

TEST REPORT #051000

STANDARD: FCC PART 15

**SUBPART B--UNINTENTIONAL RADIATORS
SECTION 15.109 RADIATION EMISSION LIMITS**

EQUIPMENT TESTED:

**AMERICAN TEL-A-SYSTEMS, INC.
dba AMTELCO**

**MODEL: H.110 BRI
BASIC RATE INTERFACE ISDN
PC PERIPHERAL PLUG-IN**

TEST DATE: 05 OCTOBER 2000

1100 Falcon Avenue
Glencoe, MN 55336



Tele: 320-864-4444
Fax: 320-864-6611

Prepared for: American Tel-A-Systems, Inc.
dba AMTELCO
4800 Curtin Drive
McFarland, WI 53558

Test agent: International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Test location: International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336
Tele: 320-864-4444
Fax: 320-864-6611

Prepared by: International Certification Services, Inc.
1100 Falcon Avenue
Glencoe, MN 55336

International Certification Services represents to the client that testing is done in accordance with standard procedures applicable and that reported test results are accurate within generally accepted commercial ranges of accuracy.

· This report only applies to the specific samples tested under stated test conditions. It is the manufacturer's responsibility to assure that additional production units of this model are manufactured with identical electrical and mechanical components. International Certification Services shall have no liability for any deductions, inferences or generalizations drawn by the client or others from this report.

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.

1.0 TEST SUMMARY

TEST REPORT: #051000	
COMPANY:	American Tel-A-Systems, Inc.
AGENT:	International Certification Services, Inc.
PHONE:	320-864-4444
TEST DATE:	05 October, 2000
EQUIPMENT UNDER TEST:	Basic Rate Interface ISDN CPCI board for Communications
GENERAL TEST SUMMARY: The testing was performed at International Certification Services, Inc. at 1100 Falcon Ave, Glencoe, MN 55336	
VERIFICATION / CERTIFICATION STATUS:	The American Tel-A-Systems, Inc. Model: H.110 BRI Communications boards were found to be in compliance with the FCC Part 15 Subpart B, Section 15.109 requirements.
MODIFICATIONS NECESSARY:	None

TESTED BY

Steve Wendlandt

WRITTEN BY

Duane R. Bagdons

2.0 Applicable Standards

47 CFR Ch.1 (10-1-98 Edition)

FCC Part 15 Radio Frequency Devices

Subpart B Unintentional Radiators

Section 15.109 Radiated Emission Limits

2.1 Referenced Standards

ANSI C63.4-1992 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 KHz to 40 Ghz.

2.2 Equipment Units Tested

The Infinity Series H.110 Basic Rate Interface ISDN Board is designed to provide thirty-two Basic Rate ISDN (Integrated Services Digital Network) interfaces connected to the H.110 bus on a board with the *CompactPCI* bus form factor. Each interface or port provides a D channel for call control signaling and two 64 kbps. B channels for either speech or circuit switched data. Each port can be independently configured as either a TE (Terminal Equipment) or NT (Network Termination) interface. The board provides complete support for the ISDN Layer 1 and Layer 2 protocols, as well as optional support for the Layer 3 protocols as defined in Q.931. In addition, the board is equipped with several DSP's to provide tone generation and detection.

The H.110 bus was devised by the Enterprise Computer Telephony Forum (ECTF) to provide a single telecom bus for the entire industry. It is intended for add-in boards using the *CompactPCI* form factor. A variety of boards are available from a number of different vendors. The H.110 specifications also provides for hot swap capabilities for use in high availability applications.

The board is equipped with a processor that can be used to control the lower level functions of the board. The host PC controls the board using messages passed through dual-ported RAM. The board shares a common message passing and control scheme with other Infinity Series H.110 boards.

2.3 Equipment and Cable Configuration

See photos of the EUT pc board and schematic and test configuration setup in Attachment A

2.4 List of Test Equipment

<u>Test Equipment</u>	<u>Model</u>	<u>S/N</u>	<u>Calibration Date</u>
Spectrum Analyzer	Hewlett-Packard 8566B	2421A00458	09/24/00
Preamplifier	MiniCircuits ZKL-2R7	N/A	09/24/00
Biconical Antenna	AH Systems Model SAS-200/540	328	09/24/00
Log Periodic Antenna (200-1000 MHz)	EMCO 3146	9111-3280	09/24/00

Measurement cable losses, and antenna correction factors are included in the data sheets. Quasi-Peak detection methods were used in the measurements. The Resolution BW was set at 100 Khz and the Video BW was set at 300 Khz.

