This is a preview - click here to buy the full publication

INTERNATIONAL STANDARD

# ISO/IEC 17825

First edition
2016-01-15

# Information technology — Security techniques — Testing methods for the mitigation of non-invasive attack classes against cryptographic modules

*Techonologie de l'information — Techniques de sécurité — Methodes de test pour la protection contre les attaques non intrusives des modules cryptographiques*

Withdrawn

Reference number
ISO/IEC 17825:2016(E)

© ISO/IEC 2016

This is a preview - click here to buy the full publication



withdrawn

**COPYRIGHT PROTECTED DOCUMENT**

© ISO/IEC 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org



© ISO/IEC 2016 – All rights reserved

This is a preview - click here to buy the full publication



# Contents

Page

**Foreword** ..... **v**

**1 Scope** ..... **1**

**2 Normative references** ..... **1**

**3 Terms and definitions** ..... **1**

**4 Symbols and abbreviated terms** ..... **4**

**5 Document organization** ..... **4**

**6 Non-invasive attack methods** ..... **4**

**7 Associated Security Functions** ..... **7**

**8 Non-invasive Attack Test Methods** ..... **9**
8.1 Introduction ..... 9
8.2 Test Strategy ..... 9
8.3 Side-Channel Analysis Workflow ..... 9
8.3.1 Core Test Flow ..... 9
8.3.2 Side-Channel Resistance Test Framework ..... 10
8.3.3 Required Vendor Information ..... 11
8.3.4 TA Leakage Analysis ..... 12
8.3.5 SPA/SEMA Leakage Analysis ..... 13
8.3.6 DPA/DEMA Leakage Analysis ..... 14

**9 Side-Channel Analysis of Symmetric-Key Cryptosystems** ..... **15**
9.1 Introduction ..... 15
9.2 Timing Attacks ..... 15
9.3 SPA/SEMA ..... 15
9.3.1 Attacks on Key Derivation Process ..... 15
9.3.2 Collision Attacks ..... 16
9.4 DPA/DEMA ..... 16
9.4.1 Introduction ..... 16
9.4.2 Test Vectors ..... 18
9.4.3 Detailed Procedure ..... 19

**10 ASCA on Asymmetric Cryptography** ..... **25**
10.1 Introduction ..... 25
10.2 Detailed Side-Channel Resistance Test Framework ..... 27
10.3 Timing Attacks ..... 28
10.3.1 Introduction ..... 28
10.3.2 Standard Timing Analysis ..... 28
10.3.3 Micro-Architectural Timing Analysis ..... 29
10.4 SPA/SEMA ..... 29
10.4.1 Introduction ..... 29
10.4.2 Standard SPA/SEMA ..... 29
10.4.3 Markov SPA/SEMA ..... 30
10.5 DPA/DEMA ..... 30
10.5.1 Introduction ..... 30
10.5.2 Standard DPA/DEMA ..... 30
10.5.3 Address-Bit DPA/DEMA ..... 32

**11 Non-invasive attack mitigation pass/fail test metrics** ..... **33**
11.1 Introduction ..... 33
11.2 Security Level 3 ..... 34
11.2.1 Time Limit ..... 34
11.2.2 SPA and SEMA ..... 34
11.2.3 DPA and DEMA ..... 34
11.2.4 Timing Analysis ..... 34

Withdrawn

© ISO/IEC 2016 – All rights reserved

This is a preview - click here to buy the full publication



11.2.5 Pre-processing conditions in differential analysis ..... 34
11.2.6 Pass / Fail condition ..... 34
11.3 Security Level 4 ..... 35
11.3.1 Time Limit ..... 35
11.3.2 SPA and SEMA ..... 35
11.3.3 DPA and DEMA ..... 35
11.3.4 Timing Analysis ..... 35
11.3.5 Pre-processing conditions in differential analysis ..... 35
11.3.6 Pass / Fail condition ..... 36
**Annex A** (normative) **Requirements for measurement apparatus** ..... **37**
**Annex B** (informative) **Emerging attacks** ..... **38**
**Annex C** (informative) **Quality criteria for measurement setups** ..... **40**
**Annex D** (informative) **Chosen-input method to accelerate leakage analysis** ..... **42**
**Bibliography** ..... **43**

Withdrawn


© ISO/IEC 2016 – All rights reserved

This is a preview - click here to buy the full publication



# Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of document should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/IEC JTC 1, *Information technology*, SC 27, *IT Security techniques*.

Withdrawn

© ISO/IEC 2016 – All rights reserved

This is a preview - click here to buy the full publication



# Information technology — Security techniques — Testing methods for the mitigation of non-invasive attack classes against cryptographic modules

## 1 Scope

This International Standard specifies the non-invasive attack mitigation test metrics for determining conformance to the requirements specified in ISO/IEC 19790 for Security Levels 3 and 4. The test metrics are associated with the security functions specified in ISO/IEC 19790. Testing will be conducted at the defined boundary of the cryptographic module and I/O available at its defined boundary.

The test methods used by testing laboratories to test whether the cryptographic module conforms to the requirements specified in ISO/IEC 19790 and the test metrics specified in this International Standard for each of the associated security functions specified in ISO/IEC 19790 are specified in ISO/IEC 24759. The test approach employed in this International Standard is an efficient "push-button" approach: the tests are technically sound, repeatable and have moderate costs.

## 2 Normative references

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

ISO/IEC 19790, *Information technology — Security techniques — Security requirements for cryptographic modules*

ISO/IEC 24759, *Information technology — Security techniques — Test requirements for cryptographic modules*

Withdrawn

© ISO/IEC 2016 – All rights reserved