<table>
<thead>
<tr>
<th><strong>Project</strong></th>
<th>IEEE 802.16 Broadband Wireless Access Working Group [<a href="http://ieee802.org/16">http://ieee802.org/16</a>]</th>
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<tbody>
<tr>
<td><strong>Title</strong></td>
<td>ASN.1 coding for AAI-NBR-ADV message over IEEE 802.16.1a</td>
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<tr>
<td><strong>Date Submitted</strong></td>
<td>2012-03-06</td>
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<td><strong>Source(s)</strong></td>
<td>Eunkyung Kim, Sungcheol Chang, Won-Ik Kim, Seokki Kim, Sungkyung Kim, Miyoung Yun, Hyun Lee, Chulsik Yoon, Kwangjae Lim</td>
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</tr>
</tbody>
</table>

**Re:** “IEEE 802.16-12-0142,” in response to Letter Ballot #38 on P802.16.1a/D1

**Abstract**

AAI-NBR-ADV message on GRIDMAN Draft Standard

**Purpose**

To discuss and adopt the proposed text in the draft amendment document on GRIDMAN

**Notice**

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Further information is located at <http://standards.ieee.org/board/pat/pat-material.html> and
ASN.1 coding for AAI-NBR-ADV message over IEEE 802.16.1a

Eunkyung Kim, Sungcheol Chang, Won-Ik Kim, Seokki Kim, Sungkyung Kim, Miyoung Yun, Hyun Lee, Chulsik Yoon, Kwangjae Lim
ETRI

1. Introduction

This document provides ASN.1 coding of AAI-NBR-ADV message for HR-Network.

2. References


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

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

[Remedy: 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,
  aaiULPNI       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-RSP,

  -- 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-CONFIG,
-- Collocated Coexistence
aaiClcReq      AAI-CLC-REQ,
aaiClcRsp      AAI-CLC-RSP,
-- MIMO
aaiSbsMimoFbk  AAI-SBS-MIMO-PBK,
aaiMbsMimoFbk  AAI-MBS-MIMO-PBK,
aaiMbsMimoReq  AAI-MBS-MIMO-REQ,
aaiMbsMimoRsp  AAI-MBS-MIMO-RSP,
aaiMbsMimoSbp  AAI-MBS-MIMO-SBP,
aaiMbsSoundingCal AAI-MBS-SOUNDING-CAL,
aaiDiIm        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,
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,
...
maxRngOpps INTEGER ::= 4
maxRngAckFrames INTEGER ::= 8 -- N_Frame_Identifiers(3 bits)
maxPreassignedCarriers INTEGER ::= 8 -- N_Preassigned_Carriers
maxPhysCarrierIndices INTEGER ::= 64 -- N-PHY-Carrier-Indices
maxNeighborABSs INTEGER ::= 64 -- N-NBR-ABSs
maxNeighborR1BSs INTEGER ::= 64 -- N-NBR-R1BSs
maxCarriers INTEGER ::= 64 -- N-Carrier-Info

-- System Configuration Descriptor Messages

-- Network entry / re-entry messages

-- Ranging Request

-- Ranging Response Message

-- Handover Command

-- Neighbor Advertisement

AAI-NBR-ADV ::= SEQUENCE {
  changeCount INTEGER (0..7),
  totalNumberOfCellTypes INTEGER (1..8),
  cellType ENUMERATED {
    macro,
    micro,
    macro-hotzone,
    femto,
    ttrRelay,
    r1-lzone,
    spare2,
    spare1
  },
  totalNumberOfSegments INTEGER (1..16),
  segmentIndex INTEGER (0..15),
  startingABSIndex INTEGER (0..255),
  nbrABSInfoList SEQUENCE (SIZE (1..maxNeighborABSs)) OF NeighborABSInfo,
  nbrR1BSInfoList SEQUENCE (SIZE (1..maxNeighborR1BSs)) OF NeighborR1BSInfo
}

-- For ABS type whose system info are not included in AAI_NBR-ADV

cellTypeInfo CellTypeInfo OPTIONAL,
CellTypeInfo ::= SEQUENCE {
  rangeIDCell  SEQUENCE (SIZE (1..maxPhyCarrierIndices)) OF RangeIDCell OPTIONAL
}

RangeIDCell ::= SEQUENCE {
  phyCarrierIndex PhyCarrierIndex,
  idCellStartEnd  SEQUENCE {
    startIDCell IDCell,
    endIDCell IDCell
  }
}

