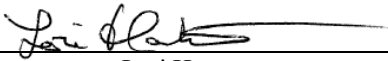
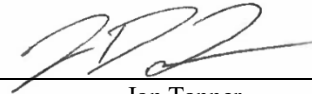


Element Materials Technology Denver-Longmont A.K.A. NTS Labs, LLC

Test Report for Electromagnetic Interference (EMI) Testing of the SHOTOVER System

Prepared For

SHOTOVER Systems | 5660 Airport Boulevard, Suite 101 | Boulder, CO 80301

Prepared ByElement Materials Technology Denver-Longmont | 1736 Vista View Drive | Longmont, CO 80504-5242 | 303-776-7249 | www.element.comEugene DeVito
Program ManagerLori Hartman
PreparerJon Tanner
Technician

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Revision History

Rev.	Description	Issue Date
0	Initial Release	01/09/2026
1	Added Section 16 2 nd Run	01/27/2026

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1.0 Introduction

This document presents the test procedures used and the results obtained during the performance of an Electromagnetic Interference (EMI) test program at Element Materials Technology Denver-Longmont (hereafter referred to as “Element”). The test program was conducted to assess the ability of the specified Equipment Under Test (EUT) to successfully satisfy the requirements defined in the test specification.

2.0 References

The following references listed below form a part of this document to the extent specified herein.

- Test Specification: DO-160G
- SHOTOVER Systems Purchase Order PO-10500 dated 01/17/2025
- Element Quotation OP0666889 dated 11/20/2024
- ISO/IEC 17025:2017(E) *General Requirements for the Competence of Testing and Calibration Laboratories*, dated 11/2017

3.0 Product Selection and Description

SHOTOVER Systems selected and provided the following test sample(s) to be used as the Equipment Under Test.

Table 3.0-1: Product Identification – Equipment Under Test (EUT)

Item	Qty.	Name/Description	Part Number	Serial Number
1	2	SHOTOVER System	012-0000	190026, 190027

3.1 Security Classification

Non-classified

4.0 General Test Requirements

4.1 Test Equipment

The instrumentation used in the performance of these tests is periodically calibrated and standardized within manufacturer's rated accuracies and are traceable to the National Institute of Standards and Technology. The calibration procedures and practices are in accordance with ISO 17025:2017. Certification of calibration is on file subject to inspection by authorized personnel.

5.0 Test Description and Results

Table 5.0-1: Summary of Test Information & Results

Section	Test	Specification	Test Facility	Test Date	Part #	Serial #	Test Result
5.1	Section 15 Magnetic Effect	DO-160G	Longmont	12/31/2025	012-0000	190026	Passed
5.2	Section 17 Voltage Spike	DO-160G	Longmont	01/07/2026	012-0000	190026	Passed
5.3	Section 21.4 – Conducted Emissions	DO-160G	Longmont	12/29/2025	012-0000	190027	Passed
5.4	Section 21.5 – Radiated Emissions	DO-160G	Longmont	12/29/2025	012-0000	190027	Passed
5.5	Section 25 Electrostatic Discharge	DO-160G	Longmont	01/07/2026	012-0000	190026	Passed
5.6	Section 16 2nd Run	DO-160G	Longmont	01/13/2026 - 01/14/2026	012-0000	190026	Passed

The decision rule for Test Results was based on the Test Specification used for testing.

5.1 Section 15 Magnetic Effect

5.1.1 Test Procedure

The EUT was tested in accordance with DO-160G.

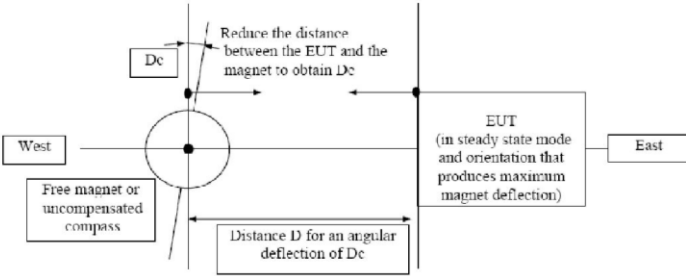
5.1.2 Test Result

The EUT passed the defined requirements.

5.1.3 Test Datasheets

Element Materials Technology			
Section 15 Magnetic Effect (Magnetometer Method) Log			
Date	Time	Log Entries	Initials
12/31/25	1507	Set up for Section 15	JT
	1512	Run Section 15 Calibration	JT
	1519	Run Section 15 Test	JT
Test Performed By: Jon Tanner			

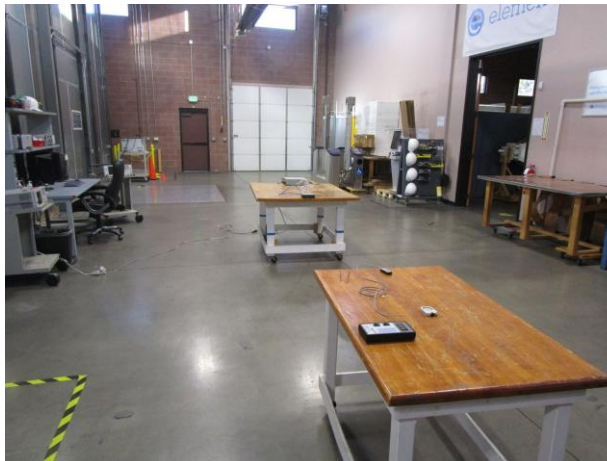
Element Materials Technology			
Magnetic Effect Data Sheet			
The Following is the process for determining the free field A/M used for test Section 15. The process will Calculate the Deflection to use for testing using a calibrated Magnetometer.			
Dc = the equivalent deflection angle to be used in determining equipment category HCFAS = Horizontal Component of Ambient Field Strength A/M = the measured Gauss field converted to A/M (Gauss Field/(4*pi*0.001)) Minimum Ambient Field = $14.4 - (14.4 * 0.1)$ Maximum Ambient Field = $14.4 + (14.4 * 0.1)$ Angular Deflection To Use For Testing = $14.4/(HCAFS \text{ A/M})$. If the calculated value falls between 14.4 +/-10%, 1 degree will be used for the Dc. If the calculated value falls outside of that range, the calculated value will be used as the Dc.			
Measured Values		Calculations	
Gauss Field:	0.1880	A/M:	14.960565
		HCAFS A/M:	14.9606
		Minimum Ambient Field:	12.9600
		Maximum Ambient Field:	15.8400
		Dc:	0.9625
Angular Deflection to use for testing:			1.00
Test Performed By:		Jon Tanner	

Element Materials Technology																									
Magnetic Effect Data Sheet																									
Remarks: The magnetic effect of the equipment shall be determined in terms of the deflection of a compass in a uniform magnetic field (as produced by earth). The horizontal intensity shall be 14.4 A/m +/- 10% when the equipment under test (EUT) is positioned on the East/West line through the pivot of a magnet.																									
<u>Equipment Category</u> Y Z A B C	<u>Distance for a Deflection of Dc</u> D = 0.0m $0 < D \leq 0.3m$ $0.3 < D \leq 1m$ $1m < D \leq 3m$ greater than 3.0 m																								
																									
Angular Deflection to use for testing:																									
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 25%;">Orientation</th> <th style="width: 25%;">Initial Distance</th> <th style="width: 25%;">Distance at Deflection (Dc)</th> <th style="width: 25%;">Category</th> </tr> </thead> <tbody> <tr> <td>Left Side</td> <td>3m</td> <td>0.03</td> <td>Category Z</td> </tr> <tr> <td>Right Side</td> <td>3m</td> <td>0.03</td> <td>Category Z</td> </tr> <tr> <td>Front</td> <td>3m</td> <td>0.03</td> <td>Category Z</td> </tr> <tr> <td>Rear</td> <td>3m</td> <td>0.03</td> <td>Category Z</td> </tr> <tr> <td>Top</td> <td>3m</td> <td>0.03</td> <td>Category Z</td> </tr> </tbody> </table>		Orientation	Initial Distance	Distance at Deflection (Dc)	Category	Left Side	3m	0.03	Category Z	Right Side	3m	0.03	Category Z	Front	3m	0.03	Category Z	Rear	3m	0.03	Category Z	Top	3m	0.03	Category Z
Orientation	Initial Distance	Distance at Deflection (Dc)	Category																						
Left Side	3m	0.03	Category Z																						
Right Side	3m	0.03	Category Z																						
Front	3m	0.03	Category Z																						
Rear	3m	0.03	Category Z																						
Top	3m	0.03	Category Z																						
Test Performed By: Jon Tanner																									

5.1.4 Test Photographs



Section 15 Calibration



Section 15 Setup



Section 15 Deflection



Section 15 Deflection Distance

5.1.5 Test Equipment List

Table 5.1-1: Section 15 Test Equipment List

Asset Number	Asset Name	Manufacturer	Model	Calibrated	Due
US58-A059715	Chamber, Semi Anechoic	Rayproof	SR1	NCR	NCR
US58-A070447	Meter (Gauss)	Walker Scientific	FGM-3D2T	04/24/2024	02/10/2027
US58-A070448	Measurement Tools (Compass)	Sunol Sciences	KB-143/360R G	NCR	NCR

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.2 Section 17 Voltage Spike

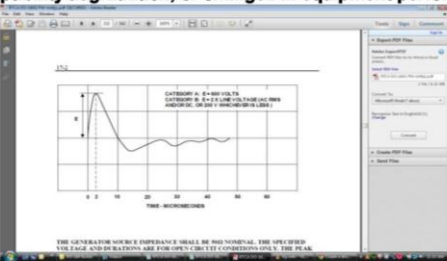
5.2.1 Test Procedure

The EUT was tested in accordance with DO-160G.

5.2.2 Test Result

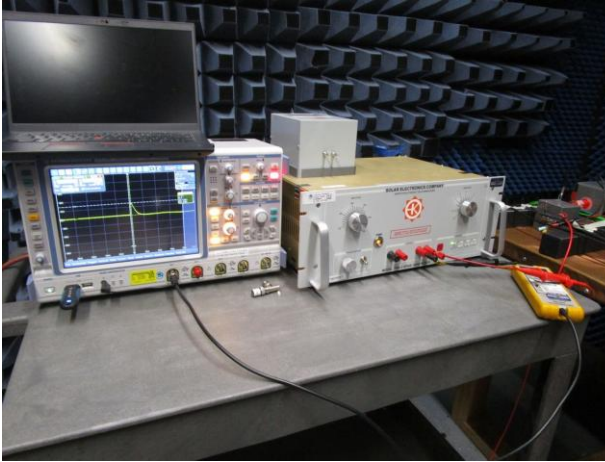
The EUT passed the defined requirements.

5.2.3 Test Datasheets

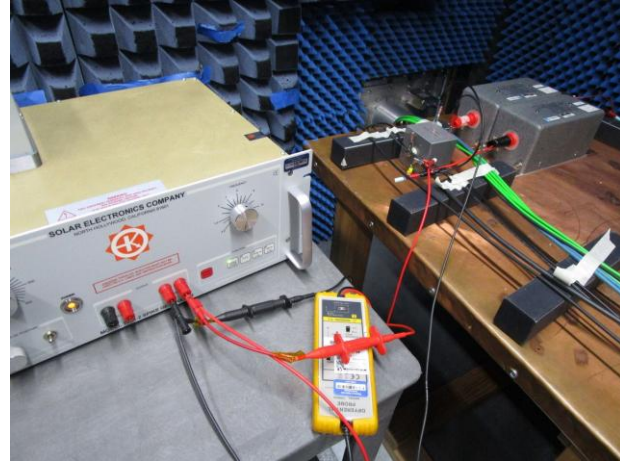
Element Materials Technology							
Voltage Spike Data Sheet							
Remarks: The EUT was monitored for susceptibility during the performance of the test, to include permanent damage, component failure, insulation breakdown, susceptibility degradation, or changes in equipment performance.							
							
Service Branch: Aerospace				Test Level: Category B			
Nominal Voltage: 28				Test Voltage: 2x Line Voltage or 200V whichever is less			
Line Under Test	Test Level (V)	Number of Positive Transients	Duration (S)	Number of Negative Transients	Duration (S)	Pass / Fail	Remarks
Power Leads	56	50	60	50	60	PASS	None
Test Performed By: Jon Tanner							

		Element Materials Technology					
		Section 17 Voltage Spike Log					
Tempera		° F	Humidity:		% RH	Barometer:	kPa
Date	Time	Log Entries					Initials
1/7/26	800	Setup for Section 17					JT
	845	Run Section 17 Category B Waveform Calibration					JT
		EUT would shut off and reboot after connecting to power. Rerun.					JT
	1024	Transformer in parallel. Rerun calibration.					JT
		Unit will not operate as intended with transformer, remove and continue test					JT
	1105	Transformer removed. Rerun calibration with generator in series.					JT
	1117	Run Section 17 Category B Test - Positive Polarity Transients					JT
	1119	Run Section 17 Category B Test - Negative Polarity Transients					JT
		Test Complete					JT
Test Performed By:		Jon Tanner					

5.2.4 Test Photographs



Section 17 Voltage Spike Equipment

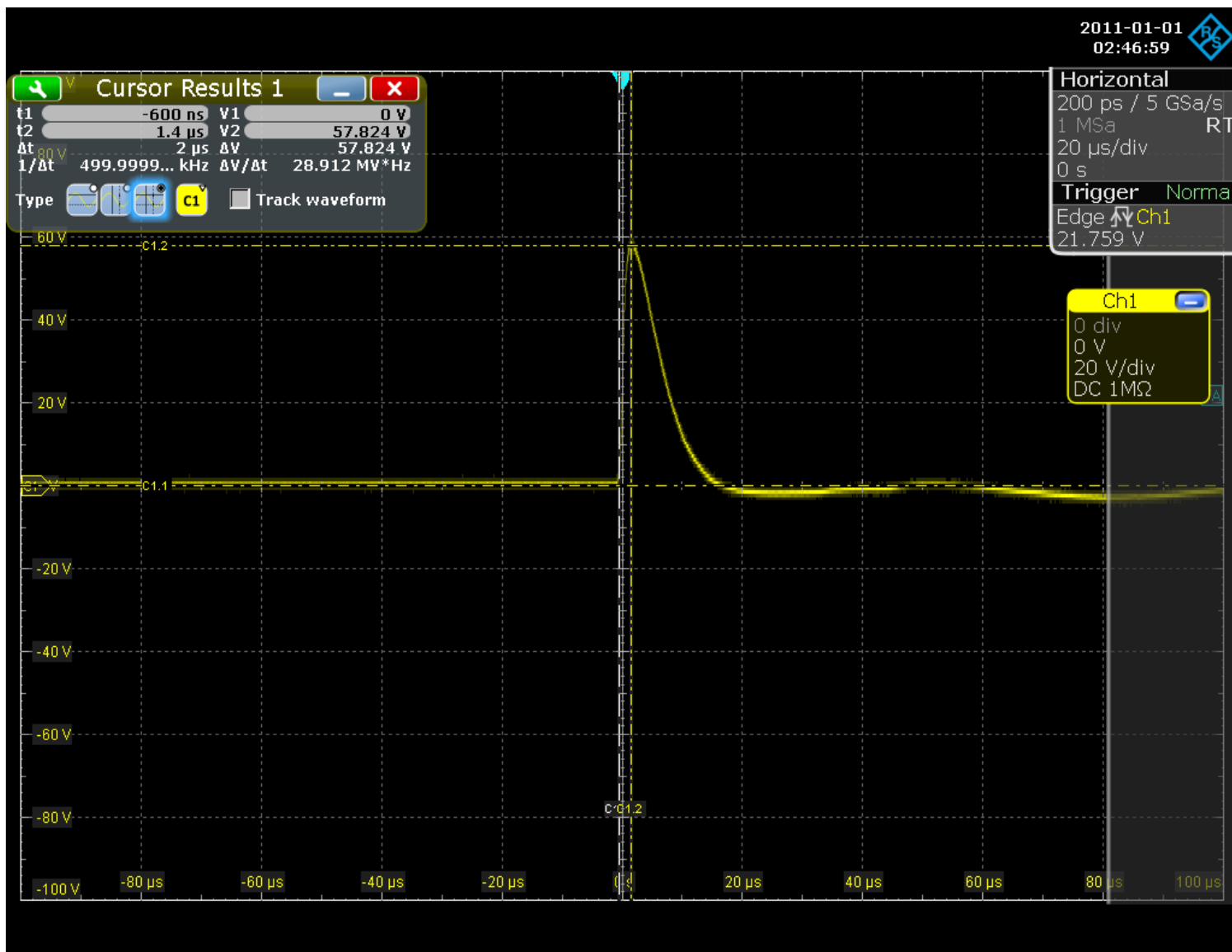


Section 17 Voltage Spike Calibration

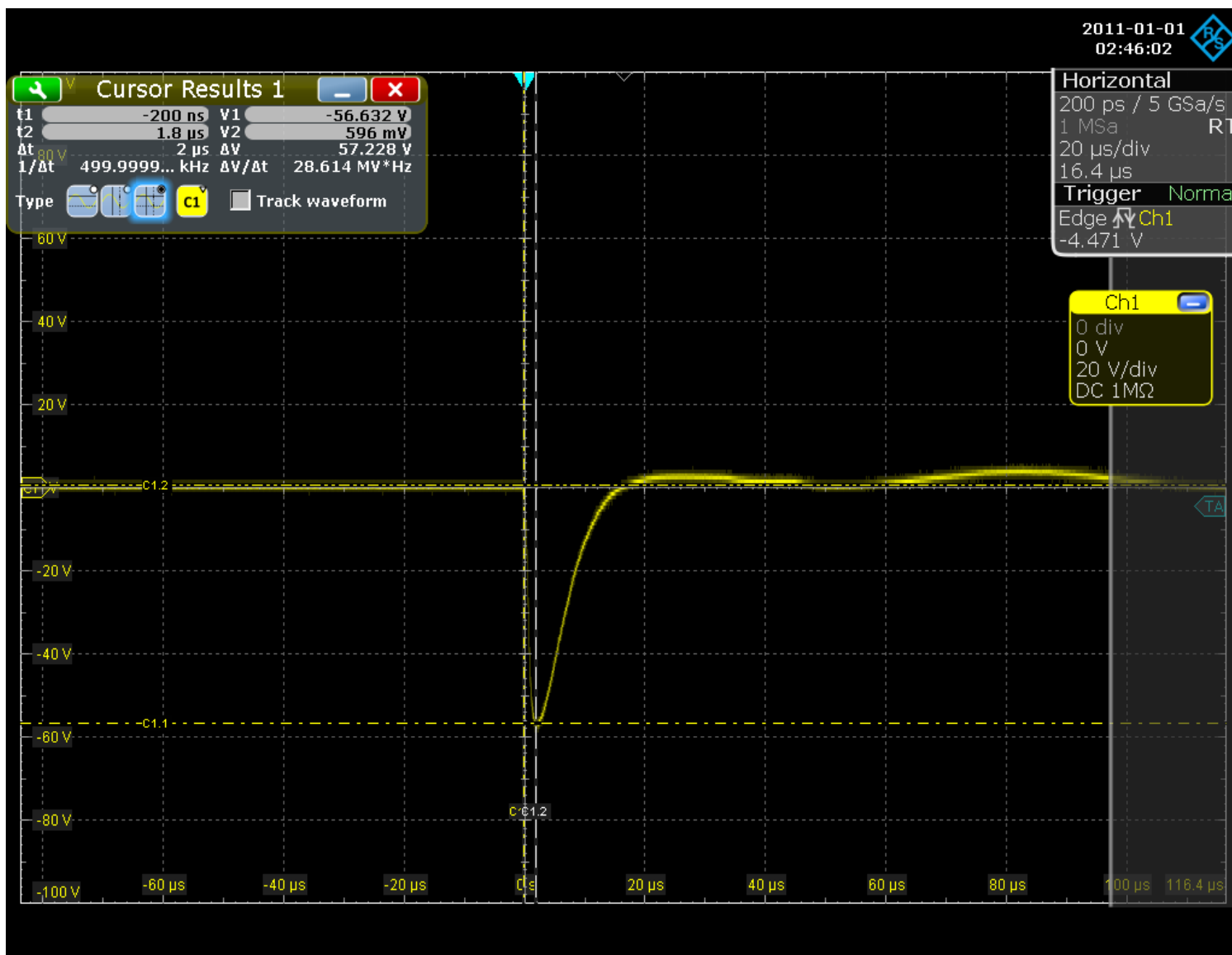


Section 17 Voltage Spike Test

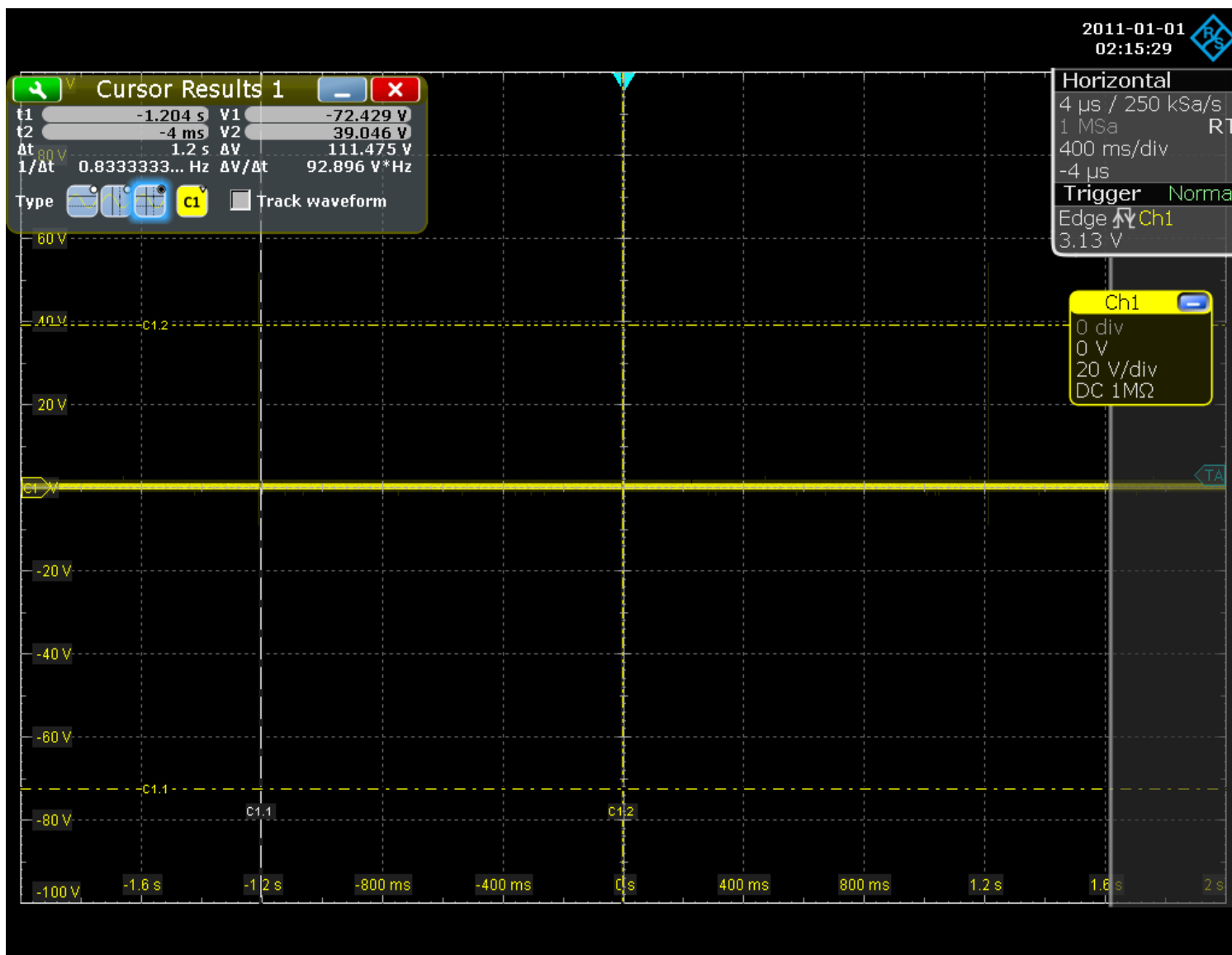
5.2.5 Test Data



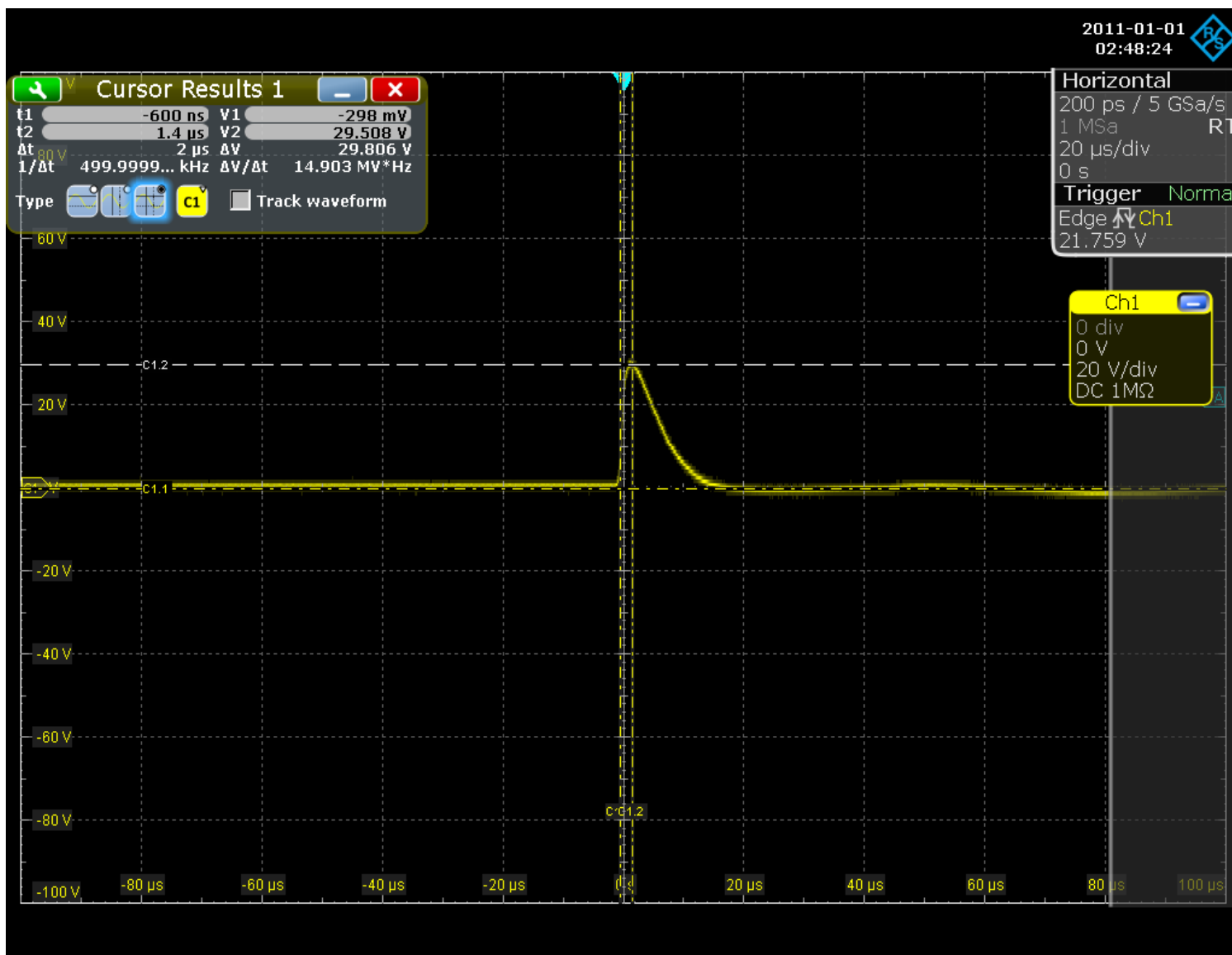
Section 17 Voltage Spike Positive Calibration

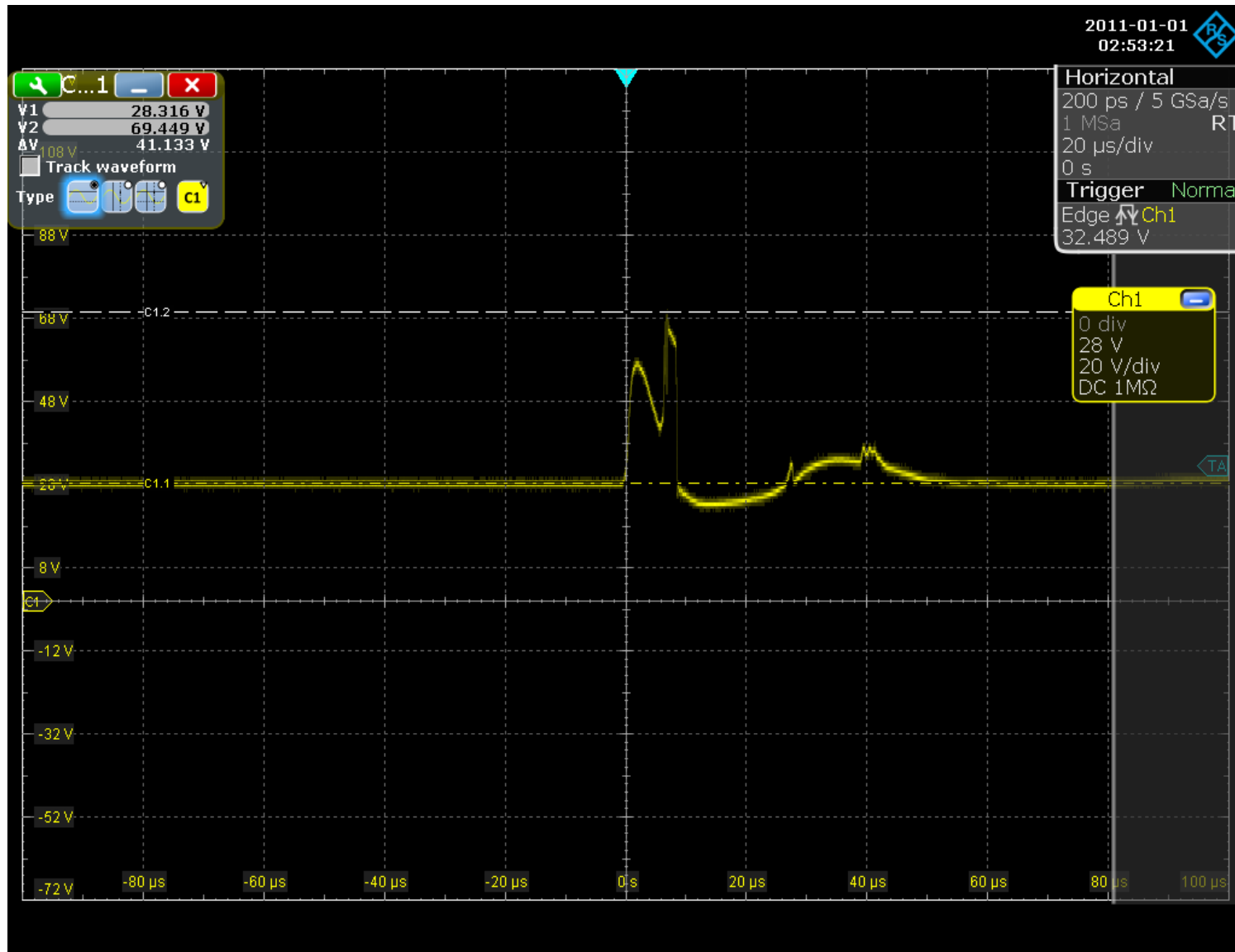


Section 17 Voltage Spike Negative Calibration

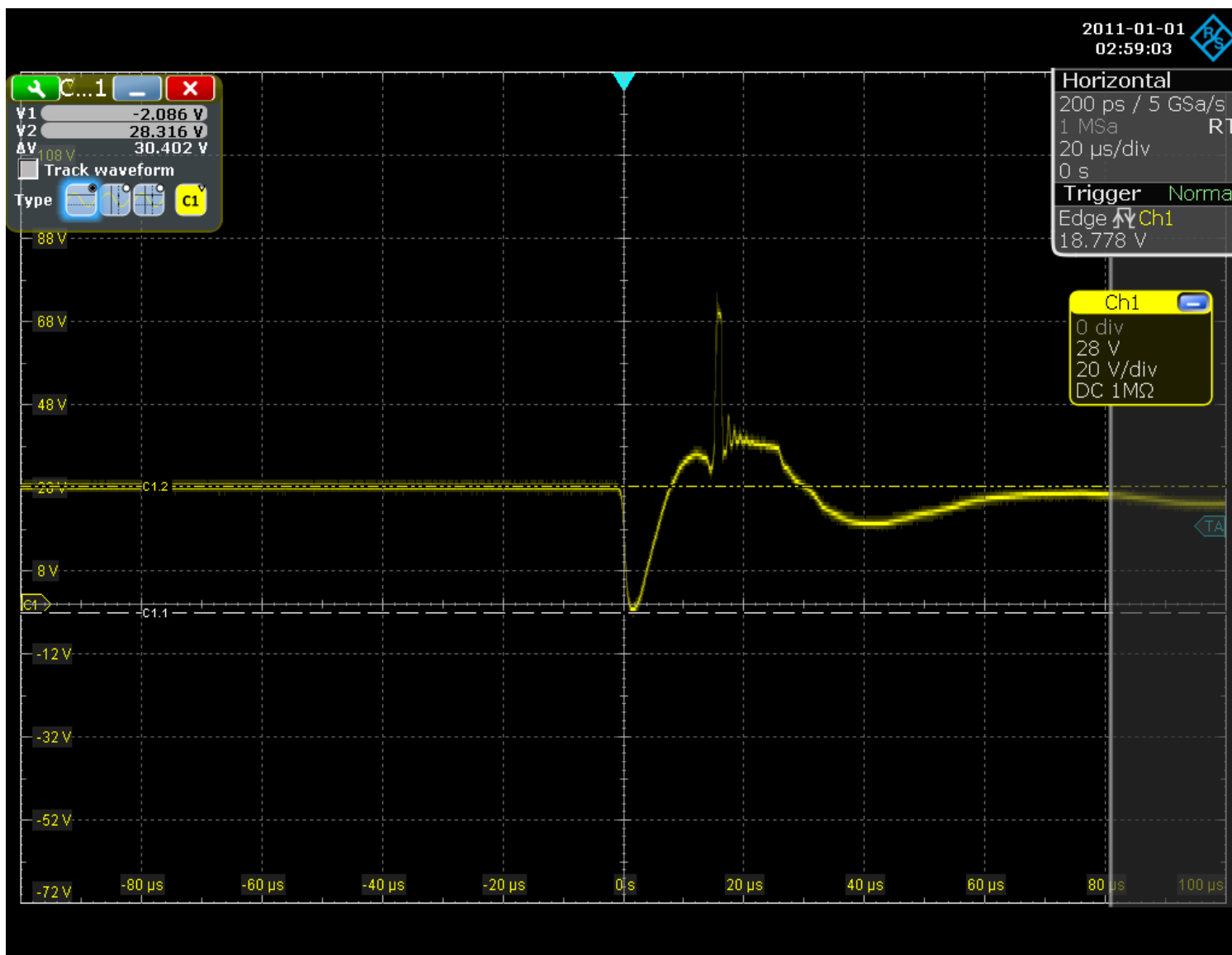


Section 17 Voltage Spike PPS Calibration





Section 17 Voltage Spike Positive Test



Section 17 Voltage Spike Negative Test

5.2.6 Test Equipment List

Table 5.3-1: Section 17 Test Equipment List

Asset Number	Asset Name	Manufacturer	Model	Calibrated	Due
US58-A059715	Chamber, Semi Anechoic	Rayproof	SR1	NCR	NCR
US58-A059545	Network (LISN)	Solar Electronics	6338-5-PJ-50-N	06/13/2022	03/05/2026
US58-A059546	Network (LISN)	Solar Electronics	6338-5-PJ-50-N	06/13/2022	03/05/2026
US58-A076853	Probe (Differential)	Yokogawa	700925	11/27/2024	11/30/2026
US58-A070485	Oscilloscope (Digital)	Rohde & Schwarz	RTE 1104	10/15/2024	10/31/2026
US58-A085371	SPIKE GENERATOR	Solar Electronics	7054-2-115V	02/12/2025	02/28/2026

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.3 Section 21.4 – Conducted Emissions

5.3.1 Test Procedure

The EUT was tested in accordance with DO-160G.

5.3.2 Test Result

The EUT passed the defined requirements.

5.3.3 Test Datasheets

		Element Materials Technology	
		Conducted Emissions Log Sheet	
Date	Time	Log Entries	Initials
12/29/25	0732	Set up for Section 21 Conducted Emissions Category H	JT
	0914	Run Section 21 CE Test Power Bundle	JT
	0946	Run Section 21 CE Test Power Bundle - Remove Ferrite	JT
	1019	Run Section 21 CE Test DSUB Bundle	JT
	1052	Run Section 21 CE Test J1 - Video In	JT
	1123	Run Section 21 CE Test J5 - Video Out	JT
	1155	Run Section 21 CE Test J12 - Hand Controller	JT
		Test Complete	JT
Test Performed By:		Jon Tanner	

		Element Materials Technology					
		Conducted Emissions Bandwidth and Measurement Time					
Remarks: The purpose of this sheet is to meet the requirements of DO-160G Section 21-3 G: "For emission measurements, the entire frequency range for each applicable test shall be scanned. Minimum measurement time for analog measurement receivers during emission testing shall be as specified in Table 1. Synthesized measurement receivers shall step in one-half bandwidth increments or less, and the measurement dwell time shall be as specified in Table 1. Larger receiver bandwidths may be used; however, they may result in higher measured emission levels. NO BANDWIDTH CORRECTION FACTORS SHALL BE APPLIED TO TEST DATA DUE TO THE USE OF LARGER BANDWIDTHS".							
Spectrum Analyzer Used:				Agilent E4446A			
Start Frequency (MHz)	Stop Frequency (MHz)	Minimum Dwell Time (seconds) for Section 21.4 and 21.5	6dB Resolution Bandwidth (MHz)	Minimum measurement time for this band (seconds)	Minimum Number of ranges needed	Minimum Sweep Time for Frequency Band (seconds) for Section 21.6	Frequency Resolution (MHz)
0.15	30	0.015	0.001	0.44775	9	0.04975	0.00041458
30	100	0.015	0.01	1.05	3	0.35	0.00291667
100	400	0.015	0.01	4.5	9	9	0.00416667
Test Performed By:		Jon Tanner					

Element Materials Technology			
Conducted Emissions Data Sheet			
Remarks: The EUT was placed into the normal operating mode during testing.			
Cable Under Test	Test Mode or Configuration	Limit Level	Test Result
Power Bundle	EUT Fully Operational	Category H - Power	Within Limit, Pass
DSUB Bundle	EUT Fully Operational	Category H - Interconnecting	Within Limit, Pass
J1 Video In	EUT Fully Operational	Category H - Interconnecting	Within Limit, Pass
J5 Video Out	EUT Fully Operational	Category H - Interconnecting	Within Limit, Pass
J12 Hand Controller	EUT Fully Operational	Category H - Interconnecting	Within Limit, Pass
Test Performed By:	Jon Tanner		

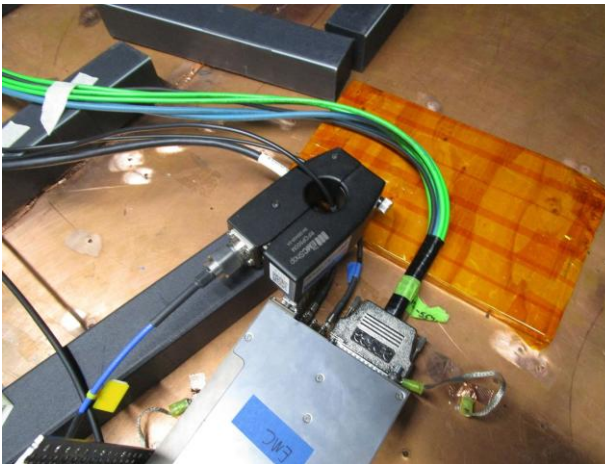
5.3.4 Test Photographs



DO-160 Section 21 CE Power Bundle



DO-160 Section 21 CE DSUB Bundle



DO-160 Section 21 CE J1 Video In



DO-160 Section 21 CE J5 Video Out



DO-160 Section 21 CE J12 Hand Controller

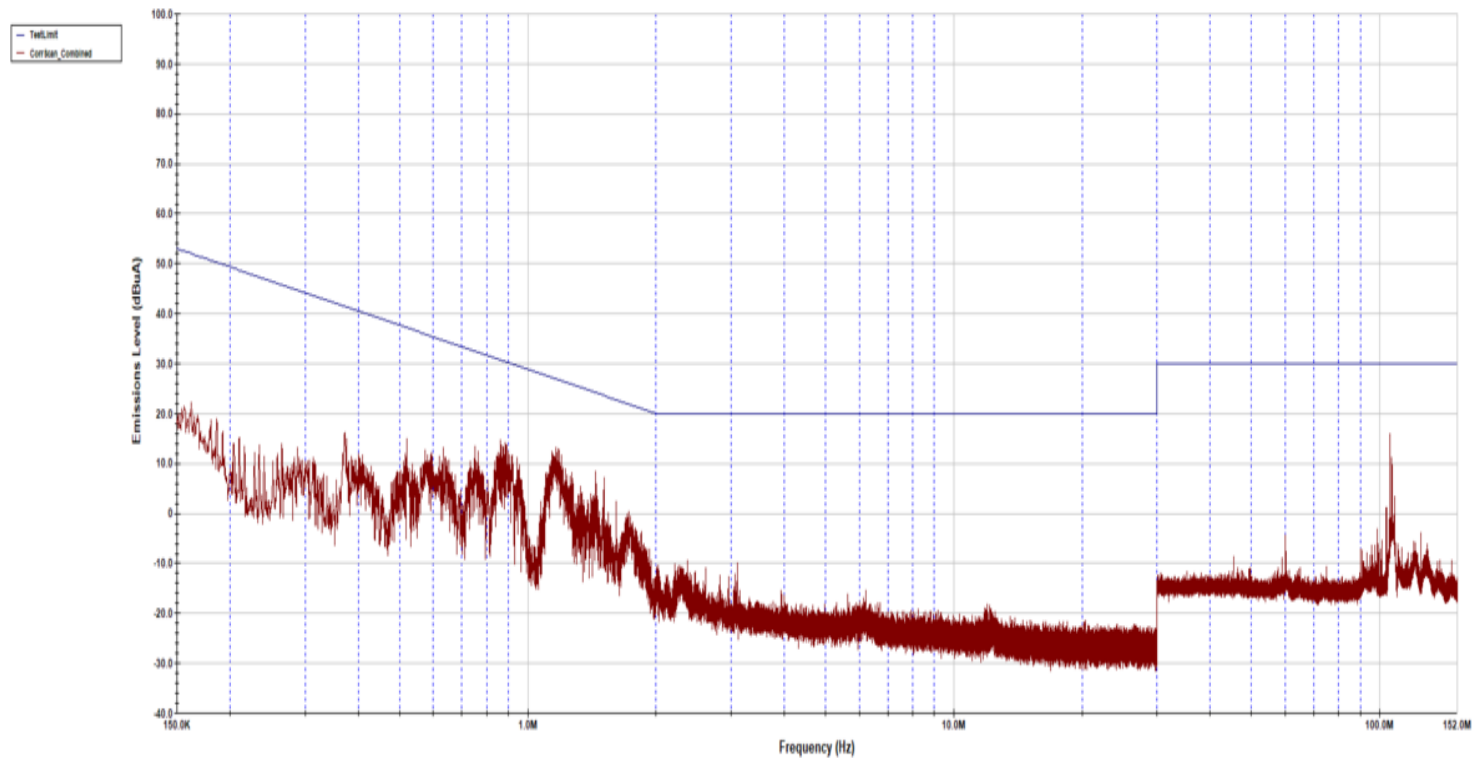
5.3.5 Test Data

RTCA/DO-160G

Section 21 (CE)

Line/Bundle Scan

Project No. - PR188448
Test Item - OSCAR
Model/Part No. - 012.000
Serial No. - 190027
Line/Bundle Under Test - Power Bundle
Mode of Operation - EUT Fully Operational



Operator: Jon Tanner

PR188448 Shotover Section 21 CE Power Bundle.til

Last Data Update 09:45:37 AM, Tuesday, December 30, 2025

Company: SHOTOVER Systems

Contact: Ken Haan

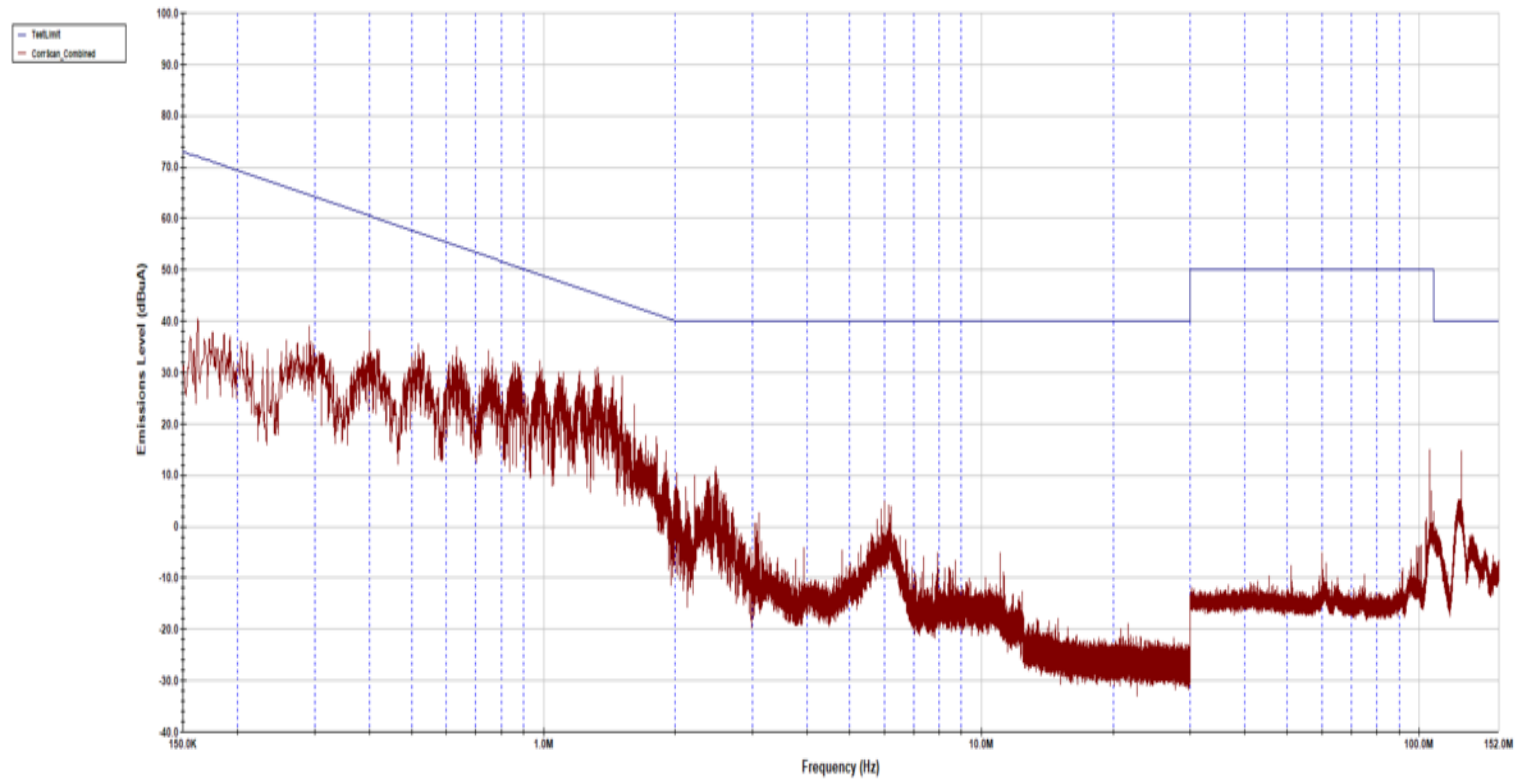
Section 21 CE Power Bundle Graph

RTCA/DO-160G

Section 21 (CE)

Line/Bundle Scan

Project No. - PR188448
Test Item - OSCAR
Model/Part No. - 012-000
Serial No. - 190027
Line/Bundle Under Test - DSUB Bundle
Mode of Operation - EUT Fully Operational



Operator: Jon Tanner

PR188448 Shotover Section 21 CE DSUB.ttl

Last Data Update 10:16:40 AM, Tuesday, December 30, 2025

Company: SHOTOVER Systems

Contact: Ken Haan

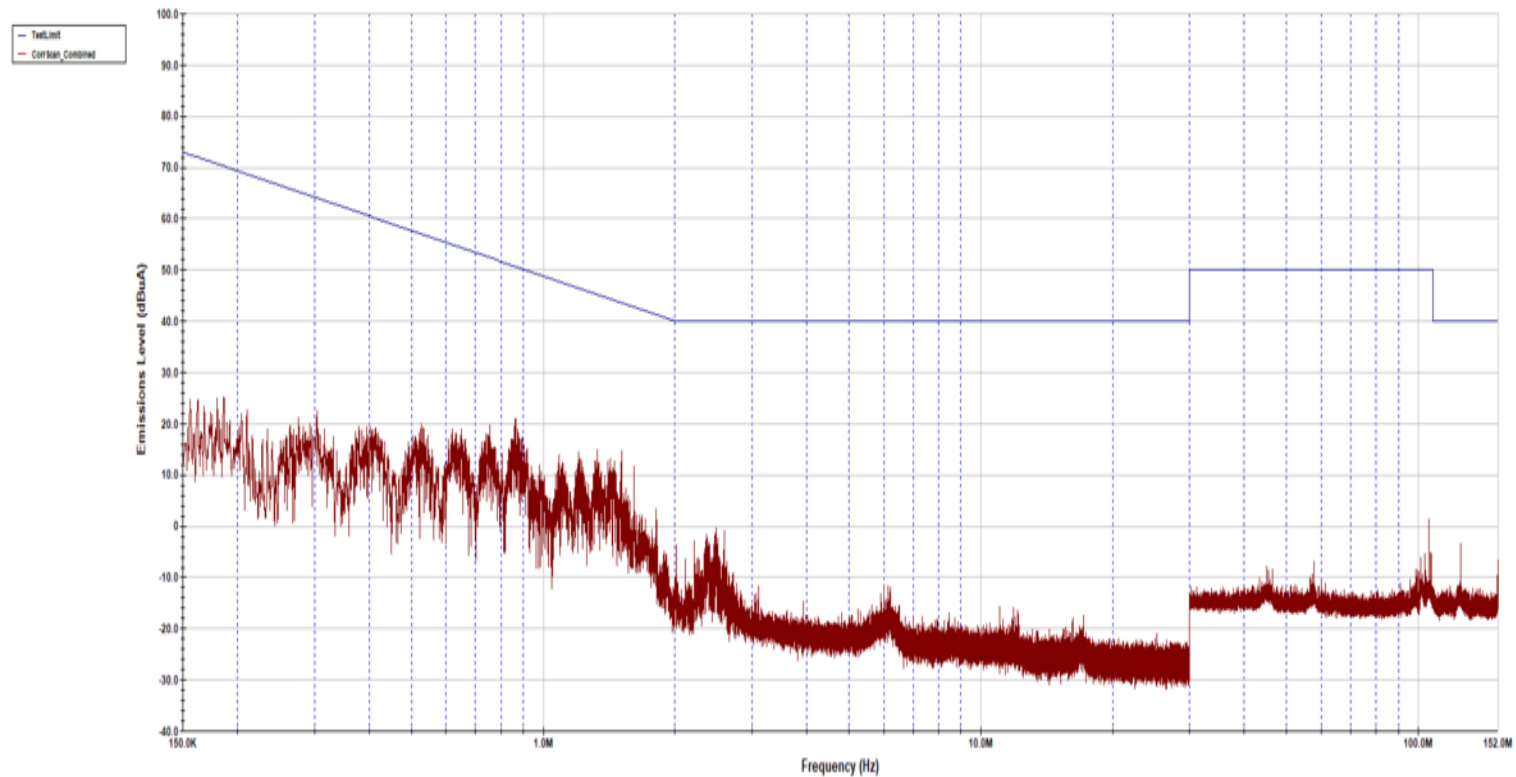
Section 21 CE DSUB Bundle Graph

RTCA/DO-160G

Section 21 (CE)

Line/Bundle Scan

Project No. - PR188448
Test Item - OSCAR
Model/Part No. - 012-000
Serial No. - 190027
Line/Bundle Under Test - J1 - Video In
Mode of Operation - EUT Fully Operational



Operator: Jon Tanner

PR188448 Shotover Section 21 CE J1 Video In.ttl

Last Data Update 10:47:55 AM, Tuesday, December 30, 2025

Company: SHOTOVER Systems

Contact: Ken Haan

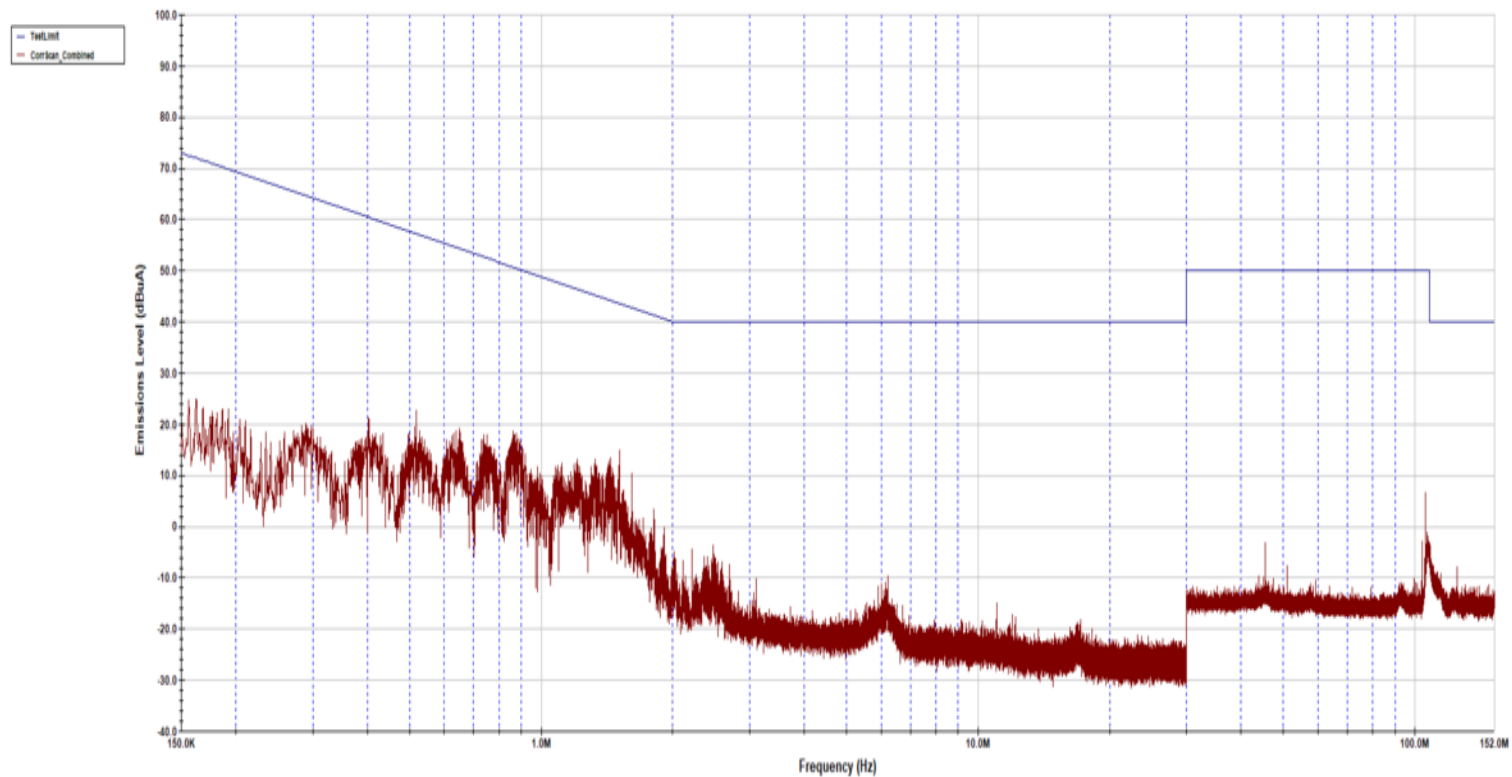
Section 21 CE J1 Video In Graph

RTCA/DO-160G

Section 21 (CE)

Line/Bundle Scan

Project No. - PR188448
Test Item - OSCAR
Model/Part No. - 012-000
Serial No. - 190027
Line/Bundle Under Test - J5 - Video Out
Mode of Operation - EUT Fully Operational



Operator: Jon Tanner

PR188448 Shotover Section 21 CE J5 Video Out.tif

Last Data Update 11:18:27 AM, Tuesday, December 30, 2025

Company: SHOTOVER Systems

Contact: Ken Haan

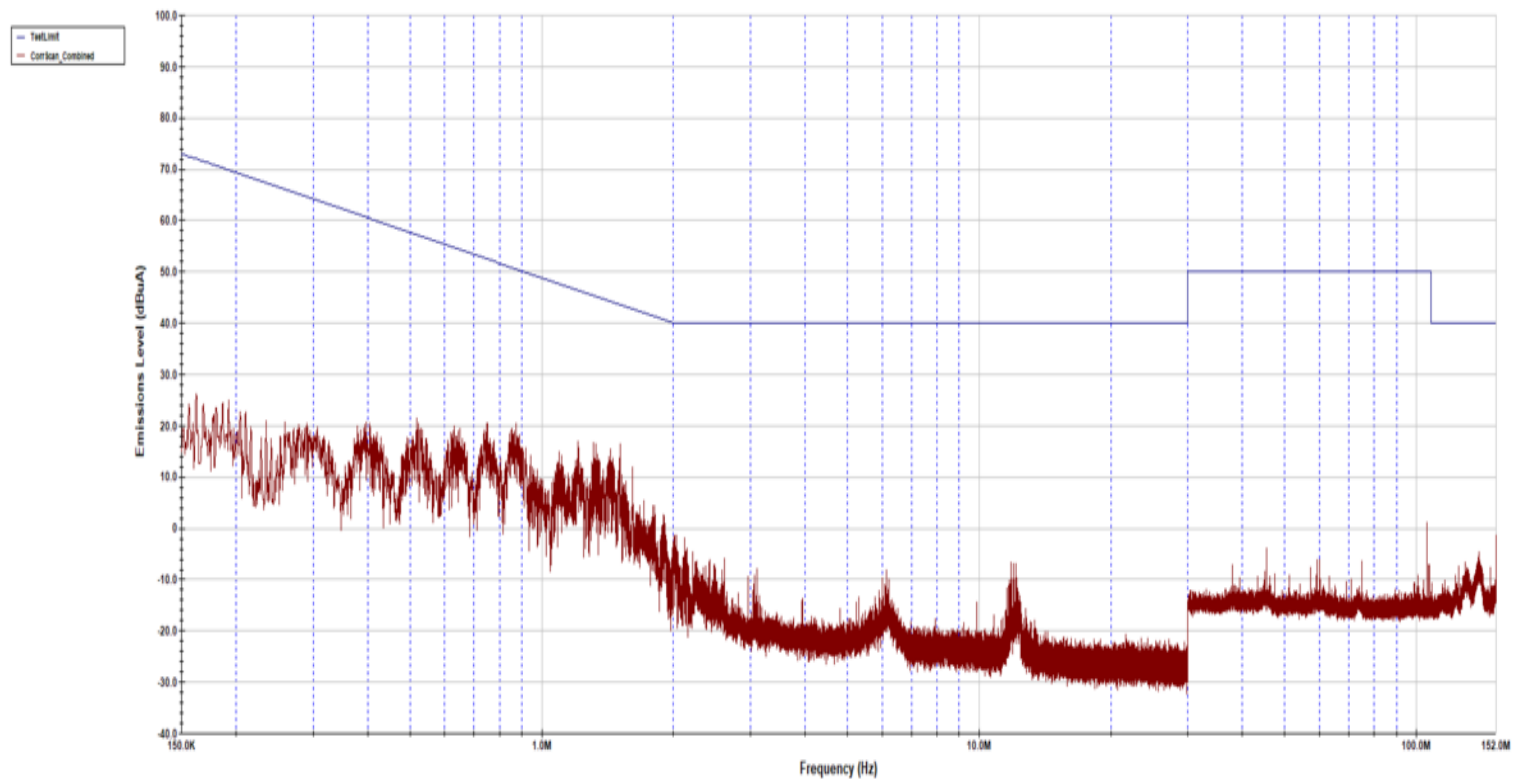
Section 21 CE J5 Video Out Graph

RTCA/DO-160G

Section 21 (CE)

Line/Bundle Scan

Project No. - PR188448
Test Item - OSCAR
Model/Part No. - 012-000
Serial No. - 190027
Line/Bundle Under Test - J12 - Hand Controller
Mode of Operation - EUT Fully Operational



Operator: Jon Tanner

PR188448 Shotover Section 21 CE J12 Hand Controller.ttl

Last Data Update 12:13:08 PM, Tuesday, December 30, 2025

Company: SHOTOVER Systems

Contact: Ken Haan

Section 21 CE J12 Hand Controller Graph

5.3.6 Test Equipment List

Table 5.4-1: Section 21.4 - Conducted Emissions Test Equipment List

Asset Number	Asset Name	Manufacturer	Model	Calibrated	Due
US58-A059715	Chamber, Semi Anechoic	Rayproof	SR1	NCR	NCR
US58-A084410	Cable (Test)	Pasternack	PE-302-72	NCR	NCR
US58-A084411	Cable (Test)	Pasternack	PE-302-72	NCR	NCR
US58-A070402	Cable (Test)	Unknown	Teledyne 90-195-048	NCR	NCR
US58-A053193	Spectrum Analyzer	Agilent Technologies	E4440A	08/01/2025	08/01/2026
US58-A084396	Current Monitor Probe	The EMC Shop	RFCP500M	03/18/2024	03/18/2026
US58-A059545	Network (LISN)	Solar Electronics	6338-5-PJ-50-N	06/13/2022	03/05/2026
US58-A059546	Network (LISN)	Solar Electronics	6338-5-PJ-50-N	06/13/2022	03/05/2026

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.4 Section 21.5 – Radiated Emissions

5.4.1 Test Procedure

The EUT was tested in accordance with DO-160G.

5.4.2 Test Result

The EUT failed the defined requirements.

