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~~Draft IEEE Standard for~~
~~Local and metropolitan area networks~~

Corrigendum to IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems

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LAN MAN Standards Committee
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Abstract: This corrigendum contains substantive corrections to IEEE Standard 802.16-2004. It corrects errors, inconsistencies, and ambiguities in that standard. It does not contain new material.

Keywords: fixed broadband wireless access network, mobile broadband wireless access network, metropolitan area network, microwave, millimeter wave, WirelessMAN™ standards

Introduction

(This introduction is not part of IEEE Draft P802.16-2004/Cor 1, Corrigendum to IEEE Standard for Local and Metropolitan Area Networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems).

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This document was developed by the IEEE 802.16 Working Group on Broadband Wireless Access, which develops the WirelessMAN™ Standard for Wireless Metropolitan Area Networks.

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This draft is intended for IEEE-SA Sponsor Ballot with individuals as the ballot group members.

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NOTE-The editing instructions contained in this corrigendum define how to merge the material contained herein into the existing base standard IEEE Std 802.16-2004.

The editing instructions are shown ***bold italic***. Four editing instructions are used: ***change***, ***delete***, ***insert***, and ***replace***. ***Change*** is used to make small corrections in existing text or tables. The editing instruction specifies the location of the change and describes what is being changed by using strike through (to remove old material) and underscore (to add new material). ***Delete*** removes existing material. ***Insert*** adds new material without disturbing the existing material. Insertions may require renumbering. If so, renumbering instructions are given in the editing instruction. ***Replace*** is used to make large changes in existing text, subclauses, tables, or figures by removing existing material and replacing it with new material. Editorial notes will not be carried over into future editions because the changes will be incorporated into the base standard.

1. Overview

1.3 Frequency bands

1.3.4 Air interface nomenclature and PHY compliance

Change in Table 1:

Table 1—Air interface nomenclature

Designation	Applicability	PHY	Additional MAC requirements	Options	Duplexing alternative
WirelessMAN-SC™	10–66 GHz	8.1			TDD FDD
WirelessMAN-SCa™	Below 11 GHz licensed bands	8.2		AAS (6.3.7.6) ARQ (6.3.4) STC (8.2.1.4.3)	TDD FDD
WirelessMAN-OFDM™	Below 11 GHz licensed bands	8.3		AAS (6.3.7.6) ARQ (6.3.4) Mesh (6.3.6.6) STC (8.3.8)	TDD FDD
WirelessMAN-OFDMA	Below 11 GHz licensed bands	8.4		AAS (6.3.7.6<u>, 8.4.4.6</u>) ARQ (6.3.4) <u>H-ARQ (6.3.17)</u> STC (8.4.8)	TDD FDD
WirelessHUMAN™	Below 11 GHz license-exempt bands	[8.2, 8.3, or 8.4] and 8.5	DFS (6.3.15)	AAS (6.3.7.6) ARQ (6.3.4) Mesh (6.3.6.6) (with 8.3 only) STC (8.2.1.4.3/8.3.8/8.4.8)	TDD

3. Definitions

Insert new definition 3.9 and update the numbering as required:

3.9 broadcast connection: the management connection used by the BS to send MAC management messages on a downlink to all subscriber station (SS). The broadcast connection is identified by a well-known CID (See Table 343).

Insert new definition 3.29 and update the numbering as required:

3.29 management connection: a connection used for the purpose of transporting MAC management messages (see: basic connection, primary management connection, broadcast connection, initial ranging connection) or standards-based messages (see: secondary management connection) required by the MAC layer. Table 14 specifies which MAC management message is transmitted on which of the management connections.

Change the following definitions as indicated:

3.4 bandwidth stealing: The use, by a subscriber station (SS), of a portion of the bandwidth allocated in response to a Bandwidth Request for a connection to send ~~another~~ a Bandwidth Request ~~rather than sending data~~ or data for any of its connections. *See also* 6.3.6.

3.12 connection: A unidirectional mapping between base station (BS) and subscriber station (SS) medium access control (MAC) peers ~~for the purpose of transporting a service flow's traffic~~. Connections are identified by a connection identifier (CID). ~~All traffic is carried on a connection, even for service flows that implement connectionless protocols, such as Internet Protocol (IP)~~The MAC defines two kinds of connections: management connections and transport connections. *See also*: **connection identifier**.

3.13 connection identifier (CID): A16-bit value that identifies a transport connection or a UL/DL pair of associated management connections (i.e. belonging to the same SS) to equivalent peers in the MAC of the base station (BS) and subscriber station (SS). The CID address space is common between UL and DL and Table 343 specifies how it is partitioned among the different type of connections. ~~It maps to a service flow identifier (SFID), which defines the Quality of Service (QoS) parameters of the service flow associated with that connection.~~ Security associations (SAs) also exist between keying material and CIDs. *See also*: **connection** ~~**service flow identifier**~~.

3.27 initial ranging connection ~~identifier~~: A a management connection used by the subscriber station (SS) and the base station (BS) during the initial ranging process. The initial ranging connection is identified by a well-known CID (see Table 343) ~~that is used by a subscriber station (SS) during the initial ranging process~~. This CID is defined as constant value within the protocol since an SS has no addressing information available until the initial ranging process is complete.

3.45 receive/transmit transition gap (RTG): A gap between the last sample of the uplink burst and the first sample of the subsequent downlink burst at the antenna port of the BS in a time division duplex (TDD) transceiver. This gap allows time for the base station (BS) to switch from receive to transmit mode and SSs to switch from transmit to receive mode. During this gap, the BS and SS are not transmitting modulated data but simply allowing the BS transmitter carrier to ramp up, the transmit/receive (Tx/Rx) antenna switch to actuate, and the SS receiver sections to activate. Not applicable for FDD systems.

3.61 transport connection identifier: A unique identifier taken from the CID address space that uniquely identifies the transport connection. All data traffic is carried on a transport connection, even for service flows that implement connectionless protocols, such as Internet Protocol (IP). It maps to a service flow identifier (SFID), which defines the Quality of Service (QoS) parameters of the service flow associated with that connection.

3.63 transmit/receive transition gap (TTG): A gap between the last sample of the downlink burst and the first sample of the subsequent uplink burst at the antenna port of the BS in a time division duplex (TDD) transceiver. This gap allows time for the base station (BS) to switch from transmit to receive mode and SSs to switch from receive to transmit mode. During this gap, the BS and SS are not transmitting modulated data but simply allowing the BS transmitter carrier to ramp down, the transmit/receive (Tx/Rx) antenna switch to actuate, and the BS receiver section to activate. Not applicable for FDD systems.

Delete definition 3.60

4. Abbreviations and acronyms

Insert the following abbreviations at appropriate location:

AMC	adaptive modulation and coding
FUSC	full usage of subchannels
PUSC	partial usage of subchannels

5. Service-specific CS

5.1 ATM CS

5.1.2 Data/Control plane

5.1.2.2 Classification

5.1.2.2.2 VC-switched mode

Change the first sentence of first paragraph as indicated:

For VC-switched mode, the VPI and VCI fields, 28 bits total for an NNI ~~and~~or 24 bits total for a UNI, are mapped to the 16-bit CID for the MAC connection on which it is transported.

5.2 Packet CS

Change the first paragraph of the section as indicated:

The packet CS resides on top of the IEEE Std 802.16 MAC CPS. The CS performs the following functions, utilizing the services of the MAC:

a) Classification of the higher-layer protocol PDU into the appropriate transport connection

Change the last paragraph of the section as indicated:

The packet CS is used for transport for all packet-based protocols ~~such as Internet Protocol (IP), Point-to-Point Protocol (PPP), and IEEE Std 802.3 (Ethernet)~~ as defined in section 11.13.19.3.

5.2.2 Classification

Change the first paragraph of the section as indicated:

Classification is the process by which a MAC SDU is mapped onto a particular transport connection for transmission between MAC peers. The mapping process associates a MAC SDU with a transport connection, which also creates an association with the service flow characteristics of that connection. This process facilitates the delivery of MAC SDUs with the appropriate QoS constraints.

5.2.3 PHS

5.2.3.1 PHS operation

Change the second paragraph as indicated:

A packet is submitted to the packet CS. The SS applies its list of Classifier rules. A match of the rule shall result in an Uplink Service Flow, CID, and may result in a PHS Rule.

5.2.4 IEEE Std 802.3/Ethernet-specific part

5.2.4.1 IEEE Std 802.3/Ethernet CS PDU format

Change the first paragraph as indicated:

The IEEE Std 802.3/Ethernet PDUs are mapped to MAC SDUs according to Figure 12 (when header suppression is enabled at the connection, but not applied to the CS PDU) or Figure 13 (with header suppression). In the case PHS is not enabled, PHSI field shall be omitted.

5.2.4.2 IEEE Std 802.3/Ethernet CS classifiers

Change the second paragraph as indicated:

~~Logical link control (LLC)~~Ethernet header classification parameters—zero or more of the ~~LLC~~Ethernet header classification parameters (destination MAC address, source MAC address, Ethertype/SAP).

5.2.5 IEEE Std 802.1Q-1998 virtual local area network (VLAN) specific part

5.2.5.1 IEEE Std 802.1Q-1998 VLAN CS PDU format

Change the first paragraph as indicated:

The format of the IEEE Std 802.1Q-1998 VLAN CS PDU shall be as shown in Figure 14 (when header suppression is enabled at the connection, but not applied to the CS PDU) or Figure 15 (with header suppression). In the case PHS is not enabled, PHSI field shall be omitted.

5.2.5.2 IEEE Std 802.1Q-1998 CS classifiers

Change the second paragraph as indicated:

~~LC~~Ethernet header classification parameters—zero or more of the ~~LLC~~Ethernet header classification parameters (Destination MAC address, source MAC address, Ethertype/SAP).

5.2.6 IP specific part

5.2.6.1 IP CS PDU format

Change the first paragraph as indicated:

The format of the IP CS PDU shall be as shown in Figure 16 (when header suppression is enabled at the connection, but not applied to the CS PDU) or Figure 17 (with header suppression). In the case PHS is not enabled, PHSI field shall be omitted.

6. MAC common part sublayer

6.1 PMP

Change the section starting from the sixth paragraph as indicated:

The MAC is connection-oriented. For the purposes of mapping to services on SSs and associating varying levels of QoS, all data communications are in the context of a transport connection. Service flows may be provisioned when an SS is installed in the system. Shortly after SS registration, transport connections are associated with these service flows (one connection per service flow) to provide a reference against which to request bandwidth. Additionally, new transport connections may be established when a customer's service needs change. A transport connection defines both the mapping between peer convergence processes that utilize the MAC and a service flow. The service flow defines the QoS parameters for the PDUs that are exchanged on the connection.

The concept of a service flow on a transport connection is central to the operation of the MAC protocol. Service flows provide a mechanism for uplink and downlink QoS management. In particular, they are integral to the bandwidth allocation process. An SS requests uplink bandwidth on a per connection basis (implicitly identifying the service flow). Bandwidth is granted by the BS to an SS as an aggregate of grants in response to per connection requests from the SS.

Transport ~~C~~connections, once established, may require active maintenance. The maintenance requirements vary depending upon the type of service connected. For example, unchannelized T1 services require virtually no connection maintenance since they have a constant bandwidth allocated ~~every frame~~ periodically. Channelized T1 services require some maintenance due to the dynamic (but relatively slowly changing) bandwidth requirements if compressed, coupled with the requirement that full bandwidth be available on demand. IP services may require a substantial amount of ongoing maintenance due to their bursty nature and due to the high possibility of fragmentation. As with connection establishment, modifiable connections may require maintenance due to stimulus from either the SS or the network side of the connection.

Finally, transport connections may be terminated. This generally occurs only when a customer's service requirements ~~contract~~ changes. The termination of a transport connection is stimulated by the BS or SS.

All three of these transport connection management functions are supported through the use of static configuration and dynamic addition, modification, and deletion of service flows~~connections~~.

6.3 Data/Control plane

6.3.1 Addressing and connections

6.3.1.1 PMP

Change the section as indicated:

Each air interface in SS shall have a 48-bit universal MAC address, as defined in IEEE Std 802®-2001. This address uniquely defines the air interface of the SS ~~from within the set of all possible vendors and equipment types~~. It is used during the initial ranging process to establish the appropriate connections for an SS. It is also used as part of the authentication process by which the BS and SS each verify the identity of the other.

Connections are identified by a 16-bit CID. At SS initialization, two pairs of management connections (uplink and downlink) shall be established between the SS and the BS and a third pair of management connections may be optionally generated. The three pairs of management connections reflect the fact that there are inherently three different levels of QoS for management traffic between an SS and the BS. The basic connection is used by the BS MAC and SS MAC to exchange short, time-urgent MAC management messages. The primary management connection is used by the BS MAC and SS MAC to exchange longer, more delay-tolerant MAC management messages. Table 14 specifies which MAC Management messages are transferred on which of these two connections. In addition, it also specifies which MAC management messages are transported on the Broadcast Connection. Finally, the Secondary Management Connection is used by the BS and SS to transfer delay tolerant, standards-based [Dynamic Host Configuration Protocol (DHCP), Trivial File Transfer Protocol (TFTP), SNMP, etc.] messages. These messages are carried using Ethernet convergence sublayer ~~in IP datagrams~~, as specified in ~~5.2.6~~5.2.4. Messages carried on the Secondary Management Connection may be packed and/or fragmented. For the SCa, OFDM, and OFDMA PHY layers, management messages shall have CRC. Use of the secondary management connection is required only for managed SS.

The CIDs for these connections shall be assigned in the RNG-RSP and REG-RSP messages. The message dialogs provide three CID values. The same CID value is assigned to both members (uplink and downlink) of each connection pair.

For bearer services, the BS initiates the set-up of service flows~~connections~~ based upon the provisioning information distributed to the BS. The registration of an SS, or the modification of the services contracted at an SS, stimulates the higher layers of the BS to initiate the setup of the service flows~~connections~~. When admitted or active, service flows are uniquely associated with transport connections. MAC management messages shall never be transferred over transport connections. Bearer or data services shall never be transferred on the Basic, Primary, or Secondary Management connections.

The CID can be considered a connection identifier even for nominally connectionless traffic like IP, since it serves as a pointer to destination and context information. ~~The use of a 16-bit CID permits a total of 64K connections within each downlink and uplink channel.~~

6.3.2 MAC PDU formats

Add the following sentence to the last paragraph:

All reserved fields shall be set to zero on transmission and ignored on reception.

6.3.2.2 MAC subheaders and special payloads

6.3.2.2.3 Packing subheader

Add the following text under the "Notes" column of the "Length" field:

Length of the SDU fragment in bytes including the packing subheader.

6.3.2.2.6 FAST-FEEDBACK allocation subheader

Change the description text of the "Allocation offset" field as indicated:

Allocation offset
Defines the offset, in units of slots, from the beginning of the FAST-FEEBACK uplink bandwidth allocation (8.4.5.4.9), of the slot in which the SS servicing the CID appearing in the MAC generic header, must send an FAST-FEEBACK feedback message for the connection associated with the CID value. Range of values 0 to 63. The allocation applies to the UL subframe ~~of the next frame~~two frames ahead of the current frame.

6.3.2.3 MAC Management messages

Change the first paragraph as indicated:

A set of MAC Management messages are defined. These messages shall be carried in the Payload of the MAC PDU. All MAC Management messages begin with a Management Message Type field and may contain additional fields. MAC Management messages on the Basic, Broadcast, and Initial Ranging connections shall neither be fragmented nor packed. MAC Management messages on the Primary Management Connection may be packed and/or fragmented. MAC Management messages on the Fragmentable Broadcast connection may be fragmented. For the SCa, OFDM, and OFDMA PHY layers, management messages carried on the Initial Ranging, Broadcast, Fragmentable Broadcast, Basic, and Primary Management connections shall have CRC usage enabled. The format of the Management message is given in Figure 21. The encoding of the Management Message Type field is given in Table 14. MAC management messages shall not be carried on Transport Connections. MAC management messages that have a Type value specified in Table 14 as "*reserved,*" or those not containing all required parameters or containing erroneously encoded parameters, shall be silently discarded.

Change the value under "Connection" column from "Broadcast" to "Fragmentable Broadcast" for UCD and DCD fields.

6.3.2.3.2 Downlink map (DL-MAP) message

Change Table 16 as indicated:

Table 16—DL-MAP message format

Syntax	Size	Notes
DL-MAP_Message_Format() {		
Management Message Type = 2	8 bits	
PHY Synchronization Field	*variable*	See appropriate PHY specification.
DCD Count	8 bits	
Base Station ID	48 bits	
Begin PHY Specific Section {		See applicable PHY section.
if (WirelessMAN-OFDMA) {		
No. OFDMA symbols	8 bits	Number of OFDMA symbols in the DL subframe including all AAS/ permutation zone.
}		
for (*i* = 1; *i* <= *n*; *i*++) {		For each DL-MAP element 1 to *n*.
DL-MAP_IE()	*variable*	See corresponding PHY specification.
}		
}		
if !(byte boundary) {		

Table 16—DL-MAP message format *(continued)*

Syntax	Size	Notes
Padding Nibble	4 bits	Padding to reach byte boundary.
}		
}		

Insert the following text at the end of the section:

The logical order in which MAC PDUs are mapped to the PHY layer bursts in the downlink is defined as the order of DL-MAP_IEs in the DL-MAP message.

6.3.2.3.4 Uplink map (UL-MAP) message

Change Table 18 as indicated

Table 18—UL-MAP message format

Syntax	Size	Notes
UL-MAP_Message_Format() {		
Management Message Type = 3	8 bits	
Uplink Channel ID	8 bits	
UCD Count	8 bits	
Allocation Start Time	32 bits	
Begin PHY Specific Section {		See applicable PHY section.
if (WirelessMAN-OFDMA) {		
No. OFDMA symbols	8 bits	Number of OFDMA symbols in the UL subframe
}		
for (*i* = 1; *i* <= *n*; *i*++) {		For each UL-MAP element 1 to *n*.
UL-MAP_IE()	*variable*	See corresponding PHY specification.
}		
}		
if !(byte boundary) {		
Padding Nibble	4 bits	Padding to reach byte boundary.
}		
}		

Insert the following text at the end of the section:

The UL-MAP (if such exists) message shall be always transmitted on the burst described by the first DL-MAP_IE of the DL-MAP following the H-ARQ Pointer_IE if such exists (or, in the case of the OFDM PHY mode, of the DLFP).

The DL-MAP_IEs in the DL-MAP shall be ordered in the increasing order of the transmission start time of the relevant PHY burst. The transmission start time is conveyed by the contents of the DL_MAP_IE in a manner which is PHY dependant.

The logical order in which MAC PDUs are mapped to the PHY layer bursts in the uplink is defined as the order of UL-MAP_IEs in the UL-MAP message.

6.3.2.3.6 Ranging response (RNG-RSP) message

Change the last paragraph as indicated:

The following WirelessMAN-OFDMA PHY specific parameters shall be included in the RNG-RSP message when an initial or periodic ranging message based on code division multiple access (CDMA) is received, in which case the RNG-RSP shall use the initial ranging CID.

6.3.2.3.8 Registration response (REG-RSP) message

Change the paragraph as indicated:

The REG-RSP shall contain the following TLVs:

SS management support (11.7.2)
Response to REG-REQ indicating the mode of SS management operation.
Secondary Management CID (11.7.5)
Present only if the SS has indicated in the REG-REQ that it is a managed SS.
IP management mode (11.7.3)
Response to REG-REQ indication of whether or not the requester wishes to accept IP-based traffic on the Secondary Management Connection, once the initialization process has completed.
HMAC Tuple (11.1.2)
The HMAC Tuple attribute shall be the final attribute in the message's TLV attribute list.
In Mesh Mode, message digest is calculated using HMAC_KEY_D.

Change the last paragraph as indicated:

The REG-RSP may contain the following TLVs:

SS Capabilities Encodings (11.7.8)
Response to the capabilities of the requester provided in the REG-REQ. Included in the response if the request included capabilities information. The response indicates whether or not the capabilities may be used. If a capability is not recognized, the response indicates that this capability shall not be used by the requester. Capabilities returned in the REG-RSP shall not be set to require greater capability of the requester than is indicated in the REG-REQ.
IP Version (11.7.4)
Vendor ID Encoding (of the responder; 11.1.5)
Vendor-specific information (11.1.6)
Included if the RNG-REQ contained the Vendor ID Encoding of the requestor.
ARQ Parameters (11.7.1)
ARQ and fragmentation parameters specified by the BS to complete ARQ parameter negotiation for the secondary management connection. This information is only included in the message if ARQ Parameters where supplied by the SS in the original REG-REQ message. For purposes of the

parameter negotiation dialog, the parameters supplied in this message are equivalent to those supplied in the DSA-RSP message.

~~**IP management mode (11.7.3)**~~
~~Response to REG-REQ indication of whether or not the requester wishes to accept IP-based traffic on the Secondary Management Connection, once the initialization process has completed.~~

6.3.2.3.11 DSA-RSP message

Change the explanation text of the 'Service Flow Parameters" field as indicated:

Service Flow Parameters (see 11.13)
The complete specification of the service flow shall be included in the DSA-RSP if it includes a newly assigned CID or an expanded Service Class Name~~ or to point to specific parameter that caused rejection of connection creation (only in the case CC = "reject-notsupported-parameter-value" or "reject-not-supported-parameter")~~.

Delete the explanation text of the 'Service Flow Error Set" field:

~~**Service Flow Error Set** (see 11.13)~~
~~A Service Flow Error Set and identifying service flow reference/SFID shall be included for every failed service flow in the corresponding DSA-REQ message. Every Service Flow Error Set shall include every specific failed QoS Parameter of the corresponding service flow (see 11.13). This parameter shall be omitted if the entire DSA-REQ is successful.~~

6.3.2.3.11.1 SS-Initiated DSA

Delete the last paragraph:

~~If the transaction is unsuccessful, the BS shall use the original service flow reference to identify the failed parameters in the DSA-RSP.~~

Delete section 6.3.2.3.11.2

~~6.3.2.3.11.2 BS-Initiated DSA~~

6.3.2.3.12 DSA-ACK message

Delete the explanation text of the 'Service Flow Error Set" field:

~~**Service Flow Error Set** (see 11.13)~~
~~The Service Flow Error Set of the DSA-ACK message encodes specifics of any failed service flows in the DSA-RSP message. A Service Flow Error Set and identifying service flow reference shall be included for every failed QoS Parameter of every failed service flow in the corresponding DSA-REQ message (see 11.13). This parameter shall be omitted if the entire DSA-REQ is successful.~~

6.3.2.3.14 DSC Response (DSC-RSP) message

Delete the explanation text of the 'Service Flow Error Set" field:

~~**Service Flow Error Set** (see 11.13)~~
~~A Service Flow Error Set and identifying CID shall be included for every failed service flow in the corresponding DSC-REQ message. Every Service Flow Error Set shall include every specific failed QoS Parameter of the corresponding service flow (see 11.13). This parameter shall be omitted if the entire DSC-REQ is successful.~~

6.3.2.3.15 DSC Acknowledge (DSC-ACK) message

Delete the explanation text of the 'Service Flow Error Set" field:

> ~~**Service Flow Error Set** (see 11.13)~~
> ~~The Service Flow Error Set of the DSC-ACK message encodes specifics of any failed service flows in the DSC-RSP message. A Service Flow Error Set and identifying SFID shall be included for every failed QoS Parameter of each failed service flow in the corresponding DSC-RSP message (see 11.13). This parameter shall be omitted if the entire DSC-RSP is successful.~~

6.3.2.3.23 SS Basic Capability Request (SBC-REQ) message

Change the last paragraph as indicated:

Basic Capability Requests contain those SS Capabilities Encodings (~~11.7.8~~11.8) that are necessary for effective communication with the SS during the remainder of the initialization protocols. Only the following parameters shall be included in the Basic Capabilities Request:

> **Physical Parameters Supported** (see 11.8.3)
> **Bandwidth Allocation Support** (see 11.8.1)

Capabilities for Construction and Transmission of MAC PDUs (see 11.8.2):

> **PKM flow control** (see 11.8.4)
> **Authorization Policy Support** (see 11.8.5)
> **Maximum number of supported security association** (see 11.8.6)

6.3.2.3.24 SS Basic Capability Response (SBC-RSP) message

Insert the following text at the end of the section:

Capabilities for Construction and Transmission of MAC PDUs (see 11.8.2):

> **PKM flow control** (see 11.8.4)
> **Authorization Policy Support** (see 11.8.5)
> **Maximum number of supported security association** (see 11.8.6)

6.3.2.3.28 Config File TFTP Complete (TFTP-CPLT) message

Change first paragraph as indicated:

The Config File TFTP-CPLT message shall be generated by ~~the~~a managed SS when it has successfully retrieved its configuration file from the provisioning server (see 6.3.9.12). If the SS does not need a config file it shall send the TFTP-CPLT message to the BS anyway, to indicate that it has completed ~~secondary management connection~~ initialization and is ready to accept services. The format of the TFTP-CPLT shall be as shown in Table 57.

6.3.2.3.33 Channel measurement Report Request/Response (REP-REQ/RSP)

Insert the following sentence at the end of the section:

Upon sending a REP-RSP message, an SS shall reset all its measurement counters for each channel on which it reported.

6.3.2.3.34 Fast Power Control (FPC) message

Insert the following sentence at the end of the first paragraph:

Implementation of FPC message at BS is optional.

6.3.2.3.43 H-ARQ MAP message

6.3.2.3.43.1 H-ARQ MAP message format

Change text in the second paragraph as indicated:

BS may broadcast multiple H-ARQ MAP messages using multiple bursts after the MAP message. Each H-ARQ MAP message ~~should~~shall have a different modulation and coding rate. ~~If the frame contains DCD or UCD message following the MAP message, the H-ARQ MAP should follow DCD or UCD message.~~

Change the second instance of 'Compact DL-MAP IE()' field in Table 88 to 'Compact UL-MAP IE()'

Change the text under the 'Syntax' column of the 'CRC appended' field in Table 88 from "CRC appended" to "reserved" insert under the 'Notes' column of the same field the following sentence:

Shall be set to zero

Change the description of 'CRC appended' field below Table 88 as indicated:

CRC ~~appended~~
~~A value of one indicates a~~ CRC-32 value is appended to the end of the compressed map(s) data. The CRC is computed across all bytes of the compressed map(s) starting with the byte containing the Compressed map indicator through the last byte of the map(s) as specified by the Map message length field. The CRC calculation is the same as that used for standard MAC messages. ~~A value of zero indicates that no CRC is appended.~~

6.3.2.3.43.2 Format Configuration

Change Table 91 as indicated:

Table 91—Format configuration IE

Syntax	Size	Notes
Compact_DL-MAP_IE( ) {		
DL-MAP Type = 4	3 bits	Format_Configuration_IE
New Format Indication	1 bit	0 = Use the format configured by the latest Format_Configuration_IE 1 = New format
if (New Format Indication == 1) {		
CID Type	2 bits	00 = Normal CID 01 = RCID11 (default) 10 = RCID7 11 = RCID3
Safety Pattern	~~10~~5 bits	

Table 91—Format configuration IE *(continued)*

Syntax	Size	Notes
Subchannel type for Band AMC	2 bits	See Band AMC specification (8.4.6.3). 00 = Default type (default) 01 = 1 bin x6 symbols type 10 = 2 bin x3 symbols type 11 = 3 bin x2 symbols type
Max Logical Bands	2 bits	0 = 3 bands, 1 = 6 bands, 2 = 12 bands (default) 3 = 24 bands
No. Symbols for Broadcast	45 bits	No. Symbol, (default = 0)
No. Symbols for DL Band AMC	46 bits	No. Symbol, (default = 0)
No. Symbols for UL Band AMC	46 bits	No. Symbol, (default = 0)
}		
}		

Change the description of the 'New Format Indication', 'Safety Pattern', 'No. Symbols for Broadcast', 'No. Symbols for DL Band AMC' and 'No. Symbols for UL Band AMC' fields below Table 91 as indicated:

New Format Indication

If this value set to 0, the format should be configured by the latest Format Configuration_IE in the previous frames. Otherwise, all parameters in Format Configuration IE ~~should~~shall be configured. The configured parameters are valid for the following Compact_DL/UL_MAP_IE. At the start of each frame all parameters are set to default values.

Safety Pattern

If this value is less than 16, the number of safety bins is 12 and the indices of allocated bins for safety are $16m+x$, where x is the value of Safety Pattern and $m = 0 \ldots 11$. If this value is not less than 16, the number of safety bins is 24 and the indices of allocated bins for safety are $16m+x'$ and $16m+(x'+8)$, where $x' = x - 16$ and $m = 0 \ldots 11$. If the safety pattern exists, it should be always allocated first. The safety pattern is valid in the region of AMC zone only.

No. Symbols for Broadcast

~~This specifies the number of symbols allocated for Broadcast subchannel.~~This field specifies the number of symbols allocated for Broadcast symbol region. The Broadcast symbols shall be allocated at the end of the DL sub-frame. The number of symbols is counted from the last symbol of the DL sub-frame. The PermBase for this broadcast symbol region shall be set to 0.

No. Symbols for DL Band AMC

This specifies the number of symbols allocated for DL Band AMC ~~subchannel~~ symbol region. The symbols for Band AMC shall be allocated before the broadcast symbol region. The other DL symbols excluding the symbols for Broadcast and DL Band are allocated for the DL Normal subchannel. PermBase for DL Band AMC is the same as one for normal subchannels region.

No. Symbols for UL Band AMC

This specifies the number of symbols allocated for UL Band AMC ~~subchannel~~ symbol region. The symbols for UL Band AMC shall be allocated at the end of the UL sub-frame and the number of symbols are counted from the last symbol of the UL sub-frame. The other UL symbols excluding the symbols for UL Band are allocated for the UL Normal subchannel. PermBase for UL Band AMC is the same as one for normal subchannels region.

Insert the following text before Table 92:

A logical band is a grouping of the AMC bands defined in 8.4.6.3. For example, 3 logical bands imply that logical band 0 is composed of AMC bands 0..15, logical band 1 is composed of AMC bands 16..31, and logical band 2 is composed of AMC bands 32..47. In general, if K = Max Logical Bands, then logical band J = [0...(K-1)] contains physical bands $48/K \cdot J, 48/K \cdot J+1, \ldots, 48/K \cdot (J+1)-1$.

6.3.2.3.43.3 Reduced CID

Change the second paragraph as indicated:

The reduced CID is composed of 1 bit of prefix and n-bits of LSB of CID of SS. The prefix is set to 1 for the broadcast CID or multicast polling CID and set to 0 for basic CID. The reduced CID cannot be used instead of transport CID, primary management CID, or secondary management CID. An exception to the above is when the multicast polling RCID is used in DL. If a downlink CID decoded from a prefix 1 and RCID-11 is in the rage of the Multicast polling CID (0xFF00 - 0xFFFD) then the DL CID should be interpreted as a DL transport CID by subtracting 0xFF (0xFFFD - 0xFEFE).

Change the description of the 'RCID n' field below Table 93 as indicated:

RCID n
n-bits LSB of CID. If the DL CID decoded from a prefix 1 and RCID-11 is in the rage of the Multicast polling CID (0xFF00 - 0xFFFD) then the DL CID should be interpreted as a DL transport CID by subtracting 0xFF (0xFFFD - 0xFEFE).

6.3.2.3.43.5 CQICH Control IE

Change the title of Table 95 to read: "CQICH_Control IE format".

6.3.2.3.43.6 Compact DL-MAP IE

6.3.2.3.43.6.1Compact DL-MAP IE for normal subchannel

Change the first paragraph as indicated:

The format of Compact DL-MAP IE for normal subchannel is presented in Table 96. The direction of slot allocation for downlink is along with the subchannel index first and then the symbol index. The direction of data mapping shall be according to 8.4.3.4.

6.3.2.3.43.6.2Compact DL-MAP IE for Band AMC Subchannel

Change the first paragraph as indicated:

Slots for downlink AMC zone are allocated along the subchannel index first within a band. The direction of data mapping for downlink AMC zone slots shall be frequency first (across bands when multiple bands are allocated). The format of Compact DL-MAP IE for Band AMC Subchannel is presented in Table 97.

6.3.2.3.43.6.4 Compact DL-MAP IE for DIUC subchannel

Change Table 99 as indicated:

Table 99—H-ARQ Compact_DL-MAP IE format for DIUC subchannel

Syntax	Size	Notes
Compact_DL-MAP_IE () {		
DL-MAP Type =3	3 bits	
reserved	1 bit	Shall be set to zero
DIUC	4 bits	
if (DIUC == 15) {		
Extended DIUC dependent IE()	variable	
} else {		
RCID_IE	*variable*	
No. Subchannels	8 bits	The number of subchannels allocated by the IE
Repetition coding indication	2 bits	0b00 - No repetition coding 0b01 - Repetition coding of 2 used 0b10 - Repetition coding of 4 used 0b11 - Repetition coding of 6 used
reserved	2 bits	Shall be set to zero
}		
H-ARQ_Control_IE	*variable*	
CQICH_Control_IE	*variable*	
}		

Insert the following text below Table 99:

Repetition coding indication
Indicates the repetition code used inside the allocated burst.

6.3.2.3.43.6.5 Compact DL-MAP IE for H-ARQ ACK BITMAP

Change the second paragraph as indicated:

For example, when an SS transmits a H-ARQ enabled burst at *i*-th frame and the burst is *j*-th H-ARQ enabled burst in the MAP, the SS should receive H-ARQ ACK at *j*-th LSB bit of the BITMAP, which is sent by the BS at *i*+(frame offset)-th frame. If the H-ARQ ACK BITMAP is omitted, the H-ARQ MSS should retain the transmitted H-ARQ burst and retransmit it when the BS request retransmission with H-ARQ Control IE.

Change the description of the 'BITMAP' field below Table 100 as indicated:

BITMAP

Includes H-ARQ ACK information for H-ARQ enabled UL bursts. The size of BITMAP should be equal or larger than the number of H-ARQ enabled UL-bursts. The j^{th} H-ARQ enabled burst in the UL-MAP is corresponding to the j^{th} LSB in the BITMAP.

6.3.2.3.43.7 UL-MAP_IE

6.3.2.3.43.7.1Compact UL-MAP IE for normal subchannel

Change the first paragraph as indicated:

The format of Compact UL-MAP IE for normal subchannel is presented in Table 102. The direction of slot allocation and the direction of data mapping for uplink shall be according to 8.4.3.4.

6.3.2.3.43.7.2Compact UL-MAP IE for Band AMC Subchannel

Change the first paragraph as indicated:

The format of Compact UL-MAP IE for Band AMC Subchannel is presented in Table 103. Slots for uplink AMC zone are allocated along the symbol index first within a band. The direction of data mapping for uplink AMC zone slots shall be frequency first (across bands when multiple bands are allocated).

6.3.2.3.43.7.3Compact UL-MAP IE for safety subchannel

Change the first paragraph as indicated:

The format of Compact UL-MAP IE for safety subchannel is presented in ~~Table 98~~Table 104.

6.3.2.3.43.7.4Compact UL-MAP IE for UIUC subchannel

Change Table 105 as indicated:

Table 105—H-ARQ Compact_UL-MAP IE format for UIUC subchannel

Syntax	Size	Notes
Compact_UL-MAP_IE () {		
UL-MAP Type =4	3 bits	
reserved	1 bit	Shall be set to zero
UIUC	4 bits	
RCID_IE	*variable*	
if (UIUC == 12) {		
OFDMA symbol offset	8 bits	
Subchannel offset	7 bits	
No. OFDMA symbols	7 bits	
No. Subchannels	7 bits	

Table 105—H-ARQ Compact_UL-MAP IE format for UIUC subchannel *(continued)*

Syntax	Size	Notes
Ranging method	2 bits	0b00 - Initial Ranging over two symbols 0b01 - Initial Ranging over four symbols 0b10 - BW Request/Periodic Ranging over one symbol 0b11 - BW Request/Periodic Ranging over three symbols
reserved	1 bit	Shall be set to zero
} else if (UIUC == 14) {		
CDMA_Allocation_IE()	32 bits	
}		
} else if (UIUC == 15) {		
Extended UIUC dependent IE()	*variable*	
} else {		
No. Subchannels	8 bits	The number of subchannels allocated by the IE
Repetition coding indication	2 bits	0b00 - No repetition coding 0b01 - Repetition coding of 2 used 0b10 - Repetition coding of 4 used 0b11 - Repetition coding of 6 used
reserved	2 bits	Shall be set to zero
}		
H-ARQ_Control_IE	*variable*	
}		

Insert the following text below Table 105:

Repetition coding indication
Indicates the repetition code used inside the allocated burst.

6.3.2.3.43.7.5 Compact UL-MAP IE for H-ARQ Region allocation

Change the third paragraph as indicated:

The H-ARQ enabled SS that receives H-ARQ DL burst at i-th frame should transmit ACK signal through the half-subchannel in the H-ARQ region at (i+j)-th frame. The frame offset "j" is defined by the "H-ARQ ACK Delay for DL Burst" field in the UCD message. The half-subchannel offset in the H-ARQ Region is determined by the order of H-ARQ enabled DL burst in the H-ARQ MAP. For example, when an SS receives a H-ARQ enabled burst at i-th frame and the burst is n-th H-ARQ enabled burst in the H-ARQ MAP, the SS should transmit H-ARQ ACK at n-th half-subchannel in H-ARQ Region that is allocated by the BS at the (i+j)-th frame. The Compact MAP IE indexing H-ARQ burst should set the RCID field to basic CID of a SS, and the prefix field in the H-ARQ Control IE to 1. Otherwise, the MAP IE shall not be considered as H-ARQ enabled burst.

6.3.2.3.43.7.6Compact UL-MAP IE for CQICH Region allocation

Change the first paragraph as indicated:

The CQI region information is delivered through the Compact_UL-MAP_IE as shown in Table 107. SS sends CQI report in CQI region. The CQICH control IE allocates a CQI channel in a CQICH region.

Insert new section 6.3.2.3.43.7.8:

6.3.2.3.43.7.8Compact UL-MAP IE for Allocation start offset

The format of Compact UL-MAP IE for allocation start offset is presented in Table 106.

Table 106—H-ARQ Compact_UL-MAP IE format for allocation start offset

Syntax	Size	Notes
Compact_UL-MAP_IE () {		
UL-MAP Type =7	3 bits	
UL-MAP subtype	5 bits	Extension subtype
Length = 1	4 bits	Length of the IE in bytes
Start offset	8 bits	Number of slots
}		

UL-MAP Type
Specifies the type of the compact UL-MAP IE. A value of 7 indicates the extension type.
UL-MAP Subtype
Specifies the subtype of the compact UL-MAP IE.
Length
Indicates the length of this IE in bytes. If an SS cannot recognize the UL-MAP Subtype, it skips the IE.
Start offset
A subsequent H-ARQ UL data burst allocation start after the number of slots specified in the value. The offset calculated from the most recent zone defined in either UL-MAP or H-ARQ MAP. However, this value does not affect to the ranging region, CQI region, and H-ARQ ACK region.

6.3.4 ARQ mechanism

6.3.4.6 ARQ operation

6.3.4.6.2 Transmitter state machine

Change the ninth paragraph as indicated:

A bitmap entry not indicating acknowledgement shall be considered a NACK for the corresponding blocks.

For a Selective ACK Map, all 'zero' bits, after the last 'one' bit of the last Selective ACK MAP of the last ARQ_feedback_IE for a given CID shall not be considered a NACK, but shall be ignored.

6.3.5 Scheduling services

6.3.5.2 Uplink request/grant scheduling

6.3.5.2.2 rtPS

Change the second paragraph as indicated:

The BS shall provide periodic unicast request opportunities. In order for this service to work correctly, the Request/Transmission Policy setting (see 11.13.12) shall be such that the SS is prohibited from using any contention request opportunities for that connection. The BS may issue unicast request opportunities as prescribed by this service even if prior requests are currently unfulfilled. This results in the SS using only unicast request opportunities and data transmission opportunities in order to obtain uplink transmission opportunities ~~(the SS could still use unsolicited Data Grant Burst Types for uplink transmission as well)~~. All other bits of the Request/Transmission Policy are irrelevant to the fundamental operation of this scheduling service and should be set according to network policy. The key service IEs are the Maximum Sustained Traffic Rate, the Minimum Reserved Traffic Rate, the Maximum Latency and the Request/Transmission Policy.

6.3.5.2.3 nrtPS

Change the second paragraph as indicated:

The BS shall provide timely unicast request opportunities. In order for this service to work correctly, the Request/Transmission Policy setting (see 11.13.12) shall be set such that the SS is allowed to use contention request opportunities. This results in the SS using contention request opportunities as well as unicast request opportunities and ~~unsolicited Data Grant Burst Types~~data transmission opportunities. All other bits of the Request/Transmission Policy are irrelevant to the fundamental operation of this scheduling service and should be set according to network policy.

6.3.5.2.4 BE service

Change the section as indicated:

The intent of the BE service is to provide efficient service for best effort traffic. In order for this service to work correctly, the Request/Transmission Policy setting shall be set such that the SS is allowed to use contention request opportunities. This results in the SS using contention request opportunities as well as unicast request opportunities and ~~unsolicited Data Grant Burst Types~~data transmission opportunities. All other bits of the Request/Transmission Policy are irrelevant to the fundamental operation of this scheduling service and should be set according to network policy.

6.3.5.6 ARQ operation

6.3.5.6.3 Receiver state machine

Replace Figure 36 with the following figure:

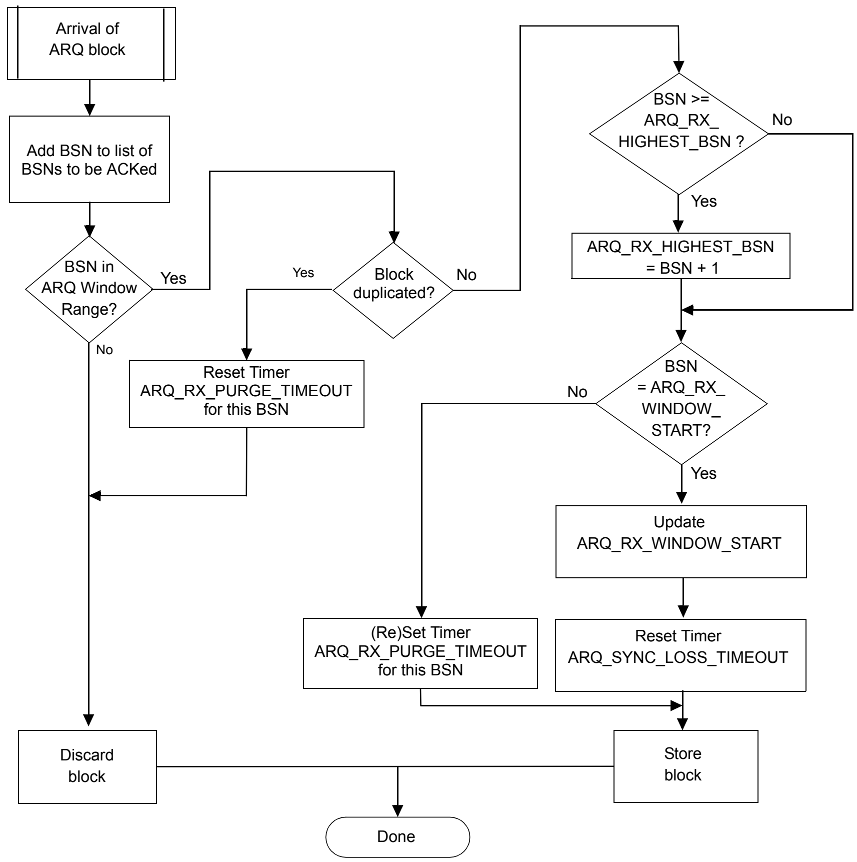

Figure 36—ARQ block reception

6.3.6 Scheduling services

Change the first paragraph as indicated:

Scheduling services represent the data handling mechanisms supported by the MAC scheduler for data transport on a connection. Each connection is associated with a single data service. Each data service is associated with a set of QoS parameters that quantify aspects of its behavior. The QoS parameters are listed in 11.13.4. These parameters are managed using the DSA and DSC message dialogs. Four services (11.13.11) are supported: Unsolicited Grant Service (UGS), Real-time Polling Service (rtPS), Non-real-time Polling Service (nrtPS), and Best Effort (BE). The following text provides a brief description of each of the supported scheduling services, including the mandatory QoS parameters that shall be included in the service flow definition when the scheduling service is enabled for a service flow. A detailed description of each QoS parameter is provided in 11.13.

6.3.6 Bandwidth allocation and request mechanisms

6.3.6.1 Requests

Change the last sentence of the third paragraph as indicated:

Due to the possibility of collisions, contention based Bandwidth Requests ~~transmitted in broadcast or multicast Request IEs should~~shall be aggregate requests.

6.3.6.3 Polling

6.3.6.3.1 Unicast

Change the box with the text "Process UL-MAP and assign bandwidth to the outstanding requests" in Figure 37 as indicated:

Process UL-MAP and assign bandwidth ~~to the outstanding requests~~

6.3.7 MAC support of PHY

6.3.7.4 UL-MAP

6.3.7.4.3 Uplink interval definition

6.3.7.4.3.2 Initial Ranging IE

Insert the following sentence at the end of the section:

For OFDMA PHY the allocation of ranging opportunity inside a ranging allocation is defined in 8.4.7.4.

6.3.7.4.3.4 End of map IE

Insert the following sentence at the end of the section:

This IE is not used in OFDMA PHY.

6.3.8 Contention resolution

Change the seventh paragraph as indicated:

The SS shall consider the contention transmission lost if no data grant has been ~~given within T16~~ received in the number of subsequent UL-MAP messages specified by the parameter Contention-based reservation timeout (or no response within T3 for initial ranging). The SS shall now increase its backoff window by a factor of two, as long as it is less than the maximum backoff window. The SS shall randomly select a number within its new backoff window and repeat the deferring process described above.

6.3.9 Network entry and initialization

6.3.9.1 Scanning and synchronization to the downlink

Change the first paragraph as indicated:

On initialization or after signal loss, the SS shall acquire a downlink channel. The SS shall have nonvolatile storage in which the last operational parameters are stored and ~~shall~~may first try to reacquire this downlink channel. If this fails, it shall begin to continuously scan the possible channels of the downlink frequency band of operation until it finds a valid downlink signal.

6.3.9.3 Obtain uplink parameters

Change the third paragraph as indicated:

The SS shall determine from the channel description parameters whether it may use the uplink channel. If the channel is not suitable, then the SS shall continue scanning to find another downlink channel. If the channel is suitable, the SS shall extract the parameters for this uplink from the UCD. ~~It then shall wait for the next DL-MAP message and extract the time synchronization from this message.~~ Then, the SS shall wait for a bandwidth allocation map for the selected channel. It may begin transmitting uplink in accordance with the MAC operation and the bandwidth allocation mechanism.

6.3.10 Ranging

6.3.10.1 Downlink burst profile management

Change the second paragraph as indicated:

The SS ~~applies an algorithm~~has full responsibility to determine its optimal burst profile~~ in accordance with the threshold parameters established in the DCD message in accordance with Figure 81~~.

Delete Figure 81.

6.3.10.3 OFDMA-based ranging

6.3.10.3.1 Contention based initial ranging and automatic adjustments

Change the first paragraph as indicated:

— The SS, after acquiring downlink synchronization and uplink transmission parameters, shall choose randomly a Ranging Slot (with the use of a binary truncated exponent algorithm to avoid possible re-collisions) at the time to perform the ranging, then it chooses randomly a Ranging Code (from the Initial Ranging domain) and sends it to the BS (as a CDMA code).

— The BS cannot tell which SS sent the CDMA ranging request; therefore, upon successfully receiving a CDMA Ranging Code, the BS broadcasts a Ranging Response message that advertises the received Ranging Code as well as the ranging slot (OFDMA symbol number, subchannel, etc.) where the CDMA Ranging code has been identified. This information is used by the SS that sent the CDMA ranging code to identify the Ranging Response message that corresponds to its ranging request. The Ranging Response message contains all the needed adjustment (e.g., time, power, and possibly frequency corrections) and a status notification.

— Upon receiving a Ranging Response message with continue status, the SS shall continue the ranging process as done on the first entry with ranging codes randomly chosen from the Initial Ranging domain sent on the Periodic Ranging region.

— When the BS receives an initial-ranging CDMA code that results in sending an RNG-RSP message with success status, the BS shall provide BW allocation for the SS using the CDMA_Allocation_IE to send an RNG-REQ message.

— Initial ranging process is over after receiving RNG-RSP message which includes a valid basic CID (following a RNG-RSP transmission on a CDMA_Allocation_IE). If this RNG-RSP message includes 'continue' indication, the ranging process should be continued using the periodic ranging mechanisms.

— The timeout required by for SS to wait for RNG-RSP, following or not following CDMA Allocation IE, is defined by T3 .

— ~~Upon receiving a Ranging Response message with continue status, the SS shall continue the ranging process as done on the first entry with ranging codes randomly chosen from the Periodic Ranging domain.~~

— Using the OFDMA ranging mechanism, the periodic ranging timer is controlled by the SS, not the BS.

Change Table 121 as indicated:

Table 107—CDMA initial Ranging and automatic adjustments procedure

BS		SS
[time to send the CDMA Initial Ranging opportunity]		
send map containing CDMA Initial Ranging IE with a broadcast Connection ID	-----------UL-MAP----------->	
	<---------Ranging Code-------	Transmit randomly selected Initial Ranging code in a randomly selected Ranging Slot from available Ranging Region
[Receive Ranging Code]		
Send RNG-RSP with Time & Power Corrections and original Ranging Code and Ranging Slot Status = Continue	----------RNG-RSP------->	
		Receive RNG-RSP message with Ranging Code and Ranging Slot matching sent values Adjust Time & Power parameters
[time to send the CDMA Initial Ranging opportunity]		
send map containing CDMA Initial Ranging IE with a broadcast Connection ID	-----------UL-MAP----------->	
	<---------Ranging Code-------	Transmit randomly selected ~~Periodic~~Initial Ranging code in a randomly selected Ranging Slot from available Periodic Ranging Region
[Receive Ranging Code]		

Table 107—CDMA initial Ranging and automatic adjustments procedure *(continued)*

BS		SS
Send RNG-RSP with Time & Power Corrections and original Ranging Code and Ranging Slot Status = Success	----------RNG-RSP------->	
		Receive RNG-RSP message with Ranging Code and Ranging Slot matching sent values Adjust Time and Power parameters
[time to send the next map]		
send map containing anonymous BW allocation with original Ranging Code and Ranging Slot	-----------UL-MAP----------->	
	<---------RNG-REQ-------	Transmit RNG-REQ and continue with regular Initial network entry

6.3.14 QoS

6.3.14.1 Theory of operation

Change the third paragraph as indicated:

The principal mechanism for providing QoS is to associate packets traversing the MAC interface into a service flow as identified by the transport CID. A service flow is a unidirectional flow of packets that is provided a particular QoS. The SS and BS provide this QoS according to the QoS Parameter Set defined for the service flow.

6.3.14.2 Service flows

Change item (b) of the second paragraph as indicated:

b) *CID:* The connection ID of the transport connection~~Mapping to an SFID~~ that exists only when the service flow is~~ connection has an~~ admitted or active~~ service flow~~. The relationship between SFID and transport CID, when present, is unique. An SFID shall never be associated with more than one transport CID, and a transport CID shall never be associated with more than one SFID.

Change footnote 14 as indicated:

To say that QoS Parameter Set A is a subset of QoS Parameter Set B the following shall be true for all QoS Parameters in A and B:
if (a smaller QoS parameter value indicates less resources, e.g., Maximum Traffic Rate)
A is a subset of B if the parameter in A is less than or equal to the same parameter in B
if (a larger QoS parameter value indicates less resources, e.g., Tolerated Grant Jitter)
A is a subset of B if the parameter in A is greater than or equal to the same parameter in B

if (the QoS parameter is not quantitative~~, e.g., Service Flow Scheduling Type~~)
A is a subset of B if the parameter in A is equal to the same parameter in B

6.3.14.3 Object model

Change the section as indicated:

The major objects of the architecture are represented by named rectangles in Figure 95. Each object has a number of attributes; the attribute names that uniquely identify it are underlined. Optional attributes are denoted with brackets. The relationship between the number of objects is marked at each end of the association line between the objects. For example, a service flow may be associated with from 0 to *N* (many) PDUs, but a PDU is associated with exactly one service flow. The service flow is the central concept of the MAC protocol. It is uniquely identified by a 32-bit (SFID). Service flows may be in either the uplink or downlink direction. There is a one-to-one mapping between admitted and active service flows (32-bit SFID) and transport connections (16-bit CID). ~~Admitted and active service flows are mapped to a 16-bit CID.~~

Outgoing user data is submitted to the MAC SAP by a CS process for transmission on the MAC interface. The information delivered to the MAC SAP includes the CID identifying the transport connection across which the information is delivered. The service flow for the connection is mapped to MAC transport connection identified by the CID.

Change Figure 95 by addition of "Transport" before "Connection":

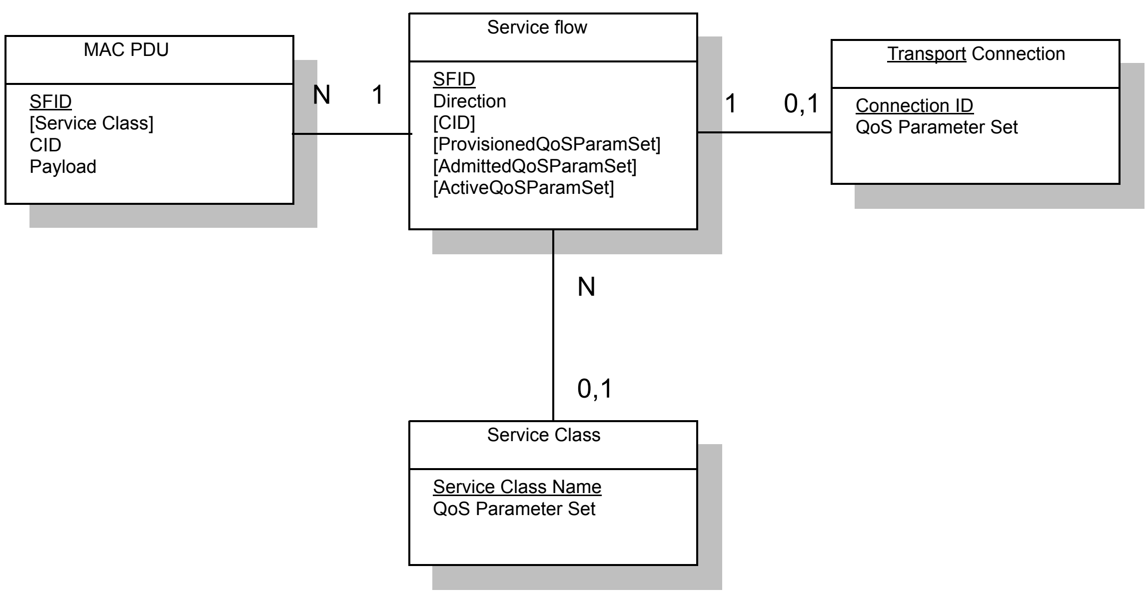

Figure 95—Theory of Operation Object Model

6.3.14.7 Service Flow Creation

6.3.14.7.1 Dynamic service flow creation

6.3.14.7.1.1 Dynamic service flow creation—SS-initiated

Change the third paragraph as indicated:

A DSA-REQ from an SS contains a ~~service flow reference and~~ QoS Parameter set (marked either for admission-only or for admission and activation).

6.3.14.9 Service flow management

6.3.14.9.2 Dynamic Service Flow state transitions

Change the first paragraph as indicated:

The Dynamic Service Flow state transition diagram (Figure 99) is the top-level state diagram and controls the general service flow state. As needed, it creates transactions, each represented by a Transaction state transition diagram, to provide the DSA, DSC, and DSD signaling. Each Transaction state transition diagram communicates only with the parent Dynamic Service Flow state transition diagram. The top-level state transition diagram filters DSx messages and passes them to the appropriate transaction based on SFID~~, service flow reference number,~~ and Transaction ID.

Change Figure 101 on the transition line between "Holding Down" to "End" as indicated:

(~~SF Change~~Delete-Remote / DSA Ended)

6.3.14.9.3 DSA

6.3.14.9.3.1 SS-initiated DSA

Change the following text in Table 123:

If ActiveQoSParamSet is non-null, Enable transmission ~~and/~~or reception of data on new service flow.

6.3.14.9.4 DSC

Change the 8-th paragraph as indicated:

Any service flow can be deactivated with a DSC command by sending a DSC-REQ message, referencing the SFID, and including a null ActiveQoSParamSet. ~~However, if a Basic, Primary Management, or Secondary Management Connection of an SS is deactivated, that SS is deregistered and shall re-register. Therefore, care should be taken before deactivating such service flows.~~ If a service flow that was provisioned is deactivated, the provisioning information for that service flow shall be maintained until the service flow is reactivated.

6.3.14.9.4.3 DSC state transition diagrams

In Figure 121, Change the fourth box from "SF Delete-Remote" to "SF Delete-Remote, SF Change-Local"

In Figure 122, Change first box from "SF Changed, SF Deleted, SF Delete-Remote" to "SF Changed, SF Deleted, SF Delete-Remote, SF Change-Local"

In Figure 123, Change first Box from "SF Deleted, SF Delete-Remote" to "SF Deleted, SF Delete-Remote, SF Change-Local"

6.3.14.9.5 Connection release

Change the section as indicated:

Any service flow can be deleted with the DSD messages. When a service flow is deleted, all resources associated with it are released. If a service flow for a provisioned service is deleted, the ability to re-establish the service flow for that service is network management dependent. Therefore, care should be taken before deleting such service flows. ~~However, the deletion of a provisioned service flow shall not cause an SS to reinitialize.~~

6.3.17 MAC support for H-ARQ

6.3.17.2 DL/UL ACK/NAK signaling

Change the section as indicated:

For DL~~/UL~~ H-ARQ, fast ACK/NAK signaling is necessary. For the fast ACK/NAK signaling of DL H-ARQ channel, a dedicated PHY layer ACK/NAK channel is designed in UL. For the fast ACK/NAK signaling of UL fast feedback, H-ARQ ACK message is designed. When H-ARQ ACK message for UL H-ARQ is absent, the SS shall assume that NACK is received.

6.3.17.3 H-ARQ parameter signaling

Change the last paragraph as indicated:

For the signaling of those parameters, H-ARQ ~~Allocation~~Control IE is defined and the IE is to be placed in a ~~DL-MAP or UL-MAP for~~ Compact MAP IE which allocates a data burst~~ where H-ARQ is used~~.

7. Security sublayer

7.5 Cryptographic methods

7.5.1 Data Encryption methods

7.5.1.1 Data encryption with DES in CBC mode

Change the second paragraph as indicated:

The CBC IV shall be calculated as follows: in the downlink, the CBC shall be initialized with the exclusive-or (XOR) of (1) the IV parameter included in the TEK keying information, and (2) the ~~content of the PHY Synchronization field~~current Frame Number (right justified) ~~of the latest DL-MAP~~. In the uplink, the CBC shall be initialized with the XOR of (1) the IV parameter included in the TEK keying information, and (2) the ~~content of the PHY Synchronization field of the DL-MAP that is in effect when the UL-MAP for the uplink transmission is created/received~~ Frame Number of the frame where the relevant UL-MAP was transmitted.

7.5.1.2 Data encryption with AES in CCM mode

7.5.1.2.1 PDU Payload Format

Change the first and third paragraph as indicated:

The PDU payload shall be prepended with a 4-byte PN (Packet Number). The PN shall be transmitted in ~~little endian~~MSB first byte order. The PN shall not be encrypted.

The ciphertext ICV is transmitted in ~~little endian~~MSB first byte order.

7.5.1.2.2 PN (Packet Number)

Change the first sentence of the first paragraph as indicated:

The PN associated with an SA shall be set to 1 when the SA is established and when a new TEK is installed. The PN shall be transmitted in ~~little endian~~MSB first order in the MAC PDU as described in 7.5.1.2.1.

8. PHY

8.1 WirelessMAN-SC PHY specification

8.1.4 Downlink PHY

8.1.4.1 Downlink subframe

8.1.4.1.2 Frame control section

8.1.4.1.2.5 Downlink_Burst_Profile

Change the first paragraph as indicated:

Each Downlink_Burst_Profile in the DCD message (6.3.2.3.1) shall include the following parameters:

- Modulation type
- FEC Code Type
- Last codeword length
- ~~DIUC mandatory exit threshold~~
- ~~DIUC minimum entry threshold~~
- Preamble Presence

8.1.9 Channel quality measurements

8.1.9.2 RSSI mean and standard deviation

Change the second paragraph as indicated:

Mean and standard deviation statistics shall be reported in units of dBm <u>and dB, respectively</u>. To prepare such reports, statistics shall be quantized in 1 dB increments, ranging from –40 dBm (encoded 0x53) to –123 dBm (encoded 0x00). Values outside this range shall be assigned the closest extreme value within the scale. <u>The standard deviation shall be quantized in 0.5dB increments (i.e. standard deviation < 0.5dB encoded 0x00, 0.5dB ≤ standard deviation < 1.0dB encoded 0x01).</u>

8.2 WirelessMAN-SCa PHY

8.2.1 Transmit processing

8.2.1.5 Duplex framing

8.2.1.5.1 FDD

8.2.1.5.1.3 FDD Channel and Burst Descriptor field definitions

Change the second paragraph as indicated:

DL Burst Descriptor Parameters

Each DCD message burst descriptor shall include the following TLV encodings:

Modulation type

RS information bytes
RS parity bytes
~~DIUC mandatory exit threshold~~
~~DIUC minimum entry threshold~~
CC/CTC-specific parameters

Each DCD message burst descriptor may include the following additional TLV encodings:

Block interleaver depth
BTC code selector
Spreading parameters
CID_In_DL_IE

8.2.1.5.2 TDD

8.2.1.5.2.1 TDD Channel Descriptor field definitions

Change the second paragraph as indicated:

DL Burst Descriptor Parameters

Each DCD message burst descriptor shall include the following TLV encodings:

Modulation type
RS information bytes
RS parity bytes
~~DIUC mandatory exit threshold~~
~~DIUC minimum entry threshold~~
CC/CTC-specific parameters

Each DCD message burst descriptor may include the following additional TLV encodings:

Block interleaver depth
BTC code selector
Spreading parameters
CID_In_DL_IE

8.2.1.9 MAP message fields and IEs

8.2.1.9.3 UL-MAP IE formats

Delete the extra period above Table 202.

8.2.2 Channel quality measurements

8.2.2.2 RSSI mean and standard deviation

Change the second paragraph as indicated:

Mean and standard deviation statistics shall be reported in units of dBm and dB, respectively. To prepare such reports, statistics shall be quantized in 1 dB increments, ranging from –40 dBm (encoded 0x53) to –123 dBm (encoded 0x00). Values outside this range shall be assigned the closest extreme value within the scale. The standard deviation shall be quantized in 0.5dB increments (i.e. standard deviation < 0.5dB encoded 0x00, 0.5dB ≤ standard deviation < 1.0dB encoded 0x01).

8.3 WirelessMAN-OFDM PHY

8.3.2 OFDM symbol parameters and transmitted signal

8.3.2.4 Parameters of transmitted signal

Change in Table 213 "{–84,–82, –47:–45, 17: 19, 54:56}" to "{–84:–82, –47:–45, 17: 19, 54:56}"

8.3.3 Channel coding

8.3.3.1 Randomization

Change the first paragraph as indicated:

Data randomization is performed on each burst of data on the downlink and uplink. The randomization is performed on each allocation (downlink or uplink), which means that for each allocation of a data block (subchannels on the frequency domain and OFDM symbols on the time domain) the randomizer shall be used independently. If the amount of data to transmit does not fit exactly the amount of data allocated, padding of 0xFF ("1" only) shall be added to the end of the transmission block for the unused integer bytes. For RS-CC and CC encoded data (see 8.3.3.2.1), padding will be added to the end of the transmission block, up to the amount of data allocated minus one byte, which shall be reserved for the introduction of a 0x00 tail byte by the FEC. For BTC (8.3.3.2.2) and CTC (8.3.3.2.3), if implemented, padding will be added to the end of the transmission block, up to the amount of data allocated.

8.3.3.2 FEC

8.3.3.2.1 Concatenated Reed–Solomon-convolutional code (RS-CC)

Change the two paragraphs below Table 214 as indicated:

~~RS-CC rate 1/2 shall always be used as the coding mode when requesting access to the network.~~

The encoding is performed by first passing the data in block format through the RS encoder and then passing it through a convolutional encoder. A single 0x00 tail byte is appended to the end of each burst. This tail byte shall be appended after randomization. In the RS encoder, the redundant bits are sent before the input bits, keeping the 0x00 tail byte at the end of the allocation. ~~When the total number of data bits in a burst is not an integer number of bytes, zero pad bits are added after the zero tail bits~~ To ensure that the number of bits after the convolutional encoder is divisible by N_{cbps}, as specified in Table 223, zero (0b0) pad bits are added after the zero tail bits before the encoder. The zero pad bits are not randomized. Note that this situation can occur only in subchannelization. In this case, the RS encoding is not employed.

8.3.3.5 Example OFDM uplink RS-CC encoding

8.3.3.5.3 Subchannelization (1 subchannel)

Change the third paragraph as indicated:

Randomized Data (Hex)

D4 BA A1 12 F2 74 96 30 27 D4 00 00

Note: The last hex value represents two bits only.

8.3.3.6 Preamble structure and modulation

Change the first sentence of the first paragraph as indicated:

All preambles are structured as either one ~~of~~ or two OFDM symbols.

8.3.5 Frame structure

8.3.5.1 PMP

Change the seventh paragraph as indicated:

The STC zone starts from a preamble and an STC encoded FCH-STC burst, which is one symbol with the same payload format as specified in ~~Table 241~~Table 225. The FCH-STC burst is transmitted at BPSK rate ½. It is followed by one or several STC encoded PHY bursts. The first burst in the STC zone may contain a DL-MAP applicable only to the STC zone. If DL-MAP is present, it shall be the first MAC PDU in the payload of the burst. The DL map if sent in Burst 1 of the normal frame shall not describe any allocations in the STC region. The STC zone may also contain an UL-MAP, as well as DCD and UCD messages. In the case that there is STC encoded traffic in a specific frame, *K*, without STC encoded data traffic on the previous frame, *K*-1, the preceding DL subframe, *K*-1, may contain an STC zone at the end of the subframe, in which the STC zone consists of only an STC preamble and FCH-STC with no MAP IE, and STC data. The SS will be able to determine that there is no STC data allocation in frame *K*-1 STC Zone by determining that there has been no STC zone in the previous frame *K*-2.

Change Table 225 and the HCS field description as indicated:

Table 225—OFDM downlink frame prefix format

Syntax	Size	Notes
DL_Frame_Prefix_Format() {		
Base_Station_ID	4 bits	4 LSB of BS ID. The burst specified by the DLFP shall not be decoded if these bits do not match those of the BS on which it is registered.
Frame_Number	4 bits	4 LSB of the Frame Number DCD Channel Encoding as specified in Table 358.
Configuration_Change_Count	4 bits	4 LSB of Change Count value as specified in 6.3.2.3.1.
Rate_ID	4 bits	
reserved	~~4~~1 bits	Shall be set to zero.
Length	11 bits	Number of OFDM symbols in the first burst.
for (n=0; n < ~~4~~3; n++) {		
DL_Frame_Prefix_IE() {		
~~Rate_ID/~~ DIUC	4 bits	~~For the first information element it shall be Rate_ID encoded according to the Table 224. For following IEs this field is DIUC that defines the burst profile of the corresponding burst.~~

Table 225—OFDM downlink frame prefix format *(continued)*

Syntax	Size	Notes
if (DIUC != 0){		
Preamble present	1 bits	If "1," preamble is placed before the burst.
~~**Length**~~	~~11 bits~~	~~Number of OFDM symbols in the burst.~~
} else {		
Start Time	12 bits	Start time of STC zone in units of symbol duration counted from the beginning of the frame.
}		
}		
}		
HCS	8 bits	An 8-bit Header Check Sequence; calculated as specified in Table 5.
}		

HCS

An 8-bit Header Check Sequence used to detect errors in the DL Frame Prefix. The generator polynomial is $g(D)= D^8 + D^2 + D + 1$. The transmitter shall take all the bytes in the DL Frame Prefix except the byte reserved for the HCS and divide them by g(x) and use the remainder as HCS code. At the receiver, dividing the DL_Frame_Prefix by g(x) then gives the remainder 0 if correct. (Example: BS_ID=0x0319B812A9B8 (4LSB=0x8), Frame_Number=187662 (4LSB=0xE), Configuration_Change_Count=159 (4LSB=0xF), Reserved=0x~~F~~0, Rate_ID=1 (0x1), Length=204 (0x0CC), DLFP_IE(1) DIUC=1 (0x1), DLFP_IE(1) Midamble Present = 1 / Burst_Length=50 (0x832), all following DLFP_IEs=0 (~~8~~2 times 0x0000). Encode byte sequence [0x8EF~~F~~010CC183200000000] and obtain 0x~~99~~30 as the HCS byte.)

8.3.5.2 PMP-AAS Zone

In Table 226, replace "else if (UIUC == 3)" by "else if (UIUC == 4)"

In Table 227, replace "else if (UIUC == 3)" by "else if (UIUC == 4)"

Change the 'Midamble repetition interval' field in Table 228 as indicated:

Midamble repetition interval	2 bits	0b00: Preamble only 0b01: Midamble after every ~~8~~4 data symbols 0b10: Midamble after every ~~16~~8 data symbols 0b11: Midamble after every ~~32~~16 data symbols

8.3.6 Map message fields and IEs

8.3.6.2 DL-MAP IE format

Insert the following text below Table 237:

The Gap Downlink Burst Profile (DIUC = 13) indicates that the Base Station does not transmit (a silent interval in downlink transmission) and the SS shall ignore the received signal.

8.3.6.2.3 Channel measurement IE format

Change the first sentence of the first paragraph as indicated:

An extended IE with an extended DIUC value of 0x00 is issued by the BS to request a channel measurement ~~report~~ (see 6.3.2.3.33).

8.3.6.3 UL-MAP IE format

Change the 'Midamble repetition interval' in Table 245 as indicated:

Midamble repetition interval	2 bits	0b00: Preamble only 0b01: Midamble after every ~~8~~4 data symbols 0b10: Midamble after every ~~16~~8 data symbols 0b11: Midamble after every ~~32~~16 data symbols

Change the description of the 'Midamble Repetition Interval' field below Table 245 as indicated:

Midamble Repetition Interval
Indicates the preamble repetition interval in OFDM symbols. When the last section of symbol after the last midamble is higher than half the midamble repetition interval (i.e., ~~4~~2, ~~8~~4, ~~16~~8 for 0b01, 0b010, 0b11) a postamble shall be added at the end of the allocation.

8.3.6.3.3 Subchannelized network entry IE

Change the last sentence of first paragraph as indicated:

An SS responding to a bandwidth allocation using the Subchannelized Network entry IE shall start its burst with a ~~short~~subchannelization preamble (see 8.3.3.6) and use only the most robust mandatory burst profile in that burst.

Insert the following sentence to the definition of the 'Transmit opportunity index' field below Table 248:

The transmit opportunities are numbered from 0x00 to 0x0f, where transmit opportunity 0x00 indicates the first transmit opportunity in the frame pointed by the frame number index.

8.3.7 Control mechanisms

8.3.7.3 Bandwidth requesting

8.3.7.3.2 Full Contention transmission

Change the second paragraph as indicated:

If the Full Contention allocation appears in subchannelized region, the allocation is partitioned into transmission opportunities (TOs) both in frequency and in time. The width (in subchannels) and length (in OFDM symbols) of each transmission opportunity is defined in the UCD message ~~defining UIUC = 2~~. The transmission of an SS shall contain a subchannelized preamble corresponding to the TO chosen, followed by data OFDM symbols using the most robust mandatory burst profile.

8.3.9 Channel quality measurements

8.3.9.2 RSSI mean and standard deviation

Change the first sentence of first paragraph as indicated:

When collection of RSSI measurements is mandated by the BS, an SS shall obtain an RSSI measurement from the OFDM downlink long preambles.

Change the second paragraph as indicated:

Mean and standard deviation statistics shall be reported in units of dBm and dB, respectively. To prepare such reports, statistics shall be quantized in 1 dB increments, ranging from –40 dBm (encoded 0x53) to –123 dBm (encoded 0x00). Values outside this range shall be assigned the closest extreme value within the scale. The standard deviation shall be quantized in 0.5dB increments (i.e. standard deviation < 0.5dB encoded 0x00, 0.5dB ≤ standard deviation < 1.0dB encoded 0x01).

Change the first sentence of the third paragraph as indicated:

The method used to estimate ~~the~~ a single RSSI ~~of a single message~~ measurement is left to individual implementation, but the relative accuracy of a single signal strength measurement, taken from a single message, shall be ± 2 dB, with an absolute accuracy of ± 4 dB.

8.3.11 Receiver requirements

8.3.11.1 Receiver sensitivity

Change the paragraph below Table 266 as indicated:

Test messages for measuring Receiver Sensitivity shall be based on a continuous stream of MAC PDUs, each with a payload ~~consisting of~~ containing an ***R*** times repeated sequence $\boldsymbol{S_{modulation}}$. The payload may also include the packet CS header consistent with 5.2. For each modulation, a different sequence applies:

Change the second paragraph below Table 266 as indicated:

For each mandatory test message, the ($\boldsymbol{R}$,$\boldsymbol{S_{modulation}}$) tuples that shall apply are:

Short length test message payload (288 data bytes): (144,S_{BPSK}), (72,S_{QPSK}), (36,S_{16QAM}), (6,S_{64QAM})
Mid length test message payload (864 data bytes): (432,S_{BPSK}), (216,S_{QPSK}), (108,S_{16QAM}), (18,S_{64QAM})
Long length test message payload (~~1536~~1488 data bytes): (~~768~~744,S_{BPSK}), (~~384~~372,S_{QPSK}), (~~192~~186,S_{16QAM}), (~~32~~31,S_{64QAM})

8.3.11.2 Receiver adjacent and alternate channel rejection

In the second paragraph, change the reference 8.3.10.3 to 8.3.11.3.

8.4 WirelessMAN-OFDMA PHY

8.4.3 OFDMA basic terms definition

8.4.3.1 Slot and Data Region

Change the second paragraph as indicated:

The definition of an OFDMA slot depends on the OFDMA symbol structure, which varies for uplink and downlink, for FUSC and PUSC, and for the distributed subcarrier permutations and the adjacent subcarrier permutation.

- — For downlink FUSC (defined in 8.4.6.1.2.2) and downlink optional FUSC (defined in 8.4.6.1.2.3) using the distributed subcarrier permutation ~~(defined in 8.4.6.1.2.2 and 8.4.6.1.2.3)~~, one slot is one subchannel by one OFDMA symbol.
- — For downlink PUSC using the distributed subcarrier permutation (defined in 8.4.6.1.2.1), one slot is one subchannel by two OFDMA symbols.
- — For uplink PUSC using either of the distributed subcarrier permutations (defined in 8.4.6.2.1 and 8.4.6.2.5), one slot is one subchannel by three OFDMA symbols.
- — For ~~uplink and downlink using~~ the adjacent subcarrier permutation (defined in 8.4.6.3), one slot is one subchannel ~~by one OFDMA symbol~~ defined in 8.4.6.3.

8.4.3.4 OFDMA data mapping

Change the first and second bullets of the second paragraph as indicated:

1) Segment the data after channel coding into blocks sized to fit into one OFDMA slot.
2) Each slot shall span one or more subchannels in the subchannel axis and ~~two~~ one or more OFDMA symbols in the time axis, as per the slot definition in 8.4.3.1 (see Figure 216 for an example). Map the slots such that the lowest numbered slot occupies the lowest numbered subchannel in the lowest numbered OFDMA symbol.

Change the second bullet of the third paragraph as indicated:

2) Each slot shall span one or more subchannels in the subchannel axis and ~~three~~one or more OFDMA symbol in the time axis, as per the slot definition in 8.4.3.1 (see Figure 217 for an example). Map the slots such that the lowest numbered slot occupies the lowest numbered subchannel in the lowest numbered OFDMA symbol.

8.4.4 Frame structure

8.4.4.2 PMP frame structure

Change the second paragraph as indicated:

In TDD and H-FDD systems, subscriber station allowances must be made by a SSRTG and by a SSTTG. The BS shall not transmit downlink information to a station later than (SSRTG+RTD) before the beginning of its first scheduled uplink allocation in any UL-subframe, and shall not transmit downlink information to it earlier than (SSTTG-RTD) after the end of the last scheduled uplink allocation, where RTD denotes Round-Trip Delay. In addition the SS should be allowed to receive the downlink preamble for each frame which contains DL data for it, by assuring the period specified above does not overlap with the preamble. The parameters SSRTG and SSTTG are capabilities provided by the SS to BS upon request during network entry (see 11.8.3.1).

Replace Figure 218 with the following figure:'

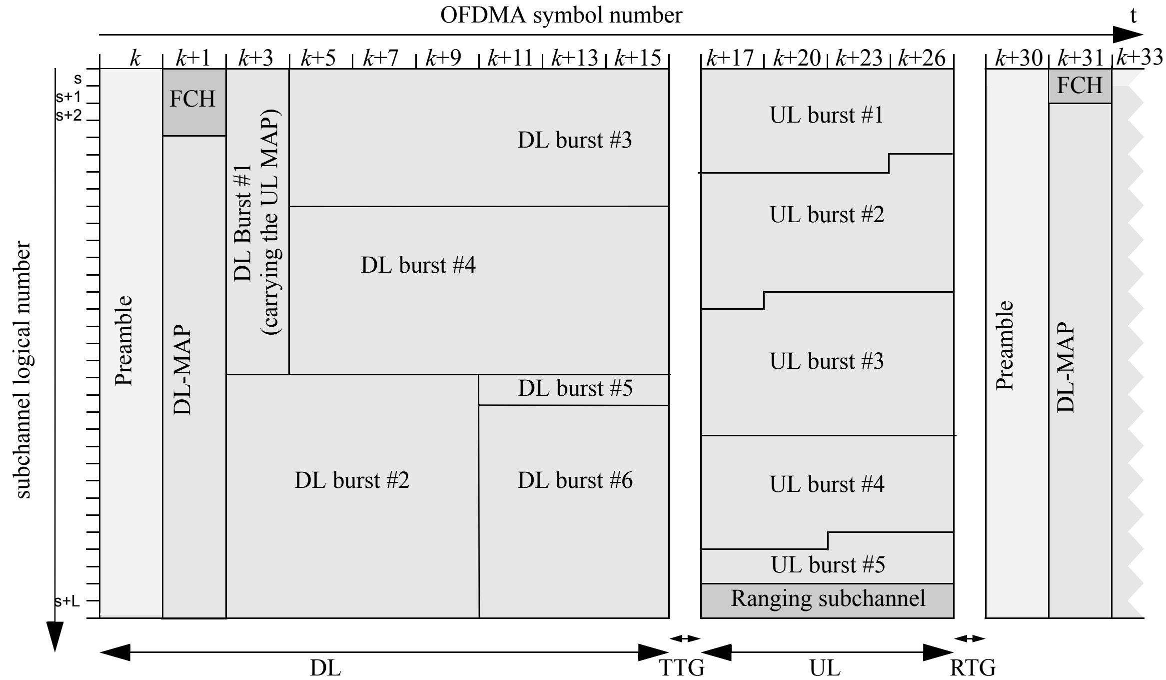

Figure 96—Time plan - one TDD time frame (with only mandatory zone)

Change the third through fifth paragraphs as indicated:

Subchannel allocation in the downlink may be performed in the following ways: partial usage of subchannels (PUSC) where some of the subchannels are allocated to the transmitter, and full usage of the subchannels (FUSC) where all subchannels are allocated to the transmitter. ~~The first two transmitted subchannels in the first data symbol of the downlink is called FCH~~. The FCH shall be transmitted using QPSK rate 1/2 with four repetitions using the mandatory coding scheme (~~e.g.~~i.e., the FCH information will be sent on four ~~adjacent~~ subchannels with successive logical subchannel numbers) in a PUSC zone. The FCH contains the DL_Frame Prefix as described in 8.4.4.3, and specifies the length of the DL-MAP message that immediately follows the DL_Frame_Prefix and the repetition coding used for the DL-MAP message.

The transitions between modulations and coding take place on ~~OFDMA symbol~~slot boundaries in time domain (except in AAS zone) and on subchannels within an OFDMA symbol in frequency domain.

The OFDMA frame may include multiple zones (such as PUSC, FUSC, PUSC with all subchannels, optional FUSC~~,~~ and AMC ~~and optional FUSC with all subchannels~~), the transition between zones is indicated in the DL-Map by the Zone_switch IE (see 8.4.5.3.4). No DL-MAP or UL-MAP allocations can span over multiple zones. Figure 219 depicts OFDMA frame with multiple zones.

Replace Figure 219 with the following figure.

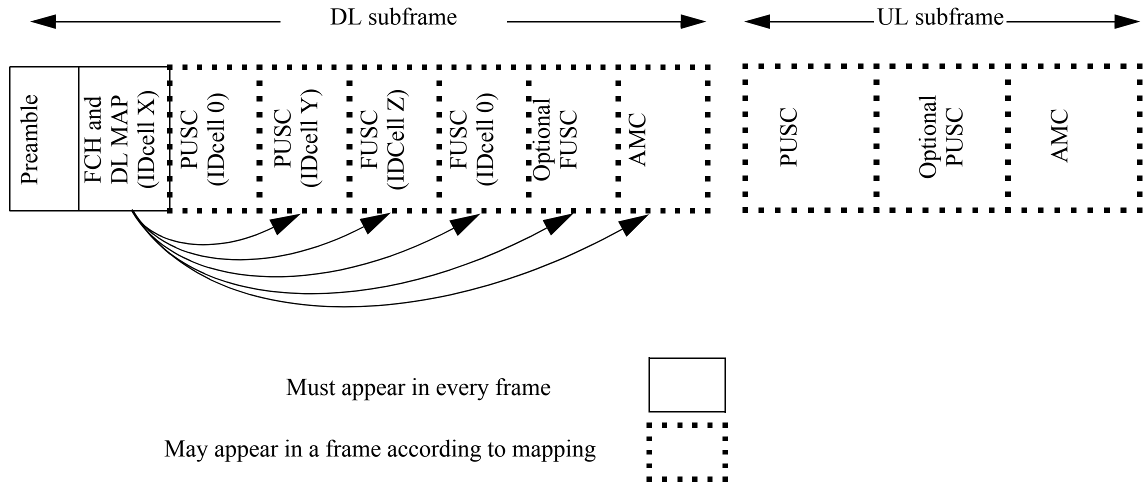

Figure 219—Illustration of OFDMA frame with multiple zones

8.4.4.3 DL Frame Prefix

Change the description of the 'Used subchannel bitmap' field below Table 268 as indicated:

Used subchannel bitmap
A bitmap indicating which groups of subchannel are used on the PUSC zone. Value of '1' means used by this segment and '0' means not used by this segment.

Change the description of the 'Coding_Indication' field below Table 268 as indicated:

Coding_Indication
Indicates the FEC encoding code used for the DL-MAP. The DL-MAP shall be transmitted with QPSK modulation at FEC rate 1/2. ~~Note that t~~ The BS ~~must~~shall ensure that DL-MAP (and other MAC messages required for SS operation) are sent with the mandatory coding scheme often enough to ensure uninterrupted operation of SS supporting only the mandatory coding scheme.

Change the description of the 'DL-Map_Length' field below Table 268 as indicated:

DL-Map_Length
Defines the length in slots of the DL-MAP message that follows immediately the DL_Frame_Prefix, after repetition code is applied.

Change the title of section 8.4.4.4 to read:

8.4.4.4 Allocation of subchannels for FCH and DL-MAP, and logical subchannel numbering

Insert the following text at the end of section 8.4.4.4:

The DL-MAP of each segment shall be mapped to the slots allocated to the segment in a frequency first order, starting from the slot after the FCH (subchannel 4 in the first symbol, after renumbering), and continuing to the next symbols if necessary. The FCH of segments that have no subchannels allocated (unused segments) will not be transmitted, and the respective slots may be used for transmission of MAP/ data of other segments.

8.4.4.5 Uplink transmission allocations

Insert the following text as the end of the section:

In the uplink, the BS shall not allocate to any SS more than one UL-MAP_IE with data burst profile UIUC (1-10) in a single frame. This limitation does not apply to H-ARQ data allocation regions.

Rectangular allocations made with UIUC = 12,13 (ranging and BW-request) shall not break the UL tile structure, and conform to the following rules:

1) In each subchannel, the size of each continuous group of OFDMA symbols remaining after allocation of UIUC = 12,13 regions shall be a multiple of 3 OFDMA symbols.
2) The slot boundaries in all subchannels shall be aligned, i.e. if a slot starts in symbol k in any subchannel, then no slots are allowed to start at symbols *k*+1, *k*+2 at any other subchannel.

The following figure depicts correct and incorrect allocations of UIUC = 12,13 regions. Each rectangle is an UL-subframe (or zone). Regions 1,2,3 are correct allocations, and 4,5 are incorrect allocations.

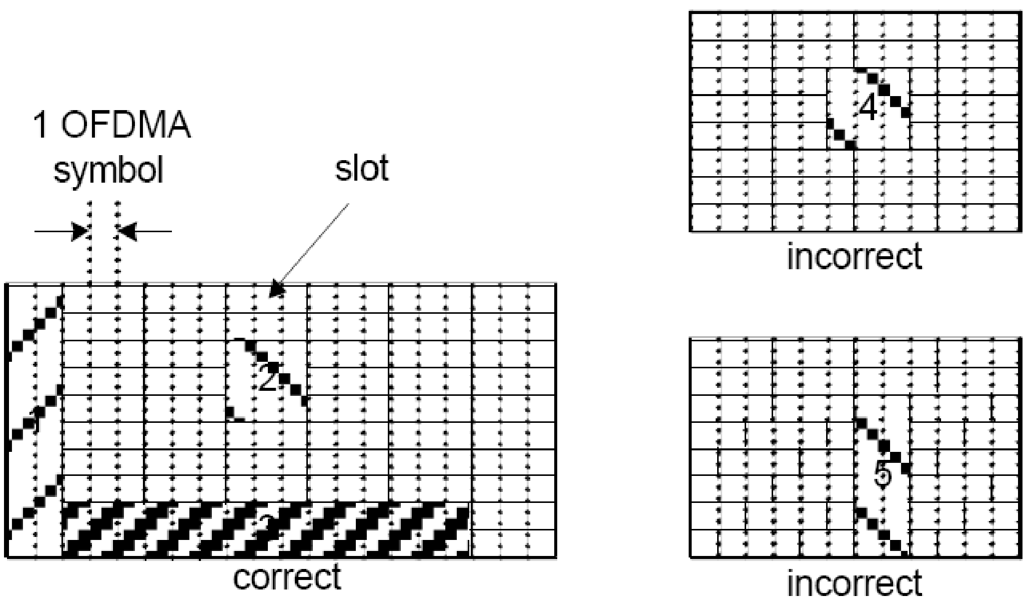

Figure 222a—Example of UIUC = 12,13 allocation rules

Change the title of section 8.4.4.6 as indicated:

8.4.4.6 Optional ~~Diversity-Map Scan~~AAS Support

Insert the following text:

AAS support is indicated by the AAS_DL_IE and AAS_UL_IE in the downlink and uplink broadcast maps. The AAS_IE specifies an AAS zone, which is defined as a contiguous block of OFDMA symbols that has a defined permutation and preamble structure. Multiple AAS zones can be supported within a frame. Each AAS Zone may or may not contain an optional Diversity-Map Scan zone. AAS Operation without the optional Diversity-Map Scan zone is referred to as Basic AAS Mode.

8.4.4.6.1 AAS frame structure

Change the first paragraph as indicated:

An AAS DL Zone begins on the specified symbol boundary and consists of all subchannels until the start of the next Zone or end of frame. The two highest numbered subchannels of the DL frame may be dedicated at the discretion of the BS for the AAS Diversity-Map Zone in PUSC, FUSC, and optional FUSC permutation. For the PUSC permutation, it is assumed that all AAS subscribers can decode the FCH in order to know the Used Subchannel Bitmap.

In the AMC permutation zone, the same antenna beam pattern shall be used for all pilot subcarriers and data subcarriers in a given AMC subchannel.

In the AMC permutation, the ~~fourth and (*N*-4)th subchannels of the total *N* subchannels~~first and last subchannels of the ~~DL frame~~ AAS DL Zone may be dedicated at the discretion of the BS for the AAS Diversity-Map Zone. For AMC permutation, each subchannel for the AAS diversity MAP consists of ~~3~~2 bins by ~~2~~3 symbols. A 2 bin by 3 symbol tile structure shall be used for all AMC permutations in an AAS zone. When ~~these~~ subchannels are used for ~~this purpose~~a Diversity-Map zone, they shall not be allocated in the normal DL-MAP message ~~and shall be used only on the AAS portion of the DL subframe~~. These subchannels will be used to transmit the AAS-DLFP() whose physical construction is shown in Figure 223. In the case that the AAS Diversity-Map zone is not included in the AAS zone, these subchannels may be used for ordinary traffic and may be allocated in DL_MAP messages.

Replace Figure 224 with the following figure:

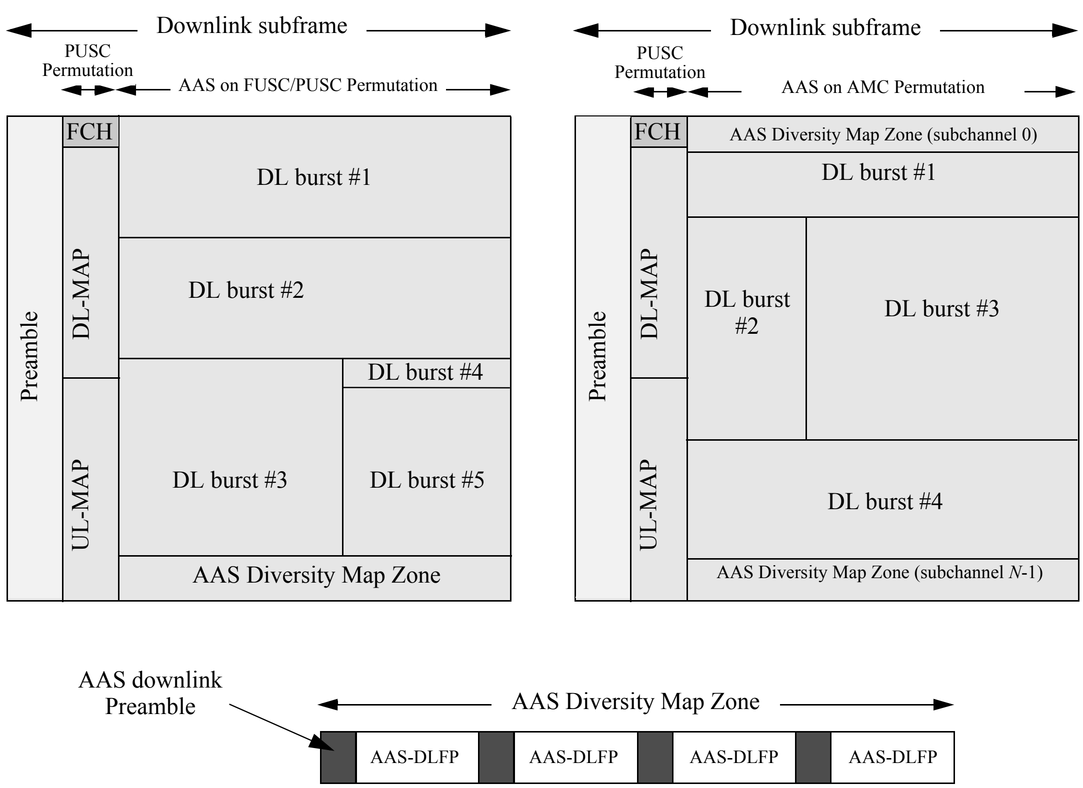

Figure 223—Example of allocation for IE AAS-DLFP

8.4.4.6.2 Optional Diversity-Map Scan

Change the section as indicated:

The purpose of the AAS-DLFP is to provide a robust transmission of the required base station parameters to enable SS initial ranging, as well as SS paging and access allocation. This is achieved through using a highly robust form of modulation and coding (namely QPSK-1/2 rate with 2 repetitions). The start of an AAS-DLFP is marked by an AAS DL preamble. The AAS-DLFPs transmitted within the AAS Diversity Map Zone may, but need not carry the same information. Different beams may be used within the AAS Diversity Map Zone; however, each AAS Downlink Preamble and associated AAS-DLFP must be transmitted on the same beam.

The UL and DL AAS Zones are defined by the uplink and downlink extended AAS-IE in the broadcast map. In the case that a SS cannot successfully decode the broadcast maps, the SS will scan for the DLFP messages and utilize private maps within the AAS zone. It is assumed that all AAS subscribers will be able to determine the IDcell used in the selection of the DL preamble at the beginning of the DL frame. This IDcell shall be used as the DL_PermBase for the AAS zone. The UL_PermBase for the UL zone referred to by the initial ranging allocation in the AAS-DLFP shall be that provided in the UCD message. For AAS subscribers that cannot detect the AAS_DL_IE transmitted in the DL-MAP which specifies the boundaries and permutation of AAS DL zones, they must search over the possible permutations (PUSC/FUSC/AMC) and starting symbol to detect the AAS-DLFP. The permutation for the AAS UL Zone is specified by a field in the AAS-DLFP.

The AAS-DLFP supports the ability to transmit a ~~MAP IE that carries a~~ compressed DL-MAP IE. This allocation message can point to a broadcast DL-MAP that is beamformed or can be used to “page” a specific SS that cannot receive the normal DL-MAP. Once the initial allocations are provided to the user, private DL-MAPs and UL-MAPs can be sent on a beamformed transmission to the user at the highest modulation and ~~lowest~~highest coding rate that can be supported by the link. The AAS-DLFP also has an uplink initial ranging allocation for AAS subscribers. The AAS-DLFP is not randomized.

The preamble length specified by the Downlink_preamble_config field should be limited to an integer number of slot durations for the DL PUSC permutation. Further, this field determines the preamble duration for the allocation pointed to by the DL Comp IE in the AAS-DLFP, and must be consistent with the preamble lengths described in the AAS_DL_IE messages.

The contents of the AAS-DLFP() payload is described by Table 226.

Table 226—AAS-DLFP Structure, Diversity-Map Scan

Syntax	Size	Notes
AAS-DLFP() {		
AAS beam index	~~6~~4 bits	This index is the index referred to by the AAS_Beam_Select message (see 6.3.2.3.41). This field also defines the preamble frequency/time shift. For frequency shifted preambles, this value is used for the value of *K* in Equation 103. For time shifted preambles, the value of *K* in equation 102 is given by: For PUSC, K = [AAS_beam_index (mod14)]*N_{fft}/14 For AMC, K = [AAS_beam_index (mod 9)]*N_{fft}/9
Preamble select	1 bit	0 – Frequency shifted Preamble 1 – Time shifted Preamble
Uplink_Preamble_Config	2 bits	00 – 0 symbols 01 – 1 symbols 10 – 2 symbols 11 – 3 symbols
Downlink_Preamble_Config	2 bits	00 – 0 symbols 01 – 1 symbols 10 – 2 symbols 11 – 3 symbols
AAS_UL_Zone_Permutation	2 bits	This field describes the permutation used by the allocation pointed to by the AAS_ranging_allocation_IE. 0b00 = PUSC permutation 0b01 = Optional PUSC permutation 0b10 = adjacent-subcarrier permutation 0b11 = *Reserved*
Initial_Ranging_Allocation_IE(){		
OFDMA Symbol Offset	8 bits	The offset to the starting location of the ranging allocation is referenced to the DL preamble of the subsequent frame, and consists of an integer symbol offset specified here, as well as the addition of the TTG known from DCD messages. If TTG is not present in the DCD (for FDD) it is assumed to be zero.
Subchannel offset	~~6~~7 bits	
No of OFDMA Symbols	~~7~~4 bits	
No of Subchannels	~~6~~4 bits	
Ranging Method	2 bits	00 – Initial Ranging over two symbols 01 – Initial Ranging over four symbols 10 – BW Request/Periodic Ranging over one symbol 11 – BW Request/Periodic Ranging over three symbols

Table 226—AAS-DLFP Structure, Diversity-Map Scan *(continued)*

Syntax	Size	Notes
}		
AAS_Comp_DL_IE()	50 bits	
HCS	8 bits	
}		

Table 227—Structure of AAS_COMP_DL_IE ()

Syntax	Size	Notes
AAS_COMP_DL_IE()		
CID	16 bits	
DIUC	4 bits	Set DIUC =15 to indicate the well known modulation of QPSK, encoded with the mandatory CC at rate ½
OFDMA Symbol Offset	8 bits	Referenced to the DL frame start preamble of the next frame.
Subchannel offset	~~6~~8 bits	
No of OFDMA Symbols	7 bits	
No of Subchannels	6 bits	
~~**Boosting**~~	~~3 bits~~	
Repetition Coding Indication	2 bits	As specified in 8.4.5.3
}		

Insert a new section 8.4.4.6.3 and renumber all subsequent sections accordingly

8.4.4.6.3 AAS Diversity-Scan Map Network Entry Procedure

The AAS network entry utilizing the DLFP involves the following procedure:

- The AAS-SS synchronizes frame timing and frequency to the frame-start DL preamble.
- For AAS-SS at cell edge, which cannot decode the FCH or broadcast DL-MAP and UL-MAP messages, they will search for the AAS-DLFP on the AAS Diversity Map Zone. This search will need to span the possible subchannel permutations.
- The AAS-SS may receive necessary messages such as the DCD and UCD pointed to by allocations made from the AAS-DLFP using the broadcast CID. These messages may be transmitted using beam-pattern diversity to increase the link budget.
- Once the AAS-SS decodes the DCD and UCD it should perform initial ranging on the interval pointed to by the best-received AAS-DLFP.

- The AAS-SS may receive a ranging response message through a DL-MAP allocation pointed to by an AAS-DLFP with the broadcast CID.
- The AAS-SS may receive initial downlink allocations through a DL-MAP allocation pointed to by the AAS-DLFP with either broadcast CID or specific CID.
- Subsequent allocations can be managed with private DL-MAP and UL-MAP allocations.

8.4.4.6.3 AAS Downlink Preamble

Change the second sentence of the section as indicated:

In addition, the "~~Preamble Presence~~Downlink_Preamble_Config" field of the AAS_DLFP indicates the presence of an AAS downlink preamble on any downlink allocation made by the DLFP.

Delete section 8.4.4.7 and all of its subsections.

