



CERTIFICATE OF ACCREDITATION

ANSI-ASQ National Accreditation Board

500 Montgomery Street, Suite 625, Alexandria, VA 22314, 877-344-3044

This is to certify that

UltraTech Engineering Labs Inc.
3000 Bristol Circle
Oakville ON L6H 6G4 Canada

has been assessed by ANAB
and meets the requirements of international standard

ISO/IEC 17025:2005

while demonstrating technical competence in the field of

TESTING

Refer to the accompanying Scope of Accreditation for information regarding the types of tests to which this accreditation applies.

AT-1945

Certificate Number



ANAB Approval

Certificate Valid: 10/06/2017-10/08/2019
Version No. 009 Issued: 10/06/2017



This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. 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 April 2017).



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

UltraTech Engineering Labs, Inc.

3000 Bristol Circle
Oakville, ONT L6H 6G4
Mr. Tri m. Luu 905-829-1570

TESTING

Valid to: **October 8, 2019**

Certificate Number: **AT-1945**

Testing performed in support of FCC DoC and Certification approval procedures

| Type of Device Examples | Scope of Accreditation | Supporting FCC Guidance | Comments |
|--|---|-------------------------|----------|
| Unintentional Radiators (FCC Part 15, Subpart B) | <ul style="list-style-type: none">ANSI C63.4-2014 | | |
| Industrial, Scientific, and Medical Equipment (FCC Part 18) <ul style="list-style-type: none">Consumer ISM equipment | <ul style="list-style-type: none">FCC MP-5, (February 1986) | | |
| Intentional Radiators (FCC Part 15 Subpart C) | <ul style="list-style-type: none">ANSI C63.10-2013 | | |
| UPCS (FCC Part 15, Subpart D) <ul style="list-style-type: none">Unlicensed Personal Communication Systems devices | <ul style="list-style-type: none">ANSI C63.17-2013 | | |
| U-NII without DFS Intentional Radiators (FCC Part 15, Subpart E) <ul style="list-style-type: none">Unlicensed National Information Infrastructure Devices (U-NII without DFS) | <ul style="list-style-type: none">ANSI C63.10-2013 | KDB Publication 789033 | |
| UWB Intentional Radiators (FCC Part 15, Subpart F) <ul style="list-style-type: none">Ultra-wideband Operation | <ul style="list-style-type: none">ANSI C63.10-2013 | | |
| BPL Intentional Radiators (FCC Part 15, Subpart G) <ul style="list-style-type: none">Access Broadband Over Power Line (Access BPL) | <ul style="list-style-type: none">ANSI C63.10-2013 | | |
| White Space Device Intentional Radiators (FCC Part 15, Subpart H) <ul style="list-style-type: none">White Space Devices | <ul style="list-style-type: none">ANSI C63.10-2013 | | |



Testing performed in support of FCC DoC and Certification approval procedures

| Type of Device Examples | Scope of Accreditation | Supporting FCC Guidance | Comments |
|--|--|--|----------|
| Commercial Mobile Services (FCC Licensed Radio Service Equipment) •Part 22 (cellular) •Part 24 •Part 25 (non-microwave) •Part 27 | <ul style="list-style-type: none"> • ANSI/TIA-603-D • TIA-102.CAAA-D | | |
| General Mobile Radio Services (FCC Licensed Radio Service Equipment) •Part 22 (non-cellular) •Part 90 (non-microwave) •Part 95 •Part 97 •Part 101 (non-microwave) | <ul style="list-style-type: none"> • ANSI/TIA-603-D • TIA-102.CAAA-D | Microwave Frequencies, as used in this part, refers to frequencies of 890 MHz and above. | |
| Citizens Broadband Radio Services (FCC Licensed Radio Service Equipment) •Part 96 | <ul style="list-style-type: none"> • ANSI/TIA-603-D • TIA-102.CAAA-D | | |
| Maritime and Aviation Radio Services (FCC Licensed Radio Service Equipment) •Part 80 •Part 87 | <ul style="list-style-type: none"> • ANSI/TIA-603-D | | |
| Microwave and Millimeter Bands Radio Services (FCC Licensed Radio Service Equipment) •Part 25 •Part 74 •Part 90 (90Y, 90Z, DSRC) •Part 101 | <ul style="list-style-type: none"> • ANSI/TIA-603-D • TIA-102.CAAA-D | | |
| Broadcast Radio Services (FCC Licensed Radio Service Equipment) •Part 73 •Part 74 (non-microwave) | <ul style="list-style-type: none"> • ANSI/TIA-603-D • TIA-102.CAAA-D | | |
| RF Exposure •Devices subject to SAR requirements | <ul style="list-style-type: none"> • IEEE Std 1528™-2013 | KDB Publication 865664 KDB Publication 447498 | |



