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| Re: | Sponsor Ballot Recirculation on P802.16.1b/D3 | |
| Abstract | This contribution proposes ANS.1 code for MAC control messages. | |
| Purpose | For discussion in M2M TG and adoption into 16.1b draft | |
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**ASN.1 code for MAC Control Messages**

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# Introduction

This contribution proposes to add the ASN.1 code for MAC control message in IEEE P802.16.1b/D3.

# Proposed Texts

----------------- Start of the text proposal --------------------------------------------------------------------------------------

**[*Add the following texts on page 71, line 57 as follow*]**

***Modify Annex B as indicated***

**Annex B**

**Definition of AAI MAC control messages**

This annex defines MAC control messages using ASN.1 notation. The Packed Encoding Rules (PER) with byte unaligned option shall be used to produce compact transfer syntax for MAC control message to be transmitted over the air interface.

**B.1 ASN.1 coding recommendations (informative)**

1. The template of a MAC control message is shown below. It consists of one or more attributes. Each attribute should associate with a TYPE (e.g., INTEGER, OCTET STRING) that defines the type of the attribute.

AAI-XXX-XXX ::= SEQUENCE {

attributes TYPE

}

1. Underscore “\_” should not be used, as it is not accepted by ASN.1 compiler
2. Attribute should use lower case in the first letter. Lower cases and upper cases can be mixed to make the attribute easy to read (e.g., userBitmapSize).
3. User-defined type should use upper case in the first letter (e.g., ResourceBitmapList).
4. The ASN.1 coding should use Courier font and no Tap in spaces.
5. The length of attributes should be limited to 30 characters.
6. The length of TYPE should be limited to 20 characters.
7. The length of each line should be limited to 72 characters.
8. Attribute should avoid using keywords (e.g., \*, +) in widely used languages (e.g., C, C++).
9. Each type should have range, when applicable, e.g.,   
   flowId INTEGER (0..15),
10. Comments may be inserted to each attribute, e.g.,   
    -- present when a flow is added to a GRA   
    graInfoForAddedFlow GroupRsrcAllocInfo OPTIONAL
11. Example of FOR loop implementation.

|  |  |  |
| --- | --- | --- |
| For (i=1; i≤4; i++) { |  |  |
| Burst size | 5 | i-th burst size of the 4 burst sizes supported in the group |
| } |  |  |

BurstSizeList :== SEQUENCE (SIZE (1..4)) OF INTEGER (0..31)

1. Example of If statement implementation

|  |  |  |
| --- | --- | --- |
| Deletion Flag | 1 | Flag to signal whether this message includes addition or deletion information.  0: Flow is added to a group  1: Flow is explicitly deleted from a group |
| If (Deletion Flag == 0) { |  | i-th burst size of the 4 burst sizes supported in the group |
| Group ID | 5 | ID of the group to which the flow is added |
| } |  |  |

graInfoForAddedFlow GroupRsrcAllocInfo OPTIONAL

1. It is not necessary to define the Condition, since ASN.1 compiler will automatically define a control bit for each OPTIONAL attribute.
2. If a MAC control message contains OPTIONAL attributes, it should include a table explaining the conditions of such attributes.
3. Each MAC control message should be free of compilation errors. A free online ASN.1 compiler is available from <http://lionet.info/asn1c/asn1c.cgi>
4. Additional information on ASN.1 can be found in <http://www.obj-sys.com/asn1tutorial/asn1only.html>

**B.2 MAC control message definitions (normative)**

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,

<insert>

-- M2M device

aaiMteInd AAI-MTE-IND,

aaiMgmc AAI-MGMC,</insert>

...

}

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

-- Common type definitions

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

PhyCarrierIndex ::= INTEGER (0..62)

PreambleIndex ::= INTEGER (0..1023)

PreambleIndex2 ::= INTEGER (0..63)

R1PreambleIndex ::= INTEGER (0..127)

PCID ::= BIT STRING (SIZE (48))

PGID ::= BIT STRING (SIZE (16))

PgOffset ::= INTEGER (0..4095)

<insert>

FMDID ::= BIT STRING (SIZE (16)) -- Fixed M2M deregistration identifier (16 bits)

MGID ::= BIT STRING (SIZE (12)) -- M2M group identifier (12 bits)

MGSS ::= BIT STRING (SIZE (64)) -- M2M service group security seed (64 bits)

</insert>

FidChangeCount ::= INTEGER (0..15)

AbsIndex ::= INTEGER (0..255)

MBSZoneID ::= INTEGER (0..127)

EMBSZoneID ::= MBSZoneID

MacProtocolVersion ::= INTEGER (0..255)

BSID ::= BIT STRING (SIZE (48))

STID ::= BIT STRING (SIZE (12))

CID ::= INTEGER (0..65535)

FID ::= INTEGER (0..15)

AKCount ::= INTEGER (0..65535)

NbrAdvChangeCount ::= INTEGER (0..7)

FAIndex ::= INTEGER (0..255)

IDCell ::= INTEGER (0..1023)

-- IdCell partitioning in Table 166

PreamblePart ::= BIT STRING (SIZE (4))

CPLength ::= ENUMERATED {

one-eighth,

one-sixteenth,

one-fourth

}

DREGID ::= BIT STRING (SIZE (12))

PgCycle ::= INTEGER {

cycle4Superframes (0),

cycle8Superframes (1),

cycle16Superframes (2),

cycle32Superframes (3),

cycle64Superframes (4),

cycle128Superframes (5),

cycle256Superframes (6),

cycle512Superframes (7)<insert>,

cycle32768Superframes (8),

cycle262144Superframes (9),

cycle4194304Superframes (10) )-- value 0x08 - 0x10 is applied to M2M devices only </insert>

} (0..15)

CMACI ::= ENUMERATED {

cmacNotPresent,

cmacPresent

}

EMBSID ::= STID

MulticastGroupID ::= BIT STRING (SIZE (12))

AMSMobilityLevel ::= ENUMERATED {

slow,

medium,

fast

}

CenterFreq ::= INTEGER (0..4294967295) -- Unit = Hz

TriggerConditions ::= SEQUENCE {

hoTriggers SEQUENCE (SIZE (1..64)) OF SEQUENCE {

hoConditionsList SEQUENCE (SIZE (1..4)) OF SEQUENCE {

absType INTEGER {

any (0),

macroABS (1),

macroHotZoneABS (2),

femtoABS (3),

r1BS (4)

} (0..15),

triggerType INTEGER {

cinr (0),

rssi (1),

rtd (2),

numConsecutivePSFHsMissed (3),

rd (4)

} (0..7),

triggerFunction INTEGER {

nbrAbsGreaterThanAbsValue (1),

nbrAbsLessThanAbsValue (2),

nbrAbsGreaterThanSabsByRelVal (3),

nbrAbsLessThanSabsByRelVal (4),

sabsGreaterThanAbsValue (5),

sabsLessThanAbsValue (6),

nbrAbsCarriersGreaterThanThreshold (7)

} (0..7),

triggerAction INTEGER {

respondWithAAI-SCN-REP (1),

respondWithAAI-HO-REQ (2),

respondWithAAI-SCN-REQ (3),

declareABSUnreachable (4),

cancelHO (5)

} (0..7),

triggerValue INTEGER (0..255),

triggerAvgPara INTEGER {

one (0),

oneOver2 (1),

oneOver4 (2),

oneOver8 (3),

oneOver16 (4),

oneOver32 (5),

oneOver64 (6),

oneOver128 (7),

oneOver256 (8),

oneOver512 (9)