5.4.3 Test Datasheets

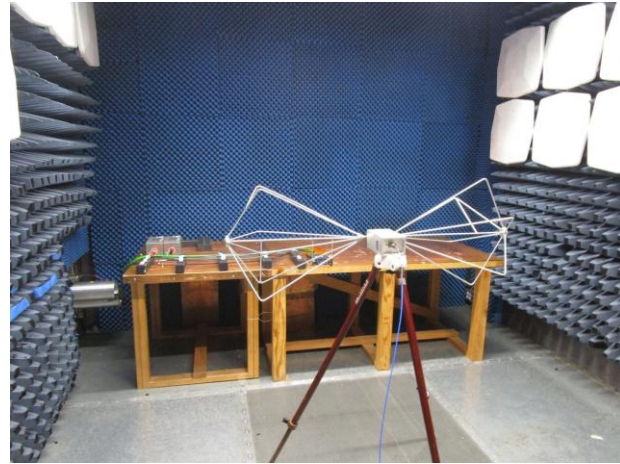
Element Materials Technology			
Section 21 Radiated Emissions Log			
Date	Time	Log Entries	Initials
12/29/25	1224	Set up for Section 21 Radiated Emissions Category H	JT
	1248	Run Section 21 RE 100-200MHz Test Vertical	JT
	1339	Run Section 21 RE 100-200MHz Ambient Vertical	JT
	1352	Run Section 21 RE 100-200MHz Test Horizontal	JT
	1402	Run Section 21 RE 200MHz-1GHz Test Horizontal	JT
	1421	Run Section 21 RE 200MHz-1GHz Test Vertical	JT
	1447	Run Section 21 RE 1-6GHz Test Vertical Position 1	JT
	1450	Run Section 21 RE 1-6GHz Ambient Vertical Position 1	JT
	1457	Run Section 21 RE 1-6GHz Test Horizontal Position 1	JT
	1503	Run Section 21 RE 1-6GHz Test Horizontal Position 2	JT
	1509	Run Section 21 RE 1-6GHz Test Vertical Position 2	JT
		Test Complete	JT
Test Performed By: Jon Tanner			

			Element Materials Technology			
			Conducted Emissions Data Sheet			
Remarks:						
Service Branch: Aerospace				Test Level: Category M		
Tile Software Version:		Tile7				
Start Frequency (MHz)	Stop Frequency (MHz)	6dB Bandwidth (kHz)	Limit	Mode of Operation	Pass / Fail	Remarks
100	400	10	Category M	EUT Fully Operational	PASS	None
400	960	10	Category M	EUT Fully Operational	PASS	None
960	1000	100	Category M	EUT Fully Operational	PASS	None
1000	6000	1000	Category M	EUT Fully Operational	PASS	None
Test Performed By:			Jon Tanner			

5.4.4 Test Photographs



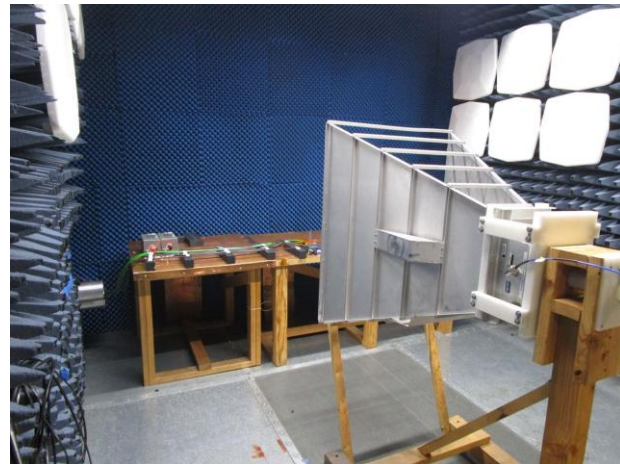
DO-160 Section 21 RE 100-200MHz Vertical



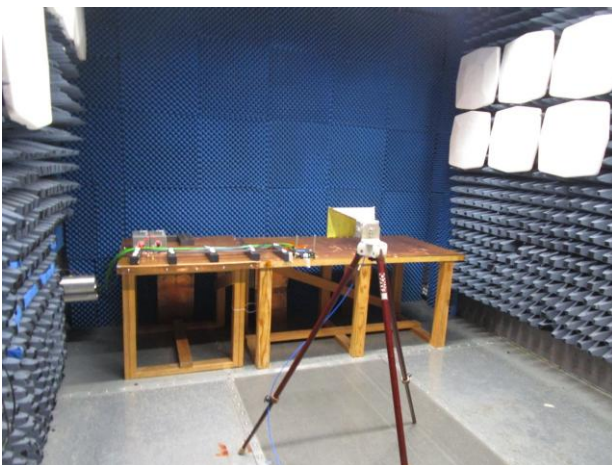
DO-160 Section 21 RE 100-200MHz Horizontal



DO-160 Section 21 RE 200MHz-1GHz Vertical



DO-160 Section 21 RE 200MHz-1GHz Horizontal



DO-160 Section 21 RE 1-6GHz Vertical Position 1



DO-160 Section 21 RE 1-6GHz Horizontal Position 1

RTCA/DO-160G

Section 21 (RE)

Vertical Scan

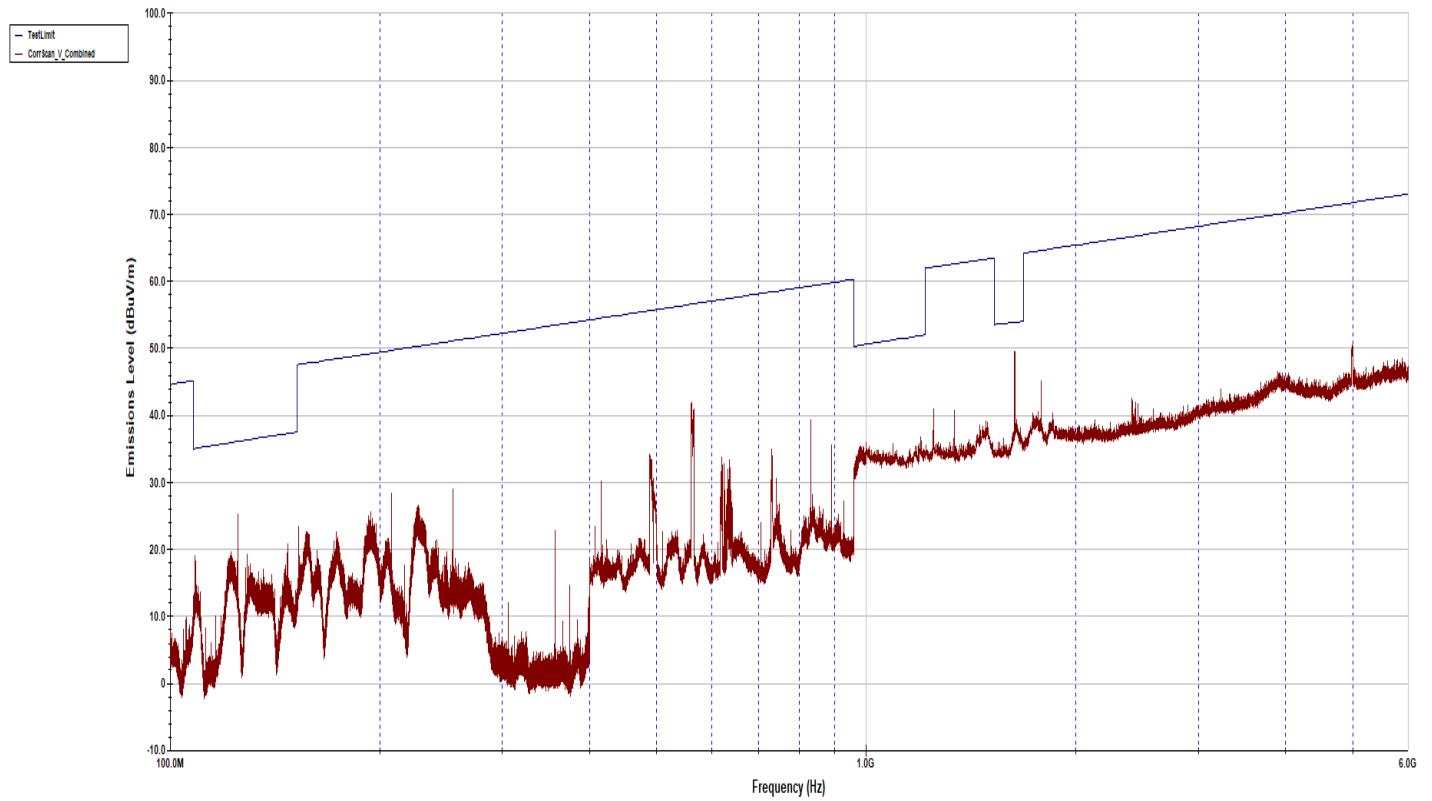
Project No. - PR188448

Test Item - OSCAR

Model/Part No. - 012-000

Serial No. - 190027

Mode of Operation - EUT Fully Operational



Operator: Jon Tanner

PR188448 SHOTOVER Sec 21 RE Test Position 1.til

Last Data Update 12:18:57 PM, Tuesday, December 30, 2025

Company: SHOTOVER Systems

Contact: Ken Haan

Section 21 RE 100MHz-6GHz Vertical Position 1

RTCA/DO-160G

Section 21 (RE)

Horizontal Scan

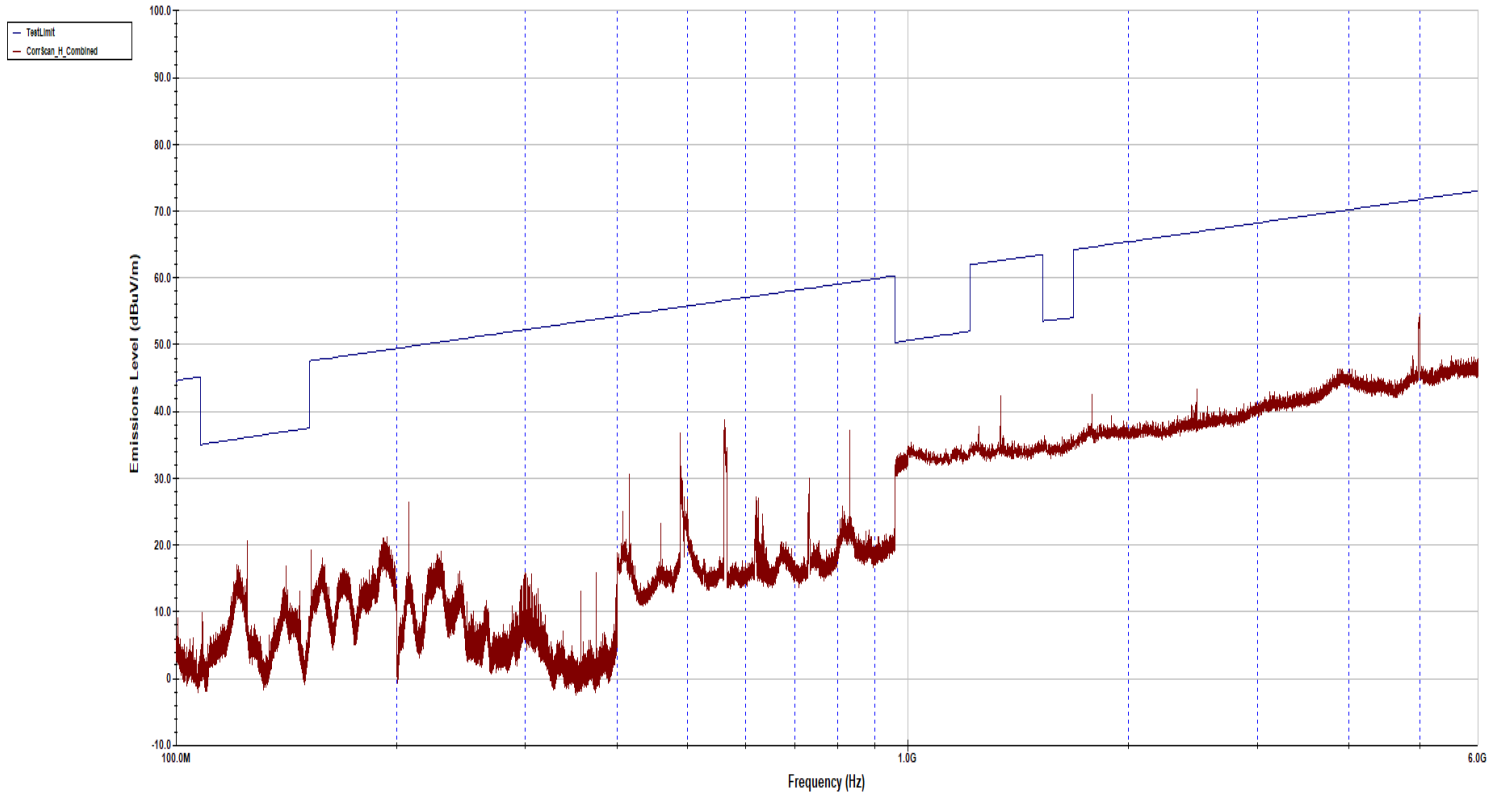
Project No. - PR188448

Test Item - OSCAR

Model/Part No. - 012-000

Serial No. - 190027

Mode of Operation - EUT Fully Operational



Operator: Jon Tanner

PR188448 SHOTOVER Sec 21 RE Test Position 1.til

Company: SHOTOVER Systems

Last Data Update 12:18:57 PM, Tuesday, December 30, 2025

Contact: Ken Haan

Section 21 RE 100MHz-6GHz Horizontal Position 1

RTCA/DO-160G

Section 21 (RE)

Vertical Scan

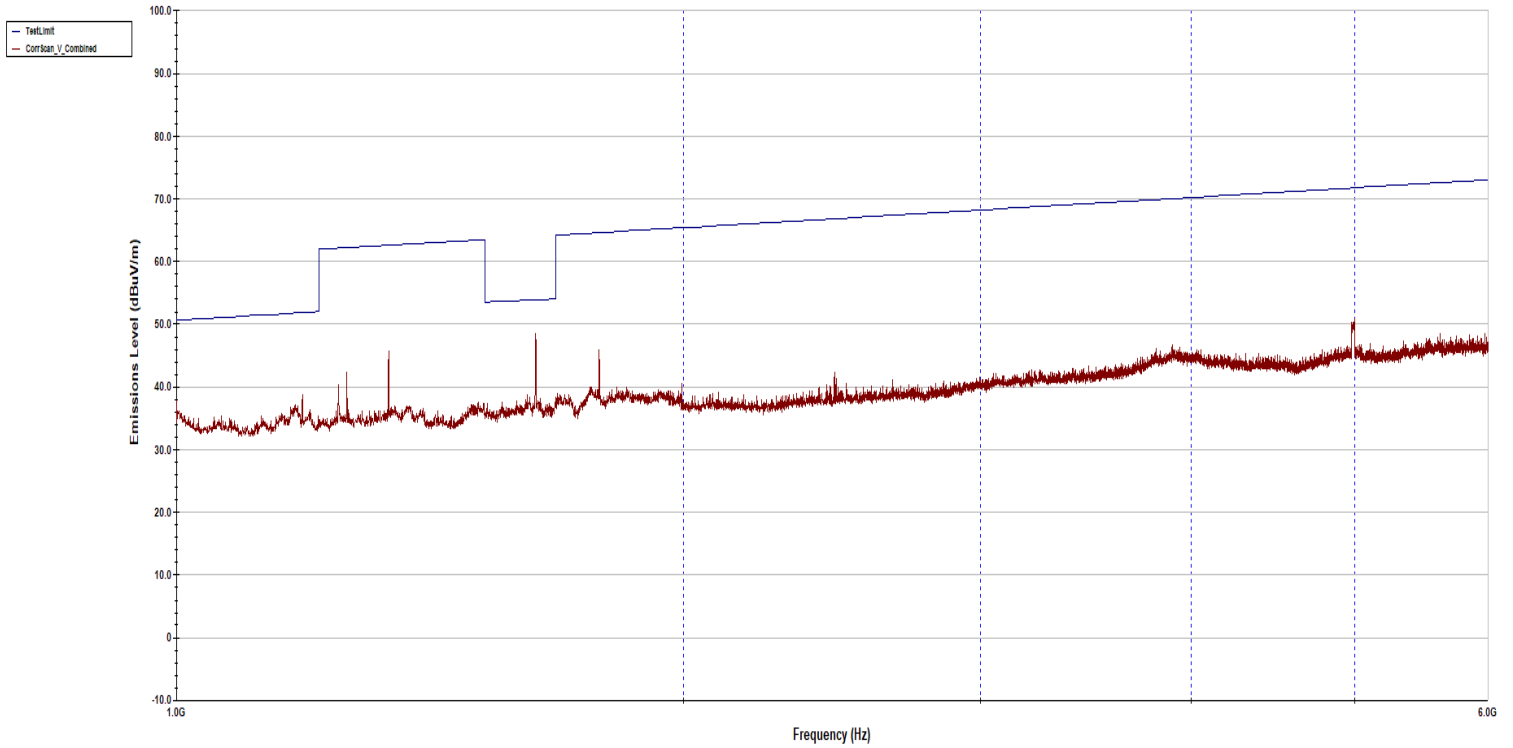
Project No. - PR188448

Test Item - OSCAR

Model/Part No. - 012-000

Serial No. - 190027

Mode of Operation - EUT Fully Operational



Operator: Jon Tanner

PR188448 SHOTOVER Sec 21 RE Test Position 2.til

Last Data Update 12:22:05 PM, Tuesday, December 30, 2025

Company: SHOTOVER Systems

Contact: Ken Haan

Section 21 RE 1GHz-6GHz Vertical Position 2

RTCA/DO-160G

Section 21 (RE)

Horizontal Scan

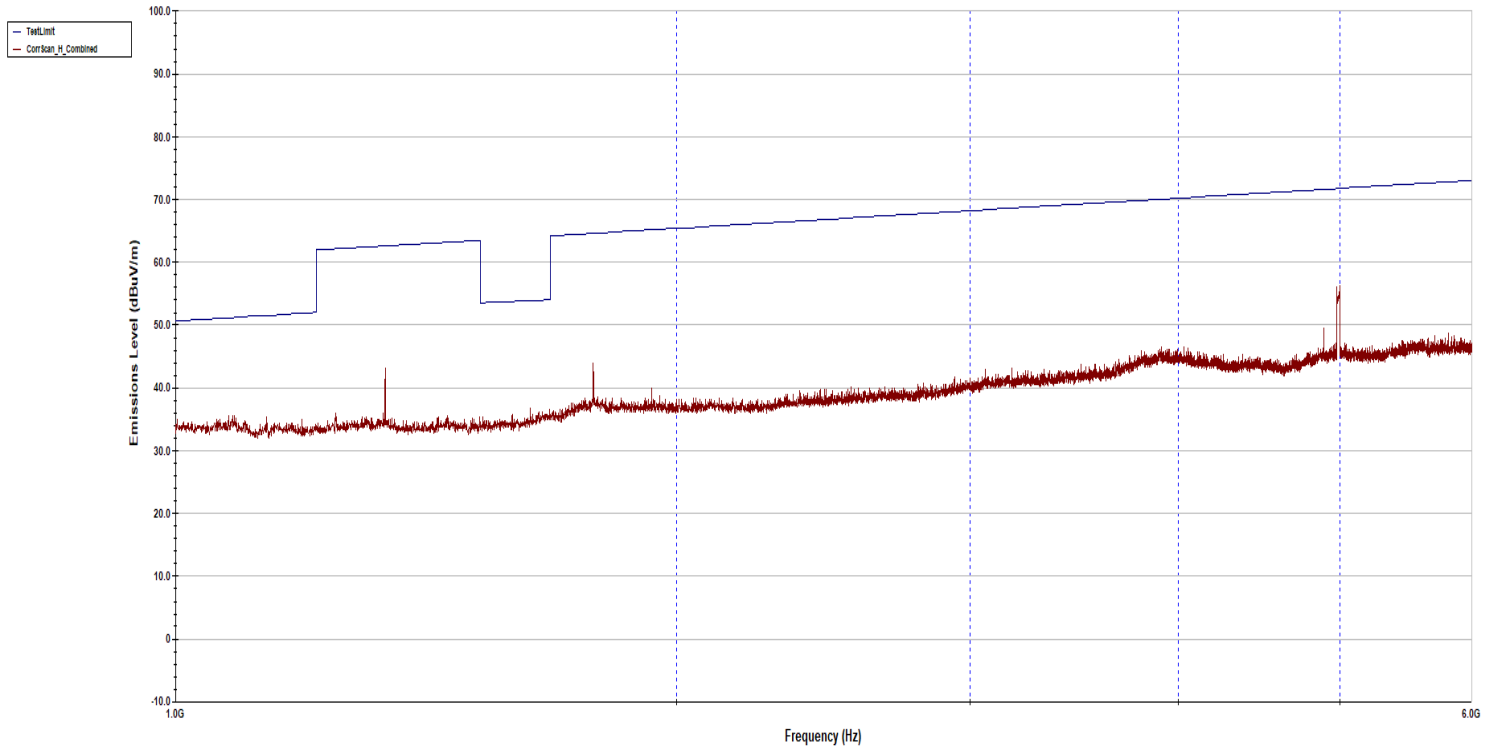
Project No. - PR188448

Test Item - OSCAR

Model/Part No. - 012-000

Serial No. - 190027

Mode of Operation - EUT Fully Operational



Operator: Jon Tanner

PR188448 SHOTOVER Sec 21 RE Test Position 2.tif

Last Data Update 12:22:05 PM, Tuesday, December 30, 2025

Company: SHOTOVER Systems

Contact: Ken Haan

Section 21 RE 1GHz-6GHz Horizontal Position 2

5.4.5 Test Equipment List

Table 5.5-1: Section 21.5 - Radiated Emissions Test Equipment List

Asset Number	Asset Name	Manufacturer	Model	Calibrated	Due
US58-A059715	Chamber, Semi Anechoic	Rayproof	SR1	NCR	NCR
US58-A059545	Network (LISN)	Solar Electronics	6338-5-PJ-50-N	06/13/2022	03/05/2026
US58-A059546	Network (LISN)	Solar Electronics	6338-5-PJ-50-N	06/13/2022	03/05/2026
US58-A084410	Cable (Test)	Pasternack	PE-302-72	NCR	NCR
US58-A084411	Cable (Test)	Pasternack	PE-302-72	NCR	NCR
US58-A070402	Cable (Test)	Unknown	Teledyne 90-195-048	NCR	NCR
US58-A053193	Spectrum Analyzer	Agilent Technologies	E4440A	08/01/2025	08/01/2026
US58-A078464	Amplifier (Pre/RF/Low Noise)	A. H. Systems	AHSY-PAM-0118P	02/19/2025	02/19/2027
US58-A059742	Antenna (Double Ridge Guide)	EMCO	3115	02/26/2025	02/26/2027
US58-A059860	Antenna (Biconical)	ETS-Lindgren	3109	05/20/2025	05/20/2027
US58-A059579	Antenna (Double Ridge Guide)	EMCO	3106	10/07/2024	10/07/2026

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.5 Section 25 Electrostatic Discharge

5.5.1 Test Procedure

The EUT was tested in accordance with DO-160G.

5.5.2 Test Result

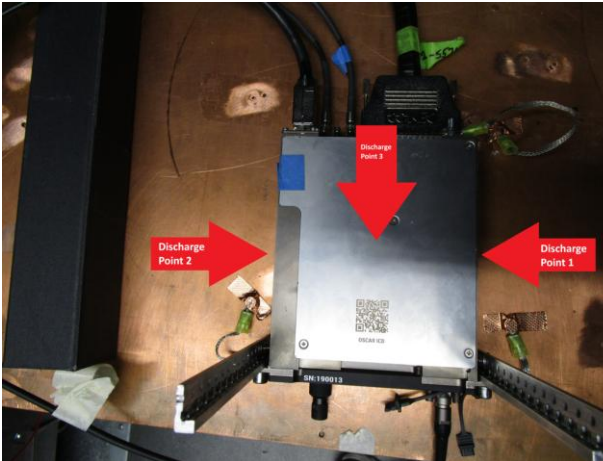
The EUT passed the defined requirements.

5.5.3 Test Datasheets

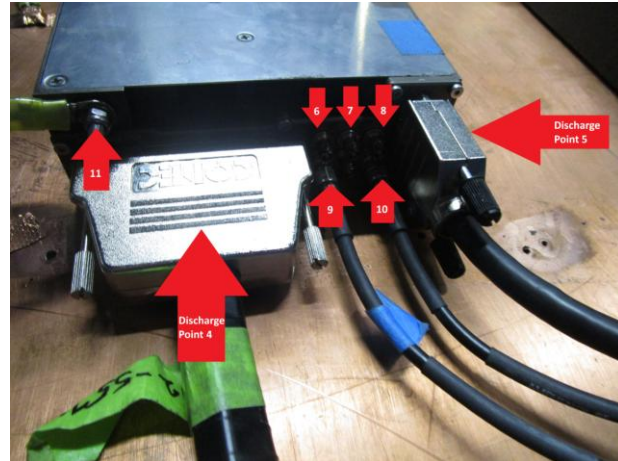
Element Materials Technology					
ESD Data Sheet					
Remarks: The immunity to electrostatic discharge shall be determined by the ability of the equipment under test (EUT) to withstand a series of ESD pulses at a test level of 15,000 volts, directed at specific human contact locations on the EUT. the quantity of pulses shall be ten in each of the selected locations in both positive and negative polarities.					
Test Point	Voltage Level	Type	Application of Discharge	Results	Comments
Discharge Point 1	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 2	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 3	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 4	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 5	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 6	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 7	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 8	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 9	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 10	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 11	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 12	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 13	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 14	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 15	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 16	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 17	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 18	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 19	±15kV	Air	10 Positive / 10 Negative	PASS	None
Discharge Point 20	±15kV	Air	10 Positive / 10 Negative	PASS	None
Test Performed By:		Jon Tanner			

Element Materials Technology			
Section 25 ESD Log			
Date	Time	Log Entries	Initials
1/7/26	1134	Run Discharge Point 1	JT
	1135	Run Discharge Point 2	JT
	1136	Run Discharge Point 3	JT
	1138	Run Discharge Point 4	JT
	1139	Run Discharge Point 5	JT
	1140	Run Discharge Point 6	JT
	1140	Run Discharge Point 7	JT
	1141	Run Discharge Point 8	JT
	1142	Run Discharge Point 9	JT
	1143	Run Discharge Point 10	JT
	1144	Run Discharge Point 11	JT
	1145	Run Discharge Point 12	JT
	1158	Run Discharge Point 13	JT
	1200	Run Discharge Point 14	JT
	1201	Run Discharge Point 15	JT
	1202	Run Discharge Point 16	JT
	1202	Run Discharge Point 17	JT
	1203	Run Discharge Point 18	JT
	1204	Run Discharge Point 19	JT
	1205	Run Discharge Point 20	JT
		Test Complete	JT
Test Performed By: Jon Tanner			

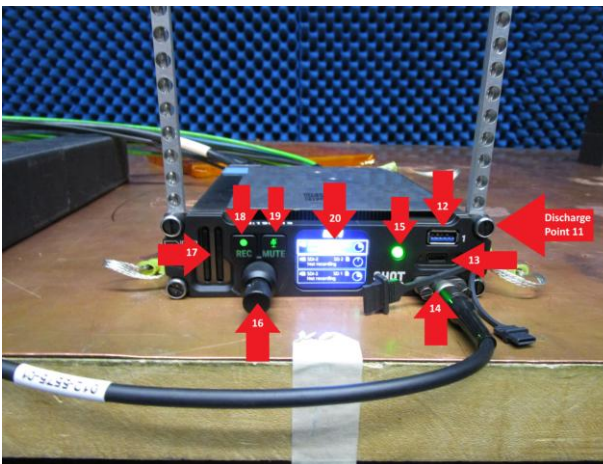
5.5.4 Test Photographs



Section 25 ESD Discharge Points 2



Section 25 ESD Discharge Points 2



Section 25 ESD Discharge Points 3

5.5.5 Test Equipment List

Table 5.6-1: Section 25 Test Equipment List

Asset Number	Asset Name	Manufacturer	Model	Calibrated	Due
US58-A059623	Chamber, Semi Anechoic	Rayproof	SR2	NCR	NCR
US58-A084471	ESD Gun	EMC-Partner	ESD3000	06/19/2025	06/19/2026
US58-A059545	Network (LISN)	Solar Electronics	6338-5-PJ-50-N	06/13/2022	03/05/2026
US58-A059546	Network (LISN)	Solar Electronics	6338-5-PJ-50-N	06/13/2022	03/05/2026

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.6 Section 16

5.6.1 Test Procedure

The EUT was tested in accordance with DO-160G.

5.6.2 Test Result

The EUT passed the defined requirements.

