INTERNATIONAL STANDARD

ISO/ IEC/IEEE 8802-11

Third edition
2022-07

Telecommunications and information exchange between systems — Specific requirements for local and metropolitan area networks —

Part 11: Wireless LAN medium access control (MAC) and physical layer (PHY) specifications

Télécommunications et échange entre systèmes informatiques — Exigences pour les réseaux locaux et métropolitains —

Partie 11: Spécifications du contrôle d'accès du milieu sans fil (MAC) et de la couche physique (PHY)

Reference number
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This third edition cancels and replaces the second edition (ISO/IEC/IEEE 8802-11:2018), which has been technically revised. It also incorporates the Amendments ISO/IEC/IEEE 8802-11:2018/Amd 1:2019, ISO/IEC/IEEE 8802-11:2018/Amd 2:2019, ISO/IEC/IEEE 8802-11:2018/Amd 3:2020, ISO/IEC/IEEE 8802-11:2018/Amd 4:2020, ISO/IEC/IEEE 8802-11:2018/Amd 5:2020.

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IEEE Std 802.11™-2020
(Revision of IEEE Std 802.11-2016)

**IEEE Standard for Information Technology—
Telecommunications and Information Exchange between Systems
Local and Metropolitan Area Networks—
Specific Requirements**

Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

Developed by the

LAN/MAN Standards Committee
of the
IEEE Computer Society

Approved 3 December 2020

IEEE SA Standards Board

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Abstract: Technical corrections and clarifications to IEEE Std 802.11 for wireless local area networks (WLANs) as well as enhancements to the existing medium access control (MAC) and physical layer (PHY) functions are specified in this revision. Amendments 1 to 5 published in 2016 and 2018 have also been incorporated into this revision.

Keywords: 2.4 GHz, 256-QAM, 3650 MHz, 4.9 GHz, 5 GHz, 5.9 GHz, 60 GHz, advanced encryption standard, AES, audio, beamforming, carrier sense multiple access/collision avoidance, CCMP, channel switching, clustering, contention based access period, Counter mode with Cipher-block chaining Message authentication code Protocol, confidentiality, CSMA/CA, DFS, direct link, directional multi-gigabit, dynamic allocation of service period, dynamic extension of service period, dynamic frequency selection, dynamic truncation of service period, E911, EDCA, emergency alert system, emergency services, fast session transfer, forwarding, GCMP, generic advertisement service, high throughput, IEEE 802.11™, international roaming, interworking, interworking with external networks, LAN, local area network, MAC, management, measurement, medium access control, media-independent handover, medium access controller, mesh, MIS, millimeter-wave, MIMO, MIMO-OFDM, multi-band operation, multi-hop, multi-user MIMO, multiple input multiple output, network advertisement, network discovery, network management, network selection, noncontiguous frequency segments, OCB, path-selection, personal basic service set, PHY, physical layer, power saving, QoS, quality of service, quality-of-service management frame, radio, radio frequency, RF, radio resource, radio management, relay operation, spatial sharing, SSPN, subscriber service provider, television white spaces, TPC, transmit power control, video, wireless access in vehicular environments, wireless LAN, wireless local area network, WLAN, wireless network management, zero-knowledge proof

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Introduction

This introduction is not part of IEEE Std 802.11-2020, IEEE Standard for Information Technology—Telecommunications and Information Exchange between Systems—Local and Metropolitan Area Networks—Specific Requirements—Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications.

This revision gives users, in one document, the IEEE 802.11 standard for wireless local area networks (WLANs) with all of the amendments that have been published to date.

Incorporating published amendments

The original standard was published in 1997, revised in 1999 with MIB changes, and reaffirmed in 2003.

A revision was published in 2007, which incorporated into the 1999 edition the following amendments:

- IEEE Std 802.11a™-1999: High-speed Physical Layer in the 5 GHz Band (Amendment 1)
- IEEE Std 802.11b™-1999: Higher-Speed Physical Layer Extension in the 2.4 GHz Band (Amendment 2)
- IEEE Std 802.11b-1999/Corrigendum 1-2001: Higher-speed Physical Layer (PHY) extension in the 2.4 GHz band (Corrigendum 1 to Amendment 2)
- IEEE Std 802.11d™-2001: Specification for operation in additional regulatory domains (Amendment 3)
- IEEE Std 802.11g™-2003: Further Higher Data Rate Extension in the 2.4 GHz Band (Amendment 4)
- IEEE Std 802.11h™-2003: Spectrum and Transmit Power Management Extensions in the 5 GHz band in Europe (Amendment 5)
- IEEE Std 802.11i™-2004: Medium Access Control (MAC) Security Enhancements (Amendment 6)
- IEEE Std 802.11j™-2004: 4.9 GHz–5 GHz Operation in Japan (Amendment 7)
- IEEE Std 802.11e™-2005: Medium Access Control (MAC) Quality of Service Enhancements (Amendment 8)

A revision was published in 2012, which incorporated into the 2007 revision the following amendments:

- IEEE Std 802.11k™-2008: Radio Resource Measurement of Wireless LANs (Amendment 1)
- IEEE Std 802.11r™-2008: Fast Basic Service Set (BSS) Transition (Amendment 2)
- IEEE Std 802.11y™-2008: 3650–3700 MHz Operation in USA (Amendment 3)
- IEEE Std 802.11w™-2009: Protected Management Frames (Amendment 4)
- IEEE Std 802.11n™-2009: Enhancements for Higher Throughput (Amendment 5)
- IEEE Std 802.11p™-2010: Wireless Access in Vehicular Environments (Amendment 6)
- IEEE Std 802.11z™-2010: Extensions to Direct-Link Setup (DLS) (Amendment 7)
- IEEE Std 802.11v™-2011: Wireless Network Management (Amendment 8)
- IEEE Std 802.11u™-2011: Interworking with External Networks (Amendment 9)
- IEEE Std 802.11s™-2011: Mesh Networking (Amendment 10)

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A revision was published in 2016, which incorporated into the 2012 revision the following amendments:

- IEEE Std 802.11ae™-2012: Prioritization of Management Frames (Amendment 1)
- IEEE Std 802.11aa™-2012: MAC Enhancements for Robust Audio Video Streaming (Amendment 2)
- IEEE Std 802.11ad™-2012: Enhancements for Very High Throughput in the 60 GHz Band (Amendment 3)
- IEEE Std 802.11ac™-2013: Enhancements for Very High Throughput for Operation in Bands below 6 GHz (Amendment 4)
- IEEE Std 802.11af™-2013: Television White Spaces (TVWS) Operation (Amendment 5)

This revision is based on IEEE Std 802.11-2016, into which the following amendments have been incorporated:

- IEEE Std 802.11ai™-2016 (second printing): Fast Initial Link Setup (Amendment 1)
- IEEE Std 802.11ah™-2016: Sub 1 GHz License Exempt Operation (Amendment 2)
- IEEE Std 802.11aj™-2018: Enhancements for Very High Throughput to Support Chinese Millimeter Wave Frequency Bands (60 GHz and 45 GHz) (Amendment 3)
- IEEE Std 802.11ak™-2018: Enhancements for Transit Links Within Bridged Networks (Amendment 4)
- IEEE Std 802.11aq™-2018: Preassociation Discovery (Amendment 5)

Technical corrections, clarifications, and enhancements

In addition, this revision specifies technical corrections and clarifications to IEEE Std 802.11 as well as enhancements to the existing medium access control (MAC) and physical layer (PHY) functions. In addition, this revision removes some features previously marked as obsolete and adds new indications of other obsolete features.

Generally, features that are marked deprecated or obsolete are not maintained; there might be technical errors in the material describing these features.

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Renumbering of clauses and annexes

The numbering of certain clauses and annexes has been modified since IEEE Std 802.11-2007.

The evolution of this numbering is shown in Figure 1.

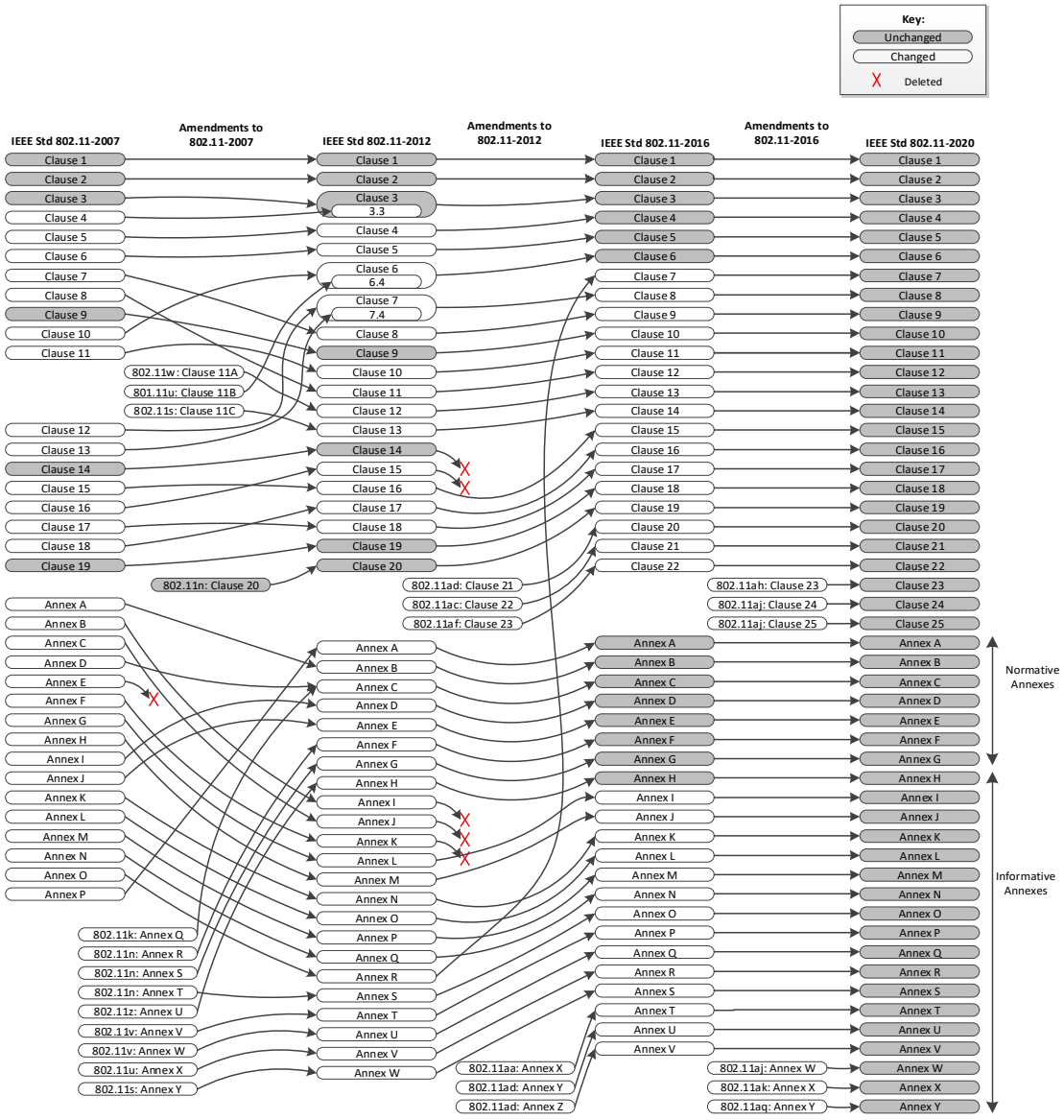


Figure 1—The evolution of numbering in IEEE Std 802.11

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IEEE Standard for Information Technology—
Telecommunications and Information Exchange between Systems
Local and Metropolitan Area Networks—
Specific Requirements

Part 11: Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) Specifications

1. Overview

1.1 Scope

The scope of this standard is to define one medium access control (MAC) and several physical layer (PHY) specifications for wireless connectivity for fixed, portable, and moving stations (STAs) within a local area.

1.2 Purpose

The purpose of this standard is to provide wireless connectivity for fixed, portable, and moving stations within a local area. This standard also offers regulatory bodies a means of standardizing access to one or more frequency bands for the purpose of local area communication.

1.3 Supplementary information on purpose

Specifically, in the context of IEEE 802.11™-compliant devices, this standard

- Describes the functions and services required by a device to operate within independent, personal, and infrastructure networks as well as the aspects of device mobility (transition) within those networks.
- Describes the functions and services that allow a device to communicate directly with another such device outside of an independent or infrastructure network.
- Defines the MAC procedures to support the MAC service data unit (MSDU) delivery services.
- Defines several PHY signaling techniques and interface functions that are controlled by the MAC.
- Permits the operation of a device within a wireless local area network (WLAN) that coexists with multiple overlapping IEEE 802.11 WLANs.
- Describes the requirements and procedures to provide data confidentiality of user information and MAC management information being transferred over the wireless medium (WM) and authentication of devices.
- Defines mechanisms for dynamic frequency selection (DFS) and transmit power control (TPC) that may be used to satisfy regulatory requirements for operation in any band.

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— Defines the MAC procedures to support local area network (LAN) applications with quality-of-service (QoS) requirements, including the transport of voice, audio, and video.
— Defines mechanisms and services for wireless network management of devices that include BSS transition management, channel usage and coexistence, collocated interference reporting, diagnostic, multicast diagnostic and event reporting, flexible multicast, efficient beacon mechanisms, proxy ARP advertisement, location, timing measurement, directed multicast, extended sleep modes, traffic filtering, and management notification.
— Defines functions and procedures aiding network discovery and selection by devices, information transfer from external networks using QoS mapping, and a general mechanism for the provision of emergency services.
— Defines the MAC procedures that are necessary for wireless multi-hop communication to support wireless LAN mesh topologies.
— Defines medium access control mechanisms to support the prioritization of Management frames.
— Defines mechanisms to improve audio video (AV) streaming QoS while maintaining data and voice performance.
— Defines the PHY signaling, MAC, and beamforming procedures required for operation with directional antenna patterns.
— Defines the PHY and MAC enhancements to enable operation in the Chinese millimeter wave frequency bands (60 GHz and 45 GHz).
— Defines the mechanisms for communications over the wireless medium used as a link in an IEEE 802.1Q™ bridged network.
— Defines mechanisms to enable delivery of preassociation service discovery information to IEEE 802.11 stations (STAs).

1.4 Word usage

In this document, the word *shall* is used to indicate a mandatory requirement. The word *should* is used to indicate a recommendation. The word *may* is used to indicate a permissible action. The word *can* is used for statements of possibility and capability.

The construction "between *x* and *y*", "*x* to *y*" or "*x*-*y*" represents an inclusive range (i.e., the range includes both values *x* and *y*).

The construction "up to *y*" represents an inclusive upper bound (i.e., the range includes the value *y).*

Any action specified as relating to a SAP primitive is to be interpreted as an action on an invocation or instance of that primitive.

If <x> represents a scalar field, scalar subfield, scalar parameter or scalar MIB attribute:
— if "<x> is" is used in a context that relates to the testing or setting the value of "<x>" this usage is to be interpreted as though written "the value of <x> is"
— "<x> indicate(s)" is to be interpreted as though written "the value of <x> indicate(s)"
— "indicated by <x>" is to be interpreted as though written "indicated by the value of <x>"
— "<x> that indicate" is to be interpreted as though written "<x> whose value indicates"

If <x> represents a frame, element, subelement, structured field, structured subfield, structured parameter or structured MIB attribute:
— "<x> indicate(s)" is to be interpreted as though written "the contents of <x> indicate"
— "indicated by <x>" is to be interpreted as though written "indicated by the contents of <x>"
— "<x> that indicate" is to be interpreted as though written "<x> whose contents indicate"

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If <x> represents a SAP primitive:

— "<x> indicate(s)" is to be interpreted as though written "the (or an) invocation of <x> indicates"

— "indicated by <x">" is to be interpreted as though written "indicated by the (or an) invocation of <x>"

The construction of descriptions for uses of the SHA family of hash algorithms [HMAC-]SHA-<1,256,384>[-*n*] is used to refer to hash algorithms/HMACs where square brackets indicate optional information, and *n* is an integer indicating the length, in bits, of the output when truncating.

A construction of the form "the x element can be included in a, b and c frames" or "the x element can be present in a, b and c frames" is not to be understood as being a complete list of frames in which the element might be present.

Constructions of the form that a frame, MPDU or A-MPDU is transmitted with a certain TXVECTOR parameter, or received with a certain RXVECTOR parameter, are to be understood as referring to the TXVECTOR or RXVECTOR parameter, respectively, corresponding to the PSDU containing the frame, MPDU or A-MPDU. Similarly, constructions of the form that a PPDU is transmitted with a certain TXVECTOR parameter, or received with a certain RXVECTOR parameter, are to be understood as referring to the TXVECTOR or RXVECTOR parameter, respectively, corresponding to the PSDU contained in the PPDU.

References in this standard to a "<name> frame", where <name> corresponds to one of the Management frame subtypes, are to be understood as being to a "<name> MMPDU, where the MMPDU is carried in the frame body of one or more Management frames with the Subtype field value corresponding to <name>, plus information from the MPDU headers (the Management frame subtype and the addresses)".

References in this standard to a "<name> request", where <name> corresponds to one of the Measurement Types in Table 9-98 is equivalent to (according to context) a) "a Spectrum Measurement Request frame or Radio Measurement Request frame carrying a Measurement Request element with the Measurement Type field equal to <name>" or b) "a Measurement Request element with the measurement type field equal to <name>".

An ASCII or UTF-8 string is a sequence of ASCII or UTF-8 encoded code points, respectively, without a terminating null.

References in this standard to "<adjective> STA" correspond to a specific instance of a STA implementation that will statically support and execute the <adjective> feature or role for the lifetime of the instance. Such a STA implementation may be capable of a different configuration where <adjective> is not supported (or even a mutually exclusive state is supported instead), but the switch from support to nonsupport of <adjective> is beyond the scope of this standard. The <adjective> support is to be understood as static for the lifetime of the instance, unless explicitly discussed otherwise.

References in this standard to "FILS authentication frame" or "SAE authentication frame" are to be understood as references to an Authentication frame that contains fields and elements for FILS or SAE (respectively) operation per Table 9-41.

1.5 Terminology for mathematical, logical, and bit operations

Floor (x), also written as $\lfloor x \rfloor$, is the largest integer smaller than or equal to x. For example, Floor (2.3) is 2 and Floor (–2.3) is –3. The two parameter form, Floor (x, y), is the largest multiple of y smaller than or equal to x; this operator is not used in this standard if y is negative. For example, Floor (3.3, 2) is 2 and Floor (–3.3, 2) is –4.

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Ceil (x), also written as $\lceil x \rceil$ is the smallest integer larger than or equal to x. For example, Ceil (2.3) is 3 and Ceil (–2.3) is –2. The two parameter form, Ceil (x, y), is the smallest multiple of y larger than or equal to x; this operator is not used in this standard if y is negative. For example, Ceil (2.3, 2) is 4 and Ceil (–2.3, 2) is –2.

