

Center for Quality Engineering

Test Report No.: T07SSR1K

Order No.: T07S	Pages: 13	Enclosures : 1	Munich, 09 Feb. 2005
-----------------	-----------	----------------	----------------------

The test report shall not be reproduced except in full without the written approval of the testing laboratory

Client: Schroff GmbH
Product Management Subracks & Systems
Langenalber Str. 96-100
75334 Straubenhardt

Equipment under test: Advanced TCA Chassis

Manufacturer: Schroff GmbH

Task: Earthquake-Testing

Test Specification(s) Telcordia-GR-63 CORE , Issue 2, April 2002
[not covered by accreditation]: Section(s) 4.4 , 5.4 , Earthquake

Result: The EUT complies with the requirements listed in sec. 6.1
in detail

The results relate only to the items tested as described in this test report.

Approved by:	Position	Signature / Date
Mr. Udo Alt	Director CQE 31	 15.02.2005

The Center for Quality Engineering of the Information and Communication Networks Group of the Siemens AG is accredited by
DATEch for

COMPONENTS TESTING ENVIRONMENTAL ENGINEERING ELECTROMAGNETIC COMPATIBILITY PRODUCT SAFETY
TELECOM CONFORMANCE TESTS

Address: Siemens AG, COM CTO CQE, Hofmannstr. 51, D-81359 München, Phone +49 89-722-48793, Fax +49 89-722-22648, Internet <http://www.pruefinstitut.de>

CONTENTS

1	SUMMARY	3
2	REFERENCES	3
2.1	Specifications	3
3	GENERAL INFORMATION.....	4
3.1	Identification of Client	4
3.2	Test Laboratory	4
3.3	Storage of Records	4
3.4	Time Schedule	4
3.5	Participants	4
4	EQUIPMENT UNDER TEST	5
4.1	Description of EUT	5
4.2	Failure Criteria	6
5	TEST EQUIPMENT	7
5.1	Test Facility	7
5.2	Measuring Equipment	7
5.3	Measurement Uncertainty	7
6	SPECIFICATIONS, TESTS AND RESULTS : ENVIRONMENTAL.....	8
6.1	Requirements Specification	8
6.1.1	Earthquake Criteria (Zone 4)	8
6.2	Test Specification	8
6.3	Test Performance	9
6.4	Test Results	10
6.4.1	Earthquake TRS vs. RRS and Acceleration at EUT	10
6.4.2	Results of Displacement measurement	13
7	ENCLOSURES	1
7.1	Accreditation Certificate	1

The test report shall not be reproduced except in full without the written approval of the testing laboratory

1 Summary

The report contains the results from the environmental compatability technical analysis of the **Schroff Advanced TCA Chassis completed with Dummy Boards** with regard to

Telcordia-GR-63 CORE , Issue 2, April 2002, Section(s) 4.4 , 5.4, Earthquake.
Testing was performed by Siemens AG, ICN TQM QE at their test-facilities.

Requirement acc. to GR 63 CORE	Criteria met (yes/no)	Remark
R 4-46 Earthquake: Structural / Mechanical Damage	y	
R 4-47 Earthquake : Deflection Criterion (3 in.)	y	

2 References

2.1 Specifications

GR 63 CORE , Issue 2 (2002)
NEBS Requirements : Physical Protection

The test report shall not be reproduced except in full without the written approval of the testing laboratory

3 General Information

3.1 Identification of Client

Client: Schroff GmbH, Product Management Subracks & Systems
Address: Langenalber Str. 96-100
75334 Straubenhardt
Country: Germany

3.2 Test Laboratory

Name: Siemens AG, COM CTO CQE 31
Address: Hofmannstrasse 51
81359 Munich
Country: Germany
Phone: (089) 722 26105 Mr. Alt
Fax: (089) 722 25326
E-Mail: Udo.Alt@siemens.com

3.3 Storage of Records

The original of the test plan / report is delivered to the client. It is in the responsibility of the client to administer and store the test report for future use.

The EUT-software has to be kept by the client and must be available for future examinations.

3.4 Time Schedule

Delivery of EUT: 24.1.2005
Start of test: 24.1.2005
End of test: 25.1.2005

3.5 Participants

Participants Testreport

Name	Function	Company	Department	Location
Knier	Accredited testing	Siemens AG	COM CTO CQE 31	Mch H
Rieger	Client	Schroff GmbH	Engineering Services	Straubenhardt

4 Equipment under Test

4.1 Description of EUT

Identification: ATCA System 12HE 14S
Part Number: 11592-085

The shelf was completed with dummy boards for weight compensation and mounted in a 19" Global Seismic Frame from the manufacturer Hendry / USA part number: 0GS136

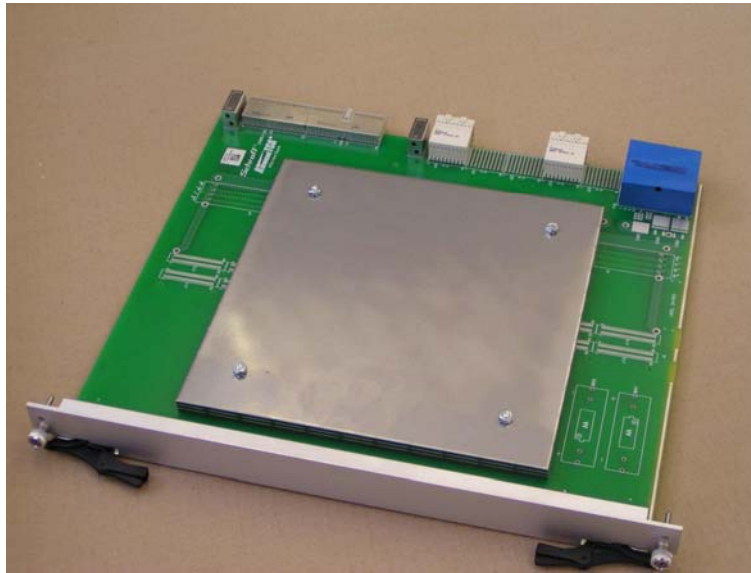


Photo 1: Dummy board for front side with load 3,0kg (each)

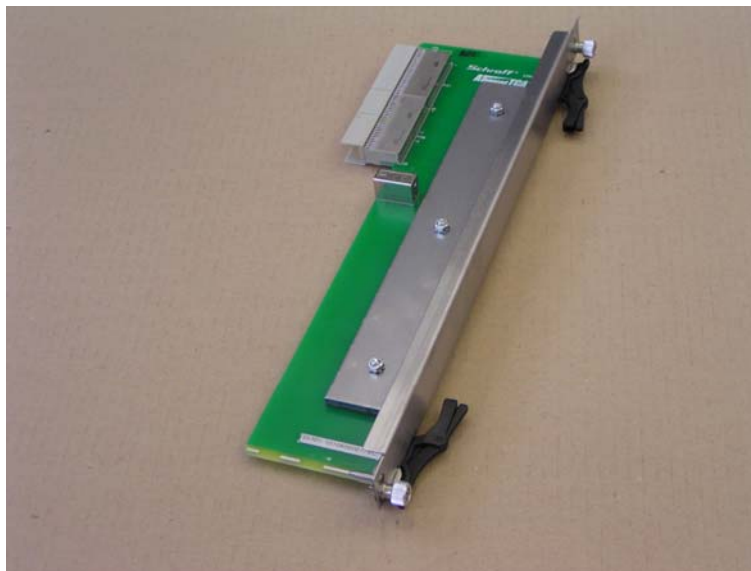


Photo 2: Dummy board for back side with load 0,4kg (each)



Photo 3: Advanced TCA shelf front



Photo 4: Advanced TCA shelf back

4.2 Failure Criteria

No mechanical deviations.

The test report shall not be reproduced except in full without the written approval of the testing laboratory

5 Test Equipment

5.1 Test Facility

The measurements were carried out in the Center for Quality Engineering: Siemens AG, Department ICN TQM QE 31, Hofmannstraße 50, 81359 München, Germany.

5.2 Measuring Equipment

Earthquake Vibration Test Equipment 86A

Ident. No.	EQUIPMENT	TYPE	MANUF.	Status of Equipment	Cal.-Date YYYY/MM	Cal. due date YYYY/MM
S0353	Earthquake Test System	921.67	MTS	not	-	-
S0420	Displacement Measuring Device	10000DC-D-006	Schaevitz	chk	2004/04	2005/03
S0896	Control System for Earthquake	TESTSTAR IIS	-	not	-	-
S0919	Amplifier	106	Endevco	cal	2005/01	2006/01
S0922	Power Supply	109V	-	not	-	-
S5033	Power Supply	32r06	Gossen	ind	-	-
S5186	Accelerometer	2262C-25	Endevco	cal	2004/02	2006/02
cal=calibrated Equipment - cpu=checked prior to use - chk=checked equipment (dated)						
ind=for indication only - not=not calibrated equipment - ref=Reference standard						

5.3 Measurement Uncertainty

The measurement uncertainty is given by the used equipment. Detailed information can be seen in the technical descriptions of the used equipment and in the calibration data sheet. It is available on request.

The test report shall not be reproduced except in full without the written approval of the testing laboratory

6 Specifications, Tests and Results : Environmental

The test results in the report refer exclusively to the test object described in section 4 and the test period in section 3.4.

6.1 Requirements Specification

6.1.1 Earthquake Criteria (Zone 4)

R 4-46 All equipment shall be constructed to sustain the waveform testing of **GR-63-CORE Section 5.4.1** without permanent structural or mechanical damage

6.2 Test Specification

Table 6.1 - Test specification

Environmental parameter	Test Severity		Duration	Method
Earthquake time-history	RRS	see Table 6.3	30 s	IEC 60068-2-57 [4] Test Ff: Vibration - Time-history method
	ZPA*	15 m/s ²		
	frequency range	1 – 50 Hz		
	axes	3		
	damping ratio	2 %		

* Zero Period Acceleration

Table 6.2 - Earthquake Required Response Spectrum

Frequency [Hz]	Values for upper floor acceleration [m/s ²]
	GR-63-Core
1	30
2	50
5	50
15	16
35	16
50	16

The test report shall not be reproduced except in full without the written approval of the testing laboratory

6.3 Test Performance

The Advanced TCA shelf with dummy boards was mounted for earthquake test with its normal fastening points in a 19" Global Seismic Frame from the manufacturer Hendry/USA. On top of the frame a 18kg load were mounted to simulate overhead cable load. A 48kg mass was mounted in the lower area to duplicate the shelf mass and the stiffness characteristics of a fully loaded equipment frame. These EUT was mounted at earthquake table by means of an 40mm aluminium adapter plate.

A LVDT was attached to the top of the EUT to measure the deflection in X- and Y-axis. A video taken from tests in all three axes is part of the documentation.

The test was performed in 3 mutually perpendicular axes.

horizontal longitudinal front to back = Y-axis

horizontal lateral = X-axis

vertical = Z-axis

The tests were performed in normal use attitude.

The test report shall not be reproduced except in full without the written approval of the testing laboratory

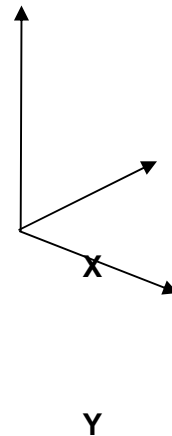


Photo 4: Mounting of EUT for Z-axis test (14 dummy board front and 14 dummy boards rear)

The test report shall not be reproduced except in full without the written approval of the testing laboratory

