

Test Report

FCC ID	P8KHID and P8KPXFA
Client	Interflex
Items tested	IF P611 and IF HDP611
Standards	Class B FCC/CISPR AC line conducted emissions
Test Dates	March 10, 2004
Results	As detailed within this report
Prepared by	 Evan Gould – Test Engineer
Authorized by	 Michael Buchholz – EMC Manager
Issue Date	<u>3/10/04</u>
Conditions of Issue	This Test Report is issued subject to the conditions stated in the 'Terms and Conditions' section on page 7 of this report.

Introduction

On March 10, 2004 the IF P611 and IF HDP611 were tested for Class B FCC/CISPR AC line conducted emissions in the range 150kHz – 30MHz. The difference between the two devices is the transmitter module used.

Setup Photos

IF HDP611



IF P611



Test Report for Interflex

Measurements

AC Mains Conducted Emissions										Curtis-Straus LLC
Date: 10-Mar-04			Company: Interflex				Table No: 1			
Engineer: Evan Gould			EUT Desc: IF HDP611 (P8KHID)				Work Order:			
Notes:										Test Site: EMI 1
LISN(s): Yellow-Black										
Range: 0.15-30Mhz			Other Equipment:			Spectrum Analyzer: Red				
Frequency (MHz)	Q.P. Readings		Ave. Readings		Impedance Factor (dB)	FCC/CISPR B		FCC/CISPR B		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	17.1	22.5			20.0	66.0	-23.5	56.0	-13.5	Pass
13.50	15.2	15.7			20.0	60.0	-24.3	50.0	-14.3	Pass
14.00	19.3	19.7			20.0	60.0	-20.3	50.0	-10.3	Pass
17.10	22.7	23.4			20.0	60.0	-16.6	50.0	-6.6	Pass
17.30	23.4	23.7			20.0	60.0	-16.3	50.0	-6.3	Pass
25.10	12.6	14.1			20.0	60.0	-25.9	50.0	-15.9	Pass
Table Result: Pass by -6.30 dB Worst Freq: 17.30 MHz										

AC Mains Conducted Emissions										Curtis-Straus LLC
Date: 10-Mar-04			Company: Interflex				Table No: 2			
Engineer: Evan Gould			EUT Desc: IF P611 (P8KPXFA)				Work Order:			
Notes:			Test Site: EMI 1							
LISN(s): Yellow-Black										
Range: 0.15-30Mhz			Other Equipment:			Spectrum Analyzer: Red				
Frequency (MHz)	Q.P. Readings		Ave. Readings		Impedance Factor (dB)	FCC/CISPR B		FCC/CISPR B		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	19.8	23.3			20.0	66.0	-22.7	56.0	-12.7	Pass
13.80	7.0	5.9			20.0	60.0	-33.0	50.0	-23.0	Pass
18.60	16.9	17.6			20.0	60.0	-22.4	50.0	-12.4	Pass
19.10	16.2	15.8			20.0	60.0	-23.8	50.0	-13.8	Pass
24.00	13.2	14.8			20.0	60.0	-25.2	50.0	-15.2	Pass
25.10	15.3	16.3			20.0	60.0	-23.7	50.0	-13.7	Pass
Table Result:		Pass	by	-12.40 dB			Worst Freq:		18.60 MHz	

Test Procedure

Line Conducted Emissions Overview

REV 25-OCT-02

Digital and microprocessor based devices use radio frequency (RF) digital techniques for timing purposes and in applications such as switching power supplies. An unintentional consequence of this for AC powered devices is that a certain amount of the RF energy is impressed upon the AC power mains in the form of a conducted noise voltage. These conducted emissions have the potential to interfere with constructive uses of the RF spectrum such as AM radio and may also interfere with other devices attached to the same AC mains circuit. In order to reduce the likelihood that a device will interfere it is required that the conducted RF signals from the device are below an allowable level.

Testing is performed according to test methods from ANSI C63.4:1992 and CISPR 22:1998.

Line conducted emissions are measured from the device over the frequency range of 0.15 to 30 MHz. The EUT is powered from a Line Impedance Stabilization Network (LISN). The purpose of the LISN is to provide a calibrated impedance across which to measure the conducted emissions. The RF noise voltage produced by the EUT across the LISN is measured and compared to the limit. In order for the LISN to perform properly it is attached to a ground plane at least 2 meters by 2 meters in size. For tabletop equipment the measurement is performed with the equipment 40 cm from a vertical conducting surface bonded to a ground plane under the product. The ground plane extends 0.5 meters beyond the product and is 2.5mx3.7m in size. The vertical surface is 2.5mx2.5m.

