IEEE P802.11  
Wireless LANs

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| Clause 6 – Investigation | | | | |
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Abstract

Look in depth at Clause 6

Rev 1 START AT PAGE 9

Rev 2 proposed table added

Rev 3 detailed 6.3 type and references

**Background:**

Contribution 21/1822 noticed that Clause 6 consumes 434 pages MORE THAN Clause 11 (398 pages) and questioned if it was really worth it.

Contribution 21/1822 also looked at refeerrences in text to Clause 6 and proposed an approach along the lines of

**ACTION.request primitives are detailed in this clause when they do not directly correspond to frame described in “Clause 9” or Clause 11 (note some might be elsewhere), or where the primitive parameters significantly differ.**

**Hence, first short list might be:**

6.3.2 MLME-POWERMGT

6.3.3 MLME SCAN

6.3.4 MLME JOIN (synchronization)

6.3.5 MLME AUTHENTICATE

6.3.6 MLME DEAUTHENICATE

6.3.7 MLME ASSOCIATE

6.3.8 MLME REASSOCIATE

6.3.9 MLME DISASSOCIATE

6.3.10 MLME RESET

6.3.11 MLME START

6.3.12 MLME STOP

6.3.19 MLME-SETKEYS

At Feb 24 telecon meeting:

Consensus on worthwhile work.

Noted diagrams in 6.3.13 and TDLS and Timing. As these are “abstract” not sure these figures are needed here. Should fit the standard model.

Possible Way ahead is to expand the Introduction to 6.3. Add diagrams showing the two different models, internal command, and request/response.

Possibly a list of all “standard” promitives meeting one or other model. Maybe with reference to Clause 9 or 11 where the respective packet is defined.

First some acronyms:

SME – Station management entity

MLME – MAC sublayer management entity

PLME – PHY layer management entity

SAP – Service Access Point

**6.3 MLME SAP interface**

The services provided by the MLME to the SME are specified in this subclause. These services are

described in an abstract way (following the model described in ITU-T Recommendation X.210 [B55]) and

do not imply any particular implementation or exposed interface. **MLME SAP primitives are of the general**

**form ACTION.request primitive followed by ACTION.confirm primitive (for an exchange initiated by the**

**SAP client) and ACTION.indication primitive followed by ACTION.response primitive (for an exchange**

**initiated by the MLME)**. The SME uses the services provided by the MLME through the MLME SAP

NOTE: “These services are described in an abstract way…and do not imply any particular implementation…”

Let’s list this out clearer:

**MLME SAP primitives are of the general form**

For an exchange initiated by the SAP client

* ACTION.request primitive,
* ACTION.confirm primitive

For an exchange initiated by the MLME

* ACTION.indication primitive
* ACTION.response primitive

Now most exchanges are of the form “Request / Response”

BTW I coud not find any similar drawing or indeed anything useful in the ITU document.

Based on this “General Form” I interpret this as following diagram:

**FIGURE 1 – General form of MLME SAP Primitives for Request/Response**



**FIGURE 2 – General form of MLME SAP Primitives for SME requests MLME to** something that does not initiate a packet to a peer STA, e.g. START



AND there is a third

**FIGURE 3 – General form of MLME SAP Primitives for request to perform a requested Action and report on it.**



Soo…let’s look at an example that we should all understand. ASSOCIATE.

**MLME-ASSOCIATE.request**

This primitive requests association with a specified peer MAC entity that is within an AP.

When generated:

This primitive is generated by the SME when a STA wishes to establish association with an AP or PCP.

Effect of receipt

This primitive initiates an association procedure. In the case that a response is received from the responder STA, the MLME subsequently issues an MLME-ASSOCIATE.confirm primitive that reflects the results.



**MLME-ASSOCIATE.confirm**

This primitive reports the results of an association attempt with a specified peer MAC entity that is in an AP or PCP.

When generated:

This primitive is generated by the MLME as a result of an MLME-ASSOCIATE.request primitive **or** receipt of an Association Response frame from the peer MAC entity to associate with a specified peer MAC entity that is in an AP or PCP.

*NOTE: This seems to indicate that the MLME sends a ‘confirmation’ of receipt back to the SME, and then later on, the confirmation that the Association Response frame has been received. Maybe this should have been “on” receipt.*

*NOTE 2 (3/7/meeting) Could be that a .confirm is sent if error in the .request or time out or ??? Might need look at the error codes and then sort out. But in any case, would need a lot more description – if it was worth it!*

Effect of receipt

The SME is notified of the results of the association procedure.

*NOTE: This does not align if really is “or”*

**MLME-ASSOCIATE.indication**

This primitive indicates that a specific peer MAC entity is requesting association with the local MAC entity, which is in an AP or PCP

When generated:

This primitive is generated by the MLME as a result of the receipt of an association request from a specific peer MAC entity

Effect of receipt

The SME is notified of the receipt of the association request

**MLME-ASSOCIATE.response**

This primitive is used to send a response to a specific peer MAC entity that requested an association with the

STA that issued this primitive, which is in an AP or PCP.

When generated:

This primitive is generated by the SME of a STA that is in an AP or PCP as a response to an MLMEASSOCIATE.indication primitive

Effect of receipt

This primitive initiates transmission of an AssociationResponse to the specific peer MAC entity that requested association.



Is this right? It fits exactly with the description. Does SME need a confirm?

Note

**MLME-REASSOCIATE.confirm**

This primitive is generated by the MLME as a result of an MLME-REASSOCIATE.request primitive to reassociate with a specified peer MAC entity that is in an AP or PCP.

*NOTE: REASSOCIATE not include the “immediate” confirm. Neither does the DISASSOCIATE.*

**FIRST PROPOSED CHANGE**

I suggest the “or” should be changed to “on”.

Then ASSOCIATE meets the general form FIG. 1.

Let’s look at another diagram that was inserted. TDLS direct link establishment. How many problems here?

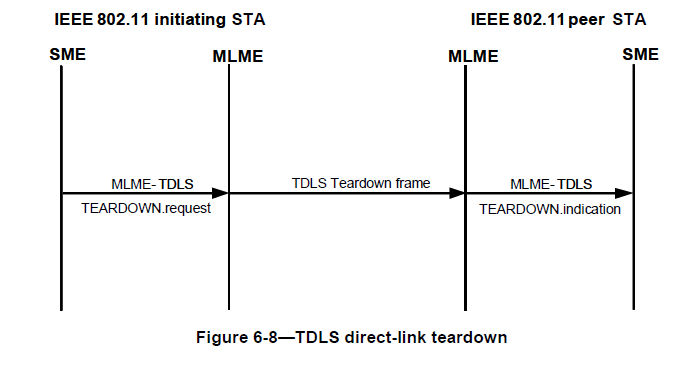


This is scary. I suspect it has never been looked at since it was written.

Do we need a primitive if no response happens?

Discussion (3/7/22) This is a 3 exchange scheme hence, 3 type 4 exchanges, single

Also look at Figure 6.8.

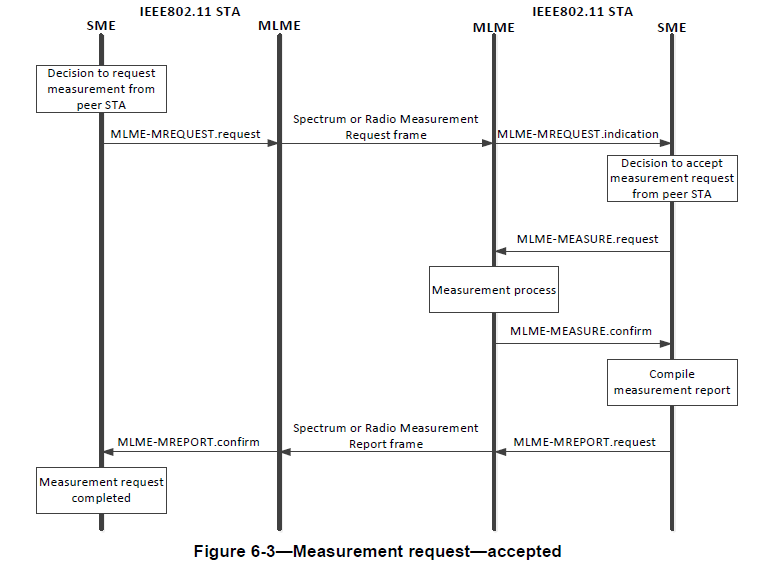
****

With no response at all, should this even be here? Note should be Type 4 case.

**Let’s discuss**.

There are 24 Figures in Clause 6.3. How many are really needed? If they meet one of the “General Cases” they need not be there?

Let’s now look at FIG. 6.3



This is classic case of General Form #3. The action is pretty clear from the text, i.e. get a request, do it, then send the response.

**NEXT STEPS**

Go through all figures in 6.3. Look at text to see if they meet one of the “General Forms” and how they are actually referred to.

Are they needed? Is description in Clause 9 or 11 sufficiently clear. What about the boxes?

We could in text refer to which “Form” of MLME SAP primitive is used.

Make decision if any do not fit the four “General Forms”. Is there another?

**OBJECTIVE**

Write Introduction with descriptions of the 4 General Forms and see if these adequately cover all the 125 cases minus the 12 listed earlier.

**In Clause 12.2.10. P3097.10, we have**

The SME of the non-AP STA may change the MAC address by generating an MLMEUPDATEMACADDRESS. request primitive containing the new MAC address. On receipt of an MLME-UPDATEMACADDRESS.request primitive, the MLME shall attempt to update the MAC address that is to be used by the MAC entity and shall generate an MLME-UPDATEMACADDRESS.confirm primitive to notify the SME whether the MAC address has been changed to the new value.

Note that it appears at 6.3.117 P815. In this case it is clear that we do not need 6.3.117.

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Proposed new 6.3 Introduction

**6.3 MLME SAP interface**

**6.3.1 Introduction**

The services provided by the MLME to the SME are specified in this subclause. These services are described in an abstract way (following the model described in ITU-T Recommendation X.210 [B55]) and do not imply any particular implementation or exposed interface. MLME SAP primitives are of the general form ACTION.request primitive followed by ACTION.confirm primitive (for an exchange initiated by the SAP client) and ACTION.indication primitive followed by ACTION.response primitive (for an exchange initiated by the MLME). The SME uses the services provided by the MLME through the MLME SAP.

**6.3.1.1 Types of MLME-SAP interface primitive forms**

There are six general forms of MLME-SAP interface primitives.

Figure 6.x depicts Type 1. The Type 1 general form is used for the exchange of request/response frames between an initiating STA and a peer STA.

**FIGURE 6.x – Type 1 form of MLME SAP primitives for request/response process**



The .request primitive is generated by the SME of the initiating STA to request that a Request frame is sent to a peer STA.

The .indication primitive is generated by the MLME of the peer STA when the Request frame is received.

The .response primitive is generated by the SME of the peer to request that a Response frame be sent to the initiating STA.

