AutoHaul®

Project No:

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# Introduction

## Overview

Rio Tinto Iron Ore (RTIO) operates a heavy-haul railway in the Pilbara region of Western Australia designed to move iron ore from mines located 300 to 500 km inland to ports for shipping overseas.

The AutoHaul® Project is concerned with the introduction of a system to automatically drive trains on the mainline. This includes trainborne, control centre, and wayside systems to control and monitor locomotives and ensure the safe movement of driverless trains, both in driver attended and driverless mode of operation.

## Purpose

This procedure is for Full commissioning AC locos as ATO Lead capable. Once this procedure is completed, the locomotive may be Autonomous ready, however, Autonomous capability will be determined by the applicable SPC (Software Product Configuration), and any outstanding defects.

Further, the locomotive capability and allowable mode of operation will be determined and stated on the Locomotive Acceptance Certificate.

## Definitions, Acronyms and Abbreviations

Table 1‑1 Abbreviations and Acronyms

| Abbreviation/Acronym | Definition |
| --- | --- |
| ADAM | Data Acquisition Module |
| ASTS | Ansaldo STS |
| ATH | AutoHaul |
| ATO | Automatic Train Operation (ATO Controller) |
| ATP | Automatic Train Protection |
| ATS | Automatic Train Supervision |
| BTM | Balise Transmission Module |
| CB | Circuit Breaker |
| CDS | Collision Detection System |
| CDU | Computer Display Unit |
| CE | Commissioning Engineer |
| DIVA | Dynamic Integrated Vital and Available system |
| DLC | Direct Locomotive Control |
| DSE | Driver Strategy Engine |
| EAB | Electronic Air Brake |
| ECP | Electronically Controlled Pneumatic (Braking) |
| ER | Event Recorder |
| ETM | End of Train Monitor |
| GE | General Electric |
| GPS | Global Positioning System |
| I/O | Input / Output |
| IP | Internet Protocol |
| LAN | Local Area Network |
| LRU | Line Replacable Unit |
| ATIR | Acceptance Test Issue Report |
| JIRA | Cloud Based Defect Management System |
| LCS | Locomotive Control System |
| NDL | Network Data Logger |
| NIU | Network Interface Unit |
| NVIP | Non Vital IP |
| NVR | Network Virtual Router |
| OC | Operation Control |
| PTP | Protocol Translator Panel |
| RF | Radio Frequency |
| RSM | Rollingstock Maintenance |
| RTIO | Rio Tinto Iron Ore |
| RTRD | Rio Tinto Rail Division |
| SLT | Senior Lead Tester |
| TCR | Test Configuration Review |
| TCS | Train Control System |
| TIM | Trainline Interface Module |
| UHF | Ultra High Frequency |
| VICS | Video Image Capture System |
| WiMAX | Worldwide Interoperability for Microwave Access |

## References

Unless otherwise specified, each document reference is to the latest approved revision.

1. 90000505.E00.EN – VICS Software Upgrade Procedure
2. 90000979.E02.EN – AC Retrofit ATO-Trail Commissioning Procedure
3. 90000885.E02.EN – AC Locomotive Acceptance Certificate
4. 90000760.E00.EN – VICS Release 14 Work Instruction
5. 90000907.E02.EN – ATO Alerter Module Lab Test Procedure
6. 90000445.S16.EN – Onboard SPC (Driver Modes)
7. 90000216.G00.EN – Current Transducer Programming Guide
8. 90001015.E02.EN – AC Lab Certificate
9. 90000XXX.E02.EN – NVIP Address Plan
10. 90001016.E02.EN – AC - NIU II Pre-Installation Commissioning
11. 90000679.E00.EN – Temperature Sensor Setup & Configuration
12. 90000739.P00.EN – AutoHaul Satellite Phone – Phone Book Entries
13. 90000XXX.E0X.EN - AC NIU2 without GoLinc - ATO Attended Movement Procedure

# Test Overview

## Location

The commissioning tests will be completed in the 8-Mile Yard, on 86rd and 87rd, in the workshop, and on the out-go tracks.

## Responsibilities

The tests will be completed by the AutoHaul commissioning team personnel, with the assistance of drivers for movement testing where required.

The commissioning engineer is responsible for checking over the completion of all tests and transferring any outstanding issues to the Locomotive Acceptance Certificate [3].

## Locomotive Setup

The locomotive must be setup in the following condition before commencing the commissioning tests:

* All intercar connectors connected to the termination connectors;
* Air brakes set to lead/cut-in; and
* ATP cut-out.

## Resources

The following resources are required for the commissioning testing:

* Commissioning laptop with software tools as listed on the applicable SPC [6]
* Multimeter

# Safety Precautions

The tests in this procedure have been assessed as low risk as per the following:

**LOW RISK – DRIVER NOT REQUIRED**

A driver is not required, however, the following safety precautions must be observed:

1. Handbrake must be applied;
2. Wheel chocks to be in place on driver side wheel 2;
3. Reverser must be removed from control stand;
4. No operation of the throttle;
5. Gen Field CB off;
6. Engine control switch to be in isolated position (except for starting the locomotive or if required for a test);
7. Brake handles only to be operated by competent tester;
8. ETM only to be connected/disconnected by competent tester

**HIGH RISK – DRIVER REQUIRED**

1. A driver is required to be present while this test is performed.
2. ETM only to be connected/removed by driver or competent tester;

1. Test Equipment Records

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Table 1: Test Equipment Records** | | | | | | |
| **Item** | **Description** | **Make** | **Model** | **Serial Number** | **Calibration Due Date** | **Inputted By** |
|  | **Text** | **Text** | **Text** | **Text** | **Text** | **UserSignature** |
| 1. |  |  |  |  |  |  |
| 2. |  |  |  |  |  |  |
| 3. |  |  |  |  |  |  |
| 4. |  |  |  |  |  |  |
| 5. |  |  |  |  |  |  |
| 6. |  |  |  |  |  |  |
| 7. |  |  |  |  |  |  |
| 8. |  |  |  |  |  |  |

1. RF Tests (LOW RISK – DRIVER NOT REQUIRED)
   1. DLC Antenna and Filter Tests

| **Table 2: DLC Antenna and Filter Tests** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | **Outcome** | **Signature** | **Notes** |
|  |  | **Text** | **UserSignature** |  |
| **Note: To protect the FieldFox during testing ensure that voice and DLC radios are powered down prior to starting.** | | | | |
| DLC Data Radio Antenna and Feeder | | | | |
| **DLCDR\_ANT\_RL**  Set the RF Analyser range to 440.0MHz to 460.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the test lead to DLC Data Radio antenna cable at the Triple Filter 450-451 MHz port.  Set the RF Analyser marker #1 to 450.000MHz.  Set the RF Analyser marker #2 to 451.000MHz.  All points between 450 MHz and 451 MHz must be below 9.5 dB to pass.  Record the minimum return loss between the two markers.  Save as: **<LOCOID>\_DLCDR\_ANT\_RL** | As per pre-installation test.  (Expected return loss > 9.5 dB) |  |  | The minimum return loss is the highest point on the scope. This must be between 450 MHz and 451 Mhz.  Site comms must be informed if the result is less than 14 dB. |
| DLC Guard Tone Radio Antenna and Feeder | | | | |
| **DLCGT\_ANT\_RL**  Set the RF Analyser range to 400.0MHz to 420.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the test lead to DLC Guard Tone Radio antenna cable at the Triple Filter 400-420 MHz port..  Measure the minimum return loss.  Save as: **<LOCOID>\_DLCGT\_ANT\_RL** | As per pre-installation test.  (Expected return loss > 9.5 dB) |  |  | The minimum return loss is the highest point on the scope.  Site comms must be informed if the result is less than 14 dB. |
| DLC Data Radio Filter | | | | |
| **DLCDR\_FILTER\_IL**  Set the RF Analyser range to 440.0MHz to 460.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF OUT test lead to the Triple Filter 450-451MHz antenna side port.  Connect the RF IN test lead to the Triple Filter 400-451MHz radio side port.  Set the RF Analyser marker #1 to 440.000MHz.  Set the RF Analyser marker #2 to 450.000MHz.  Set the RF Analyser marker #3 to 451.000MHz.  Set the RF Analyser marker #4 to 460.000MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_ DLCDR\_FILTER\_IL** | As per pre-installation test.  (Expected M1 Loss> 15 dB) | M1: |  | If there was no filter installed prior to installation, the expected results must be used.  Site comms must be informed if the expected results are not met. |
| As per pre-installation test.  (Expected M2 Loss< 1.5 dB) | M2: |
| As per pre-installation test.  (Expected M3 Loss< 1.5 dB) | M3: |
| As per pre-installation test.  (Expected M4 Loss> 25 dB) | M4: |
| **DLCDR\_CABLE\_IL**  Set the RF Analyser range to 440.0MHz to 460.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF IN test lead to the radio end of the DLC Data Radio – Triple Filter cable and the RF OUT to the filter end.  Set the RF Analyser marker #1 to 450.000MHz.  Set the RF Analyser marker #2 to 451.000MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_ DLCDR\_CABLE\_IL** | As per pre-installation test.  (Expected M1 Loss< 2.5 dB) | M1: |  | If there was no filter installed prior to installation, the expected results must be used.  Site comms must be informed if the expected results are not met. |
| As per pre-installation test.  (Expected M2 Loss< 2.5 dB) | M2: |
| **DLCDR\_FILTER\_TX\_RL**  Set the RF Analyser range to 440.0MHz to 460.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the test lead to the DLC Data Radio – Triple Filter cable at the radio end.  Terminate the Triple Filter 450-451MHz antenna side port with a 50Ω load.  Set the RF Analyser marker #1 to 450.000MHz.  Set the RF Analyser marker #2 to 451.000MHz.  Record the return loss at the two markers.  Save as: **<LOCOID>\_ DLCDR\_FILTER\_TX\_RL** | As per pre-installation test.  (Expected M1 return loss > 15 dB) | M1: |  | If there was no filter installed prior to installation, the expected results must be used.  Site comms must be informed if the expected results are not met. |
| As per pre-installation test.  (Expected M2 return loss > 15 dB) | M2: |
| **DLCDR\_FILTER\_RX\_RL**  Set the RF Analyser range to 440.0MHz to 460.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the test lead to the Triple Filter 450-451MHz antenna side port.  Terminate the DLC Data Radio – Triple Filter cable with a 50Ω load at the radio end.  Set the RF Analyser marker #1 to 450.000MHz.  Set the RF Analyser marker #2 to 451.000MHz.  Record the return loss at the two markers.  Save as: **<LOCOID>\_ DLCDR\_FILTER\_RX\_RL** | As per pre-installation test.  (Expected M1 return loss > 15 dB) | M1: |  | If there was no filter installed prior to installation, the expected results must be used.  Site comms must be informed if the expected results are not met. |
| As per pre-installation test.  (Expected M2 return loss > 15 dB) | M2: |
| DLC Guard Tone Radio Filter | | | | |
| **DLCGT\_FILTER\_IL**  Set the RF Analyser range to 350.0MHz to 450.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF OUT test lead to the Triple Filter 400-420MHz antenna side port.  Connect the RF IN test lead to the Triple Filter 400-420MHz radio side port.  Set the RF Analyser marker #1 to 360.000MHz.  Set the RF Analyser marker #2 to 400.000MHz.  Set the RF Analyser marker #3 to 420.000MHz.  Set the RF Analyser marker #4 to 445.000MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_ DLCGT\_FILTER\_IL** | As per pre-installation test.  (Expected M1 Loss > 20 dB) | M1: |  | If there was no filter installed prior to installation, the expected results must be used.  Site comms must be informed if the expected results are not met. |
| As per pre-installation test.  (Expected M2 Loss < 1.5 dB) | M2: |
| As per pre-installation test.  (Expected M3 Loss < 1.5 dB) | M3: |
| As per pre-installation test.  (Expected M4 Loss > 20 dB) | M4: |
| **DLCGT\_CABLE\_IL**  Set the RF Analyser range to 350.0MHz to 450.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF IN test lead to the radio end of the DLC Guard Tone Radio – Triple Filter cable and the RF OUT to the filter end.  Set the RF Analyser marker #1 to 400.000MHz.  Set the RF Analyser marker #2 to 420.000MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_ DLCGT\_CABLE\_IL** | As per pre-installation test.  (Expected M1 Loss < 2.5 dB) | M1: |  | If there was no filter installed prior to installation, the expected results must be used.  Site comms must be informed if the expected results are not met. |
| As per pre-installation test.  (Expected M2 Loss < 2.5 dB) | M2: |
| **DLCGT\_FILTER\_TX\_RL**  Set the RF Analyser range to 400.0MHz to 420.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the test lead to the DLC Guard Tone Radio – Triple Filter cable at the radio end.  Terminate the Triple Filter 400-420MHz antenna side port with a 50Ω load.  Measure the minimum return loss.  Save as: **<LOCOID>\_ DLCGT\_FILTER\_TX\_RL** | As per pre-installation test.  (Expected M1 return loss > 15 dB) | M1: |  | If there was no filter installed prior to installation, the expected results must be used.  Site comms must be informed if the expected results are not met. |
| **DLCGT\_FILTER\_RX\_RL**  Set the RF Analyser range to 400.0MHz to 420.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the test lead to the Triple Filter 400-420MHz antenna side port.  Terminate the DLC Guard Tone Radio – Triple Filter cable with a 50Ω load at the radio end.  Measure the minimum return loss.  Save as: **<LOCOID>\_ DLCGT\_FILTER\_RX\_RL** | As per pre-installation test.  (Expected M1 return loss > 15 dB) | M1: |  | If there was no filter installed prior to installation, the expected results must be used.  Site comms must be informed if the expected results are not met. |

* 1. Voice Radio RF Tests

| **Table 3: Voice Radio RF Tests** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | **Outcome** | **Signature** | **Notes** |
|  |  | **Text** | **UserSignature** |  |
| **Note: To protect the FieldFox during testing ensure that voice and DLC radios are powered down prior to starting.** | | | | |
| Voice Radio RX Antenna and Feeder | | | | |
| **VR\_RX\_RL**  Set the RF Analyser range to 470.0MHz to 490.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to Voice Radio RX antenna cable at the Triple Filter 470-500MHz port.  Measure the minimum return loss.  Save as: **<LOCOID>\_VR\_RX\_RL** | Return loss > 11.7dB |  |  | The minimum return loss is the highest point on the scope. |
| Voice Radio 1 TX Antenna and Feeder | | | | |
| **VR1\_TX\_RL**  Set the RF Analyser range to 470.0MHz to 490.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to Voice Radio 1 TX antenna cable at High Pass Filter 1.  Measure the minimum return loss.  Save as: **<LOCOID>\_VR1\_TX\_RL** | As per pre-installation test.  (Expected return loss > 9.5) |  |  | This was previously Voice Radio 1 Antenna.  The minimum return loss is the highest point on the scope.  Site comms must be informed if the result is less than 14 dB. |
| Voice Radio 2 TX Antenna and Feeder | | | | |
| **VR2\_TX\_RL**  Set the RF Analyser range to 470.0MHz to 490.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to Voice Radio 2 TX antenna cable at High Pass Filter 2.  Measure the minimum return loss.  Save as: **<LOCOID>\_VR2\_TX\_RL** | As per pre-installation test.  (Expected return loss > 9.5) |  |  | This was previously Voice Radio 2 Antenna.  The minimum return loss is the highest point on the scope.  Site comms must be informed if the result is less than 14 dB. |
| Voice Radio 1 RX Filters | | | | |
| **VR1\_RX\_FILTER\_IL**  **Important**: Set RF Tester to Low Power  Set the RF Analyser range to 450.0MHz to 520.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Set power level – *Meas. Setup (4) / Power / Power Level - Low*  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF OUT test lead to the Triple Filter 470-500MHz antenna side port.  Connect the RF IN test lead to the Voice Radio 1 – Circulator / Isolator 1 cable at the radio end.  Set the RF Analyser marker #1 to 470.000MHz.  Set the RF Analyser marker #2 to 477.000MHz.  Set the RF Analyser marker #3 to 482.000MHz.  Set the RF Analyser marker #4 to 490.000MHz.  Set the RF Analyser marker #5 to 479.000MHz.  Set the RF Analyser marker #6 to 479.950MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_VR1\_RX\_FILTER\_IL**  If not continuing to VR2\_RX\_FILTER\_IL return power level to High  *Meas. Setup (4) / Power / Power Level - High* | -1.5 < M1 Loss < 1dB | M1: |  | Low Noise Amplifier 1 must be powered for this test.  Adjust the LNA if required.  As the existing filter and cabling is included in this test, refer to the pre-installation tests for the insertion loss for these components if the tests do not meet the specification. |
| -1.5 < M2 Loss < 1dB | M2: |
| -1.5 < M3 Loss < 1dB | M3: |
| -1.5 < M4 Loss < 1dB | M4: |
| M5 Loss > 25dB | M5: |
| M6 Loss > 25dB | M6: |
| Record the LNA setting. | N/A |  |  |  |
| Voice Radio 2 RX Filters | | | | |
| **VR2\_RX\_FILTER\_IL**  **Important**: Set RF Tester to Low Power  Set the RF Analyser range to 450.0MHz to 520.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Set power level – *Meas. Setup (4) / Power / Power Level - Low*  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF OUT test lead to the Triple Filter 470-500MHz antenna side port.  Connect the RF IN test lead to the Voice Radio 2 – Circulator / Isolator 2 cable at the radio end.  Set the RF Analyser marker #1 to 470.000MHz.  Set the RF Analyser marker #2 to 477.000MHz.  Set the RF Analyser marker #3 to 482.000MHz.  Set the RF Analyser marker #4 to 490.000MHz.  Set the RF Analyser marker #5 to 479.000MHz.  Set the RF Analyser marker #6 to 479.950MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_VR2\_RX\_FILTER\_IL**  If not continuing to VR1\_RX\_FILTER\_IL return power level to High  *Meas. Setup (4) / Power / Power Level - High* | -1.5 < M1 Loss < 1dB | M1: |  | Low Noise Amplifier 2 must be powered for this test.  Adjust the LNA if required.  As the existing filter and cabling is included in this test, refer to the pre-installation tests for the insertion loss for these components if the tests do not meet the specification. |
| -1.5 < M2 Loss < 1dB | M2: |
| -1.5 < M3 Loss < 1dB | M3: |
| -1.5 < M4 Loss < 1dB | M4: |
| M5 Loss > 25dB | M5: |
| M6 Loss > 25dB | M6: |
| Record the LNA setting. | N/A |  |  |  |
| Voice Radio 1 TX Filters | | | | |
| **VR1\_TX\_FILTER\_IL**  Set the RF Analyser range to 450.0MHz to 520.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF OUT test lead to the Voice Radio 1 – Circulator / Isolator 1 cable at the radio end.  Connect the RF IN test lead to the High Pass Filter 1 antenna side port.  Set the RF Analyser marker #1 to 470.000MHz.  Set the RF Analyser marker #2 to 477.000MHz.  Set the RF Analyser marker #3 to 482.000MHz.  Set the RF Analyser marker #4 to 500.000MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_VR1\_TX\_FILTER\_IL** | M1 Loss < 3dB | M1: |  | As the existing filter and cabling is included in this test, refer to the pre-installation tests for the insertion loss for these components if the tests do not meet the specification. |
| M2 Loss < 3dB | M2: |
| M3 Loss < 3dB | M3: |
| M4 Loss < 3dB | M4: |
| **VR1\_TX\_FILTER\_RL1**  Set the RF Analyser range to 470.0MHz to 490.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to the Voice Radio 1 – Circulator / Isolator 1 cable at the radio end.  Terminate the High Pass Filter 1 antenna side port with a 50Ω load.  Measure the minimum return loss.  Save as: **<LOCOID>\_ VR1\_TX\_FILTER\_RL1** | Return Loss > 15 dB |  |  | As the existing filter and cabling is included in this test, refer to the pre-installation tests for the insertion loss for these components if the tests do not meet the specification.  The minimum return loss is the highest point on the scope. |
| **VR1\_TX\_FILTER\_RL2**  Move the RF Analyser test to the radio side port of the High Pass Filter 1 (leaving the 50Ω load on the other port).  Measure the minimum return loss.  Save as: **<LOCOID>\_ VR1\_TX\_FILTER\_RL2** | Return Loss > 15 dB |  |  | The minimum return loss is the highest point on the scope. |
| Voice Radio 2 TX Filters | | | | |
| **VR2\_TX\_FILTER\_IL**  Set the RF Analyser range to 450.0MHz to 520.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF OUT test lead to the Voice Radio 2 – Circulator / Isolator 2 cable at the radio end.  Connect the RF IN test lead to the High Pass Filter 2 antenna side port.  Set the RF Analyser marker #1 to 470.000MHz.  Set the RF Analyser marker #2 to 477.000MHz.  Set the RF Analyser marker #3 to 482.000MHz.  Set the RF Analyser marker #4 to 500.000MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_VR2\_TX\_FILTER\_IL** | M1 Loss < 3dB | M1: |  |  |
| M2 Loss < 3dB | M2: |
| M3 Loss < 3dB | M3: |
| M4 Loss < 3dB | M4: |
| **VR2\_TX\_FILTER\_RL1**Set the RF Analyser range to 470.0MHz to 490.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to the Voice Radio 2 – Circulator / Isolator 2 cable at the radio end.  Terminate the High Pass Filter 2 antenna side port with a 50Ω load.  Measure the minimum return loss.  Save as: **<LOCOID>\_ VR2\_TX\_FILTER\_RL1** | Return Loss > 15 dB |  |  | As the existing cable is included in this test, refer to the pre-installation insertion loss tests for this component if the tests do not meet the specification.  The minimum return loss is the highest point on the scope. |
| **VR2\_TX\_FILTER\_RL2**  Move the RF Analyser test to the radio side port of the High Pass Filter 2 (leaving the 50Ω load on the other port).  Measure the minimum return loss.  Save as: **<LOCOID>\_ VR2\_TX\_FILTER\_RL2** | Return Loss > 15 dB |  |  | The minimum return loss is the highest point on the scope. |

