

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >		
Title	<b>Updates for MOB_SCN-REQ/RSP/REP text</b>		
Date Submitted	<b>2008-07-17</b>		
Source(s)	David Comstock, Junxian Mo Huawei Technologies Co., Ltd.	E-mail:	<a href="mailto:dcomstock@huawei.com">dcomstock@huawei.com</a>
	Aeri Lim Samsung Electronics		<a href="mailto:aeri.lim@samsung.com">aeri.lim@samsung.com</a>
			*< <a href="http://standards.ieee.org/faqs/affiliationFAQ.html">http://standards.ieee.org/faqs/affiliationFAQ.html</a> >
Re:	IEEE 802.16Rev2/D5, Letter Ballot 26d Reply Comments		
Abstract	Proposal to provide updates and clarifications of the use of bitmaps for identifying BSs in MOB_SCN-REQ/RSP/REP messages.		
Purpose	Adopt proposed text changes for IEEE 802.16Rev2/D5 revision		
Notice	<i>This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups. It represents only the views of the participants listed in the "Source(s)" field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who reserve(s) the right to add, amend or withdraw material contained herein.</i>		
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.		
Patent Policy	The contributor is familiar with the IEEE-SA Patent Policy and Procedures: < <a href="http://standards.ieee.org/guides/bylaws/sect6-7.html#6">http://standards.ieee.org/guides/bylaws/sect6-7.html#6</a> > and < <a href="http://standards.ieee.org/guides/opman/sect6.html#6.3">http://standards.ieee.org/guides/opman/sect6.html#6.3</a> >. Further information is located at < <a href="http://standards.ieee.org/board/pat/pat-material.html">http://standards.ieee.org/board/pat/pat-material.html</a> > and < <a href="http://standards.ieee.org/board/pat">http://standards.ieee.org/board/pat</a> >.		

## Updates for MOB\_SCN-REQ/RSP/REP text

David Comstock, Junxian Mo  
Huawei Technologies Co., Ltd.  
Aeri Lim  
Samsung Electronics

### Description

The following proposed text changes provide updates and clarifications for the use of bitmaps to identifying BSs in MOB\_SCN-REQ/RSP/REP messages.

### Proposed Text Changes

#### Modify Section 6.3.2.3.42 as follows:

##### 6.3.2.3.42 MOB\_NBR-ADV (neighbor advertisement) message

BSs supporting mobile functionality shall be capable of transmitting a MOB\_NBR-ADV management message at a periodic interval (MOB\_NBR-ADV interval; see Table 548) to identify the network and define the characteristics of neighbor BS to potential MS seeking initial network entry or HO. For the compression of neighbor BSIDs using this message in MOB\_SCN-REQ, MOB\_SCN-RSP, MOB\_SCN-REP, and MOB\_MSHO-REQ messages, BSs shall keep mapping-tables of neighbor BS MAC addresses and neighbor BS indexes transmitted through MOB\_NBR-ADV message, for each Configuration Change Count. Using these mapping-tables, BSs can derive 48-bit neighbor BSID from neighbor BS index included in MOB\_SCN-REQ, MOB\_SCN-RSP, MOB\_SCN-REP, or MOB\_MSHO-REQ messages. MOB\_SCN-REQ, MOB\_SCN-RSP, and MOB\_SCN-REP messages may identify the MOB\_NBR-ADV BS indexes using a BS index bitmap (Nbr Index Bitmap), where a BS index corresponds to the position of a BS in the MOB\_NBR-ADV message and a bit position in the bitmap corresponds to a BS index of the MOB\_NBR-ADV.

[...]

#### Modify Section 6.3.2.3.43 as follows:

##### 6.3.2.3.43 MOB\_SCN-REQ (scanning interval allocation request) message

A MOB\_SCN-REQ message may be transmitted by an MS to request a scanning interval for the purpose of seeking available BSs and determining their suitability as targets for HO. An MS may request the scanning allocation to perform scanning or noncontention association ranging.

For the compression of neighbor BSIDs through a reference to this message in MOB\_SCN-RSP, BSs may keep mapping-tables of neighbor BS MAC addresses and neighbor BS indexes transmitted through this message, for each MOB\_SCN-REQ sequence number (Req\_Seq\_Num), where a BS index corresponds to the position of a BS in the MOB\_SCN-REQ message, such that a BS Index of 0 identifies the first BS in the MOB\_SCN-REQ message and each next BS Index (incremented by 1) identifies the next BS in the message, according to the sequential order that the BSs appear in the message.

