ROADS AND MARITIME SERVICES

TRAFFIC SYSTEMS

SPECIFICATION NO. TSI-SP-036

MOTORIST EMERGENCY TELEPHONE SYSTEM

Issue: 2.0
Dated: 22/03/2018
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## RECORD OF AMENDMENTS

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<th>Summary</th>
<th>Date</th>
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<tr>
<td>1.0</td>
<td>First Issue</td>
<td>28 Jan 2014</td>
<td>A/Mgr, TSI</td>
</tr>
</tbody>
</table>
| 1.1   | • Updated RMS logo on page 1  
      |         | 27 Feb 2018 | --          |
|       | • Cl.A.1 and sub-clauses: Change references to VC002-24 to VC002-73 | | |
| 1.2   | • Reformatted into current template.  
      |       | 21 Mar 2018 | Mgr, TSI    |
|       | • Blank pages deleted.  
      |       | | |
|       | • References to Road Network Operations Branch replaced by Intelligent Transport Systems Branch.  
      |       | | |
|       | • References to A-Tick and C-Tick replaced by RCM and consequent change to Cl.12. | | |
| 2.0   | Approved version of 1.2 converted to pdf for publishing and release. | 22 Mar 2018 | Mgr, TSI |
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1 SCOPE

This specification covers the requirements for Motorist Emergency Telephone Systems (METS) that are used in motorway applications in the State of New South Wales. The METS provides access to Motorway Emergency Services when required by a motorist and is intended to be used in emergencies only.

This specification includes requirements for the design, performance and quality assurance of Motorist Emergency Telephone System.

This specification may be referenced by other Roads and Maritime Services (RMS) specifications or work documents, and shall always be read in conjunction with these referencing documents (known as Referencing Specifications).

2 REFERENCES AND APPLICABLE DOCUMENTS

2.1 Australian and International Standards

[4] AS/NZS 3000 – Electrical installations (known as the Australian/New Zealand Wiring Rules)
[5] AS/NZS 3100 – Approval and test specification - General requirements for electrical equipment
[6] AS 60068.2.6 – Environmental testing - Tests - Test Fc: Vibration (sinusoidal)
[7] AS 60068.2.29 – Environmental testing - Tests - Test Eb and guidance: Bump
[8] AS 60118.4 – Hearing Aids – Magnetic Field Strength in Audio-Frequency Induction Loops for Hearing Aid Purposes
[9] AS 60529 – Degrees of protection provided by enclosures for electrical equipment (IP Code)
[10] AS/NZS 60950.1 – Information technology equipment - Safety - General requirements
[13] AS/CA S002 – Analogue interworking and non-interference requirements for Customer Equipment for connection to the Public Switched Telephone Network
[16] AS/CA S008 – Requirements for customer cabling products
2.2 RMS Documents

[19] TSI-SP-012 – General Requirements for Roadside Equipment Housings
[20] TSI-SP-016 – General Requirements for Outdoor Electronic Equipment

2.3 Other Documents

[21] ISO 9001 – Quality management systems - Requirements
[22] ISO 9660 – Information processing; volume and file structure of CD-ROM for information interchange

2.4 Compliance with Specifications

All equipment and materials, where not otherwise specified, shall be in accordance with Australian Standards/Specifications where such exist, and in their absence, with appropriate standards/specifications issued by IEC, ISO or other relevant authorities.

The Motorist Emergency Telephone System shall comply with the requirements of the NSW Work Health and Safety Act.

The equipment shall comply with the safety requirements of the National Electrical Codes AS/NZS 3000, AS/NZS 3100 and AS/NZS 60950.1.

Except where specifically stated otherwise in this Specification, the equipment shall comply with all relevant requirements of Specification TSI-SP-016 insofar as they are applicable.

2.5 Precedence of Specifications

In the event of any conflict between the referenced specifications, the order of precedence shall be as follows:
   (a) The dedicated project specification (including drawings);
   (b) Other Referencing Specifications;
   (c) This Specification (as amended);
   (d) Other RMS specifications and documents;
   (e) Australian Standard Specifications;
   (f) IEC and ISO Specifications.

3 DEFINITIONS AND GLOSSARY OF TERMS

For the purposes of this Specification, the following definitions and abbreviations shall apply:

ACMA Australian Communications and Media Authority
AS/CA Australian Standard/Communications Alliance
CLI Calling Line Identification
<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>CA</td>
<td>Communications Alliance Ltd.</td>
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<td></td>
<td>Was formerly known as Australian Communications Industry Forum Ltd (ACIF)</td>
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<td>IEC</td>
<td>International Electrotechnical Commission</td>
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<tr>
<td>IMS</td>
<td>Incident Management System</td>
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<td>IP</td>
<td>Internet Protocol</td>
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<td>ISO</td>
<td>International Standards Organisation</td>
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<tr>
<td>the Manager</td>
<td>Refers to the Manager, Traffic Systems Integration, of RMS’s Intelligent</td>
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<td></td>
<td>Transport Systems Branch</td>
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<td>MCC</td>
<td>Motorway Control Centre</td>
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<tr>
<td>MET</td>
<td>Motorist Emergency Telephone covered by this Specification.</td>
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<tr>
<td>METS</td>
<td>Motorist Emergency Telephone System covered by this Specification</td>
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<tr>
<td>NSW</td>
<td>New South Wales</td>
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<tr>
<td>OMCS</td>
<td>Operations Management and Control System in a motorway control centre</td>
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<tr>
<td>Operator</td>
<td>The operator at the Motorway Control Centre who receives incoming calls</td>
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<td></td>
<td>from users of the METs</td>
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<td>PSTN</td>
<td>Public switched telephone network</td>
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<td>RCM</td>
<td>Regulatory Compliance Mark. Single requirement mandated by the ACMA to</td>
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<td></td>
<td>replace the A-Tick and C-Tick requirements.</td>
</tr>
<tr>
<td>Referencing</td>
<td>The document or specification that stipulates or requires compliance</td>
</tr>
<tr>
<td></td>
<td>with this Specification (TSI-SP-036) in full or in part</td>
</tr>
<tr>
<td>RMS</td>
<td>Roads and Maritime Services, a New South Wales government agency</td>
</tr>
<tr>
<td>RMS</td>
<td>The person appointed by Roads and Maritime Services to carry responsibilities</td>
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<td></td>
<td>on behalf of Roads and Maritime Services for the execution of the</td>
</tr>
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<td>contract under which the METS is supplied.</td>
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<tr>
<td></td>
<td>A reference to the RMS Representative in this Specification shall be taken</td>
</tr>
<tr>
<td></td>
<td>to include a reference to the representative(s) of the RMS Representative</td>
</tr>
<tr>
<td>Supplier</td>
<td>Means the supplier of Motorist Emergency Telephone System covered by this</td>
</tr>
<tr>
<td></td>
<td>Specification.</td>
</tr>
<tr>
<td></td>
<td>Where the supply of Motorist Emergency Telephone System is under a contract</td>
</tr>
<tr>
<td></td>
<td>it means the contractor of the contract</td>
</tr>
<tr>
<td>TDM</td>
<td>Time Division Multiplexed</td>
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<tr>
<td>Traffic centre</td>
<td>A remote centre for the monitoring, control and operation of Intelligent</td>
</tr>
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<td>Transportation Systems equipment and responding to calls made via the METS</td>
</tr>
<tr>
<td>VoIP</td>
<td>Voice over Internet Protocol</td>
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4 [NOT USED]

5 TECHNICAL REQUIREMENTS
5.1 System Components

The METS consists of the following components:

(a) Motorist Emergency Telephone (MET);
(b) Intermediate Field Equipment (optional);
(c) Communications network;
(d) Central Equipment;
(e) Control Facilities and Operator Panels.

5.2 Motorist Emergency Telephone (MET)

5.2.1 General

The Motorist Emergency Telephone (MET) is the roadside device that a motorist may use to summon assistance when on the motorway.

METs may be of one of two distinct types:

(a) Handset types; or
(b) Non-handset types.

A MET shall consist of a metal housing containing the telephone unit and all associated equipment.

5.2.1.1 Handset Type MET

The handset type MET shall consist of a telephone handset in a weatherproof housing suitable for roadside use. The housing shall also house all other components of the roadside telephone set, including the handset cord, the ringing bell or electronic annunciator, the cradle switch, and other associated circuitry.

The handset cord shall be within 400-600mm in length and fully protected in a stainless steel flexible conduit. The handset cord shall retract automatically when the user replaces the handset on its cradle.

The telephone housing shall be complete with a door and provide all-weather protection to the telephone equipment. The door shall be latched and weatherproof when latched.

5.2.1.2 Non-handset Type MET

The non-handset type MET shall be in the form of weather-proof device. All operational facilities shall be accessible on the front face of the MET.

5.2.1.3 Acoustic characteristics

The MET shall be designed to operate in the noise levels expected in a motorway environment. It shall be designed to filter out traffic and other unwanted noise and shall have internal adjustment to ‘fine tune’ the phone to its surrounding environment.

"Non-handset" types of METs shall be designed such that there is no ‘lag’ or ‘delay’ apparent in the voice activation system when the caller starts speaking. Any delay may result in the MCC Operator missing the beginning of a callers’ conversation.

The acoustic characteristics of the MET shall comply with the provisions of AS/CA S004.
5.2.1.4 Fault detection

Where the communications between the MET and the Central Equipment is IP-based, the system shall provide fault detection of the MET and reporting to the Central Equipment.

5.2.1.5 Hearing aid loop facilities

The MET shall incorporate hearing aid loop facilities for persons with hearing disabilities. These facilities shall comply with AS 60118.4.

5.2.1.6 Annunciator to indicate an incoming call

The MET shall have facilities to alert nearby persons to an incoming call via ring tones or similar, and to allow the call to be answered.

The ring cadence shall be as specified in AS/CA S002 for a normal call.

5.2.1.7 Call connection

For a handset type MET, when a user lifts the handset off its cradle, the call shall be automatically initiated to the MCC. No dialling shall be required. Before the call is answered, the motorist shall hear ring tone.

For a non-handset type MET, the call shall be initiated by the user pressing a ‘Call Button’ or similar. Before the call is answered, the motorist shall hear ring tone.

5.2.1.8 Call disconnection

For a handset type MET, the call shall be disconnected when the handset is returned to the handset cradle. In order to reduce unnecessary call costs, for a MET using a mobile phone network, an internal timer shall hang up the call one minute after the MCC Operator hangs up if the handset has not been returned to the handset cradle.

For a non-handset type MET, the call shall be disconnected after the MCC Operator hangs up.

5.2.1.9 Buttons for non handset type telephone instruments

Where a non-handset type MET provides for both calling for help and for information, it shall provide two separate buttons for these different functions.

The buttons shall be weatherproof.

The top button shall be labelled “ASSISTANCE” and used for making calls.

The lower button shall be labelled “INFORMATION” and shall be programmed with a pre-recorded message as described in Clause 5.2.1.10.

5.2.1.10 Pre-recorded Message

Where a pre-recorded message is programmed into a MET the default message shall be as follows:

“This is a freeway help phone provided by Roads and Maritime Services for your assistance. Pressing the ASSISTANCE button will automatically connect you to an operator in the Motorway Control Centre. Please be prepared to inform the operator of your car type, the
registration number, the distance your car is from this help phone and the nature of your problem.”

It shall be possible for different pre-recorded messages to be stored. The storage capacity shall allow for a pre-recorded message of at least 60 seconds in duration.

5.2.1.11 Use of an external carrier’s network

Where the METS is connected to an external carrier’s network operation, the following shall be provided by the METS:

(a) Call-In Number

The ‘call-in’ number is the number that the MET is programmed to dial to initiate a call to the MCC. This number shall be pre-configured into the MET to facilitate immediate dialling without the user needing to dial a particular number. The ‘call-in’ number shall be specified by the RMS Representative. This number may not necessarily be the same for all METs;

(b) Call-Back Number

The ‘call-back’ number is the number allocated by the telecommunications carrier for the MET and is unique to each MET instrument. The MCC Operator uses this number when calling out to a MET.

All METs shall support the ‘Call Line Identification’ (CLI) requirements of the external carrier’s network. CLI is critical to enabling the MCC Operator to identify the phone number (and therefore the MET location) of every incoming call. CLI shall be enabled for all services installed.

5.2.1.12 Electrical characteristics

The electrical characteristics of the MET instrument shall comply with the provisions of AS/CA S004. Refer to Clause 7 for additional requirements.

5.2.1.13 Surge protection

Refer to Clause 8.3.

5.3 Intermediate Field Equipment

5.3.1 Functions

Intermediate Field Equipment refers to equipment in the METS which is located at some intermediate location between the MET instruments and the METS Central Equipment.

Not all implementations of a METS will necessarily require such equipment, since this will depend on the communications technology employed and network architecture. Such equipment will generally be required when it is unfeasible to connect all the METs to the Central Equipment directly. An example of such equipment would be concentrators used in an analogue telephone network.

5.3.1.1 Provision for expansion

The METS may require expansion in the future. The design of the Intermediate Field Equipment shall be such as to allow for expansion of the number of METs and MCC operators by at least 50%.
5.3.1.2 Fault detection

The capability for fault detection and reporting to the Central Equipment shall be provided.

5.3.1.3 Surge protection

Refer to Clause 8.3.

5.3.1.4 Mechanical characteristics

Intermediate Field Equipment will generally be located at unoccupied locations, and possibly without air conditioning or other climate control facilities.

The housings for Intermediate Field Equipment shall comply with RMS Specification TSI-SP-012.

5.3.1.5 Electrical characteristics

The housings for Intermediate Field Equipment shall comply with RMS Specification TSI-SP-012.

Refer to Clause 7 for additional requirements.

5.4 Communications network

5.4.1 Possible communications technologies

METs shall connect to the Central Equipment via the communications network and if applicable, Intermediate Field Equipment.

The communications technology employed may include one or more of the following:

(a) TDM voice circuits over copper or optical fibre bearers;
(b) VoIP over copper or optical fibre bearers;
(c) 3G wireless (including enhanced 3G technologies);
(d) 4G wireless;

Communications network equipment which is installed in an external environment shall comply with the physical, electrical and environmental provisions in this specification for Outdoor Equipment.

Communications network equipment which is installed in an internal environment shall comply with the physical, electrical and environmental provisions in this specification for Indoor Equipment.

5.4.2 Cable requirements

Cable used for the carriage of communications signals in the METS communications network shall comply with the relevant provisions of AS/CA S008.

The cable shall be suitable for the environmental conditions under which it is used.

Connecting hardware, including plugs and sockets shall comply with the relevant provisions of AS/CA S008.
5.4.3 Cable joint requirements

Joins and terminations of cable used for the carriage of communications signals in the METS communications network shall comply with the relevant provisions of AS/CA S009.

The compounds used in any joints shall not be of a type which chemically reacts with any part/material of the cable.

5.4.4 Provision for expansion

The METS may require expansion in the future. The design of the communications network shall be such as to allow for expansion of the number of METs and MCC Operators by at least 50%.

5.5 Central Equipment

The Central Equipment refers to that equipment in which resides the METS intelligence and performs the call switching and other exchange and call management functions.

The Central Equipment supports the MCC Operators' Panel functions while interfacing them to the METs via the communications network and if applicable, Intermediate Field Equipment.

5.5.1 Functions

The Central Equipment shall provide the following functions:

(a) Provide keep-alive signals as required to Intermediate Field Equipment or communications network devices;
(b) Initiate a system alarm if an Intermediate Field Equipment or communications network device fails to respond to a keep-alive signal;
(c) Initiate a system alarm if an Intermediate Field Equipment or communications network device reports a fault;
(d) Trigger alert/alarm annunciation at the operator panel to alert the Operator when a call is initiated from a MET;
(e) Transmit to the Operator Panel information on the identification of the calling MET and its geographical location;
(f) Manage queuing of simultaneous incoming calls from any number of the METs in this METS;
(g) Cause dial tone to be transmitted to a MET when it goes off-hook and set up a connection from the MET to the Operator Panel;
(h) Manage the routing of the voice link between the calling MET and the Operator Panel;
(i) Manage call control of the incoming call from the MET;
(j) Provide identification of calling or conversing METs by means of the display device at the Operator Panels;
(k) Manage call control of outgoing calls from the Operator Panel to a MET;
(l) Cause ring signal to be transmitted to a MET when it is dialled from the Operator Panel;
(m) Manage the routing of the voice link between the Operator Panel and the called MET.
(n) Provide a ring tone to the caller prior to it being answered to confirm that the call is being signalled to the MET being called;
(o) When a call is placed on hold, a signal shall be provided to the caller to indicate that the call is on hold and is still in progress. This signal may be in the form of an appropriate tone, a voice message, music or some other recording;
(p) Provide a voice announcement to the calling MET if all the operators are busy. It shall be possible for at least 4 different pre-recorded messages to be stored. The storage capacity shall allow for each pre-recorded message to be of at least 60 seconds in duration;
(q) Support the following industry standard call functions:
   (i) Call waiting;
   (ii) Redial of last called number;
   (iii) Dial of last calling number;
   (iv) Call forward to another Operator station;
   (v) Call hold;
(r) Support the recording of calls for regulatory and Operator training and quality control purposes;
(s) Support the porting of alarms to the OMCS at the MCC;
(t) Support other ancillary functions as required by the Referencing Specification;
(u) Comply with the relevant requirements of AS/CA S003;
(v) Log all calls within the METS;
(w) Log all faults detected in the METS.

NOTE: Depending on the architecture of the METS, some of the functions listed under Central Equipment may be implemented in the Intermediate Field Equipment.

5.5.1.1 Capability to route a call from a MET to the PSTN

It shall not be possible to route a call from a MET instrument to any party external to the METS.

NOTE: The verdict of the ACMA has been that if there is any possibility of the motorist's call from the MET being connected in any way whatsoever through to any party external to the METS e.g. a motorists' aid organisation or breakdown service, then the motorway operating company would need to be licensed as a Telecommunications Carrier under the relevant Australian Federal Government communications legislation.

5.5.1.2 Connections to other systems

For a METS architecture which uses a Telecommunications Carrier's network for the METS communications, the METS communications network shall provide calling line identification reference data to the Central Equipment.
The Central Equipment shall provide calling number location reference data and alarm data to the OMCS as described in the Referencing Specification.

The Central Equipment shall interface with the OMCS and any associated IMS to raise an incident in the IMS arising from a call on the METS and to automatically locate the incident.

5.5.1.3 Provision for expansion

The METS may require expansion in the future. The design of the Central Equipment shall be such as to allow for expansion of the number of METs and MCC Operators by at least 50%.

5.5.1.4 Fault detection facilities

The METS shall be self-checking against faults. In particular, there shall be continuous automatic supervision of the telephone channel between the Central Equipment and the METs, and if applicable, the Intermediate Field Equipment.

In case of a system fault, including the failure of power to the Central Equipment and the METs, and if applicable, the Intermediate Field Equipment, appropriate alarms showing the nature of the cause shall be displayed on the Operator Panel for the attention of the Operator.

All faults detected in the METS shall be logged.

The fault detection function shall be capable of localising faults associated with each MET and the communications path to the Operator Panel.

5.5.1.5 Surge protection

Refer to Clause 8.3.

5.5.1.6 Electrical characteristics

The Central Equipment shall be powered by mains supply and have its power supply backed up so that it is able to operate in the event of a mains power failure.

Refer to Clause 7 for additional requirements.

Refer to Clause 7.1 for details of the power supply backup facilities.

5.6 Control Facilities and Operator Panels

METE Control Facilities and Operator Panels shall be supplied and configured at each of the Operators' workstations to enable each Operator to independently and simultaneously answer MET calls.

5.6.1 Functions

The Control Facilities and Operator Panel shall provide the following functions:

(a) A handset shall be provided for Operator;

(b) It shall be possible to substitute each handset with a headset;

(c) The Operator shall be able to receive calls from and initiate calls to each connected MET;

(d) The Operator shall be able to receive calls from and initiate calls to the PSTN;
(e) Both visual and audible means shall be provided to alert the operator when an incoming call from a MET is received;

(f) The number and location of the calling MET shall be displayed for the Operator, before the Operator answers the call;

(g) The Operator shall be able to establish full duplex voice communication with the user of the MET, in a similar manner as conversing over an ordinary telephone;

(h) When a call is being attended to by an Operator, subsequent incoming calls shall not be barred from initiating alarms and displaying the corresponding visual identification for the Operator;

(i) There shall be provisions for managing queuing of simultaneous incoming calls from any number of METs in this METS;

(j) The Operator shall be able to place a call on hold and attend to a second incoming call. When the Operator wishes to return to the previous call, he/she may do so;

(k) The Operator shall be able to place any number of calls on hold and return to them as desired. The Operator shall not have to return to the calls in any particular order;

(l) The Operator shall be able to return to a call on hold in a simple manner without performing a complex procedure e.g. a re-dialling procedure or manual retrieval of called telephone number;

(m) The Operator Panel shall display the status of all of the calls in progress, on hold and queued for that Operator;

(n) Operators shall be able to call any METS telephone from any Operator Panel;

(o) Operators shall not have to memorise complicated procedures or inputting of lengthy text in order to perform the routine functions of the METS;

(p) Alarm information about the METS shall be displayed for the Operator;

(q) Support other ancillary functions as required by the Referencing Specification;

(r) The Operator shall be able to place calls to and receive calls from the PSTN.

5.6.1.1 Provision for expansion

The METS may require expansion in the future. The design of the Control Facilities and Operator Panels shall be such as to not require hardware changes unless provision for additional MCC Operators is required.

In general, it is expected that such expansion will involve additions to the number of METs, the Central Equipment, the communications network and if applicable, the Intermediate Field Equipment.

5.6.1.2 Fault detection facilities

Faults detected in the METS shall be displayed on the Operator Panel for the attention of the Operator. Refer also to clause 5.5.1.4.

The METS shall provide an audible alarm, with associated muting button, for alerting the Operator to the occurrence of a system fault, including power failure in the METS.

The METS shall provide visual indications of the type of system faults, including power failures. These visual indications shall be displayed until the fault has been cleared.
5.6.1.3 Surge protection

Refer to Clause 8.3.

5.6.1.4 Operator Ergonomics

The layout of the Operator Panel shall be designed to facilitate ease of use and efficient operation. The layout shall facilitate communications and event recording.

The layout of each Operator Panel shall be easily reconfigurable to suit a right-handed or left-handed Operator.

5.7 Reliability

The METS shall be designed to provide reliable service throughout its life with a mean time between failure (MTBF) of any given MET and its communications channel through to the MCC Operator not less than 40,000 hours.

5.8 Compliance with TSI-SP-016

The design, construction and manufacture of the METS equipment shall comply with RMS Specification TSI-SP-016.

5.9 Compliance with TSI-SP-012

The design, construction and manufacture of the METS equipment housings shall comply with RMS Specification TSI-SP-012 except as specified in Appendix A.

6 PHYSICAL REQUIREMENTS

6.1 General

The METS equipment shall be of modular design and be designed for ease of maintenance and component replacement.

The design, construction and manufacture of the METS shall comply with all relevant requirements in RMS Specification TSI-SP-016.

Except as otherwise specified in Appendix A of this Specification, the METS outdoor equipment (METs and Intermediate Field Equipment) shall be supplied complete with roadside equipment housings complying with RMS Specification TSI-SP-012.

6.2 Marking

6.2.1 General

The equipment shall be clearly marked with a permanent and durable label(s) with the following information:

(a) Manufacturer’s identification;
(b) Equipment code or type number;
(c) Date of supply (for warranty claims);
(d) A unique serial number;
(e) Batch code or other markings to provide traceability under the Manufacturer’s quality management system (Note: the unique serial number referred to in (d) above may be used for this purpose);
(f) The approval number of the Certificate of Suitability (see Clause 8.6);
(g) ACMA RCM approval;
(h) Approval marks of standards to which the equipment complies;
(i) Power supply information;
(j) Other information as required by the RMS Representative.

6.2.2 Motorist Emergency Telephone

A MET symbol, complying with AS 1742, shall be located on the exterior of the MET housing located on:

a) The exterior of the door of a standard "handset" type of MET; or
b) On the sides of the housing of a "non-handset" type of MET adjacent to the ‘user interface’ panel.

A "handset" type of MET shall have a label fixed in an appropriate position inside the housing such that it can draw the attention of the user to replace the telephone handset on the handset cradle after use.

The telephone reference code shall be displayed on both sides of the housing, and shall be both simple and prominent in order to ease the identification of location by road users. Details of the code numbers will be provided by the RMS Representative.

6.2.3 Intermediate Field Equipment

The Equipment reference code shall be displayed on both sides of the housing. Details of the code numbers will be provided by the RMS Representative.

7 ELECTRICAL REQUIREMENTS

7.1 General

7.1.1 Operating Voltage

The METS equipment shall operate correctly and reliably for mains supply voltages over the range 180 - 280 V r.m.s. and for any variations of frequency in the range 48 - 52 Hz.

The equipment shall not be damaged by mains supply voltages in the range 0 - 280 V r.m.s. and for any variations of frequency in the range 45 - 55 Hz.

The METs may be powered by either the mains supply or other a.c. or d.c. power source.

NOTE: Refer to Clause 2.4 for requirements for compliance with the electrical safety stipulations of AS/NZS 3100, AS/NZS 60950.1 and other ACMA Standards and Australian Standards.
7.1.2 Back Up Power Supply

The METS power supply shall be backed up so that the METS is able to operate in the event of a mains power failure.

During failure of mains supply, the backup power supply shall automatically maintain the METS equipment in normal operation for at least 8 hours with a duty cycle of:

(a) Aggregate total of 10 minutes of ringing current fed to any one of the telephones;
(b) Aggregate total of 50 minutes of conversation between any one telephone and the MCC;
(c) 7 hours of idle time with all telephones on hook and fault monitoring of the METS equipment as for normal operation.

The backup batteries used shall be of the maintenance free type suitable for the outdoor environment and compatible with the ambient temperature range specified in Clause 8.1.

8 ENVIRONMENTAL REQUIREMENTS

8.1 Ambient Conditions

8.1.1 Outdoor Equipment

The METs and Intermediate Field Equipment including their housings shall be capable of continuous operation in an ambient temperature within the range -10°C to +50°C and with a relative humidity of up to 90%.

8.1.2 Indoor Equipment

The Central Equipment and Control Facilities and Operator Panels shall be capable of continuous operation in an ambient temperature within the range +10°C to +45°C and with a relative humidity of up to 85%.

8.2 Enclosure Protection

8.2.1 Outdoor Equipment

The equipment shall have a degree of protection of not less than classification IP45 in AS 60529.

8.2.2 Indoor Equipment

The equipment shall have a degree of protection of not less than classification IP3X in AS 60529.

8.3 Surge Protection

The requirements for surge protection shall be as follows:

(a) The equipment shall be designed to withstand transient disturbances and surges induced onto the mains supply, such as by lightning. The equipment shall provide surge protection to withstand the surges specified in AS 1768, Category B, with medium exposure peak amplitudes;
(b) The equipment shall include effective protection against transients and surges present on the 230 V a.c. mains due to load switching, operation of power equipment, and lightning discharges. For the purpose of this Specification the equipment shall operate within specification when subjected to test 4.4 in Table 4 in AS/NZS 61000.6.1;

(c) Each telecommunications or external data connection to an item of METS equipment shall be provided with a dedicated Telecommunications Line Transient Protection Unit or Data Line Transient Protection Unit respectively;

(d) The Telecommunications Line Transient Protection Unit and Data Line Transient Protection Unit shall provide effective protection against transients and surges present on the external communications lines connected to the METS equipment;

(e) The protection units shall limit the surge voltage presented to the METS equipment to a safe value;

(f) The protection units and shall be tested and approved by a registered testing authority for compliance with the telecommunications line transient protection requirements and other relevant requirements of applicable ACMA Standards. Documentary evidence to confirm the approval shall be supplied to the RMS Representative;

(g) The protection units shall not include fuses with replaceable fuse cartridges; however fusible links may be used;

(h) An adequate earth connection for the protection circuits shall be provided for bonding to the MET earth stake;

NOTE: For effective surge protection, the earth conductor shall be either multistrand cable or copper braid with an effective cross sectional area of not less than 2.5 mm². The earth conductor shall be kept as short as is practicable and shall not have any small radius bends. There shall be no joins in the earth conductor. Telecommunications Line Transient Protection Units with different lengths of earth conductor for different housing types will be required.

8.4 Fire Hazard

Materials and components used in the equipment shall be selected so as to minimise the risk of fire. In this respect the requirements of Section 6 of AS/NZS 3100 shall apply. See also fire hazard related requirements of AS/NZS 60950.1.

All materials used shall be of a composition which does not support combustion or has self-extinguishing properties.

8.5 Dissimilar Materials

All metallic parts, including screws, nuts and washers, shall be plated or manufactured of non-corrodible material such that dissimilar metals in contact shall have an electro-chemical potential difference not exceeding 0.5 volt.

8.6 Certifications

The equipment shall have all necessary certifications in accordance with industry and statutory requirements.

In particular, the following Australian statutory certifications shall be provided with the equipment:
(a) Certificate of Suitability
A Certificate of Suitability issued by the NSW Department of Fair Trading;

(b) ACMA Approval
The equipment shall be tested by a registered testing authority for compliance with the relevant regulatory requirements. Documentary evidence that the equipment complies with all relevant ACMA requirements is required.

8.7 Environmental Tests

8.7.1 Outdoor Equipment

The equipment including its housing shall pass the following environmental tests:

(a) Temperature and Humidity
The equipment shall not be adversely affected by storage in an ambient with free air temperature in the range -20°C to +70°C, and with relative humidity up to 90% within the temperature range 0°C to +50°C.

The equipment shall operate correctly in an ambient with free air temperature in the range -10°C to +50°C, and with up to 90% relative humidity, and with up to 1 kW/m² insolation applied to the maximum exposed surface.

(b) Degree of Protection Test
The complete equipment shall be tested for compliance with Clause 8.2.1. There is no requirement for the equipment to be operational during the test, but the equipment shall operate correctly after the test.

(c) Immunity to Surges on Mains Supply Voltage
The equipment shall be tested in accordance with the test conditions described in Clause 8.3(b). The equipment operation shall be continuously monitored throughout the tests to confirm correct operation of the equipment.

(d) Bump Test
The equipment, in unpacked condition, shall be subjected to a bump test in accordance with AS 60068.2.29. The severity shall be 1,000 bumps at an acceleration of 98 m/s² (10g) with a pulse duration of 16 ms.

(e) Vibration
The equipment shall be subjected to the vibration tests described in this clause. The test procedures shall be in accordance with AS 60068.2.6 for sinusoidal vibration. For all tests specified in this clause, the amplitude shall be 0.75 mm up to the cross-over frequency, (approximately 8.2 Hz), where the acceleration is 0.2g, and for higher frequencies the acceleration shall be maintained constant at 0.2g.

The operation of the equipment shall be recorded during the tests and its overall performance summarised in the test report.

The tests shall be performed for three (3) mutually perpendicular axes with the equipment in the normal orientation.

For each axis of the tests, the equipment shall be tested with an endurance of 20 sweep cycles over the frequency range 5-55 Hz with an initial amplitude of 0.75 mm. The sweep rate shall be 1 octave per minute.
8.7.2 Indoor Equipment

The equipment shall pass the following environmental tests:

(a) Temperature and Humidity

The equipment shall be operated for 72 hours at an ambient temperature of 45°C and relative humidity of 85% minimum. The equipment operation shall be continuously monitored throughout the test to confirm correct operation of the equipment.

(b) Degree of Protection Test

The complete equipment shall be tested for compliance with Clause 8.2.2. There is no requirement for the equipment to be operational during the test, but the equipment shall operate correctly after the test.

(c) Immunity to Surges on Mains Supply Voltage

The equipment shall be tested in accordance with the test conditions described in Clause 8.3(b). The equipment operation shall be continuously monitored throughout the tests to confirm correct operation of the equipment.

9 QUALITY ASSURANCE

9.1 General

The Supplier and the manufacturer of the METS shall operate a quality management system complying with AS/NZS ISO 9001 or ISO 9001. This quality management system shall be certified by a quality management system certification body either accredited under the criteria laid down in the Joint Accreditation System of Australia and New Zealand (JAS-ANZ), or listed in the International Standards Organisation ISO Directory of ISO 9000 and ISO 14000 Accreditation and Certification Bodies.

9.2 Traceability

Each unit of METS equipment shall be marked with a batch code, serial number, or other marking to provide traceability under the equipment manufacturer’s quality management system to all key manufacturing, inspection and test processes, including batch identifications of key components. (Refer also to Clause 6.2.1)

10 ACCEPTANCE INSPECTION AND TESTING

Inspection and acceptance testing shall be in accordance with the project specification.

11 PACKAGING

The METS equipment and any spare parts, tools and ancillary equipment shall be packed to protect them from damage during transport and handling. All fittings liable to damage during
shipment shall be removed and packed separately. Where necessary, reusable transit bars or other forms of additional support shall be provided with the equipment.

Equipment must not be damaged and preset adjustments must not be affected when subjected to the shock and vibration of transport between the Supplier’s premises and the nominated delivery point. Unless otherwise directed, the Supplier shall select the means of transport and pack the equipment to ensure compliance with this clause.

12 DOCUMENTATION

The Supplier shall supply the following documentation for the METS equipment:

(a) Certificates of Suitability issued by the NSW Office of Fair Trading;
(b) Documentary evidence of compliance with ACMA RCM regulatory arrangements;
(c) Documentary evidence of compliance with statutory requirements for radiocommunications equipment, where applicable;
(d) Other applicable certification for the equipment;
(e) Applicable test reports for the equipment;
(f) Detailed technical manuals for the equipment and the system. The technical manuals shall contain the following information as the minimum:

(i) Overview of the equipment architecture;
(ii) Detailed specification of the equipment;
(iii) Detailed description of equipment operation, functions and parameters;
(iv) Detailed description of available parametric settings, including range of values and recommended values for each setting under various environmental conditions;
(v) Installation procedures;
(vi) Maintenance procedures.

NOTE: The technical manuals may be bundled into separate volumes respectively for field and workshop use.

Refer to the supply contract for the quantity of technical manuals to be supplied to RMS. Where the supply contract does not contain specific requirements for the supply of manuals, the following shall be supplied:

(a) A copy of the technical manual shall be provided with each of the first five (5) units of equipment supplied to RMS; and
(b) An electronic copy of the technical manual on an ISO 9660 compliant CD-ROM, or on a storage media otherwise directed by the RMS Representative. The electronic copy shall be in the portable document file format (PDF) or other file format(s) acceptable to the RMS Representative.
APPENDIX A  EXEMPTIONS TO TSI-SP-012

A.1  General
Generally housings for outdoor equipment shall comply with the requirements of RMS Specification TSI-SP-012.

However, some of the provisions of TSI-SP-012 are inappropriate for a MET. Therefore the following exemptions are granted. In some cases the exemption applies to the entire clause and in others to only specific parts of the clause.

NOTE: RMS Drawing VC002-24 is superseded and has been replaced by drawing VC002-73. Where VC002-24 has been referenced in another TSI-SP-012 it shall read as if it is a reference to VC002-73.

A.1.1  Clause 2.2 RTA Specifications and Documents et seq
All references to RTA Specification ECA/2 shall be interpreted as if they were referring to the relevant clauses of RMS Specification TSI-SP-016.

A.1.2  Clause 4.1 General
For a MET, the quoted minimum dimensions do not apply.

Concrete footings and telecommunications pits for MET housings shall comply with all requirements on RMS Drawing VC002-73 for traffic signal controller housings except that relevant plan dimensions may be reduced consequent to the MET housing being smaller than a traffic signal controller housing.

However, a smaller size of the footing and cable entry opening may necessitate the provision of an adjacent cable draw-in pit.

The design of the footing and adjacent cable draw-in pit shall be submitted to the RMS’s Representative for approval.

A.1.3  Clause 4.4 Material
For a MET, the housing may be constructed either partially or completely from an aluminium extrusion.

A.1.4  Clause 4.5 Mounting
For a MET, consequent to the MET housing being smaller than a traffic signal controller housing, the mounting bolt positions do not need to apply with the requirements on RMS Drawing VC002-73 for traffic signal controller housings.

The MET shall be secured to its mounting by at least four mounting bolts.

The design of the mounting shall be submitted to the RMS’s Representative for approval.

A.1.5  Clause 4.6 Cable Access and Telecommunications Conduit Access
Consequent to the MET housing being smaller than a traffic signal controller housing, the dimensions of the cable entry opening in the concrete footing do not need to apply with the requirements on RMS Drawing VC002-73 for traffic signal controller housings.

However, a smaller size of the footing and cable entry opening may necessitate the provision of an adjacent cable draw-in pit.

The design of the cable entry opening and adjacent cable draw-in pit shall be submitted to the RMS’s Representative for approval.
A.1.6 Clause 4.8 Door Locks
For a MET, in the event that the housing dimensions do not permit the use of the specified two (2) threaded stainless steel fasteners, an alternative fastener shall be proposed to the RMS Representative.

A.1.7 Clause 4.13 Plan Pocket
For a MET, this clause does not apply.

A.1.8 Clause 4.14 Equipment shelf
For a MET, this clause does not apply.

A.1.9 Clause 4.15 Finish and Protection
For a MET, the colour to be used shall be Bright Blue (Colour No. B23) in accordance with AS 2700.

A.1.10 Clause 4.19 Switchboard and Mains Fuse
For a MET, if mains power is not present within the housing, this clause does not apply.

A.1.11 Clause 4.19.3 Circuit Breakers
For a MET, if mains power is present within the housing, the requirement of item (c) may be amended to one "Equipment 2" circuit breaker.

A.1.12 Clause 4.20 General Purpose Outlet
For a MET, if mains power is not present within the housing, this clause does not apply.

A.1.13 Clause 4.20.2
For a MET, the equipment shall be directly wired in and shall not use socket outlets.