Round (x) is the integer closest to x, rounding values with a fractional part of 0.5 away from zero. For example, Round (2.3) is 2, Round (2.5) is 3, Round (–2.3) is –2 and Round (–2.5) is –3.

x mod y is the remainder when x is divided by y; this operator is not used in this standard if y is negative; the result is positive even if x is negative. For example, 5 mod 3 is 2 and –5 mod 3 is 1.

The symbol ⊕ represents bitwise exclusive OR (XOR).

log2 (x) is the logarithm of x to the base 2. For example, log2 (32) is 5.

Re (z) is the real part of complex number z. Im (z) is the imaginary part of complex number z (not including the factor i). For example, Re ($1 – 2i$) is 1 and Im ($1 – 2i$) is –2.

x && y is the short-circuiting Boolean AND.

x || y is the concatenation of x and y, except in code, where it sometimes is the short-circuiting Boolean OR (as determined by the context).

!x is the Boolean NOT.

x >> y is x logically shifted right (i.e., zeros are inserted at the most significant end) by y; this operator is not used in this standard if y is negative.

x << y is x shifted left (i.e., zeros are inserted at the least significant end) by y; this operator is not used in this standard if y is negative.

x == y is Boolean equality.

x != y Boolean inequality.

x & y, where x and y are numbers, is the bitwise AND of x and y.

x | y, where x and y are numbers, is the bitwise OR of x and y.

0x introduces a hexadecimal number. For example, 0x12 is 18 decimal.

L(S, F, N) is bits F to F+N–1 of the bit string S starting from the left, using the IEEE 802.11 bit conventions from 9.2.2.

Truncate-N(S) is bits 0 to N–1 of the bit string S starting from the left, using the IEEE 802.11 bit conventions from 9.2.2). Other bits are irretrievably deleted.

exp(x) is e to the power x, where e is the base of natural logarithms.

A[b:c] is the bit string consisting of bits b to c of A, where bit 0 of the output is the value of bit b. This operator is not used in this standard with b larger than c.

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int(*S*) is the numeric value of bit string *S*, where bit 0 of S is the least significant bit, using the IEEE 802.11 bit conventions from 9.2.2.

NOTE—The *int* operator applied to a (portion of a) MAC address implies that octet 0 of the MAC address is the least significant octet under this operator.[1]

bin[*x*, *k*] is the operator that casts decimal value *x* into *k* bits binary vector, where *x* is less than 2^k.

[1] NOTEs in text, tables, and figures of a standard are given for information only and do not contain requirements needed to implement the standard. Lettered footnotes to tables and figures, however, are normative.

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2. Normative references

The following referenced documents are indispensable for the application of this standard (i.e., they must be understood and used; therefore, each referenced document is cited in the text and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) at the time of publication of this standard applies.

3GPP TS 24.302, Access to the 3GPP Evolved Packet Core (EPC) via non-3GPP access networks; Stage 3.[2]

ETSI EN 301 893, Broadband Radio Access Networks (BRAN); 5 GHz high performance RLAN (latest Official Journal of the European Union published version).[3]

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IEEE Std 802.1X™-2010, IEEE Standard for Local and Metropolitan Area Networks—Port-Based Network Access Control.

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[2] 3GPP™ documents are available from the 3rd Generation Partnership Project Web site (http://www.3gpp.org).
[3] ETSI documents are available from the European Telecommunications Standards Institute (http://www.etsi.org).
[4] FIPS publications are available from the National Technical Information Service (NTIS) (http://csrc.nist.gov).
[5] The IEEE standards or products referred to in this clause are trademarks owned by The Institute of Electrical and Electronics Engineers, Inc.
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[7] IEFT documents (i.e., RFCs) are available from the Internet Engineering Task Force (http://tools.ieft.org/).

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[8] ISO publications are available from the ISO Central Secretariat (http://www.iso.ch/).

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[9] See http://www.currency-iso.org/en/home/tables/table-a1.html

[10] ISO/IEC publications are available from the ISO Central Secretariat (http://www.iso.ch/). ISO/IEC publications are also available in the United States from the American National Standards Institute (http://www.ansi.org/).

[11] The numbers in brackets correspond to the numbers of the bibliography in Annex A.

[12] ITU publications are available from the International Telecommunications Union (http://www.itu.int/).

[13] NIST publications are available from the National Institute of Standards and Technology (http://csrc.nist.gov/).

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3. Definitions, acronyms, and abbreviations

3.1 Definitions

For the purposes of this standard, the following terms and definitions apply. The *IEEE Standards Dictionary Online* should be referenced for terms not defined in this clause.[15]

access control: The prevention of unauthorized usage of resources.

access point (AP): An entity that contains one station (STA) and provides access to the distribution system services, via the wireless medium (WM) for associated STAs. An AP comprises a STA and a distribution system access function (DSAF).

access point (AP) reachability: An AP is reachable by a station (STA) if preauthentication messages can be exchanged between the STA and the target AP via the distribution system (DS).

NOTE—Preauthentication is defined in 12.6.10.2.

additional authentication data (AAD): Data that are not encrypted, but are cryptographically protected.

admission control: An algorithm intended to prevent the violation of parameterized service commitments made by the network to admitted flows by controlling the admittance of a new flow into a resource constrained network.

aggregate medium access control (MAC) protocol data unit (A-MPDU): A structure that contains one or more MPDUs and is transported by a physical layer (PHY) as a single PHY service data unit (PSDU).

aggregate medium access control (MAC) protocol data unit (A-MPDU) subframe: A portion of an A-MPDU that contains a delimiter and optionally contains an MPDU plus any necessary padding.

aggregate medium access control (MAC) service data unit (A-MSDU): A structure that contains one or more MSDUs and is transported within a single (unfragmented) data medium access control (MAC) protocol data unit (MPDU).

aggregate medium access control (MAC) service data unit (A-MSDU) subframe: A portion of an A-MSDU that contains a header and associated MSDU.

antenna connector: The measurement point of reference for radio frequency (RF) measurements in a station (STA). The antenna connector is the point in the STA architecture representing the input of the receiver (output of the antenna) for radio reception and the input of the antenna (output of the transmitter) for radio transmission. In systems using multiple antennas or antenna arrays, the antenna connector is a virtual point representing the aggregate output of (or input to) the multiple antennas. In systems using active antenna arrays with processing, the antenna connector is the output of the active array, which includes any processing gain of the active antenna subsystem.

antenna selection (ASEL) receiver: A station (STA) that performs receive ASEL.

antenna selection (ASEL) transmitter: A station (STA) that performs transmit ASEL.

[14] OMA publications are available from the Open Mobile Alliance (http://openmobilealliance.org/).

[15] *IEEE Standards Dictionary Online* is available at http://dictionary.ieee.org/. An IEEE account is required for access to the dictionary, and one can be created at no charge on the dictionary sign-in page.

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antenna weight vector (AWV): A vector of weights describing the excitation (amplitude and phase) for each element of an antenna array.

association: The service used to establish a mapping between an access point (AP) or personal basic service set (PBSS) control point (PCP), and a station (STA) and enable STA invocation of the distribution system services (DSSs).

authenticated encryption with associated data (AEAD): A cipher mode that performs authenticated encryption of a plaintext, with associated data that is authenticated but not encrypted.

authentication: The service used to establish the identity of one station (STA) as a member of the set of STAs authorized to associate with another STA.

Authentication Server (AS): An entity that provides an authentication service to an Authenticator. This service determines, from the credentials provided by the Supplicant, whether the Supplicant is authorized to access the services provided by the Authenticator. (IEEE Std 802.1X-2010[16])

Authenticator: An entity at one end of a point-to-point local area network (LAN) segment that facilitates authentication of the entity attached to the other end of that link. (IEEE Std 802.1X-2010)

authenticator address (AA): The medium access control (MAC) address of the IEEE 802.1X Authenticator's STA.

authorization: The act of determining whether a particular right, such as access to a resource, is granted to an entity.

NOTE—See IETF RFC 2903 [B35].

authorized: To be explicitly allowed.

average noise plus interference power indicator (ANIPI): A medium access control (MAC) indication of the average noise plus interference power measured on a channel that meets the two simultaneous conditions: 1) the station (STA) is not transmitting a frame, and 2) the station (STA) is not receiving a frame addressed to it.

azimuth: The horizontal orientation of the front surface of a station or of a radio antenna system's main lobe measured clockwise from true north.

basic service area (BSA): The area containing the members of a basic service set (BSS). It might contain members of other BSSs.

basic service set (BSS): A set of stations (STAs) that have successfully synchronized using the JOIN service primitives[17] and one STA that has used the START primitive. Alternatively, a set of STAs that have used the START primitive specifying matching mesh profiles where the match of the mesh profiles has been verified via the scanning procedure. Membership in a BSS does not imply that wireless communication with all other members of the BSS is possible.

basic service set (BSS) max idle period: A time period during which the access point (AP) does not disassociate a station (STA) due to nonreceipt of frames from that STA.

[16] Information on references can be found in Clause 2.
[17] Description of these primitives can be found in 6.3.4.

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basic service set (BSS) transition: Change of association by a station (STA) from one BSS to another BSS in the same extended service set (ESS).

beamformee: A station (STA) that receives a physical layer (PHY) protocol data unit (PPDU) that was transmitted using a beamforming steering matrix.

beamformer: A station (STA) that transmits a physical layer (PHY) protocol data unit (PPDU) using a beamforming steering matrix.

beamforming: A spatial filtering mechanism used at a transmitter to improve the received signal power or signal-to-noise ratio (SNR) at an intended receiver. *Syn:* **beam steering**.

beamforming steering matrix: A matrix determined using knowledge of the channel between a transmitter and an intended receiver that maps from space-time streams to transmit antennas with the goal of improving the signal power or signal-to-noise ratio (SNR) at the intended receiver.

beacon integrity group temporal key (BIGTK): A random value, assigned by the access point (AP), that is used to protect Beacon frames from that AP.

big endian: The concept that, for a given multi-octet numeric representation, the most significant octet has the lowest address.

broadcast address: A unique group address that specifies all stations (STAs).

calibration initiator: A station (STA) that initiates a calibration sequence.

calibration responder: A station (STA) that transmits during a calibration sequence in response to a transmission by a calibration initiator.

candidate peer mesh station (STA): A neighbor mesh STA to which a mesh peering has not been established but meets eligibility requirements to become a peer mesh STA.

certificate authority (CA): An entity that vouches for the binding between a device's identity, its public key, and associated keying material (such as key validity period and key usage).

channel: An instance of wireless medium (WM) use for the purpose of passing physical layer (PHY) protocol data units (PDUs) between two or more stations (STAs).

channel spacing: The difference between the center frequencies of two nonoverlapping and adjacent channels of the radio transmitter.

cipher suite: A set of one or more algorithms, designed to provide data confidentiality, data authenticity or integrity, and/or replay protection.

clear channel assessment (CCA) function: The logical function in the physical layer (PHY) that determines the current state of use of the wireless medium (WM).

collocated interference: Interference that is caused by another radio or station (STA) emitting radio energy located in the same physical device as the reporting STA, where the reported characteristics of the interference are known a priori without interference detection, measurement, or characterization by the reporting STA.

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collocated radio: A radio capable of emitting radio-frequency energy located in the same physical device as the reporting station (STA), where the radio's type and some link characteristics are known without signal detection or measurement by the reporting STA.

configuration profile: A collection of parameters identified by a profile identifier (ID) that represent a current or available configuration of a station (STA).

contiguous transmission: A transmission that uses only one frequency segment.

coordination function: The logical function that determines when a station (STA) is permitted to transmit protocol data units (PDUs) via the wireless medium (WM).

counter mode with cipher-block chaining message authentication code (CCM): A symmetric key block cipher mode providing confidentiality using counter mode (CTR) and data origin authenticity using cipher-block chaining message authentication code (CBC-MAC).

NOTE—See IETF RFC 3610.

cryptographic encapsulation: The process of generating the cryptographic payload from the plaintext data. This comprises the cipher text as well as any associated cryptographic state required by the receiver of the data, e.g., initialization vectors (IVs), sequence numbers, message integrity codes (MICs), key identifiers.

data confidentiality: A property of information that prevents disclosure to unauthorized individuals, entities, or processes.

deauthentication service: The service that voids an existing authentication relationship.

decapsulate: To recover an unprotected frame from a protected one.

decapsulation: The process of generating plaintext data by decapsulating an encapsulated frame.

dependent station (STA): A STA that is not registered and whose operational parameters are dictated by messages it receives from an enabling STA. Once enabled by the dynamic STA enablement (DSE) process, a dependent STA's continued operation becomes contingent upon being able to receive messages from its enabling STA over the wireless medium (WM).

destination mesh station (STA): A mesh STA that is the final destination of a MAC service data unit (MSDU). This mesh STA might reside in a proxy mesh gate that might forward the MSDU to a STA outside of the mesh basic service set (MBSS). A destination mesh STA might be an end station as defined in IEEE Std 802.

direct link: A bidirectional link from one quality-of-service (QoS) station (STA) to another QoS STA operating in the same infrastructure QoS basic service set (BSS) that does not pass through a QoS access point (AP). Once a direct link has been set up, all frames between the two QoS STAs are exchanged directly.

directed frame: *See:* **individually addressed**.

directed multicast service (DMS): A service in which the access point (AP) transmits group addressed frames as individually addressed frames to the requesting non-AP station (STA).

disassociation service: The service that removes an existing association.

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distributed coordination function (DCF): A class of coordination function where the same coordination function logic is active in every station (STA) in the basic service set (BSS) whenever the network is in operation.

distribution system (DS): A system used to interconnect a set of basic service sets (BSSs) and integrated local area networks (LANs) to create an extended service set (ESS).

distribution system access function (DSAF): A function within an access point (AP) or mesh gate that uses the medium access control (MAC) service and distribution system service (DSS) to provide access between the distribution system (DS) and the wireless medium (WM). Within a general link (GLK) AP or GLK mesh station (STA), the DSAF also switches GLK traffic to the GLK convergence function and from there to the IEEE 802.1Q bridge port.

distribution system medium (DSM): The medium or set of media used by a distribution system (DS) for communications between access points (APs), mesh gates, and the portal of an extended service set (ESS).

distribution system service (DSS): The set of services provided by the distribution system (DS) that enable the medium access control (MAC) to transport MAC service tuples between stations (STAs) that are not in direct communication with each other over a single instance of the wireless medium (WM).

NOTE 1—These services include transport of MAC service tuples between the access points (APs) of basic service sets (BSSs) within an extended service set (ESS), transport of MAC service tuples between the portal and BSSs within an ESS, transport of MAC service tuples between mesh gates in the same or different mesh basic service sets (MBSSs), transport of MAC service tuples between mesh gates and APs, transport of MAC service tuples between mesh gates and a portal, and transport of MAC service tuples between STAs in the same BSS when the MAC service tuples has a group destination address or the destination is an individual address and the STA is associated with an AP.

NOTE 2—DSSs are provided between pairs of MACs not on the same instance of the WM.

dynamic frequency selection (DFS): Facilities mandated to satisfy requirements in some regulatory domains for radar detection and uniform channel spreading in the 5 GHz band. These facilities might also be used for other purposes, such as automatic frequency planning.

dynamic station (STA) enablement (DSE): The process by which an enabling STA grants permission and dictates operational procedures to STAs that are subject to its control.

effective isotropic radiated power (EIRP): The equivalent power of a transmitted signal in terms of an isotropic (omnidirectional) radiator. The EIRP equals the product of the transmitter power and the antenna gain (reduced by any coupling losses between the transmitter and antenna).

emergency alert system (EAS): A U.S. national public warning system.

enabling station (STA): A registered STA that has the authority to control when and how a dependent STA can operate. An enabling STA communicates an enabling signal to its dependents over the wireless medium (WM). An enabling STA chooses whether other dynamic STA enablement (DSE) messages are exchanged over the air, over the distribution system (DS), or by mechanisms that rely on transport via higher layers.

encapsulate: To construct a protected frame from an unprotected frame.

encapsulation: The process of generating a protected frame by encapsulating plaintext data.

extended service area (ESA): The area within which members of an extended service set (ESS) can communicate. An ESA is larger than or equal to a basic service area (BSA) and might involve several basic service sets (BSSs) in overlapping, disjointed, or both configurations.

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extended service set (ESS): A set of one or more interconnected basic service sets (BSSs) that appears as a single BSS to the logical link control (LLC) layer at any station (STA) associated with one of those BSSs.

extended service set (ESS) transition: Change of association by a station (STA) from one basic service set (BSS) in one ESS to another BSS in a different ESS.

fast basic service set (BSS) transition: Change of association by a station (STA) that is from one BSS in one extended service set (ESS) to another BSS in the same ESS and that minimizes the amount of time that the data connectivity is lost between the STA and the distribution system (DS).

fast session transfer (FST): The transfer of a session from a channel to another channel, in the same or different frequency bands. The term "session" refers to non-physical layer state information kept by a pair of stations (STAs) that communicate directly (i.e., excludes forwarding).

fixed station (STA): A STA that is physically attached to a specific location. In licensed bands, a fixed STA might be authorized to operate only at a specific location.

forwarding information: The information maintained by a mesh station (STA) that allows the mesh STA to perform its path selection and forwarding functions.

frame: A unit of data exchanged between peer protocol entities.

frame exchange sequence: A sequence of frames specified by Annex G.

frequency segment: A contiguous block of spectrum used by a transmission.

Gaussian frequency shift keying (GFSK): A modulation scheme in which the data are first filtered by a Gaussian filter in the baseband and then modulated with a simple frequency modulation.

geolocation: A location within an earth-centric frame of reference.

group: The entities in a wireless network, e.g., an access point (AP) and its associated stations (STAs), or all of the STAs in an independent basic service set (IBSS) network.

group address: A medium access control (MAC) address that has the group bit equal to 1. *Syn*: **multicast address**.

group addressed: When applied to a medium access control (MAC) service data unit (MSDU), it is an MSDU with a group address as the destination address (DA). When applied to a MAC protocol data unit (MPDU), it is an MPDU with a group address in the Address 1 field. *Syn*: **multicast**.

group master key (GMK): An auxiliary key that might be used to derive a group temporal key (GTK).

group temporal key (GTK): A random value, assigned by the group source, which is used to protect group addressed medium access control (MAC) protocol data units (MPDUs) from that source. The GTK might be derived from a group master key (GMK).

hidden station (STA): A STA whose transmissions are not detected using carrier sense (CS) by a second STA, but whose transmissions interfere with transmissions from the second STA to a third STA

homogeneous extended service set (ESS): A collection of basic service sets (BSSs), which may or may not be within the same extended service set (ESS), in which every subscription service provider network (SSPN) or other external network reachable at one BSS is reachable at all of them.

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idle power indicator (IPI): A physical layer (PHY) indication of the total channel power (noise and interference) as measured in the channel at the receiving antenna connector while the station (STA) is idle, i.e., neither transmitting nor receiving a frame.

