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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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ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00 Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Contents

Intellectual Property Rights 7
Foreword 7
1 Scope 9
2 References 9
2.1 Normative references 9
2.2 Informative references 10
3 Definitions and abbreviations 10
3.1 Definitions 10
3.2 Abbreviations 11
4 SS-AS service description 11
4.1 General 11
4.2 SS-AS services offered over the TNSS-SAP 11
4.2.1 ASSIGN indication 12
4.2.2 DEFINE request 12
4.2.3 DEFINE ACK indication 13
4.2.4 INTERROGATE request 13
4.2.5 INTERROGATE ACK indication 14
4.2.6 INVOKE request 14
4.2.7 INVOCATION FAILURE indication 14
4.3 Parameter description 15
5 Signalling protocol for the support of SS-AS 17
5.1 SS-AS operational requirements 17
5.1.1 Served user MS/LS 17
5.1.2 Served user SwMI 17
5.1.3 Called user home SwMI 18
5.1.4 Group home SwMI 18
5.1.5 Group controlling SwMI 18
5.1.6 Participating SwMI 19
5.1.7 New participating SwMI 19
5.1.8 Terminating SwMI 19
5.1.9 Authorized user MS/LS 19
5.1.10 Authorized user SwMI 19
5.1.11 Served user/group home SwMI 19
5.2 Coding requirements 20
5.2.1 SS-AS PDUs 20
5.2.1.1 ASSIGN PDU 20
5.2.1.2 ASSIGN ACK PDU 20
5.2.1.3 DEFINE PDU 21
5.2.1.4 DEFINE ACK PDU 21
5.2.1.5 INTERROGATE PDU 22
5.2.1.6 INTERROGATE ACK PDU 23
5.2.1.7 INVOCATION FAILURE PDU 23
5.2.1.8 INVOCATION QUALIFIER PDU 24
5.2.1.9 INVOKE PDU 24
5.2.1.10 INVOKE CONFIRM PDU 25
5.2.1.11 INVOKE EXT PDU 25
5.2.1.12 Selected area number information element in ANF-ISIIC and ANF-ISIGC PDUs 25
5.2.2 TETRA PDU information element and sub-element coding 26
5.2.2.1 Acknowledgement requested 26
5.2.2.2 Address type of served user/group 26
5.2.2.3 Area selection 26
5.2.2.4 Assignment requested 27
5.2.2.5 Assignment result 27

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 300 392-12-8 V1.2.1:2010
https://standards.iteh.ai/catalog/standards/sist/d486b8a8-60f3-4c2e-ae20-46fd0f4674e5/sist-en-300-392-12-8-v1-2-1-2010

SIST EN 300 392-12-8 V1.2.1:2010

5.2.2.6 Definition failure cause 27
5.2.2.7 Definition result 28
5.2.2.8 Interrogation failure cause 28
5.2.2.9 Interrogation result 28
5.2.2.10 Invocation failure cause 28
5.2.2.11 Multiple selected area numbers / multiple served users/groups mask and multiple selected area numbers / multiple served users/groups mask present 28
5.2.2.12 Range type for selected area number(s) / for served user(s)/group(s) 29
5.2.2.13 Selected area definition 29
5.2.2.13.1 General on area definition 29
5.2.2.13.2 Area type 30
5.2.2.13.3 Area by circle 30
5.2.2.13.4 Area by line 31
5.2.2.13.5 Area by rectangular 31
5.2.2.13.6 Area by site list 31
5.2.2.13.7 Area defined by SwMI 31
5.2.2.13.8 Latitude direction 31
5.2.2.13.9 Longitude direction 32
5.2.2.13.10 Registered cell 32
5.2.2.13.11 Registered location area 32
5.2.2.14 Selected area definition length indicator 32
5.2.2.15 Selected area number 32
5.2.2.16 Served user/group extension 33
5.2.2.17 Served user/group short number address 33
5.2.2.18 Served user/group SSI 33
5.2.2.19 SS-AS inhibition requested/supported 33
5.2.2.20 AS PDU type 34
5.2.3 Coding requirements over the ISI 34
5.2.3.1 SS-AS profile 34
5.2.3.2 SS-AS profile ACK information element 35
5.2.3.3 SS-AS profile information elements 35
5.2.3.3.1 General on SS-AS profile information elements 35
5.2.3.3.2 Void 35
5.2.3.3.3 Result of profile exchange 36
5.2.3.3.4 Supported area definitions 36
5.2.3.4 Additional coding requirements over the ISI 36
5.3 SS-AS state definition 37
5.3.1 States at the served user MS/LS 37
5.3.1.1 States for invocation and operation 37
5.3.1.2 State for assignment 37
5.3.2 States at the served user SwMI 37
5.3.2.1 States for invocation and operation 37
5.3.2.2 State for assignment 37
5.3.3 States at the called user home SwMI 38
5.3.4 States at the group home SwMI 38
5.3.4.1 States for operation 38
5.3.4.2 State for definition or interrogation 38
5.3.5 States at the group controlling SwMI 38
5.3.6 States at a participating SwMI 38
5.3.7 States at a new participating SwMI 38
5.3.8 States at the terminating SwMI 39
5.3.9 State at the authorized user MS/LS 39
5.3.10 State at the authorized user SwMI 39
5.3.11 State at the served user home SwMI 39
5.4 SS-AS signalling procedures 39
5.4.1 Actions at the served user MS/LS 39
5.4.1.1 Normal procedures 39
5.4.1.1.1 Invocation and operation 39
5.4.1.1.2 Assignment 40
5.4.1.2 Exceptional procedures 40
5.4.1.2.1 Invocation 40
5.4.1.2.2 Assignment 41

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(standards.iteh.ai)
SIST EN 300 392-12-8 V1.2.1:2010
https://standards.iteh.ai/catalog/standards/sist/d486b8a8-60f3-4c2e-ae20-46f10f4674e5/sist-en-300-392-12-8-v1-2-1-2010

SIST EN 300 392-12-8 V1.2.1:2010

5.4.2 Actions at the served user SwMI 41
5.4.2.1 Normal procedures 42
5.4.2.1.1 Operation 42
5.4.2.1.2 Assignment 45
5.4.2.2 Exceptional procedures 45
5.4.2.2.1 Operation 45
5.4.2.2.2 Assignment 48
5.4.3 Actions at the called user home SwMI 48
5.4.3.1 Normal operation procedures 48
5.4.3.2 Exceptional operation procedures 49
5.4.4 Actions at the group home SwMI 50
5.4.4.1 Normal procedures 50
5.4.4.1.1 Operation 50
5.4.4.1.2 Definition or interrogation 52
5.4.4.2 Exceptional procedures 52
5.4.4.2.1 Operation 52
5.4.4.2.2 Definition or interrogation 53
5.4.5 Actions at the group controlling SwMI 53
5.4.5.1 Normal operation procedures 53
5.4.5.2 Exceptional operation procedures 56
5.4.6 Actions at a participating SwMI 57
5.4.6.1 Normal operation procedures 57
5.4.6.2 Exceptional operation procedures 58
5.4.7 Actions at a new participating SwMI 58
5.4.7.1 Normal operation procedures 58
5.4.7.2 Exceptional operation procedures 58
5.4.8 Actions at the terminating SwMI 58
5.4.8.1 Normal operation procedures 58
5.4.8.2 Exceptional operation procedures 59
5.4.9 Actions at authorized user MS/LS 60
5.4.9.1 Normal procedures 60
5.4.9.2 Exceptional procedures 60
5.4.10 Actions at the authorized user SwMI 60
5.4.11 Actions at the served user/group home SwMI 61
5.4.11.1 Normal procedures 61
5.4.11.1.1 Case where the served user/group home SwMI coincides with the authorized user SwMI 61
5.4.11.1.2 Case where the served user/group home SwMI is different from the authorized user SwMI 61
5.4.11.2 Exceptional procedures 61
5.5 SS-AS impact of interworking with other networks 62
5.5.1 SS-AS impact of interworking with other TETRA networks 62
5.5.2 SS-AS impact of interworking with external networks 62
5.6 Protocol interactions between SS-AS and other supplementary services and ANFs 62
5.6.1 Interactions with ISI Mobility Management (ANF-ISIMM) 62
5.6.1.1 Migration of individual subscriber 62
5.6.1.2 SS-AS definition updates for individual subscriber 63
5.6.1.3 Group attachment 63
5.6.1.4 Group linking 63
5.6.2 Interactions with ISI Short Data Service (ANF-ISISDS) 64
5.7 SS-AS parameter values (timers) 64

Annex A (informative): Examples of message sequences 65

Annex B (informative): Specification and Description Language (SDL) representation of procedures 66

B.1 SDL representation of SS-AS at the served user MS/LS 66
B.2 SDL representation of SS-AS at the served user SwMI 71
B.3 SDL representation of SS-AS at the called user home SwMI 82
B.4 SDL representation of SS-AS at the group home SwMI 85
B.5 SDL representation of SS-AS at the group controlling SwMI 91

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SIST EN 300 392-12-8 V1.2.1:2010
https://standards.iteh.ai/catalog/standards/sist/d486b8a8-60f3-4c2e-ae20-4ef/sist-en-300-392-12-8-v1.2.1-2010

