A G E N D A

TO THE LAWRENCE COUNTY BOARD OF COMMISSIONERS

MARCH 25, 1996

5:00 P.M.

CALL TO ORDER BY COUNTY EXECUTIVE

ROLL CALL

PLEDGE

INVOCATION

BI-MONTHLY FINANCIAL REPORT FISCAL AGENT

BI-MONTHLY FINANCIAL REPORT SCHOOL SUPERINTENDENT

REPORT OF RESOLUTION COMMITTEE

1. RESOLUTION # 01032596

   Resolution to approve minutes of the January 29, 1996 regular session.

2. RESOLUTION # 02032596

   Resolution of Consent To Assignment and Transfer of CATV Franchise.

3. RESOLUTION # 03032596

   Resolution to amend the Lawrence County ~~Personnel Policy.~~

4. RESOLUTION # 04032596

   Resolution to fund engineering for the Solid Waste Management Board.

5. RESOLUTION # 05032596

   Resolution to reduce the speed limit on Holloway Street in Summertown.

6. RESOLUTION # 06032596

   Resolution to support legislation requiring a deposit on all beverage containers.

7. RESOLUTION # 07032596

   Resolution to amend County General Budget.

8. RESOLUTION # 08032596

   Resolution to amend County Highway Budget.

9. RESOLUTION # 09032596

   Resolution to transfer funds from Capital Projects to Highway Capital Project Fund.

REPORT-HEALTH DEPARTMENT

APPOINTMENT OF 3 MEMBERS TO 911 BOARD

ELECTION OF 5 MEMBERS TO THE EQUALIZATION BOARD

NOTARIES

APPROVED:

Ed Martin

~~ED MARTIN, COUNTY EXECUTIVE~~

ATTEST:

~~KENNETH WEATHERS, COUNTY CLERK~~

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH, WEATHERS, COUNTY CLERK

RESOLUTION# Open Court Ed Martin Roll Call Kenneth Weathers Pledge to the flag Franklin Burns Invocation Jim Buie		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464						X	
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464						X	
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456						X	
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464						X	
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456						X	
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468						X	
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468						X	
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St., P.O. Box 224, Loretto 38469						X	
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456						X	
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468						X	
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468						X	
5th District MOORE, W.T. (TOMMY)	762-5501 305 Pond Field Rd., West Point 38486						X	
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464						X	
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468						X	
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464						X	
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468						X	
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464						X	
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469						X	
TOTALS							18	

Total present Eighteen (18)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH, WEATHERS, COUNTY CLERK

RESOLUTION# Bi-Monthly FinancialReport Fiscal Agent		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464							
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464							
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456							
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464							
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456							
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468							
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468							
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St., P.O. Box 224, Loretto 38469							
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456							
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468	X						
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468							
5th District MOORE, W.T. (TOMMY)	762-5501 305 Pond Field Rd., West Point 38486							
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464							
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468							
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464							
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468							
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464							
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469		X					
TOTALS								

Motion carried by a unanimous voice vote.

Total voting aye Eighteen (18)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION#		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT	
Bi-Monthly Financial Report School Superintendent									
No Report was filed									
9th District	762-3716								
BAILEY, JACKIE	411 6th St., L'burg, TN 38464								
8th District	766-0768								
BARNES, TODD	707 Buffalo Rd., L'burg TN 38464								
7th District	829-2358								
BENEFIELD, RONALD	91 Benefield Lane, Ethridge 38456								
9th District	762-3167								
BUIE, JIM	508 8th St., L'burg 38464								
6th District	964-3404								
BURNS, FRANKLIN	383 L'burg-Henryville Rd., Ethridge 38456								
4th District	762-7118								
DRYDEN, JERRY	12 Ingram Rd., Leoma 38468								
1st District	852-2899								
GABEL, JIM	2773 Hwy 43 S., P. O. BOX 176, Leoma 38468								
2nd District	853-6709								
GREEN, ROBERT L.	404 N. Military St.,P.O. Box 224, Loretto 38469								
7th District	829-2603								
HILL, STEVE	38 Dry Weakley Rd., Ethridge 38456								
3rd District	852-4561								
KEENER, ALAN J.	226 Dunn-Leoma Rd., Leoma 38468								
4th District	762-5914								
MARSTON, NORMAN	110 Horseshoe Bend Rd., Leoma 38468								
5th District	762-5501								
MOORE, W.T.(TOMMY)	305 Pond Field Rd., West Point 38486								
5th District	762-8299								
ODOM, PAUL	3353 Grandaddy Rd., L'burg 38464								
3rd District	852-2425								
PARROTT, L.C.	52 Williams Hill Rd., Leoma 38468								
6th District	762-8007								
PERRY, TIM A.	1136 Ethridge-Red Hill Rd., L'burg 38464								
1st District	852-2204								
PURCELL, STEVE	112 Old Jackson Hwy., Leoma 38468								
8th District	762-7419								
WRAY, JOE ROBERT	1403 Beckham Ave., L'burg 38464								
2nd District	853-6725								
YOCOM, WAYNE A.	148 Rigling Rd., P.O. BOX 185, Loretto 38469								
TOTALS									

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

REPORT OF THE RESOLUTION COMMITTEE

TO THE LAWRENCE COUNTY BOARD OF COMMISSIONERS
LAWRENCE COUNTY, TENNESSEE
MARCH 25, 1996.

WE, THE RESOLUTION COMMITTEE, RESPECTFULLY REPORT THAT AS SUCH COMMITTEE, IN ACCORDANCE WITH RESOLUTION OF THE COURT WHICH CREATED AND PRESCRIBED THE FUNCTIONS OF THE COMMITTEE, MET, RECEIVED, EXAMINED AND HEREBY REPORT TO THE COURT FOR ITS CONSIDERATION AT THIS TERM WITHOUT SUSPENSION OF THE RULES, CERTAIN RESOLUTIONS HERETO ATTACHED, FILED IN THE OFFICE OF THE COUNTY EXECUTIVE WHEN THE COMMITTEE MET FOURTEEN (14) DAYS BEFORE THE TERM OF THE FOLLOWING SUBJECT, TO WIT:

1. RESOLUTION # 01032596

   Resolution to approve minutes of the January 29, 1996 regular session.

2. RESOLUTION # 02032596

   Resolution of Consent To Assignment and Transfer of CATV Franchise.

3. RESOLUTION # 03032596

   Resolution to amend the Lawrence County Personnel Policy.

4. RESOLUTION # 04032996

   Resolution to fund engineering for the Solid Waste Management Board.

5. RESOLUTION # 05032596

   Resolution to reduce the speed limit on Holloway Street in Summertown.

6. RESOLUTION # 06032596

   Resolution to support legislation requiring a deposit on all beverage containers.

7. RESOLUTION # 07032596

   Resolution to amend County General Budget.

8. RESOLUTION # 08032596

   Resolution to amend County Highway Budget.

9. RESOLUTION # 09032596

   Resolution to transfer funds from Capital Projects to Highway Capital Project Fund.

REPORT--HEALTH DEPARTMENT

APPOINTMENT OF 3 MEMBERS TO 911 BOARD

ELECTION OF 5 MEMBERS TO THE EQUALIZATION BOARD

NOTARIES

SUBMITTED THIS ___ DAY OF 1996 MARCH TERM

TIM PERRY

ROBERT L. GREEN

STEVE HILL

NORMAN MARSTON

JIM BUIE

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH, WEATHERS, COUNTY CLERK

RESOLUTION# Report of the Resolution Committee		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464							
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464							
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456							
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464							
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456							
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468							
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468							
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St., P.O. Box 224, Loretto 38469	X						
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456							
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468							
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468							
5th District MOORE, W.T. (TOMMY)	762-5501 305 Pond Field Rd., West Point 38486							
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464							
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468							
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464							
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468							
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464							
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469		X					
TOTALS								

Motion to approved carried by a unanimous voice vote.

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

MINUTES

LAWRENCE COUNTY COMMISSION

JANUARY 29, 1996

OPEN COURT-ED MARTIN
ROLL CALL-KENNETH WEATHERS
PLEDGE TO THE FLOAG-FRANKLIN BURNS
INVOCATION-JIM BUIE

Bi-Monthly Financial Report Fiscal Agent-APPROVED

Bi-Monthly Financial Report School Superintendent-NO REPORT

Report of the Resolution Committee-APPROVED

Minutes of November 27, 1995-APPROVED

ESOLUTION 02012996-Change Carol Lane to Hessie Lane-APPROVED

RESOLUTION 03012996-Resolution to Create the Lawrence County Solid Waste Authority. Withdrawn by Committee until a later meeting.

RESOLUTION 04012996-Resolution to transfer funds from Capital Projects to Highway Fund and Highway Capital Project Fund. APPROVED

RESOLUTION-05012996-Resolution to amend the Lawrence County Highway Budget-APPROVED

RESOLUTION-06012996-Resolution to amend the County General Budget-APPROVED

RESOLUTION-07012996-Resolution to appoint David Morrow Director of Budget and Accounts. APPROVED

RESOLUTION-08012996-Resolution to set salary of Director of Budget and Accounts-APPROVED

RESOLUTION-09012996-Resolution to approve bond of the Director of Budgets and Accounts-APPROVED

APPOINIMENTS TO THE AGRICULTURAL BOARD-Jean McAnally, Jim Belew, L. C. Parrott Tommy Moore

APPROVE NOTARIES

ADJOURNMENT

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH, WEATHERS, COUNTY CLERK

RESOLUTION# 01032596

Resolution to approve munutes of the January 29, 1996 regular sesion.

		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464							
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464							
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456							
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464							
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456							
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468							
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468							
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St., P.O. Box 224, Loretto 38469	X						
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456							
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468		X					
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468							
5th District MOORE, W.T. (TOMMY)	762-5501 305 Pond Field Rd., West Point 38486							
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464							
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468							
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464							
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468							
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464							
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469							
TOTALS								

Motion to approve carried by a unanimous voice vote.

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

RESOLUTION NO. _____

CONSENT TO ASSIGNMENT AND TRANSFER

OF

CATV FRANCHISE

WHEREAS, the County of Lawrence of the County of Lawrence, Tennessee (the "Franchising Authority") granted a cable television franchise to Rifkin Cablevision of Tennessee, Ltd., a Tennessee limited partnership ("RCT"), pursuant to Ordinance No. , adopted August 1, 1986 (as amended to the date hereof, the "Franchise");

WHEREAS, RCT desires to sell, assign and otherwise transfer the cable systems owned by it (the effective date of such transaction being the "Closing Date") to Rifkin Acquisition Partners, L.L.L.P., a Colorado limited liability limited partnership ("RAP") by either (i) selling and transferring all of its assets, including the Franchise, to RAP on the Closing Date, or (ii) selling and assigning all of its partnership interests to RAP on the Closing Date; and

WHEREAS, Monroe M. Rifkin ("Rifkin") jointly controls the corporate general partner of RCT and solely controls the corporate general partner of RAP; and

WHEREAS, as a result of the transactions described above, RAP will either directly or indirectly hold the assets of RCT, including the Franchise; and

WHEREAS, the cable television systems owned by RCT are managed by Rifkin & Associates, Inc., a Colorado corporation, that is wholly owned by Rifkin; and

WHEREAS, after the sale of the cable television systems owned by RCT to RAP, Rifkin & Associates, Inc. will continue to manage the cable television systems on behalf of RAP; and

WHEREAS, the Franchising Authority is willing to consent to either of the transactions described in the second paragraph above.

NOW, THEREFORE, in consideration of the premises:

1. The Franchising Authority hereby confirms that RCT is in substantial compliance with all obligations under the Franchise and that the Franchise was validly issued and is in full force and effect.

2. The Franchising Authority hereby consents to either (i) the assignment and transfer of the Franchise by RCT to RAP on the Closing Date and to RAP's assumption of the rights and obligations of RCT under the Franchise, or (ii) the transfer of control of RCT to RAP on the Closing Date resulting in the indirect ownership by RAP of all of the assets owned by RCT, including the Franchise, in the event that RCT's partnership interests are sold to RAP.

3. The Franchising Authority does hereby consent to RAP's pledge and grant of a security interest to RAP's lenders, their successors and assigns, of, in and to the assets of RAP and/or its subsidiaries, including the Franchise and all rights of RAP related thereunder, to secure any indebtedness of RAP, and to the exercise by each of the secured parties of its rights as a secured party in the event of a default by RAP in the payment or the performance of any of its indebtedness or obligations secured thereby; provided, however, that nothing herein shall constitute a waiver of any right of the Franchising Authority to approve any other transfer or assignment of the Franchise.

ADOPTED AND APPROVED this 25th day of March, 1996.

Ed Martin
County Executive

ATTEST:

Kenneth W. Sell
County Clerk

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH WEATHERS, COUNTY CLERK

RESOLUTION# 02032596

Resolution of Consent To Assignment and Transfer of CATV Franchise.

		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456			X				
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469			X				
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456			X				
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468			X				
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468			X				
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468		X	X				
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469			X	X			
TOTALS								

Motion carried:

Total voting aye Eighteen (18)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

RESOLUTION NO. 03032596

RESOLUTION TO AMEND LAWRENCE COUNTY'S PERSONNEL POLICY

WHEREAS, the county legislative body of Lawrence County has established a personnel and travel policy in which Lawrence County has reserved the right to amend policies and procedures outlined in this manual, and

WHEREAS the legislative body of Lawrence County desires to amend certain provisions in order to further standardize benefits for all employees.

BE IT, THEREFORE, RESOLVED that the personnel and travel policy for employees of Lawrence County shall be amended as follows:

To delete pages 3, 4 and 5 and substitute in their stead the attached pages 3, 4, 5 and 5a.

This resolution shall become effective on July 1, 1996.

Adopted this _____ day of _____, 1996.

APPROVED:

Ed Martin

ED MARTIN,
COUNTY EXECUTIVE

ATTEST:

KENNETH WEATHERS,
COUNTY CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# 03032596 Resolution to amend the Lawrence County Personnel Policy.		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456			X				
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469		X	X				
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456			X				
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468	X		X				
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468			X				
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468			X				
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469			X				
TOTALS				18				

Resolution carried by a unanimous voice vote.

Total voting aye Eighteen (18)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

RESOLUTION NO. 04032596

RESOLUTION TO FUND ENGINEERING FOR THE
SOLID WASTE MANAGEMENT BOARD

WHEREAS, the county legislative body of Lawrence County on the 25th day of January, 1993 approved funding of $40,000.00 for the engineering needed to extend the usefulness of the bale fill cite, and

WHEREAS, such an amount was not actually paid to the Solid Waste Management Board, and

WHEREAS, the legislative body of Lawrence County desires to fulfill its obligation in this matter.

NOW, THEREFORE, BE IT RESOLVED by the county legislative body of Lawrence County meeting in regular session this 25 day of March, 1996 that said $40,000.00 fee be paid to the Solid Waste Management Board out of the current year's budget, if possible, and if this is not possible, then that such an amount be appropriated in the budget for the fiscal year 1996-1997.

Adopted this 25 day of March, 1996.

APPROVED:

Ed Martin

ED MARTIN,
COUNTY EXECUTIVE

ATTEST:

KENNETH WEATHERS,
COUNTY CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# 04032596 Resolution to fund engineering for the Solid Waste Management Board.		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456			X				
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469	X		X				
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456			X				
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468			X				
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468			X				
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468				X			
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469		X	X				
TOTALS				17	1			

Resolution carried by a roll call vote.

