Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Re-definition of Mobile Terminal Management Primitives**
Date Submitted	**2007-03-08**
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Re:	Contribution on comments to IEEE 802.16g/D8
Abstract	Re-definition of mobile terminal management primitives
Purpose	Adoption
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Re-definition of Mobile Terminal Management Primitives

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ETRI

1. Motivation

Some of mobile terminal management primitives are not defined correctly. For example, M-MTM-REQ (Power On) primitive is generated to force the terminal to power on. But, the terminal can not receive the primitive because it has already been powered off.

Another example is the primitives used to change the status of the terminal. Generally, an indication primitive is used to notify any event. But, in the current draft, the NCMS uses an indication primitive to request the terminal to change the current status.

Therefore, primitives defined in subclause 14.2.8 need to be refined. In the next section, we summarized the proposed text changes and reason for the changes.

2. Summary of the Changes

Primitives	Changes	Reason for Changes
M-MTM-REQ (Power on) M-MTM-RSP (Power on)	➤ Remove two primitives ➤ Add a new primitive; M-MTM-IND (Power On)	➤ We can't give any instruction to the device which is powered off.
M-MTM-REQ (Power Down) M-MTM-RSP (Power Down)	➤ The SS generates M-MTM-RSP (Power Down) primitives before it starts power-down procedure.	➤ After power-down, the SS can't generate any primitive.
M-MTM-REQ (Reset) M-MTM-RSP (Reset)	➤ If NCMS at SS side generates the request primitive, the SS performs reset procedure after it responds to the request. And then, it generates M-MTM-IND (reset) primitive to notify the NCMS of the completion of reset. ➤ If NCMS at BS side uses M-MTM-REQ (reset) primitive instead of M-MTM-IND (reset) primitive to reset the terminal	➤ It's better to use one unified primitive to notify the NCMS of a reset event; M-MTM-IND (reset) ➤ The generation of M-MTM-IND (reset) by the NCMS at BS side is not the event notification. It's just a request to reset the terminal
M-MTM-IND (Hold)	➤ Only SS can generate M-MTM-IND (Hold) primitive. ➤ The new primitives are used at BS side; M-MTM-REQ (Hold), M-MTM-RSP (Hold)	➤ The generation of M-MTM-IND (Hold) by the NCMS at BS side is not the event notification. It's just a request to change the status of the terminal
M-MTM-IND (Normal)	➤ Only SS can generate M-MTM-IND (Normal) primitive. ➤ The new primitives are used at BS side; M-MTM-REQ (Normal), M-MTM-RSP (Normal)	➤ The generation of M-MTM-IND (Normal) by the NCMS at BS side is not the event notification. It's just a request to change the status of the terminal

3. Proposed Text Changes

[*Remove Action_Type 'Power On' from the table on page 45*]

[*Add two new Action_Type 'Hold' and 'Normal' to the table on page 45*]

[*Add a new Event_Type 'Power On' to the table on page 46*]

[*Modify Subclause 14.2.8 as follow*]

