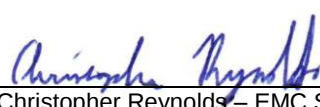




**BUREAU
VERITAS**

Curtis-Straus LLC, a wholly owned subsidiary of BV CPS

Test Report

Report No	EL2270-9
Client	AirPointe of New Hampshire
Address	35E Industrial Way Suite 101 Rochester, NH 03867
Phone	603-994-2200
Items tested	Mako 440
FCC ID	WUS00045
FRN	0018228197
Equipment Type	Part 15 Security/Remote Control Transmitter
Equipment Code	DSC
FCC Rule Parts	47 CFR 15.231(e) (Partial Testing)
Test Dates	March 5, 2012 and June 16, 2014
Results	As detailed within this report
Prepared by	 Tuyen Truong- Test Engineer
Authorized by	 Christopher Reynolds - EMC Supervisor
Issue Date	February 20, 2015
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Conditions of Testing' section on page 10 of this report.

Curtis-Straus LLC is accredited by the American Association for Laboratory Accreditation for the specific scope of accreditation under Certificate Number 1627-01. This report may contain data which is not covered by the A2LA accreditation.



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



Contents

Contents.....2

Summary.....3

Test Methodology.....3

Product Tested - Configuration Documentation4

Test Results5

 Fundamental Emission.....5

 Timing Requirements / Duty Cycle Correction Factor.....7

Measurement Uncertainty.....9

Conditions Of Testin.....10

Form Final Report REV 7-20-07 (DW)



Summary

This report is an amendment to report EL2270-6 to support an application for certification of a transmitter operating pursuant to 47 CFR 15.231(e) (for fundamental radiated emission testing and timing tests only) while in beacon mode. The remainder of testing can be found in report EL2270-6. The product is the Mako 440. The operating frequency is 440MHz. It is powered by +3VDC coin cell batteries. Line Conducted Emissions was not performed.

We found that the product met the requirements with modification. The power level was reduced to level 8D (equivalent to 1.4dBm). Don Proulx from AirPointe was present during the testing. The test sample was received in good condition.

Test Methodology

Testing was performed according to ANSI C63.4-2009 and ANSI C63.10-2009. Radiated emissions were maximized by rotating the device around its three orthogonal axes, as well as varying the test antenna's height and polarity. The EUT's antenna cannot be maximized separately. Fresh batteries were used for testing.

Release Control Record

Issue No.	Reason for change	Date Issued
1	Original Release	February 20, 2015



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS
One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828



page 3 of 11

Product Tested - Configuration Documentation

EUT Configuration																																			
Work Order: L2270 Company: airPointe Company Address: 35E Industrial Way Rochester, NH 03867 Contact: Don Proulx Person Present: Don Proulx																																			
MN						SN																													
EUT: E3490						Sample 1																													
EUT Description: MAKO 440 - Active RFID Tag																																			
EUT TX Frequency: 440MHz																																			
Support Equipment:						MN																													
NONE																																			
EUT Ports:																																			
<table border="1"> <thead> <tr> <th>Port Label</th> <th>Port Type</th> <th>No. of ports</th> <th>No.</th> <th>Populated</th> <th>Cable Type</th> <th>Shielded</th> <th>Ferrites</th> <th>Length</th> <th>Max Length</th> <th>In/Out NEBS Type</th> <th>Unpopulated Reason</th> </tr> </thead> <tbody> <tr> <td colspan="12">NONE</td> </tr> </tbody> </table>												Port Label	Port Type	No. of ports	No.	Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out NEBS Type	Unpopulated Reason	NONE											
Port Label	Port Type	No. of ports	No.	Populated	Cable Type	Shielded	Ferrites	Length	Max Length	In/Out NEBS Type	Unpopulated Reason																								
NONE																																			
Software / Operating Mode Description:																																			
EUT is continuously transmitting a 440MHz signal																																			

Test Results**Fundamental Emission****LIMIT**

<i>Fundamental Frequency</i>	<i>Field Strength of Fundamental (microvolts/meter)</i>	<i>Field Strength of Spurious Emission (microvolts/meter)</i>
440MHz	1,500 to 5,000	150 to 500

[15.231(e)]

