

© Copyright SEK Svensk Elstandard. Reproduction in any form without permission is prohibited.

## **Koaxialkablar med påmonterade anslutningsdon – Del 1: Artspecifikation – Allmänna fordringar och provningsmetoder**

*Radio frequency and coaxial cable assemblies –  
Part 1: Generic specification –  
General requirements and test methods*

Som svensk standard gäller europastandarden EN IEC 60966-1:2019. Den svenska standarden innehåller den officiella engelska språkversionen av EN IEC 60966-1:2019.

### **Nationellt förord**

Europastandarden EN IEC 60966-1:2019

består av:

- **europastandardens ikraftsättningsdokument**, utarbetat inom CENELEC
- **IEC 60966-1, Third edition, 2019 - Radio frequency and coaxial cable assemblies - Part 1: Generic specification - General requirements and test methods**

utarbetad inom International Electrotechnical Commission, IEC.

Tidigare fastställd svensk standard SS-EN 60966-1, utgåva 2, 1999, gäller ej fr o m 2022-03-15.

### *Standarder underlättar utvecklingen och höjer elsäkerheten*

Det finns många fördelar med att ha gemensamma tekniska regler för bl a mätning, säkerhet och provning och för utförande, skötsel och dokumentation av elprodukter och elanläggningar.

Genom att utforma sådana standarder blir säkerhetsfordringar tydliga och utvecklingskostnaderna rimliga samtidigt som marknadens acceptans för produkten eller tjänsten ökar.

Många standarder inom elområdet beskriver tekniska lösningar och metoder som åstadkommer den elsäkerhet som föreskrivs av svenska myndigheter och av EU.

### *SEK är Sveriges röst i standardiseringsarbetet inom elområdet*

SEK Svensk Elstandard svarar för standardiseringen inom elområdet i Sverige och samordnar svensk medverkan i internationell och europeisk standardisering. SEK är en ideell organisation med frivilligt deltagande från svenska myndigheter, företag och organisationer som vill medverka till och påverka utformningen av tekniska regler inom elektrotekniken.

SEK samordnar svenska intressenters medverkan i SEKs tekniska kommittéer och stödjer svenska experters medverkan i internationella och europeiska projekt.

### *Stora delar av arbetet sker internationellt*

Utformningen av standarder sker i allt väsentligt i internationellt och europeiskt samarbete. SEK är svensk nationalkommitté av International Electrotechnical Commission (IEC) och Comité Européen de Normalisation Electrotechnique (CENELEC).

Standardiseringsarbetet inom SEK är organiserat i referensgrupper bestående av ett antal tekniska kommittéer som speglar hur arbetet inom IEC och CENELEC är organiserat.

Arbetet i de tekniska kommittéerna är öppet för alla svenska organisationer, företag, institutioner, myndigheter och statliga verk. Den årliga avgiften för deltagandet och intäkter från försäljning finansierar SEKs standardiseringsverksamhet och medlemsavgift till IEC och CENELEC.

### *Var med och påverka!*

Den som deltar i SEKs tekniska kommittéarbete har möjlighet att påverka framtida standarder och får tidig tillgång till information och dokumentation om utvecklingen inom sitt teknikområde. Arbetet och kontakterna med kollegor, kunder och konkurrenter kan gynnsamt påverka enskilda företags affärsutveckling och bidrar till deltagarnas egen kompetensutveckling.

Du som vill dra nytta av dessa möjligheter är välkommen att kontakta SEKs kansli för mer information.

