

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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In the Matter of)
)
Advanced Television Systems)
and Their Impact Upon the)
Existing Television Broadcast)
Service)

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

MM Docket No. 87-268

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REPLY COMMENTS OF APPLE COMPUTER, INC.

Apple Computer, Inc. ("Apple") hereby submits the following reply comments with respect to the Fifth Further Notice of Proposed Rule Making in the above-captioned proceeding. Apple is also participating in this proceeding through its membership in the Computer Industry Coalition on Advanced Television Service ("CICATS"). Apple wholeheartedly supports the reply comments submitted by CICATS in this proceeding and is submitting these separate reply comments to rebut the one remaining affirmative argument in support of interlace.

Everyone — including the Commission and the Advisory Committee on Advanced Television Service ("ACATS") — recognizes that progressive scanning is superior to interlace scanning.¹ Indeed, those in the academic and computer communities have demonstrated convincingly that an exclusively progressive digital television ("DTV") video transmission format will reduce costs to consumers associated with migration to DTV by billions of dollars, enable interoperability between computers and television and, in this regard, allow DTV to play a central role in the development of the National Information Infrastructure ("NII").²

¹ See, e.g., ACATS, Advisory Committee Final Report and Recommendation (November 28, 1995) at 14; Advanced Television Systems and Their Impact on the Existing Broadcast Service, Notice of Inquiry, 2 FCC Rcd 5125 (1987) at ¶ 6; Comments of Sony Electronics Inc. at 15.

² See, e.g., Comments of the CICATS at i-v; ; Comments of William F. Schreiber of the Research Laboratory of Electronics at the Massachusetts Institute of Technology ("MIT"); Comments of Richard J. Solomon, Branko J. Gerovac, Clark E. Johnson, and David C. Carver of the Research Program on Communications Policy at MIT; Comments of Lee McKnight of MIT's Research

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That said, supporters of the ACATS standard continue to assert that the inclusion of interlace scanning techniques in a DTV video transmission standard is essential for a number of reasons, including that interlace scanning is superior to progressive scanning for the transmission of events characterized by a high degree of unpredictable motion (*e.g.*, live news and sporting events).³ Critics of interlace have made an effective case, but insufficient attention has been given to the “unpredictable motion” argument. As discussed below, however, that argument does not justify the inclusion of interlace in a DTV video transmission standard.

The engineering report prepared by Eric Petajan of AT&T Bell Laboratories entitled “A Video Compression Efficiency Analysis Using Progressive and Interlaced,” concludes that, based on a range of experiments, progressive scanning yields higher picture quality than interlace “on a wide variety of scenes.”⁴ The only exception, Mr. Petajan notes, is scenes with high amplitude random noise, in which case there is a “somewhat visible difference in picture quality” in favor of interlace.⁵ That said, Mr. Petajan states that the interlace format of scenes with high amplitude random noise still contain “visible interlace artifacts”⁶

In light of the substantial costs to the public associated with interlace and the significant public interest benefits in an all-progressive DTV standard, this “somewhat visible difference” cannot justify the inclusion of interlace in a DTV standard. While at present there may be a slight quality enhancement using interlace scanning techniques for sports-like programming, this advantage will be eliminated in the near future. As explained in detail in Appendix I to the initial

Program on Communications Policy and Joseph P. Bailey of MIT’s Technology, Management and Policy Program.

³ Comments of Sony Electronics Inc. at 19 and 21.

⁴ “A Video Compression Efficiency Analysis Using Progressive and Interlaced,” by Eric Petajan, AT&T Bell Laboratories, at p. 6 of Appendix K to CICATS Comments.

⁵ Id.

⁶ Id.

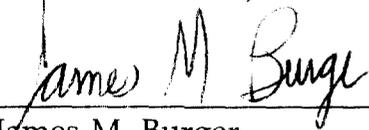
comments submitted by DemoGraFX, by making minor changes to MPEG-2, temporal and resolution layering of progressive transmissions can be enhanced to a degree that will make it superior to interlace for the transmission of images marked by a high level random, unpredictable motion.⁷

Given the rapid technological progression in the decoder chip industry, these minor changes will be made in the near term⁸ Moreover, because not even the most optimistic DTV proponent expects the migration to DTV to occur in the immediate or even near future, these minor adjustments to MPEG-2 can be made in a time frame that in no way will retard the introduction of DTV.

In any event, the enormous costs of including interlace in a DTV transmission standard (*e.g.*, the huge additional and unjustified costs imposed on consumers and the barriers to interoperability among media) outweigh any public interest benefit associated with the existing modest quality difference derived from use of interlace to transmit random, high motion programming. Accordingly, in the event the Commission elects to adopt a DTV standard, that standard should exclude the use of interlace scanning techniques

Respectfully submitted,

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⁷ Comments of DemoGraFX at Appendix I ("Temporal and Resolution Layering In Advanced Television").

⁸ *Id.* at 10.