



MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*

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TCG NEBS COMPLIANCE REPORT

CUSTOMER NAME: **InfiNet Malta LTD**
222 Merchants Street
Valletta VLT1170, Malta

PRODUCT NAME: **AUX-ODU-LPU-G**

TESTED TO:

**Telcordia Technologies GR-1089-CORE, Issue 6, May 2011
Section 4**

**Telecommunications Carrier Group, NEBS Compliance Checklist,
VZ.NEBS.TE.NPI.2004.015**

Date: June 4, 2015

Project: 85305-NEBS

**TCG INDEPENDENT TESTING
LABORATORY:**

MET Laboratories, Inc.
914 West Patapsco Ave.
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Issued By: Documentation Department, MET Laboratories, Inc. **Date:** June 4, 2015



Release Control Record

Issue No.	Reason for change	Date Issued
∅	Initial Report Issue	June 4, 2015



Introduction

Overview:

The AUX-ODU-LPU-G, manufactured by InfiNet Malta LTD, was tested to all applicable surge test criteria of GR-1089-CORE Section 4[Ref. 1]. Refer to the Executive Summary of this report for a synopsis of evaluation criteria and AUX-ODU-LPU-G test results.

About This Report:

This report consists of several dependent parts, identified by labeled tabs. Each part is one component of the final, comprehensive, evaluation scheme, and is not intended for stand-alone use.

Tabbed parts correspond to individual sections of Telcordia Technologies' GR-1089-CORE, Issue 6, May 2011. Parts are arranged in the order in which they are found in the Telcordia Technologies' documents.

References:

1. Telcordia Technologies GR-1089-CORE, Issue 6, May 2011¹
2. Customer supplied information

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11	Section 4 of GR-1089	Lightning and AC Power Fault



Executive Summary

Declaration of compliance to GR-1089-CORE:

The Equipment Under Test (EUT), is **compliant** with selected requirements of Section 4 of Telcordia Technologies' GR-1089-CORE, Issue 6, May 2011. Test results to each section in GR-1089-CORE can be found in Part 4 of this document.

Testing was performed on the AUX-ODU-LPU-G.

The results obtained relate only to the item(s) tested.

Overview:

MET Laboratories, Inc. was contracted by InfiNet Malta LTD to perform compliance testing to selected NEBS GR-1089-CORE criteria on the AUX-ODU-LPU-G under the InfiNet Malta LTD purchase order number 9INF1212R2.

Compliance Summary to GR-1089-CORE

Lightning and AC Power Fault Immunity Criteria

The EUT was subjected to the customer selected Lightning and AC Power Fault Immunity criteria as described in Section 4.0. The EUT was subjected to the customer specified first-level, second-level or intra-building AC power fault tests and found to be **compliant**.

Product Description and Equipment Configuration

Description of EUT

The AUX-ODU-LPU-G, Equipment Under Test (EUT), is a Ethernet ESD and Lightning protection unit (twisted pair copper media).

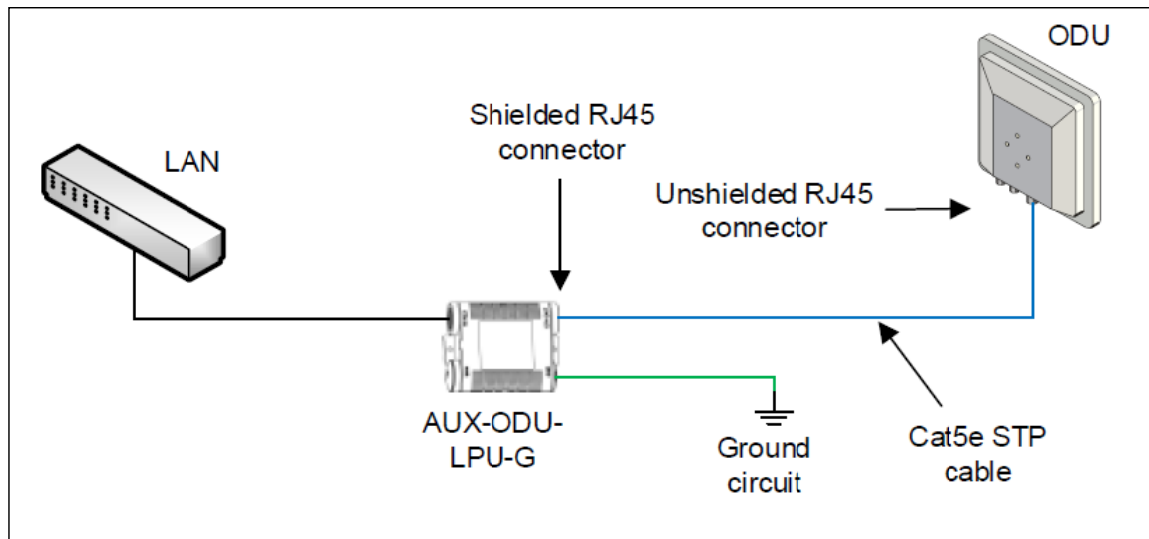


Figure 5A-1. EUT Configuration



Sample Selection

InfiNet Malta LTD selected and provided the test samples for the AUX-ODU-LPU-G product under test.

Details of the equipment under test can be found in the table below.

Configuration List for all Equipment

Name / Description	Model Number	Part Number	Serial Number
AUX-ODU-LPU-G	Not provided	Not provided	Not provided

Table 5A-1. Detailed List of all Equipment

Description of Cable Interface Types

Ref. ID	Port name on EUT	Cable & Connector Description or reason for no cable	Qty	Length as tested (m)	Max Length (m)	Shielded? (Y/N)	Termination Box ID & Port Name
1	ETH IN	Ethernet input	1	10	40	N	ETH IN
2	ETH OUT	Ethernet output (protected leg)	1	10	40	Y	ETH OUT

Table 5A-2. Details of Cables and Interfaces on Equipment

Ref. ID	Slot #	PCB Description	Port Name on the EUT	Protocol	Connector Type
1	ETH IN	Ethernet input	ETH IN	10/100/1000 Mbps (Gigabit Ethernet pass-through)	Standard RJ-45 connector
2	ETH OUT	Ethernet output (protected leg)	ETH OUT	10/100/1000 Mbps (Gigabit Ethernet pass-through)	Shielded RJ-45 connector
3	GND	ground clamp	GND	n/a	screw

Table 5A-3. Details of Equipment Ports



General Test Set-up

The EUT was configured in accordance with the manufacturer’s instructions and to the extent possible operated in a manner representative of the typical usage of the equipment (see Figure 5A-1).

Equipment Configuration and Test Conditions

Model(s) Tested:	AUX-ODU-LPU-G	
Model(s) Covered:	AUX-ODU-LPU-G	
Description of EUT:	Ethernet ESD and Lightning protection unit (twisted pair copper media)	
Number of Samples Tested:	1	
EUT Specifications:	Primary Power:	10-55 VDC
	Secondary Power:	n/a
Mode of Operation:	AUX-ODU-LPU-G is an optional outdoor Lightning Protection Unit (LPU) for InfiNet Wireless systems, designed to withstand the toughest conditions and protect the outdoor or indoor unit from sudden power surges induced by lightning strikes.	
Configuration:	The “ETH OUT” port of the AUX-ODU-LPU-G is connected to the ODU. The “ETH IN” port of the AUX-ODU-LPU-G is connected to indoor network equipment connected to the Ethernet port of the IDU. AUX-ODU-LPU-G should be properly grounded.	
Instruction Manual: <i>(Manual title, date and revision or issue number)</i>	Technical User Manual, Last updated: 9/4/2014	
Physical Description: <i>(19” Rack, 23” Rack, Table top, size, etc.)</i>	EUT Arrangement (table top, floor standing or both): Table top/ Rack mount /etc System w/Multiple Chassis? (Yes/No): No Size: (HxWxD): 1.339 x 3.701 x 4.764 inches / 34x94x121 mm Weight: 0.6173 lbs / 0.28 kg	

Table 5A-4. EUT Configuration and Test Conditions

EUT Operation, Method of Monitoring and Pass/ Fail Criteria

If the AUX-ODU-LPU-G unit is out of order (is inoperable, #2), then there is no connection between the indoor router and the outdoor InfiNet Wireless system through the Ethernet STP Cat.5e/6.

Otherwise (#1) - there is a connection, the traffic is transmitted in both directions through the AUX-ODU-LPU-G device.



Modifications made to the EUT

The following modifications were made to the EUT during GR-1089-CORE testing:

InfiNet Malta LTD only requested testing to the following test requirements,

- R4-1 [231] Section 4.1 Port Classification
- R4-3 [26] Section 4.5.1 Test Equipment
- R4-8 [234] Section 4.6.1.3 Cell Site Inter-Structure Withstand Criteria
- R4-10 [27] Section 4.6.2.1.1 First Level Lightning Criteria Telecommunications Ports
- Section 4.6.2.1.2.3 Surge Test Number 3 – Gas Tube Interaction Test
- R4-14 [30] Section 4.6.2.1.3 Intra-Building or Intra-Site Criteria
- R4-17 [170] Section 4.6.2.1.3 Intra-Building or Intra-Site Criteria
- R4-18 [237] Section 4.6.2.1.3 Intra-Building or Intra-Site Criteria

Modifications made to the Test Standard

GR-1089-CORE:

No modifications were made to the test standard.



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TCG NEBS COMPLIANCE TEST REPORT FOR:

InfiNet Malta LTD
222 Merchants Street
Valletta VLT1170, Malta

Product: AUX-ODU-LPU-G

PART: 6B
EXECUTIVE SUMMARY GR-1089-CORE COMPLIANCE
SECTION 4 SURGE TEST REQUIREMENTS
Telcordia Technologies GR-1089, Issue 6, May 2011

Date: June 4, 2015

Project: 85305-NEBS

Prepared By: _____ **Date:** June 4, 2015

Approved By: _____ **Date:** June 4, 2015



GR-1089-CORE Detailed Test Results Summary

The following defines the contents of the Executive Summary of Test Results table.

Section column gives the Section numbers from GR-1089-CORE

Section Name column gives the Section name from GR-1089-CORE

Criteria column gives the local number of the Requirement (e.g., R3-1) from GR-1089-CORE and the absolute number of the Requirement (e.g., [2])

Results column gives the results of the evaluation (Compliant, Non-compliant, etc.)

Compliant: The product met the requirements of the corresponding criteria

Non-compliant: The product did not meet the requirements of the corresponding criteria

NA: The criteria were Not Applicable to the product

ENR: An evaluation to these criteria was Not Requested by the customer

Part column gives the part number of the report

Comment column provides some additional information on the test or test results. Detailed information is found in the corresponding part of this document.



MET Laboratories, Inc.

TCG NEBS Compliance Test Report

Customer Name: InfiNet Malta LTD

Product Name: AUX-ODU-LPU-G

Date: June 4, 2015

Table 6B-1: GR-1089-CORE Test Results Summary

Section	Section Name	Criteria	Results ¹	Part	Comment
4.	Lightning and Power Fault				
4.1	Overview	R4-1 [231]	Compliant	11	EUT utilizes Type 3a/5a 3b/5b ports
4.2.2	Current-Limiting Protectors	R4-2 [232]	Not Applicable	11	Not requested as part of the test program.
4.5.1	Test Equipment	R4-3 [26]	Compliant	11	All test generators during testing were found to be in compliance.
4.5.9	Equipment Interfacing With Agreed or Non-Field Replaceable Integrated Primary Protectors	R4-4 [179]	Not Applicable	11	Not requested as part of the test program.
		R4-5 [181]	Not Applicable	11	Not requested as part of the test program.
4.6.1.1	Short Circuit Test (Telecommunications Type 1, 3, and 5 Ports)	R4-6 [25]	Not Applicable	11	Not requested as part of the test program.
4.6.1.2	Ethernet Interface Considerations (Telecommunications Type 1, 2, 3, 3a/5a, 3b/5b, 4, 4a, or 5 Ports)	R4-7 [233]	Not Applicable	11	Not requested as part of the test program.
4.6.1.3.1	Cell Site Inter-Structure Withstand Criteria - Option A	R4-8 [234]	Compliant	11	EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.
4.6.1.3.2	Cell Site Inter-Structure Withstand Criteria - Option B	CR4-9 [235]	Not Applicable	11	Not requested as part of the test program.
4.6.2.1.1	First-Level Lightning Criteria for Telecommunications Ports (Type 1, 3, 3b/5b, and 5 Ports)	R4-10 [27]	Compliant	11	EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.
		R4-11 [167]	Not Applicable	11	Not requested as part of the test program.
		R4-12 [236]	Not Applicable	11	Not requested as part of the test program.

¹ NA: Not Applicable; ENR: Evaluation Not Requested



MET Laboratories, Inc.

TCG NEBS Compliance Test Report

Customer Name: InfiNet Malta LTD

Product Name: AUX-ODU-LPU-G

Date: June 4, 2015

Section	Section Name	Criteria	Results ¹	Part	Comment
4.6.2.1.2.3	Surge Test Number 3 – Gas Tube Interaction Test		Compliant	11	EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.
4.6.2.1.2.7	Test Procedure and Criteria for Surge Test Number 7 of Table 4-2 – High Lightning Exposure Test for Remote OSP Interfaces	CO4-13 [178]	Not Applicable	11	Not requested as part of the test program.
4.6.2.1.3	Intra-Building or Intra-Site Lightning Criteria (Telecommunications Type 2, 3a/5a, 4, 4a Ports)	R4-14 [30]	Compliant	11	EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.
		R4-15 [169]	Not Applicable	11	Not requested as part of the test program.
		R4-16 [31]	Not Applicable	11	Not requested as part of the test program.
		R4-17 [170]	Compliant	11	EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.
		R4-18 [237]	Compliant	11	EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.
4.6.2.1.5	First-Level Lightning Criteria for Antenna Ports (Telecommunications Type 6 Ports)	R4-19 [209]	Not Applicable	11	Not requested as part of the test program.
		R4-20 [238]	Not Applicable	11	Not requested as part of the test program.
4.6.2.1.6	First-Level Lightning Criteria for AC Power Ports (Telecommunications Type 7 Ports)	R4-21 [210]	Not Applicable	11	Not requested as part of the test program.
		R4-22 [32]	Not Applicable	11	Not requested as part of the test program.
		R4-23 [211]	Not Applicable	11	Not requested as part of the test program.
		R4-24 [239]	Not Applicable	11	Not requested as part of the test program.
4.6.2.1.7	DC Power to Antenna Lightning Criteria (Type 8a Ports)	R4-25 [240]	Not Applicable	11	Not requested as part of the test program.
4.6.3.1	Second-Level Lightning for Telecommunication Ports (Type 1, 3, and 5 Ports)	R4-26 [29]	Not Applicable	11	Not requested as part of the test program.
		R4-27 [241]	Not Applicable	11	Not requested as part of the test program.
4.6.3.2	Second-Level Lightning for AC Power Ports (Type	R4-28 [33]	Not Applicable	11	Not requested as part of the test program.



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TCG NEBS Compliance Test Report

Customer Name: InfiNet Malta LTD

Product Name: AUX-ODU-LPU-G

Date: June 4, 2015

Section	Section Name	Criteria	Results ¹	Part	Comment
	7 Ports)	R4-29 [242]	Not Applicable	11	Not requested as part of the test program.
4.6.4.1	First-Level Power Fault/Induction Requirements	R4-30 [35]	Not Applicable	11	Not requested as part of the test program.
		R4-31 [172]	Not Applicable	11	Not requested as part of the test program.
		R4-32 [173]	Not Applicable	11	Not requested as part of the test program.
4.6.4.2	Second-Level Power Fault Requirements	R4-33 [40]	Not Applicable	11	Not requested as part of the test program.
		R4-34 [41]	Not Applicable	11	Not requested as part of the test program.
		R4-35 [36]	Not Applicable	11	Not requested as part of the test program.
		R4-36 [174]	Not Applicable	11	Not requested as part of the test program.
		R4-37 [175]	Not Applicable	11	Not requested as part of the test program.
4.7	Criteria for Equipment With Integrated Primary Protection	R4-38 [182]	Not Applicable	11	Not requested as part of the test program.
4.7.1	Equipment Classification	R4-39 [183]	Not Applicable	11	Not requested as part of the test program.
		R4-40 [184]	Not Applicable	11	Not requested as part of the test program.
4.7.2	Protector Requirements	R4-41 [185]	Not Applicable	11	Not requested as part of the test program.
		R4-42 [186]	Not Applicable	11	Not requested as part of the test program.
		R4-43 [187]	Not Applicable	11	Not requested as part of the test program.
		R4-44 [188]	Not Applicable	11	Not requested as part of the test program.
		R4-45 [189]	Not Applicable	11	Not requested as part of the test program.
		R4-46 [190]	Not Applicable	11	Not requested as part of the test program.
4.7.3	Lightning Surge and Power Fault Tests for Protected Circuits	R4-47 [191]	Not Applicable	11	Not requested as part of the test program.
4.7.4.1	Fusing Coordination for Circuits That Contain Components or Circuitry That Acts as OSP Fuse Links	R4-48 [193]	Not Applicable	11	Not requested as part of the test program.



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TCG NEBS Compliance Test Report

Customer Name: InfiNet Malta LTD

Product Name: AUX-ODU-LPU-G

Date: June 4, 2015

Section	Section Name	Criteria	Results ¹	Part	Comment
4.7.4.1.1	Enclosure Suitable for Fusing	R4-49 [194]	Not Applicable	11	Not requested as part of the test program.
		R4-50 [195]	Not Applicable	11	Not requested as part of the test program.
		R4-51 [196]	Not Applicable	11	Not requested as part of the test program.
4.7.4.2	Fusing Coordination for Circuits Not Containing Components of Circuitry That Act as OSP Fuse Links	R4-52 [199]	Not Applicable	11	Not requested as part of the test program.
4.7.5	Dielectric Withstand	R4-53 [200]	Not Applicable	11	Not requested as part of the test program.
4.7.6	EIPP Cable Requirements	R4-54 [201]	Not Applicable	11	Not requested as part of the test program.
		R4-55 [202]	Not Applicable	11	Not requested as part of the test program.
4.7.7	AC Power Fault Immunity – Unprotected Circuits	R4-56 [203]	Not Applicable	11	Not requested as part of the test program.
4.7.8	Lightning Surge Tests – Unprotected Circuits	R4-57 [204]	Not Applicable	11	Not requested as part of the test program.
4.7.8.1	Lightning Surge Tests for Severe Climatic Conditions – Unprotected Units	CR4-58 [205]	Not Applicable	11	Not requested as part of the test program.
		CR4-59 [206]	Not Applicable	11	Not requested as part of the test program.



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TCG NEBS COMPLIANCE TEST REPORT FOR:

InfiNet Malta LTD
222 Merchants Street
Valletta VLT1170, Malta

Product: AUX-ODU-LPU-G

PART: 11

LIGHTNING AND POWER FAULT

Section 4, GR-1089-CORE Surge Test Requirements

Telcordia Technologies GR-1089, Issue 6, May 2011

Date: June 4, 2015

Project: 85305-NEBS

Report: TEL85305-NEBS



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TEST RESULTS SUMMARY

Where applicable, the EUT was evaluated to the following tests from Section 4 of GR-1089-CORE:

- Electrical Protection on Coaxial and Paired-Conductor Systems
- Lightning Effects on Pair-Conductor Cables
- AC Power Fault Effects on Paired-Conductor Cables
- General Testing Information and Guidelines
- Testing Requirements
- Criteria for Equipment With Integrated Primary Protection

Column Heading Definitions for Summary of Test Results Table

The following Summary of Test Results table contains these columns of information:

- **Section** column gives the Section numbers from GR-1089-CORE.
- **Section Name** column gives the Section name from GR-1089-CORE.
- **Criteria** column gives the local number of the requirement (e.g., R3-1) from GR-1089-CORE and the absolute number of the requirement (e.g., [2]).
- **Results** column gives the results of the evaluation (Compliant, non-compliant, etc.).
 - **Compliant:** The Equipment Under Test met the requirements of the corresponding criteria.
 - **Non-compliant:** The EUT did not meet the requirements of the corresponding criteria.
 - **NA:** The criteria were Not Applicable to the EUT.
 - **ENR:** An Evaluation, to these criteria, was Not Requested by the customer.
 - For additional details go to the page listed in the **Page** column.
- **Page** column gives the page number, of this report, for the corresponding criteria.



MET Laboratories, Inc.

TCG NEBS Compliance Test Report

Customer Name: InfiNet Malta LTD

Product Name: AUX-ODU-LPU-G

Date: June 4, 2015

OVERVIEW

Project Objective

Testing was performed to determine if the AUX-ODU-LPU-G met the requirements for Section 4, *Lightning and Power Fault*, of Telcordia Technologies GR-1089-CORE, Issue 6, May 2011.

Equipment Configuration and Test Conditions

The test sample(s) including all support equipment submitted to the Telecommunications Lab for testing was returned to InfiNet Malta LTD upon completion of testing.

Refer to Part 5A for details on equipment diagrams, test configurations, equipment tables, support equipment, and ports and cabling information.

Test Location

All testing under Section 4 (Part 11) was performed by Lamin Conteh between 05/08/15 – 05/14/15 at MET Laboratories, Inc. 914 West Patapsco Ave., Baltimore MD 21230.



LIGHTNING AND POWER FAULT – OVERVIEW (4.1)

Criteria:

R4-1 [231] The equipment manufacturer shall classify all equipment ports associated with the EUT and the test laboratory shall clearly identify the classification of all ports in the Test Report for equipment that has been evaluated in accordance with Appendix B.

Test Method:

R4-1 Work with Customer representative to determine and record all of the ports contained within the EUT. Determine and record the classification of each port type in accordance with the criteria listed in Appendix B. Once all ports have been identified and classified, analyze the system and determine what surge or AC power fault testing will be performed. Record the planned tests as well as the exemptions and reason for exemption in the Surge requirements analysis. Exemptions for test are determined by clauses in the standard or in some cases due to compliance by similarity. In the case of CBS record the project and/or report numbers as necessary.

Test Results:

The EUT was Compliant with Requirement **R4-1 [231]**. EUT utilizes Type 3a/5a 3b/5b ports.

Ref. ID	Slot #	PCB Description	Port Name on the EUT	Protocol	Connector Type
1	ETH IN	Ethernet input	ETH IN	10/100/1000 Mbps (Gigabit Ethernet pass-through)	Standard RJ-45 connector
2	ETH OUT	Ethernet output (protected leg)	ETH OUT	10/100/1000 Mbps (Gigabit Ethernet pass-through)	Shielded RJ-45 connector
3	GND	ground clamp	GND	n/a	screw

Table 11-1. Port Types



GENERAL TESTING INFORMATION AND GUIDELINES – TEST EQUIPMENT (4.5.1)

Criteria:

R4-3 [26] A declaration of the generator's compliance shall be provided in the test report. Oscilloscope plots of the waveforms for each lightning generator utilized, and a description of measurement results shall be part of the data sheet package or test report for each product. Characterization of power fault generator waveforms is not required.

Test Method:

R4-3 Each generator utilized for testing shall be functionally verified and characterized before each test. For surge generators capture measure and store with an oscilloscope the rise-time, peak amplitude and fall-time in both positive and negative polarity. Check each plot to ensure conformance of each waveform utilized to the tolerances defined in this standard. Insert a copy of each validated plot into the report. For AC generators measure peak amplitudes of open circuit voltage and short circuit current before each test, ensure that each setting is equal to or more than the specified minimum value for each parameter.

Test Results:

The EUT was compliant with Requirement **R4-3 [26]**. All test generators during testing were found to be in compliance.



CELL SITE INTER-STRUCTURE WITHSTAND CRITERIA (TELECOMMUNICATIONS TYPE 3A/5A AND 8B PORTS) (4.6.1.3)

Criteria:

R4-8 [234] Type 3a/5a and Type 8b interfaces deployed between separate structures, cabinets, buildings, H-frames, and similar enclosures within a cell site shall demonstrate resistance to GPR via isolation or surge testing.

Test Method:

R4-8 Based upon the Equipment port type and customer preference, determine and record whether Option A isolation test or Option B Surge test is to be performed. Perform testing as recommended in either 4.6.1.3.1 or 4.6.1.3.2 and record setup, test parameters utilized and test results as appropriate.

Option A – Isolation Test (4.6.1.3.1)

Option A may be applied to any Type 3a/5a or Type 8b port regardless of manufacturer's installation instructions for shielding or metallic conduit.

Option A requires port isolation to withstand the effects of GPR. The Isolation Test shall be performed using any one of the following:

- 1500 Vrms at 50 Hz; 60 Hz for 60 seconds
- 2120 VDC for 60 seconds
- Ten (10) 2400 V 1.2/50 impulses of alternating polarity applied at intervals of not less than 1 second. A 1.2/50-8/20 combination wave generator, as described in Table 4-2 (GR-1089), may also be used for this test.

The Isolation Test is to be performed between each individual Type 3a/5a telecommunication port, and the following locations within the equipment:

- All other telecommunications ports (Application note: If the ports being isolated from each other need primary protection, the voltage can be reduced to 2000 V.) If the port under test and the other port being isolated must terminate at the same far end location, this test does not need to be applied.
- Earth or chassis ground
- DC power ports (including battery return)
- Any other port that exits the equipment (i.e., RS232, USB, RS485, etc.). See Figure 11-1.

The Isolation Test is to be performed between each individual Type 8b dc power port(s) (including battery return), and the following locations within the equipment:

- All telecommunications ports
- Earth or chassis ground
- Any other port that exits the equipment (i.e., RS232, USB, RS485, etc.). See Figure 11-2.

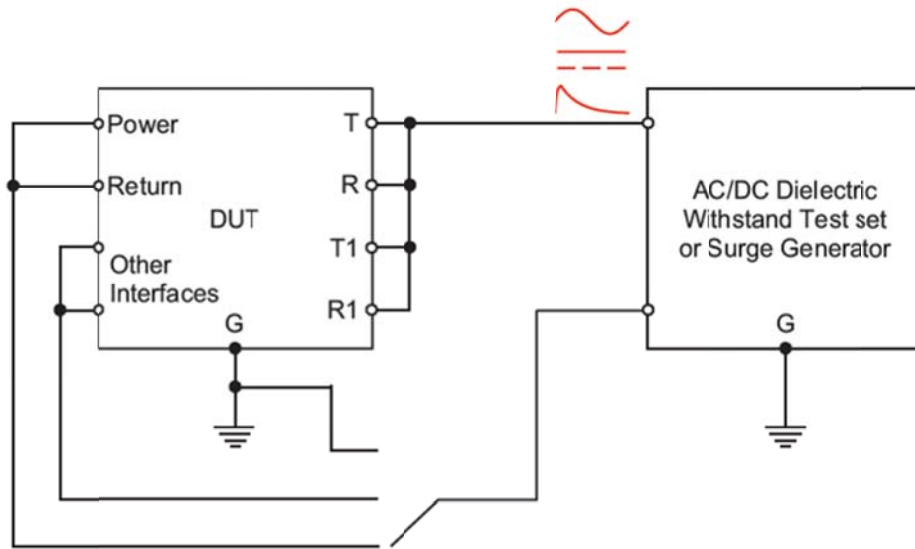


Figure 11-1. Option A – Isolation Test for Type 3a/5a Interfaces (Figure 4-3 of GR-1089)

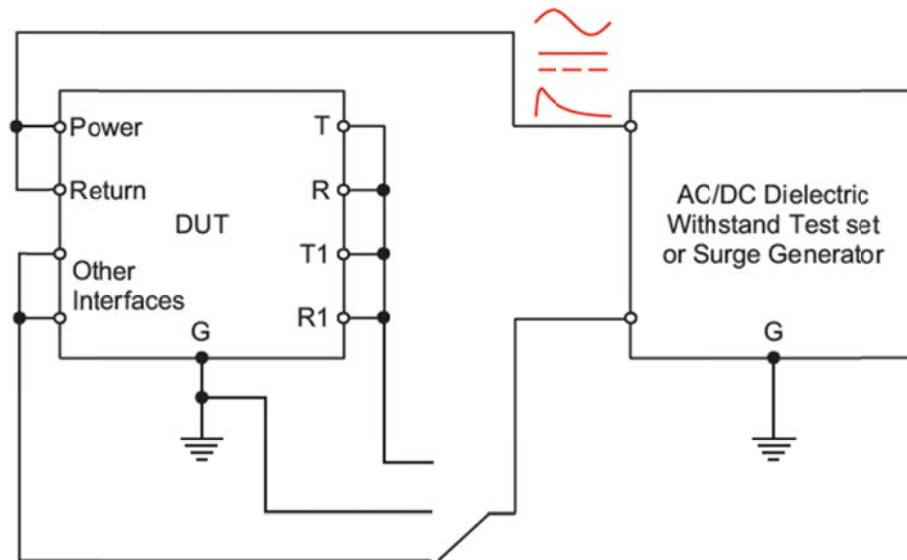


Figure 11-2. Option A – Isolation Test for Type 8b Interfaces (Figure 4-4 of GR-1089)



Option A Isolation Test Conformance

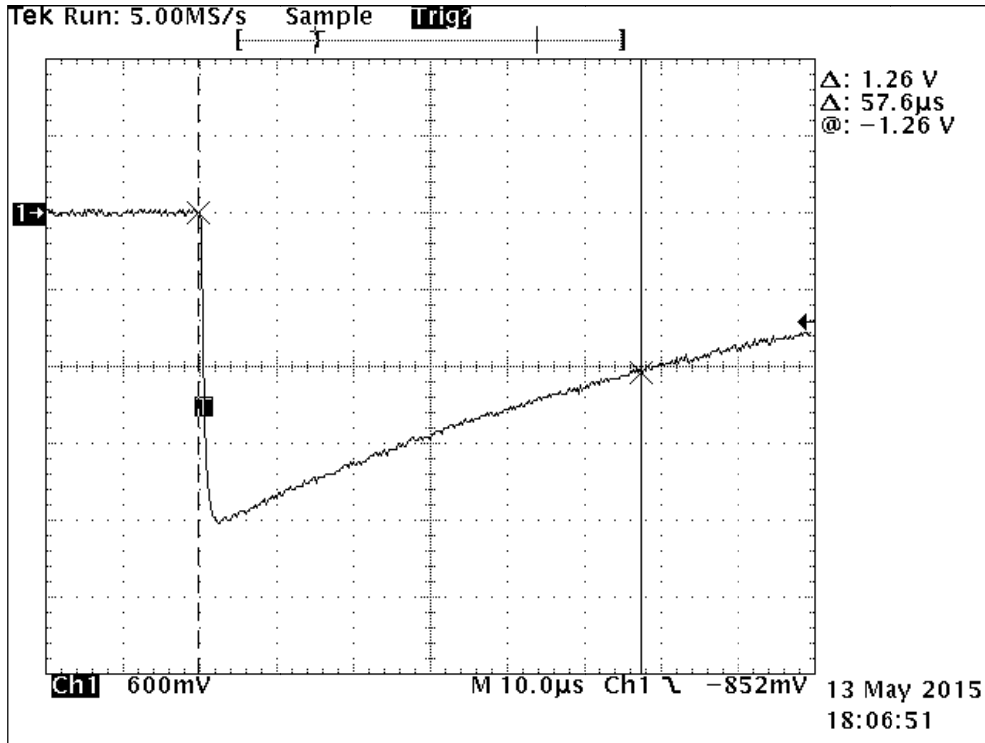
There shall be no indication of a breakdown of the isolation, and the equipment shall continue to function properly without functional degradation after the particular test has been performed. A lack of breakdown of the isolation can be determined by the lack of arcing or monitoring with an oscilloscope. A breakdown has occurred if there is a sudden step increase in current between the locations being tested. It does not include the small flow of current that can result from the charging of capacitors or the small linear currents in high impedance resistors. The intent of not allowing breakdown is to prevent large currents to flow between the locations described due to a GPR. This the driving consideration when determining if a breakdown has occurred.

Test Results:

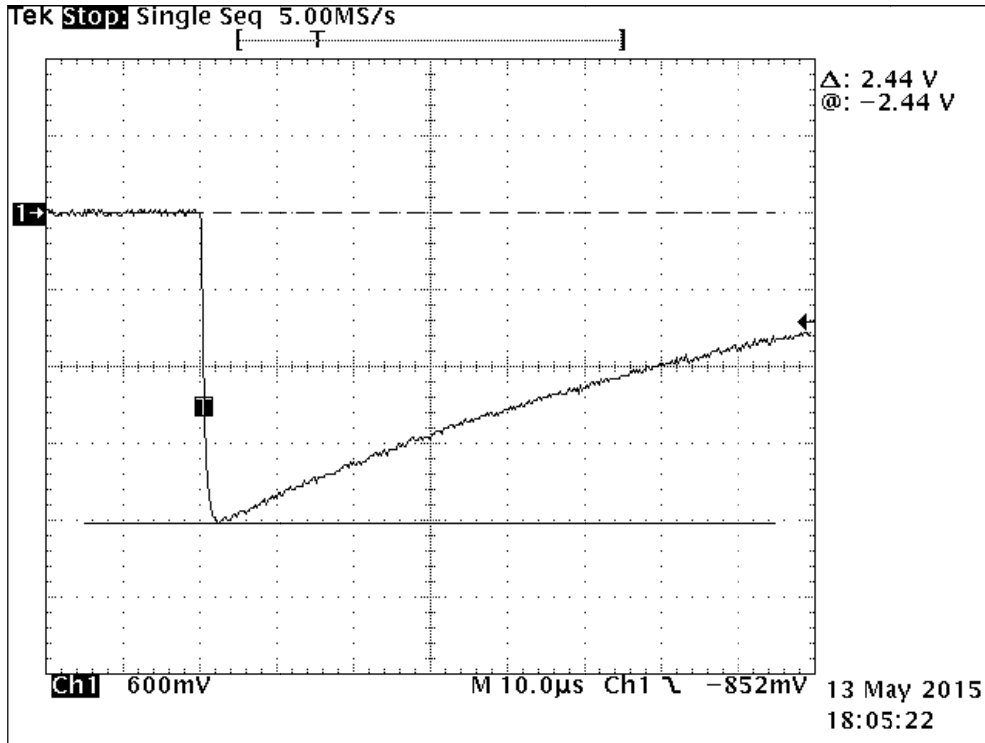
The EUT was compliant with Requirement **R4-8 [234]**. EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.

EUT		Part Number	Revision
AUX-ODU-LPU-G			
Sample	Port Name	Serial Number	Result
1	ETH OUT	208155	Pass
Final Result: EUT continued to operate properly after the surge.			
Monitoring Method: Monitored traffic data.			

