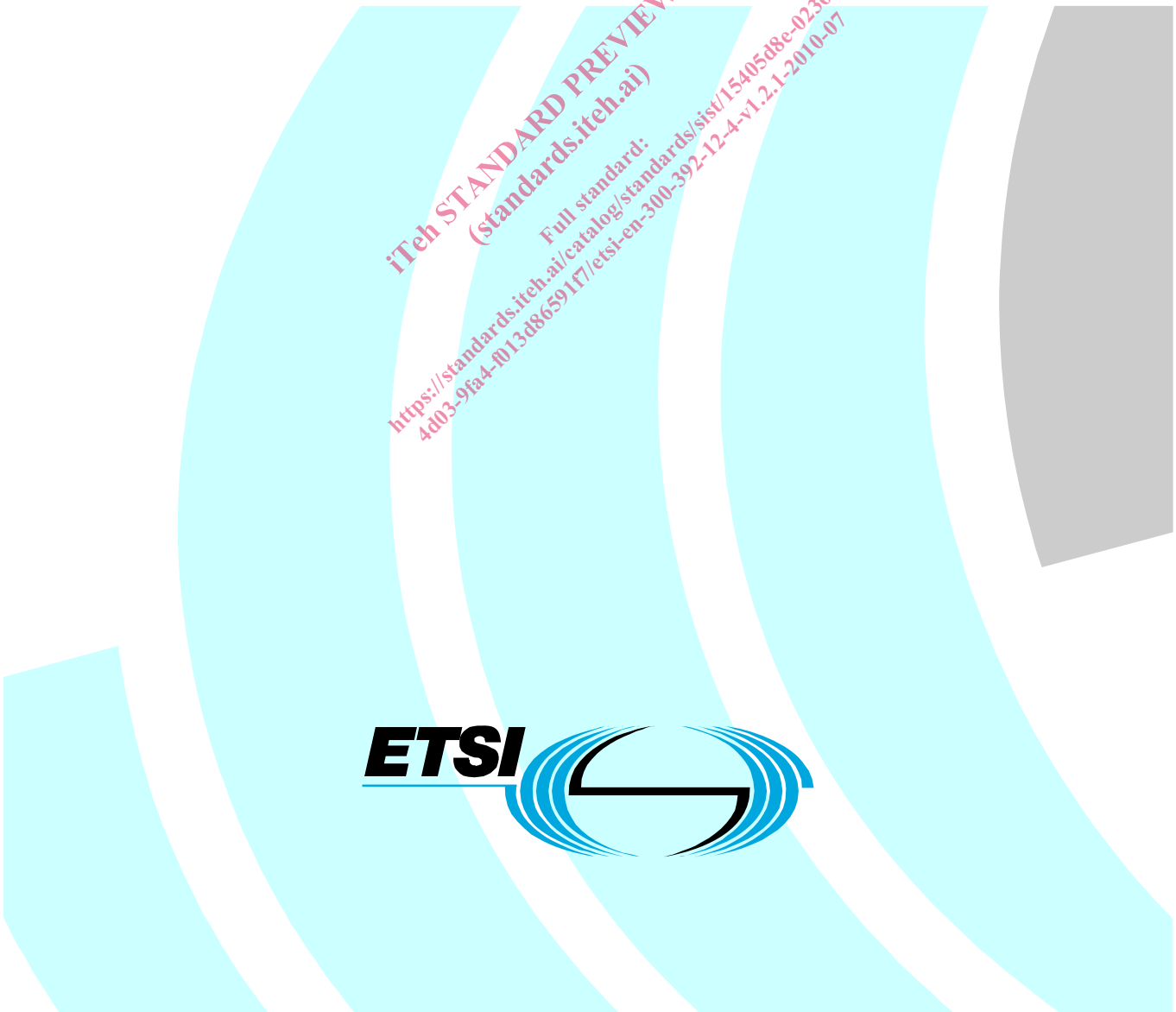
Final draft ETSI EN 300 392-12-4 V1.2.0 (2010-03)

European Standard (Telecommunications series)

Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 4: Call Forwarding (CF)



Reference
REN/TETRA-03199

Keywords
radio, TETRA

ETSI

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Terrestrial Trunked Radio (TETRA), and is now submitted for the ETSI standards One-step Approval Procedure.

