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Interface Practices Subcommittee

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Specification for “F” Connector, Male, Pin Type

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Table of Contents

Title	Page Number
NOTICE.....	2
Table of Contents.....	3
1. Introduction.....	4
1.1. Executive Summary.....	4
1.2. Scope.....	4
1.3. Benefits.....	4
1.4. Intended Audience.....	4
1.5. Areas for Further Investigation or to be Added in Future Versions.....	4
2. Normative References.....	4
2.1. SCTE References.....	5
2.2. Standards from Other Organizations.....	5
2.3. Published Materials.....	5
3. Informative References.....	5
3.1. SCTE References.....	5
3.2. Standards from Other Organizations.....	5
3.3. Published Materials.....	5
4. Compliance Notation.....	6
5. Abbreviations and Definitions.....	6
5.1. Abbreviations.....	6
5.2. Definitions.....	6
6. Electrical Requirements.....	7
6.1. Bandwidth.....	7
6.2. Return Loss.....	7
6.3. Insertion Loss.....	7
6.4. Contact resistance outer conductor.....	7
6.5. Center conductor DC current-carrying capability.....	7
6.6. Power passing.....	7
6.7. Shielding Effectiveness.....	7
7. Mechanical Requirements.....	8
7.1. Physical Dimensions.....	8
8. Mechanical Strength.....	9
8.1. Withstand Tightening Torque.....	9
8.2. Axial Pull Force.....	9
9. Outdoor Environmental Requirements.....	9
9.1. Interface Moisture Migration.....	9
9.2. Salt Spray.....	9

List of Figures

Title	Page Number
Figure 1 - Male “F” Pin Type Connector.....	8

List of Tables

Title	Page Number
Table 1 – Insertion Loss.....	7
Table 2 – Male “F” Pin Type Connector Dimensions.....	8

1. Introduction

1.1. Executive Summary

This specification applies to the Pin Type “F” Male connector interface used to interconnect broadband cables to broadband devices, such as mainline taps, bonding boxes, splitters and customer premises equipment (CPE) used in the indoor and outdoor environment.

1.2. Scope

The purpose of this document is to specify the mechanical, environmental and baseline electrical performance for male “F” pin type connectors that are used in the 75 ohm RF broadband communications industry. This specification applies to SCTE drop cable specifications ANSI/SCTE 74 and ANSI/SCTE 71.

Unless otherwise noted, all requirements of this document are measured after installation per manufacturer’s instructions of the cable into the connector.

DOCSIS 4.0 specifications include operation at frequencies up to 1794 MHz and many service providers would like to futureproof their networks for eventual operation up to 3000 MHz.

The connector is capable of 3000 MHz operation as a stand-alone interface but, is also an integral component on many devices. The bandwidth performance is dependent on the type of device to which the connector is attached.

1.3. Benefits

This specification is necessary to provide manufacturers and users of this product a basic set of standard dimensional and performance requirements from which to gauge design performance.

It’s useful for cable and equipment manufacturers to ensure proper mating with varied connector manufactured designs. This specification provides confidence to end users that designs which meet these minimum criteria will perform properly in their systems.

1.4. Intended Audience

Manufacturers, test laboratories, and end-users.

1.5. Areas for Further Investigation or to be Added in Future Versions

None

2. Normative References

The following documents contain provisions, which, through reference in this text, constitute provisions of this document. At the time of Subcommittee approval, the editions indicated were valid. All documents are subject to revision; and while parties to any agreement based on this document are encouraged to investigate the possibility of applying the most recent editions of the documents listed below, they are reminded that newer editions of those documents might not be compatible with the referenced version.

2.1. SCTE References

- ANSI/SCTE 05 2020, Test Method for “F” Connector Return Loss In-Line Pair
- ANSI/SCTE 60 2015, Test Method for Interface Moisture Migration Double Ended
- ANSI/SCTE 98 2014, Test Method for Withstand Tightening Torque - 'F' Male
- ANSI/SCTE 99 2019, Test Method for Axial Pull Connector/Drop Cable
- ANSI/SCTE 103 2018, Test Method for DC Contact Resistance, Drop cable to “F” connectors and F 81 Barrels
- ANSI/SCTE 143 2018, Test Method for Salt Spray

2.2. Standards from Other Organizations

- No normative references are applicable.

2.3. Published Materials

- No normative references are applicable.

3. Informative References

The following documents might provide valuable information to the reader but are not required when complying with this document.