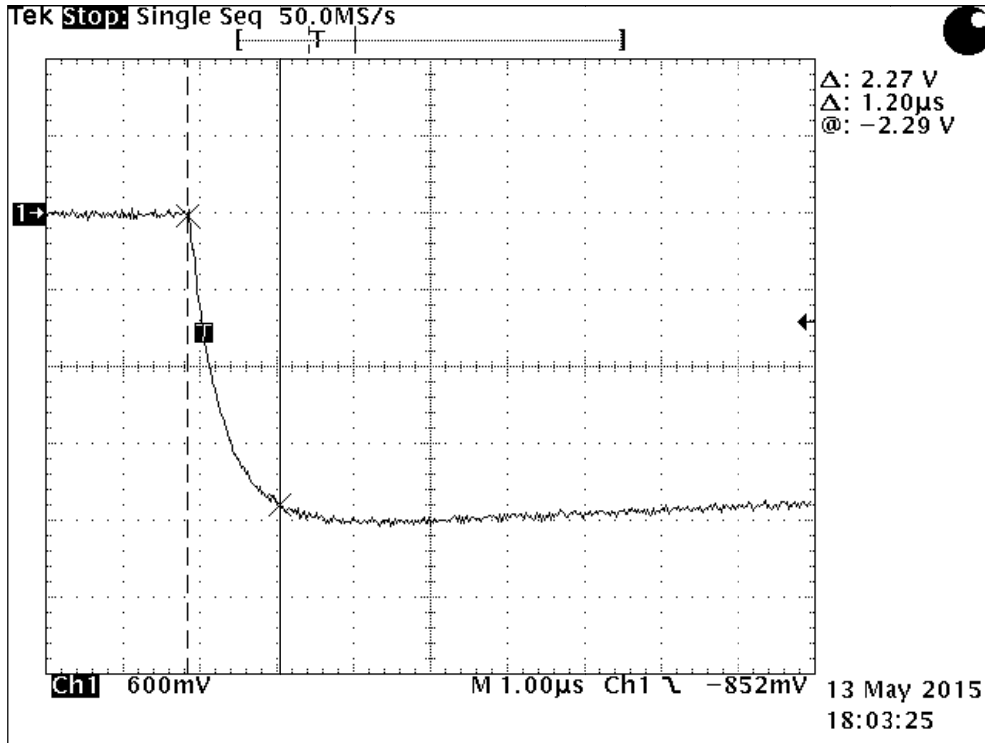
Table 11-2. Cell Site Inter-Structure Withstand Criteria, Test Results



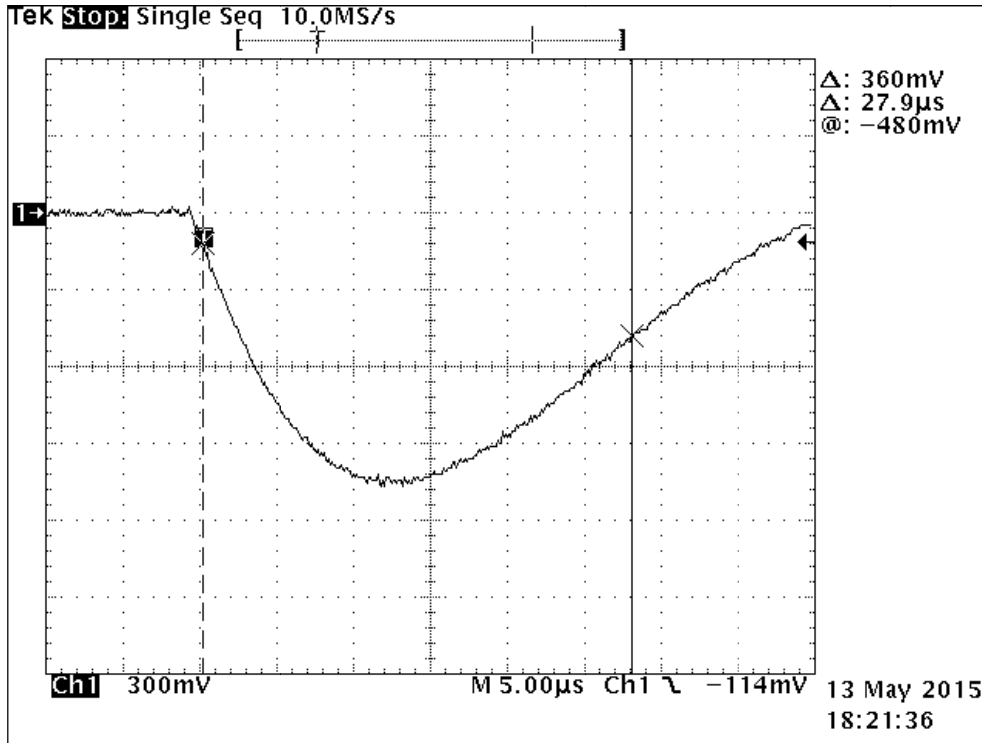
Plot 11-1. Cell Site Inter-Structure Withstand Criteria, -1.2-50us 2400V - decay (0.001V = 1V)



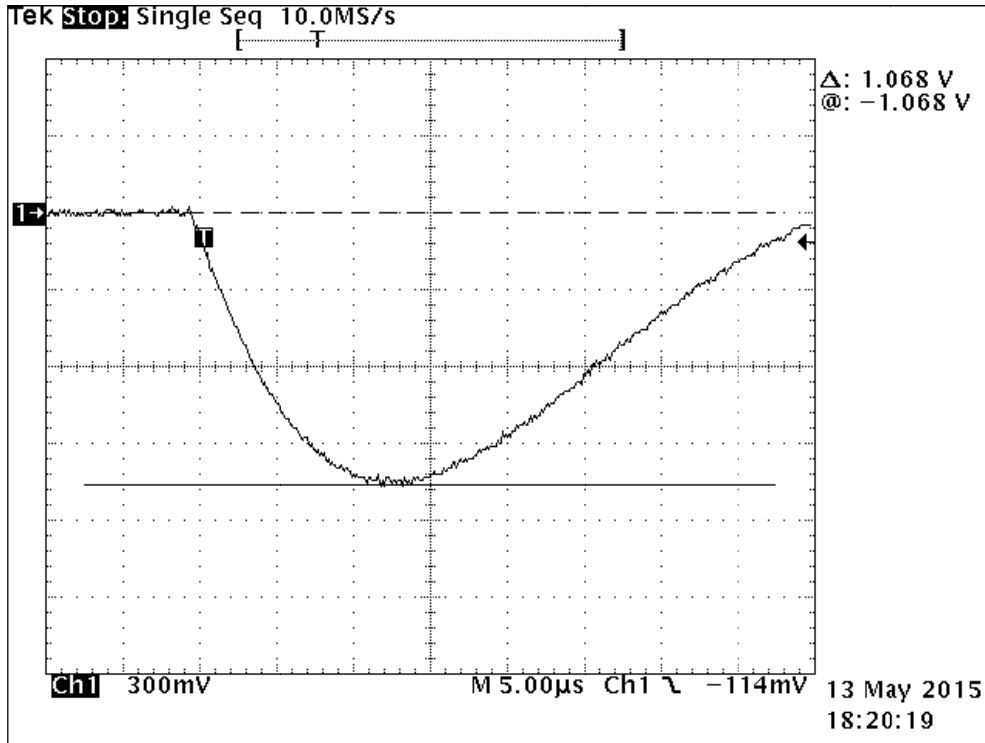
Plot 11-2. Cell Site Inter-Structure Withstand Criteria, -1.2-50us 2400V - peak (0.001V = 1V)



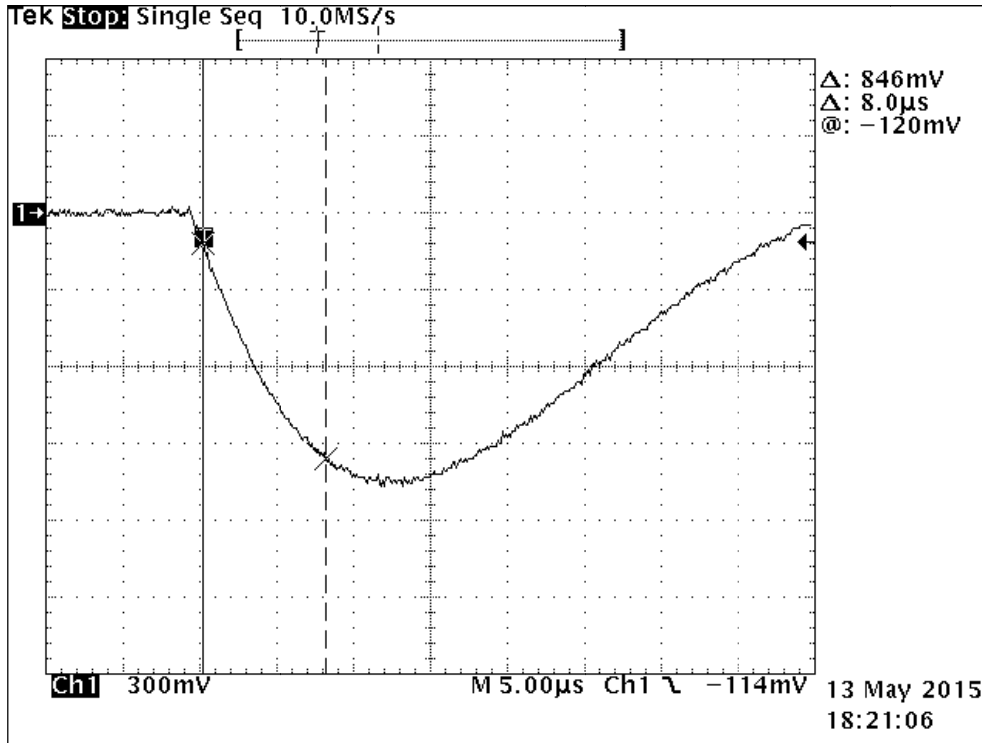
Plot 11-3. Cell Site Inter-Structure Withstand Criteria, -1.2-50us 2400V - rise (0.001V = 1V)



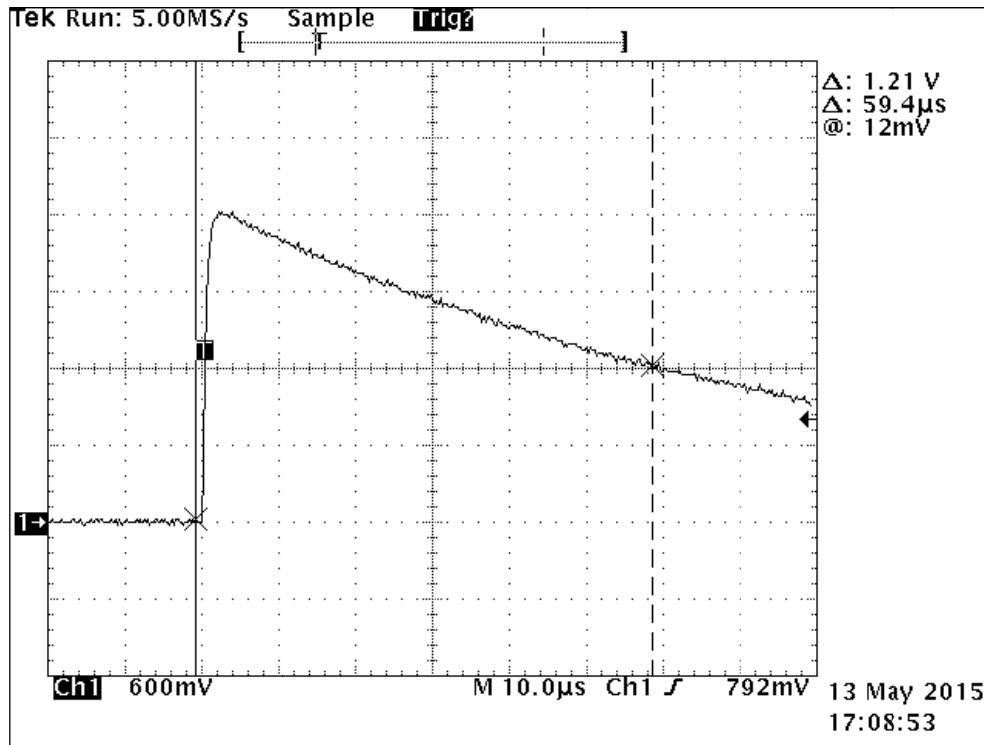
Plot 11-4. Cell Site Inter-Structure Withstand Criteria, -1.2-50us current - decay (0.001V = 1A)



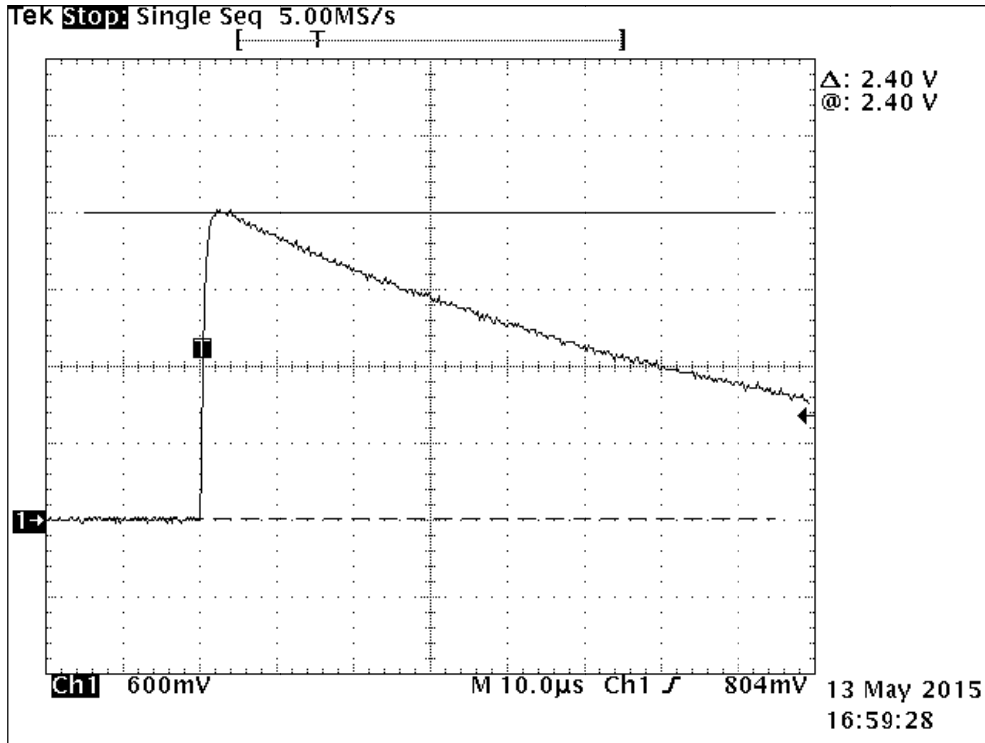
Plot 11-5. Cell Site Inter-Structure Withstand Criteria, -1.2-50us current - peak (0.001V = 1A)



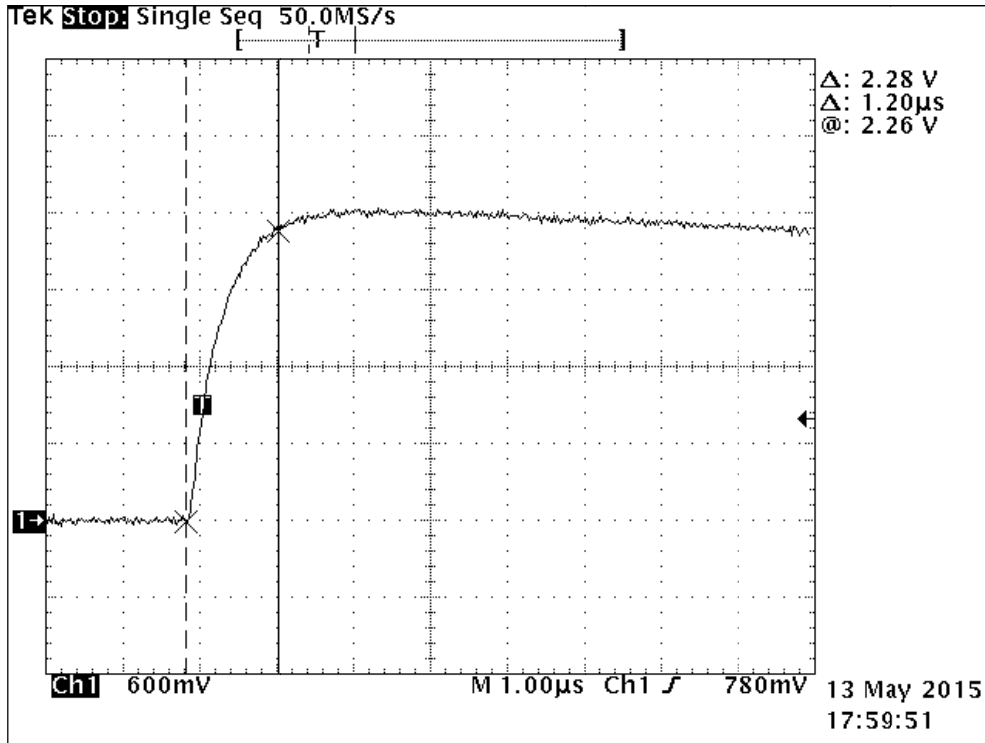
Plot 11-6. Cell Site Inter-Structure Withstand Criteria, -1.2-50us current - rise (0.001V = 1A)



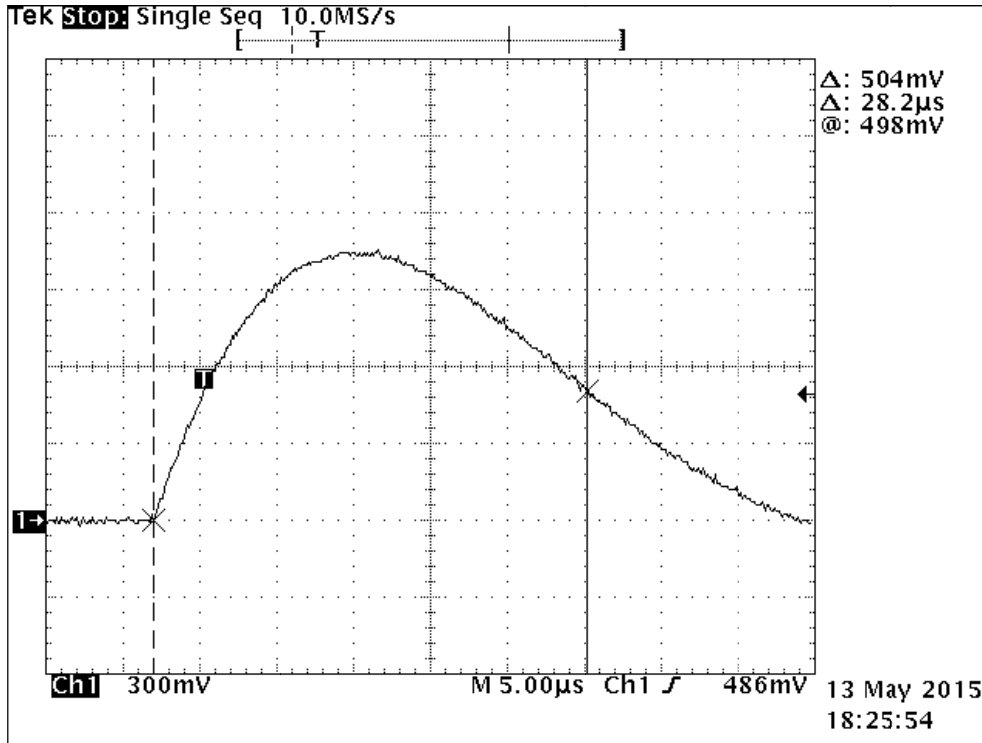
Plot 11-7. Cell Site Inter-Structure Withstand Criteria, +1.2-50us 2400V - decay (0.001V = 1V)



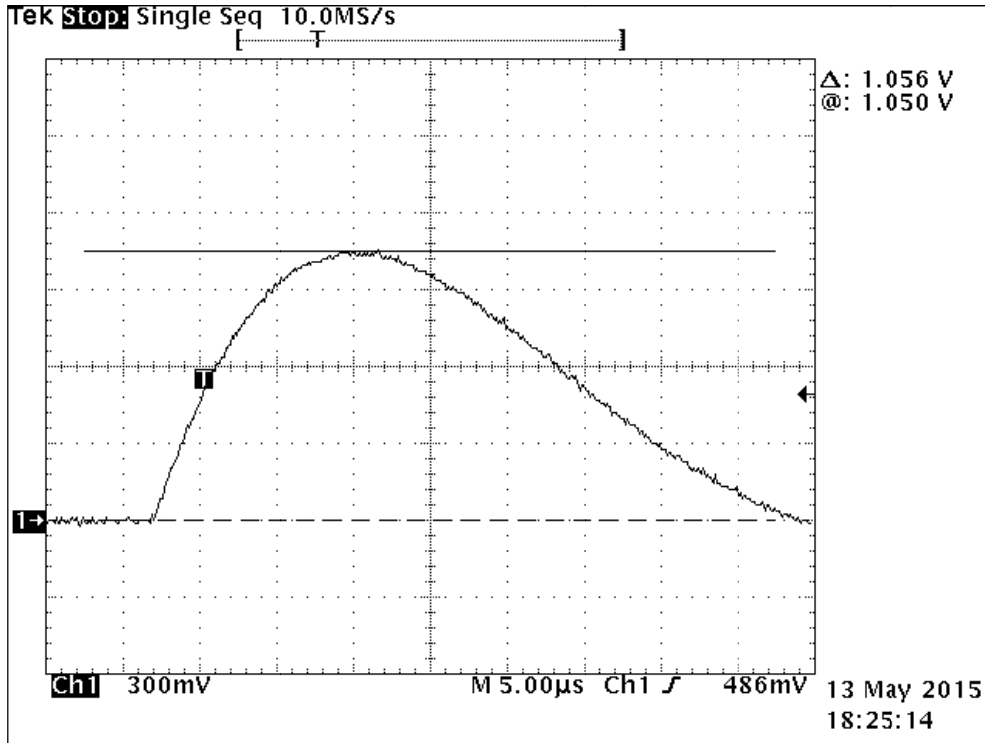
Plot 11-8. Cell Site Inter-Structure Withstand Criteria, +1.2-50us 2400V - peak (0.001V = 1V)



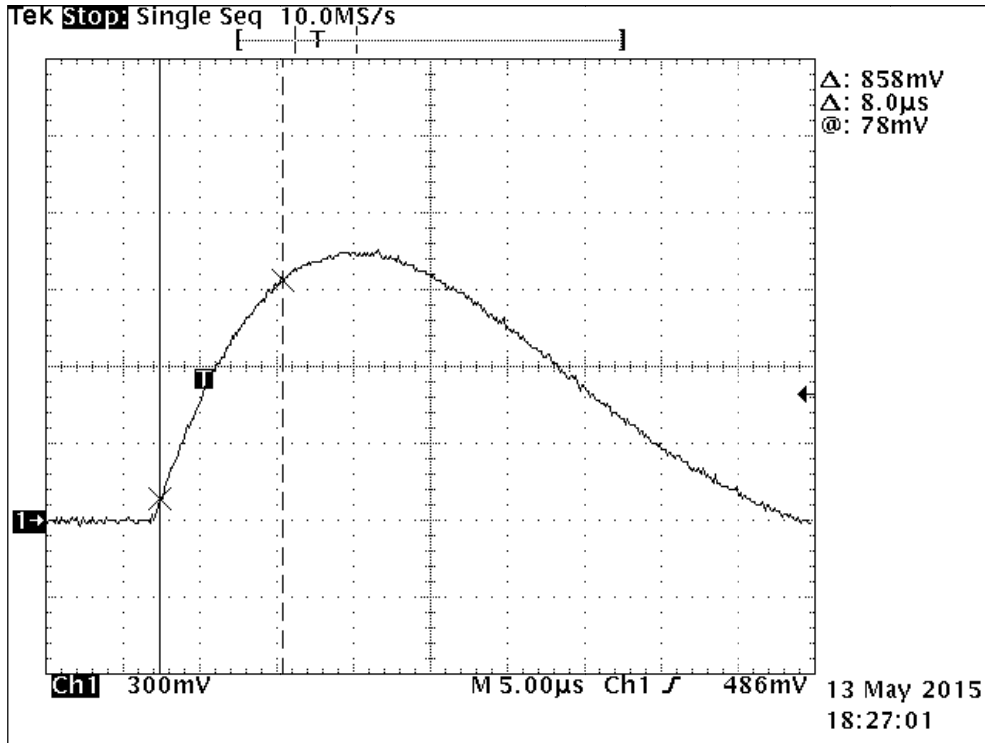
Plot 11-9. Cell Site Inter-Structure Withstand Criteria, +1.2-50us 2400V - rise (0.001V = 1V)



Plot 11-10. Cell Site Inter-Structure Withstand Criteria, +1.2-50us current - decay(0.001V = 1A)



Plot 11-11. Cell Site Inter-Structure Withstand Criteria, +1.2-50us current - peak (0.001V = 1A)



Plot 11-12. Cell Site Inter-Structure Withstand Criteria, +1.2-50us current - rise (0.001V = 1A)



MET Laboratories, Inc.

TCG NEBS Compliance Test Report

Customer Name: InfiNet Malta LTD
Product Name: AUX-ODU-LPU-G
Date: June 4, 2015



Photograph 11-1. Cell Site Inter-Structure Withstand Criteria, Test Setup



MET Laboratories, Inc.

Customer Name: InfiNet Malta LTD

Product Name: AUX-ODU-LPU-G

Date: June 4, 2015

TCG NEBS Compliance Test Report

MET #	Equipment	Manufacturer	Model #	Last Cal	Cal Due
4T7187	DIGITIZING OSCILLOSCOPE	TEKTRONIX	TDS680C	3/26/2015	3/26/2016
4T7263	WIDE BAND CURRENT MONITOR	PEARSON ELECTRONICS, INC.	110	8/6/2014	2/6/2016
4T7324	70 MHZ HIGH VOLTAGE DIFFERENTIAL PROBE	SAPPHIRE INSTRUMENTS CO. LTD.	SI-9010	1/30/2015	7/30/2016
4T7061	SURGE GENERATOR	KEYTEK	ECAT SYSTEM	SEE NOTE	
4T7162	SURGE MODULE	KEYTEK	E506-4W	SEE NOTE	
4T7335	ECAT E518 MODULE	KEYTEK	E518	SEE NOTE	
4T7336	ECAT E508 MODULE	KEYTEK	E508	SEE NOTE	
4T7337	ECAT E509 MODULE	KEYTEK	E509	SEE NOTE	

Table 11-3. Cell Site Inter-Structure Withstand Criteria, Test Equipment

Note: Functionally verified test equipment is verified using calibrated instrumentation at time of testing.



FIRST-LEVEL LIGHTNING CRITERIA FOR TELECOMMUNICATIONS PORTS (TYPE 1, 3, 3B/5B, AND 5 PORTS) (4.6.2.1.1)

Criteria:

R4-10 [27] Telecommunications pairs that are exposed to OSP lightning surges (Type 1, 3, 3b/5b, and 5 ports) shall comply with first-level criterion of Section 4.5.7, "Conformance Criteria," when subject to the applicable surge tests in Table 4-2.

Test Method:

R4-10 Verify the port type determinations made in section 4-1 and perform testing as specified in table 4-2 for that port type. Connect equipment as applicable to test parameters listed in 4-2 and connection criteria listed in table 4-1. Verify conformance as specified in 4.5.7 and record the results of that test as applicable.

Test Results:

The EUT was compliant with Requirement **R4-10 [27]**. EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.

EUT		Part Number	Revision
AUX-ODU-LPU-G			
Sample	Port Name	Serial Number	Result
1	ETH OUT	208155	Pass
Final Result: EUT continued to operate properly after the surge.			
Monitoring Method: Monitored traffic data.			

Table 11-4. First-Level Lightning Criteria For Telecommunications Ports Test Results

Note for Ethernet & GbE ports:

Longitudinal:

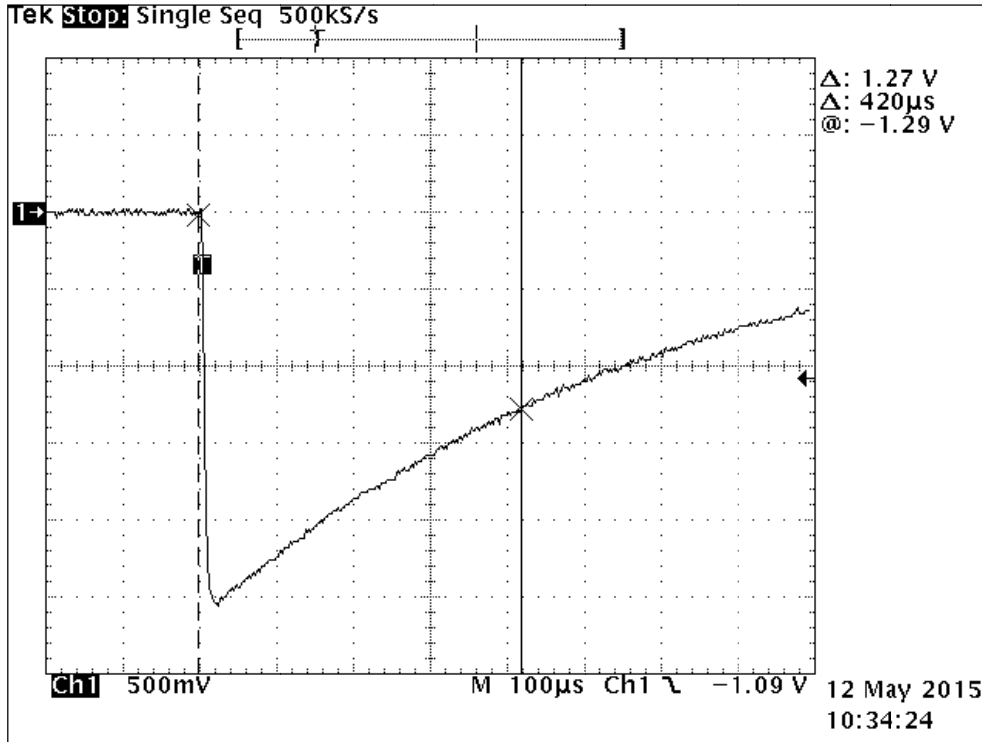
1. Port #1, All lines Longitudinal.
2. Port #1 Pins 1 and 2 with pin 3 and 6 grounded. There is a path between the pairs that will likely be damaged, however pair 1 and 2 and 3 and 6 should be intact.
3. Port #2, Pins 3 and 6 with pins 1 and 2 grounded. Like the other tests, the path between the pair will be damaged, but the pairs themselves should remain intact.

Metallic:

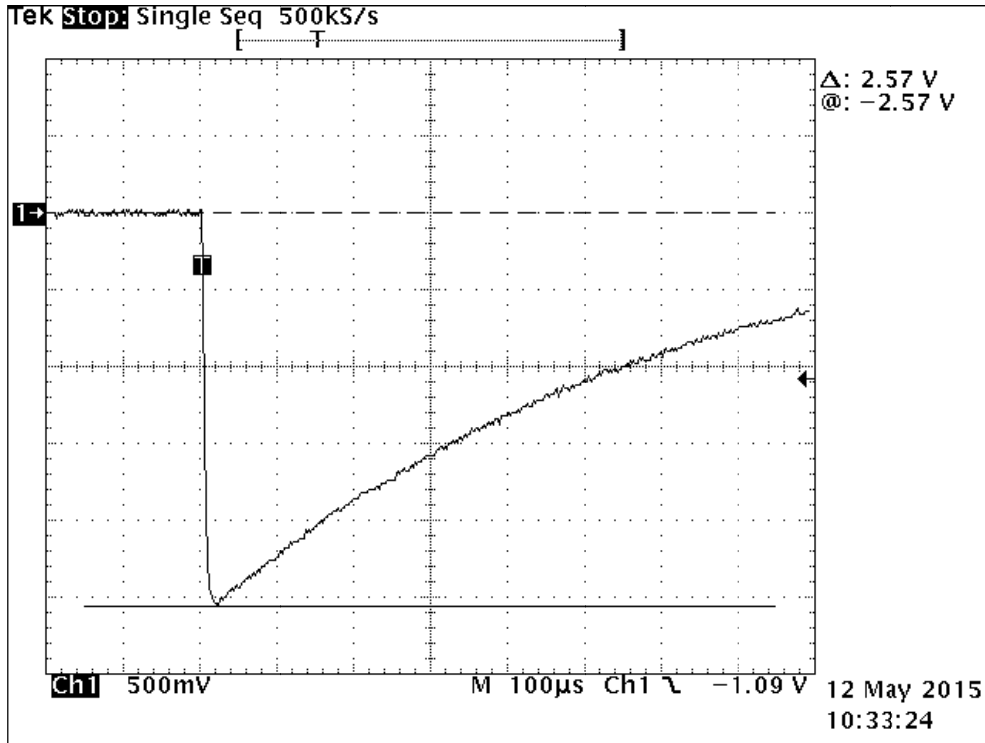
4. Port #1 Pin1 with all other pins grounded
5. Port #1 Pin 3 with all other pins grounded
6. Port #2 pin2 with all other pins grounded
7. Port #2 Pin 6 with all other pins grounded.



