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Re:	“IEEE 802.16-12-0142,” in response to Letter Ballot #38 on P802.16.1a/D1	
Abstract	HR-MG-IND and HR-MT-IND messages on GRIDMAN Draft Standard	
Purpose	To discuss and adopt the proposed text in the draft amendment document on GRIDMAN	
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# Clarification on HR multicast indication messages over IEEE 802.16.1a

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## 1. Introduction

This document provides clarification on the AAI-HR-MG-IND and AAI-HR-MT-IND messages and ASN.1 coding thereof.

## 2. References

- [1] IEEE 802.16-12-0132, GRIDMAN System Requirement Document including SARM annex, January 2012.
- [2] IEEE P802.16n<sup>TM</sup>/D1, Air Interface for Broadband Wireless Access Systems - Draft Amendment: Higher Reliability Networks, February 2012.
- [3] IEEE P802.16.1a<sup>TM</sup>/D1, WirelessMAN-Advanced Air Interface for Broadband Access Systems - Draft Amendment: Higher Reliability Networks, February 2012.
- [4] IEEE P802.16Rev3/D4, IEEE Draft Standard for Local and metropolitan area networks; Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems," February 2012.
- [5] IEEE P802.16.1<sup>TM</sup>/D4, IEEE Draft for WirelessMAN-Advanced Air Interface for Broadband Wireless Access Systems, February 2012.

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

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

**[Remedy1: Change 6.2.3.65.55 AAI-HR-MG-IND in page 84 on P802.16.1a/D1 as follows:]**

### 6.2.3.65.55 AAI-HR-MG-IND

An HR-BS providing multicast service transmits AAI-HR-MG-IND message in the beginning of available interval in multicast indication cycle. This message indicates whether there is DL multicast traffic for a specific multicast group. There are two formats for the AAI-HR-MG-IND message, indicated by the indication type field. If the indication type is set to "0," this message indicates the multicast traffic transmission offset directly. Otherwise, MGIND bitmap indicates a subgroup of multicast group and further information will be transmitted by AAI-HR-MT-IND described in [6.2.3.65.48](#) [6.2.3.65.56](#).

**Table 106zz - AAI-HR-MG-IND message field description**

Field	Size (bits)	Value/Description	Condition
<u>Indication type</u>	<u>1</u>	<u>0b0: full MGID indication</u> <u>0b1: MGIND+MTIND indication</u>	
<u>If (Indication type == 0b0) {</u>			
<u>For(i=0;</u> <u>i&lt;Num_MGID;i++){</u>		<u>Num_MGID is the number of multicast group to indicate multicast traffic is transmitting.</u> <u>Range : 0 ~ 32</u>	
<u>Multicast Group ID</u>	<u>12</u>		<u>Shall be present</u>
<u>Action Code</u>	<u>3</u>	<u>if bit0 = 1, perform network entry or exit sleep mode</u> <u>if bit1 = 1, perform ranging procedure with ranging purpose indication set to 0b1110 and Extended Ranging Purpose Indication set to 0b0000</u> <u>if bit2 = 1, receiving multicast</u>	<u>Shall be present</u>
<u>if (Action Code bit2 == 1) {</u>			
<u>Offset of multicast traffic</u>	<u>4</u>	<u>frame number offset in which the ABS transmits multicast traffic</u>	<u>Shall be present</u>
<u>}</u>			
<u>}</u>			
<u>}Else if(Indication type == 0b1) {</u>			

**Table 106zz - AAI-HR-MG-IND message field description**

Field	Size (bits)	Value/Description	Condition
<u>MGIND bitmap</u>	<u>M(=64)</u>	<p>Indicates whether a corresponding subgroup of multicast group has multicast data to transmit, where the N-th bit of <u>MGIND bitmap</u> [MSB corresponds to N = 0] corresponds to MGIDs in a subgroup (<math>2^{ML} \times N/M</math> to <math>2^{ML} \times (N+1)/M - 1</math>), where <u>ML</u> is the length of MGID (i.e. 12) and length of M is <math>64 (= 2^{ML-1})</math></p> <p>0: There is no multicast traffic for any of <u>multicast groups in the corresponding multicast subgroup</u>  1: There is multicast traffic for at least one <u>multicast group in the corresponding multicast subgroup</u></p>	<u>Shall be present</u>
<del>For (i=0; i&lt;L; i++) {</del>		<del>L equals the number of bits in MGIND-bitmap whose bit is set to 1.</del>	
<u>Offset of multicast AAI-HR-MT-IND message</u>	<u>2</u>	<p>frame number offset in which the ABS transmits AAI-HR-MT-IND message</p> <p>0b00: first frame of this superframe  0b01: second frame of this superframe  0b10: third frame of this superframe  0b11: fourth frame of this superframe</p>	<u>Shall be present</u>
<del>}</del>			
<del>}</del>			
<del>}</del>			

