Project	IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>
Title	Credit token based coexistence protocol text update to consider inter-system communication MAC messages encapsulation changes
Date Submitted	2007-09-07
Source(s)	David Grandblaise Voice: +33 (0)1 6935 2582 Motorola Labs mailto: david.grandblaise@motorola.com Parc Les Algorithmes Commune de Saint Aubin 91193 Gif sur Yvette, France
Re:	IEEE 80216h-07/019
Abstract	Contribution IEEE C802.16h-07/077 has provided text remedy on inter-system communication MAC messages encapsulation. These changes on the messages require adapting consequently some additional text on the credit token based coexistence protocol (CT-CXP) within section 15.4.2.4 and 15.6.2.
Purpose	Consolidation of draft D2c on credit token based coexistence protocol
Notice	*This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups*. It represents only the views of the participants listed in the "Source(s)" field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who reserve(s) the right to add, amend or withdraw material contained herein.
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.
Patent Policy	The contributor is familiar with the IEEE-SA Patent Policy and Procedures: <http://standards.ieee.org/guides/bylaws/sect6-7.html#6> and <http://standards.ieee.org/guides/opman/sect6.html#6.3>. Further information is located at <http://standards.ieee.org/board/pat/pat-material.html> and <http://standards.ieee.org/board/pat>.

Credit token based coexistence protocol text update to consider inter-system communication MAC messages encapsulation changes

David Grandblaise
Motorola

Introduction

Contribution IEEE C802.16h-07/077 has provided text remedy on inter-system communication MAC messages encapsulation. These changes on the messages require adapting consequently some additional text on the credit token based coexistence protocol (CT-CXP) within section 15.4.2.4 and 15.6.2.

Specific editorial changes

This section provides a list of changes to the draft document.

Blue text represents specific editorial additions.

Red strikethrough text is to be deleted.

Black text is text already in the draft.

Bold italic text is editorial instructions to the editor.

Proposed text

[Update text of section 15.4.2.4 as indicate:]

15.4.2.4 Credit token based coexistence protocol (CT-CXP)

In some traffic conditions circumstances, some master subframes are temporally under-used by some BS (offering BS, namely offeror) due to some low traffic activity while some of its neighboring BSs (requesting BS, namely requester) require temporally some additional master sub frame capacity to face some traffic increase. With respect to this, master sub frame sharing between neigbhouring systems contributes for better spectrum efficiency. The typically operation of sharing is illustrated in *Figure h65* and *Figure h66* where system S1 proposes to rent out its assigned last OFDM symbols (for a time duration T_ renting_subframe per master subframe over several consecutive CX frames of total time duration T_ renting_epoch) to system S2 and S3. This master sub frame sharing is supported by the credit token based coexistence protocol (CT-CXP). CT-CXP provides the means for an offeror to rent out temporally some of its master sub frame capacity to some competing requester(s) willing to rent in simultaneously this proposed additional resource. CT-CXP guarantees exclusive access of the offeror's unused master subframe resource to the requester(s) for an agreed time period between the offeror and the requester. During this agreed period, the requester is granted with the resource during which the offeror will not use the resource. Also, CT-CXP ensures over time a fair access of the offeror's master subframe available resource between competing requesters.
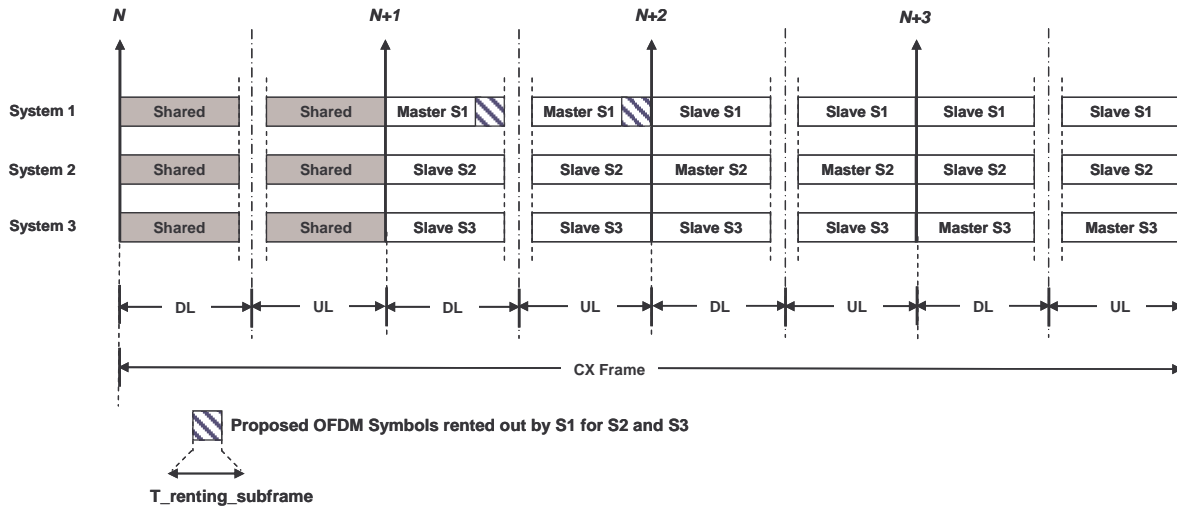
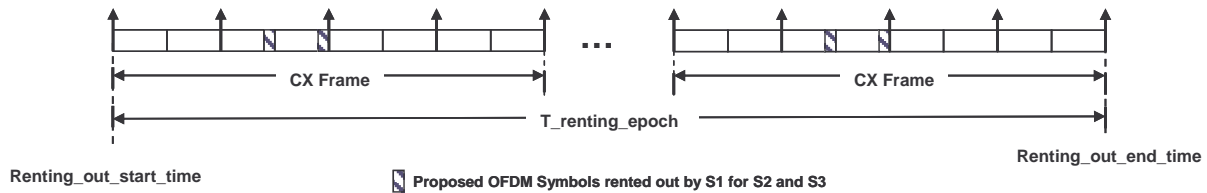Figure h65: Master subframe (OFDM symbols) sharing within CX Frame

Figure h66: Master subframe (OFDM symbols) sharing over T_renting_epoch

15.4.2.4.1 CT-CXP Procedures

15.4.2.4.1.1 Whole CT-CXP Procedure

CT-CXP can be instantiated either in a non-negotiated mode or in a negotiated mode. This allows CT-CXP to be flexibly executed as a function of the context (e.g. time constraints for negotiation, regulatory spectrum sharing policies and so forth). The followed approach is flexible in that it is scalable and it allows a vendor differentiated implementation of non-negotiated or negotiated (of any types) based CT-CXP.