Testing performed in support of FCC DoC and Certification approval procedures

| Type of Device Examples | Scope of Accreditation | Supporting FCC Guidance | Comments |
|--|--|-------------------------|----------|
| Hearing Aid Compatibility (Part 20) •HAC for Commercial mobile services | <ul style="list-style-type: none"> • ANSI C63.19-2007; or • ANSI C63.19-2011 | | |
| Signal Boosters (Part 20) •Wideband Consumer signal boosters •Provider-specific signal boosters •Industrial signal boosters | <ul style="list-style-type: none"> • FCC KDB Publication 935210 D03 Signal Booster Measurements v04(February 12, 2016) • FCC KDB Publication 935210 D04 Provider Specific Booster Measurements v02 (February 12, 2016) • FCC KDB Publication 935210 D05 Indus Booster Basic Meas v01r01 (February 12, 2016) | | |

Electromagnetic Compatibility

| Test Method | Test Specification(s) | Range | Comments |
|----------------------------------|---|-----------------|----------|
| Conducted and Radiated Emissions | FCC 47 CFR Parts 11, 15, 18; ANSI C63.4(2014), ANSI C63.10(2013), ANSI C63.17(2013); FCC OST/MP-5(February 1986); ICES 001,003,004,005,006 CISPR 32; EN 55032; AS/NZS CISPR 32:2015; CAN/CSA-CEI/IEC CISPR 32; CNS 13438:2010 (up to 6GHz); VCCI V-3 and VCCI-CISPR 32: 2016 (up to 6 GHz); CISPR 11; EN 55011, AS/NZS CISPR 11; CISPR 22. EN 55022 CISPR 32, EN55032; EN 50121-3-2, EN 50121-4; EN 50366; EN 55103-1; CISPR 15, EN 55015, KN 15:2015-12 Technical Requirements for Electromagnetic Compatibility (RRA Public Notification 2016-24, Dec 7, 2016); Test Methods for Electromagnetic Compatibility (RRA Announce 2016-79, Dec 19, 2015); KN 11:2015-12, KN 32:2015-12 (Annex 11) | 40 Hz to 40 GHz | |