5.6.3 Test Datasheets

Element Materials Technology			
Section 16 Power Input DC Log			
Date	Time	Log Entries	Initials
1/13/26	0740	Setup for Section 16 Power Input DC	EDD
	0826	Setup complete	EDD
	0852	Run Voltage Average Value DC with Emergency Voltage added	EDD
	1029	Test Complete	EDD
	1119	Run Ripple Voltage DC - unit rebooted near 2.0kHz - again at 3kHz	EDD
	1201	Test Complete - Failed - stop near 4kHz	EDD
	1340	Run Momentary Power Interruptions DC	EDD
	1531	Test Complete	EDD
	1533	Run Normal Surge Voltage DC	EDD
	1541	Test Complete	EDD
		Unit appeared to fail at the very end of the positive surge. Rerun.	EDD
	1547	Rerun Normal Surge Voltage DC. Still Failing.□	EDD
	1553	Test Complete	EDD
1/14/26	848	Rerun Momentary Power Interruption Test 10 with 10uF capacitor.	EDD
	849	Rerun Momentary Power Interruption Test 18 with 10uF capacitor.□	EDD
	859	Rerun Normal Surge Voltage DC with 10uF capacitor.	EDD
	909	Test Complete	EDD
	917	Run Abnormal Surge Voltage DC with 10uF capacitor.	EDD
	921	Test Complete	EDD
	926	Run Low Voltage Conditions DC with 10uF capacitor.	EDD
	940	Test Complete	EDD
	943	Run Voltage Steady State DC with 10uF capacitor.	EDD
	955	Test Complete	EDD
	958	Run Momentary Undervoltage Operation DC with 10uF capacitor.	EDD
	1000	Test Complete	EDD
	1011	Run Engine Starting Undervoltage with 10000uF Capacitor	EDD
	1012	Test Complete	EDD
		Test Results for Inrush Indicated Below	EDD
	1144	Run Condition 1 with 10000uF capacitor. Max Current 11.9A at 108ms. Max steady state current is 3A.	EDD
	1244	Run Condition 2 with 10uF capacitor. Max Current 8.08A at 95ms. Max steady state current is 3A.	EDD
	1304	Test Complete	EDD
	1347	Run Ripple Voltage DC with AFCS Equipment (see "Section 18" datasheet)	EDD
	1449	Test Complete (Passing)	EDD
Test Performed By: Eugene DeVito			

Element Materials Technology							
Voltage Average Value (dc)							
Test Notes: None							
Category:	Category B 28VDC Equipment						
Test Condition	Nominal Voltage		Test Voltage (Vdc)		Duration (minutes)	Pass / Fail	Remarks
Maximum	28	Vdc	30.3	Vdc	30	Pass	None
Minimum	28	Vdc	22.0	Vdc	30	Pass	None
Emergency	28	Vdc	18.0	Vdc	30	Pass	None
Technician: Eugene DeVito							

Element Materials Technology								
Momentary Power Interruptions (dc)								
Test Notes: Category B does not test conditions 8 and 15.								
Category:	Category B 28VDC Equipment							
	Nominal Voltage (Vdc)	Interrupt Voltage (Vdc)	Interrupt Period (mS)	Repetition	Interrupt Period (mS)	Repetition	Pass / Fail	Remarks
	28	0	50	5		5	PASS	Unit rebooted a few times.
Test Condition	Tf (mS)	Ti (mS)	Tr (mS)	% Vnom (Vmin)	Nominal Voltage (Vdc)	Number of Applications	Pass / Fail	Remarks
1	<1	<1	2	0	28	2	PASS	None
2	10	0	3	50		2	PASS	None
3	17	8	4	15		2	PASS	None
4	18	32	5	10		2	PASS	None
5	19	56	5	5		2	PASS	None
6	20	80	5	0		2	PASS	None
7	20	180	5	0		2	PASS	None
9	10	0	4	80		2	PASS	None
10	25	0	10	50		2	PASS	Passed with 10 uF Capacitor
11	50	0	20	0		2	PASS	None
12	43	33	17	15		2	PASS	None
13	48	53	19	5		2	PASS	None
14	50	150	20	0		2	PASS	None
16	18	13	7	65		2	PASS	None
17	20	15	2	60		2	PASS	None
18	13	27	13	35		2	PASS	Passed with 10 uF Capacitor
19	5	20	5	0		2	PASS	None

Double Interrupt Requirements									
Category:		Category B 28VDC Equipment							
Test Condition	T1 (mS)	T2 (mS)	T3 (mS)	Pass / Fail	T1 (mS)	T2 (mS)	T3 (mS)	Pass / Fail	
1	9000	10	20	PASS	9000	50	20	PASS	None
2	9000	10	50	PASS	9000	50	50	PASS	None
3	10	10	10	PASS	10	50	10	PASS	None
4	10	10	50	PASS	10	50	50	PASS	None
6	20	10	10	PASS	20	50	10	PASS	None
10	50	10	10	PASS	50	50	10	PASS	None
11	50	10	50	PASS	50	50	50	PASS	None
Technician: Eugene DeVito									

Element Materials Technology								
Normal Surge Voltage (dc)								
Test Notes: Only Applicable for Category A, B, and Z equipment.								
Category:		Category B 28VDC Equipment						
Nominal Voltage (Vdc)	Surge (Vdc)	Duration (mS)	Surge (Vdc)	Duration (mS)	Rise Time (mS)	Fall Time (mS)	Pass / Fail	Remarks
Positive Surge								
28	47	5	40	30	1	5	PASS	Passed with 10uF capacitor.
Nominal Voltage (Vdc)	Surge (Vdc)	Duration (mS)			Rise Time (mS)	Fall Time (mS)	Pass / Fail	Remarks
Negative Surge								
28	17	30			1	5	PASS	Passed with 10uF capacitor.
Technician: Eugene DeVito								

Element Materials Technology							
Engine Starting Undervoltage (dc)							
Test Notes: This requirement is only applicable to Category Z and 28VDC Category B Equipment.							
Category:		Category B 28VDC Equipment					
Nominal Voltage (dc)	Starting Voltage	Rate of Increase (Vdc/sec)	Ending Voltage (dc)	Test Duration (S)		Pass / Fail	Remarks
28	10	0.30	20.5	35		PASS	with 10000uF Capacitor
Technician: Eugene DeVito							

Element Materials Technology						
Voltage Steady State (dc)						
Test Notes: None						
Category:		Category B 28VDC Equipment				
Test Condition	Nominal Voltage	Test Voltage (Vdc)		Duration (minutes)	Pass / Fail	Remarks
Maximum	28 Vdc	32.2	Vdc	5	PASS	with 10uF Capacitor
Minimum	28 Vdc	20.5	Vdc	5	PASS	with 10uF Capacitor
Technician: Eugene DeVito						

Element Materials Technology					
Low Voltage Conditions (dc) (Category B Only)					
Test Notes: None					
Category:		Category B 28VDC Equipment			
Nominal Voltage (Vdc)	Minimum Operating Voltage (dc)	End Voltage	Linear Decay Time (S)	Pass / Fail	Remarks
28	20.5	0	600	PASS	with 10uF capacitor
Technician: Eugene DeVito					

Element Materials Technology					
Momentary Undervoltage Operation (dc)					
Test Notes: The level of voltage distortion can be controlled by varying the on the rectifiers, and insertion of source impedance in the line. Alternatively, input voltage of the EUT may be distorted by clipping the supply voltage. The EUT shall operate in these conditions.					
Category:		Category B 28VDC Equipment			
Nominal Voltage (Vdc)	Undervoltage Level (Vdc)	Duration (S)		Pass / Fail	Remarks
28	12	7		PASS	with 10uF Capacitor
Technician: Eugene DeVito					

Element Materials Technology								
Abnormal Surge Voltage (dc)								
Test Notes: None								
Category:		Category B 28VDC Equipment						
Nominal Voltage (Vdc)	Surge (Vdc)	Duration (mS)	Surge (Vdc)	Duration (mS)	Rise Time (mS)	Fall Time (mS)	Pass / Fail	Remarks
28	60	100	40	1000	1	5	PASS	with 10uF capacitor
Technician: Eugene DeVito								

Element Materials Technology						
Section 16 (18) Ripple Voltage DC Log						
Date	Time	Log Entries				Initials
1/14/26	1347	Run Ripple Voltage DC with AFCS Equipment				EDD
	1449	Test Complete				EDD
Test Performed By: Eugene DeVito						
Element Materials Technology						
Section 16 (18) Ripple Voltage DC Data Sheet						
Remarks: The EUT was monitored for susceptibility during the performance of the test, to include permanent damage, component failure, insulation breakdown, susceptibility degradation, or changes in equipment performance.						
Test Level:		Category B				
Line Under Test	Test Level	Start Frequency (Hz)	Dwell Time (S)	Stop Frequency (kHz)	Pass / Fail	Remarks
Line 1	28Vdc Limit	200	60	15	PASS	None
Test Performed By:		Eugene Devito				

5.6.4 Test Photographs



Section 16 Category B Initial Setup



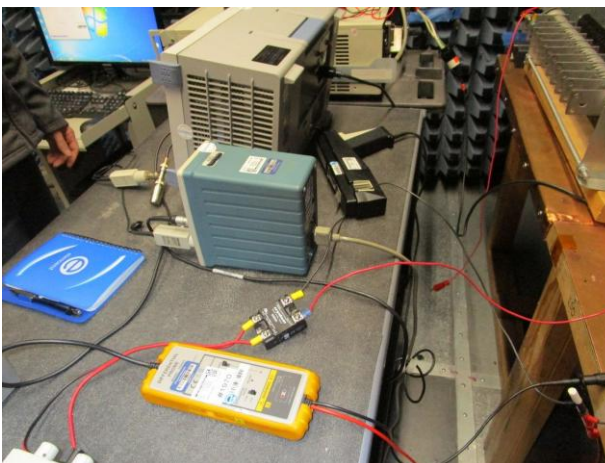
Section 16 Category B Differential Probe



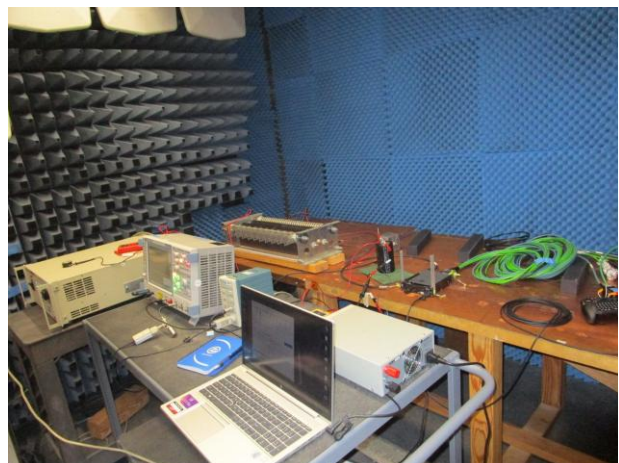
Section 16 Category B Setup with 10uF Capacitor



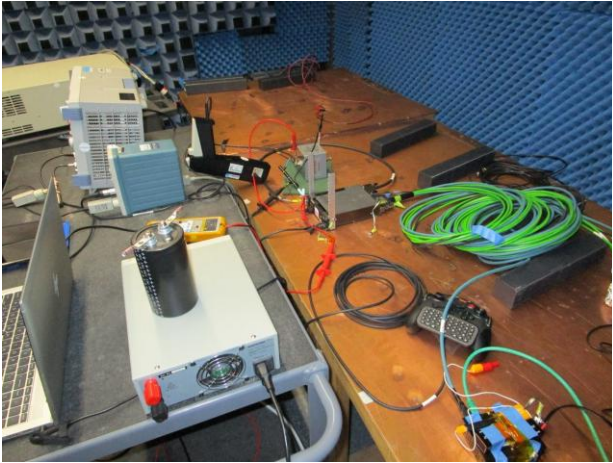
Section 16 Category B Setup with 10000uF Capacitor



Section 16 Category B Designation I Inrush Probes



Section 16 Category B Designation I Inrush Test Condition 1

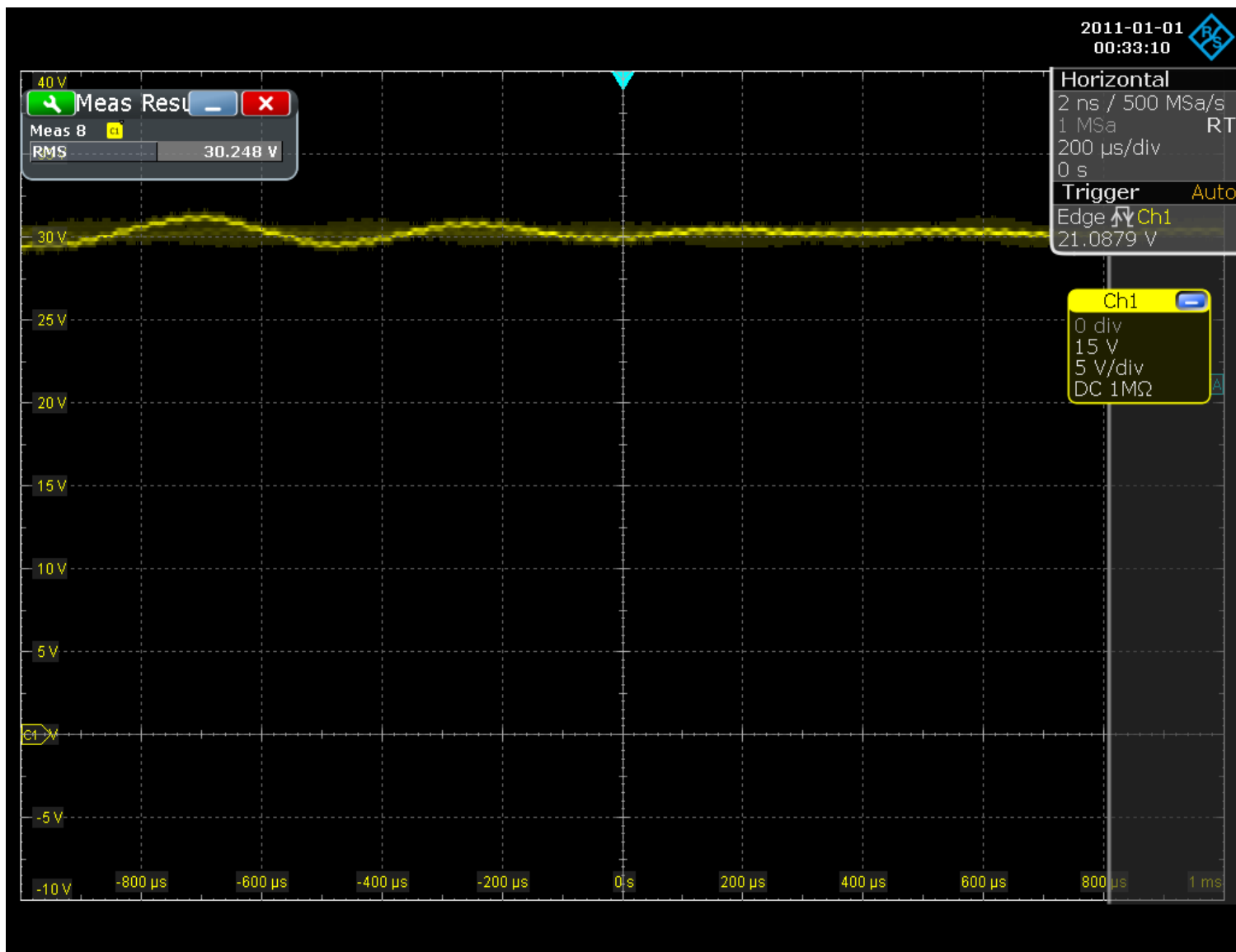


Section 16 Category B Designation I Inrush Test
Condition 2

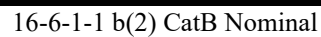


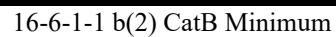
Section 16 Category B Voltage Ripple Test with AFCS
Equipment

