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CR-Form-v3

CHANGE REQUEST

| | ⌘ | **33.107 CR xxx** | ⌘ rev | **-** | ⌘ Current version: | **5.0.0** | ⌘ |

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: ⌘   (U)SIM ☐   ME/UE ☐   Radio Access Network ☐   Core Network ☒

Title:	⌘	Alignment of TS 33.107 for Release 5 to previous Releases
Source:	⌘	SA WG3 LI
Work item code:	⌘ Security	***Date:*** ⌘ 23.08.01
Category:	⌘ **C**	***Release:*** ⌘ REL-5

Use <u>one</u> of the following categories:
    F *(essential correction)*
    A *(corresponds to a correction in an earlier release)*
    B *(Addition of feature),*
    C *(Functional modification of feature)*
    D *(Editorial modification)*
Detailed explanations of the above categories can
be found in 3GPP TR 21.900.

Use <u>one</u> of the following releases:
    2   *(GSM Phase 2)*
    R96   *(Release 1996)*
    R97   *(Release 1997)*
    R98   *(Release 1998)*
    R99   *(Release 1999)*
    REL-4 *(Release 4)*
    REL-5 *(Release 5)*

Reason for change:	⌘	This CR is necessary to get alignment to the specification 3GPP 33.107 for release 99 and 4 and to correct editorial and wording errors.
Summary of change:	⌘	
Consequences if not approved:	⌘	

Clauses affected:	⌘	
Other specs affected:	⌘	☐ Other core specifications ⌘ 33.106 CR003 ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	CRs to previous Releases to be implemented before this CR

****   FIRST MODIFIED SECTION   ****

3.2   Abbreviations

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

3GPP MS	3rd Generation Mobile Communication System
3G GGSN	3rd Generation Gateway GPRS Support Node
3G GSN	3rd Generation GPRS Support Node (GGSN/SGSN)
3G MSC	3rd Generation Mobile Switching Center
3G SGSN	3rd Generation Serving GPRS Support Node
3G UMSC	3rd Generation Unified Mobile Switching Centre
ADMF	Administration Function
CC	Content of Communication
~~CGI~~	~~Cell Global Identity~~
DF	Delivery Function
ECT	Explicit Call Transfer
GPRS	General Packet Radio Service
HI	Handover Interface
IA	Interception Area
ICEs	Intercepting Control Elements (3G MSC Server, 3G GMSC Server, P CSCF, S CSCF, SGSN, GGSN)
IP	Internet Protocol
IRI	Intercept Related Information
LDI	Location Dependent Interception
LEA	Law Enforcement Agency
LEMF	Law Enforcement Monitoring Facility
INEs	Intercepting Network Elements (3G MSC Server, 3G GMSC Server, P CSCF, S CSCF, SGSN, GGSN, MGW)
RA	Routing Area
RAI	Routing Area Identitiy
SAI	Service Area Identity

****   SECOND MODIFIED SECTION   ****

5   Activation, deactivation and interrogation

Figure 2 is an extraction from the reference intercept configuration shown in figure 1which is relevant for activation, deactivation and interrogation of the lawful interception.
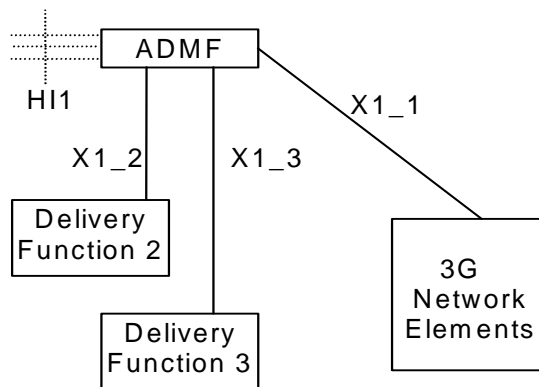
ADMF

HI1

X1_2   X1_3   X1_1

Delivery
Function 2

Delivery
Function 3

3G
Network
Elements

Figure 2: Functional model for Lawful Interception activation, deactivation and interrogation

In addition to the typical 3G ICEs functional entities, a new functional entity is introduced - the ADMF - the Lawful Interception administration function. The ADMF:

- interfaces with all the LEAs that may require interception in the intercepting network;

- keeps the intercept activities of individual LEAs separate;

- interfaces to the intercepting network.

Every physical 3G ICE, is linked by its own X1_1-interface to the ADMF. Consequently, every single 3G ICE performs interception (activation, deactivation, interrogation as well as invocation) independently from other 3G ICEs. The HI1-interface represents the interface between the requester of the lawful interception and the Lawful administration function; it is included for completeness, but is beyond the scope of standardisation in this document.

The target identities for 3GPP MS CS and GPRS interception at the SGSN, GGSN, 3G MSC Server and 3G GMSC Server can be at least one of the following: IMSI, MSISDN or IMEI.

The target identity for multi-media is the SIP URL at the CSCF. Other identities are for further study.

In case of location dependent interception the following network/national options exist:

- target location versus Interception Areas (IAs) check in the 3G ICEs and Delivery Functions (DFs);

- target location versus IAs check in the DFs (physical collocation of the DFs to the 3G ICEs. may be required by national law).

NOTE 1: The IA is previously defined by a set of cells. From the location of the target this set of cells permits to find the relevant IA.

NOTE 2: It is not required that the 3G GMSC or the 3G GGSN are used for interception when Location Dependent Interception is invoked and the location of the target is not available.

Locationdependent intercept at the CSCF is for further study.

Location dependent intercept for the 3G MSC Server and SSGN is for further study.

The ADMF shall be able to provision P-CSCFs independently from S-CSCFs. on a networkwarrant wide basis. All P-CSCFs, all S-CSCFs or both shall be administered for intercept as a network configuration. If both P-CSCFs and S-CSCFs are administered within the network for intercept, redundant multi-media IRI may be presented to the agency as a result.

5.1   Activation

Figures 3,4 and 5 show the information flow for the activation of Lawful Interception.

5.1.1   X1_1-interface

The messages sent from the ADMF to the 3G ICEs (X1_1-interface) contain the:

-    target identities (MSISDN, IMSI, IMEI or SIP URL) (see note 4);

-    information whether the Content of Communication (CC) shall be provided (see note 1);

-    address of Delivery Function 2 (DF2) for the intercept related information (see note 2);

-    address of Delivery Function 3 (DF3) for the intercepted content of communications (see note 3);

-    IA in case of location dependent interception.

NOTE 1:   As an option, the filtering whether intercept product and/or intercept related information has to be provided can be part of the delivery functions. (Note: intercept product options do not apply at the CSCF) If the option is used, the corresponding information can be omitted on the X1_1-interface, while "information not present" means "intercept product and related information has to be provided" for the ICE. Furthermore the delivery function which is not requested has to be "pseudo-activated", in order to prevent error cases at invocation.

NOTE 2:   As an option, only a single DF2 is used by and known to every 3G ICEs. In this case the address of DF2 can be omitted.

NOTE 3:   As an option, only a single DF3 is used by and known to every 3G ICEs. (except at the CSCFs) In this case the address of DF3 can be omitted.

NOTE 4:   Since the IMEI is not available, interception of IMEI is not applicable at the 3G Gateway.

NOTE 5: Interception at the CSCFs is based only upon SIP URL. However, SIP URL as a target identity is not supported the other ICEs.

If after activation subsequently Content of Communications (CC) or Intercept Related Information (IRI) has to be activated (or deactivated) an "activation change request" with the same identity of the target is to be sent.
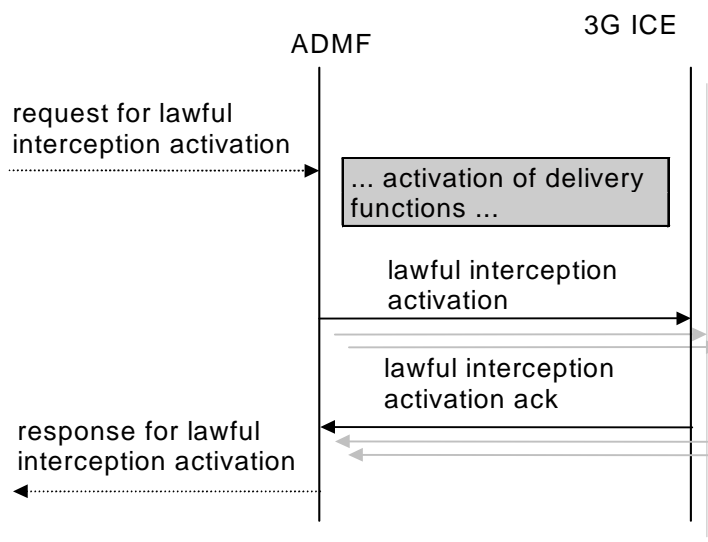
Figure 3: Information flow on X1_1-interface for Lawful Interception activation

Interception of a target can be activated on request from different LEAs and each LEA may request interception via a different identity. In this case, each target identity on which to intercept will need to be sent via separate activation messages from ADMF to the 3G ICEs on the X1_1-interface. Each activation can be for IRI only, or both CC and IRI.

When several LEAs request activation on the same identity then the ADMF determines that there are existing activations on the identity. In this case, the ADMF will not send an additional activation message to the 3G ICEs except when the activation needs to change from IRI only to CC and IRI. In that case an activation change message will be sent to the 3G ICEs.

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****   THIRD MODIFIED SECTION   ****

</div>

7.3.2   Structure of the events

There are seven different events in which the information is sent to the DF2 if this is required. Details are described in the following section. The events for interception are configurable (if they are sent to DF2) in the 3G GSN and can be suppressed in the DF2.

The following events are applicable to 3G SGSN:

- Mobile Station Attach;

- Mobile Station Detach;

- PDP context activation;

- Start of intercept with PDP context active;

- PDP context deactivation;

- RA update;

- SMS.

  NOTE: 3G GGSN interception is a national option. Location information may not be available in this case.

The following events are applicable to the 3G GGSN:

- PDP context activation ;

- PDP context deactivation ;

- Start of interception with PDP context active.

A set of fields as shown below is used to generate the events. The events transmit the information from 3G GSN to DF2. This set of fields as shown below can be extended in the 3G GSN, if this is necessary as a national option. DF2 can extend this information if this is necessary as a national option e.g. a unique number for each surveillance warrant.

Table 2: Information Events for Packet Data Event Records

Observed MSISDN MSISDN of the target subscriber (monitored subscriber)
Observed IMSI IMSI of the target subscriber (monitored subscriber)
Observed IMEI IMEI of the target subscriber (monitored subscriber),it shall be checked for each activation over the radio interface.
Event type Description which type of event is delivered: MS attach, MS detach, PDP context activation, Start of intercept with PDP context active, PDP context deactivation, SMS, Cell and/or RA update,
Event date Date of the event generation in the 3G GSN
Event time Time of the event generation in the 3G GSN
PDP address The PDP address of the target subscriber. Note that this address might be dynamic.
Access Point Name The APN of the access point. (Typically the GGSN of the other party)
Location Information Location information is the Service Area Identity (SAI), RAI and/or location area identity that is present at the GSN at the time of event record production.
PDP Type The used PDP type.
Correlation Number The correlation number is used to correlate CC and IRI.
SMS The SMS content with header which is sent with the SMS-service. The header also includes the SMS-Centre address.
Network Element Identifier Unique identifier for the element reporting the ICE.
Failed attach reason Reason for failed attach of the target subscriber.
Failed context activation reason Reason for failed context activation of the target subscriber.
IAs The observed Interception Areas
Initiator SMS indicator whether the SMS is MO or MT

****   FOURTH MODIFIED SECTION   ****

7.4.7   SMS

For MO-SMS the event is generated in the 3G SGSN, when the SMS-Centre successfully receives the SMS; for MT-SMS the event is generated in the 3G SGSN when the target receives the message. This fields will be delivered to the DF2 if available:

Observed MSISDN
Observed IMSI
Observed IMEI
Event Type
Event Time
Event Date
Network Element Identifier
Location Information
SMS
IAs (if applicable) Initiator (optional)
IAs (if applicable)

7A.3 Multi-media events

- All SIP messages to or from a targeted subscriber, and all SIP messages executed on behalf of a targeted subscriber for multi-media session control are intercepted by the P CSCF and S CSCF and sent to DF2. The target identifier used to trigger the intercept will also be sent with the SIP message. P CSCF event reports may be redundant with S CSCF event reports when the P CSCF and S CSCF reside in the same network, however, this standard does not require nor prohibit redundant information from being reported to DF2.

- The IRI should be sent to DF2 with a reliable transport mechanism.

- The reporting of location information for the sake of location dependent intercept is for further study.

- The use of a correlation ID for SIP to bearer correlation is a topic for further study.

