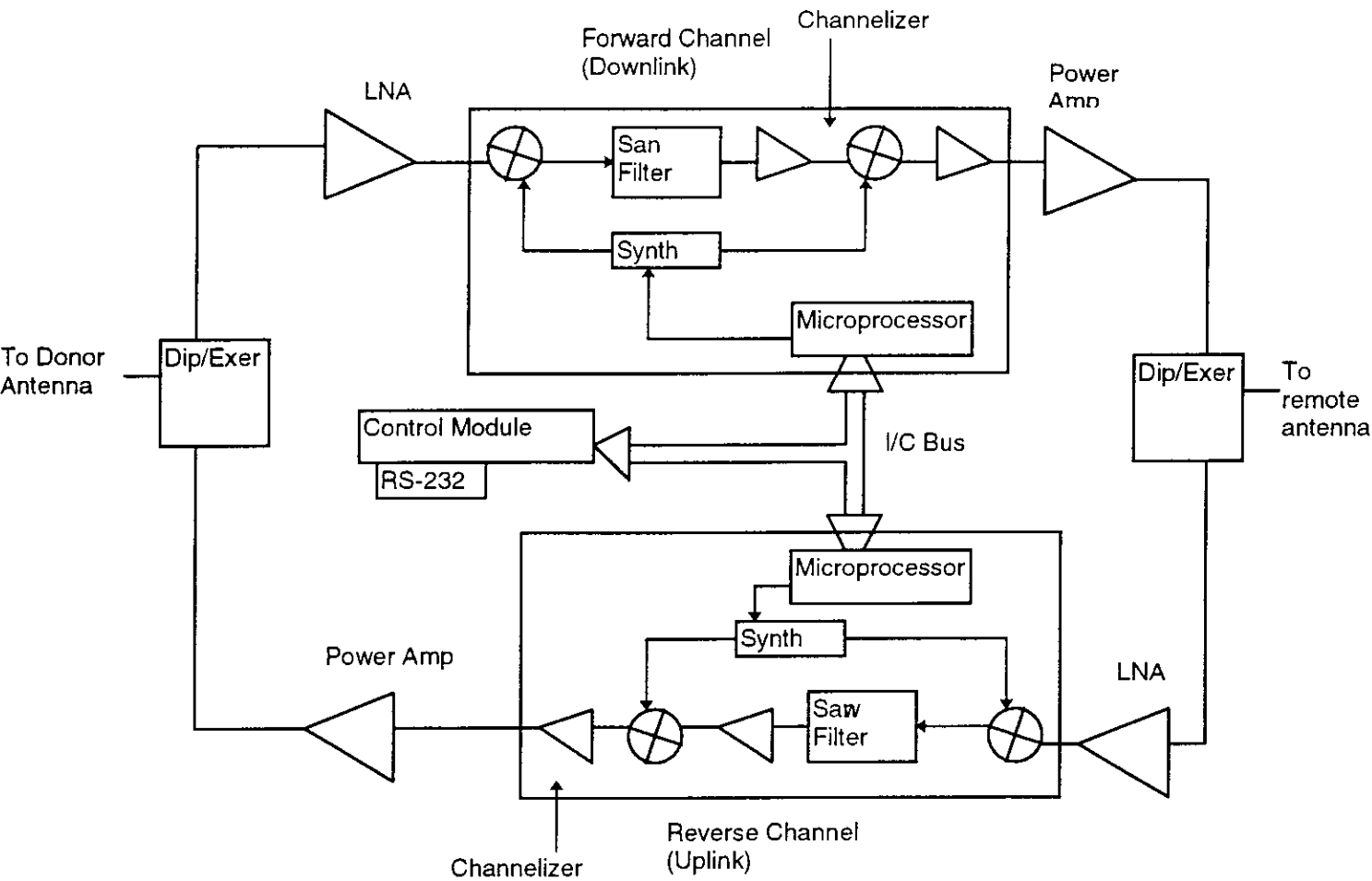


Appendix B

Product Information Form(s)



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 1 ϕ , 1.3 A 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 #B48003 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.	





Appendix C

Change History

Not Applicable



Appendix D

Testing Facilities

Certificates of Approval

VCCI (3), NVLAP, EN 45001



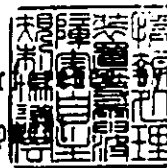
CERTIFICATE

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





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





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.

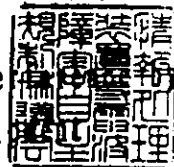
*This is to certify that the following measuring facility
has been registered in accordance with the Regulations
for Voluntary Control Measures, Article 8.*

Registration No. : R-212

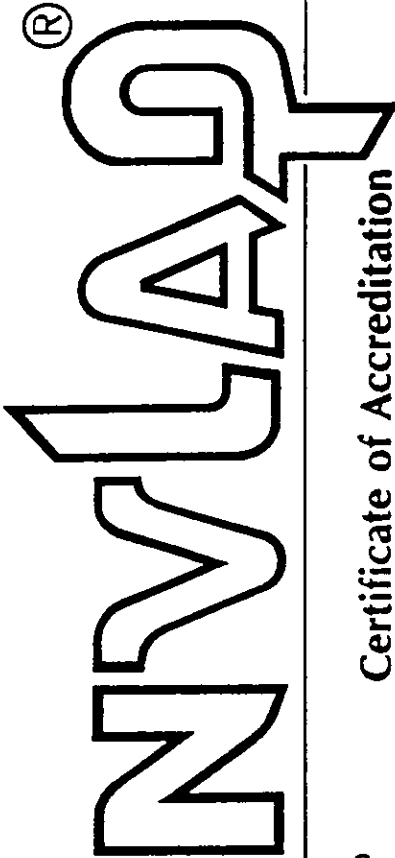
Date of Registration : December 26, 1994

This Certificate is valid until October 5, 1997.

Voluntary Control Council for Inter
Information Technology Equi

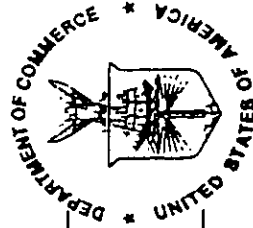


United States Department of Commerce
National Institute of Standards and Technology



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 (11-86)





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

Page D6 of D13

National Institute
of Standards and Technology



National Voluntary
Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation



Page: 1 of 1

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

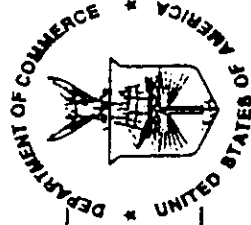
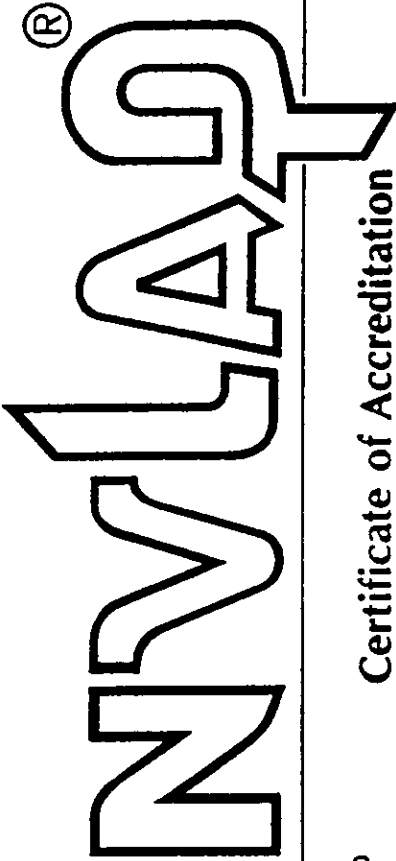
12/F01 FCC Method - 47 CFR Part 15 - Digital Devices
12/F01a Conducted Emissions, Power Lines, 450 KHz to 30 MHz
12/F01b Radiated Emissions

December 31, 1997

Effective through

A handwritten signature in black ink, appearing to read "John G. Smith".
For the National Institute of Standards and Technology

United States Department of Commerce
National Institute of Standards and Technology



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: 166288-0

NVLAP-01C (11-96)



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

Page D9 of D13

National Institute
of Standards and Technology



National Voluntary
Laboratory Accreditation Program

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation



Page: 1 of 2

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

A handwritten signature in dark ink, appearing to read "John G. Smith".
For the National Institute of Standards and Technology

ISO/IEC GUIDE 25:1990
ISO 9002:1987

Scope of Accreditation



Page: 2 of 2

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



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,

A handwritten signature in black ink, appearing to read "Thomas W. Phillips".

Thomas W. Phillips
Electronics Engineer
Customer Service Branch

Enclosure:
PAL PN



CERTIFICATE

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

A handwritten signature in black ink, appearing to read 'W. Kreinberg', is written over a horizontal line.

Dr. Wolfgang Kreinberg

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



Appendix E

Supplemental Information

Not Applicable



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

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

Preliminary Operator's Manual

MirrorCell Channel Selective CDMA Repeater

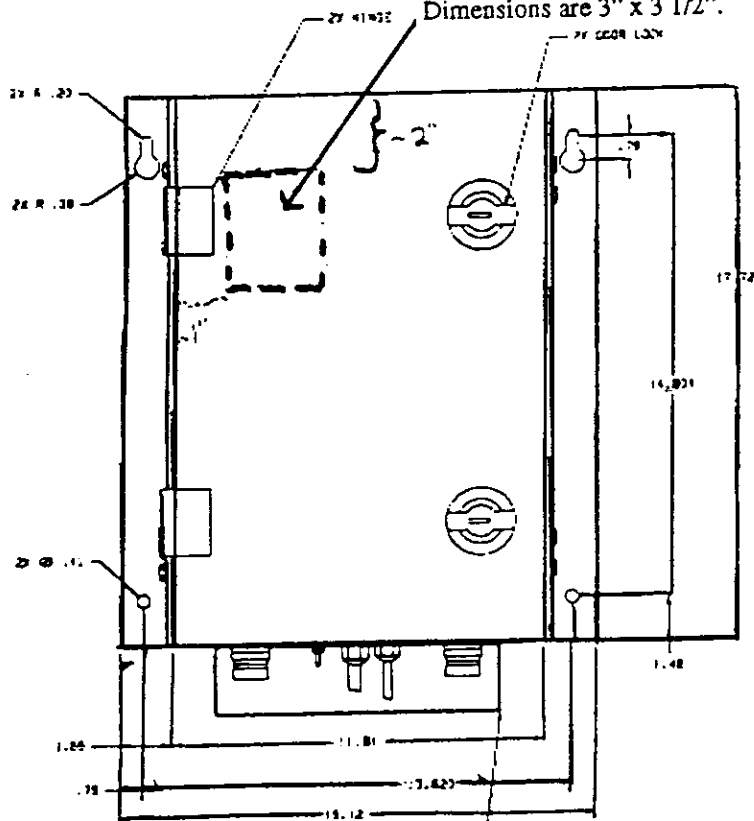
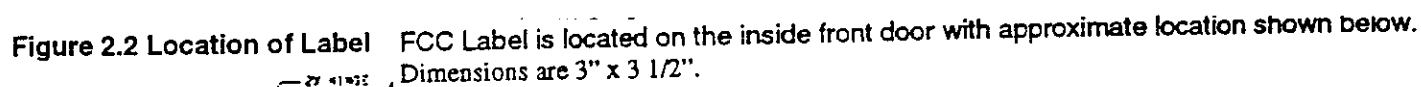
Model CDR1901



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

Figure 2.1 **FCC ID Label**

Figure 2.1 **FCC ID Label**



3. SYSTEM TEST CONFIGURATION

3.1 Justification

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

See Block Diagram.

3.2 EUT Exercise Software

None



3.3 Special Accessories

None

3.4 Modification

None

3.5 Configuration of Tested System

See Block Diagram

Figure 3.1 Configuration of Tested System

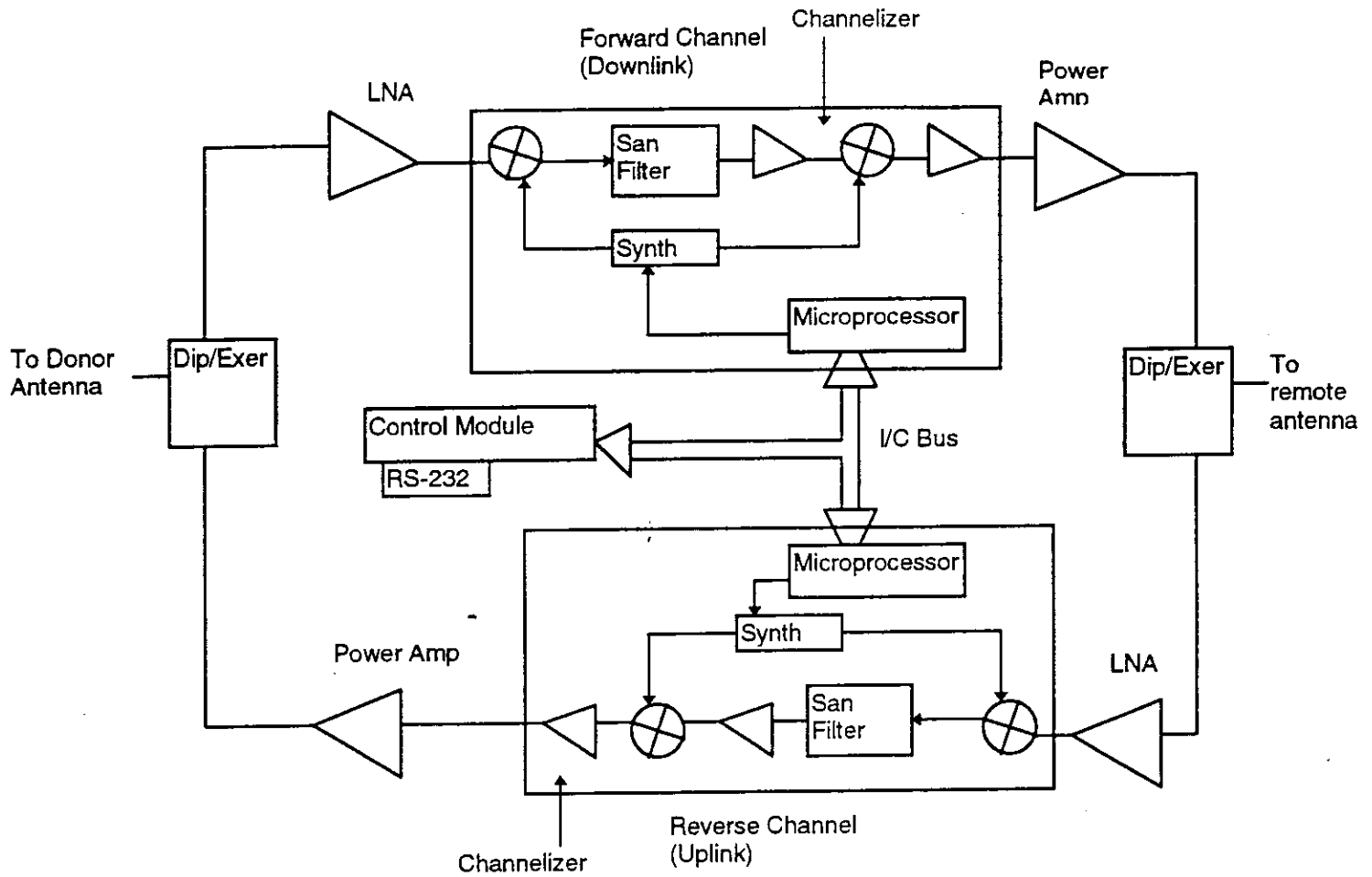
See Block Diagram.

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

4.1 Block Diagram Description

CDMA Repeater, Model CDR-1901-1-B

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.

6 CONDUCTED EMISSION DATA

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

See following page(s).

3. SYSTEM TEST CONFIGURATION

3.1 Justification

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

See Block Diagram.

3.2 EUT Exercise Software

None

3.3 Special Accessories

None

3.4 Modification

None

3.5 Configuration of Tested System

See Block Diagram

Figure 3.1 Configuration of Tested System

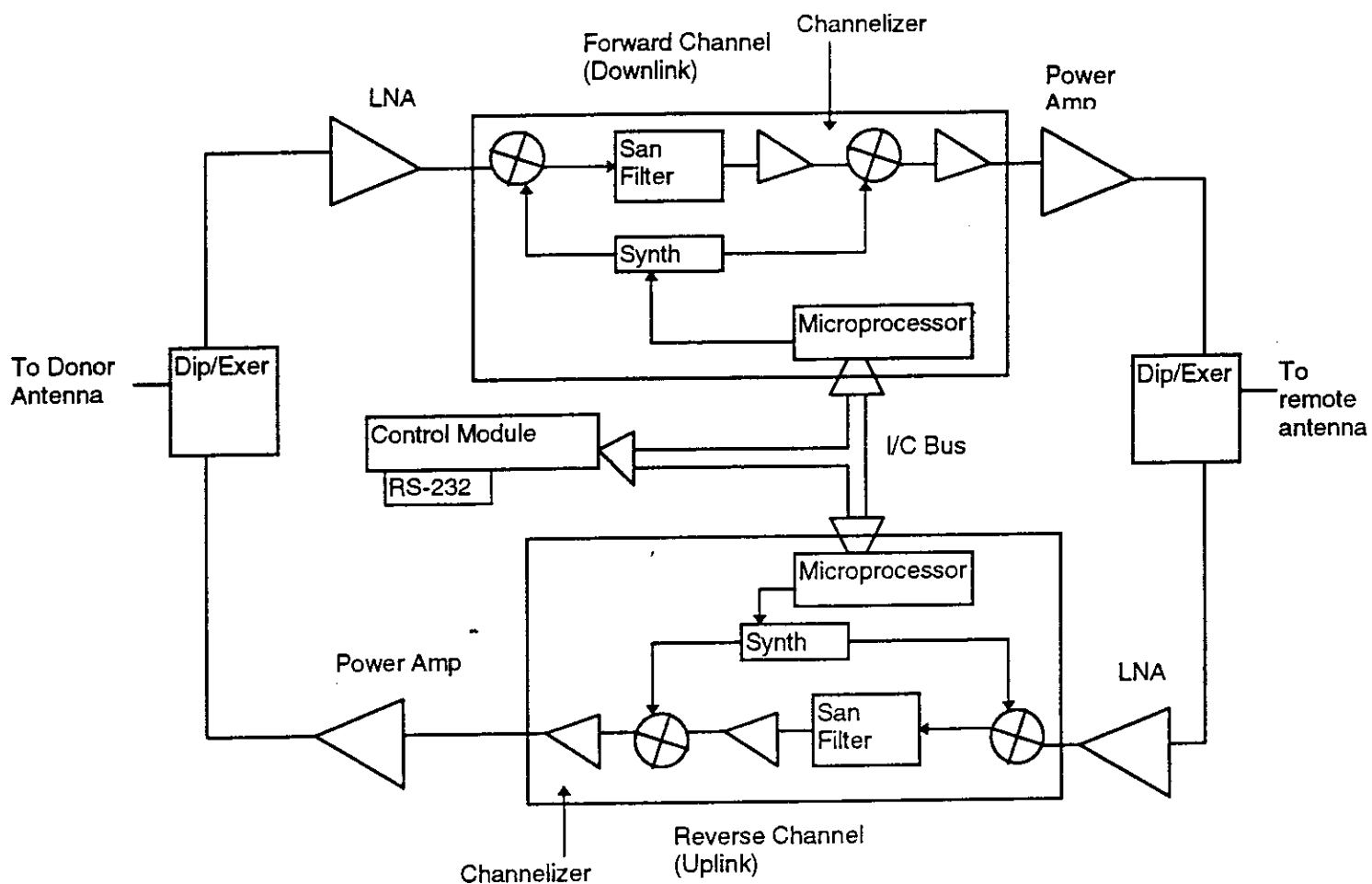
See Block Diagram.

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

4.1 Block Diagram Description

CDMA Repeater, Model CDR-1901-1-B

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



5 CONDUCTED MEASUREMENT PHOTOS

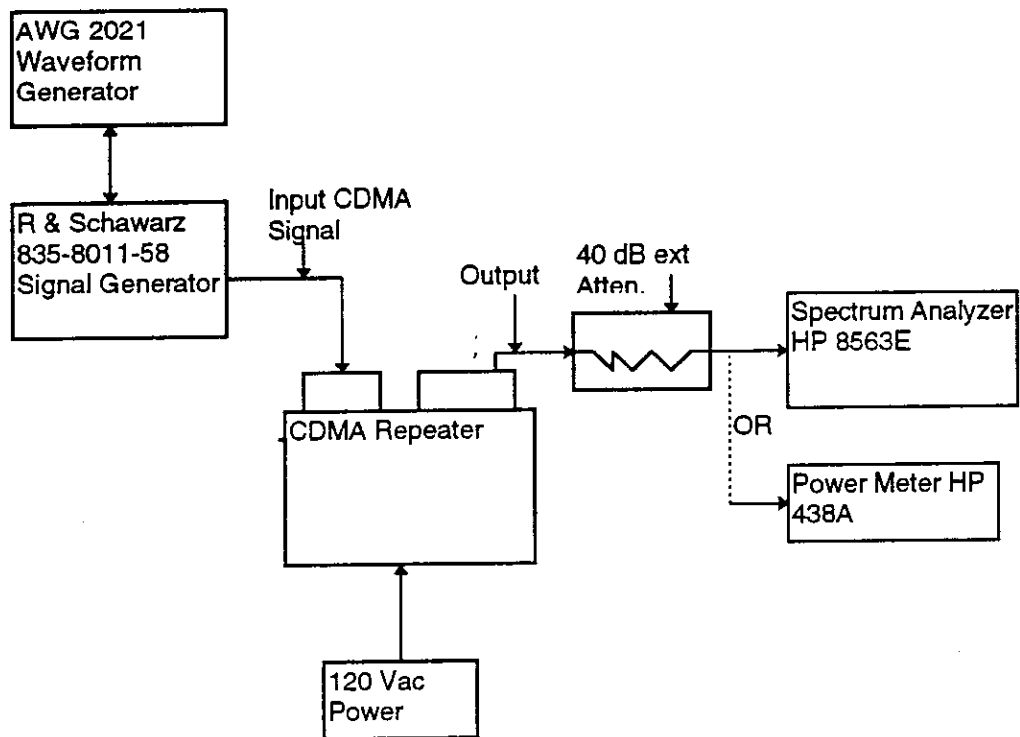
Photographs not available. Data provided by ORTEL without photographs.

6 CONDUCTED EMISSION DATA

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

See following page(s).

Test Setup for CDMA Repeater



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

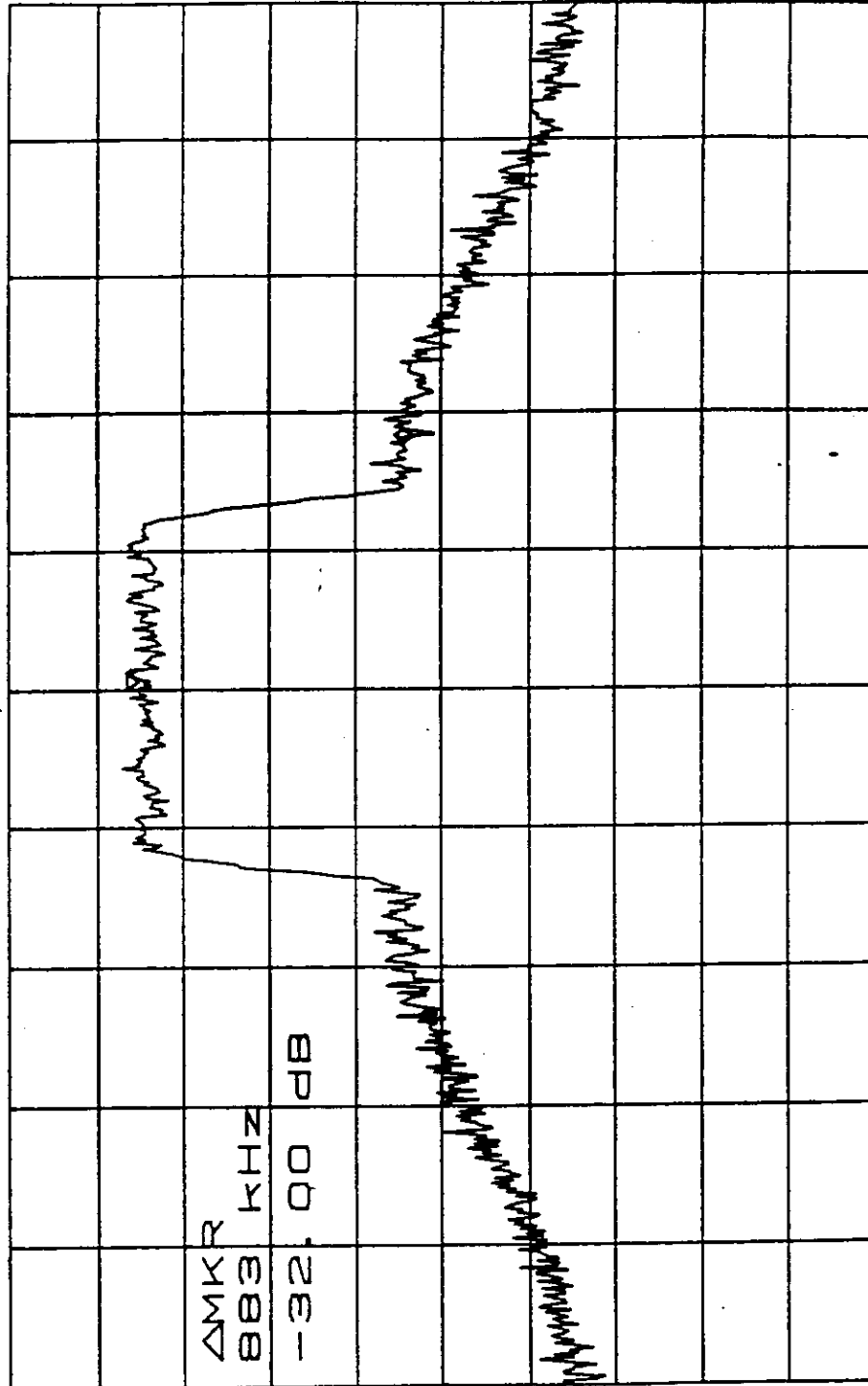
Tab: B-Band

Page 37 of 115

Rev.No 1.0



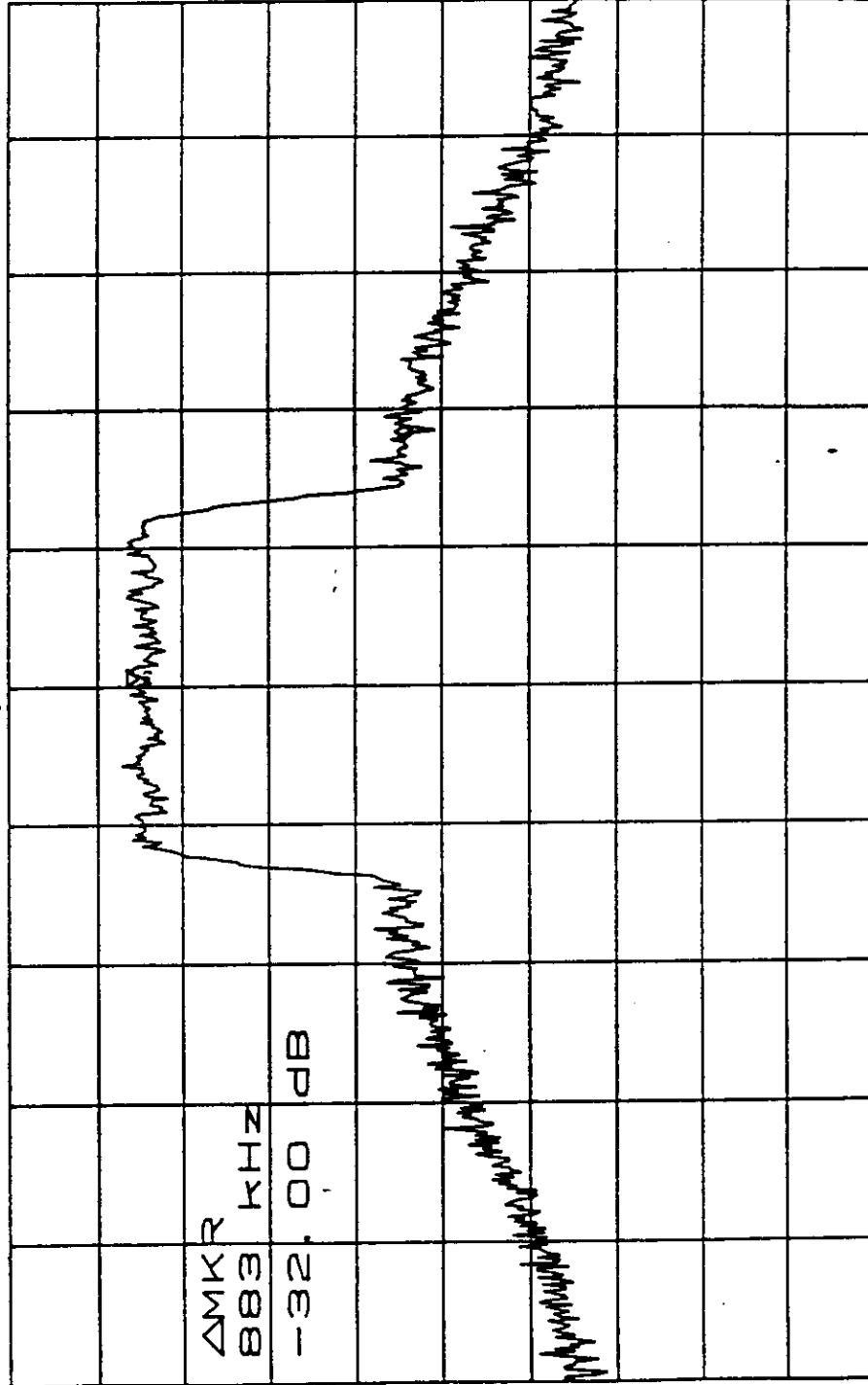
CDMA #1
 * ATTN 10dB VAVG 10 ΔMKR -32.00dB
 RL -10.00dBm 10dB% 883KHz
 Reverse Path (UL) Low Jam 425 11/13/96



CENTER 1.871250GHZ SPAN 5.000MHZ
 * RBW 30KHz VBW 30KHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeller, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 2.989 DATE: 13 November 1996



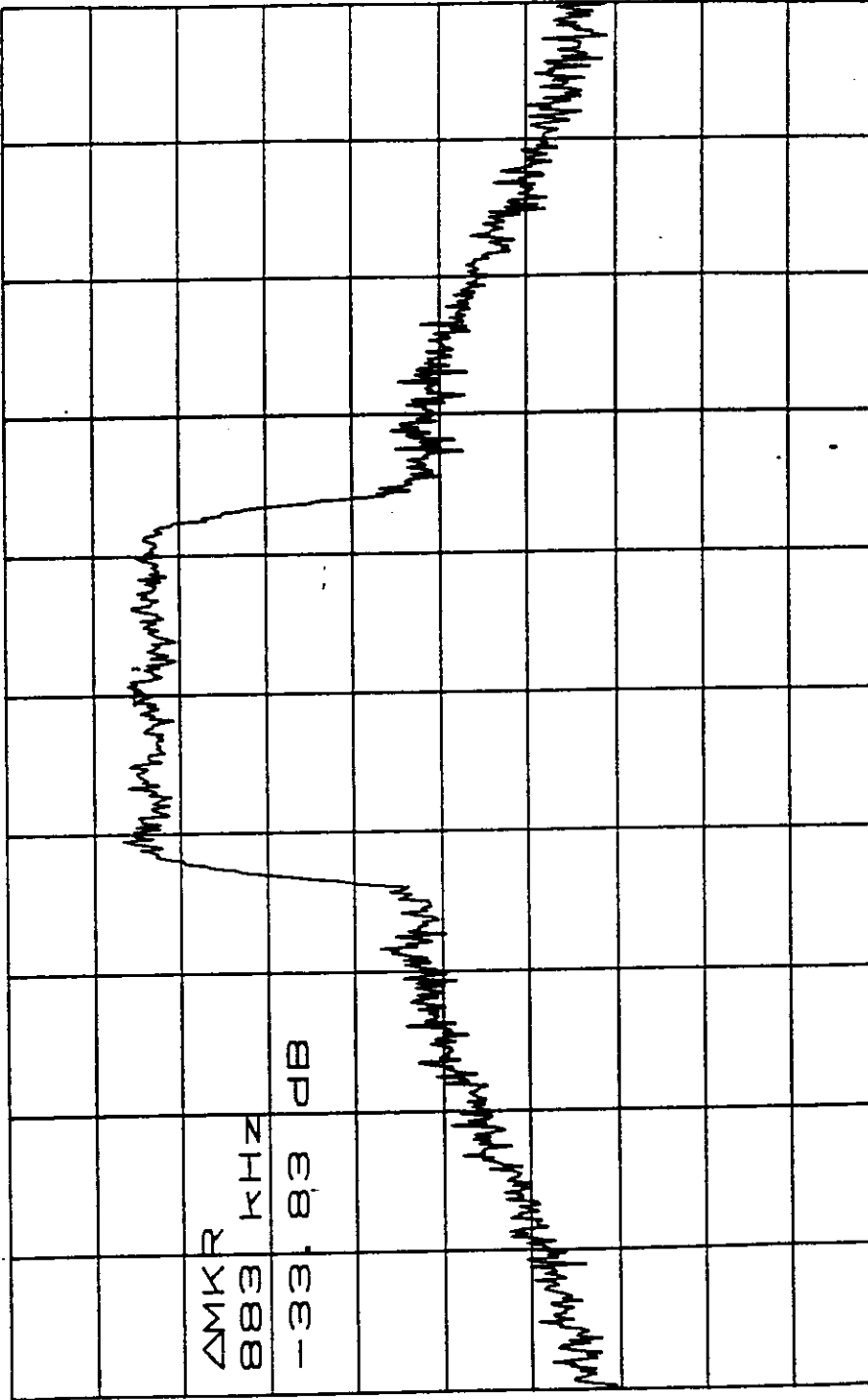
CDMA #1 Reverse Path (UL) Low Jam 425 11/13/96
 **ATTEN 10dB VAVG 10 ΔMKR -32.00dB
 RL -10.00dBm 10dB% 883KHZ



CENTER 1.871250GHZ SPAN 5.000MHZ
 *RBW 30KHZ VBW 30KHZ SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 2.989 DATE: 13 November 1996

CDMA #1 Reverse Path (UL) Upper Chan 675 11/13/96

*ATTEN 10dB VAVG 10 ΔMKR -33.83dB
RL -10.0dBm 10dB% 883kHz



CENTER 1.883750GHZ SPAN 5.000MHZ
*RBW 30KHZ VBW 30KHZ SWP 50.0ms

TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.989 DATE: 13 November 1996

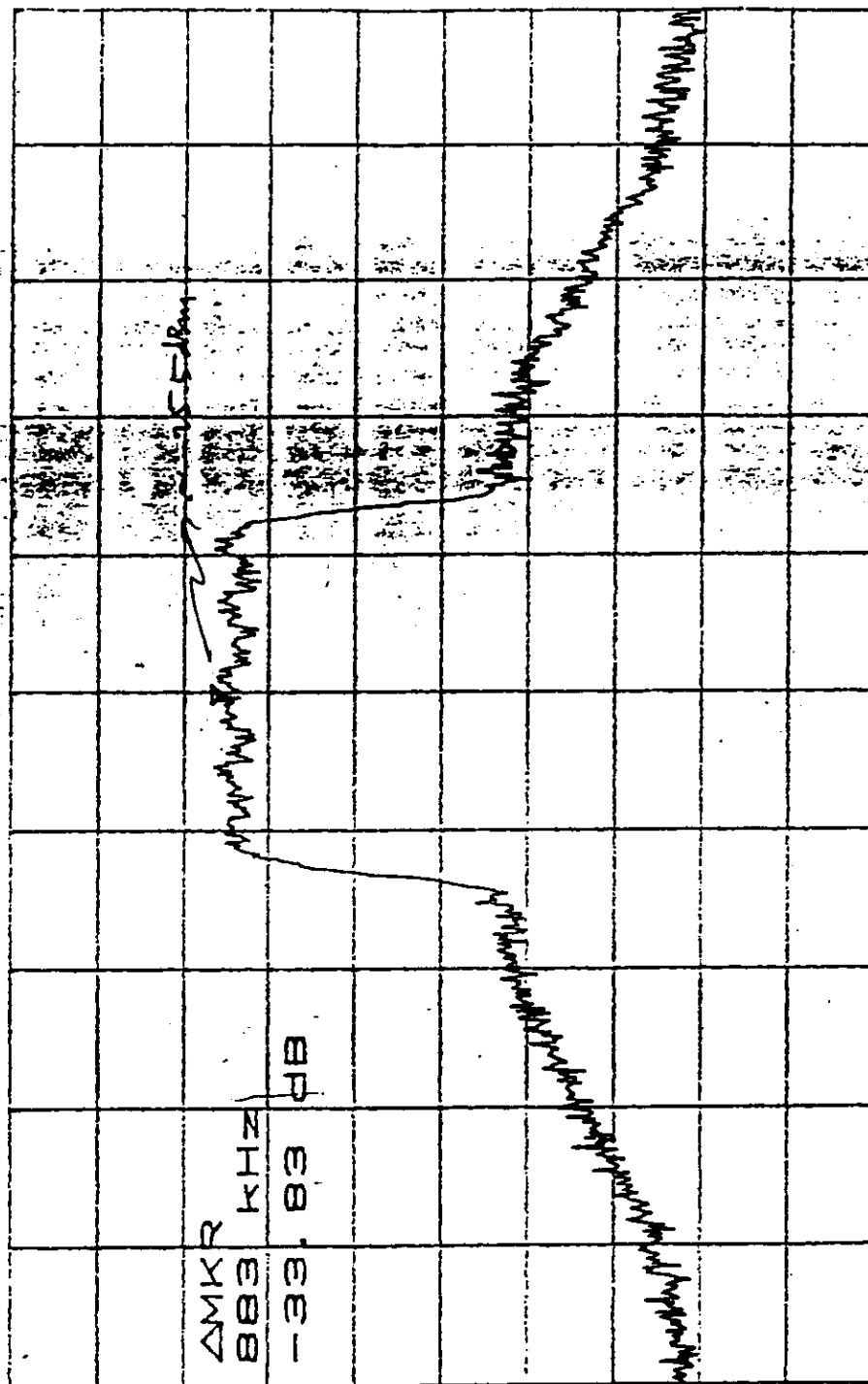


11/13/96

Fwd Path (DL)

CDMA#1

ATTN 10dB VAVG 10 ΔMKR -33.83dB
RL 0dBm 10dB% 883KHz



2.987

CENTER 1.963750GHZ SPAN 5.000MHZ
*RBW 30KHz VBW 30KHz SWP 150.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.989 DATE: 13 November 1996