} (0..255)

}

}

}

<insert>

M2mShortDataEncryptI ::= ENUMERATED {

notEncrypted,

encrypted

} -- M2M devices only

M2MGROUPZONEID ::= BIT STRING (SIZE (12)) -- M2M devices only

M2MGROUPZONEIDX ::= BIT STRING (SIZE (2)) -- M2M devices only

BWGrantI ::= ENUMERATED {

bwGranted,

bwNotGranted

} -- M2M devices only

</insert>

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

-- Some boundary values

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

maxReceivedCodes INTEGER ::= 32 -- N\_Received\_Codes(6 bits)

-- Equal to the size of RngAckBitmap

maxRngOpps INTEGER ::= 4

maxRngAckFrames INTEGER ::= 8 -- N\_Frame\_Identifiers(3 bits)

maxPreassignedCarriers INTEGER ::= 8 -- N\_Preassigned\_Carriers

maxPhyCarrierIndices 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

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- AAI-SCD message

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-SCD ::= SEQUENCE {

configChangeCount INTEGER (0..15),

…………………………………<insert>

msbExtendSuperframeNumber INTEGER (0..1023) OPTIONAL, -- M2M devices only

m2mConfigChangeCount INTEGER (0..15) OPTIONAL, -- M2M devices only

probabilityM2MGDSelection INTEGER (0..1023)OPTIONAL, -- M2M devices only

m2mRangingIndicator CHOICE {

normalRanging NormalRanging, -- 0x00

dedicatedRanging DedicatedRanging, -- 0x01

notAllowedNetworkReentry NULL, -- 0x02

...

} OPTIONAL, -- M2M devices only

m2mGroupZoneArray SEQUENCE (SIZE (1..4)) OF M2MGROUPZONEID OPTIONAL, -- M2M devices only

</insert>

...

}

<insert>

NormalRanging ::= SEQUENCE {

restrictionAccessCalssOne INTEGER (0..1) OPTIONAL,

restrictionAccessCalssTwo INTEGER (0..1) OPTIONAL,

restrictionAccessCalssThree INTEGER (0..1) OPTIONAL,

restrictionAccessCalssFour INTEGER (0..1) OPTIONAL

} -- M2M devices only

DedicatedRanging ::= SEQUENCE {

m2mRangingOpportunitySubframeIndex INTEGER (0..7) OPTIONAL,

periodicityOfM2mRanging INTEGER {

everyFrame (0),

firstFrameInEverySuperframe (1),

firstFrameIneveryEvenSuperframe (2),

firstFrameInFourthSuperframe (3)

--values 4 to 7 are reserved

} (0..7) OPTIONAL

} -- M2M devices only

</insert>

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Service Identity Information Advertisement

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-SII-ADV ::= SEQUENCE {

-- List of the verbose names of the NSPs. The value of Verbose

-- NSP Name List is a list of verbose NSP names. The order of the

-- Verbose NSP Names presented shall be in the same order as the

-- NSP IDs presented in the NSP List.

nspInfoList SEQUENCE (SIZE (1..16)) OF NSPID,

-- Verbose NSP name string

verboseNspNameList SEQUENCE (SIZE (1..16)) OF VerboseName,

...

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- AI\_UL Noise and Interference Level Broadcast Message

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-ULPC-NI ::= SEQUENCE {

iotSounding IotValue OPTIONAL,

-- IoT value of Frequency Partition #0, #1, #2, and #3,

-- quantized in 0.5 dB steps as IoT level from 0 dB to 63.5 dB

iotFreqPartitionList SEQUENCE (SIZE (4)) OF SEQUENCE {

iotValue IotValue OPTIONAL

},

...

}

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

-- Network entry / re-entry messages

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

-- single type definition for ranging messages

MACAddress ::= BIT STRING (SIZE (48))

MACVersion ::= INTEGER (0..255)

CRID ::= BIT STRING (SIZE (72))

DID ::= BIT STRING (SIZE (12))

CSGID ::= BIT STRING (SIZE (1..24))

SMS ::= OCTET STRING (SIZE (1..140))

SFID ::= BIT STRING (SIZE (32))

MapMaskSeed ::= BIT STRING (SIZE (15))

IPv4Address ::= OCTET STRING (SIZE (4))

IPPortNumber ::= INTEGER (0..65535)

OperatorID ::= BIT STRING (SIZE (24))

CapabilityIndex ::= INTEGER (0..31)

DeviceClass ::= INTEGER (0..31)

FeatureSupport ::= ENUMERATED {

notSupported,

supported

}

IPv6HomeNetworkPrefix ::= BIT STRING (SIZE (64))

-- complex type definition for ranging messages

FidInfo ::= SEQUENCE {

flowIdentifier FID,

fidChangeCount FidChangeCount,

dlULIndicator ENUMERATED {

dl,

ul

}

}

AddressOrDID ::= CHOICE {

-- be selected for R1 network mode

macAddress MACAddress,

-- be selected for non R1 network mode

deregistrationID DID

}

<insert>

MfmBitMap0 ::= SEQUENCE {

wideBandCqi BIT STRING (SIZE (4)),

wideBandStcRate BIT STRING (SIZE (3))

} -- M2M devices only

MfmBitMap1 ::= SEQUENCE {

wideBandCqi BIT STRING (SIZE (4)),

wideBandStcRate BIT STRING (SIZE (3)),

wideBandpMI BIT STRING (SIZE (6))

} -- M2M devices only </insert>

PagingControlInfo ::= SEQUENCE {

pagingControllerID PCID,

pagingGroupID PGID,

pagingCycle PgCycle,

pagingOffset PgOffset

}

CsgInfoItem ::= SEQUENCE {

operatorID OperatorID OPTIONAL,

csgIdList SEQUENCE (SIZE (1..64, ...)) OF CSGID

}

LocationUpdateRsp ::= INTEGER {

successOfLocationUpdate (0),

failureOfLocationUpdate (1),

successOfLocationUpdateAndDLTrafficPending (3),

allowAmsDcrInitReqOrExtensionReq (4),

rejectAmsDcrInitReqOrExtensionReq (5)

-- 0x6~0xF: Reserved

} (0..15)

BitmapPlusNewSfInfo ::= SEQUENCE {

serviceFlowUpdateBitmap BIT STRING (SIZE (16)),

-- for each 1 bit in the service flow update bitmap

flowIDUpdate SEQUENCE (SIZE (0..16)) OF SEQUENCE {

newEMBSID EMBSID,

newFID FID

}

}

CurrentSfPlusNewSfInfo ::= SEQUENCE {

-- for loop of N\_EMBS\_IDs (maximum value is 7)