As with radiated emissions, the “human factor” is accounted for by the use of a “quasi-peak” detector in the receiver or spectrum analyzer that measures the signal from the LISN. For certain tests (such as EN55022), both an average and a quasi-peak limit are specified. Emissions from a device must be below both limits when measured with the appropriate detector. If the emission level is below the average limit when measured with the quasi-peak detector, the EUT is presumed to pass both limits.

The possible operating modes of the EUT are explored to determine the configuration that maximizes emissions. Software is investigated as well as different methods of displaying data if available. Data is recorded in the worst case operating mode.

As of September 9, 2002, the FCC has harmonized it's conducted emission limits with CISPR. The following table displays the limits applicable to both FCC and CISPR.

Line Conducted Emissions Limits: Class A (dBµV)		
Frequency (MHz)	Quasi-Peak	Average
0.15 - 0.5	79	66
0.5 - 30	73	60
Line Conducted Emissions Limits: Class B (dBµV)		
Frequency (MHz)	Quasi-Peak	Average
0.15 - 0.5	66 - 56*	56 - 46*
0.5 - 5	56	46
5 - 30	60	50
Note 1: The lower limit applies at the transition frequencies		
*Note 2: The limit decreases linearly with the logarithm of the frequency		

Although the FCC is now accepting the limits shown above, it should be noted that the former FCC limits may be used until July 11, 2005 for any equipment authorized prior to July 12, 2004.

At least the six highest emissions with respect to the limit are recorded. If less than six emissions are visible above the noise floor of the instrumentation, then the noise floor at six representative frequencies is recorded. The test report will document if noise floor readings are reported.

Standard Uncertainty per NIST Technical Note 1297 1994 for this test is estimated to be 2dB.

All testing is performed within the framework of a laboratory quality system modeled on ISO/IEC 17025 *General requirements for the competence of calibration and testing laboratories* and is subject to our terms and conditions. This test method is covered by our A2LA accreditation.

Test Report for Interflex

Test Equipment Used

REV. 3/9/04

<i>SPECTRUM ANALYZER</i>	RANGE	MN	MFR	SN	ASSET	CALIBRATION DUE
RED	9kHz-1.8GHz	8591E	HP	3441A03559	00024	21-MAY-2004
<i>LISN</i>	RANGE	MN	MFR	SN	ASSET	CALIBRATION DUE
YELLOW-BLACK	10kHz-30MHz	8012-50-R-24-BNC	SOLAR	984735	00248	01-APR-2004
<i>LINE CONDUCTED TEST SITE</i>	FCC CODE		IC CODE	VCCI CODE	CALIBRATION DUE	
EMI 1	93448		N/A	C-1801	01-MAY-2006	

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

Test Report for Interflex

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 or 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.

Test Report for Interflex

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.

