First edition
2012-05-01

Intelligent transport systems — Communications access for land mobiles (CALM) — Using broadcast communications

Systèmes intelligents de transport — Accès aux communications des services mobiles terrestres (CALM) — CALM utilisant les communications de diffusion générale

Reference number
ISO 13183:2012(E)

COPYRIGHT PROTECTED DOCUMENT

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13183 was prepared by Technical Committee ISO/TC 204, *Intelligent transport systems*.

Introduction

This International Standard is part of a family of International Standards for CALM ("Communications Access for Land Mobiles") which specify a common architecture, network protocols and communications interface definitions for wireless communications using different bearer technologies, e.g. 2nd generation cellular, cellular 3rd generation, 5 GHz microwave, 60 GHz millimetre-wave, mobile wireless broadband, infra-red communications, and satellite. These wireless communications interfaces are designed to provide parameters and protocols for broadcast, point-to-point, vehicle-vehicle, and vehicle-point communications in the ITS sector.

This International Standard provides definitions and procedures for the establishment, maintenance and termination of an ITS communications session within a CALM system environment using received public network broadcast communications messages. Such broadcast communications can be delivered by a variety of media that could include satellite, digital audio broadcast (e.g. $ISDB_{ss}$ and DAB), digital video broadcast (e.g. DVB and ISDB) or any other public communications broadcast service.

Some of the media developed explicitly for CALM include a fully defined broadcast capability, but this International Standard covers only those media that have not been developed specifically for CALM. Protocols for broadcasts that use new dedicated private ITS communications are fully defined in the standards developed for these new communications media.

CALM standards are explicitly designed to enable quasi-continuous communications as well as communications of protracted duration between vehicles and service providers, and between vehicles.

The fundamental advantage of the CALM concept over traditional systems is the ability to support media-independent handover (MIH), also referred to as heterogeneous or vertical handover, between the various media supported by CALM (e.g., cellular, microwave, mobile wireless broadband, infra-red, DSRC, and satellite). Selection policies are supported that include user preferences and media capabilities in making decisions as to which medium to use for a particular session, and when to hand over between media or between service providers on the same medium. These handover mechanisms are defined within the CALM architecture International Standard, ISO 21217, the CALM IPv6 networking protocols International Standard, ISO 21210, the CALM medium service access points International Standard, ISO 21218, and the CALM station management International Standard, ISO 24102. Handovers between access points using the same technology and service provider use mechanisms that are defined within the particular medium-specific CALM standard.

Broadcast communications using public networks will typically be used where large numbers of users are running applications intended to receive the same information. Examples of broadcast information include incremental map-update information, ephemeral information on road conditions including traffic and weather conditions, and the current road use charge that is applied to specific sections of road. Furthermore, GNSS location information can be routed to relevant applications using this protocol.

Broadcasting this information is very efficient spectrally, rather than sending the same information individually to thousands of vehicles via point-to-point communications: the transmission costs could be shared between all the users.

The broadcast medium can also be used to carry paging messages. Strictly speaking, these are unicast, but take advantage of the wide geographical coverage of the broadcast system at the physical layer.

There is no embedded means for the individual receivers to acknowledge correct receipt of broadcast transmissions in real time, and the intended recipient system could be powered down at the time of transmission.

This International Standard identifies techniques that can be used to overcome these limitations.

The time of transmission is determined by the information supplier and is not under the control of the recipient. Therefore it is possible that the ITS station could be powered down at the time of the transmission, in which case the information will not be received. For example, it is conceivable that there might be overnight transmission of map updates. This International Standard defines a “sleep mode”, which would be appropriate for a parked car which would normally require the ITS system to be powered down. However, the (very low power consumption) broadcast receiver and its associated “Medium Management Adaptation Entity” (MMAE) would remain powered to listen for, and store, relevant information transmissions. Any relevant information could be passed to the appropriate applications within the ITS station when the ITS station is next powered up. The following three possible methods have been identified to allow this operation:

a) The MMAE provides storage for all information received over the logical ITS channel, whilst the ITS is in sleep mode, for subsequent transfer to the relevant application via intermediate CALM protocols.

b) The MMAE uses selective storage of information received, following a filtering process. The filtering would be achieved by the application alerting the MMAE on the types of application that are of interest. The application type information will be included within the information header. The MMAE reads the application type information in the header, and stores only the selected information.

c) Filtering and buffering of information, whilst a wake-up message is sent to the rest of the ITS station so that the information being received can be passed to the application for immediate processing. The application would instruct the ITS station to return to sleep mode, once all the information has been received and processed.

The wake-up process in a) above is not currently supported by the relevant CALM standards, so this mode is not currently supported.

The inclusion of this function in the MMAE is not mandated. However, each of these arrangements would greatly increase the probability that broadcast information will be received by a large proportion of the users. As noted above, the broadcast medium does not include a return path. However, reliable information transfer can be supported by using an alternative medium for the return channel. This can be a very sensible approach where there is significant asymmetry, with large amounts of information downloaded with very simple acknowledgement messages to be returned.

Bi-directional satellite communications in the CALM environment are specified in ISO 29282.