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TO: J.A.Flaherty, Chairman-Planning Subcommittee

FM: R.A.McMann, Chairman - Working Party One

DT: November 1, 1989

RE: Chairman's Report for WP-1

The Planning Subcommittee Chairman in his letter of 15 May 1989 (document number PS-032, also entered as PS/WP1-052), requested that Working Party 1 undertake to complete "unfinished business" as follows:

1. "to specify the minimum number of audio channels which proponents should provide in ATV systems".
2. "to define the attributes of an ATV system required for ghost elimination".

Subsequently, the Technical Attributes Working Party (WP1) was reconvened; meetings being held on July 6 and September 20, 1989.

At the first meeting, the Working Party members agreed that an ATV service needs to have an audio service of near CD stereo quality, noting that such a recommendation did not necessarily imply support of any particular implementation. It was further noted that a near CD stereo quality audio service did not necessarily imply a digital stereo pair in addition to the NTSC stereo service; it might be possible to accomplish the same by other means such as a digitally assisted audio (DAA) implementation.

The members of WP1 still believe that the number of sound or data channels and the methodology by which they are achieved should be a choice of the system proponents.

During the first meeting it was further agreed that a service survey to determine what services in addition to a stereo audio service might be provided. Such additional services to include SAP, analog or digital data service, etc. WP1 is currently undertaking such a survey.

The request to define the attributes of an ATV system required for ghost cancelling were discussed and then finalized during the second meeting. Additional attributes were also added. The additional attributes are as follows:

- a. Ghost Cancelling: Attributes were added as section 2.10.4.1 through 2.10.4.5 supplemented by an additional paragraph to section 6.3 on page 9 of the notes.

- b. IDTV Prefiltering Attributes covering the issue of temporal and spatial prefiltering of compatible NTSC signals appear as sections 2.11.1 through 2.11.4 and 6.7.4
- c. Collocation/Non-collocation contours appear as section 6.12.1 and 6.12.2
- d. The question of Sync ruggedness resulted in the addition of sections 6.2.1, 6.2.2, 6.13 and 8.5
- e. The attributes list on ATV Audio was amended to include a note after attribute 3.3 and a new attribute 3.8.1
- f. WPl added section 6.14 on Non-flat transmission paths and
- g. WPl also added Section 1.5 on Video "cuts"
- h. The question of camera steadiness resulted in a note being added to section B covering section 1.1
- i. Attributes were added concerning bit and symbol errors in section 5.3.1 through 5.3.4
- j. The question of base band format compatibility is addressed by adding section 7.5

The revised attributes matrix and accompanying notes was reissued as document PS/WPl-054 which is attached to this report.

WPl will issue a report on the results of the survey when the results have been compiled.

Your letter of 24 October 1989, (PS-046,PS/WPl-056) provided a list of eight (8) additional system features which needed to be defined. The requirements of this list were filled during our meeting of September 20, 1989.

Respectfully Submitted
R.H.McMann, Jr.
Chairman, PS/WPl

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

PS/WP1-059

Doc. No. PS-046Date 10/24/89**Dear Chairman:**

I wish to remind you of the November 15, 1989 due date of your working party's report as an input to the Planning Subcommittee's Third Interim Report. Your report should contain a statement of your Working Party's progress since the Second Interim Report and work plan for the remainder of 1989.

Much of the work of the Advisory Committee is passing to the Systems and Implementation Subcommittees but several key issues remain on the agenda of the Planning Subcommittee. In addition, the Planning Subcommittee must remain responsive to events occurring during the later phases of the Advisory Committee's work to insure that Planning Subcommittee documents that impact the Systems and Implementation Subcommittees are updated as necessary to reflect new developments. This can only happen if working parties hold meetings to attend to action items, results are documented and chairmen of working parties actively participate in Planning Subcommittee Meetings.

Please review the work statement of August 14, 1989 and convene meetings of your working party as appropriate in preparing your report. The working party action items discussed at the September 19 Planning Subcommittee meeting are briefly listed here for your information.

