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Title	Fix the Problem of Scan/Association Type Indication in MOB_SCN-REQ/RSP Message
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Re:	Call for contribution and comments.
Abstract	This contribution proposes method to fix the problem of scan/association type in MOB_SCN-REQ/RSP message.
Purpose	Adoption
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Fix the Problem of Scan/Association Type Indication in MOB_SCN-REQ/RSP Message

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Problem

Three Levels of scan /association are defined in 802.16e D9:

Association Level 0 – Scan/Association without coordination

Association Level 1 – Association with coordination

Association Level 2 – Network assisted association reporting

BS and MS need to indicate the scan/association type in MOB_SCN-REQ & MOB_SCN-RSP messages. Currently a 3-bits field “association type” is defined in MOB_SCN-REQ / MOB_SCN-RSP messages and a method to indicate scan/association type using this field is described as following :

Association type=0b000 : Association level 0 with scanning: association without coordination.

Association type=0b001 : Association level 1 with scanning: association with coordination.

Association type=0b010 : Association level 2 with scanning: NW assisted association reporting.

Association type=0b011 : No association with scanning

One problem is that, while SCN-RSP was changed to allow the MS to report scanning results per neighbor BS with differentiated Association Type, the SCN-REQ was not similarly changed. That is, the MS can report that for neighbor BS 1, it used Association type 0, while for neighbor BS 2, it used Association type 1. So while the MS could report the differentiated Association type per neighbor BS scanned, the MS has no method to actually request to use different Association type per neighbor BS. The SCN-REQ message permits and requires designation of a single Association type method to be used for all neighbor BS designated in the message. Fortunately, this problem is easily fixed by using a similar method employed in SCN-RSP and applying it to SCN-REQ.

Another problem is that Association type in SCN-REQ was previously, correctly, changed to support the option of Scanning without Association. SCN-RSP was not similarly changed. Since Association is an optional feature, the SCN-REQ & SCN-RSP messages must support an Association Type selection that is Scanning without Association only. And certainly the use of Association Type in the two messages should match. However, the change in Association Type done in SCN-REQ was poorly performed. Because of the priority of sequencing in 11.8.3.7.16 Association type support, the option of Scanning without Association must occur as the first value of the option. Similar change must be performed in 11.8.3.7.16 to support the negotiated option of scanning without Association. Again, Association is an optional feature, so the negotiation of 11.8.3.7.16 must contain an option of Scanning without Association. Also, the use of the term ‘Association Type’ is entirely misleading since it implies that all scanning is for Association, which is certainly not true. Finally, 11.8.3.7.16 is not PHY specific and should be moved to general SBC capabilities negotiation from the OFDMA PHY specific subsection. And delete the duplicate section 11.8.3.7.16.

Remedy

Fortunately, the identified Association type specification discontinuity problem between SCN-REQ & SCN-RSP is easily fixed by using a similar method employed in SCN-RSP and applying it to SCN-REQ.

And Association type support for scanning without Association is easily accommodated by adding a new value to Association type. Note that, due to selection precedence in 11.8.3.7.16 Association type support, the new value must be added as option '0'. Also, change 11.8.3.7.16 to correctly support the selection of no support for the optional Association feature. Also, change the term 'Association type' into the more correct term 'Scanning type'. Finally, 11.8.3.7.16 needs to be moved to 11.8.8. And delete the duplicate section 11.8.3.7.15.

Proposed changes to text

[In 6.3.2.3.48 Scanning Interval Allocation Request (MOB_SCN-REQ) message, page 102, Table 108h—MOB_SCN-REQ message format, modify Table as:]