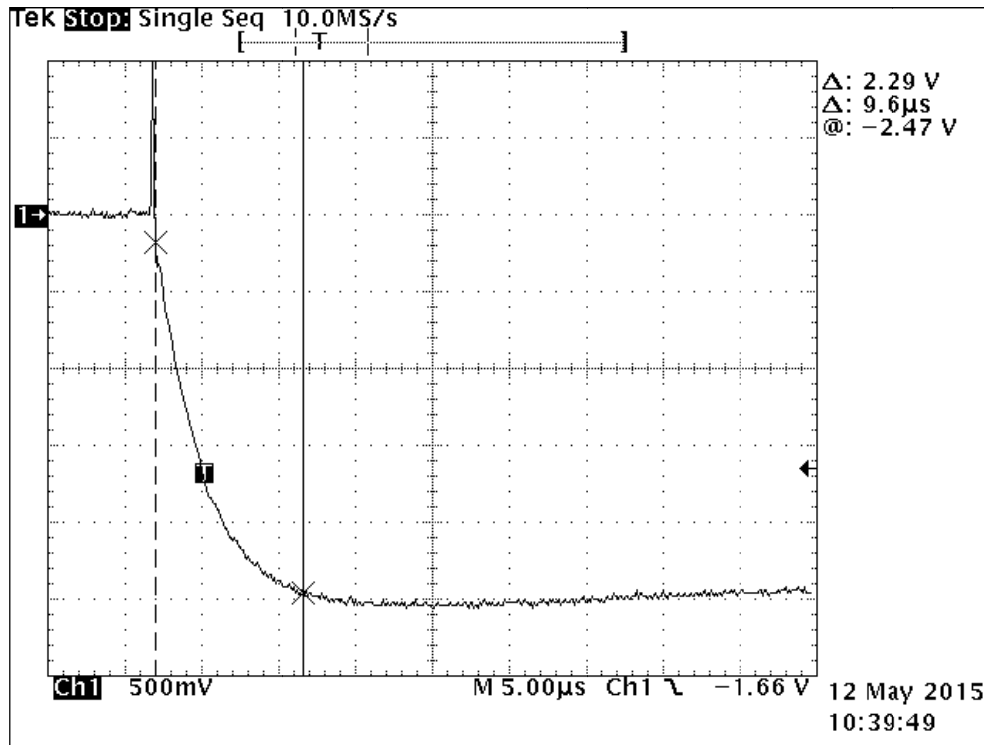
Calibration Waveforms:



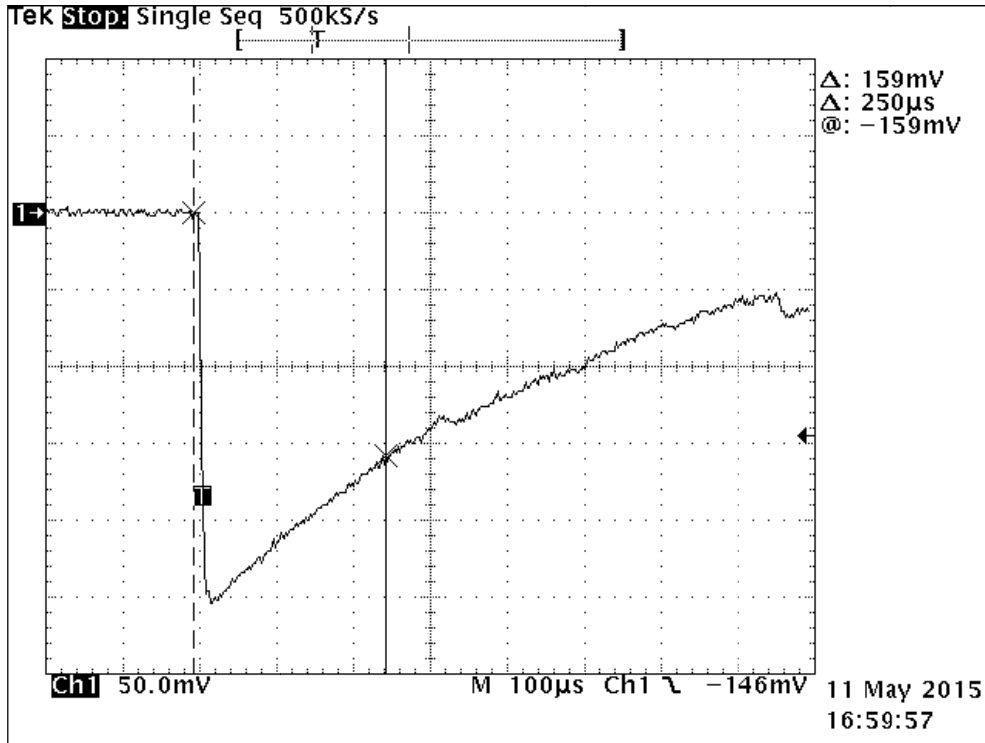
Plot 11-13. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 25A - decay (0.1V = 1A)



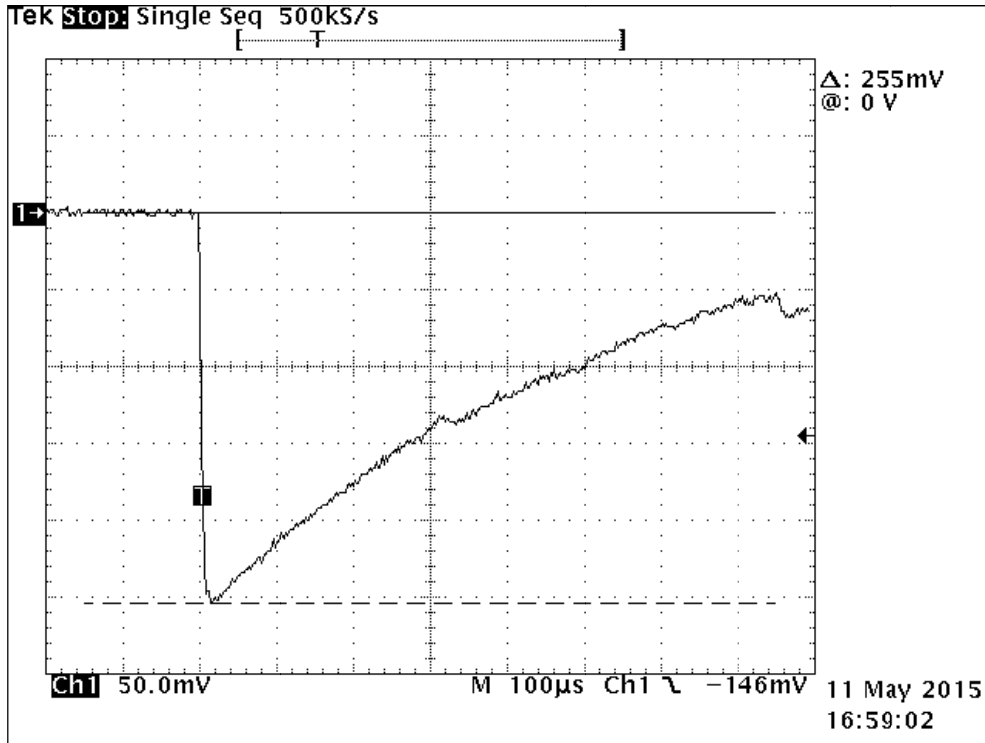
Plot 11-14. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 25A - peak (0.1V = 1A)



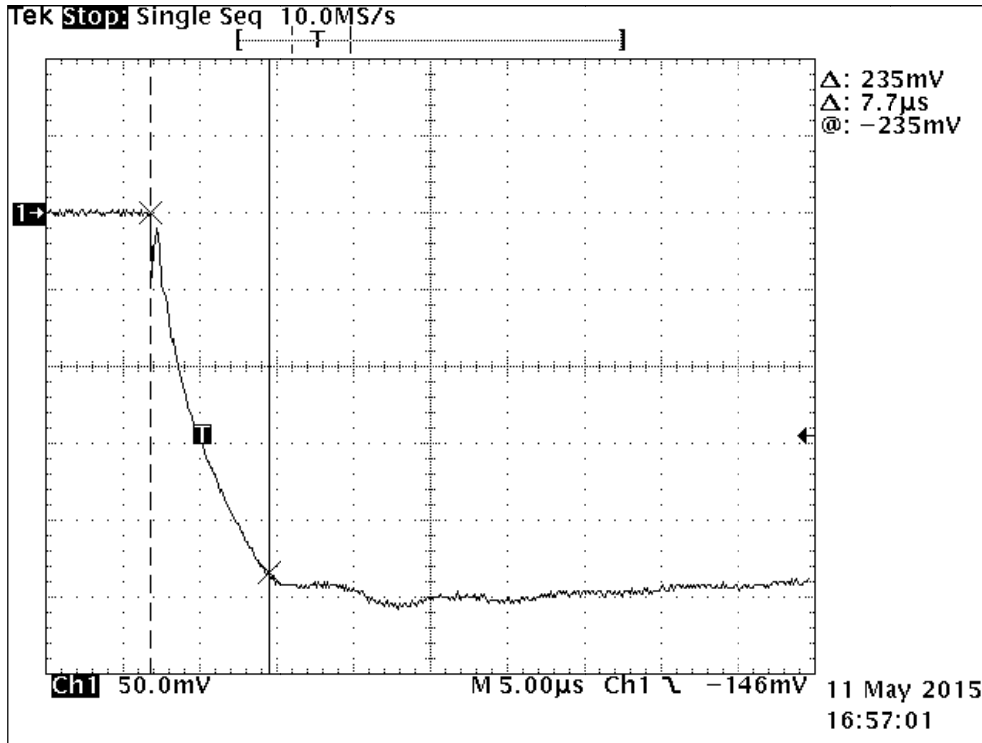
Plot 11-15. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 25A - rise (0.1V = 1A)



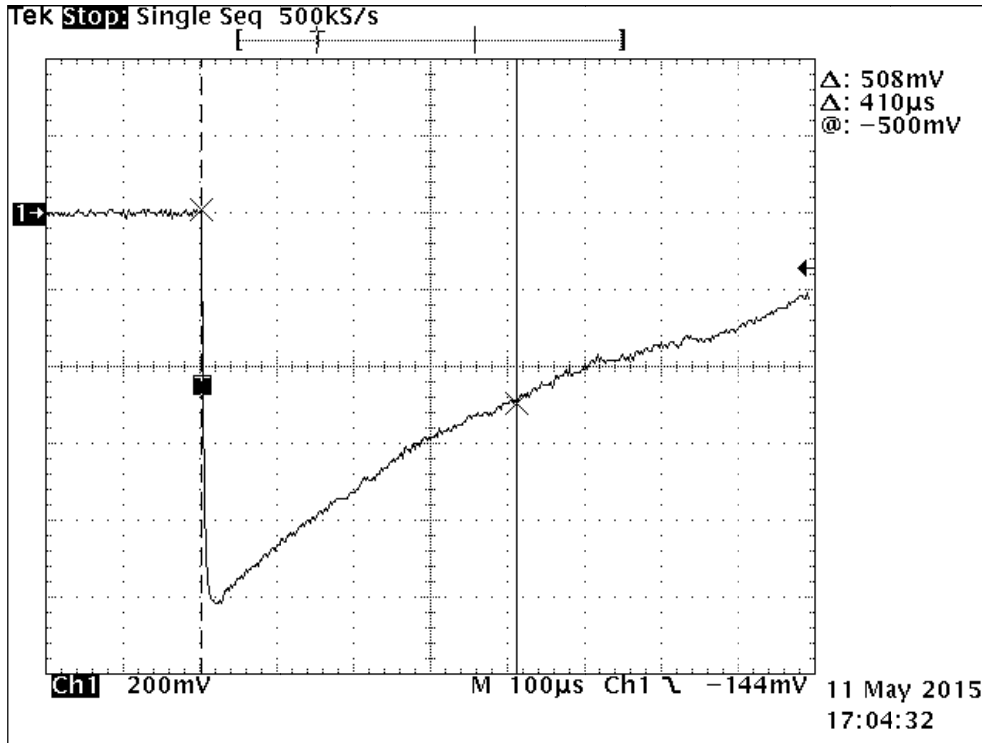
Plot 11-16. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 25A at 1000V - duration (0.1V = 1A)



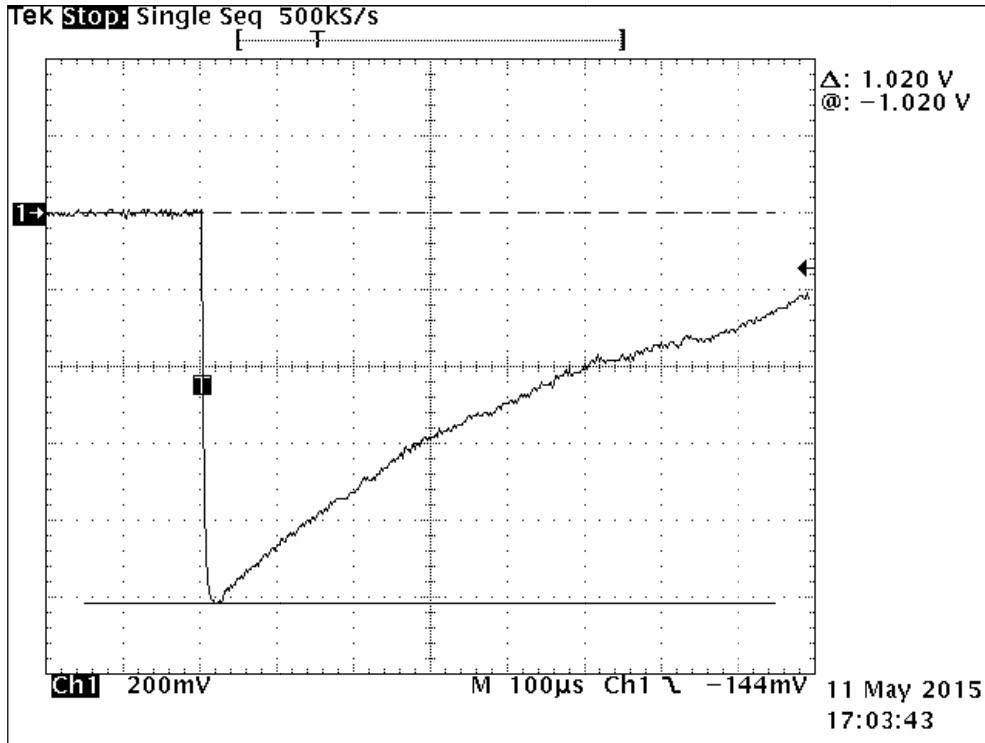
Plot 11-17. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 25A at 1000V - peak (0.1V = 1A)



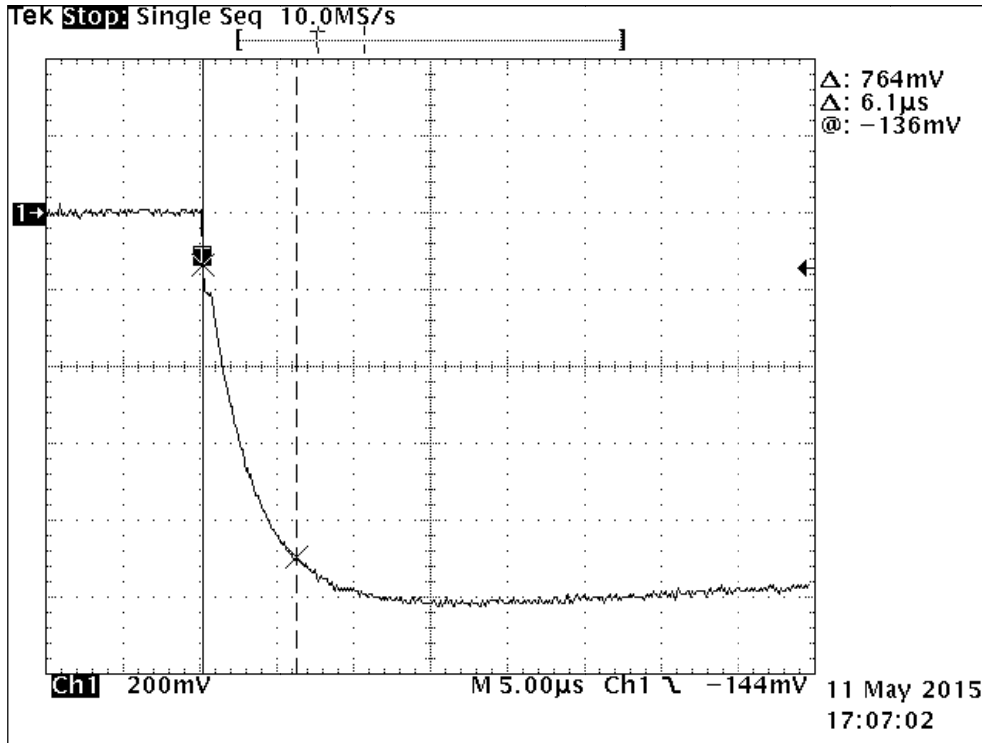
Plot 11-18. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 25A at 1000V - rise (0.1V = 1A)



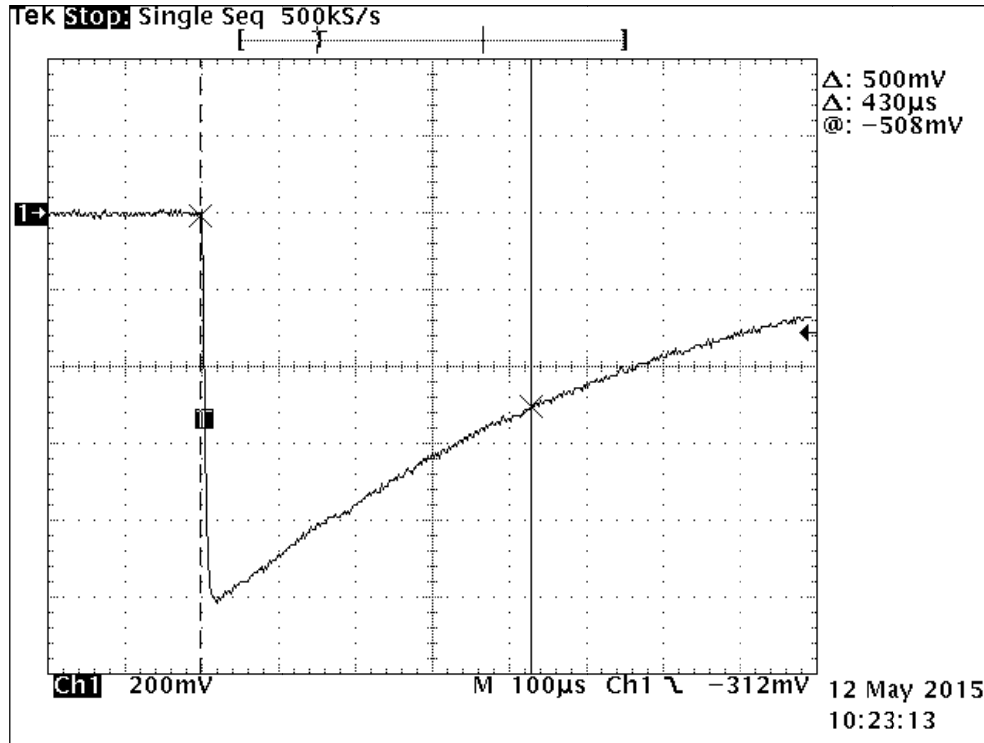
Plot 11-19. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 106V - duration (0.01V = 1V)



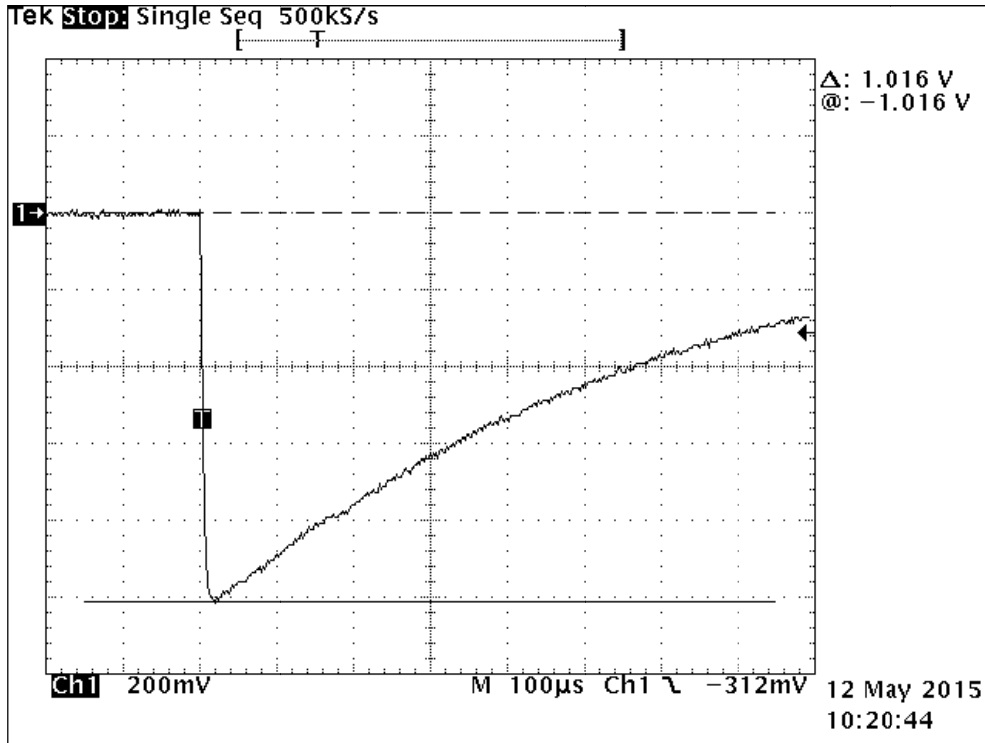
Plot 11-20. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 106V - peak (0.01V = 1V)



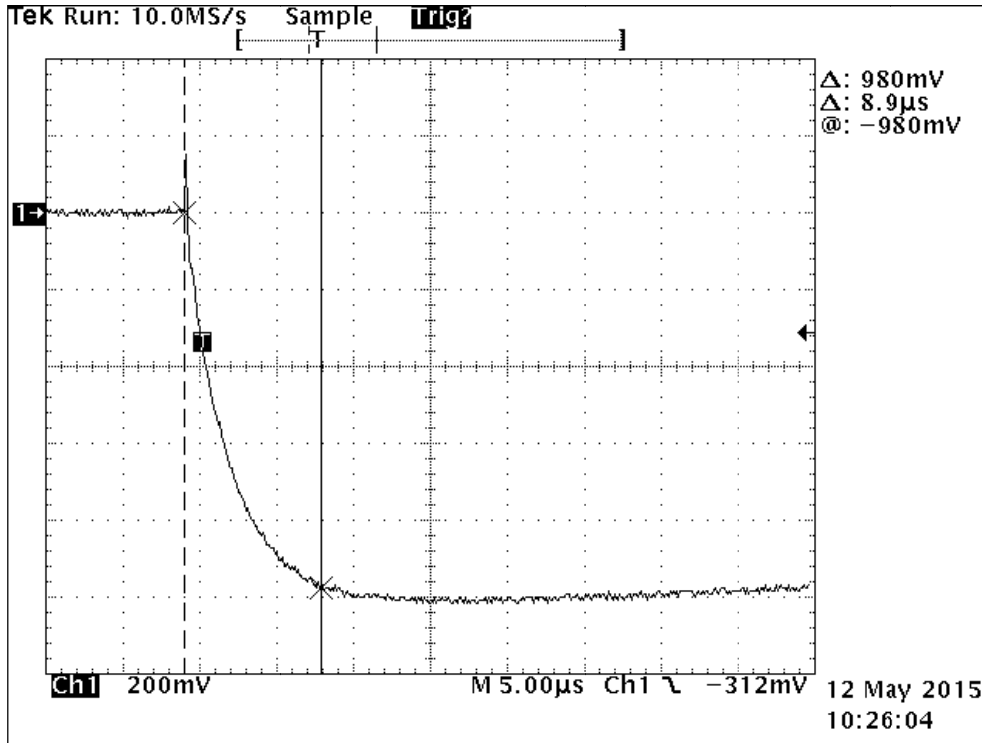
Plot 11-21. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 106V - rise (0.01V = 1V)



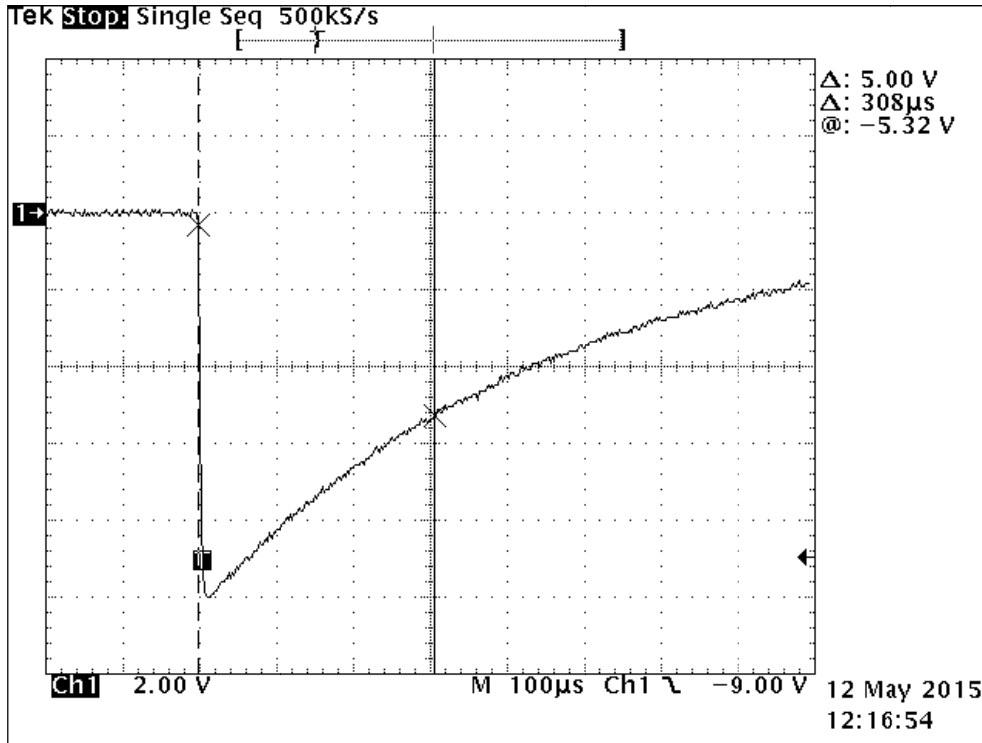
Plot 11-22. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 1000V - decay (0.001V = 1V)



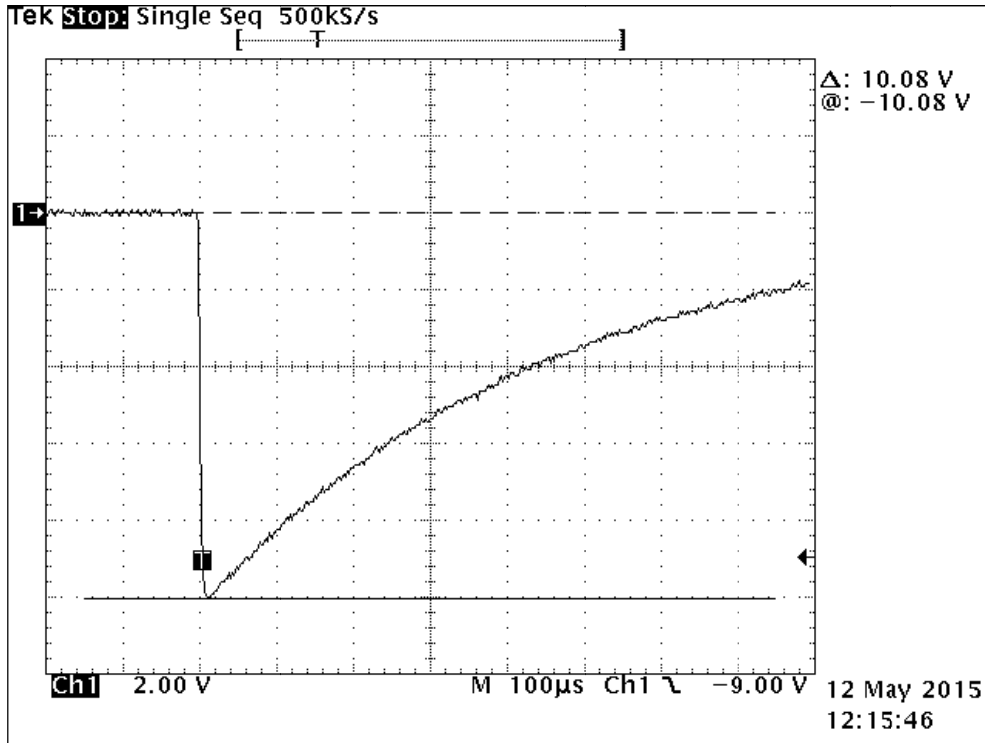
Plot 11-23. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 1000V - peak (0.001V = 1V)



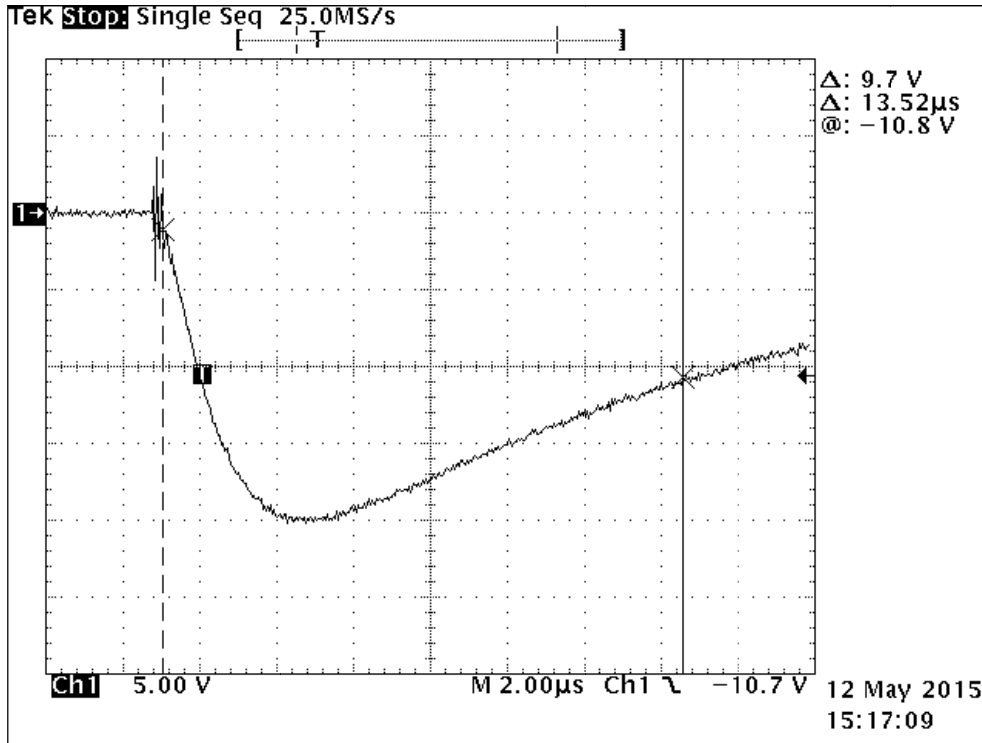
Plot 11-24. First-Level Lightning Criteria For Telecommunications Ports, -10-360us 1000V - rise (0.001V = 1V)



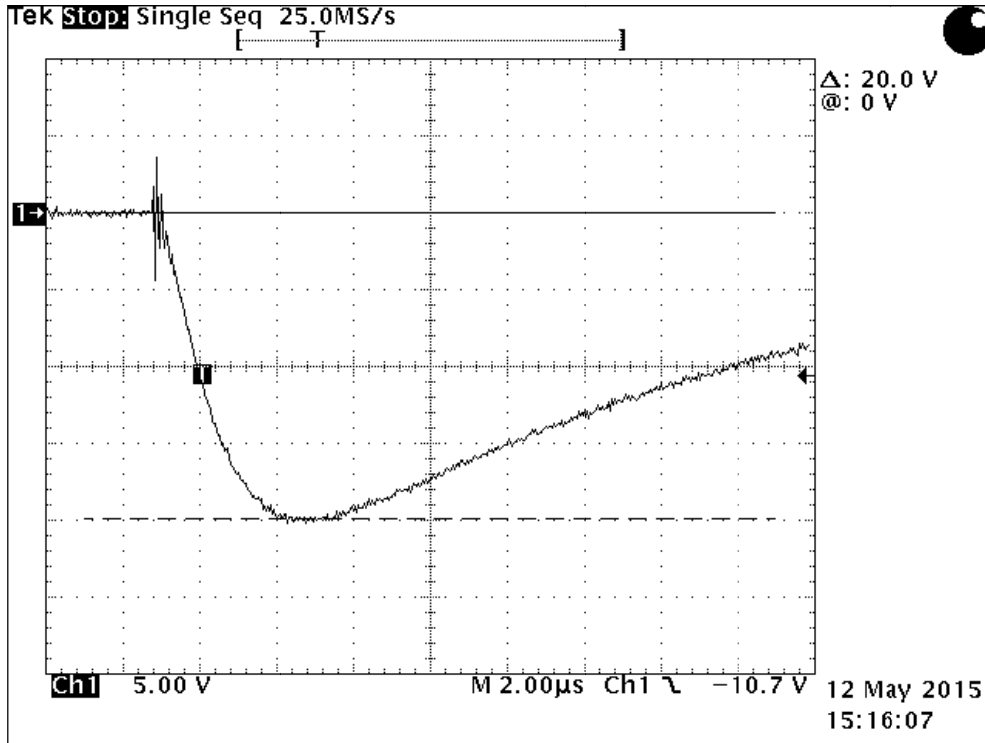
Plot 11-25. First-Level Lightning Criteria For Telecommunications Ports, -10-700us 100A - decay (0.1V = 1A)



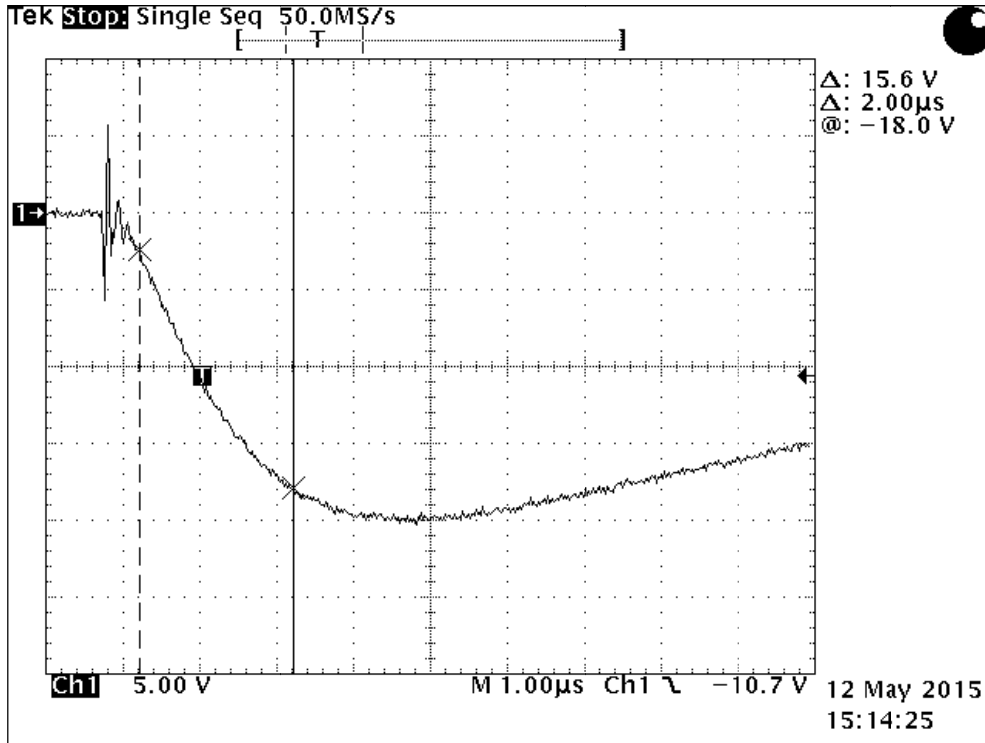
Plot 11-26. First-Level Lightning Criteria For Telecommunications Ports, -10-700us 100A - peak (0.1V = 1A)