### **SEK Svensk Elstandard**

Box 1284  
164 29 Kista  
Tel 08-444 14 00  
[www.elstandard.se](http://www.elstandard.se)

English Version

**Radio frequency and coaxial cable assemblies - Part 1: Generic  
specification - General requirements and test methods  
(IEC 60966-1:2019)**

Cordons coaxiaux et cordons pour fréquences  
radioélectriques - Partie 1: Spécification générique -  
Exigences générales et méthodes d'essai  
(IEC 60966-1:2019)

Konfektionierte Koaxial- und Hochfrequenzkabel - Teil 1:  
Fachgrundspezifikation - Allgemeine Anforderungen und  
Prüfverfahren  
(IEC 60966-1:2019)

This European Standard was approved by CENELEC on 2019-03-06. CENELEC members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CENELEC member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CENELEC member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CENELEC members are the national electrotechnical committees of Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.



European Committee for Electrotechnical Standardization  
Comité Européen de Normalisation Electrotechnique  
Europäisches Komitee für Elektrotechnische Normung

**CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels**

## **European foreword**

The text of document 46/700A/FDIS, future edition 3 of IEC 60966-1, prepared by IEC/TC 46 "Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories" was submitted to the IEC-CENELEC parallel vote and approved by CENELEC as EN IEC 60966-1:2019.

The following dates are fixed:

- latest date by which the document has to be implemented at national level by publication of an identical national standard or by endorsement (dop) 2019-12-15
- latest date by which the national standards conflicting with the document have to be withdrawn (dow) 2022-03-15

This document supersedes EN 60966-1:1999.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CENELEC shall not be held responsible for identifying any or all such patent rights.

## **Endorsement notice**

The text of the International Standard IEC 60966-1:2019 was approved by CENELEC as a European Standard without any modification.

In the official version, for Bibliography, the following notes have to be added for the standards indicated:

|                    |      |                                               |
|--------------------|------|-----------------------------------------------|
| IEC 60339 (series) | NOTE | Harmonized as HD 350.1 S1 (series)            |
| ISO 9000           | NOTE | Harmonized as EN ISO 9000                     |
| ISO 9001:2015      | NOTE | Harmonized as EN ISO 9001:2015 (not modified) |

## Annex ZA

(normative)

### Normative references to international publications with their corresponding European publications

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.

NOTE 1 Where an International Publication has been modified by common modifications, indicated by (mod), the relevant EN/HD applies.

NOTE 2 Up-to-date information on the latest versions of the European Standards listed in this annex is available here: [www.cenelec.eu](http://www.cenelec.eu).

| <u>Publication</u> | <u>Year</u> | <u>Title</u>                                                                                                                                                                               | <u>EN/HD</u>  | <u>Year</u> |
|--------------------|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|
| IEC 60068          | series      | Environmental testing                                                                                                                                                                      | EN 60068      | series      |
| IEC 60068-2-6      | -           | Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)                                                                                                                  | EN 60068-2-6  | -           |
| IEC 60068-2-11     | -           | Basic environmental testing procedures - Part 2-11: Tests - Test Ka: Salt mist                                                                                                             | EN 60068-2-11 | -           |
| IEC 60068-2-14     | -           | Environmental testing - Part 2-14: Tests - Test N: Change of temperature                                                                                                                   | EN 60068-2-14 | -           |
| IEC 60068-2-27     | -           | Environmental testing - Part 2-27: Tests - Test Ea and guidance: Shock                                                                                                                     | EN 60068-2-27 | -           |
| IEC 60068-2-42     | -           | Environmental testing - Part 2-42: Tests - Test Kc: Sulphur dioxide test for contacts and connections                                                                                      | EN 60068-2-42 | -           |
| IEC 60068-2-68     | -           | Environmental testing - Part 2-68: Tests - Test L: Dust and sand                                                                                                                           | EN 60068-2-68 | -           |
| IEC 60068-2-78     | -           | Environmental testing - Part 2-78: Tests - Test Cab: Damp heat, steady state                                                                                                               | EN 60068-2-78 | -           |
| IEC 60332-1-2      | 2004        | Tests on electric and optical fibre cables under fire conditions - Part 1-2: Test for vertical flame propagation for a single insulated wire or cable - Procedure for 1 kW pre-mixed flame | EN 60332-1-2  | 2004        |
| -                  | -           |                                                                                                                                                                                            | + A11         | 2016        |
| IEC 60512-6-2      | -           | Connectors for electronic equipment - Tests and measurements - Part 6-2: Dynamic stress tests - Test 6b: Bump                                                                              | EN 60512-6-2  | -           |
| IEC 60512-7-2      | -           | Connectors for electronic equipment - Tests and measurements - Part 7-2: Impact tests (free components) - Test 7b: Mechanical strength impact                                              | EN 60512-7-2  | -           |
| IEC 60529          | -           | Classification of degrees of protection - provided by enclosures                                                                                                                           |               | -           |

