



Report No	ED0421-1
Client	VTech Telecommunications Ltd. Suite 200 – 7671 Alderbridge Way Richmond, BC, Canada V6X 1Z9
Phone	(604) 273-5131 Ext. 257
Fax	(604) 276-9137
FRN	0006-0955-82
<hr/>	
Model	AT&T 1485 (Base only)
FCC ID	EW780-5299-B00
Equipment Type Equipment Code	Cordless Telephone Base Transceiver ETB
Results	As detailed within this report
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Prepared by	 Evan Gould – Test Engineer
Authorized by	 Michael Buchholz – EMC Manager
Issue Date	6/13/03
Conditions of issue	This Test Report is issued subject to the conditions stated in ‘terms and conditions’ section of this report.

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Summary

This test report supports a Class II Permissive Change intended to add a new model number to the FCC ID: EW780-5299-B00, previously attributed to the VTech 2434 base. The new model is the AT&T 1485 2.4GHz cordless phone, which operates in the range 2400-2483.5MHz as defined by 15.249. The actual center frequencies in which the product operates are 30 channels, in the range 2410.2-2418.9MHz with a channel separation of 300kHz.

The AT&T 1485 base differs from the VTech 2434 base in the following changes:

- addition of speakerphone
- addition of ITAD
- addition of a corded handset
- a common Tx/Rx antenna (the 2434 used 2 antennas)

The AT&T 1485 handset contains minor changes in the audio circuitry from the VTech 2434 Handset, and requires no additional testing.

Test Methodology

Radiated emissions testing is performed according to the procedures specified in ANSI C63.4 (2000).

Frequency range investigated: 150kHz – 26.5GHz

Measurement distance:	0.15-30MHz	Conducted
	30-10,000MHz	3m
	10-18GHz	1m
	18-26.5GHz	0.1m

AC Line conducted emissions testing was performed with a 50Ω/50μH LISN.

EUT Configuration

EUT Configuration					
Work Order: D0421					
Company: Vtech Engineering Canada					
Company Address: Suite 200 - 7671 Alderbridge Way Richmond, BC V6X 1Z9					
Contact: Joseph Poon					
MN		SN	FCC ID		
EUT: AT&T 1485		PA 091	EW780-5299-B00		
EUT Description: 2.4GHz Cordless Phone (base only)					
EUT Max Frequency: 2.4189GHz					
Support Equipment:		MN	SN	FCC ID	
Component Telephone Power					
Supply Class 2		350905003CT	-	-	
EUT Cables:		Qty	Shielded?	Length	Ferrites
DC Power		1	No	2m	No
RJ11 Telephone Cable		1	No	2m	No
Unpopulated EUT Ports:		Qty	Reason		
RJ11 Port		1	Redundant		
Software / Operating Mode Description:					
The EUT was put into Manual Test Mode, which allows the mode to be switched from "Active" to "Rx", as well as allowing the transmission channel to be set.					

Statement of Conformity

The AT&T 1485 cordless phone base has been found to conform with the following parts of the 47 CFR as detailed below:

Part 2	Part 15	Comments
	15.15(b)	The product contains no user accessible controls that increase transmission power above allowable levels.
	15.27	No special accessories are required for compliance.
	15.203	The antenna is soldered to the transmitter board, and there is no external antenna connection.
	15.205 15.209	The fundamental is not in a Restricted band and the spurious and harmonic emissions in the Restricted bands comply with the general emission limits of 15.209.
	15.207	The unit meets the AC conducted emissions requirements of 15.207.
	15.249	The unit complies with the field strength limits of 15.249

Fundamental Frequency Measurement

LIMIT

Average: 50mV/m = 93.9dBμV/m @ 3m [15.249(a), (b), and (d)]

