



Test Report

For

Applicant : ZyXEL Communications Corporation
Equipment Type : IDSL Modem
Model : Omni 128L
FCC ID : I88OMNI128L

Report No. : 99CH001FI



Test Report Certification

Quietek Corporation

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Accredited by NIST(NVLAP), VCCI, BSMI, DNV, TUV

Applicant : ZyXEL Communications Corporation

Address : No.6, Innovation Rd II, Science-Based Industrial Park,
Hsin-Chu, Taiwan, R.O.C.

Equipment Type : IDSL Modem

Model : Omni 128L

FCC ID. : I88OMNI128L

Measurement Standard : CISPR 22/1994

Measurement Procedure : ANSI C63.4 /1992

Operation Voltage : 120VAC/60Hz

Classification : Class B

Test Result : Complied

Test Date : December 02,1999

Report No. : 99CH001FI



The Test Results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of Quietek Corporation.

This report must not be used to claim product endorsement by NVLAP any agency of the U.S. Government

Documented by: Shelly Fun

Test Engineer: Jimmy Huang

Approved: Gene Chang



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1. General Information

1.1 EUT Description

Applicant : ZyXEL Communications Corporation

Address : No.6, Innovation Rd II, Science-Based Industrial
Park, Hsin-Chu, Taiwan, R.O.C.

Equipment Type : IDSL Modem

Model : Omni 128L

FCC ID : I88OMNI128L

Operation Voltage : 120VAC/60Hz

RS 232 Cable : Shielded, 1.7m, 25 pin male to 25 pin female

Connect Adapter : 25 pin male to 9 pin female

UTP Cable : Non-Shielded, 2.0m

Power Adapter : ZyXEL, MW48-1801000UA
Cable out: Non-Shielded, 1.8m

Remark:

1. This device an IDSL Modem included an ISDN port, and a serial port.
2. The band rate of EUT is 128K.
3. QuieTek had verified the construction and function of the above model in typical operation, then shown in the test report.



1.2 Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

1.2.1 Notebook PC 1

Model Number : 500
Serial Number : 9145B0160C9100170EM
Manufacturer : ACER
Power Adapter : DELTA, ADP-45GB
Cable In: Non-Shielded, 1.8m
Cable Out: Shielded, 1.8m

1.2.2 Monitor

Model Number : CM752ET-311
Serial Number : T8E004443
FCC ID : DoC
Manufacturer : HITACHI
Data Cable : Shielded, 1.5m
Power Cord : Shielded, 1.8m

1.2.3 Keyboard

Model Number : 6311-TW2C
Serial Number : N/A
FCC ID : DoC
Manufacturer : ACER
Data Cable : Shielded, 1.8m

1.2.4 Printer

Model Number : C2642A
Serial Number : MY75N1D2XN
FCC ID : B94C2642X
Manufacturer : HP
Data Cable : Shielded, 1.2m
Power Adapter : NMB, M/N: C2175A
Cable for AC IN: Non-Shielded, 0.7m
Cable for AC Out: Non-Shielded, 1.5m



1.2.5 IDSL Modem(EUT)

Model Number : Omni 128L
Serial Number : N/A
FCC ID : I88OMNI128L
Manufacturer : ZyXEL
Power Adapter : ZyXEL, MW48-1801000UA
Cable out: Non-Shielded, 1.8m

1.2.6 Video Camera

Model Number : Wcam 3X
Serial Number : N/A
FCC ID : DoC
Manufacturer : Mustek
Data Cable (USB) : Shielded, 1.5m

1.2.7 Microphone

Model Number : CD-8000
Serial Number : N/A
Manufacturer : AIWA
Data Cable : Non-Shielded, 1m

1.2.8 Speaker

Model Number : J-009
Serial Number : 97-C-019790-T
FCC ID : DoC
Manufacturer : JS
Data Cable : Shielded, 1.5m

1.2.9 Walkman

Model Number : TB-21984
Manufacturer : TOBISHI
Serial Number : N/A
Data Cable : Non-Shielded, 1.5m

