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Purpose	Adoption
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Clean Up Section 14.5.10

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1. Introduction

In response to the clause editing action item assigned in IEEE 802.16 session #40, this contribution includes text changes for section 14.5.10 after clean up work. This clean up also includes the naming convention modification based on contribution C80216g-05_052r4 which was accepted in session #40.

As part of the modification for the primitives' names, the following are defined:

SAP
- C – Control plane SAP
- M – Management plane SAP

Function
- SMC – Secondary Management Connection
- SFM – Service Flow Management

Operation
- REQ – Request
- RSP – Response to the REQ message
- ACK – Acknowledgement to the reception of RSP or NOTFY message
- NOTFY – Event Notification

2. Proposed Solution

The following changes are made in section 14.5.6:

1. Rename Primitives. The following table provides a mapping between the old and new names of the primitives:

Existing Primitives	New Primitives
Spare Capacity Request	C_RRM_REQ(Operation_Type==Action,Action_Type==Spare Capacity Report)
Spare Capacity Report	C_RRM_RSP(Operation_Type==Action,Action_Type==Spare Capacity Report)
PHY report request	C_RRM_REQ(Operation_Type==Action,Action_Type==Phy_Report)
PHY report	C_RRM_RSP(Operation_Type==Action,Action_Type==Phy_Report)
Neighbor-BS Radio Resource Status Update primitive	C_RRM_NOTFY(Event_Type==BS_Radio_Resource_Status_Update)
	C_RRM_NOTFY(Event_Type==Spare Capacity Report)

2. Due to the renaming and merging of some primitives, the section is re-arranged. However, the content of the primitives are kept same except for some additional fields due of adopted changes in contribution C80216g-05_052r4.

3. Use of 802.16 Entity instead of BS. An 802.16Entity can be either a BS or MS. When a primitive is defined for both BS and MS unless specified otherwise.

4. Primitive diagrams are modified according to contribution C80216g-05_052r4 and also the introducing of 802.16 Entity

5. Most of the text modification shown is due to re-arranging of the section. Only minor text modification is introduced.

3. Detail Text Changes

[*Replace section 14.5.10 with the following*]

14.5.10 Radio Resource Management

14.5.10.1 Radio Measurements and Reporting

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

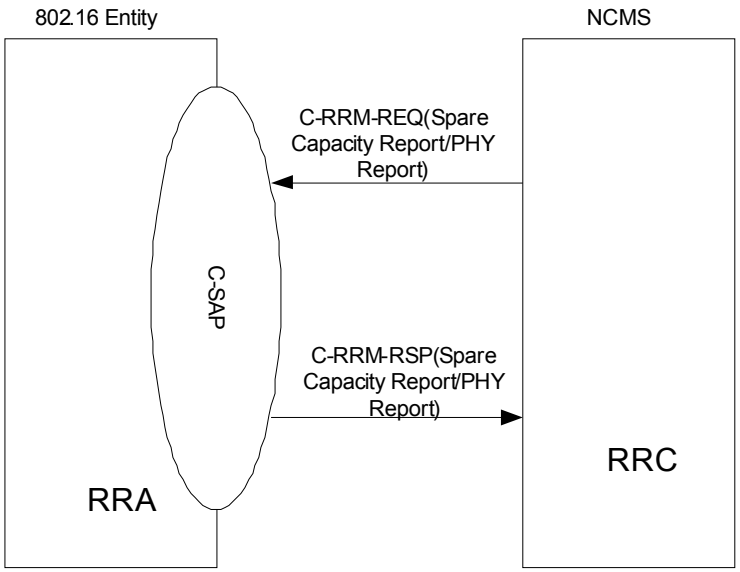

Figure xxx Primitive Flow of C_RRM_REQ/RSP

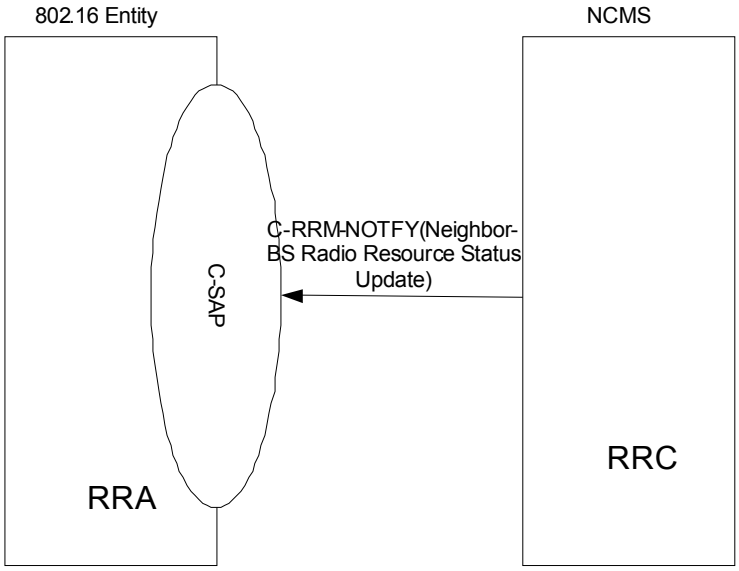

Figure xxx Primitive Flow of C_RRM_NOTFY(Neighbor-BS Radio Resource Status Update)

Figure xxx Primitive Flow of C_RRM_NOTFY(Spare Capacity Report)

14.5.10.1.1 C_RRM_REQ

The Radio Resource Controller (RRC) may use this primitive to request a BS to provide spare capacity information to the RRC or to provide a report of the link level quality for a

specific MS. The RRC may be located in another BS, or in a central entity in the NCMS. The possible action type for this primitive are listed in Table xxx.

