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| Project | **IEEE 802.16 Broadband Wireless Access Working Group <**<http://ieee802.org/16>**>** | |
| Title | **Text changes related to satellite-based LBS support** | |
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| Re: | Proposed text changes to P802.16.1/D4 by sb01R0 | |
| Abstract | The contribution proposes the text changes related to satellite-based LBS support. | |
| Purpose | To be discussed and adopted the proposed text in next revision as the 802.16.1/D5 by Maintenance Task Group | |
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**Text changes related to satellite-based LBS support**

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1. **Introduction**

This contribution proposes the text changes related to LBS support in current draft standard [1]. In LBS service support case, the AAI supports to assist satellite-based location determination by a generic MAC control message called the AAI-L2-XFER with Transfer-Types: GNSS assistance and LBS measurement for uplink. Also, the AAI provides AAI-L2-XFER that acts as various service carriers for service provision contents such as SMS for uplink. This AAI-L2-XFER message is used in connected mode for the AMS. In idle mode of the AMS for SMS service, AAI-RNG-REQ/AAI-RNG-RSP message is used to send/receive SMS and SMS confirmation, respectively.

However, in idle mode of the AMS for LBS service to assist satellite-based location, there is no any method for sending and receiving the related service provision content. Subscribed in satellite-based LBS service, many mobile stations with the devices to aid satellite-based solutions, e.g., GPS can be requested to send LBS measurement information for location determination, but those may be in idle mode. To transition to the connected mode state from idle mode, the AMS is needed to network reentry process. If the transition process occurs whenever the report for satellite-based LBS service is requested to the AMS, this additional transition process will have become big overhead and bring about a waste of the radio resource usage. So, it is much better than the process including connected mode transition procedure that the LBS measurement report is processed in idle mode state for uplink.

To provide the report method of LBS measurement on satellite-based location service in idle mode without transition to connected mode, we recommend that AAI-RNG-REQ/AAI-RNG-RSP message be applied to send/receive LBS measurement information and its confirmation in the similar manner as SMS service for uplink, respectively.

The LBS measurement information for satellite-based location determination may be included only when the action code of AAI-PAG-ADV indicates to perform ranging for location update or when the AAI-RNG-REQ with Ranging Purpose Indication value has 0b0011. When LBS measurement is included in an AAI-RNG-REQ message with a Ranging Purpose Indication that has a value 0b0011, an AAI-RNG-RSP is transmitted as the confirmation of a positive acknowledge for the LBS measurement information.

Then, we propose the text changes related to LBS support for satellite-based location determination in this contribution.

1. **References**

[1] IEEE P802.16.1/D4, *“WirelessMAN-Advanced Air Interface for Broadband Wireless Access Systems,”* 2012-02-09

1. **Proposed Text Changes**

The blue colored tag is used to represent the inserted texts, figures, or tables using the following INSERT TAG: <insert> </insert>

The red colored tag is used to represent the deleted texts, figures, or tables using the following DELETE TAG: <delete> </delete>

------------------------------------------- Start of Proposed Text Changes --------------------------------------------

***[Remedy#1: Adopt the following modification text on Table 28 in page 62, section 6.2.3.1 AAI-RNG-REQ]***

**Table 28 – 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* |  |
| CMAC indicator | 1 | Indicate whether this message is protected by CMAC tuple  0b0: not protected  0b1: protected | Shall always be present |
| … | … | … | … |
| } else if (Ranging Purpose Indication == 0b0011  |0b0110|0b0111| 0b1011) { |  | // Idle mode location update (and with  other additional purposes) |  |
| if (S-SFH Network Configuration bit == 0b1 or AMSID privacy is disabled){ |  |  |  |
| AMS MAC address | 48 | AMS’s real MAC address |  |
| } else{ |  |  |  |
| Deregistration Identifier (DID) | 18 | The ID that the MS 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 |  |
| Paging Cycle Change | 4 | PAGING\_CYCLE requested by the AMS | Present if AMS wants to  change Paging Cycle |
| Paging Carrier update | 6 | Preferred Paging carrier index requested by the AMS | Present if AMS wants to change Paging  Carrier |
| 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 present for secure Location Update |
| } |  |  |  |
| AMS Mobility Information | 2 | 0b00 = Slow (0–10 km/h)  0b01 = Medium (10–120 km/h)  0b10 = Fast (above 120 km/h)  0b11 = Reserved | Optional |
| SMS | *Variable* | Short Message content up to 140 bytes | May be present when there is SMS content to be sent |
| <insert>  LBS Measurement | *Variable* | LBS Measurement content [Terrestrial meas. and GNSS pseudo ranges] | May be present when there is LBS Measurement content to be sent  </insert> |
| } |  |  |  |
| … | … | … | … |

***[Remedy#2: Adopt the following modification text on page 906, section 6.8.2.3 Assistance for satellite-based location determination, as]***

**6.8.2.3 Assistance for satellite-based location determination**

The AAI support to assist satellite based location involves the following <delete>two</delete><insert>three</insert> functions:

— The support of AAI-LBS-ADV that contain optional fields providing time and frequency information to aid satellite-based solutions, e.g., GPS, receivers to improve their performance. The content of this message and its functionality is consistent with LBS-ADV message in 6.3.2.3.59.

* To further assist satellite-based location determination in connected mode, the AAI-L2-XFER messages may be used for the following Transfer-Types: GNSS assistance and LBS measurement. (See 6.2.3.30.)

<insert>

* To further assist satellite-based location determination in idle mode, the AAI-RNG-REQ messages may be used for the LBS measurement. The LBS measurement may be included only when the action code of AAI-PAG-ADV indicates to perform ranging for location update or when the AAI-RNG-REQ with Ranging Purpose Indication value has 0b0011. When LBS measurement is included in an AAI-RNG-REQ message with a Ranging Purpose Indication that has a value 0b0011, an AAI-RNG-RSP is transmitted as the confirmation of a positive acknowledge for the LBS measurement information. (See 6.2.3.1.)

</insert>

***[Remedy#3: Adopt the following modification text on page 944, Annex A.*** ***MAC control message definitions (normative) as]***

-- 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))

<insert>LBSMeasurement::= OCTET STRING (SIZE (1..140)) </insert>

***[Remedy#4: Adopt the following modification text on page 948, Annex A.*** ***MAC control message definitions (normative) as]***

LocationUpdate ::= SEQUENCE {

addressOrDID AddressOrDID,

pagingControlInfo PagingControlInfo,

pagingCycleChange PgCycle OPTIONAL,

pagingCarrierUpdate INTEGER (0..63) OPTIONAL,

akCount AKCount OPTIONAL,

amsMobility AMSMobilityLevel OPTIONAL,

smsMessage SMS OPTIONAL,

<insert>lbsMeasurement LBSMeasurement OPTIONAL, </insert>

...

}

----------------------------------------------- Proposed texts end --------------------------------------------------------