- 1.2.10 LAN Cable for connecting PC 2 and : Non-Shielded, 2..5m**
- 1.2.11 ISDN Cable for connecting : Non-Shielded, 20m**
- 1.2.12 SCSI Cable for connecting : Shielded, 1.2m**

Partner PC System 1

1.2.13 Notebook PC 1

Model Number : 500
Serial Number : 9145B0160C91400C1DM
Manufacturer : ACER
Power Adapter : DELTA, ADP-45GB
Cable In: Non-Shielded, 1.8m
Cable Out: Shielded, 1.8m

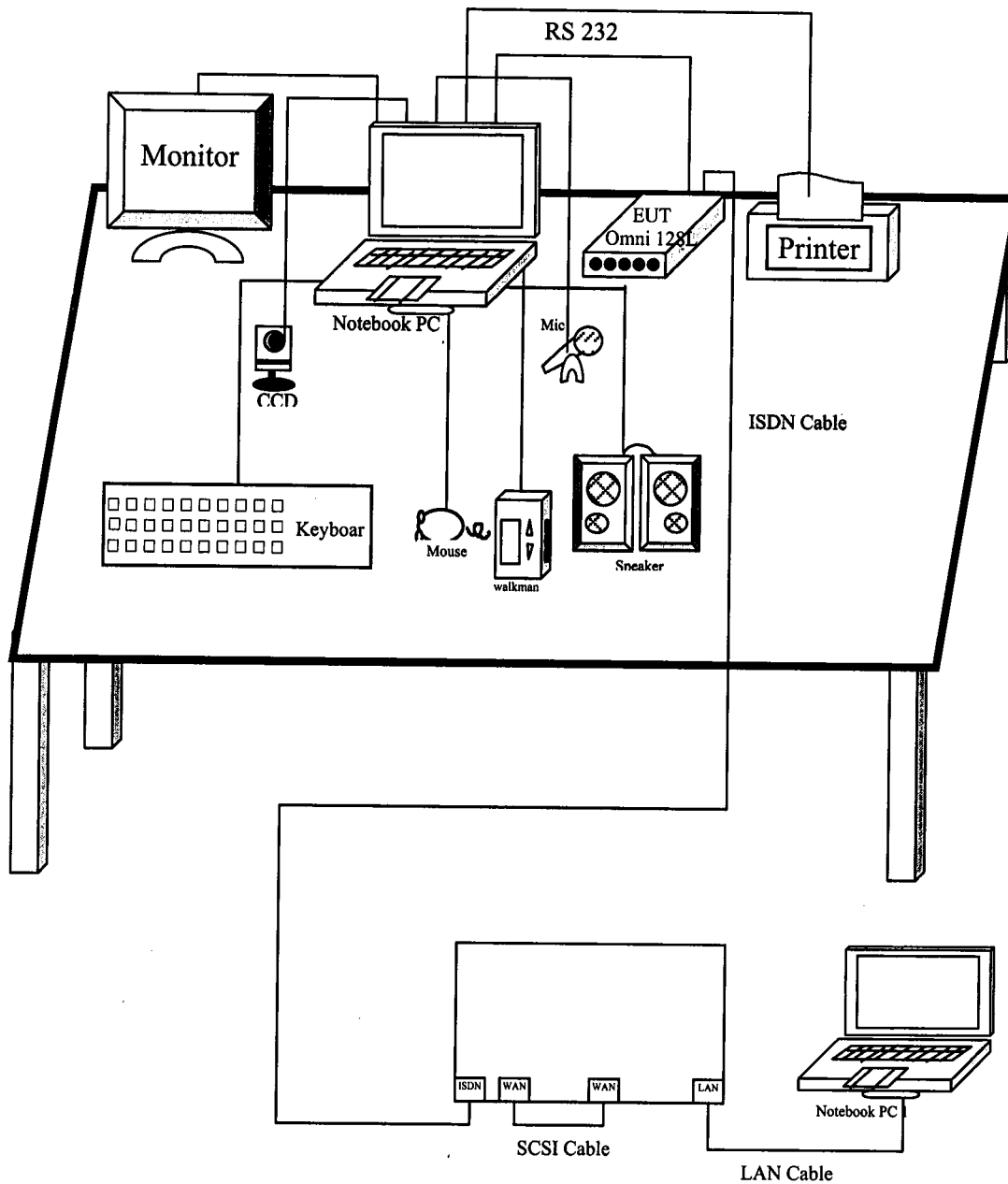
1.2.14 IDSL Access Concentrator

Model Number : Prestige 1600
Serial Number : N/A
FCC ID : DoC
Manufacturer : ZyXEL

