

PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD



Connectors for electrical and electronic equipment – Tests and measurements –
Part 27-200: Additional specifications for signal integrity tests up to 2 000 MHz on
IEC 60603-7 series connectors – Tests 27a to 27g

[IEC PAS 60512-27-200:2018](https://standards.iteh.ai/catalog/standards/sist/748eb06f-e4ff-417a-97ef-464dd8fdce69/iec-pas-60512-27-200-2018)

<https://standards.iteh.ai/catalog/standards/sist/748eb06f-e4ff-417a-97ef-464dd8fdce69/iec-pas-60512-27-200-2018>



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2018 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - webstore.iec.ch/advsearchform

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing 21 000 terms and definitions in English and French, with equivalent terms in 16 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

67 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: sales@iec.ch.

IEC'S STANDARD PREVIEW
(standards.iteh.ai)
IEC PAS 60512-7:2018
https://standards.iteh.ai/catalog/standards/iec-pas-60512-7-2018
464dd8fdce69/iec-pas-60512-7-2018

PUBLICLY AVAILABLE SPECIFICATION

PRE-STANDARD



**Connectors for electrical and electronic equipment – Tests and measurements –
Part 27-200: Additional specifications for signal integrity tests up to 2 000 MHz on
IEC 60603-7 series connectors – Tests 27a to 27g**

[IEC PAS 60512-27-200:2018](https://standards.iteh.ai/catalog/standards/sist/748eb06f-e4ff-417a-97ef-464dd8fdce69/iec-pas-60512-27-200-2018)

<https://standards.iteh.ai/catalog/standards/sist/748eb06f-e4ff-417a-97ef-464dd8fdce69/iec-pas-60512-27-200-2018>

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 31.220.10

ISBN 978-2-8322-6093-7

Warning! Make sure that you obtained this publication from an authorized distributor.

CONTENTS

FOREWORD.....	8
1 Scope.....	10
2 Normative references	10
3 Terms and definitions	12
4 Overall test arrangement.....	12
4.1 General.....	12
4.2 Indirect-reference test fixtures	12
Annex A (normative) Indirect-reference test fixtures.....	13
A.1 General.....	13
A.2 Requirements	13
Annex B (normative) Measurement requirements (general).....	14
B.1 General test configuration.....	14
B.2 Termination of a cable DUT to test system.....	14
B.2.1 General	14
B.2.2 Interconnections between the device under test (DUT) and the calibration plane	15
B.2.3 Test lead return loss requirements.....	15
B.2.4 Ground plane requirements	18
B.2.5 Network analyzer requirements.....	18
B.3 Measurement points and spacing.....	18
B.4 Impedance matching terminations.....	19
B.4.1 General	19
B.4.2 Resistor terminations.....	19
B.4.3 Termination return loss performance at the calibration plane	20
B.4.4 Termination TCL performance at the calibration plane	20
B.4.5 Calibration methods.....	20
B.4.6 Two-port calibration of the test system	21
B.4.7 One-port calibration of the test system	21
B.5 General calibration plane	21
B.5.1 General	21
B.5.2 Calibration references	22
B.5.3 50 Ω and 100 Ω calibration reference load requirements	22
B.5.4 Calibration reference load return loss requirement.....	23
B.5.5 Typical test equipment performance parameters	23
Annex C (normative) Cabling and component test procedures using baluns.....	24
C.1 Measurement test setup and apparatus.....	24
C.1.1 General	24
C.1.2 Balun terminations	24
C.1.3 Balun requirements.....	24
C.2 Testing of cabling	26
C.2.1 Cabling DC resistance	26
C.2.2 Return loss testing of cables and channels	27
C.2.3 Insertion loss of cables and channels	29
C.2.4 NEXT loss of cables and channels.....	30
C.2.5 FEXT loss of cables and channels	32
C.2.6 Cable and channel propagation delay	34

