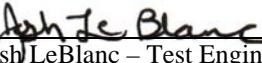


Report No	EG0726-1
Client	Arbitron
Phone	410-312-8515
Fax	410-312-8604
FRN	007870256
Models	Model HP107A Locator Hub
FCC ID	IGKHP107A
IC #	4213A-HP107A
Emissions Designator	12K1A1D
Equipment Type	Low Power Periodic Communications Device Transmitter
Equipment Code	DXX
Results	As detailed within this report
Prepared by	 Josh LeBlanc – Test Engineer
Authorized by	 Michael Buchholz – EMC Manager
Issue Date	9/14/06
Conditions of issue	This Test Report is issued subject to the conditions stated in 'Conditions of Testing' section of this

Summary .....	3
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## ***Summary***

This report is an application for certification of a transmitter operating pursuant to 47 CFR and RSS-210 Issue 6. The product covered by this report is the Model HP107A Locator Hub. It has only a transmitter which operates at 433.92MHz.

## ***Test Methodology***

Radiated emissions testing was performed according to the procedures specified in ANSI C63.4 (2003). The EUT was maximized around one axis, as the EUT can only be installed in one position. The EUT has an integrated internal antenna which can not be maximized separately. The standard test voltage was 120VAC. The ambient environmental conditions were as follows:

<b>Date</b>	<b>Temperature</b>	<b>Humidity</b>
7/24/06	24.7°C	1010.6mb
7/25/06	24.8°C	1012.0mb
7/26/06	25.1°C	1009.8mb
7/29/06	24.6°C	1004.7mb
8/09/06	25.2°C	1014.7mb

<b>Frequency range investigated:</b>	30 MHz- 5GHz
--------------------------------------	--------------

<b>Measurement Distance:</b>		
<i>Frequency (MHz)</i>	<i>Distance (m)</i>	<i>Comments</i>
AC conducted 0.15 – 30MHz	-	Conducted
Fundamental 433.82MHz	3 m	Radiated
Spurious & harmonics 30 –5000 MHz	3 m	Radiated

All readings are peak unless otherwise noted.

***Statement of Conformity***

The HP107A has been found to conform to the following parts of the 47 CFR, RSS-210, and RSS-GEN as detailed below:

RSS-GEN	RSS-210	47 CFR Part #	Comments
5.3		15.15(b)	The product contains no user accessible controls that increase transmission power above allowable levels.
5.2		15.19	The label is shown in the label exhibit.
7.1.5		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)	The voltage was varied to $\pm 15\%$ of the rated voltage. The fundamental did not change.
7.1.4		15.203	The device utilizes an integrated antenna.
7.1.4		15.204	The antenna is not accessible to the user and therefore cannot be easily removed.
	2.2	15.205 15.209	The fundamental is not in a restricted band and the spurious emissions in the restricted bands comply with the general emission limits of 15.209.
See comment		15.207(b)(2)	AC line conducted emissions. EUT meets ICES-006 Issue 1 limits for carrier current systems.
	A1.1.1(1)	15.231(a) (1)	Product complies with 15.231(e), and A1.1.5
	(2)	(2)	Product complies with 15.231(e), and A1.1.5
	(3)	(3)	Product complies with 15.231(e), and A1.1.5
	(4)	(4)	Product complies with 15.231(e), and A1.1.5
		15.231(b)	Product complies with 15.231(e).
	A1.1.3	15.231(c)	20dB bandwidth of the emission is less than 0.25% of the center frequency.
	A1.1.4	15.231(d)	Frequency tolerance is not required, because product does not operate in the specified band.
	A1.1.5	15.231(e)	Fundamental and spurious emissions meet the limits specified in this section.

**Modifications required for compliance:**

In order to meet the limit at the fundamental, the output power was lowered by increasing R34 from 5.9kOhms to 24.9kOhms.

## ***EUT Configuration***

<b>EUT Configuration</b>																			
<b>Work Order:</b> G0726 <b>Company:</b> Arbitron Inc. <b>Company Address:</b> 9705 Patuxent Woods Drive Columbia, MD 21046 <b>Contact:</b> Robert Shelley																			
<table> <thead> <tr> <th>MN</th><th>SN</th></tr> </thead> <tbody> <tr> <td>EUT: HP107A</td><td>001267 (Operational Sample) 001266 (100% Duty Cycle Sample) 001265 (Actual Duty Cycle Sample)</td></tr> </tbody> </table>					MN	SN	EUT: HP107A	001267 (Operational Sample) 001266 (100% Duty Cycle Sample) 001265 (Actual Duty Cycle Sample)											
MN	SN																		
EUT: HP107A	001267 (Operational Sample) 001266 (100% Duty Cycle Sample) 001265 (Actual Duty Cycle Sample)																		
<b>EUT Description:</b> Data Collector <b>EUT Max Frequency:</b> 433MHz																			
<table> <thead> <tr> <th>Support Equipment:</th><th>MN</th><th>SN</th></tr> </thead> <tbody> <tr> <td>Bell Telephone</td><td>2500DM</td><td>-</td></tr> <tr> <td>Compaq Laptop w/ mouse</td><td>Armada 7400</td><td>Arbitron 103184</td></tr> <tr> <td>Telephone Line Simulator</td><td>Teltone TLS-3B-01</td><td>168258</td></tr> <tr> <td>ZOOM Modem</td><td>3048</td><td>1384-3048-00-03C1-0079</td></tr> </tbody> </table>					Support Equipment:	MN	SN	Bell Telephone	2500DM	-	Compaq Laptop w/ mouse	Armada 7400	Arbitron 103184	Telephone Line Simulator	Teltone TLS-3B-01	168258	ZOOM Modem	3048	1384-3048-00-03C1-0079
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AC Power	1	No	2m	No															
RJ11 Telephone Cables	2	No	7ft	No															
<b>Unpopulated EUT Ports:</b> Qty      Reason None																			
<b>Software / Operating Mode Description:</b> Radiated/Conducted Spurious Emissions: EUT is operating normally; placing calls to the support laptop through the telephone line simulator and uploading packets of data. Radiated Fundamental/Harmonic Emissions: EUT is transmitting a 100% duty cycle CW signal																			

