

# **SCTE** | **STANDARDS**

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**Interface Practices Subcommittee**

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**AMERICAN NATIONAL STANDARD**

**ANSI/SCTE 01 2021**

**Specification for “F” Port, Female, Outdoor**

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140 Philips Road  
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## 1. Introduction

### 1.1. Executive Summary

This specification applies to the “F” Female port connector used on broadband devices, such as mainline taps, bonding bocks and splitters used in the outdoor environment.

### 1.2. Scope

The purpose of this document is to specify the mechanical, environmental and base line electrical performance for female outdoor “F” ports that are used in the 75 ohm RF broadband communications industry and that interface with “F” Male connectors as defined by ANSI/SCTE 123 and ANSI/SCTE 124.

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 103 2018, Test Method for DC Contact Resistance, Drop cable to “F” connectors and F 81 Barrels
- ANSI/SCTE 123 2020, Specification for “F” Connector Male Feed-Through
- ANSI/SCTE 124 2020, Specification for “F” Connector Male Pin Type

- ANSI/SCTE 149 2019, Test Method for Withstand Tightening Torque - 'F' Female
- ANSI/SCTE 191 2018, Test Method for Axial Pull Force, Female “F” Port
- SCTE 269 2021, Test Procedure for “F” Port Center Conductor Retention Force

## 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

- No informative references are applicable.

### 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.  |
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| <i>should</i>     | This word or the adjective “ <i>recommended</i> ” means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighted before choosing a different course.                    |
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## 5. Abbreviations and Definitions

### 5.1. Abbreviations

|       |   |
|-------|---|
| °C    | degree celsius                                |
| 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

|   |   |
|---|---|
| thread relief                                   | A reduced diameter section of the threaded surface to allow the tool to run out. This feature is optional.  |
| center conductor                                | The inner conductor of a coaxial port, cable or pin of mating male connector.   |
| mating male center conductor clearance          | The distance from the reference plane of the female “F” port to which the center conductor of the mating male connector may penetrate without damaging the port or encountering a blockage.                     |
| positive contact point                          | The distance from the reference plane of the female “F” port to the first point of contact in the female center contact when the installed mating center conductor is centered.                                 |
| reference plane                                 | The reference plane on the female outdoor “F” port is the mating surface that seats against the reference plane of the male “F” connector. 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 “F” Female outdoor interface *shall* be designed to operate over a bandwidth of 5 MHz to 3000 MHz with an impedance of 75 ohms.

### 6.2. Return Loss, Insertion Loss, Surge Withstand, and Shielding Effectiveness

Refer to the individual equipment specifications for these requirements.

### 6.3. Center Conductor Contact Resistance

After being stressed per the procedure in section 9.1 of SCTE 269 2021, the center conductor junction of the outdoor female “F” port to male F center conductor *shall* have a DC contact resistance of less than 25

milliohms when tested in accordance to ANSI/SCTE 103 with a 0.0320 inch (0.812 mm) diameter center conductor.

#### **6.4. Outer Conductor Contact Resistance**

The outer conductor junction of the outdoor female “F” port to male F connector *shall* have a DC contact resistance less than 10 milliohms when tightened to 40 lb.-in. and tested to ANSI/SCTE 103.

#### **6.5. Center Conductor DC current carrying capacity**

The center conductor junction of the outdoor female “F” port to male F center conductor *shall* be capable of carrying a minimum of 1 ampere DC continuous current at an ambient temperature of 40 °C without degrading the electrical performance.

#### **6.6. Center Conductor AC current carrying capacity**

If the F Female outdoor port is required to pass AC power, then center conductor junction of the outdoor female “F” port to male F 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.

### **7. Mechanical Requirements**

#### **7.1. Physical dimensions**

The physical dimensions for female outdoor “F” ports *shall* be as specified in Figure 1, Table 1, and the notes below Table 1.

