DAkkS Deutsche Akkreditierungsstelle D-PL-12053-01-02

Test Report acc. to EN 61326-1
relating to
D&S Steuerungssysteme GmbH
F1

Electrical equipment for measurement, control and laboratory use - EMC requirements - Part 1 General requirements

m. dudde hochfrequenz-technik Rottland 5a D-51429 Bergisch Gladbach/ Germany Tel: +49 2207-96890 Fax +49 2207-968920

1. Test result summary

Clause	Enclosure	Test result			Report page number
7.1.1	Electrostatic discharge	**Pass**	~~Fail~~	~~N.t.~~ *	9 - 10
7.1.2	Electromagnetic fields	**Pass**	~~Fail~~	~~N.t.~~ *	11
7.1.3	Power frequency magnetic fields	**Pass**	~~Fail~~	~~N.t.~~ *	12

Clause	AC power input ports	Test result			Report page number
7.2.1	Voltage dips and interruptions	**Pass**	~~Fail~~	~~N.t.~~ *	13
7.2.2	Voltage interruptions	**Pass**	~~Fail~~	~~N.t.~~ *	14
7.2.3	Fast transients	**Pass**	~~Fail~~	~~N.t.~~ *	15
7.2.4	Surge voltages	**Pass**	~~Fail~~	~~N.t.~~ *	16
7.2.5	Conducted RF signals	**Pass**	~~Fail~~	~~N.t.~~ *	17

Clause	DC power input ports	Test result			Report page number
7.3.1	Fast transients	~~Pass~~	~~Fail~~	**N.t.**[1]	18
7.3.2	Surge voltages	~~Pass~~	~~Fail~~	**N.t.**[1]	19
7.3.2	Conducted RF signals	~~Pass~~	~~Fail~~	**N.t.**[1]	20

Clause	Input / output ports	Test result			Report page number
7.4.1	Fast transients	**Pass**	~~Fail~~	~~N.t.~~ *	21
7.4.2	Surge voltages	**Pass**	~~Fail~~	~~N.t.~~ *	22
7.4.3	Conducted RF signals	**Pass**	~~Fail~~	~~N.t.~~ *	23

Clause	Input / output ports with a direct AC connection	Test result			Report page number
7.5.1	Fast transients	~~Pass~~	~~Fail~~	**N.t.**[1]	24
7.5.2	Surge voltages	~~Pass~~	~~Fail~~	**N.t.**[1]	25
7.5.3	Conducted RF signals	~~Pass~~	~~Fail~~	**N.t.**[1]	26

Clause	Limits for devices of class A	Test result			Report page number
7.6.1	Conducted emissions according to CISPR 11	~~Pass~~	~~Fail~~	**N.t.**[5]	27
7.6.2	Radiated emissions according to CISPR 11	**Pass**	~~Fail~~	~~N.t.~~[*]	28

Clause	Limits for devices of class B	Test result			Report page number
7.7.1	Conducted emissions according to CISPR 11	**Pass**	~~Fail~~	~~N.t.~~[*]	29 - 30
7.7.2	Conducted emissions according to IEC 61000-3-2 and IEC 61000-3-3	~~Pass~~	~~Fail~~	**N.t.**[8]	31 – 35
7.7.3	Radiated emissions according to CISPR 11	~~Pass~~	~~Fail~~	**N.t.**[6]	36

The equipment passed the conducted tests	Yes	~~No~~

Signature	R Witze	Manfred Dudde
Name	**Mr. Roger Witze**	**Mr. Manfried Dudde**
Designation	**EMC Test Engineer**	**Laboratory Manager**
Date of issue	**2016-06-23**	**2016-06-23**

A Ftouhi

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m. dudde hochfrequenz-technik Rottland 5a D-51429 Bergisch Gladbach/ Germany Tel: +49 2207-96890 Fax +49 2207-968920

2. Introduction

This test report **is not an expert opinion** and consists of:

- Test result summary
- List of contents
- Introduction and further information
- Detailed test information
- List of measurement equipment with calibration validity
- Photographs and further test results (plots, graphs, etc.)

All pages have been numbered consecutively and bear the m. dudde hochfrequenz-technik logo, the test report number, the date, the test specification in its current version as well as the type designation of the EUT. The total number of pages in this report is **108**.

The tests were carried out at:

- m. dudde hochfrequenz-technik, D-51429 Bergisch Gladbach &
- EMC TestHaus Dr. Schreiber, Siegen

in a representative assembly and in accordance with the test methods stated in:

EN 61326-1:2013

The sample of the product was received on:

- 2016-04-16

The tests were carried out in the following period of time:

- 2016-05-31 – 2016-06-16

3. Testing laboratory

m. dudde hochfrequenz-technik
Rottland 5a, 51429 Bergisch Gladbach, Germany

Phone: +49 - (0) 22 07 / 96 89-0
Fax: +49 - (0) 22 07 / 96 89-20

Accredited by:

DAkkS Deutsche Akkreditierungsstelle GmbH
DAkkS accreditation number: D-PL-12053-01

4. Applicant

Company name	: D&S Steuerungssysteme GmbH
Address	: St. Tönnis Str. 201
	50769 Köln
Country	: Germany
Telephone	: +49 (0) 221 976557 12
Fax	: +49 (0) 221 976557 16
Email	: stanzick@ds-steuerungssysteme.de
Date of order	: 2016-05-17
References	: Mr. Gerhard Stanzick

5. Product and product documentation

Samples of the following apparatus were submitted for testing:

EUT information*	
Manufacturer	NSC Sicherheitstechnik GmbH
Trademark	VS-1
Type of equipment	Fire alarm system
Serial number	---
Type designation	F1
Hardware version	---
Software release	---
Power supply	230 V AC
Ports	AC port (0.5 m)
	Signal port (1.2 m)
*: See clause 12 for more EUT information	

For issuing this report the following product documentation was used:

Description	Date	Identifications
---	---	---

6. Conclusions, observations and comments

The test report will be filed at m. dudde hochfrequenz-technik for a period of 10 years following the issue of this report. It may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of m. dudde hochfrequenz-technik.

The results of the tests as stated in this report are exclusively applicable to the EUT as identified in this report. m. dudde hochfrequenz-technik cannot be held liable for properties of the EUT that have not been observed during these tests.

m. dudde hochfrequenz-technik assumes the sample to comply with the requirements of EN 61326-1 for the respective test sector, if the test results turn out positive.

Comments: ---

Date	: 2016-06-23	Date	: 2016-06-23
Name	: Mr. Roger Witze	Name	: Mr. Manfried Dudde
Designation	: EMC Test Engineer	Designation	: Laboratory Manager
Signature	:	Signature	: .....

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7. Conformity assessment

7.1 Enclosure

7.1.1 Electrostatic discharge (ESD)

Requirements for Electrostatic Discharge		
Electrostatic discharge	**Test voltage**	**Test method**
Type	**kV**	**Basic Standard**
Contact discharge	± 4	**EN 61000-4-2**
Air discharge	± 8	
** Electrostatic discharges shall be applied to all exposed surfaces of the EUT except where the user documentation specifically indicates a requirement for appropriate protective measures.		

Environmental conditions during the test		
Temperature: 22 °C	Air pressure: 984 hPa	Rel. humidity: 59 %
Operating mode		
EUT in running order		

Test results evaluation for Electrostatic Discharge in accordance with EN 61000-4-2						
Electrostatic Discharge type	**Test Voltage [kV]**	**Test points**	**Numbers of discharge**	**Time interval [secs]**	**Performance criteria**	**Remarks**
Direct Contact discharge	**± 2**	6	**10**	1	**A**	No reaction remarked
	± 4	6	**10**	1	**A**	No reaction remarked
Indirect Contact discharge (HCP)	**± 2**	4	**10**	1	**A**	No reaction remarked
	± 4	4	**10**	1	**A**	No reaction remarked
Indirect contact discharge (VCP)	**± 2**	1	**10**	1	**A**	No reaction remarked
	± 4	1	**10**	1	**A**	No reaction remarked
Air discharge	**± 2**	9	**10**	1	**A**	No reaction remarked
	± 4	9	**10**	1	**A**	No reaction remarked
	± 6	9	**10**	1	**A**	No reaction remarked
	± 8	9	**10**	1	**A**	No reaction remarked
Measurement uncertainty: < ± 3 %						
Test Remarks						
---						

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Test cables used	---
Test equipment used	106, 112a, 265

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~ *

Further test results are attached	**Yes**	~~No~~	Page no.: 88-90

N.t.* See clause 8: additional information to the test report

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7.1.2 Electromagnetic fields

Requirements for radio frequency electromagnetic fields				
Frequency Range	**Test Voltage**	**Modulation**		**Test Method**
MHz	**V/m**	**%**	**Type**	**Basic Standard**
80 – 1000	10	80 (1 kHz)	AM	**EN 61000-4-3**
1400 – 2000	3	80 (1 kHz)	AM	
2000 - 2700	1	80 (1 kHz)	AM	

Environmental conditions during the test		
Temperature: 24 °C	Air pressure: 1020 hPa	Rel. humidity: 45 %
Operating mode		
EUT in running order		

Test results evaluation for radio frequency electromagnetic fields in accordance with EN 61000-4-3							
Frequency range	**Test field**	**Test side**	**Ant. Pol.**	**Dwell time**	**Modulation type**	**Per. criterion**	**Remarks**
80 – 1000	**10 V/m**	Front	**H**	1 sec	**80 %, 1 kHz, AM modulation**	**A**	No reaction remarked
			V	1 sec		**A**	No reaction remarked
		Right	**H**	1 sec		**A**	No reaction remarked
			V	1 sec		**A**	No reaction remarked
		Left	**H**	1 sec		**A**	No reaction remarked
			V	1 sec		**A**	No reaction remarked
		Rear	**H**	1 sec		**A**	No reaction remarked
			V	1 sec		**A**	No reaction remarked
1000 - 2700	**10** V/m**	Front	**H**	1 sec	**80 %, 1 kHz, AM modulation**	**A**	No reaction remarked
			V	1 sec		**A**	No reaction remarked
		Right	**H**	1 sec		**A**	No reaction remarked
			V	1 sec		**A**	No reaction remarked
		Left	**H**	1 sec		**A**	No reaction remarked
			V	1 sec		**A**	No reaction remarked
		Rear	**H**	1 sec		**A**	No reaction remarked
			V	1 sec		**A**	No reaction remarked
Test Remarks							
**** The measurements were carried out with higher test voltage level (10 V/m)**							

Test cables used	EMC TestHaus Dr. Schreiber, Siegen
Test equipment used	EMC TestHaus Dr. Schreiber, Siegen

*The measurements were performed by our technician with the calibrated test equipment of the accredited test laboratory EMC TestHaus Dr. Schreiber, Siegen.

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~*

Further test results are attached	**Yes**	~~No~~	**Page no.: 91-92**

N.t.* See clause 8: additional information to the test report

7.1.3 Power frequency magnetic fields

Requirements for radio frequency electromagnetic fields	
Test Level	**Basic Standard**
30 [A/m]*	**EN 61000-4-8**
***: For 50 Hz and 60 Hz main power supply.**	

Environmental conditions during the test		
Temperature: 22 °C	Air pressure: 1010 hPa	Rel. humidity: 57 %
Operating mode		
EUT in running order		

Test results for radio frequency electromagnetic fields			
Test Level	**Basic Standard**	**Performance criterion**	**Test remarks**
30 [A/m]*	**EN 61000-4-8**	A	No reaction remarked by testing of all 3 axises
***: For 50 Hz and 60 Hz main power supply.**			

Test cables used	EMC TestHaus Dr. Schreiber, Siegen.
Test equipment used	EMC TestHaus Dr. Schreiber, Siegen.

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~ *

Further test results are attached	**Yes**	~~No~~	Page no.: 93-94

N.t.* See clause 8: additional information to the test report

7.2 AC power input port

7.2.1 Voltage dips

Requirements for voltage dips			
Residual Voltage	**Cycles**	**AC Mains Frequency**	**Test Method**
%	**n**	**Hz**	**Basic Standard**
0	1	50	EN 61000-4-11
40	10		
70	25		

Environmental conditions during the test		
Temperature: 21 °C	Air pressure: 987 hPa	Rel. humidity: 65 %
Operating mode		
EUT in running order		

Test results evaluation for voltage dips in accordance with EN 61000-4-11			
Residual Voltage	**Cycles**	**AC Mains Frequency**	**Performance**
%	**n**	**Hz**	**Criterion**
0	**1**	**50**	**A**
40	**10**		**A**
70	**25**		**A**
Measurement uncertainty: < ± 2 %.			
Test Remarks			
During these tests no interferences are observed. The EUT operated as intended in the event of voltage dips present on the AC mains power input ports.			

Test cables used	---
Test equipment used	106, 241a

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~ *

Further test results are attached	**Yes**	~~No~~	Page no.: 95

N.t.* See clause 8: additional information to the test report

7.2.2 Voltage interruptions

Requirements for voltage interruptions			
Residual Voltage	**Cycles**	**AC Mains Frequency**	**Test Method**
%	**n**	**Hz**	**Basic Standard**
0	250	50	EN 61000-4-11

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		
EUT in running order		

Test results evaluation for voltage interruptions in accordance with EN 61000-4-11			
Residual Voltage	**Cycles**	**AC Mains Frequency**	**Performance**
%	**n**	**Hz**	**Criterion**
0	**250**	**50**	**B**
Measurement uncertainty: < ± 2 %.			
Test Remarks			
During this test the EUT reboot itself. After reboot the central unit must acknowledge the beeper (alarm) via button			

Test cables used	---
Test equipment used	106, 241a

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~*

Further test results are attached	**Yes**	~~No~~	Page no.: 95

N.t.* See clause 8: additional information to the test report

7.2.3 Fast transients

Requirements for fast transients on AC ports			
Test Voltage	**T_r/T_h**	**Repetition Frequency**	**Test Method**
kV	**ns**	**kHz**	**Basic Standard**
± 2	5/50	5	EN 61000-4-4
Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports, which were not tested for this reason, shall be included in the test report.			

Environmental conditions during the test		
Temperature: 21 °C	Air pressure: 987 hPa	Rel. humidity: 65 %
Operating mode		
EUT in running order		

Test results evaluation for fast transients on AC main ports in accordance with EN 61000-4-4			
Test voltage	**T_r/T_h**	**Repetition frequency**	**Performance**
kV	**ns**	**kHz**	**Criterion**
± 2*	**5/50**	**5**	**A**
Measurement uncertainty: < ± 5 %			
Test Remarks			
During these tests no interferences are observed. The EUT operated as intended in the event of fast transients present on the AC mains power port.			
***: tested with higher test level to fulfil the requirements of EN61000-6-2**			

Test cables used	---
Test equipment used	106, 46a

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~*

Further test results are attached	**Yes**	~~No~~	Page no.:96

N.t.* See clause 8: additional information to the test report

7.2.4 Surge voltages

Requirements for surges on AC mains power input ports			
Test Voltage	**Test Voltage**	**T_s/T_r**	**Test Method**
kV	**type**	**µs**	**Basic Standard**
± 2*	Line to Ground	1.2/50	EN 61000-4-5
± 1*	Line to Line	1.2/50	
*: for industrial environment			

Environmental conditions during the test		
Temperature: 19 °C	Air pressure: 985 hPa	Rel. humidity: 68 %
Operating mode		
EUT in running order		

Test results evaluation for surges on AC mains power input ports in accordance with EN 61000-4-5			
Test Voltage Level	**Test Voltage**	**T_s/T_r**	**Performance**
kV	**type**	**µs**	**Criterion**
± 2*	**Line to Ground**	**1.2/50**	**A**
± 1*	**Line to Line**	**1.2/50**	**A**
Measurement uncertainty: < ± 2 %.			
***: The tests were carried out on 0°, 90°, 180° and 270°**			
During these tests no interferences are observed. The EUT operated as intended in the event of surges present on the AC mains power input ports.			

Test cables used	---
Test equipment used	106, 522

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~*

Further test results are attached	**Yes**	~~No~~	Page no.: 97

N.t.* See clause 8: additional information to the test report

7.2.5 Conducted RF signals

Requirements for radio frequency on AC mains power ports				
Frequency Range	**Test Voltage**	**Modulation**		**Test Method**
MHz	**V**	**%**	**Type**	**Basic Standard**
0.15 – 80	3	80 (1 kHz)	AM	EN 61000-4-6
Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports, which were not tested for this reason, shall be included in the test report				

Environmental conditions during the test		
Temperature: 21 °C	Air pressure: 987 hPa	Rel. humidity: 65 %
Operating mode		
EUT in running order		

Test results evaluation for radio frequency on AC mains power input ports in accordance with EN 61000-4-6				
Frequency Range	**Test Voltage**	**Modulation**		**Performance**
MHz	**V**	**%**	**Type**	**Criterion**
0.15 – 80	**10***	**80 (1 kHz)**	**AM**	**A**
Measurement uncertainty: < ± 2 %.				
Test Remarks				
***: tested with higher test level to fulfil the requirements of EN61000-6-2**				

Test cables used	K27, K35, K112
Test equipment used	106, 264, 177, 162, 123, 136, 307

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~*

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.3 DC power input port

7.3.1 Fast transients

Requirements for fast transients on DC mains power input ports			
Test Voltage	**T_r/T_h**	**Repetition Frequency**	**Test Method**
kV	**ns**	**kHz**	**Basic Standard**
± 2	5/50	5	EN 61000-4-4
Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports, which were not tested for this reason, shall be included in the test report.			

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results evaluation for fast transients on DC mains power input ports in accordance with EN 61000-4-4			
Test voltage	**T_r/T_h**	**Repetition frequency**	**Performance**
kV	**ns**	**kHz**	**Criterion**
± 2	**5/50**	**5**	---
Measurement uncertainty: < ± 5 %			
Test Remarks			

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.**[1]

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.3.2 Surge voltages

Requirements for surges on DC mains power input ports			
Test Voltage	**Test Voltage**	**T_s/T_r**	**Test Method**
kV	**type**	**µs**	**Basic Standard**
2	Line to Ground	1.2/50	EN 61000-4-5
1	Line to Line	1.2/50	

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results evaluation for surge on DC mains power input port in accordance with EN 61000-4-5				
Test Level	**Test line**	**Number of pulse**	**Basic standard**	**Performance**
±1 kV	Line to line	**5**	IEC 61000-4-5	---
±2 kV	Line to ground	**5**		---
Measurement uncertainty: < ± 5 %				
Test Remarks				

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.[1]**

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.3.3 Conducted RF signals

Requirements for radio frequency on DC mains power ports				
Frequency Range	**Test Voltage**	**Modulation**		**Test Method**
MHz	**V**	**%**	**Type**	**Basic Standard**
0.15 – 80	3	80 (1 kHz)	AM	EN 61000-4-6
Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports, which were not tested for this reason, shall be included in the test report				

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results evaluation for radio frequency on DC mains power port in accordance with EN 61000-4-6				
Frequency range	**Test Level**	**Modulation**	**Basic standard**	**Performance**
[MHz]	**[V]**			
0.15 to 80	3	80%, AM 1 kHz	IEC 61000-4-6	---
Measurement uncertainty: < ± 2 %				
Test remarks				

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.**[1]

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.4 Input / output ports

7.4.1 Fast transients

Requirements for fast transients on input / output ports			
Test Voltage	**T_r/T_h**	**Repetition Frequency**	**Test Method**
kV	**ns**	**kHz**	**Basic Standard**
± 1	5/50	5	EN 61000-4-4
Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports, which were not tested for this reason, shall be included in the test report.			

Environmental conditions during the test		
Temperature: 21 °C	Air pressure: 985 hPa	Rel. humidity: 67 %
Operating mode		
EUT in running order		

Test results evaluation for fast transients on input / output ports in accordance with EN 61000-4-4				
Test port	**Test voltage**	**T_r/T_h**	**Repetition frequency**	**Performance**
---	**kV**	**ns**	**kHz**	**Criterion**
Central Unit to module Adr. 1	**± 1**	**5/50**	**5**	**A**
Module Adr. 1 to module Adr. 2	**± 1**	**5/50**	**5**	**A**
Central Unit to module Adr. 2	**± 1**	**5/50**	**5**	**A**
Measurement uncertainty: < ± 5 %				
Test Remarks				

Test cables used	KEMV19a
Test equipment used	106, 608, 46a, 264

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~*

Further test results are attached	**Yes**	~~No~~	Page no.: 98-99

N.t.* See clause 8: additional information to the test report

7.4.2 Surge voltages

Requirements for surges on input / output ports			
Test Voltage	**Test Voltage**	**T_s/T_r**	**Test Method**
kV	**type**	**µs**	**Basic Standard**
± 1	line to ground	1.2/50	EN 61000-4-5

Environmental conditions during the test		
Temperature: 21 °C	Air pressure: 984 hPa	Rel. humidity: 63 %
Operating mode		
EUT in running order		

Test results evaluation for surges on input / output ports in accordance with EN 61000-4-5				
Test port	**Test Voltage Level**	**Test Line**	**T_s/T_r**	**Performance**
	kV	**type**	**µs**	**Criterion**
Central Unit to module Adr. 1	±1	Line to ground	**1.2/50**	**B**
Module Adr. 1 to module Adr. 2	±1	Line to ground	**1.2/50**	**B**
Central Unit to module Adr. 2	±1	Line to ground	**1.2/50**	**B**
Measurement uncertainty: < ± 2 %.				
Test Remarks				

Test cables used	KEMV18a
Test equipment used	106, 522, 264, 285

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~ *

Further test results are attached	**Yes**	~~No~~	Page no.: 100-101

N.t.* See clause 8: additional information to the test report

7.4.3 Conducted RF signals

Requirements for radio frequency on input / output ports				
Frequency Range	**Test Voltage**	**Modulation Depth**	**Modulation**	**Test Method**
MHz	**V**	**%**	**Type**	**Basic Standard**
0.15 – 80	3	80 (1 kHz)	AM	EN 61000-4-6
Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports, which were not tested for this reason, shall be included in the test report				

Environmental conditions during the test		
Temperature: 21 °C	Air pressure: 987 hPa	Rel. humidity: 65 %
Operating mode		
EUT in running order		

Test results evaluation for radio frequency on input / output ports in accordance with EN 61000-4-6					
Test port	**Frequency Range**	**Test Voltage**	**Modulation**		**Performance**
---	**MHz**	**V**	**%**	**Type**	**Criterion**
Central Unit to module Adr. 1	**0.15 – 80**	**10***	**80 (1 kHz)**	**AM**	**A***
Module Adr. 1 to module Adr. 2	**0.15 – 80**	**10***	**80 (1 kHz)**	**AM**	**A***
Central Unit to module Adr. 2	**0.15 – 80**	**10***	**80 (1 kHz)**	**AM**	**A***
Measurement uncertainty: < ± 2 %.					
Test Remarks					
***: During these tests no interferences are observed. The EUT operated as intended in the presence of a radio frequency electromagnetic on the signal port**					
***: tested with higher test level to fulfil the requirements of EN61000-6-2**					

Test cables used	K27, K35, K112
Test equipment used	106, 156, 177, 162, 123, 136, 307, 264

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~ N.t.*

Further test results are attached	**Yes**	~~No~~	Page no.: 102-103

N.t.* See clause 8: additional information to the test report

7.5 Input / output ports with a direct AC connection

7.5.1 Fast transients

Requirements for fast transients on AC input / output ports with a direct AC connection			
Test Voltage	**T_r/T_h**	**Repetition Frequency**	**Test Method**
kV	**ns**	**kHz**	**Basic Standard**
± 2	5/50	5	EN 61000-4-4
Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports, which were not tested for this reason, shall be included in the test report.			