A BS index bitmap (Req\_Bitmap\_Index) in a MOB\_SCN-RSP message may be used to identify MOB\_SCN-REQ BS indexes such that each bit position corresponds to a BS Index of the corresponding MOB\_SCN-REQ message, the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index in sequential order, the most significant bit corresponds to the BS Index of the last requested BS, and BSs with BS Index greater than the last requested BS are not requested and do not have a corresponding bit position in the bitmap. Bitmap position bit value of 1 indicates that the BS is requested and a bit value of 0 indicates that the BS is not requested.

An MS shall generate MOB\_SCN-REQ messages in the format shown in Table 146.

Table 146—MOB\_SCN-REQ message format

Syntax	Size (bit)	Notes
MOB_SCN-REQ_Message_format() {	—	—
Management Message Type = 54	8	—
Scan duration	8	Units are in frames.
Interleaving interval	8	Units are frames.
Scan Iteration	8	—
N_Recommended_BS_Index	8	Number of neighboring BS to be scanned or associated, which are using BS index that corresponds to the position of BS in MOB_NBR-ADV message <u>or, when equal to 0xFF, indicates that the BS index bitmap (Nbr Bitmap Index) is used.</u>
If(N_Recommended_BS_Index != 0) {	—	—
Configuration change count for MOB_NBR-ADV	8	Configuration Change Count value of referring MOB_NBR-ADV message
}	—	—
if( N_Recommended_BS_Index == 0xFF){	—	—
<u>Reserved</u>	<u>1</u>	<u>Shall be set to zero.</u>
Req_Seq_Num	1	<u>One-bit sequence number for this message that is toggled <del>incremented</del> for each new message.</u>
<u>Nbr Bitmap Size</u>	<u>6</u>	<u>Size of Nbr Bitmap Index in nibbles ((Nbr Bitmap Size+1)*4), which may be less than or equal to the number of BSs in MOB_NBR ADV.</u>
Nbr_Bitmap_Index	<u>(Nbr Bitmap Size+1)* 4</u> <u>Up to the number BSs in MOB_NBR- ADV</u>	<u>Each bit position corresponds to a BS Index of the corresponding MOB_NBR-ADV message, where the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index in sequential order, the most significant bit corresponds to the BS Index of the last requested BS, and BSs with BS Index greater than the last requested BS are not requested and do not have a corresponding bit position in the bitmap.</u>  <u>Bitmap position bit value: 0: the corresponding BS is not requested.. 1: the corresponding BS is requested.</u>
for( each '1' in Nbr_Bitmap_Index) {	—	—
<u>Reserved</u>	<u>1</u>	<u>Shall be set to zero.</u>
Scanning_type	3	<u>0b000: Scanning without association. 0b001: Scanning with association level 0: association without coordination</u>

		<u>0b010: Scanning with association level 1: association with coordination.</u> <u>0b011: Scanning with association level 2: network assisted association.</u> <u>0b100—0b111: Reserved</u>
}	—	—
} else {	—	—
for(j = 0; j < N_Recommended_BS_Index; j++) {	—	—
Neighbor_BS_Index	8	BS index corresponds to position of BS in MOB_NBR-ADV message
Req_Seq_Num	1	<u>One-bit sequence number for this message that is toggled incremented for each new message.</u>
Scanning type	3	0b000: Scanning without association. 0b001: Scanning with association level 0: association without coordination 0b010: Scanning with association level 1: association with coordination. 0b011: Scanning with association level 2: network assisted association. 0b100—0b111: Reserved
}	—	—
}	—	—
N_Recommended_BS_Full	8	Number of neighboring BS to be scanned or associated, which are using full 48 bits BS ID.
for(j = 0; j < N_Recommended_BS_Full; j++) {	—	—
Recommended BS ID	48	—
Req_Seq_Num	1	<u>One-bit sequence number for this message that is toggled incremented for each new message.</u>
Scanning type	3	0b000: Scanning without association. 0b001: Scanning with association level 0: association without coordination 0b010: Scanning with association level 1: association with coordination. 0b011: Scanning with association level 2: network assisted association. 0b100-0b111: Reserved
}	—	—
Padding	<i>variable</i>	If needed for alignment to byte boundary.
TLV encoded information	<i>variable</i>	—
}	—	—

[...]