**Note: To protect the FieldFox during testing ensure that Data Radio is powered down prior to starting.**

* 1. Data Radio RF Tests

| **Table 4: Data Radio RF Tests** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Action** | | **Expected Result** | **Outcome** | | | **Signature** | | **Notes** |
|  | |  | **Text** | | | **UserSignature** | |  |
| Note: To protect the FieldFox during testing ensure that Data Radio is powered down prior to starting. | | | | | | | | |
| Data Radio RX Antenna and Feeder | | | | | | | | |
| **DR\_RX\_RL**  Set the RF Analyser range to 470.0MHz to 490.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to Data Radio RX antenna cable at the band pass filter.  Measure the minimum return loss.  Save as: **<LOCOID>\_DR\_RX\_RL** | | Return loss > 9.5 dB |  | | |  | | The minimum return loss is the highest point on the scope.  Site comms must be informed if the result is less than 14 dB. |
| Data Radio TX/RX Antenna and Feeder | | | | | | | | |
| **DR\_TX\_RL**  Set the RF Analyser range to 470.0MHz to 490.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to Data Radio TX/RX antenna cable at the duplexer.  Measure the minimum return loss.  Save as: **<LOCOID>\_DR\_TX\_RL** | | Return loss > 9.5 dB |  | | |  | | The minimum return loss is the highest point on the scope.  Site comms must be informed if the result is less than 14 dB. |
| Data Radio RX Filters | | | | | | | | |
| **DR\_RX\_FILTER\_IL**  Set the RF Analyser range to 450.0MHz to 500.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF OUT test lead to the Band Pass Filter IN port.  Connect the RF IN test lead to the Data Radio – Band Pass Filter cable at the radio end.  Set the RF Analyser marker #1 to 469.800MHz.  Set the RF Analyser marker #2 to 478.800MHz.  Set the RF Analyser marker #3 to 473.800MHz.  Set the RF Analyser marker #4 to 474.800MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_DR\_RX\_FILTER\_IL** | | M1 Loss > 50dB | M1: | | |  | |  |
| M2 Loss > 50dB | M2: | | |
| M3 Loss < 3dB | M3: | | |
| M4 Loss < 3dB | M4: | | |
| **DR\_RX\_ FILTER\_RL**  Set the RF Analyser range to 473.8MHz to 474.8MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to Band Pass Filter IN port.  Terminate the Band Pass Filter OUT port with a 50Ω load.  Measure the minimum return loss.  Save as: **<LOCOID>\_DR\_RX\_ FILTER\_RL** | | Return Loss > 15 dB |  | | |  | | The minimum return loss is the highest point on the scope. |
| **DR\_TXRX\_RXFILTER\_IL**  Set the RF Analyser range to 450.0MHz to 500.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF OUT test lead to the Duplexer ANT port.  Connect the RF IN test lead to the Data Radio – Circulator / Isolator cable at the radio end.  Set the RF Analyser marker #1 to 468.000MHz.  Set the RF Analyser marker #2 to 478.800MHz.  Set the RF Analyser marker #3 to 473.800MHz.  Set the RF Analyser marker #4 to 474.800MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_DR\_TXRX\_RXFILTER\_IL** | | M1 Loss > 35dB | M1: | | |  | |  |
| M2 Loss > 35dB | M2: | | |
| M3 Loss < 3dB | M3: | | |
| M4 Loss < 3dB | M4: | | |
| **DR\_ TXRX\_RXFILTER\_RL**  Set the RF Analyser range to 473.8MHz to 474.8MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to Duplexer ANT port.  Terminate the Data Radio – Circulator / Isolator cable with a 50Ω load at the radio end.  Measure the minimum return loss.  Save as: **<LOCOID>\_DR\_ TXRX\_RXFILTER\_RL** | | Return Loss > 15 dB |  | | |  | | The minimum return loss is the highest point on the scope. |
| Data Radio TX Filters | | | | | | | | |
| **DR\_TXRX\_TXFILTER\_IL**  Set the RF Analyser range to 450.0MHz to 500.0MHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF OUT test lead to the Data Radio – Circulator / Isolator cable at the radio end.  Connect the RF IN test lead to the Duplexer ANT port.  Set the RF Analyser marker #1 to 475.000MHz.  Set the RF Analyser marker #2 to 484.000MHz.  Set the RF Analyser marker #3 to 479.000MHz.  Set the RF Analyser marker #4 to 479.950MHz.  Record the loss at the markers.  Save as: **<LOCOID>\_DR\_TXRX\_TXFILTER\_IL** | | M1 Loss > 20dB | M1: | | |  | |  |
| M2 Loss > 20dB | M2: | | |
| M3 Loss < 3dB | M3: | | |
| M4 Loss < 3dB | M4: | | |
| **DR\_ TXRX\_TXFILTER\_RL**  Set the RF Analyser range to 479.0MHz to 480.0MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to Data Radio – Circulator / Isolator cable at the Radio end.  Terminate the Duplexer ANT port with a 50Ω load.  Measure the minimum return loss.  Save as: **<LOCOID>\_DR\_ TXRX\_TXFILTER\_RL** | | Return Loss > 15 dB |  | | |  | | The minimum return loss is the highest point on the scope. |
| Data Radio TX Tests | | | | | | | | |
| Connect a test lead from the HP 8920 **RF IN** port, to the Data Radio **Tx/Rx** port.  Power up the Data Radio.  Set the HP 8920 to **TX TEST**.  Set the HP 8920 Tune Freq to 479.356250 MHz.  Set the frequency error readout to Hz.  Ensure the radio is warmed up and has been operating for more than 5 minutes.  Set the laptop IP details to:  IP Address: 192.168.201.10  Subnet Mask: 255.255.255.0  Gateway: 192.168.201.1  Connect the laptop to the data radio Ethernet port.  Log into the Data Radio web interface.  Navigate to **Maintenance > RF Tests**  Click the **Mode >** **Test** button.  Click the **Goto** button for channel 9 (479.356250 MHz).  Select **Unmodulated** test tone.  Click **Execute**.  Check the frequency from HP 8920 and record the frequency error. | Frequency Error < 300Hz | | |  |  | | The data radio IP address is 192.168.201.1 | |
| Record the RF power reading on the HP 8920. | Tx power = 24 W ± 10% | | |  |  | |  | |
| Data Radio RX Tests | | | | | | | | |
| Connect a test lead from the HP 8920 **RF OUT** port, to the Data Radio **Tx/Rx** port.  Power up the Data Radio.  Set the HP 8920 to **RX TEST**.  Set the RF Gen Freq to **473.831250 MHz**.  Set the Amplitude to **-70dBm**.  Set the laptop IP details to:  IP Address: 192.168.201.10  Subnet Mask: 255.255.255.0  Gateway: 192.168.201.1  Connect the laptop to the data radio Ethernet port.  Log into the Data Radio web interface.  Navigate to **Maintenance > RF Tests**  Click the **Goto** button for **Channel 2 (473.831250 MHz)**.  Check the RSSI Display, use the **Main – Cal** reading. | RSSI = -70 dBm ± 5dB | | |  |  | | The data radio IP address is 192.168.201.1 | |
| Set the Amplitude to **-90dBm**. | RSSI = -90 dBm ± 5dB | | |  |  | |  | |
| Set the Amplitude to **-110dBm**. | RSSI = -110 dBm ± 5dB | | |  |  | |  | |
| Set the RF Gen Freq to **474.556250 MHz**.  Set the Amplitude to **-70dBm**.  Click the **Goto** button for **Channel 16 (474.556250 MHz)**. | RSSI = -70 dBm ± 5dB | | |  |  | |  | |
| Set the Amplitude to **-90dBm**. | RSSI = -90 dBm ± 5dB | | |  |  | |  | |
| Set the Amplitude to **-110dBm**. | RSSI = -110 dBm ± 5dB | | |  |  | |  | |
| Connect a test lead from the HP 8920 **RF OUT** port, to the Data Radio **Rx** port.  Set the HP 8920 to **RX TEST**.  Set the RF Gen Freq to **473.831250 MHz**.  Set the Amplitude to **-70dBm**.  Click the **Go to** button for **Channel 2 (473.831250 MHz)**.  Check the RSSI Display, use the **Diversity – Cal** reading. | RSSI = -70 dBm ± 5dB | | |  |  | |  | |
| Set the Amplitude to **-90dBm**. | RSSI = -90 dBm ± 5dB | | |  |  | |  | |
| Set the Amplitude to **-110dBm**. | RSSI = -110 dBm ± 5dB | | |  |  | |  | |
| Set the RF Gen Freq to **474.556250 MHz**.  Set the Amplitude to **-70dBm**.  Click the **Goto** button for **Channel 16 (474.556250 MHz)**. | RSSI = -70 dBm ± 5dB | | |  |  | |  | |
| Set the Amplitude to **-90dBm**. | RSSI = -90 dBm ± 5dB | | |  |  | |  | |
| Set the Amplitude to **-110dBm**. | RSSI = -110 dBm ± 5dB | | |  |  | |  | |

* 1. WiMAX RF Tests

| **Table 5: WiMAX RF Tests** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | | **Outcome** | | **Signature** | | **Notes** | |
|  |  | | **Text** | | **UserSignature** | |  | |
| WiMAX Antenna and Feeder 1 (new antenna with internal GPS) | | | | | | | | |
| **WM1\_RL**  Set the RF Analyser range to 3400MHz to 3700MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to WiMAX antenna 1 cable at the WiMAX unit.  Measure the minimum return loss.  Save as: **<LOCOID>\_WM1\_RL** | Return loss > 11.7dB | |  | |  | | An O, S, L calibration tool is required for these tests, the QuickCal calibration will not work. | |
| **Measure Insertion Loss of GPS Cable**  Set the RF Analyser range to 1.5GHz to 1.6GHz.  Connect test leads to the FieldFox RF ports and join the cables using an adaptor.  Select measurement - *Measure (1) / More / Insertion Loss (2 Port)*.  Calibrate the unit - *Cal (5) / Start Cal.*  Connect the RF IN test lead to the GPS cable fly lead end at Data Radio and the RF OUT to the GPS cable end at WM1 GPS antenna.  Set the RF Analyser marker #1 to 1.575 GHz.  Record the loss at the marker.  Expected Result 1.5 to 5.0 dB  Save as: **<LOCOID>\_WM1\_GPS\_IL** | Cable loss = 1.5dB <X < 5dB | |  | |  | |  | |
| **Transfer antenna serial number from lab test certificate** |  | |  | |  | |  | |
| WiMAX Antenna and Feeder 2 | | | | | | | | | |
| **WiMAX Antenna and Feeder 2**  **WM2\_RL**  Set the RF Analyser range to 3400MHz to 3700MHz.  Connect a test lead to the FieldFox RF OUT port.  Select measurement - *Measure (1) / Return Loss (dB)*.  Calibrate the unit - *Cal (5) / Start Cal*.  Connect the test lead to WiMAX antenna 2 cable at the WiMAX unit.  Measure the minimum return loss.  Save as: **<LOCOID>\_WM2\_RL** | | Return loss > 12.7dB | |  | |  | | An O, S, L calibration tool is required for these tests, the QuickCal calibration will not work. | |

* 1. BTM Antenna RF Tests

| **Table 6: BTM Antenna RF Tests** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | **Result** | **Signature** | **Notes** |
|  |  | **Text** | **UserSignature** |  |
| **BTMN\_TX\_VSWR**  Set the RF Analyser range to 20.0MHz to 40.0MHz.  Ensure BTM-N is off.  Set the RF Analyser marker #1 to 27.000MHz.  Select measurement - *Measure (1) / VSWR*.  Calibrate the unit - *Cal (5) / Start Cal*.  Measure the VSWR for the BTM-N TX feeder and antenna at **27MHz**.  Reconnect the feeder cables to BTM-N.  Save as: **<LOCOID>\_BTMN\_\_TX\_ VSWR** | VSWR < 1.4 |  |  |  |
| **BTMR\_TX\_VSWR**  Set the RF Analyser range to 20.0MHz to 40.0MHz.  Ensure BTM-R is off.  Set the RF Analyser marker #1 to 27.000MHz.  Select measurement - *Measure (1) / VSWR*.  Calibrate the unit - *Cal (5) / Start Cal*.  Measure the VSWR for the BTM-R TX feeder and antenna at **27MHz**.  Reconnect the feeder cables to BTM-R.  Save as: **<LOCOID>\_BTMR\_TX\_VSWR** | VSWR < 1.4 |  |  |  |

* 1. Comms Engineer RF Test Verification

| **Table 7: Comms Engineer RF Test Verification** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | **Result** | **Signature** | **Notes** |
|  |  | **Text** | **UserSignature** |  |
| Communications Engineer verifies that all RF tests are complete and have passed.  Alternatively, the Communications Engineer verifies that any tests that have not passed have a corresponding ATIR in JIRA detailing the item as conditional pass, punchlist, or restricted use. | All RF tests Pass |  |  |  |

1. Pre-Shunt Works (LOW RISK – DRIVER NOT REQUIRED)
   1. Power-Up Confirmation

| **Table 8: Pre-Shunt Works – Power-Up Confirmation** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | **Result** | **Signature** | **Notes** |
|  |  | **Text** | **UserSignature** |  |
| Power-Up Confirmation | | | | |
| **Confirm Power-Up Procedure is complete** | N/A | N/A |  |  |

* 1. CDS Force Washer Configuration & Functional Location Checks

| **Table 9: Pre-Shunt Works - CDS Force Washer Configuration & Functional Location Checks** | | | | |
| --- | --- | --- | --- | --- |
| **Procedure** | **Expected Result** | **Outcome** | **Signature** | **Notes** |
|  |  | **Text** | **UserSignature** |  |
| Connect the laptop to the bottom left force washer  Use CDM600 Software Assistant to verify the configuration of the force washer. | Sensitivity: 4.35 |  |  | Do NOT change Sensitivity value. |
| Physical Gain: 19996.09 |  |
| Low Pass Filter (-3dB): 30000 |  |
| High Pass Filter (-3dB): 0.15 |  |
| Disconnect the bottom left force washer by removing the plug from the washer housing. | Connection is lost on the CDM600 Software Assistant | n/a |  | Left is observers side  Right is drivers side |
| Reconnect the plug | Connection is re-established | n/a |  |  |
| Connect the laptop to the top right force washer via CDSL J9.  Use CDM600 Software Assistant to verify the configuration of the force washer. | Sensitivity: 4.35 |  |  | Do NOT change Sensitivity value. |
| Physical Gain: 19996.09 |  |
| Low Pass Filter (-3dB): 30000 |  |
| High Pass Filter (-3dB): 0.15 |  |
| Disconnect the top right force washer by removing the plug from the washer housing. | Lost connection on the CDM600 Software Assistant | n/a |  | Left is observers side  Right is drivers side |
| Reconnect the plug | Connection is re-established | n/a |  |  |
| Connect the laptop to the bottom right force washer via CDSR J8.  Use CDM600 Software Assistant to verify the configuration of the force washer. | Sensitivity: 4.35 |  |  | Do NOT change Sensitivity value. |
| Physical Gain: 19996.09 |  |
| Low Pass Filter (-3dB): 30000 |  |
| High Pass Filter (-3dB): 0.15 |  |
| Disconnect the bottom right force washer by removing the plug from the washer housing. | Lost connection on the CDM600 Software Assistant | n/a |  | Left is observers side  Right is drivers side |
| Reconnect the plug | Connection is re-established | n/a |  |  |
| Connect the laptop to the top left force washer via CDSR J9.  Use CDM600 Software Assistant to verify the configuration of the force washer. | Sensitivity: 4.35 |  |  | Do NOT change Sensitivity value. |
| Physical Gain: 19996.09 |  |
| Low Pass Filter (-3dB): 30000 |  |
| High Pass Filter (-3dB): 0.15 |  |
| Disconnect the top left force washer by removing the plug from the washer housing. | Lost connection on the CDM600 Software Assistant | n/a |  | Left is observers side  Right is drivers side |
| Reconnect the plug | Connection is re-established | n/a |  |  |
| Access the CDSMU and re-instate any disabled force washer | On the left-hand side column of the CDSMU, check the row value (ES) - all boxes are showing as green | n/a |  | This represents the health status of each force washer and accelerometer |
| Whilst utilising the CDSMU, navigate to the RAW tab and strike a blow to the Cow Catcher with the orange hammer | Impact is detected on all Force Washers and Accelerometers | n/a |  | In the Raw tab the settings are adjustable – To be checked when striking the Cow Catcher |

* 1. BSCS – Solenoid Tests

| **Table 10: Pre-Shunt Works – BSCS – Solenoid Tests** | | | |
| --- | --- | --- | --- |
| **Procedure** | **Expected Result** | **Signature** | **Notes** |
|  |  | **UserSignature** |  |
| Setup Equipment | | | |
| Isolate the BS Test box power | N/A |  |  |
| Isolate the BSCS AIR – Lock out the air cock to enable to installation of the Pressure gauges | N/A |  |  |
| Connect the BSCS Pressure Gauges to the walkway BSC pneumatic bulkhead | N/A |  |  |
| Remove the cover from the BSCS solenoid box | N/A |  |  |
| Connect the Solenoid test box up to the BSCS J6 plug in the fridge cab utilising the extended test lead | N/A |  |  |
| Initialise Equipment | | | |
| CARE TO BE TAKEN WHEN ENERGISING THE BSCS SYSTEM | N/A |  |  |
| De-isolate the BS test box power | N/A |  |  |
| De-Isolate the BSCS Air cock and pressurise the BSCS System | N/A |  |  |
| Adjust the regulator in the BSC Solenoid Box under the walkway to 80 PSI. | N/A |  |  |
| Verify that there are no leaks in the BSCS’s pneumatics. | N/A |  |  |
| Test the BSCS Solenoids | | | |
| Operate the BSCS solenoids utilising the test box and press button 1 and confirm that pressure gauge 1 is showing 0 PSI and pressure gauge 2 is showing 80 PSI | N/A |  | If the gauges are not connected correctly the gauge switching sequence will not align to the test plan, but will still work |
| Operate the BSCS solenoids utilising the test box and press button 2 - confirm that pressure gauge 2 is showing 0 PSI and pressure gauge 1 is showing 80 PSI | N/A |  |  |
| Operate the BSCS solenoids utilising the test box and press button 3 - confirm that pressure gauge 3 is showing 0 PSI and pressure gauge 4 is showing 80 PSI | N/A |  |  |
| Operate the BSCS solenoids utilising the test box and press button 4 - confirm that pressure gauge 4 is showing 0 PSI and pressure gauge 3 is showing 80 PSI | N/A |  |  |
| Isolation and Removal of Test Equipment | | | |
| Isolate the BS test box power | N/A |  |  |
| Adjust the regulator in the BSCS Solenoid Box under the walkway to 0 PSI | N/A |  |  |
| Isolate the BSCS Air cock and depressurise the BSCS System | N/A |  |  |
| Disconnect the BSCS Pressure Gauges to the walkway BSC pneumatic bulkhead | N/A |  |  |
| Disconnect the BSCS solenoid test box and re install the BSCS solenoid box lid | N/A |  |  |

1. Pneumatic Brake Test (LOW RISK – DRIVER NOT REQUIRED)

| **Table 11: Pneumatic Brake Test** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | **Outcome** | **Signature** | **Notes** |
|  |  | **Text** | **UserSignature** |  |
| Perform a pneumatic brake test as per 90000505.E00.EN – VICS Software Upgrade Procedure. | Results as per 90000505.E00.EN – VICS Software Upgrade Procedure. |  |  | This test must be completed successfully before the locomotive is moved.  Attach results or ensure eWMS is complete. |

1. ADL, GoLinc, CS & ADAM Configuration (LOW RISK – DRIVER NOT REQUIRED)

| **Table 12: ADL, GoLinc, CS & ADAM Configuration** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | | **Outcome** | | **Signature** | | **Notes** | |
|  |  | | **Text** | | **UserSignature** | |  | |
| ADL | | | | | | | | |
| Confirm ADL install and test procedure is complete on eWMS | N/A | | N/A | |  | |  | |
| GoLinc | | | | | | | | |
| Ensure the GoLinc has correct Firmware & Application and the TCR has been completed for install and verification | N/A | | N/A | |  | |  | |
| ****Current Sensors**** | | | | | | | | |
| Check the Front Headlight 1 (CFHL1) current sensor settings and verify on TCR | As per 90000216.G00.EN – Current Transducer Programming Guide | |  | |  | |  | |
| Check the Front Headlight 2 (CFHL2) current sensor settings and verify on TCR | As per 90000216.G00.EN – Current Transducer Programming Guide | |  | |  | |  | |
| Check the Ditch Light Right (CDLSR) current sensor settings and verify on TCR | As per 90000216.G00.EN – Current Transducer Programming Guide | |  | |  | |  | |
| Check the Ditch Light Left (CDLSL) current sensor settings and verify on TCR | As per 90000216.G00.EN – Current Transducer Programming Guide | |  | |  | |  | |
| Check the Strobe Light A (CSLA) current sensor settings and verify on TCR | As per 90000216.G00.EN – Current Transducer Programming Guide | |  | |  | |  | |
| Check the Strobe Light B (CSLB) current sensor settings and verify on TCR | As per 90000216.G00.EN – Current Transducer Programming Guide | |  | |  | |  | |
| Check the Safe to Board/Alight Lights (CSBAL) current sensor settings and verify on TCR | As per 90000216.G00.EN – Current Transducer Programming Guide | |  | |  | |  | |
| Check the Not Safe to Board/Alight Lights (CNSBAL) current sensor settings and verify on TCR | As per 90000216.G00.EN – Current Transducer Programming Guide | |  | |  | |  | |
| Check the ATO Status Light (CATOS) current sensor settings and verify on TCR | As per 90000216.G00.EN – Current Transducer Programming Guide | |  | |  | |  | |
| ADAM | | | | | | | |
| Confirm the ADAM Module has been configured with the correct settings as per 90000679.E00.EN – Temperature Sensor Setup & Configuration document | TCR updated with version & Install signature |  | |  | |  | |
| Independently Verify the Settings are correct as per 90000679.E00.EN – Temperature Sensor Setup & Configuration document | TCR updated with verified signature |  | |  | |  | |

1. Self Load Test (HIGH RISK – DRIVER REQUIRED)

| **Table 13: Self Load Test** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Action** | **Expected Result Item** | **Expected Value** | **Outcome** | **Outcome Unit** | **Signature** | **Notes** |
|  |  |  | **Text** |  | **UserSignature** |  |
| Put the locomotive into self-load mode.  Change one of the SDIS to the *Inbound / Outbound* screen. | Oil Pressure | 173 |  | kPa |  |  |
| Fuel Pressure | 600 |  | kPa |
| Move the throttle to notch **8** slowly.  Record the values from the SDIS. | Amps | N/A |  | Amps |  |  |
| Volts | N/A |  | Volts |
| kW | N/A |  | kW |
| RPM | N/A |  | RPM |
| Leave the throttle in notch **8**.  Record the values from the SDIS. | Main Alternator Volts | 1217 |  | V |  |  |
| Auxiliary Load | 148 |  | kW |
| Engine Speed | 1050 |  | RPM |
| Grid Blower #1 | 3583 |  | RPM |
| Grid Blower #2 | 3583 |  | RPM |
| Ambient Air Temperature | N/A |  | Deg C. |
| Main Gen Ground Leakage | 0.19 |  | mA |
| Leave the throttle in notch **8**.  Record the statistics from the *Inbound / Outbound* screen on the SDIS.  Return throttle to idle and take loco out of self load. | Gross Power | 3345 |  | kW |  |  |
| Load Control Pot | 100 |  | % |
| Engine Water Pressure | 327 |  | kPa |
| Oil Pressure | 683 |  | kPa |
| COP Pressure | -0.65 |  | kPa |
| Horse Power Available | 3355 |  | kW |
| Turbo Speed | 22020 |  | RPM |
| Engine Water Temp Inlet | 85 |  | Deg. C |
| Engine Lube Oil Temp Inlet | 80 |  | Deg. C |
| Available Traction Kilowatts | 3197 |  | kW |
| Engine Water Temp Outlet | 89 |  | Deg. C |
| Oil Outlet Temp | 89 |  | Deg. C |
| Fuel Pressure | 506 |  | kPa |
| Intake Air Manifold Pressure | 307 |  | kPa |
| Battery Volts | 72 |  | V |
| Manifold Air Temp | 47 |  | Deg. C |
| Pre Turbine Temp Left | 579 |  | Deg. C |
| Pre Turbine Temp Right | 580 |  | Deg. C |

1. Communications Install/Verify/Function

| **Table 14: Communications Install or Verify or Function** | | | | | | | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Action** | | | | | | **Expected Result** | | **Outcome** | | | | | | **Signature** | | | | **Notes** | | |
|  | | | | | |  | | **Text** | | | | | | **UserSignature** | | | |  | | |
| Voice Radio Test Calls | | | | | | | | | | | | | | | | | | | | |
| **Simoco Radio 1 Test Call**  Perform a test call to 7 Mile Tower using radio 1. | | | | | | Test call is successful. | |  | | | | | |  | | | | The test calls must be completed after all other tests are completed.  The cables must not be disturbed again following these tests. | | |
| **Simoco Radio 2 Test Call**  Perform a test call to 7 Mile Tower using radio 2. | | | | | | Test call is successful. | |  | | | | | |  | | | |
| Satellite | | | | | | | | | | | | | | | | | | | | |
| Ensure Satellite Modem has correct Firmware & Application and the TCR has been completed for install and verification | | | N/A | | | | |  | | | | | |  | | | |  | | |
| Check the satellite handset networking settings. | | | DCHP: Disabled | | | | |  | | | | | |  | | | | The NVR should be connected and powered during these tests. | | |
| IP Address: 192.168.0.11 | | | | |  | | | | | |
| Subnet Mask: 255.255.255.0 | | | | |  | | | | | |
| Gateway IP: 192.168.0.1 | | | | |  | | | | | |
| Primary DNS: 192.168.0.1 | | | | |  | | | | | |
| Check the satellite reception signal level shown on the handset screen. | | | At least 5 bars of signal level. | | | | |  | | | | | |  | | | |  | | |
| Record the SIM serial number. | | | SIM Serial Number: | | | | | | | | | | |  | | | |  | | |
| Record the Satellite modem IMEI number. | | | IMEI Number: | | | | | | | | | | |  | | | |  | | |
| Prior to final programming, make a test call and record the SIM phone number. | | | SIM Phone Number: | | | | | | | | | | |  | | | |  | | |
| Check the pre-programmed numbers on the handset. | | | Numbers have been programmed according to [12]. | | | | |  | | | | | |  | | | |  | | |
| Perform a test call to 7 Mile Supervisor. | | | Test call is successful. | | | | |  | | | | | |  | | | |  | | |
| Perform a test call to any number not entered in the phone book. | | | Test call is not successful (restricted dialling is enabled). | | | | |  | | | | | |  | | | |  | | |
| Connect the laptop to the spare Ethernet port on the satellite modem.  Set the laptop IP details to:  IP Address: 192.168.0.10  Subnet Mask: 255.255.255.0  Gateway: 192.168.0.1  Login to the web interface. | | | Web interface shows:  **ONGOING DATA SESSIONS**  Standard data (X.X.X.X)  Where X.X.X.X is an IP address assigned by the satellite service. | | | | |  | | | | | |  | | | | The satellite modem Ethernet IP address is 192.168.0.1. | | |
| Data Radio | | | | | | | | | | | | | | | | | | | | |
| Ensure Data Radio has correct Firmware & Application and the TCR has been completed for install and verification | | | | | N/A | | | |  | | | |  | | | |  | | | |
| Set the laptop IP details to:  IP Address: 192.168.201.10  Subnet Mask: 255.255.255.0  Gateway: 192.168.201.1  Open a command prompt window and enter:  ping 10.213.120.49 –w 12000 | | | | | No packets lost. | | | |  | | | |  | | | |  | | | |
| WiMAX | | | | | | | | | | | | | | | | | | | | |
| Ensure WiMAX has correct Firmware & Application and the TCR has been completed for install and verification | | N/A | | | | | |  | | | | | |  | | | |  | | |
| Connect the laptop to the PoE Injector Ethernet port  Log into the WiMAX web interface.  Navigate to **Link Status** and check the following: | | Active: Yes | | | | | |  | | | | | |  | | | | The WiMAX Ethernet IP address is 192.168.25.1.  This test should be completed on the Dampier side of the 8-mile workshop to avoid line of sight to the base station being blocked.  RF2 results are expected to be worse than RF1 due to the orientation of the base station antennas. | | |
| Status Code: 0x0000 | | | | | |  | | | | | |
| Data Link Condition: On | | | | | |  | | | | | |
| Downlink Burst Rate > 1Mb/s | | | | | |  | | | | | |
| Uplink Burst Rate > 1Mb/s | | | | | |  | | | | | |
| Downlink RSSI RF1 > -99dBm | | | | | |  | | | | | |
| Downlink RSSI RF2 > -99dBm | | | | | |  | | | | | |
| Uplink RSSI RF1 or RF2 > -99dBm | | | | | |  | | | | | |
| WiMAX Antenna 1 GPS Function Test (Outside Shed) | | | | | | | | | | | | | | | | | | |
| Log into the Data Radio and under GPS -> Status check the following:  **\*Condition**  **\*Number SVs**  **\*UTC time**  **\*Position** | \*Condition = “Differential”  \*Number SV’s > 5  \*UTC time = Perth -8hr  \*Position = approx. 20 45.49 S 116 45.75 E | | | | | |  | | | |  | | | | If the condition is “Last Known (DR)” then the test has failed | | | |
| MOXA Switches - Configuration | | | | | | | | | | | | | | | | | | | | |
| Connect the laptop to port 16 on Moxa Switch A.  Login to the switch web interface to configure.  Complete the TCR Install & Verify fields for MOXA firmware and application. | | | | Configuration to latest SPC baseline [6]  Moxa A is configured correctly as per [9] | | | |  | | | |  | | | | | Moxa Switch A IP Address:  192.168.126.251 | | | |
| Connect the laptop to port 16 on Moxa Switch B.  Login to the switch web interface to configure.  Complete the TCR Install & Verify fields for MOXA firmware and application. | | | | Configuration to latest SPC baseline [6]  Moxa B is configured correctly as per [9] | | | |  | | | |  | | | | | Moxa Switch B IP Address:  192.168.126.252 | | | |
| MOXA Switches - Switch A Connections | | | | | | | | | | | | | | | | | | | | |
| Disconnect the Ethernet cables at the equipment end or power off the device.  Confirm that the correct Moxa port light goes dark.  Reconnect the Ethernet cables at the equipment end or restore power to the device.  Confirm that the correct Moxa port light is lit. | | | | ATO-N  ATOC-1  1 | | | | |  | | | |  | | | | Cables must be identified by equipment port, not by cable label only.  Ensure that cables are reconnected tightly and fixed correctly. | | | |
| ATO-N  DSE-1  2 | | | | |  | | | |
| ATO-R  ATOC-2  3 | | | | |  | | | |
| ATO-R  DSE-2  4 | | | | |  | | | |
| DIVA  X1  5 | | | | |  | | | |
| Data Logger  ETH2  6 | | | | |  | | | |
| NVR  A7  7 | | | | |  | | | |
| NVR  B4  8 | | | | |  | | | |
| TMC  RSM1  9 | | | | |  | | | |
| CMU  ETH2  10 | | | | |  | | | |
| MDR  X3  11 | | | | |  | | | |
| CDSL  J5  12 | | | | |  | | | |
| RTD  ETH  13 | | | | |  | | | |
| NDL2  ETH1  14 | | | | |  | | | |
| Maint. Port (Connect Laptop)  ETH  15 | | | | |  | | | |
| MOXA Switches - Switch B Connections | | | | | | | | | | | | | | | | | | | | |
| Disconnect the Ethernet cables at the equipment end or power off the device.  Confirm that the correct Moxa port light goes dark.  Reconnect the Ethernet cables at the equipment end or restore power to the device.  Confirm that the correct Moxa port light is lit. | | | | ATO-N  ATOC-2  1 | | | | |  | | | |  | | | | Ensure that cables are identified by port, not by label.  Ensure that cables are reconnected tightly and fixed correctly. | | | |
| ATO-N  DSE-2  2 | | | | |  | | | |
| ATO-R  ATOC-1  3 | | | | |  | | | |
| ATO-R  DSE-1  4 | | | | |  | | | |
| DIVA  X2  5 | | | | |  | | | |
| Data Logger  ETH1  6 | | | | |  | | | |
| NVR  A4  7 | | | | |  | | | |
| NVR  B3  8 | | | | |  | | | |
| TMC  RSM2  9 | | | | |  | | | |
| CMU  ETH3  10 | | | | |  | | | |
| MDR  X4  11 | | | | |  | | | |
| CDSR  J5  12 | | | | |  | | | |
| NDL2  ETH0  14 | | | | |  | | | |
| NVR - Configuration | | | | | | | | | | | | | | | | | | |
| Ensure NVR has correct Firmware & Application and the TCR has been completed for install and verification | N/A | | | | | |  | | | |  | | | |  | | | |
| NVR - General Diagnostics | | | | | | | | | | | | | | | | | | | | |
| Check the LEDs on the front of the NVR. | | | | POWER INPUT A  GREEN | | | | |  | | | |  | | | | NVR self-configuration must be completed before starting the NVR tests. | | | |
| POWER INPUT B  GREEN | | | | |  | | | |
| CPU STATUS A  GREEN | | | | |  | | | |
| CPU STATUS B  GREEN | | | | |  | | | |
| CPU RADIO A  OFF | | | | |  | | | |
| CPU RADIO B  OFF | | | | |  | | | |
| DATA RAD  GREEN | | | | |  | | | |
| SATELLITE  GREEN | | | | |  | | | |
| WIMAX  GREEN | | | | |  | | | |
| Connect a laptop to the NVR diagnostics port.  Set the laptop to obtain an IP address automatically.  Open a command prompt in the directory of ncat.exe.  Enter the command:  ncat –u –p 50000 192.168.3.2 51234  Press the *<Enter>* key twice to access the login prompt.  Login with the details:  Username: **admin**  Password: **admin**  If a newer version of NVR software with encryption is utilised, use the following login procedure:  Connect a laptop to the NVR diagnostic Port.  Open the “PAGEANT” program and add “lmciuser\_key.ppk” key using password “4uT0hau1”  Set the laptop to obtain an IP automatically.  Open up PuTTY. Select SSH and port 22. Type 192.168.3.2 or 192.168.3.3 to log into CPU A or B respectively.  Click “open” and login with  Username : lmciuser (no password) | | | | Login is successful and a list of available commands is displayed. | | | | |  | | | |  | | | | The directory of ncat.exe is usually:  C:\Program Files (x86)\Nmap | | | |
| Enter the command:  status switch | | | | Switch (A): Accessible | | | | |  | | | |  | | | |  | | | |
| Switch (B): Accessible | | | | |  | | | |
| Enter the command:  status gps | | | | Latitude, longitude is approximately:  -20.75, 116.75 | | | | |  | | | |  | | | |  | | | |
| NVR - Ping Tests – A Side | | | | | | | | | | | | | | | | | | | | |
| Connect the laptop to Moxa A – Port 16.  Set the laptop IP address details to one of the spare IP addresses on the A-side for that locomotive. See [9] for details.  Turn on the Data Radio circuit breaker.  Turn off the WiMAX circuit breaker.  Turn off the Satellite Modem circuit breaker.  Open a command prompt window.  Enter the command:  ping 10.213.120.49 –w 12000 | | | | DATA RAD LED  GREEN | | | | |  | | | |  | | | | Ensure the laptop gateway IP address is set to the NVR IP address. | | | |
| SATELLITE LED  OFF | | | | |  | | | |
| WIMAX LED  OFF | | | | |  | | | |
| No packets lost | | | | |  | | | |
| Turn off the Data Radio circuit breaker.  Turn on the WiMAX circuit breaker.  Turn off the Satellite Modem circuit breaker.  Enter the command:  ping 10.213.120.49 –w 12000 | | | | DATA RAD LED  OFF | | | | |  | | | |  | | | |  | | | |
| SATELLITE LED  OFF | | | | |  | | | |
| WIMAX LED  GREEN | | | | |  | | | |
| No packets lost | | | | |  | | | |
| Turn off the Data Radio circuit breaker.  Turn off the WiMAX circuit breaker.  Turn on the Satellite Modem circuit breaker.  Enter the command:  ping 10.213.120.49 –w 12000 | | | | DATA RAD LED  OFF | | | | |  | | | |  | | | |  | | | |
| SATELLITE LED  GREEN | | | | |  | | | |
| WIMAX LED  OFF | | | | |  | | | |
| No packets lost | | | | |  | | | |
| NVR - Ping Tests – B Side | | | | | | | | | | | | | | | | | | | | |
| Connect the laptop to Moxa B – Port 16.  Set the laptop IP address details to one of the spare IP addresses on the B-side for that locomotive. See [9] for details.  Turn on the Data Radio circuit breaker.  Turn off the WiMAX circuit breaker.  Turn off the Satellite Modem circuit breaker.  Open a command prompt window.  Enter the command:  ping 10.213.120.49 –w 12000 | | | | DATA RAD LED  GREEN | | | | |  | | | |  | | | | Ensure the laptop gateway IP address is set to the NVR IP address. | | | |
| SATELLITE LED  OFF | | | | |  | | | |
| WIMAX LED  OFF | | | | |  | | | |
| No packets lost | | | | |  | | | |
| Turn off the Data Radio circuit breaker.  Turn on the WiMAX circuit breaker.  Turn off the Satellite Modem circuit breaker.  Enter the command:  ping 10.213.120.49 –w 12000 | | | | DATA RAD LED  OFF | | | | |  | | | |  | | | |  | | | |
| SATELLITE LED  OFF | | | | |  | | | |
| WIMAX LED  GREEN | | | | |  | | | |
| No packets lost | | | | |  | | | |
| Turn off the Data Radio circuit breaker.  Turn off the WiMAX circuit breaker.  Turn on the Satellite Modem circuit breaker.  Enter the command:  ping 10.213.120.49 –w 12000 | | | | DATA RAD LED  OFF | | | | |  | | | |  | | | |  | | | |
| SATELLITE LED  GREEN | | | | |  | | | |
| WIMAX LED  OFF | | | | |  | | | |
| No packets lost | | | | |  | | | |
| Locomotive Communications | | | | | | | | | | | | | | | | | | | |
| Check the ATS links on the CDU | | | ATP (green) | | | | | | |  | | | | | | ATP & ATO links will establish when the subsystems are turned ON.  Green – healthy  Red – Comms down | | | |
| CDU (green) | | | | | | |  | | | | | |
| ATO (green) | | | | | | |  | | | | | |
| DLC (green) | | | | | | |  | | | | | |
| PTP (green) | | | | | | |  | | | | | |
| Check the DLC links on the CDU | | | ATS (green) | | | | | | |  | | | | | | Green – healthy  Red – Comms down | | | |
| CDU (green) | | | | | | |  | | | | | |
| Fastbrake (green) | | | | | | |  | | | | | |
| TIM (green) | | | | | | |  | | | | | |
| EIU (green) | | | | | | |  | | | | | |
| PTC (green) | | | | | | |  | | | | | |
| Check the Ethernet links on the SDIS  *Requires level 2 diagnostic access.*  *Navigate to More Menu -> Loco Monitor -> Network -> Cab Comms* | | | EAB (green) | | | | | | |  | | | | | | Green – healthy  Yellow- degraded  Red – comms down | | | |
| End of Train (green) | | | | | | |  | | | | | |
| Event Recorder (green) | | | | | | |  | | | | | |
| CDS DLC (green) | | | | | | |  | | | | | |
| GPS (green) | | | | | | |  | | | | | |
| Consist Modem (green) | | | | | | |  | | | | | |
| Fuel Monitor (green) | | | | | | |  | | | | | |
| AAP (green) | | | | | | |  | | | | | |
| Check the PTP links on the SDIS  *Requires level 2 diagnostic access.*  *Navigate to More Menu -> Loco Monitor -> Network -> Cab Comms*  *Network -> Cab Comms* | | | SDIS1 (green) | | | | | | |  | | | | | | Green – healthy  Yellow- degraded  Red – comms down | | | |
| SDIS2 (green) | | | | | | |  | | | | | |
| CIO (green) | | | | | | |  | | | | | |
| CMU link DEGRADED (yellow) | | | | | | |  | | | | | |
| Check the Arcnet Health on the SDIS  *Requires level 2 diagnostic access.*  *Navigate to More Menu -> Loco Monitor -> Network -> Cab Comms*  *Network -> Cab Comms* | | | Arcnet 0 link is healthy (Green) | | | | | | |  | | | | | |  | | | |
| Arcnet 1 link is healthy (Green) | | | | | | |  | | | | | |

