



THE AMERICAN ASSOCIATION FOR
LABORATORY ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

NATIONAL TECHNICAL SYSTEMS (CALGARY)

Calgary, Alberta, Canada

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005 *General Requirements for the Competence of Testing and Calibration Laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated 8 January 2009*).



Presented this 14th day of May 2009.

Peter Abney

President

For the Accreditation Council

Certificate Number 0214.22

Valid to February 28, 2010

Revised December 30, 2009

For the tests or types of tests to which this accreditation applies,
please refer to the laboratory's Electrical Scope of Accreditation.

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

NATIONAL TECHNICAL SYSTEMS (CALGARY)
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ELECTRICAL (EMC)

Valid To: February 28, 2010

Certificate Number: 0214.22

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following tests on Electrical Products and Electronic Products:

<u>Test Method(s)</u>	<u>Test Description</u>
ANSI C12.1/C12.20	American National Standard for Electric Meters Code for Electricity Metering / Electricity Meters – 0.2 and 0.5 Accuracy Classes Only for: 16 – Voltage Interruptions 17 – Effect of High Voltage Line Surges 25 – Electrical Fast Transient/Burst 26 – Effect of Radio Frequency Interference 27 – Radio Frequency Conducted and Radiated Emission 28 – Effect of Electrostatic Discharge (ESD) (see other sections in National Technical Systems (Calgary) mechanical scope of accreditation, number: 0214.23)
ANSI C63.17	American National Standard for Methods of Measurement of the Electromagnetic and Operational Compatibility of Unlicensed Personal Communications Services (UPCS) Devices
ANSI C63.4	American National Standard for Methods of Measurement of Radio-Noise Emissions for Low Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI/TIA-603-C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
ARIB T66	Second Generation Low Power Data Communication System/Wireless LAN System
AS/NZS/EN/IEC 61000-3-2	Electromagnetic Compatibility (EMC) – Part 3-2: Testing and Measurement Techniques – Harmonics Measurements (2 – 40 th Harmonic)
AS/NZS/EN/IEC 61000-3-3	Electromagnetic Compatibility (EMC) – Part 3-3: Testing and Measurement Techniques – Flicker (dc 0-100% dmax 100% 1x10 ⁹ short or long term flickers)

<u>Test Method(s)</u>	<u>Test Description</u>
CISPR 25	Limits and Methods of Measurement of Radio Disturbance Characteristics for the Protection of Receivers Used on Board Vehicles
EN 300 386, -2	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Telecommunication Network Equipment; Electromagnetic Compatibility (EMC) Requirements
EN 301 489-01 to 26	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Electromagnetic Compatibility (EMC) Standard for Radio Equipment and Services; Part 1: Common Technical Requirements
EN 61000-6-1	Electromagnetic Compatibility (EMC) – Part 6-1: Generic Standards – Immunity for Residential, Commercial and Light-Industrial Environments
EN 61000-6-2	Electromagnetic Compatibility (EMC) – Part 6-2: Generic Standards – Immunity for Industrial Environments
EN 61000-6-3	Electromagnetic Compatibility (EMC) – Part 6-3: Generic Standards – Emissions Standard for Residential, Commercial and Light-Industrial Environments
EN 61000-6-4	Electromagnetic Compatibility (EMC) – Part 6-3: Generic Standards – Emissions Standard for Industrial Environments
ETSI EN 300 220	SRD Short Range Devices 25 MHz 1GHz
ETSI EN 300 328, -1, -2	2.4 GHz ISM
ETSI EN 300 330	SRD Short Range Devices 9KHz 30 MHz
ETSI EN 300 440	SRD Short Range Devices 1 GHz 25 GHz
ETSI EN 300 761-1/-2	Electromagnetic Compatibility and Radio Spectrum Matters (ERM) Short Range Devices (SRD); Automatic Vehicle Identification (AVI) for Railways Operating in the 2.4 GHz Frequency Range
ETSI EN 301 357	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Technical Characteristics and Test Methods for Analogue Cordless Wideband Audio Devices Using Integral Antennas Operating in the CEPT Recommended 863 MHz to 865 MHz Frequency Range