## EN IEC 60966-1:2019 (E)

| <u>Publication</u> | <u>Year</u> | <u>Title</u>                                                                                                                                                                                                                                                                                      | <u>EN/HD</u> | <u>Year</u> |
|--------------------|-------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-------------|
| IEC 60966-2        | series      | Radio frequency and coaxial cable assemblies                                                                                                                                                                                                                                                      | EN 60966-2   | series      |
| IEC 60966-3        | series      | Radio frequency and coaxial cable assemblies                                                                                                                                                                                                                                                      | EN 60966-3   | series      |
| IEC 60966-4        | series      | Radio frequency and coaxial cable assemblies                                                                                                                                                                                                                                                      | EN 60966-4   | series      |
| IEC 61169          | series      | Radio frequency connectors                                                                                                                                                                                                                                                                        | EN 61169     | series      |
| IEC 61169-1        | 2013        | Radio frequency connectors - Part 1: Generic specification - General requirements and measuring methods                                                                                                                                                                                           | EN 61169-1   | 2013        |
| IEC 61196          | series      | Coaxial communication cables                                                                                                                                                                                                                                                                      | -            | series      |
| IEC 61196-1-119    | -           | Coaxial communication cables - Part 1-119: Electrical test methods - RF power rating                                                                                                                                                                                                              | -            | -           |
| IEC 62037-2        | -           | Passive RF and microwave devices, intermodulation level measurement - Part 2: Measurement of passive intermodulation in coaxial cable assemblies                                                                                                                                                  | EN 62037-2   | -           |
| IEC 62153-4-6      | -           | Metallic cables and other passive components test methods - Part 4-6: Electromagnetic compatibility (EMC) - Surface transfer impedance - line injection method                                                                                                                                    | -            | -           |
| IEC 62153-4-7      | 2015        | Metallic communication cable test methods – Part 4-7: Electromagnetic compatibility (EMC) – Test method for measuring of transfer impedance $Z_T$ and screening attenuation $a_s$ or coupling attenuation $a_C$ of connectors and assemblies up to and above 3 GHz – Triaxial tube in tube method | EN 62153-4-7 | 2016        |