IEEE 802.1X authentication: Extensible Authentication Protocol (EAP) authentication transported by the IEEE 802.1X protocol.

independent basic service set (IBSS): A basic service set (BSS) that forms a self-contained network, and in which no access to a distribution system (DS) is available.

independent basic service set (IBSS) station (STA): A STA that has started or joined an IBSS.

individual address: A medium access control (MAC) address in which the group bit is 0. *Syn:* **directed address**, **unicast address**.

individually addressed: When applied to a medium access control (MAC) service data unit (MSDU), it is an MSDU with an individual address as the destination address (DA). When applied to a MAC protocol data unit (MPDU), it is an MPDU with an individual address in the Address 1 field. *Syn:* **directed, unicast**.

infrastructure: An infrastructure comprises a distribution system (DS), one or more more access points(APs), zero or one portals, and zero or more mesh gates. It is also the logical location of distribution and integration service functions of an extended service set (ESS).

infrastructure authorization information: The information that specifies the access rights of the user of a non-access-point (non-AP) station (STA). This information might include the rules for routing the user traffic, a set of permissions about services that a user is allowed to access, quality-of-service (QoS) configuration information, or the accounting policy to be applied by the infrastructure.

integration service: The service that enables delivery of medium access control (MAC) service data units (MSDUs) between the distribution system (DS) and a local area network (LAN) (via a portal).

integrity group temporal key (IGTK): A random value, assigned by the broadcast/multicast source station (STA), which is used to protect group addressed medium access control (MAC) management protocol data units (MMPDUs) from that source STA.

link margin: Ratio of the received signal power to the minimum required by the station (STA). The STA might incorporate rate information and channel conditions, including interference, into its computation of link margin. The specific algorithm for computing the link margin is implementation dependent.

link metric: A criterion used to characterize the performance, quality, and eligibility of a link.

little endian: The concept that, for a given multi-octet numeric representation, the least significant octet has the lowest address.

liveness: A demonstration that the peer is actually participating in this instance of communication.

location subject local: The term used when a location request is for the location of the requesting station (STA), i.e., when the requesting STA asks, “Where am I?”

location subject remote: The term used when a location request is for the location of the reporting station (STA), i.e., when the requesting STA asks, “Where are you?”

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location subject third party: The term used when the location request is for the location of a station (STA) other than the requesting STA or the requested STA, (i.e., when the requesting STA asks, "Where is he/she?")

master session key (MSK): Keying material that is derived between the Extensible Authentication Protocol (EAP) peer and exported by the EAP method to the Authentication Server (AS).

NOTE—In this standard, this key is at least 64 octets in length.

medium access control (MAC) frame: The unit of data exchanged between MAC entities. *Syn:* **medium access control (MAC) protocol data unit (MPDU)**.

NOTE—In contexts in which the MAC is clearly the subject, "frame" is an implicit reference to a MAC frame.

medium access control (MAC) protocol data unit (MPDU): The unit of data exchanged between two peer MAC entities using the services of the physical layer (PHY). *Syn:* **medium access control (MAC) frame**.

medium access control (MAC) service data unit (MSDU): Information that is delivered as a unit between MAC service access points (SAPs).

medium access control (MAC) service tuple: The collection of a MAC service data unit (MSDU) along with the associated source address, destination addresses, priority, drop eligibility, service class, optional set of service_access_point_identifiers, and optional indication of whether the supplied MSDU is in Ethertype protocol discrimination (EPD) or logical link control (LLC) protocol discrimination (LPD) format, which are all passed as parameters across the MAC service access point (SAP) and are all except the service_access_point_identifiers delivered across the distribution system between access points (APs), mesh gates, and the portal of an extended service set (ESS).

mesh basic service set (MBSS): A basic service set (BSS) that forms a self-contained network of mesh stations (STAs) that use the same mesh profile. An MBSS contains zero or more mesh gates, and can be formed from mesh STAs that are not in direct communication.

mesh facility: The set of enhanced functions, channel access rules, frame formats, mutual authentication methods, and managed objects used to provide data transfer among autonomously operating stations (STAs) that might not be in direct communication with each other over a single instance of the wireless medium. Communication between STAs using the mesh facility takes place using only the wireless medium. The mesh facility transports a medium access control (MAC) service data unit (MSDU) between source and destination STAs over potentially multiple hops of the wireless medium without transiting the MAC service access point (SAP) at intermediate STAs.

mesh gate: Any entity that has a mesh station (STA) function and a distribution system access function (DSAF) to provide access to a single distribution system for the mesh basic service set (MBSS).

mesh link: A link from one mesh station (STA) to a neighbor mesh STA that have a mesh peering with each other.

mesh neighborhood: The set of all neighbor mesh stations (STAs) of a particular mesh STA.

mesh path: A concatenated set of mesh links from a source mesh station (STA) to a destination mesh STA.

mesh path selection: The process of selecting a mesh path.

mesh peering: A relationship between two mesh stations (STAs) that is required for direct communication over a single instance of the wireless medium (WM). A mesh peering is established with a mesh peering protocol.

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mesh profile: A set of values of parameters that identifies the attributes of the mesh basic service set (MBSS) and that is used in a single MBSS.

NOTE—The mesh profile consists of the identifiers that are the values for the parameters: mesh identifier (ID), active path selection protocol, active path selection metric, congestion control mode, synchronization method, and authentication protocol.

mesh services: The set of services that enable the creation and operation of a mesh basic service set (MBSS).

mesh station (STA): A quality-of-service (QoS) STA that implements the mesh facility.

message integrity code (MIC): A value generated by a cryptographic function. If the input data are changed, a new value cannot be correctly computed without knowledge of the cryptographic key(s) used by the cryptographic function.

NOTE—This is traditionally called a *message authentication code* (MAC), but the acronym MAC is already reserved for another meaning in this standard.

mobile station (STA): A type of STA that uses network communications while in motion.

mobility domain: A set of basic service sets (BSSs), within the same extended service set (ESS), that support fast BSS transitions between themselves and that are identified by the set's mobility domain identifier (MDID).

mobility domain identifier (MDID): An identifier that names a mobility domain.

multicast: *See:* **group addressed**.

multicast address: *See:* **group address**.

multicast-group address: A medium access control (MAC) address associated by higher level convention with a group of logically related stations (STAs).

multi-level precedence and preemption (MLPP): A framework used with admission control for the treatment of traffic streams based on precedence, which supports the preemption of an active traffic stream by a higher precedence traffic stream when resources are limited. Preemption is the act of forcibly removing a traffic stream in progress in order to free up resources for another higher precedence traffic stream.

multiple basic service set identifier (BSSID) capability: The capability to advertise information for multiple BSSIDs using a single Beacon or Probe Response frame instead of using multiple Beacon or Probe Response frames, each corresponding to a single BSSID, and the capability to indicate buffered frames for these multiple BSSIDs using a single traffic indication map (TIM) element in a single Beacon or TIM frame.

multiple input, multiple output (MIMO): A physical layer (PHY) configuration in which both transmitter and receiver use multiple antennas.

multiple medium access control (MAC) station management entity (SME) (MM-SME): Component of station management that manages multiple cooperating stations (STAs).

multi-user multiple input, multiple output (MU-MIMO): A technique by which multiple stations (STAs), each with one or more antennas, either simultaneously transmit to a single STA or simultaneously receive from a single STA independent data streams over the same radio frequencies.

NOTE—IEEE Std 802.11 supports only downlink (DL) MU-MIMO. *See* downlink multi-user multiple input, multiple output (DL-MU-MIMO) (in 3.2).

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neighbor access point (AP): Any AP that is a potential service set transition candidate.

neighbor station (STA): A STA in the following relationship: STA A is a neighbor to STA B if STA A can both directly transmit to and receive from STA B over the wireless medium.

network access identifier (NAI): The user identity submitted by the Supplicant during IEEE 802.1X authentication.

NOTE—See IETF RFC 4282.

network access server (NAS) client: The client component of a NAS that communicates with the Authentication Server (AS).

network allocation vector (NAV): An indicator, maintained by each station (STA), of time periods when transmission onto the wireless medium (WM) is not initiated by the STA regardless of whether the STA's clear channel assessment (CCA) function senses that the WM is busy.

next-hop mesh station (STA): The next peer mesh STA on the mesh path to the destination mesh STA.

non-access-point (non-AP) station (STA): A STA that is not contained within an access point (AP).

nonce: A numerical value, used in cryptographic operations associated with a given cryptographic key, that is not to be reused with that key, including over all reinitializations of the system through all time.

noncontiguous transmission: A transmission that uses nonadjacent frequency segments.

nonoperating channel: A channel that is not the operating channel of the basic service set (BSS) of which the station (STA) is a member.

non-quality-of-service (non-QoS) access point (AP): An AP that does not support the quality-of-service (QoS) facility.

non-quality-of-service (non-QoS) basic service set (BSS): A BSS that does not support the quality-of-service (QoS) facility.

non-quality-of-service (non-QoS) station (STA): A STA that does not support the quality-of-service (QoS) facility.

operating channel: The operating channel is the channel in which beacons are transmitted.

NOTE—In IEEE Std 802.11, the serving access point (AP) of an infrastructure basic service set (BSS) or the dynamic frequency selection (DFS) owner of an independent basic service set (IBSS) transmits beacons.

operating channel width: The channel width in which the station (STA) is currently able to receive.

overlapping basic service set (OBSS): A basic service set (BSS) operating on the same channel as the station's (STA's) BSS and within (either partly or wholly) its basic service area (BSA).

over-the-air fast basic service set (BSS) transition (FT): An FT method in which the station (STA) communicates over a wireless medium (WM) link to the target access point (AP).

over-the-DS (distribution system) fast basic service set (BSS) transition (FT): An FT method in which the station (STA) communicates with the target access point (AP) via the current AP.

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pairwise: Referring to, or an attribute of, two entities that are associated with each other, e.g., an access point (AP) and an associated station (STA), or two STAs in an independent basic service set (IBSS) network. This term is used to refer to a type of encryption key hierarchy pertaining to keys shared by only two entities.

pass-phrase: A secret text string employed to corroborate the user's identity.

password: A shared, secret, and potentially low-entropy word, phrase, code, or key used as a credential for authentication purposes.

NOTE—The method of distribution of a password to the units in the system is outside the scope of this standard.

path metric: An aggregate multi-hop criterion used to characterize the performance, quality, and eligibility of a mesh path.

peer mesh station (STA): A mesh STA to which a mesh peering has been established.

peer-to-peer link: A direct link within a quality-of-service (QoS) basic service set (BSS), a tunneled direct-link setup (TDLS) link, or a station-to-station (STA-to-STA) communication in an independent basic service set (IBSS).

peer-to-peer traffic specification (PTP TSPEC): The quality-of-service (QoS) characteristics of a data flow between non-access point (non-AP) QoS stations (STAs).

perfect forward secrecy (PFS): A property of a key agreement protocol that protects a session key derived from a set of long-term public and private keys from being compromised if one of the (long-term) private keys is compromised in the future.

per-frame encryption key: A unique encryption key constructed for each medium access control (MAC) protocol data unit (MPDU).

physical layer (PHY) frame: The unit of data exchanged between PHY entities. *Syn:* **physical layer (PHY) protocol data unit (PPDU)**.

NOTE—In contexts in which the PHY is clearly the subject, "frame" is an implicit reference to a PHY frame.

physical layer (PHY) protocol data unit (PPDU): The unit of data exchanged between two peer PHY entities to provide the PHY data service.

piggyback: The overloading of data with an acknowledgment of a previously received frame to the station (STA) to which the data is directed.

portable station (STA): A type of station (STA) that might be moved from location to location, but that uses network communications only while at a fixed location.

portal: The logical point at which the integration service is provided.

NOTE—For the purposes of this Standard, there is at most one portal in a given extended service set's (ESS's) infrastructure. In an implementation, a single logical portal function may be provided by multiple devices that provide integration services for the ESS. How such multiple devices coordinate to appear as a single logical portal is implementation dependent.

precursor mesh station (STA): A neighbor peer mesh STA on the mesh path to the destination mesh STA, that identifies the mesh STA as the next-hop mesh STA.

preshared key (PSK): A static key that is distributed to the units in the system by some out-of-band means.

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primary channel: The common channel of operation for all stations (STAs) that are members of the basic service set (BSS). For example, in a 20 MHz, 40 MHz, 80 MHz, 160 MHz or 80+80 MHz BSS the primary channel is a primary 20 MHz channel.

prioritized quality of service (QoS): The provisioning of service in which the medium access control (MAC) protocol data units (MPDUs) with higher priority are given a preferential treatment over MPDUs with a lower priority.

NOTE—Prioritized QoS is provided through the enhanced distributed channel access (EDCA) mechanism.

protection mechanism: Any procedure that attempts to update the network allocation vector (NAV) of all receiving stations (STAs) prior to the transmission of a frame that might or might not be detected as valid network activity by the physical layer (PHY) entities at those receiving STAs.

protection mechanism frame: Any frame that is sent as part of a protection mechanism procedure.

protocol instance: An execution of a particular protocol that consists of the state of the communicating parties as well as the messages exchanged.

proxy mesh gate: A mesh gate acting as an intermediary for IEEE 802 stations (STAs) outside the mesh basic service set (MBSS).

pseudorandom function (PRF): A function that hashes various inputs to derive a pseudorandom value. In order to ensure liveness of a communication in which a pseudorandom value is used, a nonce is used as one of the inputs to the function.

public safety answering point (PSAP): A physical location where emergency calls are received and routed to the appropriate emergency service dispatch center.

NOTE—See NENA 08-002 [B57].

quadrature binary phase shift keying (QBPSK): A binary phase shift keying modulation in which the binary data is mapped onto the imaginary (Q) axis.

quality-of-service (QoS) access point (AP): An AP that supports the QoS facility.

NOTE—In IEEE Std 802.11, the functions of a QoS AP are a superset of the functions of a non-QoS AP, and thus a QoS AP is able to function as a non-QoS AP to non-QoS stations (STAs).

quality-of-service (QoS) basic service set (BSS): A BSS that provides the QoS facility. An infrastructure QoS BSS contains a QoS access point (AP).

quality-of-service (QoS) facility: The set of enhanced functions, channel access rules, frame formats, frame exchange sequences and managed objects used to provide parameterized and prioritized QoS.

quality-of-service (QoS) independent basic service set (IBSS): An IBSS in which one or more of its stations (STAs) support the QoS facility.

quality-of-service (QoS) station (STA): A STA that implements the QoS facility.

NOTE—A QoS STA acts as a non-QoS STA when associated in a non-QoS basic service set (BSS).

radio frequency (RF) chain: The physical entity that is able to act as a receive chain or transmit chain, or both.

reassociation service: The service that enables an established association [between access point (AP) and station (STA)] to be transferred from one AP to another (or the same) AP.

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receive chain: The physical entity that implements any necessary signal processing to provide the received signal to the digital baseband. Such signal processing includes filtering, amplification, down-conversion, and sampling.

receive power: Mean power measured at the antenna connector.

received channel power indicator (RCPI): An indication of the total channel power (signal, noise, and interference) of a received frame measured on the channel and at the antenna connector used to receive the frame.

received power indicator (RPI): A quantized measure of the received power level as seen at the antenna connector.

registered location: The geolocation of a station (STA) registered in accordance with the requirements for the regulatory domain.

registered location query protocol (RLQP): The query protocol for registered location information that is received and transported by generic advertisement service (GAS) Public Action frames.

registered location secure server (RLSS): An entity that accesses and manages a database that organizes storage of information by geographic location and securely holds the location and some operating parameters of one or more basic service sets (BSSs).

registered station (STA): A STA for which information needs to be submitted to an appropriate regulatory or coordination authority before it is allowed to transmit.

remote request broker (RRB): The component of the station management entity (SME) of an access point (AP) that supports fast basic service set (BSS) transitions over the distribution system (DS).

roaming consortium: A group of subscription service providers (SSPs) having inter-SSP roaming agreements.

service hash: A value used for representing a service. This value is formed from a hash of the service name.

service set identifier (SSID): A string used to identify the infrastructure basic service sets (BSSs) that comprise an extended service set (ESS), or to identify a non-infrastructure BSS.

service set transition: A station (STA) movement from one basic service set (BSS) to another BSS, i.e., either a BSS transition or an extended service set (ESS) transition.

serving access point (AP): The AP to which the station (STA) is associated.

single-user multiple input, multiple output (SU-MIMO): A technique by which a station (STA) with more than one antenna either transmits to or receives from a single STA independent space-time streams over the same radio frequencies.

single-user (SU) physical layer (PHY) protocol data unit (PPDU): A PPDU with a format that is capable of carrying only a single PHY service data unit (PSDU), or no PSDU.

sounding: The use of preamble training fields to measure the channel for purposes other than demodulation of the Data portion of the physical layer (PHY) protocol data unit (PPDU) containing the training fields.

NOTE—These uses include calculation of transmit steering, calculation of recommended modulation and coding scheme (MCS), and calculation of calibration parameters.

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source mesh station (STA): A mesh STA from which a medium access control (MAC) service data unit (MSDU) enters the mesh basic service set (MBSS). A source mesh STA is either a mesh STA that is the source of an MSDU or a proxy mesh gate that receives an MSDU from a STA outside of the MBSS and forwards the MSDU on a mesh path.

space-time stream (STS): Stream of modulation symbols created by applying a combination of spatial and temporal processing to one or more spatial streams of modulation symbols.

spatial multiplexing (SM): A transmission technique in which data streams are transmitted on multiple spatial channels that are provided through the use of multiple antennas at the transmitter and the receiver.

spatial stream: One of several streams of bits or modulation symbols that might be transmitted over multiple spatial dimensions that are created by the use of multiple antennas at both ends of a communications link.

station (STA): A logical entity that is a singly addressable instance of a medium access control (MAC) and physical layer (PHY) interface to the wireless medium (WM).

NOTE—For IEEE 802.11 purposes, a station is any MAC/PHY entity providing the IEEE 802.11 MAC services. This differs from the IEEE 802 definition of 'station,' which includes bridges (or 'end stations') that are endpoints of link layer data traffic.

station service (SS): The set of services that support transport of medium access control (MAC) service data units (MSDUs) between stations (STAs) within a basic service set (BSS).

subscription service provider (SSP): An organization (operator) offering connection to network services, perhaps for a fee.

subscription service provider network (SSPN): The network controlled by a subscription service provider (SSP). The network maintains user subscription information.