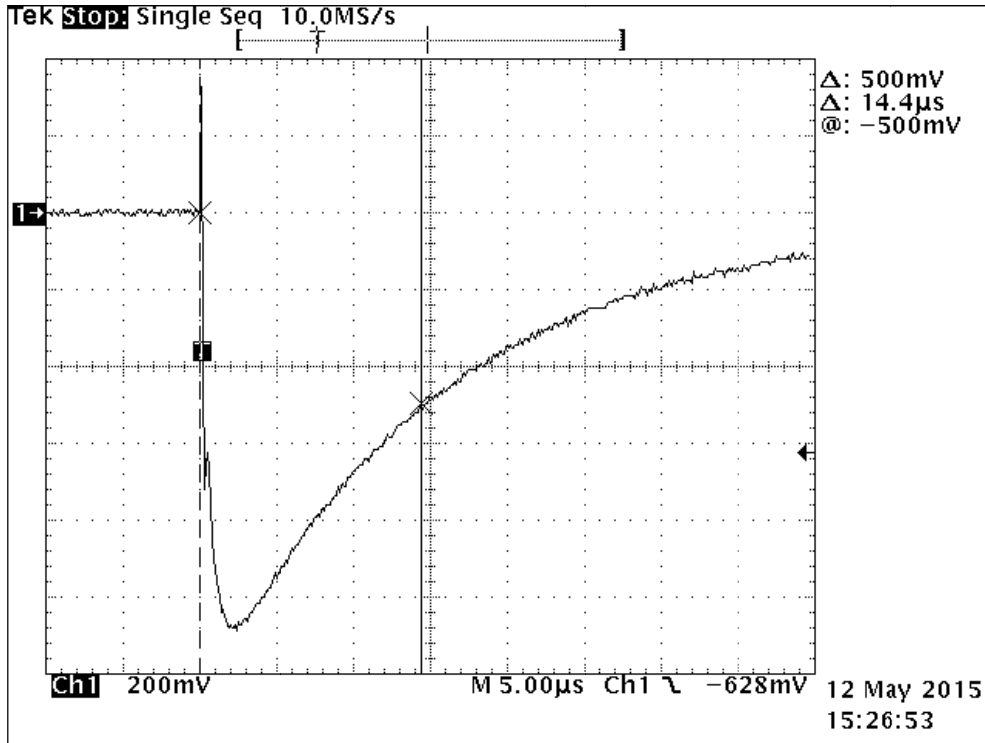
Plot 11-27. First-Level Lightning Criteria For Telecommunications Ports, -2-10us 200A - decay (0.1V = 1A)



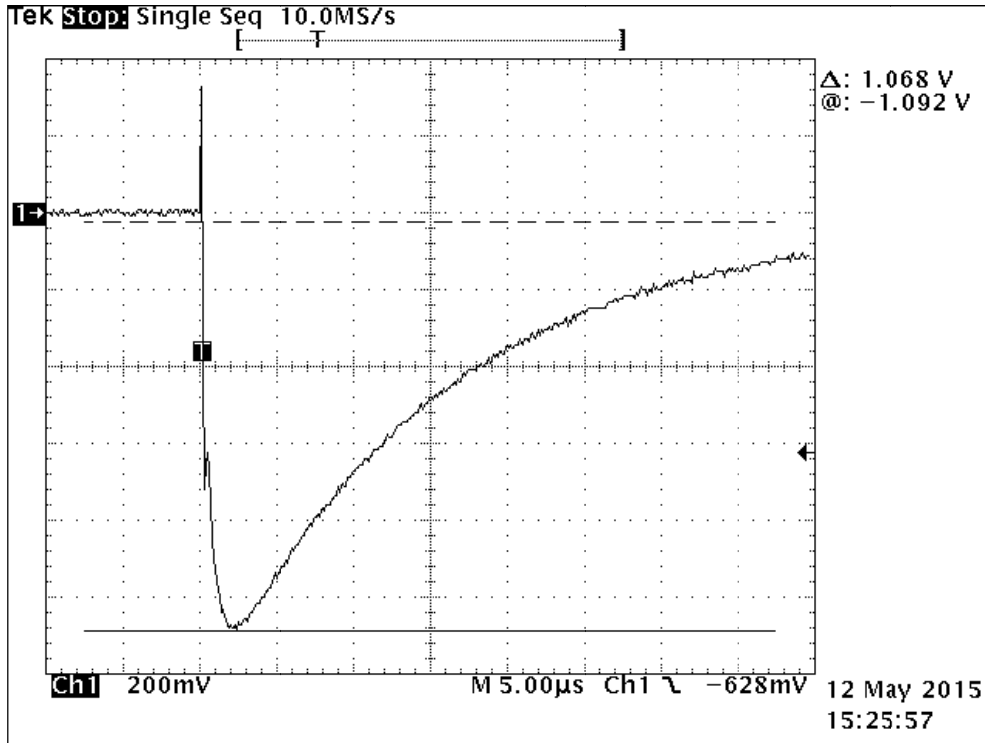
Plot 11-28. First-Level Lightning Criteria For Telecommunications Ports, -2-10us 200A - peak (0.1V = 1A)



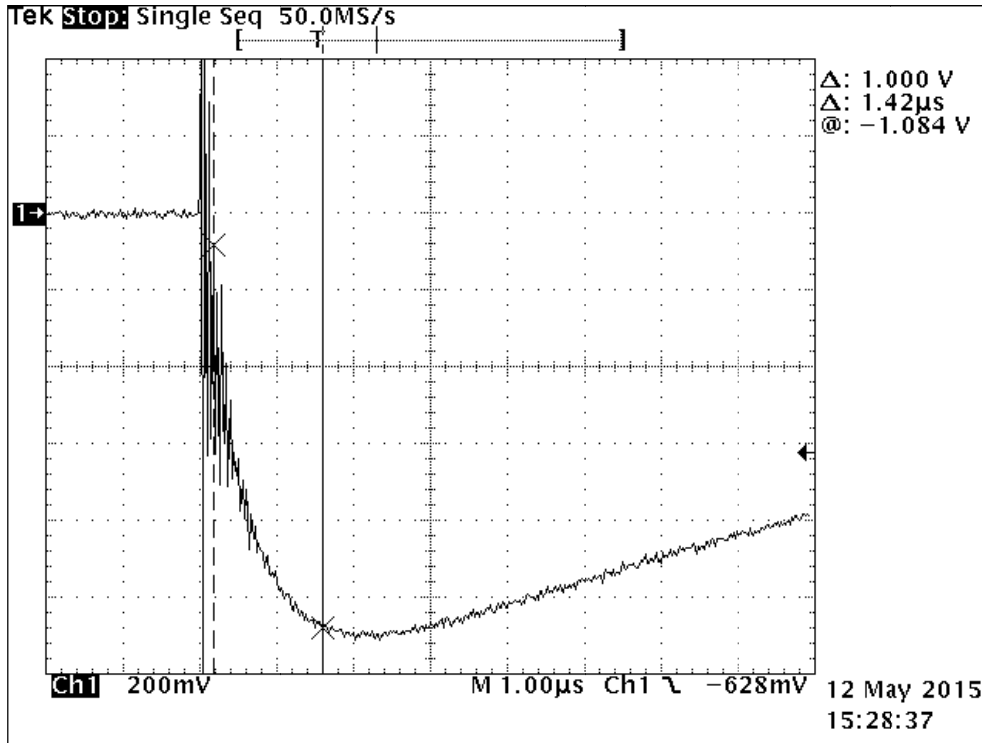
Plot 11-29. First-Level Lightning Criteria For Telecommunications Ports, -2-10us 200A - rise (0.1V = 1A)



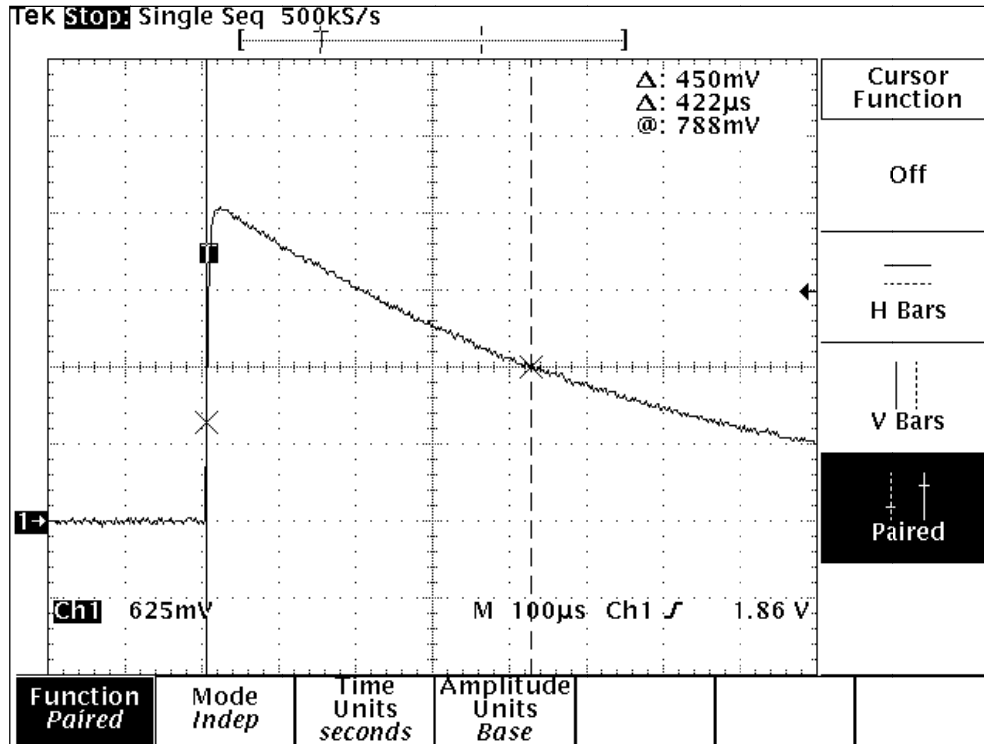
Plot 11-30. First-Level Lightning Criteria For Telecommunications Ports, -2-10us 1000V - decay (0.001V = 1V)



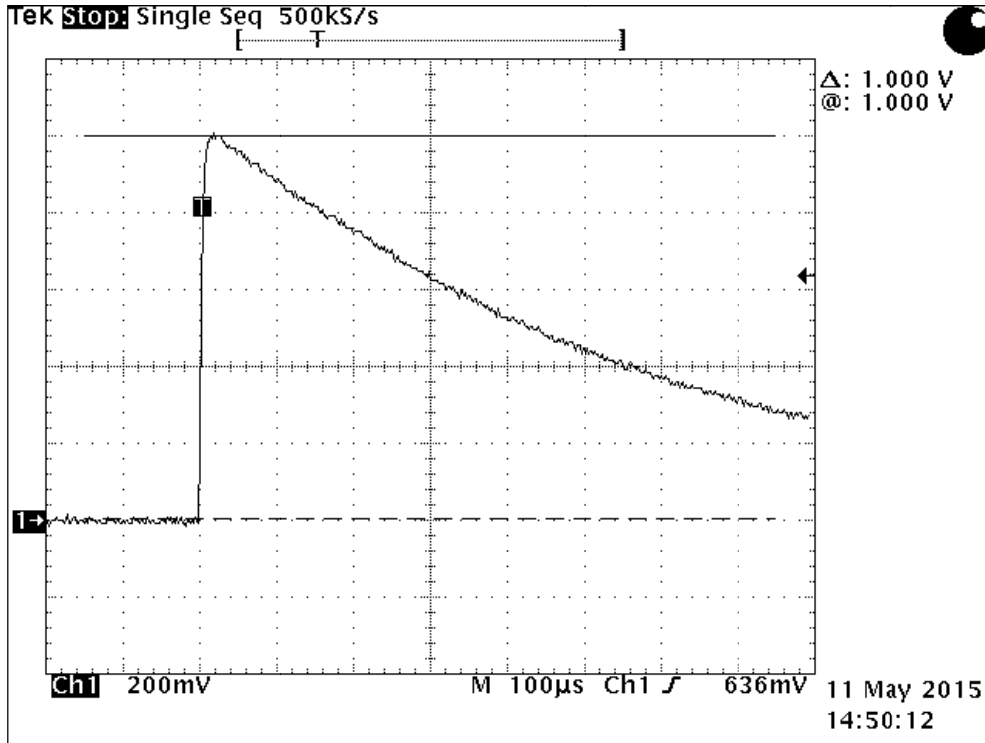
Plot 11-31. First-Level Lightning Criteria For Telecommunications Ports, -2-10us 1000V - peak (0.001V = 1V)



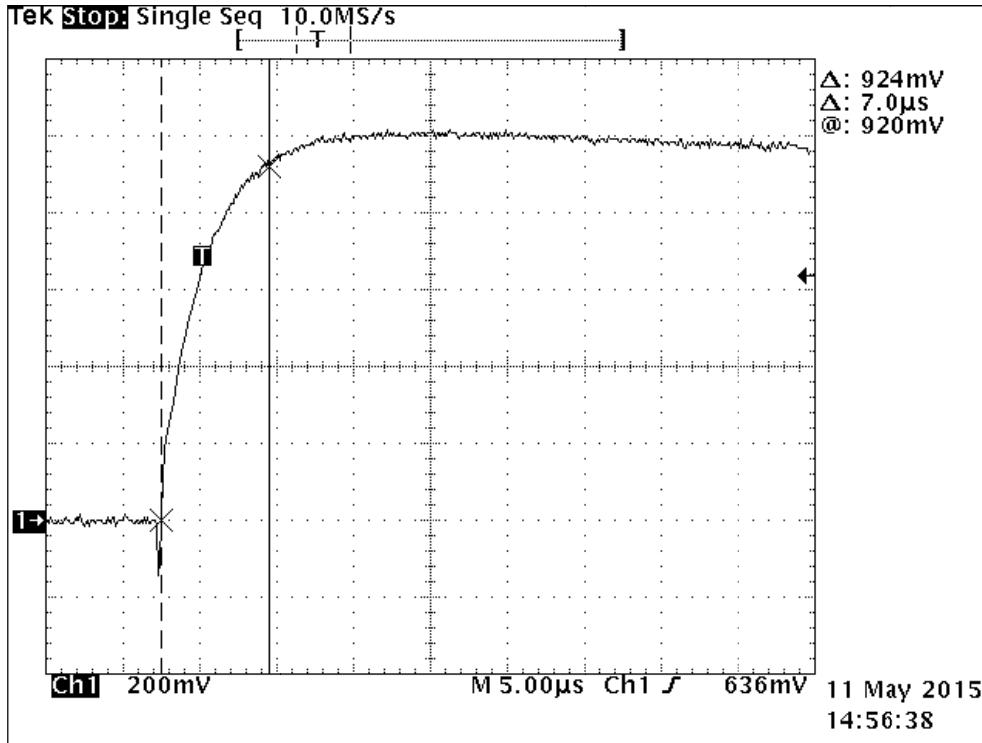
Plot 11-32. First-Level Lightning Criteria For Telecommunications Ports, -2-10us 1000V - rise (0.001V = 1V)



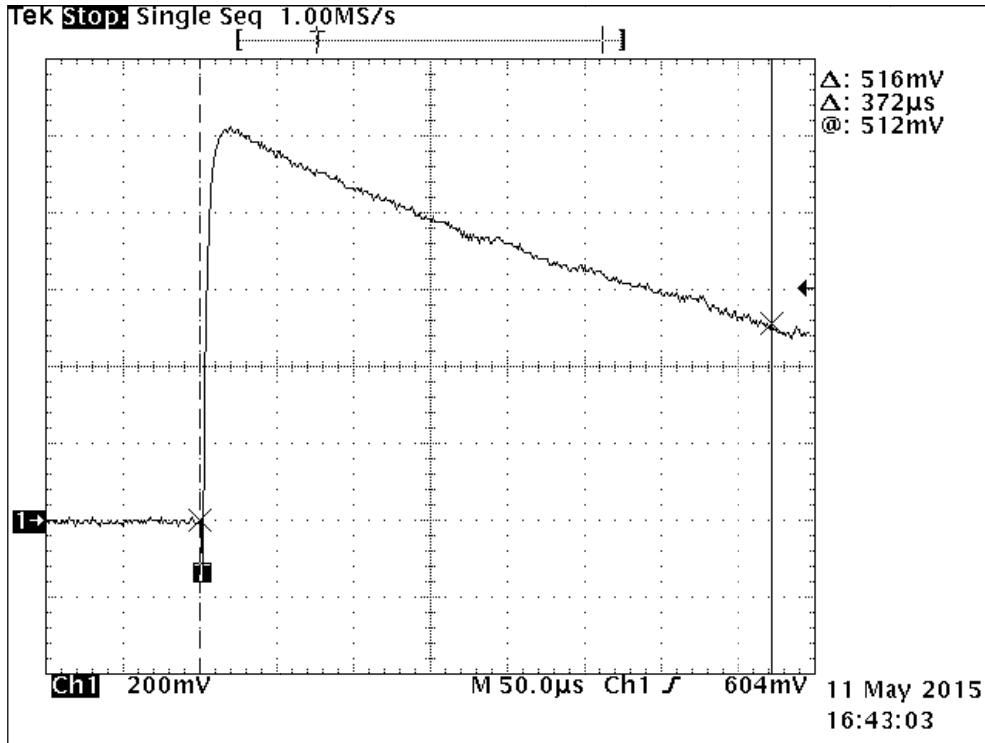
Plot 11-33. First-Level Lightning Criteria For Telecommunications Ports, +10-360us 1000V - duration (0.001V = 1V)



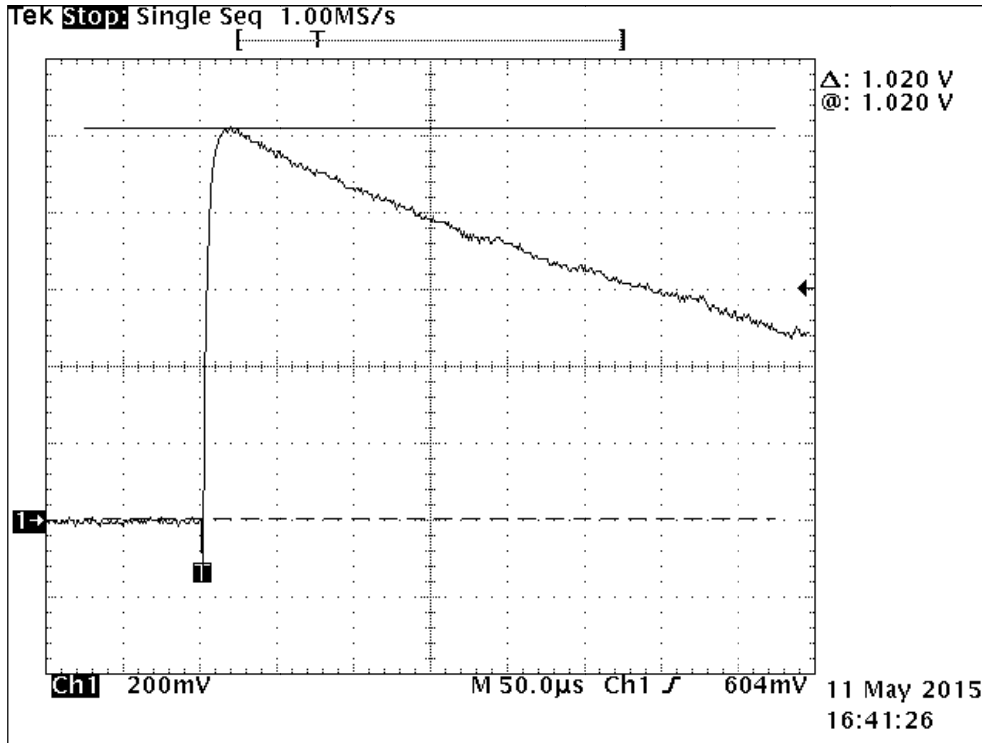
Plot 11-34. First-Level Lightning Criteria For Telecommunications Ports,+10-360us 1000V - peak (0.001V = 1V)



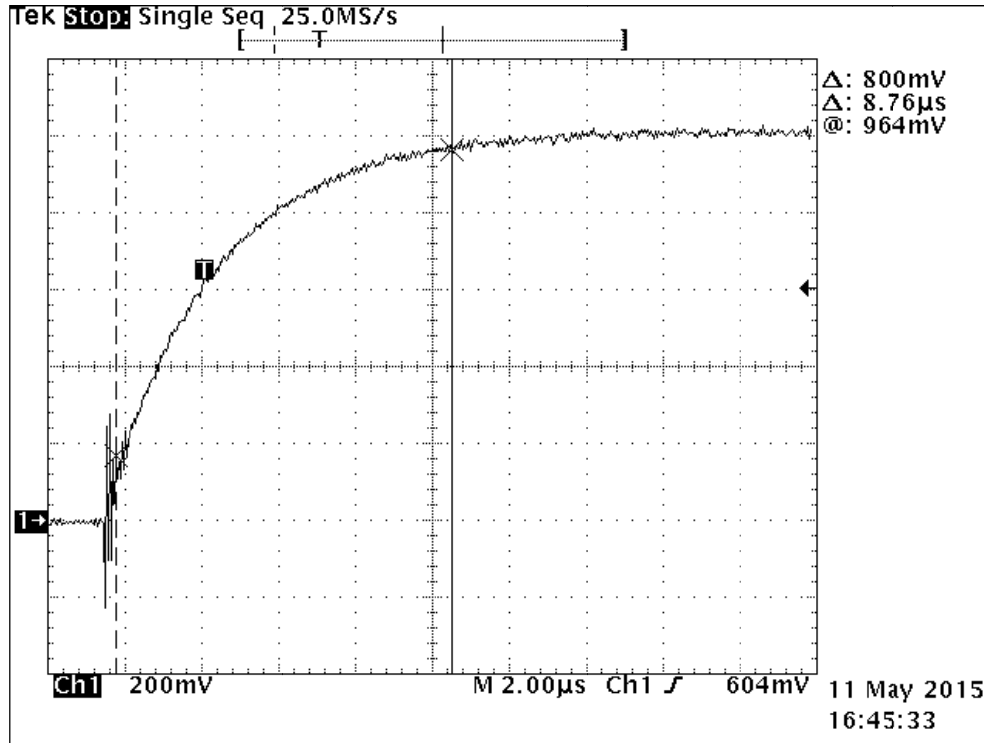
Plot 11-35. First-Level Lightning Criteria For Telecommunications Ports, +10-360us 1000V - rise (0.001V = 1V)



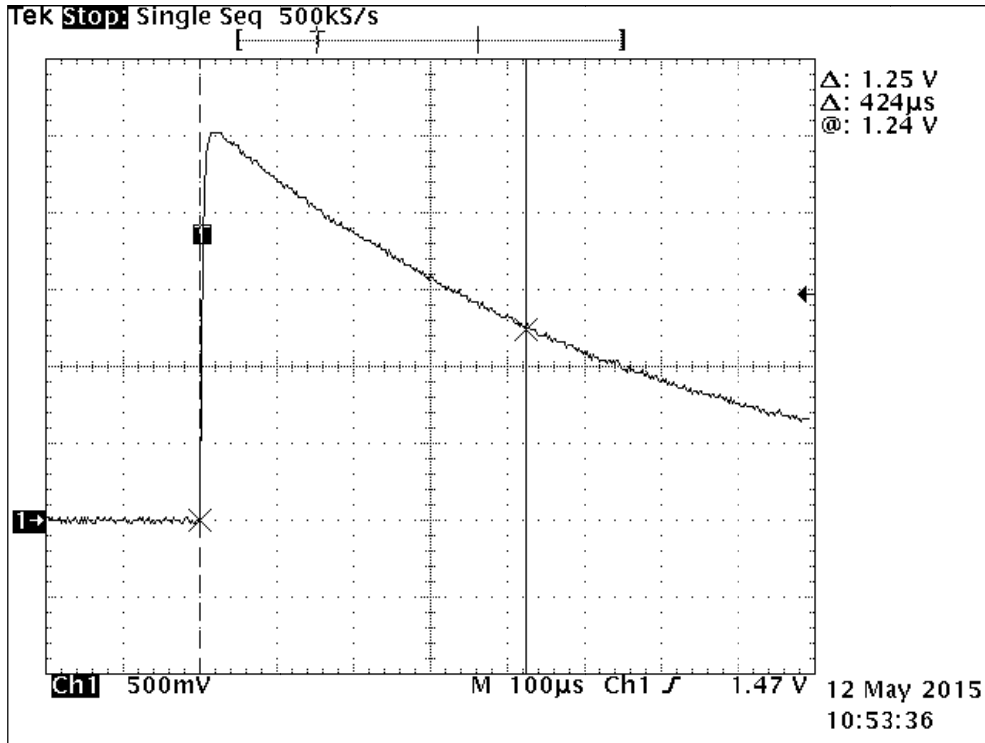
Plot 11-36. First-Level Lightning Criteria For Telecommunications Ports,+10-360us 106V - duration (0.01V = 1V)



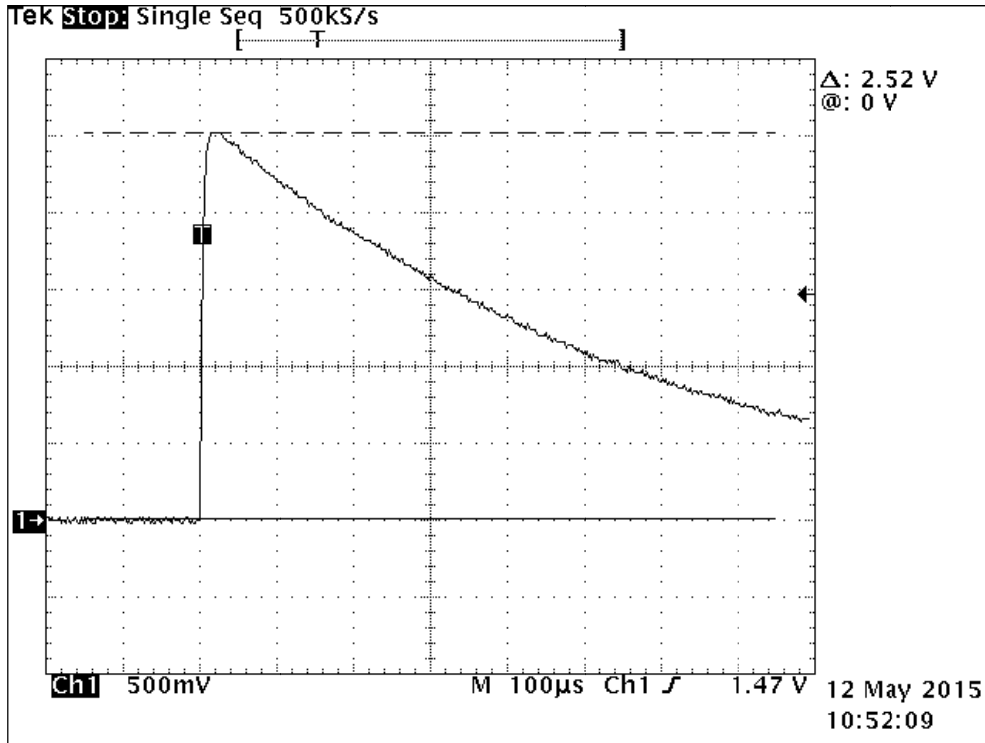
Plot 11-37. First-Level Lightning Criteria For Telecommunications Ports, +10-360us 106V - peak (0.01V = 1V)



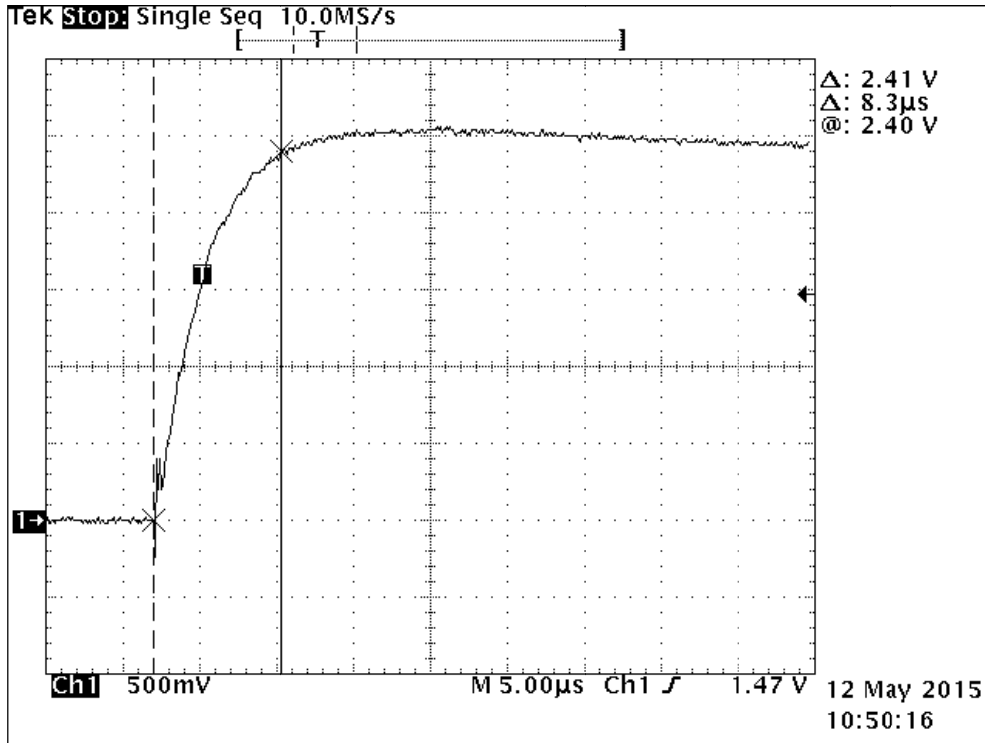
Plot 11-38. First-Level Lightning Criteria For Telecommunications Ports, +10-360us 106V - rise (0.01V = 1V)



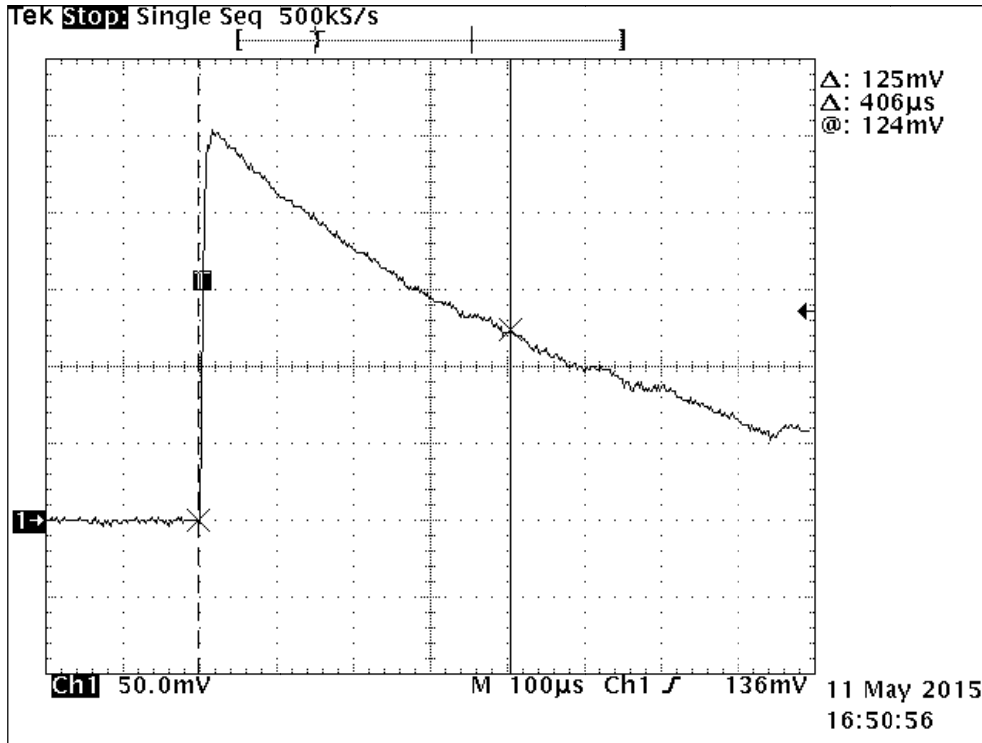
Plot 11-39. First-Level Lightning Criteria For Telecommunications Ports, +10-360us 25A - decay (0.1V = 1A)



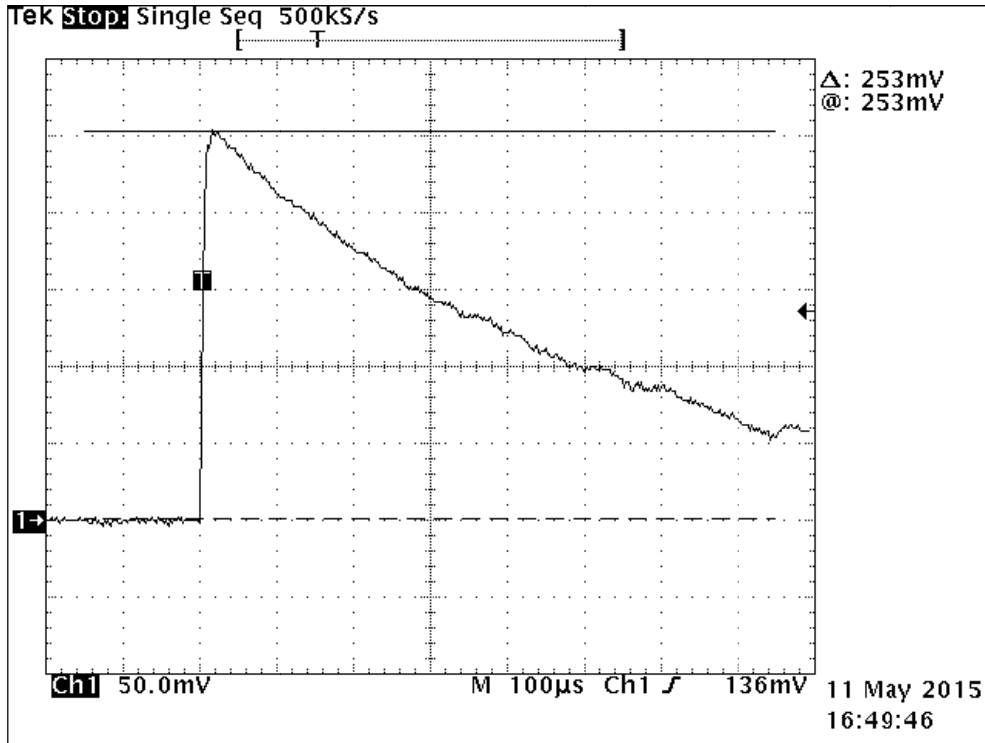
Plot 11-40. First-Level Lightning Criteria For Telecommunications Ports,+10-360us 25A - peak (0.1V = 1A)



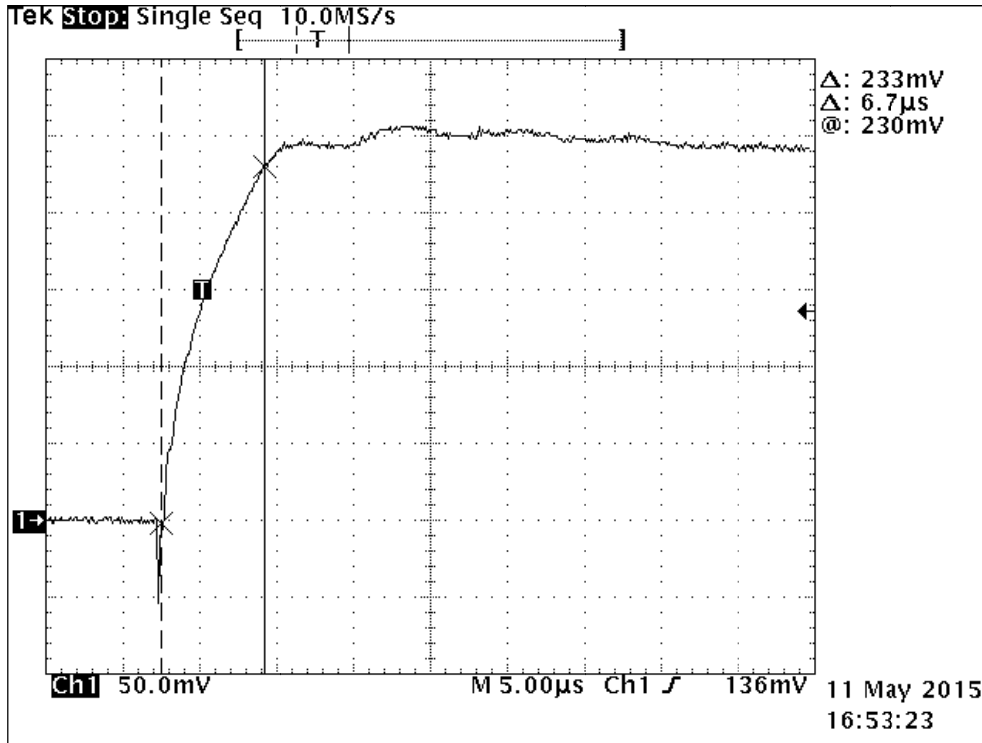
Plot 11-41. First-Level Lightning Criteria For Telecommunications Ports, +10-360us 25A - rise (0.1V = 1A)



Plot 11-42. First-Level Lightning Criteria For Telecommunications Ports, +10-360us 25A at 1000V - duration (0.1V = 1A)



Plot 11-43. First-Level Lightning Criteria For Telecommunications Ports, +10-360us 25A at 1000V - peak (0.1V = 1A)



Plot 11-44. First-Level Lightning Criteria For Telecommunications Ports, +10-360us 25A at 1000V - rise (0.1V = 1A)



MET Laboratories, Inc.