<u>Test Method(s)</u>	<u>Test Description</u>
ETSI EN 301 449	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Harmonized EN for CDMA Spread Spectrum Base Stations Operating in the 450 MHz Cellular Band (CDMA 450) and 410, 450 and 870 MHz PAMR Bands (CDMA-PAMR) Covering Essential Requirements of Article 3.2 of the R&TTE Directive. Only for: 4.2.2.2.1 – Transmitter Conducted Unwanted Emissions 4.2.2.2.2 – Transmitter Conducted Unwanted Emissions 4.2.2.2.3 – Transmitter Conducted Unwanted Emissions 4.2.3 – Accuracy of Maximum Output Power 4.2.4 – Radiated Spurious Emissions 4.2.5 – Inter-base Station Transmitter Inter-Modulation 4.2.6 – Receiver Conducted Spurious Emissions 4.2.7 – Single Tone Desensitization
ETSI EN 301 511	Global System for Mobile Communications (GSM); Harmonized EN for Mobile Stations in the GSM 900 and GSM 1800 Bands Covering Essential Requirements Under Article 3.2 fo the R&TTE Directive (1999/5/EC)
ETSI EN 301 893	Broadband Radio Access Networks (BRAN): 5 GHz High Performance RLAN
ETSI EN 301 908-1, -5	3rd Generation Cellular
ETSI EN 302 208	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Radio Frequency Identification Equipment Operating in the Band 865 MHz to 868 MHz with Power Levels up to 2 W; Part 1: Technical Requirements and Methods of Measurement
ETSI EN 302 291-1	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Close Range Inductive Data Communication Equipment Operating at 13,56 MHz: Part 1: Technical Characteristics and Testing Methods
FCC 47 CFR part 95	Personal Radio Services
FCC 47 CFR part 101	Fixed Microwave Services
FCC 47 CFR part 15	Federal Communication Commission: Radio Frequency Devices
FCC 47 CFR part 18	Industrial, Scientific and Medical Equipment
FCC 47 CFR part 22	Public Mobile Services
FCC 47 CFR part 24	Personal Communication
FCC 47 CFR part 90	Private Land Mobile Radio Services

<u>Test Method(s)</u>	<u>Test Description</u>
IEC 60945	Maritime Navigation and Radiocommunication Equipment and Systems – General Requirements – Methods of Testing Required Test Results Section 9: Electromagnetic Emission Section 10: Immunity to Electromagnetic Environment
IEC 61000-4-12	Electromagnetic Compatibility (EMC) – Part 4-12: Testing and Measurement Techniques – Ring Wave Immunity Test
IEC 61000-4-16	Electromagnetic Compatibility (EMC) – Part 4-12: Testing and Measurement Techniques – Test for Immunity to Conducted Common Mode Disturbances in the Frequency Range 0 Hz to 150 kHz
IEC/EN 60601-1-2	Medical Electrical Equipment Part 1-2: General Requirements for Safety – Collateral Standard: Electromagnetic Compatibility – Requirements and Tests
KN 11/EN 55011/CISPR 11	Industrial, Scientific and Medical (ISM) Radio Frequency Equipment Radiated Emissions 30 MHz – 1 GHz, Conducted Emissions 150kHz – 30 MHz
KN 22/EN 55022/CISPR 22/ AS/NZS CISPR 22/ CNS 13438	Information Technology Equipment Radio Disturbance Characteristics Limits and Methods of Measurement Radiated Emissions 30 MHz – 1 GHz, Conducted Emissions 150 kHz – 30 MHz
KN/EN/IEC 61000-4-11	Electromagnetic Compatibility (EMC) – Part 4-11 Testing and Measurement Techniques Voltage Dips and Interruptions; (1 ms – 99.99 seconds)
KN/EN/IEC 61000-4-2	Electromagnetic Compatibility (EMC) Section 4.2 Electrostatic Discharge Immunity Test – Basic EMC Publication, 8kV Contact Discharge/15kV/Air Discharge
KN/EN/IEC 61000-4-3	Electromagnetic Compatibility (EMC) – Part 4-3: Testing and Measurement Techniques – Radiated, Radio Frequency, Electromagnetic Field Immunity Test; 3V/m – 10V/m; 80 MHz – 1 GHz
KN/EN/IEC 61000-4-4	Electromagnetic Compatibility (EMC) – Part 4-4: Testing and Measurement Techniques – Electrical Fast Transient/Burst Immunity Test Levels 1-4
KN/EN/IEC 61000-4-5	Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques Section 5. Surge Immunity Test only for: 6.1 – Combination Wave 6.2 – CCITT Wave