The .confirm primitive includes a Result Code reporting success or failure of the request, and is generated by the MLME of the initiating STA when the either Response frame from the peer STA is acknowledged, or the (re)transmission of the request frame fails.

Figure 6.xx depicts Type 2. The Type 2 general form is used for the SME requesting a process to be initiated by the MLME.

**FIGURE 6.xx – Type 2 form of MLME SAP primitives for SME requesting MLME to perform a process**



The .request primitive is generated by the SME to request that a process is initiated by the MLME.

The .confirm primitive generally includes a Result Code reporting success or failure of the request, and is generated by the MLME when the requested action of process is completed, or fails.

Figure 6.xxx depicts Type 2a. The Type 2a general form is used for the SME requesting a process to be initiated by the MLME and the SME does not require a confirmation

**FIGURE 6.xxx – Type 2a form of MLME SAP primitives for SME requesting MLME to perform a process not requiring a confirmation**



The .request primitive is generated by the SME to request that a process is initiated by the MLME.

Figure 6.xxxx depicts Type 3. The Type 3 general form is used for the transmission of a frame from one STA to a peer STA that does not require a response from the peer STA but does require a confirmation that the frame was transmitted and either acknowledged or timed out.

**FIGURE 6.xxxx – Type 3 form of MLME SAP primitives for frame transmission not requiring a response, but requiring a confirmation**

The .request primitive is generated by the SME of the initiating STA to request that a Request frame is sent to a peer STA.

The .confirm primitive generally includes a Result Code reporting success or failure of the request, and is generated by the MLME when the requested action of process is completed, or fails.

The .indication primitive is generated by the MLME of the peer STA when the Request frame is received.

Figure 6.xxxxx depicts Type 4. The Type 4 general form is used for the transmission of a frame from one STA to a peer STA that does not require a response from the peer STA or a confirmation.

**FIGURE 6.xxxx – Type 4 form of MLME SAP primitives for frame transmission not requiring a response or a confirmation**

The .request primitive is generated by the SME of the initiating STA to request that a Request frame is sent to a peer STA.

The .indication primitive is generated by the MLME of the peer STA when the Request frame is received.

Figure 6.xxxxxx depicts Type 5. The Type 5 general form is used for the transmission of a frame that does not require a response, but does require a confirmation that it was sent.

**FIGURE 6.xxxxxx – Type 5 form of MLME SAP primitives for a frame transmission from a STA, but does require a confirmation that it was sent**



The .request primitive is generated by the SME to request that the MLME transmits a frame.

The .confirm primitive generally includes a Result Code reporting success or failure of the request, and is generated by the MLME when the requested frame transmission is completed, or fails.

Figure 6.xxxxxxx depicts Type 6. The Type 6 general form is used when the MAC informs the SME of an event.

**FIGURE 6.xxxxxxx – Type 6 form of MLME SAP primitives for MAC informing SME of an event**



The .indication primitive is generated by the MLME to inform the SME of an event.

**6.3.1.2 MLME-SAP Primitives**

*MLME-SAP primitives generally have the parameters that …*

MLME-SAP primitives are only detailed in this clause when they do not directly correspond to frame exchanges described in Clause 9 or Clause 11, where the primitive parameters differ significantly from the fields in the respective Action frames, or when the primitives may not be clear from the descriptions in Clauses 9 or 11.

**Include the following, renumbering where necessary:**

6.3.2 MLME-POWERMGT Type 2 see 11.2

6.3.3 MLME SCAN Type 2

MLME-SCAN-STOP Type 2a see 6.3.3

6.3.4 MLME JOIN (synchronization) Type 2 see 11.1

6.3.5 MLME AUTHENTICATE Type 1 see 11.3.4

6.3.6 MLME DEAUTHENICATE Type 3 see 11.3.4

6.3.7 MLME ASSOCIATE Type 1 see 11.3.5

6.3.8 MLME REASSOCIATE Type 1 see 11.3.5

6.3.9 MLME DISASSOCIATE Type 3 see 11.3.5

6.3.10 MLME RESET Type 2a

6.3.11 MLME START Type 2

6.3.12 MLME STOP Type 2a

6.3.13 Protocol layer model for spectrum management and radio measurement

6.3.14 MLME SETKEYS (was 6.3.19) Type 2a

6.3.15 MLME DELETEKEYS (was 6.3.20) Type 2a

**Look through the rest, one by one to see if a case for keeping them or if adequately described in the relate text.**

**Look at recommendations in 21/1822 for text changes related to 6.3 references in text.**

**Here follows a detailed look at each 6.3 subclause. The idea is to identify the Type, and the references. Then, once agreed, we can arrange the results into a Table.**

6.3.14 Measurement Request (NOTE: Spectrum OR Radio Measurement)

MREQUEST. Type 4 Reference 6.3.13 AND 9.6.2, 9.6.6

6.3.15 Channel measurement

MEASURE. Type 2 Reference 6.3.13

6.3.16 Measurement report

MREPORT. Type 4, Reference 6.3.13

6.3.17 Channel switch

CHANNELSWITCH Type 1 Reference 6.3.13 AND 9.6.2.6

6.3.18 TPC request

TPCADAPT Type 5 Reference 6.3.13 and 11.7.7

6.3.21 MIC failure

MICHAELMICFAILURE Type 6 see 12.5.2.4

6.3.22 EAPOL Type 5 see 12.5.2.4.1

6.3.23 Set Protection

SETPROTECTION Type 2a

Candidate to include in detail?? I think it is clear though if I can find a text reference for use.

