

Appendix F

**Impact of NTSC Taboos on the
Availability of ATV Spectrum**

**IMPACT OF NTSC TABOOS
ON THE
AVAILABILITY OF ATV SPECTRUM**

PURPOSE

To assess the impact of keeping and/or relaxing some or all of the existing NTSC taboos on the availability of spectrum for ATV.

To examine a number of different assignment approaches to reduce and/or minimize the impact of taboos on the availability of spectrum for ATV.

TECHNICAL PARAMETERS

- NTSC TABOOS

Adjacent (Channels $n \pm 1$) = 87.7 km

IF Beat (Channels $n \pm 7$ and 8) = 32.2 km

Half IF (Channel $n + 4$) = 32.2 km

Intermodulation (Channels $n \pm 2, 3, 4$ and 5) = 32.2 km

Cross Modulation (Channels $n \pm 2, \pm 4$) = 32.2 km

Oscillator Radiation (Channel $n + 7$)* = 95.7 km

Sound & Picture Image (Channels $n + 14, 15$) = 95.7, 119.0 km

- Co-channel Separation

ATV-to -NTSC and ATV-to-ATV = 160 km

(Baseline run)

* Data not included in the presentation

ANALYSIS

ATV/NTSC Scenario

Taboo mileage separation restrictions are applied equally to all ATV and NTSC assignments -- similar to the existing NTSC service.

NTSC Scenario

Taboo mileage separation restrictions are applied to all existing NTSC assignments.

NTSC/Co-located Scenario

Taboo mileage separation restrictions are applied to all NTSC assignments except when the taboo channel is co-located.

ADJACENT & IMAGE TABOOS

<u>Taboo</u>	<u>ATV/NTSC Scenario*</u>	<u>NTSC Scenario*</u>	<u>NTSC/Colocated Scenario*</u>
n + 1	47	20	2
n - 1	47	15	1
n ± 1	93	63	30
⁶⁹ n + 14	35	5	3
n + 15	111	30	5
n ± 1, + 14, + 15	338	156	99

* The value denotes the number of HDTV assignments lost relative to co-channel only assignment at 160 km.

INTERMODULATION TABOOS

<u>Taboo</u>	<u>ATV/NTSC Scenario*</u>	<u>NTSC Scenario*</u>	<u>NTSC/Colocated Scenario*</u>
n + 2	3	0	0
n - 2	3	1	0
n + 3	4	0	0
n - 3	5	3	0
09 n + 4	4	0	0
n - 4	5	1	0
n + 5	4	0	0
n - 5	7	0	0
n ± 2, 3, 4, 5	70	50	3

* The value denotes the number of HDTV assignments lost relative to co-channel only assignment at 160 km.

IF-RELATED/ CROSS MODULATION TABOOS

<u>Taboo</u>	<u>ATV/NTSC Scenario*</u>	<u>NTSC Scenario*</u>	<u>NTSC/Colocated Scenario*</u>
n + 7	2	0	0
n - 7	1	0	0
n + 8	3	3	1
n - 8	2	0	0
61 n + 4	4	0	0
n + 4, \pm 7 and 8	33	11	1
<u>Cross Modulation</u>			
n + 2, n + 4	19	1	1
n - 2, n - 4	19	1	0

* The value denotes the number of HDTV assignments lost relative to co-channel only assignment at 160 km.

COMBINED ADJ. IM/XM, IF & IMAGE TABOOS

<u>Taboo</u>	<u>ATV/NTSC Scenario*</u>	<u>NTSC Scenario*</u>	<u>NTSC/Colocated Scenario*</u>
n ± 1	93	63	30
n ± 1, 14, 15	338	156	99*
n + 2, 3, 4, 5	70	50	3
n + 4, ± 7 and 8	19	11	1
n ± 2, 3, 4, 5, 7, 8	135	98	21
n ± 1, 2, 3, 4, 5, 7, 8, + 14, 15	491	304	153*

* The value denotes the number of HDTV assignments lost relative to co-channel only assignment at 160 km.