1. ****NDL**** (LOW RISK – DRIVER NOT REQUIRED)

| **Table 15: NDL** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | Outcome | Signature | **Notes** |
|  |  | Text | UserSignature |  |
| Confirm that NDL 2 has been LAB configured in section 90001015.E02.EN – AC Lab Certificate | N/A |  |  | 90001015.E02.EN – AC Lab Certificate must be completed before continuring |
| Ensure NDL has correct Firmware & Application and the TCR has been completed for install and verification | N/A |  |  |  |
| Confirm the ethernet wiring for the NDL2 is correctly ported | TMC RSM P5 wired to USB/ETH into NDL  NDL2 Comm2 serial link installed to X4 L15k. |  |  |  |
| Power OFF the NDL2 processor by opening the ATS/TMC CB | NDL2 is isolated |  |  |  |
| Turn ON the NDL2 processor by closing the ATS/TMC CB.  Confirm that the NDL powers up automatically and does not require the power button to be pressed | NDL2 powers ON automatically |  |  | If the NDL requires the power button to be pressed, refer to LAB [8] for configuration. |
| Connect a latop into MOXA A Port 16  Create a putty session to log into the NDL2 via LCS network | NDL2 session established |  |  | Laptop Network Settings:   * VLAN: VLAN 2 * IP: 10.228.XX.XX (spare IP on NVIP plan) * Sub: 255.255.255.224   NDL2 Network Settings:   * IP: 10.228.XX.XX (Next available IP allocation on NVIP plan) * Sub: 255.255.255.224   Session:   * SSH * Port 22 * Username: pi * Password: admin12 |
| Ping the NVR local gateway.  Take a screenshot as evidence and save to Comm HDD. | Ping successful. No packet loss |  |  | Refer to NVIP plan for the NVR local gateway IP address |
| Screenshot saved to comm HDD |
| Type the following commands and take a screenshot as evidence.   * listif * showroutes * df –h | grep sda3 | 3 x Screenshots saved to comm HDD |  |  |  |
| Type the following command and take a screenshot as evidence.  Verify the expected results & update the TCR.   * showndlver | NDL Version = 2.0 build 00 |  |  | Screenshot saved to comm HDD |
| LocoID = [correct loco] |  |  |
| Disk Space = 110 GB+ |  |  |
| Network adapters are correctly set |  |  |
| Time server has synced to correct time |  |  |
| Screenshot saved to Comm HDD |  |  |
| Verify the required NDL network links are healthy | Time Server / NVR: Connected |  |  |  |
| ATS: Connected |  |  |
| DSE: Connected |  |  |
| ER: Connected |  |  |
| DLC: Connected |  |  |
| Maintenance: DISCONNECTED |  |  |
| DSE-A: DISCONNECTED |  |  |
| DSE-B: DISCONNECTED |  |  |
| CDU: Connected |  |  |
| ATOC\_1: Connected |  |  |
| ATOC\_2: Connected |  |  |
| Cmu: Connected (EVO)  Cmu: DISCONNECTED (D9) |  |  |
| Cds\_ftp\_server: Connected |  |  |
| Asts\_data\_logger: Connected |  |  |
| Dse\_normal\_ns: Connected |  |  |
| Ato\_normal\_ns: Connected |  |  |
| Verify the ATP L15k Serial Link is healthy.   * WINSCP into the NDL * Port 22, SFTP * Navigate to /home/pi/tcpdump/dump/drain/legacy\_atp\_get * Ensure there is a recent .LCF file (ATP log file)   OR  Check the debug file for [INFO]:Download successful | Recent .LCF file (ATP log file)  OR  Debug file – [INFO]: Download successful |  |  | If the log file does not exist, wait 20minutes or interrogate the debug file as the L15k log may have already been offboarded. |

1. ****VICS**** (LOW RISK – DRIVER NOT REQUIRED)

| **Table 16: VICS** | | | |
| --- | --- | --- | --- |
| **Procedure** | **Expected Result** | **Signature** | **Notes** |
|  |  | **UserSignature** |  |
| Ensure the locomotive is in the following state:  ATH-NV Circuit Breaker – On  VICS Circuit Breaker – On | MDR LCD panel displays:  **System Status**  **I: On S/W:Run Cam:Ok** |  |  |
| Verify the MDR-5R configuration. | As per 90000505.E00.EN - VICS Software Upgrade Procedure |  | 90000760.E00.EN – VICS Release 14 Work Instruction |
| Verify the driver side camera configuration. | As per 90000505.E00.EN - VICS Software Upgrade Procedure |  | 90000760.E00.EN – VICS Release 14 Work Instruction |
| Verify the observer side camera configuration. | As per 90000505.E00.EN - VICS Software Upgrade Procedure |  | 90000760.E00.EN – VICS Release 14 Work Instruction |
| On the desktop, open the **Video Manager** program. | Video Manager launched successfully.  Live video streams are displayed successfully. |  |  |
| Confirm that the video from both cameras are clear and unobstructed. | Live video streams do not contain any image defect and provide a clear view from the front of the locomotive. |  |  |
| Confirm that the horizon in the video image from both cameras is roughly 10% from the top of the image. | Live video streams contain roughly 10% of sky at the side of the image. |  |  |
| Save an image from the driver side camera.  Save as: **<LOCOID>\_VICS\_DR** | Image saved to the Cobtmbtmmmissioning HDD |  |  |
| Save an image from the driver side camera.  Save as: **<LOCOID>\_VICS\_OB** | Image saved to the Commissioning HDD |  |  |
| Confirm that the CamData.dvs file is recording on the correct partition | Drive letter will be: “F”  Partition name will be: “Data” |  |  |

1. Collision Detection System (LOW RISK – DRIVER NOT REQUIRED)

| **Table 17: Collision DetectionSystem** | | | | |
| --- | --- | --- | --- | --- |
| **Procedure** | **Expected Result** | **Result** | **Signature** | **Notes** |
|  |  | **Text** | **UserSignature** |  |
| ****CDS Configuration, Characterisation & Desensitisation**** | | | | |
| Ensure the CDS has correct Firmware & Application and the TCR has been completed for install and verification | N/A |  |  |  |
| Characterise the Cowcatcher with the latest approved CDS Characterisation Utility.  Add hammer serial details to the comments | Characterisation successful | n/a |  | The latest CDSCU will desensitise the cowcatcher by default factor of 2. |
| Confirm the Characterisation file is deployed on both the LEFT & RIGHT CDS Processors | CDP-L Characterised | n/a |  |  |
| CDP-R Characterised | n/a |  |
| Save & archive the Characterisation file onto the Commissioning HDD for records | Characterisation file saved onto the HDD. | n/a |  |  |
| Desensitize the Coupler by executing the latest CDP Coupler Desensitizer tool.  Observe the trigger values in the CDSMU. | Accelerometers desensitized to 50g |  |  | This will desensitize the accelerometers by a factor of 2. |
| Obtain a screenshot of CDSMU trigger values | Screenshot saved to HDD as evidence. | n/a |  |  |

1. End of Train (LOW RISK – DRIVER NOT REQUIRED)

| **Table 18: End Of Train** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | **Outcome** | **Signature** | **Notes** |
|  |  | **Text** | **UserSignature** |  |
| Using the GE screen, set the EOT ID to **99999**. | EOT ID is accepted |  |  | Leave the ETM connected until all ETM alarms are observed, so that these can be checked in the Event Recorder log.  This test must be successful before attempting DLC testing. |
| SDIS receives rear brake values from the test EOT marker. |  |  |
| Check the *Operator Log* on the CDU. | Correct locomotive ID is displayed for log of EOT change. |  |  |  |

1. L15000 ATP Static (LOW RISK – DRIVER NOT REQUIRED)

| **Table 19: L15000 ATP Static** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | | Outcome | | Signature | | **Notes** | |
|  |  | | Text | | UserSignature | |  | |
| VCU DIP Switch Verification | | | | | | | | |
| Record the required DIP switch settings. | As per pre-installation test. | |  | |  | | To be completed by the commissioning engineer. | |
| Record the DIP switch settings on the VCU. | As per step 1. | |  | |  | |  | |
| **Start Up - DO NOT PROCEED FURTHER TEST UNTIL DIP SWITCH SETTING IS VERIFIED**. | | | | | | | | |
| Ensure the locomotive is in the following state:   * Brakes: **Lead** and **Cut-In** * All circuit breakers: **On** * ATP Air Cock: **Open** * ABH: **Release** | N/A | |  | |  | |  | |
| Set the ATP switch to **LEGACY** without the ATP power supply unit switched on. | ATP Fail audible alarm and LED. | |  | |  | |  | |
| Turn on the ATP switch on the power supply unit.  Set the ATP switch to **LEGACY** | At stage 5:  The ASU makes an audible alarm when the ATP performs an emergency brake dump. (“Multiple beeps” sound) | |  | |  | |  | |
| At stage 6:  The ATP alarm panel has a flashing ATP Alarm LED and an audible alarm (not continuous). | |  | |
| Push the ATP alarm button once. | CDU displays random characters in the ATP data area.  The ATP alarm panel has a steady ATP Fail LED and a continuous audible alarm. | |  | |  | |  | |
| Push the ATP alarm button again. | ATP completes start-up without error.  ASU makes an audible alarm for ATP update. (“Whoop” sound)  CDU displays ATP data  Authority = **StartUp** | |  | |  | |  | |
| Cab Code Detection | | | | | | | | |
| Setup ATP as per the Start Up procedure in A.1.  Setup the locomotive in ATP Screen 2 as Single Engine, and shorthood first.  Apply a **Clear (180)** cab code to the shorthood. | CDU displays ATP data  Direction = **Clear** | |  | |  | |  | |
| Apply a **Caution (120)** cab code to the shorthood. | CDU displays ATP data  Direction = **Caution** | |  | |  | |  | |
| Apply a **Stop (75)** cab code to the shorthood. | CDU displays ATP data  Direction = **Stop** | |  | |  | |  | |
| Apply a **Turnout (50)** cab code to the shorthood. | CDU displays ATP data  Direction = **Turnout** | |  | |  | |  | |
| Setup the locomotive in ATP Screen 2 as Single Engine, and longhood first.  Apply a **Clear (180)** cab code to the longhood. | CDU displays ATP data  Direction = **Clear** | |  | |  | |  | |
| Apply a **Caution (120)** cab code to the longhood. | CDU displays ATP data  Direction = **Caution** | |  | |  | |  | |
| Apply a **Stop (75)** cab code to the longhood. | CDU displays ATP data  Direction = **Stop** | |  | |  | |  | |
| Apply a **Turnout (50)** cab code to the longhood. | CDU displays ATP data  Direction = **Turnout** | |  | |  | |  | |
| ECP | | | | | | | | |
| Connect an ETM to the locomotive brake pipe and the long hood junction box B.  Ensure all other locomotive junction box cables are terminated.  Ensure ATP L15000 has been started as per A.1. | | CDU displays:  Authority: **StartUp** | |  | |  | |  |
| Move the ABH to *Full*.  Press *ECP SETUP*.  Press *RUN*.  Follow the prompts to enter ECP Run mode. Check and record that expected result is displayed on the CDU | | During sequencing CDU displays:  POWER: **24V** | |  | |  | |  |
| Wait for ECP to enter Run mode.  Check that the expected results are displayed on the CDU and record the voltage. | | CDU displays:  ECP Mode: **RUN**  POWER: **230V**  Authority: **ECPTest** | |  | |  | |  |
| Move the ABH to lower the TBC to less than 50%.  Check that the expected result is displayed on the CDU. | | CDU displays:  **ATP PENALTY**  TBC %: **100**  No ATP alarms (Authority box does not become highlighted) | |  | |  | |  |
| Connect a laptop to the recorder card.  Setup WLANA to “Monitor to screen” | | TBC column shows the TBC shown on the CDU. | |  | |  | | If 255 is shown, this indicates the TAP is not paired with the DLC. |
| Move the ABH to *SUP*.  Follow the prompts to acknowledge the penalty.  Move the ABH to *REL*. Check and record the BP value is displayed on the CDU. | | CDU displays:  Authority: **StartUp**  TBC % : **0**  BP (kPa) : **620 ± 21** | |  | |  | |  |
| Move the ABH to *FULL*. Check and record the BP value is displayed on the CDU. | | TBC % : **100**  BP (kPa) : **620 ± 21** | |  | |  | |  |
| Press *ECP*. (Record the result in the column)  Press *ECP INFO*.  Press *VIEW LOCO PS*. | | The correct locomotive number is displayed. | |  | |  | |  |
| Press *ECP*.  Press *ECP INFO*.  Press *POWER CONTROL*.  Press *TL PWR OFF*. | | CDU displays:  POWER: **OFF** or **---** | |  | |  | |  |
| Press *POWER CONTROL*.(Record the Voltage displayed)  Press *TL PWR AUTO*.  Follow the prompts to apply trainline power. | | CDU displays:  POWER: **230V** | |  | |  | |  |
| Press *ECP SETUP*.  Press *CUT-OUT*.  Follow the prompts to cut out ECP. | | CDU displays:  ECP Mode: **OFF**  POWER: **OFF** or **---** | |  | |  | | Check if expected result is displayed on the CDU |
| Disconnect the termination at one of the shorthood junction boxes.  Press *ECP SETUP*.  Press *SWITCH*.  Follow the prompts to enter ECP Switch mode. | | CDU displays:  **NO HEAD END TERMINATION**  POWER: **OFF** or **---** | |  | |  | | Check if expected result is displayed on the CDU |
| Disconnect the ETM from the locomotive.  Terminate the long hood junction box B cables.  Press *ECP SETUP*.  Press *SWITCH*.  Follow the prompts to enter ECP Switch mode. | | CDU displays:  ECP Mode: **SWITCH** | |  | |  | | Check if expected result is displayed on the CDU,  Driver is required to disconnect ETM. |
| Press *ECP SETUP*.  Press *CUT-OUT*.  Follow the prompts to cut out ECP. | | CDU displays:  ECP Mode: **OFF**  POWER: **OFF** or **---** | |  | |  | | Check if expected result is displayed on the CDU |
| Terminate the shorthood junction box cables. | | N/A | | N/A | |  | |  |

1. DIVA I/O

| Table 20: DIVA I/O | | | | | |
| --- | --- | --- | --- | --- | --- |
| Procedure | Expected Result | | Outcome | Signature | Notes |
|  |  | | Text | UserSignature |  |
| Forward and Reverse Relays (HIGH RISK – DRIVER REQUIRED) | | | | | |
| Put the reverser in **neutral**.  Test resistance between **J2/A1** and **J2/A7** for the **FORWARD RELAY** input. | Open circuit | |  |  |  |
| Test resistance between **J2/A2** and **J2/A8** for the **REVERSE RELAY** input. | Open circuit | |  |  |  |
| Put the reverser in **forward**.  Test resistance between **J2/A1** and **J2/A7** for the **FORWARD RELAY** input. | Closed circuit | |  |  |  |
| Test resistance between **J2/A2** and **J2/A8** for the **REVERSE RELAY** input. | Open circuit | |  |  |  |
| Put the reverser in **reverse**.  Test resistance between **J2/A1** and **J2/A7** for the **FORWARD RELAY** input. | Open circuit | |  |  |  |
| Test resistance between **J2/A2** and **J2/A8** for the **REVERSE RELAY** input. | Closed circuit | |  |  |  |
| Put the reverser in **neutral**. | N/A | | N/A | N/A |  |
| Emergency Magnetic Valves | | | | | |
| Setup the locomotive in the following state:  ATP Air Cock: **Open**  ATP Switch: **Isolated**  ATP CB: **On**  DIVA CB: **Off**  Install the following jumper wires:  Vital Cabinet J1 – E2 to Vital Cabinet J1 – F2  Vital Cabinet J1 – E4 to Vital Cabinet J1 – F4 | Brake Pipe: **620 ± 14 kPa** | |  |  |  |
| Move the ATP Switch to **Enhanced**. | No emergency brake dump initiated.  Brake Pipe: **620 ± 14 kPa** | |  |  |  |
| Remove the jumper wire from **J1 – E2**. | EMV 1 initiates emergency brake dump.  Brake Pipe: **0 ± 14 kPa** | |  |  |  |
| Reinstall the jumper wire to **J1 – E2**.  Move the ABH to **EMG** then **REL** after 60 seconds. | Emergency brake is recovered.  Brake Pipe: **620 ± 14 kPa** | |  |  |  |
| Remove the jumper wire from **J1 – E4**. | EMV 2 initiates emergency brake dump.  Brake Pipe: **0 ± 14 kPa** | |  |  |  |
| Reinstall the jumper wire to **J1 – E4**.  Move the ABH to **EMG** then **REL** after 60 seconds. | Emergency brake is recovered.  Brake Pipe: **620 ± 14 kPa** | |  |  |  |
| Move the ATP Switch to **Isolated**. | No emergency brake dump initiated.  Brake Pipe: **620 ± 14 kPa** | |  |  |  |
| DIVA Pressure Switches | | | | | |
| Place the automatic brake in **MIN SERVICE**.  Test resistance between **J2/C5** and **J2/C11** for the **HIGH PRESSURE SWITCH** input. | | Open circuit |  |  |  |
| Place the automatic brake in **FULL SERVICE**.  Test resistance between **J2/C5** and **J2/C11** for the **HIGH PRESSURE** **SWITCH** input. | | Closed circuit |  |  |  |
| Test resistance between **J2/C4** and **J2/C10** for the **LOW PRESSURE SWITCH – DIVA** input. | | Open circuit |  |  |  |
| Place the automatic brake in **EMERGENCY**.  Test resistance between **J2/C4** and **J2/C10** for the **LOW PRESSURE SWITCH – DIVA** input. | | Closed circuit |  |  |  |
| Place the automatic brake in **RELEASE**.  Test resistance between **J2/C4** and **J2/C10** for the **LOW PRESSURE SWITCH – DIVA** input. | | Open circuit |  |  |  |
| Test resistance between **J2/C5** and **J2/C11** for the **HIGH PRESSURE SWITCH – DIVA** input. | | Open circuit |  |  |  |

1. DIVA & BTM Verification & Static Tests (LOW RISK – DRIVER NOT REQUIRED)

| **Table 21: DIVA and BTM Verification and Static Tests** | | | | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Action** | | **Expected Result** | | | | **Outcome** | | | | **Signature** | **Notes** | | | |
|  | |  | | | | **Text** | | | | **UserSignature** |  | | | |
| Verification | | | | | | | | | | | | | | |
| Ensure the TCR has been completed for Installation and complete the DIVA TCR verification. | |  | | | |  | | | |  |  | | | |
| Start Up | | | | | | | | | | | | | | |
| Bootup DIVA | | DIVA boots up successfully | | | |  | | | |  |  | | | |
| Setup ECP Run completing “ECP Test” | | ECP setup in Run. “ECP Test” completed successfully. | | | |  | | | |  |  | | | |
| Inform OC to setup SINGLE ENGINE trainsheet | | OC confirms SINGLE ENGINE trainsheet is setup | | | |  | | | |  |  | | | |
| Startup DIVA | | DIVA completes startup tests. | | | |  | | | |  |  | | | |
| On the ATP screen press **LEAD** & **LEAD DO-IT** | | **TxtInfo** appears on the **Direction** field. | | | |  | | | |  |  | | | |
| Setup DIVA as SINGLE ENGINE and Track ID as 7M | | DIVA is setup as SINGLE ENGINE and Track ID as 7M | | | |  | | | |  |  | | | |
| Press **SHOWMORE**  Press **VALIDATE** (for train data)  Press **VALIDATE** (for ID and location)  Call OC to confirm VSS has received train data | | OC confirms that train data is received and DIVA is connect to VSS | | | |  | | | |  | Continue this procedure into section Appendix A to test the ATP redundancy. | | | |
| Redundancy Tests | | | | | | | | | | | | | | | |
| Confirm DIVA firmware upgrade is completed for all 3 CCTEs | | | | | All CCTE Firmware (FPGA) are upgraded, confirm via checking TCR and that FPGA stickers on all cards | | |  | | | |  | | | |
| Bootup DIVA and note down all DIVA messages on ATP Screen 3 | | | | | DIVA booted up and all DIVA messages are noted down. | | |  | | | |  | | | |
| Set up DIVA and connect to RTC VSS | | | | | VSS Connection established | | |  | | | | Enter 7M when setting up Train Data to connect to RTC VSS  Request OC to set up Train Sheet | | | |
| Put DIVA into Staff Responsible mode | | | | | DIVA is in Staff Responsible | | |  | | | |  | | | |
| Ensure ABH is released. Power down **CCTE2** only and confirm DIVA has not failed and there is no PEB | | | | | DIVA has not failed.  No PEB. | | |  | | | |  | | | |
| Check DIVA is showing DEGRADED in Direction Field | | | | | Direction field shows DEGRADED | | |  | | | |  | | | |
| Select End journey from previous session | | | | | Disconnect from VSS | | |  | | | |  | | | |
| Turn ON **CCTE2** and power cycle DIVA C/B | | | | | **CCTE2** is ON and DIVA C/B is cycled | | |  | | | |  | | | |
| Set up DIVA and connect to RTM VSS | | | | | VSS Connection established | | |  | | | | Enter RO when setting up Train Data to connect to RTM VSS  VSS connection can be established without requesting another train sheet to be created | | | |
| Put DIVA into Staff Responsible mode | | | | | DIVA is in Staff Responsible | | |  | | | |  | | | |
| Ensure ABH is released. Power down **CCTE1** only and confirm DIVA has not failed and there is no PEB.  (Press the “ATP Alarm” button to acknowledge audible alarm from ATP Hard Horn.) | | | | | DIVA has not failed. ATP CDU displays “---“  No PEB. | | |  | | | |  | | | |
| Turn OFF DIVA C/B | | | | | DIVA C/B is OFF followed by PEB. | | |  | | | |  | | | |
| Turn ON **CCTE1** and power ON DIVA C/B | | | | | **CCTE1** is ON and DIVA C/B is powered ON | | |  | | | |  | | | |
| Set up DIVA and connect to RTM VSS | | | | | VSS Connection established | | |  | | | | Enter RO when setting up Train Data to connect to RTM VSS  VSS connection can be established without requesting another train sheet to be created | | | |
| Put DIVA into Staff Responsible mode | | | | | DIVA is in Staff Responsible | | |  | | | |  | | | |
| Ensure ABH is released. Power down **CCTE3** only and confirm DIVA has not failed and there is no PEB | | | | | DIVA has not failed.  No PEB. | | |  | | | |  | | | |
| Check DIVA is showing DEGRADED in Direction Field | | | | | Direction field shows DEGRADED | | |  | | | |  | | | |
| Select End Journey | | | | | Disconnect from VSS | | |  | | | |  | | | |
| Banker Button Function Test | | | | | | | | | | | | | | | |
| Ensure the banker J2 connection in the fridge cab is disconnected | | | | | N/A | | |  | | | |  | | | |
| Confirm the following MTORE A & B LED states | | | | | \* ES7 LED – Banker connection - OFF  \* ES8 LED – BSCS arm deployment - OFF  \* E15 LED – BSCS arm stowed - OFF | | |  | | | | E15 LED would be on if the banker processor was installed and connected | | | |
| Connect banker switch cable to J2 plug in fridge cab | | | | | N/A | | |  | | | |  | | | |
| Ensure banker switch set to “Banker Separated” | | | | | \* ES7 LED – Banker connection - OFF  \* ES8 LED – BSCS arm deployment - ON  \* E15 LED – BSCS arm stowed - OFF | | |  | | | |  | | | |
| Toggle banker switch to “Banker Attached” | | | | | \* ES7 LED – Banker connection - ON  \* ES8 LED – BSCS arm deployment - ON  \* E15 LED – BSCS arm stowed - OFF | | |  | | | |  | | | |
| Disconnect the Banker Switch cable in the Fridge Cab and install dust cap on J2 plug | | | | | N/A | | |  | | | |  | | | |
| BTM D360 Checks & Verification | | | | | | | | | | | | | | |
| Bootup DIVA with BTM-N on and BTM-R off | | DIVA boots up successfully | | | |  | | | |  |  | | | |
| Connect to BTM-N with D360 tool  \*Select English  \*Select Diag  \*On the right hand panel double click “TLGTEST” | | “Esito Test Antenna” = “TEST\_OK”  “numero Test Antenna elementare” > 100  “num. fallimenti test antenna elementary” = 0 | | | |  | | | |  | “Esito Test Antenna” = “TEST\_KO”  Indicates a failure | | | |
| Ensure the TCR has been completed for Installation and complete the BTM N verification. | |  | | | |  | | | |  |  | | | |
| Rebootup DIVA with BTM-R on and BTM-N off | | DIVA boots up successfully | | | |  | | | |  |  | | | |
| Connect to BTM-R with D360 tool  \*Select English  \*Select Diag  \*On the right hand panel double click “TLGTEST” | | “Esito Test Antenna” = “TEST\_OK”  “numero Test Antenna elementare” > 100  “num. fallimenti test antenna elementary” = 0 | | | |  | | | |  | “Esito Test Antenna” = “TEST\_KO”  Indicates a failure | | | |
| Ensure the TCR has been completed for Installation and complete the BTM R verification. | |  | | | |  | | | |  |  | | | |
| Hardware Interface Checks | | | | | | | | | | | | | | | |
| Move the reverser to forward. | | MTORE A&B LED ES4: **On**  MTORE A&B LED ES5: **Off** | | | | | |  | | | |  | | | |
| Move the reverser to reverse. | | MTORE A&B LED ES4: **Off**  MTORE A&B LED ES5: **On** | | | | | |  | | | |  | | | |
| Move the reverser to neutral. | | MTORE A&B LED ES4: **Off**  MTORE A&B LED ES5: **Off** | | | | | |  | | | |  | | | |
| Apply a minimum service brake. | | MTORE A&B LED ES13: **Off**  MTORE A&B LED ES14: **Off** | | | | | |  | | | |  | | | |
| Apply a full service brake. | | MTORE A&B LED ES13: **Off**  MTORE A&B LED ES14: **On** | | | | | |  | | | |  | | | |
| Apply an emergency brake. | | MTORE A&B LED ES13: **On**  MTORE A&B LED ES14: **On** | | | | | |  | | | |  | | | |
| ATO switch is in PASSIVE position | | MTORE A&B LED E1: **On** | | | | | |  | | | |  | | | |
| ATO switch is in DRIVER ASSIST position | | MTORE A&B LED E2: **On** | | | | | |  | | | |  | | | |
| ATO switch is in ATTENDED position | | MTORE A&B LED ES9: **On** | | | | | |  | | | |  | | | |
| ATO switch is in DRIVERLESS position | | MTORE A&B LED ES10: **On** | | | | | |  | | | |  | | | |
| ATP switch is in ENHANCED position | | MTORE A&B LED E8: **On** | | | | | |  | | | |  | | | |
| Proceed to turn the ATP swtich to ISOLATED position | | DIVA is isolated | | | | | |  | | | | If following on from a previous DIVA bootup. | | | |
| ATP switch is in LEGACY position | | MTORE A&B LED E3: **On** | | | | | |  | | | |  | | | |
| ECP | | | | | | | | | | | | | | | | |
| Connect an ETM to the locomotive brake pipe and the long hood junction box B.  Ensure all other locomotive junction box cables are terminated.  Start up DIVA as per section N.1 – steps 1-6. | | | DIVA starts up correctly. | | |  | | | |  | | | Driver is required to connect ETM. | | | |
| Move the ABH to *Full*.  Press *ECP SETUP*.  Press *RUN*. (Record the voltage displayed)  Follow the prompts to enter ECP Run mode. | | | During sequencing CDU displays:  POWER: **24V** | | |  | | | |  | | | Check if expected result is displayed on the CDU | | | |
| Wait for ECP to enter Run mode.  Record the voltage displayed on the CDU | | | CDU displays:  ECP Mode: **RUN**  POWER: **230V**  Authority: **ECPTest** | | |  | | | |  | | |  | | | |
| Move the ABH to lower the TBC to less than 50%. | | | CDU displays:  **ATP PENALTY**  TBC %: **100**  No ATP alarms (Authority box does not become highlighted) | | |  | | | |  | | |  | | | |
| Move the ABH to *SUP*.  Follow the prompts to acknowledge the penalty.  Move the ABH to *REL*. | | | CDU displays:  TBC % : **0**  BP (kPa) : **620 ± 21** | | |  | | | |  | | | Record the BP in the outcome column | | | |

1. ATO Static Testing & Verification (LOW RISK – DRIVER NOT REQUIRED)

| **Table 22: ATO Static Testing and Verification** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | Outcome | Signature | **Notes** |
|  |  | Text | UserSignature |  |
| ATO Links | | | | |
| If ATO logs are collected in separate sessions of testing, create a folder with the name of the test done | Folder name:  **LOCO\_ATO\_Links** | N/A |  |  |
| Check that the locomotive is in the following state:  ATO ‘N’ CB ON.  ATO VITAL CB OFF.  ALL OTHER CIRCUIT BREAKERS ON.  MOVEMENT EMERGENCY SWITCHES ENABLED.  ATP AIR COCK IS OPEN.  DIVA IS RUNNING. | N/A | N/A |  | ATO ‘R’ is not commissioned at this stage |
| Configure SimATO to the relevant locomotive | N/A | N/A |  |  |
| Turn on ATO VITAL CB  Press START on SimATO | N/A | N/A |  | ATO will take around 5 minutes to fully boot. |
| ATO fully boots up | LEDs on ATO Keyswitch have stopped flashing | N/A |  |  |
| PASSIVE softkey is available on CDU |
| “Startup Test OK” message is displayed |
| Navigate to the location of the SimATO Logs for the current test. Press F5 to refresh the logs.  Open up the latest log. | SimATO logs record:  LIG Linked | N/A |  | All Links to be confirmed prior to proceeding |
| SimATO logs record:  ATP linked |
| SimATO logs record:  LCS linked |
| SimATO logs record:  DSE Linked |
| SimATO Logs record:  TCS linked |
| SimATO Logs record:  VICS Linked |
| SimATO Logs record:  CDS Linked |
| Confirm in latest logs 2 way comms between ATO and ATP | SimATO Logs record messages:  [ATO->ATP]  [ATP->ATO] | N/A |  | Check for at least 1 minutes worth of comms. |
| Confirm in latest logs 2 way comms between ATO and DSE | SimATO Logs record messages:  [ATO->DSE]  [DSE->ATO] | N/A |  | Check for at least 1 minutes worth of comms. |
| Confirm in latest logs 2 way comms between ATO and LCS | SimATO Logs record messages:  [ATO->LCS]  [LCS->ATO] | N/A |  | Check for at least 1 minutes worth of comms. |
| Confirm in latest logs 2 way comms between ATO and TCS | SimATO Logs record messages:  [ATO->TCS]  [TCS->ATO] | N/A |  | Check for at least 1 minutes worth of comms. |
| Confirm in latest logs 2 way comms between ATO and VICS | SimATO Logs record messages:  [ATO->VICS]  [VICS->ATO] | N/A |  | Check for at least 1 minutes worth of comms. |
| Confirm in latest logs 2 way comms between ATO and CDS | SimATO Logs record messages:  [ATO->CDS]  [CDS->ATO] | N/A |  | Check for at least 1 minutes worth of comms. |
| Confirm in latest logs 1 way comms from LIG to ATO | SimATO Logs record messages at least 1 every second:  [LIG->ATO] | N/A |  | Check for at least 1 minutes worth of comms. |
| Take the ATO Logs for this testing and save to the Commissioning HDD:  LOCO\_ID\_Static ATO LINKS (Folder) | Logs saved to HDD | N/A |  |  |
| Verification | | | | |
| Ensure the TCR has been completed for Installation and complete the ATO & DSE TCR verification. | DIVA boots up successfully |  |  |  |
| ATO I/O Functional Testing | | | | |
| If ATO logs are collected in separate sessions of testing, create a folder with the name of the test done | Folder name:  **LOCO\_ATO\_Static** | N/A |  |  |
| SimATO is running | SimATO is logging | N/A |  |  |
| ATOC is running | LEDs on ATO Keyswitch have stopped flashing | N/A |  |  |
| PASSIVE softkey is available on CDU | N/A |
| “Startup Test OK” message is displayed | N/A |
| Using SimATO, set the **Headlight** command to **High Beam**. | **Headlights** are on **HIGH BEAM**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT HEAD\_LIGHT=HIGH\_BEAM  CHANGE-IN  HEAD\_LIGHT =ON | N/A |
| Using SimATO, set the **Headlight** command to **OFF**. | **Headlights** are **OFF** | N/A |  |  |
| SimATO logs record:  CHANGE-OUT HEAD\_LIGHT=HEAD\_OFF  CHANGE-IN  HEAD\_LIGHT =OFF | N/A |
| Using SimATO, set the **Headlight** command to **Low Beam**. | **Headlights** are on **LOW BEAM**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT HEAD\_LIGHT=LOW\_BEAM  CHANGE-IN HEAD\_LIGHT =ON | N/A |
| Repeat previous 3 tests for **HeadLight** | SimATO logs are correct as per previous 3 tests | N/A |  |  |
| Using SimATO, set the **Ditch Light** command to **FLASHING**. | **Ditch Lights** are **FLASHING**. | N/A |  | Failure due to LED Globes |
| SimATO logs record:  CHANGE-OUT DITCH\_LIGHT=FLASHING  CHANGE-IN DITCH\_LIGHT 1=FLASHING  CHANGE-IN DITCH\_LIGHT 2=FLASHING | N/A |
| Using SimATO, set the **Ditch Light** command to **OFF**. | **Ditch Light** are **OFF**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT DITCH\_LIGHT=OFF  CHANGE-IN DITCH\_LIGHT 1=OFF  CHANGE-IN DITCH\_LIGHT 2=OFF | N/A |
| Using SimATO, set the **Class Lights (Rear)** command to **ON**. | **Class Lights (Rear)** are **ON**. | N/A |  | Failure due to lack of current sensor |
| SimATO logs record:  CHANGE-OUT LONG\_HOOD\_RED=ON  CHANGE-IN LONG\_HOOD\_RED=ON | N/A |
| Using SimATO, set the **Class Lights (Rear)** command to **OFF**. | **Class Lights (Rear)** are **OFF**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT LONG\_HOOD\_RED=OFF  CHANGE-IN LONG\_HOOD\_RED=OFF | N/A |
| Using SimATO, set the **Class Lights (Front)** command to **ON**. | **Class Lights (Front)** are **ON**. | N/A |  | Failure due to lack of current sensors |
| SimATO logs record:  CHANGE-OUT SHORT\_HOOD\_RED=ON  CHANGE-IN SHORT\_HOOD\_RED=ON | N/A |
| Using SimATO, set the **Class Lights (Front)** command to **OFF**. | **Class Lights (Front)** are **OFF**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT SHORT\_HOOD\_RED=OFF  CHANGE-IN SHORT\_HOOD\_RED=OFF | N/A |
| Using SimATO, set the **Blue Distress Lights** command to **ON**. | **Blue Strobe Lights** are **ON**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT DISTRESS\_LIGHT=ON  CHANGE-IN DISTRESS\_LIGHT=ON | N/A |
| Using SimATO, set the **Blue Distress Lights** command to **OFF**. | **Strobe Lights** are **OFF**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT DISTRESS\_LIGHT=OFF  CHANGE-IN DISTRESS\_LIGHT=OFF | N/A |
| Using SimATO, set the **Green Lights** command to **ON**. | **Green Lights** are **ON** (inside, observer and driver sides) | N/A |  |  |
| SimATO logs record:  CHANGE-OUT GREEN\_LIGHT=ON  CHANGE-IN GREEN\_LIGHT=ON |
| Measure the voltage between:  TBSCP 40 (positive side) & CSBAL 7 (negative side) | Between 62V and 78V | Voltage = |  |  |
| Measure the voltage between:  TBSCP 43 (positive side) & CNSBAL 7 (negative side) | 0V | Voltage = |  |  |
| Using SimATO, set the **Green Lights** command to O**FF**. | **Green Lights** are **OFF** (inside, observer and driver sides) | N/A |  |  |
| SimATO logs record:  CHANGE-OUT GREEN\_LIGHT=OFF  CHANGE-IN GREEN\_LIGHT=OFF |
| Measure the voltage between:  TBSCP 40 (positive side) & CSBAL 7 (negative side) | 0V | Voltage = |  |  |
| Repeat previous 2 tests for **Green Lights** | SimATO logs are correct as per previous 2 tests | N/A |  |  |
| Using SimATO, set the **Orange Lights** command to **ON**. | **Orange Lights** are **ON** (inside, observer and driver sides) | N/A |  |  |
| SimATO logs record:  CHANGE-OUT ORANGE\_LIGHT=ON  CHANGE-IN ORANGE N/A \_LIGHT=ON |
| Measure the voltage between:  TBSCP 43 (positive side) & CNSBAL 7 (negative side) | Between 62V and 78V | Voltage = |  |  |
| Measure the voltage between:  TBSCP 40 (positive side) & CSBAL 7 (negative side) | 0V | Voltage = |  |  |
| Using SimATO, set the **Orange Lights** command to **OFF**. | **Orange Lights** are **OFF** (inside, observer and driver sides) | N/A |  |  |
| SimATO logs record:  CHANGE-OUT ORANGE\_LIGHT=OFF  CHANGE-IN ORANGE \_LIGHT=OFF |
| Measure the voltage between:  TBSCP 43 (positive side) & CNSBAL 7 (negative side) | 0V | Voltage = |  |  |
| Repeat previous 2 tests for **Orange Lights** | SimATO logs are correct as per previous 2 tests | N/A |  |  |
| Using SimATO, set the **Blue ATO Controlled Lights** command to **ON**. | **Blue ATO Controlled Lights** are **ON** (insided, observer and driver side) | N/A |  |  |
| SimATO logs record:  CHANGE-OUT ATO\_CONTROLLED\_LIGHT=ON  CHANGE-IN ATO\_CONTROLLED\_LIGHT=ON |
| Using SimATO, set the **Blue ATO Controlled Lights** command to **OFF**. | **Blue ATO Controlled Lights** are **OFF** (insided, observer and driver side) | N/A |  |  |
| SimATO logs record:  CHANGE-OUT ATO\_CONTROLLED\_LIGHT=OFF  CHANGE-IN ATO\_CONTROLLED\_LIGHT=OFF |
| Repeat previous 2 tests for **Blue Status Lights** | SimATO logs are correct as per previous 2 tests | N/A |  |  |
| Using SimATO, set the **Horn** command to **ON**. | **Horn** is **ON**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT HORN=ON  CHANGE-IN HORN=ON  CHANGE-LIG HORN PRESSURE SWITCH STATE=1 | N/A |
| Using SimATO, set the **Horn** command to **OFF**. | **Horn** is **OFF**. | N/A |  |
| SimATO logs record:  CHANGE-OUT HORN=OFF  CHANGE-IN HORN=OFF  CHANGE-LIG HORN PRESSURE SWITCH STATE=0 | N/A |
| Repeat previous 2 tests for the Horn | SimATO logs are correct as per previous 2 tests | N/A |  |
| Using SimATO, set the **Bell** command to **ON**. | **Bell** is **ON**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT BELL=ON  CHANGE-IN BELL=ON  CHANGE-LIG BELL MAGNET VALVE COMMAND=1 | N/A |
| Using SimATO, set the **Bell** command to **OFF**. | **Bell** is **OFF**. | N/A |  |  |
| SimATO logs record:  CHANGE-OUT BELL=OFF  CHANGE-IN BELL=OFF  CHANGE-LIG BELL MAGNET VALVE COMMAND=0 | N/A |
| Repeat previous 2 tests for the Bell | SimATO logs are correct as per previous 2 tests | N/A |  |  |
| **Open** the **Rear Cab Door**.  **Close** the **Front Cab Door**. | SimATO logs record:  CHANGE-IN DOORS=OPEN  MISSTA DOORS-OPEN - [M0]=1(FFFF) | N/A |  |  |
| **Close** the **Rear Cab Door**.  **Open** the **Front Cab Door**. | SimATO logs record:  CHANGE-IN DOORS=OPEN  MISSTA DOORS-OPEN - [M0]=1(FFFF) | N/A |  |  |
| **Close** the **Rear Cab Door**.  **Close** the **Front Cab Door**. | SimATO logs record:  CHANGE-IN DOORS=CLOSED  MISSTA DOORS-OPEN - [M0]=0(FFFF) | N/A |  |  |
| Repeat previous 3 tests for Cab Door | SimATO logs are correct as per previous 3 tests. | N/A |  |  |
| Isolate the shorthood bogie (near driver side 2nd axle) | Check on CDU TIM/TMC data screen IN 1 = 0 | N/A |  | Log Analyst to confirm in ATO Logs |
| De-isolate the shorthood bogie | Check on CDU TIM/TMC data screen IN 1 = 1 | N/A |  | Log Analyst to confirm in ATO Logs |
| Isolate the longhood bogie (near driver side 5th axle) | Check on CDU TIM/TMC data screen IN 2 = 0 | N/A |  | Log Analyst to confirm in ATO Logs |
| De-isolate the longhood bogie | Check on CDU TIM/TMC data screen IN 2 = 1 | N/A |  | Log Analyst to confirm in ATO Logs |
| Set the Movement Emergency Switches:  **Driver Side: Disabled**  **Observer Side: Enabled**  Set the **ATP Isolation Cock** to **Open**. | SimATO logs record:  MOVEMENT\_EMERGENCY=ON | N/A |  |  |
| Set the Movement Emergency Switches:  **Driver Side: Enabled**  **Observer Side: Enabled**  Set the **ATP Isolation Cock** to **Open**. | SimATO logs record:  MOVEMENT\_EMERGENCY=OFF | N/A |  |  |
| Set the Movement Emergency Switches:  **Driver Side: Enabled**  **Observer Side: Disabled**  Set the **ATP Isolation Cock** to **Open**. | SimATO logs record:  MOVEMENT\_EMERGENCY=ON | N/A |  |  |
| Set the Movement Emergency Switches:  **Driver Side: Enabled**  **Observer Side: Enabled**  Set the **ATP Isolation Cock** to **Open**. | SimATO logs record:  MOVEMENT\_EMERGENCY=OFF | N/A |  |  |
| Set the Movement Emergency Switches:  **Driver Side: Enabled**  **Observer Side: Enabled**  Set the **ATP Isolation Cock** to **Closed**. | SimATO logs record:  MOVEMENT\_EMERGENCY=ON | N/A |  |  |
| Set the Movement Emergency Switches:  **Driver Side: Enabled**  **Observer Side: Enabled**  Set the **ATP Isolation Cock** to **Open**. | SimATO logs record:  MOVEMENT\_EMERGENCY=OFF | N/A |  |  |
| Repeat previous 6 tests for Movement Switches | SimATO logs are correct as per previous 6 tests. | N/A |  |  |
| Set the IBH to fully applied position. | SimATO logs record:  EAB INDEPENDENT BRAKE APPLIED=1  INDEPENDENT BRAKE HANDLE RELEASED=0 | N/A |  |  |
| Set the IBH to released position | SimATO logs record:  EAB INDEPENDENT BRAKE APPLIED=0  INDEPENDENT BRAKE HANDLE RELEASED=1 | N/A |  |  |
| Repeat 3 more times with IBH | SimATO logs are correct for applied and released position. | N/A |  |  |
| Slowly Move the IBH towards applied until you can hear the micro switch open. | SimATO logs record:  EAB INDEPENDENT BRAKE APPLIED=1  INDEPENDENT BRAKE HANDLE RELEASED=0 | N/A |  | If there is a difference in either output this test has failed. Notify SLT or engineer |
| Slowly Move the IBH towards release until you can hear the micro switch close. | SimATO logs record:  EAB INDEPENDENT BRAKE APPLIED=0  INDEPENDENT BRAKE HANDLE RELEASED=1 | N/A |  | If there is a difference in either output this test has failed. Notify SLT or engineer |
| Nudge the drivers console  Note 1: The IBH must still be in applied and the micro switch open  Note 2: This test is there to see if vibration will incorrectly close a defective switch. | SimATO logs Show no difference in EAB INDEPENDENT BRAKE APPLIED or INDEPENDENT BRAKE HANDLE RELEASED | N/A |  | If there is a difference in either output this test has failed. Notify SLT or engineer |
| Set the ABH to full application | SimATO logs record:  AUTOMATIC BRAKE HANDLE POSITION=0 |  |  |  |
| Set the ABH to released position | SimATO logs record:  AUTOMATIC BRAKE HANDLE POSITION=2 |  |  |  |
| Repeat 3 more times with ABH | SimATO logs are correct for applied and full application position. |  |  |  |
| **Ensure the ECSW is in run prior to the following tasks**  Set ATO switch to: **Driver Assist** | SimATO logs record:  ATOKEY\_SWITCH=DRIVER\_ASSIST | N/A |  |  |
| Set ATO switch to: **Driverless Attended** | SimATO logs record:  ATOKEY\_SWITCH=ATO\_ATTENDED | N/A |  |  |
| Set ATO switch to: **Driverless** | SimATO logs record:  ATOKEY\_SWITCH=DRIVERLESS | N/A |  |  |
| Set ATO switch to: **Passive** | SimATO logs record:  ATOKEY\_SWITCH=PASSIVE | N/A |  |  |
| If ECS is already in ISOLATE, put it into RUN. If not, put into ISOLATE, then RUN | SimATO logs record:  ENGINE CONTROL SWITCH=1  ATO-RUN-ISOLATED - [M0]=1 | N/A |  |  |
| Set the **Air Conditioner Switch** to **OFF**. | SimATO logs record:  AIR\_CONDITIONED=OFF | N/A |  |  |
| Set the **Air Conditioner Switch** to **LOW FAN**. | SimATO logs record:  AIR\_CONDITIONED=OFF | N/A |  |  |
| Set the **Air Conditioner Switch** to **LOW COOL**. | SimATO logs record:  AIR\_CONDITIONED=ON | N/A |  |  |
| Set the **Air Conditioner Switch** to **HIGH FAN**. | SimATO logs record:  AIR\_CONDITIONED=OFF | N/A |  |  |
| Set the **Air Conditioner Switch** to **HIGH COOL**. | SimATO logs record:  AIR\_CONDITIONED=ON | N/A |  |  |
| Stop all movement in the cabin. | SimATO logs record:  MOTION\_SENSOR=OFF | N/A |  |  |
| Create movement in the cabin. | SimATO logs record:  MOTION\_SENSOR=ON | N/A |  |  |
| Use the smoke detector test aerosol to activate **SDA (Alcove Smoke Detector)**. | SimATO logs record:  SMOKE\_ALCOVE=ON | N/A |  |  |
| Reset **SDA (Alcove Smoke Detector)**. | SimATO logs record:  SMOKE\_ALCOVE=OFF | N/A |  |  |
| Use the smoke detector test aerosol to activate **SDC (Cabin Smoke Detector)**. | SimATO logs record:  SMOKE\_CAB=ON | N/A |  |  |
| Reset **SDC (Cabin Smoke Detector)**. | SimATO logs record:  SMOKE\_CAB=OFF | N/A |  |  |
| Use the smoke detector test aerosol to activate **SDCL (Fridge Cabinet Smoke Detector)**. | SimATO logs record:  SMOKE\_LOCKER=ON | N/A |  |  |
| Reset **SDCL (Fridge Cabinet Smoke Detector)**. | SimATO logs record:  SMOKE\_LOCKER=OFF | N/A |  |  |
| Check in ATO logs the temperature for the Alcove:  EVENT CHANGE-IN TEMP\_ALCOVE  Convert to degrees Celsius and record. | Alcove temperature in logs converted to degrees Celsius using *(log\_value \* 0.1) – 50* | Degrees Celsius = |  | All 3 temperatures should be a few degrees within each other |
| Check in ATO logs the temperature for the Cab:  EVENT CHANGE-IN TEMP\_CAB  Convert to degrees Celsius and record. | Cab temperature in logs converted to degrees Celsius using *(log\_value \* 0.1) – 50* | Degrees Celsius = |  | All 3 temperatures should be a few degrees within each other |
| Check in ATO logs the temperature for the Locker:  EVENT CHANGE-IN TEMP\_LOCKER  Convert to degrees Celsius and record. | Locker temperature in logs converted to degrees Celsius using *(log\_value \* 0.1) – 50* | Degrees Celsius = |  | All 3 temperatures should be a few degrees within each other |
| Do if ID\_CFG\_GESHADOW=0 in atoc\_plant\_signed.cfg  Unplug power supply to Event Recorder to simulate “Event Recorder Problem”.  Check the ATO Logs and search for ALARM to check if Alarm 2018 has been generated. | Alarm code ‘ALARM::==XXX’ can be seen in the logs where XXX is between 3000 and 3093 inclusive. | Alarm Code = |  | Try the following if required alarm is not found.  Move ECS switch to ISOLATE to get ALARM:=3090. Move ECS Switch to RUN to get ALARM:=3092. |
| Connect a jumper wire between:  **Contacts 1 & 2 : Retention Tank Sensor** | SimATO logs record:  RETENTION\_TANK=ON | N/A |  | Retention Tank sensor located outside – See cap on sensor for relay contact indications |
| Remove the jumper wire. | SimATO logs record:  RETENTION\_TANK=OFF | N/A |  |  |
| Refresh the SimATO logs.  Press **Stop** on SimATO.  Close SimATO application.  Close SimATO logs.  (Put in logs in LOCO\_ID\_ATO\_Static\_Testing folder) | Logs refreshed. | N/A |  |  |
| SimATO Application stopped and closed. | N/A |
| SimATO logs collected. | N/A |

* 1. ATO – Alerter

| **Table 23: ATO-Alerter** | | | |
| --- | --- | --- | --- |
| **Action** | **Expected Result** | **Signature** | **Reference** |
|  |  | **UserSignature** |  |
| Alerter Module Lab Configuration | | | |
| Confirm the Alerter module has been successfully re-programmed by reviewing the ATO Alerter Module Lab Test Procedure – 9000907.E02.EN, 00.01.  Ensure the serial number matches with the unit identified in the Lab test. | Firmware & time parameters correctly configured |  | ATO Alerter Module Lab Test Procedure – 9000907.E02.EN, 00.01. |
| Ensure Alerter module has correct Firmware & Application and the TCR has been completed for install and verification | N/A |  |  |
| Alerter Functional Test | | | |
| Setup SimATO if you have not already done so in the previous section | | | |
| Ensure the siren potentiometer is turned fully anti-clockwise  (adjusts the Alerter volume to a minimum) | n/a |  | The siren potentiometer & dip switches are on the underside of the ATO/ATP switch box lid |
| Ensure the siren dip switches are all ON (Up) | n/a |  |
| Set ATO Switch to Attended | LED Power light on Alerter Module should start to blink |  | ATP Alerter Module is located in the drivers console. The LED can be seen through the grille above the TDU Communications port on the driver’s side of the stairs  Circuits:  EVO: 90000532.D10.EN |
| Run SimATO program and turn on the orange NSTB Lights | RONSBAL and Alerter relays should both be energised and each relay should have their LED lit. This will commence the Alerter countdown. |  |  |
| Observe that the Alerter is operational | Alerter will operate between 60 and 100 seconds. Record the duration to the nearest 5 seconds.  (Between 55 and 105 seconds is a pass) |  | Circuits:  EVO: 90000532.D10.EN  Latest wiring modification changes the Alerter light to only operate as BLUE |
| Alerter siren is audible 15 seconds after the light comes on. Record the time to the nearest second. (Between 13 and 17 seconds is a pass) |  |
| Alerter light will be lit BLUE |  |
| Acknowledge the Alerter by pressing (hold for one second) the driver’s side ATP Alerter switch.  The light is extinguished and the siren stops |  |
| Allow the Alerter to run down and observe SimATO for Movement Emergency | When the Alerter sounds do not acknowledge the Alerter.  Once the Alerter has run down, the siren will stop but the light will stay lit |  |
| Observe the following state change in SimATO:  EVENT CHANGE-IN MOVEMENT\_EMERGENCY=ON |  |
| Rest the Alerter by switching the ATO switch to Driver Assist | Observe the following state change in SimATO:  EVENT CHANGE-IN MOVEMENT\_EMERGENCY=OFF |  |
| Utilising SimATO, tutn off the NSTB lights | Check that the RONSBAL and Alerter relays are de energised |  |

1. Legacy Dynamic Tests (HIGH RISK – DRIVER REQUIRED)

| **Table 24: Legacy Dynamic Tests** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | Outcome | Signature | **Notes** |
|  |  | Text | UserSignature |  |
| L15K Dynamic Tests - Overspeed Detection | | | | |
| Perform ATP L15000 start up as per A.1.  Setup the locomotive for Dark Territory.  Setup the locomotive in ATP Screen 2 as Single Engine, and shorthood first. Verify that the expected results are displayed on the CDU | ATP completes start-up without error.  CDU displays ATP Data  Max Speed = **100**  Authority = **DarkTerr**  Direction = **NoCabSig** |  |  | It is possible to perform this test in conjunction with the DLC test in section P.2 |
| Drive the locomotive over the DLC transponders at less than 5km/h. Verify that the expected results are displayed on the CDU. | CDU updates ATP Data  Section = **YB**  Max Speed = **5** |  |  |  |
| Drive the locomotive at more than 10km/h overspeed.  Do not acknowledge any alarms. | ATP alerts the driver and then applies a penalty brake. |  |  |  |
| L15K Dynamic Tests - LoA Supervision | | | | |
| Perform ATP L15000 start up as per A.1.  Setup the locomotive for Dark Territory.  Setup the locomotive in ATP Screen 2 as Single Engine, and shorthood first. Verify that the expected results are displayed on the CDU. | ATP completes start-up without error.  CDU displays ATP Data  Max Speed = **100**  Authority = **DarkTerr**  Direction = **NoCabSig** |  |  | It is possible to perform this test in conjunction with the DLC test in section P.2 |
| Drive the locomotive over the L15000 test transponders.  Reverse Loco towards transponders | CDU displays ATP Data  Max Speed = **100**  Target Speed = **00**  Dist. To TL = **<Varies>**  Section = **YA**  Current Loc = **<Varies>**  Target Loc = **443.92**  Authority = **Normal**  **Loco performs Service brake and stops before transponders** |  |  | The details will be different if performed using the DLC transponders. |
| DLC Dynamic Setup | | | | |
| Place the DLC transponders 5m in front of the locomotive, and 3m apart. | N/A |  |  |  |
| Switch the ICSS Cut-Out Switch to the ‘Cut-In’ position.  Setup the locomotive for Dark Territory.  Setup the locomotive in ATP Screen 2 as Single Engine, and shorthood first. | ATP completes start-up without error.  CDU displays ATP Data  Max Speed = 100  Authority = DarkTerr  Direction = NoCabSig |  |  | Check that the expected results are displayed on the CDU. |
| Drive the locomotive over the DLC transponders at less than 5km/h. | CDU updates ATP Data  Section = YB |  |  | Check the display on the CDU. |
| The **DLC SESSION** soft-key is available. |  |
| Press the **DLC SESSION** soft-key. | The CDU shows the DLC Session window with the countdown message:  “DLC Entry Point: ## metres to go” |  |  |  |
| Stop the train after the countdown message reaches zero.  Access the Operation Log on the CDU. | The Operation Log shows the entry:  “LOCO IN DLC AREA, YANDI B” |  |  | For efficiency, test A.1 can be performed at this time. |
| Set the reverser to neutral.  Set the throttle to idle.  Release the automatic brake. (BP = 620 kPa)  Release the independent brake (maintain enough brake to prevent locomotive movement).  (BC = 60 kPa)  Access the DLC Session window on the CDU. | The **ACTIVATE DLC** soft-key is available. |  |  |  |
| Press the **ACTIVATE DLC** soft-key. | The DLC Session window displays the message:  “Independent Handle: Move to Apply” |  |  | Verify the display on the CDU |
| The **ACK ALARM** soft-key is available. |  |
| Press the **ACK ALARM** soft-key. | The DLC Session window shows no messages. |  |  |  |
| The **ACTIVATE DLC** soft-key is available. |  |
| Apply the automatic brake. (BP < 540 kPa)  Fully apply the independent brake. (BC > 450 kPa)  Press the **ACTIVATE DLC** soft-key. | The DLC Session window displays the message:  “Automatic Handle: Move to Release” |  |  | Verify the display on the CDU |
| The **ACK ALARM** soft-key is available. |  |
| Press the **ACK ALARM** soft-key. | The DLC Session window shows no messages. |  |  |  |
| The **ACTIVATE DLC** soft-key is available. |  |
| Set the engine control switch to isolate.  Release the automatic brake. (BP = 620 kPa)  Set the reverser to forward.  Set the throttle to notch 1.  Press the **ACTIVATE DLC** soft-key. | The DLC Session window displays the messages:  “Throttle Handle: Move to Idle”  “Reverser Handle: Move to Neutral” |  |  | Verify the display on the CDU |
| The **ACK ALARM** soft-key is available. |  |
| Press the **ACK ALARM** soft-key. | The DLC Session window shows no messages. |  |  |  |
| The **ACTIVATE DLC** soft-key is available. |  |
| Set the reverser to neutral.  Set the throttle to idle.  Set the engine control switch to run.  Press the **ACTIVATE DLC** soft-key. | The DLC Session window displays the message:  “XXXX Waiting for link to Tower”  Where XXXX is the locomotive number. |  |  | Verify the display on the CDU |
| Identify the G/T radio and place a DYMO label on top of the housing.  “Guard Tone Radio” | N/A |  |  |  |
| Identify the Data Radio and place a DYMO label on top of the housing.  “Data Radio” | N/A |  |  |  |
| Request the tower to link to the locomotive (using the correct locomotive ID). | The tower confirms that the link is established. |  |  | Verify the display on the CDU |
| The CDU shows the crew message:  “DLC STANDBY MODE SELECTED” |
| Access the DLC Session window. | The DLC Session window displays the message:  “Check independent handle in release.” |  |  | Verify the display on the CDU |
| Set the independent brake handle to release.  Set locomotive headlights to off. | BC > 450 kPa |  |  | Verify and record the BC displayed on the CDU. |
| DLC Automatic Mode | | | | |
| Request the DLC tower to press the AUTO button on the DLC load-out panel.  Request the DLC tower to set the speed set-point to 0.7km/h. | The CDU shows the crew message:  “DLC AUTO MODE SELECTED” |  |  | Verify the display on the CDU |
| Request the DLC tower to start the auto run. | Independent brake is fully released (BC = 0 kPa) |  |  | Verify the display on the CDU |
| Bell rings for at least 5 seconds before locomotive moves. |  |
| Locomotive accelerates to speed set-point. |  |
| Bell stops when locomotive speed is greater than 0.2 km/h. |  |
| The CDU shows the crew message:  “DLC AUTO MODE RUNNING” |  |
| Independent brake is fully released (BC = 0 kPa) |  |
| Request the DLC tower to stop the auto run. | Locomotive decelerates to a stop. |  |  | Verify and record the BC displayed on the CDU. |
| Independent brake is fully applied  (BC > 450 kPa). |  |
| Request the DLC tower to press the STANDBY button on the DLC load-out panel. | Headlights are off. |  |  | Verify the display on the CDU |
| The CDU shows the crew message:  “DLC STANDBY MODE SELECTED” |  |
| DLC Manual Forward Mode | | | | |
| Request the DLC tower to press the MANUAL button, then the MANUAL FORWARD button on the DLC load-out panel. | The CDU shows the crew message:  “DLC MANUAL MODE SELECTED” |  |  |  |
| Request the DLC tower to start the manual run. Verify the display on the CDU; record the BC value in the appropriate column. | Independent brake is fully released (BC = 0 kPa) |  |  | Ensure no alarms have been produced on the monitor at the DLC tower |
| Both overhead console LED Headlight indicators are ON |  |
| Bell rings for at least 5 seconds before locomotive moves. |  |
| Locomotive accelerates to speed set-point. |  |
| Bell stops when locomotive speed is greater than 0.2 km/h. |  |
| The CDU shows the crew message:  “DLC AUTO MODE RUNNING” |  |
| Independent brake is fully released (BC = 0 kPa) |  |
| Request the DLC tower to stop the manual run. Verify and record the BC displayed on the CDU. | Locomotive decelerates to a stop. |  |  |  |
| Independent brake is fully applied  (BC > 450 kPa). |  |
| Request the DLC tower to press the STANDBY button on the DLC load-out panel. | Both Headlights are off as indicated on the overhead console. |  |  | Verify the display on the CDU |
| The CDU shows the crew message:  “DLC STANDBY MODE SELECTED” |  |
| DLC Manual Reverse Mode | | | | |
| Request the DLC tower to press the MANUAL button, then the MANUAL REVERSE button on the DLC load-out panel. | The CDU shows the crew message:  “DLC MANUAL MODE SELECTED” |  |  | Verify the display on the CDU |
| Request the DLC tower to start the manual run. Verify the display on the CDU and record the BC values in the appropriate column, | Independent brake is fully released (BC = 0 kPa) |  |  | Ensure no alarms have been produced on the monitor at the DLC tower |
| Both overhead console LED Headlight indicators are ON |  |
| Bell rings for at least 5 seconds before locomotive moves. |  |
| Locomotive accelerates to speed set-point. |  |
| Bell stops when locomotive speed is greater than 0.2 km/h. |  |
| The CDU shows the crew message:  “DLC AUTO MODE RUNNING” |  |
| Independent brake is fully released (BC = 0 kPa) |  |
| Request the DLC tower to stop the manual run. Verify and record BC value displayed on the CDU | Locomotive decelerates to a stop. |  |  |  |
| Independent brake is fully applied  (BC > 450 kPa). |  |
| Request the DLC tower to press the STANDBY button on the DLC load-out panel.  Verify the expected result is displayed on the CDU. | Both Headlights are off as indicated on the overhead console. |  |  |  |
| The CDU shows the crew message:  “DLC STANDBY MODE SELECTED” |  |
| DLC Emergency Stop | | | | |
| Request the DLC tower to perform an emergency stop.  Verify and record the Brake pressure values displayed on the CDU. | Locomotive applies emergency brake.  (BP = 0 kPa) |  |  |  |
| Independent brake is fully applied.  (BC > 450 kPa) |  |
| Request the DLC tower to recover the brakes.  Verify and record the Brake pressure values displayed on the CDU. | Automatic brake is released.  (BP = 620 kPa) |  |  |  |
| Independent brake is fully applied.  (BC > 450 kPa) |  |
| DLC Unlink | | | | |
| Request the DLC tower to unlink from the locomotive.  Verify and record the Brake pressure values displayed on the CDU. | CDU displays crew message:  “DLC Unlinked” |  |  |  |
| Automatic brake is released.  (BP = 620 kPa) |  |
| Independent brake is fully applied.  (BC > 450 kPa) |  |
| Move the independent brake handle to the release position. | Independent brake remains fully applied.  (BC > 450 kPa) |  |  | Verify and record the BC values displayed on the CDU. |
| Set the reverser to forward. | Independent brake is released.  (BC = 0 kPa) |  |  | Verify and record the BC values displayed on the CDU. |
| Fully apply the independent brake. | Independent brake is applied.  (BC > 450 kPa) |  |  | Verify and record the BC values displayed on the CDU. |