TCG NEBS Compliance Test Report

Customer Name: InfiNet Malta LTD
Product Name: AUX-ODU-LPU-G
Date: June 4, 2015



Photograph 11-2. First-Level Lightning Criteria For Telecommunications Ports, Test Setup



MET Laboratories, Inc.

Customer Name: InfiNet Malta LTD

TCG NEBS Compliance Test Report

Product Name: AUX-ODU-LPU-G

Date: June 4, 2015

MET #	Equipment	Manufacturer	Model #	Last Cal	Cal Due
4T7187	DIGITIZING OSCILLOSCOPE	TEKTRONIX	TDS680C	3/26/2015	3/26/2016
4T7263	WIDE BAND CURRENT MONITOR	PEARSON ELECTRONICS, INC.	110	8/6/2014	2/6/2016
4T7324	70 MHZ HIGH VOLTAGE DIFFERENTIAL PROBE	SAPPHIRE INSTRUMENTS CO. LTD.	SI-9010	1/30/2015	7/30/2016
4T7061	SURGE GENERATOR	KEYTEK	ECAT SYSTEM	SEE NOTE	
4T7162	SURGE MODULE	KEYTEK	E506-4W	SEE NOTE	
4T7335	ECAT E518 MODULE	KEYTEK	E518	SEE NOTE	
4T7336	ECAT E508 MODULE	KEYTEK	E508	SEE NOTE	
4T7337	ECAT E509 MODULE	KEYTEK	E509	SEE NOTE	

Table 11-5. First-Level Lightning Criteria For Telecommunications Ports, Test Equipment

Note: Functionally verified test equipment is verified using calibrated instrumentation at time of testing.



SURGE TEST NUMBER 3 – GAS TUBE INTERACTION TEST (4.6.2.1.2.3)

Test Results:

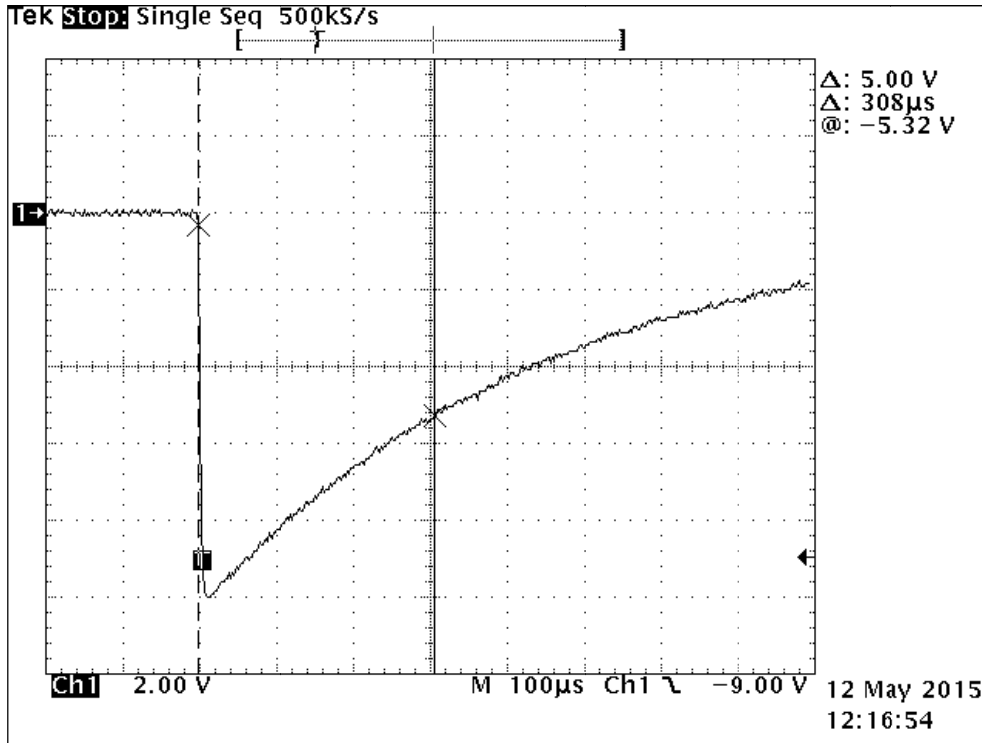
The EUT was compliant with Surge Test Number 3 Requirement (4.6.2.1.2.3). EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.

EUT		Part Number	Revision
AUX-ODU-LPU-G			
Sample	Port Name	Serial Number	Result
1	ETH OUT	208155	Pass
Final Result: EUT continued to operate properly after the surge.			
Monitoring Method: Monitored traffic data.			

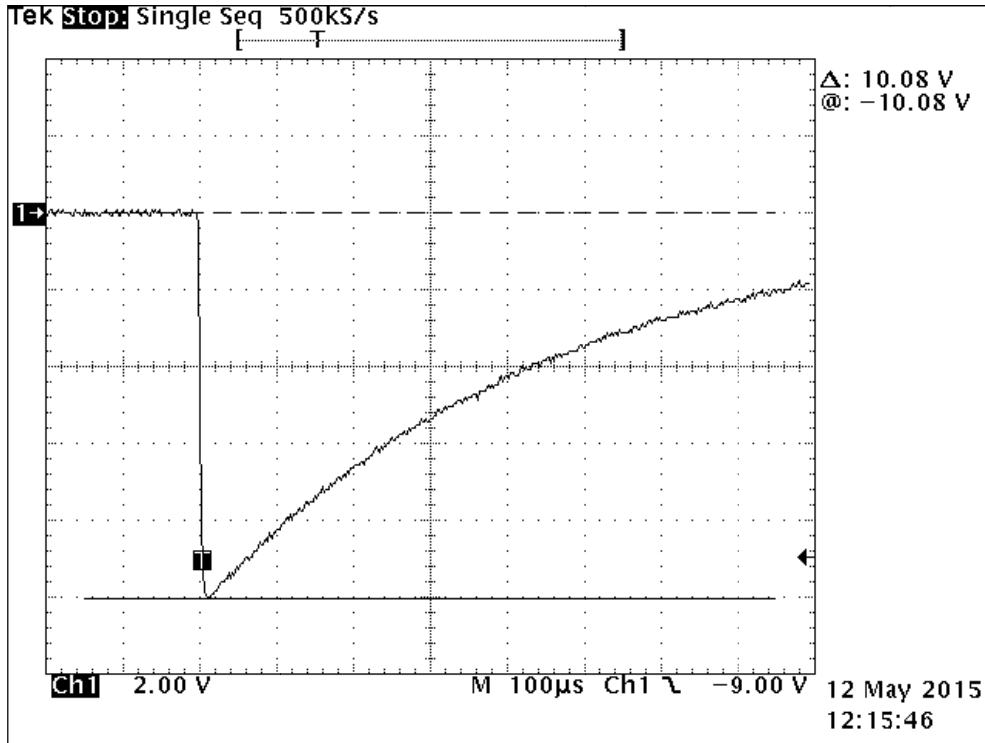
Table 11-6. Surge Test Number 3 – Gas Tube Interaction, Test Results

Note for Ethernet & GbE ports:
Longitudinal:

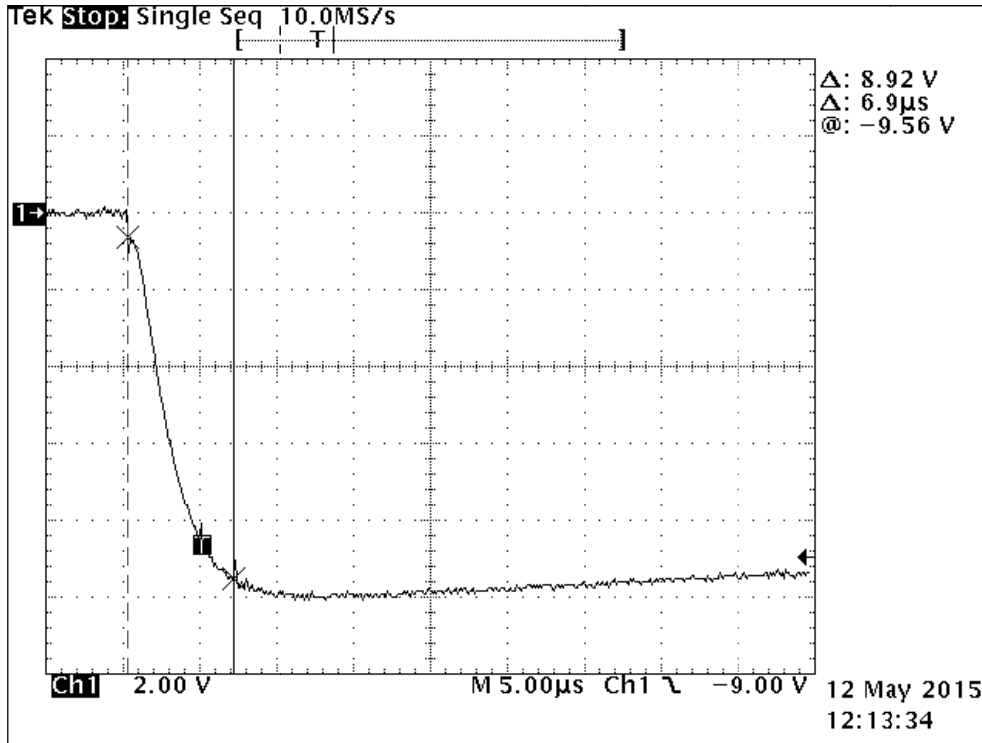
1. Port #1, All lines Longitudinal.
2. Port #1 Pins 1 and 2 with pin 3 and 6 grounded. There is a path between the pairs that will likely be damaged, however pair 1 and 2 and 3 and 6 should be intact.
3. Port #2, Pins 3 and 6 with pins 1 and 2 grounded. Like the other tests, the path between the pair will be damaged, but the pairs themselves should remain intact.



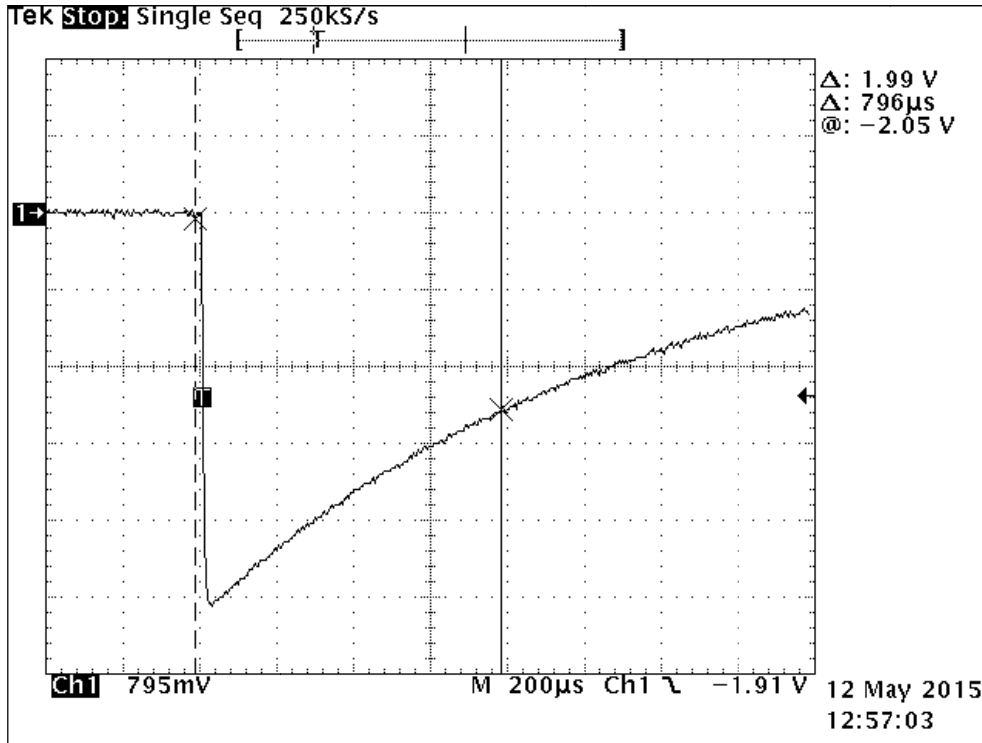
Plot 11-45. Surge Test Number 3 – Gas Tube Interaction, -10-700us 100A - decay (0.1V = 1A)



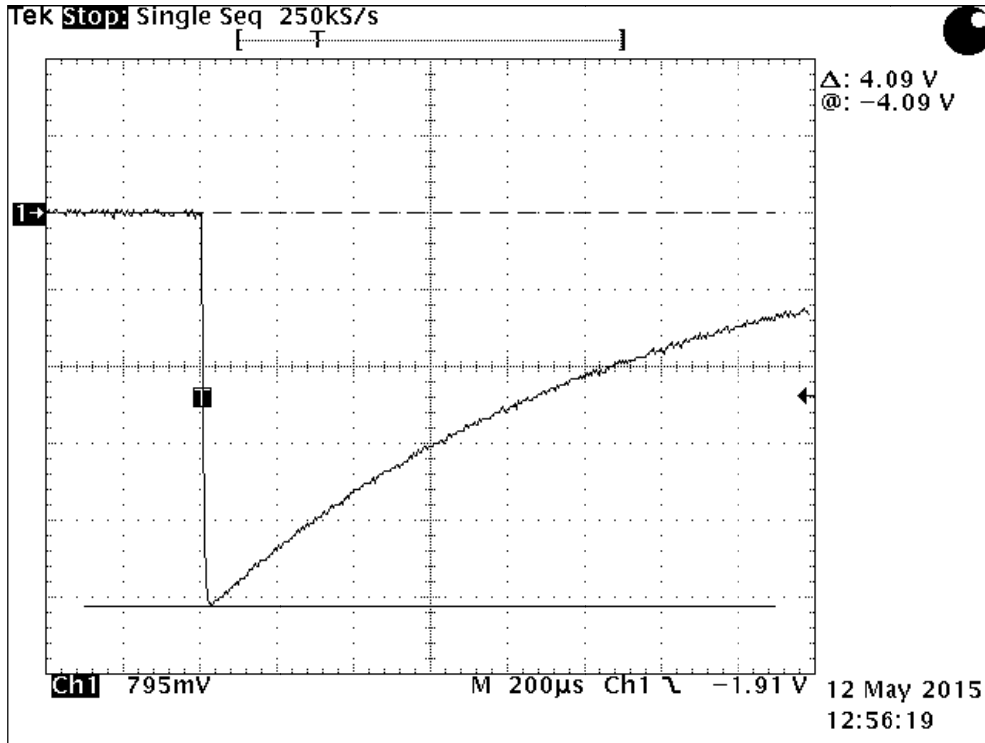
Plot 11-46. Surge Test Number 3 – Gas Tube Interaction, -10-700us 100A - peak (0.1V = 1A)



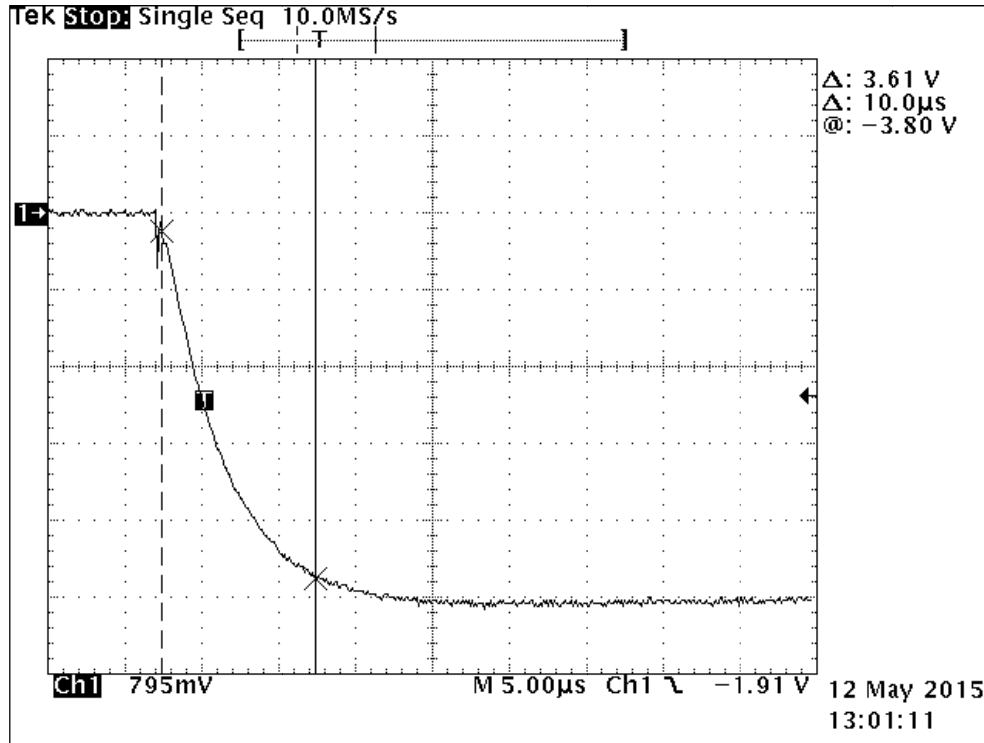
Plot 11-47. Surge Test Number 3 – Gas Tube Interaction, -10-700us 100A - rise (0.1V = 1A)



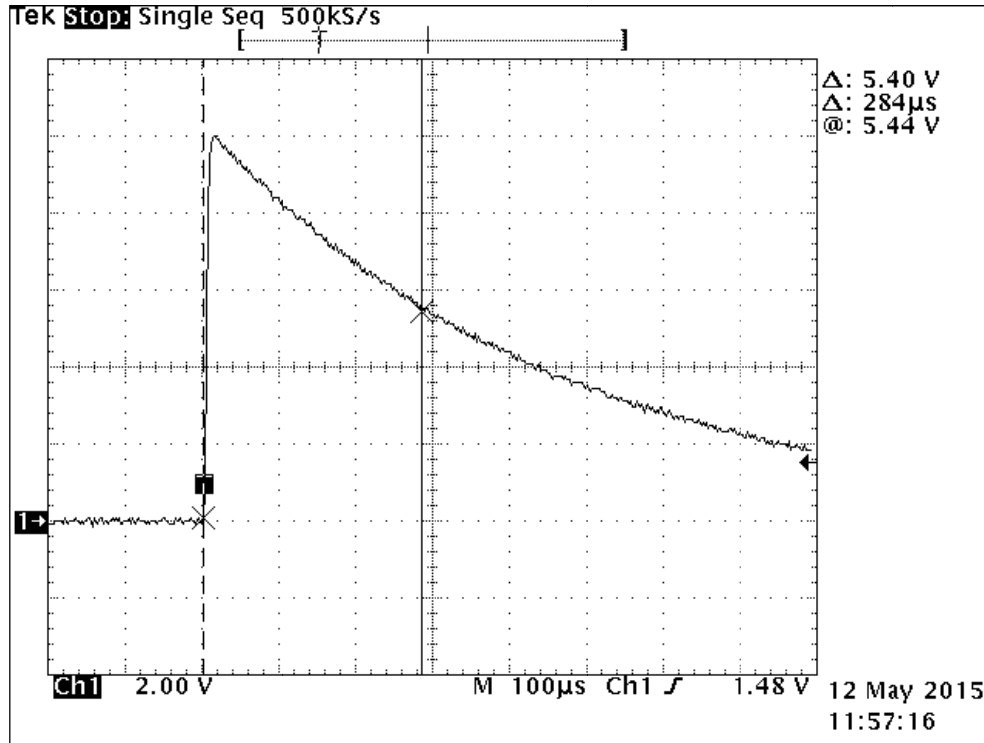
Plot 11-48. Surge Test Number 3 – Gas Tube Interaction, -10-700us 4000V - decay (0.001V = 1V)



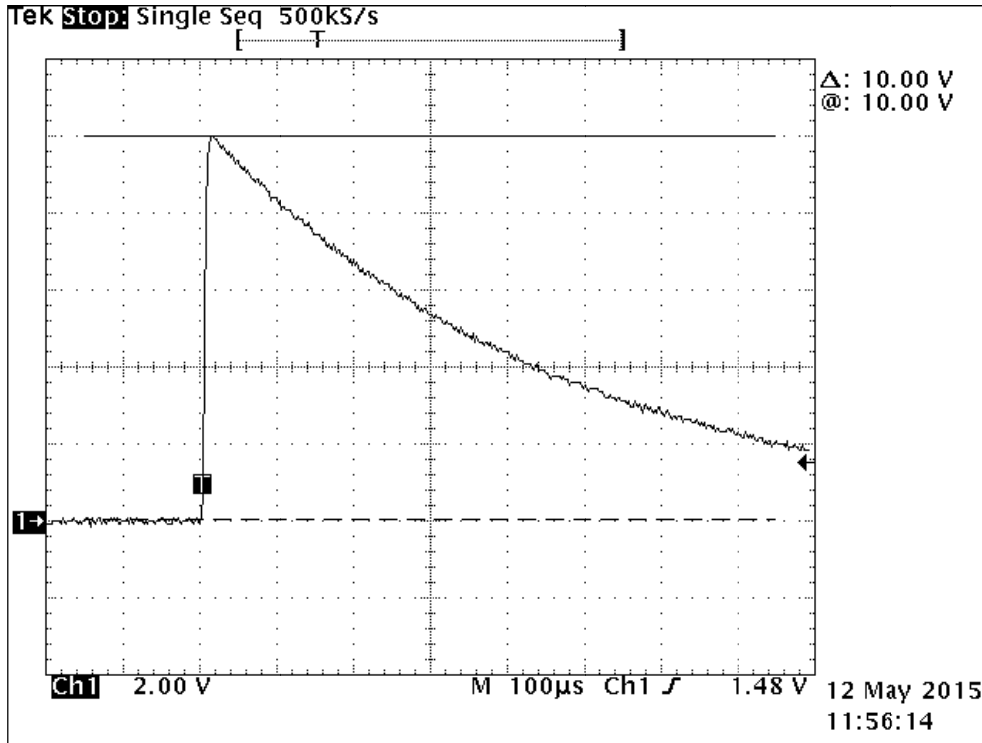
Plot 11-49. Surge Test Number 3 – Gas Tube Interaction, -10-700us 4000V - peak (0.001V = 1V)



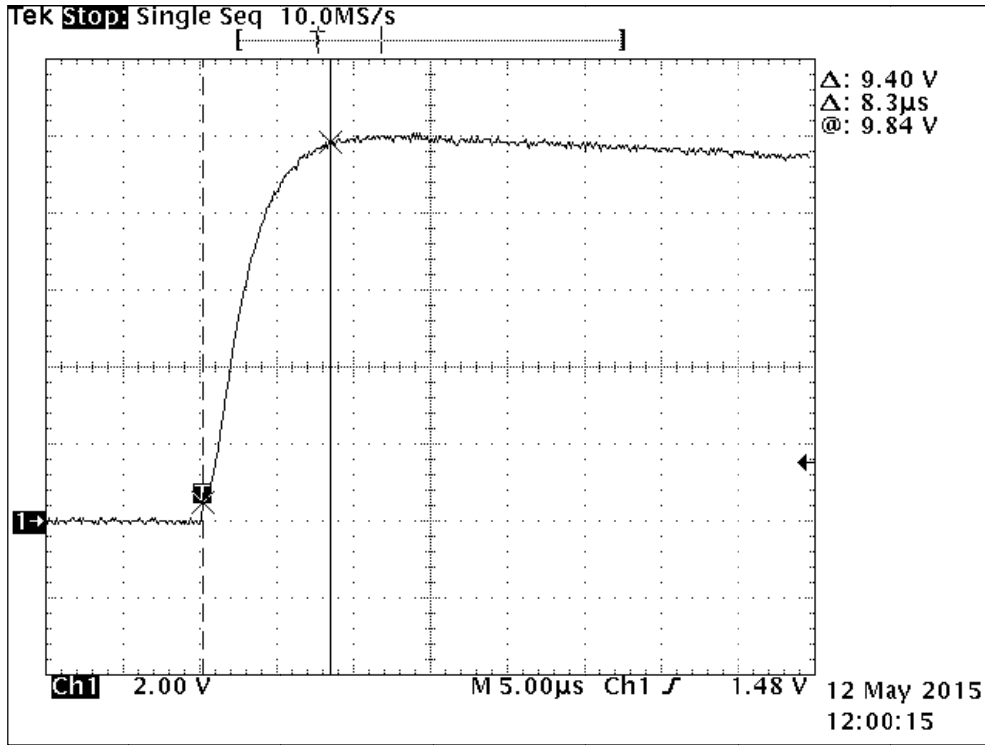
Plot 11-50. Surge Test Number 3 – Gas Tube Interaction, -10-700us 4000V - rise (0.001V = 1V)



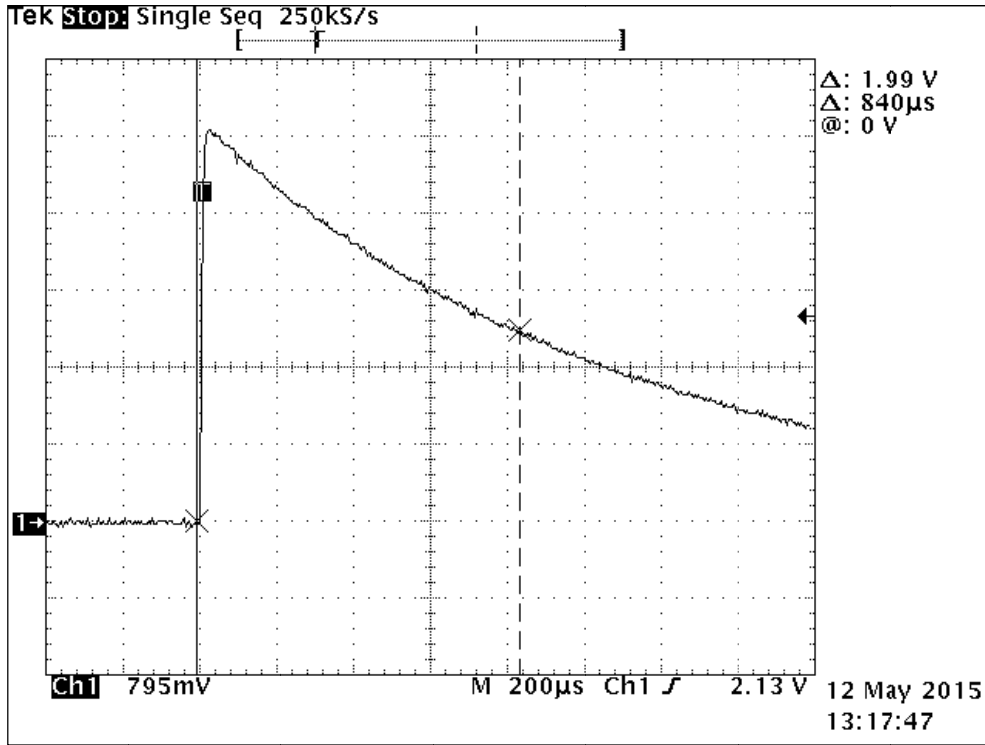
Plot 11-51. Surge Test Number 3 – Gas Tube Interaction, +10-700us 100A - decay (0.1V = 1A)



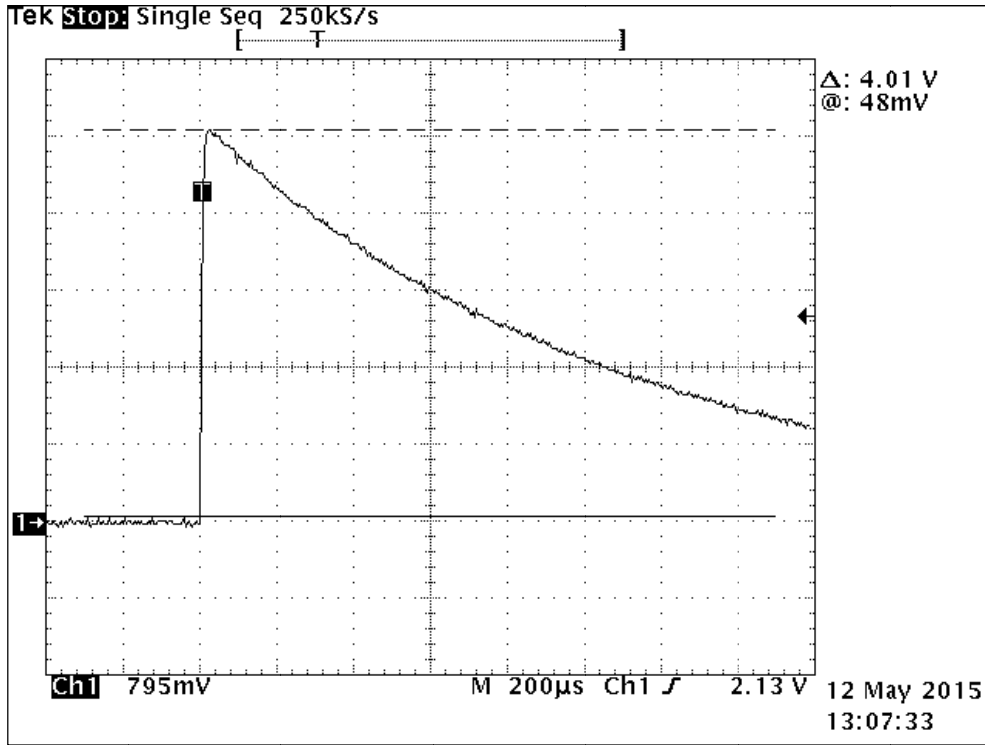
Plot 11-52. Surge Test Number 3 – Gas Tube Interaction, +10-700us 100A - peak (0.1V = 1A)



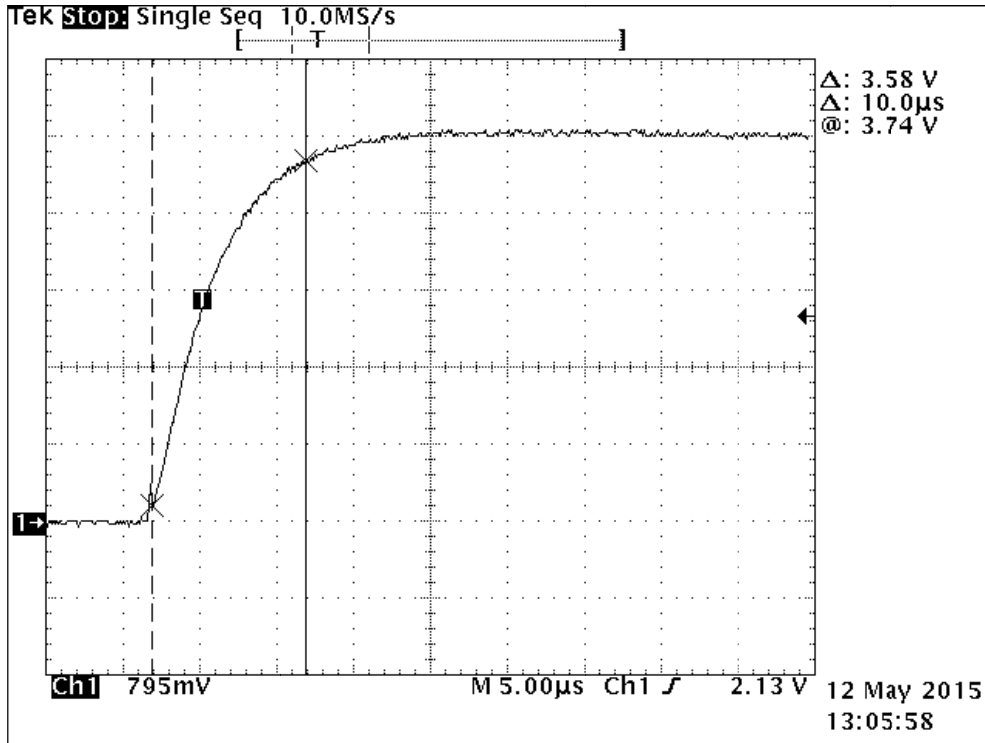
Plot 11-53. Surge Test Number 3 – Gas Tube Interaction, +10-700us 100A - rise (0.1V = 1A)



Plot 11-54. Surge Test Number 3 – Gas Tube Interaction, +10-700us 4000V - decay (0.001V = 1V)



Plot 11-55. Surge Test Number 3 – Gas Tube Interaction, +10-700us 4000V - peak (0.001V = 1V)



Plot 11-56. Surge Test Number 3 – Gas Tube Interaction, +10-700us 4000V - rise (0.001V = 1V)



MET Laboratories, Inc.

