

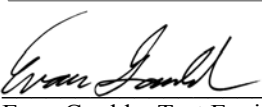
Report No	EC0748-1
Client	Maximum Inc. 30 Samuel Barnet Blvd. New Bedford, MA 02745
Phone	(508) 995-2200
Fax	(508) 998-5359
FRN	0005833959
Model	EA311
FCC ID	KLN311
Equipment Type	Low Power Communication Device Transmitter
Equipment Code	DXX
Results	As detailed within this report
Prepared by	 Evan Gould – Test Engineer
Authorized by	 Michael Buchholz – EMC Manager
Issue Date	<u>10/4/02</u>
Conditions of issue	This Test Report is issued subject to the conditions stated in ‘terms and conditions’ section of this report.

Table Of Contents

<i>Summary</i>	3
<i>Test Methodology</i>	3
<i>Statement of Conformity</i>	4
<i>Test Equipment Used</i>	5
<i>Fundamental Frequency Measurement</i>	6
<i>Band Edge Measurements</i>	7
<i>Harmonic Frequency Measurements</i>	8
<i>Voltage Variation</i>	9
<i>AC Line Conducted Emission Measurements</i>	10
<i>Terms and Conditions</i>	11

Summary

This report is an application for Certification of a transmitter operating pursuant to Part 15.249 of the FCC Rules, Code of Federal Regulations 47. This report is designed to demonstrate the compliance of the EA311 Wireless Receiver with the requirements outlined in Part 15 (using the methods outlined in Part 2) of 47 CFR.

Test Methodology

Radiated emission testing was performed according to the procedures in ANSI C63.4 (1992). The testing was performed at distance of 3 meters below 1GHz, and 3 or 1 meter(s) above 1GHz. The actual test distance used is noted in the test data sheets. The device's performance was investigated in the range 30MHz to 9166MHz (tenth harmonic). Since the device is installed in various orientations, the emissions were maximized around the three orthogonal axes and the maximum reading was recorded. The integrated antenna cannot be maximized separately.

All other performance tests were made in accordance with the procedures outlined in Part 15 of CFR 47. The applicable sections provided under Part 15 are provided in the measurement section of this report.

Statement of Conformity

The Maximum Inc. Wireless Receiver 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.
2.925	15.19	The label is shown in the label exhibit.
	15.21	Information to the user is shown in the instruction manual exhibit.
	15.27	No special accessories are required for compliance.
	15.31(e)	Measurements of the fundamental emission were taken at 85% and 115% of the rated nominal supply voltage.
	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 EUT passes the AC line conducted emission limits.
	15.249	The unit complies with the field strength limits of 15.249

Test Equipment Used

SPECTRUM ANALYZERS					
x	Analyzer	Model No.	Company	Serial No.	Calibration Due
X	YELLOW 9kHz-2.9GHz	8594E	HP	3523A01958	03-JUL-2003
X	BLACK 9kHz-12.8GHz	8596E	HP	3710A00944	08-JUL-2003
X	ORANGE 9kHz-26.5GHz	E4407B	HP	US39440975	07-JUN-2003

OPEN AREA TEST SITE (OATS)					
x	Site	FCC Code	IC Code	VCCI Code	Calibration Due
X	"T" Texas	93448	IC 2762-T	R-905/ C-480	04-FEB-2004

LISNs					
x	LISN	Model No.	Company	Serial No.	Calibration Due
X	YELLOW-BLACK 10kHz-30MHz	8012-50-R-24-BNC	Solar	984735	10-MAY-2003

ANTENNAS					
x	Antenna	Model No.	Company	Serial No.	Calibration Due
X	BLUE Bilog: 30MHz-1GHz	3143	EMCO	1271	11-JUL-2004
X	YELLOW Horn: 1-18GHz	3115	EMCO	9608-4898	08-MAY-2003