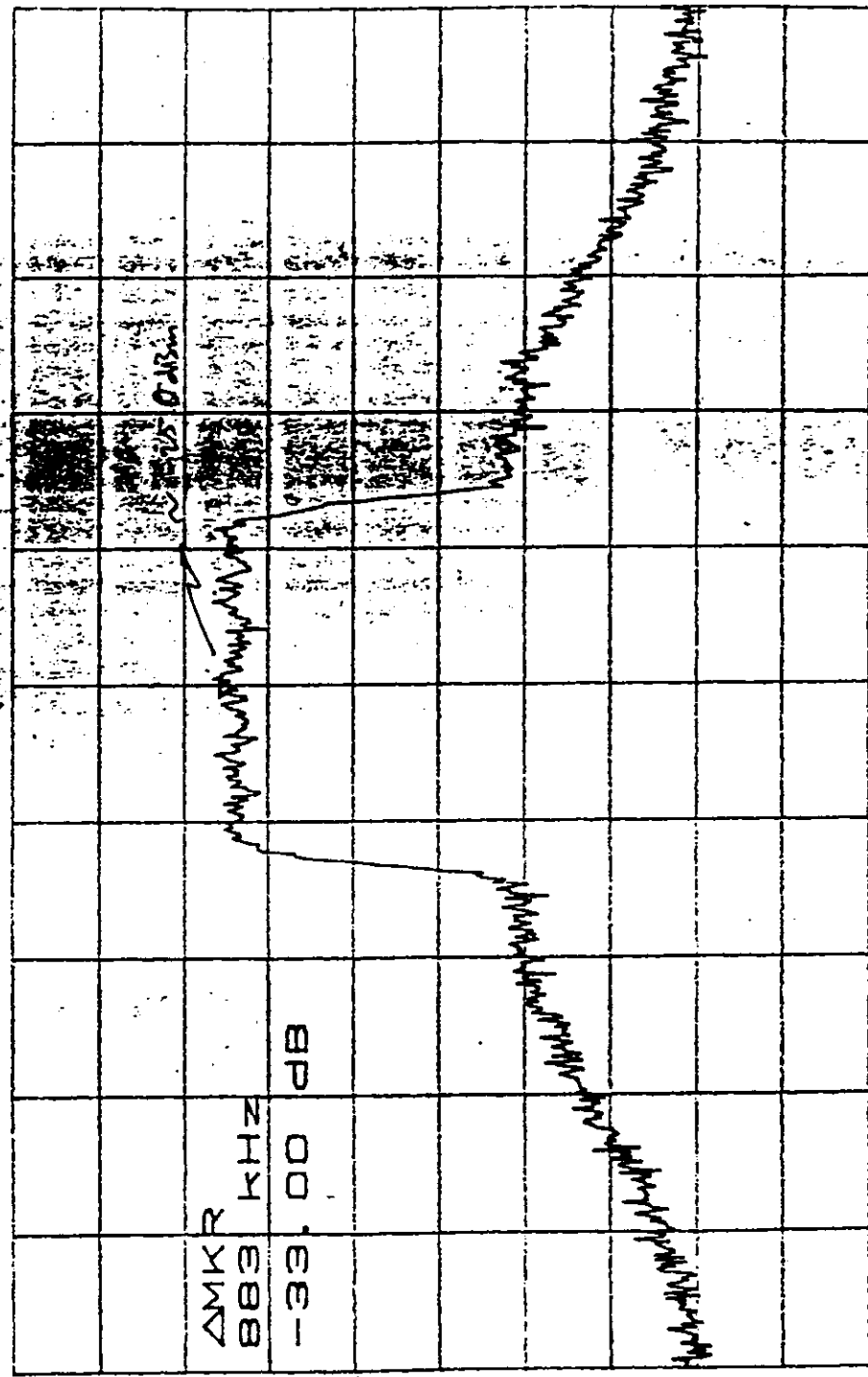
11/13/96

Fwd Path (DL)

CDMA #1

ATTN 10dB VAVG 10 ΔMKR 33.00dB
RL 0dBm 10dB% 883KHz

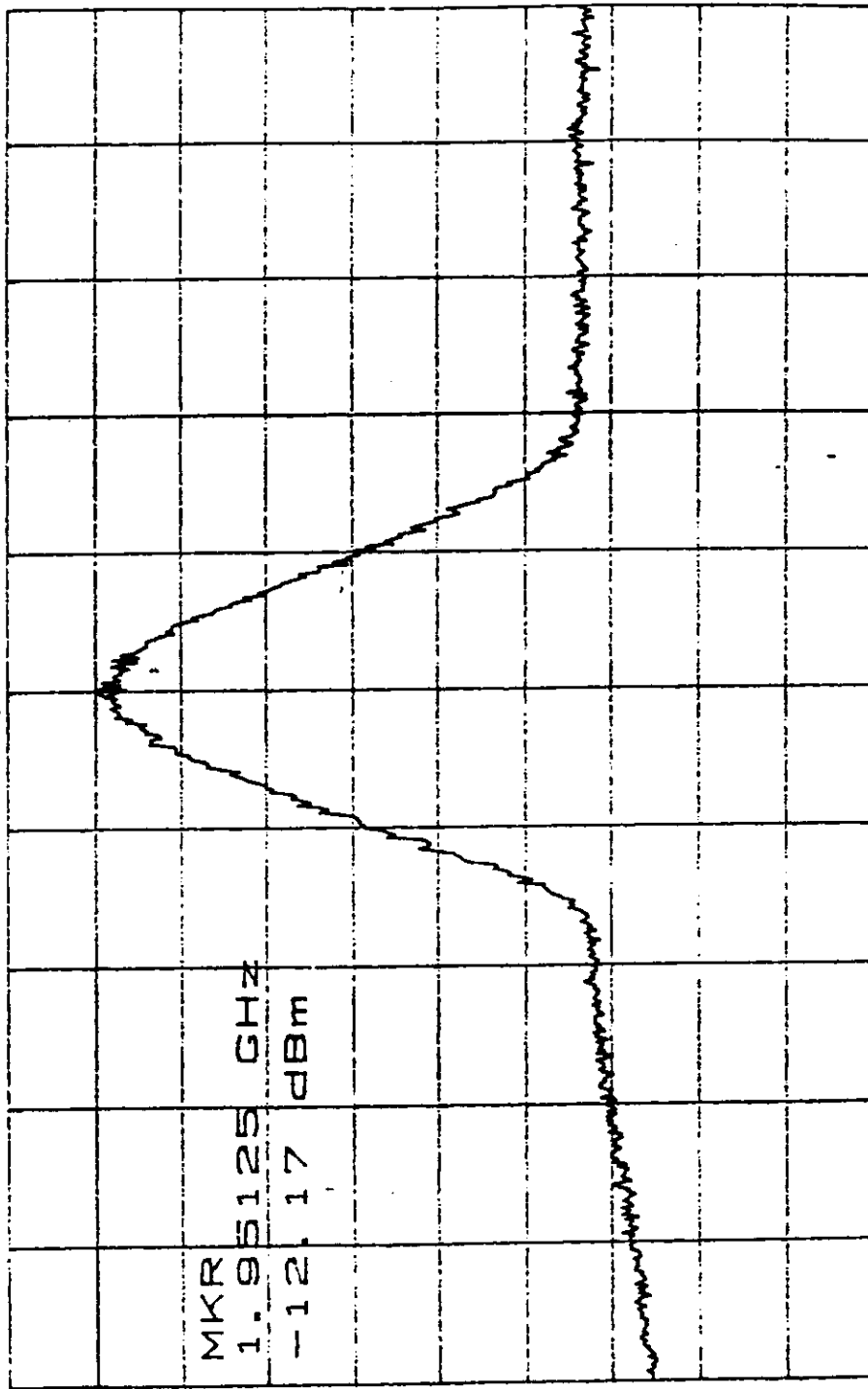
2-789



CENTER 1.951250GHZ SPAN 5.000MHZ
*RBW 30KHZ VBW 30KHZ SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.989 DATE: 13 November 1996



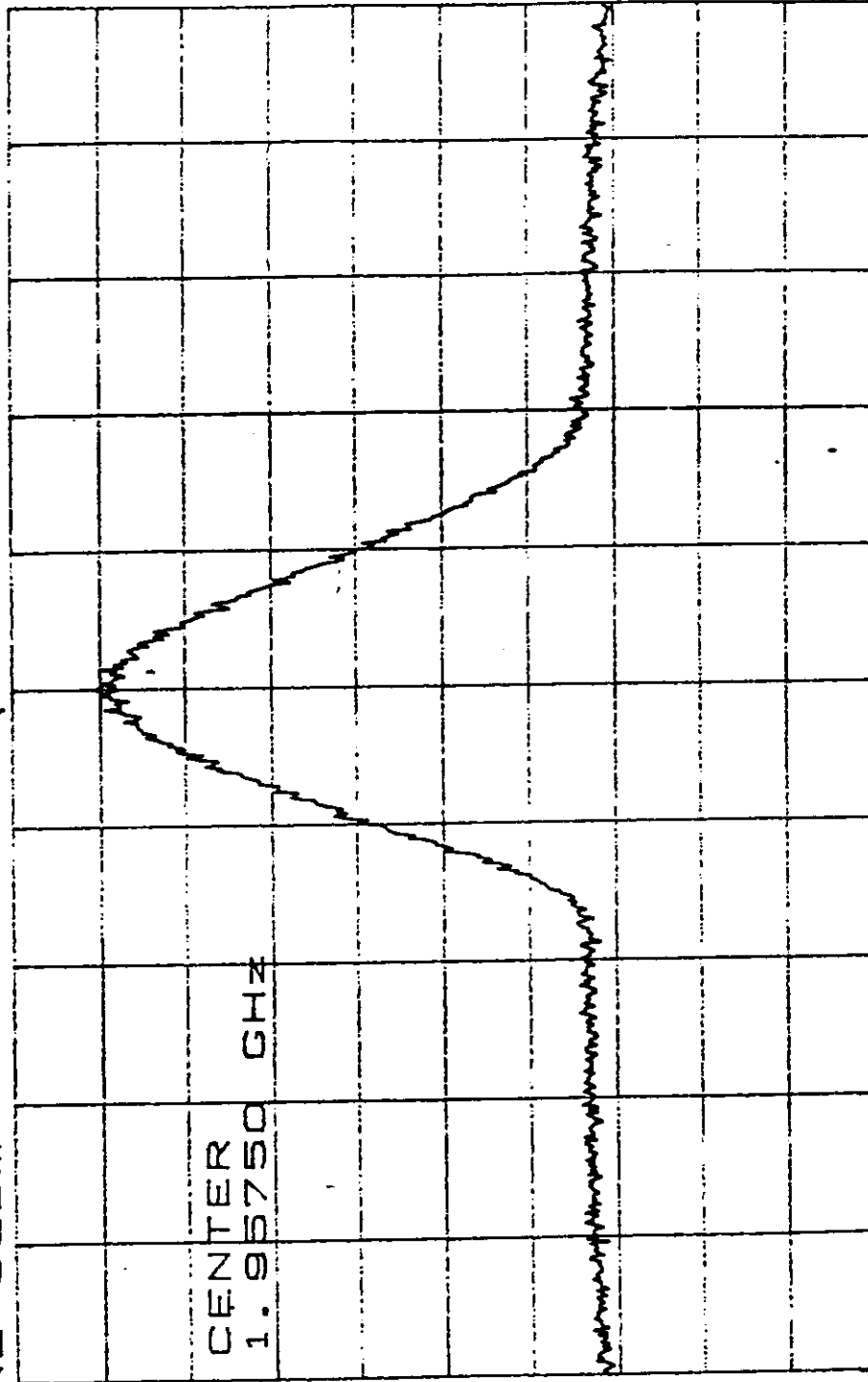
CDMA #1 RF_{out} = 2 watts Fwd Path (DL) Low Band 1425 11/27/98
 ATTN 10dB VAVG 10 MKR -12.17dBm
 RL 0dBm 10dB% 1.95125GHz



CENTER 1.95125GHz SPAN 25.00MHz
 *RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 2.991 DATE: 13 November 1996

2991

CDMA #1
RFout = 2watt
ATTEN 10dB
RL 0dBm
Fwd Path (DL)
VAVG 10
10dB
11/13/96
Mid Band 550
MKR -11.50dBm
1.95750GHz



CENTER 1.95750GHz
SPAN 25.00MHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms
TESTED BY ORTEL CORPORATION
EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 2.991
DATE: 13 November 1996



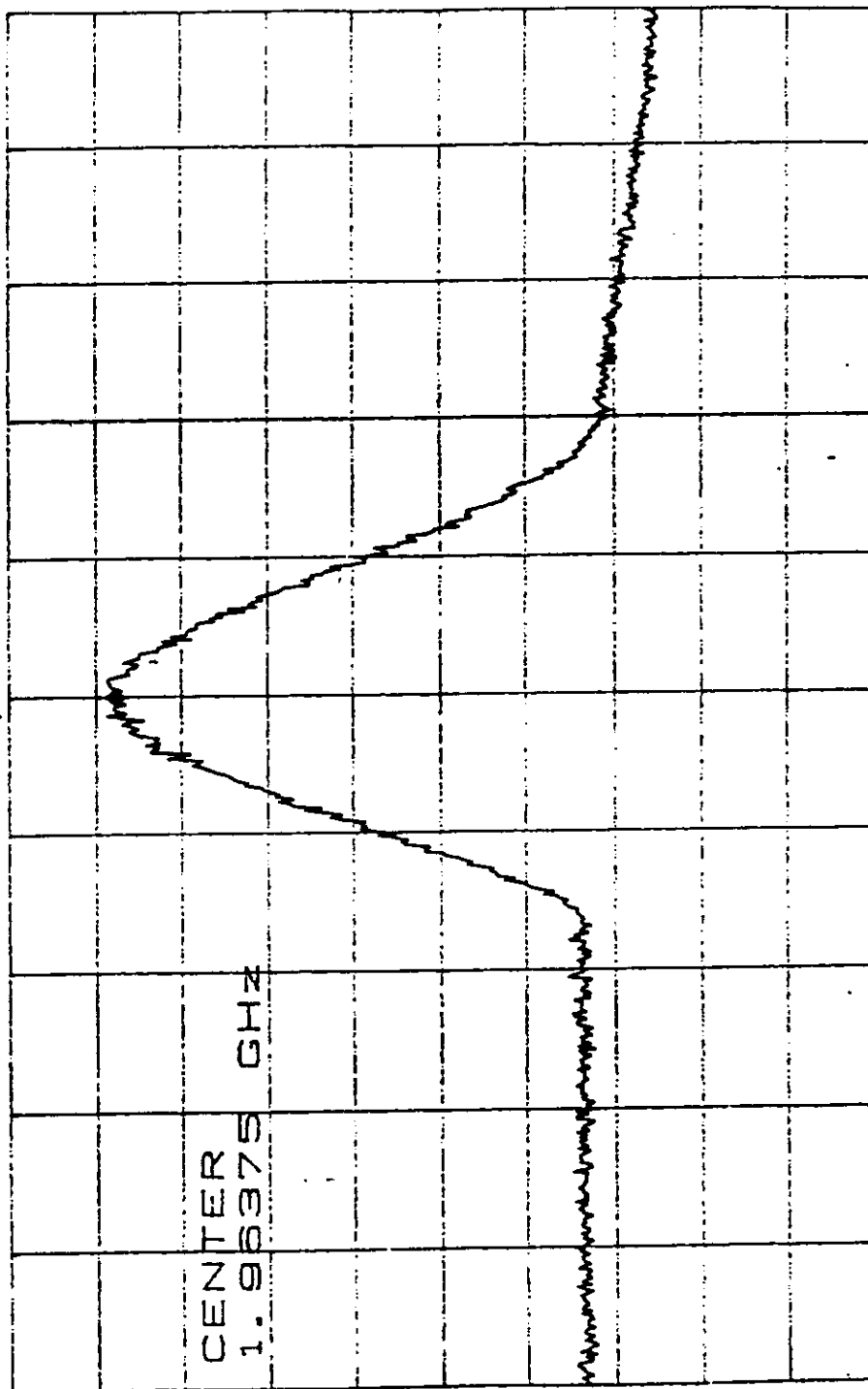
11/13/96

Upper Chan 675

Fwd Path (DL)

ATTN 10dB VAVG 10 MKR -13.17dBm

RL 0dBm 10dB% 1.96375GHz



2.991

D

CENTER 1.96375GHz

*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms

TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5

SPECIFICATION: FCC Part 2, Para. 2.991

DATE: 13 November 1996

11/13/16

Upper Channel 675

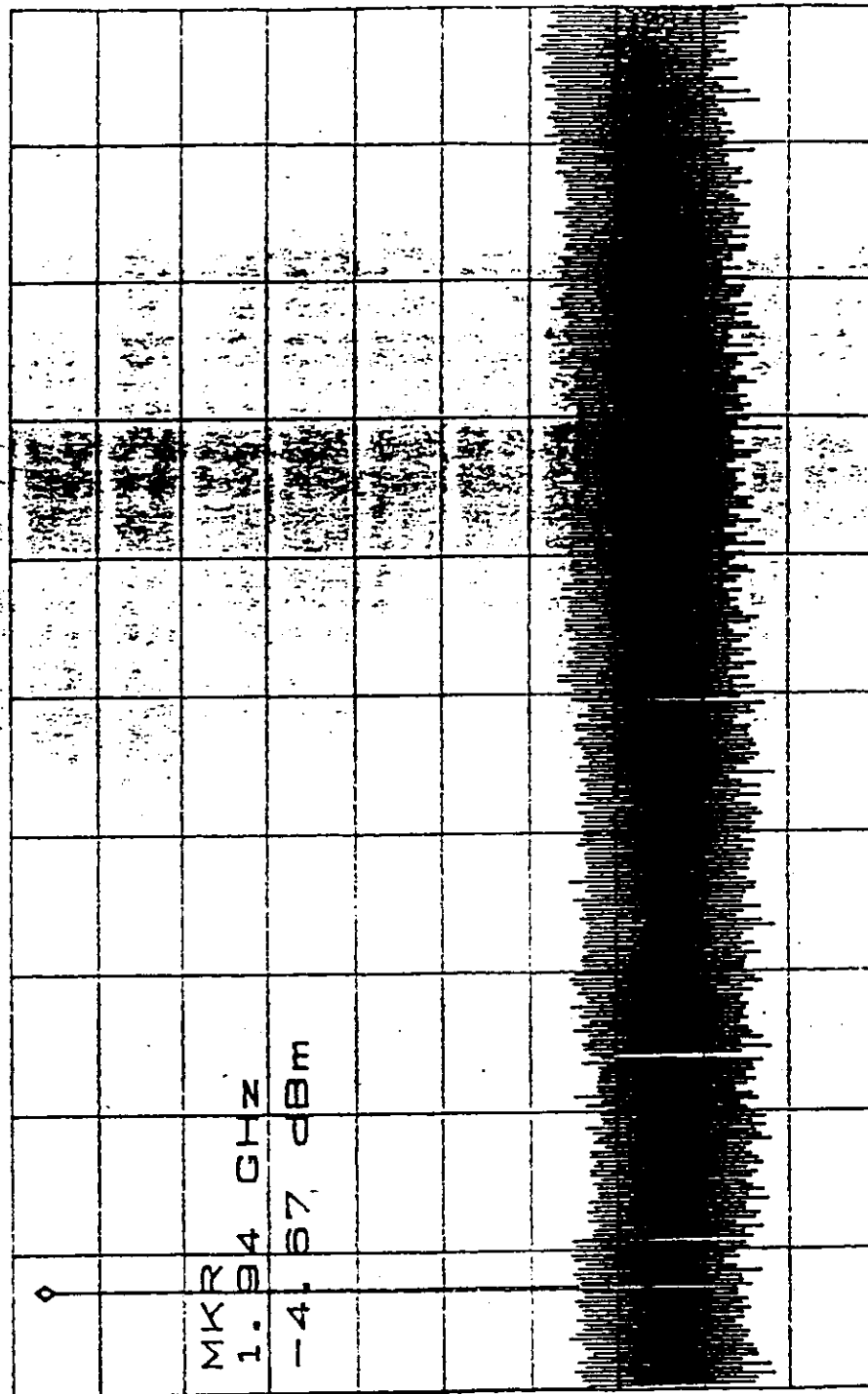
Fwd Pwrk (PL)

ATTEN 10dB

RL 0dBm

MKR -4.67dBm

1.94GHz



CENTER 13.25GHz

RBW 1.0MHz

VBW 1.0MHz

SPAN 26.50GHz

SWP 530ms

TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 2.991

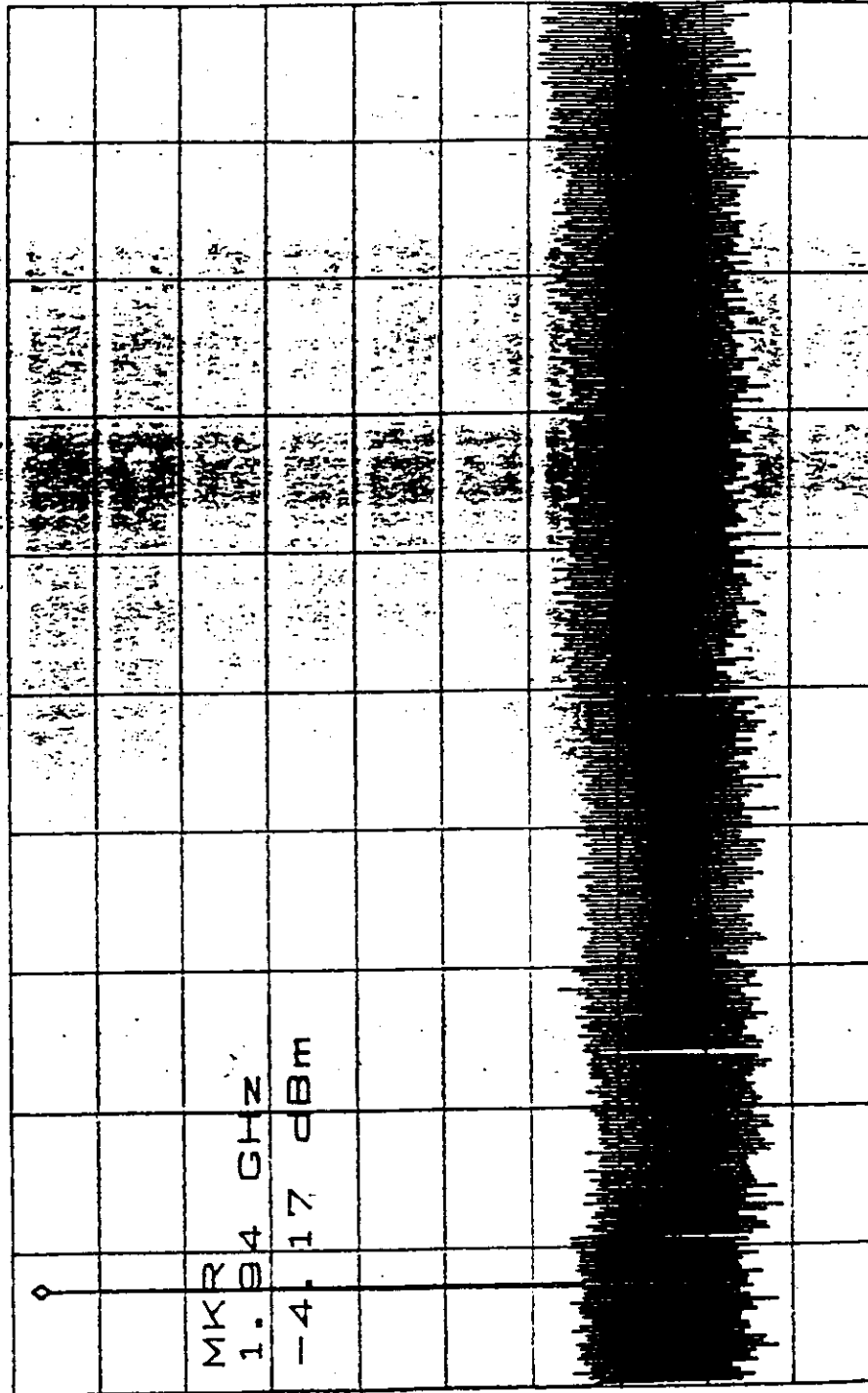
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996

CDMA #1

12.991



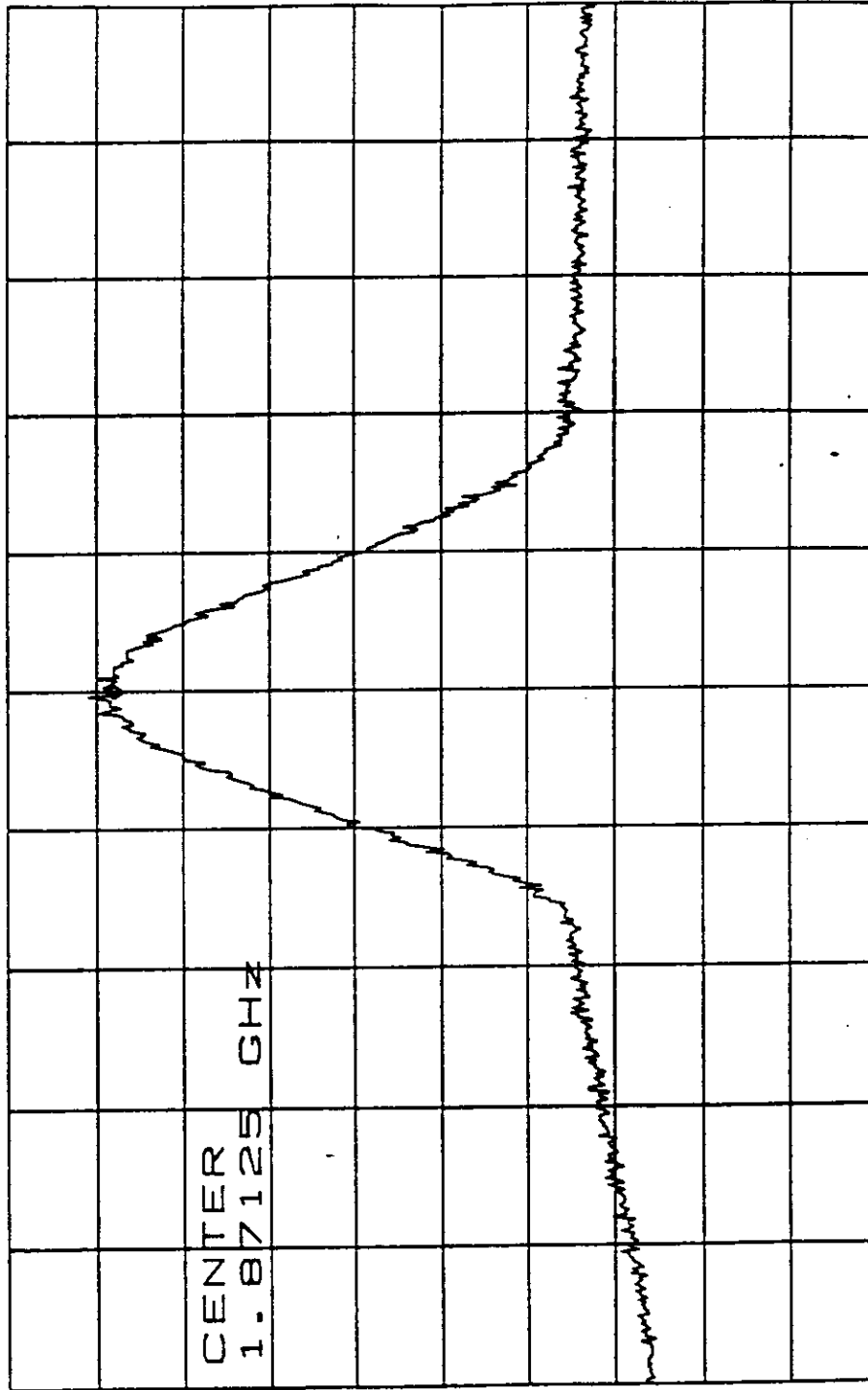
CDMA
 ATTN 10dB
 RL 0dBm
 Fwd Path (DL)
 10dB
 MKR 1.94 GHz
 -4.17 dBm
 Low Jan 425 11/13/96



CENTER 13.25GHz
 RBW 1.0MHz
 VBW 1.0MHz
 SPAN 26.50GHz
 SWP 1530ms
 EUT: CDMA Repeater, Model CDR-1901-1-5
 DATE: 13 November 1996
 TESTED BY ORTEL CORPORATION
 SPECIFICATION: FCC Part 2, Para. 2.991

2.991

CDMA #1
*ATTEN 10dB VAVG 10 MKR -12.83dBm 11/13/96
RL 0dBm 1.87125GHz



CENTER 1.87125GHz SPAN 25.00MHz
*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 2.99
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996

2.991



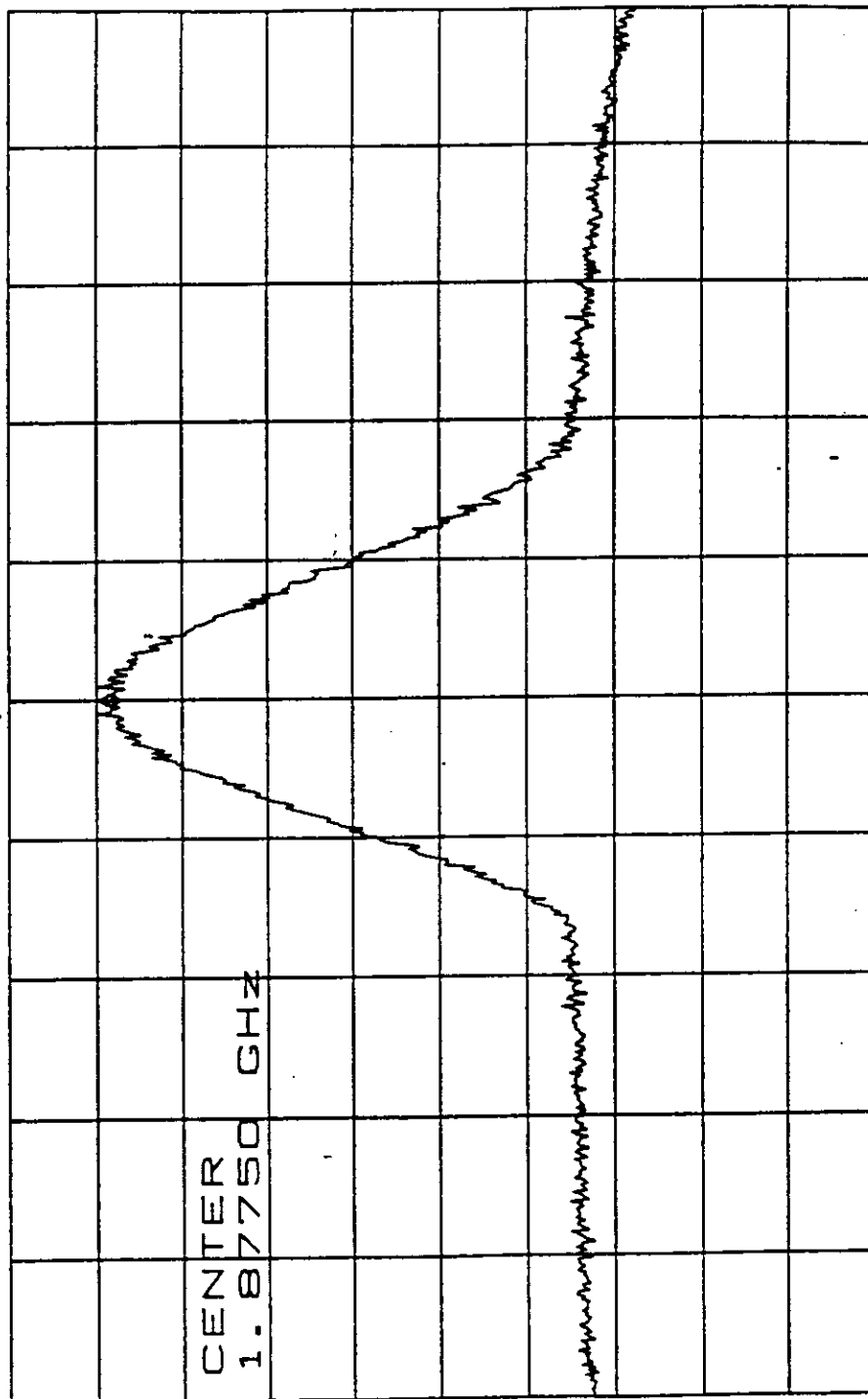
CDMA #1

Reverse Path (UL)

Mid Chan 550 11/13/96

*ATTEN 10dB VAVG 10 MKR -12.50dBm

RL 0dBm 10dB% 1.87750GHZ



2.991

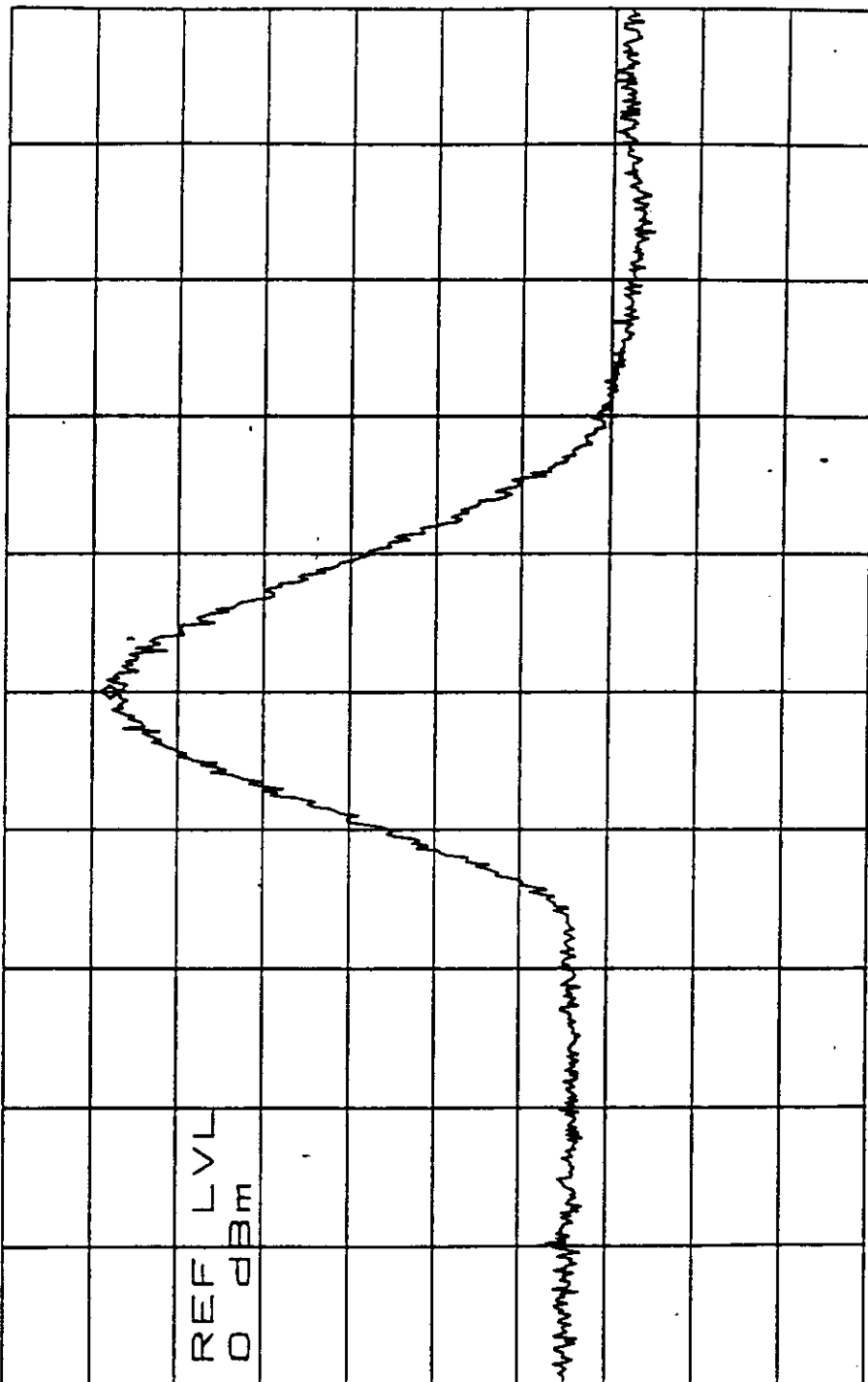
CENTER 1.87750GHZ SPAN 25.00MHZ

*RBW 1.0MHZ VBW 1.0MHZ SWP 50.0ms

TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 2.991
DATE: 13 November 1996
BUT: CDMA Repeater, Model CDR-1901-1-5



CDMA #1
 *ATTEN 10dB VAVG 10 MKR -13.00dBm 11/13/96
 RL 0dBm 10dB 1.88375GHz

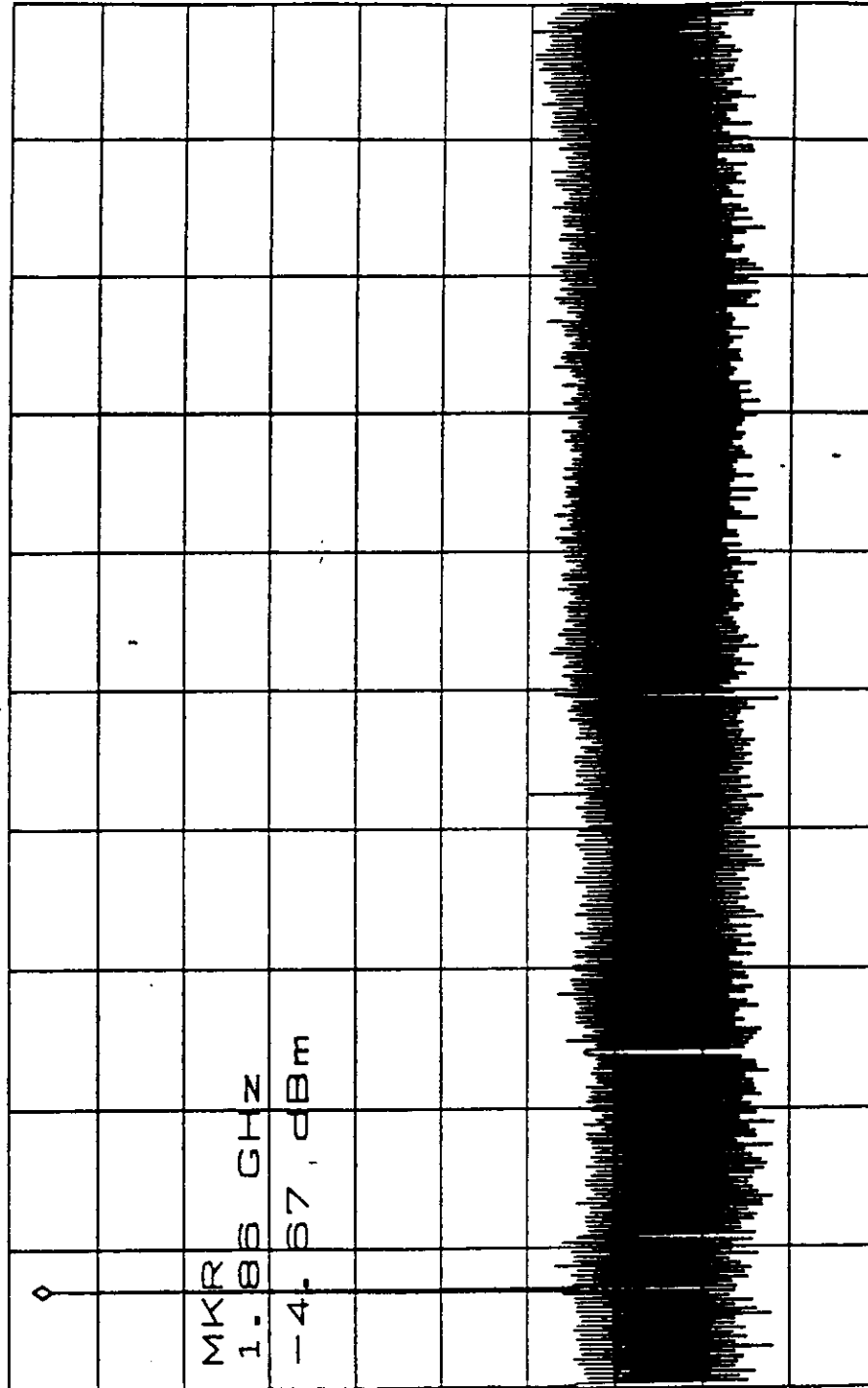


CENTER 1.88375GHz SPAN 25.00MHz
 *RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1.5
 SPECIFICATION: FCC Part 2, Para. 2.991 DATE: 13 November 1996

2.991



CDMA #1
 ATTN 10dB
 RL 0dBm
 Reverse Path (UL)
 10dB
 Upper Chan 675
 MKR -4.67dBm
 1.86GHz
 11/13/96



CENTER 13.25GHz
 RBW 1.0MHz
 VBW 1.0MHz
 SPAN 26.50GHz
 SWP 530ms
 EUT: CDMA Repeater, Model CDR-1901-1-3
 DATE: 13 November 1996
 TESTED BY ORTEL CORPORATION
 SPECIFICATION: FCC Part 2, Para. 2.991



11/13/96

CDMA #1

Reverse Path (UL)