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results evaluation for fast transients on AC input/output ports with a direct AC connection in accordance with EN 61000-4-4				
Test port	**Test voltage**	**T_r/T_h**	**Repetition frequency**	**Performance**
---	**kV**	**ns**	**kHz**	**Criterion**
	± 2	**5/50**	**5**	**---**
	± 2	**5/50**	**5**	**---**
Measurement uncertainty: < ± 5 %				
Test Remarks				

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.[1]**

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.5.2 Surge voltages

Requirements for surges on AC input / output ports with a direct AC connection			
Test Voltage	**Test Voltage**	**T_s/T_r**	**Test Method**
kV	**type**	**µs**	**Basic Standard**
±1	line to line	1.2/50	IEC 61000-4-5
±2	line to ground	1.2/50	

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results evaluation for surges on AC input / output ports with a direct AC connection in accordance with EN 61000-4-5			
Test Voltage Level	**Test Voltage**	**T_s/T_r**	**Performance**
kV	**type**	**µs**	**Criterion**
±2	**Line to Ground**	**1.2/50**	**---**
±1	**Line to Line**	**1.2/50**	**---**
Measurement uncertainty: < ± 2 %.			
The above test is repeated for the following phase angles: 0°, 90°, 180°, 270°			
Test remarks:			

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.**[1]

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.5.3 Conducted RF signals

Requirements for radio frequency on AC input / output ports with a direct AC connection				
Frequency Range	**Test Voltage**	**Modulation**		**Test Method**
MHz	**V**	**%**	**Type**	**Basic Standard**
0.15 – 80	3	80 (1 kHz)	AM	EN 61000-4-6
Where this test is not carried out on any port because the manufacturer declares that it is not intended to be used with cables longer than 3 m, a list of ports, which were not tested for this reason, shall be included in the test report				

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results evaluation for radio frequency on AC input/output ports with a direct AC connection in accordance with EN 61000-4-6				
Frequency Range	**Test Voltage**	**Modulation Depth**	**Modulation**	**Performance**
MHz	**V**	**%**	**Type**	**Criterion**
0.15 – 80	**3**	**80 (1 kHz)**	**AM**	**---**
Measurement uncertainty: < ± 2 %.				
Test Remarks				

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.**[1]

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.6 Limits for class A equipment

7.6.1 Conducted emissions according to CISPR 11

Limits for conducted emissions of Class A equipment			
Frequency Range	**Quasi Peak Limit**	**Average Limit**	**Test Method**
MHz	**dBµV**	**dBµV**	**Standard**
0.15 MHz to 0.5 MHz	79	66	EN 55011
> 0.5 MHz to 5 MHz	73	60	
> 5 MHz to 30 MHz	73	60	
NOTE1: The lower limit shall apply at the transition frequencies. NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50 MHz			

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results for conducted emissions of Class A equipment in accordance with EN 55011						
Frequency	**Quasi Peak Value**	**Quasi Peak Limit**	**Margin**	**Average Value**	**Average Limit**	**Margin**
MHz	**dBµV**	**dBµV**	**dB**	**dBµV**	**dBµV**	**dB**
---	---	---	---	---	---	---
---	---	---	---	---	---	---
---	---	---	---	---	---	---
---	---	---	---	---	---	---
---	---	---	---	---	---	---
---	---	---	---	---	---	---
---	---	---	---	---	---	---
Measurement uncertainty < ± 2 dB						
Test Remarks						

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.**[5]

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.6.2 Radiated emissions according to CISPR 11

Environmental conditions during the test		
Temperature: 19 °C	Air pressure: 982 hPa	Rel. humidity: 63 %
Operating mode		
EUT in running order		

Limits for radiated disturbance of Class A equipment at the measuring distance of 10 m		
Frequency Range	**Quasi-Peak Limits**	**Test Method**
MHz	**dBµV/m**	**Standard**
30 to 230	40	EN 55011
230 to 1000	47	
NOTE: The lower limit shall apply at the transition frequencies		

Test results for radiated disturbance at a measuring distance of 10 m	
Frequency	**Quasi Peak value**
[MHz]	**[dB(µV/m)]**
143.90	35.8
144.15	30.8
145.50	26.9
153.60	32.1
160.90	34.0
180.85	25.8
183.80	30.7
186.60	28.1
189.60	30.7
224.82	35.4
378.42	19.5
386.42	24.1
Measurement uncertainty: < ± 4 dB	

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~ *

Further test results are attached	**Yes**	~~No~~	Page no.: 104-105

N.t.* See clause 8: additional information to the test report

7.7 Limits for class B equipment

7.7.1 Conducted emissions according to CISPR 11

Limits for conducted emissions of Class B equipment			
Frequency Range	**Quasi Peak Limit**	**Average Limit**	**Test Method**
MHz	**dBµV**	**dBµV**	**Standard**
0.15 MHz to 0.5 MHz	66 – 56	56 - 46	EN 55011
> 0.5 MHz to 5 MHz	56	46	
> 5 MHz to 30 MHz	60	50	
NOTE1: The lower limit shall apply at the transition frequencies. NOTE2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50 MHz			

Environmental conditions during the test		
Temperature: 20 °C	Air pressure: 987 hPa	Rel. humidity: 70 %
Operating mode		
EUT in running order		

Test results for conducted emissions of Class B equipment in accordance with EN 55011 (Line N)						
Frequency	**QP Value**	**QP Limit**	**Margin**	**AV Value**	**AV Limit**	**Margin**
MHz	**dBµV**	**dBµV**	**dB**	**dBµV**	**dBµV**	**dB**
3.645	**32**	**56**	**24**	**	---	---
6.148	**39**	**60**	**21**	**	---	---
6.262	**40**	**60**	**20**	**	---	---
6.487	**39**	**60**	**21**	**	---	---
6.827	**37**	**60**	**23**	**	---	---
7.395	**36**	**60**	**24**	**	---	---
10.887	**42**	**60**	**18**	**	---	---
11.164	**38**	**60**	**22**	**	---	---
13.003	**37**	**60**	**23**	**	---	---
13.268	**39**	**60**	**21**	**	---	---
13.534	**40**	**60**	**20**	**	---	---
13.798	**41**	**60**	**19**	**	---	---
16.313	**42**	**60**	**18**	**	---	---
19.228	**49**	**60**	**11**	**	---	---
22.146	**42**	**60**	**18**	**	---	---
24.000	**48**	**60**	**12**	**	---	---
24.730	**43**	**60**	**17**	**	---	---
Measurement uncertainty < ± 2 dB						
Test Remarks						
****The average limit is not met when using a quasi-peak detector, therefore measurement with the average detector is unnecessary.**						

Test results for conducted emissions of Class B equipment in accordance with EN 55011 (Line L)						
Frequency	**QP Value**	**QP Limit**	**Margin**	**AV Value**	**AV Limit**	**Margin**
MHz	**dBµV**	**dBµV**	**dB**	**dBµV**	**dBµV**	**dB**
3.645	**31**	**56**	**25**	**	---	---
6.148	**38**	**60**	**22**	**	---	---
6.262	**40**	**60**	**20**	**	---	---
6.487	**39**	**60**	**21**	**	---	---
6.827	**37**	**60**	**23**	**	---	---
7.395	**36**	**60**	**24**	**	---	---
10.887	**43**	**60**	**17**	**	---	---
11.164	**41**	**60**	**19**	**	---	---
13.003	**37**	**60**	**23**	**	---	---
13.268	**39**	**60**	**21**	**	---	---
13.534	**40**	**60**	**20**	**	---	---
13.798	**41**	**60**	**19**	**	---	---
16.313	**43**	**60**	**17**	**	---	---
19.228	**49**	**60**	**11**	**	---	---
22.146	**42**	**60**	**18**	**	---	---
24.000	**48**	**60**	**12**	**	---	---
24.730	**42**	**60**	**18**	**	---	---
Measurement uncertainty < ± 2 dB						
Test Remarks						
****The average limit is not met when using a quasi-peak detector, therefore measurement with the average detector is unnecessary.**						

Test cables used	K30
Test equipment used	429, 428, 272, 72

The equipment passed the conducted tests	**Yes**	~~No~~	~~N.t.~~ *

Further test results are attached	**Yes**	~~No~~	Page no.: 106-107

N.t.* See clause 8: additional information to the test report

7.7.2 Conducted emissions according to IEC 61000-3-2 and IEC 61000-3-3

7.7.2.1 Conducted emissions according to IEC 61000-3-2

Limits for Class A equipment		
Harmonics Order	**Maximum Permissible Harmonic Current**	**Test Method**
n	**A**	**Standard**
Odd harmonics		EN 61000-3-2* EN 61000-3-12*
3	2.30	
5	1.14	
7	0.77	
9	0.40	
11	0.33	
13	0.21	
$15 \leq n \leq 39$	0.15 x 15/n	
Even harmonics		
2	1.08	
4	0.43	
8	0.30	
$8 \leq n \leq 40$	0.23 x 8/n	
*Input current per phase ≤ 16 A EN 61000-3-2 applies | *Input current per phase > 16 A EN 61000-3-12 applies		

Limits for Class B equipment		
Harmonics Order	**Maximum Permissible Harmonic Current**	**Test Method**
n	**A**	**Standard**
Odd harmonics		EN 61000-3-2* EN 61000-3-12*
3	2.30 x 1.5	
5	1.14 x 1.5	
7	0.77 x 1.5	
9	0.40 x 1.5	
11	0.33 x 1.5	
13	0.21 x 1.5	
$15 \leq n \leq 39$	0.15 x 15/n x 1.5	
Even harmonics		
2	1.08 x 1.5	
4	0.43 x 1.5	
8	0.30 x 1.5	
$8 \leq n \leq 40$	0.23 x 8/n x 1.5	
*Input current per phase ≤ 16 A EN 61000-3-2 applies | *Input current per phase > 16 A EN 61000-3-12 applies		

N.t.* See clause 8: additional information to the test report

Limits for Class C equipment		
Harmonics Order	**Maximum Permissible Harmonic Current Indicated In Per Cent Of The Basic Current**	**Test Method**
n	**A**	**Standard**
2	2	EN 61000-3-2* EN 61000-3-12*
3	30 λ**	
5	10	
7	7	
9	5	
(only odd harmonics) 11 ≤ n ≤ 39	3	
** λ is the power factor of the circuitry *Input current per phase ≤ 16 A EN 61000-3-2 applies | *Input current per phase > 16 A EN 61000-3-12 applies		

Limits for Class D equipment			
Harmonics Order	**Maximum Permissible Harmonic Current**	**Maximum Permissible Harmonic Current**	**Test Method**
n	**mA / W**	**A**	**Standard**
3	3.4	2.30	EN 61000-3-2* EN 61000-3-12*
5	1.9	1.14	
7	1.0	0.77	
9	0.5	0.40	
11	0.35	0.33	
(only odd harmonics) 13 ≤ n ≤ 39	3.85/n	0.15 x 15/n	
*Input current per phase ≤ 16 A EN 61000-3-2 applies | *Input current per phase > 16 A EN 61000-3-12 applies			

N.t.* See clause 8: additional information to the test report

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results for Class A / B equipment in accordance with EN 61000-3-2 / EN 61000-3-12			
Harmonics Order	**Measured Harmonic Current**	**Limit**	**Margin**
n	**A**	**A**	**A**
Odd harmonics			
3	---	---	---
5	---	---	---
7	---	---	---
9	---	---	---
11	---	---	---
13	---	---	---
$15 \leq n \leq 39$	---	---	---
Even harmonics			
2	---	---	---
4	---	---	---
8	---	---	---
$8 \leq n \leq 40$	---	---	---
Measurement uncertainty: < ± 1.0 %			
Test Remarks			

Test results for Class C / D equipment in accordance with EN 61000-3-2 / EN 61000-3-12			
Harmonics Order	**Measured Harmonic Current**	**Limit**	**Margin**
n	**% / mA / W / A**	**% / mA / W / A**	**% / mA / W / A**
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
---	---	---	---
Measurement uncertainty: < ± 1.0 %			
Test Remarks			

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.**[8]

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.7.2.2 Conducted emissions according to IEC 61000-3-3

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results for Voltage fluctuations and flicker in accordance with EN 61000-3-3 / EN 61000-3-11			
Phenomenon	**Measured Values**	**Limit**	**Margin**
Short term flicker	---	1.0 XX	---
Long term flicker	---	0.65 XX	---
Voltage fluctuation d(t)	---	3.3 % for more than 500 ms	---
Relative steady voltage deviation dc	---	3.3 %	---
Maximum relative voltage fluctuation d_{max}	---	4 % / 6 % / 7 %	---
Measurement uncertainty: < ± 0.2 %			
Test Remarks			

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.[8]**

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

7.7.3 Radiated emissions according to CISPR 11

Limits for radiated disturbance of Class B equipment at the measuring distance of 10 m		
Frequency Range	**Quasi-Peak Limits**	**Test Method**
MHz	**dBµV/m**	**Standard**
30 to 230	30	EN 55011
230 to 1000	37	
NOTE: The lower limit shall apply at the transition frequencies		

Environmental conditions during the test		
Temperature: --- °C	Air pressure: --- hPa	Rel. humidity: --- %
Operating mode		

Test results for radiated disturbance at a measuring distance of 10 m	
Frequency	**Quasi Peak value**
[MHz]	**[dB(µV/m)]**
---	---
---	---
---	---
---	---
---	---
---	---
Measurement uncertainty: < ± 4 dB	

Test cables used	---
Test equipment used	---

The equipment passed the conducted tests	~~Yes~~	~~No~~	**N.t.**[6]

Further test results are attached	~~Yes~~	**No**	Page no.:

N.t.* See clause 8: additional information to the test report

8. Additional information to the test report

N.t.[1]	Not tested, because the EUT has no corresponding port
N.t.[2]	Not tested, because the EUT has no lines inside of a building > 30 m or lines leaving a building
N.t.[3]	Not tested, because the EUT has no lines > 3 m
N.t.[4]	Not tested, because the EUT is not magnetically sensitive
N.t.[5]	Not tested, because the EUT is not Class A equipment
N.t.[6]	Not tested, because the EUT is not Class B equipment
N.t.[7]	Not tested, because not applicable for this type of device
N.t.[8]	Not tested, because not ordered

9. List of test equipment

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Vacumeter - 0–1999 mbar |± 0.3 % ± 1 digit	Ebro - VM 2000	2a	09/17
LF-Generator - 0 – 25 MHz	Rohde & Schwarz - SPN	4a	03/18
Low Noise Signal Generator 10 kHz – 5.4 GHz | -144 dBm – +13 dBm	Marconi 2042	6	03/18
Power Meter 100 kHz – 50 GHz | -70 – +44 dBm (100 pW -	Hewlett Packard 436 A	12a	06/18
Measurement – Transceiver AM / FM | Ton Generator | Broadband discriminator	Schomandl FD530	13	---
Frequency Counter Accessory FD530 - 1 Hz - 12 MHz	Schomandl - FZ-1	13a	---
K-Band Attenuator - 18- 27 GHz	Philips - PM 7100QA	15b	---
Waveguide Power Sensor 26.5 GHz – 40 GHz | -70 – -20 dBm	Hewlett Packard HP R8486 A	16a	---
Modulation Meter 50 kHz–2.32 GHz | -25 – +30 dBm | 50Ω N	Marconi 2305	17	---
Field strength measuring Accessories 9 kHz –30MHz | 146 dBµV/m	Schwarzbeck FMZB 1516	23	05/19
Switch - 9 kHz –1000MHz | 0–100 dB	Auth Nachritent - 1S63	26a	11/18
DC Power Supply - 0–20 V | 0–10 A	Rohde & Schwarz - NGR 20	27	---
Programmable Power Supply	Fluke - PM 2813	28a	---
DC Power Supply	Heinzinger - TNs 15-300	29	---
DC Power Supply - 70V DC | max. 3.5A	Statron - 3206	30	---
AC Microvoltmeter 5 Hz – 600 kHz | -110 – + 10 dBm | Zi : 10 MΩ || 20	Hewlett Packard 3410 A	31	---
Signal Generator 0.1 – 2060 MHz | +13 dBm – -143.5 dBm | <±1.5 dB	Hewlett Packard 8657B	32a	---
Insertion Unit 9 kHz – 2000 MHz | 10V | 50 Ω	Rohde & Schwarz URY-Z2	34a	02/17
50 Ω – 75 Ω Impedance matching pad DC – 500 MHz | 5.7 ± 0.5 dB | VSWR: 1.35	Pasternack Ent. PE7028	36a	04/18
Impedance matching pad DC – 500 MHz | 5.7 ± 0.5 dB | VSWR: 1.35	Pasternack Ent PE7028	37a	04/18
AF Transformer	Rohde & Schwarz - TS8910	38a	---

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Sound Generator	Schomandl - SG 1	40	---
Near Field Probe Set 100 kHz–3 GHz | N.F.: 3.5 dB | + 12 dBm	EMCO 7405	41	---
RF Current Probe 9 kHz – 30 MHz | CISPR 16- 1	Rohde & Schwarz ESH2-Z1	42	02/19
VHF- Current Probe 9 kHz – 600 MHz| –33 dBµA – +117 dBµA | 50 A | -	Rohde & Schwarz ESV-Z1	43	02/19
Passive Test Probe - 9 kHz – 30 MHz	Dudde - VDE 0876	45	05/18
EFT / Burst – Generator - Up to 125 kHz | 5 kV	Schlöder GmbH - SFT 1400	46a	05/17
Line Impedance Stabilization Network 9 kHz – 30 MHz | 50Ω | 50 µH / 250 µH | 10 A	EMCO 3810/2 LISN	49b	08/17
Coaxial Fixed Attenuator DC – 12.4 GHz | |3 ± 0.3 dB | Pin_max.: 2 Wavg /	Hewlett Packard 8491 A	54	06/18
Digital-Hygro-Thermometer -20 °C - +70.0 °C | %RH: 10 %RH- 95 %RH	Greisinger GFTH 95	57a	03/17
Passive Test Probe	RFT - TK 11	58a	05/18
Coaxial Fixed Attenuator DC – 1 GHz | 30 dB | 50Ω BNC | 1W	Texscan HFP50/30	59	04/18
Fixed Attenuator - DC – 12.4 GHz | 10 dB | 50Ω N | 2 W	Tektronix - 011-0085-00	61	01/17
Fixed Attenuator - DC – 4 GHz | 20 dB | 50Ω N | 10 W	Radiall	62	12/16
Fixed Attenuator - 0 – 500 MHz | 40 dB | 50Ω Coaxial | 1W	Mini-Circuits - CAT-40	63	04/18
Step Attenuator - DC – 12.4 GHz | 0 – 60 dB	Narda - Model 710	64	---
Bandpass Filter 41 0 MHz – 41 MHz | 30W | 54 MHz –1 GHz | 1W	Schomandl BN 86871	66	11/18
Bandpass Filter 174 0 MHz –174 MHz | 30W | 240 MHz – 1 GHz | 1W	Schomandl BN 86873	67	11/18
Bandpass Filter 470 0 MHz – 470 MHz | 30 W | 600 MHz – 1 GHz | 1W	Schomandl BN 86874	68	11/18
Notch Filter - 15 – 90 MHz	Schomandl - SF 1	69	---
Notch Filter - 210 W | 500 MHz	Schomandl - SF 3	70	---
8 Wire Impedance Stabilisation Network 150 kHz – 30 MHz | I.L. 1 – 2.5 dB | 150 Ω ± 20 Ω	Schwarzbeck CAT5 8158	71a	01/18
Artificial Mains Network 1 9 – 150 kHz / 150 kHz – 30 MHz | 10 dB	RFT NNB 11	72	08/16

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Dual Artificial Mains Network - 9 kHz – 30 MHz	Dudde	73a	09/17
Noise Signal Generator 2 Hz – 200 kHz | 50Ω | 0 – -60 dB |	Robotron 03004	74a	---
Miniature Fixed Attenuator DC – 6 GHz | 6 dB | 50Ω SMA | VSWR : 1.2 | 2 W	Narda 4780-6	75a	04/18
Power Sensor 10 MHz – 18 GHz | 10nW – 500mW	Rohde & Schwarz NRV-Z2	76a	02/17
VHF-Half - Wave Tuned Dipole Antenna 30 –300 MHz | 10 W | N-Connector	Schwarzbeck VHA 9103	80	04/17
UHF- Half - Wave Tuned Dipole Antenna 300 – 1000 MHz | 10 W | N	Schwarzbeck UHA 9105	81	04/17
Double Ridged Broadband Horn Antenna 1.25 – 12 GHz | 6 – 16 dBi | 25 – 34dB/m	Schwarzbeck BBHA 9120-B	83	09/20
Test Sphere - 50 mm | 500 g	Dudde	84a	---
RF condenser Microphone - 1 Hz | Subsonic	Sennheiser - MKH 110	86	---
Temperature Chamber – -60 °C – +70.0 °C	Brabender - TTE 32/40H	87	04/17
Turntable - 0° – 360°	Dudde	89	---
DC-Block - 50 Ω | I.L. 0.1 dB | VSWR: 1.3	Microlab - HR-D18	90b	06/18
Dummy Load Antenna - 9 kHz – 1.5 GHz | 50 Ω	Spinner - BN 6944-00	91	02/17
Dummy Load Antenna - 60 Ω | 20 W	Spinner - BN 2766-B	92	---
T-Section - 50 Ω	Rohde & Schwarz BN 42441/50	93	06/18
Tunable Band pass-Filter - N	Texscan - 5VF500/1000	97	---
Tunable Band pass-Filter	Rohde & Schwarz HA 70/1	98	---
Tunable Bandpass-Filter	Rohde & Schwarz HS 9041	99	---
Termaline Wattmeter - DC – 1.5GHz|50Ω|VSWR:1.2| ± 10%	BIRD	101	01/17
Open Area Test Site - 9 kHz – 1.0 GHz | CISPR 16	Dudde	103	09/17
Open Area Test Site - Substitution	Dudde	104	05/16
Digital Oscilloscope - BW: 1GHz – 1.9GHz | 4 Channel	LeCroy - LC534AL	105b	---

m. dudde hochfrequenz-technik **Rottland 5a** **D-51429 Bergisch Gladbach/ Germany** **Tel: +49 2207-96890** **Fax +49 2207-968920**

