IEEE P802.11
Wireless LANs

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| SB1 Comment Resolutions Miscellaneous Part 2 |
| Date: 2016-03-12 |
| Author(s): |
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|  |  |  |  |  |

Abstract

This submission proposes resolutions for multiple comments related to TGah D6.0 as follows:

* 9046, 9005, 9007, 9067

Revisions:

* Rev 0: Initial version of the document.

Interpretation of a Motion to Adopt

A motion to approve this submission means that the editing instructions and any changed or added material are actioned in the TGah Draft. This introduction is not part of the adopted material.

***Editing instructions formatted like this are intended to be copied into the TGah Draft (i.e. they are instructions to the 802.11 editor on how to merge the text with the baseline documents).***

***TGah Editor: Editing instructions preceded by “TGah Editor” are instructions to the TGah editor to modify existing material in the TGah draft. As a result of adopting the changes, the TGah editor will execute the instructions rather than copy them to the TGah Draft.***

# PARS I

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **CID** | **Commenter** | **P.L** | **Comment** | **Proposed Change** | **Resolution** |
| 9046 | Asterjadhi, Alfred | 387.51 | As noted in the Editor's note this subclause'baseline text could not be updated to that of REVmc D5.0. Please provide text that ensures consistency with baseline D5.0. | As in comment. | Revised –Agree in principle with the comment. Proposed resolution resolves these inconsistencies.TGah editor to make the changes shown in 11-16/0472r0 under all headings that include CID 9046. |
| 9005 | Aboulmagd, Osama | 534.1 | The Editor's note at the beginning of Annex B is very true. The whole Annex needs to be rewritten to be inline with REVmc 5.1 and to fix other items. | Rewrite Annex B | Revised –Agree in principle with the comment. Proposed resolution resolves these inconsistencies and provides an update to the Annex B that is inline with REVmc D5.0.TGah editor to make the changes shown in 11-16/0472r0 under all headings that include CID 9005. |
| 9007 | Aboulmagd, Osama | 536.13 | In writing the PICS any PICS item that was referenced by another item need to add "\*" at its entry. This PICS entry at line 13 reference both VHTM3.1 and and SIGM28 (page 557). Yet "\*" were not added to thses two items. There are many instants of this comment through out the PICS section that need to be fixed. | add an "\*" everytime an item is referenced. | Revised –Agree in principle with the comment. Proposed resolution provides these references.TGah editor to make the changes shown in 11-16/0472r0 under all headings that include CID 9007. |
| 9067 | Rolfe, Benjamin | 0.0 | "The resolution to i-249 does not completely address the comment, but does point out that the balloters were not provided with information essential to properly review the draft (the ""alignment tool"" referred to in the resolution). The resolution fails to address the obsevation that the unmodified text in the amendment does not match the base standard (the latest revision and all published amendments). Specific problems are identied in the initial comment. A very specific resolution is provided in the comment. The reason for reject is incomplete and incorrect.THe BRC appears not to have fully understood the comment. The commenter's contact information is provided with the ballot submission. A ""reasonable effort"" to resolve the comment would reasonably inclue seeking clarification on the parts of the comment that were not understood from the commenter. The commenter was readily available to the BRC. No effort was made to seek clarification." | Withdraw the draft from sponsor ballot. Restart the ballot providing voters the tools referenced in the comment resolution. | Revised –Agree in principle with the comment. Proposed resolution resolves some remaining inconsistencies (due to REVmc update from 4.0 to D5.0) and provides an update to the text so that it is inline with the REVmc D5.0.The BRC has determined that access to the editors’ numbering alignment tool is not necessary to fully understand the draft amendment. It is a tool used by the editors to develop numbering and not relevant to comment resolution.TGah editor to make the changes shown in 11-16/0472r0 under all headings that include CID 9067. |

**TGah Editor: *Change the paragraphs below of each of the subclauses as follows (#9047, 9046, 9005, 9007, 9067):***

**9.2.4.2 Duration/ID field**

***Change the item a) in the first paragraph as follows:***

a)In Control frames of subtype PS-Poll other than PS-Poll+BDT frames, the Duration/ID field carries the association identifier (AID) of the STA that transmitted the frame in the 14 least significant bits (LSB), and the 2 most significant bits (MSB) both set to 1.

**9.2.5.2 Setting for single and multiple protection under enhanced distributed channel access (EDCA)**

***Change the 1st and 2nd paragraph of this subclause and add a sentence as follows:***

**9.4.1.6 Listen Interval field**

***Change the first paragraph of this subclause as follows:***

The Listen Interval field is used to indicate to the AP how often an S1G STA with dot11NonTIMModeActivated equal to false or a non-S1G STA in power save mode wakes to listen to Beacon frames. It is also used to indicate to an AP the duration during which an S1G STA with dot11NonTIMModeActivated equal to true is required to transmit at least one frame that is addressed to the associated AP. The value of this field is the ListenInterval parameter ~~of the MLME-ASSOCIATE.request or MLME-REASSOCIATE.request~~ when present as a parameter of an MLME primitives is determined from the Listen Interval field as described in this subclause and is expressed in units of ~~B~~beacon ~~I~~interval if dot11ShortBeaconInterval is false and in units of short beacon interval if dot11ShortBeaconInterval is true (see 11.1.3.10.2 (Generation of S1G Beacon frames)). The length of the Listen Interval field is 2 octets. The Listen Interval field carried in a non-S1G PPDU is illustrated in Figure 9-70 (Listen Interval field carried in a non-S1G PPDU.).

9.8.3.1 Frame Control field

The Protocol Version subfield is defined in 9.2.4.1.2 (Protocol Version subfield). For PV1 frames the value of the protocol version is 1.

**10.2.4.2 HCF contention-based channel access (EDCA)**

***Change the following NOTE 1 as follows:***

NOTE 1—A DMG or S1G STA that implements a single AC (see 10.22.2.1 (Reference model)) has all of its UP values in Table 10-1 (UP-to AC mappings) mapped to AC\_BE.

***Change the 4th paragraph of this subclause as follows:***

The QoS AP shall announce the EDCA parameters in selected Beacon frames and in all Probe Response and (Re)Association Response frames by the inclusion of the EDCA Parameter Set element using the information from the MIB entries in dot11ECDATable. If no such element is received, a STA shall use the default values for the parameters. The fields following the QoS Info field in the EDCA Parameter Set element shall be included in all Beacon frames occurring within two (optionally more) delivery traffic indication map (DTIM) periods following a change in AC parameters, which provides all STAs an opportunity to receive the updated EDCA parameters. If any associated STAs are in WNM sleep mode or using FMS, these fields should be included by the AP for as many DTIM periods as needed to exceed the longest interval any STA is expected to not receive Beacon frames. A QoS STA shall update its MIB attributes that correspond to fields in an EDCA parameter Set element within an interval of time equal to one beacon interval after receiving an updated EDCA parameter set. QoS STAs update the MIB attributes and store the EDCA Parameter Set update count value in the QoS Info field. An S1G STA shall update its MIB attributes that correspond to fields in an EDCA parameter Set element if its STA type is indicated by the STA Type subfield contained in the received EDCA Parameter Set element (see 11.50.7 (S1G BSS type and STA type)). An AP may change the EDCA access parameters by changing the EDCA Parameter Set element in the Beacon frame, Probe Response frame, and (Re)Association Response frame. However, the AP should change them only rarely. A QoS STA shall use the EDCA Parameter Set Update Count Value subfield in the QoS Capability element of all Beacon frames to determine whether the STA is using the current EDCA Parameter Values. If the EDCA Parameter Set update count value in the QoS Capability element is different from the value that has been stored, the QoS STA shall query the updated EDCA parameter values by sending a Probe Request frame to the AP.

**10.14 PPDU duration constraint**

***Insert as the last paragraph of this subclause:***

A STA shall not transmit an S1G PPDU that has a duration (as determined by the PHY-TXTIME.confirm primitive defined in 6.5.8 (PLME-TXTIME.confirm)) that is greater than aPPDUMaxTime defined in Table 23-37 (S1G PHY characteristics).

