

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>ASN.1 coding for handover messages in IEEE 802.16.1a</b>	
Date Submitted	<b>2012-09-19</b>	
Source(s)	Eunkyung Kim, Jaesun Cha, Anseok Lee, Wooram Shin, Kwangjae Lim ETRI	Voice: +82-42-860-5415 E-mail: <a href="mailto:ekkim@etri.re.kr">ekkim@etri.re.kr</a>
Re:	In response to Sponsor Ballot on P802.16.1a	
Abstract	ASN.1 coding for handover messages in GRIDMAN Draft Standard	
Purpose	To discuss and adopt the proposed text in the draft amendment document on GRIDMAN	
Notice	<i>This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups.</i> It represents only the views of the participants listed in the “Source(s)” field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who reserve(s) the right to add, amend or withdraw material contained herein.	
Copyright Policy	The contributor is familiar with the IEEE-SA Copyright Policy < <a href="http://standards.ieee.org/IPR/copyrightpolicy.html">http://standards.ieee.org/IPR/copyrightpolicy.html</a> >.	
Patent Policy and Procedures	The contributor is familiar with the IEEE-SA Patent Policy and Procedures: < <a href="http://standards.ieee.org/guides/bylaws/sect6-7.html#6">http://standards.ieee.org/guides/bylaws/sect6-7.html#6</a> > and < <a href="http://standards.ieee.org/guides/opman/sect6.html#6.3">http://standards.ieee.org/guides/opman/sect6.html#6.3</a> >. Further information is located at < <a href="http://standards.ieee.org/board/pat/pat-material.html">http://standards.ieee.org/board/pat/pat-material.html</a> > and < <a href="http://standards.ieee.org/board/pat">http://standards.ieee.org/board/pat</a> >.	

# ASN.1 coding for handover messages in IEEE 802.16.1a

*Eunkyung Kim, Jaesun Cha, Anseok Lee, Wooram Shin, Kwangjae Lim*  
*ETRI*

## 1. Introduction

This document provides ASN.1 encoding for handover messages in P802.16.1a.

## 2. References

- [1] IEEE 802.16-12-0132-00, GRIDMAN System Requirement Document including SARM annex, January 2012.
- [2] IEEE P802.16n<sup>TM</sup>/D5, Air Interface for Broadband Wireless Access Systems - Draft Amendment: Higher Reliability Networks, June 2012.
- [3] IEEE P802.16.1a<sup>TM</sup>/D5, WirelessMAN-Advanced Air Interface for Broadband Access Systems - Draft Amendment: Higher Reliability Networks, June 2012.
- [4] IEEE P802.16<sup>TM</sup>-2012, IEEE Standard for Air Interface for Broadband Wireless Access Systems," August 2012.
- [5] IEEE P802.16.1<sup>TM</sup>-2012, IEEE Standard for WirelessMAN-Advanced Air Interface for Broadband Wireless Access Systems, September 2012.

## 3. Proposed Text on the IEEE 802.16.1a Amendment Draft Standard

[-----Start of Text Proposal-----]

**[Remedy: replace text in line#24 - line#33, page 245, P802.16.1a/D5 by following:]**

```
-- *-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
-- Handover Messages
-- *-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
-- +*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+
-- Handover Indication
-- +*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+*+
AAI-HO-IND ::= SEQUENCE {
    hoEventCode CHOICE {
        targetABSSelection TargetABSSelection, -- 0b00
        targetABSUnreachable TargetABSSelection, -- 0b01
        servingABSUnreachable TargetABSSelection, -- 0b10
        handoverCancel HandoverCancel -- 0b11
    },
    ...
}

TargetABSSelection ::= SEQUENCE {
    targetABSID BSID,
```

```

1      targetPhyCarrierID          PhyCarrierIndex          OPTIONAL,
2      servingPhyCarrierID        PhyCarrierIndex          OPTIONAL
3  }
4  HandoverCancel ::=             SEQUENCE {
5      sfhMismatch                 BOOLEAN,
6      akCount                     AKCount
7  }
8
9
10
11  -- +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
12  -- Handover Request
13  -- +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
14  maxNewABSIndices INTEGER ::= 256
15  maxNewABSFULL INTEGER ::= 256
16  maxNewR1BSIndices INTEGER ::= 256
17  AAI-HO-REQ ::=                SEQUENCE {
18      nbrAdvChangeCount           NbrAdvChangeCount,
19      carrierPreassignmentIndicator BOOLEAN
20                                     OPTIONAL,
21      -- start for HR-Network
22      -- 0: HR-MS is transmitting this message to request HO
23      -- 1: HR-MS is transmitting this message to request FBIS termination
24      fbisTerminationIndicator    BOOLEAN
25                                     OPTIONAL,
26      terminationReason           ENUMERATED {
27          backboneRecovery,
28          noConnectionForFBIS,
29          linkFailure
30      } OPTIONAL,
31      -- end for HR-Network
32      newABSIndexList             NewABSIndexList OPTIONAL,
33      newABSFULLList              NewABSFULLList OPTIONAL,
34      newR1BSIndexList            NewR1BSIndexList OPTIONAL,
35      ...
36  }
37
38  NewABSFULLList ::=             SEQUENCE (SIZE (1..maxNewABSFULL)) OF NewABSFULLInfo
39  NewR1BSIndexList ::=           SEQUENCE (SIZE (1..maxNewR1BSIndices)) OF NewR1BSIndexInfo
40  NewABSIndexInfo ::=            SEQUENCE {
41      nbrABSIndex                 INTEGER (0..255),
42      cinrMean                    CINRMean
43                                     OPTIONAL,
44      rssiMean                    RSSIMean
45                                     OPTIONAL,
46      physicalCarrierIndex         PhyCarrierIndex
47                                     OPTIONAL
48  }
49
50  NewABSFULLInfo ::=             SEQUENCE {
51      nbrABSID                    BSID,
52      cinrMean                    CINRMean
53                                     OPTIONAL,
54      rssiMean                    RSSIMean
55                                     OPTIONAL,
56      physicalCarrierIndex         PhyCarrierIndex
57                                     OPTIONAL
58  }
59
60  NewR1BSIndexInfo ::=           SEQUENCE {
61      nbrAdvChangeCount           NbrAdvChangeCount,
62      nbrR1BSIndex                INTEGER (0..255),
63      cinrMean                    CINRMean
64                                     OPTIONAL,
65      rssiMean                    RSSIMean
66                                     OPTIONAL
67  }
68  CINRMean ::=                  INTEGER (0..255)
69  RSSIMean ::=                   INTEGER (0..255)
70

