Sydney Trains

Engineering System Integrity

Engineering Standard
Signalling and Control Systems

ST S 43016

Computer Based Signalling Equipment Tester

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Document control

Version	Date	Author	Summary of change
1.0	17 August 2023	David Mulley	First issue as a Sydney Trains document

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1 Computer Based Signalling Tester

This unit covers the application of knowledge and skill required to test Computer Based Signalling Equipment (non-commissioned) assets on the Sydney Trains network. This includes:

- Testing of computer based signalling equipment, including, but not limited to:
  - Computer based interlocking
  - Radio block centre
  - Key management system
  - Temporary speed restriction manager
  - Maintenance and diagnostic equipment
  - Signalling communications equipment.
- Checking equipment is positioned, installed and configured correctly to specification/specific design.
- Checking versions of the hardware, firmware and software are correct.
- Checking data version is correct (this does not attest the data to control tables).
- Checking the equipment correctly starts-up.
- Confirming the equipment functions and indicates correctly with no alarms.
- Confirming interfaces correspond correctly [this is a cooperative test with competent person for the external interfacing sub-system/equipment].
- Identifying equipment faults, damage, anomalies and errors, including fault indicators, error codes and take appropriate action.
- Completing test records and recording equipment information once satisfied all checks and test results are correct.

Note:

This unit excludes:

- **Function testing to control tables which is the verification of installed data to control tables**
- **Design integrity testing which is the validation of the installed data to the signalling principles and business requirements.**

1.1 Elements		1.2 Performance Criteria	
ST S 43016.1	Prepare to test computer-based signalling equipment	ST S 43016.1.1	All necessary configuration documents, manuals and work instructions are obtained
		ST S 43016.1.2	All necessary resources, including competent staff, tools and test equipment are obtained
ST S 43016.2	Inspect and power-up equipment	ST S 43016.2.1	Equipment is positioned, configured, and installed in accordance with specifications and signalling design
		ST S 43016.2.2	Equipment powers up correctly
		ST S 43016.2.3	Equipment hardware, firmware and software versions are correct
		ST S 43016.2.4	Equipment data version is correct
		ST S 43016.2.5	Equipment faults/damage/anomalies are identified and documented for appropriate action
ST S 43016.3	Perform equipment tests	ST S 43016.3.1	Equipment functions and indicates correctly with no alarms indicated
		ST S 43016.3.2	Test results are assessed for compliance with standards and design. Any anomalies are documented for appropriate action
ST S 43016.4	Perform interface tests	ST S 43016.4.1	Input sub-systems/equipment correspond and are correctly detected
		ST S 43016.4.2	Outputs correspond and correctly operate interfacing sub-systems/equipment
ST S 43016.5	Record equipment details and operating values	ST S 43016.5.1	Equipment details are recorded
		ST S 43016.5.2	Critical operating values are recorded
		ST S 43016.5.3	Test equipment details are recorded

1.1 Elements		1.2 Performance Criteria	
ST S 43016.6	Finalise testing of computer-based signalling equipment	ST S 43016.6.1	Equipment is left in a safe state
		ST S 43016.6.2	Outstanding or unresolved issues are documented and reported for further action in accordance with requirements.
		ST S 43016.6.3	Test documents are completed, signed and submitted

1.3 Range of Variables

Computer based signalling equipment:

The list of computer based signalling equipment is detailed in Section 1.

Relevant TfNSW standards and Sydney Trains instructions include:

- TfNSW, Sydney Trains and OEM equipment manuals and requirements
- *PR S 47113 Inspection and Testing of Signalling: Inspection and Testing Principles*
- *PR S 47114 Inspection and Testing of Signalling: Inspection and Testing Procedures.*

Standard configuration documents and records include:

- Signalling plan and circuit books
- Signalling Work Instructions
- Inspection and test forms
- Firmware, software and data installation forms.

1.4 Knowledge Requirements

The following underlying knowledge elements are requirements for the achievement of this competency.

For each type of computer-based signalling equipment for which competency is sought, the candidate will:

- Understand the critical nature of the equipment and how it operates.
- Read signalling plans and circuit books and interpret their details on the ground.
- Know how to set up and adjust the equipment for correct operation.
- Recognise when the equipment is not operating correctly.
- Recognise basic types of damage, faults and anomalies.

1.5 Competency Requirements

The following knowledge, competency and qualification requirements shall be achieved as a pre-requisite to receiving this competency.

Pre-Requisite Entry requirements

- *ST S 43002 Work Safely in a live Signal Location (SCS02)* authorisation.

Entry Qualification Requirements

Either:

- Certificate IV in Rail Signalling,

Or

- Certificate III – Electronics & Communications, Telecommunication Technology,

Electrotechnology, with the completion of the following units of study (or similar):

- Introduction to electrical engineering – fundamentals
- Basic electrical logic systems
- PLC's and microprocessors
- Basic data communication networks
- Analogue electronics (including problem solving in D.C. and low voltage A.C. circuits),

Or

- Relevant Tertiary Qualification (S or CS)
  - Bachelor's degree in electrical engineering

    Or
  - Bachelor's degree in an engineering subject with completion of the following electrical units of study (or similar):
    - Introduction to electrical engineering – fundamentals
    - Basic electrical logic systems
    - PLC's and microprocessors
    - Basic data communication networks
    - Analogue electronics (including problem solving in D.C. and low voltage A.C. circuits).

Training requirements

- EJ05 Signalling Principles 1
- EJ06 Signalling Principles 2
- ST46 Signal Circuit Inspection and Testing
- Product training for the setup and testing of the computer-based signalling equipment in accordance with this unit.

Experience

- Demonstrated experience in the product (through logbook evidence or other attestment).

Competency Requirements

- Be assessed as competent in Competency Standard *ST S 43016 Computer Based Signalling Equipment Tester* using an approved Competency Assessment Tool.

Behavioural Competencies

- Deciding and Initiating Action or equivalent
- Applying Expertise and Technology or equivalent
- Analysing or equivalent.

1.6 Evidence Guide

This provides essential advice for the assessment of the unit and must be read in conjunction with the performance criteria and range statement.

Each element and associated performance criteria must be demonstrated on at least two occasions in accordance with the "Assessment Guidelines UEE11".

Before the critical aspects of evidence are considered, all pre-requisites must be met.

Candidates shall demonstrate their knowledge and understanding of the computer-based signalling equipment fundamentals and operation using each of the following assessment methods:

- Documentary evidence of appropriate product training and qualifications held
- Evidence of completed training courses
- Logbook showing relevant experience in the product and testing.
- Responses to questioning by the competence assessor
- Practical Demonstration.

1.7 Assessment Context

This unit should be assessed as it relates to normal workplace practice using procedures, information and resources typical of a workplace. This should include a suitable work environment, facilities, equipment and materials to undertake actual work as prescribed in this unit.

Where simulation is considered a suitable strategy for assessment, conditions must be authentic and as far as possible, replicate the workplace.