

## Test Report No. EWB40192-05-TR2

### Neutrik RJ45 Plug NE8MX6 / NE8MX6-B

#### Initial Sample Testing

Return Loss and NEXT

Tested according to ISO/IEC 11801 Ed. 2.2 Cat. 6<sub>A</sub>

Tested for

**Neutrik AG**

Im alten Riet 143

9494 Schaan

Liechtenstein



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## 1 Test Description

### 1.1 General/Overview

With initial sample testing, the Telegärtner Labs evaluate whether an infrastructure component complies with national or international standards. With this sort of testing, selected samples are usually tested before the production of a series starts.

To ensure superior product quality, the Telegärtner Labs test passive components and devices according to the most demanding national and international standards.

With Telegärtner's Real-time Re-embedded testing procedure, components and devices are tested according to the demanding category 6<sub>A</sub> specifications. However, these specifications are not relevant for all kinds of components. Depending on the very type, they have to be tested as individual components or as part of an assembly or a link.



Telegärtner is one of the very few companies who are able to test components without the need for baluns to be used as an adapter between the tester and the device to be tested. Telegärtner's direct fixture test procedure allows the fixture of the device under test to be connected directly to the tester. This leads to more precise and more reliable test results than usual test procedures.



For a detailed description of the component to be tested, please refer to chapter *1.2 Device under Test (DUT)*.

The standards against the component is tested are listed in chapter *1.4 Applicable Standards*.

## 1.2 Device under Test (DUT)

The following component was tested in the Telegärtner Lab:

### **Neutrik RJ45 Plug NE8MX6**



The test applies also for the following plug type as the printed circuit board and contacts are the same as in the type above:

### **Neutrik RJ45 Plug NE8MX6-B**



**Technical data of the DUT according to supplying company:**

Product	
Title	NE8MX6
Gender	male
Electrical	
Dielectric strength	1 kVdc
Insulation resistance	> 0.5 GΩ
Rated current per contact	1.5 A
Transmission performance	CAT6A, acc. TIA/EIA rating CAT6A, acc. IEC/ISO/EN rating
Power over Ethernet	PoE+ acc. IEEE 802.3at
Mechanical	
Cable O.D.	7.0 - 9.5 mm
Lifetime	> 1000 mating cycles
Wiresize	solid: AWG 24/1 - AWG 22/1 stranded: AWG 24/7 - AWG 22/7
Locking device	Latch lock
Insulation diameter	> 1.10 - 1.60 mm
Material	
Bushing	PA / PU
Contact plating	Au
Shell	Zinc diecast (ZnAl4Cu1)
Shell plating	Nickel
Strain relief	POM
Environmental	
Protection class	IP 65 (in combination with NE8FDX-*6-W)
Temperature range	-40 °C to +70 °C

### 1.3 Parameters to be tested

The following parameters of the DUT were tested:

#### *a) Return Loss*

When an electrical signal travels along a link, any disturbances that might occur (e.g. transition from a cable to a connector, transition from a connector to a module ("plug to jack")) or any changes whatsoever cause a part of the signal to be reflected at the very point the disturbance appears. The return loss indicates how much of the signal is being reflected. As the return loss is by convention expressed as a logarithmic ratio of the signal power returned to the incident signal power, a high return loss value is desirable and means that only very few power is reflected.

#### *b) NEXT*

The acronym NEXT stands for "near end crosstalk attenuation". Crosstalk means that the signal travelling along one pair of a cable can be detected on an adjacent pair as well, which is unwanted. NEXT is the attenuation ("suppression") of the unwanted crosstalk at the near end of a link. Similar to the return loss, a high dB value of NEXT is desirable because it indicates that only very little of signal energy leaks into adjacent signal lines.

