

# Testing and Commissioning of Signalling Systems

## Engineering Standard

Rail Commissioner

SG1-DOC-000452

## DOCUMENT CONTROL

### Document Status

DOCUMENT OWNER UNIT MANAGER, SIGNAL & CONTROL SYSTEM ENGINEERING			
Action	Name and Position	Signature	Date
<b>Prepared By:</b>	Name: Edward Burch Title: Principal Engineer, Signals Engineering	<b>Digital Approval No: 6863</b>  Knet#16131496	07/10/2020
<b>Reviewed By:</b>	Name: Keith Charlton Title: Manager, Technical & Operational Assurance  Name: Gary Penfold Title: Principal Engineer, Signals Engineering	<b>Digital Approval No: 6863</b>  Knet#16131496  <b>Digital Approval No: 6863</b>  Knet#16131496	07/10/2020
<b>Approved By:</b>	Name: Joseph Denichilo Title: Unit Manager, Signal & Control System Engineering	<b>Digital Approval No: 6863</b>  Knet#16131496	07/10/2020
<b>Document Review Schedule:</b>		This document is due for review every 5 years or as required.	

(Document review cycle is every 5 years or as required)

### Document Amendment Record

REVISION	CHANGE DESCRIPTION	DATE	PREPARED	REVIEWED	APPROVED
0.1	Draft	November 2017	Kuldeep Zala	Keith Charlton  Oluwole Odusanya	Keith Charlton
0.2	Draft revised for review	April 2020	Edward Burch	Gary Penfold	
0.3	Draft updated to review comments. Submitted for wider review.	May 2020	Edward Burch	Gary Penfold	Joe Denichilo

## TABLE OF CONTENTS

<b>TABLE OF CONTENTS .....</b>	<b>3</b>
<b>1. Introduction.....</b>	<b>4</b>
<b>2. Purpose .....</b>	<b>4</b>
<b>3. Scope.....</b>	<b>4</b>
<b>4. Related Documents.....</b>	<b>4</b>
<b>5. References.....</b>	<b>4</b>
<b>6. Acronyms .....</b>	<b>4</b>
<b>7. Definitions .....</b>	<b>4</b>
<b>8. General Requirements.....</b>	<b>6</b>
8.1. Operating rules and procedures.....	7
8.2. Coordination with rail operations.....	7
<b>9. Responsibilities and accountabilities.....</b>	<b>7</b>
9.1. Tester in Charge.....	8
9.2. Commissioning Manager .....	8
9.3. Test Team Leader .....	9
9.4. Testers .....	9
9.5. Assistant Testers .....	9
9.6. Witness.....	9
9.7. Designers .....	10
<b>10. Planning and Documentation.....</b>	<b>10</b>
10.1. Testing strategy .....	10
10.2. Test Plans.....	11
10.3. Commissioning Plans .....	12
10.4. Commissioning Readiness .....	13
10.5. Pre-commissioning meeting.....	13
10.6. Test Logs.....	14
10.7. Design Changes .....	14
10.8. Handover.....	14
<b>appendix A – testing and commissioning forms.....</b>	<b>16</b>
(a) FO-EM-SE-1228 Certificate of Signalling.....	16
(b) FO-EM-SE-1229 Certificate of Signalling – Conditional .....	16

## 1. Introduction

The Department of Infrastructure and Transport and (DIT) owns the Adelaide Metropolitan Passenger Rail Network (AMPRN) infrastructure under the Rail Accreditation assigned to the Rail Commissioner. The AMPRN is operated by South Australia Public Transport Authority (SAPTA).

This Signalling Testing and Commissioning standard forms part of the engineering management system (EMS) to ensure that risks to safety are eliminated or minimised So Far As Is Reasonably Practicable (SFAIRP) as legislated by the Rail Safety National Law (RSNL).

## 2. Purpose

The purpose of this standard is to detail the principles and requirements for the inspection, testing and certification of signalling works within the Adelaide Metropolitan Passenger Rail Network.

## 3. Scope

The principles and procedures in this document are applicable to all new and modified signalling works undertaken within the AMPRN.

## 4. Related Documents

DOCUMENT NAME	DOCUMENT NUMBER
Signalling Principles and Practices	PTS-AR-10-SG-STD-0000068

## 5. References

- *Rail Safety National Law (South Australia) Act 2012*
- *Network Access Manual – PR-RC-NA-267 & PR-RC-NA-913 for Maintenance and Engineering works*
- *Master Specification – PART RW50 RAILWAYS - INSPECTION, TESTING AND COMMISSIONING*

## 6. Acronyms

ACRONYM	FULL NAME
AMPRN	Adelaide Metropolitan Passenger Rail Network
CBI	Computer Based Interlocking
DIT	Department of Infrastructure and Transport
RSNL	Rail Safety National Law
SAPTA	South Australia Public Transport Authority

## 7. Definitions

TERM	DEFINITION
Alterations	Alterations refer to modifications and like for like renewals and include works associated with a maintenance activity or when included as part of project Works.
Aspect Sequence Test	An aspect sequence test is the verification of the signal aspects and aspect sequence in accordance with the design drawings and any special sequence charts drawn up specifically for this test.
Axle Counter	A method of Train Detection. Track mounted equipment counts the number of axles entering and leaving a Track Section at each extremity. A calculation is performed to determine whether the track section is Occupied or Clear.

Bell Continuity Test	This is the process whereby wiring is checked for conformity with the wiring diagrams and that all wires are continuous from termination point to termination point. This test is generally carried out with a wire count and insulation test.
Bond	Usually refers to a conductive cable or wire connecting to rails of a track to provide a reliable low electrical resistance path for track circuit and/or traction return currents.
Bond, Rail	A bond connected to adjoining rails to provide reliable electrical conductivity for track circuit integrity.
Bond, Red	A traction return cable which, if disconnected, could result in either the bond itself or the equipment to which it was connected rising to a dangerously high potential. The bond is identified by red colour.
Bond, Traction	A bond of low resistance providing a reliable path for the traction return current.
Certification	Certification is the signing of certification documents by qualified, competent persons certifying that all testing has been fully completed for the testing activity. The Tester in Charge is ultimately responsible for certifying that all testing activities have been fully completed and that the installation is available for service by signing the Certificate of Signalling.
Commissioning (of signalling equipment)	Commissioning is the final phase of the implementation of the signalling installation where the installed equipment is permanently connected to the operational network and then brought into operational use in accordance with the safeworking procedures. At completion of the commissioning the certificate of signalling is signed by the tester in charge, the Contractor responsible representative, and the responsible representative of the rail operator at which point the signalling system is considered accepted for handover into operational service.
Correspondence Test	A test to verify that the interlocking is in correspondence with the detected state of its respective signalling function. The interlocking is considered 'out of correspondence' if the interlocking function does not correspond to its detected state.
Factory Acceptance Test	These are tests of manufactured equipment to verify it is built to design specifications prior to shipment to site. These are not certification tests, but rather quality control tests.
Fail Safe	A design property of an item which on failure will revert to a safe state minimising the risk of harm to other systems and the environment.
Function Test	This is the energisation of each circuit, or part of a circuit, and verifying by operation or disconnection that each and every control device, relay contact, fuse and link from its power supply fuse to its final controlled function is effective and in accordance with the design drawings. Where it is difficult to isolate individual device terminations, such as relay contacts a strap is applied across the contact and re-energisation of the circuit is verified by observation of the voltmeter and circuit function.
Insulation Test	This is a test of the resistance of the insulation between an electrical circuit conductor and "earth" or directly between the conductors of two separate electrical circuits.
Interlocking	A system that provides logical interpretation of the network rules and signalling principles for the safe signalling of train movements.
Lamp Proving	A method of monitoring the lamp operating circuits to prove that the required lamp is lit.
Null Count	This is a check against the circuit book analysis sheets that there are no wires terminated on spare contacts, fuses, links, terminals, and all other spare termination points.

Principles test (Design Integrity Test)	A form of testing that relies on the tester's knowledge and experience to validate that the system conforms to the signalling principles. The purpose of the principles test is to challenge the integrity of the interlocking by trying to defeat it.  Also may be referred to as Design Integrity Testing.
Site Acceptance Test	A test undertaken on site to confirm the equipment works correctly in the operational environment.
Site Acceptance Test Signalling System	A collection of equipment which together forms a system for the safe movement of trains.
Through Test	This is a function test of a circuit across sites that are geographically separated.
Wire Count	A visual examination against the wiring diagrams to confirm that each termination contains the correct number of wires. See also, Final Wire Count
Final Wire Count	A visual examination, performed on the culmination of testing, of the presence and absence of the correct number of wires for each termination point in accordance with the wiring diagrams.
Tester in Charge	The nominated tester with overall responsibility for the testing and commissioning of the new or altered signalling system.
Test Plan	A document or suite of documents that defines the detailed processes & resources required for the testing.
Commissioning Plan	A document or suite of documents that defines the detailed processes & resources required to commission the changes.