## CONTENTS

|                                                                |    |
|----------------------------------------------------------------|----|
| FOREWORD.....                                                  | 7  |
| 1 Scope.....                                                   | 9  |
| 2 Normative references .....                                   | 9  |
| 3 Terms and definitions .....                                  | 10 |
| 4 Design and manufacturing requirements.....                   | 12 |
| 4.1 Cable design and construction .....                        | 12 |
| 4.2 Connector design and construction .....                    | 12 |
| 4.3 Outline and interface dimensions .....                     | 13 |
| 5 Workmanship, marking and packaging.....                      | 13 |
| 5.1 Workmanship .....                                          | 13 |
| 5.2 Marking.....                                               | 13 |
| 5.3 End caps.....                                              | 13 |
| 5.4 Packaging and labelling .....                              | 13 |
| 6 Quality management.....                                      | 13 |
| 7 Test methods – General .....                                 | 13 |
| 7.1 Standard atmospheric conditions for testing.....           | 13 |
| 7.2 Visual inspection.....                                     | 14 |
| 7.3 Dimensions inspection .....                                | 14 |
| 7.3.1 Interface dimensions .....                               | 14 |
| 7.3.2 Outline dimensions .....                                 | 14 |
| 8 Electrical tests.....                                        | 15 |
| 8.1 Reflection properties.....                                 | 15 |
| 8.1.1 Object.....                                              | 15 |
| 8.1.2 Test equipment.....                                      | 15 |
| 8.1.3 Procedure.....                                           | 15 |
| 8.1.4 Requirements .....                                       | 16 |
| 8.1.5 Information to be given in the detail specification..... | 16 |
| 8.2 Uniformity of impedance .....                              | 16 |
| 8.2.1 Object.....                                              | 16 |
| 8.2.2 Procedure.....                                           | 16 |
| 8.2.3 Requirements .....                                       | 16 |
| 8.2.4 Information to be given in the detail specification..... | 16 |
| 8.3 Insertion loss .....                                       | 16 |
| 8.3.1 Procedure.....                                           | 16 |
| 8.3.2 Requirements .....                                       | 16 |
| 8.3.3 Information to be given in the detail specification..... | 16 |
| 8.4 Insertion loss stability .....                             | 17 |
| 8.4.1 Object.....                                              | 17 |
| 8.4.2 Procedure.....                                           | 17 |
| 8.4.3 Requirements .....                                       | 17 |
| 8.4.4 Information to be given in the detail specification..... | 17 |
| 8.5 Propagation time.....                                      | 17 |
| 8.5.1 Procedure.....                                           | 17 |
| 8.5.2 Requirements .....                                       | 17 |
| 8.5.3 Information to be given in the detail specification..... | 17 |

|        |                                                           |    |
|--------|-----------------------------------------------------------|----|
| 8.6    | Stability of electrical length .....                      | 17 |
| 8.6.1  | Object.....                                               | 17 |
| 8.6.2  | Procedures .....                                          | 17 |
| 8.6.3  | Requirements .....                                        | 19 |
| 8.6.4  | Information to be given in the detail specification ..... | 19 |
| 8.7    | Phase difference .....                                    | 19 |
| 8.7.1  | Object.....                                               | 19 |
| 8.7.2  | Procedure.....                                            | 19 |
| 8.7.3  | Requirements .....                                        | 19 |
| 8.7.4  | Information to be given in the detail specification ..... | 20 |
| 8.8    | Phase variation with temperature .....                    | 20 |
| 8.8.1  | Object.....                                               | 20 |
| 8.8.2  | Procedure.....                                            | 20 |
| 8.8.3  | Requirements .....                                        | 20 |
| 8.8.4  | Information to be given in the detail specification ..... | 20 |
| 8.9    | Screening effectiveness .....                             | 20 |
| 8.9.1  | Transfer impedance .....                                  | 20 |
| 8.9.2  | Screening attenuation .....                               | 20 |
| 8.10   | Voltage proof .....                                       | 21 |
| 8.10.1 | Procedure.....                                            | 21 |
| 8.10.2 | Requirements .....                                        | 21 |
| 8.10.3 | Information to be given in the detail specification ..... | 21 |
| 8.11   | Insulation resistance .....                               | 21 |
| 8.11.1 | Procedure.....                                            | 21 |
| 8.11.2 | Requirements .....                                        | 21 |
| 8.11.3 | Information to be given in the detail specification ..... | 21 |
| 8.12   | Inner and outer conductor continuity .....                | 22 |
| 8.12.1 | Object.....                                               | 22 |
| 8.12.2 | Procedure.....                                            | 22 |
| 8.12.3 | Requirements .....                                        | 22 |
| 8.12.4 | Information to be given in the detail specification ..... | 22 |
| 8.13   | Power rating .....                                        | 22 |
| 8.13.1 | Object.....                                               | 22 |
| 8.13.2 | Procedure.....                                            | 22 |
| 8.13.3 | Requirements .....                                        | 22 |
| 8.13.4 | Information to be given in the detail specification ..... | 22 |
| 8.14   | Intermodulation level measurement.....                    | 23 |
| 8.14.1 | Procedure.....                                            | 23 |
| 8.14.2 | Requirements .....                                        | 23 |
| 8.14.3 | Information to be given in the detail specification ..... | 23 |
| 9      | Mechanical robustness tests.....                          | 23 |
| 9.1    | Tensile.....                                              | 23 |
| 9.1.1  | Object.....                                               | 23 |
| 9.1.2  | Procedure.....                                            | 23 |
| 9.1.3  | Requirements .....                                        | 23 |
| 9.1.4  | Information to be given in the detail specification ..... | 23 |
| 9.2    | Flexure .....                                             | 24 |
| 9.2.1  | Object.....                                               | 24 |
| 9.2.2  | Procedure.....                                            | 24 |