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
EMC Test Table	HAEFELY	106	---
Step Attenuator - DC – 1.0 GHz | 1dB –80dB	Texscan	107	---
XY Plotter - 5 – 500 mV /cm | ± 0.3% | Ri : 1 MΩ	Hewlett Packard - 7035 B	109	---
Measuring Terminators - 4 – 8 – 16 Ω	Dudde	111	---
ESD Simulator - Air: 0.2 – 16.5 kV | Contact: 0.2 – 9.0 kV	Schlöder GmbH - SESD 200	112a	11/17
Sweep Generator - 18 – 26.5GHz | 50 Ω | VSWR:2.0	Wiltron - 6636a	113a	---
RF-Power Amplifier 0.8 – 1000 MHz | 50 Ω BNC | G: 40 dB | Pout: 3 W	ENI Model 603L	114b	---
Capacitive - Coupling link	Schaffner - SL 400-071	115	---
Passive probe	RFT - TK 11	117a	05/18
Passive probe	RFT - TK 11	118a	05/18
Fitting Transformer - 10 – 150 kHz | 50Ω / 150Ω	RFT - TG11	119a	---
Digital Oszilloscope - 500 MHz	Hewlett Packard - 54520C	120a	03/17
Open Area Test Site - 1 – 6 GHz | CISPR 16	Dudde	122	05/17
RF-Power Amplifier 250 kHz – 150 MHz | G: 55± 1.5 dB | 100 W | VSWR:	ENI Model 3100LA	123	---
Coupling-Decoupling Network	E Fiedler - CDN 801 R6 SP	126	---
AM / FM Signal Generator 10 kHz –1 GHz |50 N | -127 – + 6 dBm | VSWR : <	Marconi 2022	127	---
Dummy Load - 0 – 1000 MHz | 50 N | 30 W	Radiall	128b	09/17
T-Section - 600 Ω	Dudde	129	---
Microwave Frequency Counter	Hewlett Packard - 5351A	130	10/18
Digital Sound Level Meter - 30 Hz – 12 kHz | ± 2 dB	Chauvin Arnoux - CDA 830	133	---
Laboratory DC Power Supply 0 – 30 V DC | 0 – 6 A DC | BW: 5 Hz – 1 MHz	Sorensen LM 30-6	134a	---
Coupling Network (Mic-input)	Dudde	135	---

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Signalgenerator - 0.1 – 1000 MHz | AM / FM	Rohde & Schwarz - SMG	136	04/19
Fixed Coaxial Attenuator - DC – 4 GHz | 3 dB | 5 W	SUHNER - 6803/17/A	137	03/19
RF Power Meter 30 kHz – 46 GHz | -70 dBm (100 pW) – +44 dBm	Marconi 6960B	139a	06/18
RF Power Sensor 10MHz –20.0GHz | 50Ω N | -30dBm – +20dBm	Marconi 6910	140	06/18
Thermocouple Power Sensor 100 kHz – 2 GHz | 75 Ω N | 1 uW – 100 mW	Hewlett Packard 8483A	143b	07/18
Digital Multimeter 1200 V / 20 A | Accuracy: 0.03% | Resl.: 10uV / 10nA	Goodwill Instek GDM-8045G	144	08/17
Coaxial Fixed Attenuator DC – 1 GHz | 10 dB | 50Ω BNC | 1W	Texscan FP-50	146	09/17
Attenuator 20 dB - 9 kHz – 1 GHz | 20 dB |10 W	Trilithic	148a	02/19
Fixed Attenuator 0 – 500 MHz | 40 dB | 50Ω Coaxial | 1W	Mini-Circuits CAT-40	149	04/18
Fixed Attenuator 0.01 – 3 GHz | 10 dB | 50Ω Coaxial | 5W	Narda 771-10	150	12/16
Fixed Attenuator - 9 kHz – 1 GHz | 3 dB | 60 W	Trilithic - HFP 560/3	152	01/17
Fixed Attenuator - 10 MHz – 1 GHz | 3 dB | 150 W	Trilithic - HFP 5150/3	153	01/17
Adjustable-Isolation Transformer - 0 - 250 V AC | 1.6 A	RFT - LTS 002	154a	---
Adjustable transformer	Schunt+Ben	155	---
RF Current Injection Clamp 0.15 – 1000 MHz | 150 Ω | k = -5dB	Lüthi GmbH EM 101	156	07/17
RF Current Transformer - 10 kHz – 30 MHz	RFT - SMZ 11	157	---
Unbalanced Voltage Supply - 8 ± 0.5 V DC | 12 – 18 mA	Sennheiser - MZN 16-x	158	---
Absorbing Clamp MDS 30MHz – 1GHz | 50Ω BNC | 628mm x 105mm x	Lüthi GmbH MDS-21	160	11/18
Volt & RF Power Meter Measurement range V: up to 3 GHz | RF Power up to	Rohde & Schwarz URV35	161	04/19
Insertion Unit 100 kHz – 3 GHz | 50 Ω | 2 mV – 100 V	Rohde & Schwarz URV5-Z4	162	04/19
Coaxial RF Termination - 0 – 1000 MHz | 50 Ω | 35 W	Telewave Inc. - TWL 35	164	11/18
Coaxial RF Termination - 0 – 1000 MHz | 50 Ω | 60 W	Telewave Inc. - TWL 60	165	11/18

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Pre-amplifier - 100 kHz – 1.3 GHz | 50Ω | 22 dB	Hewlett Packard - 8447 E	166a	07/16
Bilog Antenna - 30 - 1000 MHz | 50Ω | 150W	CHASE - CBL6111	167	06/20
Double Ridged Broadband Horn Antenna 2 – 18 GHz | 10 – 16 dBi | 50 – 100 W	Schwarzbeck BBHA 9120-C	169	09/20
Fixed Attenuator - 9 kHz – 1 GHz | 10 dB | 10 W	Trilithic	170	02/19
Spectrum Analyzer - 9 kHz – 18 GHz | BW = 28 MHz	Rohde & Schwarz - FSL 18	171a	09/17
Broadband RF-Power Amplifier - 250 kHz – 300MHz | 3 W	ENI - Model 403L A	172	---
Automotive Artificial Mains Network - 0.15 – 80 MHz	Reimesch - NNB-1	173	---
Isotropic E-field Meter - 1.8 MHz – 30 MHz	Schwarzbeck - IEMH 1601	174	---
Eletro-Magnetic Fieldmeter 100 kHz – 2.5 GHz | E: 0.1 – 200 V/m | Pden: 0.1 – 2	Chauvin-Arnoux C/A 43	175	---
Fixed Attenuator - DC – 1.5GHz | 50Ω N |6 dB | 100 W	Bird - Mod/ 8343-060	177	01/17
RF-Power Amplifier - 100 – 520 MHz | 50 W	EATON - Model 3552B	179	---
Burst – Generator 200V – 4,800 V | 50 Ω ± 20% | f : 0.1kHz – 1,000	EM – Test AG EFT 200	180	---
Micro Pulse Generator U = 50V – 1100V ± 10% | 2 Ω, 4 Ω, 10 Ω, 20 Ω, 30	EM – Test AG MPG 200	181	09/17
Fixed Attenuator - 3 dB DC -12.4GHz	Narda - TB 50902-1	183a	11/17
Fixed Attenuator - 6 dB DC -12.4GHz	Narda - TB 50901-2	183b	11/17
Fixed Attenuator - 10 dB DC -12.4GHz	Narda	183c	11/17
Fixed Attenuator - 20 dB	Hewlett Packard - 8491a	183d	11/17
Rotary Step Attenuator DC – 2 GHz | BNC | 1 - 10 dB | Pmax: 1 Wavg / 500	Texscan TA – 50	184	02/17
Signalgenerator 0.0002 Hz – 20 MHz | 30 Vp-p | AM / FM / PM /	Wavetek 148 A	185	---
Hand Held Programmer	GR Electronics Pocket VDU	187	---
Direct Reading Variable Attenuator 18 – 50 GHz | 0 – 20dB | VSWR: 1.2	Waveline 1005A	191b	---
Sweep Generator 26.5 – 40 GHz | Pout : > 1 mW | Full Sweep / CW	Wiltron 6640A	192a	---

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Hand-held Component Tester - 0.1 pF-20 mF | 0.1 Ω – 20 MΩ	BK Precision - 815	193	---
Voltage Regulator - 0.5 kVA | Single-phase	Pro Star - TDGC2	196a	---
Sound Generators	Schomandl - 86110	197	---
Waveguide Mixer	Tektronix - WM 490-2	199a	---
Measurement Microphone	MB - MP NM 550	200a	---
Bias Network	Rohde & Schwarz - ZPV-Z6	202	---
Bias Network	Rohde & Schwarz - ZPV-Z6	203	---
Feed-Through Adapter	Rohde & Schwarz - ZPV-Z1	204	---
Feed-Through Adapter	Rohde & Schwarz - ZPV-Z1	205	---
Feed-Through Adapter	Rohde & Schwarz - ZPV-Z2	206	---
DC Power Supply - 0 – 40 V | 0 – 0.5 A	Hewlett Packard - 6102A	207	---
Variable Isolation Transformer - 250 V AC | 10A	RFT - LSS 010	209	---
General Purpose Oscilloscope BW:100 MHz | 2 ns /div | 2 Channels	Hewlett Packard 54600 A	210	---
Band Pass Filter 310 MHz | 0.3 dB	Digital Microwave DMC-110746-001	212	03/19
Signalgenerator 10 kHz – 2.4 GHz | 50Ω N | - 137 – +13 dBm |	Marconi 2024	213	03/18
Fixed Attenuator - 20 dB 2 W – 18 GHz	Spectrum - DG-0018-2051	214	11/17
Miteq Amplifier - 26.5 – 40 GHz | G: 32 dB	Miteq	223a	02/17
Coaxial Attenuator DC – 18 GHz | Pin: 0.5 – 2 W | I.L.: 3 / 6 / 10 / 20 dB	Spectrum DG-0018-2051	225	04/18
DC Power Supply - 0 – 60 V |0 – 10 A	Hewlett Packard - 6034L	226	---
2.4 GHz Notch Filter - 10 MHz – 8 GHz | @ 2. 4 GHz : 10 dB	Dudde	227	---
RF Power Sensor 10 MHz – 20 GHz|-70 – 0 dBm | Pi-max: 26	Marconi 6920	228	10/17
Radiocommunication Service Monitor 0.4 – 1000 MHz | +47 dB – -47 dBm | Span: 0 – 50	Rohde & Schwarz CMS 54	229	06/17

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Fixed Attenuator - 2 W – 18 GHz 10 dB	Spectrum - DG-0018-2051	230	01/17
Dummy Load - 0 – 1000 MHz | 5 W	TWL - TWL-5	231a	11/18
Positioning Controller - 0 – 360°	Rohde & Schwarz - HCC	232	---
Antenna Pole - 100 – 400 cm	Rohde & Schwarz - HCM	233	---
Attenuator Wave Gate - 0 – 95dB	Spinner - BN6686	234b	---
Immunity Test Probe - 0 – 4.8 kV	EM TEST - ITP	235	---
DC Power / Wattage Meter DC input: 5A, 1A, 75mV, 100V, 500V	H&B Wattavik	238	---
Multimeter	Metrawatt - Multiscript 2S	239	---
Analog Multimeter 100 mV – 1000 V | 30 µA – 10 A	Metrawatt Unigor A43P	240	---
Voltage Interruption Simulator AC/DC - Interruptions – Dips max. 280V / 360	Schlöder GmbH VIS 1700	241a	02/18
UHF Termination - DC – 2 GHz | 50Ω | 100 W	Rohde & Schwarz - RAU	243	01/17
Measuring Shunt Resistor - 50 mV | 50A DC	Metrix - HA0512	247	---
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	248	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	249	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	250	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	251	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	252	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	253	11/18
Attenuator: DC – 1 GHz | 5.7 dB | 50 – 75 Ω	Trilithic - ZM-57	254	---
Attenuator: DC – 1 GHz | 5.7 dB | 50 – 75 Ω	Trilithic - ZM-57	255	---
Pre-amplifier 100 kHz – 400 MHz | Gi: 20 dB | N.F.: < 7 dB	Hewlett Packard 8447 A	256	02/19
Power Sensor - 40 GHz	Marconi - 6914	258	06/18

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Thermohygrometer – -10 – +60 °C | 0 – +100 %	Testo AG - testo 625	259a	08/17
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	260	11/18
Coupling Decoupling Network 0.1 MHz – 230 MHz | 150 Ω | 10 dB	MEB KEN-M 2 /M 3	264	10/17
Vertical Coupling Plate	Dudde	265	---
NF-Assessment Filter	H/W/Schulte	266	04/19
DC Power Supply - 0 – 20 V DC | 5 A DC	Hewlett Packard - 6632B	268a	---
Artificial Hand - VDE 0876 Part 1	Dudde	270	---
Volt & RF Power Meter Measurement range V: up to 3 GHz | RF Power up to	Rohde & Schwarz URV35	271	05/17
Pulse Limiter 0 Hz – 30 MHz |10 dB	Rohde & Schwarz ESH3-Z2	272	02/19
Low Pass Filter DC – 520 MHz | 50Ω SMA | 0.5 W | VSWR: 1.7	Mini-Circuits SLP550	273	05/18
Low Pass Filter DC – 520 MHz | 50Ω SMA | 0.5 W | VSWR: 1.7	Mini-Circuits SLP550	274	05/18
Fixed Attenuator - DC – 18 GHz | 30 dB	MTS	275	11/17
Fixed Attenuator - DC – 18 GHz | 30 dB	MTS	276	02/17
Broadband Horn Antenna 14 – 40 GHz | 15 – 20 dBi | 10 – 25 W	Schwarzbeck BBHA 9170	280	08/17
Broadband Horn Antenna 14 – 40 GHz | 15 – 20 dBi | 10 – 25 W	Schwarzbeck BBHA 9170	281	08/17
RF Small Signal Power Amplifier 0.9 GHz - 2/8 GHz | Gi: 27 dB	Avantek SFT 84-2152	282	---
Harmonic Flicker Analyzer 600Vrms / 900Vpeak | L1 / L2 / L3	Schlöder GmbH HFA 3000	283	---
Double Ridged Broadband Horn Antenna 0.5 – 5.5 GHz | -6 – +13 dBi	Schwarzbeck BBHA 9120 A	284	09/20
I/O Lines Coupling-Decoupling Network 4 kV | 4 -8 I/O Lines | Max. 50 V / 1-4A	EM – Test AG CNV 504 - 508	285	---
Power Sensor 10MHz – 26.5GHz | -30dBm – +20dBm |VSWR: 1.4	Marconi 6913	286	10/17
Adjustable-Isolation Transformer - 0 – 250 V Ac | 1.6 A	RFT - LTS 002	287	---
LF-Power Amplifier 20 Hz – 20 kHz | 40 W | 8 Ω | THD: 0.08%	ONKYO A-9211	288	---

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Coaxial T Connector - DC – 1000 MHz | 50 Ω N	Mera-Tronik - V40.31	291	---
V-Band Mixer - 50 – 75 GHz | C.L. 30 dB | WR15	Anritsu - MA2744A	295a	09/17
Dummy-Load - 50Ω	Texscan	297	---
APC 3.5 Precision Termination DC – 34 GHz | 50 Ω Coaxial | 2.5 kW | R.L.: 26 dB	Amphenol	298	---
Fixed Attenuator - 0 – 18 GHz | 3 dB | 50Ω Coaxial | 2W	Suhner - 6603.19 AA	299	12/16
RF-Dummy Load - 50 Ω N	Spinner - BN5947	300	12/16
RF-Dummy Load - 50 Ω	Spinner - BN3924c	301	12/16
Passive Probe - 9 kHz – 30 MHz | 2.5 kΩ	RFT - TK 121	302	04/17
RF-Dummy Load - 50 Ω	Texscan	304	12/16
RF-Dummy Load - 50 Ω	Texscan	305	07/17
RF Coaxial Termination - DC – 12.4 GHz | 50 Ω N | 5 W	Sage Labs - 9200	306	---
Broadband Voltage, Level and Power Meter - 9 kHz – 3 GHz	Rohde & Schwarz - URY	307	04/19
Dummy Load 9 kHz – 1 GHz | 50 Ω | N	Hewlett Packard 1250-0256	308a	11/18
RF/Microwave Termination DC – 1 GHz | 50 Ω | Pin max: +30 dBm | VSWR: 1.15	Radiall 404011	309	11/18
Calibration cable - 32 cm	Dudde	310	---
Calibration cable - 89 cm	Dudde	311	---
DC Block Adapter - DC – 2 GHz | 50 Ω	Anritsu - MA8601A	312	12/16
AC Power Source - 260 Vrms / 4.5 Arms | 1000 W | ± 1%	ELGAR - 1001B	314	---
Frequency Counter - 0 – 50 MHz | 1MΩ || 25 pF	Hewlett Packard - 5326A	316	09/17
Shunt - 300A	AEG - 4 90073	317	---
Digital Multimeter - 2 – 1000 V | 10 MΩ ||75 pF	Hameg - HM 8011-3	319	---
4- Way Branched Connector 0 – 1000 MHz | 50 Ω | I.L. 10 dB	Rohde & Schwarz 892228/20	320	10/18

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Test Weight Block - 30 N	Dudde	321a	---
Test Weight Block - 250 N	Dudde	322a	---
Function Generator / Universal Counter 10 MHz |10 VSS | 50 Ω / 0 - 1.6 GHz | 20 - 30 mVrms	Hameg HM8030/HM8021	324	---
RF Amplifier - 0.9 – 2.3 GHz	Dudde	325	04/18
Ohmmeter 0 – 1000 MΩ	Holtzer-Cabot ZM-144 / PSM-2	326	---
Drop Test Surface	---	328a	---
APC 3.5 Precision Termination DC – 34 GHz | 50 Ω Coaxial | 2.5 kW | R.L.: 26 dB	Amphenol	334a	---
Standard Gain Horn Antenna - 0.7 – 4.8 GHz	---	335	---
Standard Gain Horn Antenna - 0.7 – 4.8 GHz	---	336	---
Standard Gain Horn Antenna - 14.3 – 26.9 GHz	---	337	---
Coaxial Directional Coupler	Microwavegear - 519 D	338	---
Spectrum Analyzer - 9 kHz – 2.9 GHz | AC / DC coupled	Hewlett Packard - 8594E	341a	---
Terminator (Dummy Load) DC-18GHz | 25 W	Aeroflex / Weinschel BV 7017	342a	01/18
Dummy-Load - 2 – 18 GHz | 50 Ω | 40 W	Narda - MODEL 367NF	343	12/16
Fixed Attenuator - 0 – 18 GHz | 6 dB | 50Ω Coaxial | 2W	SUHNER - 606.19 AA	344	12/16
2 – 18 GHz | 50 Ω | 40 W - 1 GHz – 18 GHz | Gi : 23 dB	Narda	345	02/18
Impedance Converter - DC – 1.4 GHz | 50 – 75 Ω | 1 W	Suhner - 6001/01A	347	---
Wave Guide Mixer - 40 - 60 GHz | 3 dB Compression -10 dBm	Tektronix - WM490U	349	---
Resistance Load - 5 x 6.8 C | 1100 W	Dudde	350a	07/17
Wave Guide Mixer - 18 – 26.5 GHz | 3 dB Compression -10 dBm	Tektronix - WM 490K	351	---
Wave Guide Mixer - 26.5 - 40 GHz | 3 dB Compression -10 dBm	Tektronix - WM 490 A	352	---
Fixed Attenuator - 0 – 40 GHz | 10 dB | 50Ω Coaxial |	Parzich - 40 AH-10	353	10/18

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Fixed Attenuator - 0 – 20 GHz | 20 dB | 50Ω Coaxial |	Parzich - 40 AH-20	354	10/18
Wave Guide - Coaxial Adapter - 26.5 – 40GHz	Parzich - SN/15	355	---
DC Block Adapter - 0.045 – 26.5 GHz	Hewlett Packard - 11742A	356	04/18
Antenna Probe - 9 kHz – 1 GHz	Rohde & Schwarz	357	---
Voltage Regulator - 0.5 kVA | Single-phase	Pro Star - TDGC2	358a	---
Spectrum Analyzer 9 kHz – 40 GHz | 18 – 110 GHz (external mixers)	Anritsu MS2668C	359a	06/17
DC-BLOCK - DC – 18.0 GHz |50 Ω	Mini Circuits - BLK-18-S+	361	07/18
DC-BLOCK - DC – 18.0 GHz |50 Ω	Mini Circuits - BLK-18-S+	362	07/18
DC-BLOCK - DC – 6.0 GHz |50 Ω	Mini Circuits- BLK-6-N+	365	07/18
Coupling Filter	Haefely - FP 16/3-1	366	---
Insertion Unit 10V |9 kHz 1000 MHz	Rohde & Schwarz URV 5-Z2	367	04/19
RF Probe 0.02 – 1000 MHz | 15V AC	Rohde & Schwarz 395.2680.02	368	04/19
Single Rotary Attenuator DC – 1000 MHz | 0–10 dB | 2 W	JFW Industries Inc. 50R-028	369	03/19
Coaxial Directional Coupler 2– 4GHz | VSWR:1.2 |10 dB:25 dB/20 dB:27 dB/30	Narda 3003-20	370	01/17
Circular Polarized Probe - 1– 12GHz	---	373	---
High Power Fixed Coaxial Attenuator DC – 8.5 GHz |N| 20 dB |Pmax: 150W_{Avg} /5 kW_{Peak} |	Weinschel 49-20-33	374	03/19
Medium Power Fixed Coaxial Attenuator - DC – 18 GHz | N |6 dB | Pmax: 10 WAvg /1 kWPeak |	Weinschel 23-6-34	375	02/17
Attenuator - DC – 8 GHz | 60dB	---	376	10/17
Attenuator - 0 – 18 GHz | 30 dB | 100 W	Weinschel - 6312-30	377	03/19
Oscilloscope - DC – 100 MHz | BW: 20 MHz | 2 Channels	Fluke - PM3082	380a	---
High Power Reactive Probe	Microlab - HZ-A22	382	---
Gain Horn Antenna	Dorado - GH-22-25	383	---

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Gain Horn Antenna	Dorado - GH-15-25	384	---
Gain Horn Antenna	Dorado - GH-10-25	385	---
High Power Signal Generator	Philco - 470A-500	386	---
Precision Adapter - DC – 20 GHz | 50 Ω N | 1 W	Anritsu - 34AKNF50	387	---
Peak Power Sensor DC – 6 GHz | 0 – mW	Rohde & Schwarz NRV-Z31	391	02/17
Test Pattern Transmitter	Müter - CSG 5	392	---
Variable Attenuators - 0 – 10 MHz | 0 - 132 dB	Siemens - D110	393	---
EMF Tester	PCE Group - PCE-G28	394	---
Field Measurement Adapter 0.0 – 30000.0 V~/m | 0.0 – 300.0 µT	Gossen Metrawatt FMA1	395	---
Dummy Load - 18 GHz | 50 Ω	Narda	396	---
Dummy Load - 18 GHz | 50 Ω	Narda	397	---
Field Strength Measurement Kit - 500 kHz – 50 MHz	SAT-Service Schneider	398	02/17
RF Signal Generator 5 kHz – 3 GHz | -144 – +13 dBm | Resolution 0.1 Hz	Rohde & Schwarz SME03	399	02/18
Mini Infrared Thermometer -30°C – 500°C | ±1.5°C	Fluke - 62 Mini	403	---
Absorbing clamp - 30 – 300 MHz | 50 Ω	Lüthi - MDS 20	404	11/18
Coaxial High Pass Filter 185 – 3000 MHz | 50 Ω N | 0.5 W | I.L. : < 1 dB	Mini-Circuits NHP-200	405	05/18
Tri-Log Broadband Antennas 25 MHz – 2 GHz | 50 Ω N | 10 W	Schwarzbeck VULB 9168	406	04/19
4-Way-Power Splitter DC – 2 GHz | 50 Ω SMA | 1 W | I.L.: 12 dB | VSWR:	Weinschel 6503	407	12/16
Band Pass Filter 310 MHz | 0.3 dB	Digital Microwave DMC-110746-001	412	04/19
Insertion Unit 9 kHz – 2000 MHz | 10 V	Rohde & Schwarz URY-Z2	416	09/17
Dummy Load	Amphenol	424	---
Dummy Load	Amphenol	425	---

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Radio Interference Measuring Receiver 10 kHz – 30 MHz | SSB / CW	Schwarzbeck FMLK 1518	428	08/16
Panoramic Adapter for VUMA BW: 20 kHz	Schwarzbeck PAZ 1550	429	---
Interference Measuring Receiver 20 MHz – 1050 MHz | 50 Ω N | PK / AV / QP / CAV /	Schwarzbeck FCVU 1534	430	08/16
Standard Gain Horn Antenna - 17.6 – 26.5 GHz | Gi: 23 dBi	MBMT - K-235	431	09/18
Miteq Amplifier - 18 – 26 GHz	Miteq	433	02/17
Coaxial High Pass Filter 700 – 3000 MHz | 50 Ω N | 0.5 W | I.L.: < 1dB	Mini-Circuits NHP-700	435	05/18
Interference Coupler	Dudde	436	---
Inductive Coil - 660 µH	Dudde	437	---
Inductive Coil - 660 µH	Dudde	438	---
Wide Band Amplifier 1 – 2 GHz | 50 Ω SMA | Gi: 30 dB | Pout-max: +16	Watkins Johnson WJ-5201-77A	439	02/17
Microwave Broadband Amplifier 12 – 28 GHz | 50 Ω SMA | Pin_max.: -20 dBm	Schwarzbeck BBV 9719	443	02/19
Microwave Broadband Amplifier 0.5 – 20 GHz | 50 Ω N / SMA | Pin_max.: -30 dBm	Schwarzbeck BBV 9718	444	03/19
Microwave Log.-Per. Antenna 0.7 – 20 GHz | 50 Ω N | Pin_max.: 50 W | Gi: 8.6 dBi	Schwarzbeck STLP 9148	445a	03/19
IR Digital CCD Video Camera	Conrad - SE-906-1	446	---
Laptop-Power Supply Input 100-240V~ 50-60Hz | Output DC = 18-21V DC	Hama ACHG-07	450	---
Coaxial High Pass Filter 3900 – 9800 MHz | 50 Ω SMA | 7 W | I.L.: < 2 dB	Mini-Circuits VHF-3500+	451	05/18
Coaxial High Pass Filter 1220 – 4600 MHz | 50 Ω SMA | 7 W | I.L.: < 2 dB	Mini-Circuits VHF-1200+	452	05/18
Coaxial High Pass Filter 27.5 – 800 MHz | 50 Ω N | 0.5 W | I.L.: < 1 dB	Mini Circuits NHP-25+	455	05/18
Coaxial High Pass Filter 27.5 – 800 MHz | 50 Ω N | 0.5 W | I.L.: < 1 dB	Mini Circuits NHP-25+	456	05/18
Coaxial Low Pass Filter DC – 22 MHz | 50 Ω BNC | 0.5 W | I.L.: < 1 dB	Mini Circuits BLP-21/4+	457	05/18
Coaxial Low Pass Filter DC – 22 MHz | 50 Ω BNC | 0.5 W | I.L.: < 1 dB	Mini Circuits BLP-21/4+	458	05/18
Dummy Load - 100 Ω - BNC	Dudde	460	---

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
DC-BLOCK - DC – 6.0 GHz |50 Ω	Mini Circuits - BLK-6-N+	462	07/18
Fixed Attenuator - 20 dB | BNC	Spinner	465	04/18
4 Port Junction Box - 10 – 900 MHz | 50 Ω	---	470	---
Adapter	Hewlett Packard - P281B	471	---
Directional Coupler	Narda - 42468-20	472	---
Calibration Noise Source	Rohde & Schwarz BN 4519	473	---
Band Pass Filter 310 MHz | 0.3 dB	Digital Microwave DMC-110746-001	478	04/19
Attenuator - 20 dB SMA	Weinschel - 6500-20	482	04/18
Dummy Load - 50 Ω	---	485	11/18
Dummy Load - 50 Ω	TI-30D	486	11/18
Dummy Load - 50 Ω	TI-30D	487	11/18
Dummy Load - 50 Ω	TI-30D	488	11/18
Dummy Load - 50 Ω	---	489	11/18
Dummy Load - 50 Ω SMA	HRM - 60I	491	01/19
Dummy Load - 50 Ω SMA	---	493	01/19
Dummy Load - 50 Ω SMA	---	494	01/19
Dummy Load - 50 Ω SMA	OSM - 2001 6110/00	495	01/19
Dummy Load - 50 Ω SMA	OSM - 2001 6110/00	496	01/19
Dummy Load - 50 Ω SMA	SC 60-601-0000-31	497	01/19
Dummy Load - 50 Ω SMA	SC 60-601-0000-31	498	01/19
Dummy Load - 50 Ω BNC	Texscan	499	11/18
Dummy Load - 50 Ω BNC	Radiall - 404011	500	11/18

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Harmonic Mixer 60 - 90 GHz | 1 dB compression: -7 dBm | Pin_max.: 0	Rohde & Schwarz FS-Z90	501	05/19
Signal & Spectrum Analyzer 10 Hz - 30 GHz | Level :–60 dBm - 0 dBm	Rohde & Schwarz FSV-30	502	01/19
PLC Test Box	Dudde	503	---
Fixed Attenuator - 0 – 40 GHz | 10 dB | 50Ω Coaxial |2W	Anritsu - 41KC-10	504	12/16
Fixed Attenuator - 0 – 40 GHz | 10 dB | 50Ω Coaxial |2W	Anritsu - 41KC-10	505	12/16
Fixed Attenuator - 0 – 40 GHz | 6 dB | 50Ω Coaxial |2W	Anritsu - 41KC-6	506	12/16
Fixed Attenuator - 0 – 40 GHz | 3 dB | 50Ω Coaxial |2W	Anritsu - 41KC-3	507	12/16
Broadband Horn Antenna 12.4 – 18 GHz | Gain 20 dB	Mid-Century Mic BH 18-SQB-xxx-C-20	508	---
Broadband Dipole Antenna 25 - 80 MHz | 50 Ω | K factor: 15 / 20 dB	Rohde & Schwarz HUF-Z1	509	---
Bit Error Rate Test Set Synchronous & Asynchronous | 0.075 – 19.2 kbps	Hewlett Packard 4925B	510	---
Gain Horn Antenna	Dorado - GH-15-20	511	---
Active Field strength measuring Accessory 10 kHz – 30 MHz | VLF Long-Medium-Short Waves	Schwarzbeck FMZL 1514	513	10/16
Standard Gain Horn Antenna - 1.7 – 2.6 GHz	Narda - Model 645	514	---
Harmonic Mixer 40-60 GHz | 1 dB compression: 0 dBm | Pin_max.:	Rohde & Schwarz FS-Z60	515	05/19
Active Probe BW: 2.5 GHz | 8 Vpk-pk | tr <140 ps | Rin :40 kΩ	Textronix P7225	517-1	---
Active Probe BW: 2.5 GHz | 8 Vpk-pk | tr <140 ps | Rin :40 kΩ	Textronix P7225	517-2	---
Active Probe BW: 2.5 GHz | 8 Vpk-pk | tr <140 ps | Rin :40 kΩ	Textronix P7225	517-3	---
Horn Antenna - 20 dB	Dorado - GH-19	518	---
Horn Antenna - 20 dB	Dorado - GH-28-20	519	---
GaAS FET Amplifier	Avantek - AMT-8006M	520	---
15 MHz Function / Arbitrary Waveform Generator DC – 15 MHz | AM , FM FSK , Burst | 50 Ω	Agilent 33120A	521	---
Surge / Hybrid Generator Voltage Pulse: 0.2 – 4.4 kV | 1.2 / 50 µs	Schlöder CWG 1500	522	01/17

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Band Pass Filter 310 MHz | 0.3 dB	Digital Microwave DMC-110746-001	524	04/19
Electric Dummy Load	RA-NAV Laboratories DA-75U	526	01/17
Power Splitter / Combiner - 10 - 2000 MHz	Mini Circuits - ZESC-2-11	527	12/16
Dummy Load - 20 GHz | 50 Ω SMA	---	528	01/17
3 Way Power Splitter / Combiner 1 - 500 MHz | I.L.: 0.5 dB | Isolation: 30 dB	Mini Circuits ZFSC-3-1	529	02/17
3 Way Power Splitter / Combiner 1 - 500 MHz | I.L. : 0.5 dB | Isolation: 30 dB	Mini Circuits ZFSC-3-1	530	02/17
Band Pass Filter - 310 MHz | 0.3 dB	Digital Microwave	531	04/19
Standard Gain Horn Antenna - 26.5 - 40 GHz	Maury Microwave	532/628	09/20
Notch Filter - 10 MHz – 2 GHz	Dudde	533	05/18
Dual Display Handheld LCR Meter L/C/R/D/Q | Tolerance modes 1% / 5% / 10%	Agilent U1731B	535	---
Voltage Divider Probe - 70 dB	TK104	536	09/17
Analog-Digital Multimeter	Gossen Metrawatt METRAHIT ONE	538	08/17
Flexible, insulated plug-in sensor	Gossen Metrawatt	539	04/19
RF-Attenuator - 6 dB	Haefely	540	02/17
RF-Attenuator - 1– 120 MHz | 12 dB	Haefely	541	02/17
RF-Attenuator - 1– 120 MHz | 39 dB	Haefely	542	02/17
Dummy Load - 0 –12.5 GHz | 50 Ω	---	543	09/17
Circulator - 428 – 430 MHz	Forem	544	---
Spectrum Analyzer Mixer 90 – 140 GHz | VSWR 1.5 | Pmax: 3 dBm | C.L. 35 dB	Radiometer Physics SAM-140	545	05/19
Spectrum Analyzer Mixer 140 – 220 GHz | VSWR 1.7 | Pmax: +3 dBm | C.L. 42 dB	Radiometer Physics SAM-220	546	02/19
Dual Mode Potter Horn Antenna 90 – 140 GHz	Radiometer Physics FH-PP-140-WR8	547	---
Dual Mode Potter Horn Antenna 140 – 220 GHz	Radiometer Physics FH-PP-220-WR5.1	548	---

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Dual Mode Potter Horn Antenna 60-90 GHz	Radiometer Physics FH-PP-90-WR12	549	---
Line Impedance Stabilisation Network 9kHz – 30 MHz | 50 Ω | 50 µH + 5 Ω	Schwarzbeck NNLA 8120	551	09/17
Digital-Baro / Vacuum-Meter 0 - 1300 mbar | ± 0,1 % / ± 0,2 % f.s.	Greisinger GDH 12 AN	558	09/17
Laboratory Power Supply ISO 7637 Pulse 4 12 V / 24 V System	Elektro-Automation EA-PSI 8080-40-DT	560	03/18
Surge - Generator (Hybrid) 6 kV | 1.2 / 50 µs | 10/700µs	H & H MIG 0603 IN 2 S-T	561	02/18
Modular Oscilloscope Probe - 100:1 | 1500 Vp	Testec - TT-HV 150	564	---
Standard Gain Horn Antenna - 2.6 – 3.95 GHz	Flann - 1024-15	565	---
Standard Gain Horn Antenna - 3.42 – 6.0 GHz	Flann - 1224-15	566	---
HV Probe - 0-40 KV 1: 1000	Tektronix	567	04/18
Digital Storage Oscilloscope BW : 100 MHz | 2 Channels | FFT	Tektronix - TDS 2012C	568	03/18
APC Adapter Pair - 100 kHz – 40 GHz | 2.9 – 2.4 |I.L. < 0.5 dB	Weinschel	573	02/18
APC Adapter Pair - 100 kHz – 40 GHz | 2.9 – 2.4 |I.L. < 0.5 dB	Weinschel	574	02/18
Dummy Load - 0.009 MHz – 4400 MHz | 100 W	RELM - T44100	575	02/19
Automotive Line Impedance Stabilisation Network 9 kHz – 30 MHz | 5 – 50 Ω	Dudde NNB	580	---
Passive USB adapter (cable) - NRP-Z sensors	Rohde & Schwarz - NRP-Z4	582	---
Supraguard PC-strip with Mains Filter	REV Ritter - 1796	583	---
Supraguard PC-strip with Mains Filter	REV Ritter - 1796	584	---
Single Path Vehicle AMN (LISN) 0.1 – 150 MHz | 5 µH + 1Ω || 50Ω | 10 dB	Schwarzbeck 8125-1945	585	01/19
Single Path Vehicle AMN (LISN) 0.1 – 150 MHz | 5 µH + 1Ω || 50Ω | 10 dB	Schwarzbeck 8125-1945	586	01/19
Attenuator - DC – 50 GHz | 50Ω | 1 WAvg. | 100 WPeak	Agilent - 8490D	587 + 589	03/19
APC2.9 – APC2.4 Adapter Pair 100 kHz – 40 GHz | I.L. <0.5 dB | 2.9 mm – 2.4 mm	Jyebao	589	02/17
APC2.9 – APC2.4 Adapter Pair 100 kHz – 40 GHz | I.L. <0.5 dB | 2.9 mm – 2.4 mm	Jyebao	590	03/20

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Spectrum Analyzer Mixer 220 – 325 GHz | VSWR 2.5 | Pmax: +3 dBm | C.L. 44 dB	Radiometer Physics SAM 325	591	02/19
Dual Mode Potter Horn Antenna 220 - 325 GHz	Radiometer Physics FH-PP-325-WR2	592	---
Waveguide Adapter WR8 - WR10 75 – 140 GHz | VSWR 1.4 dB | I.L. 1.1 dB	Radiometer Physics	593	---
Coaxial Precision Fixed Attenuator 0.01 - 18 GHz | 20dB | 50Ω | 5W | VSWR 1.2	Mini Circuits BW-N20W5+	594	02/19
Coaxial Precision Fixed Attenuator 0.01 - 18 GHz | 30 dB | 50Ω | 5W | VSWR 1.2	Mini Circuits BW-N30W5+	595	02/19
Isolator - 7.2 - 9.0 GHz | I.L.: < 1 dB | Isolation : 40 dB	Alcatel - 60D117-06	596	03/17
Isolator 8.8 - 15.0 GHz | 50Ω | 1 W | I.L.: <0.5 dB | Isolation : 20 dB	Sky Microwave SMIS10A	597	03/17
Broadband Coaxial Isolator 10.0 - 15.0 GHz | I.L. 0.4 dB | Isolation 21 dB | VSWR 1.20	Trak T100150/DB	598	03/19
Step Attenuator - DC-18 GHz | 0 to 11 dB | I.L. : 0.6 dB | Pin_{max}: $1W_{Avg}$ / 100 W_{Peak}	Hewlett Packard 8494B	604	11/16
Digital-Hygro-/ Thermometer - 20 - 70 °C | 10 - 95 %RH	Greisinger - GFTH 95	605	03/17
Analyzer Reference System Harmonic / Flicker Analysis 90Vrms - 300Vrms	Spitzenberger & Spies Type ARS 16/1	606	03/17
Capacitive Coupling Clamp 5 kV (1.2/50 µs) | 100 pF – 1000 pF	Schlöder SFT 415	608	04/17
RF Probes for 50 Ω Receivers - Input Impedance: 1.5 kΩ	Schwarzbeck - TK 9416	612	07/17
Miniature Flat, Zero-Biased Schottky Detector 0.1– 18 GHz | SMA–BNC | VSWR < 1.6 | Pin_{max}: 100 mW	Narda 4503A-03	613	07/17
VHF-UHF Biconical Broadband Antenna 160 - 1100 MHz | Pin max: 5 W | Gi: -1.4 - +1.3 dBi	Schwarzbeck UBA 9116	614	07/17
Biconical Elements - 30-300 MHz | 50Ω N | 1.36 m	Schwarzbeck - BBA 9106	616	07/17
Diode Detector - 0.1 – 2.5 GHz	Spinner - BN 7545	617	08/17
Surface -Immersion Measurement Sensor PT100 Class A | IEC 751 | - 40 °C - + 600 °C	Gossen Metrawatt Z3409	618	---
Digital-Vacuum/ Barometer 0 - 11000 mbar ± 3 mbar| -25 - +50 °C | ± 0.3 % FS	Greisinger GDH 200-14	632	09/17
RF Vector Signal Generator CW : MHz- 6 GHz | I/Q: 80 MHz - 6 GHz	Rohde & Schwarz SGT100A	636	03/18
Impedance Matching Pad 50 Ω – 75 Ω | DC – 3.0 GHz	Mini Circuits UNMP-5075+	643	07/17
Dual Mode Potter Horn Antenna 78 – 110 GHz	Radiometer Physics	649	12/20

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Vacumeter - 0–1999 mbar |± 0.3 % ± 1 digit	Ebro - VM 2000	2a	09/17
LF-Generator - 0 – 25 MHz	Rohde & Schwarz - SPN	4a	03/18
Low Noise Signal Generator 10 kHz – 5.4 GHz | -144 dBm – +13 dBm	Marconi 2042	6	03/18
Power Meter 100 kHz – 50 GHz | -70 – +44 dBm (100 pW -	Hewlett Packard 436 A	12a	06/18
Measurement – Transceiver AM / FM | Ton Generator | Broadband discriminator	Schomandl FD530	13	---
Frequency Counter Accessory FD530 - 1 Hz - 12 MHz	Schomandl - FZ-1	13a	---
K-Band Attenuator - 18- 27 GHz	Philips - PM 7100QA	15b	---
Waveguide Power Sensor 26.5 GHz – 40 GHz | -70 – -20 dBm	Hewlett Packard HP R8486 A	16a	---
Modulation Meter 50 kHz–2.32 GHz | -25 – +30 dBm | 50Ω N	Marconi 2305	17	---
Field strength measuring Accessories 9 kHz –30MHz | 146 dBµV/m	Schwarzbeck FMZB 1516	23	05/19
Switch - 9 kHz –1000MHz | 0–100 dB	Auth Nachritent - 1S63	26a	11/18
DC Power Supply - 0–20 V | 0–10 A	Rohde & Schwarz - NGR 20	27	---
Programmable Power Supply	Fluke - PM 2813	28a	---
DC Power Supply	Heinzinger - TNs 15-300	29	---
DC Power Supply - 70V DC | max. 3.5A	Statron - 3206	30	---
AC Microvoltmeter 5 Hz – 600 kHz | -110 – + 10 dBm | Zi : 10 MΩ || 20	Hewlett Packard 3410 A	31	---
Signal Generator 0.1 – 2060 MHz | +13 dBm – -143.5 dBm | <±1.5 dB	Hewlett Packard 8657B	32a	---
Insertion Unit 9 kHz – 2000 MHz | 10V | 50 Ω	Rohde & Schwarz URY-Z2	34a	02/17
50 Ω – 75 Ω Impedance matching pad DC – 500 MHz | 5.7 ± 0.5 dB | VSWR: 1.35	Pasternack Ent. PE7028	36a	04/18
Impedance matching pad DC – 500 MHz | 5.7 ± 0.5 dB | VSWR: 1.35	Pasternack Ent PE7028	37a	04/18
AF Transformer	Rohde & Schwarz - TS8910	38a	---
Sound Generator	Schomandl - SG 1	40	---

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Near Field Probe Set 100 kHz–3 GHz | N.F.: 3.5 dB | + 12 dBm	EMCO 7405	41	---
RF Current Probe 9 kHz – 30 MHz | CISPR 16- 1	Rohde & Schwarz ESH2-Z1	42	02/19
VHF- Current Probe 9 kHz – 600 MHz| –33 dBµA – +117 dBµA | 50 A | -	Rohde & Schwarz ESV-Z1	43	02/19
Passive Test Probe - 9 kHz – 30 MHz	Dudde - VDE 0876	45	05/18
EFT / Burst – Generator - Up to 125 kHz | 5 kV	Schlöder GmbH - SFT 1400	46a	05/17
Line Impedance Stabilization Network 9 kHz – 30 MHz | 50Ω | 50 µH / 250 µH | 10 A	EMCO 3810/2 LISN	49b	08/17
Coaxial Fixed Attenuator DC – 12.4 GHz | |3 ± 0.3 dB | Pin_max.: 2 Wavg /	Hewlett Packard 8491 A	54	06/18
Digital-Hygro-Thermometer -20 °C - +70.0 °C | %RH: 10 %RH- 95 %RH	Greisinger GFTH 95	57a	03/17
Passive Test Probe	RFT - TK 11	58a	05/18
Coaxial Fixed Attenuator DC – 1 GHz | 30 dB | 50Ω BNC | 1W	Texscan HFP50/30	59	04/18
Fixed Attenuator - DC – 12.4 GHz | 10 dB | 50Ω N | 2 W	Tektronix - 011-0085-00	61	01/17
Fixed Attenuator - DC – 4 GHz | 20 dB | 50Ω N | 10 W	Radiall	62	12/16
Fixed Attenuator - 0 – 500 MHz | 40 dB | 50Ω Coaxial | 1W	Mini-Circuits - CAT-40	63	04/18
Step Attenuator - DC – 12.4 GHz | 0 – 60 dB	Narda - Model 710	64	---
Bandpass Filter 41 0 MHz – 41 MHz | 30W | 54 MHz –1 GHz | 1W	Schomandl BN 86871	66	11/18
Bandpass Filter 174 0 MHz –174 MHz | 30W | 240 MHz – 1 GHz | 1W	Schomandl BN 86873	67	11/18
Bandpass Filter 470 0 MHz – 470 MHz | 30 W | 600 MHz – 1 GHz | 1W	Schomandl BN 86874	68	11/18
Notch Filter - 15 – 90 MHz	Schomandl - SF 1	69	---
Notch Filter - 210 W | 500 MHz	Schomandl - SF 3	70	---
8 Wire Impedance Stabilisation Network 150 kHz – 30 MHz | I.L. 1 – 2.5 dB | 150 Ω ± 20 Ω	Schwarzbeck CAT5 8158	71a	01/18
Artificial Mains Network 1 9 – 150 kHz / 150 kHz – 30 MHz | 10 dB	RFT NNB 11	72	08/16
Dual Artificial Mains Network - 9 kHz – 30 MHz	Dudde	73a	09/17