C.2.7	TCL of cables and channels.....	34
C.2.8	TCTL of cables and channels	38
C.2.9	Cable and channel measurement precautions.....	40
C.2.10	Screened or shielded cable and channel measurement configurations.....	40
C.3	Permanent link test procedures.....	40
C.3.1	General	40
C.3.2	Permanent link measurement configurations.....	40
C.3.3	Calibration of permanent link test configurations.....	41
C.3.4	Return loss of permanent links	41
C.3.5	Insertion loss of permanent link	42
C.3.6	NEXT loss of permanent link.....	42
C.3.7	FEXT loss of permanent link.....	43
C.3.8	TCL of permanent link	44
C.3.9	TCTL of permanent link	45
C.3.10	Propagation delay of permanent link.....	46
C.4	Direct attach measurement procedures.....	47
C.4.1	Direct attach test configurations.....	47
C.5	Modular cord test procedures.....	50
C.5.1	Network analyzer test configuration	50
C.5.2	Test fixturing for modular cords	52
C.5.3	Modular cord measurements.....	52
C.6	Connecting hardware testing.....	52
C.6.1	General	52
C.6.2	Connecting hardware measurement configurations.....	52
C.6.3	Return loss measurements.....	53
C.6.4	Insertion loss measurements.....	53
C.6.5	NEXT loss measurements.....	54
C.6.6	Test plug characterization.....	56
C.6.7	Category 6A measurement reproducibility.....	72
C.7	Modular cord test head requirements	74
C.7.1	General	74
C.7.2	Modular cord test head NEXT loss.....	74
C.7.3	Modular cord test head FEXT loss	74
C.7.4	Modular cord test head return loss.....	75
C.8	Alien crosstalk measurements.....	75
C.8.1	Cabling ANEXT loss and AFEXT loss laboratory measurement procedures	75
C.8.2	ANEXT loss and AFEXT loss of cable.....	77
C.8.3	Connecting Hardware ANEXT loss and AFEXT loss measurements.....	79
Annex D (normative)	Cabling and component balunless test procedures.....	83
D.1	Balunless measurement requirements.....	83
D.2	Resistor terminations used with balunless measurement systems	83
D.3	Calibration methods.....	84
D.4	Testing of cables and cabling.....	84
D.4.1	Cabling and cable measurement procedures	84
D.4.2	Cabling and cable DC resistance	85
D.4.3	Cabling and cable return loss	85
D.4.4	Insertion loss of cables and channels	86
D.4.5	NEXT loss of cables and channels.....	87

D.4.6	FEXT loss of cables and channels	87
D.4.7	TCL of cabling and cables	88
D.4.8	TCTL of cabling and cables	88
D.4.9	Propagation delay of cabling and cable.....	89
D.5	Permanent link test procedures.....	89
D.5.1	General	89
D.5.2	Permanent link measurement configurations.....	89
D.5.3	Calibration of permanent link test configurations.....	89
D.5.4	Return loss of permanent links	89
D.5.5	Insertion loss of permanent link	90
D.5.6	NEXT loss of permanent link.....	91
D.5.7	FEXT loss of permanent link	92
D.5.8	TCL of permanent link	93
D.5.9	TCTL of permanent link	93
D.5.10	Propagation delay of permanent link.....	94
D.6	Balunless direct attach measurement procedures	94
D.7	Balunless modular cord test procedures – Balunless network analyzer test configuration.....	98
D.8	Connecting hardware test procedures	100
D.8.1	General	100
D.8.2	Connecting hardware measurement configurations.....	100
D.9	Balunless alien crosstalk for cabling, cable and connecting hardware.....	101
D.9.1	Balunless ANEXT loss and AFEXT loss laboratory measurement procedures	101
D.9.2	Balunless connecting hardware ANEXT loss and AFEXT loss procedures.....	101
Annex E (informative)	Connecting hardware test fixtures.....	104
E.1	General.....	104
E.2	Additional components for connection to a network analyzer.....	105
E.3	Direct fixture	106
E.4	PCB based test plug assembly.....	106
E.5	Connecting hardware measurement configuration	107
E.6	Test fixture calibration	108
E.6.1	General	108
E.6.2	Calibration and reference plane location.....	112
E.7	DUT connections using header PCB assemblies.....	113
Bibliography	114
Figure B.1	– Example 360° shielded cable termination.....	16
Figure B.2	– Example individually shielded pair cable termination.....	17
Figure B.3	– Test fixture interface pattern	17
Figure B.4	– Example pin and socket dimension	18
Figure B.5	– Resistor termination networks for balun testing.....	19
Figure B.6	– Balunless resistor termination network.....	20
Figure B.7	– Calibration plane.....	21
Figure C.1	– Measurement configurations for test balun qualification.....	26
Figure C.2	– Balun schematic diagram.....	27
Figure C.3	– Laboratory test configuration for return loss.....	28

