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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		
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Updates for MOB_SCN-REQ/RSP/REP related text

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Description

The following proposed text changes provides updates and clarifications of the use of bitmaps for identifying BSs in MOB_SCN-REQ/RSP/REP messages.

Proposed Text Changes

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.

[...]

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){	—	—
Req_Seq_Num	1	<u>One-bit sequence number for this message that is incremented after each message transmission.</u>
<u>Nbr Bitmap Size</u>	<u>8</u>	<u>Size of Nbr Bitmap Index in bits, which may be less than</u>

		<u>or equal to the number of BSs in MOB_NBR ADV.</u>
Nbr_Bitmap_Index	<u>Nbr_Bitmap_Size</u> Up to the number of BSs in MOB_NBR ADV	<u>Each bit position corresponds to a BS index of the corresponding MOB_NBR-ADV message.-</u>
for(each '1' in Nbr_Bitmap_Index) {	—	—
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>
}	—	—
} 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	—

[...]

The following parameters shall be included in the MOB_SCN-REQ message:

N_Recommended_BS_Index

If not equal to 0xFF, this is the Nnumber 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~~ ~~Toggles~~ after each transmission of ~~this the message and is used to identify the source message in a MOB_SCN-RSP message that identifies BSs based on their position in a MOB_SCN-REQ message.~~

Nbr_Bitmap_Index

Bitmap index of BS into MOB_NBR-ADV message, where a bit position in the bitmap corresponds to a BS index of a MOB_NBR-ADV message and where a BS index corresponds to the position of the BS in a MOB_NBR-ADV message.

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.

[...]

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 incremented after each message transmission.</u>
Use_Nbr_Bitmap_Index	1	<u>Indicates if the bitmap index for MOB_NBR-ADV is used.</u>
Use_Req_Bitmap_Index	1	<u>Indicates if the bitmap index for MOB_SCN-REQ is 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>Nbr_Bitmap_Size</u>	<u>8</u>	<u>Size of Nbr_Bitmap_Index in bits, which may be less than or equal to the number of BSs in MOB_NBR-ADV.</u>
Nbr_Bitmap_Index	<u>Nbr_Bitmap_Size</u> <u>Up to the Number of BSs in MOB_NBR-ADV</u>	<u>Each bit position corresponds to a BS index of the corresponding MOB_NBR-ADV message.</u>
for(each '1' in Nbr_Bitmap_Index) {	—	—
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 both N_Recommended_BS_Index and N_Recommended_BS_Full 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>Req_Bitmap_Size</u>	<u>8</u>	<u>Size of Req_Bitmap_Index in bits, which may be less than or equal to the number of BSs in the corresponding MOB_SCN-REQ.</u>
Req_Bitmap_Index	<u>Req_Bitmap_Size</u> <u>Up to the Number of BSs in MOB_SCN-REQ</u>	<u>Each bit position corresponds to a BS index of the corresponding MOB_SCN-REQ message.</u>
for(each '1' in Req_Bitmap_Index)	—	—
Scanning_type	3	<u>0b000: Scanning without association</u> <u>0b001: Scanning with association level 0:</u>

		<u>association without coordination</u> <u>0b010: Scanning with association level 1:</u> <u>association with coordination</u> <u>0b011: Scanning with association level 2:</u> <u>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 0`
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	variable	—
}	—	—
TLV encoded information	variable	—
}	—	—

[...]

Req_Seq_Num

One-bit sequence number for the corresponding MOB_SCN-REQ message that is used to identify the source message in a MOB_SCN-RSP message that identifies BSs based on their position in a MOB_SCN-REQ message.

Rsp_Seq_Num

One-bit sequence number for ~~this message. Toggles after each transmission of this message.~~ the MOB_SCN-RSP message that is incremented after each transmission of the message and is used to identify the source message in a MOB_SCN-REP message that identifies BSs based on their position in a MOB_SCN-RSP message.

Use_Nbr_Bitmap_Index

Indicates if the bitmap index for MOB_NBR-ADV is used.

Use_Req_Bitmap_Index

Indicates if the bitmap index for MOB_SCN-REQ is used.

Nbr_Bitmap_Index

Bitmap index of BS into the MOB_NBR-ADV message, where a bit position in the bitmap corresponds to a BS index of a MOB_NBR-ADV message and where a BS index corresponds to the position of the BS in a MOB_NBR-ADV message.

Req_Bitmap_Index

Bitmap index of BS into the MOB_SCN-REQ message, where a bit position in the bitmap corresponds to a BS index of a MOB_SCN-REQ message and where a BS index corresponds to the position of the BS in a 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 147).

[...]

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	—
Use_Rsp_Bitmap_Index	1	—
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>Nbr_Bitmap_Size</u>	<u>8</u>	<u>Size of Nbr_Bitmap_Index in bits, which may be less than or equal to the number of BSs in MOB_NBR-ADV.</u>
Nbr_Bitmap_Index	<u>Nbr_Bitmap_Siz</u> <u>e</u> <u>Up to the</u> <u>Number of</u> <u>BSs in MOB_</u> <u>NBR-ADV</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>Rsp_Bitmap_Size</u>	<u>8</u>	<u>Size of Rsp_Bitmap_Index in bits, which may be less than or equal to the number of BSs in the corresponding MOB_SCN-RSP.</u>
Rsp_Bitmap_Index	<u>Rsp_Bitmap_Size</u> Up to the Number of BSs in MOB_SCN- RSP	—
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	—
}	—	—
}	—	—
TLV encoded information	<i>variable</i>	Optional
}	—	—

Rsp_Seq_Num

Sequence number for the corresponding MOB_SCN-RSP message.

Use_Nbr_Bitmap_Index

Indicates if the bitmap index for MOB_NBR-ADV is used.

Use_Rsp_Bitmap_Index

Indicates if the bitmap index for MOB_SCN-RSP is used.

Nbr_Bitmap_Index

Bitmap index of BS into MOB_NBR-ADV message.

Rsp_Bitmap_Index

Bitmap index of BS into MOB_SCN-RSP message.