ISO/IEC 10373-3:2018 (E)

Identification cards — Test methods — Part 3: Integrated circuit cards with contacts and related interface devices

Contents

Foreword

1 Scope

2 Normative references

3 Terms and definitions

4 General items applicable to the test methods

- 4.1 Test environment
- 4.2 Pre-conditioning
- 4.3 Selection of test methods
- 4.4 Default tolerance
- 4.5 Total measurement uncertainty
- 4.6 Conventions for electrical measurements
- 4.7 Apparatus
- 4.7.1 Apparatus for testing the integrated circuit cards with contacts (card-test-apparatus)
- 4.7.1.1 Generating the VCC voltage (UCC) and timing
- 4.7.1.2 Measuring ICC
- 4.7.1.3 Generating SPU (C6) voltage
- 4.7.1.4 Generating the RST voltage and timing
- 4.7.1.5 Measuring the RST current
- 4.7.1.6 Generating the I/O voltage and timing in reception mode
- 4.7.1.7 Measuring the I/O current in reception mode
- 4.7.1.8 Generating the I/O current
- 4.7.1.9 Measuring the I/O voltage and timing
- 4.7.1.10 Generating the CLK voltage
- 4.7.1.11 Generating the CLK waveforms (single cycle measurement)
- 4.7.1.12 Measuring the CLK current
- 4.7.1.13 Measuring the contact capacitance of RST, CLK and I/O
- 4.7.1.14 Generating the sequence of the activation and deactivation of the contacts
- 4.7.1.15 Emulating the I/O protocol
- 4.7.1.16 Generating the I/O character timing in reception mode
- 4.7.1.17 Measuring and monitoring the I/O protocol
- 4.7.1.18 Protocol analysis
- 4.7.2 Apparatus for testing the interface device (IFD-test-apparatus)
- 4.7.2.1 Generating the VCC current (ICC)
- 4.7.2.2 Measuring the VCC voltage (UCC) and timing
- 4.7.2.3 Measuring the SPU (C6) voltage (UCC) and timing
- 4.7.2.4 Generating the RST current
- 4.7.2.5 Measuring RST voltage and timing
- 4.7.2.6 Generating the I/O currents
- 4.7.2.7 Measuring the I/O voltage and timing
- 4.7.2.8 Generating the I/O voltage and timing in transmission mode
- 4.7.2.9 Measuring the I/O current in transmission mode
- 4.7.2.10 Generating the CLK current
- 4.7.2.11 Measuring the CLK voltage and timing
- 4.7.2.12 Measuring the CLK waveforms (single cycle measurement)
- 4.7.2.13 Measuring the contact capacitance between GND and I/O
- 4.7.2.14 Emulating the I/O protocol
- 4.7.2.15 Generating the I/O character timing in transmission mode
- 4.7.2.16 Measuring and monitoring the I/O protocol
- 4.7.2.17 Protocol analysis

4.7.2.18 Overall impedance (current and voltage sources inactive)
4.7.3 Test Scenario
4.8 Relationship of test methods versus base standard requirements

5 Test methods for electrical characteristics of cards with contacts

5.1 VCC contact
5.1.1 General
5.1.2 Apparatus
5.1.3 Procedure
5.1.4 Test report
5.2 I/O contact
5.2.1 General
5.2.2 Apparatus
5.2.3 Procedure
5.2.4 Test report
5.3 CLK contact
5.3.1 General
5.3.2 Apparatus
5.3.3 Procedure
5.3.4 Test report
5.4 RST contact
5.4.1 General
5.4.2 Apparatus
5.4.3 Procedure
5.4.4 Test report
5.5 SPU (C6) contact

6 Test methods for logical operations of cards with contacts

6.1 Answer to reset
6.1.1 Cold reset and answer-to-reset (ATR)
6.1.1.1 General
6.1.1.2 Apparatus
6.1.1.3 Procedure
6.1.1.4 Test report
6.1.2 Warm reset
6.1.2.1 General
6.1.2.2 Apparatus
6.1.2.3 Procedure
6.1.2.4 Test report
6.2 T=0 Protocol
6.2.1 General
6.2.2 I/O transmission timing for T=0 protocol
6.2.2.1 General
6.2.2.2 Apparatus
6.2.2.3 Procedure
6.2.2.4 Test report
6.2.3 I/O character repetition for T=0 protocol
6.2.3.1 General
6.2.3.2 Apparatus
6.2.3.3 Procedure
6.2.3.4 Test report
6.2.4 I/O reception timing and error signalling for T=0 protocol
6.2.4.1 General
6.2.4.2 Apparatus
6.2.4.3 Procedure
6.2.4.4 Test report
6.3 T=1 Protocol
6.3.1 General
6.3.2 I/O transmission timing for T=1 protocol
6.3.2.1 General
6.3.2.2 Apparatus
6.3.2.3 Procedure
6.3.2.4 Test report
6.3.3 I/O reception timing for T=1 protocol