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Noise Signal Generator 2 Hz – 200 kHz | 50Ω | 0 – -60 dB |	Robotron 03004	74a	---
Miniature Fixed Attenuator DC – 6 GHz | 6 dB | 50Ω SMA | VSWR : 1.2 | 2 W	Narda 4780-6	75a	04/18
Power Sensor 10 MHz – 18 GHz | 10nW – 500mW	Rohde & Schwarz NRV-Z2	76a	02/17
VHF-Half - Wave Tuned Dipole Antenna 30 –300 MHz | 10 W | N-Connector	Schwarzbeck VHA 9103	80	04/17
UHF- Half - Wave Tuned Dipole Antenna 300 – 1000 MHz | 10 W | N	Schwarzbeck UHA 9105	81	04/17
Double Ridged Broadband Horn Antenna 1.25 – 12 GHz | 6 – 16 dBi | 25 – 34dB/m	Schwarzbeck BBHA 9120-B	83	09/20
Test Sphere - 50 mm | 500 g	Dudde	84a	---
RF condenser Microphone - 1 Hz | Subsonic	Sennheiser - MKH 110	86	---
Temperature Chamber – -60 °C – +70.0 °C	Brabender - TTE 32/40H	87	04/17
Turntable - 0° – 360°	Dudde	89	---
DC-Block - 50 Ω | I.L. 0.1 dB | VSWR: 1.3	Microlab - HR-D18	90b	06/18
Dummy Load Antenna - 9 kHz – 1.5 GHz | 50 Ω	Spinner - BN 6944-00	91	02/17
Dummy Load Antenna - 60 Ω | 20 W	Spinner - BN 2766-B	92	---
T-Section - 50 Ω	Rohde & Schwarz BN 42441/50	93	06/18
Tunable Band pass-Filter - N	Texscan - 5VF500/1000	97	---
Tunable Band pass-Filter	Rohde & Schwarz HA 70/1	98	---
Tunable Bandpass-Filter	Rohde & Schwarz HS 9041	99	---
Termaline Wattmeter - DC – 1.5GHz|50Ω|VSWR:1.2| ± 10%	BIRD	101	01/17
Open Area Test Site - 9 kHz – 1.0 GHz | CISPR 16	Dudde	103	09/17
Open Area Test Site - Substitution	Dudde	104	05/16
Digital Oscilloscope - BW: 1GHz – 1.9GHz | 4 Channel	LeCroy - LC534AL	105b	---
EMC Test Table	HAEFELY	106	---

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Step Attenuator - DC – 1.0 GHz | 1dB –80dB	Texscan	107	---
XY Plotter - 5 – 500 mV /cm | ± 0.3% | Ri : 1 MΩ	Hewlett Packard - 7035 B	109	---
Measuring Terminators - 4 – 8 – 16 Ω	Dudde	111	---
ESD Simulator - Air: 0.2 – 16.5 kV | Contact: 0.2 – 9.0 kV	Schlöder GmbH - SESD 200	112a	11/17
Sweep Generator - 18 – 26.5GHz | 50 Ω | VSWR:2.0	Wiltron - 6636a	113a	---
RF-Power Amplifier 0.8 – 1000 MHz | 50 Ω BNC | G: 40 dB | Pout: 3 W	ENI Model 603L	114b	---
Capacitive - Coupling link	Schaffner - SL 400-071	115	---
Passive probe	RFT - TK 11	117a	05/18
Passive probe	RFT - TK 11	118a	05/18
Fitting Transformer - 10 – 150 kHz | 50Ω / 150Ω	RFT - TG11	119a	---
Digital Oszilloscope - 500 MHz	Hewlett Packard - 54520C	120a	03/17
Open Area Test Site - 1 – 6 GHz | CISPR 16	Dudde	122	05/17
RF-Power Amplifier 250 kHz – 150 MHz | G: 55± 1.5 dB | 100 W | VSWR:	ENI Model 3100LA	123	---
Coupling-Decoupling Network	E Fiedler - CDN 801 R6 SP	126	---
AM / FM Signal Generator 10 kHz –1 GHz |50 N | -127 – + 6 dBm | VSWR : <	Marconi 2022	127	---
Dummy Load - 0 – 1000 MHz | 50 N | 30 W	Radiall	128b	09/17
T-Section - 600 Ω	Dudde	129	---
Microwave Frequency Counter	Hewlett Packard - 5351A	130	10/18
Digital Sound Level Meter - 30 Hz – 12 kHz | ± 2 dB	Chauvin Arnoux - CDA 830	133	---
Laboratory DC Power Supply 0 – 30 V DC | 0 – 6 A DC | BW: 5 Hz – 1 MHz	Sorensen LM 30-6	134a	---
Coupling Network (Mic-input)	Dudde	135	---
Signalgenerator - 0.1 – 1000 MHz | AM / FM	Rohde & Schwarz - SMG	136	04/19

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Fixed Coaxial Attenuator - DC – 4 GHz | 3 dB | 5 W	SUHNER - 6803/17/A	137	03/19
RF Power Meter 30 kHz – 46 GHz | -70 dBm (100 pW) – +44 dBm	Marconi 6960B	139a	06/18
RF Power Sensor 10MHz –20.0GHz | 50Ω N | -30dBm – +20dBm	Marconi 6910	140	06/18
Thermocouple Power Sensor 100 kHz – 2 GHz | 75 Ω N | 1 uW – 100 mW	Hewlett Packard 8483A	143b	07/18
Digital Multimeter 1200 V / 20 A | Accuracy: 0.03% | Resl.: 10uV / 10nA	Goodwill Instek GDM-8045G	144	08/17
Coaxial Fixed Attenuator DC – 1 GHz | 10 dB | 50Ω BNC | 1W	Texscan FP-50	146	09/17
Attenuator 20 dB - 9 kHz – 1 GHz | 20 dB |10 W	Trilithic	148a	02/19
Fixed Attenuator 0 – 500 MHz | 40 dB | 50Ω Coaxial | 1W	Mini-Circuits CAT-40	149	04/18
Fixed Attenuator 0.01 – 3 GHz | 10 dB | 50Ω Coaxial | 5W	Narda 771-10	150	12/16
Fixed Attenuator - 9 kHz – 1 GHz | 3 dB | 60 W	Trilithic - HFP 560/3	152	01/17
Fixed Attenuator - 10 MHz – 1 GHz | 3 dB | 150 W	Trilithic - HFP 5150/3	153	01/17
Adjustable-Isolation Transformer - 0 - 250 V AC | 1.6 A	RFT - LTS 002	154a	---
Adjustable transformer	Schunt+Ben	155	---
RF Current Injection Clamp 0.15 – 1000 MHz | 150 Ω | k = -5dB	Lüthi GmbH EM 101	156	07/17
RF Current Transformer - 10 kHz – 30 MHz	RFT - SMZ 11	157	---
Unbalanced Voltage Supply - 8 ± 0.5 V DC | 12 – 18 mA	Sennheiser - MZN 16-x	158	---
Absorbing Clamp MDS 30MHz – 1GHz | 50Ω BNC | 628mm x 105mm x	Lüthi GmbH MDS-21	160	11/18
Volt & RF Power Meter Measurement range V: up to 3 GHz | RF Power up to	Rohde & Schwarz URV35	161	04/19
Insertion Unit 100 kHz – 3 GHz | 50 Ω | 2 mV – 100 V	Rohde & Schwarz URV5-Z4	162	04/19
Coaxial RF Termination - 0 – 1000 MHz | 50 Ω | 35 W	Telewave Inc. - TWL 35	164	11/18
Coaxial RF Termination - 0 – 1000 MHz | 50 Ω | 60 W	Telewave Inc. - TWL 60	165	11/18
Pre-amplifier - 100 kHz – 1.3 GHz | 50Ω | 22 dB	Hewlett Packard - 8447 E	166a	07/16

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Bilog Antenna - 30 - 1000 MHz | 50Ω | 150W	CHASE - CBL6111	167	06/20
Double Ridged Broadband Horn Antenna 2 – 18 GHz | 10 – 16 dBi | 50 – 100 W	Schwarzbeck BBHA 9120-C	169	09/20
Fixed Attenuator - 9 kHz – 1 GHz | 10 dB | 10 W	Trilithic	170	02/19
Spectrum Analyzer - 9 kHz – 18 GHz | BW = 28 MHz	Rohde & Schwarz - FSL 18	171a	09/17
Broadband RF-Power Amplifier - 250 kHz – 300MHz | 3 W	ENI - Model 403L A	172	---
Automotive Artificial Mains Network - 0.15 – 80 MHz	Reimesch - NNB-1	173	---
Isotropic E-field Meter - 1.8 MHz – 30 MHz	Schwarzbeck - IEMH 1601	174	---
Eletro-Magnetic Fieldmeter 100 kHz – 2.5 GHz | E: 0.1 – 200 V/m | Pden: 0.1 – 2	Chauvin-Arnoux C/A 43	175	---
Fixed Attenuator - DC – 1.5GHz | 50Ω N |6 dB | 100 W	Bird - Mod/ 8343-060	177	01/17
RF-Power Amplifier - 100 – 520 MHz | 50 W	EATON - Model 3552B	179	---
Burst – Generator 200V – 4,800 V | 50 Ω ± 20% | f : 0.1kHz – 1,000	EM – Test AG EFT 200	180	---
Micro Pulse Generator U = 50V – 1100V ± 10% | 2 Ω, 4 Ω, 10 Ω, 20 Ω, 30	EM – Test AG MPG 200	181	09/17
Fixed Attenuator - 3 dB DC -12.4GHz	Narda - TB 50902-1	183a	11/17
Fixed Attenuator - 6 dB DC -12.4GHz	Narda - TB 50901-2	183b	11/17
Fixed Attenuator - 10 dB DC -12.4GHz	Narda	183c	11/17
Fixed Attenuator - 20 dB	Hewlett Packard - 8491a	183d	11/17
Rotary Step Attenuator DC – 2 GHz | BNC | 1 - 10 dB | Pmax: 1 Wavg / 500	Texscan TA – 50	184	02/17
Signalgenerator 0.0002 Hz – 20 MHz | 30 Vp-p | AM / FM / PM /	Wavetek 148 A	185	---
Hand Held Programmer	GR Electronics Pocket VDU	187	---
Direct Reading Variable Attenuator 18 – 50 GHz | 0 – 20dB | VSWR: 1.2	Waveline 1005A	191b	---
Sweep Generator 26.5 – 40 GHz | Pout : > 1 mW | Full Sweep / CW	Wiltron 6640A	192a	---
Hand-held Component Tester - 0.1 pF-20 mF | 0.1 Ω – 20 MΩ	BK Precision - 815	193	---

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Voltage Regulator - 0.5 kVA | Single-phase	Pro Star - TDGC2	196a	---
Sound Generators	Schomandl - 86110	197	---
Waveguide Mixer	Tektronix - WM 490-2	199a	---
Measurement Microphone	MB - MP NM 550	200a	---
Bias Network	Rohde & Schwarz - ZPV-Z6	202	---
Bias Network	Rohde & Schwarz - ZPV-Z6	203	---
Feed-Through Adapter	Rohde & Schwarz - ZPV-Z1	204	---
Feed-Through Adapter	Rohde & Schwarz - ZPV-Z1	205	---
Feed-Through Adapter	Rohde & Schwarz - ZPV-Z2	206	---
DC Power Supply - 0 – 40 V | 0 – 0.5 A	Hewlett Packard - 6102A	207	---
Variable Isolation Transformer - 250 V AC | 10A	RFT - LSS 010	209	---
General Purpose Oscilloscope BW:100 MHz | 2 ns /div | 2 Channels	Hewlett Packard 54600 A	210	---
Band Pass Filter 310 MHz | 0.3 dB	Digital Microwave DMC-110746-001	212	03/19
Signalgenerator 10 kHz – 2.4 GHz | 50Ω N | - 137 – +13 dBm |	Marconi 2024	213	03/18
Fixed Attenuator - 20 dB 2 W – 18 GHz	Spectrum - DG-0018-2051	214	11/17
Miteq Amplifier - 26.5 – 40 GHz | G: 32 dB	Miteq	223a	02/17
Coaxial Attenuator DC – 18 GHz | Pin: 0.5 – 2 W | I.L.: 3 / 6 / 10 / 20 dB	Spectrum DG-0018-2051	225	04/18
DC Power Supply - 0 – 60 V |0 – 10 A	Hewlett Packard - 6034L	226	---
2.4 GHz Notch Filter - 10 MHz – 8 GHz | @ 2. 4 GHz : 10 dB	Dudde	227	---
RF Power Sensor 10 MHz – 20 GHz|-70 – 0 dBm | Pi-max: 26	Marconi 6920	228	10/17
Radiocommunication Service Monitor 0.4 – 1000 MHz | +47 dB – -47 dBm | Span: 0 – 50	Rohde & Schwarz CMS 54	229	06/17
Fixed Attenuator - 2 W – 18 GHz 10 dB	Spectrum - DG-0018-2051	230	01/17

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Dummy Load - 0 – 1000 MHz | 5 W	TWL - TWL-5	231a	11/18
Positioning Controller - 0 – 360°	Rohde & Schwarz - HCC	232	---
Antenna Pole - 100 – 400 cm	Rohde & Schwarz - HCM	233	---
Attenuator Wave Gate - 0 – 95dB	Spinner - BN6686	234b	---
Immunity Test Probe - 0 – 4.8 kV	EM TEST - ITP	235	---
DC Power / Wattage Meter DC input: 5A, 1A, 75mV, 100V, 500V	H&B Wattavik	238	---
Multimeter	Metrawatt - Multiscript 2S	239	---
Analog Multimeter 100 mV – 1000 V | 30 µA – 10 A	Metrawatt Unigor A43P	240	---
Voltage Interruption Simulator AC/DC - Interruptions – Dips max. 280V / 360	Schlöder GmbH VIS 1700	241a	02/18
UHF Termination - DC – 2 GHz | 50Ω | 100 W	Rohde & Schwarz - RAU	243	01/17
Measuring Shunt Resistor - 50 mV | 50A DC	Metrix - HA0512	247	---
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	248	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	249	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	250	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	251	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	252	11/18
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	253	11/18
Attenuator: DC – 1 GHz | 5.7 dB | 50 – 75 Ω	Trilithic - ZM-57	254	---
Attenuator: DC – 1 GHz | 5.7 dB | 50 – 75 Ω	Trilithic - ZM-57	255	---
Pre-amplifier 100 kHz – 400 MHz | Gi: 20 dB | N.F.: < 7 dB	Hewlett Packard 8447 A	256	02/19
Power Sensor - 40 GHz	Marconi - 6914	258	06/18
Thermohygrometer – -10 – +60 °C | 0 – +100 %	Testo AG - testo 625	259a	08/17

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Dummy Load DC – 10 GHz | 50Ω BNC | 2 W | VSWR: ≤ 1.3	KDI T173CS	260	11/18
Coupling Decoupling Network 0.1 MHz – 230 MHz | 150 Ω | 10 dB	MEB KEN-M 2 /M 3	264	10/17
Vertical Coupling Plate	Dudde	265	---
NF-Assessment Filter	H/W/Schulte	266	04/19
DC Power Supply - 0 – 20 V DC | 5 A DC	Hewlett Packard - 6632B	268a	---
Artificial Hand - VDE 0876 Part 1	Dudde	270	---
Volt & RF Power Meter Measurement range V: up to 3 GHz | RF Power up to	Rohde & Schwarz URV35	271	05/17
Pulse Limiter 0 Hz – 30 MHz |10 dB	Rohde & Schwarz ESH3-Z2	272	02/19
Low Pass Filter DC – 520 MHz | 50Ω SMA | 0.5 W | VSWR: 1.7	Mini-Circuits SLP550	273	05/18
Low Pass Filter DC – 520 MHz | 50Ω SMA | 0.5 W | VSWR: 1.7	Mini-Circuits SLP550	274	05/18
Fixed Attenuator - DC – 18 GHz | 30 dB	MTS	275	11/17
Fixed Attenuator - DC – 18 GHz | 30 dB	MTS	276	02/17
Broadband Horn Antenna 14 – 40 GHz | 15 – 20 dBi | 10 – 25 W	Schwarzbeck BBHA 9170	280	08/17
Broadband Horn Antenna 14 – 40 GHz | 15 – 20 dBi | 10 – 25 W	Schwarzbeck BBHA 9170	281	08/17
RF Small Signal Power Amplifier 0.9 GHz - 2/8 GHz | Gi: 27 dB	Avantek SFT 84-2152	282	---
Harmonic Flicker Analyzer 600Vrms / 900Vpeak | L1 / L2 / L3	Schlöder GmbH HFA 3000	283	---
Double Ridged Broadband Horn Antenna 0.5 – 5.5 GHz | -6 – +13 dBi	Schwarzbeck BBHA 9120 A	284	09/20
I/O Lines Coupling-Decoupling Network 4 kV | 4 -8 I/O Lines | Max. 50 V / 1-4A	EM – Test AG CNV 504 - 508	285	---
Power Sensor 10MHz – 26.5GHz | -30dBm – +20dBm |VSWR: 1.4	Marconi 6913	286	10/17
Adjustable-Isolation Transformer - 0 – 250 V Ac | 1.6 A	RFT - LTS 002	287	---
LF-Power Amplifier 20 Hz – 20 kHz | 40 W | 8 Ω | THD: 0.08%	ONKYO A-9211	288	---
Coaxial T Connector - DC – 1000 MHz | 50 Ω N	Mera-Tronik - V40.31	291	---

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
V-Band Mixer - 50 – 75 GHz | C.L. 30 dB | WR15	Anritsu - MA2744A	295a	09/17
Dummy-Load - 50Ω	Texscan	297	---
APC 3.5 Precision Termination DC – 34 GHz | 50 Ω Coaxial | 2.5 kW | R.L.: 26 dB	Amphenol	298	---
Fixed Attenuator - 0 – 18 GHz | 3 dB | 50Ω Coaxial | 2W	Suhner - 6603.19 AA	299	12/16
RF-Dummy Load - 50 Ω N	Spinner - BN5947	300	12/16
RF-Dummy Load - 50 Ω	Spinner - BN3924c	301	12/16
Passive Probe - 9 kHz – 30 MHz | 2.5 kΩ	RFT - TK 121	302	04/17
RF-Dummy Load - 50 Ω	Texscan	304	12/16
RF-Dummy Load - 50 Ω	Texscan	305	07/17
RF Coaxial Termination - DC – 12.4 GHz | 50 Ω N | 5 W	Sage Labs - 9200	306	---
Broadband Voltage, Level and Power Meter - 9 kHz – 3 GHz	Rohde & Schwarz - URY	307	04/19
Dummy Load 9 kHz – 1 GHz | 50 Ω | N	Hewlett Packard 1250-0256	308a	11/18
RF/Microwave Termination DC – 1 GHz | 50 Ω | Pin max: +30 dBm | VSWR: 1.15	Radiall 404011	309	11/18
Calibration cable - 32 cm	Dudde	310	---
Calibration cable - 89 cm	Dudde	311	---
DC Block Adapter - DC – 2 GHz | 50 Ω	Anritsu - MA8601A	312	12/16
AC Power Source - 260 Vrms / 4.5 Arms | 1000 W | ± 1%	ELGAR - 1001B	314	---
Frequency Counter - 0 – 50 MHz | 1MΩ || 25 pF	Hewlett Packard - 5326A	316	09/17
Shunt - 300A	AEG - 4 90073	317	---
Digital Multimeter - 2 – 1000 V | 10 MΩ ||75 pF	Hameg - HM 8011-3	319	---
4- Way Branched Connector 0 – 1000 MHz | 50 Ω | I.L. 10 dB	Rohde & Schwarz 892228/20	320	10/18
Test Weight Block - 30 N	Dudde	321a	---

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Test Weight Block - 250 N	Dudde	322a	---
Function Generator / Universal Counter 10 MHz |10 VSS | 50 Ω / 0 - 1.6 GHz | 20 - 30 mVrms	Hameg HM8030/HM8021	324	---
RF Amplifier - 0.9 – 2.3 GHz	Dudde	325	04/18
Ohmmeter 0 – 1000 MΩ	Holtzer-Cabot ZM-144 / PSM-2	326	---
Drop Test Surface	---	328a	---
APC 3.5 Precision Termination DC – 34 GHz | 50 Ω Coaxial | 2.5 kW | R.L.: 26 dB	Amphenol	334a	---
Standard Gain Horn Antenna - 0.7 – 4.8 GHz	---	335	---
Standard Gain Horn Antenna - 0.7 – 4.8 GHz	---	336	---
Standard Gain Horn Antenna - 14.3 – 26.9 GHz	---	337	---
Coaxial Directional Coupler	Microwavegear - 519 D	338	---
Spectrum Analyzer - 9 kHz – 2.9 GHz | AC / DC coupled	Hewlett Packard - 8594E	341a	---
Terminator (Dummy Load) DC-18GHz | 25 W	Aeroflex / Weinschel BV 7017	342a	01/18
Dummy-Load - 2 – 18 GHz | 50 Ω | 40 W	Narda - MODEL 367NF	343	12/16
Fixed Attenuator - 0 – 18 GHz | 6 dB | 50Ω Coaxial | 2W	SUHNER - 606.19 AA	344	12/16
2 – 18 GHz | 50 Ω | 40 W - 1 GHz – 18 GHz | Gi : 23 dB	Narda	345	02/18
Impedance Converter - DC – 1.4 GHz | 50 – 75 Ω | 1 W	Suhner - 6001/01A	347	---
Wave Guide Mixer - 40 - 60 GHz | 3 dB Compression -10 dBm	Tektronix - WM490U	349	---
Resistance Load - 5 x 6.8 C | 1100 W	Dudde	350a	07/17
Wave Guide Mixer - 18 – 26.5 GHz | 3 dB Compression -10 dBm	Tektronix - WM 490K	351	---
Wave Guide Mixer - 26.5 - 40 GHz | 3 dB Compres-sion -10 dBm	Tektronix - WM 490 A	352	---
Fixed Attenuator - 0 – 40 GHz | 10 dB | 50Ω Coaxial |	Parzich - 40 AH-10	353	10/18
Fixed Attenuator - 0 – 20 GHz | 20 dB | 50Ω Coaxial |	Parzich - 40 AH-20	354	10/18

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Wave Guide - Coaxial Adapter - 26.5 – 40GHz	Parzich - SN/15	355	---
DC Block Adapter - 0.045 – 26.5 GHz	Hewlett Packard - 11742A	356	04/18
Antenna Probe - 9 kHz – 1 GHz	Rohde & Schwarz	357	---
Voltage Regulator - 0.5 kVA | Single-phase	Pro Star - TDGC2	358a	---
Spectrum Analyzer 9 kHz – 40 GHz | 18 – 110 GHz (external mixers)	Anritsu MS2668C	359a	06/17
DC-BLOCK - DC – 18.0 GHz |50 Ω	Mini Circuits - BLK-18-S+	361	07/18
DC-BLOCK - DC – 18.0 GHz |50 Ω	Mini Circuits - BLK-18-S+	362	07/18
DC-BLOCK - DC – 6.0 GHz |50 Ω	Mini Circuits- BLK-6-N+	365	07/18
Coupling Filter	Haefely - FP 16/3-1	366	---
Insertion Unit 10V |9 kHz 1000 MHz	Rohde & Schwarz URV 5-Z2	367	04/19
RF Probe 0.02 – 1000 MHz | 15V AC	Rohde & Schwarz 395.2680.02	368	04/19
Single Rotary Attenuator DC – 1000 MHz | 0–10 dB | 2 W	JFW Industries Inc. 50R-028	369	03/19
Coaxial Directional Coupler 2– 4GHz | VSWR:1.2 |10 dB:25 dB/20 dB:27 dB/30	Narda 3003-20	370	01/17
Circular Polarized Probe - 1– 12GHz	---	373	---
High Power Fixed Coaxial Attenuator DC – 8.5 GHz |N| 20 dB |Pmax: 150W_{Avg} /5 kW_{Peak} |	Weinschel 49-20-33	374	03/19
Medium Power Fixed Coaxial Attenuator - DC – 18 GHz | N |6 dB | Pmax: 10 WAvg /1 kWPeak |	Weinschel 23-6-34	375	02/17
Attenuator - DC – 8 GHz | 60dB	---	376	10/17
Attenuator - 0 – 18 GHz | 30 dB | 100 W	Weinschel - 6312-30	377	03/19
Oscilloscope - DC – 100 MHz | BW: 20 MHz | 2 Channels	Fluke - PM3082	380a	---
High Power Reactive Probe	Microlab - HZ-A22	382	---
Gain Horn Antenna	Dorado - GH-22-25	383	---
Gain Horn Antenna	Dorado - GH-15-25	384	---