- An intercepted SIP event sent to DF2 is shown below:

- Observed SIP URL

- Event Time and Date

- Network element identifier

- SIP Message Header

- SIP Message Payload

7A.4 Multi-media Call State Control Service Scenarios

Annex C shows ~~The following section shows~~examples of the delivery of intercepted events and product under various call scenarios. ~~The scenarios show where IRI and CC are intercepted, and whether the bearer is presented to DF3 as packet or circuit bearer.~~

~~The following scenarios are for further study.~~

~~PS mobile to PS mobile CF to PS mobile~~

~~CS mobile to PS mobile CF to PSTN~~

~~PSTN to PS mobile CF PSTN~~

~~PDN to PS mobile CF to PDN~~

~~CS mobile to CS mobile CF to CS mobile~~

~~PS mobile to CS mobile CF to PS mobile~~

~~PSTN to CS mobile CF to PSTN~~

~~Multi-party calls with CS anchor~~

~~Multi-party calls with PS anchor~~

Annex A (informative):
Information flows for Lawful Interception invocation of circuit switched services

The following figures show the information flows for the invocation of Lawful Interception for various types of calls. The figures show some of the basic signalling messages of the target calls and the events on the X2 and X3-interfaces. The ~~ISUP~~ call control messages to and from the network are shown for informational purposes only; some of them may not be sent or may be combined in certain networks. The handling of the bearers for the basic calls is not shown. The bearer points are established in a manner to minimise content loss without delaying the call to the target subscriber. The bearer establishment to agency will be in parallel or immediately following the bearer establishment to the target subscriber. The flows portray both forward and backward bearer establishment and release to the agency.

A.1   Mobile originated circuit switched calls

Figure A1 shows the interception of a basic mobile originated circuit switched speech or data call where the originating mobile (A) is the target for interception. B is not necessarily also a mobile subscriber and resides on a different exchange.
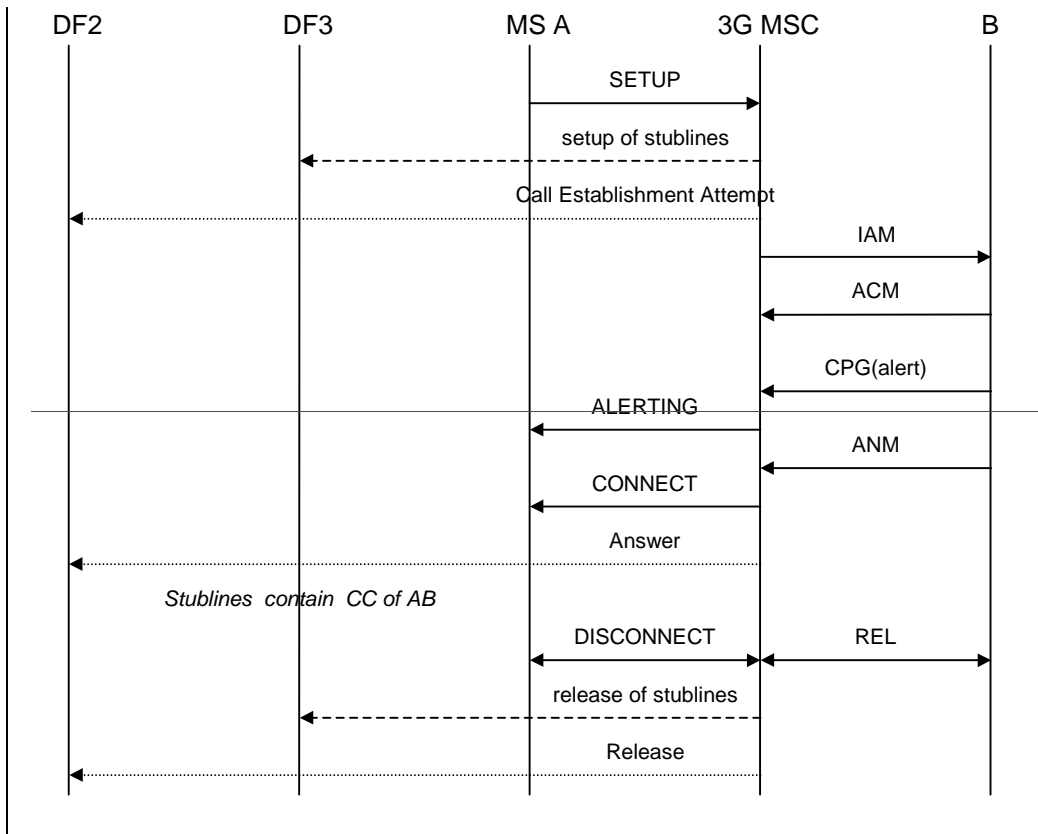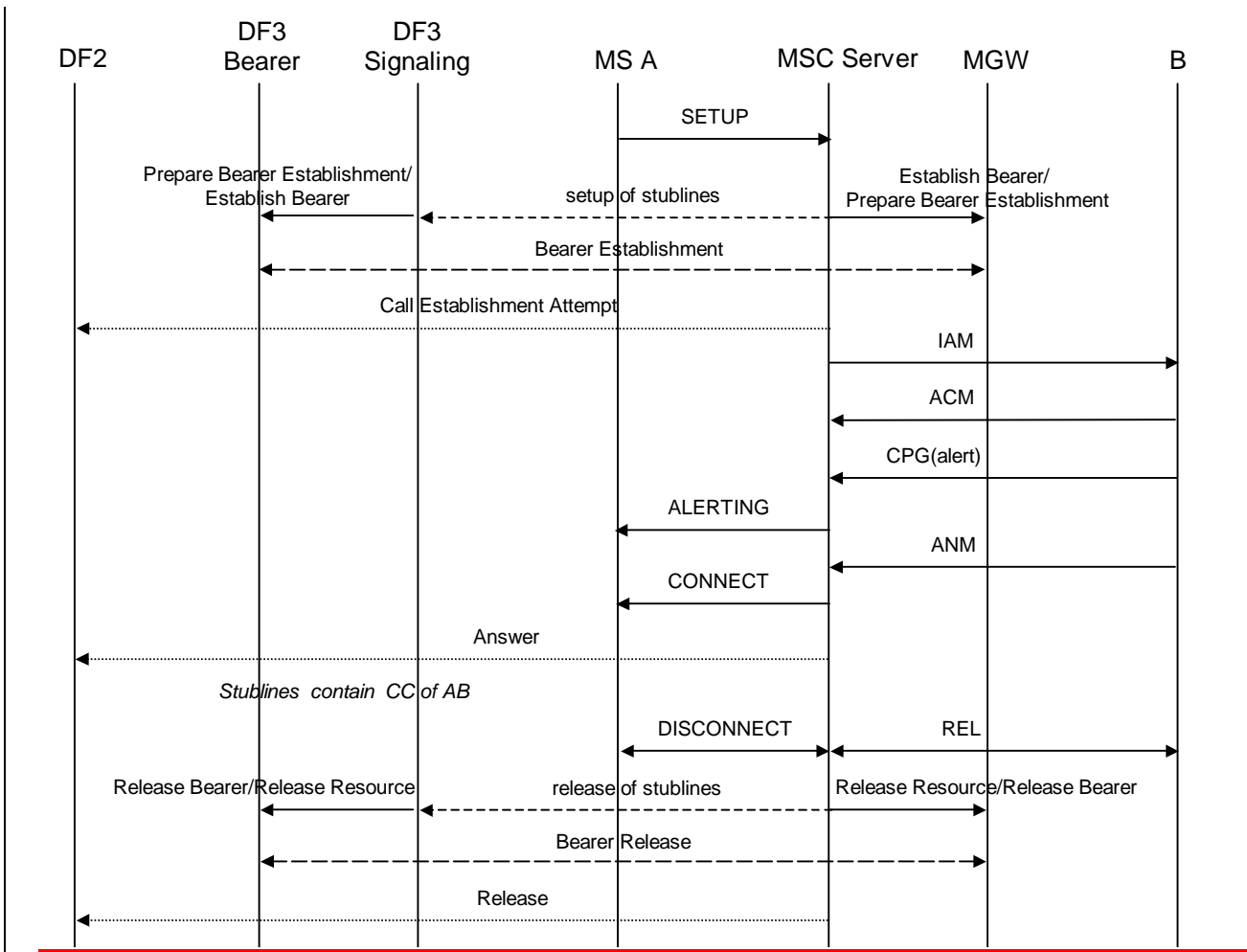
Figure A1: Interception of mobile originated circuit switched calls

In figure A1 the result (answer) of the set-up of the stublines is not shown. This assumes no special action is taken in case of failure.

A.2   Mobile terminated circuit switched calls

Figure A2 shows the interception of a basic mobile terminated circuit switched speech or data call where the terminating mobile (B) is the target for interception. A is not necessarily also a mobile subscriber and resides on a different exchange.

Diagram 1: DF2 / DF3 / MS B / 3G MSC / A

DF2	DF3	MS B	3G MSC	A

- IAM (A → 3G MSC)
- setup of stublines (→ DF3)
- Call Establishment Attempt (→ DF2)
- ACM (3G MSC → A)
- SETUP (3G MSC → MS B)
- ALERTING (MS B → 3G MSC)
- CPG(alert) (3G MSC → A)
- CONNECT (MS B → 3G MSC)
- Answer (→ DF2)
- ANM (3G MSC → A)
- *stublines contain CC of AB*
- DISCONNECT (MS B ↔ 3G MSC) / REL (3G MSC ↔ A)
- release of stublines (→ DF3)
- Release (→ DF2)

Diagram 2: DF2 / DF3 Bearer / DF3 Signaling / MS B / MSC Server / MGW / A

DF2	DF3 Bearer	DF3 Signaling	MS B	MSC Server	MGW	A

- IAM (A → MSC Server)
- Prepare Bearer Establishment/ Establish Bearer (DF3 Signaling → DF3 Bearer)
- setup of stublines (→ DF3 Signaling)
- Establish Bearer/ Prepare Bearer Establishment (MSC Server → MGW)
- Bearer Establishment (DF3 Bearer → MGW)
- Call Establishment Attempt (→ DF2)
- ACM (MSC Server → A)
- SETUP (MSC Server → MS B)
- ALERTING (MS B → MSC Server)
- CPG(alert) (MSC Server → A)
- CONNECT (MS B → MSC Server)
- Answer (→ DF2)
- ANM (MSC Server → A)
- *stublines contain CC of AB*
- DISCONNECT (MS B ↔ MSC Server) / REL (MSC Server ↔ A)
- Release Bearer/Release Resource (DF3 Signaling → DF3 Bearer)
- release of stublines (→ DF3 Signaling)
- Release Resource/Release Bearer (MSC Server ↔ MGW)
- Bearer Release (DF3 Bearer → MGW)
- Release (→ DF2)

Figure A2: Interception of mobile terminated circuit switched calls

A.3 Call hold / call waiting

Figures A3 and A4 show the interception of calls involving call hold / call waiting. Figure A3 covers the case where one stubline or one pair of stublines is used per target, figure A4 covers the case where a separate stubline or pair of stublines is used for each target call. The mobile that receives the waiting call (A) is the target for interception.

DF2	DF3	MS A	3G MSC	B	C

SETUP(AB)

... setup and interception of AB call as in figure A1 ...

Answer(AB)

Stublines contain CC of AB

IAM

Call Establishment Attempt(CA, CWAIT)

ACM

SETUP(CA)

ALERTING(CA)

CPG(alert)

HOLD(AB)

HOLD ACK(AB)

Suppl. Service(AB, CHOLD)

CONNECT(CA)

Answer(CA)

ANM

stublines contain CC of CA

DISCONNECT(CA)   REL

Release(CA)

RETRIEVE(AB)

RETRIEVE ACK(AB)

Suppl. Service(AB, CRETR)

Stublines contain CC of AB

DISCONNECT(AB)   REL

... release of AB call and interception as in figure A1 ...

Release(AB)

DF2	DF3 Bearer	DF3 Signaling	MS A	MSC Server	MGW	B	C

SETUP(AB)

... setup and interception of AB call as in figure A1 ...

Answer(AB)

Stublines contain CC of AB

IAM

Call Establishment Attempt(CA, CWAIT)

ACM

SETUP(CA)

ALERTING(CA)

CPG(alert)

HOLD(AB)

HOLD ACK(AB)

Suppl. Service(AB, CHOLD)

CONNECT(CA)

Answer(CA)

ANM

stublines contain CC of CA

DISCONNECT(CA)   REL

Release(CA)

RETRIEVE(AB)

RETRIEVE ACK(AB)

Suppl. Service(AB, CRETR)

Stublines contain CC of AB

DISCONNECT(AB)   REL

... release of AB call and interception as in figure A1 ...

Release(AB)

Figure A3: Interception of call hold / call waiting - stublines per target

DF2	DF3	MS A	3G MSC	B	C

SETUP(AB)

... setup and interception of AB call as in figure A1 ...

