APPENDIX V

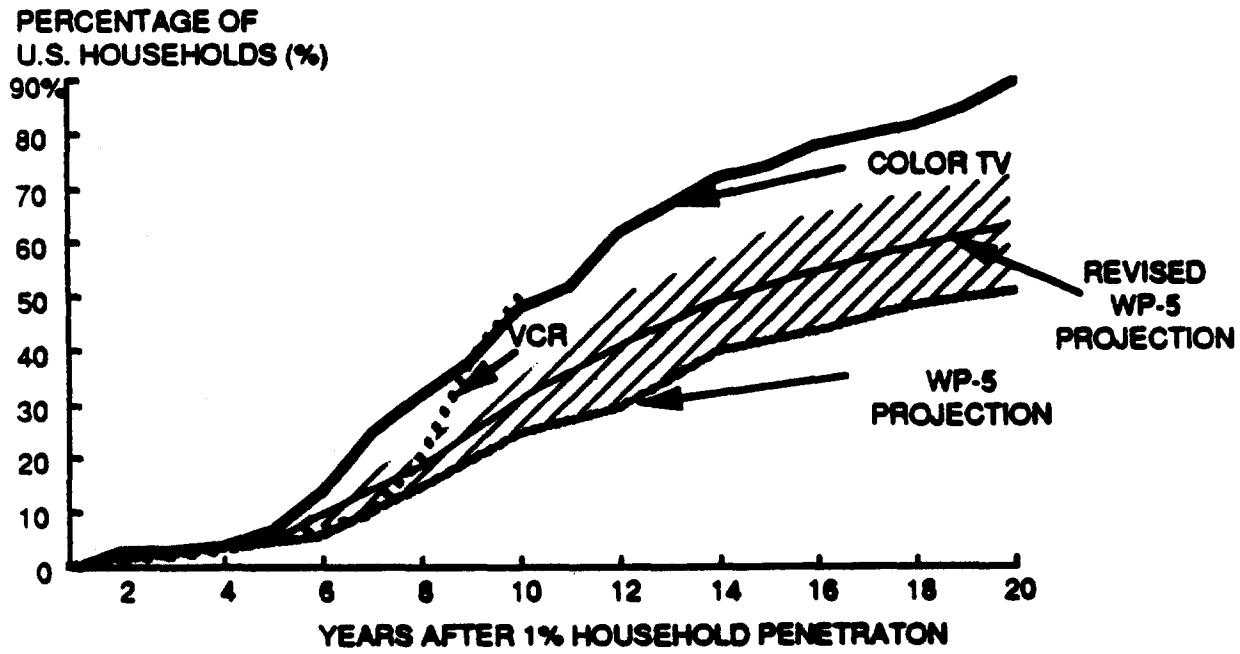
REVISED PS WP-5 PENETRATION RATES OF ATV RECEIVERS

SCENARIO 1

The following assumptions underlay the generation of the penetration curve shown in **Figure 1**.

- ATV signals will be downward compatible with NTSC;
- Three years subsequent to ATV introduction, ATV will exist in 15 percent of television broadcast stations, 5 of the 10 largest cable television programming networks, and 15 percent of cable system operators;
- **Consumer preference for ATV relative to conventional NTSC will be less than that exhibited for color TV versus black and white;**
- The ATV receiver price in each year after introduction will be similar (in constant dollars) to the prices of color TV receivers in the same number of years after the introduction of color.
- Introduction of considerations of price elasticity.
- Europe and Japan would lead the U.S. in ATV implementation. Their technological experience and their initial higher volume demand would cause U.S. ATV receiver prices to be lower than they would have been if the U.S. were pioneering ATV alone (as it did with color television). These lower prices should cause ATV penetration rates to climb.

PROPOSED REVISION OF WP-5 ESTIMATE OF U.S. ATV RECEIVER PENETRATION RATES



The shaded area above and below the new curve reflects the current uncertainty present in both cost and elasticity assumptions.

SCENARIO 2

As an exploration of such a scenario, the ATV penetration in both Europe and Japan is then viewed more conservatively - on the basis of a dearth of ATV programming and slow acceptance of ATV technology. **Figure 2** shows the lowering of the penetration curve of **Figure 1** - if this scenario postulates that only one-half of the potential ATV demand in Europe and Japan actually occurs.

PENETRATION RATES OF ATV RECEIVERS UNDER FIRST ALTERNATIVE SCENARIO
(Assumes 1/2 of Europe and Japan potential demand)

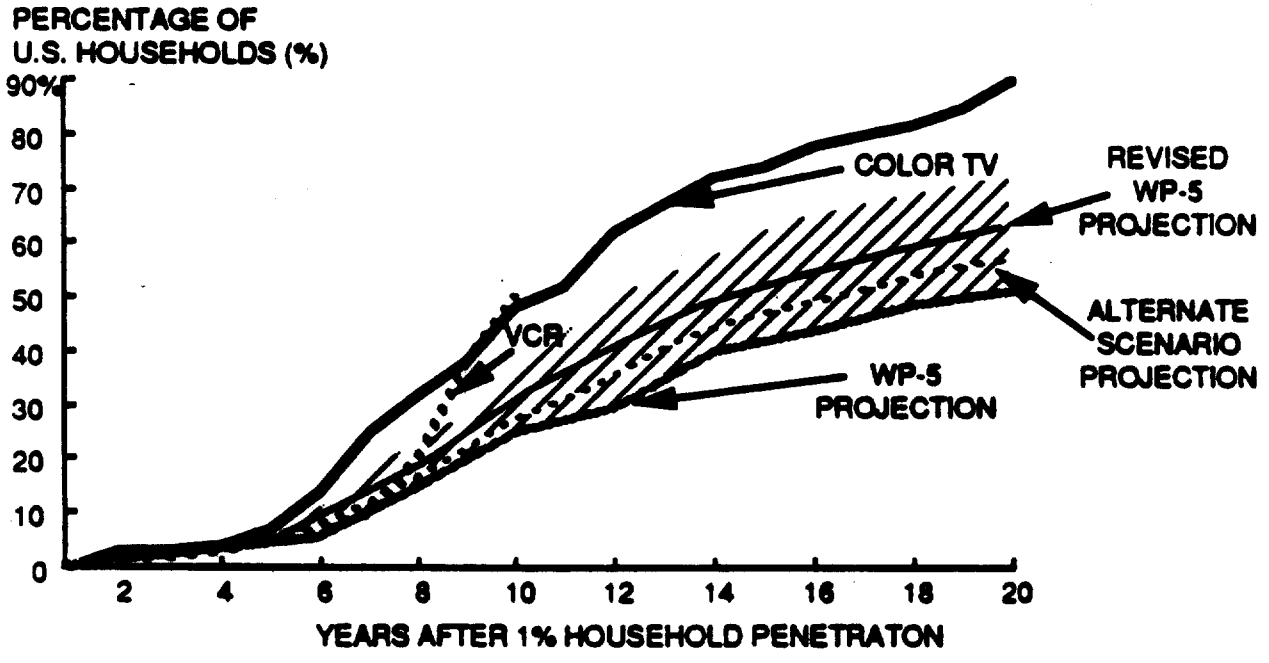


FIGURE 2

TAB

APPENDIX I

TEST AND DATA MATRIX

SAMPLE DATA RECORDING SHEETS

	Page
ATTC Test and Data Matrix	1 - 9
Sample ATTC Data Recording Sheet	10
Sample CableLabs Data Recording Sheet	11
Sample CRC Data Recording Sheet	12

Attachment G
SS - 0281
01 Feb 91

FCC ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE

SYSTEMS SUBCOMMITTEE

WORKING PARTY ON SYSTEM STANDARDS (SS/WP4)

PROGRESS REPORT

(SUBMISSION FOR THE FOURTH INTERIM REPORT)

February 20, 1991

SS/WP4-0052
20 Feb 1991

FCC ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE
SYSTEMS SUBCOMMITTEE
WORKING PARTY ON SYSTEM STANDARDS (SS/WP4)

PROGRESS REPORT
(SUBMISSION FOR THE FOURTH INTERIM REPORT)

Executive Summary

Systems Subcommittee Working Party 4 (SS/WP4) has the responsibility to examine all the available data gathered or developed by other working parties in the Advisory Committee and, based upon that information, recommend standards for an advanced television (ATV) service.