```

```

1
2 -- +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
3 -- Handover Command
4 -- +---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+---+
5
6 AAI-HO-CMD ::= SEQUENCE {
7     mode CHOICE {
8         hoCmd HandoverCommand, -- 0b00
9         zsCmd ZoneSwitchCommand, -- 0b01
10        hoReject NULLRejectHOCommand, -- 0b10
11        reservedhoCmdHrNetwork NULLHRHandoverCommend-- 0b11
12    },
13    ...
14 }
15
16 HandoverCommand ::= SEQUENCE {
17     hoReentryMode CHOICE {
18         bbeHO NULL,
19         ebbHO EBBHOInfo
20     },
21     disconnectTimeOffset INTEGER (0..255),
22     resourceRetainTime INTEGER (0..255) OPTIONAL,
23     targetBSList SEQUENCE (SIZE (0..maxNewABSIndices)) OF TargetBSInfo
24 }
25
26
27 EBBHOInfo ::= SEQUENCE {
28     -- "interleavingMode" is used to avoid using
29     -- OPTIONAL to those hoReentryXXXX parameters
30     interleavingMode CHOICE {
31         -- hoReentryInterleavingInterval > 0
32         withInterleaving HoReentryInterleavingInfo,
33         -- hoReentryInterleavingInterval = 0(multicarrier EBB)
34         noInterleaving NULL
35     },
36     servingPhyCarrierID PhyCarrierIndex OPTIONAL
37 }
38
39
40 HoReentryInterleavingInfo ::= SEQUENCE {
41     hoReentryInterleavingInterval INTEGER (1..256),
42     hoReentryInterval INTEGER (1..256),
43     hoReentryIteration INTEGER (1..8)
44 }
45
46
47 TargetBSInfo ::= SEQUENCE {
48     targetBSID BSID,
49     preambleIndex CHOICE {
50         saPreambleIndex PreambleIndex,
51         r1PreambleIndex R1PreambleIndex
52     },
53     centerFrequency CenterFreq OPTIONAL,
54     -- Only included for the target R1 BS
55     actionTime INTEGER (0..255),
56     seamlessHO BOOLEAN,
57     cdmaRngFlag CHOICE {
58         offsetInfo OffsetInfo,
59         -- CDMA_RNG_FLAG=0: skip CDMA ranging
60         dedicatedRngInfo DedicatedRngInfo
61         -- CDMA_RNG_FLAG=1: perform CDMA ranging
62     },
63     reentryProcessOptimization BIT STRING (SIZE (5)),
64
65