***Spurious Radiated Emissions*****FCC Sections 15.231(b) & (e), 15.205, 15.209, & RSS-210 section 2.2**

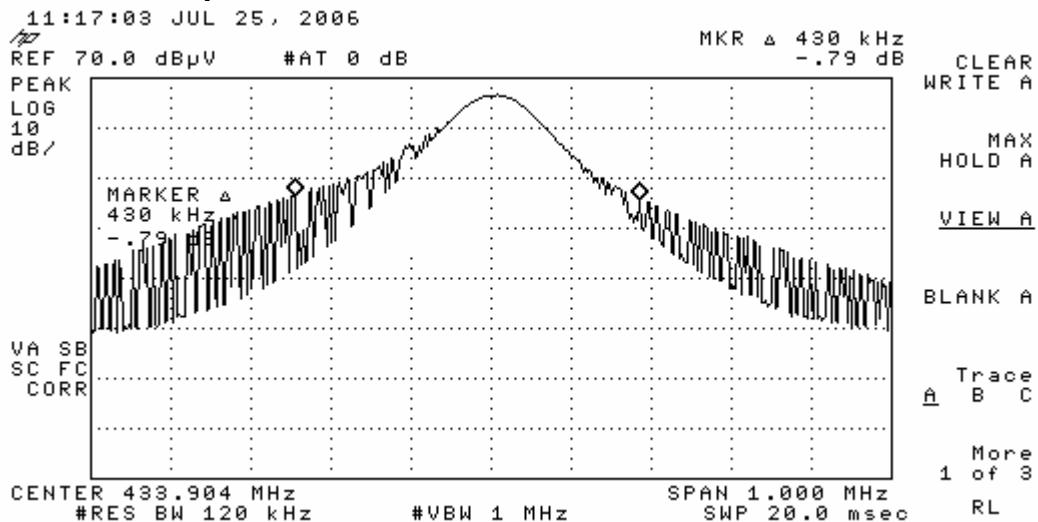
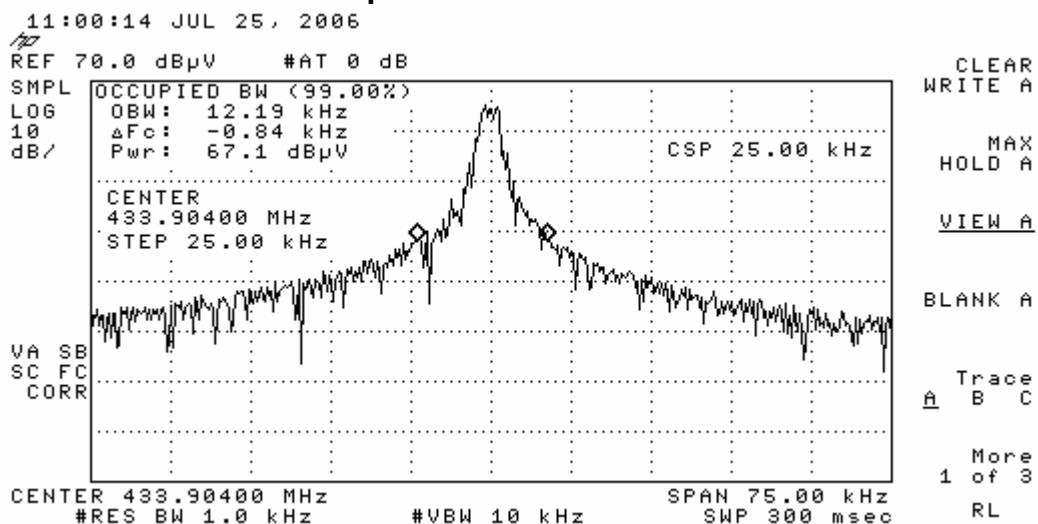
Radiated Emissions Table							Curtis-Straus LLC						
Date: 25-Jul-06 Engineer: Evan Gould			Company: Arbitron EUT Desc: HP107A				Work Order: G0726						
Frequency Range: 30-1000MHz							Measurement Distance: 3 m						
Notes: TX mode							RBW: 120kHz VBW: 1MHz						
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB <sub>u</sub> V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Adjusted Reading (dB <sub>u</sub> V/m)	47 CFR 15.231(b); RSS-210 Table 4						
							Limit (dB <sub>u</sub> V/m)	Margin (dB)	Result (Pass/Fail)				
Vbb	144.8	42.2	21.4	13.5	1.5	35.8	52.8	-17.0	Pass				
Hqp	221.2	40.2	21.3	11.5	1.9	32.3	52.8	-20.5	Pass				
Hqp	294.9	42.1	21.3	13.9	2.3	37.0	52.8	-15.8	Pass				
Hqp	368.6	43.0	21.2	15.6	2.6	40.0	52.8	-12.8	Pass				
Hqp	516.1	30.1	20.9	18.3	3.2	30.7	52.8	-22.1	Pass				
<b>Table Result:</b> Pass by -12.8 dB							<b>Worst Freq:</b> 368.6 MHz						
Test Site: "T"	Pre-Amp: Green	Cable: EMIR-04	Analyzer: Green	Antenna: Red-Black									