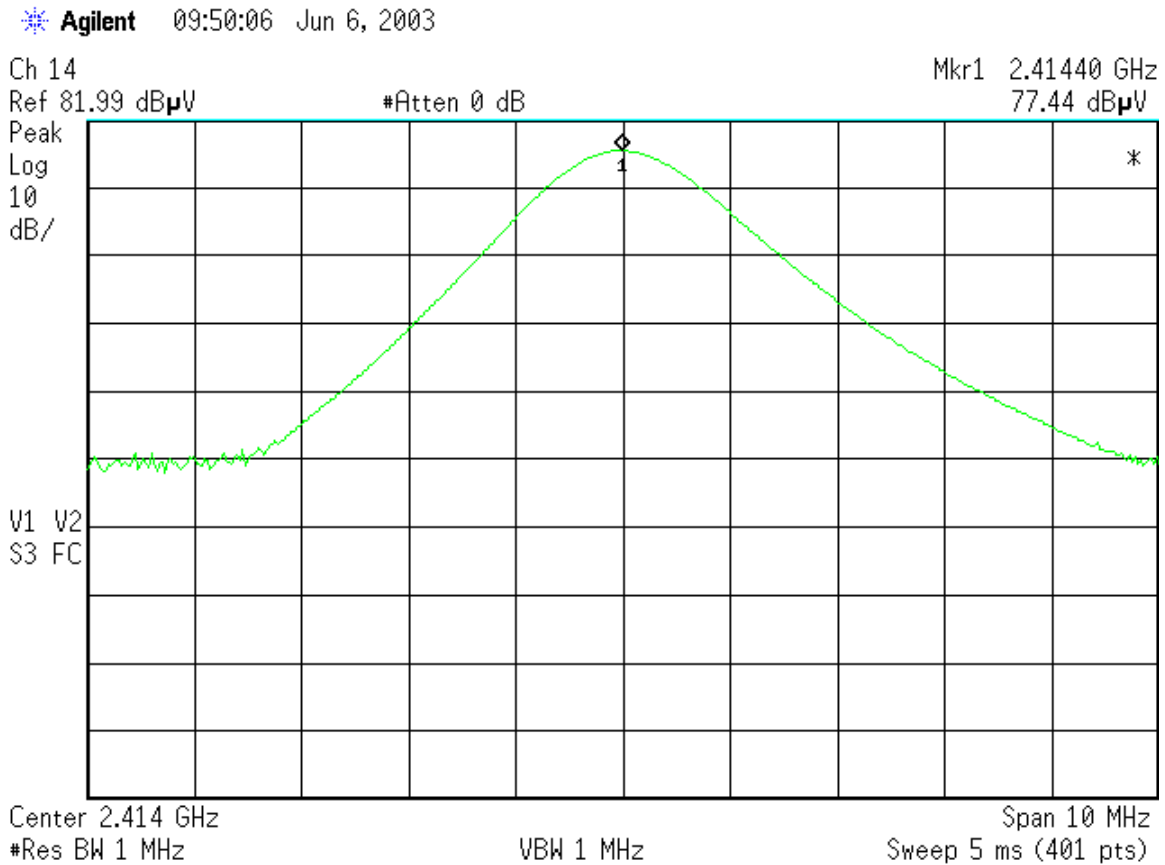
Peak: 93.9dBμV/m + 20dB = 123.9dBμV @ 3m [15.249(d)]

Note: If Peak measurements meet Average limits, then Average measurements are not required.

MEASUREMENTS

Fundamental Measurements							Curtis-Straus LLC		
Date: 06-Jun-03		Company: VTech			Table: 1				
Engineer: Evan Gould		EUT Desc: AT&T 1485 (base)			Work Order: D0421				
Frequency Range: just those shown below					Measurement Distance: 3 m				
Notes:					EUT Max Freq: 2.4189GHz				
Antenna Polarization (H/V)	Frequency (MHz)	Peak Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.249		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
Ch. 14 V	2414.4	77.4	25.5	30.3	1.0	83.2	93.9	-10.7	Pass
Ch. 29 V	2418.8	77.2	25.5	30.4	1.0	83.1	93.9	-10.8	Pass
Ch. 0 V	2410.2	77.2	25.5	30.3	1.0	83.0	93.9	-10.9	Pass
Test Site: "T"		Pre-Amp: Or-Blk		Cable: 8 Microflex		Analyzer: Orange		Antenna: Black Horn	

SAMPLE ANALYZER PLOT



Band Edges

LIMITS

Average: 50dB below level of Fundamental OR
 General radiated emission limits of 15.209
 "...whichever is the lesser attenuation." [15.249(c)]

Peak: (Average limit) + 20dB [15.249(d)]