***Change the subclause below as follows:***

**11.2.2.2 Non-AP STA power management modes**

***Change the 6th paragraph of this subclause as follows:***

A non-S1G STA that is changing from doze to awake state in order to transmit shall perform CCA until a frame is detected by which it can set its NAV, or until a period of time indicated by the NAVSyncDelay from the MLME-JOIN.request primitive has transpired. An S1G STA that is changing from doze to awake state in order to transmit shall perform CCA until a frame is detected by which it can set its RID or NAV, or until a period of time indicated by the NAVSyncDelay from the MLME-JOIN.request primitive has transpired.

**11.42 Notification of operating mode changes**

***Change the 1st paragraph of this subclause as follows:***

A STA in which dot11OperatingModeNotificationImplemented is true shall set the Operating Mode Notification field in the Extended Capabilities element to 1. A VHT STA shall set dot11OperatingModeNotificationImplemented to true. An S1G STA may set dot11OperatingModeNotificationImplemented to true. A STA that is not a VHT STA or an S1G STA shall set dot11OperatingModeNotificationImplemented to false. A STA in which dot11OperatingModeNotificationImplemented is true is referred to as *operating mode notification capable*.

12.5.3.4.4 PN and replay detection

Change this subclause as follows (bullets g, h, and i are unchanged and not shown):

To effect replay detection, the receiver extracts the PN from the CCMP header. NOTE: The CCMP header is not present in secure PV1 MPDUs, but constructed locally at the STA as defined in 12.5.3.2a (Construction of the CCMP header for PV1 MPDUs). See 12.5.3.2 (CCMP MPDU format) for a description of how the PN is encoded in the CCMP header. The following processing rules are used to detect replay:

1. The receiver shall maintain a separate set of replay counters for each PTKSA, GTKSA, ~~and~~STKSA, and protocol version value. The receiver initializes these replay counters to 0 when it resets the temporal key for a peer. The replay counter is set to the PN value of accepted CCMP MPDUs.
2. For each PTKSA, GTKSA, ~~and~~ STKSA, and protocol version value, the recipient shall maintain a separate replay counter for each TID, subject to the limitation of the number of supported replay counters indicated in the RSN Capabilities field (see 9.4.2.25 (RSNE)), and shall use the PN in a received frame to detect replayed frames. A replayed frame occurs when the PN extracted from a received frame is less than or equal to the current replay counter value for the frame’s MSDU or A MSDU priority and frame type.
3. If dot11RSNAProtectedManagementFramesActivated is true, the recipient shall maintain a single replay counter for received individually addressed robust Management frames that are received with the To DS subfield equal to 0, and a single replay counter for received individually addressed robust PV1 Management frames and shall use the PN from the received frame to detect replays. If dot11QMFActivated is also true, the recipient shall maintain an additional replay counter for each ACI for received individually addressed Robust Management frames and Robust PV1 Management frames that are received with the To DS subfield equal to 1. The QMF receiver shall use the ACI encoded in the Sequence Number field of the received frame to select the replay counter to use for the received frame, and shall use the PN from the received frame to detect replays. A replayed frame occurs when the PN from the frame is less than or equal to the current value of the management frame replay counter that corresponds to the ACI of the frame.

23.3.9.11.1 Transmission in S1G format

The auto-detection between 1 MHz and 2 MHz preambles assumes channel smoothness. It is recommended that the spatial mapping matrix *Qk* applied to LTF1 field is chosen such that it preserves the smoothness of the physical channel. This can, for example, be achieved by minimizing the amplitude and phase variation of each element *Qk* of in successive tones.

Examples:

a) The following may be used *Qk*: *Qk* as defined for cyclic shift diversity using the values specified in the corresponding tables.

b) The following *Qk* should not be used – antenna hopping as described in 19.3.11.11.2 (Spatial mapping) (C)-(2) - the values of *Qk* on successive tones flip between 1 and 0.

Protocol Implementation Conformance Statement (PICS) -proforma

* Abbreviations and special symbols
* General abbreviations for Item and Support columns

Insert the following abbreviation definitions:

S1GM Sub 1 GHz (S1G) medium access control (MAC) features

S1GP Sub 1 GHz (S1G) physical layer (PHY) features

RL S1G Relay features

* PICS proforma—IEEE Std 802.11-<year>

Change B.4.3 as follows (Only changed rows are shown.):

|  |
| --- |
| * IUT configuration
 |
| Item | IUT configuration | References | Status | Support |
|  | What is the configuration of the IUT? |  |  |  |
| \*CFAP | Access Point (AP) | 4.3 (Components of the IEEE Std 802.11 architecture) | O.1 | Yes  No  |
| \*CFIndepSTA | Independent station (neither an AP, nor a mesh STA, nor a STA operating outside the context of a BSS) | 4.3 (Components of the IEEE Std 802.11 architecture) | O.1 | Yes  No  |
| ... |  |  |  |  |
| \*CFOFDM | Orthogonal frequency division multiplexing (OFDM) PHY | --- | O.2CFCFHT5G:MCFS1G:M | Yes  No  |
| ... |  |  |  |  |
| \* CFQoS | Quality of service (QoS) supported | 10.22 (HCF), 10.24 (Block acknowledgment (block ack)), 4.3.11(High throughput (HT) STA), 4.3.18.3(Mesh STA) | OCFHT OR CFMBSS ORCFQMF ORCFAVT:MCFDMG:MCFTVHT:MCFS1G:M | Yes  No  N/A  |
| ... |  |  |  |  |
| \*CFMBSS | Operation in a mesh BSS (MBSS) | 4.3.18(Mesh BSS) | (NOT CFDMG) AND (NOT CFS1G):O.1 | Yes  No  N/A  |
| ... |  |  |  |  |
| \* CFS1G | Sub 1 GHz (S1G) features | 9.4.2.197 (S1G Capabilities element) | O.2 | Yes  No  N/A  |
| \*CFS1GRelay | S1G Relay | 10.51 (S1G Relay operation) | (CFAP AND CFINDEPSTA):O | Yes  No  N/A  |