flowInfoUpdate SEQUENCE (SIZE (0..7)) OF SEQUENCE {

currentEMBSID EMBSID,

currentFID FID,

newEMBSID EMBSID,

newFID FID

}

}

BitmapAndSfInfo ::= CHOICE {

-- be selected when serviceFlowUpdateIndicator = 0b0

bitmapPlusNewSfInfo BitmapPlusNewSfInfo,

-- be selected when serviceFlowUpdateIndicator = 0b1

currentSfPlusNewSfInfo CurrentSfPlusNewSfInfo

}

EMBSZoneInfoItem ::= SEQUENCE {

embsZoneID EMBSZoneID,

newEMBSZoneID EMBSZoneID OPTIONAL,

physicalCarrierIndex PhyCarrierIndex OPTIONAL,

bitmapAndServiceFlowInfo BitmapAndSfInfo

}

SuccessOfLocationUpdate ::= SEQUENCE {

paginggroupidupdate BIT STRING (SIZE (32)) OPTIONAL,

pagingoffsetupdate BIT STRING (SIZE (24)) OPTIONAL,

newPagingCycle PgCycle OPTIONAL,

newPagingGroupID PGID OPTIONAL,

newPagingOffset PgOffset OPTIONAL,

deregistrationID DID OPTIONAL,

<insert>

newFixedM2MDID FMDID OPTIONAL, -- M2M devices only

</insert>

newPagingControllerID PCID OPTIONAL,

embsZoneInfo SEQUENCE (SIZE (1..8)) OF EMBSZoneInfoItem OPTIONAL,

multicastInfo SEQUENCE (SIZE (1..16)) OF SEQUENCE {

currentMulticastGroupID MulticastGroupID,

currentFID FID,

newMulticastGroupID MulticastGroupID,

newFID FID

} OPTIONAL,

smsMessage SMS OPTIONAL

}

RngRspForHoReentryInfo ::= SEQUENCE {

multicastInfo SEQUENCE (SIZE (1..15)) OF SEQUENCE {

currentMulticastGroupID MulticastGroupID,

currentFID FID,

newMulticastGroupID MulticastGroupID,

newFID FID

} OPTIONAL

}

LocationUpdateResponse ::= SEQUENCE {

locationUpdateRsp LocationUpdateRsp OPTIONAL,

locationUpdateResult CHOICE {

-- locationUpdateResponse = 0x0

successOfLocationUpdate SuccessOfLocationUpdate,

others NULL

}

}

InitialNetworkEntry ::= SEQUENCE {

amsidOrMacAddress CHOICE {

-- be selected for advanced network mode and AMSID privacy is

-- enabled

amsidStarHashValue MACAddress,

-- be selected for other cases

macAddress MACAddress

},

macVersion MACVersion,

-- The bit size represents power level ranging from -15dB (0x00) to

-- 26dB (0x1F)

-- The value is determined by AMS after successful initial ranging

-- process.

initialOffsetUlpc INTEGER (0..31),

...

}

HandoverReentry ::= SEQUENCE {

stidOrMacAddress CHOICE {

-- be selected if STID is not pre assigned

stidInfo SEQUENCE {

servingBsid BSID,

previousSTID STID

},

-- be selected if STID is pre assigned

addressInfo CHOICE {

-- be selected for R1 network mode

macAddress MACAddress,

-- be selected for non R1 network mode

currentSTID STID

}

},

akCount AKCount OPTIONAL,

fidList SEQUENCE (SIZE (1..24)) OF FidInfo OPTIONAL,

...

}

NetworkReentryFromIdleMode ::= SEQUENCE {

<delete> ~~addressOrDID~~  ~~AddressOrDID,~~ </delete>

<insert>

addressInfo CHOICE {

-- be selected for legacy device

addressOrDID AddressOrDID,

-- be selected for fixed M2M device

fmDID FMDID -- M2M devices only

},

mfmBitMap CHOICE {

mfmBitMap0 MfmBitMap0,

mfmBitMap1 MfmBitMap1

} OPTIONAL, -- M2M devices only </insert>

pagingControlInfo PagingControlInfo,

akCount AKCount OPTIONAL,

fidList SEQUENCE (SIZE (1..24)) OF FidInfo OPTIONAL,

<insert>

bwReqSize INTEGER (0..2047) OPTIONAL, -- M2M devices only </insert>

...

}

LocationUpdate ::= SEQUENCE {

addressOrDID AddressOrDID,

pagingControlInfo PagingControlInfo,

pagingCycleChange PgCycle OPTIONAL,

pagingCarrierUpdate INTEGER (0..63) OPTIONAL,

akCount AKCount OPTIONAL,

amsMobility AMSMobilityLevel OPTIONAL,

smsMessage SMS OPTIONAL,

<insert>

mgidAckIndication BIT STRING (SIZE (1)) OPTIONAL, -- M2M devices only

m2mShortDataEncryptI M2mShortDataEncryptI OPTIONAL, -- M2M devices only

curM2MGroupZoneId M2MGROUPZONEID OPTIONAL, -- M2M devices only

curMGID SEQUENCE (SIZE (1..16)) OF MGID OPTIONAL, -- M2M devices only

</insert>

...

}

<insert>

AbnormalPwrDown::= NULL -- M2M devices only </insert>

DCRModeExtension ::= SEQUENCE {

crid CRID,

akCount AKCount OPTIONAL,

...

}

EmergencyCallSetup ::= SEQUENCE {

macAddress MACAddress,

macVersion MACVersion,

initialOffsetUlpc INTEGER (0..31),

...

}

ReentryFromDCR ::= SEQUENCE {

crid CRID,

stidInfo SEQUENCE {

previousServingBsid BSID,

previousSTID STID

} OPTIONAL,

akCount AKCount OPTIONAL,

fidList SEQUENCE (SIZE (1..24)) OF FidInfo OPTIONAL,

...

}

NetworkReentryFromR1 ::= SEQUENCE {

-- be selected for advanced network mode and AMSID privacy is enabled

amsidStarHashValue MACAddress OPTIONAL,

servingBsid BSID,

macAddress MACAddress,

akCount AKCount OPTIONAL,

...

}

ZoneSwitch ::= SEQUENCE {

-- be selected for advanced network mode and AMSID privacy is enabled

zoneSwitchInfo CHOICE {

receiveTSTID SEQUENCE {

tstid STID,

amsidStarHashValue MACAddress OPTIONAL

},

receiveBsid SEQUENCE {

servingBsid BSID,

previousBasicCid CID

}

},

akCount AKCount OPTIONAL,

...

}

FemtoInterference ::= SEQUENCE {

akCount AKCount OPTIONAL,

...

}

NsEpCallSetup ::= SEQUENCE {

macAddress MACAddress,

macVersion MACVersion,

initialOffsetUlpc INTEGER (0..31),

...

}

ReentryProOptimization ::= BIT STRING {

omitSbcMessages (0),

omitPkmAuthenticationPhase (1),

omitRegMessages (2),

omitIPRefresh (3),

contextAvailability (4)

} (SIZE (5))

ImCapabilities ::= BIT STRING { -- 1: supported

dlPMICoordination (0),

dlCollaborativeMBSMIMO (1),

dlClosedLoopMbsMacroDiversity (2),

ulPmiCombination (3),

multiBsSoundingCalibration (4)

} (SIZE (5))

EmbsCapabilities ::= BIT STRING {

servingAbsOnly (0),

macroDiversityMultiAbs (1),

nonMacroDiversityMultiAbs (2)

} (SIZE (3))

R1R1Support ::= BIT STRING {

fiveMHz (0),

tenMHz (1),

eightDotSevenFiveMHz (2),

sevenMHz (3)

} (SIZE (4))

McCapabilities ::= ENUMERATED {

noMcModes,

basicMcMode,

mcAggregation,

mcSwitching,

mcAggregationAndSwitching

}

SoundingAntennaSw ::= ENUMERATED {

amongDLRx,

amongULTx

}

ReportMetric ::= BIT STRING {

absCINRMean (0),

absRSSIMean (1),

relativeDelay (2),

absRTD (3)

} (SIZE (4))

AmsCapabilities ::= SEQUENCE {

maxARQBufferSize INTEGER (0..8388607) OPTIONAL,

maxNonARQBufferSize INTEGER (0..8388607) OPTIONAL,

multicarrierCapabilities McCapabilities OPTIONAL,

zoneSwitchingMode FeatureSupport OPTIONAL,

agpsMethod FeatureSupport OPTIONAL,

imCapabilities ImCapabilities OPTIONAL,

embsCapabilities EmbsCapabilities OPTIONAL,

channelBwAndCyclicPrefix BIT STRING {

fiveMHz1Over16 (0),

fiveMHz1Over8 (1),

fiveMHz1Over4 (2),

tenMHz1Over16 (3),

tenMHz1Over8 (4),

tenMHz1Over4 (5),

twentyMHz1Over16 (6),

twentyMHz1Over8 (7),

twentyMHz1Over4 (8),

eightDotSevenFiveMHz1Over16 (9),

eightDotSevenFiveMHz1Over8 (10),

eightDotSevenFive5MHz1Over4 (11),

sevenMHz1Over16 (12),

sevenMHz1Over8 (13),

sevenMHz1Over4 (14)

} (SIZE (15)) OPTIONAL,

frameConfigOfR1R1 R1R1Support OPTIONAL,

persistentAllocation FeatureSupport OPTIONAL,

groupResourceAllocation FeatureSupport OPTIONAL,

coLocatedCoexistence BIT STRING {

typeI (0),

typeII-1 (1),

typeII-2 (2),

typeII-3 (3),

typeIII (4)

} (SIZE (5)) OPTIONAL,

hoTriggerMetric ReportMetric OPTIONAL,

ebbHandover FeatureSupport OPTIONAL,

-- shall be 0 when multicarrier capability = 0b010 or 0b100

minHoRentryIntlvInterval INTEGER (0..3) OPTIONAL,

soundingAntSwitching FeatureSupport OPTIONAL,

antennaConfig SoundingAntennaSw OPTIONAL

}

CsCapabilities ::= SEQUENCE {

csSpecificationTypes CsSpecificationTypes OPTIONAL,

maxNoOfClassificationRules INTEGER (0..65535) OPTIONAL,

rohc FeatureSupport OPTIONAL,

phs INTEGER {

packetPhs (1)

} (0..1) OPTIONAL,

-- may only be present AAI\_REG-RSP

resourceRetainTime INTEGER (0..65535) OPTIONAL

}

ClcLimits ::= SEQUENCE {

type1Indicator BOOLEAN,

type2Indicator BOOLEAN,

-- 0: the maximum number of active CLC classes is 8

-- otherwise: the maximum number = 1..7

activeClassLimit INTEGER (0..7),

activeRatioLimit INTEGER (0..63),

activeIntervalLimit INTEGER (0..31)

}

InterRatOpMode ::= INTEGER {

singleRadioMode (0),

multiRadioMode (1)

} (0..3)

BroadcastRngAck ::= SEQUENCE {

aggregatedRngAckList SEQUENCE (SIZE (1..maxRngAckFrames)) OF AggregatedRngAck

}

AggregatedRngAck ::= SEQUENCE {

frameIdentifier FrameIdentifier,

rngAckBitmap RngAckBitmap,

rngOppsStatusList SEQUENCE (SIZE (1..maxRngOpps)) OF RangingOppStatus OPTIONAL

}

FrameIdentifier ::= SEQUENCE {

superFrameNumber INTEGER (0..3),

frameIndex INTEGER (0..3)

}

RngAckBitmap ::= BIT STRING {

rngOpp1 (0),

rngOpp2 (1),

rngOpp3 (2),

rngOpp4 (3)

} (SIZE (4))

RangingOppStatus ::= SEQUENCE {

receivedCodesList SEQUENCE (SIZE (1..maxReceivedCodes)) OF SEQUENCE {

rngPreambleIndex PreambleIndex2,

rngStatus RangingStatus

}

}

RangingStatus ::= CHOICE {

success AdjustmentParameters,

abort RangingAbort,

continue AdjustmentParameters

}

Sign ::= ENUMERATED {

positive,

negative

}

AdjustmentParameters ::= SEQUENCE {

timeingOffsetAdjustment SEQUENCE {

sign Sign,

timingOffset INTEGER (1..16384)

} OPTIONAL, -- unit = 1/Fs

powerLevelAdjustment SEQUENCE {

sign Sign,

powerLevelOffset INTEGER (1..8)

} OPTIONAL, -- unit = dB

frequencyOffsetAdjustment SEQUENCE {

-- unit = 2% of subcarrier spacing

sign Sign,

frequencyOffset INTEGER (1..256)

} OPTIONAL

}

RangingAbort ::= CHOICE {

noMoreRanging NULL,

rngAbortTimer INTEGER (1..65535)

}

RedirectionInfo ::= SEQUENCE {

absidForNeighborABS BSID,

preambleForNeighborABS PreambleIndex,

centerFreqForNeighborABS CenterFreq

}

RangingPurposeIndicatorExtension ::= CHOICE {

abnormalPwrDown AbnormalPwrDown -- M2M devices only, 0b000

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Ranging Request

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-RNG-REQ ::= SEQUENCE {

-- Indicate whether this message is protected by CM

cmacIndicator CMACI,

rangingPurposeDiffMessage CHOICE {

initialNetworkEntry InitialNetworkEntry,

handoverReentry HandoverReentry,

networkReentryFromIdleMode NetworkReentryFromIdleMode,

idleModeLocationUpdate LocationUpdate,

dcrModeExtension DCRModeExtension,

emergencyCallSetup EmergencyCallSetup, -- e.g., E911

-- Location update for updating service flow management encoding

-- of E-MBS flows

locationUpdateEmbsFlows LocationUpdate,

-- Location update for transition to DCR mode from idle mode

locationUpdateToDcrMode LocationUpdate,

-- Reentry from DCR mode, coverage loss or detection of

-- different ABS restart count

reentryFromDcr ReentryFromDCR,

-- Network reentry from a R1 BS

networkReentryFromR1 NetworkReentryFromR1,

-- Zone switch to MZONE from LZONE

zoneSwitch ZoneSwitch,

locationUpdatePowerDown LocationUpdate,

-- experiencing "femto interference"

femtoInterference FemtoInterference,

-- NS/EP Call Setup

nsEpCallSetup NsEpCallSetup,

networkReentryFromIdleModeR1 NetworkReentryFromIdleModeR1,

<insert>

rangingPurposeIndicatorExtension RangingPurposeIndicatorExtension,

</insert>

...

},

-- CSG information

csgInformation SEQUENCE (SIZE (1..15)) OF CsgInfoItem OPTIONAL,

<insert>

rangingRetrialInfo BIT STRING {

successInFirstAttempt (0),

successInSecondAttempt (1),

successInThirdAttempt (2),

successInForthorMoreAttempt (3)

} (SIZE (4)) OPTIONAL, -- M2M devices only </insert>

...

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Ranging Response Message

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-RNG-RSP ::= SEQUENCE {

-- set to 1 when an ABS rejects the AMS

rangingAbortFlag BOOLEAN,

timerOrSTID CHOICE {

-- Timer defined by an ABS to prohibit the AMS from attempting

-- network entry at this ABS, for a specific time duration

-- Value 65535 (When the received CSGID(s) from the AMS

-- does not match any of the CSGID(s) of the Femto ABS.

-- This value indicates the Ranging Abort Timer is not

-- to be used, and the AMS can range any time.)