Test Report for Interflex

A2LA Accreditation

<u>SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999</u> CURTIS-STRAUS¹ 527 Great Road Littleton, MA 01460 Barry Quinlan Phone: 978-486-8880 ELECTRICAL Valid until: July 31, 2005 Certificate Number: 1627-01 In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following <u>Electromagnetic Compatibility (EMC), Telecommunications, and Product Safety tests:</u> Electromagnetic Compatibility (EMC) 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 <table><tr><th>EMC Standards</th><th>Title</th></tr><tr><td><i>Emissions</i> CISPR 22 1997 with amendments 1 and 2</td><td>Limits and methods of measurement of radio disturbance characteristics of information technology equipment.</td></tr><tr><td>CNS13438 1994</td><td>Limits and methods of measurement of radio interference characteristics of information technology equipment.</td></tr><tr><td>EN55022:1994 and 1998</td><td>Limits and methods of measurement of radio disturbance characteristics of information technology equipment.</td></tr><tr><td>SABS CISPR 22:1997</td><td>Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement</td></tr><tr><td>Canada ICES-003 1997 AS/NZS 3548 1995</td><td>Digital apparatus Australian/New Zealand Standard Limits and methods of measurement of radio disturbance characteristics of information technology equipment</td></tr><tr><td>CISPR 11 1990, 1997, 1999</td><td>Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.</td></tr></table> ¹ Note: This accreditation covers testing performed at the laboratory listed above and the satellite facility located at 168 Ayer Rd, Littleton, MA 01460 (A2LA Cert. No. 1627-01) 10/31/03 Page 1 of 11		EMC Standards	Title	<i>Emissions</i> CISPR 22 1997 with amendments 1 and 2	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.	CNS13438 1994	Limits and methods of measurement of radio interference characteristics of information technology equipment.	EN55022:1994 and 1998	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.	SABS CISPR 22:1997	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement	Canada ICES-003 1997 AS/NZS 3548 1995	Digital apparatus Australian/New Zealand Standard Limits and methods of measurement of radio disturbance characteristics of information technology equipment	CISPR 11 1990, 1997, 1999	Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.	EN 55011 1991, 1998 SABS CISPR 11:1997 – Canada ICES-001 1998 CNS13803 AS/NZS 2064: 1997 disturbance CSA C108.8 – M1983 CISPR 13:1996, 1998, 2001 EN 55013: 1990, 2001 equipment: EN 55013 Amend 12 1994 SABS CISPR 13: 1996 CNS 13439 of AS/NZS 1053: 1999 CISPR 14 1993 (except discontinuous disturbances) for apparatus. EN 55014 1993, 1997 discontinuous disturbances) for AS/NZS 1044: 1995 discontinuous disturbances) for <i>Immunity</i> CNS13783-1 SABS CISPR 14-1 1993 SABS CISPR 14-2 1997 + A1:2001 – (A2LA Cert. No. 1627-01) 10/31/03 11 Limits and methods of measurement of radio disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment. Industrial, scientific and medical (ISM) radio-frequency equipment Electromagnetic disturbance characteristics Limits and methods of measurement Industrial, scientific and medical radio frequency generators Industrial, Scientific and Medical Instrument Limits and methods of measurement of electromagnetic characteristics of industrial, scientific and medical (ISM) radio-frequency equipment. Electromagnetic Emission from Data Processing Equipment and Electronic Office Machines Limits and methods of measurement of radio interference characteristics of sound and television broadcast receivers and associated equipment. Sound and television broadcast receivers and associated Electromagnetic compatibility. Part 1: Specification for limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment. Limits and methods of measurement of radio disturbance characteristics of broadcast receivers and associated equipment. Amendment 12 Limits and methods of measurement of radio interference characteristics of sound and television broadcast receivers and associated equipment. Broadcast receiver and associated equipment Limits and methods of measurement of radio interference characteristics of sound and television broadcast receivers and associated equipment. Limits and methods of measurement of radio disturbance characteristics of electrical motor- operated and thermal appliances household and similar purposes, electric tools and electric Limits and methods of measurement of radio disturbance (except characteristics of electrical motor- operated and thermal appliances household and similar purposes, electric tools and similar electric apparatus. Limits and methods of measurement of radio disturbance (except characteristics of electrical motor- operated and thermal appliances household and similar purposes, electric tools and similar electric apparatus. Household Electrical Appliances Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus Part 1: Emission – Product family standard Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus Part 2: Immunity - Product family standard
EMC Standards	Title															
<i>Emissions</i> CISPR 22 1997 with amendments 1 and 2	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.															
CNS13438 1994	Limits and methods of measurement of radio interference characteristics of information technology equipment.															
EN55022:1994 and 1998	Limits and methods of measurement of radio disturbance characteristics of information technology equipment.															
SABS CISPR 22:1997	Information technology equipment – Radio disturbance characteristics – Limits and methods of measurement															
