



SLOVENSKI STANDARD
oSIST prEN IEC 60966-2-1:2022
01-september-2022

Sestavi radiofrekvenčnih in koaksialnih kablov - 2-1. del: Področna specifikacija za sestave zvijavih koaksialnih kablov

Radio frequency and coaxial cable assemblies - Part 2-1: Sectional specification for flexible coaxial cable assemblies

Konfektionierte Koaxial- und Hochfrequenzkabel - Teil 2-1: Rahmenspezifikation für flexible konfektionierte Koaxialkabel

Cordons coaxiaux et cordons pour fréquences radioélectriques – Partie 2-1: Spécification intermédiaire pour cordons coaxiaux souples

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OF INTEREST TO THE FOLLOWING COMMITTEES: SC 46A, TC 100	PROPOSED HORIZONTAL STANDARD: <input type="checkbox"/> Other TC/SCs are requested to indicate their interest, if any, in this CDV to the secretary.
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Radio frequency and coaxial cable assemblies - Part 2-1: Sectional specification for flexible coaxial cable assemblies

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NOTE FROM TC/SC OFFICERS:

CONTENTS

1		
2	1	Scope.....4
3	2	Normative references4
4	3	Definitions4
5	4	Design and construction4
6	4.1	Cable design and construction.....4
7	4.2	Connector design and construction.....5
8	4.3	The relative position dimensions of the interface5
9	4.4	Outline of the cable assembly.....5
10	5	Workmanship, marking and packaging.....6
11	6	IEC type designation7
12	7	Standard rating and characteristics8
13	7.1	Nominal characteristic impedance8
14	7.2	Temperature range.....8
15	7.3	Bending radius8
16	7.4	Rated operating frequency range.....9
17	7.5	Rated working voltage9
18	7.6	Rated power9
19	8	Requirements of finished cable assemblies9
20	8.1	General9
21	8.2	Electrical requirements9
22	8.3	Mechanical requirements.....11
23	8.4	Environmental requirements.....13
24	8.5	Content of toxic and harmful substances15
25	9	Quality management.....15
26	10	Test schedules15
27	10.1	Qualification test15
28	10.2	Acceptance tests17
29	10.3	Periodic tests17
30		Annex A.....19
31		Annex B.....21
32	B.1	Purpose.....21
33	B.2	Test equipment21
34	B.3	Test procedure21
35	B.4	Requirements22
36	B.5	Test report22
37		Annex C.....23
38		
39		Figure 1 - Length definition of cable assemblies with two connectors.....6
40		Figure 2 - Length definition of cable assemblies with one connector6
41		Figure 3 – The marking example of a cable assembly7
42		Figure A.1 –The relative position dimensions of the interface of some typical
43		connectors.....20
44		Figure B.1 schematic diagram of shaking test.....21
45		Figure C.1 – Preferred arrangement for vibrations, shocks test.....23

46		
47	Table 1 Rated temperature of cable assemblies with flexible cables	8
48	Table 2- Electrical requirements	9
49	Table 3- Mechanical requirements	11
50	Table 4- Environmental requirements.....	13
51	Table 5 – Content of toxic and harmful substance	15
52	Table 6 Qualification test	16
53	Table 7 Acceptance test	17
54	Table 8 Sampling plan	17
55	Table 9 Periodic test.....	18
56	Table A.1 –The dimensions of A and B in Figure A.1	20
57		
58		

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59 INTERNATIONAL ELECTROTECHNICAL COMMISSION

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RADIO FREQUENCY AND COAXIAL CABLE ASSEMBLIES - Part 2-1: Sectional specification for flexible coaxial cable assemblies

65 1 Scope

66 This part of IEC 60966 is a sectional specification that relates to flexible RF coaxial cable
67 assemblies operating in the transverse electromagnetic mode (TEM). It establishes uniform
68 requirements for testing the electrical, mechanical and climatic properties of flexible cable
69 assemblies composed of flexible RF coaxial cables and RF coaxial connectors.

70 This part of IEC 60966 applies to flexible cable assemblies composed of flexible RF coaxial
71 cables and coaxial connectors. Flexible RF cable assemblies are widely used in mobile
72 communication systems, microwave test equipment, radar, aerospace and other fields.

73 NOTE 1: For the purposes of this sectional specification, a cable assembly is always regarded as an integral unit.
74 All specifications apply to the finished assembly and not to individual and non-assembled parts thereof.

75 NOTE 2: This sectional specification should be supplemented with detail specifications giving additional details as
76 required by the particular application. This application will not necessarily require all tests.

