

# SCTE • ISBE<sup>®</sup>

## S T A N D A R D S

---

**Interface Practices Subcommittee**

---

**AMERICAN NATIONAL STANDARD**

**ANSI/SCTE 17 2018**

**Test Procedure for Carrier to Noise  
(C/N, CCN, CIN, CTN)**

ANSI/SCTE 17 2018

## NOTICE

The Society of Cable Telecommunications Engineers (SCTE) / International Society of Broadband Experts (ISBE) Standards and Operational Practices (hereafter called “documents”) are intended to serve the public interest by providing specifications, test methods and procedures that promote uniformity of product, interchangeability, best practices and ultimately the long-term reliability of broadband communications facilities. These documents shall not in any way preclude any member or non-member of SCTE•ISBE from manufacturing or selling products not conforming to such documents, nor shall the existence of such standards preclude their voluntary use by those other than SCTE•ISBE members.

SCTE•ISBE assumes no obligations or liability whatsoever to any party who may adopt the documents. Such adopting party assumes all risks associated with adoption of these documents, and accepts full responsibility for any damage and/or claims arising from the adoption of such documents.

Attention is called to the possibility that implementation of this document may require the use of subject matter covered by patent rights. By publication of this document, no position is taken with respect to the existence or validity of any patent rights in connection therewith. SCTE•ISBE shall not be responsible for identifying patents for which a license may be required or for conducting inquiries into the legal validity or scope of those patents that are brought to its attention.

Patent holders who believe that they hold patents which are essential to the implementation of this document have been requested to provide information about those patents and any related licensing terms and conditions. Any such declarations made before or after publication of this document are available on the SCTE•ISBE web site at <http://www.scte.org>.

All Rights Reserved

© Society of Cable Telecommunications Engineers, Inc. 2018  
140 Philips Road  
Exton, PA 19341

# Table of Contents

<b>Title</b>	<b>Page Number</b>
NOTICE.....	2
Table of Contents.....	3
1. Introduction.....	5
1.1. Executive Summary.....	5
1.2. Scope.....	5
1.3. Benefits.....	5
1.4. Intended Audience.....	5
1.5. Areas for Further Investigation or to be Added in Future Versions.....	5
2. Normative References.....	5
2.1. SCTE References.....	5
2.2. Standards from Other Organizations.....	5
2.3. Published Materials.....	5
3. Informative References.....	6
3.1. SCTE References.....	6
3.2. Standards from Other Organizations.....	6
3.3. Published Materials.....	6
4. Compliance Notation.....	6
5. Abbreviations and Definitions.....	6
5.1. Abbreviations.....	6
5.2. Definitions.....	7
6. Equipment.....	8
6.1. Required Test Equipment.....	8
7. Setup.....	8
8. Procedure.....	9
8.1. Initial Adjustments.....	10
8.2. Check for Test Equipment Noise Floor.....	10
8.3. Measure Carrier Level.....	10
8.4. Choose Noise Measurement Option.....	11
8.5. Measurement of Raw Composite Noise.....	11
8.6. Measurement of Raw Thermal Noise.....	11
8.7. Measurement of Test Equipment Noise floor.....	12
8.8. Calculation of Carrier to Thermal Noise (CTN).....	13
8.9. Correction for Thermal Noise Contribution of an optional Post Amp if the difference between the post amp C/N and the measured C/N is less than 15 dB.....	13
8.10. Calculation of Carrier to Composite Noise (CCN).....	13
8.11. Calculation of Carrier to Intermodulation Noise (CIN).....	14
Appendix 1 - Spectrum Analyzer Corrections for Noise Measurements.....	15
Appendix 2 – Example Calculations.....	16

## List of Figures

<b>Title</b>	<b>Page Number</b>
Figure 1 - Test Equipment Setup.....	8
Figure 2 - Flowchart for Carrier to Noise Measurements.....	9
Figure 3 – Sketch of Noise Components.....	14

ANSI/SCTE 17 2018

## List of Tables

<b>Title</b>	<b>Page Number</b>
Table 1 - Analyzer BW Correction for HP 8591x .....	11
Table 2 - Noise Near Noise Corrections .....	13

ANSI/SCTE 17 2018

## 1. Introduction

### 1.1. Executive Summary

This document describes test techniques for measuring RF thermal noise and RF “noise-like” intermodulation with respect to desired RF signals.

### 1.2. Scope

This procedure defines the measurement procedure for determining the ratio of carrier to thermal noise and “noise-like” interference for broadband telecommunications system components. The test involves measuring the noise levels, or the combined noise plus “noise-like” intermodulation product levels, relative to the carrier level of a CW signal. The noise contribution of the test equipment is also measured to allow for correction of readings near the test equipment noise floor. ANSI/SCTE 96 2013, Cable Telecommunications Testing Guidelines, has additional definitions common to this and other SCTE test procedures.

### 1.3. Benefits

The use of these techniques will provide a standardized method to predict the effect of RF thermal noise and “noise like” intermodulation on system performance. It will also provide a standard means of making comparisons between the performance of various types of RF equipment.

### 1.4. Intended Audience

The intended audience contains both system operators and RF equipment manufacturers.

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

Future versions may contain a discussion of how to relate the results described herein to the performance OFDM and OFDMA (either in a 6 MHz equivalent block or in a 25 kHz or 50 kHz subcarrier).

## 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 96 2013: Cable Telecommunications Testing Guidelines

### 2.2. Standards from Other Organizations

- No normative references are applicable.

### 2.3. Published Materials

- No normative references are applicable.