1. DIVA Dynamic Testing – Local (HIGH RISK – DRIVERS REQUIRED)

| **Table 25: DIVA Dynamic Testing - Local** | | | | |
| --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | **Signature** | **Notes** | |
|  |  | **UserSignature** |  | |
| General Setup Requirements | | | | |
| Setup 2 groups of Test Transponders on the 8mile 300m test track. | Transponder groups setup an absolute distance of 300m apart. |  | Seperate T1 & T2 from each group at the same distance apart (approx. 3 metres) | |
| Tester 1 turn OFF DATA COMMS circuit breakers | NVR LEDs are extinguished |  |  | |
| Tester 2 confirms DATA COMMS is turned OFF | NVR LEDs are extinguished |  |  | |
| Cycle the Data Logger CB so there is a fresh log file created for the following test results. | Data Logger rebooted |  |  | |
| BTM-N Transponder & Odometer Validation Test | | | | |
| Turn ON BTM-N  Turn OFF BTM-R  Boot DIVA up. | DIVA successfully boots up with BTM-N profibus comms. |  |  | |
| CDU displays Degraded for BTM (relating to BTM-Reserve) |  |
| Setup DIVA  Setup the train as:  **SINGLE ENGINE**  **SHORTHOOD FIRST or LONGHOOD FIRST**  Train ID: **Current Locomotive ID**  Track ID: **L0**  Press **SHOWMORE**  Press **SHOWMORE**  Press **VALIDATE** (for train data)  Press **VALIDATE** (for ID and location)  Wait for the soft keys, then press **NON** **AUTOHAUL** | CDU displays:  Authority: **NonATH** |  | Track ID: L0 is a General track section for Non-AutoHaul areas, DIVA will not attempt a connection with VSS.  Track ID: 7M - the Non-AutoHaul softkeys will appear after a DIVA timeout due to no comms available. | |
| Verify the BTM-N LEDs. | 16-24V/5A LED  ON |  |  | |
| 24V/0.2A LED  ON |  |
| 5VB LED  ON |  |
| 15VB LED  ON |  |
| 5VLN LED  ON |  |
| 5VLR LED  ON |  |
| 5VA LED  ON |  |
| 15VA LED  ON |  |
| POWER GOOD LED  ON |  |
| LDB 1 LED  FLASHING |  |
| LDB 2 LED  FLASHING |  |
| HTOK B  FLASHING |  |
| HTOK A  FLASHING |  |
| LDA 1  FLASHING |  |
| LDA 2  FLASHING |  |
| B DET  FLASHING |  |
| V TEL  OFF |  |
| B ON  ON |  |
| WD LED  ON |  |
| TX ON LED  ON |  |
| Move the locomotive across GROUP 1 transponders | BTM LED **B TEL** flashes each time the locomotive crosses a transponder. |  |  | |
| Move the locomotive across GROUP 2 transponders. | BTM LED **B TEL** flashes each time the locomotive crosses a transponder. |  |  | |
| Turn the ATP switch to Isolate | DIVA is cut out |  |  | |
| BTM-R Transponder & Odometer Validation Test | | | | |
| Turn OFF BTM-N  Turn ON BTM-R  Boot DIVA up. | DIVA successfully boots up with BTM-R profibus comms.. |  |  | |
| CDU displays Degraded for BTM (relating to BTM-Normal) |  |
| Setup DIVA  Setup the train as:  **SINGLE ENGINE**  **SHORTHOOD FIRST or LONGHOOD FIRST**  Train ID: **Current Locomotive ID**  Track ID: **L0**  Press **SHOWMORE**  Press **SHOWMORE**  Press **VALIDATE** (for train data)  Press **VALIDATE** (for ID and location)  Wait for the soft keys, then press **NON** **AUTOHAUL** | CDU displays:  Authority: **NonATH** |  | Track ID: L0 is a General track section for Non-AutoHaul areas, DIVA will not attempt a connection with VSS.  Track ID: 7M - the Non-AutoHaul softkeys will appear after a DIVA timeout due to no comms available. | |
| Verify the BTM-R LEDs. | 16-24V/5A LED  ON |  |  | |
| 24V/0.2A LED  ON |  |
| 5VB LED  ON |  |
| 15VB LED  ON |  |
| 5VLN LED  ON |  |
| 5VLR LED  ON |  |
| 5VA LED  ON |  |
| 15VA LED  ON |  |
| POWER GOOD LED  ON |  |
| LDB 1 LED  FLASHING |  |
| LDB 2 LED  FLASHING |  |
| HTOK B  FLASHING |  |
| HTOK A  FLASHING |  |
| LDA 1  FLASHING |  |
| LDA 2  FLASHING |  |
| B DET  FLASHING |  |
| V TEL  OFF |  |
| B ON  ON |  |
| WD LED  ON |  |
| TX ON LED  ON |  |
| Move the locomotive across GROUP 1 transponders | BTM LED **B TEL** flashes each time the locomotive crosses a transponder. |  |  | |
| Move the locomotive across GROUP 2 transponders. | BTM LED **B TEL** flashes each time the locomotive crosses a transponder. |  |  | |
| Turn the ATP switch to Isolate | DIVA is cut out |  |  | |
| Collect SAM DIVA log from the Data Logger  Save the log file as:  **LOCO\_DIVA\_300** | Log file downloaded |  |  |
| Pass logs to log analyst to confirm no other issues with DIVA detecting the 8 transponders.  Save Logs to Commissioning HDD:  **LOCO\_DIVA\_DYNAMIC** (folder) | Logs saved to Comm HDD |  |  |
| Calculate the 300m test result from either BTM-N or BTM-R movements. | 297m <= X <= 303m  Where X represents the test result from Group 1 Transponder 1 to Group 2 Transponder 1. |  | Log Analyst to perform this calculation. |
| Review the SAM log file - ODO\_Diagnostic to evaluate the overall performance of the wheel sensor heads. | Wheel Sensor 1 – All 3x sensor heads operating as expected |  | Log Analyst to assess the wheel sensorhead health. |
| Wheel Sensor 2 – All 3x sensor heads operating as expected |  |

1. DIVA Odometric Verification (HIGH RISK – DRIVER REQUIRED)

| **Table 26: DIVA Odometric Verification** | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Action** | | **Expected Result** | | **Outcome** | | **Signature** | | **Notes** |
|  | |  | | **Text** | | **UserSignature** | |  |
| General Setup Requirements | | | | | | | | |
| Shunt the locomotive onto a road with at least 1000m of clear track ahead which is clear of any transponders. | | n/a | | N/A | |  | |  |
| Turn DIVA OFF | | n/a | | N/A | |  | |  |
| Setup SIMEV laptop with ‘Windows 7 – RTX Dedicated’ and LAN port of CCTE1.  Ensure the latest SIMEV scenario is configured | | n/a | | N/A | |  | | IP address of the SIMEV laptop is:  IP: 192.168.1.241  Sub: 255.255.255.0 |
| SIMEV Functional Testing | | | | | | | | |
| Start SIMEV and perform following tasks   1. File > Open …[select scenario] 2. Action > Configuration… OK | SIMEV graphical display successfully opens | | N/A | |  | |  | |
| Setup DIVA  Setup the train as:  **SINGLE ENGINE**  **SHORTHOOD FIRST**  Train ID: **Current Locomotive ID**  Track ID: **L0**  Press **SHOWMORE**  Press **SHOWMORE**  Press **VALIDATE** (for train data)  Press **VALIDATE** (for ID and location)  Wait for the soft keys, then press **NON** **AUTOHAUL** | CDU displays:  Authority: **NonATH** | | N/A | |  | | We don’t need a VSS connection within this testing environment.  Track ID: L0 is a General track section for Non-AutoHaul areas, DIVA will not attempt a connection with VSS. | |
| On SIMEV  select Action > Run  select DEBUG\_Main header tab. | EVC Date field starts counting | | N/A | |  | |  | |
| Request the driver to move forward at least 1000m | SIMEV ODO inputs are being received. | | N/A | |  | | Ensure no transponders are traversed over. This will void the test results obtained. | |
| X Odo > 1000 | |
| Wait 2 minutes.  Check the following parameters   1. ‘X Odo’ 2. Doubt + 3. Doubt - | X Odo < 1 | |  | |  | | If expected results are not witnessed, do not proceed past this step. | |
| Doubt + < 1 | |  | |
| Doubt - < 1 | |  | |
| Stop the locomotive.  Take a screenshot of SIMEV’s graphical display. | Screenshot placed on the HDD. | | N/A | |  | |  | |
| Calculate the error percentage of the two tachometer inputs over the distance travelled by using the following formula  Error % = (((“Doubt +” + “Doubt -“)/2)/“X Odo”)\*100 | % Error < 2.70% | |  | |  | |  | |
| Obtain the SIMEV log:  Open SIMEV log shortcut on desktop  Get the debug.bin file and save it on the HDD | SIMEV log saved on the HDD, | | N/A | |  | |  | |