Canada ICES-003 1997 AS/NZS 3548 1995	Digital apparatus Australian/New Zealand Standard Limits and methods of measurement of radio disturbance characteristics of information technology equipment															
CISPR 11 1990, 1997, 1999	Limits and methods of measurement of electromagnetic disturbance characteristics of industrial, scientific and medical (ISM) radio-frequency equipment.															
CISPR 14-2 1996, 1997 + A1:2001 CISPR 20: 1995, 2002 with amendment 3 (associated group only) EN 55020: 1995, 2002 (associated group only) CISPR 24 SABS CISPR 24 1997 AS/NZS 3200.1.2: 1995 <i>European Union Basic EMC Standards</i> EN 61000-4-2: 1995, 1999, 2001 EN 61000-4-3:1997, 1998, 2002 AS/NZS 61000.4.3 1999 EN 61000-4-4 1995 EN 61000-4-5 1995 AS/NZS 61000.4.5 1999 EN 61000-4-6 1996 AS/NZS 61000.4.6 1999 EN 61000-4-8 1994 EN 61000-4-11 1994 ENV 61000-2-2 1993 <i>EU Product Family Standards</i> EN 50081-1 1992 EN 50081-2 1993 EN 50082-1 1992, 1998 EN 50082-2 1995 (A2LA Cert. No. 1627-01) 10/31/03	Immunity requirements for household appliances, tools and similar apparatus. Limits and methods of measurement of immunity characteristics of sound and television broadcast receivers and associated equipment. Electromagnetic immunity of broadcast receivers and Associated equipment. Information technology equipment – Immunity characteristics – Limits and methods of measurement Information technology equipment – Immunity characteristics – Limits and methods of measurement Approval and test specification – Medical electrical Equipment – General requirements for safety – Collateral Standard: Electromagnetic compatibility – Requirements and tests. Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 2: Electrostatic discharge immunity test – Basic EMC Publication Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 3: Radiated, radio-frequency, electromagnetic field immunity test Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 4: Electrical fast transient/burst immunity test – Basic EMC publication (EMC) Part 4: Testing and measurement techniques. Section 5: Surge immunity test. Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 6: Immunity to conducted disturbances, induce by radio-frequency fields. Electromagnetic compatibility (EMC). Part 4: Testing and measurement techniques. Section 8: Power frequency magnetic field immunity test. (EMC) Part 4: Testing and measurement techniques. Section 11: Voltage dips, short interruptions and voltage Variations immunity tests. Electromagnetic compatibility (EMC). Part 2: Environment, Section 2: Compatibility levels for low-frequency conducted disturbances and signaling in public low-voltage power supply systems (IEC 1000-2-2:1990) Electromagnetic capability – Generic emission standard. Part 1: Residential, commercial and light industry. (I.S.) Electromagnetic compatibility – Generic emission standard. Part 2: Industrial environment Electromagnetic compatibility – Generic emission standard. Part 1: Residential, commercial and light industry Electromagnetic compatibility – Generic immunity Standard. Part 2: Industrial environment	EN 61000-6-1: 1997, 2001 industrial EN 61000-6-2: 1998, 2001 EN 50091-2 1996 EMC EN 55024 1998 Limits EN 55103-1 1997 audio, for EN 55103-2 1997 audio, (excluding Annex A3) use. EN 61326 1998 – EN 61547 1996 EN 50130-4 1996 family and EN 55104 1995 household EN 50083-2 1995 2: EN 60601-1-2: 1993, 2002 safety IEC 1800-3 1995 product EN 60555 Part 2 1987 and EN 60555 Part 3 1987 and EN 61000-3-2: 1995, 2000 Limits AS/NZS 61000.3.2 1998 EN 61000-3-3 1995 AS/NZS 61000.3.3 1999 ETS 300 386-1 1994 Part 1: (A2LA Cert. No. 1627-01) 10/31/03 of 11 Electromagnetic Compatibility (EMC)- Part 6: Generic standards- Section 1: Immunity for residential, commercial and light-environments Electromagnetic Compatibility (EMC)- Part 6: Generic standards- Specification for Uninterruptible Power Systems (UPS). Part 2: requirements Information technology equipment – Immunity Characteristics – and methods of measurement. Electromagnetic Compatibility – Product family standard for video, audio-visual and entertainment lighting control apparatus professional use. Part 1: Emission Electromagnetic Compatibility – Product family standard for video, audio-visual and entertainment lighting control professional Part 2: Immunity Electrical equipment for measurement, control and laboratory use EMC requirements Equipment for general lighting purposes – EMC immunity Alarm Systems. Part 4: Electromagnetic compatibility. Product standard: Immunity requirements for components of fire, intruder social alarm systems. Electromagnetic compatibility immunity – requirements for appliances, tools and similar apparatus. Product family standard. Cabled distribution systems for television and sound signals. Part Electromagnetic compatibility for equipment. Medical electrical equipment Part 1: general requirements for Section 2: Collateral standard: Electromagnetic compatibility – Adjustable speed electrical power drive systems. Part 3: EMC standard including specific test methods. Disturbances in supply systems caused by household appliances similar electrical equipment. Part 2: Harmonics Disturbances in supply systems caused by household appliances similar electrical equipment. Part 3: Voltage fluctuations. Electromagnetic compatibility (EMC). Part 3: Limits Section 2: for harmonic current emissions Electromagnetic compatibility (EMC). Part 3: Limits Section 2: Limitation of voltage fluctuations and flicker in low-voltage supply systems. Equipment Engineering (EE); Public telecommunication network equipment electro-magnetic compatibility (EMC) requirements Product family overview, compliance criteria and test levels														
(A2LA Cert. No. 1627-01) 10/31/03 Page 3 of 11	Page 2 of 10 Page 4															