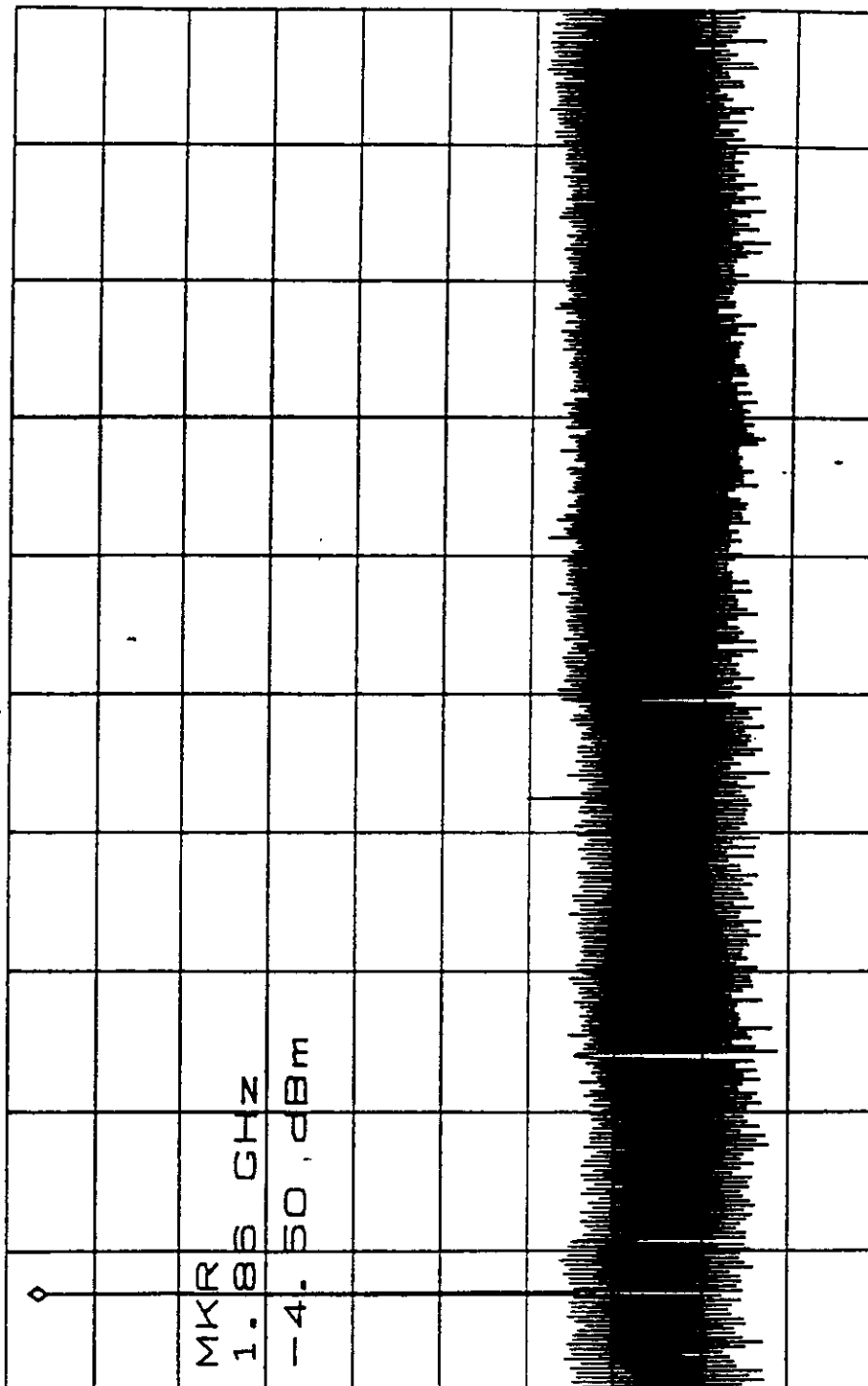
Low Chan 425

ATTEN 10dB

MKR -4.50dBm

RL 0dBm

10dB/ 1.86GHz



2.991

CENTER 13.25GHz SPAN 26.50GHz

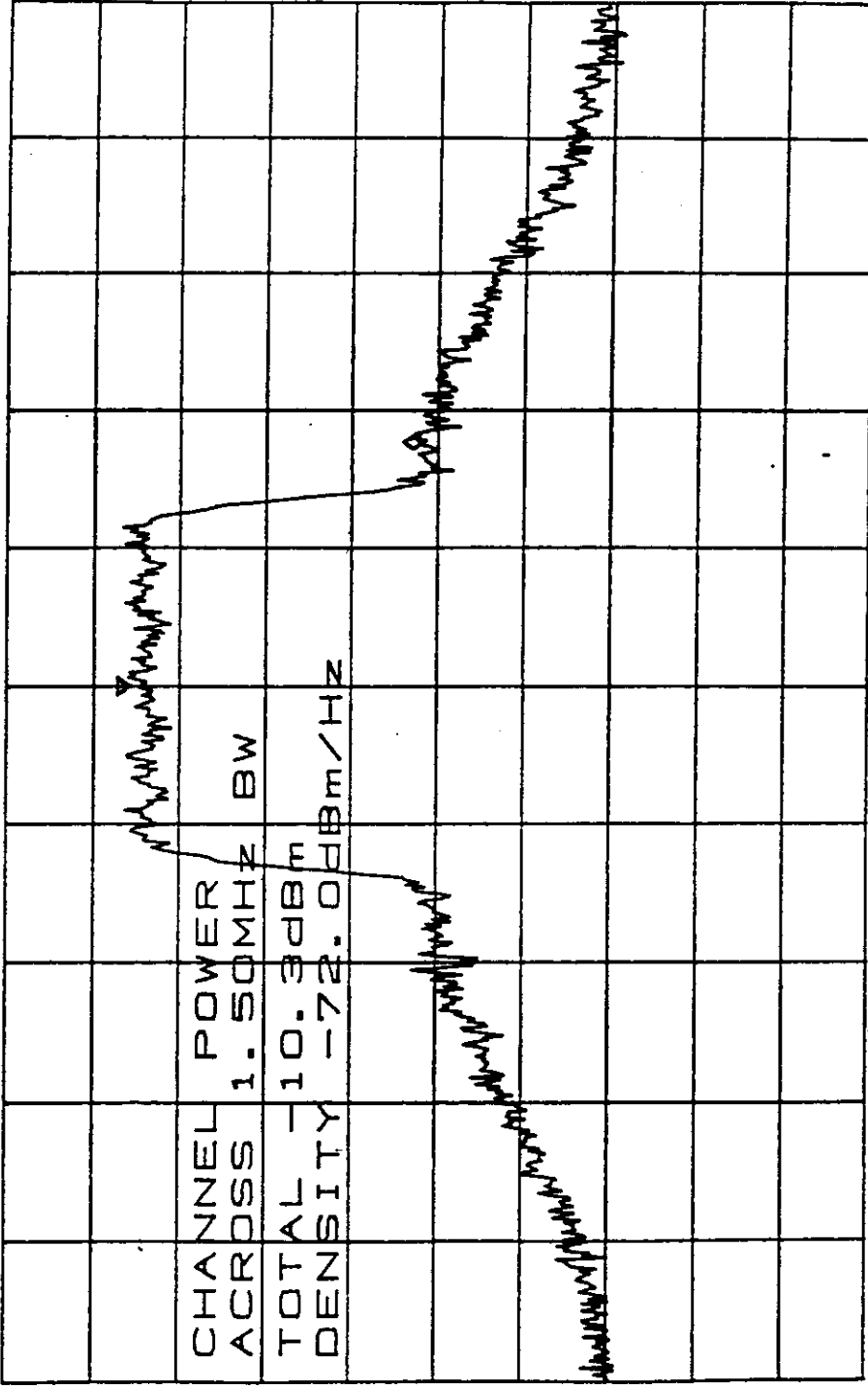
RBW 1.0MHz VBW 1.0MHz SWP 530ms

TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 2.991

EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996



24.238
 CDMA #1, Fwd Path (DL)
 Fundamental
 Low chan 425
 11/14/96
 *ATTEN 10dB VAVG 10 ΔMKR -34.00dB
 RL -10.00dBm 10dB% 883kHz

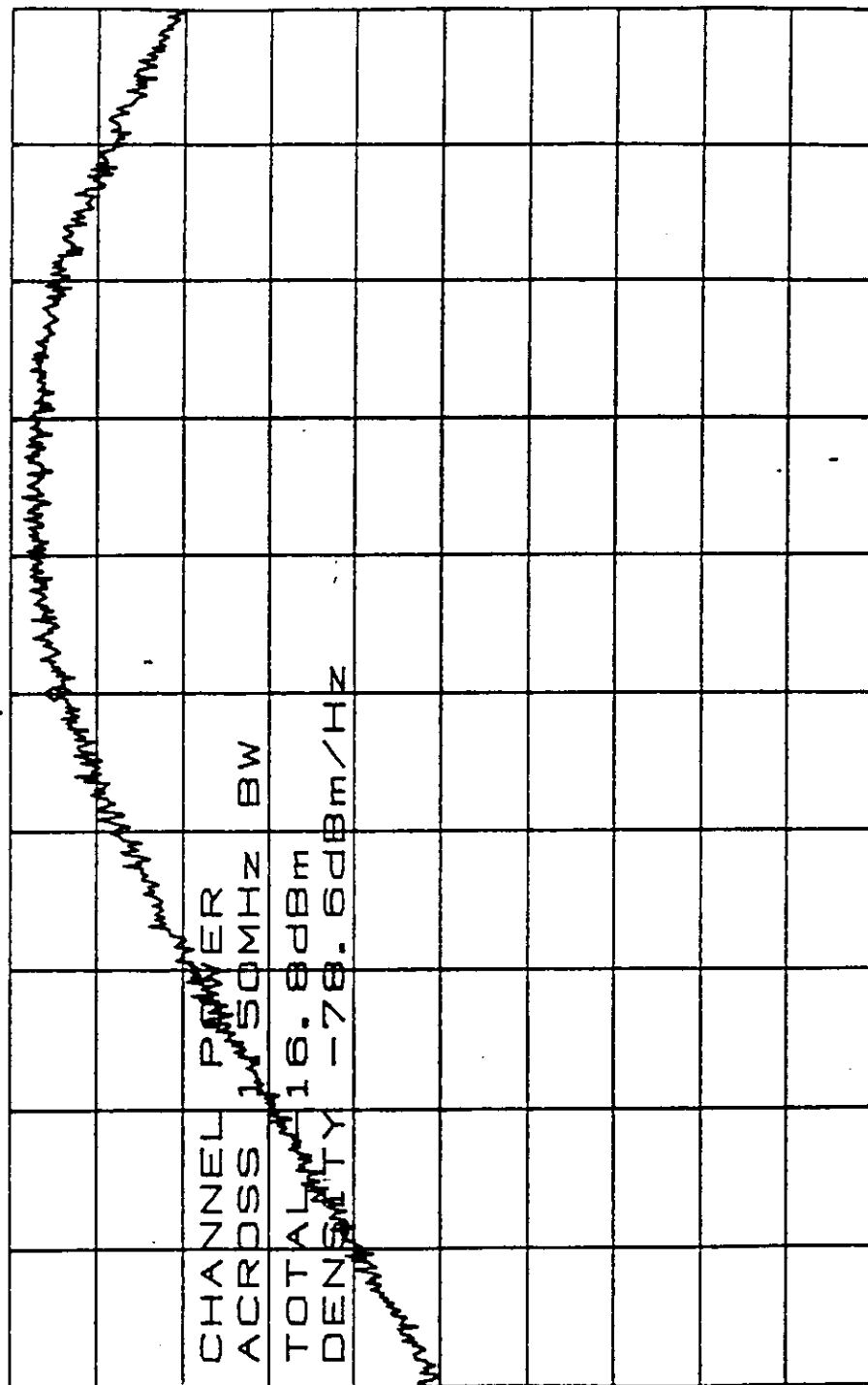


CENTER 1.951250GHZ SPAN 5.000MHZ
 *RBW 30kHz VBW 30kHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996



424.238

CDMA #1, Fwd Path (DL) 11/14/96
 *ATTEN 10dB VAVG 10 MKR -16.00dBm
 RL -10.00dBm 10dB% 1.950500GHZ

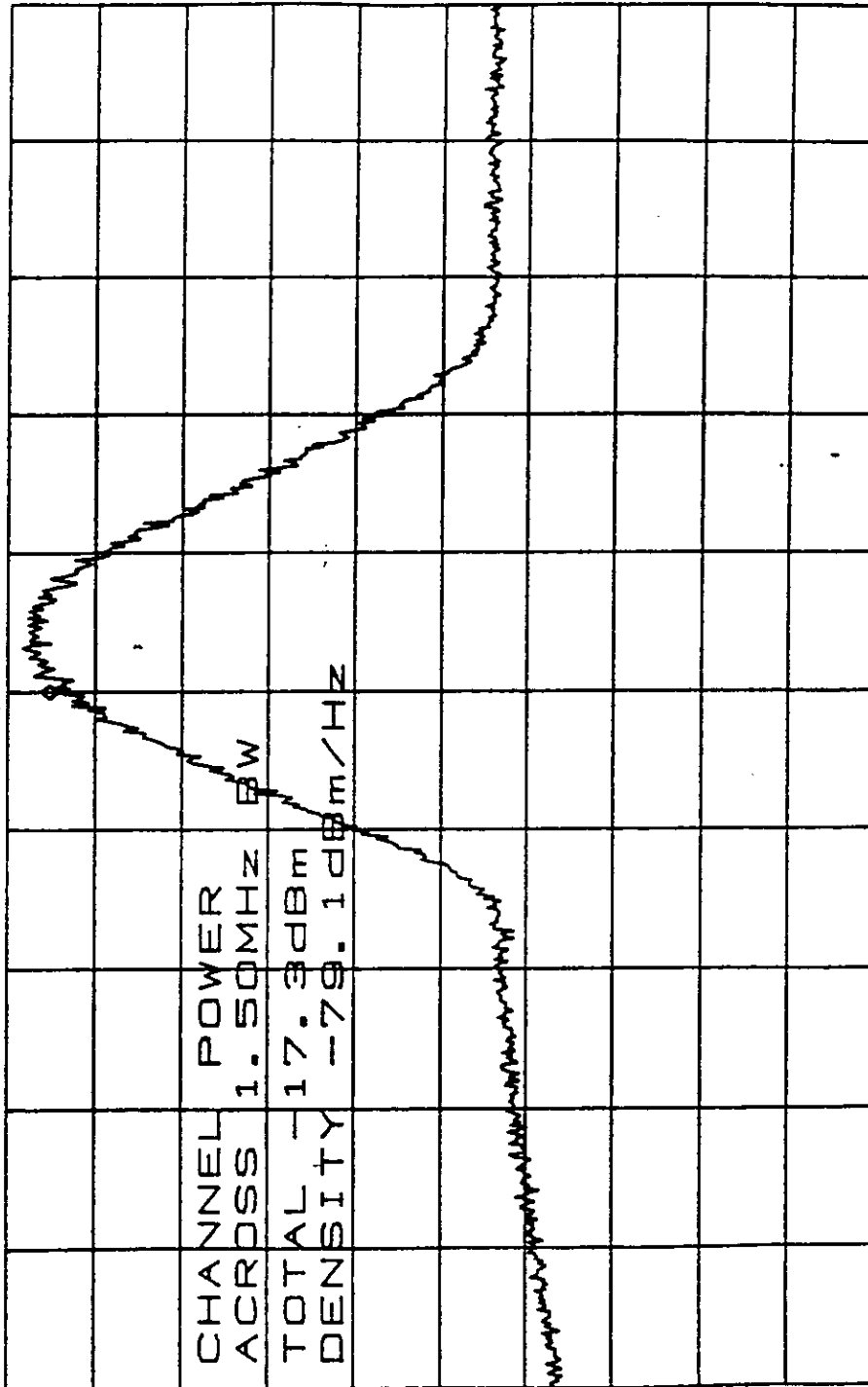


D

CENTER 1.950500GHZ SPAN 5.000MHZ
 *RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION HUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996



CDMA #1, Fwd Path (DL) 11/14/96
 *ATTEN 10dB VAVG 10 MKR -15.67dBm
 RL -10.0dBm 10dB% 1.95050GHZ



CENTER 1.95050GHZ SPAN 20.00MHz
 *RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996

24-238

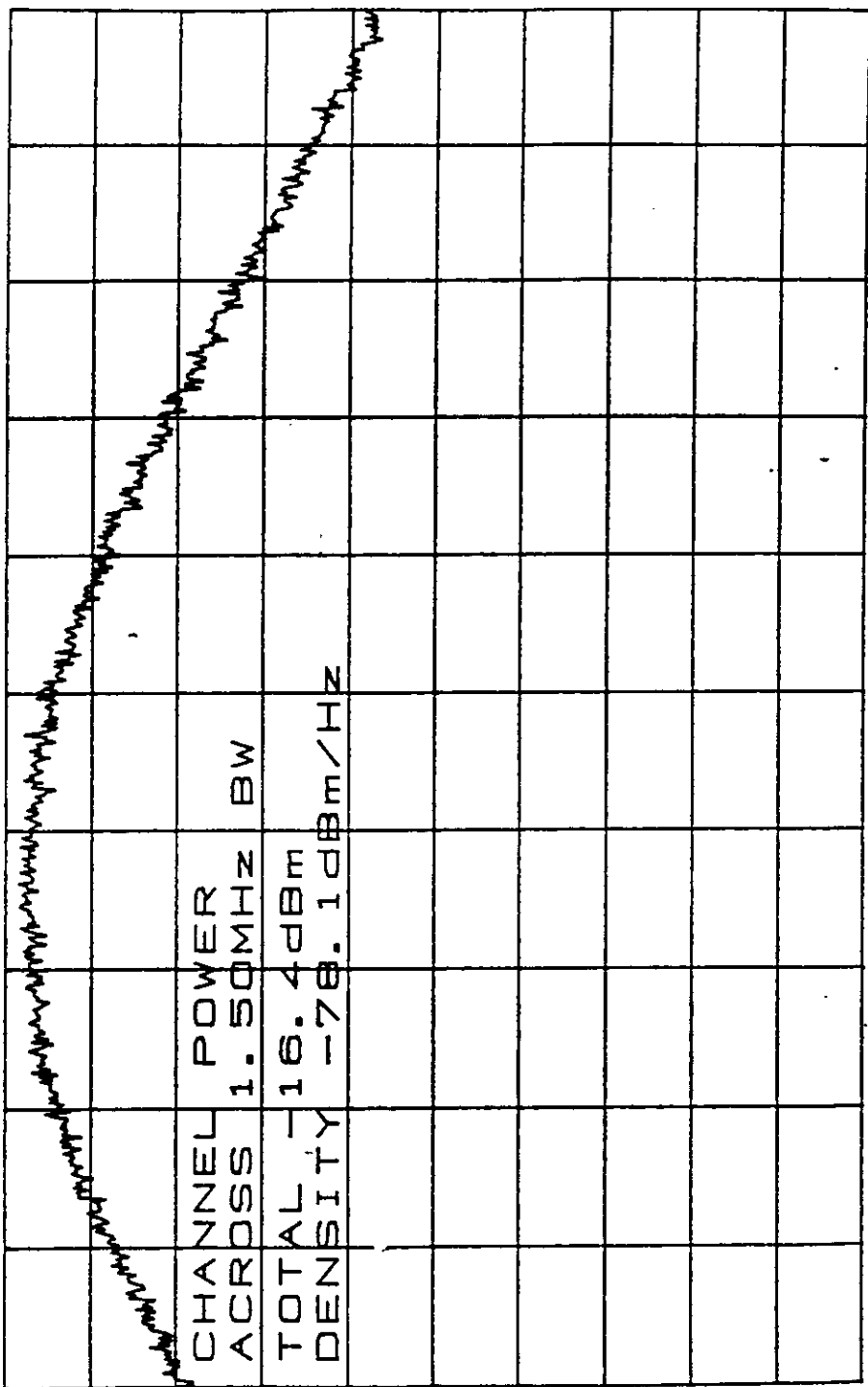


24.238

11/14/96

CDMA #1, Ford Patch (DL) Hi-Side ~~600000~~ Span 425

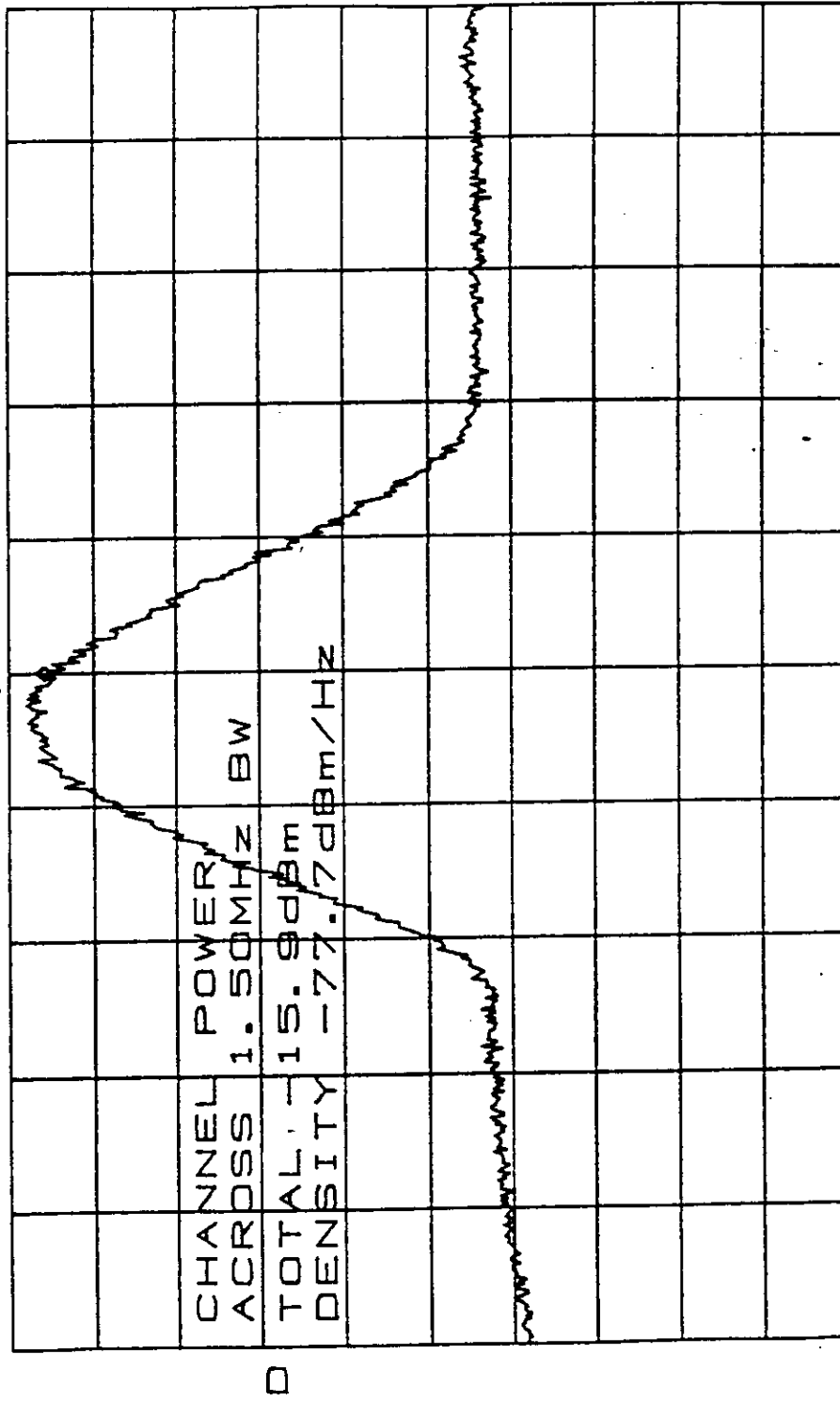
*ATTEN 10dB VAVG 10 MKR -15.67dBm
RL -10.0dBm 10dB% 1.952000GHZ



CENTER 1.952000GHZ SPAN 5.000MHZ
*RBW 1.0MHZ VBW 1.0MHZ SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996



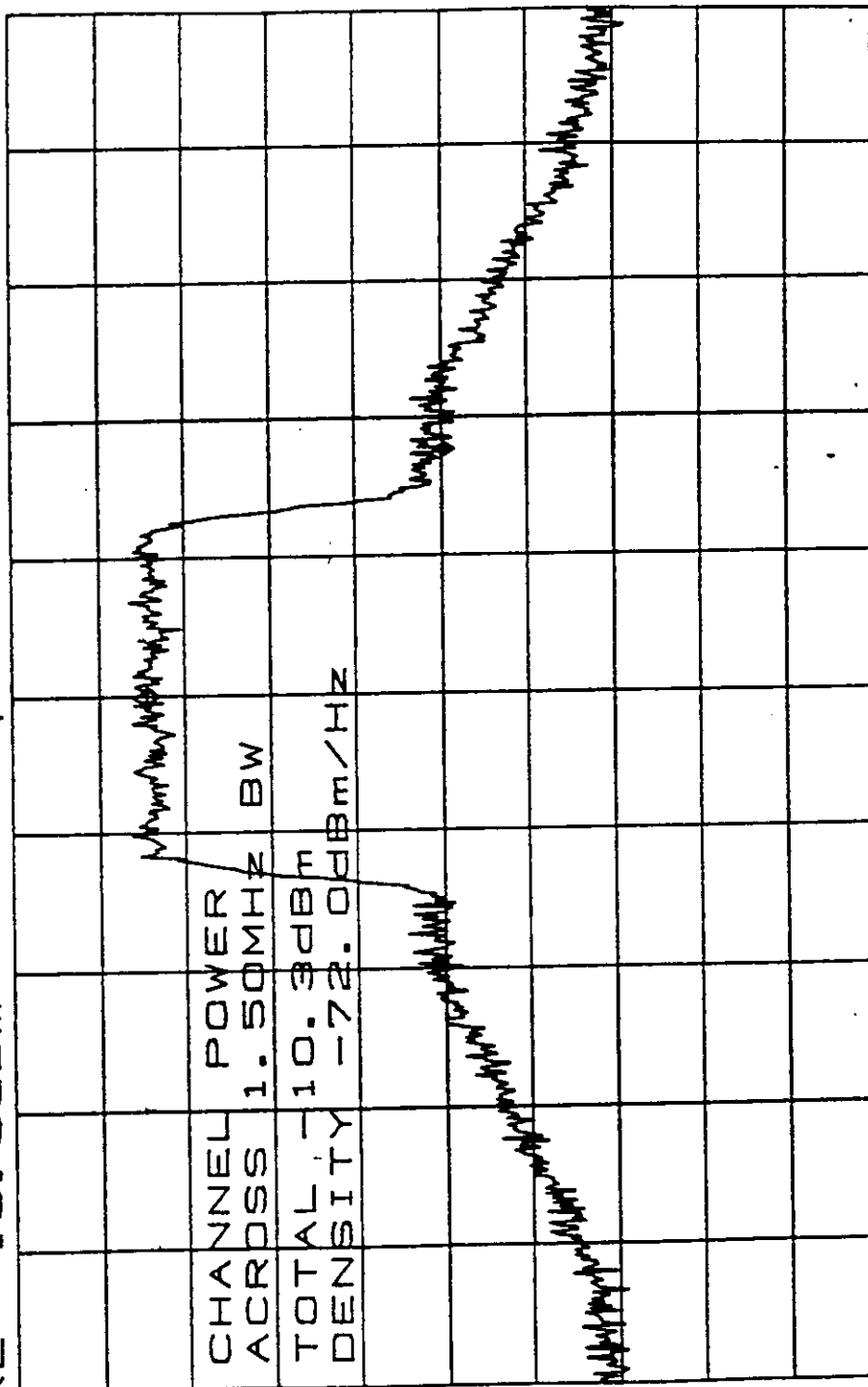
CDMA #1, Fund Pwr (DL) 11/14/96
 Hi-side Low Chan 425
 *ATTEN 10dB VAVG 10 MKR -15.17dBm
 RL -10.0dBm 10dB% 1.95200GHZ



CENTER 1.95200GHZ SPAN 20.00MHZ
 *RBW 1.0MHZ VBW 1.0MHZ 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

24.238
CDMA #1, fwd path (PL)
Fundamental
Upper than 575 11/14/96
*ATTEN 10dB VAVG 10 ΔMKR -34.34dB
RL -10.0dBm 10dB% 883KHz



CENTER 1.963750GHZ SPAN 5.000MHZ
*RBW 30KHz VBW 30KHz SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996

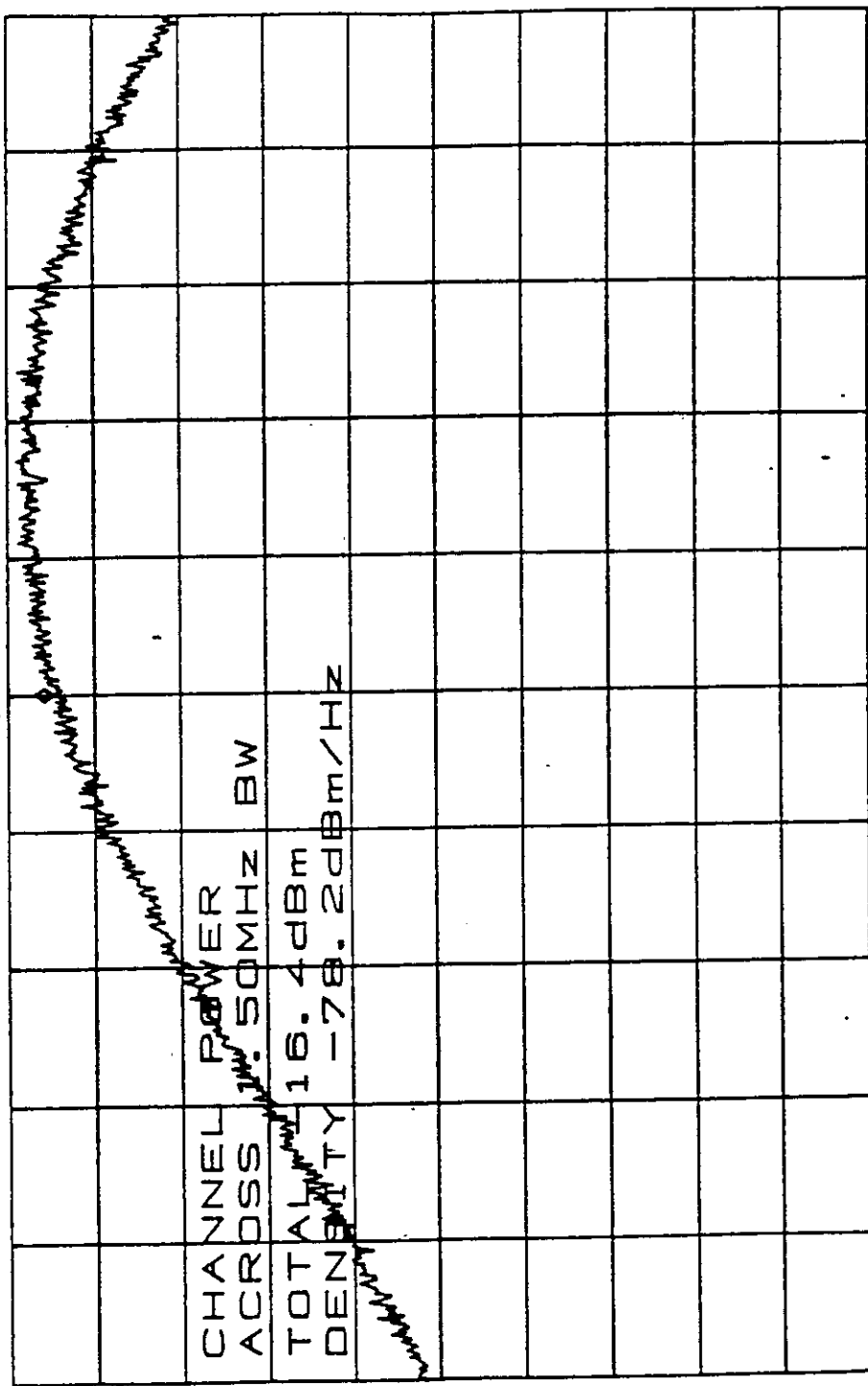


11/14/96

Below
Upper Limit 675

CDMA #1, Fwd Path (DL)

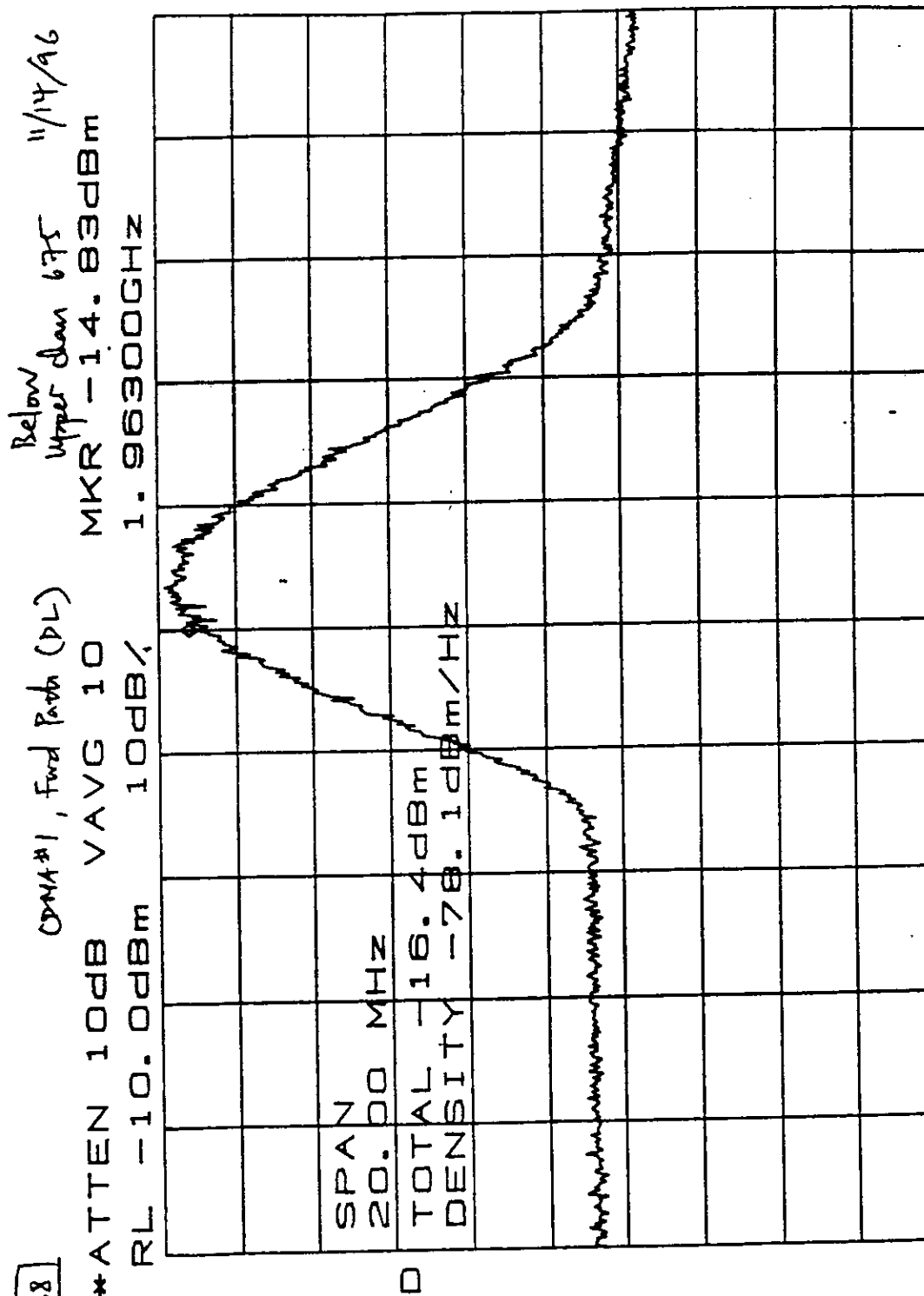
*ATTEN 10dB VAVG 10 MKR -15.17dBm
RL -10.0dBm 10dB% 1.9630000GHZ



CENTER 1.9630000GHZ 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, Model CDR-1901-1-5
DATE: 14 November 1996

24.238

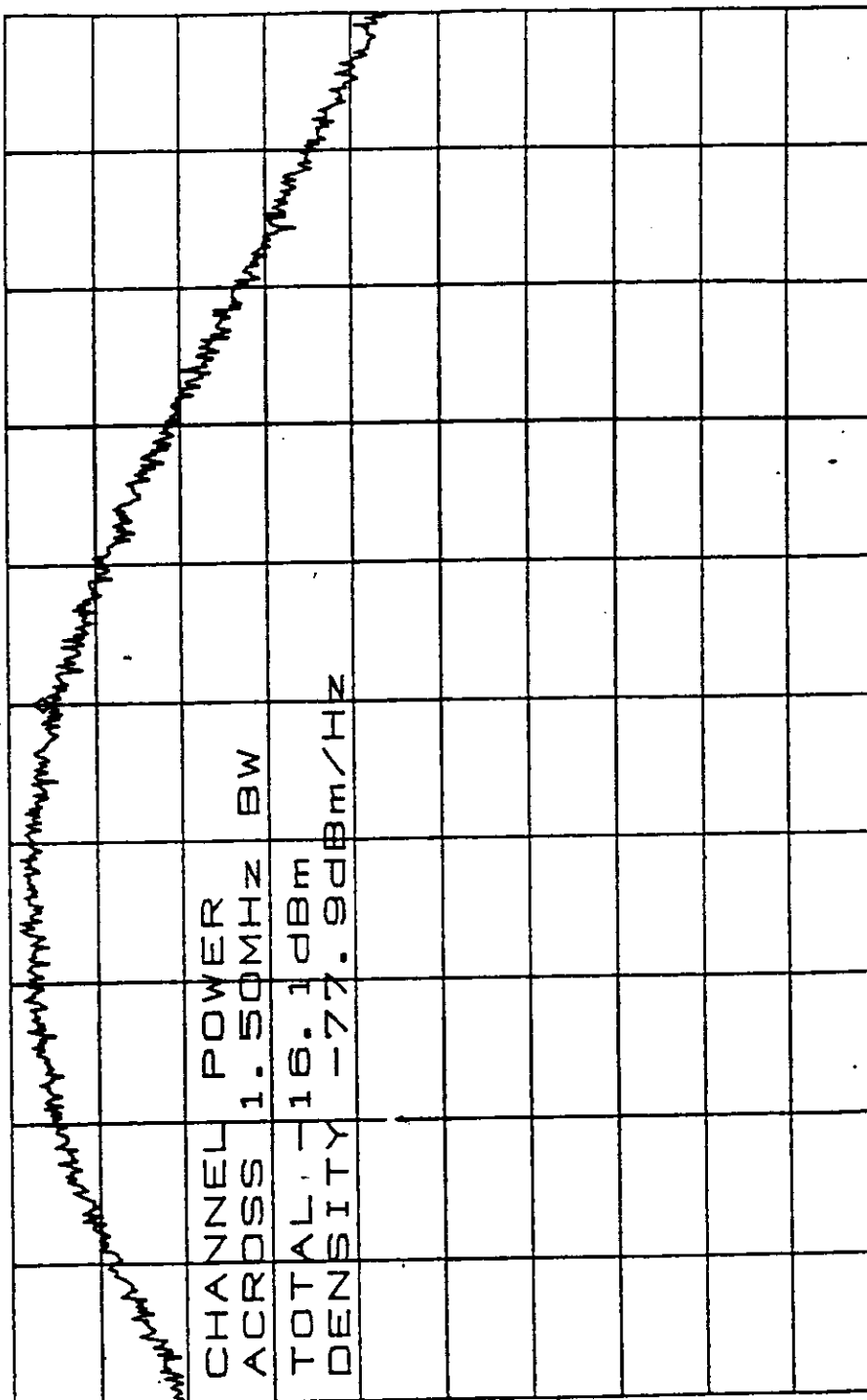


CENTER 1.96300GHZ SPAN 20.00MHZ
*RBW 1.0MHZ VBW 1.0MHZ SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996

11/14/96

CDMA #1, Fwd Path (DL) hi-side of upper chan 675
*ATTEN 10dB VAVG 10 MKR -14.83dBm
RL -10.0dBm 10dB/ 1.964508GHz

