<table>
<thead>
<tr>
<th>Project</th>
<th>IEEE 802.16 Broadband Wireless Access Working Group <a href="http://ieee802.org/16">http://ieee802.org/16</a></th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Comment on AAI-RNG-REQ Message over IEEE 802.16.1a</td>
</tr>
<tr>
<td>Date Submitted</td>
<td><strong>2012-05-15</strong></td>
</tr>
<tr>
<td>Source(s)</td>
<td>Eunkyung Kim, Sungcheol Chang, Won-Ik Kim, Seokki Kim, Sungkyung Kim, Miyoung Yun, Hyun Lee, Chulsik Yoon, Jaesun Cha, Soojung Jung, Anseok Lee, Wooram Shin, Kwangjae Lim</td>
</tr>
<tr>
<td>Voice, E-mail</td>
<td>Voice: +82-42-860-5415 E-mail: <a href="mailto:ekkim@etri.re.kr">ekkim@etri.re.kr</a></td>
</tr>
<tr>
<td>Re:</td>
<td>“IEEE 802.16-12-271,” in response to Letter Ballot Recirc #38a on P802.16.1a/D2</td>
</tr>
<tr>
<td>Abstract</td>
<td>Comments on AAI-RNG-REQ message in GRIDMAN Draft Standard</td>
</tr>
<tr>
<td>Purpose</td>
<td>To discuss and adopt the proposed text in the draft amendment document on GRIDMAN</td>
</tr>
<tr>
<td>Notice</td>
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</tr>
</tbody>
</table>
Comment on AAI-RNG-REQ Message over IEEE 802.16.1a

Eunkyung Kim, Sungcheol Chang, Won-Ik Kim, Seokki Kim, Sungkyung Kim, Miyoung Yun, Hyun Lee, Chulsik Yoon, Jaesun Cha, Soojung Jung, Anseok Lee, Wooram Shin, Kwangjae Lim

ETRI

1. Introduction

This document provides clarification on extended ranging purpose indication in AAI-RNG-REQ message.

2. References


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

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

[Remedy1: change Table 27 - AAI-RNG-REQ message field description, page 10 on P802.16.1a/D2 as follows:]

6.2.3.1 AAI-RNG-REQ

Change Table 27 in section 6.2.3.1 as indicated:
Table 2730 - AAI-RNG-REQ message field description

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
</tr>
</thead>
</table>
| Ranging Purpose Indication | 4           | 0b0000 = Initial network entry  
0b0001 = HO reentry  
0b0010 = Network reentry from idle-mode  
0b0011 = Idle mode location update  
0b0100 = DCR mode extension  
0b0101 = Emergency call setup (e.g., E911)  
0b0110 = Location update for updating-service flow management encodings of E-MBS-flows  
0b0111 = Location update for transition to DCR mode from idle mode  
0b1000 = Reentry from DCR mode, coverage loss or detection of different ABS restart count.  
0b1001 = Network reentry from a Legacy BS  
0b1010 = Zone switch to MZONE from LZONE  
0b1011 = Location update due to power-down  
0b1100 = Interference mitigation request to a CSG Femto ABS when experiencing interference from the CSG Femto ABS  
0b1101 = NS/EP call setup  
0b1110 = reserved  
0b1111 = Ranging purpose for HR-Network  
0b1111 = reserved |
### Table 27.40 - AAI-RNG-REQ message field description

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended Ranging Purpose Indication for HR-Network</td>
<td>2</td>
<td>0b00 = Ranging request for non HR-Network and for other operation (i.e., initial network entry after coverage loss) 0b01 = Ranging request for HR multicast service 0b10 = Network reentry for FBIS operation 0b11 = Network reentry from idle mode for extension of TDC</td>
<td>Shall be present if HR-MS performs ranging for HR-multicast service, FBIS operation, extension of TDC, or initial network reentry after coverage loss. Otherwise, it is omitted.</td>
</tr>
</tbody>
</table>

```java
if (Extended Ranging Purpose Indication for HR-Network == 0b00 || Extended Ranging Purpose Indication for HR-Network is not included in this message (i.e., AAI-RNG-REQ)) {
    // Ranging request for non HR-Network and for other operation (i.e., initial network entry after coverage loss)
}
```
### Table 2730 - AAI-RNG-REQ message field description

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ranging Purpose Indication</td>
<td>4</td>
<td>0b0000 = Initial network entry&lt;br&gt;0b0001 = HO reentry&lt;br&gt;0b0010 = Network reentry from idle mode&lt;br&gt;0b0011 = Idle mode location update&lt;br&gt;0b0100 = DCR mode extension&lt;br&gt;0b0101 = Emergency call setup (e.g., E911)&lt;br&gt;0b0110 = Location update for updating service flow management encodings of E-MBS flows&lt;br&gt;0b0111 = Location update for transition to DCR mode from idle mode&lt;br&gt;0b1000 = Reentry from DCR mode, coverage loss or detection of different ABS restart count.&lt;br&gt;0b1001 = Network reentry from a Legacy BS&lt;br&gt;0b1010 = Zone switch to MZONE from LZONE&lt;br&gt;0b1011 = Location update due to power down.&lt;br&gt;0b1100 = Interference mitigation request to a CSG Femto ABS when experiencing interference from the CSG Femto ABS&lt;br&gt;0b1101 = NS/EP call setup&lt;br&gt;0b1110 = Network Reentry from idle mode of AMS which has entered Idle Mode in R1 BS&lt;br&gt;0b1111 = Reserved</td>
<td></td>
</tr>
<tr>
<td>If (Ranging Purpose Indication == 0b000) {</td>
<td></td>
<td>// Initial network entry</td>
<td></td>
</tr>
<tr>
<td>If (S-SFH Network Configuration bit == 0b0 and AMSID privacy is enabled) {</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AMSID*</td>
<td>48</td>
<td>The AMSID hash value. Refer to 6.2.5.3.1</td>
<td></td>
</tr>
</tbody>
</table>
else if (S-SFH Network Configuration bit == 0b1 or AMSID privacy is disabled) {
  AMS MAC address 48  AMS’s real MAC address
}

MAC version 8  See 11.1.3

Initial Offset for uplink power control (OffsetInitial) 5  The bit size represents power level ranging from – 15 dB (0x00) to 16dB (0x1F) with 1dB step The value is determined by AMS after successful initial ranging process

Serving BSID 48  The BSID of the HR-MS’s previous Serving HR-BS before incurring a coverage loss

Serving BSID

else if (Ranging Purpose Indication == 0b1101) {
  //NS/EP call setup
  AMS MAC address 48  AMS’s real MAC address
  MAC version 8  See 11.1.3
  Initial Offset for uplink power control (OffsetInitial) 5  The bit size represents power level ranging from – 15 dB (0x00) to 16dB (0x1F) with 1dB step The value is determined by AMS after successful initial ranging process

  } else if (Ranging Purpose Indication == 0b1110) {
    // Network Reentry from idle mode of AMS which has entered idle mode in R1 BS
    Paging Controller ID 48  The Paging Controller ID to which the AMS previously belonged in serving legacy BS

if (S-SFH Network Configuration bit == 0b1 or AMSID privacy is disabled) {
  AMS MAC address 48  AMS’s real MAC address
}

}\n
Table 2730 - AAI-RNG-REQ message field description

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AMS MAC address</td>
<td>48</td>
<td>AMS’s real MAC address</td>
<td></td>
</tr>
<tr>
<td>MAC version</td>
<td>8</td>
<td>See 11.1.3</td>
<td></td>
</tr>
<tr>
<td>Initial Offset for uplink power control (OffsetInitial)</td>
<td>5</td>
<td>The bit size represents power level ranging from – 15 dB (0x00) to 16dB (0x1F) with 1dB step The value is determined by AMS after successful initial ranging process</td>
<td>Shall be present if the initial network entry after coverage loss in HR-Networks</td>
</tr>
<tr>
<td>Serving BSID</td>
<td>48</td>
<td>The BSID of the HR-MS’s previous Serving HR-BS before incurring a coverage loss</td>
<td></td>
</tr>
<tr>
<td>AMS MAC address</td>
<td>48</td>
<td>AMS’s real MAC address</td>
<td></td>
</tr>
<tr>
<td>MAC version</td>
<td>8</td>
<td>See 11.1.3</td>
<td></td>
</tr>
<tr>
<td>Initial Offset for uplink power control (OffsetInitial)</td>
<td>5</td>
<td>The bit size represents power level ranging from – 15 dB (0x00) to 16dB (0x1F) with 1dB step The value is determined by AMS after successful initial ranging process</td>
<td></td>
</tr>
<tr>
<td>Paging Controller ID</td>
<td>48</td>
<td>The Paging Controller ID to which the AMS previously belonged in serving legacy BS</td>
<td></td>
</tr>
<tr>
<td>AMS MAC address</td>
<td>48</td>
<td>AMS’s real MAC address</td>
<td></td>
</tr>
</tbody>
</table>
If (CMAC indicator == 0b1) {

AK_COUNT 16 The AMS’s current value of the AK_COUNT, which is used to update the security keys in the TABS. Shall be present if the AMS has a CMAC Tuple necessary to expedite security authentication.

}  //end of Ranging Purpose Indication

} else if (Ranging Purpose Indication == 0b1110) {

// Ranging purpose for HR-Network

Extended Ranging Purpose Indication 4 0b0000 = HR-multicast service location update 0b0001 = Network reentry for FBIS operation 0b0010 = Network reentry from idle mode for extension of TDC 0b0011-0b1111 = reserved

} else if (Extended Ranging Purpose Indication for HR-Network == 0b01) {

// Ranging request for HR multicast service

action code 3 bit0: multicast service flow update bit1: location update due to multicast zone change bit2: multicast security key update

} if (action code bit0 is set) {

If (STID is not pre assigned) {

Serving BSID 48 The BSID of the AMS's previous S-ABS before incurring a coverage loss, or the BSID of the S-ABS to which the AMS is currently connected (has completed the registration cycle and is in Connected State)

Table 2730 - AAI-RNG-REQ message field description

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK_COUNT</td>
<td>16</td>
<td>The AMS’s current value of the AK_COUNT, which is used to update the security keys in the TABS. Shall be present if the AMS has a CMAC Tuple necessary to expedite security authentication.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extended Ranging Purpose Indication</td>
<td>4</td>
<td>0b0000 = HR-multicast service location update 0b0001 = Network reentry for FBIS operation 0b0010 = Network reentry from idle mode for extension of TDC 0b0011-0b1111 = reserved</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>action code</td>
<td>3</td>
<td>bit0: multicast service flow update bit1: location update due to multicast zone change bit2: multicast security key update</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serving BSID</td>
<td>48</td>
<td>The BSID of the AMS's previous S-ABS before incurring a coverage loss, or the BSID of the S-ABS to which the AMS is currently connected (has completed the registration cycle and is in Connected State)</td>
<td></td>
</tr>
</tbody>
</table>
The STID which the AMS uses in the previous S-ABS.

The Station ID pre-assigned by the T-ABS.

The AMS's current value of the AK_COUNT, which is used to update the security keys in the T-ABS. Shall be presented if the AMS has a CMAC Tuple necessary to expedite security authentication.

AMS’s real MAC address

The ID that the AMS is assigned for idle mode and currently maintains.

The Paging Controller ID that the AMS currently maintains in idle mode

The identification of the paging group to which the AMS previously belonged

PAGING_CYCLE applied to the AMS

PAGING_OFFSET applied to the AMS

The STID which the AMS uses in the previous S-ABS.

The Station ID pre-assigned by the T-ABS.

The AMS's current value of the AK_COUNT, which is used to update the security keys in the T-ABS. Shall be presented if the AMS has a CMAC Tuple necessary to expedite security authentication.

AMS’s real MAC address

The ID that the AMS is assigned for idle mode and currently maintains.

The Paging Controller ID that the AMS currently maintains in idle mode

The identification of the paging group to which the AMS previously belonged

PAGING_CYCLE applied to the AMS

PAGING_OFFSET applied to the AMS

The STID which the AMS uses in the previous S-ABS.

The Station ID pre-assigned by the T-ABS.

The AMS's current value of the AK_COUNT, which is used to update the security keys in the T-ABS. Shall be presented if the AMS has a CMAC Tuple necessary to expedite security authentication.

AMS’s real MAC address

The ID that the AMS is assigned for idle mode and currently maintains.

The Paging Controller ID that the AMS currently maintains in idle mode

The identification of the paging group to which the AMS previously belonged

PAGING_CYCLE applied to the AMS

PAGING_OFFSET applied to the AMS
### Table 27.30 - AAI-RNG-REQ message field description

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AK_COUNT</td>
<td>16</td>
<td>The AMS's current value of the AK_COUNT, which is used to update the security keys in the T-ABS.</td>
<td>Shall be presented if the AMS has a CMAC Tuple necessary to expedite security authentication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>// Network reentry for FBIS operation</td>
<td></td>
</tr>
</tbody>
</table>

```c
if (Extended Ranging Purpose Indication == 0b0001) {
else if (Extended Ranging Purpose Indication for HR-Network == 0b10) {

If (STID is not pre assigned) {

Serving BSID       | 48          | The BSID of the AMS's previous S-ABS before incurring a coverage loss, or the BSID of the S-ABS to which the AMS is currently connected (has completed the registration cycle and is in Connected State). |

Previous STID      | 12          | The STID which the AMS uses in the previous S-ABS.                              |

STID               | 12          | The Station ID pre-assigned by the T-ABS                                       |

If (CMAC indicator == 0b1) { |

AK_COUNT           | 16          | The AMS's current value of the AK_COUNT, which is used to update the security keys in the T-ABS. | Shall be presented if the AMS has a CMAC Tuple necessary to expedite security authentication |

```

8
Table 27.30 - AAI-RNG-REQ message field description

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary Serving ABS flag</td>
<td>1</td>
<td>0b0 : the AMS shall set its primary serving ABS as S-ABS (Degraded HR-BS) after network reentry&lt;br&gt;0b1 : the AMS shall set its primary serving ABS as T-ABS (Target HR-BS) after network reentry</td>
<td></td>
</tr>
<tr>
<td>if (switch access mode is switch access with fixed Switched Access Windows) {</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switched Access Window Size</td>
<td>8</td>
<td>The size of fixed Switched Access Window in unit of frame</td>
<td>Shall be present if Switched Access Mode is fixed Switch Access Window</td>
</tr>
<tr>
<td>} else if (switch access mode is switch access with variable Switched Access Windows) {</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maximum Switched Access Window Size</td>
<td>8</td>
<td>Maximum size of Switched Access Window in unit of frame</td>
<td>Shall be present if Switched Access Mode is variable Switch Access Window</td>
</tr>
<tr>
<td>}</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switched Access Start Time</td>
<td>8</td>
<td>The 8 least significant bits of the absolute frame number at the T-ABS where the AMS starts to perform the Switched Access operation</td>
<td></td>
</tr>
<tr>
<td>} //end of Extended Ranging Purpose Indication for HR-Network</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>} //end of Ranging Purpose Indication</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---
---
---
for (i=0; i<N_CSG_IDInfos; i++) {

N_CSG_IDInfos is the number of CSG ID Information blocks. 
1 ≤ N_CSG_IDInfos ≤ 15

Optional for loop. May be included for quick CSG membership detection or ABS reselection assistance.

Operator ID of the CSG Femtocell

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>24</td>
<td>The Operator ID of the CSG δ Femtocell.</td>
<td>Present if the Operator ID is different from the one of the ABS</td>
</tr>
</tbody>
</table>

for (j = 0; j < N_CSG_IDs; j++) {

N_CSG_IDs is the number of CSG IDs belongs to this Operator ID.

CSGID variable

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>variable</td>
<td>The CSGID within the Operator ID. It may be part of the BS ID, with certain bits inside indicating its length. If the CSG has single BS, it may be of maximum length, which is the LSB-24-bits of the full BS ID.</td>
<td></td>
</tr>
</tbody>
</table>

New Multicast Group Zone ID

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Multicast Group Zone ID</td>
<td>12</td>
<td>Indicates a Multicast Group Zone ID to update in target HR-BS.</td>
<td>Shall be included in HR-Network in response to the AAI-RNG-REQ message where ranging-purpose-indication is set to 0b1110 and Extended Ranging Purpose Indication for HR-Network is set to 0b0000 and action code bit0 is set to 1.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[Remedy2: change the 4th row on Table 28 in page 15 on P802.16.1a/D2 as follows:]

<table>
<thead>
<tr>
<th>Field</th>
<th>Size (bits)</th>
<th>Value/Description</th>
<th>Condition</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
[Remedy3: change the 2th row on Table 28 in page 18 on P802.16.1a/D2 as follows:]

| New Multicast Group Zone ID | 12 | Indicates a Multicast Group Zone ID to update in target HR-BS. | Shall be included in HR-Network in response to the AAI-RNG-REQ message where ranging purpose indication is set to 0b1110 and Extended Ranging Purpose Indication for HR-Network is set to 0b0000 and action code bit0 is set to 1. |

[Remedy4: change the 6th row on Table 106zz in page 89 on P802.16.1a/D2 as follows:]

| Action Code | 3 | if bit0 = 1, perform network entry or exit sleep mode. if bit1 = 1, perform ranging procedure with ranging purpose indication set to 0b1110 and Extended Ranging Purpose Indication for HR-Network set to 0b00000b01. if bit2 = 1, receiving multicast. | Shall be present |

[Remedy5: change the 5th row on Table 106aaa in page 90 on P802.16.1a/D2 as follows:]

| Action Code | 3 | if bit0 = 1, perform network entry or exit sleep mode. if bit1 = 1, perform ranging procedure with ranging purpose indication set to 0b1110 and Extended Ranging Purpose Indication for HR-Network set to 0b00000b01. if bit2 = 1, receiving multicast. | Shall be present |
if bit0 = 1, perform network entry or exit sleep mode
if bit1 = 1, perform ranging procedure
with Ranging Purpose Indication set to 0b1110 and Extended Ranging Purpose Indication for HR-Network set to 0b00000b01
if bit2 = 1, receiving multicast

**[Remedy6: change line #14 - #18 in page 187 on P802.16.1a/D2 as follows:]**

In the reentry procedure, Designated FBIS HR-MS shall send AAI-RNG-REQ message with Ranging Purpose Indication to 0b1110 and Extended Ranging Purpose Indication for HR-Network to 0b00010b10 (Network reentry for FBIS operation). In addition, Primary Serving ABS flag and Switched Access Mode shall also be included in the AAI-RNG-REQ message to Target HR-BS. The optimized HO may not be applied due to the failure of backbone connectivity at the Degraded HR-BS.

**[Remedy7: change line #8 - #15 in page 191 on P802.16.1a/D2 as follows:]**

When the HR-MS transits to a new Multicast Zone while in Active Mode or Sleep Mode, the HR-MS shall send AAI-RNG-REQ message described in 6.2.3.1 with Ranging Purpose Indication = 0b1110 and Extended Ranging Purpose Indication for HR-Network = 0b00000b01 with action code at the target HR-BS. In response to the request for multicast service flow update (Ranging Purpose Indication = 0b1110 and Extended Ranging Purpose Indication for HR-Network = 0b00000b01 and action code bit0 is set to 1), the HR-BS shall transmit AAI-RNG-RSP message described in 6.2.3.2, which may include Multicast Group Zone Identifier, Multicast Indication Cycle, Multicast Group ID, FID Update, and feedback parameters if used, to provide updated service flow management encodings for any affected multicast flow(s) as part of the handover procedure.

**[Remedy8: change line #1 - #6 in page 192 on P802.16.1a/D2 as follows:]**

In order to perform the multicast location update process, the HR-MS shall transmit AAI-RNG-REQ message with Ranging Purpose Indication = 0b1110 and Extended Ranging Purpose Indication for HR-Network = 0b00000b01 with action code. When the HR-MS detects the current multicast group zone changes and expects to update service flow, the bit0 of action code is set to 1. In addition to changing the multicast group zone, the HR-MS detects current paging zone changes, the bit1 of action code is set to 1. In the case of performing multicast security key update, the bit2 of the action code is set to 1.

**[Remedy9: change line #21, page 222 - line #7, page 223 on P802.16.1a/D2 as follows:]**

RedirectionInfo ::= SEQUENCE {
    absidForNeighborABS BSID,
preambleForNeighborABS PreambleIndex,
centerFreqForNeighborABS CenterFreq
}
RNGPurposeForHRNetwork ::= SEQUENCE {
  extendedRngPurposeInd CHOICE {
    hrMulticastServiceRangingLocationUpdate, 
    networkReentryForFBISOperation, 
    networkReentryFromIdleModeForExtenOfTDC BOOLEAN, 
    ... 
  }
}

hrMulticastServiceRangingLocationUpdate ::= SEQUENCE {
  actionCode BIT STRING {
    multicastServiceFlowUpdate (0),
    locationUpdateDueToMulticastZoneChange (1),
    multicastSecurityKeyUpdate (2)
  } (SIZE(3)),
  locationUpdateMulticastFlows LocationUpdate
}

NetworkReentryForFBISOperation ::= SEQUENCE {
  isStidPreAssigned CHOICE {
    -- be selected if STID is not pre assigned
    stidInfo SEQUENCE {
      servingBsid BSID,
      previousSTID STID
    },
    -- be selected if STID is pre assigned
    currentSTID STID
  },
  akCount AKCount OPTIONAL,
  -- Primary serving ABS flag
  -- set to 0 when the AMS sets its primary serving ABS as S-ABS (Degraded HR-BS)
  -- after network reentry
  -- set to 1 when the AMS sets its primary serving ABS as T-ABS (Target HR-BS)
  -- after network reentry
  primaryServingAbsFlag BOOLEAN,
  switchedAccessWindowSize CHOICE {
    -- be selected if switch access mode is fixed switched access windows
    switchAccessWindowSize SwitchAccessWindowSize,
    -- be selected if switch access mode is variable switched access windows
    maximumSwitchedAccessWindowSize MAXSwitchAccessWindowSize
  },
  switchedAccessStartTime SwitchAccessStartTime
}

-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
-- Ranging Request
-- +-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+-+
AAI-RNG-REQ ::= SEQUENCE {
  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,
rngPurposeForHRNetwork RNGPurposeForHRNetwork OPTIONAL,
...)
shall be present unless HR-MS performs ranging for HR-multicast service, FBIS operation, and extension of TDC.

rngPurposeForHRNetwork RNGPurposeForHRNetwork OPTIONAL,

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

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