The non-negotiated mode requires the minimum messages exchange to support CT-CXP between the offeror and requester(s). This mode requires no negotiation iteration between the offeror and requester. This mode can be applied when time availability is very limited to handle several iterations for the negotiations and/or when the CT-CXP is executed over the air (safe mode) through over the air inter-BSs communications.
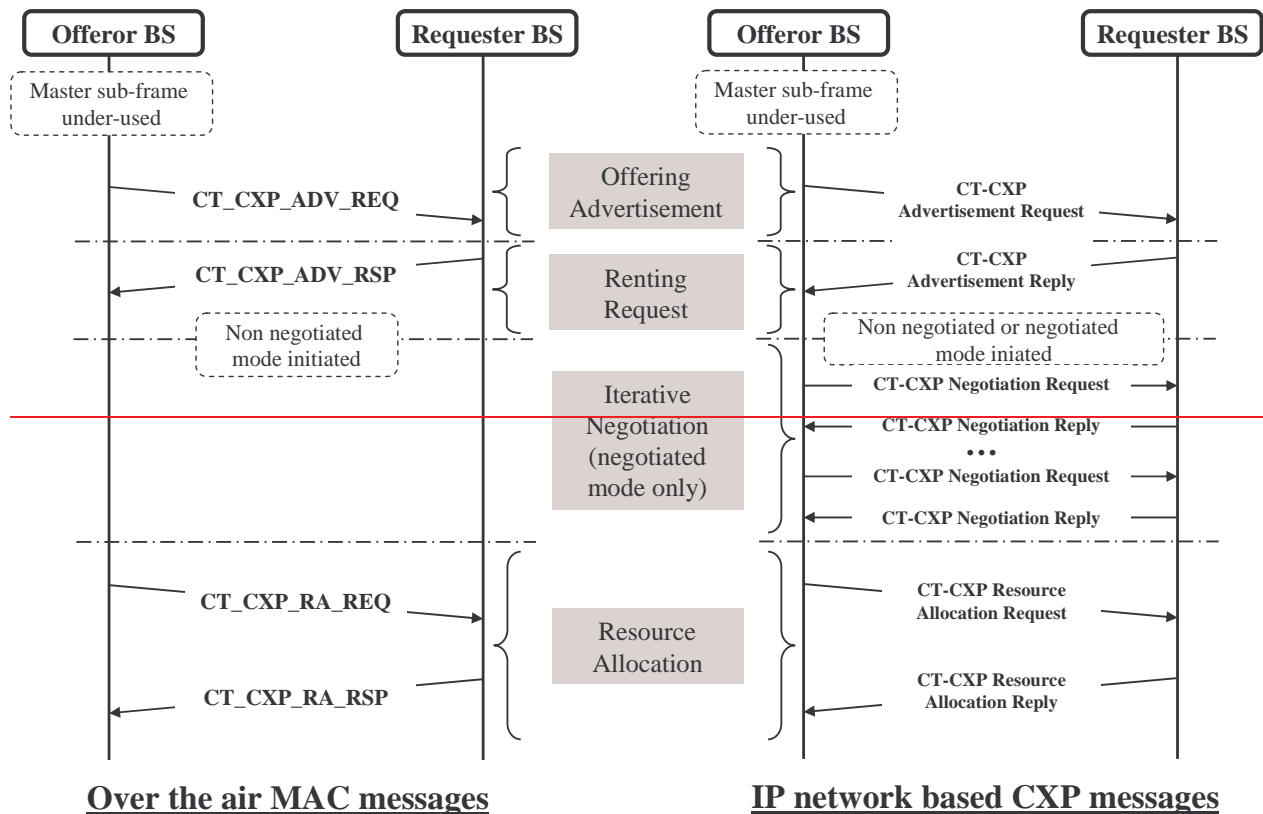
The negotiated mode is used when time availability is enough to handle several iterations for the negotiation. This mode is operated through IP network based inter-BSs communications.

CT-CXP is composed of several consecutive procedures (offering advertisement, renting request, iterative negotiation, and resource allocation) as shown in *Figure h67*. For the sake of simplicity, this figure is only depicted for one (among multiple) requesters. Over the air based instantiation of CT-CXP for the non negotiated mode is depicted on the left hand side of *Figure h67*. The over IP network based instantiation of CT-

CXP for the negotiation or non negotiated mode is depicted on the right hand side of *Figure h67*. Inter system over the air messages are encapsulated ~~MAC messages~~ within CX-REQ-MAC and CX-RSP-MAC messages (section 6.3.2.3). ~~related to the over the air instantiation are specified in section 6.3.2.3.~~ Inter system over the air communications mechanisms are described in subclause *15.6*. CXP messages related to IP network based instantiation are specified in section *15.5.1*. The offering advertisement message (CT-CX-ADV-REQ~~CT-CXP Advertisement Request~~) specifies which negotiation mode is used by the CT-CXP. The iterative negogtiation procedure is executed only with the negotiated mode and not with the non-negotiated mode.

Within CT-CXP, a renting resource unit (RRU) is defined as the minimum time x frequency unit (e.g. OFDM symbol, or a minimum number of symbols and subcarriers in OFDMA) that can be rented in/out between the offeror and a requester. RRU time duration is denoted RRU_duration. A master sub-frame is composed of a fixed amount of RRUs. The part of the offeror's available master sub-frame to be rented out is named rented resource. Consequently, an offeror's rented resource is defined as an amount of RRUs. A credit token (CT) is the pseudo monetary unit used by CT-CXP allowing the requester to rent in a RRU to the offeror. A RRU is charged as a number of CTs. Each BS is initially assigned with a CT budget, i.e. a maximum number of CTs. This maximum number can be normalized to the total number of RRUs per master sub-frame. Also, this number can be dynamically specified by policy issued by the RAIS via the BSIS (subclause *15.8*).

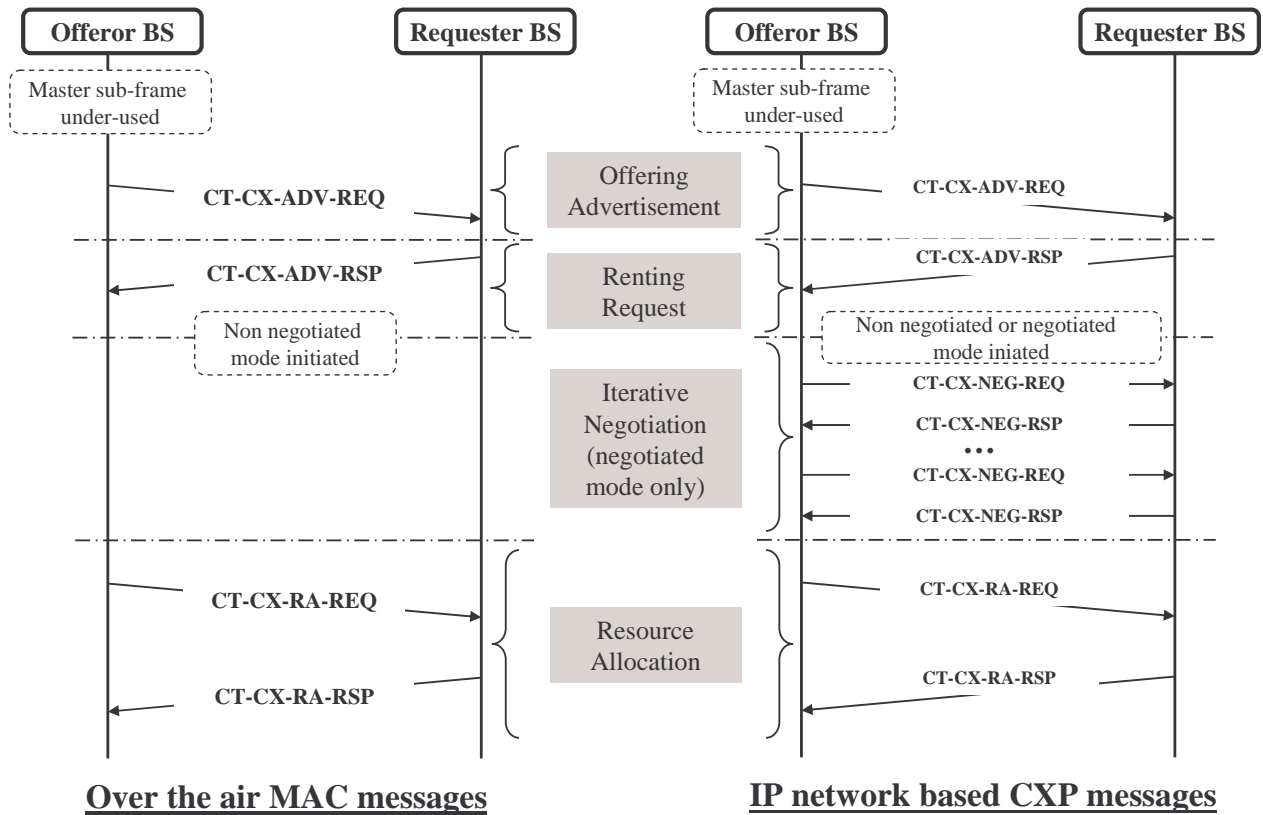*[Replace Figure h67 with the following updated one as indicate:]*