6.3.3.1 General
6.3.3.2 Apparatus
6.3.3.3 Procedure
6.3.3.4 Test report
6.3.4 Character Waiting Time (CWT) behaviour
6.3.4.1 General
6.3.4.2 Apparatus
6.3.4.3 Procedure
6.3.4.4 Test report
6.3.5 Card-reaction to IFD exceeding CWT
6.3.5.1 General
6.3.5.2 Apparatus
6.3.5.3 Procedure
6.3.5.4 Test report
6.3.6 Block Guard time (BGT)
6.3.6.1 General
6.3.6.2 Apparatus
6.3.6.3 Procedure
6.3.6.3.1 Procedure 1
6.3.6.3.2 Procedure 2
6.3.6.4 Test report
6.3.7 Block sequencing by the card
6.3.7.1 General
6.3.7.2 Apparatus
6.3.7.3 Procedure
6.3.7.3.1 Procedure 1
6.3.7.3.2 Procedure 2
6.3.7.3.3 Procedure 3 (with chaining)
6.3.7.4 Test report
6.3.8 Reaction of the card to protocol errors
6.3.8.1 General
6.3.8.2 Apparatus
6.3.8.3 Procedure
6.3.8.4 Test report
6.3.9 Recovery of a transmission error by the card
6.3.9.1 General
6.3.9.2 Apparatus
6.3.9.3 Procedure
6.3.9.4 Test report
6.3.10 Resynchronization
6.3.10.1 General
6.3.10.2 Apparatus
6.3.10.3 Procedure
6.3.10.4 Test report
6.3.11 IFSD negotiation
6.3.11.1 General
6.3.11.2 Apparatus
6.3.11.3 Procedure
6.3.11.4 Test report
6.3.12 Abortion by the IFD
6.3.12.1 General
6.3.12.2 Apparatus
6.3.12.3 Procedure
6.3.12.4 Test report

7 Test methods for physical and electrical characteristics of the IFD

7.1 Activation of contacts
7.1.1 General
7.1.2 Apparatus
7.1.3 Procedure
7.1.4 Test report
7.2 VCC contact
7.2.1 General
7.2.2 Apparatus

7.2.3 Procedure
7.2.4 Test report
7.3 I/O contact
7.3.1 General
7.3.2 Apparatus
7.3.3 Procedure
7.3.4 Test report
7.4 CLK contact
7.4.1 General
7.4.2 Apparatus
7.4.3 Procedure
7.4.4 Test report
7.5 RST contact
7.5.1 General
7.5.2 Apparatus
7.5.3 Procedure
7.5.4 Test report
7.6 SPU (C6) contact
7.7 Deactivation of the contacts
7.7.1 General
7.7.2 Apparatus
7.7.3 Procedure
7.7.4 Test report

8 Test methods for logical operations of the IFD

8.1 Answer to reset
8.1.1 Card reset (cold reset)
8.1.1.1 General
8.1.1.2 Apparatus
8.1.1.3 Procedure
8.1.1.4 Test report
8.1.2 Card reset (warm reset)
8.1.2.1 General
8.1.2.2 Apparatus
8.1.2.3 Procedure
8.1.2.4 Test report
8.2 T=0 Protocol
8.2.1 General
8.2.2 I/O transmission timing for T=0 protocol
8.2.2.1 General
8.2.2.2 Apparatus
8.2.2.3 Procedure
8.2.2.4 Test report
8.2.3 I/O character repetition for T=0 protocol
8.2.3.1 General
8.2.3.2 Apparatus
8.2.3.3 Procedure
8.2.3.4 Test report
8.2.4 I/O reception timing and error signaling for T=0 protocol
8.2.4.1 General
8.2.4.2 Apparatus
8.2.4.3 Procedure
8.2.4.4 Test report
8.3 T=1 Protocol
8.3.1 General
8.3.2 I/O transmission timing for T=1 protocol
8.3.2.1 General
8.3.2.2 Apparatus
8.3.2.3 Procedure
8.3.2.4 Test report
8.3.3 I/O reception timing for T=1 protocol
8.3.3.1 General
8.3.3.2 Apparatus
8.3.3.3 Procedure

8.3.3.4 Test report
8.3.4 IFD Character Waiting Time (CWT) behaviour
8.3.4.1 General
8.3.4.2 Apparatus
8.3.4.3 Procedure
8.3.4.4 Test report
8.3.5 IFD-reaction to card exceeding CWT
8.3.5.1 General
8.3.5.2 Apparatus
8.3.5.3 Procedure
8.3.5.4 Test report
8.3.6 Block Guard Time (BGT)
8.3.6.1 General
8.3.6.2 Apparatus
8.3.6.3 Procedure
8.3.6.4 Test report
8.3.7 Block sequencing by the IFD
8.3.7.1 General
8.3.7.2 Apparatus
8.3.7.3 Procedure
8.3.7.3.1 Procedure 1 (ISO/IEC 7816-3:2006, 11.6.3.2, rule 7.1, ISO/IEC 7816-3:2006, Annex A, scenario 9)
8.3.7.3.2 Procedure 2 (ISO/IEC 7816-3:2006, 11.6.3.2, rule 7.4.2)
8.3.7.3.3 Procedure 3 (with chaining) (ISO/IEC 7816-3:2006, 11.6.3.2, rules 7.1 and 5)
8.3.7.3.4 Procedure 4 (ISO/IEC 7816-3:2006, 11.6.3.2, rule 7.4.2, scenario 34)
8.3.7.3.5 Test report
8.3.8 Recovery of a transmission error by the IFD
8.3.8.1 General
8.3.8.2 Apparatus
8.3.8.3 Procedure
8.3.8.4 Test report
8.3.9 IFSC negotiation
8.3.9.1 General
8.3.9.2 Apparatus
8.3.9.3 Procedure
8.3.9.4 Test report
8.3.10 Abortion by the card
8.3.10.1 General
8.3.10.2 Apparatus
8.3.10.3 Procedure
8.3.10.4 Test report
8.4 IFD — Reaction of the IFD to invalid PCBs
8.4.1 General
8.4.2 Apparatus
8.4.3 Procedure
8.4.4 Test report

Page count: 50