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Gain Horn Antenna	Dorado - GH-10-25	385	---
High Power Signal Generator	Philco - 470A-500	386	---
Precision Adapter - DC – 20 GHz | 50 Ω N | 1 W	Anritsu - 34AKNF50	387	---
Peak Power Sensor DC – 6 GHz | 0 – mW	Rohde & Schwarz NRV-Z31	391	02/17
Test Pattern Transmitter	Müter - CSG 5	392	---
Variable Attenuators - 0 – 10 MHz | 0 - 132 dB	Siemens - D110	393	---
EMF Tester	PCE Group - PCE-G28	394	---
Field Measurement Adapter 0.0 – 30000.0 V~/m | 0.0 – 300.0 µT	Gossen Metrawatt FMA1	395	---
Dummy Load - 18 GHz | 50 Ω	Narda	396	---
Dummy Load - 18 GHz | 50 Ω	Narda	397	---
Field Strength Measurement Kit - 500 kHz – 50 MHz	SAT-Service Schneider	398	02/17
RF Signal Generator 5 kHz – 3 GHz | -144 – +13 dBm | Resolution 0.1 Hz	Rohde & Schwarz SME03	399	02/18
Mini Infrared Thermometer -30°C – 500°C | ±1.5°C	Fluke - 62 Mini	403	---
Absorbing clamp - 30 – 300 MHz | 50 Ω	Lüthi - MDS 20	404	11/18
Coaxial High Pass Filter 185 – 3000 MHz | 50 Ω N | 0.5 W | I.L. : < 1 dB	Mini-Circuits NHP-200	405	05/18
Tri-Log Broadband Antennas 25 MHz – 2 GHz | 50 Ω N | 10 W	Schwarzbeck VULB 9168	406	04/19
4-Way-Power Splitter DC – 2 GHz | 50 Ω SMA | 1 W | I.L.: 12 dB | VSWR:	Weinschel 6503	407	12/16
Band Pass Filter 310 MHz | 0.3 dB	Digital Microwave DMC-110746-001	412	04/19
Insertion Unit 9 kHz – 2000 MHz | 10 V	Rohde & Schwarz URY-Z2	416	09/17
Dummy Load	Amphenol	424	---
Dummy Load	Amphenol	425	---
Radio Interference Measuring Receiver 10 kHz – 30 MHz | SSB / CW	Schwarzbeck FMLK 1518	428	08/16

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Panoramic Adapter for VUMA BW: 20 kHz	Schwarzbeck PAZ 1550	429	---
Interference Measuring Receiver 20 MHz – 1050 MHz | 50 Ω N | PK / AV / QP / CAV /	Schwarzbeck FCVU 1534	430	08/16
Standard Gain Horn Antenna - 17.6 – 26.5 GHz | Gi: 23 dBi	MBMT - K-235	431	09/18
Miteq Amplifier - 18 – 26 GHz	Miteq	433	02/17
Coaxial High Pass Filter 700 – 3000 MHz | 50 Ω N | 0.5 W | I.L.: < 1dB	Mini-Circuits NHP-700	435	05/18
Interference Coupler	Dudde	436	---
Inductive Coil - 660 µH	Dudde	437	---
Inductive Coil - 660 µH	Dudde	438	---
Wide Band Amplifier 1 – 2 GHz | 50 Ω SMA | Gi: 30 dB | Pout-max: +16	Watkins Johnson WJ-5201-77A	439	02/17
Microwave Broadband Amplifier 12 – 28 GHz | 50 Ω SMA | Pin_max.: -20 dBm	Schwarzbeck BBV 9719	443	02/19
Microwave Broadband Amplifier 0.5 – 20 GHz | 50 Ω N / SMA | Pin_max.: -30 dBm	Schwarzbeck BBV 9718	444	03/19
Microwave Log.-Per. Antenna 0.7 – 20 GHz | 50 Ω N | Pin_max.: 50 W | Gi: 8.6 dBi	Schwarzbeck STLP 9148	445a	03/19
IR Digital CCD Video Camera	Conrad - SE-906-1	446	---
Laptop-Power Supply Input 100-240V~ 50-60Hz | Output DC = 18-21V DC	Hama ACHG-07	450	---
Coaxial High Pass Filter 3900 – 9800 MHz | 50 Ω SMA | 7 W | I.L.: < 2 dB	Mini-Circuits VHF-3500+	451	05/18
Coaxial High Pass Filter 1220 – 4600 MHz | 50 Ω SMA | 7 W | I.L.: < 2 dB	Mini-Circuits VHF-1200+	452	05/18
Coaxial High Pass Filter 27.5 – 800 MHz | 50 Ω N | 0.5 W | I.L.: < 1 dB	Mini Circuits NHP-25+	455	05/18
Coaxial High Pass Filter 27.5 – 800 MHz | 50 Ω N | 0.5 W | I.L.: < 1 dB	Mini Circuits NHP-25+	456	05/18
Coaxial Low Pass Filter DC – 22 MHz | 50 Ω BNC | 0.5 W | I.L.: < 1 dB	Mini Circuits BLP-21/4+	457	05/18
Coaxial Low Pass Filter DC – 22 MHz | 50 Ω BNC | 0.5 W | I.L.: < 1 dB	Mini Circuits BLP-21/4+	458	05/18
Dummy Load - 100 Ω - BNC	Dudde	460	---
DC-BLOCK - DC – 6.0 GHz |50 Ω	Mini Circuits - BLK-6-N+	462	07/18

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Fixed Attenuator - 20 dB | BNC	Spinner	465	04/18
4 Port Junction Box - 10 – 900 MHz | 50 Ω	---	470	---
Adapter	Hewlett Packard - P281B	471	---
Directional Coupler	Narda - 42468-20	472	---
Calibration Noise Source	Rohde & Schwarz BN 4519	473	---
Band Pass Filter 310 MHz | 0.3 dB	Digital Microwave DMC-110746-001	478	04/19
Attenuator - 20 dB SMA	Weinschel - 6500-20	482	04/18
Dummy Load - 50 Ω	---	485	11/18
Dummy Load - 50 Ω	TI-30D	486	11/18
Dummy Load - 50 Ω	TI-30D	487	11/18
Dummy Load - 50 Ω	TI-30D	488	11/18
Dummy Load - 50 Ω	---	489	11/18
Dummy Load - 50 Ω SMA	HRM - 60I	491	01/19
Dummy Load - 50 Ω SMA	---	493	01/19
Dummy Load - 50 Ω SMA	---	494	01/19
Dummy Load - 50 Ω SMA	OSM - 2001 6110/00	495	01/19
Dummy Load - 50 Ω SMA	OSM - 2001 6110/00	496	01/19
Dummy Load - 50 Ω SMA	SC 60-601-0000-31	497	01/19
Dummy Load - 50 Ω SMA	SC 60-601-0000-31	498	01/19
Dummy Load - 50 Ω BNC	Texscan	499	11/18
Dummy Load - 50 Ω BNC	Radiall - 404011	500	11/18
Harmonic Mixer 60 - 90 GHz | 1 dB compression: -7 dBm | Pin_max.: 0	Rohde & Schwarz FS-Z90	501	05/19

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Signal & Spectrum Analyzer 10 Hz - 30 GHz | Level :–60 dBm - 0 dBm	Rohde & Schwarz FSV-30	502	01/19
PLC Test Box	Dudde	503	---
Fixed Attenuator - 0 – 40 GHz | 10 dB | 50Ω Coaxial |2W	Anritsu - 41KC-10	504	12/16
Fixed Attenuator - 0 – 40 GHz | 10 dB | 50Ω Coaxial |2W	Anritsu - 41KC-10	505	12/16
Fixed Attenuator - 0 – 40 GHz | 6 dB | 50Ω Coaxial |2W	Anritsu - 41KC-6	506	12/16
Fixed Attenuator - 0 – 40 GHz | 3 dB | 50Ω Coaxial |2W	Anritsu - 41KC-3	507	12/16
Broadband Horn Antenna 12.4 – 18 GHz | Gain 20 dB	Mid-Century Mic BH 18-SQB-xxx-C-20	508	---
Broadband Dipole Antenna 25 - 80 MHz | 50 Ω | K factor: 15 / 20 dB	Rohde & Schwarz HUF-Z1	509	---
Bit Error Rate Test Set Synchronous & Asynchronous | 0.075 – 19.2 kbps	Hewlett Packard 4925B	510	---
Gain Horn Antenna	Dorado - GH-15-20	511	---
Active Field strength measuring Accessory 10 kHz – 30 MHz | VLF Long-Medium-Short Waves	Schwarzbeck FMZL 1514	513	10/16
Standard Gain Horn Antenna - 1.7 – 2.6 GHz	Narda - Model 645	514	---
Harmonic Mixer 40-60 GHz | 1 dB compression: 0 dBm | Pin_max.:	Rohde & Schwarz FS-Z60	515	05/19
Active Probe BW: 2.5 GHz | 8 Vpk-pk | tr <140 ps | Rin :40 kΩ	Textronix P7225	517-1	---
Active Probe BW: 2.5 GHz | 8 Vpk-pk | tr <140 ps | Rin :40 kΩ	Textronix P7225	517-2	---
Active Probe BW: 2.5 GHz | 8 Vpk-pk | tr <140 ps | Rin :40 kΩ	Textronix P7225	517-3	---
Horn Antenna - 20 dB	Dorado - GH-19	518	---
Horn Antenna - 20 dB	Dorado - GH-28-20	519	---
GaAS FET Amplifier	Avantek - AMT-8006M	520	---
15 MHz Function / Arbitrary Waveform Generator DC – 15 MHz | AM , FM FSK , Burst | 50 Ω	Agilent 33120A	521	---
Surge / Hybrid Generator Voltage Pulse: 0.2 – 4.4 kV | 1.2 / 50 µs	Schlöder CWG 1500	522	01/17
Band Pass Filter 310 MHz | 0.3 dB	Digital Microwave DMC-110746-001	524	04/19

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Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Electric Dummy Load	RA-NAV Laboratories DA-75U	526	01/17
Power Splitter / Combiner - 10 - 2000 MHz	Mini Circuits - ZESC-2-11	527	12/16
Dummy Load - 20 GHz | 50 Ω SMA	---	528	01/17
3 Way Power Splitter / Combiner 1 - 500 MHz | I.L.: 0.5 dB | Isolation: 30 dB	Mini Circuits ZFSC-3-1	529	02/17
3 Way Power Splitter / Combiner 1 - 500 MHz | I.L. : 0.5 dB | Isolation: 30 dB	Mini Circuits ZFSC-3-1	530	02/17
Band Pass Filter - 310 MHz | 0.3 dB	Digital Microwave	531	04/19
Standard Gain Horn Antenna - 26.5 - 40 GHz	Maury Microwave	532/628	09/20
Notch Filter - 10 MHz – 2 GHz	Dudde	533	05/18
Dual Display Handheld LCR Meter L/C/R/D/Q | Tolerance modes 1% / 5% / 10%	Agilent U1731B	535	---
Voltage Divider Probe - 70 dB	TK104	536	09/17
Analog-Digital Multimeter	Gossen Metrawatt METRAHIT ONE	538	08/17
Flexible, insulated plug-in sensor	Gossen Metrawatt	539	04/19
RF-Attenuator - 6 dB	Haefely	540	02/17
RF-Attenuator - 1– 120 MHz | 12 dB	Haefely	541	02/17
RF-Attenuator - 1– 120 MHz | 39 dB	Haefely	542	02/17
Dummy Load - 0 –12.5 GHz | 50 Ω	---	543	09/17
Circulator - 428 – 430 MHz	Forem	544	---
Spectrum Analyzer Mixer 90 – 140 GHz | VSWR 1.5 | Pmax: 3 dBm | C.L. 35 dB	Radiometer Physics SAM-140	545	05/19
Spectrum Analyzer Mixer 140 – 220 GHz | VSWR 1.7 | Pmax: +3 dBm | C.L. 42	Radiometer Physics SAM-220	546	02/19
Dual Mode Potter Horn Antenna 90 – 140 GHz	Radiometer Physics FH-PP-140-WR8	547	---
Dual Mode Potter Horn Antenna 140 – 220 GHz	Radiometer Physics FH-PP-220-WR5.1	548	---
Dual Mode Potter Horn Antenna 60-90 GHz	Radiometer Physics FH-PP-90-WR12	549	---

m. dudde hochfrequenz-technik **Rottland 5a** **D-51429 Bergisch Gladbach/ Germany** **Tel: +49 2207-96890** **Fax +49 2207-968920**

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Line Impedance Stabilisation Network 9kHz – 30 MHz | 50 Ω | 50 µH + 5 Ω	Schwarzbeck NNLA 8120	551	09/17
Digital-Baro / Vacuum-Meter 0 - 1300 mbar | ± 0,1 % / ± 0,2 % f.s.	Greisinger GDH 12 AN	558	09/17
Laboratory Power Supply ISO 7637 Pulse 4 12 V / 24 V System	Elektro-Automation EA-PSI 8080-40-DT	560	03/18
Surge - Generator (Hybrid) 6 kV | 1.2 / 50 µs | 10/700µs	H & H MIG 0603 IN 2 S-T	561	02/18
Modular Oscilloscope Probe - 100:1 | 1500 Vp	Testec - TT-HV 150	564	---
Standard Gain Horn Antenna - 2.6 – 3.95 GHz	Flann - 1024-15	565	---
Standard Gain Horn Antenna - 3.42 – 6.0 GHz	Flann - 1224-15	566	---
HV Probe - 0-40 KV 1: 1000	Tektronix	567	04/18
Digital Storage Oscilloscope BW : 100 MHz | 2 Channels | FFT	Tektronix - TDS 2012C	568	03/18
APC Adapter Pair - 100 kHz – 40 GHz | 2.9 – 2.4 |I.L. < 0.5 dB	Weinschel	573	02/18
APC Adapter Pair - 100 kHz – 40 GHz | 2.9 – 2.4 |I.L. < 0.5 dB	Weinschel	574	02/18
Dummy Load - 0.009 MHz – 4400 MHz | 100 W	RELM - T44100	575	02/19
Automotive Line Impedance Stabilisation Network 9 kHz – 30 MHz | 5 – 50 Ω	Dudde NNB	580	---
Passive USB adapter (cable) - NRP-Z sensors	Rohde & Schwarz - NRP-Z4	582	---
Supraguard PC-strip with Mains Filter	REV Ritter - 1796	583	---
Supraguard PC-strip with Mains Filter	REV Ritter - 1796	584	---
Single Path Vehicle AMN (LISN) 0.1 – 150 MHz | 5 µH + 1Ω || 50Ω | 10 dB	Schwarzbeck 8125-1945	585	01/19
Single Path Vehicle AMN (LISN) 0.1 – 150 MHz | 5 µH + 1Ω || 50Ω | 10 dB	Schwarzbeck 8125-1945	586	01/19
Attenuator - DC – 50 GHz | 50Ω | 1 WAvg. | 100 WPeak	Agilent - 8490D	587 + 589	03/19
APC2.9 – APC2.4 Adapter Pair 100 kHz – 40 GHz | I.L. <0.5 dB | 2.9 mm – 2.4 mm	Jyebao	589	02/17
APC2.9 – APC2.4 Adapter Pair 100 kHz – 40 GHz | I.L. <0.5 dB | 2.9 mm – 2.4 mm	Jyebao	590	03/20
Spectrum Analyzer Mixer 220 – 325 GHz | VSWR 2.5 | Pmax: +3 dBm | C.L. 44	Radiometer Physics SAM 325	591	02/19

Test equipment Specifications	Manufacturer Model Type	Internal Equipment No.	Calibration Validity
Dual Mode Potter Horn Antenna 220 - 325 GHz	Radiometer Physics FH-PP-325-WR2	592	---
Waveguide Adapter WR8 - WR10 75 – 140 GHz | VSWR 1.4 dB | I.L. 1.1 dB	Radiometer Physics	593	---
Coaxial Precision Fixed Attenuator 0.01 - 18 GHz | 20dB | 50Ω | 5W | VSWR 1.2	Mini Circuits BW-N20W5+	594	02/19
Coaxial Precision Fixed Attenuator 0.01 - 18 GHz | 30 dB | 50Ω | 5W | VSWR 1.2	Mini Circuits BW-N30W5+	595	02/19
Isolator - 7.2 - 9.0 GHz | I.L.: < 1 dB | Isolation : 40 dB	Alcatel - 60D117-06	596	03/17
Isolator 8.8 - 15.0 GHz | 50Ω | 1 W | I.L.: <0.5 dB | Isolation :	Sky Microwave SMIS10A	597	03/17
Broadband Coaxial Isolator 10.0 - 15.0 GHz | I.L. 0.4 dB | Isolation 21 dB | VSWR	Trak T100150/DB	598	03/19
Step Attenuator - DC-18 GHz | 0 to 11 dB | I.L. : 0.6 dB | Pin_{max}: $1W_{Avg}$ / 100 W_{Peak}	Hewlett Packard 8494B	604	11/16
Digital-Hygro-/ Thermometer - 20 - 70 °C | 10 - 95 %RH	Greisinger - GFTH 95	605	03/17
Analyzer Reference System Harmonic / Flicker Analysis 90Vrms - 300Vrms	Spitzenberger & Spies Type ARS 16/1	606	03/17
Capacitive Coupling Clamp 5 kV (1.2/50 µs) | 100 pF – 1000 pF	Schlöder SFT 415	608	04/17
RF Probes for 50 Ω Receivers - Input Impedance: 1.5 kΩ	Schwarzbeck - TK 9416	612	07/17
Miniature Flat, Zero-Biased Schottky Detector 0.1– 18 GHz | SMA–BNC | VSWR < 1.6 | Pin_{max}: 100	Narda 4503A-03	613	07/17
VHF-UHF Biconical Broadband Antenna 160 - 1100 MHz | Pin max: 5 W | Gi: -1.4 - +1.3 dBi	Schwarzbeck UBA 9116	614	07/17
Biconical Elements - 30-300 MHz | 50Ω N | 1.36 m	Schwarzbeck - BBA 9106	616	07/17
Diode Detector - 0.1 – 2.5 GHz	Spinner - BN 7545	617	08/17
Surface -Immersion Measurement Sensor PT100 Class A | IEC 751 | - 40 °C - + 600 °C	Gossen Metrawatt Z3409	618	---
Digital-Vacuum/ Barometer 0 - 11000 mbar ± 3 mbar| -25 - +50 °C | ± 0.3 % FS	Greisinger GDH 200-14	632	09/17
RF Vector Signal Generator CW : MHz- 6 GHz | I/Q: 80 MHz - 6 GHz	Rohde & Schwarz SGT100A	636	03/18
Impedance Matching Pad 50 Ω – 75 Ω | DC – 3.0 GHz	Mini Circuits UNMP-5075+	643	07/17
Dual Mode Potter Horn Antenna 78 – 110 GHz	Radiometer Physics	649	12/20

10. Cable list

Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer
1	N	10 – 12000	14.50	M.Dudde
1a	N	10 – 18000	18.00	M. Dudde
1b	N	10 – 18000	14.00	Megaphase
3	N	10 – 12000	5.00	Kabelmetal
4	BNC	---	1.50	---
2a	BNC	---	0.50	Telemeter
3a	BNC	---	0.50	Telemeter
4a	BNC	10 – 1500	0.50	Telemeter
5a	N	10 – 20000	1.50	Telemeter
6a	N	---	1.50	Telemeter
7a	N	---	0.50	Telemeter
8a	N	10 – 2000	0.50	Telemeter
10a	BNC	---	1.00	Telemeter
11a	BNC	---	1.00	Telemeter
12a	N	10 – 26500	6.00	Huber+ Suhner
13a	N	10 – 6000	---	RG 213 M.Dudde
14a	BNC	10 – 1000	1.00	Telemeter
15a	BNC		1.00	Telemeter
17a	APC 3.5	10 – 26500	2.13	Huber + Suhner
18a	APC 3.5	10 – 26500	2.13	Huber + Suhner
19a	SMA	10 – 18000	3.00	Semi Rigid
20a	SMA	10 – 18000	3.00	Semi Rigid
21	BNC	---	3.00	---
22	BNC	10 – 1000	1.50	---
23	BNC	---	1.00	---
24	BNC	---	2.80	---
25	BNC	---	1.00	---
26	BNC	---	0.40	---
27	BNC	10 – 1000	1.00	Fabrica Milanese Cond.
28	BNC	---	5.00	---
29 No.1	APC	10 – 40000	1.00	Harbour Industries
29 No.2	APC	10 – 40000	1.00	Harbour Industries
29 No.3	APC	10 – 40000	1.00	Harbour Industries
29 No.4	APC	10 – 40000	1.00	Harbour Industries
29 No.5	APC	10 – 40000	1.00	Harbour Industries
30	BNC / N	10 – 500	1.80	Huber + Suhner
31	BNC / N	---	1.80	Huber + Suhner
32	BNC / N	---	1.80	Huber + Suhner
33	N	10 – 1000	2.00	---
34	N	---	0.50	F&G
35	N	10 – 2000	1.10	Fujikura

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Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer
36	N	10 – 6000	1.80	Filotex
37	N	10 – 6000	1.80	Filotex
38	N	10 – 6000	2.00	Dudde
39	N	10 – 6000	0.80	F&G
40	BNC	---	0.50	Aircell
41	N	10 – 12400	1.50	Huber + Suhner
42	N	---	1.50	Huber + Suhner
43	SMA	10 – 18000	0.50	Rosenberger
44	SMA	---	0.50	Huber + Suhner
45	SMA	10 – 18000	0.50	Huber + Suhner
46	N	10 – 18000	1.01	Huber + Suhner
47	SMA	10 – 18000	0.50	Huber + Suhner
48	SMA		0.50	Huber + Suhner
49	N	10 – 18000	1.00	Huber + Suhner
50	N	10 – 18000	1.00	Huber + Suhner
51	N	10 – 18000	1.00	Huber + Suhner
52	N	10 – 18000	1.00	Huber + Suhner
53	SMA	10 – 14000	0.34	---
54	BNC	10 – 3500	1.00	Aircell
55	BNC / N	---	0.50	Aircell
56	BNC / N	---	1.00	Aircell
57	N	---	12.00	Aircell
57a	---	10 – 12400	7.00	---
58	N	10 – 18000	2.00	Huber + Suhner
59	N	10 – 18000	1.00	Huber + Suhner
60	N	10 – 18000	2.00	Huber + Suhner
61	N	10 – 18000	1.00	Huber + Suhner
62	SMA	---	0.50	Huber + Suhner
63	SMA	10 – 18000	0.50	Huber + Suhner
64	SMA	10 – 18000	0.50	Huber + Suhner
65	APC 3.5	10 – 26500	0.60	---
66	APC 3.5	10 – 26500	0.60	---
67	APC 3.5	10 – 26500	0.60	---
68	APC 3.5	10 – 26500	0.60	---
69	SMA/N	10 – 14000	1.20	Huber + Suhner
70	SMA	---	7.00	---
71	BNC	---	7.00	---
72	BNC	---	0.40	---
73	BNC	---	0.40	---
74	N	10 – 18000	6.40	Huber + Suhner
75	N	10 – 18000	6.40	Huber + Suhner
76	SMA	10 – 30000	3.00	Gore
77	SMA	10 – 20000	12.00	Huber + Suhner

Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer
78	SMA	10 – 20000	12.19	Huber + Suhner
79	BNC/N	10 – 1000	5.00	---
80	SMA	---	0.25	Huber + Suhner
81	---	---	---	---
82	N	---	13.00	Aircell 7
83	N	10 – 18000	8.00	Huber + Suhner
84	N	10 – 18000	10.00	Huber + Suhner
86	SMA	---	0.80	Flrst
87	SMA	10 – 18000	0.15	Huber + Suhner
88	SMA	10 – 18000	0.15	Huber + Suhner
89	SMA	10 – 18000	0.15	Huber + Suhner
90	SMA	10 – 18000	0.15	Huber + Suhner
91	SMA	---	1.50	Huber + Suhner
92	APC/SMA	---	0.20	---
92a	APC/SMA	10 – 20000	0.20	---
92b	APC/SMA	10 – 20000	0.20	---
92c	APC/SMA	10 – 20000	0.20	---
92d	APC/SMA	10 – 20000	0.20	---
92e	APC/SMA	10 – 20000	0.20	---
92 f	APC/SMA	10 – 20000	0.20	---
92 g	APC/SMA	10 – 20000	0.20	---
92 h	APC/SMA	10 – 20000	0.20	---
93	N	10 – 6000	0.35	---
94	BNC	---	1.10	---
95	BNC	---	0.80	---
96	BNC	---	0.80	---
97	BNC	---	0.25	---
98	SMA	10 – 18000	0.90	Flrst
99	N	10 – 12400	3.00	Gore & Asscoc.
100	N	10 – 26500	6.00	Rosenberg
102	SMA	10 – 18000	2.00	Huber + Suhner
103	N	---	1.20	---
104	N	---	1.20	---
105	N	---	1.20	---
106	N	---	1.20	---
107	N	---	1.20	---
108	N	---	1.20	---
109	N	---	1.20	---
110	N	---	1.20	---
111	BNC	10 – 1000	0.50	---
112	BNC	10 – 1000	0.50	---
113	SMA	10 – 20000	0.60	---
114	SMA	10 – 18000	0.25	Huber + Suhner

Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer
115	SMA	---	0.60	---
116	SMA	10 – 18000	0.25	Huber + Suhner
117	---	---	0.90	75 Ohm
118	---	---	3.00	75 Ohm
119	N	10 – 20000	8.00	Jyebao
120	N	10 – 18000	14.00	Jyebao
121	SMA	10 – 18000	1.50	Huber + Suhner
122	SMA	10 – 18000	2.00	Huber + Suhner
123	SMA	10 – 18000	2.00	Huber + Suhner
124	SMA	10 – 20000	0.15	Jyebao
125	SMA	10 – 20000	0.15	Jyebao
126	SMA	10 – 20000	0.15	Jyebao
127	SMA	10 – 20000	0.15	Jyebao
128	SMA	10 – 20000	0.10	Jyebao
129	SMA	10 – 20000	0.10	Jyebao
130	SMA	10 – 20000	0.10	Jyebao
131	SMA	10 – 20000	0.10	Jyebao
132	SMA	10 – 20000	0.20	Jyebao
133	SMA	10 – 20000	0.20	Jyebao
134	SMA	---	0.20	Jyebao
135	SMA	10 – 20000	0.20	Jyebao
136	SMA	---	0.30	Jyebao
137	SMA	10 – 20000	0.30	Jyebao
138	SMA	10 – 20000	0.30	Jyebao
139	SMA	---	0.30	Jyebao
140	SMA	10 – 20000	0.50	Jyebao
141	SMA	10 – 20000	0.50	Jyebao
142	SMA	10 – 20000	0.50	Jyebao
143	SMA	10 – 20000	0.50	Jyebao
144	N	10 – 10000	15.00	Commscope
145	SMA	10 – 26500	8.00	Huber + Suhner
146	SMA	10 – 26500	8.00	Huber + Suhner
147	APC 3.5	10 – 40000	1.50	Jyebao
148	APC 3.5	10 – 40000	3.00	Jyebao
149	BNC	10 – 500	9.00	---
150	BNC	---	0.50	Huber + Suhner
151	SMA	10 – 18000	0.50	Rosenberger
152	SMA	10 – 18000	0.50	Rosenberger
153	BNC	---	1.40	---
154	BNC	10 – 1000	1.00	---
155	N / BNC	---	0.85	---
156	N	---	10.00	---
157	BNC	---	0.50	---

Internal Cable Number	Connector Type	Frequency Range (MHz)	Cable Length (m)	Manufacturer
158	SMA	10 – 26500	2.00	Huber + Suhner
159	SMA	10 – 18000	0.40	Nortel Networks
160	SMA	10 – 18000	0.40	Nortel Networks
EMV 1	BNC	---	2.00	Henn
EMV 2	BNC	10 – 1000	2.00	Henn
EMV 4	BNC	---	9.70	Henn
EMV 5	BNC	---	3.80	Henn
EMV 6	BNC/N	10 – 1000	5.00	Lüthi
EMV 7	BNC	10 – 1000	1.50	Henn
EMV 8	BNC	10 – 1500	1.70	Henn
EMV 9	BNC	10 – 1000	1.70	Henn
EMV 11	BNC	---	5.20	Hasselt
EMV 12	BNC	10 – 1000	2.40	Hasselt
EMV 13	BNC	10 – 1000	4.10	Hasselt
EMV 14	BNC	10 – 1000	2.50	Hasselt
EMV 15	BNC	---	0.90	Henn
EMV 16	Fischer	---	2.00	---
EMV 18a	Fischer	---	1.00	---
EMV 19a	Fischer	---	1.50	---
KISN2	BNC	10 – 2000	4.80	---

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11. List of rented test equipment and auxiliary means

EMC TestHaus Dr. Schreiber GmbH

Electromagnetic fields (EN 61000-4-3)

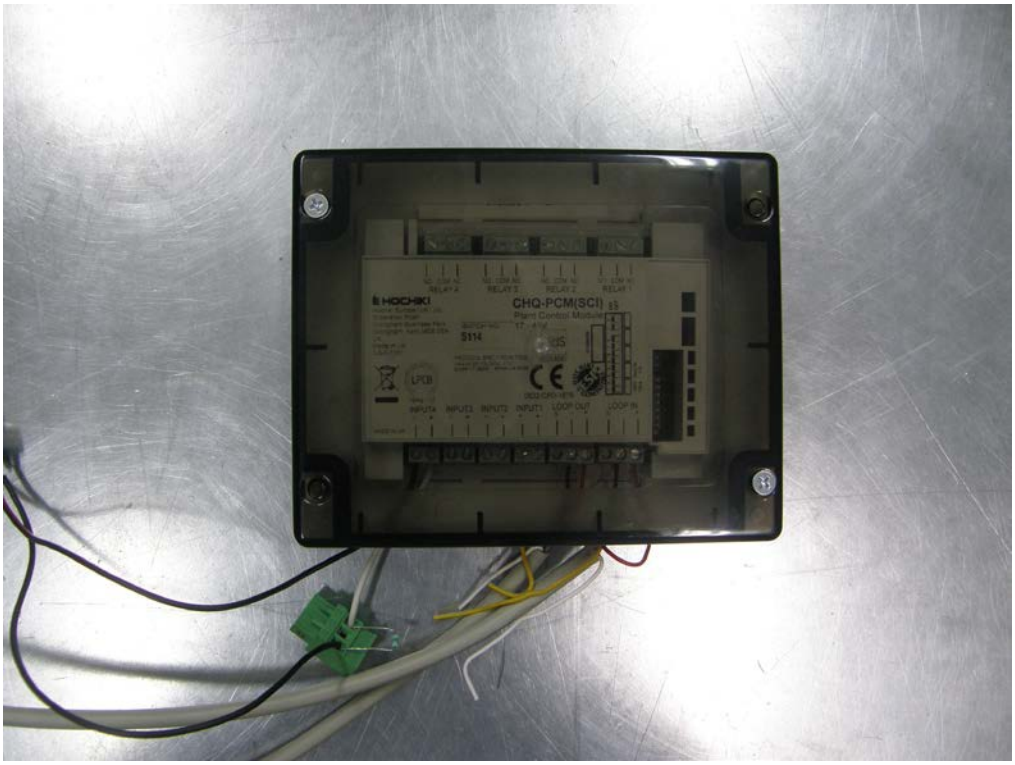
Inv. – Nr.	Type	Hersteller [manufacturer]	kal. bis [cal. till]
G3	SMY Generator (1082.5502.12)	Rohde & Schwarz	07/2017
G4	ESG D3000A - Generator	HP Agilent	04/2017
I4.2	714FC Verstärker 30W	Kalmus	---
I4.11	BBM3Q7ECK 15W Verstärker	EM Power	---
E15	URV55 Millivoltmeter (1029.1701.02)	Rohde & Schwarz	---
E14.2	URV Z2 Tastkopf (SN 288.801)	Rohde & Schwarz	07/2017
E15.5	NRVZ5 – Tastkopf (SN 100156)	Rohde & Schwarz	01/2017
E22	DC3001M2	Ampl.Res.	04/2018
E15.2	30611 - Richtkoppler	Narda	07/2017
X2	Absorber Kab. Nr. 1 mit BNC Stecker-Anschluß	MPE	07/2017
X5	Absorber Kab. 2	MPE	11/2017
I5.4	VULP 9118E	Schwarzbeck	11/2017
E53	BBHA9120E Antenne	Schwarzbeck	01/2018
E12.4	VUSLP 9111B Log per 200 MHz – 3 GHz	Schwarzbeck	05/2017

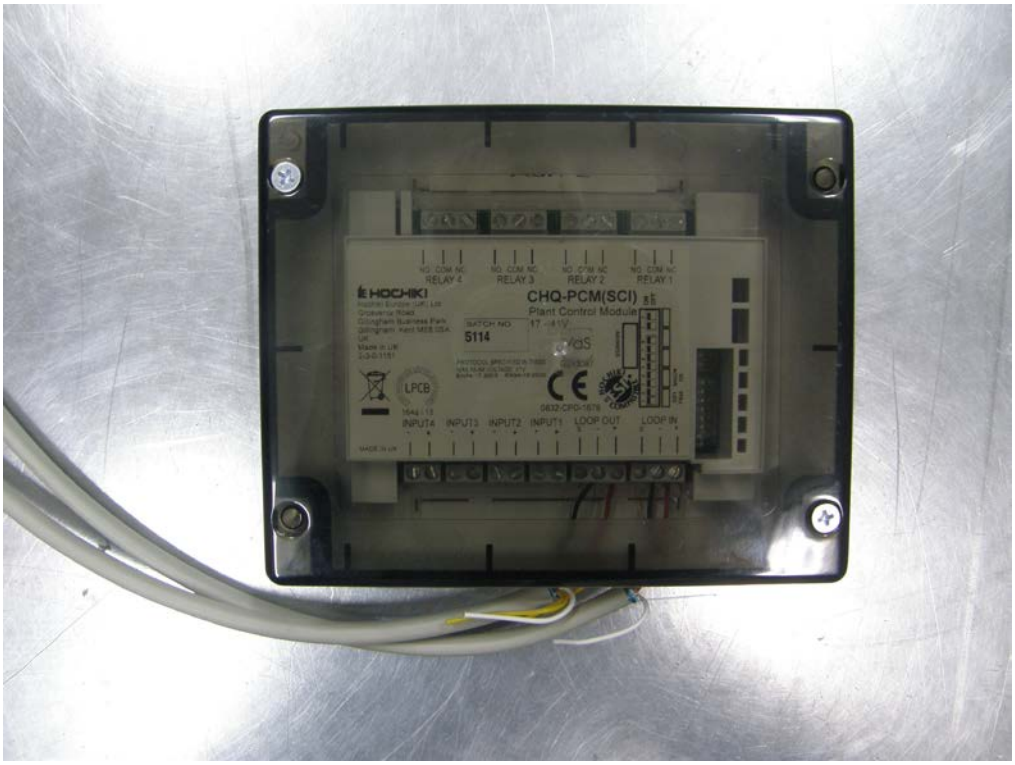
Magnetic fields (EN 61000-4-8)

Inv. – Nr.	Type	Hersteller [manufacturer]	kal. bis [cal. till]
G6	Chroma AC Quelle 4500L	Chroma	04/2017
I13	Chroma 61704	EMC Testhaus	07/2017
E23	Helmholz Spule 1m	Sym./Trebbau	07/2017

12. Photographs to the EUT

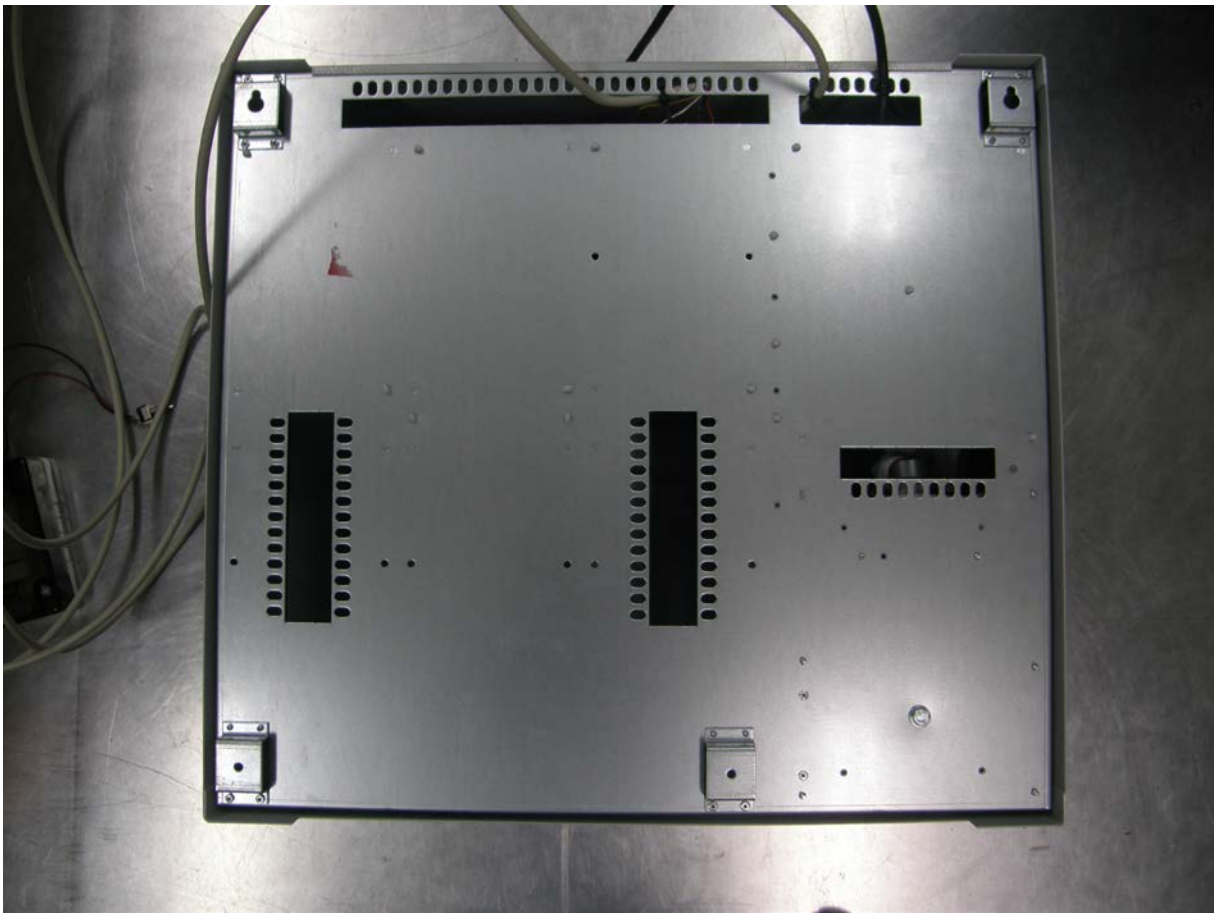
Assembly of units or parts





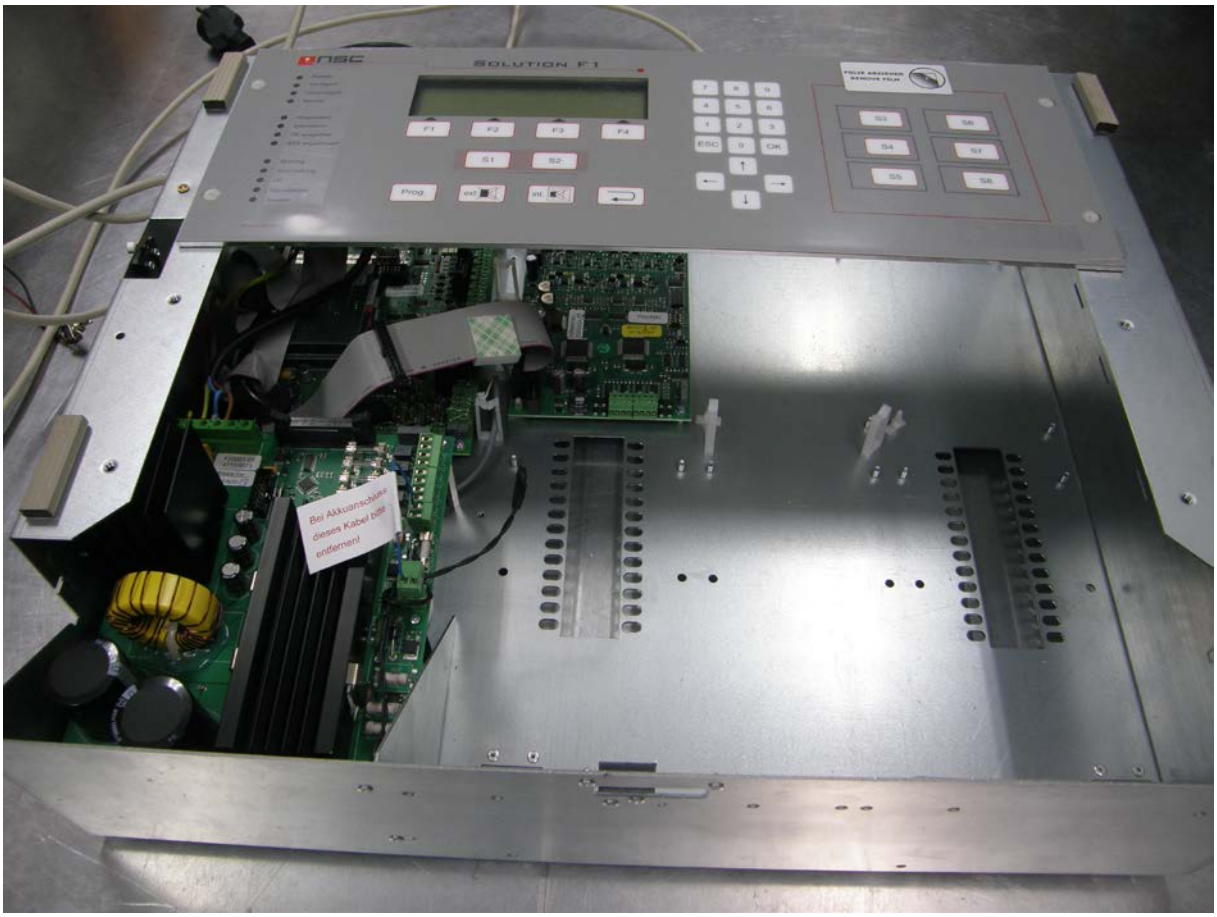
Front side of the EUT

Rear side of the EUT



If the label or identifying mark is affixed on a surface other than at 2. or 3. above, a photograph of this shall be provided.