### 1.4 Applicable Standards

The device was tested according to the following standard:

ISO/IEC 11801 Ed. 2.2 Cat. 6<sub>A</sub>

## 2 Test Setup

### 2.1 General/Overview

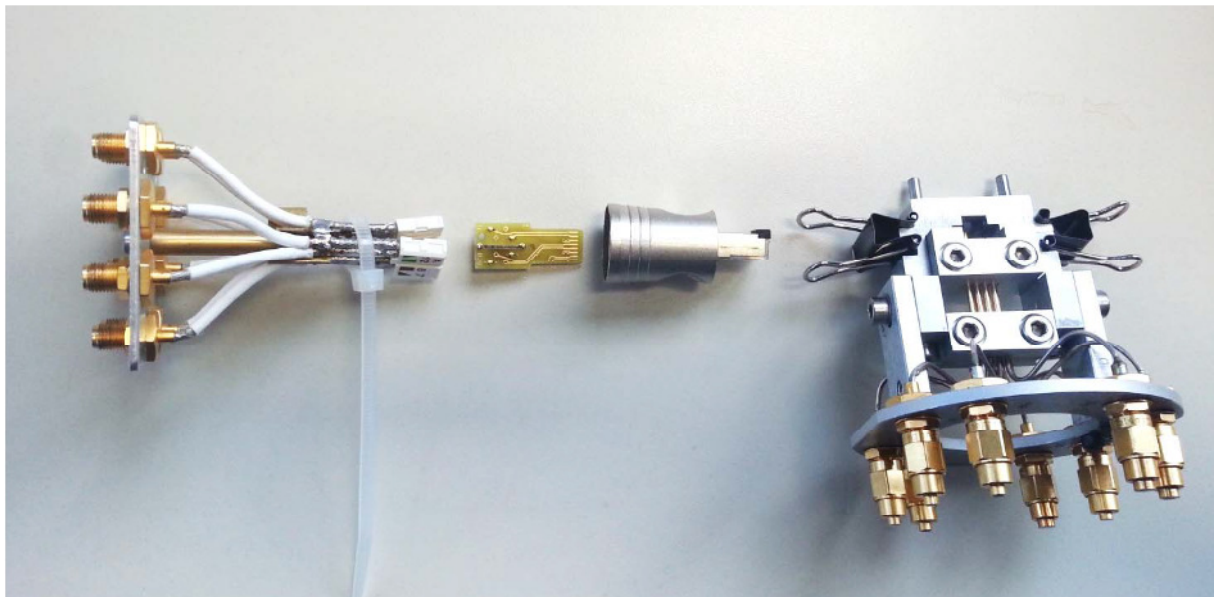
The test was conducted in the Telegärtner Lab in Steinenbronn, Germany, as described in chapter 2.2 Test Setup, in a standard lab environment.

### 2.2 Test Setup

The device under test was connected to the test fixture.

The fixture was connected to an 8-port network analyzer using coaxial cables.

Baluns as adaptors were NOT used.



Exploded view of the test setup. The connector body was opened to access the RJ45 connector interface. RG 188 coaxial cables connected the printed circuit board to the network analyzer. A standard compliant direct probe fixture by Telegärtner terminated the test setup.

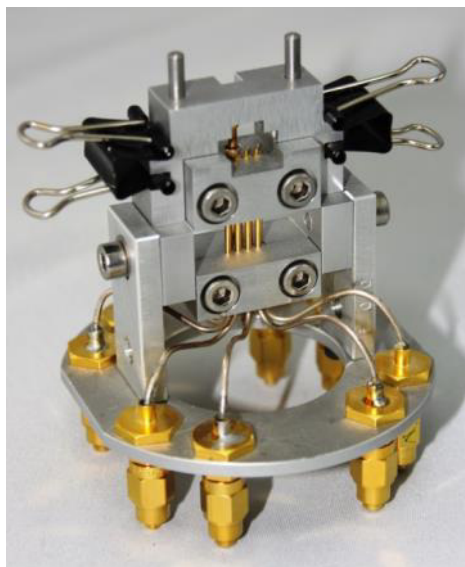
## 2.3 Tester

8-port network vector analyzer Rohde & Schwarz ZVT 8  
with calibration unit ZV-Z58, 300 kHz to 8 GHz.



## 2.4 Test Adapter

Telegärtner direct probe fixture.





### **3 Testing**

#### **3.1 General/Overview**

The test was conducted in the Telegärtner Lab in Steinenbronn, Germany.  
It was conducted in a standard lab environment. No special EMC cabin was used.

