



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

NATIONAL TECHNICAL SYSTEMS (NTS)
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ELECTRICAL (EMC)

Valid To: December 31, 2011

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:

TEST METHODS(S)

ANSI C12.1/C12.20

TEST DESCRIPTION

American National Standard for Electric Meters Code for Electricity Metering / Electricity Meters – 0.2 and 0.5 Accuracy Classes

Only for:

15 – Insulation

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 C62.41

IEEE Recommended practice on Surge Voltages in Low-Voltage AC power circuits

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

ANSI/SCTE 48-2 2008

Test procedure for measuring relative shielding properties of active and passive coaxial cable devices using Agilent magnetic close field probe

TEST METHODS(S)

ARIB T66

TEST DESCRIPTION

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 – 40th Harmonic)

AS/NZS/EN/IEC 61000-3-3

Electromagnetic Compatibility (EMC) – Part 3-3: Testing and Measurement Techniques – Flicker (dc 0-100% dmax 100% 1x109 short or long term flickers)

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 50121-3-2

Railway applications - Electromagnetic compatibility – Part 3-2: Rolling stock - Apparatus

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 to 1GHz

ETSI EN 300 328, -1, -2

2.4 GHz ISM

ETSI EN 300 330, -1, -2

SRD Short Range Devices 9KHz to 30 MHz

ETSI EN 300 440, -1, -2
(excluding DFS)

SRD Short Range Devices 1 GHz to 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

TEST METHODS(S)

ETSI EN 301 357

TEST DESCRIPTION

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

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 for 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
(excluding DFS)

Federal Communication Commission: Radio Frequency Devices

FCC 47 CFR part 18

Industrial, Scientific and Medical Equipment

FCC 47 CFR part 22

Public Mobile Services

TEST METHODS(S)

FCC 47 CFR part 24

FCC 47 CFR part 90

IEC 60945

IEC 60255-5

IEC 60255-22-1

IEC/EN 61326-1

IEC 61000-4-12

IEC 61000-4-16

IEC/EN 60601-1-2

KN 11/EN 55011/CISPR 11

KN 22/EN 55022/CISPR 22/
AS/NZS CISPR 22/
CNS 13438

KN/EN/IEC 61000-4-11

KN/EN/IEC 61000-4-2

KN/EN/IEC 61000-4-3

TEST DESCRIPTION

Personal Communication

Private Land Mobile Radio Services

Maritime Navigation and Radiocommunication Equipment
and Systems – General Requirements – Methods of Testing
Required Test Results
Section 9: Electromagnetic Emission
Section 10: Immunity to Electromagnetic EnvironmentElectrical relays –Part 5:Insulation coordination for measuring
relays and protection equipment –Requirements and testsMeasuring relays and protection equipment –
Part 22-1: Electrical disturbance tests – 1 MHz burst immunity testsElectrical equipment for measurement, control and laboratory use –
EMC requirementsElectromagnetic Compatibility (EMC) – Part 4-12: Testing
and Measurement Techniques – Ring Wave Immunity TestElectromagnetic 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 kHzMedical Electrical Equipment Part 1-2: General
Requirements for Safety – Collateral Standard:
Electromagnetic Compatibility – Requirements and TestsIndustrial, Scientific and Medical (ISM) Radio Frequency
Equipment Radiated Emissions 30 MHz – 1 GHz, Conducted
Emissions 150kHz – 30 MHzInformation Technology Equipment Radio Disturbance
Characteristics Limits and Methods of Measurement Radiated
Emissions 30 MHz – 1 GHz, Conducted Emissions
150 kHz – 30 MHzElectromagnetic Compatibility (EMC) – Part 4-11 Testing
and Measurement Techniques Voltage Dips and
Interruptions; (1 ms – 99.99 seconds)Electromagnetic Compatibility (EMC) Section 4.2
Electrostatic Discharge Immunity Test – Basic EMC
Publication, 8kV Contact Discharge/15kV/Air DischargeElectromagnetic Compatibility (EMC) – Part 4-3: Testing and
Measurement Techniques – Radiated, Radio Frequency,
Electromagnetic Field Immunity Test; 3V/m – 10V/m;

TEST METHODS (S)

KN/EN/IEC 61000-4-4

TEST DESCRIPTION

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

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

TEST METHODS (S)**TEST DESCRIPTION**

RSS 137	Location and Monitoring Service in 902 928 MHz Band
RSS 210	Low-Power License – Exempt Radiocommunication Devices
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 Only for: Section 2.0 – ESD & EFT Section 3.0 – EMI Section 4.0 – Lightning Surge & AC Power Fault Section 7.0 – Electrical Safety Section 8.0 – Corrosion Section 9.0 – Bonding & Grounding
VCCI V-2, V-3 (up to 1 GHz)	Agreement of Voluntary Control Council for Interference by Information Technology 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

TEST METHODS(S)

ETSI TS 301 437 – 1 V1.1.1
(1999-06)

ETSI TS 103 021 – 1 V1.1.1
(2003-08)

ETSI TS 203 021 V1.1.1
(2006-01)

HKTA 2011 Issue 4
August 2003

HKTA 2017 Issue 3
February 2003

IC CS-03 Including
Amendments

IDA TS ADSL.1

IDA TS PSTN 1 A (2000)

ITU-T G 823 (03/2000)

TEST DESCRIPTION

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

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

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

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

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

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

Technical Specification for Asymmetric Digital Subscriber Line (ADSL) Modems

Specification for Connection to Terminal Equipment to Public Switched Telephone Network (PSTN)

The Control of Jitter and Wander Within Digital Networks Which are Based on the 2048 kbit/s Hierarchy

TEST METHODS(S)

ITU-T Recommendation
G.703 (2001)

MIC Notice Republic of
Korea (RRA Public
Notification 2009-38, Sep
11, 2009).

Republic of Korea
(Presidential Decree 21098,
Oct 29, 2008).

RRL Notice (RRA
Announce 2008-10, Dec 23,
2008).

PSTN01

TBR 10, Dec 1993

TBR 12, Dec 1993 + Amnt
A1, Jan 1996

TBR 13, Jan 1996

TBR 15, Jan 1997

TBR 17, January 1997

TEST DESCRIPTION

SERIES G: TRANSMISSION SYSTEMS AND MEDIA,
DIGITAL SYSTEMS AND NETWORKS Digital
Transmission Systems – Terminal Equipments – General
Physical/Electrical Characteristics of Hierarchical Digital
Interfaces

Technical Requirement for Telecommunications Terminal
Equipment

Regulation on Technical Criteria of Telecommunications
Facilities

Republic of Korea, Conformity Assessment Procedure
for Type Approval of Telecommunications Terminal
Equipment

Technical Specifications for Terminal Equipment for
Connection to Public Switched Telephone Network (Taiwan)

Radio Equipment and Systems (RES); Digital European
Cordless Telecommunications (DECT) General Terminal
Attachment

Business Telecommunications (BT); Open Network
Provision (ONP) Technical Requirements; 2048 kbit/s Digital
Unstructured Leased Line (D2048U) Attachment
Requirements for Terminal Equipment

Business Telecommunications (BTC); 2048 kbit/s Digital
Structured Leased Lines (D2048S); Attachment
Requirements for Terminal Equipment Interface

Business Telecommunications (BTC); Ordinary and Special
Quality Voice Bandwidth 2-Wire Analogue Leased Lines (A2O
and A2S); Attachment Requirements for Terminal Equipment
Interface

Business Telecommunications (BTC); Ordinary and Special
Quality Voice Bandwidth 4-Wire Analogue Leased Lines (A4O
and A4S); Attachment Requirements for Terminal Equipment
Interface

TEST METHODS(S)

TBR 21, Jan 1998

TEST DESCRIPTION

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

Safety Requirements and Methods for Telecommunication and Medical Electrical Equipment

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

Information Technology Equipment – Safety – Part 1:
General Requirements. Only for (clause number 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

TEST METHODS(S)

EN 61010-1 / IEC 61010-1 /
UL 61010-1 / CSA C22.2
61010-1

TEST DESCRIPTION

Safety Requirements for Electrical Equipment for
Measurement, Control, and Laboratory Use, Part 1: General
Requirements.

Only for (clause number may vary):

- 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

EN/IEC 60601-1-1 / UL 60601-1 /
CSA C22.2 60601-1

Medical Electrical Equipment - Part 1: General Requirements for
Basic Safety and Essential Performance. Only for (clause number
may vary):

- 4.11 - Power Input
- 4.7 & 13.2 - Single fault conditions
- 5.7 - Humidity preconditioning treatment
- 8.5.4 - Working voltage
- 8.6 - Protective Earthing
- 8.7.4.5 - Leakage current
- 8.8.3 - Dielectric voltage
- 8.9.4 – Creepage distances and air clearances
- 9.4.2 - Instability – overbalance
- 11.1 - Temperature
- 15.3.2 – Push
- 15.3.3 – Impact
- 15.3.4 - Drop

IEC 60529

Degree of Protection Provided by Enclosures.

- Hose Down Test, x5
- Jet Spray, x6
- Immersion

UL50 / UL 60950-22 /
IEC 60950-22

- Rain Test
- Immersion
- Hydrogen Outgassing
- Jets of Water



The American Association for Laboratory Accreditation

World Class Accreditation

Accredited Laboratory

A2LA has accredited

NATIONAL TECHNICAL SYSTEMS (NTS)

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 30th day of March 2010.



A handwritten signature in black ink, reading "Peter Abney".

President & CEO
For the Accreditation Council
Certificate Number 0214.22
Valid to December 31, 2011
Revised April 14, 2010

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