-- Value 0 (do not try ranging again at the ABS)

-- Value 1-65534, in units of seconds

rangingAbortTimer INTEGER (0..65535),

availableRangingRsp RangingResponse

},

...

}

RangingResponse ::= SEQUENCE {

tempStidOrSTID CHOICE {

temporarySTID STID,

stid STID

} OPTIONAL,

mapMaskSeed MapMaskSeed,

amsidOrMacAddress CHOICE {

-- selected for advanced network mode and AMSID privacy is enabled

amsidStarHashValue MACAddress,

-- selected for other cases

macAddress MACAddress

},

crid CRID OPTIONAL,

-- response based on ranging purpose sent in AAI-RNG-REQ

rangingPurpose CHOICE {

emergencyCallSetup SEQUENCE {

emergencyServiceFID FID (2..15)

},

nsEpCallSetup SEQUENCE {

nsEPServiceFID FID (2..15)

},

locationUpdatePowerDown LocationUpdateResponse,

locationUpdateEmbsFlows LocationUpdateResponse,

idleModeLocationUpdate LocationUpdateResponse,

locationUpdateToDcrMode LocationUpdateResponse,

dcrModeExtension LocationUpdateResponse

},

-- bitmap for Reentry Process Optimization

reentryProcessOptimization ReentryProOptimization OPTIONAL,

activationDeadline INTEGER (0..63) OPTIONAL,

-- 1: perform neighbor station measurement report

nbrBsMeasurementRptIndicator BOOLEAN OPTIONAL,

resourceRetainTime INTEGER (0..255) OPTIONAL,

flowUpdating SEQUENCE (SIZE (1..24)) OF SEQUENCE {

sfid SFID,

updateOrDelete ENUMERATED {

update,

delete

},

dlULIndicator ENUMERATED {

dl,

ul

},

updatedQoSInfo QosParameter OPTIONAL,

rohc FeatureSupport OPTIONAL,

phs INTEGER {

packetPhs (1)

} (0..1) OPTIONAL

} OPTIONAL,

unsolicitedBsGrantIndicator BOOLEAN OPTIONAL,

clcResponse CLCResponse OPTIONAL,

csgIdList SEQUENCE (SIZE (1..64, ...)) OF CSGID OPTIONAL,

nbrAbsRedirectInfoList SEQUENCE (SIZE (1..8)) OF RedirectionInfo OPTIONAL,

rangingRequestBit BOOLEAN OPTIONAL,

invalidFIDList SEQUENCE (SIZE (1..24)) OF SEQUENCE {

fid FID,

dlULIndicator ENUMERATED {

dl,

ul

}

} OPTIONAL,

saidUpdateBitMap BIT STRING (SIZE (16)) OPTIONAL,

rngRspForHandoverReentry RngRspForHoReentryInfo OPTIONAL,

mzoneSfidList SEQUENCE (SIZE (1..24)) OF SFID OPTIONAL,

<insert>

bwGrantIndicator BWGrantI OPTIONAL, -- M2M devices only

m2mGroupZoneIndex M2MGROUPZONEIDX OPTIONAL, -- M2M devices only

mgidUpdateInfo SEQUENCE (SIZE (1..16)) OF SEQUENCE {

currentMGID MGID,

newMGID MGID,

newMGSS MGSS

} OPTIONAL, -- M2M devices only </insert>

...

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Ranging Acknowledge

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-RNG-ACK ::= SEQUENCE {

unicastIndication CHOICE {

broadcastRngAck BroadcastRngAck,

unicastRngAck RangingStatus

},

...

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Registration Request

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

CsSpecificationTypes ::= BIT STRING {

packetIpv4 (1),

packetIpv6 (2),

packetEthernet (3),

packetIpv4OrIpv6 (14),

multiProtocol (15)

} (SIZE (16))

MobilityFeaturesSupported ::= BIT STRING {

hoSupport (0),

sleepModeSupport (1),

dcrModeSupport (2)<insert>,</insert>

reserved(3)

} (SIZE (4))

AAI-REG-REQ ::= SEQUENCE {

amsMacAddress MACAddress,

amsCapNegotiation AmsCapabilities,

csCapabilities CsCapabilities,

hostCfgCapIndicator FeatureSupport,

-- maximum requested host configuration size is 1023 octets

requestedHostConfig OCTET STRING (SIZE (0..1023)) OPTIONAL,

globalCarrierConfigChangeCount INTEGER (0..7),

amsInitAgpServiceAdaptation FeatureSupport OPTIONAL,

vendorID VendorID OPTIONAL,

mobilityFeaturesSupported MobilityFeaturesSupported OPTIONAL,

<insert>

supportOfSTIDSharing ENUMERATED {

notSupported,

supported

} OPTIONAL, -- M2M devices only

rangingBackoffMechanism ENUMERATED {

decBackoffSupported,

decBackoffNotSupported

} OPTIONAL, -- M2M devices only </insert>

...

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Registration Response

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-REG-RSP ::= SEQUENCE {

stidAndMAPMaskSeed SEQUENCE {

stid STID,

mapMaskSeed MapMaskSeed

} OPTIONAL,

crid CRID OPTIONAL,

femtoAbsLdm SEQUENCE {

startSuperframeOffset INTEGER (0..511),

availableIntervalLeng INTEGER (0..15),

unavailableIntervalLeng INTEGER (0..255)

} OPTIONAL,

agpsMethod FeatureSupport OPTIONAL,

imCapabilities ImCapabilities OPTIONAL,

antennaConfig SoundingAntennaSw OPTIONAL,

embsCapabilities EmbsCapabilities OPTIONAL,

persistentAllocation FeatureSupport OPTIONAL,

groupResourceAllocation FeatureSupport OPTIONAL,

hoTriggerMetric ReportMetric OPTIONAL,

csCapabilities CsCapabilities OPTIONAL,

ipv4HostAddress IPv4Address OPTIONAL,

ipv6HomeNetworkPrefix IPv6HomeNetworkPrefix OPTIONAL,

-- maximum additional host configuration IE size is 1023 octets

additionalHostConfigIe OCTET STRING (SIZE (0..1023)) OPTIONAL,

redirectionInfoArray SEQUENCE (SIZE (1..8)) OF RedirectionInfo OPTIONAL,

csgIdlength INTEGER (1..24) OPTIONAL,

globalCarrierCfgChangeCount INTEGER (0..7),

multicarrierCapabilities McCapabilities OPTIONAL,

csTypeOfDefaultServiceFlow CsSpecification OPTIONAL,

clcLimits SEQUENCE (SIZE (1..2)) OF ClcLimits OPTIONAL,

amsInitAgpServiceAdaptation FeatureSupport OPTIONAL,

vendorID VendorID OPTIONAL,

mobilityFeaturesSupported MobilityFeaturesSupported OPTIONAL,

<insert>

supportOfSTIDSharing ENUMERATED {

notSupported,

supported

} OPTIONAL, -- M2M devices only

stidSharingInfo SEQUENCE {

stidValidPeriodicity BIT STRING (SIZE (3)),

stidValidOffset BIT STRING (SIZE (3))

} OPTIONAL, -- M2M devices only

rangingBackoffMechanism ENUMERATED {

decBackoffSupported,

decBackoffNotSupported

} OPTIONAL, -- M2M devices only

indicationOfGDScheme ENUMERATED {

notSupported,

supported

} OPTIONAL, -- M2M devices only </insert>

...

}

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

-- Network exit Messages

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

IdleModeRetain ::= BIT STRING {

sbcMessages (0),

-- Retain info associated with SBC messages

pkmMessages (1),

-- Retain info associated with PKM messages

regMessages (2),

-- Retain info associated with REG messages

networkAddr (3),

-- Retain info associated with network addresses

msState (4)

-- Retain MS state information

} (SIZE (5))

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Deregistration Request message

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-DREG-REQ ::= SEQUENCE {

deRegReqCode CHOICE {

deregFromABSAndNetwork NULL, -- 0x00

deregAndInitIdleMode DeregAndInitIdleMode, -- 0x01

unsolicitedDeregRspWithAct05 <delete> ~~NULL~~ </delete>

<insert> UnsolicitedDeregRspWithAct05 </insert>, -- 0x02

rejectUnsolicitedDeregRsp NULL, -- 0x03

deregToEnterDcrMode DeregToEnterDcrMode, -- 0x04

unsolicitedDeregRspWithAct00-01-02-03 NULL, -- 0x05

...

},

...

}

DeregAndInitIdleMode ::= SEQUENCE {

………………………………………………….

<insert> ,

localizedIdle ENUMERATED {

enterNomalIdle,

enterLocalized

} OPTIONAL, -- M2M devices only

... </insert>

}

DeregToEnterDcrMode ::= SEQUENCE {

idleModeRetainInfo IdleModeRetain

}

<insert>

UnsolicitedDeregRspWithAct05 ::= SEQUENCE {

localizedIdle ENUMERATED {

enterNomalIdle,

enterLocalized

} OPTIONAL, -- M2M devices only

...

} </insert>

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Deregistration Response message

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-DREG-RSP ::= SEQUENCE {

actionCode CHOICE {

attempyNewNtwkEntry NULL, -- 0x00

listenAndNoTx NULL, -- 0x01

listenAndTxOnControlConnection NULL, -- 0x02

returnAndTxOnActiveConnection NULL, -- 0x03

amsTerminateNormalOperation NULL, -- 0x04

initiateIdleMode InitiateIdleMode, -- 0x05

rejectIdleModeInitiationRequest RejectIdleModeInitiationRequest, -- 0x06

allowIdleModeInitiationRequest AllowIdleModeInitiationRequest, -- 0x07

allowConnectionInfoRetention NULL, -- 0x08

rejectConnectionInfoRetention NULL, -- 0x09

...

},

...

}

InitiateIdleMode ::= SEQUENCE {

<insert>

localizedIdle ENUMERATED {

enterNomalIdle,

enterLocalized

} OPTIONAL, -- M2M devices only </insert>

pagingCycle PgCycle,

pagingOffset PgOffset,

<insert>

m2mPagingOffset M2MPgOffset OPTIONAL, -- M2M devices only </insert>

pagingControllerId PCID,

pagingGroupId PGID,

-- if Network Configuration indicates ABS is attached to the advanced network

<delete>

~~deRegId DREGID OPTIONAL,~~</delete>

<insert>

deRegIdInfo CHOICE {

deRegId DREGID,

fixedM2Mid FMDID

} OPTIONAL, -- M2M devices only </insert>

idleModeRetainInfo IdleModeRetain,

reqDuration INTEGER (0..255) OPTIONAL <insert>,

m2mIdleTimer INTEGER (0..16777215) OPTIONAL -- M2M devices only </insert>

}

RejectIdleModeInitiationRequest ::= SEQUENCE {

reqDuration INTEGER (0..255) OPTIONAL

}

AllowIdleModeInitiationRequest ::= SEQUENCE {

<insert>

localizedIdle ENUMERATED {

enterNomalIdle,

enterLocalized

} OPTIONAL, -- M2M devices only </insert>

pagingCycle PgCycle,

pagingOffset PgOffset,

<insert>

secondPagingOffset SecondPgOffset OPTIONAL, -- M2M devices only

m2mPagingOffset M2MPgOffset OPTIONAL, -- M2M devices only </insert>

pagingControllerId PCID,

pagingGroupId PGID,

-- if Network Configuration indicates ABS is attached to the advanced network

<delete>

~~deRegId DREGID OPTIONAL,~~</delete>

<insert>

deRegIdInfo CHOICE {

deRegId DREGID,

fixedM2Mid FMDID

} OPTIONAL, -- M2M devices only </insert>

idleModeRetainInfo IdleModeRetain <insert>,

m2mIdleTimer INTEGER (0..16777215) OPTIONAL, -- M2M devices only

transmissionType ENUMERATED {

none,

sendData

} OPTIONAL, -- M2M devices only

maxNumPagingCycle MaxNumPgCycle OPTIONAL -- M2M devices only </insert>

}

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

-- Connection management Messages \*

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

………………………………………………………………………………………………

-- The mapping of predefined BR index used in quick access message to

-- BR size and BR actions

PredefinedBrIndex ::= SEQUENCE {

brIndex INTEGER (0..15) OPTIONAL,

brAction INTEGER {

ertPS (0),

aGP (1),

br (2)<insert>,

abnormalPowerDownIndicator (3)</insert> -- M2M device only

} (0..3) OPTIONAL,

brSize INTEGER (0..2047) OPTIONAL

} -- bytes

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- DSA Request

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

<insert>

M2MDsaReqParameters ::= SEQUENCE { -- M2M device only

minAccessWindow INTEGER (0..1023) OPTIONAL,

m2mDeviceMulticast SEQUENCE {

sfid SFID,

mgid MGID,

m2mGroupZoneIndex INTEGER (0..3) OPTIONAL,

mgss MGSS OPTIONAL

} OPTIONAL

} </insert>

……………………………

AAI-DSA-REQ ::= SEQUENCE {

fidChangeCount FidChangeCount,

absInitDsaInfo AbsInitDsaInfo OPTIONAL,

directionIndicator DirIndicator,

qoSParameters QosParameter OPTIONAL,

additionalSfInfo AdditionalSfInfo OPTIONAL,

emergencyIndication BOOLEAN OPTIONAL,

embsService EMBSService OPTIONAL,

fullEMBSIDArray SEQUENCE (SIZE (1..8)) OF SEQUENCE {

embsZoneID EMBSZoneID,

carrierIndex PhyCarrierIndex,

embsidFIDMappingList SEQUENCE (SIZE (1..15)) OF SEQUENCE {

embsid EMBSID,

fid FID

}

} OPTIONAL,

unicastAvailIntervalBitmap UnicastAvailIntervalBitmap OPTIONAL,

groupParameterCreateChange GroupParaCreateChange OPTIONAL,

coupledGroupCreateChange CoupledGroupCreateChange OPTIONAL,

multicastGroup SEQUENCE (SIZE (1..16)) OF SEQUENCE {

multicastGroupId MulticastGroupID,

fid FID

} OPTIONAL,

sleepCycleSetting SleepCycleSetting OPTIONAL,

harqChannelsList SEQUENCE (SIZE (1..16)) OF INTEGER (0..15) OPTIONAL,

<insert> m2mDsaReq M2MDsaReqParameters OPTIONAL, </insert> -- M2M device only

...