6.3.24 Protected frame dropped

PROTECTEDFRAMEDROPPED Type 6 need reference

6.3.25 TS management

LOOK AT THIS ONE for correct reference(s)

ADDTS Type 1 see 10.23, 11.4, 11.21.16.3,

DELTS Type 6

ADDTSRESERVE Type 1

6.3.26 Higher layer synchronization support

HL-SYNC Type 4 Reference ???

6.3.27 Block Ack

ADDBA Type 1. BlockACK Request 9.3.1.7

DELBA Type 4.

6.3.28 Schedule element management

SCHEDULE Type 4 see 9.4.2.33

6.3.29 Vendor Specific action

VSPECIFIC Type 4 Reference?

Simply requests sending a Vendor Specific frame – does not specify the frame.

6.3.30 Neighbor report

NEIGHBORREPREQ Type 4 see 9.4.2.20 and 9.4.2.36

6.3.31 Neighbor report response

NEIGHBORREPRESP Type 4 see 9.4.2.36

6.3.32 Link Measure request

LINKMEASURE Type 5 see 9.4.2.6

6.3.33 Resource request

RESOURCE-REQUEST Type 1 NEED REFERENCE

RESOURCE-REQUEST-LOCAL Type 2

6.3.34 Remote requests

REMOTE-REQUEST Type 4 see 9.6.8

6.3.35 Extended channel switch announcement

EXTCHANNELSWITCH Type 1 see 9.4.2.52

6.3.36 DSE power constraint announcement

DSETPC Type 1 see 9.6.7.10

6.3.37 Enablement

ENABLEMENT Type 1 see 9.6.7.4

6.3.38 Deenablement

DEENABLEMENT Type 4 see 9.6.7.5

6.3.39 SA Query support

SA-QUERY Type 1 see 9.6.9.2

6.3.40 Get TSF timer

GETTSFTIME Type 2 NEED REFERENCE (simply get TSF time)

6.3.41 Timing Advertisement

TIMING-ADVERTISEMENT Type 5 Find Timing Advertisement frame clause

6.3.42 TDLS Discovery

TDLSDISCOVERY Type 1 Find TDSL Discovery request frame clause

6.3.43 TDLS direct link establishement

TDLSSETUPREQUEST Type 4 Reference to TDLS clause

TDLSSETUPRESPONSE Type 4

TDLSCONFIRM Type 4

TDLSPOTENTIALPEERSTA Type 2

6.3.44 TDLS direct link teardown

TDLSTEARDOWN Type 4

6.3.45 TDLS peer U-APSD

TDLSPTI Type 1 Find TDLS Peer Traffic Indication frame

6.3.46 TDLS channel switching

TDLSCHANNELSWITCH Type 1 Find TDLS channel switch request frame

6.3.47 TDLS peer PSM

TDLSPEERPSM Type 1 Find TDLS Peer PSM Request/response frames

6.3.48 Event request

EVLREQUEST Type 4 Find event request frame

6.3.49 Event report

EVLREPORT Type 4 Find event report frame

6.3.50 Event

EVLOG Type 2 Requests initiate specified event ??

6.3.51 Diagnostic request

DIAGREQUEST Type 4 Diagnostic request frame

6.3.52 Diagnostic report

DIAGREPORT Type 4 Diagnostic report frame -

6.3.53 Location configuration request

LOCATIONCFG Type 1 Reference Location Config Request and Response frames

6.3.54 Location track notification

LOCATIONTRACKNOTIF Type 4 Location Track Notification frame

6.3.55 Timing measurement

TIMINGMSMTRQ Type 4 Timing Measurement Request frame

TIMINGMSMT Type 3 Timing Measurement Frame

6.3.56 Fine timing measurement

FINETIMINGMSMTRQ Type 4 FineTiming Measurement Request frame

FINETIMINGMSMT Type 3 Fine Timing Measurement Frame

.

6.3.57 BSS transition management procedure

BTMQUERY Type 4 BSS Transition Management Query

BTM Type 1 BSS Transition Management request rresponse

Diagram appears useful, does it appear in similar form in text? Don’t think so but primitives are described in text. (see 11.21.7.4) So decision is whether it is clear without the diagram in 6.3.57 Or add diagram to text

6.3.58 FMS setup

FMS Type 1 9.4.2.75 and 9.4.2.76 (FMS request/response)

6.3.59 Collocated interference request

CLINTERFERENCEREQUEST Type 4 9.6.13.13

6.3.60 Collocated interference response

CLINTERFERENCEREPORT Type 4 9.4.2.84 (why so difference to request)

6.3.61 TFS setup

TFS Type 1 TSF Request and Response frames

6.3.62 WNM sleep mode request

SLEEPMODE Type 1 9.4.2.79 and 9.4.2.80 WNM Sleep Mode Request Response

6.3.63 TIM broadcast setup

TIMBROADCAST Type 1 9.4.2.82 and 9.4.2.83 TIM Broadcast Request/Response

6.3.64 QoS traffic capability update

QOSTRAFFICCAPUPDATE Type 4 9.6.13.23 QOS Traffic Capability Update frame

6.3.65 Channel Usage request

CHANNELUSAGE Type 1 Channel Usage Request/Response frames

6.3.66 DMS or GCR request and response procedure

GATS Type 1 DMS Request and Respnse frames 9.4.2.87/88 elements

GATS TERM Type 4 DMS Response frame

6.3.67 WNM notification request

WNMNOTIFICATIONREQUEST Type 4 9.6.13.29

6.3.68 WNM notification response

WNMNOTIFICATIONRESPONSE Type 4 9.6.13.30

Why two type 4’s. Should be Type 1?