* MAC protocol

***Change table in B.4.4.2 as follows (Note that only changed rows shown):***

|  |
| --- |
| * MAC frames
 |
| Item | MAC frame | References | Status | Support |
|  | Is transmission of the following MAC frames supported? | Clause 9 (Frame formats),Annex E |  |  |
| ... |  |  |  |  |
| FT7 | Beacon | Clause 9 (Frame formats) | (CFAP OR CFIBSSOR CFMBSS)AND (CFNOTDMGSTA AND (NOT CFS1G)):M | Yes  No  N/A  |
| ... |  |  |  |  |
| FT14 | CTS | Clause 9 (Frame formats) | CFNOTDMGSTA AND NOT CFS1G):M(CFS1G AND VHTM3.1):O | Yes  No  |
| FT15 | Acknowledgement (Ack) | Clause 9 (Frame formats) | NOT CFS1G:MCFS1G AND VHTM3.1 OR S1GM28):O | Yes  No  |
| ... |  |  |  |  |
| FT43 | TACK | Clause 9 (Frame formats) | S1GM6.2(#8146):M(CFS1G AND NOT S1GM6):O | Yes  No  N/A  |
| FT44 | S1G Beacon | Clause 9 (Frame formats) | ((CFAP OR CFIBSS) AND CFS1G):M | Yes  No  N/A  |
| FT45 | PV1 frame | 9.8 (MAC frame format for PV1 frames) | CFS1G:O | Yes  No  N/A  |
| FT45.1 | STACK frame | (S1GM6.2(#8146): OR S1GM6.1):M | Yes  No  N/A  |
| FT45.2 | BAT frame | (S1GM6.2 AND QB4.1(#8146)):M | Yes  No  N/A  |
| FT45.3 | PV1 Action frame | CFS1G:O | Yes  No  N/A  |
| FT45.4 | PV1 Action No Ack frame | CFS1G:O | Yes  No  N/A  |
| FT45.5 | PV1(#8486) Probe Response frame | (CFAP AND CFS1G):O | Yes  No  N/A  |
| FT45.6 | PV1 Data frame | CFS1G:ORL6:MS1GM13(#8146):M | Yes  No  N/A  |
| FT45.7 | Resource Allocation | (CFAP AND S1GM22.5)(#8146):O | Yes  No  N/A  |
| FT46 | NDP CMAC frames | 9.9 (NDP CMAC frames) | CFS1G: M | Yes  No  N/A  |
| FT46.1 | NDP CTS | CFS1G: M | Yes  No  N/A  |
| FT46.2 | NDP PS-Poll | (CFIndepSTA AND CFS1G): O | Yes  No  N/A  |
| FT46.3 | NDP Ack | CFS1G: M | Yes  No  N/A  |
| FT46.4 | NDP PS-Poll-Ack | (CFAP AND CFS1G AND FR47.2): M | Yes  No  N/A  |
| FT46.5 | NDP BlockAck | (CFS1G AND HTM5.3): M | Yes  No  N/A  |
| FT46.6 | NDP Beamforming Report Poll | CFS1G AND CFAP: O | Yes  No  N/A  |
| FT46.7 | NDP Paging | S1GM6.11(#8146): M | Yes  No  N/A  |
| FT46.8 | NDP Probe Request | (CFS1G AND CFINDEPSTA AND S1GM4.5):M | Yes  No  N/A  |
| FT46.9 | NDP CF-End | CFS1G:O | Yes  No  N/A  |
| FT47 | S1G Action frame | 9.6.25 (S1G Action frame details) | CFS1G:M | Yes  No  N/A  |
| FT47.1 | AID Switch Request frame | (CFINDEPSTA AND CFS1G AND (S1GM13 OR S1GM18)):M | Yes  No  N/A  |
| FT47.2 | AID Switch Response frame | (CFAP AND CFS1G AND (S1GM13 OR S1GM18)):M | Yes  No  N/A  |
| FT47.3 | Sync Control frame | (CFAP AND CFS1G AND S1GM8.2):M | Yes  No  N/A  |
| FT47.4 | STA Information Announcement frame | (CFINDEPSTA AND CFS1G AND S1GM18):M | Yes  No  N/A  |
| FT47.5 | EDCA Parameter Set frame | (CFAP AND CFS1G):O | Yes  No  N/A  |
| FT47.6 | EL Operation(#8475) frame | (CFINDEPSTA AND CFS1G AND S1GM21):M | Yes  No  N/A  |
| FT47.7 | TWT Setup frame | (CFS1G AND S1GM6.3):M | Yes  No  N/A  |
| FT47.8 | TWT Teardown frame | (CFS1G AND S1GM6.5):M | Yes  No  N/A  |
| FT47.9 | Sectorized Group ID List frame | (CFAP AND CFS1G AND S1GM11):M | Yes  No  N/A  |
| FT47.10 | Sector ID feedback frame | (CFINDEPSTA AND CFS1G AND S1GM11):M | Yes  No  N/A  |
| FT47.11 | Header Compression Request frame |  | (CFS1G AND S1GM16):O | Yes  No  N/A  |
| FT47.12 | Header Compression Response frame |  | CFS1G:M | Yes  No  N/A  |
| FT47.13 | TWT Information frame |  | (CFS1G AND S1GM6.1):O(CFS1G AND S1GM6.2):O | Yes  No  N/A  |
| FT48 | S1G Relay Action frame | 9.6.26 (S1G Relay Action frame details) | RL1:M | Yes  No  N/A  |
| FT48.1 | Reachable Address Update frame | RL1:M | Yes  No  N/A  |
| FT48.2 | Relay Activation Request frame |  | RL1:O | Yes  No  N/A  |
| FT48.3 | Relay Activation Response frame |  | RL1:M | Yes  No  N/A  |
| FT49 | Flow Control Action frame | 9.6.27 (Flow Control Action frame details) | CFS1G:M | Yes  No  N/A  |
| FT49.1 | Flow Suspension frame | (CFS1G AND S1GM17.1):M | Yes  No  N/A  |
| FT49.2 | Flow Resumption frame | (CFS1G AND S1GM17.1):O | Yes  No  N/A  |
| FT50 | Control Response MCS Negotiation frame | 9.6.28 (Control Response MCS Negotiation frame details) | CFS1G AND S1GM28:M | Yes  No  N/A  |
| FT50.1 | Control Response MCS Negotiation Request | (CFS1G AND S1GM28):O | Yes  No  N/A  |
| FT50.2 | Control Response MCS Negotiation Response | (CFS1G AND S1GM28):M | Yes  No  N/A  |
|  | Is reception of the following MAC frames supported? | Clause 9 (Frame formats),Annex E |  |  |
| ... |  |  |  |  |
| FR7 | Beacon | Clause 9 (Frame formats) | (NOT CFOCB AND (NOT CFS1G)):MCFNOTDMGSTA AND (NOT CFS1G)):M | Yes  No  N/A  |
| ... |  |  |  |  |
| FR14 | CTS | Clause 9 (Frame formats) | CFNOTDMGSTA AND NOT CFS1G):M(CFS1G AND VHTM3.1):O | Yes  No  |
| FR15 | Acknowledgement (Ack) | Clause 9 (Frame formats) | NOT CFS1G:MCFS1G AND VHTM3.1 OR S1GM28):O | Yes  No  |
| ... |  |  |  |  |
| FR44 | TACK | Clause 9 (Frame formats) | (CFAP AND CFS1G):O(CFINDEPSTA AND CFS1G AND S1GM7.3 OR S1GM6.1):M | Yes  No  N/A  |
| FR45 | S1G Beacon | Clause 9 (Frame formats) | CFS1G:M | Yes  No  N/A  |
| FR46 | PV1 frame | 9.8 (MAC frame format for PV1 frames) | CFS1G:O | Yes  No  N/A  |
| FR46.1 | STACK frame | (CFS1G AND S1GM6.1):M | Yes  No  N/A  |
| FR46.2 | BAT frame |  (CFS1G AND S1GM6.1 AND QB4.1 OR):M | Yes  No  N/A  |
| FR46.3 | PV1 Action frame | CFS1G AND (S1GM20.1 OR S1GM20.3 OR S1GM20.5):MCFS1G AND (S1GM20.2 OR S1GM20.5):O:O | Yes  No  N/A  |
| FR46.4 | PV1 Action No Ack frame | CFS1G AND (S1GM20.1 OR S1GM20.3 OR S1GM20.5):MCFS1G AND (S1GM20.2 OR S1GM20.5):O | Yes  No  N/A  |
| FR46.5 | PV1(#8486) Probe Response frame | CFS1G:O | Yes  No  N/A  |
| FR46.6 | PV1 Data frame | CFS1G AND (S1GM20.1 OR S1GM20.3 OR S1GM20.4):MCFS1G AND (S1GM20.2 OR S1GM20.5):O | Yes  No  N/A  |
| FR46.7 | Resource Allocation | (CFINDEPSTA AND CFS1G AND S1GM22.5):M | Yes  No  N/A  |
| FR47 | NDP CMAC frames | 9.9 (NDP CMAC frames) | CFS1G:M | Yes  No  N/A  |
| FR47.1 | NDP CTS | CFS1G:M | Yes  No  N/A  |
| FR47.2 | NDP PS-Poll | (CFAP AND CFS1G):O | Yes  No  N/A  |
| FR47.3 | NDP ACK | CFS1G:M | Yes  No  N/A  |
| FR47.4 | NDP PS-Poll-Ack | (CFINDEPSTA AND CFS1G AND FT46.2):M | Yes  No  N/A  |
| FR47.5 | NDP BlockAck | (CFS1G AND HTM5.3):M | Yes  No  N/A  |
| FR47.6 | NDP Beamforming Report Poll | (CFINDEPSTA AND CFS1G):O | Yes  No  N/A  |
| FR47.7 | NDP Paging | (CFS1G AND S1GM6.9):M | Yes  No  N/A  |
| FR47.8 | NDP Probe Request | (CFAP AND CFS1G):M | Yes  No  N/A  |
| FR47.9 | NDP CF-End | (CFINDEPSTA AND CFS1G):O | Yes  No  N/A  |
| FR48 | S1G Action frame | 9.6.25 (S1G Action frame details) | CFS1G:M | Yes  No  N/A  |
| FR48.1 | AID Switch Request frame | (CFINDEPSTA AND CFS1G AND (S1GM13 OR S1GM18)):M | Yes  No  N/A  |
| FR48.2 | AID Switch Response frame | (CFAP AND CFS1G OR (S1GM13 OR S1GM18)):M | Yes  No  N/A  |
| FR48.3 | Sync Control frame | (CFINDEPSTA AND CFS1G AND S1GM8.1):M | Yes  No  N/A  |
| FR48.4 | STA Information Announcement frame | (CFAP AND CFS1G AND S1GM18):M | Yes  No  N/A  |
| FR48.5 | EDCA Parameter Set frame | (CFINDEPSTA AND CFS1G):M | Yes  No  N/A  |
| FR48.6 | EL Operation(#8475) frame | (CFAP AND CFS1G AND S1GM21):M | Yes  No  N/A  |
| FR48.7 | TWT Setup frame | (CFS1G AND S1GM6.2):M | Yes  No  N/A  |
| FR48.8 | TWT Teardown frame | (CFS1G AND S1GM6.5):M | Yes  No  N/A  |
| FR48.9 | Sectorized Group ID List frame | (CFINDEPSTA AND CFS1G AND S1GM11):M | Yes  No  N/A  |
| FR48.10 | Sector ID feedback frame | (CFAP AND CFS1G AND S1GM11):M | Yes  No  N/A  |
| FR48.11 | Header Compression Request frame | CFS1G: M | Yes  No  N/A  |
| FR48.13 | TWT Information frame |  | (CFS1G AND S1GM6):M | Yes  No  N/A  |
| FR48.12 | Header Compression Response frame |  | (CFS1G AND FT47.11):M | Yes  No  N/A  |
| FR49 | S1G Relay Action frame | 9.6.26 (S1G Relay Action frame details) | (CFAP AND CFS1G):O | Yes  No  N/A  |
| FR49.1 | Reachable Address Update frame | RL1:M | Yes  No  N/A  |
| FR49.2 | Relay Activation Request frame | RL1:M | Yes  No  N/A  |
| FR49.3 | Relay Activation Response frame | RL1:M | Yes  No  N/A  |
| FR50 | Flow Control Action frame | 9.6.27 (Flow Control Action frame details) | (CFINDEPSTA AND CFS1G):O | Yes  No  N/A  |
| FR50.1 | Flow Suspension frame | (CFINDEPSTA AND CFS1G AND S1GM17):M | Yes  No  N/A  |
| FR50.2 | Flow Resumption frame | (CFINDEPSTA AND CFS1G AND S1GM17):M | Yes  No  N/A  |
| FR51 | Control Response MCS Negotiation frame | 9.6.28 (Control Response MCS Negotiation frame details) | CFS1G AND S1GM28:M | Yes  No  N/A  |
| FR51.1 | Control Response MCS Negotiation Request | (CFS1G AND S1GM28):M | Yes  No  N/A  |
| FR51.2 | Control Response MCS Negotiation Response | (CFS1G AND S1GM28):M | Yes  No  N/A  |

***Change table in B.4.4.4 as follows (only changed rows shown):***

|  |
| --- |
| * MAC addressing functions
 |
| Item | MAC Address function | References | Status | Support |
|  | Are the following MAC Addressing functions supported? |  |  |  |
| ... |  |  |  |  |
| AD12 | Group addressed Dataframe addressing (4 address frame) | 9.2.3 (General frame format),9.2.4.1 (Frame Control field),8.2.4.3 (Addressfields) | CFS1GRELAY: ORL2:OCFAP: OCFINDEPSTA: O | Yes  No  N/A  |
| AD13 | Individually addressed Dataframe addressing (4 address frame) | CFS1GRELAY: ORL2:OCFAP: OCFINDEPSTA: O | Yes  No  N/A  |
| AD14 | Group addressed PV1 Dataframe addressing (4 address frame) | 9.8 (MAC frame format for PV1 frames)10.51.4 (Addressing and forwarding of group addressed relay frames)10.51.3 (Addressing and forwarding of individually addressed relay frames) | CFS1GRELAY: ORL2:OCFS1G: O | Yes  No  N/A  |
| AD15 | Individually addressed PV1 Dataframe addressing (4 address frame) | CFS1GRELAY: ORL2:OCFS1G: O | Yes  No  N/A  |

***Change table in B.4.13 as follows (only changed rows shown):***

|  |
| --- |
| * QoS enhanced distributed channel access (EDCA)
 |
| Item | Protocol capability | References | Status | Support |
| QD1 | Support for four transmit queues with a separate channel access entity associated with each | 10.2.4.2 (HCF contention-based channel access (EDCA)),10.22.2.1 (Reference model) | CFNOTDMGSTA AND CFQOS:MCFS1G AND S1GM20.5: MCFS1G AND S1GM20.4:O | Yes  No  N/A  |
| ... |  |  |  |  |
| QD3 | Multiple frame transmission support | 10.22.2.7 (Multiple frame transmission in an EDCA TXOP) | CFQOS ORCFDMG ORCFS1G:O | Yes  No  N/A  |
| QD4 | Maintenance of within-queue ordering, exhaustive retransmission when sending non-QoS Data frames | 10.22.2.10(Retransmitprocedures) | (CFQOS AND NOT CFS1G) ORCFDMG:M | Yes  No  N/A  |

* High throughput (HT) features

***Change table in B.4.17.1 as follows (only changed rows shown):***

|  |
| --- |
| * HT MAC features
 |
| Item | Protocol capability | References | Status | Support |
| ... |  |  |  |  |
| HTM3 | MPDU aggregation |  |  |  |
| HTM3.1 | Reception of A-MPDU | 9.4.2.56.3 (AMPDU Parameters field), 12.4(RSNA confidentialityand integrity protocols),10.13.2 (A-MPDU length limit rules) | (CFHT AND NOT CFS1G):MCFS1G: O | Yes  No  N/A  |
| HTM3.2 | A-MPDU format | 9.7.1 (AMPDU format) | (CFHT OR CFS1G):M | Yes  No  N/A  |
| HTM3.3 | A-MPDU contents | 9.7.3 (A-MPDU contents) | (CFHT OR CFS1G):M | Yes  No  N/A  |
| HTM3.4 | A-MPDU frame exchange sequences | 10.22.2.7 (Multiple frame transmission in an EDCA TXOP) | (CFHT AND NOT CFS1G):MCFS1G: O | Yes  No  N/A  |
| HTM3.5 | Transmission of A-MPDU | 9.4.2.56.3 (AMPDU Parameters field), 11.4(RSNA confidentialityand integrity protocols) | CFHT:OCFVHT:MCFS1G: O | Yes  No  N/A  |
| HTM4 | MSDU aggregation |  |  |  |
| HTM4.1 | Reception of A-MSDUs | 92.4.5 (QoS Control field), 9.3.2.2 (Aggregate MSDU (A-MSDU) format) | (CFHT AND NOT CFS1G):MCFS1G:O | Yes  No  N/A  |
| HTM4.2 | A-MSDU format | 9.3.2.2 (Aggregate MSDU (A-MSDU) format) | (CFHT AND NOT CFS1G):MCFS1GRELAY AND ((NOT AD12) AND (NOT AD14)): MCFS1GRELAY AND ((NOT AD13) AND (NOT AD15)): MRL2 AND ((NOT AD12) AND (NOT AD14)): MRL2 AND ((NOT AD13) AND (NOT AD15)): MCFS1GRELAY AND (AD12 OR (AD14): OCFS1GRELAY AND (AD13 OR AD15): ORL2 AND (AD12 OR AD14): ORL2 AND (AD13 OR AD15): O(#8145) | Yes  No  N/A  |
| HTM4.3 | A-MSDU content | 9.3.2.2 (Aggregate MSDU (A-MSDU) format) | (CFHT AND NOT CFS1G):M | Yes  No  N/A  |
| HTM4.4 | Transmission of A-MSDUs | 9.3.2.2 (Aggregate MSDU (A-MSDU) format)format), 9.2.4.5 (QoS Control field) | CFHT:OCFS1G:O | Yes  No  N/A o |
| ... |  |  |  |  |
| HTM5.3 | HT-immediate block ack extensions | 10.24.7 (HT-immediate block ack extensions) | (CFHT AND NOT CFS1G):MCFS1G:O(CFS1G AND (S1GM20.2 OR S1GM20.3 ORS1GM20.5)): M | Yes  No  N/A  |
| HTM5.4 | HT-delayed block ack extensions | 10.24.8 (HT-delayed block ack extensions) | (CFHT ANDQB4.2 AND NOT CFS1G):MCFTVHT ANDQB4.2:MCFS1G: O | Yes  No  N/A  |
| ... |  |  |  |  |
| HTM16.2 | Dual CTS protectionThe use of the dual CTS mechanism is deprecated. | 10.3.2.8 (Dual CTS protection) | HTP2.11 AND NOT CFS1G: O | Yes  No  N/A  |

***Change table in B.4.19 as follows (only changed rows shown):***

|  |
| --- |
| * WNM extensions
 |
| Item | Protocol capability | References | Status | Support |
| ... |  |  |  |  |
| \*WNM11 | BSS max idle period | 11.24.13 (BSS max idle period management) | (CF19 ORCFS1G):M | Yes  No  N/A  |

* Very high throughput (VHT) features

***Change table in B.4.25.1 as follows (only changed rows shown):***

|  |
| --- |
| * VHT MAC features (11ac)
 |
| Item | Protocol capability | References | Status | Support |
| ... |  |  |  |  |
| VHTM3 | Link adaptation |  |  |  |
| \*VHTM3.1 | Use of the VHT variant HT Control field for link adaptation in immediate response exchange. | 9.2.4.6 (HT Control field),9.3.3.15 (Action No Ack frame format), 10.31.3 (Link adaptation using the VHT variant HT Control field), 10.9 (HT Control field operation) | CFVHT:OCFS1G: O | Yes  No  N/A  |
| ... |  |  |  |  |
| VHTM11 | ~~VHT single~~ S-MPDU format(#8029, 8487) | 10.13.7 (Setting the EOF field of the MPDU delimiter) | CFVHT:MCFS1G: M | Yes  No  N/A  |

Insert the subclauses below at the end of this sub-clause as following:

