

ANSI/CTA Standard

**Intermediate Frequencies for Entertainment
Receivers**

ANSI/CTA-109-D R-2015

(Formerly ANSI/CEA-109-D R-2015)

May 2010



**Consumer
Technology
Association**

NOTICE

Consumer Technology Association (CTA)TM Standards, Bulletins and other technical publications are designed to serve the public interest through eliminating misunderstandings between manufacturers and purchasers, facilitating interchangeability and improvement of products, and assisting the purchaser in selecting and obtaining with minimum delay the proper product for his particular need. Existence of such Standards, Bulletins and other technical publications shall not in any respect preclude any member or nonmember of the Consumer Technology Association from manufacturing or selling products not conforming to such Standards, Bulletins or other technical publications, nor shall the existence of such Standards, Bulletins and other technical publications preclude their voluntary use by those other than Consumer Technology Association members, whether the standard is to be used either domestically or internationally.

Standards, Bulletins and other technical publications are adopted by the Consumer Technology Association in accordance with the American National Standards Institute (ANSI) patent policy. By such action, the Consumer Technology Association does not assume any liability to any patent owner, nor does it assume any obligation whatever to parties adopting the Standard, Bulletin or other technical publication.

This document does not purport to address all safety problems associated with its use or all applicable regulatory requirements. It is the responsibility of the user of this document to establish appropriate safety and health practices and to determine the applicability of regulatory limitations before its use.

This document is copyrighted by the Consumer Technology Association (CTA)TM and may not be reproduced, in whole or part, without written permission. Federal copyright law prohibits unauthorized reproduction of this document by any means. Organizations may obtain permission to reproduce a limited number of copies by entering into a license agreement. Requests to reproduce text, data, charts, figures or other material should be made to the Consumer Technology Association (CTA)TM.

(Formulated under the cognizance of the CTA **R4 Video Systems Committee**.)

Published by
©CONSUMER TECHNOLOGY ASSOCIATION 2015
Technology & Standards Department
www.cta.tech

All rights reserved

FOREWORD

This standard was developed under the auspices of the Consumer Electronics Association (CEA) R4 Video Systems Committee.

CEA-109-D supersedes EIA-REC109-C and CEA-REC109-C.

NOTE—In 2003, CEA redesignated EIA/CEA standards and bulletins, and those EIA standards under CEA auspices, as CEA standards or bulletins, respectively. Please see <http://global.ihs.com> for the most recent designation.

CONTENTS

1 Scope	1
2 References	1
2.1 Informative References	1
2.1.1 Informative Reference List	1
2.1.2 Informative Reference Acquisition	1
3 IFs for Analog FM Broadcast Receivers	1
4 IFs for Analog AM Broadcast Receivers	1
5 Television Receivers	1
5.1 IFs for Single Conversion Analog NTSC Television Receivers	2
5.2 IFs for Single Conversion Digital Television Receivers	2
5.3 IFs for Double Conversion Analog and Digital Television Receivers	2

Intermediate Frequencies for Entertainment Receivers

1 Scope

CEA-109-D specifies Intermediate Frequencies (IFs) to be used in Standard Broadcast (AM), FM, and TV broadcast receivers.

In CEA-109-D, the term Intermediate Frequency (IF) refers to the dominant interference-rejecting and passband-shaping circuits in receiver front-ends.

2 References

2.1 Informative References

2.1.1 Informative Reference List

47 C.F.R. §73.207(b), Minimum Distance Separation Between Stations

47 C.F.R. §73.682(a)(3), TV Transmission Standards

47 C.F.R. §73.698, Tables

CEA-542-B, Cable Television Channel Identification Plan, July 2003

2.1.2 Informative Reference Acquisition

CEA Standards and Bulletins:

- Global Engineering Documents, World Headquarters, 15 Inverness Way East, Englewood, CO USA 80112-5776; Phone 800-854-7179; Fax 303-397-2740; Internet <http://global.ihs.com>; Email global@ihs.com

Federal Communications Commission (FCC) Regulations:

- U.S. Code of Federal Regulations (C.F.R.), U.S. Government Printing Office, Washington, D.C. 20401; <http://www.access.gpo.gov/nara/cfr/cfr-table-search.html>

3 IFs for Analog FM Broadcast Receivers

FM broadcast receivers typically use 10.7 MHz as the IF.

NOTE—This is consistent with the FCC channel spacing requirements in 47 C.F.R. §73.207(b).

4 IFs for Analog AM Broadcast Receivers

AM broadcast receivers typically use 455 kHz or 450 kHz as the IF.

5 Television Receivers

For single-conversion analog or digital television receivers, the (one) filter performing the IF function is typically centered on 44 MHz.

In the case of double-conversion analog or digital television receivers, a translation of the input signal to a higher first IF may occur, and this may be associated with some rejection of interference (e.g., image frequencies). Such double-conversion receivers typically have a second IF, typically with much narrower bandwidth, and typically centered on 44 MHz. Further translation of the 44 MHz IF output to lower frequencies may occur at the discretion of the receiver designer (e.g., to facilitate analog-to-digital conversion), but such lower frequencies are not considered IFs as CEA-109-D defines IF.

By using 44 MHz as the first IF, analog television receiver designs benefit from associated protections built into the FCC channel assignments. In addition, both analog and digital television receiver designs benefit from the identification of TV-IF spectrum that could be vulnerable to interference from any new services that might seek to use this band.