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Re:	
Abstract	Event logging provides a standard and centralized way to record important software and hardware events. It is instrumental to fault mitigation, system debugging, and the monitoring of the system operation, performance. This contribution proposed the BS and SS event log MIB to be included wmanIfMib in IEEE P802.16f/D1.
Purpose	Adoption
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2 1. Introduction

3 Event logging provides a standard and centralized way to record important software and
4 hardware events. Event Log MIB records the transient information associated with an
5 event against the possibility that the Notification message can be lost. It is instrumental to
6 fault mitigation, system debugging, and the monitoring of the system operation,
7 performance. This contribution proposed the BS and SS event log MIB to be included in
8 wmanIfMib in IEEE P802.16f/D1.

9 2. Event Log Requirements

10 wmanIfBsEventTable and wmanIfBsEventTable store the events that are supported
11 by BS and SS respectively. Each event entry contains the following attributes:

- 12
- 13 ▪ wmanIfBsEventIdentifier – the identifier of an event
- 14 ▪ wmanIfBsEventDescription – a string description of the event. It can be
15 configurable from NMS.
- 16 ▪ wmanIfBsEventSeverity -- the severity of an event. It is configurable from NMS.
 - 17 • **Emergency** – Reserved for vendor-specific ‘fatal’ hardware or software
18 errors that prevents normal system operation and causes reporting
19 system to reboot. Vendors may define their own set of emergency events.
 - 20 • **Alert** – A serious failure, which causes reporting system to reboot but it is
21 not caused by hardware or software malfunctioning. After recovering from
22 the critical event, the system **MUST** send a cold/warm start notification.
23 The alert event could not be reported as a Trap or SYSLOG message
24 and **MUST** be stored in the internal log file. The code of this event **MUST**
25 be saved in non-volatile memory and reported later.
 - 26 • **Critical** – A serious failure that requires attention and prevents the device
27 from transmitting data but could be recovered without rebooting the
28 system. After recovering from the error event SS **MUST** send the Link Up
29 notification. Critical events could not be reported as a Trap or SYSLOG
30 message and **MUST** be stored in the internal log file. The code of this
31 event **MUST** be reported later.
 - 32 • **Error** – A failure occurred that could interrupt the normal data flow but will
33 not cause the SS to re-register. Error events could be reported in real time
34 by using the trap or SYSLOG mechanism.
 - 35 • **Warning** – A failure occurred that could interrupt the normal data flow but
36 will not cause the SS to re-register. ‘Warning’ level is assigned to events
37 both SS and BS have information about. To prevent sending the same
38 event both from the SS and the BS, the trap and Syslog reporting
39 mechanism is disabled by default for this level.
 - 40 • **Notice** – The event is important, but is not a failure and could be reported
41 in real time by using the trap or SYSLOG mechanism.

- 1 • **Informational** – The event is of marginal importance, and is not failure,
2 but could be helpful for tracing the normal modem operation.
- 3 • **Debug** – Reserved for vendor-specific non-critical events.
- 4 ▪ wmanIfSsEventNotification – a Boolean value determines if a trap should be
5 reported.
- 6 ▪ wmanIfSsEventNotificationOid – the object identifier of the event.

7 The Event Log consists of the following requirements:

- 8
- 9 ▪ Event log uses the wrap-around buffers to store events. When the buffer is full,
10 the oldest entry will be removed to make room for the new entry. The wrap-
11 around can be disabled by NMS to prevent faulty events from flooding the log
12 buffer quickly.
- 13 ▪ The sizes of the buffers are configurable.
- 14 ▪ Events in the log have a lifespan that is also configurable.
- 15 ▪ NMS can set the minimum severity for the events that should be logged into the
16 buffer.
- 17 ▪ The content of each entry will be retained after the power reset.
- 18 ▪ Certain events can trigger notifications that will be sent to NMS.
- 19 ▪ A pointer is provided to enable the access the latest event.