Supplicant: An entity at one end of a point-to-point local area network (LAN) segment that is being authenticated by an Authenticator attached to the other end of that link. (IEEE Std 802.1X-2010)

Supplicant address (SPA): The medium access control (MAC) address of the IEEE 802.1X Supplicant's STA.

television white spaces (TVWS): The opportunistic use of allocated but not assigned spectrum—spectrum allocated for broadcast television, but with no assignment at a particular location.

time unit (TU): A measurement of time equal to 1024 μs.

traffic category (TC): A label for medium access control (MAC) service data units (MSDUs) that have a distinct user priority (UP), as viewed by higher layer entities, relative to other MSDUs provided for delivery over the same link. Traffic categories are meaningful only to MAC entities that support quality of service (QoS) within the MAC data service. These MAC entities determine the UP for MSDUs belonging to a particular traffic category using the priority value provided with those MSDUs at the MAC service access point (MAC SAP).

traffic classification (TCLAS): The specification of one of several types of matching filter to classify protocol data units (PDUs) or medium access control (MAC) service data units (MSDUs) as belonging to a particular traffic stream (TS). Depending on the type of classification, the filter is applied within the MAC sublayer management entity (MLME), above the MAC, or within the MAC itself.

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traffic filter: A set of traffic specifications defined by the use of traffic classification (TCLAS) elements that are utilized by the traffic filtering service (TFS) to identify specific allowed frames.

traffic filtering service (TFS): A service provided by an access point (AP) to a non-AP station (STA) to reduce the number of frames sent to the non-AP STA by not forwarding individually addressed frames addressed to the non-AP STA that do not match traffic filters specified by the non-AP STA.

traffic identifier (TID): Any of the identifiers usable by higher layer entities to distinguish medium access control (MAC) service data units (MSDUs) to MAC entities that support quality of service (QoS) within the MAC data service.

NOTE—There are 16 possible TID values; eight identify traffic categories (TCs), and the other eight identify parameterized traffic streams (TSs). The TID is assigned to an MSDU in the layers above the MAC.

traffic specification (TSPEC): The quality-of-service (QoS) characteristics of a data flow to and from a QoS station (STA).

traffic stream (TS): A set of medium access control (MAC) service data units (MSDUs) to be delivered subject to the quality-of-service (QoS) parameter values provided to the MAC in a particular traffic specification (TSPEC). TSs are meaningful only to MAC entities that support QoS within the MAC data service. These MAC entities determine the TSPEC applicable for delivery of MSDUs belonging to a particular TS using the priority parameter provided with those MSDUs at the MAC service access point (MAC SAP).

transmission opportunity (TXOP): An interval of time during which a particular quality-of-service (QoS) station (STA) has the right to initiate frame exchange sequences onto the wireless medium (WM).

NOTE—A TXOP is defined by a starting time and a maximum duration.

transmit chain: The physical entity that implements any necessary signal processing to generate the transmit signal from the digital baseband. Such signal processing includes digital to analog conversion, filtering, amplification and upconversion.

trusted third party (TTP): An entity that is relied upon to vouch for two parties in a pairwise authentication protocol.

type/length/value (TLV): A format that consists of a type, a length, and a value.

unauthorized disclosure: The process of making information available to unauthorized individuals, entities, or processes.

unauthorized resource use: The use of a resource not consistent with the defined security policy.

unicast: *See*: **individually addressed**.

unicast address: *See:* **individual address**.

uniform spreading: A regulatory requirement for a channel selection mechanism that provides uniform usage across a minimum set of channels in the regulatory domain.

unreachable destination: A destination mesh station (STA) for which the link to the next hop of the mesh path to this destination mesh STA is no longer usable.

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user priority (UP): A value associated with an medium access control (MAC) service data unit (MSDU) that indicates how the MSDU is to be handled. The UP is assigned to an MSDU in the layers above the MAC.

validated AP: An AP that has either been explicitly configured as a neighbor or learned through a mechanism such as the Beacon report.

wildcard basic service set identifier (BSSID): A BSSID value used to represent all BSSIDs.

NOTE—In IEEE Std 802.11, this is represented by all binary 1s.

wildcard service set identifier (SSID): An SSID value used to represent all SSIDs.

NOTE—In IEEE Std 802.11, this is represented by the value "null".

wireless medium (WM): The medium used to implement the transfer of protocol data units (PDUs) between peer physical layer (PHY) entities of a wireless local area network (LAN).

3.2 Definitions specific to IEEE Std 802.11

The following terms and definitions are specific to terms or references in this standard and are not appropriate for inclusion in the *IEEE Standards Dictionary Online*.

1 MHz mask physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted using the 1 MHz transmit spectral mask defined in Clause 23 and that is a 1 MHz sub 1 GHz (S1G) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW1).

1 MHz physical layer (PHY) protocol data unit (PPDU): A Clause 23 1 MHz sub 1 GHz (S1G) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW1).

2 MHz mask physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted using the 2 MHz transmit spectral mask defined in Clause 23 and that is one of the following:

a) A 1 MHz sub 1 GHz (S1G) non-duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW1).
b) A 2 MHz S1G non-duplicate or S1G 1 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW2).

2 MHz physical layer (PHY) protocol data unit (PPDU): A Clause 23 2 MHz sub 1 GHz (S1G) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW2) or a Clause 23 2 MHz S1G 1 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW2).

4 MHz mask physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted using the 4 MHz transmit spectral mask defined in Clause 23 and that is one of the following:

a) A 1 MHz sub 1 GHz (S1G) non-duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW1).
b) A 2 MHz S1G non-duplicate or S1G 1 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW2).
c) A 4 MHz S1G non-duplicate, or S1G 1 MHz duplicate, or S1G 2 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW4).

4 MHz physical layer (PHY) protocol data unit (PPDU): A Clause 23 4 MHz sub 1 GHz (S1G) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW4), a Clause 23 4 MHz S1G 1 MHz duplicate

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PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW4), or a Clause 23 4 MHz S1G 2 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW4).

4-way handshake: A pairwise key management protocol defined by this standard. This handshake confirms mutual possession of a pairwise master key (PMK) by two parties and distributes a group temporal key (GTK).

8 MHz mask physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted using the 8 MHz transmit spectral mask defined in Clause 23 and that is one of the following:

a) A 1 MHz sub 1 GHz (S1G) non-duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW1).
b) A 2 MHz S1G non-duplicate or S1G 1 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW2).
c) A 4 MHz S1G non-duplicate, or S1G 1 MHz duplicate, or S1G 2 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW4).
d) An 8 MHz S1G non-duplicate, or S1G 1 MHz duplicate, or S1G 2 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW8).

8 MHz physical layer (PHY) protocol data unit (PPDU): A Clause 23 8 MHz sub 1 GHz (S1G) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW8), a Clause 23 8 MHz S1G 1 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW8), or a Clause 23 8 MHz S1G 2 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW8).

16 MHz mask physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted using the 16 MHz transmit spectral mask defined in Clause 23 and that is one of the following:

a) A 1 MHz sub 1 GHz (S1G) non-duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW1).
b) A 2 MHz S1G non-duplicate or S1G 1 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW2).
c) A 4 MHz S1G non-duplicate, or S1G 1 MHz duplicate, or S1G 2 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW4).
d) An 8 MHz S1G non-duplicate, or S1G 1 MHz duplicate, or S1G 2 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW8).
e) A 16 MHz S1G non-duplicate, or S1G 1 MHz duplicate, or S1G 2 MHz duplicate (TXVECTOR parameter CH_BANDWIDTH equal to CBW16).

16 MHz physical layer (PHY) protocol data unit (PPDU): A Clause 23 16 MHz sub 1 GHz (S1G) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW16), a Clause 23 16 MHz S1G 1 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW16), or a Clause 23 16 MHz S1G 2 MHz duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW16).

20 MHz basic service set (BSS): A BSS in which there is a primary 20 MHz channel and no secondary channel.

20 MHz high-throughput (HT): A Clause 19 transmission with the TXVECTOR parameter FORMAT equal to HT_MF or HT_GF and TXVECTOR parameter CH_BANDWIDTH equal to HT_CBW20.

20 MHz mask physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs:

a) A Clause 17 PPDU transmitted using the 20 MHz transmit spectral mask defined in Clause 17.
b) A Clause 18 orthogonal frequency division multiplexing (OFDM) PPDU transmitted using the transmit spectral mask defined in Clause 18.

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c) A high-throughput (HT) PPDU with the TXVECTOR parameter CH_BANDWIDTH equal to HT_CBW20 and the CH_OFFSET parameter equal to CH_OFF_20 transmitted using the 20 MHz transmit spectral mask defined in Clause 19.

d) A very high throughput (VHT) PPDU with the TXVECTOR parameter CH_BANDWIDTH equal to CBW20 transmitted using the 20 MHz transmit spectral mask defined in Clause 21.

e) A Clause 17 PPDU transmitted by a VHT STA using the 20 MHz transmit spectral mask defined in Clause 21.

f) An HT PPDU with the TXVECTOR parameter CH_BANDWIDTH equal to HT_CBW20 and the CH_OFFSET parameter equal to CH_OFF_20 transmitted by a VHT STA using the 20 MHz transmit spectral mask defined in Clause 21.

20 MHz physical layer (PHY) protocol data unit (PPDU): A Clause 15 PPDU, Clause 17 PPDU (when using 20 MHz channel spacing), Clause 16 PPDU, Clause 18 orthogonal frequency division multiplexing (OFDM) PPDU, Clause 19 20 MHz high-throughput (HT) PPDU with the TXVECTOR parameter CH_BANDWIDTH equal to HT_CBW20, or Clause 21 20 MHz very high throughput (VHT) PPDU with the TXVECTOR parameter CH_BANDWIDTH equal to CBW20.

20/40 MHz basic service set (BSS): A BSS in which the supported channel width of the access point (AP) or dynamic frequency selection (DFS) owner (DO) station (STA) is 20 MHz and 40 MHz (Channel Width field is equal to 1) and the Secondary Channel Offset field is equal to a value of secondary channel above (SCA) or secondary channel below (SCB).

40 MHz high-throughput (HT): A Clause 19 transmission with the TXVECTOR parameter FORMAT equal to HT_MF or HT_GF and TXVECTOR parameter CH_BANDWIDTH equal to HT_CBW40.

40 MHz mask physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs:

a) A 40 MHz high-throughput (HT) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to HT_CBW40) transmitted using the 40 MHz transmit spectral mask defined in Clause 19.

b) A 40 MHz non-HT duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to NON_HT_CBW40) transmitted by a non-very high throughput (non-VHT) STA using the 40 MHz transmit spectral mask defined in Clause 19.

c) A 40 MHz non-HT duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW40) transmitted by a very high throughput (VHT) STA using the 40 MHz transmit spectral mask defined in Clause 21.

d) A 20 MHz HT PPDU with the TXVECTOR parameter CH_BANDWIDTH equal to HT_CBW20 and the CH_OFFSET parameter equal to either CH_OFF_20U or CH_OFF_20L transmitted using the 40 MHz transmit spectral mask defined in Clause 19.

e) A 20 MHz VHT PPDU with the TXVECTOR parameter CH_BANDWIDTH equal to CBW20 transmitted using the 40 MHz transmit spectral mask defined in Clause 21.

f) A 40 MHz VHT PPDU with the TXVECTOR parameter CH_BANDWIDTH equal to CBW40 transmitted using the 40 MHz transmit spectral mask defined in Clause 21.

g) A 40 MHz HT PPDU (TXVECTOR parameter CH_BANDWIDTH equal to HT_CBW40) transmitted by a VHT STA using the 40 MHz transmit spectral mask defined in Clause 21.

h) A 20 MHz non-HT PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW20) transmitted using the 40 MHz transmit spectral mask defined in Clause 19.

i) A 20 MHz non-HT PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW20) transmitted by a VHT STA using the 40 MHz transmit spectral mask defined in Clause 21.

40 MHz physical layer (PHY) protocol data unit (PPDU): A 40 MHz high-throughput (HT) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to HT_CBW40), or a 40 MHz non-HT duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to NON_HT_CBW40 or TXVECTOR parameter

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CH_BANDWIDTH equal to CBW40), or a 40 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW40).

40-MHz-capable (40MC) high-throughput (HT) access point (AP): An HT AP that included a value of 1 in the Supported Channel Width Set subfield (indicating its capability to operate on a 40 MHz channel) of its most recent transmission of a frame containing an HT Capabilities element.

40-MHz-capable (40MC) high-throughput (HT) access point (AP) 2G4: An HT AP 2G4 that is also a 40MC HT AP.

40-MHz-capable (40MC) high-throughput (HT) access point (AP) 5G: An HT AP 5G that is also a 40MC HT AP.

40-MHz-capable (40MC) high-throughput (HT) station (STA): An HT STA that included a value of 1 in the Supported Channel Width Set subfield (indicating its capability to operate on a 40 MHz channel) of its most recent transmission of a frame containing an HT Capabilities element.

40-MHz-capable (40MC) high-throughput (HT) station (STA) 2G4: An HT STA 2G4 that is also a 40MC HT STA.

40-MHz-capable (40MC) high-throughput (HT) station (STA) 5G: An HT STA 5G that is also a 40MC HT STA.

80 MHz mask physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted using the 80 MHz transmit spectral mask defined in Clause 21 and that is one of the following:

a) An 80 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW80).
b) An 80 MHz non-high-throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW80).
c) A 20 MHz non-HT, high-throughput (HT), or VHT PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW20).
d) A 40 MHz non-HT duplicate, HT, or VHT PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW40).

80 MHz physical layer (PHY) protocol data unit (PPDU): A Clause 21 80 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW80) or a Clause 21 80 MHz non-high-throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW80).

80+80 MHz mask physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted using the 80+80 MHz transmit spectral mask defined in Clause 21 and that is one of the following:

a) An 80+80 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW80+80).
b) An 80+80 MHz non-high-throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW80+80).

80+80 MHz physical layer (PHY) protocol data unit (PPDU): A Clause 21 80+80 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW80+80) or a Clause 21 80+80 MHz non-high-throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW80+80).

160 MHz mask physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted using the 160 MHz transmit spectral mask defined in Clause 21 and that is one of the following:

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a) A 160 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW160).
b) A 160 MHz non-high-throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW160).
c) A 20 MHz non-HT, high-throughput (HT), or VHT PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW20).
d) A 40 MHz non-HT duplicate, HT, or VHT PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW40).
e) An 80 MHz non-HT duplicate or VHT PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW80).

160 MHz physical layer (PHY) protocol data unit (PPDU): A Clause 21 160 MHz very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW160) or a Clause 21 160 MHz non-high-throughput (non-HT) duplicate PPDU (TXVECTOR parameter CH_BANDWIDTH equal to CBW160).

access category (AC): A label for the common set of enhanced distributed channel access (EDCA) parameters that are used by a quality-of-service (QoS) station (STA) to contend for the channel in order to transmit medium access control (MAC) service data units (MSDUs) with certain priorities.

access network query protocol (ANQP): The query protocol for access network information retrieval transported by generic advertisement service (GAS) Public Action frames.

access period: A time period during a beacon interval established in a directional multi-gigabit (DMG) basic service set (BSS).

access point (AP) path: Path between two tunneled direct-link setup (TDLS) peer stations (STAs) via the AP with which the STAs are currently associated.

active mode: A power management mode in which a nonmesh station (STA) remains in the awake state, and a mesh power management mode with respect to a neighbor peer mesh STA in which a mesh station remains in the awake state and is expected to receive frames from this neighbor peer mesh STA.

advanced groupcast with retries (GCR): A set of features comprising the GCR block acknowledgment retransmission policy and the GCR service period (GCR-SP) delivery method.

advertisement protocol: Access network query protocol (ANQP) and higher layer protocols defined external to this standard that are used for network and service discovery.

advertisement server: A logical server that provides the information repository for a specific advertisement protocol. The location of the physical server that instantiates the advertisement server is outside the scope of this standard.

aggregated schedule: The aggregation of delivery and/or poll schedules by the quality-of-service (QoS) access point (AP) for a particular QoS station (STA) into a single service period (SP).

attached bridge: An IEEE 802.1Q bridge that has one or more bridge port Enhanced Internal Sublayer Service (EISS) interfaces supported by general links (GLKs) provided by a GLK access point (AP), GLK non-AP station (STA), GLK mesh STA, or GLK independent basic service set (IBSS) STA.

authentication and key management (AKM) suite: A set of one or more algorithms designed to provide authentication and key management, either individually or in combination with higher layer authentication and key management algorithms outside the scope of this standard.

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average noise power indicator (ANPI): A medium access control (MAC) indication of the average noise plus interference power measured when the channel is idle as defined by three simultaneous conditions: 1) the virtual carrier sense (CS) mechanism indicates idle channel, 2) the station (STA) is not transmitting a frame, and 3) the STA is not receiving a frame.

awake beacon interval (A-BI): In a directional multi-gigabit (DMG) basic service set (BSS) or personal basic service set (PBSS), a beacon interval of a power save mode wakeup schedule during which a station (STA) is expected to be in the awake state during several portions of the beacon interval.

bandwidth signaling transmitter address (TA): A TA that is used by a very high throughput (VHT) station (STA) to indicate the presence of additional signaling related to the bandwidth to be used in subsequent transmission in an enhanced distributed channel access (EDCA) transmission opportunity (TXOP). It is represented by the IEEE medium access control (MAC) individual address of the transmitting VHT STA but with the Individual/Group bit set to 1.

base channel: Primary channel of the basic service set (BSS) of the access point (AP) with which the tunneled direct-link setup (TDLS) peer station (STA) is associated with an access point (AP).

basic channel unit (BCU): For television very high throughput (TVHT) operation, 6 MHz, 7 MHz, or 8 MHz, depending on the regulatory domain.

basic modulation and coding scheme (MCS) set: The set of MCS values that are supported by all high-throughput (HT) stations (STAs) that are members of an HT basic service set (BSS).

basic space-time block coding (STBC) modulation and coding scheme (MCS): An MCS value and STBC encoder specification used in the transmission of STBC-encoded Control frames and STBC-encoded group addressed frames.

beacon header interval (BHI): The period of time that starts at the target beacon transmission time (TBTT) of a beacon interval of a directional multi-gigabit (DMG) basic service set (BSS) and that ends no later than the beginning of the data transfer interval (DTI) of the beacon interval.

beacon interval: The time interval between two consecutive target beacon transmission times (TBTTs).

beacon transmission interval (BTI): The time interval between the start of the first Directional Multi-gigabit (DMG) Beacon frame transmission by a DMG station (STA) in a beacon interval to the end of the last DMG Beacon frame transmission by the STA in the same beacon interval.

bufferable medium access control (MAC) management protocol data unit (MMPDU): An MMPDU that is eligible to be queued for delivery using a power saving mechanism (see Table 11-2).

bufferable unit (BU): A medium access control (MAC) service data unit (MSDU), aggregate MAC service data unit (MSDU) [quality-of-service (QoS) stations (STAs) only], or bufferable MAC management protocol data unit (MMPDU).

centralized authentication controlled (CAC) station (STA): A sub 1 GHz (S1G) non-access point (non-AP) STA with dot11S1GCentralizedAuthenticationControlActivated equal to true. A CAC STA supports a CAC access point (AP) to alleviate wireless medium contention when a large number of STAs are trying to, or are expected to, reconnect to the AP at about the same time.

centralized authentication controller (CAC) access point (AP): A sub 1 GHz (S1G) AP with dot11S1GCentralizedAuthenticationControlActivated equal to true. A CAC AP is able to alleviate wireless medium contention when a large number of stations (STAs) are trying to, or are expected to, reconnect to the AP at about the same time.