Answer(AB)

Stublines contain CC of AB

IAM

setup of stublines"

Call Establishment Attempt(CA, CWAIT)

ACM

SETUP(CA)

ALERTING(CA)

CPG(alert)

HOLD(AB)

HOLD ACK(AB)

Suppl. Service(AB, CHOLD)

CONNECT(CA)

Answer(CA)

ANM

stublines" contain CC of CA

DISCONNECT(CA)

REL

release of stublines"

Release(CA)

RETRIEVE(AB)

RETRIEVE ACK(AB)

Suppl. Service(AB, CRETR)

stublines' contain CC of AB

DISCONNECT(AB)

REL

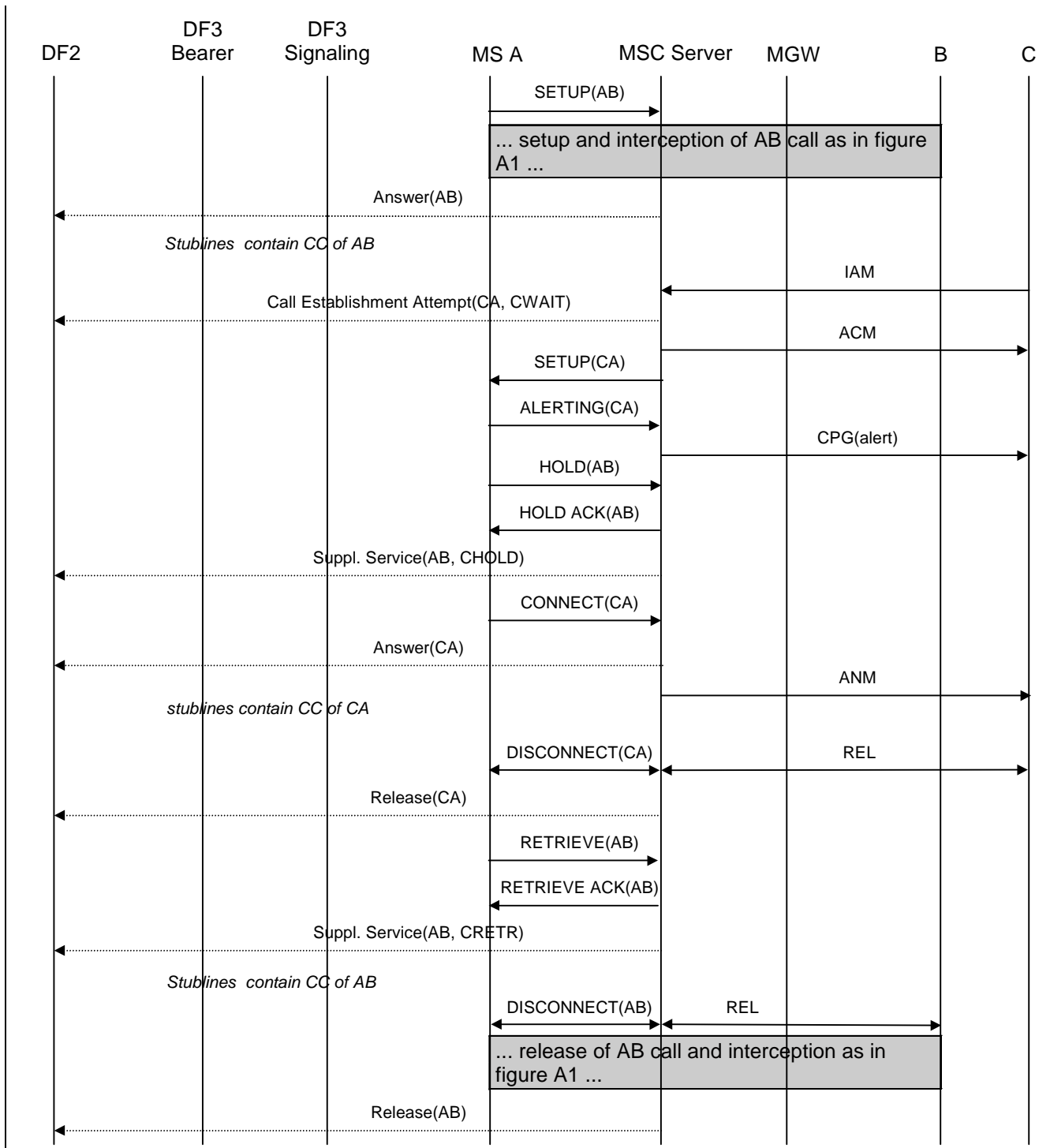... release of AB call and interception as in figure A1 ...

Release(AB)

Figure A4: Interception of call hold / call waiting - stublines per target call

A.4 Multiparty calls

Figures A5 and A6 show the interception of multiparty calls. Figure A5 covers the case where one stubline or one pair of stublines is used per target, figure A6 covers the case where a separate stubline or pair of stublines is used for each target call. The mobile setting up the multiparty call (A) is the target for interception.
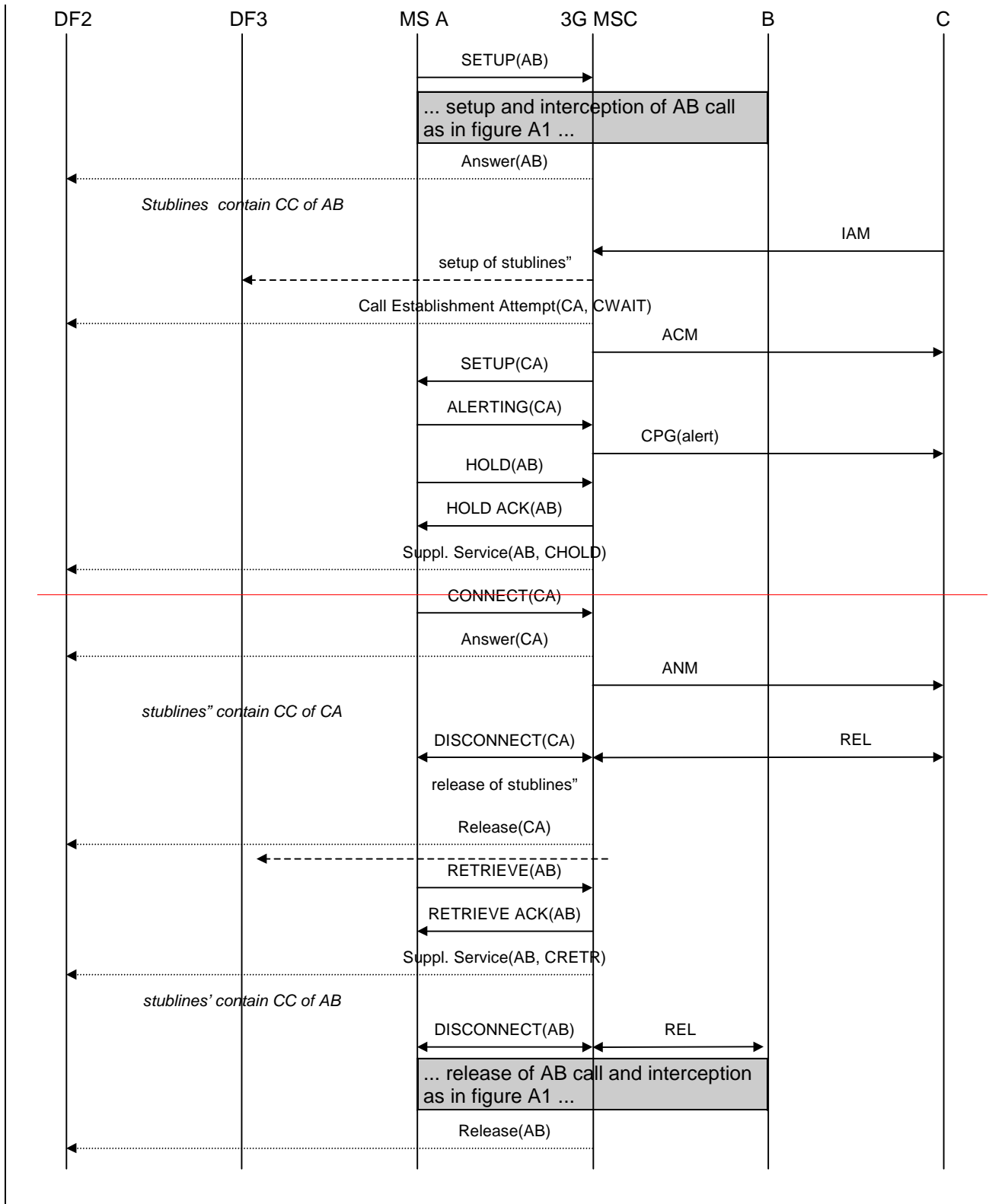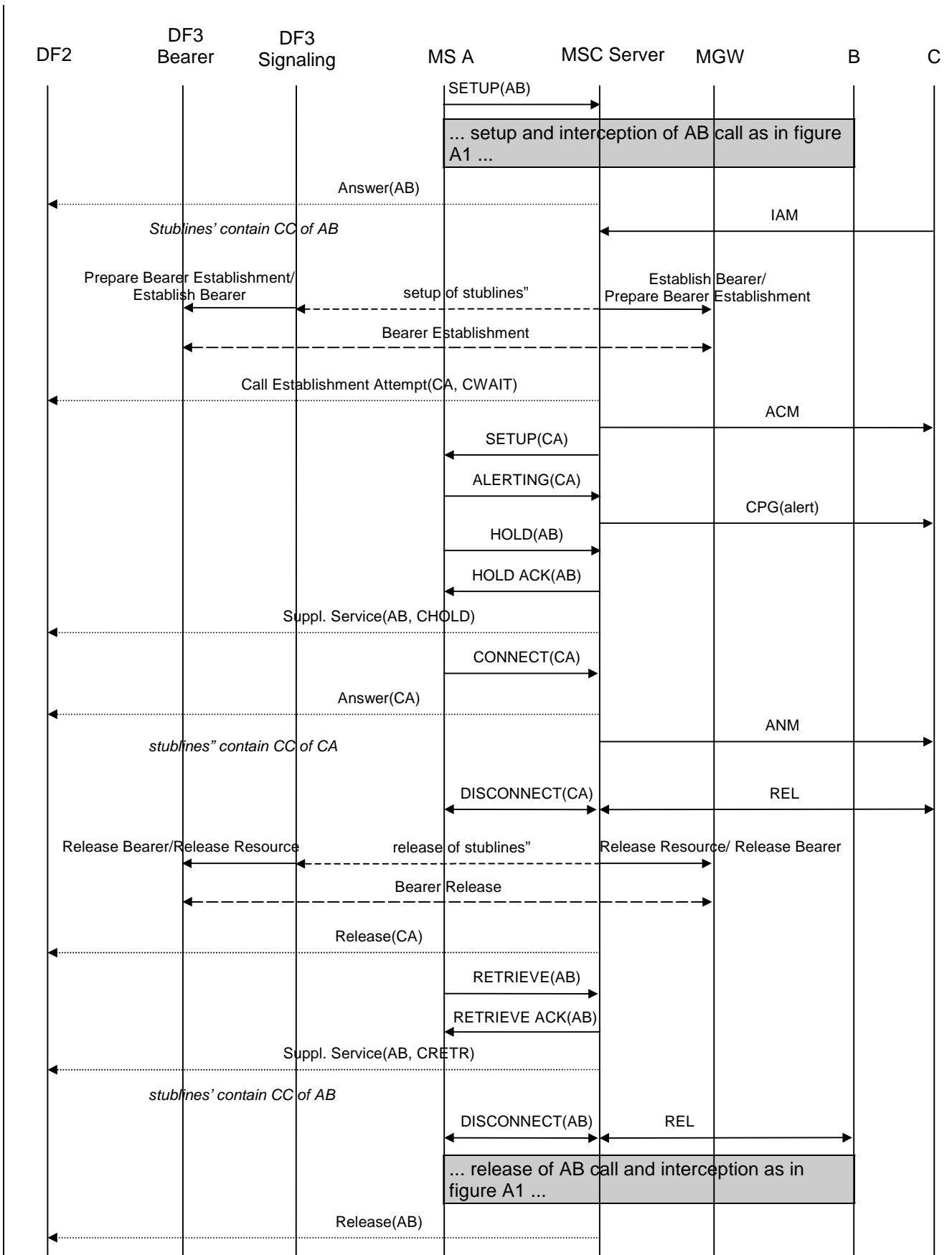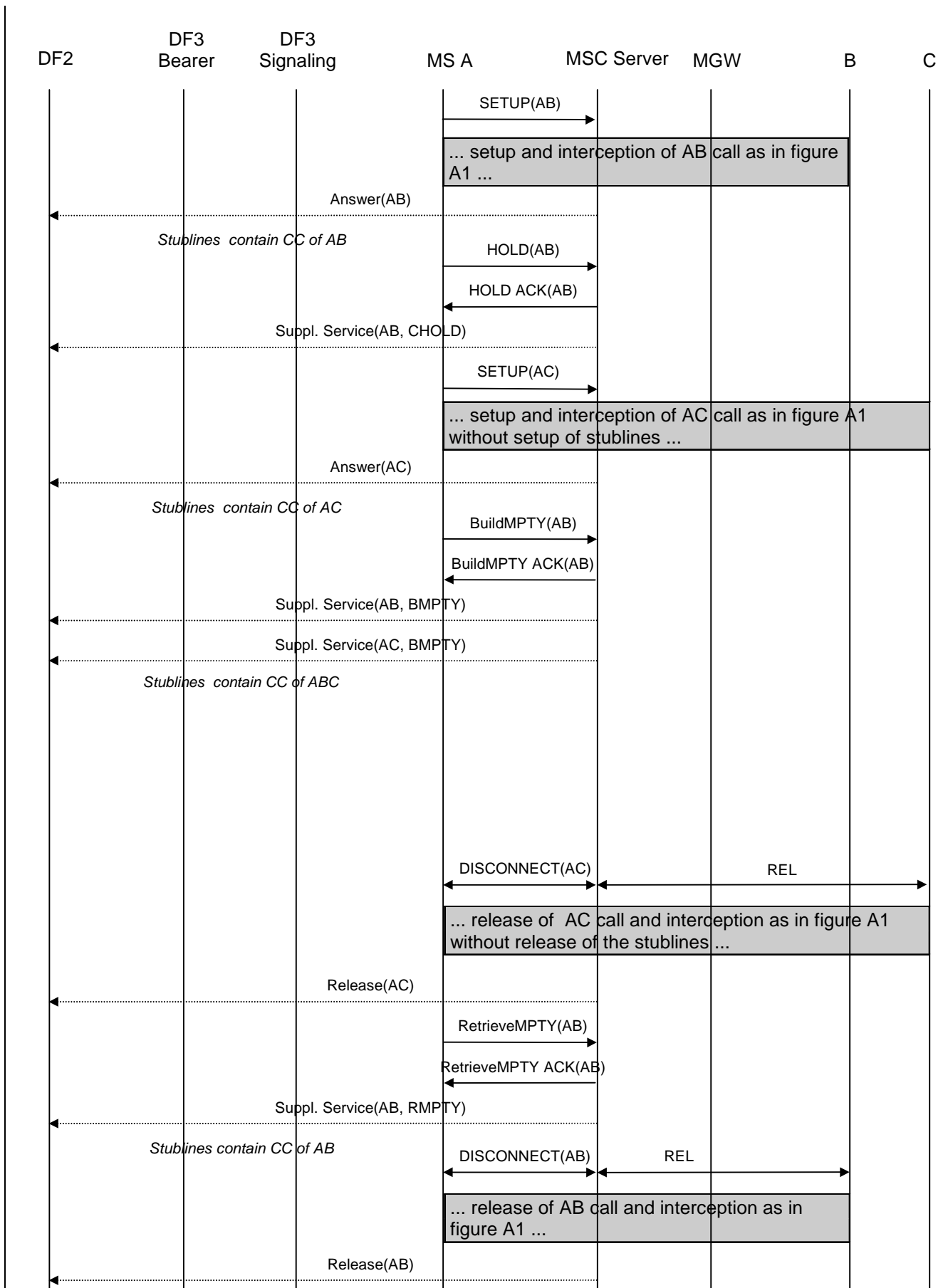
DF2	DF3	MS A	3G MSC	B	C