20

21 Each entry consists of the following objects:

- 22
- 23 ▪ wmanIfSsEventIdentifier – the event ID.
- 24 ▪ wmanIfSsEventLoggedTime – the time when the event occurred.
- 25 ▪ wmanIfSsEventDescription – a string description of the event.
- 26 ▪ wmanIfSsEventSeverity – the severity of the event.

27 **3. Event Log ASN.1 Definition**

```

28
29 WmanIfEventSeverity ::= TEXTUAL-CONVENTION
30     STATUS      current
31     DESCRIPTION
32         "WmanIfEventSeverity defines the alarm Severity of an
33         event."
34     SYNTAX      INTEGER {emergency(1),
35                   alert(2),
36                   critical(3),
37                   error(4),
38                   warning(5),
39                   notice(6),
40                   informational(7),
41                   debug(8)}
42

```

```

1  --
2  -- BS Event log configuration
3  --
4  wmanIfBsEventLogEntryLimit    OBJECT-TYPE
5      SYNTAX                    INTEGER
6      MAX-ACCESS                read-write
7      STATUS                    current
8      DESCRIPTION
9          "The maximum number of event entries that may be held
10         in wmanIfBsEventLogTable. If an application changes
11         the limit while there are events in the log, the
12         oldest events must be discarded to bring the log down
13         to the new limit."
14     DEFVAL                    { 200 }
15     ::= { wmanIfBsEventLog 1 }
16
17  wmanIfBsEventLifeTimeLimit    OBJECT-TYPE
18      SYNTAX                    INTEGER
19      UNITS                    "minutes"
20      MAX-ACCESS                read-write
21      STATUS                    current
22      DESCRIPTION
23          "The number of minutes an event should be kept in the log
24         before it is automatically removed. If an application
25         changes the value of wmanIfBsEventLifeTimeLimit, events
26         that are older than the new time may be discarded to meet
27         the new lifetime. A value of 0 means lifetime limit."
28     DEFVAL                    { 1440 }
29     ::= { wmanIfBsEventLog 2 }
30
31  wmanIfBsEventLogSeverityThreshold    OBJECT-TYPE
32      SYNTAX                    WmanIfEventSeverity
33      MAX-ACCESS                read-write
34      STATUS                    current
35      DESCRIPTION
36          "This object defines the minimum severity level of the
37         event that will be logged into the buffer."
38     DEFVAL                    { warning }
39     ::= { wmanIfBsEventLog 3 }
40
41  wmanIfBsEventLogWrapAroundBuffEnable    OBJECT-TYPE
42      SYNTAX                    TruthValue
43      MAX-ACCESS                read-write
44      STATUS                    current
45      DESCRIPTION
46          "True (1), indicates that the log buffer will be wrapped
47         around when the buffer is full."
48     DEFVAL                    { 1 }
49     ::= { wmanIfBsEventLog 4 }
50
51  wmanIfBsEventLogLatestEvent    OBJECT-TYPE
52      SYNTAX                    Unsigned32 (1..4294967295)
53      MAX-ACCESS                not-accessible
54      STATUS                    current