Total voting aye Seventeen (17)

Total voting nay One (1)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

AMENDED RESOLUTION NO. 05032596

RESOLUTION TO REDUCE SPEED LIMIT ON HOLLOWAY ROAD IN SUMMERTOWN

WHEREAS, Tennessee Code Annotated Section 55-8-153 authorizes county legislative bodies to prescribe such lower speed limits as it may deem appropriate on any road being maintained by the county, and

WHEREAS, the county legislative body of Lawrence County desires that the speed limit on the Holloway Road in Summertown shall be reduced to 35 miles per hour to protect the safety of the public.

NOW, THEREFORE, BE IT RESOLVED by the county legislative body of Lawrence County meeting this 25th day of March, 1996, that:

SECTION 1: The speed limit on the Holloway Road in Summertown shall be reduced to 35 miles miles per hour.

SECTION 2: That appropriate road signs be posted to give notice of such reduced speed limit.

SECTION 3: This resolution shall take place upon adoption, the general welfare requiring it.

Adopted this 25 day of March, 1996.

APPROVED:

_____
ED MARTIN
COUNTY EXECUTIVE

ATTEST:

_____
KENNETH WEATHERS
COUNTY CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# 05032596 Amend the resolution to reduce the speed limit to 35MPH on Holloway Street in Summertown.	MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE 762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD 766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD 829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM 762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN 964-3404 383 L'burg-Henryville Rd., Ethridge 38456	X		X				
4th District DRYDEN, JERRY 762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM 852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L. 853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469			X				
7th District HILL, STEVE 829-2603 38 Dry Weakley Rd., Ethridge 38456		X	X				
3rd District KEENER, ALAN J. 852-4561 226 Dunn-Leoma Rd., Leoma 38468			X				
4th District MARSTON, NORMAN 762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY) 762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL 762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C. 852-2425 52 Williams Hill Rd., Leoma 38468			X				
6th District PERRY, TIM A. 762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE 852-2204 112 Old Jackson Hwy., Leoma 38468			X				
8th District WRAY, JOE ROBERT 762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A. 853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469			X				
TOTALS			18				
Resolution as amended carried by a roll call vote.							
Total voting aye Eighteen (18)							

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH WEATHERS, COUNTY CLERK

RESOLUTION# 05032596 Resolution to reduce the speed limit on Holloway Street in Summertown As amended		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456	X		X				
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469			X				
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456		X	X				
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468			X				
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468			X				
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468			X				
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469			X				
TOTALS				17				

Resolution amended carried by a roll call vote.

Total voting aye Eighteen (18)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

RESOLUTION NO. 06032596

RESOLUTION TO SUPPORT LEGISLATION REQUIRING A DEPOSIT ON ALL GLASS, ALUMINUM AND PLASTIC BEVERAGE CONTAINERS

WHEREAS, the county legislative body of Lawrence County desires to reduce roadside litter, and

WHEREAS, the county legislative body is interested in protecting the environment, and

WHEREAS, the county legislative body of Lawrence County is concerned about the danger that broken glass, aluminum, and plastic containers pose to the safety of the public.

NOW, THEREFORE, BE IT RESOLVED by the county legislative body of Lawrence County meeting in regular sessions this _____ day of March, 1996 that a resolution shall be adopted encouraging the Tennessee State Legislature to enact legislation requiring a deposit on glass, aluminum, and plastic beverage containers sold in the state of Tennessee, and directing the Clerk to transmit a copy of this resolution to the state legislature.

Adopted this _____ day of March, 1996.

APPROVED:

Ed Martin

ED MARTIN,
COUNTY EXECUTIVE

ATTEST:

_____

KENNETH WEATHERS,
COUNTY CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# 06032596 Resolution to support legislation requiring a deposit on all beverage containers.		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456			X				
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469			X				
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456			X				
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468			X				
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468		X	X				
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468			X				
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469	X		X				
TOTALS				18				

Motion carried by a roll call vote.

Total voting aye Eighteen (18)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

Resolution #07032596

Resolution to approve budget amendments for the Lawrence County General fund.

NOW, THEREFORE BE IT RESOLVED, by the Lawrence County Board of Commissioners meeting in regular session this 25th day of March, 1996 approve budget amendments for the County General Fund.

	ACCOUNT	DESCRIPTION	Debit	Credit
A)	101-39000	Undesignated Fund Ba	32,492.00	
	101-55710-316	Sanitation Management		32,492.00

To increase Solid Waste Appropriation from 40% to 50% for the balance of the 95-96 fiscal year.

B)	101-39000	Undesignated Fund Ba	13,500.00	
	101-53100-106	Cir. Court Deputies		13,500.00

To appropriate additional funds to support Circuit Court staff for the balance of the 95-96 fiscal year.

C)	101-39000	Undesignated Fund Ba	9,500.00	
	101-55130-790	Other Equipment		9,500.00

To appropriate additional funds for ambulance service to purchase four new blood pressure and pulse oximeters for ambulance transport readings

DAVID MORROW
DIRECTOR OF ACCOUNTS & BUDGETS
912 N. MILITARY
LAWRENCEBURG, TN 38464

MEMORANDUM

TO: COUNTY COMMISSIONERS

FROM: DAVID MORROW

DATE: 3/7/96

SUBJECT: BUDGET AMENDMENTS

RESOLUTION #07032596

A) THIS ITEM INCREASES SOLID WASTE APPROPRIATION AS PASSED BY COUNTY COMMISSION IN DECEMBER 1995 FROM 40% TO 50% FOR THE BALANCE OF THE FISCAL YEAR BEGINNING DECEMBER 1995. DIFFERENCE IS $4641.66 PER MONTH FOR SEVEN MONTHS.

B) THIS ITEM INCREASES CIRCUIT COURT CLERK JERALD WILSON'S BUDGET TO COVER A $13,500 DEFICIT IN HIS DEPUTY SALARY LINE AND FOR SALARY INCREASES FOR TWO OF HIS EMPLOYEES TO MAKE REGULAR CLERK PAY.

C) THIS ITEM INCREASES THE AMBULANCE BUDGET BY $9500 TO PAY FOR FOUR NEW BLOOD PRESSURE MONITORS AND FOUR NEW PULSE OXIMETERS WHICH ANTHONY STATES ARE DESPERATELY NEEDED BY AMBULANCE SERVICE PERSONNEL TO TAKE ACCURATE READINGS DURING TRANSPORT.

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# 07032596

Resolution to amend County General Budget.

		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456			X				
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469	X		X				
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456			X				
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468			X				
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468			X				
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468			X				
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469		X	X				
TOTALS				18				

Motion carried by a roll call vote.

Total voting aye Eighteen (18)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

RESOLUTION # 09032596

RESOLUTION TO TRANSFER BOND PROCEEDS OF GENERAL OBLIGATION SERIES 1994 FROM GENERAL CAPITAL PROJECTS FUND TO HIGHWAY CAPITAL PROJECTS FUND

WHEREAS, bond proceeds from General Obligations Bond Series 1994 were deposited into the General Capital Projects Fund, and;

WHEREAS, Federal-Aid Bridge Replacement BRZE-5000(2) Bridge over Buffalo River on Brace Summertown Road and BRZE-5000(3) Bridge over Buffalo River on Railroad Bed bid tabulations were estimated at $188,050 of which $175,280 has already been deposited with State of Tennessee Department of Transportation, and;

WHEREAS, funds are presently needed to pay this additional amount of $12,770 on these Federal Bridge Projects,

NOW, THEREFORE, BE IT RESOLVED by the county legislative body of Lawrence County meeting in regular session this 25th day of March, 1996 that $12,770 shall be transferred from the General Capital Projects Fund to the Highway Capital Projects Fund.

Adopted this 25th day of March, 1996.

ADOPTED:

Ed Martin

ED MARTIN,
COUNTY EXECUTIVE

ATTEST:

KENNETH WEATHERS,
COUNTY COURT CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# 09032596 Resolution to transfer funds from Capital Projects to Highway Campital Project Fund.		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456			X				
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469	X		X				
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456			X				
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468			X				
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468			X				
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468			X				
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469		X	X				
TOTALS				18				

Motion carried by a roll call vote.

Total voting aye Eighteen (18)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

SUMMARY OF SERVICES

LAWRENCE COUNTY HEALTH DEPARTMENT

January and February, 1996

ADULT HEALTH:
Number of clinic visits for blood pressure checks, hemoglobins, injections ordered by physicians, flu shots, tuberculin skin tests, etc. 107

CARE COORDINATION:
CSS (Children's Special Services)
Number of clinic and home visits 20
HUG (Help Us Grow)
Number of visits by staff to assist patients access care and/or teach or counsel patients 31

CHILD HEALTH:
Number of clinic visits for immunizations, physical inspections, hemoglobins, tuberculin skin tests, PKU tests, etc. 305

FAMILY PLANNING:
Number of clinic visits for examinations, supplies, or problems 184

HEALTH EDUCATION:
Total number attending classes taught by staff to school age groups 461
Number completing 4 sessions of prenatal classes 2

HIV:
Total number of HIV tests performed 46

PRENATAL:
Number of clinic visits for prenatal care 92

SEXUALLY TRANSMITTED DISEASES:
Number of clinic visits 33
Number of STD investigations 21

TUBERCULOSIS CONTROL:
Number of tuberculosis cases served 2
Number of preventative cases under treatment 9

VITAL RECORDS:
Birth and Death Certificates 61

WIC (Women, Infants, and Children)
Number of clinic visits for WIC certification, nutrition education, and/or vouchers 698

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# Health Department Report		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456			X				
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469	X		X				
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456			X				
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468			X				
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468			X				
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468			X				
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469		X	X				
TOTALS				18				
Report Approved								

Total voting aye Eighteen

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

MEMBERS OF BOARD OF DIRECTORS OF LAWRENCE COUNTY EMERGENCY COMMUNICATIONS DISTRICT

ALL FOUR (4) YEAR TERMS

APPOINTED:	NAME	EXPIRES	PLACE TAKEN
5/22/95	Joe Wray	4/99	Anthony Grinnell
5/22/95	W.L. Wright	4/99	Louie Fite
5/22/95	William H. Lindsey	4/99	Marty Dunkin
9/26/94	William Dorning	4/98	Terry Beecham
3/25/96	Larry Glass	4/2000	Ronnie McMasters
3/25/96	Joe Gieske	4/2000	Dempsey Holder
3/25/96	Harold Newton	4/2000	Roy Holloway

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# 3 Members to 911 Board Larry Glass to replace Ronnie McMasters Joe Gieske to replace Dempsey Holder Harold Newton to replace Roy Holloway		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464			X				
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464			X				
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456			X				
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464			X				
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456	X		X				
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468			X				
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468			X				
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469			X				
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456			X				
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468			X				
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468			X				
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486			X				
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464			X				
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468			X				
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464			X				
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468			X				
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464			X				
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469		X	X				
TOTALS								
Approved:								

Total voting aye Eighteen (18)

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH, WEATHERS, COUNTY CLERK

RESOLUTION# Election of 5 Members to the Equalization Board		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464							
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464							
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456							
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464							
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456							
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468							
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468							
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St., P.O. Box 224, Loretto 38469							
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456		X					
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468							
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468							
5th District MOORE, W.T. (TOMMY)	762-5501 305 Pond Field Rd., West Point 38486							
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464							
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468							
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464	X						
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468							
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464							
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469							
TOTALS								
Carl Holloway								
Bobby Stout								
Guy Dover								
H. V. Peppers								
Charlie Osborn								

Motion carried by a unanimous voice vote.

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

March 25 1996

BOND

Angela N Lyons	Elliott
Mary D Jones	Western Surety
Debby C Davis	United States Fidelity
Rev Joe F Davis	Willie D Davis- Irene D Dowell
Teresa A Hensley	Van Vickle
Julia Sewell	Elliott
Junive Markus	Markus
Barbara Norwood	Oneal Stanford - Jonthan M Edwards
Gemma Hill	Daniel Freeman - Randy Hillhouse
Edward H White	L A Willis - Louie White
Cheryl J Holt	Col Skeets Eskridge - Freeman A Wright
Virgil Holt Cummings	Rhonda L Curtis - Sharon D Myrick
Louie White	C W Rawden - Edward White
Beverly Geho	Bond Safeguard Ins Co
Connie Sue Gamble	Reva Lee - Franklin Lee
Gail K Brink	Nathan Thomas Ins
Frances Mashburn	Western Surety Co
Phyllis Love	United Pacific Ins Co
Sherri Wright	Markus
Wanda Davis	Van Vickle
Sheri C Letherer	Howard Hildreth Agency

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# Notaries		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT	
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464								
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464								
7th District BENEFIELD, RONALD	829-2358 91 Benefield Lane, Ethridge 38456								
9th District BUIE, JIM	762-3167 508 8th St., L'burg 38464								
6th District BURNS, FRANKLIN	964-3404 383 L'burg-Henryville Rd., Ethridge 38456								
4th District DRYDEN, JERRY	762-7118 12 Ingram Rd., Leoma 38468								
1st District GABEL, JIM	852-2899 2773 Hwy 43 S., P. O. BOX 176, Leoma 38468								
2nd District GREEN, ROBERT L.	853-6709 404 N. Military St.,P.O. Box 224, Loretto 38469		X						
7th District HILL, STEVE	829-2603 38 Dry Weakley Rd., Ethridge 38456								
3rd District KEENER, ALAN J.	852-4561 226 Dunn-Leoma Rd., Leoma 38468								
4th District MARSTON, NORMAN	762-5914 110 Horseshoe Bend Rd., Leoma 38468								
5th District MOORE, W.T.(TOMMY)	762-5501 305 Pond Field Rd., West Point 38486								
5th District ODOM, PAUL	762-8299 3353 Grandaddy Rd., L'burg 38464								
3rd District PARROTT, L.C.	852-2425 52 Williams Hill Rd., Leoma 38468								
6th District PERRY, TIM A.	762-8007 1136 Ethridge-Red Hill Rd., L'burg 38464								
1st District PURCELL, STEVE	852-2204 112 Old Jackson Hwy., Leoma 38468								
8th District WRAY, JOE ROBERT	762-7419 1403 Beckham Ave., L'burg 38464								
2nd District YOCOM, WAYNE A.	853-6725 148 Rigling Rd., P.O. BOX 185, Loretto 38469			X					
TOTALS									

Approved by a unanimous voice vote.

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

COUNTY COMMISSION, LAWRENCE COUNTY, TN

KENNETH,WEATHERS, COUNTY CLERK

RESOLUTION# Adjourmment		MOTION	SECOND	AYE	NAY	PASS	PRESENT	ABSENT	
9th District BAILEY, JACKIE	762-3716 411 6th St., L'burg, TN 38464								
8th District BARNES, TODD	766-0768 707 Buffalo Rd., L'burg TN 38464								
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TOTALS									
Motion carried by a unanimous voice vote.									

