American Association for Laboratory Accreditation



#### SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

#### QAI LABORATORIES LTD.<sup>1</sup> 3980 North Fraser Way Burnaby, BC Canada V5J 5K5 Lawrence Gibson Phone: 604-527-8378

#### ELECTRICAL

Valid To: October 31, 2016

Certificate Number: 3657.02

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory at the location listed above, *as well as the satellite laboratory location listed below*, to perform the following tests:

#### **ELECTRICAL PRODUCTS AND ELECTRONIC PRODUCTS** Electromagnetic Compatibility and Interference: EMC and EMI

Canada	Description of Standard
ICES-001	Industrial, Scientific, and Medical (ISM) Radio Frequency Generators
ICES-003	Information Technology Equipment (ITE) - Limits and Methods of Measurement
RSS-Gen	General Requirements and Information for the Certification of Radio Apparatus
RSS 119	Radio Transmitters and Receivers Operating in the Land Mobile and Fixed Services in the Frequency Range 27.41-960 MHz
RSS 133	2 GHz Personal Communications Services
RSS 134	900 MHz Narrowband Personal Communication Service
RSS 195	Wireless Communications Service Equipment Operating in the Bands 2305-2320 MHz and 2345-2360 MHz
RSS 210	License-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
RSS 213	2 GHz Licence-exempt Personal Communications Service Devices (PCS)
RSS 215	Analogue Scanner Receiver

V- C. Burr Page 1 of 10

European Union	Description of Standard
EN 61000-4-2	Electrostatic Discharge Immunity Test
EN 61000-4-3	Radiated, Radio-Frequency Electromagnetic Field Immunity Test.
EN 61000-4-4	Electrical Fast Transient/Burst Immunity Test
EN 61000-4-5	Surge Immunity Test
EN 61000-4-6	Immunity to Conducted Disturbances, Induced Radio-Frequency Fields
EN 61000-4-8	Power Frequency Magnetic Field Immunity Test
EN 61000-4-9	Pulse Magnetic Field Immunity Test
EN 61000-4-11	Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests
EN 55011	Industrial, Scientific, and Medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurements
EN 55012	Vehicles, Boats, and Internal Combustion Engine - Radio disturbance characteristics - Limits and methods of measurements for the protection of off-board receivers
EN 55022	Information Technology Equipment - Radio disturbance characteristics. Limits and methods of measurement
EN 55014	Information Technology Equipment - Immunity characteristics. Limits and methods of measurements and measuring.
EN 55025	Vehicles, Boats, and Internal Combustion Engines -Radio disturbance characteristics - Limits and methods of measurements for the protection of on-board receivers
EN 50121-3-2:2006	Railway Applications - Electromagnetic Compatibility: Rolling stock Apparatus
EN 50155:2007	Railway Applications - Electronic equipment used on rolling stock (Only for Sections 12.2.7 and 12.2.8)
EN 55103-1:2009 + A1:2012	Electromagnetic Compatibility. Product family standard for audio, video, audio-visual, and entertainment lighting control apparatus for professional use - Part 1: Emissions
EN 55103-2:2009	Electromagnetic Compatibility. Product family standard for audio, video, audio-visual, and entertainment lighting control apparatus for professional use - Part 2: Immunity
EN 60945	Maritime Navigation and Radio Communication Equipment and Systems, General requirements - Methods of testing and required test results.

