COMMITTEE T1

CONTRIBUTION

Document Number: T1A1.5/94-104

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STANDARDS PROJECT: Analog Interface Performance Specifications for Digital Video Teleconferencing/Video Telephony Service

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TITLE: VTC Hypothetical Reference Circuit Active Video Display Area Measurements

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ISSUE ADDRESSED: Draft Standard Section 4.2.4.1.2

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KEYWORDS: Video Quality, Video Performance Specifications, Objective Quality, Subjective Quality

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DISCLAIMER: This contribution references specific vendors' video test equipment. This is not intended to be an endorsement of any particular vendor's products.

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1. Introduction

The Institute for Telecommunication Sciences has measured the active video display area of the twenty five hypothetical reference circuits (HRCs) and the source tape used in the T1A1.5 Subjective Viewing Test. These active video display area measurements provide information for selecting the standard values of the active video area (see T1A1.5/93-107R1 section 4.2.4.1.2). This contribution discusses the method of measurement used to obtain the active video display area and reports the values found for each of the twenty five HRCs and the source tape.

2. Method of Measurement

The active display area was measured using the flat field (55 IRE) video on each HRC tape before the colorbar signal. The video line can be selected using a video line selector as seen in Figure 1.

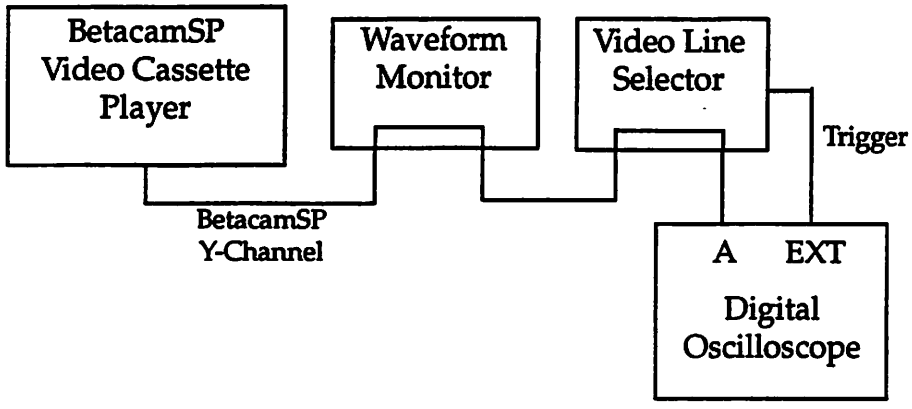

Figure 1 Laboratory test configuration.

The waveform monitor was used to find the top and bottom lines containing active video. The oscilloscope was used to measure the left and right boundaries of the active video. For the left and right boundaries, a video line through the center of the screen was used (Tektronix 1730 Waveform monitor field1: line 141). All measurements were taken with the player in play mode.

The oscilloscope was set as follows:

2 μs/div ~ 25 MHz (512 samples over 10 divisions)
200 mV/div
DC coupling
Ext Trigger
Trigger Delay: 54 μs

The trigger delay was adjusted such that the end of one line, the horizontal sync pulse, and the beginning of the next line were visible.

The left side of the active video was measured as the time between the falling

(leading) edge of the sync pulse to the rising edge of the gray video. The right side of the active video was measured as the time between the falling edge of the gray video to the falling edge of the sync pulse.

According to CCIR recommendation 601-1, the active video line starts 9.037 μs (122 samples/13.5 MHz) after the falling (leading) edge of the horizontal sync pulse, and it ends 1.1852 μs (16 samples/13.5 MHz) before the falling edge of the next horizontal sync pulse.

According to the line numbering scheme of the Tektronix 1730 waveform monitor, the first (top) line of active video is field2: line 20, and the last (bottom) line of active video is field 1: line 263.

3. Results

Table 1 gives the left (falling edge of horizontal sync pulse to rising edge of video), right (falling edge of video to falling edge of next horizontal sync pulse), top line, and bottom line of the active video display area for each HRC, the source, and typical NTSC values. The top and bottom lines are given in Tektronix 1730 waveform monitor numbering convention as well as a uniform numbering from 1 to 486. Line 1 is the top line of active video, and 486 is the bottom line of active video.

Table 1: HRC Active Video Display Area

HRC	Left (μs after falling sync)	Right (μs before falling sync)	Top Line		Bottom Line	
			Tektronix line number	line number	Tektronix line number	line number
NTSC (typical)	9.04	1.19	field 2: line 20	1	field 1: line 263	486
1	9.54	1.91	field 2: line 20	1	field 1: line 263	486
2	9.54	2.24	field 2: line 20	1	field 1: line 263	486
3	9.54	1.92	field 2: line 20	1	field 1: line 263	486
4	9.90	2.46	field 2: line 23	7	field 1: line 262	484
5	9.90	2.46	field 2: line 23	7	field 1: line 262	484
6	10.40	2.61	field 2: line 21	3	field 1: line 260	480
7	10.40	2.61	field 2: line 21	3	field 1: line 260	480
8	10.40	2.63	field 2: line 21	3	field 1: line 260	480
9	9.42	2.21	field 2: line 22	5	field 1: line 261	482

Table 1: HRC Active Video Display Area (Continued)

HRC	Left (μs after falling sync)	Right (μs before falling sync)	Top Line		Bottom Line	
			Tektronix line number	line number	Tektronix line number	line number
10	9.42	2.21	field 2: line 22	5	field 1: line 261	482
11	9.60	1.82	field 2: line 22	5	field 1: line 261	482
12	9.85	1.84	field 2: line 22	5	field 1: line 261	482
13	9.23	2.46	field 2: line 23	7	field 1: line 262	484
14	9.66	1.95	field 2: line 22	5	field 1: line 261	482
15	9.57	2.05	field 2: line 22	5	field 1: line 261	482
16	9.64	4.94	field 2: line 21	3	field 1: line 260	480
17	9.46	2.22	field 2: line 21	3	field 1: line 260	480
18	10.00	1.61	field 2: line 22	5	field 1: line 261	482
19	9.29	2.27	field 2: line 23	7	field 1: line 262	484
20	9.42	2.18	field 2: line 22	5	field 1: line 262	484
21	9.63	1.91	field 2: line 21	3	field 1: line 260	480
22	9.51	2.20	field 2: line 22	5	field 1: line 261	482
23	9.43	2.20	field 2: line 22	5	field 1: line 261	482
24	9.54	1.98	field 2: line 22	5	field 1: line 261	482
25	9.63	1.92	field 2: line 21	3	field 1: line 260	480

The extrema are

Left: 10.40 μs (141 samples @ 13.5 MHz)

Right: 2.63 μs (36 samples @ 13.5 MHz)

Active video line width: 50.47 μs (681 samples @ 13.5 MHz)

63.5 μs - 10.40 μs - 2.63 μs = 50.47 μs

Top: field 2: line 23 (7)

Bottom: field 1: line 260 (480).

Total number of active video lines: 480 - 7 + 1 = 474