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

In the Matter of	)	
	)	
ADVANCED TELEVISION SYSTEMS AND THEIR IMPACT ON THE EXISTING TELEVISION BROADCAST SERVICE	)	MM Docket No. 87-268

AT&T COMMENTS

American Telephone and Telegraph Company ("AT&T") respectfully submits the following comments on the Commission's Notice of Proposed Rulemaking ("NPRM"), FCC 91-337, released on November 8, 1991. The NPRM proposes policies and rules for implementing advanced television service in this country.

AT&T is a partner with Zenith Electronics Corporation in development of the Digital Spectrum Compatible ("DSC") all-digital high-definition television ("HDTV") simulcast system. AT&T submits these comments in particular to address the Commission's inquiries in paragraph 47 of the NPRM, where the Commission notes that "ATV compatibility with other forms of transmission and applications would appear to be a desirable policy objective, provided that it does not unduly compromise other goals in this proceeding."

Specifically, the Commission requests comment on the extent to which it can or should encourage compatibility of a terrestrial broadcast ATV system with

other media such as satellite transmission or video cassette recorders, and with computer applications and other forms of data transmission. Id. The Commission also seeks comment generally on the overall importance of an ATV system's ability to interconnect with other applications and delivery systems, particularly as such interconnection relates to an ATV system's ability to "be interoperable, extensible, scalable, and harmonious with standards for other applications." Id.

AT&T agrees with the Commission that compatibility principles such as interoperability are important policy objectives in establishing an HDTV standard.* Consumers, for example, need to have an ATV system which allows them to use camcorders to record images that can be shown on HDTV receivers. Examples of the transfers or connections requiring compatibility include:

> use of different media including terrestrial broadcast, satellite, fiber optic networks, and coaxial cable;
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> consistency with existing and emerging telecommunications protocols and standards;
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> transfers from film to HDTV to NTSC to ultra-high definition formats;

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* Interoperability is the ease of conversion between different media, applications, industries, generations of technology, performance levels and geopolitical technological variations. Interoperability does not necessarily mean that one item of video equipment will perform multiple functions. Instead, interoperability ensures that different types of equipment and systems will be compatible.

use of images or equipment in different industries, including entertainment television, education, and medical industries;

various applications of image technology, including CAD-CAM, image databases, computer art, and entertainment television;

use of image data in different time periods, as video data are archived or stored for later use by historians or others; and

image transfers between the United States, Japan, Europe and the rest of the world.*

Despite the importance of compatibility for an ATV standard, the Commission (NPRM, ¶ 47) correctly notes that the desirability of compatibility has to be balanced against -- and should not compromise -- the Commission's other fundamental goals in this proceeding. Those goals include (NPRM, ¶ 2): prompt implementation of a new generation of affordable, higher quality television; coverage comparable to or better than today's NTSC coverage; and use of 6 MHz channels.

Compatibility questions involve trade-offs because implementing greater levels of compatibility could result in the loss of other technical features or in increased costs. For example, compatibility could be

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* Because it is both a computer manufacturer and telecommunications firm, in addition to a proponent of an ATV system, AT&T is very aware of the crucial importance and advantages of technological compatibility. Indeed, Zenith and AT&T designed their all-digital DSC-HDTV system from the outset to ensure that the system would offer adequate compatibility among other media and applications.

further enhanced by eliminating so-called "motion-compensated predictive coding" from the compression process. To do so, however, would result in lower compression and a resulting decrease in the quality of the picture that can be transmitted over a given spectrum range.

Moreover, implementation of greater compatibility characteristics in an HDTV system involves complex cost issues. On one hand, greater compatibility may increase costs because HDTV receivers likely will cost more if manufacturers have to implement extensive compatibility features. On the other hand, greater compatibility may lower costs by, for example, decreasing image format conversion costs and permitting development of certain components on a high-volume basis for use in multiple applications or types of equipment.

In light of these types of trade-offs potentially involved in the implementation of greater compatibility, the Commission should not establish a rigid set of standards which require an HDTV system to be totally compatible with all potential technologies or applications. It is simply unrealistic to attempt to define standards so comprehensive that they can meet all video and image communications needs for the indefinite future.

The Commission currently has a process in place which is actively and successfully addressing compatibility matters. Specifically, the Advisory Committee on Advanced Television, which the Commission established to recommend an ATV system after investigating all relevant issues, is actively investigating compatibility issues such as interoperability through its subcommittees. These subcommittees are composed of representatives from all affected industries.

This advisory-committee approach has been used successfully in the past in other contexts, such as the development of electromagnetic emission measurement standards,* and it is operating successfully here. Indeed, the Commission's Advisory Committee has been addressing compatibility for quite some time. Early this year, when the Systems Subcommittee of the Advisory Committee developed ten criteria to be used in selecting the best HDTV system, two of those criteria -- "extensibility" and "interoperability considerations" --

* In In the Matter of Procedures for Measuring Electromagnetic Emissions From Digital Devices, Gen. Dkt. No. 89-44, the Commission used the American National Standards Institute to develop a recommended position.

concerned compatibility. The Advisory Committee's Planning Subcommittee, through its Alternative Media Technology and Broadcast Interface Working Group, also is currently conducting a detailed examination of compatibility and interoperability issues. This process permits an in-depth analysis of both the benefits and costs of various levels of compatibility.