Table 108h—MOB_SCN-REQ message format

Syntax	Size (bits)	Notes
MOB_SCN-REQ Message format() {	--	--
Management Message Type = 54	8	
Scan duration	8	Units are in frames.
Association type	3	0b000: Association level 0 with scanning: association without coordination: 0b001: Association level 1 with scanning: association with coordination: 0b010: Association level 2 with scanning: NW assisted association reporting: 0b011: No association with scanning 0b100-0b111: Reserved
Interleaving interval	8	Units are frames.
Scan Iteration	8	In frames
Comp_NBR_BSID_IND	1	1 = use compressed BS ID
Padding	4	Shall be set to zero
If (Comp_NBR_BSID_IND == 1) {		
Configuration change count for MOB_NBR_ADV	8	Configuration Change Count value of referring MOB_NBR_ADV message
}		
N_Recommended_BS	8	Number of neighboring BS's to be scanned/associated
For (j=0; j<N_Recommended_BS; j++) {		
If (Comp_NBR_BSID_IND == 1) {		
Neighbor_BS_index	8	BS index corresponds to position of BS in MOB_NBR_ADV message
} Else {		
Recommended_BS_ID	48	
}		
Association-Scanning_type	3	0b000: Scanning without Association Association level 0 with scanning: association without coordination: 0b001: Scanning with Association level 0: association without coordination Association level 1 with scanning: association with coordination: 0b010: Scanning with Association level 1: association with coordination Association level 2 with scanning: NW assisted association reporting: 0b011: Scanning with Association level 2: NW assisted association No association with scanning 0b100-0b111: Reserved
}		
Padding	variable	If needed for alignment to byte boundary.
TLV encoded information	variable	

}	
---	--

[In 6.3.2.3.48 Scanning Interval Allocation Request (MOB_SCN-REQ) message, page 104, lines 3-5, modify as:]

Association Scanning type

Type of scanning or association to be used by the MS and coordinated by the Serving BS (if Association type $\geq 0b0100b011$).

[In 6.3.2.3.49 Scanning Interval Allocation Response (MOB_SCN-RSP) message, page 104, Table 108i—MOB_SCN-RSP message format, modify Table as:]

Table 108i—MOB_SCN-RSP message format

Syntax	Size (bits)	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: reserved
<i>reserved</i>	6	Shall be set to zero
Report period	8	Available when the value of Report Mode is set to 0b01. Report period in frames.
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	4	
<i>reserved</i>	1	Shall be set to zero.
Interleaving interval	8	Duration in frames
Scan iteration	8	
Comp_NBR_BSID_IND	1	
<i>padding</i>	3	Shall be set to zero.
If (Comp_NBR_BSID_IND == 1)		
Configuration change count for MOB_NBR_ADV	8	Configuration Change Count value of referring MOB_NBR_ADV message
}		
N_Recommended_BS	4	Number of neighboring BS's to be scanned/associated
For (j=0; j<N_Recommended_BS; j++) {		
If (Comp_NBR_BSID_IND == 1) {		
Neighbor_BS_index	8	BS index corresponds to position of BS in MOB_NBR_ADV message
} Else {		
Recommended_BS_ID	48	BS IDs of BSs that MS shall scan
}		
}		

Association Scanning type	3	0b000: Scanning without Association Scanning with association level 0: association without coordination 0b001: Scanning with Association level 0: association without coordination Scanning with association level 1: association with coordination 0b010: Scanning with Association level 1: association with coordination Scanning with association level 2: NW assisted association reporting 0b011: Scanning with Association level 2: NW assisted association 0b010-0b111 : Reserved
If (Association type == 0b001) OR (Association type == 0b010) {		
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	
}		

[In 6.3.2.3.49 Scanning Interval Allocation Response (MOB_SCN-RSP) message, page 106, lines 33-34, modify as:]

Association Scanning type

Type of scanning or association ~~to be~~ used by the MS and coordinated by the Serving BS (if Association type >=0b011).

[In 11.8.3.7.16 Association type support, page 542, modify Table as:]

Type	Length	Value	Scope
167	1	0: Scanning without Association: Association not supported 01: Association level 0: Scanning or association without coordination. 12: Association level 1: association with coordination. 23: Association level 2: NW assisted association reporting . 4-255 reserved	SBC-REQ (see 6.3.2.3.23) SBC-RSP (see 6.3.2.3.24)

[Relocate 11.8.3.7.16 Association type support, page 542, to new subsection 11.8.8:]

[Delete duplicate section 11.8.3.7.15 Association type support, page 542; note: 11.8.3.7.15 is duplicate to 11.8.3.7.16, but 11.8.3.7.16 has some different, more correct language after the Table, so should kill .15 not .16]

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