MEASUREMENT**Radiated Emissions Table**

Date: 05-Mar-12		Company: Airpointe		Work Order: L2270								
Engineer: Tuyen Truong		EUT Desc: Mako440		EUT Operating Voltage/Frequency: 3Vdc								
Temp: 23.3°C		Humidity: 13%		Pressure: 1011mBar								
Frequency Range: Fundamental				Measurement Distance: 3 m								
Notes: DCCF = 20.0dB Y-orientation is the worst case EUT's power is set to 8D (or equivalent to 1.4dBm)				EUT Max Freq: 440 MHz								
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dBμV)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dBμV/m)	---			47 CFR 15.231(e)		
							Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)	Limit (dBμV/m)	Margin (dB)	Result (Pass/Fail)
v, pk	440.0	73.9	0.0	16.6	1.9	92.4	---	---	---	93.1	-0.7	Pass
v, avg	440.0	53.9	0.0	16.6	1.9	72.4	---	---	---	73.1	-0.7	Pass
h, pk	440.0	71.4	0.0	16.6	1.9	89.9	---	---	---	93.1	-3.2	Pass
h, avg	440.0	51.4	0.0	16.6	1.9	69.9	---	---	---	73.1	-3.2	Pass
Table Result: Pass				by -0.7 dB		Worst Freq: 440.0 MHz						
Test Site: EMI Chamber 2		Cable 1: Asset #1506		Cable 2: Asset #1507								
Analyzer: Asset #1328		Preamp: none		Antenna: Red-White								

2/17/2012

Spectrum Analyzers / Receivers / Preselectors		Range	MN	Mfr	SN	Asset	Cat	Calibration Due
SA EMI Chamber (1328)		9kHz-13.2 GHz	E4405B	Agilent	MY44210241	1328	I	3/6/2012
Radiated Emissions Sites		FCC Code	IC Code	VCCI Code				
EMI Chamber 2		719150	2762A-7	R-3033, G-107				
Antennas		Range	MN	Mfr	SN	Asset	Cat	Calibration Due
Red-White Bilog		30-2000MHz	JB1	Sunol	A091604-1	1105	I	1/28/2013
Meteorological Meters		MN		Mfr	SN	Asset	Cat	Calibration Due
Temp./Humidity/Atm. Pressure Gauge		7400 Perception II		Davis	N/A	965	I	4/4/2013
CHAMBER2 Thermohygrometer		35519-044		Control Company	72457639	1347	II	8/19/2013
Cables		Range	Mfr					
Asset #1506		9kHz - 18GHz	Florida RF					
Asset #1507		9kHz - 26.5GHz	Florida RF					

All equipment is calibrated using standards traceable to NIST or other nationally recognized calibration standard.

