Test Project

Module A - Optical Fibre Cabling System

ICT Network Infrastructure

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Contents

Introduction **3**
Description of project and tasks **3**
Requirement Categories 3
Task Structure 4
Task 1: Work Planning and Record Preparation *4*
Task 2: Optical Cable Installation, Fibre Connection, Storage and Labelling *4*
Task 3: Inspection, Measurement and Acceptance Judgement *4*
Task 4: Final Verification and Completion Reporting *5*
Instructions to the Competitor **6**
Competition time and breaks 6
Changes in competition and site conditions *6*
Mandatory requirements for installation and Measurement 6
1. Non-compliance with Installation Requirements *6*
2. General Installation Requirements *7*
3. Cable Length, Routing and Management *7*
4. Optical Fibre and Labelling Requirements *7*
5. Identification, Record and File Requirements *8*
6. Measurement Requirements *8*

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Introduction

Module A addresses the ability to plan, install, connect, identify, verify and validate an optical backbone infrastructure extending from the OSP area to the main distribution area inside a building. The Module simulates optical infrastructure deployment and acceptance work, including OSP cable introduction, underground closure work, ODF termination in the building CD area, wall-mounted FTB connections, rack-to-rack backbone cabling, inspection, measurement and documentation.

The purpose of this Module is not only to complete optical fibre connections, but also to demonstrate that the completed infrastructure is safe, measurable, maintainable and traceable through records and related files. Therefore, consistency between the physical installation, labels, measurement results, Forms, competitor-assigned IDs and related files is important.

The Module also requires Competitors to respond to formally announced changes in competition or site conditions, maintain installation quality, update records appropriately and complete all required work under conditions that simulate an actual installation environment.

Module A consists of the following documents and files:

- Module A Test Project: Optical Fibre Cabling System
- Doc. MA1: Module A Installation Specifications
- Fig.MA_series: Installation Layout and Reference Drawings
- Form MA_1: Work Plan, Execution and Completion Record
- Form MA_2: Equipment Fibre Connection and Patch Cord Management Record
- Form MA_3: Label Record
- Form MA_4: Inspection and Measurement Record
- Label Guide_WorldSkills2026_brother.pdf: Labelling requirements and application examples

Description of project and tasks

Module A consists of four Tasks covering work planning and record preparation, optical cable installation and fibre connection, inspection and measurement, and final verification and completion reporting.

Requirement Categories

The requirements in this Module are classified into three categories: Mandatory (M), Advanced (A) and Option (O).

Mandatory requirements are the requirements that every competitor shall complete. They define the required links, quantities, connection methods, permitted work ranges, measurement methods and other basic requirements specified in the Installation Specifications.

Advanced requirements are optional, point-bearing requirements for improving the quality, maintainability, identification and record consistency of the work covered by the Mandatory requirements. They may include fibre assignment, cable and fibre storage, label management, consistency between the physical installation and the records, and conditions required for reliable measurement and verification. If an Advanced requirement is not completed, no points are awarded for the corresponding item, but this does not constitute incomplete Mandatory work.

Option requirements specify additional advanced work that competitors may carry out. They may include additional links, additional verification, improved cable or fibre storage, enhanced record consistency and other specified work. The applicable Advanced requirements associated with an Option requirement shall be satisfied before points may be awarded for that Option requirement. If an Option requirement is not carried out, or if any

Advanced requirement has not been assessed as satisfied, no points shall be awarded for that Option requirement. This does not constitute incomplete Mandatory work.

Assessment in this Module covers not only the completed physical installation but also the consistency and traceability of the work plan, physical identifiers, installation and label records, inspection and measurement results, and related files.

Task Structure

The Module is organized into the following four Tasks.

Task 1: Work Planning and Record Preparation

During Task 1, competitors shall complete the following work planning and record preparation:

- Review the Installation Specifications (Doc.MA1), drawings, relevant guidelines, supplied materials, tools and measurement instruments, and identify the requirements and conditions for installation, inspection and measurement. Refer to Fig.MA_series for the sleeve fixing positions in the storage trays.
- Record the work sequence, work description, planned time, installation precautions and key points in the Work Plan, Execution and Completion Record (Form MA_1).
- Complete the planning fields required before installation in the Equipment Fibre Connection and Patch Cord Management Record (Form MA_2) and the Label Record (Form MA_3). Competitors may also complete any other fields that can be determined at this stage.

Competitors may produce identification labels during the preparation period on Day 1. Competitors may also prepare connection diagrams (Fig.MA_series) as working aids where necessary. Competitors are not required to submit these figures.

At the end of the one-hour Task 1 period on Day 1, Competitors shall submit Forms MA_1 for interim review. The Forms will be returned after the review and may be updated during the remainder of the Module.

If the work plan, fibre assignment, port assignment or other planned information is changed during Task 2-4, competitors shall update Form MA_1 and any other affected Forms.

