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Re:	Contribution to IEEE 802.16i		
Abstract	This contribution proposed to add mobility related handover and paging group MIBs		
Purpose	Adoption		
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Proposal for Adding Mobility Handover and Paging group MIBs

Huawei Technologies.

Introduction

With the mobility feature introduced, handover between BS and its neighbouring BS is inevitable. This contribution proposes to add BS handover related parameters which will help to execute smoothly handover.

Paging group configuration is also very important in the mobility scenario, proper paging group settings will make the paging procedure simple and effective. The configuration of paging group is also included in this contribution.

Proposed Text

X.1 wmanlfBsObjects

- X.1.1 wmanIfBsMobility
- X.1.1.1 wmanIfBsHandoverConfiguration

wmanIfBsHandoverConfiguration contains handover related parameters. Handover related parameters include BS configuration parameters and its neighbouring BSes configuration parameters.

X.1.1.2 wmanIfBsPagingGroupTable

wmanIfBsPagingGroupTable contains paging group related parameters.

ASN.1 Definitions of 802.16 MIB for SNMP

wmanIfBsMobility OBJECT IDENTIFIER ::= { wmanIfBsObjects 1 }

wmanIfBsHandoverConfiguration OBJECT IDENTIFIER ::= { wmanIfBsMobility 2 }

wmanIfBsOperatorId OBJECT-TYPE SYNTAX Integer32 MAX-ACCESS read-write STATUS current DESCRIPTION "An unique operator identifier." ::= { wmanIfBsHandoverConfiguration 1 }

wmanIfBsId OBJECT-TYPE

SYNTAX WmanIfBsIdType MAX-ACCESS read-write STATUS current DESCRIPTION "An unique BS identifier." ::= { wmanIfBsHandoverConfiguration 2 }

wmanIfBsHandoverSupport OBJECT-TYPE SYNTAX BITS MDHO/FBSS HO not supported(0), FBSS/MDHO DLRF combining supported(1), MDHO DL soft combining supported monitoring single MAP from anchor BS(2), MDHO DL soft combining supported monitoring MAPS from active BSs(3), reserved1(5), reserved2(6), reserved3(7)} MAX-ACCESS read-write STATUS current DESCRIPTION "The Handover supported field indicates what type(s) of HO the BS and the MS supports." ::= { wmanIfBsHandoverConfiguration 3 } wmanIfBsHandoverSupport OBJECT-TYPE SYNTAX BITS { mdho/fbss HO not supported(0), fbss/mdho DLRF combining supported(1), mdho DL soft combining supported monitoring single MAP from anchor BS(2), mdho DL soft combining supported monitoring MAPS from active BSs(3) } **MAX-ACCESS** read-write STATUS current DESCRIPTION "The Handover supported field indicates what type(s) of HO the BS and the MS supports." ::= { wmanIfBsHandoverConfiguration 3 }

wmanIfBsResourceRetainTime OBJECT-TYPE

SYNTAX Integer32 MAX-ACCESS read-write STATUS current DESCRIPTION

"The Resource_Retain_Time is the duration for MS s connection information that will be retained in serving BS. BS shall start Resource_Retain_Time timer at MS notification of pending HO attempt through MOB_HO-IND or by detecting an MS drop. The unit of this value is 100 milliseconds."

::= { wmanIfBsHandoverConfiguration 4 }

wmanIfBsHOProcessOptimizationMSTimer OBJECT-TYPE SYNTAX INTEGER MAX-ACCESS read-write

STATUS current DESCRIPTION "the duration in frames MS shall wait until receipt of the next unsolicited network re-entry MAC management message as indicated in the HO Process Optimization element of the RNG-RSP message." ::= { wmanIfBsHandoverConfiguration 5 }

wmanIfBsMsHORetransmissionTimer OBJECT-TYPE SYNTAX INTEGER

> MAX-ACCESS read-write STATUS current DESCRIPTION

> SYNTAX INTEGER MAX-ACCESS read-write

"After a MS transmits MOB_MSHO-REQ to initiate a handover process, it shall start MS Handover Retransmission Timer and shall not transmit another MOB_MSHO-REQ until the expiration of the MS Handover Retransmission Timer."

::= { wmanIfBsHandoverConfiguration 6 }

```
wmanIfBsMobilityModeSupport OBJECT-TYPE
      SYNTAX BITS
             {
            handover support(0),
            sleep-mode support(1),
            idle-mode support(2)
            }
      MAX-ACCESS read-write
      STATUS current
      DESCRIPTION
            "This parameter is to represent the supported mobility mode."
      ::= { wmanIfBsHandoverConfiguration 7 }
wmanIfBsMsHOConnectProcessingTime OBJECT-TYPE
      SYNTAX INTEGER
      MAX-ACCESS read-write
      STATUS current
      DESCRIPTION
            "Time in ms the MS needs to process information
            on connections provided in
            RNGRSP or REG-RSP message during
            HO "
      ::= { wmanIfBsHandoverConfiguration 8 }
wmanIfBsMsHoTekProcessingTime OBJECT-TYPE
```

2006-01-05 STATUS current DESCRIPTION

> "Time in ms the MS needs to completely process TEK information during HO." ::= { wmanIfBsHandoverConfiguration 9 }

wmanIfBsULPermutationBase OBJECT-TYPE
 SYNTAX OCTET STRING
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "This parameter is used for uplink subcarrier allocation."
 ::= { wmanIfBsHandoverConfiguration 10 }

wmanIfBsDLPermutationBase OBJECT-TYPE
 SYNTAX OCTET STRING
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "This parameter is used for downlink subcarrier allocation."
 ::= { wmanIfBsHandoverConfiguration 11 }

wmanIfBsPreambleIndex OBJECT-TYPE

SYNTAX OCTET STRING MAX-ACCESS read-write STATUS current DESCRIPTION "This parameter is used for downlink synchronization by MS." ::= { wmanIfBsHandoverConfiguration 12 }

wmanIfBsSegmentNumber OBJECT-TYPE
 SYNTAX INTEGER
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "This parameter is an unique segment identifier ."
 ::= { wmanIfBsHandoverConfiguration 13 }

wmanIfNeighbourBsTable OBJECT-TYPE

SYNTAX SEQUENCE OF WmanIfNeighbourBsEntry MAX-ACCESS not-accessible STATUS current DESCRIPTION "This table contains neighbouring BS related parameters." ::= { wmanIfBsHandoverConfiguration 14 }

wmanIfNeighbourBsEntry OBJECT-TYPE	
SYNTAX WmanIfNeighbourBsEntry	
MAX-ACCESS not-accessible	
STATUS current	
DESCRIPTION	
"This table is indexed by wmanIfNeight	oourBsId."
INDEX { wmanIfNeighbourBsId }	
::= { wmanIfNeighbourBsTable 1 }	
<pre>wmanIfNeighbourBsEntry ::= SEQUENCE {</pre>	
wmanIfNeighbourBsId	WmanIfBsIdType,
wmanIfNeighbourBsFAIndex	INTEGER,
wmanIfNeighbourBsEIRP	INTEGER (-128127),
wmanIfNeighbourBsHOProcessOptimization	Integer32,
wmanIfNeighbourBsSchedulingServiceSupport	BITS,
wmanIfNeighbourBsBandwidth	Integer32,
wmanIfNeighbourBsFFTSize	Integer32,
wmanIfNeighbourBsCyclePrefix	Integer32,
wmanIfNeighbourBsFrameDurationCode	Integer32,
wmanIfNeighbourBsULPermutationBase	Integer32,
wmanIfNeighbourBsDLPermutationBase	Integer32,
wmanIfNeighbourBsSegmentNumber In	teger32,
wmanIfNeighbourBsPreambleIndex	Integer32

}

wmanIfNeighbourBsId OBJECT-TYPE
 SYNTAX WmanIfBsIdType
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "The neighbouring BS identifier."
 ::= { wmanIfNeighbourBsEntry 1 }

wmanIfNeighbourBsFAIndex OBJECT-TYPE
 SYNTAX INTEGER
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "Frequency Assignment Index."
 ::= { wmanIfNeighbourBsEntry 2 }

wmanIfNeighbourBsEIRP OBJECT-TYPE SYNTAX INTEGER (-128..127) MAX-ACCESS read-write

STATUS current DESCRIPTION "Neighbour BS EIRP." ::= { wmanIfNeighbourBsEntry 3 }

wmanIfNeighbourBsHOProcessOptimization OBJECT-TYPE

SYNTAX Integer32 MAX-ACCESS read-write STATUS current DESCRIPTION

"Identifies re-entry process management messages that may be omitted during the current HO attempt due to the availability of MS service and operational context information, and the MS service and operational status post-HO completion."