|        |                                                           |    |
|--------|-----------------------------------------------------------|----|
| 9.2.3  | Requirements .....                                        | 24 |
| 9.2.4  | Information to be given in the detail specification ..... | 24 |
| 9.3    | Flexing endurance .....                                   | 24 |
| 9.3.1  | Object.....                                               | 24 |
| 9.3.2  | Procedure.....                                            | 25 |
| 9.3.3  | Requirements .....                                        | 25 |
| 9.3.4  | Information to be given in the detail specification ..... | 25 |
| 9.4    | Cable assembly crushing .....                             | 25 |
| 9.4.1  | Object.....                                               | 25 |
| 9.4.2  | Procedure.....                                            | 25 |
| 9.4.3  | Requirements .....                                        | 26 |
| 9.4.4  | Information to be given in the detail specification ..... | 26 |
| 9.5    | Torque .....                                              | 26 |
| 9.5.1  | Procedure.....                                            | 26 |
| 9.5.2  | Requirements .....                                        | 27 |
| 9.5.3  | Information to be given in the detail specification ..... | 27 |
| 9.6    | Multiple bending.....                                     | 27 |
| 9.6.1  | Object.....                                               | 27 |
| 9.6.2  | Procedure.....                                            | 27 |
| 9.6.3  | Requirements .....                                        | 28 |
| 9.6.4  | Information to be given in the detail specification ..... | 28 |
| 9.7    | Abrasion test of cable assembly.....                      | 28 |
| 9.7.1  | Object.....                                               | 28 |
| 9.7.2  | Procedure.....                                            | 28 |
| 9.8    | Vibrations, shocks.....                                   | 28 |
| 9.9    | Impact test.....                                          | 28 |
| 9.10   | Mechanical endurance .....                                | 28 |
| 10     | Environmental tests .....                                 | 29 |
| 10.1   | Recommended severities .....                              | 29 |
| 10.2   | Vibration, bumps and shock .....                          | 29 |
| 10.3   | Climatic sequence.....                                    | 29 |
| 10.3.1 | Procedure.....                                            | 29 |
| 10.3.2 | Requirements .....                                        | 29 |
| 10.3.3 | Information to be given in the detail specification ..... | 29 |
| 10.4   | Damp heat, steady state .....                             | 29 |
| 10.4.1 | Procedure.....                                            | 29 |
| 10.4.2 | Requirements .....                                        | 29 |
| 10.4.3 | Information to be given in the detail specification ..... | 30 |
| 10.5   | Rapid change of temperature .....                         | 30 |
| 10.5.1 | Procedure.....                                            | 30 |
| 10.5.2 | Requirements .....                                        | 30 |
| 10.5.3 | Information to be given in the detail specification ..... | 30 |
| 10.6   | Resistance to solvents and contaminating fluids .....     | 30 |
| 10.6.1 | Procedure.....                                            | 30 |
| 10.6.2 | Requirements .....                                        | 30 |
| 10.6.3 | Information to be given in the detail specification ..... | 31 |
| 10.7   | Water immersion.....                                      | 31 |
| 10.7.1 | Procedure.....                                            | 31 |
| 10.7.2 | Requirements .....                                        | 31 |