Over the air MAC messages　　　　　　**IP network based CXP messages**

Over the air MAC messages   **IP network based CXP messages**

Figure h67: Whole CT-CXP Procedure

The details of these procedures are specified in subsections hereafter.
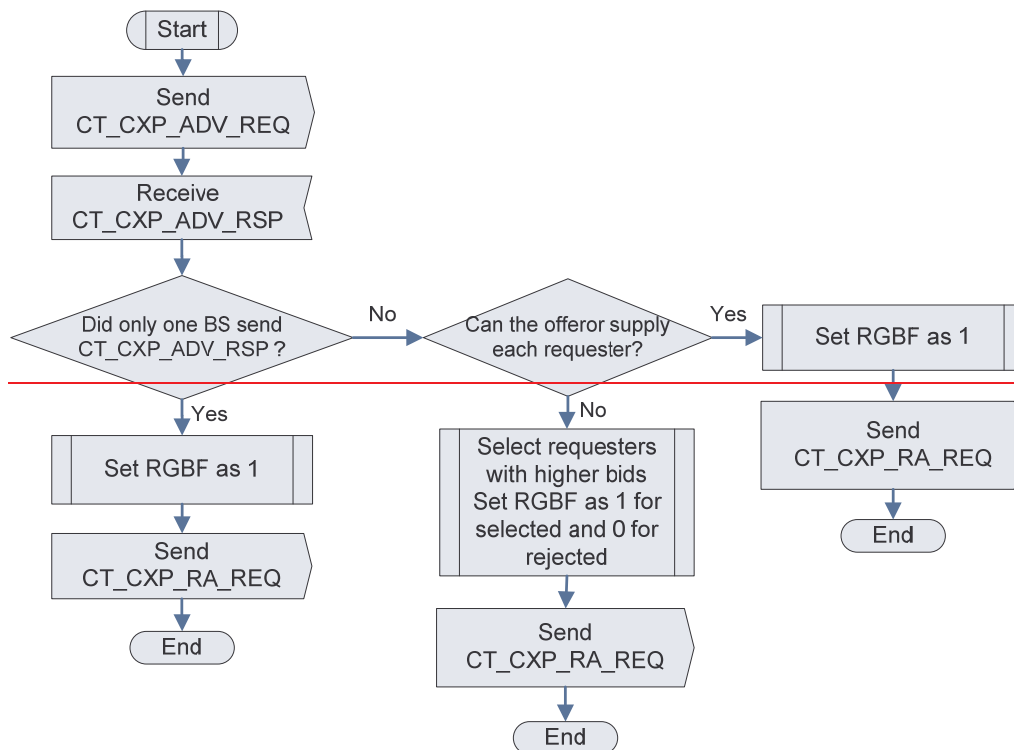
15.4.2.4.1.2 CT-CXP Offering Procedure

The over the air and IP network based CT-CXP offering procedures are respectively depicted in *Figure h68* and *Figure h69*.

a) The procedure described in *Figure h68* is as follows:

- A BS identifies that a part of its master subframe is going to be under-used and can be rented out. With respect to this, this BS becomes an offeror BS and initiates the renting advertisement by broadcasting the CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message. In particular, this message includes information related to the available resource (T_renting_subframe, Renting_out_start_time, Renting_out_end_time) as well as the renting conditions (MNCT: Minimum number of credit tokens per resource unit required per requester's bid), and also a list (LC: List of Channels) of other channels (frequency domain) proposed by the offeror BS for renting.
- If the offeror BS receives one single CT-CX-ADV-RSP~~CT_CXP_ADV_RSP~~ message, then the offeror BS grants the renting resource to the single requester by setting the Resource Granting Bit Flag (RGBF) to 1 in the CT-CX-RA-REQ~~CT_CXP_RA_REQ~~ message. The granted requester is not charged with credit token since it is not competing with some other requesters.
- If the offeror BS receives more than one CT-CX-ADV-RSP~~CT_CXP_ADV_RSP~~ message, then it assesses whether he can supply each requester or not:
  - o If it can supply, the offeror BS grants the renting resource to all requesters by setting the Resource Granting Bit Flag (RGBF) to 1 in the CT-CX-RA-REQ~~CT_CXP_RA_REQ~~ message.

o If it cannot, the offeror BS derives and selects requesters with higher bids based on the information received from competing requesters. The offeror BS grants the resource to the selected requesters by setting the Resource Granting Bit Flag (RGBF) to 1 in the CT-CX-RA-REQ~~CT_CXP_RA_REQ~~ message. These selected requesters can access to their requested resource Rented_resource_amount from Renting_subframe_start_time to Renting_subframe_end_time during the guaranteed requested time period (Renting_in_start_time, and Renting_in_end_time). RGBT is set to 0 for the non selected requesters.

• The CT-CX-RA-REQ~~CT_CXP_RA_REQ~~ message includes the clearing price (Clearing_price). Derived from the selection process, the clearing price corresponds to the number of credit tokens per RRU that has to be frozen to acquire the granted resources. ~~considered in the pricing method specified within PBF of CT-CXP Advertisement Request message.~~

[Replace Figure h68 with the following updated one as indicate:]