**6.2.3.65.56 AAI-HR-MG-IND**

AAI-HR-MT-IND message shall be transmitted at the offset indicated by AAI-HR-MG-IND message described in ~~6.2.3.65.49~~6.2.3.65.56. Based on the action code in AAI-HR-MT-IND message, HR-MSs may receive multicast traffic or perform network entry or exit sleep mode.

**[Remedy2: Add the following text in Annex in page 212 on P802.16.1a/D1]**

**Annex A**

...

## A.2 MAC control message definitions (normative)

### *Change Annex A.2 as indicated:*

```

WirelessMAN-Advanced-Air-Interface DEFINITIONS AUTOMATIC TAGS ::=
BEGIN

-- MAC Control Messages

MAC-Control-Message ::= SEQUENCE {
    message MAC-Control-Msg-Type,
    ...
}

MAC-Control-Msg-Type ::= CHOICE {
    -- System information
    aaiSCD                                AAI-SCD,
    aaiSIIAdv                             AAI-SII-ADV,
    aaiULPCNi                             AAI-ULPC-NI,
    -- Network entry / re-entry
    aaiRngReq                             AAI-RNG-REQ,
    aaiRngRsp                             AAI-RNG-RSP,
    aaiRngAck                             AAI-RNG-ACK,
    aaiRngCfm                             AAI-RNG-CFM,
    aaiSbcReq                             AAI-SBC-REQ,
    aaiSbcRsp                             AAI-SBC-RSP,
    aaiRegReq                             AAI-REG-REQ,
    aaiRegRsp                             AAI-REG-RSP,
    -- Network exit
    aaiDregReq                             AAI-DREG-REQ,
    aaiDregRsp                             AAI-DREG-RSP,
    -- Connection management
    aaiDsaReq                             AAI-DSA-REQ,
    aaiDsaRsp                             AAI-DSA-RSP,
    aaiDsaAck                             AAI-DSA-ACK,
    aaiDscReq                             AAI-DSC-REQ,
    aaiDscRsp                             AAI-DSC-RSP,
    aaiDscAck                             AAI-DSC-ACK,
    aaiDsdReq                             AAI-DSD-REQ,
    aaiDsdRsp                             AAI-DSD-RSP,
    aaiGrpCfg                             AAI-GRP-CFG,
    -- Security
    aaiPkmReq                             AAI-PKM-REQ,
    aaiPkmRsp                             AAI-PKM-RSP,
    -- ARQ
    aaiArqFbk                             AAI-ARQ-FBK,
    aaiArqDsc                             AAI-ARQ-DSC,
    aaiArqRst                             AAI-ARQ-RST,
    -- Sleep mode
    aaiSlpReq                             AAI-SLP-REQ,
    aaiSlpRsp                             AAI-SLP-RSP,
    aaiTrfInd                             AAI-TRF-IND,
    aaiTrfIndReq                         AAI-TRF-IND-REQ,
    aaiTrfIndRsp                         AAI-TRF-IND-RSP,
    -- Handover
    aaiHoInd                             AAI-HO-IND,
    aaiHoReq                             AAI-HO-REQ,