The equipment (ONLY AFTER TYPE TESTING IS COMPLETED) shall be opened and photographs of the internal construction shall be made (upper side)



The equipment (ONLY AFTER TYPE TESTING IS COMPLETED) shall be opened and photographs of the internal construction shall be made (lower side)

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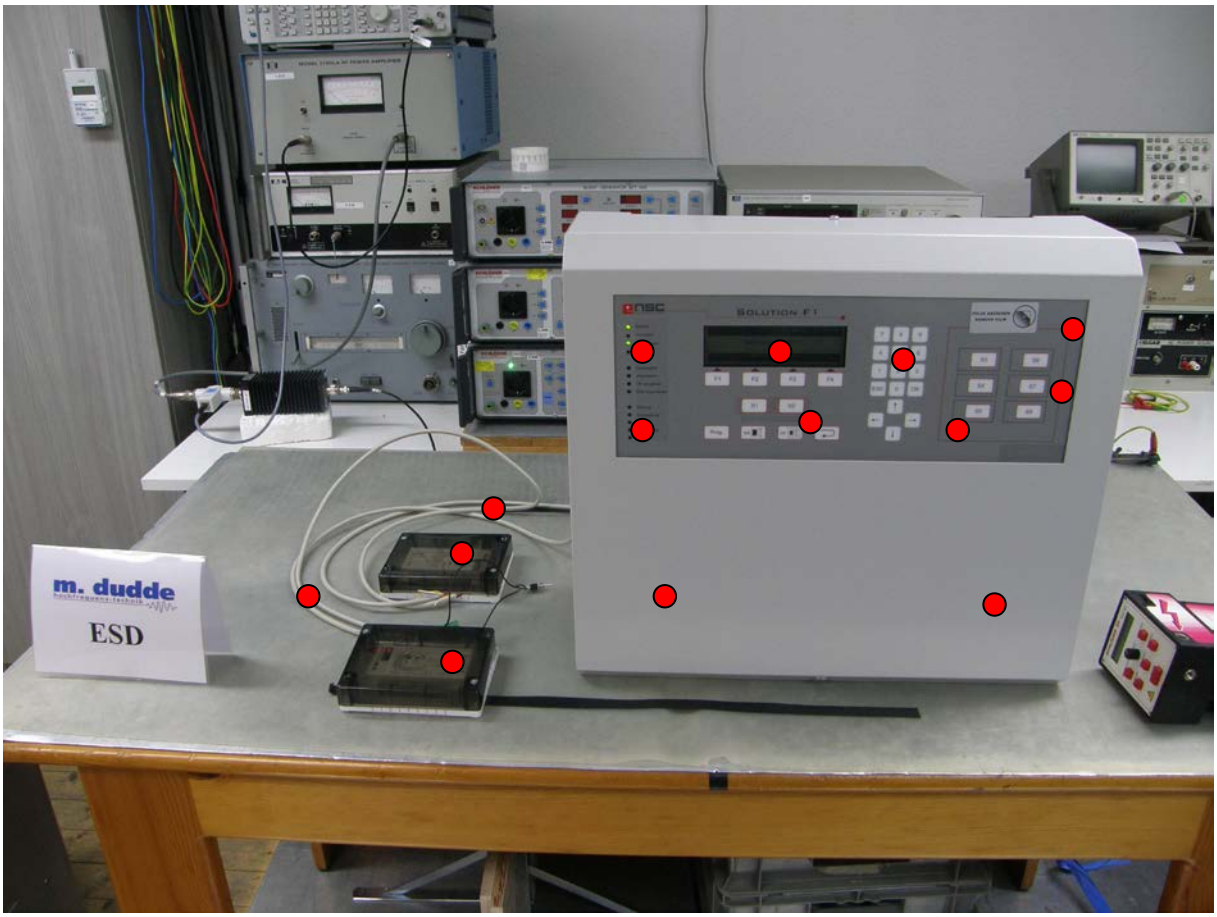
13. Photographs to the set up and results plots:

Photographs to the test: Electrostatic discharge, air discharge

Discharge points



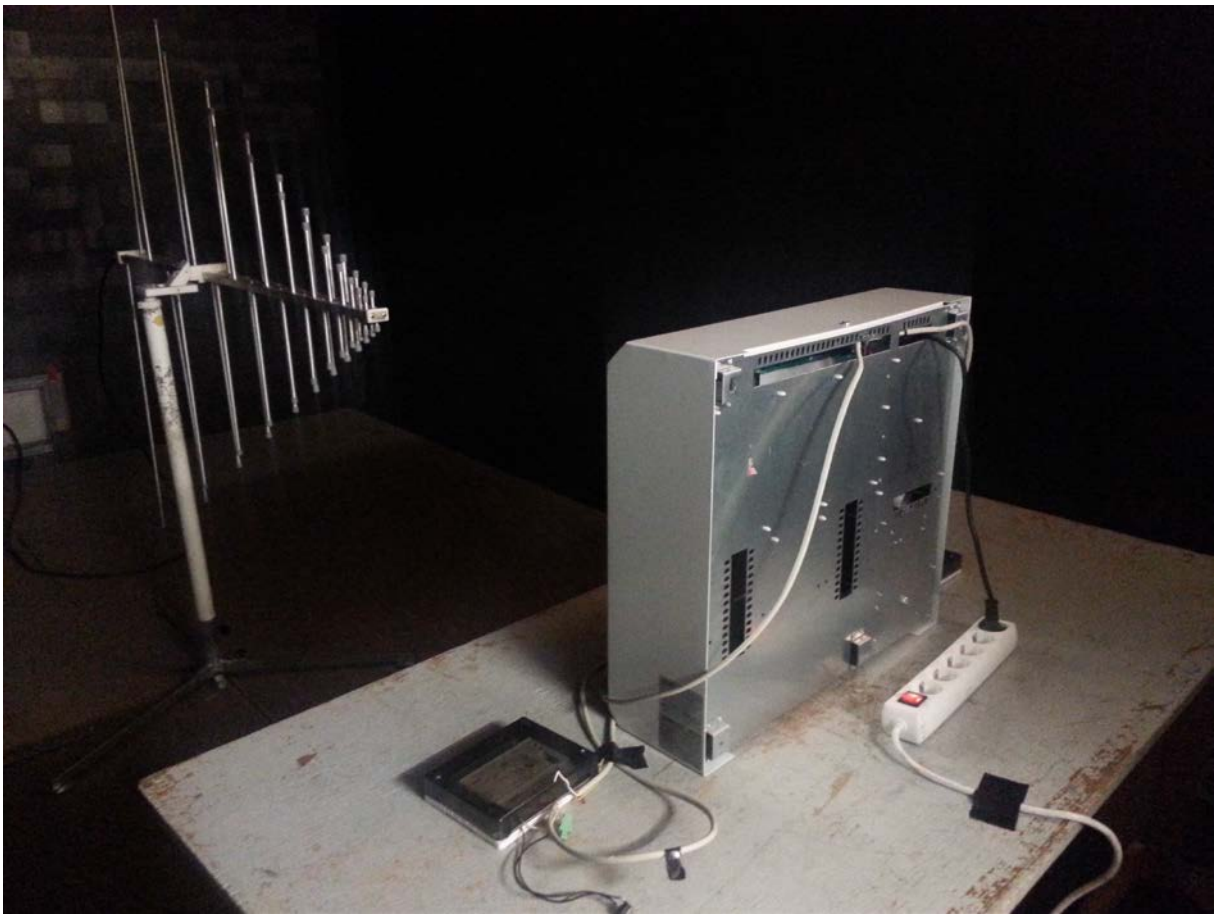
Photographs to the test: direct contact discharge

● **Discharge points**

Photographs to the test: indirect contact discharge

Discharge points

Photographs to the test: Electromagnetic fields - 1

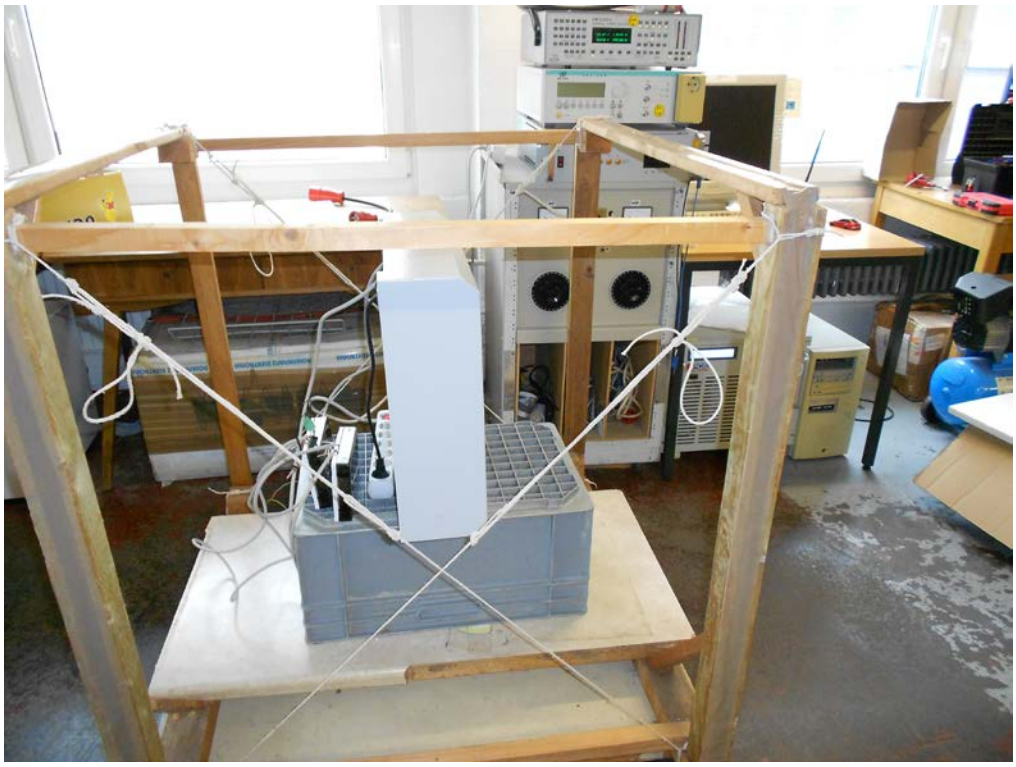


Photographs to the test: Electromagnetic fields - 2

Photographs to the test: Power magnetic fields

X-axis

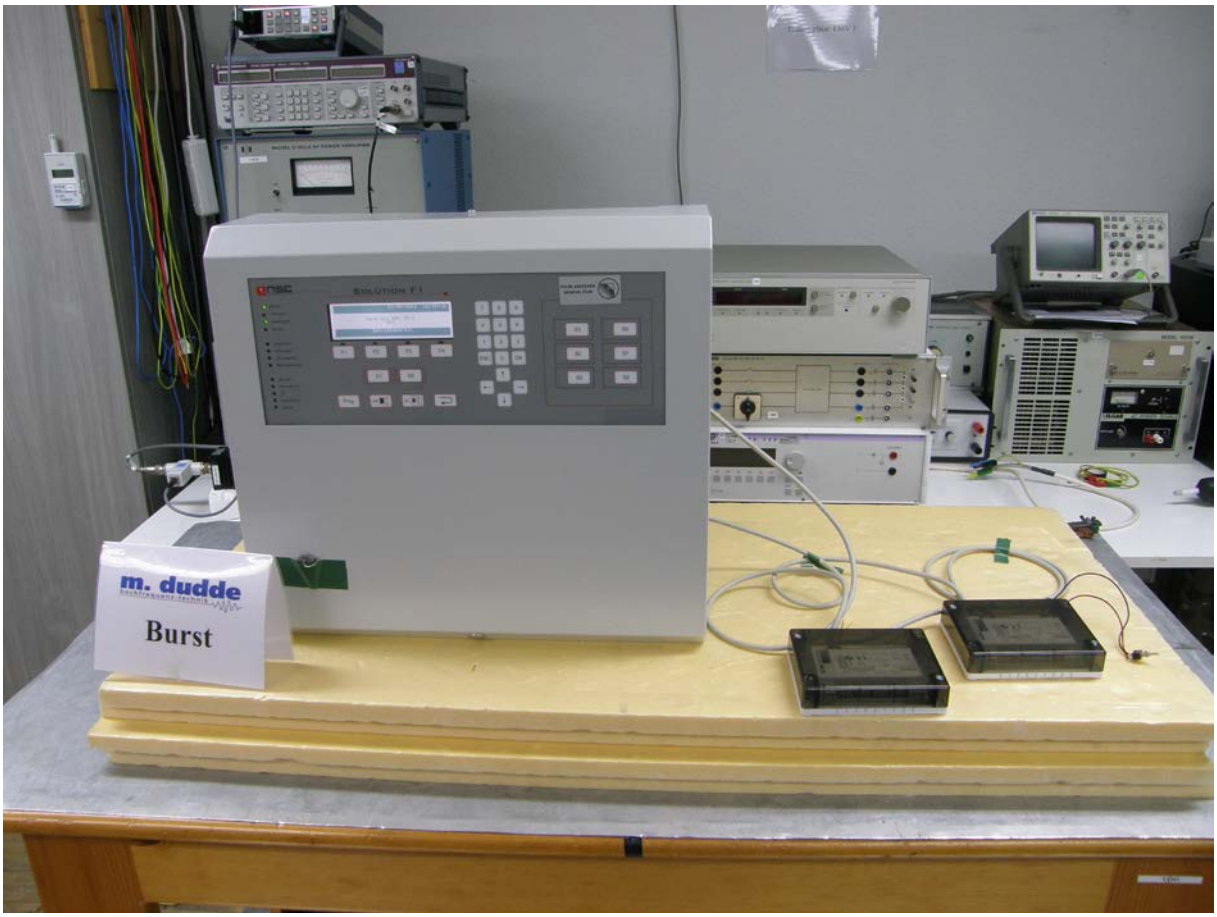
Y-axis



Z-axis

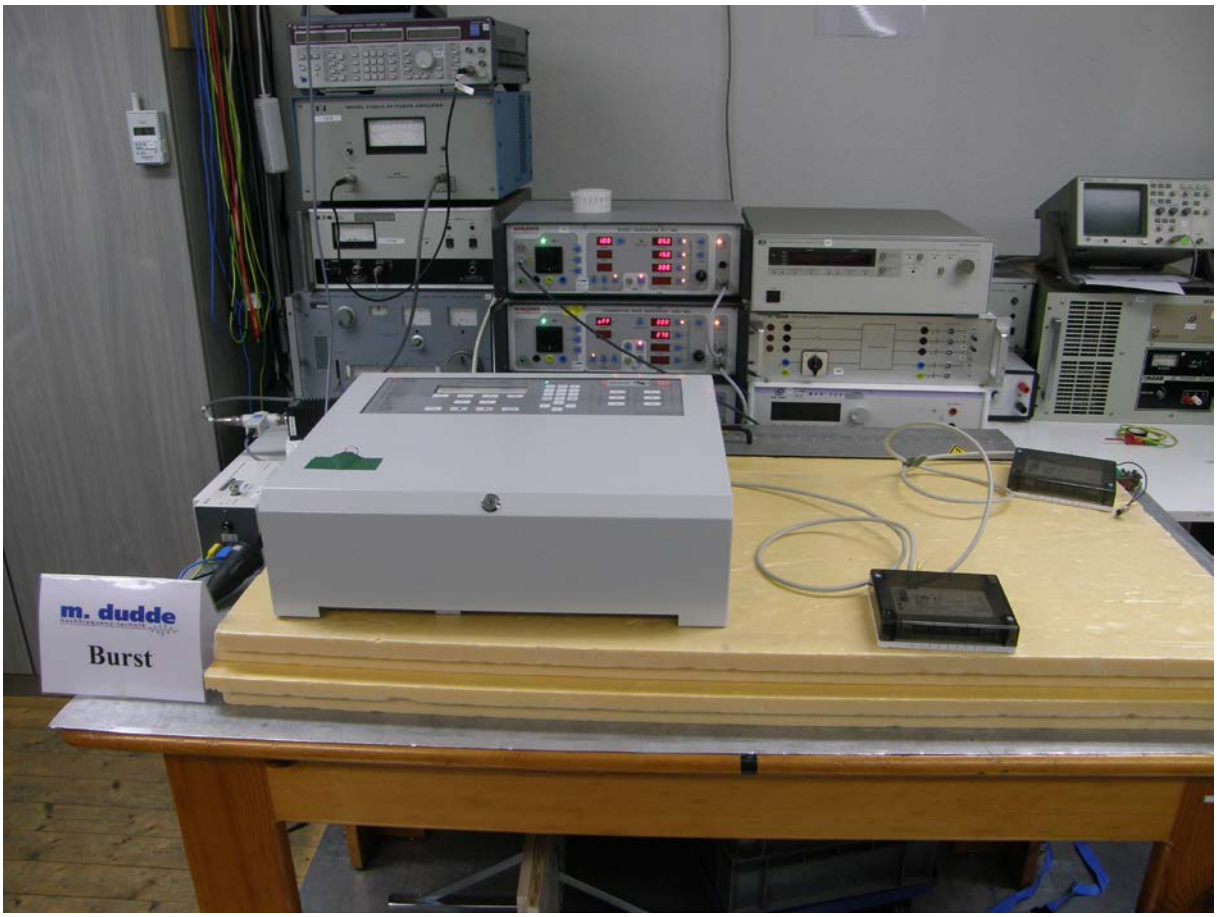
Photographs to the test: Voltage dips & interruptions

Photographs to the test: Fast transients AC Port



Photographs to the test: Surges – AC power input port

Photographs to the test: Fast transient Input / Output ports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Burst

Photographs to the test: Surge Input / Output ports

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Photographs to the test: Radio frequency common mode, Input / Output ports


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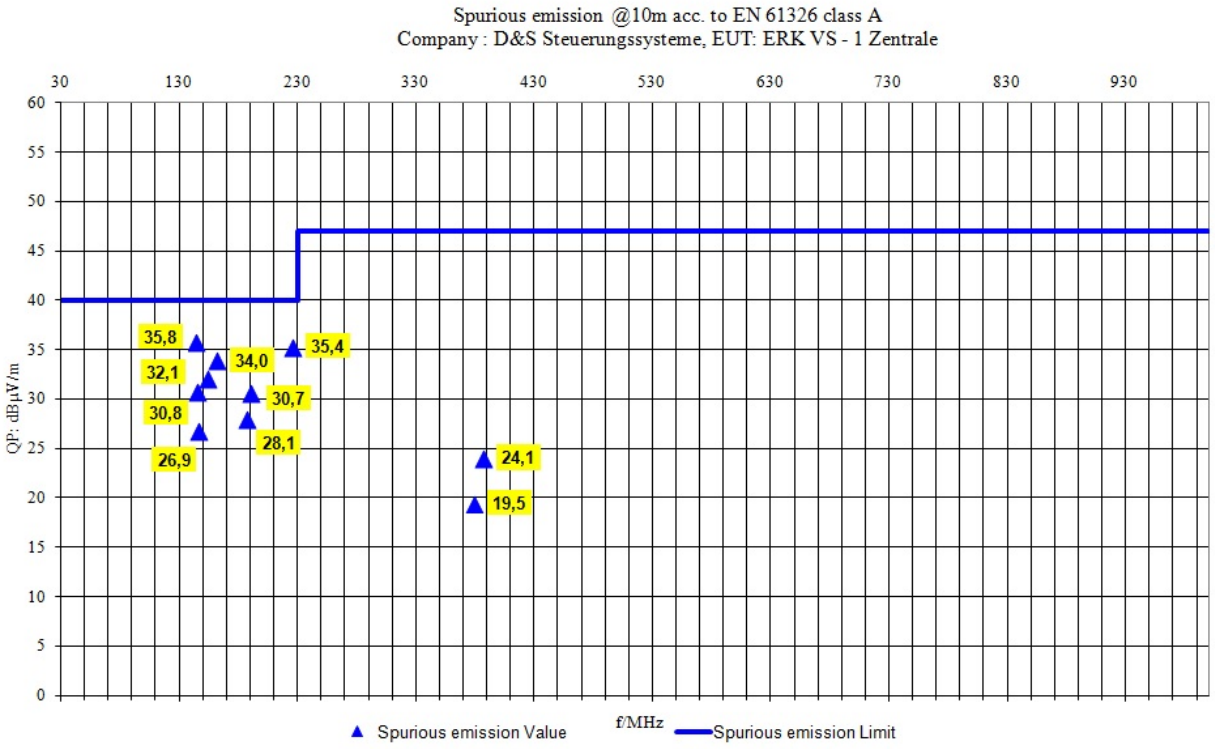
RF common mode

Photographs to the test: Radiated emissions

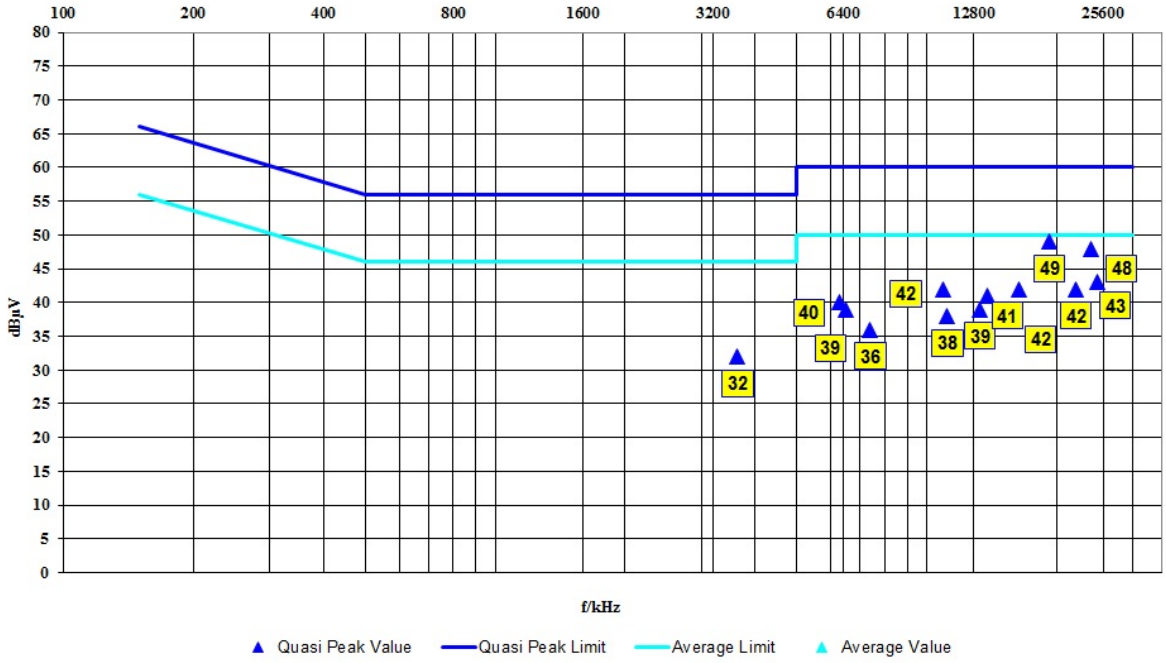
Test result: Radiated emissions



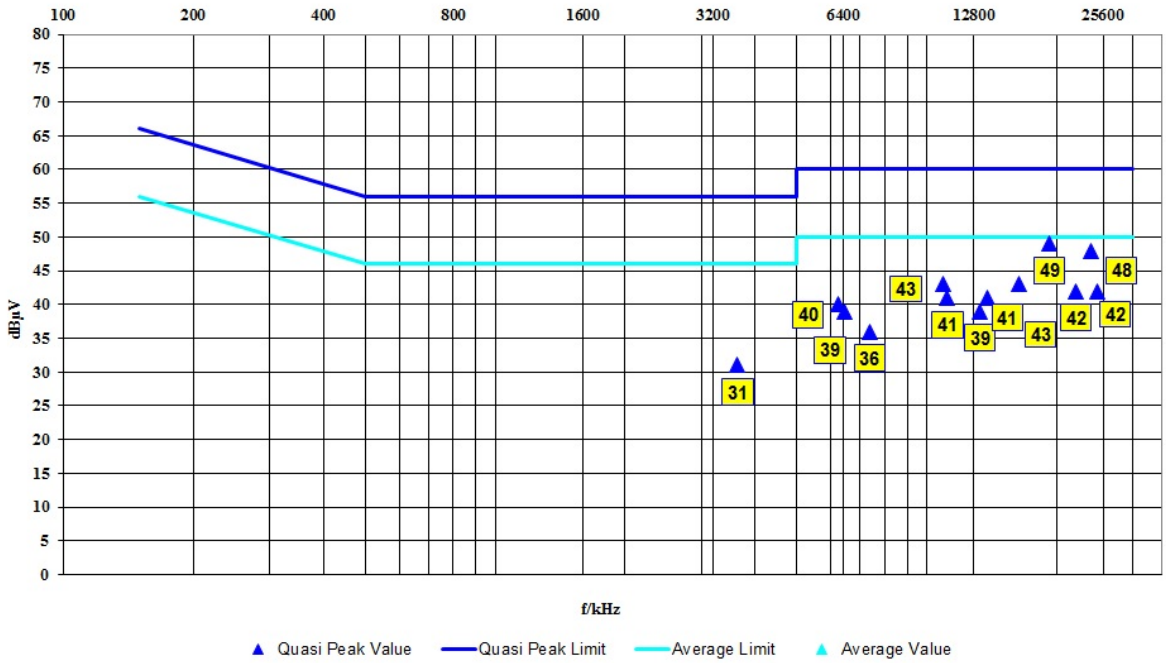
Photographs to the test: Conducted emissions

Test result: Conducted emissions

AC mains power input ports acc. to EN 61326
Company: D&S Steuerungssysteme GmbH EUT: ERK VS-1 Zentrale line N



AC mains power input ports acc. to EN 61326
Company: D&S Steuerungssysteme GmbH EUT: ERK VS-1 Zentrale line L



End of test report

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