::= { wmanIfNeighbourBsEntry 4 }

```
wmanIfNeighbourBsSchedulingServiceSupport OBJECT-TYPE
```

SYNTAX BITS

```
{
    real-time polling service(0),
    extended real-time polling service(1),
    non-real-time polling service(2),
    unsolicited grant service(3),
    best effort(4)
    }
MAX-ACCESS read-write
STATUS current
DESCRIPTION
"This perpendent is used to indicate poighbout
"This perpendent is used"
"This perpe
```

"This parameter is used to indicate neighbouring BS scheduling service type." ::= { wmanIfNeighbourBsEntry 5 }

wmanIfNeighbourBsBandwidth OBJECT-TYPE

SYNTAX Integer32 MAX-ACCESS read-write STATUS current DESCRIPTION "This parameter is used to indicate neighbouring BS bandwidth." ::= { wmanIfNeighbourBsEntry 6 }

```
wmanIfNeighbourBsFFTSize OBJECT-TYPE
```

SYNTAX Integer32 MAX-ACCESS read-write STATUS current DESCRIPTION "This parameter is used to indicate neighbouring BS FFT size." ::= { wmanIfNeighbourBsEntry 7 }

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wmanIfNeighbourBsCyclePrefix OBJECT-TYPE SYNTAX Integer32 MAX-ACCESS read-write **STATUS current** DESCRIPTION "This parameter is used to indicate neighbouring BS Cycle prefix." ::= { wmanIfNeighbourBsEntry 8 } wmanIfNeighbourBsFrameDurationCode OBJECT-TYPE SYNTAX Integer32 MAX-ACCESS read-write STATUS current DESCRIPTION "This parameter is used to indicate neighbouring BS Frame duration code." ::= { wmanIfNeighbourBsEntry 9 } wmanIfNeighbourBsULPermutationBase OBJECT-TYPE SYNTAX Integer32 MAX-ACCESS read-write STATUS current DESCRIPTION "This parameter is used to indicate neighbouring BS uplink permutation base." ::= { wmanIfNeighbourBsEntry 10 } wmanIfNeighbourBsDLPermutationBase OBJECT-TYPE SYNTAX Integer32 MAX-ACCESS read-write **STATUS current** DESCRIPTION "This parameter is used to indicate neighbouring BS downlink permutation base." ::= { wmanIfNeighbourBsEntry 11 } wmanIfNeighbourBsSegmentNumber OBJECT-TYPE SYNTAX Integer32 MAX-ACCESS read-write **STATUS current DESCRIPTION** "This parameter is used to indicate neighbouring BS segment number."

::= { wmanIfNeighbourBsEntry 12 }

wmanIfNeighbourBsPreambleIndex OBJECT-TYPE SYNTAX Integer32 MAX-ACCESS read-write STATUS current

DESCRIPTION

"This parameter is used to indicate neighbouring BS preamble index."

::= { wmanIfNeighbourBsEntry 13 }

```
wmanIfBsPagingGroupTable OBJECT-TYPE
    SYNTAX SEQUENCE OF WmanIfBsPagingGroupEntry
    MAX-ACCESS not-accessible
    STATUS current
    DESCRIPTION
        "This table contains paging group related parameters."
    ::= { wmanIfBsMobility 3 }
```

wmanIfBsPagingGroupEntry OBJECT-TYPE

SYNTAX WmanIfBsPagingGroupEntry MAX-ACCESS not-accessible STATUS current DESCRIPTION "This table is indexed by wmanIfBsPagingGroupId." INDEX { wmanIfBsPagingGroupId } ::= { wmanIfBsPagingGroupTable 1 }

wmanIfBsPagingGroupEntry ::= SEQUENCE {

wmanIfBsPagingControlId	IpAddress,
wmanIfBsPagingGroupId	INTEGER,
wmanIfBsMgmtResourceHoldingTimer	Integer32,
wmanIfBsT46Timer	Integer32,
wmanIfBsPagingRetryCount	INTEGER,
wmanIfBsREQDuration	INTEGER,
wmanIfBsMACHashSkipThreshold	Integer32,
wmanIfBsCDMATransmissionOpportunityAssignment	INTEGER,
wmanIfBsPagingResponseWindow	INTEGER,
wmanIfBsIdleModeTimer	INTEGER,
wmanIfBsIdleModeSystemTimer	INTEGER,
wmanIfBsPagingIntervalLength	INTEGER,
wmanIfBsPagingCycle	INTEGER

}

wmanIfBsPagingControlId OBJECT-TYPE SYNTAX IpAddress MAX-ACCESS read-write STATUS current DESCRIPTION "This parameter is used to indicate paging controller identifier connected by BS."