3.1. SCTE References

- ANSI/SCTE 01 2020, Specification for “F” Port, Female, Outdoor
- ANSI/SCTE 02 2020, Specification for “F” Port, Female, Indoor
- ANSI/SCTE 71 2018, Specification for Series 15, Braided, 75 Ω , Coaxial, Multi-Purpose Cable
- ANSI/SCTE 74 2011, Specification for Braided 75 Ω Flexible RF Coaxial Drop Cable

3.2. Standards from Other Organizations

- No informative references are applicable.

3.3. Published Materials

- No informative references are applicable.

4. Compliance Notation

<i>shall</i>	This word or the adjective “ <i>required</i> ” means that the item is an absolute requirement of this document.
<i>shall not</i>	This phrase means that the item is an absolute prohibition of this document.
<i>forbidden</i>	This word means the value specified shall never be used.
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<i>should not</i>	This phrase means that there may exist valid reasons in particular circumstances when the listed behavior is acceptable or even useful, but the full implications should be understood and the case carefully weighed before implementing any behavior described with this label.
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<i>deprecated</i>	Use is permissible for legacy purposes only. Deprecated features may be removed from future versions of this document. Implementations should avoid use of deprecated features.

5. Abbreviations and Definitions

5.1. Abbreviations

CPE	customer premises equipment
lb	pound
in	inch
mm	millimeter
DC	direct current
lb-in	pound inch
MHz	megahertz
Hz	hertz
ISBE	International Society of Broadband Experts
SCTE	Society of Cable Telecommunications Engineers

5.2. Definitions

Dielectric	The material that is used to insulate the center conductor from contacting the outer housing.
Thread Relief	A reduced diameter section of the threaded surface to allow the tool to run out. This feature is optional.
Center Conductor	The pin conductor inside the male “F” pin type connector that accepts the coaxial cable center conductor.
Reference Plane	The reference plane on the male “F” pin type connector is the mating surface that seats against the female “F” port. It is also the plane from where all horizontal dimensions are taken.
Parting Line (relevant to casting process only)	A raised mark left on the surface of a part as a result of the gap between two halves of a die.

6. Electrical Requirements

6.1. Bandwidth

The male “F” pin type connector *shall* operate over a bandwidth of 5 MHz to 3000 MHz with an impedance of 75 ohms.

6.2. Return Loss

Please see equipment specifications that the male “F” pin type connector is a part of for specific return loss requirements.

6.3. Insertion Loss

The male “F” pin type connector insertion loss *shall* meet the requirements in Table 1.

Table 1 – Insertion Loss

Frequency (MHz)	Loss (dB)
5 - 1002	≤ 0.05
1002 - 1218	≤ 0.05
1218 - 1794	≤ .10
1794 - 2250	≤ .12
2250 - 3000	≤ .15

6.4. Contact resistance outer conductor

The outer conductor junction of the female “F” port to male “F” pin type connector *shall* have a DC contact resistance less than 10 milliohms when tightened to 35 in.-lbs. and tested to ANSI/SCTE 103.

6.5. Center conductor DC current-carrying capability

The center conductor junction of the female “F” port to male “F” pin type center conductor *shall* be capable of carrying a minimum of 1.0 ampere DC continuous current at an ambient temperature of 40 °C without degradation.

6.6. Power passing

If the connector is required to pass AC power, then the center conductor junction of the male “F” pin type center conductor *shall* be capable of carrying a minimum of 2.0 ampere, 90 VAC continuous current at an ambient temperature of 40 °C without degrading the electrical performance.

6.7. Shielding Effectiveness

When the “F” male connector interface is attached to cables manufactured to SCTE approved standards, the assembly *shall* meet shielding performance levels of an unspliced section of the same cable within a +/- 3 dB tolerance when both are tested with the same method. One of the methods used for this testing *shall* be ANSI/SCTE 48-3, Test Procedure for Measuring Shielding Effectiveness of Coaxial Cable and Connectors Using the GTEM Cell.

7. Mechanical Requirements

7.1. Physical Dimensions

The physical dimensions for the male “F” pin type connector *shall* be as specified in Figure 1, Table 2 and the notes below Table 2.