<u>Test Method(s)</u>	<u>Test Description</u>
KN/EN/IEC 61000-4-6	Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques Section 6. Immunity to Conducted and Disturbance, Induced by Radio-Frequency Fields; (3V/m – 10V/M: 150 kHz – 80 MHz)
KN/EN/IEC 61000-4-8	Electromagnetic Compatibility (EMC) Part 4: Testing and Measurement Techniques Section 8. Power Frequency Magnetic Field Immunity Test – Basic EMC Publication: (1 A/m – 100 A/m Continuous, 300 A/m 1000 A/m Short Duration)
KN 24/EN 55024/CISPR 24	Information Technology Equipment – Immunity Characteristics Limits and Methods of Measurement
MIC Notice No. 2001 – 115	Criteria for EMI (Korea) Dec 12, 2001
MIC Notice No. 2001 – 116	Criteria for EMS (Korea) Dec 12, 2001
RRL Notice No. 2000 – 182	Test Method for EMI (Korea) Oct 27, 2000
RRL Notice No. 2000 – 183	Test Method for EMS (Korea) Oct 28, 2000
RRL Notice No. 2005 – 128	Conformity Assessment Procedure for Type Official Approval and Type Registration of Radio Equipment
RSS 118	Land and Subscriber Stations: Voice, Data and tone Modulated Angle Modulation Radio Telephone Transmitters and Receivers Operating in the Cellular Mobile Bands 824 – 849 MHz and 869 – 894 MHz
RSS 128	800 MHz Dual-Mode TDMA Cellular Mobile Radiophones
RSS 129	800 MHz Dual-Mode CDMA Cellular Mobile Radiophones
RSS 130	Digital Cordless Telephones in the Band 944 to 948.5 MHz
RSS 131	Zone Enhancers for the Land Mobile Service
RSS 132	800 MHz Cellular Telephones Employing New Technologies
RSS 133	2 GHz Licensed Personal Communications Services
RSS 134	Narrowband 900 MHz Personal Communications Services
RSS 135	Digital Scanner Receivers
RSS 137	Location and Monitoring Service in 902 928 MHz Band
RSS 210	Low-Power License – Exempt Radiocommunication Devices

<u>Test Method(s)</u>	<u>Test Description</u>
RSS 213	2 GHz License Exempt Personal Communications Service Devices (PCS)
RSS 215	Analogue Scanner Receivers
RSS 195	Wireless Communication Service Equipment Operating in the Bands 2305 – 2320 MHz and 2345 – 2360 MHz
RSS – GEN	General Requirements and Information for the Certification of Radiocommunication Equipment
Telcordia GR-1089 CORE	Electromagnetic Compatibility and Electrical Safety – Generic Criteria for Network Telecommunication Equipment Except for: 4.7 Lightning Protection Tests for Equipment to be Located in High Exposure Customer Premises of OSP Facilities (Type 3 and 5 Telecommunications Ports) 4.9 Criteria for Equipment with Integrated Primary Protection 4.10 Criteria for Equipment Interfacing with Coaxial Cable Ports 5. Steady-State Power Induction 10. Criteria for DC Power Port of Telecommunications Load Equipment

Telecommunications Equipment

AS/ACIF S002:2005	Analogue Interworking and Non-Interference Requirements for Customer Equipment for Connection to the Public Switched Telephone
AS/ACIF S003:2005	Customer Switching, Multiplexing and Ancillary Equipment for Connection to a Telecommunications Network
AS/ACIF S004:2001	Voice Frequency Performance Requirements for Customer Equipment
AS/ACIF S016:2001	Requirements for Customer Equipment for Connection to Hierarchical Digital Interfaces (2048 Kbit/s)
AS/ACIF S041:2005	Requirements for DSL Customer Equipment for Connection to the Public Switched Telephone Network
AS/ACIF S043.2:2008	Requirements for Customer Equipment for Connection to a Metallic Local Loop Interface of a Telecommunications Network – Part 2: Broadband

<u>Test Method(s)</u>	<u>Test Description</u>
ETSI TS 301 437 – 1 V1.1.1 (1999-06)	Terminal Equipment (TE); Attachment Requirements for Pan-European Approval for Connection to the Analogue Public Switched Telephone Networks (PSTNs) of TE Supporting the Voice Telephony Service in Which Network Addressing, if Provided, is by Means of Dual Tone Multi Frequency (DTMF) Signaling
ETSI TS 103 021 – 1 V1.1.1 (2003-08)	Access and Terminals (AT); Harmonized Basic Attachment Requirements for Terminals for connection to Analogue Interfaces of the Telephone Networks; Update of the Technical Contents of TBR 21, EN 301 437, TBR 015, TBR 17; Part 1: General Aspects
ETSI TS 203 021 V1.1.1 (2006-01)	Access and Terminals (AT); Harmonized Basic Attachment Requirements for Terminals for connection to Analogue Interfaces of the Telephone Networks; Update of the Technical Contents of TBR 21, EN 301 437, TBR 015, TBR 17; Part 2: Basic Transmission and Protection of the Network from Harm
HKTA 2011 Issue 4 August 2003	Network Connection Specification for Connection of Customer Premises Equipment (CPE) to Direct Exchange Lines (DEL) of the Public Switched Telephone Network (PSTN) in Hong Kong
HKTA 2017 Issue 3 February 2003	Network Connection Specification for Connection of Customer Premises Equipment (CPE) to the Public Telecommunications Network (PTN) in Hong Kong Over Digital Trunk at 1544 Kbits/s Using DTMF Signaling
IC CS-03 Including Amendments	Part I: Requirements for Terminal Equipment and Related Access Arrangements Intended for Direct Connection to Analogue Wire Line Facilities Part II: Requirements for Terminal Equipment Intended for Connection to 1.544 Mbps (DS-1) Digital Facilities Part V: Requirements and Test Methods for Magnetic Output from Handset Telephones for Hearing Aid Coupling Part VI: Requirements for ISDN Terminal Equipment (PRI only) Part VIII: Requirements for Digital Subscriber Line (xDSL) Terminal Equipment
IDA TS ADSL.1	Technical Specification for Asymmetric Digital Subscriber Line (ADSL) Modems
IDA TS PSTN 1 A (2000)	Specification for Connection to Terminal Equipment to Public Switched Telephone Network (PSTN)
ITU-T G 823 (03/2000)	The Control of Jitter and Wander Within Digital Networks Which are Based on the 2048 kbit/s Hierarchy

