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BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, DC 20554

In the Matter of)
The Impact of Advanced)
Television Technologies)
on Local Television)
Broadcasting)

RM-5811

COMMENTS OF MOTOROLA, INC.

Motorola, Inc. (hereinafter Motorola) is pleased to submit the following
Comments in the above-entitled matter.

Respectfully Submitted,

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INTRODUCTION

The Association of Maximum Service Telecasters, Inc. et al filed a Petition For Notice of Inquiry relative to issues arising from the potential use of High Definition Television (HDTV). A companion Petition for Special Relief was also filed relating to Gen. Docket No. 85-172. Motorola is filing extensive comments in the latter proceeding. For completeness of the record, however, we are including herein portions of those comments particularly relevant to HDTV.

As indicated below, the Petition for Special Relief is without merit, and should be dismissed. We have no objection to promulgation of a Notice of Inquiry on advanced television technologies if it is believed to be useful. However, this Notice need not and should not in any way defer expeditious action on Docket 85-172.

SPECTRUM PROPOSED IN DOCKET 85-172 FOR LAND MOBILE USE IS NOT RELEVANT TO POTENTIAL PROVISION OF HDTV SERVICE

The Petition for Special Relief filed by the Association of Maximum Service Telecasters, inc. (AMST), the National Association of Broadcasters (NAB), and others seeks to defer action in Docket 85-172, arguing that existing unused UHF television spectrum is needed to accommodate High Definition Television (HDTV). The thrust of this petition is without merit, however, for three reasons:

- o The unused UHF-TV spectrum in major markets is wholly inadequate to support the upgrade of existing television stations equitably to HDTV

(based on the broadcasters stated requirement of an additional 3 MHz per television station).

- o Fortunately, techniques such as those developed by Faroudja, Iredale and others offer promise for a vastly improved television picture without requiring additional spectrum.
- o Furthermore, television picture tube considerations are likely to be more limiting to the growth of HDTV than spectrum.

With regard to HDTV spectrum needs, LMCC's comments analyze and expand upon an AMST study entitled, "Preliminary and Partial Study of the Use of the UHF Band to Accommodate Local High Definition Television". The AMST study indicated that there was sufficient unused UHF-TV spectrum to support HDTV in six major markets, assuming that land mobile sharing was not permitted. The LMCC analysis, however, shows the AMST conclusions to be invalid because AMST failed to consider a large number of television stations which presumably would also require additional spectrum for HDTV, which were within the co-channel reuse distance from city centers.

As a specific example, LMCC showed that in the New York/Philadelphia area there were 17 television stations which would not be able to upgrade to HDTV because of insufficient spectrum in the UHF-TV band even if the land mobile sharing proposal was not adopted. Similarly, in Los Angeles and in Chicago, there were 21 and 5 television stations, respectively, which would likewise be denied the opportunity to employ HDTV. Clearly, with shortfalls of

these magnitudes in New York/Philadelphia and Los Angeles, AMST's proposal to employ unused UHF-TV spectrum for HDTV is not feasible. It would be grossly unfair to permit what amounts to only about one-half of the stations in each of these two areas to provide HDTV service to the public. The AMST proposal to use unused UHF-TV channels for HDTV is unresponsive to the need, if there is one, to provide terrestrial HDTV. Therefore, the Petition for Special Relief should be dismissed and the Commission should move forward with adoption of the land mobile TV sharing proposal in Gen. Docket 85-172.

Fortunately, substantial improvements in the current NTSC format are possible which are well known and documented. See, for example, William F. Schreiber, "Improved Television Systems: NTSC and Beyond", SMPTE, Feb. 1987, ATRP-T-60, pp. 1-14. Also, Y. Faroudja, "Optimizing NTSC to RGB Performance", Faroudja Laboratories Inc., 946 Benicia Ave., Sunnyvale, CA 94086, and Joseph Roizen, "Dubrovnik impasse puts high-definition TV on hold", IEEE Spectrum, Sept. 1986, pp. 32-37. In fact such improvements lie at the very heart of the HDTV scheme proposed by Glenn and cited in the AMST Petition for Notice of Inquiry. This scheme, which requires additional spectrum beyond the 6 MHz associated with a single television channel, has perhaps led to the belief that HDTV and the need for additional spectrum are synonymous. Such is not the case. For example, Iredale has proposed an HDTV scheme that is NTSC compatible and requires only the currently allocated 6 MHz channel, ("A Proposal for a New High-Definition NTSC Broadcast Protocol", IEEE Tr. on Consumer Elec. Vol. CE-33, No. 1, Feb. 1987, pp. 14-27).

Even if there were sufficient spectrum to accommodate HDTV as portrayed by AMST, or alternatively if a technique is ultimately chosen which operates within existing 6 MHz channels, a problem of picture quality remains which may significantly inhibit the advance of television picture quality.

Picture quality is limited by, and to varying degrees degraded by, the characteristics of each of the elements which convey the TV picture information. The process starts with the camera and proceeds through the transmission equipment, the over-the-air propagation path, TV signal reception and processing, and finally ends with the display on the picture tube.

Some of the limitations and degradations depend on the particular system being used such as NTSC, enhanced NTSC, HDTV, etc. However, the most important limitations to picture quality are common to all of these systems. Of these limitations, the most critical are those imposed by the picture tube itself.

There has been a 30-year history of attempts to improve the picture definition without sacrificing picture brightness. The initial color TV sets offered to the market a compromise which favored improved definition at the expense of reduced brightness. This required the picture to be viewed in subdued lighting rather than normal room lighting. However, the marketplace rejected that trade-off and preferred instead to have improved picture brightness at the expense of picture definition.

The basic physics which necessitates this trade-off relates to the fact that for increased brightness, a more intense electron beam is utilized which tends to spread the spot size and reduce definition. On the other hand, attempts to improve definition utilized narrower, less intense electron beams which reduce the spot size but results in significantly reduced brightness.

Over the past 30 years, continuing attempts have been made to eliminate the need for this trade-off compromise, but with only limited success. It appears, therefore, that picture tube limitations are likely to be a key limiting factor in any attempt to enhance television quality.