* Sub 1 GHz (S1G) features
* S1G MAC features

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Protocol capability | References | Status | Support |
|  | Are the following MAC protocol features supported? |  |  |  |
| S1GM1 | S1G capabilities signaling |  | CFS1G:M | Yes  No  N/A  |
| S1GM1.1 | S1G Capabilities element | 9.4.2.197 (S1G Capabilities element) | CFS1G:M | Yes  No  N/A  |
| S1GM1.2 | Signaling of S1G capabilities in Probe Request, (Re) Association Request frames  | 9.4.2.197 (S1G Capabilities element), 9.3.3.6 (Association Request frame format), 9.3.3.8 (Reassociation Request frame format), 9.3.3.10 (Probe Request frame format) | (CFINDEPSTA AND CFS1G):M | Yes  No  N/A  |
| S1GM1.3 | Signaling of S1G capabilities in S1G Beacon, Probe Response, (Re) Association Response frames  | 9.4.2.197 (S1G Capabilities element), 9.3.4.3 (S1G Beacon frame format), 9.3.3.7 (Association Response frame format), 9.3.3.9 (Reassociation Response frame format), 9.3.3.11 (Probe Response frame format) | (CFAP AND CFS1G):M | Yes  No  N/A  |
| S1GM2 | S1G operation |  | CFS1G:M | Yes  No  N/A  |
| S1GM2.1 | S1G Operation element | 9.4.2.209 (S1G Operation element) | CFS1G:M | Yes  No  N/A  |
| S1GM2.2 | Signaling of S1G operation in S1G Beacon, Probe Response | 9.4.2.209 (S1G Operation element), 9.3.4.3 (S1G Beacon frame format), 9.3.3.11 (Probe Response frame format) | ((CFAP OR CFIBSS) AND CFS1G):M | Yes  No  N/A  |
| S1GM3 | MSDU aggregation | 10.12 (A-MSDU operation)9.2.4.5 (QoS Control field)9.8.3.2 (Address fields)9.3.2.2.4 (Dynamic A-MSDU format) | CFS1G:O | Yes  No  N/A  |
| S1GM3.1 | Transmission of Dynamic A-MSDU | CFS1G:O(CFS1G AND HTM4.4):M | Yes  No  N/A  |
| S1GM3.2 | Reception of Dynamic A-MSDU  | CFS1G:O(CFS1G AND HTM4.1):M | Yes  No  N/A  |
| S1GM3.3 | Transmission of Dynamic A-MSDU in PV1 frame | (CFS1G AND HTM4.4 AND FT45):M | Yes  No  N/A  |
| S1GM3.4 | Reception of Dynamic A-MSDU in PV1 frame | (CFS1G AND HTM4.1 AND FT46):M | Yes  No  N/A  |
| S1GM3.5 | Reception of Dynamic A-MSDU  | (CFS1G AND (HTM4.1 OR HTM4.4 OR S1GM3.3 OR S1GM3.4)):M | Yes  No  N/A  |
| S1GM4 | Timing synchronization function (TSF) |  | CFS1G:M | Yes  No  N/A  |
| S1GM4.1 | Generation of S1G Beacon | 11.1.3.10.2 (Generation of S1G Beacon frames) | (CFAP AND CFS1G): M | Yes  No  N/A  |
| S1GM4.1.1 | S1G Beacon generation at TBTT |  | (CFAP AND CFS1G): M |  |
| S1GM4.1.2 | S1G Beacon generation at TSBTT |  | (CFAP AND CFS1G): O | Yes  No  N/A  |
| S1GM4.1.3 | S1G Beacon reception at TBTT |  | (CFINDEPSTA AND CFS1G): M | Yes  No  N/A  |
| S1GM4.1.4 | S1G Beacon reception at TSBTT |  | (CFINDEPSTA AND CFS1G): M | Yes  No  N/A  |
| S1GM4.2 | TSF timer accuracy with S1G Beacon | 11.1.3.10.3 (TSF timer accuracy with S1G Beacon) | CFS1G: M | Yes  No  N/A  |
| S1GM4.3 | TSF timer accuracy with TACK, STACK, BAT, PV1 Probe Response frames |  | CFS1G: O | Yes  No  N/A  |
| S1GM4.4 | Signaling PV1 Probe Response Option element in Probe Request frame |  | CFS1G: O | Yes  No  N/A  |
| S1GM4.5 | Active scanning using NDP Probe Request frame | 11.1.4.3.4b (NDP Probing) | CFS1G: O | Yes  No  N/A  |
| S1GM4.6 | Sending PV1 Probe Response frame | 11.1.4.3.4c (Active scanning using PV1 Probe Response), 11.1.4.3.4b (NDP Probing) | (CFAP AND CFS1G): O | Yes  No  N/A  |
| S1GM5 | Reverse direction protocol | 10.28 (Reverse direction protocol) | CFS1G:O | Yes  No  N/A  |
| S1GM5.1 | Initiation of RD protocol | CFS1G:O | Yes  No  N/A  |
| S1GM5.2 | Response to RD request | CFS1G:O | Yes  No  N/A  |
| \* S1GM6 | Target wake time (TWT) operation | 10.44 (Target wake time (TWT)) | CFS1G:O | Yes  No  N/A  |
| \*S1GM6.1 | Assume the role of TWT requesting STA | 10.44.1 (TWT overview) | S1GM6(#8146):O.1 | Yes  No  N/A  |
| \* S1GM6.2 | Assume the role of TWT responding STA | 10.44.1 (TWT overview) |  S1GM6:O.1 | Yes  No  N/A  |
| S1GM6.3 | Request TWT Setup  | 10.44.1 (TWT overview) |  S1GM6.1:O | Yes  No  N/A  |
| S1GM6.4 | Response to TWT Setup request  | 10.44.1 (TWT overview) | S1GM6.2:M | Yes  No  N/A  |
| S1GM6.5 | TWT Teardown | 10.44.8 (TWT Teardown) | S1GM6:O | Yes  No  N/A  |
| S1GM6.6 | TWT acknowledgement procedure | 10.44.2 (TWT acknowledgement procedure) | S1GM6:M | Yes  No  N/A  |
| S1GM6.7 | Explicit TWT operation | 10.44.3 (Explicit TWT operation) |  S1GM6:O.2 | Yes  No  N/A  |
| S1GM6.8 | Implicit TWT operation | 10.44.4 (Implicit TWT operation) | S1GM6:O.2 | Yes  No  N/A  |
| S1GM6.9 | Request NDP Paging Setup  | 10.44.6 (NDP Paging Setup) | S1GM6.1:O | Yes  No  N/A  |
| S1GM6.10 | Accept the NDP Paging Setup request  | 10.44.6 (NDP Paging Setup) | S1GM6.2:O | Yes  No  N/A  |
| S1GM6.11 | Schedule NDP Paging frame as the first frame in a TWT |  | S1GM10:M | Yes  No  N/A  |
| S1GM6.12 | TWT grouping | 10.44.5 (TWT grouping) | S1GM6:O | Yes  No  N/A  |
| S1GM7 | Non-TIM STA operation | 10.45 (Non-TIM STA operation) | (CFINDEPSTA AND CFS1G):O(CFAP AND CFS1G AND (S1GM20.1 OR S1GM20.3)): M | Yes  No  N/A  |
| S1GM7.1 | Request non-TIM Mode  | 11.2.2.2 (Non-AP STA power management modes) | (CFINDEPSTA AND S1GM7):O | Yes  No  N/A  |
| S1GM7.2 | Response to non-TIM Mode request  | 11.2.2.2 (Non-AP STA power management modes) | (CFAP AND S1GM7):M | Yes  No  N/A  |
| S1GM7.3 | Request rescheduling of awake/doze cycle | 10.45.2 (Rescheduling of awake/doze cycle) | (CFINDEPSTA AND S1GM7):O | Yes  No  N/A  |
| S1GM7.4 | Reschedule awake/doze cycle of non-TIM STAs | 10.45.2 (Rescheduling of awake/doze cycle) | (CFAP AND S1GM7):O | Yes  No  N/A  |
| S1GM7.5 | Temporary PS Mode Switch to TIM mode | 10.45.2 (Rescheduling of awake/doze cycle) | (CFINDEPSTA AND S1GM7):O | Yes  No  N/A  |
| S1GM7.6 | Listen interval update procedure for non-TIM STAs |  | S1GM7:O | Yes  No  N/A  |
| S1GM7.7 | Resource protection for non-TIM STAs | 10.45.1 (Resource protection for non-TIM STAs) | (CFAP AND S1GM7):O | Yes  No  N/A  |
| S1GM7.8 | Resource protection for non-TIM STAs using periodic RAW (PRAW) operation | 10.45.1.2 (Resource protection for non-TIM STAs using periodic RAW (PRAW) operation) | (CFAP AND S1GM7):O | Yes  No  N/A  |
| S1GM8 | Synchronization (Sync) frame operation | 10.46 (Synchronization (Sync) frame operation) | CFS1G:O | Yes  No  N/A  |
| S1GM8.1 | Request for a sync frame transmission | 10.46.1 (Sync frame transmission procedure for uplink traffic) | (CFINDEPSTA AND S1GM8):O | Yes  No  N/A  |
| \*S1GM8.2 | Schedule a sync frame transmission | (CFAP AND S1GM8):M | Yes  No  N/A  |
| S1GM8.3 | Request for time slot protection | (CFINDEPSTA AND S1GM8):O | Yes  No  N/A  |
| S1GM8.4 | Protect the time slot assigned to the STA that requested for time slot protection. | (CFAP AND S1GM8):M | Yes  No  N/A  |
| S1GM8.5 | Respond to sync frame |  | (CFINDEPSTA AND S1GM8):M | Yes  No  N/A  |
| S1GM9 | Bidirectional TXOP | 10.47 (Bidirectional TXOP) | CFS1G:O | Yes  No  N/A  |
| S1GM9.1 | Act as BDT Initiator | 10.47.2 (Rules for BDT) | S1GM9:O | Yes  No  N/A  |
| S1GM9.2 | Act as BDT Responder | S1GM9:M | Yes  No  N/A  |
| S1GM10 | Subchannel Selective Transmission (SST) | 10.49 (Subchannel Selective Transmission (SST)) | CFS1G:O | Yes  No  N/A  |
| S1GM11 | Sectorized beam operation | 10.50 (Sectorized beam operation) | CFS1G:O | Yes  No  N/A  |
| S1GM11.1 | Support for Group Sectorization Operation  | 10.50.3 (Group sectorization operation) | (CFAP AND S1GM11):O.3(CFINDEPSTA AND S1GM11):M | Yes  No  N/A  |
| S1GM11.2 | Support for TXOP-based Sectorization Operation | 10.50.4 (TXOP-based sectorization operation) | (CFAP AND S1GM11):O.3(CFINDEPSTA AND S1GM11):M | Yes  No  N/A  |
| S1GM11.3 | Transmission of S1G Sector Operation element with Sectorization Type field equal to 0 | 10.50.2 (Sector Capabilities Exchange) | (CFAP AND S1GM11.1):M | Yes  No  N/A  |
| S1GM11.4 | Transmission of S1G Sector Operation element with Sectorization Type field equal to 1 | (CFAP AND S1GM11.2):M | Yes  No  N/A  |
| S1GM11.5 | Sector training operation | S1GM11:O | Yes  No  N/A  |
| S1GM11.6 | Send back Sector ID feedback to associated AP | (CFINDEPSTA AND S1GM11):O | Yes  No  N/A  |