Date March 25, 1996

KENNETH WEATHERS, COUNTY CLERK

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

In the Matter of: Speer Communications Holdings Limited Partnership Must Carry Complaint Concerning Carriage of Television Station WNAB-TV, Nashville, Tennessee, On Cable Systems Serving McMinnville, Tullahoma, Spencer, Pulaski and Lawrenceburg, Tennessee	CSR-5009-M

To: Chief, Cable Services Bureau

OPPOSITION TO MUST CARRY COMPLAINT

Rifkin & Associates, Inc. ("Rifkin"), by its attorneys, hereby submits its opposition to the captioned "Must Carry Complaint" filed by Speer Communications Holdings Limited Partnership ("Speer") seeking carriage of television station WNAB-TV, Nashville, on the cable television systems serving Lawrenceburg, McMinnville. Pulaski, Spencer and Tullahoma, Tennessee.[1]

Speer is correct that Rifkin's Vice President of Engineering, Mr. Peter Smith, indicated that preamplifiers could not be used, but his statement was not the categorical denial of must carry as WNAB asserts. Rather, Mr. Smith was stating to Mr. Martin, Speer's Director of Engineering a physical and engineering truism -- preamplifiers in this case may raise signal **strength** but will not cure poor carrier-to-noise ratio ("CNR") and thus will not improve poor signal **quality**.

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[1] By letter dated June 16, 1997, counsel for Rifkin requested an additional two weeks, to and including June 30, 1997, in which to file its response to Speer. Counsel for Speer interposed no objection to that request.

The Commission makes the distinction between signal strength and signal quality, and it has made clear that it is up to the television broadcast station to take whatever steps are necessary to provide a good **quality** signal for carriage on the cable system. Thus, in Tri-State Christian TV, Inc. v. Century Communications Corp., 1996 FCC LEXIS 2332 (May 7, 1996), the right of a television station to use a preamplifier to make its signal level measurements was upheld, but the obligation to deliver a good signal quality to the cable system was also emphasized:

> Therefore, Tri-State may make its signal tests at the output of any equipment that it supplies the system. Should WNIM's signal still lack sufficient quality or exhibit excessive noise, then the station may need to acquire additional equipment, such as an improved antenna, and take addition signal measurements at the output of this equipment until such time as the station does provide a good quality signal at the system's headend. Supra. at ¶12

Mr. Smith was well within his right -- indeed obligation -- to advise Mr. Martin that a preamplifier would not be appropriate in this situation. The station must find another way to improve its signal so that the CNR is adequate.

In adopting its current technical standards, the Commission, in its Report & Order in MM Dkt 91-169, 7 FCC Rcd 2021(1992), recognized how crucial the CNR is to proper picture quality:

> The visual signal level to undesired noise ratio (C/N) is a key factor in the signal quality of a TV picture. The C/N is the level of the desired signal above the level of undesired noise in the delivered picture. The higher the ratio, the better quality the picture. For example, a good NTSC television picture should have a C/N of 43 dB or better. We believe that this parameter is critical to the quality of the picture received by cable subscribers, and we reiterate that there is merit to the criticism that our standards in this regard need to be improved in order to assure provision of a high quality picture to cable subscribers. Id. at ¶ 37.

Thus, the Commission decided to raise the definition of a good signal quality from the TASO 3 level to the TASO 2 level:

> For years, our rules and guidelines set a C/N standard of 36 dB, approximating a Television Allocation Study Organization [TASO] Grade 3 picture: a passable picture, indicating acceptable quality with perceptible but not objectionable impairment. Industry system design generally recommends a C/N of 43 dB or better, approximating a TASO Grade 2 picture: a fine picture, indicating a picture of high enough quality to provide enjoyable viewing with impairment just perceptible. In our Notice, we proposed to increase the C/N by 7 dB, from 36 dB to 43 dB. As we stated in the Notice, this approximates a one TASO grade increase from TASO Grade 3 to TASO Grade 2. This single augmentation of our standards would contribute vastly toward improving the quality of signal delivered by a cable operator, and should reduce significantly subscriber signal quality complaints. Id. at ¶ 38.

Attached is the statement of Mr. Smith explaining in detail why the criterion relevant to signal **quality**, carrier-to-noise ratio, is not met in the instant case where WNAB's signal strength is too low to be adequately improved by preamplifiers. The Commission's signal **strength** levels established in its current must carry rules were intended to ensure a CNR that would provide acceptable signal **quality**. The signal levels chosen by the Commission in its must carry rules, when converted to CNR equivalents as demonstrated in Mr. Smith's statement, permit signals of a quality at the "perceptible but not annoying" interference level using the 1983 Regional Administrative Radio Conference picture quality studies.[2] The initial signal levels measured for WNAB at Rifkin's headends translate to CNRs at the "annoying" to "very annoying" interference levels, well below the "perceptible but not annoying" level. As Mr. Smith demonstrates in his statement, a preamplifier cannot raise the signal strength without also raising the noise level thus leaving the signal quality in the "annoying" to "very annoying" range.

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[2] As noted in Mr. Smith's statement, the RARC levels show that viewer expectations of picture quality have increased since the original TASO studies so that, if anything, holding WNAB just to the TASO standard (which it cannot meet using preamplifiers) is actually itself less than adequate .

Cable Television Laboratories recently also has done a study of viewer expectations of picture quality and has found that the public has developed even higher standards.[3] The CTL study is attached hereto in order to show the rigorous scientific testing methodologies employed in assessing picture quality as it relates to CNR. The CTL study, along with the RARC and original TASO studies, show that the crucial factor is signal noise, not signal strength, and that the CNR is the key determinant of acceptable or not acceptable signal quality.

In its Must Carry Report & Order, 8 FCC Rcd 2965 (1993), the Commission discussed the relationship between its benchmark signal strength tests and signal quality. It specifically noted that there may be instances where signal strength alone does not permit adequate signal quality:

> However, as Time Warner notes in its comments, there may be situations where the levels of undesired signals (noise), outside of the cable operator's control, that are received at the cable system's headend adversely affect the quality of a television station's signal. We believe that, where a broadcaster's signal strength at the cable headend meets the above standard but, for reasons beyond the control of the cable operator, a good quality picture is not receivable, the broadcast station and the cable operator should initially attempt to resolve the problem.
> Id. at ¶100

But the Commission emphasized that it is the broadcaster who must deliver to the cable operator a signal of proper quality:

> If good engineering practices and proper processing equipment produce a signal that does not meet our technical standards at the subscriber terminals, we will require the cable operator to resolve the problem or identify the reason why it cannot provide

---

[3] The statement of Ms. Bronwen Jones, who participated in the CTL study, attached to Mr. Smith's statement indicates, if anything, that consumer expectations will dramatically increase in the future. The Commission, in enforcing the must carry rules, must also take into account the actual picture quality delivered to the public not just now but in the near future as well. It is unacceptable to say merely that a cable operator is not expected to improve a poor signal quality if that is all that is delivered to its headend. In the near future the expectations of the viewing public for good picture quality will rise dramatically; cable operators must not be saddled with an obligation to carry signals of poor picture quality.

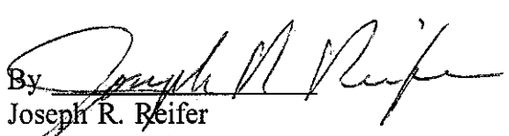
> the required level of signal quality. In so doing, the cable operator should be able to identify the problem. If the problem stems from an unsatisfactory quality local television signal received at the cable system's principal headend, the cable operator is not required to bear the burden of improving the signal; however, we expect it to cooperate with the television station to resolve the problem.
> Id. at ¶101

Thus, Mr. Smith has demonstrated that a preamplifier, by increasing noise along with increased signal, will not cure the signal quality problem under any standard, TASO, RARC or CTL. In accordance with the Commission's procedures this has been explained to Speer. It is now the station's obligation to come up with a solution, if possible, other than the preamplifier.

For the foregoing reasons, the captioned must-carry complaint was, at best, prematurely filed as Speer has made no effort to improve on its signal quality other than indicating it would use preamplifiers. Since it has been demonstrated that preamplifiers will not provide proper signal quality Speer has not complied with the Commission's procedural requirements. The captioned complaint should be denied and dismissed.

Respectfully submitted,

RIFKIN & ASSOCIATES, INC.

By 

Joseph R. Reifer
Cole, Raywid & Braverman, L.L.P.
1919 Pennsylvania Ave., NW
Washington, DC 20006
(202) 659-9750

June 30, 1997

STATEMENT OF MR. PETER N. SMITH,

VICE PRESIDENT - ENGINEERING

RIFKIN & ASSOCIATES, INC.

As Vice President - Engineering for Rifkin & Associates, Inc., I have been directly involved in the analysis of signal strength and signal quality issues related to the FCC's must carry and technical standards regulations.

The purpose of the following discussion is to explain and demonstrate that signal strength is not the only factor involved in a determination of the quality of a television station's broadcasts. Rather, the crucial determinant is the carrier-to-noise ratio, with signal strength being one component of the CNR. However, noise itself is another component which must be separately analyzed.

The benchmark signal strength measurements contained in the FCC's must carry rules were intended to insure that viewers would receive a picture quality containing at most "perceptible but not annoying" interference or noise. Use of a preamplifier, under the right circumstances, will raise the signal to a useable level to overcome cable losses. But use of a preamplifier under the wrong circumstances -- where the signal is too low to begin with -- will degrade the CNR and thus will not improve the signal quality.

The following discussion demonstrates that WNAB's signal strength as measured at Rifkin's headends does not lend itself to use of preamplifiers and that the station must find some other way to improve its signal quality.

Noise Level in a 75Ω, 4 MHZ channel

The definition for the basic level of thermal noise from a source is defined as:

$$e_n^2 = 4KTBR \quad [1]$$

e_n = Mean square open circuit noise voltage from a resistor R

K = Boltzmann's Constant which is 1.38×10^{-23} Joules per °Kelvin

T = temperature in degrees Kelvin. Kelvin equals degrees Celsius plus 273.

B = bandwidth in Hertz

R = resistance in Ohms (Ω)

For a 4 MHZ, 75Ω system at room temperature (25° C + 273 = 298°K) the equation becomes:

$$e_n^2 = 4\ (1.38 \times 10^{-23})(298)(4 \times 10^6)(75)$$

$$e_n^2 = (5.52 \times 10^{-23})(298)(4 \times 10^6)(75)$$

$$e_n^2 = (1.64496 \times 10^{-20})(4 \times 10^6)(75)$$

$$e_n^2 = (6.57984 \times 10^{-14})(75)$$

$$e_n^2 = (4.93488 \times 10^{-12})$$

$$e_n = \sqrt{(4.93488 \times 10^{-12})}$$

$$e_n = 2.22146 \times 10^{-6} = .00222146 \text{ millivolts}$$

This is the open circuit voltage of a resistor of 75Ω and when a load of 75Ω is placed across it the voltage will be halved to .00111073 millivolts.

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[1] Fink, Donald G.; Christiansen, Donald Christiansen; Electrical Engineers Handbook; 3rd Edition; P 13-5, 1989

The conversion of a voltage to Dbmv is defined as:

$$\text{Dbmv} = 20 \times \text{Log (voltage in millivolts)}$$

Therefore in this case:

$$\text{Dbmv} = 20 \times \text{Log}(.00111073)$$

$$\text{Dbmv} = 20 \times (-2.95439)$$

$$\text{Dbmv} = -59.1$$

The noise delivered to a terminating resistor in a 75Ω system of 4 MHZ bandwidth at room temperature is -59.1 Dbmv. This is a widely accepted number[2] in the broadcasting and cable industry.

Carrier to Noise Calculation in an Amplifier of Known Noise Figure

Every amplifier generates some excess noise and the amount is characterized as the Noise Figure[3]. A theoretical 75Ω amplifier that is noise free that is terminated at the input and has a gain of 25 db will have a noise output of -59.1 + 25 = -34.1 Dbmv at room temperature with a 4 MHZ bandwidth. If that amplifier has a noise figure of 10 Db then the noise output will be -59.1 +25 + 10 = -24.1 Dbmv.

If the strength of a carrier that is inserted into the input of the same amplifier were +5 Dbmv the amplifier would provide the same 25 Db of gain and the output carrier strength would be + 30 Dbmv.

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[2] Simons, Ken; Technical Handbook for CATV Systems; 3rd Edition; 1968; Jerrold Electronics Corp. P 13.

[3]Deboo, Gordon J. And Burrous, Clifford N.; Integrated Circuits and Semiconductor Devices: Theory and Application; 1971; McGraw Hill, Inc.; P 47.

There is at the output of the amplifier a carrier of +30 Dbmv and noise of -24.1 Dbmv and the Carrier to noise ratio is simply the difference or 30 -(-24.1) = 54.1 Db. Because the amplifier provides the same gain to the carrier and to the noise the gain of the amplifier is immaterial and the formula becomes:

Carrier to Noise Ratio(CNR) = -59.1- input carrier level + noise figure

In this example CNR = -59.1 - 5 + 10

CNR = 54.1 Db

Use of Antennas and Preamplifiers for reception of Broadcast Television Signals.

When an antenna is used to receive a broadcast television carrier the antenna will provide gain to the carrier but does not increase the noise level as it is a passive device. The Carrier to noise ratio of the received carrier is determined by the level of the carrier into the first active device and the noise figure of that device. It is preferable to use as large an antenna as is practicable in order to provide an adequate carrier into the first active device. If the carrier is received near a broadcast station then the level may be adequate to allow for the losses of the cable from the antenna down the tower to the first active device. When the carrier is weak due to excessive distance from the broadcast transmitter and tower larger antennas must be used and they are generally placed high on towers. Even with the large antennas the carrier strength may be too low to overcome the cable losses going down the tower and the resultant carrier level into the processing equipment may be too low to allow for adequate carrier to noise ratio. In those cases the use of a tower mounted preamplifier is required to keep the carrier level into the first active device adequate for a good quality carrier to noise ratio.

As an example assume that channel 58 (734 - 740 MHZ) is received with a large antenna at the top of a 300 foot tower. The carrier level at the back of the antenna is -10 Dbmv. The loss of a 300 foot piece of ½" Parameter III (manufactured by CommScope, Inc.) is 6.4 Db and the resultant carrier level at the bottom of the tower would be -16.4 Dbmv. If that carrier level were inserted into a normal processor with a noise figure of 9 Db (Scientific Atlanta model 6150) the carrier to noise would be:

Carrier to Noise Ratio(CNR) = -59.1- input carrier level + noise figure

CNR = -59.1 -(-16.4) + 9

CNR = -33.7 Db

If, however a preamplifier with a noise figure of 2 Db were mounted at the back of the antenna the carrier to noise ratio will improve because of the better noise figure and the higher carrier level into the first active device due to avoiding the cable loss down the tower. In this case the calculation is:

Carrier to Noise Ratio(CNR) = -59.1- input carrier level + noise figure

CNR = -59.1 - (-10) + 2

CNR = -47.1 Db

An improvement of 13.4 Db is achieved from the 6.4 Db less cable loss and the 7 Db better noise figure. Preamplifiers are an obvious way to improve the CNR of a received signal. There is a linear relationship between the Input Carrier Level and the CNR if the Noise Figure is held constant. As the carrier level goes below -14.1 the CNR goes below 43 Db {-59.1-(-14.1)+2 = -43 Db} which is defined as the minimum allowable in the FCC rules[4] governing cable system operation. While

[4] 76.605 (a)(7)(iii)

the FCC rules allow for an exception to these rules for signals received outside Grade B[5] it appears that the issue was addressed in the must carry rules[6] which require a carrier level of -45 Dbm (+3.75 Dbmv) into "the input terminals of the signal processing equipment, i.e., the input to the first active component of the signal processing equipment relevant to the signal at issue, if such station does not agree to be responsible for the costs of delivering to the cable system a signal of good quality or a baseband video signal." It is obvious that there needs to be some lower limit on the signal quality a broadcaster delivers to the cable system. Otherwise it would be physically possible for a broadcaster to insist on the use of a 50 Db preamp to meet the +3.75 Dbmv requirement and have a resultant 11 Db CNR. (Input Carrier would equal 3.75-50 = -46.25 Dbmv ; resultant CNR = -59.1-(-46.25) + 2 = 10.85 DB). A Carrier to noise ratio of 11 Db is an unviewable picture as will be demonstrated.