(A2LA Cert. No. 3657.02) 02/04/2016

Page 2 of 10

European Union (cont.)	Description of Standard
EN 61326-2-1 thru 5	Electrical Equipment for Measurement, Control, and Laboratory use. EMC requirements - Part 2-3: Particular requirements. Test configuration, operational conditions and performance criteria.
EN 62233:2005, 2009	Measurement Methods for Electromagnetic Fields of household appliances and similar apparatus with regard to human exposure
EN 61000-3-2	Electromagnetic Compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current $\leq$ 16 A per phase)
EN 61000-3-3	Electromagnetic Compatibility (EMC) - Part 3-3: Limits Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rat current $\leq 16$ A per phase and not subject to conditional connection
EN 61000-6-1	Electromagnetic Compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial & 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 - Emission standard for residential, commercial, and light-industrial environments
EN 61000-6-4	Electromagnetic Compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
EN 55014-1	Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
EN 60601-1-2	Medical Electrical Equipment - Part 1-2: General requirements for basic safety and essential performance
EN 50130-4	Alarm Systems - Part 4: Electromagnetic Compatibility. Product family standard: Immunity requirements for components for fire, intruder and social alarm systems
EN 300 339	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); General electromagnetic Compatibility (EMC) for radio communications equipment
EN 300 385	Electromagnetic Compatibility (EMC) Standard for fixed radio links and ancillary equipment
EN 300 386-2	Electromagnetic Compatibility and Radio spectrum Matters (ERM); Telecommunication network equipment; Electromagnetic Compatibility (EMC) requirements; Part 2: Product family standard
EN 300 683	Electromagnetic Compatibility Standard for Short Range Devices (SRD) operating on frequencies between 9 kHz and 25 GHz.

Page 3 of 10

European Union (cont.)	Description of Standard
EN 301 489-01 to EN 301 489-26	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Electromagnetic Compatibility (EMC) standards for radio equipment and services
International	Description of Standard
CISPR 11	Industrial, Scientific, and Medical (ISM) radio-frequency equipment - Electromagnetic disturbance characteristics - Limits and methods of measurement
CISPR 12	Vehicles, Boats, and Internal Combustion Engine - Radio disturbance characteristics - Limits and methods of measurements for the protection of off-board receivers
CISPR 14-1	Electromagnetic Compatibility - Requirements for household appliances, electric tools and similar apparatus - Part 1: Emission
CISPR 14-2	Electromagnetic Compatibility - Requirements for household appliances, electric tools, and similar apparatus - Part 2 Immunity-Product Family Standard
CISPR 16-2-1:2010	Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods - Part 2-1: Methods of measurement of disturbances and immunity- Conducted disturbance measurements
CISPR 16-2-2:2010	Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods - Part 2-2: Methods of measurement of disturbances and immunity-Measurement of disturbance power
CISPR 16-2-3:2010	Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods - Part 2-3: Methods of measurement of disturbances and immunity-Radiated disturbance measurements
CISPR 16-2-4:2010	Specification for Radio Disturbance and Immunity Measuring Apparatus and Methods - Part 2-4: Methods of measurement of disturbances and immunity-Immunity measurements
CISPR 22	Information Technology Equipment - Radio disturbance characteristics- Limits and methods of measurement
CISPR 24	Information Technology Equipment - Immunity characteristics-Limits and methods of measurements and measuring
CISPR 25	Vehicles, Boats, and Internal Combustion Engines - Radio disturbance Characteristics-Limits and methods of measurements for the protection of on-board receivers
IEC 61000-4-2	Electrostatic Discharge Immunity Test
IEC 61000-4-3	Radiated, Radio-Frequency Electromagnetic Field Immunity Test

And C. But Page 4 of 10

International (cont.)	Description of Standard
IEC 61000-4-4	Electrical Fast Transient/Burst Immunity Test
IEC 61000-4-5	Surge Immunity Test
IEC 61000-4-6	Immunity to Conducted Disturbances, Induced Radio-Frequency Fields
IEC 61000-4-8	Power Frequency Magnetic Field Immunity Test
IEC 61000-4-9	Pulse Magnetic Field Immunity Test
IEC 61000-4-11	Voltage Dips, Short Interruptions, and Voltage Variations Immunity Tests
IEC 61000-3-2	Electromagnetic Compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current $\leq 16$ A per phase)
IEC 61000-3-3	Electromagnetic Compatibility (EMC) - Part 3-3: Limits Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rat current $\leq 16$ A per phase and not subject to conditional connection
IEC 61000-6-1	Electromagnetic Compatibility (EMC) - Part 6-1: Generic standards - Immunity for residential, commercial & light-industrial environments
IEC 61000-6-2	Electromagnetic Compatibility (EMC) - Part 6-2: Generic standards - Immunity for industrial environments
IEC 61000-6-3	Electromagnetic Compatibility (EMC) - Part 6-3: Generic standards - Emission standard for residential, commercial and light-industrial environments
IEC 61000-6-4	Electromagnetic Compatibility (EMC) - Part 6-4: Generic standards - Emission standard for industrial environments
IEC 60601-1-2	Medical Electrical Equipment - Part 1-2: General requirements for basic safety and essential performance
IEC 61326-1	Electrical Equipment for Measurement, Control, and Laboratory Use EMC Requirements Part 1: General Requirements
IEC 61326-2-1 thru 5	Electrical Equipment for Measurement, Control, and Laboratory Use - EMC requirements - Part 2-2: Particular requirements - Test configurations, operational conditions and performance criteria for portable test, measuring and monitoring equipment used in low-voltage distribution systems
ETSI 300 086	Land Mobile Service; Technical characteristics and test conditions for radio equipment with an internal or external RF connector intended primarily for analogue speech

