



IEC 61196-1-111

Edition 3.0 2024-09

INTERNATIONAL STANDARD



**Coaxial communication cables –
Part 1-111: Electrical test methods – Stability of phase test methods**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

ICS 33.120.10

ISBN 978-2-8322-9609-7

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

CONTENTS

FOREWORD.....	4
1 Scope.....	6
2 Normative references	6
3 Terms and definitions	6
4 Phase variation with temperature.....	9
4.1 Purpose	9
4.2 Test equipment	9
4.3 Preparation of test sample (TS)	9
4.4 Test environment	9
4.5 Preconditioning	10
4.6 Test procedure.....	10
4.7 Test result.....	12
4.7.1 Calculation of temperature coefficient of phase.....	12
4.7.2 Graph of phase temperature change.....	13
4.7.3 Maximum variation value of phase variation with temperature.....	13
4.7.4 Ratio of the relative phase temperature coefficient	13
4.8 Test report	13
4.9 Requirement	13
5 Phase constant variation with temperature	13
5.1 Purpose	13
5.2 Test equipment	14
5.3 Test sample	14
5.4 Test environment	14
5.5 Preconditioning	14
5.6 Test procedure.....	14
5.7 Test result.....	14
5.8 Test report	15
5.9 Requirement	15
6 Phase stability with bending	15
6.1 Purpose	15
6.2 Test environment	15
6.3 Test sample	16
6.4 Test equipment	16
6.5 Test procedure.....	16
6.6 Test report	17
6.7 Requirement	18
7 Phase stability with twisting	18
7.1 Purpose	18
7.2 Test environment	18
7.3 Test sample	18
7.4 Test equipment	19
7.5 Test procedure.....	19
7.6 Test report	20
7.7 Requirement	20
Annex A (normative) Phase consistency test for two or more cables.....	21
A.1 Purpose	21

A.2	Test equipment	21
A.3	The preparation of test sample (TS)	21
A.4	Test environment	21
A.5	Test procedure	22
A.6	Test report	22
A.7	Requirement	22
Annex B (normative)	Phase variation with temperature test between two cables	23
B.1	Purpose	23
B.2	Preparation of test sample	23
B.3	Test environment	23
B.4	Preconditioning	23
B.5	Test procedure	23
B.6	Test results	23
B.7	Test report	24
B.8	Requirement	24
Annex C (informative)	Example for recording and calculating the phase variation with temperature	25
C.1	Purpose	25
C.2	Test sample	25
C.3	Test conditions	25
C.4	Test record and calculation	25
C.5	Test result calculation	27
Figure 1	– Test sample (TS)	9
Figure 2	– Preconditioning	10
Figure 3	– TS placement diagram	11
Figure 4	– Phase–Frequency graph schematic diagram	12
Figure 5	– Test sample (TS)	16
Figure 6	– Bending test	17
Figure 7	– Test graph schematic diagram	18
Figure 8	– Twist test	19
Figure 9	– Test graph schematic diagram	20
Figure A.1	– Cable	21
Figure A.2	– Cable assembly (TS)	21
Figure B.1	– $\eta_{t,f} - T$ (°C) contrast graph	23
Figure C.1	– $\eta_{t,f} - T$ (°C) graph	26
Table C.1	– Test record and calculation	26

INTERNATIONAL ELECTROTECHNICAL COMMISSION

COAXIAL COMMUNICATION CABLES –

Part 1-111: Electrical test methods – Stability of phase test methods

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) IEC draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). IEC takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, IEC had not received notice of (a) patent(s), which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at <https://patents.iec.ch>. IEC shall not be held responsible for identifying any or all such patent rights.

IEC 61196-1-111 has been prepared by subcommittee 46A: Coaxial cables, of IEC technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories. It is an International Standard.

This second edition cancels and replaces the first edition published in 2014. This edition constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- a) addition of the list of test methods in the Scope;
- b) addition of "the number of scanning points" in every test method;
- c) addition of Annex A, Phase consistency test for two or more cables;
- d) addition of Annex B, Phase variation with temperature test between two cables.

The text of this International Standard is based on the following documents:

Draft	Report on voting
46A/1666/CDV	46A/1680/RVC

Full information on the voting for its approval can be found in the report on voting indicated in the above table.

The language used for the development of this International Standard is English.

This document was drafted in accordance with ISO/IEC Directives, Part 2, and developed in accordance with ISO/IEC Directives, Part 1 and ISO/IEC Directives, IEC Supplement, available at www.iec.ch/members_experts/refdocs. The main document types developed by IEC are described in greater detail at www.iec.ch/publications.

A list of all parts in the IEC 61196 series, published under the general title *Coaxial communication cables*, can be found on the IEC website.

The committee has decided that the contents of this document will remain unchanged until the stability date indicated on the IEC website under webstore.iec.ch in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn, or
- revised.

IMPORTANT – The "colour inside" logo on the cover page of this document 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.

COAXIAL COMMUNICATION CABLES –

Part 1-111: Electrical test methods – Stability of phase test methods

1 Scope

This part of IEC 61196 provides test methods to determine the stability of phase of coaxial communication cables.

This document is applicable to RF coaxial cables. RF coaxial cable assemblies can also use this document for reference.

This part of IEC 61196 comprises following test methods:

- a) phase variation with temperature (Clause 4);
- b) phase constant variation with temperature (Clause 5);
- c) phase stability with bending (Clause 6);
- d) phase stability with twisting (Clause 7);
- e) phase consistency test for two or more cables (Annex A);
- f) phase variation with temperature test between two cables (Annex B).

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 61196-1, *Coaxial communication cables – Part 1: Generic specification – General, definitions and requirements*

IEC 61196-1-108:2011, *Coaxial communication cables – Part 1-108: Electrical test methods – Test for characteristic impedance, phase and group delay, electrical length and propagation velocity*