```

```

1      DESCRIPTION
2          "This object is the index pointing to the latest event in
3          wmanIfBsEventLogTable"
4      DEFVAL      { 1 }
5      ::= { wmanIfBsEventLog 5 }
6
7      wmanIfBsEventTable OBJECT-TYPE
8          SYNTAX      SEQUENCE OF WmanIfBsEventEntry
9          MAX-ACCESS  not-accessible
10         STATUS      current
11         DESCRIPTION
12             "This table provides the events that are supported by BS."
13         ::= { wmanIfBsEventLog 6 }
14
15         wmanIfBsEventEntry OBJECT-TYPE
16             SYNTAX      WmanIfBsEventEntry
17             MAX-ACCESS  not-accessible
18             STATUS      current
19             DESCRIPTION
20                 "Each entry in this table represents an event that can be
21                 generated by BS. It is indexed by ifIndex and
22                 wmanIfBsEventId."
23             INDEX      { ifIndex, wmanIfBsEventIdentifier }
24             ::= { wmanIfBsEventTable 1 }
25
26         WmanIfBsEventEntry ::= SEQUENCE {
27             wmanIfBsEventIdentifier      INTEGER,
28             wmanIfBsEventDescription     SnmpAdminString,
29             wmanIfBsEventSeverity        WmanIfEventSeverity,
30             wmanIfBsEventNotification    TruthValue,
31             wmanIfBsEventNotificationOid OBJECT IDENTIFIER}
32
33         wmanIfBsEventIdentifier OBJECT-TYPE
34             SYNTAX      INTEGER (1..100000)
35             MAX-ACCESS  not-accessible
36             STATUS      current
37             DESCRIPTION
38                 "A numeric value represents the Event Identifier."
39             ::= { wmanIfBsEventEntry 1 }
40
41         wmanIfBsEventDescription OBJECT-TYPE
42             SYNTAX      SnmpAdminString
43             MAX-ACCESS  read-write
44             STATUS      current
45             DESCRIPTION
46                 "This object describes the event."
47             ::= { wmanIfBsEventEntry 2 }
48
49         wmanIfBsEventSeverity OBJECT-TYPE
50             SYNTAX      WmanIfEventSeverity
51             MAX-ACCESS  read-write
52             STATUS      current
53             DESCRIPTION
54                 "This object describes the severity of such event.

```

```

1           The system will assign a severity for each event. But,
2           it can be configurable by NMS"
3           ::= { wmanIfBsEventEntry 3 }
4
5 wmanIfBsEventNotification OBJECT-TYPE
6     SYNTAX      TruthValue
7     MAX-ACCESS  read-write
8     STATUS      current
9     DESCRIPTION
10            "An event notification will be reported when it is
11             True (1)."

```

```

1         wmanIfBsEventLoggedTime           TimeStamp,
2         wmanIfBsEventLogDescription       SnmpAdminString,
3         wmanIfBsEventLogSeverity         WmanIfEventSeverity}
4
5 wmanIfBsEventLogIndex OBJECT-TYPE
6     SYNTAX      Unsigned32 (1..4294967295)
7     MAX-ACCESS  read-only
8     STATUS      current
9     DESCRIPTION
10        "A monotonically increasing integer for the sole purpose
11        of indexing entries within the event log. When it
12        reaches the maximum value, the agent wraps the value
13        back to 1."
14        ::= { wmanIfBsEventLogEntry 1 }
15
16 wmanIfBsEventId OBJECT-TYPE
17     SYNTAX      INTEGER
18     MAX-ACCESS  read-only
19     STATUS      current
20     DESCRIPTION
21        "The identifier of a BS event."
22        ::= { wmanIfBsEventLogEntry 2 }
23
24 wmanIfBsEventLoggedTime OBJECT-TYPE
25     SYNTAX      TimeStamp
26     MAX-ACCESS  read-only
27     STATUS      current
28     DESCRIPTION
29        "The value of sysUpTime when the entry was placed in the
30        log. If the entry occurred before the most recent
31        management system initialization this object value must
32        be set to zero."
33        ::= { wmanIfBsEventLogEntry 3 }
34
35 wmanIfBsEventLogDescription OBJECT-TYPE
36     SYNTAX      SnmpAdminString
37     MAX-ACCESS  read-only
38     STATUS      current
39     DESCRIPTION
40        "This object describes the event."
41        ::= { wmanIfBsEventLogEntry 4 }
42
43 wmanIfBsEventLogSeverity OBJECT-TYPE
44     SYNTAX      WmanIfEventSeverity
45     MAX-ACCESS  read-only
46     STATUS      current
47     DESCRIPTION
48        "This object describes the severity of such event."
49        ::= { wmanIfBsEventLogEntry 5 }
50
51 wmanBsEventTrap NOTIFICATION-TYPE
52     OBJECTS      {wmanIfBsEventId,
53                  wmanIfBsEventLogIndex,
54                  wmanIfBsEventLoggedTime,