|         |                                                                                                   |    |
|---------|---------------------------------------------------------------------------------------------------|----|
| 10.7.3  | Information to be given in the detail specification .....                                         | 31 |
| 10.8    | Salt mist and sulphur dioxide tests .....                                                         | 31 |
| 10.8.1  | Procedure .....                                                                                   | 31 |
| 10.8.2  | Requirements .....                                                                                | 31 |
| 10.8.3  | Information to be given in the detail specification .....                                         | 31 |
| 10.9    | Dust tests .....                                                                                  | 31 |
| 10.9.1  | Object .....                                                                                      | 31 |
| 10.9.2  | Procedure .....                                                                                   | 31 |
| 10.9.3  | Requirements .....                                                                                | 32 |
| 10.9.4  | Information to be given in the detail specification .....                                         | 32 |
| 10.10   | Flammability .....                                                                                | 32 |
| 10.10.1 | Procedure .....                                                                                   | 32 |
| 10.10.2 | Requirements .....                                                                                | 32 |
| 10.10.3 | Information to be given in the detail specification .....                                         | 32 |
| 11      | Specialized test methods .....                                                                    | 32 |
| 12      | Test schedules .....                                                                              | 32 |
| Annex A | (normative) Test methods for insertion loss determination .....                                   | 33 |
| A.1     | Purpose .....                                                                                     | 33 |
| A.2     | Test methods .....                                                                                | 33 |
| A.2.1   | General .....                                                                                     | 33 |
| A.2.2   | Test method 1 .....                                                                               | 33 |
| A.2.3   | Test method 2 .....                                                                               | 34 |
| A.2.4   | Test method 3 .....                                                                               | 36 |
| A.3     | Correction for characteristic impedance differences .....                                         | 37 |
| Annex B | (informative) Measuring methods for propagation time .....                                        | 39 |
| B.1     | General .....                                                                                     | 39 |
| B.2     | Resonance method for propagation time measurement .....                                           | 39 |
| B.3     | Time domain method for propagation time measurement .....                                         | 40 |
| Annex C | (informative) Recommended severities for environmental tests .....                                | 41 |
| C.1     | Introduction to the relationship between environmental conditions and severities of testing ..... | 41 |
| C.1.1   | General .....                                                                                     | 41 |
| C.1.2   | Environmental conditions .....                                                                    | 41 |
| C.1.3   | Environmental testing .....                                                                       | 41 |
| C.2     | Recommended severities for environmental tests .....                                              | 42 |
| C.2.1   | Vibration .....                                                                                   | 42 |
| C.2.2   | Bump .....                                                                                        | 43 |
| C.2.3   | Shock .....                                                                                       | 43 |
| C.2.4   | Climatic sequence .....                                                                           | 43 |
| C.2.5   | Damp heat, steady state .....                                                                     | 44 |
| C.2.6   | Rapid change of temperature .....                                                                 | 44 |
| C.2.7   | Salt mist .....                                                                                   | 44 |
| C.2.8   | Sulphur dioxide test .....                                                                        | 44 |
| C.2.9   | Dust test .....                                                                                   | 44 |
| Annex D | (normative) Quality management .....                                                              | 45 |
| D.1     | General .....                                                                                     | 45 |
| D.2     | Object .....                                                                                      | 45 |
| D.3     | Basic aspects .....                                                                               | 45 |

