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ELECTRICAL

Valid To: September 30, 2024   Certificate Number: 3350.01

In recognition of the successful completion of the A2LA evaluation process accreditation is granted to this laboratory for the Bluetooth testing on <u>Information Technology Equipment (ITE), Bluetooth devices, and NFC devices</u>:

Test Technology:	**Test Method(s) [1]:**
Near Field Communications (NFC)	
NFC Forum Digital Protocol	NFC Forum Test Cases for Digital Protocol
NFC Forum Type 1 Tag Operation	NFC Forum Test Cases for Type 1 Tag Operation
NFC Forum Test Cases for Type 2 Tag and Type 2 Tag Operation	NFC Forum Test Cases for Type 2 Tag and Type 2 Tag Operation
NFC Forum Test Cases for Type 3 Tag and Type 3 Tag Operation	NFC Forum Test Cases for Type 3 Tag and Type 3 Tag Operation
NFC Forum Type 4 Tag and Type 4 Tag Operation	NFC Forum Test Cases for Type 4 Tag and Type 4 Tag Operation
NFC Forum Type 5 Tag and Type 5 Tag Operation	NFC Forum Test Cases for Type 5 Tag and Type 5 Tag Operation
NFC Forum Tag Performance	NFC Forum Test Cases for Tag Performance
NFC Forum Analog	NFC Forum Test Cases for Analog
NFC Forum Simple NDEF Exchange Protocol (SNEP Protocol)	NFC Forum Test Cases for Simple NDEF Exchange Protocol (SNEP Protocol)

Test Technology:	Test Method(s) [1]:
Near Field Communications (NFC) *(cont.)*	
NFC Forum Logical Link Control Protocol (LLCP Protocol)	NFC Forum Test Cases for Logical Link Control Protocol (LLCP Protocol)
NFC Forum Wireless Charging	NFC Forum Test Cases for Wireless Charging
UICC-based NFC IOP	GSMA TS.27 - NFC Handset Testbook
Bluetooth	
Bluetooth Radio and Protocol Conformance Testing	RF:1: Vol 2 Part A Radio Specification, in the Test Suite RF.TS, which includes receiver and transmitter tests for Bluetooth Basic Rate (BR) and Enhanced Data Rate (EDR), EDR2 and EDR3. RF-PHY1: (a) Vol. 6, Part A, Physical Layer Specification, in the Test Suite RF – PHY.TS which includes receiver and transmitter tests for LE 1 Mb/s with: (b) fixed 37 bytes packet payload length, and (c) packet length extensions (packet payload length ranges from 37 bytes to 255 bytes) RF-PHY2: Vol. 6, Part A, Physical Layer Specification, in the Test Suite RF – PHY.TS which includes receiver and transmitter tests for (a) 20 dBm Higher Output Power RF - PHY (b) LE 2Mb/s (c) Coded PHY (125 kb/s or 500 kb/s) (d) Stable Modulation Index (e) All required testing capabilities associated with the RF – PHY:1 test scope option RF-PHY3: Vol. 6, Part A, Physical Layer Specification, in the Test Suite RF – PHY.TS which includes receiver and transmitter tests for (a) AoA/AoD (IQ Samples Coherency AoD/AoA Receiver, IQ Sample Dynamic Range AoD/AoA Receiver) (b) All required testing capabilities associated with the RF – PHY:2 test scope option

Test Technology:	Test Method(s) [1]:
Bluetooth Radio and Protocol Conformance Testing *(cont.)*	LE Protocols:1: (a) Vol 6 Part B Link Layer (LL) Specification, in the Test Suite LL.TS (c) Vol 2 Part E Host Controller Interface (HCI) Specification, including the LE-only and BR/EDR/LE HCI tests in the Test Suite HCI.TS LE Protocols:2: (a) Vol 6 Part G Isochronus Adaption Layer (IAL) Specification, in the Test Suite IAL.TS (Isochronus Adaption Layer) (b) All required testing capabilities associated with the LE Protocols:1 test scope option Host Layers: Layers above HCI in the Bluetooth SIG adopted Core Specifications Traditional Profiles and Protocols: Bluetooth SIG adopted Profile and Protocol Specifications external to the Core in the Profile TCRL GATT-Based Profile & Services: Bluetooth SIG adopted Profile and Service Specifications operating over the GATT architecture in the GATT based TCRL Mesh Profile & Mesh Models: Bluetooth SIG adopted Mesh Profile and Mesh Model Specifications in the MESH-MMDL TCRL
Field Trials and Interoperability [2]	
GSM, UMTS, LTE, and 5G	GSM Association Official Document; TS.11 – Device Field and Lab Test Guidelines
	GSM Association Official Document; TS.40 – MioT Field and Lab Test Cases
	GSM Association Official Document; TS.42: Multi SIM Devices Requirements Test Cases
	MultiFire Alliance; MFA TS MF.501 Interoperability Test Specification

Test Technology:	Test Method(s) [1]:
Connected Car	
Conformance Protocol	IEEE Std 802.11; Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

	IEEE Std 1609.2;
	IEEE Standard for Wireless Access in Vehicular
	  Environments – Security Services for Applications
	  and Management Messages;

	IEEE Std 1609.3; IEEE Standard for Wireless Access in Vehicular Environments (WAVE) – Networking Services;
	IEEE Std 1609.4; IEEE Standard for Wireless Access in Vehicular Environments (WAVE) – Multi-Channel Operation
Conformance Protocol ITS-G5	TS 102 859 Conformance Test Specifications for Transmission of IP Packets over GeoNetworking (GN6)
	TS 102 868 Conformance Test Specification for Co-operative Awareness Messages (CAM)