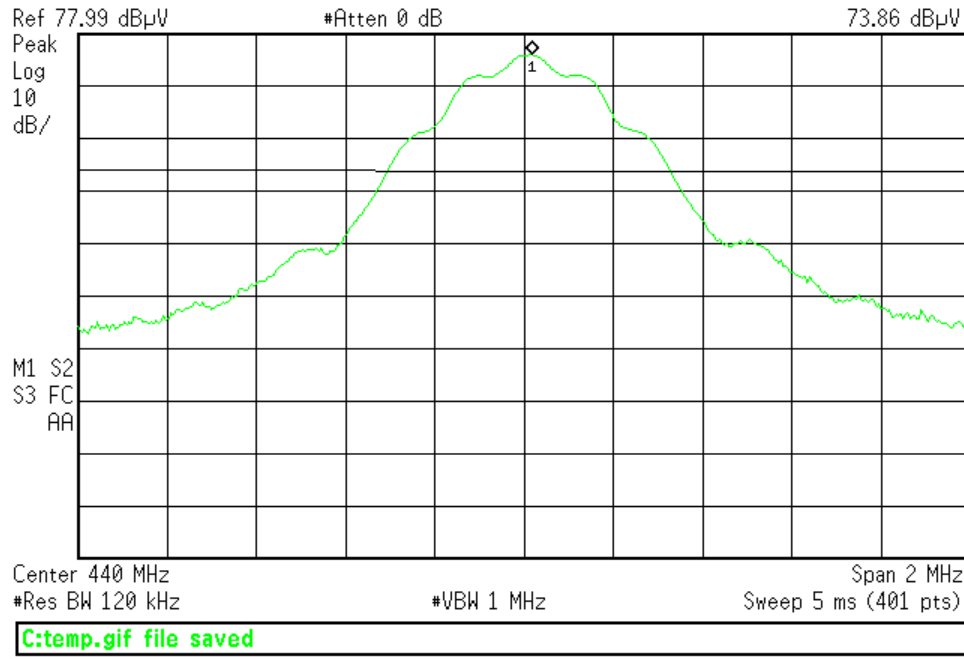


Analyzer Screen Plot

✱ Agilent 17:43:38 Mar 4, 2012

R T

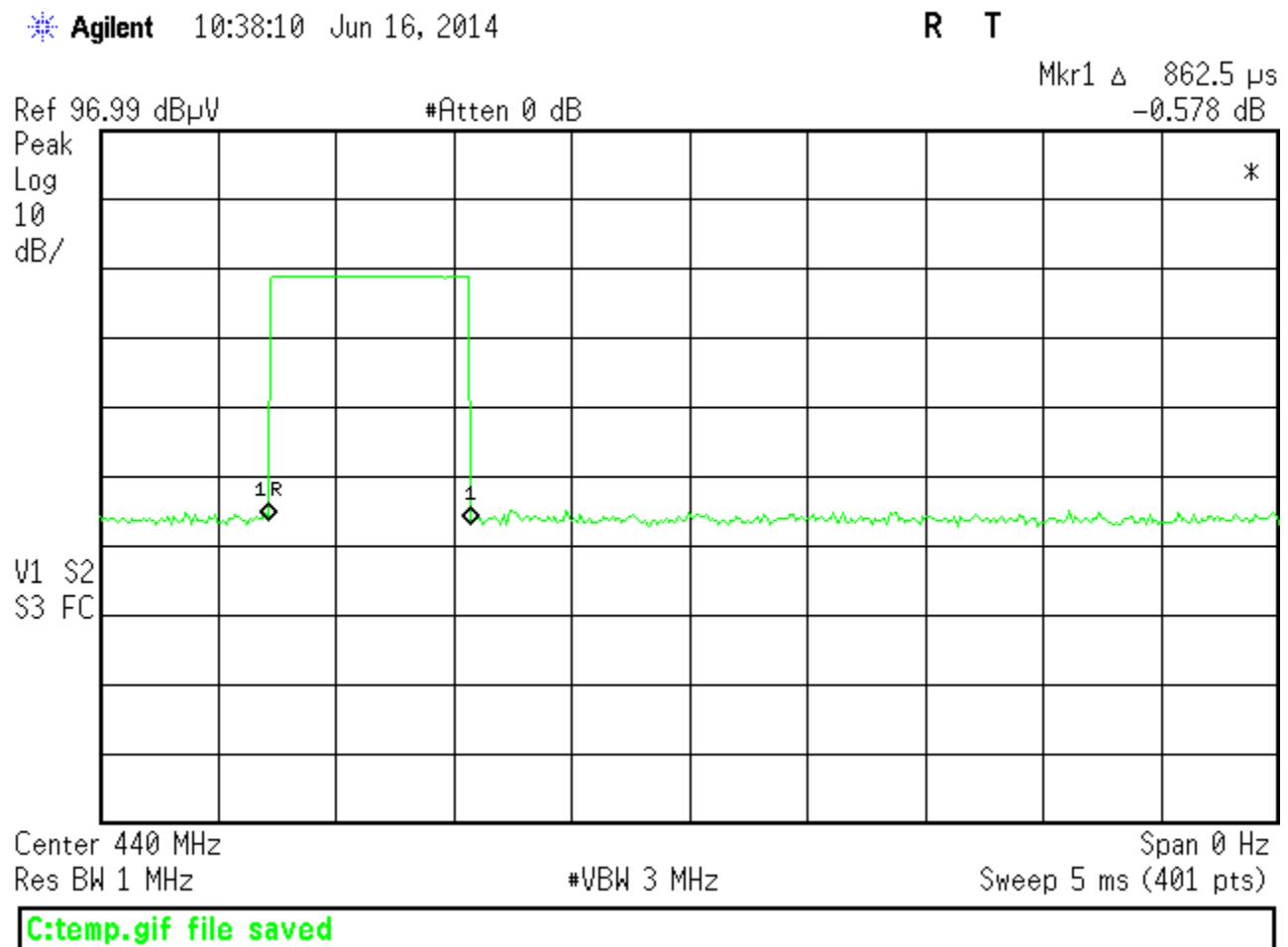
Mkr1 440.020 MHz
73.86 dBμV

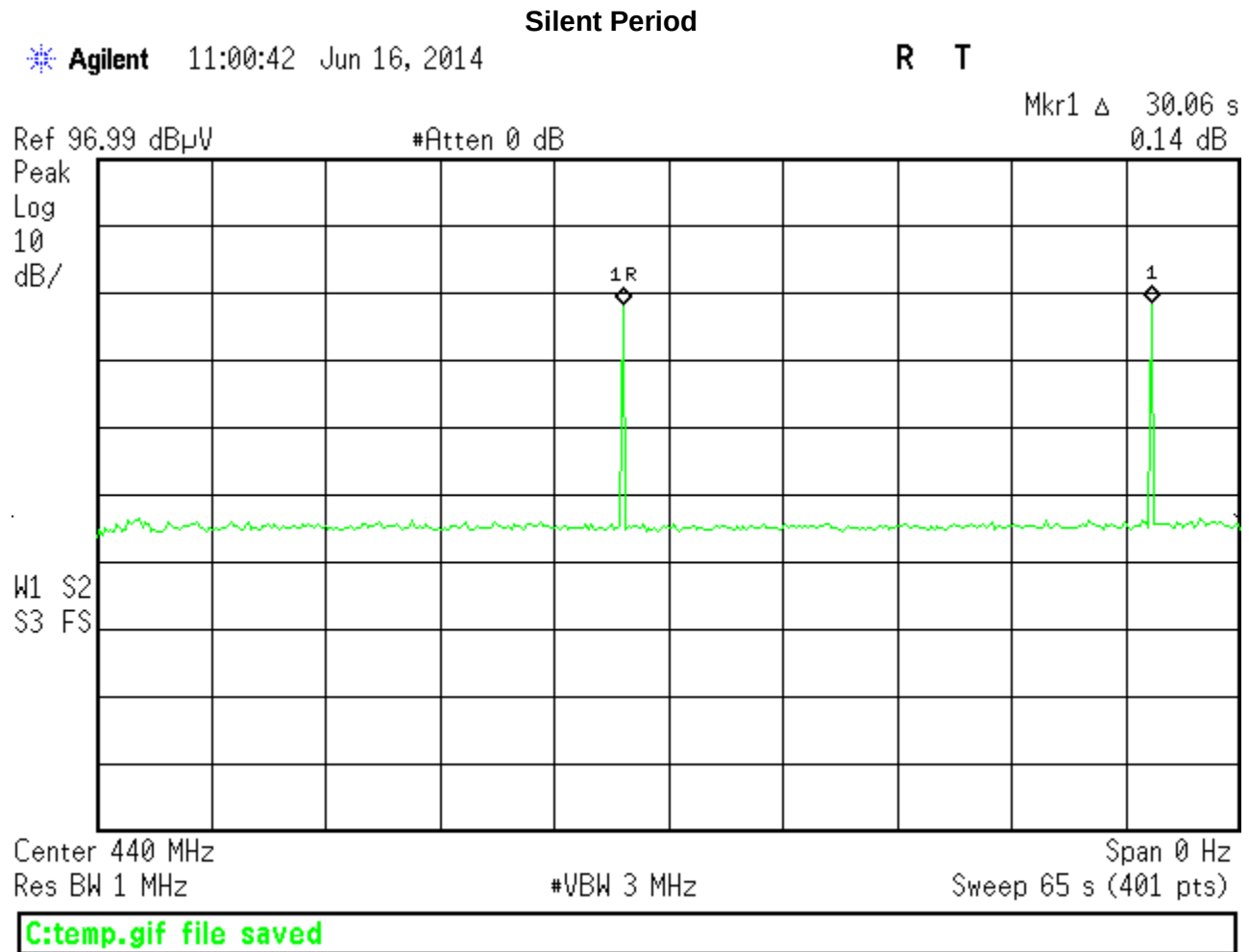


Timing Requirements / Duty Cycle Correction Factor

"In addition, devices operated under the provisions of this paragraph shall be provided with a means for automatically limiting operation so that the duration of each transmission shall not be greater than one second and the silent period between transmissions shall be at least 30 times the duration of the transmission but in no case less than 10 seconds." [15.231(e)]

Duration of single pulse





The worst case duty cycle is represented by the two analyzer plots immediately above.

$$\text{DCCF} = 20 \cdot \log(0.8625\text{mS}/100\text{mS})$$

$$\text{DCCF} = -41.3\text{dB}$$

A 20dB Duty Cycle Correction Factor was used in this report.