And C. But Page 5 of 10

International (cont.)	Description of Standard
ETSI 300 113-1	Land Mobile Service; Radio equipment intended for the transmission of data (and/or speech) using constant or non-constant envelope modulation and having an antenna connector
ETSI EN 300 328	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized EN covering essential requirements under article 3.2 of the R&TTE Directive
ETSI EN 300 330-1	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 1: Technical characteristics and test methods
ETSI EN 300 330-2	Electromagnetic Compatibility and Radio Spectrum Matters (ERM); Short Range Devices (SRD); Radio equipment in the frequency range 9 kHz to 25 MHz and inductive loop systems in the frequency range 9 kHz to 30 MHz; Part 2: Harmonized EN under article 3.2 of the R&TTE Directive
CNS 13438 (up to 6 GHz)	Taiwan EMC for information technology equipment
Republic of Korea	Description of Standard
Annex 1-6	KN/CISPR 16-2-1
Annex 1-7	KN/CISPR 16-2-2
Annex 1-8	KN/CISPR 16-2-3
Annex 1-9	KN/CISPR 16-2-4
Annex 1-11	KN/EN 61000-3-2
Annex 1-12	KN/EN 61000-3-3
Annex 1-13	KN/EN 61000-4-2
Annex 1-14	KN/EN 61000-4-3
Annex 1-15	KN/EN 61000-4-4
Annex 1-16	KN/EN 61000-4-5
Annex 1-17	KN/EN 61000-4-6
Annex 1-18	KN/EN 61000-4-8
Annex 1-19	KN/EN 61000-4-11

Page 6 of 10

Republic of Korea (cont.)	<b>Description of Standard</b>
Annex 1-20	KN/EN 61000-4-9
Annex 2	KN/CISPR 11
Annex 2-2	KN/EN 60601-1-2
Annex 4	KN/EN 14-1
Annex 4-2	KN/EN 14-2
Annex 8-1	KN/EN 301 489-01
Annex 8-2	KN/EN 301 489-07
Annex 8-3	KN/EN 301 489-17
Annex 8-4	KN/EN 301 489-24
Annex 8-5	KN/EN 301 489-6
Annex 8-6	KN/EN 301 489-13
Annex 8-7	KN/EN 301 489-5
Annex 8-8	KN/EN 301 489-3
Annex 8-9	KN/EN 301 489-9
Annex 8-10	KN/EN 301 489-26
Annex 8-11	KN/EN 301 489-18
Annex 8-12	KN/EN 301 489-15
Annex 8-13	KN/EN 301 489-2
Annex 8-16	KN/EN 301 489-20
Annex 14	KN/EN 60945
Annex 17	KN/EN 61000-6-3
Annex 17-2	KN/EN 61000-6-1
Annex 18	KN/EN 61000-6-4
Annex 18-2	KN/EN 61000-6-2
	KN/CISPR 22: 2006
	KN/CISPR 24: 2010

Page 7 of 10

United States	Description of Standard
ANSI C63.4: 2003, 2009, 2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
ANSI-603C	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
FCC 47 CFR Part 15	Radio Frequency Devices
FCC 47 CFR Part 18	Industrial, Scientific and Medical Equipment
FCC 47 CFR Part 68	Connection of Terminal Equipment to the Telephone Network
FCC 47 CFR Part 90	Private Land Mobile Radio Services
FCC MP-5	Methods of Measurements of Radio Noise Emissions from ISM equipment
TIA-603C	Land Mobile FM or PM communications equipment measurement and Performance Standards
MIL-STD-461 F	Requirements for the control of electromagnetic interference characteristics of subsystems and equipment. Restricted to following: CE101, CE102, CE106, RE101, RE102, RE103