2.5 Units of Measurement.

All measurements were taken in dBuV/m with the antenna located at 3 meters distance from the EUT. Frequency measurements are recorded in Mhz

2.6 Location of Test Site

The open area test site (OATS) measurement facility used to collect the data was International Certification Services, Inc. at 1100 Falcon Ave in Glencoe, MN 55336. This site has been certified to be in spec of the normalized site attenuation per ANSI C63.4-1992. See letter of compliance from FCC dated July 23, 1998. (FCC 31040/SIT 1300F2)

2.7 Measurement Procedures

The American Tel-A-Systems, Inc. Model: H.110 BRI Basic Rate Interface ISDN board set was installed in a Motorola CPX2000 Series Main Frame. The H110 BRI boards are a 2 board set that must be installed together. The Motorola CPV5300 SBC Card was removed from the main frame to eliminate emissions from that card. American Tel-A-Systems, Inc. verified that the H.110 BRI boards were functioning normally with this card removed.

The receiving antenna was placed at a distance of 3 meters from the EUT. The EUT was set on an insulating table in the OATS site and rotated through 360 degrees to determine the worst case EUT orientation. The antenna was then positioned vertical and horizontal to determine which antenna polarity orientation was worst case. Then certification data was recorded at all the frequencies from the fundamental to the 10th harmonic at an antenna height variation of from 1-4 meters.

2.8 Reporting Measurement Data

See data sheets and plots in Attachment B.

2.9 Radiated Emissions Data

The frequency and amplitude of the tuned frequency of the EUT along with the frequencies and amplitudes of the harmonics are reported in the data sheets in Attachment B. This information is plotted against the limit of section 15.109 of FCC Part 15 subpart B. The polarization of the antenna for each measurement is also recorded.

The Final Level, expressed in dBuV/m, is arrived at by taking the reading from the spectrum analyzer (Level dBuV) and adding the antenna correction factor and cable loss factor (Factor dB) and subtracting the preamp gain. This result then has the FCC

limit subtracted from it to provide the margin which gives the tabular data as shown in the data sheets in Attachment B.

Example:

<u>Frequency</u> <u>(MHz)</u>	<u>Level</u> <u>(dBuV)</u>	+	<u>Factor</u> <u>(dB)</u>	=	<u>Corr Data</u> <u>(dBuV/m)</u>	-	<u>FCC Limit</u> <u>(dBuV/m)</u>	=	<u>Margin</u> <u>(dB)</u>
100.0	20.6	+	11.0	=	31.6	-	43.5	=	-11.9

2.10 Operating Frequency Data for Unintentional Radiators

All operating frequencies and harmonic frequencies and ambient temperature at which all data was taken at is recorded in the data sheets in Attachment B.

