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Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 14: Late Entry (LE)

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European Standard (Telecommunications series)

**Terrestrial Trunked Radio (TETRA);
Voice plus Data (V+D);
Part 12: Supplementary services stage 3;
Sub-part 14: Late Entry (LE)**

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Project Terrestrial Trunked Radio (TETRA).

The present document had been submitted to Public Enquiry as ETS 300 392-12-14. During the processing for Vote it was converted into an EN.

The present document is part 12, sub-part 14 of a multi-part deliverable covering Voice plus Data (V+D), as identified below:

- EN 300 392-1: "General network design";
- EN 300 392-2: "Air Interface (AI)";
- EN 300 392-3: "Interworking at the Inter-System Interface (ISI)";
- ETS 300 392-4: "Gateways basic operation";
- EN 300 392-5: "Peripheral Equipment Interface (PEI)";
- EN 300 392-7: "Security";
- EN 300 392-9: "General requirements for supplementary services";
- EN 300 392-10: "Supplementary services stage 1";
- EN 300 392-11: "Supplementary services stage 2";
- EN 300 392-12: "Supplementary services stage 3";**
- Sub-part 1: "Call Identification (CI)";
- Sub-part 2: "Call Report (CR)";
- Sub-part 3: "Talking Party Identification (TPI)";
- Sub-part 4: "Call Forwarding (CF)";
- Sub-part 5: "List Search Call (LSC)";
- Sub-part 6: "Call Authorized by Dispatcher (CAD)";
- Sub-part 7: "Short Number Addressing (SNA)";
- Sub-part 8: "Area Selection (AS)";
- Sub-part 9: "Access Priority (AP)";
- Sub-part 10: "Priority Call (PC)";

Sub-part 11: "Call Waiting (CW)";

Sub-part 12: "Call Hold (CH)";

Sub-part 13: "Call Completion to Busy Subscriber (CCBS)";

Sub-part 14: "Late Entry (LE)";

Sub-part 16: "Pre-emptive Priority Call (PPC)";

Sub-part 17: "Include Call (IC)";

Sub-part 18: "Barring of Outgoing Calls (BOC)";

Sub-part 19: "Barring of Incoming Calls (BIC)";

Sub-part 20: "Discreet Listening (DL)";

Sub-part 21: "Ambience Listening (AL)";

Sub-part 22: "Dynamic Group Number Assignment (DGNA)";

Sub-part 23: "Call Completion on No Reply (CCNR)";

Sub-part 24: "Call Retention (CRT)";

ETS 300 392-13: "SDL model of the Air Interface (AI)";

ETS 300 392-14: "Protocol Implementation Conformance Statement (PICS) proforma specification";

TS 100 392-15: "TETRA frequency bands, duplex spacings and channel numbering";

TS 100 392-16: "Network Performance Metrics";

TS 100 392-17: "TETRA V+D and DMO Release 1.1 specifications".

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1 Scope

The present document defines the stage 3 specifications of the Supplementary Service Late Entry (SS-LE) for the Terrestrial Trunked Radio (TETRA).

SS-LE allows radio users to be informed of and, if they are concerned, to join an already existing point-to-multipoint speech or data call.

Man-Machine Interface (MMI) and charging principles are outside the scope of the present document.

Supplementary Service stage 3 specification is preceded by the stage 1 and the stage 2 specifications of the service. Stage 1 describes the functional capabilities from the user's point of view. Stage 2 defines the functional behaviour in terms of functional entities and information flows. Stage 3 gives a precise description of the Supplementary Service from the implementation point of view. It defines the protocols for the service and the encoding rules for the information flows. It defines the processes for the functional entities and their behaviour. The described protocols and behaviour apply for the Switching and Management Infrastructure (SwMI), for the Mobile Station (MS) and for the Line Station (LS) and can be applied over the Inter System Interface (ISI) between TETRA systems.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

- [1] ETSI EN 300 392-10-14: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 14: Late Entry (LE)".
- [2] ETSI EN 300 392-11-14: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 14: Late Entry (LE)".
- [3] ETSI ETS 300 392-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".
- [4] ETSI EN 300 392-9: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 9: General requirements for supplementary services".
- [5] ETSI ETS 300 392-12-7: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 7: Short Number Addressing (SNA)".
- [6] ETSI EN 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".
- [7] ETSI ETS 300 392-3-3: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 3: Additional Network Feature Group Call (ANF-ISIGC)".
- [8] ETSI EN 300 392-3-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 1: General design".
- [9] ITU-T Recommendation Z.100 (1993): "Specification and description language (SDL)".
- [10] ETSI ETS 300 392-3-5: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 5: Additional Network Feature for Mobility Management (ANF-ISIMM)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

acknowledge LE: indication sent in LE messages by a SwMI to inform a member who would like to join the call that he has to inform the SwMI of his entering the call

authorized user: identified user who is able to define and interrogate the SS-LE parameters

broadcast LE: indication sent by a SwMI to inform members of a multipoint call which are currently not already involved in this call that they can join directly an existing communication (a channel is already allocated in this cell)

home SwMI: TETRA system in which SS-LE can be defined and invoked.

NOTE: Home SwMI is the TETRA system which has same Mobile Network Identity (MNI) as the TETRA group identity to which SS-LE is defined.

paging LE: indication sent by a SwMI to inform members of a multipoint call which are currently not already involved in this call that they need to ask for a communication channel for that call if they wish to participate the call (a channel is not yet allocated in this cell)

server user: party that receives the SS-LE indications about an ongoing call and joins the call

NOTE: Also known as user B.

user B: in a group call a party that receives the SS-LE indications about an ongoing call

visited SwMI: TETRA system to which SS-LE can be extended and invoked.

NOTE: Visited SwMI is a TETRA system which has a different MNI as the TETRA group identity to which SS-LE is defined.

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

CC	Call Control
FE	Functional Entity
GTSI	Group TETRA Subscriber Identity
ISI	Inter-System Interface
LE	Late Entry
LS	Line Station
MS	Mobile Station
SS	Supplementary Service

NOTE: The abbreviation SS is only used when referring to a specific supplementary service.

SwMI	Switching and Management Infrastructure
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4 SS-LE service description

4.1 General

SS-LE supplementary service enables users to join the group call after the original call setup. SS-LE specifies the definition, interrogation and operation of the supplementary service. The Switching and Management Infrastructure (SwMI) applies the SS-LE definitions when a call is active for the group. The SS-LE actions are defined for the SwMI and for the Mobile Station (MS). The SS-LE information flows may be delivered over the Inter System Interface (ISI).

This supplementary service is applicable to circuit mode speech and data group call services defined in EN 300 392-2 [6].

The Functional Entities used in the present document are defined in EN 300 392-11-14 [2].

4.2 SS-LE services offered over the TNSS-SAP and TNCC-SAP

SS-LE is an optional supplementary service for TETRA voice plus data layer 3. If SS-LE is supported, this clause shall specify the services and their availability.

The following SS-LE services shall be provided:

- late entry indications for a basic service (call control service).

The following SS-LE services may be provided:

- definition: a request to define SS-LE into the SwMI;
- definition information: the reception of SS-LE definition for information;
- interrogation: interrogation of SS-LE definition.

The SS-LE service access point may be used in conformance testing as a normative (but potentially not accessible) boundary in MSs and LSs.

NOTE 1: As the present document only deals with the SS-LE all the service primitives have been shown without a TNSS-LE-prefix e.g. the TNSS-LE DEFINE request is shorten into the DEFINE request.

NOTE 2: As man-machine interface and MS/LS applications are outside the scope of the present document service primitives are used to define information exchange to and from the standardized part of the MS/LS. Those primitives may be only indirectly accessible.

NOTE 3: The layer 3 services and service boundary for the SwMI are outside the scope of the present document.

The SS-LE services described in this clause shall complement the call control service specified in EN 300 392-2 [6], clause 11.

4.3 SS-LE service primitives

4.3.1 List of SS-LE service primitives

The SS-LE services as defined in EN 300 392-10-14 [1] are accessed in the SS-LE protocol description via service primitives. The SS-LE service primitives at the authorized user MS/LS (FE3) shall be:

- DEFINE request;
- DEFINE indication;
- INTERROGATE request; and
- INTERROGATE indication.

The SS-LE service primitives at the served user MS/LS (FE1) may be:

- BROADCAST LE indication;
- ACKNOWLEDGE LE indication;
- ACKNOWLEDGE LE response;
- PAGING LE indication; and
- PAGING LE response.

Clauses 4.3.2 to 4.3.10 present the service primitive descriptions in alphabetic order.

4.3.2 ACKNOWLEDGE LE indication

The ACKNOWLEDGE LE indication primitive may be offered from FE1 to application over TNSS-SAP with the corresponding basic call primitive TNCC-SETUP indication indicating an acknowledged group call. The ACKNOWLEDGE LE indication primitive shall contain the SS-LE parameters listed in table 1. The ACKNOWLEDGE indication implies, that application shall send an ACKNOWLEDGE LE response, if it wants to joint in the call.

Table 1: ACKNOWLEDGE LE indication contents

Parameter	C/O/M	Remark
LE type	M	Acknowledge LE

4.3.3 ACKNOWLEDGE LE response

The ACKNOWLEDGE LE response primitive may be offered from application to FE1 over TNSS-SAP with the corresponding basic call primitive TNCC-SETUP response. Application shall send the primitive if the subscriber joins the call.

Application should discard any other ACKNOWLEDGE LE indications to the same call item:

- while it is making a response to the received ACKNOWLEDGE LE indication; and
- after sending an ACKNOWLEDGE LE response for the same call.

However, if the subscriber receives another ACKNOWLEDGE LE indication after leaving the call and if the user wants to re-join in the group call, application shall send a new ACKNOWLEDGE LE response.

If the subscriber leaves the acknowledged call, e.g. due to another call, the application shall send a TNCC-RELEASE request which invokes sending of a U-RELEASE PDU to SwMI to indicate that the user leaves the call.

If the paging LE is changed to acknowledge LE within a call and if the application has sent a PAGING LE response for that call, the sent PAGING LE response shall be considered also as an ACKNOWLEDGE LE response.