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| Title | **Changes on inter-base station messages associated with handover** |
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| Re: | Task Group Review of IEEE802.16e-D1 |
| Abstract | This document contains suggestions to change the inter-base station messages associated with handover. |
| Purpose | This document is submitted for review by 802.16e Working Group members |
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# Changes on Inter-base station messages

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## 1. Problem Statement

This document suggest changes in TGe Draft Document IEEE 802.16e-D1 to provide the concept of multiple Service Flow for inter-base station messages in handover process.

As specified in TGe Draft Document IEEE 802.16e-D1, "In the initial Network Entry, Ranging and Hand-over processes, MSS shall request from the Target BS certain QoS levels **per Active Service Flow, differentiated by Service Class available for the Service Flow**"

Such a definition says that the MSS may have multiple Service Flows which are differentiated by Service Class. This means that each Service Flow is specified with its own QoS parameter set.

But, several inter-base station messages (HO-pre-notification, HO-pre-notification-response and HO-confirm) don't include the concept of multiple Service Flows in their parameters.

Currently, "Required BW/QoS" in HO-pre-notification message and "BW/QoS Estimated" in HO-pre-notification-response message represent QoS level of only one Service Flow.

Therefore, problems may exist as followings:

1. The Serving BS does not have any information to choose specific Service Flow that should be guaranteed for minimum bandwidth among multiple Service Flows.

2. After receiving HO-pre-notification-response message from one or more the potential Target BS, Serving BS shall send MOB_BSHO_RSP message with Service Level Prediction for potential Target BS to the MSS.

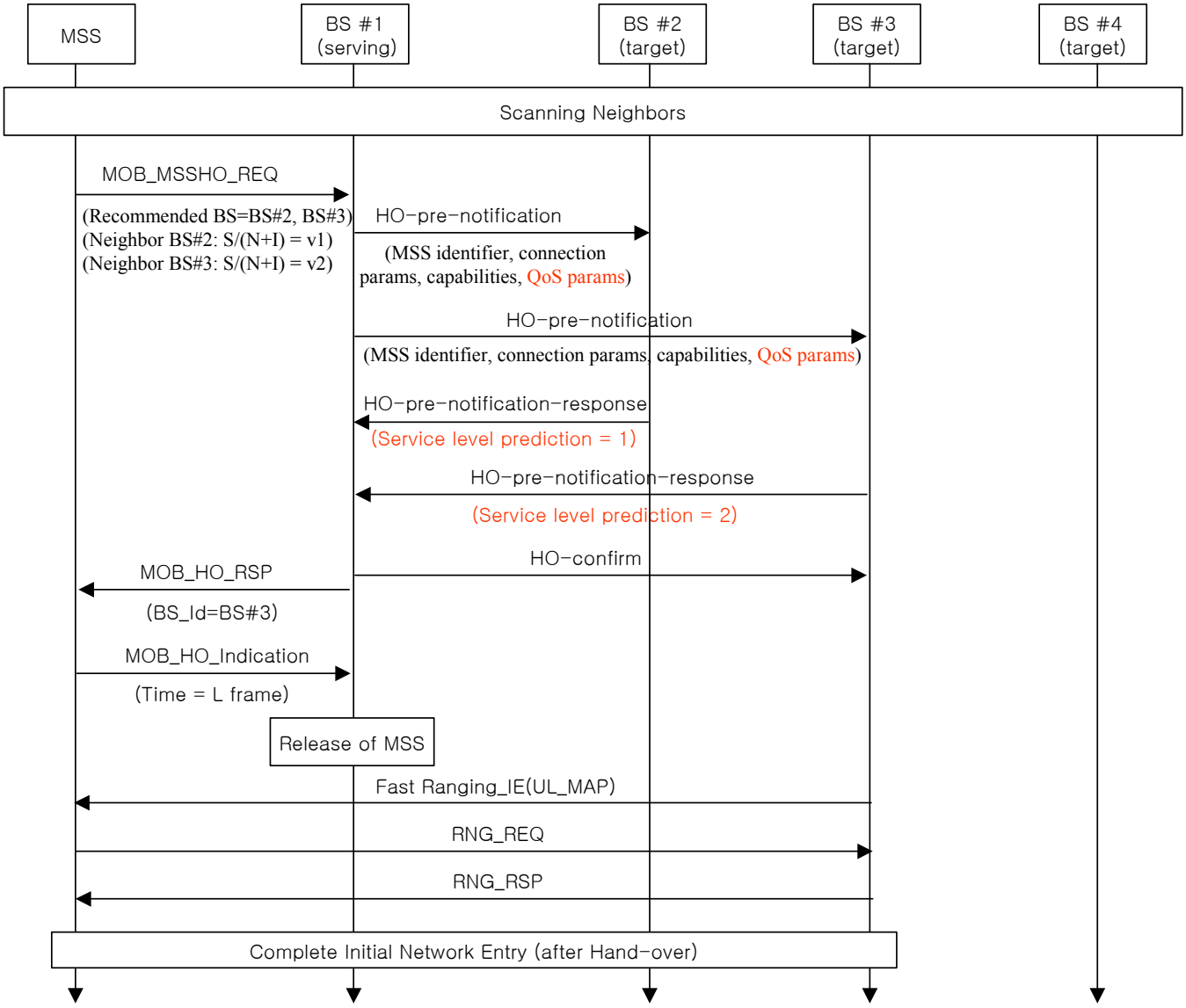
   But, because HO-pre-notification-response message has a parameter for only one Service Flow(Estimated BW/QoS) and ACK/NACK indication, it is not sufficient information to decide the Service Level Prediction in MOB_BSHO_RSP message.

