

Appendix 1

R&Mfreenet Warranty Program

1. R&M certification Process

The following persons are eligible to apply for warranty certification.

Certified person	Eligible to apply for
R&Mfreenet-Certified Installation Manager (individual person)	25 year system warranty
R&Mfreenet-Certified Designer (individual person)	Lifetime application warranty 25 year system warranty

1.1. R&M Certification requirements

- a) Follow the applicable standards for products and installation.
See "Chapter 3 Standards"
- b) Installation according latest versions of:
 - R&M Product Instruction Guides
 - R&M "Installation and Testing Guideline for Generic Cabling"
- c) Visual inspection shows no faults:
Visual inspection covers at least 10% of installed links (5% on patch panel and 5% on outlet) according the following points:
 - Termination and/or re-termination according to installation guides.
 - Bending radius according to R&Mfreenet "Installation and Testing Guideline for Generic Cabling"
 - Cable jacket stripping and untwisting of cable pairs according to EN 50174-1 and R&Mfreenet "Installation and Testing Guideline for Generic Cabling";
 - Labeling of components according to EN 50174-1
 - Cable laying, management, grounding connection according to EN 50174-1 and "R&Mfreenet Installation and Testing Guideline for Generic Cabling";
 - The fiber optic measurement can be made with either a Light Source / Power Meter or OTDR according to ISO/IEC 11801 and

“R&M*freenet* Installation and Testing Guideline for Generic Cabling”;

- d) Measurement results show no faults

R&M reserves the right to refusal of warranty

1.2. Administrative process for warranty

A complete R&M certification process package is required when applying for a warranty, consisting of:

- Cabling plans in AutoCad, PDF, RTF, visio format;
- Request for certification using the online form, fully completed with all relevant information and all necessary compliance tick boxes checked.
- Calibration certificate of testers for tests made not using Fluke equipment
- Power budget at 850nm/1300nm or 1310nm/1550nm including fiber length, number of connectors and number of splices for fiber applications.
- Complete test report showing all auto test electrical parameters and/or optical parameters (original test equipment measurement data only), and bi-directional measurements (for fiber applications).
- For copper **channel** certification the declaration on the warranty request form, that 50% of all channels are equipped with a work area cord and an equipment cord manufactured by R&M, must be ticked.
- For all warranty certifications, the declaration in the warranty request, of compliance to standards, R&M installation and testing guidelines and exclusive use of genuine R&M products throughout the installed system, must be ticked.
- The material list in the warranty application must be completed including at least the core products that make up the installed system.

2. Specification

2.1. Product specification

The specification of the product can be found in the product data sheet.

2.2. System specification

The table below specifies the channel and permanent link performance of the different systems. The channel and permanent link requirements are defined according to standards listed in chapter 3.

R&M system name	Permanent Link	Channel
Category 5e	Class D	Class D
Category 6	Class E	Class E
Category 6 Real 10	Class E	Class E _A
Category 6A* **	Class E _A	Class E _A
Category 8	Class I	Class I
OM3	ISP, OSP ISO14763-3 EN61280-4-1	ISP, OSP ISO14763-3 EN61280-4-1
OM4		
OM5		
OS2	ISP, OSP ISO14763-3 EN61280-4-2	ISP, OSP ISO14763-3 EN61280-4-2

* The R&M Cat. 6_A system exceeds the requirements of all cabling standards for channel and permanent link as listed in chapter 3 for NEXT parameter by at least either 2dB or 4dB margin, dependent upon the connector used (Min 2dB margin for Cat6_AEL and min 4dB margin for Cat6_A).

** The combination of Category 6_A connectivity and Category 7_A installation cable will support 25GBase-T transmission according ISO/IEC TR11801-9905 up to 30m.

3. Standards

3.1. ISO/IEC

- ISO/IEC 11801-1 2017
- ISO/IEC 11801-2 2017
- ISO/IEC 11801-3 2017
- ISO/IEC 11801-4 2017
- ISO/IEC 11801-5 2017
- ISO/IEC 11801-6 2017
- ISO/IEC 14763-3 2018
- ISO/IEC TR11801-9905 2018

3.2. EN

- EN 50173-1 2018
- EN 50173-2 2018
- EN 50173-3 2018
- EN 50173-4 2018
- EN 50173-5 2018
- EN 50173-6 2018
- EN 50174-1 2018
- EN 50174-2 2018
- EN 61280-4-1 2019
- EN 61280-4-2 2014
- EN 50310 2020






3.3. TIA/EIA

- TIA/EIA-568-0.E 2020
- TIA/EIA-568-1.E 2020
- TIA/EIA-568-2.D 2018
- TIA/EIA-568-3.D 2016
- TIA-942-B 2017

4. Approved Test Equipment

4.1. Copper certification test equipment

The listed test equipment is approved for executing certification measurements and producing an original measurement file, which is needed to apply for a warranty. The test equipment is used for Pass or Fail observations.