Electromagnetic Compatibility

| Test Method | Test Specification(s) | Range | Comments |
|---|--|---------------------|----------|
| Harmonic Emissions | IEC 61000-3-2, EN 61000-3-2, AS/NZS 61000-3-2 | | |
| Flicker | IEC 61000-3-3, EN 61000-3-3, AS/NZS 61000-3-3 | | |
| Product Specific Emissions | IEC 61000-6-3; EN 61000-6-3; KN 61000-6-3; IEC 61000-6-4; EN 61000-6-4; KN 61000-6-4; AS/NZS 61000.6.4; CISPR 12, EN 55012 CISPR 14-1: (excluding measurement of clicks); EN 55014-1 (excluding measurement of clicks); AS/NZS CISPR 14-1, KN 14-1, EN 60255-26 CISPR 25, sections 6.2, 6.3 and 6.4 only CISPR 13, EN 55013 | | |
| ESD Immunity | IEC 61000-4-2, EN 61000-4-2, KN 61000-4-2, DO-160D/E/F: Section 25 | | |
| Radiated Immunity | IEC 61000-4-3, EN 61000-4-3, KN 61000-4-3 | Up to 6 GHz, 20 V/m | |
| EFT | IEC 61000-4-4; EN 61000-4-4; KN 61000-4-4 | | |
| Surge | IEC 61000-4-5; EN 61000-4-5; KN 61000-4-5 | | |
| Conducted Immunity | IEC 61000-4-6, EN 61000-4-6, KN 61000-4-6 | | |
| Low Frequency Magnetic Immunity | IEC 61000-4-8, EN 61000-4-8, KN 61000-4-8 | | |
| Pulse Magnetic Immunity | IEC 61000-4-9, EN 61000-4-9 | | |
| Damped Oscillatory Magnetic Immunity | IEC 61000-4-10, EN 61000-4-10 | | |
| Power Dips and Interrupts | IEC 61000-4-11, EN 61000-4-11, KN 61000-4-11 | | |
| Power Dips and Interrupts and voltage variations on dc input power port | IEC 61000-4-29, EN 61000-4-29 | | |
| Ring Wave Immunity | IEC 61000-4-12, EN 61000-4-12, ANSI/IEEE C37.90, ANSI/IEEE C62.41 | | |
| Harmonics and Inter-harmonics | IEC 61000-4-13, EN 61000-4-13 | | |
| Immunity, Common Mode Disturbances | IEC 61000-4-16, EN 61000-4-16 | | |



Electromagnetic Compatibility

| Test Method | Test Specification(s) | Range | Comments |
|--|--|-------|-------------------------------------|
| Damped Oscillatory Waveform Immunity | IEC 61000-4-18, EN 61000-4-18 | | |
| Product Specific Immunity | CISPR 24; EN55024; AS/NZS CISPR 24; EN 61000-6-1; EN 61000-6-2; AS/NZS 4254.1; CISPR 14-2, EN 55014-2, AS/NZS CISPR 14-2, KN 14-2:2015-12, EN 61547, KN 61547 CISPR 20 and EN 55020; EN 55103-2; EN 50130-4 Test Methods for Electromagnetic Compatibility (RRA Announce 2016-79, Dec 19, 2015); KN 35:2015-12 (Annex 11-2) KN 24, KN 61000-6-1, KN 61000-6-2 | | |
| Emissions and Immunity Standards | IEC 60601-1-2; EN 60601-1-2; IEC 61326; EN 61326; IEC 50121; EN 50121; IEC 50155, EN 50155; EN 300 386; ISO 7637-2; ISO 7637-3, IEC/EN 61850-3 | | Combined Generic / Product Specific |
| SAR (Specific Absorption Rate) RF Exposure MPE (Maximum Permissible Exposure) | OET Bulletin 65, IEEE STD 1528(2013), IEEE STD 1528a IEEE STD C95.1; IEEE STD C95.3; ANSI C63.19(2011) IEC 62209, EN 62209, IEC 62479, EN 62479, EN 62233 IEC 50360, EN 50360, IEC 50361, EN 50361, IEC 50364, EN 50364, IEC 50371, EN 50371 H46-2/99-273 ^E , Health Canada Safety Code 6 KDB Publications 865664 D01 v01r04, 865664 D01 v01r02, 447498 D01 v06, 447498 D02 v02r01, 447498 D03 v01 | | RF Safety and EMF |
| EMF Lighting Equipment | IEC 62493, EN 62493 | | |
| EMF Household Appliances | IEC 62232, EN 62232 | | |
| Conducted Emissions | MIL-STD-461E, F: Methods CE101, CE102, CE106; MIL-STD-462D: Methods CE101, CE102, CE106; MIL-STD-462: Methods CE01, CE02, CE03, CE06 | | Military EMC |
| Radiated Emissions | MIL-STD-461E, F: Methods RE101, RE102 and RE103; MIL-STD-462D: Methods RE101, RE102 and RE 103; MIL-STD-462: Methods RE01, RE02 and RE03 | | |
| Conducted Susceptibility | MIL-STD-461E, F: Methods CS101, CS 103; CS 104; CS 105, CS109, CS114, CS115, CS116; MIL-STD-462D: Methods CS101, CS103, CS114, CS115, CS116; MIL-STD-462: Methods, CS01, CS02, CS03, CS04, CS05, CS06, CS08 | | |