SETUP(AB)

... setup and interception of AB call as in figure A1 ...

Answer(AB)

Stublines contain CC of AB

HOLD(AB)

HOLD ACK(AB)

Suppl. Service(AB, CHOLD)

SETUP(AC)

... setup and interception of AC call as in figure A1 without setup of stublines ...

Answer(AC)

Stublines contain CC of AC

BuildMPTY(AB)

BuildMPTY ACK(AB)

Suppl. Service(AB, BMPTY)

Suppl. Service(AC, BMPTY)

Stublines contain CC of ABC

SplitMPTY(AC)

SplitMPTY ACK(AB)

Suppl. Service(AC, SMPTY)

Suppl. Service(AB, HMPTY)

Stublines contain CC of AC

DISCONNECT(AC)   REL

... release of AC call and interception as in figure A1 without release of the stublines ...

Release(AC)

RetrieveMPTY(AB)

RetrieveMPTY ACK(AB)

Suppl. Service(AB, RMPTY)

Stublines contain CC of AB

DISCONNECT(AB)   REL

... release of AB call and interception as in figure A1 ...

Release(AB)

DF2	DF3 Bearer	DF3 Signaling	MS A	MSC Server	MGW	B	C

SETUP(AB)

... setup and interception of AB call as in figure A1 ...

Answer(AB)

Stublines contain CC of AB

HOLD(AB)

HOLD ACK(AB)

Suppl. Service(AB, CHOLD)

SETUP(AC)

... setup and interception of AC call as in figure A1 without setup of stublines ...

Answer(AC)

Stublines contain CC of AC

BuildMPTY(AB)

BuildMPTY ACK(AB)

Suppl. Service(AB, BMPTY)

Suppl. Service(AC, BMPTY)

Stublines contain CC of ABC

DISCONNECT(AC)   REL

... release of AC call and interception as in figure A1 without release of the stublines ...

Release(AC)

RetrieveMPTY(AB)

RetrieveMPTY ACK(AB)

Suppl. Service(AB, RMPTY)

Stublines contain CC of AB

DISCONNECT(AB)   REL

... release of AB call and interception as in figure A1 ...

Release(AB)

Figure A5: Interception of multiparty calls - stublines per target

| DF2	DF3	MS A	3G MSC	B	C

SETUP(AB)

... setup and interception of AB call as in figure A1 ...

Answer(AB)

Stublines contain CC of AB

HOLD(AB)

HOLD ACK(AB)

Suppl. Service(AB, CHOLD)

SETUP(AC)

... setup and interception of AC call as in figure A1 ...

Answer(AC)

stublines" contain CC of AC

BuildMPTY(AB)

BuildMPTY ACK(AB)

Suppl. Service(AB, BMPTY)

Suppl. Service(AC, BMPTY)

stublines' contain CC of ABC

stublines" contain CC of ABC

SplitMPTY(AC)

SplitMPTY ACK(AB)

Suppl. Service(AC, SMPTY)

Suppl. Service(AB, HMPTY)

stublines" contain CC of AC

DISCONNECT(AC)   REL

... release of AC call and interception as in figure A1 ...

Release(AC)

RetrieveMPTY(AB)

RetrieveMPTY ACK(AB)

Suppl. Service(AB, RMPTY)

stublines' contain CC of AB

DISCONNECT(AB)   REL

... release of AB call and interception as in figure A1 ...

Release(AB)

Figure A6: Interception of multiparty calls - stublines per target call

A.5 Call forwarding / call deflection

The following pictures show the information flows for the interception of forwarded calls. Information flows will be given for three typical cases of call forwarding. All other types of call forwarding / call deflection are intercepted similar to one of these.

A.5.1 Unconditional call forwarding

Figure A7 shows the interception of unconditionally forwarded calls. The mobile that activated unconditional call forwarding (B) is the target for interception. In this case interception will be performed at the 3G GMSC, where the Service Request Indicator (SRI) request for B is issued and subsequently the SRI response indicating that the call shall be forwarded is received.
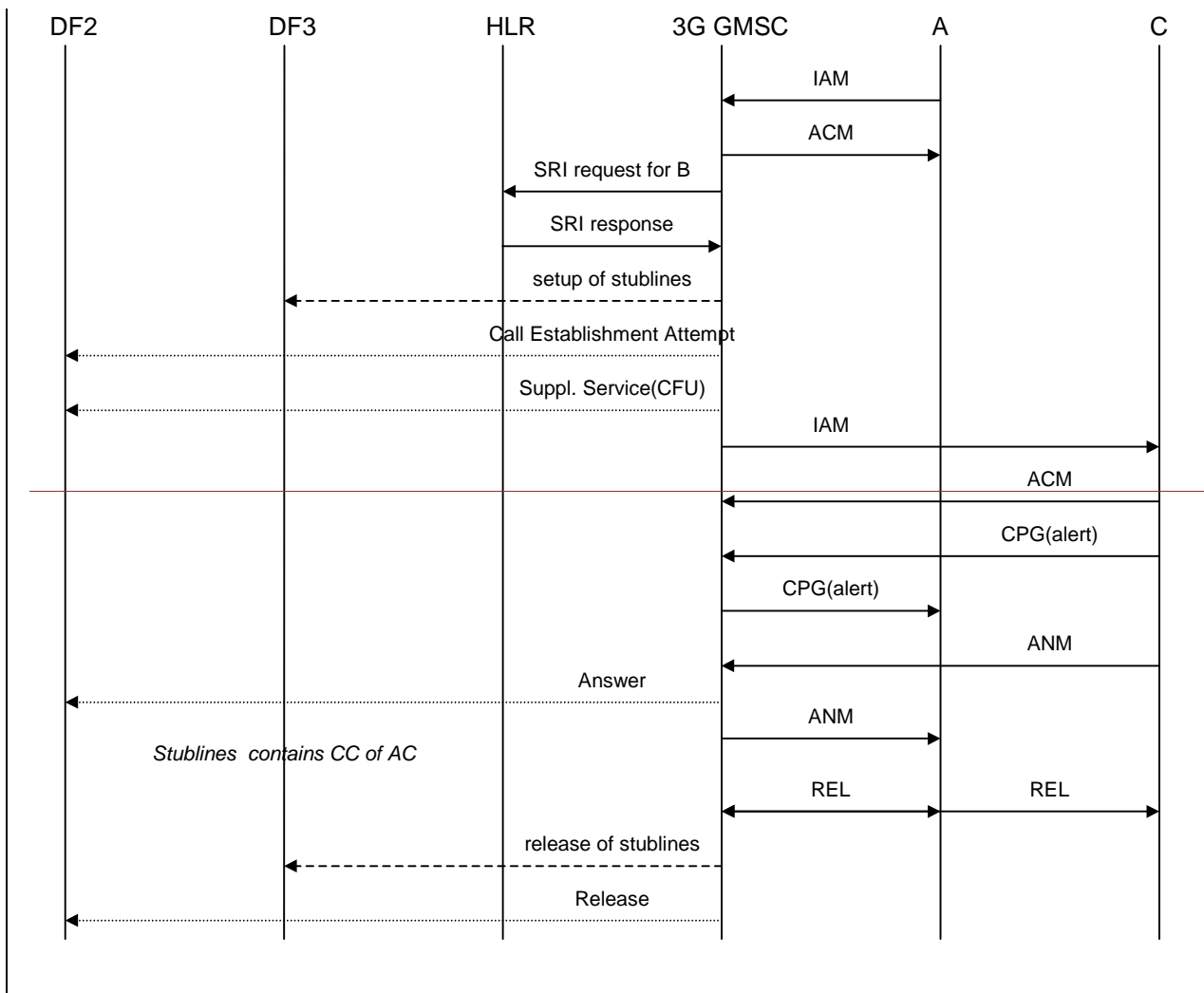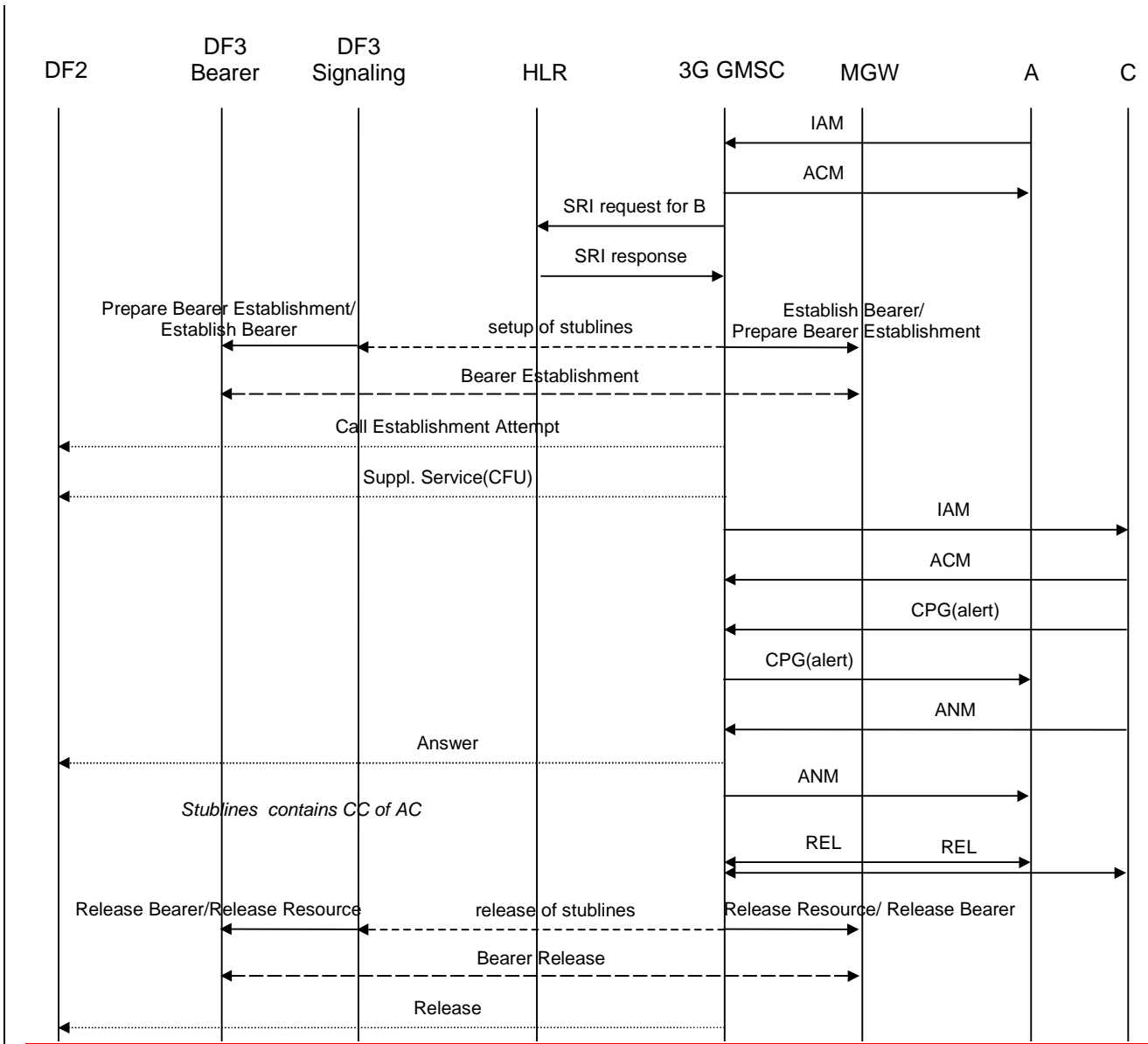
Figure A7: Interception of unconditional call forwarding

