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Interface Practices Subcommittee

SCTE STANDARD

SCTE 68 2018

Drop Passives: Matching Transformers 75Ω to 300Ω

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1.0 SCOPE

This document is identical to SCTE 68 2013 except for informative components which may have been updated such as the title page, NOTICE text, headers and footers. No normative changes have been made to this document.

The purpose of this document is to specify recommended mechanical and electrical standards for broadband radio frequency (RF) devices whose primary purpose is to provide impedance and connector match between 75Ω coaxial type F and 300Ω twin-lead open screw connectorized devices. The most common use for such devices is matching coaxial input cables from distribution systems to 300Ω balanced screw antenna terminals on indoor receivers.

The specification is not intended to limit or restrict any manufacturer's innovation and improvement. The specification may be amended in the future as deemed appropriate.

2.0 MECHANICAL

2.1 RF Ports

2.1.1 All coaxial RF ports shall be type F. Female ports shall conform to the requirements of ANSI/SCTE 01 2006 while male ports shall conform to the requirements of ANSI/SCTE 123 2011.

2.1.2 300Ω ports shall either consist of a pair of screw terminals or a short length of twin-lead cable terminated in a pair of spade lugs.

2.2 Labeling

No labeling is required for either input or output port.

3.0 ELECTRICAL

3.1 Bandwidth. All devices shall be designed to operate over a bandwidth of at least 5 to 1002 MHz.

3.2 Pass-band Response. The pass-band response of two devices connected back-to-back via their 300Ω ports, and measured from one 75Ω port to the other 75Ω port shall not exceed ±1.0 dB relative to the slope loss of the device as measured and defined in SCTE 144 2012.

3.3 Insertion Loss. The insertion loss of two devices connected back-to-back as described in Section 3.2 shall not exceed the values specified in the following table. All measurements shall be made using the methods specified in SCTE 144 2012:

Maximum Insertion Loss (dB)	
Frequency Range (MHz)	Insertion Loss (dB)
50 - 108	2.0
109 - 300	3.0
301 - 1002	4.0

- 3.4 Return Loss. The return loss shall be measured using a 1%, 300-Ohm resistor soldered across the 300-Ohm twin-lead cable. The resistor shall be cut to a length equal to the twin lead conductors. For screw type devices, resistors should be installed across screw terminals as closely as possible with excess lead material trimmed off. For threaded twin lead devices, resistors should be soldered across the terminals such that the terminals remain parallel as originally manufactured with excess lead material trimmed off. Measuring in accordance with SCTE 144 2012, the return loss shall be no less than 20dB across the pass-band.
- 3.5 Surge Withstand. The surge protection of the device when measured in accordance with ANSI/SCTE 81 2007 shall be a minimum of compliance with IEEE C62.41-1991 Category A-3 Ring Wave 1kV, 200 Amps at the “F” port.
- 3.6 Balance Ratio. The balance ratio of the transformer, when tested in accordance to ANSI/SCTE 120 2011, shall not be less than as follows:

Minimum Balance (dB)	
Frequency Range (MHz)	Balance Ratio (dB)
50	35
51 - 300	25
301 - 1002	20

4.0 ENVIRONMENTAL

Temperature/Humidity. The matching transformer must meet all specifications when operated in an ambient temperature ranging from +32°F (0°C) to +122° F (+50° C) and relative humidity ranging from 5 % and 99%, non-condensing.

5.0 NORMATIVE REFERENCES

The following documents contain provisions, which, through reference in this text, constitute provisions of the standard. At the time of Subcommittee approval, the editions indicated were valid. All standards are subject to revision; and while parties to any agreement based on this standard 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 may not be compatible with the referenced version.

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1. ANSI/SCTE 01 2006: Specification for “F” Port, Female, Outdoor
2. ANSI/SCTE 81 2012: Surge Withstand Test Procedure
3. ANSI/SCTE 123 2011: Specification for “F” Connector, Male, Feed-Through
4. SCTE 144 2012: Test Procedure for Measuring Transmission and Reflection
5. SCTE 120 2011: Test Method for Balance Ratio
6. IEEE C62.41-1991: IEEE Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits