

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>WirelessMAN coexistence function primitives consolidation</b>	
Date Submitted	<b>2008-05-02</b>	
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Re:	IEEE 802.16-08/019 IEEE 802.16 Working Group Letter Ballot Recirc #29b: Announcement (2008-04-07)	
Abstract	<b>Semantic consolidation on Coexistence Functionality primitives in 16h, moving CX proxy description into Annex and generalize the network address for basic connectivity between WirelessMAN-CX systems.</b>	
Purpose	To consolidate the 16h draft.	
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## WirelessMAN coexistence function primitives consolidation

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### Overview

*In letter ballot recirculation 29a, we have notice that some content in P802.16h-D5 is describing the IP level activity and beyond the scope of 802.16, we should do cleaning up to:*

*1) Remove IP activity description or put it into informative annex.*

*2) Define the primitives to enable the coexistence function in WirelessMAN-CX systems.*

### Reference:

[1] IEEE 80216-08\_009r4: Letter Ballot Recirc #29a Comment Database (2008-04-07)

[2] IEEE P802.16h/D5: 802.16h draft 5(2008-03-22)

[3] IEEE 802.16-08/019: IEEE 802.16 Working Group Letter Ballot #29b: Announcement (2008-04-07)

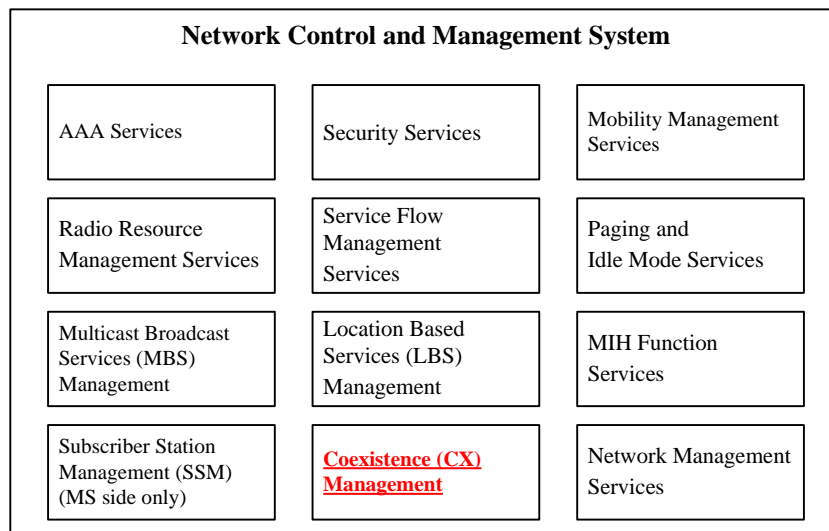
[4] IEEE 802.16-2004: IEEE Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed Broadband Wireless Access Systems (2004-10-01)

[5] IEEE 802.16e-2005: IEEE Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems Amendment 2: Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands and Corrigendum 1 (2006-02-28)

[6] P802.16Rev2/D4: (April 2008) DRAFT Standard for Local and metropolitan area networks Part 16: Air Interface for Broadband Wireless Access Systems

### Proposed Text Changes:

*Modified the figure 3 in 1.4.4 accordingly:*



Add a new section 14.2.12 in 14.2, or replace according content in 15.6 with following:

**15.6(or 14.2.12) Coexistence Management:**

The CX primitives are a set of primitives for supporting CX procedures between BS and NCMS.

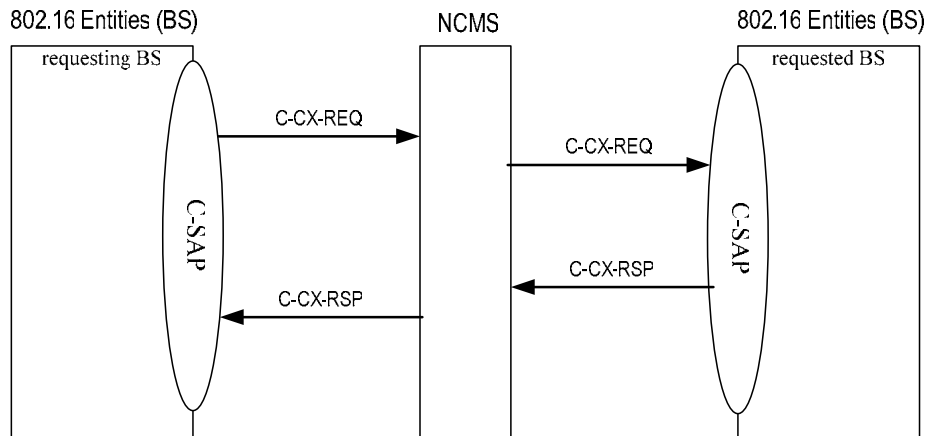


Figure xx1. primitive flow of C-CX-REQ/RSP

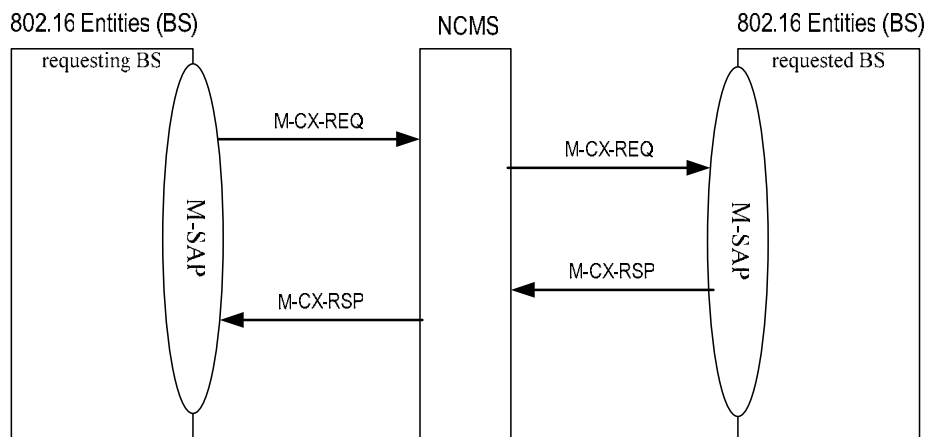


Figure xx2. primitive flow of M-CX-REQ/RSP

**15.6.1(or 14.2.12.1) C-CX-REQ**

This primitive is used by an 802.16 entity or NCMS to request a coexistence reaction. The Action Type included in this primitive defines the type of coexistence procedure to be performed. The possible Action Types for this primitive are listed in Table below:

Action Type	Description
Add neighbor	Add coexistence neighbor procedure in the WirelessMAN-CX system.
Delete neighbor	Delete coexistence neighbor procedure in the WirelessMAN-CX system.
Channel Switch	Ask the neighbor system to switch to an alternative channel.
Master Sub-frame Switch	Ask the neighbor system to switch to an alternative master sub-frame allocation.
OCSI backoff	Ask the neighbor system to hold on the OCSI signaling or recover.
.....	.....

The following sub-sections define the primitive when its action type is set to a specific action.

**15.6.1.1(or 14.2.12.1.1) C-CX-REQ (Action Type = Add neighbor)****Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to request adding the requesting BS into the neighborhood contact list of the requested BS.

**Semantics of the service primitive:**

The parameters of the primitive are as follow:

**C-CX-REQ**

(  
Operation\_Type: Action,  
Action\_Type: Add neighbor,  
Destination: BS, NCMS,  
Attribute\_List:  
  BSID,  
  Contact Network address,  
  Channel Center Frequency,  
  Channel Width,  
  Channel information  
 )

<u>Attribute</u>	<u>Contents</u>
<u>BSID</u>	<u>The BSID of the requested BS.</u>
<u>Contact Network address</u>	<u>The IP address of the requested BS or the agent of the requested BS.</u>
<u>Channel Center Frequency</u>	<u>in10kHz</u>
<u>Channel Width</u>	<u>in10kHz</u>
<u>Channel information</u>	<u>The channel information of the requesting BS. Containing:</u> <u>Modulation mode (0-reserved; 1-OFDM; 2-OFDMA; 3-15 reserved)</u> <u>alternative Channel Flag (0- no ALTCH; 1-have ALTCH)</u>

**When generated:****• 802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to request the NCMS to inform the requested BS to add the requesting BS into the neighborhood contact list, while the WirelessMAN-CX system of the requesting BS have discover the requested BS's system's neighboring.

**• NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to request the requested neighbor to adding the requesting BS into the neighborhood contact list, while NCMS is requested by the requesting BS.

**Effect of receipt:****• NCMS:**

The NCMS perform the action to inform the requested BS to add the requesting BS into the neighborhood contact list.

**• 802.16 entity (BS):**

The requested BS performs the coexistence procedure and response to the requesting BS accordingly.

**15.6.1.2(or 14.2.12.1.2) C-CX-REQ (Action Type = Delete neighbor)****Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to request deleting the requesting BS from the neighborhood contact list of the requested BS.

**Semantics of the service primitive:**

The parameters of the primitive are as follow:

**C-CX-REQ**

(  
Operation Type: Action,  
Action Type: Delete neighbor,  
Destination: BS, NCMS,  
Attribute List:  
BSID,  
Contact Network address  
 )

<u>Attribute</u>	<u>Contents</u>
<u>BSID</u>	<u>The BSID of the requested BS.</u>
<u>Contact Network address</u>	<u>The IP address of the requested BS or the agent of the requested BS.</u>

**When generated:**

**• 802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to request the NCMS to inform the requested BS to delete the requesting BS from the neighborhood contact list, while the WirelessMAN-CX system of the requesting BS is stop neighboring the requested BS's system.

**• NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to request the requested neighbor to delete the requesting BS from the neighborhood contact list, while NCMS is requested by the requesting BS.

**Effect of receipt:**

**• NCMS:**

The NCMS perform the action to inform the requested BS to delete the requesting BS from the neighborhood contact list.

**• 802.16 entity (BS):**

The requested BS performs the coexistence procedure and response to the requesting BS accordingly.

**15.6.1.3(or 14.2.12.1.3) C-CX-REQ (Action Type = Channel Switch)**

**Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to request the requested BS (in the neighborhood contact list of the requesting BS) to switch to an alternative channel.

**Semantics of the service primitive:**

The parameters of the primitive are as follow:

**C-CX-REQ**

(  
Operation Type: Action,  
Action Type: Channel Switch,  
Destination: BS, NCMS,  
Attribute List:  
BSID,  
Requested BSID,  
Channel Center Frequency,  
Channel Width,  
Rolling back indication,  
FSN  
 )

)

<b>Attribute</b>	<b>Contents</b>
<u>BSID</u>	<u>The requesting BS identifier</u>
<u>Requested BSID</u>	<u>BS identifier of the requested BS</u>
<u>Channel Center Frequency</u>	<u>Channel Center Frequency of the requested BS</u>
<u>Channel Width</u>	<u>Channel Width of the requested BS</u>
<u>Rolling back indication</u>	<u>0: to switch to one of the alternative channels</u> <u>1: to switch back to the channel before the last channel switching request</u>
<u>FSN</u>	<u>Frame sequence number to switch channel</u>

**When generated:**

• **802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to request the NCMS to inform the requested BS to switch to an alternative channel.

• **NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to request the requested neighbor to switch to an alternative channel, while NCMS is requested by the requesting BS.

**Effect of receipt:**

• **NCMS:**

The NCMS perform the action to inform the requested BS to switch to an alternative channel.

• **802.16 entity (BS):**

The requested BS performs the coexistence procedure and response to the requesting BS accordingly.

**15.6.1.4(or 14.2.12.1.4) C-CX-REQ (Action Type = Master Sub-frame Switch)**

**Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to request the requested BS (in the neighborhood contact list of the requesting BS) to switch the master sub-frame allocation to an ALTSF.

**Semantics of the service primitive:**

The parameters of the primitive are as follow:

**C-CX-REQ**

(

- Operation Type: Action,
- Action Type: Delete neighbor,
- Destination: BS, NCMS,
- Attribute List:
  - BSID,
  - Requested BSID,
  - Channel Center Frequency,
  - Channel Width
  - sub-frame ID,
  - Rolling back indication,
  - FSN

)

<b>Attribute</b>	<b>Contents</b>
<u>BSID</u>	<u>The requesting BS identifier</u>
<u>Requested BSID</u>	<u>BS identifier of the requested BS</u>
<u>Channel Center Frequency</u>	<u>working ChannelCenterFrequency of the requested</u>

	<u>BS</u>
<u>Channel Width</u>	<u>Channel width of the requested BS</u>
<u>sub-frame ID</u>	<u>The current master sub-frame ID of the requested BS</u>
<u>Rolling back indication</u>	<u>0: to switch master sub-frame to one of the ALTSE</u> <u>1: to switch back to the sub-frame before the last master sub-frame switching request</u>
<u>FSN</u>	<u>Frame sequence number to switch master sub-frame</u>

**When generated:**

• **802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to request the NCMS to inform the requested BS to switch the master sub-frame allocation to an ALTSE.

• **NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to request the requested neighbor to switch the master sub-frame allocation to an ALTSE, while NCMS is requested by the requesting BS.

**Effect of receipt:**

• **NCMS:**

The NCMS perform the action to inform the requested BS to switch the master sub-frame allocation to an ALTSE.

• **802.16 entity (BS):**

The requested BS performs the coexistence procedure and response to the requesting BS accordingly.

**15.6.1.5(or 14.2.12.1.5) C-CX-REQ (Action Type = OCSI backoff)**

**Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to request the requested BS (in the neighborhood contact list of the requesting BS) to hold on the OCSI signaling or recover. See 15.3.4.4

**Semantics of the service primitive:**

The parameters of the primitive are as follow:

**C-CX-REQ**

(  
Operation Type: Action,  
Action Type: Delete neighbor,  
Destination: BS, NCMS,  
Attribute List:  
BSID,  
Requested BSID,  
OCSN,  
Backoff request  
 )

<u>Attribute Contents</u>	<u>Contents</u>
<u>BSID</u>	<u>The requesting BS identifier</u>
<u>Requested BSID</u>	<u>identifier of the requested BS</u>
<u>OCSN</u>	<u>OCSN of the occupying OCSI</u>
<u>Backoff request</u>	<u>1- start backoff request</u> <u>0- end of backoff request</u>

**When generated:**

- **802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to request the NCMS to inform the requested BS to hold on the OCSI signaling or recover, when the requesting BS is reported by its SS that collision has been detected in the OCSI which is occupying by this neighbor.

- **NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to request the requested BS to hold on the OCSI signaling or recover, when NCMS is requested by the requesting BS.

**Effect of receipt:**

- **NCMS:**

The NCMS perform the action to inform the requested BS to hold on the OCSI signaling or recover.

- **802.16 entity (BS):**

The requested BS performs the coexistence procedure and response to the requesting BS accordingly.

**15.6.1.6(or 14.2.12.1.6) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.1.7(or 14.2.12.1.7) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.1.8(or 14.2.12.1.8) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.1.9(or 14.2.12.1.9) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.1.10(or 14.2.12.1.10) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.1.11(or 14.2.12.1.11) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.1.12(or 14.2.12.1.12) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.1.13(or 14.2.12.1.13) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.1.14(or 14.2.12.1.14) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.1.15(or 14.2.12.1.15) C-CX-REQ (Action Type = TBD)**

TBD

**15.6.2(or 14.2.12.2) C-CX-RSP**

This primitive is used by an 802.16 entity or NCMS to response to a request in coexistence procedure. The Action Type included in this primitive defines the type of coexistence procedure to be performed. The possible Action Types for this primitive are listed in Table below:

<u>Action Type</u>	<u>Description</u>
--------------------	--------------------



<u>Add neighbor</u>	<u>Add coexistence neighbor procedure in the WirelessMAN-CX system.</u>
<u>Delete neighbor</u>	<u>Delete coexistence neighbor procedure in the WirelessMAN-CX system.</u>
<u>Channel Switch</u>	<u>Answer the neighbor's request of switching to an alternative channel.</u>
<u>Master Sub-frame Switch</u>	<u>Answer the neighbor's request of switching to an alternative master sub-frame allocation.</u>
<u>OCSI backoff</u>	<u>Answer the neighbor's request of holdinf on the OCSI signaling or recover.</u>
.....	.....

The following sub-sections define the primitive when its action type is set to a specific action.

### **15.6.2.1(or 14.2.12.2.1) C-CX-RSP (Action Type = Add neighbor)**

#### **Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to respond the request of adding the requesting BS into the neighborhood contact list of the responding BS.

#### **Semantics of the service primitive:**

The parameters of the primitive are as follow:

##### **C-CX-RSP**

```
(
  Operation_Type: Action,
  Action_Type: Add neighbor,
  Destination: BS, NCMS,
  Attribute_List:
    No attribute.
)
```

#### **When generated:**

##### **• 802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to respond the request of adding the requesting BS into the neighborhood contact list of the responding BS.

##### **• NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to inform the requesting BS of the response from the requested BS.

#### **Effect of receipt:**

##### **• NCMS:**

The NCMS perform the action to inform the requesting BS of the response from the requested BS.

##### **• 802.16 entity (BS):**

The requesting BS updates the neighborhood contact list.

### **15.6.2.2(or 14.2.12.2.2) C-CX-RSP (Action Type = Delete neighbor)**

#### **Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to respond the request of deleting the requesting BS from the neighborhood contact list of the responding BS.

#### **Semantics of the service primitive:**

The parameters of the primitive are as follow:

##### **C-CX-RSP**

```
(
  Operation_Type: Action,
  Action_Type: Delete neighbor,
  Destination: BS, NCMS,
)
```

Attribute List:  
No attribute.  
 )

**When generated:**

• **802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to respond the request of deleting the requesting BS from the neighborhood contact list of the responding BS.

• **NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to inform the requesting BS of the response from the requested BS.

**Effect of receipt:**

• **NCMS:**

The NCMS perform the action to inform the requesting BS of the response from the requested BS.

• **802.16 entity (BS):**

The requesting BS updates the neighborhood contact list.

**15.6.2.3(or 14.2.12.2.3) C-CX-RSP (Action Type = Channel Switch)**

**Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to respond the request of channel switching to the requesting BS.

**Semantics of the service primitive:**

The parameters of the primitive are as follow:

**C-CX-RSP**

(  
Operation Type: Action.  
Action Type: Delete neighbor.  
Destination: BS, NCMS.  
Attribute List:  
     BSID.  
     Requested BSID.  
     Acknowledge.  
     Channel Center Frequency.  
     Channel Width.  
     FSN  
 )

<b><u>Attribute</u></b>	<b><u>Contents</u></b>
<u>BSID</u>	<u>The requesting BS identifier</u>
<u>Requested BSID</u>	<u>BS identifier of the requested BS</u>
<u>Acknowledge</u>	<u>0: rejection for fail in switching</u> <u>1: succeeded in switching</u>
<u>Channel Center Frequency</u>	<u>Channel Center Frequency of the requested BS</u> <u>will switch to</u>
<u>Channel Width</u>	<u>Channel Width of the requested BS</u>
<u>FSN</u>	<u>Frame sequence number of the channel</u> <u>switching</u>

**When generated:**

• **802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to respond the request of channel switching to the requesting BS.

• **NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to inform the requesting BS of the response from the requested BS.

**Effect of receipt:**• **NCMS:**

The NCMS perform the action to inform the requesting BS of the response from the requested BS.

• **802.16 entity (BS):**

The requesting BS updates the information of the responding BS.

**15.6.2.4(or 14.2.12.2.4) C-CX-RSP (Action\_Type = Master Sub-frame Switch)****Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to respond the request of master sub-frame allocation switching to the requesting BS.

**Semantics of the service primitive:**

The parameters of the primitive are as follow:

**C-CX-RSP**

```
(
  Operation_Type: Action,
  Action_Type: Delete neighbor,
  Destination: BS, NCMS,
  Attribute_List:
    BSID,
    Requested BSID,
    Acknowledge,
    Target Channel Center Frequency,
    Target sub-frame ID,
    FSN
)
```

<b><u>Attribute</u></b>	<b><u>Contents</u></b>
<u>BSID</u>	<u>The requesting BS identifier</u>
<u>Requested BSID</u>	<u>BS identifier of the requested BS</u>
<u>Acknowledge</u>	<u>0: rejection for fail in switching</u> <u>1: succeeded in switching</u>
<u>Target Channel Center Frequency (for new master sub-frame)</u>	<u>target ChannelCenterFrequency of the requested BS</u>
<u>Target sub-frame ID (for new master sub-frame)</u>	<u>The sub-frame ID of the requested BS will switch its master sub-frame to</u>
<u>FSN</u>	<u>Frame sequence number of the master sub-frame switching</u>

**When generated:**• **802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to respond the request of master sub-frame allocation switching to the requesting BS.

• **NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to inform the requesting BS of the response from the requested BS.

**Effect of receipt:**• **NCMS:**

The NCMS perform the action to inform the requesting BS of the response from the requested BS.

• **802.16 entity (BS):**

The requesting BS updates the information of the responding BS.

**15.6.2.5(or 14.2.12.2.5) C-CX-RSP (Action\_Type = OCSI backoff)**

**Function:**

This primitive is used by an 802.16 entity (BS) or NCMS to respond the request of holding on OCSI signaling or request of recover to the requesting BS. See 15.3.4.4

**Semantics of the service primitive:**

The parameters of the primitive are as follow:

**C-CX-RSP**

(  
Operation\_Type: Action,  
Action\_Type: Delete neighbor,  
Destination: BS, NCMS,  
Attribute\_List:  
    BSID,  
    Requested BSID,  
    OCSN,  
    Response indication  
 )

<u>Attribute Contents</u>	<u>Contents</u>
<u>BSID</u>	<u>The requesting BS identifier</u>
<u>Requested BSID</u>	<u>identifier of the requested BS</u>
<u>OCSN</u>	<u>OCSN of the occupying OCSI</u>
<u>Response indication</u>	<u>01- refuse to backoff</u> <u>00- refuse to end the backoff</u> <u>11- notification of acceptance and backoff begin</u> <u>10- notification of acceptance and backoff end</u> <u>because of timer and counter having run out</u>

**When generated:**

**• 802.16 entity (BS) to NCMS:**

This primitive is used by the 802.16 entity (BS) to respond the request of holding on OCSI signaling or request of recover to the requesting BS.

**• NCMS to 802.16 entity (BS):**

This primitive is used by the NCMS to inform the requesting BS of the response from the requested BS.

**Effect of receipt:**

**• NCMS:**

The NCMS perform the action to inform the requesting BS of the response from the requested BS.

**• 802.16 entity (BS):**

The requesting BS updates the information of the responding BS.

**15.6.2.6(or 14.2.12.2.6) C-CX-RSP (Action\_Type = TBD)**

TBD

**15.6.2.7(or 14.2.12.2.7) C-CX-RSP (Action\_Type = TBD)**

TBD

**15.6.2.8(or 14.2.12.2.8) C-CX-RSP (Action\_Type = TBD)**

TBD

**15.6.2.9(or 14.2.12.2.9) C-CX-RSP (Action\_Type = TBD)**

TBD

**15.6.2.10(or 14.2.12.2.10) C-CX-RSP (Action Type = TBD)**  
**TBD**

**15.6.2.11(or 14.2.12.2.11) C-CX-RSP (Action Type = TBD)**  
**TBD**

**15.6.2.12(or 14.2.12.2.12) C-CX-RSP (Action Type = TBD)**  
**TBD**

**15.6.2.13(or 14.2.12.2.13) C-CX-RSP (Action Type = TBD)**  
**TBD**

**15.6.2.14(or 14.2.12.2.14) C-CX-RSP (Action Type = TBD)**  
**TBD**

**15.6.2.15(or 14.2.12.2.15) C-CX-RSP (Action Type = TBD)**  
**TBD**