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Telecommunications
Engineers***

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Interface Practices Subcommittee**

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ANSI/SCTE 151 2015

**Mechanical, Electrical, and Environmental
Requirements for RF Traps and Filters**

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TABLE OF CONTENTS

1.0	SCOPE	1
2.0	NORMATIVE REFERENCES	1
3.0	COMPLIANCE NOTATION.....	2
4.0	DEFINITIONS AND ACRONYMS	3
5.0	MECHANICAL.....	4
6.0	ELECTRICAL	4
7.0	ENVIRONMENTAL.....	6
8.0	DIMENSIONS.....	7

LIST OF FIGURES

FIGURE 1 – DEVICE PORT AND INSTALLATION TOOL DIMENSIONS	7
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1.0 SCOPE

The purpose of this specification is to provide the mechanical, electrical and environmental requirements for broadband radio frequency (RF) Trap and Filter devices whose primary purpose is to provide a fixed attenuation of RF signal(s) at user defined frequencies while preserving adjacent topology.

This scope is limited to 75-ohm devices with F connectors. This specification is not intended to limit or restrict any manufacturer's innovation and improvement.

2.0 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.

2.1 SCTE References

ANSI/SCTE 01 2006, Specification for "F" Port, Female, Outdoor

ANSI/SCTE 45 2012, Test Method for Group Delay

ANSI/SCTE 48-1 2007, Test Method for Measuring Shielding Effectiveness of Passive and Active Devices Using a GTEM Cell

ANSI/SCTE 60 2010, Test Method for Interface Moisture Migration Double Ended

ANSI/SCTE 81 2012, Surge Withstand Test Procedure

ANSI/SCTE 98 2014, Test Method for Withstand Tightening Torque – "F" Male

ANSI/SCTE 143 2013, Test Method for Salt Spray

ANSI/SCTE 144 2012, Test Procedure for Measuring Transmission and Reflection

ANSI/SCTE 149 2013, Test Method for Withstand Tightening Torque – "F" Female

2.2 Standards from other Organizations

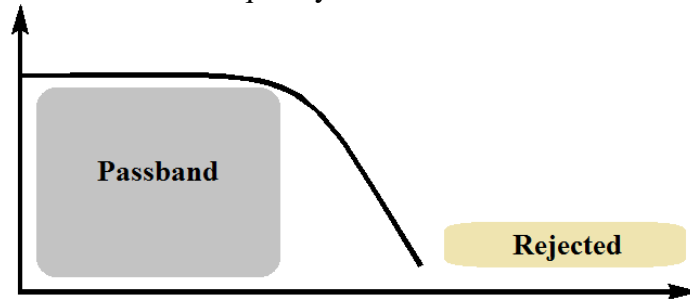
IEEE C 62.41-1991, IEEE Recommended Practice for Surge Voltage in Low-Voltage AC Power Circuits

3.0 COMPLIANCE NOTATION

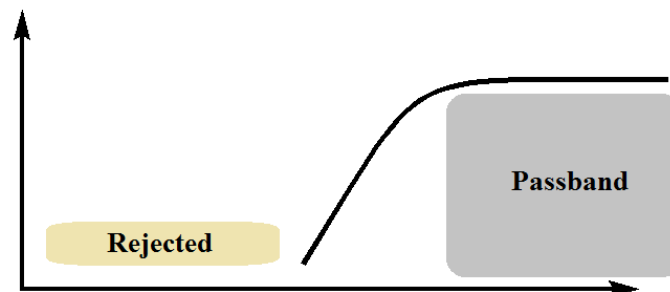
“SHALL”	This word or the adjective “REQUIRED” means that the item is an absolute requirement of this specification.
“SHALL NOT”	This phrase means that the item is an absolute prohibition of this specification.
“SHOULD”	This word or the adjective “RECOMMENDED” means that there may exist valid reasons in particular circumstances to ignore this item, but the full implications should be understood and the case carefully weighted before choosing a different course.
“SHOULD NOT”	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.
“MAY”	This word or the adjective “OPTIONAL” means that this item is truly optional. One vendor may choose to include the item because a particular marketplace requires it or because it enhances the product, for example; another vendor may omit the same item.