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centralized coordination service root (CCSR): An entity that provides synchronization and configuration services to synchronization access points (S-APs).

centralized coordination service set (CCSS): The collection of one centralized coordination service root (CCSR) and a set of one or more synchronization access points (S-APs) that are stationary with respect to their local environment while operating and are connected to the CCSR.

China directional multi-gigabit (CDMG): Pertaining to directional multi-gigabit (DMG) operation and where the channel is contained within the Chinese 60 GHz frequency band.

China directional multi-gigabit (CDMG) physical layer (PHY) protocol data unit (PPDU): A Clause 24 PPDU.

China directional multi-gigabit small band beacon interval (CDMG SBBI): A value, in units of time units (TUs) represents the length of a beacon interval operating on a 1.08 GHz channel.

China millimeter-wave multi-gigabit (CMMG): Pertaining to operation in a frequency band containing a channel in 42.3 GHz to 47.3 GHz or 47.2 GHz to 48.4 GHz frequency bands.

China millimeter-wave multi-gigabit (CMMG) basic service set (BSS): A BSS in which directional multi-gigabit (DMG) Beacon frames are transmitted by CMMG stations (STAs).

China millimeter-wave multi-gigabit (CMMG) beamformee: A CMMG station (STA) that receives a CMMG physical layer (PHY) protocol data unit (PPDU) that was transmitted using a beamforming steering matrix and that supports the CMMG transmit beamforming feedback mechanism as described in 10.33.

China millimeter-wave multi-gigabit (CMMG) beamformer: A CMMG station (STA) that transmits a CMMG physical layer (PHY) protocol data unit (PPDU) using a beamforming steering matrix.

China millimeter-wave multi-gigabit (CMMG) duplicate physical layer (PHY) protocol data unit (PPDU) format: A PPDU format that duplicates the transmission of a 540 MHz signal over two 540 MHz frequency segments.

China millimeter-wave multi-gigabit (CMMG) physical layer (PHY) protocol data unit (PPDU): A Clause 25 PPDU.

China millimeter-wave multi-gigabit (CMMG) single medium access control (MAC) protocol data unit (CMMG single MPDU): An MPDU that is the only MPDU in an aggregate MPDU (A-MPDU) carried in a CMMG physical layer (PHY) protocol data unit (PPDU) and that is carried in an A-MPDU subframe with the EOF subfield of the MPDU delimiter field equal to 1.

concealed groupcast with retries (GCR) frame: A group addressed frame that is transmitted using the aggregate medium access control (MAC) service data unit (A-MSDU) frame format with the destination address (DA) field set to the GCR concealment address.

contention based access period (CBAP): The time period in the data transfer interval (DTI) of a directional multi-gigabit (DMG) basic service set (BSS) during which enhanced distributed channel access (EDCA) is used.

controlled access phase (CAP): A time period during which the hybrid coordinator (HC) maintains control of the medium. It might span multiple consecutive HCCA transmission opportunities (TXOPs).

data physical layer (PHY) protocol data unit (PPDU): A PPDU containing at least one medium access control (MAC) service data unit (MSDU) or fragment of an MSDU.

deep sleep mode: A mesh power management mode with respect to a neighbor peer mesh STA in which a mesh station (STA) alternates between awake and doze states and is not expected to receive beacons from this neighbor peer mesh STA.

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delivery traffic indication map (DTIM) interval: The interval between the consecutive target beacon transmission times (TBTTs) of beacons containing a DTIM. The value, expressed in time units, is equal to the product of the value in the Beacon Interval field and the value in the DTIM Period subfield in the TIM element in Beacon frames.

delivery-enabled access category (AC): A quality-of-service (QoS) access point (AP) AC where the AP is allowed to use enhanced distributed channel access (EDCA) to deliver traffic from the AC to a QoS station (STA) in an unscheduled service period (SP) triggered by the STA.

destination directional multi-gigabit (DMG) station (STA): A DMG STA identified by the destination association identifier (AID) field contained in a Grant frame or Extended Schedule element that caused the allocation of a service period (SP) or a contention based access period (CBAP).

differentiated initial link setup (DILS): A mechanism for restricting fast initial link setup (FILS) to certain categories of stations.

direct sequence spread spectrum (DSSS) physical layer (PHY) protocol data unit (PPDU): A Clause 15 PPDU.

direct sequence spread spectrum/complementary code keying (DSSS/CCK): A Clause 15 or Clause 16 transmission.

direct sequence spread spectrum/complementary code keying (DSSS/CCK) physical layer (PHY) protocol data unit (PPDU): A Clause 15 or Clause 16 PPDU.

directional multi-gigabit (DMG): Pertaining to operation in a frequency band containing a channel with the channel starting frequency above 45 GHz.

NOTE—The channel starting frequency for IEEE 802.11 stations (STAs) is defined in Annex E.

directional multi-gigabit (DMG) antenna: A DMG antenna is a phased array, a single element antenna, or a set of switched beam antennas covered by a quasi-omni antenna pattern.

directional multi-gigabit (DMG) basic service set (BSS): A BSS in which DMG Beacon frames are transmitted by DMG stations (STAs).

directional multi-gigabit (DMG) frame: A frame transmitted or received within a DMG physical layer (PHY) protocol data unit (PPDU).

directional multi-gigabit (DMG) physical layer (PHY) protocol data unit (PPDU): A Clause 20 PPDU.

directional transmission: A transmission that does not use an omnidirectional antenna pattern or quasi-omni antenna pattern.

downlink: A unidirectional link from an access point (AP) to one or more non-AP stations (STAs) or a unidirectional link from a non-AP destination directional multi-gigabit (DMG) STA to a non-AP source DMG STA.

downlink multi-user multiple input, multiple output (DL-MU-MIMO): A technique by which an access point (AP) with more than one antenna transmits a physical layer (PHY) protocol data unit (PPDU) to multiple receiving non-AP stations (STAs) over the same radio frequencies, wherein each non-AP STA simultaneously receives one or more distinct space-time streams.

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downlink multi-user multiple input, multiple output (DL-MU-MIMO) physical layer (PHY) protocol data unit (PPDU): A PPDU using the DL-MU-MIMO technique.

doze beacon interval (D-BI): In a directional multi-gigabit (DMG) basic service set (BSS) or personal basic service set (PBSS), a beacon interval of a power save mode wakeup schedule during which a station (STA) is expected to be in the doze state for most of the portions of the beacon interval.

dynamic bandwidth operation: A feature of a very high throughput (VHT) station (STA) in which the request-to-send/clear-to-send (RTS/CTS) exchange, using non-high-throughput (non-HT) duplicate physical layer (PHY) protocol data units (PPDUs), negotiates a potentially reduced channel width (compared to the channel width indicated by the RTS) for subsequent transmissions within the current transmission opportunity (TXOP).

dynamic frequency selection (DFS) owner: A station (STA) in an independent basic service set (IBSS) or off-channel tunneled direct link setup (TDLS) direct link that takes responsibility for selecting the next channel after radar is detected operating in a channel. Due to the nature of IBSSs, it cannot be guaranteed that there is a single DFS owner at any particular time and the protocol is robust to this situation.

EAPOL-Key confirmation key (KCK): A key used to integrity-check an EAPOL-Key frame.

EAPOL-Key encryption key (KEK): A key used to encrypt the Key Data field in an EAPOL-Key frame.

EAPOL-Key frame: A Data frame that carries all or part of an IEEE 802.1X EAPOL PDU of type EAPOL-Key.

EAPOL-Key request frame: A Data frame that carries all of part of an IEEE 802.1X EAPOL-Key protocol data unit (PDU) with the Request bit in the Key Information field in the IEEE 802.11 Key Descriptor set to 1.

EAPOL-Start frame: A Data frame that carries all or part of an IEEE 802.1X EAPOL PDU of type EAPOL-Start.

emergency services association: A robust security network association (RSNA) between an access point (AP) and a non-AP station (STA) without security credentials; the non-AP STA is granted access to emergency services using unprotected frames via this association.

energy limited (EL) station (STA): A sub 1 GHz (S1G) STA whose limited energy supply requires the STA to transmit or receive in certain intervals of time determined by an EL Operation element.

enhanced distributed channel access (EDCA): The prioritized carrier sense multiple access with collision avoidance (CSMA/CA) access mechanism used by quality-of-service (QoS) stations (STAs) in a QoS basic service set (BSS) and STAs operating outside the context of a BSS. This access mechanism is also used by the QoS access point (AP) and operates concurrently with hybrid coordination function (HCF) controlled channel access (HCCA).

enhanced distributed channel access function (EDCAF): A logical function in a quality-of-service (QoS) station (STA) that determines, using enhanced distributed channel access (EDCA), when a frame in the transmit queue with the associated access category (AC) is permitted to be transmitted via the wireless medium (WM). There is one EDCAF per AC.

extended centralized access point (AP) or personal basic service set (PBSS) control point (PCP) cluster (ECAPC): The collection of 1) a single centralized coordination service set (CCSS), 2) the set of centralized AP or PCP clusters such that each synchronization AP (S-AP) of a centralized AP or PCP cluster

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is within the CCSS, and 3) all stations (STAs) within the basic service sets (BSSs) of the S-APs and member APs and PCPs of the centralized AP or PCP clusters.

extended channel switching (ECS): A procedure that is used to announce a pending change of operating channel, operating class, or both.

extended rate physical layer (ERP): A physical layer (PHY) compliant with Clause 18.

extended rate physical layer (ERP) physical layer (PHY) protocol data unit (PPDU): A Clause 18 PPDU that is not a Clause 16 PPDU.

extended rate physical layer (PHY) using complementary code keying (CCK) modulation (ERP-CCK): A mode of operation of a PHY operating under Clause 18 rules, where MODULATION=ERP-CCK.

extended rate physical layer (PHY) using direct sequence spread spectrum (DSSS) modulation (ERP-DSSS): A PHY operating under Clause 18 rules, where MODULATION=ERP-DSSS.

extended rate physical layer (PHY) using direct sequence spread spectrum (DSSS) or complementary code keying (CCK) modulation (ERP-DSSS/CCK): A PHY operating under Clause 18 rules, where MODULATION=ERP-CCK or MODULATION=ERP-DSSS.

extended rate physical layer (PHY) using orthogonal frequency division multiplexing (OFDM) modulation (ERP-OFDM): A mode of operation of a PHY operating under Clause 18 rules, where MODULATION=ERP-OFDM.

extended service set (ESS) link: In the context of an IEEE 802.11 medium access control (MAC) entity, a connection path through the wireless medium between a non-access-point (non-AP) station (STA) and one of the APs that is a member of the ESS.

Extensible Authentication Protocol (EAP) reauthentication protocol (EAP-RP): A protocol, using the EAP framework, that allows single round trip reauthentication with an Authentication Server after an initial EAP authentication.

NOTE—IETF RFC 6696 uses “ERP” for the abbreviation of EAP reauthentication protocol; IEEE Std 802.11 uses “EAP-RP” because “ERP” stands for “Extended Rate PHY” in IEEE Std 802.11.

fast basic service set (BSS) transition (FT) 4-way handshake: A pairwise key management protocol used during FT initial mobility domain association. This handshake confirms mutual possession of a pairwise master key, the PMK-R1, by two parties and distributes a group temporal key (GTK).

fast basic service set (BSS) transition (FT) initial mobility domain association: The first association or first reassociation procedure within a mobility domain, during which a station (STA) indicates its intention to use the FT procedures.

fast basic service set (BSS) transition (FT) originator: A station (STA) that initiates the FT protocol by sending an FT Request frame or an Authentication frame with Authentication Algorithm Number field equal to Fast BSS Transition.

fast initial link setup (FILS): A collection of mechanisms that enable IEEE Std 802.11 networks to minimize initial link setup time.

fast initial link setup (FILS) access point (AP): An access point that implements FILS and for which dot11FILSActivated is true.

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fast initial link setup (FILS) association: A type of association used in fast initial link setup.

fast initial link setup (FILS) authentication: A type of authentication used in fast initial link setup.

fast initial link setup (FILS) station (STA): A station that implements fast initial link setup (FILS) and for which dot11FILSActivated is true.

fine timing measurement (FTM) procedure: A procedure that allows a station (STA) to determine its distance from another STA.

flexible multicast service (FMS): A service that enables a non-access-point (non-AP) station (STA) to request a multicast delivery interval longer than the delivery traffic indication map (DTIM) interval for the purposes of lengthening the period of time a STA can be in a power save state.

flexible multicast service (FMS) stream: A succession of frames transmitted by the access point (AP) that correspond to a single flexible multicast stream identifier (FMSID).

flexible multicast service (FMS) stream set: A collection of FMS streams identified by the value of the FMS Token field, used during the FMS Request procedure.

flexible multicast stream identifier (FMSID): An identifier assigned by the access point (AP) to a particular group addressed stream subsequent to a successful FMS Request.

fragmentation: The process of partitioning a medium access control (MAC) service data unit (MSDU) or MAC management protocol data unit (MMPDU) into a sequence of smaller MAC protocol data units (MPDUs) prior to transmission. The process of recombining a set of fragment MPDUs into an MSDU or MMPDU is known as defragmentation. These processes are described in 5.8.1.9 of ISO/IEC 7498-1:1994.

future channel guidance: future channel guidance communicates likely future channel information so that STAs can efficiently move their activity when the absence of Beacon frames is noticed.

general link (GLK): A point-to-point connection between two instances of the IEEE 802.1D Internal Sublayer Service that uses an IEEE 802.11 wireless link between stations (STAs). A general link is suitable for use in an IEEE 802.1Q bridged network.

general link (GLK) convergence function: The convergence function defined in IEEE Std 802.1AC-2016 between an IEEE 802.11 medium access control (MAC) and an IEEE 802.1Q bridge.

general link groupcast with retries (GLK-GCR): A variant of GCR that specifies the use of GCR for general link.

general link (GLK) station (STA): A STA that implements GLK functionality.

generic advertisement service (GAS): An over-the-air transportation service that provides over-the-air transportation for frames of higher layer advertisements between stations (STAs) or between an advertisement server and a non-access-point (non-AP) STA. The protocol(s) used to relay frames between an AP, portal, and advertisement server is outside the scope of this standard. GAS supports higher layer protocols that employ a query/response mechanism.

geolocation database (GDB): A database whose operation is mandated or authorized by a regulatory authority and that organizes storage of information by geographic location.

geolocation database dependent (GDD): A modifier describing when station (STA) operation is dependent on information received from a geolocation database (GDB).

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geolocation database dependent (GDD) access point (AP): A station (STA) dependent on information received from a geolocation database (GDB) in order to initiate and maintain a network.

geolocation database dependent (GDD) dependent station (STA): A STA that is under the control of a GDD enabling STA.

geolocation database dependent (GDD) enabling station (STA): A STA that has the authority to control the operation of GDD dependent STAs after obtaining available spectrum for use at its own location.

geolocation database dependent (GDD) fixed station (STA): A STA whose geographical location information is fixed and maintained in a geolocation database (GDB) and whose operation depends on information received from that database.

geolocation database dependent (GDD) geolocated non-access point (non-AP) station (STA): A STA that is not an AP and is authorized by a geolocation database (GDB) to operate at its current location.

geolocation database dependent (GDD) non-access point (non-AP) station (STA): A STA that is not an AP but operates under the control of a GDD enabling STA.

global operating class: An operating class value that is any of the nonreserved values in Table E-4.

group addressed bufferable unit (BU): A group addressed medium access control (MAC) service data unit (MSDU) or group addressed bufferable MAC management protocol data unit (MMPDU).

group addressed quality-of-service management frame (GQMF): A group addressed Management frame that is transmitted using the quality-of-service management frame (QMF) service.

group addressed transmission service (GATS): A mechanism comprising directed multicast service (DMS) and groupcast with retries (GCR), for delivery of group addressed frames.

group key handshake: A group key management protocol defined by this standard. It is used only to issue a new group temporal key (GTK) to peers with whom the local station (STA) has already formed security associations.

group temporal key (GTK): A temporal key that is used to protect information exchanged in group addressed Data frames.

group temporal key security association (GTKSA): The context resulting from a successful group temporal key (GTK) distribution exchange via either a group key handshake, a 4-way handshake, or fast initial link setup (FILS) authentication.

groupcast with retries (GCR) active (GCR-A) delivery: A delivery method for a group addressed stream subject to a GCR agreement wherein the frames are transmitted without regard to the power state of non-access-point (non-AP) stations (STAs).

groupcast with retries (GCR) concealment address: A medium access control (MAC) address that is used to prevent group addressed frames transmitted via the GCR unsolicited retry or GCR block ack retransmission policies from being passed up the medium access control service access point (MAC SAP) of GCR-incapable stations (STAs).

groupcast with retries (GCR) frame: A group addressed frame subject to a GCR agreement between the access point (AP) and at least one station (STA) within the infrastructure basic service set (BSS) or between peer mesh STAs in a mesh BSS.

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groupcast with retries (GCR) group address: A group address subject to a GCR agreement between the access point (AP) and at least one station (STA) within the basic service set (BSS) or between peer mesh STAs in a mesh BSS.

groupcast with retries (GCR) service: A means for transmission and retransmission of medium access control (MAC) service data units (MSDUs) to a destination that is a group address. The GCR service provides greater reliability by using group addressed retransmissions, concealed from GCR-incapable stations (STAs).

groupcast with retries (GCR) service period (GCR-SP) aggregate medium access control (MAC) service data unit (A-MSDU): An A-MSDU subject to the GCR service with the delivery method equal to GCR-SP.

groupcast with retries (GCR) service period (GCR-SP) frame: A frame subject to the GCR service when the delivery method is GCR-SP.

groupcast with retries (GCR) service period (GCR-SP) medium access control (MAC) service data unit (MSDU): An MSDU subject to the GCR service with the delivery method equal to GCR-SP.

groupcast with retries (GCR) transmission opportunity (TXOP): An interval of time during which an access point (AP) or a mesh station (STA) has the right to initiate frame exchange sequences onto the wireless medium (WM) for the purpose of transmitting multiple frames that are subject to the GCR service.

high rate direct sequence spread spectrum (HR/DSSS) physical layer (PHY) protocol data unit (PPDU): A Clause 16 PPDU that is not a Clause 15 PPDU.

high-throughput (HT) basic service set (BSS): A BSS in which Beacon frames transmitted by an HT station (STA) include the HT Capabilities element.

high-throughput (HT) beamformee: An HT station (STA) that receives an HT physical layer (PHY) protocol data unit (PPDU) that was transmitted using a beamforming steering matrix and that supports an HT transmit beamforming feedback mechanism.

high-throughput (HT) beamformer: An HT station (STA) that transmits an HT physical layer (PHY) protocol data unit (PPDU) using a beamforming steering matrix.

high-throughput (HT) greenfield (HT-greenfield) format: A physical layer (PHY) protocol data unit (PPDU) format of the HT PHY using the HT-greenfield format preamble.

high-throughput (HT) immediate (HT-immediate) block acknowledgment (Ack): An immediate block ack mechanism that requires the use of the compressed BlockAck frame and an implicit block ack request and allows partial-state operation at the recipient. This block ack scheme is negotiated between two HT or directional multi-gigabit (DMG) stations (STAs).

high-throughput (HT) mixed (HT-mixed) format: A physical layer (PHY) protocol data unit (PPDU) format of the HT PHY using the HT-mixed format preamble.

high-throughput (HT) modulation and coding scheme (HT-MCS): A specification of the HT physical layer (PHY) parameters that consists of modulation order (e.g., BPSK, QPSK, 16-QAM, 64-QAM), forward error correction (FEC) coding rate (e.g., 1/2, 2/3, 3/4, 5/6), and number of spatial streams (NSS) and that is used in an HT PHY protocol data unit (PPDU).