1.2.15 Mau : Non-Shielded, 1.8m



1.3 EUT Configuration



1.4 EUT Exercise Software

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

- 1.4.1 Setup the EUT and simulators as shown on 3.2
- 1.4.2 Turn on the power of all equipment.
- 1.4.3 Notebook reads data from disk.
- 1.4.4 Notebook sends "H" pattern to printer, the printer will print "H" pattern on paper.
- 1.4.5 Notebook reads and writes data into and from modem.
- 1.4.6 Notebook will read data from floppy disk and then writes the data into floppy disk , same operation for hard disk.
- 1.4.7 Notebook will communicate with the partner PC through the EUT.
- 1.4.8 Repeat the above procedure 1.4.4 to 1.4.8

1.5 Test performed

Conducted emissions were investigated over the frequency range from **0.15MHz to 30MHz** using a receiver bandwidth of 9kHz.

Radiated emissions were investigated over the frequency range from **30MHz to 1000MHz** using a receiver bandwidth of 120kHz. Radiated testing was performed at an antenna to EUT distance of 10 meters

1.6 Test Facility

Ambient conditions in the laboratory:

Items	Required (IEC 68-1)	Actual
Temperature (°C)	15-35	20-35
Humidity (%RH)	25-75	50-65
Barometric pressure (mbar)	860-1060	950-1000

Site Description: November 3, 1998 File on
Federal Communications Commission
FCC Engineering Laboratory
7435 Oakland Mills Road
Columbia, MD 21046
Reference 31040/SIT1300F2



September 30, 1998 Accreditation on NVLAP
NVLAP Lab Code: 200347-0

February 23, 1999 Accreditation on DNV
Statement No. : 413-99-LAB11



December 8, 1998 Registration on VCCI
Registration No. for No.2 Shielded Room C-858
Registration No. for No.1 Open Area Test Site R-823
Registration No. for No.2 Open Area Test Site R-835



January 04, 1999 Accreditation on TÜV Rheinland
Certificate No.: I9865712-9901



Name of firm : QuieTek Corporation

Site location : No.75-1, Wang-Yeh Valley, Yung-Hsing Tsuen,
Chiung-Lin, Hsin-Chu County, Taiwan, R.O.C.

2. Conducted Emission

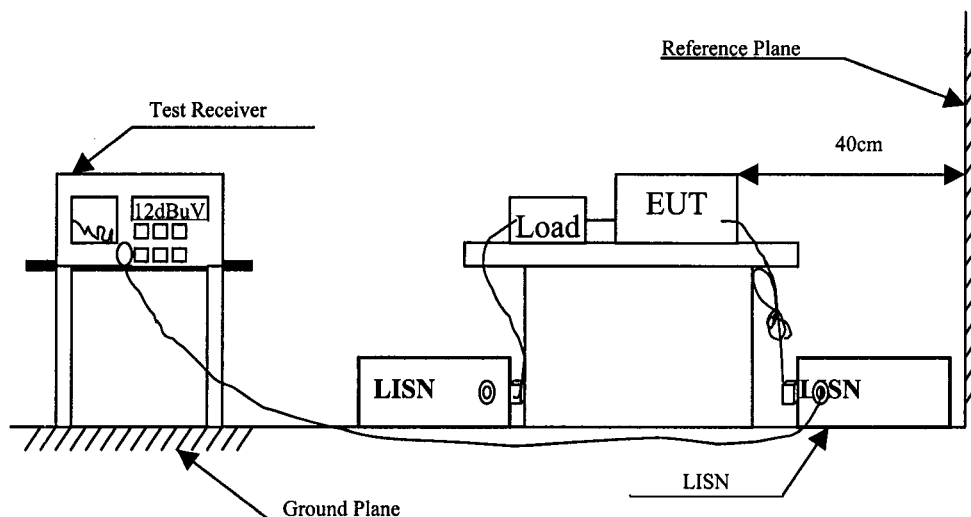
2.1 Test Equipment List

The following test equipment are used during the conducted emission test:

Item	Instrument	Manufacturer	Type No./Serial No	Last Cal..	Remark
1	Test Receiver	R & S	ESCS 30/825442/17	May, 1999	
2	L.I.S.N.	R & S	ESH3-Z5/825016/6	May, 1999	EUT
3	L.I.S.N.	Kyoritsu	KNW-407/8-1420-3	May, 1999	Peripherals
4	Pulse Limiter	R & S	ESH3-Z2	N/A	
5	N0.2 Shielded Room			N/A	

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

2.2 Test Setup



2.3 Limits

CISPR 22 Limits (dBuV)					FCC Part 15 Subpart B (dBuV)				
Frequency MHz	Class A		Class B		Frequency MHz	Class A		Class B	
	QP	AV	MHz	AV		uV	dBuV	uV	dBuV
0.15 - 0.50	79	66	66-56	56-46	0.45-1.705	1000	60.0	250	48.0
0.50-5.0	73	60	56	46	1.705-30	3000	69.5	250	48.0
5.0 - 30	73	60	60	50					

Remarks : In the above table, the tighter limit applies at the band edges.

2.4 Test Procedure

The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4 /1992 on conducted measurement.

The bandwidth of the field strength meter (R & S Test Receiver ESCS 30) is set at 9kHz.

2.5 Test Results

The conducted emission from the EUT is measured and shown in attachment 1 of test report. The acceptance criterion was met and the EUT passed the test.



3. Radiated Emission

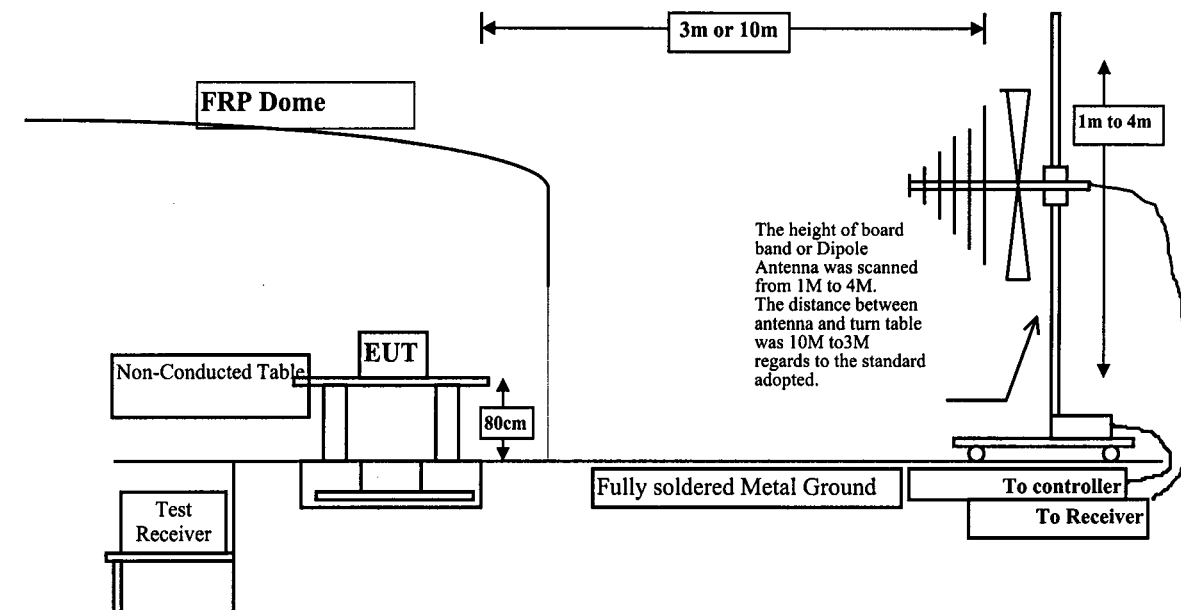
3.1 Test Equipment

The following test equipment are used during the radiated emission test:

Test Site		Equipment	Manufacturer	Model No./Serial No.	Last Cal.
Site # 1	X	Test Receiver	R & S	ESCS 30 / 825442/14	May, 1999
		Spectrum Analyzer	Advantest	R3261C / 71720140	May, 1999
		Pre-Amplifier	HP	8447D/3307A01812	May, 1999
	X	Bilog Antenna	Chase	CBL6112B / 12452	Sep., 1999
	X	Horn Antenna	EM	EM6917 / 103325	May, 1999
Site # 2	X	Test Receiver	R & S	ESCS 30 / 825442/17	May, 1999
		Spectrum Analyzer	Advantest	R3261C / 71720609	May, 1999
		Pre-Amplifier	HP	8447D/3307A01814	May, 1999
	X	Bilog Antenna	Chase	CBL6112B / 2455	Sep., 1999
	X	Horn Antenna	EM	EM6917 / 103325	May, 1999

- Note: 1. All equipment upon which need to calibrated are with calibration period of 1 year.
2.. Mark "X" test instruments are used to measure the final test results.

3.2 Test Setup



3.3 Limits

CISPR 22 Limits (dBuV)					FCC Part 15 Subpart B (dBuV)				
Frequency MHz	Class A		Class B		Frequency	Class A		Class B	
	Distance (m)	dBuV/m	Distance (m)	dBuV/m		uV	dBuV	uV	dBuV
30 – 230	10	40	10	30	30 – 88	90	39	100	40.0
230 – 1000	10	47	10	37	88 – 216	150	43.5	150	43.5
					216 – 960	210	46.5	200	46.0
					960 - 2000	300	49.5	500	54.0

Remark: 1. The tighter limit shall apply at the edge between two frequency bands.

2. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

3. RF Line Voltage (dBuV) = 20 log RF Line Voltage (uV)

3.4 Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 10 meters . The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.

Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4 /1992 on radiated measurement.

The bandwidth below 1GHz setting on the field strength meter (R&S Test Receiver ESCS 30) is 120 kHz.

3.5 Test Results

The radiated emission from the EUT is measured and shown in attachment 1 of test report. The acceptance criterion was met and the EUT passed the test.

4. EMI Reduction Method During Compliance Testing

No modification was made during testing.



5. Attachment

Attachment 1: Summary of Test Results	Number of Pages: 5
Attachment 2: EUT Test Photographs	Number of Pages: 2
Attachment 3: EUT detail photographs	Number of Pages: 4

Attachment 1 : Summary of Test Results

The test results in the emission and immunity were performed according to the requirements of measurement standard and process. QuieTek Corporation is assumed full responsibility for the accuracy and completeness of these measurements. The test data of the emission and immunity are listed as the attached data.

All the tests were carried out with the EUT in normal operation, which was defined as:

(1) Mode 1 : Omni 128L

The EUT passed all the tests.

The uncertainty is calculated in accordance with NAMAS NIS 81, The total uncertainty for this test is as follows:

➤ **Emission Test**

- Uncertainty in the Conducted Emission Test: $< \pm 2.0 \text{ dB}$
- Uncertainty in the field strength measured: $< \pm 4.0 \text{ dB}$

CONDUCTED EMISSION DATA

Date of Test : December 02, 1999 EUT : IDSL Modem
 Test Mode : Mode 1 Detect Mode : Quasi-Peak & Average

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line1	Line1	
	dB	dB	dBuV	dBuV	dBuV
0.187	0.01	0.10	23.70	23.81	64.16
0.221	0.02	0.10	18.79	18.91	62.80
0.480	0.06	0.10	26.06	26.22	56.35
2.287	0.15	0.14	23.09	23.38	56.00
3.572	0.18	0.16	30.19	30.52	56.00
* 15.361	0.33	0.36	40.81	41.49	60.00

Average:

0.187	0.01	0.10	20.80	20.91	54.16
0.221	0.02	0.10	13.20	13.32	52.80
0.480	0.06	0.10	18.20	18.36	46.35
2.287	0.15	0.14	12.90	13.19	46.00
3.572	0.18	0.16	22.80	23.13	46.00
15.361	0.33	0.36	37.70	38.38	50.00

Remarks :

1. " * " means that this data is the worst emission level.