The Effects of the Received CNR on the Final CNR delivered to Consumers.

If a carrier to noise ratio of 52 Db were delivered with a particular preamplifier and the consumers were to view the picture at that point they would be very pleased as their impression would be that the picture has either imperceptible or just perceptible impairments[7]. Unfortunately, the consumer is connected at some more distant point in the cable system which introduces its own noise due to the effects of processing, fiber optic transport, cascading of amplifiers, converters and the television receiver. If the cable system is designed to deliver a carrier to noise ratio of 46 Db

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[5] 76.605 (a)(7)(4)(A,B, and C)

[6] 76.55 (c)(3)

[7] Jones, Bronwen Lindsay and Turner, James A.; Subjective Assessment of Cable Impairments on Television Picture Quality; Cable Television Laboratories; 1992.

with a noiseless carrier it would deliver a carrier to noise ratio of 45 Db with the use of a 52 Db CNR carrier. If the same cable system were to receive a carrier of 46 Db CNR the delivered quality to the consumer would be 43 Db CNR. This principle is due to the fact that impairments introduced into a picture do not disappear and as a matter of fact they add on a logarithmic basis[8]. The point is that the reception of a carrier with a CNR of some definitive level does not guarantee that the end consumer will receive this quality and as a matter of fact they almost certainly will not unless they live very close to the receiving facility (headend).

What Consumers expect in Picture Quality

The original studies conducted were the TASO studies of 1958. More recently studies were conducted for the Regional Administrative Radio Conference in 1983 and for Cable Television Laboratories in 1991. A graph depicting the consumer (non expert) reaction to various levels of signal to noise ratios (signal to noise is essentially equal to carrier to noise in this environment[9]) shows that consumer expectations have increased over time. The following chart summarizes this.

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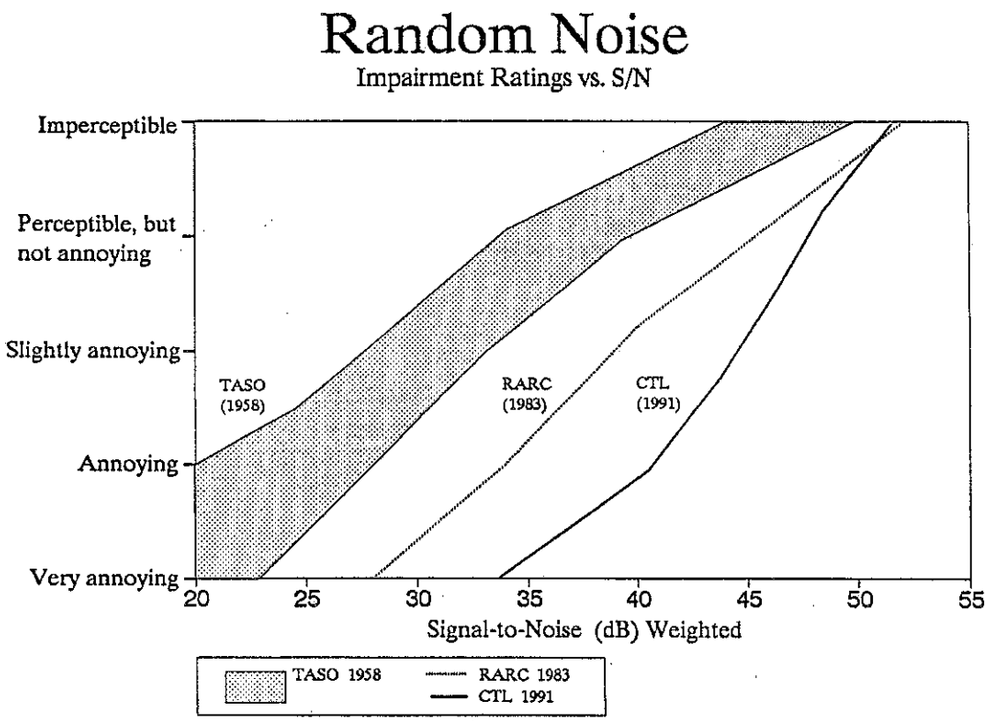
[8] Simons, Ken; P11

[9] Strauss, T. M.; The Relationship Between the NCTA, EIA, and CCIR Definitions of Signal to Noise Ratio; 1974 NCTA Technical Papers; P 58.



Carrier to Noise Ratio (Db) and Consumer Perception of Quality

Test Date and Organization	Annoying	Slightly Annoying	Perceptible
1958 TASO	20 - 28 (Avg 24)	27 - 33 (Avg 30)	33 - 39 (Avg 36)
1983 RARC	33	38	44
1991 CTL	42	45	51

Using the Annoying category it can be seen that in the 25 years from 1958 to 1983 the

consumer perception increased by about 9 Db; while in only 8 years from 1983 to 1991 the perception increase was again about 9 Db. These tests have some room for interpretation but it is absolutely clear that consumer demands for picture quality have increased dramatically and are continuing to increase. The statement of Bronwen Jones, an expert in the field and a participant in the 1991 CTL tests, is attached and attests to this. The consumer expectations have increased somewhat due to the advent of cable and the ability of cable to deliver clear pictures.

Cable systems generally offer product from two main sources; satellite and terrestrial broadcast. In general, a properly designed and well maintained satellite reception system will deliver a carrier to noise of 52 to 55 Db at the headend. A terrestrial broadcast signal that is at +3.75 Dbmv will yield a carrier to noise ratio of 53.8 Db when using a processor of 9 Db noise figure (Scientific Atlanta Model 6150). This means there will be equivalent quality signals available to consumers. If the quality of terrestrial broadcast signals is allowed to dramatically degrade the cable system operator will answer many inquiries about the situation over a long period of time. It has proven to be virtually impossible to explain to laymen why we are able to give them a crystal clear picture on ESPN but the picture for a broadcast station is of not only inferior, but annoying quality.

Measurements Made on WNAB

The following chart gives details of the measurements that were made at each of the cable systems.

	Lawrenceburg	McMinnville	Pulaski	Spencer	Tullahoma
Measurement Height	200 Feet	300 Feet	260 Feet	40 Feet	100 Feet
Overall Tower Height	260 Feet	370 Feet	300 Feet	50 Feet	300 Feet
Antenna Type	Scala PRTV-58/75	Cometic D-1338-BB	Scala PRTV-58/75	Antennacraft CCS-822	Channel-master 4248
Antenna Gain (Db)	16.5	6.0	16.5	6.0	12.1
Reading in Dbmv	-19	<-40	-9	-17	-18.5
Date of reading	3-24-97	3-21-97	1-23-97	3-21-97	12-21-96
Calculated CNR (Db)	-38.1	If at -40 then -17.1	-48.1	-40.1	-38.6
Reading with Scala Antenna	-19	<-29.5	-9	-6.5	-14.1
CNR with Scala antenna	-38.1	If at -30 then -27.6	-48.1	-50.6	-43.0

The CNR is calculated using the previously referenced and derived formulas and contemplates the use of a high quality preamplifier with a 2 Db noise figure. Improving the gain of the antenna has a direct linear improvement in the CNR delivered by the preamplifier. None of these CNR calculations show that even with the Scala antenna that the quality of the signal will meet the standards necessary to achieve the quality that consumers expect. The readings even with the Scala

antenna do not meet or even come close to the FCC standard of +3.75 Dbmv (-45 Dbm)[10]. As was previously shown the +3.75 Dbmv level under normal circumstances will provide a CNR of 53.8 Db which is rated as imperceptible noise based on the results of the 1991 CTL tests. It seems obvious that while carrier level does have some bearing on picture quality that it is not and cannot be the only and sole criteria for judging whether a station should be afforded must carry privileges. Certainly if a station had horrible interference such that all consumers complained but was meeting the carrier level standard reasonable people would require that the interference be eliminated before consideration of must carry was granted. Then the question becomes what is reasonable picture quality and in this case it revolves around the CNR. It appears that the FCC themselves set this standard at being in the low 50s by the promulgation of the +3.75 Dbmv (-45 Dbm) standard and it appears that this is a reasonable standard as it matches fairly well with the quality that cable systems receive from satellite delivered signals. To ask a cable system to offer a lower quality signal is to ask the operator to lower their overall quality resulting in customer complaints and a resultant degradation of the cable operator's reputation and image in the customers mind. Perception is reality and a requirement to carry a poor quality signal is anticompetitive in light of the fact that other delivery mechanisms are not under the same regulations.

I declare under penalty of perjury that the foregoing is true and correct.

Signed _____ Date 6/26/97
Peter N. Smith, Vice President

[10] 76.55 (c)(3)

BRONWEN L. JONES
2021 GARDEN STREET
SANTA BARBARA, CA 93105
June 23, 1997

THE EFFECT OF S/N (C/N) ON SUBJECTIVE PICTURE QUALITY: A REVIEW AND SUMMARY

Over the past 40 years listeners' and viewers' signal-quality expectations have increased markedly. At its inception, recorded telephone-bandwidth audio was considered equal in quality to live sound, and an equivalent S/N or C/N in video was most likely considered equal in quality to live viewing. People who had never heard or seen reproduced sound or pictures found understandable speech, recognizable faces and melodies, realistic motion and so on. The recent advent of clear digital- and soon HD-TV, with four times the information of NTSC, and very large pictures, assures an already-quite- certain, further increase in viewer sensitivity and expectations.

A major moving force behind the HDTV effort for many years has been display size. NTSC picture quality does not hold up when displayed large enough for the scanning lines to be seen. Noise and other impairments are also amplified, producing a very gritty or grainy look.

Viewing ratio relative to picture height (or viewing distance) is a key factor affecting viewer expectations regarding display size; in fact, viewing distance is a key factor in the determination of visual acuity (measured at a distance based on 20'). As the size of TV displays get larger, the viewing ratio, or in effect viewing distance, is reduced, and therefore vision is, in effect, more acute. The average television viewing distance in the U.S. is about 9 feet: a viewing ratio of nine for a 19" display. A 60" display will have a viewing ratio of only three (3).

In 1983, an international study using non-expert viewers (CRC/NASA/CBS) found a minimum of a 10dB difference in subjective sensitivity compared to the seminal TASO work done in 1958. In 1991/92 Cable Television Laboratories Inc., the cable industry's research consortium, conducted studies of (also non-expert) viewer ratings/judgements of a number of television impairments and interferences including weighted random noise. Once more a difference was found, this time in the four- to seven-dB range, and this time in only eight or nine years.

The CTL study found that a 40- to 42dB signal-to-noise ratio was subjectively judged "Annoying"; it was no longer 35- 36dB as in the 1983 study. A five-dB improvement in signal-to-noise ratio, to 45dB, improved the subjective rating only to "Slightly Annoying". It took about another five-dB to reach a subjective judgment of "Perceptible, but not Annoying" (i.e. 48dB S/N using a videodisc source, and a 51dB S/N using a cleaner, more pristine, digital- tape source).

There can be no doubt that television viewers clearly demonstrate a concern for better and better picture quality.

CableLabs

Subjective Assessment of Cable Impairments on Television Picture Quality

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Subjective Assessment of Cable Impairments on Television Picture Quality

Abstract: Psychophysical test methods were used for the subjective assessment of NTSC television pictures which had been subjected to a number of levels of commonly encountered cable-system impairments: random noise, phase noise, microreflections, composite triple beat and chroma/luma or group delay. The tests evaluated picture impairments, using the CCIR impairment scale with terms describing a continuum of annoyance. A comparison of the random noise test results with data from earlier similar studies in 1958 and 1983 demonstrates a continuing rise in viewer expectations for improved picture quality.

1.0 Introduction

In 1958, the Television Allocations Study Organization (TASO) found that a weighted signal-to- (random) noise interference (S/I) ratio of less than 30 dB was rated "Somewhat Objectionable."[1] In 1983, a study similar to that of TASO, using weighted triangular noise, was conducted by three laboratories (CBS, NASA and CRC) in preparation for the 1983 Regional Administrative Radio Conference (RARC) for Region 2 (western hemisphere).[2] At that time a S/N of about 40 dB was found to evoke a similar judgement. The fact that observer expectations change over a period of time is not surprising, but it has not been documented. An important aspect of the recent study by Cable Television Laboratories (CableLabs) was to collect new data in order to determine if there might be any additional shift of viewer expectations. Although experimental test conditions in all three studies were slightly different, a comparison of test results demonstrating the trend is valid, since the random-noise impairments in all cases were similarly CCIR-weighted.

This report describes the measurement procedures and test results of the subjective assessments of impairments of NTSC television pictures subjected to various levels of commonly encountered cable impairments. In addition to random-noise tests, these experiments tested and compared normally received pictures with those having some degree of the following other impairments: phase noise, microreflections, composite triple beat (CTB) and group or chroma/luma delay. The evaluations were performed in controlled-viewing experiments using psychophysical test methods with both expert and non-expert viewers.

2.0 Experimental Test Procedure

A good experimental design often begins with initial pilot studies. These are abbreviated experiments which allow the experimenter to evaluate a sample of the data and possible test results as well as the test methods themselves. In this study, expert observers were utilized to determine factors such as the proper range over which to show the impairments to the non-expert observers, the thresholds of visibility of each impairment and the instructions for the observers on the proper use of the "voting boxes" and scale terminology. Adjustments to the original test plan were made, among them the restriction of group delay and microreflection tests to expert observers only. Unless presented at unrealistic levels, these impairments were too subtle for non-expert observers to assess, using this experimental design.

2.1 Experimental Method

The International Consultative Committee for Radio (CCIR) test procedure and the impairment scale were used. It utilizes terms describing a continuum of annoyance: "Imperceptible" impairment, "Perceptible, but not Annoying," "Slightly Annoying," "Annoying" and "Very Annoying." This scale, which is usually used in a discrete fashion, was used as a continuous scale in this study. Judgements were made and recorded on a "voting box" which had a slide potentiometer which could be placed anywhere along the scale length. Regulatory agencies such as the Federal Communications Commission (FCC) use this internationally-recommended scale to determine and specify such factors as protection ratios, reception contours and fringe-area reception for over-the-air broadcasts. They assess the degree of annoyance that picture interference causes to viewers, so that signal strengths can be regulated accordingly.

The CCIR test procedure employs a double-stimulus, pair-comparison presentation scheme, wherein the subjects made judgments about test pictures relative to reference pictures. They view the unimpaired reference picture for 10 seconds, after which the display changes to a 50% mid-gray for three seconds. The test picture is then presented for 10 seconds, followed by mid-gray, this time for five seconds. During this latter interval, the subjects recorded their responses.