| S1GM12 | 1 MHz Control Response Preamble Support |  10.7.6.6 (Channel Width selection for Control frames) | CFS1G: O | Yes  No  N/A  |
| \*S1GM13 | Group AID(#8299) | 10.52 (Group AID) | CFS1G:O | Yes  No  N/A  |
| S1GM14 | Traveling Pilot Operation | 10.53 (Traveling Pilot Operation) | CFS1G:O | Yes  No  N/A  |
| S1GM15 | Bitmap Protection for NDP BlockAck frames | 10.54 (Bitmap Protection for NDP BlockAck frames) | (CFS1G AND (FT47 OR FR 48)): M | Yes  No  N/A  |
| S1GM16 | Header compression procedure | 10.55 (Generation of PV1 MPDUs and header compression procedure) | CFS1G:O | Yes  No  N/A  |
| S1GM16.1 | Signaling Header Compression element in (Re)Association Request frames  | (CFINDEPSTA AND S1GM16):O | Yes  No  N/A  |
| S1GM16.2 | Signaling Header Compression element in (Re)Association Response frames  | (CFAP AND S1GM16):M | Yes  No  N/A  |
| S1GM16.3 | Request header compression procedure |  | S1GM16:O | Yes  No  N/A  |
| S1GM16.4 | Store the optional fields indicated in the Header Compression Request |  |  S1GM16:O | Yes  No  N/A  |
| S1GM16.5 | Send back the Header Compression Response |  | CFS1G:M | Yes  No  N/A  |
| S1GM17 | Flow control | 10.58 (S1G flow control) | CFS1G:M | Yes  No  N/A  |
| S1GM17.1 | Request flow suspension/resumption | CFS1G:O | Yes  No  N/A  |
| S1GM17.2 | Flow suspension in response to Flow Suspension(#8049) frame or NDP ACK frame | (CFINDEPSTA AND CFS1G):M | Yes  No  N/A  |
| S1GM17.3 | Flow suspension in response to STACK or BAT or TACK frame |  | (CFINDEPSTA AND S1GM6.6):M | Yes  No  N/A  |
| S1GM17.4 | Flow resumption upon receiving a Flow Resumption(#8049) frame |  | (CFINDEPSTA AND CFS1G):O | Yes  No  N/A  |
| \*S1GM18 | Dynamic AID assignment operation | 11.48 (Dynamic AID assignment operation) | CFS1G:O | Yes  No  N/A  |
| S1GM18.1 | Request AID switch | (CFINDEPSTA AND S1GM18):O | Yes  No  N/A  |
| S1GM18.2 | Respond to request for AID switch | (CFAP AND S1GM18):M | Yes  No  N/A  |
| S1GM18.3 | Issue unsolicited AID switch instruction | (CFAP AND S1GM18):O | Yes  No  N/A  |
| S1GM18.4 | Respond to unsolicited AID switch instruction | (CFINDEPSTA AND S1GM18):O | Yes  No  N/A  |
| S1GM19 | System information update procedure | 11.49 (System information update procedure) | CFS1G:M | Yes  No  N/A  |
| S1GM19.1 | Update the Change Sequence field in S1G Beacon frame | (CFAP AND CFS1G):M | Yes  No  N/A  |
| S1GM19.2 | Respond to changes in the Change Sequence field in S1G Beacon frame | (CFINDEPSTA AND CFS1G):M | Yes  No  N/A  |
| S1GM19.3 | Respond to probe request frames that contain the Change Sequence field  | (CFAP AND CFS1G):O | Yes  No  N/A  |
| S1GM20 | STA types | 11.50.7 (S1G BSS type and STA type) | CFS1G:M | Yes  No  N/A  |
| S1GM20.1 | Support for sensor STA  | (CFAP AND CFS1G):O.5 | Yes  No  N/A  |
| S1GM20.2 | Support for non-sensor STA | (CFAP AND CFS1G):O.5 | Yes  No  N/A  |
| S1GM20.3 | Support for both sensor and non-sensor STA  | (CFAP AND CFS1G):O.5 | Yes  No  N/A  |
| S1GM20.4 | Assume the role of sensor STA | (CFINDEPSTA AND CFS1G):O.6 | Yes  No  N/A  |
| S1GM20.5 | Assume the role of non-sensor STA | (CFINDEPSTA AND CFS1G):O.6 | Yes  No  N/A  |
| S1GM21 | Support for energy limited STAs | 11.51 (Support for energy limited STAs) | (CFAP AND CFS1G AND (S1GM20.1 OR S1GM20.3)):M(CFAP AND S1GM20.2):O(CFINDEPSTA AND S1GM20.4):O | Yes  No  N/A  |
| S1GM22 | S1G Channel Access |  | CFS1G: M | Yes  No  N/A  |
| S1GM22.1 | Response indication deferral (RID) function | 10.3.2.1 (CS mechanism),10.3.2.4 (Setting and resetting the NAV),10.3.2.4a (Setting and resetting the RID),10.3.2.15 (Response Indication procedure) | CFS1G: M | Yes  No  N/A  |
| S1GM22.2 | Dynamic bandwidth operation | 10.3.2.7 (CTS and DMG CTS procedure) | CFS1G: O | Yes  No  N/A  |
| S1GM22.3 | Fragment BA procedure | 10.3.2.10a (Fragment BA procedure) | CFS1G: O | Yes  No  N/A  |
| S1GM22.4 | Support for at least one transmit queue with AC\_BE access category | 10.2.4.2 (HCF contention-based channel access (EDCA)), 10.22.2.1 (Reference model) | S1GM20.4: M | Yes  No  N/A  |
| S1GM22.5 | Restricted Access Window (RAW) Operation | 10.22.5 (Restricted Access Window (RAW) operation) | CFS1G:O | Yes  No  N/A  |
| S1GM22.5.1 | EDCA backoff procedure in generic RAW or triggering frame RAW | 10.22.5.5 (EDCA backoff procedure in generic RAW or triggering frame RAW) | (CFAP AND S1GM22.5):O(CFINDEPSTA AND S1GM22.5):M | Yes  No  N/A  |
| S1GM22.5.2 | Deferral for generic RAW, triggering RAW, sounding RAW and simplex RAW when RAW Type Options subfield indicates non-TIM RAW |  | (CFINDEPSTA AND S1GM7): O(CFINDEPSTA AND CFS1G AND (NOT S1GM7)): M |  |
| S1GM22.5.3 | Deferral for simplex RAW when RAW Type Options subfield does not indicate non-TIM RAW |  | (CFINDEPSTA AND CFS1G): O |  |
| S1GM23 | Traffic indication map (TIM) | 11.2.2.3 (AP TIM transmissions), 11.2.2.4 (TIM types) | CFAP: M | Yes  No  N/A  |
| S1GM23.1 | Encode partial virtual bitmap in Block Bitmap mode | 9.4.2.6 (TIM element) | (CFAP AND CFS1G): O.5 | Yes  No  N/A  |
| S1GM23.1.1 | Encode partial virtual bitmap in Single AID mode |  | (CFAP AND CFS1G): O.5 | Yes  No  N/A  |
| S1GM23.1.2 | Encode partial virtual bitmap in OLB mode |  | (CFAP AND CFS1G): O.5 | Yes  No  N/A  |
| S1GM23.1.3 | Encode partial virtual bitmap in ADE mode |  | (CFAP AND CFS1G): O | Yes  No  N/A  |
| S1GM23.1.4 | Decode partial virtual bitmap encoded in Block Bitmap mode |  | (CFINDEPSTA AND CFS1G AND NOT S1GM7):M(CFINDEPSTA AND S1GM7):O | Yes  No  N/A  |
| S1GM23.1.5 | Decode partial virtual bitmap encoded in Single AID mode |  | (CFINDEPSTA AND CFS1G AND NOT S1GM7):M(CFINDEPSTA AND S1GM7):O | Yes  No  N/A  |
| S1GM23.1.6 | Decode partial virtual bitmap encoded in OLB mode |  | (CFINDEPSTA AND CFS1G AND NOT S1GM7):M(CFINDEPSTA AND S1GM7):O | Yes  No  N/A  |
| S1GM23.1.7 | Decode partial virtual bitmap encoded in ADE mode |  | (CFINDEPSTA AND CFS1G AND NOT S1GM7):O | Yes  No  N/A  |
| S1GM23.2 | Page slicing | 10.48 (Page Slicing) | (CFAP AND CFS1G): O(CFINDEPSTA AND CFS1G):O | Yes  No  N/A  |
| S1GM23.2.1 | Divide the TIM into page slices |  | (CFAP AND S1GM23.2): O | Yes  No  N/A  |
| S1GM23.2.2 | Decode the TIM divided into page slices |  | (CFINDEPSTA AND S1GM23.2):M | Yes  No  N/A  |
| S1GM24 | AP power management | 11.2.2.20 (AP Power management) | (CFAP AND CFS1G): O | Yes  No  N/A  |
| S1GM25 | Association and reassociation | 11.3 (STA authentication and association) | CFS1G: M | Yes  No  N/A  |
| S1GM25.1 | Service characteristic(#8005) indication during association | 11.3.5.11 (Service characteristic indication during association) | (CFINDEPSTA AND CFS1G AND PC14):O | Yes  No  N/A  |
| S1GM25.2 | Authentication Control | 11.3.8 (Authentication Control) | CFS1G: O | Yes  No  N/A  |
| S1GM25.2.1 | Centralized authentication control |  | (CFAP AND S1GM25.2): O.2(CFINDEPSTA AND S1GM25.2): O | Yes  No  N/A  |
| S1GM25.2.2 | Distributed authentication control |  | (CFAP AND S1GM25.2): O.2(CFINDEPSTA AND CFS1G): M | Yes  No  N/A  |
| S1GM26 | Robust security network association (RSNA) |  | O | Yes  No  |
| S1GM26.1 | PV1 CCMP MPDU format | 12.5.3.2 (CCMP MPDU format) | CFS1G AND (FT45 or FR46): M | Yes  No  N/A  |
| S1GM26.2 | Local construction of CCMP Header for PV1 MPDUs | 12.5.3.2a (Construction of the CCMP header for PV1 MPDUs) | CFS1G AND FR46: M | Yes  No  N/A  |
| S1GM26.3 | CCMP cryptographic encapsulation procedure for PV1 MPDUs | 12.5.3.3 (CCMP cryptographic encapsulation) | CFS1G AND FT45: M | Yes  No  N/A  |
| S1GM26.4 | CCMP decapsulation procedure for PV1 MPDUs | 12.5.3.4 (CCMP decapsulation) | CFS1G AND FR46: M | Yes  No  N/A  |
| S1GM27 | Asymmetric Block Ack Operation | 10.7.6.5.2 (Selection of a rate or MCS),10.7.6.5.4a (MCS for asymmetric Block Ack operation) | CFS1G: O | Yes  No  N/A  |
| \*S1GM28 | Control Response MCS Negotiation | 10.7.6.5.4b (Control response MCS negotiation) | CFS1G: O | Yes  No  N/A  |
| S1GM29 | OBSS Mitigation Support | 10.7.6.6 (Channel Width selection for Control frames) | CFS1G: O | Yes  No  N/A  |