6.3.69 Network discovery and selection support

GAS Type 1 9.4.2.92 (element) Requests a specific service

Response Table 9-78 for Result Code

This one should be two Type 4s?

6.3.70 QoS Map element management

QOS-MAP Type 4 9.4.2.94 element (look for QoS Map configurations)

(Note: Lots of normative text in the General. Is this the right place for this? Hopefully it is in the main text, if not move it there?)

6.3.71 Mesh peering management

MESHPEERINGMANAGEMENT Type 1 9.6.15.2, 9.6.15.3, 9.6.15.4

6.3.72 Mesh power management

MESHPOWERMGT Type 2 Mesh power management clause?

6.3.73 Mesh neighbor offset synchronization

MESHNEIGHBOROFFSETSYNCSTART Type 2 Need clause reference

MESHNEIGHBOROFFSETCALCULATE Type 2

MESHNEIGHBOROFFSETSTOP Type 2

6.3.74 Mesh TBTT adjustment

MESHBTTADJUSTMENT Type 1 9.4.2.104 (element)

6.3.75 MCCA management interface

ACTIVATEMCCA Type 2a

MCCASETUP Type 1 Sets up a reservation Need Reference for the actions

MCCAADVERTISEMENT Type 1 9.4.2.108 (element)

MCCATEARDOWN Type 4

6.3.76 MBSS congestion control

MBSSCONGESTIONCONTROL Type 4 9.4.2.100 (element)

6.3.77 MBSS proxy update

MBSSPROXYUPDATE Type 1 9.4.2.115 (PXU element) 9.4.2.116 (PXUC element)

6.3.78 MBSS mesh gate announcement

MBSSGATEANNOUNCEMENT Type 4 9.4.2.110 (GANN element)

6.3.79 Mesh link metric is there text on this action?

MESHLINKMETRICREAD Type 2

MESHLINKMETRICREPORT Type 4 9.4.2.99 (element)

MESHLINKMETRICREPORT Type 4 9.4.2.99 (element)

6.3.80 HWMP mesh path selection

HWMPMESHPATHSELECTION Type 4 9.4.2.112, 9.4.2.113, and 9.4.2.114

6.3.81 QMF policy

POLICY Type 4 9.4.2.119

POLICYCHANGE Type 1 9.4.2.119

POLICYSET Type 2a 9.4.2.119

6.3.82 SCS request and response procedure

SCS Type 1 9.4.2.121

SCS\_TERM Type 4 Just returns Status Table 9-78

6.3.83 QLoad report management

QLOAD Type 1 QLOAD Request/Response

6.3.84 HCCA TXOP advertisement management

TXOPADVERTISEMENT Type 1 TXOP Advertisement frame (I know this has text)

6.3.85 GCR group membership management

GROUP-MEMBERSHIP Type 1 Find the text

6.3.86 AP PeerKey management

APPEERKEY Type 4 Table 9-461, 9.4.1.39, 9.4.1.40

6.3.87 On-channel Tunneling operation

OCTTunnel Type 3 9.6.20.7 frame, 9.4.2.138, 9.4.2.245

6.3.88 Multi band operation

FST-SETUP Type 1 Need reference for FST Setup request/response

FST-ACK Type 1

FST-TEARDOWN Type 4

FST-INCOMING Type 2a

6.3.89 DMG relay operation

RELAY-SEARCH Type 1 9.4.1.44

RLS Type 1 RLS Response frame

RLS-TEARDOWN Type 4

6.3.90 Quieting adjacent BSS operation

QAB Type 1 9.4.2.149 Quiet Period Request

6.3.91 DMG beamforming

BF-TRAINING Type 3 9.5.4, 9.4.2.129, 9.4.2.270 Text reference ?

SU-MIMO-BF TRAINING Type 3

MU-MIMO-BF-TRAINING Type 3

SU-MIMO-HYBRID-BF-PROTOCOL Type 3

MU-MIMO-HYBRID-BF-PROTOCOL Type 3

6.3.92 PN event report

PN-EXHAUSTION Type 6 dot11PNExhaustionThresholdLow and ot11PNExhaustionThresholdHigh.

PN-WARNING Type 6

6.3.93 Channel availability query

CHANNELAVAILABILITYQUERY Type 1 9.6.7.25

6.3.94 Channel schedule management

CHANNESCHEDULEMANAGEMENT Type 1 9.6.7.26, 9.4.4.2.3, 9.4.4.2.5.

6.3.95 Contact verification signal

CVS Type 4 Contact Verification Signal frame

6.3.96 GDD Enablement

GDDENABLEMENT Type 1 GDD Enablement request/response frame

6.3.97 Network channel control management

NETWORKCHANNELCONTROL Type 1 Network Channel Control public action frame request/response

6.3.98 White space map

WSM Type 4 White Space Map Announcement frame (9.4.2.169 element)

6.3.99 Estimated Throughput

ESTIMATED-THROUGHPUT Type 2 Need text reference for this

6.3.100 Get authentication and association state

GETAUTHASSOCSTATE Type 2 Need text reference

6.3.101 FILS Container

FILSContainer Type 1 9.4.2.184

6.3.102 Dynamic AID assignment operation

AIDSWITCH Type 1 9.4.2.184, 9.4.2.194

6.3.103 Sync control

SYNCCONTROL Type 4 9.4.1.57 (element) in Sync Control frame?