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high-throughput (HT) null data PPDU (NDP) announcement: A physical layer (PHY) protocol data unit (PPDU) that contains one or more +HTC frames (i.e., frames with an HT Control field) that have the HT NDP Announcement subfield equal to 1.

high-throughput (HT) physical layer (PHY) protocol data unit (PPDU): A Clause 19 PPDU that is not a Clause 15, Clause 16, Clause 17, or Clause 18 PPDU.

high-throughput (HT) station (STA) 2G4: An HT STA that is also a STA 2G4.

high-throughput (HT) station (STA) 5G: An HT STA that is also a STA 5G.

hybrid coordination function (HCF): A coordination function that combines and enhances aspects of the contention based and contention free access methods to provide quality-of-service (QoS) stations (STAs) with prioritized and parameterized QoS access to the wireless medium (WM), while continuing to support non-QoS STAs for best-effort transfer. The HCF includes the functionality provided by both enhanced distributed channel access (EDCA) and HCF controlled channel access (HCCA).

hybrid coordination function (HCF) controlled channel access (HCCA): The channel access mechanism utilized by the hybrid coordinator (HC) to coordinate contention free media use by quality-of-service (QoS) stations (STAs) for downlink individually addressed, uplink, and direct-link transmissions.

hybrid coordinator (HC): A type of coordinator, defined as part of the quality-of-service (QoS) facility, that implements the frame exchange sequences and medium access control (MAC) service data unit (MSDU) handling rules defined by the hybrid coordination function (HCF).

IEEE 802.11 station (STA): Any station that is compliant with IEEE Std 802.11. Any reference to the term station (STA) in this standard that is not qualified by the term *IEEE 802.11* implicitly refers to an IEEE 802.11 station.

individually addressed bufferable unit (BU): An individually addressed medium access control (MAC) service data unit (MSDU), individually addressed aggregate MAC service data unit (A-MSDU) [quality-of-service (QoS) stations (STAs) only], or individually addressed bufferable MAC management protocol data unit (MMPDU).

individually addressed quality-of-service management frame (IQMF): An individually addressed Management frame that is transmitted using the quality-of-service management frame (QMF) service.

integrity check key (ICK): A key used to integrity check FILS Authentication frames.

interworking service: A service that supports use of an IEEE 802.11 network with non-IEEE-802.11 networks. Functions of the interworking service assist non-access-point (non-AP) stations (STAs) in discovering and selecting IEEE 802.11 networks, in using appropriate quality-of-service (QoS) settings for transmissions, in accessing emergency services, and in connecting to subscription service providers (SSPs).

key counter: A 256-bit (32-octet) counter that is used in the pseudorandom function (PRF) to generate initialization vectors (IVs). There is a single key counter per station (STA) that is global to that STA.

key data encapsulation (KDE): A format for data other than elements in the EAPOL-Key Data field.

key management service: A service to distribute and manage cryptographic keys within a robust security network (RSN).

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light sleep mode: A mesh power management mode with respect to a neighbor peer mesh STA in which a mesh station (STA) alternates between awake and doze states and is expected to receive beacons from this neighbor peer mesh STA.

link: In the context of an IEEE 802.11 medium access control (MAC) entity, a physical path consisting of exactly one traversal of the wireless medium (WM) that is usable to transfer MAC service data units (MSDUs) between two stations (STAs).

link setup: The process of discovering an extended service set (ESS), (secure) association and authentication, and gaining the ability to send higher layer [e.g., Internet Protocol (IP)] traffic with a valid higher layer address through an access point (AP).

location configuration information (LCI): As defined in IETF RFC 6225: includes latitude, longitude, and altitude, with uncertainty indicators for each.

medium access control (MAC) management protocol data unit (MMPDU): The unit of data exchanged between two peer MAC entities, using services of the physical layer (PHY), to implement the MAC management protocol. The MMPDU is transported in one or more Management frames. The MMPDU might include a Mesh Control field or management message integrity code element (Management MIC element), but does not include a MAC header, a frame check sequence (FCS), or any other security encapsulation overhead.

NOTE—The MMPDU occupies a position in the management plane similar to that of the MAC service data unit (MSDU) in the data plane. An MSDU or MMPDU is transmitted in one or more MAC protocol data units (MPDUs) (with the Type field set to Data or Management, respectively). An MSDU can be carried in an aggregate MAC service data unit (A-MSDU). An A-MSDU is transmitted in one MPDU. An MSDU, A-MSDU, or MMPDU can be carried (in an MPDU) in an aggregate MAC protocol data unit (A-MPDU).

mesh awake window: A period of time during which the mesh station (STA) operates in awake state after its Beacon or Probe Response frame transmission that contained the Mesh Awake Window element.

mesh coordination function (MCF): A coordination function that combines aspects of the contention based and scheduled access methods. The MCF includes the functionality provided by both enhanced distributed channel access (EDCA) and MCF controlled channel access (MCCA).

mesh coordination function (MCF) controlled channel access (MCCA): A coordination function for the mesh basic service set (MBSS).

mesh coordination function (MCF) controlled channel access opportunity (MCCAOP): A period of time scheduled for frame transmissions between mesh stations (STAs) using MCF controlled channel access (MCCA).

mesh Data frame: A Data frame that is transmitted by a mesh station (STA).

mesh peer service period: A period of time during which one or more individually addressed frames are transmitted between two peer mesh stations (STAs) with at least one of those mesh STAs operating in light sleep or deep sleep mode. A mesh peer service period is directional and might contain one or more transmission opportunities (TXOPs).

mesh peer service period owner: A mesh station (STA) that obtains transmission opportunities (TXOPs), transmits individually addressed frames to the recipient mesh STA in the mesh peer service period, and terminates the mesh peer service period.

mesh peering management: A group of protocols to facilitate mesh peering establishment and closure.

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mesh power management mode: The activity level identifier of a mesh station (STA) set per mesh peering or for nonpeer neighbor STAs. A lower activity level enables a mesh STA to reduce its power consumption.

mesh power management mode tracking: Operation to observe the peering-specific mesh power management modes from the peer mesh STAs and to maintain the peering-specific mesh power management modes for each peer mesh STA.

message integrity code (MIC) key: Temporal key integrity protocol (TKIP) only: The portion of a transient key used to validate the integrity of medium access control (MAC) service data units (MSDUs) or MAC protocol data units (MPDUs).

method-specific service access point (SAP) (MS SAP): The point at which an instance of the IEEE 802.11 method-specific medium access control (MAC) service is offered.

michael: The message integrity code (MIC) for the temporal key integrity protocol (TKIP).

minimum downlink transmission time (DTT) to uplink transmission time (UTT) [DTT2UTT] spacing: The minimum time within a power save multi-poll (PSMP) sequence between the end of a station's (STA's) PSMP-DTT and the start of its PSMP-UTT.

modulation and coding scheme (MCS): A specification of the physical layer (PHY) parameters that consists of modulation order (e.g., BPSK, QPSK, 16-QAM, 64-QAM, and 256-QAM), forward error correction (FEC) coding rate (e.g., 1/2, 2/3, 3/4, 5/6), and, depending on the context, the number of space-time streams.

modulation and coding scheme 32 (MCS 32) format: A physical layer (PHY) protocol data unit (PPDU) format of the high-throughput (HT) PHY in which signals in two halves of the occupied channel width contain the same information. This HT PPDU format supports the lowest rate.

modulation and coding scheme (MCS) feedback (MFB) requester: A station (STA) that transmits a physical layer (PHY) protocol data unit (PPDU) containing an HT Control field in which the MCS request (MRQ) subfield is equal to 1.

modulation and coding scheme (MCS) feedback (MFB) responder: A station (STA) that transmits a physical layer (PHY) protocol data unit (PPDU) containing an HT Control field with the MFB field containing an MCS index or the value 127 in response to a PPDU containing an HT Control field in which the MCS request (MRQ) subfield is equal to 1.

multiple basic service set identifier (BSSID) set: A collection of cooperating access points (APs), such that all of the APs use a common operating class, channel, and antenna connector.

multiple medium access control (MAC) sublayers link (MMSL): A link between two stations (STAs), wherein one of the STAs is coordinated by a multiple MAC station management entity (MM-SME) that delivered a Multiple MAC Sublayers (MMS) element to the peer STA.

multiple medium access control (MAC) sublayers link (MMSL) cluster: The set of all MMSLs between a pair of stations (STAs).

multi-user (MU) beamformee: A non-access-point (non-AP) station (STA) that receives a physical layer (PHY) protocol data unit (PPDU) that was transmitted using a multi-user beamforming steering matrix and that supports the very high throughput (VHT) transmit beamforming feedback mechanism with a VHT null data PPDU (NDP) Announcement frame that includes more than one STA Info field.

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multi-user (MU) beamformer: An access point (AP) that transmits a physical layer (PHY) protocol data unit (PPDU) using a multi-user beamforming steering matrix.

multi-user (MU) physical layer (PHY) protocol data unit (PPDU): A PPDU that carries one or more PHY service data units (PSDUs) for one or more stations (STAs) using the downlink multi-user multiple input, multiple output (DL-MU-MIMO) technique.

no acknowledgment/no retry (No-Ack/No-Retry): A retransmission policy for group addressed frames in which each frame is transmitted once and without acknowledgment.

non-40-MHz-capable (non-40MC) high-throughput (HT) station (STA): A STA that is not a 40-MHz-capable (40MC) HT STA.

nonaggregate medium access control (MAC) protocol data unit (non-A-MPDU) frame: A frame that is transmitted in a Clause 15 physical layer (PHY) protocol data unit (PPDU), Clause 17 PPDU, Clause 16 PPDU, or Clause 18 orthogonal frequency division multiplexing (OFDM) PPDU; or is transmitted with the TXVECTOR AGGREGATION parameter present and equal to NOT_AGGREGATED; or is a single medium access control (MAC) protocol data unit (S-MPDU).

nonbandwidth signaling transmitter address (TA): An address in the TA field of an medium access control (MAC) protocol data unit (MPDU) in which the Individual/Group bit has the value 0.

nonbufferable medium access control (MAC) management protocol data unit (MMPDU): An MMPDU that is not a bufferable MMPDU.

nonconcealed groupcast with retries (GCR) frame: A group addressed frame that is not transmitted to the GCR concealment address.

nonextended rate physical layer (non-ERP): A physical layer (PHY) compliant with Clause 15 or Clause 16, but not with Clause 18.

nongroupcast with retries (non-GCR): A method for delivering group addressed frames without using the groupcast with retries (GCR) unsolicited retry retransmission policy, the GCR block acknowledgment retransmission policy, or the GCR service period (GCR-SP) delivery method.

nongroupcast with retries service period (non-GCR-SP): A method for the delivery of group addressed frames without the use of a groupcast with retries service period (GCR-SP).

non-high-throughput (non-HT): A modifier meaning neither high throughput (HT) nor very high throughput (VHT).

non-high-throughput (non-HT) duplicate: A transmission format of the physical layer (PHY) that duplicates a 20 MHz non-HT transmission in two or more 20 MHz channels and allows a station (STA) in a non-HT basic service set (BSS) on any one of the 20 MHz channels to receive the transmission. A non-HT duplicate format is one of the following:

a) 40 MHz non-HT duplicate: A transmission format of the PHY that replicates a 20 MHz non-HT transmission in two adjacent 20 MHz channels.
b) 80 MHz non-HT duplicate: A transmission format of the PHY that replicates a 20 MHz non-HT transmission in four adjacent 20 MHz channels.
c) 160 MHz non-HT duplicate: A transmission format of the PHY that replicates a 20 MHz non-HT transmission in eight adjacent 20 MHz channels.

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d) 80+80 MHz non-HT duplicate: A transmission format of the PHY that replicates a 20 MHz non-HT transmission in two frequency segments of four adjacent 20 MHz channels where the two frequency segments of channels are not adjacent.

non-high-throughput (non-HT) duplicate frame: A frame transmitted in a non-HT duplicate physical layer (PHY) protocol data unit (PPDU).

non-high-throughput (non-HT) duplicate in television white spaces (TVWS) band: A transmission format of the physical layer (PHY) that duplicates a single basic channel unit (BCU) non-HT transmission in two or more BCUs and allows a station (STA) in a non-HT basic service set (BSS) on any one BCU to receive the transmission. A non-HT duplicate format is one of the following:

a) TVHT_W non-HT duplicate: A PHY transmission that replicates a non-HT PHY protocol data unit (PPDU) two times in a single BCU.
b) TVHT_2W non-HT duplicate: A PHY transmission that replicates a non-HT PPDU four times in two contiguous BCUs.
c) TVHT_4W non-HT duplicate: A PHY transmission that replicates a non-HT PPDU eight times in four contiguous BCUs.
d) TVHT_W+W non-HT duplicate: A PHY transmission that replicates a non-HT PPDU two times in each single BCU.
e) TVHT_2W+2W non-HT duplicate: A PHY transmission that replicates a non-HT PPDU four times in each of two contiguous BCUs.

non-high-throughput (non-HT) duplicate physical layer (PHY) protocol data unit (PPDU): A PPDU transmitted by a Clause 19 or Clause 21 PHY with the TXVECTOR FORMAT parameter equal to NON_HT and the CH_BANDWIDTH parameter equal to NON_HT_CBW40, CBW40, CBW80, CBW160, or CBW80+80.

non-high-throughput (non-HT) duplicate physical layer (PHY) protocol data unit (PPDU) in television white spaces (TVWS) band: A PPDU transmitted by a Clause 22 PHY with the TXVECTOR parameter FORMAT set to NON_HT and the TXVECTOR parameter CH_BANDWIDTH set to TVHT_W, TVHT_2W, TVHT_4W, TVHT_W+W, or TVHT_2W+2W.

non-high-throughput (non-HT) physical layer (PHY) protocol data unit (PPDU): A PPDU that is transmitted by a Clause 15, Clause 16, Clause 17, or Clause 18 PHY, or not using a TXVECTOR FORMAT parameter equal to HT_MF, HT_GF or VHT.

non-high-throughput (non-HT) SIGNAL field (L-SIG) transmit opportunity (TXOP) protection: A protection mechanism in which protection is established by the non-HT SIG Length and Rate fields indicating a duration that is longer than the duration of the PPDU itself.

nonpeer mesh power management mode: The activity level identifier of a mesh station (STA) toward nonpeer neighbor mesh STAs. Two nonpeer mesh power management modes are defined: active mode and deep sleep mode.

non-personal basic service set (BSS) control point (non-PCP) station (STA): A STA that is not a personal BSS control point (PCP).

nonprimary channel: In a 40 MHz, 80 MHz, 160 MHz, or 80+80 MHz basic service set (BSS), any 20 MHz channel other than the primary 20 MHz channel.

non-quality-of-service management frame (non-QMF) access point (AP): An AP that does not implement the quality-of-service management frame (QMF) service.

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non-quality-of-service management frame (non-QMF) station (STA): A STA that does not implement the quality-of-service management frame (QMF) service.

non-sensor station (STA): A sub 1 GHz (S1G) non-access point (non-AP) STA transmitting or receiving Data frames not subject to limitation of payload size. A non-sensor STA might not have the power and traffic volume limitation expected for a sensor STA.

non-space-time-block-coding (non-STBC) frame: A frame that is transmitted in a physical layer (PHY) protocol data unit (PPDU) that has the TXVECTOR STBC parameter equal to 0, or a frame that is received in a PPDU that has the RXVECTOR STBC parameter equal to 0.

non-traffic indication map (non-TIM) mode: A sub 1 GHz (S1G) non-access point (non-AP) station (STA) power save mode in which an S1G non-AP STA need not listen for traffic indication map (TIM) Beacon frames but transmits at least one PS-Poll or trigger frame to the associated access point (AP) every listen interval.

non-traffic indication map (non-TIM) station (STA): A sub 1 GHz (S1G) non-access point (non-AP) STA that has entered the non-TIM mode.

nontransmitted basic service set (BSS) identifier (BSSID): A BSSID that is not transmitted explicitly, but that can be derived from the information encoded in Probe Response, Beacon and directional multi-gigabit (DMG) Beacon frames and neighbor reports.

null data PPDU (NDP): A physical layer (PHY) protocol data unit (PPDU) that carries no Data field.

null data PPDU (NDP) 1M (NDP_1M): An NDP carrying medium access control (MAC) information (CMI) frame that is transmitted using the S1G_1M format.

null data PPDU (NDP) 2M (NDP_2M): An NDP carrying medium access control (MAC) information (CMI) frame that is transmitted using the S1G_SHORT format.

null data PPDU (NDP) carrying medium access control information (CMAC) PPDU: A physical layer (PHY) protocol data unit (PPDU) with no Data field used by the PHY to provide to the medium access control (MAC) the service of carrying MAC information in the SIGNAL field of the sub 1 GHz (S1G) PPDU.

off-channel: A channel used by a tunneled direct link setup (TDLS) station (STA) that does not overlap the channel(s) used by the access point (AP) with which the TDLS STA is associated.

operating class: An E.1 index into a set of values for radio operation in one or more regulatory domains.

operational modulation and coding scheme (MCS) set: The set of MCSs that a station (STA) is capable of receiving. The operational MCS set is typically advertised in the physical layer (PHY) capabilities element(s), e.g. HT and VHT Capabilities elements.

operational rate set: The set of data rates that a station (STA) is capable of receiving. The operational rate set is advertised in the Supported Rates and BSS Membership Selectors element and, if present, the Extended Supported Rates and BSS Membership Selectors element.

orthogonal frequency division multiplexing (OFDM) physical layer (PHY) protocol data unit (PPDU): A Clause 17 PPDU.