The present document is part 12, sub-part 4 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)";

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".

Proposed national transposition dates	
Date of latest announcement of this EN (doa):	3 months after ETSI publication
Date of latest publication of new National Standard or endorsement of this EN (dop/e):	6 months after doa
Date of withdrawal of any conflicting National Standard (dow):	6 months after doa

Introduction

The supplementary service stage 3 description is preceded by the stage 1 [2] and the stage 2 [3] description of the service, according to the method described in ITU-T Recommendation I.130 [i.4]. 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.4], 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.

1 Scope

The present document specifies the stage 3 description of the Supplementary Services CFU Call Forwarding Unconditional, CFB Call Forwarding on Busy, CFNRy Call Forwarding on No Reply and CFNRc Call Forwarding on Not Reachable for the Terrestrial Trunked Radio (TETRA).

SS-CFU, SS-CFB, SS-CFNRy and SS-CFNRc are supplementary services which allow a served user to have a TETRA network send all or specific incoming calls addressed to the served user's TETRA number to another number.

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

The present document is applicable to Voice plus Data individual call or group call; some parts of the present document are applicable to SDS (Short Data Service); more specifically to the following entities:

- the MS of either the calling user or the called 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 interworking SwMI for an individual call.

The present document is based on the latest version of ECMA-174 [i.1]. Contrary to ECMA-174 [i.1], the present document does not define Call Deflection supplementary service and the present document distinguishes between the case of No Reply and the case of Not Reachable. Moreover, the present document defines the protocol in cases of group calls and of mobility not covered by ECMA-174 [i.1].

The present document also specifies additional signalling protocol requirements for the support of interactions at the ISI reference point, other supplementary services and ANFs. The present document is applicable to SwMIs that can interconnect to form a TETRA network.

2 References

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.
- Non-specific reference may be made only to a complete document or a part thereof and only in the following cases:
  - if it is accepted that it will be possible to use all future changes of the referenced document for the purposes of the referring document;
  - for informative references.

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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 indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

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

[2] ETSI EN 300 392-10-4: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 4: Call Forwarding (CF)".

[3] ETSI EN 300 392-11-4: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 11: Supplementary services stage 2; Sub-part 4: Call Forwarding (CF)".

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

[5] 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".

[6] 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)".

[7] 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)".

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

[9] ETSI EN 300 392-10-1: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 10: Supplementary services stage 1; Sub-part 1: Call Identification (CI)".

[10] ETSI ETS 300 392-12-13: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 13: Call Completion to Busy Subscriber (CCBS)".

[11] ETSI ETS 300 392-12-23: "Terrestrial Trunked Radio (TETRA); Voice plus Data (V+D); Part 12: Supplementary services stage 3; Sub-part 23: Call Completion on No Reply (CCNR)".

[12] ETSI EN 300 403-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Signalling network layer for circuit-mode basic call control; Part 1: Protocol specification [ITU-T Recommendation Q.931 (1993), modified]".

[13] ETSI EN 300 195-1: "Integrated Services Digital Network (ISDN); Digital Subscriber Signalling System No. one (DSS1) protocol; Supplementary service interactions; Part 1: Protocol specification".

[14] ETSI EN 300 196-1: "Integrated Services Digital Network (ISDN); Generic functional protocol for the support of supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[15] 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)".

[16] ETSI EN 300 207-1 (V1.2.5): "Integrated Services Digital Network (ISDN); Diversion supplementary services; Digital Subscriber Signalling System No. one (DSS1) protocol; Part 1: Protocol specification".

[17] ITU-T Recommendation E.164: "The international public telecommunication numbering plan".

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

[19] ITU-T Recommendation X.229: "Remote Operations: Protocol specification".

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

2.2 Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area**.** For non-specific references, the latest version of the referenced document (including any amendments) applies.

[i.1] ECMA-174: "Private Integrated Services Network (PISN) - Inter-Exchange Signalling Protocol - Call Diversion Supplementary Services (QSIG-CF)".