6.3 104 STA Information Announcement

STAINFORMATION Type 4 STA Information Announcement frame (element 9.4.2.208)

6.3.105 EDCA Parameter Set update

EDCAPARAMETERSET Type 4 9.4.2.28 (element) EDCA Parameter Set frame

6.3.106 EL operation

ELOPERATION Type 4 9.4.2.210 (element) EL operation frame

6.3.107 TWT setup

TWTSETUP Type 1 9.4.2.199 (element) TWT Setup frame

6.3.108 TWT teardown

TWTTEARDOWN Type 4 TWT Teardown frame

6.3.109 Sectorized Group ID List management

SECTORIZEDGROUPID Type 4 9.4.2.211 (element) Sectorized Group ID List frame

6.3.110 Header Compression procedure

HEADERCOMPRESSION Type 1 9.4.2.213 (element) Header Compression frame

6.3.111 Reachhable Address update

REACHABLEADDRESSUPDATE Type 4 9.4.2.205 (element) Reachable Address Update frame

6.3.112 Control response MCS negotiation operation

CONTROLRESPONSEMCS Type 1 9.6.27.3 (element) Control Response MCS Negotiation Request frame

6.3.113 S1G relay

S1GRELAYACTIVATE Type 1 9.4.2.206 (element) Relay Activation Request/Response frames

6.3.114 DCS procedure

DCSMEASUREMENT Type 1 9.6.7.37 DSC Measurement Request

DCS Type 1 9.6.3.39 DCS Request frame

6.3.115 Update

UPDATE Type 2 BSS Update procedure

6.3.116 MSCS request and response procedure

MSCS Type 1 9.4.2.243 (element) MSCS request/response frames

MSCS TERM Type 4 transmit an MSCS response frame

6.3.117 MAC Address update

UPDATEMACADDRESS Type 2 Simply change MAC Address

6.3.118 Quiet time period

QTP Type 1 QTP Request/Response frames

6.3.119 TDD beamforming

TDD-BF-TRAINING Type 3 See 11.36.2

6.3.120 TDD sector switch

TDD-SECTOR-SWITCH Type 3 See/find TDD Sector switch for reference

6.3.121 TDD beam measurement

TDD-BEAM-MEASUREMENT Type 3 See 10.42.11 and 11.36.4

6.3.122 TDD structure and schedule

TDD-SLOT-STRUCTURE Type 2 See 10.39.6.2.2 and 11.54

TDD-SLOT-SCHEDULE Type 2

TDD-SLOT-ANNOUNCE Type 3

TDD-BANDWIDTH Type 3

6.3.123 WUR mode set up

WURMODESETUP Type 1 See 29.8.2

6.3.124 WUR mode teardown

WURMODETEARDOWN Type 4 See 29.8.2

6.3.125 WUR Discosvery

WURDISCOVERY Type 2. See 29.12

**6.4 Table of MLME SAP interfaces**

Proposed table format:

This will be re-drawn once the above is settled.