14.2.8 Mobile Terminal Management

The Mobile Terminal Management Primitives are a set of primitives to manage the status of mobile terminal. A management entity in the NCMS can change the status of mobile terminal into power on/down etc. Those primitives are also used to notify the NCMS of information or events which are related with the status of the mobile terminal.
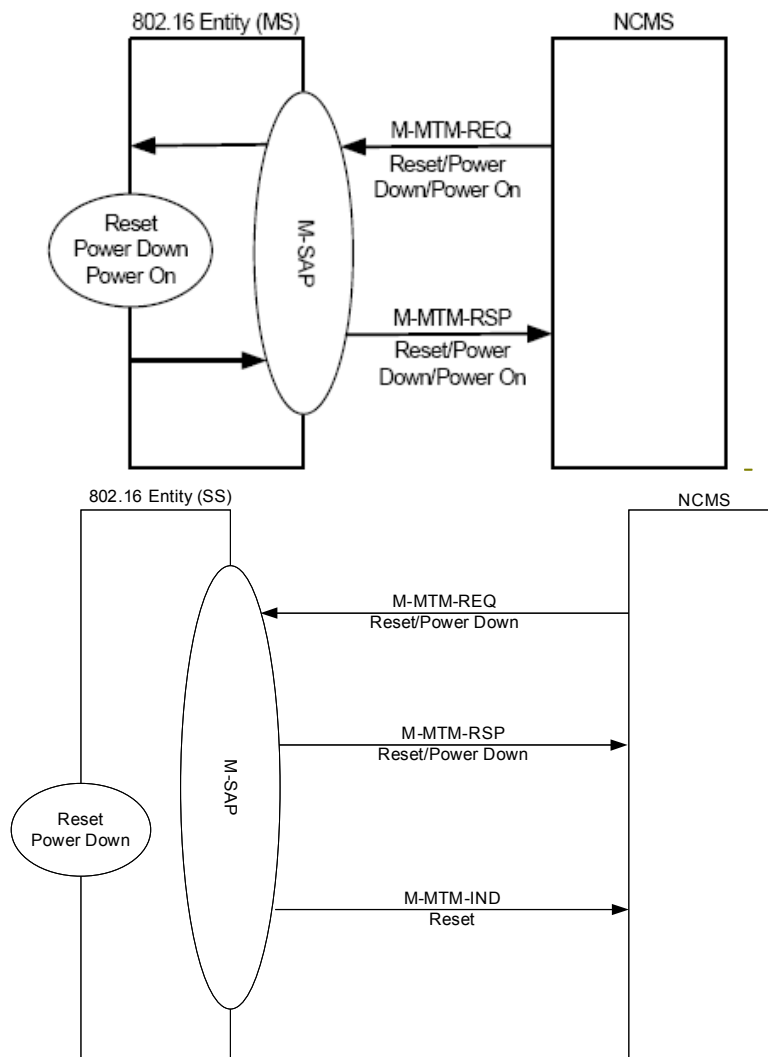
Figure 505 – M-MTM primitives flow for Reset / ~~Power On /~~ Power Down at ~~MS~~SS side
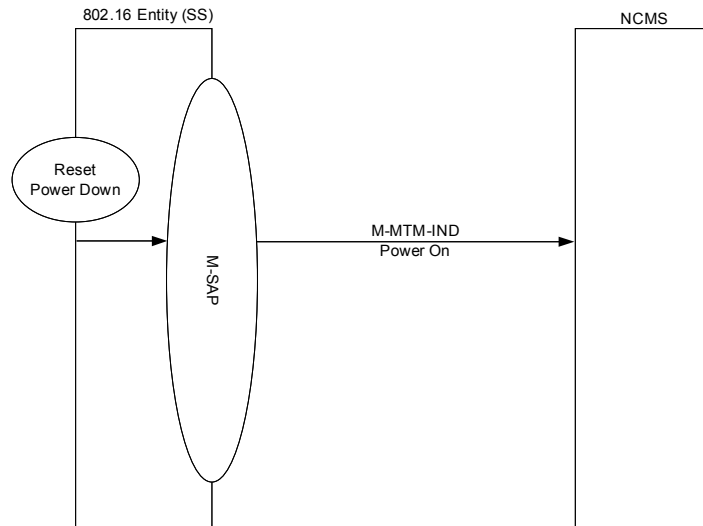
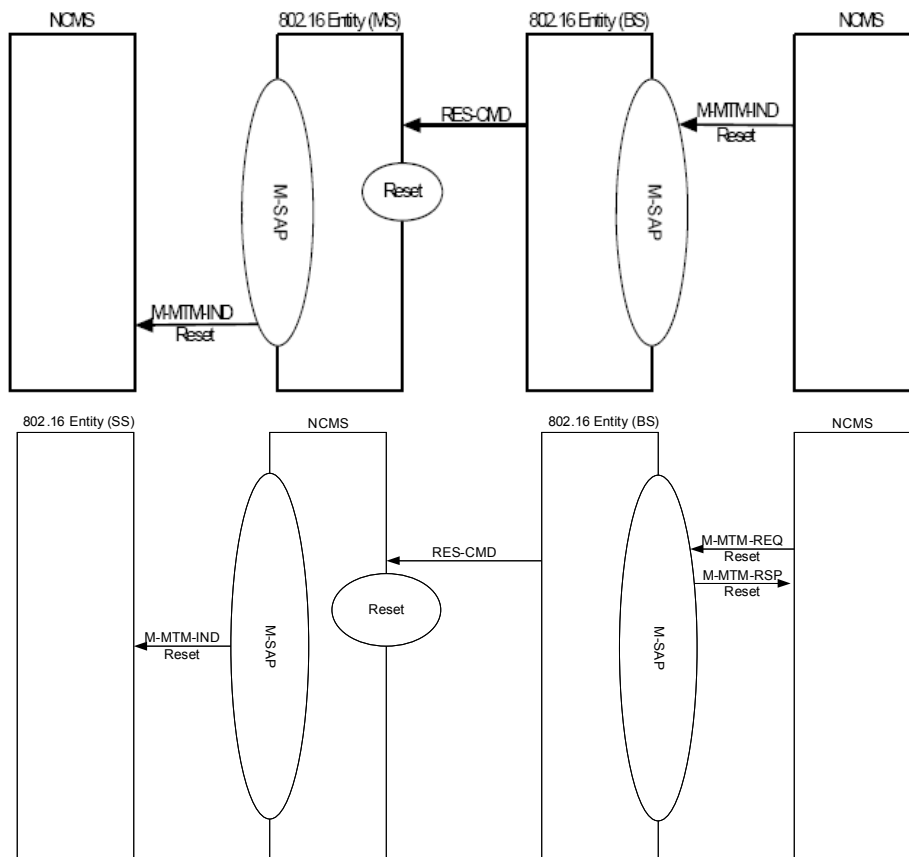Figure xxx – M-MTM flow for Power On at SS side