[i.2] ITU-T Recommendation I.210: "Principles of telecommunication services supported by an ISDN and the means to describe them".

[i.3] ITU-T Recommendation Z.100: "ITU-T Specification and Description Language (SDL)".

[i.4] ITU-T Recommendation I.130: "Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN".

[i.5] ITU-T Recommendation Q.9: "Vocabulary of switching and signalling terms".

[i.6] ECMA-173: "Private Integrated Services Network (PISN) - Specification, Functional Model and Information Flows - Call Diversion Supplementary Services (CFSD)".

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 SwMI user

busy: user is engaged in another telecommunication service

NOTE: TETRA destination is considered to be busy if either a "network determined user busy" NDUB or a "user determined user busy" UDUB condition exists by analogy to ISDN.

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

call forwarding type: reason for call forwarding

NOTE: In order to distinguish SS-CFU, SS-CFB, SS-CFNRy and SS-CFNRc, the (invoked call) forwarding type is used; the word "type" instead of "procedure" is used to avoid possible confusions with other use of the word "procedures" e.g. signalling procedure, etc.

forwarded-to number: number to which a call is forwarded

forwarded-to SwMI: SwMI serving the forwarded-to user

forwarded-to user: user to which a call is forwarded

forwarding: redirection of a call, on behalf of a called user and prior to answer, to a number different from the number of that called user

forwarding number: forwarding number is the number of the served user

forwarding SwMI: forwarding SwMI is the SwMI which executes call forwarding

NOTE: In case of re-routeing, the forwarding SwMI is either the originating SwMI or the incoming gateway SwMI. In case of forward switching, the forwarding SwMI is the terminating SwMI.

forwarding type: cause for the forwarding: CFU, CFB, CFNRy or CFNRc

NOTE: Forwarding cause is called forwarding type in the present document.

forwarding user: called user for which the call forwarding is invoked

NOTE: Forwarding user may be the called user first and then any of the successive forwarded-to users (see also last forwarding user).

forward switching: network routeing algorithm which performs the redirection by joining together the first connection from user A's node to user B's node and a second, new connection from user B's node to user C's node

NOTE: In TETRA the connections between users may not exist before the user C has answered to the call.

forward switching SwMI: SwMI which performs the forwarding of the call by joining together the first connection from user A's node to user B's node and a second, new connection from user B's node to user C's node

NOTE: In TETRA the connections between users may not exist before the user C has answered to the call.

forwarding type: reason for forwarding

NOTE: The forwarding type and the call forwarding type may be used interchangeably.

last forwarding user: served user from the point of view of the forwarded-to user for a particular stage of call forwarding

NOTE: In the case of a call subject to a single stage of call forwarding, user B is the last forwarding user from the point of view of user C. In the case of a call subject to multiple stages of call forwarding, user B1 is the last forwarding user from the point of view of user B2, user B2 is the last forwarding user from the point of view of user B3, etc. The served user for the final stage of call forwarding is the last forwarding user from the point of view of user C.

Mobile Station (MS): physical grouping that contains all of the mobile equipment that is used to obtain TETRA services

original called number: number of the first called user B in the call (in case of multiple call forwarding user B1)

original called user: first served user of a call which is subject to one or more stages of call forwarding, i.e. user B or B1

partial re-routeing: network routeing algorithm which performs the call forwarding by replacing a particular part of the connection from user A's node to user B's node by another connection from user A's node to user C's node

re-routeing: network routeing algorithm which performs the call forwarding by replacing the connection from user A's node to user B's node by another connection from user A's node to user C's node

served user: user for which the call forwarding supplementary service concerned has been subscribed

NOTE: When a call is made to a served user and call forwarding is invoked, this user may then also be referred to as the forwarding user or if it is the first call forwarding the (original) called user.

served user SwMI: SwMI where the served user is currently registered; it may be served user home SwMI or a visited SwMI

signalling connection: connection used to exchange information between peer supplementary service protocol control entities independently of a basic call

SS-CF invocation counter: counter for the number of call forwarding involved in a call or signalling connection during the call establishment phase