Action Type	Description
Spare Capacity Report	Report the spare capacity information
PHY report	Report the link level quality for a specific MS

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

14.5.10.1.1.1 C_RRM_REQ(Operation Type ==Action, Action_Type==Spare Capacity Report)

14.5.10.1.1.1.1 Function

This primitive shall be used to request the BS send spare capacity information periodically or event driven.

14.5.10.1.1.1.2 Semantics of the service primitive

The parameters of the primitives are as follows:

C_RRM_REQ
(
Message_id,
Operation_Type(Action),
Action_Type(Spare Capacity Report),
Object_id(BS_ID or NCMS node),
Attribute_List:
Spare Capacity Report Type,
Report Characteristics,
)

Spare Capacity Report Type
Type of requested report profile. 1 for spare capacity report type 1. (Types > 1 reserved for future types)

Report Characteristics
Indicates whether report should be sent periodically, or event driven. Following events are possible:
- Completion of Network Entry
- Deregistration of MS
- Adding / changing / deleting connections
- MOB_MSHO-REQ received from MS
- MOB_SCAN-REPORT received from MS
- Association performed by MS
- MOB_HO-IND received by Serving BS
- Completion of network re-entry at Target BS after HO
- Report solicitation from RRC

14.5.10.1.1.2 C_RRM_REQ(Operation Type==Action, Action_Type==PHY report)

14.5.10.1.1.2.1 Function

The Radio Resource Controller (RRC) may use this primitive to request a BS to provide a report of the link level quality for a specific MS.

14.5.10.1.1.2.2 Semantics of the service primitive

C_RRM_REQ
(
Message_id,
Operation_Type(Action),
Action_Type(PHY Report),
Object_id(BS_ID or NCMS node),
Attribute_List:
MS_ID,
)

MS ID

48-bit unique identifier of the MS

14.5.10.1.2 C_RRM_RSP

The BS may use this primitive to report spare capacity information to the RRC, as requested by the RRC within the Spare Capacity Request Primitive. Or the BS may use this primitive to provide a report of the link level quality for a specific MS to the Radio Resource Controller (RRC). The possible action type for this primitive are listed in Table xxx.

Action Type	Description
Spare Capacity Report	Report the spare capacity information
PHY report	Report the link level quality for a specific MS

14.5.10.1.2.1 C_RRM_RSP(Operation _Type==Action, Action_Type==Spare Capacity Report)

14.5.10.1.2.1.1 Function

The BS may use this primitive to provide spare capacity information to the RRC, as requested by the RRC within the Spare Capacity Request Primitive.

14.5.10.1.2.1.2 Semantics of the service primitive

C_RRM_RSP
(
Message_id,

Operation_Type(Action),
Action_Type(Spare Capacity Report),
Object_id(BS_ID or NCMS node),
Attribute_List:
Spare Capacity Report Type,
Available Radio Resource,
Radio Resource Fluctation,
)

Spare Capacity Report Type

Type of report profile = 1

Available Radio Resource

Percentage of reported average available sub channels and symbols resources per frame, as defined in section 14.5.13.3

Radio Resource Fluctuation

Radio Resource Fluctuation is used to indicate the degree of fluctuation in DL and UL channel data traffic throughputs. When Radio Resource Fluctuation is set to 0, it implies that the DL and UL data traffic is constant in data throughput. Hence, there is no fluctuation in Available Radio Resource. When Radio Resource Fluctuation is set to maximum value 255, the data traffic is very volatile in nature which makes the Available Radio Resource unpredictable. The Radio Resource Fluctuation for all traffic models should be in the range of 0 to 255.

14.5.10.1.2.2 C_RRM_RSP(Operation _Type==Action, Action_Type==PHY Report)

14.5.10.1.2.2.1 Function

The BS may use this primitive to provide a report of the link level quality for a specific MS to the Radio Resource Controller (RRC).

14.5.10.1.2.2.2 Semantics of the service primitive

C_RRM_RSP
(
Message_id,
Operation_Type(Action),
Action_Type(PHY Report),
Object_id(BS_ID or NCMS node),
Attribute_List:
MS ID,
Downlink Physical Service Level,
Downlink RSSI mean,
Downlink RSSI standard deviation,
Downlink CINR mean,

Uplink Physical Service Level,
Uplink RSSI mean,
Uplink RSSI standard deviation,
Uplink CINR mean,
)

Downlink Physical Service Level
Channel rate available for the MS calculated as a multiple of 1/32 of nominal bandwidth in the correspondent direction assuming 1 bit/Hz. For example, if DL channel bandwidth is 10 MHz, value PSL=4 means 4*1/32*10 Mbps = 1.25 Mbps. 1 PSL 96 (Number of sub channels in different OFDMA modes is multiple of 16 or 32; highest modulation (QAM64) provides 3 bits/Hz)

Downlink RSSI mean
As specified in 8.1.9 Channel quality measurements [802.16-2004].