77 2 Normative references

78 The following referenced documents are indispensable for the application of this document. For
79 dated references, only the edition cited applies. For undated references, the latest edition of
80 the referenced document (including any amendments) applies. ²

<https://standards.iteh.ai/catalog/standards/sist/5c310f6d-ebd2-4cba-b984->

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

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

84 IEC 61196-1-126 *Coaxial communication cables Part 1-126: Electrical test methods – Corona*
85 *extinction voltage*

86 IEC 61196-9 *Coaxial communication cables - Part 9: Sectional specification for RF flexible*
87 *cables*

88 IEC 62321 *Electrotechnical products-Determination of levels of six regulated substance (lead,*
89 *mercury, cadmium, hexavalent chromium, polybrominated biphenyls, polybrominated diphenyl*
90 *ethers)*

91 3 Definitions

92 For the purposes of this document, the definitions given in IEC 60966-1:2019 apply.

93 4 Design and construction

94 4.1 Cable design and construction

95 Cables should conform to IEC 61196-9 and its related detail specifications. Where cable designs
96 deviating from these publications are required, they shall comply with the requirements of the
97 relevant detail specification.

98 When required, the manufacturer may use additional protective tubing or cable deviating from
99 IEC 61196, in order to comply with the requirements of the relevant detail specification.

100 The materials used in the cable shall be given as engineering information in the relevant detail
101 specification.

102 According to local regulation, raw material of the cable as well as those of additional protection
103 shall be chosen to comply with regional or national Directives and Regulations such as RoHS
104 and REACH in Europe.

105 **4.2 Connector design and construction**

106 Connectors should conform to IEC 61169. Where connector designs deviating from IEC 61169
107 are required, the interface should conform to the relevant part of IEC 61169 where available and
108 shall comply with the requirements of the relevant detail specification.

109 The materials used in the connector shall be given as engineering information in the relevant
110 detail specification.

111 According to local regulation, raw material of the connector as well as those of additional
112 protection shall be chosen to comply with regional or national Directives and Regulations such as
113 RoHS and REACH in Europe.

114 **4.3 The relative position dimensions of the interface**

115 The relative position dimensions of the interface of end connector(s) of the cable assemblies
116 should comply with the interface of the relevant part of IEC 61169 or the relevant detail
117 specification. The relative position dimensions of the interface of end connector(s) include the
118 dimension of inner conductor relative to dielectric and inner conductor relative to out
119 conductor.

120 The relative position dimensions of the interface of some typical connectors are shown in
121 Annex A.

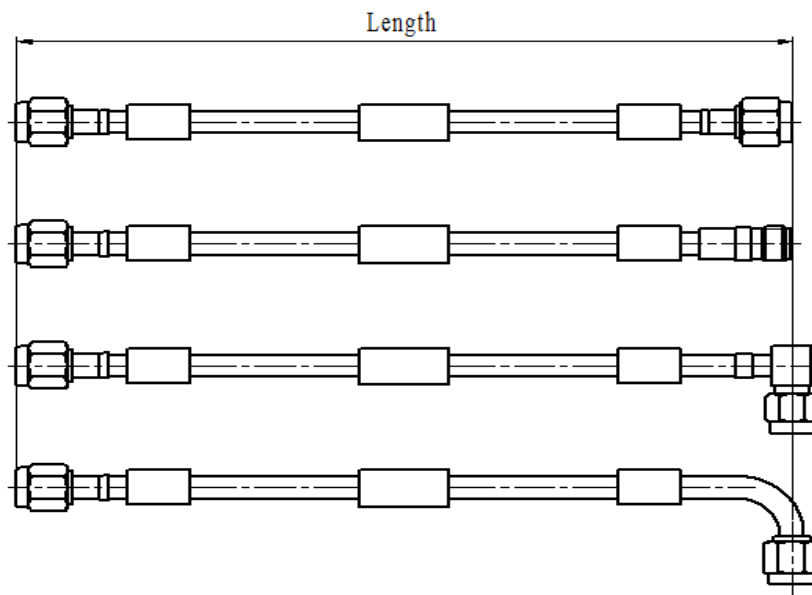
122 **4.4 Outline of the cable assembly**

123 The outline shall be in accordance with the relevant detail specification of the cable assembly.

124 The length, unless otherwise specified in the relevant detail specification, is defined as
125 between the reference planes of the connectors. In the case of right-angle connectors, the
126 length applies to the axis of the connectors (see Figure 1 and Figure2).

127 If not indicated in the relevant detail specification, the length tolerance shall be ± 1 % for
128 cables equal to, or longer than, 300 mm and ± 3 mm for cables shorter than 300mm.