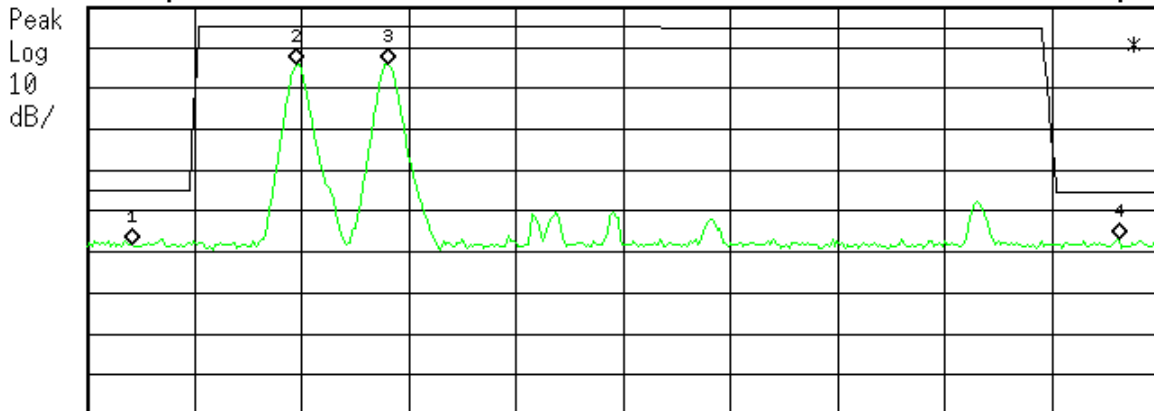
Note: If Peak measurements meet Average limits, then Average measurements are not required.

ANALYZER PLOT

Max-hold traces of the lowest and highest channels are shown below in relation to the average limit line.

Agilent 10:11:12 Jun 6, 2003

Band Edges Mkr4 2.4896 GHz
 Ref 92.99 dBµV #Atten 0 dB 36.05 dBµV



Start 2.39 GHz Stop 2.494 GHz
 #Res BW 1 MHz VBW 1 MHz Sweep 4 ms (401 pts)

Marker	Trace	Type	X Axis	Amplitude
1	(1)	Freq	2.3944 GHz	35.03 dBµV
2	(1)	Freq	2.4102 GHz	78.88 dBµV
3	(1)	Freq	2.4190 GHz	78.96 dBµV
4	(1)	Freq	2.4896 GHz	36.05 dBµV

Harmonic Frequency Measurements

LIMITS

Average: $500\mu\text{V}/\text{m} = 53.9\text{dB}\mu\text{V}/\text{m}$ @ 3m [15.249(a), (b), and (d)]

Peak: $53.9\text{dB}\mu\text{V}/\text{m} + 20\text{dB} = 73.9\text{dB}\mu\text{V}$ @ 3m [15.249(d)]

Note: If Peak measurements meet Average limits, then Average measurements are not required.

MEASUREMENTS

No harmonic emissions were detected within 20dB of the limit. The EUT was also scanned for harmonic emissions with the Combo set to Rx mode. None were detected.

Spurious Emissions

LIMITS

Average: 50dB below level of Fundamental OR

General radiated emission limits of 15.209

"...whichever is the lesser attenuation." [15.249(c)]

Peak: (Average limit) + 20dB [15.249(d)]

Note: If Peak measurements meet Average limits, then Average measurements are not required.

MEASUREMENTS

Radiated Spurious Emissions							Curtis-Straus LLC			
Date: 05-Jun-03		Company: VTech			Table: 2					
Engineer: Evan Gould		EUT Desc: AT&T 1485 (base)			Work Order: D0421					
Frequency Range: 30-1000MHz				Measurement Distance: 3 m						
Notes: The frequency range was rechecked with the EUT set to "Rx" mode. The EUT was initially set to "Active" mode.						EUT Max Freq: 2.42GHz		RBW: 120kHz		VBW: 300kHz
Antenna Polarization (H / V)	Frequency (MHz)	QP Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	47 CFR 15.209			
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
H	257.7	36.1	22.4	13.0	1.8	28.5	46.0	-17.5	Pass	
H	429.5	36.4	22.3	17.0	2.5	33.6	46.0	-12.4	Pass	
H	925.5	30.4	21.6	24.2	4.2	37.2	46.0	-8.8	Pass	
Table Result: Pass by -8.8 dB							Worst Freq: 925.5 MHz			
Test Site: "T"		Pre-Amp: Blue		Cable: 65 ft RG8A/U		Analyzer: White		Antenna: Red		