SUMMARY OF FINDINGS

- **Regardless of which scenario was examined, the adjacent channel taboo was determined to achieve the worst accommodation statistics for ATV, while the IM-related taboos exhibited the best.**
- **NTSC/Co-located Scenario was determined to achieve the best accommodation statistics.**
- **Except for the picture image taboo, the effect of increasing or reducing taboo separation distance has little or no impact on the ATV accommodation statistics.**
- **Allowing exact co-location of the taboo channel slightly/moderately improves the ATV accommodation statistics of ATV. Near co-location of the taboo channel adds little, if any, improvement to the accommodation statistics.**

RECEIVED

NOV 12 1991

Federal Communications Commission
Office of the Secretary

FOURTH INTERIM REPORT OF THE
WORKING PARTY 4
ON ALTERNATIVE MEDIA TECHNOLOGY AND BROADCAST INTERFACE
of the
PLANNING SUBCOMMITTEE
of the
ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE

March 6, 1991

PS/WP4-CC70

FINAL REPORT
of
FCC ACATS Working Party 4
Alternative Media Technology and Broadcast Interface
(Draft March 6,1991)

TABLE OF CONTENTS

1.0 EXECUTIVE SUMMARY

2.0 BACKGROUND

3.0 SUMMARY OF WORK

3.1 EVALUATION OF ATV SYSTEM PROPONENTS

- 1. Suitability for Cable Television Distribution
- 2. Suitability for Satellite Distribution
- 3. Suitability for Terrestrial Microwave Distribution
- 4. Suitability for Fiber Optic Transmission
- 5. Suitability for use in Pre-Recorded Media

3.2 OTHER RELATED WORK

- EIA NTIA FCC
- ATSC NRC NAB
- NCTA CABLE LABS
- IEEE ATTC
- OTHERS

4.0 CONCLUSIONS AND RECOMMENDATIONS

- Spectrum Utilization
- Technology
- Consumer Issues
- Security system Issues
- ATV Implementation

5.0 APPENDIX

Definitions



Advisory Committee on
Advanced Television (ATV) Service

Doc. No. _____

Date MAR 5 1991

ATTACHMENTS:

PS/WP4-0063 Notice and Agenda for June 20, 1990 Meeting

PS/WP4-0064 Minutes of June 20, 1990 Meeting

PS/WP4-0065 Attendance List of June 20, 1990 Meeting

PS/WP4-0066 Electronic Industries Association (EIA)
ATV Multiport Receiver S/Ctte Phase 1
Activites Summary Report Dated March 21,
1990 - E. Lubchenko, Philips Labs.

PS/WP4-0067 Summary of Demonstrations on Business
Aspects of HDTV given to various members
of Congress June 18-19, 1990 - L. Lockwood

PS/WP4-0068 Specs Sheet for 45 Mbps Video Coder/Decoder
made by Compression Labs - L. Lockwood 6/1/90



**Advisory Committee on
Advanced Television (ATV) Service**

Doc. No. PS/WP4-0073

Date _____

**FCC ADVISORY COMMITTEE ON ADVANCED TELEVISION
Planning Subcommittee**

PS/WP-4 Report to the Planning Subcommittee

March 8, 1991

BACKGROUND

Working Party 4 -- Alternative Media Technology and Broadcast Interface has met twice since the third interim report. Attached are documents that were generated and gathered during those meetings.

Previous work of PS/WP-4 includes: 1) characterization of various alternative media namely cable, satellite, microwaves, fiber optics and pre-recorded media; 2) development of specific alternative media test plans ; and, 3) development of a strawman "multiport" document that facilitates consumer interfacing between broadcast ATV and alternative media. Consequently, PS/WP-4 contributed to an increase in the industry's level of awareness on the need to efficiently interface between broadcast ATV and alternative media.

Since December 1989, PS/WP-4 focussed on monitoring the activities of various FCC Working parties and other industry organizations such as ATTC, Cable Labs, NCTA, EIA, AEA, IEEE and ATSC in order to determine the prominent issues concerning interfacing ATV terrestrial broadcast signals with alternative media. In addition, PS/WP-4 studied basic requirements and minimum features of an ATV receiver.

