AS ISO/IEC 19795.1—2007

Australian Standard®

Information technology—Biometric performance testing and reporting

Part 1: Principles and framework

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The following are represented on Committee IT-032:

- AUSTROADS
- Attorney General's Department
- Australian Business Limited
- Australian Electrical and Electronic Manufacturers Association
- Centrelink
- The Biometric Institute

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PREFACE

This Standard was prepared by the Standards Australia Committee IT-032, Biometric and Identification.

The objective of this Standard is to make available to the Australian biometrics community the core ISO SC37 standards published over the last 24 months, specifically testing principles and framework.

This Standard is identical with, and has been reproduced from ISO/IEC 19751-1:2006, *Information technology—Biometric performance testing and reporting*—Part 1: *Principles and framework*.

As this Standard is reproduced from an international standard, the following applies:

(a) Its number appears on the cover and title page while the international standard number appears only on the cover.

(b) In the source text 'this part of ISO/IEC 19795' should read 'this Australian Standard'.

(c) A full point substitutes for a comma when referring to a decimal marker.

Reference to International Standard		*Australian Standard*	
ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories	AS ISO/IEC 17025	General requirements for the competence of testing and calibration laboratories

Only international references that have been adopted as Australian or Australian/New Zealand Standards have been listed.

The term 'informative' has been used in this Standard to define the application of the annex to which it applies. An 'informative' annex is only for information and guidance.

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INTRODUCTION

This part of ISO/IEC 19795 is concerned solely with the scientific “technical performance testing” of biometric systems and devices. Technical performance testing seeks to determine error and throughput rates, with the goal of understanding and predicting the real-world error and throughput performance of biometric systems. The error rates include both false positive and false negative decisions, as well as failure-to-enrol and failure-to-acquire rates across the test population. Throughput rates refer to the number of users processed per unit time based both on computational speed and human–machine interaction. These measures are generally applicable to all biometric systems and devices. Technical performance tests that are device-specific — for example, fingerprint scanner image quality — are not considered in this part of ISO/IEC 19795.

It is acknowledged that technical performance testing is only one form of biometric testing. Other types of testing not considered in this part of ISO/IEC 19795 include

— reliability, availability and maintainability;

— security, including vulnerability;

— conformance;

— safety;

— human factors, including user acceptance;

— cost/benefit;

— privacy regulation compliance.

Methods and philosophies for these other types of test are currently being considered internationally by a broad range of groups.

The purpose of this part of ISO/IEC 19795 is to present the requirements and best scientific practices for conducting technical performance testing. This is necessary because even a short review of the technical literature on biometric device testing over the last two decades or more reveals a wide variety of conflicting and contradictory testing protocols [1-11]. Even single organizations have produced multiple tests, each using a different test method. Test protocols have varied not only because test goals and available data are different from one test to the next, but also because no standard has existed for protocol creation.

Biometric technical performance testing can be of three types: technology, scenario or operational evaluation. Each type of test requires a different protocol and produces different types of results. Even for tests of a single type, the wide variety of biometric devices, sensors, vendor instructions, data acquisition methods, target applications and populations makes it impossible to present precise uniform testing protocols. Other parts of ISO/IEC 19795 will provide specific advice and requirements for the development and use of such different test protocols. This part of ISO/IEC 19795 addresses specific philosophies and principles that can be applied over a broad range of test conditions.

This part of ISO/IEC 19795 has been developed from the UK Biometrics Working Group’s Best Practices in Testing and Reporting Performance of Biometric Devices [12] which itself drew from two primary source documents developed by the US National Institute of Standards and Technology (NIST) [13, 14], a variety of evaluation reports [7-10], and comments from the Biometrics Consortium Working Group on Interoperability, Performance and Assurance.

NOTES

AUSTRALIAN STANDARD

Information technology — Biometric performance testing and reporting —

Part 1: Principles and framework

1 Scope

This part of ISO/IEC 19795

— establishes general principles for testing the performance of biometric systems in terms of error rates and throughput rates for purposes including prediction of performance, comparison of performance, and verifying compliance with specified performance requirements;

— specifies performance metrics for biometric systems;

— specifies requirements on test methods, recording of data and reporting of results; and

— provides a framework for developing and describing test protocols, to help avoid bias due to inappropriate data collection or analytic procedures, to help achieve the best estimate of field performance for the expended effort, and to improve understanding of the limits of applicability of the test results.

This part of ISO/IEC 19795 is applicable to empirical performance testing of biometric systems and algorithms through analysis of the matching scores and decisions output by the system, without detailed knowledge of the system's algorithms or of the underlying distribution of biometric characteristics in the population of interest.

Not within the scope of this part of ISO/IEC 19795 is the measurement of error and throughput rates for people deliberately trying to circumvent correct recognition by the biometric system (i.e. active impostors).

2 Conformance

To conform to this part of ISO/IEC 19795, a biometric performance test shall be planned, executed and reported in accordance with the mandatory requirements contained herein.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories*