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Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 8: Area Selection (AS)

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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 300 392-12-8. During the processing for Vote it was converted into an EN.

The present document is a multi-part standard and will consist of the following parts:

Part 1: "General network design";

Part 2: "Air Interface (AI)";

Part 3: "Interworking at the Inter-System Interface (ISI)";

Part 4: "Gateways basic operation";

Part 5: "Peripheral Equipment Interface (PEI)";

Part 6: "Line connected Station (LS)";

Part 7: "Security";

Part 9: "General requirements for supplementary services";

Part 10: "Supplementary services stage 1";

Part 11: "Supplementary services stage 2";

Part 12: "Supplementary services stage 3";

Part 13: "SDL Model of the Air Interface (AI)";

Part 14: "Protocol Implementation Conformance Statement (PICS) proforma specification".

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1 Scope

The present document defines the stage 3 description of the Supplementary Service Area Selection (SS-AS) for the Terrestrial Trunked Radio (TETRA).

SS-AS enables the calling user to establish a call in restricting the area where the participating users in a group call or the connected user in an individual call may be located.

Man Machine interface and Charging clauses are outside the scope of the present document.

Supplementary service specifications are produced in three stages according to the method described in ITU-T Recommendation I.130 [1]. The stage 1 description specifies the service from the user's point of view (see ETS 300 392-10-11 [8]). The stage 2 description identifies the functional capabilities and the information flows needed to support the service as specified in its stage 1 description (see ETS 300 392-11-11 [9]). The present stage 3 description specifies the protocols at the air interface and at the various Inter-System Interfaces (ISI) to support SS-AS.

NOTE: According to ITU-T Recommendation I.130 [1], the stage 3 description of any telecommunication service addresses the network implementation aspects. Consequently it comprises two steps: the specifications of all protocols at the various reference points involved in any of the service procedures (notably the service operation) are the first step of the stage 3 description, and the specifications of the functions of the corresponding network entities are its second step.

The latter have not been provided since they can be derived from the specification of the functional entity actions in the stage 2 description.

The present document is applicable to Voice plus Data individual calls or group calls; more specifically to the following entities:

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- the MS/LS of the calling user in an individual call or a group call;
- the originating Switching and Management Infrastructure (SwMI) in an individual call or a group call;
- the group home SwMI and the participating SwMIs for a group call;
- the terminating SwMI for an individual call; and
- optionally, the home SwMI of the group or of the MS/LSs involved, for managing the supplementary service.

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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, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

[1] ITU-T Recommendation I.130 (1993): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[2] ETSI EN 300 392-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 2: Air Interface (AI)".

[3] ETSI ETS 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".

[4] ETSI EN 300 392-3-2: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 3: Interworking at the Inter-System Interface (ISI); Sub-part 2: Additional Network Feature Individual Call (ANF-ISIIC)".

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[5] 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)".

[6] 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)".

[7] ETSI EN 300 392-9: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 9: General requirements for supplementary services".

[8] ETSI ETS 300 392-10-8: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 8: Area selection".

[9] ETSI EN 300 392-11-8: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 8: Area Selection (AS)".

[10] ITU-T Recommendation Z.100: "CCITT Specification and Description Language (SDL)".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions of EN 300 392-9 [7] shall apply with the following modification:

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authorized user: identified user who is allowed to define selected areas and to interrogate the infrastructure about the existing defined selected areas

served user: user for whom the supplementary has been subscribed. That user can thus successfully invoke the supplementary service

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served user SwMI: SwMI where the served user is currently registered. In a call (whether an individual or a group call), the served user SwMI is the originating SwMI

geographical definition: definition of an SS-AS area given by limits on a map. In practice, due to the difficulty to describe mathematically any area shape, only circles and rectangular areas are specified. See subclause 5.2.2.12

site definition: definition of an SS-AS area given as a list of base stations within one or more SwMI. Such list may be implicit, e.g. area defined as a whole home SwMI with no visited SwMI (i.e. no participating SwMI in the case of a group call, and no other terminating SwMI than such home SwMI in the case of an individual call). See subclause 5.2.2.12

SS-AS operation inhibition: calling user or important users are included into the call even in the case those are outside the selected area

3.2 Abbreviations

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

ANF-ISIGC	Additional Network Feature - Inter-System Interface Group Call
ANF-ISIIC	Additional Network Feature - Inter-System Interface Individual Call
ANF-ISIMM	Additional Network Feature - Inter-System Interface Mobility Management
ANF-ISISS	Additional Network Feature - Inter-System Interface Supplementary Service
AS	Area Selection
GTSI	Group TETRA Subscriber Identity
ISI	Inter-System Interface
ITSI	Individual TETRA Subscriber Identity
LS	Line Station
MS	Mobile Station

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PDU	Protocol Data Unit
ROSE	Remote Operation Service Element
SDL	Specification Description Language
SS	Supplementary Service

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

SSI	Short Subscriber Identity
SwMI	Switching and Management Infrastructure

4 SS-AS service description

4.1 General

SS-AS enables the calling user to establish a call in restricting the area where the participating users in a group call or the connected user in an individual call may be located. The calling user invokes SS-AS in using a selected area number when he sets up the call. That number corresponds to a selected area the definition of which is known by the infrastructure (i.e. some SwMI on the call path).

After a group call has been established, as an option, SS-AS may continue to operate to restrict the area where the participating users may roam or migrate, thereby barring the call restoration attempt for that user.

This clause describes the SS-AS services offered by the Circuit Mode Control Entity (CMCE) at the Supplementary Services service access point (TNSS-SAP) of the TETRA voice plus data layer 3 service boundary in a TETRA Mobile Station (MS) or TETRA Line Station (LS). The SS-AS service access point is used in conformance testing as a normative boundary in MSs and LSs.

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NOTE: As the present document only deals with the SS-AS all the service primitives has been shown without a TNSS-AS-prefix e.g. the TNSS-AS-DEFINE request is shortened into a DEFINE request.

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4.2 SS-AS services offered over the TNSS-SAP

NOTE: As man-machine interface or user 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.

The SS-AS service primitives at the served user MS/LS TNSS-SAP shall be:

- ASSIGN request;
- INVOKE request;
- INVOCATION FAILURE indication.

The SS-AS service primitives at the authorized user MS/LS TNSS-SAP shall be:

- DEFINE request;
- DEFINE ACK indication;
- INTERROGATE request;
- INTERROGATE ACK indication.

The served user should have the possibility to use the INTERROGATE primitives mentioned above, limited to its own ITSI and to GTSIs of groups of which he is a member.

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4.2.1 ASSIGN indication

The ASSIGN indication primitive shall be sent over the served user TNSS-SAP by the MS/LS CMCE to the served user application to inform it about the definition of a selected area against the corresponding selected area number for either an ITSI allocated to that MS/LS or the GTSI of a group of which the served user is a member.

When supported (since it is optional), the assignment process shall support one selected area in a request. Optionally it may support a list of selected areas in a single request.

The ASSIGN indication primitive shall contain the SS-AS parameters listed in table 1.

Table 1: Parameters for the primitive ASSIGN indication

Parameter	Indication
Selected area number(s)	M (see note 1)
Selected area definition(s)	M (see note 2)
Acknowledgement requested from served user(s)	O
NOTE 1: It is optional to support more than one selected area number. NOTE 2: There shall be as many selected area definitions as there are selected area numbers.	

When an acknowledgement is requested from the served user, it shall be sent by the served user MS/LS without involving the user application (i.e. directly); hence there is no ASSIGN ACK request primitive.

4.2.2 DEFINE request

The DEFINE request primitive shall be sent over the authorized user TNSS-SAP by the authorized user application to the MS/LS CMCE to define a selected area against the corresponding selected area number for an individual subscriber or for a group.

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When supported (since it is optional), the definition process shall support one selected area for one TETRA identity in a request. That TETRA identity may be either that of an individual subscriber or that of a group. Optionally the definition process may support a list of selected areas in a single request. Still optionally it may support a list and/or range of identities.

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The DEFINE request primitive shall contain the SS-AS parameters listed in table 2.

Table 2: Parameters for the primitive DEFINE request

Parameter	Indication
Access priority	O
Defined TETRA identity/identities	M (see note 1)
Selected area number(s)	M (see note 2)
Selected area definition(s)	M (see note 3)
Assignment to served user(s) requested	O
Acknowledgement requested from served user(s)	C (see note 4)
NOTE 1: It is optional to support more than one defined TETRA identity. The same selected area number definitions given by the following parameters (in the primitive) shall then apply to the corresponding individual subscribers and/or groups. In addition those individual subscribers and/or groups shall then have the same home SwMI. NOTE 2: It is optional to support more than one selected area number. NOTE 3: There shall be as many selected area definitions as there are selected area numbers. NOTE 4: Such acknowledgement may be requested only together with the assignment to served user(s).	

