

ENL Testing Laboratory ENL Prüfstelle

METTLER TOLEDO

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Registration No.: **STS 0009**
Registrier- Nr.:
Swiss testing service
Schweizerischer
Prüfstellendienst



TEST REPORT – Nr.:

20151053.A02.01

Generation date:
Erstellungs-Datum:

2015-June - 15

Client:
Kunde:

**NetModule AG
CH – 8400 Winterthur**

Device under test:
Prüf-Objekt:

**NetModule Router for Railways
NB3710 and NB3720**

Test Standard
Prüfnorm:

Standard Norm	Method Methode	P	F	C
EN 60068-2-64 With parameters from EN 61373	Fc	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EN 60068-2-27 With parameters from EN 61373	Ea	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EN 60068-2-1	Ad	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EN 60068-2-2	Bd	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
EN 60068-2-30	Db	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

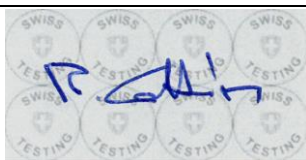
P = Pass / erfüllt; F = Fail / nicht erfüllt; C = Carried out / durchgeführt

Report Lange
Berichtssprache:

☒ : **English**

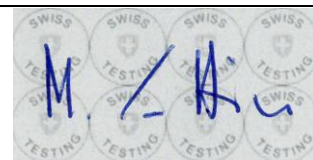
☐ : **Deutsch**

Test performed by:
Test durchgeführt durch:



Roland Cattin
Project Leader

Test Report released
by:
Test Bericht freige-
geben durch:



Marcel Cattin
Team Leader

Mettler-Toledo AG
ENL Test Laboratory
Heuwinkelstrasse
CH – 8606 Nänikon

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Dieser Bericht darf nicht auszugsweise, ohne schriftliche Genehmigung der Prüfstelle, kopiert werden.

The results of this report apply only to the devices under test listed
Die Ergebnisse in diesem Prüfbericht gelten nur für die aufgeführten Prüfobjekte.

Form 05.1e/d / 13.02.2015 / Cat

Date of issue / Datum: 2015-06-15 **TR Nr.: 20151053.A02.01**

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Part 1: Client details / Kundenangaben

Name of the company:
Name der Firma:

NetModule AG

Street:
Strasse:

Neuwiesenstrasse 37

Country / ZIP / City:
Land / PLZ / Ort:

CH - 8400 Winterthur

Telephone Nr.:
Telefon Nr.:

+41 52 209 00 44

Telephone direct Nr.:
Telefon Direktwahl Nr.:

+41 52 209 00 41

Fax No.:
Fax Nr.:

+41 52 209 00 40

Mobile Phone Nr.:
Mobiltelefon-Nr.:

E – Mail:
E – Mail:

thomas.siegrist@netmodule.com

Contact person (s):
Kontaktperson (en):

Mr Thomas Siegrist

Part 2: Data of devices under test / Daten der Prüfobjekte

Number of device (s):
Anzahl Geräte:

2

Model / Type:
Modell / Type:

NB3710 and NB3720

Instrument description/function:
Gerätebeschreibung / Funktion:

NetModul Router for Railway Applications

Additional information :
Weitere Angaben:

**During all mechanical tests the devices under test were permanent in operation.
During the climatic tests the devices under test were partly in operation, see records.**

Serial- / Identifications- No.: / Serien- und Identifikationsnummern:

Test-Object Test-Objekt	Manufacturer Identification number: Hersteller Identifikationsnummer:	Identification number *) Identifikationsnummer
1	NB3710 Serial No: 00112B009FB3 IMEI: 860461024128517 IMEI: 860461024092218 WLAN MAC: 04F02110C7E5 WLAN MAC: 04F0210AE2C9 Input Voltage: 12 .. 60V Power: 6W GSM: 850/900/1800/1900 MHz UMTS: 850/900/1900/2100 MHz LTE: 800(B20)/850/900/1800/1900/2100/2600 MHz WLAN: 2.4/5 GHz contains FCC ID TK4-10-WLE200NX	01

Serial- / Identifications- No.: / Serien- und Identifikationsnummern:

Test-Object Test-Objekt	Manufacturer Identification number: Hersteller Identifikationsnummer:	Identification number *) Identifikationsnummer
2	NB3720 Serial No: 00112BFFDCD4 IMEI: 860461024372529 WLAN MAC: 04F02111BD83 WLAN MAC: 04F02111BD73 Input Voltage: 12 .. 60V Power: 9W GSM: 850/900/1800/1900 MHz UMTS: 850/900/1900/2100 MHz LTE: 800(B20)/850/900/1800/1900/2100/2600 MHz WLAN: 2.4/5 GHz contains FCC ID TK4-10-WLE200NX	02

*) Identification number given by the testing laboratory
Identifikationsnummer, durch die Prüfstelle vergeben

Part 3: Documentation of the device under test Dokumentation der Prüfobjekte

Pictures of the device under test 01 Bildokumentation Prüfkörper 01



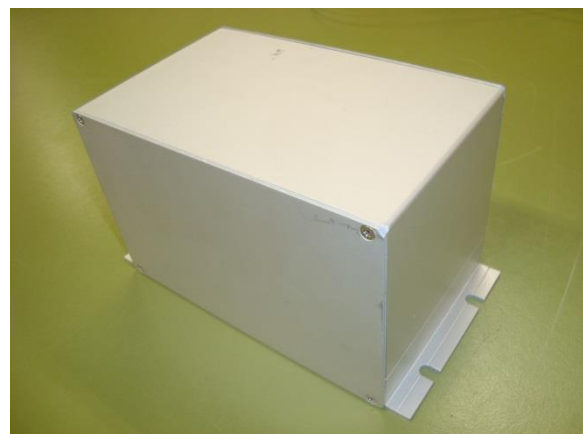
Device under test 01:
Overview



Device under test 01:
Overview (other point of view)



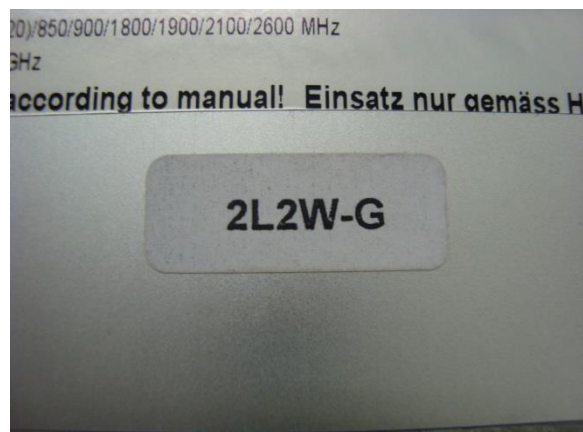
Device under test 01:
Front



Device under test 01:
Rear



Device under test 01:
Label 1



Device under test 01:
Label 2

Pictures of the device under test 02 Bildokumentation Prüfkörper 02



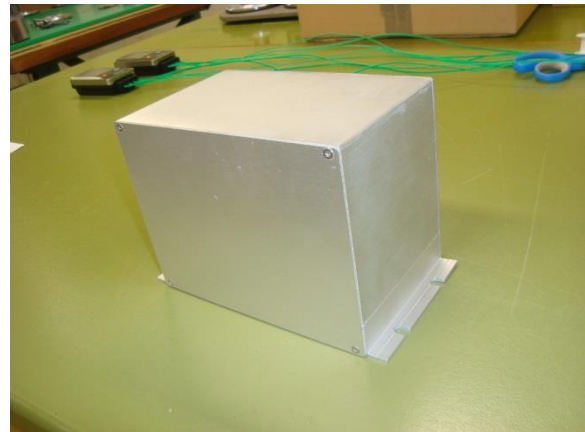
Device under test 02:
Overview



Device under test 02:
Overview (other point of view)



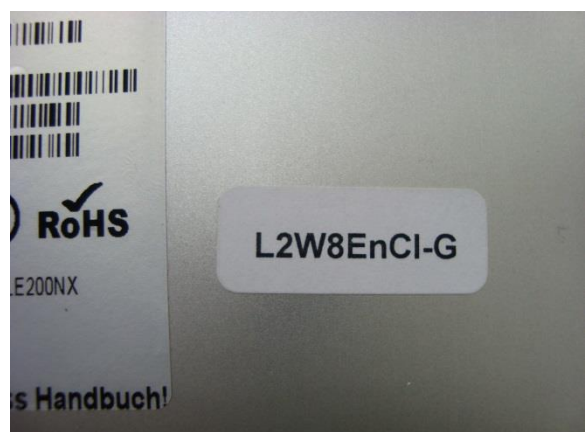
Device under test 02:
Front



Device under test 02:
Rear



Device under test 02:
Label 1

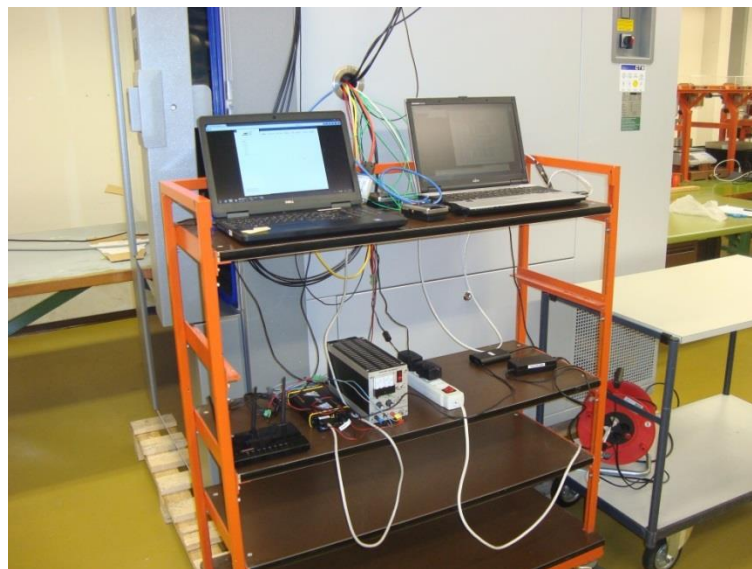


Device under test 02:
Label 2

Part 4: Peripheral units / Zusatzgeräte

Number of instruments / Anzahl Geräte: **None / Keine**

Unit No. Gerät Nr	Name of manufacturer Hersteller	Model / Type Modell / Typ	Series-Nr. Serie - Nr.	Description of function Funktionsbeschreibung
1	Fujitsu Esprimo Mobile	V6555	YKLM089106	Data logger for NB3710
2	Dell Latitude	E5540	1PF9M12	Data logger for NB3720
3	Trendnet	TEW-672GR	UM0836R80028	WLAN AP
4	mg- industriellelektronik	IWT2000		IBIS to Wagenbus Monitor
5	IXXAT	1.01.0087.10200		CAN to USB converter



Overview: All peripheral devices

Part 5: Operating mode during test Betriebsart während des Tests

- ☐ Not in operation / Nicht im Betrieb
- ☐ Continuous operation / Dauerbetrieb
- ☒ Partly in operation as described in test record
Teilweise im Betrieb gemäss Protokoll

Power supply: ☒ Mains: 230V_{AC} nominal voltage / Nennspannung
Speisung: Netz 50 Hz nominal frequency / Nennfrequenz

☐ Other ---
Andere

More details / Weitere Beschreibung:

Part 7: Overview of the test standards Übersicht der verwendeten Normen

Mechanical stress / Transport simulation

Mechanische Beanspruchung / Transportsimulation

Tested Ge- testet	Test designation Test Benennung	Standard Norm	Year Jahr	Device under test Testobjekte									
				1	2	3	4	5	6	7	8	9	10
<input type="checkbox"/>	Vibration Sinus	EN 60068-2-6	2008										
<input type="checkbox"/>	Vibration Sinus												
<input checked="" type="checkbox"/>	Vibration Random	EN 60068-2-64	2008	X	X								
<input type="checkbox"/>	Vibration Random	MIL-STD-810,M514	2008										
<input type="checkbox"/>	Vibration Random												
<input checked="" type="checkbox"/>	Shock	EN 60068-2-27	2009	X	X								
<input type="checkbox"/>	Shock												
<input type="checkbox"/>	Transport vibration	Mettler PP 426	1994										
<input type="checkbox"/>	Stress vibration	Mettler PP 422	1989										
<input type="checkbox"/>	Drop	Mettler PP 428	1994										
<input type="checkbox"/>	Drop	ISTA 1A	2001										
<input type="checkbox"/>	Drop	ISTA 2A	2011										
<input type="checkbox"/>	Drop												
<input type="checkbox"/>	Vibration Transport	ISTA 1A	2001										
<input type="checkbox"/>	Vibration Transport	ISTA 2A	2011										
<input type="checkbox"/>													
<input type="checkbox"/>													

Climatic- / Environment simulations

Klima- / Umweltsimulation

Tested Ge- testet	Test designation Test Benennung	Standard Norm	Year Jahr	Device under test Testobjekte									
				1	2	3	4	5	6	7	8	9	10
<input checked="" type="checkbox"/>	Cold	EN 60068-2-1	2007	X	X								
<input checked="" type="checkbox"/>	Dry heat	EN 60068-2-2	2007	X	X								
<input type="checkbox"/>	Temperature cyclic	EN 60068-2-14	2009										
<input type="checkbox"/>	Damp heat steady state	EN 60068-2-78	2008										
<input checked="" type="checkbox"/>	Damp heat cyclic	EN 60068-2-30	2005	X	X								
<input type="checkbox"/>	Climatic Conditioning	ISTA 2A	2011										
<input type="checkbox"/>													
<input type="checkbox"/>													
<input type="checkbox"/>													
<input type="checkbox"/>													

Part 8: Special occurrence / Spezielle Vorkommnisse

Part 8.1: Special occurrence / Spezielle Vorkommnisse

None / keine

Part 8.2: Test Report History / Vorgängerberichte

This report may have a previous version Dieser Testbericht kann eine Vorgängerversion haben	
Ref. No. / Bericht Nr.	State / Zustand
20151053.A02.01	2015-06-15: Initial test report / Erster Testbericht

Part 9: Test records and additional sheets Protokolle und Zusatzblätter

In the next pages the following test records and additional sheets are documented:
Auf den nachstehenden Seiten sind folgende Protokolle und Zusatzblätter dokumentiert:

<input checked="" type="checkbox"/>	Part 9.1	Climatic test, steady state / Klimatest konstant	Cold partly in operation	+	2	Additional sheet (s) Zusatzblatt (-blätter)
<input checked="" type="checkbox"/>	Part 9.2	Climatic test, steady state / Klimatest konstant	Dry heat	+	1	Additional sheet (s) Zusatzblatt (-blätter)
<input checked="" type="checkbox"/>	Part 9.3	Climatic test, cyclic / Klimatest Wechsel	Damp Heat, cyclic	+	1	Additional sheet (s) Zusatzblatt (-blätter)
<input checked="" type="checkbox"/>	Part 9.4	Climatic test, steady state / Klimatest konstant	Cold storage	+	1	Additional sheet (s) Zusatzblatt (-blätter)
<input checked="" type="checkbox"/>	Part 9.5	Vibration, random Vibration, Rauschen		+	3	Additional sheet (s) Zusatzblatt (-blätter)
<input checked="" type="checkbox"/>	Part 9.6	Shock / Schock		+	3	Additional sheet (s) Zusatzblatt (-blätter)

Part 9.1: Climatic test, steady state: Cold, partly in operation

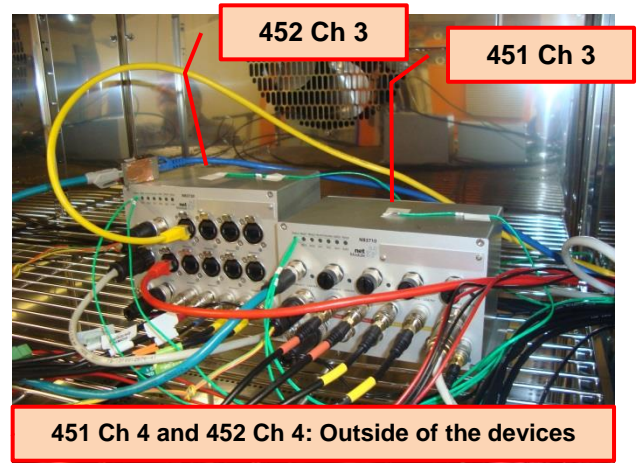
Type of test Art des Tests	<input checked="" type="checkbox"/> Temperature, steady state / Temperatur konstant <input type="checkbox"/> Damp heat, steady state / Feuchte Wärme, konstant		
Type of test / goal Art des Tests / Zweck	<input checked="" type="checkbox"/> Stress test / Stress Beanspruchung <input type="checkbox"/> Transportation / Transport <input type="checkbox"/> Zulassung		
According to standard Nach Norm oder Vorschrift	<input checked="" type="checkbox"/> EN 60068-2-1 <input type="checkbox"/> EN 60068-2-2 <input type="checkbox"/> EN 60068-2-56 <input type="checkbox"/>		
Applicable Test Method Zutreffendes Prüfverfahren	<input checked="" type="checkbox"/> Ad <input type="checkbox"/> High air velocity <input checked="" type="checkbox"/> Low air velocity *) <input checked="" type="checkbox"/> Air flow: Bottom-up		
Test instrument Prüfgerät	ENL-P Nr. <input type="checkbox"/> 000/0298 <input checked="" type="checkbox"/> 000/0483 <input checked="" type="checkbox"/> 000 / 0451 <input checked="" type="checkbox"/> 000 / 0452		
Device under test Prüfobjekt	NB3710 and NB3720		Serial / Ident. No. Seriennummer 01+02
Client Kunde	NetModule AG, CH – 8400 Winterthur, Mr T. Siegrist		
Start-Date, Time Start-Datum, Zeit	2015-05-18, 13:15		End-Date, Time End-Datum, Zeit 2015-05-19, 15:15
Temperature Temperatur	-40°C	Humidity Feuchte uncontrolled	Duration Dauer 18 h
Uncertainties Temp. Messunsicherheit Temp.	± 1.8 K	Uncertainties Humidity Messunsicherheit Feuchte	--
Cooling and/or warming up procedure Abkühlungs- bzw. Erwärmungsvorgang	<input type="checkbox"/> Device under test into the preheating / precooling chamber Prüfkörper in vortemperierte Kammer <input type="checkbox"/> Max possible heating / cooling rate / Ofenkonstante <input checked="" type="checkbox"/> 1 °C/min		
State of test object Zustand des Testobjekts	<input checked="" type="checkbox"/> Partly in operation <input type="checkbox"/> Not in operation		
Preconditioning Vorbehandlung	None	Post conditioning Nachbehandlung	Dry Heat
Initial measurement Anfangsmessung	Done by the client		
Measurement during the test Zwischenmessung	Done by the client via remote reading		
Final measurement Endmessung	Done by the client (after all tests)		
Remarks Bemerkungen	During all temperature tests there are some temperature sensors mounted in the housing of the device under test, see picture part 9.1.1 For marking see also part 10 The device under test was switched on for the last 60 minutes of the test *): Heating with free air circulation: max 9.5K, Heating with forced circulation: max 6 K		
Additional sheets Zusatzblätter	2	Test Test	<input checked="" type="checkbox"/> passed erfüllt <input type="checkbox"/> failed nicht erfüllt <input type="checkbox"/> carried out durchgeführt
Tested by Geprüft von	Marcel Cattin		

Part 9.1.1: Additional sheet / Zusatzblatt

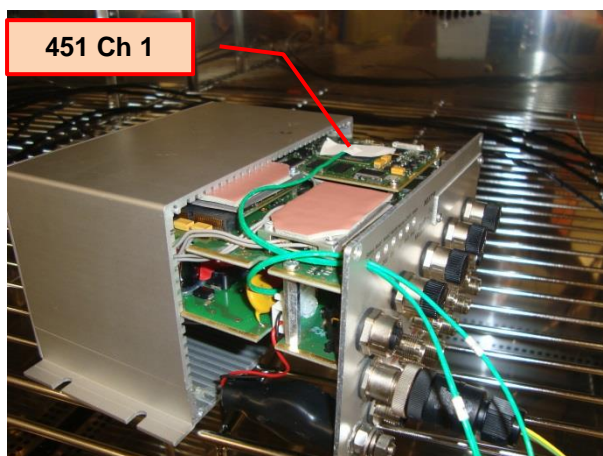
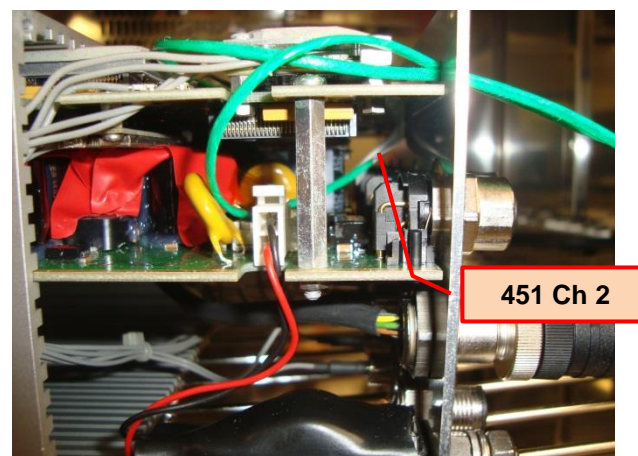
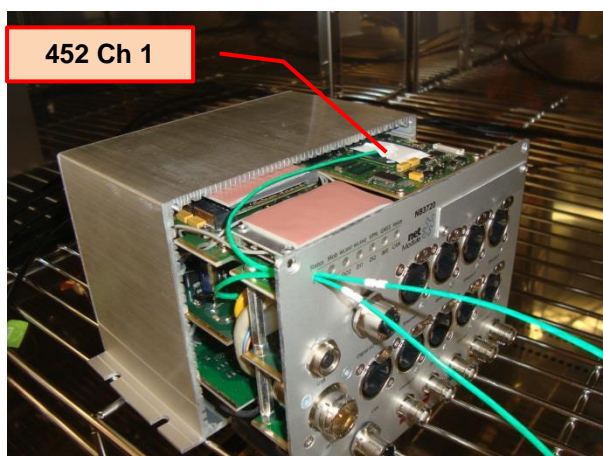
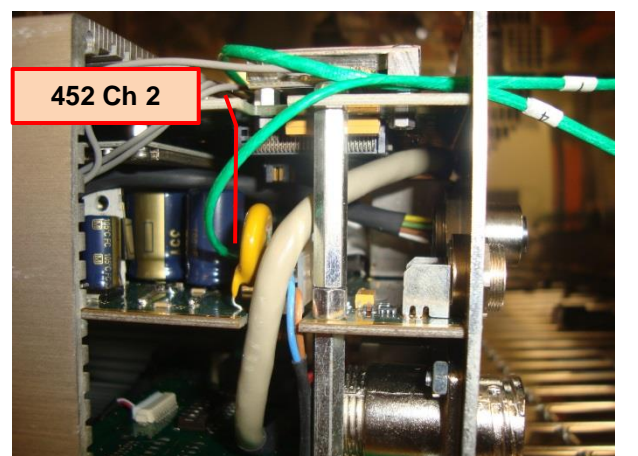
to Test / zum Test:

Climatic test, steady state: Cold, partly in operationDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02**

Overview climatic chamber



Detail

Device under test **01** (NB3710)
Position of temperature sensorsDevice under test **01** (NB3710)
Position of temperature sensorsDevice under test **02** (NB3720)
Position of temperature sensorsDevice under test **02** (NB3720)
Position of temperature sensors

Part 9.1.2: Additional sheet / Zusatzblatt

to Test / zum Test:

Climatic test, steady state: Cold, partly in operationDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02**

Overview climatic chamber



Arrangement of the device under test in the climatic chamber

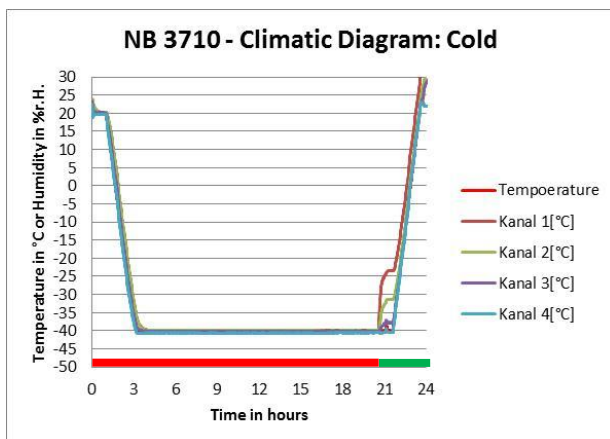


Diagram: Cold in operation

— : switched on, — : switched off

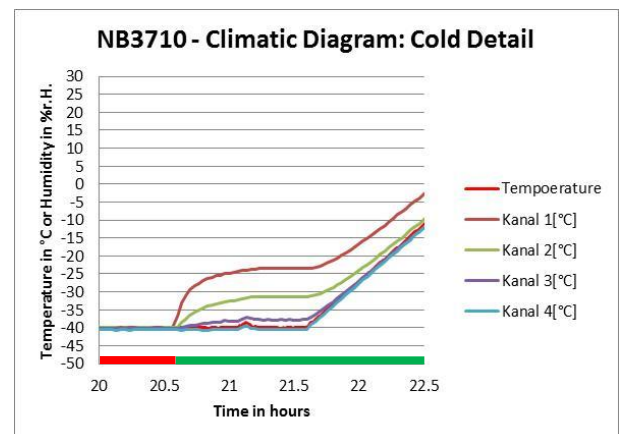


Diagram: Cold in operation, Detail

— : switched on, — : switched off

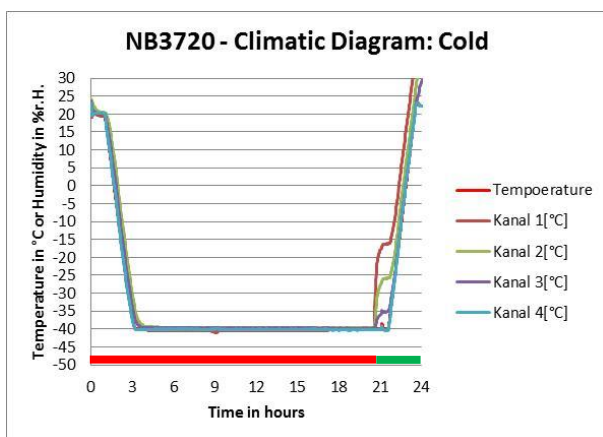


Diagram: Cold in operation

— : switched on, — : switched off

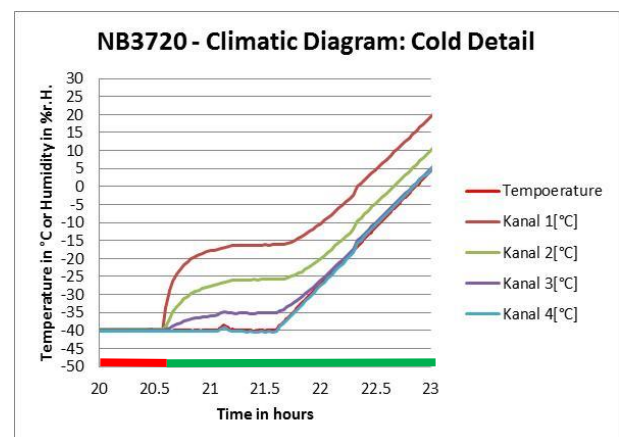


Diagram: Cold in operation, Detail

— : switched on, — : switched off

Part 9.2: Climatic test, steady state: Dry Heat

Type of test Art des Tests	<input checked="" type="checkbox"/> Temperature, steady state / Temperatur konstant <input type="checkbox"/> Damp heat, steady state / Feuchte Wärme, konstant		
Type of test / goal Art des Tests / Zweck	<input checked="" type="checkbox"/> Stress test / Stress Beanspruchung <input type="checkbox"/> Transportation / Transport <input type="checkbox"/> Zulassung		
According to standard Nach Norm oder Vorschrift	<input type="checkbox"/> EN 60068-2-1 <input checked="" type="checkbox"/> EN 60068-2-2 <input type="checkbox"/> EN 60068-2-56 <input type="checkbox"/>		
Applicable Test Method Zutreffendes Prüfverfahren	<input checked="" type="checkbox"/> Bd <input type="checkbox"/> High air velocity <input checked="" type="checkbox"/> Low air velocity <input checked="" type="checkbox"/> Air flow: Bottom-up		
Test instrument Prüfgerät	ENL-P Nr. <input type="checkbox"/> 000/0298 <input checked="" type="checkbox"/> 000/0483 <input checked="" type="checkbox"/> 000 / 0451 <input checked="" type="checkbox"/> 000 / 0452		
Device under test Prüfobjekt	NB3710 and NB3720		Serial / Ident. No. Seriennummer 01+02
Client Kunde	NetModule AG, CH – 8400 Winterthur, Mr T. Siegrist		
Start-Date, Time Start-Datum, Zeit	2015-05-19, 19:15		End-Date, Time End-Datum, Zeit 2015-05-20, 10:30
Temperature Temperatur	+70°C	Humidity Feuchte uncontrolled	Duration Dauer 9 h
Uncertainties Temp. Messunsicherheit Temp.	± 1.2 K	Uncertainties Humidity Messunsicherheit Feuchte ---	
Cooling and/or warming up procedure Abkühlungs- bzw. Erwärmungsvorgang	<input type="checkbox"/> Device under test into the preheating / precooling chamber Prüfkörper in vortemperierte Kammer <input checked="" type="checkbox"/> 1 °C/min		
State of test object Zustand des Testobjekts	<input checked="" type="checkbox"/> In operation / Im Betrieb <input type="checkbox"/> Not in operation / Nicht im Betrieb		
Preconditioning Vorbehandlung	Cold in operation	Post conditioning Nachbehandlung	Damp Heat cyclic
Initial measurement Anfangsmessung	Done by the client		
Measurement during the test Zwischenmessung	Done by the client via remote reading		
Final measurement Endmessung	Done by the client (after all tests)		
Remarks Bemerkungen	During all temperature tests there are some temperature sensors mounted in the housing of the device under test, see picture part 9.1.1 The temperature of the climatic chamber was rising for 10 minutes to +85°C, see diagram		
Additional sheets Zusatzblätter	1	Test Test	<input checked="" type="checkbox"/> passed erfüllt <input type="checkbox"/> failed nicht erfüllt <input type="checkbox"/> carried out durchgeführt
Tested by Geprüft von	Marcel Cattin		

Part 9.2.1: Additional sheet / Zusatzblatt

to Test / zum Test:

Climatic test, steady state: Dry HeatDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02**