Downlink RSSI standard deviation
As specified in 8.1.9 Channel quality measurements [802.16-2004].

Downlink CINR mean
As specified in 8.1.9 Channel quality measurements [802.16-2004].

Downlink CINR standard deviation
As specified in 8.1.9 Channel quality measurements [802.16-2004].

Uplink Physical Service Level
Channel rate available for the MS calculated as a multiple of 1/32 of nominal bandwidth in the correspondent direction assuming 1 bit/Hz. (see definition of Downlink Physical Service Level)

Uplink RSSI mean
As specified in 8.1.9 Channel quality measurements [802.16-2004].

Uplink RSSI standard deviation
As specified in 8.1.9 Channel quality measurements [802.16-2004].

Uplink CINR mean
As specified in 8.1.9 Channel quality measurements [802.16-2004].

Uplink CINR standard deviation
As specified in 8.1.9 Channel quality measurements [802.16-2004].

14.5.10.1.3 C_RRM_NOTFY

This primitive can be used by RRC to inform a Serving BS about the list of Neighbor BSs which are potential HO Target Base Stations for any MS's being served by the SBS,

including an information about their radio resource status. And it can be used to report the spare capacity information to the RRC periodically or event driven. The possible event type for this primitive are listed in Table xxx

Event Type	Description
Spare Capacity Report	Report the spare capacity information
Neighbor-BS Radio Resource Status Update	Inform neighbor list BS's list or related information about the radio resource status

14.5.10.1.3.1 C_RRM_NOTFY(Event_Type==Spare Capacity Report)

14.5.10.1.3.1.1 Function

The primitive provide the mechanism to report the spare capacity information to the RRC beside the report solicitation from RRC.

14.5.10.1.3.1.2 Semantics of the service primitive

C_RRM_NOTFY
(
Message_id,
Event_Type(Spare Capacity Report),
Object_id(BS_ID or NCMS node),
Attribute_List:
Spare Capacity Report Type,
Available Radio Resource,
Radio Resource Fluctuation,
)

Spare Capacity Report Type
Type of report profile = 1

Available Radio Resource
Percentage of reported average available sub channels and symbols resources per frame, as defined in section 14.5.13.3

Radio Resource Fluctuation
Radio Resource Fluctuation is used to indicate the degree of fluctuation in DL and UL channel data traffic throughputs. When Radio Resource Fluctuation is set to 0, it implies that the DL and UL data traffic is constant in data throughput. Hence, there is no fluctuation in Available Radio Resource. When Radio Resource Fluctuation is set to maximum value 255, the data traffic is very volatile in nature which makes the Available Radio Resource unpredictable. The Radio Resource Fluctuation for all traffic models should be in the range of 0 to 255.

14.5.10.1.3.2 C_RRM_NOTFY(Event_Type== Neighbor-BS Radio Resource Status Update)

14.5.10.1.3.1.1 Function

This primitive can be used by RRC to inform a Serving BS about the list of Neighbor BSs which are potential HO Target Base Stations for any MS's being served by the SBS, including the information about their radio resource status.

14.5.10.1.3.1.2 Semantics of the service primitive

C_RRM_NOTFY
(
Message_id,
Event_Type(Neighbor-BS Radio Resource Status Update),
Object_id(BS_ID or NCMS node),
Attribute_List:
N_NEIGHBORS,
BS List:
BS_ID,
Available Radio Resource,
Radio Resource Fluctation,
DCD Configuration Change Count,
UCD Configuration Change Count,
)

N NEIGHBORS
Number of neighbor BS's

BS_ID
Unique identifier of BS

Available Radio Resource
Percentage of reported average available sub channels and symbols resources per frame, as defined in section 14.5.13.3

Radio Resource Fluctuation
Radio Resource Fluctuation is used to indicate the degree of fluctuation in DL and UL channel data traffic throughputs. When Radio Resource Fluctuation is set to 0, it implies that the DL and UL data traffic is constant in data throughput. Hence, there is no fluctuation in Available Radio Resource. When Radio Resource Fluctuation is set to maximum value 255, the data traffic is very volatile in nature which makes the Available Radio Resource unpredictable. The Radio Resource Fluctuation for all traffic models should be in the range of 0 to 255.

DCD Configuration Change Count
This represents the Neighbor BS current Downlink Channel Descriptor (DCD) configuration change count

UCD Configuration Change Count

This represents the Neighbor BS current Uplink Channel Descriptor (UCD) configuration change count

14.5.10.2 Power Control Management

<Section Note: PHY Specific sections>