TCG NEBS Compliance Test Report

Customer Name: InfiNet Malta LTD
Product Name: AUX-ODU-LPU-G
Date: June 4, 2015



Photograph 11-3. Surge Test Number 3 – Gas Tube Interaction, Test Setup



MET Laboratories, Inc.

Customer Name: InfiNet Malta LTD

TCG NEBS Compliance Test Report

Product Name: AUX-ODU-LPU-G

Date: June 4, 2015

MET #	Equipment	Manufacturer	Model #	Last Cal	Cal Due
4T7187	DIGITIZING OSCILLOSCOPE	TEKTRONIX	TDS680C	3/26/2015	3/26/2016
4T7263	WIDE BAND CURRENT MONITOR	PEARSON ELECTRONICS, INC.	110	8/6/2014	2/6/2016
4T7324	70 MHZ HIGH VOLTAGE DIFFERENTIAL PROBE	SAPPHIRE INSTRUMENTS CO. LTD.	SI-9010	1/30/2015	7/30/2016
4T7061	SURGE GENERATOR	KEYTEK	ECAT SYSTEM	SEE NOTE	
4T7162	SURGE MODULE	KEYTEK	E506-4W	SEE NOTE	
4T7335	ECAT E518 MODULE	KEYTEK	E518	SEE NOTE	
4T7336	ECAT E508 MODULE	KEYTEK	E508	SEE NOTE	
4T7337	ECAT E509 MODULE	KEYTEK	E509	SEE NOTE	

Table 11-7. Surge Test Number 3 – Gas Tube Interaction, Test Equipment

Note: Functionally verified test equipment is verified using calibrated instrumentation at time of testing.



INTRA-BUILDING OR INTRA-SITE LIGHTNING CRITERIA (TELECOMMUNICATIONS TYPE 2, 3A/5A, 4, 4A PORTS) (4.6.2.1.3)

Criteria:

R4-14 [30] Ports that remain intra-building or intra-site (Type 2, 3a/5a, 4, and 4a ports) and do not require shielded cables shall comply with first level criteria of Section 4.5.7, “Conformance Criteria,” when subjected to the applicable surge tests in Table 4-2.

R4-17 [170] Ports that remain intra-building or intra-site (Type 2, 3a/5a, 4, and 4a ports) that require shielded cables shall comply with the first-level criteria of Section 4.5.7, “Conformance Criteria,” when subjected to Surge Test Number 16 (paired conductors) or Surge Test Number 17 (coaxial) of Table 4-2.

R4-18 [237] If Type 2, 3a/5a, 4, or 4a ports of the equipment requires a shielded cable, the documentation shall contain a warning statement indicating that the intra-building port(s) of the equipment, or subassembly, is suitable for connection only to “shielded intra-building cabling that is grounded at both ends.” This requirement applies to paired conductor interfaces as well as coaxial interfaces (i.e., DS3). An example is show below.

WARNING: The intra building port(s) (list the port or ports) of the equipment or subassembly must use shielded intra-building cabling/wiring that is grounded at both ends.

Test Method:

R4-14

Verify the port type determinations made in Section 4-1 and perform testing as specified in Table 4-2 for that port type. Connect equipment as applicable to test parameters listed in Table 4-2 and connection criteria listed in Table 4-1. Verify conformance as specified in Section 4.5.7 and record the results of that test as applicable for a non-shielded cable.

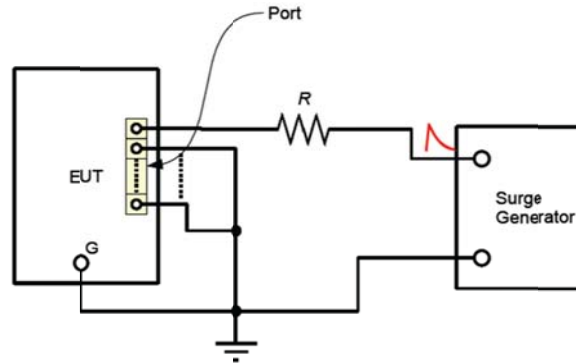


Figure 11-3. Test Circuit for Multi-Pair Ports – Metallic Test (Figure 4-10 of GR-1089)

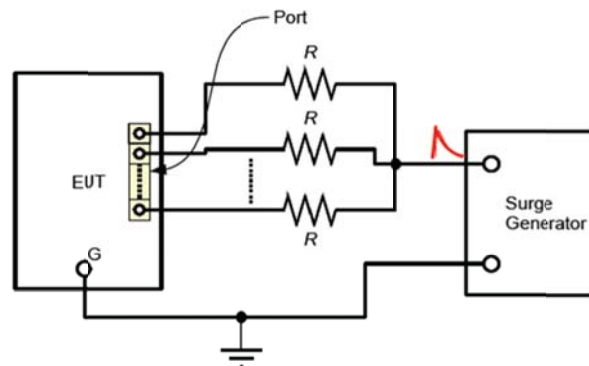
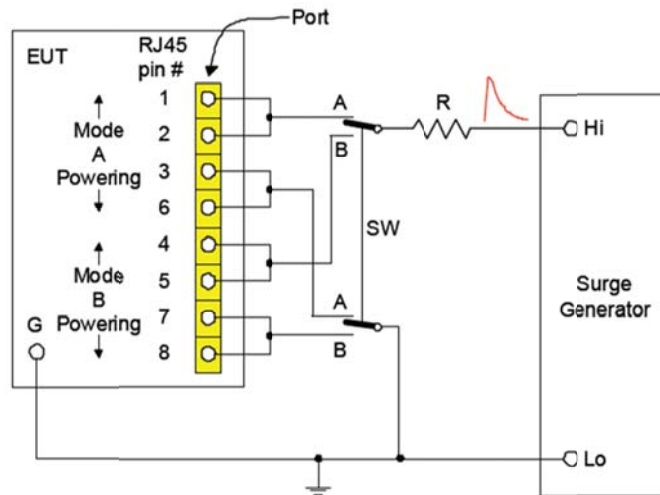


Figure 11-4. Test Circuit for Multi-Pair Ports – Longitudinal Test (Figure 4-11 of GR-1089)



NOTE: Testing is to be done on all PoE power feeding pair variants. For Power Sourcing Equipment (PSE) and Powered Device (PD) ports, test in both Switch (SW) positions A and B. For mid-span power insertion

Figure 11-5. Test Circuit for Unshielded PoE Ports – Metallic Test (SW Sets Mode A or Mode B Testing) (Figure 4-14 of GR-1089)

R4-17

Verify the port type determinations made in section 4-1 and perform testing as specified in Table 4-2 for that port type. Connect equipment as applicable to test parameters listed under surge 16 for paired conductors or Surge 17 for coaxial conductors in Table 4-2 of the standard. Make connections as specified criteria listed in table 4-1. Verify conformance as specified in 4.5.7 and record the results of that test as applicable for shielded cable.

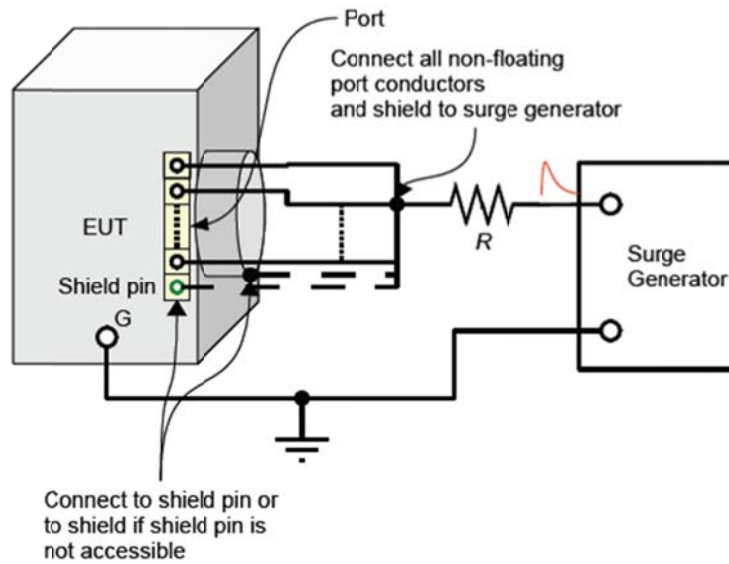


Figure 11-6. Test Circuit for Paired – Conductor Ports Providing a Connection Means for the Shielded Cable (Figure 4-12 of GR-1089)

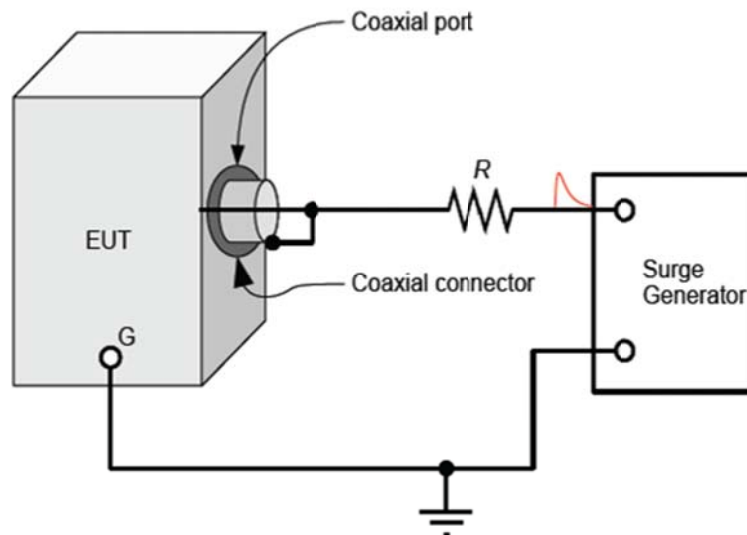


Figure 11-7. Test Circuit for Coaxial Cable Ports Providing a Connection Means for the Shielded Cable (Figure 4-13 of GR-1089)

R4-18 Locate, copy and paste the required manual statement for this section into the data table for R1-2. Record the Manual Name, revision and page number in the table. State in METrak “The appropriate note was located and is available for review in a Table located in section R1-2.



Test Results:

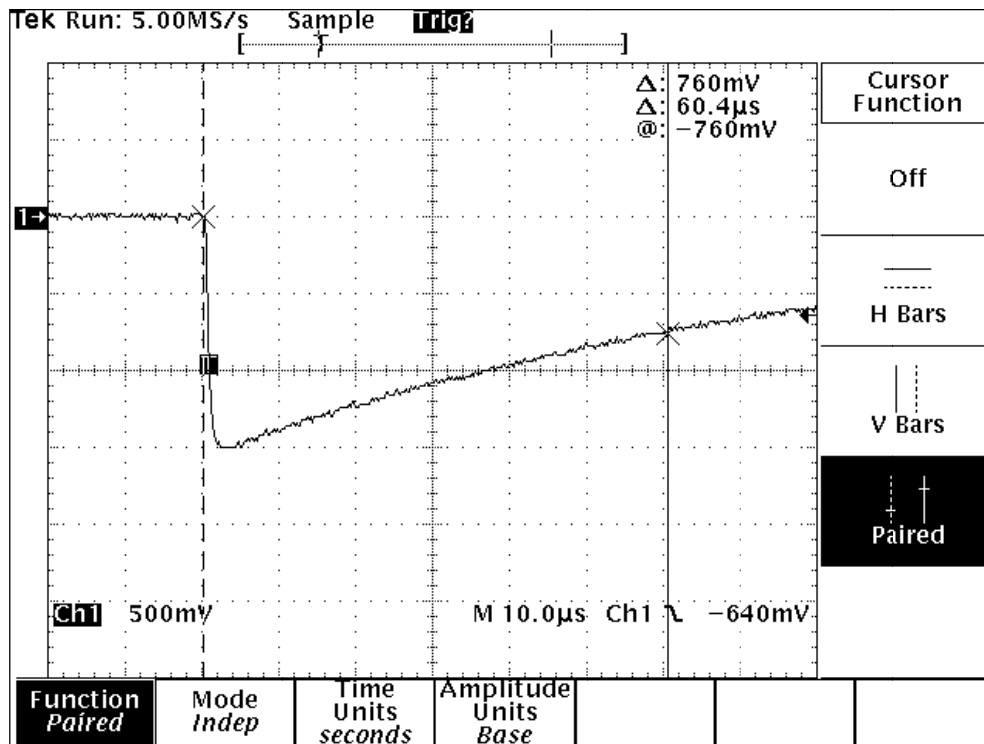
The EUT was compliant with Requirement **R4-14 [30]**. EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.

The EUT was compliant with Requirement **R4-17 [170]**. EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.

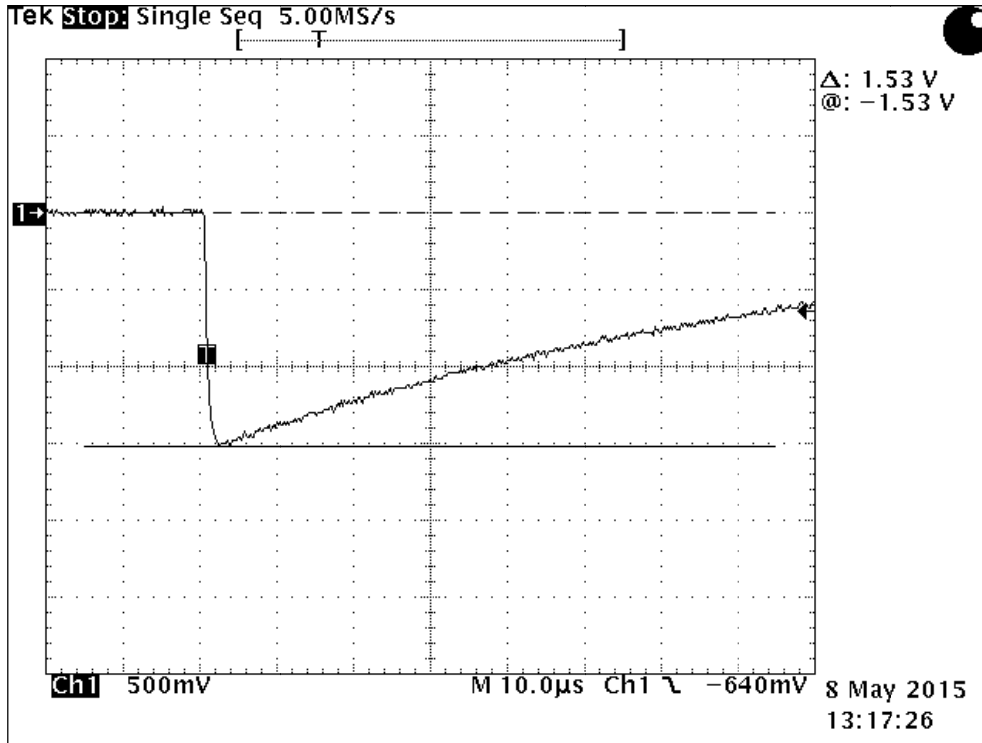
The EUT was compliant with Requirement **R4-18 [237]**. EUT continued to operate normally after the surge. EUT was not damaged and did not catch fire, fragment, or become electrical safety hazard.

EUT		Part Number	Revision
AUX-ODU-LPU-G			
Sample	Port Name	Serial Number	Result
1	ETH IN	208155	Pass
Final Result: EUT continued to operate properly after the surge.			
Monitoring Method: Monitored traffic data.			

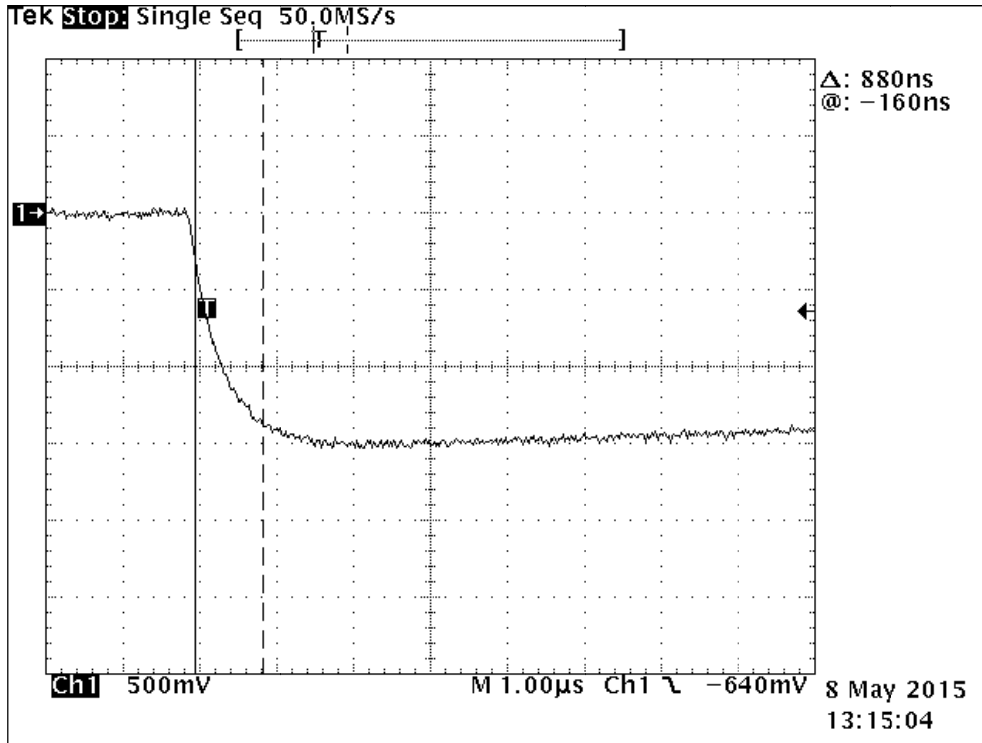
Table 11-8. Intra-Building or Intra-Site Criteria, Test Results



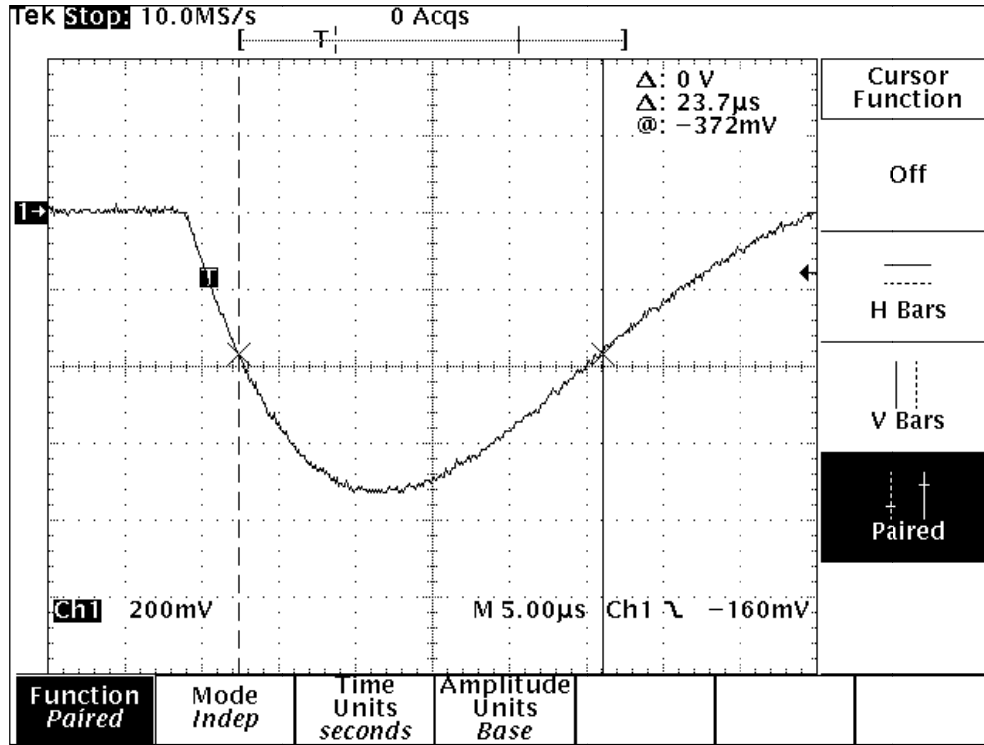
Plot 11-57. Intra-Building or Intra-Site Criteria, -1.2-50us 1500V - Duration (0.001V = 1V)



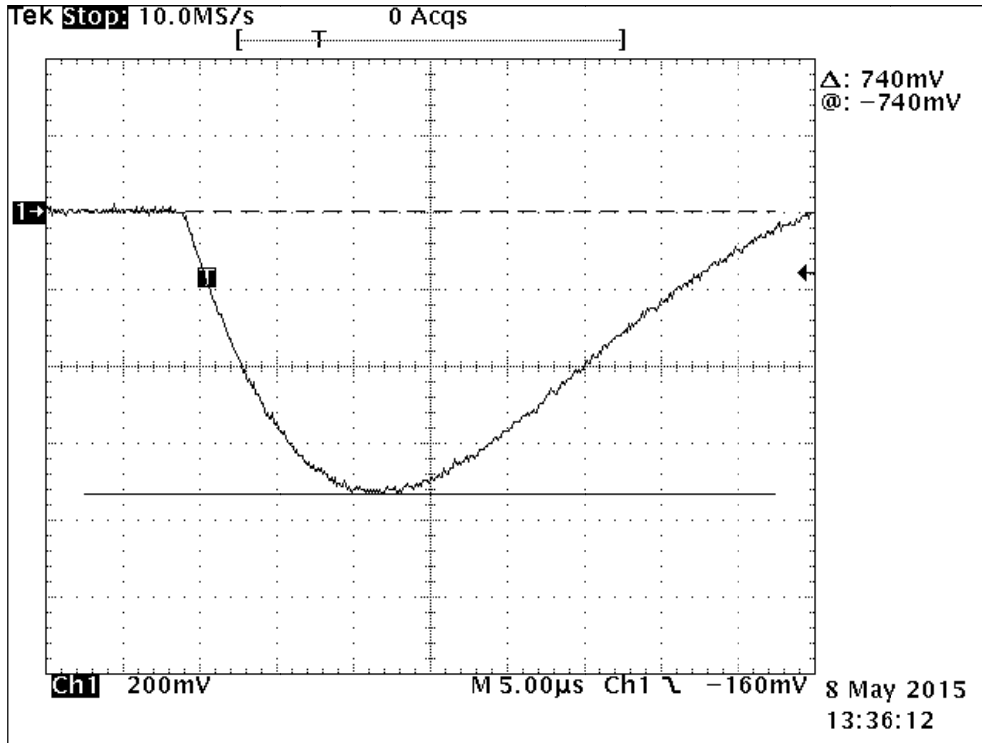
Plot 11-58. Intra-Building or Intra-Site Criteria, -1.2-50us 1500V - peak (0.001V = 1V)



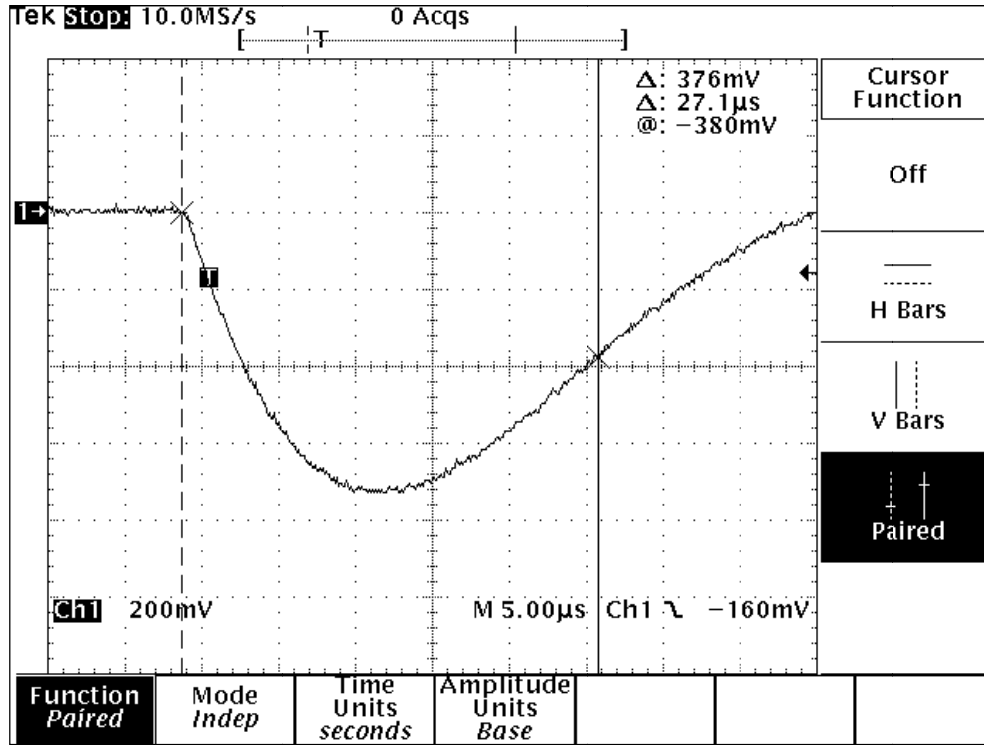
Plot 11-59. Intra-Building or Intra-Site Criteria, -1.2-50us 1500V - Risetime (0.001V = 1V)



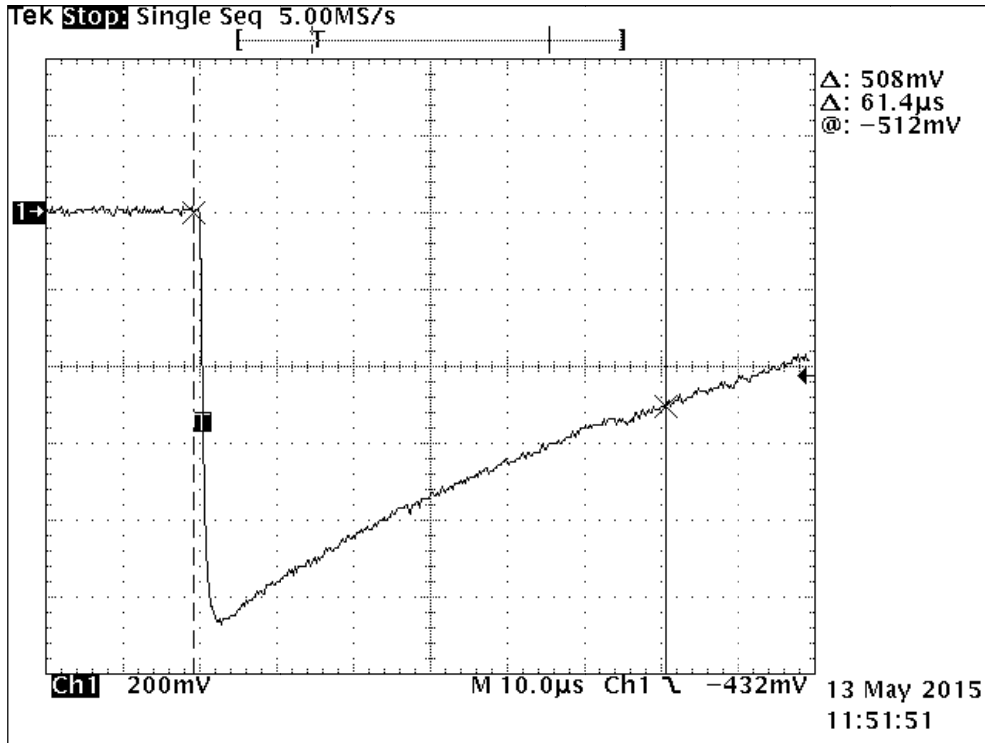
Plot 11-60. Intra-Building or Intra-Site Criteria, -8-20us 750A - Duration (0.001V = 1A)



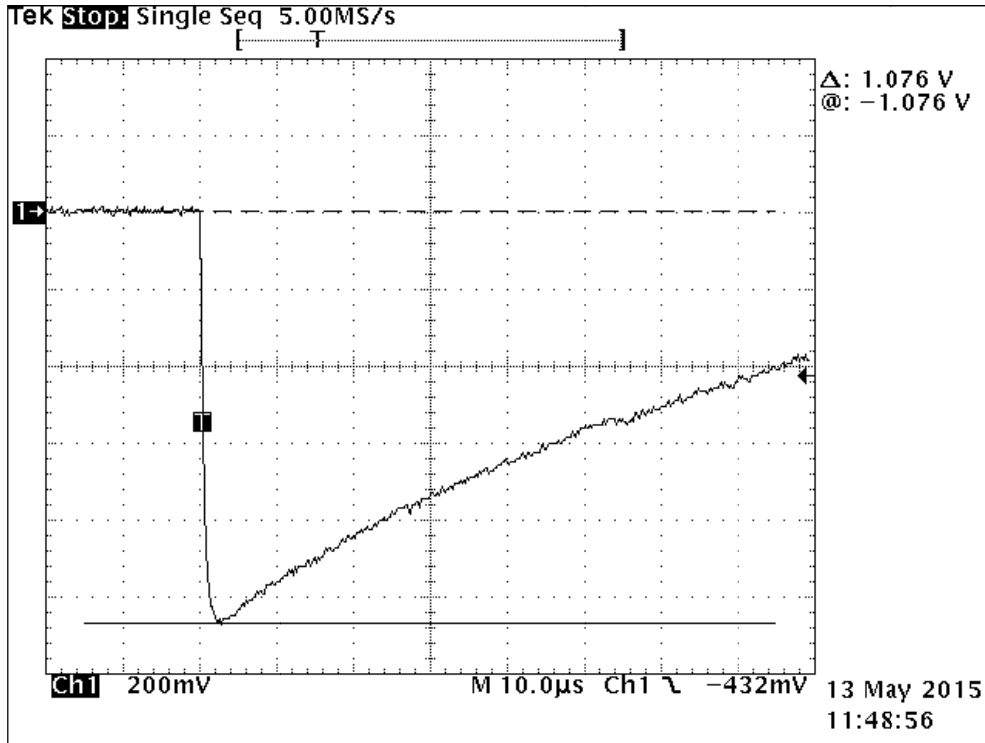
Plot 11-61. Intra-Building or Intra-Site Criteria, -8-20us 750A - peak (0.001V = 1A)



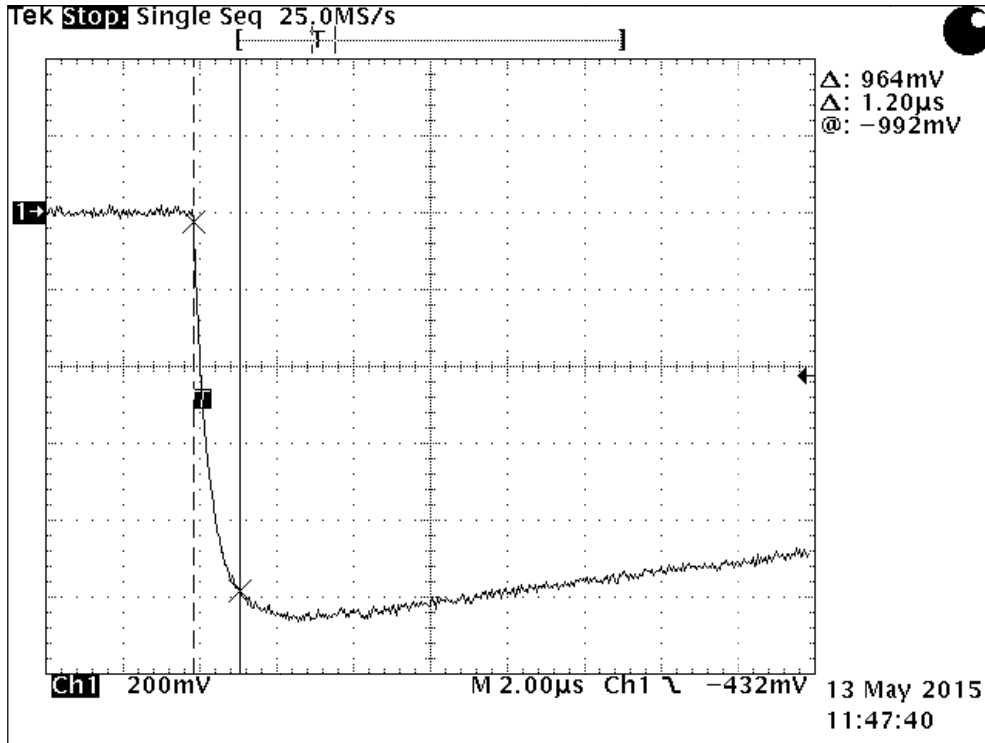
Plot 11-62. Intra-Building or Intra-Site Criteria, -8-20us 750A - Risetime (0.001V = 1A)