6

```
                    ┌─────────┐
                    │  Start  │
                    └─────────┘
                         │
                         ▼
              ┌──────────────────┐
              │ Send CT-CX-ADV-  │
              │      REQ         │
              └──────────────────┘
                         │
                         ▼
              ┌──────────────────┐
              │ Receive CT-CX-ADV-│
              │      RSP         │
              └──────────────────┘
                         │
                         ▼
         ╱────────────────────╲      No    ╱────────────────╲    Yes   ┌──────────────┐
        ╱ Did only one BS send  ╲─────────╱ Can the offeror  ╲────────▶│ Set RGBF as 1│
        ╲   CT-CX-ADV-RSP ?     ╱          ╲ supply each     ╱          └──────────────┘
         ╲────────────────────╱            ╲ requester?    ╱                  │
                  │ Yes                      ╲───────────╱                    ▼
                  ▼                             │ No              ┌──────────────┐
         ┌──────────────┐            ┌──────────────────┐        │ Send CT-CX-RA-│
         │ Set RGBF as 1│            │ Select requesters │        │     REQ      │
         └──────────────┘            │ with higher bids  │        └──────────────┘
                  │                  │ Set RGBF as 1 for │               │
                  ▼                  │ selected and 0 for│               ▼
         ┌──────────────┐            │    rejected      │         ┌─────────┐
         │ Send CT-CX-RA-│           └──────────────────┘         │   End   │
         │     REQ      │                     │                   └─────────┘
         └──────────────┘                     ▼
                  │                  ┌──────────────────┐
                  ▼                  │ Send CT-CX-RA-   │
            ┌─────────┐              │     REQ          │
            │   End   │              └──────────────────┘
            └─────────┘                       │
                                              ▼
                                        ┌─────────┐
                                        │   End   │
                                        └─────────┘
```
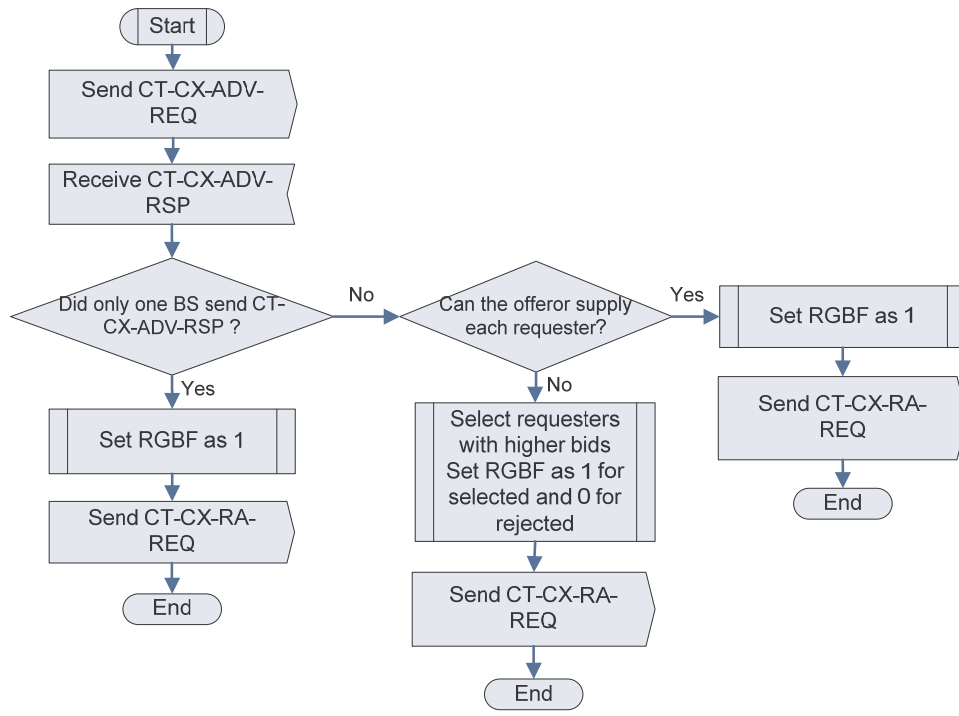
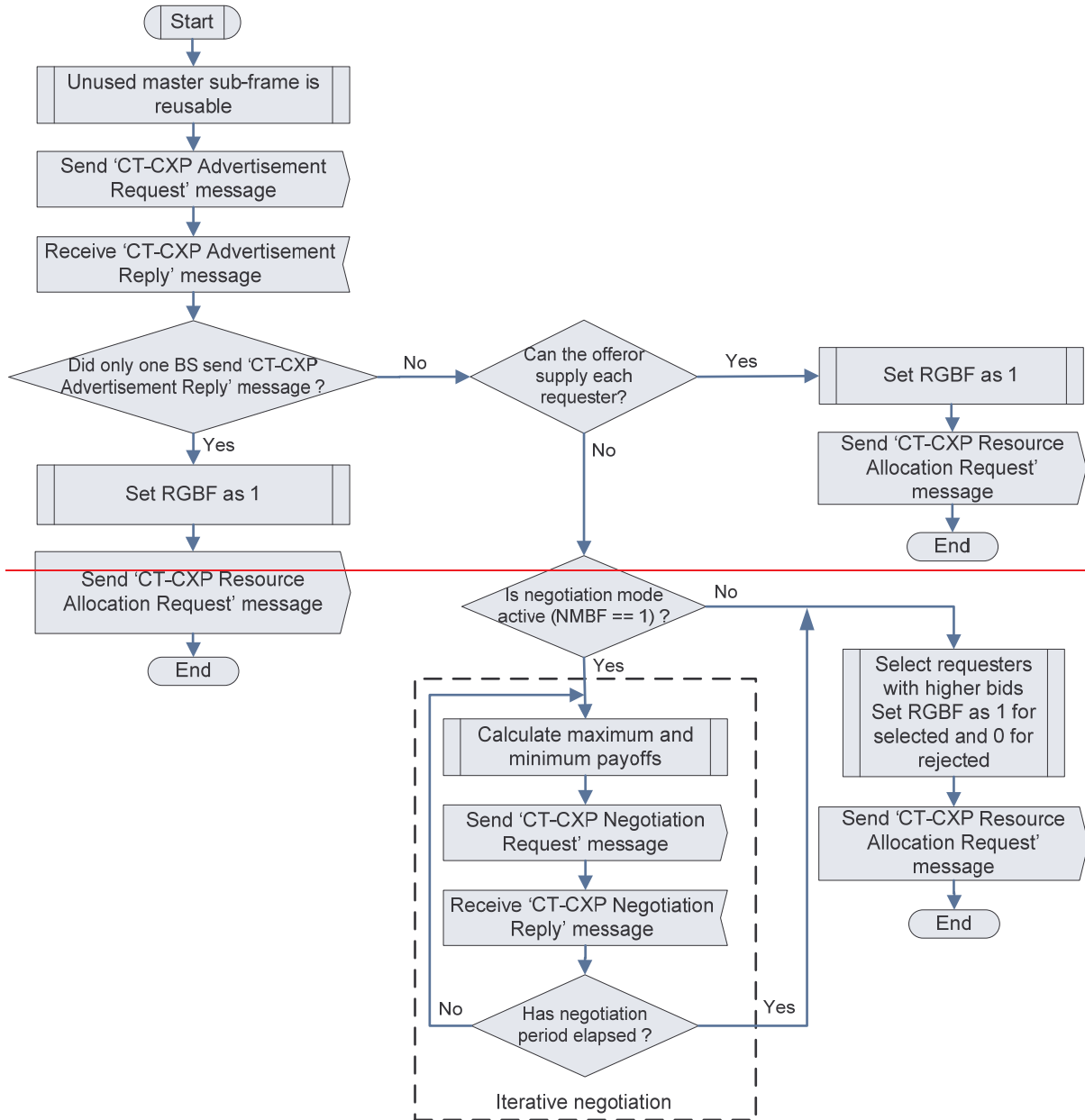Figure h68: Over the air based CT-CXP offering procedure

b) The procedure described in *Figure h69* is as follows:

- A BS identifies that a part of its master subframe is going to be under-used and can be rented out. With respect to this, this BS becomes an offeror BS and initiates the renting advertisement by broadcasting the CT-CX-ADV-REQ~~"CT CXP Advertisement Request"~~ message. In particular, this message includes information related to:
  - o The available resource (T_renting_subframe, Renting_out_start_time, Renting_out_end_time),
  - o The negotiation mode (NMBF == 0: non negotiated mode is active, NMBF == 1: negotiated mode is active),
  - o The renting conditions (Start_negotiation_time, End_negotiation_time, MNCT, LC),
  - o The pricing method in case NMBF == 1.
- If the offeror BS receives one single CT-CX-ADV-RSP~~"CT CXP Advertisement Request"~~ message, then the offeror BS grants the renting resource to the single requester by setting the Resource Granting Bit Flag (RGBF) to 1 in the CT-CX-RA-REQ~~"CT CXP Resource Allocation Request"~~ message. The granted requester is not charged with credit token since it is not competing with some other requesters.
- If the offeror BS receives more than one CT-CX-ADV-REQ~~"CT CXP Advertisement Request"~~ message, then it assesses whether he can supply each requester or not:
  - o If it can supply, the offeror BS grants the renting resource to all requesters by setting the Resource Granting Bit Flag (RGBF) to 1 in the CT-CX-RA-REQ~~"CT CXP Resource Allocation Request"~~ message.
  - o If it cannot, the offeror BS follows the negotiated mode under consideration:
    - ▪ If NMBF == 0, same procedure as a) is executed. The offeror BS derives and selects requesters with higher bids based on the information received from competing requesters. The offeror BS grants the resource to the selected requesters by setting the Resource Granting Bit Flag (RGBF) to 1 in the CT-CX-RA-REQ~~"CT CXP Resource Allocation Request"~~ message. These selected requesters can access to their requested resource

Rented_resource_amount from Renting_subframe_start_time to Renting_subframe_end_time during the guaranteed requested time period (Renting_in_start_time, and Renting_in_end_time). RGBT is set to 0 for the non selected requesters.

- If NMBF == 1, iterative negotiation occurs between the offeror BS and each requester BS. Based on the infomation received within the CT-CX-ADV-RSP~~"CT CXP Advertisement Reply"~~ message, the offeror BS calculates respectively a minimum and maximum payoff (Minimal_payoff and Maximal_payoff) at each iteration. These payoffs allow selecting the remaining requesters at each iteration. An example of payoff calculation is given in section *15.4.2.4.2*. At each iteration, Minimal_payoff and Maximal_payoff are sent within the CT-CX-NEG-REQ~~"CT CXP Negotiation Request"~~ message. The iterative negotiation occurs until the negotiation period (bounded by End_negotiation_time) is elapsed. At the end of the negotiation, the final requesters are selected by the offeror BS. The offeror BS grants the resource to the selected requesters by setting the Resource Granting Bit Flag (RGBF) to 1 in the CT-CX-RA-REQ~~"CT CXP Resource Allocation Request"~~ message. These selected requesters can access to their requested resource Rented_resource_amount from Renting_subframe_start_time to Renting_subframe_end_time during the guaranteed requested bounded time period (Renting_in_start_time, and Renting_in_end_time). RGBT is set to 0 for the non selected requesters.

