

**Biometric performance testing and reporting**  
**Part 2: Testing methodologies for technology and scenario evaluation**  
**AMENDMENT 1: Testing of multimodal biometric implementations**

**Amendment No. 1**

**International adoption identical**

**Publishing and Approval Dates**

Council of Standards Australia Approval: 20 September 2021

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**Summary**

This Amendment applies to the following elements:

- Front cover
- Preface
- Amendment 1

**Amendment Details**

AS ISO/IEC 19795.2:2010 is amended as follows. The amendments should be inserted in the locations as instructed.

| <b>Element</b>     | <b>Instruction/New text</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Front cover</b> | After "ISO/IEC 19795-2:2007" <i>add</i> the following:<br>ISO/IEC 19795-2:2007/Amd.1:2015<br>(Incorporating Amendment No. 1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Preface</b>     | <ol style="list-style-type: none"> <li>1 After first paragraph, <i>add</i> the following:<br/>Amendment No. 1 to this Standard was prepared by the Standards Australia Committee IT-032, Biometrics and Identification.</li> <li>2 <i>Delete</i> third paragraph and <i>replace</i> with the following:<br/>This Standard is identical with, and has been reproduced from ISO/IEC 19795-2:2007, <i>Information technology — Biometric performance testing and reporting — Part 2: Testing methodologies for technology and scenario evaluation</i> and its Amendment No. 1 (2015) which has been added at the end of the source text.</li> </ol> |
| <b>Amd 1 (new)</b> | After Bibliography, <i>add</i> the following Amendment 1 (2015):                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

## Amendment 1

*Add the following items to the list in the scope clause of ISO/IEC 19795-2:*

- multimodal biometric specific requirements for technology evaluation and scenario evaluation;
- description of the structure and performance measures of multimodal biometric devices and systems;
- specification of biometric data collection and performance calculation methods;
- specification of reporting requirements.

*Add the following item to the definitions clause in this part of ISO/IEC 19795:*

### 4.4.2

#### **multimodal FTE**

#### **MFTE**

proportion of the population for whom the multimodal biometric system with a stated enrolment policy fails to complete the enrolment process

**EXAMPLE 1** For a policy which allows one of a set of modalities to be enrolled, MFTE would be the proportion of subjects that fail to enrol in all the modalities. This results in lower effective FTE.

**EXAMPLE 2** For a policy which requires enrolment in all considered modalities, MFTE would be the proportion of subjects that fail to enrol in one or more modalities. This results in an effective FTE greater than or equal to the higher of the individual modality FTEs.

*Insert the following normative Annex into this part of ISO/IEC 19795:*

## **Annex F**

(normative)

### **Testing of multimodal biometric implementations**

#### **F.1 General**

This annex specifies methods for evaluating and reporting the performance of multimodal biometric algorithms and systems.

Multimodal biometric implementations might be used to meet the following objectives:

- to support users who cannot present one or more requested modalities to the system, in other words, to improve failure-to-enrol rate;
- to improve biometric system throughput;
- to improve recognition performance (e.g. through reduction of false negative identification rates);
- to improve usability; and
- to increase robustness against presentation attacks.

ISO/IEC TR 24722 defines the following multimodal fusion levels:

- decision-level;
- score-level;
- feature-level;
- sample-level.

Multimodal fusion implementations differ across each level. Even when multimodal data are gathered with identical sensors, results might differ based the fusion level implemented.

For this reason, the experimenter shall determine the system or application to be evaluated. An evaluation shall clearly identify the fusion level implemented, the components of the multimodal implementation, and requirements applicable to evaluations for each fusion level.

Two types of multimodal evaluations can be considered:

- evaluations in which the experimenter does require insight into the multimodal system;
- evaluations in which the experimenter does not require insight into the integrated multimodal system.

This annex focuses on evaluations in which the experimenter requires insight into the multimodal system. F.1 and F.6 are applicable to all multimodal implementations. If the experimenter does not require insight into the integrated multimodal system component shown in [Figure F.2](#) or [Figure F.4](#), then the multimodal implementation can be tested without using this annex.

## F.2 Fusion scheme identification information for repeatable evaluation

### F.2.1 Decision-level fusion

#### F.2.1.1 General

An example of decision-level fusion is shown in [Figure F.1](#). Decision-level fusion systems combine decision results from separate biometric sub systems.