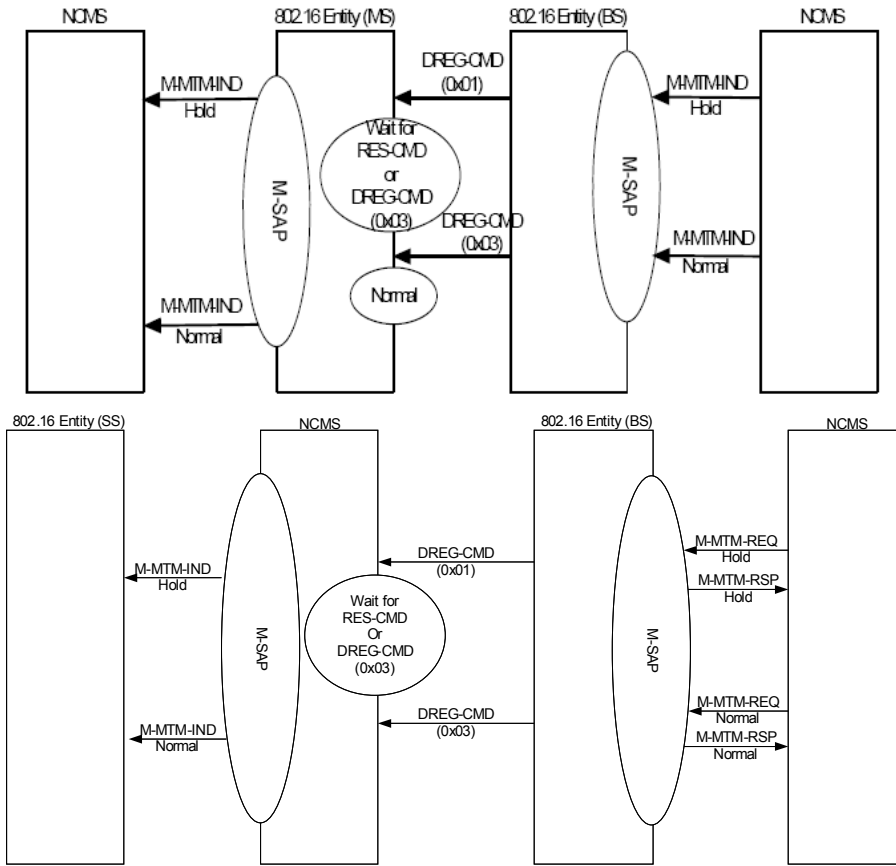Figure 506 – M-MTM primitives flow for Reset