Electromagnetic Compatibility

| Test Method | Test Specification(s) | Range | Comments |
|--|--|-------|---|
| Radiated Susceptibility | MIL-STD-461E, F: Methods RS101, RS103; MIL-STD-461/462D: Methods RS101, RS103 | | Military EMC |
| Power Input | RTCA DO-160 E, F, G: Section 16 | | Aviation EMC |
| Voltage Spikes | RTCA DO-160 E, F, G: Section 17 | | |
| Audio Frequency Conducted Susceptibility | RTCA DO-160 E, F, G: Section 18 | | |
| Induced Signal Susceptibility | RTCA DO-160 E, F, G: Section 19 | | |
| Conducted Susceptibility and Radiated Susceptibility | RTCA DO-160 E, F, G: Section 20.4 Section 20.5 | | |
| Conducted and Radiated Emissions | RTCA DO-160 E, F, G: Sections 21.4 & 21.5 | | |
| Lighting Induced Transient Susceptibility | RTCA DO-160 E, F, G: Section 22 | | |
| ESD | RTCA DO-160 E, F, G: Section 25 | | |
| Product Safety | IEC 60950-1 (2005); IEC 60950-1:2005+A1:2009; EN 60950-1 (2006); EN 60950-1:2006 + A1:2009; EN 60950-1:2006 + A1:2010; EN 60950-1:2006 + A2:2013; CAN/CSA-C22.2 NO. 60950-1-07 (R2012) CAN/CSA-C22.2 NO. 60950-1B-07 - A2:2014 | | All tests except sections 2.10.8 to 2.10.12, 3.2.5.1, 4.2.8, 4.3.6, 4.3.12, 4.3.13.3, 4.3.13.4, 4.3.13.5, 4.6.2, 4.6.5, 4.7.3.6, Annexes AA, A3 and H |
| | IEC/EN 61010-1:2010; UL 61010-1: 2010; CAN/CSA C22.2 NO. 61010-1-12 | | All tests except sections 6.7.1.2, 11.6, 11.7, 12.2.1, 12.3, 12.4, 12.5.2, 12.6 and 13.3 |
| | IEC 60601-1:2005; EN 60601-1:2006; EN 60601-1:2006/A1:2013+A12:2014 | | All test except 9.6.2 to 9.7.8, 9.8.3, 10.1 to 10.7, 11.2.2 to 11.2.3 and Annex G |

Electromagnetic Compatibility

| Test Method | Test Specification(s) | Range | Comments |
|----------------|--|-------|--|
| | EN60215:1989 + A1: 1992; +A2:1994 | | All tests except for clauses 21 to 24 |
| Product Safety | IEC/EN 62368-1 (2014); UL 62368-1 (2014); CAN/CSA-C22.2 NO. 62368-1-14 | | All tests except sections 5.4.1.10 (Vicat test), 5.4.4.6.5, 5.4.1.5.3, 10, Annex G.7, Annex G.9, Annex G.13.6.2, Annex G.15, Annex J, Annex M.8.2, Annex P.4, Annex S.2, S.3, S.5, and Annex U |
| | EN 60335-1:2002 +A14:2010 IEC 60335-1:2001 +A2:2006 EN 60335-1:2012 EN 60335-2-2 – Vacuum Cleaner appliances EN 60335-2-29 – Battery chargers EN 60335-2-65 – Air Cleaning appliances EN 60335-2-80 – Fans EN 60335-2-109 UV radiation water treatment appliances | | All tests except for clauses 15, 22.3, 22.16, 24.1.3, 24.1.4 to 24.1.9, 30.2.1 to 30.2.4, 31 to 32, Annex C, Annex F, Annex G, Annex H, Annex I, Annex J, Annex N, and Annex R |