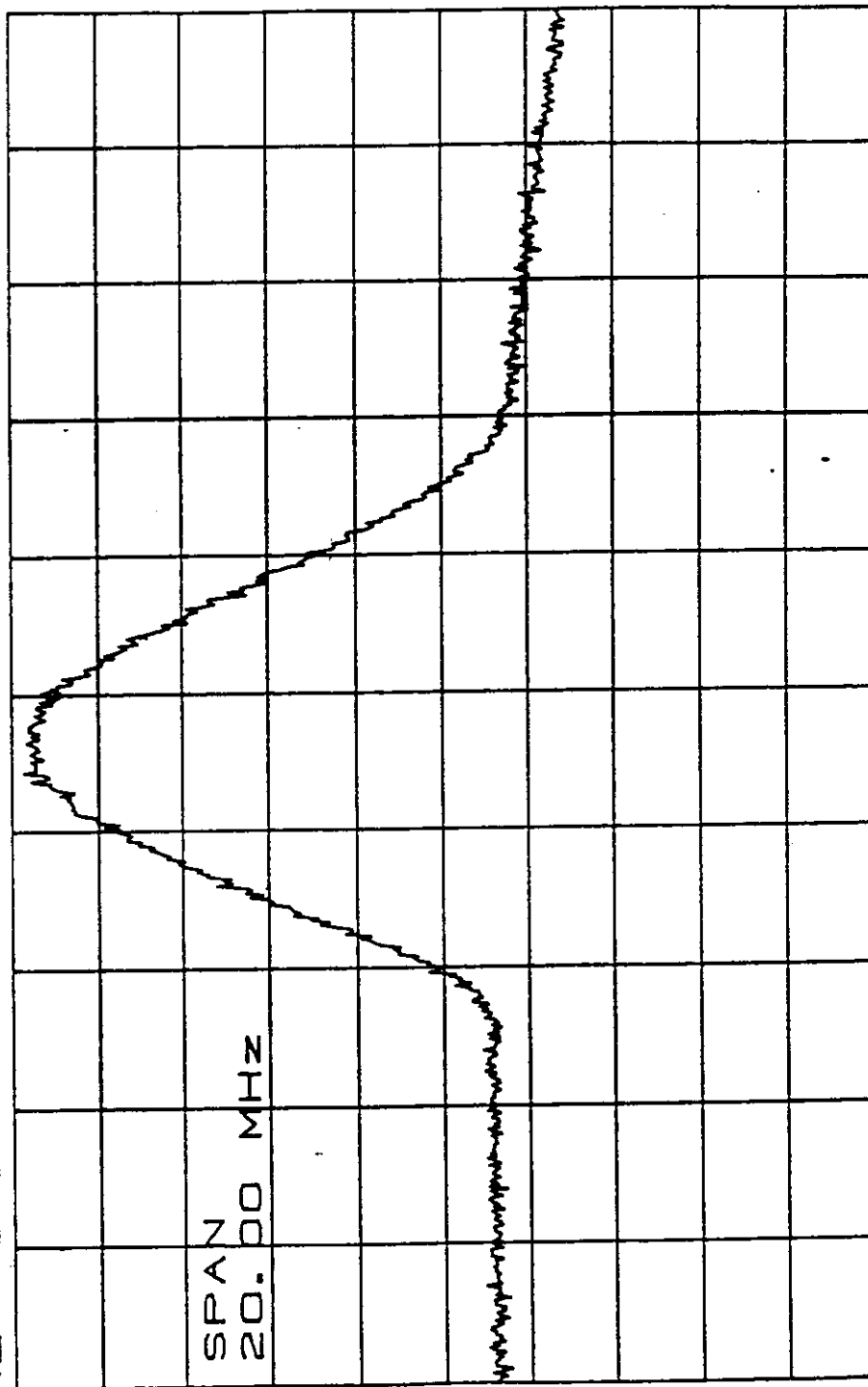
24.238



D

CENTER 1.964508GHz SPAN 5.000MHz
*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996

CDMA #1, Fwd Path (DL)
Hi-side of upper chan 675
11/14/96
*ATTEN 10dB VAVG 10 MKR -15.67dBm
RL -10.0dBm 10dB 1.96451GHz

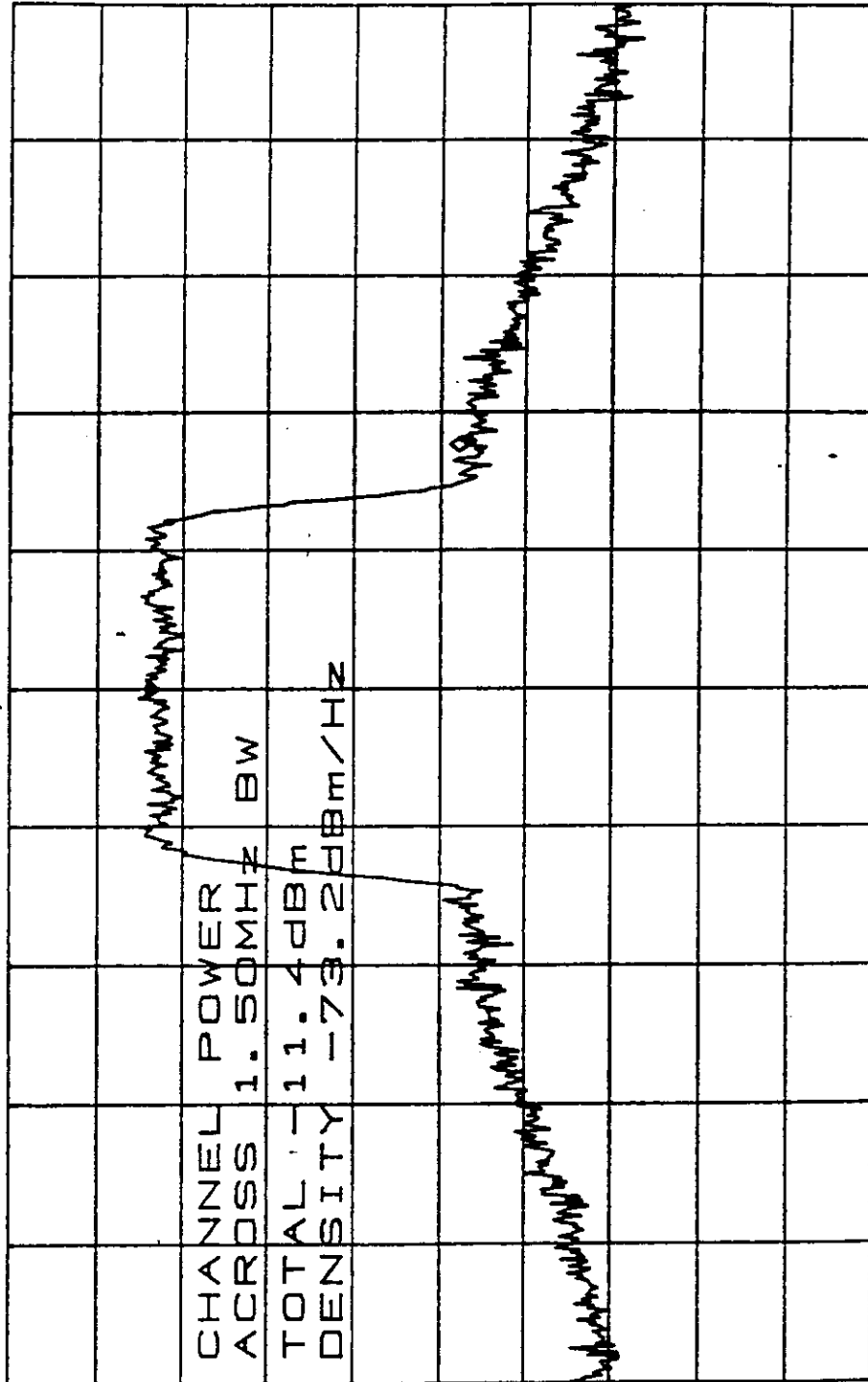


CENTER 1.96451GHz SPAN 20.00MHz
*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1.5
SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996

24.238

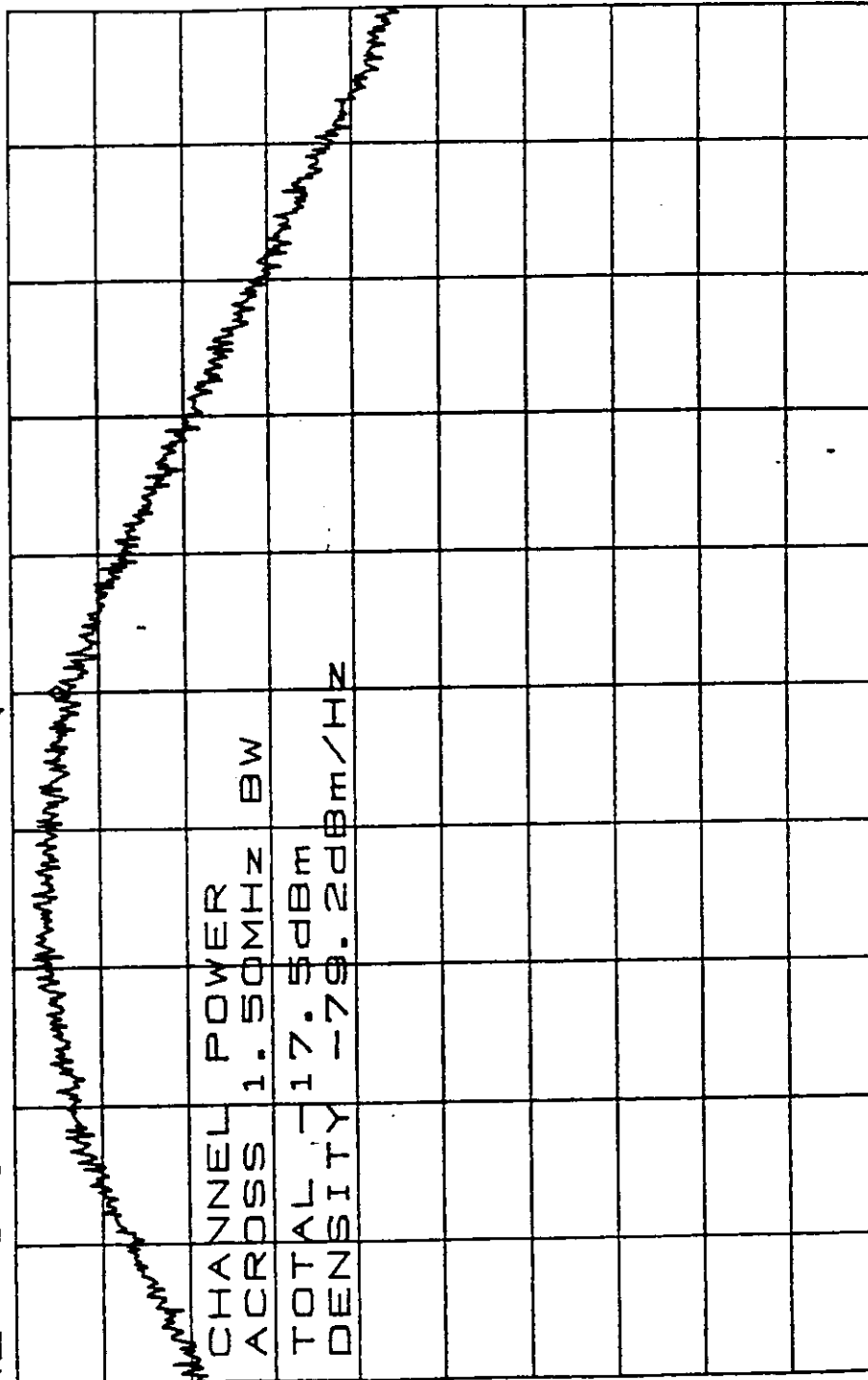


(24-238) CDMA #1, Reverse Path (UL) 11/14/96
 *ATTEN 10dB VAVG 10 ΔMKR -36.00dB
 RL -10.00dBm 10dB% 883kHz



CENTER 1.883750GHZ SPAN 5.000MHZ
 *RBW 30kHz VBW 30kHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996

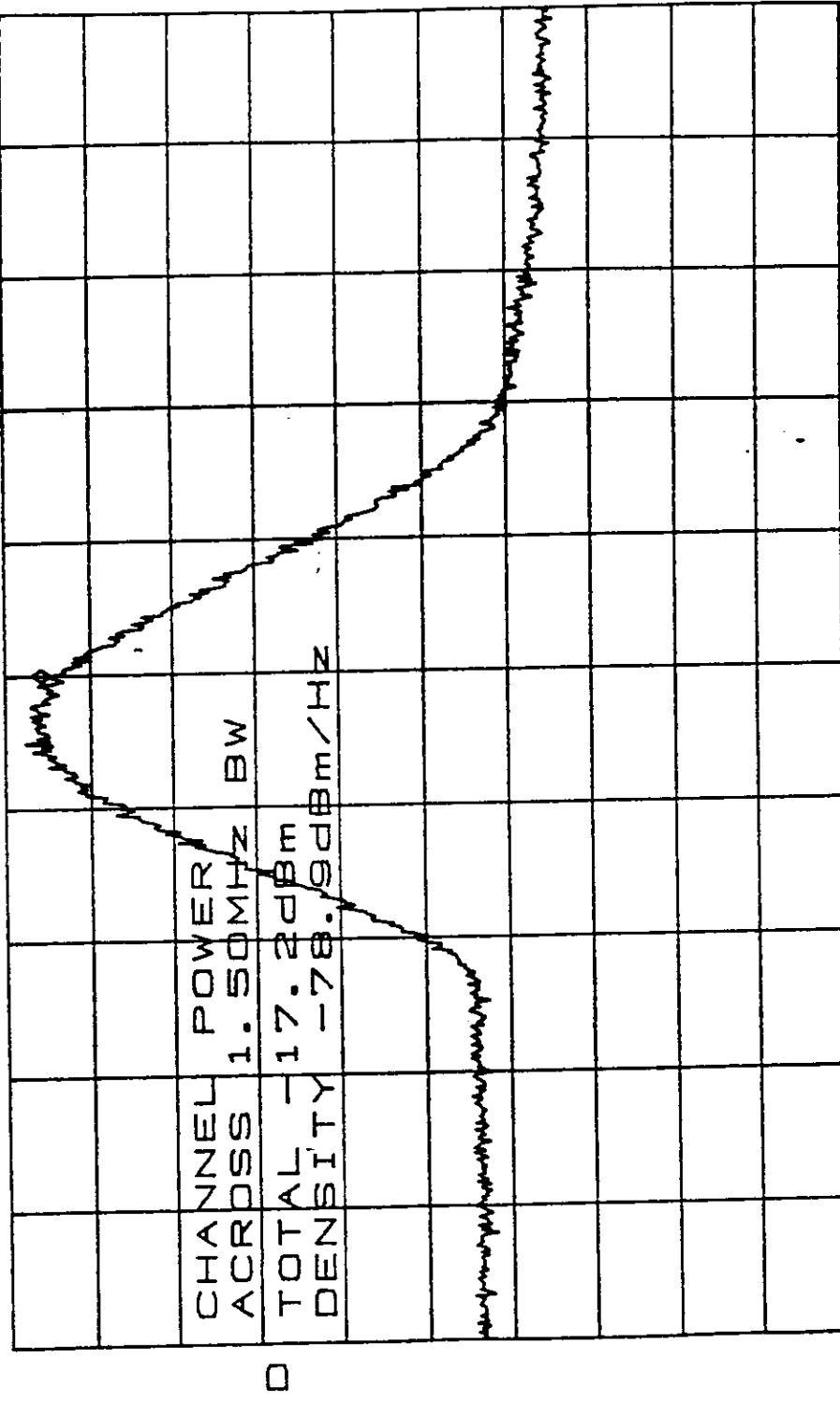
CDMA#1, Reverse Path (UL) 11/14/96
 *ATTEN 10dB VAVG 10 MKR -16.17dBm
 RL -10.0dBm 10dB% 1.884508GHZ



CENTER 1.884508GHZ 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, Model CDR-1901-1-3
 DATE: 14 November 1996

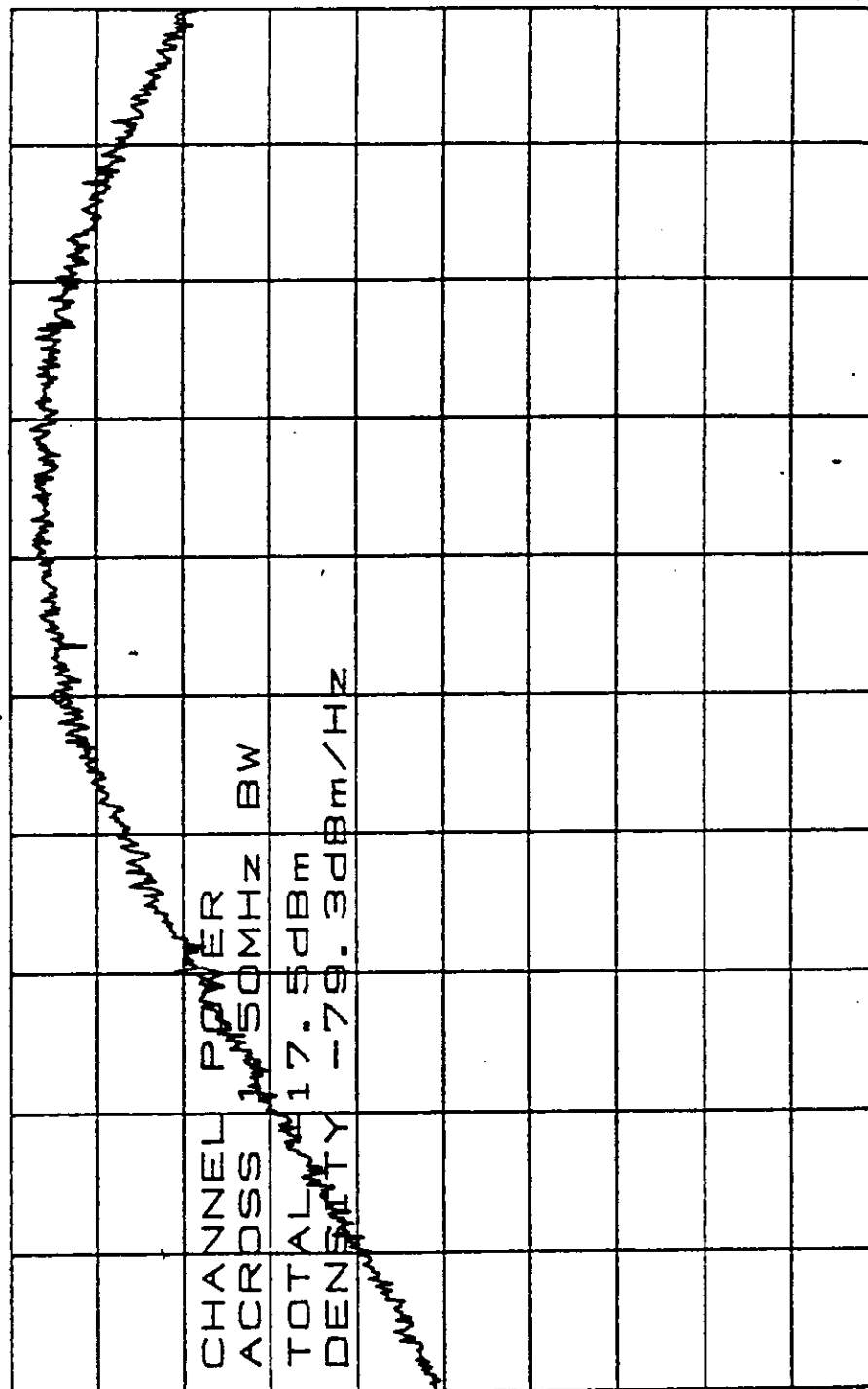
24-238

24.238
CDMA #1, Reverse Path (UL)
*ATTEN 10dB VAVG 10
RL -10.0dBm 10dB%
Hi-side
Upper chan 675
MKR -15.17dBm
1.88451GHz

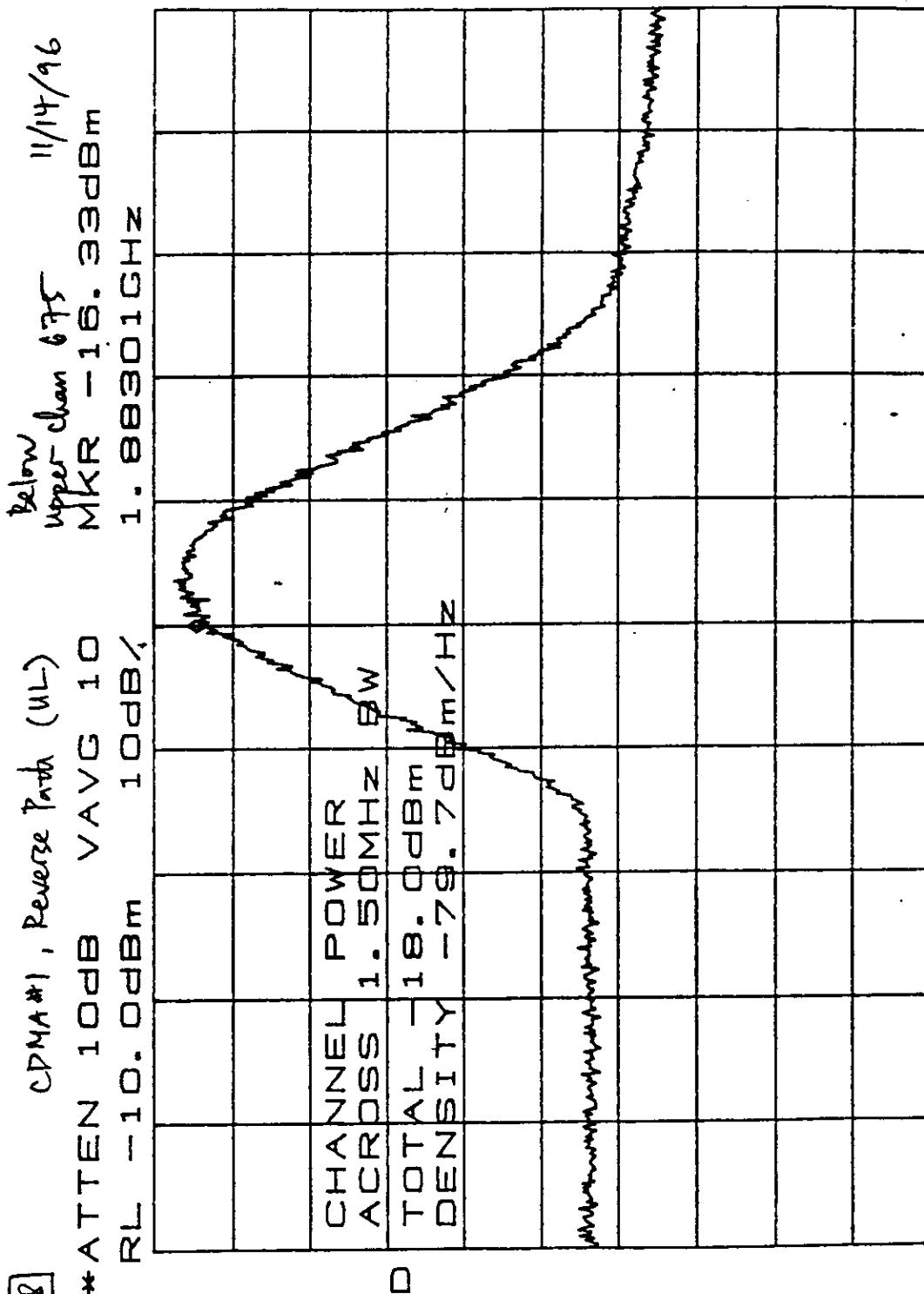


CENTER 1.88451GHz
*RBW 1.0MHz VBW 1.0MHz
SPAN 20.00MHz SWP 50.0ms
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996
TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Part 2, Para. 24.238

CDMA #1, Reverse Path (UL) Below Upper Chan 675 11/14/96
 *ATTEN 10dB VAVG 10 MKR -16.50dBm
 RL -10.00dBm 10dB% 1.883008GHZ

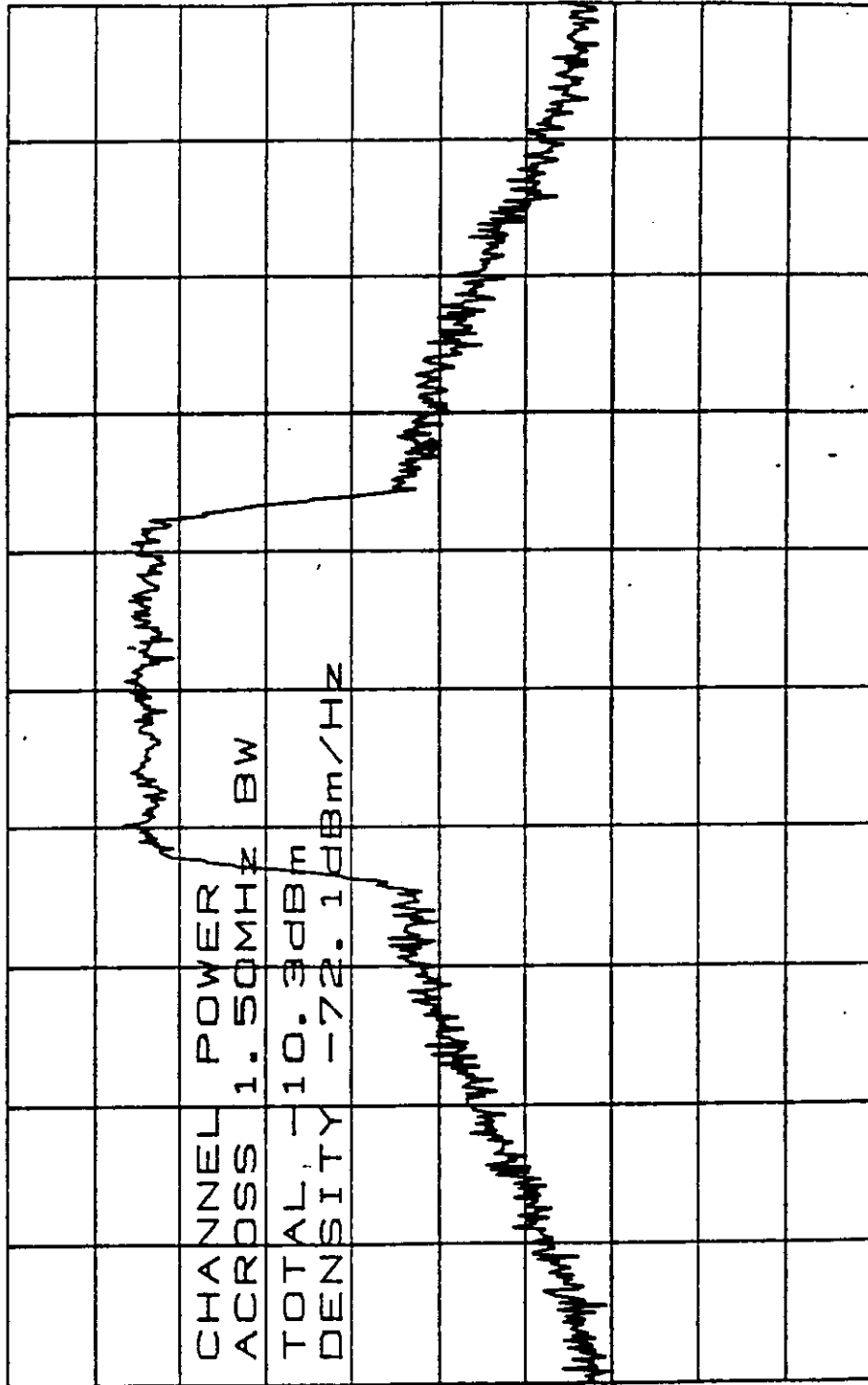


CENTER 1.883008GHZ SPAN 5.000MHZ
 *RBW 1.0MHZ VBW 1.0MHZ SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996



CENTER 1.88301GHz SPAN 20.00MHz
*RBW 1.0MHz VBW 1.0MHz 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

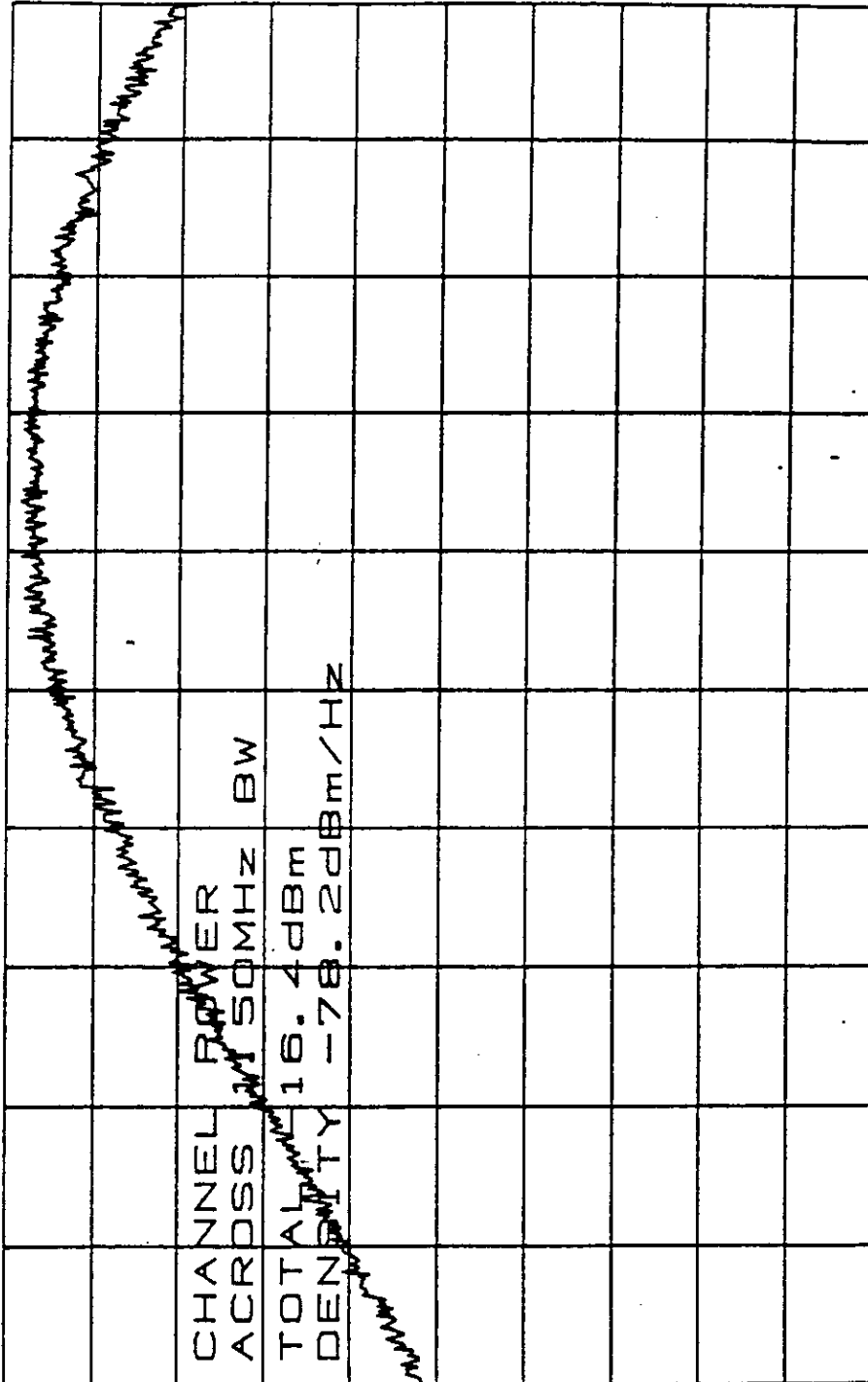
24.238
CDMA #1, Reverse Path (UL) 11/14/96
Fundamental
low chan 425
*ATTEN 10dB VAVG 10 ΔMKR -34.00dB
RL -10.00dBm 10dB/ 883kHz



CENTER 1.871250GHZ SPAN 5.000MHZ
*RBW 30KHZ VBW 30KHZ SWP 50.0ms
TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996



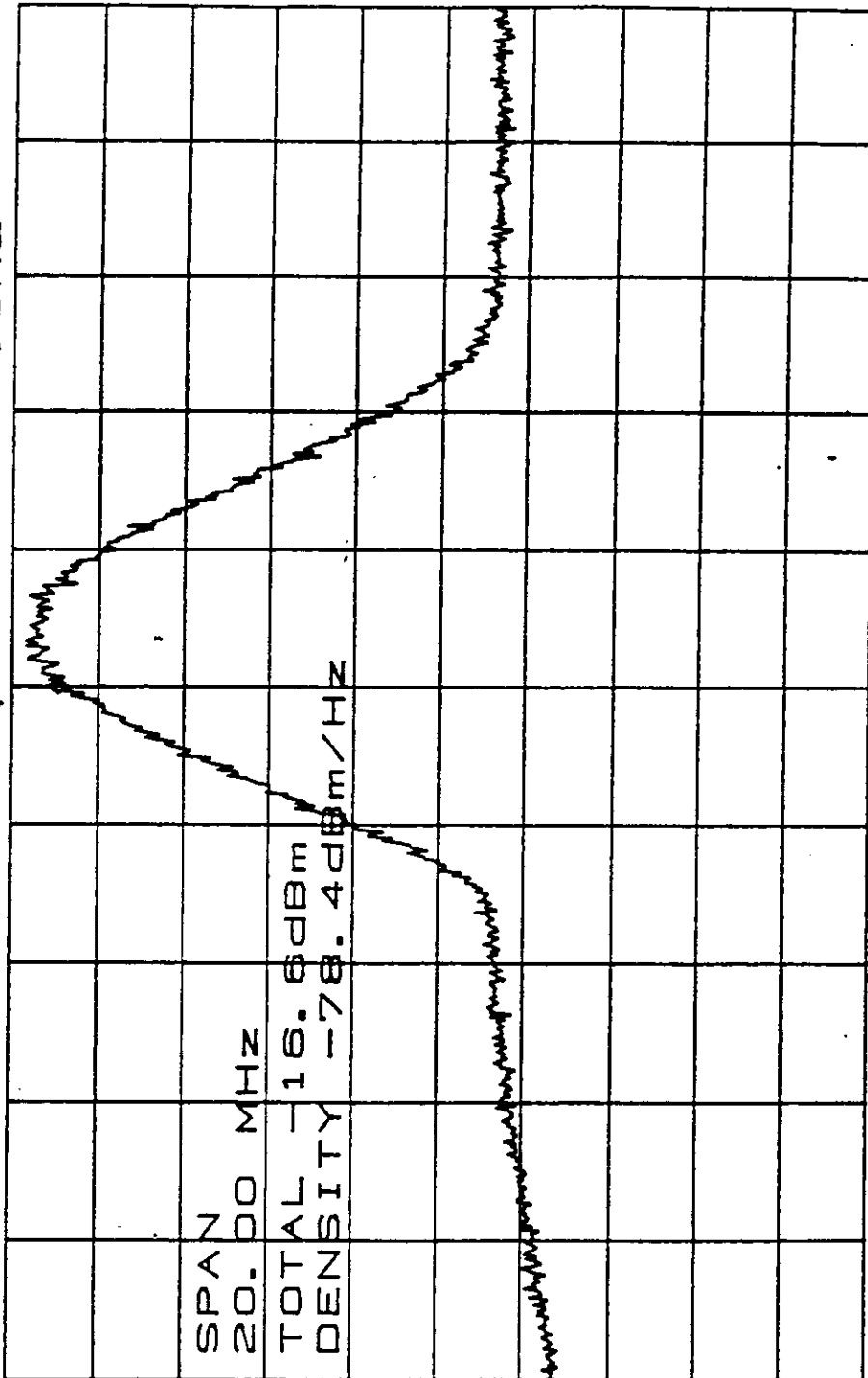
(24.238) CDMA #1, Reverse Path (UL) 11/14/16
 *ATTEN 10dB VAVG 10 MKR -16.50dBm
 RL -10.00dBm 10dB% 1.870500GHZ



CENTER 1.870500GHZ SPAN 5.000MHZ
 *RBW 1.0MHZ VBW 1.0MHZ SWP 50.0ms
 TESTED BY ORTEL CORPORATION BUT: CDMA Repeater, Model CDR-1901-1-3
 SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996



CDMA #1, Reverse Path (UL) 11/14/96
 *ATTEN 10dB VAVG 10 MKR -16.33dBm
 RL -10.0dBm 10dB/1.87050GHZ



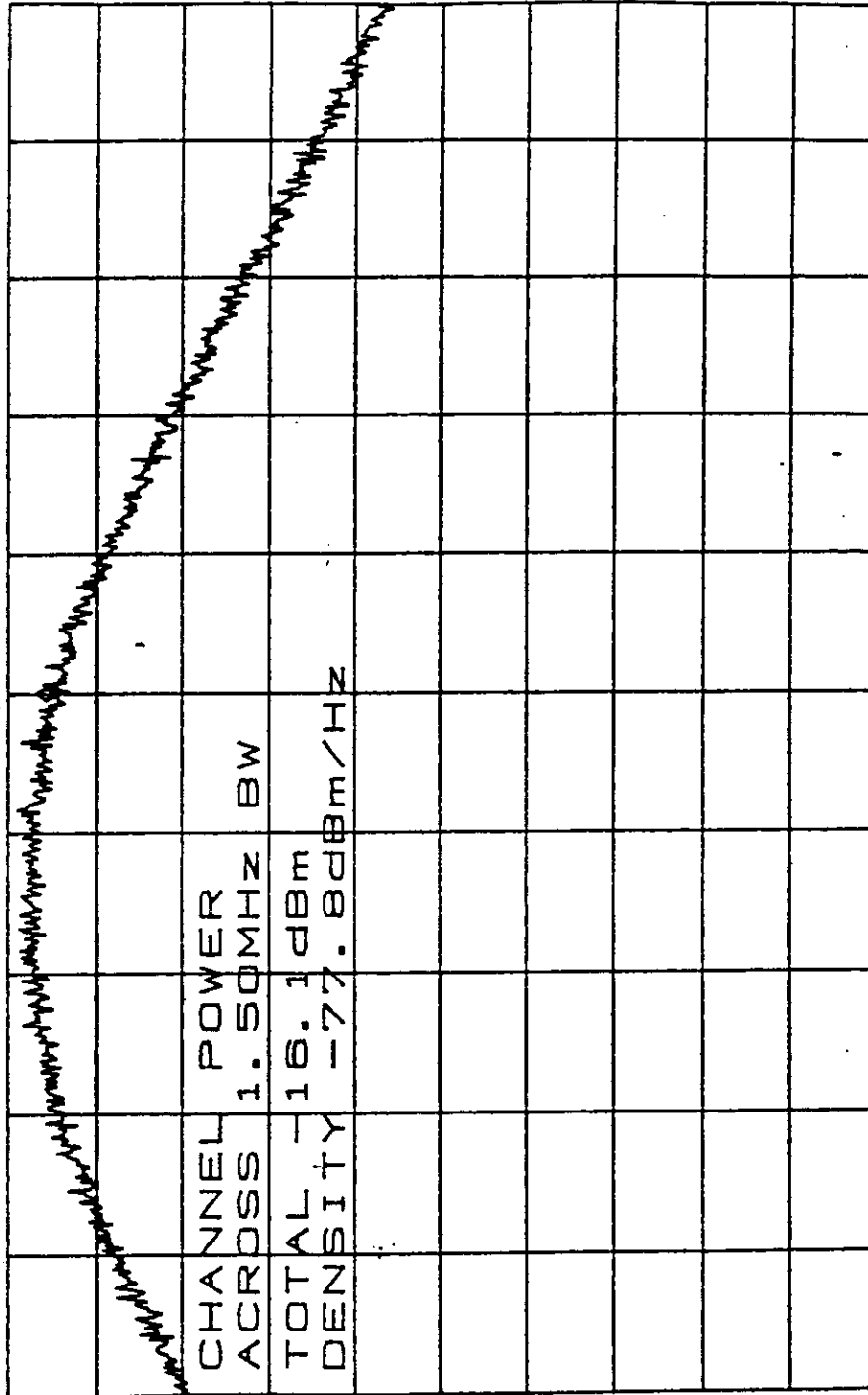
CENTER 1.87050GHZ SPAN 20.00MHZ
 *RBW 1.0MHZ VBW 1.0MHZ SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC Part 2, Para. 24.238 DATE: 14 November 1996



CDMA #1, Reverse Path (UL)
 *ATTEN 10dB VAVG 10 MKR -15.33dBm
 RL -10.0dBm 10dB% 1.872000GHZ