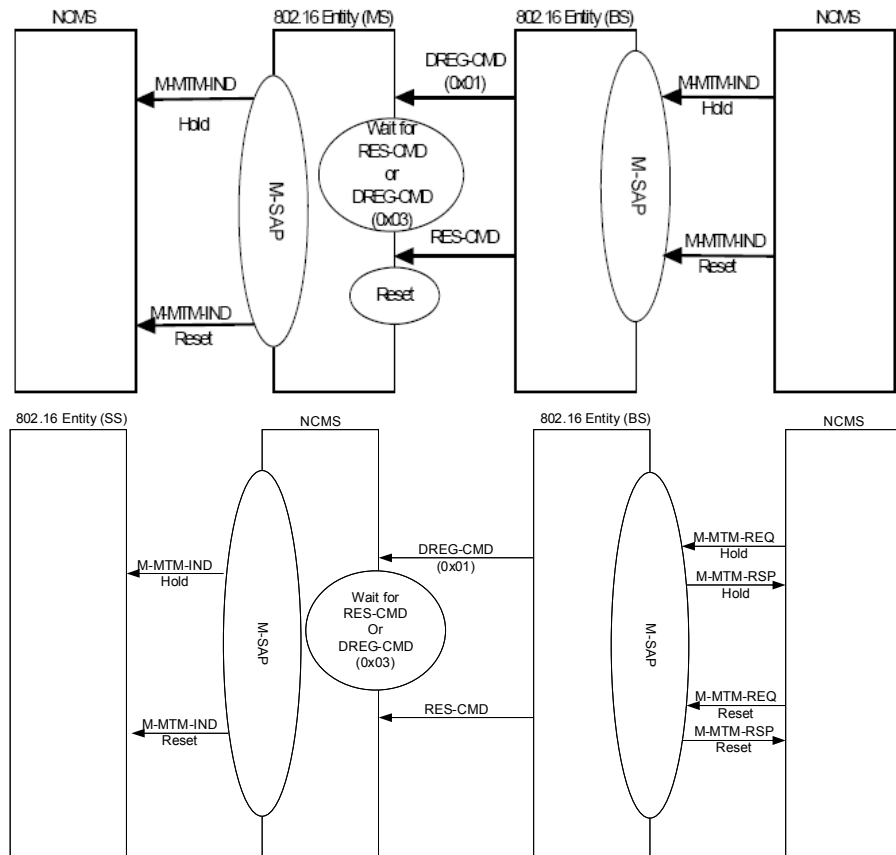Figure 507 – M-MTM primitives flow for Hold and Normal resumption

Figure 508 – M-MTM primitives flow for Hold and Reset

14.2.8.1 M-MTM-REQ

This primitive is used by NCMS or 802.16 entity to request status change of the ~~MS~~SS. The Action_Type included in this primitive defines the type of status change to be performed. The possible Action_Type for this primitive are listed in Table below:

Action type	Description
~~Power On~~	~~Power on procedure between MS and NCMS~~
Power Down	Power down procedure between ~~MS~~SS and NCMS
Reset	Reset Procedure
Hold	Change of the current status to the hold status
Normal	Change of the current status to the normal status

14.2.8.1.1 M-MTM-REQ (Action_Type == Power On)

Function:

This primitive is used by the NCMS to change the status of the MS to Power On. This primitive is only used by the NCMS at MS side.

Semantics of the service primitive:

The following parameters are included in this primitive.

> M-MTM-REQ
> (
>   Operation_Type: Action,
>   Action_Type: Power On,
>   Destination: MS,
>   Attribute_list:
>)

When generated:

This primitive is generated when a higher layer entity in NCMS wants to request the 802.16 MS entity to power itself on.

Effect of receipt:

The 802.16 entity at the MS performs power on procedure and responds to it with M-MTM-RSP primitive.

14.2.8.1.~~2~~1 M-MTM-REQ (Action_Type == Power Down)

Function:

This primitive is used by NCMS to change the status of ~~MS~~SS to Power Down. This primitive is only used by NCMS at ~~MS~~SS side.