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4.2.3 DEFINE ACK indication

The DEFINE ACK indication primitive shall be sent over the authorized user TNSS-SAP by the MS/LS CMCE to the authorized user application to inform it of the result of a previous DEFINE request.

If the previous request has been addressed to a SwMI for more than one identity, that SwMI may send its corresponding response either in one single request which applies to all those identities or in multiple requests.

The DEFINE ACK indication primitive shall contain the SS-AS parameters listed in table 3.

Table 3: Parameters for the primitive DEFINE ACK indication

Parameter	Indication
Definition result	M (see note 1)
Defined TETRA identity/identities	M (see note 2)
Selected area number(s)	C (see notes 3 and 4)
NOTE 1: There shall be only one definition result per primitive if there are more than one defined TETRA identity or more than one selected area number. NOTE 2: It is optional to support more than one defined TETRA identity. NOTE 3: Conditional on the definition result being positive. NOTE 4: It is optional to support more than one selected area number.	

4.2.4 INTERROGATE request

The INTERROGATE request primitive shall be sent over the authorized user TNSS-SAP by the authorized user application to the MS/LS CMCE to know the definition of a selected area against the corresponding selected area number for an individual user or for a group.

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When supported (since it is optional), the interrogation process shall support one TETRA identity in a request. That TETRA identity may be either that of an individual subscriber or that of a group. Optionally, the interrogation request may be limited to the definition of one or more selected area numbers.

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The INTERROGATE request primitive shall contain the SS-AS parameters listed in table 4.

Table 4: Parameters for the primitive INTERROGATE request

Parameter	Request
Access priority	O
Interrogated TETRA identity	M
Interrogated selected area number/numbers	O (see note)
NOTE: May be present to limit the scope of the interrogation to the definition of one or more selected area numbers.	

4.2.5 INTERROGATE ACK indication

The INTERROGATE ACK indication primitive shall be sent over the authorized user TNSS-SAP by the MS/LS CMCE to the authorized user application to inform it about the result of a previous INTERROGATE request.

The SwMI interrogated may send its response either in one single request which gives the definition of all selected area numbers (for which the interrogation has been placed) or in multiple requests.

The INTERROGATE ACK indication primitive shall contain the SS-AS parameters listed in table 5.

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Table 5: Parameters for the primitive INTERROGATE ACK indication

Parameter	Indication
Interrogation result	M (see note 1)
Interrogated TETRA identity	M
Selected area number(s)	M (see note 2)
Selected area definition(s)	M (see note 3)
Assignment to served user(s) requested	O
Acknowledgement requested from served user(s)	C (see note 4)
NOTE 1: There shall be only one interrogation result per primitive if there are more than one interrogated TETRA identity or more than one selected area number. NOTE 2: It is optional to support more than one selected area number. NOTE 3: There shall be as many selected area definitions as there are selected area numbers. NOTE 4: Such acknowledgement may have been requested only together with the assignment to served user(s).	

4.2.6 INVOKE request

The INVOKE request primitive shall be sent over the served user TNSS-SAP by the served user application to the MS/LS CMCE to invoke SS-AS.

It shall contain the SS-AS parameters listed in table 6.

Table 6: Parameters for the primitive INVOKE request

Parameter	Request
Selected area number	M
SwMI where the selected area number is defined	M (see note 2)
NOTE 1: There is no access priority parameter in table 6 since the access priority of that primitive is the same as that of the concurrent TNSS-SETUP request. NOTE 2: Addressing information parameter not a SS-AS parameter.	

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4.2.7 INVOCATION FAILURE indication

The INVOCATION FAILURE indication primitive shall be sent over the served user TNSS-SAP by the MS/LS CMCE to the served user application to inform it about the failure of SS-AS invocation.

It shall contain the SS-AS parameter given in table 7.

Table 7: Parameter for the primitive INVOCATION FAILURE indication

Parameters	Indication
Invocation failure cause	M