## 8. General Requirements

Any planned works that involve the testing and commissioning of new, altered or replaced signalling infrastructure must include detailed documentation and processes covering the management and planning of all testing activities that need to be undertaken during the project.

These project processes and procedures are essential for ensuring that railway signalling systems are implemented methodically, safely and that the resultant systems are safe for the operation of rail services.

A key part of the project documentation includes information detailing the scope, planned staging of works, responsibilities and interaction between all parties involved throughout the testing and commissioning phases of the works (including responsibilities related to the railway operator, maintainer and other contractors/sub-contractors employed on the project). This information forms the backbone of the project implementation strategy and must be documented and made available prior to the commencement of any testing activities.

Project Managers and contractors undertaking signalling projects must ensure that projects are adequately resourced with competent personnel who are able to perform their allocated duties.

The following areas are to be considered during the planning of the testing requirements:

1. the signalling system types and technology used
2. the complexity of the work
3. the required allocation of responsibility to the different parties involved in the testing and commissioning phases
4. the testing methods that need to be employed
5. the personnel required to do the work, including the competencies and levels of independence required for the activities and associated tasks
6. other resources required together with any special tools, test equipment etc.

### 8.1. Operating rules and procedures

Network rules and operating procedures must be observed. Clear boundaries and interfaces must be identified with a clear understanding between all involved parties of the safeworking systems to be employed, the responsibilities and expectations of all staff involved in testing and commissioning works.

Before undertaking any works on the operating railway the project shall issue a Notice of Intent to the Asset Maintainer at least 30 days prior to the planned work. The TIC shall ensure that safeworking notices are prepared and published prior to undertaking any work.

Under no circumstances should any signalling equipment that has been installed but not commissioned, or decommissioned but not removed from site be connected to the operational railway except where approval has been obtained from the Unit Manager Signals and Control Systems Engineering.

Under no circumstances should any signalling circuitry that has been installed but not commissioned, or decommissioned but not removed from site be connected to the operational railway.

### 8.2. Coordination with rail operations

All signalling testing and commissioning works undertaken on the AMPRN shall be coordinated, documented and agreed with AMPRN Rail Operations before any site activities are undertaken.

Communication protocols shall be established and defined during the development of the testing strategy and confirmed prior to the commencement of each testing activity.

Coordination with rail operations is required:

- To coordinate and agree safeworking systems to be employed during the testing activities.
- To coordinate conclusion of rail services at the start of an occupation.
- To coordinate recommencing rail services at the end of an occupation.
- To coordinate train movements into and out of the worksite.
- To coordinate any required isolations of the signalling and overhead electrification systems.
- Where any testing activity affects train operations.

Agreements shall be documented and must be fully and clearly understood by all involved parties. They shall include details of all train movements, under whose authority they shall be issued and any speed restrictions to be enforced during the testing and commissioning period.

## 9. Responsibilities and accountabilities

This section details the responsibilities of key personnel involved in the testing and commissioning of signalling works.

All staff involved in managing, coordinating or undertaking testing activities shall be independent and not have had any involvement in the management, design or construction of the systems or equipment allocated to them to test with the following exception:

- Assistant Testers – where sufficient, independent resources are not available.

### 9.1. Tester in Charge

Immediately following contract award involving alterations to the signalling system the Contractor organisation shall appoint a Tester in Charge to manage and coordinate the testing and commissioning activities for the project.

The Tester in Charge is responsible for ensuring the works are installed, inspected and tested to the design and design standards and for the planning and overall management of all testing activities for the project, which includes:

- The satisfactory completion of all systems tests, including:
  - Factory Acceptance Testing
  - System Integration Testing
  - Regression Testing
  - Site Acceptance Testing
  - System configuration testing, including wire count and continuity/resistance testing.
  - System Function Testing
  - Principles Testing
  - System commissioning and handover.
- Development and production of the testing strategy and all associated test plans covering all required testing activities.
- Development and production of all associated commissioning plans.
- The management and control of test logs.
- Ensuring that testers hold the required competencies for the tasks they are undertaking, and that each person is fully briefed and understands their role and responsibilities at each phase of the project.

Where testing is undertaken over multiple shifts, the Tester in Charge shall appoint a shift-TIC to manage the testing activities during her or his absence.

The Tester in Charge has the ultimate responsibility for certifying that all necessary tests have been completed and that the installation is available for service and shall maintain an auditable record of all testing documentation for the project.

On completion of the testing the TIC inspects all test certification for completeness prior to signing the Certificate of Signalling.

A Tester in Charge must hold related competencies at level working or higher<sup>1</sup>, in all of the following areas:

- Principles Testing
- Function Testing and Set to Work
- Development and management of testing documentation, and
- Testing process management.

### 9.2. Commissioning Manager

The Commissioning Manager performs a supporting role to the TIC for the coordination of testing including managing the distribution and collection of testing documentation and monitoring of testing activities against the program.

The Commissioning Manager reports regularly to the TIC on the progress of the testing activities throughout the commissioning and acts under instruction from the TIC.

The Commissioning Manager must have a demonstrable understanding of the testing process with a background in testing, holding competencies at level working or higher<sup>1</sup>

---

<sup>1</sup> Reference the competency matrix requirements for staff holding lower level competencies.

in Testing Process and Procedure Management and Documentation and Drawing Management.

### 9.3. Test Team Leader

One member of each testing team shall be designated the test team leader.

The test team leader:

- Is responsible for the completion of testing activities allocated to that team.
- Collates testing documentation related to the testing activities undertaken, ensuring any check marks and documentation have been completed and in accordance with the Test or Commissioning Plan.
- Reports to and updates:
  - The TIC (or delegated coordinator) on the status of allocated testing activities during the pre-commissioning phase.
  - The Commissioning Manager on the status of allocated testing activities during the commissioning phase.

The test team leader must hold competencies comparable to the activities being tested including competencies at level working or higher<sup>1</sup> in Testing Process and Procedure Management and Documentation and Drawing Management.

### 9.4. Testers

The testers complete the testing activities within the limits of their own levels of competency and under the direction of the test team leader.

Each tester shall be allocated a separate pen colour for recording of testing marks for identification of which tests have been performed.

As each test is completed the test prints shall be marked to identify the individual function, wire, terminal, contact or control has been tested. Any discrepancies, defects or issues shall be identified on the test prints, entered into the test log register and a test log raised.

### 9.5. Assistant Testers

The assistant tester works under the direction of the tester to assist in testing activities (disconnecting terminals, fuses etc.).

Assistant testers must be supervised at all times and hold relevant competencies in Assistant Tester or higher.

### 9.6. Witness

SAPTA may at their discretion appoint a witness to observe and audit testing activities to provide confirmation that testing is being performed in compliance with associated standards, procedures and planning documentation.

The Contractor shall allow access to the designated witness and make available any associated testing documentation that may be required to perform their duty.

Any issues or deficiencies that are identified by the witness shall be recorded and addressed prior to the production of any associated certification for the related testing activity. Any safety issues shall be recorded and addressed immediately.

### 9.7. Designers

Design resources are allocated to provide support to the testing process. Designers:

- Review and provide responses to test logs. Ref 10.6.
- Produce design modifications where it is determined that a test log requires a change to the design. Ref 10.7.

## 10. Planning and Documentation

Any organisation involved in the testing and/or commissioning of signalling alterations must have robust processes for the management and control of testing activities, including:

- Resource management (including WHS and time management).
- Risk management.
- Competency management.
- Documentation configuration control and management, including management and control of test logs.
- Testing tools and equipment calibration.
- Incident management.

These procedures and processes must be made available for review and audit by SAPTA on request.

To control the project testing activities documentation must be prepared by the project to define the testing that needs to be completed and to ensure that all associated parties are conversant with the works required to implement the infrastructure changes. The minimum documentation requirements are described in the following sections.

### 10.1. Testing strategy

Produced as soon as practicable following contract award, a Testing Strategy defines the anticipated testing to be undertaken as part of the project based on the information available at contract award (generally a detailed assessment of the accepted proposal together with the concept designs).