Hi-side
 Low Chan 425

11/14/96



CHANNEL POWER
 ACROSS 1.50MHz BW
 TOTAL -16.1dBm
 DENSITY -77.8dBm/Hz

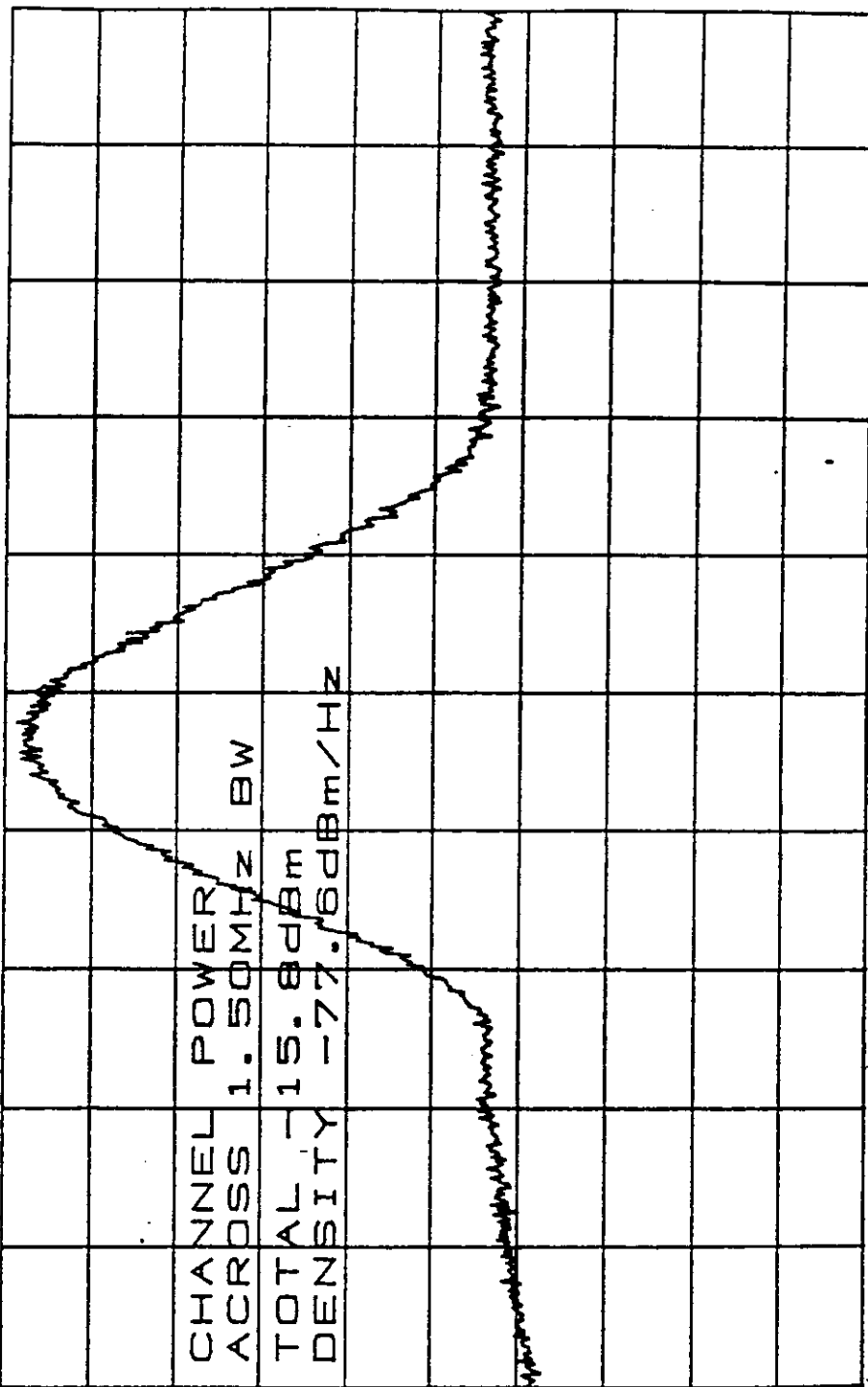
CENTER 1.872000GHZ SPAN 5.000MHZ
 *RBW 1.0MHz VBW 1.0MHz SWP 50.0ms

TESTED BY ORTEL CORPORATION
 SPECIFICATION: FCC Part 2, Para. 24.238
 EUT: CDMA Repeater, Model CDR-1901-1-5
 DATE: 14 November 1996

24.238

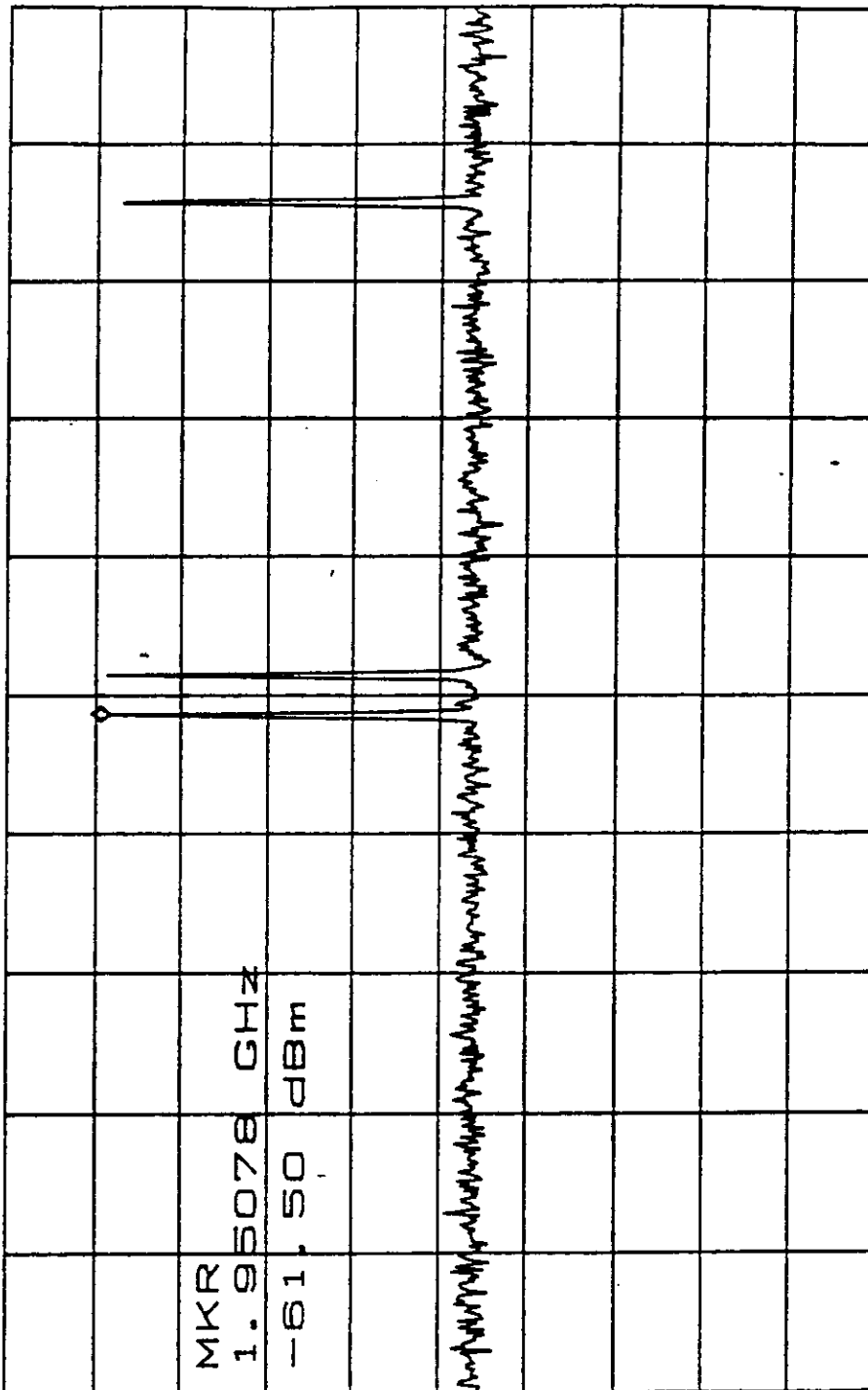


24.238
 CDMA#1, Reverse Path (UL)
 *ATTEN 10dB VAVG 10
 RL -10.0dBm 10dB%
 Hi-side
 Low chan 425
 MKR -15.50dBm
 11/14/96
 1.87200GHZ



CENTER 1.87200GHZ SPAN 20.00MHz
 *RBW 1.0MHz VBW 1.0MHz 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

Intermod, 3 tones CW
 *ATTEN 0dB
 RL -50.0dBm
 VAVG 10
 10dB%
 Fwd Path (DL)
 Suppt tones, CW
 MKR -61.50dBm
 1.95078GHz
 11/14/96



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

TESTED BY ORTEL CORPORATION
 SPECIFICATION: FCC Intermodulation

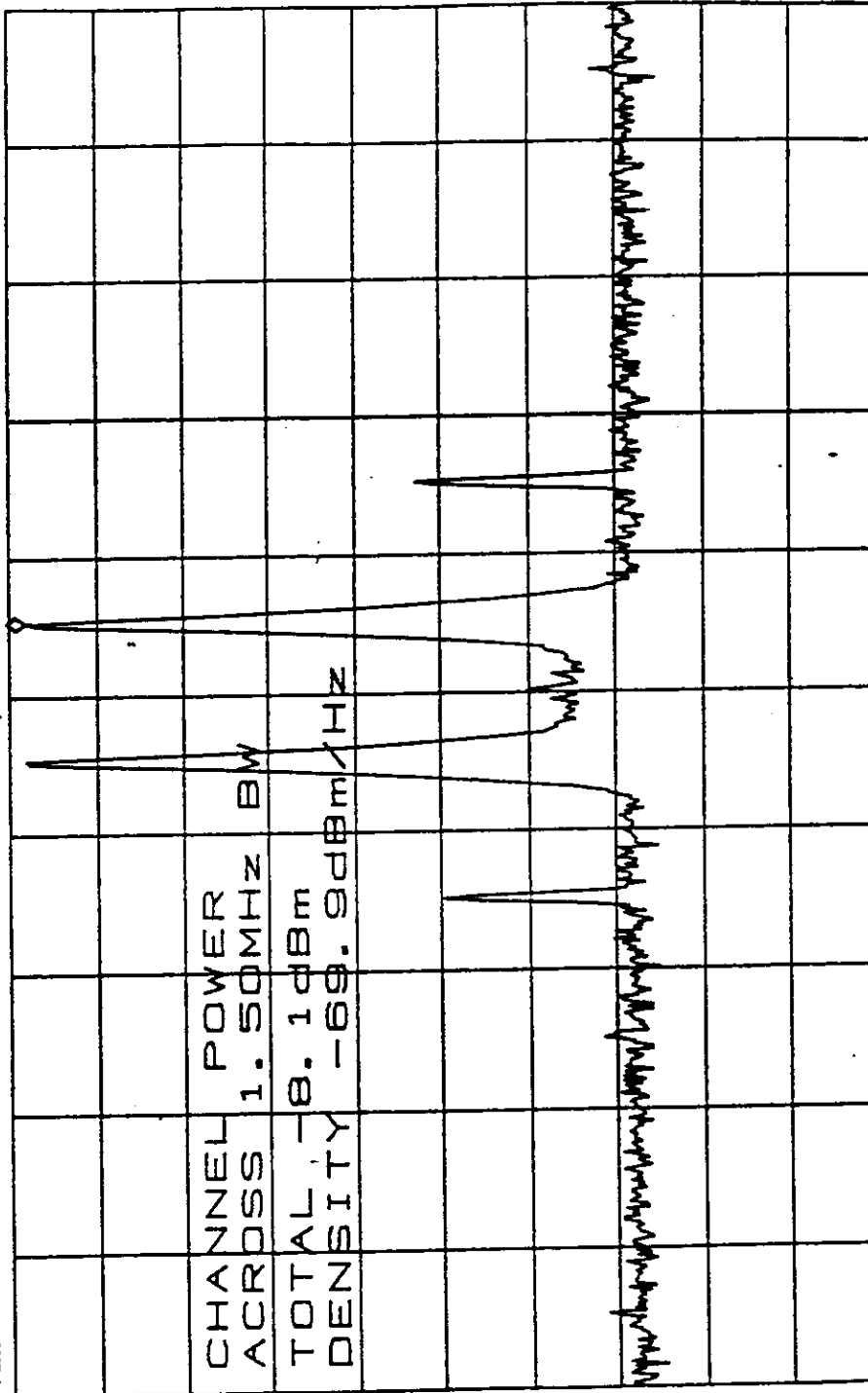
CENTER 1.95125GHz
 *RBW 30kHz
 VBW 30kHz
 SPAN 35.00MHz
 SWP 98.0ms
 tones: 1950.75, 1951.75, 1963.75 MHz



CDMA #1, Fund Path (DL) Output tones 11/14/96

*ATTEN 10dB VAVG 10 MKR -11.67dBm

RL -10.0dBm 10dB% 1.95178GHz



CENTER 1.95125GHz SPAN 10.00MHz

*RBW 30KHz VBW 30KHz SWP 50.0ms

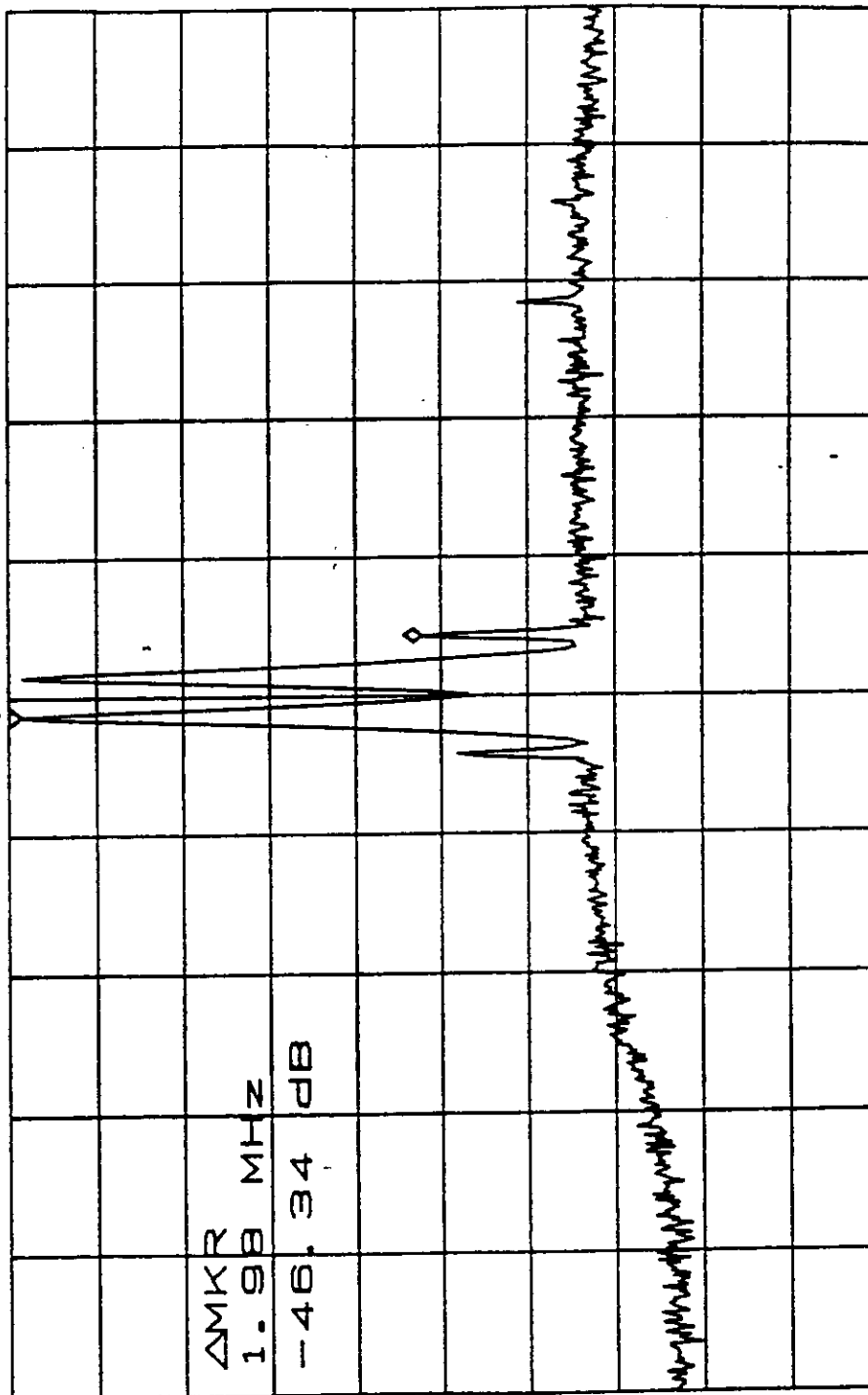
tones: 1950.75, 1951.75, 1963.75 MHz

Intermod

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

TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Intermodulation

CDMA #1
Fwd Pwr (DL)
11/14/96
*ATTEN 10dB VAVG 10 ΔMKR -46.34dB
RL -10.0dBm 10dB% 1.98MHz



11/14/96

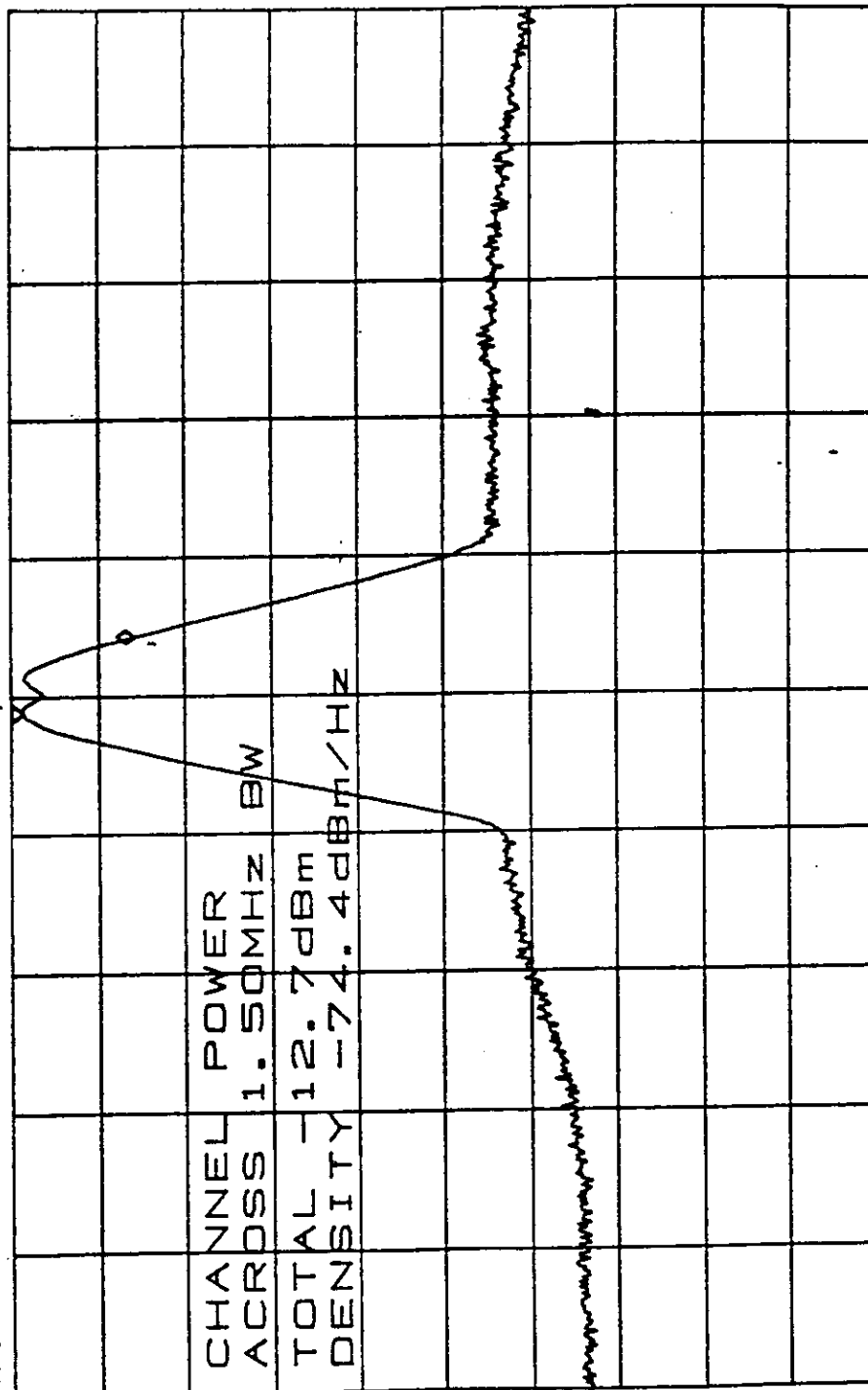
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 14 November 1996

TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Intermodulation

CENTER 1.95125GHz SPAN 35.00MHz
*RBW 100kHz VBW 100kHz SWP 50.0ms
tones: 1950.75, 1951.75, 1963.75 MHz



CDMA #1, Fwd Path (DL) Output tones 11/14/96
 *ATTEN 10dB VAVG 10 ΔMKR -12.67dB
 RL -10.0dBm 10dB% 2.20MHz



CENTER 1.95125GHz SPAN 40.00MHz
 *RBW 1.0MHz VBW 1.0MHz SWP 50.0ms

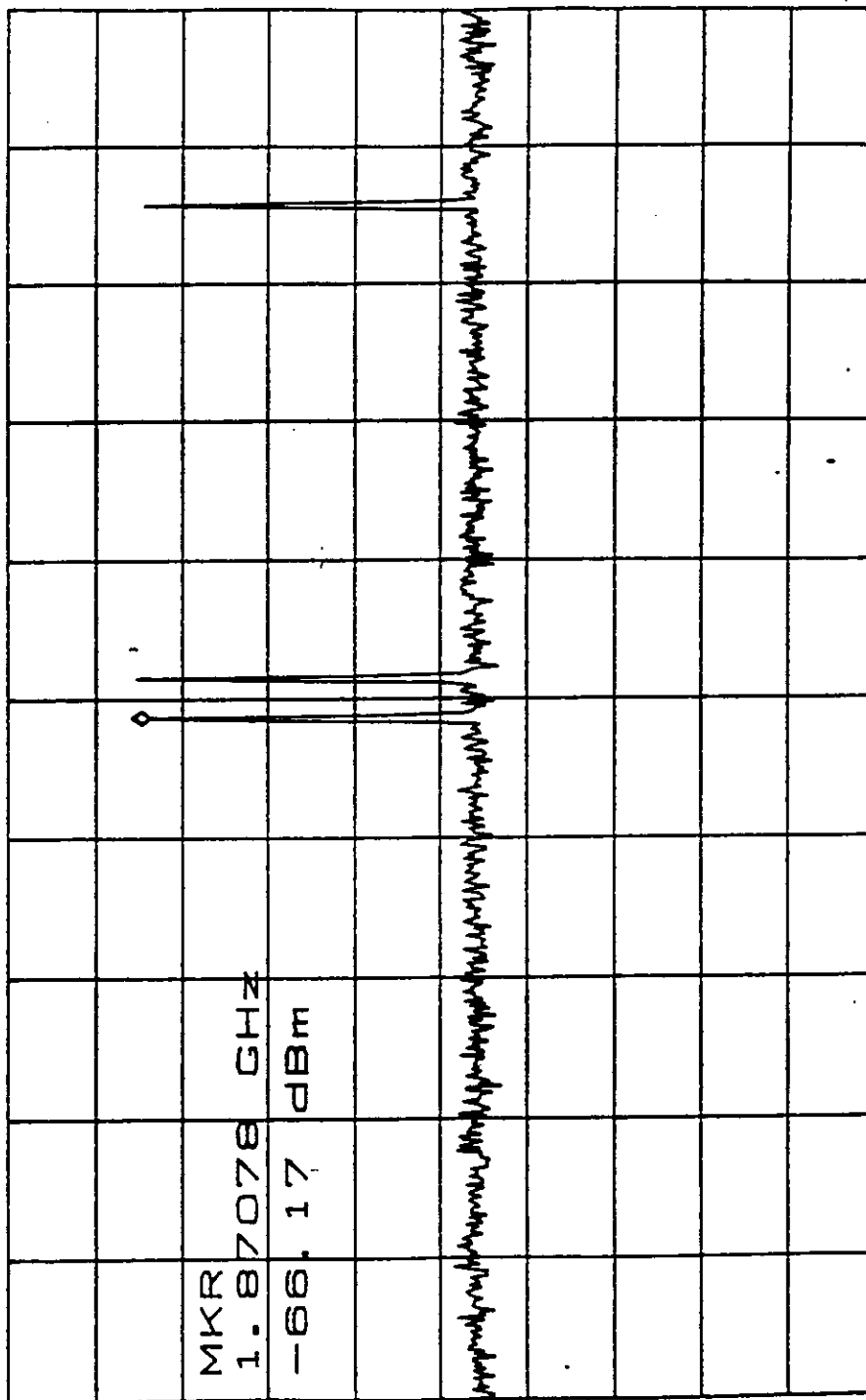
Tones: 1950.75, 1951.75, 1963.75 MHz

Intermod

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

TESTED BY ORTEL CORPORATION
 SPECIFICATION: FCC Intermodulation

Intermode 3 tones, CW
Reverse Path (UL) Input tones, CW 11/14/96
*ATTEN 0dB VAVG 10 MKR -66.17dBm
CDMA#1 RL -50.0dBm 10dB% 1.87078GHZ



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

TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Intermodulation

CENTER 1.87125GHZ SPAN 35.00MHZ
*RBW 30kHz VBW 30kHz SWP 98.0ms
tones: 1870.75, 1871.75, 1883.75 MHz

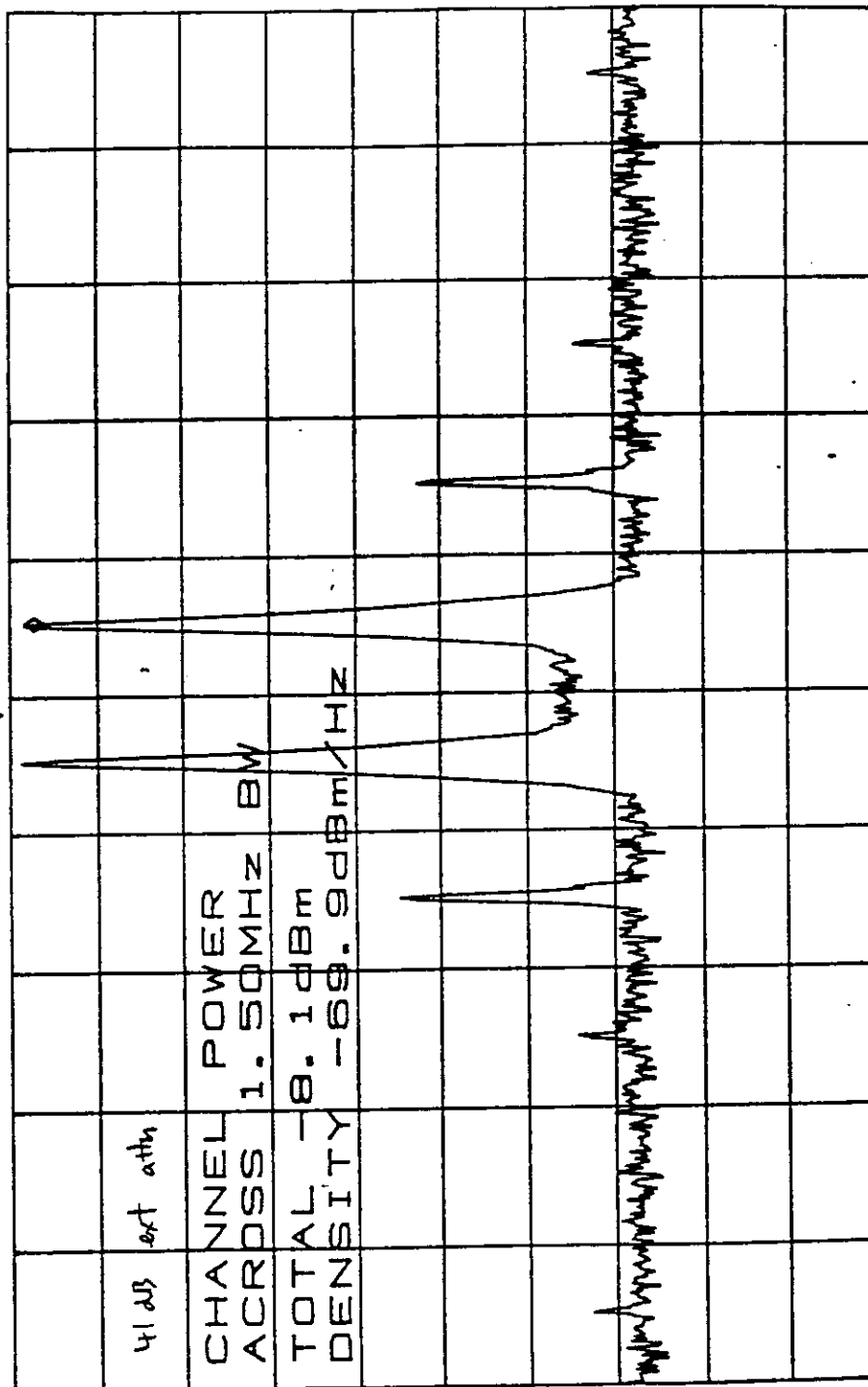


CDMA #1
 Reverse Path (UL) Output
 11/14/96
 *ATTEN 10dB VAVG 10 MKR -13.67dBm
 RL -10.0dBm 10dB% 1.87178GHz

Intermod

3 tones

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



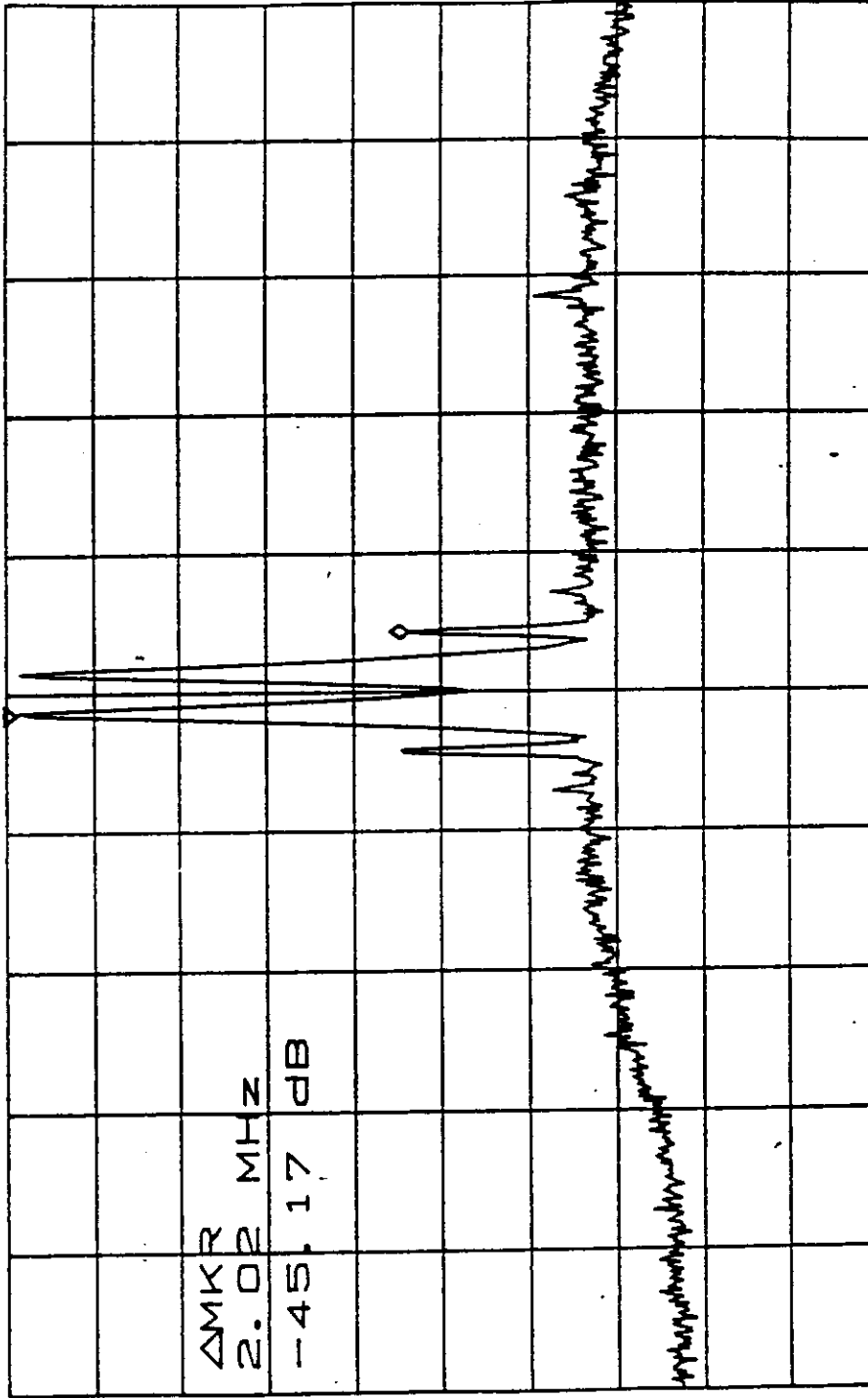
CENTER 1.87125GHz SPAN 10.00MHz
 *RBW 30kHz *VBW 300kHz SWP 50.0ms
 tones, : 1870.75, 1871.75, 1883.75MHz

TESTED BY ORTEL CORPORATION
 SPECIFICATION: FCC Intermodulation



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

Tones : 1870.75, 1871.75, 1883.75 MHz

Intermod

3 tones

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

TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Intermodulation

TESTED BY ORTEL CORPORATION
SPECIFICATION: FCC Intermodulation

EUT: CDMA Repeater, Model CDR-1901-1-5

DATE: 14 November 1996

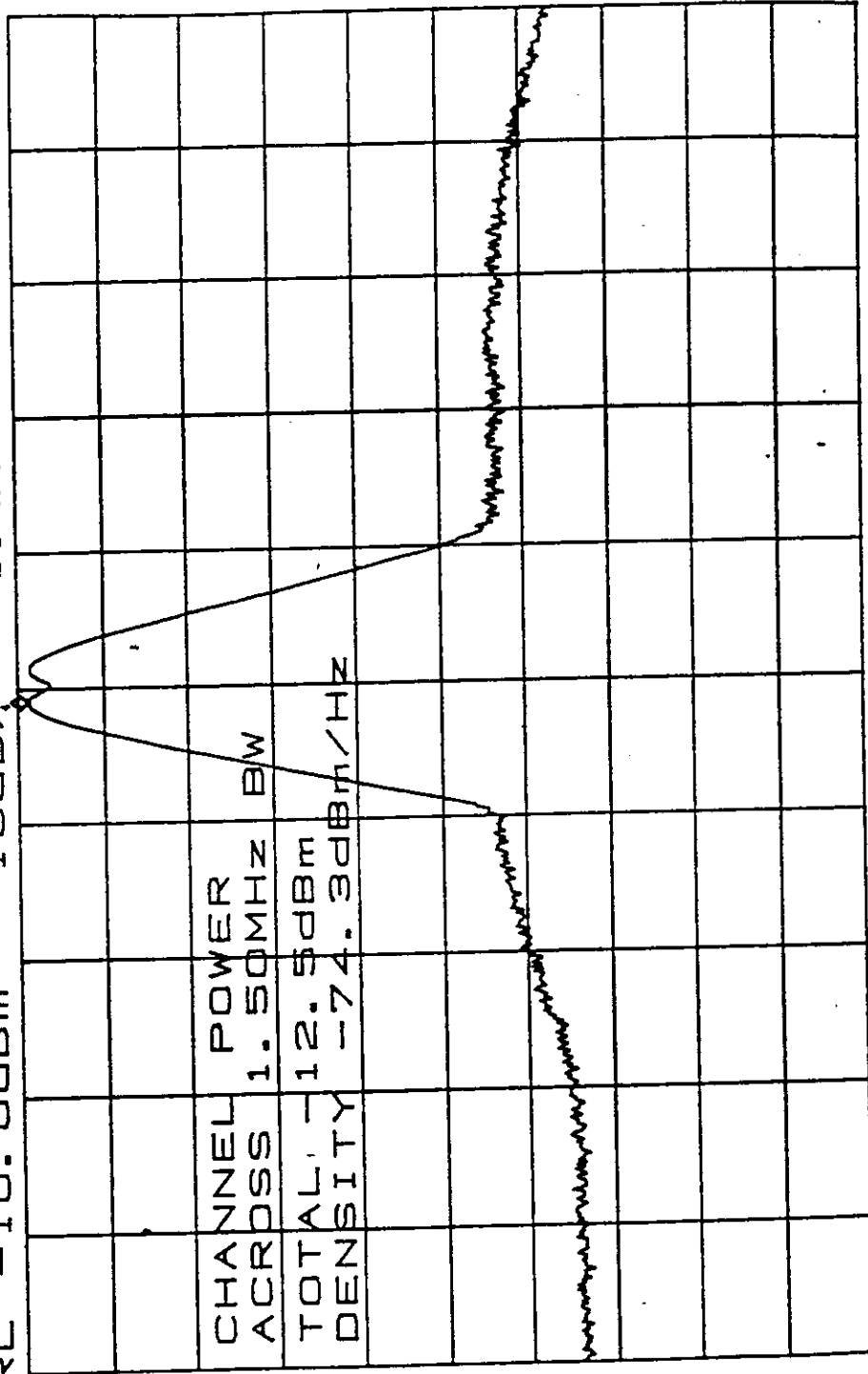
Reverse Path (UL)

CDMA#1 Output 11/14/96

*ATTEN 10dB VAVG 10 MKR -11.17dBm
RL -10.0dBm 10dB/ 1.87085GHz

Inter mod

3 tones

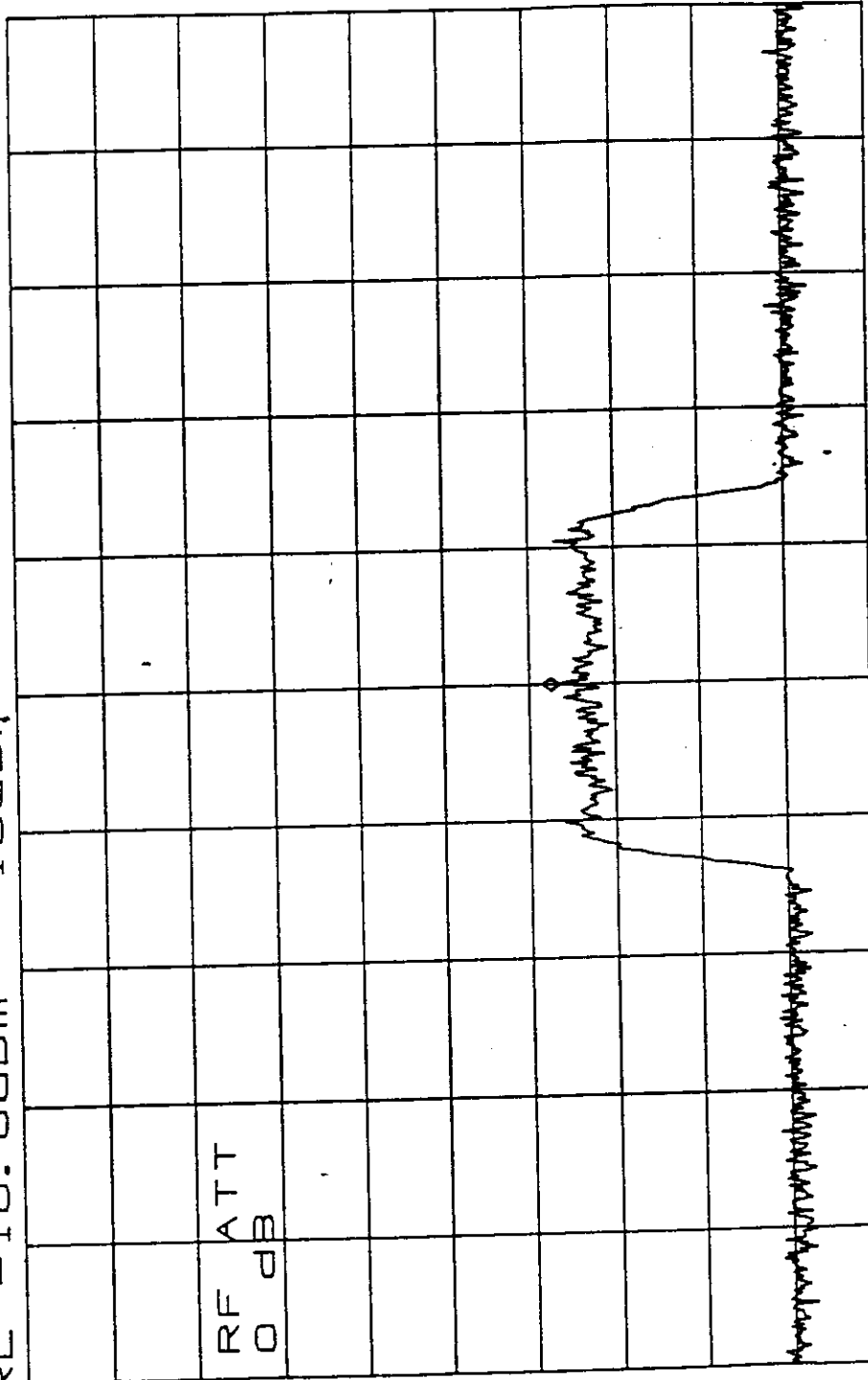


CENTER 1.87125GHz SPAN 40.00MHz
*RBW 1.0MHz VBW 1.0MHz SWP 50.0ms

tones: 1870.75, 1871.75, 1883.75 MHz



CDMA #1
 Fund Path (DL) Supp Low Chan 425 11/13/96
 **ATTEN 0dB VAVG 10 MKR -73.50dBm
 RL -10.0dBm 10dB 1.951250GHz



CENTER 1.951250GHz SPAN 5.000MHz
 **RBW 30kHz VBW 30kHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC In/Out DATE: 13 November 1996