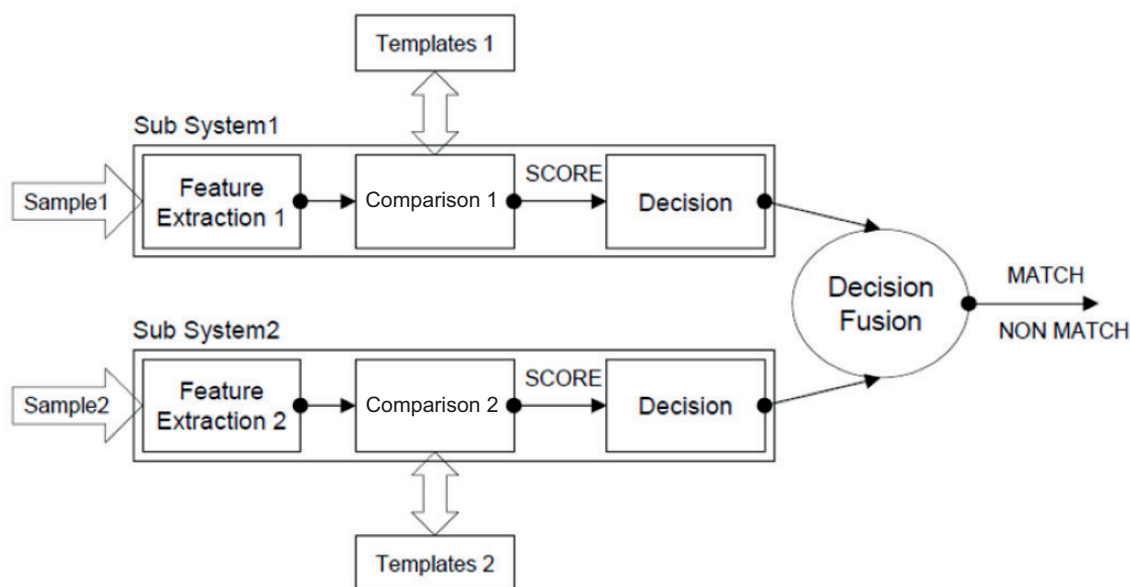


**Figure F.1 — Decision-level fusion**

NOTE Decision-level fusion systems might be used to improve false match rate (FMR) or false non-match rate (FNMR).

[Figure F.2](#) is an example of an integrated multimodal system with a decision output in which insight is not provided into the implementation. This type of system can be tested without methods described in this annex.

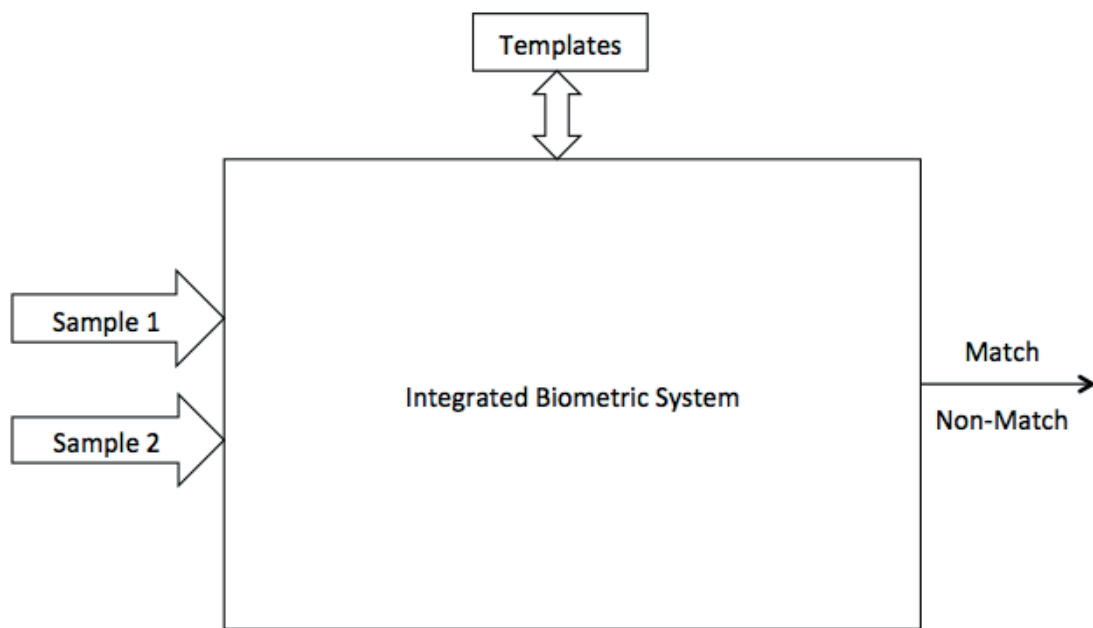


**Figure F.2 — Fusion in an integrated multimodal system with decision output**

### F.2.1.2 Technology evaluation

Requirements for repeatability of decision-level fusion technology evaluation results are as follows:

- the decision fusion logic shall be identical;
- the function configurations (i.e. feature extraction, comparison, and decision) of Sub System 1 and Sub System 2, respectively, shall remain consistent across all tests;

NOTE 1 Sub System 1 and Sub System 2 can have different function configurations, and user-specific thresholds can differ for different users.

- the combination of Sample 1 and Sample 2 fed into each feature extraction function shall be identical;
- the combination of Template 1 and Template 2 shall be identical.

Consistent data selection methods for samples and templates are also required for evaluation repeatability.

If Sub System 1 and Sub System 2 are independent and separate, the evaluation report should include the following:

- identifying information for Sub System 1 and Sub System 2;
- identifying information for decision fusion logic;
- fusion level.

NOTE 2 See 6.4.2.

### F.2.1.3 Scenario evaluation

Requirements for repeatability of decision-level fusion evaluation results are as follows:

- the function configurations (i.e. capture, feature extraction, comparison, and decision) of Sub System 1 and Sub System 2, respectively, shall remain consistent across all tests;

NOTE 1 Sub System 1 and Sub System 2 can have different function configurations, and user-specific thresholds may differ for different users.