```

```

1      rngInitDeadline          INTEGER (0..255),
2      preassignedSTID          STID                                OPTIONAL,
3      preassignedMAPMaskKey    BIT STRING (SIZE (15))           OPTIONAL,
4      serviceLevelPrediction    ServiceLevelPrediction,
5      targetPhyCarrierID       PhyCarrierIndex                  OPTIONAL,
6      channelBandwidth         INTEGER (0..255)                  OPTIONAL,
7      cpLength                  CPLength                          OPTIONAL,
8      preassignedCarrierList    SEQUENCE (SIZE (0..maxPreassignedCarriers)) OF
9
10         PreassignedCarrierInfo OPTIONAL,
11     preallocatedBasicCID      CID                                OPTIONAL,
12     sfhDeltaInfo              SEQUENCE {
13         s-SFHChangeCount      INTEGER (0..15),
14         s-SFHApplicationIndication  ENUMERATED {
15             sfhNotApp,
16             -- 0: SFH delta information is not applied
17             -- at the action time
18             sfhApp
19             -- 1: SFH delta information is applied
20             -- at the action time
21         }
22     } OPTIONAL,
23     sfhDeltaInfo              SEQUENCE {
24         sfhSubpacket1          OptSFHSubpacket1                 OPTIONAL,
25         sfhSubpacket2          OptSFHSubpacket2                 OPTIONAL,
26         sfhSubpacket3          OptSFHSubpacket3                 OPTIONAL
27     } OPTIONAL,
28     dcdConfigurationChangeCount DcdConfigurationChangeCount    OPTIONAL,
29     ucdConfigurationChangeCount UcdConfigurationChangeCount    OPTIONAL,
30     -- dcdInfo includes the TLV encoded DCD information of R1 BS
31     dcdInfo                    DcdInfo                           OPTIONAL,
32     -- ucdInfo includes the TLV encoded DCD information of R1 BS
33     ucdInfo                    UcdInfo                           OPTIONAL
34 }
35 }
36 }
37 }
38 }
39 OffsetInfo ::= SEQUENCE {
40     offsetData                  INTEGER (0..127)                 OPTIONAL,
41     offsetControl                INTEGER (0..127)                 OPTIONAL
42 }
43 }
44 DedicatedRngInfo ::= SEQUENCE {
45     dedicatedCDMARngCode        INTEGER (0..31),
46     iotFP                       INTEGER (0..3),
47     offsetControl                INTEGER (0..127),
48     rngOptIndex                  INTEGER (0..1)                    OPTIONAL,
49     rngOptSubframeIndex          INTEGER (0..7)                    OPTIONAL
50 }
51 }
52 }
53 ServiceLevelPrediction ::= ENUMERATED {
54     noServiceAvailable,
55     partiallyServiceAvailable,
56     allServiceAvailable,
57     noServiceLevelPrediction
58 }
59 }
60 }
61 PreassignedCarrierInfo ::= SEQUENCE {
62     carrierStatusIndication      BOOLEAN,
63     physicalCarrierIndex          PhyCarrierIndex
64 }
65 }

```

```

1  DcdConfigurationChangeCount ::= INTEGER (0..255)
2  UcdConfigurationChangeCount ::= INTEGER (0..255)
3  DcdInfo ::= OCTET STRING (SIZE (0..1023))
4  UcdInfo ::= OCTET STRING (SIZE (0..1023))
5
6
7  ZoneSwitchCommand ::= SEQUENCE {
8      hoReentryMode          BOOLEAN,
9      resourceRetainTime     INTEGER (0..255)           OPTIONAL,
10     faIndex                FAIndex OPTIONAL,
11     actionTime             INTEGER (0..255),
12     preambleIndexLZone    BIT STRING (SIZE (8)),
13     preallocatedBasicCID   CID OPTIONAL
14 }
15
16 RejectHOCCommand ::= SEQUENCE {
17     rejectHRNetwork        SEQUENCE {
18         regDuration        INTEGER (0..255),
19         targetBSList       SEQUENCE (SIZE (1..16)) OF SEQUENCE {
20             targetBSID     BSID,
21             saPreambleIndex PreambleIndex           OPTIONAL,
22             r1PreambleIndex R1PreambleIndex         OPTIONAL,
23             centerFrequency CenterFreq
24         }
25     } OPTIONAL
26 }
27
28
29 HRHandoverCommand ::= SEQUENCE {
30     extendHOMode           CHOICE {
31         alternativePath    AlternativePath,
32         fbisInitiation     FBISInitiation,
33         fbisTermination    FBISTermination,
34         hoCmdMSActionAsRS  HOCmdMSActionAsRS
35     },
36     handoverCommandHandoverCommand
37 }
38
39
40 AlternativePath ::= SEQUENCE {
41     role                    BOOLEAN
42     -- 0: stay as HR-MS
43     -- 1: change to HR-RS
44 }
45
46
47 FBISInitiation ::= SEQUENCE {
48     primaryServingABS       BOOLEAN,
49     -- 0: the AMS shall set its primary serving ABS
50     -- as S-ABS (Degraded HR-BS) after network reentry
51     -- 1: the AMS shall set its primary serving ABS
52     -- as T-ABS (Target HR-BS) after network reentry
53     switchedAccessMode     CHOICE {
54         switchedAccessWindowSize INTEGER (0..255),
55         maximumSwitchedAccessWindowSize INTEGER (0..255)
56     },
57     switchingAccessStartTimeOffset INTEGER (0..255)
58 }
59
60 FBISTermination ::= SEQUENCE {
61     terminationReason       ENUMERATED {
62         backboneRecovery,
63         noConnectionForFBIS,
64         linkFailure
65     }

```

```

1           }
2     }
3   HOCmdMSActionAsRS ::=          SEQUENCE {
4     rsReconfigInd                BOOLEAN
5     -- 0: No change
6     -- 1: change
7   }
8
9
10  -- +-----+
11  -- Neighbor Advertisement
12  -- +-----+
13
14  [-----End of Text Proposal-----]
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65

```