The Working Party has agreed that its primary intention is to recommend a single standard for the terrestrial broadcasting of ATV, that a recommended system must be capable of being carried by cable systems, and that the recommendation will be based on consensus of the Working Party.

The Working Party will recommend which proponent system(s) should be tested in the field.

SS/WP4 has been working with the Advanced Television Test Center (ATTC), Cable Television Laboratories (CableLabs), and the Canadian Communications Research Centre (CRC) as they develop formats for reporting data. The Working Party has found the proposed formats suitable for the needs of SS/WP4.

The Working Party has developed an outline for its final report. While some portions of the final report cannot be written until testing of the proponent systems is complete, other portions are being drafted currently.

The Working Party has defined a process for recommending an ATV system.

The Working Party plans to complete its final report for inclusion in the September 30, 1992 final report of the Advisory Committee.

I. Organization of the Working Party

The Chair of SS/WP4 is Dr. Robert Hopkins, Executive Director of the Advanced Television Systems Committee. He is assisted by three Vice-Chairs: Mr. Hugo Gaggioni of Sony Advanced Systems, Mr. Bruce Sidran of Bell Communications Research, and

Mr. Louis Williamson of American Television and Communications. Mr. Gerald Robinson of Scientific Atlanta serves as the Secretary.

The Working Party, at its first meeting, agreed to the following Charter:

The Working Party on System Standards shall recommend standards for the transmission of ATV based on information supplied by any and all other working parties in the Advisory Committee.

The Working Party has held nine meetings. The average attendance at Working Party meetings is 25 persons; approximately 80 persons have attended one or more meetings. There are currently 70 members.

II. Summary of Progress Prior to the Third Interim Report

The SS/WP4 progress report for the Third Interim Report listed a number of agreements reached in the Working Party. They are summarized here because of their importance in the work of SS/WP4:

SS/WP4 intends to make recommendations based only on consensus.

The primary intention of SS/WP4 is to recommend a single standard for ATV terrestrial broadcasting.

Whatever system is recommended for terrestrial broadcast must be capable of being carried by cable systems.

SS/WP4 will not document a standard in the manner of SMPTE or EIA, rather its role is to recommend a standard documented by others.

III. Progress Since the Third Interim Report

While it was agreed in the April 11, 1989 meeting of SS/WP4 that recommendations would be based only on consensus, at subsequent meetings concerns were expressed that it may not be possible to reach consensus on a recommended standard. Several SS/WP4 members believed it was necessary to develop a process which would lead to a recommendation in the absence of consensus. A Task Force, chaired by Ron Gnidziejko of NBC, was established to examine possible processes. After several meetings of the Task Force, it was determined that there were no acceptable alternatives to consensus. Following that determination, at its October 25, 1990 meeting the Working Party re-affirmed its position that the recommendation of a standard would be based only on consensus.

At meetings in April and June 1990, the Working Party discussed its role in "certifying" systems for field testing. Most members of the Working Party believed that

only a small number of the proponent systems, perhaps only one, would be tested in the field. Some members expressed the view that the selection of proponent systems for field testing is part of the overall ATV selection process. Some members expressed the view that the purpose of field testing is to validate the final recommendation in actual over-the-air conditions. There was agreement that SS/WP4 should request responsibility for certification. At the June 21, 1990 meeting of the Systems Subcommittee, there was agreement that "SS/WP4 shall be the body to certify systems for field testing by SS/WP2."

The Working Party recognizes that there will be volumes of data as a result of the testing process. It will be necessary to summarize data in the SS/WP4 final report. It will also be necessary to perform some data analysis to make a recommendation for an ATV standard. The Working Party established a Task Force, chaired by Hugo Gaggioni of Sony Advanced Systems, to consider what data would be needed by SS/WP4, where the data would come from, and how and by whom any necessary data reduction would be accomplished. The Task Force has been working with the testing laboratories to obtain answers to these questions. The ATTC has provided to the Working Party a matrix which lists the objective tests which will be performed and shows how the results will be recorded — as numerical values, graphs, photos, and video tape. The ATTC has also provided sample data recording sheets to the Task Force. Similar information has been provided by CableLabs and CRC. Appendix I contains the matrix and some of the sample data recording sheets. The Working Party has found the form of this information suitable for the needs of SS/WP4. The Task Force will continue to work with the laboratories commenting on the data recording sheets until a complete set is available. It must be noted that these discussions center on the presentation of information, not on what information will be gathered — SS/WP2 has specified what information will be gathered by the nature of its test procedures.

The Working Party has developed a process to write the final report — including SS/WP4 recommendations. The first step in the process is to draft the outline of the final report. The Working Party established a Task Force, chaired by Bruce Sidran of Bellcore, to draft the final report and, as a first step, to propose an outline to the Working Party. The Working Party has approved a proposed outline which is contained in Appendix II. The first six chapters of the final report will include background information and contributions from other working parties. Work is underway to provide to other working parties details on the information needed by SS/WP4 in these sections. Appendix III shows the information flow between SS/WP4 and other working parties. Chapters seven through nine will contain an examination of the issues which must be considered in making a recommendation for an ATV standard, an analysis of each tested system, and the recommendations of the Working Party. Work is underway to write Chapter 7 which examines the issues and establishes the format which will be used to analyze the tested systems. The remainder of the final report will contain conclusions and information regarding work — related to the recommendation — which must be done in the future. The attachment to Appendix II gives more detailed information on the outline.

The Working Party has defined a process for recommending a system for an ATV service. The process is shown in Appendix IV. The critical objectives are viewed as desirable features of an ATV service and are expected to exceed minimum requirements. This is the information which will be contained in Chapter 7 of the final report. Each proponent system will be measured against the critical objectives. Systems which survive this process will be compared against each other by examining the differences and determining which system(s) could offer a superior service. The process has provisions for review or reconsideration as new information becomes available.

IV. Future Work

The Working Party will continue to work with the testing laboratories to complete the set of data reporting sheets prior to the onset of system testing.

The Working Party plans to complete its final report for inclusion in the September 30, 1992 final report of the Advisory Committee. Information will be given to other working parties throughout 1991 to serve as guidance on the material needed by SS/WP4. The section of the final report which examines the issues which must be considered in making a recommendation is planned for completion prior to the onset of system testing. Each section analyzing a tested system will begin when testing of that system is complete. The recommendation and conclusions cannot be completed until all systems have been tested.

Many members of the Working Party anticipate that differences in the proponent systems will be small. Making a choice between systems will be simplified if the number of proponent systems decreases to only one. The Working Party thus encourages the system proponents to find ways to combine their efforts to lead to one system which could be supported by the entire industry.