1. ATO Mode Dynamic Testing – 82RD / 83RD (HIGH RISK – DRIVERS REQUIRED)

| **Table 27: ATO Mode Dynamic Testing – 82nd or 83rd** | | | | | | | | | | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Action** | **Expected Result** | | **Outcome** | | | **Signature** | | | **Notes** | | |
|  |  | | **Text** | | | **UserSignature** | | |  | | |
| General Setup Requirements | | | | | | | | | | | |
| Attach an ETM in preparation for setting up DIVA with ECP | ETM attached | | N/A | | |  | | |  | | |
| Setup the locomotive on 82rd or 83rd shorthood facing Tom Price before the first group of transponders. | N/A | | N/A | | |  | | |  | | |
| Request the OC Tester to setup the train sheet for the following:  **SPECIAL TRAIN**  Locomotives: **1**  Ore Cars: **10**  Brake Delay: **18**  Deceleration: **0.25**  Adhesion: **Low** | OC tester confirms train sheet has been created. | | N/A | | |  | | |  | | |
| Startup DIVA | DIVA successfully completes startup tests. No degraded messages are evident on the CDU. | | N/A | | |  | | | Start up DIVA until Lead Do It then setup ECP in RUN mode prior to validating the train sheet. | | |
| On the ATP screen press **LEAD** & **LEAD DO-IT** | **TxtInfo** appears on the **Direction** field. | | N/A | | |  | | | If this is the first time that DIVA is connecting to the VSS or if the logs from the DIVA have been recently downloaded, the **Authority** field will show **NoVSSComms.**  If you can ping the VSS through the NVR, then proceed. When you validate the train data, the loco will show up on the VSS. | | |
| Setup ECP into **RUN** mode | ECP is in **RUN** mode. | | N/A | | |  | | |  | | |
| For DIVA, setup the train as:  **SPECIAL TRAIN**  Locomotives: **1**  Ore Cars: **10**  Brake Delay: **18**  Deceleration: **0.25**  Adhesion: **Low**  **SHORTHOOD FIRST**  Train ID: **Current Locomotive ID**  Track ID: **7M**  Press **SHOWMORE** | ATP Session window shows:  **VSS SESSION OPEN** | | N/A | | |  | | |  | | |
| Press **SHOWMORE**  Press **VALIDATE** (for train data)  Press **VALIDATE** (for ID and location)  Lead Tester calls OC Tester to confirm VSS has received train data | OC Tester confirms that train data is received. | | N/A | | |  | | |  | | |
| Wait for the soft keys, then press **AUTOHAUL**  Press **STAFF RESPONSIBLE**  Press **STAFF RESPONSIBLE DO IT** | CDU displays:  MAX: **80**  Authority: **Staff Responsible** | | N/A | | |  | | |  | | |
| Cross the first group of transponders to localise.  Stop the locomotive. | The **Current Location** and **Section** ATP data fields are updated. | | N/A | | |  | | | Train driver might have to call up OC Tester and ask for an MA once localised/ transponders are crossed.  The next step can be done in parallel to this. | | |
| OC Tester confirms that the train is shown on the VSS. CC gives Movement Authority (MA) and ATP **Direction** field shows **ENHNCD** | | N/A | | |
| Ensure that there are no ATP/ECP penalties on the CDU. If there are a penalties clear them.  Ensure SimATO is configured to communicate with the correct loco ID. Run SimATO and press Start  Turn on the ATO rack.  **Note:** ATOC will take 5 minutes to boot, DSE will boot in approximately 30 seconds, so the next step can be commenced while waiting for ATOC to boot. | There are no penalties on the CDU | | N/A | | |  | | |  | | |
| SimATO is running | | N/A | | |
| ATO completes start-up tests. | | N/A | | |
| ATO Passive Softkeys become available on the CDU | | N/A | | |
| No red fail LEDs are indicated on the ATO key switch. | | N/A | | |
| On the CDU:  Press **LEADER**  Press **LOGIN**  Wait for the 2 x 10 second timeouts.  Press **DONE**  Setup the train data as:  Locomotives: **1**  Ore Cars: **10 empty ore cars**  Press **CONFIRM**  On the *Select Destination* screen, select a route in the correct direction (eg. 7M to Brockman4 MLW).  If there is no route to select, press **SELECT**. | Driver Assist is logged into on CDU. | | N/A | | |  | | | If DIVA’s train data is setup before logging into LEADER, then the train data will be passed onto LEADER.  Otherwise, you’ll need to edit the train sheet for LEADER. Press the softkey for the item that needs to be changed (colour goes from red to blue) and press again to bring up the editing keys. All red softkeys need to be pressed once to turn them blue. Once all soft keys are blue, the **CONFIRM** softkey will be available to complete Train Sheet editing. | | |
| Driver to request the Train Controller to set a route to the departing signal on the road.  82rd = DA571  83rd = DA569. | ATP data **Target Location** is updated. | | N/A | | |  | | |  | | |
| Request the OC tester to setup a **Prepare for Mission** **(PFM)** for the locomotive.  Ask for a final destination of Rosella 5 or Dingo 17, in the south direction. | OC Tester confirms that a **Prepare for Mission** is ready. | | N/A | | |  | | | Final destination is part of the PFM.  CC might send the **PFM** instead of just setting it up, which is not a problem. | | |
| Driver Assist Mode | | | | | | | | | | | |
| Set the ATO switch to **Driver Assist** | Driver Assist displays the track profile on the CDU. | | N/A | | |  | | | When the ATO Switch is turned to Driver Assist, the **PFM** is sent automatically | | |
| Use PuTTY to open a telnet session to the DSE (10.255.255.14).  Username: root  Password: admin12  Enter the following commands:  cd /TDS\_Data/Program <Enter>  ./autohaul\_diag <Enter> | LEADER diagnostics screen is shown. | | N/A | | |  | | | Your laptop should already be set as 10.255.255.245 and connected to the correct port on Moxa A. | | |
| Press 1 (Air Brake Data Menu)  Press 2 (Air Brake Data Validity) | All air brake analog data is indicated as valid. | | N/A | | |  | | |  | | |
| Press X  Press 4 (Air Brake Discrete Data Validity Display) | All air brake discrete data is indicated as valid. | | N/A | | |  | | |  | | |
| Press X, X  Press 2 (Display Engine Data Menu)  Press 1 (Analog Data Display) | All engine analog data is indicated as valid. | | N/A | | |  | | |  | | |
| Set the Gen Field C/B to On.  Move the reverser to Forward.  Move the throttle to DB8. Record DB Voltage values | DB Excitation ≈ 70V | | DB Exc. Volt = | | |  | | | Drivers must be used for tests requiring throttle movements. | | |
| Perform a self-load test.  Compare the Main Generator Voltage reading on the  CDU to the voltage reading on the GE screen. | Main Generator Voltage ≈ Voltage (GE) | | MG Volt = | | |  | | | Drivers must be used for tests requiring throttle movements. | | |
| M Alt Volt = | | |
| Press X  Press 2 (Engine Discrete Data Display)  Switch the engine control switch between RUN and  ISOLATE. | In RUN:  Not in Isolate: \* | | N/A | | |  | | |  | | |
| In ISOLATE:  Not in Isolate: - | | N/A | | |  | | |  | | |
| Press X  Press 3 (Engine Discrete Data Validity Display) | All engine discrete data is indicated as valid. | | N/A | | |  | | | ATO locomotives will not have the bell and horn. | | |
| Press X, X, X | The remote diagnostic screen is exited | | N/A | | |  | | |  | | |
| Ensure loco is not in Self Load Test.  Ask driver to move the locomotive according to the driving strategy advice shown on the CDU. | Driving strategy advice is updated regularly on the CDU. | | N/A | | |  | | |  | | |
| When the locomotive is under power, check that the amps are displayed on the main CDU screen. | Amps are displayed. | | N/A | | |  | | |  | | |
| Ask the driver to stop the train after it has moved more than 10m. | Train is stopped. | | N/A | | |  | | | There is no need to move the train to the LoA as we are not testing the driving strategy. | | |
| Set the ATO switch to Passive | ATO is in passive mode | | N/A | | |  | | |  | | |
| Reboot ATO |  | | N/A | | |  | | |  | | |
| ATO-Attended Mode | | | | | | | | | | | |
| Ensure the locomotive is setup in the following state. | All doors closed | | | N/A | | |  | | |  | |
| Movement switches in **ENABLE** | | | N/A | | |  | | |
| Set the independent brake handle to **FULL**  Set the automatic brake handle to **RELEASE**  Set the throttle to **IDLE**  Set the reverser to **CENTER**  Set the GEN FIELD CB to **OFF**  Set the air conditioning to **COOL**  Set the ATO switch to **Driverless Attended**. | Green Safe to Board Lights: **ON** | | | N/A | | |  | | |  | |
| Blue ATO Status Lights: **ON** | | | N/A | | |  | | |
| SimATO logs record: ATO\_STATUS\_LIGHT= ON | | | N/A | | |  | | |
| Orange Not Safe to Board Lights: **OFF** | | | N/A | | |  | | |
| CDU displays **ATO ATTENDED** soft-key. | | | N/A | | |  | | |
| Press the **ATO ATTENED** soft key on the CDU | ATO screen is displayed on CDU | | | N/A | | |  | | |  | |
| Lead Tester to request the Train Controller to send the **Prepare for Mission Command (PFM)** on the TCS. | The CDU prompts the driver to release the automatic and independent brakes. | | | N/A | | |  | | | Final destination is part of the PFM.  Use a final destination of Rosella 5 or Dingo 17. | |
| Check the DSE has the final destination information:  Press **1**  Press **A**  Press **1**  Press **3** | BaliseGroupID in Final Destination Information is non-zero and not equal to the Current Location BaliseGroupID | | | N/A | | |  | | | This step is optional, as if the locomotive moves, it proves this. | |
| Driver to put the **Independent Brake** in **Release**. | Headlights are illuminated | | | N/A | | |  | | | ATOC/DSE may overspeed due to the train configuration and the ATP may intervene.  If Actual Power remains in IDLE for more than 2 minute after the horn has sounded, the train is unlikely to move.  If it doesn’t move: collect SimATO logs,  Isolate ATP, Cut-out ECP, turn off ATO and shunt loco back to starting point.  Power cycle circuit breakers: ECP, ATS/TMC, DLC, (CDU) DCV5, and restart test case at Step 1. | |
| Green Safe to Board Lights: **OFF** | | | N/A | | |  | | |
| SimATO logs record:  GREEN\_LIGHT=OFF | | | N/A | | |  | | |
| Orange Not Safe to Board Lights: **ON** | | | N/A | | |  | | |
| SimATO logs record:  ORANGE\_LIGHT=ON | | | N/A | | |  | | |
| Bell sounds and then stops | | | N/A | | |  | | |
| Horn sounds after bell finishes | | | N/A | | |  | | |
| Train starts moving | | | N/A | | |  | | |
| Direction = **Forward**  Recommended Power = **TH1**  Commanded Power = **TH1**  Actual Power = **TH1**  TBC = **0%** | | | N/A | | |  | | |
| Confirm that the Alerter is operational. | Alerter sounds randomly between 100 and 140 seconds (approximately) and is successfully acknowledged by the driver. | | | N/A | | |  | | |  | |
| Driver to intervene after the locomotive has moved 100m.   1. Intervene with IBH or ABH 2. TBC=60% is applied by ATO (check on the CDU) 3. Orange light goes OFF, Green lights come ON 4. Put ATO key back into Passive   Note  If BC does not get applied, then put ABH=Emergency to stop the train.  Wait for ER to build backup to 620kPA  Recover all your penalties. | Locomotive is stopped. | | | N/A | | |  | | | If an Emergency dump is required, this will cause ATO to fail (expected behavior)  You will be required to cut your HEL back in during the recovery process. | |
| Lead Tester to request the OC Tester to select End of Journey. | The locomotive is disconnected from the VSS. | | | N/A | | |  | | |  | |
| Perform a second lift by repeating steps 2 to 9 | Second lift performed without issue. | | | N/A | | |  | | |  | |
| Perform a third lift by repeating steps 2 to 9 | Third lift performed without issue. | | | N/A | | |  | | |  | |
| Retrieve ATO & DSE logs. | Logs retrieved successfully. | | | N/A | | |  | | |  | |
| ****Notch**** Testing(HIGH RISK – DRIVER REQUIRED) | | | | | | | | | | | | | |
| Turn OFF the AutoHaul Vital CB to shut down ATO | | | ATO off | | |  | | |  | | |  | |
| Disconnect both ETH1 & 2 from DSE-N | | | ETH 1 & 2 disconnected from DSE-N | | |  | | |  | | |  | |
| Setup special SimATO that simulates DSE on Laptop – laptop is set to 10.255.255.14 and can ping 10.255.255.11. | | | Ping is successful. | | |  | | |  | | | NOTE: see TEST\_INSTRUCTIONS for correct setup of SimATO and laptop | |
| Turn ON the AutoHaul Vital CB to reboot ATO | | | ATO is rebooted | | |  | | |  | | |
| Setup simulated DSE in SimATO to:  1) TICK **Engine Controls** box.  2) TICK **Srv Brk Apply** box.  3) **Serv Brk** =100%.  4) TICK **Indip. Brk Apply** box.  5) Indip. Brk = 100%.  6) Traction is set to IDLE | | | Engine Control box = TICKED | | |  | | |  | | |  | |
| Srv Brk Apply bo = TICKED | | |  | | |  | | |
| Serv Brk =100%. | | |  | | |  | | |
| Indip Brk Apply = TICKED | | |  | | |  | | |
| Indip. Brk = 100%. | | |  | | |  | | |
| Traction = IDLE | | |  | | |  | | |
| Set the independent brake handle to **FULL**  Set the automatic brake handle to **RELEASE**  Set the throttle to **IDLE**  Set the reverser to **CENTER**  Set the ATO switch to **Driverless Attended**. | | | Green Safe to Board Lights: **ON** | | |  | | |  | | |  | |
| Blue ATO Status Lights: **ON** | | |  | | |  | | |
| Orange Not Safe to Board Lights: **OFF** | | |  | | |  | | |
| CDU displays **ATO ATTENDED** soft-key. | | |  | | |  | | |
| Driver to request the OC to send the **Prepare for Mission Command** **(PFM)** | | | Driver to request the OC to send the **Prepare for Mission Command** **(PFM)** | | |  | | |  | | |  | |
| Driver to put the **Independent Brake** in **Release**. | | | Headlights are illuminated | | |  | | |  | | |  | |
| Green Safe to Board Lights: **OFF** | | |  | | |  | | |
| SimATO logs record:  GREEN\_LIGHT=OFF | | |  | | |  | | |
| Orange Not Safe to Board Lights: **ON** | | |  | | |  | | |
| SimATO logs record:  ORANGE\_LIGHT=ON | | |  | | |  | | |
| Bell sounds (60s) and then stops | | |  | | |  | | |
| Horn sounds after bell finishes | | |  | | |  | | |
| Record the following from CDU for each DB notch   1. DB excitation voltage (mV), Battery voltage, DB excitation % 2. On ATO CDU screen: Actual Power and Commanded Power | | | Values on CDU recorded on table | | |  | | |  | | |  | |
| In simulated DSE, set Traction=DB1. Wait 5 seconds once Actual Power= DB1. | | | Actual Power = DB1 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | IDLE to DB1 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB2. Wait 5 seconds once Actual Power= DB2. | | | Actual Power = DB2 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB1 to DB2 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB3. Wait 5 seconds once Actual Power= DB3. | | | Actual Power = DB3 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB2 to DB3 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB4. Wait 5 seconds once Actual Power= DB4. | | | Actual Power = DB4 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB3 to DB4 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| Simulated DSE, set Traction=DB5. Wait 5 seconds once Actual Power= DB5. | | | Actual Power = DB5 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB4 to DB5 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB6. Wait 5 seconds once Actual Power= DB6. | | | Actual Power = DB6 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB5 to DB6 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB7. Wait 5 seconds once Actual Power= DB7. | | | Actual Power = DB7 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB6 to DB7 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB8. Wait 5 seconds once Actual Power= DB8. | | | Actual Power = DB8 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB7 to DB8 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB7. Wait 5 seconds once Actual Power= DB7. | | | Actual Power = DB7 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB8 to DB7 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB6. Wait 5 seconds once Actual Power= DB6. | | | Actual Power = DB6 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB7 to DB6 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB5. Wait 5 seconds once Actual Power= DB5. | | | Actual Power = DB5 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB6 to DB5 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB4. Wait 5 seconds once Actual Power= DB4. | | | Actual Power = DB4 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB5 to DB4 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB3. Wait 5 seconds once Actual Power= DB3. | | | Actual Power = DB3 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB4 to DB3 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB2. Wait 5 seconds once Actual Power= DB2. | | | Actual Power = DB2 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB3 to DB2 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=DB1. Wait 5 seconds once Actual Power= DB1. | | | Actual Power = DB1 on ATO CDU for 5 seconds. Loco is stationary. | | |  | | |  | | | DB2 to DB1 | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| In simulated DSE, set Traction=IDLE. | | | Actual Power = IDLE. | | |  | | |  | | | DB1 to IDLE | |
| Battery Voltage | | |  | | |  | | |
| DB Excitation Voltage (mV) | | |  | | |  | | |
| DB Excitation % | | |  | | |  | | |
| DB Notch on GE Screen | | |  | | |  | | |
| Switch ATO Keyswitch back to Passive and Drivers regains control. | | | Driver is in control. | | |  | | |  | | |  | |
| Select End Journey | | | Disconnect from VSS | | |  | | |  | | |  | |

1. Locomotive Auxiliary Systems and Equipment

| **Table 28: Locomotive Auxiliary Systems and Equipment** | | | | | | |
| --- | --- | --- | --- | --- | --- | --- |
| **Action** | | **Expected Result** | **Outcome** | | **Signature** | **Notes** |
|  | |  | **Text** | | **UserSignature** |  |
| PTP GPS System | | | | | | |
| Using the GE SCREEN, check the PTP GPS status. | | GPS operating correctly. |  | |  |  |
| BlackBox GPS System | | | | | | |
| Check the 8002CS BlackBox GPS Recorder LEDs. | | POWER (Green)  ON | |  |  |  |
| COMMS (Orange)  FLASHING | |  |
| SDB (Red)  ON | |  |
| Check the R120 GPS unit LEDs. | | POWER (Red)  ON | |  |  | Either the GPS or DGPS LED must be ON. |
| GPS (Yellow)  See notes | |  |
| DGPS (Green)  See notes | |  |
| Using the RTRD laptop BlackBox GPS tracking system, find the locomotive. | | Locomotive has an updated position following installation. | |  |  |  |
| Interior Lights | | | | | | |
| Test the **Cab Dome Light** using the switch on the side of the driver’s console. | | Switch and light are operational. |  | |  |  |
| Test the **Toilet Comp Light** using the switch on the side of the driver’s console. | | Switch and light are operational. |  | |  |  |
| Test the **Nose Cab Light** using the switch on the side of the driver’s console. | | Switch and light are operational. |  | |  |  |
| Test the **Driver Side** **Lights** using the switch on the driver side ceiling panel. | | Switch and lights are operational. |  | |  |  |
| Test the **Observer** **Side** **Lights** using the switch on the observer side ceiling panel. | | Switch and lights are operational. |  | |  |  |
| Test the **Gage Lights** using the switch on the driver’s console. | | Switch and lights are operational. |  | |  |  |
| Exterior Lights | | | | | | |
| Test the **Short Hood Headlights** and **Short Hood Ditch Lights** using the switch on the driver’s console. | | Switch and lights are operational. |  | |  |  |
| Test the **Long Hood Headlights** using the switch on the driver’s console. | | Switch and lights are operational. |  | |  |  |
| Test the **Step Lights** using the switch on the driver’s console. | | Front left step (2 lights) |  | |  |  |
| Front right step (2 lights) |
| Rear left step (2 lights) |
| Rear right step (2 lights) |
| Driver side ground (2 lights) |
| Observer side ground (2 lights) |
| Test the **Crosswalk Lights** using the switch on the engine control panel. | | Front platform |  | |  |  |
| Front coupler |
| Rear platform |
| Rear coupler |
| Driver side platform top (2 lights) |
| Driver side platform near door (2 lights) |
| Observer side platform top (2 lights) |
| Test the **Front Number Lights** using the switch on the engine control panel. | | Switch and lights are operational. |  | |  |  |
| Test the **Short Hood Class Lights** using the switch on the engine control panel. | | Switch and lights are operational. |  | |  |  |
| Test the **Long Hood Class Lights** using the switch on the engine control panel. | | Switch and lights are operational. |  | |  |  |
| Test the **Strobe Lights** using the switch on the overhead console. | | Switch and lights are operational. |  | |  |  |
| Sand | | | | | | |
| Test the **Lead Axle Sand** using the switch on the driver’s console. | | Switch and sand are operational. |  | |  |  |
| Test the **Manual Sand** using the switch on the driver’s console. | | Switch and sand are operational. |  | |  |  |
| Bell | | | | | | |
| Test the **Bell** using the switch on the driver’s console. | | Switch and bell are operational. |  | |  |  |
| Horn | | | | | | |
| Test the **Horn** using the button on the driver’s console. | | Button and horn are operational. |  | |  |  |
| Auto Uncoupler | | | | | | |
| Test the **Auto Uncoupler** using the switch on the driver’s side overhead console. | | Auto uncoupler operates correctly. |  | |  |  |
| Air Conditioner | | | | | | |
| Inspect and test the **Air Conditioner**. | | No damage, abnormalities, defects, or out-of-service tags. |  | |  |  |
| Fan function operates correctly. |  | |
| Cool function operates correctly. |  | |
| Fridge | | | | | | |
| Inspect and test the **Fridge**. | | No damage, abnormalities, defects, or out-of-service tags. |  | |  |  |
| Fridge operates correctly. |  | |
| AM/FM Radio | | | | | | |
| Inspect and test the **AM/FM Radio**. | | No damage, abnormalities, defects, or out-of-service tags. |  | |  |  |
| Radio operates correctly and signal is received. |  | |
| Driver side speaker operates correctly. |  | |
| Observer side speaker operates correctly. |  | |
| Microwave and Kettle | | | | | | |
| Inspect and test the **Microwave**. | | No damage, abnormalities, defects, or out-of-service tags. |  | |  |  |
| Microwave power point operates correctly. |  | |
| Microwave operates correctly. |  | |
| Inspect and test the **Kettle**. | | No damage, abnormalities, defects, or out-of-service tags. |  | |  |  |
| Kettle power point operates correctly. |  | |
| Kettle operates correctly. |  | |
| Seats | | | | | | |
| Inspect and test the **Driver Seat**. | | No damage, abnormalities, defects, or out-of-service tags. |  | |  |  |
| Recline function operates correctly. |  | |
| Slide function operates correctly. |  | |
| Inspect and test the **Observer Seat**. | | No damage, abnormalities, defects, or out-of-service tags. |  | |  |  |
| Recline function operates correctly. |  | |
| Slide function operates correctly. |  | |
| Windows and Doors | | | | | | |
| Inspect and test the **Driver Side Window**. | No damage, abnormalities or defects. | |  | |  |  |
| Window opens, closes and latches correctly. | |  | |
| Blind opens, closes and latches correctly. | |  | |
| Inspect and test the **Observer Side Window**. | No damage, abnormalities or defects. | |  | |  |  |
| Window opens, closes and latches correctly. | |  | |
| Blind opens, closes and latches correctly. | |  | |
| Inspect and test the **Front Window**. | No damage, abnormalities or defects. | |  | |  |  |
| Driver side blind opens, closes and latches correctly. | |  | |
| Observer side blind opens, closes and latches correctly. | |  | |
| Window wiper operates correctly. | |  | |
| Inspect and test the **Driver Side Rear Window**. | No damage, abnormalities or defects. | |  | |  |  |
| Window wiper operates correctly. | |  | |
| Inspect and test the **Observer Side Rear Window**. | No damage, abnormalities or defects. | |  | |  |  |
| Window wiper operates correctly. | |  | |
| Inspect and test the **Front Cab Door** | No damage, abnormalities or defects. | |  | |  |  |
| Door operates correctly and can be locked using a padlock. | |  | |
| Inspect and test the **Rear Cab Door** | No damage, abnormalities or defects. | |  | |  |  |
| Door operates correctly and can be locked using the latch inside the cab. | |  | |

1. ****Logs**** (LOW RISK – DRIVER NOT REQUIRED)

| **Table 29: LOGS** | | | |
| --- | --- | --- | --- |
| **Action** | **Expected Result** | Signature | **Notes** |
|  |  | UserSignature |  |
| Log Retrieval & Archiving | | | |
| **NOTE**: Logs may have been collected in separate sessions, make sure they are placed in a folder and named accordingly with the tests performed. | | | |
| Download the logs from the **ATO** using a laptop.  Name the folder: **LOCO\_ATO\_LINKS** | Logs can be downloaded and inspected. |  | Logs to be captured from the DATA Logger |
| Download the logs from the **ATO** using a laptop.  Name the folder: **LOCO\_ATO\_STATIC** | Logs can be downloaded and inspected. |  | Logs to be captured from the DATA Logger |
| Download the logs from the **ATO** using a laptop.  Name the folder: **LOCO\_ATO\_DB\_STATIC** | Logs can be downloaded and inspected. |  | Logs to be captured from DATA Logger |
| Download the logs from the **DIVA** (SAM & MID) using a laptop.  Name the folder: **LOCO\_DIVA\_DYNAMIC** | Logs can be downloaded and inspected. |  | Logs to be captured from DATA Logger |
| Download the logs from the **ATO** & **DSE** using a laptop.  Name the folder: **LOCO\_ATO\_DYNAMIC** | Logs can be downloaded and inspected. |  |  |
| Confirm CDS Logs & Characterisation files have been downloaded | Logs can be downloaded and inspected. |  |  |
| Download the logs from the **Event Recorder USB Download Port** using a USB drive.  Save the file as **<LOCOID>\_<DDMMYY>\_ER\_USB** | Logs can be downloaded and inspected. |  |  |
| Download the logs from the **Event Recorder** using a laptop.  Save the file as **<LOCOID>\_<DDMMYY>\_ER\_LAP** | Logs can be downloaded and inspected. |  |  |
| Use **DAS** to confirm that all **Event Recorder** inputs are correctly operating. | All inputs are received in multiple positions throughout the testing. |  | Use the DAS *Exception Scan* function to find times when the inputs change. |
| Time stamp on the log is correct.  (8 hours behind WST) |  |
| Download the logs from the **ATP Recorder Card Extender** using a flash card reader.  Save the file as **<LOCOID>\_<DDMMYY>\_ATP\_FL** | Logs can be downloaded and inspected. |  | Locate record ID 95 in WLANA and press F5 to check the locomotive ID. |
| Locomotive ID is correct in ID plug. |  |
| Download the logs from the **ATP Recorder Card** using a laptop.  Save the file as **<LOCOID>\_<DDMMYY>\_ATP\_LAP** | Logs can be downloaded and inspected. |  |  |
| Download the logs from the **FastBrake** using a laptop.  Save the file as **<LOCOID>\_<DDMMYY>\_FB** | Logs can be downloaded and inspected. |  |  |
| Download the logs from the **DLC** using a laptop.  Save the files in a folder named **<LOCOID>\_<DDMMYY>\_DLC** | Logs can be downloaded and inspected. |  |  |

1. Log Analysis

| **Table 30: Log Analysis** | | | |
| --- | --- | --- | --- |
| **Action** | **Expected Result** | Signature | **Notes** |
|  |  | UserSignature | **Text** |
| Log Analyst reviews the onboard logs for correct system behaviour. | ATO\_Links verified |  |  |
| ATO\_Static verified |  |  |
| ATO\_DB\_STATIC verified |  |  |
| DIVA\_Dynamic verified |  |  |
| ATO\_Dynamic verified |  |  |

1. **ATO Dynamic without GoLinc Configured**

|  |  |  |
| --- | --- | --- |
| **Table 31: ATO Dynamic Without Golinc Configured** | | |
| **Assumptions** | **Signature** | **Comments** |
|  | **UserSignature** | **Text** |
| Complete the Dynamic procedure as per the ATO Dynamic procedure in 90000XXX.E0X.EN - AC NIU2 without GoLinc - ATO Attended Movement Procedure |  |  |

| **COMMISSIONING - AC - NIU II ATO-A Commissioning Procedure - Signatures** | | | |
| --- | --- | --- | --- |
| **Name** | **Date** | **Comments** | **Signature** |
| %USERS.NAME% |  |  |  |