SIST EN 300 392-12-8 V1.2.1:2010

B.6 SDL representation of SS-AS at a participating SwMI 91
B.7 SDL representation of SS-AS at a new participating SwMI 96
B.8 SDL representation of SS-AS at the terminating SwMI 100
B.9 SDL representation of SS-AS at the authorized user MS/LS 101
B.10 SDL representation of SS-AS at the authorized user SwMI 103
B.11 SDL representation of SS-AS at the served user/group home SwMI 105
Annex C (informative): Change requests 107
History 108

iTeh STANDARD PREVIEW
(standards.iteh.ai)
SIST EN 300 392-12-8 V1.2.1:2010
https://standards.iteh.ai/catalog/standards/sist/d486b8a8-60f3-4c2e-ae20-46fd0f4674e5/sist-en-300-392-12-8-v1-2-1-2010

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Foreword

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

The present document is part 12, sub-part 8 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";

- EN 300 392-12-1: "Call Identification (CI)";
- ETS 300 392-12-2: "Call Report (CR)";
- EN 300 392-12-3: "Talking Party Identification (TPI)";
- EN 300 392-12-4: "Call Forwarding (CF)";
- ETS 300 392-12-5: "List Search Call (LSC)";
- EN 300 392-12-6: "Call Authorized by Dispatcher (CAD)";
- ETS 300 392-12-7: "Short Number Addressing (SNA)";
- **EN 300 392-12-8: "Area Selection (AS)";**
- ETS 300 392-12-9: "Access Priority (AP)";
- EN 300 392-12-10: "Priority Call (PC)";
- ETS 300 392-12-11: "Call Waiting (CW)";
- EN 300 392-12-12: "Call Hold (HOLD)";

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SIST EN 300 392-12-8 V1.2.1:2010

ETS 300 392-12-13: "Call Completion to Busy Subscriber (CCBS)";

EN 300 392-12-14: "Late Entry (LE)";

EN 300 392-12-16: "Pre-emptive Priority Call (PPC)";

EN 300 392-12-17: "Include Call (IC)";

EN 300 392-12-18: "Barring of Outgoing Calls (BOC)";

EN 300 392-12-19: "Barring of Incoming Calls (BIC)";

ETS 300 392-12-20: "Discreet Listening (DL)";

EN 300 392-12-21: "Ambience Listening (AL)";

EN 300 392-12-22: "Dynamic Group Number Assignment (DGNA)";

ETS 300 392-12-23: "Call Completion on No Reply (CCNR)";

ETS 300 392-12-24: "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 spacing and channel numbering";

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

TR 100 392-17: "TETRA V+D and DMO specifications";

TS 100 392-18: "Air interface optimized applications".

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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 [i.1]. The stage 1 description specifies the service from the user's point of view (see EN 300 392-10-8 [i.3]). 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 EN 300 392-11-8 [i.4]). 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 [i.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

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the reference document (including any amendments) applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

NOTE: While any hyperlinks included in this clause were valid at the time of publication ETSI cannot guarantee their long term validity.

2.1 Normative references

The following referenced documents are necessary for the application of the present document.

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

[2] 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)".

SIST EN 300 392-12-8 V1.2.1:2010

[3] ETSI EN 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)".

[4] ETSI EN 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)".

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

2.2 Informative references

The following referenced documents are not necessary for the application of the present document but they assist the user with regard to a particular subject area.

[i.1] ITU-T Recommendation I.130 (1988): "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[i.2] 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".

[i.3] ETSI EN 300 392-10-8: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 8: Area Selection (AS)".

[i.4] 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)".

[i.5] ITU-T Recommendation Z.100: "Specification and Description Language (SDL)".

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3 Definitions and abbreviations

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3.1 Definitions

For the purposes of the present document, the terms and definitions given in EN 300 392-9 [5] apply with the following modification:

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

geographical definition: definition of an SS-AS area given by limits on a map

NOTE: In practice, due to the difficulty to describe mathematically any area shape, only circles and rectangular areas are specified (see clause 5.2.2.12).

served user: user for whom the supplementary has been subscribed

NOTE: That user can thus successfully invoke the supplementary service.

served user SwMI: SwMI where the served user is currently registered

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

site definition: definition of an SS-AS area given as a list of base stations within one or more SwMI

NOTE: 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 clause 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

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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
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

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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).

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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.

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.

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.

SIST EN 300 392-12-8 V1.2.1:2010

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.

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.	

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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.

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).	

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.

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

Table 3: Parameters for the primitive DEFINE ACK indication

SIST EN 300 392-12-8 V1.2.1:2010
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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.

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.

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.	