Semantics of the service primitive:

The following parameters are included in this primitive.

> M-MTM-REQ
> (

         Operation_Type: Action,
         Action_Type: Power Down,
         Destination: ~~MS~~SS,
         Attribute_list:
)

When generated:
This primitive is generated when a higher layer entity in NCMS wants to request the 802.16 ~~MS~~SS entity to power down.

Effect of receipt:
The 802.16 entity in ~~MS~~SS responds to this primitive with M-MTM-RSP (Power Down) and performs power down procedure

14.2.8.1.~~3~~ 2 M-MTM-REQ (Action_Type == Reset)

Function:
This primitive is used by NCMS at ~~MS~~ SS or BS to reset the mobile terminal.

Semantics of the service primitive:
The following parameters are included in this primitive.

    M-MTM-REQ
    (
         Operation_Type: Action,
         Action_Type: Reset,
         Destination: ~~MS~~SS, or BS,
         Attribute_list:
             ~~MS~~SS MAC Address,
             Reset Code
)

~~MS~~SS MAC Address
    ~~MS~~SS Identifier
Reset Code
    Reason for reset

When generated:
This primitive is generated when a higher layer entity in NCMS wants to reset the ~~mobile terminal~~SS.

Effect of receipt:
If the 802.16 ~~MS~~ SS entity receives this primitive, it shall respond to the request with M-MTM-RSP primitive and ~~it shall~~ re-initialize its MAC. ~~and responds to the request with M-MTM-RSP primitive.~~ After reset procedure is completed, the 802.16 SS entity shall notify the NCMS of the completion of reset procedure using M-MTM-IND (Reset) primitive. If the 802.16 BS entity receives this primitive, it shall sends RES-CMD message to the mobile terminal and respond to the request with M-MTM-RSP (Reset) primitive.

14.2.8.1.3 M-MTM-REQ (Action_Type == Hold)

Function:
This primitive is used by NCMS at BS to change the status of the SS from Normal to Hold status. This primitive is used only by the NCMS at BS side.

Semantics of the service primitive:
The following parameters are included in this primitive.

M-MTM-REQ
(
        Operation_Type: Action,
        Action_Type: Hold,
        Destination: BS,
        Attribute_list:
                SS MAC Address
)

SS MAC Address
        SS Identifier

When generated:
This primitive is generated when NCMS at BS side wants to change the status of the SS from Normal to Hold status.

Effect of receipt:
The BS sends DREG-CMD message with action code = 0x01 to the SS and responds to the request with M-MTM-RSP (Hold) primitive.

14.2.8.1.4 M-MTM-REQ (Action_Type == Normal)

Function:
This primitive is used by NCMS at BS to change the status of the SS to Normal status. This primitive is used only by the NCMS at BS side.

Semantics of the service primitive:
The following parameters are included in this primitive.

M-MTM-REQ
(
        Operation_Type: Action,
        Action_Type: Normal,
        Destination: BS,
        Attribute_list:
                SS MAC Address
)

SS MAC Address
        SS Identifier

When generated:
This primitive is generated when NCMS at BS side wants to change the status of the SS from Hold to Normal status.

Effect of receipt:
The BS sends DREG-CMD message with action code = 0x03 to the SS and responds to the request with M-MTM-RSP (Normal) primitive.

14.2.8.2 M-MTM-RSP

This primitive is used by a 802.16 entity or NCMS to responds a mobile terminal management request. The Action type included in this primitive defines the type of management procedure to be performed. The possible Action_Type for this primitive is listed in Table below:

Action type	Description
Power On	Power on procedure between MS and NCMS

Power Down	Power down procedure between ~~MS~~SS and NCMS
Reset	Reset Procedure
Hold	Change of the current status to the hold status
Normal	Change of the current status to the normal status

~~14.2.8.2.1 M-MTM- RSP (Action_Type == Power On)~~

~~**Function:**~~
~~This primitive is generated by the 802.16 entity to respond to M-MTM-REQ (Power On). This primitive is only used by NCMS at MS side.~~

