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Title	BS and SS Event Log for wmanIfMib			
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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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## Table of Content

1.	Introduction	3
2.	Event Log Requirements	3
<i>3</i> .	Event Log ASN.1 Definition	4

1

## **1. Introduction** 2

Event logging provides a standard and centralized way to record important software and 3

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

## **2. Event Log Requirements**

10 11 12	wmanIfBsEventTable and wmanIfBsEventTable store the events that are are supported by BS and SS respectively. Each event entry contains the following attributes:			
13	•	wmanli	fBsEventIdentifier – the identifier of an event	
14 15	•	<ul> <li>wmanIfBsEventDescription – a string description of the event. It can be configurable from NMS.</li> </ul>		
16	•	wmanli	BsEventSeverity the severity of an event. It is configurable from NMS.	
17 18 19		•	<b>Emergency</b> – Reserved for vendor-specific 'fatal' hardware or software errors that prevents normal system operation and causes reporting system to reboot. Vendors may define their own set of emergency events.	
20 21 22 23 24 25		•	<b>Alert</b> – A serious failure, which causes reporting system to reboot but it is not caused by hardware or software malfunctioning. After recovering from the critical event, the system MUST send a cold/warm start notification. The alert event could not be reported as a Trap or SYSLOG message and MUST be stored in the internal log file. The code of this event MUST be saved in non-volatile memory and reported later.	
26 27 28 29 30 31		•	<b>Critical</b> – A serious failure that requires attention and prevents the device from transmitting data but could be recovered without rebooting the system. After recovering from the error event SS MUST send the Link Up notification. Critical events could not be reported as a Trap or SYSLOG message and MUST be stored in the internal log file. The code of this event MUST be reported later.	
32 33 34		•	<b>Error</b> – A failure occurred that could interrupt the normal data flow but will not cause the SS to re-register. Error events could be reported in real time by using the trap or SYSLOG mechanism.	
35 36 37 38 39		•	<b>Warning</b> – A failure occurred that could interrupt the normal data flow but will not cause the SS to re-register. 'Warning' level is assigned to events both SS and BS have information about. To prevent sending the same event both from the SS and the BS, the trap and Syslog reporting mechanism is disabled by default for this level.	
40 41		•	<b>Notice</b> – The event is important, but is not a failure and could be reported in real time by using the trap or SYSLOG mechanism.	

1 2		<ul> <li>Informational – The event is of marginal importance, and is not failure, but could be helpful for tracing the normal modem operation.</li> </ul>			
3		• <b>Debug</b> – Reserved for vendor-specific non-critical events.			
4 5	-	wmanIfSsEventNotification – a Boolean value determines if a trap should be reported.			
6	•	wmanIfSsEventNotificationOid – the object identifier of the event.			
7 8	· · · · · · · · · · · · · · · · · · ·				
9 10 11 12	•	Event log uses the wrap-around buffers to store events. When the buffer is full, the oldest entry will be removed to make room for the new entry. The wrap- around can be disabled by NMS to prevent faulty events from flooding the log buffer quickly.			
13	•	The sizes of the buffers is configurabale.			
14	•	Events in the log have a lifespan that may be configurable.			
15 16	•	NMS can set the minimum severity fo the events that should be logged into the buffer.			
17	•	Certain events can trigger notifications that shall be sent to NMS.			
18	•	A pointer is provided to enable the access to the latest event.			
19 20 21	The co	ntent of each entry should be retained after the power reset.			
22	Each e	entry consists of the following objects:			
23 24	•	wmanlfSsEventIdentifier – the event ID.			
25	•	wmanIfSsEventLoggedTime - the time when the event occurred.			
26	•	wmanIfSsEventDescription – a string description of the event.			
07	_	we and the Event Coverting the according of the event			

• wmanlfSsEventSeverity – the severity of the event.

## 28 **3. Event Log ASN.1 Definition**

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

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

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

```
1
               "This object describes the severity of such event.
2
                The system will assign a severity for each event. But,
3
                it can be configurable by NMS"
 4
           ::= { wmanIfBsEventEntry 3 }
5
6 wmanIfBsEventNotification OBJECT-TYPE
7
                      TruthValue
           SYNTAX
           MAX-ACCESS read-write
8
9
           STATUS
                    current
10
           DESCRIPTION
               "An event notification will be reported when it is
11
12
                True (1)."
13
           DEFVAL
                   { 2 }
           ::= { wmanIfBsEventEntry 4 }
14
15
16 wmanIfBsEventNotificationOid OBJECT-TYPE
17
                       OBJECT IDENTIFIER
           SYNTAX
18
           MAX-ACCESS read-only
19
           STATUS
                      current
20
           DESCRIPTION
21
               "This is the object identifier of a NOTIFICATION-TYPE
                object. If wmanIfBsEventNotification is True, a trap that
22
                is identified by this OID will be reported."
23
24
                       { wmanBsEventTrap }
           DEFVAL
25
           ::= { wmanIfBsEventEntry 5 }
26
27 wmanIfBsEventLogTable OBJECT-TYPE
28
           SYNTAX
                       SEQUENCE OF WmanIfBsEventLogEntry
29
           MAX-ACCESS not-accessible
30
           STATUS
                      current
31
           DESCRIPTION
32
               "This is the Syslog table that is used to store Bs local
33
                events. This table should reside in the non-volatile
                memory that should presist after power cycle or reboot.
34
35
                The number of entries in this table is determined by
                wmanIfBsEventLogEntryLimit. It is a wrap around buffer.
36
37
                When the buffer is full, the oldest entry will be removed
38
                to make room for the newest entry."
39
           ::= { wmanIfBsEventLog 7 }
40
41 wmanIfBsEventLogEntry OBJECT-TYPE
42
           SYNTAX
                       WmanIfBsEventLogEntry
43
           MAX-ACCESS not-accessible
44
           STATUS
                       current
45
           DESCRIPTION
46
               "Entries appear in this table when events occur, and are
47
                removed to make ways for new entries when buffer is full,
48
                the entry passes the lifetime limit. This table is
49
                indexed by ifIndex and wmanIfBsEventLogIndex."
50
           INDEX
                       { ifIndex, wmanIfBsEventLogIndex }
51
           ::= { wmanIfBsEventLogTable 1 }
52
53 WmanIfBsEventLogEntry ::= SEQUENCE {
54
           wmanIfBsEventLogIndex
                                                    Unsigned32,
```

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

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

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

```
1
2 wmanIfSsEventSeverity OBJECT-TYPE
                      WmanIfEventSeverity
3
           SYNTAX
4
           MAX-ACCESS read-write
5
           STATUS
                       current
6
           DESCRIPTION
7
               "This object describes the severity of such event.
8
                The system will assign a severity for each event. But,
9
                it can be configurable by NMS"
10
           ::= { wmanIfSsEventEntry 3 }
11
12 wmanIfSsEventNotification OBJECT-TYPE
13
           SYNTAX
                       TruthValue
14
           MAX-ACCESS read-write
15
           STATUS
                       current
16
           DESCRIPTION
17
               "An event notification will be reported when it is
18
                True (1)."
            DEFVAL
19 --
                         { 0 }
20
           ::= { wmanIfSsEventEntry 4 }
21
22 wmanIfSsEventNotificationOid OBJECT-TYPE
                      OBJECT IDENTIFIER
23
           SYNTAX
24
           MAX-ACCESS read-only
25
           STATUS
                      current
26
           DESCRIPTION
27
               "This is the object identifier of a NOTIFICATION-TYPE
28
                object. If wmanIfSsEventNotification is True, a trap that
29
                is identified by this OID will be reported."
30
           DEFVAL
                       { wmanSsEventTrap }
31
           ::= { wmanIfSsEventEntry 5 }
32
33 wmanIfSsEventLogTable OBJECT-TYPE
                      SEQUENCE OF WmanIfSsEventLogEntry
34
           SYNTAX
35
           MAX-ACCESS not-accessible
           STATUS
36
                       current
37
           DESCRIPTION
               "This is the Syslog table that is used to store SS local
38
39
                events. This table should reside in the non-volatile
40
                memory that should presist after power cycle or reboot.
41
                The number of entries in this table is determined by
42
                wmanIfSsEventLogEntryLimit. It is a wrap around buffer.
43
                When the buffer is full, the oldest entry will be removed
44
                to make room for the newest entry."
45
           ::= { wmanIfSsEventLog 7 }
46
47 wmanIfSsEventLogEntry OBJECT-TYPE
48
           SYNTAX
                       WmanIfSsEventLogEntry
49
           MAX-ACCESS not-accessible
50
           STATUS
                       current
51
           DESCRIPTION
52
               "Entries appear in this table when events occur, and are
53
                removed to make ways for new entries when buffer is full,
54
                the entry passes the lifetime limit. This table is
```

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

1 2 3	"This object describes the severity of such event." ::= { wmanIfSsEventLogEntry 5 }
4	wmanSsEventTrap NOTIFICATION-TYPE
5	OBJECTS {wmanIfSsEventId,
6	wmanIfSsEventLogIndex,
7	wmanIfSsEventLoggedTime,
8	wmanIfSsEventDescription,
9	wmanIfSsEventSeverity}
10	STATUS current
11	DESCRIPTION
12	"This trap report the event."
13	<pre>::= { wmanIfSsTrapDefinitions 5 }</pre>