```

```

aaiHoCmd                AAI-HO-CMD,
aaiNbrAdv               AAI-NBR-ADV,
aaiScnReq               AAI-SCN-REQ,
aaiScnRsp               AAI-SCN-RSP,
aaiScnRep               AAI-SCN-REP,
-- Idle mode
aaiPagAdv               AAI-PAG-ADV,
aaiPgidInfo             AAI-PGID-INFO,
-- Multicarrier
aaiMcAdv                AAI-MC-ADV,
aaiMcReq                AAI-MC-REQ,
aaiMcRsp                AAI-MC-RSP,
aaiCmCmd                AAI-CM-CMD,
aaiCmInd                AAI-CM-IND,
aaiGlobalConfig         AAI-GLOBAL-CFG,
-- Power Control
aaiUlPowerAdj           AAI-UL-POWER-ADJ,
aaiUlPsrConfig          AAI-UL-PSR-CFG,
-- Collocated Coexistence
aaiClcReq               AAI-CLC-REQ,
aaiClcRsp               AAI-CLC-RSP,
-- MIMO
aaiSbsMimoFbk           AAI-SBS-MIMO-FBK,
aaiMbsMimoFbk           AAI-MBS-MIMO-FBK,
aaiMbsMimoReq           AAI-MBS-MIMO-REQ,
aaiMbsMimoRsp           AAI-MBS-MIMO-RSP,
aaiMbsMimoSbp           AAI-MBS-MIMO-SBP,
aaiMbsSoundingCal       AAI-MBS-SOUNDING-CAL,
aaiDlIm                 AAI-DL-IM,
-- FFR
aaiFfrCmd               AAI-FFR-CMD,
aaiFfrRep               AAI-FFR-REP,
-- SON
aaiSonAdv               AAI-SON-ADV,
-- Relay
aaiARSCfgCmd            AAI-ARS-CFG-CMD,
-- EMBS
aaiEmbsCfg              AAI-EMBS-CFG,
aaiEmbsRep              AAI-EMBS-REP,
aaiEmbsRsp              AAI-EMBS-RSP,
-- LBS
aaiLbsAdv               AAI-LBS-ADV,
aaiLbsInd               AAI-LBS-IND,
-- Misc
aaiL2Xfer               AAI-L2-XFER,
aaiMsgAck                AAI-MSG-ACK,
aaiResCmd               AAI-RES-CMD,
-- HR Multicast message
aaiHrMgInd              AAI-HR-MG-IND,
aaiHrMtInd              AAI-HR-MT-IND,
...
}

-- *-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
-- Common type definitions
-- *-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*

PhyCarrierIndex ::=          INTEGER (0..62)

```

.....

```
-- +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
-- Reset Command
-- +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
AAI-RES-CMD ::= SEQUENCE {
    ...
}
```

```
-- *-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
-- MAC control messages for HR-Networks
-- *-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*-*
```

```
-- +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
-- Multicast Messages
-- +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
maxNumberOfMGID INTEGER ::= 32
```

```
-- +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
-- HR Multicast Group Indication Message
```

```
AAI-HR-MG-IND ::= SEQUENCE {
    mgIndType CHOICE {
        fullMgInd SEQUENCE(SIZE (0..maxNumberOfMGID)) OF FullMgInd,
        mgIndPlusMtInd MgIndPlusMtInd
    },
    ...
}
```

```
FullMgInd ::= SEQUENCE {
    multicastGroupID MulticastGroupID,
    actionCode BIT STRING {
        networkEntryOrExitSleep (0),
        performRanging (1),
        receiveMulticast (2)
    } (SIZE(3)),
    -- if performRanging bit is set to 1
    offsetOfMulticastTraffic INTEGER (0..16) OPTIONAL,
    ...
}
```

```
MgIndPlusMtInd ::= SEQUENCE {
    mgIndBitmap BIT STRING (SIZE (64)),
    -- for each 1 bit corresponding subgroup of multicast group
    offsetOfAaiHrMtIndMessage ENUMERATED {
        first,
        second,
        third,
        fourth
    },
    ...
}
```

```
-- +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
-- HR Multicast Traffic Indication Message
```

```
-- +--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+--+
```

```
AAI-HR-MT-IND ::= SEQUENCE {
  aaiHrMtIndMessageList SEQUENCE (SIZE (0..64)) OF SEQUENCE {
    mtIndBitmap BIT STRING (SIZE (64)),
    actionForMulticast SEQUENCE (SIZE (0..64)) OF SEQUENCE {
      actionCode BIT STRING {
        networkEntryOrExitSleep ( 0),
        performRanging (1),
        receiveMulticast (2)
      } (SIZE(3)),
      -- if performRanging bit is set to 1
      offsetOfMulticastTraffic INTEGER (0..16) OPTIONAL
    }
  }
}
END
```

```
[-----End of Text Proposal-----]
```