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**Intelligent transport systems —
Communications access for land
mobiles (CALM) — Access technology
support**

AMENDMENT 1

*Systèmes intelligents de transport — Accès aux communications des
services mobiles terrestres (CALM) — Support à la technologie d'accès*

AMENDEMENT 1

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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

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 204, *Intelligent transport systems*.

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Intelligent transport systems — Communications access for land mobiles (CALM) — Access technology support

AMENDMENT 1

Page 2, Terms and definitions

Add at the end:

3.7

temps atomique international

time since 00:00:00 UTC, 1 January, 2004, identical with UTC except that no leap seconds need to be added

Page 3, Abbreviated terms

Add:

TAI Temps Atomique International

UTC Temps Universel Coordonné/Coordinated Universal Time

Page 5, 6.2.1.1 CI classes

Add at the end of the first sentence:

A CI shall support exactly one of these CI classes presented in Table 1.

Page 6, Table 1

Delete all occurrences of the term “wireless”.

Delete the character “w” in the terms contained in column “Communication interface class”

Replace the character sequence “lan” in the terms contained in the column “Communication interface class” by the character sequence “il”.

Page 6, last sentence (before Table 2 on page 7)

Delete the end of the sentence “in line with requirements presented in Table 3”.

Page 7, 6.2.1.3

Delete the whole 6.2.1.3.

Page 11, bullet c) sub-bullet 2)

Add:

“not applicable for receive-only CIs (CIC-I4)”.

Page 12, bullet d)

Add:

“not applicable for receive-only CIs (CIC-I4)”.

Page 18, third paragraph below Figure 7

Replace the first three sentences with the corrected versions:

“Each RX/TX-CI shall maintain at least one RX-VCI for reception of frames. There is a single UC-VCI for every known peer CI. The RX-VCI of a CI is shared by all of its TX-VCIs.”

Page 21, Table 4

Replace “GeneralizedTime” by “Time48IAT”.

Page 29, Table 10

Insert:

TIMEOUT	2	Lifetime of pending packet expired prior to transmission of the packet
PRIORITY	3	Priority of the packet is smaller than the minimum required priority given in I-Parameter “MinimumUserPriority”

Page 32, Table A.1

Delete information on I-Param No 1. This parameter is no longer supported.

Page 33, Table A.1

Delete information on I-Param No 14 and 15. This parameter is no longer supported.

Page 37-46, Annex B

Replace whole annex by the following one:

Annex B
(normative)

ASN.1 definitions

B.1 Use of modules

The ASN.1 modules specified in Annex B.2 shall be used. ASN.1 BASIC-PER, UNALIGNED, as specified in ISO/IEC 8825-2, shall apply.

In order to achieve octet alignment enabling cheap implementations, “fill” bits were defined. All fill bits shall be set to the value ‘0’b.

B.2 ASN.1 modules

```

CALM11sap {iso(1) standard(0) calm-11-sap(21218) asnm-1 (1)} DEFINITIONS AUTOMATIC
TAGS ::=BEGIN

-- EXPORTS;
IMPORTS

ITS-scuId FROM CALMmanagement { iso (1) standard (0) calm-management (24102) local (1)
asnm-1 (1) }

ErrStatus, COMMUPDOWN FROM CALMmsap { iso (1) standard (0) calm-management (24102) msap
(3) asnm-1 (1) }

MediumCost FROM CITSapplReq {iso(1) standard(0) cits-applReq (17423) asnm-1 (1) }

LogicalChannelType FROM CITSapplMgmtComm {iso(1) standard(0) cits-applMgmt (17419) comm
    
```

```

(3) }
;

-- End of IMPORTS

Alt ::= INTEGER(0..65535) -- Resolution 0,1 m.

CIaClass ::= INTEGER{
    unknown          (0),
    ciac-1           (1),
    ciac-2           (2),
    ciac-3           (3)
} (0..255)

CIclass ::= INTEGER{
    unknown          (0),
    cic-l1           (1),
    cic-l2           (2),
    cic-l3           (3),
    cic-l4           (4),
    cic-l5           (5),
    cic-il1          (254),
    cic-il2          (255)
} (0..255)

Link-ID ::= SEQUENCE{
    remoteCIID       EUI64,          -- Link-ID
    localCIID        EUI64          -- CI in peer ITS-S(s)
}                                     -- Unique ID of local CI

CIstatus ::= INTEGER{
    not-existent     (0),
    existent         (1),
    unknown          (2),
    registered       (4),
    active           (8),
    connected        (16),
    suspended        (64),
    inactive         (128)
} (0..255)

CommProfile ::= SEQUENCE (SIZE(0..255)) OF I-Param

Connect ::= INTEGER{
    automatic        (0),
    manual           (255)
} (0..255)

IN-SAPaddress ::= INTEGER(0..255)

DataRate ::= INTEGER(0..4294967295) -- in 100 bit/s

DataRatesNW ::= SEQUENCE{
    minimum          DataRate,      -- available to the appl.
    maximum          DataRate      -- minimum possible value
}                                     -- maximum possible value

Directivity ::= SEQUENCE{
    mode             DirMode,
    dirPredef        INTEGER(0..255), -- 0: see dirVar
    -- >0: predefined direction
    fill            BIT STRING (SIZE(7)),
    dirVar          SEQUENCE (SIZE(0..1)) OF DirVar
}

DirMode ::= INTEGER{
    fixed            (0),
    tracking          (255)
} (0..255)

```

```
DirVar ::= SEQUENCE {
    bsAzimuth      INTEGER(-32768..32767), -- -180 - +180
    bsElevation    INTEGER(-128..127),   -- -90 - +90
    openHorizontal INTEGER(0..255),      -- 0 - 180
    openVertical   INTEGER(0..255)      -- 0 - 180
}
```

TxPowMax ::= INTEGER(0..255) -- unit, minimum value and step size defined by access technology (medium)

Errors ::= SEQUENCE (SIZE(0..255)) OF SingleError

```
SingleError ::= SEQUENCE {
    paramNo      INTEGER(0..255), -- ref number of parameter
    errStatus    ErrStatus        -- IS24102-3
}
```

Gs ::= INTEGER(0..65535) -- Resolution 0,01 m/s.

```
KineVectIn ::= SEQUENCE {
    dut          Time48IAT, -- date and universal time
    lat          Lat,      -- latitude
    lon          Lon,      -- longitude
    alt          Alt,      -- altitude / elevation
    gs           Gs,       -- ground speed
    tta          Tta -- true track angle
}
```

```
KineVectOut ::= SEQUENCE {
    dut          Time48IAT, -- date and universal time
    fill         BIT STRING (SIZE(5)), -- used for octet alignment in PER
    options      SEQUENCE (SIZE(0..5)) OF KineVectOptions -- options
}
```

```
KineVectOptions ::= CHOICE {
    lat          Lat, -- latitude
    lon          Lon, -- longitude
    alt          Alt, -- altitude
    gs           Gs, -- ground speed
    tta          Tta -- true track angle
}
```

Lat ::= INTEGER(-2147483648..2147483647) -- equals $\pm \pi/2$

Lon ::= INTEGER(-2147483648..2147483647) -- equals $\pm \pi$

```
LLserviceAddr ::= SEQUENCE {
    csap         IN-SAPaddress,
    linkID       Link-ID
}
```

MACaddress ::= OCTET STRING (SIZE(6))

```
MediumUsage ::= SEQUENCE {
    receive      INTEGER(0..255),
    transmit     INTEGER(0..255)
}
```

```
MedType ::= INTEGER {
    unknown      (0),
    any          (1),
    iso21212     (2), -- 2G
    iso21213     (3), -- 3G
    iso21214     (4), -- IR
    iso21215     (5), -- M5
    iso21216     (6), -- MM
    iso25112     (7), -- 802.16e
    iso25113     (8), -- HC-SDMA
    iso29283     (9), -- 802.20
}
```

```

iso17515          (10), -- LTE
iso15628          (128), -- DSRC
can               (254),
ethernet          (255)
} (0..255)

MedUseObsTime ::= SEQUENCE {
    value          INTEGER(0..1023), -- valid parameter number (10 bits in PER)
    unit           TimeUnit
} -- 2 octets in PER

TimeUnit ::= INTEGER {
    microseconds   (0),
    milliseconds   (1),
    seconds         (2),
    minutes         (3),
    hours           (4),
    days            (5),
    weeks           (6),
    months          (7),
    years           (8)
} (0..63) -- 6 bits in PER

Notify ::= SEQUENCE (SIZE(0..255)) OF INTEGER(0..255) -- valid parameter number

PeerRXpower ::= INTEGER(0..255)

PARAMS ::= CLASS {
    &paramRef INTEGER(0..255),
    &Parameter
}

IPARAM ::= PARAMS

I-Params IPARAM ::= {errors | commProfile | properties | manuDeviceID | iTs-scuId | medID |
localCIID | timeoutReg | macAddress | macAddrTemp | ciClass | ciaClass | ciStatus | notify
| medType | regInfo | connect | simPin | providerInfo | minUserPriority | queueLevel |
queueLowTh | queueAlarmTh | distancePeer | commRangeRef | timeOfLastRecep | inactTimeLimit
| mediumUsage | medUseObsTime | peerMAC | virtualCIs | minPrioCrossCI | rxSens | txPower |
txPowMax | peerRXpower | dataRate | dataRateNW | dataRatesNW | dataRateNWreq | directivity
| blockLength | freeAirTime | frameLengthMax | kineVectIn | kineVectOut | cost |
reliability | logicalChannel, ...}

I-Param ::= SEQUENCE {
    paramNo       IPARAM.&paramRef({I-Params}),
    parameter     IPARAM.&Parameter({I-Params}){@paramNo}
}

errors           IPARAM ::= {&paramRef 0, &Parameter Errors}
commProfile      IPARAM ::= {&paramRef 2, &Parameter CommProfile}
properties       IPARAM ::= {&paramRef 3, &Parameter Properties}
manuDeviceID    IPARAM ::= {&paramRef 4, &Parameter UTF8String}
iTs-scuId       IPARAM ::= {&paramRef 5, &Parameter ITS-scuId}
medID           IPARAM ::= {&paramRef 6, &Parameter MedID}
localCIID       IPARAM ::= {&paramRef 7, &Parameter EUI64}
timeoutReg      IPARAM ::= {&paramRef 8, &Parameter INTEGER(0..255)}
macAddress      IPARAM ::= {&paramRef 9, &Parameter MACaddress}
macAddrTemp     IPARAM ::= {&paramRef 10, &Parameter MACaddress}
ciClass         IPARAM ::= {&paramRef 11, &Parameter CIclass}
ciaClass        IPARAM ::= {&paramRef 12, &Parameter CIaClass}
ciStatus        IPARAM ::= {&paramRef 13, &Parameter CIstatus}
notify          IPARAM ::= {&paramRef 16, &Parameter Notify}
medType         IPARAM ::= {&paramRef 17, &Parameter MedType}
regInfo         IPARAM ::= {&paramRef 18, &Parameter RegInfo}
connect         IPARAM ::= {&paramRef 19, &Parameter Connect}
simPin          IPARAM ::= {&paramRef 20, &Parameter SimPin}
providerInfo    IPARAM ::= {&paramRef 21, &Parameter ProviderInfo}
minUserPriority  IPARAM ::= {&paramRef 22, &Parameter UserPriority}
queueLevel      IPARAM ::= {&paramRef 23, &Parameter QueueLevel}

```

-- DEFAULT 0

```

queueLowTh          IPARAM::={&paramRef 24, &Parameter QueueValue}
queueAlarmTh        IPARAM::={&paramRef 25, &Parameter QueueValue}
distancePeer        IPARAM::={&paramRef 26, &Parameter Distance}
commRangeRef        IPARAM::={&paramRef 27, &Parameter Distance}
timeOfLastRecep     IPARAM::={&paramRef 28, &Parameter Time48IAT}
  -- 1 ms resolution
inactTimeLimit      IPARAM::={&paramRef 29, &Parameter INTEGER(0..65535)}
  -- milliseconds
mediumUsage          IPARAM::={&paramRef 30, &Parameter MediumUsage}
medUseObsTime        IPARAM::={&paramRef 31, &Parameter MedUseObsTime}
peerMAC              IPARAM::={&paramRef 32, &Parameter MACaddress}
virtualCIs           IPARAM::={&paramRef 33, &Parameter VirtualCIs}
minPrioCrossCI       IPARAM::={&paramRef 34, &Parameter UserPriority}
rxSens               IPARAM::={&paramRef 35, &Parameter INTEGER(0..255)}
txPower              IPARAM::={&paramRef 36, &Parameter INTEGER(0..255)}
txPowMax             IPARAM::={&paramRef 37, &Parameter TxPowMax}
peerRXpower          IPARAM::={&paramRef 38, &Parameter PeerRXpower}
dataRate             IPARAM::={&paramRef 39, &Parameter DataRate}
dataRateNW           IPARAM::={&paramRef 40, &Parameter DataRate}
dataRatesNW          IPARAM::={&paramRef 41, &Parameter DataRatesNW}
dataRateNWreq        IPARAM::={&paramRef 42, &Parameter DataRate}
directivity          IPARAM::={&paramRef 43, &Parameter Directivity}
blockLength          IPARAM::={&paramRef 44, &Parameter INTEGER(0..65535)}
freeAirTime          IPARAM::={&paramRef 45, &Parameter INTEGER(0..255)}
  -- measured in milliseconds
frameLengthMax       IPARAM::={&paramRef 46, &Parameter INTEGER(0..255)}
  -- measured in milliseconds
kineVectIn           IPARAM::={&paramRef 47, &Parameter KineVectIn}
kineVectOut          IPARAM::={&paramRef 48, &Parameter KineVectOut}
cost                  IPARAM::={&paramRef 49, &Parameter MediumCost}
reliability           IPARAM::={&paramRef 50, &Parameter INTEGER(0..255)}
logicalChannel        IPARAM::={&paramRef 51, &Parameter LogicalChannels}

Time48IAT::= INTEGER { utcStartOf2004(0), oneMilliSecAfterUTCStartOf2004(1) }
(0..281474976710655) -- International Atomic Time with one millisecond steps

```

```

I-ParamNo::=INTEGER{
  errors              (0),
  commProfile         (1),
  properties          (2),
  manuDeviceID       (3),
  iTs-scuId          (4),
  medID              (5),
  localCIID          (6),
  timeoutReg         (7),
  macAddress         (8),
  macAddrTemp       (9),
  ciClass            (10),
  ciaClass           (11),
  ciStatus           (12),
  notify             (13),
  medType            (14),
  regInfo            (15),
  connect            (16),
  simPin             (17),
  providerInfo       (18),
  minUserPriority     (19),
  queueLevel         (20),
  queueLowTh         (21),
  queueAlarmTh       (22),
  distancePeer       (23),
  commRangeRef       (24),
  timeOfLastRecep   (25),
  inactTimeLimit     (26),
  mediumUsage        (27),
  medUseObsTime      (28),
  peerMAC            (29),
  virtualCI          (30),
  minPrioCrossCI     (31),
  rxSens             (32),
  txPower            (33),

```

```

txPowMax          (34),
peerRXpower       (35),
dataRate          (36),
dataRateNW        (37),
dataRatesNW       (38),
dataRateNWreq     (39),
directivity       (40),
blockLength       (41),
freeAirTime       (42),
frameLengthMax    (43),
kineVectIn        (44),
kineVectOut       (45),
cost              (46),
reliability       (47),
logicalChannel    (51)
} (0..255)

SimPin::=OCTET STRING

LogicalChannels::=SEQUENCE (SIZE(0..255)) OF LogicalChannelType

Distance::=INTEGER(0..65535)      -- measured in 1/10 m

MedID::=INTEGER(0..255)

Properties::=SEQUENCE (SIZE(0..255)) OF I-Param -- only selected parameters

ProviderInfo::=SEQUENCE{
  provName      OCTET STRING (SIZE(0..255)), -- Name of provider
  apn           OCTET STRING (SIZE(0..255)), -- Name of access point
  username      OCTET STRING (SIZE(0..255)), -- Log-in name of user
  password      OCTET STRING (SIZE(0..255)) -- Password for log-in
}

QueueLevel::=SEQUENCE{
  priority      UserPriority,
  level         QueueValue
}

QueueValue::=INTEGER(0..255)

RegInfo::=SEQUENCE{
  status        RegInfoStatus,
  limits        RegulatoryScheme
}

RegInfoStatus::=INTEGER{
  notApplicable (0),
  invalid        (1),
  new            (254),
  valid          (255)
} (0..255)

REGULSCHEME::=CLASS {
  &regID        INTEGER(0..255),
  &RegInfo
}

RegulatoryScheme::=SEQUENCE{
  reguIdent     REGULSCHEME.&regID({RegulSchemes}),
  reguInfo      REGULSCHEME.&RegInfo({RegulSchemes}{@reguIdent})
}

RegulSchemes REGULSCHEME::={nullRegScheme, ...} -- to be filled

nullRegScheme REGULSCHEME::={&regID 0, &RegInfo NULL}

```

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Tta::=INTEGER(0..65535) -- Resolution 0,1°.

UserPriority::=INTEGER(0..255)

VirtualCIs::=SEQUENCE (SIZE(0..65535))OF RemoteCIID

INSAP::= COMMUPDOWN

INsapspsdown INSAP::={inUnitdataRq | inDataAckRq | inReplyAckRq | inReplyUpdateRq, ...}

```
INsapPrimitivesDown::=SEQUENCE{
    spRef          INSAP.&primitiveRef ({INSapspsdown}),
    servPrimitive  INSAP.&Primitive ({INSapspsdown}){@spRef}
}
```

```
inUnitdataRq      INSAP::={&primitiveRef 0, &Primitive IN-UNITDATA-request}
inDataAckRq      INSAP::={&primitiveRef 1, &Primitive IN-DATA-ACK-request}
inReplyAckRq     INSAP::={&primitiveRef 2, &Primitive IN-REPLY-ACK-request}
inReplyUpdateRq  INSAP::={&primitiveRef 3, &Primitive IN-REPLY-UPDATE-request}
```

```
IN-UNITDATA-request::=SEQUENCE{
    source-addr    LLserviceAddr,
    dest-addr      LLserviceAddr,
    data           INdata,
    priority       UserPriority,
    accessParams   AccessParameters
}
```

```
IN-DATA-ACK-request::=SEQUENCE{
    source-addr    LLserviceAddr,
    dest-addr      LLserviceAddr,
    data           INdata,
    priority       UserPriority,
    serviceClass   MACServiceClass
}
```

```
IN-REPLY-ACK-request::=SEQUENCE{
    source-addr    LLserviceAddr,
    dest-addr      LLserviceAddr,
    data           INdata,
    priority       UserPriority,
    serviceClass   MACServiceClass
}
```

```
IN-REPLY-UPDATE-request::=SEQUENCE{
    source-addr    LLserviceAddr,
    data           INdata
}
```

INSAPUP::= COMMUPDOWN

INsapspsup INSAP::={inUnitdataInd | inUnitdataStatusInd | inDataAckInd | inDataAckStatusInd | inReplyInd | inReplyStatusInd | inReplyUpdateStatusInd, ...}

```
INsapPrimitivesUp::=SEQUENCE{
    spRef          INSAP.&primitiveRef ({INSapspsup}),
    servPrimitive  INSAP.&Primitive ({INSapspsup}){@spRef}
}
```

```
inUnitdataInd      INSAP::={&primitiveRef 0, &Primitive IN-UNITDATA-indication}
inUnitdataStatusInd INSAP::={&primitiveRef 1, &Primitive IN-UNITDATA-STATUS-indica-
tion}
inDataAckInd      INSAP::={&primitiveRef 2, &Primitive IN-DATA-ACK-indication}
inDataAckStatusInd INSAP::={&primitiveRef 3, &Primitive IN-DATA-ACK-STATUS-indica-
tion}
inReplyInd        INSAP::={&primitiveRef 4, &Primitive IN-REPLY-indication}
inReplyStatusInd  INSAP::={&primitiveRef 5, &Primitive IN-REPLY-STATUS-indication}
inReplyUpdateStatusInd INSAP::={&primitiveRef 6, &Primitive IN-REPLY-UPDATE-STATUS-indi-
cation}
```

```
IN-UNITDATA-indication::=SEQUENCE{
```