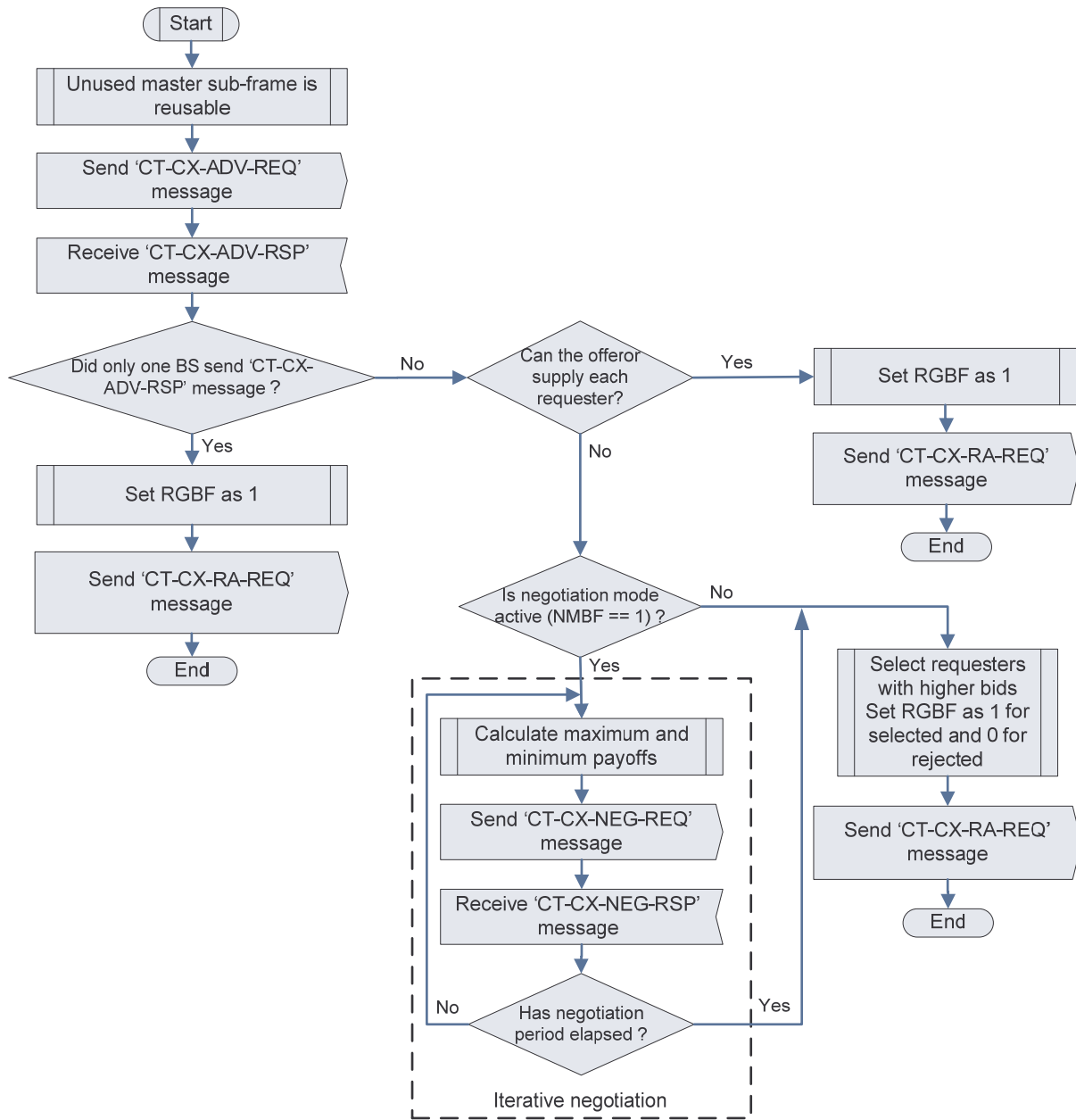*[Replace Figure h69 with the following updated one as indicate:]*

Figure h69: IP network based CT-CXP offering procedure
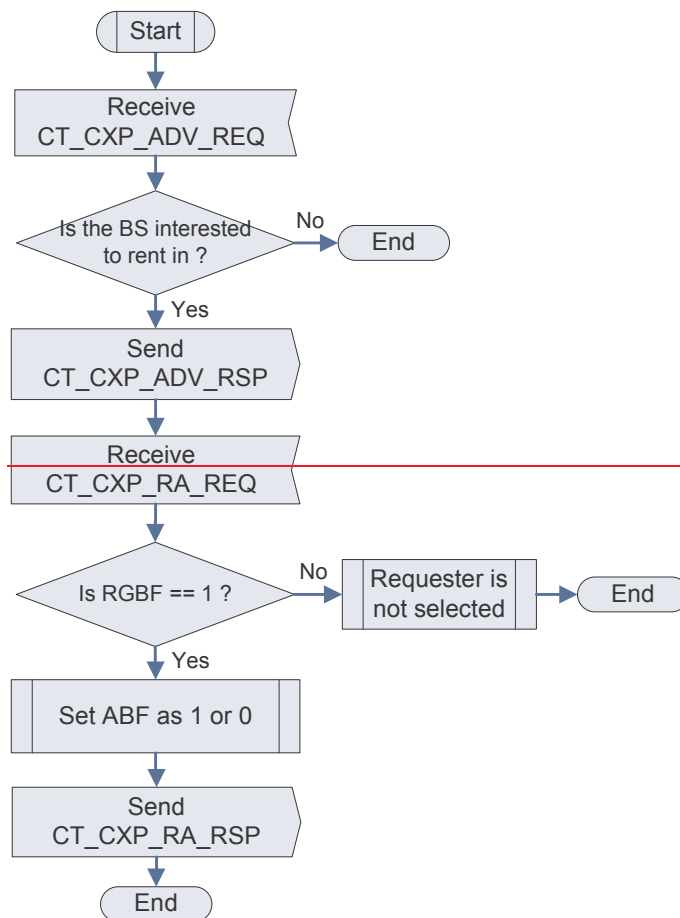
15.4.2.4.1.3 CT-CXP Requesting Procedure

The over the air and IP network based CT-CXP requesting procedures are respectively depicted in *Figure h70* and *Figure h71*.

a) The procedure described in *Figure h70* is as follows:

- If a BS is in need of additional resource and can meet MNCT requirements, he can make a request (CT-CX-ADV-RSP~~CT_CXP_ADV_RSP~~ message) upon the reception of CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~.

- Within CT-CX-ADV-RSP~~CT_CXP_ADV_RSP~~, the requester informs about the amount of required resource (Rented_resoure_amount), the rented in start and end time (Renting_in_start_time, Renting_in_end_time) and the requester's bid (Requester_bid) in term of number of credit tokens bidded per RRU.
- Upon reception of CT-CX-RA-REQ~~CT_CXP_RA_REQ~~ message, the requester BS knows whether it has been selected or not. If RGBF is set to 1, the requester BS is selected, otherwise (RGBF set to 0) the requester is rejected.
- The requester decides to accept (Acceptation Bit Flag ABF set to 1) or to reject (ABF set to 0) the resource granting based on the Clearing_price information. This information is sent within the CT-CX-RA-RSP~~CT_CXP_RA_RSP~~ message.
- If ABF is set to 1, a number of credit tokens equal to Clearing_price* Rented_resource_amount*T_renting_subframe *[(Renting_in_end_time - Renting_in_start_time)/CX_Frame_duration]/RRU_duration will not be usable (for some further renting requests by this same requester) for a time duration equal to [Renting_in_start_time; Renting_in_end_time + δ] where δ is a frozen period margin. This ensures fairness over time between competing requester BSs to access to some other renting offers.