4.0 DEFINITIONS AND ACRONYMS

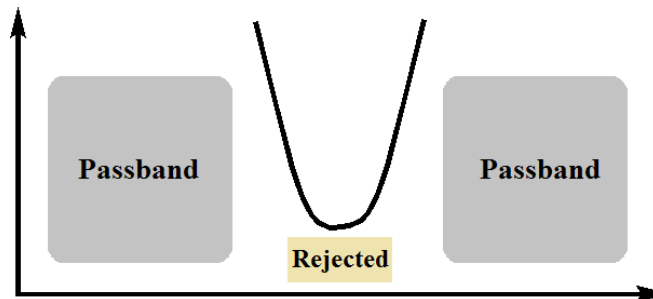
- 4.1 **Lowpass** – passes from a certain frequency and lower, while rejecting unwanted carriers above the certain frequency



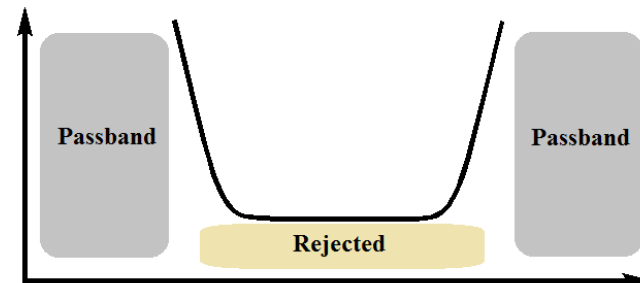
- 4.2 **Highpass** – passes from a certain frequency and higher, while rejecting unwanted carriers below a certain frequency



- 4.3 **Notch** – removes a very small segment of band while passing frequencies above and below the band



- 4.4 **Bandstop** – removes a larger segment of band than a notch filter and passes frequencies above and below the band



5.0 MECHANICAL

5.1 RF Ports

- 5.1.1 All RF ports shall be type F
- 5.1.2 Female ports shall conform to the requirements of ANSI/SCTE 01 2006 Specification for “F” Port, Female, Outdoor
- 5.1.3 Male ports shall conform to Figure 1

5.2 Physical Parameters

- 5.2.1 The physical limits of the housing are defined in Figure 1
- 5.2.2 There shall be no relative movement of the outer housing to the inner housing

5.3 Labeling

Each device shall be permanently marked with product part number, date code and manufacturer.

5.4 Torque Requirements

- 5.4.1 The Female “F” port shall withstand 40 inch pounds of torque, without damage or permanent deformation to the threads, reference plane or body when tested in accordance to ANSI/SCTE 149 2013, Test Method for Withstand Tightening Torque – “F” Female
- 5.4.2 The Male “F” plug shall withstand 60 inch pounds of torque, without damage or permanent deformation to the threads, reference plane or body when tested in accordance to ANSI/SCTE 98 2014, Test Method for Withstand Tightening Torque – “F” Male

6.0 ELECTRICAL

6.1 Frequency Range

All devices shall operate over a Frequency Range of at least 5 MHz to 1,002 MHz

6.2 Shielding Effectiveness

The shielding effectiveness shall be a minimum of 100dB when tested in accordance with ANSI/SCTE 48-1, Test Method for Measuring Shielding Effectiveness of Passive and Active Devices Using a GTEM Cell.

6.3 Surge Withstand

The surge withstand when measured in accordance with ANSI/SCTE 81 shall be a minimum of IEEE C62.41-1991 Category A3 Ring Wave, 6KV 200 amps for devices used indoors and IEEE C62.41-1991 Category B3 Combination Wave, 6KV 3000 amps for devices prior to the demarcation point.

6.4 Adjacent Channel Loss

6.4.1 The upper adjacent Analogue Video Carrier loss shall be no greater than 6dB when tested in accordance to ANSI/SCTE 144, Test Procedure for Measuring Transmission and Reflection.

6.4.2 The lower adjacent Analogue Audio Carrier loss shall be no greater than 10dB when tested in accordance to ANSI/SCTE 144, Test Procedure for Measuring Transmission and Reflection.

6.4.3 The adjacent Digital Carrier loss shall be no greater than 3dB when tested in accordance to ANSI/SCTE 144, Test Procedure for Measuring Transmission and Reflection.

6.5 Pass band Insertion loss

The pass band insertion loss shall be 2dB maximum, when tested in accordance to ANSI/SCTE 144, Test Procedure for Measuring Transmission and Reflection.

6.6 Rejection Band Attenuation

The rejection band attenuation shall be a minimum of 40 dB at the frequencies of interest.