V. Appendices

Attached to this progress report are the following Appendices:

Appendix I Data Format Matrix and Sample Data Sheets
Appendix II Outline of SS/WP4 Final Report
Appendix III Information Flow in the Advisory Committee
Appendix IV SS/WP4 Selection Process
Appendix V SS/WP4 Documents:
SS/WP4-0000 (Document Index),
SS/WP4-0002 (Membership List), and
SS/WP4-0026 - SS/WP4-0051 (Documents Released Since the Third Interim Report).

DRAFT (SIMULCAST & E-NTSC) Page 1 of 9 1/4/91

ATTC Test & Data Matrix

Objective Test Procedures, Sect. 1, 2: Image Resolution, System Performance

(Sect. 2. System Performance Verification: Procedures used to detect any changes in system under test, no other use of data.)

Time Line Cross Ref.	TEST ID	TYPE	Resource Utilization: PIXAR	RFTB	HDD VTR	D2VTR	Experts	Display	Test Signals: S=still, M=motion seq T=test pattern	Results: Numerical Taken/Reported	Graph	Photo	Tape	Notes
XV.1 XVI.5	1.3.1 Luminance Static Horiz. Res. ATV	EO&C Obj	--	--	1	--	5	--	T11 (zone plate)	Lim. H res. 5/1 x3(E) Half-ampl. H res. 1 x3(E)	---	Pic mon Wvfm mon	Archive	Repeat for side panels if applicable. (E) Also log ZPG settings
XV.1	1.3.2 Luminance Static Vert. Res ATV.	EO&C	--	--	1	--	5	--	T11 (zone plate)	Lim. V res. 5/1 x3(E)	---	Pic mon	Archive	Repeat for side panels if applicable. (E) Also log ZPG settings
XV.1	1.3.3 Luminance Static Diag. Res. ATV	EO&C	--	--	1	--	5	--	T11 (zone plate)	Lim. Diag. res. 5/1 x3(E)	---	Pic mon	Archive	Repeat for side panels if applicable. (E) Also log ZPG settings
XV(E).1 XVI(E).5	1.3.4 Luminance Static Horiz. Res. NTSC Rcvr (E)	EO&C Obj	--	--	--	1	5	--	T11 (zone plate)	Lim. H res. 5/1 (E) Half-ampl. H res. 1 (E)	---	Pic mon Wvfm mon	Archive	Also log ZPG settings
XV(E).1	1.3.5 Luminance Static Vert. Res. NTSC Rcvr (E)	EO&C	--	--	--	1	5	--	T11 (zone plate)	Lim. V res. 5/1 (E)	---	Pic mon	Archive	Also log ZPG settings.
XV(E).1	1.3.6 Luminance Static Diag. Res. NTSC Rcvr (E)	EO&C	--	--	--	1	5	--	T11 (zone plate)	Lim. Diag. res. 5/1 (E)	---	Pic mon	Archive	Also log ZPG settings.
XV.1 XVI.4a	1.3.7 Luminance Dynamic Horiz. Res. ATV	EO&C	--	--	1	--	5	--	T11 (zone plate, moving)	Lim. H res.20/4 x3(E) Half-ampl. H res. 4 x3(E)	---	Pic mon Wvfm mon (Gate 1 fr.)	Archive	Repeat for side panels if applicable. (E) Also log ZPG settings.
XV.1	1.3.8 Luminance Dynamic Vert. Res ATV.	EO&C	--	--	1	--	5	--	T11 (zone plate, moving)	Lim. V res. 20/4 x3(E)	---	Pic mon (Gate 1 fr.)	Archive	Repeat for side panels if applicable. (E) Also log ZPG settings
XV.1	1.3.9 Luminance Dynamic Diag. Res. ATV	EO&C	--	--	1	--	5	--	T11 (zone plate, moving)	Lim. Diag. res. 20/4 x3(E)	---	Pic mon (Gate 1 fr.)	Archive	Repeat for side panels if applicable. (E) Also log ZPG settings
XV(E).1 XVI(E).4a	1.3.10 Luminance Dynamic Horiz. Res. NTSC Rcvr (E)	EO&C Obj	--	--	--	1	5	--	T11 (zone plate, moving)	Lim. H res. 20/4 Half-ampl. H res 4	---	Pic mon Wvfm mon (Gate 1 fr.)	Archive	Also log ZPG settings.
XV(E).1	1.3.11 Luminance Dynamic Vert. Res. NTSC Rcvr (E)	EO&C	--	--	--	1	5	--	T11 (zone plate, moving)	Lim. V res. 20/4	---	Pic mon (Gate 1 fr.)	Archive	Also log ZPG settings.
XV(E).1	1.3.12 Luminance Dynamic Diag. Res. NTSC Rcvr (E)	EO&C	--	--	--	1	5	--	T11 (zone plate, moving)	Lim. Diag. res. 20/4	---	Pic mon (Gate 1 fr.)	Archive	Also log ZPG settings
XV.2	1.3.13 Dynamic Res. Camera-generated Signal	EO&C	--	--	1	--	5	LS	M21, M22, M23 M24, M25 M26	(Expert comment only)	---	(As needed)		Experts look for, document temporal artifacts.

RF Test Bed is used in all tests but is checked only where it is used to introduce impairment or interference.

Display: 24=24 NTSC Rcvrs; LS=Large Scrn NTSC; ATV=Hitachi

(E): applies to Enhanced NTSC systems, only

Objective Test Procedures, Sect. 3-5, Transient Response; Chromaticity/Colorimetry Characteristics; VCR Compatibility

