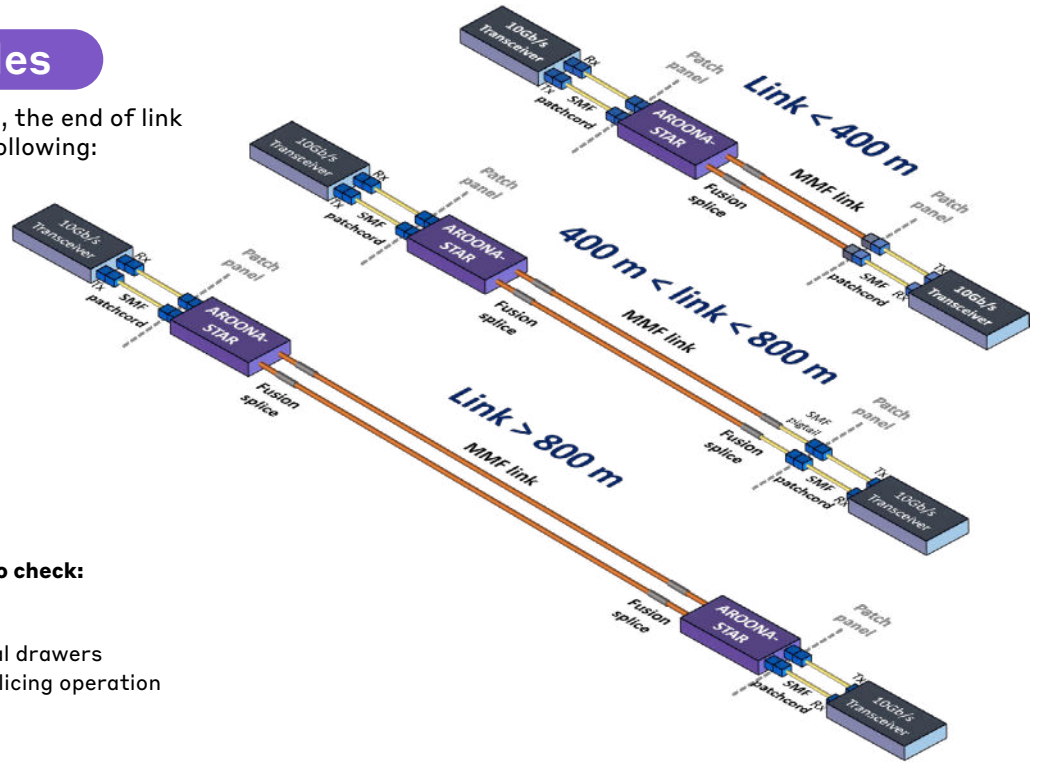


QUICK **INSTALLATION** GUIDE

Engineering rules

Depending on the fiber length, the end of link is different, as shown in the following:



Site survey

Before installation, remember to check:

- Access to IT rooms
- Access patch panels and optical drawers
- Available length of MMF for splicing operation
- Fibers identification
- Granted cut-off time per link

Distance	< 400 m (short link)	< 800 m (mid-range link)	> 800 m (long link)
End of the link	Existing MMF connector	MMF connector replaced with SMF connector or pigtail	2nd AROONA-STAR

1. Setup

1.1 Required equipment

- Optical fusion splicer
- Lint-free wipes and cleaning solvent
- Kevlar scissors
- Stripper for cable and optical fiber
- Optical fiber cleaver
- Fiber optic extension OM1/OM2 type (≥ 2 mm sheath)
- Splice protection sleeves
- 1310 nm single mode reflectometer
- SMF launch cables x2 (100 m minimum)
- Single-mode patch cords

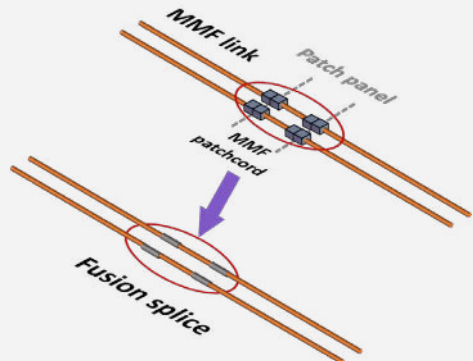


1.2 Optical link control

Before installation, OTDR control is recommended. Please refer to the **“OTDR link test after AROONA-STAR installation”** section of this guide to know recommended parameters and analysis.

1.3 Replacing connectors

When distribution panels are present along the link, **MMF connectors must be cut off and fibers must be fusion spliced instead**, prior to installing AROONA-STAR.

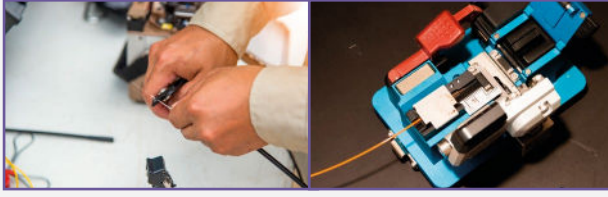


1.4 Install the AROONA rack or module

- **Rack format:** Fix the AROONA-STAR rack to the front side of the network cabinet using the 4 cage nuts and the 4 screws provided. Bring the AROONA-STAR MMF to the existing optical drawer.
- **Compact format:** Install the AROONA-STAR compact module in the existing optical drawer. Connect the SMF ports to the patch panel.

2. Fusion splicing

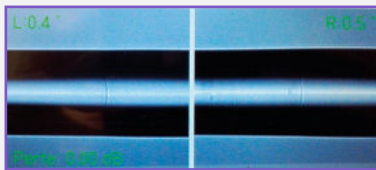
Cut the existing fiber MMF connector and strip the fiber over a few centimeters using the stripper. Clean and cleave the fiber at a precise 90° (+/- 2°) angle using the optical fiber cleaver.



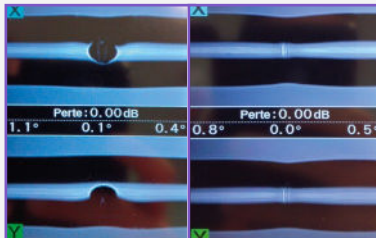
2.1 MMF to MMF splicing

Use the **automatic MMF program** of the splicer for any type of MMF. Place the supplied protection sleeves to secure the splicing.

Compliant splicing



Non-compliant splicing



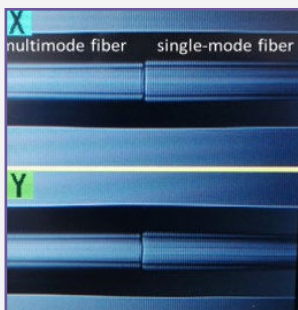
Bubble

Pinching

2.2 SMF to MMF splicing

For links **between 400 m and 800 m**, the connector at the end of the link must be replaced with a single-mode pigtail. Therefore, a single-mode to multimode fusion splicing is necessary.

Most splicing equipment does not have a dedicated program to this end. However, an **MMF-to-MMF auto-alignment** can be used, as the cladding diameter of single-mode fibers and multimode fibers are similar (125 µm).



Warning: A “bubble in the fiber” error may be reported after the fusion is completed, even if the fusion quality is compliant. Do not take it into account, unless an actual bubble is observed on the control screen, as shown in the previous section. Visual acceptance criteria are the same as for a standard MMF-to-MMF fusion splice.

3. Control and production

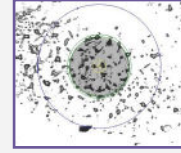
3.1 Cleaning connectors

Dirty connectors will seriously degrade the link performance. Dirt will add insertion loss and prevent optimal modal control. Be sure to use the proper cleaning procedure, using specific inspection equipment and dedicated cleaning material: solvent, lint-free wipes, etc.

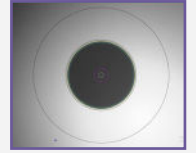
Check MMF and SMF connectors before OTDR control and production.



NOK connector: dust



NOK connector: sebum



OK connector

3.2 Reflectometry control

OTDR is mandatory to check that every event meets compliant values for loss and reflectivity. See the “OTDR link test after AROONA-STAR installation” section of this guide for more details.

Use **single-mode OTDR at 1310 nm** and make sure you have **single-mode launch and receive cables** (100 m minimum).

3.3 Transceiver compatibility

- Use **single-mode transceivers only**, dual-link and bi-directional
- Operating wavelength range: **[1270 nm - 1625 nm]**

Recommended transceivers at 1 and 10 Gb/s (1310/1550 nm)

	< 400 m (short link)	< 800 m (mid-range link)	> 800 m (long link)
Simple link (less than 3 fiber trunks)	1000BASE-LX/EX 10GBASE-LR/ER	1000BASE-LX/EX 10GBASE-LR/ER	1000BASE-LX/EX 10GBASE-ER
Complex link (more than 3 fiber trunks)	1000BASE-LX/EX 10GBASE-ER	1000BASE-LX/EX 10GBASE-ER	1000BASE-LX/EX 10GBASE-ER

For more information on transceiver recommendations, see the complete instruction manual.