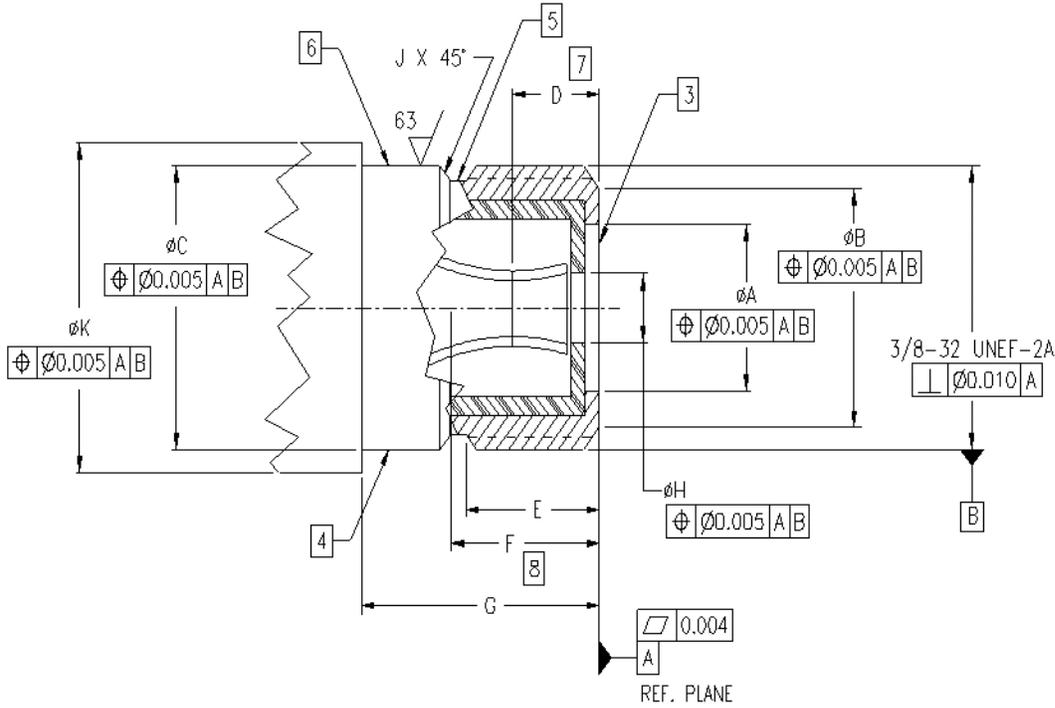


Figure 1 - Outdoor Female “F” Port

Table 1 - Outdoor Female “F” Port Dimensions

| DESCRIPTION                            | DIM | mm    |       | inches |       | NOTES |
|--|-----|-------|-------|--------|-------|-------|
|  |     | MIN   | MAX   | MIN    | MAX   |       |
| REF PLANE OPENING DIAMETER             | A   | 4.32  | 6.10  | 0.170  | 0.240 |       |
| REF PLANE OUTER DIAMETER               | B   | 7.11  | 8.00  | 0.280  | 0.315 |       |
| BASE OUTER DIAMETER                    | C   | 9.35  | 9.65  | 0.368  | 0.380 |       |
| POSITIVE CONTACT POINT DEPTH           | D   | -     | 5.08  | -      | 0.200 | 7     |
| FULL THREAD DEPTH                      | E   | 8.26  | 8.89  | 0.325  | 0.350 |       |
| MATING MALE CENTER CONDUCTOR CLEARANCE | F   | 9.65  | -     | 0.380  | -     | 8     |
| PORT LENGTH                            | G   | 12.32 | 13.08 | 0.485  | 0.515 |       |
| CENTER CONDUCTOR GUIDE INNER DIAMETER  | H   | -     | 1.73  | -      | 0.068 |       |
| CHAMFER                                | J   | 0.25  | 0.76  | 0.010  | 0.030 |       |
| BULKHEAD                               | K   | 10.80 |       | 0.425  |       | 10    |

**Notes:**

- 1 DRAWING NOT TO SCALE.
- 2 INTERPRET DRAWING IN ACCORDANCE WITH ASME Y14.5M-1994.
- 3 NO MATERIAL **SHALL** IMPEDE THE ENTRY OF THE MALE F CONNECTOR.
- 4 NO PARTING LINES PERMITTED.
- 5 THREAD RELIEF NOT TO EXCEED 2 FULL THREADS, OPTIONAL
- 6 FINISH REQUIRED FOR PORT SEAL RING.
- 7 DIMENSION TO POINT OF POSITIVE CONTACT OF MALE CENTER CONDUCTOR.
- 8 MINIMUM CLEARANCE REQUIRED FOR MAXIMUM LENGTH MALE CENTER CONDUCTOR.
- 9 RECOMMENDED MATING MALE CENTER CONDUCTOR DIAMETER RANGE IS 0.030 in. (0.76 mm) MIN. to 0.042 in. (1.066 mm) MAX.
- 10 MINIMUM BULKHEAD STOP. GEOMETRY OPTIONAL (EXAMPLE: HEX, CYLINDRICAL, FLAT SURFACE AREA).

## 8. Mechanical Strength

### 8.1. Center Conductor Mating and Retention Force

The center conductor port **shall** accept male “F” connector center conductors whose diameters are between 0.030 inches (0.76 mm) and 0.042 inches (1.066 mm). The center conductor port **shall** meet the requirements of SCTE 269 2021.

### 8.2. Withstand Tightening Torque

Outdoor female “F” ports **shall** be able to withstand a minimum tightening torque of 40 lb.-in. without damage when measured per ANSI/SCTE 149.

### 8.3. Axial Pull Strength

All female “F” ports **shall** withstand a minimum 60 lbs. of axial pull force without damage when measured per ANSI/SCTE 191.

### 8.4. Other

Refer to the equipment specs for mechanical requirements that affect any material beyond the outdoor female “F” ports.

## 9. Environmental Requirements

### 9.1. Salt Spray

Outdoor female “F” ports **shall** meet the corrosion requirements of the equipment to which they are attached.