Test Project

Module E - Troubleshooting

ICT Network Infrastructure

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Introduction

Competitors shall analyze the available evidence, identify faults, performance degradation or operational risks, infer the most probable contributing factors, and record the basis for their decisions. Where specified in Task 3, Competitors shall also implement and verify preventive or corrective actions.

Description of project and tasks

Module E requires Competitors to analyse faults, performance degradation factors, and maintenance risks related to physical and logical layers using the ICT infrastructure they constructed, and the evidence data provided. Competitors shall not simply identify fault locations, but shall establish hypotheses based on evidence, verify them, implement appropriate corrective or preventive actions, and record the reasons for their decisions.

Instructions to the Competitor

Module E evaluates whether Competitors can interpret, maintain, and improve ICT network infrastructure as an operational system. The total competition time for module E is two hours, allocated as follows:

- Task 1: 30 minutes
- Task 2: 30 minutes
- Task 3: 60 minutes

Task 1: Common Evidence Analysis and Reasoning

Description

In Task 1, Competitors shall analyze test and measurement data obtained using copper cabling testers and OTDR.

Competitors shall determine whether the provided data indicates a fault or performance degradation. Where a fault or performance degradation is identified, competitors shall determine its location or affected section and infer the most probable contributing factor based on the measurement results.

Requirements

Competitors shall:

- Review the provided test and measurement data.
- For each evidence set, Competitors shall record up to two diagnostic results. If no fault or performance degradation is identified, Competitors shall record “No fault or performance degradation identified” and state the supporting evidence.
- Determine the fault location or affected section.
- Infer the most probable contributing factor based on the measurement results.
- Record the identified fault or performance degradation, relevant measurement values, inferred contributing factor, and basis of judgement in the Reasoning Record.
- Record the basis for excluding other possible contributing factors.

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Task 2: Wi-Fi Environment Survey and Diagnostic Analysis

Description

In Task 2, competitors shall verify the Wi-Fi environment using the provided Wi-Fi testing instrument.

Competitors shall analyse the measured radio parameters and Wi-Fi radar scanning results. Based on the provided network requirements, Competitors shall identify access points (APs) exhibiting abnormal or non-compliant conditions and infer the most probable contributing factor for each identified issue from the measurement results.

Requirements

Competitors shall:

- Conduct a Wi-Fi environment survey and analysis using the provided Wi-Fi testing instrument.
- Review the radio parameters and Wi-Fi radar scanning results obtained from the survey and analysis.
- Identify APs exhibiting abnormal or non-compliant conditions based on the provided network requirements.
- Mark the identified APs on the Wi-Fi heatmap generated by the Wi-Fi radar.
- Identify the measurement values indicating each abnormal or non-compliant condition.
- Infer the most probable contributing factor for each identified issue based on the measurement results.
- Record each identified AP, the relevant measurement values, the inferred contributing factor, and the basis for the judgement in the Reasoning Record.
- A "non-compliant" finding is one that fails a specified network requirement or acceptance criterion. An "abnormal" finding is an unusual condition identified from the measurement pattern or comparative analysis where no explicit pass/fail criterion is specified.
- Complete the Reasoning Record.

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Task 3: Risk Assessment and Preventive Optical Correction

Description

This task includes preventive improvement work on optical links. Competitors shall inspect the optical links installed in Module A and identify connectors considered to require improvement from the perspectives of long-term reliability, maintainability, and sustainability. Competitors shall record the basis of their judgement and replace the identified connector using Splice-on Connectors. After re-termination, competitors shall perform cleaning and necessary measurements, and record the corrective results.

Requirements

Competitors shall:

- Review the measurement records, connection records, and label records from Module A.
- Based on the available records and physical condition, identify the specified number of connectors having the highest relative priority for preventive improvement. A connector may be selected even if it currently satisfies the acceptance criteria, provided that the selection is supported by evidence relating to performance margin, long-term reliability, maintainability, or sustainability.
- Record the basis of identified risks or inconsistencies.
- Identify two or more field-terminated connectors considered to require improvement from the perspectives of long-term reliability, maintainability, and sustainability.
- Record the basis for selecting the identified connector.
- Remove two identified connectors and re-terminate them using a Splice-on Connector.
- Perform cleaning after re-termination.
- Record the corrective or preventive actions, reasons, and verification results.
- Take and save photographs of the re-terminated connectors.

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MOUDLE E: REASONING RECORD TASK 1 | Common Evidence Analysis and Reasoning

Comp. No.		Record ID		Medium	☐ Copper ☐ Optical Fibre

1 Diagnostic Results

No	Classification	Identified Fault/ Performance Degradation	Fault Location/Affected Section	Relevant Evidence	Measurement Value	Most Probable Contributing Factor
1	☐ Fault ☐ Performance Degradation ☐ No fault or performance degradation identified					
2	☐ Fault ☐ Performance Degradation ☐ No fault or performance degradation identified					

2 Basis for Judgement

1	**Basis for Judgement**	*State the Diagnostic Result No. and briefly explain the basis for the conclusion.*
	Basis for Excluding Other Causes	*State the Diagnostic Result No., the main alternative causes considered, and why they were excluded.*
2	**Basis for Judgement**	*State the Diagnostic Result No. and briefly explain the basis for the conclusion.*
	Basis for Excluding Other Causes	*State the Diagnostic Result No., the main alternative causes considered, and why they were excluded.*

MODULE E: Reasoning Record

Task 2: Wi-Fi Environment Survey and Diagnostic Analysis

Heatmap / Measurement File ID		Survey Location	

Instructions: Mark each abnormal or non-compliant AP on the heatmap using its No. Then record the measurement value indicating the issue, the network requirement, the most probable contributing factor, and the basis for the judgement in the row with the same No. Record each abnormal or non-compliant finding in a separate row. If one AP has more than one distinct finding, record each finding in a separate row using the same AP identification.

Finding No.	Identified AP SSID/BSSID	Heat map No.	Measurement value indicating the abnormal or non-compliant condition Parameter/Value/Unit	Network requirement Acceptance criterion	Most probable contributing factor	Basis for judgement Comparison with requirement and relationship to measurement results	Finding
1		1	Parameter: Value: Unit:	Requirement: Acceptance criterion:			□ Non-compliant □ Abnormal
2		2	Parameter: Value: Unit:	Requirement: Acceptance criterion:			□ Non-compliant □ Abnormal
3		3	Parameter: Value: Unit:	Requirement: Acceptance criterion:			□ Non-compliant □ Abnormal
4		4	Parameter: Value: Unit:	Requirement: Acceptance criterion:			□ Non-compliant □ Abnormal

Completion Check

□ Identified APs are marked on the heatmap	□ Measurement values indicating each issue are recorded	□ Contributing factors and bases for judgement are recorded	□ The Reasoning Record is complete