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outside the context of a basic service set (BSS) (OCB): A mode of operation in which a station (STA) is not a member of a BSS and does not utilize IEEE 802.11 authentication, association, or data confidentiality services.

paged association identifier (AID): An AID of a sub 1 GHz (S1G) non-access point (non-AP) station (STA) whose corresponding bit value in a transmitted traffic indication map (TIM) encoded in AID with differential encoding (ADE) mode is 1.

pairwise master key (PMK): The key derived from a key generated by an Extensible Authentication Protocol (EAP) method or obtained directly from a preshared key (PSK).

pairwise master key (PMK) R0 (PMK-R0): The key at the first level of the fast basic service set (BSS) transition (FT) key hierarchy.

pairwise master key (PMK) R0 key holder (R0KH): The component of robust security network association (RSNA) key management of the Authenticator that is authorized to derive and hold the PMK-R0, derive the PMK-R1s, and distribute the PMK-R1s to the R1KHs.

pairwise master key (PMK) R0 key holder identifier (R0KH-ID): An identifier that names the holder of the PMK-R0 in the Authenticator.

pairwise master key (PMK) R0 name (PMKR0Name): An identifier that names the PMK-R0.

pairwise master key (PMK) R1 (PMK-R1): A key at the second level of the fast basic service set (BSS) transition (FT) key hierarchy.

pairwise master key (PMK) R1 key holder (R1KH): The component of robust security network association (RSNA) key management of the Authenticator that receives a PMK-R1 from the R0KH, holds the PMK-R1, and derives the pairwise transient keys (PTKs).

pairwise master key (PMK) R1 key holder identifier (R1KH-ID): An identifier that names the holder of a PMK-R1 in the Authenticator.

pairwise master key (PMK) R1 name (PMKR1Name): An identifier that names a PMK-R1.

pairwise master key (PMK) S0 key holder (S0KH): The component of robust security network association (RSNA) key management of the Supplicant that derives and holds the PMK-R0, derives the PMK-R1s, and provides the PMK-R1s to the S1KH.

pairwise master key (PMK) S0 key holder identifier (S0KH-ID): An identifier that names the holder of the PMK-R0 in the Supplicant.

pairwise master key (PMK) S1 key holder (S1KH): The component of robust security network association (RSNA) key management in the Supplicant that receives a PMK-R1 from the S0KH, holds the PMK-R1, and derives the pairwise transient keys (PTKs).

pairwise master key (PMK) S1 key holder identifier (S1KH-ID): An identifier that names the holder of the PMK-R1 in the Supplicant.

pairwise master key security association (PMKSA): The context resulting from a successful IEEE 802.1X authentication exchange between the peer and Authentication Server (AS) or from a preshared key (PSK).

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pairwise transient key (PTK): A concatenation of session keys derived from the pairwise master key (PMK) or from the PMK-R1.

pairwise transient key (PTK) name (PTKName): An identifier that names the PTK.

pairwise transient key security association (PTKSA): The context resulting from a successful 4-way handshake between a peer and Authenticator or from a successful fast initial link setup (FILS) authentication.

parameterized quality of service (QoS): The treatment of the medium access control (MAC) protocol data units (MPDUs) depends on the parameters associated with the MPDU. Parameterized QoS is primarily provided through the hybrid coordination function (HCF) controlled channel access (HCCA) mechanism, but is also provided by the enhanced distributed channel access (EDCA) mechanism if used with a traffic specification (TSPEC) for admission control.

payload protected (PP) aggregate medium access control (MAC) service data unit (A-MSDU): An A-MSDU that is protected with counter mode (CTR) with cipher-block chaining message authentication code (CBC-MAC) protocol (CCMP) or Galois/counter mode (GCM) protocol (GCMP) but does not include the A-MSDU Present field (bit 7 of the QoS Control field) in the construction of the additional authentication data (AAD).

peer trigger frame: A Mesh Data or quality-of-service (QoS) Null frame that initiates a mesh peer service period.

peer-specific mesh power management mode: The activity level identifier of a mesh station (STA) set per mesh peering. Three peer-specific mesh power management modes are defined: active mode, light sleep mode, and deep sleep mode.

per-frame sequence counter: For temporal key integrity protocol (TKIP), the counter that is used as the nonce in the derivation of the per-frame encryption key. For counter mode with cipher-block chaining message authentication code protocol (CCMP) or Galois/counter mode (GCM) protocol (GCMP), the per-frame initialization vector (IV).

personal basic service set (PBSS): A directional multi-gigabit (DMG) basic service set (BSS) that includes one station (STA) that is in a PBSS control point (PCP), and in which access to a distribution system (DS) is not present.

personal basic service set (PBSS) control point (PCP): An entity that contains one station (STA) and coordinates access to the wireless medium (WM) by STAs that are members of a PBSS.

personal basic service set (PBSS) control point (PCP) or access point (AP) cluster: A single directional multi-gigabit (DMG) synchronization AP or synchronization PCP, plus zero or more neighboring DMG APs or PCPs (or a mixture of both) that join as member APs and PCPs to the synchronization AP or synchronization PCP.

physical layer (PHY) header: The portion of a PHY protocol data unit (PPDU) up to and excluding the first symbol that contains part of the PHY service data unit (PSDU).

power save (PS) mode: A power management mode in which a nonmesh station (STA) alternates between awake and doze states.

power save multi-poll (PSMP): A mechanism that provides a time schedule that is used by an access point (AP) and its stations (STAs) to access the wireless medium. The mechanism is controlled using the PSMP frame.

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power save multi-poll (PSMP) burst: A series of one or more PSMP sequences, separated by short interframe space (SIFS).

power save multi-poll downlink transmission time (PSMP-DTT): A period of time described by a PSMP frame during which the access point (AP) transmits.

power save multi-poll (PSMP) sequence: A sequence of frames in which the first frame is a PSMP frame that is followed by transmissions in zero or more power save multi-poll downlink transmission times (PSMP-DTTs) and then by transmissions in zero or more power save multi-poll uplink transmission times (PSMP-UTTs). The schedule of the PSMP-DTTs and PSMP-UTTs is defined in the PSMP frame.

power save multi-poll (PSMP) session: The relationship between an access point (AP) and one or more stations (STAs) that exists while any traffic stream (TS) exists that uses the PSMP mechanism with the same service period.

power save multi-poll uplink transmission time (PSMP-UTT): A period of time described by a PSMP frame during which a non-access-point (non-AP) station (STA) can transmit.

power save multi-poll uplink transmission time (PSMP-UTT) spacing: The period of time between the end of one PSMP-UTT and the start of the following PSMP-UTT within the same power save multi-poll (PSMP) sequence.

power save (PS) station (STA): A station that is in power save mode.

pre-robust security network association (pre-RSNA): The type of association used by a pair of stations (STAs) if the procedure for establishing authentication or association between them did not include the 4-way handshake, was not fast initial link setup (FILS) authentication, and did not use the fast basic service set (BSS) transition (FT) protocol.

pre-robust security network association (pre-RSNA) station (STA): A STA that is not able to create robust security network associations (RSNAs).

primary 1 MHz channel: In a 2 MHz, 4 MHz, 8 MHz, or 16 MHz sub 1 GHz (S1G) basic service set (BSS), the 1 MHz channel that is used to transmit 1 MHz physical layer (PHY) protocol data units (PPDUs).

primary 2 MHz channel: In a 4 MHz, 8 MHz, or 16 MHz sub 1 GHz (S1G) basic service set (BSS), the 2 MHz channel that is used to transmit 2 MHz physical layer (PHY) protocol data units (PPDUs).

primary 4 MHz channel: In an 8 MHz or 16 MHz sub 1 GHz (S1G) basic service set (BSS), the 4 MHz channel that is used to transmit 4 MHz physical layer (PHY) protocol data units (PPDUs).

primary 8 MHz channel: In a 16 MHz sub 1 GHz (S1G) basic service set (BSS), the 8 MHz channel that is used to transmit 8 MHz physical layer (PHY) protocol data units (PPDUs).

primary 20 MHz channel: In a 40 MHz, 80 MHz, 160 MHz, or 80+80 MHz basic service set (BSS), the 20 MHz channel that is used to transmit 20 MHz physical layer (PHY) protocol data units (PPDUs). In a high-throughput (HT) or very high throughput (VHT) BSS, the primary 20 MHz channel is also the primary channel.

primary 40 MHz channel: In an 80 MHz, 160 MHz, or 80+80 MHz basic service set (BSS), the 40 MHz channel that is used to transmit 40 MHz physical layer (PHY) protocol data units (PPDUs).

primary 80 MHz channel: In a 160 MHz or 80+80 MHz basic service set (BSS), the 80 MHz channel that is used to transmit 80 MHz physical layer (PHY) protocol data units (PPDUs).

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primary access category (AC): The AC associated with the enhanced distributed channel access function (EDCAF) that gains channel access.

protected dual of public action frame: An Action frame with the category value specified in 9.4.1.11 (Table 9-51). For each Protected Dual of Public Action frame, there is a dual Action frame in a category that is specified with No in the Robust column of Table 9-51.

protected frame: A frame that has been encrypted and/or whose integrity can be verified cryptographically.

protocol version 0 (PV0) medium access control (MAC) protocol data unit (MPDU): An MPDU that has the Protocol Version field of the Frame Control field of the MPDU header equal to 0.

protocol version 1 (PV1) medium access control (MAC) protocol data unit (MPDU): An MPDU that has the Protocol Version field of the Frame Control field of the MPDU header equal to 1.

quality-of-service (QoS) frame: A frame containing the QoS Control field.

quality-of-service management frame (QMF): A Management frame that is transmitted using the QMF service.

quality-of-service management frame (QMF) access point (AP): A quality-of-service AP that implements the QMF service.

quality-of-service management frame (QMF) policy: A policy defining the access category of Management frames. QMF stations (STAs) transmit their Management frames using the access category defined by the policy.

quality-of-service management frame (QMF) service: A service in which the enhanced distributed channel access (EDCA) access category with which a Management frame is sent is determined according to a configured policy.

quality-of-service management frame (QMF) station (STA): A quality-of-service STA that implements the QMF service.

quasi-omni antenna pattern: A directional multi-gigabit (DMG) antenna operating mode with the widest beamwidth attainable.

receive sector sweep (RXSS): Reception of Sector Sweep (SSW) frames via different sectors, in which a sweep is performed between consecutive receptions.

received signal-to-noise indicator (RSNI): An indication of the signal-to-noise plus interference ratio of a received frame.

resource information container (RIC): A sequence of elements that include resource request and response parameters.

restricted access window (RAW): A medium access interval for a group of stations (STAs) during which a STA in the RAW group indicated by the RAW parameter set (RPS) element is allowed to contend for access to the medium.

reverse direction (RD) initiator: A station (STA) that is a transmit opportunity (TXOP) holder that transmits a medium access control (MAC) protocol data unit (MPDU) in which the reverse direction grant/more physical layer protocol data unit (RDG/More PPDU) subfield is equal to 1.

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reverse direction (RD) responder: A station (STA) that is not the RD initiator and whose medium access control (MAC) address matches the value of the Address 1 field of a received MAC protocol data unit (MPDU) in which the RDG/More PPDU subfield is equal to 1.

robust Action frame: An Action frame with a category value specified in 9.4.1.11 (Table 9-51 with Yes in the Robust column).

robust Management frame: A Management frame that is eligible for protection.

robust security network (RSN): A security network that allows only the creation of robust security network associations (RSNAs). An RSN can be identified by the indication in the RSN element (RSNE) of Beacon frames that the group cipher suite specified is not wired equivalent privacy (WEP).

robust security network association (RSNA): The type of association used by a pair of stations (STAs) if the procedure to establish authentication or association between them includes the 4-way handshake or the fast basic service set (BSS) transition (FT) protocol, or is fast initial link setup (FILS) authentication. Note that existence of an RSNA between two STAs does not of itself provide robust security. Robust security is provided when all STAs in the network use RSNAs.

robust security network association (RSNA) key management: Key management that includes the 4-way handshake, the group key handshake, authenticated mesh peering exchange, mesh group key handshake, and the PeerKey handshake. If fast basic service set (BSS) transition (FT) is enabled, the FT 4-way handshake and FT authentication sequence are also included. If fast initial link setup (FILS) is enabled, FILS authentication is also included.

sub 1 GHz (S1G) band: Frequency band for which an S1G operating class is defined in Annex E.

scheduled service period (SP): An SP that is scheduled by a quality-of-service (QoS) access point (AP) or a personal basic service set (PBSS) control point (PCP).

secondary 1 MHz channel: In a 2 MHz sub 1 GHz (S1G) basic service set (BSS), the 1 MHz channel adjacent to the primary 1 MHz channel that with the primary 1 MHz channel forms the 2 MHz channel of the 2 MHz S1G BSS. In a 4 MHz, 8 MHz, and 16 MHz S1G BSS, the 1 MHz channel adjacent to the primary 1 MHz channel that together form the primary 2 MHz channel of the S1G BSS.

secondary 2 MHz channel: In a 4 MHz sub 1 GHz (S1G) basic service set (BSS), the 2 MHz channel adjacent to the primary 2 MHz channel that with the primary 2 MHz channel forms the 4 MHz channel of the 4 MHz S1G BSS. In an 8 MHz and 16 MHz S1G BSS, the 2 MHz channel adjacent to the primary 2 MHz channel that together form the primary 4 MHz channel of the S1G BSS.

secondary 4 MHz channel: In an 8 MHz sub 1 GHz (S1G) basic service set (BSS), the 4 MHz channel adjacent to the primary 4 MHz channel that with the primary 4 MHz channel forms the 8 MHz channel of the 8 MHz S1G BSS. In a 16 MHz S1G BSS, the 4 MHz channel adjacent to the primary 4 MHz channel that together form the primary 8 MHz channel.

secondary 8 MHz channel: In a 16 MHz sub 1 GHz (S1G) basic service set (BSS), the 8 MHz channel adjacent to the primary 8 MHz channel that with the primary 8 MHz channel forms the 16 MHz channel of the 16 MHz S1G BSS.

secondary 20 MHz channel: In a 40 MHz very high throughput (VHT) basic service set (BSS), the 20 MHz channel adjacent to the primary 20 MHz channel that together form the 40 MHz channel of the 40 MHz VHT BSS. In an 80 MHz VHT BSS, the 20 MHz channel adjacent to the primary 20 MHz channel that together form the primary 40 MHz channel of the 80 MHz VHT BSS. In a 160 MHz or 80+80 MHz VHT BSS, the 20 MHz channel adjacent to the primary 20 MHz channel that together form the primary 40 MHz

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channel of the 160 MHz or 80+80 MHz VHT BSS. In a VHT BSS, the secondary 20 MHz channel is also the secondary channel.

secondary 40 MHz channel: In an 80 MHz very high throughput (VHT) basic service set (BSS), the 40 MHz channel adjacent to the primary 40 MHz channel that together form the 80 MHz channel of the 80 MHz VHT BSS. In a 160 MHz or 80+80 MHz VHT BSS, the 40 MHz channel adjacent to the primary 40 MHz channel that together form the primary 80 MHz channel.

secondary 80 MHz channel: In a 160 MHz or 80+80 MHz very high throughput (VHT) basic service set (BSS), the 80 MHz channel not including the primary 20 MHz channel, that together with the primary 80 MHz channel form the 160 MHz or 80+80 MHz channel of the 160 MHz or 80+80 MHz VHT BSS.

secondary access category (AC): An AC that is not associated with the enhanced distributed channel access function (EDCAF) that gains channel access.

NOTE—Traffic associated with a secondary AC can be included in a multi-user (MU) physical layer (PHY) protocol data unit (MU PPDU) that includes traffic associated with the primary AC. There could be multiple secondary ACs at a given time. A single medium access control protocol data unit (S-MPDU) is a special form of MPDU that is carried in an A-MPDU.

secondary channel: A channel associated with a primary channel used to create a channel wider than the primary channel. In a 40 MHz, 80 MHz, 160 MHz or 80+80 MHz basic service set (BSS) the secondary channel is a secondary 20 MHz channel.

sector: A transmit or receive antenna pattern corresponding to a sector identifier (ID).

security network: A basic service set (BSS) in which the station (STA) starting the BSS provides information about the security capabilities and configuration of the BSS by including the robust security network element (RSNE) in Beacon frames.

self-protected action frame: An Action frame that is not eligible for protection by the robust management frame service. The protection on each Self-protected Action frame is provided by the protocol that uses the frame.

sensor station (STA): A sub 1 GHz (S1G) non-access point (non-AP) STA that has certain traffic and device characteristics (e.g., limited payload size, limited traffic volume, battery operated device) and is allowed to associate with an access point (AP) that transmits an S1G Beacon, a Probe Response, or a PV1 Probe Response frame containing the S1G Capabilities element with the STA Type Support subfield indicating a sensor basic service set (BSS) or a mixed BSS.

service information client (SIC): A logical entity that initiates station (STA) service discovery.

service information registry (SIR): A logical entity that contains caches of information about services that are available via the basic service set (BSS).

service interval (SI): The interval between the starts of two successive scheduled service periods (SPs).

service period (SP): A period of time during which one or more downlink individually addressed frames are transmitted to a quality-of-service (QoS) station (STA) and/or one or more transmission opportunities (TXOPs) are granted to the same STA. SPs are either scheduled or unscheduled.

NOTE—A non-access-point (non-AP) STA can have at most one nongroupcast with retries SP (non-GCR-SP) active at any time.

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session key: A key that is generated for a single session, to be used, e.g., for encryption and integrity protection, such as a temporal key (TK), group temporal key (GTK), EAPOL-Key encryption key (KEK) or EAPOL-Key confirmation key (KCK).

NOTE—A session key is not necessarily a temporal key.

shared bands: Radio frequency bands in which dissimilar services are permitted.

short beacon interval: The interval between the consecutive target short beacon transmission times (TSBTTs) of beacons containing a minimal set of elements.

signaling and payload protected (SPP) aggregate medium access control (MAC) service data unit (A-MSDU): An A-MSDU that is protected with counter mode (CTR) with cipher-block chaining message authentication code (CBC-MAC) protocol (CCMP) or Galois/counter mode (GCM) protocol (GCMP) and that includes the A-MSDU Present field (bit 7 of the QoS Control field) in the construction of the additional authentication data (AAD).

single medium access control (MAC) protocol data unit (S-MPDU): An MPDU that is the only MPDU in an aggregate MPDU (A-MPDU) and that is carried in an A-MPDU subframe with the EOF subfield of the MPDU delimiter field equal to 1.

sounding physical layer (PHY) protocol data unit (PPDU): A PPDU that is intended by the transmitting station (STA) to enable the receiving STA to estimate the channel between the transmitting STA and the receiving STA. The Not Sounding field in the High Throughput SIGNAL field (HT-SIG) is equal to 0 in sounding PPDUs.

source directional multi-gigabit (DMG) station (STA): A DMG STA identified by the source association identifier (AID) field contained in a Grant frame or Extended Schedule element that caused the allocation of a service period (SP) or contention based access period (CBAP).

space-time block coding (STBC) beacon: A beacon that is transmitted using the basic STBC modulation and coding scheme (MCS) to enable discovery of the basic service set (BSS) by high-throughput (HT) stations (STAs) that support the HT STBC feature in order to extend the range of the BSS.

space-time block coding (STBC) delivery traffic indication map (DTIM): An STBC beacon transmission that is a DTIM Beacon frame.

space-time block coding (STBC) frame: A frame that is transmitted in a physical layer (PHY) protocol data unit (PPDU) that has a nonzero value of the TXVECTOR STBC parameter, or a frame that is received in a PPDU that has a nonzero value of the RXVECTOR STBC parameter.

spatial sharing (SPSH): Use of a frequency channel by multiple stations (STAs) that are located in the same vicinity, and whose directional transmissions might overlap in time.

staggered preamble: A physical layer (PHY) preamble in a sounding PHY protocol data unit (PPDU) that is not a null data PPDU (NDP) and that includes one or more Data Long Training fields (DLTFs) and one or more Extension Long Training fields (ELTFs).

staggered sounding: The use of a sounding physical layer (PHY) protocol data unit (PPDU) that is not a null data PPDU (NDP) and that includes one or more Data Long Training fields (DLTFs) and one or more Extension Long Training fields (ELTFs).