Radio

| Test Method | Test Specification(s) | Range | Comments |
|---|--|-------|---------------------------------------|
| Output Power Power Spectral Density Conducted Spurious Emissions Radiated Spurious Emissions Occupied Bandwidth Duty Cycle Frequency Stability ERP/EIRP Audio Frequency Response Modulation Limiting Transient Frequency Behavior Intermodulation Dwell time, Minimum Frequency Occupation & Hopping Sequence SAR – RF RF Exposure MPE – RF RF Exposure | USA: TIA-102.CAAA-D(2013) & ANSI/TIA-603-D(2010) using 47 CFR Parts 2, 20, 22(cellular and non-cellular), 24, 25, 27, 73, 74, 80, 87, 90, 95, 96, 97 and 101, ANSI C63.17(2013); ANSI 63.26(2015), KDB Publications 789033 D02 v01r03, 971168 D01 v02r02, 971168 D02 v01, 971168 D03 v01, 935210 D02 v03r02(April 08, 2016), 935210 D03 v04(February 12, 2016), 935210 D04 v02(February 12, 2016), 935210 D05 v01r01(February 12, 2016) Canada: RSS-Gen; RSS-102; RSS-111; RSS-112; RSS-117; RSS-119; RSS-123; RSS-125; RSS-127; RSS-130; RSS-131; RSS-132; RSS-133; RSS-134; RSS-135; RSS-137; RSS-139; RSS-141; RSS-142; RSS-170; RSS-181; RSS-182; RSS-191; RSS-192; RSS-194; RSS-195; RSS-196; RSS-197; RSS-199; RSS-210; RSS-211; RSS-213; RSS-215; RSS-216; RSS-220; RSS-222; RSS-236; RSS-238; RSS-243; RSS-244; RSS-247; RSS-251; RSS-287; RSS-288; RSS-310 | | Radio Transmitters and Receiver |

Radio

| Test Method | Test Specification(s) | Range | Comments |
|--|--|-------|---|
| Output Power Power Spectral Density Conducted Spurious Emissions Radiated Spurious Emissions Occupied Bandwidth Duty Cycle Frequency Error Modulation range ERP/EIRP Dwell time, Minimum Frequency Occupation & Hopping Sequence Adjacent channel power Internodulation attenuation Transmitter attack time Transmitter release time Rx maximum usable sensitivity Rx average sensitivity Rx co-channel rejection Rx spurious response rejection Rx Intermodulation response rejection Blocking/ Desensitization | Europe ETSI EN 300 086; ETSI EN 300 220; ETSI EN 300 328; ETSI EN 300 330; ETSI EN 300 386; ETSI EN 300 440; ETSI EN 301 489-1; ETSI EN 301 489-3; ETSI EN 301 489-4; ETSI EN 301 489-5; ETSI EN 301 489-7; ETSI EN 301 489-8; ETSI EN 301 489-17; ETSI EN 301-489-24 ETSI EN 300 826; ETSI EN 301 113; ETSI EN 301 459; ETSI EN 301 441; ETSI EN 301 893; ETSI EN 301 721 ETSI EN 302 065; ETSI EN 302 502; ETSI EN 302 372, KN 301 489-1, KN 301 489-3, KN 301 489-5, KN 301 489-7, KN 301 489-17, KN 301 489-24 | | |
| Telecommunications | FCC/ACTA Part 68 – Analog & Digital Industry Canada CS-03 TIA/EIA TSB-31 TIA/EIA-968 | | Analog PSTN devices – physical layer tests, Hearing Aid Compatibility, Volume control |

Note:

1. This scope is formatted as part of a single document including Certificate of Accreditation No. AT-1945.



Vice President