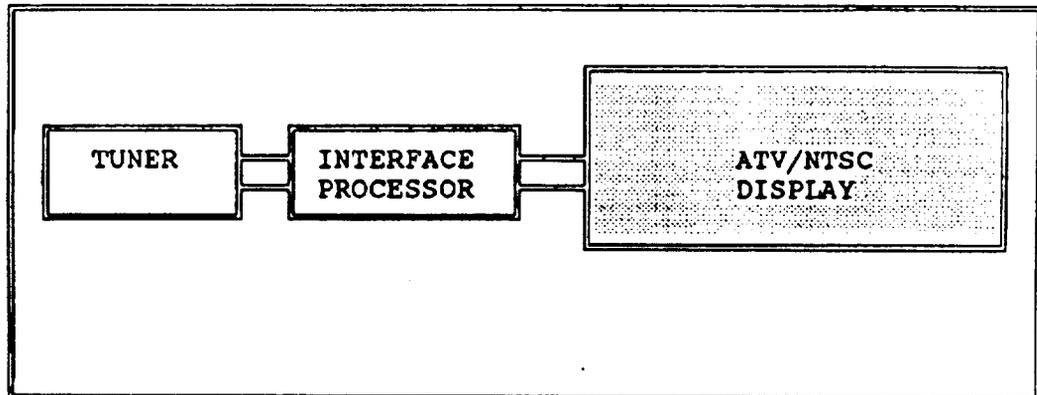
SUMMARY OF WORK and RESULTS

Substantial progress has been made by the EIA and the ATSC in addressing interoperability issues. Document PS/WP4-0066 is a Phase I Activities Summary Report of the EIA ATV Multiport Receiver Subcommittee, which describes an hierarchical family of ATV multiports and their characteristics. They propose three basic structures that will provide receiver manufacturers, television service providers, and consumers with standardized interfaces that can be implemented in various levels of performance and complexity. We commend the EIA for providing very useful information.

PS/WP-4 found that many ambiguous new terms have evolved in the ATV proceedings which created confusion. Thus, PS/WP-4 attempted to simplify and clarify terms in the context of alternative media, and offered the following definition:

An ATV receiver consists of a tuner/demodulator which yields non-carrier protocol(s) to an interface processor and a display. The ATV receiver is capable of accepting non-carrier signals at interface points, and operates in the visual, aural and ancillary domains.

**Basic Elements of an
Advanced Television Receiver**



The interface Processor in the above diagram is a device that accepts non-carrier

protocol(s) such that information can be extracted and/or manipulated for subsequent display.

Conditional access is also an essential element of the selected ATV standard, and PS/WP-4 believes that various issues regarding conditional access, compatibility and interoperability need further study. Some conditional access issues discussed are:

a. Anti-taping

This mechanism embedded in the transmission, distribution and display of ATV signals control the consumer's ability to store or reproduce certain programs or services. The anti-taping mechanism might also include a limit on the number of times a program or service may be viewed or used.

b. Addressability

This feature is the ability of a program or service provider to identify and subsequently control a consumer. Some questions were raised during these discussions; should there be a way for a consumer to access 'all' potential programs or service providers in a timely and non-discriminatory manner? If addressability is desirable, then what is the minimum number of addressable subscribers? Should addressability be transparent to 'all' types of media?

c. Service on Demand

Also called video-on-demand, pay-per-view or near-video-on-demand, this feature is closely linked to the addressability functions and allows consumers to access various services whenever he/she desires.

d. Interactive

A service may be considered Interactive if consumers perceive that exchange of information occur between him/herself and the service provider. Data exchange may or may not be in real time, and the actual flow of information may involve more than one media.

e. Service Tiers

A tier may be defined as an arbitrary combination of programs/services that comprise a single service. Tiers may be further combined and purchased as a single package. The number of tiers that an ATV system is capable of handling need to be defined.

f. Standardized, Universal Access System

Is there a need to standardize a universal access system in which 'all' consumers contact either by phone, mail or other means, one central authorization depot? should 'all' program/service providers be required to participate ?

g. Blackout

The blackout feature is defined as a program/service provider's capability to disable real-time viewing of programs/services for a given region. An alternative program/service may be provided in lieu of the blacked out program for the duration of the blackout time.