This document shall record the processes, resources, required activities, program and control measures that will be required for the totality of the testing and shall include the following:

- The nominated TIC for the project.
- Applicable standards and procedures that will be followed.
- Identify all testing that will be undertaken prior to the commissioning activity together with timings and management controls where there are significant time differences (typically >3 months) between testing activities.
- Identify the testing methodology including details of required test plans covering all testing and commissioning activities (e.g. as defined for each work package, testing activity, project phase or geographical area).
- Detail the occupations required and their duration, test train requirements and safeworking to complete commissioning activities.
- Preliminary programme including all off-site and on-site, including commissioning.
- Details of any special testing that is required (e.g. in relation to type approvals, EMC, etc.) together with training needs.
- Identification of resource constraints and control measures.
- Limits of systems and interfaces (technical, operational and project).
- Initial assessment of hazards raised during concept development together with addition of any new hazards identified during development of the test strategy, together with control measures.
- Allocation of responsibilities during the project delivery for each test undertaken.

The testing strategy forms the basis of development of the test and commissioning plans for the project.

Where significant changes are made to the project scope or timing, the testing strategy shall be reviewed and where necessary, updated and reissued.

## 10.2. Test Plans

Each testing activity of the project shall be supported by a written Test Plan.

The test plan must be accepted for use a minimum 10 days prior to the commencement of any associated testing activities.

As detailed in the testing strategy, test plans may be produced by work package, testing activity, project phase or geographical area depending on the complexity of the project however the developed test plans must cover all testing activities required.

The Tester in Charge is responsible for the production of all test plans. Test plans shall be produced by person(s) holding related competencies at level working or higher<sup>2</sup> in testing process and procedures related to the development and production of testing documentation.

All Test Plans shall be independently checked by a competent person holding related competencies at level working or higher<sup>3</sup> in testing process and procedures related to the development and production of testing documentation.

Test Plans must be endorsed by the TIC prior to issue.

Test plans are developed from the testing strategy to provide detailed account of all testing activities required to be undertaken, including the following details:

- Distribution list.
- Details, including contact number of the nominated Tester in Charge. Where the works are spread across multiple shifts, details of all nominated shift TIC(s).
- A detailed description of items, systems and/or equipment requiring testing, together with what testing will be undertaken.
- A detailed testing programme showing all testing activities and resources. Where testing is to be undertaken over a longer period (e.g. where undertaking principles testing for large interlockings), it may be impractical to show daily schedules, in which case it is sufficient to show the different preparatory testing activities being carried out over a long duration together with nominated resources.
- Details of any occupations / safeworking that may be required to undertake any of the testing activities.
- Detailed limits of systems and interfaces (technical, operational and project) related to the testing activities being undertaken.
- OHS requirements for all staff involved in the testing, including facilities, transport and accommodation arrangements.
- List(s) of all input documentation including testing guides, codes of practice, handbooks, specifications.
- All relevant test documentation, including test certificates that need to be completed.
- Recovery and removal of redundant materials.

---

<sup>2</sup> Reference the competency matrix requirements for staff holding lower level competencies.

<sup>3</sup> Mentorship for independent checking of Test Plans is not permitted.

- A description of related testing undertaken prior and further works to be undertaken on completion of the testing activities, including details of any stageworks and / or related commissionings.
- Description of any required temporary wiring and disconnections.
- An overview of the related commissioning methodology.
- Where the testing activities are undertaken trackside, details of train movements within the area affected by or in the vicinity of the testing activities.
- Contact details for all related personnel, including operations control and emergency contacts.
- Location of the Test Log Index.
- All relevant signalling plans and drawing numbers, together with any amendments / modifications.
- Methods for annotation of testing documentation.
- Closure list providing a final index of design details, data updates (including release versions and checksums) issued to the tester-in-charge by the design organisation.

Where changes are made to the Testing Strategy, project scope, staging or timing, the Test Plans shall be reviewed and where necessary, updated and reissued.

### 10.3. Commissioning Plans

Commissioning plans are based on the identified commissionings detailed in the testing strategy and are developed from the test plans related to the commissioning works.

The Commissioning Plan details the activities required to finalise and complete the testing to bring the equipment and / or systems into service as part of the operational railway.