~~**Semantics of the service primitive:**~~
~~The following parameters are included in this primitive.~~

~~M-MTM-RSP~~
~~(~~
~~Operation_Type: Action,~~
~~Action_Type: Power On,~~
~~Destination: NCMS,~~
~~Attribute_list:~~
~~Result Code~~
~~)~~

~~**When generated:**~~
~~This primitive is generated when the 802.16 MS entity receives M-MTM-REQ (Power On) primitive from NCMS.~~

~~**Effect of receipt:**~~
~~NCMS completes power-on procedure.~~

14.2.8.2.~~2~~1 M-MTM- RSP (Action_Type == Power Down)

Function:
This primitive is generated by the 802.16 entity to respond to M-MTM-REQ (Power Down). This primitive is only used by NCMS at ~~MS~~SS side.

Semantics of the service primitive:
The following parameters are included in this primitive.
M-MTM-RSP
(
Operation_Type: Action,
Action_Type: Power Down,
Destination: NCMS,
Attribute_list:
Result Code
)

When generated:
This primitive is generated when the 802.16 ~~MS~~SS entity receives M-MTM-REQ (Power Down) primitive from NCMS.

Effect of receipt:
NCMS completes power-down procedure.

14.2.8.2.~~3~~2 M-MTM- RSP (Action_Type == Reset)

Function:
This primitive is generated by the 802.16 entity to respond to M-MTM-REQ (Reset). ~~This primitive is only used by NCMS at MS side.~~

Semantics of the service primitive:
The following parameters are included in this primitive.
M-MTM-RSP
(
      Operation_Type: Action,
      Action_Type: Reset,
      Destination: NCMS,
      Attribute_list:
          Result Code
)

When generated:
This primitive is generated when the 802.16 ~~MS~~SS entity receives M-MTM-REQ (Reset) primitive from NCMS.

Effect of receipt:
NCMS completes reset procedure.

14.2.8.2.3 M-MTM-RSP (Action_Type == Hold)

Function:
This primitive is used by BS to respond to M-MTM-REQ (Hold) primitive. This primitive is used only by the BS.

Semantics of the service primitive:
The following parameters are included in this primitive.

    M-MTM-RSP
    (
      Operation_Type: Action,
      Action_Type: Hold,
      Destination: NCMS,
      Attribute_list:
         SS MAC Address
)

    SS MAC Address
        SS Identifier

When generated:
This primitive is generated when the BS receives M-MTM-REQ (Hold) primitive form the NCMS and sends DREG-CMD message with action code = 0x01 to the SS.

Effect of receipt:
The NCMS recognizes that the status of the SS has been changed to Hold status.

14.2.8.2.4 M-MTM-RSP (Action_Type == Normal)

Function:
This primitive is used by BS to respond to M-MTM-REQ (Normal) primitive. This primitive is used only by the BS.

Semantics of the service primitive:

The following parameters are included in this primitive.

    M-MTM-RSP
    (
        Operation_Type: Action,
        Action_Type: Normal,
        Destination: NCMS,
        Attribute_list:
            SS MAC Address
)

    SS MAC Address
        SS Identifier

When generated:
This primitive is generated when the BS receives M-MTM-REQ (Normal) primitive form the NCMS and sends DREG-CMD message with action code = 0x03 to the SS.

Effect of receipt:
The NCMS recognizes that the status of the SS has changed to Normal status.

14.2.8.3 M-MTM-IND

This primitive is used by the 802.16 entity at ~~MS~~SS to notify NCMS of some events. The possible event types for this primitive are listed in Table below:

Action type	Description
Power On	Notification of Power-On event
Reset	Notification of ~~Reset~~ reset event~~procedure initiated by the BS~~
Hold	Notification of status change to Hold status~~Request from the BS to change the current status to the hold status~~
Normal	Notification of status change to Normal status~~Request from the BS to return back to the normal status~~

14.2.8.3.1 M-MTM-IND (Event_Type == Power On)

Function:
This primitive is generated by the 802.16 SS entity to notify the NCMS at SS side of a power-on event. This primitive is used only by the SS.

Semantics of the service primitive:
The following parameters are included in this primitive.