Overview climatic chamber



Arrangement of the device under test in the climatic chamber

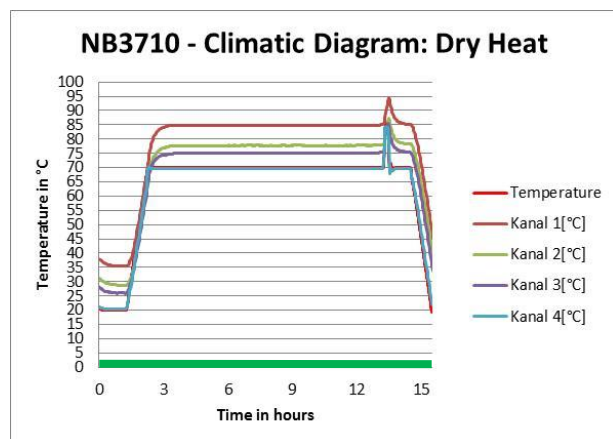


Diagram: Cold in operation

— : switched on, — : switched off

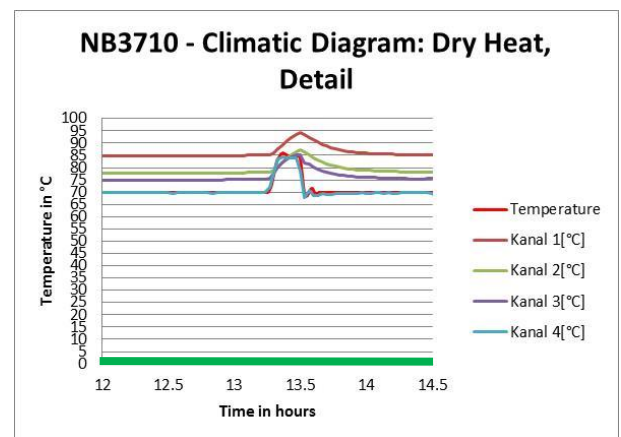


Diagram: Cold in operation, Detail

— : switched on, — : switched off

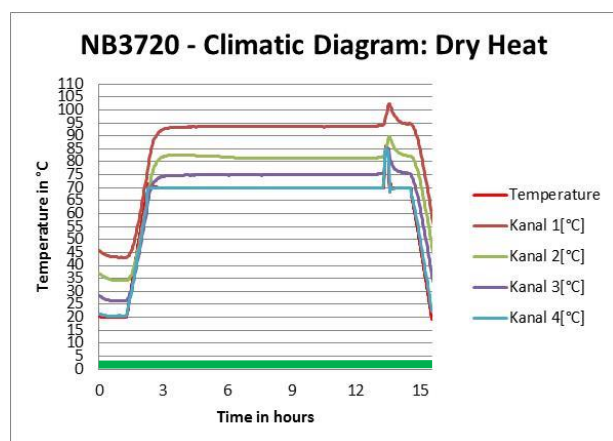


Diagram: Cold in operation

— : switched on, — : switched off

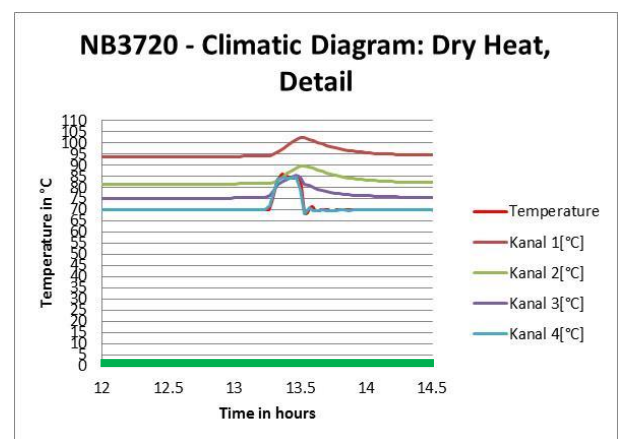


Diagram: Cold in operation, Detail

— : switched on, — : switched off

Part 9.3: Climatic test, cyclic: Damp Heat, cyclic

Type of test Art des Tests	<input checked="" type="checkbox"/> Temperature, cyclic / Temperatur Wechsel <input type="checkbox"/> Damp heat, cyclic / Feuchte Wärme, Wechsel		
Type of test / goal Art des Tests / Zweck	<input checked="" type="checkbox"/> Stress test / Stress Beanspruchung <input type="checkbox"/> Transportation / Transport		
According to standard Nach Norm oder Vorschrift	<input type="checkbox"/> EN 60068-2-14 <input checked="" type="checkbox"/> EN 60068-2-30		
Applicable Test Method Zutreffendes Prüfverfahren	<input checked="" type="checkbox"/> Db		
Test instrument Prüfgerät	ENL-P Nr. <input type="checkbox"/> 000/0298 <input checked="" type="checkbox"/> 000/0483 <input checked="" type="checkbox"/> 000 / 0451 <input checked="" type="checkbox"/> 000 / 0452		
Device under test Prüfobjekt	NB3710 and NB3720		Serial / Ident. No. Seriennummer 01+02
Client Kunde	NetModule AG, CH – 8400 Winterthur, Mr T. Siegrist		
Start-Date, Time Start-Datum, Zeit	2015-05-20, 10:55		End-Date, Time End-Datum, Zeit 2015-05-22, 11:55
High Temperature Obere Temperatur	+55°C	Humidity Feuchte 95%r.H.	Hold Time Haltezeit 9 h
Low Temperature Untere Temperatur	+25°C	Humidity Feuchte 95%r.H.	Hold Time Haltezeit 9 h
Uncertainties Temp. Messunsicherheit Temp.	± 1.2 K		Uncertainties .Humidity Messunsicherheit Feuchte ± 2.8 %r.H.
Change of temperature Temperaturrampe	<input type="checkbox"/> 1°C/min <input type="checkbox"/> Change time / Umlagerzeit < 10 s <input checked="" type="checkbox"/> Time from low to high temp: 3 hours		
Number of cycles Anzahl Zyklen	2	Time per cycle Zeit/Zyklus 24 h	Totally time Gesamtzeit 48 h
State of test object Zustand des Testobjekts	<input checked="" type="checkbox"/> Partly in operation <input type="checkbox"/> Not in operation		
Preconditioning Vorbehandlung	Dry Heat	Post conditioning Nachbehandlung	Cold storage
Initial measurement Anfangsmessung	Done by the client		
Measurement during the test Zwischenmessung	Done by the client via remote reading		
Final measurement Endmessung	Done by the client (after all tests)		
Remarks Bemerkungen	During all temperature tests there are some temperature sensors mounted in the housing of the device under test, see picture part 9.1.1 The device under test was switched on at the beginning of the second cycle, see diagram.		
Additional sheets Zusatzblätter	1	Test Test	<input checked="" type="checkbox"/> passed erfüllt <input type="checkbox"/> failed nicht erfüllt <input type="checkbox"/> carried out durchgeführt
Tested by Geprüft von	Marcel Cattin		

Part 9.3.1: Additional sheet / Zusatzblatt

to Test / zum Test:

Climatic test, cyclic: Damp Heat, cyclicDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02**

Overview climatic chamber



Arrangement of the device under test in the climatic chamber

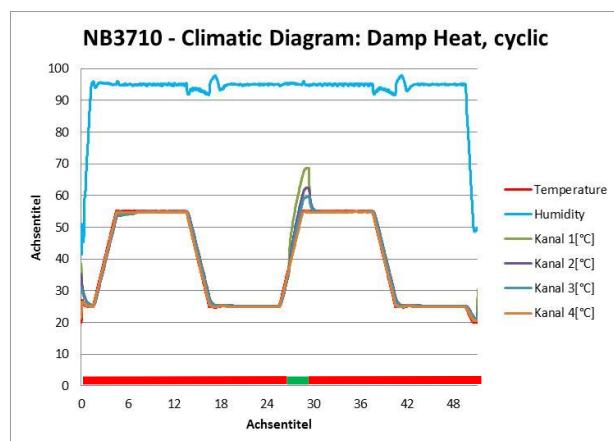


Diagram: Cold in operation

— : switched on, — : switched off

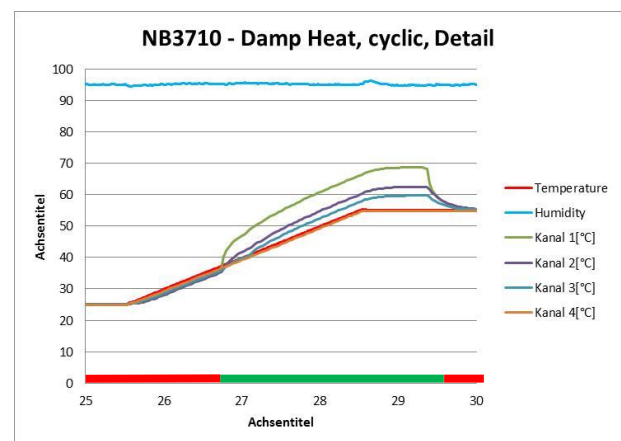


Diagram: Cold in operation, Detail

— : switched on, — : switched off

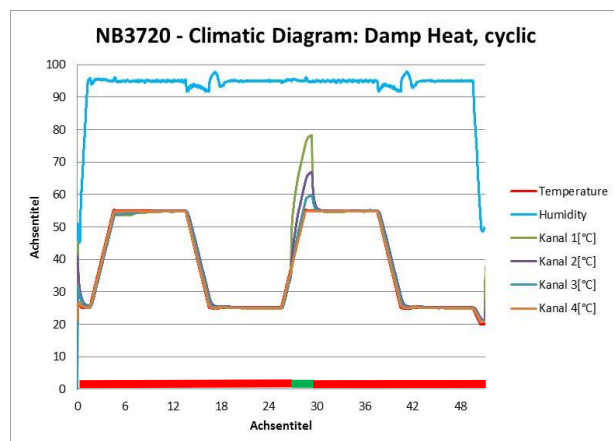


Diagram: Cold in operation

— : switched on, — : switched off

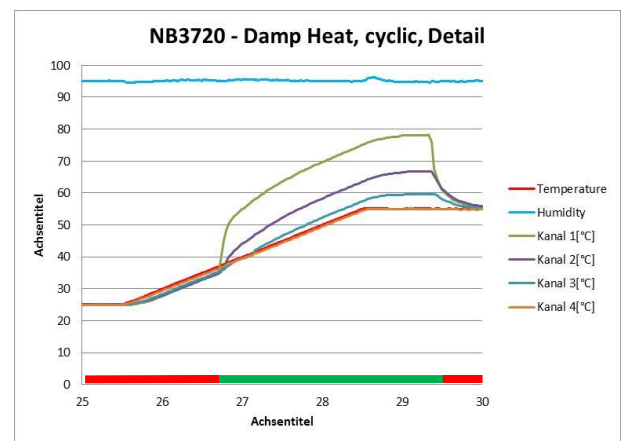


Diagram: Cold in operation, Detail

— : switched on, — : switched off

Part 9.4: Climatic test, steady state: Cold, Storage

Type of test Art des Tests	<input checked="" type="checkbox"/> Temperature, steady state / Temperatur konstant <input type="checkbox"/> Damp heat, steady state / Feuchte Wärme, konstant
Type of test / goal Art des Tests / Zweck	<input checked="" type="checkbox"/> Stress test / Stress Beanspruchung <input type="checkbox"/> Transportation / Transport <input type="checkbox"/> Zulassung
According to standard Nach Norm oder Vorschrift	<input checked="" type="checkbox"/> EN 60068-2-1 <input type="checkbox"/> EN 60068-2-2 <input type="checkbox"/> EN 60068-2-56 <input type="checkbox"/>
Applicable Test Method Zutreffendes Prüfverfahren	<input checked="" type="checkbox"/> Ab <input type="checkbox"/> High air velocity <input checked="" type="checkbox"/> Low air velocity <input checked="" type="checkbox"/> Air flow: Bottom-up
Test instrument Prüfgerät	ENL-P Nr. <input type="checkbox"/> 000/0298 <input checked="" type="checkbox"/> 000/0483 <input checked="" type="checkbox"/> 000 / 0451 <input checked="" type="checkbox"/> 000 / 0452

Device under test Prüfobjekt	NB3710 and NB3720	Serial / Ident. No. Seriennummer	01+02
Client Kunde	NetModule AG, CH – 8400 Winterthur, Mr T. Siegrist		

