Project	**IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>**	
Title	**Comment on AAI-RNG-REQ Message over IEEE 802.16.1a**	
Date Submitted	**2012-05-15**	
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Re:	"IEEE 802.16-12-271," in response to Letter Ballot Recirc #38a on P802.16.1a/D2	
Abstract	Comments on AAI-RNG-REQ message in GRIDMAN Draft Standard	
Purpose	To discuss and adopt the proposed text in the draft amendment document on GRIDMAN	
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Comment on AAI-RNG-REQ Message over IEEE 802.16.1a

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1. Introduction

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

2. References

[1] IEEE 802.16-12-0132-00, GRIDMAN System Requirement Document including SARM annex, January 2012.
[2] IEEE P802.16n[TM]/D2, Air Interface for Broadband Wireless Access Systems - Draft Amendment: Higher Reliability Networks, April 2012.
[3] IEEE P802.16.1a[TM]/D2, WirelessMAN-Advanced Air Interface for Broadband Access Systems - Draft Amendment: Higher Reliability Networks, April 2012.
[4] EEE P802.16Rev3/D6, IEEE Draft Standard for Local and metropolitan area networks; Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems," April 2012.
[5] IEEE P802.16.1[TM]/D6, IEEE Draft for WirelessMAN-Advanced Air Interface for Broadband Wireless Access Systems, April 2012.

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~~30 in section 6.2.3.1 as indicated:

Table 2730 - AAI-RNG-REQ message field description

Field	Size (bits)	Value/Description	Condition
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 0b1110–0b1111 = reserved 0b1110 = Ranging purpose for HR-Network 0b1111 = reserved	

Table 2730 - AAI-RNG-REQ message field description

Field	Size (bits)	Value/Description	Condition
Extended Ranging Purpose Indication for HR-Network	2	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	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.
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

Field	Size (bits)	Value/Description	Condition
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 = Network Reentry from idle mode of AMS which has entered Idle Mode in R1 BS *0b1111 = Reserved*	
If (Ranging Purpose Indication == 0b000) {		// Initial network entry	
If (S-SFH Network Configuration bit == 0b0 and AMSID privacy is enabled) {			
AMSID*	48	The AMSID hash value. Refer to 6.2.5.3.1	

Table ~~27~~30 - AAI-RNG-REQ message field description

Field	Size (bits)	Value/Description	Condition
} 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	Shall be present if the initial network entry after coverage loss in HR-Networks
....	...	...	......
}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	
}			

Table ~~27~~30 - AAI-RNG-REQ message field description

Field	Size (bits)	Value/Description	Condition
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	
if (Extended Ranging Purpose Indication == 0b0000) { } 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

Field	Size (bits)	Value/Description	Condition
Previous STID	12	The STID which the AMS uses in the previous S-ABS.	
} else {			
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
}			
}			
if (action code bit1 is set) {			
if (S-SFH Network Configuration bit == 0b1){			
AMS MAC Address	48	AMS's real MAC address	
} else {			
Deregistration Identifier (DID)	18	The ID that the AMS is assigned for idle mode and currently maintains.	
}			
Paging Controller ID	48	The Paging Controller ID that the AMS currently maintains in idle mode	
PGID	16	The identification of the paging group to which the AMS previously belonged	
Paging Cycle	4	PAGING_CYCLE applied to the AMS	
Paging Offset	12	PAGING_OFFSET applied to the AMS	
If (CMAC indicator == 0b1){			

Table ~~27~~30 - AAI-RNG-REQ message field description

Field	Size (bits)	Value/Description	Condition
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
}			
}			
~~if (Extended Ranging Purpose Indication == 0b0001) {~~ else if (Extended Ranging Purpose Indication for HR-Network == 0b10) {		// Network reentry for FBIS operation	
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.	
} else {			
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
}			

Table 2730 - AAI-RNG-REQ message field description

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

Table ~~27~~30 - AAI-RNG-REQ message field description

Field	Size (bits)	Value/Description	Condition
for (i=0;i<N_CSG_ID_Infos;i++){		N_CSG_ID_Infos is the number of CSG ID Information blocks. $1 \leq$ N_CSG_ID_Infos ≤ 15	Optional for loop. May be included for quick CSG membership detection or ABS reselection assistance.
Operator ID of the CSG Femtocell	24	The Operator ID of the CSG ð Femtocell.	Present if the Operator ID is different from the one of the ABS
for (j = 0; j < N_CSG_IDs; j++) {		N_CSG_IDs is the number of CSG IDs belongs to this Operator ID.	
CSGID	*variable*	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.	
}			
}			

[Remedy2: change the 4th row on Table 28 in page 15 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.

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

[Remedy3: change the 2th row on Table 28 in page 18 on P802.16.1a/D2 as follows:]

.....	...	......	...
New Multicast Group Zone ID	<u>12</u>	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	<u>3</u>	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 ~~0b00000~~b01 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:]

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.....	...	......	...
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 ~~0b00000~~0b01 if bit2 = 1, receiving multicast	Shall be present
.....	...	......	...

[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 ~~0b0001~~0b10 (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 = ~~0b00000~~0b01 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 = ~~0b00000~~0b01 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 = ~~0b00000~~0b01 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
HrMulticastServiceRangingLocationUpdate,
                networkReentryForFBISOperation                 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
                switchedAccessWindowSize                       SwitchAccessWindowsSize,
                -- be selected if switch access mode is variable switched access windows
                maximumSwitchedAccessWindowSize                MAXSwitchAccessWindowsSize
                },
        switchedAccessStartTime                        SwitchAccessStartTime
}



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

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```
                -- 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,
                ...
                }                                                      OPTIONAL, -- it
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---]