Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of	)	
	)	
Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television	)	MM Docket No. 00-39

COMMENTS OF MOTOROLA, INC.

Motorola, Inc. (Motorola) hereby submits these comments in response to the FCC's Further Notice of Proposed Rulemaking in the above-captioned proceeding.[1] Motorola takes this opportunity to comment on: (1) the potential requirement to include digital television (DTV) receivers and decoders in certain types of television sets; (2) issues associated with television set labeling; and (3) incorporation of the amended ATSC standards into FCC rules.

Motorola's position as a major consumer electronics manufacturer, designing everything from cable modems and set-top equipment to wireless handsets, provides it with a unique perspective on developing DTV technology. The transition to DTV in the United States affects almost every business sector within Motorola. Motorola's Semiconductor Product Sector is directly involved in the design and manufacture of advanced circuitry to enable affordable DTV reception. Motorola's Network Sector is a leading manufacturer of digital consumer and commercial terminals designed to deliver broadband communications, including DTV to multichannel video subscribers, over its advanced end-to-end digital cable system equipment. This sector also produces the advanced infrastructure for those wireless communications over

[1] *In the Matter of Review of the Commission's Rules and Policies Affecting the Conversion to Digital Television*, MM Docket No. 00-39, FCC 01-24, *Report and Order and Further Notice of Proposed Rule Making*, released January 19, 2001 (*hereinafter Notice*).

spectrum in the 698-806 MHz bands enabled by the DTV transition. The Personal Communications Sector will design and manufacture the handsets that will be used by consumers to reach their wireless service provider in this spectrum.

Motorola has participated in numerous Commission proceedings related to the DTV transition, commenting extensively on the technical characteristics of the spectrum at issue in the Commission proceeding regarding service and operational rules[2], as well as the need to promote a speedy transition to DTV in order to make the spectrum available to wireless communications entities, including public safety users, private wireless carriers and commercial wireless carriers.[3] Motorola is happy to offer its expertise and unique perspective to the Commission on issues relating to DTV receivers and decoders. As always, the Commission must be cautious regarding any activity that may alter the development of market forces, and the presumption should be against regulation unless a compelling showing is made that government action is necessary to ensure a consumer benefit and advance the public interest. In assessing the market developments in this area, the Commission must examine, among other things, the potential costs to television set manufacturers and consumers of a DTV receiver and decoder requirement. It must also examine the potential benefits such a requirement would have in making the spectrum in the 700 MHz band more readily available to wireless service providers and the consumers of those services, including public safety agencies, private wireless carriers and commercial

---

[2] *See, e.g., In the Matter of Service Rules for the 746-764 and 776-794 MHz Bands and Revision to Part 27 of the Commission's Rules,* WT Docket 99-168.

[3] *See, e.g., In the Matter of the Development of Operational, Technical and Spectrum Requirements for Meeting Federal, State and Local Public Safety Communication Requirements Through the Year 2010, Establishment of Rules and Requirements for Priority Access Service,* WT Docket No. 96-86.

wireless carriers. We submit the following information to assist the Commission in its determination.

I. New Product Development Demonstrates that DTV Receivers and Decoders Can Be Integrated into Sets At A Relatively Low Cost

Motorola believes it is uniquely qualified to address the Commission's questions and concerns about the cost impacts to consumers of a DTV receiver/decoder requirement. As a leading manufacturer of a full line of DTV products, Motorola has aggressively deployed advanced digital cable system equipment, including digital encoders, decoders and head-end transcoding equipment. In addition, Motorola's receiver and decoder chip sets, fully compliant with the ATSC terrestrial broadcast DTV standards, enable TV set manufacturers to deliver high performance, low cost integrated DTV sets to consumers.

In late 1999, Motorola began development of a highly integrated DTV receiver/decoder product family that allows set manufacturers to rapidly convert an existing analog TV set into a hybrid analog/digital TV set at minimum cost. The first of these "turnkey" system solutions, the M-DTV™ module product line, went into production in late 2000 and is designed into integrated DTV sets from several different set manufacturers. Examples of fully functional, production-ready DTV sets incorporating the M-DTV™ were demonstrated at the Consumer Electronics Show in January 2001, and these DTV sets are expected to appear in retail stores no later than the third quarter of 2001.[4]

---

[4] The M-DTV™ module includes a high-performance 8-VSB demodulator, an MPEG-2 video decoder, a Dolby™ digital audio decoder, a Motorola PowerPC™ microcontroller and system software that controls all DTV receiver/decoder functions and provides a high-level programming interface to the TV set's host microprocessor. To minimize cost, the modules re-

(Continued...)

The M-DTV™ module enables low-cost Standard Definition TV (SDTV) sets utilizing a 480 line interlaced NTSC display (480i). Motorola's MPEG-2 decoder chip decodes any of the 18 video formats specified in the ATSC standard and converts them to 480i at 4:3 or 16:9 aspect ratio for this application. Similarly, the Dolby™ AC-3 audio data is decoded and converted to stereo audio for presentation to the internal audio system normally used for analog TV.