Radiated Spurious Emissions							Curtis-Straus LLC			
Date: 06-Jun-03		Company: VTech			Table: 3					
Engineer: Evan Gould		EUT Desc: AT&T 1485 (base)			Work Order: D0421					
Frequency Range: 1-18GHz				Measurement Distance: 3 m						
Notes: Channel 14; Combo set to "Active"; Data transmission On Rechecked frequency range with Combo set to "Rx" mode						EUT Max Freq: 2.42GHz		RBW: 1MHz		VBW: 1MHz
Antenna Polarization (H / V)	Frequency (MHz)	Peak Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBµV/m)	47 CFR 15.209			
							Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
V	1207.2	50.0	23.5	25.6	0.8	52.9	54.0	-1.1	Pass	
Table Result: Pass by -1.1 dB							Worst Freq: 1207.2 MHz			
Test Site: "T"		Pre-Amp: Or-Blk		Cable: 8 Microflex		Analyzer: Orange		Antenna: Black Horn		

AC Line Conducted Emission Measurements

LIMITS

Frequency of emission (MHz)	Quasi-peak limit (dBµV)	Average limit (dBµV)
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

[15.207(a)]

MEASUREMENTS

AC Mains Conducted Emissions								Curtis-Straus LLC		
Date: 06-Jun-03		Company: VTech			Table No: 4					
Engineer: Evan Gould		EUT Desc: AT&T 1485 (base)			Work Order: D0421					
Notes: checked in both "Active" and "Rx" modes								Test Site: EMI 2		
LISN(s): Orange										
Range: 0.15-30Mhz				Other Equipment: none		Spectrum Analyzer: Blue				
Frequency (MHz)	Q.P. Readings		Ave. Readings		Impedance Factor (dB)	47 CFR 15.207		47 CFR 15.207		Overall Result (Pass/Fail)
	QP1 (dBµV)	QP2 (dBµV)	AV1 (dBµV)	AV2 (dBµV)		qp Limit (dBµV)	qp Margin dB	AVE Limit (dBµV)	AVE Margin dB	
0.15	27.8	27.7			20.0	66.0	-18.2	56.0	-8.2	Pass
1.00	12.7	11.5			20.0	56.0	-23.3	46.0	-13.3	Pass
Table Result:		Pass	by	-8.20 dB	Worst Freq:		0.15 MHz			

No other emissions were detected within 20dB of the limit.

Voltage Variation

REQUIREMENT

“For intentional radiators, measurements of the variation of the...radiated signal level of the fundamental frequency component of the emission...shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.” [15.31(e)]

MEASUREMENTS

Voltage Variation								Curtis-Straus LLC	
Date: 6-Jun-03			Engineer: Evan Gould			Work Order: D0421			
Company: Vtech			EUT: AT&T 1485			Fundamental Frequency: 2.4189GHz			
Test Site: "T"			Cable: Microflex #8			Pre-amp: Orange-Blk			
Antenna: Black Horn			Filter/Attenuator: N/A			Analyzer: Orange			
Measurement Distance: 3m			Resolution BW: 1MHz						
Detector Type: Peak			Video BW: 3MHz						
Notes:									
Supply Voltage	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Filter/Attenuator Factor (dB)	Duty Cycle Factor (dB)	Adjusted Reading (dBμV/m)	
(85%) 99.5V	2414.4	75.5	25.5	30.3	1.0	0.0	0.0	81.3	
(nominal) 117V	2414.4	75.8	25.5	30.3	1.0	0.0	0.0	81.6	
(115%) 134.5V	2414.4	75.2	25.5	30.3	1.0	0.0	0.0	81.0	

Test Equipment Used

REV. 5/11/03

SPECTRUM ANALYZERS						
	RANGE	MN	MFR	SN	ASSET	CALIBRATION DUE
WHITE	9kHz-22GHz	8593E	HP	3547U01252	00022	25-FEB-2004
BLUE	9kHz-1.8GHz	8591E	HP	3223A00227	00070	04-SEP-2003
ORANGE	9kHz-26.5GHz	E4407B	HP	US39440975	00394	07-JUL-2003