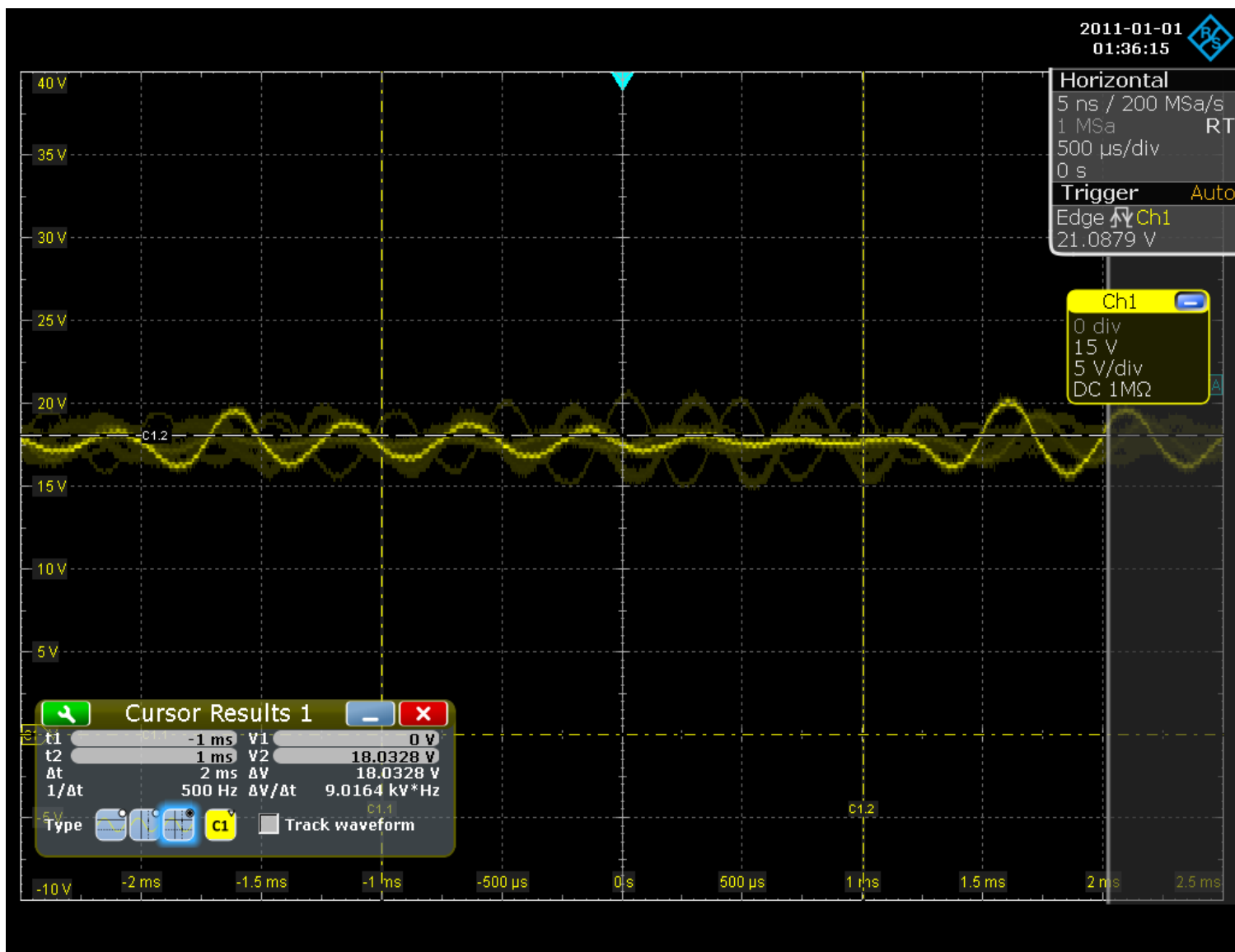
5.6.5 Test Data



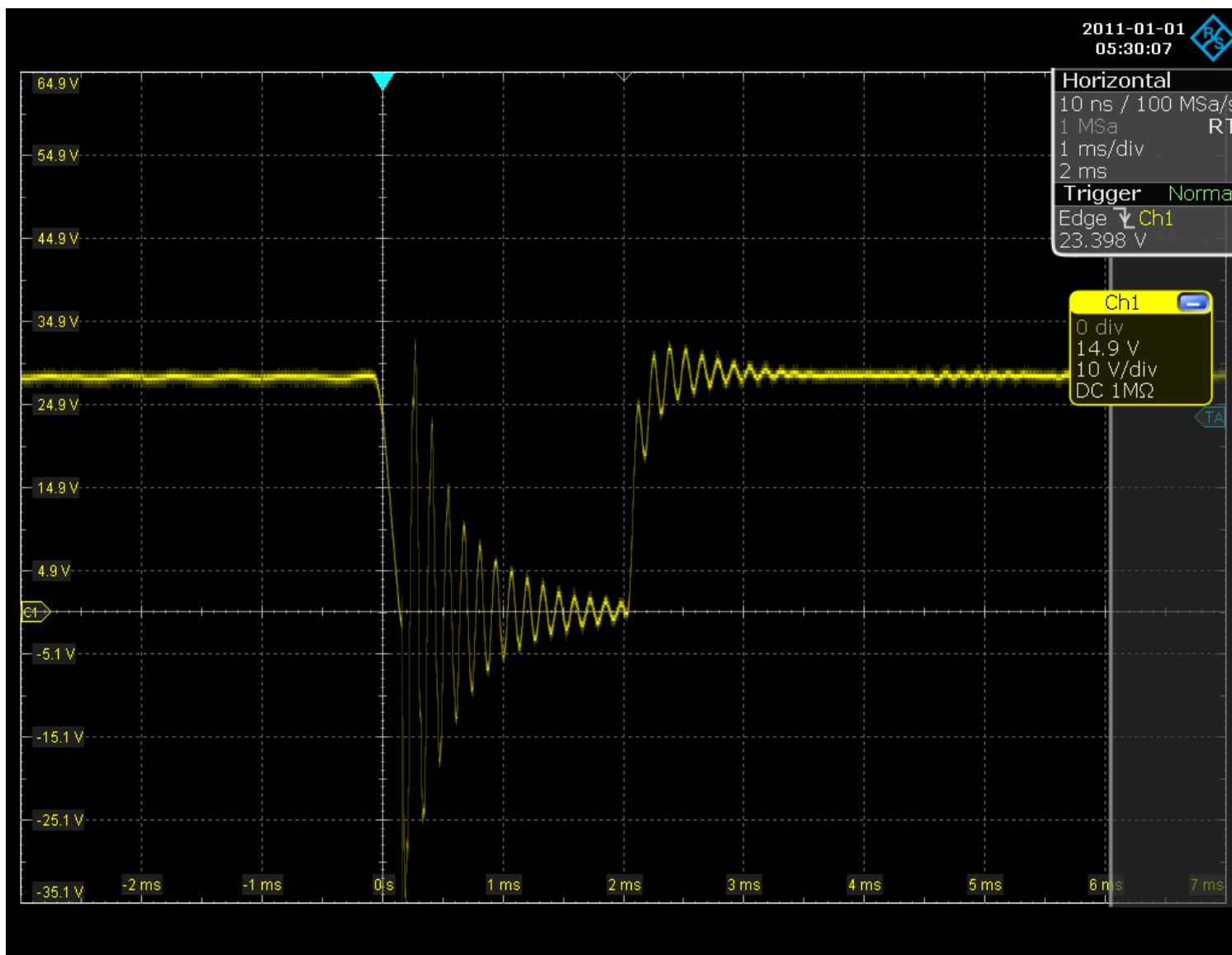
16-6-1-1 b(1) CatB Maximum



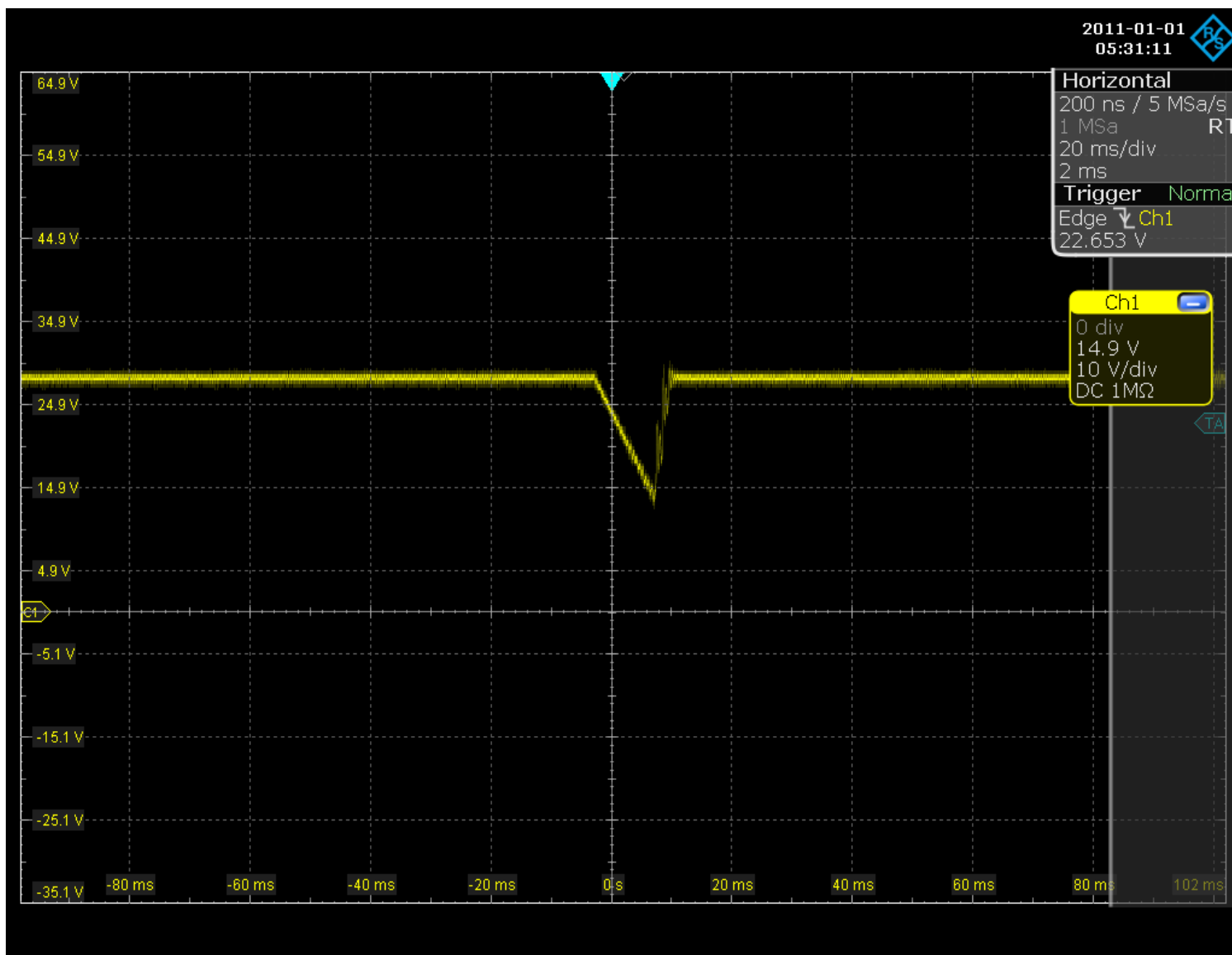




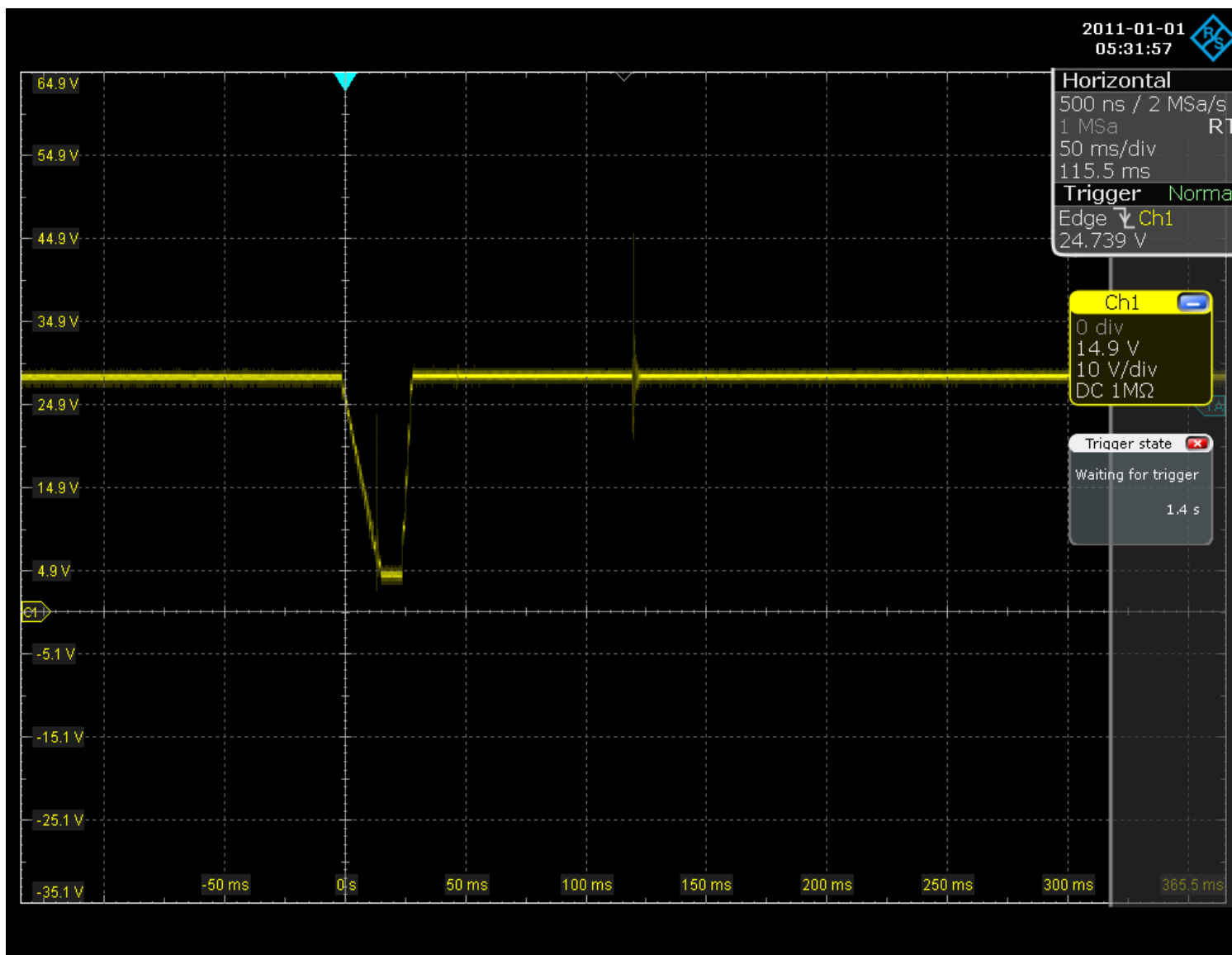
16-6-1-1 b(3) CatB Emergency



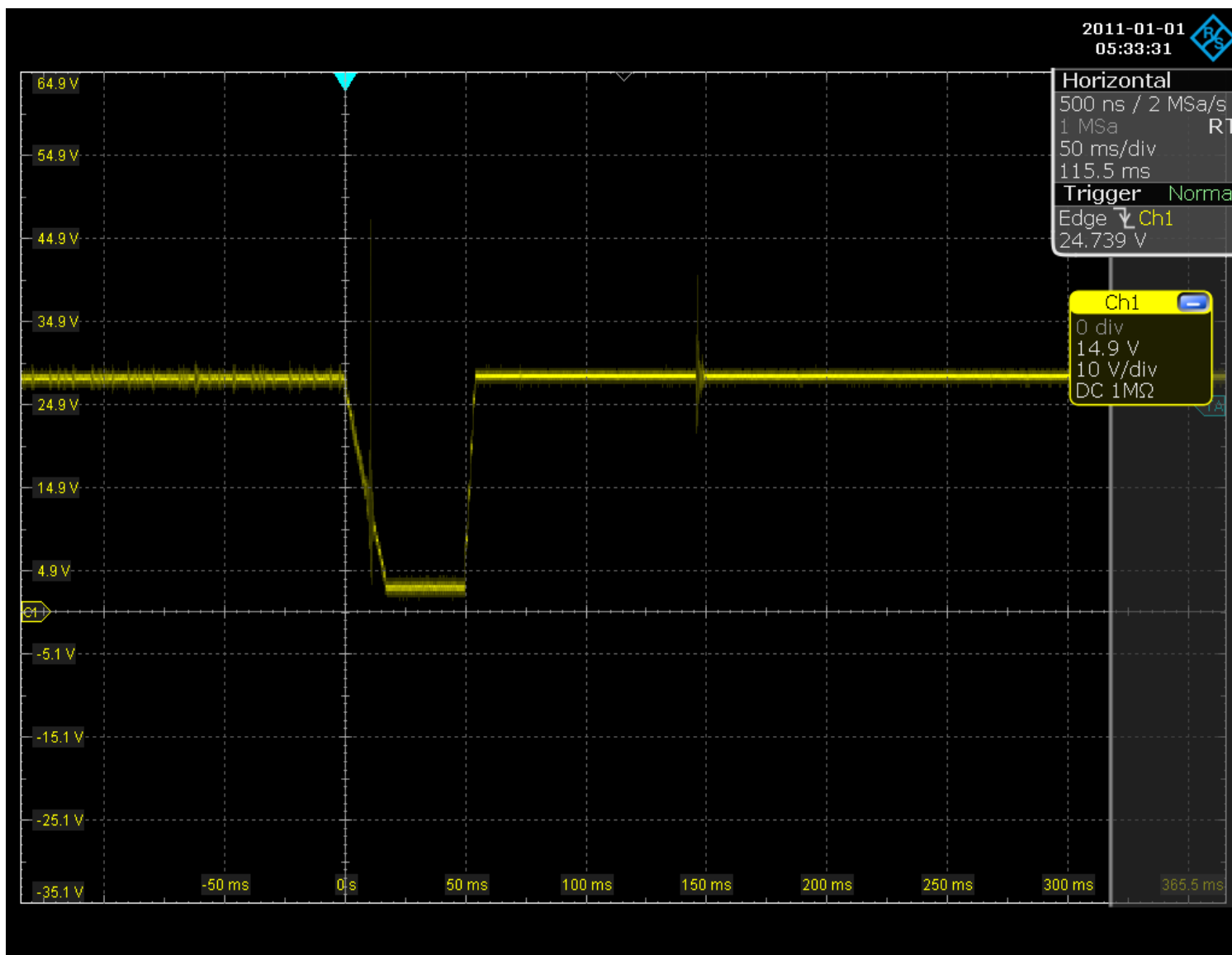
16-6-1-3 b Condition 1 CatB



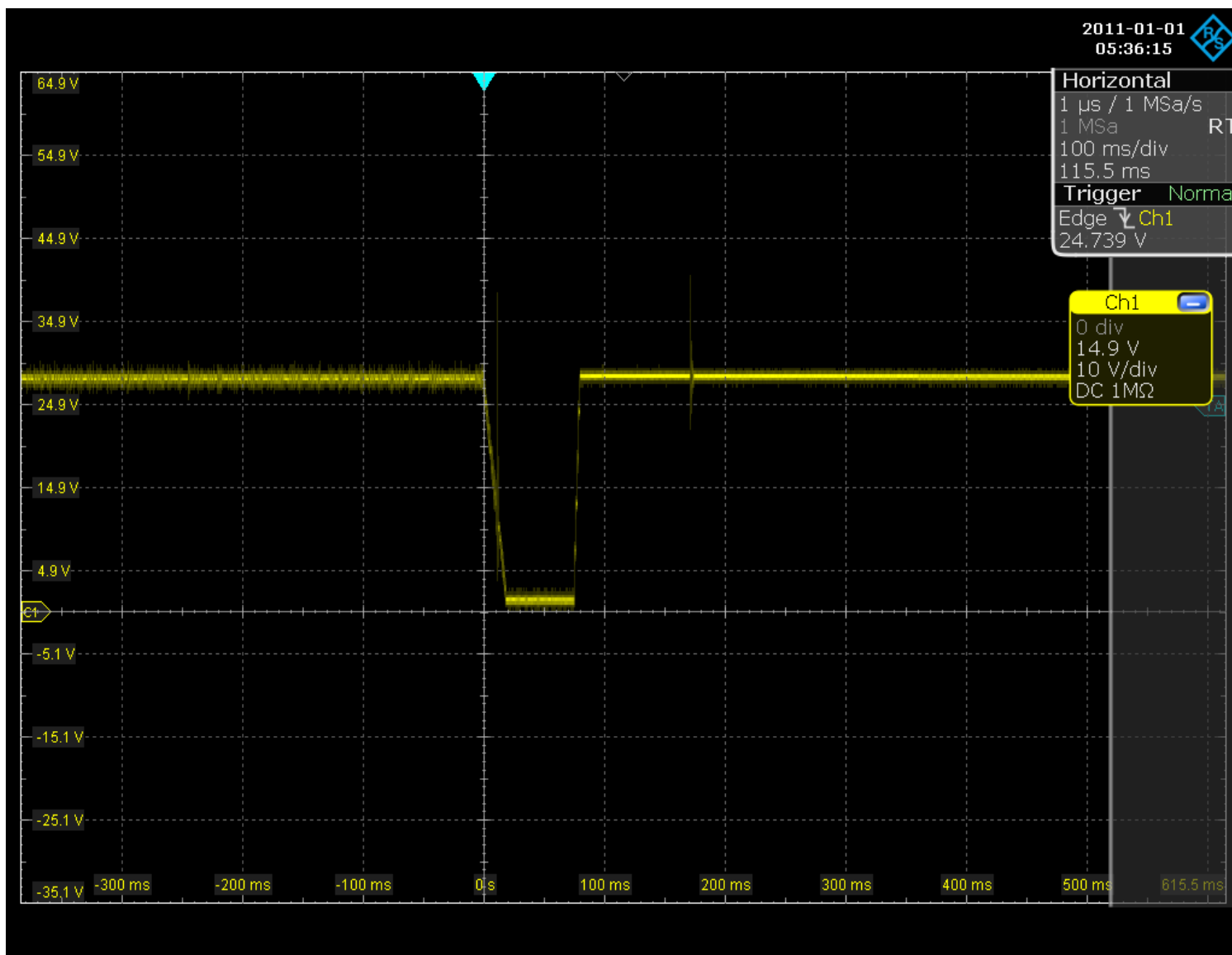
16-6-1-3 b Condition 2 CatB



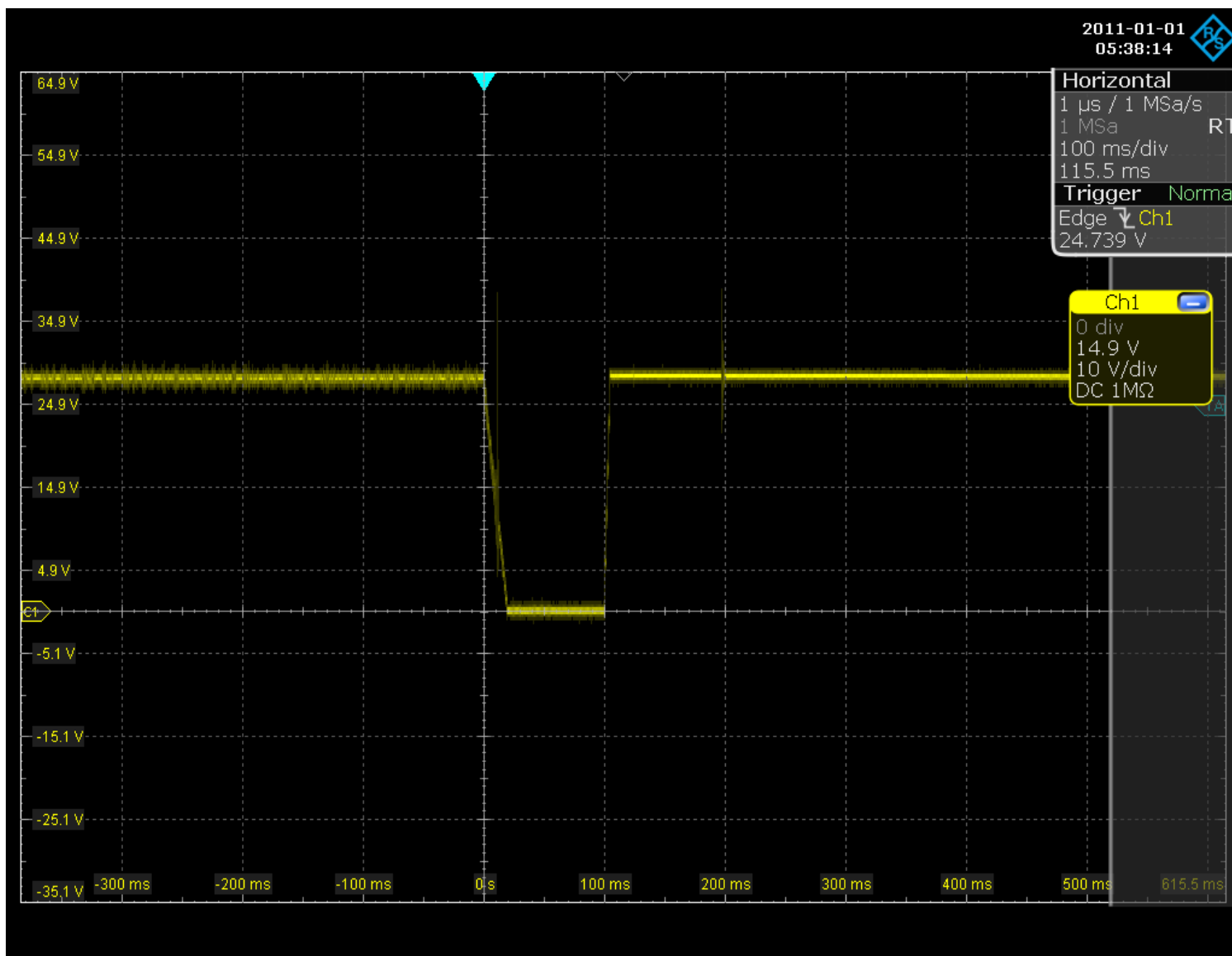
16-6-1-3 b Condition 3 CatB



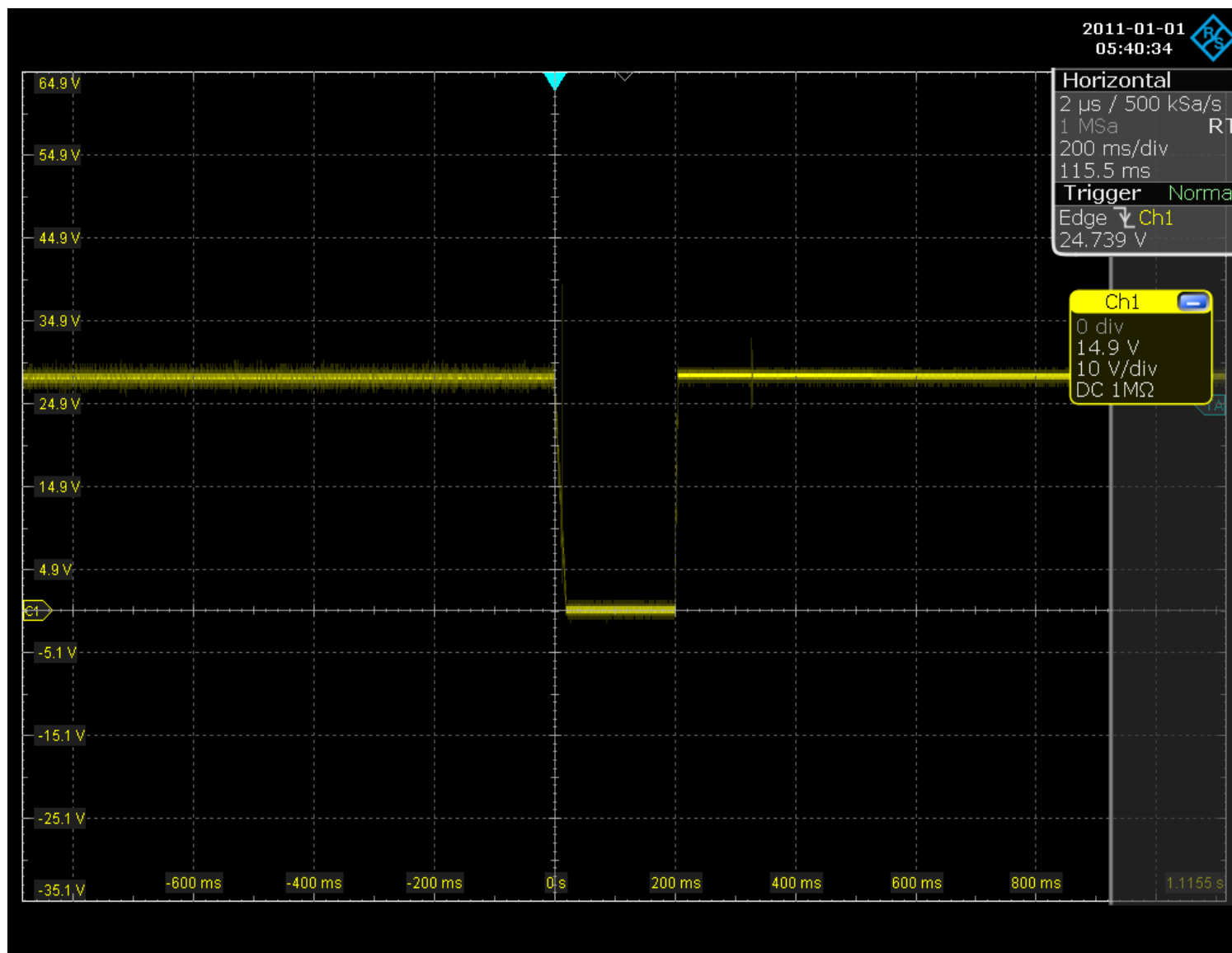
16-6-1-3 b Condition 4 CatB



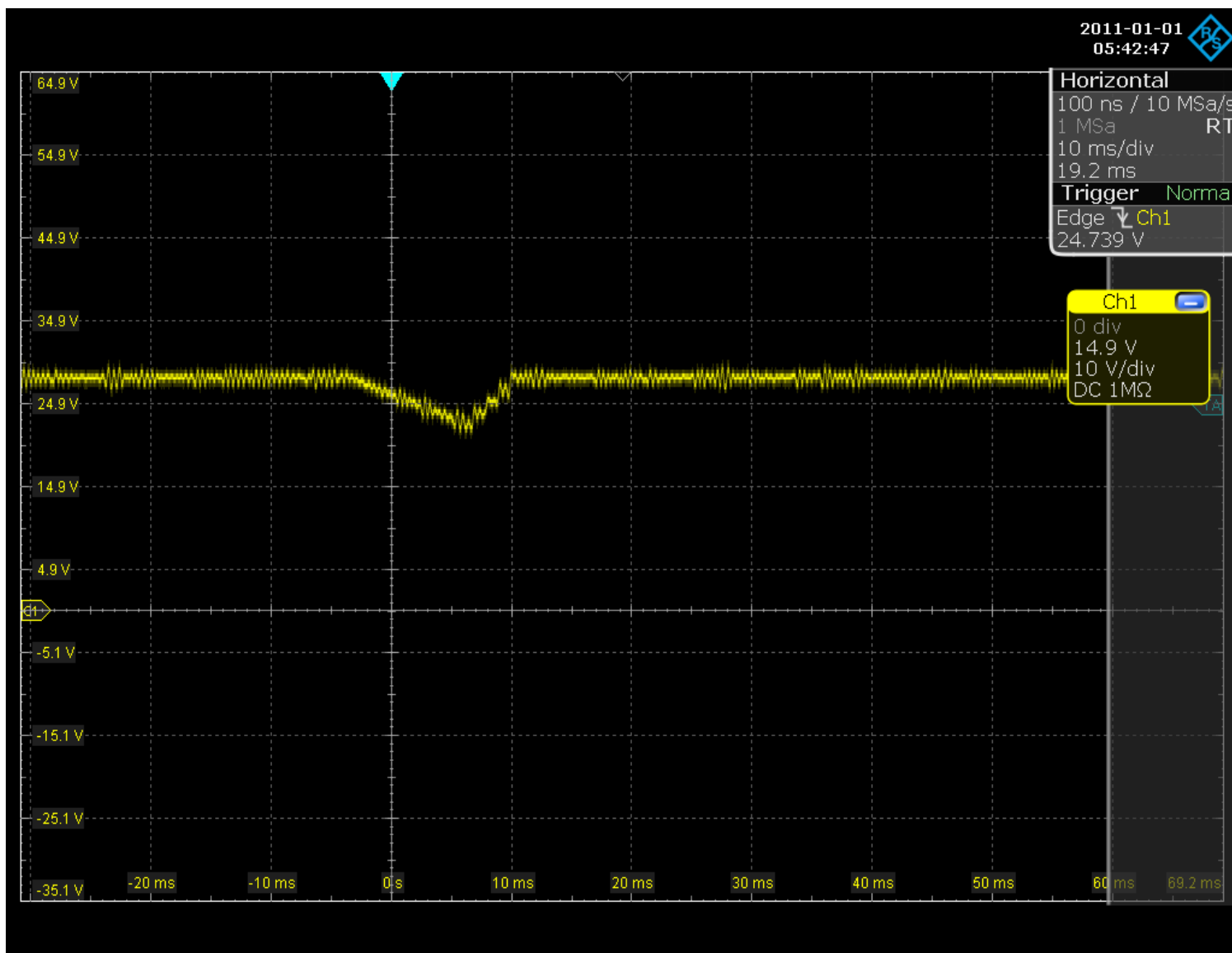
16-6-1-3 b Condition 5 CatB



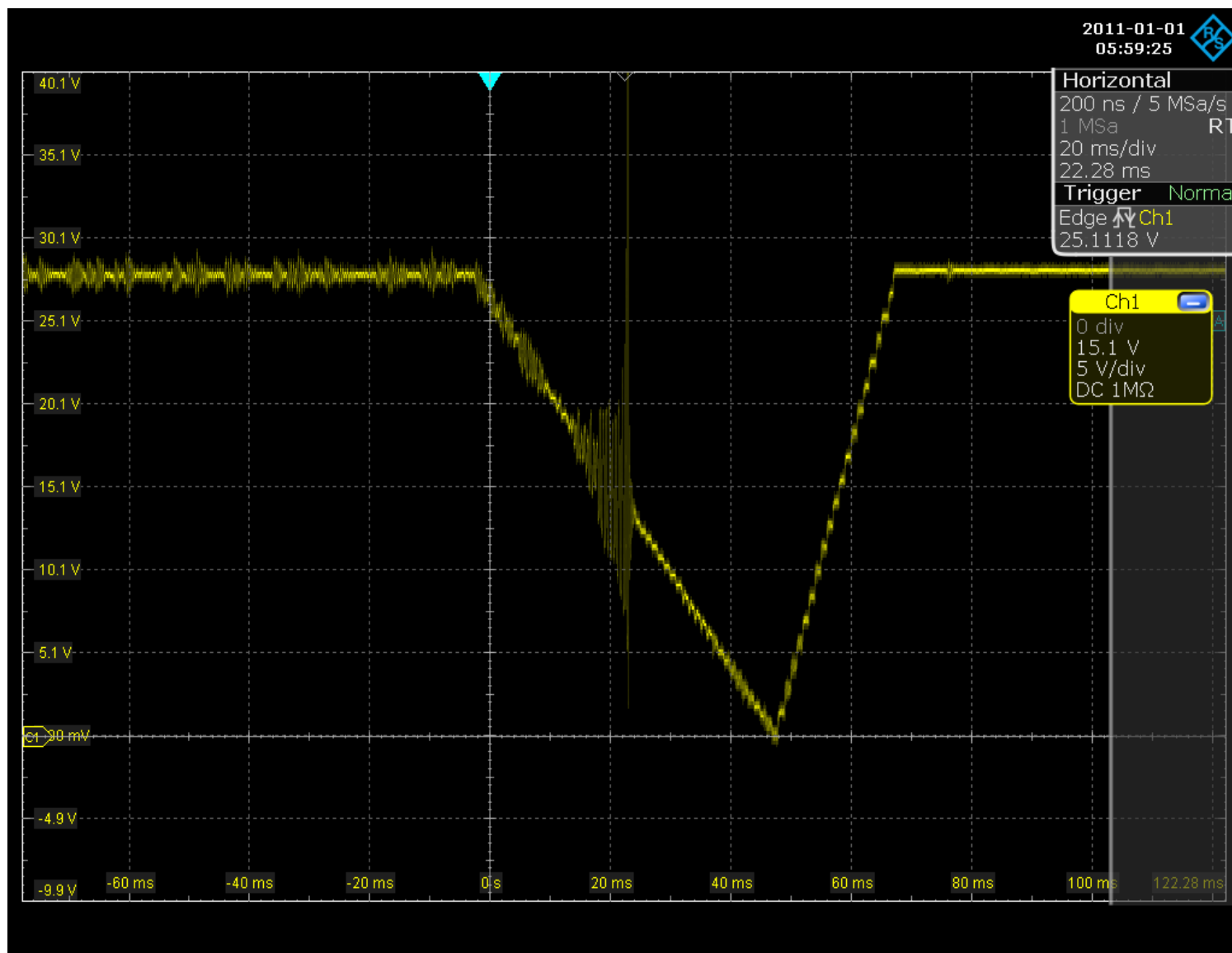
16-6-1-3 b Condition 6 CatB



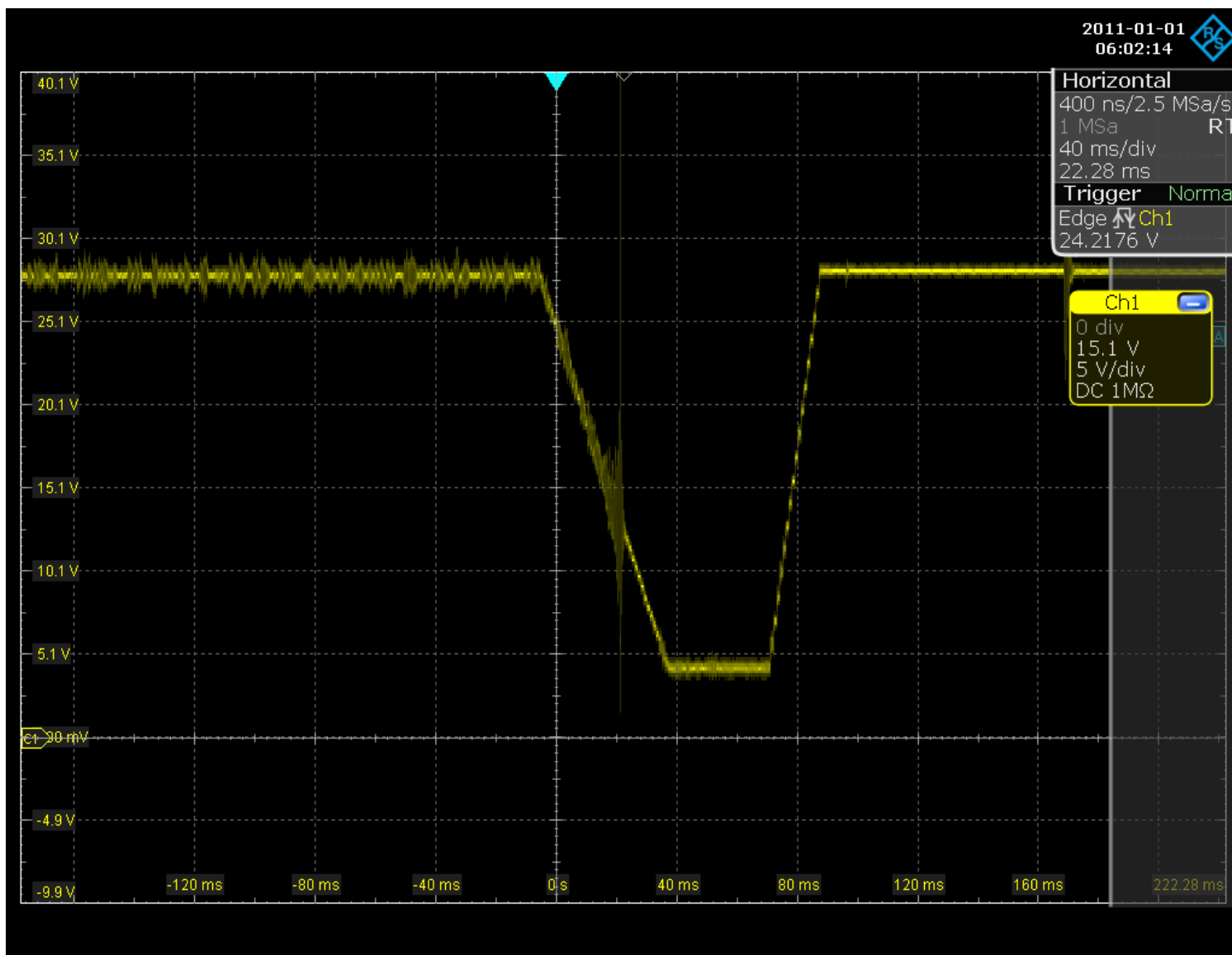
16-6-1-3 b Condition 7 CatB



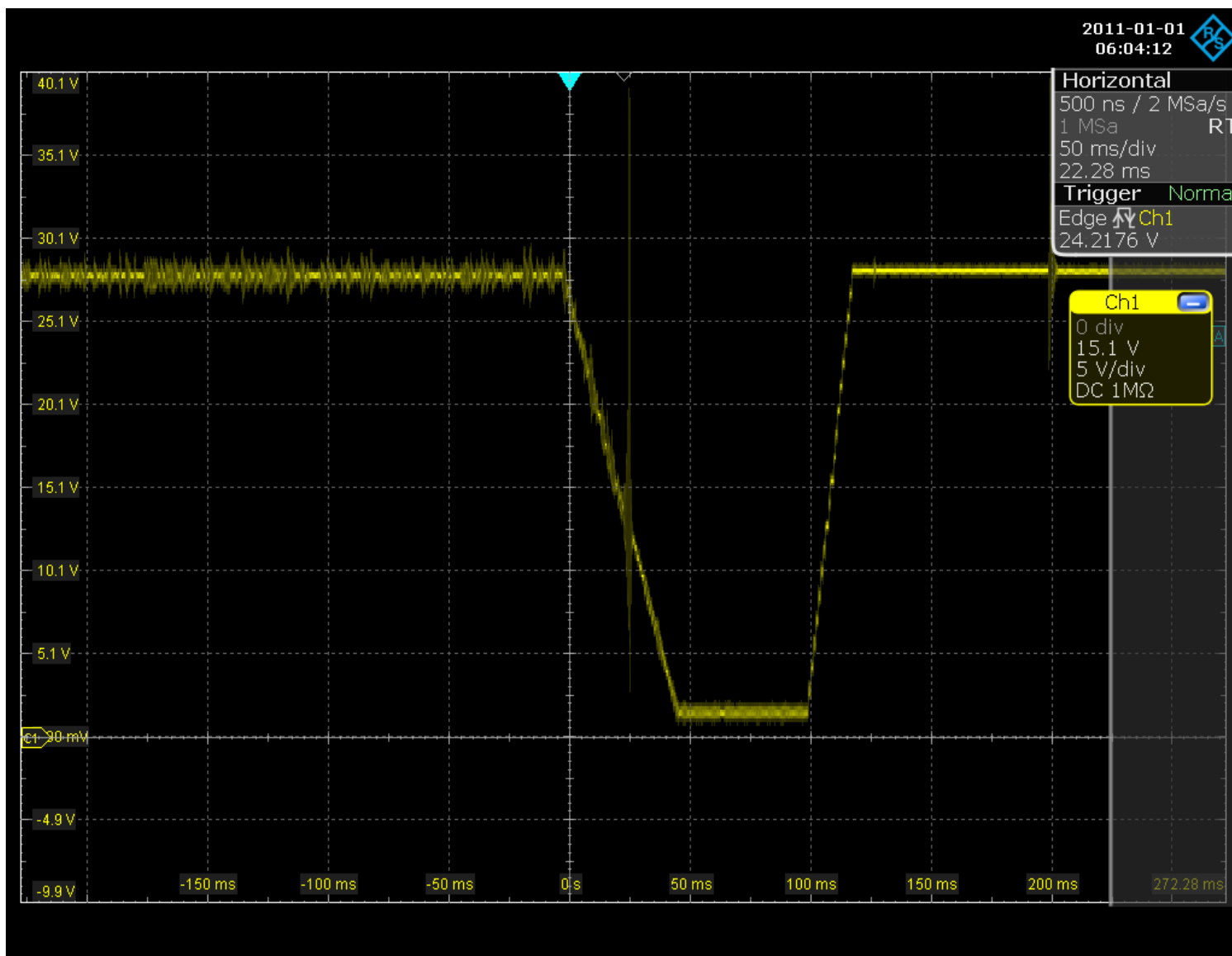
16-6-1-3 b Condition 9 CatB