The following parameters shall be included in the MOB\_SCN-REQ message:

#### **N\_Recommended\_BS\_Index**

If not equal to 0xFF, this is the number of neighboring BS to be scanned or associated, which are included in MOB\_NBRADV message. If equal to 0xFF, this indicates that the BS index bitmap (Nbr\_Bitmap\_Index) is used to identify the BS index that corresponds to the position of BS in MOB\_NBR-ADV message. When MS receives MOB\_SCN-RSP message from BS in response to MOB\_SCN-REQ message, MS shall check whether Configuration Change Count stored by MS is the same as one included in MOB\_SCN-RSP message sent by BS. If MS detects mismatch of Configuration Change Counts, it may retransmit MOB\_SCN-REQ message to BS. In this case, MS shall set this value to zero.

#### **Configuration Change Count for MOB\_NBR-ADV**

The value of Configuration Change Count in MOB\_NBR-ADV message referred in order to compress neighbor BSID.

#### **Req\_Seq\_Num**

One-bit sequence number for this the MOB\_SCN-REQ message that is incremented toggled after for each new message transmission of this message and may be included in a MOB\_SCN-RSP message to identify the MOB\_SCN-REQ message associated with a MOB\_SCN-REQ BS Index bitmap (Req\_Bitmap\_Index), where a bit position in this bitmap corresponds to a BS index of the MOB\_SCN-REQ message and where a BS index corresponds to the position of a BS in the MOB\_SCN-REQ message. When an MS receives a MOB\_SCN-RSP message from the BS that includes Req\_Seq\_Num, the MS shall compare its stored value of Req\_Seq\_Num with the one included in the MOB\_SCN-RSP message and discard the MOB\_SCN-RSP message if there is a mismatch.

#### **Nbr\_Bitmap\_Index**

Bitmap of BS indexes of BS into for a MOB\_NBR-ADV message, where each bit position corresponds to a BS Index of the corresponding MOB\_NBR-ADV message, the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index in sequential order, the most significant bit corresponds to the BS Index of the last requested BS, and BSs with BS Index greater than the last requested BS are not requested and do not have a corresponding bit position in the bitmap. Bitmap position bit value of 1 indicates that the BS is requested and a bit value of 0 indicates that the BS is not requested.

#### **Neighbor\_BS\_Index**

BS index corresponds to position of BS in MOB\_NBR-ADV message.

[...]

### **Modify Section 6.3.2.3.44 as follows:**

#### **6.3.2.3.44 MOB\_SCN-RSP (scanning interval allocation response) message**

A MOB\_SCN-RSP message shall be transmitted by the BS either unsolicited or in response to a MOB\_SCN-REQ message sent by an MS. A BS may transmit MOB\_SCN-RSP to start MS scan reporting with or without scanning allocation. A BS may allocate the scanning allocation for MS scanning with Scanning type = 0b000, or MS noncontention association ranging with Scanning type = 0b010 or 0b011. The message shall be transmitted on the Basic CID.

For the compression of neighbor BSIDs through a reference to this message in MOB\_SCN-REP, BSs may keep mapping-tables of neighbor BS MAC addresses and neighbor BS indexes transmitted through this message, for each MOB\_SCN-RSP sequence number (Rsp\_Seq\_Num), where a BS index corresponds to the position of a BS in the MOB\_SCN-RSP message, such that a BS Index of 0 identifies the first BS in the MOB\_SCN-RSP message and each next BS Index (incremented by 1) identifies the next BS in the message, according to the sequential order that the BSs appear in the message.

A BS index bitmap (Rsp\_Bitmap\_Index) in a MOB\_SCN-REP message may be used to identify MOB\_SCN-RSP BS indexes such that each bit position corresponds to a BS Index of the corresponding MOB\_SCN-RSP message, the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index in sequential order, the most significant bit corresponds to the BS Index of the last recommended BS, and BSs with BS Index greater than the last recommended BS are not recommended and do not have a corresponding bit position in the bitmap. Bitmap position bit value of 1 indicates that the BS is recommended and a bit value of 0 indicates that the BS is not recommended.

The format of the MOB\_SCN-RSP message is depicted in Table 147.

Table 147—MOB\_SCN-RSP message format

Syntax	Size (bit)	Notes
MOB_SCN-RSP_Message_format() {	—	—
Management Message Type = 55	8	—
Scan duration	8	In units of frames. When Scan Duration is set to zero, no scanning parameters are specified in the message. When MOB_SCN-RSP is sent in response to MOB_SCN-REQ, setting Scan Duration to zero denies MOB_SCN-REQ.
Report mode	2	0b00: No report 0b01: Periodic report 0b10: Event-triggered report 0b11: One-time scan report
Reserved	3	Shall be set to zero.
Rsp_Seq_Num	1	<u>One-bit sequence number for this message that is toggled incremented for each new message.</u>
Use_Nbr_Bitmap_Index	1	<u>Indicates if the bitmap of BS indexes for MOB_NBR-ADV is used.</u> <u>0: Bitmap of BS indexes for MOB_NBR-ADV is not used.</u> <u>1: Bitmap of BS indexes for MOB_NBR-ADV is not used.</u>
Use_Req_Bitmap_Index	1	<u>Indicates if the bitmap of BS indexes for MOB_SCN-REQ is used.</u> <u>0: Bitmap of BS indexes for MOB_SCN-REQ is not used.</u> <u>1: Bitmap of BS indexes for MOB_SCN-REQ is not used.</u>
Report period	8	If Report mode is set to 0b01 or 0b11, this is the Report Period, in frames; otherwise this field is set to 0. For MS request denied (Scan Duration == 0), Report period is the number of frames that BS suggests to MS before transmitting next MOB_SCN-REQ.
Report metric	8	Bitmap indicating metrics on which the corresponding triggers are based: Bit 0: BS CINR mean Bit 1: BS RSSI mean Bit 2: Relative delay Bit 3: BS RTD: this metric shall be only measured on serving BS/anchor BS. Bits 4—7: <i>Reserved</i> ; shall be set to zero.
If (Scan Duration != 0) {	—	—

Start frame	8	—
Interleaving interval	8	Duration in frames.
Scan iteration	8	—
If( Use_Nbr_Bitmap_Index == 1) {	—	—
Configuration change count for MOB_NBR-ADV	8	—
<u>Reserved</u>	<u>2</u>	<u>Shall be set to zero.</u>
<u>Nbr_Bitmap_Size</u>	<u>6</u>	<u>Size of Nbr_Bitmap_Index in nibbles ((Nbr_Bitmap_Size+1)*4), which may be less than or equal to the number of BSs in MOB_NBR ADV.</u>
Nbr_Bitmap_Index	<u>(Nbr_Bitmap_Size +1)*4</u> <u>Up to the Number of BSs in MOB_NBR-ADV</u>	<u>Each bit position in this bitmap corresponds to a BS Index of the corresponding MOB_NBR-ADV message, where the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index, the most significant bit corresponds to the BS Index of the last recommended BS, and BSs with BS Index greater than the last recommended BS are not recommended and do not have a corresponding bit position in the bitmap.</u> <u>Bitmap position bit value:</u> <u>0: the corresponding BS is not recommended.</u> <u>1: the corresponding BS is recommended.</u> <u>When Use_Req_Bitmap_Index equals 1, Nbr_Bitmap_Index only includes BSs that were included in the MOB_NBR-ADV message but that were not included in the corresponding MOB_SCN-REQ message.</u>
for( each '1' in Nbr_Bitmap_Index ) {	—	—
<u>Reserved</u>	<u>1</u>	<u>Shall be set to zero.</u>
Scanning_type	3	<u>0b000: Scanning without association</u> <u>0b001: Scanning with association level 0: association without coordination</u> <u>0b010: Scanning with association level 1: association with coordination</u> <u>0b011: Scanning with association level 2: network assisted association</u> <u>0b100—0b111: Reserved</u>
If( Scanning_type == 0b010) OR Scanning_type == 0b011){	—	—
Rendezvous_time	8	—
CDMA_code	8	—
Transmission_opportunity_offset	8	—

