



AUSTRALIAN RAIL TRACK CORPORATION LTD

Discipline
Engineering

Category
Process Procedures

New Signal Locations without Signal Post Telephones

PP-165.2

Applicability

ARTC Network wide	✓
New South Wales	
Western Jurisdiction	
Victoria	

Primary Source
(New Draft)

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List of Amendments

Issue	Date	Clause	Description
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1. Purpose

The purpose of this standard is to document the procedure to be followed by signals staff preparing a new signalling location for operation using mobile communications coverage.

2. Scope

This procedure covers the following:-

- The conditions which must be met in order to select a signalling location with adequate mobile communications coverage.

3. Background

ARTC has removed signal post telephones from the tracks under its control in Victoria, South Australia and Western Australia.

Telstra CDMA coverage of ARTC rail network is already extensive. The true extent of CDMA coverage on the ARTC rail network, including the NSW Leased and Hunter Valley rail lines was determined jointly by ARTC and Telstra by running a wagon equipped with RF monitoring equipment over all rail lines.

The NSW rail lines are also covered by a number of satellite telephone service providers.

In October 2004 the Federal Government announced the allocation of \$45M to eliminate the CDMA coverage 'holes' identified by this survey across the entire ARTC rail network. CDMA blackspots are expected to be progressively eliminated on the ARTC network over the period Jan 2006 – Dec 2007. This program will be updated to provide Telstra 3G network coverage in lieu of the CDMA coverage during this period.

Since the take up of the 60 year lease for the ARTC-managed rail network in NSW on 4th Sep 2004, ARTC has issued all NSW field work groups/teams and managers with CDMA and/or satellite mobile telephones. As a result ARTC field maintenance and management staff no longer rely on the use of SPTs to contact Signaller or Controller staff.

4. ITSRR Approval

On 13 May 2005 ITSRR approved in principle the removal of Signal Post Telephones from the NSW Leased and Hunter Valley rail lines.

5. Risk Mitigation

Approval is provided to operate the NSW Leased and Hunter Valley rail network without Signal Post Telephones (SPTs) on the condition that CDMA coverage is available at the signalling location.

6. Procedure

The following procedure is to be followed when installing new signalling locations or signals without a signal post telephone in the ARTC rail network. The major steps

are:

- (a) Confirmation of CDMA radio coverage for the area from service supplier;
- (b) ARTC mobile test for the particular signalling location or signal location ;
- (c) Drawings and documentation for the new signalling location;
- (d) Complete the work and submit certified drawings for updating.

7. CDMA Service Supplier Coverage

It is essential that the CDMA service supplier has completed any work associated with providing the designated level of radio coverage for the respective area to have the new signalling locations installed. The Communications project manager or manager will provide details of the areas that the CDMA service supplier has confirmed have the infrastructure to provide the necessary level of radio coverage.

8. ARTC Mobile Test for particular Signal locations

The ARTC shall conduct and confirm the results of the following tests prior to commencing the installation of the new signals or signalling locations.¹ It is important that the CDMA calls can be made consistently and that the voice quality is sufficient for the voice recording systems in use at the signal boxes and train control centres. It is preferable that the ARTC Communications section establish a test telephone circuit that is connected to a channel on the Voice Recording systems for the respective area. Otherwise, in consultation with the signallers and train controllers, a standard telephone line shall be used for the conduct of the tests.

- The test shall be conducted using a standard CDMA handset as issued for ARTC maintenance staff. The phone operator shall be positioned adjacent to the proposed signal/signalling equipment location and clear of any danger zones from the track or other hazards.
- The phone operator shall make 5 consecutive phone calls that are successful and meet the following criteria. The operator to achieve the 5 successful calls within a group of 8 calls. The phone calls shall be to the designated test line with voice recording.
- Each of the 5 calls shall be held for 100seconds without disconnection by the network.
- The operator shall talk for half the duration of the call, including at least at the start and the finish of the 100 seconds. The voice quality of the call as observed on the voice recording shall be at least level 3 or above on the attached scale for the recorded voice.
- CDMA coverage is to be judged as acceptable only if the caller and recipient can communicate in clear and intelligible manner that is understood by both parties.

If CDMA coverage is not judged as acceptable then the proposed signal/signalling equipment location is NOT to be progressed without signal post telephones.

¹ Where CDMA coverage test call fails, ARTC shall use these results to report unsatisfactory CDMA coverage to Telstra.

The results of the test are to be annotated onto the attached record sheet. This shall be included as part of the Commissioning Work Package.

9. Certification of New Work

If CDMA coverage is acceptable as detailed above and if the Certified Construction Copy of the drawings is available, then installation and commissioning of the new signals and signalling locations may proceed. The new work is to be certified in the normal manner.

10. CDMA Network and Voice Quality

The Network and Voice Quality are important for reliability and usability of the CDMA network in the railway application. The attached table indicates nominal levels for Voice Quality on a mobile network.

Table 1. Voice quality of CDMA mobile network

Opinion Score Rating	Level of Distortion
5	Imperceptible
4	Just perceptible but not annoying
3	Perceptible and slightly annoying
2	Annoying but not objectionable
1	Very Annoying and objectionable

Alternative methods to test the CDMA signal strength at a location and the number and strength of pilot signals provide a more quantifiable result but are more difficult to test. Processes to perform tests in this manner may be submitted for approval.

New Signalling Locations with Mobile Communications
ARTC Network

Name: _____ Position: _____

Employee No: _____ Team/Work Group Name: _____

Location/Line Sector: _____

A: CDMA Service Supplier confirmation of radio coverage: _____

B: ARTC Track Plan/Signalling Plan and Circuits available for (list all signals)

Signals: _____

Individual Signalling Location Results

Signal Location: _____ Line: _____ Km: _____

C: ARTC Mobile Test: Date & Time Call to Test Number:

Date: _____ Time: _____ Test Number Called: _____

No. of Calls Made: _____ No. of successful consecutive 100 sec calls : _____

Voice Quality (level of distortion – see Table 1): _____

Confirmed - recorded voice meets requirement: Yes/No Signed: _____

D: Confirmation of New Signalling Construction and Certification of drawings.

Signal Job No: _____

Signalling location work completed as per PP-165.2: Yes/No

Certified Construction Copy marked up and certified: Yes/No

Signed: _____ Date: _____

Individual Signalling Location Results

Signal Location: _____ Line: _____ Km: _____

C: ARTC Mobile Test: Date & Time Call to Test Number:

Date: _____ Time: _____ Test Number Called: _____

No. of Calls Made: _____ No. of successful consecutive 100 sec calls : _____

Voice Quality (level of distortion – see Table 1): _____

Confirmed - recorded voice meets requirement: Yes/No Signed: _____

D: Confirmation of New Signalling Construction and Certification of drawings.

Signal Job No: _____

Signalling location work completed as per PP-165.2: Yes/No

Certified Construction Copy marked up and certified: Yes/No

Signed: _____ Date: _____

This record is to be kept as part of the New Works Signalling Construction Work Package