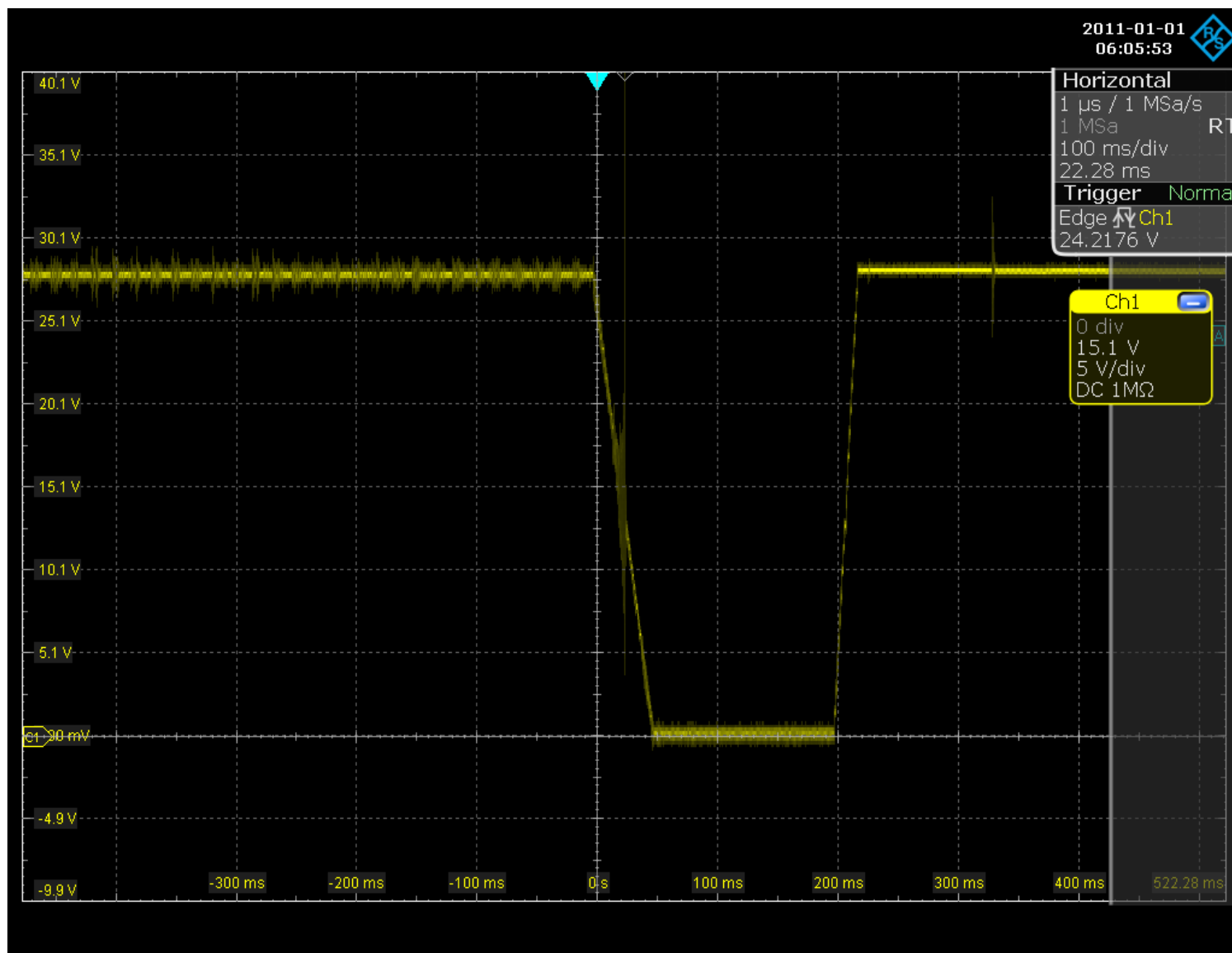
16-6-1-3 b Condition 11 CatB



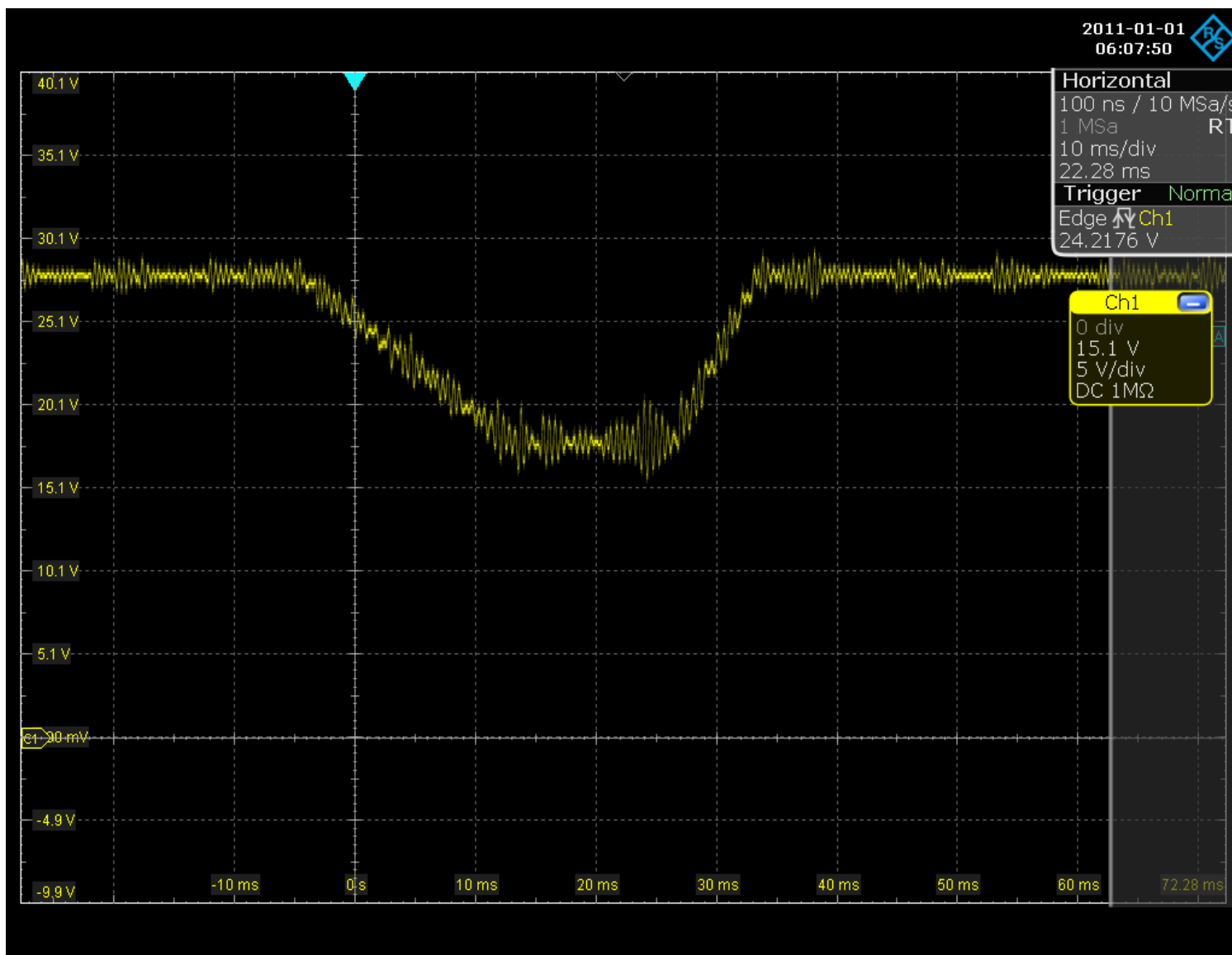
16-6-1-3 b Condition 12 CatB



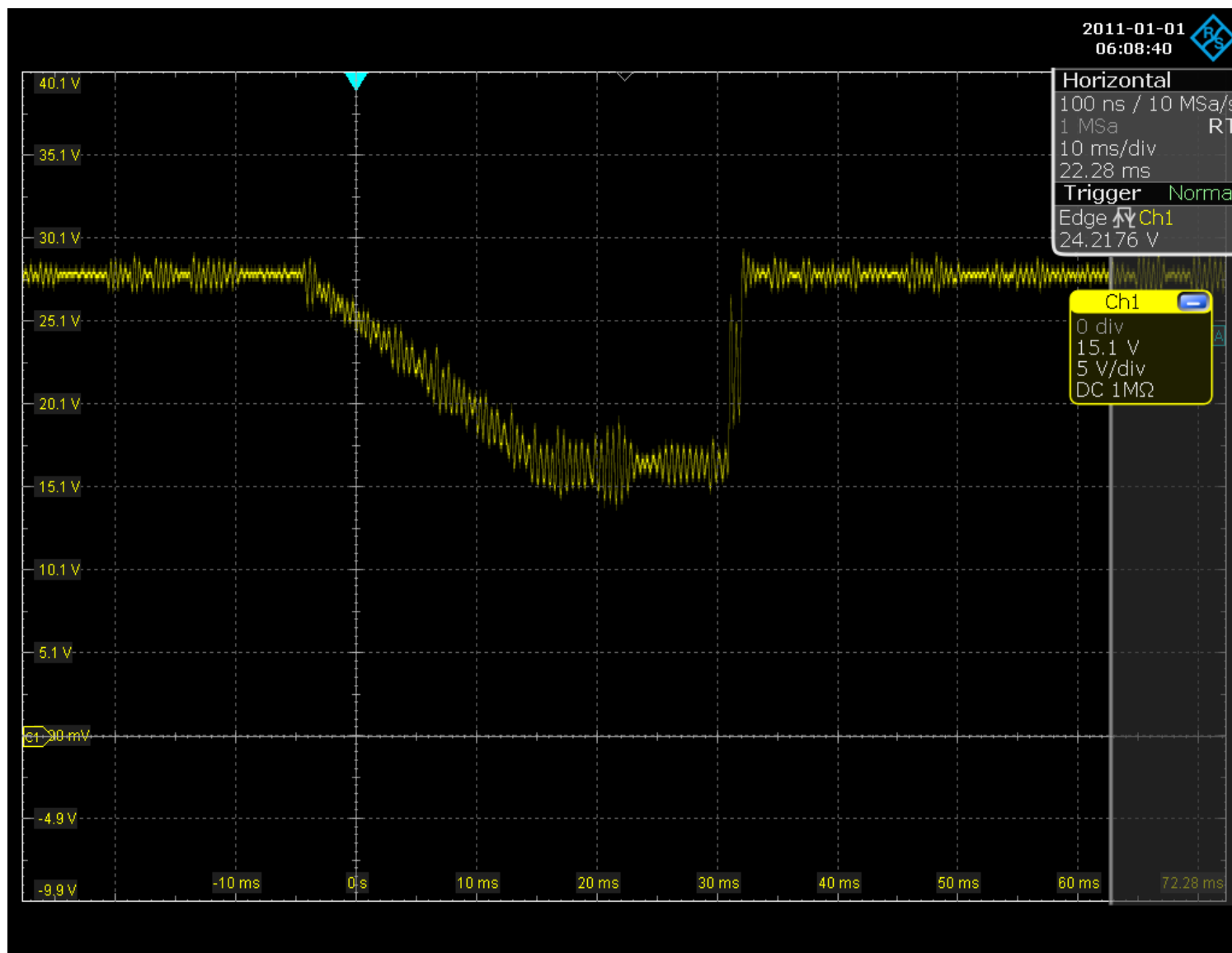
6-6-1-3 b Condition 13 CatB



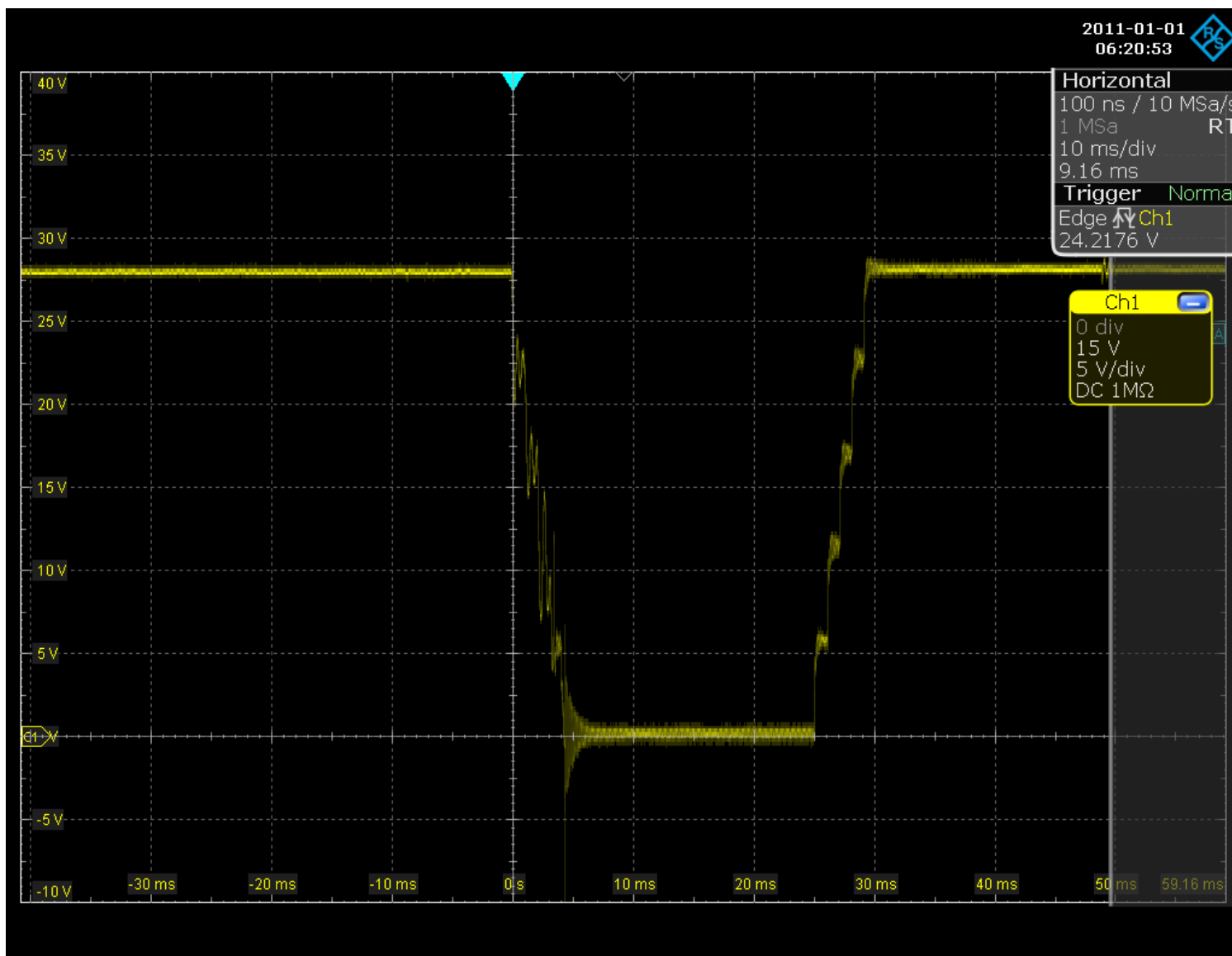
16-6-1-3 b Condition 14 CatB



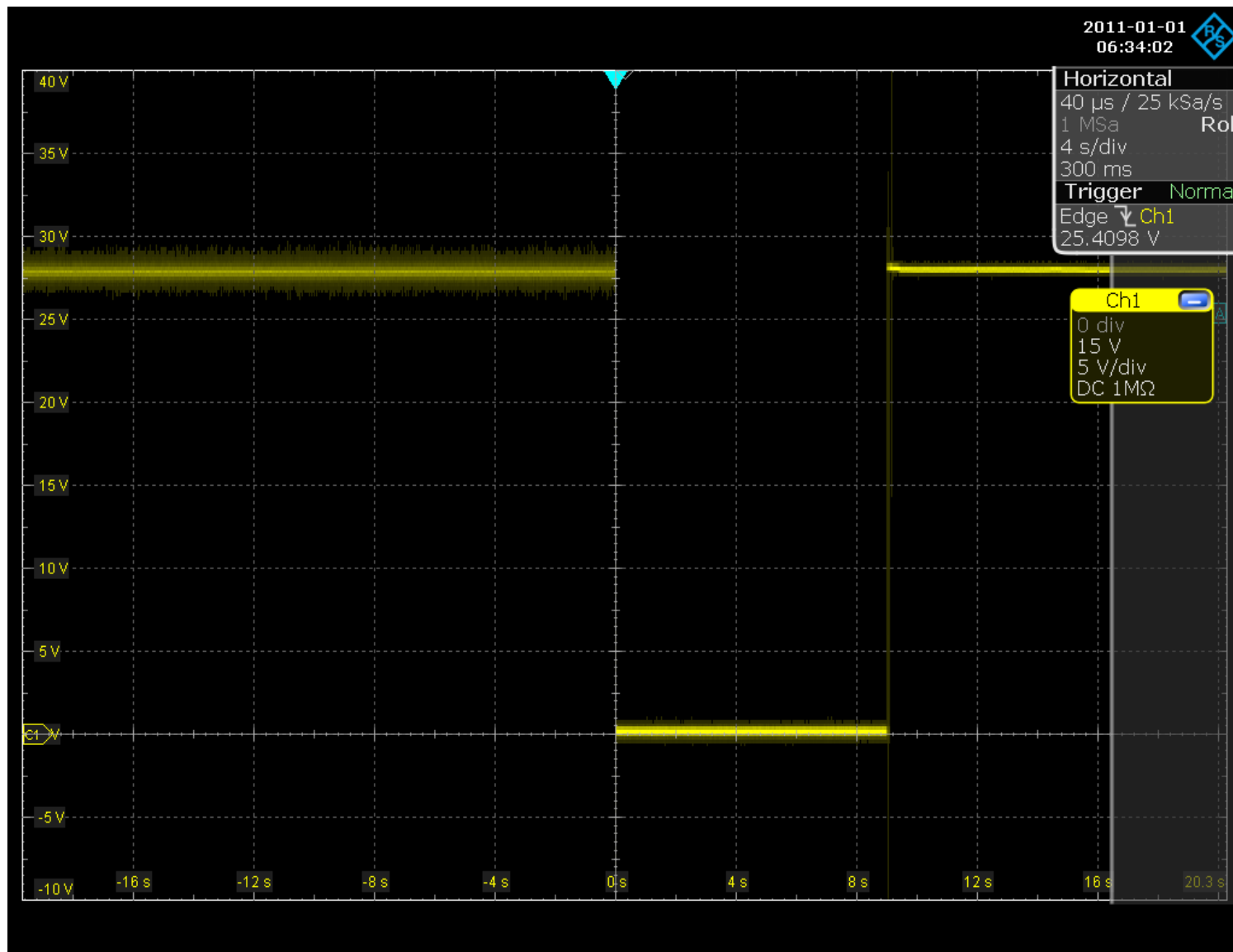
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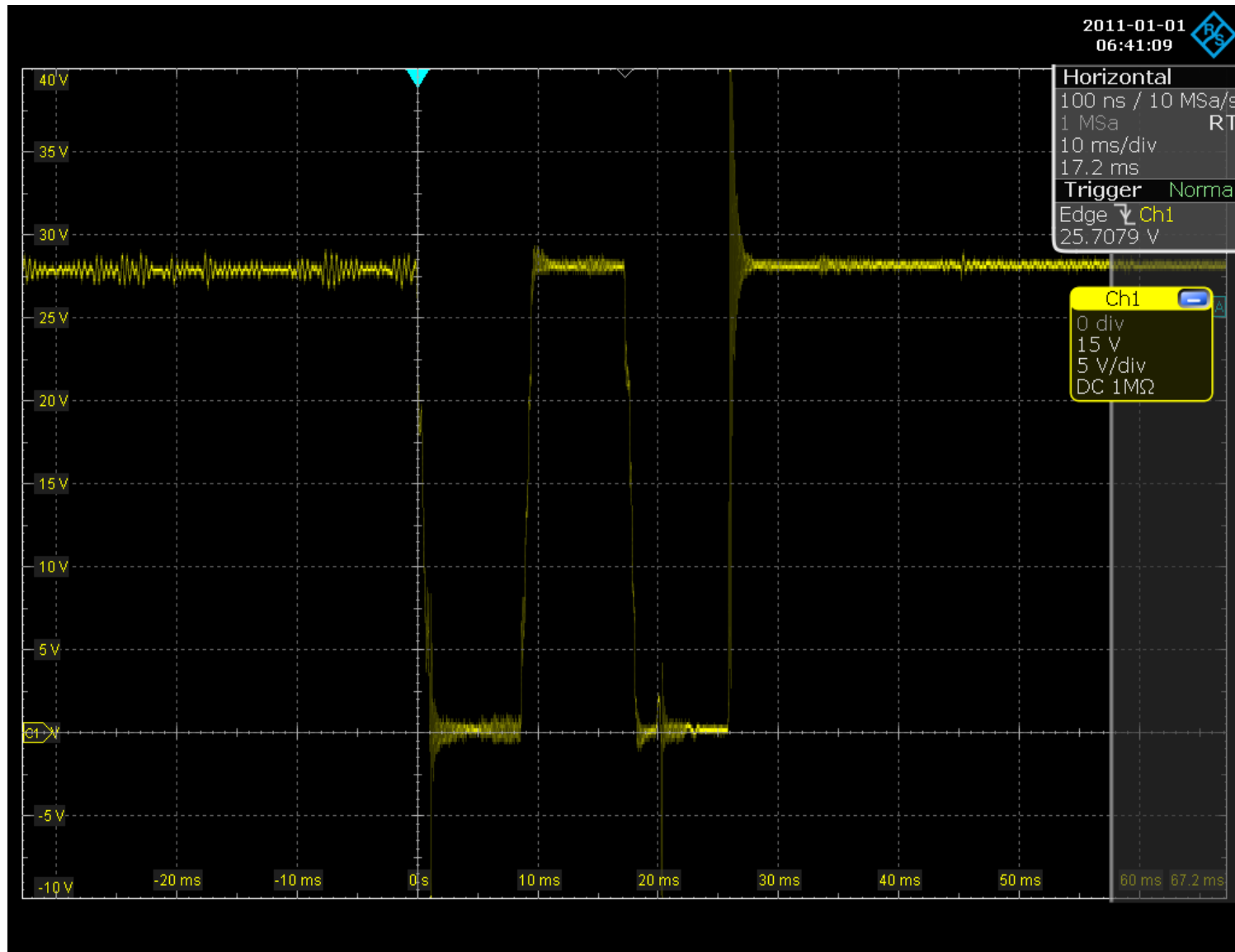
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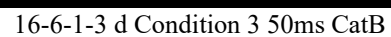
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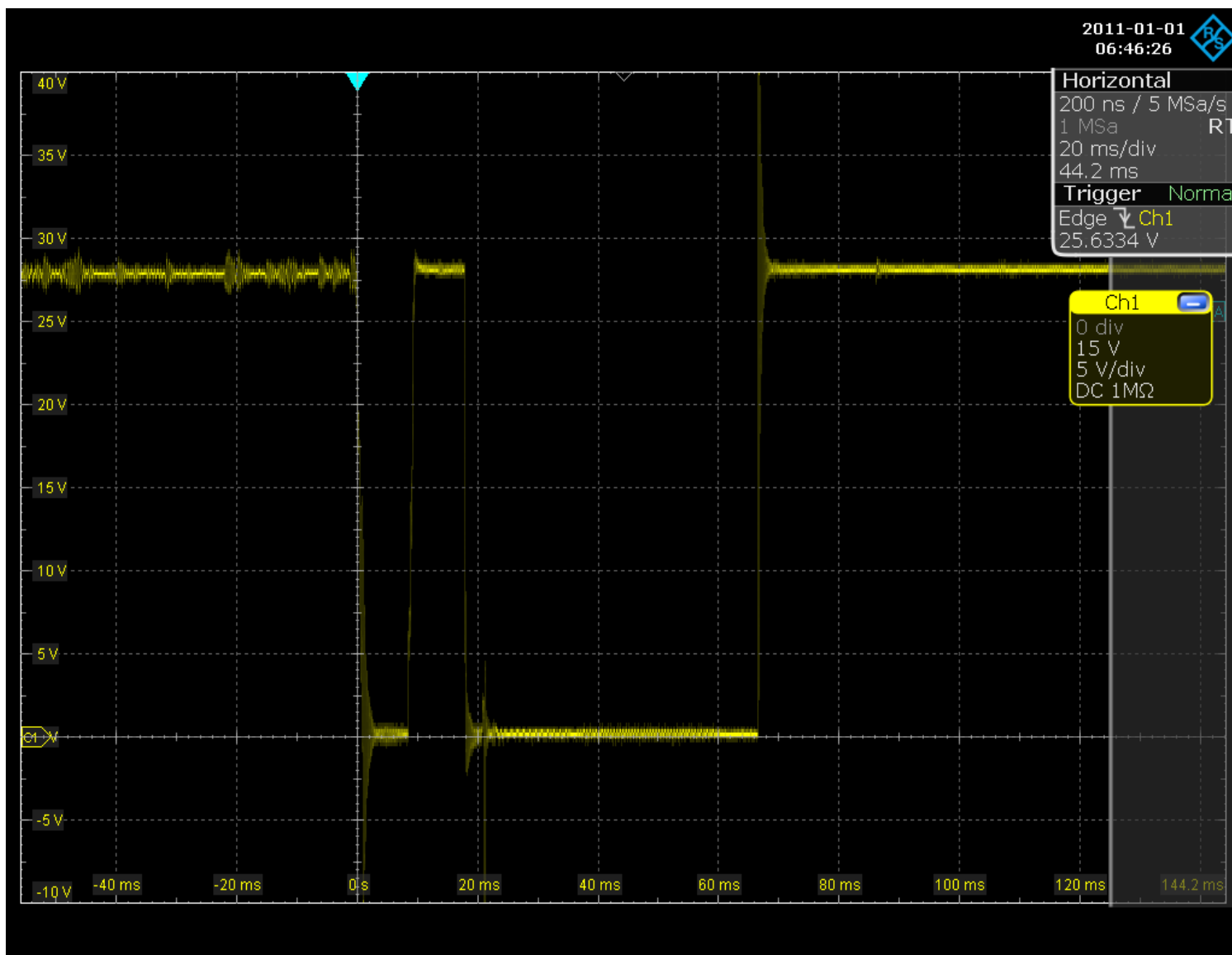


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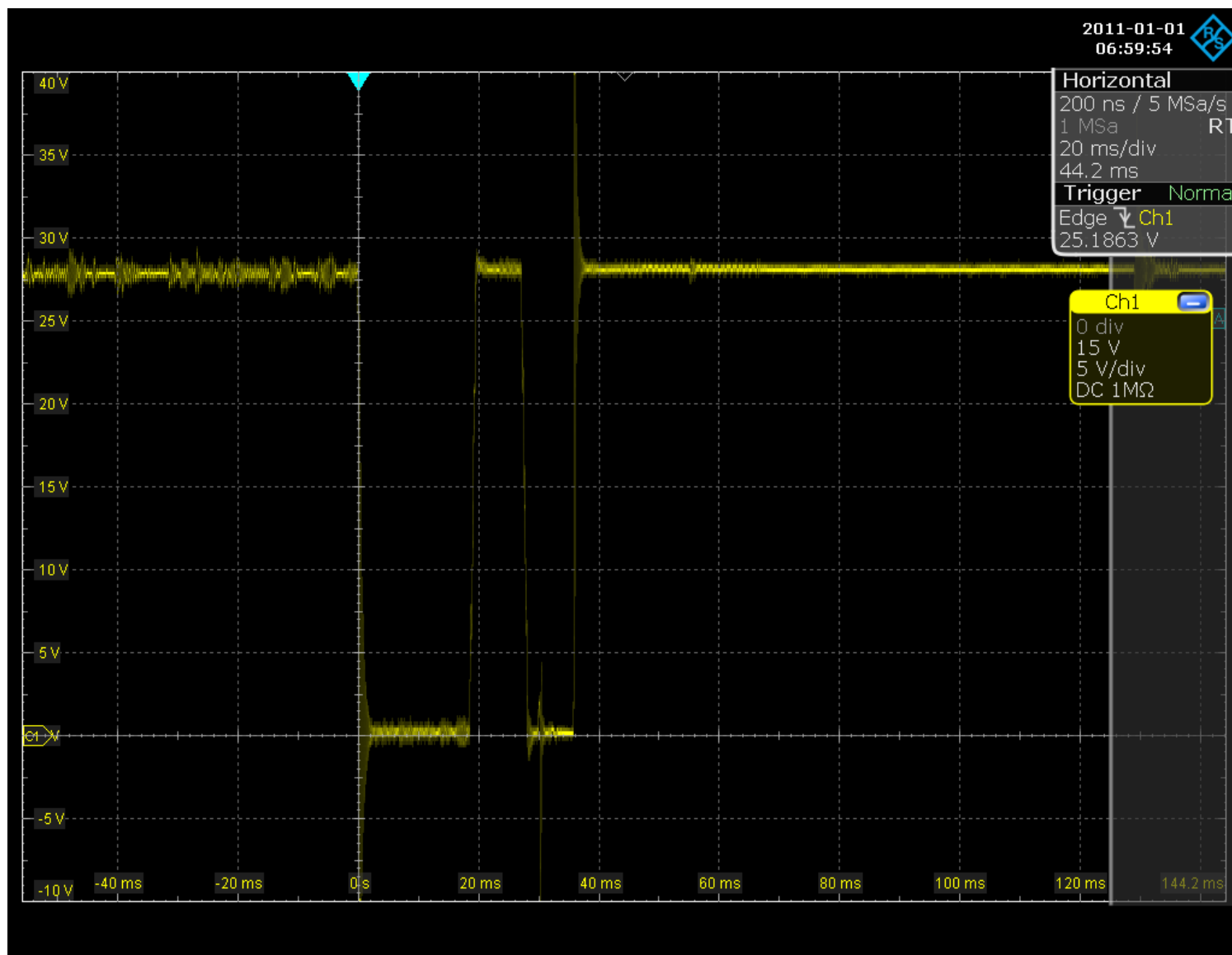


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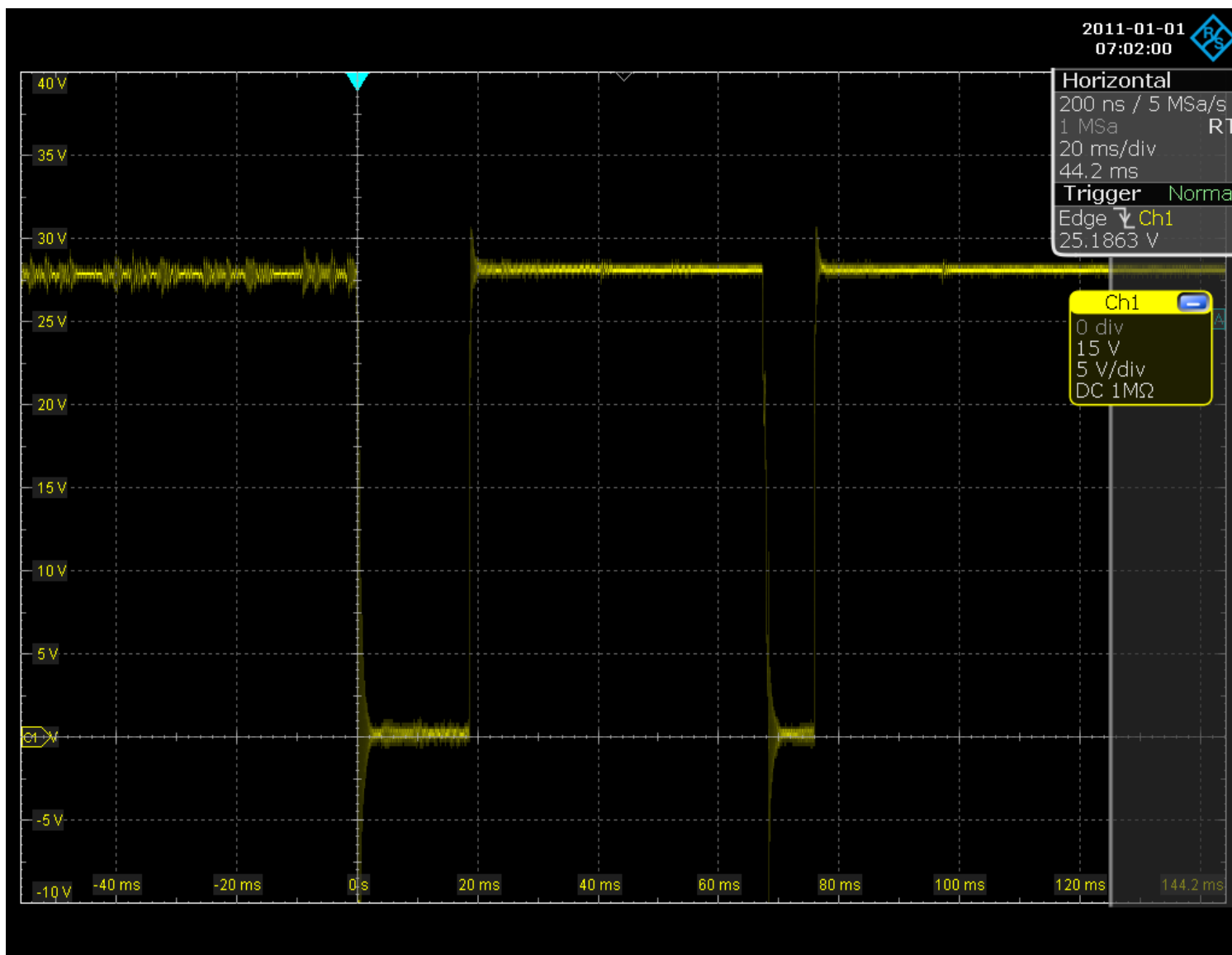




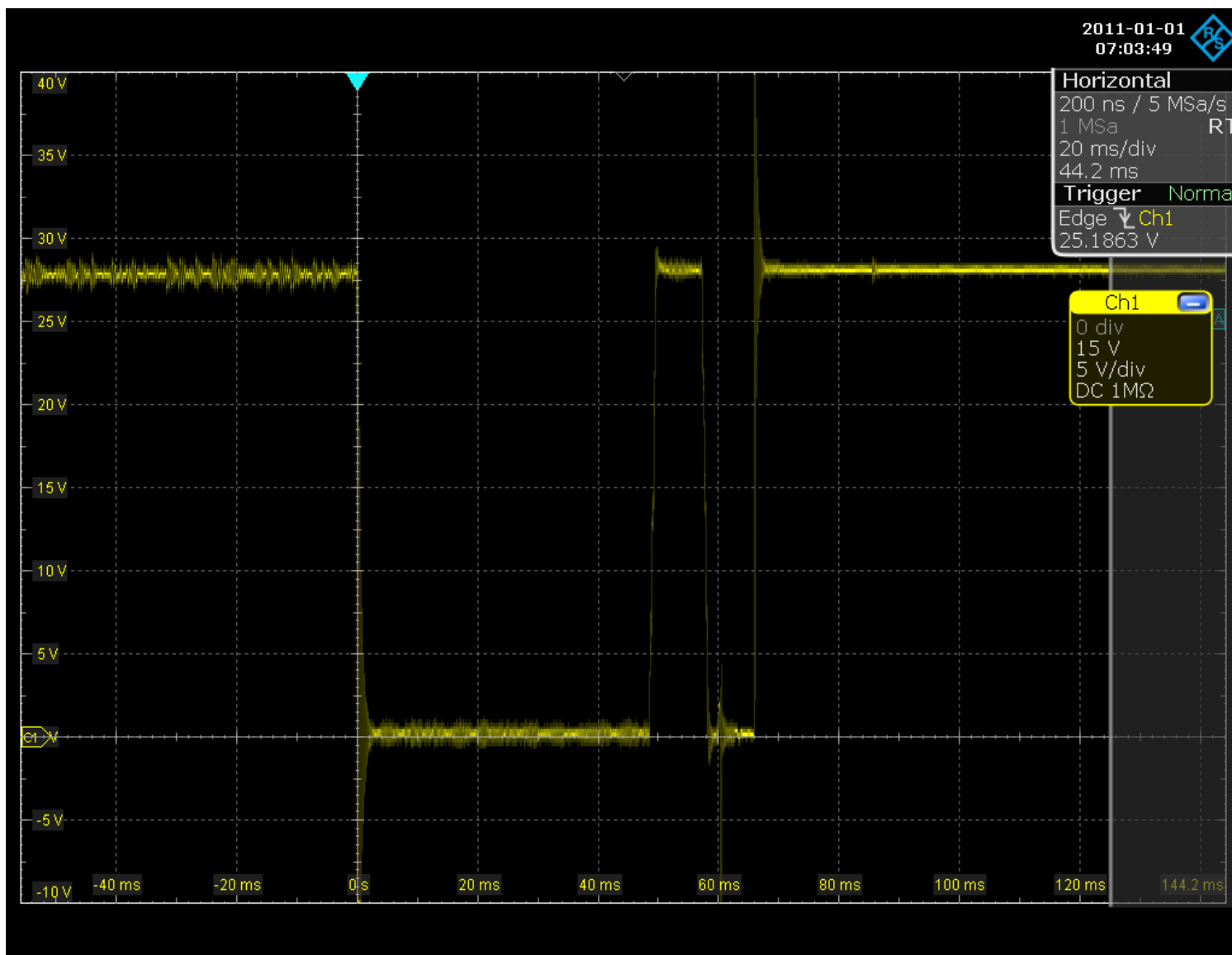
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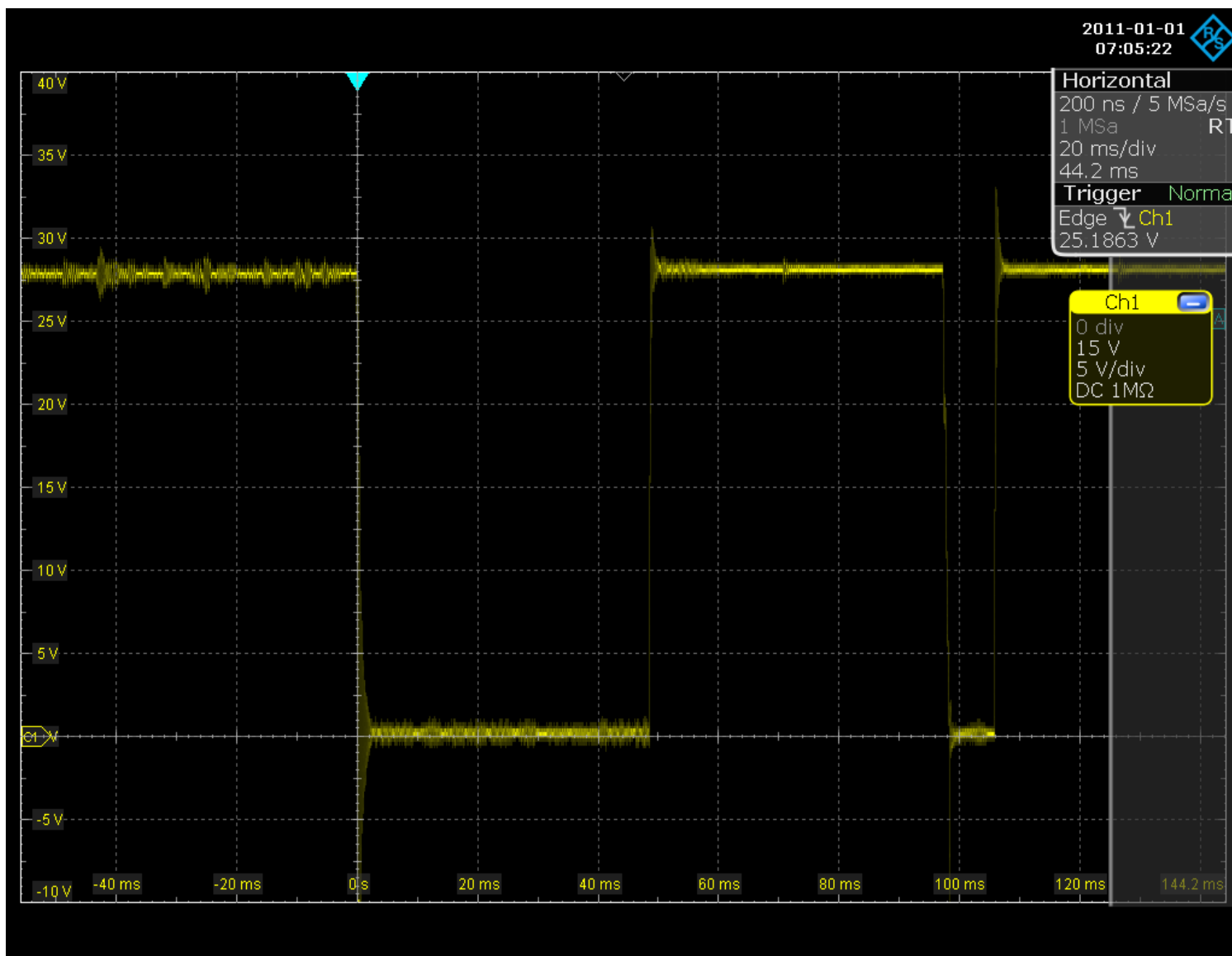
16-6-1-3 d Condition 6 10ms CatB



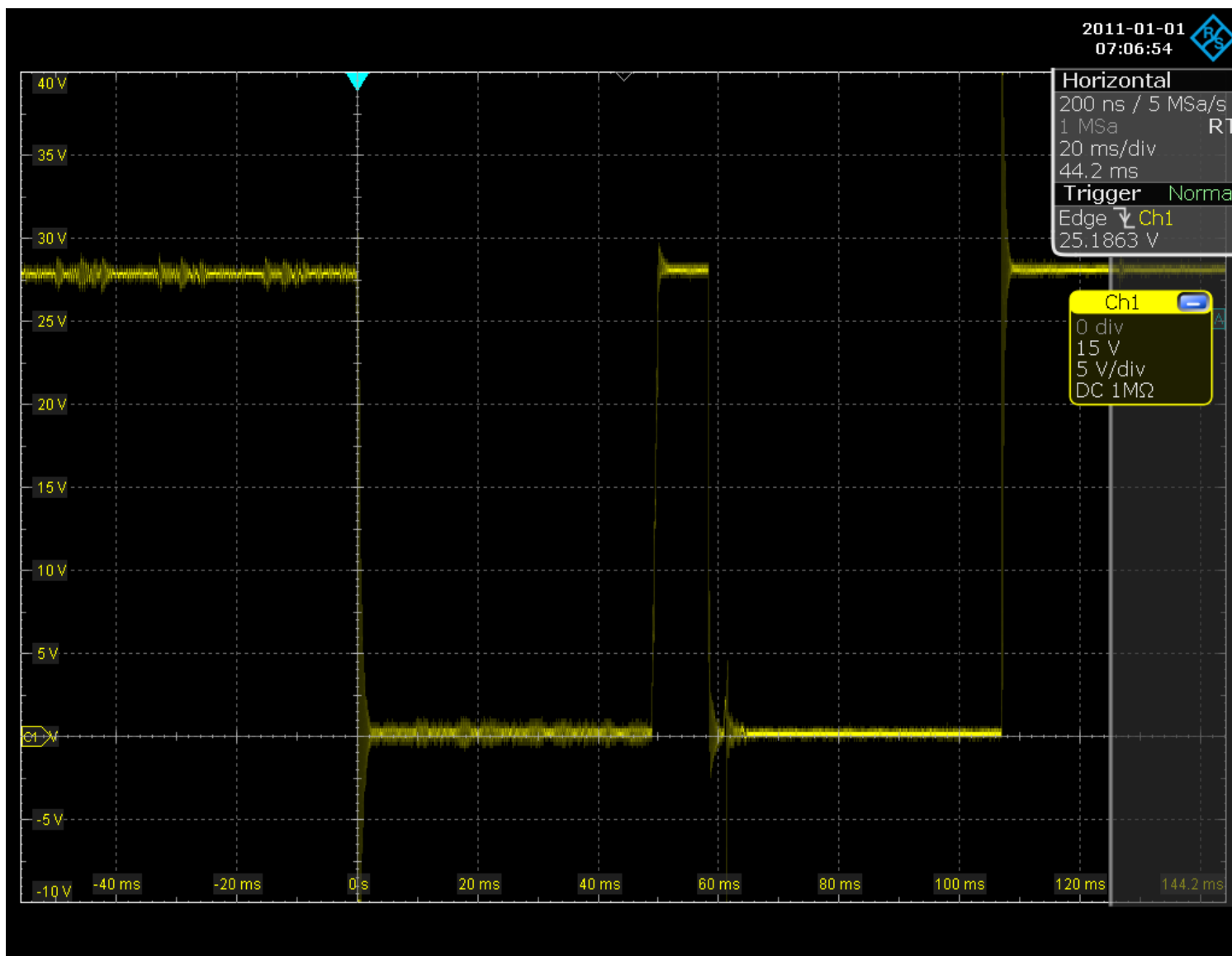
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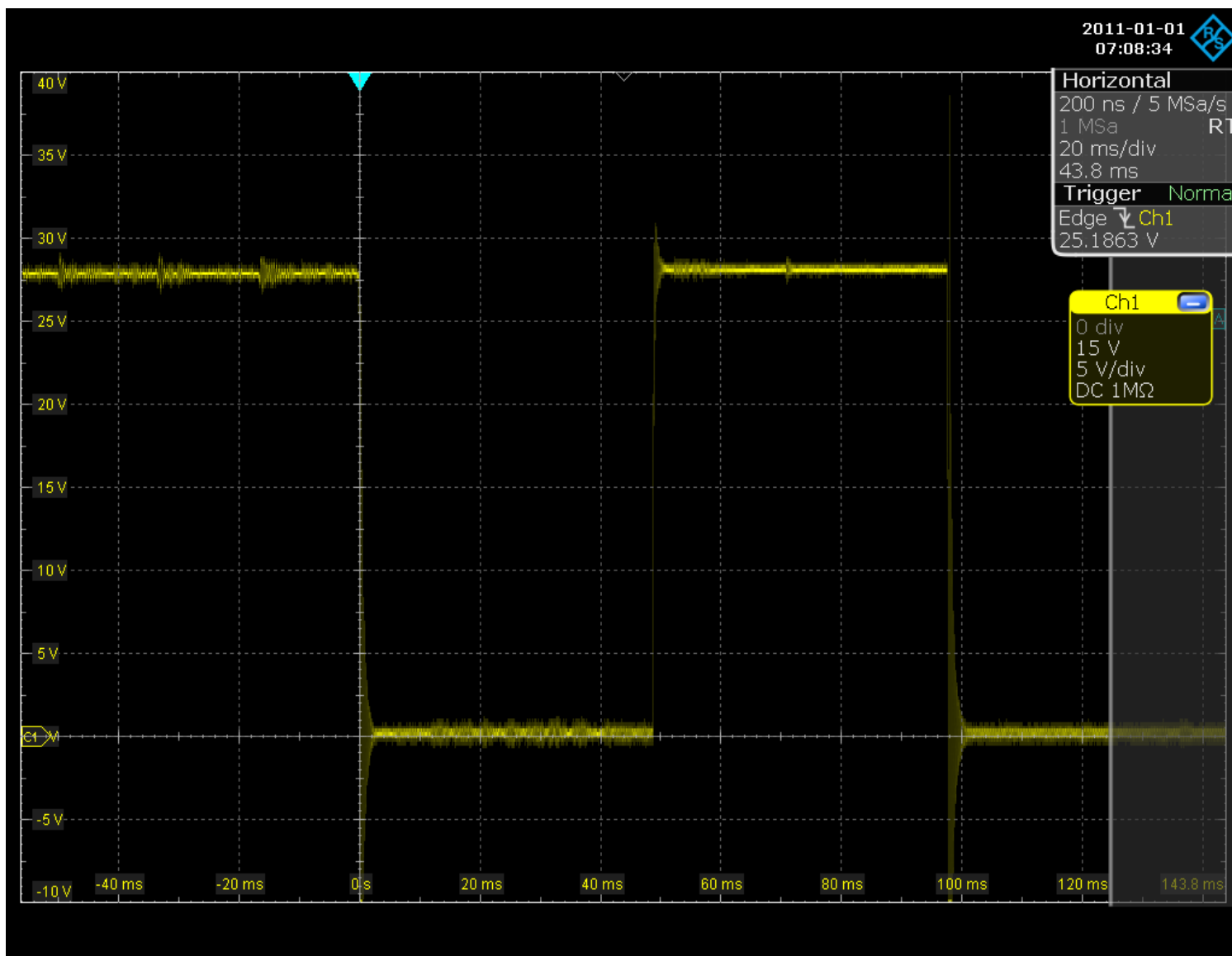
16-6-1-3 d Condition 10 10ms CatB



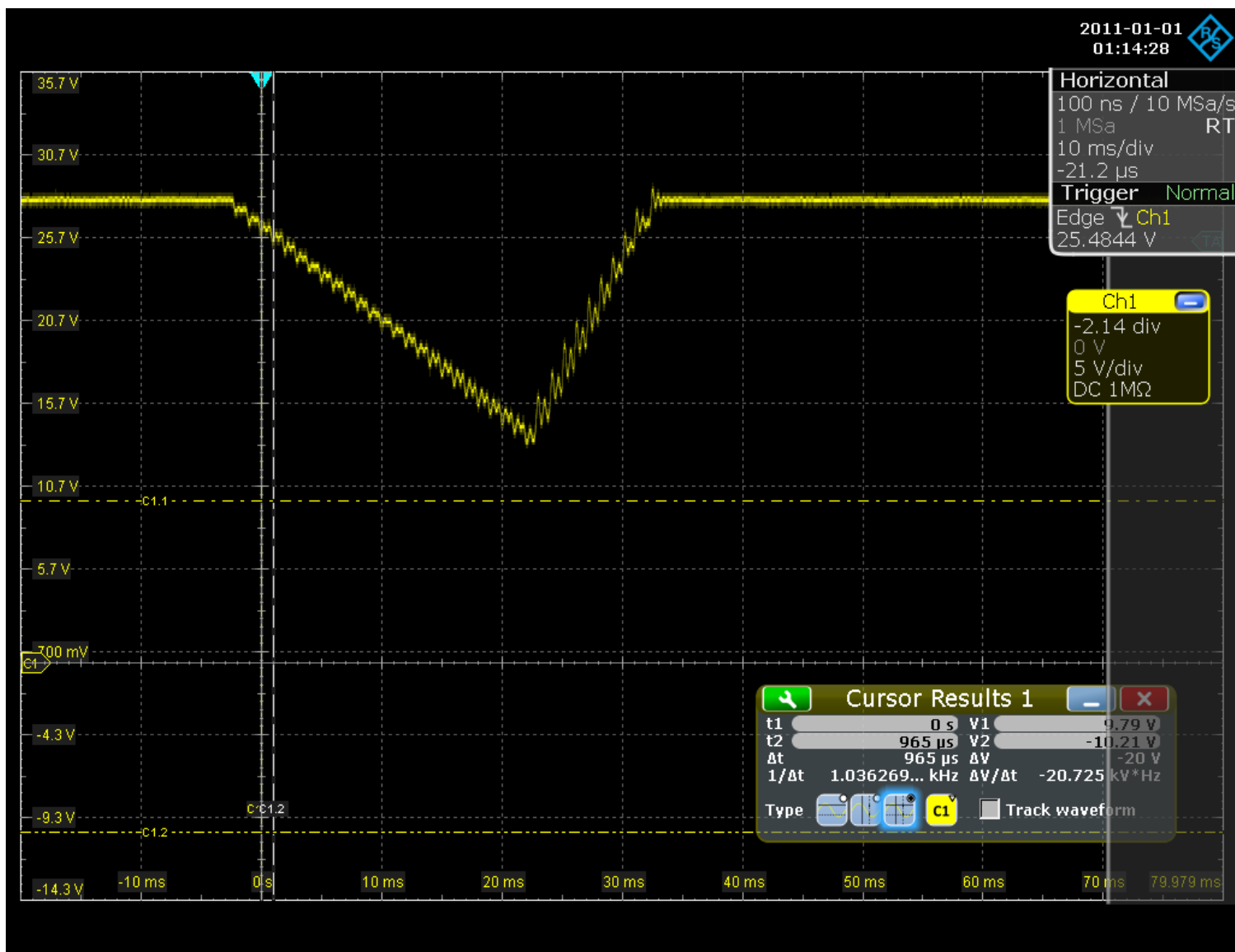
16-6-1-3 d Condition 10 50ms CatB



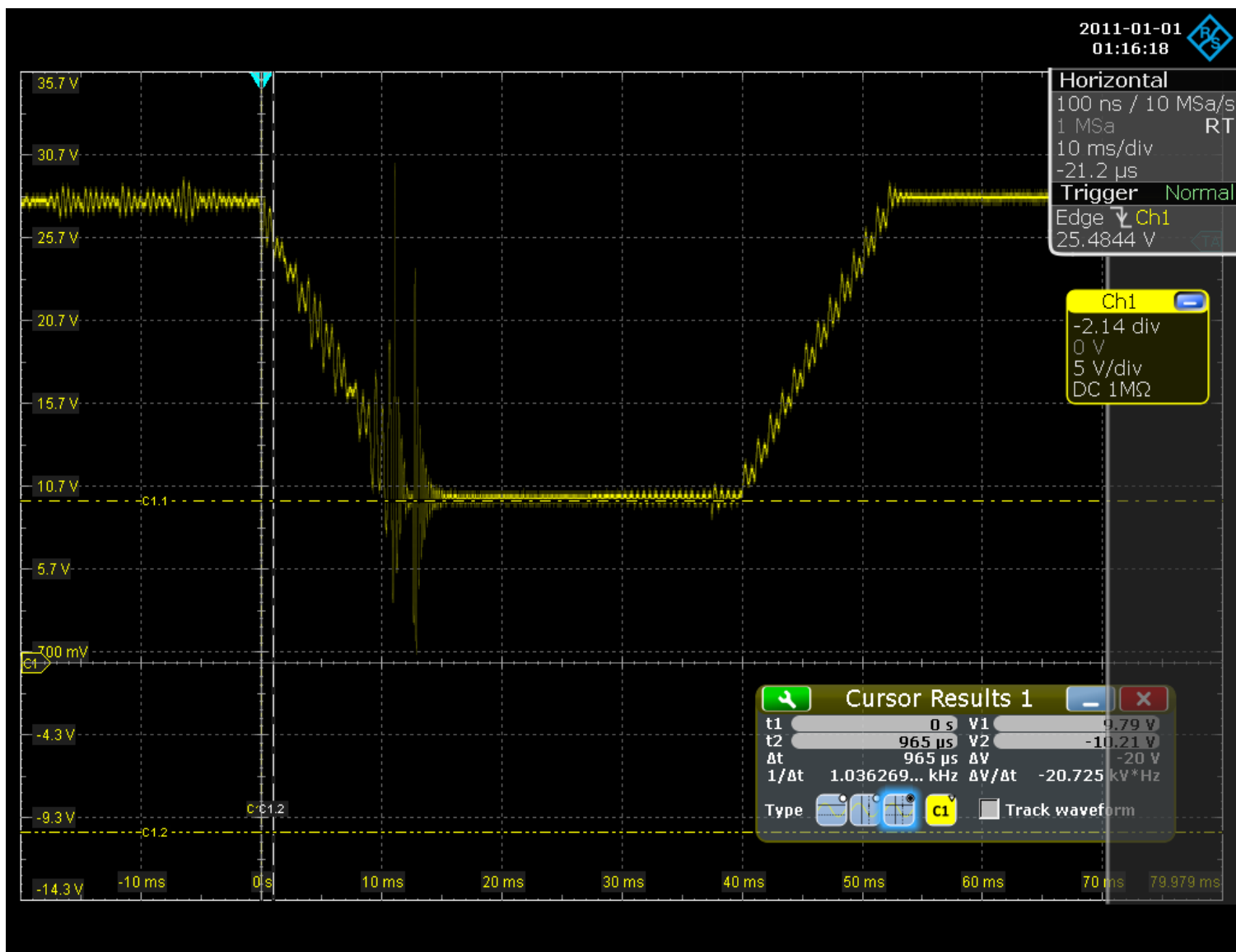
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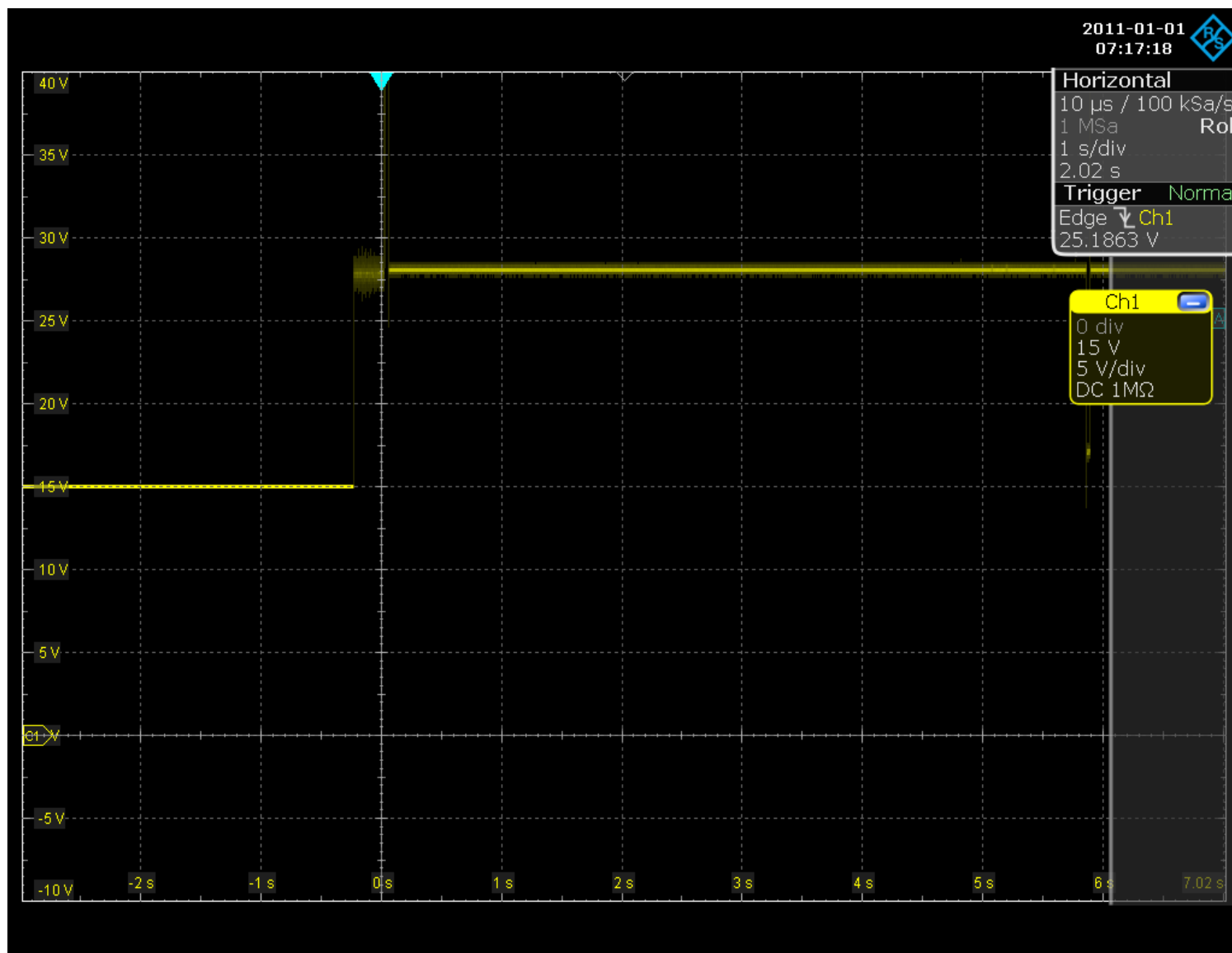
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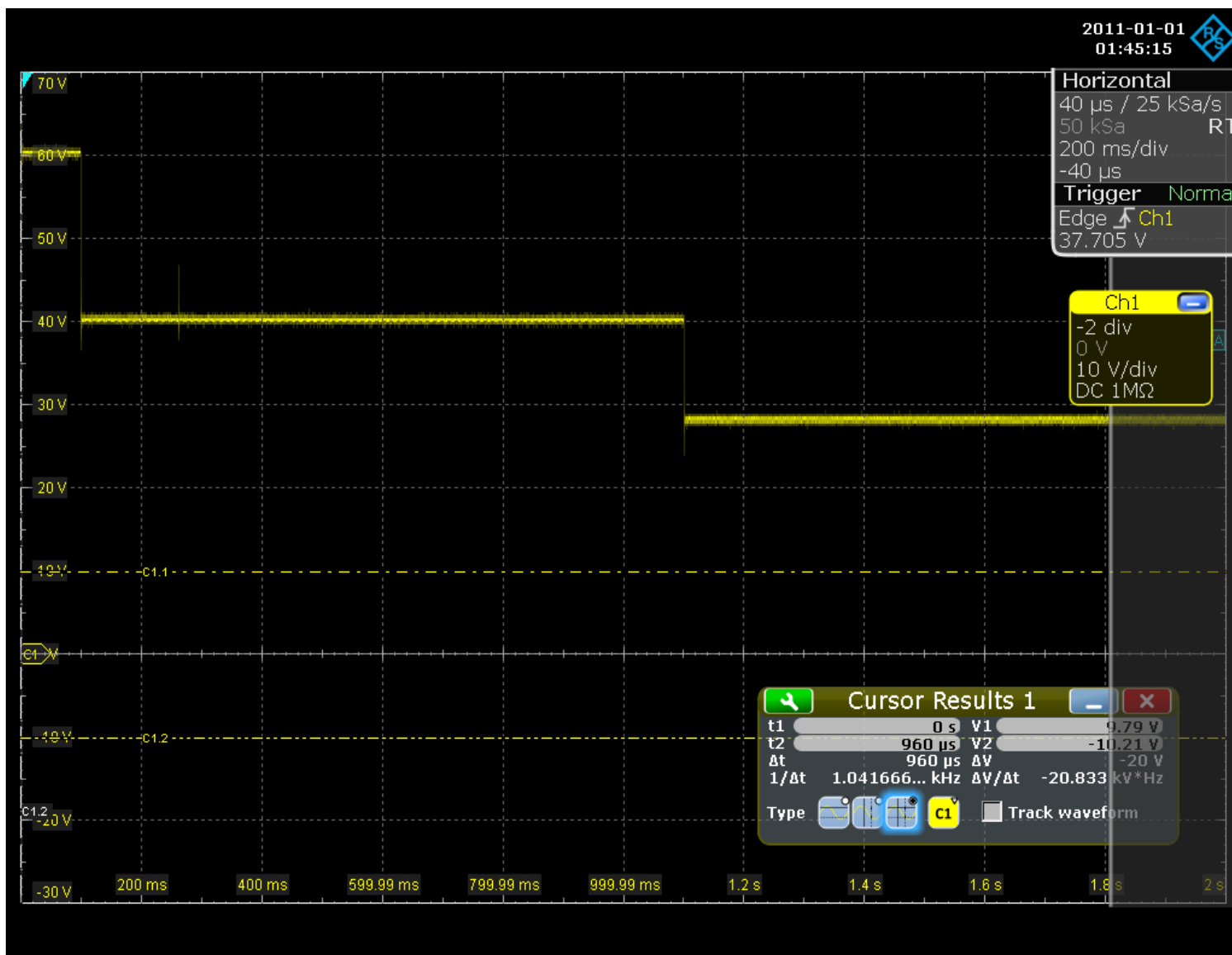
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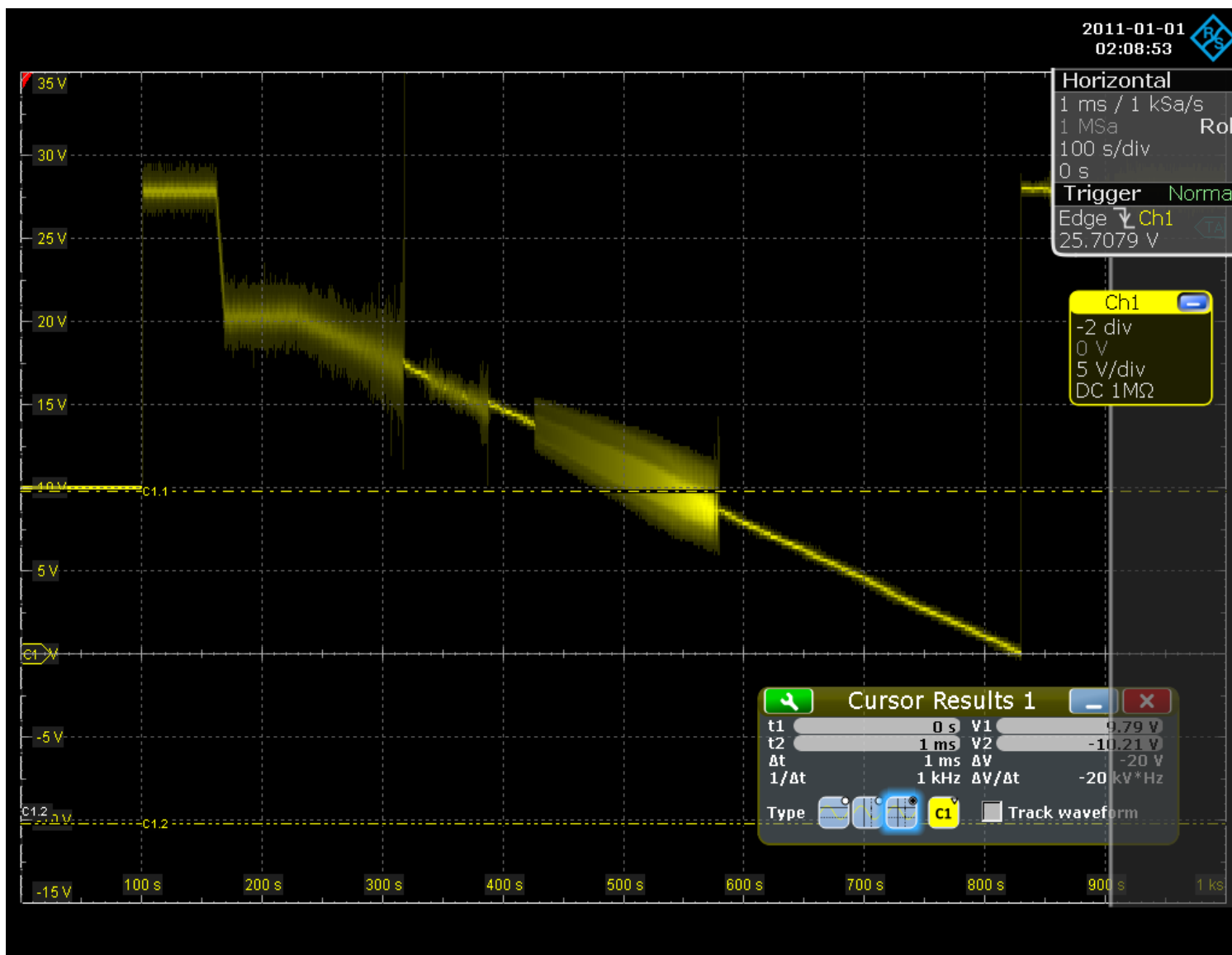
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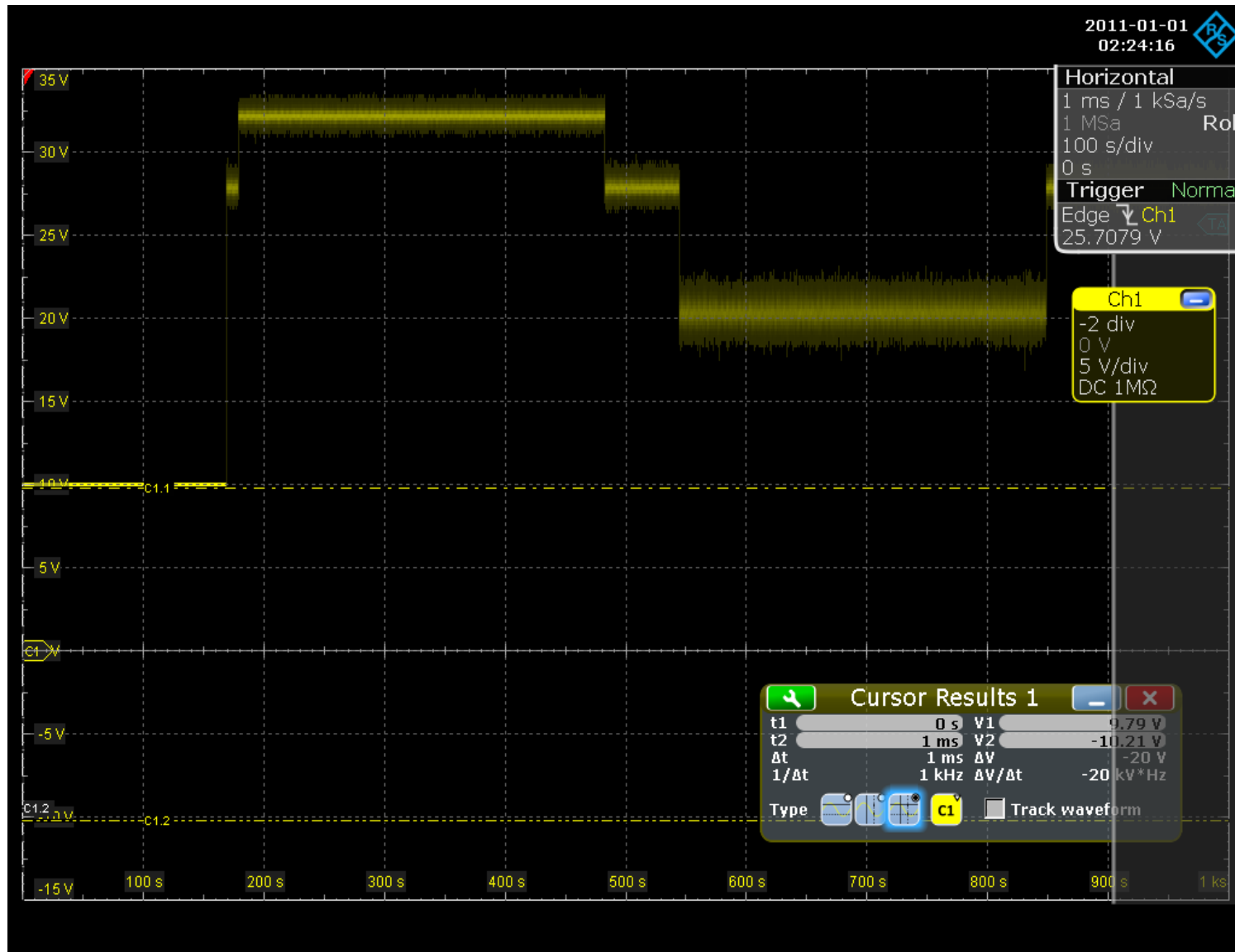