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- DSA Response

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

<insert>

M2MDsaRspParameters ::= SEQUENCE { -- M2M device only

minAccessWindow INTEGER (0..1023) OPTIONAL,

m2mDeviceMulticast SEQUENCE {

mgid MGID,

m2mGroupZoneIndex INTEGER (0..3) OPTIONAL

} OPTIONAL

} </insert>

AAI-DSA-RSP ::= SEQUENCE {

fidChangeCount FidChangeCount,

confirmationCode ConfirmationCode,

fid FID OPTIONAL,

groupParameterCreateChange SEQUENCE {

fidArray SEQUENCE (SIZE (1..16)) OF SEQUENCE {

fid FID OPTIONAL

}

} OPTIONAL,

embsService EMBSService OPTIONAL,

fullEMBSIDArray SEQUENCE (SIZE (1..8)) OF SEQUENCE {

embsZoneID EMBSZoneID,

carrierIndex PhyCarrierIndex OPTIONAL,

embsidFIDMappingArray SEQUENCE (SIZE (1..15)) OF SEQUENCE {

embsid EMBSID,

fid FID

}

} OPTIONAL,

carrierSwitching CHOICE {

unicastAvailIntervalBitmap UnicastAvailIntervalBitmap,

aaiEmbsRepMsg NULL

} OPTIONAL,

multicastGroup SEQUENCE (SIZE (1..16)) OF SEQUENCE {

multicastGroupId MulticastGroupID

} OPTIONAL,

sleepCycleSetting SleepCycleSetting OPTIONAL,

<insert> m2mDsaRsp M2MDsaRspParameters OPTIONAL, </insert> -- M2M device only

...

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- DSC Request

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

……………………………

<insert>

M2MDscReqParameters ::= SEQUENCE { -- M2M device only

minAccessWindow INTEGER (0..1023) OPTIONAL,

mgid MGID OPTIONAL,

m2mGroupZoneIndex INTEGER (0..3) OPTIONAL

} </insert>

AAI-DSC-REQ ::= SEQUENCE {

fidChangeCount FidChangeCount,

absInitDscInfo AbsInitDscInfo OPTIONAL,

directionIndicator DirIndicator,

serviceClassName ServiceClassName OPTIONAL,

globalServiceClass GlobalServiceClassName OPTIONAL,

qosParameterSet QosParameterSetType OPTIONAL,

qoSParameters QosParameter OPTIONAL,

sduInterArrival Interval OPTIONAL, -- 0.5ms

timeBase Interval OPTIONAL, -- ms

classifierDSCAction ClassifierDSCAction OPTIONAL,

classificationRules ClassificationRule OPTIONAL,

rohcAttributes RohcAttributes OPTIONAL,

packetErrorRate PacketErrorRate OPTIONAL,

emergencyIndication BOOLEAN OPTIONAL,

embsService EMBSService OPTIONAL,

fullEMBSIDArray SEQUENCE (SIZE (1..8)) OF SEQUENCE {

embsZoneID EMBSZoneID,

newEmbsZoneID EMBSZoneID,

carrierIndex PhyCarrierIndex OPTIONAL,

serviceFlowUpdateType CHOICE {

bitmapAndNew SEQUENCE {

serviceFlowUpdateBitmap BIT STRING (SIZE (16)),

embsidFIDMappingArray SEQUENCE (SIZE (1..16)) OF SEQUENCE {

newEMBSID EMBSID,

newFID FID

}

},

currentAndNew SEQUENCE (SIZE (1..16)) OF SEQUENCE {

currentEMBSID EMBSID,

currentFID FID,

newEMBSID EMBSID,

newFID FID

}

}

} OPTIONAL,

unicastAvailIntervalBitmap UnicastAvailIntervalBitmap OPTIONAL,

groupParameterCreateChange GroupParaCreateChange OPTIONAL,

coupledGroupCreateChange CoupledGroupCreateChange OPTIONAL,

multicastGroupAddition SEQUENCE (SIZE (1..16)) OF SEQUENCE {

multicastGroupAddedId MulticastGroupID

} OPTIONAL, -- multicast group id to be added

multicastGroupDeletion SEQUENCE (SIZE (1..16)) OF SEQUENCE {

multicastGroupDeletedId MulticastGroupID

} OPTIONAL, -- multicast group id to be deleted

sleepCycleSetting SleepCycleSetting OPTIONAL,

initialBackoffWindowSize INTEGER (0..15) OPTIONAL,

maxBackoffWindowSize INTEGER (0..15) OPTIONAL,

backoffScalingFactor INTEGER (0..15) OPTIONAL,

harqChannelsList SEQUENCE (SIZE (1..16)) OF INTEGER (0..15) OPTIONAL,

<insert> m2mDscReq M2MDscReqParameters OPTIONAL, </insert> -- M2M device only

...

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- DSC Response

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

<insert> M2MDscRspParameters ::= SEQUENCE { -- M2M device only

minAccessWindow INTEGER (0..1023) OPTIONAL

} </insert>

AAI-DSC-RSP ::= SEQUENCE {

fidChangeCount FidChangeCount,

sfid SFID OPTIONAL,

confirmationCode ConfirmationCode,

groupParameterCreateChange SEQUENCE {

fidArray SEQUENCE (SIZE (1..16)) OF SEQUENCE {

fid FID OPTIONAL

}

} OPTIONAL,

sleepCycleSetting SleepCycleSetting OPTIONAL,

<insert> m2mDscRsp M2MDscRspParameters OPTIONAL, </insert> -- M2M device only

...

}

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

-- Security Messages

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

……………………………

<insert>

PKM-MGTEKRequest ::= SEQUENCE { -- M2M device only

mgId MGID

}

PKM-MGTEKUpdate ::= SEQUENCE { -- M2M device only

mgId MGID,

mgss MGSS,

mgtekCount INTEGER (0..65535)

}

PKM-MGTEKReply ::= SEQUENCE { -- M2M device only

newMgss MGSS

}

</insert>

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Privacy Key Management Request

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-PKM-REQ ::= SEQUENCE {

pkmMessage CHOICE {

reauthRequest PKM-ReauthRequest,

eapTransfer PKM-EAPTransfer,

keyAgreementMsg2 PKM-KeyAgreementMsg2,

tekRequest PKM-TEKRequest,

tekInvalid PKM-TEKInvalid,

<insert> mgtekRequest PKM-MGTEKRequest, </insert> -- applied only for M2M device

...

},

...

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Privacy Key Management Response

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-PKM-RSP ::= SEQUENCE {

pkmid PKMID,

pkmMessage CHOICE {

eapTransfer PKM-EAPTransfer,

keyAgreementMsg1 PKM-KeyAgreementMsg1,

keyAgreementMsg3 PKM-KeyAgreementMsg3,

tekReply PKM-TEKReply,

tekInvalid PKM-TEKInvalid,

<insert> mgtekUpdate PKM-MGTEKUpdate, -- applied only for M2M device

mgtekReply PKM-MGTEKReply, -- applied only for M2M device </insert>

...

},

...

}

<insert>

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Idle mode initiation message

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- M2M Specific parameter for Deregistration Response message

SecondPgOffset ::= INTEGER (0..4095) OPTIONAL, -- M2M device only

M2MPgOffset ::= INTEGER (0..1023) OPTIONAL, -- M2M device only

MaxNumPgCycle ::= INTEGER (0..65535) OPTIONAL -- M2M device only </insert>

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

-- Idle Mode Messages

-- \*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-\*-

……………………………

<insert>

-- M2M individual paging (i.e., devices with DID), applied to M2M device only

MACAddressHash ::= BIT STRING (SIZE (24))

PagedMSInfo ::= SEQUENCE {

-- if Network Configuration indicates ABS is attached to the advanced network

deRegId DREGID OPTIONAL,

-- if Network Configuration indicates ABS is attached to the R1 network

macAddressHash MACAddressHash OPTIONAL,

-- if Network Configuration indicates ABS is attached to the advanced network

pagingCycle PgCycle OPTIONAL,

actionCode ENUMERATED {

networkReentry,

locationUpdate

},

m2mAccessType CHOICE { -- M2M device only

resourceAllocationByMapOffset ResourceAllocationByMapOffset, -- 0x00

dedicatedRangingByPaging NULL, -- 0x01

dedicatedRangingByBroadcastmap NULL, -- 0x02

noDedicatedRanging NULL -- 0x03

},

reportCode ENUMERATED { -- M2M device only

none,

sendUplinkdata

} OPTIONAL,

...