    M-MTM-IND
    (
        Event_Type: Power On,
        Destination: NCMS,
        Attribute_list:
            SS MAC Address
)

    SS MAC Address
        SS Identifier

When generated:
    This primitive is generated when the 802.16 terminal has been powered on.

Effect of receipt:
      NCMS performs initialization procedure.

14.2.8.3.~~1~~ 2 M-MTM-IND (Event_Type == Reset)

Function:
This primitive is generated by the 802.16 ~~MS~~SS entity ~~or NCMS~~ to notify ~~other entity~~the NCMS at SS side of a reset event. This primitive is used only by the SS.

Semantics of the service primitive:
The following parameters are included in this primitive.

      M-MTM-IND
      (
            Event_Type: Reset,
            Destination: ~~BS or~~ NCMS,
            Attribute_list:
                  ~~MS~~SS MAC Address
)

      SS MAC Address
            SS Identifier

When generated:
• NCMS to 802.16 BS entity:
      ~~This primitive is generated when NCMS at BS side wants to reset the mobile terminal.~~
• 802.16 ~~MS~~ entity to NCMS:
      This primitive is generated when the 802.16 entity at ~~MS~~SS receives RES-CMD message from the BS. The 802.16 entity issues this primitive after internal reset procedure.

Effect of receipt:
• NCMS to 802.16 BS entity:
      ~~If 802.16 BS entity receives this primitive, BS sends RES-CMD message to the MS.~~
• 802.16 ~~MS~~ entity to NCMS:
      NCMS performs internal reset procedure and initialization of the 802.16 entity.

14.2.8.3.~~2~~ 3 M-MTM-IND (Event_Type == Hold)

Function:
This primitive is generated by the 802.16 ~~MS~~SS entity ~~or NCMS~~ to notify ~~other entity~~the NCMS at SS side of a hold event. This primitive is used only by the SS.

Semantics of the service primitive:
The following parameters are included in this primitive.

      M-MTM-IND
      (
            Event_Type: Hold,
            Destination: ~~BS,~~ NCMS,
            Attribute_list:
                  ~~MS~~SS MAC Address
)

      SS MAC Address
            SS Identifier

When generated:

• ~~NCMS to 802.16 BS entity:~~
~~This primitive is generated when NCMS at BS side wants to change the status of the MS from Normal to Hold status.~~

• ~~802.16 MS entity to NCMS:~~
This primitive is generated when the 802.16 entity at ~~MS~~SS receives DREG-CMD message with action code = 0x01 from the BS. The 802.16 entity issues this primitive after it changes its status to Hold status.

Effect of receipt:

• ~~NCMS to 802.16 BS entity:~~
~~The BS sends DREG-CMD message with action code = 0x01 to the MS.~~

• ~~802.16 MS entity to NCMS:~~
NCMS waits for the next M-MTM-IND primitive with Action_Type = Normal or Reset.

14.2.8.3.~~3~~ 4 M-MTM-IND (Event_Type == Normal)

Function:

This primitive is generated by the 802.16 ~~BS~~ SS entity ~~or NCMS~~ to notify ~~other entity~~ the NCMS at SS side of a normal event. This primitive is used only by the SS.

Semantics of the service primitive:

The following parameters are included in this primitive.

```
M-MTM-IND
(
        Event_Type: Normal,
        Destination: BS or NCMS,
        Attribute_list:
                MSSS MAC Address
)
```

SS MAC Address
SS Identifier

When generated:

• ~~NCMS to 802.16 BS entity:~~
~~This primitive is generated when NCMS at BS side wants to change the status of the MS from Hold to Normal status.~~

• ~~802.16 MS entity to NCMS:~~
This primitive is generated when the 802.16 entity at ~~MS~~SS receives DREG-CMD message with action code = 0x03 from the BS. The 802.16 entity issues this primitive after it changes its status to Normal status.

Effect of receipt:

• ~~NCMS to 802.16 BS entity:~~
~~BS sends DREG-CMD message with action code = 0x03 to the MS.~~

• ~~802.16 MS entity to NCMS:~~
NCMS returns back to the normal status.