Figure C.4 – Laboratory test configuration for insertion loss and propagation delay measurements	29
Figure C.5 – Laboratory test configuration for cable and channel NEXT loss	31
Figure C.6 – Laboratory test configuration for FEXT loss	33
Figure C.7 – Laboratory test configuration for TCL	35
Figure C.8 – Coaxial lead through calibration	36
Figure C.9 – Back-to-back balun insertion loss measurement	36
Figure C.10 – Output terminal connection	37
Figure C.11 – Outer shield grounding position	37
Figure C.12 – Laboratory test configuration for TCTL	39
Figure C.13 – Laboratory test configuration for permanent link return loss and TCL measurements	41
Figure C.14 – Laboratory test configuration for permanent link insertion loss and propagation delay measurements	42
Figure C.15 – Laboratory test configuration for permanent link NEXT loss measurements	43
Figure C.16 – Laboratory test configuration for permanent link FEXT loss (ACRF)	44
Figure C.17 – Laboratory test configuration for permanent link TCL measurements	45
Figure C.18 – Laboratory test configuration for permanent link TCTL	46
Figure C.19 – Direct attach return loss test configuration	47
Figure C.20 – Direct attach cord insertion loss test configuration	48
Figure C.21 – Direct attach cord NEXT loss test configuration	48
Figure C.22 – Direct attach cord FEXT loss, (ACRF) test configuration	49
Figure C.23 – Direct attach cord TCL test configuration	49
Figure C.24 – Direct attach cord TCTL test configuration	50
Figure C.25 – Modular cord return loss test configuration	51
Figure C.26 – Modular cord NEXT loss test configuration	51
Figure C.27 – Modular cord FEXT loss, (ACRF) test configuration	52
Figure C.28 – Female test connector interface mating dimensions (1)	58
Figure C.29 – Female test connector interface mating dimensions (2)	59
Figure C.30 – Balun fixture PCB paddle card interface mating dimensions	60
Figure C.31 – Balunless fixture PCB paddle card interface mating dimensions	60
Figure C.32 – Example of a measurement setup for test plug NEXT loss	64
Figure C.33 – Example of a measurement setup for test plug FEXT loss	65
Figure C.34 – Direct fixture mating dimensions, top view	67
Figure C.35 – Direct fixture mating dimensions, front view	68
Figure C.36 – Direct fixture mating dimensions, side view	68
Figure C.37 – Modular plug placed into the plug clamp	69
Figure C.38 – Guiding the plug into position	69
Figure C.39 – Calibration planes, test plug phase reference plane, and port extensions	70
Figure C.40 – Examples of direct fixture short, open, load, and through artefacts	72
Figure C.41 – Inter-laboratory return loss variability for testing category 6A connecting hardware	74
Figure C.42 – 6-around-1 cable test configuration	78
Figure C.43 – Connecting hardware ANEXT loss measurement setup	80