```



```

1           wmanIfBsEventDescription,
2           wmanIfBsEventSeverity}
3     STATUS      current
4     DESCRIPTION
5         "This trap report the event."
6     ::= { wmanIfBsTrapDefinitions 12 }
7
8 --
9 -- SS Event log configuration
10 --
11 wmanIfSsEventLogEntryLimit      OBJECT-TYPE
12     SYNTAX      INTEGER
13     MAX-ACCESS  read-write
14     STATUS      current
15     DESCRIPTION
16         "The maximum number of event entries that may be held
17         in wmanIfSsEventLogTable. If an application changes
18         the limit while there are events in the log, the
19         oldest events must be discarded to bring the log down
20         to the new limit."
21     DEFVAL      { 100 }
22     ::= { wmanIfSsEventLog 1 }
23
24 wmanIfSsEventLifeTimeLimit      OBJECT-TYPE
25     SYNTAX      INTEGER
26     UNITS       "minutes"
27     MAX-ACCESS  read-write
28     STATUS      current
29     DESCRIPTION
30         "The number of minutes an event should be kept in the log
31         before it is automatically removed. If an application
32         changes the value of wmanIfSsEventLifeTimeLimit, events
33         that are older than the new time may be discarded to meet
34         the new lifetime. A value of 0 means lifetime limit."
35     DEFVAL      { 1440 }
36     ::= { wmanIfSsEventLog 2 }
37
38 wmanIfSsEventLogSeverityThreshold  OBJECT-TYPE
39     SYNTAX      WmanIfEventSeverity
40     MAX-ACCESS  read-write
41     STATUS      current
42     DESCRIPTION
43         "This object defines the minimum severity level of the
44         event that will be logged into the buffer."
45     DEFVAL      { warning }
46     ::= { wmanIfSsEventLog 3 }
47
48 wmanIfSsEventLogWrapAroundBuffEnable  OBJECT-TYPE
49     SYNTAX      TruthValue
50     MAX-ACCESS  read-write
51     STATUS      current
52     DESCRIPTION
53         "True (1), indicates that the log buffer will be wrapped
54         around when the buffer is full."

```

```

1      DEFVAL      { 1 }
2      ::= { wmanIfSsEventLog 4 }
3
4 wmanIfSsEventLogLatestEvent OBJECT-TYPE
5     SYNTAX      Unsigned32 (1..4294967295)
6     MAX-ACCESS  not-accessible
7     STATUS      current
8     DESCRIPTION
9         "This object is the index pointing to the latest event in
10        wmanIfSsEventLogTable"
11     DEFVAL      { 1 }
12     ::= { wmanIfSsEventLog 5 }
13
14 wmanIfSsEventTable OBJECT-TYPE
15     SYNTAX      SEQUENCE OF WmanIfSsEventEntry
16     MAX-ACCESS  not-accessible
17     STATUS      current
18     DESCRIPTION
19         "This table provides the events that are supported by SS."
20     ::= { wmanIfSsEventLog 6 }
21
22 wmanIfSsEventEntry OBJECT-TYPE
23     SYNTAX      WmanIfSsEventEntry
24     MAX-ACCESS  not-accessible
25     STATUS      current
26     DESCRIPTION
27         "Each entry in this table represents an event that can be
28         generated by SS. It is indexed by wmanIfSsEventId."
29     INDEX      { ifIndex, wmanIfSsEventIdentifier }
30     ::= { wmanIfSsEventTable 1 }
31
32 WmanIfSsEventEntry ::= SEQUENCE {
33     wmanIfSsEventIdentifier      INTEGER,
34     wmanIfSsEventDescription     SnmpAdminString,
35     wmanIfSsEventSeverity        WmanIfEventSeverity,
36     wmanIfSsEventNotification    TruthValue,
37     wmanIfSsEventNotificationOid OBJECT IDENTIFIER}
38
39 wmanIfSsEventIdentifier OBJECT-TYPE
40     SYNTAX      INTEGER (1..100000)
41     MAX-ACCESS  not-accessible
42     STATUS      current
43     DESCRIPTION
44         "A numeric value represents the Event Identifier."
45     ::= { wmanIfSsEventEntry 1 }
46
47 wmanIfSsEventDescription OBJECT-TYPE
48     SYNTAX      SnmpAdminString
49     MAX-ACCESS  read-write
50     STATUS      current
51     DESCRIPTION
52         "This object describes the event."
53     ::= { wmanIfSsEventEntry 2 }
54