Radiated Emissions Table							Curtis-Straus LLC						
Date: 26-Jul-06 Engineer: Evan Gould			Company: Arbitron EUT Desc: HP107A				Work Order: G0726						
Frequency Range: 1-5GHz							Measurement Distance: 3 m						
Notes: TX mode							RBW: 1MHz VBW: 3MHz						
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB <sub>u</sub> V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Duty Cycle Factor (dB)	Adjusted Reading (dB <sub>u</sub> V/m)	47 CFR 15.231(b); RSS-210 Table 4					
								Limit (dB <sub>u</sub> V/m)	Margin (dB)	Result (Pass/Fail)			
Hpk	1301.5	53.3	42.4	26.2	2.1	0.0	39.2	72.8	-33.6	Pass			
Hav	1301.5	53.3	42.4	26.2	2.1	16.8	22.4	52.8	-30.4	Pass			
Vpk	1735.3	56.0	42.4	27.6	2.3	0.0	43.5	72.8	-29.3	Pass			
Vav	1735.3	56.0	42.4	27.6	2.3	16.8	26.7	52.8	-26.1	Pass			
<b>Table Result:</b> Pass by -26.1 dB							<b>Worst Freq:</b> 1735.3 MHz						
Test Site: "A"	Pre-Amp: Red-Green	Cable: EMIR-HIGH 5	Analyzer: Black	Antenna: Orange Horn									

**Sample Calculation:**Adjusted Reading = Reading – Pre Amp<sub>(factor)</sub> + Antenna<sub>(factor)</sub> + Cable<sub>(factor)</sub>

***Emission Bandwidth***

FCC Section 15.231(c) &amp; RSS-210 section A1.1.3

**20dB bandwidth plot****1 kHz RBW 99% bandwidth plot**

0.25% of center frequency = (433.82MHz \* .0025) = 1.084MHz

**Conclusion:** The 20dB and 99% bandwidths are less than 0.25% of the center frequency.

## Fundamental Field Strength and Duty Cycle

### FCC Section 15.231(e) & RSS-210 section A1.1.5

Fundamental Field Strength								Curtis-Straus LLC							
Date: 29-Aug-06		Company: Arbitron					Work Order: G0726								
Engineer: Evan Gould															
EUT Desc: HP107A (s/n: 001266)															
Frequency Range: 433.82MHz					Measurement Distance: 3 m										
Notes: Duty Cycle = 14.35% (worst case 100ms)								RBW: 120kHz							
Duty Cycle Correction Factor = 16.8dB								VBW: 1MHz							
R34 has been changed from 5.9kOhms to 24.9kOhms.															
Antenna Polarization (H / V)	Frequency (MHz)	Reading (dB $\mu$ V)	Preamp Factor (dB)	Antenna Factor (dB/m)	Cable Factor (dB)	Duty Cycle Factor (dB)	Adjusted Reading (dB $\mu$ V/m)	47 CFR 15.231(e); RSS-210 Table 4							
Hpk	433.84	69.5	0.0	16.8	2.5	0.0	88.8	92.8	-4.0	Pass					
Hav	433.84	69.5	0.0	16.8	2.5	16.8	71.9	72.8	-0.9	Pass					
<b>Table Result:</b> Pass by -0.9 dB					<b>Worst Freq:</b> 433.84 MHz										
Test Site: "A"			Pre-Amp: none			Cable: EMIR-11			Analyzer: Yellow	Antenna: Red-Black					

#### Sample Calculation:

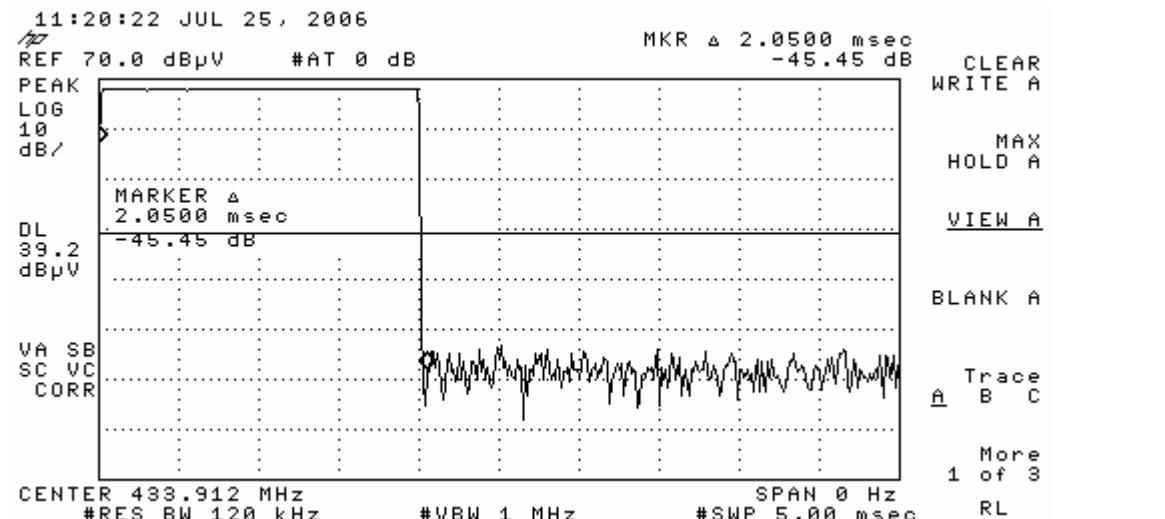
Adjusted Reading = Reading – Pre Amp<sub>(factor)</sub> + Antenna<sub>(factor)</sub> + Cable<sub>(factor)</sub>

#### Duty Cycle Correction Factor:

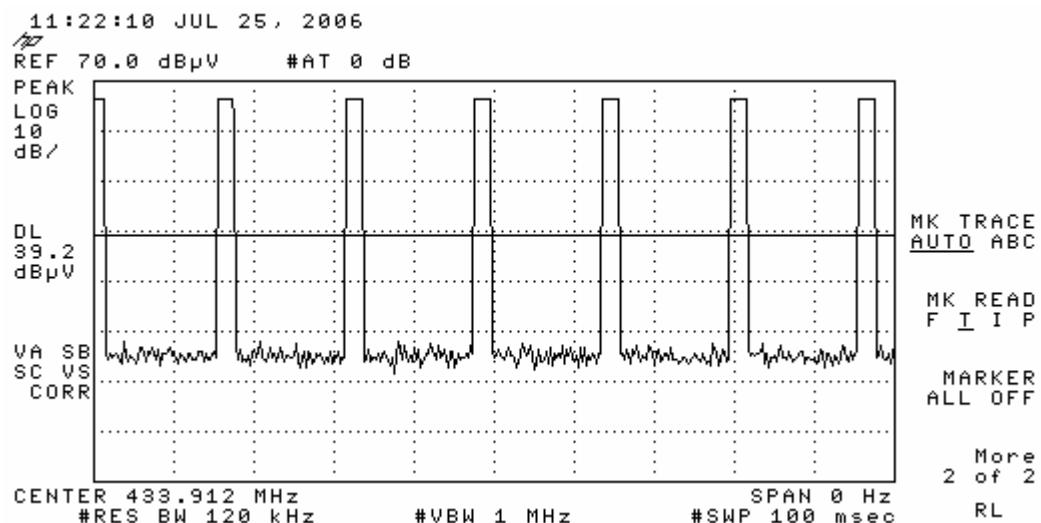
DCCF over 100ms =  $20 \cdot \log(14.35\text{ms}/100\text{ms}) = -16.8\text{dB}$

See technical description document and plots on page 9 for further details on the duty cycle.

## Duty Cycle Plots



Transmission Pulse = 2.05 seconds



100mS window

## AC Line Conducted Emission Measurements

FCC Section 15.207(b)(2) & ICES-006

AC Mains Conducted Emissions				Curtis-Straus LLC									
Date: 24-Jul-06 Engineer: Evan Gould		Company: Arbitron EUT Desc: HP107A		Work Order: G0726 Test Site: EMI 2									
Notes: RBW = 9kHz; VBW = 30kHz													
Measurement Device: Green LISN													
Range: 535-1705 kHz		Spectrum Analyzer: Yellow											
Frequency (MHz)	QP Readings		Impedance Factor (dB)	Adjusted Reading (dB $\mu$ V)	CFR 15.207(b)(2) 006		ICES Overall Result (Pass/Fail)						
	QP1 (dB $\mu$ V)	QP2 (dB $\mu$ V)			QP Limit (dB $\mu$ V)	QP Margin dB							
During a call													
0.79	14.4	15.3	20.3	35.6	60.0	-24.4	Pass						
0.99	16.4	20.1	20.3	40.4	60.0	-19.6	Pass						
1.09	16.7	21.0	20.3	41.3	60.0	-18.7	Pass						
1.19	17.3	21.3	20.3	41.6	60.0	-18.4	Pass						
1.29	17.5	20.3	20.3	40.6	60.0	-19.4	Pass						
1.58	18.3	13.7	20.3	38.6	60.0	-21.4	Pass						
Idle mode													
0.59	22.3	16.8	20.4	42.7	60.0	-17.3	Pass						
1.09	22.6	18.1	20.3	42.9	60.0	-17.1	Pass						
1.19	24.1	20.3	20.3	44.4	60.0	-15.6	Pass						
1.29	24.3	19.0	20.3	44.6	60.0	-15.4	Pass						
1.38	23.2	18.0	20.3	43.5	60.0	-16.5	Pass						
1.48	21.0	16.0	20.3	41.3	60.0	-18.7	Pass						
Pass	by	-15.40 dB			Worst Freq:	1.29 MHz							

Line conducted testing was performed with  $50\Omega/50\mu\text{H}$  LISN.

## Voltage Variations

FCC Section 15.31(e)

Voltage Variations		
Work Order: G0726		
Date: 9-Aug-06		
Engineer: Josh LeBlanc		
EUT: HP107A		
Fundamental (MHz)	voltage (Vac)	Reading (dB $\mu$ V)
433.9	230.00	71.5
433.9	76.50	71.5
433.9	281.75	71.5
Analyzer: Red		

Conclusion: The fundamental amplitude does not vary when the input voltage is varied by  $\pm 15\%$ .