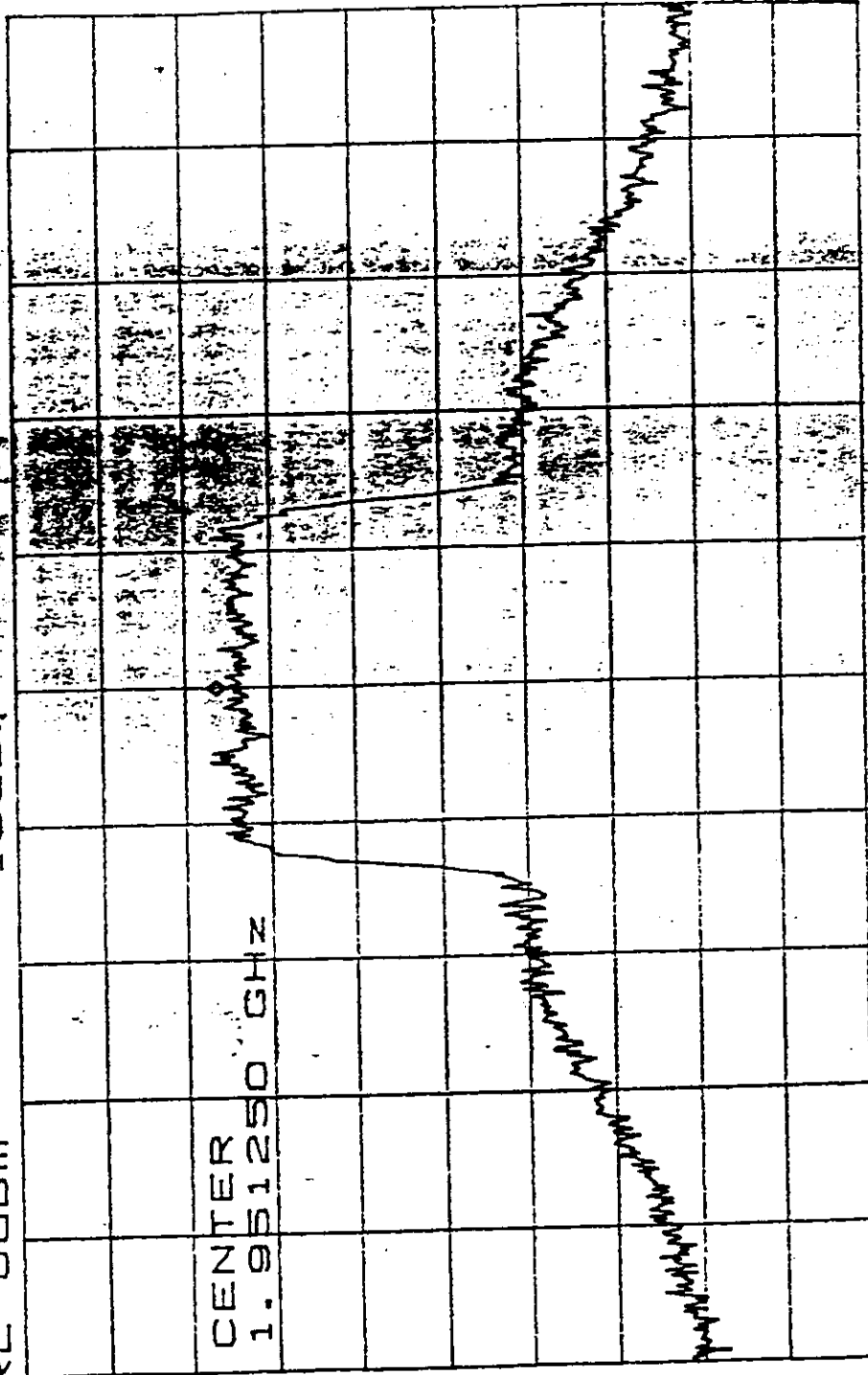
CDMA #1

Fwd Path (PL)

Output Low dnm 475

11/3/96

ATTEN 10dB VAVG 10 MKR 24.150dBm
RL 0dBm 1.951250GHz



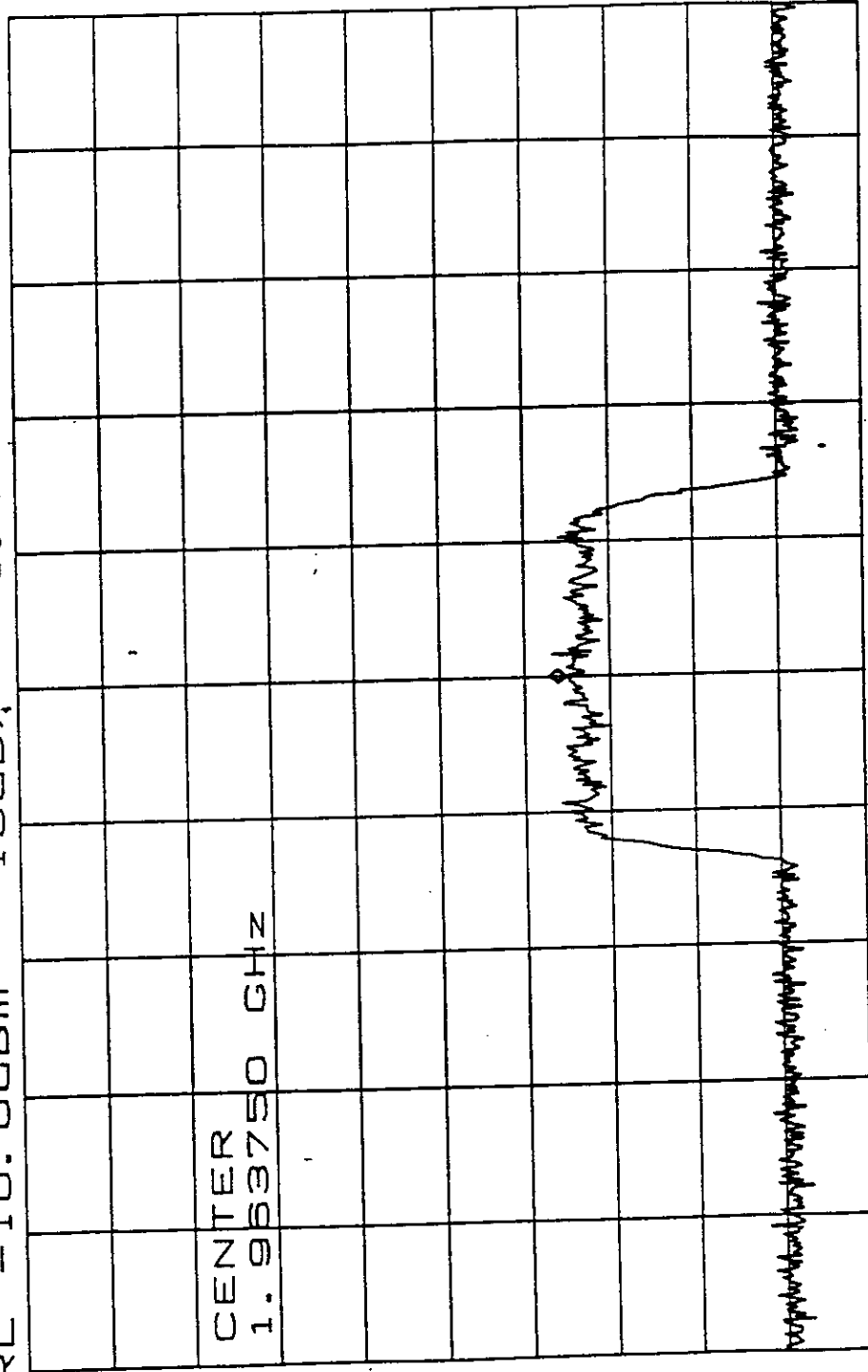
CENTER 1.951250GHz SPAN 5.000MHz
*RBW 30kHz VBW 30kHz SWP 50.0ms
TESTED BY ORTEL CORPORATION
EUT: CDMA Repeater, Model CDR-1901-1-5
DATE: 13 November 1996
SPECIFICATION: FCC In/Out



CDMA #1
 Input Upper Chan 675 11/13/96
 MKR -74.83dBm
 1.963750GHZ

Fwd Path (PL)
 VAVG 10
 10dB

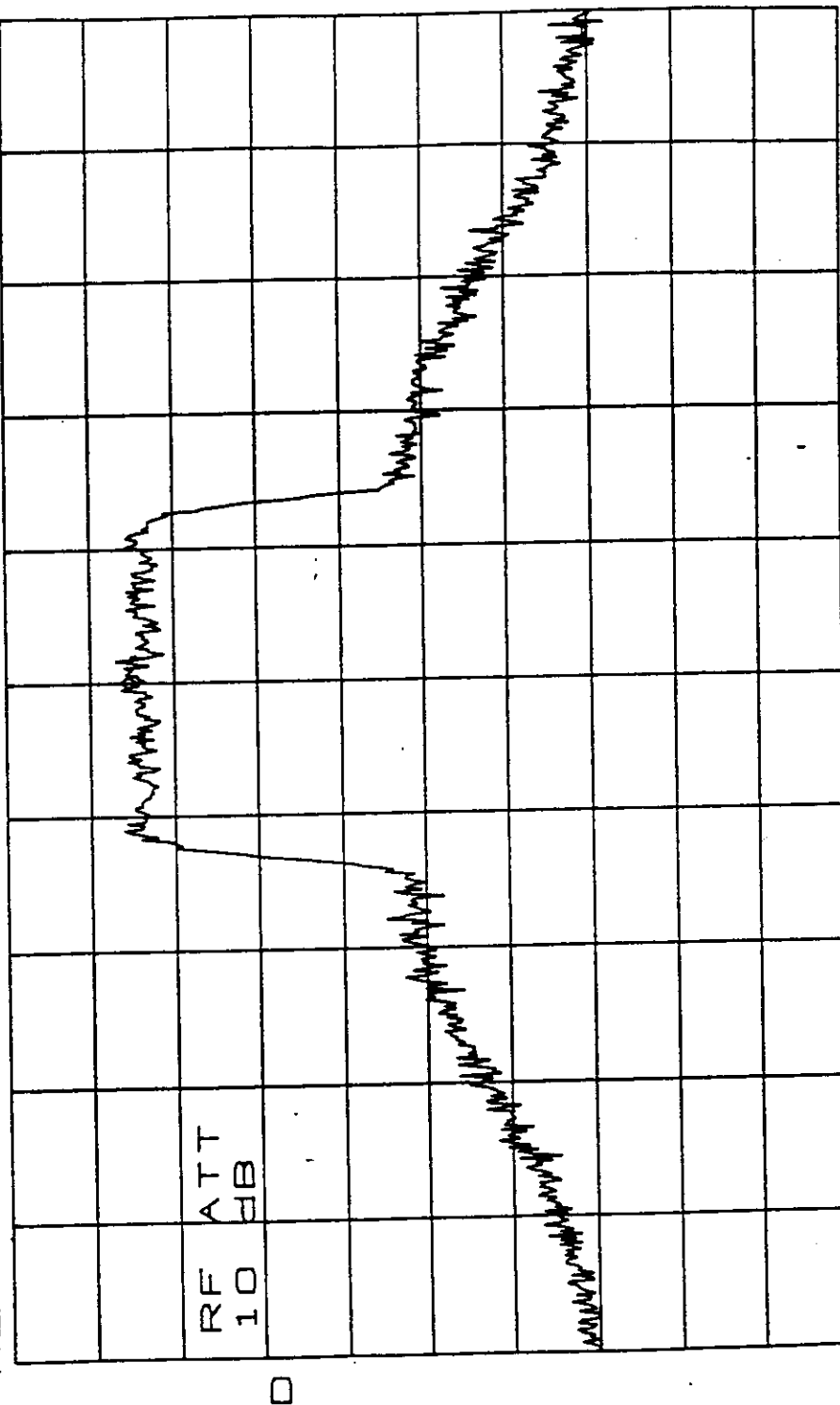
*ATTEN 0dB
 RL -10.0dBm



CENTER 1.963750GHZ
 *RBW 30KHZ
 VBW 30KHZ
 SWP 50.0ms
 SPAN 5.000MHZ
 EUT: CDMA Repeater, Model CDR-1901-1-5
 DATE: 13 November 1996
 TESTED BY ORTEL CORPORATION
 SPECIFICATION: FCC In/Out



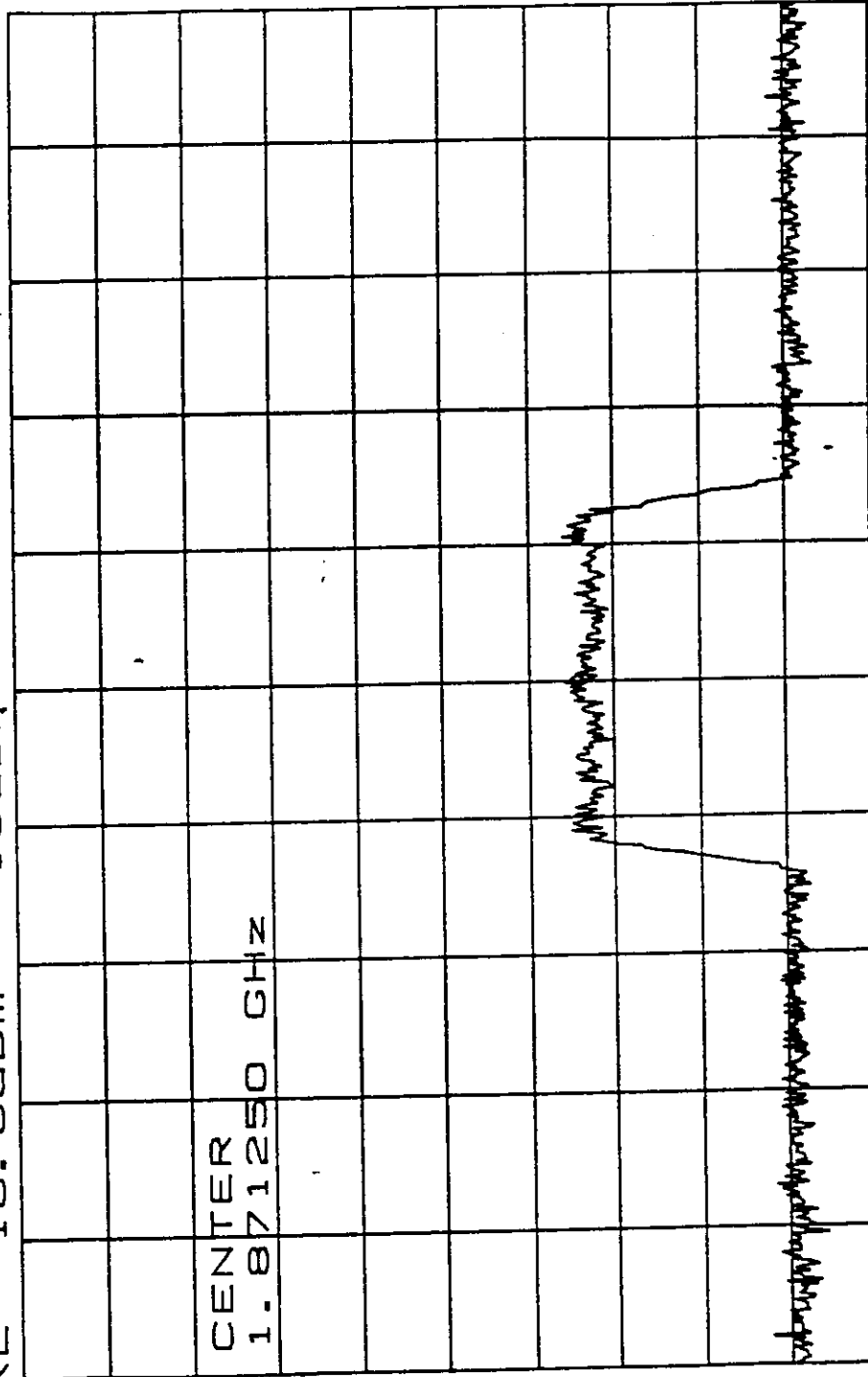
CDMA #1
 * ATTN 10dB VAVG 10 MKR -25.50dBm 11/13/96
 RL -10.00dBm 10dB% 1.963750GHZ



CENTER 1.963750GHZ SPAN 5.000MHZ
 * RBW 30KHZ VBW 30KHZ SWP 50.0ms
 TESTED BY ORTEL CORPORATION
 BUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC In/Out
 DATE: 13 November 1996

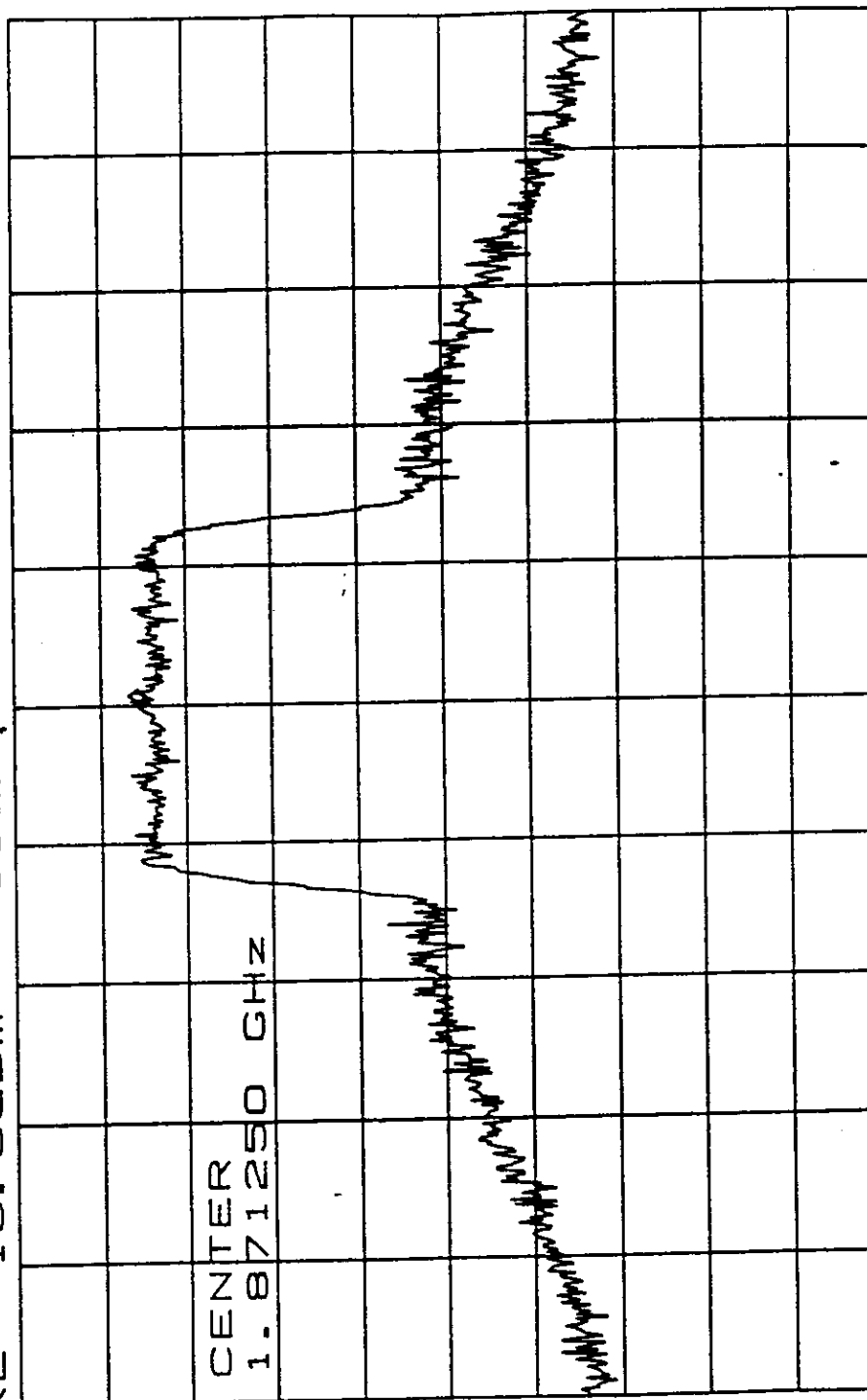


CDMA #1
 *ATTEN 0dB
 RL -10.0dBm
 Reverse Path (UL)
 VAVG 10
 10dBZ
 MKR -76.67dBm
 1.871250GHz
 Input Low Chan 425 11/13/96



CENTER 1.871250GHZ
 *RBW 30kHz
 VBW 30kHz
 SPAN 5.000MHZ
 SWP 50.0ms
 EUT: CDMA Repeater, Model CDR-1901-1-5
 DATE: 13 November 1996
 TESTED BY ORTEL CORPORATION
 SPECIFICATION: FCC In/Out

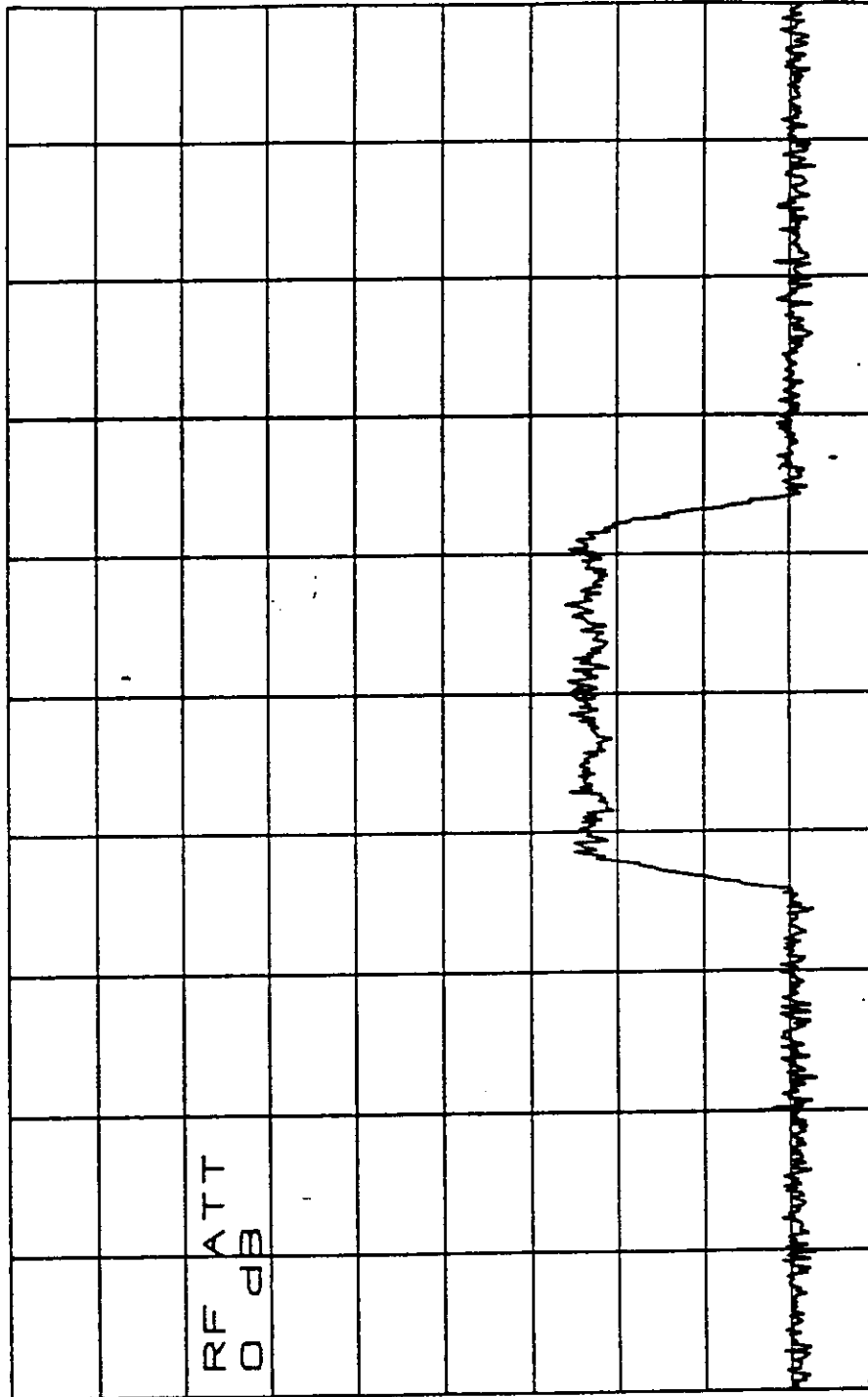
CDMA #1
Reverse Path (UL)
*ATTEN 10dB VAVG 10 MKR -25.17dBm
RL -10.0dBm 10dB% 1.871283GHz 11/13/95



CENTER 1.871250GHz 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



CDMA #1 Reverse Path (UL) Input Upper Chan 675 11/13/96
 *ATTEN 0dB VAVG 10 MKR -76.50dBm
 RL -10.0dBm 10dB% 1.883767GHz



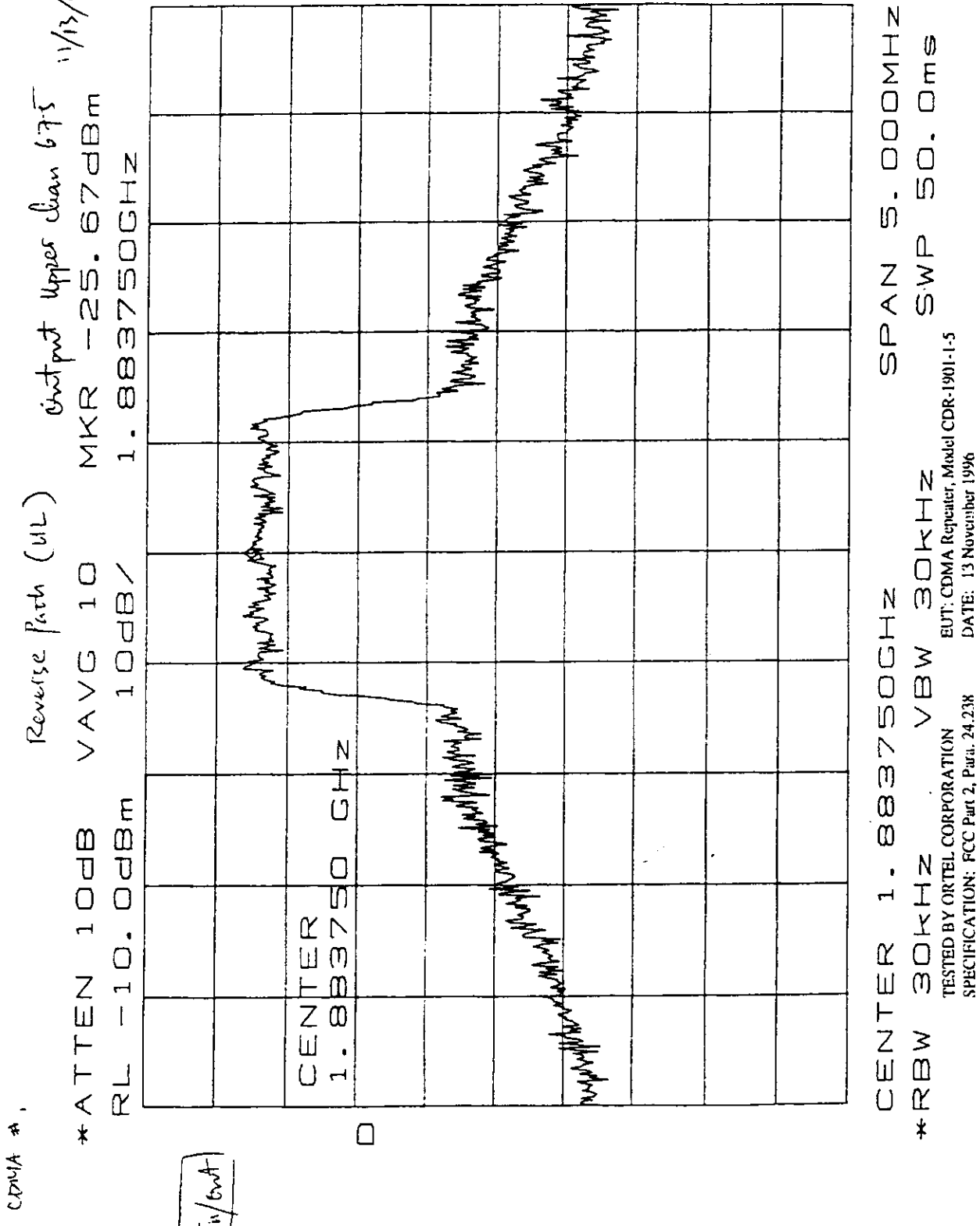
CENTER 1.883767GHz SPAN 5.000MHz
 *RBW 30kHz VBW 30kHz SWP 50.0ms
 TESTED BY ORTEL CORPORATION EUT: CDMA Repeater, Model CDR-1901-1-5
 SPECIFICATION: FCC In/Out DATE: 13 November 1996



Jan-22-97 11:43A Ortel Purchasing.

818 281 7913

P.05



Date of Change: 23 January 1997 Page 87a of 115

Rev.No 1.1

CDMA #1

Reverse Path (UL)

Output Upper Chan 675

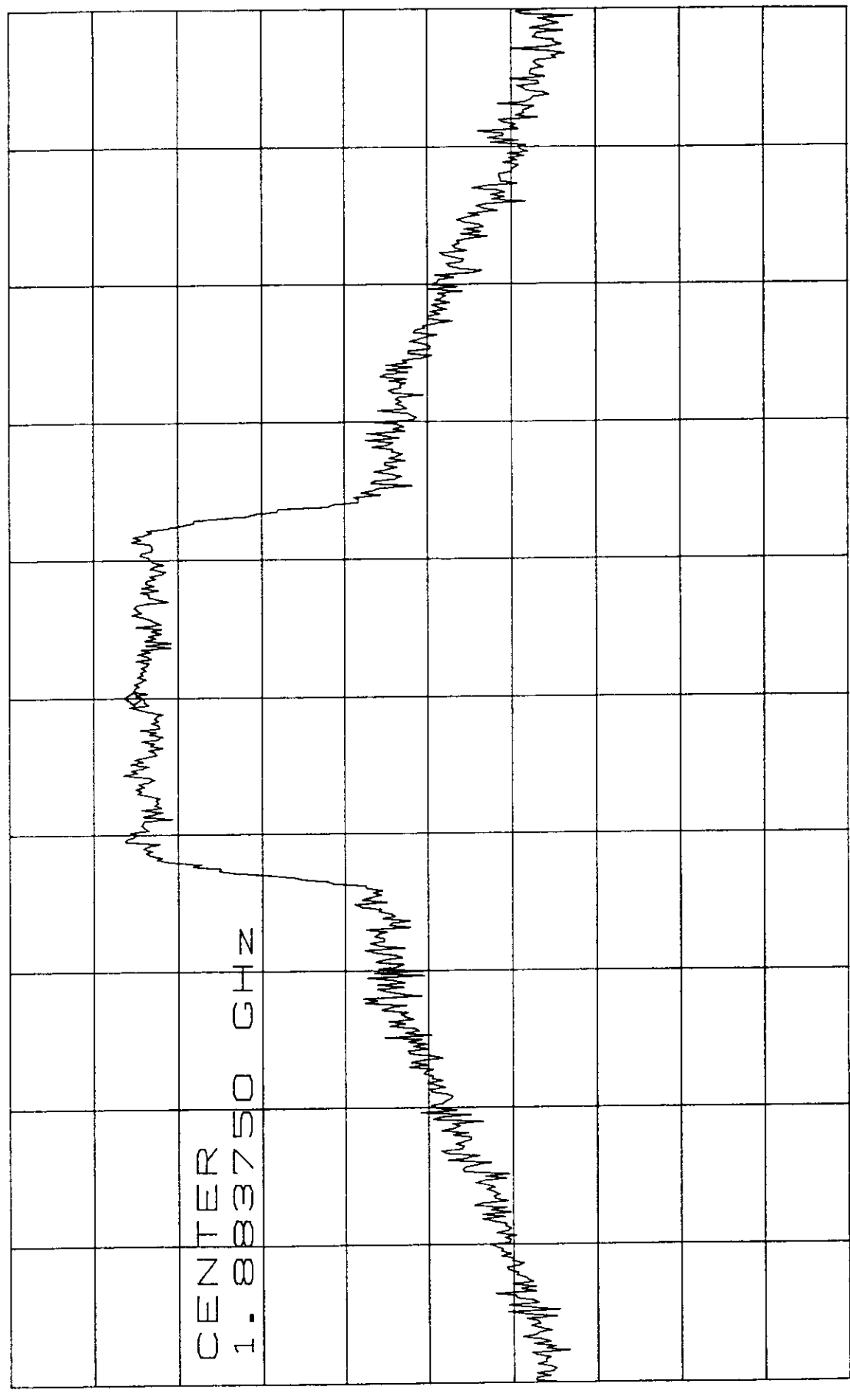
11/13/96

*ATTEN 10dB VAVG 10 MKR -25.67dBm
RL -10.0dBm 10dB/ 1.883750GHZ

in/out

CENTER
1.883750 GHz

D



CENTER 1.883750GHZ SPAN 5.000MHZ
*RBW 30KHZ VBW 30KHZ SWP 50.0ms

7 RADIATED MEASUREMENT PHOTOS

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



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).

[illegible]

NOTES:

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

revised

SPECIFICATION: FC Part 2, Paragraph 2.993 (m)

[illegible]

1. Resolution bandwidth and video bandwidth was 1 MHz.

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

[illegible]

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

revised

SPECIFICATION: FCC Part 2, Paragraph 2.993 m1D

[illegible]

- Resolution bandwidth and video bandwidth was 1 MHz.
- No emissions were detectable except the fundamental

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:

$$\text{Corrected Meter Reading Limit (CMRL)} = \text{SAR} + \text{AF} + \text{CL} - \text{AG} - \text{DC}$$

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:

$$\text{CMRL} = 29.4 \text{ dBuV} + 9.2 \text{ dB} - 1.4 \text{ dB} - 20 \text{ dB/M} - 0.0 \text{ dB}$$

$$\text{CMRL} = 20.0 \text{ dBuV/M}$$

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.

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

Figure 8.1 External View CDMA Repeater (A)

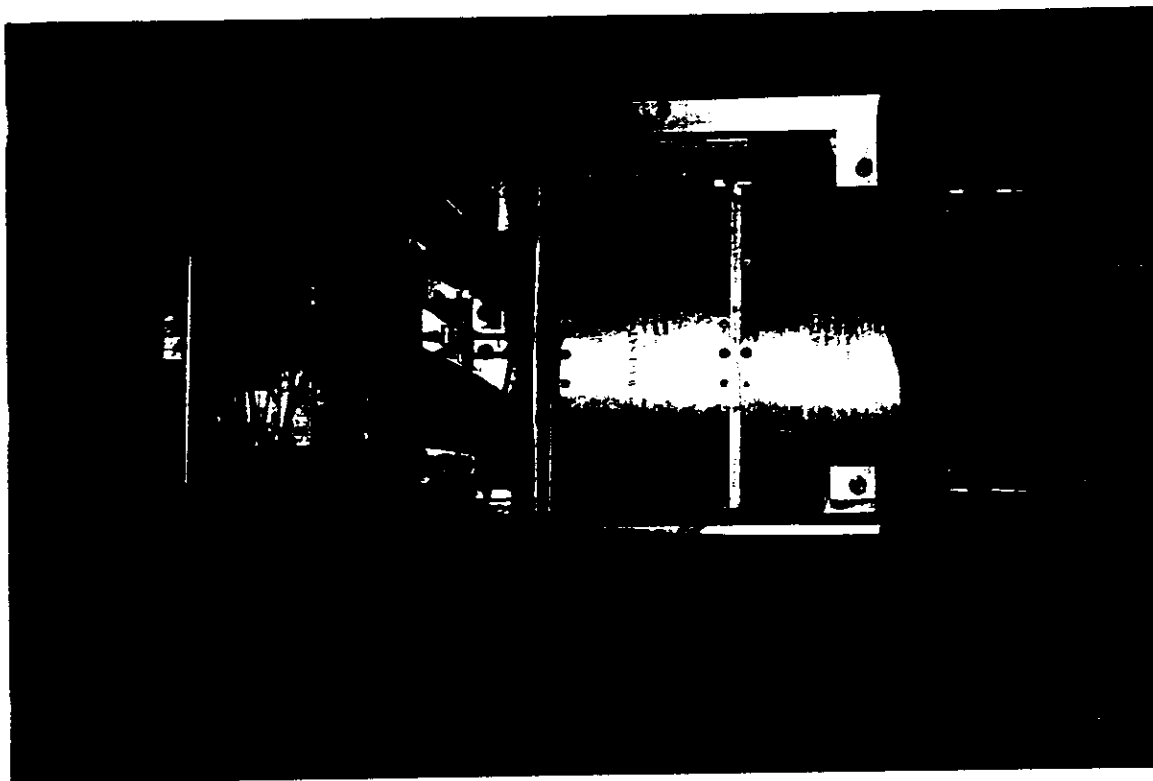


Figure 8.2 External View CDMA Repeater (B)