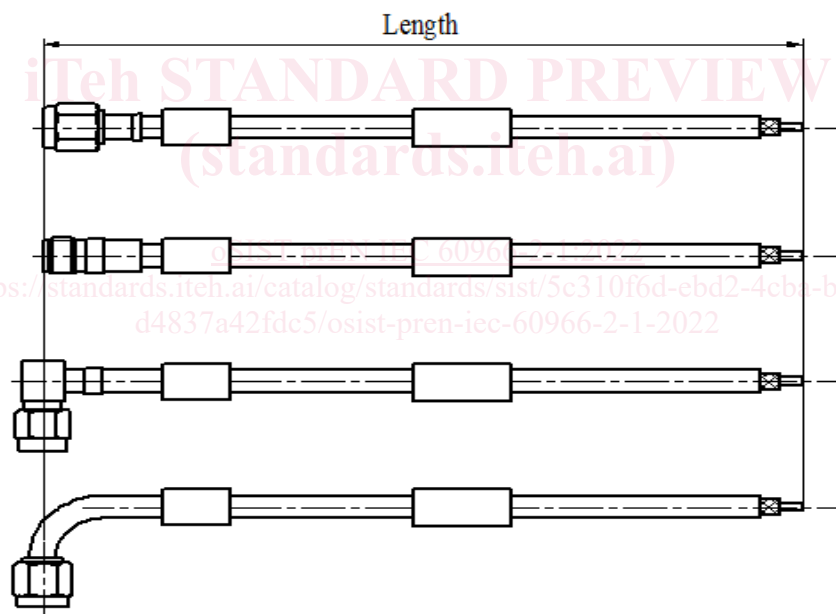
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Figure 1 - Length definition of cable assemblies with two connectors



132

133

Figure 2 - Length definition of cable assemblies with one connector

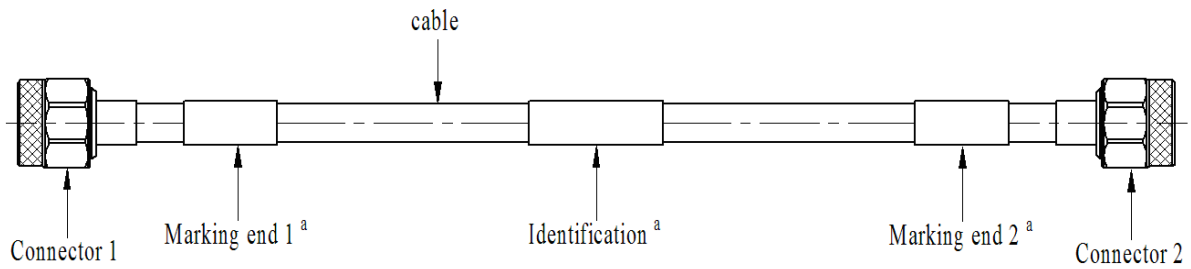
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135 **5 Workmanship, marking and packaging**

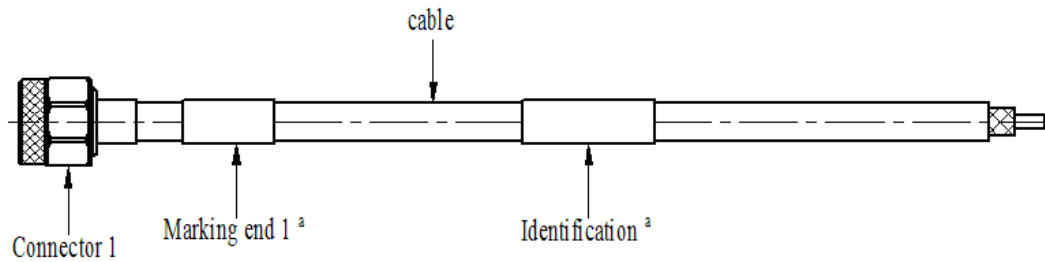
136 Clause 5 of IEC 60966-1:2019 and the following applies:

137 **5.2 Marking**

138 Cable assemblies made in accordance with this sectional specification comprise a section of
 139 cable and two connectors. Occasionally the cable assembly will comprise only a cable and
 140 one connector. When specified in the relevant detail specification, the assembly may
 141 additionally include markers for identification of the assembly and interconnecting ends. End
 142 caps and other accessories may also be specified (see figure 3).