NeighborABSInfo ::= SEQUENCE {
  bsID BSID,
  macVersion MacProtocolVersion,
  cpLength CPLength,
  hrMultimodeIndication HRMultimodeIndication OPTIONAL,
  neighborMulticastGroupZoneId MulticastGroupZoneID OPTIONAL,
  neighborMulticastIndicationCycle MulticastIndicationCycle OPTIONAL,
  neighborMulticastInfo
    SEQUENCE (SIZE (1..16)) OF SEQUENCE {
      currentMulticastGroupID MulticastGroupID,
      currentFID FID,
      neighborMulticastGroupID MulticastGroupID,
      neighborFID FID
    } OPTIONAL,
  carrierInfoList SEQUENCE (SIZE (1..maxCarriers)) OF CarrierInfo,
  nbrSpecificTrigger Triggers OPTIONAL
}

CarrierInfo ::= SEQUENCE {
  idCell IDCell,
  phyCarrierIndex PhyCarrierIndex,
  pgid PGID,
  sfhChangeCount INTEGER (0..15),
  sfhBmcFmt CHOICE {
    -- All parameters of SFHSubpacket shall be included
    fullSubpkt SFHSubpacket,
    -- Parameters of SFHSubpacket are partially included
    deltaInfoCurrentCxr CptSFHSubpacket,
    -- Parameters of SFHSubpacket are partially included
    deltaInfoPrecedingCxr CptSFHSubpacket,
    noSFHIncluded NULL
  }
}

NeighborR1BSInfo ::= SEQUENCE {
  bsID BSID,
  r1PreambleIndex BIT STRING (SIZE (8)),
  phyModeID INTEGER (0..65535),
  channelBW ENUMERATED {
    five-mhz,
    seven-mhz,
    eightPoint75-mhz,
    ten-mhz
  },
  ...}
-- Parameters of SFH IBs
-- All variables in SFH-SP1, SFH-SP2 and SFH-SP3 will be OPTIONAL
-- so that the SFHSbpacket structure can be reused by CarrierInfo

-- for different sfhEncFormat

-- Triggers
-- Designed based on Table 119
--
maxNumberOfTriggers INTEGER ::= 64
maxNumberOfConditions INTEGER ::= 4
Triggers ::= SEQUENCE {
  triggerList SEQUENCE (SIZE (1..maxNumberOfTriggers)) OF TriggerInfo
}
TriggerInfo ::= SEQUENCE {
  absType ENUMERATED {
    any,
    macro,
    macro-hotzone,
    femto,
    r1,
    spare11,
    spare10,
    spare9,
    spare8,
    spare7,
    spare6,
    spare5,
    spare4,
    spare3,
    spare2,
    spare1
  }
}
hrMultimodeIndication OPTIONAL,
triggerAveParamForIntra ENUMERATED {
  one,
  half,
  quarter,
  one-8th,
  one-16th,
  one-32th,
  one-64th,
  one-128th,
  one-256th,
  one-512th
} OPTIONAL,
triggerAveParamForInter ENUMERATED {
  one,
  half,
  quarter,
one-8th,
one-16th,
one-32th,
one-64th,
one-128th,
one-256th,
one-512th
} OPTIONAL,
conditionList SEQUENCE (SIZE (1..maxNumberOfConditions)) OF ConditionInfo

ConditionInfo ::= SEQUENCE {
typeFuncAction TypeFuncAction,
triggerValue INTEGER (0..255)
}

-- Table 120
TypeFuncAction ::= SEQUENCE {
  triggerType ENUMERATED {
    cinr,
    rssi,
    rtd,
nMissedP-SFHs,
    rd,
    spare3,
    spare2,
    spare1
  },
  triggerFunc ENUMERATED {
    dummy,
    nbr-greater-than-absolute-value,
    nbr-less-than-absolute-value,
    nbr-greater-than-sabs-by-relative-value,
    nbr-less-than-sabs-by-relative-value,
    sabs-greater-than-absolute-value,
    sabs-less-than-absolute-value,
    nbr-carriers-greater-than-threshold
  },
  triggerAction ENUMERATED {
    dummy,
    response-aai-scn-rep,
    response-aai-ho-req,
    response-aai-scn-req,
    declare-abs-unreachable,
    cancel-ho,
    spare2 initiate-mode-change,
    spare1
  }
}

--
-- CA Specific Triggers
-- Designed based on Table 121 and Table 122--
CAConditionInfo ::= SEQUENCE {
  triggerType ENUMERATED {
    cinr,
    rssi
  },
  triggerFunction ENUMERATED {
    }
CASpecificTriggers ::= SEQUENCE {
    conditionList SEQUENCE (SIZE (1..maxNumberOfConditions)) OF CAConditionInfo
}

-- +-------------------------------------------------------------------
-- Scanning Interval Allocation Request
-- +-------------------------------------------------------------------

.............

END