PREAMPLIFIERS					
x	Preamplifier	Model No.	Company	Serial No.	Calibration Due
X	BLACK 0.01-2000MHz	ZFL-1000-LN	MiniCircuits/ C-S	n/a	22-MAR-2003
X	ORANGE-BLACK 1-20GHz	SMC-12A	MITEQ	690639	27-AUG-2003

RMS VOLTMETER					
x	Meter	Model No.	Company	Serial No.	Calibration Due
X	TRUE-RMS VOLTMETER	79III	Fluke	71700298	03-OCT-2002

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

Fundamental Frequency Measurement

LIMIT

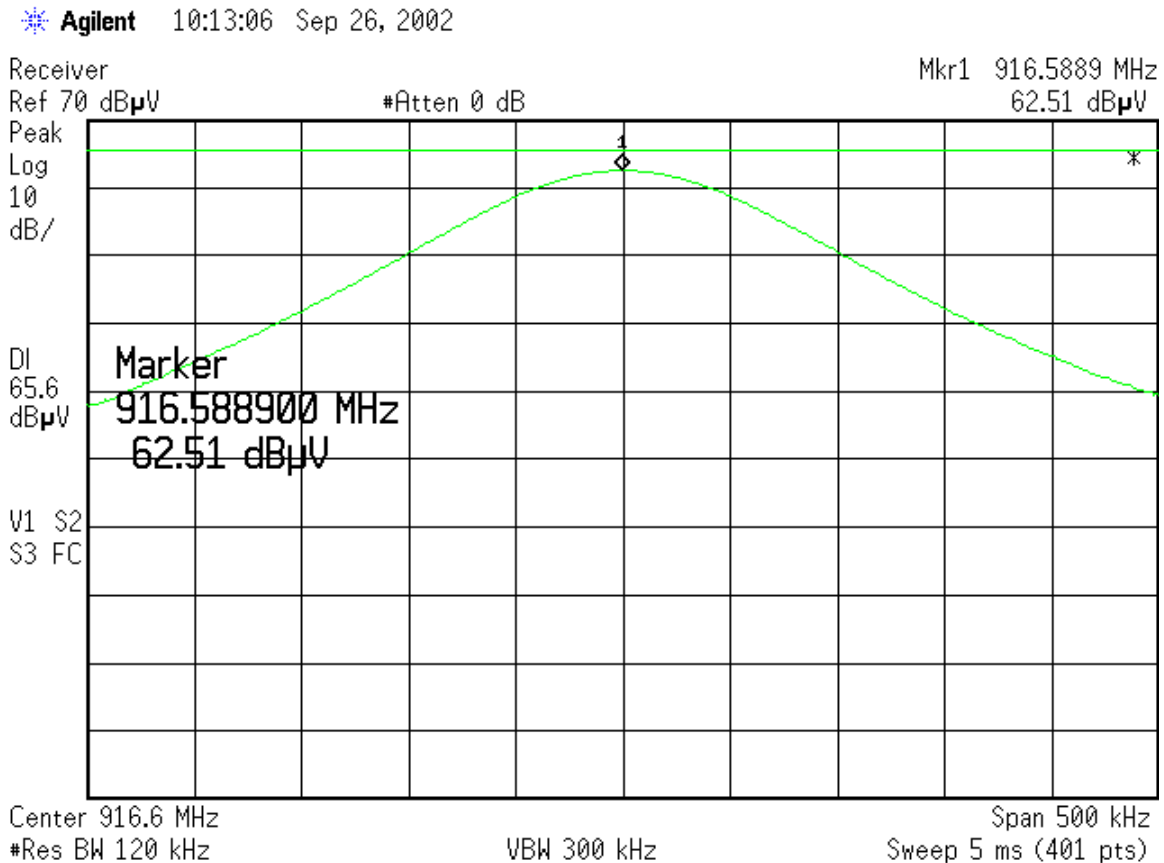
Quasi-Peak: 50mV/m = 93.9dBμV/m @ 3m [15.249(a), (b), and (d)]