Test Report for Interflex

ETS EN 300 386-2 1997, 1998, ETS EN 300 386 2000 v1.2.1, 2001 v1.3.1 ETS 300 132-1 1996 ETS 300 132-2 1996 ETR 283 1997 <i>EU radio standards</i> (ETS) EN 300 385 v1.2.1: 1998, 1999 EN 300 330 v1.2.1: 1998, 1999 ETS 300 328 1996 ETS EN 300 440 v1.2.1 1999 EN 301 893:2002 v1.2.1 ETS 300 836-1:1998 EN301 489-17:2002 (A2LA Cert. No. 1627-01) 10/31/03	Electromagnetic compatibility and radio spectrum matters (ERM); Telecommunication network equipment; Electromagnetic compatibility (EMC) requirements; Part 2: Product family standard. Equipment Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 1: Operated by alternating current (ac) derived from direct current (dc) sources Equipment Engineering (EE); Power supply interface at the input to telecommunications equipment; Part 2: Operated by direct current (dc) Equipment Engineering (EE); Transient voltages at Interface A on telecommunications direct current (DC) power distributions. Electromagnetic compatibility and Radio spectrum matters (ERM); Electromagnetic Compatibility (EMC) standard for fixed radio links and ancillary equipment (ETS) Electromagnetic compatibility and Radio spectrum matters (ERM); Short range devices (SRD); Technical characteristics and test methods for radio equipment in the range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz Radio Equipment and Systems (RES); Wideband transmission systems; Technical characteristics and test conditions for data transmission equipment operating in the 2.4 GHz ISM band and using spread spectrum modulation techniques Electromagnetic compatibility and Radio spectrum matters (ERM); Short range devices; Technical characteristics and test methods for radio equipment to be used in the 1 GHz to 40 GHz frequency range Broadband Radio Access Networks (BRAN); 5 GHz (draft) high performance RLAN; Harmonized EN covering Essential requirements of article 3.2 of the R&TTE Directive Broadband Radio Access Networks (BRAN); High Performance Radio Local Area Network (HIPERLAN) Type 1; Conformance testing specification; Part 1: Radio Type approval and Radio Frequency (RF) conformance test specification Electromagnetic compatibility and Radio spectrum Matters v1.2.1 (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for 2.4 GHz wideband transmission systems and 5 GHz high performance RLAN equipment EN 300 328-2:2001 v1.2.1 in the 2.4 GHz ISM band and using spread spectrum modulation techniques; Part 2: Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive EN 301 489-1:2002 EN 60669-2-1:2002 <i>Canada Radio Standards</i> Canadian GL-36 1995 Canadian RSS-119 1999, 2000 Issue 6 27.41 to 960.0 MHz Canadian RSS-134 1996 & 2000, Issue 1 Rev 1 Canadian RSS-210 2000 Issue 3, RFS29 1998 <i>FCC Standards</i> 47 CFR FCC low power transmitters operating on frequencies below 1 GHz, emergency alert systems, unintentional radiators and ISM devices. 47 CFR FCC low power transmitters operating on frequencies above 1 GHz, with the exception of spread spectrum devices. 47 CFR FCC Unlicensed Personal Communications System (PCS) devices 47 CFR FCC Unlicensed National Information Infrastructure devices and low power transmitters using spread spectrum techniques. 