| **Diagnostic report Name** | **MLME-** | **Type** | **Reference(s)** | **Note** |
| --- | --- | --- | --- | --- |
| Power management | POWERMGT | 2 |  | *6.3.2* |
| Scan | SCAN | 2 |  | *6.3.3* |
| SCAN-STOP | 2a |  | *6.3.3.4 no confirm* |
| Synchronization | Join | 2 |  | *6.3.4* |
| Authenticate | AUTHENTICATE | 1 |  | *6.3.5* |
| Deauthenticate | DEAUTHENTICATE | ? |  | *6.3.6* |
| Associate | ASSOCIATE | 1 |  | *6.3.7* |
| Reassociate | REASSOCIATE | 1 |  | *6.3.8* |
| Disassociate | DISASSOCIATE | ? |  | *6.3.9* |
| Reset | RESET | 2a |  | *6.3.10* |
| Start | START | 2 |  | *6.3.11* |
| Stop | STOP | 2a |  | *6.3.12* |
| Measurement request | MREQUEST | 4 |  | *6.3.14* |
| Channel measurment | MEASURE | 2 |  | *6.3.15* |
| Measurement report | MREPORT | 4 |  | *6.3.16* |
| Channel switch | CHANNELSWITCH | 1 |  | *6.3.17* |
| TPC request | TPCADAPT | 2 |  | *6.3.18* |
| SetKeys | SETKEYS | 2a |  | *6.3.19* |
| DeleteKeys | DELETEKEYS | 2a |  | *6.3.20* |
| MIC (michael) failure event | MICHAELMICFAILURE | 6 |  | *6.3.21* |
| EAPOL | EAPOL | 2 |  | *6.3.22* |
| SetProtection | SETPROTECTION | 2 |  | *6.3.23* |
| MLME-PROTECTEDFRAMEDROPPED | PROTECTEDFRAMEDROPPED | 6 |  | *6.3.24* |
| TS management interface | ADDTS | 1? |  | *6.3.25* |
| Higher layer synchronization support | HL-SYNC | 4 |  | *6.3.26* |
| Block Ack | ADDBA | 1 |  | *6.3.27.2-5* |
| EDLBA | 4 |  | *6.3.27.6-7* |
| Schedule element management | SCHEDULE | 4 |  | *6.3.28* |
| Vendor-specific action | VSPECIFIC | 4 |  | *6.3.29* |
| Neighbor report request | NEIGHBORREPREQ | 4? |  | *6.3.30* |
| Neighbor report response | NEIGHBORREPRESP | 4? |  | *6.3.31* |
| Link Measure Request | LINKMEASURE | 2 |  | *6.3.32* |
| MLME SAP interface for resource request | RESOURCE-REQUEST | 1? |  | *6.3.33* |
| MLME SAP interface for remote requests | REMOTE-REQUEST | 4 |  | *6.3.34* |
| Extended channel switch announcement | EXTCHANNELSWITCH | 1 |  | *6.3.35* |
| DSE power constraint announcement | DSETPC | 1 |  | *6.3.36* |
| Enablement | ENABLEMENT | 1 |  | *6.3.37* |
| Deenablement | DEENABLEMENT | 4 |  | *6.3.38* |
| SA Query support | SA-QUERY | 1 |  | *6.3.39* |
| Get TSF timer | GETTSFTIME | 2 |  | *6.3.40* |
| Timing Advertisement | TIMING-ADVERTISEMENT | 4 |  | *6.3.41* |
| TDLS Discovery | TDLSDISCOVERY | 1 |  | *6.3.42* |
| TDLS direct-link establishment | TDLSSETUPREQUEST | ? |  | *6.3.43* |
| TDLS direct-link teardown | TDLSTEARDOWN | 4 |  | *6.3.44* |
| TDLS peer U-APSD (TPU) | TDLSPTI | 1 |  | *6.3.45* |
| TDLS channel switching | TDLSCHANNELSWITCH | 1 |  | *6.3.46* |
| TDLS peer PSM | TDLSPEERPSM | 1 |  | *6.3.47* |
| Event request | EVLREQUEST | 4 |  | *6.3.48* |
| Event report | EVLREPORT | 4 |  | *6.3.49 Why 2 type 4 (.48/.49)?* |
| Event | EVLOG | 2 |  | *6.3.50* |
| Diagnostic request | DIAGREQUEST | 4 |  | *6.3.51* |
| Diagnostic report | DIAGREPORT | 4 |  | *6.3.52 Why 2 type 4 (.51/.52)?* |
| Location configuration request | LOCATIONCFG | 1 |  | *6.3.53* |
| Location track notification | LOCATIONTRACKNOTIF | 4 |  | *6.3.54* |
| Timing measurement | TIMINGMSMTRQ | 2a? |  | *6.3.55.2 need to study* |
| TIMINGMSMT | ? |  | *6.3.55.3-6 need to study* |
| Fine timing measurement (FTM) | FINETIMINGMSMTRQ | 2 |  | *6.3.56.2-3 need to study* |
| FINETIMINGMSMT | ? |  | *6.3.56.4-6 need to study* |
| BSS transition management | BTMQUERY | 4 |  | *6.3.57.2-3* |
| BTM | 1 |  | *6.3.57.4-7 - not in typical order* |
| FMS setup | FMS | 1 |  | *6.3.58* |
| Collocated Interference request | CLINTERFERENCEREQUEST | 4 |  | *6.3.59* |
| Collocated Interference report | CLINTERFERENCEREPORT | 4 |  | *6.3.60 Why 2 type 4 (.64/.65)?* |
| TFS setup | TFS | 1 |  | *6.3.61* |
| WNM sleep mode request | SLEEPMODE | 1 |  | *6.3.62* |
| TIM broadcast setup | TIMBROADCAST | 1 |  | *6.3.63* |
| QoS traffic capability update | QOSTRAFFICCAPUPDATE | 4 |  | *6.3.64* |
| Channel Usage request | CHANNELUSAGE | 1 |  | *6.3.65 but really is a type 3?* |
| DMS or GCR request and response procedure | GATS | 1 |  | *6.3.66.2-5 or is this a type 3* |
| GATS-TERM | 4 |  | *6.3.66.6-7* |
| WNM notification request | WNMNOTIFICATIONREQUEST | 4 |  | *6.3.67* |
| WNM notification response | WNMNOTIFICATIONRESPONSE | 4 |  | *6.3.68 Why 2 type 4 (.67/.68)?* |
| Network discovery and selection support | GAS | 1 |  | *6.3.69* |
| QoS Map element management | QOS-MAP | 4 |  | *6.3.70* |
| Mesh peering management | MESHPEERINGMANAGEMENT | 1 |  | *6.3.71* |