<u>Test Method(s)</u>	<u>Test Description</u>
ITU-T Recommendation G.703 (2001)	SERIES G: TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS Digital Transmission Systems – Terminal Equipments – General Physical/Electrical Characteristics of Hierarchical Digital Interfaces
PSTN01	Technical Specifications for Terminal Equipment for Connection to Public Switched Telephone Network (Taiwan)
TBR 10, Dec 1993	Radio Equipment and Systems (RES); Digital European Cordless Telecommunications (DECT) General Terminal Attachment
TBR 12, Dec 1993 + Amnt A1, Jan 1996	Business Telecommunications (BT); Open Network Provision (ONP) Technical Requirements; 2048 kbit/s Digital Unstructured Leased Line (D2048U) Attachment Requirements for Terminal Equipment
TBR 13, Jan 1996	Business Telecommunications (BTC); 2048 kbit/s Digital Structured Leased Lines (D2048S); Attachment Requirements for Terminal Equipment Interface
TBR 21, Jan 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 38, May 1998	Public Switched Telephone Network (PSTN); Attachment Requirements for Terminal Equipment Incorporating an Analogue Handset Function Capable of Supporting the Justified Cases When Connected to the Analogue Interface of the PSTN in Europe
TBR 4, Nov 1995 + A1 Dec 1997	Integrated Services Digital Network (ISDN); Attachment Requirements for Terminal Equipment to Connect to an ISDN Using ISDN Primary Rate Access
TIA-968-A	Telecommunications Telephone Terminal Equipment Technical Requirement for Connection of Terminal Equipment to the Telephone Network Including: FCC Part 68.316: Hearing Aid Compatibility: Technical Requirements FCC Part 68.317: Hearing Aid Compatibility Volume Control: Technical Standards

<u>Test Method(s)</u>	<u>Test Description</u>
<i>Safety Requirements and Methods for Telecommunication and Medical Electrical Equipment</i>	
CAN/CSA C22.2 No.60950-1 / ANSI/UL 60950-1 / AS/NZS 60950-1 / EN 60950-1 (EU) / IEC 60950-1 / J 60950-1 (Japan) / TTAS IC 950 Dec 31, 1998 / EN/IEC 60335-1 / -2-82	Safety of Information Technology Equipment, Including Electrical Business Equipment, Third Edition, December 1, 2000. Only for: (Test per CAN/CSA C22.2 No 60950-1, clause numbers may vary) 1.7.1 – Power Rating 2.6.3 – Protective 2.8 – Safety Interlocks 2.10.3.1 – Clearances 4.2.1 – Mechanical Strength Sections (4.2.2 to 4.2.4) 4.2.5 – Impact Test 4.2.6 – Drop Test 4.5 – Thermal Requirements 5.1 – Touch Current and Protective Conductor Current 5.2 – Electric Strength 5.3 – Abnormal Operating and Fault Conditions Sections (5.3.1 to 5.3.8) 6.4 – Protection Against Overvoltage from Power Line Crosses 6 – Connections to Telecommunications Networks 7 – Connections to Cable Distribution Systems
EN 61010-1 / IEC 61010-1 / UL 61010-1 / CSA C22.2. 61010-1-04	Safety Requirements for Electrical Equipment for Measurement, Control, and Laboratory Use. Only for: 5.1.3 – Mains Supply 6.5.1.3 – Impedance of Protective Bonding of Plug-Connected Equipment 6.5.1.4 – Bonding Impedance of Permanently Connected Equipment 6.8 – Procedure for Dielectric Strength Tests 7.3 – Stability 8.1 – Enclosure Rigidity Test 8.2 – Drop Test 10.1 – Surface Temperature Limit for Protection Against Burns 10.4 – Conduct of Temperature Tests 14.9 – Circuits or Components Used as Transient Overvoltage Limiting Devices 15 – Protection by Interlocks
IEC 60529 / UL50 / UL 60950-22 / IEC 60950-22	Degree of Protection Provided by Enclosures. Only for: Rain Test Hose Down Test Jet Spray Immersion Hydrogen Outgassing