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

MEASUREMENT

Fundamental Frequency									Curtis-Straus LLC		
Date: 26-Sep-02			Engineer: Evan Gould				Work Order: C0748				
Company: Maximum Inc.			EUT: Wireless Receiver				Fundamental Frequency: 916.5MHz				
Test Site: "T"			Cable: 65 ft RG8A/U				Pre-amp: N/A				
Antenna: Blue			Filter/Attenuator: N/A				Analyzer: Orange				
Measurement Distance: 3 meters				Resolution BW: 120kHz Video BW: 300kHz							
Detector Type: Peak											
Notes:											
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Filter/Attenuator Factor (dB)	Distance Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.249		
									Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
V	916.6	62.5	0.0	24.2	4.1	0.0	0.0	90.8	93.9	-3.1	Pass

ANALYZER PLOT



Band Edge Measurements

LIMITS

Quasi-Peak: 50dB below level of Fundamental *OR*

General radiated emission limits of 15.209

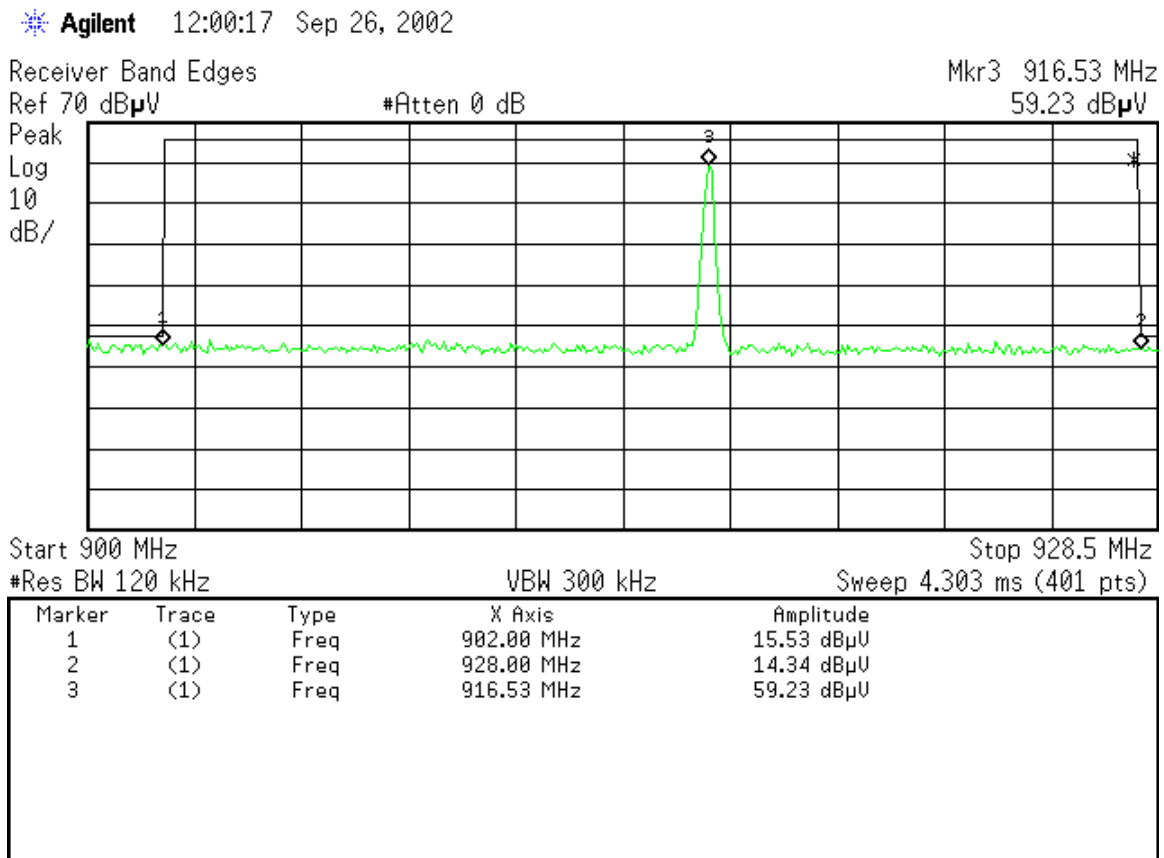
"...whichever is the lesser attenuation." [15.249(c)]