<sup>1</sup>*This accreditation covers testing performed at the main laboratory listed above, and the satellite laboratory listed below:* 

And C. But Page 8 of 10

**UBC Malcolm Knapp Research Forest** QAI Laboratories EMC Test Facility 14500 Silver Valley Road Maple Ridge, B.C. V4R 2R3 Canada

#### **Test Technology:**

#### **Test Method(s):**

Wireless and Radio Standards (Emissions) (10 meter Open Air Test Site)

**Basic Test Method Standards** (Emissions):

Conducted & Radiated

(using ANSI C63.4:2003, ANSI C63.4:2009); EN 301 489-01 V1.9.2; EN 300 328 V1.8.1; RSS-210

FCC Part 15 Subpart C 15.231, 15.247, and 12.205

ANSI C63.4:2003; ANSI C63.4:2009, ANSI C63:4-2014; FCC OST MP-5:1986;

CISPR 11:2003 + A1:2004 + A2:2006; EN 55011:2007 + A2:2007; CISPR 11:2009-05 + A1:2010-03; EN 55011:2009 + A1:2010;

CISPR 12:2007-05 + A1:2009-01 (excluding tests on Boats, and excluding the Insertion Loss Test Methods detailed in Informative Annex E of CISPR 12);

EN 55012:2007 + A1:2009 (excluding tests on Boats, and excluding the Insertion Loss Test Methods detailed in Informative Annex E of EN 55012);

CISPR 13:2001 + Corrigendum 1:2002 + A1:2003 + A2:2006; EN 55013:2001 + Corrigendum 1:2002 + A1:2003 + A2:2006; CISPR 13:2009-06; EN 55013:2009;

CISPR 14-1:2005 + A1:2008 + A2:2011; EN 55014-1:2006 + A1:2009 + A2:2011;

CISPR 22:2005 + A1:2005; EN 55022:2006 + C1:2006 + A1:2007; CISPR 22:2008 + IS1:2009-10 + IS2:2010-03 + IS3:2012-04; EN 55022:2006 + A1:2007 + A2:2010; EN 55022:2010 + AC:2011

Harmonic Current

IEC 61000-3-2:2005-11 + A1:2008-03 + A2:2009-02; EN 61000-3-2:2006 + A1:2009-07 + A2:2009-07; IEC 61000-3-2:2014-05

Voltage Fluctuations & Flicker

IEC 61000-3-3:2008; EN 61000-3-3:2008-06; IEC 61000-3-3:2013-05; EN 61000-3-3:2013-05

And C. But Page 9 of 10

Test Technology:	Test Method(s):
Conducted Disturbance at	VCCI V-3/2013.04, Annex 1 Clauses 4.1, 5.2, 6.3;
Mains Ports (up to 1 GHz)	VCCI V-3/2014.04, Annex 1 Clauses 4.1, 5.2, 6.3
Conducted Disturbance at Telecom Ports ( <i>up to 1 GHz</i> )	VCCI V-3/2013.04, Annex 1 Clauses 4.2, 5.2, 6.4, Appendix IV and VCCI V-15/2012.04 Normative Annex 1-4; VCCI V-3/2014.04, Annex 1 Clauses 4.2, 5.2, 6.4, Appendix IV and VCCI V-15/2012.04 Normative Annex 1-4
Radiated Disturbances (up to 1 GHz)	VCCI V-3/2013.04, Annex 1 Clauses 4.3.1, 5.3, 6.5.1; VCCI V-3/2014.04, Annex 1 Clauses 4.3.1, 5.3, 6.5.1
Radiated Disturbances (1 to 6 GHz)	VCCI V-3/2013.04, Annex 1 Clauses 4.3.2, 5.3, 6.5.2 Appendix VI; VCCI V-3/2014.04, Annex 1 Clauses 4.3.2, 5.3, 6.5.2 Appendix VI

- C. But Page 10 of 10





# Accredited Laboratory

A2LA has accredited

## QAI LABORATORIES LTD.

Burnaby, BC, 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 4th day of February 2016.

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Senior Director of Quality & Communications For the Accreditation Council Certificate Number 3657.02 Valid to October 31, 2016

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