[Replace Figure h70 with the following updated one as indicate:]
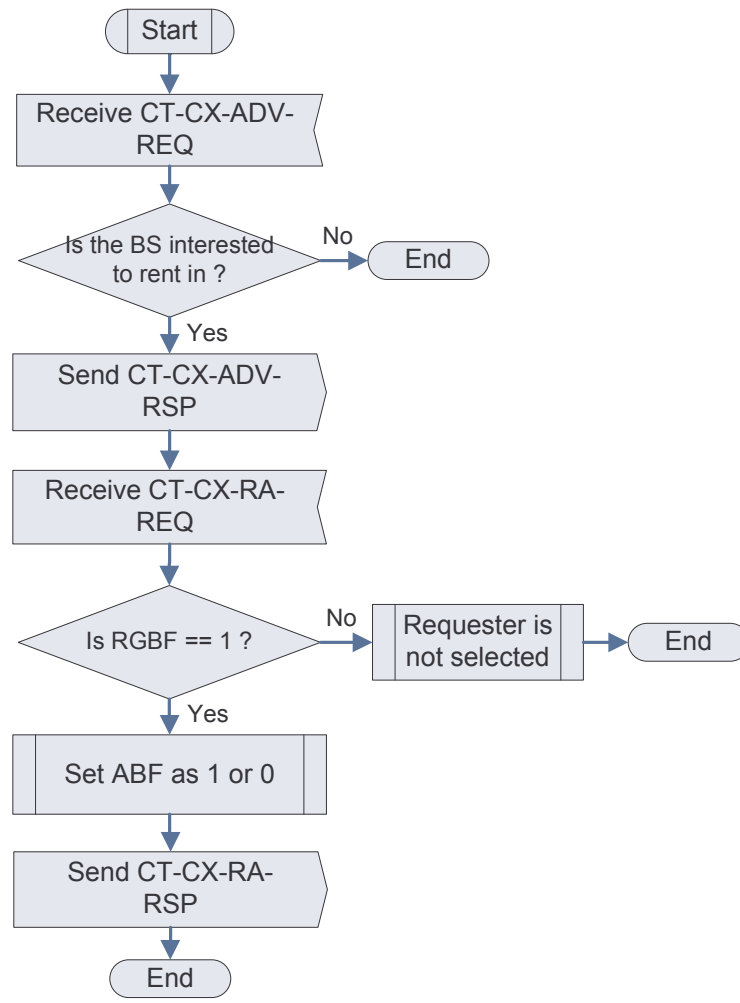
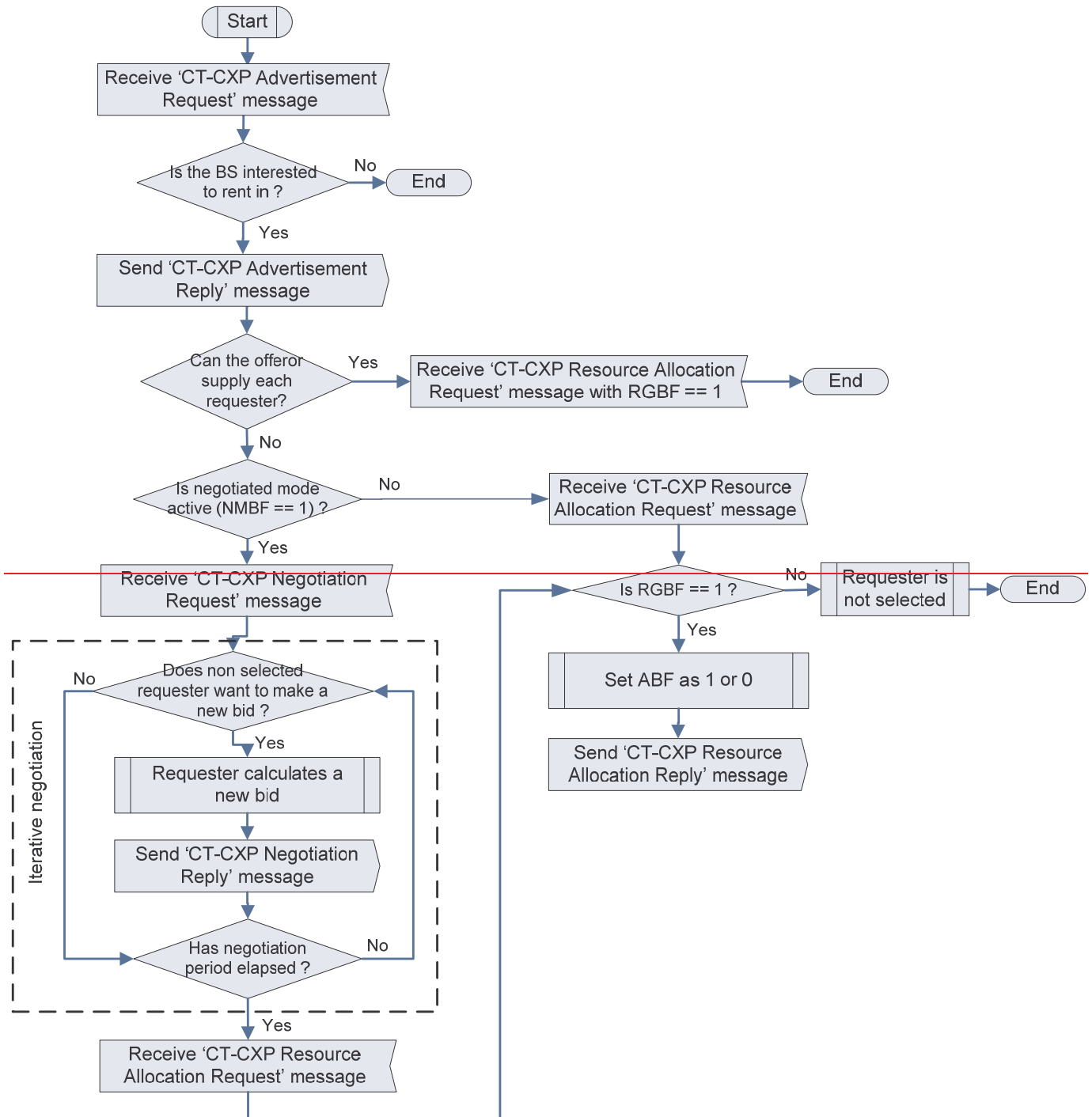Figure h70: Over the air based CT-CXP requesting procedure

b) The procedure described in Figure h71 is as follows:

- If a BS is in need of additional resource, meets MNCT requirements, and agrees with the proposed negotiation mode (NMBF) and pricing method (PBF) specified within the CT-CX-ADV-REQ~~"CT-CXP Advertisement Request"~~ message , he can submit a bid (within CT-CX-ADV-RSP~~"CT-CXP Advertisement Reply"~~ message) upon the reception of the CT-CX-ADV-REQ~~"CT-CXP Advertisement Request"~~ message.

- Within the CT-CX-ADV-RSP~~"CT-CXP Advertisement Reply"~~ message, the requester informs about the amount of required resource (Rented_resoure_amount), the rented in start and end time (Renting_in_start_time, Renting_in_end_time) and its bid (Requester_bid) in term of number of credit tokens bidded per RRU.

  o If the non negotiation mode is active (NMBF == 0), same procedure as a) is executed. If the offorer BS can supply to the requester BS, the offeror BS grants the renting resource by setting the Resource Granting Bit Flag (RGBF) to 1 in the CT-CX-RA-REQ~~"CT-CXP Resource Allocation Request"~~ message.

  o If the negotiation mode is active (NMBF == 1), iterative negotiation occurs between the offeror BS and each requester BS. At each iteration, based on the information Minimum_payoff and Maximal_payoff received from the CT-CX-NEG-REQ~~"CT-CXP Negotiation Request"~~ message, the requester decides to submit a new bid (Requester_bid_update) or not. Requester_bid_update

is sent within the CT-CX-NEG-RSP~~"CT-CXP Negotiation Reply"~~ message. The iterative negotiation occurs until the negotiation period (bounded by End_negotiation_time) is elapsed.