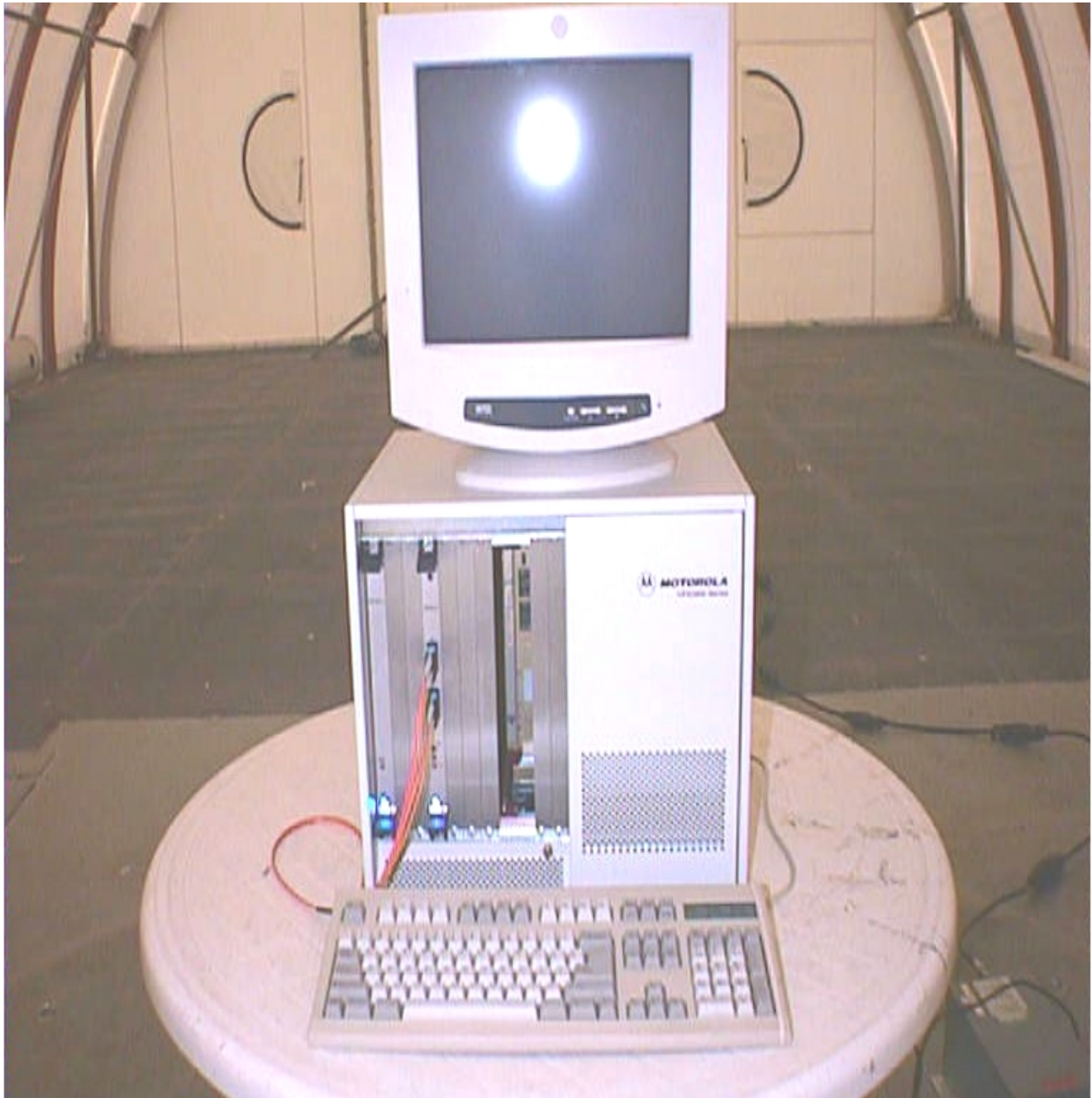
2.11 Summary of Results

The EUT passed the requirements of FCC Part 15 Subpart B, Section 15.109 with a minimum passing margin of -5.3382 dBuV/m at 798.0904 Mhz. for radiated emissions and -14.63 dBuV at 0.5161 Mhz for conducted emissions. No modifications were necessary to accomplish this compliance.