Figure C.44 – Connecting hardware AFEXT loss measurement setup	81
Figure C.45 – Example connector configurations for alien crosstalk	82
Figure D.1 – Balunless resistor termination network.....	84
Figure D.2 – Laboratory test configuration for cabling and cable return loss and TCL measurements	85
Figure D.3 – Laboratory test configuration for cabling and cable insertion loss, TCTL, and propagation delay measurements – Alternate test configuration for return loss and TCL.....	86
Figure D.4 – Laboratory test configuration for cabling and cable NEXT loss.....	87
Figure D.5 – Laboratory test configuration for cabling and cable FEXT loss (ACRF)	88
Figure D.6 – Laboratory test configuration for permanent link return loss and TCL measurements	90
Figure D.7 – Laboratory test configuration for permanent link insertion loss, TCTL, and propagation delay measurements – Alternate test configuration for return loss and TCL	91
Figure D.8 – Laboratory test configuration for permanent link NEXT loss measurements	92
Figure D.9 – Laboratory test configuration for permanent link FEXT loss (ACRF).....	93
Figure D.10 – Balunless direct attach cord return loss test configuration.....	95
Figure D.11 – Balunless direct attach insertion loss, TCTL, and propagation delay test configuration – Alternate test configuration for return loss and TCL	96
Figure D.12 – Balunless direct attach cord NEXT loss test configuration.....	97
Figure D.13 – Balunless direct attach cord FEXT loss (ACRF) test configuration	98
Figure D.14 – Balunless modular cord NEXT loss test configuration	99
Figure D.15 – Balunless modular cord return loss test configuration	100
Figure D.16 – Connecting hardware ANEXT loss measurement setup.....	102
Figure D.17 – Connecting hardware AFEXT loss measurement setup	103
Figure E.1 – Test head assembly with baluns attached	104
Figure E.2 – Test head assembly showing shielding between interconnecting sockets	105
Figure E.3 – Plug direct fixture.....	106
Figure E.4 – PCB based plug.....	107
Figure E.5 – PCB based plug assembly with adapter	107
Figure E.6 – An example of a connecting hardware measurement configuration	108
Figure E.7 – Test fixture interface	109
Figure E.8 – Open calibration standard applied to balunless test interface	109
Figure E.9 – Short calibration standard applied to balunless test interface	110
Figure E.10 – Load calibration standard applied to test interface	110
Figure E.11 – A loop back through standard applied to a balunless test interface	111
Figure E.12 – Test plug attached to the test interface	111
Figure E.13 – Direct fixture mounted to the test head interface	112
Figure E.14 – Calibration reference plane	112
Figure E.15 – Back-to-back through calibration.....	113
Table A.1 – IEC 60603-7 series, 8-way connector types detail specifications and respective detail connector test procedures standards	13
Table B.1 – Interconnection return loss.....	16
Table B.2 – Minimum number of measurement points	19

Table B.3 – Calibration reference load return loss requirement	23
Table C.1 – Test balun performance characteristics	25
Table C.2 – Category 6, 6A and 8 test plug NEXT loss limit vectors	55
Table C.3 – Category 5e test plug NEXT loss limit vectors	55
Table C.4 – Category 6, 6A and 8 connecting hardware NEXT loss requirements for case 1 and case 4	56
Table C.5 – Category 5e, 6, and 6A test plug NEXT loss ranges	62
Table C.6 – Category 8 test plug NEXT loss ranges	63
Table C.7 – Test plug FEXT loss ranges	64
Table C.8 – Category 5e, 6 and 6A test plug return loss requirements	66
Table C.9 – Category 8 test plug return loss requirements	66
Table C.10 – Direct fixture performance	68
Table C.11 – Category 6A NEXT loss measurement reproducibility between laboratories	73
Table C.12 – Category 6A FEXT loss measurement reproducibility between laboratories	73
Table C.13 – Category 5e, 6, and 6A modular cord test head return loss	75
Table C.14 – Category 8 modular cord test head return loss	75

iTeh STANDARD PREVIEW **(standards.iteh.ai)**

[IEC PAS 60512-27-200:2018](https://standards.iteh.ai/catalog/standards/sist/748eb06f-e4ff-417a-97ef-464dd8fdce69/iec-pas-60512-27-200-2018)
<https://standards.iteh.ai/catalog/standards/sist/748eb06f-e4ff-417a-97ef-464dd8fdce69/iec-pas-60512-27-200-2018>

INTERNATIONAL ELECTROTECHNICAL COMMISSION

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 27-200: Additional specifications for signal integrity tests up to 2 000 MHz on IEC 60603-7 series connectors – Tests 27a to 27g

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

A PAS is a technical specification not fulfilling the requirements for a standard, but made available to the public.

IEC PAS 60512-27-200 has been processed by subcommittee 48B: Electrical connectors, of IEC technical committee 48: Electrical connectors and mechanical structures for electrical and electronic equipment.

The text of this PAS is based on the following document:

This PAS was approved for publication by the P-members of the committee concerned as indicated in the following document

Draft PAS	Report on voting
48B/2652/DPAS	48B/2673/RVDPAS

Following publication of this PAS, which is a pre-standard publication, the technical committee or subcommittee concerned may transform it into an International Standard.

A list of all parts of IEC 60512 series, under the general title *Connectors for electrical and electronic equipment – Tests and measurements* can be found on the IEC website.

Future standards in this series will carry the new general title as cited above. Titles of existing standards in this series will be updated at the time of the next edition.