::= { wmanIfBsPagingGroupEntry 1 }

2006-01-05 wmanIfBsPagingGroupId OBJECT-TYPE SYNTAX INTEGER MAX-ACCESS read-write **STATUS current** DESCRIPTION "This parameter is used to indicate the paging group identifier assigned to BS by network." ::= { wmanIfBsPagingGroupEntry 2 } wmanIfBsMgmtResourceHoldingTimer OBJECT-TYPE SYNTAX Integer32 MAX-ACCESS read-write **STATUS current** DESCRIPTION "Time the BS maintain connection information with the MS after the BS send DREG-CMD to the MS" ::= { wmanIfBsPagingGroupEntry 3 } wmanIfBsT46Timer OBJECT-TYPE SYNTAX Integer32 MAX-ACCESS read-write **STATUS current** DESCRIPTION "Time the BS waits for DREGREQ in case of unsolicited Idle Mode initiation from BS." ::= { wmanIfBsPagingGroupEntry 4 } wmanIfBsPagingRetryCount OBJECT-TYPE SYNTAX INTEGER MAX-ACCESS read-write STATUS current DESCRIPTION "Number of retries on paging transmission. If the BS does not receive RNG-REQ from the MS until this value decreases to zero. it determines that the MS is unavailable." ::= { wmanIfBsPagingGroupEntry 5 } wmanIfBsREQDuration OBJECT-TYPE SYNTAX INTEGER

MAX-ACCESS read-write

STATUS current

DESCRIPTION

"Waiting value for the DREG-REQ message re-transmission (measured in frames)."

::= { wmanIfBsPagingGroupEntry 6 }

```
wmanIfBsMACHashSkipThreshold OBJECT-TYPE
```

SYNTAX Integer32 MAX-ACCESS read-write STATUS current DESCRIPTION

> "Maximum number of successive MOB_PAG-ADV messages that may be sent from a BS without individual notification for an MS for which BS is allowed to skip MS MAC Address Hash when the Action Code for the MS is 0b00,'No Action Required'."

::= { wmanIfBsPagingGroupEntry 7 }

 $wmanIfBsCDMATransmissionOpportunityAssignment\ OBJECT-TYPE$

SYNTAX INTEGER

MAX-ACCESS read-write STATUS current

DESCRIPTION

"The CDMA code and transmission opportunity assignment field indicates the assigned code and transmission opportunity for a MS who is paged to use over dedicated CDMA ranging region." ::= { wmanIfBsPagingGroupEntry 8 }

wmanIfBsPagingResponseWindow OBJECT-TYPE

SYNTAX INTEGER MAX-ACCESS read-write STATUS current

DESCRIPTION

"The Page-Response Window indicates the Page-Response window for a MS who is paged to

transmit

the assigned code for CDMA ranging channel."
::= { wmanIfBsPagingGroupEntry 9 }

wmanIfBsIdleModeTimer OBJECT-TYPE

SYNTAX INTEGER (128..65536) MAX-ACCESS read-write STATUS current DESCRIPTION "MS timed interval to conduct Location Update. Set timer to MS Idle Mode Timeout capabilities setting. Timer recycles on successful Idle Mode Location Update." ::= { wmanIfBsPagingGroupEntry 10 }

wmanIfBsIdleModeSystemTimer OBJECT-TYPE SYNTAX INTEGER (128..65536) MAX-ACCESS read-write STATUS current DESCRIPTION "For BS acting as Paging Controller, timed interval to receive notification of MS Idle Mode Location Update. Set timer to MS Idle Mode Timeout. Timer recycles on successful Idle Mode

Location Update."

::= { wmanIfBsPagingGroupEntry 11 }

wmanIfBsPagingIntervalLength OBJECT-TYPE SYNTAX INTEGER (2..5) MAX-ACCESS read-write STATUS current DESCRIPTION "time duration of Paging Interval of the BS." ::= { wmanIfBsPagingGroupEntry 12 }

wmanIfBsPagingCycle OBJECT-TYPE
 SYNTAX INTEGER
 MAX-ACCESS read-write
 STATUS current
 DESCRIPTION
 "Cycle in which the paging message is transmitted
 within the paging group."
 ::= { wmanIfBsPagingGroupEntry 13 }