2.2 Viewing Conditions

CCIR Recommendation 500-4 specifies using viewing ratios of four- and six-times picture height for NTSC subjective tests. Five-times picture height (5 ph) was chosen not only as a compromise, but because it is close to the 90-inch distance of TASO (distance, not ratio)

and because one of the goals of this study was to examine future trends. Certainly as picture displays in homes get larger, the viewing ratio (not distance) will get smaller.

Viewing studio conditions were also in accordance with CCIR Recommendation 500-4. Except for the computer-controlled voting boxes and the display, all equipment was located in an adjacent control room so as not to be distracting. As shown in the photograph of the viewing studio, up to three observers could be accommodated at a time without exceeding the CCIR ± 30° off-axis viewing specification. Some abbreviated tests utilizing fewer subjects were performed at 3 and 4 ph.

Two displays were used. The first and primary unit was a 27-inch JVC consumer receiver. The picture height was 16 inches, so 5 ph was nearly seven feet. For a few comparison tests, a new high-end, 32-inch Sony Trinitron receiver was employed. The picture height was 19 inches, so 5 ph was just about eight feet. (The average viewing distance in the U.S. has been reported as 9 to 11 feet.[3]) In the initial phase of the study, a videodisc player was employed as the picture source. Since this player/disc provided a weighted S/N limited to about 50 dB, a D2 tape recorder was substituted for random-noise tests in a second phase of the study. When the D2 tapes were employed, the JVC receiver was used strictly as a monitor, i.e., its demodulator was bypassed, resulting in a weighted S/N of 54 dB or better.

2.3 Viewers: Experts and Non-experts

Expert viewers are people who are engaged in a field of work involving picture quality or picture impairment assessment. Often, due to the nature of the facilities or laboratories which perform subjective studies, the experts are video engineers. The CCIR defines experts as "observers who have had recent extensive experience in observing picture quality or impairments, particularly of the type being studied." In this particular case, experts from the field of cable engineering were recruited for the determination of visual-perception thresholds and impairment level range values. The range includes the scale boundaries or end points, a point below threshold where no impairment can be seen and several steps in between. (Step size is a key factor in designing subjective impairment tests.) The expert viewers discussed and agreed, according to their subjective impressions, what the ranges to be studied deemed "critical" viewers in that they were artists, photographers, or movie buffs, etc. Most were frequent television viewers.

Thirty-three, non-expert viewers were recruited for the second phase of the study, which utilized the D2 tape recordings. This group comprised an approximately equal number of men and women, and an equal number who had or had not participated in the prior videodisc tests.

2.4 Subjective Test Material

Three noise-sensitive, still pictures were used in the non-expert tests of random noise, phase noise and composite triple beat: Kodak's *Balloon Girl* (a young girl in front of a background of multi-colored balloons), *Shirley* (a woman's face and hands on a plain, solid blue-grey background), and the Society of Motion Picture and Television Engineers' (SMPTE) *Night Exterior* (a couple on an outside balcony at night). A European Broadcasting Union (EBU) slide entitled *Boats* was used to evaluate microreflections, and other pictures, including a live camera image of a photograph (a scene with radial burst-like components), were used for chroma/luma delay. One training slide, *Downtown Rochester* (Kodak), was used exclusively for instructing the subjects as to what the impairments looked like.

The SMPTE and EBU images were recorded onto D2 tape from 35mm-film slides. The Kodak images however, were recorded onto D2 tape directly from a SUN computer system. This original D2 tape was then used to master both the videodisc and the D2 "presentation master." D2 tape machines are specified at 54 dB S/N. However, the machine used in these tests was measured in the lab at better than 60 dB.

The Kodak images (*Balloon Girl* and *Shirley* were primarily used) originated on Vericolor III 4" X 5" format film and were digitized by Kodak using a Perkin Elmer PDS microdensitometer. This provided digitized images containing 5900 pixels X 4700 lines at 12 bits per pixel per color. For this study the images were prepared so that the grayscale and color information were similar to that described in the SMPTE 240 M Recommended Practice and were quantized at 8 bits per pixel per color. The images were split into their three color components and a separate file was written for each. They originated on a VAX/VMS computer system and were copied to a SUN system for transfer to D2 tape using the standard TAR QIC-11 format.

2.5 Interferences

Of the five interferences evaluated, group delay and microreflections were confined to a test category called Expert Observation and Commentary (EO&C), due to the fact that they are quite subtle and their ranges could not be scaled within the range of the CCIR impairment scale.

Random noise, which is electrical in nature, is worsened by the cascading of trunk and distribution amplifiers. In a picture, random (or thermal) noise appears as twinkling or grainy "snow," and it shows up especially well on pictures with saturated-color backgrounds.

Phase noise can be caused simply by poorly designed hardware but is also frequently caused by the random variation of the frequency or phase of the video carrier of a modulator by undesired interfering signals. Because of this, its appearance may vary from looking like fine horizontal lines to much broader horizontal bands. Most of the time when it is present, phase noise looks like horizontal lines of slightly higher-than-background brightness, scattered over the video frame.

Chroma/luma delay is generally characterized by the chrominance information lagging behind the luminance detail (although the reverse can happen). Chroma/luma is the most significant of the two factors which make up group delay, the other being parabolic delay. Parabolic delay is frequency dependent, thereby affecting different colors to different degrees and resulting is a defocused-looking image. Chroma/luma delay, on the other hand, is linear and fixed, causing color smear or what is commonly called the "comic book effect." In most broadband cable systems, the chroma/luma component is dominant, and the effect of parabolic delay is usually negligible. In this study, the two could not be separated, but is assumed that parabolic delay did not make a significant contribution to the appearance of the test pictures at 100 ns increments between the 100-ns and 700-ns delays tested. During the initial pilot study, however, the expert viewers did report some "fuzziness" in the pictures at a delay of 50 ns.

Microreflections are caused by impedance mismatches between cables and other system components such as amplifiers, passive devices, connectors and splices. Such microreflections on NTSC signals can cause three subjective effects. For reflections delayed longer than 500 ns, a distinct second image or "ghost" can be identified in the picture background, (not a subject of this study, however). At around 250-350 ns, an

apparent increase or decrease in signal contrast can be observed. The increase or decrease in signal contrast depends on the relative phase of the reflected signal with respect to the carrier frequency. Reflections with delays of less than 250 ns show a chrominance-saturation change and a small amount of luminance-level change. The effects of microreflections were evaluated for delays of 50, 100, 200 and 400 feet which equate to 58.4, 116.8, 233.6 and 467.2 ns. Due to the close correlation of the numbers, therefore, feet and nanoseconds are shown as equivalent in the remainder of this report. The microreflections were evaluated both in phase and 180 degrees out-of-phase, at desired-to-undesired (delayed) signal-level ratios of -20, -10, -7, -4 and 0 dB.

Composite triple beat (CTB) is a form of intermodulation distortion resulting from the generation of beats between multiple signals. As signals are processed through amplifiers and other active devices having non-linear characteristics, intermodulation distortions are introduced. Intermodulation distortion products manifest themselves in the form of clusters of beats. In general, low-order intermodulation products are the strongest, with the second- and third-order intermodulation products being the most significant. Second-order products have an offset of +1.25 MHz relative to the video-carrier frequency and dominate in single-ended amplifiers. Third-order products build up at the video-carrier frequency and dominate in push-pull amplifiers. Because CTB is caused by the modulation of a number of undesired neighboring or adjacent channels, the nature of this distortion changes in appearance as a function of their number and program material. The generally accepted limit for third-order intermodulation products for NTSC signals is -53 dB.

3.0 Signal Generation and Measurement

3.1 System Description

The Impairment Control System (ICS) was a self-contained signal generation, measurement, and control unit[4] located adjacent to the viewing area at a facility provided by Jerrold Communications, a division of General Instrument, Inc. A block diagram of the ICS is shown in Figure 2. The system allowed manual or computer control of each of the five impairments under test and included hardware and software for recording the responses of the viewers during the tests. The condition of the system was continuously monitored on the master control panel for verification of computer operation. Control devices utilized were coaxial relays or programmable attenuators which were functional to beyond one gigahertz. The system was assembled and calibrated using the *NCTA Recommended Practices for Measurements on Cable Television Systems, Second Edition.*

The ICS was under the control of a personal computer for daily calibration and subjective test sessions. The computer had full control of all signal levels and routing. The software developed for the system created pseudo-random sequences of presentations under specific guidelines for psychophysical testing. It controlled the presentation of the images and the associated impairments, and recorded and stored the viewers' responses for later evaluation.

The system headend in the facility had capacity for sixty video-modulated RF carriers and was operated in the Standard mode. During the tests, the headend carried twenty clean NTSC signals received off-air, by satellite, or internally generated as test signals. The reference channel for the ICS was modulated with impaired and unimpaired images and was capable of being assigned to any frequency in the RF spectrum.

A number of studio and consumer displays were evaluated for the test presentations. The selected high-quality, consumer JVC 27-inch receiver was set up before each test series using a combination of test signals from a signal generator and from a reference videodisc. The setup procedure for the Sony receiver was identical. Signal-to-noise characteristics of the receiver were measured by applying an RF-modulated 50 IRE flat field to the RF input and then measuring the signal-to-noise at the video output. S / N performance above an RF-input level of +10 dBmV was consistently better than 58 dB weighted, and the RF-level to the receiver was measured and maintained at +14 dBmV throughout the tests. The video source for all tests except for the D2 Random Noise test was a Pioneer LD-V8000 videodisc player using a specially created and mastered videodisc. A number of

disc players were evaluated for use and the LD-V8000 selected for its combination of control and performance specifications. The videodisc player provided a clean and stable four-field, still image with signal-to-noise greater than 50 dB weighted.

For the D2 Random Noise test, the presentation tape was prepared using a master tape consisting of sequences of reference images played through a modulator, mixed with RF random noise (as done with the videodisc tests), demodulated through a Rohde & Schwartz Model EMFT TV Test Receiver reference demodulator, and recorded on D2 tape. The signal-to-noise of the D2 machine measured better than 60 dB weighted by recording a 50 IRE flat field and measuring the noise on playback. During the actual test sessions, the D2 video output was fed directly into the video input of the JVC receiver, bypassing all other processing.

3.2 Random Noise

Random noise signals were created by injecting broadband noise through a programmable attenuator into the system at RF as shown in the system block diagram. Carrier-to-noise ratios were measured according to the National Cable Television Association (NCTA) Recommended Practices. Under the test conditions of 4 MHz bandwidth using a CCIR weighting filter, these measurements are equal to video signal-to-noise measurements as established in the Recommended Practices. Reported noise levels were measured as video signal-to-noise using 50 IRE full-field measurements as the reference. All measurements were taken using a Rohde & Schwartz UPSF-2 Video Noise Meter and verified within 0.2 dB with an Anritsu Model MS 6301B Video Signal Analyzer.

The videodisc-based tests were made using the videodisc player as the source and adding noise to the RF signal at defined levels under computer control. The combined noise floor of the videodisc player and ICS was approximately 50 dB weighted. Tests using the D2 tape as source were made by feeding the video output of the D2 tape machine directly to the video input of the JVC receiver, providing a noise floor in excess of 56 dB weighted.

3.3 Phase Noise

Phase noise was generated in the ICS by passing the IF output of a standard television modulator through a phase-varying circuit driven by a noise source bandlimited to 300 kHz by a flat low-pass filter. The level of noise was controllable through a programmable attenuator.

To calibrate the system, an unmodulated signal was passed through the phase-varying circuit and converted to RF in the standard manner. The output was coupled to a spectrum analyzer. The level of energy caused by the phase modulation was measured in the upper sideband at 20 kHz above the carrier through a 1-kHz bandwidth filter. A correction factor of -28.3 dB was applied to convert the measurement to dBC/Hz (-30.8 dB bandwidth correction from 1 kHz to 1 Hz and the balance from factors related to the spectrum analyzer).

3.4 Chroma/Luma Delay

Chroma/luma delay was generated by passing the video signal through a series of all-pass networks. The networks were designed and cascaded in a binary combination of 100 ns, 200 ns and 400 ns, resulting in a maximum possible delay of 700 ns. The steps of delay were controlled through a series of coaxial relays. The delay was calibrated by passing a 12.5-T pulse through the system and measured on the Anritsu Video Signal Analyzer Model MS 6301B and verified on a Tektronix VM700.

3.5 Microreflections

Microreflections were generated by using calibrated lengths of RG-11 cable. The RF signal from the amplifier cascade was split into five paths. One path was not delayed and the four remaining paths passed through cables of 50, 100, 200 and 400 feet in length. These lengths yielded delays of 58.4 ns, 116.8 ns, 233.6 ns, and 467.2 ns respectively. All cables were trimmed to produce coherent delays at the output of the combination of the delayed and undelayed signals. Fixed attenuators were used to set equal levels through all paths.

After the delayed signals were recombined, the output was fed through a variable delay network consisting of short lengths of cable to produce delays of 1/8, 1/4, 1/2, and 1 full wavelength. This allowed the reflections to be "tuned" to be in-phase, out-of-phase, or at steps in between, relative to the undelayed signal.

The delay paths could be selected individually or in combination to produce single or multiple reflection conditions. A single amplifier and programmable attenuator were used to control the overall relative level of delayed-to-undelayed signal. Levels up to 0 dB relative to the undelayed signal were possible.

3.6 Composite Triple Beat

Composite Triple Beat (CTB) was created by combining the output of the reference-channel modulator with the signal from the headend as shown in the system block diagram. The combined signal was passed through a ganged programmable attenuator and a cascade of CATV amplifiers. By varying the drive level to the amplifiers, specific amounts of distortion could be created. Distortion was measured and reported according to NCTA Recommended Practices.

4.0 Results

4.1 General

In general, the CableLabs test results revealed viewer judgements to be 3 to 6 dB more sensitive than the 1983 RARC data. Naturally, some of this difference, but not all, may be attributed to differences in the test conditions such as weighted-triangular versus weighted-random noise, hardware, viewing distances, etc. A 40 dB signal-to-noise ratio is now considered to be "Annoying," (versus about 35 dB in 1983) and 45 or 46 dB is considered "Slightly Annoying" (versus 40 dB). (The current NCTA-recommended *visual carrier*-to-noise ratio performance objective is a minimum of 48 dB.) In the D2 phase of this study, it required a signal-to-noise ratio of about 50 dB to be considered "Perceptible, but not Annoying."

The viewing-distance comparison did not demonstrate differences for any impairment on either monitor. This test would probably show differences with a large (i.e., projection) display because there would be greater distances and differences in viewing distances. At the range of six to eight feet in this study, there may not have been enough visual-acuity differences due to the relatively close-in distance. In other words, once a critical viewing distance has been reached, a closer look will not change the threshold of acuity for that impairment.

4.2 Random Noise Means

Figure 3 shows the average responses of all viewers and pictures in the videodisc random-noise impairment tests at 5 ph on the JVC display. "Annoying" falls at about 40 dB S/N, and "Slightly Annoying" falls at about 45 dB. "Perceptible, but not Annoying" falls at about 48 dB, and overall the slope of this contour gets steeper as the S/N increases. These results clearly demonstrate increased viewer sensitivity, even when compared with the 1983 RARC results from less than a decade ago. The authors were impressed with this finding, but wondered if the top end of the contour represented a limit of the visual system or demonstrated a possible masking effect. It was decided that revisiting the contour with signals directly from D2 tape, where a S/N of better than 54 dB could be obtained, might yield different results.