The M-DTV™ module also enables low-cost Enhanced Definition TV (EDTV) sets utilizing a 480 line progressive scan display (480p). Its MPEG-2 decoder decodes any of the 18 video formats specified in the ATSC standard and converts them to 480p at 4:3 or 16:9 aspect ratio. It can de-interlace 480i video for presentation as 480p. The Dolby™ AC-3 audio data is decoded and converted to stereo audio for presentation to the internal audio system normally used for analog TV. Digital audio data is also output for 5.1 channel decoding by an external audio decoder, as is done in many consumer Digital Versatile Disk (DVD) players.[5]

M-DTV™ modules are priced today to support hybrid analog/digital SDTV and EDTV sets selling at approximately a $200 premium over the equivalent NTSC set. For low-cost DTV

(...Continued)
use circuits already included in an analog television. A single radio frequency (RF) tuner is used for both analog and digital TV reception. Existing video and stereo audio output circuits in the analog television are also used for DTV, and the module draws its power from the existing power supply in the analog TV chassis.

[5] M-DTV™ modules employ Motorola's high-performance 8-VSB receiver, the MCT2100. During the course of development of these modules, Motorola has succeeded in substantially improving 8-VSB reception performance compared to the achievements reported in 1999 when the MCT2100 was first introduced. These performance improvements were achieved while simultaneously reducing the overall cost of the 8-VSB receiver.

sets, the most popular sizes are in the 27”-34” range.[6] For this screen size, consumers, and even industry expert viewers, report an HDTV-like viewing experience that is virtually indistinguishable from genuine HDTV at 1080i. Today, Motorola has engaged with and has successfully designed the M-DTV™ module into several OEM TV chassis. These OEMs are currently in low-volume production as a result of uncertainties regarding the deployment of DTV in the United States.

Motorola sees numerous opportunities to reduce the costs of adding DTV receiver and decoder capability to analog TV sets, but these opportunities are currently hampered by the slow growth of the DTV receiver market. A near-term cost reduction, for example, could be obtained by integrating the components contained within the M-DTV™ modules onto the chassis motherboard of the TV set, and Motorola will fully support CE manufacturers who choose to do this. Motorola understands that at present, its customers prefer to take the lower risk approach of using the M-DTV™ modules as “add-ons” to their existing TV set designs. The most substantial cost reductions, however, will occur when the market reaches high volumes. Higher levels of chip integration and economies of scale will rapidly reduce costs, as the market continues to grow, as has been the case with other high-volume consumer electronics products.[7]

---

[6] Consumer research obtained by Motorola indicates that a large number of consumers would prefer to purchase direct-view DTV sets in this size range rather than larger HDTV sets that are out of the average consumer price range. Consumers planning to purchase a TV set in the next three years expect to pay an average of $600-$800. For DTV, consumers say they would pay an average of a 22% premium.

[7] Motorola estimates that, if DTV receivers and decoders were included in a large percentage of all TV sets, economies of scale could reduce the retail cost differential between NTSC sets and SDTV/EDTV sets to approximately $50 by 2006. This is due to the competitive pressures and incentives to accelerate investment in DTV receiver and decoder development that would ensue from high volumes.

(Continued...)

Finally, the *Notice* also solicited comments on how best to implement DTV reception capability requirements, if the Commission were to adopt them. Motorola fully agrees with the Commission that it would not be economically feasible today to require DTV capability in smaller screen TV sets, *i.e.*, smaller than 27 inches. The cost of today's DTV receiver components would significantly inflate the cost of these small-screen TVs. For higher-priced TV sets in the larger screen sizes, however, consumer research indicates that the added cost of today's DTV receiver components is commensurate with the premium that consumers expect to pay for a DTV set over an analog set.

II. Television Set Labeling

Motorola supports voluntary industry labeling of analog, digital and hybrid analog/digital TV sets in a manner that clearly indicates to the consumer the types of services supported and not supported by the internal receiver(s). Motorola believes that voluntary industry labeling can adequately address concerns regarding consumer information on DTV set capabilities and that no further government regulation is necessary.

III. Update on A/53 Standard

The *Notice* further requested comments on whether the Commission should update its rules to reflect the March 16, 2000 amendment to ATSC standard A/53. Motorola supports the existing voluntary ATSC standards and ongoing standards development work of the ATSC, including current ATSC standards activity that may lead to further changes in document A/53. Motorola believes that the FCC should avoid incorporating the amended ATSC standard at this

---

(...Continued)

time as the standard is still fluctuating. Motorola finds no compelling need for an update of the FCC rules pertaining to adoption of changes to A/53 or other ATSC standards documents.

IV. Conclusion

Motorola has invested considerable funds and effort to design an efficient and cost-effective technology solution in the M-DTV™ module that it believes can greatly streamline the transition to DTV by enabling high-performance analog/digital TV sets at retail prices commensurate with consumer expectations for DTV sets in the most popular screen sizes. Motorola forecasts substantial cost reductions through higher density semiconductor technology evolution and economies of scale that will occur as DTV becomes more persuasive. Motorola is working diligently with TV manufacturers and others in the industry to incorporate this innovative technology into TV sets and in furthering the DTV transition.

Finally, Motorola supports voluntary industry labeling of TV sets and voluntary industry implementation of DTV receivers and decoders compliant with existing and evolving ATSC standards.

Respectfully Submitted,

__/s/_____
Christine G. Crafton
Vice President and Director
Broadband Regulatory Policy

__/s/_____
Jeanine Poltronieri
Director
Telecommunications Strategy and Regulation

_/s/_____
Joel Klein
Director, Marketing
Semiconductor Products, Entertainment Solutions

Motorola, Inc.
1350 I Street, NW
Washington, DC 20005-3305
Tel: 202-371-6870

April 5, 2001