Time Line Cross Ref.	TEST ID	TYPE	Resource Utilization: PIXAR	RFTB	HDD VTR	D2VTR	Experts	Display	Test Signals: S=still, M=motion seq Test pattern	Results: Numerical Tolerances	Graph	Photo	Tape	Notes
XVI.1b	3.3.1.2.1. Lumin. Resp to Stationary Step: Horiz. Resp.	Obj Meas	✓	--	1	1(E)	--	--	T10 (static windows)	Risetime; Ringing: period, ampl;Oversht: ampl, time;Undrsht: ampl, time. 72/72 x2(E)	--	Wvfm: 8 x2(E)	Archive HD, D2(E)	Data normalized to pic.
XVI.1b	3.3.1.2.2. Lumin. Resp to Stationary Step: Vert. Resp.	Obj Meas	✓	--	1	1(E)	--	--	T10 (static windows)	Transient ampl, line no. 727/72 x2(E)	--	Wvfm: 8 x2(E)	Archive HD, D2(E)	Measure transient ampls, if any, at top & bottom of pic. Data normalized to pic.
XVI.1b	3.3.2.2.1. Lumin. Resp to Moving Step: Horiz. Resp.	Obj Meas	✓	--	1	1(E)	--	--	T10 (moving windows @3 H rates)	Risetime; Ringing: period, ampl;Oversh: ampl, time;Undsh: ampl, time.216/216 x2(E)	--	Pic: 24 ATV + 24 NTSC(E)	Archive HD, D2(E)	Data normalized to pic.
XVI.1b	3.3.2.2.2. Lumin. Resp to Moving Step: Vert. Resp.	Obj Meas	✓	--	1	1(E)	--	--	T10 (moving windows @3 V rates)	Risetime; Ringing: period, ampl;Oversh: ampl, time;Undsh: ampl, time.2167/216 x2(E)	--	Pic: 24 ATV + 24 NTSC(E)	Archive HD, D2(E)	Data normalized to pic.
XVI.2b XVI.3a	3.3.3.2.1. Chrom. Resp. to Stationary Step: Horiz. Resp.	Obj Meas	✓	--	1	1(E)	--	--	T10 (static windows)	Risetime; Ringing: period, ampl;Oversh: ampl, time;Undsh: ampl, time. 144/144 x2(E)	--	Wvfm: 16 x2(E)	Archive HD, D2(E)	Measure transient ampls, if any,at top & bottom of pic, R&B Data normalized to pic.
XVI.2b XVI.3a	3.3.3.2.2. Chrom. Resp. to Stationary Step: Vert. Resp.	Obj Meas	✓	--	1	1(E)	--	--	T10 (static windows)	Transient ampl, line no. 1447/144 x2(E)	--	Wvfm: 16 x2(E)	Archive HD, D2(E)	Measure both R & B channels. Data normalized to pic.
XVI.2b XVI.3a	3.3.4.2.1. Chrom. Resp. to Moving Step: Horiz. Resp.	Obj Meas	✓	--	1	1(E)	--	--	T10 (moving windows @3 H rates)	Risetime; Ring: period, ampl;Oversht: ampl, time;Undrsht: ampl, time. 432/432 x2(E)	--	Pic: 48 ATV 48 NTSC(E)	Archive HD, D2(E)	Measure both color component channels. Data normalized to pic.
XVI.2b XVI.3a	3.3.4.2.2. Chrom. Resp. to Moving Step: Vert. Resp.	Obj Meas	✓	--	1	1(E)	--	--	T10 (moving windows @3 V rates)	Risetime; Ring: period, ampl;Oversht: ampl, time;Undrsht: ampl, time. 4327/432 x2(E)	--	Pic: 48 ATV 48 NTSC(E)	Archive HD, D2(E)	Measure both color component channels. Data normalized to pic.
XVI.1b	3.3.5. Luminance Temporal Response	Obj Meas	✓	--	1	1(E)	--	--	T10G (static windows, gated) T5G (radial res., gated)	(Photos, only)	--	Pic & Wvfm: 16 ATV + 16 NTSC(E)	Archive HD, D2(E)	Photo sets of both test patterns.
XVI.2b XVI.3a	3.3.6. Chrominance Temporal Response	Obj Meas	✓	--	1	1(E)	--	--	T10G (static windows, gated) T5G (radial res., gated)	(Photos, only)	--	Pic & Wvfm: 32 ATV + 32 NTSC(E)	Archive HD, D2(E)	Photo sets of both test patterns, for R & B channels
XVI(E).6	4.3.1. Color Difference Compatibility (E)	Obj Meas	✓	--	--	1(E)	--	--	T7 (color bars)	Vector ampl, phase differences. 10/10 (E)	--	Wvfm: 4 Vector-scope: 4	Archive D2	Compare vector (ref G) ampls, phases with 1 dB input change, photo before & after.
XVI.2a	4.3.2. Chrominance Component Dynamic Range	Obj Meas	✓	--	1	--	--	--	T4 (line-rate ramp)	Input attn to elim. any nonlinearity. 3/3	--	Wvfm: 6	Archive HD	Observe nonlinearity in ramp intro'd by system, photo both conditions.
XX.	5. VCR Compatibility for Enhanced NTSC (E)	EO&C	--	--	1(E)	1(E)	5	LS	5 min. video & audio material	(Comment, only)	--	--	8 NTSC video cassettes	Output is written expert commentary on diff between ENTSC & NTSC replays on VCRs

RF Test Bed is used in all tests but is checked only where it is used to introduce impairment or interference.

Display: 24=24 NTSC Rcvrs; LS=Large Scrn NTSC; ATV=Hitachi

(E) = applies to Enhanced NTSC systems, only.
"x2(E)" = double number for Enhanced NTSC system

Objective Test Procedures, Sect. 6-12: Tx Spectrum, Degrad. to BTSC Audio, Audio

Time Line Cross Ref.	TEST ID	TYPE	Resource Utilization: PDXAR	RFTB	HDD VTR	D2VTR	Experts	Display	Test Signals: S=still, M=motion seq T=test pattern	Results: Numerical Taken/Reported	Graph	Photo	Tape	Notes
XVI.1a	6. Transmitted Spectrum	Obj Meas	✓	✓	--	--	--	--	T8 (matrix pattern) Audio material? Pseudorandom data	--	--	Spectrum analyzer display	--	Spectrum used by ATV system with all channels fully loaded.
XVIII.3a, -.3b, -.3c, -.3d	7.1.1.2 Degradation to BTSC Audio ATV -> NTSC	Obj Meas	✓	✓	--	--	--	6-10 BTSC Rcvrs	8 kHz tone; 20-15,000 sweep; audio program material; D: T8 (matrix) U: T8G (matrix gated)	THD+N @ coch., upper adj, lin & non-lin taboo calibr. 710/? L-R sep 4?/4	Plot spectral distr 20Hz - 15kHz left output. 1	--	--	THD+N from left channel of all pairs.
XIX.1	7.2. Degradation of Ancillary VBI Services ATV -> NTSC	Obj Meas	✓	✓	--	--	--		D: T1 (flat field) U: T8G (matrix, gated)	RMS noise on lines 12, 21 cochnl 12/12	Plot spectral distr of signal comps lines 12, 21. 1	--	--	Cochannel D=-55 U= 6 levels
XIX.2	7.2. Degradation of Ancillary VBI Services ATV (E)	Obj Meas	✓	✓	--	--	--		T8 (matrix)	RMS noise on lines 12, 21 2/2	Plot spectral distr of signal comps lines 12, 21. 1	--	--	
--	8. Audio, General Considerations		This section gives some general considerations for the following sections on audio testing. No test procedures are included in Section 8.											
XVIII.1f	9. E-NTSC Audio Signal-to-Noise (E)	Obj Meas	--	--	--	--	--	--	1 kHz audio tone T7 (NTSC color bars)	S/N unweighted S/N weighted 4/4 (E)	Plot broad-band noise spectrum. 1 (E)	--	--	BTSC main audio channels, only. (E)
XVIII.1a	10. Dynamic Range	Obj Meas	--	--	--	--	--	--	1 kHz audio tone	(THD+N -70dB 4/4		--	--	All audio channels. (Assume 4)
XVIII.1b	11.1.3 ATV Non-linear Distortion THD+N	Obj Meas	--	--	--	--	--	--	20 - 20,000 Hz audio sweep	--	THD+N vs freq. 32	--	--	All audio channels. (Assume 4)
XVIII.1b	11.1.5 ATV Non-linear Distortion THD	Obj Meas	--	--	--	--	--		8 frequencies or 20 - 20,000 Hz audio sweep	Harmonic amplitudes 64/64	--	--	--	All audio channels. (Assume 4)
XVIII.1b	11.2.4 ATV Non-linear Distortion IMD	Obj Meas	--	--	--	--	--	--	60 Hz audio tone 7 kHz audio tone	--	IMD vs input level 20	--	--	All audio channels. (Assume 4)
XVIII.1b	11.2.5 ATV Non-linear Distortion DIM	Obj Meas	--	--	--	--	--	--	400 Hz audio tone 750 Hz audio tone 2.4 Khz audio tone	--	DIM vs input level 20	--	--	All audio channels. (Assume 4)
XVIII.1g	12. Audio/Video Delay ATV	Obj Meas		--	--	--	--	--	T2G (ATV flat field, gated) 1 kHz audio tone, gated	Delay: video vs audio, off-on and on-off. 8/8	--	--	--	All audio channels. (Assume 4)
XVIII.1g	12. Audio/Video Delay E-NTSC (E)	Obj Meas		--	--	--	--	--	T1G (NTSC flat field, gated) 1 kHz audio tone, gated	Delay: video vs audio, off-on and on-off. 4/4	--	--	--	2 BTSC channels

RF Test Bed is used in all tests but is checked only where it is used to introduce impairment or interference.