A.5.2   Call forwarding on not reachable (IMSI detached)

Call forwarding on not reachable because the IMSI is detached is also handled on the 3G GMSC. Interception of this type of call forwarding is similar to interception of unconditional call forwarding.

A.5.3   Call forwarding on busy (network determined)

Figure A8 shows the interception of call forwarding on busy (network determined). The mobile that activated call forwarding on busy (B) is the target for interception. In this case interception will be performed at the 3G MSC where B resides, where the busy condition is detected and the call is forwarded.
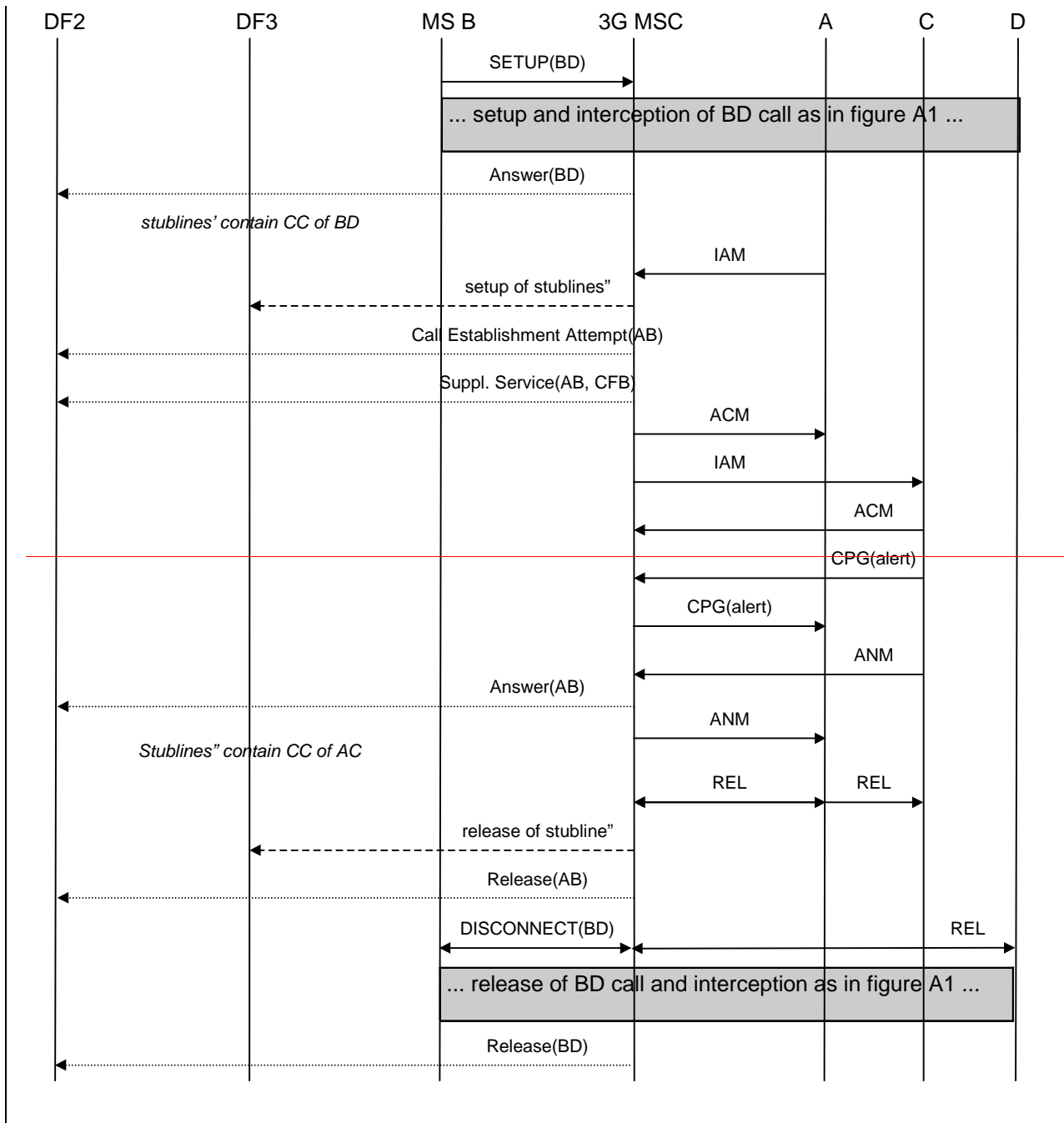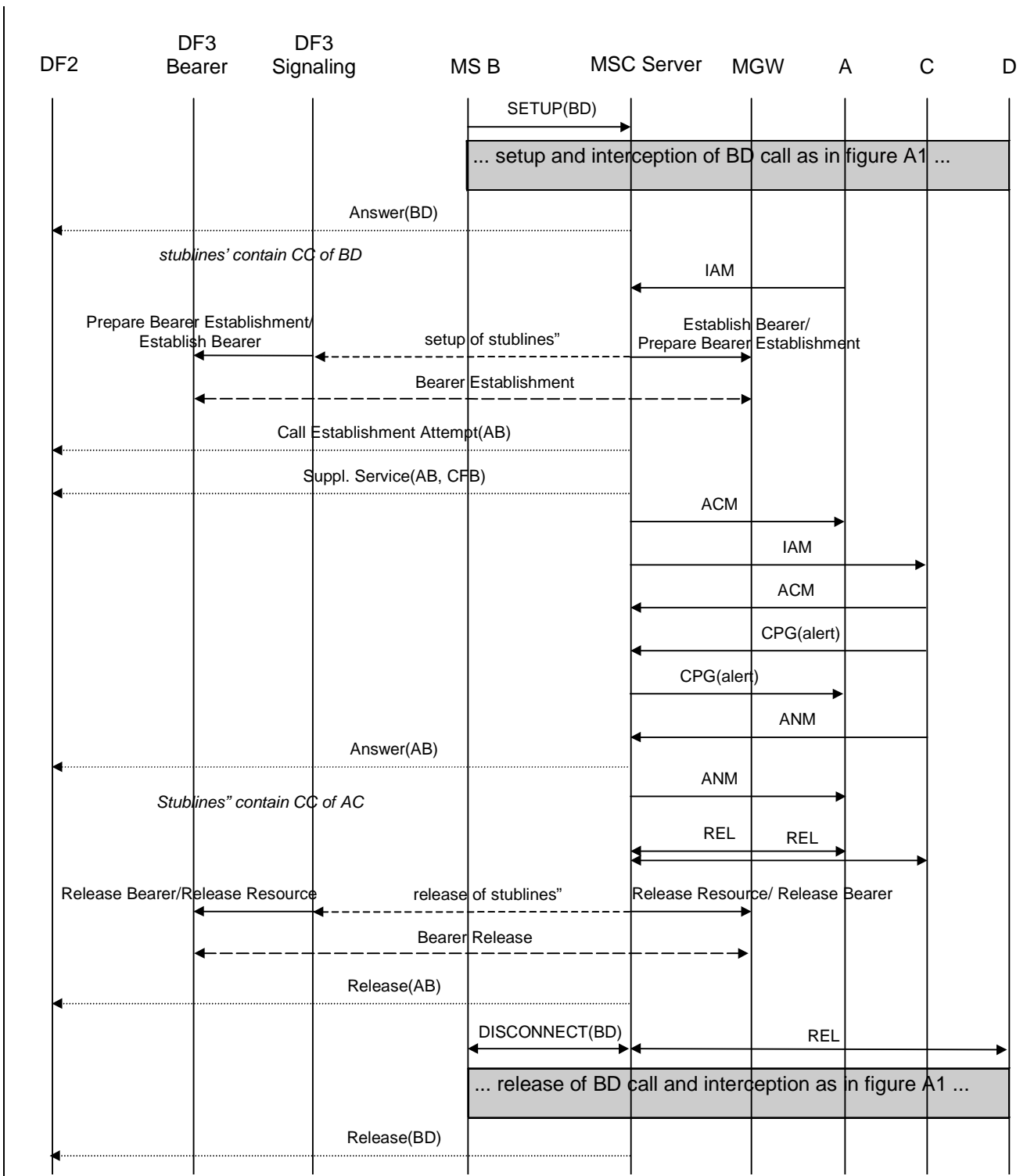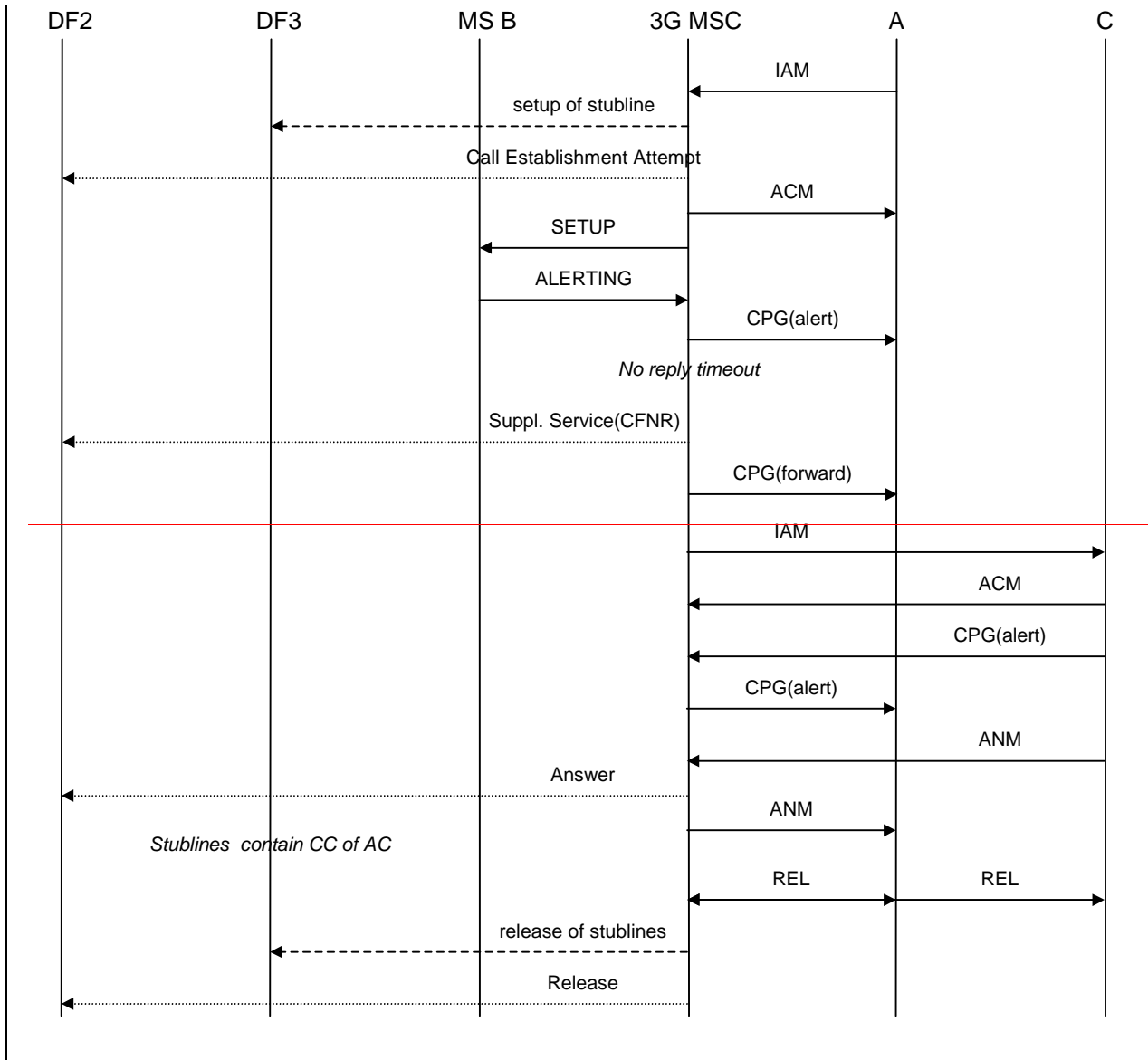
Figure A8: Interception of call forwarding on busy (network determined)