- Upon reception of the CT-CX-RA-REQ~~"CT-CXP Resource Allocation Request"~~ message, the requester BS knows whether it has been selected or not. If RGBF is set to 1, the requester BS is selected, otherwise (RGBF set to 0) the requester is rejected.

- The requester decides to accept (Acceptation Bit Flag ABF set to 1) or to reject (ABF set to 0) the resource granting based on the Clearing_price information. This information is sent within the CT-CX-RA-RSP~~"CT-CXP Resource Allocation Reply"~~ message. The method to derive the clearing price is open for the implementation.

- If ABF is set to 1:
  - If PBF == 0, a number of CTs equal to Clearing_price* Rented_resource_amount*T_renting_subframe *[(Renting_in_end_time - Renting_in_start_time)/CX_Frame_duration]/RRU_duration is transferred from the requester's ownership to the offeror's one. This calculation is an example and it is open for implementation.
  - If PBF == 1, the CT are not transferred but remains to the requester ownership. However, a number of credit tokens equal to the previous number (as calculated in the previous bullet point) will not be usable (for some further renting requests by this same requester) for a time duration equal to [Renting_in_start_time; Renting_in_end_time + δ] where δ is a frozen period margin. This ensures fairness over time between competing requester BSs to access to some other renting offers.

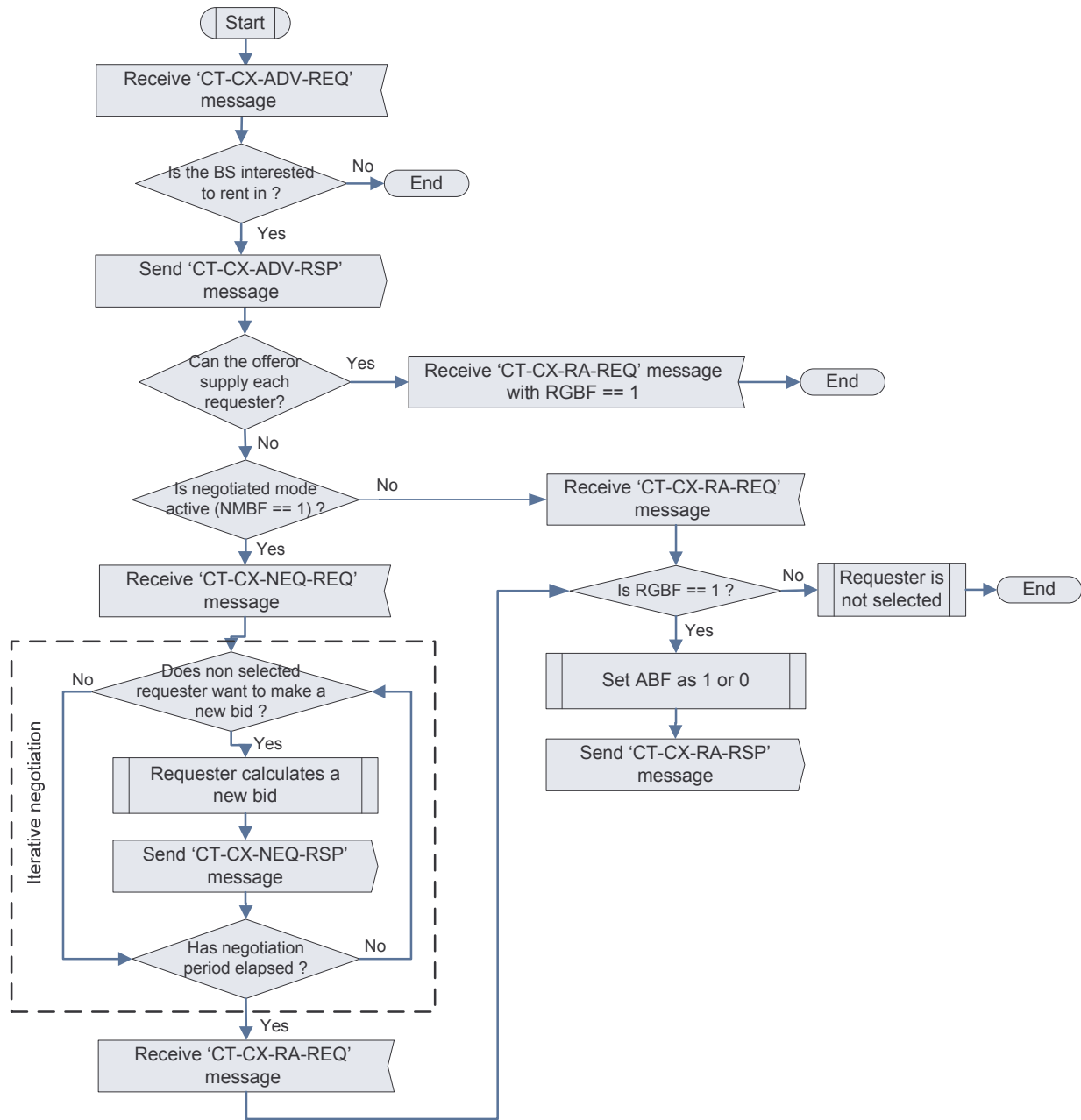*[Replace Figure h71 with the following updated one as indicate:]*

Figure h71: IP network based CT-CXP requesting procedure

15.4.2.4.2 Payoff calculation

This section provides an example on how the payoff in section *15.4.2.4.1.2* can be calculated. This method is an example and the implementation is vendor specific.

At each iteration:

    i)   The offeror BS calculates the payoff (Payoff_requester) corresponding to each remaining requester as follows:

    ii)   Payoff_requester = Requester_bid_update* Rented_resource_amount*[T_renting_subframe *(Renting_in_end_time - Renting_in_start_time)/CX_Frame_duration]/RRU_duration.

1

iii)   The offeror selects the requesters that maximise jointly sum(Rented_resource_amount) and sum(Payoff_requester) over all the remaining requesters.

iv)   The offeror BS derives the Minimal_payoff and Maximal_payoff from the selected requesters and sends this information to all initial remaining requesters.

v)   Based on this information, each requester knows whether it has been selected or not by comparing its own Payoff_requester with Minimal_payoff.

vi)   Based on this comparison, the non selected requester decides to make a new bid (Requester_bid_update) or not for the next iteration of the negotiation.

15.4.2.4.3 Inter BSs communications for CT-CXP

CT-CXP requires inter BSs communication between different systems. These inter BS communications are necessary to exchange the parameters (*Table h10*) related to the CT-CXP procedures described in section *15.4.2.4.1*.

The parameters related to CT-CXP (*Table h10*) are stored into the BSIS and into the database of each WirelessMAN-CX BS of the shared distributed system architecture (section *15.1.6*).

The exchange of these parameters between BSs is supported through IP network inter-BS communications for the negotiated and non-negotiated modes. The related CXP messages are defined in section *15.5.1*.

The exchange of these parameters and related CXP messages (section *15.5.1*) between BSs is also supported with over the air MAC messages for the non-negotiated mode. These CXP messages are encapsulated within the CX-REQ and CX-RSP MAC messages (defined in section *6.3.2.3*) for the non negotiated mode. Inter system over the air communications mechanisms are detailed within clause *15.6*.

[Update text of section 15.6 as indicate:]

15.6 Inter-system over the air communications

15.6.2 CT-CXP

Figure h74 describes the over the air communications messages between the offeror and requester for CT-CXP operations. The messages between the offeror BS and requester BSs are conveyed through SS(s) acting as forwarder between the offeror and requester BSs. Each forwarding SS is associated to the requester BS and is in the overlapping coverage of the offeror and requester BSs. The forwarding SS can receive and decode messages from both its serving BS (requester BS) and the foreign BS (offeror BS), and can send transmit message to both offer or and requester BS.