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

MEASUREMENTS

Band Edges										Curtis-Straus LLC		
Date: 26-Sep-02			Engineer: Evan Gould					Work Order: C0748				
Company: Maximum Inc.			EUT: Wireless Receiver					Fundamental Frequency Band: 902-928MHz				
Test Site: "T"			Cable: 65 ft RG8A/U					Pre-amp: N/A				
Antenna: Blue			Filter/Attenuator: N/A					Analyzer: Orange				
Measurement Distance: 3 meters					Resolution BW: 120kHz							
Detector Type: Peak					Video BW: 300kHz							
Notes:												
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Filter/Attenuator Factor (dB)	Distance Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.249			
									Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	
V	902.0	15.5	0.0	24.3	4.1	0.0	0.0	43.9	46.0	-2.1	Pass	
V	928.0	14.4	0.0	24.2	4.2	0.0	0.0	42.8	46.0	-3.2	Pass	

ANALYZER PLOT



Harmonic Frequency Measurements

LIMITS

Average: $500\mu\text{V/m} = 54\text{dB}\mu\text{V/m}$ @ 3m [15.249(a), (b), and (d)]

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

Note: If peak measurements meet the Average limit, then Average measurements are not required.

MEASUREMENTS

Harmonics											Curtis-Straus LLC		
Date: 25-Sep-02			Engineer: Evan Gould						Work Order: C0748				
Company: Maximum Inc.			EUT: Wireless Receiver						Fundamental Frequency: 916.5MHz				
Test Site: "T"			Cable: 65 ft RG8A/U						Pre-amp: N/A				
Antenna: Yellow Horn			Filter/Attenuator: N/A						Analyzer: Orange				
Measurement Distance: 3 meters								Resolution BW: 1MHz					
Detector Type: Peak								Video BW: 1MHz					
Notes:													
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBµV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Filter/Attenuator Factor (dB)	Duty Cycle Factor (dB)	Distance Factor (dB)	Adjusted Reading (dBµV/m)	47 CFR 15.249			
										Limit (dBµV/m)	Margin (dB)	Result (Pass/Fail)	
V	1833.2	40.6	24.1	28.2	1.2	0.0	0.0	0.0	45.9	54.0	-8.1	Pass	
V	2749.8	31.6	23.9	31.1	1.5	0.0	0.0	0.0	40.3	54.0	-13.7	Pass	
V	3666.4	29.7	23.6	33.4	2.0	0.0	0.0	0.0	41.5	54.0	-12.5	Pass	
V	4583.0	29.3	23.3	34.1	2.2	0.0	0.0	0.0	42.3	54.0	-11.7	Pass	
V	5499.6	30.1	22.4	36.2	2.3	0.0	0.0	0.0	46.2	54.0	-7.8	Pass	

Harmonics											Curtis-Straus LLC		
Date: 25-Sep-02			Engineer: Evan Gould					Work Order: C0748					
Company: Maximum Inc.			EUT: Wireless Receiver					Fundamental Frequency: 916.5MHz					
Test Site: "T"			Cable: 65 ft RG8A/U					Pre-amp: N/A					
Antenna: Yellow Horn			Filter/Attenuator: N/A					Analyzer: Orange					
Measurement Distance: 1 meter							Resolution BW: 1MHz						
Detector Type: Peak							Video BW: 1MHz						
Notes:													
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Filter/Attenuator Factor (dB)	Duty Cycle Factor (dB)	Distance Factor (dB)	Adjusted Reading (dBμV/m)	47 CFR 15.249			
										Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	
V	6416.2	29.6	21.5	36.5	2.5	0.0	0.0	9.5	37.6	54.0	-16.4	Pass	
V	7332.8	30.6	21.3	37.7	2.8	0.0	0.0	9.5	40.3	54.0	-13.7	Pass	
V	8249.4	28.7	20.9	38.4	3.2	0.0	0.0	9.5	39.9	54.0	-14.1	Pass	
V	9166.0	28.7	20.2	40.2	3.3	0.0	0.0	9.5	42.5	54.0	-11.5	Pass	