Start-Date, Time Start-Datum, Zeit	2015-05-24, 05:45	End-Date, Time End-Datum, Zeit	2015-05-25, 10:00
Temperature Temperatur	-40°C	Humidity Feuchte	uncontrolled
Uncertainties Temp. Messunsicherheit Temp.	± 1.8 K	Uncertainties .Humidity Messunsicherheit Feuchte	--
Cooling and/or warming up procedure Abkühlungs- bzw. Erwärmungsvorgang	<input type="checkbox"/> Device under test into the preheating / precooling chamber Prüfkörper in vortemperierte Kammer <input type="checkbox"/> Max possible heating / cooling rate / Ofenkonstante <input checked="" type="checkbox"/> 1 °C/min		
State of test object Zustand des Testobjekts	<input type="checkbox"/> Partly in operation <input checked="" type="checkbox"/> Not in operation		
Preconditioning Vorbehandlung	Damp Heat, cyclic	Post conditioning Nachbehandlung	Vibration

Initial measurement Anfangsmessung	Done by the client
Measurement during the test Zwischenmessung	Done by the client via remote reading
Final measurement Endmessung	Done by the client (after all tests)

Remarks Bemerkungen	During all temperature tests there are some temperature sensors mounted in the housing of the device under test, see picture part 9.1.1

Additional sheets Zusatzblätter	1	Test Test	<input checked="" type="checkbox"/> passed erfüllt	<input type="checkbox"/> failed nicht erfüllt	<input type="checkbox"/> carried out durchgeführt
Tested by Geprüft von	Marcel Cattin				

Part 9.4.1: Additional sheet / Zusatzblatt

to Test / zum Test:

Climatic test, steady state: Cold, storageDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02**

Overview climatic chamber



Arrangement of the device under test in the climatic chamber

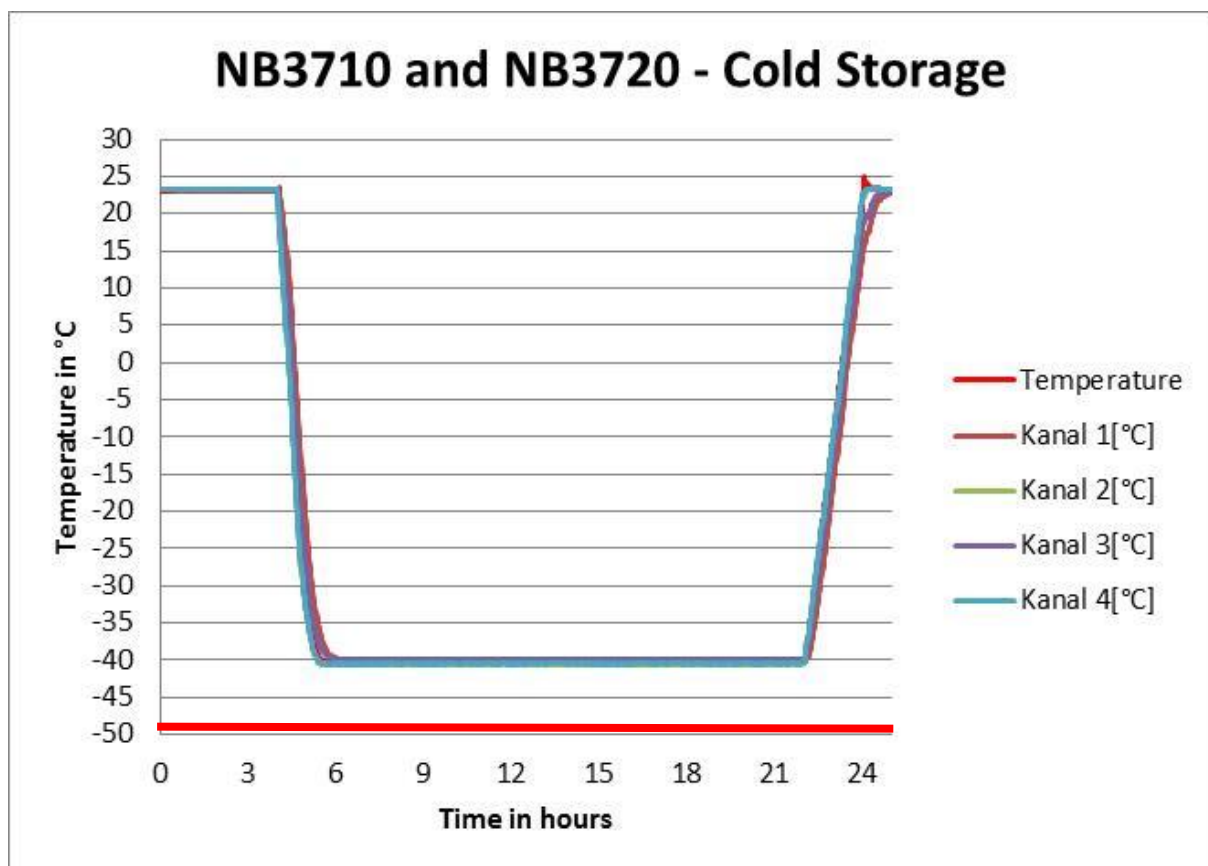


Diagram: Cold in operation

: switched on, : switched off

Part 9.5: Vibration Random / Vibration Rauschen

Type of test / goal Art des Tests / Zweck	<input checked="" type="checkbox"/> Stress vibration / Stress Vibration <input type="checkbox"/> Transportation / Transport <input type="checkbox"/> Approval / Zulassung <input type="checkbox"/>
According to standard Nach Norm oder Vorschrift	<input checked="" type="checkbox"/> EN 60068-2-64 <input type="checkbox"/> ISTA 2A <input type="checkbox"/> Mettler PP 426 <input type="checkbox"/> MIL-STD-810 <input type="checkbox"/>
Applicable Test Method Zutreffendes Prüfverfahren	<input checked="" type="checkbox"/> Fh
Test instrument Prüfgerät	ENL-P Nr. Controller: <input checked="" type="checkbox"/> 000 / 0466 <input checked="" type="checkbox"/> 000 / 0465 System: <input checked="" type="checkbox"/> 062 / 0129 / 062 / 0130 <input checked="" type="checkbox"/> 063 / 0302 / 063 / 0303 Picup: <input checked="" type="checkbox"/> 000 / 0392 <input checked="" type="checkbox"/> 066 / 0318 <input type="checkbox"/>

Device under test Prüfobjekt	NB3710 and NB3720	Serial / Ident. No. Seriennummer	01+02
Client Kunde	NetModule AG, CH – 8400 Winterthur, Mr T. Siegrist		

Start-Date, Time Start-Datum, Zeit	2015-05-26, 10:05	End-Date, Time End-Datum, Zeit	2015-05-27, 15:35
Frequency range Frequenzbereich	5 Hz to 150 Hz	Eff. Accel.: Eff. Besch.:	5.7 m/s²_{rms} Duration: Dauer: 5 h /Axis

Vibration / Anregung

Frequency (Range): Frequenz (Bereich):	5 Hz to 20 Hz	SPD:	0.964 m²/s³	<input type="checkbox"/> decrease fallend	<input type="checkbox"/> rising with steigend mit	dB
Frequency (Range): Frequenz (Bereich):	20 Hz to 150 Hz	SPD:	m²/s³	<input checked="" type="checkbox"/> decrease fallend	<input type="checkbox"/> rising with steigend mit	6 dB
Frequency (Range): Frequenz (Bereich):	Hz to Hz	SPD:	m²/s³	<input type="checkbox"/> decrease fallend	<input type="checkbox"/> rising with steigend mit	dB
Frequency (Range): Frequenz (Bereich):	Hz to Hz	SPD:	m²/s³	<input type="checkbox"/> decrease fallend	<input type="checkbox"/> rising with steigend mit	dB
Frequency (Range): Frequenz (Bereich):	Hz to Hz	SPD:	m²/s³	<input type="checkbox"/> decrease fallend	<input type="checkbox"/> rising with steigend mit	dB

Control method: / Regelart :	<input checked="" type="checkbox"/> Single Point/ Einzelpkt.	<input type="checkbox"/> Multipoint / Mehrpunkt
Axis of stimulation : / Anregungsachse :	<input checked="" type="checkbox"/> Z-Axis	<input checked="" type="checkbox"/> Y-Axis <input checked="" type="checkbox"/> X-Axis
Operation position: / Betriebslage :	<input checked="" type="checkbox"/> yes / ja	<input type="checkbox"/> no / nein
Fixation : / Aufspannungsart :	<input checked="" type="checkbox"/> screwed/geschraubt	<input type="checkbox"/> with belt / gegurtet <input checked="" type="checkbox"/> Photo / Foto

Arrangement of pickups Anordnung der Messfühler	Built in the vibration table		
Ambient temperature: Umgebungstemperatur:	23 - 24 °C	Ambient humidity: Umgebungsfeuchte:	42 - 46 % r.H.
State of test object Zustand des Testobjekts	<input checked="" type="checkbox"/> In operation / Im Betrieb	<input type="checkbox"/> Not in operation / Nicht im Betrieb	
Preconditioning Vorbehandlung	Cold storage	Post conditioning Nachbehandlung	Shock Test

Vibration Random (cont.) / Vibration Rauschen (Forts.)Initial measurement
Anfangsmessung

Done by the client

Measurement during the test
Zwischenmessung

Done by the client via remote reading

Final measurement
Endmessung

Done by the client (after all tests)

Remarks
Bemerkungen

The vibration in X-direction was done in two steps:
Step 1: 2015-05-26, 16:15 to 19:15, 3 hours (see diagram in part 9.5.2)
Step 2: 2015-05-27, 07:25 to 09:25, 2 hours