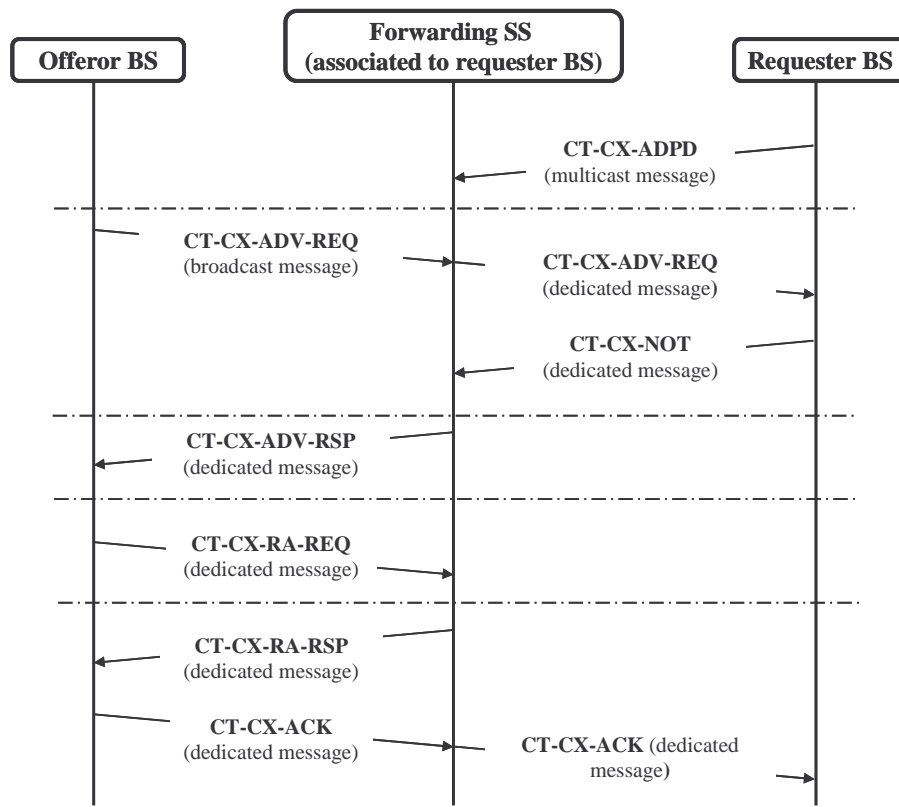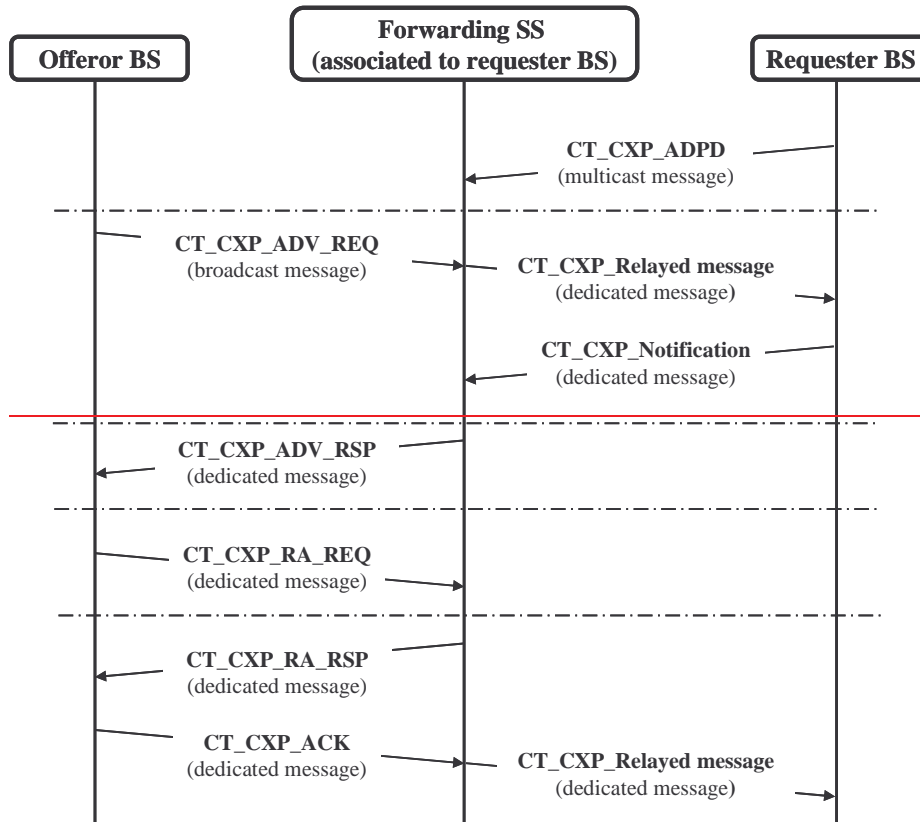*[Replace Figure h74 with the following updated one as indicate:]*

1

Figure h74: Inter system over the air communications messages for CT-CXP operations

CT-CX-ADPD~~CT_CXP_ADPD~~ message ~~(CT-CXP Advertisement Discovery Policy Descriptor)~~ is sent from the home requester BS to its associated forwarding SSs as a regular multicast data message. Purpose of CT-CX-ADPD~~CT_CXP_ADPD~~ is to instruct the attitude of each forwarding SS when it receives CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message. CT-CX-ADPD~~CT_CXP_ADPD~~ specifies whether the forwarding SS has to forward CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message towards it serving BS (requester BS). If the content of CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message meets the requirements instructed in CT-CX-ADPD~~CT_CXP_ADPD~~, the forwarding SS actually forwards CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message content from the offeror BS to its serving BS (requester BS). Otherwise, it does not. That way, CT-CX-ADPD~~CT_CXP_ADPD~~ rules the transmissions from any forwarding SS towards its serving BS. This mechanism avoids having unecessary~~incessant~~ transmissions from the forwarding SS towards its serving BS when renting conditions proposal specified in CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ does not meet the requester BS's need. Any policy can be established and can be adapted dynamically in time by the requester.

The CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message is sent by the offeror BS within the time interval specified in subclause *15.6.1*~~*15.1.5.3*~~. If the CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ content meets the CT-CX-ADPD~~CT_CXP_ADPD~~ requirements, the forwarding SS forwards the CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message towards its serving BS followed up the mechanisms specified in subclause *15.6.1*~~*15.1.5.3*~~. In order to ensure the CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message is appropriately received by the requester BS, CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message can be sent out by several forwarding SSs. If multiple CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ messages are received from different forwarding SSs, the offeror BS selects only one forwarding SS to complete the remaining CT-CXP operations (CT-CX-ADV-RSP~~CT_CXP_ADV_RSP~~, CT-CX-RA-REQ~~CT_CXP_RA_REQ~~, CT-CX-RA-RSP~~CT_CXP_RA_RSP~~). For that, the offeror BS notifies (with CT-CX-NOT~~through the notification~~ message) each of the forwarding SS whether or not it should complete the remaining CT-CXP operations. Once the selected forwarding SS has received the CT-CX-ACK~~CT_CXP_ACK~~ message from the offeror BS, it forwards this message to its serving BS (requester) to confirm that the requester BS can actually use the rented resources for the agreed renting period with the offeror BS.

During the initial phase, as previously mentioned, in case the renting conditions sent in CT-CX-ADPD~~CT_CXP_ADAP~~ message are not met, the forwarding SS does not forward the CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~ message to its serving BS (requester). However, upon requester BS recommendation (policy based), even if the renting conditions are not met, the requester BS can allow the forwarding SS to convey the information about the list of channel LC (parameter included in CT-CX-ADV-REQ~~CT_CXP_ADV_REQ~~). This information will provide the serving BS some further information about other radio resources renting opportunities on other channel (frequency domain).

Whole CT-CXP procedures are detailed in clause *15.4.2.4*.

References

[1] IEEE 802.16h/D2c: Part 16: Air Interface for Fixed Broadband Wireless Access Systems Amendment for Improved Coexistence Mechanisms for License-Exempt Operation, 2007-07-31.