}

-- M2M Group paging, applied to M2M devices only

GroupPagedMSInfo ::= SEQUENCE { -- M2M device only

mgId MGID,

m2mGroupZoneIndex INTEGER (0..3) OPTIONAL,

actionCode CHOICE {

networkReentry NetworkReentry, -- 0x00

locationUpdate GroupLocationUpdate, -- 0x01

receivingMulticastTrafficWithoutReentry ReceivingMulticastTrafficWithoutReentry, -- 0x02

mgIDReassignment MgIDReassignment, -- 0x03

...

},

...

}

NetworkReentry ::= SEQUENCE { -- M2M device only

initialRangingBackoffStart INTEGER (0..15),

rangingBackoffWindow ENUMERATED {

increaseWindow,

decreaseWindow

},

m2mAccessType CHOICE { -- M2M device only

resourceAllocationByMapOffset ResourceAllocationByMapOffset, -- 0x00

dedicatedRangingBySrch DedicatedRangingBySrch, -- 0x01

dedicatedRangingByNsrch DedicatedRangingByNsrch, -- 0x02

noDedicatedRanging NULL -- 0x03

},

...

}

GroupLocationUpdate ::= SEQUENCE { -- M2M device only

initialRangingBackoffStart INTEGER (0..15),

rangingBackoffWindow ENUMERATED {

increaseWindow,

decreaseWindow

},

m2mAccessType CHOICE { -- M2M device only

groupResourceAllocationByMapOffset GroupResourceAllocationByMapOffset, -- 0x00

dedicatedRangingBySrch DedicatedRangingBySrch, -- 0x01

dedicatedRangingByNsrch DedicatedRangingByNsrch, -- 0x02

noDedicatedRanging NULL -- 0x03

},

...

}

ReceivingMulticastTrafficWithoutReentry ::= SEQUENCE { -- M2M device only

multicastTransStartTime INTEGER (0..255), OPTIONAL

}

MgIDReassignment ::= SEQUENCE { -- M2M device only

newMgID MGID,

m2mGroupZoneIndex INTEGER (0..3), OPTIONAL

}

-- M2M Network Access Type, applied to M2M devices only

ResourceAllocationByMapOffset ::= SEQUENCE { -- M2M device only

offset INTEGER (0..255)

}

GroupResourceAllocationByMapOffset ::= SEQUENCE { -- M2M device only

offset INTEGER (0..255),

resourceMonitorTimer INTEGER (0..255)

}

DedicatedRangingBySrch ::= SEQUENCE { -- M2M device only

groupPagingChangeCount INTEGER (0..3) OPTIONAL,

groupAccessProbability INTEGER { -- M2M device only

twentyFive (0),

fifty (1),

hundred (2)

--values 1 is reserved

} (0..3) OPTIONAL,

m2mRangingOpportunitySubframeIndex INTEGER (0..7), -- M2M device only

periodicityOfM2mRanging INTEGER { -- M2M device only

everyFrame (0),

firstFrameInEverySuperframe (1),

firstFrameIneveryEvenSuperframe (2),

firstFrameInFourthSuperframe (3)

--values 4 to 7 are reserved

} (0..7),

dedicatedChannelAllocationTimer INTEGER (0..255) OPTIONAL -- M2M device only

}

-- M2M Individual paging (i.e., devices with FMDID), M2M device only

IndividualPagedMSInfo ::= SEQUENCE { -- M2M device only

fixedM2Mid FMDID ~~OPTIONAL~~,

reportCode ENUMERATED { -- M2M device only

none,

sendUplinkdata

} OPTIONAL,

actionCode ENUMERATED {

networkReentry,

locationUpdate

},

m2mAccessType CHOICE { -- M2M device only

resourceAllocationByMapOffset ResourceAllocationByMapOffset, -- 0x00

dedicatedRangingByPaging NULL, -- 0x01

dedicatedRangingByBroadcastmap NULL, -- 0x02

noDedicatedRanging NULL -- 0x03

}

} </insert>

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- Paging Advertisement

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-PAG-ADV ::= SEQUENCE {

<insert>

-- HTC paging </insert>

……………………………………………………

<insert>

-- M2M Individual Paging (i.e., Devices with DID), M2M device only

pagingGroupInfoArray SEQUENCE (SIZE (1..4)) OF SEQUENCE { -- M2M device only

pagedMSInfoArray SEQUENCE (SIZE (1..32)) OF PagedMSInfo

},

-- M2M Group Paging, M2M device only

groupPagedMSInfoArray SEQUENCE (SIZE (1..32)) OF GroupPagedMSInfo, -- M2M device only

-- Fixed M2M Individual Paging (i.e., Devices with FMDID), M2M device only

individualPagingGroupInfoArray SEQUENCE (SIZE (1..4)) OF SEQUENCE { -- M2M device only

individualPagedMSInfoArray SEQUENCE (SIZE (1..32)) OF IndividualPagedMSInfo

},

initialRangingBackoffStart INTEGER (0..15) OPTIONAL, -- M2M device only

rangingBackoffWindow ENUMERATED { -- M2M device only

increaseWindow,

decreaseWindow

} OPTIONAL,

m2mRangingOpportunitySubframeIndex INTEGER (0..7) OPTIONAL, -- M2M device only

periodicityOfM2mRanging INTEGER { -- M2M device only

everyFrame (0),

firstFrameInEverySuperframe (1),

firstFrameIneveryEvenSuperframe (2),

firstFrameInFourthSuperframe (3)

--values 4 to 7 are reserved

} (0..7) OPTIONAL,

dedicatedChannelAllocationTimer INTEGER (0..255) OPTIONAL, -- M2M device only </insert>

extensionFlag ENUMERATED {

lastFragmentOfPagAdv,

moreFragmentOfPagAdv

},

<insert>

m2mExtensionFlag ENUMERATED { -- M2M device only

lastFragmentOfPagAdv,

moreFragmentOfPagAdv

} OPTIONAL, </insert>

emergencyAlert BOOLEAN OPTIONAL

}

<insert>

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- AAI-MTE-IND message (M2M device only)

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-MTE-IND ::= SEQUENCE {

mgidToStopTransmission SEQUENCE (SIZE (1..4)) OF SEQUENCE {

mgid MGID,

m2mGroupZoneIndex INTEGER (0..3)

}

}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

-- AAI-MGMC message (M2M device only)

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-

AAI-MGMC ::= SEQUENCE {

actionCode INTEGER {

reassign (0)

} (0..3),

mgidToUpdate SEQUENCE (SIZE(1..4)) OF SEQUENCE {

currentMGID MGID,

newMGID MGID,

m2mGroupZoneIndex INTEGER (0..3)

} OPTIONAL

} </insert>

END

----------------- End of the text proposal ---------------------------------------------------------------------------------------