PSWP-1

Attributes for the following system features need to be defined:

1. Audio
2. Ghost Cancellation
3. Prefiltering
4. Interference due to signal peaking
5. Temporal and dynamic resolution
6. Frame "cuts" with systems that have picture information
7. Sync ruggedness
8. Transmitter Co-location

PSWP-2

Test procedures for some of the above additional attributes to be defined by WP-1 need to be developed. The test parameters plan submitted to the systems subcommittee and to chairman Wiley should be reviewed and updated as necessary, in coordination with PSWP-4.

PSWP-3

The following action items were identified:

1. Prepare a document outlining WP-3 requirements for computer modeling of channel allotment.
2. Obtain the FCC Program for computer modeling and solicit computer time to run the program - this task may have to be parcelled out.
3. Contact NTIA to determine their efforts, if any, in this area of computer modeling for channel allotment.

PSWP-4

Obtain responses to the multipoint receiver questionnaire previously distributed to proponents.

PSWP-5

Coordinate with SSWP-3 (economic assessment) in the preparation of a report on the impact of proponent systems on domestic economics.

PSWP-6

Reexamine the 32 identified subjective test scenes to ensure that they represent the minimum number of scenes required. Verify that the recommended scenes accomplish the task they are to perform considering the proponent systems to be tested.

Prepare a final recommendation on the still picture scenes, for subjective testing.

PSWP-7

Prepare a final plan, budgets, and time schedule for the recommended audience tests. Indicate how the costs will be covered.

Yours Sincerely


Joe Flaherty
Chairman, Planning Subcommittee

Distribution: Renville H. McMann, Chairman WP-1, Richard Green, Chairman WP-2, Dale Hatfield, Chairman WP-3, Edward Borowitz, Chairman WP-4, Michael Tyler, Chairman WP-5, Bronwen Jones, Chairman WP-6, Richard Ducey, Chairman WP-7, James Hindman, Chairman AG-1, Robert Crandall, Chairman AG-2, Wendell Bailey, Vice Chairman, PS, Greg DePriest, Vice Chairman, PS, Richard Wiley, Chairman, Advisory Committee on ATV Service, Irwin Dorros, Chairman, SS, William Hassinger, FCC, Lex Felker, Chief of FCC Mass Media Bureau

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E. Chairman's Report: Working Party 2



Advisory Committee on Advanced Television (ATV) Service

PS/ WP2-46
December 15, 1989

Doc. No. _____

Date _____

CHAIRMAN'S REPORT

FCC ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE

PLANNING SUBCOMMITTEE

WORKING PARTY ON ATV TESTING

(PS/WP2)

SCOPE:

PS/WP-2 was reactivated September 19, 1989 to review new attributes identified by PS/WP-1 at their September 20, 1989 meeting.

The reactivation of WP/PS-2 was at the request of Planning Subcommittee Chairman Joseph Flaherty. The new charge to PS/WP-2 from Chairman Flaherty was:

Develop a test plan in coordination with PS/WP-4 for the following attributes to be identified by PS/WP-1 and update the test parameters plan submitted to Chairman Wiley as necessary to reflect these new tests:

IMPLEMENTATION:

- 1) Audio
- 2) Ghost Cancellation
- 3) Prefiltering
- 4) Interference due to signal peaking
- 5) Temporal and dynamic resolution
- 6) Frame "cuts" with systems that have picture information
- 7) Sync ruggedness
- 8) Transmitter collocation

In accordance with the chairman's directive, PS/WP-2 held a meeting via teleconference on November 29, 1989. The output of that meeting is represented by the proposed changes and additions to the PS/WP-2 test document as detailed on the following pages.

RECOMMENDATIONS:

The chairman of PS/WP-2 supports these actions by the Subcommittee. The chairman believes the proposed tests are as comprehensive as possible in light of present ATV development.

2.10. Performance Characteristics

Add to 1.6

6.7 If a ghost cancelling training signal is present, observations of the demodulated signal shall be performed during gracefulness of degradation tests to determine whether the training signal maintains it's integrity during all acceptable signal performance levels.

2.11 Prefiltering

The Subcommittee was unable to develop a test plan for this attribute within the given time frame. (See Phillips document attached) EIA will provide a bank of twenty "off the shelf receiving devices, primarily 20-23 inch television sets, with one or two each of projection systems, receiver/monitors and VCR units. None of these will be IDTV sets.