A.5.4 Call forwarding on not reachable (no response to paging/radio channel failure)

Call forwarding on not reachable because of no response to paging or radio channel failure is also handled on the 3G MSC similar to call forwarding on busy (network determined). Interception of this type of call forwarding is therefore done in the same way. (see section A.5.3)

A.5.5 Call forwarding on no reply

Figure A9 shows the interception of call forwarding on no reply. The mobile that activated call forwarding on no reply (B) is the target for interception. In this case interception will be performed at the 3G MSC where B resides, where the no reply condition is detected and the call is forwarded. Initially, the interception is similar to the interception of a basic mobile terminated circuit switched speech of data call. On no reply time-out, the interception will continue on the forwarded call to C.
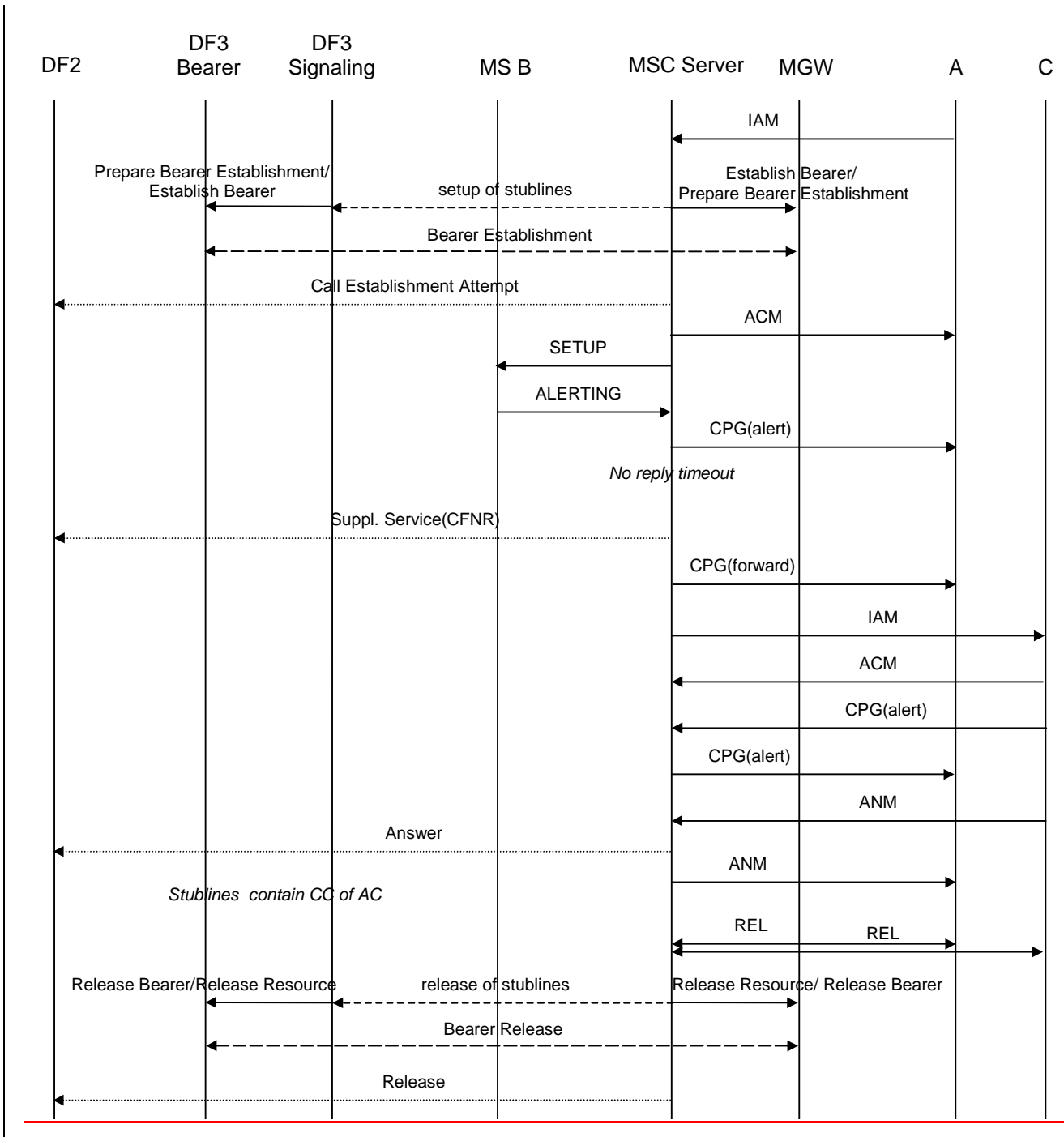
DF2	DF3	MS B	3G MSC	A	C

IAM (A → 3G MSC)

setup of stubline (3G MSC ⇠ DF3)

Call Establishment Attempt (3G MSC ⋯→ DF2)

ACM (3G MSC → A)

SETUP (3G MSC → MS B)

ALERTING (MS B → 3G MSC)

CPG(alert) (3G MSC → A)

No reply timeout

Suppl. Service(CFNR) (3G MSC ⋯→ DF2)

CPG(forward) (3G MSC → A)

IAM (3G MSC → C)

ACM (C → 3G MSC)

CPG(alert) (C → 3G MSC)

CPG(alert) (3G MSC → A)

ANM (C → 3G MSC)

Answer (3G MSC ⋯→ DF2)

ANM (3G MSC → A)

Stublines contain CC of AC

REL (3G MSC → A) REL (3G MSC → C)

release of stublines (3G MSC ⇠ DF3)

Release (3G MSC ⋯→ DF2)

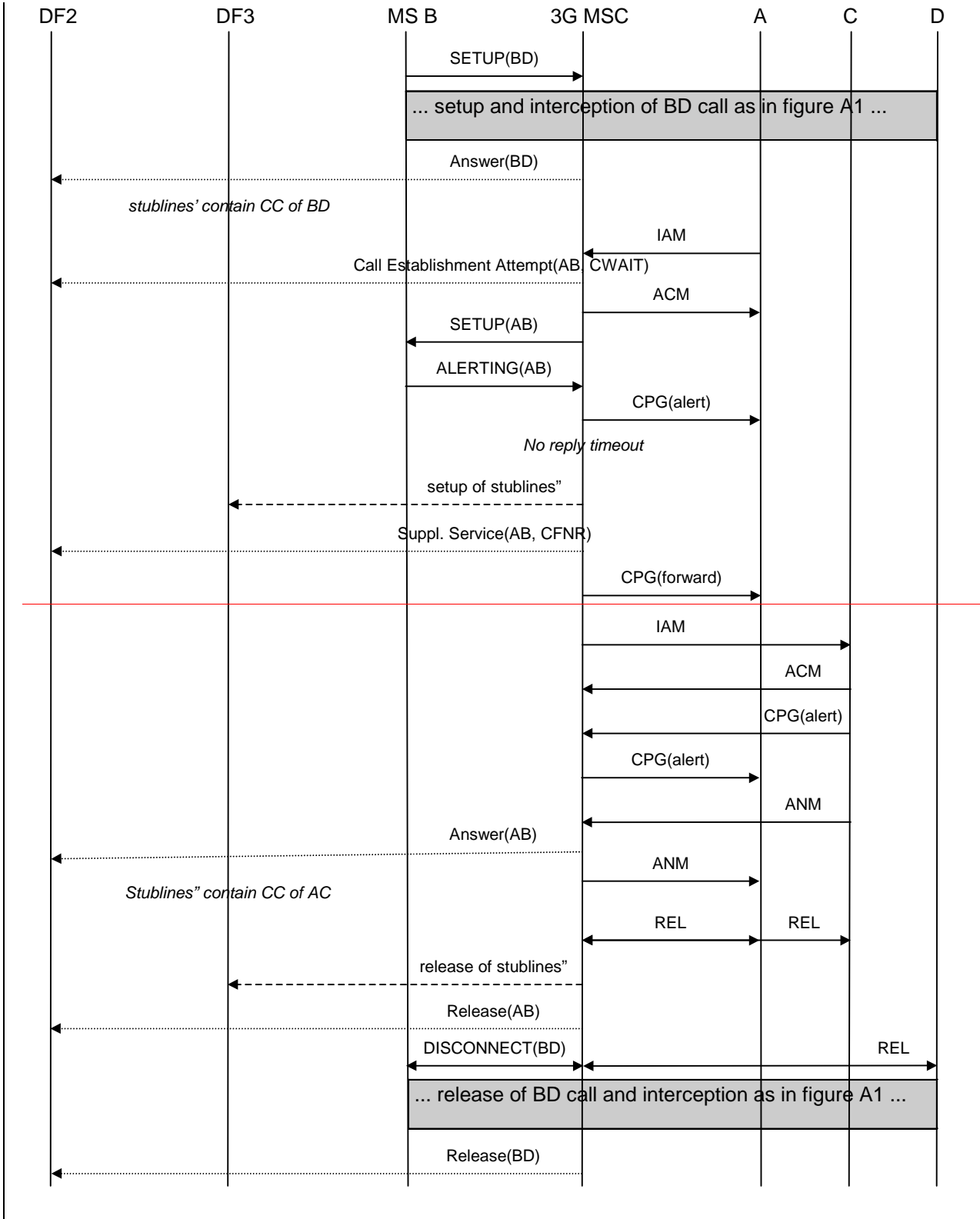**Figure A9: Interception of call forwarding on no reply**

In figure A9 the release of the stublines is done after the forwarded call is released by A or C. It is a national option not to support interception of forwarded calls. In that case, the release of the stublines is done after the call is forwarded and B is no longer involved.