Wavelength Division Multiplexing compatibility

AROONA-STAR is compliant with C-WDM and D-WDM multiplexing at any wavelength in the operation range. MUX and DEMUX equipment are installed between AROONA-STAR and the active layer.



Flash the QR code to access the **AROONA-STAR instruction manual**

See quick installation guide and video tutorial in other languages:



AROONA

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OTDR link test after installation of AROONA-STAR

Hardware and parameters

● **Before installation:** perform a **single-mode bidirectional** OTDR inspection (link length, fiber or connector degradation)

Connectors at intermediate distribution panels must be replaced by fusion splicing

● **Equipment:** Single-mode Optical Time Domain Reflectometer **at 1310 nm**, **5-10 ns pulse**

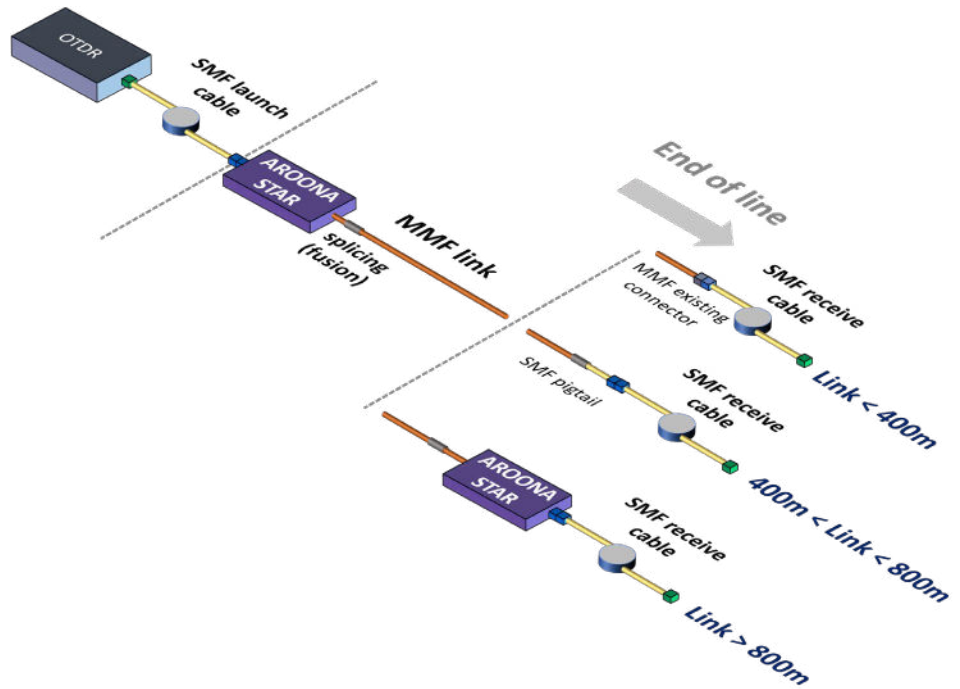
● **Check** that the patch cord connectors and equipment are **clean** before performing the measurement

● **Single-mode launch and receive cables:** 100 m minimum

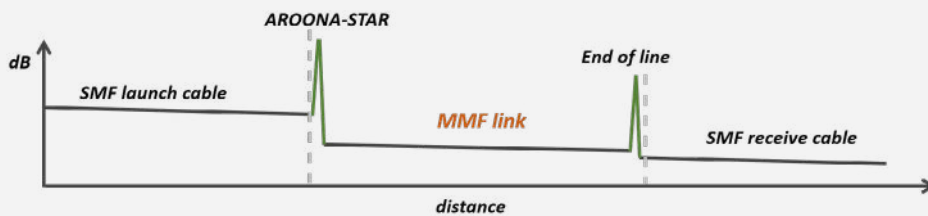
● See AROONA-STAR Instruction manual for more details on the OTDR analysis

Note: The «AROONA-STAR» event is the combination of 3 events: a connector, the modal control function and a fusion splice