6.6.1 The rejection bandwidth is dependent on band edge slope loss, frequency and filter type, which is determined by manufacturer.

6.7 Group Delay

The group delay shall be less than 20 nano-seconds in the pass band, when tested in accordance per ANSI/SCTE 45 2007, Test Method for Group Delay.

6.8 Return Loss

6.8.1 Shall be a minimum of 16 dB minimum for the pass bands that reside in the return band, when tested in accordance to ANSI/SCTE 144 2012, Test Procedure for Measuring Transmission and Reflection

6.8.2 Shall be a minimum of 16 dB minimum for the pass bands that reside in the forward band when tested in accordance to ANSI/SCTE 144 2012, Test Procedure for Measuring Transmission and Reflection

7.0 ENVIRONMENTAL

7.1 Salt Spray

Devices intended for outdoor use shall meet all electrical and mechanical performance requirements after 1,000 hours of conditioning when tested in accordance to ANSI/SCTE 143 2013, Test Method for Salt Spray.

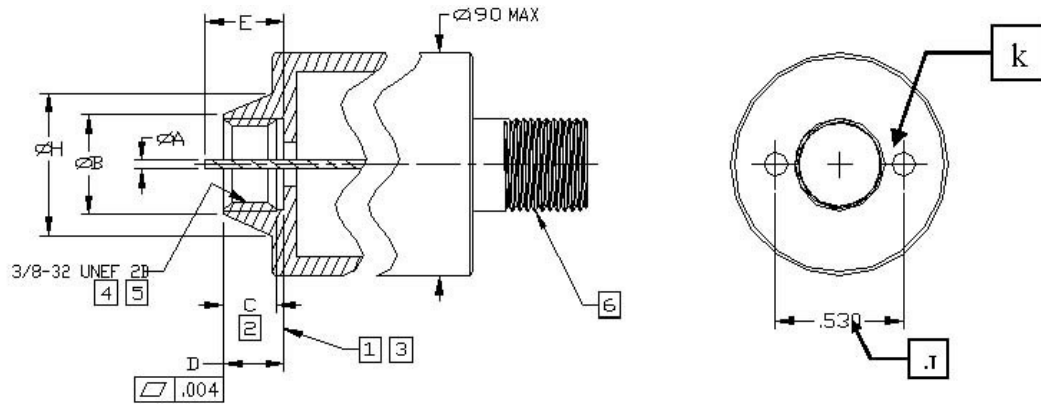
7.2 Interface Moisture Migration

Devices shall be tested in accordance to ANSI/SCTE 60 2010, Test Method for Interface Moisture Migration Double Ended with no degradation in electrical or mechanical performance.

7.3 Temperature

The devices shall meet all performance requirements after exposure to temperatures ranging from -40°F (-40°C) to +140°F (+60°C) inclusive.

8.0 DIMENSIONS



NOTES:

- 1 DIELECTRIC MUST NOT PROTRUDE BEYOND REF. PLANE
- 2 MINIMUM 4 FULL THREADS
- 3 REF. PLANE AFTER INSTALLATION ON STANDARD PORT TIGHTENED TO 40 INCH POUNDS AND REMOVED
- 4 MAXIMUM 1 THREAD LEAD IN
- 5 ANSI SPECIFICATION B14
- 6 *F* PORT TO MEET THE REQUIREMENTS OF ANSI/SCTE 01 2006

Figure 1 – Device Port and Installation Tool Dimensions

DESCRIPTION	REF	MM		INCHES		NOTES
		MIN	MAX	MIN	MAX	
CENTER CONDUCTOR DIAMETER	A	0.76	1.07	0.030	0.042	
COLLAR NARROW DIAMETER	B	10.29	11.30	0.405	0.445	
COLLAR THREADED LENGTH	C	6.10	-	0.240	-	2
PORT FACE DEPTH TO COLLAR LEADING EDGE	D	5.84	6.86	0.230	0.270	
PORT CENTER CONDUCTOR TO PORT FACE LENGTH	E	7.40	9.10	0.291	0.358	
COLLAR WIDE DIAMETER	H	10.92	15.88	0.430	0.625	
DIMENSION FOR INSTALLATION TOOL (optional)	J	-	13.46	-	0.530	
MINIMUM HOLE SIZE FOR INSTALLATION TOOL (optional)	K	2.39	-	0.094	-	