



***Society of Cable
Telecommunications
Engineers***

**ENGINEERING COMMITTEE
Interface Practices Subcommittee**

AMERICAN NATIONAL STANDARD

ANSI/SCTE 145 2015

**Test Method for Second Harmonic Distortion of Passives
Using a Single Carrier**

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140 Philips Road

Exton, PA 19341

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1.0 SCOPE AND DEFINITION

- 1.1 The purpose of this document is to establish the standard methodology to measure second harmonic distortion in a Cable Telecommunication System passive at high signal level conditions (50 – 60 dBmV). Due to the difficulty in acquiring multi-carrier signal generators with both 55 dBmV output and intermod beats at –120 dBc, the test procedure will use a single carrier source test method.
- 1.2 The area of concern for most cable telecommunication systems are the high power signals sent in the return path. Therefore, this document limits the testing to signals in the return path range.
- 1.3 Second harmonic: A waveform generated at twice the frequency as the original. Such distortion can occur when one or more carriers pass through a nonlinear device.
- 1.4 Second Harmonic Distortion (SHD) is defined as the ratio of the second harmonic signal level to the fundamental carrier signal level at the Device Under Test (DUT) output.
- 1.5 Please note that this procedure is a very unique procedure for measuring second harmonic distortion of passives using a single carrier source test method and distinguishes itself from other similar procedures in the following ways:
 - Designed for Passives
 - Two port measurement
 - Inject return frequency into input and measure 2nd harmonic at output
 - Used to test for distortion caused by core saturation. Designed to be consistent with the mechanisms that have caused problems in outside plant -- large reverse carriers causing distortion in channels 2 through 5.