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Terrestrial Trunked Radio (TETRA) - Voice plus Data (V+D) - Part 12: Supplementary services stage 3 - Sub-part 13: Call Completion to Busy Subscriber (CCBS)

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Foreword

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

The present document is part 12, sub-part 13 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)";

EN 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)";

EN 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)";

EN 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 spacings 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".

NOTE: Part 3, sub-parts 6 and 7 (Speech format implementation), part 4, sub-part 3 (Data networks gateway), part 10, sub-part 15 (Transfer of control), part 13 (SDL) and part 14 (PICS) of this multi-part deliverable are in status "historical" and are not maintained.

National transposition dates	
Date of adoption of this EN:	12 March 2012
Date of latest announcement of this EN (doa):	30 June 2012
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	31 December 2012
Date of withdrawal of any conflicting National Standard (dow):	31 December 2012

1 Scope

The present document specifies the stage 3 description of the Supplementary Service CCBS Call Completion on Busy Subscriber for the Terrestrial Trunked Radio (TETRA).

Call Completion on Busy Subscriber allows a calling User A MS, encountering a busy destination user B, to have the call completed when user B becomes non busy, without having to make a new call attempt.

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

The supplementary service stage 3 description is preceded by the stage 1 and the stage 2 description of the service, 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. The stage 2 description identifies the functional capabilities of each SS and the information flows needed to support the supplementary service as specified in its stage 1 description. The present stage 3 description specifies the protocols at the air interface and at the various Inter-System Interfaces (ISI) to support each Supplementary Service.

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 call or group call; the present document is neither applicable to Packet Mode of Operation nor to DMO; more specifically to the following entities:

- the MS of either the calling user or the connected user during an individual call or a group call;
- the originating Switching and Management Infrastructure (SwMI) in an individual call or a group call;
- the group controlling SwMI for a group call;
- the terminating SwMI in an individual call;
- the inter-working SwMI for an individual call.

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 300 392-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 1: General network design".

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

[3] 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".

[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)".

[5] 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)".

[6] 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)".

[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 300 392-10-13: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 13: Call completion to busy subscriber".

[9] ITU-T Recommendation X.217: "Information technology - Open Systems Interconnection - Service definition for the Association Control Service Element".

[10] ITU-T Recommendation X.219: "Remote operations: Model, notation and service definition".

[11] ITU-T Recommendation X.229: "Remote operations: Protocol specification".

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 (Blue Book)".

[i.2] ITU-T Recommendation Z.100 (1993): "CCITT Specification and Description Language (SDL)".

[i.3] ECMA 185 (1997): "Private Integrated Services Network (PISN) - Specification, Functional Model and Information Flows - Call Completion Supplementary Services (CCSD), 2nd edition".

[i.4] ITU-T Recommendation I.221 (1993): "Common specific characteristics of services".

[i.5] ECMA-186 (4th edition December 2001): "Private Integrated Services Network (PISN) - Inter-Exchange Signalling Protocol - Call Completion Supplementary Services (QSIG-CC).

3 Definitions, symbols and abbreviations

3.1 Definitions

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

Additional Network Feature (ANF): capability, over and above that of a basic service, provided by a SwMI, but not directly to a user

bearer service: type of telecommunication service that provides the capability for the transmission of signals between user-network interfaces

busy: called user engaged in a service

NOTE: Busy is a property of a user for whom either a "network determined user busy" or "user determined user busy" condition (see clause 3.1 of ITU-T Recommendation I.221 [i.4]) exists.

call, basic call: instance of the use of a basic service

call completion: successful presentation of a previously unsuccessful Call to a destination user (user B) which occurs when the call has entered an alerting phase or has been answered

compatible MS: MS presenting the same basic TETRA class of service as the TETRA class of service requested by the calling user MS. By analogy to ISDN "compatible terminal"

free: property of a user who can accept any attempt by the SwMI to present a call to that user (i.e. allow the call to reach the alerting or answered state)

Network Determined User Busy (NDUB): network cannot allocate an additional call for the user

NOTE: If all of the appropriate user-network interface information channels are busy (channels busy) and either the network does not support the offering of additional calls beyond the number of appropriate channels, or the maximum number of such additional calls has been reached, the network will clear the call and indicate network determined user busy (see clause 3.1.4 of ITU-T Recommendation I.221 [i.4]).

path reservation: reservation of resources prior to SS-CCBS Recall in order that a connection path through the SwMI is available when User A MS accepts the SS-CCBS Recall

NOTE 1: Path Reservation would not guarantee that user B be free when User A MS accepts the SS-CCBS Recall.

NOTE 2: Due to mobility considerations, path reservation will not be used in the TETRA environment (a path reserved would have to be re-reserved each time a migration occurs).

recall timer: user A response waiting timer

NOTE: This timer specifies the length of time the network waits for a response from User A MS to a CCBS Recall.

retention timer: originating call information timer

NOTE: This timer specifies the period of time the network retains the originating call information after a valid call attempt is released.

