
TABLE OF CONTENTS

1.0 PURPOSE, SCOPE, AND APPLICATION	1
1.1 PURPOSE	1
1.2 SCOPE	1
1.3 APPLICATION	1
2.0 REFERENCED DOCUMENTS	1
3.0 DEFINITIONS.....	2
4.0 PERSONNEL SAFETY	2
5.0 EQUIPMENT	2
5.1 OSCILLOSCOPE.....	3
5.2 VOLTAGE PROBE	3
5.3 CURRENT PROBE.....	3
5.4 TRANSMISSION LINE (PRE-CHARGED TL CONNECTED TO THE HIGH VOLTAGE)	3
5.5 HIGH VOLTAGE POWER SUPPLY	4
5.6 HIGH VOLTAGE SWITCH	4
5.7 ATTENUATOR.....	4
5.8 RISE TIME FILTER	4
6.0 TLP PARAMETERS.....	4
6.1 WAVEFORM PARAMETERS	5
6.2 PARAMETERS MEASURED BY TLP	7
7.0 TLP WAVEFORMS	8
7.1 TLP WAVEFORMS AT PULSE GENERATOR.....	9
7.2 TLP WAVEFORMS IN DUT MEASUREMENT CONFIGURATION	10
7.2.1 <i>Time Domain Reflection with Overlap (TDR-O)</i>	10
7.2.2 <i>Time Domain Reflection with Overlap (TDR-O) with Kelvin Voltage Sense</i>	11
7.2.3 <i>Time Domain Reflection Separate (TDR-S)</i>	11
7.2.4 <i>TDR-S Waveforms with Kelvin Voltage Measurement</i>	13
8.0 TEST REQUIREMENTS AND PROCEDURES.....	13
8.1 ERROR CORRECTION AND CALIBRATION.....	13
8.2 TESTER ERROR CORRECTION METHODOLOGY	13
8.2.1 <i>Short Circuit Error Correction Methodology</i>	13
8.2.2 <i>Open Circuit Error Correction Methodology</i>	14
8.3 TESTER CALIBRATION METHODOLOGY	14
8.3.1 <i>Voltage Calibration Methodology</i>	14

8.3.2 Current Calibration Methodology	15
8.3.3 Second Run Pass at Correction Calibration Procedure	15
8.4 TLP TEST HANDLING	15
8.5 TLP TEST PROCEDURE.....	15

ANNEXES

Annex A (Informative): TLP Design Guidelines	17
Annex B (Informative): Evaluation and Determination of Failure	24
Annex C (Informative): System Verification Failures.....	26
Annex D (Informative): Revision History for ANSI/ESD STM5.5.1.....	27

TABLES

Table 1: Required Minimum Single Shot Band Width and Sampling Rate for Typical TLP Pulse Width / Rise Time.....	3
Table 2: VF-TLP Pulse Parameters (at the Pulse Source)	9
Table 3: (Standard and Long Pulse) TLP Pulse Parameters (at the Pulse Source)	9
Table 4: TDR-O Waveform Measurements.....	10
Table 5: TDR-O with Kelvin Voltage Probe	11
Table 6: TDR-S Waveform Parameters	12
Table 7: TLP Methodologies and Parameters.....	17

FIGURES

Figure 1: General TLP Waveform Parameter Illustration of Maximum Overshoot, Plateau, and Ringing Duration for a Pulse with a Well-Defined Plateau, Measured at the Pulse Source	5
Figure 2: Typical VF-TLP Pulse at the Pulse Source	5
Figure 3: TLP Waveform for a Very Long Pulse Showing Sag in the Latter Parts of the Pulse, Measured at the Pulse Source	6
Figure 4: Overlap Pulse Showing Settling Time.....	7
Figure 5: Typical TLP Plot Illustrating Several Parameters.....	8
Figure 6: TDR-S Voltage Waveforms.....	12
Figure 7: Current Source TLP	18
Figure 8: Time Domain Reflectometer (TDR-O) TLP	19
Figure 9: Time Domain Reflectometer (TDR-S) TLP	19
Figure 10: Time Domain Reflection and Transmission (TDRT) TLP.....	20
Figure 11: Time Domain Reflection and Transmission (TDRT) TLP Waveforms	20
Figure 12: Kelvin Set-Up	23