16-6-1-4 b CatB

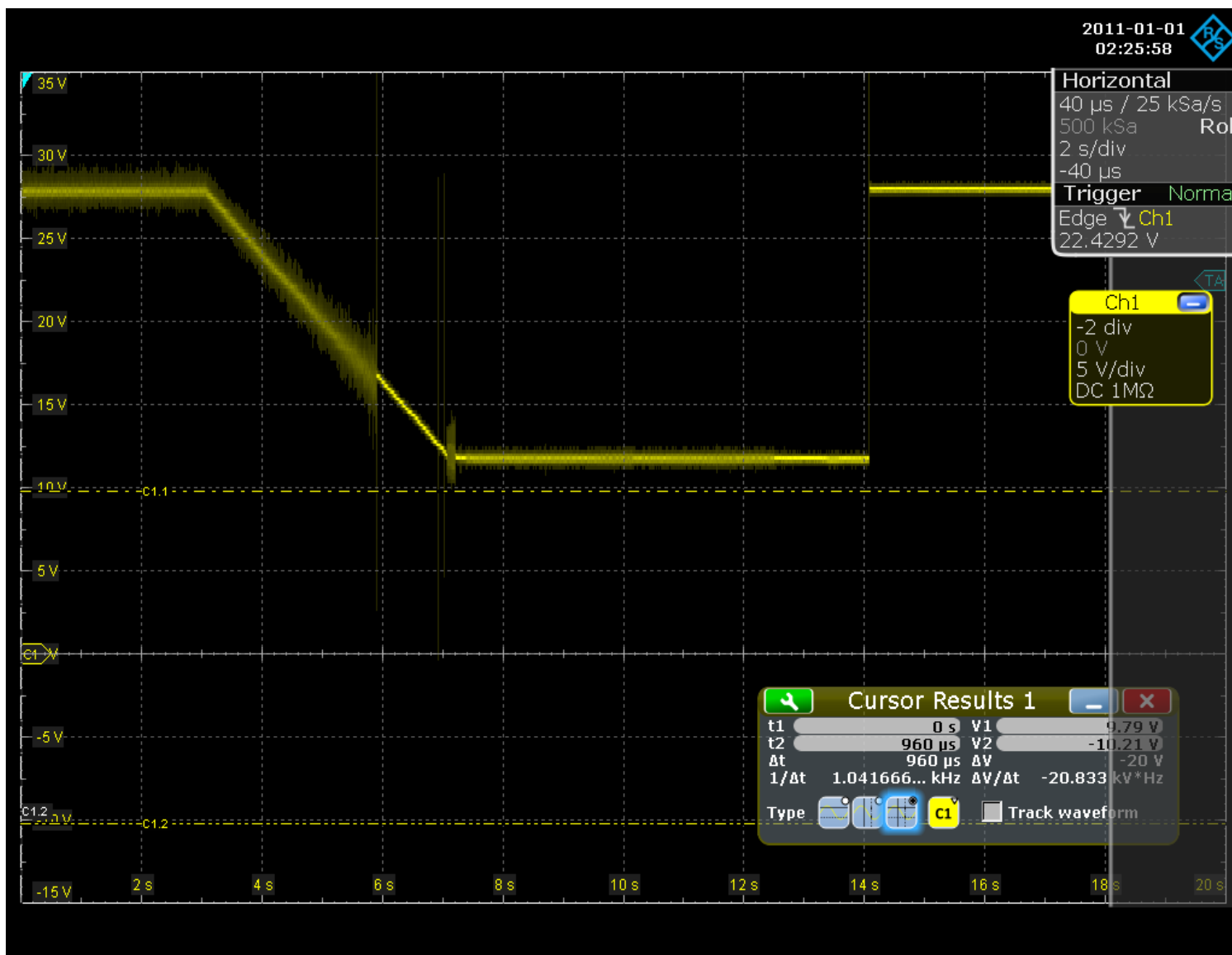


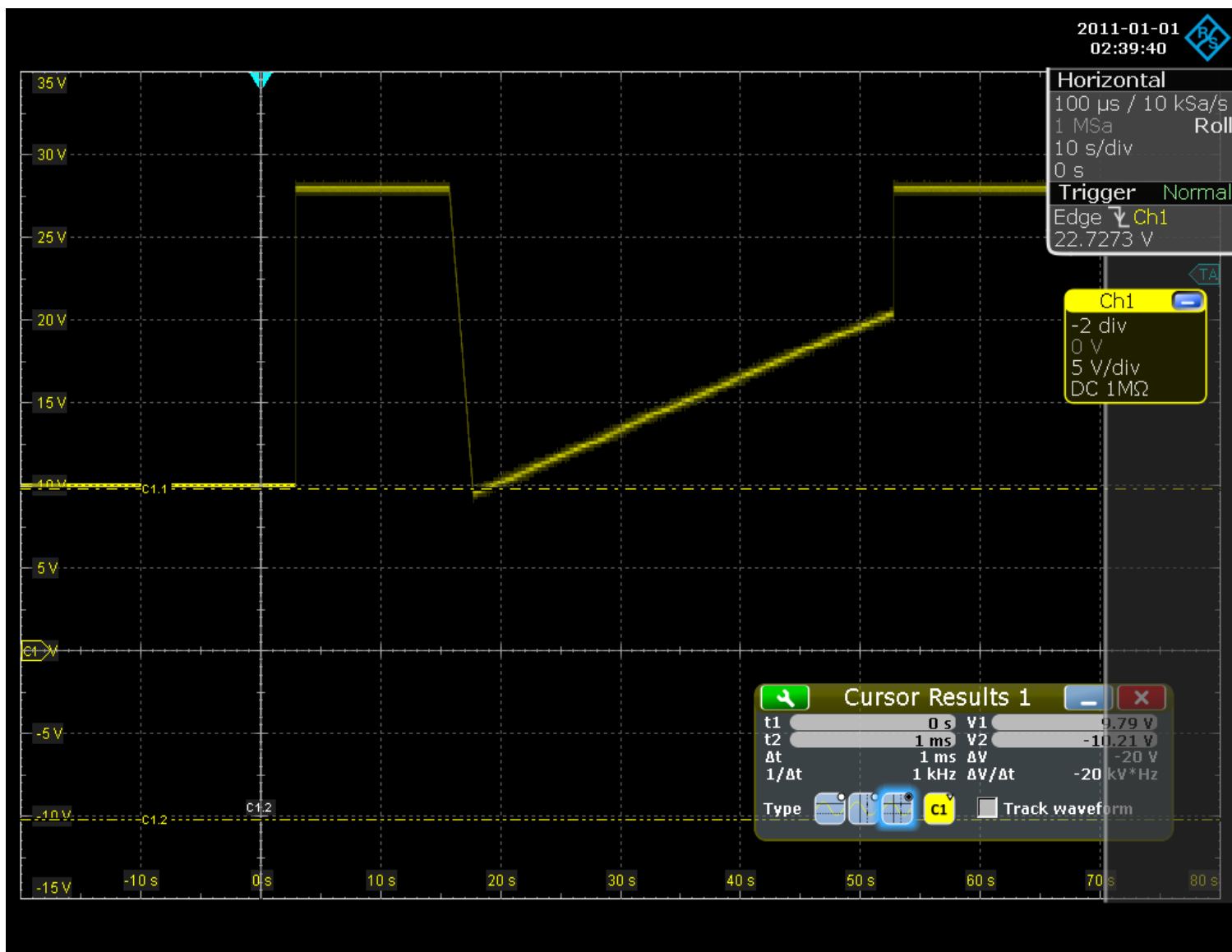
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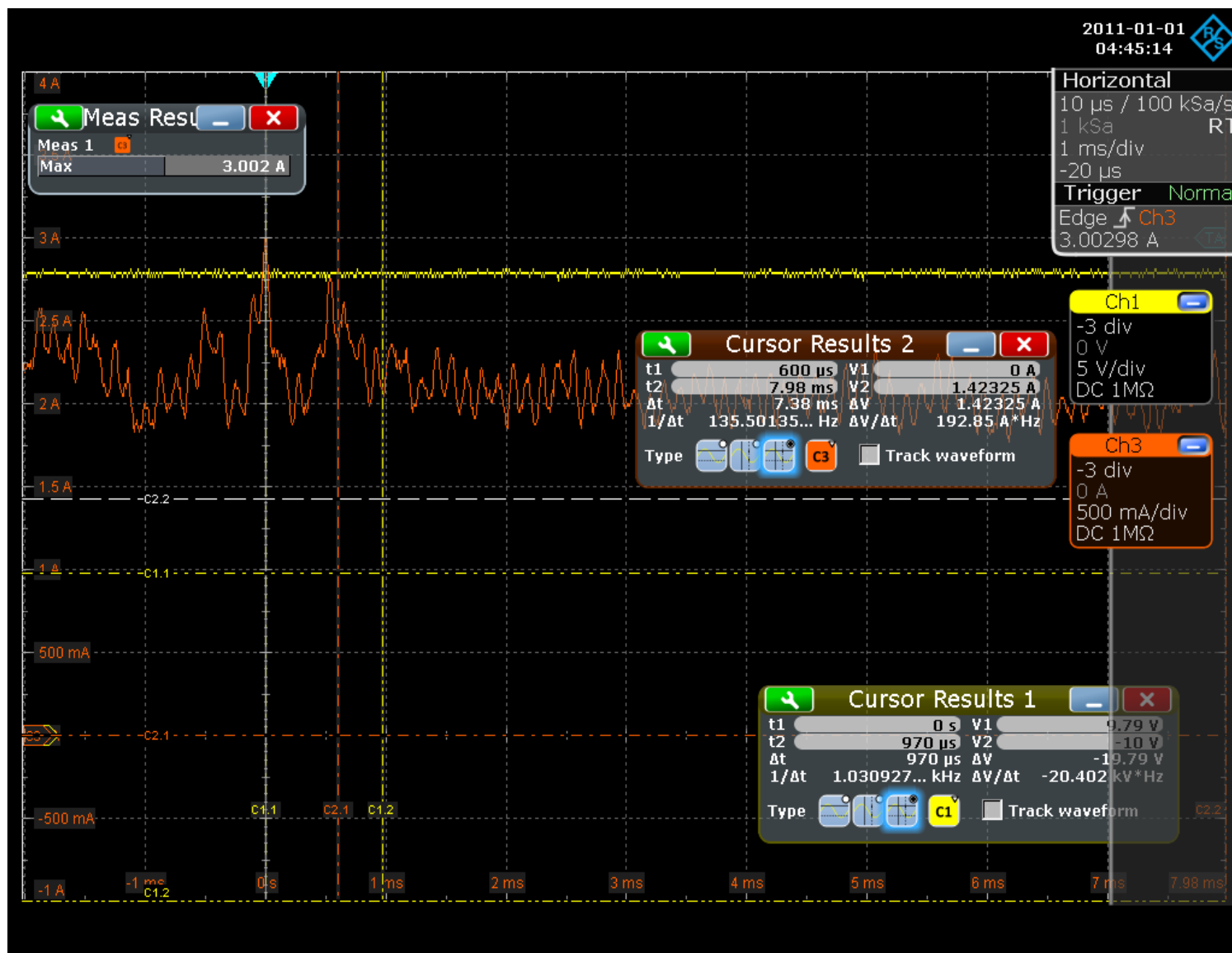




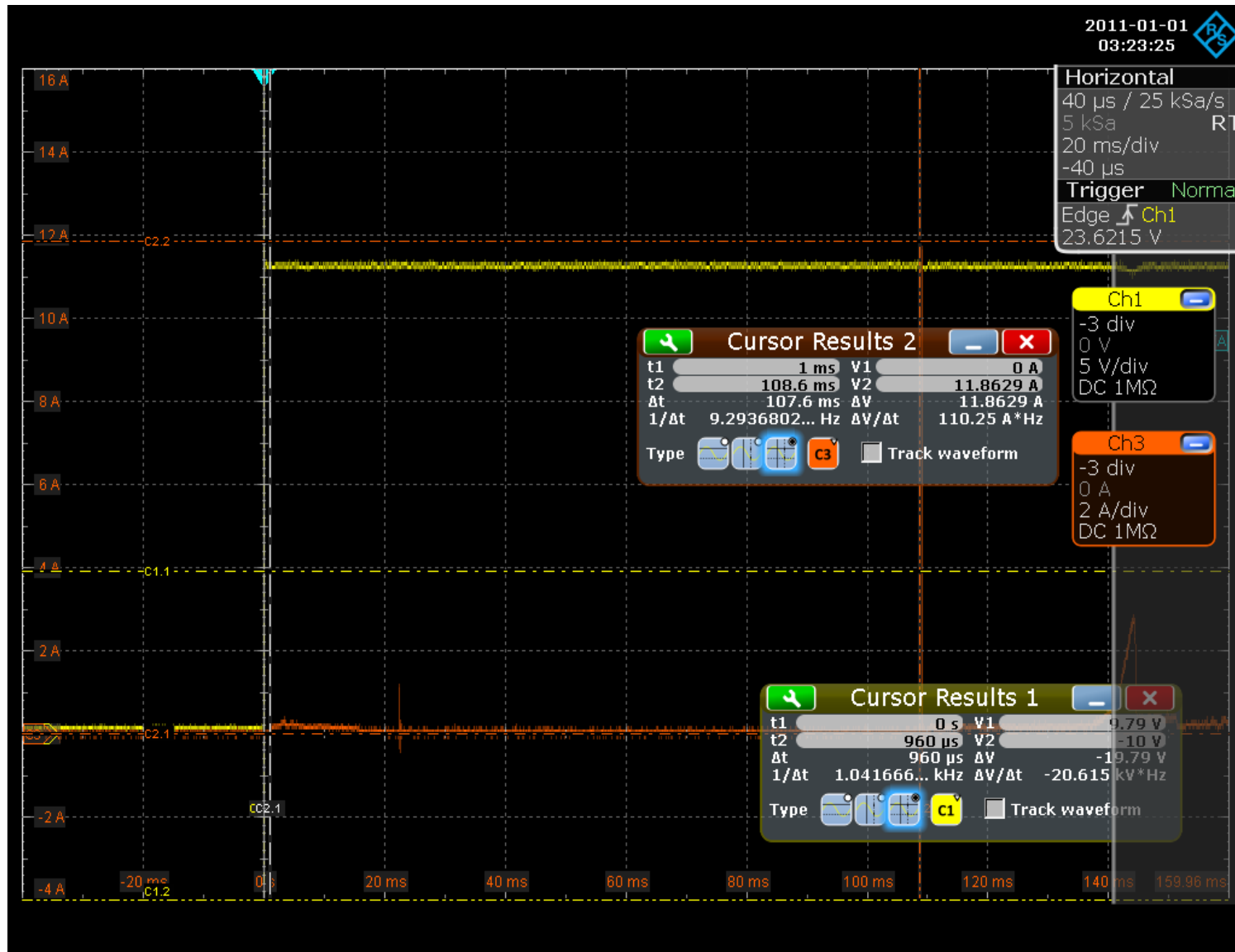
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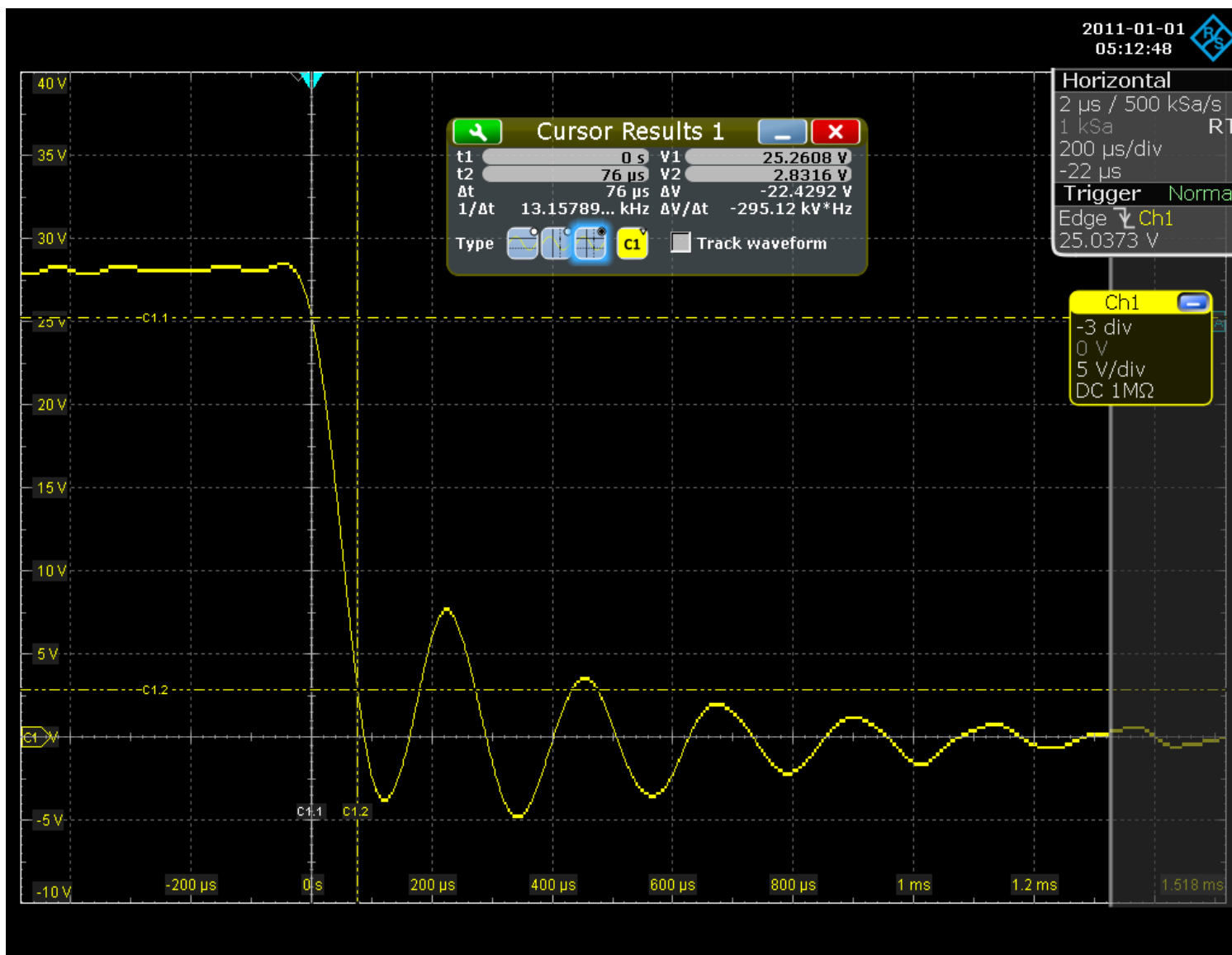




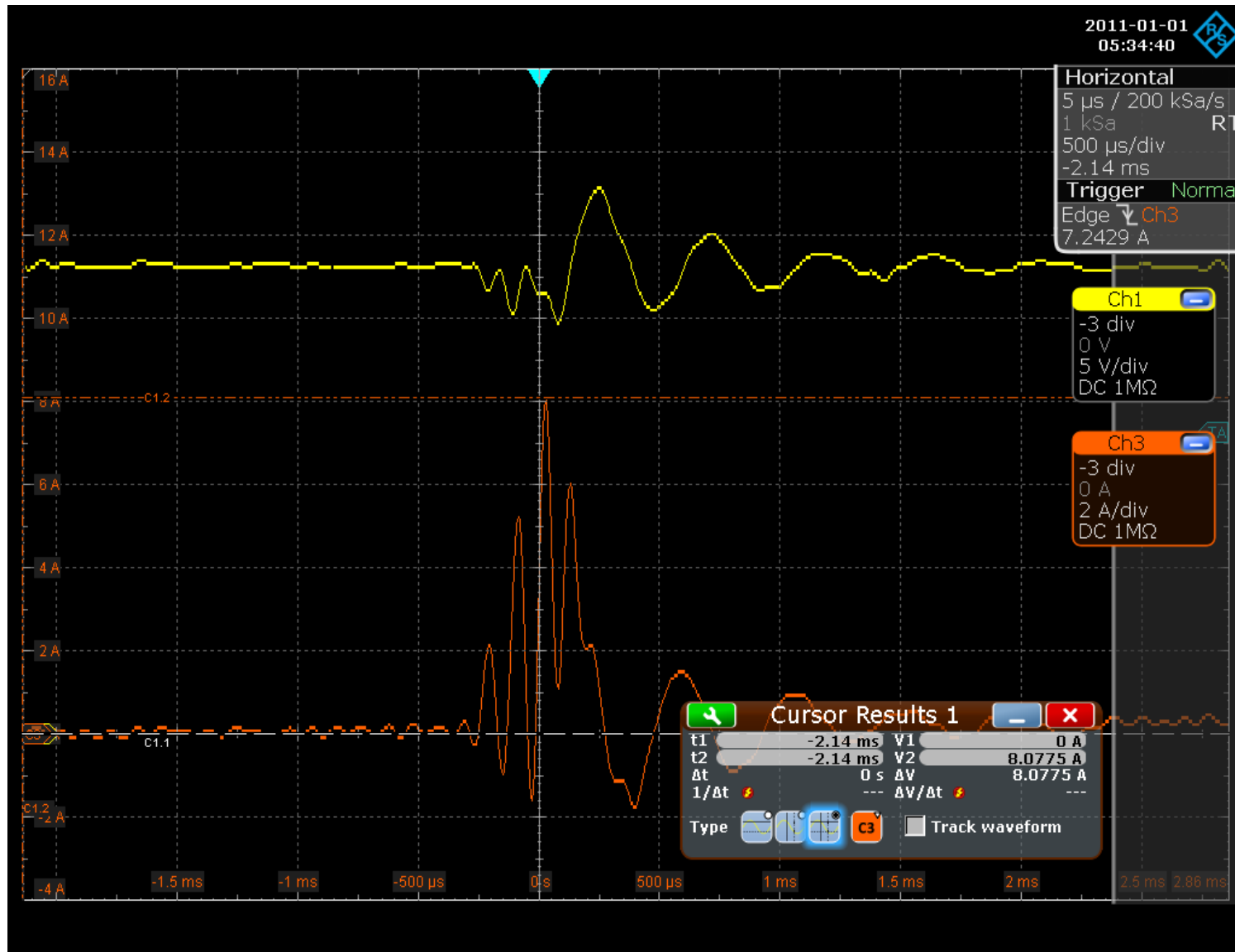


16-7-5 Maximum Steady State Current DesignI









Element Materials Technology

RTCA/DO-160G

Section 18 - Audio Frequency Conducted Susceptibility

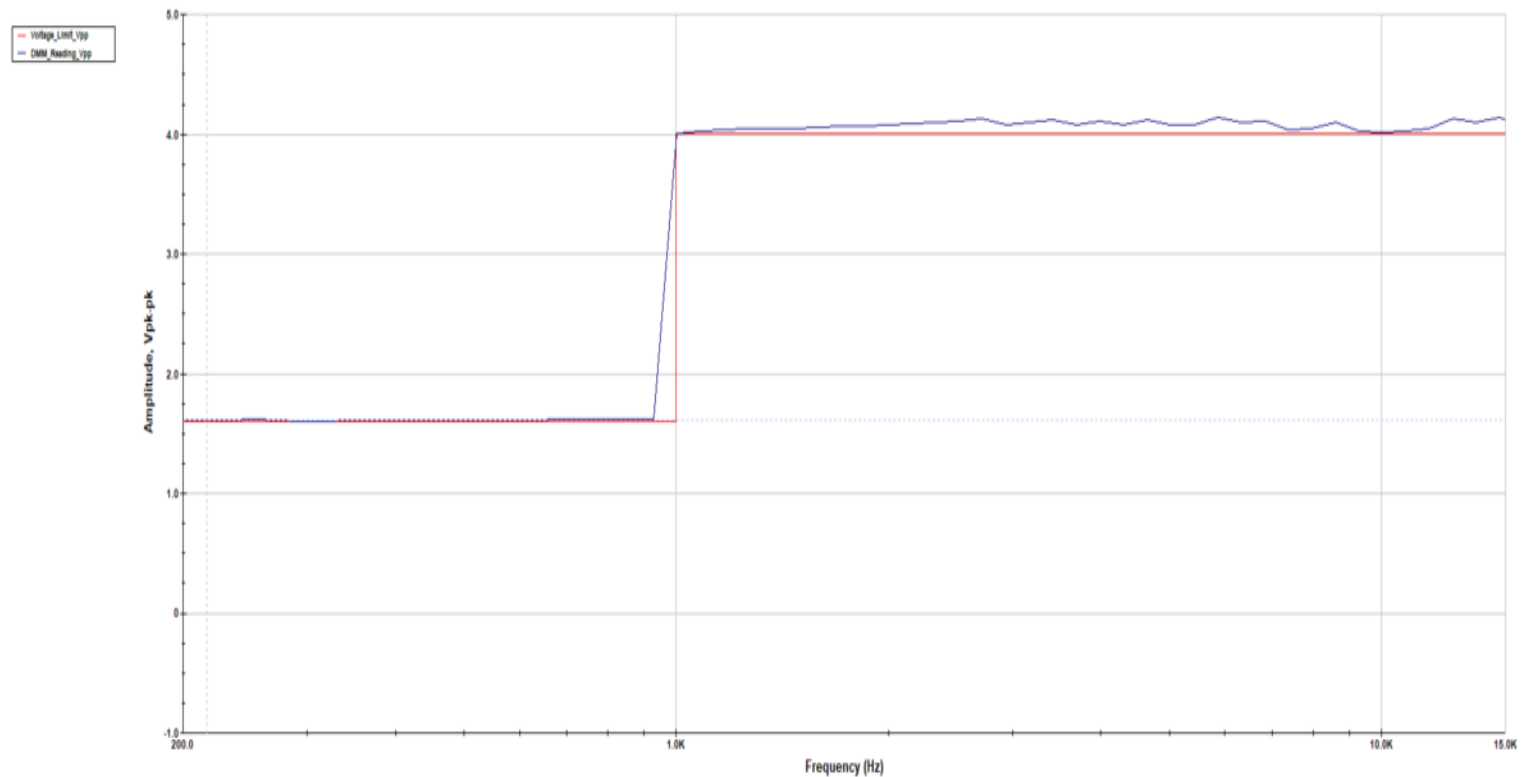
Project No. - PR188448

Test Item - The Shotover System

Part/Model No. - 012.0000

Serial No. - 190026

Mode of Operation - Fully Operational



Operator: Eugene DeVito

Ripple Voltage.ttl

Last Data Update 02:49:20 PM, Wednesday, January 14, 2026

Company: SHOTOVER Systems

Contact: Ken Haan

16-6-1-2 CatB

5.6.6 Test Equipment List

Table 5.6-1: Section 16 Test Equipment List

Asset Number	Asset Name	Manufacturer	Model	Calibrated	Due
US58-A059623	Chamber, Semi Anechoic	Rayproof	SR2	NCR	NCR
US58-A070485	Oscilloscope (Digital)	Rohde & Schwarz	RTE 1104	10/15/2024	10/31/2026
US58-A059770	Power Supply (AC)	California Inst	5001IX-CTS	06/10/2024	06/10/2026
US58-A076853	Probe (Differential)	Yokogawa	700925	11/27/2024	11/30/2026
US58-A059514	Amplifier (Current Probe)	Tektronix	TCPA300	06/28/2024	06/30/2026
US58-A059515	Probe (Current)	Tektronix	TCP303	06/18/2024	06/30/2026
US58-A084468	Precision Amplifier/120V	AE Techtron	7212	NCR	NCR
US58-A084463	Transformer (Audio)	Solar Electronics	6220-2A	NCR	NCR
US58-A059635	Meter (Digital Multimeter)	Hewlett Packard	34401A	04/24/2025	04/24/2027
US58-A059810	Generator (Function)	SRS	DS345	12/03/2024	09/19/2026
US58-A080751	Power Supply (DC)	Hewlett Packard	Harrison 626B	NCR	NCR

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

End of Test Report