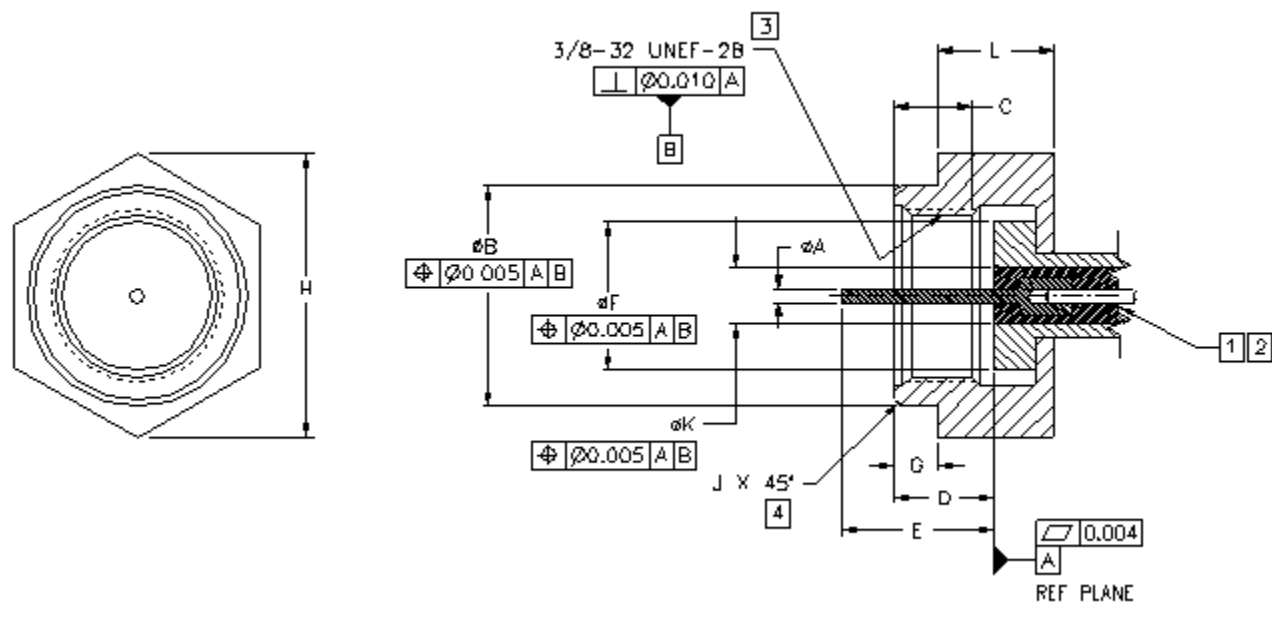


Figure 1 - Male “F” Pin Type Connector

Table 2 – Male “F” Pin Type Connector Dimensions

DESCRIPTION	DIM	mm		inches		NOTES
		MIN	MAX	MIN	MAX	
PIN DIAMETER	A	0.76	1.07	0.030	0.042	
SEALING SLEEVE DIAMETER	B	10.41	11.05	0.410	0.435	
NUT THREADED LENGTH	C	3.97	-	0.156	-	3
MANDREL FACE DEPTH TO NUT LEADING EDGE	D	4.29	6.10	0.169	0.240	
CENTER CONDUCTOR TO MANDREL FACE LENGTH	E	6.35	9.53	0.250	0.375	
MANDREL FACE OUTER DIAMETER	F	7.11	-	0.280	-	
NUT TO SEALING SLEEVE INTERFACE LENGTH	G	1.78	4.45	0.070	0.175	
MAXIMUM ENVELOPE DIMENSION	H	-	16.61	-	0.654	
CHAMFER BREAK	J	0.25	0.76	0.010	0.030	4
MANDREL FACE INNER DIAMETER	K	-	5.84	-	0.230	
NUT HEX LENGTH	L	4.75	-	0.187	-	

Notes

1. dielectric must not protrude beyond ref. plane
2. the mating of the female ‘f’ to the reference plane should not be impeded
3. minimum one thread lead-in
4. radius optional
5. drawing not to scale
6. interpret drawing in accordance with ASME Y14.5m-1994

8. Mechanical Strength

8.1. Withstand Tightening Torque

The male “F” pin type connector *shall* withstand a minimum tightening torque of 60 in-lbs. without damage when measured per ANSI/SCTE 98, Test Method For Withstand Tightening Torque – ‘F’ Male.

8.2. Axial Pull Force

The male “F” pin type connector, when attached to cables manufactured to SCTE approved standards, *shall* withstand a minimum axial pull force of 40 lbs. for outdoor and 30 lbs. for indoor applications when tested per ANSI/SCTE 99, Test Method For Axial Pull Connector/Drop Cable.

9. Outdoor Environmental Requirements

Male “F” pin type connectors *shall* meet the environmental requirements of the equipment to which they are attached, and the requirements specified in this document.

9.1. Interface Moisture Migration

Male “F” pin type connectors, when attached to cables manufactured to SCTE approved standards, *shall* have no penetrant present or evident, when inspected visually, after undergoing testing per ANSI/SCTE 60, Interface Moisture Migration Test.

9.2. Salt Spray

The Male “F” pin type connector *shall* meet the electrical requirements as outlined in section 6, and the mechanical requirements as outlined in section 7 and section 8, after 1000 hours salt spray when tested in accordance to ANSI/SCTE 143, Test Method For Salt Spray.