This PAS shall remain valid for an initial maximum period of 3 years starting from the publication date. The validity may be extended for a single period up to a maximum of 3 years, at the end of which it shall be published as another type of normative document, or shall be withdrawn.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

IEC PAS 60512-27-200:2018

<https://standards.iteh.ai/catalog/standards/sist/748eb06f-e4ff-417a-97ef-464dd8fdce69/iec-pas-60512-27-200-2018>

CONNECTORS FOR ELECTRICAL AND ELECTRONIC EQUIPMENT – TESTS AND MEASUREMENTS –

Part 27-200: Additional specifications for signal integrity tests up to 2 000 MHz on IEC 60603-7 series connectors – Tests 27a to 27g

1 Scope

This part of IEC 60512 covers additional, supplemental specifications for signal integrity and transmission performance test methods of IEC 60512-27-100, for connectors using de-embedded crosstalk measurements, which are specified in respective parts of IEC 60603-7 standards for connecting hardware applications up to 2 000 MHz.

These additional specifications are also applicable for testing the related lower frequency connectors. However, the test methodology specified in the detail specification for any given connector remains the reference conformance test for that connector.

Test procedures of IEC 60512-27-100 affected by these supplemental methods and procedures are:

- insertion loss, test 27a;
- return loss, test 27b;
- near-end crosstalk (NEXT) test 27c;
- far-end crosstalk (FEXT), test 27d;
- transverse conversion loss (TCL), test 27f;
- transverse conversion transfer loss (TCTL), test 27g.

Other test procedures referenced here are:

- transfer impedance (Z_T), see test procedures in IEC 62153-4-6 or IEC 62153-4-7.
- for coupling attenuation (a_C), see test procedures in IEC 62153-4-7 or IEC 62153-4-12.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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.

IEC 60050-581, *International Electrotechnical Vocabulary (IEV) – Part 581: Electromechanical components for electronic equipment*

IEC 60512-1, *Connectors for electronic equipment – Tests and measurements – Part 1: General*

IEC 60512-26-100, *Connectors for electronic equipment – Tests and measurements – Part 26-100: Measurement setup, test and reference arrangement and measurements for connectors according to IEC 60603-7 – Tests 26a to 26g*

IEC 60512-27-100, *Connectors for electronic equipment – Tests and measurements – Part 27-100: Signal integrity tests up to 500 MHz on 60603-7 series connectors – Tests 27a to 27g*

IEC 60512-28-100, *Connectors for electronic equipment – Tests and measurements – Part 28-100: Signal integrity tests up to 2 000 MHz on IEC 60603-7 and IEC 61076-3 series connectors – Tests 28a to 28g*

IEC 60603-7, *Connectors for electronic equipment – Part 7: Detail specification for 8-way, unshielded, free and fixed connectors*

IEC 60603-7-1, *Connectors for electronic equipment – Part 7-1: Detail specification for 8-way, shielded, free and fixed connectors*

IEC 60603-7-2, *Connectors for electronic equipment – Part 7-2: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 100 MHz*

IEC 60603-7-3, *Connectors for electronic equipment – Part 7-3: Detail specification for 8-way, shielded, free and fixed connectors, for data transmission with frequencies up to 100 MHz*

IEC 60603-7-4, *Connectors for electronic equipment – Part 7-4: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 250 MHz*

IEC 60603-7-5, *Connectors for electronic equipment – Part 7-5: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 250 MHz*

IEC 60603-7-41, *Connectors for electronic equipment – Part 7-41: Detail specification for 8-way, unshielded, free and fixed connectors, for data transmissions with frequencies up to 500 MHz*

IEC 60603-7-51, *Connectors for electronic equipment – Part 7-51: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 500 MHz*

<https://standards.iteh.ai/catalog/standards/sist/748eb06f-e4ff-417a-97ef-464dd8fdce69/iec-pas-60512-27-200-2018>

IEC 60603-7-81, *Connectors for electronic equipment – Part 7-81: Detail specification for 8-way, shielded, free and fixed connectors, for data transmissions with frequencies up to 2 000 MHz*

IEC 61156-1, *Multicore and symmetrical pair/quad cables for digital communications – Part 1: Generic specification*

IEC 61156-9, *Multicore and symmetrical pair/quad cables for digital communications – Part 9: Cables for channels with transmission characteristics up to 2 GHz – Sectional specification*

IEC 61156-10, *Multicore and symmetrical pair/quad cables for digital communications – Part 10: Cables for cords with transmission characteristics up to 2 GHz – Sectional specification*