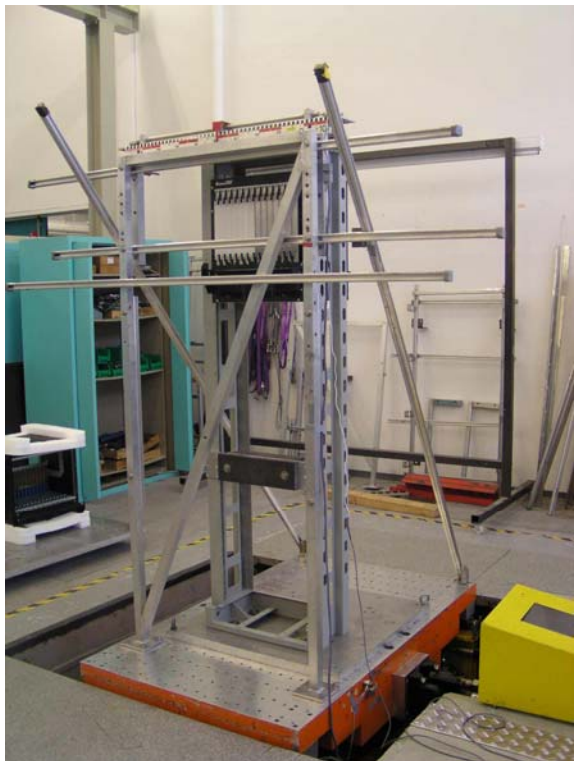


Photo 5: Mounting of EUT for X-axis test

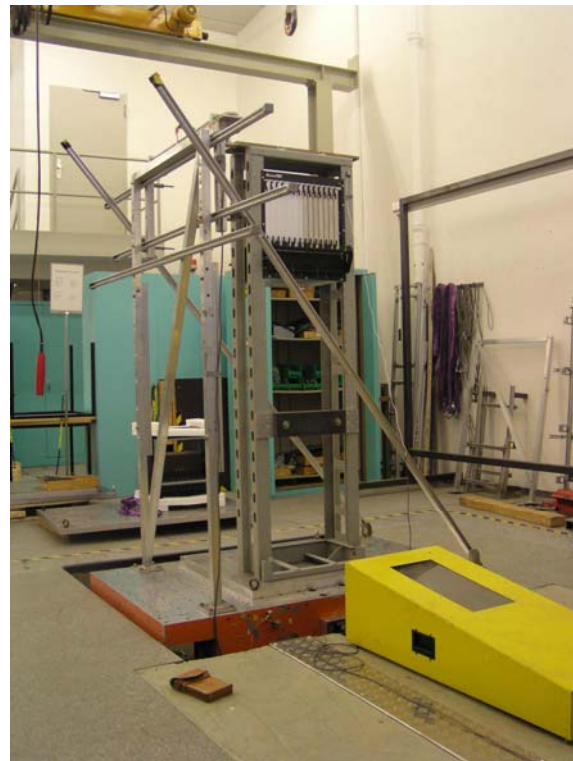


Photo 6: Mounting of EUT for Y-axis test

6.4 Test Results

No mechanical deformations of the EUT could be ascertained during and after the test. All criteria listed in section 6.1.1 were met.

In detail:

- R4-46 : No mechanical or structural damages occurred
- R4-47 : The deflection on top was < 30 mm. For the z-axis test, no LVDT-measurement was performed.

6.4.1 Earthquake TRS vs. RRS and Acceleration at EUT

The shaker table's analyzed acceleration response signal (Test Response Spectrum (TRS, red line)), must meet or exceed the Required Response Spectrum (RRS, blue line) for the Earthquake Risk Zone 4 in the range from 1.0 to 50 Hz.

The following diagrams show the recorded plots for each axis.

Depart.: COM CTO CQE 31	Test Report	Date: 09 Feb. 2005
Author: Knier	Advanced TCA Chassis	10/13