47 CFR FCC Personal mobile Radio Services in the following FCC Rule Parts 22, 24, 25, 27. 47 CFR FCC General Mobile Radio Scope Services in the following FCC Rule Parts 22, 74, 90, 95, 97. 47 CFR FCC Maritime and Aviation Scope RadioServices in 47 CFR Parts 80 and 87 47 CFR FCC Microwave Radio Services Scope in 47 CFR Parts 21, 74 and 101. Electromagnetic compatibility and Radio spectrum Matters (ERM); Wideband Transmission systems; Data transmission equipment operating spectrum modulation techniques; Part 2: Harmonized EN covering requirements under article 3.2 of the R&TTE Directive Electromagnetic compatibility and Radio spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements Switches for household and similar fixed electrical installations -- Part 2-1: Particular requirements -- Electronic switches Industry Canada -- technical requirements for low power Devices in the 2400 -- 2483.5 MHz band. Industry Canada -- Land mobile and fixed radio Transmitters and receivers, Industry Canada -- 900 MHz narrowband personal communications services Industry Canada -- Low power license-exempt radio 2001 Issue 5 communication devices Specification for Restricted Radiation Radio Apparatus (New Zealand) Scope A1 Scope A2 A3 A4 B1 B2 B3 B4 (A2LA Cert. No. 1627-01) 10/31/03 Page 5 of 11
FCC/OST MP-5 1986 GR-1089-CORE: 1997, 1999 issue 2/ 2002 Issue 3 <i>ANSI EMC Standards</i> ANSI C63.4: 1992, 1999, 2001 ANSI C63.5 1988 <i>IEEE EMC Standards</i> IEEE C62.41: 1980, 1991 <i>Swedish EMC Standards</i> BAKOM 3336.3 1995 <i>South African EMC standards other than CISPR equivalents</i> SABS 1718-1: 1996 <i>Japanese VCCI Standards</i> VCCI V-3/99.05 1999 VCCI V-4/99.05 1999 <i>Telecommunications</i> 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. <i>Telecom Standards</i> FCC 47 CFR Part 68 Telephone CS-03 Issue 8 1996 through amendment 5 TIA/EIA TSB31-B 1998 (A2LA Cert. No. 1627-01) 10/31/03	TIA/EIA-IS-968 TIA/EIA-IS-883 TIA-968-A T1.TRQ.6-2001 Canada VDSL January 2003 AS/ACIF S002-2001 Equipment for connection to the Public Switched Telephone Network AS/ACIF S016-2001 Requirements for Customer Equipment for connection to hierarchical digital interfaces AS/ACIF S031-2001 AS/ACIF S038-2001 AS/ACIF S043-2001 Requirements for ISDN Basic Access Interface Requirements for ISDN Primary Rate Access Interface Requirements for Customer Equipment for Connection to a Metallic Local Loop Interface of a Telecommunications Network -- Part 1: General Part 2: Broadband Part 3: DC, Low Frequency AC and Voiceband Physical/electrical characteristics of hierarchical Digital interfaces 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 Attachment requirements for terminal equipment to be connected to circuit switched data networks and leased circuits using a CCITT Recommendation X.21 interface, or at 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 signaling rates up to 1 920 kbit/s utilizing interfaces derived from X.21 and X.21 bit ITU-T G.703 HKTA 2028 HKTA 2029 TBR 1 : 1995 TBR 2 : 1997 Recommendation X.25 interfaces at data signaling rates up to 1 920 kbit/s utilizing interfaces derived from X.21 and X.21 bit (A2LA Cert. No. 1627-01) 10/31/03 Page 8 of 11

Test Report for Interflex

TBR 3 : 1995 + Amdt : 1997 Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN basic access TBR 4 : 1995 + Amdt : 1997 Integrated Services Digital Network (ISDN); Attachment requirements for terminal equipment to connect to an ISDN using ISDN primary rate access TBR 012 : 1993 + Amdt : 1996 Business Telecommunications (BT); Open Network Provision (ONP) technical requirements; 2 048 kbit/s digital unstructured leased line (D2048U) Attachment requirements for terminal equipment TBR 013 : 1996 Business Telecommunications (BTC); 2 048 kbit/s digital structured leased lines (D2048S); Attachment requirements for terminal equipment interface 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 TBR 24 : 1997 Business Telecommunications (BTC); 34 Mbit/s digital Unstructured and structured leased lines (D34U and D34S); Attachment requirements for terminal equipment interface <i>Australia</i> TS 002 : 1997 Analogue Interworking and Non interference Requirements for Customer Equipment Connected to the Public Switched Telephone Network TS 016 : 1997 General Requirements for Customer Equipment Connected to Hierarchical Digital Interfaces TS 031 : 1997 Requirements for ISDN Basic Access Interface TS 038 : 1997 Requirements for ISDN Primary Rate Access Interface AS/ACIF S043 2:2001 Requirements for Customer Equipment for connection to a metallic loop interface of a Telecommunications Network – Part 2 Broadband Product Safety General test methods; Input tests; Electric strength tests; Impulse tests; Permanency of marking tests; Accessibility tests; Energy Hazard measurements; Capacitor discharge tests; Humidity conditioning; Earthing tests; Limited power source measurements; Stability tests; Steel ball tests; Lithium Battery Reverse Current measurements; Leakage current tests; Transformer abnormal tests; Telecom leakage tests; Over voltage/power cross tests (excluding x-ray tests). <u>Product Safety Standards</u> <i>Specific Product Safety Standards</i> IEC 950 1991 Safety of information technology equipment including Includes Amendments 1, 2, 3, and 4 electrical business equipment. UL 1950 1998 Safety of information technology equipment, including electrical business equipment. CSA C22.2 No. 950-95 Safety of Information Technology Equipment (UL 1950) UL 60950 2000 Safety of information technology equipment (A2LA Cert. No. 1627-01) 10/31/03 Page 9 of 11	IEC 60950 2000 EN 60950 1997, 1998, 2000 IEC 60950-1 2001 UL 60950-1 2003 CSA C22.2 No. 60950-00 CSA C22.2 No. 60950-1 03 AS/NZS 3260 1993 AS/NZS 3260 Supp 1 1996 ACA TS 001 1997 equipment. UL 1459 1995 IEC 1010-1 1990 61010-1 1993 EN 61010-1 1993, 2001 61010-1 2001 UL 61010B-1 2003 UL 3101-1 1993 CAN/CSA 1010-1 1999 (Including AM 2) UL 3111-1 1996 UL 3121-1 1995 IEC 60601-1 1995 EN 60601-1 1995 (Including AM 2) UL 2601-1 1997 IEC 60065 1998, 2000 ANSI/UL 6500: 1998 CAN/CSA 60065-00 AS/NZS 3250 1995 AS/NZS 60065 2000 Canadian C22.2 No. 1-94 (1-98) 1994, 1998 EN 60065 1994 IEC 60825 1990 and user's guide EN 60825-1 1994 IEC 60825-1 2001 IEC 60825-2 2000-5 IEC 60825-4 1997-11 IEC 60335-1 1995 (Including AM2 – 1997 & AM 12 – 1997) EN 60335-1 2001 UL 60335-1 1998 CAN/CSA E335-1 1994 Safety of information technology equipment Safety of information technology equipment, including Electrical business equipment. Approval and test specification – Safety of information technology equipment including electrical business Equipment. Approval and test specification – Safety of information technology equipment including electrical business equipment – Alphabetical reference index to IEC 950 (Supplement to AS/NZS 3260:1993) Australian Communications Authority – Safety requirements for customer equipment. Telephone Equipment Safety requirements for electrical equipment for measurement, control IEC and laboratory use, Part 1: General requirements. Safety requirements for electrical equipment for measurement, control IEC and laboratory use, Part 1: General requirements. Electrical equipment for laboratory use Part 1: General requirements. Electrical measuring and test equipment. Part 1: General requirements. Medical electrical equipment. Part 1: General requirements for safety. Medical electrical equipment. Part 1: General Requirements for safety. Audio, video and similar electronic apparatus – Safety requirements 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 Audio, video and similar electronic equipment. Consumer and commercial products Safety requirements for main operated electronic and related apparatus for household and similar general use. Radiation safety of laser products, equipment Classification, requirements Safety of laser products Part 1: equipment 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 Safety of household and similar electrical appliances Part 1: General requirements (A2LA Cert. No. 1627-01) 10/31/03 Page 10 of 11
UL 61010A-1 : 2002 Electrical equipment for laboratory use; part 1: General requirements EN 61010-1 : 2001 Safety requirements for electrical equipment for measurement, control, and laboratory use - Part 1: General requirements AS/NZS 60950 : 2000 Safety information technology equipment Environmental² <u>Environmental Standards</u> GR-63-CORE ETS 300 019 (vibration up to 1000Hz) <u>Title</u> NEBS Requirements: Physical Protection Environmental conditions and environmental tests For telecommunications equipment ² Environmental testing is performed at the satellite facility located at 168 Ayer Rd, Littleton, MA 01460 (A2LA Cert. No. 1627-01) 10/31/03 Page 11 of 11	