IEC 61169-16, *Radio-frequency connectors – Part 16: Sectional specification – RF coaxial connectors with inner diameter of outer conductor 7 mm (0,276 in) with screw coupling – Characteristics impedance 50 ohms (75 ohms) (type N)*

IEC 61935-1, *Specification for the testing of balanced and coaxial information technology cabling – Part 1: Installed balanced cabling as specified in ISO/IEC 11801 and related standards*

IEC 61935-2, *Specification for the testing of balanced and coaxial information technology cabling – Part 2: Cords as specified in ISO/IEC 11801 and related standards*

ISO/IEC 11801-1, *Information technology – Generic cabling for customer premises – Part 1: General requirements*

ITU-T Recommendation G.117, *Transmission aspects of unbalance about earth*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in IEC 60050-581, IEC 60512-1 and IEC 60603-7 apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

4 Overall test arrangement

4.1 General

This document specifies test methods and procedures for connectors.

The test fixtures and reference connectors specified in this document are referenced by IEC 60512-28-100.

The test methods and procedures for signal integrity and transmission performance, specified in IEC 60512-28-100, covering the frequency range up to 2 000 MHz, are referenced by connector standards, specified in IEC 60603-7 and IEC 60603-7-1, with signal integrity specifications up to 2 000 MHz; e.g., IEC 60603-7-81.

This document extends the frequency range, up to 2 000 MHz, for IEC 60512-27-100, which has a frequency range up to 500 MHz.

The test methods and procedures for signal integrity and transmission performance specified herein are for connectors using de-embedded crosstalk specifications and measurements up to 2 000 MHz; e.g. IEC 60603-7-81.

The test methods and procedures specified herein are referenced by connector standards for connecting hardware normally used with twisted-pair cables having 100 Ω nominal differential characteristic impedance, which are specified up to 2 000 MHz, in accordance with IEC 61156-1 cable standard and its sectional specifications; e.g. IEC 61156-9 and IEC 61156-10.

4.2 Indirect-reference test fixtures

Indirect-reference test fixtures are for connector types utilizing indirect reference to re-embedded crosstalk vectors for measurement of transmission parameters, e.g. IEC 60603-7 series (8-way types): IEC 60603-7-2, IEC 60603-7-3, IEC 60603-7-4, IEC 60603-7-5, IEC 60603-7-41, IEC 60603-7-51, and IEC 60603-7-81.

The detail tests and measurement specifications for the measurement of the respective transmission parameters required by the detail product specifications of the IEC 60603-7 series 8-way connector types are given in Annex A.

The indirect-reference test fixtures and associated test procedures used for measuring IEC 60603-7 series 8-way connector types transmission parameters, up to 2 000 MHz, shall conform to their respective detail tests and measurements specifications requirements, given in Annex A, and to the additional requirements in this standard, which are given in Annex B, Annex C, Annex D, and Annex E.

Annex A (normative)

Indirect-reference test fixtures

A.1 General

Indirect-reference test fixtures are for connector types utilizing indirect reference to re-embedded crosstalk vectors for measurement of transmission parameters, e.g. IEC 60603-7 series (8-way types), IEC 60603-7-2, IEC 60603-7-3, IEC 60603-7-4, IEC 60603-7-5, IEC 60603-7-41, IEC 60603-7-51, IEC 60603-7-81.

The indirect-reference test fixtures and associated test procedures used for measuring IEC 60603-7 series 8-way connector types transmission parameters shall conform to their respective detail specification test procedures requirements and to the requirements in this annex.

The IEC 60603-7 series, 8-way connector types detail specifications and respective detail test procedures standards for connector transmission parameters measurements are given in Table A.1.

Table A.1 – IEC 60603-7 series, 8-way connector types detail specifications and respective detail connector test procedures standards

Connector specification	Frequency MHz	Test procedure	Frequency MHz
IEC 60603-7-2	100	IEC 60512-25-x series	100
IEC 60603-7-3	250	IEC 60512-26-100	250
IEC 60603-7-4	500	IEC 60512-27-100	500
IEC 60603-7-5	2 000	IEC PAS 60512-27-200	2 000
IEC 60603-7-41			
IEC 60603-7-51			
IEC 60603-7-81			

A.2 Requirements

Indirect reference test fixtures for 2 000 MHz shall also meet the overall test fixtures minimum signal integrity requirements for 2 000 MHz listed in IEC 60512-28-100.