Display: 24=24 NTSC Rcvrs; LS=Large Scrn NTSC; ATV=Hitachi

(E) = applies to Enhanced NTSC systems, only.
"x2(E)" = double number for Enhanced NTSC system

ATTC Test & Data Matrix

Objective Test Procedures, Sect. 13-18

Time Line Cross Ref.	TEST ID	TYPE	Resource Utilization: PDXAR	RFTB	HDD VTR	D2VTR	Experts	Display	Test Signals: S=still, M=motion seq Test pattern	Results: Numerical Taken/Reported	Graph	Photo	Tape	Notes
XVIII.1c	13. Audio Frequency Response	Obj Meas	--	--	--	--	--	--	20 - 20,000 audio sweep @ 3 levels	--	Audio out level vs freq. 12	--	--	All audio channels. (Assume 4)
XVIII.1d	14. Sine Wave Overload vs Frequency	Obj Meas	--	--	--	--	--	--	"series of frequencies"	--	Plot overload level vs freq 1	--	--	Overload point: output drops .2 dB rel. input. All chs. (Assume 4)
XVIII.1h	15. RF Bandwidth & RF Spectrum.	Obj Meas	--	--	--	--	--	--	Audi o program material AF pink noise	3 & 30 dB bandwidths, (from photos) 6/6	--	Spectrum 3		Spectrum photos with all audio chs quiet & loaded with noise & music.
XVIII.1e	16. Stereo Interchannel Amplitude & Phasing	Obj Meas	--	--	--	--	--	--	10+ frequencies across band	Ampl. shift, phase shift between channels of stereo pairs. 40/40	Plot ampl & phase shifts vs freq. 2	--	--	Assume 2 stereo pairs.
XVIII.1	17. Noise Degradation of Compatible NTSC Audio (E)	EO&C	--	✓	--	--	5	24	T7 (color bars) Audio program material	(Written commentary, only)	--	--	--	Experts compare audio from NTSC mod. and E-NTSC system.
XVIII.1i	18. Confirmation of Provisions for Ancillary Data Signals.	Obj Meas	--	✓	--	--	--	--	Pseudorandom data T87 (matrix) ? Hz audio tone	BER @ 6+ levels of C/N. 18+/6+				

Audio Subjective Test Procedures, Sect. 1

Document SSWP2-0533

Time Line Cross Ref.	TEST ID	TYPE	PDXAR	RFTB	HDD VTR	D2VTR	Experts	Display	Test Signals	Numerical	Graph	Photo	Tape	Notes
Day 36 Day 41 (E)	1.2.1 Audio Quality Rating Test	Rating	--	--	1	1 (E)	--	--	A1...A10	--	--	--	HD/DAT Rating	Rating tests done off site.
Day 35 Day 40 (E)	1.2.2 Transmission Impairment Test	EO&C	--	✓	1	1 (E)	--	--	A2, A3, A8	(Comment only)	--	--	HD/DAT Archive	Experts listen on headphones, write comments.
--	--													
--	--													
--	--													
--	--													

RF Test Bed is used in all tests but is checked only where it is used to introduce impairment or interference. Display: 24=24 NTSC Rcvrs, LS=Large Scrn NTSC; ATV=Hitachi (E): applies to Enhanced NTSC systems, on

DRAFT (SIMULCAST) Page 5 of 9 1/4/91

ATTC Test & Data Matrix

Objective Test Procedures, Sect. 19, Susceptibility to Interference, Other Impairments.

Time Line Cross Ref.	TEST ID	TYPE	Resource Utilization: FIXAR	RFTB	HDD VTR	D2VTR	Experts	Display	Test Signals: S=still, M=motion seq. T=test pattern	Results: Numerical Taken/Reported	Graph	Photo	Tape	Notes
XIV.1	19.3.1 Random Noise ->NTSC	ToV	✓	✓	--	--	3	24	D: T1(flat field, stat)	ToV 72/1	--	--	--	
XIV.1b	19.3.1 Random Noise ->ATV	ToV	✓	✓	--	--	5	ATV	D: T3 (flat field, dyn)	ToV 25/1	--	--	--	
XIV.1c	19.3.1 Random Noise ->ATV	PoU	✓	✓	--	--	5	ATV	D: T9 (text)	PoU 15/1	--	--	--	
XIV.1d	19.3.1 Random Noise ->ATV	Range	✓	✓	--	--	5	ATV	D: S5 (tulips) or S11 (woman w. roses)	Range levels 6+/6	--	--	--	"+" indicates experts may look at additional levels.
XIV.1e	19.3.1 Random Noise ->ATV	Rating	✓	✓	2	--	--	--	D: S5 (tulips), S11 (woman w roses), M11 desk lamp	--	--	--	2 D2 Rating	Subj. rating to be done at CRC.
XIV.4	19.3.2. Impulse Noise ->ATV	ToV △	✓	✓	--	--	5	ATV 24	D: T3 (flat field, dyn)/ T1 (flat field, stat)	ToV 50/1	--	--	--	"Threshold" is difference between ATV and NTSC
XIV.2b	19.4.3.2.1. Static Multipath ->ATV	ToV	✓	✓	--	--	5	ATV	D: T9? (text)	ToV 300/12	ToV vs +/-delay (See Fig. 19-5.)	--	--	12 delays
XIV.2c	19.4.3.2.1. Static Multipath ->ATV	PoU	✓	✓	--	--	5	ATV	D: T9? (text)	PoU 180/12	PoU vs +/-delay (See Fig. 19-5.)	--	--	Experts describe failure.
XIV.3b	19.4.3.2.2. Flutter ->ATV	ToV	✓	✓	--	--	5	ATV	D: T9? (text) (Same as multipath)	1/1	--	--	--	
XIV.3c	19.4.3.2.2. Flutter ->ATV	PoU	✓	✓	2	1	5	ATV	D: T9? (text) (Same as multipath)	1/1	--	--		Experts describe failure including rate and level.
Sections 19.5.3.2.1 (Cochannel), 19.5.3.2.2 (Upper & Lower Adjacent), and 19.5.3.2.3. (Taboos) are listed on separate sheets.														
XIII.13	19.5.3.2.4. Discrete Frequency Interf. ->ATV	ToV	✓	✓	--	--	5	ATV	D: T3 (flat field, dyn)	ToV 1250/graph	Carrier:beat vs intrf freq; (See Fig. 19-5)	--	--	
--	--													

RF Test Bed is used in all tests but is checked only where it is used to introduce impairment or interference.