Cabling diagram



OTDR control analysis



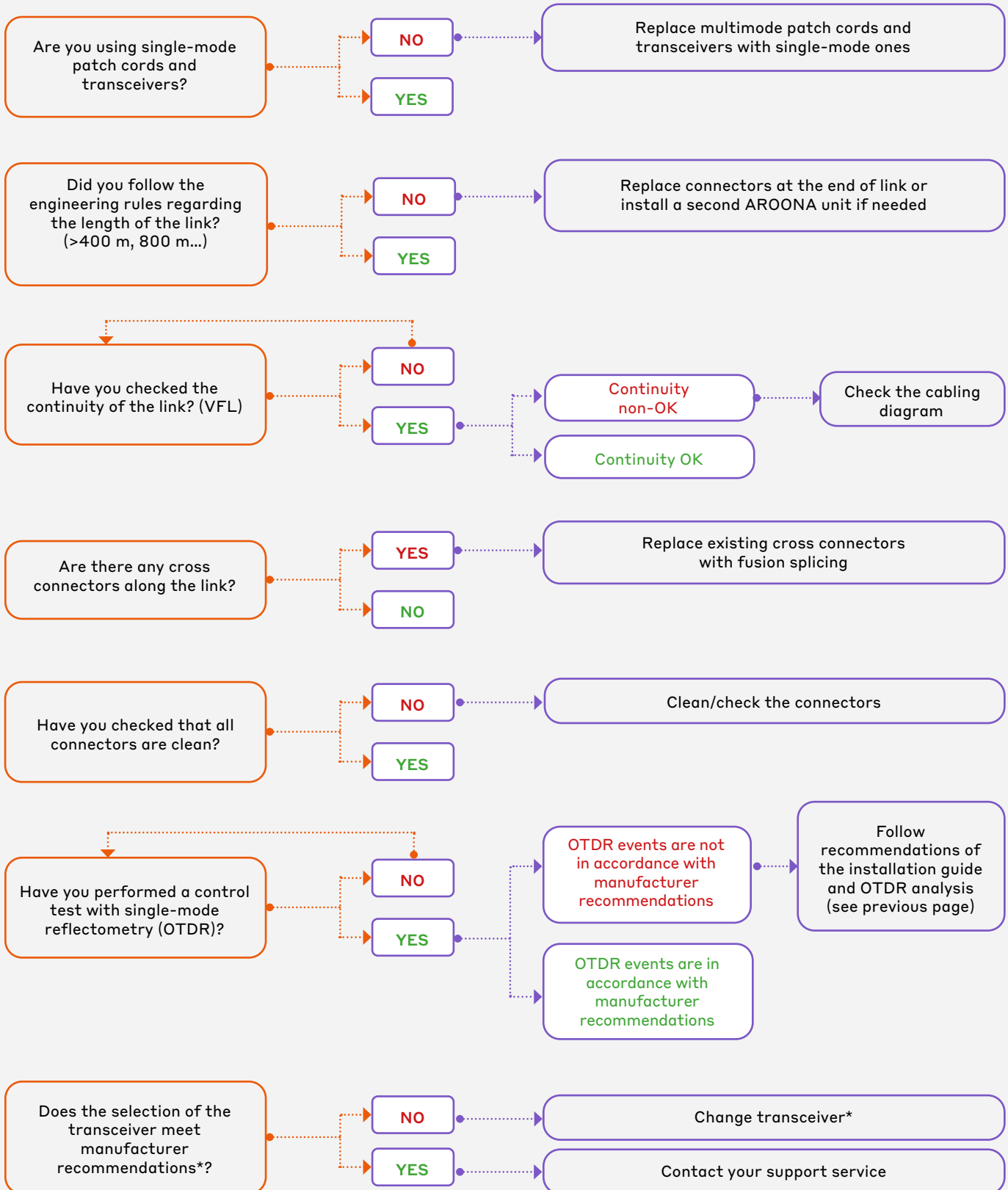
Events	Standard compliant loss	Standard compliant reflectance
AROONA-STAR	< 2 dB	< -45 dB
MMF connector (end of the link)	< 2.5 dB	< -20 dB
Pigtail or SMF connector (end of the link)	< 2 dB	< -45 dB
MMF-MMF Intermediate fusion splice	< 0.3 dB	< -55 dB
Linear attenuation (at 1310 nm)	< 1.5 dB/km	/

Note: The values shown are averaged in both direction. The insertion loss may vary significantly depending on the direction of measurement. Typical loss for AROONA-STAR or cable connectors at the end of the link are ≈ 2 dB in the SMF \rightarrow MMF direction, and ≈ 1 dB in the MMF \rightarrow SMF direction.

What to do in case of non-compliance

- **Non-compliant loss:** check the condition of the connectors or redo the splicing
- **Non-compliant reflectance:** clean the connectors

Any problem on your link? Have you checked these points?



*See user manual for transceivers recommendations, depending on the network architecture.