Add to 1.6

6.12 Colocation/Non-colocation contours

Introduction

It is assumed that there are two types of systems to be tested that may require separate antenna systems. These are "simulcasting" and "augmented" systems. Thus, there are two subsets of tests to perform depending on the type of system.

6.12.1 Augmented Systems:

The proponent main signal will be compared on the RF test bench with a standard NTSC signal at the same frequency using the test procedures detailed in Section 6 to ascertain contour distance variation, if any. The proponent claim for the required augmentation signal power shall be verified.

6.12.2 Use of a separate antenna for augmentation

Main and augmentation levels shall be varied to simulate close in conditions assuming the two antennas operate with a separation of as much as one mile. Investigation of phase and other variations calls for field testing. See Section 1.4

6.12.3 Simulcast systems: See Section 1.4

Addition to Section 1.4 Over The Air Testing

Augmentation system using a separate antenna

A series of tests will be required. These are: VHF to UHF; VHF to VHF; UHF to UHF and UHF to VHF. Within these groupings, differences between frequencies within each band should be investigated (low and high VHF, low UHF and high UHF, etc.) should be considered and tests performed to determine the effects of using different parts of the same band.

In the interests of economy, it is hoped that testing can employ existing antennas during off-hour periods for the augmentation channel in markets where physical spacing and channel allocation permit the conditions detailed in the proceeding paragraph to be investigated.

Addition to section 1.4 Over The Air Testing

Simulcast systems

Since the simulcast system will be a separate and distinct 6 Mhz system, field tests are necessary to validate:

- 1) The proponent claims of the use of the second 6 mhz channel to transmit a simulcast signal without interference to existing licensed operations;
- 2) If after the transition period the television station elects to switch the NTSC channel with the simulcast channel, to establish:
 - a) Comparable service area would be achieved as that provided with the NTSC signal, and to determine any probable loss or gain of NTSC service that would result under such a scenario;
 - b) That the interference situation will be no greater than that caused by the NTSC transmission and with comparable service area.

Add to 1.6

6.3.2 Sync Ruggedness

The ruggedness of the synchronization portion of the transmitted signal shall be evaluated in the presence of random noise. The same configuration as for testing the susceptibility of the video to random noise, Attribute 6.2.1 may be used. The level of noise injected into the RF path shall be increased (The carrier signal to noise ratio decreased) until the proponent supplied demodulator/decoder loses synchronization, as evidenced by instability of the picture monitor display. Since it is likely that the sync acquisition process incorporates hysteresis, the noise level should be reduced slowly, from the point at which synchronization was lost, to determine the level at which picture stability is restored.

Attribute 6.3.3 Digital Audio

Add to 1.6

3.0.1 Digital audio channels, if present, are measured at the output of the digital interface and shall be subject to the test procedures described in this section where applicable. If digital data channels are used see Section 3.2.4 (Next three paragraphs to be renumbered 3.0.2, 3.0.3, 3.0.4.)

Attribute 3.8.1, Level vs Frequency Response

amend paragraph 3.7.2 as follows:

3.7.2 The output shall be measured and plotted with a true RMS voltmeter and notch-filter based THD + N analyzer. Sine-wave tones of 50; 100; 1,000; 5,000; 7,500; 10,000; 15,000; and 20,000 Hz are presented to the input of the system under test. At each frequency, the input level is varied from -40 db to +10 db, with respect to the reference input level, using steps of no more than 10db. The output level and distortion are measured at each step. Data shall be displayed graphically.

December 15, 1989 Chairman's Report (page 5)

Add to 1.6

6.14 Non-flat Transmission Frequency Response.

6.14.1 Introduction

Unequal frequency response is expected to occur at various points in the total system from origination to receiving antenna. Thus tests need to be performed to determine the effects of such variations upon the proponent systems. Initially, tests can be performed to determine the effect of amplitude distortion occurring under laboratory conditions. The introduction of a filter, capable of introducing as much as 15 db tilt from band edge to band edge in the RF path, will provide much information about system transmission viability. Field tests must be performed, however, to determine the effects of the entire system, i.e., the effects of amplitude distortion occurring in the transmission, propagation path, and the receiving antenna.

1.5 Video "cuts"

No objective test was proposed. PS/WP-6 has agreed to judge this attribute subjectively.