Figure 4 shows the results of the same test using a D2-tape machine connected directly to the JVC receiver which was then used strictly as a monitor (i.e., without the cable test bed or the JVC demodulator). It is readily apparent that the viewers could see noise at a S/N of

better than 50 dB. In fact there appears to be an area between "Slightly Annoying" and "Perceptible, but not Annoying," (48 - 51 dB), where the viewers were uncertain as to which judgement to make. By 53 dB (at 5 ph) they agreed the noise was no longer visible. On this contour, a slope of about 5 dB per scale interval, about 1 dB steeper than that of the RARC data, can be seen.

4.3 Random-Noise Response Distribution

Figures 5 and 6 show the percent of responses at each subjective scale grade as a function of impairment level. It is interesting to observe how closely the top two grades (those on either side of visual perception threshold) track, i.e., within about 10%. Clearly there is a perceivable difference between 51 and 53 dB S/N (at 5 ph), demonstrating that the use of D2 tape was a worthwhile effort.

There is a classic context effect[5] demonstrated in these graphs. As mentioned previously, the top two curves track closely, demonstrating consistency and reliability of responses. Yet for the videodisc source, the 50/51 dB level reaches about 80% agreement at "Just Perceptible/Imperceptible." In the D2 case, 30-40% agreement is reached - half as much. This shift is due to the fact that subjects work within the boundaries of scales and tend to use the whole scale, regardless of fit. Thus when 50/51 dB was the end point or scale boundary, 80% of the viewers said it was "Perceptible" or "Imperceptible." But when 51/53 dB was more to the middle of the scale, it was rated at a lesser grade. In other words, the experimenters expanded the impairment range from 36 - 50 dB to 36 - 54 dB, and the subjects compressed the new range to fit into the scale accordingly. Test subjects will take a range which is narrow (i.e., all quite high- or low-quality presentations) and expand it to fit the scale, thereby labeling, for example, good quality signals as "Very Annoying," as in these graphs. Conversely, if a range is quite wide, the subjects will compress it to fit.

Knowledge of this context effect can be used in the design of subjective tests to influence the outcome. It is part of the reason that microreflections and group delay were not tested on this particular impairment scale with non-experts. In this case, they would have taken very small differences and expanded them to fit the "Very Annoying" to "Imperceptible" impairment descriptors. There are, however, other psychophysical scales which could be used.

Figures 7 and 8 show the 60% and 80% viewer responses replotted from the response distribution curves for the videodisc and D2 picture sources, respectively. As expected, the curve shifts to the right for the 80% example. The curves track well, diverging at the top where pictures with improved S/N were presented.

4.4 Phase Noise

The displays and the test material exhibited sensitivity to phase noise. Figure 9 is a summary of all phase-noise test presentations at 5 ph with the JVC display. The slope is very close to 5 dB per impairment-scale grade, with -85 and -90 dB falling at about the "Slightly Annoying" and "Perceptible, but not Annoying" points, respectively. Figure 10 shows that the JVC receiver was more sensitive than the Sony. Since phase noise is a very horizontal impairment in orientation, this difference is probably due to the well-known masking effect of the Sony Trinitron slotted mask. Figure 11 shows a slightly greater sensitivity of the dark exterior night scene over the other two images.

4.5 Distortion (CTB)

The composite-triple-beat (CTB) distortion test results for the JVC display are summarized in Figure 12. The slope here is approximately 10 dB per impairment-scale grade with "Slightly Annoying" falling at about 40 dB and "Annoying" and "Perceptible, but not Annoying" falling fairly close to 10 dB on either side. This finding validates and reaffirms the NCTA "performance objective" of 53 dB CTB as a minimum acceptable level. As in the phase-noise tests, the dark exterior night scene was more sensitive to CTB, as shown in Figure 13.

4.6 Microreflections

A picture from the EBU entitled *Boats* was used to examine this impairment. It was selected because the many masts and detail in the rigging make it especially useful for showing the effects of microreflections.

In general it can be said that in-phase reflections made the pictures look soft, or slightly out-of focus, while reflections which were 180° out-of-phase caused the pictures to sharpen. Viewer preferences varied, but the majority preferred the sharper pictures.
At impairment levels between 0 and -10 dB the pictures were seriously impaired. At a level of -10 dB, differences were easily detectable. At -20 dB, the differences were quite subtle and often had to be pointed out to the viewers. The observed effect progressed from

almost nothing for reflections representative of a 50-foot transmission-path difference between the desired and undesired signals, to a contrast effect at 100 feet, to an edge effect at 200 feet and finally to a true echo at 400 feet. (Delay times, in nanoseconds, are approximately equivalent to path length, in feet.)

At -10 dB, the sharper pictures looked better to most of the expert viewers except at 400 feet where the pictures appeared similar in quality. At -20 dB, the 50-foot condition was indistinguishable whether in- or out-of-phase. At 100 and 200 feet, the edge-enhancement effect made the sharper pictures preferable to most (but not all) viewers, and at 400 feet the softer pictures were preferred. A summary of the expert observations of microreflections is shown in Table 1.

4.7 Chroma/Luma Delay

Chroma/luma delay in pictures appears as bleeding or shifting colors. It has been referred to as the "comic-book effect." It is subtle and does not show up in most pictures. It is due to chroma being delayed relative to luma and is most visible on red images. Using NASA's *Yarn* and *Girls in Kitchen* and SMPTE's *Woman in Yellow Jacket*, a threshold of detection was found between 300 and 400 ns. At delays of 400 ns and greater, the picture impairment was clearly visible. At 300 ns or less, there was just a vague sense that the image was impaired. The best demonstration was a star-burst type of image which had red spokes radiating out from a central hub. As the delay increased beyond 300 ns, the red color completely separated from the spokes, leaving them white.

5.0 Conclusions

It is clear that viewers are more sensitive to picture quality today than they have been in the past. Today, computers with high resolution pictures and graphics are used for work and play. In the past two years television receivers have achieved vast improvements, and high definition television (HDTV) is being touted as the future of TV. Videodiscs are becoming popular, and VHS tape may be replaced by new tape formulations such as ED Beta, Hi 8mm and Super VHS. Just as the introduction of the Compact Disc has raised the public's expectation for high standards of audio quality, improved video products have had a similar effect on expectations for picture quality.

Figure 14 shows a comparison of the random-noise test results from the CableLabs study with the results from the earlier TASO and RARC studies. In this graph, the TASO results are plotted as a range due to the many differences in test conditions in that study, e.g., color and black-and-white pictures, greater viewing distances and a different (six-point) rating scale which used different terms. (The CCIR now specifies a five-point scale.) The RARC data perhaps also should be shown as a range for some of the same reasons, i.e., it is an average of tests conducted by two laboratories, using weighted triangular noise, pencil-and-paper discrete responses versus computerized continuous slider controls, etc. The emphasis should be placed not on the numbers (which are not absolute in any way), but rather on the fact that they show trends which should help in making plans for the future.

6.0 Figures

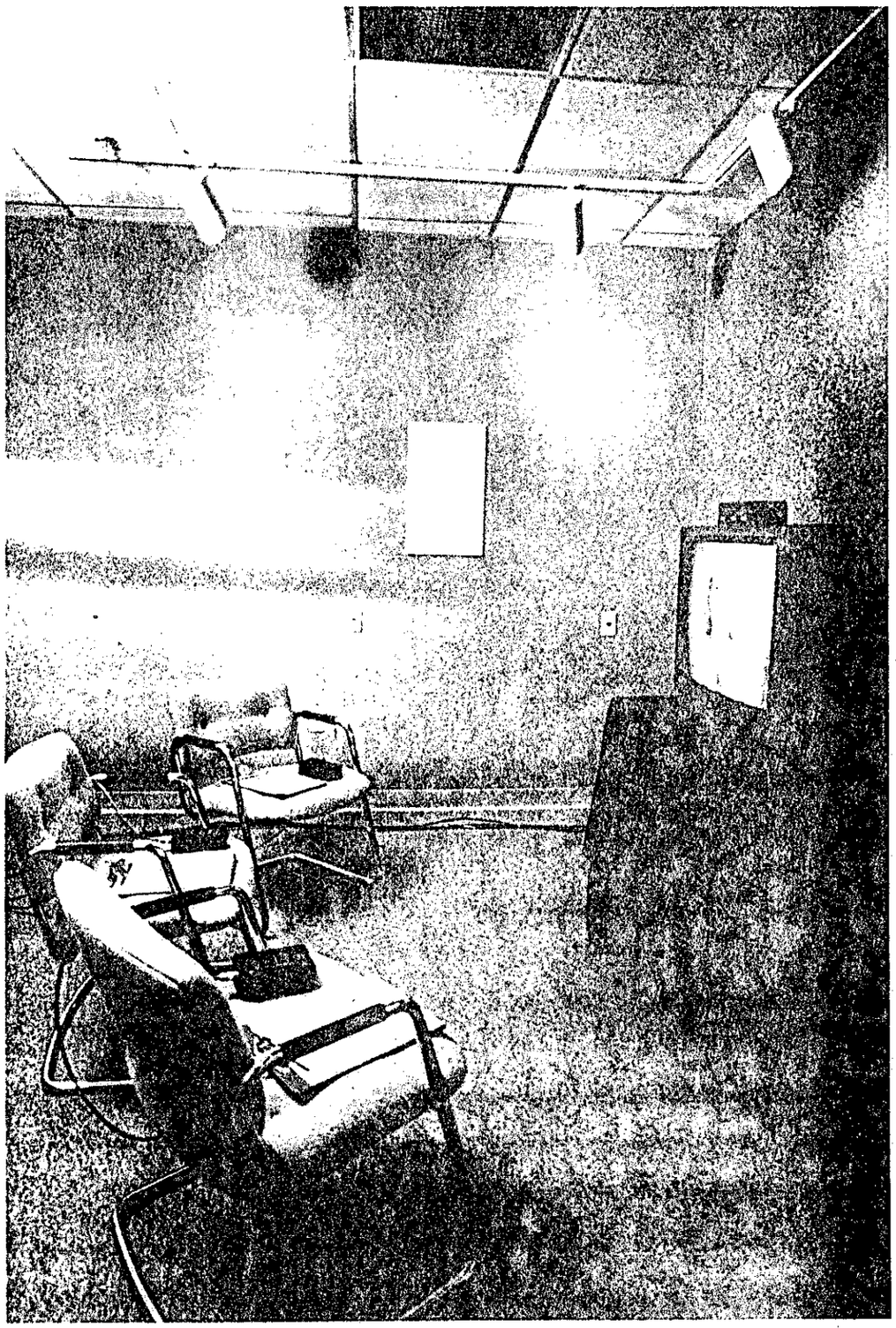

Figure 1. Viewing Studio

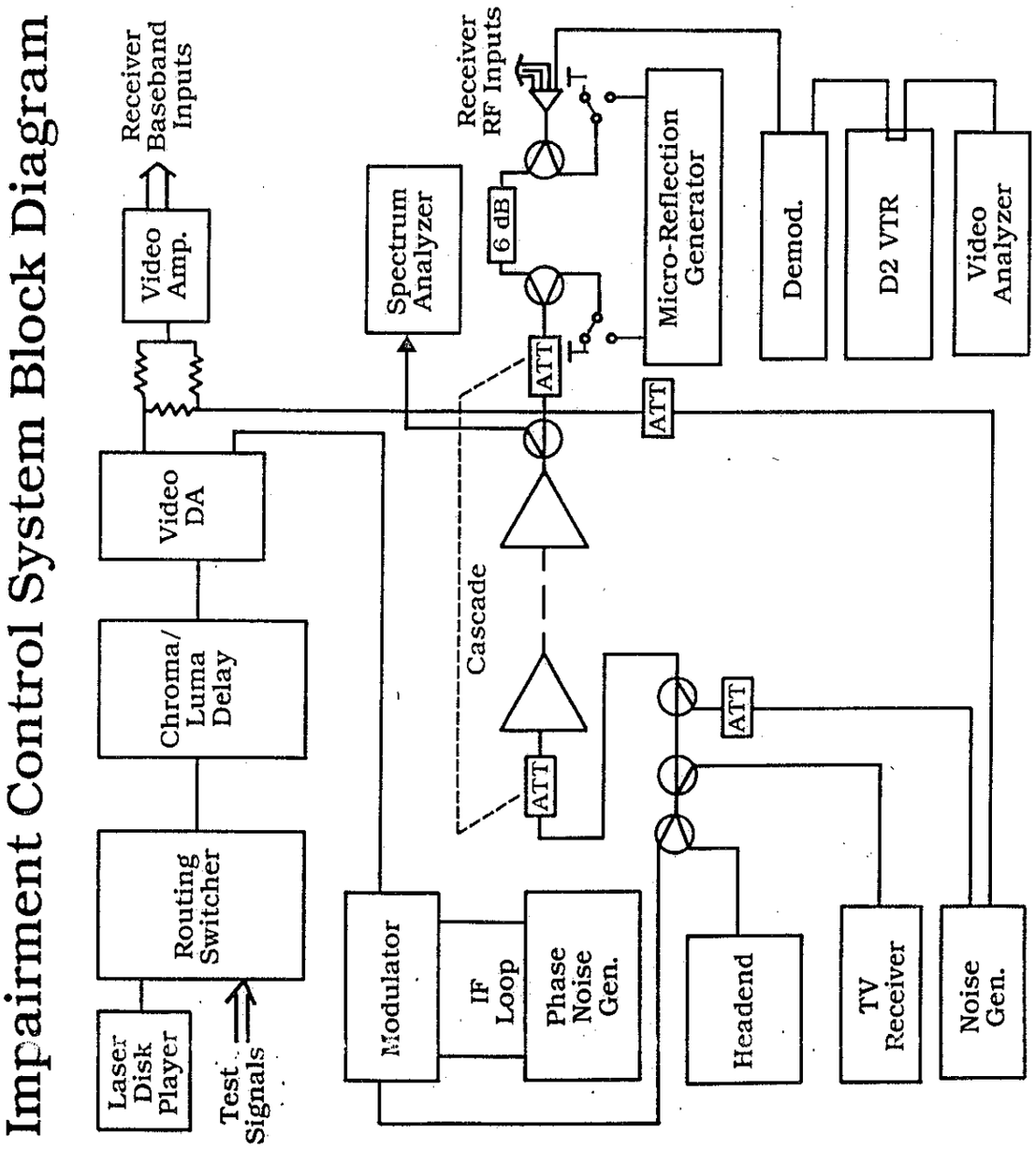

Figure 2. Block Diagram, Impairment Control System

Figure 3

e 3. Random Noise, Impairment Scale Ratings vs S/N, (videodisc source)

20

Figure 4. Random Noise, Impairment Scale Ratings vs S/N, (D2-tape source)