CONCLUSION

Much of PS/WP-4's work has been completed, and numerous organizations have picked up on what we began. Even though most ATV system proponents now have digital systems, we believe that the test plans, strawman documents and definitions that we have developed still apply in the digital domain. It is our goal to continue monitoring industry activities and participate fully when needed.

* * *



Advisory Committee on
Advanced Television (ATV) Service

Doc. No. PS/WP4-006

Date MAY 29, 1990

Planning Subcommittee

Working Party 4 -- Alternative Media Technology and Broadcast Interface

=====

MEETING NOTICE

=====

PS/WP-4 will hold a meeting on Wednesday, June 20, 1990 from
10:00 a.m. to 2:00 p.m. at:

National Cable Television Association
Conference Room
1724 Massachusetts Ave.
Washington, D.C. 20036

* * * * *

AGENDA:

1. Progress report from representatives of:

EIA	NTIA	FCC
ATSC	NRC	NAB
NCTA	CABLE LABS	
IEEE	ATTC	

2. Discuss action items (attached) assigned to PS/WP-4 by Planning Subcommittee.

3. Draft an outline and assign members of task force to prepare PS/WP-4 report to Planning Subcommittee.

4. Other business

PS/WP-4

Alternative Media Technology and Broadcast Interface

=====
MINUTES OF THE JUNE 20,1990 MEETING
=====

1. PS/WP-4 met on June 20, 1990 at the NCTA offices in Washington, D.C. The chairman, Mr. Ed Horowitz called the meeting to order at 10:08 A.M. Virgil Conanan served as secretary.
2. The agenda, document number PS/WP4 -0063 was approved without changes. Document number PS/WP4065 is the attendance list.
3. After a brief introduction, the chairman began the discussions of the first item on the agenda. He reported that the Electronic Industries Association (EIA) ATV Multiport receiver Subcommittee, co-chaired by J. Donahue and A. Toth completed a summary report on their Phase I activities. Their report (document number PS/WP4 0066) is a comprehensive document describing a hierarchical family of ATV multiports. The envisaged multiport structure provides a standardized "generic" consumer interface that includes a group of analog minimum service ports, another group of analog extended service ports and finally, a combination of analog and digital ports for the digital extended service.
4. The Institute of Electrical and Electronic Engineers, the National Research Council and the Committee on High Resolution Systems jointly conducted an HDTV workshop. L. Lockwood reported that their discussions included the standardization of an open-architecture digital HDTV that is modular, scaleable and extensible. They recognize the importance of synergies in a multi-media HDTV environment, but participation from the broadcast and cable industries is lacking.
5. The NTIA and other communications committees within the government demonstrated the business aspects of HDTV to various members of the congress. Larry Lockwood summarized the event and submitted a document prepared by the Subcommittee on Telecommunications and Finance, document number PS/WP4 -0067 which lists the companies that participated, and the nature of their demonstration. Emphasizing the importance of video compression in HDTV, he also submitted a specifications sheet for 45 Mbps video coder/decoder made by Compression Labs Document number PS/WP4 - 0068 .

6. The ATSC working group on Interoperability met jointly with the EIA ATV Multiport Subcommittee and reported the outcome of their meeting to the ATSC parent Technology group on distribution. The same report will be made available to PS/WP-4 members.
7. Much of the HDTV work done by the FCC, CABLE LABS, ATTC and the NAB centered around testing of advanced terrestrial television system proponents. The delivery of the standards format converter, a crucial piece of test equipment being developed by Tektronix for the ATTC has been delayed until the fall this year. Work has begun on the cable test bed at ATTC, which is being funded by cable labs. Field testing is now a high priority action item in many working parties within the ATS Advisory Committee.
8. The chairman then addressed the PS/WP-4 statement of work for the fourth period. Regarding the first work item, the chairman said he is satisfied with the results produced by the EIA and he will include the EIA's phase 1 report in PS/WP-4's report to the planning subcommittee.
9. Regarding the second work item, the group identified the DBS systems below. It was noted that each format was developed with a specific target business market, which may or may not encompass terrestrial broadcasting.
 - * Scientific/Atlanta HD-B-MAC
 - * Philips HD-MAC-60
 - * NHK MUSE family
 - * General Instruments DigiCipher
10. To determine compatibility and suitability of a proposed HDTV system for satellite distribution, the group agreed to resubmit to the planning subcommittee a document titled:

Proposed Testing Procedures for Advanced Television Systems
FCC ATS PS/WP-4
Alternative Media Technology and Broadcast Interface

Suitability for Satellite Distribution
Version 3.0
December 13, 1988
11. During the discussions of the third work statement, it was mentioned the original PS/WP-4 test plan already included a complete, conceptual field test plan. Therefore, PS/WP-4 need not do further work on developing a field test plan. Instead, it will

be up to either ATTC, CABLE LABS, or other testing bodies to implement those procedures outlined in the said test plan.

12. Conditional access was mentioned as a necessary component of the chosen ATV standard. Numerous organizations are currently studying the desirable attributes for ATV conditional access. Both the EIA and the ATSC working group on interoperability are investigating the technical issues. However, there are non-technical issues such as economic and regulatory issues that need to be defined. It was felt that the diverse membership of PS/WP-4 makes it an ideal forum to discuss both technical and non-technical issues regarding conditional access, compatibility and interoperability. Some conditional access issues that were identified and need further clarification are:

- a. Anti-taping

The mechanism embedded in the transmission, distribution and display of ATV signals for controlling the consumer's ability to store or reproduce certain programs or services. The anti-taping mechanism might also include a limit on the number of times a program or service may be viewed or used.

- b. Addressability

This feature is the ability of a program or service provider to identify and subsequently control a consumer. Some questions were raised during these discussions. Should there be a way for a consumer to access 'all' potential program or service provider and timely and non-discriminatory manner? If addressability is desirable, then what is the minimum number or addressable subscribers? Should addressability be transparent to 'all' type of media?

- c. Service on Demand

Also called video-on-demand, pay-per-view or near-video-on-demand, this feature is closely linked to the addressability functions and allows consumers to access various services whenever he/she desires.

- d. Interactive

A service may be considered interactive if consumers perceive that exchange of information occur between himself and the service provider. Data exchange may or may not be in real time, and the actual flow of information may involve more than one media.

- e. Service Tiers

A tier may be defined as an arbitrary combination of programs/services that comprise a single service. Tiers may be further combined and purchased as a single package. The number of tiers that an ATV system is capable of handling need to be defined.

f. Standardized, Universal Access System

Is there a need to standardize a universal access system in which 'all' consumers contact either by phone, mail or other means, one central authorization depot? should 'all' program/service providers be required to participate ?

g. Blackout

The blackout feature is defined as a program/service provider's capability to disable real-time viewing of a programs/services for a given region. An alternative program/service may be provided in lieu of the blackedout program for the duration of the blackout time.

13. Other issues raised were: handling of ancillary services, requirements for ghost canceling, data channels, and cable security.
14. There were no new business discussed. The chairman thanked those present and adjourned the meeting at 12:30 P.M.

* * * * *

PS/WP-4 ATTENDANCE LIST
JUNE 20, 1990 NCTA, WASH. D. C.

VIRGIL CONANAN

HBO 1114 6TH AVE
NEW YORK, NY 10036
212-512-5309
FAX 5598

Lawrence W. Lockwood

TeleResources
1111 Army-Navy Dr., B809
Arlington, VA 22202
(703) 920-3795

BOB PLUMMER

DAVID SARNOFF RC
201 WASHINGTON RD
PRINCETON NJ
609-734-2624
FAX 609-734-2901

William Woodward

Scientific Atlanta
Communications Department
4000 ...
...

LORETTA POLK

NATIONAL CABLE TELEV. ASSOC.
LEGAL DEPT.
1724 MASSACHUSETTS AVE. N.W.
WASHINGTON D.C. 20036
202 775-3664
FAX 775-3605