Additional sheets
Zusatzblätter

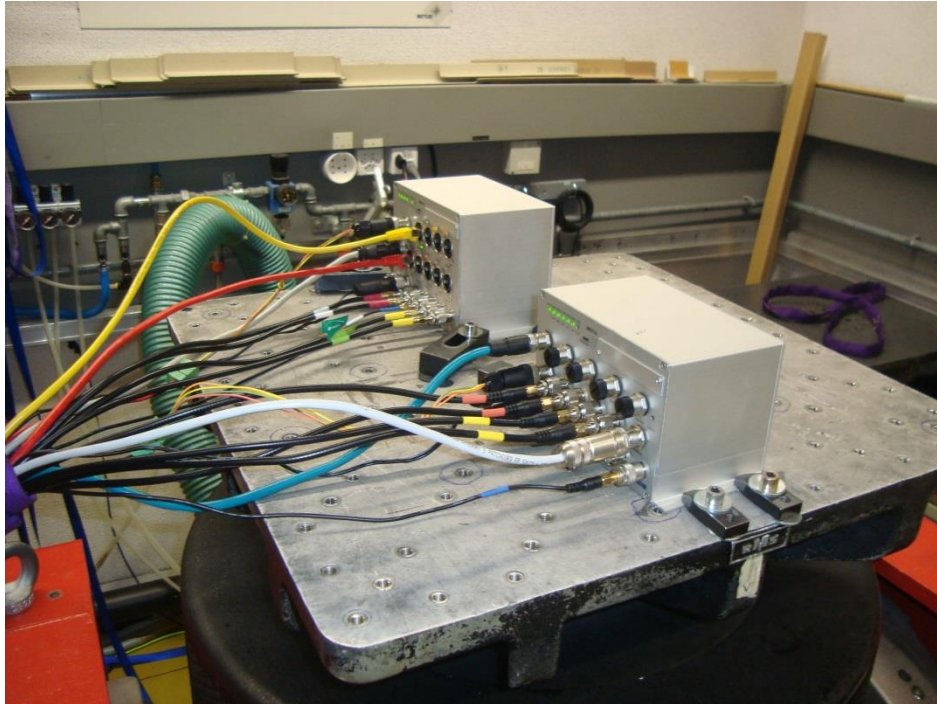
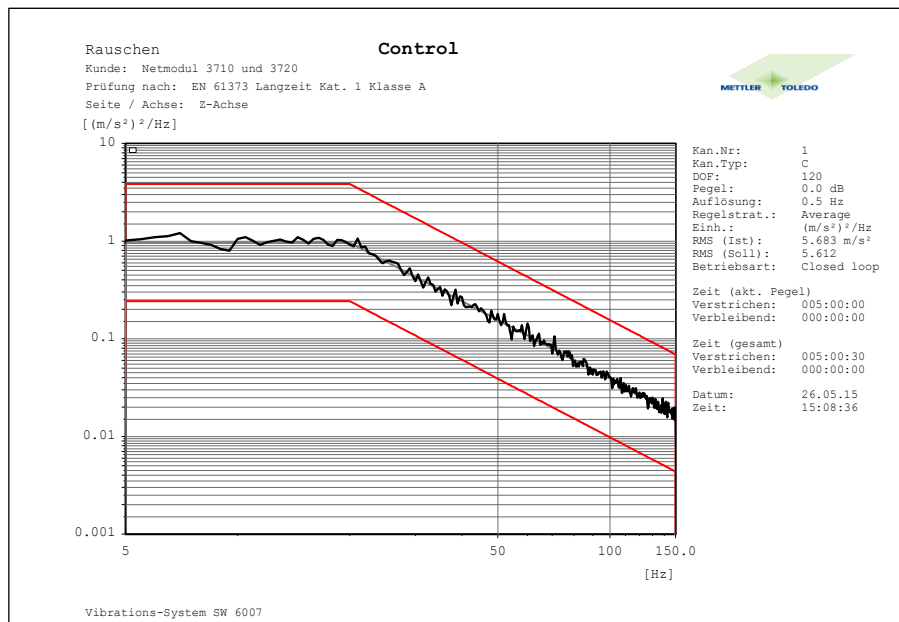
3

Test
Testpassed
erfülltfailed
nicht erfülltcarried out
durchgeführtTested by
Geprüft von

Roland Cattin

Part 9.5.1: Additional sheet / Zusatzblatt

to Test / zum Test:

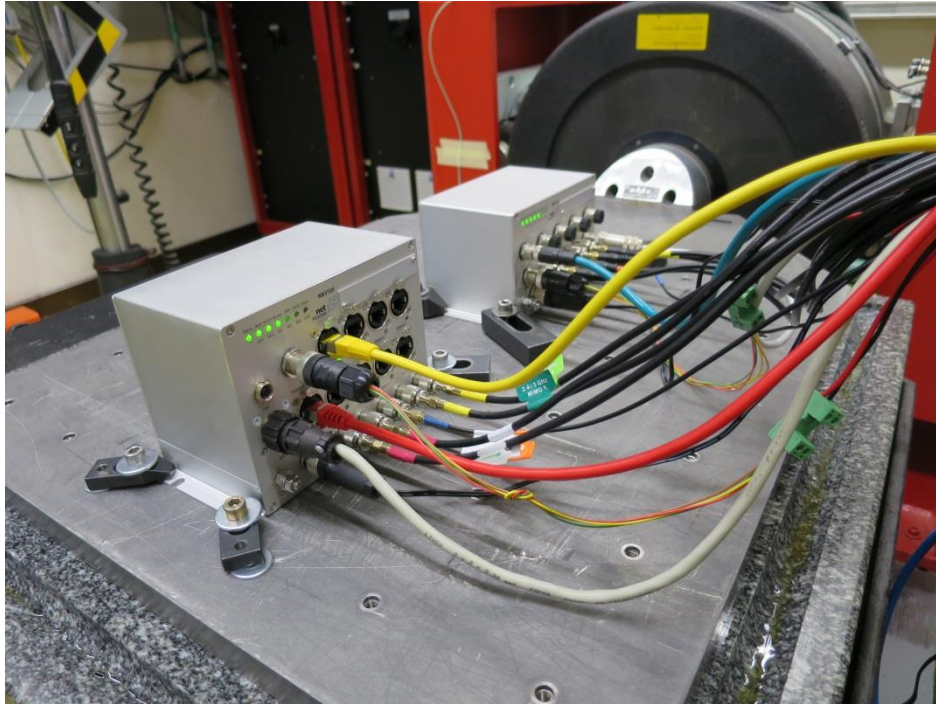
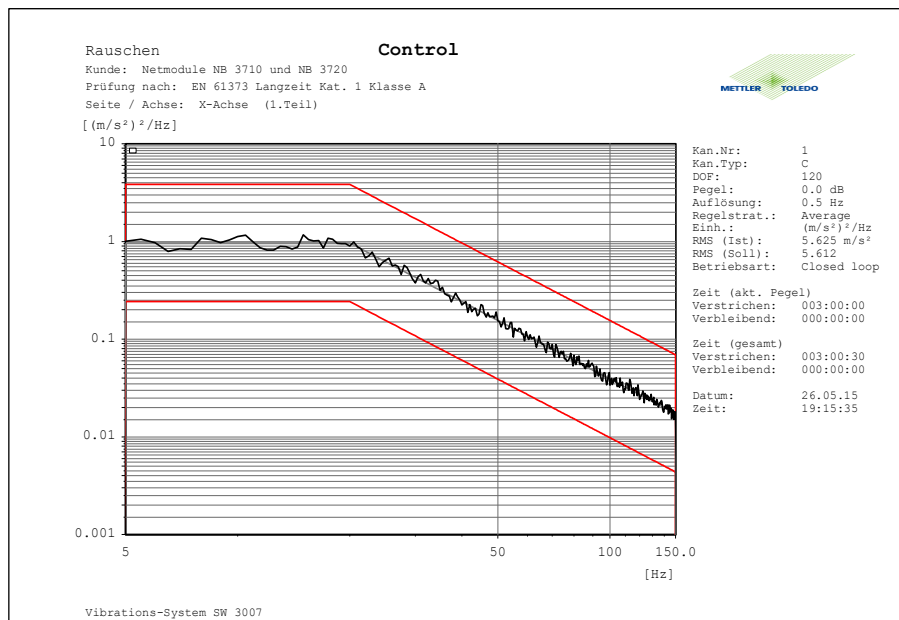
Vibration Random / Vibration RauschenDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02**Fixation and diagram of vibration in **Z-direction** / Aufspannung und Vibrationsdiagramm in **Z-Richtung****Fixation in Z-direction / Aufspannung in Z-Richtung**

C:\M+P Vibration\B - Daten\1 - Kunden-Daten\NeMoDevice\Jahr 2015\Auftrag vom 2015-05-26\Rauschen EN 61373 Kat.1 Klasse A (Langzeit E

Diagram of vibration in Z-direction / Vibrationsdiagramm in Z-Richtung

Part 9.5.2: Additional sheet / Zusatzblatt

to Test / zum Test:

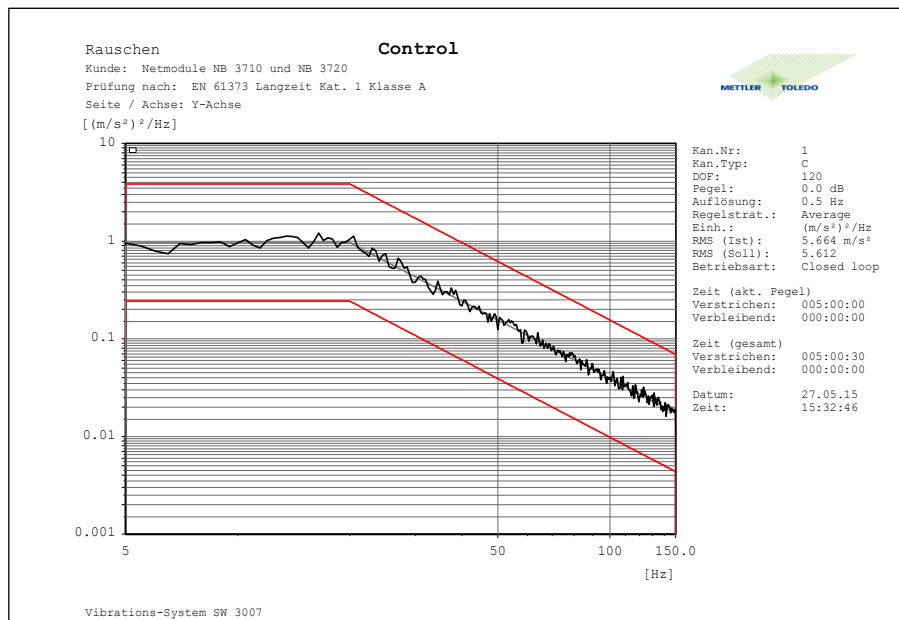
Vibration Random / Vibration RauschenDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02**Fixation and diagram of vibration in **X-direction** / Aufspannung und Vibrationsdiagramm in **X-Richtung****Fixation in X-direction / Aufspannung in X-Richtung**

C:\M+P Vibration\B - Daten\1 - Kunden-Daten\NetModul\Jahr 2015\Auftrag vom 2015-05-26\Rauschen EN 61373 Kat.1 Klasse A (Langzeit Ser

Diagram of vibration in X-direction / Vibrationsdiagramm in X-Richtung

Part 9.5.3: Additional sheet / Zusatzblatt

to Test / zum Test:

Vibration Random / Vibration RauschenDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02**Fixation and diagram of vibration in **Y-direction** / Aufspannung und Vibrationsdiagramm in **Y-Richtung****Fixation in Y-direction / Aufspannung in Y-Richtung**

C:\M+P Vibration\B - Daten\1 - Kunden-Daten\NetModul\Jahr 2015\Auftrag vom 2015-05-26\Rauschen EN 61373 Kat.1 Klasse A (Langzeit Ser