* S1G PHY features

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Item | Protocol capability | References | Status | Support |
|  | Are the following PHY protocol features supported? |  |  |  |
| S1GP1 | BSS bandwidth |  |  |  |
| S1GP1.1 | 1 MHz operation | 11.50.1 (Basic S1G BSS functionality) & 23.1.1 (Introduction to the S1G PHY) | CFS1G: M | Yes  No  N/A  |
| S1GP1.2 | 2 MHz operation | 11.50.1 (Basic S1G BSS functionality) & 23.1.1 (Introduction to the S1G PHY) | CFS1G: M | Yes  No  N/A  |
| S1GP1.3 | 4 MHz operation | 11.50.1 (Basic S1G BSS functionality) & 23.1.1 (Introduction to the S1G PHY) | CFS1G: O | Yes  No  N/A  |
| S1GP1.4 | 8 MHz operation | 11.50.1 (Basic S1G BSS functionality) & 23.1.1 (Introduction to the S1G PHY) | CFS1G: O | Yes  No  N/A  |
| S1GP1.5 | 16 MHz operation | 11.50.1 (Basic S1G BSS functionality) & 23.1.1 (Introduction to the S1G PHY) | CFS1G: O | Yes  No  N/A  |
| S1GP2 | Coding scheme |  |  |  |
| S1GP2.1 | Use of BCC code | 23.1.1 (Introduction to the S1G PHY) & 23.3.4 (Overview of the PPDU encoding process) | CFS1G: M | Yes  No  N/A  |
| S1GP2.2 | Use of STBC code | 23.1.1 (Introduction to the S1G PHY) & 23.3.4 (Overview of the PPDU encoding process) | CFS1G: O | Yes  No  N/A  |
| S1GP2.3 | Use of LDPC code | 23.1.1 (Introduction to the S1G PHY) & 23.3.4 (Overview of the PPDU encoding process) | CFS1G: O | Yes  No  N/A  |
| S1GP3 | Demodulation scheme |  |  |  |
| S1GP3.1 | SIG-A of greater than orequal to 2 MHz long preamble format PPDU | 23.1.1 (Introduction to the S1G PHY) & 23.3.4.2.3 (Construction of SIG-A) | CFS1G: M | Yes  No  N/A  |
| S1GP4 | PHY timing parameters |  |  |  |
| S1GP4.1 | Normal (long) guard interval | 23.1.1 (Introduction to the S1G PHY) & 23.3.6 (Timing-related parameters) | CFS1G: M | Yes  No  N/A  |
| S1GP4.2 | Short guard interval | 23.1.1 (Introduction to the S1G PHY) & 23.3.6 (Timing-related parameters) | CFS1G: O | Yes  No  N/A  |
| S1GP5 | Use of S1G beamforming | 23.1.1 (Introduction to the S1G PHY) & 24.3.10 | CFS1G: O | Yes  No  N/A  |
| S1GP6 | PPDU format |  |  |  |
| S1GP6.1 | 1 MHz short preamble format PPDU | 23.1.1 (Introduction to the S1G PHY) & 23.3.2 (S1G PPDU format) | CFS1G: M | Yes  No  N/A  |
| S1GP6.2 | 2 MHz short preamble format PPDU | 23.1.1 (Introduction to the S1G PHY) & 23.3.2 (S1G PPDU format) | CFS1G: M | Yes  No  N/A  |
| S1GP6.3 | Greater than 2 MHz short preamble format PPDU | 23.1.1 (Introduction to the S1G PHY) & 23.3.2 (S1G PPDU format) | CFS1G: O | Yes  No  N/A  |
| S1GP6.4 | Greater than or equal to 2 MHz long preamble format PPDU | 23.1.1 (Introduction to the S1G PHY) & 23.3.2 (S1G PPDU format) | CFS1G AND S1GP1.1: OCFS1G AND S1GP1.2: OCFS1G AND S1GP1.3: MCFS1G AND S1GP1.4: MCFS1G AND S1GP1.5: M | Yes  No  N/A  |
| S1GP6.5 | S1G 1 MHz duplicate(#8148) PPDU | 23.3.9.12.1 (1 MHz duplicate transmission) | CFS1G: O | Yes  No  N/A  |
| S1GP6.6 | S1G 2 MHz duplicate(#8148) PPDU | 23.3.9.12.2 (2 MHz duplicate transmission) | CFS1G AND S1GP1.3: MCFS1G AND S1GP1.4: MCFS1G AND S1GP1.5: M | Yes  No  N/A  |
| S1GP6.7 | Use of fixed pilots | 23.3.9.10 (Pilot subcarriers) | CFS1G: M | Yes  No  N/A  |
| S1GP6.8 | Use of traveling pilots | 23.3.9.10 (Pilot subcarriers) | CFS1G: O | Yes  No  N/A  |
| S1GP7 |  |  |  |  |
| S1GP7.1 | MCS0, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: M | Yes  No  N/A  |
| S1GP7.2 | MCS0, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: O | Yes  No  N/A  |
| S1GP7.3 | MCS0, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: O | Yes  No  N/A  |
| S1GP7.4 | MCS0, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: O | Yes  No  N/A  |
| S1GP7.5 | MCS1, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: M | Yes  No  N/A  |
| S1GP7.6 | MCS1, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: O | Yes  No  N/A  |
| S1GP7.7 | MCS1, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: O | Yes  No  N/A  |
| S1GP7.8 | MCS1, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: O | Yes  No  N/A  |
| S1GP7.9 | MCS2, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: M | Yes  No  N/A  |
| S1GP7.10 | MCS2, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: O | Yes  No  N/A  |
| S1GP7.11 | MCS2, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: O | Yes  No  N/A  |
| S1GP7.12 | MCS2, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: O | Yes  No  N/A  |
| S1GP7.13 | MCS3, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G: MCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.14 | MCS3, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.13: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.15 | MCS3, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.13: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.16 | MCS3, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.13: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.17 | MCS4, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G: MCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.18 | MCS4, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.17: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.19 | MCS4, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.17: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.20 | MCS4, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.17: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.21 | MCS5, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G: MCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.22 | MCS5, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.21: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.23 | MCS5, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.21: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.24 | MCS5, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.21: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.25 | MCS6, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G: MCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.26 | MCS6, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.25: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.27 | MCS6, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.25: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.28 | MCS6, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.25: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.29 | MCS7, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G: MCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.30 | MCS7, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.29: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.31 | MCS7, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.29: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.32 | MCS7, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.29: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.33 | MCS8, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.34 | MCS8, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.33: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.35 | MCS8, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.33: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.36 | MCS8, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | S1GP7.33: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.37 | MCS9, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G AND (NOT S1GP1.2): O CFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.38 | MCS9, Nss = 2 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G AND S1GP7.37 AND (NOT S1GP1.2): O CFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.39 | MCS9, Nss = 3 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G AND S1GP7.37: OCFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.40 | MCS9, Nss = 4 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFAP AND CFS1G AND S1GP7.37 AND (NOT S1GP1.2): O CFINDEPSTA AND CFS1G: O | Yes  No  N/A  |
| S1GP7.41 | MCS10, Nss = 1 | 23.1.1 (Introduction to the S1G PHY) & 23.5 (Parameters for S1G-MCSs) | CFS1G: M | Yes  No  N/A  |

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| * S1G Relay features
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| Item | Protocol capability | References | Status | Support |
| RL1 | S1G Relay operation | 10.51 (S1G Relay operation) | CFS1GRELAY: M | Yes  No  N/A  |
| RL2 | S1G Relay Support | CFAP: O | Yes  No  N/A  |
| RL3 | S1G Relay element | RL1 OR RL2:M | Yes  No  N/A  |
| RL4 | Signaling of S1G Relay element in Probe Request, (Re)Association Request frames  | CFS1GRELAY:M | Yes  No  N/A  |
| RL5 | Signaling of S1G Relay element in S1G Beacon, Probe Response, PV1 Probe Response frames and (Re)Association Response frames  | (RL2):M | Yes  No  N/A  |
| RL6 | TXOP sharing | 10.51.5 (Procedures of TXOP sharing for S1G relay operation) | (CFS1G AND RL1):O(CFS1G AND RL2):O(CFINDEPSTA AND CFS1G):O | Yes  No  N/A  |
| RL6.1 | Explicit Ack procedure | 10.51.5.2 (Explicit Ack procedure) | RL6:O.4 | Yes  No  N/A  |
| RL6.2 | Implicit Ack procedure | 10.51.5.3 (Implicit Ack procedure) | RL6:O.4 | Yes  No  N/A  |
| RL7 | S1G Relay discovery procedure | 10.51.6 (S1G Relay discovery procedure), 11.1.4.3.4a (Active scanning for relay discovery) | (CFS1G AND RL1):OCFAP: OCFINDEPSTA: O | Yes  No  N/A  |