***Test Equipment Used***

REV. 28-AUG-2006

<b>SPECTRUM ANALYZERS / RECEIVERS</b>		RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED	9kHz-1.8GHz	8591E	HP	3441A03559	00024	I		30-DEC-2006
YELLOW	9kHz-2.9GHz	8594E	HP	3523A01958	00100	I		05-JUN-2007
GREEN	9kHz-26.5GHz	8593E	HP	3829A03618	00143	I		02-AUG-2005
BLACK	9kHz-12.8GHz	8596E	HP	3710A00944	00337	I		02-NOV-2006

<b>LISNS/MEASUREMENT PROBES</b>		RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN	10kHz-30MHz	8012-50-R-24-BNC		SOLAR	0411657	00987	II	08-MAY-2007

<b>OPEN AREA TEST SITES (OATS)</b>		FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
SITE T		93448	IC 276A-2	R-905	II	14-AUG-2007
SITE A		93448	IC 2762-A	R-903	II	13-AUG-2007

<b>CONDUCTED TEST SITES (MAINS / TELCO)</b>		FCC CODE	IC CODE	VCCI CODE	CAT	CALIBRATION DUE
EMI 2		93448	N/A	C-1802, T-269	III	NA

<b>PREAMPS / ATTENUATORS / FILTERS</b>		RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
GREEN	0.01-2000MHz	ZFL-1000-LN		C-S	N/A	00802	II	07-AUG-2007
RED-GREEN	1-20GHz	PM2-38-218-4R5-17-15-SFF		C-S			II	14-AUG-2007

<b>ANTENNAS</b>		RANGE	MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
RED-BLACK BILOG	30-2000MHz	JB1	SUNOL	A091604-2	01106	II		11-APR-2008
ORANGE HORN	1-18GHz	3115	EMCO	0004-6123	00390	I		09-JUN-2007

<b>RMS VOLTMETERS/CURRENT CLAMP</b>		MN	MNFR	SN	ASSET	CAT	CALIBRATION DUE
TRUE-RMS MULTIMETER	79III	FLUKE	71700298	00769	I		25-OCT-2006
TRUE-RMS MULTIMETER (REFERENCE)	177	FLUKE	83390024	00973	I		21-MAR-2007
TRUE-RMS MULTIMETER	177	FLUKE	83390025	00974	I		10-MAR-2007
TRUE-RMS MULTIMETER (TELECOM)	177	FLUKE	83430419	00975	I		21-MAR-2007

<b>METEOROLOGICAL METERS</b>		MN	MFR	SN	ASSET	CAT	CALIBRATION DUE
TEMP./HUMIDITY/ATM. PRESSURE GAUGE	7400 PERCEPTION II		DAVIS	N/A	00965	II	08-FEB-2007
TEMPERATURE /HUMIDITY GAUGE	THG-912		HUGER	4000562	00789	I	01-FEB-2007
WEATHER CLOCK (PRESSURE ONLY)	BA928		OREGON SCIENTIFIC	C3166-1	00831	I	02-FEB-2007

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

## 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 were 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 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.