|                                                                                                            |                                                             |    |
|------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------|----|
| D.3.1                                                                                                      | Related documents .....                                     | 45 |
| D.3.2                                                                                                      | Standards and preferred values .....                        | 45 |
| D.3.3                                                                                                      | Marking of the cable assembly and packaging (see 5.2) ..... | 45 |
| D.3.4                                                                                                      | Terminology.....                                            | 46 |
| D.4                                                                                                        | Quality management procedures.....                          | 46 |
| D.4.1                                                                                                      | Procedures for qualification approval .....                 | 46 |
| D.4.2                                                                                                      | Procedures for capability approval .....                    | 47 |
| D.4.3                                                                                                      | Quality conformance inspection .....                        | 48 |
| D.5                                                                                                        | Capability manual and approval .....                        | 49 |
| D.5.1                                                                                                      | Responsibilities .....                                      | 49 |
| D.5.2                                                                                                      | Contents of the capability manual .....                     | 49 |
| D.5.3                                                                                                      | Criteria for capability limits .....                        | 50 |
| Bibliography.....                                                                                          |                                                             | 53 |
| Figure 1 – Bending test: U shape assembly .....                                                            |                                                             | 18 |
| Figure 2 – Bending test: straight assembly.....                                                            |                                                             | 18 |
| Figure 3 – Twisting test: U shape assembly .....                                                           |                                                             | 19 |
| Figure 4 – Fixture for cable assembly flexure test .....                                                   |                                                             | 24 |
| Figure 5 – Apparatus for cable assembly flexing endurance test .....                                       |                                                             | 25 |
| Figure 6 – Fixture for cable crushing test .....                                                           |                                                             | 26 |
| Figure 7 – Example of test fixture for torque .....                                                        |                                                             | 27 |
| Figure 8 – Multiple bending test .....                                                                     |                                                             | 28 |
| Figure A.1 – Circuit for the determination of insertion loss .....                                         |                                                             | 33 |
| Figure A.2 – Circuit for the determination of insertion loss – principle .....                             |                                                             | 35 |
| Figure A.3 – Alternative circuit for the determination of insertion loss .....                             |                                                             | 35 |
| Figure A.4 – Double-pass circuit for the determination of insertion loss.....                              |                                                             | 36 |
| Figure B.1 – Arrangement of test equipment .....                                                           |                                                             | 39 |
| Figure C.1 – Description of action needed for the preparation of the environmental test specification..... |                                                             | 42 |
| Table 1 – Standard range of atmospheric conditions .....                                                   |                                                             | 14 |
| Table C.1 – Relationship between displacement and acceleration.....                                        |                                                             | 43 |
| Table C.2 – Relationship between peak acceleration and velocity change.....                                |                                                             | 43 |
| Table D.1 – Example of capability limits for cable assemblies .....                                        |                                                             | 51 |
| Table D.2 – Example of capability limits for flexible cables.....                                          |                                                             | 51 |
| Table D.3 – Example of capability limits for connectors.....                                               |                                                             | 51 |
| Table D.4 – Example of flow chart (see D.5.2.5) .....                                                      |                                                             | 52 |

## INTERNATIONAL ELECTROTECHNICAL COMMISSION

---

RADIO FREQUENCY AND COAXIAL CABLE ASSEMBLIES –**Part 1: Generic specification – General requirements and 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) 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.

International Standard IEC 60966-1 has been prepared by technical committee 46: Cables, wires, waveguides, RF connectors, RF and microwave passive components and accessories.

This third edition cancels and replaces the second edition published in 1999. This edition constitutes a technical revision.

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

- a) Annex C (informative) Measurement method for screening effectiveness was cancelled;
- b) Subclause 8.9 gives references to relevant test procedures.

The text of this standard is based on the following documents:

| FDIS         | Report on voting |
|--------------|------------------|
| 46/700A/FDIS | 46/704/RVD       |

Full information on the voting for the approval of this International Standard can be found in the report on voting indicated in the above table.