The Tester in Charge is responsible for the production of all Commissioning Plans.

Commissioning Plans shall be produced by person(s) holding related competencies at level working or higher<sup>4</sup> in testing process and procedures related to the development and production of testing documentation.

All Test Plans shall be independently checked by a competent person holding related competencies at level working or higher<sup>5</sup> in testing process and procedures related to the development and production of testing documentation.

Commissioning Plans must be endorsed by the TIC prior to issue.

A separate Commissioning Plan shall be produced for each commissioning event to include following:

- Items identified in section 10.2 Test Plans.
- Details of all Test Plans associated with the commissioning activity.
- Details of all outstanding testing activities required to complete the pre-testing.
- Details of all outstanding construction activities.
- Location of the commissioning control center and communication protocols.
- Shift-by-shift programme detailing all testing and commissioning activities planned to be undertaken during the commissioning works.
- Safeworking arrangements before, during and after commissioning.
- Details of worksites and any associated or adjacent construction activities.

<sup>4</sup> Reference the competency matrix requirements for staff holding lower level competencies.

<sup>5</sup> Mentorship for independent checking of Commissioning Plans is not permitted.

- Any train movements including test trains and works trains (tamper, ballast trains, etc).
- Details, including contact telephone numbers of the TIC, Commissioning Managers all testers and key interfaces.
- Responsibilities of all staff and organisations.
- Details of contingencies for overrunning works.
- Validation of required competencies for testing and design staff involved.
- Details of all equipment to be commissioned.
- Details of all equipment to be decommissioned together with removal requirements.
- Details of all works undertaken within the same occupation and any overlapping works or interfaces.
- Arrangements for maintenance spares.
- Details of all test certificates.
- Arrangements for supply of commissioning test copies and final maintenance drawings.

Commissioning plans must be fully endorsed and accepted by SAPTA minimum 21 days prior to the commencement of the commissioning works or commencement of the related occupation, whichever is the sooner.

For minor works the commissioning plan may be combined with a test plan subject to approval by the Unit Manager Signals and Control Systems Engineering.

#### **10.4. Commissioning Readiness**

At least 10 working days prior to commencement of the commissioning works, the TIC shall chair a Commissioning Readiness review meeting to determine the status of works leading up to the commissioning and to determine whether the commissioning may proceed.

As a minimum, attendance is required from the following:

- TIC
- Commissioning manager
- Principles tester(s)
- Construction supervisor/ manager
- Representative of the Unit Manager Signals and Control Systems Engineering.

The meeting shall consider the status of all construction and testing works required to be completed in accordance with the schedule, together with confirmation of resource availability and final confirmation of all works required to be undertaken during the commissioning.

Risks identified during the planning phase shall be considered to confirm effective controls are in place and updated where necessary.

The commissioning works may only proceed after approval has been obtained from the Unit Manager Signals and Control Systems Engineering or delegated representative.

#### **10.5. Pre-commissioning meeting**

Following the commissioning readiness meeting and prior to the commencement of the commissioning, the TIC shall hold a pre-commissioning meeting to brief all personnel involved on the details and scope of the works together with work areas, key staff and responsibilities.

## 10.6. Test Logs

Any discrepancy, defect or issue identified during testing shall be entered into a test log register for allocation of a uniquely numbered test log.

Test logs are distributed for addressing by the designer, who shall respond in one of the following methods:

- No change to the design – detailed reasoning provided on the test log.
- Change to the design – explanation of the changes and issuance of an accompanying uniquely numbered design modification.

In each case the completed test log shall be independently reviewed in accordance with the normal design processes before being returned to the TIC.

On satisfactory retesting or acceptance that no changes to the design are required, the tester shall endorse the test log and the register shall be updated.

The TIC is responsible for ensuring all test logs have been closed.

## 10.7. Design Changes

Resources allocated from the design team shall be made available during the testing and commissioning process to respond to test logs and complete design modifications where required and in accordance with the accepted design processes.

During the testing phase it is essential that any changes to the design are effectively controlled and managed to minimise potential errors.

Following the submission of design as Issued for Construction (IFC), all design changes must be controlled through the Test Log process.