Class D	Cat. 5e	MHz 1 - 100	Class E	Cat. 6	MHz 1 - 250	Class E _A	Cat. 6 _A	MHz 1 – 500	
AEM TestPro CV100			AEM TestPro CV100			AEM TestPro CV100			
Fluke DSX-600, 5000, 8000 Versiv™			Fluke DSX-600, 5000, 8000 Versiv™			Fluke DSX-600, 5000, 8000 Versiv™			
Ideal LanTEK III, LanTEK IV LanTEK IV - >FW 1.34			Ideal LanTEK III, LanTEK IV LanTEK IV - >FW 1.34			Ideal LanTEK III, LanTEK IV LanTEK IV - >FW 1.34			
Softing WireXpert WX4500 WireXpert WX500			Softing WireXpert WX4500 WireXpert WX500			Softing WireXpert WX4500 WireXpert WX500			
VIAVI Certifier 10G, Certifier 40G			VIAVI Certifier 10G, Certifier 40G			VIAVI Certifier 10G, Certifier 40G			

Class I systems equipment approval can be viewed on our R&M webpage for the latest information.

Test equipment must be calibrated in accordance with manufacturer specifications (typically once per year).

4.2. Copper reference test equipment

R&M recognized reference test equipment must be used for the warranty claim procedure.

Furthermore, in case of headroom examination and system comparison, only R&M recognized reference test equipment is accepted.

This test equipment exceeds the required measurement accuracy of the standards set for level IIIE test equipment and approaches the measurement accuracy of laboratory test equipment.

The below table specifies the R&M recognised copper reference test equipment for the relevant standards:

Class D	Class E	Class E _A
Fluke DSX 5000	Fluke DSX 5000	Fluke DSX 5000

Test equipment must be calibrated in accordance with manufacturer specifications (typically once per year).

4.3. Fiber Optic (FO)

All commercially available test equipment complying with the measurement procedure IEC 60874 or similar are admissible as long as:

- Test Equipment (TE) must be able to store results in an electronic format
- TE must be able to measure length and attenuation
- TE must be able to produce test result data in format other than .csv or .pdf

ALL test equipment (including test heads) must be calibrated in accordance with manufacturer specifications (typically once per year).

5. Guaranteed topologies

Copper

- **One** connector model (**MPTL**) measured as either PL (for CP cords) or Channel (for equipment cords)
(refer to R&M Installation and Testing Guidelines);
- **Two**-connector model measured as a permanent link or channel without CP or cross-connect,
(refer to R&M Installation and Testing Guidelines);
- **Three**-connector model measured as a channel, through a permanent link and a 1 connector model for equipment cords,
(refer to R&M Installation and Testing Guidelines);
- **Three**-connector model measured as a permanent link, through a permanent link and a 1 connector model for CP cords
(refer to R&M Installation and Testing Guidelines);
- **Basic, standards compliant Four**-connector model measured as a channel through a permanent link, a 1 connector model for equipment cords and a 1 connector model for CP cords
(refer to R&M Installation and Testing Guidelines);
- **Four**-connector “**Back-to-Back Interconnect**” model (Double fixed-link model) measured as a permanent link or channel through two interconnected permanent links
(refer to R&M Installation and Testing Guidelines);
- **Four**-connector “**Cross-Inter-Cross Connect**” model measured as a channel through a permanent link and two, one connector models for equipment cords
(refer to R&M Installation and Testing Guidelines);

Fiber

- “Direct” combined channel
(refer to R&M Installation and Testing Guidelines);
- “Spliced” combined channel
(refer to R&M Installation and Testing Guidelines);
- “Patched” combined channel
(refer to R&M Installation and Testing Guidelines);

6. Abbreviations

CP	Consolidation Point
dB	decibel
EIA	Electronic Industries Alliance
EN	European Norm (Standard)
IEC	International Electrotechnical Commission
ISO	International Organisation for Standardisation
MPTL	Modular Plug Terminated Link
NEXT	Near End Cross Talk
OTDR	Optical Time-Domain Reflectometer
PL	Permanent Link
TIA	Telecommunications Industry Association