SS-CCBS recall: indication informing User A MS that user B is no longer busy (in the case of SS-CCBS) or acceptance of this indication by User A MS will cause the call to be completed by the SwMI

SS-CCBS service duration timer: service active timer

NOTE: This timer specifies the length of time that the service is active within the network.

supplementary service: supplementary service modifies or supplements a bearer service or a tele-service

NOTE: A supplementary service cannot be offered to a customer as a standalone service. It should be offered in combination with a bearer service or a tele-service.

Switching and Management Infrastructure (SwMI): all of the TETRA equipment for a Voice plus Data (V+D) network except for subscriber terminals

NOTE: The SwMI enables subscriber terminals to communicate with each other via the SwMI

tele-service: type of telecommunications service that provides the complete capability, including terminal equipment functions, for communication between users according to agreed protocols

user A MS: specific user that originated the call and requested the supplementary service

user B: user that was initially addressed in the original call set up

user determined user busy: user rejecting a call

NOTE 1: The called user does not accept the call as he is busy.

NOTE 2: If no compatible terminal responds "positively" to the call offering but one or more compatible terminal responds "user busy", then when the response-to-call-offering time-out occurs, the network will clear the call with the indication "user determined user busy" (see clause 3.1.5 of ITU-T Recommendation I.221 [i.4]).

3.2 Symbols

For the purposes of the present document, there are no additional symbols besides the symbols defined and used in ITU-T Recommendation Z.100 [i.2].

3.3 Abbreviations

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

ACSE	Association Control Service Element
AE	Application Entity
ANF	Additional Network Feature
APDU	Application Protocol Data Unit
CC	Call Control (functional entity)
CCBSI	Call Completion to Busy Subscriber Identifier
CMCE	Circuit Mode Control Entity
CPTI	Called Party Type Identifier
CR	Cancellation Reason
GSSI	Group Short Subscriber Identity
ISDN	Integrated Services Digital Network
ISI	Inter-System Interface
ISSI	Individual Short Subscriber Identity
ITSI	Individual TETRA Subscriber Identity
MM	Mobility Management
MMI	Man-Machine Interface
MNI	Mobile Network Identity
MS	Mobile Station
PINX	Private Integrated Services Network Exchange
OSI	Open System Interconnect
PC	Priority Call
PDU	Protocol Data Unit
PICS	Protocol Implementation Conformance Statement
PISN	Private Integrated Services Network
RC	Reject Cause
RL	Request List
RO	Remote Operations
ROSE	Remote Operation Service Element
RTSE	Reliable Transport Service Element
SAP	Service Access Point
SDL	Specification and Description Language
SS	Supplementary Service

NOTE 1: The abbreviation SS is only used when referring to a specific supplementary service.

SSI	Short Subscriber Identity
SwMI	Switching and Management Infrastructure
TCH	Traffic CHannel
TETRA	Terrestrial Trunked Radio
TSI	TETRA Subscriber Identity
V+D	Voice Plus Data

Supplementary service abbreviations

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

SS-AL	Ambience Listening
SS-AP	Access Priority
SS-AS	Area Selection
SS-BIC	Barring of Incoming Calls
SS-BOC	Barring of Outgoing Calls
SS-CAD	Call Authorized by Dispatcher
SS-CCBS	Call Completion to Busy Subscriber
SS-CCNR	Call Completion on No Reply
SS-CF	Call Forwarding
SS-CFB	Call Forwarding on Busy
SS-CFNR	Call Forwarding on No Reply (generic for both CFNRy and CFNRc)
SS-CFNRc	Call Forwarding on Mobile Subscriber Not Reachable
SS-CFNRy	Call Forwarding on No Reply
SS-CFU	Call Forwarding Unconditional
SS-CI	Call Identification
SS-CLIP	Calling Line Identification Presentation
SS-CLIR	Calling Line Identification Restriction
SS-COLP	COnnected Line identification Presentation
SS-COLR	COnnected Line identification Restriction
SS-CR	Call Report
SS-CRT	Call Retention
SS-CW	Call Waiting
SS-DGNA	Dynamic Group Number Assignment
SS-DL	Discreet Listening
SS-HOLD	call HOLD
SS-IC	Include Call
SS-LE	Late Entry
SS-LSC	List Search Call
SS-PC	Priority Call
SS-PPC	Pre-emptive Priority Call
SS-SNA	Short Number Addressing
SS-TPI	Talking Party Identification

NOTE 2: Supplementary service abbreviations are also used without "SS-" preamble e.g. "SS-AL" and "AL" are used as appropriate.

NOTE 3: The supplementary services list contains also abbreviations that are not used in the present document.

4 SS-CCBS Service Description

4.1 General

Completion of Calls to Busy Subscribers (SS-CCBS) is a supplementary service which allows a calling User A MS, on encountering a busy called user B, to request that the SwMI monitors user B and indicates to User A MS when user B becomes not busy. On response by User A MS to that indication the SwMI will attempt to complete the call to user B.

These supplementary services are applicable to all basic circuit mode services defined in EN 300 392-2 [2].

4.2 SS-CCBS services offered over the TNSS-SAP

This clause describes SS-CCBS specific 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). The SS-CCBS service access point is a conceptual boundary in MSs.