CONDUCTED EMISSION DATA

Date of Test : December 02, 1999 EUT : IDSL Modem
 Test Mode : Mode 1 Detect Mode : Quasi-Peak & Average

Frequency	Cable	LISN	Reading Level	Measurement Level	Limits
MHz	Loss	Factor	Line2	Line2	
	dB	dB	dBuV	dBuV	dBuV
0.187	0.01	0.10	24.19	24.30	64.18
0.482	0.06	0.10	23.15	23.31	56.30
2.257	0.15	0.14	26.07	26.36	56.00
3.549	0.18	0.15	30.46	30.79	56.00
6.547	0.23	0.18	25.12	25.53	60.00
* 15.360	0.33	0.36	39.48	40.16	60.00

Average:

0.187	0.01	0.10	21.00	21.11	54.18
0.482	0.06	0.10	14.70	14.86	46.30
2.257	0.15	0.14	15.60	15.89	46.00
3.549	0.18	0.15	18.60	18.93	46.00
6.547	0.23	0.18	23.30	23.71	50.00
15.360	0.33	0.36	36.30	36.98	50.00

Remarks :

1. " * " means that this data is the worst emission level.

RADIATED EMISSION DATA

Date of Test : December 02, 1999 EUT :
 Test Mode : Mode 1

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit	Ant	Turn
	Loss	Factor		Level	Horizontal				
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
61.440	1.45	5.39	0.00	7.33	14.17	15.83	30.00	395	15
122.880	2.05	11.93	0.00	0.55	14.53	15.47	30.00	395	196
184.320	2.64	9.18	0.00	6.28	18.09	11.91	30.00	395	96
245.768	3.23	12.21	0.00	5.17	20.62	16.38	37.00	395	99
307.207	3.79	13.43	0.00	5.36	22.57	14.43	37.00	395	35
368.647	4.11	14.81	0.00	1.86	20.78	16.22	37.00	352	85
430.087	4.43	16.39	0.00	-0.11	20.71	16.29	37.00	328	35
552.968	5.07	19.16	0.00	0.87	25.10	11.90	37.00	170	132
614.407	5.39	19.03	0.00	0.52	24.94	12.06	37.00	164	75
675.860	5.71	19.11	0.00	1.85	26.66	10.34	37.00	164	74
* 737.300	6.03	20.03	0.00	1.42	27.48	9.52	37.00	150	100

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable loss

RADIATED EMISSION DATA

Date of Test : December 02, 1999 EUT : IDS L Modem
 Test Mode : Mode 1

Freq.	Cable	Probe	PreAMP	Reading	Measurement	Margin	Limit	Ant	Turn
	Loss	Factor		Level	Vertical				
MHz	dB	dB/m	dB	dBuV	dBuV/m	dB	dBuV/m	cm	deg
* 61.440	1.45	6.15	0.00	19.29	26.88	3.12	30.00	99	58
122.880	2.05	11.33	0.00	7.94	21.31	8.69	30.00	99	120
184.320	2.64	9.01	0.00	9.24	20.88	9.12	30.00	104	144
245.768	3.23	12.01	0.00	9.85	25.10	11.90	37.00	104	132
307.207	3.79	13.84	0.00	7.40	25.02	11.98	37.00	104	2
368.640	4.11	15.60	0.00	3.77	23.48	13.52	37.00	100	140
614.407	5.39	18.43	0.00	0.14	23.96	13.04	37.00	288	94
737.287	6.03	19.14	0.00	-1.52	23.65	13.35	37.00	264	116

Remarks:

1. All Readings below 1GHz are Quasi-Peak, above are average value.
2. " * ", means this data is the worst emission level.
3. Emission Level = Reading Level + Antenna Factor + Cable los