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## A2LA Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025-1999		Immunity	
CURTIS-STRAUSS <sup>1</sup> 527 Great Road Littleton, MA 01460 Barry Quinlan Phone: 978-486-8880 ELECTRICAL		RRL No. 2005-130 (December 27, 2005) EN 61000-4-2; AS/NZS 61000.4.2; KN61000-4-2	
Valid until: July 31, 2007		EN 61000-4-3; AS/NZS 61000.4.3; KN61000-4-3	
In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following Electromagnetic Compatibility (EMC), Telecommunications, and Product Safety tests:		EN 61000-4-4; AS/NZS 61000.4.4; KN61000-4-4	
<b>Electromagnetic Compatibility (EMC)</b> Radiated emissions testing (electric and magnetic fields)*; Conducted emissions testing (voltage and current)*; Electrostatic Discharge testing*; Electrical Fast Transient testing*; Radiated Immunity testing*; Conducted Immunity testing*; Lightning Immunity testing*; Voltage Dips*, Interrupts and Voltage Variations testing*; Magnetic Immunity testing*; RF Power measurements*; Frequency Stability Measurements*; Longitudinal Induction measurements*; Harmonic emissions testing*; Light flicker testing*; Low frequency disturbance voltage testing*; Disturbance Power measurements*; Power Cross Overvoltage testing*;		EN 61000-4-5; AS/NZS 61000.4.5; KN61000-4-5	
Test Type	Test Method(s)	EN 61000-4-6; AS/NZS 61000.4.6; KN61000-4-6	
<b>Emissions</b>		EN 61000-4-8; AS/NZS 61000.4.8; KN61000-4-8	
Radiated and Conducted Emissions		EN 61000-4-11; KN61000-4-11	
Harmonics		EN 61000-2-2	
Flicker		EN 61000-2-3	
1 Note: This accreditation covers testing performed at the laboratory listed above and the satellite facility located at 168 Ayer Rd, Littleton, MA 01460 and, for test types marked with an asterisk, at other sites as defined in "A2LA specific criteria for the accreditation of site testing and site calibration laboratories."			
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Other Radio Standards		GR-1089-CORE; GR-78-CORE (ESD) EN50081-1; EN50081-2; EN50082-2; EN50082-1; EN 61000-6-1; EN 61000-6-2; EN 61000-6-3; EN 61000-6-4; EN 50091-2; EN 55024; CISPR 24 EN 55103-1; EN 55103-2; EN 61326; EN 61547; EN 50130-4; EN 50083-2; EN 60601-1-2; EN 60601-2-2; EN 60601-2-24; EN 60601-2-32; EN 60601-2-38; EN 60601-2-47; IEC 1800-3; EN 61800-3; EN 55020; CISPR 20; EN 60555 Part 2; EN 60555 Part 3; ETS 300 386-1; EN 300 386-2; EN 300 386, ETS 300 132-1; ETS 300 132-2; EN 60669-2-1; AS/NZS 3200.1.2; CNS 13783-1; ETR 283; C62.41	
Radiocommunications		EU R&TTE Radio Standards; EN 300 220-1; EN 300 220-3; EN 300 330-1; EN 300 330-2; EN 300 440-1; EN 300 440-2; EN 300 328; EN 300 385; EN 301 893	
EU R&TTE EMC Standards		EN 301 339; EN 301 489-01; EN 301 489-03; EN 301 489-17	
Canada Radio Standards		RSS-102; RSS-117; RSS-118; RSS-119; RSS-123; RSS-125; RSS-128; RSS-129; RSS-130; RSS-131; RSS-132; RSS-133; RSS-134; RSS-135; RSS-136; RSS-137; RSS-138; RSS-141; RSS-142; RSS-170; RSS-181; RSS-182; RSS-187; RSS-188; RSS-191; RSS-192; RSS-193; RSS-195; RSS-210; RSS-212; RSS-213; RSS-215; RSS-243; RSS-GEN; RSS- 310; GL-36;	
Australia/New Zealand Radio Standards		AS/NZS 4268; AS/NZS 4771; RFS29; Radiocommunications (Data Transmission Equipment Using Spread Spectrum Modulation Techniques); Radiocommunications (Spread Spectrum Devices); Radiocommunications (Short Range Devices); Radiocommunications (Low Interference Potential Devices);	
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FCC Standards and Test methods Support TCB Status--		Telecommunications	
FCC Scope A – Unlicensed Radio Frequency Devices		Telecommunications Registration; General test methods; Lightning surge*; Drop testing*; Balance testing*; Signal power (metallic and longitudinal)*; Frequency measurements*; Pulse templates*; Leakage testing*; Impedance testing*; Hearing Aid Compatibility testing (excluding volume control)*; Protocol analysis* and Jitter testing*.	
FCC Scope B – Licensed Radio Service Equipment		Telecom Standards	
B1 1. 47 CFR Part 11, 15 and 18 2. FCC MP-5, 3. ANSI C63.4-2003,		North American standards FCC 47 CFR Part 68 Telephone Terminal Equipment CS-03 Issue 9	
B2 1. 47 CFR Part 15, 2. ANSI C63.4-2003,		TIA/EIA TSB31-B 1998	
B3 1. 47 CFR Part 15, 2. ANSI C63.4-2003,		TIA-968-A, A1, A2, A3	
B4 1. 47 CFR Parts 2, 21, 74, and 101 2. ANSI/TIA-603-C (2004)		T1.TRQ.6-2001	
Country Specific Standards and Other		Australia standards AS/ACIF S002-2001	
ITU EMC Standards		AS/ACIF S016-2001	
Swedish EMC Standards		AS/ACIF S031-2001	
South African EMC Standards other then CISPR equivalents		AS/ACIF S038-2001	
Hong Kong EMC Standards		AS/ACIF S043-2001	
Singapore EMC Standards		International standards ITU-T G.703	
Japanese VCCI Standards		Hong Kong standards HKTA 2011	
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<u>Telecom Standards</u> HKTA 2028	<u>Title</u> Network connection specification for connection of CPE to the PTNs in Hong Kong using digital leased circuits at data rate of 1544 kbit/s Network connection specification for connection of CPE to the PTNs in Hong Kong using digital leased circuits at data rate of 2048 kbit/s Network Connection Specification for Connection of Customer Premises Equipment (CPE) to the Public Telecommunications Network (PTN) in Hong Kong using Digital Leased Circuits at nx64 kbit/s Network Connection Specification for Connection of Customer Premises Equipment (CPE) to the Public Telecommunications Networks in Hong Kong using Asymmetric Digital Subscriber Lines (ADSL) based on ITU-T Recommendation G.992.1 Network Connection Specification for Connection of Customer Premises Equipment (CPE) to Fixed Telecommunications Networks in Hong Kong using Splitterless Asymmetric Digital Subscriber Lines (ADSL) based on ITU-T Recommendation G.992.2	<u>European standards (cont'd)</u> TBR 21: 1998	Terminal Equipment (TE); Attachment requirements For pan-European approval for connection to the Analogue Public Switched Telephone Networks (PSTNs) of TE (excluding TE supporting the voice telephony service) in which network addressing, if provided, is by means of Dual Tone Multi Frequency (DTMF) signaling Business TeleCommunications (BTC); 34 Mbit/s Digital Unstructured and structured leased lines (D34U and D34S); Attachment requirements for Terminal equipment interface
HKTA 2029		TBR 24: 1997	
HKTA 2030		<u>Taiwan standards (DGT)</u> ADSL01	
HKTA 2031		<u>New Zealand standards</u> PTC 200 (non-voice only)	
HKTA 2032		PTC 217 TNA 117 PTC 270	
<u>European standards</u> TBR 1: 1995	Attachment requirements for terminal equipment to Be connected to circuit switched data networks and Leased circuits using a CCITT Recommendation X.21 interface, or an interface physically, functionally and electrically compatible with CCITT Recommendation X.21 but operating at any data signaling rate up to, and including, 1 984 kbit/s Attachment requirements for Data Terminal Equipment (DTE) to connect to Packet Switched Public Data Networks (PSPDNs) for CCITT Recommendation X.25 interface at data signaling rates up to 1 920 kbit/s utilizing interfaces derived from CCITT Recommendations X.21 and X.21 bit Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN primary rate access Business Telecommunications (BT); Open Network Provision (ONP) technical requirements; 2 048 kbit/s digital unstructured leased line (D2048U); Attachment requirements for terminal equipment Business TeleCommunications (BTC); 2 048 kbit/s digital structured leased lines (D2048S); Attachment requirements for terminal equipment interface	<u>Singapore Standards</u> IDA TS ADSL	Type Approval Specification for Asymmetric Digital Subscriber Line (Full-rate ADSL) Modems
TBR 2: 1997		IDA TS ADSL 2	Type Approval Specification for Asymmetric Digital Subscriber Line Splitterless (G-Lite) Modems
TBR 3: 1995 + Amdt : 1997		IDA TS DLCN 1	Type Approval Specification for Digital Interfaces based on hierarchical bit rates of 2048 kbit/s, 34 368 kbit/s and 139 264 kbit/s
TBR 4: 1995 + Amdt : 1997		IDA TS ISDN 1	Type Approval Specification for connection of Terminal Equipment to Integrated Services Digital Network (ISDN) Basic Access
TBR 012: 1993 + Amdt : 1996		IDA TS ISDN 2	Type Approval Specification for connection of Terminal Equipment to Integrated Services Digital Network (ISDN) Primary Rate Access (PRA)
TBR 013: 1996		IDA TS PSTN (non-voice only)	Type Approval Specification for connection of Terminal Equipment to Public Switched Telephone Network (PSTN)
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<u>Product Safety</u> General test methods:	Power input*, Permanence of marking*, Accessibility*, Permissibly limits*, Energy hazard measurement*, SELV circuits*, TNV limits*, Limited current*, Capacitor Discharge / voltage limitation*, Ring signal*, Humidity conditioning*, Creepage / Clearance / Distance thru Insulation (excluding CTI)*, Limited power measurement*, Ground Bond/Earthing*, Ground continuity*, Temperature*, Stability*, Applied force*, Steel sphere impact*, Mold stress*, Battery reverse current*, Ball pressure*, Leakage current*, Component abnormal*, Electric strength*, Impulse*, Overvoltage*, Acoustic sound pressure*, 130mm / 20mm flame*, Needle flame*, Hot flaming oil*, Locked rotor/motor armature*, Vibration, Bump, Drop*, Strain relief*, Torque*, Insulation resistance*, Sound level*, Handle loading*, Liquid overflow*, Spillage*, Liquid leakage*, Transformer shorts/overloads*, Rain test*, Wall mount*, Laser radiation (excluding x-ray)*, Voltage surge*, Functionality*, Protective impedance abnormal*, Capacitor short circuit abnormal*, Output abnormal*, Multi-supply abnormal*, Cooling abnormal*, Heating device abnormal*, Interlock abnormal*, Rigidity*, Cleaning*	<u>Product Safety Standards</u> IEC 60825-1 2001 IEC 60825-2 2000-5	Title Classification, requirements and user's guide. Safety of laser products – Part 2: Safety of optical communication systems Safety of laser products – Part 4: Laser guards Performance standard for laser products Safety of household and similar electrical appliances Part 1: General requirements
<u>Product Safety Standards</u>	<u>Title</u> <u>Specific Product Safety Standards</u> UL 60950 2000 IEC 60950 1999 EN 60950 2000 IEC 60950-1 2001 UL 60950-1 2003 CSA C22.2 No. 60950-00 CSA C22.2 No. 60950-1 03 IEC 61010-1 1993	Safety of information technology equipment Safety of information technology equipment Safety of information technology equipment, including Electrical business equipment.	Electrical equipment for laboratory use; part 1: General requirements Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements Safety requirements for electrical equipment for measurement, control and laboratory use, Part 1: General requirements.