## 2. Proposed Remedy

For the purpose to solve the above problems, we propose that QoS parameters (Network Service Information Element) which can include all Active Service Flow in the HO-pre-notification message instead of Required BW/QoS parameters.

We also propose the Service Level Prediction parameter in HO-pre-notification-response instead of ACK/NACK indication.

The following figure-"HO process by MSS request" shows what the proposal is applied.



## 3. Specific Changes Suggested in TGe Draft Document IEEE P802.16e-D1

*[Change Table C6 at page 72 ]*

**Table C6—HO-pre-notification Message**

| Field | Size | Notes |
|---|---|---|
| Global Header | 152-bit | |
| For (j=0; j<Num Records; j++) { | | |
| MSS unique identifier | 48-bit | 48-bit unique identifier used by MSS (as provided by the MSS or by the *I-am-host-of* message) |
| Estimated Time to HO | 16-bit | In milliseconds, relative to the time stamp. A value of 0 indicates that the estimated time is unknown. |
| ~~**Required BW**~~ | ~~**8-bit**~~ | ~~**Bandwith which is required by MSS (to gurarantee minimum packet data transmission)**~~ |
| ~~**Required QoS**~~ | ~~**8-bit**~~ | ~~**Name of Service Class representing AuthorizedQoSParamSet**~~ |
| **N_NSIE** | | **Number of Network Service Information Elements** |
| **For (k=0; k<N_NSIE; k++) {** | | |
| **Field Size** | **16-bit** | **Size of TLV encoded information field below** |
| **TLV encoded information** | **Variable** | **TLV information as allowed on a DSA-REQ MAC message** |
| **}** | | |
| } | | |
| Security field | TBD | A means to authenticate this message |
| CRC field | 32-bit | IEEE CRC-32 |

*[Change Table C7 at page 73]*

**Table C7—HO-pre-notification-response Message**

| Field | Size | Notes |
|---|---|---|
| Global Header | 152-bit | |
| For (j=0; j<Num Records; j++) { | | |
| MSS unique identifier | 48-bit | 48-bit unique identifier used by MSS (as provided by the MSS or by the *I-am-host-of* message) |
| ~~BW Estimated~~ | ~~8-bit~~ | ~~Bandwidth which is provided by BS (to guarantee minimum packet data transmission) TBD how to set this field~~ |
| ~~QoS Estimated~~ | ~~8-bit~~ | ~~Quality of Service level~~<br>~~Unsolicited Grant Service (UGS)~~<br>~~Real-time Polling Service (rtPS)~~<br>~~Non-real-time Polling Service (nrtPS)~~<br>~~Best Effort~~ |
| ~~ACK/NACK~~ | ~~8 bits~~ | ~~Acknowledgement or Negative acknowledgement~~<br>~~1 is Acknowledgement which means that the neighbor BS accepts the HO-pre-notification message from the Serving BS~~<br>~~0 is Negative acknowledgement which means that the neighbor BS may not accept the HO-pre-notification message from the Serving BS~~ |
| **Service level prediction** | **8 bits** | **Expected service level**<br>**0 = No service possible for this MSS**<br>**1 = Some service is available for one or several Service Flows authorized for the MSS.**<br>**2 = For each authorized Service Flow, a MAC connection can be established with QoS specified by the AuthorizedQoSParamSet.**<br>**3 = No service level prediction available.** |
| } | | |
| Security field | TBD | A means to authenticate this message |
| CRC field | 32-bit | IEEE CRC-32 |

***[Change Table C8 at page 74]***

**Table C8—HO-confirm Message**

| Field | Size | Notes |
|---|---|---|
| Global Header | 152-bit | |
| For (j=0; j<Num Records; j++) { | | |
| MSS unique identifier | 48-bit | 48-bit unique identifier used by MSS (as provided by the MSS or by the *I-am-host-of* message) |
| ~~BW Estimated~~ | ~~8-bit~~ | ~~Bandwidth which is provided by BS (to guarantee minimum packet data transmission) TBD how to set this field~~ |
| ~~QoS Estimated~~ | ~~8-bit~~ | ~~Quality of Service level~~<br>~~— Unsolicited Grant Service (UGS)~~<br>~~— Real-time Polling Service (rtPS)~~<br>~~— Non-real-time Polling Service (nrtPS)~~<br>~~— Best Effort Service (BE)~~ |
| } | | |
| Security field | TBD | A means to authenticate this message |
| CRC field | 32-bit | IEEE CRC-32 |