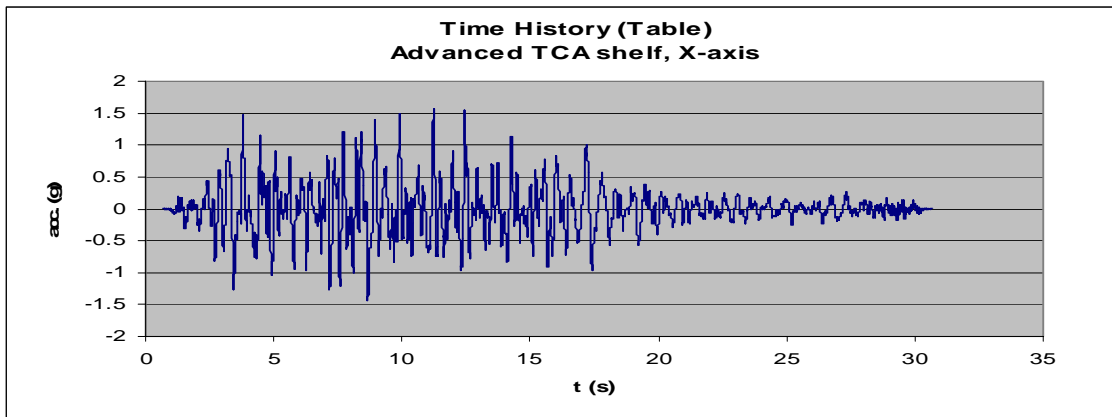


Figure 6.1 - Acceleration at Earthquake table - X-axis

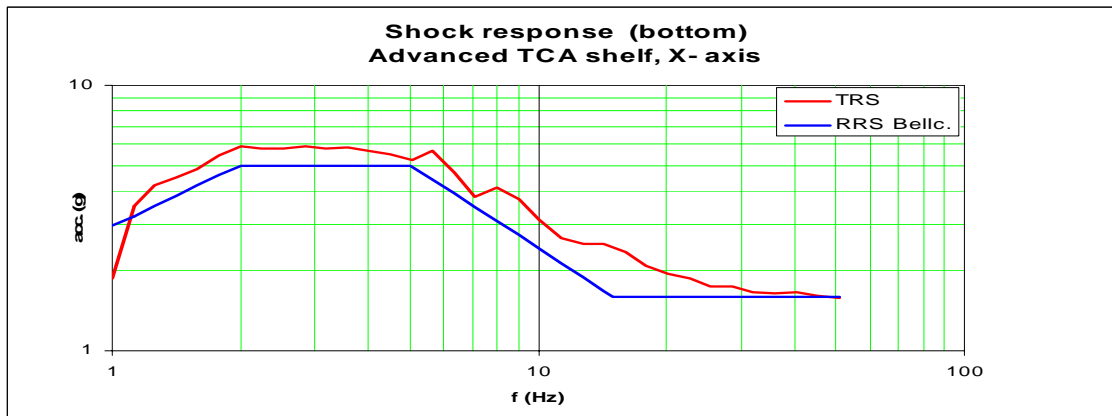


Figure 6.2 – Test Response Spectrum - X-axis

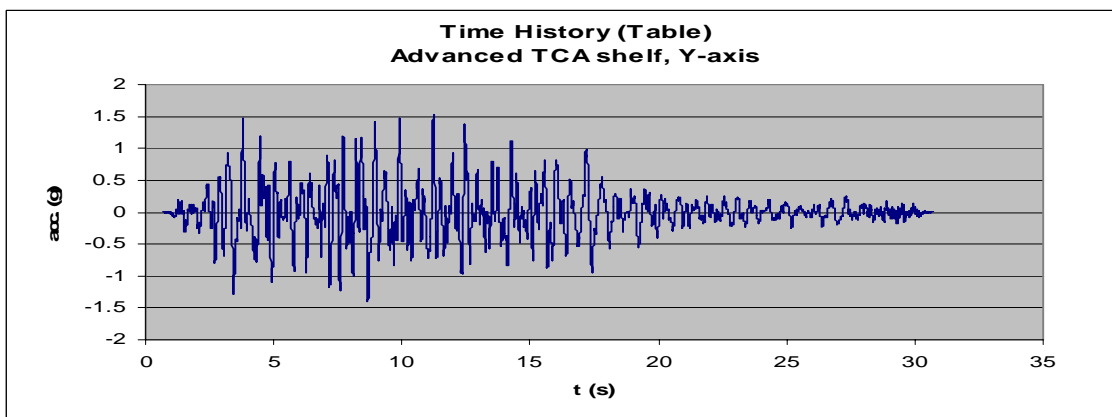


Figure 6.3 - Acceleration at Earthquake table - Y-axis

The test report shall not be reproduced except in full without the written approval of the testing laboratory