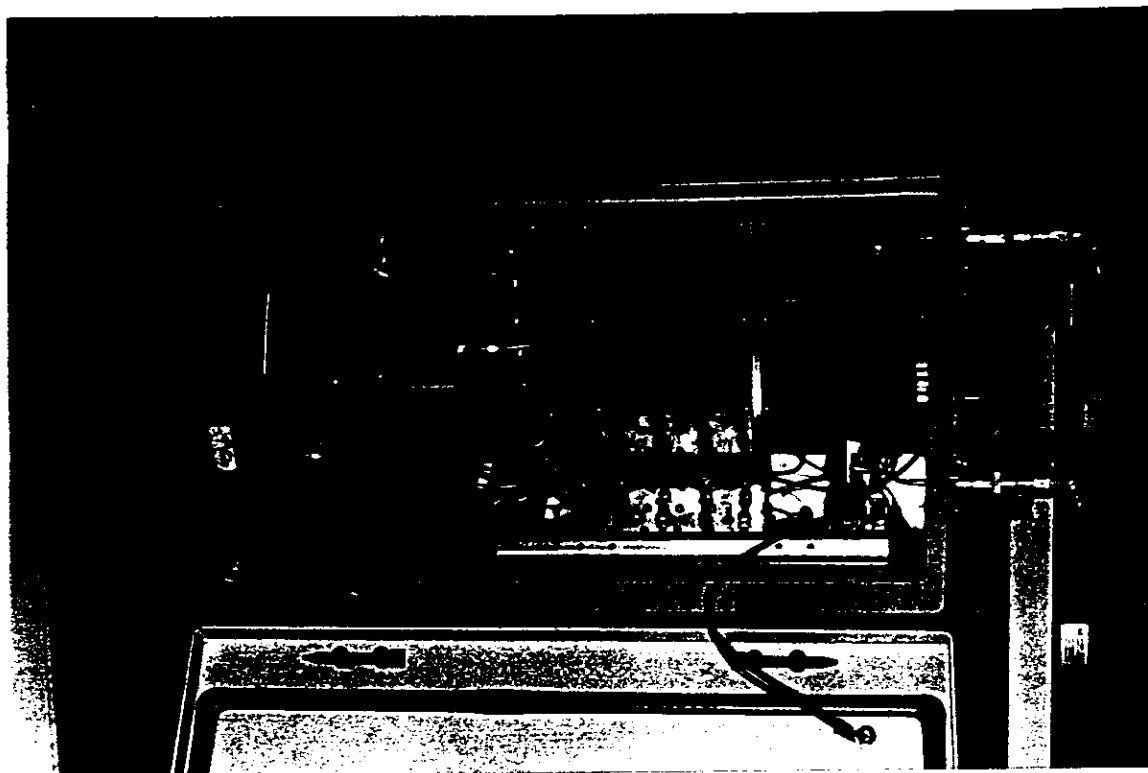


Figure 8.3 Uplink/Downlink Amplifier External View

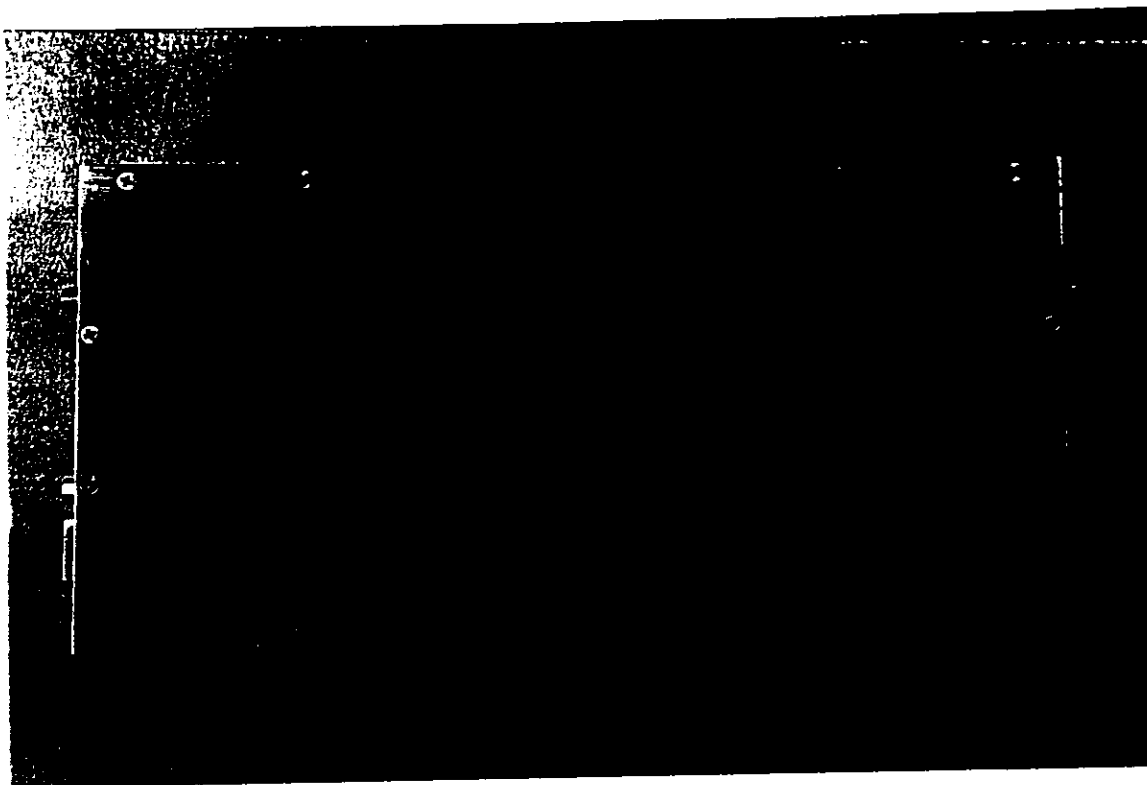


Figure 8.4 Uplink/Downlink Amplifier Internal View



Figure 8.5 Internal View Controller Module

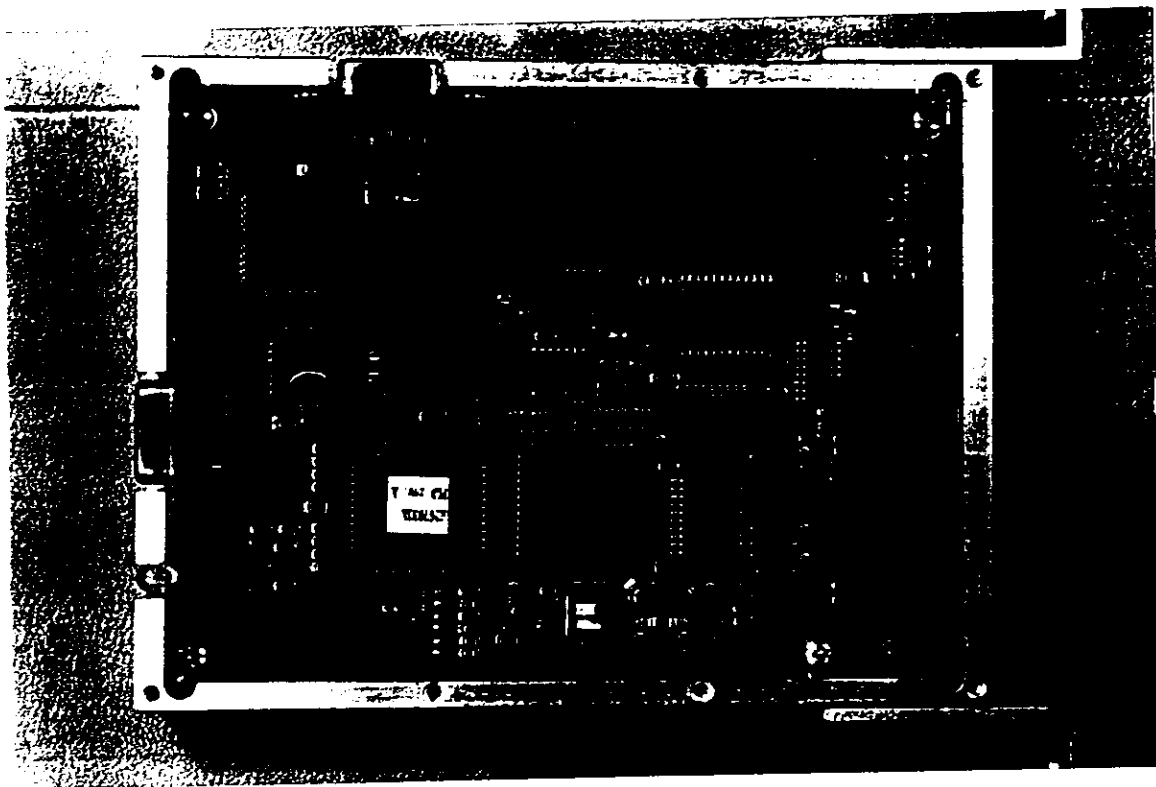


Figure 8.6 Exterior View of DC-DC Power Supply

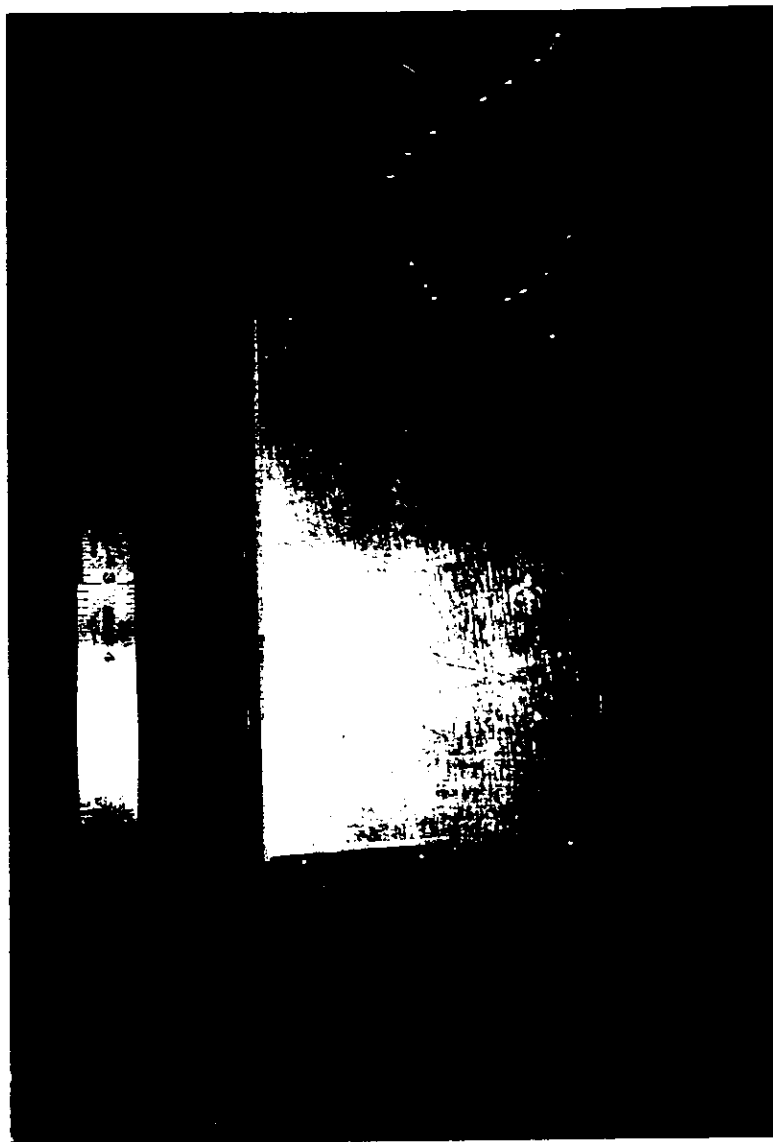


Figure 8.7 DC/DC Converter Internal View

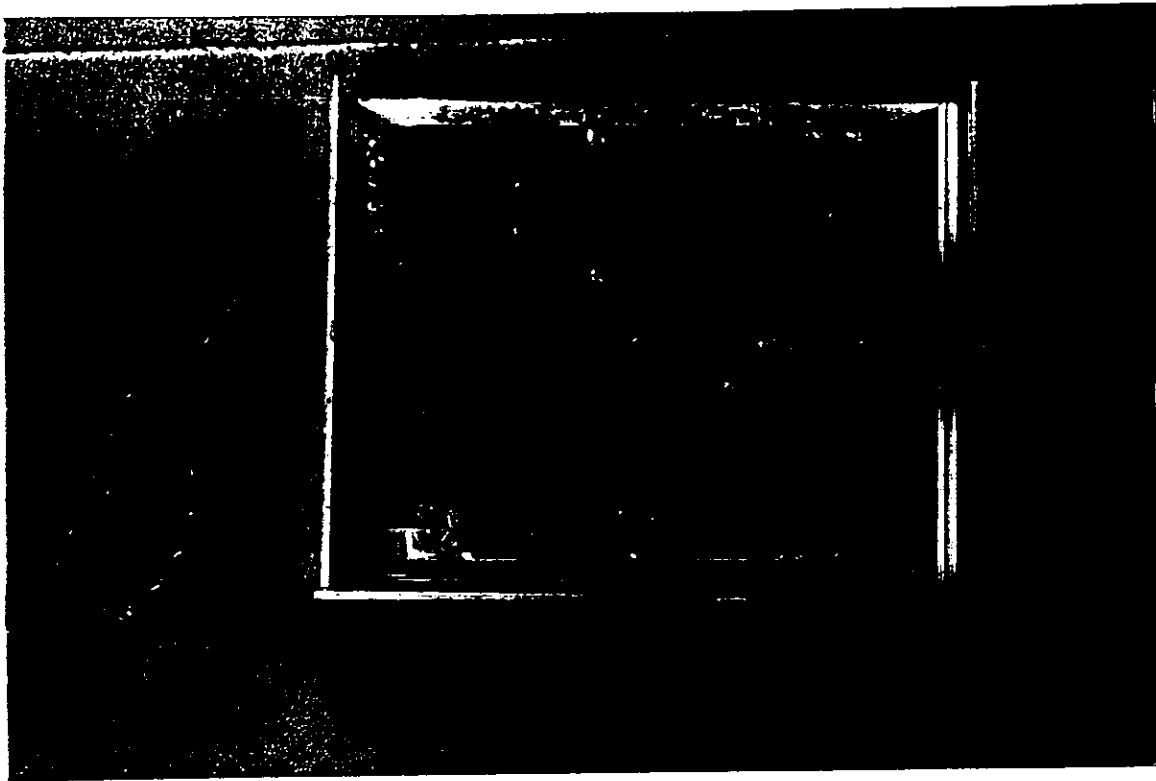


Figure 8.8 DC/DC Converter Close-up Internal View

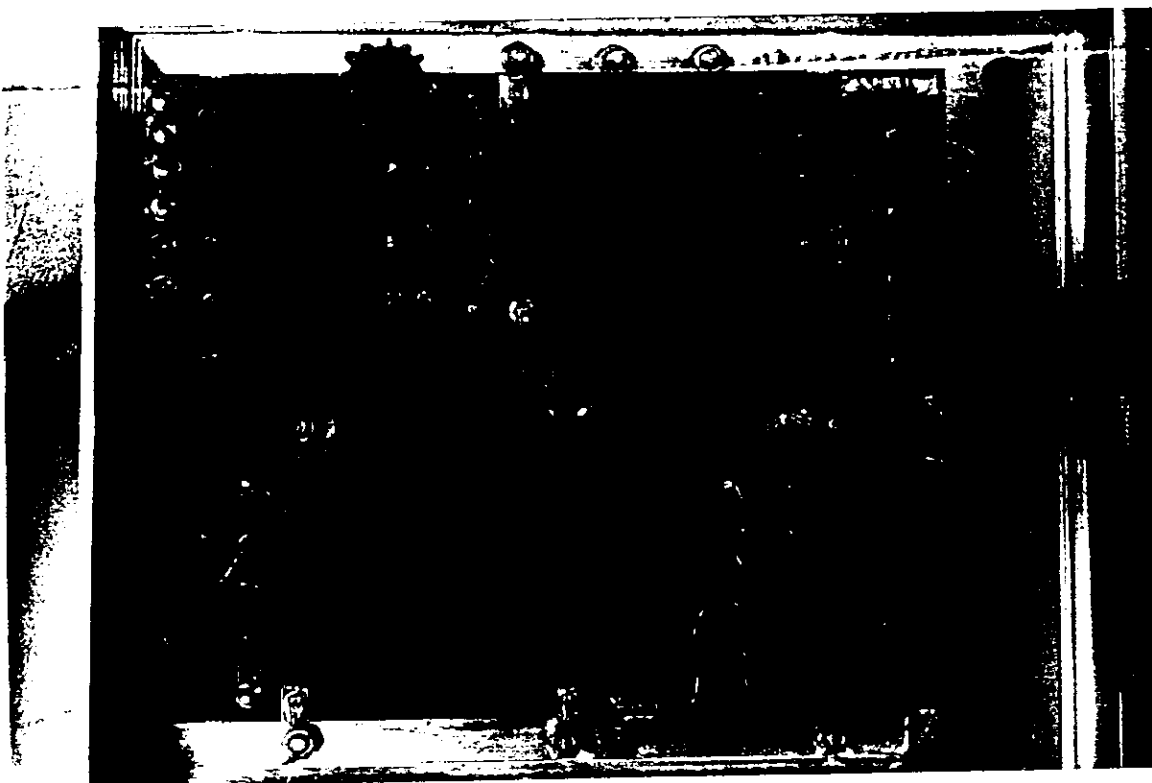


Figure 8.9 Channelizer External View

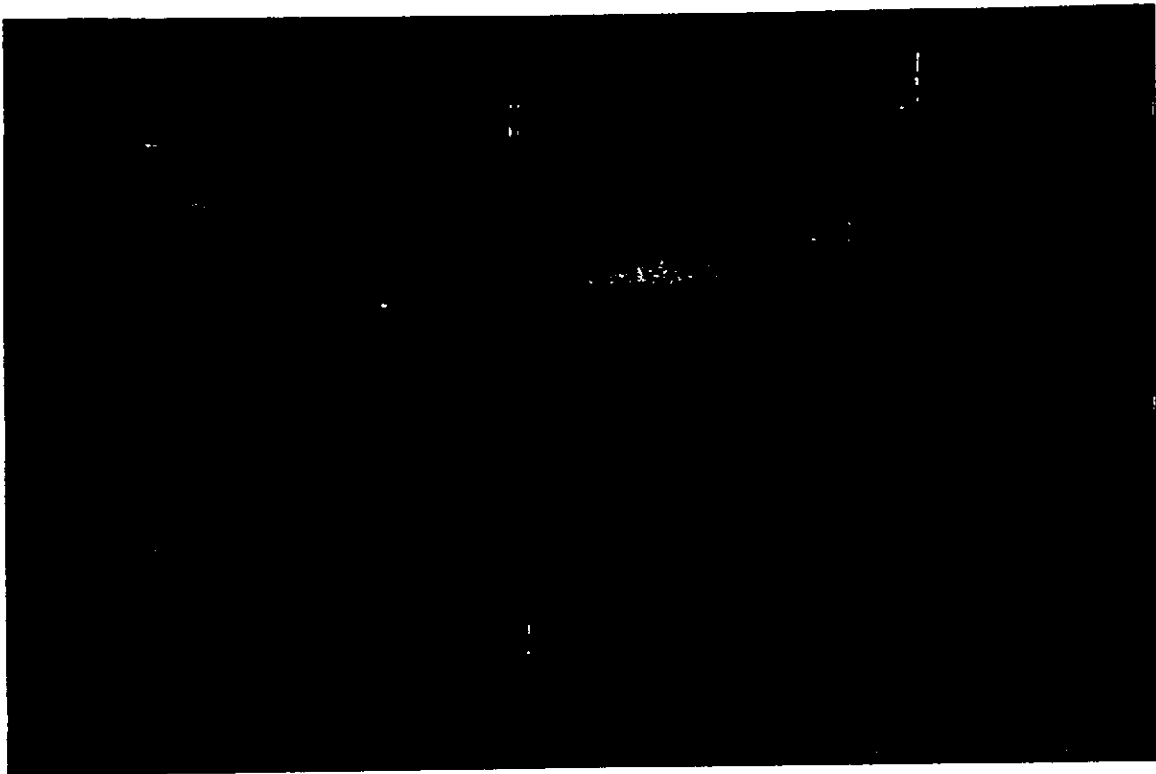


Figure 8.10 Channelizer Internal View

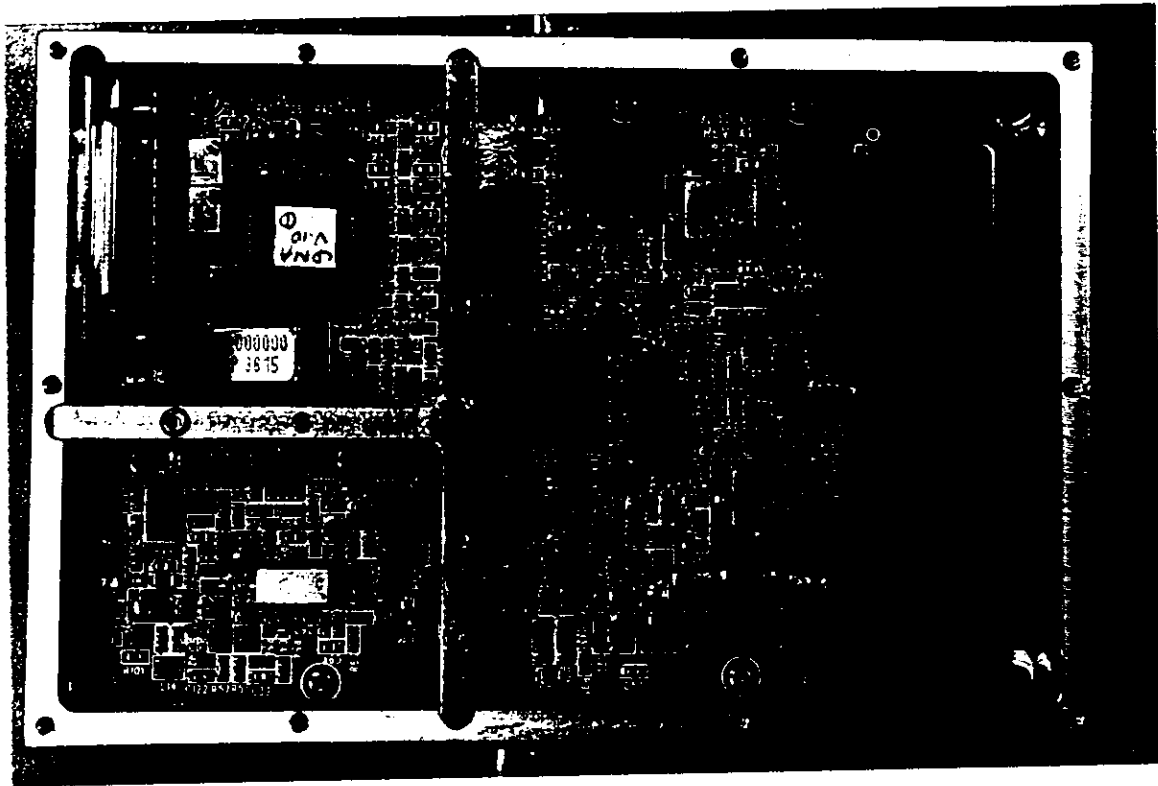


Figure 8.11 Channelizer Close-up Internal View

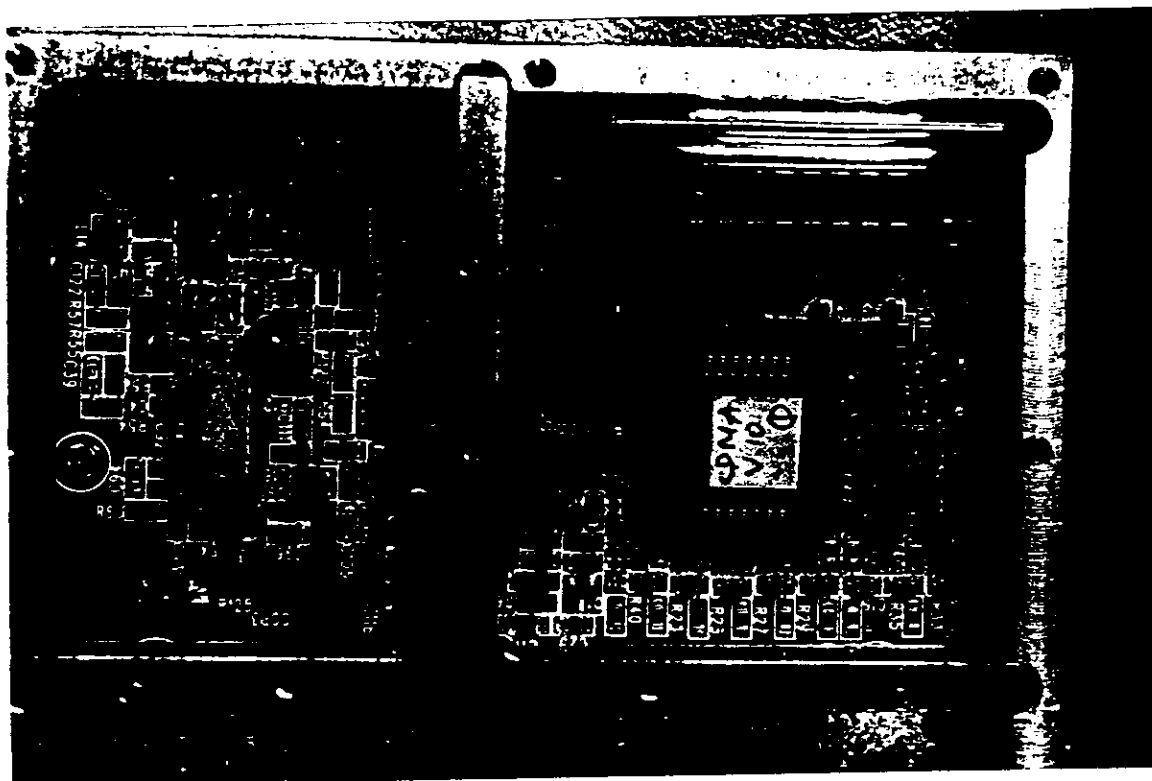


Figure 8.12 Channelizer Close-up Internal View

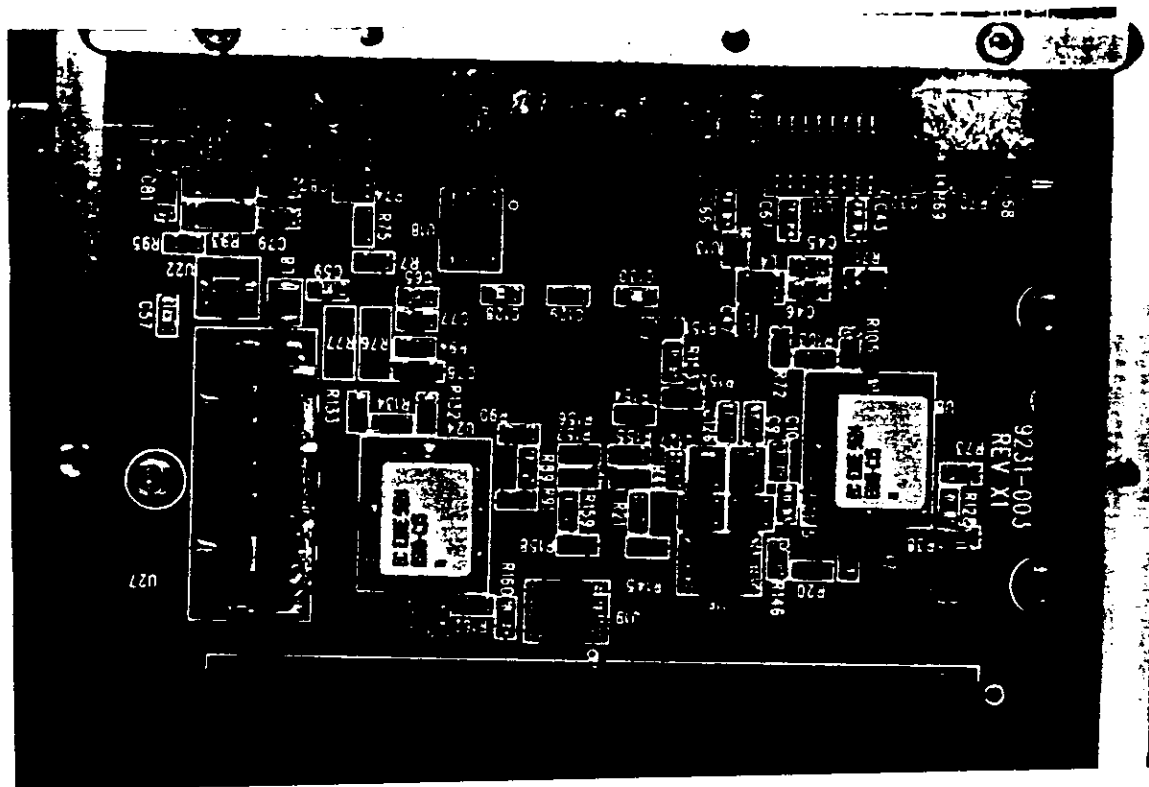


Figure 8.13 Channelizer Back Panel

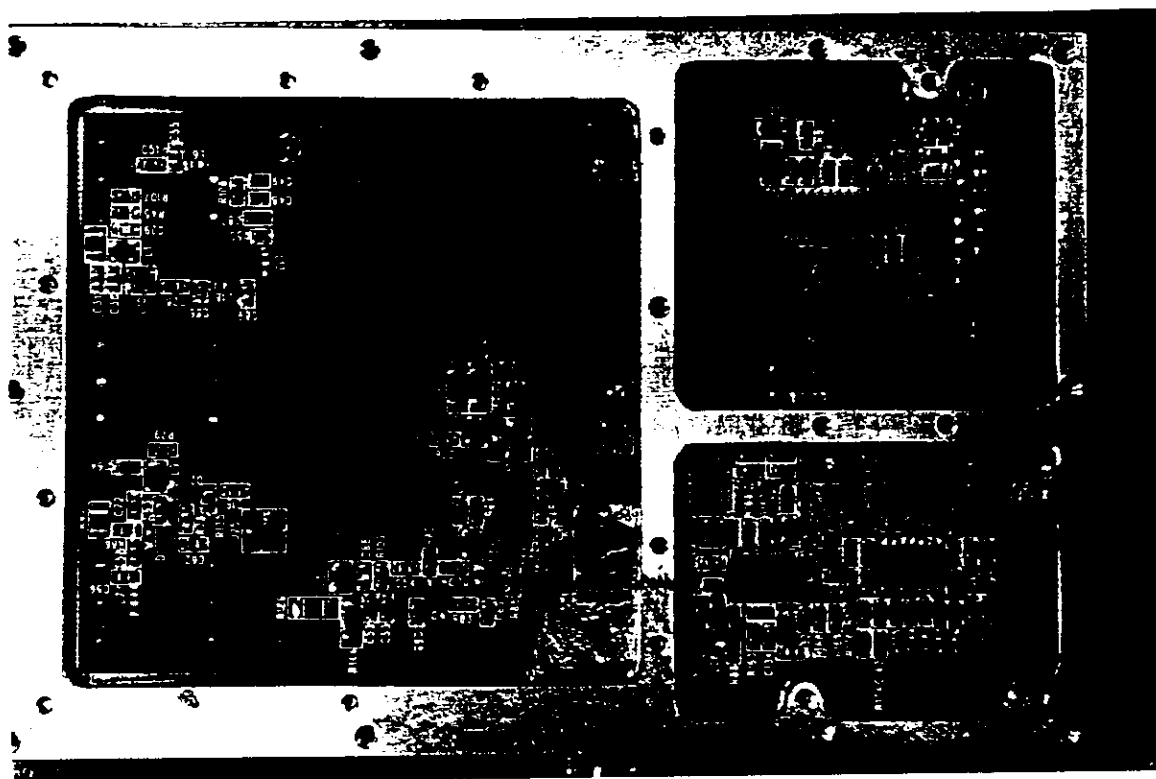


Figure 8.14 AC/DC Power Supply Internal View



Figure 8.15 Exterior View of Downlink Duplexer

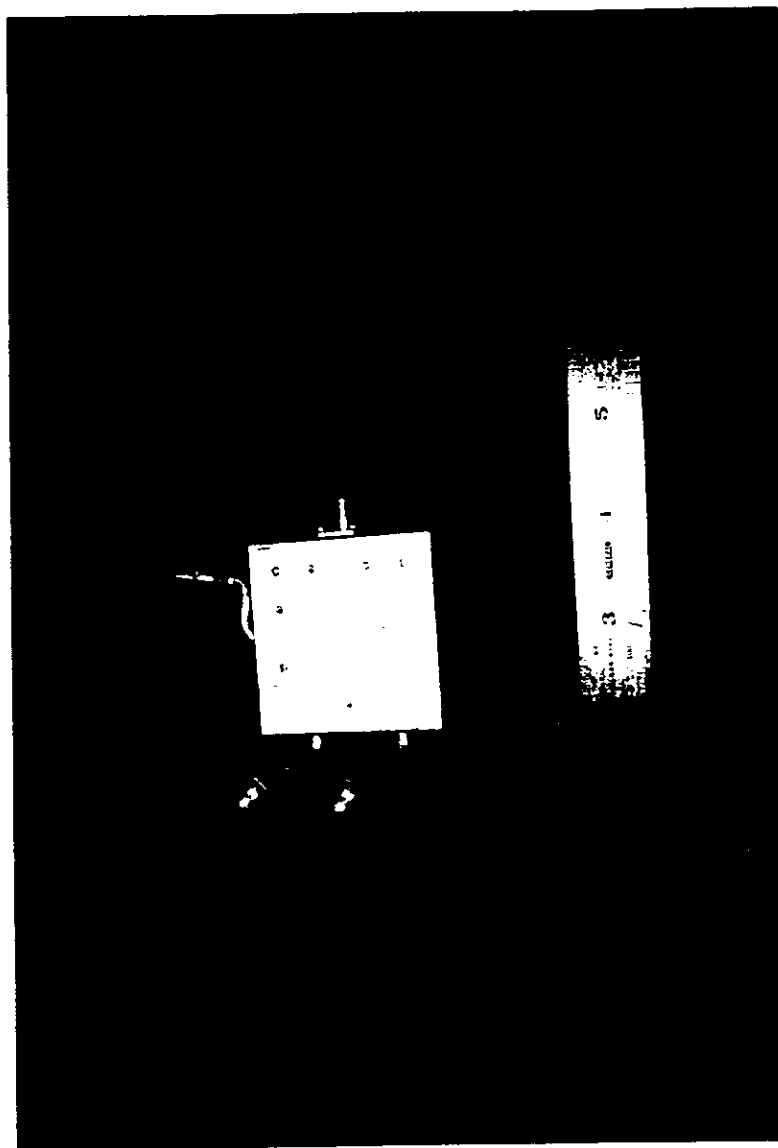


Figure 8.16 Exterior View of Uplink Duplexer

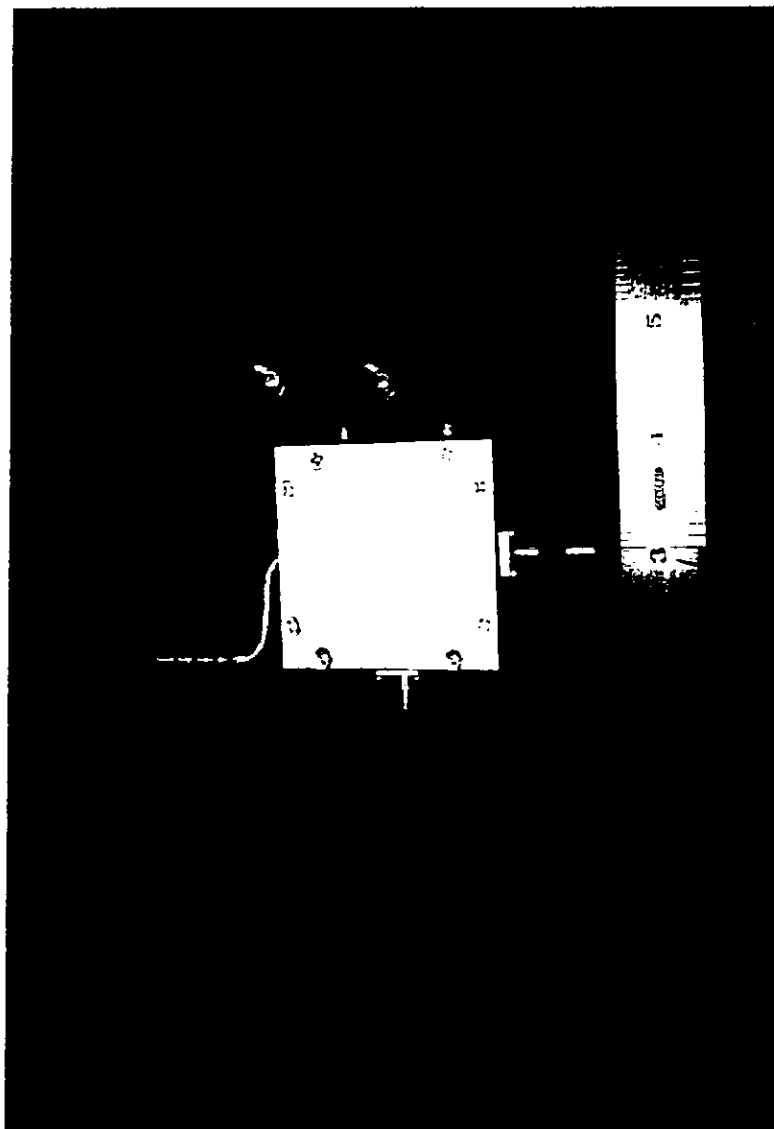


Figure 8.17 Interior View of Downlink Duplexer

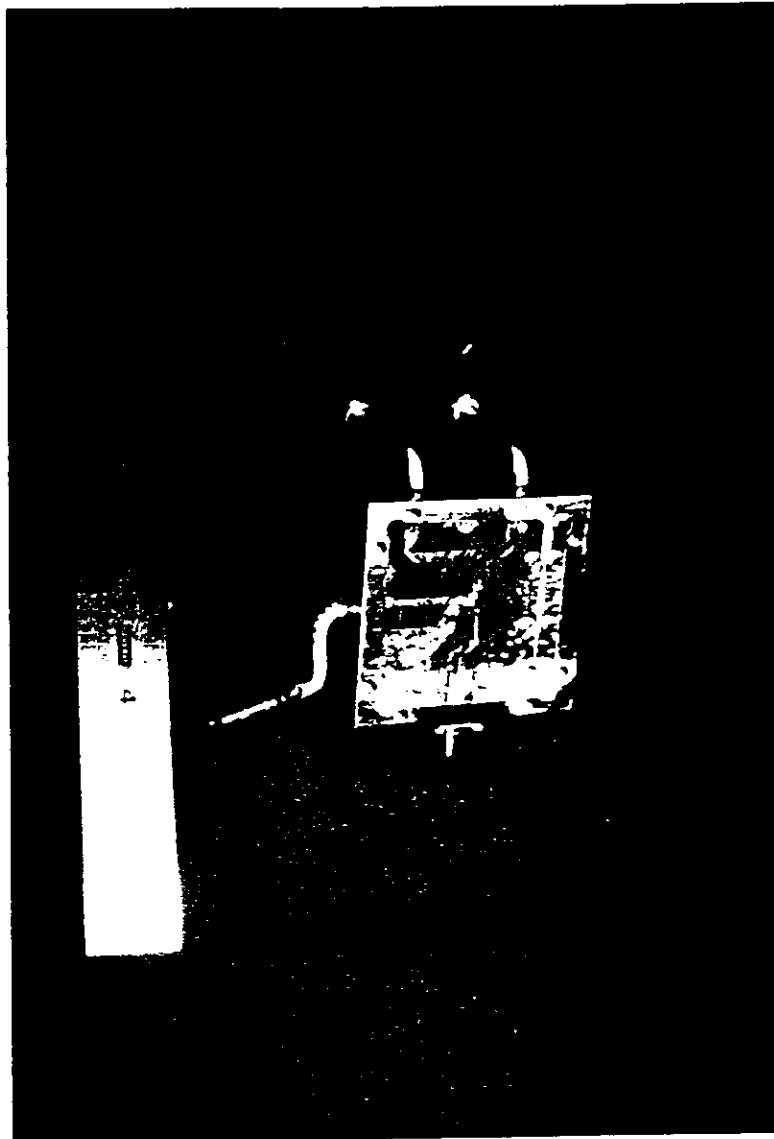


Figure 8.18 Interior View of Uplink Duplexer

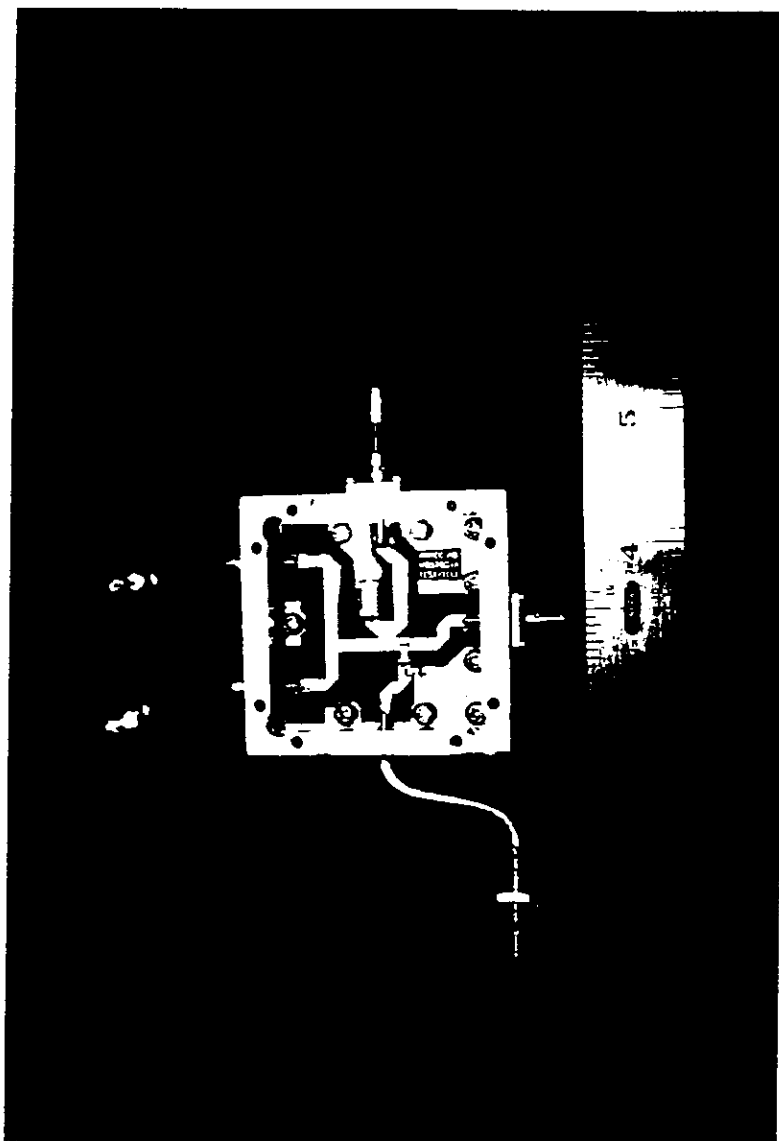


Figure 8.19 Exterior View of LNA Splitter

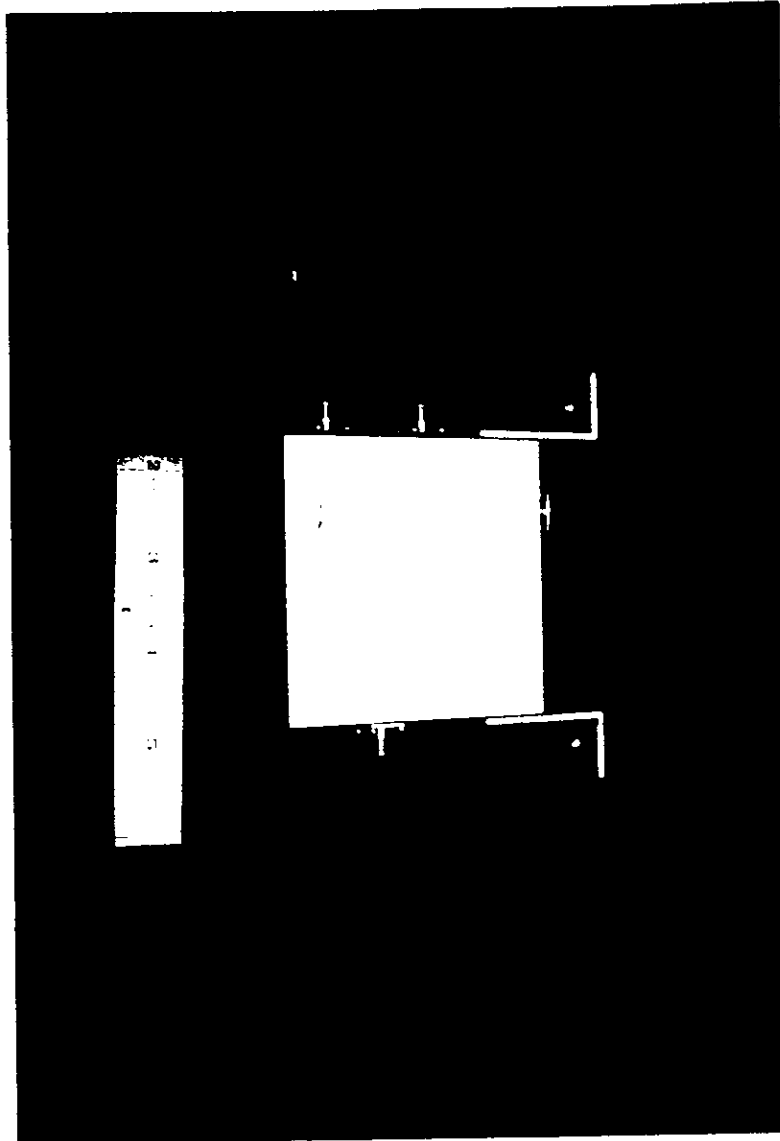


Figure 8.20 Exterior View of Uplink LNA Splitter

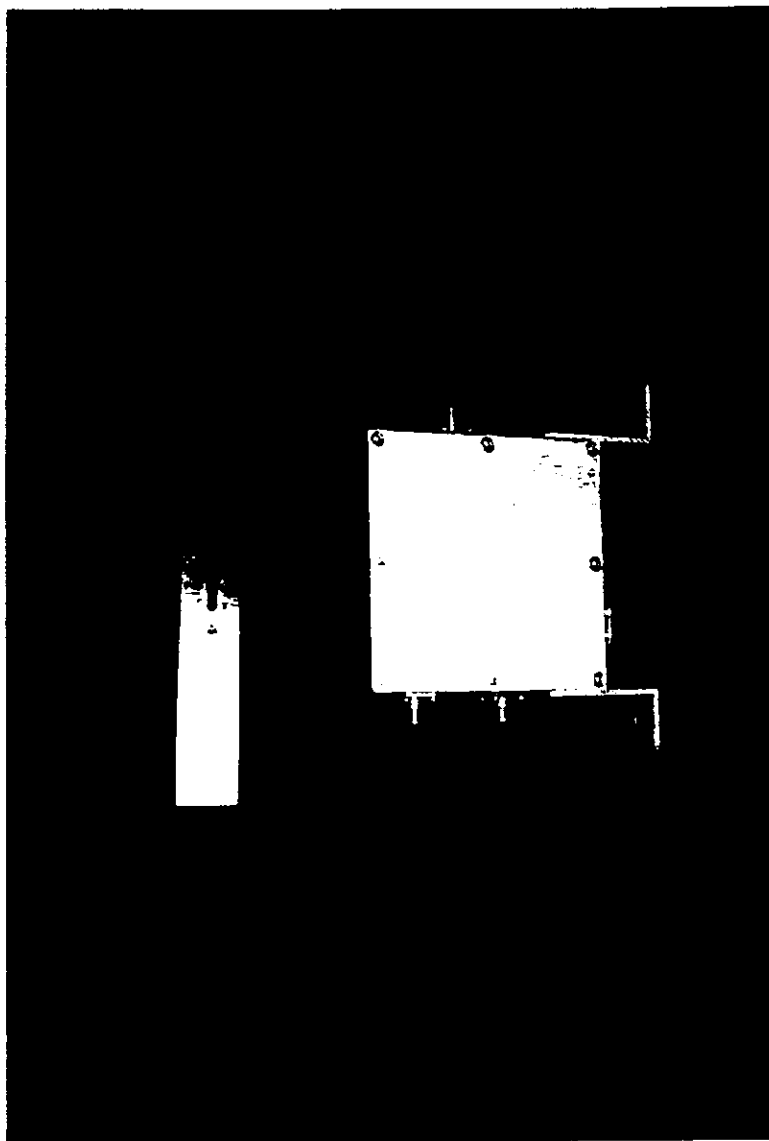
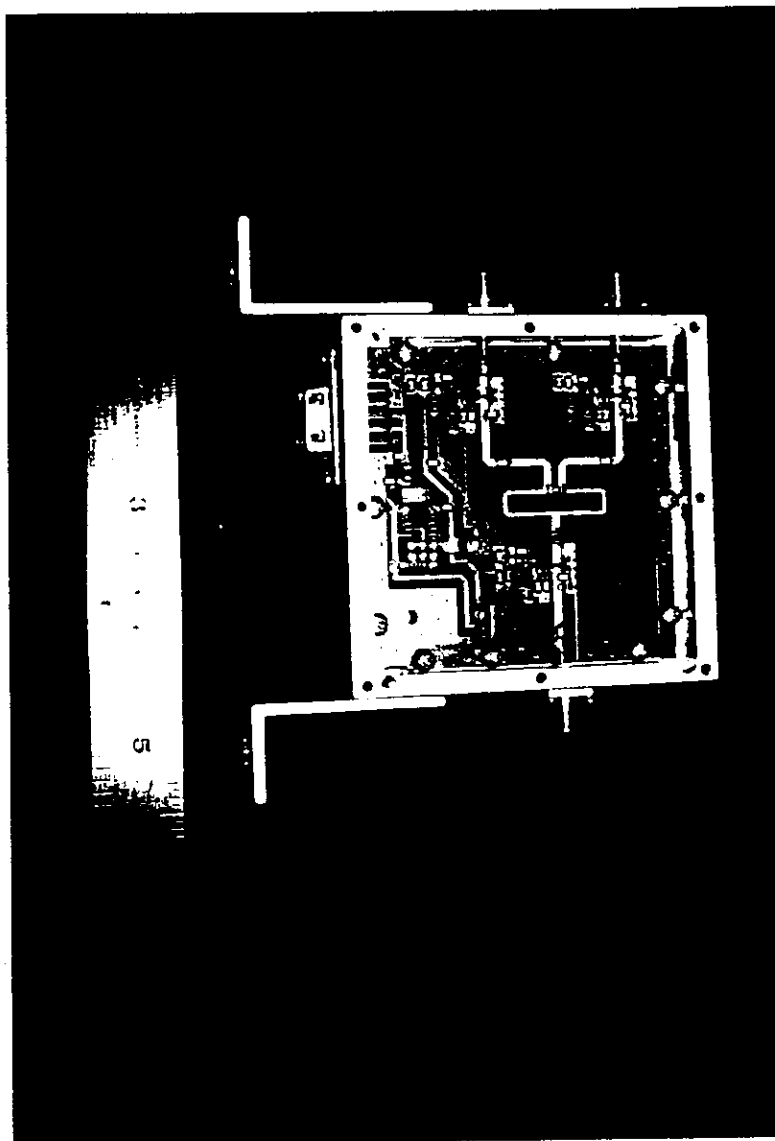


Figure 8.21 Interior View of LNA Splitter





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# LB41901(CDMA)). 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
Quality Engineer

File: "CDMATYPE.DOC"

CDMA, B-Band

Fwd Pwr (DL) Input Low Clean 425

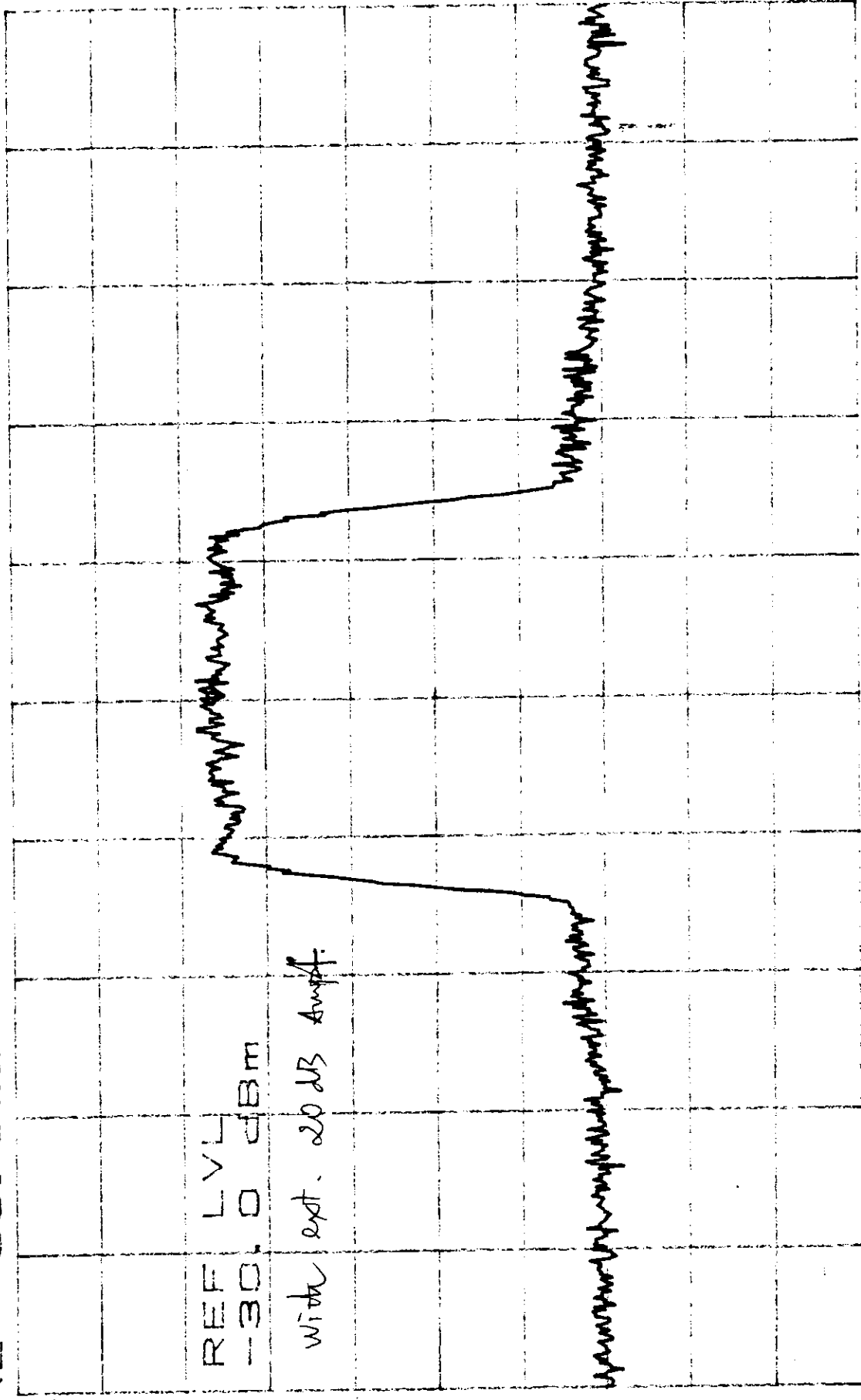
2/18/97

*ATTEN 0dB VAVG 10 MKR -55.00dBm
RL -30.00dBm 10dB/ 1.951267GHz

I_{n}/out

REF LVL
-30.0 dBm

With ext. 20 dB Ampl.



CENTER 1.951250GHz SPAN 5.000MHz
RBW 30kHz VBW 30kHz SWP 50.0ms

CDMA, B-Band

Fwd Path (DL)

Input Upper Chan 675

*ATTEN 0dB

VAVG 10

MKR -54.67dBm

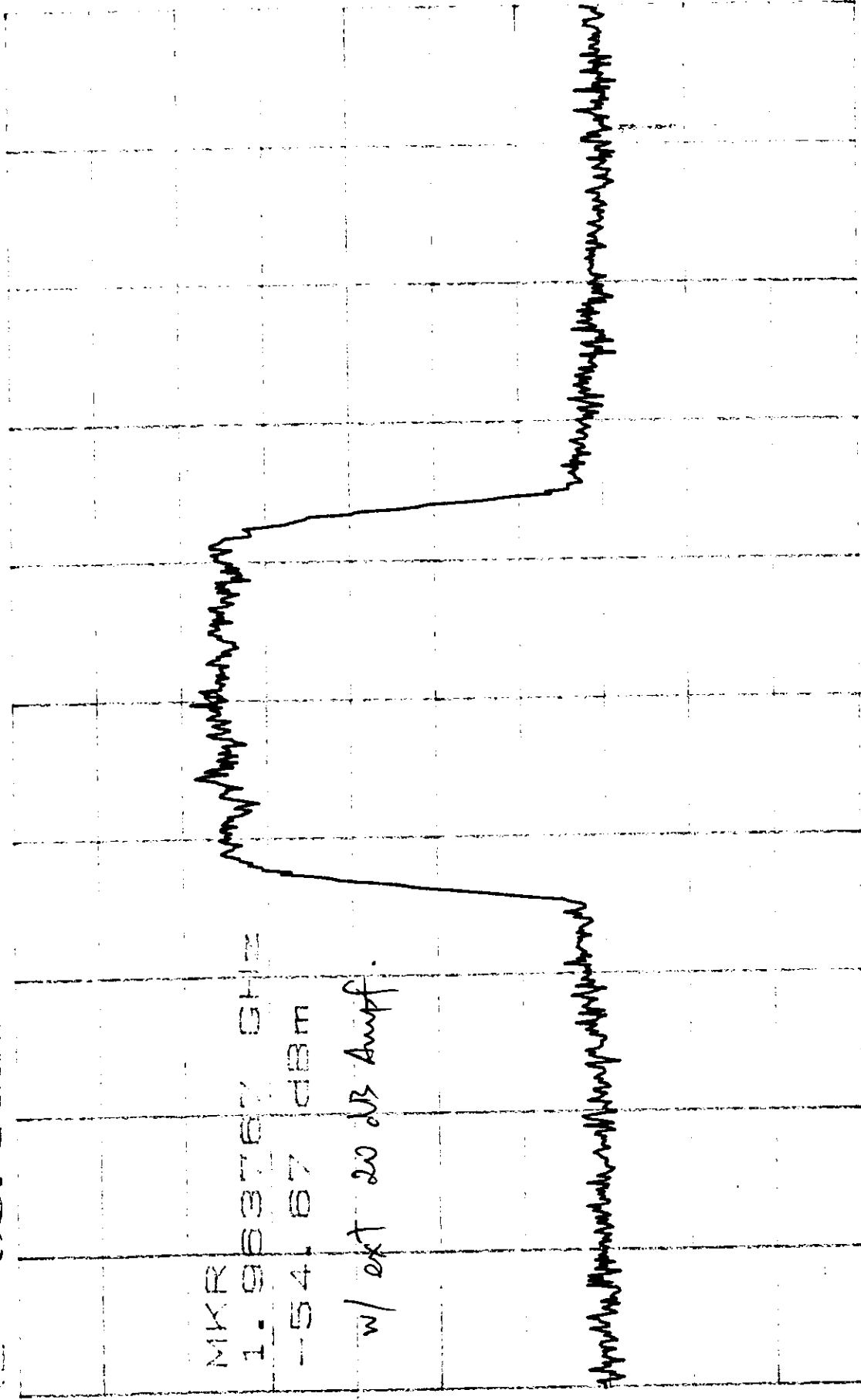
PL -30.00dBm

1.963767GHz

In/Out

1.0000000000000000
-54.67 dBm

w/ ext 20 dB Amp.