}	—	—
}	—	—
} else {	—	—
N_Recommended_BS_Index	8	Number of neighboring BS to be scanned or associated, which are using BS index that corresponds to the position of BS in MOB_NBR-ADV message. If <del>both</del> N_Recommended_BS_Index, <del>and</del> N_Recommended_BS_Full, <u>Use Nbr Bitmap Index, and Use Req Bitmap Index</u> are set to 0, the BS recommends the MS scan all neighbors listed in the MOB_NBR-ADV message. MS may scan a sub-set of the list.
If(N_Recommended_BS_Index != 0) {	—	—
Configuration change count for MOB_NBR-ADV	8	Configuration Change Count value of referring MOB_NBR-ADV message.
}	—	—
for(j = 0; j < N_Recommended_BS_Index; j++){	—	—
Neighbor_BS_Index	8	BS index corresponds to position of BS in MOB_NBR-ADV message.
Reserved	1	Shall be set to zero.
Scanning type	3	0b000: Scanning without association 0b001: Scanning with association level 0: association without coordination 0b010: Scanning with association level 1: association with coordination 0b011: Scanning with association level 2: network assisted association 0b100—0b111: <i>Reserved</i>
If (Scanning type == 0b010 OR Scanning_type == 0b011) {	—	—
Rendezvous time	8	Units are frames.
CDMA code	8	From initial ranging codeset.
Transmission_opportunity offset	8	Units are transmission opportunity.
}	—	—
}	—	—
}	—	—
If( Use_Req_Bitmap_Index == 1) {	—	—
Req_Seq_Num	1	<u>One-bit sequence number for the corresponding MOB_SCN-REQ message.</u>



<u>Reserved</u>	<u>1</u>	<u>Shall be set to zero.</u>
<u>Req_Bitmap_Size</u>	<u>6</u>	<u>Size of Req_Bitmap_Index in nibbles ((Req_Bitmap_Size +1)*4), which may be less than or equal to the number of BSs in MOB_SCN-REQ.</u>
Req_Bitmap_Index	<u>(Req_Bitmap_Size +1)*4</u> <u>Up to the Number of BSs in MOB_SCN-REQ</u>	<u>Each bit position in this bitmap corresponds to a BS Index of the corresponding MOB_SCN-REQ message, where the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index, the most significant bit corresponds to the BS Index of the last recommended BS, and BSs with BS Index greater than the last recommended BS are not recommended and do not have a corresponding bit position in the bitmap.</u>  <u>Bitmap position bit value:</u> <u>0: the corresponding BS is not recommended.</u> <u>1: the corresponding BS is recommended.</u>
for( each '1' in Req_Bitmap_Index){	—	—
<u>Reserved</u>	<u>1</u>	<u>Shall be set to zero.</u>
Scanning_type	3	<u>0b000: Scanning without association</u> <u>0b001: Scanning with association level 0: association without coordination</u> <u>0b010: Scanning with association level 1: association with coordination</u> <u>0b011: Scanning with association level 2: network assisted association</u> <u>0b100—0b111: Reserved</u>
if( Scanning_type == 0b010 OR Scanning_type == 0b011 ){	—	—
Rendezvous_time	8	—
CDMA_code	8	—
Transmission_opportunity_offset	8	—
}	—	—
}	—	—
}	—	—
N_Recommended_BS_Full	8	Number of neighboring BS to be scanned or associated, which are using full 48 bits BS ID.
for(j = 0; j < N_Recommended_BS_Full; j++){	—	—
Recommended BS ID	48	BS IDs of BSs that MS shall scan.
Reserved	1	Shall be set to zero.

Scanning type	3	0b000: Scanning without association 0b001: Scanning with association level 0: association without coordination 0b010: Scanning with association level 1: association with coordination 0b011: Scanning with association level 2: network assisted association 0b100—0b111: <i>Reserved</i>
If (Scanning type == 0b010 OR Scanning_type == 0b011) {	—	—
Rendezvous time	8	Units are frames.
CDMA code	8	From initial ranging codeset.
Transmission_opportunity offset	8	Units are transmission opportunity.
}	—	—
}	—	—
Padding	<i>variable</i>	—
}	—	—
TLV encoded information	<i>variable</i>	—
}	—	—

[...]

**Req\_Seq\_Num**

One-bit sequence number for the corresponding MOB\_SCN-REQ message associated with a MOB\_SCN-REQ BS Index bitmap (Req\_Bitmap\_Index), where a bit position in this bitmap corresponds to a BS index of the MOB\_SCN-REQ message and where a BS index corresponds to the position of a BS in the MOB\_SCN-REQ message.