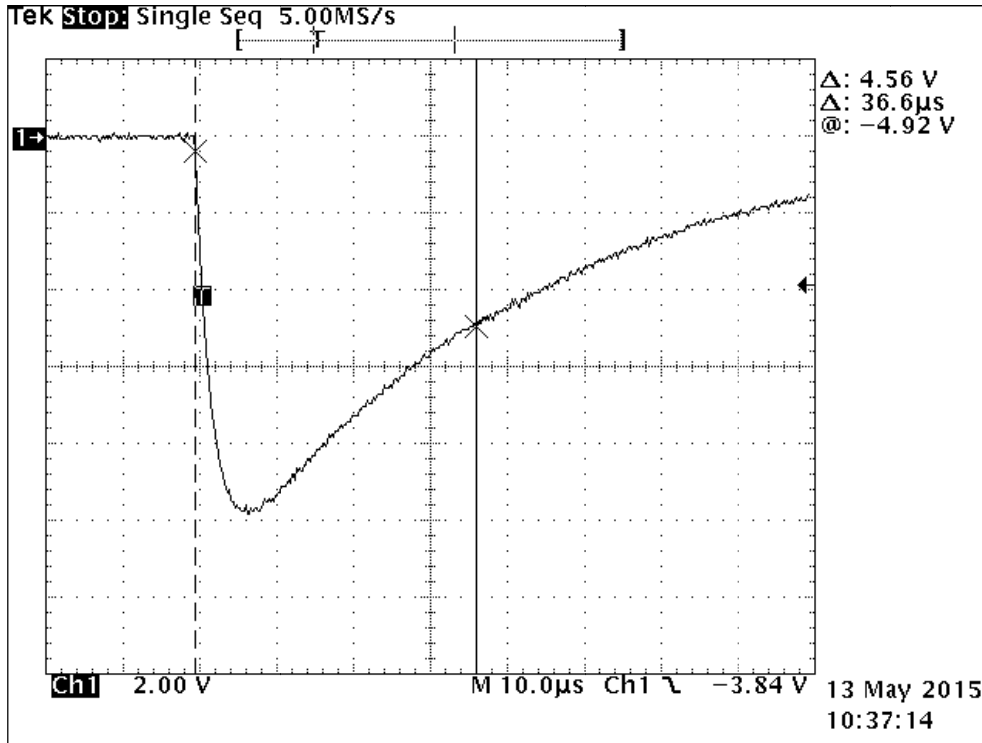
Plot 11-63. Intra-Building or Intra-Site Criteria, -1.2-50us 106V - decay (0.01V = 1V)



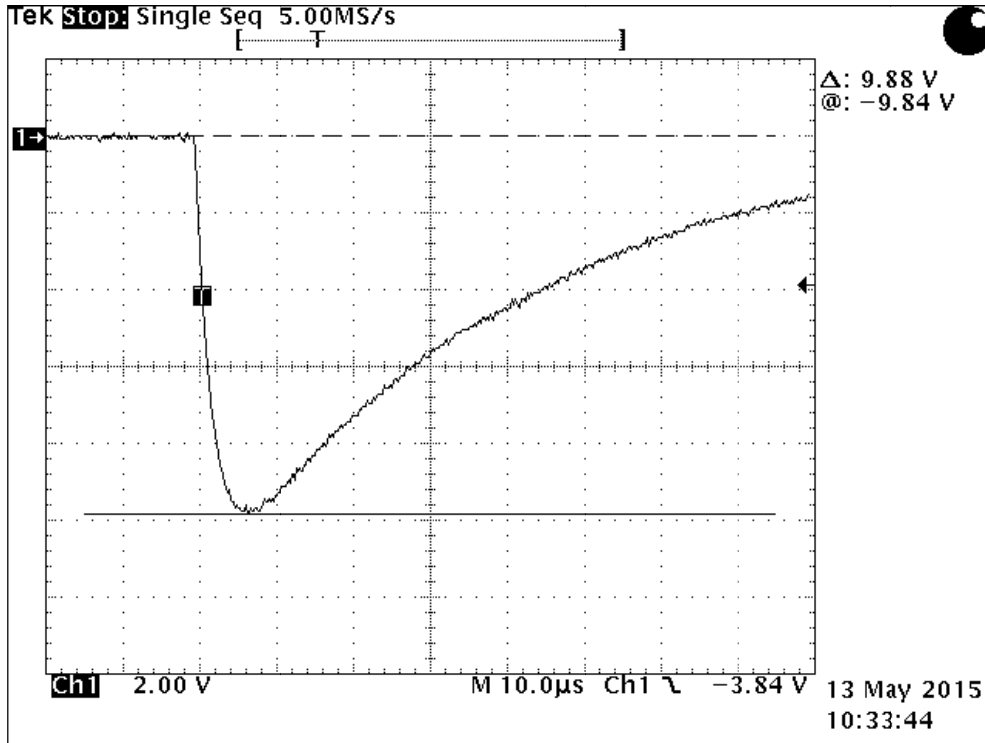
Plot 11-64. Intra-Building or Intra-Site Criteria, -1.2-50us 106V - peak (0.01V = 1V)



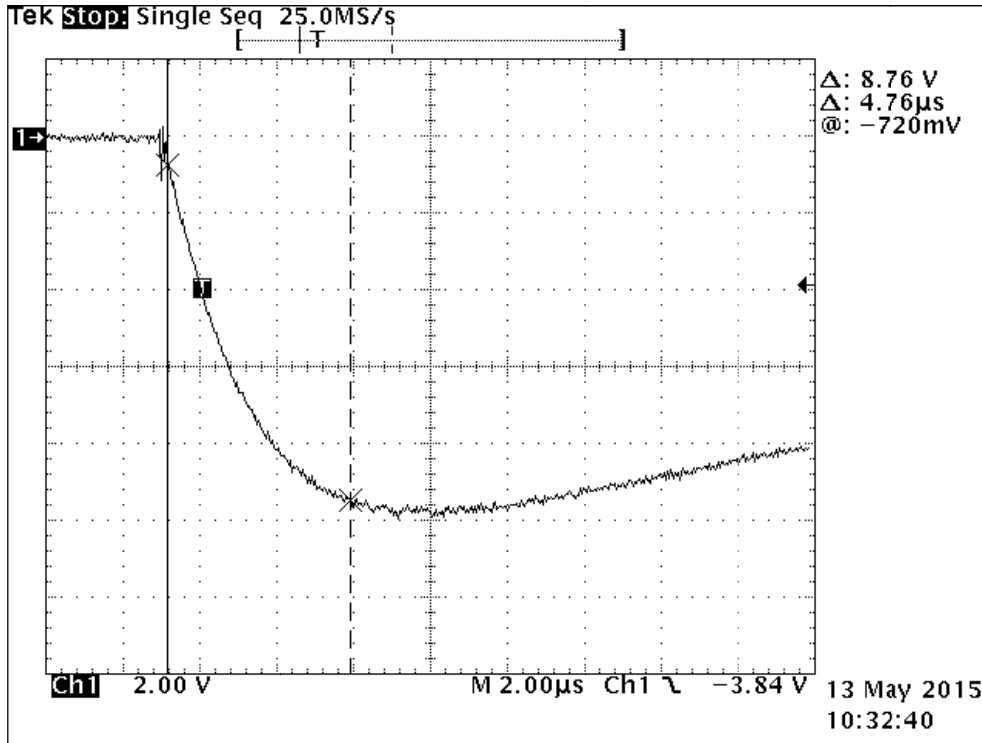
Plot 11-65. Intra-Building or Intra-Site Criteria, -1.2-50us 106V - rise (0.01V = 1V)



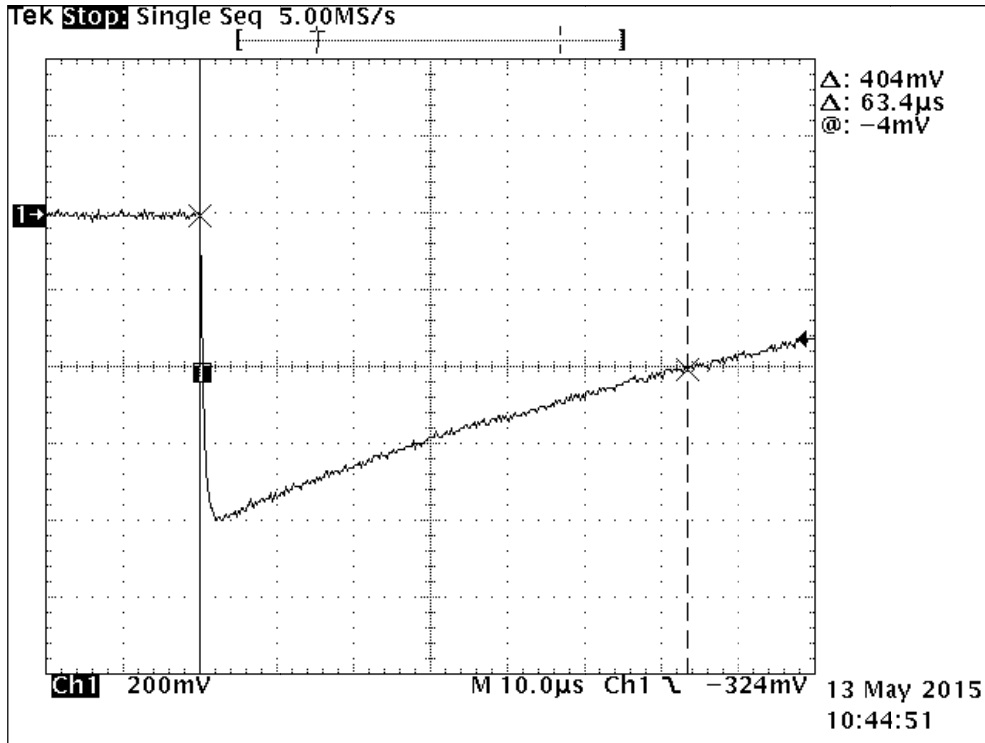
Plot 11-66. Intra-Building or Intra-Site Criteria, -1.2-50us 400A - decay with 6ohms (0.1V = 1A)



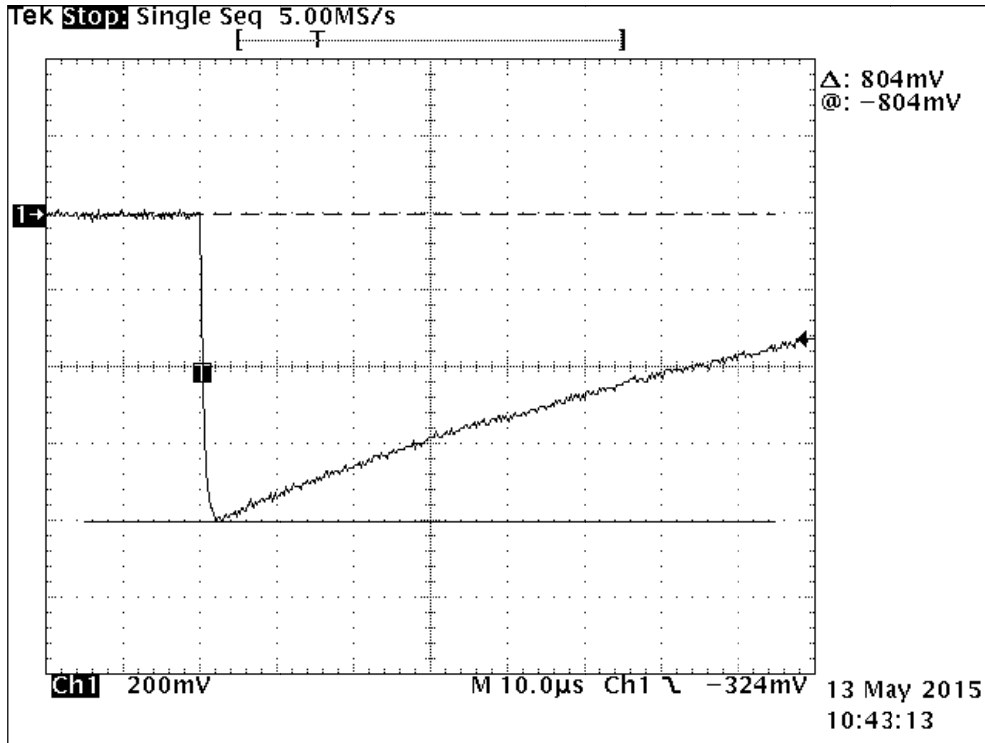
Plot 11-67. Intra-Building or Intra-Site Criteria, -1.2-50us 400A - peak with 6ohms (0.1V = 1A)



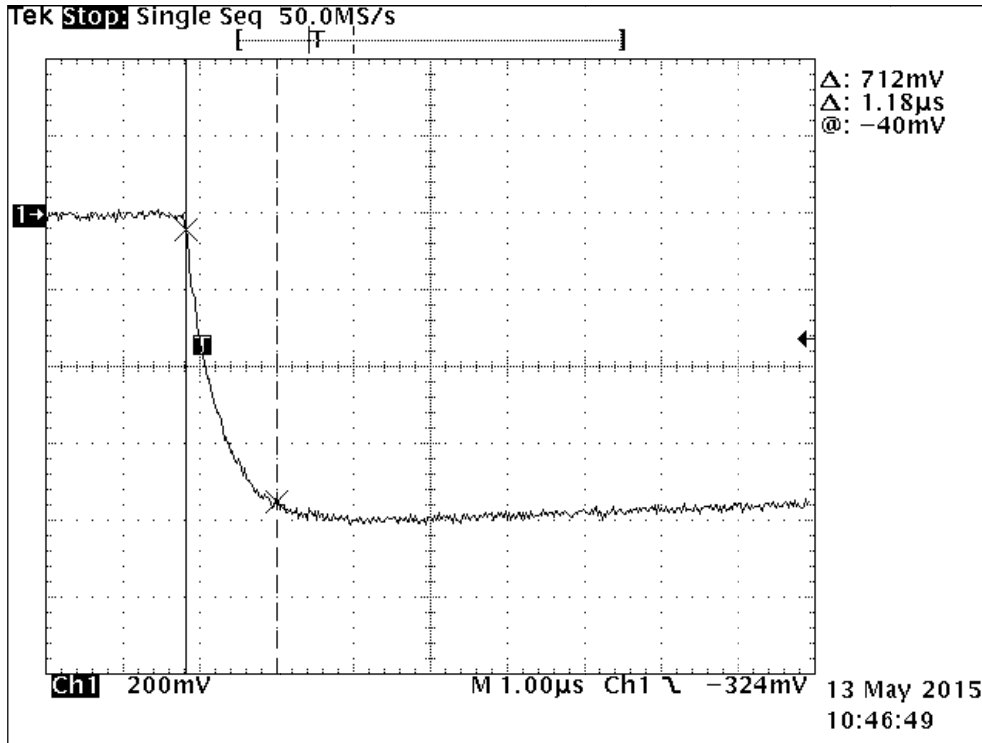
Plot 11-68. Intra-Building or Intra-Site Criteria, -1.2-50us 400A - rise with 6ohms (0.1V = 1A)



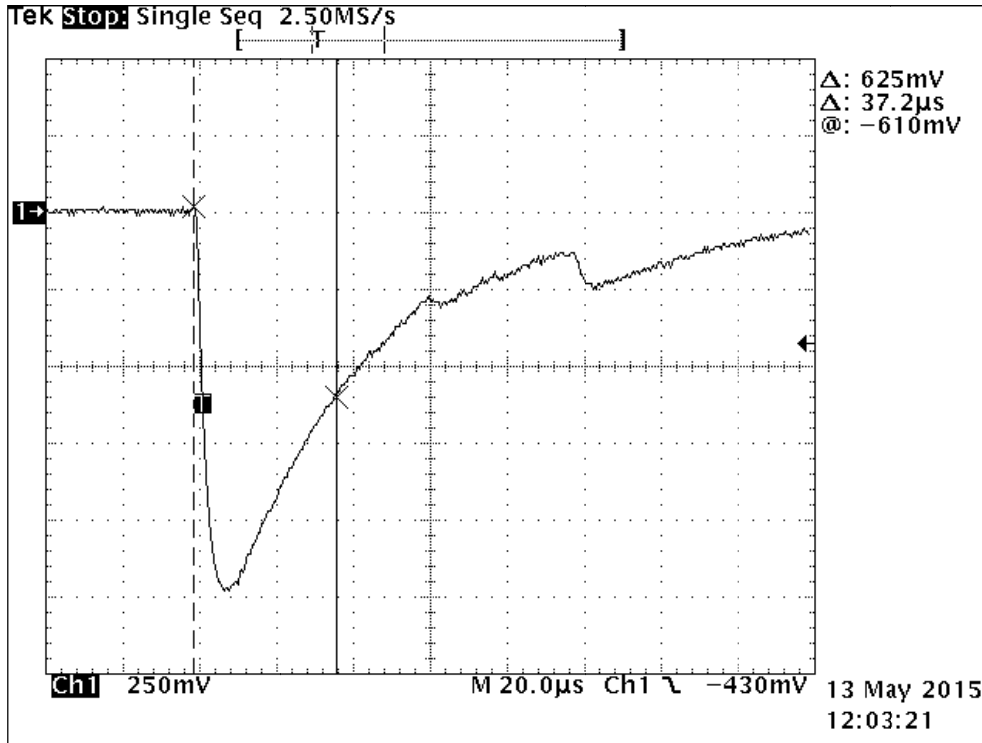
Plot 11-69. Intra-Building or Intra-Site Criteria, -1.2-50us 800V - decay (0.001V = 1V)



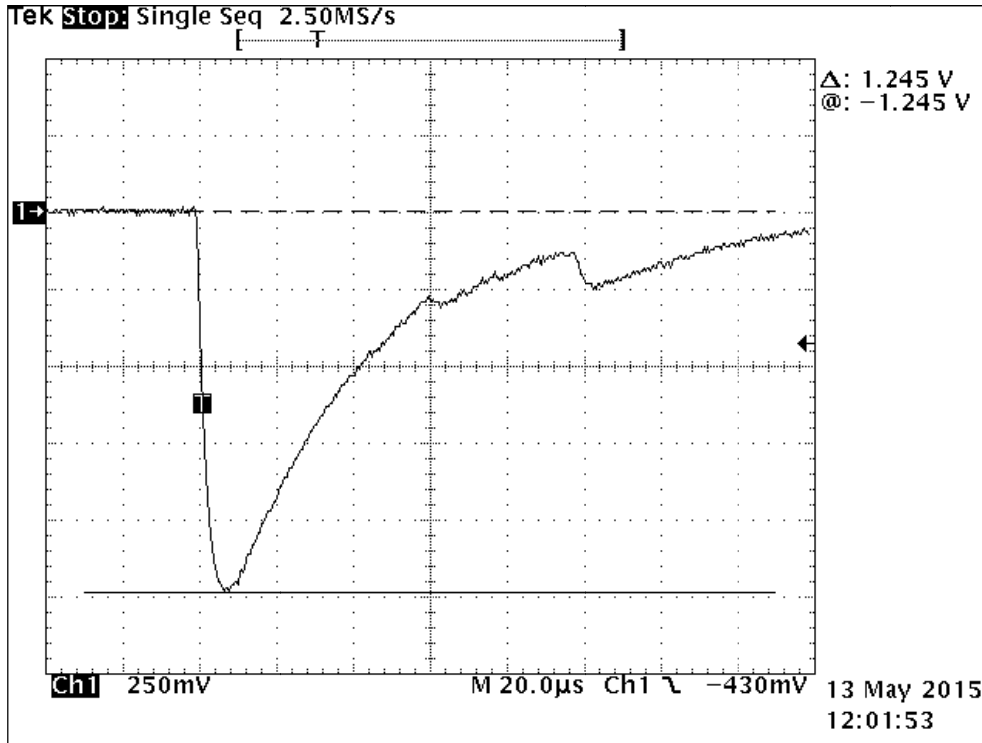
Plot 11-70. Intra-Building or Intra-Site Criteria, -1.2-50us 800V - peak (0.001V = 1V)



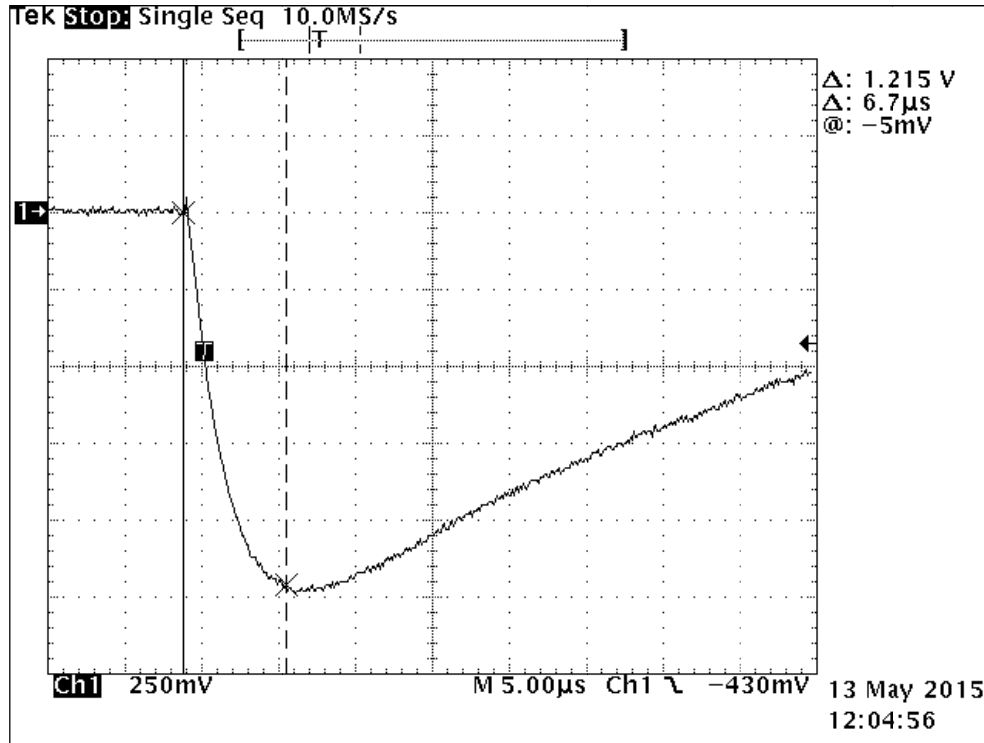
Plot 11-71. Intra-Building or Intra-Site Criteria, -1.2-50us 800V - rise (0.001V = 1V)



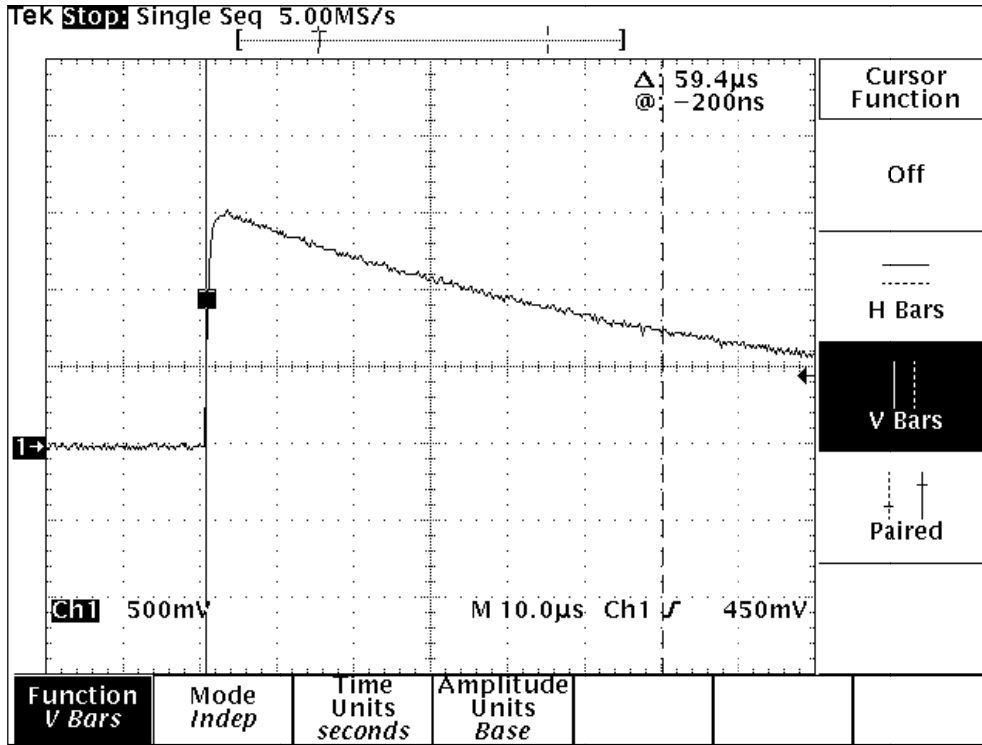
Plot 11-72. Intra-Building or Intra-Site Criteria, -1.2-50us Vs current - decay (0.01V = 1A)



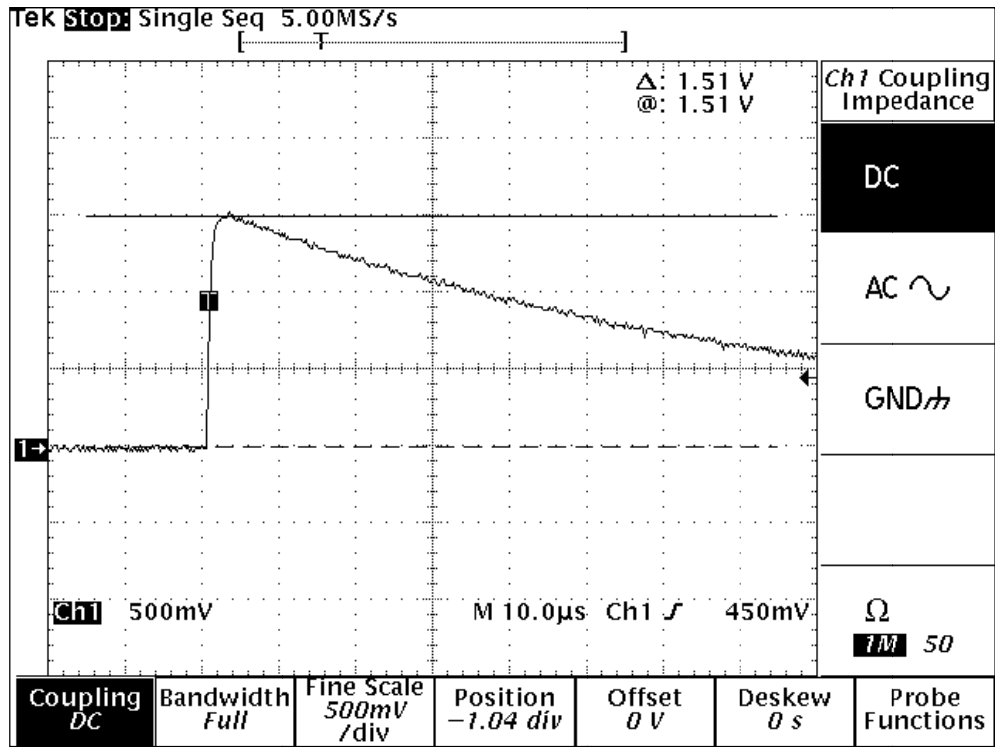
Plot 11-73. Intra-Building or Intra-Site Criteria, -1.2-50us Vs current - peak (0.01V = 1A)



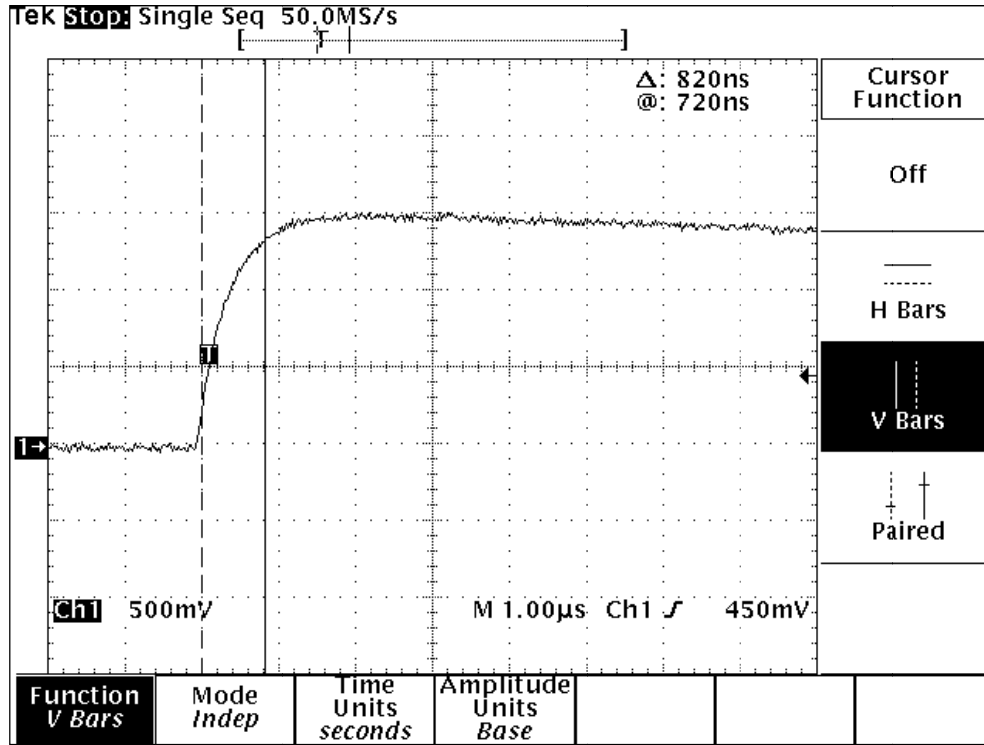
Plot 11-74. Intra-Building or Intra-Site Criteria, -1.2-50us Vs current - rise (0.01V = 1A)



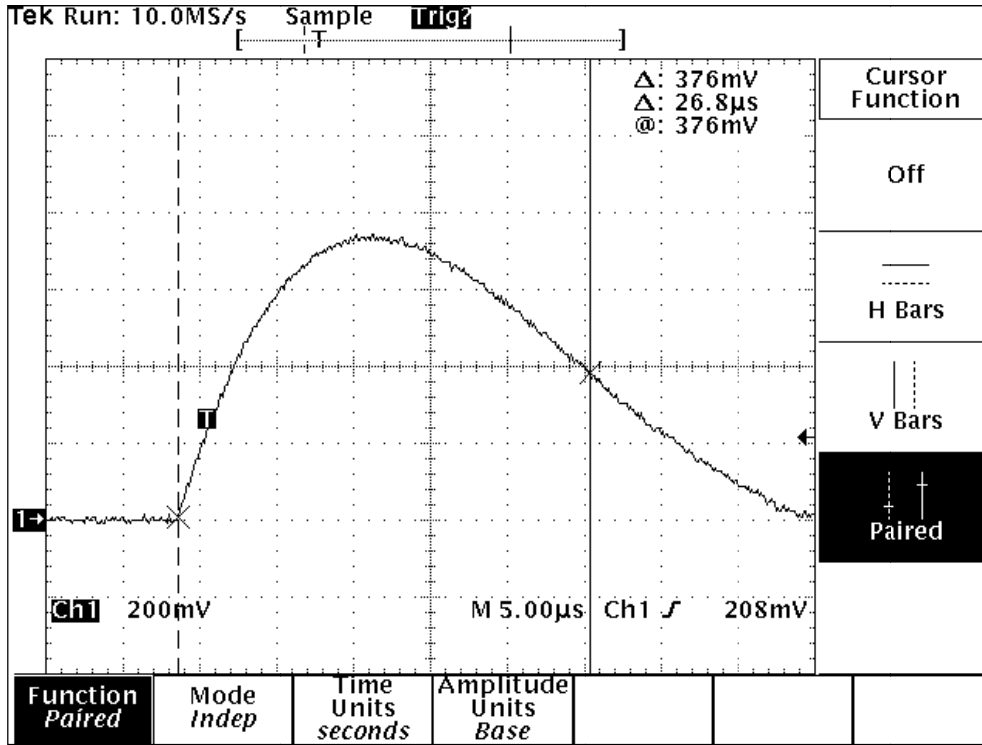
Plot 11-75. Intra-Building or Intra-Site Criteria, +1.2-50us 1500V - Duration (0.001V = 1V)



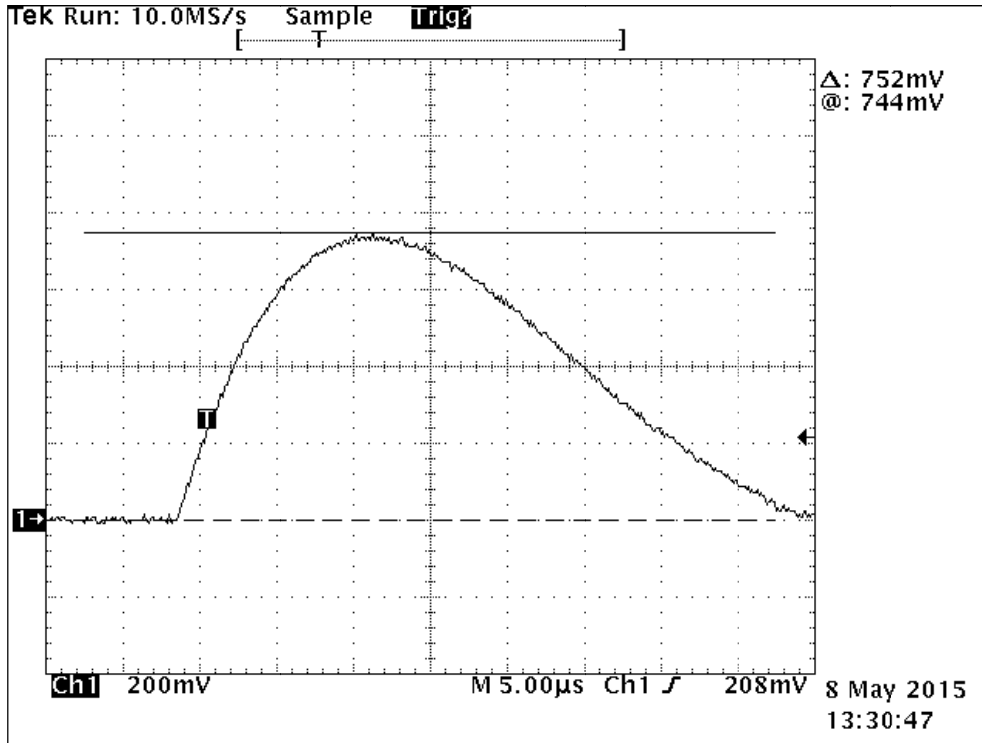
Plot 11-76. Intra-Building or Intra-Site Criteria, +1.2-50us 1500V - peak (0.001V = 1V)