CENTER 1.963750GHz

SPAN 5.000MHz

RBW 30kHz

VBW 30kHz

SWP 50.0ms

CDMA, B-Band

Reverse Path (UL)

Input Low Chan 425

2/18/97

*ATTEN 0dB

VAVG 10

MKR -55.50dBm

RL -30.0dBm

10dB/

1.871267GHz

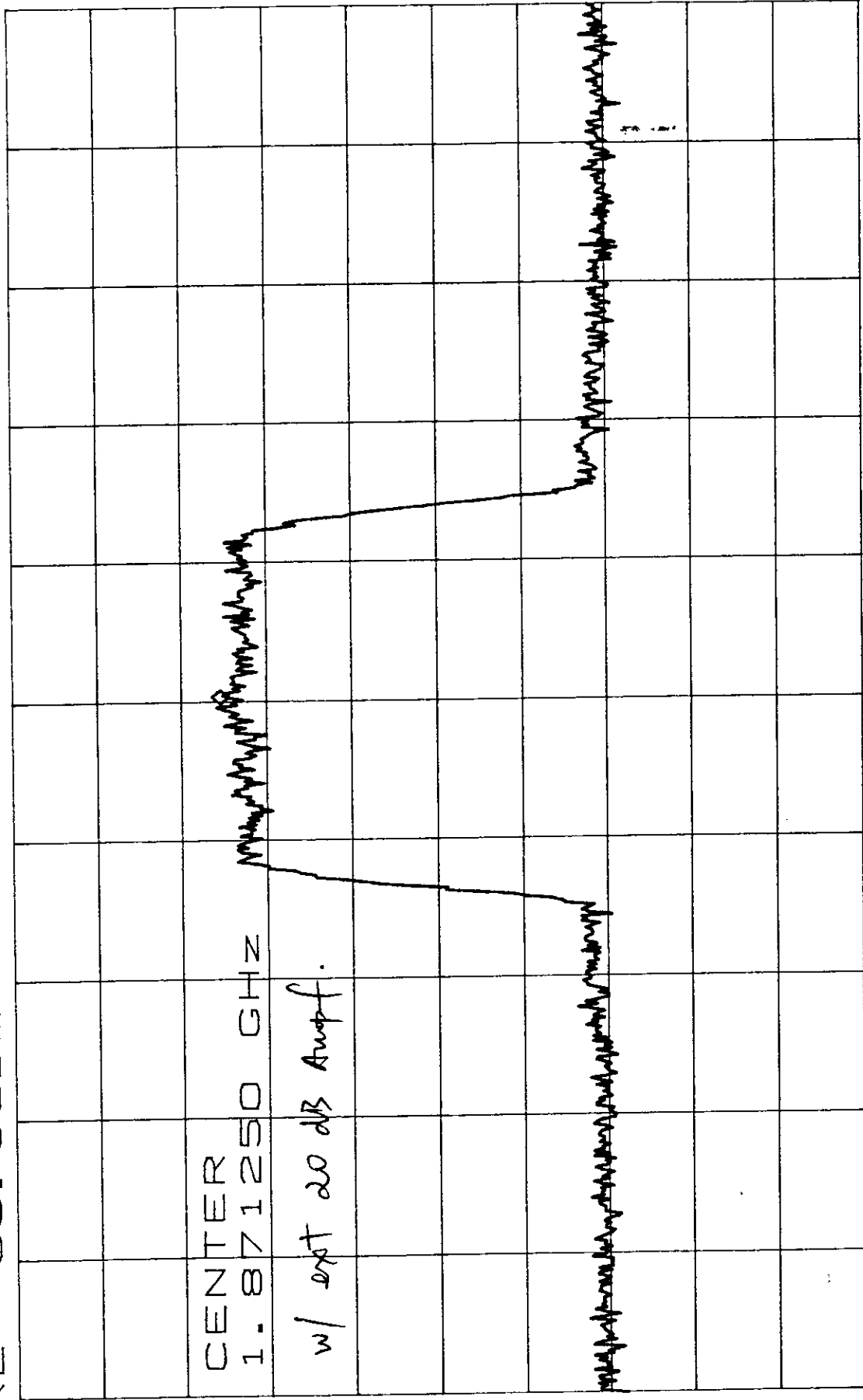
In/out

CENTER

1.871250 GHz

w/ ext 20 dB Amp.

D



CENTER 1.871250GHz

RBW 30kHz

VBW 30kHz

SPAN 5.000MHz

SWP 50.0ms

CDMA, B-Band

Rev. Patch (UL)

Input Upper Chan 675

2/18/97

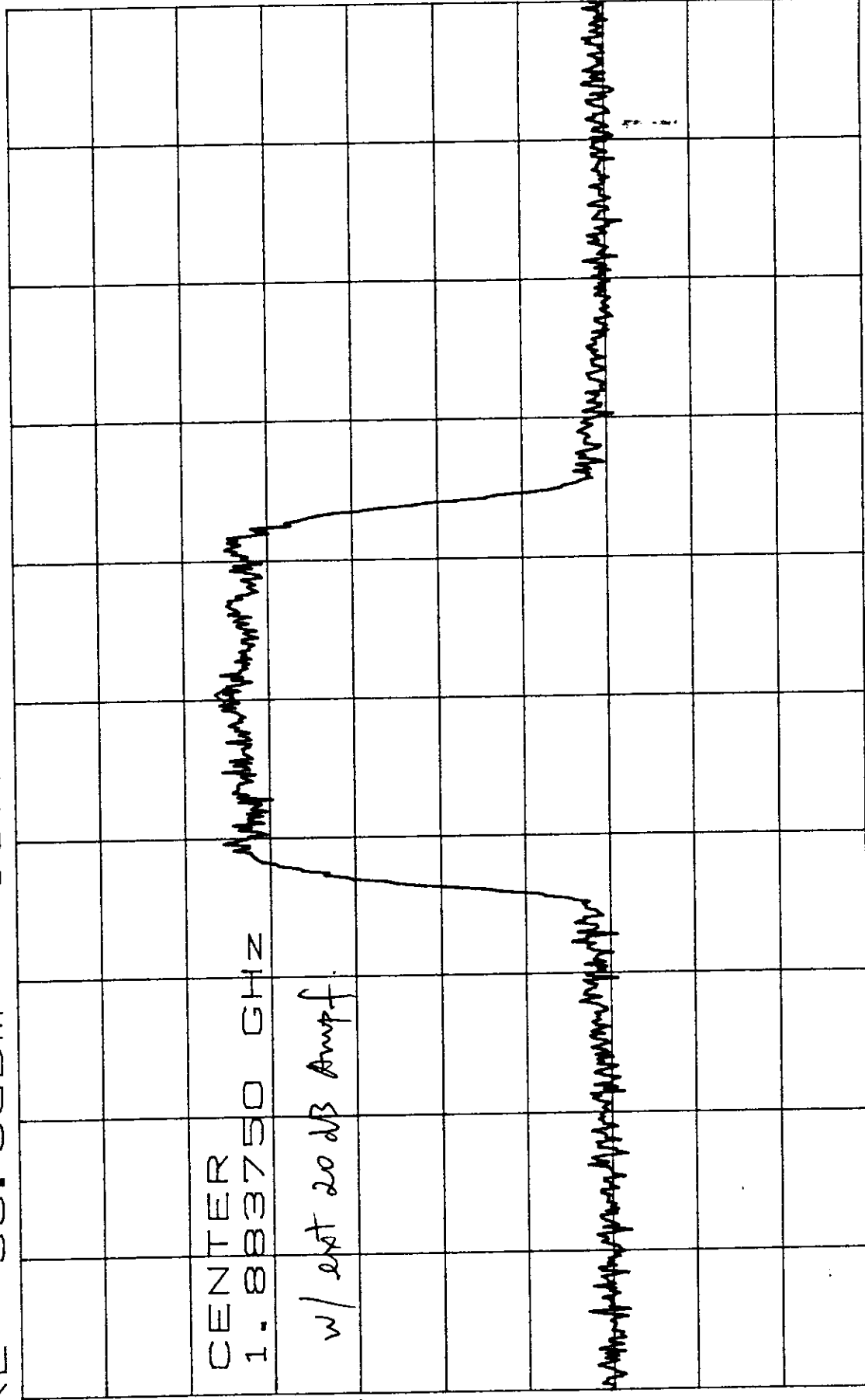
*ATTEN 0dB VAVG 10 MKR -55.67dBm
RL -30.0dBm 10dB/ 1.883767GHz

In/Out

CENTER

1.883750 GHz

w/ ext 20 dB Ampf.



CENTER 1.883750GHz

SPAN 5.000MHz

RBW 30kHz

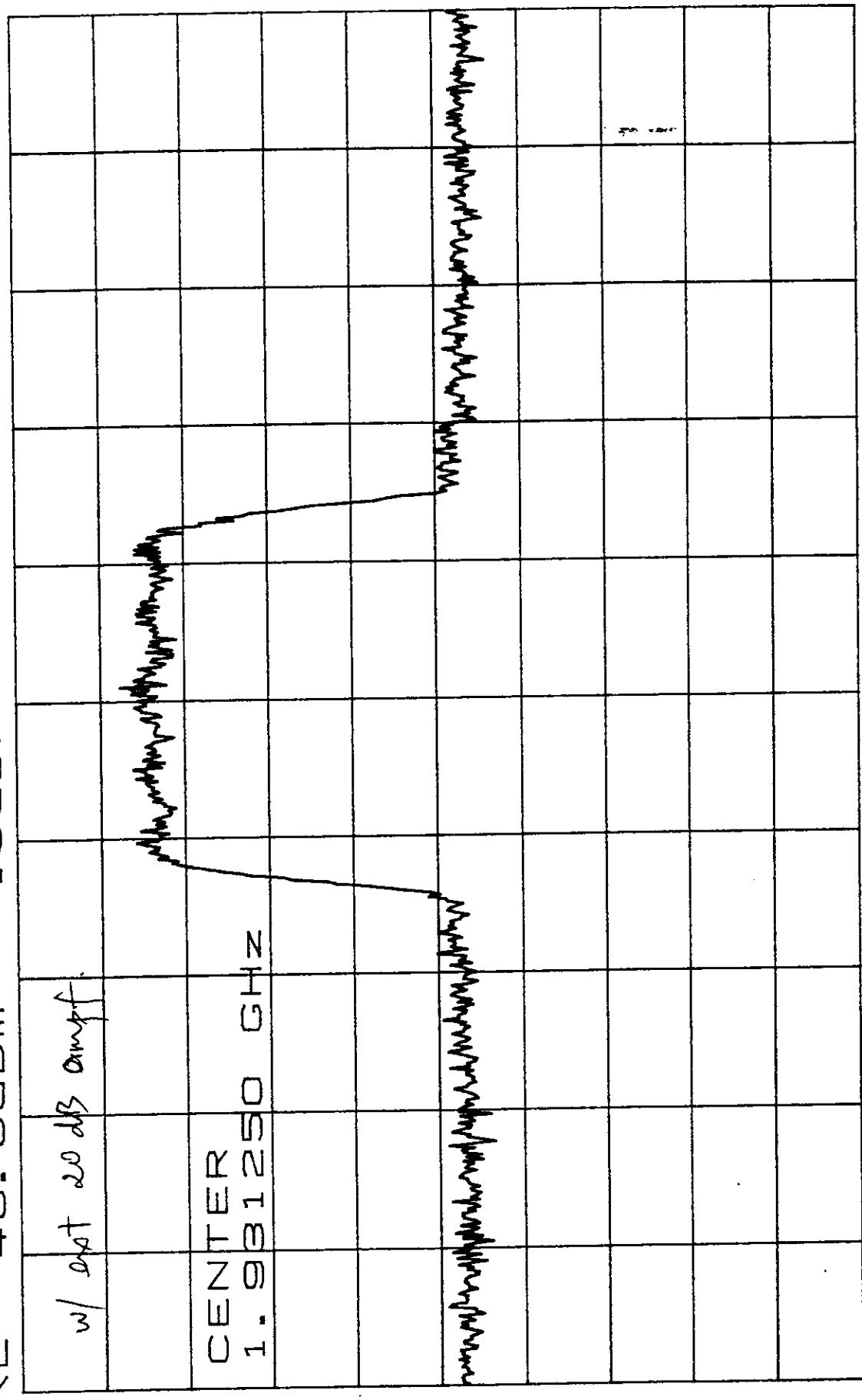
VBW 30kHz

SWP 50.0ms

CDMA, A-Band DL, Fund Pwr Inpurt, LO chan 25 2/18/97

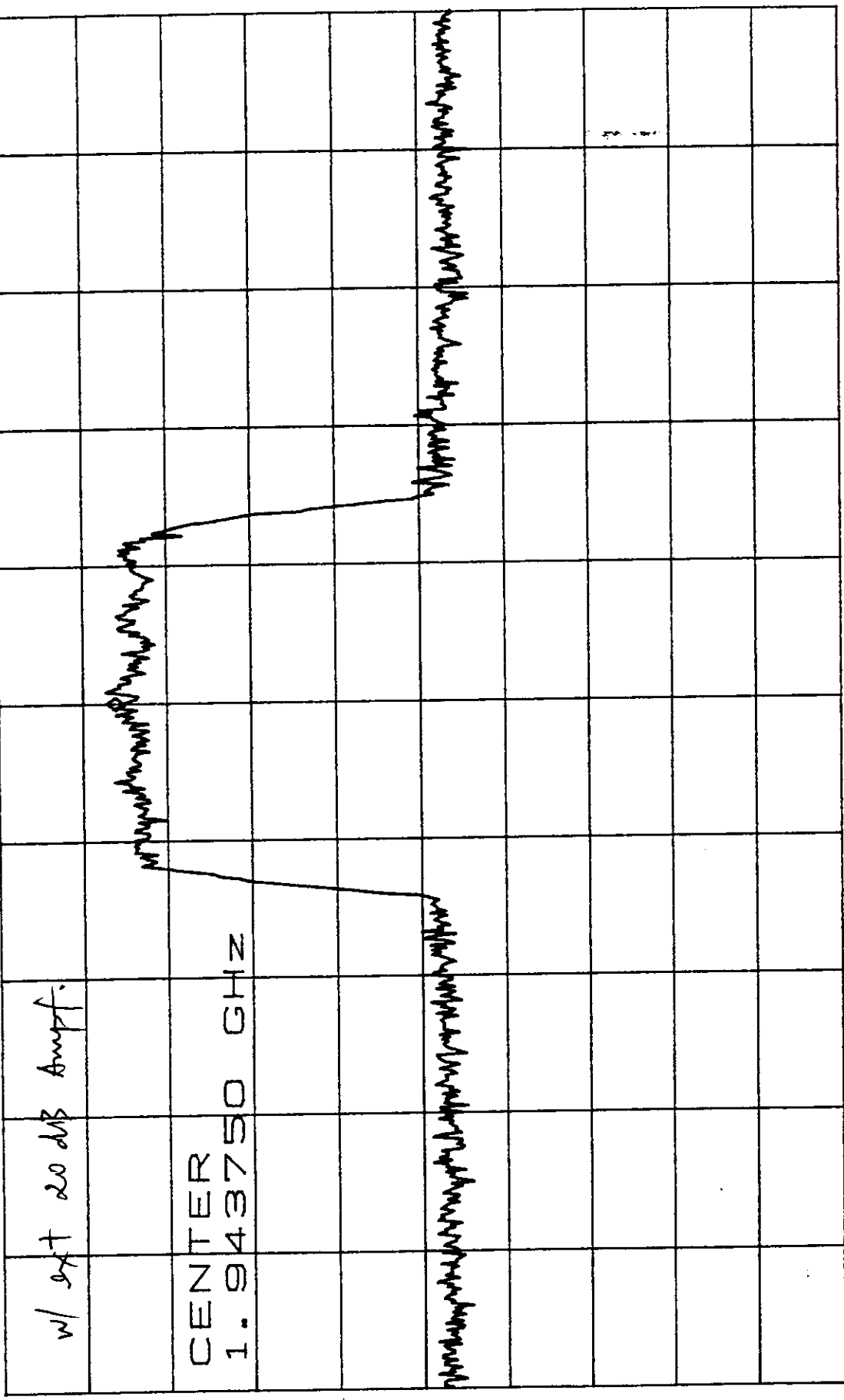
*ATTEN 10dB VAVG 10 MKR -55.67dBm
RL -40.0dBm 10dB/ 1.931292GHz

Inpurt



CENTER 1.931250GHz SPAN 5.000MHz
RBW 30kHz VBW 30kHz SWP 50.0ms

CRMA, 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



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

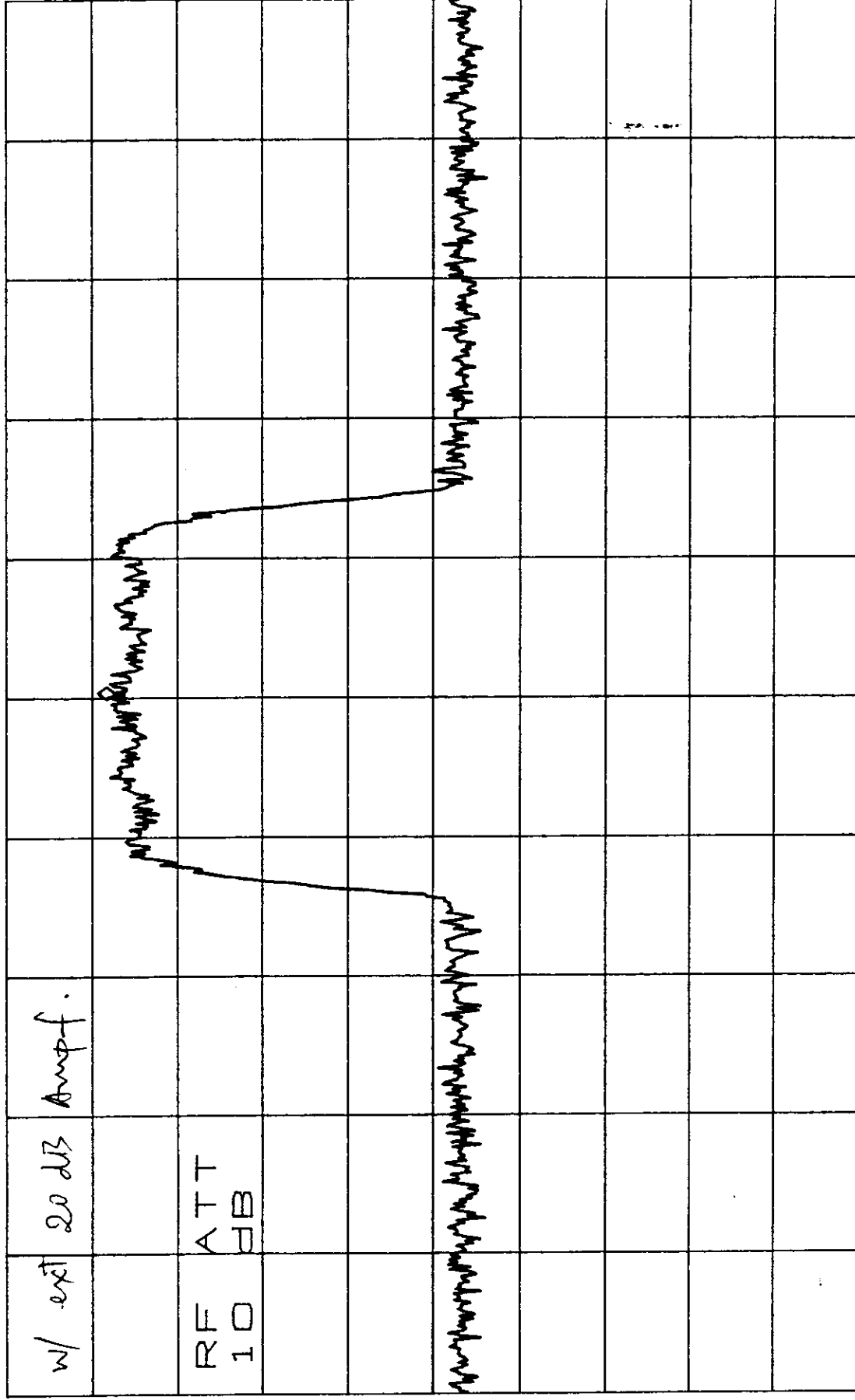
MKR -52.67dBm

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

RL -40.00dBm

10dB/

1.863792GHz

In/Out

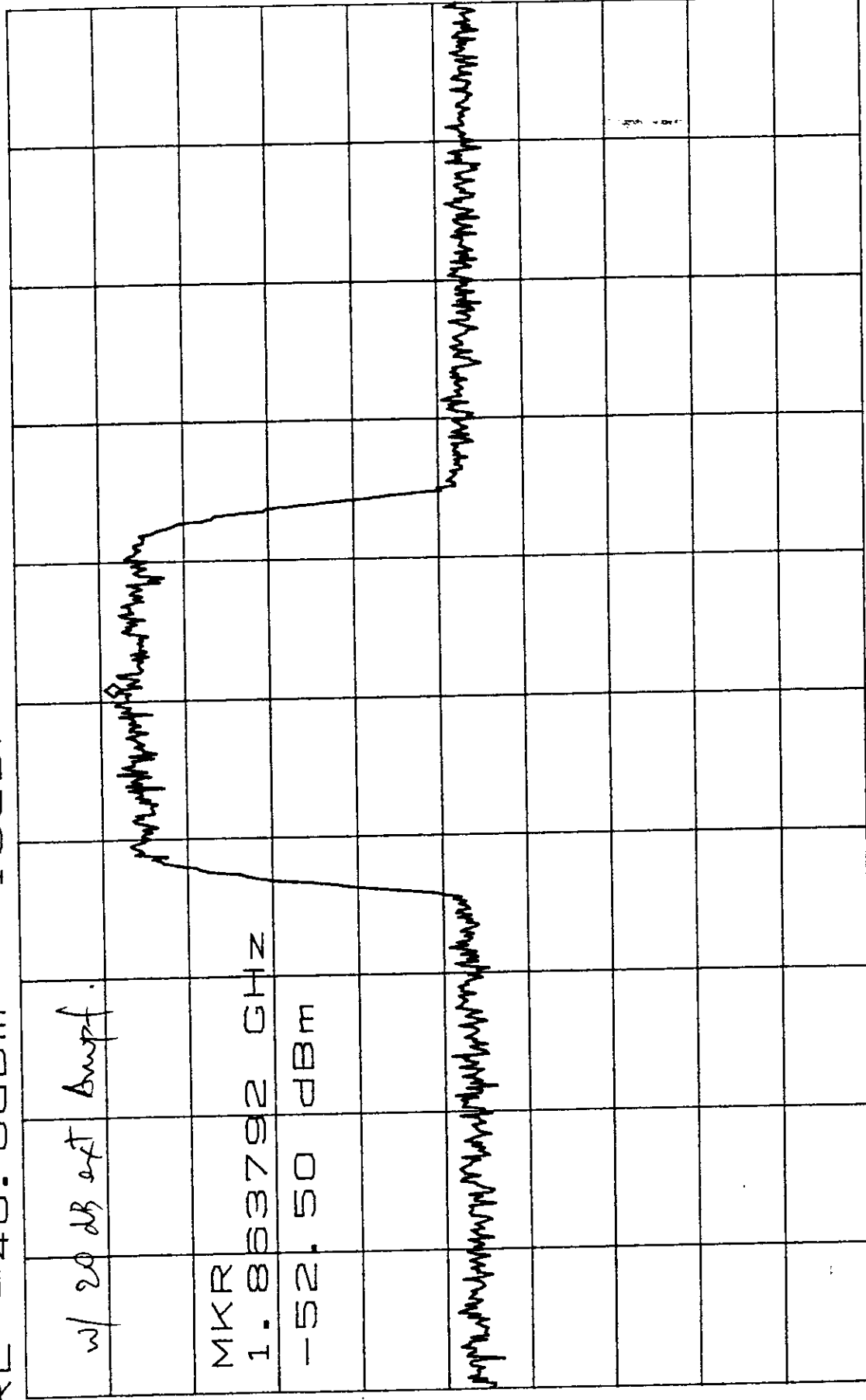
w/ 20 dB ext Ampf.

MKR

1.863792 GHz

-52.50 dBm

D



CENTER 1.863750GHz

RBW 30kHz

VBW 30kHz

SPAN 5.000MHz

SWP 50.0ms



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
Quality Engineer

File: "CDMATYPE.DOC"



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
Quality Engineer

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

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™ CDR-1901-2 PCS Repeater~~

MirrorCell™ CDMA CDR-1901-1 PCS Repeater

EXHIBIT 2

§ 2.983(b) Identification of Equipment

FCC ID: LB41901CDMA

Part Number: 1

Trade Name: MirrorCell™ CDMA

EXHIBIT 3

§ 2.983(c) Quantity Production

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

EXHIBIT 4

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

§ 2.983(d)(2) Frequency Range (^B~~A~~ 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.~~



Making Light Work For You

ORTEL
CORPORATION

2015 West Chestnut Street
Alhambra, California 91803
(818)281-3836 Fax: (818)281-8231

CHANNEL SELECTIVE REPEATER
FCC ID LB41901CDMA

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