ATTACHMENT A

RADIATED MEASUREMENT SCHEMATIC, PHOTOS AND TEST CONFIGURATION

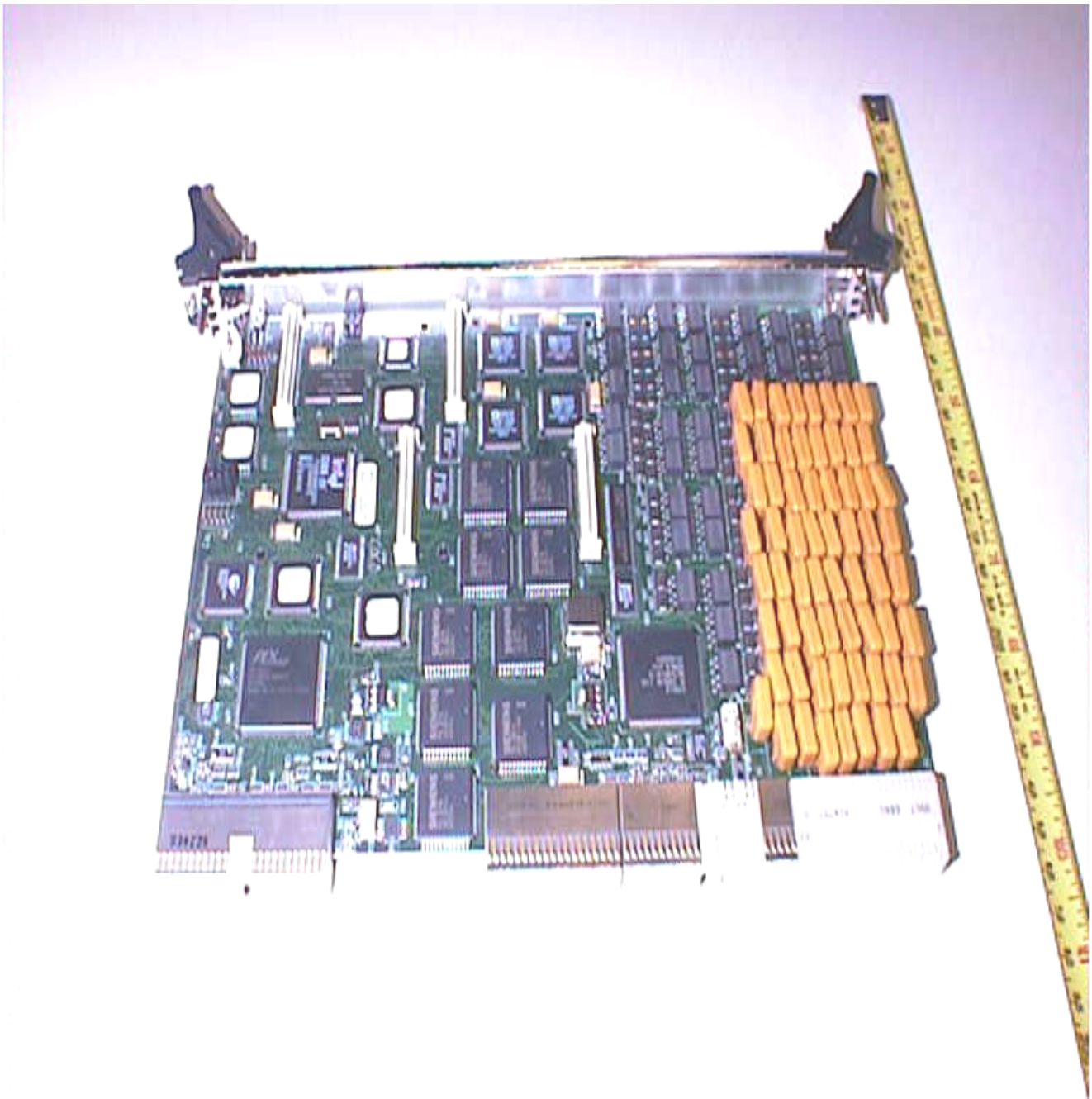
American Tel-A-Systems, Inc.
Model: H110 BRI Basic Rate Interface ISDN board set
Radiated Emissions Test Configuration