Measurement Uncertainty

The listed uncertainties are the worst case uncertainty for the entire range of measurement. Please note that the uncertainty values are provided for informational purposes only and are not used in determining the PASS/FAIL results.

Measurement	Expanded Uncertainty k=2	Maximum allowable uncertainty
Radiated Emissions (30-1000MHz)		
NIST	5.6dB	N/A
CISPR	4.6dB	5.2dB (Ucisp)
Radiated Emissions (1-26.5GHz)	4.6dB	N/A
Radiated Emissions (above 26.5GHz)	4.9dB	N/A
Magnetic Radiated Emissions	5.6dB	N/A
Conducted Emissions		
NIST	3.9dB	N/A
CISPR	3.6dB	3.6dB (Ucisp)
Telco Conducted Emissions (Current)	2.9dB	N/A
Telco Conducted Emissions (Voltage)	4.4dB	N/A
Electrostatic Discharge	11.5%	N/A
Radiated RF Immunity (Uniform Field)	1.6dB	N/A
Electrical Fast Transients	23.1%	N/A
Surge	23.1%	N/A
Conducted RF Immunity	3dB	N/A
Magnetic Immunity	12.8%	N/A
Dips and Interrupts	2.3V	N/A
Harmonics	3.5%	N/A
Flicker	3.5%	N/A
Radio frequency (@ 2.4GHz)	3.23×10^{-8}	1×10^{-7}
RF power, conducted	0.40dB	0.75dB
Maximum frequency deviation:		
• Within 300Hz and 6kHz of audio frequency / Within 6kHz and 25kHz of audio frequency	3.4% 0.3dB	5% 3dB
Adjacent channel power	1.9dB	3dB
Conducted spurious emission of transmitter, valid up to 12.75GHz	2.39dB	3dB
Conducted emission of receivers	1.3dB	3dB
Radiated emission of transmitter, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of transmitter, valid up to 80GHz	3.3dB	6dB
Radiated emission of receiver, valid up to 26.5GHz	3.9dB	6dB
Radiated emission of receiver, valid up to 80GHz	3.3dB	6dB
Humidity	2.37%	5%
Temperature	0.7°C	1.0°C
Time	4.1%	10%
RF Power Density, Conducted	0.4dB	3dB
DC and low frequency voltages	1.3%	3%
Voltage (AC, <10kHz)	1.3%	2%
Voltage (DC)	0.62%	1%
The above reflects a 95% confidence level		



Conditions Of Testing

[Bureau Veritas Consumer Products Services, Inc., a Massachusetts corporation], and/or its affiliates (collectively, the "Company") will conduct, at the request of the Submitter ("Client"), the tests specified on the submitted Test Request Form or equivalent in accordance with, and subject to, the following terms and conditions (collectively, "Conditions"):