EN 61010-1 1993, 2001 IEC 61010-1 2001 UL 61010B-1 2003 CAN/CSA 1010-1 1999 (Including AM 2)	Electrical equipment for laboratory use Part 1: General requirements.	IEC 60825-4 1997-11 21 CFR 1040.10 IEC 60335-1 1995 (Including AM2 – 1997 & AM 12 – 1997) EN 60335-1 2001 UL 60335-1 1998 CAN/CSA E335.1 1994 UL 61010A-1: 2002	Safety of information technology equipment Information Technology Equipment – Safety – Part 1: General Requirements Information Technology Equipment – Safety – General requirements Electrical Equipment for Measurement, Control and Laboratory Use; Part 1: General Requirements Medical Electrical Equipment, Part 1: General Requirements for Safety Medical Electrical Equipment - Part 1: General Requirements For Safety 1: Collateral Standard: Safety Requirements For Medical Electrical Systems Medical Electrical Equipment - Part 1: General Requirements for Safety – Section 1-1: Collateral Standard: Safety Requirements For Medical Electrical Systems
IEC 60601-1 1995	Medical electrical equipment. Part 1: General requirements for safety.	EN 61010-1: 2001	Audio, Video and Similar Electronic Apparatus – Safety Requirements
EN 60601-1 1995 (Including AM 2) UL 2601-1 1997	Medical electrical equipment. Part 1: General Requirements for safety.	AS/NZS 60950: 2000 EN 60950-1: 2001	Audio, Video and Similar Electronic Apparatus – Safety Requirements
IEC 60065 1998, 2000	Audio, video and similar electronic apparatus – Safety requirements	AS/NZS 60950.1: 2003	Information Technology Equipment – Safety – Part 1: General Requirements Electrical Equipment for Measurement, Control and Laboratory Use; Part 1: General Requirements Medical Electrical Equipment, Part 1: General Requirements for Safety
ANSI/UL 6500: 1998 CAN/CSA 60065-00 AS/NZS 60065 2000	Audio/video and musical instrument apparatus for Household, commercial and similar general use Australian/New Zealand Standard – Approval and test Specification – Mains operated electronic and related Equipment for household and similar general use	IEC 60601-1: 2000	Requirements for Safety Medical Electrical Equipment - Part 1: General Requirements For Safety 1: Collateral Standard: Safety Requirements For Medical Electrical Systems Medical Electrical Equipment - Part 1: General Requirements for Safety – Section 1-1: Collateral Standard: Safety Requirements For Medical Electrical Systems
Canadian C22.2 No. 1-94 (1-98) 1994, 1998 EN 60065 1994	Consumer and commercial products Safety requirements for main operated electronic and related apparatus for household and similar general use.	UL 60065: 2003	Audio, Video and Similar Electronic Apparatus – Safety Requirements Audio, Video and Similar Electronic Apparatus – Safety Requirements
IEC 60825 1990	Radiation safety of laser products, equipment	CSA 60065: 2003	Audio, Video and Similar Electronic Apparatus – Safety Requirements Audio, Video and Similar Electronic Apparatus – Safety Requirements
EN 60825-1 1994	Classification, requirements and user's guide Safety of laser products Part 1: equipment	IEC 60065: 2001	Safety of Machinery – Electrical Equipment of Machines – Part 1: Specification for General Requirements Compliance Test Specification – Safety and Electrical Protection Requirements for Subscriber Equipment Connected to the Public Telecommunications Networks In Hong Kong
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<i>Environmental Simulation</i>		
<u>Test Technology</u>	<u>Test Standard</u>	<u>Supporting Standards</u>
Accessibility*	IEC 60529	IP-0x thru IP-6x
Acoustic Noise*	GR-63-CORE Sec 4.6	
Airborne Contaminants	GR-63-CORE Sec 4.5	MFG & Hygroscopic Dust
Altitude	GR-63-CORE Sec 4.1.3	
Cold Start*	ETS 300 019	IEC 60068-2-1
Drip	IEC 60529	IP-x1 & IP-x2
Drops*	ETS 300 019	IEC 60068-2-32
Dust	GR-63-CORE Sec 4.3	
	IEC 60529	IP-5x & IP-6x
Firearms Resistance Testing	GR-487	
Fire Resistance	ANSI/T1.319	
Heat Dissipation*	GR-63-CORE Sec 4.2	Fire & Needle Flame
Illumination	GR-63-CORE Sec 4.1.4	
Operational Temperature & Humidity (OpTH)*	GR-63-CORE Sec 4.7	
	ETS 300 019	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-14 IEC 60068-2-56
		GR-63-CORE Sec 4.1.2
Salt Fog & Spray	ASTM B117	
Spatial*	GR-63-CORE Sec 2.0 & 3.0	
Spraying-Splashing	IEC 60529	IP-x3 & IP-x4
Storage (Temperature & Humidity)*	ETS 300 019	IEC 60068-2-1 IEC 60068-2-2 IEC 60068-2-14 IEC 60068-2-30 IEC 60068-2-56
Vibration	GR-63-CORE Sec 4.1.1	
	ETS 300 019	IEC 60068-2-6 IEC 60068-2-27 IEC 60068-2-29 IEC 60068-2-32 IEC 60068-2-57 IEC 60068-2-64 Earthquake, Office & Transportation
Water Immersion	GR-63-CORE Sec 4.4	
Water Jet	IEC 60529	IP-x7 & IP-x8
	IEC 60529	IP-x5 & IP-x6
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Note 1. For standards or methods listed on the scope of accreditation without a revision date, laboratories are expected to be competent in the use of the current version within one year of the date of publication of the standard test method or upon the date specified by the standard test method originator when the originator has implementation authority. When a superseded standard or method is required for an accredited test, the scope will include the superseded date/version. For those that support the TCB/CB status of the organization acting as a certifier on behalf of the FCC or IC the expectation is currency within 30 days of Federal Register publication of changes for FCC and 30 days after IC website update. This note shall not be construed as an Accreditation Body implication to adopt a more current standard than is required in a regulation or code (i.e. the legal requirement) which is adopted by the lab under their responsibility.

*\* On-site test service is available for this technology, test, or method.*