LISN						
	RANGE	MN	MFR	SN	ASSET	CALIBRATION DUE
ORANGE	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	903707	00754	24-OCT-2003

OPEN AREA TEST SITE (OATS)					
	FCC CODE	IC CODE	VCCI CODE	CALIBRATION DUE	
SITE T	93448	IC 2762-T	R-905	04-FEB-2004	

LINE CONDUCTED TEST SITE					
	FCC CODE	IC CODE	VCCI CODE	CALIBRATION DUE	
EMI 2	93448	N/A	C-480	01-MAY-2006	

ANTENNAS						
	RANGE	MN	MFR	SN	ASSET	CALIBRATION DUE
RED BILOG	30MHz-1GHz	3143	EMCO	1270	00042	17-MAR-2005
BLACK HORN	1-18GHz	3115	EMCO	9703-5148	00056	12-JUN-2003
WHITE HORN	18-26.5GHz	3160-09	EMCO	9610-1068	00758	26-JUN-2003

PREAMPS						
	RANGE	MN	MFR	SN	ASSET	CALIBRATION DUE
BLUE	0.01-2000MHz	ZFL-1000-LN	C-S	N/A	00759	07-AUG-2003
ORANGE-BLACK	1-20GHz	SMC-12A	C-S	637367	00761	04-MAR-2004
YELLOW	18-26.5GHz	AFS4-18002650-60-8P-4	C-S	467559	00758	27-AUG-2003

Unless otherwise noted the calibration interval is one year. All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

Terms And Conditions

Paragraph 1. SERVICES. LABORATORY will:

- 1.1 Use the degree of care and skill ordinarily exercised by and consistent with the standards of the profession.
- 1.2 Perform all technical services in substantial accordance with the generally accepted laboratory principles and practices.
- 1.3 Retain all pertinent records relating to the services performed for a period of three (3) years following submission of the report describing such services, during which period the records will be made available to CLIENT upon reasonable request.

Paragraph 2. CLIENT'S RESPONSIBILITIES. CLIENT or his authorized representative will:

- 2.1 Provide LABORATORY with all plans, schematics, specifications, addenda, change orders, drawings and other information for the proper performance of technical services.
- 2.2 Designate a person to act as CLIENT's representative with respect to LABORATORY's services to be performed on behalf of the CLIENT; such person or firm to have complete authority to transmit instructions, receive information and data, interpret and define CLIENT's policies and decisions with respect to the LABORATORY's work on behalf of the CLIENT and to order, at CLIENT's expense, such technical services as may be required.
- 2.3 Designate a person who is authorized to receive copies of LABORATORY's reports.
- 2.4 Undertake the following:
 - (a) Secure and deliver to LABORATORY, without cost to LABORATORY, preliminary representative samples of the equipment proposed to require technical services, together with any relevant data.
 - (b) Furnish such labor and equipment needed by LABORATORY to handle samples at the LABORATORY and to facilitate the specified technical services.

Paragraph 3. GENERAL CONDITIONS:

- 3.1 LABORATORY, by the performance of services covered hereunder, does not in any way assume any of those duties or responsibilities customarily vested in the CLIENT, its employees, or any other party, agency or authority.
- 3.2 LABORATORY shall not be responsible for acts of omissions of any other party or parties involved in the design, manufacture or maintenance of the equipment or the failure of any employee, contractor or subcontractor to undertake any aspect of equipment's design, manufacture or maintenance.
- 3.3 LABORATORY is not authorized to revoke, alter, release, enlarge or release any requirement of the equipment's design, manufacture or maintenance unless specifically authorized by CLIENT or his authorized representative.
- 3.4 THE ONLY WARRANTY MADE BY LABORATORY IN CONNECTION WITH ITS SERVICE PERFORMED HEREUNDER IS THAT IT WILL USE THAT DEGREE OF CARE AND SKILL AS SET FORTH IN PARAGRAPH 1 ABOVE. NO OTHER WARRANTY, EXPRESS OR IMPLIED, IS MADE OR INTENDED FOR SERVICES PROVIDED HEREUNDER.
- 3.5 Where the LABORATORY indicates that additional testing is advisable to obtain more valid or useful data, and where such testing has not been authorized, CLIENT agrees to view such test reports as inconclusive and preliminary.
- 3.6 The LABORATORY will supply technical service and prepare a report based solely on the sample submitted to the LABORATORY by the CLIENT. The CLIENT understands that application of the data to other devices is highly speculative and should be applied with extreme caution.
- 3.7 The LABORATORY agrees to exercise ordinary care in receiving, preserving and shipping (F.O.B. Littleton, MA) any sample to be tested, but assumes no responsibility for damages, either direct or consequential, which arise from loss, damage or destruction of the samples due to the act of examination, modification or testing, or technical services or circumstances beyond LABORATORY's control.
- 3.8 The LABORATORY will hold samples for thirty (30) days after tests are completed, or until the CLIENT's outstanding debts to the LABORATORY are satisfied, whichever is later.
- 3.9 The CLIENT recognizes that generally accepted error variances apply and agrees to consider such error variances in its use of test data.
- 3.10 It is agreed between LABORATORY and CLIENT that no distribution of any tests, reports or analysis other than that described below shall be made to any third party without the prior written consent of both parties unless such distribution is mandated by operation of law. It is agreed that tests, reports, or analysis results may be disclosed to third party auditors of the laboratory at the laboratory facility in the course of accreditation maintenance audits. No reference to reports or technical services of the LABORATORY shall be made in any advertising or promotional literature without the express written permission of the LABORATORY.
- 3.11 The CLIENT acknowledges that all employees of LABORATORY operate under employment contracts with the LABORATORY and CLIENT agrees not to solicit employment of such employees or to solicit information related to other clients from said employees.
- 3.12 In recognition of the relative risks and benefits of the project to both CLIENT and LABORATORY, the risks have been allocated such that the CLIENT agrees, to the fullest extent permitted by law, to limit the liability of the LABORATORY to the CLIENT for any and all claims, losses, costs, damages of any nature whatsoever or claims expenses from any cause or causes, including attorneys' fees and costs and expert witness fees and costs, so that the total aggregate liability of the LABORATORY to the CLIENT shall not exceed \$100,000, or the LABORATORY'S total fee for services rendered on this project, whichever is greater. It is intended that this limitation apply to any and all liability or cause of action however alleged or arising, unless otherwise prohibited by law.

Paragraph 4. INSURANCE:

- 4.1 LABORATORY shall secure and maintain throughout the full period of the services provided to the CLIENT adequate insurance to protect it from claims under applicable Workmen's Compensation Acts and also shall maintain one million dollars of general liability coverage to cover claims for bodily injury, death or property damage as may arise from the performance of its services.
- 4.2 The CLIENT hereby warrants that it has sufficient insurance to protect its employees adequately under applicable Workmen's Compensation Acts and for bodily injury, death, or property damage.

- 4.3 No insurance of whatever kind or type, which may be carried by either party is to be considered as in any way limiting any other party's responsibility for damages resulting from their operations or for furnishing work and materials.

Paragraph 5. PAYMENT:

- 5.1 CLIENT shall pay to LABORATORY such fees for services as previously agreed, orally or in writing, within 30 days of presentment of a bill for such services performed. In the event CLIENT ordered, orally or in writing, services but such services were not assigned a rate for billing, such services shall be billed at the LABORATORY's reasonable and customary rate.
- 5.2 CLIENT shall be responsible for all shipping, customs and other expenses related to services provided by LABORATORY to the CLIENT, and shall fully insure any test sample or other equipment provided to LABORATORY by the CLIENT.
- 5.3 Amounts overdue from CLIENT to LABORATORY shall be charged interest at a rate of 1½% per month.

Paragraph 6. ISO/IEC GUIDE 17025 ADDITIONS:

- 6.1 CLIENT agrees that this test report will not be reproduced except in full, without written approval from the LABORATORY.
- 6.2 CLIENT agrees that this test report shall not be used to claim product endorsement by A2LA or ANSI or any agency of the U.S. Government.
- 6.3 CLIENT agrees that test results presented herein relate only to the sample tested by the LABORATORY.