| Mesh power management | MESHPOWERMGT | 2 |  | *6.3.72* |
| Mesh neighbor offset synchronization | MESHNEIGHBOROFFSETSYNCSTART | 2 |  | *6.3.73.2-3* |
| MESHNEIGHBOROFFSETCALCULATE | 2 |  | *6.3.73.4-5* |
| MESHNEIGHBOROFFSETSYNCSTOP | 2 |  | *6.3.73.6-7* |
| Mesh TBTT adjustment | MESHTBTTADJUSTMENT | 1 |  | *6.3.74* |
| MCCA management interface | ACTIVATEMCCA | 2a |  | *6.3.75.2* |
| MCCASETUP | 1 |  | *6.3.75.3-6* |
| MCCAADVERTISEMENT | 1 |  | *6.3.75.7-10* |
| MCCATEARDOWN | 4 |  | *6.3.75.11-* |
| MBSS congestion control | MBSSCONGESTIONCONTROL | 4 |  | *6.3.76* |
| MBSS proxy update | MBSSPROXYUPDATE | 1 |  | *6.3.77* |
| MBSS mesh gate announcement | MBSSGATEANNOUNCEMENT | 4 |  | *6.3.78* |
| Mesh link metric | MESHLINKMETRICREAD | 2 |  | *6.3.79.2-3* |
| MESHLINKMETRICREPORT | 4 |  | *6.3.79.4-5* |
| HWMP mesh path selection | HWMPMESHPATHSELECTION | 4 |  | *6.3.80* |
| QMF policy | QMFPOLICY | 2 |  | *6.3.81.2-3* |
| QMFPOLICYCHANGE | 4 |  | *6.3.81.4-7* |
| QMFPOLICYSET | 2a |  | *6.3.81.8* |
| SCS request and response procedure | SCS | 1 |  | *6.3.82.2-5* |
| SCS-TERM | 4 |  | *6.3.82.6-7* |
| QLoad report management | QLOAD | 1 |  | *6.3.83* |
| HCCA TXOP advertisement management | TXOPADVERTISEMENT | 1 |  | *6.3.84* |
| GCR group membership management | GROUP-MEMBERSHIP | 1 |  | *6.3.85* |
| AP PeerKey management | APPEERKEY | 4 |  | *6.3.86* |
| On-channel Tunneling operation | OCTunnel | 6 |  | *6.3.87 - not in typical order* |
| Multi-band operation | FST-SETUP | 1 |  | *6.3.88.2-5* |
| FST-ACK | 1 |  | *6.3.88.6-9* |
| FST-TEARDOWN | 4 |  | *6.3.88.10-11* |
| FST-INCOMING | 2a |  | *6.3.88.12* |
| DMG relay operation | RELAY-SEARCH | 1 |  | *6.3.89.2-5* |
| RLS | 1 |  | *6.3.89.6-9* |
| RLS-TEARDOWN | 4 |  | *6.3.89.10-11* |
| Quieting adjacent BSS operation | QAB | 1 |  | *6.3.90* |
| DMG beamforming | BF-TRAINING | 6 |  | *6.3.91.1* |
| SU-MIMO-BF-TRAINING | 6 |  | *6.3.91.2* |
| MLME-MU-MIMO-BF-TRAINING | 6 |  | *6.3.91.3* |
| SU-MIMO-HYBRID-BF-PROTOCOL | 6 |  | *6.3.91.4* |
| MU-MIMO-HYBRID-BF-PROTOCOL | 6 |  | *6.3.91.5* |
| PN event report | PN-EXHAUSTION | 6a |  | *6.3.92.2* |
| PN-WARNING | 6a |  | *6.3.92.3* |
| Channel Availability Query | CHANNELAVAILABILITYQUERY | 1 |  | *6.3.93* |
| Channel schedule management | CHANNELSCHEDULEMANAGEMENT | 1 |  | *6.3.94* |
| Contact verification signal | CVS | 4 |  | *6.3.95* |
| GDD Enablement | GDDENABLEMENT | 1 |  | *6.3.96* |
| Network channel control management | NETWORKCHANNELCONTROL | 1 |  | *6.3.97* |
| White space map (WSM) | WSM | 4 |  | *6.3.98* |
| Estimated Throughput | ESTIMATED-THROUGHPUT | 2 |  | *6.3.99* |
| Get authentication and association state | GETAUTHASSOCSTATE | 2 |  | *6.3.100* |
| FILS Container | FILSContainer | 1 |  | *6.3.101* |
| Dynamic AID assignment operation | AIDSWITCH | 1 |  | *6.3.102* |
| Sync Control | SYNCCONTROL | 4 |  | *6.3.103* |
| STA Information Announcement | STAINFORMATION | 4 |  | *6.3.104* |
| EDCA Parameter Set update | EDCAPARAMETERSET | 4 |  | *6.3.105* |
| EL Operation | ELOPERATION | 4 |  | *6.3.106* |
| TWT Setup | TWTSETUP | 1 |  | *6.3.107* |
| TWT Teardown | TWTTEARDOWN | 4 |  | *6.3.108* |
| Sectorized Group ID List management | SECTORIZEDGROUPID | 4 |  | *6.3.109* |
| Header Compression procedure | HEADERCOMPRESSION | 1 |  | *6.3.110* |
| Reachable Address Update | REACHABLEADDRESSUPDATE | 4 |  | *6.3.111* |
| Control response MCS negotiation operation | CONTROLRESPONSEMCS | 1 |  | *6.3.112* |
| S1G relay (de)activation | S1GRELAYACTIVATE | 1 |  | *6.3.113* |
| DCS procedure | DCSMEASUREMENT | 1 |  | *6.3.114* |
| Update | UPDATE | 2 |  | *6.3.115* |
| MSCS request and response procedure | MSCS | 1 |  | *6.3.116.2-5* |
| MSCS-TERM | 4 |  | *6.3.116.6-7* |
| MAC Address Update | UPDATEMACADDRESS | 2 |  | *6.3.117* |
| Quiet time period | QTP | 1 |  | *6.3.118 - not in typical order* |
| TDD beamforming | TDD-BF-TRAINING | 1a |  | *6.3.119* |
| TDD sector switch | TDD-SECTOR-SWITCH | 1a |  | *6.3.120* |
| TDD beam measurement | TDD-BEAM-MEASUREMENT | 1a |  | *6.3.121* |
| TDD structure and schedule | TDD-SLOT-STRUCTURE | 2 |  | *6.3.122.2-3* |
| TDD-SLOT-SCHEDULE | 2 |  | *6.3.122.4-5* |
| TDD-SLOT-ANNOUNCE | 1a |  | *6.3.122.6-8* |
| TDD-BANDWIDTH | 1a |  | *6.3.122.9-11* |
| WUR mode setup | WURMODESETUP | 1 |  | *6.3.123* |
| WUR mode teardown | MCCATEARDOWN | 4 |  | *6.3.124* |
| WUR Discovery | WURDISCOVERY | 2 |  | *6.3.125* |