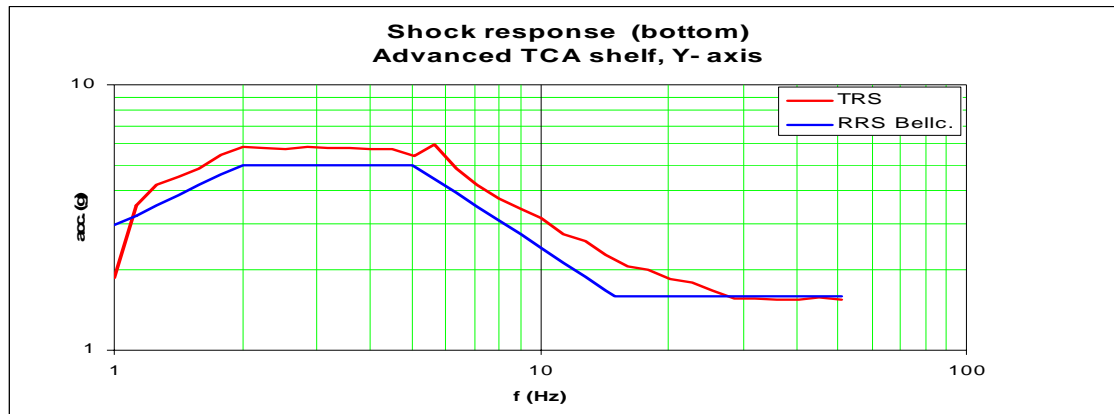


Figure 6.4 – Test Response Spectrum - Y-axis

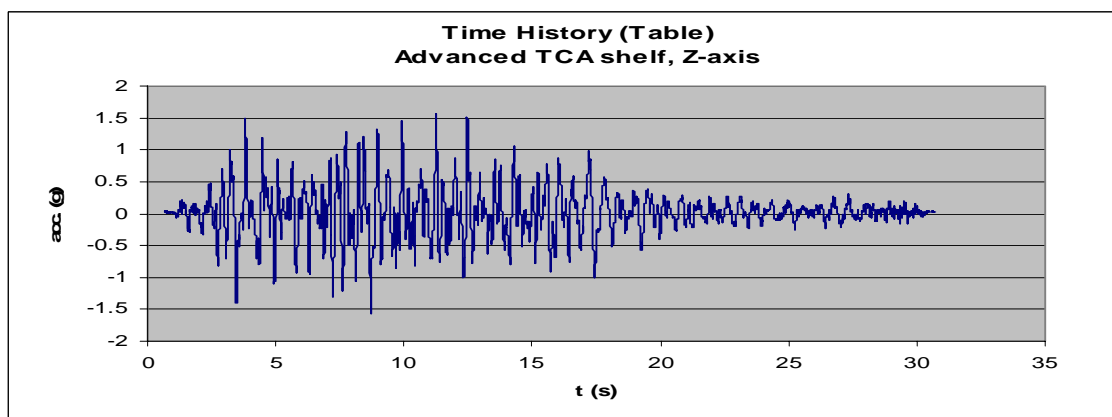


Figure 6.5 - Acceleration at Earthquake table - Z-axis

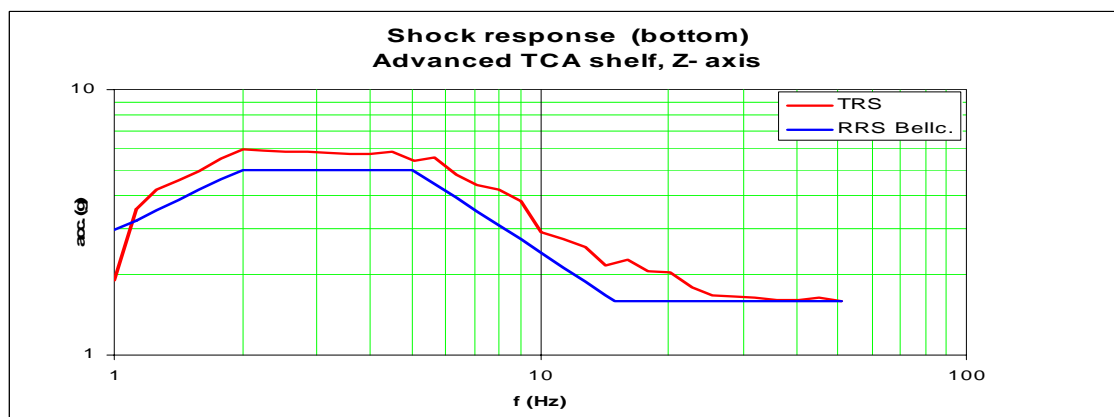


Figure 6.6 – Test Response Spectrum - Z-axis

6.4.2 Results of Displacement measurement

- **R4-47:** Frame-level equipment shall be constructed so that during the waveform testing of Section 5.4.1, the maximum single-amplitude deflection at the top of the framework, relative to the base does not exceed 75mm (3in).