A.5.6   Call forwarding on busy (user determined)/call deflection

Call forwarding on busy (user determined) and call deflection are also handled on the 3G MSC similar to call forwarding on no reply. Interception of this type of call forwarding is therefore done in the same way. (see A5.5)

A.5.7 Call waiting / call forwarding on no reply

Figures A10 and A11 show the interception of a call involving both call waiting and call forwarding on no reply. Figure A10 covers the case where one stubline or one pair of stublines is used per target, figure A11 covers the case where a separate stubline or pair of stublines is used for each target call. The mobile that activated call forwarding on no reply and receives the waiting call (B) is the target for interception. In figure A10 a new (pair of) stublines needs to be set up when the call is forwarded since the first (pair of) stublines is still used for the initial call.
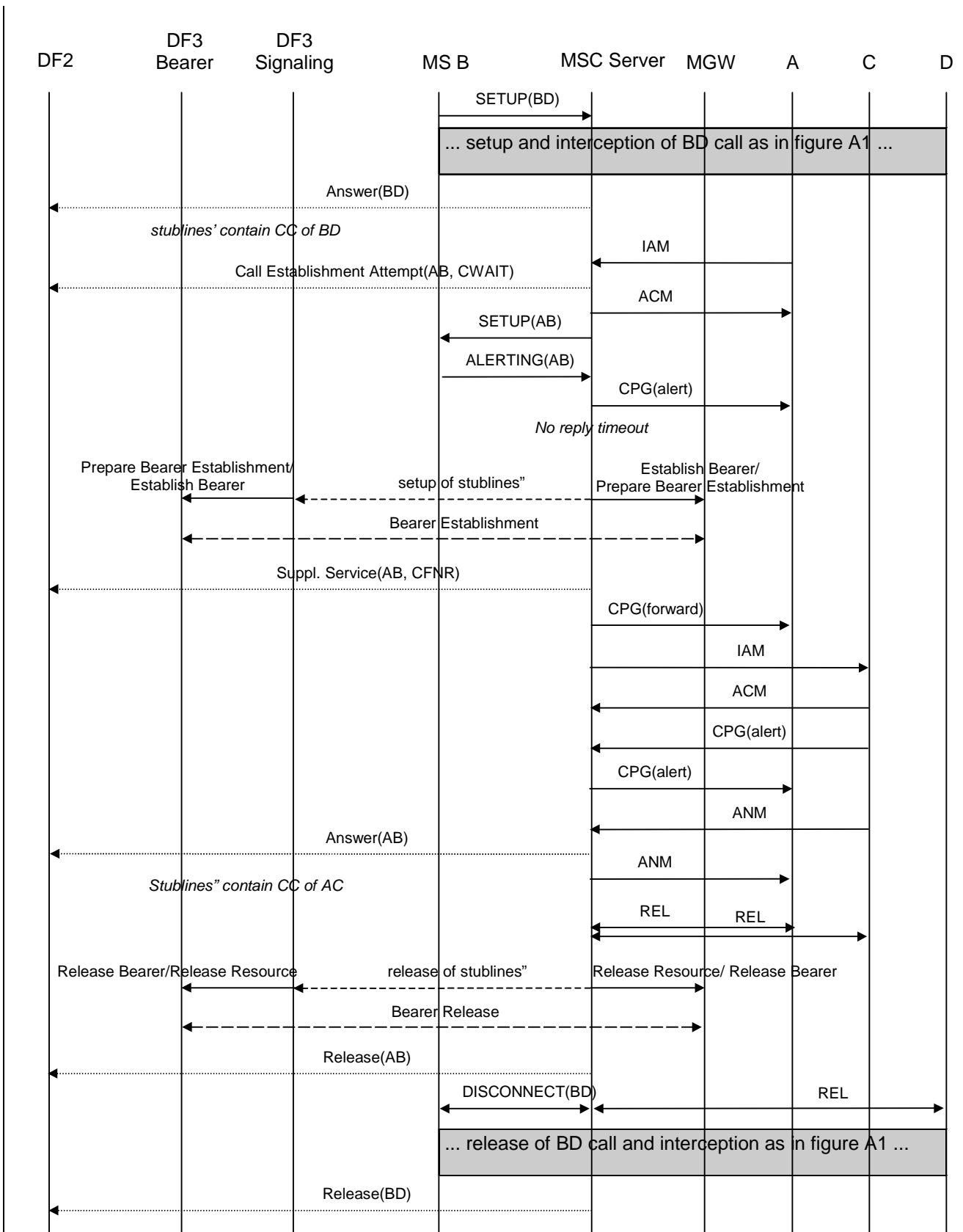
DF2	DF3	MS B	3G MSC	A	C	D

SETUP(BD)

... setup and interception of BD call as in figure A1 ...

Answer(BD)

stublines' contain CC of BD

IAM

Call Establishment Attempt(AB, CWAIT)

ACM

SETUP(AB)

ALERTING(AB)

CPG(alert)

No reply timeout

setup of stublines"

Suppl. Service(AB, CFNR)

CPG(forward)

IAM

ACM

CPG(alert)

CPG(alert)

ANM

Answer(AB)

ANM

Stublines" contain CC of AC

REL   REL

release of stublines"

Release(AB)

DISCONNECT(BD)   REL

... release of BD call and interception as in figure A1 ...

Release(BD)

DF2 | DF3 Bearer | DF3 Signaling | MS B | MSC Server | MGW | A | C | D

SETUP(BD)

... setup and interception of BD call as in figure A1 ...

Answer(BD)

stublines' contain CC of BD

IAM

Call Establishment Attempt(AB, CWAIT)

ACM

SETUP(AB)

ALERTING(AB)

CPG(alert)

No reply timeout

Prepare Bearer Establishment/ Establish Bearer

Establish Bearer/ Prepare Bearer Establishment

setup of stublines"

Bearer Establishment

Suppl. Service(AB, CFNR)

CPG(forward)

IAM

ACM

CPG(alert)

CPG(alert)

ANM

Answer(AB)

ANM

Stublines" contain CC of AC

REL

REL

Release Bearer/Release Resource

release of stublines"

Release Resource/ Release Bearer

Bearer Release

Release(AB)

DISCONNECT(BD)

REL

... release of BD call and interception as in figure A1 ...

Release(BD)

Figure A10: Interception of call waiting / call forwarding on no reply - stublines per target

DF2	DF3	MS B	3G MSC	A	C	D

SETUP(BD)

... setup and interception of BD call as in figure A1 ...

Answer(BD)

stublines' contain CC of BD

IAM

setup of stublines"

Call Establishment Attempt(AB, CWAIT)

ACM

SETUP(AB)

ALERTING(AB)

CPG(alert)

No reply timeout

Suppl. Service(AB, CFNR)

CPG(forward)

IAM

ACM

CPG(alert)

CPG(alert)

ANM

Answer(AB)

ANM

Stublines" contain CC of AC

REL   REL

release of stublines"

Release(AB)

DISCONNECT(BD)   REL

... release of BD call and interception as in figure A1 ...

Release(BD)

Figure A11: Interception of call waiting / call forwarding on no reply - stublines per target call