This document has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all parts in the IEC 60966 series, published under the general title *Radio frequency and coaxial cable assemblies*, 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 "<http://webstore.iec.ch>" in the data related to the specific document. At this date, the document will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

**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.**

## RADIO FREQUENCY AND COAXIAL CABLE ASSEMBLIES –

### Part 1: Generic specification – General requirements and test methods

#### 1 Scope

This part of IEC 60966 specifies requirements for radio frequency coaxial cable assemblies operating in the transverse electromagnetic mode (TEM) and establishes general requirements for testing the electrical, mechanical and environmental properties of radio frequency coaxial cable assemblies composed of cables and connectors. Additional requirements relating to specific families of cable assemblies are given in the relevant sectional specifications.

The design of the cables and connectors used will preferably conform to the applicable parts of IEC 61196 and IEC 61169 respectively.

NOTE 1 This document does not include tests which are normally performed on the cables and connectors separately. These tests are described in IEC 61196-1 (all parts) and IEC 61169-1 respectively.

NOTE 2 Wherever possible, cables and connectors used in cable assemblies, even if they are not described in the IEC 61196 or IEC 61169 series, are tested separately according to the tests given in the relevant generic specification.

NOTE 3 Where additional protection is applied to a cable assembly, the mechanical and environmental tests described in this document are applicable.

#### 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 60068 (all parts), *Environmental testing*

IEC 60068-2-6, *Environmental testing – Part 2-6: Tests – Test Fc: Vibration (sinusoidal)*

IEC 60068-2-11, *Basic environmental testing procedures – Part 2-11: Tests – Test Ka: Salt mist*

IEC 60068-2-14, *Environmental testing – Part 2-14: Tests – Test N: Change of temperature*

IEC 60068-2-27, *Environmental testing – Part 2-27: Tests – Test Ea and guidance: Shock*

IEC 60068-2-42, *Environmental testing – Part 2-42: Tests – Test Kc: Sulphur dioxide test for contacts and connections*

IEC 60068-2-68, *Environmental testing – Part 2-68: Tests – Test L: Dust and sand*

IEC 60068-2-78, *Environmental testing – Part 2-78: Tests – Test Cab: Damp heat, steady state*

IEC 60332-1-2:2004, *Tests on electric and optical fibre cables under fire conditions – Part 1-2: Test for vertical flame propagation for a single insulated wire or cable – Procedure for 1 kW pre-mixed flame*

IEC 60512-6-2, *Connectors for electronic equipment – Tests and measurements – Part 6-2: Dynamic stress tests – Test 6b: Bump*

IEC 60512-7-2, *Connectors for electronic equipment – Tests and measurements – Part 7-2: Impact tests (free components) – Test 7b: Mechanical strength impact*

IEC 60529, *Degrees of protection provided by enclosures (IP Code)*

IEC 60966-2 (all parts), *Radio frequency and coaxial cable assemblies*

IEC 60966-3 (all parts), *Radio frequency and coaxial cable assemblies*

IEC 60966-4 (all parts), *Radio frequency and coaxial cable assemblies*

IEC 61169 (all parts), *Radio-frequency connectors*

IEC 61169-1:2013, *Radio-frequency connectors – Part 1: Generic specification – General requirements and measuring methods*

IEC 61196 (all parts), *Coaxial communication cables*

IEC 61196-1-119, *Coaxial communication cables – Part 1-119: Electrical test methods – RF power rating*

IEC 62037-2, *Passive RF and microwave devices, intermodulation level measurement – Part 2: Measurement of passive intermodulation in coaxial cable assemblies*

IEC 62153-4-6, *Metallic cables and other passive components test methods – Part 4-6: Electromagnetic compatibility (EMC) – Surface transfer impedance – Line injection method*

IEC 62153-4-7:2015, *Metallic communication cable test methods – Part 4-7: Electromagnetic compatibility (EMC) – Test method for measuring of transfer impedance  $Z_T$  and screening attenuation  $a_s$  or coupling attenuation  $a_C$  of connectors and assemblies up to and above 3 GHz – Triaxial tube in tube method*