1. All orders for tests are subject to acceptance by the Company, and no order will constitute a binding commitment of the Company unless and until such order is accepted by it, as evidenced by the issuance of a written report ("Test Report") by the Company. The Test Report is issued solely by the Company, is intended for the exclusive use of Client and shall not be published, used for advertising purposes, copied or replicated for distribution to any other person or entity or otherwise publicly disclosed without the prior written consent of the Company. By submitting a request for services to the Company, Client consents to the disclosure to accreditation bodies of those records of Client relevant to the accreditation body's assessment of the Company's competence and compliance with relevant accreditation criteria. The Company shall not be liable for any loss or damage whatsoever resulting from the failure of the Company to provide its services within any time period for completion estimated by the Company. If Client anticipates using the Test Report in any legal proceeding, arbitration, dispute resolution forum or other proceeding, it shall so notify the Company prior to submitting the Test Report in such proceeding. The Company has no obligation to provide a fact or expert witness at such proceeding unless the Company agrees in advance to do so for a separate and additional fee.
2. The Test Report will set forth the findings of the Company solely with respect to the test samples identified therein. Unless specifically and expressly indicated in the Test Report, the results set forth in such Test Report are not intended to be indicative or representative of the quality or characteristics of the lot from which a test sample is taken, and Client shall not rely upon the Test Report as being so indicative or representative of the lot or of the tested product in general. The Test Report will reflect the findings of the Company at the time of testing only, and the Company shall have no obligation to update the Test Report after its issuance. The Test Report will set forth the results of the tests performed by the Company based upon the written information provided to the Company. The Test Report will be based solely on the samples and written information submitted to the Company by Client, and the Company shall not be obligated to conduct any independent investigation or inquiry with respect thereto.
3. The Company may, in its sole discretion, destroy samples which have been furnished to the Company for testing and which have not been destroyed in the course of testing. The Company may delegate the performance of all or a portion of the services contemplated hereunder to an affiliate, agent or subcontractor of the Company, and Client consents to such delegation.
4. These Conditions and the Test Report represent the entire understanding of the parties hereto with respect to the subject matter hereof and of the Test Report, and no modification, variance or extrapolation with respect thereto shall be permitted without the prior written consent of the Company.
5. The names, service marks, trademarks and copyrights of the Company and its affiliates, including the names "BUREAU VERITAS," "BUREAU VERITAS CONSUMER PRODUCTS SERVICES," "BVCPS," "MTL," "ACTS," "MTL-ACTS" and CURTIS-STRAUS (collectively, the "Marks") are and shall remain the sole property of the Company or its affiliates and shall not be used by Client except solely to the extent that Client obtains the prior written approval of the Company and then only in the manner prescribed by the Company. Client shall not contest the validity of the Marks or take any action that might impair the value or goodwill associated with the Marks or the image or reputation of the Company or its affiliates.
6. Payment in full shall be due 30 days after the date of invoice. Interest shall be due on overdue amounts from the due date until paid at an interest rate of 1.5% per month or, if less, the maximum rate permitted by law. The Company reserves the right, at any time and from time to time, to revoke any credit extended to Client. Client shall reimburse the Company for any costs it incurs in collecting past due amounts, including court costs and fees and expenses of attorneys and collection agencies. The Test Report may not be used or relied upon by Client if and for so long as Client fails to pay when due any invoice issued by the Company or any affiliate of it to Client or any affiliate or subsidiary of Client together with interest and penalties, if any, accrued thereon.
7. The Company disclaims any and all responsibility or liability arising out of or in connection with e-mail transmissions of such information.
8. Client understands and agrees that the Company is neither an insurer nor a guarantor, that the Company does not take the place of Client or any designer, manufacturer, agent, buyer, distributor or transportation or shipping company, and that the Company disclaims all liability in such capacities. Client further understands that if it seeks assurance against loss or damage, it should obtain appropriate insurance.
9. Client agrees that the Company, by providing the services, does not take the place of Client nor any third party, nor does the Company release them from any of their obligations, nor does the Company otherwise assume, abridge, abrogate or undertake to discharge any duty of any third party to Client or any duty of Client or any third party to any other third party, and Client will not release any third party from its obligations and duties with respect to the tested goods.
10. Client shall, on a timely basis, (a) provide adequate instructions to the Company in order to enable the Company to perform properly its services, (b) provide, or cause Client's suppliers and contractors to provide, the Company with all documents necessary to enable the Company to perform its services, (c) furnish the Company with all relevant information regarding Client's intended use and purposes of the tested goods, (d) advise the Company of essential dates and deadlines relevant to the tested goods and (e) fully exercise all rights and remedies available to Client against third parties in respect of the tested goods.
11. The Company shall undertake due care and ordinary skill in the performance of its services to Client, and the Company shall accept responsibility only where such skill has not been exercised and, even in such event, only to the extent of the limitation of liability set forth herein.
12. If Client desires to assert a claim arising from or relating to (i) the performance, purported performance or non-performance of any services by the Company or (ii) the sale, resale, manufacture, distribution or use of any tested goods, it must submit that claim to the Company in a writing that sets forth with particularity the basis for such claim within 60 days from discovery of the potential claim and not more than six months after the date of issuance of the Test Report to Client. Client waives any and all such claims including, without limitation, claims that the Test Report is inaccurate, incomplete or misleading or that additional or different testing is required, unless and then only to the extent that Client submits a written claim to the Company within both such time periods.
13. CLIENT SHALL, EXCEPT TO THE EXTENT OF COMPANY'S LIABILITY TO CLIENT HEREUNDER (WHICH IN NO EVENT SHALL EXCEED THE LIMITATION OF LIABILITY HEREIN), HOLD HARMLESS AND INDEMNIFY THE COMPANY, ITS AFFILIATES AND THEIR RESPECTIVE DIRECTORS, OFFICERS, EMPLOYEES, AGENTS AND SUBCONTRACTORS AGAINST ALL ACTUAL OR ALLEGED THIRD PARTY CLAIMS FOR LOSS, DAMAGE OR EXPENSE OF WHATSOEVER NATURE AND HOWSOEVER ARISING FROM OR RELATING TO (i) THE PERFORMANCE, PURPORTED PERFORMANCE OR NON-PERFORMANCE OF ANY SERVICES BY THE COMPANY OR (ii) THE SALE, RESALE, MANUFACTURE, DISTRIBUTION OR USE OF ANY TESTED GOODS.
14. EXCEPT AS MAY OTHERWISE BE EXPRESSLY AGREED TO IN WRITING BY THE COMPANY AND NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN OR IN ANY TEST REPORT, NO WARRANTY OR GUARANTEE, EXPRESS OR IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE, IS MADE.
15. (A) IN NO EVENT WHATSOEVER SHALL THE COMPANY BE LIABLE FOR ANY CONSEQUENTIAL, SPECIAL, INCIDENTAL, EXEMPLARY OR PUNITIVE DAMAGES IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE TEST REPORT OR THE



