

CEA Standard

Multi-Channel TV Sound System
BTSC System Recommended
Practices

CEA TVSB5-R2005

July 1985



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(Formulated under the cognizance of the CEA's **R4 Video Systems Committee.**)

Published by

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Technology & Standards Department
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PREFACE

These recommended practices on the BTSC system for multichannel television sound (MTS) have been prepared by the Ad hoc working Group of the Multichannel Sound Subcommittee's Steering Committee of the EIA Engineering Department's Broadcast Television Systems Committee.

This bulletin is intended to be a living document. Users may find in it what they consider incomplete or unclear information suggestions for the next edition are invited. They should be sent to:

BTSC SYSTEM
MULTICHANNEL TELEVISION SOUND
RECOMMENDED PRACTICES

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- A1. The use of subcarrier frequencies in the aural baseband of television transmitters, Second Report and Order FCC Docket No.21323 (RM-2836), released April 23, 1984. Erratum released June 26, 1984.
- A2. OST Bulletin No.60, Multichannel sound transmission and audio processing requirements for the BTSC system (April 1984).
- B. 75 us equivalent input modulation; L.B.Tyler.
- C. RF transmission and antenna considerations; J.J. Gibson.
- D. Relations between amplitudes and phases of the stereophonic difference encoded signal "D" and the stereophonic sum modulating signal "M" in the BTSC system when a sinewave feeds the left input; J.J. Gibson.
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- G. Aural carrier deviation by composite stereo -need for calibration; Pieter Fockens.
- H. Pilot protection *in* the BTSC system; Pieter Fockens.
- I. A proposed test signal for measuring crosstalk between subchannels; J.J. Gibson.
- J. BTSC companding programs -DEBEX; J.J. Gibson.
- K. Calculations of expander noise reduction and noise pumping *in* the presence of signals; J.J. Gibson.

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4. Electrical Performance Standards for Television Broadcast Demodulators, EIA RS-462 (May, 1979).

1. INTRODUCTION

1.1. Scope

This document is intended to serve the industry in the form of recommendations for anyone wishing to practice multichannel television sound (MTS) in accordance with the BTSC system and the FCC Rules governing its use. Both the FCC Report and Order in Docket 21323 which authorized MTS, and the OST Bulletin No.60 (OST 60 gives a technical description of the BTSC system) referred to in that report are reproduced in Appendix A.

This document is intended for equipment manufacturers and broadcasters. For manufacturers, there is discussion material useful to determine design tradeoffs together with recommended performance standards. For broadcasters, there is discussion and information, which allows individual equipment items to be defined in terms of performance so that the transmitter plant will perform properly as a system. Receiver issues are identified which are of particular significance to the broadcaster as well as to the receiver manufacturer.

While there is herein much useful information for the CATV industry, this document does not directly address the CATV MTS application.

1.2 Description of the System and Its Protection

The transmission standards are graphically illustrated in Figure 1.2.1 and summarized in Table 1.2. More detailed system standards are found in OST 60 and the total system block diagram in Figures 1.2.2 and 1.2.3.

The main-channel aural-carrier modulation consists of an (L+R) audio signal. It is subjected to 75 μ s preemphasis. The (L-R) audio signal is subjected to compression (the transmitter part of the companding system that includes complementary expansion in the receiver). The compressed (L-R) signal causes double-sideband, suppressed-carrier amplitude modulation of a subcarrier at $2f_{\text{H}}$ where f_{H} is the transmitted picture horizontal scanning frequency, 15.734 kHz. The audio bandlimits of both preemphasized (L+R) and of encoded (L-R) are 50 Hz and 15 kHz.

The main channel peak deviation is 25 kHz. The stereophonic subchannel peak deviation is 50 kHz. When L and R are statistically independent, the combined peak deviation of the main channel and the stereophonic subchannel is also 50 kHz when full interleaving exists. When (L+R) and (L-R) signals do not have matching pre-emphasis characteristics (as is the case when (L-R) is compressed), the combined deviation of main channel and stereophonic subchannel is constrained to 50 kHz. The separate components assume their respective natural levels as dictated by the acoustic scene.