Diagram of vibration in Y-direction / Vibrationsdiagramm in Y-Richtung

Part 9.6: Shock / Schock

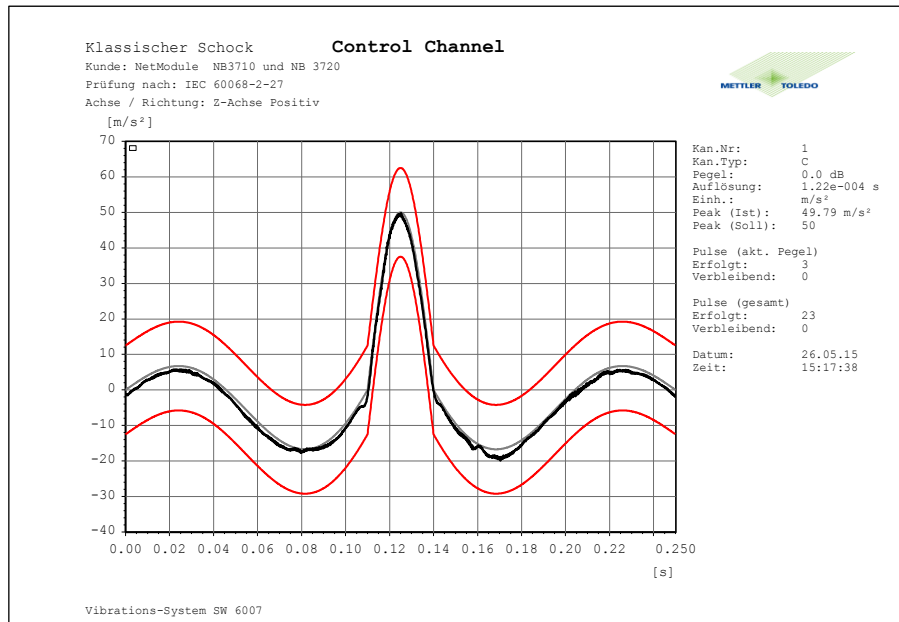
Type of test Art des Tests	<input checked="" type="checkbox"/> Single shock / Einzelschock <input type="checkbox"/> Endurance / Dauerschocken		
Type of test / goal Art des Tests / Zweck	<input checked="" type="checkbox"/> Stress shock / Stress Schocken <input type="checkbox"/> Transportation / Transport <input type="checkbox"/> Zulassung <input type="checkbox"/>		
According to standard Nach Norm oder Vorschrift	<input checked="" type="checkbox"/> EN 60068-2-27 <input type="checkbox"/>		
Applicable Test Method Zutreffendes Prüfverfahren	<input checked="" type="checkbox"/> Ea		
Test instrument Prüfgerät	ENL-P Nr. Controller: <input checked="" type="checkbox"/> 000 / 0466 <input checked="" type="checkbox"/> 000 / 0465 System: <input checked="" type="checkbox"/> 062 / 0129 / 062 / 0130 <input checked="" type="checkbox"/> 063 / 0302 / 063 / 0303 Picup: <input checked="" type="checkbox"/> 000 / 0392 <input checked="" type="checkbox"/> 066 / 0318 <input type="checkbox"/> <input type="checkbox"/> Shocker: <input type="checkbox"/> 000 / 0040, 066 / 0191 <input type="checkbox"/>		
Device under test Prüfobjekt	NB3710 and NB3720		Serial / Ident. No. Seriennummer 01+02
Client Kunde	NetModule AG, CH – 8400 Winterthur, Mr T. Siegrist		
Start-Date, Time Start-Datum, Zeit	2015-05-26, 15:15		End-Date, Time End-Datum, Zeit 2015-05-27, 15:55
Shock form Schockform	Half sinus halbsinus	Acceleration Beschleunigung 50 m/s ²	Shock Duration: Schock-Dauer: 30 ms
Number of shocks Anzahl Schocks	3 per axis pro Achse	Totally: Total: 18	Shocks Schocks
Axis of stimulation : / Anregungsachse :	<input checked="" type="checkbox"/> + Z Axis <input checked="" type="checkbox"/> - Z Axis	<input checked="" type="checkbox"/> + Y Axis <input checked="" type="checkbox"/> - Y Axis	<input checked="" type="checkbox"/> + X Axis <input checked="" type="checkbox"/> - X Axis
Operation position: / Betriebslage :	<input checked="" type="checkbox"/> yes / ja	<input type="checkbox"/> no / nein	
Fixation : / Aufspannungsart :	<input checked="" type="checkbox"/> screwed/geschraubt	<input type="checkbox"/> with belt / gegurtet	<input checked="" type="checkbox"/> Photo / Foto
Arrangement of pickups Anordnung der Messfühler	Built in the vibration table		
Ambient temperature: Umgebungstemperatur:	23 - 24 °C		Ambient humidity: Umgebungsfeuchte: 42 - 46 % r.H.
State of test object Zustand des Testobjekts	<input checked="" type="checkbox"/> In operation / Im Betrieb <input type="checkbox"/> Not in operation / Nicht im Betrieb		
Preconditioning Vorbehandlung	Vibration Test	Post conditioning Nachbehandlung	None

Shock (cont.) / Schock (Forts.)

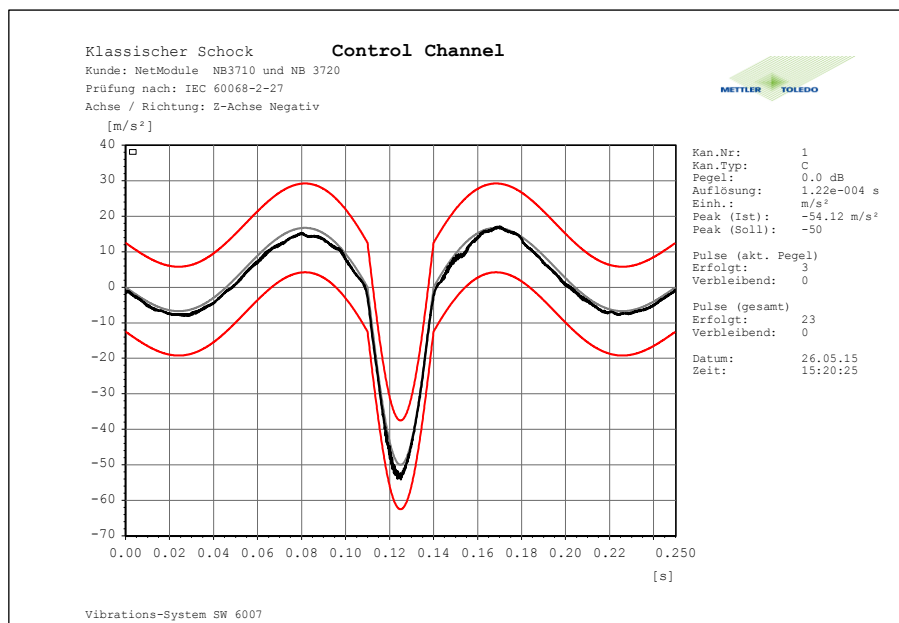
Initial measurement Anfangsmessung	Done by the client				
Measurement during the test Zwischenmessung	Done by the client via remote reading				
Final measurement Endmessung	Done by the client (after all tests)				
Remarks Bemerkungen	<div></div> <div></div> <div></div>				
Additional sheets Zusatzblätter	3	Test Test	<input type="checkbox"/> passed erfüllt	<input type="checkbox"/> failed nicht erfüllt	<input checked="" type="checkbox"/> carried out durchgeführt
Tested by Geprüft von	Roland Cattin				

Part 9.6.1: Additional sheet / Zusatzblatt

to Test / zum Test:

Shock / SchockDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02****Diagram of shock test in Z-direction / Diagramm des Schocktests in Z-Richtung**

C:\M+P Vibration\B - Daten\1 - Kunden-Daten\NeMoDevice\Jahr 2015\Auftrag vom 2015-05-26\Schock 5g 30ms_001.rcs

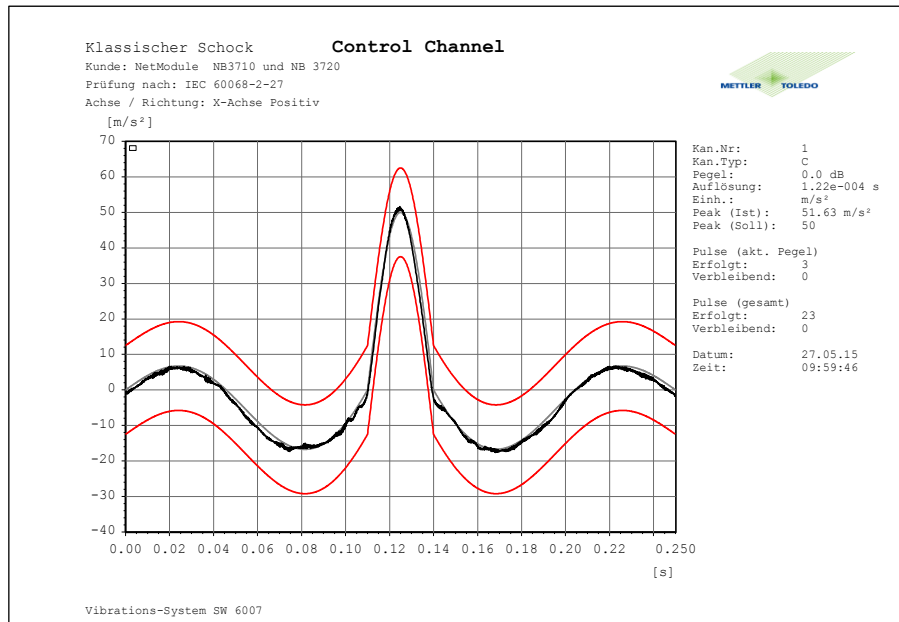
Diagram of shock in +Z-direction / Schockdiagramm in +Z-Richtung

C:\M+P Vibration\B - Daten\1 - Kunden-Daten\NeMoDevice\Jahr 2015\Auftrag vom 2015-05-26\Schock 5g 30ms_002.rcs

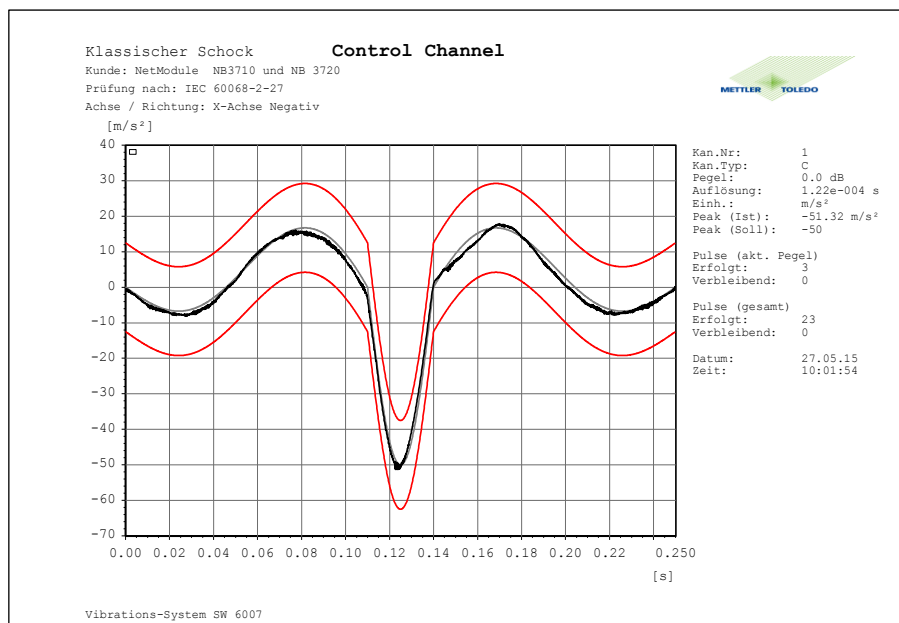
Diagram of shock in -Z-direction / Schockdiagramm in -Z-Richtung