**Rsp\_Seq\_Num**

One-bit sequence number for ~~this the~~ MOB\_SCN-RSP message that is incremented ~~Toggle~~ after for each new transmission of this message and may be included in a MOB\_SCN-REP message to identify the MOB\_SCN-RSP message associated with a MOB\_SCN-RSP BS Index bitmap (Rsp\_Bitmap\_Index), where a bit position in this bitmap corresponds to a BS index of the MOB\_SCN-RSP message and where a BS index corresponds to the position of a BS in the MOB\_SCN-RSP message. When an BS receives a MOB\_SCN-REP message from an MS that includes Rsp\_Seq\_Num, the BS shall compare its stored value of Rsp\_Seq\_Num with the one included in the MOB\_SCN-REP message and discard the MOB\_SCN-REP message if there is a mismatch.

**Use\_Nbr\_Bitmap\_Index**

Indicates if the bitmap of BS indexes for MOB\_NBR-ADV is used.

**Use\_Req\_Bitmap\_Index**

Indicates if the bitmap of BS indexes for MOB\_SCN-REQ is used.

**Nbr\_Bitmap\_Index**

Bitmap index of BS into the MOB\_NBR-ADV message Bitmap of BS indexes for the corresponding MOB\_NBR-ADV message where each bit position corresponds to a BS Index of the corresponding MOB\_NBR-ADV message, the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index in sequential order, the most significant bit corresponds to the BS Index of the last recommended BS, and BSs with BS Index greater than the last recommended BS are not reported and do not have a corresponding bit position in the bitmap. Bitmap position bit value of 1 indicates that the BS is recommended and a bit value of 0 indicates that the BS is not recommended.

When Use\_Req\_Bitmap\_Index equals 1, Nbr\_Bitmap\_Index only includes BSs included in the MOB\_NBR-ADV message but not included in the corresponding MOB\_SCN-REQ message.

#### Req\_Bitmap\_Index

Bitmap of BS indexes of BS into for the corresponding MOB\_SCN\_REQ message, where each bit position corresponds to a BS Index of the corresponding MOB\_SCN\_REQ message, the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index in sequential order, the most significant bit corresponds to the BS Index of the last recommended BS, and BSs with BS Index greater than the last recommended BS are not reported and do not have a corresponding bit position in the bitmap.

This bitmap identifies recommended BSs that were included in the corresponding MOB\_SCN-REQ message, including BSs that are included in the MOB\_NBR-ADV message that were included in the MOB\_SCN-REQ message.

[...]

#### Modify Section 6.3.2.3.45 as follows:

##### 6.3.2.3.45 MOB\_SCN-REP (scanning result report) message

When the report mode is 0b10 (i.e., event triggered) in the most recently received MOB\_SCN-RSP, the MS shall transmit a MOB\_SCN-REP message to report the scanning results to its serving BS after each scanning period if the trigger condition is met. For a periodic report (i.e., Report Mode is 0b01) and for One-time Scan Report (Report Mode is 0b11), the MS reports the scanning results to its serving BS at the time indicated in the MOB\_SCN-RSP message except when it is in the scanning interval. The MS shall include all available scanning results for the requested BSs specified in the said MOB\_SCN-RSP message. The MS may transmit a MOB\_SCN-REP message to report the scanning results to its serving BS at anytime. The message shall be transmitted on the Primary Management CID. (See Table 148).

**Table 148—MOB\_SCN-REP message format**

Syntax	Size (bit)	Notes
MOB_SCN-REP_Message_format() {	—	—
Management Message Type = 60	8	—
Report Mode	1	0: Event-triggered report 1: Periodic report
N_current_BSs	3	When FBSS/MDHO is supported, N_current_BSs is the number of BSs currently in the diversity set; When FBSS/MDHO is not supported or the MS has an empty diversity set, N_current_BSs is set to 1.
Use_Nbr_Bitmap_Index	1	<u>Indicates if the bitmap of BS indexes for MOB_NBR-ADV is used.</u> <u>0: Bitmap of BS indexes for MOB_NBR-ADV is not used.</u> <u>1: Bitmap of BS indexes for MOB_NBR-ADV is not used.</u>
Use_Rsp_Bitmap_Index	1	<u>Indicates if the bitmap of BS indexes for MOB_SCN-RSP is used.</u> <u>0: Bitmap of BS indexes for MOB_SCN-RSP is not used.</u> <u>1: Bitmap of BS indexes for MOB_SCN-RSP is not</u>