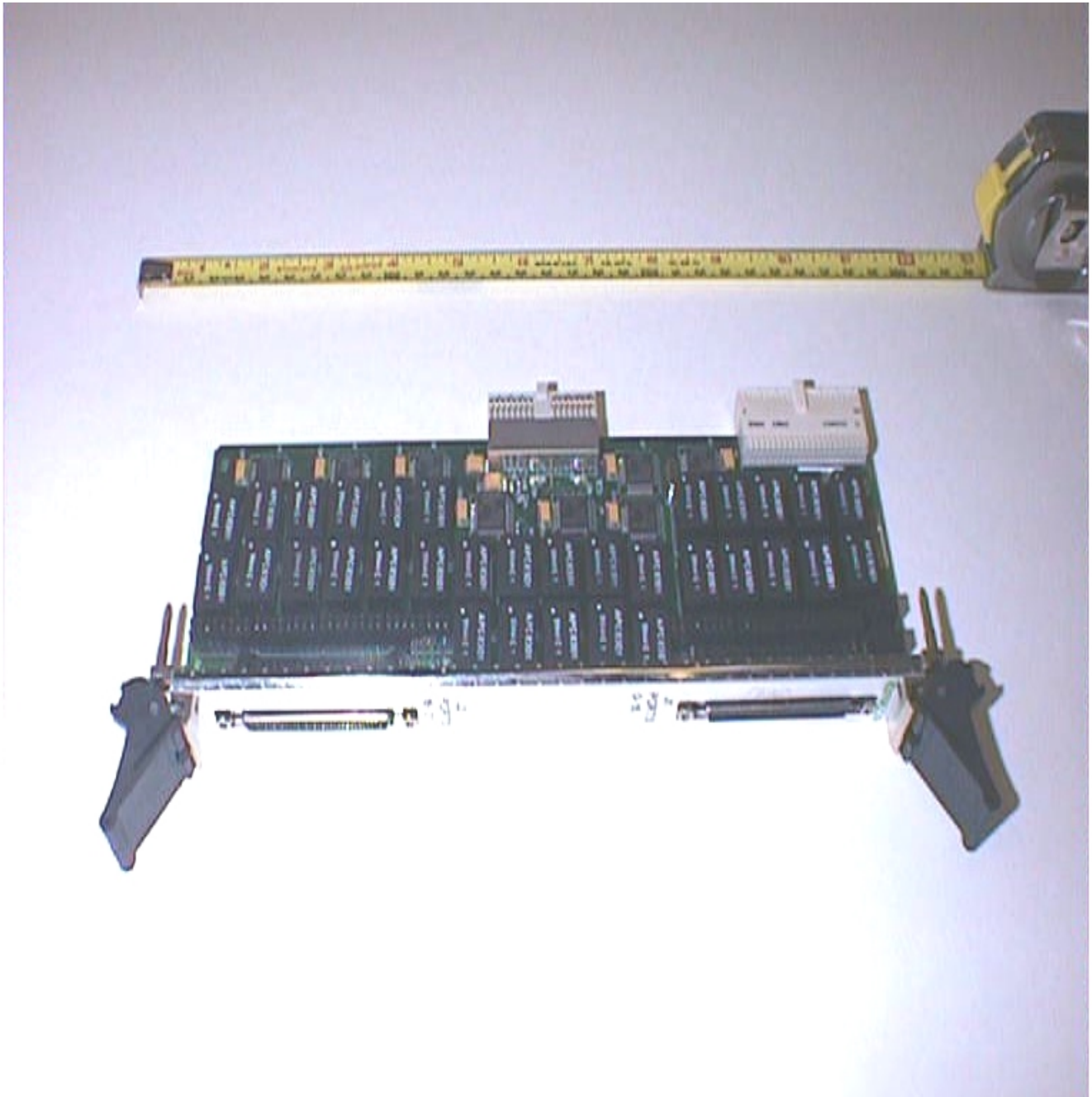
American Tel-A-Systems, Inc.
Model: H110 BRI Basic Rate Interface ISDN board set
Conducted Emissions Test Configuration



American Tel-A-Systems, Inc.
Model: H110 BRI Basic Rate Interface ISDN board set
H110.BRI Front Board



American Tel-A-Systems, Inc.
Model: H110 BRI Basic Rate Interface ISDN board set
H110.BRI Rear Board



ATTACHMENT B

DETAILED TEST DATA SHEETS

Each radiated emissions plot indicates the receiving antenna measurement distance in meters and the emission amplitudes with respect to their applicable limits. The associated tabulation for each radiated plot lists the emission frequency, the final emission level, and the margin from the limit.

American Tel-A-Systems, Inc.

Model: H110.BRI Basic Rate Interface ISDN Board set

Temperature: 66 Deg F.

Humidity: 55 % R.H.

Test Technician: Steve Wendlandt

Certification testing was performed at the OATS site with an antenna distance of 3 meters and the EUT at 0-360 Degrees to the antenna. Data was optimized at antenna heights of from 1-4 meters.

The limit for section 15.109 is 100 uV/m from 30-88 Mhz, 150 uV/m from 88-216, 200 uV/m from 216-960 Mhz and 500 uV/m above 960 Mhz. All data is taken with the required Quasi-Peak Detector. This converted to dBuV is the limit shown in the next table.