Part 9.6.2: Additional sheet / Zusatzblatt

to Test / zum Test:

Shock / SchockDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02****Diagram of shock test in *X-direction* / Diagramm des Schocktests in *X-Richtung***

C:\M+P Vibration\B - Daten\1 - Kunden-Daten\NetModul\Jahr 2015\Auftrag vom 2015-05-26\Schock 5g 30ms_002.rcs

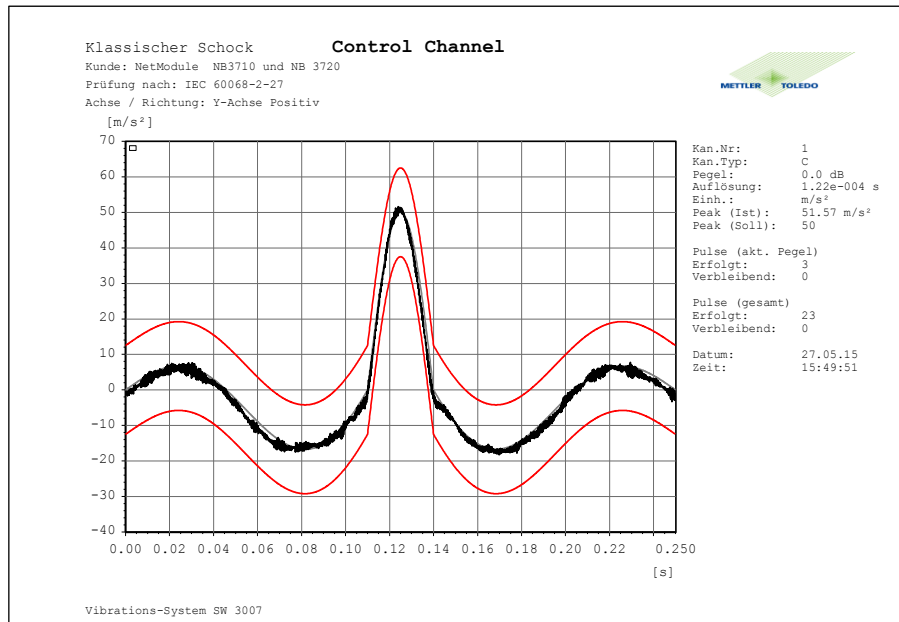
Diagram of shock in *+X-direction* / Schockdiagramm in *+X-Richtung*

C:\M+P Vibration\B - Daten\1 - Kunden-Daten\NetModul\Jahr 2015\Auftrag vom 2015-05-26\Schock 5g 30ms_003.rcs

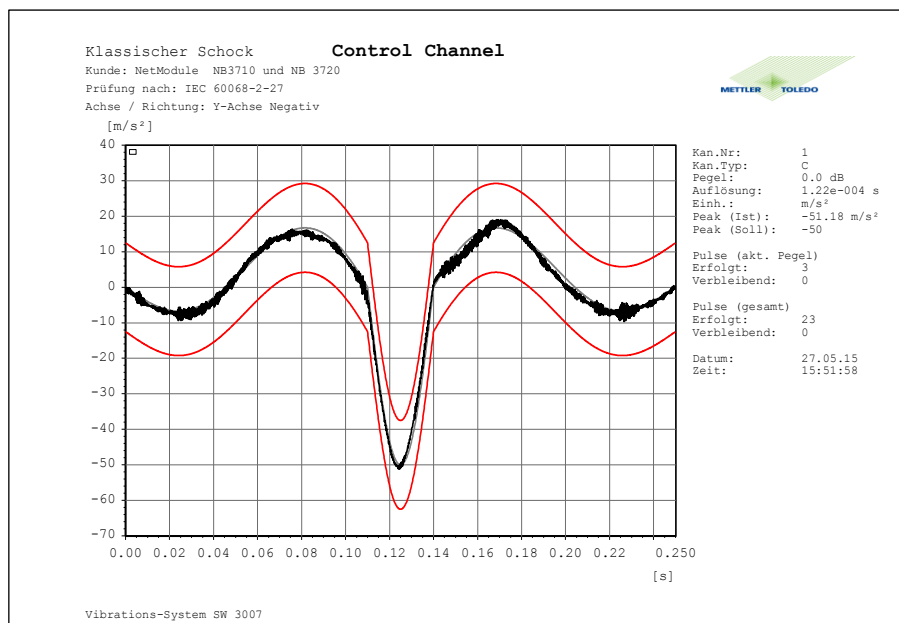
Diagram of shock in *-X-direction* / Schockdiagramm in *-X-Richtung*

Part 9.6.3: Additional sheet / Zusatzblatt

to Test / zum Test:

Shock / SchockDevice under test
Prüfobjekt**NB3710 and NB3720**Serial / Ident. No.
Seriennummer**01+02****Diagram of shock test in Y-direction / Diagramm des Schocktests in Y-Richtung**

C:\M+P Vibration\B - Daten\1 - Kunden-Daten\NetModul\Jahr 2015\Auftrag vom 2015-05-26\Schock 5g 30ms_004.rcs

Diagram of shock in +Y-direction / Schockdiagramm in +Y-Richtung

C:\M+P Vibration\B - Daten\1 - Kunden-Daten\NetModul\Jahr 2015\Auftrag vom 2015-05-26\Schock 5g 30ms_005.rcs

Diagram of shock in -Y-direction / Schockdiagramm in -Y-Richtung

Part 10: Testing stations / test instruments Prüfanlagen / Prüfgeräte

Followed testing instruments are needed in this test procedure:

Measurement Uncertainty:

Measurement uncertainties for the test methods are available on customer request

Folgende Testeinrichtungen wurden in dieser Prüfung verwendet:

Messunsicherheit:

Angaben zur Messunsicherheit können auf Wunsch abgegeben werden.

<i>Equipment / Gerät</i>		<i>Identification number of ENL Testing laboratory</i>	<i>Last Calibration</i>	<i>Next Calibration</i>
Climatic tests / Klimaprüfungen				
<input checked="" type="checkbox"/>	Climatic chamber CTS C-40/600 Klimakammer CTS C-40/600	ENL-P 000 / 0483	2015-05	2016-05
<input checked="" type="checkbox"/>	Logger Testo 176T4 Logger Testo 176T4	ENL-P 000 / 0451	2015-04	2016-04
<input checked="" type="checkbox"/>	Logger Testo 176T4 Logger Testo 176T4	ENL-P 000 / 0452	2015-04	2016-04
Vibration / Vibrationstests				
<input checked="" type="checkbox"/>	Vibration Control System VibPilot m+p - Jerry Vibrationsregelsystem VibPilot m+p – Jerry	ENL-P 000 / 0467	2014-04	2015-10
<input checked="" type="checkbox"/>	Vibration Control System VibPilot m+p - Tom Vibrationsregelsystem VibPilot m+p – Tom	ENL-P 000 / 0465	2014-04	2015-10
<input checked="" type="checkbox"/>	System RMS SW 3007 / RMS TGA 3005 System RMS SW 3007 / RMS TGA 3005	ENL-P 062 / 0129 ENL-P 062 / 0130	2014-04	2015-10
<input checked="" type="checkbox"/>	Accelerometer built in Beschleunigungsaufnehmer eingebaut	ENL-P 000 / 0392	2014-04	2015-10
<input checked="" type="checkbox"/>	System RMS SW 6007 / RMS TGA 6005 System RMS SW 6007 / RMS TGA 6005	ENL-P 063 / 0302 ENL-P 063 / 0303	2014-04	2015-10
<input checked="" type="checkbox"/>	Accelerometer built in Beschleunigungsaufnehmer eingebaut	ENL-P 066 / 0318	2014-04	2015-10
<input type="checkbox"/>	Accelerometer Beschleunigungsaufnehmer	ENL-P 066 / 0137		
<input type="checkbox"/>	Accelerometer Beschleunigungsaufnehmer	ENL-P 000 / 0459		
<input type="checkbox"/>	Accelerometer Beschleunigungsaufnehmer			
Drop / Freier Fall				
<input type="checkbox"/>	Drop test machine L.A.B. Accudrop 160 Falltestanlage L.A.B. Accudrop 160	ENL-P 000 / 0060	--	--
<input type="checkbox"/>	Accelerometer Triax Beschleunigungsaufnehmer Triax	ENL-P 066 / 0332		
Shock / Schock				
<input type="checkbox"/>	Mech. Shock tester Mech. Schocktest	ENL-P 000 / 0040	--	--
<input type="checkbox"/>	Accelerometer Beschleunigungsaufnehmer	ENL-P 066 / 0191		

Part 11: Description of the initial and final measurement Beschreibung der Start- und Schlussmessungen

NB3720-L2W8EnCI-G

Setup:

- LTE; connection to the Internet
- WLAN-AP; connection from notebook computer
- WLAN-client; connection to an additional WLAN-AP
- GPS; GPS data receiver
- IBIS; data simulation sent from notebook computer
- CAN; data simulation sent from notebook computer
- I/O; data simulation sent from notebook computer

The router is connected to a notebook computer via the Ethernet and WLAN.

Over these connections the data are collected from the Internet (LTE), WLAN-AP and GPS. The IBIS, CAN and I/O interfaces are tested by the appertaining application on the notebook computer.

NB3710-2L2W-G

Setup:

- 2 x LTE; connection to the Internet
- WLAN-AP; connection from notebook computer
- WLAN-client; connection to an additional WLAN-AP
- GPS; GPS data receiver
- Serial interface; serial output
- I/O; data simulation sent from notebook computer

The router is connected to a notebook computer via the Ethernet and WLAN.

Over these connections the data are collected from the Internet over both mobile connections (LTE), WLAN-AP and GPS. The serial- and the I/O interfaces are tested by the appertaining application on the notebook computer.

The measured data is monitored by the client via remote reading.

The copies of the records of the measured data can be found by the client.

No failure detected

Part 12: Test duration / Presence during the test Testdauer / Anwesenheiten

Test started on : / Prüfung gestartet am: **2015-05-18**

Test completed on : / Prüfung abgeschlossen am: **2015-05-27**

Present during the test / Während der Prüfung anwesend ---