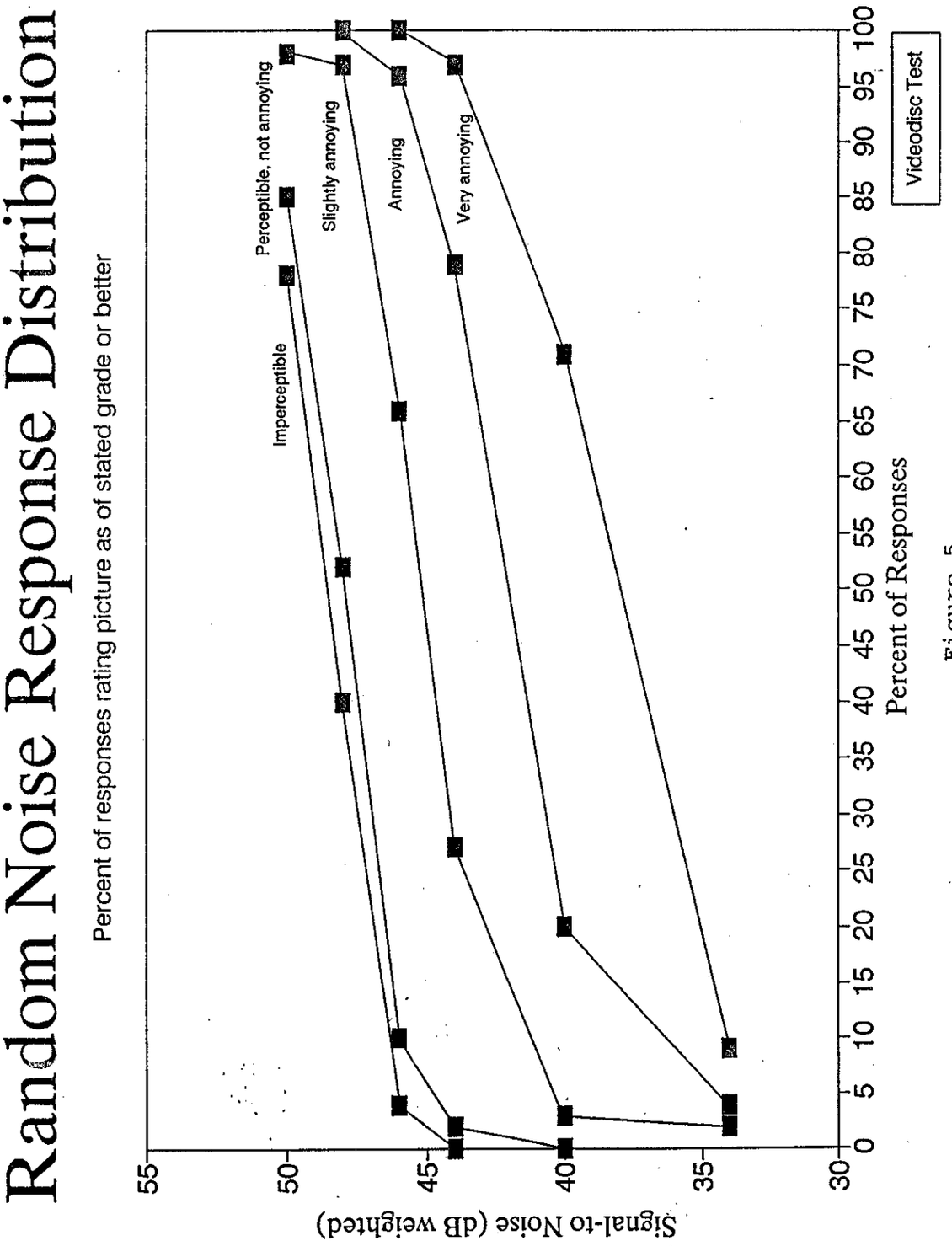

Figure 5

Figure 5. Random Noise Response Distribution, (videodisc source)

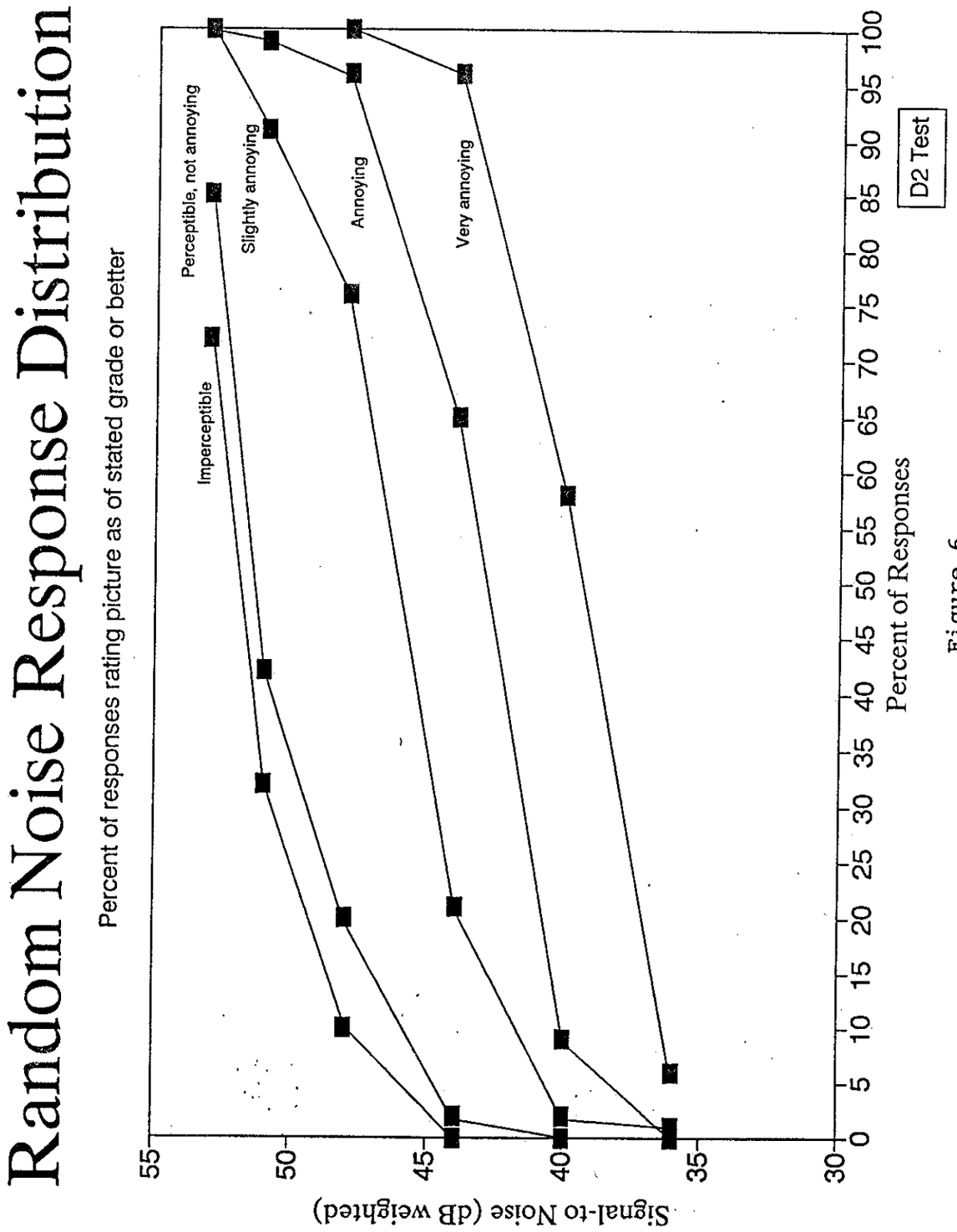

Figure 6

Figure 6. Random Noise Response Distribution, (D2-tape source)

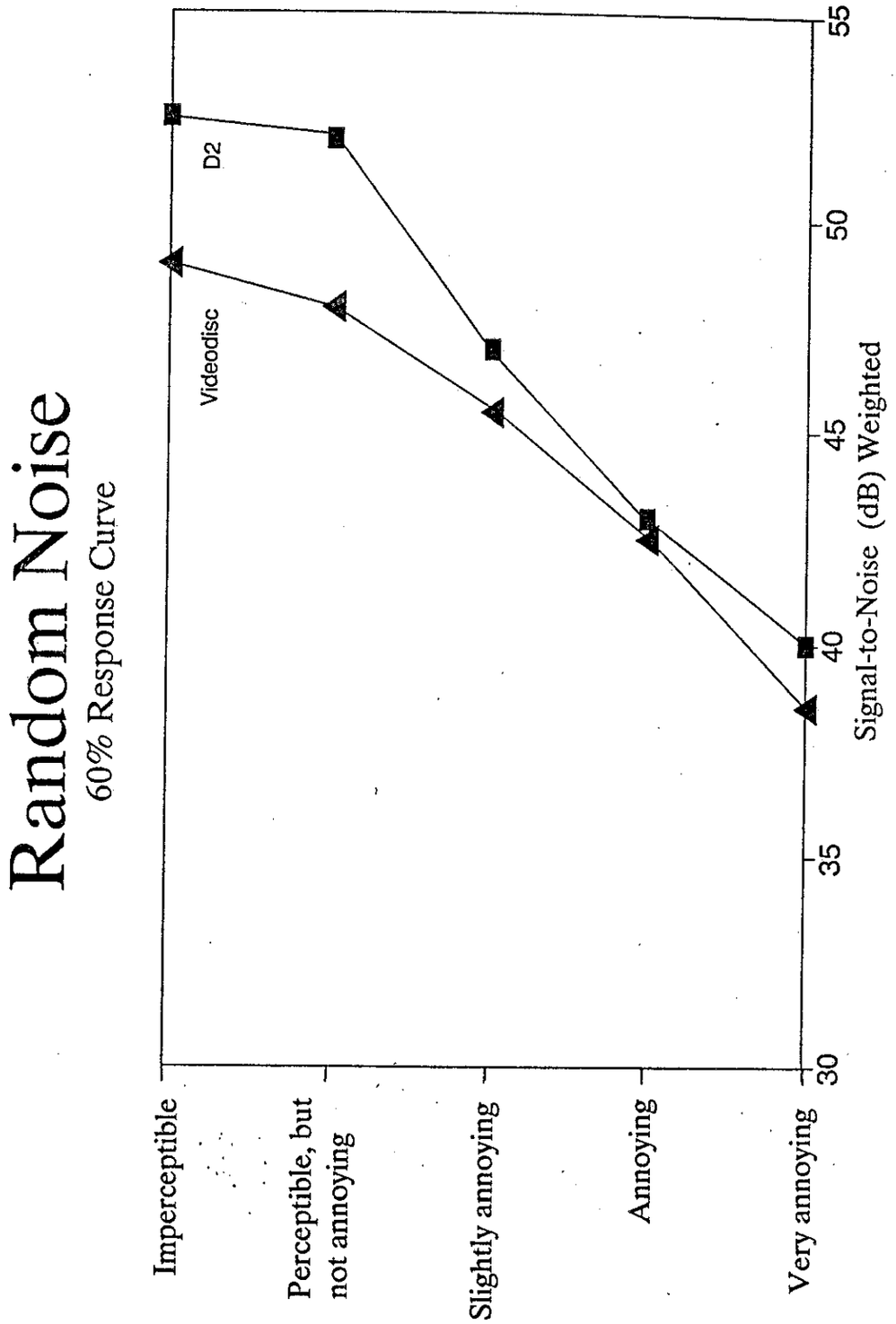

Figure 7

Figure 7. Random Noise Impairment Scale Ratings vs S/N, Both Picture Sources, 60% of Responses, (from Figure 5)

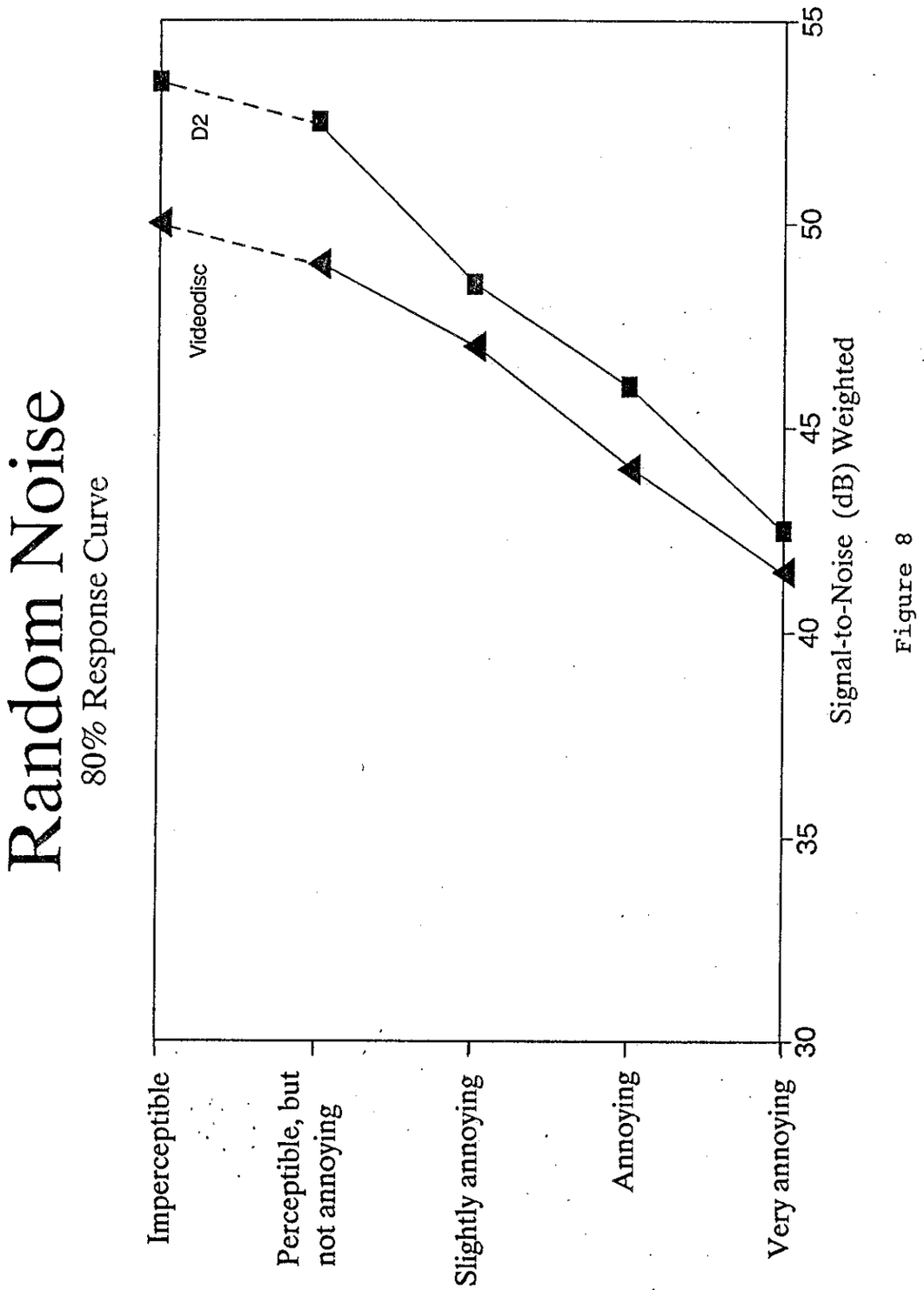

Figure 8

Figure 8. Random Noise Impairment Scale Ratings vs S/N, Both Picture Sources, 80% of Responses, (from Figure 6)