#### **3.2 Date**

Date of the test: 08.12.2014

#### **3.3 Tester/Test Device Numbers**

Rohde & Schwarz vector network analyzer ZVT8  
with calibration unit ZV-Z58, 300 kHz to 8 GHz.  
Serial number 100159  
TG number 06457300

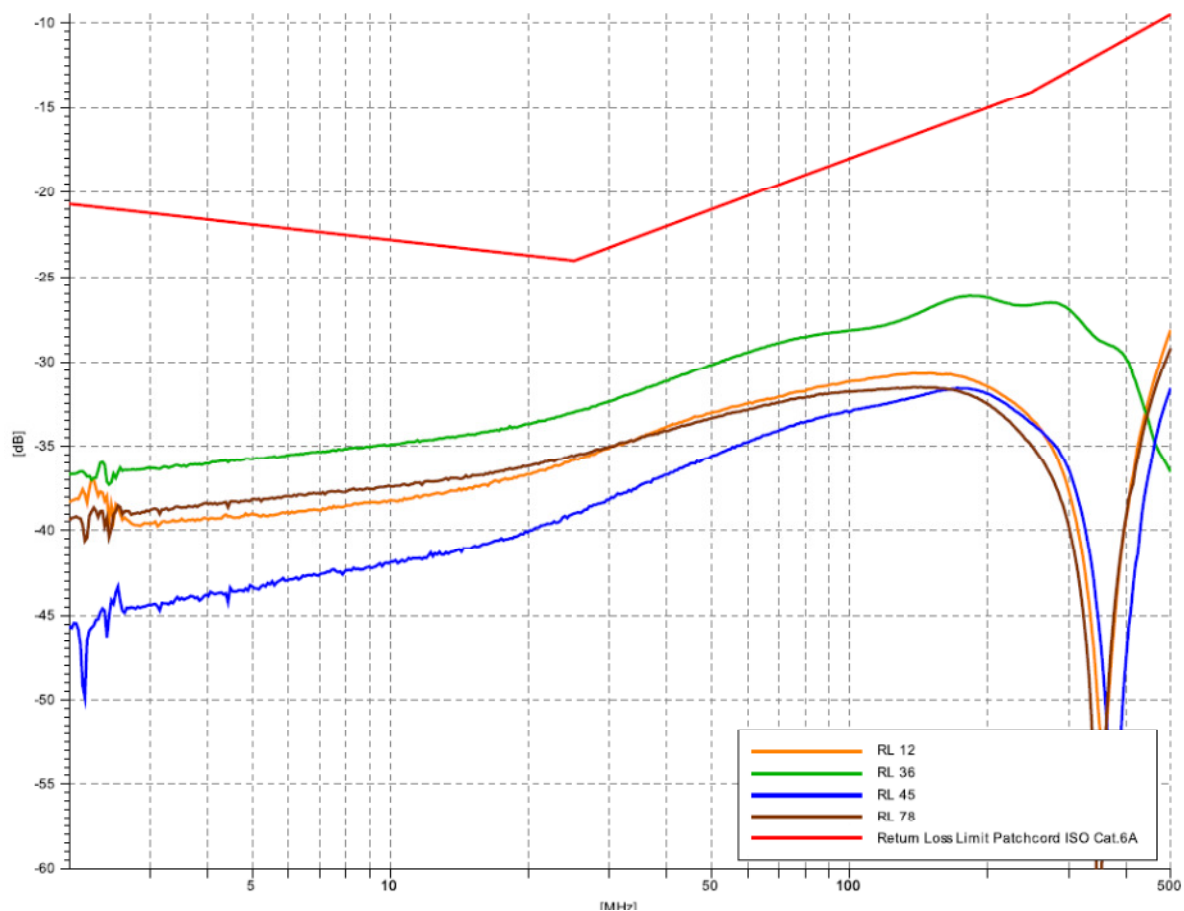
#### **3.4 Technician**

Test technician:  
Frank Albert  
Lab Technician

### 3.5 Test Data

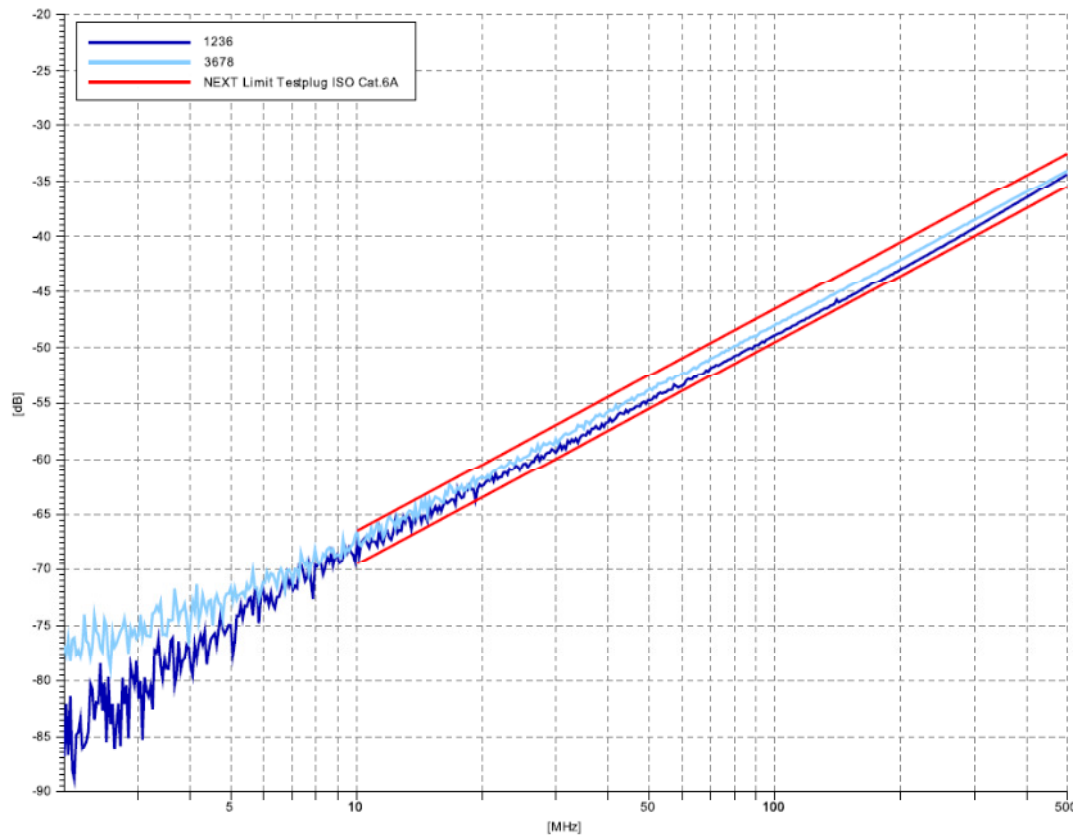
The following graphical data was obtained during the tests:

#### a) Return Loss



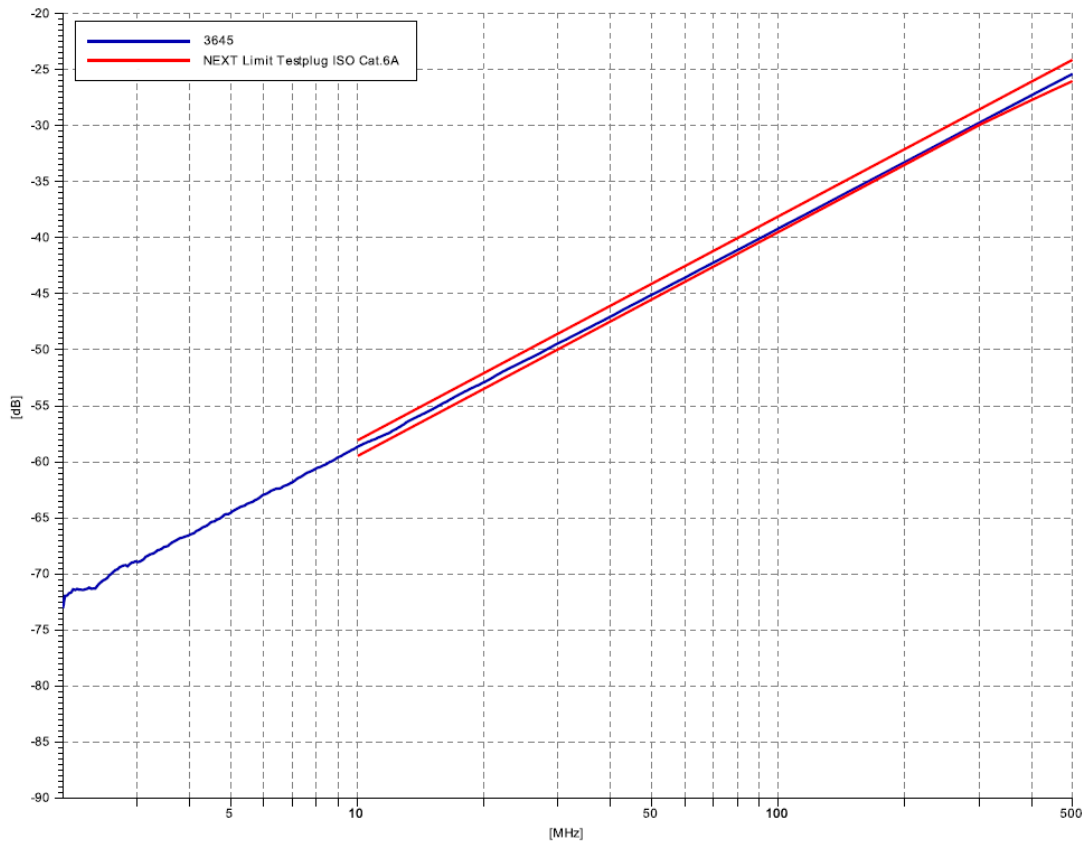
Return loss is measured using the direct probe fixture. The fixture is terminated with 50  $\Omega$  impedance. Notice that this is the only way to characterize the return loss of a plug without destroying the device under test. This means that return loss contributions from the fixture is included in the measured signal as well. However, this is not a serious drawback, as the return loss contribution is small compared to that of the plug. Ultimately it is most reasonable to compare the return loss of the plug plus fixture to the limits specified for patch cords. As we can see there is ample headroom with respect to the limit.