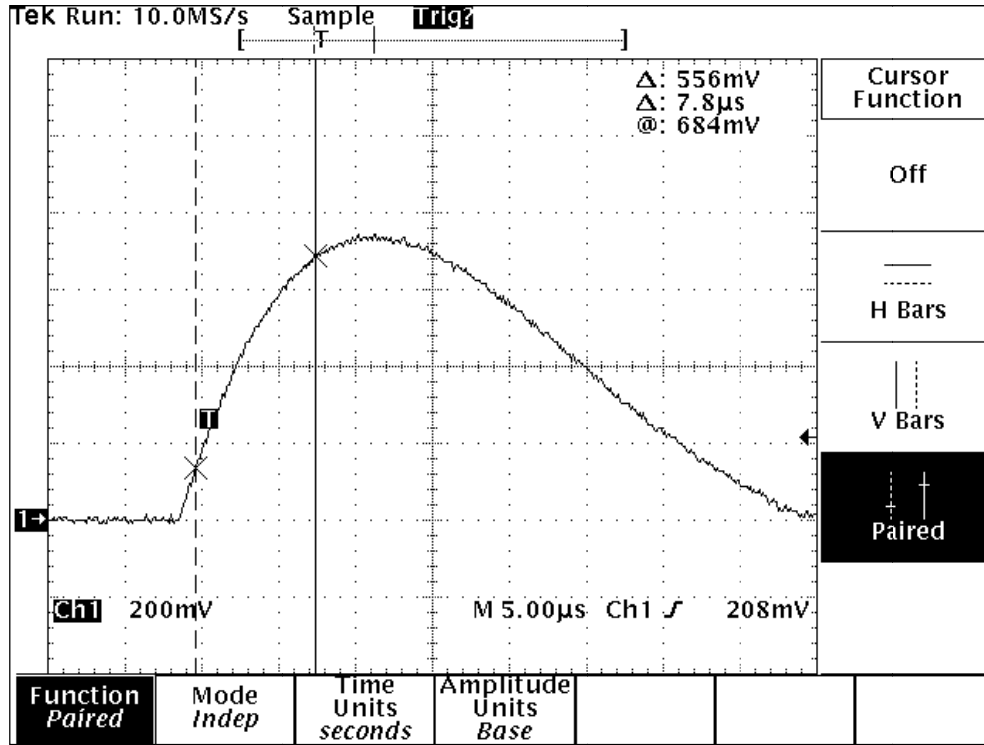
Plot 11-77. Intra-Building or Intra-Site Criteria, +1.2-50us 1500V - Risetime (0.001V = 1V)



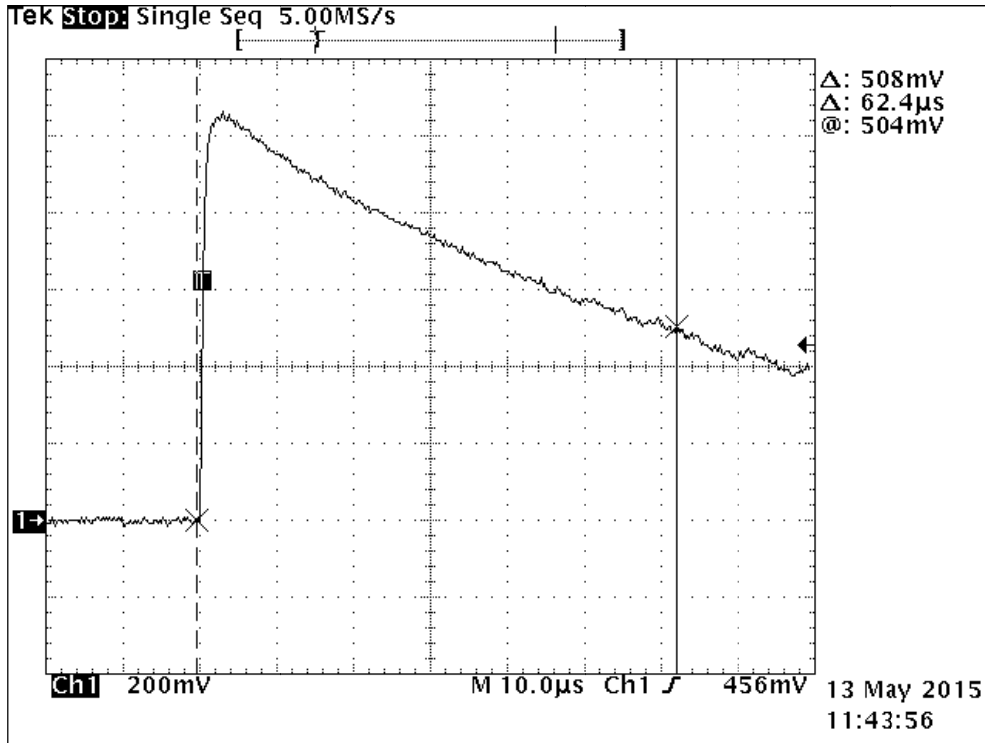
Plot 11-78. Intra-Building or Intra-Site Criteria, +8-20us 750A - Duration (0.001V = 1A)



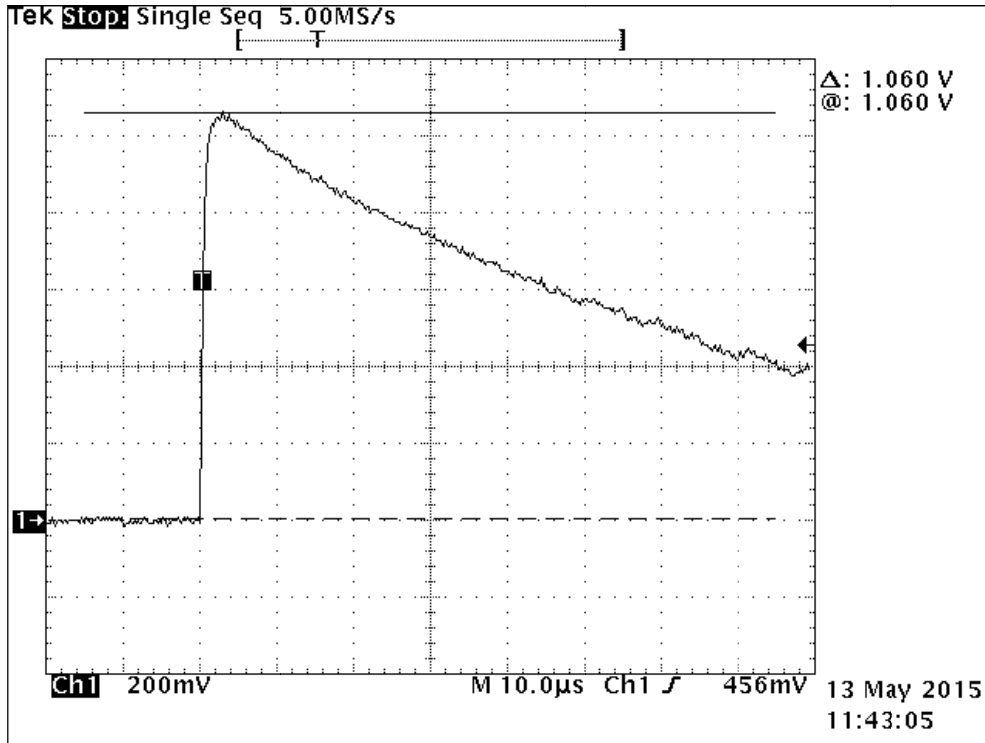
Plot 11-79. Intra-Building or Intra-Site Criteria, +8-20us 750A - peak (0.001V = 1A)



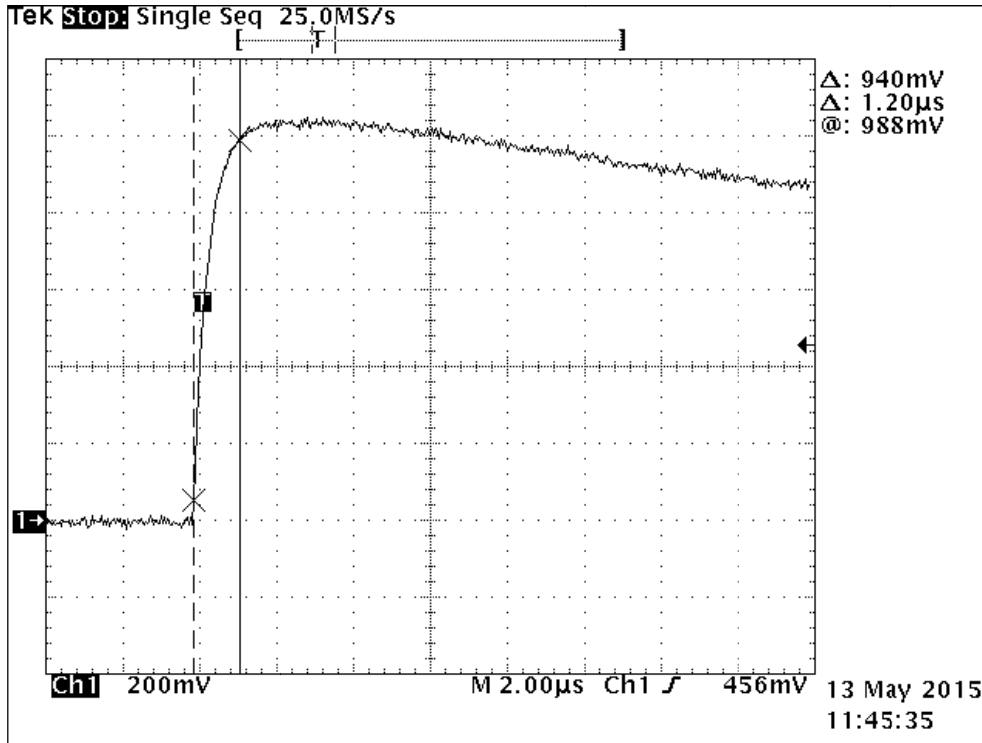
Plot 11-80. Intra-Building or Intra-Site Criteria, +8-20us 750A - Risetime (0.001V = 1A)



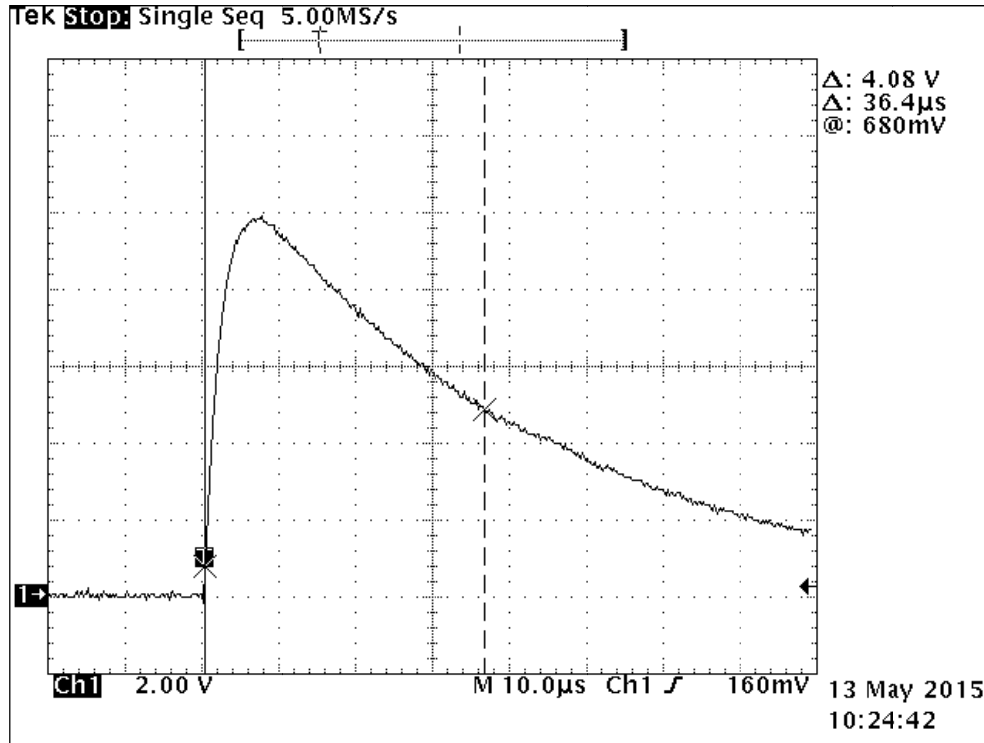
Plot 11-81. Intra-Building or Intra-Site Criteria, +1.2-50us 106V - decay (0.01V = 1V)



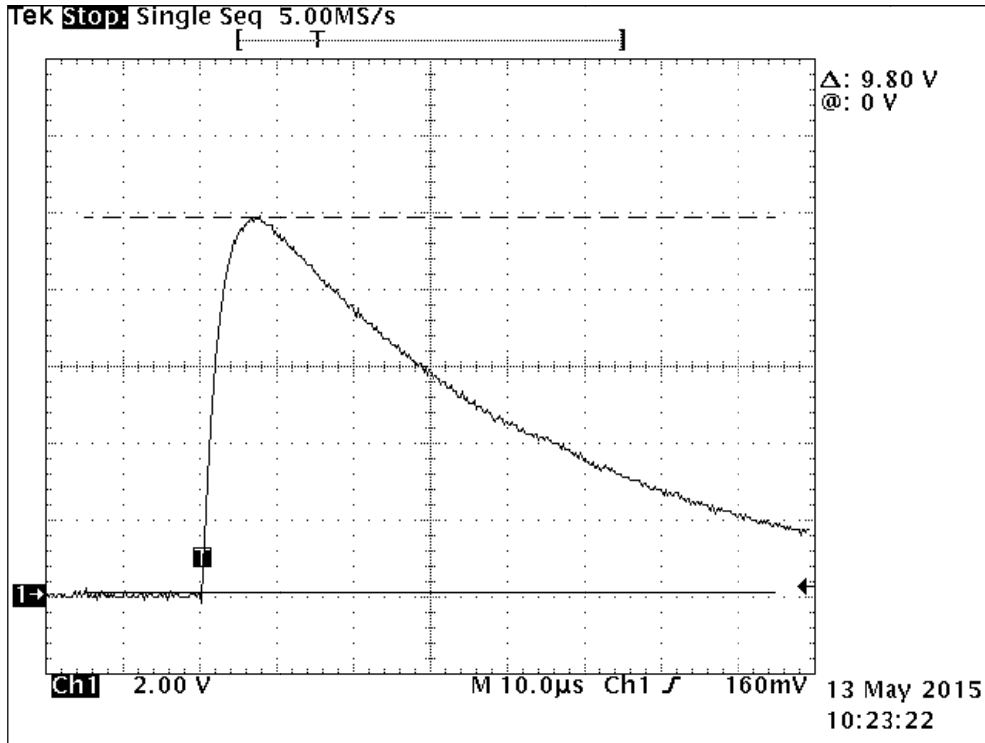
Plot 11-82. Intra-Building or Intra-Site Criteria, +1.2-50us 106V - peak (0.01V = 1V)



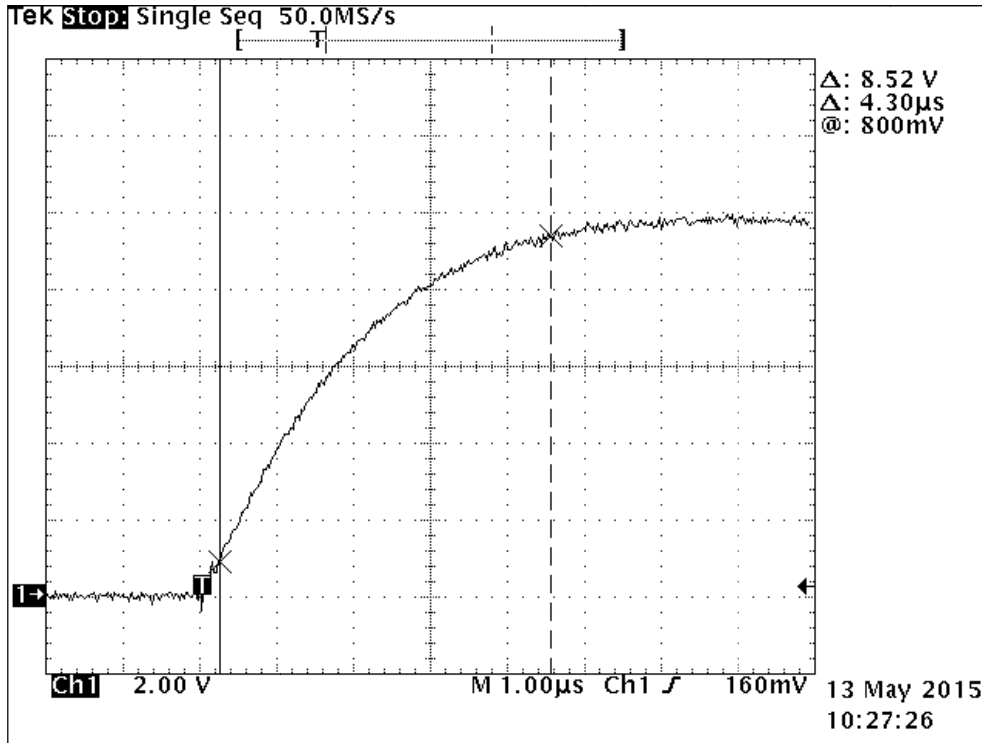
Plot 11-83. Intra-Building or Intra-Site Criteria, +1.2-50us 106V - rise (0.01V = 1V)



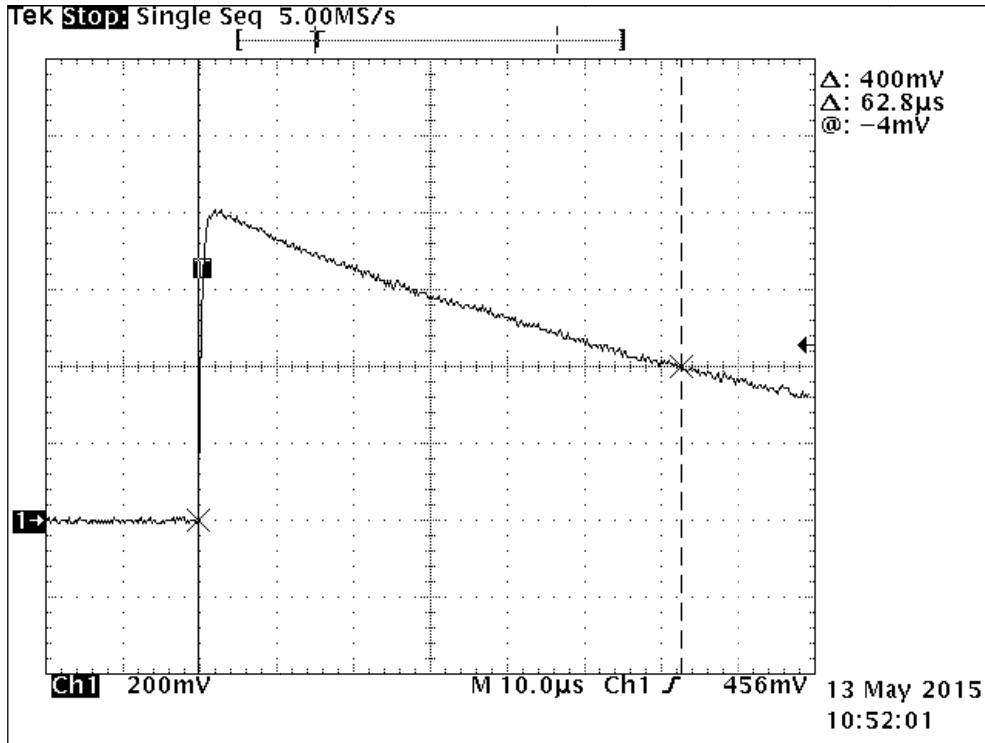
Plot 11-84. Intra-Building or Intra-Site Criteria, +1.2-50us 400A - decay with 6ohms (0.1V = 1A)



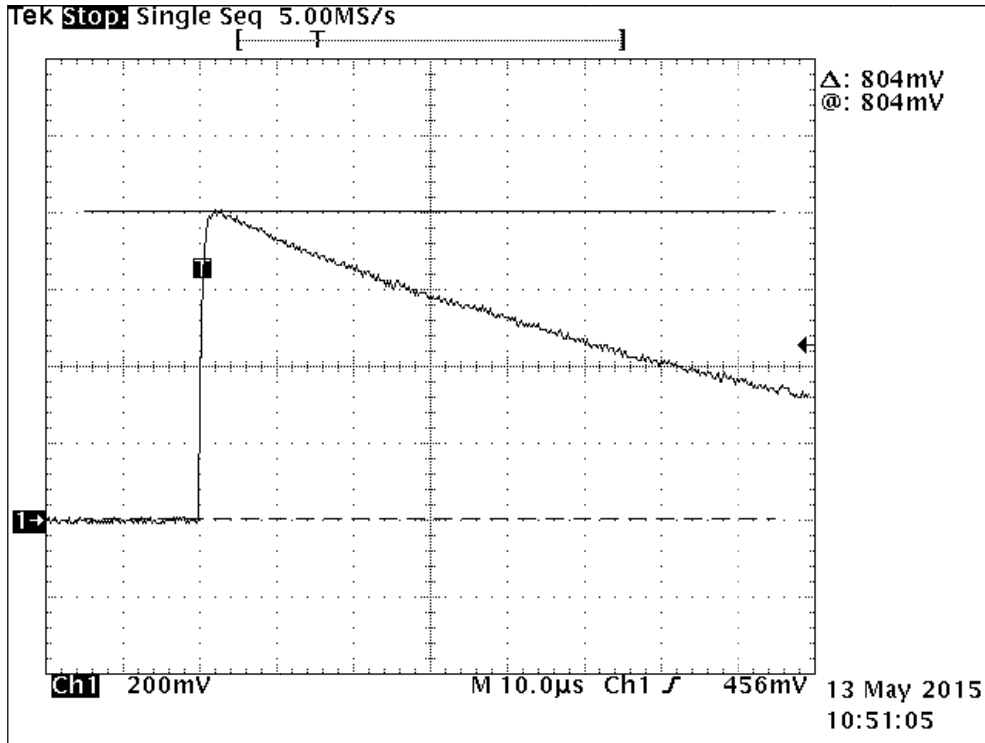
Plot 11-85. Intra-Building or Intra-Site Criteria, +1.2-50us 400A - peak with 6ohms (0.1V = 1A)



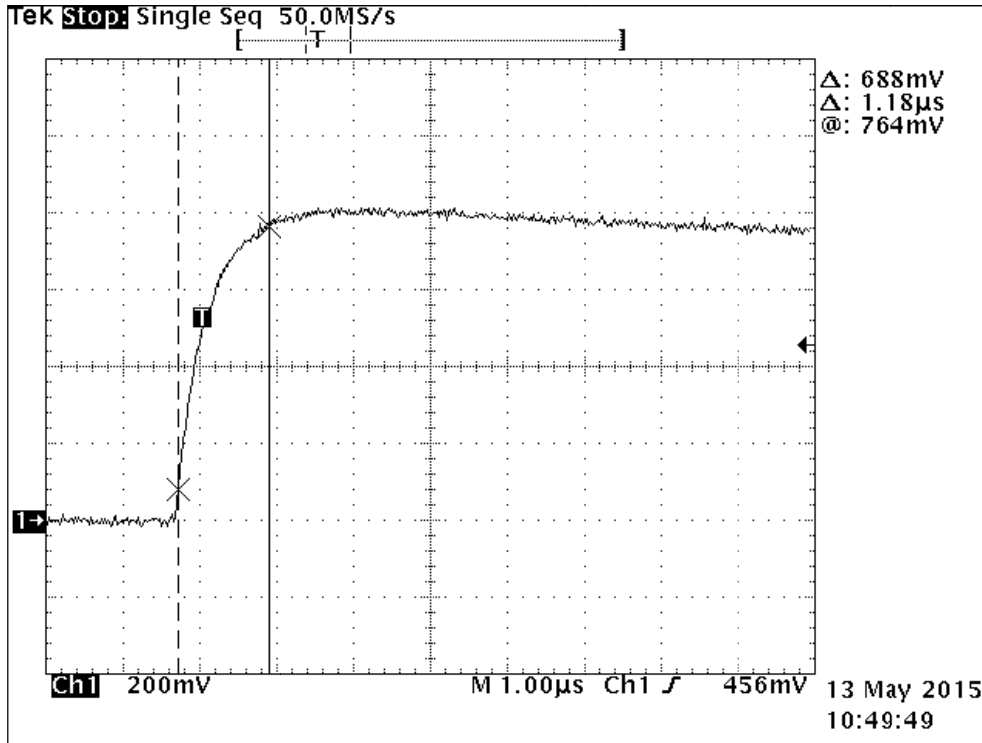
Plot 11-86. Intra-Building or Intra-Site Criteria, +1.2-50us 400A - rise with 6ohms (0.1V = 1A)



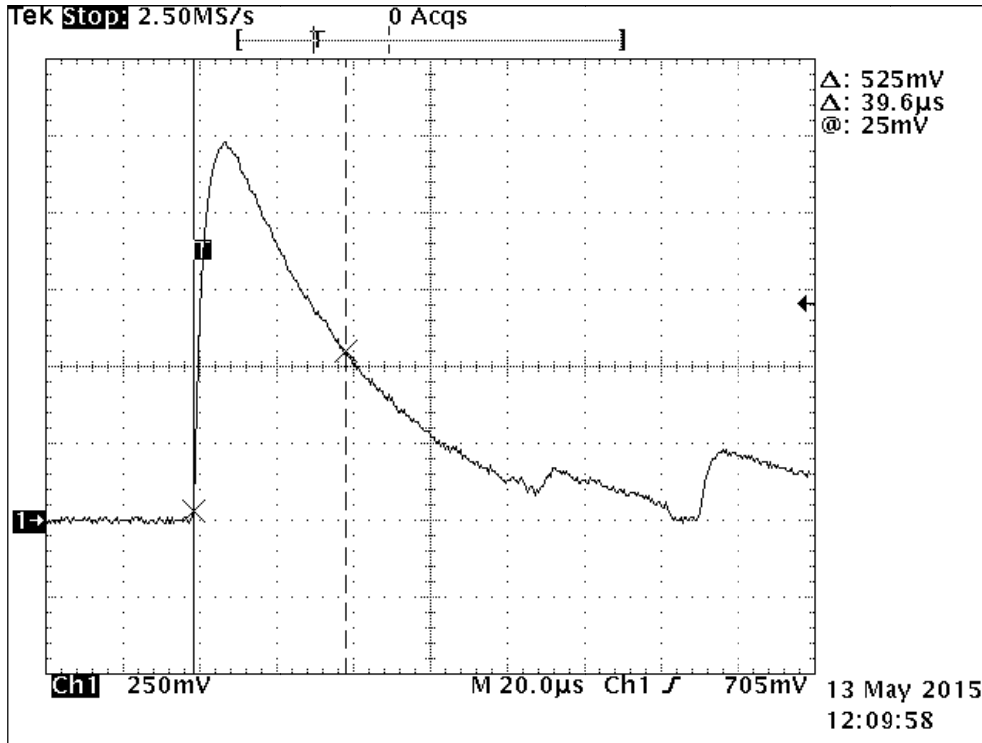
Plot 11-87. Intra-Building or Intra-Site Criteria, +1.2-50us 800V - decay (0.001V = 1V)



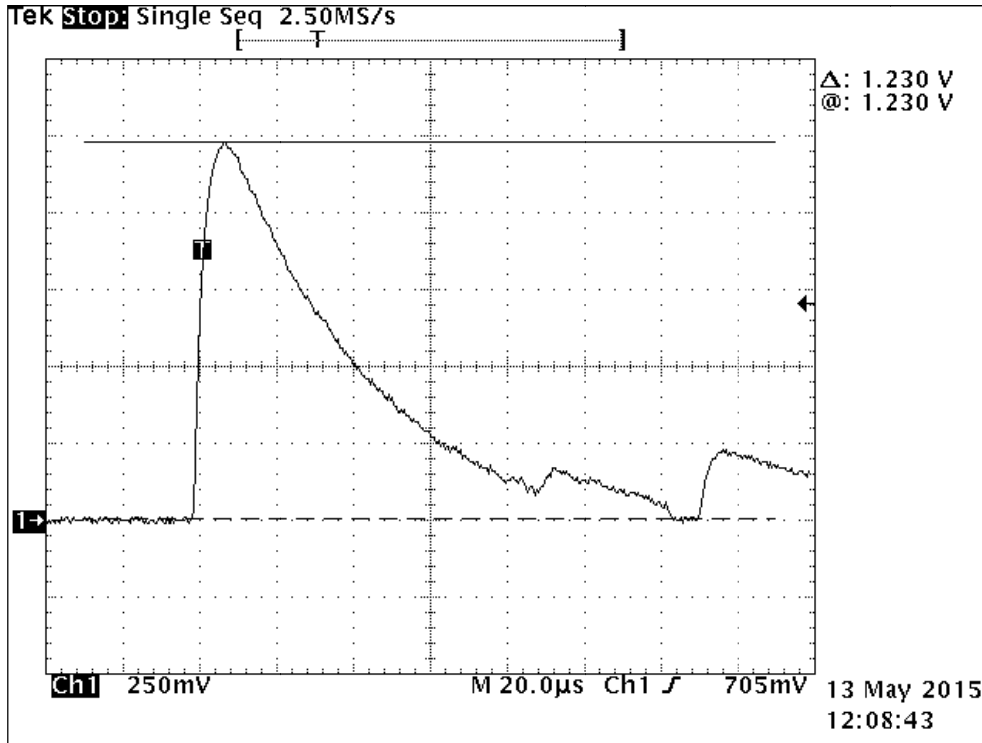
Plot 11-88. Intra-Building or Intra-Site Criteria, +1.2-50us 800V - peak (0.001V = 1V)



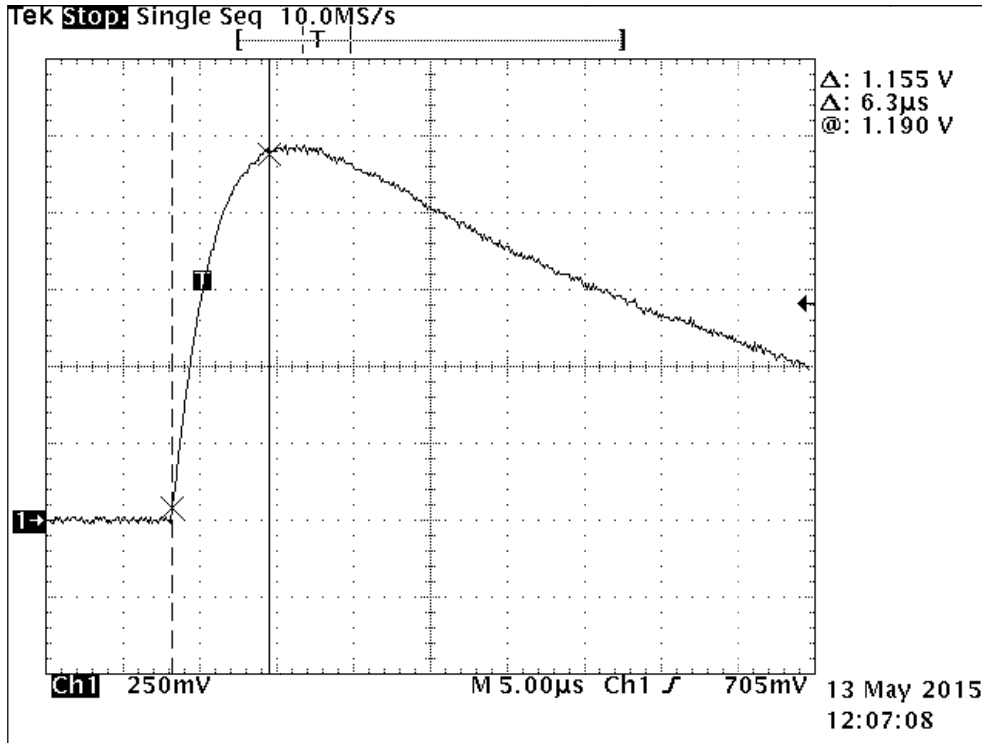
Plot 11-89. Intra-Building or Intra-Site Criteria, +1.2-50us 800V - rise (0.001V = 1V)



Plot 11-90. Intra-Building or Intra-Site Criteria, +1.2-50us Vs current - decay (0.01V = 1A)



Plot 11-91. Intra-Building or Intra-Site Criteria, +1.2-50us Vs current - peak (0.01V = 1A)



Plot 11-92. Intra-Building or Intra-Site Criteria, +1.2-50us Vs current - rise (0.01V = 1A)



MET Laboratories, Inc.

TCG NEBS Compliance Test Report

Customer Name: InfiNet Malta LTD
Product Name: AUX-ODU-LPU-G
Date: June 4, 2015



Photograph 11-4. Intra-Building or Intra-Site Criteria, Test Setup



MET Laboratories, Inc.

Customer Name: InfiNet Malta LTD
Product Name: AUX-ODU-LPU-G
Date: June 4, 2015

TCG NEBS Compliance Test Report

MET #	Equipment	Manufacturer	Model #	Last Cal	Cal Due
4T7187	DIGITIZING OSCILLOSCOPE	TEKTRONIX	TDS680C	3/26/2015	3/26/2016
4T7263	WIDE BAND CURRENT MONITOR	PEARSON ELECTRONICS, INC.	110	8/6/2014	2/6/2016
4T7324	70 MHZ HIGH VOLTAGE DIFFERENTIAL PROBE	SAPPHIRE INSTRUMENTS CO. LTD.	SI-9010	1/30/2015	7/30/2016
4T7061	SURGE GENERATOR	KEYTEK	ECAT SYSTEM	SEE NOTE	
4T7162	SURGE MODULE	KEYTEK	E506-4W	SEE NOTE	
4T7335	ECAT E518 MODULE	KEYTEK	E518	SEE NOTE	
4T7336	ECAT E508 MODULE	KEYTEK	E508	SEE NOTE	
4T7337	ECAT E509 MODULE	KEYTEK	E509	SEE NOTE	

Table 11-9. Intra-Building or Intra-Site Criteria, Test Equipment

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.