		<u>used.</u>
Reserved	2	—
Report metric	8	Bitmap indicating presence of certain metrics (threshold values) on which the corresponding trigger's are based: Bit 0: BS CINR mean Bit 1: BS RSSI mean Bit 2: Relative delay Bit 3: BS RTD; this metric shall be only measured between the serving BS/anchor BS and the reporting MS Bits 4-7: Reserved: shall be set to zero
For (j = 0; j < N_current_BSs; j++) {	—	—
Temp BSID	4	Diversity set member ID assigned to this BS. When the MS has an empty diversity set or FBSS/MDHO is not supported. Temp BSID shall be set to 0.
Reserved	4	Shall be set to zero.
If (Report metric[Bit 0] == 1)	—	—
BS CINR mean	8	—
If (Report metric[Bit 1] == 1)	—	—
BS RSSI mean	8	—
If ((Report metric[Bit 2] == 1) and (TempBSID != anchor))	—	—
Relative delay	8	In case FBSS/MDHO is in progress, this field shall include the relative delay of BSs currently in the diversity set, except for that of the anchor BS.
If ((Report metric[Bit 3] == 1) and ((TempBSID == anchor BS) or (TempBSID == serving BS)))	—	—
BS RTD	8	This field shall include the RTD between the serving BS anchor BS and the reporting MS.
}	—	—
if( Use_Nbr_Bitmap_Index == 1) {	—	—
Configuration change count for MOB_NBR-ADV	8	—
<u>Reserved</u>	<u>2</u>	<u>Shall be set to zero.</u>

<u>Nbr_Bitmap_Size</u>	<u>6</u>	<u>Size of Nbr_Bitmap_Index in nibbles ((Nbr_Bitmap_Size+1)*4), which may be less than or equal to the number of BSs in MOB_NBR-ADV.</u>
Nbr_Bitmap_Index	<u>(Nbr_Bitmap_Size+1)* 4</u> <u>Up to the Number of BSs in MOB_NBR-ADV</u>	<u>Each bit position in this bitmap corresponds to a BS Index of the corresponding MOB_NBR-ADV message, where the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index, the most significant bit corresponds to the BS Index of the last reported BS, and BSs with BS Index greater than the last reported BS are not reported and do not have a corresponding bit position in the bitmap.</u>  <u>Bitmap position bit value:</u> <u>0: the corresponding BS is not reported.</u> <u>1: the corresponding BS is reported.</u>  <u>When Use_Rsp_Bitmap_Index equals 1, Nbr_Bitmap_Index only includes reported BSs that were included in the MOB_NBR-ADV message but that were not included in the corresponding MOB_SCN-RSP message.</u>
for( each '1' in Nbr_Bitmap_Index ) {	—	—
if( Report_metric[Bit 0] == 1)	—	—
BS_CINR_mean	8	—
if( Report_metric[Bit 1] == 1)	—	—
BS_RSSI_mean	8	—
if( Report_metric[Bit 1] == 1)	—	—
Relative_delay	8	—
}	—	—
} else (	—	—
N_Neighbor_BS_Index	8	Number of neighboring BS that are included in MOB_NBR-ADV message.
If (N_Neighbor_BS_Index != 0){	—	—
Configuration change count for MOB_NBR-ADV	8	Configuration Change Count value of referring MOB_NBR-ADV message
}	—	—
For(j = 0; j <	—	—