Display: 24=24 NTSC Rcvrs; LS=Large Scrn NTSC; ATV=Hitachi

DRAFT (NTSC Reception) Page 6 of 9 1/4/91

ATTC Test & Data Matrix

Objective Test Procedures, Sect. 19, Susceptibility to Interference, Other Impairments, Quality

Time Line Cross Ref.	TEST ID	TYPE	Resource Utilization: PIXAR	RFTB	HDD VTR	D2VTR	Experts	Display	Test Signals: S=still, M=motion seq, T=test pattern	Results: Numerical Taken/Reserved	Graph	Photo	Tape	Notes
XIV(E).1	19.3.1 Random Noise ->NTSC	ToV	✓	✓	--	--	3	24	D: T1 (flat field, static)	ToV 72/1	--	--	--	
XIV(E).1b	19.3.1 Random Noise ->ATV	ToV	✓	✓	--	--	3	24	D: T3 (flat field, dyn)	ToV 72/1	--	--	--	
XIV(E).1c	19.3.1 Random Noise ->ATV	PoU	✓	✓	--	--	3	24	D: T9 (text)	PoU 1/1	--	--	--	
XIV(E).4b	19.3.2. Impulse Noise ->ATV	ToV △	✓	✓	--	--	3	24	D: T3 (flat field, dyn)/ T1 (flat field, static)	ToV 2/1	--	--	--	"Threshold" is difference between ATV and NTSC
XIV(E).2b	19.4.3.2.1. Static Multipath ->ATV	ToV	✓	✓	--	--	3	24	D: T9? (text)	ToV 12/12	ToV vs +/-delay (See Fig. 19-5.)	--	--	12 delays
XIV(E).2c	19.4.3.2.1. Static Multipath ->ATV	PoU	✓	✓	--	--	3	24	D: T9? (text)	PoU 12/12	PoU vs +/-delay (See Fig. 19-5.)	--	--	Experts describe failure.
XIV(E).3b	19.4.3.2.2. Flutter ->ATV	ToV	✓	✓	--	--	3	24	D: T9? (text) (Same as multipath)	1/1	--	--	--	
XIV(E).3c	19.4.3.2.2. Flutter ->ATV	PoU	✓	✓	2	1	3	24	D: T9? (text) (Same as multipath)	1/1	--	--		Experts describe failure including rate and level.

Video Subjective Test Procedures, Sect. 1

Document SSWP2-0390

Day ? Day ? (E)	Basic Received Quality (Video Subj. Tests, Sect 1.9	Rating	--	--	1	1	--	--	S14, M1...M10, M16...M20	--	--	--	4D2	Subj. rating to be done at CRC.
	--													
	--													
	--													

RF Test Bed is used in all tests but is checked only where it is used to introduce impairment or interference.

Display: 24=24 NTSC Rcvrs; LS=Large Scrn NTSC; ATV=Hitachi

Objective Test Procedures, Sect. 19, Susceptibility to Interference, Cochannel Interference

Time Line Cross Ref.	TEST ID	TYPE	Resource Utilization						Test Signals	Results				Notes
			PIXAR	RFTB	HDD VTR	D2VTR	Experts	Display	S=still, M=motion seq Test pattern	Numerical Tolerances	Graph	Photo	Tape	
I.A.1	19.5.3.2.1. Cochannel Interference NTSC->NTSC	ToV	✓	✓	--	--	3	24	D: T1 (flat field, stat) U: T8 (matrix)	ToV 144/2	--	--	--	
I.A.2.b	19.5.3.2.1. Cochannel Interference ATV->NTSC	ToV	✓	✓	--	--	3	24	D: T1 (flat field, stat) U: T8G (matrix, gated)	ToV 288/4	--	--	--	Test at 2 freq. offsets.
I.A.2.c	19.5.3.2.1. Cochannel Interference ATV->NTSC	PoU	✓	✓	--	--	3	24	D: T (text) U: T8G (matrix, gated)	PoU 2/2	--	--	--	
I.A.2.d	19.5.3.2.1. Cochannel Interference ATV->NTSC	Range	✓	✓	--	--	3	LS	D: S9 (girl w toys) or S11 (wmn w roses) U: T8G (matrix, gated)	Range levels 12+/12	--	--	--	"+" indicates experts may look at additional levels.
I.A.2.e	19.5.3.2.1. Cochannel Interference ATV->NTSC	Rating	✓	✓	1	2	--	--	D: S9 (girl w toys), S11 (wmn w roses), M14 (cochnl) U: M15 (primary)	--	--	--	4 D2 Rating	Subj. rating to be done at CRC.
I.B.1.b	19.5.3.2.1. Cochannel Interference NTSC->ATV	ToV	✓	✓	--	--	5	ATV	D: T3 U: T8	ToV 100/4	--	--	--	Test at 2 freq. offsets.
I.B.1.c	19.5.3.2.1. Cochannel Interference NTSC->ATV	PoU	✓	✓	--	--	5	ATV	D: T9 U: T8	PoU 30/2	--	--	--	
I.B.1.d	19.5.3.2.1. Cochannel Interference NTSC->ATV	Range	✓	✓	--	--	5	ATV	D: S9 (girl w toys) or S11 (wmn w roses) U: T8 (matrix)	Range levels 12+/12	--	--	--	"+" indicates experts may look at additional levels.
I.B.1.e	19.5.3.2.1. Cochannel Interference NTSC->ATV	Rating	✓	✓	2	1	--	--	D: S9, S11, M14 U: M15	--	--	--	4 HD Rating	Subj. rating to be done at CRC.
I.B.2.b	19.5.3.2.1. Cochannel Interference ATV->ATV	ToV	✓	✓	--	--	5	ATV	D&U: T8GS	ToV 50/2	--	--	--	
I.B.2.c	19.5.3.2.1. Cochannel Interference ATV->ATV	PoU	✓	✓	--	--	5	ATV	D&U: T9	PoU 30/2	--	--	--	
I.B.2.d	19.5.3.2.1. Cochannel Interference ATV->ATV	Range	✓	✓	--	--	5	ATV	D&U: S9 or S11	Range levels 12+/12	--	--	--	"+" indicates experts may look at additional levels.
I.B.2.e	19.5.3.2.1. Cochannel Interference ATV->ATV	Rating	✓	✓	2	--	--	--	D&U: S9, S11, M14	--	--	--	4 HD Rating	Subj. rating to be done at CRC.

RF Test Bed is used in all tests but is checked only where it is used to introduce impairment or interference.

Display: 24=24 NTSC Rcvrs; LS=Large Scrn NTSC; ATV=Hitachi

ATTC Test & Data Matrix

Objective Test Procedures, Sect. 19, Susceptibility to Interference, Upper & Lower Adjacent Channel Interference

Note: Procedures and test signals are same for Upper and Lower adjacent channel tests.

Time Line Cross Ref.	TEST ID	TYPE	Resource Utilization: PIXAR	RFTB	HDD VTR	D2VTR	Experts	Display*	Test Signals: S=still, M=motion seq T=test pattern	Results: Numerical Taken/Required	Graph	Photo	Tape	Notes
II.A.1. III.A.1.	19.5.3.2.2. Adjacent Channel Interference NTSC->NTSC	ToV	✓	✓	--	--	3	24	D: T1 (flat field, stat) U: T8 (matrix)	ToV 432/6	--	--	--	
II.A.2.b. III.A.2.b.	19.5.3.2.2. Adjacent Channel Interference ATV->NTSC	ToV	✓	✓	--	--	3	24	D: T1 (flat field, stat) U: T8G (matrix, gated)	ToV 432/6	--	--	--	
II.A.2.c. III.A.2.c.	19.5.3.2.2. Adjacent Channel Interference ATV->NTSC	PoU	✓	✓	--	--	3	24	D: T (text) U: T8G (matrix, gated)	PoU 6/6	--	--	--	
II.A.2.d. III.A.2.d	19.5.3.2.2. Adjacent Channel Interference ATV->NTSC	Range	✓	✓	--	--	3	LS	D: S9 or S11 U: T8G	Range levels 36+/36	--	--	--	"+" indicates experts may look at additional levels.
II.A.2.e. III.A.2.e.	19.5.3.2.2. Adjacent Channel Interference ATV->NTSC	Rating	✓	✓	1	2	--	--	D: S9, S11, M14 U: M15	--	--	--	12 D2 Rating	Subj. rating to be done at CRC.
II.B.1.b. III.B.1.b.	19.5.3.2.2. Adjacent Channel Interference NTSC->ATV	ToV	✓	✓	--	--	5	ATV	D: T3 U: T8	ToV 150/6	--	--	--	
II.B.1.c. III.B.1.c.	19.5.3.2.2. Adjacent Channel Interference NTSC->ATV	PoU	✓	✓	--	--	5	ATV	D: T9 U: T8	PoU 90/6	--	--	--	
II.B.1.d. III.B.1.d.	19.5.3.2.2. Adjacent Channel Interference NTSC->ATV	Range	✓	✓	--	--	5	ATV	D: S9 or S11 U: T8	Range levels 36+/36	--	--	--	"+" indicates experts may look at additional levels.
II.B.1.e. III.B.1.e.	19.5.3.2.2. Adjacent Channel Interference NTSC->ATV	Rating	✓	✓	2	1	--	--	D: S9, S11, M14 U: M15	--	--	--	12 HD Rating	Subj. rating to be done at CRC.
II.B.2.b. III.B.2.b.	19.5.3.2.2. Adjacent Channel Interference ATV->ATV	ToV	✓	✓	--	--	5	ATV	D&U: T8GS	ToV 150/6	--	--	--	
II.B.2.c. III.B.2.c.	19.5.3.2.2. Adjacent Channel Interference ATV->ATV	PoU	✓	✓	--	--	5	ATV	D&U: T9	PoU 90/6	--	--	--	
II.B.2.d. III.B.2.d.	19.5.3.2.2. Adjacent Channel Interference ATV->ATV	Range	✓	✓	--	--	5	ATV	D&U: S9 or S11	Range levels 36+/36	--	--	--	"+" indicates experts may look at additional levels.
II.B.2.e. III.B.2.e.	19.5.3.2.2. Adjacent Channel Interference ATV->ATV	Rating	✓	✓	2	--	--	--	D&U: S9, S11, M14	--	--	--	12 HD Rating	Subj. rating to be done at CRC.