A.6   Explicit call transfer

Figures A12 and A13 show the interception of explicit call transfer. Figure A12 covers the case where one pair of stublines is used per target, figure A13 covers the case where a separate pair of stublines is used for each target call. The mobile transferring the call (B) is the target for interception.
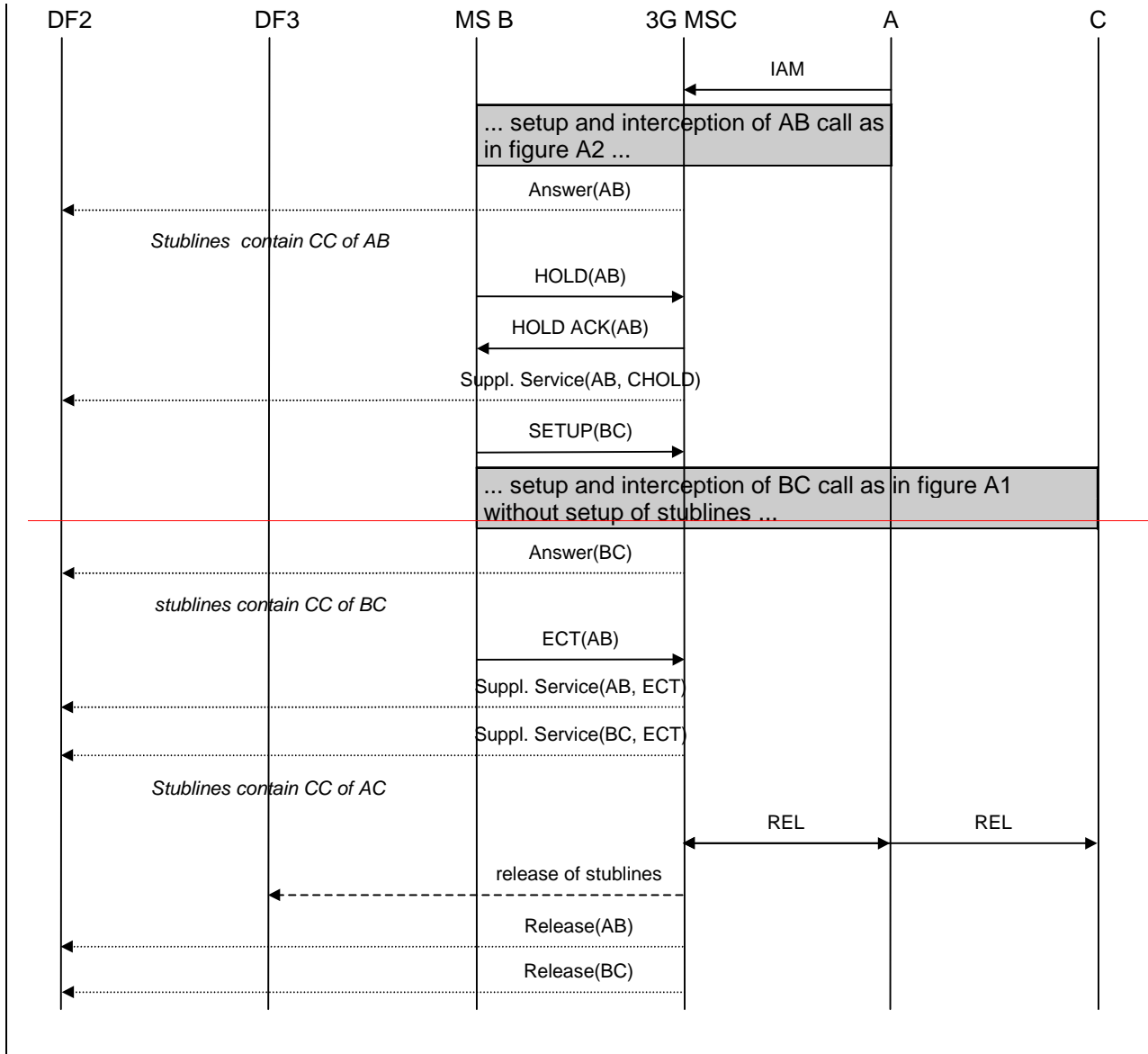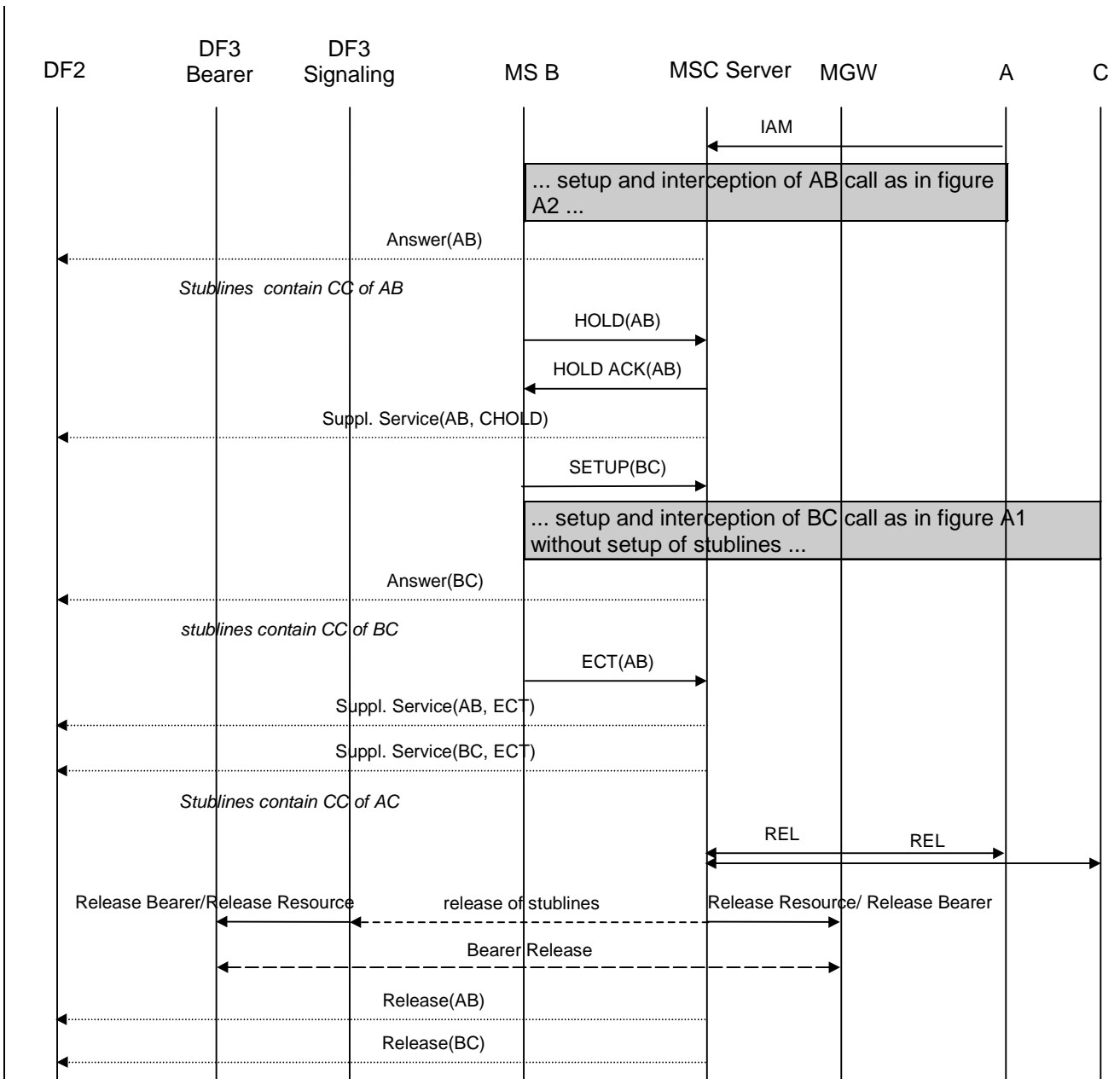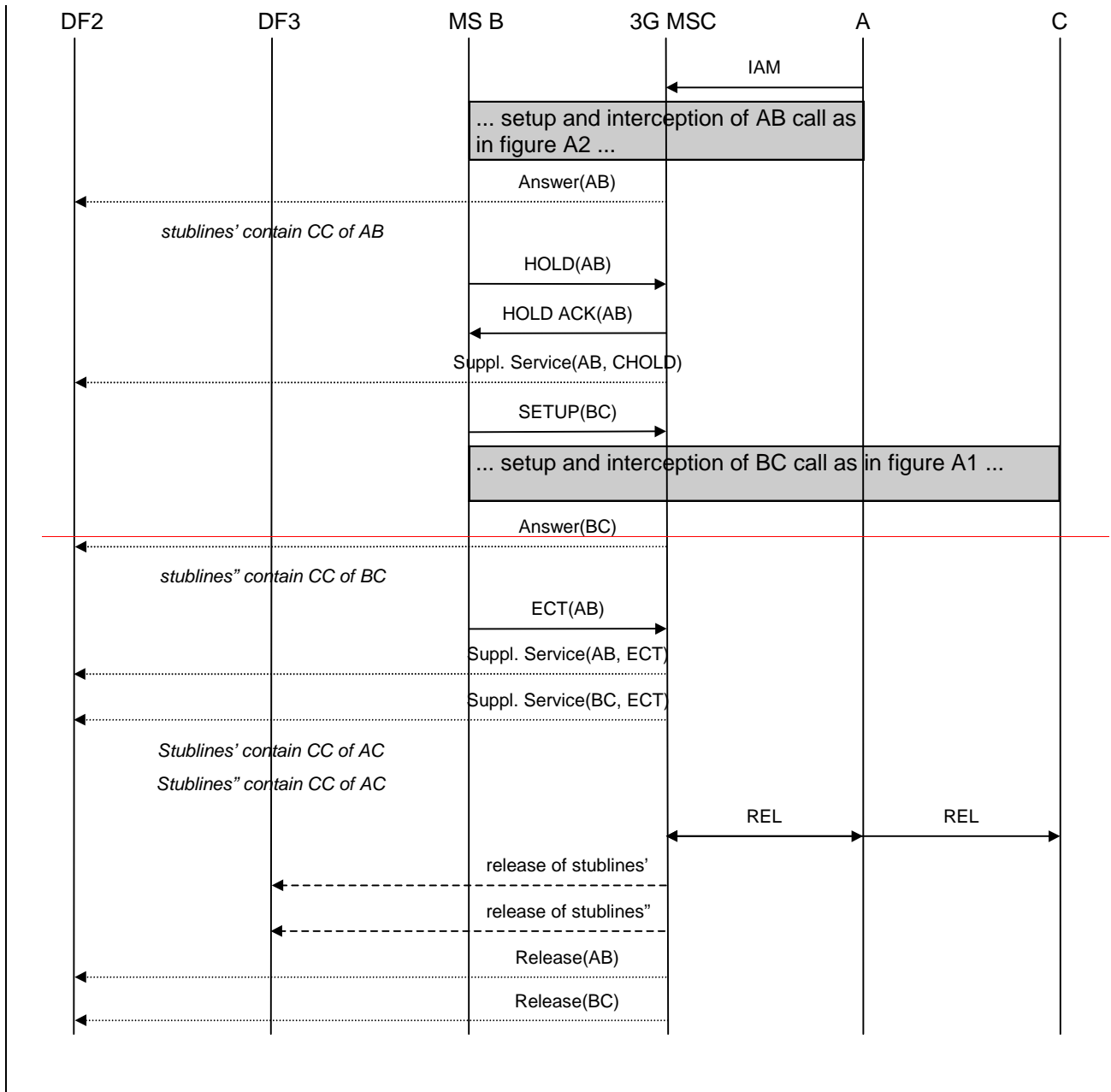
Figure A12: Interception of explicit call transfer - stublines per target
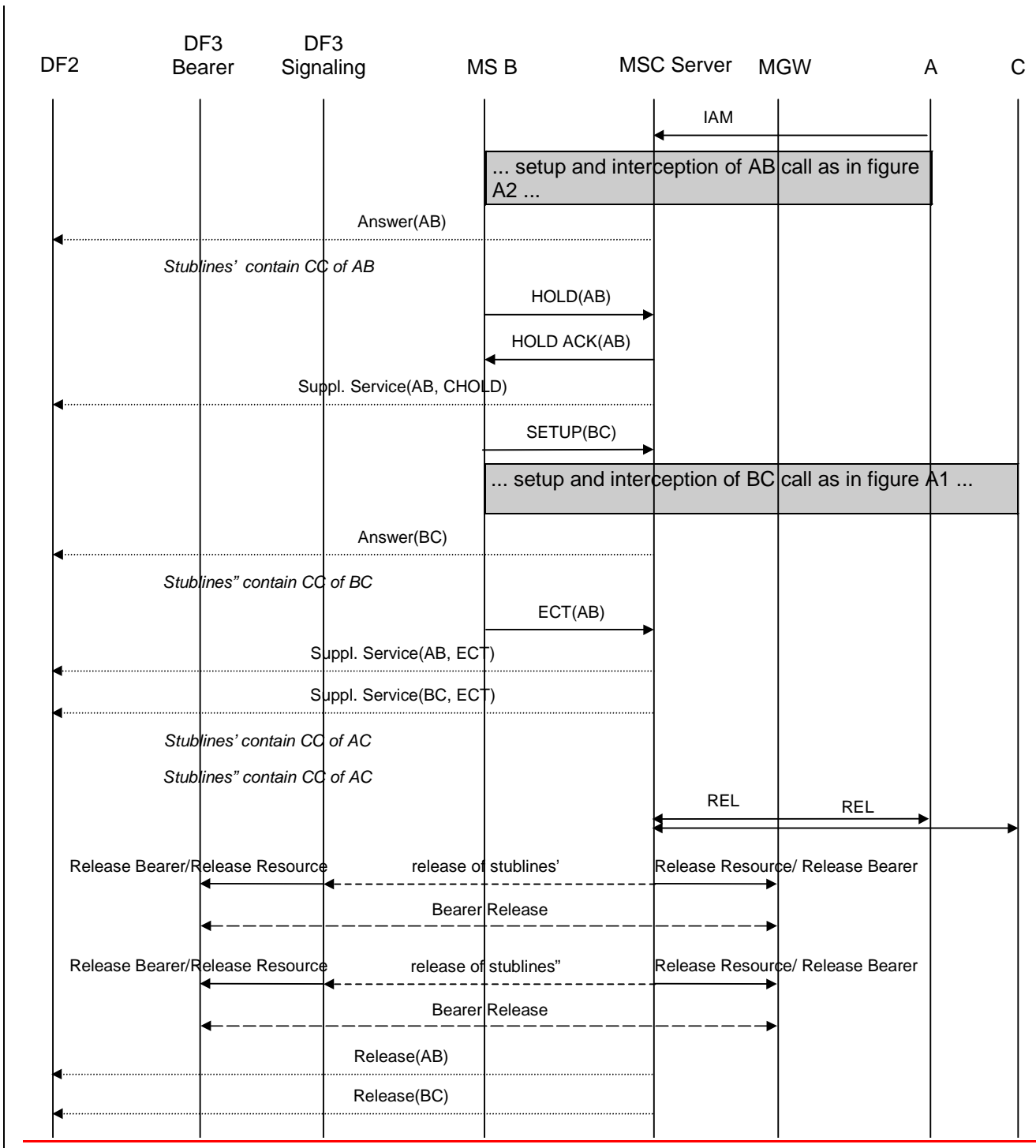
DF2	DF3	MS B	3G MSC	A	C

IAM

... setup and interception of AB call as in figure A2 ...

Answer(AB)

stublines' contain CC of AB

HOLD(AB)

HOLD ACK(AB)

Suppl. Service(AB, CHOLD)

SETUP(BC)

... setup and interception of BC call as in figure A1 ...

Answer(BC)

stublines" contain CC of BC

ECT(AB)

Suppl. Service(AB, ECT)

Suppl. Service(BC, ECT)

Stublines' contain CC of AC

Stublines" contain CC of AC

REL   REL

release of stublines'

release of stublines"

Release(AB)

Release(BC)

Figure A13: Interception of explicit call transfer - stublines per target call

In figures A12 and A13 the release of the stublines is done after the transferred call is released by A or C. It is a national option not to support interception of transferred calls. In that case, the release of the stublines is done after the call is transferred and B is no longer involved.

****   SEVENTH MODIFIED SECTION   ****

B.10 SMS

Figure B9 and B10 show the interception of a Mobile-terminated SMS and a Mobile-originated SMS transfer where the mobile (A) is the target for interception.
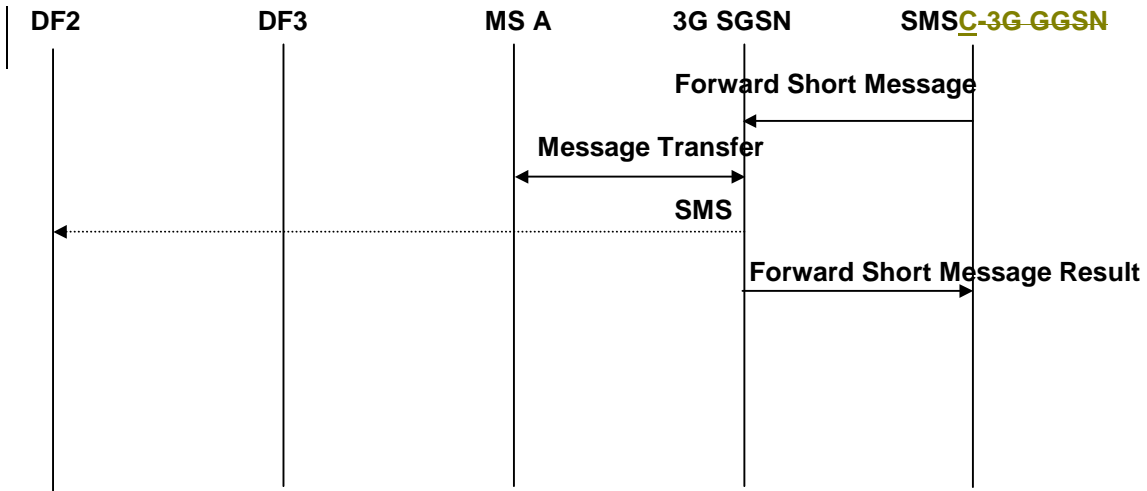
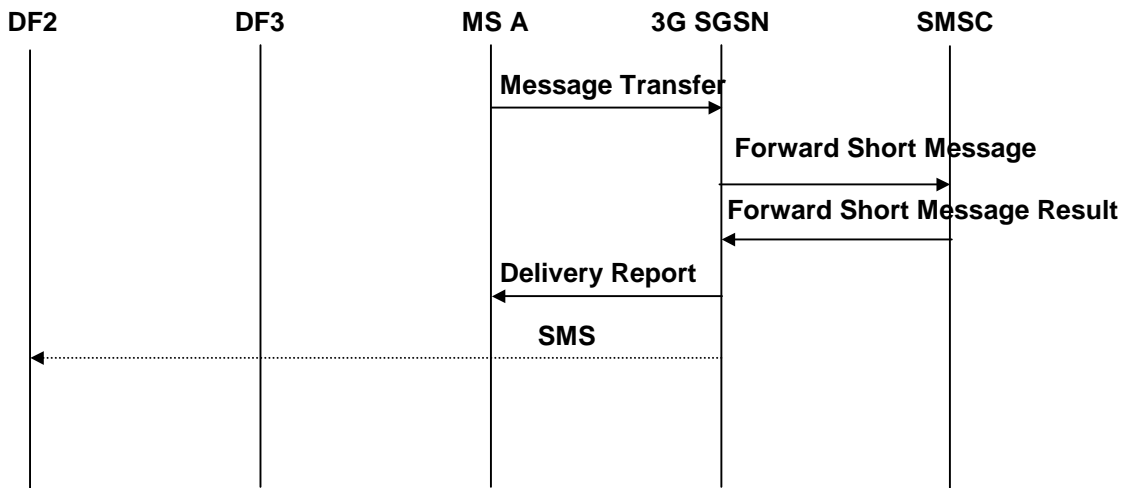**Figure B.9: Interception of a Mobile-terminated SMS transfer**

Figure B.10: Interception of a Mobile-originated SMS transfer