*b) NEXT*



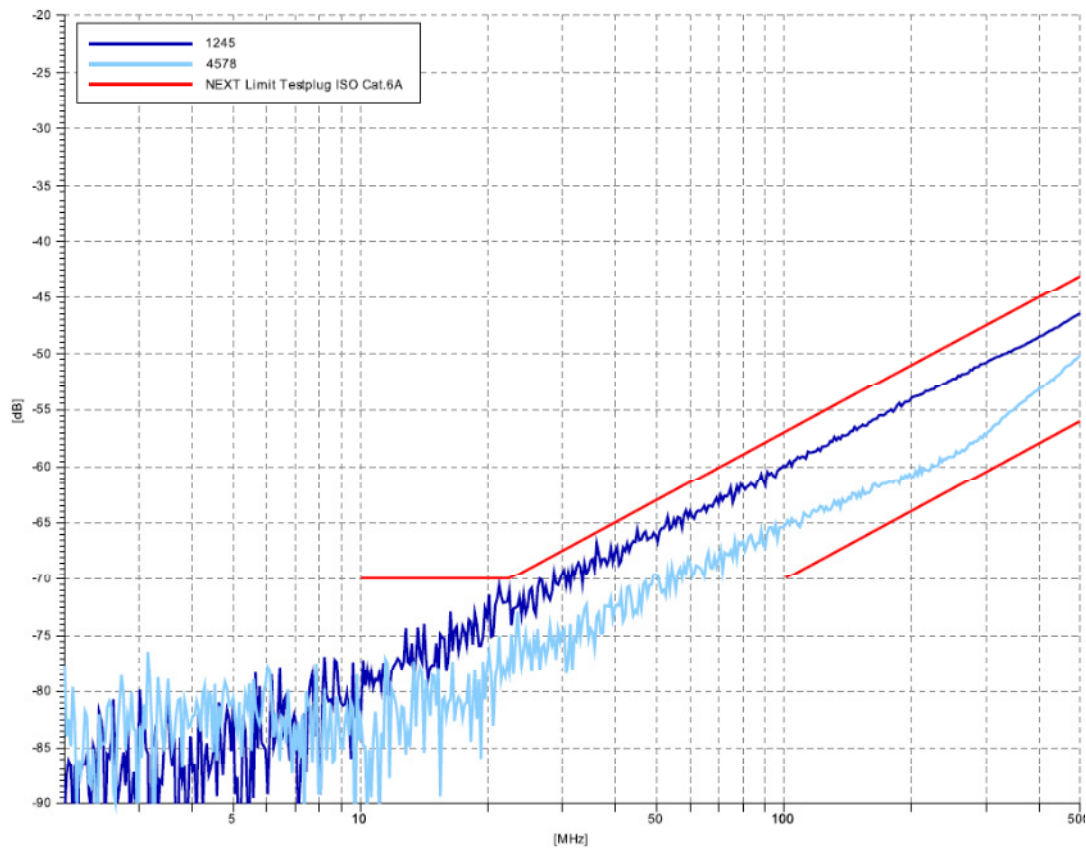
Notice that here the limits of the test are the limits of the Test Free Connectors (TFCs) according to IEC 60512-27-100.