RF Test Bed is used in all tests but is checked only where it is used to introduce impairment or interference.

Display: 24=24 NTSC Rcvrs; LS=Large Scrn NTSC; ATV=Hitachi

DRAFT (SIMULCAST & E-NTSC)

ATTC Test & Data Matrix

Objective Test Procedures, Sect. 19, Susceptibility to Interference, Taboo Channels (9) Interference, Quality

Time Line Cross Ref.	TEST ID	TYPE	Resource Utilization: PIXAR	RFTB	HDD VTR	D2VTR	Experts	Display*	Test Signals: S=still, M=motion seq T=test pattern	Results: Numerical Taboo/Reported	Graph	Photo	Tape	Notes
n.A.1.	19.5.3.2.3. Taboo Channel Interference NTSC->NTSC	ToV	✓	✓	--	--	3	24	D: T1 (flat field, stat) U: T8 (matrix)	ToV 1944/27 1800/25 (E)	--	--	--	
n.A.2.b	19.5.3.2.3. Taboo Channel Interference ATV->NTSC	ToV	✓	✓	--	--	3	24	D: T1 (flat field, stat) U: T8G (matrix, gated)	ToV 1944/27 1800/25 (E)	--	--	--	
n.A.2.c	19.5.3.2.3. Taboo Channel Interference ATV->NTSC	PoU	✓	✓	--	--	3	24	D: T (text) U: T8G (matrix, gated)	PoU 27/27 25/25	--	--	--	
n.A.2.d	19.5.3.2.3. Taboo Channel Interference ATV->NTSC	Range	✓	✓	--	--	3	LS	D: S9 or S11 U: T8G	Range levels 162+/162 150/150	--	--	--	Numbers may be less if no interference is observed on some taboo channels.
n.A.2.e	19.5.3.2.3. Taboo Channel Interference ATV->NTSC	Rating	✓	✓	1	2	--	--	D: S9, S11, M14 U: M15	--	--	--	12 D2 Rating	Subj. rating to be done at CRC. Rating tapes made for 1 linear, 1 non-linear taboo.
n.B.2.b	19.5.3.2.3. Taboo Channel Interference NTSC->ATV	ToV	✓	✓	--	--	5	ATV	D: T3 U: T8	ToV 675/27 625/25 (E)	--	--	--	
n.B.2.c	19.5.3.2.3. Taboo Channel Interference NTSC->ATV	PoU	✓	✓	--	--	5	ATV	D: T9 U: T8	PoU 405/27 375/25 (E)	--	--	--	
n.B.2.d	19.5.3.2.3. Taboo Channel Interference ATV->ATV	ToV	✓	✓	--	--	5	ATV	D&U: T8GS	ToV 675/27 625/25 (E)	--	--	--	
n.B.2.e	19.5.3.2.3. Taboo Channel Interference ATV->ATV	PoU	✓	✓	--	--	5	ATV	D&U: T9	PoU 405/27 375/25 (E)	--	--	--	

Note: In first column, "n" = IV, V, VI, VII, VIII, IX, X XI, XII (Same tests repeated for 9 taboo channels)

Video Subjective Test Procedures, Sect. 1

Document SSWP2-0390

Day 21 Day 20 (E)	Basic Received Quality (Video Subj Tests, Sect. 1.9)	Rating	--	--	2	1 (E)	--	--	S14, M1...M10, M16...M20	--	--	--	4HD	Subj. rating to be done at CRC.

RF Test Bed is used in all tests but is checked only where it is used to introduce impairment or interference.

* Display: 24=24 NTSC Rcvrs; LS=Large Scrn NTSC; ATV=Hitachi

DRAFT SAMPLE DATA LIST : typical data to be taken/output for a test 10/19/90

Test Director _____ Date _____
Proponent representative _____
Expert observers _____ _____ _____ _____ _____

1.3.1. Luminance Static Horizontal Resolution Test Schedule Sequence # ___

Type of test: EO&C, 5 expert observers Test signal(s): _____
(Test pattern, phase, motion sequence, etc.)

PICTURE MONITOR: [OUTPUT DATA]

Limiting horizontal resolution of the center area, in C/APH [1 to 5] Agreed or mean _____ C/APH

_____ C/APH _____ C/APH _____ C/APH
_____ C/APH _____ C/APH

ZPG coefficients [10]
(1) _____ (2) _____ (3) _____ (4) _____ (5) _____
(6) _____ (7) _____ (8) _____ (9) _____ (10) _____

Limiting resolution of the side panels, in C/APH. [1 to 5] Agreed or mean _____ C/APH*

_____ C/APH _____ C/APH _____ C/APH
_____ C/APH _____ C/APH

ZPG coefficients [10]
(1) _____ (2) _____ (3) _____ (4) _____ (5) _____
(6) _____ (7) _____ (8) _____ (9) _____ (10) _____

PHOTOGRAPH: All conditions under which data were taken [2]
1. ID # _____ 2. ID # _____*

VIDEO TAPE RECORD: All conditions under which data were taken [2]
Time code 1 _____ Time code 2 _____*

WAVEFORM MONITOR:

Half-amplitude resolution response of the center area, in C/APH [1 to 5] Agreed or mean _____ C/APH
_____ C/APH _____ C/APH _____ C/APH
_____ C/APH _____ C/APH

ZPG coefficients [10]
(1) _____ (2) _____ (3) _____ (4) _____ (5) _____
(6) _____ (7) _____ (8) _____ (9) _____ (10) _____

Half-amplitude resolutionof the side panels, in C/APH. [1 to 5] Agreed or mean _____ C/APH*
_____ C/APH _____ C/APH _____ C/APH
_____ C/APH _____ C/APH

ZPG coefficients [10]
(1) _____ (2) _____ (3) _____ (4) _____ (5) _____
(6) _____ (7) _____ (8) _____ (9) _____ (10) _____

PHOTOGRAPH: All conditions under which data were taken [2]
1. ID # _____ 2. ID # _____*

VIDEO TAPE RECORD: All conditions under which data were taken [2]
Time code 1 _____ Time code 2 _____*

* Data taken only where side panels are transmitted differently from center.