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: 26-Sep-02		Engineer: Evan Gould				Work Order: C0748		
Company: Maximum Inc.		EUT: Wireless Receiver				Fundamental Frequency: 916.5MHz		
Test Site: "T"		Cable: 65 ft RG8A/U				Pre-amp: N/A		
Antenna: Blue		Filter/Attenuator: N/A				Analyzer: Orange		
Measurement Distance: 3 meters				Resolution BW: 120kHz				
Detector Type: Peak				Video BW: 300kHz				
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	916.6	62.5	0.0	24.2	4.1	0.0	0.0	90.8
(nominal) 117V	916.6	62.5	0.0	24.2	4.1	0.0	0.0	90.8
(115%) 134.5V	916.6	62.5	0.0	24.2	4.1	0.0	0.0	90.8

AC Line Conducted Emission Measurements

LIMITS

Quasi-Peak: 250 μ V = 47.9dB μ V in the range 450kHz to 30MHz

[47 CFR 15.207(a) Revised as of October 1, 2001]

Note: On July 12, 2004, the FCC adopts the conducted emissions limits of the European CISPR 22 standard as outlined below

Frequency of emission (MHz)	Quasi-peak limit (dB μ V)	Average limit (dB μ V)
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.

[47 CFR 15.207(a) Revised as of October 1, 2002; amended by ET Docket 98-80; FCC 02-157, published in the Federal Register Vol. 67, No. 132, on Wednesday, July 10, 2002]

MEASUREMENTS

AC Mains Conducted Emissions											Curtis-Straus LLC	
Date: 26-Sep-02					Company: Maximum Inc.					Table No:		
Engineer: Evan Gould					EUT Desc: Receiver					Work Order: C0746		
Notes:												
Range: 0.15-30Mhz			LISN(s): Yellow-Black			Resolution Bandwidth: 9kHz				Spectrum Analyzer: Black		
Frequency (MHz)	Q.P. Readings		Ave. Readings		Impedance Factor	15.207 Applicable until July 12, 2004		FCC/CISPR B		FCC/CISPR B		Overall Result (Pass/Fail)
	QP1 (dBµV)	QP2 (dBµV)	AV1 (dBµV)	AV2 (dBµV)		Limit (dBµV)	Margin dB	qp Limit (dBµV)	qp Margin dB	AVE Limit (dBµV)	AVE Margin dB	
0.15	28.0	30.9	23.8	28.3	20.0	---	---	66.0	-15.1	56.0	-7.7	Pass
0.19	29.7	29.8	26.3	25.5	20.0	---	---	64.0	-14.2	54.0	-7.7	Pass
0.53	21.2	20.1	2.8	3.5	20.0	47.9	-19.7	56.0	-14.8	46.0	-22.5	Pass
1.23	15.6	14.8			20.0	47.9	-12.3	56.0	-20.4	46.0	-10.4	Pass
15.49	7.7	6.5			20.0	47.9	-20.2	60.0	-32.3	50.0	-22.3	Pass
20.00	10.4	12.6			20.0	47.9	-15.3	60.0	-27.4	50.0	-17.4	Pass
21.70	7.3	4.4			20.0	47.9	-20.6	60.0	-32.7	50.0	-22.7	Pass
27.60	6.0	6.7			20.0	47.9	-21.2	60.0	-33.3	50.0	-23.3	Pass
Table Result: Pass by -7.70 dB Worst Freq: 0.15 MHz												

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 shall be made to any third party without the prior written consent of both parties unless such distribution is mandated by operation of law. 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.

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 Guide 25 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.