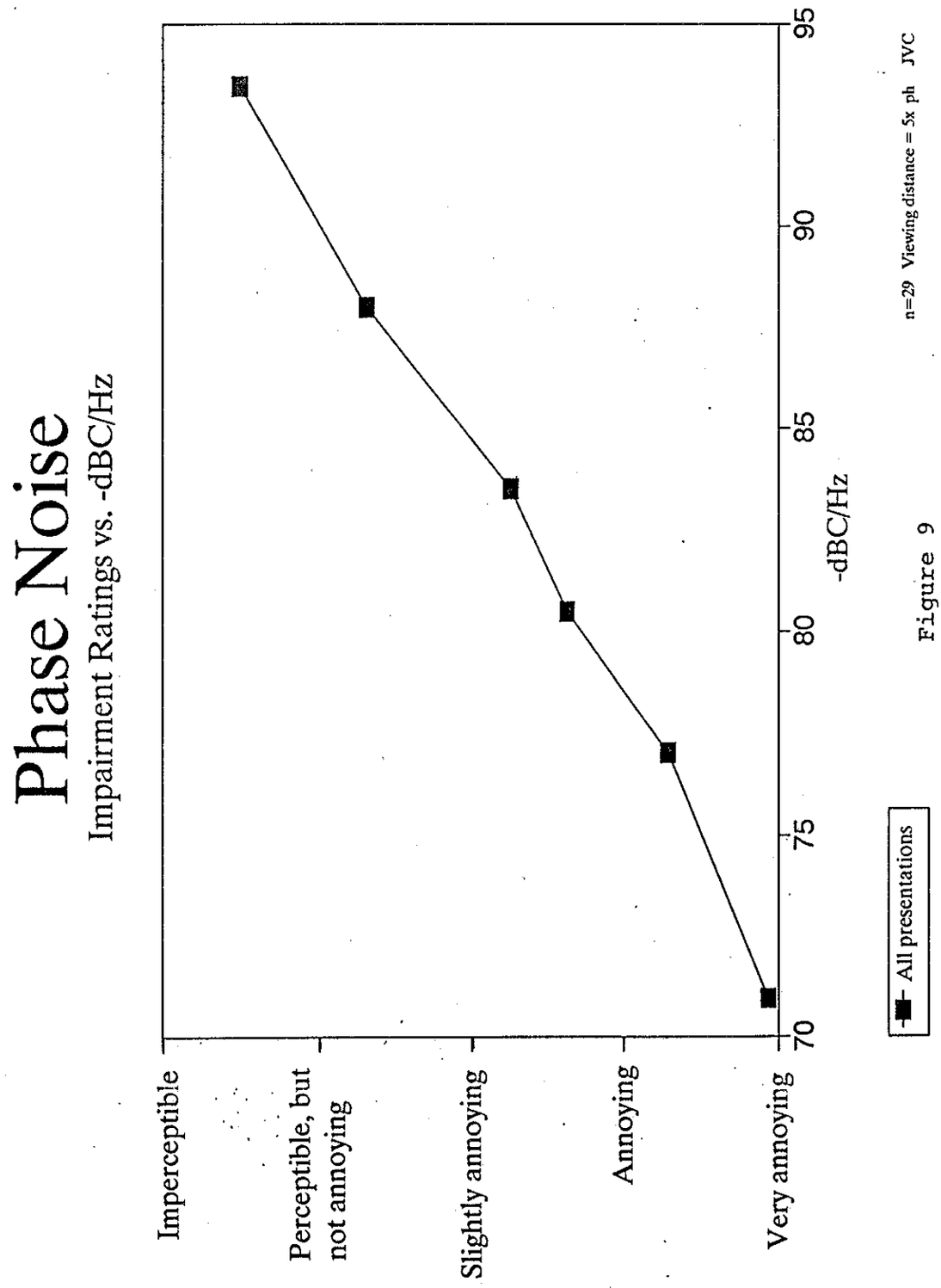

Figure 9. Phase Noise, Impairment Scale Ratings vs -dBC/Hz

Figure 10. Phase Noise, Monitor Comparison

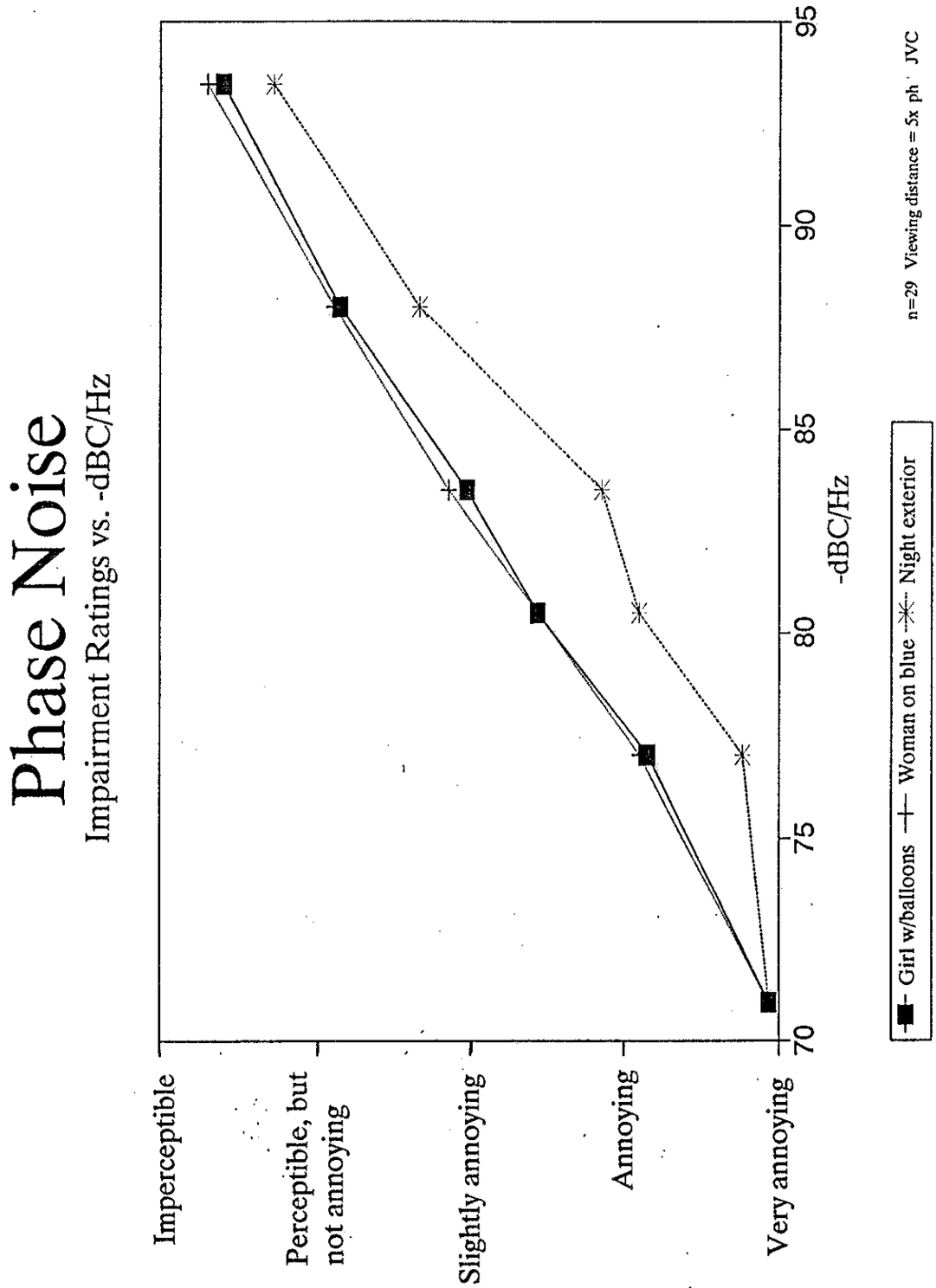

Figure 11. Phase Noise, Impairment Scale Ratings vs -dBC/Hz, (three images compared)

Figure 12. Distortion, Impairment Scale Ratings vs CTB

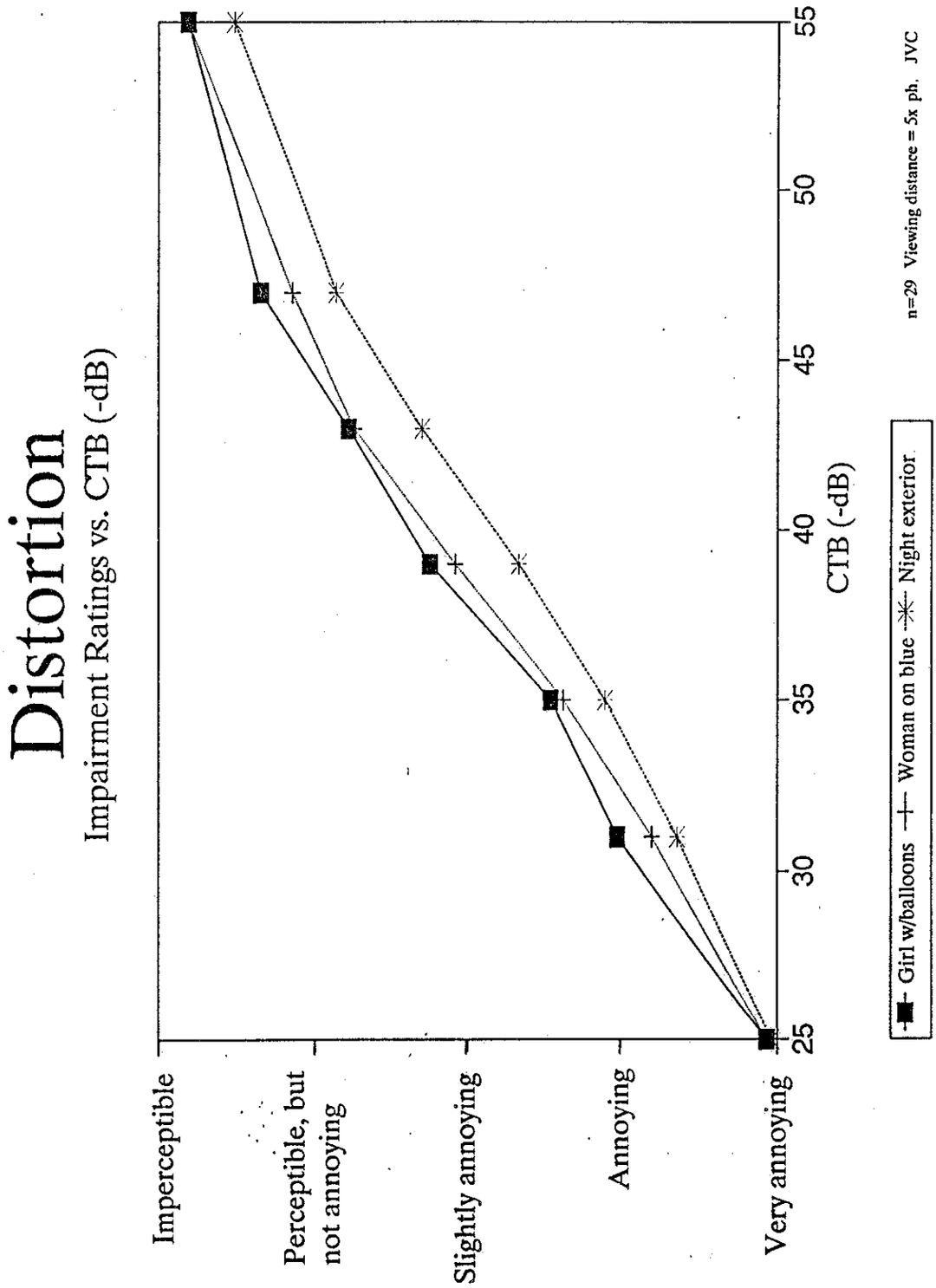

Figure 13. Distortion, Impairment Scale Ratings vs CTB, (three images compared)

Figure 14

Figure 14. Random noise, Impairment Scale Ratings vs S/N (1958, 1983 and 1991 results compared)

Microreflection Level re: Signal Level			
Distance Ft ≈ ns	0 & - 4 dB	- 7 dB	- 10 dB	- 20 dB
Reflection in Phase				
50 ft	The color moves out, off the objects	Severe loss of detail blurring, out of focus, soft	Softening, reduced chroma saturation and dot crawl	Very slight softening, slight darkening
100	The color is ok, picture is fuzzy	Same as 50 ft only more so, very fuzzy	Softening, monitor's pre-shoot cancelled, as above	As above
200	Double images, clear echoes	Fuzzy, out of focus, obvious trailing ghost	Softening, left horizontal shift, as above, more ghost	Barely perceptible trailing echo, slightly soft
400	Double everything!	Horizontal shift, double lines, very noticeable ghost	1/4-1/2" delayed double image, horizontal shift, blur	Very slight trailing echo, slightly more dot crawl
Reflection 180° Out of Phase				
50	Picture really bad	Close bright reflection, looks like more detail	Increased detail and dot crawl, sharper and brighter picture	Sharper picture, slight thickening of dark vertical lines
100	Picture sharpening, not too bad	Wider trailing reversed ghost, more detail, sharper	Increased grainy detail, second image before and after	Enhanced detail (very subtle), slightly sharper
200	Looks like severe edge enhancement	Halo, wider than before, pre-ghost or pre-brightening	Bright outlining, horizontal shift right, no reflection	Subtle shift, barely perceptible echo or halo, widens dark lines.
400	Really bad, too much contrast	Trailing dark then bright second image, double lines	Reversed ghost following, out of focus, trailing edges	Slight trailing halo following darks and vice versa (pre-shoot white on dark lines)

TABLE 1

Table 1. Microreflections, Expert Observation and Commentary

7.0 References

1. C. E. Dean, "Measurements of the Effects of Interference in Television Reception," Proceedings of the IRE, June 1960.

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3. Recommendation 500-4, "Method for the Subjective Assessment of the Quality of Television Pictures," Recommendations and Reports of the CCIR, Vol. XI, Part 1, Dubrovnik, 1986.

4. T. Elliot and J. Waltrich, "A Test System for Controlled Subjective Testing of Cable System Impairments," Proceedings of the 1991 NCTA Technical Sessions, March 1991.

5. B. L. Jones and L. E. Marks, "Picture Quality Assessment: A Comparison of Ratio and Ordinal Scales," SMPTE J., Vol. 94, No. 12, Dec. 1985.

8.0 About the Authors

Bronwen Lindsay Jones is a recognized authority in the fields of subjective testing, auditory and visual perception and psychophysical test methods. She is presently a consultant to Cable Television Labs.

She is the Vice-Chairman of the Advisory Committee on Advanced Television Systems' Planning Subcommittee Working Party 6 on Subjective Tests (ACATS, PSWP6) and is Vice-Chairman of the International Radio Consultative Committee (CCIR) Working Group 11-E. She was the head of perception research at CBS Labs in Stamford Connecticut from 1978 until it was closed in 1986.

Her writings and technical presentations include work on speech recognition, the "ventriloquism effect," FM protection ratios, loudness, dynamic visual acuity, picture quality evaluation and subjective test methodology. She designed and conducted the listening tests of noise reduction systems for the BTSC TV stereo sound standard.

Miss Jones is a member of the American Speech-Language & Hearing Association, the American Auditory Society, the Society for Information Display, the Association for Research in Vision and Ophthalmology and the International Society for Psychophysics. She is the first recipient of the Matti S. Siukola Memorial Award sponsored by the IEEE Broadcast Technology Society.

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CERTIFICATE OF SERVICE

I hereby certify that on this 30th day of June 1997, I caused copies of the foregoing Opposition to Must-Carry Complaint to be mailed via first-class postage prepaid mail to the following:

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