Low Frequency Noise Modulation

Test Date: _____ ATV Carrier Freq.: _____ ATV System: _____

Video Tape Number: _____ Time Code: _____ Test Engineer: _____

Test Data Accepted By: _____

Expert Observers

1: _____ 2: _____ 3: _____

4: _____ 5: _____

Interference Levels

Threshold of Visibility of Interference: _____%

Point of Unusability: _____%

Range Ratios 1: ____ 2: ____ 3: ____ 4: ____ 5: ____ 6: ____ 7: ____%

Recording Levels 1: ___ 2: ___ 3: ___ 4: ___ 5: ___ 6: ___ 7: ___ 8: ___ %

Comments

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

CableLabs DRAFT 91-01-24

TABLE 1: GENERIC FORMAT FOR OVERALL QUALITY TEST RESULTS

Picture Quality Attribute	Test Item	Scores: 100-(Ref-Test); X, SD, and Rank for Systems 1-6						NOTES
		Sys 1 X SD R	Sys 2 X SD R	Sys 3 X SD R	Sys 4 X SD R	Sys 5 X SD R	Sys 6 X SD R	
STILL:	Ss 1-n							Across stills, means, SDs, Ranks.
Stat luma Resol								Item-by-item, notes and comments.
Stat Chroma Resol								
Luma Rendition								
Luma Dynamic Range								
Color Gamut/ Rend								
Color Dyn Range								
Depth Portrayal								
Peripheral Performance								
Elect Gen Material								
MOTION:	Ms 1-n							Across stills, means, SDs, Ranks.
Dyn Luma Resol 1								Item-by-item, notes and comments.
Dyn Luma Resol 2								
Dyn Chroma Resol 1								
Dyn Chroma Resol 2								
Motion Rend Camera								
Motion Rend Scene 1								
Motion Rend Scene 2								
Motion Rend Scene 3								
Motion Rend Scene 4								
Motion Rend (comb.)								
Elect Gen Material								
Film (24 fps)								
Film (30 fps)								
Film (60 fps)								

COMMENTS:
Notes on any factors, occurrences, observations which might influence the interpretation of results described in the table.

APPENDIX II

FCC ADVISORY COMMITTEE ON ADVANCED TELEVISION SERVICE
SYSTEMS SUBCOMMITTEE
WORKING PARTY ON SYSTEM STANDARDS (SS/WP4)

OUTLINE FOR 1992 FINAL REPORT

1. **Executive Summary**

2. **Introduction**

3. **Background and History**

4. **Contributions from the Planning Subcommittee**

   4.1. WP1 — Working Party on Technology Attributes and Assessment
   4.2. WP2 — Working Party on Testing and Evaluation Specifications
   4.3. WP3 — Working Party on Spectrum Utilization and Alternatives
   4.4. WP4 — Working Party on Alternative Media Technology and BC Interface
   4.5. WP5 — Working Party on Economic Factors and Market Penetration
   4.6. WP6 — Working Party on Systems Subjective Assessment
   4.7. WP7 — Working Party on Audience Research
   4.8. AG1 — Advisory Group on Creative Issues
   4.9. AG2 — Advisory Group on Consumer/Trade Issues

5. **Contributions from the Systems Subcommittee**

   5.1. WP1 — Working Party on Systems Analysis
   5.2. WP2 — Working Party on Testing and Evaluation
      5.2.1. ATTC Report
      5.2.2. CableLabs Report
      5.2.3. CRC Report
      5.2.4. Field Test Report
   5.3. WP3 — Working Party on Economic Assessment
   5.4. WP4 — Working Party on System Standards

6. **Contributions from the Implementation Subcommittee**

   6.1. WP1 — Working Party on Policy and Regulation
   6.2. WP2 — Working Party on Transition Scenarios

7. Selection Criteria

7.1. Policy and Regulatory Issues
7.2. Spectrum Utilization
  7.2.1. Coverage Area
7.3. Economics
  7.3.1. Cost to Broadcasters
  7.3.2. Cost to Alternative Media
  7.3.3. Cost to Consumers
    7.3.3.1 Receivers
    7.3.3.2 VCRs
    7.3.3.3 Antennas/Receiving Equipment
7.4. Technology
  7.4.1. Total Viewing Experience Compared to NTSC
  7.4.2. Transmission Robustness
  7.4.3. Range of Services and Features
  7.4.4. Extensibility
  7.4.5. Interoperability Considerations

8. Analysis of System Data

8.1. System A
  8.1.1. Policy and Regulatory Issues
  8.1.2. Spectrum Utilization
  8.1.3. Economics
  8.1.4. Technology
8.2. System B
  8.2.1. Policy and Regulatory Issues
  8.2.2. Spectrum Utilization
  8.2.3. Economics
  8.2.4. Technology
8.3. System C
  8.3.1. Policy and Regulatory Issues
  8.3.2. Spectrum Utilization
  8.3.3. Economics
  8.3.4. Technology
8.4. Other Sections as necessary (one per system)

9. Recommendations

9.1. Policy
9.2. Technology and Standards
9.3. Regulatory Issues

10. Implementation Plan

11. Future Work

11.1. Development of Standards

12. Conclusions

13. Notes and Comment

14. Bibliography

15. Acknowledgements

Appendices

A1. Raw Data
A2. Methods of Data Reduction

Attachment 1

Philosophy for 1992 Final Report

This attachment to the draft "Outline for 1992 Final Report" of the Working Party on System Standards (SS/WP4) has been written to articulate clearly the philosophy contained in the outline.

The primary goal of the final report is to help the FCC choose an ATV terrestrial broadcasting standard. SS/WP4 results must be usable to that end. The work must take into account issues of inter-operability with alternative media. Secondly, the report should provide the affected industries with information needed to plan and implement an ATV system. The second goal is important, but only after the first is satisfied.

The first three chapters are self-explanatory and will be written by SS/WP4. Chapters 4, 5, and 6 are intended to be input contributions from the various groups named. Detailed outlines for these chapters will be written by SS/WP4 in early 1991 and distributed to the other groups as a means of guiding their input to SS/WP4. The rest of the final report is the output of SS/WP4.

The substantive work of SS/WP4 begins with Chapter 7 entitled "Selection Criteria". Its existence was suggested by a need to develop, understand, and write down those issues which will set the context for a recommendation. While not completely separable, those issues are, in general, independent of any specific implementation. This chapter is intended to be a discussion, based on real-world constraints and considerations, of what is important, and why. It is, in a very real sense, the foundation upon which the rest of the report and the rest of SS/WP4's work will be based. Logically, then, it will be the first chapter written.

The four sections of Chapter 7 — "Policy and Regulatory Issues", "Spectrum Utilization", "Economics", and "Technology" — identify a set of critical objectives to guide the work of SS/WP4. There may be other considerations identified and added later, but these four topics address issues which are critical to the success of any system. The first section, "Policy and Regulatory Issues", will ask, and hopefully answer, questions such as: Can existing television licensees be granted additional allocations for a simulcast ATV broadcast, or must all interested parties be given an equal opportunity to compete for any available spectrum? This is clearly an issue requiring legal review and SS/WP4 will seek advice from the Implementation Subcommittee. It is also an issue which applies equally to any and all specific systems under consideration and, in that sense, is independent of which proponent system is being discussed.