143



144

145

^a When specified

146

Figure 3 – The marking example of a cable assembly

147 **6 IEC type designation**

148 IEC type designation of cable assembly consists of the type of cable and connectors, the
 149 length of the cable assembly and the IEC standard number, as shown below:

150

× - × / × - × - × - IEC 60966-2-1

151

IEC standard number

152

Distinguishing number (when needed)

153

Length of cable assembly, in mm

154

Connector type at the other end

155

Connector type at one end

156

157

Cable type, Variant

158

159

160 For example 1: RG316-SMA-P/SMA-P-3000-A-IEC60966-2-1 cable assembly is comprised
 161 with type RG316 flexible RF coaxial cable, one end is type SMA-P connector and the other
 162 end is type SMA-P connector, the length of the cable assembly is 3000mm, its distinguishing
 163 number is A. This cable assembly comply with IEC 60966-2-1.

164 For example 2:RG142-SMAJ-2000-B-IEC60966-2 cable assembly is comprised with type
 165 RG142 flexible RF coaxial cable, one end is type SMAJ connector and the other end empty,
 166 the length of the cable assembly is 2000mm, its distinguishing number is B. This cable
 167 assembly comply with IEC 60966-2-1.

168 **7 Standard rating and characteristics**169 **7.1 Nominal characteristic impedance**

170 The nominal characteristic impedance shall be 50Ω or specified in the relevant detail
171 specification.

172 **7.2 Temperature range**

173 The rated temperature range of cable components made of different cables, connectors and
174 auxiliary materials shall comply with the provisions in Table 1.

175 **Table 1 Rated temperature of cable assemblies with flexible cables**

Materials used in cable assemblies	Storage(°C)	Installation(°C)	Operational(°C)
PE	-40~+70	-30~+60	-40~+70
PP	-20~+85	-10~+80	-10~+80
PVC	-40~+75	-30~+60	-40~+70
TPE	-40~+85	-30~+80	-40~+80
Silica gel	-40~+150	-20~+150	-20~+150
Rubber	-40~+105	-20~+100	-20~+100
LSZH	-25~+70	-15~+60	-25~+70
XLPE	-55~+105	-40~+100	-40~+100
PVDF	-40~+125	-40~+60	-40~+125
FEP	-60~+200	-60~+200	-60~+200
PFA	-60~+250	-60~+230	-60~+230
ETFE	-60~+150	-60~+150	-60~+150
PTFE	-60~+250	-60~+250	-60~+250
Ordinary tin solder(Sn)	-60~+150	-60~+150	-60~+150
Note: unless otherwise specified in the relevant detail specification, the rated temperature of cable assembly shall comply with the provisions of this table.			

176

177 **7.3 Bending radius**178 **7.3.1 Static bending radius**

179 The static bending radius R of the cable assembly shall not be less than 5 times the cable
180 diameter D , i.e. $R \geq 5 \times D$, or as specified in the relevant detail specification.

181 **7.3.2 Dynamic bending radius**

182 The dynamic bending radius R of the cable assembly shall not be less than 10 times of the
183 cable diameter D , i.e. $R \geq 10 \times D$, or as specified in the relevant detail specification.

184 **7.4 Rated operating frequency range**

185 The operating frequency range of cable assemblies shall be as specified in the relevant detail
186 specification.

187 **7.5 Rated working voltage**

188 The rated operating voltage range of cable assemblies shall be as specified in the relevant
189 detail specification.

190 **7.6 Rated power**

191 When required, the rated RF power of cable assemblies shall be in accordance with the
192 relevant detail specification.

193 **8 Requirements of finished cable assemblies**194 **8.1 General**

195 For finished cable assemblies, the requirements given below shall apply when they are tested
196 in accordance with IEC 60966-1:2019 and the test methods specified herein.

197 When needed, cable assemblies with one connector shall be terminated with a suitable
198 connector at the cable end to do the test and cut off after the test.

199 Unless otherwise specified, all measurements shall be carried out under standard
200 atmospheric conditions for testing in accordance with clause 7 of IEC 60966-1:2019.

201 **8.2 Electrical requirements**

202 Electrical requirements are given in Table 2.

203

Table 2- Electrical requirements

Subclause	Inspection	Test method IEC 60966-1:2019	Requirements/Remarks
8.2.1	Reflection properties	8.1	Value in accordance with the relevant detail specification. While the parameter return loss (A_r) is preferred, the reflection factor (r) or the VSWR (voltage standing wave ratio) may be specified where $A_r = -20 \log_{10} r $ and $VSWR = \frac{1 + r }{1 - r }$
8.2.2	Uniformity of impedance	8.2	Rise time of the TDR system according to in the relevant detail specification. The characteristic impedance variation shall not exceed $\pm 5\%$ of the nominal value or in according with the relevant detail specifications.
8.2.3	Insertion loss	8.3	Value in accordance with the relevant detail specification.
8.2.4	Insertion loss stability	8.4	When required, unless otherwise specified in the relevant detail specification, test conditions and requirements are as follows : a) test mandrel radius: $5D$, where D is the