Camera Steadiness

No objective test was proposed. PS/WP-6 has agreed to judge this attribute subjectively.

5.3 Bit and Symbol Errors Add the following:

3.2 Digital Data Channel *etc*

3.2.1 If the proponent system provides a separate digital data channel, then the bit error distribution through that channel shall be measured and its bit error distribution shall be recorded for all channel impairments. The digital interface specifications shall be provided to the proponents. When designing error distribution recording techniques, consideration shall be given to means to record information necessary for the evaluation of the rate and distribution of symbol errors.

In the event that a proponent provides a system for initial testing without a audio subsystem, but with a digital channel in place for future implementation of audio, then this digital channel shall be tested in the manner specified above.

NORTH AMERICAN PHILIPS CORPORATION

PHILIPS LABORATORIES

Date: 12/14/89

Jack Kean
John W. Kean Associates
25 Sunset Road C-13
Old Saybrook, CT 06475

FAX: 203-388-6137

Dear Jack:

Enclosed is our initial recommendations for proper tests for 2-D and 3-D NTSC/EDTV prefiltering. In order to carry out complete recommendations the prefiltering system should be removed from specific ATV proponent hardware constrains and should carried out as a separate issue. Subsequently recommendations could be given to ATV, EDTV or IDTV system implementor on how to approach this properly.

We are willing to participate in the strategic performance evaluation of EDTV and IDTV schemes. We like to offer the generation of the required test patterns as well as support in defining specific test procedures and carrying out tests.

Best Regards



Mikhail Tsinberg
Research Department Head
Advanced Television Systems Department

Pre-filtering in EDTV Systems -
Recommendation for Testing

The use of 2D and 3D filter techniques at EDTV encoders and decoders requires special test procedures to evaluate the system performance on all kinds of picture contents. In particular, studies of 3D or temporal processing like frame and field comb filters, have to employ reliable moving test patterns, which were not known in television measurement so far.

Test patterns for performance check of 2D and 3D filters:

1. Circular Zone Plate, monochrome [1, 2, 3]
examples: VG zone plate generator, parameters: x2, y2, BTS Test D7, BTS H-1000, Tektronix TSG 1000
2. Circular Zone Plate, color
examples: BTS Test D7, BTS H-1000
3. Elliptical Zone Plate, monochrome [3]
examples: VG zone plate generator, parameters: y2, xt
4. Color patches
examples: like color bars of Tektronix 1410 (in reversed mode), but with all different color transitions in each direction

All test patterns have to be available

- a) in stationary mode
for checking of still picture performance
- b) with different (selectable) speeds of motion
for evaluation of motion portrayal
- c) with different rates of acceleration
for continuous scan of parameter spaces
- d) with adjustable luminance contrast
for performance check of adaptive filters
- e) with adjustable color saturation (independently for each color difference signal)
for performance check of adaptive filters

These test patterns allow to check visually (on the TV screen of the receiver) and by measurement (with oscilloscope):

- a) 3D luminance bandwidths
- b) 3D chrominance bandwidths
- c) cross color (or 'color moire') (in 3D terms)
- d) cross luminance (or 'dot patterns', subcarrier) (in 3D terms)
- e) additional artifacts, which may be caused
 - *by certain adaptive implementations,
 - *by additional subcarriers,
 - *by compression and expansion techniques,
 - *by companding and expanding techniques and
 - *by certain filter implementations.

Most of these test patterns and their desirable flexibility and

adjustment parameters are not available as commercial products so far. Also, if available for some standards, no equivalent patterns, which cover the respective full range of resolution, are available for certain other standards.

For a generalized test procedure of EDTV systems, it is therefore recommended, to generate the above mentioned patterns by software and to provide them to the equipment under test by a real time video sequence system (DVS, VTE).

References

- [1] Weston, M. - A set of Time Varying Television Test Patterns, BBC Research Department Report 1980/9
- [2] Drewery, J.O. - The Zone Plate as a Television Test Pattern, BBC Research Department Report 1978/23
- [3] Teichner, D. - Three-dimensional Pre- and Post-Filtering for PAL TV Signals, ntz Archiv, Vol. 10 (1988), No. 6-8

December 13, 1989

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F. Chairman's Report: Working Party 3