Task 2: Optical Cable Installation, Fibre Connection, Storage and Labelling

Carry out the specified optical cable routing, fibre termination and connection, cable and fibre storage, patch cord connection, and labelling in accordance with the Installation Specifications (Doc.MA1).

The installation locations of ODFs and other equipment shall be in accordance with the Installation Layout (Fig.MA_1_location).

Record the installation and connection results in the Equipment Fibre Connection and Patch Cord Management Record (Form MA_2), and record the production and attachment results of identification labels in the Label Record (Form MA_3).

Task 3: Inspection, Measurement and Acceptance Judgement

Connector end-face inspection is classified under Task 3 but shall be performed immediately before each optical connector is connected during Task 2. If cleaning or any other action is taken, competitors shall re-inspect the connector and confirm a Pass result before connection.

After completing the specified optical links, competitors shall carry out the required measurements or verifications in accordance with the specified measurement conditions, applicable standards and acceptance criteria.

Competitors shall record the inspection results and final judgements, together with the results and Pass/Fail judgements of all measurements and verifications, in the Inspection and Measurement Record (Form MA_4). Form

MA_4 consists of the following three forms: Form MA_4a shall be used for connector end-face inspection, Form MA_4b for OTDR and OLTS measurements, and Form MA_4c for VFL and continuity verification.

If an inspection, measurement or verification result is Fail or abnormal, competitors shall take the necessary corrective action and record the re-inspection, re-measurement or re-verification result and final judgement in Form MA_4.

Competitors shall record the corresponding IDs in Form MA_4 and provide links to the related files.

Task 4: Final Verification and Completion Reporting

At the end of the Module, competitors shall verify consistency between the physical installation and the records in Forms MA_1 to MA_4. Competitors shall also confirm that the IDs shown on the physical installation match the IDs recorded in each Form.

Competitors shall complete the Completion Report in Form MA_1 and clearly identify the completed requirements and any incomplete, unresolved or on-hold items.

Competitors shall take and save photographs of the completed fibre storage and connection condition for each applicable equipment item and record the corresponding Photographic Record ID in Form MA_2.

Any item that was not performed or has a final judgement of "Fail" in Form MA_4 shall be reflected in the "Change, Non-Conformity and Corrective Action" section and the Completion Report in Form MA_1.

Competitors shall complete the required installation work and Forms MA_1 to MA_4, collect all tools and materials, dispose of waste, and clean the work area.

Competitors shall submit the completed Forms MA_1 to MA_4 and all related files by the specified deadline.

Table 1 Forms and Main Purposes

FORM	TITLE	MAIN PURPOSE
MA_1	Work Plan, Execution and Completion Record	Work planning and execution, changes, non-conformities, corrective actions and completion reporting
MA_2	Equipment Fibre Connection and Patch Cord Management Record	Management of cable and fibre connections, remaining fibres, storage and patch cords
MA_3	Label Record	Printing, attachment and verification of identification labels
MA_4	Inspection and Measurement Record	Connector end-face inspection, measurement and verification, action and correction, re-inspection, re-measurement, re-verification and final judgement

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Instructions to the Competitor

Competition time and breaks

- The total competition time for Module A is nine hours. Day 1 consists of 2.5 hours. Day 2 consists of 6.5 hours, divided into two competition periods of three hours and 3.5 hours.
- During the first 1.5 hours on Day 1, Competitors shall carry out material checking, tool checking, Work area organization, cable preparation, measurement equipment preparation, label preparation and other necessary preparation work. Installation work, including cable cutting, stripping and termination, shall not be carried out during this preparation period. During the preparation period, Competitors may produce identification labels. Entries relating to labels produced during the preparation period shall be completed in Form MA_3 during the Task 1 record-preparation period. The preparation and organization of the Work area will also be assessed. During the following one hour, competitors shall complete the initial requirements of Task 1.
- During each competition period on Day 2, Competitors shall take one 10-minute break at a time of their own choice. A break shall not be taken during the last 30 minutes of either competition period. Each break shall be taken within the Competitor's own Work area unless otherwise instructed or permitted by the designated Expert.
- Each break is included in the competition time. Competitors shall notify the designated Expert immediately before starting and after completing the break. During the break, Competitors shall not carry out installation, preparation, recording, measurement or any other competition work.

Changes in competition and site conditions

- During the Competition but before installation work begins, a reduction in the available installation time or changes to the site conditions may be formally announced as revised competition conditions for this module. Such changes may affect cable routes, connection methods, the installation or placement of termination equipment, the work sequence or other work procedures. Competitors shall adapt their work plan and work to the formally announced conditions, update the affected Forms to reflect the actual installation, and complete all required Tasks within the revised installation time.

Mandatory requirements for installation and Measurement

1. Non-compliance with Installation Requirements

- Where the SMT determines that a competitor has failed to comply with any of the installation requirements set out in Sections 2[1]-[4] and 3[6]-[7],[9]-[12] below, they shall notify the competitor and instruct the required restoration and rework. The competitor shall, where practicable, return the affected part of the installation to the condition immediately before the non-compliant work commences and repeat the work in accordance with the applicable requirement. Where restoration is not possible, replacement materials may be provided for the rework. The time required for restoration and rework shall be included in the competition time, and no additional time shall be granted. If the repeated work complies with the applicable requirements, full points remain available for the corresponding assessment item.

2. General Installation Requirements

1. All competition work shall, in principle, be performed in accordance with the installation methods and procedures applied at actual installation sites.
2. Special installation methods that are used solely to reduce competition time or gain a scoring advantage, that are feasible only in the competition environment, and that would not be acceptable at an actual installation site are not permitted.
3. All installation work shall be carried out in a manner that ensures quality, safety and maintainability.
4. Products shall be installed and handled in accordance with the manufacturer's instructions. Where different instructions are specified in the Test Project, drawings or other competition documents, those instructions shall take precedence.

3. Cable Length, Routing and Management

5. Where a cable length is specified by a numerical value, drawing or other means, the cable length shall comply with that specification.
6. Where a cable length is not specified, the cable shall be routed along the designated path, and the required length shall be confirmed before the cable is cut. However, where multiple cables have the same starting point, termination point, routing path and required maintenance slack, the required length may be confirmed using the first cable, after which the remaining cables may be cut to the same reference length.
7. A cable-routing operation begins when the cables are first placed along the designated route and ends when they have been routed to the specified termination location.
8. Temporary installation marks may be applied to identify cables during installation. However, such marks shall not be used as a substitute for identification labels. All cables for which identification labels are specified in the Installation Specifications or the Labelling Guidelines shall be fitted with the required labels.
9. A cable shall not be finally dressed or placed in its final storage position until its termination or connection has been completed. Temporary securing, support or staging necessary to ensure safety during installation or prevent damage to the cable is permitted.
10. A cable shall not be terminated before it has been routed along the designated path and positioned at the specified termination point.
11. Several cables shall not be pre-bundled or dressed on the floor or in another location and then routed as a bundle onto a cable ladder or other cable-routing system.
12. Unless otherwise specified, sufficient cable slack shall be provided for re-termination and other maintenance work. Excessive slack or coiled cable shall not obstruct equipment airflow.
13. Cables shall be secured to the cable tray at the specified intervals. Cables belonging to different systems or applications shall be routed in accordance with the designated pathways and segregation requirements. They shall not be intermixed and shall be secured independently.

4. Optical Fibre and Labelling Requirements

14. The colour coding of optical fibres and tubes shall comply with the manufacturer's specifications.
15. After the coating has been removed, the optical fibre shall be cleaned at least three times with a cleaning wipe moistened with ethyl alcohol before cleaving. A new cleaning wipe shall be used for each cleaning.
16. Identification labels shall be produced using a label printer in accordance with the Labelling Guidelines.

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5. Identification, Record and File Requirements

- Requirement IDs and any other IDs specified in the Installation Specifications, drawings or other competition documents shall be used as specified.
- Except for these specified IDs, Competitors shall assign all IDs used in the Forms, installed items, identification labels and related files.
- Each Competitor-assigned ID shall uniquely identify the corresponding item, record or file within this Module and shall be used consistently across the applicable Forms, installed items, identification labels and related files.
- Each inspection record file and measurement result file shall have a Competitor-assigned file ID. The file ID does not need to be identical to the corresponding Inspection Record ID or Measurement Record ID.
- Where a file ID differs from the corresponding Inspection Record ID or Measurement Record ID, the file ID shall be included in the file name or recorded in Form MA_4 so that the relationship between them is unambiguous.
- Minor corrections made promptly as part of the normal work process, before the relevant work is completed, do not need to be recorded in Form MA_1. A record shall be made in Form MA_1 if the work plan or planned installation details are changed, completed work is removed or repeated, or any item remains incomplete, unresolved or on hold.
- Competitors shall save all related files in the specified folder and ensure that all links in the Forms remain valid after submission.
- If AI is used in this Module, Competitors shall record the relevant work and the purpose of the AI use in the "Status/Remarks" field of Form MA_1. Competitors are responsible for verifying the accuracy and suitability of all AI-generated content before using it.

6. Measurement Requirements

- Inspection and testing of optical fibre cabling shall be performed in accordance with ISO/IEC 14763-3:2024 and the measurement conditions specified in Doc. MA1.
- Before performing any official OLTS measurement, Competitors shall complete the specified reference-setting procedure during the competition time in accordance with the manufacturer's instructions and the reference method specified in Doc.MA1. Before performing an OTDR measurement, Competitors shall confirm the specified wavelength, range, pulse width, refractive index and launch/receive fibre conditions.
- All official measurement results shall be retained in the internal memory of the test instrument and shall not be deleted or overwritten, regardless of whether the results are a Pass or Fail. Competitors shall export copies of the results for submission and save them in the designated folder without deleting or overwriting the original results.

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