Moreover, the Advisory Committee and its subcommittees and working parties have made substantial progress on compatibility issues. For example, the Alternative Media Working Group has developed detailed definitions of key compatibility concepts, which AT&T endorses.* The compatibility concerns reflected in those definitions can be addressed by an all-digital system, four of which are under consideration by the Advisory Committee.** Furthermore, two of the all-digital

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* The key definitions are set forth in Attachment A to these Comments. These definitions are still under review and have not been formally adopted by the Advisory Committee.

** If signals are digital, all systems that process the signals have predictably identical material to process. The significant impact of digital signal representation on compatibility is due to the fact that a signal represented in digital form retains its intrinsic identity regardless of what medium is used means that loss-less transfers can be a part of the interoperability process. In addition, signals in a digital form can be filtered and processed in a predictable and reproducible way. As a result,

(footnote continued on following page)

systems offer features -- progressive scanning and square pixels -- which facilitate compatibility even more.*

Among the compatibility issues which are being resolved by the Advisory Committee process is the development of a system of encoding "headers and descriptors" which will permit receivers to read only the digital data needed for a particular application or generation of technology.** Carefully designed headers and descriptors within the digital HDTV data can be used to identify image data to current and future receivers,

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(footnote continued from previous page)

conversions among formats can be implemented that exactly perform functions based on mathematical theories of sampling, filtering, interpolation and prediction.

* The two systems are the Zenith/AT&T system and the MIT/General Instrument progressive scan system. Progressive scanning, which is the preferred and increasingly prevalent technique used in computer displays, facilitates format conversions because it involves relatively simple filtering operations. Square pixels improve compatibility because they are the basic standard for computer graphics and because they permit much simpler format conversions for all applications.

** The Society of Motion Picture and Television Engineers ("SMPTE") Header-Descriptor task force has made great strides in showing how properly chosen headers and descriptors can enable receivers to locate and process only data that are needed within a mixed data stream, while ignoring unneeded data. This work is being incorporated into the Advisory Committee's examination of compatibility.

thus promoting "extensibility" of an ATV transmission standard over time.* With proper headers and descriptors, older receivers could still function by ignoring information that can only be used by newer or more comprehensive receivers or systems.

In short, the Commission's Advisory Committee approach to system selection is working and should not be delayed out of any concern that issues regarding compatibility are not being addressed and resolved. The Commission should not dictate any particular compatibility requirements beyond reaffirming its conclusion in the NPRM (¶ 47) that compatibility is important and should continue to be evaluated in the Advisory Committee process.

The NPRM (¶ 46) also requests comment on the extent to which a system proponent's patent licensing practices should be considered during the system selection process. AT&T agrees that the selection process should ensure that the winning system proponent will agree to follow reasonable licensing practices. That objective, however, has already been achieved. As the Commission

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* All four of the all-digital systems under consideration provide for auxiliary data in digital form. Only a very small part of that auxiliary data channel capacity is needed for headers and descriptors to make the data streams self-identifying. Consequently, it is not necessary to test these headers and descriptors as part of the current selection process. Instead, after a digital system is selected, the Commission can ensure that the system provides for self-identifying headers and descriptors.

noted in the NPRM, the Advisory Committee ATV Test Procedures Test Management Plan already addresses the question of patent licensing. Each of the ATV system proponents must agree to follow the patent policy of the American National Standards Institute, which requires reasonable patent licensing practices. Consequently, no further Commission investigation or delineation of patent licensing procedures is required.

CONCLUSION

WHEREFORE, for the reasons stated herein, the Commission should continue its process, through the Advisory Committee, of analyzing compatibility and interoperability issues in order to ensure that such features are adequately provided and to compare the relative characteristics of the competing ATV proposals.

Respectfully submitted,

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ATTACHMENT A

KEY DEFINITIONS

Interoperability

The capability of providing useful and cost-effective interexchange of electronic image, audio and associated data: among different signal formats, among different transmission media, among different applications, among different industries, among different performance levels.

Extensibility

A property of a system, format or standards that allows future improvements in performance or format within a common framework, while retaining partial or complete compatibility among systems that belong to the common framework.

Harmonization

The coordination of different advanced image standards in an orderly process.

Scalability

The degree to which video and image formats can be combined in systematic proportions for distribution over communications channels of varying capacities.

CERTIFICATE OF SERVICE

I, Helen Dalba, hereby certify that a true copy of the foregoing "AT&T Comments" was served this 20th day of December, 1991 by first class mail, postage prepaid, upon the following parties.

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