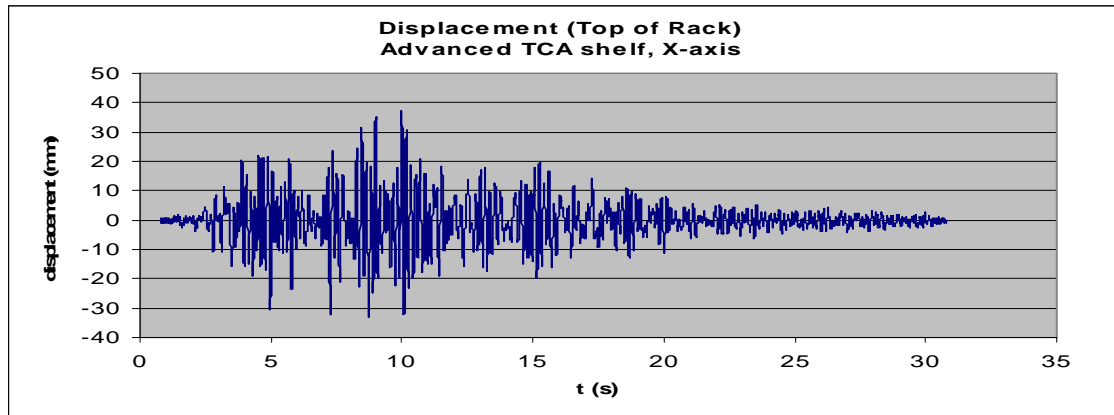


Figure 6.7 - Displacement measured at top of NB-440U- X-axis

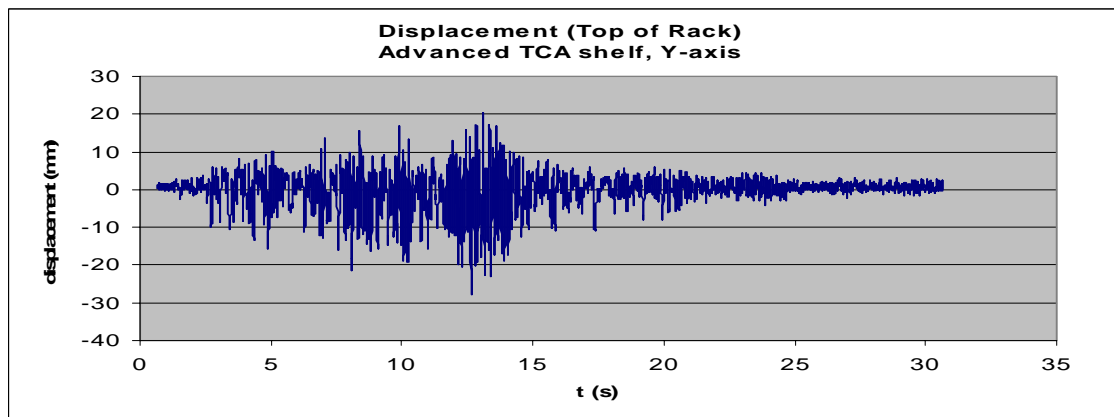


Figure 6.8 - Displacement measured at top of NB-440U- Y-axis

In vibration direction vertical (Z-axis) no displacement was measured.

7 Enclosures

7.1 Accreditation Certificate

The test report shall not be reproduced except in full without the written approval of the testing laboratory



Mch H, 09 Feb. 2005

**Distributor to Test Report No. T07SSR1K
for Advanced TCA Chassis**

Name:	Department:	Location:	
Mr. Traut	Schroff GmbH	Straubenhardt	(o+pdf)
Mr. Klein	COM CTO CQE	Mch H	(pdf)
Mr. Dr. Frentzel	COM CTO CQE 3	Mch H	(pdf)

(o): original of test report
(pdf): only as pdf-file via e-mail

The test report shall not be reproduced except in full without
the written approval of the testing laboratory