N_Neighbor_BS_Index; j++ {		
Neighbor_BS_Index	8	BS index corresponds to position of BS in MOB_NBR-ADV message
If(Report metric[Bit 0] == 1)	—	—
BS CINR mean	8	—
If(Report metric[Bit 1] == 1)	—	—
BS RSSI mean	8	—
If(Report metric[Bit 2] == 1)	—	—
Relative delay	8	—
}	—	—
}	—	—
N_Neighbor_BS_Full	8	Number of neighboring BS that are using full 48 bits BS ID.
for(j = 0; j < N_Neighbor_BS_Full; j++){	—	—
Neighbor BSID	48	—
If(Report metric[Bit 0] == 1)	—	—
BS CINR mean	8	—
If(Report metric[Bit 1] == 1)	—	—
BS RSSI mean	8	—
If(Report metric[Bit 2] == 1)	—	—
Relative delay	8	—
}	—	—
If( Use_Rsp_Bitmap_Index == 1) {	—	—
Rsp_Seq_Num	1	<u>One-bit sequence number for the corresponding MOB_SCN-RSP message.</u>
<u>Reserved</u>	<u>1</u>	<u>Shall be set to zero.</u>
<u>Rsp_Bitmap_Size</u>	<u>6</u>	<u>Size of Rsp_Bitmap_Index in nibbles ((Rsp_Bitmap_Size +1)*4), which may be less than</u>

		<u>or equal to the number of BSs in MOB_SCN-RSP.</u>
Rsp_Bitmap_Index	<u><math>(\text{Rsp\_Bitmap\_Size} + 1) * 4</math></u> <u>Up to the Number of BSs in MOB_SCN-RSP</u>	<u>Each bit position in this bitmap corresponds to a BS Index of the corresponding MOB_SCN-RSP message, where the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index, the most significant bit corresponds to the BS Index of the last reported BS, and BSs with BS Index greater than the last reported BS are not reported and do not have a corresponding bit position in the bitmap.</u>  <u>Bitmap position bit value:</u> <u>0: the corresponding BS is not reported.</u> <u>1: the corresponding BS is reported.</u>
for( each '1' in Rsp_Bitmap_Index ) {	—	—
If( Report_metric[ Bit 0] == 1)	—	—
BS_CINR_mean	8	—
If( Report_metric[ Bit 1] == 1)	—	—
BS_RSSI_mean	8	—
If( Report_metric[ Bit 2 ] == 1)	—	—
Relative_delay	8	—
}	—	—
}	—	—
<u>Padding</u>	<u>variable</u>	<u>If needed for alignment to byte boundary.</u>
TLV encoded information	<i>variable</i>	Optional
}	—	—

[...]

**Rsp\_Seq\_Num**

Sequence number for the corresponding MOB\_SCN-RSP message associated with a MOB\_SCN-RSP BS Index bitmap (Rsp\_Bitmap\_Index), where a bit position in this bitmap corresponds to a BS index of the MOB\_SCN-RSP message and where a BS index corresponds to the position of a BS in the MOB\_SCN-RSP message.

**Use\_Nbr\_Bitmap\_Index**

Indicates if the bitmap of BS indexes for MOB\_NBR-ADV is used.

**Use\_Rsp\_Bitmap\_Index**

Indicates if the bitmap of BS indexes for MOB\_SCN-RSP is used.

**Nbr\_Bitmap\_Index**

Bitmap of BS indexes ~~of BS into~~ for the corresponding MOB\_NBR-ADV message where each bit position corresponds to a BS Index of the corresponding MOB\_NBR-ADV message, the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index in sequential order, the most significant bit corresponds to the BS Index of the last reported BS, and BSs with BS Index greater than the last reported BS are not reported and do not have a corresponding bit position in the bitmap. Bitmap position bit value of 1 indicates that the BS is reported and a bit value of 0 indicates that the BS is not reported ~~[DRC1]~~ ~~[DRC2]~~.

When Use Rsp Bitmap Index equals 1, Nbr Bitmap Index only includes BSs included in the MOB\_NBR-ADV message but not included in the corresponding MOB\_SCN-RSP message.

#### **Rsp\_Bitmap\_Index**

Bitmap of BS indexes ~~of BS into~~ for the corresponding MOB\_SCN-RSP message, where each bit position corresponds to a BS Index of the corresponding MOB\_SCN-RSP message, the least significant bit corresponds to the first BS Index, each next significant bit corresponds to the next BS Index in sequential order, the most significant bit corresponds to the BS Index of the last reported BS, and BSs with BS Index greater than the last reported BS are not reported and do not have a corresponding bit position in the bitmap. Bitmap position bit value of 1 indicates that the BS is reported and a bit value of 0 indicates that the BS is not reported.

This bitmap identifies BSs included in the corresponding MOB\_SCN-RSP message, including BSs that are included in the MOB\_NBR-ADV message that were included in the MOB\_SCN-RSP message.

[...]