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station (STA) 2G4: A STA that is operating on a channel that belongs to any operating class that has a value of 25 or 40 for the entry in the Channel spacing column and that has a value of 2.407 or 2.414 for the entry in the Channel starting frequency column of any of the tables found in E.1.

station (STA) 5G: A STA that is operating on a channel that belongs to any operating class that has a value of 20 or 40 for the entry in the Channel spacing column and that has a value of 5 for the entry in the Channel starting frequency column of any of the tables found in E.1.

sub 1 GHz 1M (S1G_1M) physical layer (PHY) protocol data unit (PPDU): A 1 MHz PPDU or 1 MHz duplicate PPDU that is transmitted with S1G_1M preamble.

sub 1 GHz long (S1G_LONG) physical layer (PHY) protocol data unit (PPDU): A Clause 23 PPDU.

sub 1 GHz modulation and coding scheme (S1G-MCS): A specification of the S1G physical layer (PHY) parameters that consists of modulation order (e.g., BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) and forward error correction (FEC) coding rate (e.g., 1/2 rep2, 1/2, 2/3, 3/4, 5/6) that is used in an S1G PHY protocol data unit (PPDU).

sub 1 GHz (S1G) physical layer (PHY) protocol data unit (PPDU): A PPDU transmitted with the TXVECTOR parameter FORMAT equal to S1G, S1G_DUP_1M, or S1G_DUP_2M. The PPDU is transmitted with the S1G_SHORT, S1G_LONG, or S1G_1M preamble.

sub 1 GHz short (S1G_SHORT) physical layer (PHY) protocol data unit (PPDU): A 2 MHz, 4 MHz, 8 MHz, 16 MHz, or 2 MHz duplicate PPDU with short preamble format.

subchannel selective transmission (SST) channel: A channel that is permitted for the subchannel selective transmission indicated by either an SST element or an RPS element.

subscription service provider (SSP) roaming: The act when a station (STA) uses an SSP's IEEE 802.11 infrastructure, with which the terminal has no direct agreement, based on a subscription and formal agreement with the STA's own SSP.

successful transmission: A transmission and the reception of its expected immediate response or a transmission for which no immediate response is expected.

sweep: A sequence of transmissions, separated by a short beamforming interframe space (SBIFS), in which the antenna configuration at the transmitter or receiver is changed between transmissions.

synchronization access point (AP) (S-AP): An AP that provides synchronization and other services to an AP cluster or personal basic service set (PBSS) control point (PCP).

synchronization personal basic service set (PBSS) control point (PCP) (S-PCP): A PCP that provides synchronization and other services to an access point (AP) cluster or PCP cluster.

synchronizing access point (AP) or personal basic service set (PBSS) control point (PCP): A China directional multi-gigabit (CDMG) AP or PCP that is operating on a 1.08 GHz channel but still transmitting its DMG Beacon frames on the relevant 2.16 GHz channel with the AP or PCP Role subfield of the Dynamic Bandwidth Control element (9.4.2.220) set to 0 and providing synchronization service to a synchronized AP or PCP on the relevant 2.16 GHz channel.

synchronized access point (AP) or personal basic service set (PBSS) control point (PCP): A CDMG AP or PCP that is operating on a 1.08 GHz channel but still transmitting its DMG Beacon frames on the relevant 2.16 GHz channel with the AP or PCP Role subfield of the Dynamic Bandwidth Control element (9.4.2.220) set to 1 and synchronizing with the synchronizing AP or PCP on the relevant 2.16 GHz channel.

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synthetic receiver address (SYNRA): A constructed group address used by a general link (GLK) access point (AP) as a receiver address to forward frames to a subset of GLK non-AP stations (STAs), as required by IEEE 802.1Q bridges.

target wake time (TWT): A specific time or set of times for individual stations (STAs) to wake in order to exchange frames with other STAs.

target wake time (TWT) requester: A station (STA) that has had a requested TWT agreement accepted by another STA and that receives TWT service period (SP) start times from that STA.

target wake time (TWT) responder: A station (STA) that has accepted a TWT agreement that was requested by another STA and that assigns TWT service period (SP) start times to the requesting STA.

target wake time (TWT) service period (SP): A period of time during which a TWT station (STA) is awake to transmit and/or receive frames.

target wake time (TWT) service period (SP) start time: The value of the timing synchronization function (TSF) at the beginning of a TWT SP.

television very high throughput 2W (TVHT_2W): Two contiguous basic channel units (BCUs) in television white spaces (TVWS).

television very high throughput 2W+2W (TVHT_2W+2W): Two noncontiguous frequency segments, each of which comprises two contiguous basic channel units (BCUs) in television white spaces (TVWS).

television very high throughput 4W (TVHT_4W): Four contiguous basic channel units (BCUs) in television white spaces (TVWS).

television very high throughput (TVHT) basic service set (BSS): A set of stations (STAs) that consists of a geolocation database dependent (GDD) enabling STA operating in television white spaces (TVWS) and one or more of its GDD STAs.

television very high throughput W (TVHT_W): One basic channel unit in television white spaces (TVWS).

television very high throughput W+W (TVHT_W+W): Two noncontiguous basic channel units (BCUs) in television white spaces (TVWS).

temporal encryption key: The portion of a pairwise transient key (PTK) or group temporal key (GTK) used directly or indirectly to encrypt data in medium access control (MAC) protocol data units (MPDUs).

temporal key (TK): Temporal key integrity protocol (TKIP) only: The combination of temporal encryption key and a message integrity code (MIC) key. Non-TKIP only: A temporal encryption key.

NOTE—A temporal key is a session key.

time priority Management frame: A Management frame that is transmitted using specific frame type channel access rules.

traffic indication map (TIM) broadcast: A service that enables a non-access-point (non-AP) station (STA) to request periodic transmission of a TIM frame by the AP. TIM frames have shorter duration than Beacon frames and can be transmitted at a higher physical layer (PHY) rate, which allows the STA to save additional power while periodically checking for buffered traffic in standby mode, relative to the power consumed if the station (STA) were to periodically wake up to receive a Beacon frame.

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traffic stream identifier (TSID): Any of the identifiers usable by higher layer entities to distinguish medium access control (MAC) service data units (MSDUs) to MAC entities for parameterized quality of service (QoS) [i.e., the traffic stream (TS) with a particular traffic specification (TSPEC)] within the MAC data service. The TSID is assigned to an MSDU in the layers above the MAC.

transition security network (TSN): A security network that allows the creation of pre-robust security network associations (pre-RSNAs) as well as RSNAs. A TSN is identified by the indication in the robust security network element (RSNE) of Beacon frames that the group cipher suite in use is wired equivalent privacy (WEP).

transmission opportunity (TXOP) holder: A quality-of-service (QoS) station (STA) that has either been granted a TXOP by the hybrid coordinator (HC) or successfully contended for a TXOP.

transmission opportunity (TXOP) responder: A station (STA) that transmits a frame in response to a frame received from a TXOP holder during a frame exchange sequence, but that does not acquire a TXOP in the process.

transmit power: The effective isotropic radiated power (EIRP) when referring to the operation of an orthogonal frequency division multiplexing (OFDM) physical layer (PHY) in a country where so regulated.

transmit sector sweep (TXSS): Transmission of multiple sector sweep (SSW) or directional multi-gigabit (DMG) Beacon frames via different sectors, in which a sweep is performed between consecutive transmissions.

transmit sector sweep (TXSS) contention based access period (CBAP): A CBAP that is available to all stations (STAs) in an extended centralized personal basic service set (PBSS) control point (PCP) or access point (AP) cluster outside which TXSSs in the data transfer interval (DTI) can be prohibited.

transmitted basic service set identifier (BSSID): The BSSID included in the medium access control (MAC) header transmitter address field of a Beacon frame when the multiple BSSID capability is supported.

trigger frame: A frame type or a frame transmission occurrence within a specific context, intended to solicit the peer entity into a responding action.

trigger-enabled access category (AC): A quality-of-service (QoS) station (STA) AC where frames of subtype QoS Data and QoS Null from the STA that map to the AC trigger an unscheduled service period (SP) if one is not in progress.

tunneled direct-link setup (TDLS): A protocol that uses a specific Ethertype encapsulation to TDLS frames through an access point (AP) to establish a TDLS direct link.

tunneled direct-link setup (TDLS) direct link: Direct link between two non-access-point (non-AP) stations (STAs) that has been established using the TDLS protocol.

tunneled direct-link setup (TDLS) initiator station (STA): A STA that transmits a TDLS Setup Request frame or a TDLS Discovery Request frame.

tunneled direct-link setup (TDLS) peer power save mode (PSM): A PSM that is based on periodically scheduled service periods (SPs), which can be used between two stations (STAs) that have set up a TDLS direct link.

tunneled direct-link setup (TDLS) peer power save mode (PSM) initiator: A station (STA) that transmits a TDLS Peer PSM Request frame.

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tunneled direct-link setup (TDLS) peer power save mode (PSM) responder: A station (STA) that transmits a TDLS Peer PSM Response frame.

tunneled direct-link setup (TDLS) peer station (STA): A STA with which another STA has, or is in the process of establishing, a TDLS direct link.

tunneled direct-link setup (TDLS) peer unscheduled automatic power save delivery (U-APSD) [TDLS peer U-APSD (TPU)]: A power save mode based on unscheduled service periods that can be used between two stations (STAs) that have set up a TDLS direct link.

tunneled direct-link setup (TDLS) peer unscheduled automatic power save delivery (U-APSD) [TDLS peer U-APSD (TPU)] buffer station (STA): A TDLS peer STA that buffers traffic for a TPU sleep STA.

tunneled direct-link setup (TDLS) peer unscheduled automatic power save delivery (U-APSD) [TDLS peer U-APSD (TPU)] sleep station (STA): A TDLS STA that entered power save mode on a TDLS direct link and that is using TPU for the delivery of buffered traffic.

tunneled direct-link setup (TDLS) power save mode (PSM): TDLS peer PSM or peer unscheduled automatic power save delivery (U-APSD).

tunneled direct-link setup (TDLS) responder station (STA): A STA that receives or is the intended recipient of a TDLS Setup Request frame or TDLS Discovery Request frame.

TVHT_2W mask physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs:

a) A Clause 22 TVHT_2W very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_2W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_2W transmit spectral mask defined in 22.3.17.1.

b) A Clause 22 TVHT_2W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_2W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_2W transmit spectral mask defined in 22.3.17.1.

c) A Clause 22 TVHT_W VHT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_2W transmit spectral mask defined in 22.3.17.1.

d) A Clause 22 TVHT_W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_2W transmit spectral mask defined in 22.3.17.1.

TVHT_2W+2W mask physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs:

a) A Clause 22 TVHT_2W+2W very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_2W+2W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_2W+2W transmit spectral mask defined in 22.3.17.1.

b) A Clause 22 TVHT_2W+2W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_2W+2W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_2W+2W transmit spectral mask defined in 22.3.17.1.

c) A Clause 22 TVHT_2W VHT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_2W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_2W+2W transmit spectral mask defined in 22.3.17.1.

d) A Clause 22 TVHT_2W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_2W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter

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NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_2W+2W transmit spectral mask defined in 22.3.17.1.

e) A Clause 22 TVHT_W VHT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_2W+2W transmit spectral mask defined in 22.3.17.1.

f) A Clause 22 TVHT_W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_2W+2W transmit spectral mask defined in 22.3.17.1.

TVHT_4W mask physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs:

a) A Clause 22 TVHT_4W very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_4W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_4W transmit spectral mask defined in 22.3.17.1.

b) A Clause 22 TVHT_4W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_4W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_4W transmit spectral mask defined in 22.3.17.1.

c) A Clause 22 TVHT_2W VHT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_2W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_4W transmit spectral mask defined in 22.3.17.1.

d) A Clause 22 TVHT_2W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_2W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_4W transmit spectral mask defined in 22.3.17.1.

e) A Clause 22 TVHT_W VHT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_4W transmit spectral mask defined in 22.3.17.1.

f) A Clause 22 TVHT_W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_4W transmit spectral mask defined in 22.3.17.1.

TVHT_MODE_1 physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs: A Clause 22 TVHT_W VHT PPDU or TVHT_W NON_HT PPDU.

TVHT_MODE_2C physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs: A Clause 22 TVHT_2W VHT PPDU or TVHT_2W NON_HT PPDU.

TVHT_MODE_2N physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs: A Clause 22 TVHT_W+W VHT PPDU or TVHT_W+W NON_HT PPDU.

TVHT_MODE_4C physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs: A Clause 22 TVHT_4W VHT PPDU or TVHT_4W NON_HT PPDU.

TVHT_MODE_4N physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs: A Clause 22 TVHT_2W+2W VHT PPDU or TVHT_2W+2W NON_HT PPDU.

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TVHT_W mask physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs:

a) A Clause 22 TVHT_W very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_W transmit spectral mask defined in 22.3.17.1.

b) A Clause 22 TVHT_W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_W transmit spectral mask defined in 22.3.17.1.

TVHT_W+W mask physical layer (PHY) protocol data unit (PPDU): One of the following PPDUs:

a) A Clause 22 TVHT_W+W very high throughput (VHT) PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W+W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_W+W transmit spectral mask defined in 22.3.17.1.

b) A Clause 22 TVHT_W+W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W+W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_W+W transmit spectral mask defined in 22.3.17.1.

c) A Clause 22 TVHT_W VHT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W and TXVECTOR parameter FORMAT set to VHT) transmitted using the TVHT_W+W transmit spectral mask defined in 22.3.17.1.

d) A Clause 22 TVHT_W NON_HT PPDU (TXVECTOR parameter CH_BANDWIDTH set to TVHT_W, TXVECTOR parameter FORMAT set to NON_HT, and TXVECTOR parameter NON_HT_MODULATION set to NON_HT_DUP_OFDM) transmitted using the TVHT_W+W transmit spectral mask defined in 22.3.17.1.

unscheduled service period (SP): The period that is started when a quality-of-service (QoS) station (STA) transmits a trigger frame to the QoS access point (AP).

uplink: A unidirectional link from a non-access point (non-AP) station (STA) to an access point (AP) or a unidirectional link from a non-AP source directional multi-gigabit (DMG) STA to a non-AP destination DMG STA.

upstream network: An integrated local area network (LAN) to which an access point (AP) is connected through a portal.

very high throughput (VHT) basic service set (BSS): A BSS in which a Beacon frame transmitted by a VHT station (STA) includes the VHT Operation element.

very high throughput (VHT) beamformee: A VHT station (STA) that receives a VHT physical layer (PHY) protocol data unit (PPDU) that was transmitted using a beamforming steering matrix and that supports the VHT transmit beamforming feedback mechanism.

very high throughput (VHT) beamformer: A VHT station (STA) that transmits a VHT physical layer (PHY) protocol data unit (PPDU) using a beamforming steering matrix.

very high throughput (VHT) modulation and coding scheme (VHT-MCS): A specification of the VHT physical layer (PHY) parameters that consists of modulation order (e.g., BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM) and forward error correction (FEC) coding rate (e.g., 1/2, 2/3, 3/4, 5/6) and that is used in a VHT PHY protocol data unit (PPDU).

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very high throughput (VHT) multi-user (MU) physical layer (PHY) protocol data unit (PPDU): A VHT PPDU that is capable of carrying up to four PHY service data units (PSDUs) for up to four users and is transmitted using the downlink multi-user multiple input, multiple output (DL-MU-MIMO) technique.

very high throughput (VHT) physical layer (PHY) protocol data unit (PPDU): A Clause 21 PPDU that is not a Clause 17 or Clause 19 PPDU.

very high throughput (VHT) single-user (SU) physical layer (PHY) protocol data unit (PPDU): A VHT PPDU that carries one PHY service data unit (PSDU) for one user and is not transmitted using the downlink multi-user multiple input, multiple output (DL-MU-MIMO) technique.

very high throughput (VHT) single-user-only (SU-only) beamformee: A VHT beamformee that does not receive VHT multi-user (MU) physical layer (PHY) protocol data units (PPDUs).

very high throughput (VHT) single-user-only (SU-only) beamformer: A VHT beamformer that does not transmit VHT multi-user (MU) physical layer (PHY) protocol data units (PPDUs).

white space map (WSM): Information on identified available frequencies that is obtained from a geolocation database (GDB) and that is used by IEEE 802.11 stations (STAs).

wired equivalent privacy (WEP): An obsolete cryptographic data confidentiality algorithm specified by this standard.

wireless network management (WNM) sleep mode: An extended power save mode for non-access-point (non-AP) stations (STAs) whereby a non-AP STA need not listen for every delivery traffic indication map (DTIM) Beacon frame and does not perform group temporal key/integrity group temporal key/beacon integrity group temporal key (GTK/IGTK/BIGTK) updates.

3.3 Definitions specific to IEEE 802.11 operation in some regulatory domains

ISO 3166-1 defines the international two-letter designation for country names, and these designations are included [in square brackets] at the end of each definition that has clear attribution to a regulatory domain.

contact verification signal (CVS): A signal sent by a geolocation database dependent (GDD) enabling station (STA) to validate the list of available frequencies and to verify that the receiving GDD STA is within reception range of the master white space device (WSD) [US].

personal/portable station (STA): A STA that uses network communications at unspecified locations [US].

television band device (TVBD): An intentional radiator that operates on an unlicensed basis on available channels in the broadcast television frequency bands [US].

white space device (WSD): An entity that employs cognitive facilities to use white space spectrum without causing harmful interference to protected services [EU].

3.4 Acronyms and abbreviations

3GPP	3rd Generation Partnership Project
40MC	40-MHz-capable
802.x LAN	IEEE 802-based local area networks such as IEEE Std 802.3 and IEEE Std 802.11
AA	authenticator address
AAA	authentication, authorization, and accounting

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