Curtis-Straus LLC, a wholly owned subsidiary of BV CPS

One Distribution Center Circle, #1 • Littleton, MA • TEL (978) 486-8880 • FAX (978) 486-8828

page 10 of 11



SERVICES PROVIDED BY THE COMPANY HEREUNDER, INCLUDING WITHOUT LIMITATION LOSS OF OR DAMAGE TO PROPERTY; LOSS OF INCOME, PROFIT OR USE; OR ANY CLAIMS OR DEMANDS MADE AGAINST CLIENT OR ANY OTHER PERSON BY ANY THIRD PARTY IN CONNECTION WITH, RELATING TO OR ARISING OUT OF THE SERVICES PROVIDED BY THE COMPANY HEREUNDER.

(B) NOTWITHSTANDING ANY PROVISION TO THE CONTRARY CONTAINED HEREIN, AND IN RECOGNITION OF THE RELATIVE RISKS AND BENEFITS TO CLIENT AND THE COMPANY ASSOCIATED WITH THE TESTING SERVICES CONTEMPLATED HEREBY, THE RISKS HAVE BEEN ALLOCATED SUCH THAT UNDER NO CIRCUMSTANCES WHATSOEVER SHALL THE LIABILITY OF THE COMPANY TO CLIENT OR ANY THIRD PARTY IN RESPECT OF ANY CLAIM FOR LOSS, DAMAGE OR EXPENSE, OF WHATSOEVER NATURE OR MAGNITUDE, AND HOWSOEVER ARISING, EXCEED AN AMOUNT EQUAL TO FIVE (5) TIMES THE AMOUNT OF THE FEES PAID TO THE COMPANY FOR THE SPECIFIC SERVICES WHICH GAVE RISE TO SUCH CLAIM OR U.S.\$10,000, WHICHEVER IS THE LESSER AMOUNT.

16. The Company shall not be liable for any loss or damage resulting from any delay or failure in performance of its obligations hereunder resulting directly or indirectly from any event of force majeure or any event outside the control of the Company. If any such event occurs, the Company may immediately cancel or suspend its performance hereunder without incurring any liability whatsoever to Client.

17. Company's services, including these Conditions, shall be governed by, and construed in accordance with, the local laws of the country where the Company performs the tests or, in the case of tests performed in the United States of America, the laws of Massachusetts without regard to conflicts of laws principles. If any aspect(s) of these Conditions is found to be illegal or unenforceable, the validity, legality and enforceability of all remaining aspects of these Conditions shall not in any way be affected or impaired thereby. Any proceeding related to the subject matter hereof shall be brought, if at all, in the courts of the country where the Company performs the tests or, in the case of tests performed in the United States of America, in the courts of Massachusetts. Client waives the right to interpose any counterclaim or setoffs of any nature in any litigation arising hereunder.

The complete list of the Approved Subcontractors Curtis-Straus may use to delegate the performance of work can be provided upon request.
Rev.160009121(2)_#684340 v14CS