Freq (Mhz)	(dBuV)	Cable Corr Fac	Ant Corr Fac	Preampl Gain	Corr Data (dBuV)	FCC 15.109 Class B Limits	FCC Margin
33.2318	28.9	12.8872	1.306244	22	21.09344	40	-8.90656
38.3396	30.3	11.6542	1.3895	22	21.3437	40	-8.6563
61.3984	29.5	9.8	1.7818	22	19.0818	40	-10.9182
115.254	33.7	10.5106	2.5141	22	24.7247	43.52	-8.7953
532.0908	24.6	18.2581	5.3124	22	26.1705	46.02	-9.8495
598.5544	24.5	18.8861	5.6313	22	27.0174	46.02	-9.0026
665.0686	24.5	20.6048	5.7001	22	28.8049	46.02	-7.2151
698.3898	24.5	21.5	5.7267	22	29.7267	46.02	-6.2933
798.0904	24.5	21.3814	6.8004	22	30.6818	46.02	-5.3382
997.604	24.5	23.9529	6.7957	22	33.2486	53.98	-10.7314

Minimum Passing Margin

Conducted tests were performed at 120 VAC, 60 Hz. The limit for section 15.109 is 250 uV or 48 dBuV from .45-30 Mhz. All data is taken with the required Quasi-Peak Detector. This converted to dBuV is the limit shown in the next table.

Freq (Mhz)	dBuV	COND	LISN Corr Fac	Cable Corr Fac	EM7600 Corr Fac	Corr Data (dBuV)	FCC Class B Limits	FCC Margin
0.45							48	
0.5							48	
0.51161	23.05	Line1	-0.48	0.1	10	32.67	48	-15.33
0.5161	23.75	N	-0.48	0.1	10	33.37	48	-14.63
0.54142	20.8	Line1	-0.48	0.1	10	30.42	48	-17.58
0.5431	20.5	N	-0.48	0.1	10	30.12	48	-17.88
0.57302	18.75	Line1	-0.48	0.1	10	28.37	48	-19.63
0.6322	20.9	Line1	-0.48	0.2	10	30.62	48	-17.38
0.6945	19.9	Line1	-0.48	0.1	10	29.52	48	-18.48
0.8312	13.9	N	-0.48	0.1	10	23.52	48	-24.48
0.835	17.05	Line1	-0.48	0.1	10	26.67	48	-21.33
30							48	

Worst Case Margin

ATTACHMENT C

**PRODUCT DATA SHEET OR PRODUCT INFORMATION FORM AS SUPPLIED
BY THE CUSTOMER**

COMPANY NAME: American Tel-A-Systems, Inc.

CUSTOMER REPRESENTATIVE: International Certification Services, Inc.

EQUIPMENT DESCRIPTION: Basic Rate Interface ISDN Board Set.

MODEL NUMBER: H.110 BRI

SERIAL NUMBER: 0107

TYPE OF TEST:

	Development
X	Initial Design Verification
	Design Change (Please describe exact changes below)
	Production Sample (Audit Test)

OSCILLATOR FREQUENCIES: 16.384 Mhz, 50 Mhz

POWER INTERFACE:

Frequency: 60 Hz

Voltage: 120 VAC

Number of Phases: 1

Current N/A

POWER SUPPLY: (included in the HOST computer)

Description:

Manufacturer:

Model Number:

Switching Frequencies:

POWER CABLE:

☐ Hardwired

☒ Flexible

☐ Shielded

☒ Unshielded

☐ Current

☒ Removable

POWER LINE FILTER: (Included in the HOST computer)

Manufacturer: N/A

Model Number: N/A

CABINET SHIELDING PROVISION:

Painted metal enclosure.

SOFTWARE AND / OR OPERATING MODES:

American Tel-A-Systems, Inc. Firmware

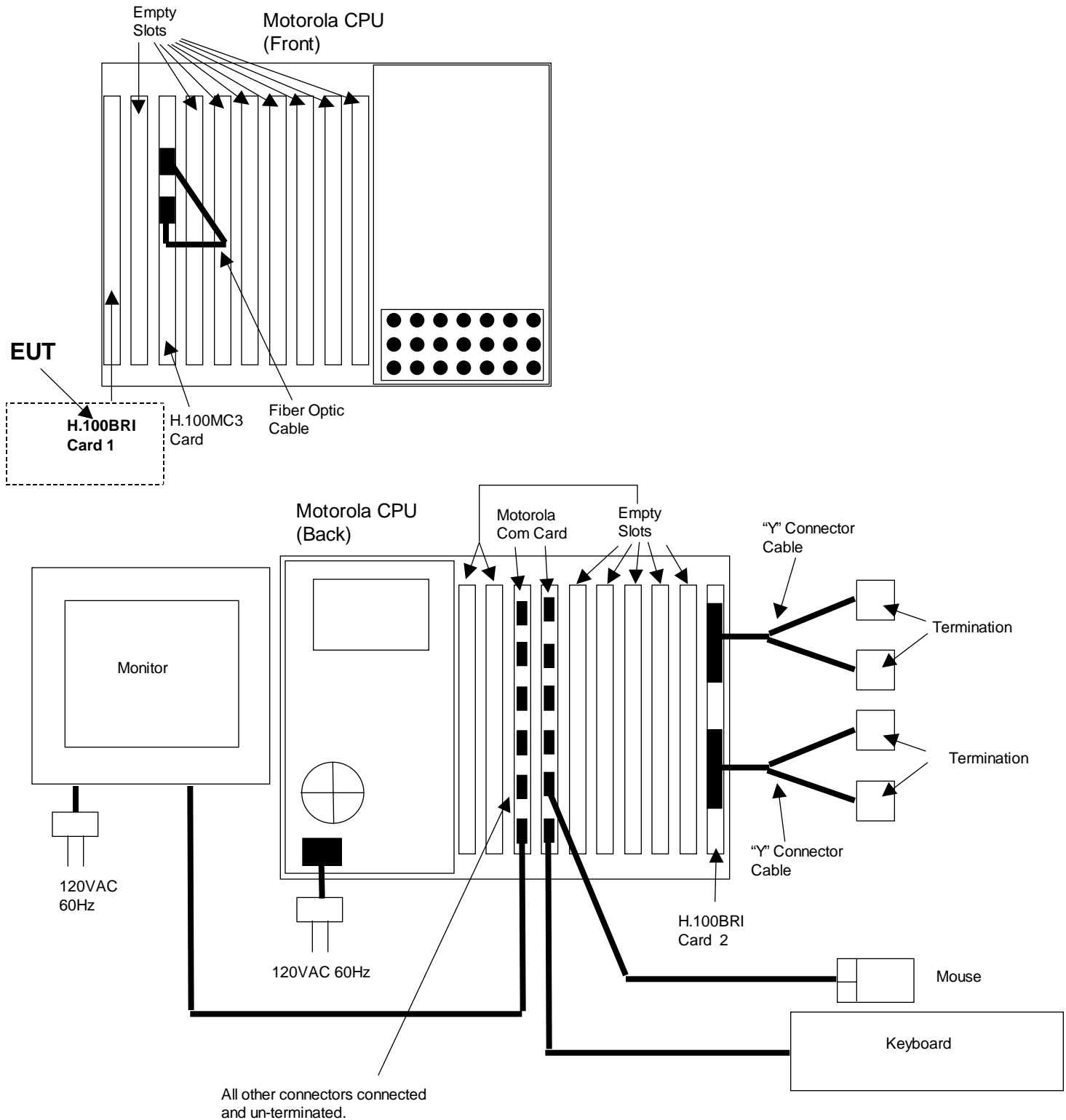
INTERFACING EQUIPMENT OR SIMULATORS

Description	Model Number	Serial Number	FCC ID (If Applicable)
WYSE PC Monitor	WY-15E	2DP15700858	LXMWY-157PES
BTC Keyboard	BTC-53 Series	N/A	E5X5R5BTC-5339R-0
Logitech Mouse	M-SAS51	None	JNZ211167
Motorola CPU	CPX2208	FH294	None

I/O CABLES:

Function	Length	Connector Type	Shield Termination Location
Fiber Optic	1 Meter	Siemens JZ-062SS002K	No Shield
Communication Interface "Y" Cable	1.5 Meters	XDS SCSI to RJ21	No Shield

American Tel-A-Systems, Inc.
Model: H.110 BRI Basic Rate Interface ISDN board set
Test Configuration



INTERNATIONAL



CERTIFICATION SERVICES, INC.

INTERNATIONAL



CERTIFICATION SERVICES, INC.