	TS 102 869 Conformance Test specification for
	  Decentralized Environmental Notification Messages
	  (DENM)

	TS 102 870 Conformance Test Specifications for GeoNetworking Basic Transport Protocol (BTP)
	TS 102 871 Conformance Test Specifications for GeoNetworking ITS-G5 (GN)
	TS 103 191 Conformance Test Specifications for Signal Phase and Timing (SPAT) and Map (MAP)
	TS 103 096 Conformance Test Specification for TS 102 867 and TS 102 941 Security Testing

RF Testing	ETSI EN 302 571 Intelligent Transport Systems (ITS);
	Radiocommunications Equipment Operating in the
	  5 855 MHz to 5 925 MHz Frequency Band;
	Harmonised Standard covering the Essential
	  Requirements of Article 3.2 of Directive 2014/53/EU

Test Technology:	Test Method(s) [1]:
eCall [2]	
eCall Conformance Testing (*excluding crash test as applicable*)	EVS-EN 16454; ETSI TS 103 412; ETSI TS 126 269; Commission Delegated Regulation (EU) 2017/79 (Annex I, II, III, IV, VI, VII, & VIII); GOST 33467; GOST 33470; R144 (ECE-TRANS-WP29-2017-132e); UAE.S 5019_2018
Mobile Communications	
Communication Devices with GSM/GPRS/EDGE Interface:	
RF (Conducted only) and Layer 1: Protocol	3GPP TS 51.010-1; ETSI EN 301 511; ETSI TS 151.010-1
Communication Devices with UMTS Interface:	
RF Testing (*using the Reference Specification: 3GPP TS 34.108*)	3GPP TS 34.121-1; ETSI TS 134 121-1; ETSI EN 301 908-2
Protocol Testing (*using the Reference Specification: 3GPP TS 34.108*)	3GPP TS 34.123-1; ETSI TS 134 123-1
Communication Devices with LTE Interface:	
RF Testing (*using the Reference Specification: 3GPP TS 36.508*)	3GPP TS 36.521-1; ETSI TS 136 521-1; 3GPP TS 36.521-3; ETSI TS 136 521-3; ETSI EN 301 908-13
Protocol Testing (*using the Reference Specification: 3GPP TS 36.508*)	3GPP TS 36.523-1; ETSI TS 136 523-1

Test Technology:	Test Method(s) [1]:
Mobile Communications (cont.)	
Communication Devices with 5G FR1 Interface:	
RF Testing (*using the Reference Specification:* *3GPP TS 38.508*)	3GPP TS 38.521-1; ETSI TS 138 521-1; 3GPP TS 38.521-3; ETSI TS 138 521-3; 3GPP TS 138 521-4; ETSI TS 138 521-4; 3GPP TS 38.533; ETSI TS 138.533
Protocol Testing (*using the Reference Specification:* *3GPP TS 38.508-1*)	3GPP TS 38.523-1; ETSI TS 138 523-1
Communication Devices with UICC Interface:	
RSP Testing	GSM Association - Official Document SGP.23 – RSP Test Specification
Electrical SIM Testing (***using the Reference Specification:*** ***ETSI TS 102 221***)	ETSI TS 102 230-1
Communication Devices with Application Enablers Interface:	
AT-Command Testing	AT-Command. Test Specification Covering RFT 77; 3GPP TS 27.005; 3GPP TS 27.007
Data Throughput Testing	3GPP TR 37.901
Wireless Communications	
Communication Devices with WLAN Interface:	
Interoperability Testing	Wi-Fi Alliance Certification Program According to the ATL Accreditation: https://www.wi-fi.org/AT4-wireless
Thread Testing	
Thread Devices	Thread Certification Test Plan; Thread Specification

Test Technology:	Test Method(s) [1]:
Cybersecurity Testing	
IoT Devices:	
Cybersecurity Testing for IoT Devices	CTIA Cybersecurity Certification Test Plan for IoT Devices
Zigbee Testing	
Zigbee PRO Compliant Platform:	
IEEE 802.15.4 PHY Testing	ZigBee IEEE 802.15.4 Test Specification
IEEE 802.15.4 MAC Testing	ZigBee IEEE 802.15.4 Test Specification
Zigbee PRO Network Testing	Zigbee PRO Compliant Platform Test Specification
Zigbee 3.0 Devices:	
Base Device Behavior Testing	Base Device Behavior Test Specification
Cluster Testing	Cluster Library Specification
Zigbee PRO Green Power:	
Zigbee PRO Green Power Testing	Zigbee PRO Green Power Feature Test Specification, Basic Functionality Set
Amazon AVS Testing	
AVS Acoustic Testing	Amazon Alexa Acoustic Testing User Guide
AVS Functional Testing	AVS Functional Testing
AVS User Experience Testing	AVS UX Self-Test Checklist
AVS Music Testing	AVS Music Self-Test Checklist

[1] When the date, edition, version, etc. is not identified in the scope of accreditation, laboratories may use the version that immediately precedes the current version for a period of one year from the date of publication of the standard measurement method, per part C., Section 1 of A2LA _R101 - General Requirements- Accreditation of ISO-IEC 17025 Laboratories_.

[2] This laboratory performs field testing activities for these tests.

Accredited Laboratory

A2LA has accredited

DEKRA TESTING AND CERTIFICATION, S.A.U.

Málaga, Spain

for technical competence in the field of

Electrical Testing

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

Presented this 20th day of November 2022.

Mr. Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 3350.01
Valid to September 30, 2024

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