- Where the change is as a result of a designer requested changes:
  - The designer shall notify the Commissioning Manager of the requirement to undertake a design modification.
  - The Commissioning Manager allocates a test log number and coordinates the completion of a test log for transmission to the designer.
  - The designer allocates a design modification number and completes the design change, submitting for independent review in accordance with the normal design process.
  - The completed test log and associated design modification are sent back to the Commissioning Manager.
- Where the requested design change is as a result of a discrepancy, defect or issue identified by the tester:
  - The Commissioning Manager allocates a test log number and coordinates the completion of a test log for transmission to the designer.
  - The designer reviews the test log and, where a design change is required, allocates a design modification number and completes the design change, submitting for independent review in accordance with the normal design process.
  - The completed test log and associated design modification are sent back to the Commissioning Manager.

## 10.8. Handover

On completion of the testing, including closure of any test logs raised during the testing process, the TIC inspects all test certification for completeness prior to signing the Certificate of Signalling to certify the system is ready for handover for rail operations.

Where there are outstanding items that have not been tested or accepted for rail operations a conditional certificate of signalling may be issued subject to the following:

- The outstanding items do not present a safety risk to rail operations.
- Agreement is reached with Unit Manager Signals and Control Systems Engineering or delegated representative and rail operations.
- A timeline is identified for completion of the testing.

The conditional certificate of signalling shall document:

- Details of all tests that have not been completed.
- Details of all affected equipment.
- Details of any agreed restriction on operations.

The certificate of signalling or conditional certificate of signalling provide certification that the commissioning process is complete and the signalling system is ready for handover to the rail operator for commencement of rail services.

The certificate of signalling is endorsed by the following:

- Tester in Charge – Certifies that the commissioning process is complete and that the system is ready for service.
- Testing Witness (where allocated) – Provides assurance the system has been tested in accordance with the associated standards, procedures and testing documentation.
- Designated representative for the Unit Manager Signals and Control Systems Engineering – Acceptance that the commissioning is completed and the system may be used for operational services.
- Rail Operations/ Network Access Manager – Acceptance that the commissioning process is completed and that safeworking systems employed during the commissioning may be removed.

The original copy is retained by Rail Operations with copies issued to all signatories.

Refer Appendix A for an example Certificate of Signalling.

## APPENDIX A – TESTING AND COMMISSIONING FORMS

## (a) FO-EM-SE-1228 Certificate of Signalling

## (b) FO-EM-SE-1229 Certificate of Signalling – Conditional

Form		DPTI
Rail Commissioner		
<b>CERTIFICATE OF SIGNALLING</b>		
Certificate No: nnn		
CLIENT: Department of Infrastructure and Transport (DIT)	Ref:	
PROJECT:	DATE:	
LOCATION:		
<b>Purpose:</b>		
This Certificate of Signalling exists to provide assurance that the AMPRN new/modified xxx systems have been tested and verified in accordance with the Testing and Commissioning obligations, and the integrity of the system has been validated and is fit and safe for the purpose and meets DIT requirements criteria & conditions for running trains.		
<b>Tester in Charge :</b>		
I certify that the operational integrity of the AMPRN xxx Systems have been tested and validated in its entirety in accordance with the Testing and Commissioning obligations and, complies with the Rail Commissioner/DIT Standard Requirement and Rail Industry Signalling Practices. I hereby certify that the system is fit and safe for the purpose and meets DIT Operational requirements criteria & conditions for running trains.		
Organisation: Siemens	Title: Tester-in-Charge	
Name:	Signature:	
Date:	Time:	
<b>Contractor Project Representative:</b>		
On behalf of the Contractor, I have witnessed and acknowledge the testing and commissioning of the AMPRN System has followed an agreed testing and validation process in accordance with the project requirements and meets DIT operational requirements criteria & conditions for running trains.		
Organisation: Siemens	Title: Project Manager	
Name:	Signature:	
Date:	Time:	
Document Number: FO-AM-SE-1228	Issue Date: XX-September-2018	Parent Doc. Title: Testing and Commissioning of Signalling Systems
Knet No: 12601041	Last Review Date: 24-September-2018	Parent Doc. Knet No: 8261487
Version Number: 3	Last Printed: 28/09/2020 1:24:00 PM	Parent Doc. No: SG1-DOC-000452
Document Owner: Signal Engineering	Document Controller: RSOP	UNCONTROLLED WHEN PRINTED
		Page 1 of 2