```

```

1 wmanIfSsEventSeverity OBJECT-TYPE
2     SYNTAX      WmanIfEventSeverity
3     MAX-ACCESS  read-write
4     STATUS      current
5     DESCRIPTION
6         "This object describes the severity of such event.
7         The system will assign a severity for each event. But,
8         it can be configurable by NMS"
9     ::= { wmanIfSsEventEntry 3 }
10
11 wmanIfSsEventNotification OBJECT-TYPE
12     SYNTAX      TruthValue
13     MAX-ACCESS  read-write
14     STATUS      current
15     DESCRIPTION
16         "An event notification will be reported when it is
17         True (1)."

```

```

1      INDEX      { ifIndex, wmanIfSsEventLogIndex }
2      ::= { wmanIfSsEventLogTable 1 }
3
4  WmanIfSsEventLogEntry ::= SEQUENCE {
5      wmanIfSsEventLogIndex      Unsigned32,
6      wmanIfSsEventId            INTEGER,
7      wmanIfSsEventLoggedTime    TimeStamp,
8      wmanIfSsEventLogDescription SnmpAdminString,
9      wmanIfSsEventLogSeverity    WmanIfEventSeverity}
10
11 wmanIfSsEventLogIndex OBJECT-TYPE
12     SYNTAX      Unsigned32 (1..4294967295)
13     MAX-ACCESS  read-only
14     STATUS      current
15     DESCRIPTION
16         "A monotonically increasing integer for the sole purpose
17         of indexing entries within the event log. When it
18         reaches the maximum value, the agent wraps the value
19         back to 1."
20     ::= { wmanIfSsEventLogEntry 1 }
21
22 wmanIfSsEventId OBJECT-TYPE
23     SYNTAX      INTEGER
24     MAX-ACCESS  read-only
25     STATUS      current
26     DESCRIPTION
27         "The identifier of a SS event."
28     ::= { wmanIfSsEventLogEntry 2 }
29
30 wmanIfSsEventLoggedTime OBJECT-TYPE
31     SYNTAX      TimeStamp
32     MAX-ACCESS  read-only
33     STATUS      current
34     DESCRIPTION
35         "The value of sysUpTime when the entry was placed in the
36         log. If the entry occurred before the most recent
37         management system initialization this object value must
38         be set to zero."
39     ::= { wmanIfSsEventLogEntry 3 }
40
41 wmanIfSsEventLogDescription OBJECT-TYPE
42     SYNTAX      SnmpAdminString
43     MAX-ACCESS  read-only
44     STATUS      current
45     DESCRIPTION
46         "This object describes the event."
47     ::= { wmanIfSsEventLogEntry 4 }
48
49 wmanIfSsEventLogSeverity OBJECT-TYPE
50     SYNTAX      WmanIfEventSeverity
51     MAX-ACCESS  read-only
52     STATUS      current
53     DESCRIPTION
54         "This object describes the severity of such event."

```

```
1      ::= { wmanIfSsEventLogEntry 5 }
2
3 wmanSsEventTrap NOTIFICATION-TYPE
4     OBJECTS      {wmanIfSsEventId,
5                   wmanIfSsEventLogIndex,
6                   wmanIfSsEventLoggedTime,
7                   wmanIfSsEventDescription,
8                   wmanIfSsEventSeverity}
9     STATUS      current
10    DESCRIPTION
11     "This trap report the event."
12    ::= { wmanIfSsTrapDefinitions 5 }
```