*NEXT continued*



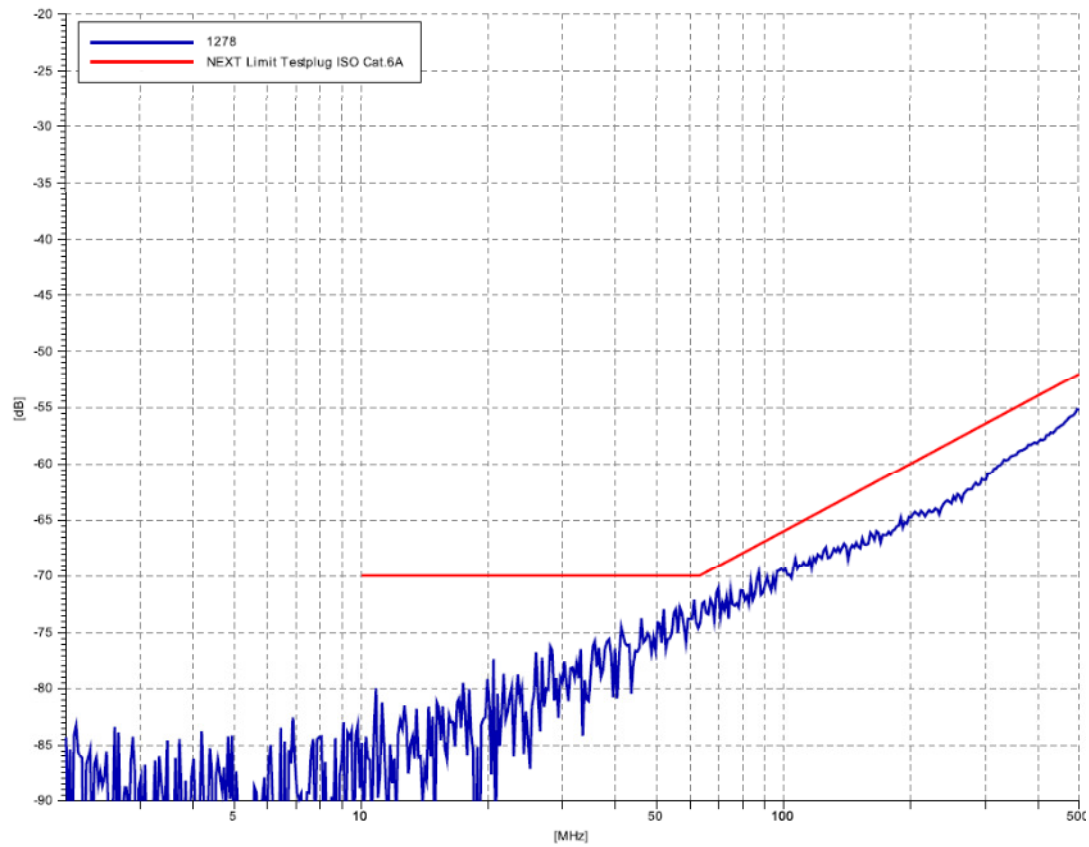
Notice that here the limits of the test are the limits of the Test Free Connectors (TFCs) according to IEC 60512-27-100.

*NEXT continued*



Notice that here the limits of the test are the limits of the Test Free Connectors (TFCs) according to IEC 60512-27-100.

*NEXT continued*



## 4 Test Results

### 4.1 Summary of the Test Data

The **return loss test result** of all pairs is better than the specified values.

The **NEXT test result** of all pair combinations, including the innermost pair combination 3645 is in line with the specified values.

### 4.2 Conclusion/Recommendations

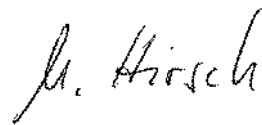
As a results of the test, the parameters NEXT and Return Loss tests can be regarded as

**PASS**

The DUT is a fully compliant Cat. 6<sub>A</sub> component according to ISO/IEC 11801 Ed. 2.2 standard.



Dr. Habbo Heinze  
Technical Managing Director R&D



Margret Hirsch  
Distinguished Expert

# Mouser Electronics

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