8.4.5 Map message fields and IEs

8.4.5.3 DL-MAP IE format

Change Table 275 as indicated:

Table 275—OFDMA DL-MAP_IE format

Syntax	Size	Notes
DL-MAP_IE() {		
DIUC	4 bits	
if (DIUC == 15) {		
Extended DIUC dependent IE	*variable*	See subclauses following 8.4.5.3.1
} else {		
if (INC_CID == 1) {		The DL-MAP starts with INC_CID =0. INC_CID is toggled between 0 and 1 by the CID-SWITCH_IE() (8.4.5.3.7)
N_CID	8 bits	Number of CIDs assigned for this IE
for (*n*=0; *n*< N_CID; *n*++) {		
CID	16 bits	
}		
}		
OFDMA Symbol offset	8 bits	
if (Permutation = 0b11 and (AMC type is 2x3 or 1x6)) {		

Table 275—OFDMA DL-MAP_IE format *(continued)*

Syntax	Size	Notes
Subchannel offset	8 bits	
Boosting	3 bits	000: normal (not boosted); 001: +6dB; 010: -6dB; 011: +9dB; 100: +3dB; 101: -3dB; 110: -9dB; 111: -12dB;
No. OFDMA triple symbol	5 bits	Number of OFDMA symbols is given in multiples of 3 symbols
No. Subchannels	6 bits	
} else {		
Subchannel offset	6 bits	
Boosting	3 bits	000: normal (not boosted); 001: +6dB; 010: -6dB; 011: +9dB; 100: +3dB; 101: -3dB; 110: -9dB; 111: -12dB;
No. OFDMA Symbols	7 bits	
No. Subchannels	6 bits	
Repetition Coding Indication	2 bits	0b00 – No repetition coding 0b01 – Repetition coding of 2 used 0b10 – Repetition coding of 4 used 0b11– Repetition coding of 6 used
}		
}		
}		

Change the description of the 'OFDMA Symbol offset', 'Boosting' and 'Repetition coding Indication' fields below Table 275 as indicated:

OFDMA Symbol offset
The offset of the OFDMA symbol in which the burst starts, measured in OFDMA symbols from ~~beginning of~~ the downlink ~~frame~~symbol in which the ~~DL-MAP~~preamble is transmitted, starting from symbol 0.

Boosting
~~Indication whether the subcarriers for this allocation are power boosted.~~ Power boost applied to the allocation's data subcarriers. The field shall be zero in AAS zone with AMC permutation.

Repetition coding Indication
Indicates the repetition code used inside the allocated burst. Repetition shall be used only for DIUC indicating QPSK modulation.

8.4.5.3.1 DIUC allocation

Change Table 276 as indicated:

Table 276—OFDMA DIUC values

DIUC	Usage
0–12	Different burst profiles
13	Gap/PAPR reduction
14	~~End of map~~*Reserved*
15	Extended DIUC

Insert the following sentence at the end of the section:

The SS shall ignore the received signal in the GAP/PAPR reduction region.

8.4.5.3.3 AAS IE format

Change the section as indicated:

Within a frame, the switch from non-AAS to AAS-enabled traffic is marked by using the extended DIUC = 15 with the AAS_DL_IE() to indicate that the subsequent allocations, until the ~~start of the first UL-MAP allocation using TDD, and until the end of the frame using FDD~~next Zone Switch IE or AAS_IE, shall be for AAS traffic. The AAS_DL_IE defines a DL AAS Zone that spans continuous OFDMA symbols until terminated by a Zone Switch IE, another AAS_DL_IE or the end of the DL frame. Multiple AAS zones can exist within the same frame. For the H-ARQ MAP, the last AAS_IE is relevant until the beginning of the broadcast region if defined in H-ARQ format configuration IE. When used, the CID in the DL-MAP_IE() shall be set to the broadcast CID. All DL bursts in the AAS portion of the frame may be preceded by an AAS preamble based on the ~~indication~~ “Downlink_preamble_config” field in the AAS_DL_IE(). The preamble is defined in 8.4.4.6.3.1. ~~The preamble is defined in 8.4.6.1.1, and shall be selected to have the same segment number as the DL frame preamble, and the cell ID shall equal to *(DL-Preamble IDcell + 16) mod 32*. The preamble shall exist only on those subchannels used by the DL burst.~~

Table 278—OFDMA downlink AAS IE

Syntax	Size	Notes
AAS_DL_IE() {		
Extended DIUC	4 bits	AAS = 0x02
Length	4 bits	Length = 0x03
OFDMA symbol offset	8 bits	Denotes the start of the zone (counting from the frame preamble and starting from 0)
Permutation	2 bits	0b00 = PUSC permutation 0b01 = FUSC permutation 0b10 = Optional FUSC permutation 0b11 = adjacent-subcarrier permutation
DL_PermBase	6 bits	

Table 278—OFDMA downlink AAS IE

Syntax	Size	Notes
Preamble indication	2 bits	~~0b00 = No preamble~~ ~~0b01 = Preamble used~~ ~~0b10-0b11 = *Reserved*~~ 0b00 - 0 symbols 0b01 - 1 symbols 0b10 - 2 symbols 0b11 - 3 symbols
~~**First bin index**~~	~~6 bits~~	~~When Permutation=0b10, this indicates the index of the first band allocated to this AMC segment~~
~~**Last bin index**~~	~~6 bits~~	~~When Permutation=0b10, this indicates the index of the last band allocated to this AMC segment~~
reserved	6 bits	Shall be set to zero
}		

Permutation
Defines the permutation used within the DL AAS Zone

DL_PermBase
Permutation Base for specified DL AAS Zone

OFDMA Symbol offset
The offset of the OFDMA symbol in which the AAS Zone starts, measured in OFDMA symbols from beginning of the current downlink frame.

Preamble Indication
Defines the number of DL AAS preambles to be used before each DL burst in the AAS Zone.

Following AAS_IE indicating AMC permutation the AMC type shall be 2x3 (2 bins by 3 symbols).

Change the title of section 8.4.5.3.4

8.4.5.3.4 ~~Transmit diversity (TD)~~Space-Time Coding (STC)/Zone switch IE format

Change the section as indicated:

In the DL-MAP, a BS may transmit DIUC = 15 with the ~~TD~~STC_ZONE_IE() to indicate that the subsequent allocations shall use a specific permutation, or be ~~transmit diversity~~STC encoded. The downlink frame shall start in PUSC mode with IDcell = 0 and no transmit diversity. Allocations subsequent to this IE shall use the permutation and transmit diversity mode it instructs, until the next Zone Switch IE or AAS_IE.

Table 279—OFDMA downlink ~~TD~~STC_ZONE IE format

Syntax	Size	Notes
TD_ZONE_IE() {		
Extended DIUC	4 bits	~~TD~~STC/ZONE_SWITCH = 0x01
Length	4 bits	Length = 0x0~~2~~4

Table 279—OFDMA downlink ~~TD~~STC ZONE IE format *(continued)*

Syntax	Size	Notes
OFDMA symbol offset	8 bits	Denotes the start of the zone (counting from the frame preamble and starting from 0)
Permutation	2 bits	0b00 = PUSC permutation 0b01 = FUSC permutation 0b10 = Optional FUSC permutation 0b11 = Adjacent subcarrier permutation
Use All SC indicator	1 bits	0 = Do not use all subchannels 1 = Use all subchannels
~~Transmit Diversity~~STC	2 bits	0b00 = No ~~transmit diversity~~STC 0b01 = STC using 2 antennas 0b10 = STC using 4 antennas 0b11 = FHDC using 2 antennas
Matrix Indicator	2 bits	Antenna STC/FHDC matrix (see 8.4.8) 0b00 = Matrix A 0b01 = Matrix B 0b10 = Matrix C (applicable to 4 antennas only) 0b11 = *Reserved*
IDcell	6 bits	
AMC type	2 bits	Indicates the AMC type in case permutation type = 0b11, otherwise shall be set to 0. AMC type (NxM = N bins by M symbols): 0b00 - 1x6 0b01 - 2x3 0b10 - 3x2 0b11 - reserved
reserved	~~2~~1 bit~~s~~	Shall be set to zero
}		

Permutation

Indicates the permutation that shall be used by the transmitter for allocations following this IE. Permutation changes are only allowed on a zone boundary. The IDcell indicated by the IE shall be used as the basis of the permutation (see 8.4.6.1).

Use All SC indicator

When set, this indicator indicates transmission on all available subchannels For PUSC. For ~~FUSC~~other permutation~~s~~, ~~transmission is always on all subchannels~~ this field shall be ignored..

~~Transmit diversity~~STC

Indicates the ~~transmit diversity~~STC mode that shall be used by the transmitter for allocations following this IE (see 8.4.8). All allocations without ~~transmit diversity~~STC shall be transmitted only from one antenna (antenna 0). The BS shall transmit from both its antennas for all allocations with ~~transmit diversity~~STC.

8.4.5.3.6 Data location in another BS IE

Change the section as indicated:

In the DL-MAP, a BS may transmit DIUC=15 with the Data_location_in_another_BS_IE() to indicate that data is transmitted to the SS through another BS. This IE shall be sent right after the IE defining the same data received in the current BS, but it may be sent alone without the IE defining the same data received in the current BS only if the data is to be transmitted in the current frame.

Table 281—OFDMA Data location in another BS IE

Syntax	Size	Notes
Data_location_in_another_BS_IE() {		
Extended DIUC	4 bits	Data_location_in_another_BS = 0x3
Length	4 bits	Length = 0x0~~A~~9
~~*reserved*~~	~~6 bits~~	~~Shall be set to zero~~
Segment	2 bits	Segment number
Used subchannels	6 bits	Used subchannels at other BS Bit #0: 0–11 Bit #1: 12–19 Bit #2: 20–31 Bit #3: 32–39 Bit #4: 40–51 Bit #5: 52–59
~~**IDcell**~~	~~5 bits~~	~~Cell ID of other BS~~
DIUC	4 bits	DIUC used for the burst in the other BS
Frame Advance	3 bits	The number of frames offset from the ~~current~~next frame where the data will be transmitted (0 = Next frame)
reserved	1 bit	Shall be set to zero
OFDMA Symbol offset	8 bits	
Subchannel offset	6 bits	
Boosting	3 bits	000: normal (not boosted); 001: +6dB; 010: –6dB; 011: +9dB; 100: +3dB; 101: –3dB; 110: -9dB; 111: -12dB;
Preamble index	7 bits	Preamble index of the other BS
No. OFDM Symbols	8 bits	
No. Subchannels	6 bits	
Repetition Coding Indication	2 bits	00 – No repetition coding 01 – Repetition coding of 2 used 10 – Repetition coding of 4 used 11 – Repetition coding of 6 used
CID	16 bits	
}		

8.4.5.3.8 MIMO DL basic IE format

Change the first paragraph as indicated:

In the DL-MAP, a MIMO-enabled BS may transmit DIUC = 15 with the MIMO_DL_Basic_IE() to indicate the MIMO configuration of the subsequent downlink allocation to a specific MIMO-enabled SS CID. The MIMO mode indicated in the MIMO_DL_Basic_IE() shall only apply to the ~~subsequent~~ downlink allocation ~~until the end of frame~~s indicated in the IE.

Insert the following field at the end Table 283:

padding	*variable*	Number of bits required to align to byte length, shall be set to zero.

8.4.5.3.9 MIMO DL Enhanced IE format

Insert the following field at the end Table 284:

padding	*variable*	Number of bits required to align to byte length, shall be set to zero.

8.4.5.3.10 H-ARQ MAP Pointer IE

Change the first paragraph as indicated:

This IE shall only be used by a BS supporting H-ARQ, for SS supporting H-ARQ. There shall be at most 4 H-ARQ MAP Pointer IE in the DL-MAP.

Change the first line in Table 285 as indicated:

~~MIMO_DL_Enhanced~~HARQ_MAP_Pointer_IE() {

8.4.5.3.11 DL-MAP Physical Modifier IE

Change the first two paragraphs as indicated:

The Physical Modifier Information Element indicates that the subsequent allocations shall utilize a preamble, which is either cyclically delayed in time or cyclically rotated in frequency. This IE applies to operation in AAS mode.

In the case when the preamble is cyclically delayed in time by *k* samples, the preamble will contribute a component s(t) to the transmitted waveform as defined in Equation (104). This IE applies to operation in AAS mode.

Change the text under the 'Notes' column of the 'Length' field in Table 286 as indicated:

Length = 0x0~~3~~1

Insert the following field to Table 286 before the 'Preamble frequency shift index' field:

reserved	1 bits	Shall be set to zero

8.4.5.4 UL-MAP IE format

Change the section as indicated:

The OFDMA UL-MAP IE defines uplink bandwidth allocations. If OFDMA UL-MAP IE with UIUC = 12 or UIUC = 13 exists, they ~~must be~~ shall always be allocated first. The first OFDMA UL-MAP IE, with UIUC other than 12 or 13, shall start at the lowest numbered non-allocated subchannel on the first non-allocated OFDMA symbol defined by the allocation start time field of the UL-MAP message that is not allocated with UIUC = 12 or UIUC = 13 (See Figure 217 for an example). These IEs shall represent the number of slots provided for the allocation. Each allocation IE shall start immediately following the previous allocation and shall advance in the time domain. If the end of the UL ~~frame~~ zone has been reached, the allocation shall continue at the next subchannel at first OFDMA symbol ~~(define by the allocation start time field)~~allocated to that zone that is not allocated with UIUC = 12 or UIUC = 13. The CID represents the assignment of the IE to either a unicast, multicast, or broadcast address. A UIUC shall be used to define the type of uplink access and the burst type associated with that access. A Burst Descriptor shall be specified in the UCD for each UIUC to be used in the UL-MAP. For UIUC = 12 allocations may include broadcast CID and in addition, multicast polling CID when working in FDD mode. In case of multicast polling CID the allocation will be used only by members of the multicast polling group and ignored by other SS. The format of the UL-MAP IE is defined in Table 287.

Table 287—OFDMA UL-MAP IE format

Syntax	Size	Notes
UL-MAP_IE() {		
CID	16 bits	
UIUC	4 bits	
if (UIUC == 12) {		
OFDMA Symbol offset	8 bits	
Subchannel offset	7 bits	
No. OFDMA Symbols	7 bits	
No. Subchannels	7 bits	
Ranging Method	2 bits	0b00 – Initial Ranging over two symbols 0b01 – Initial Ranging over four symbols 0b10 – BW Request/Periodic Ranging over one symbol 0b11– BW Request/Periodic Ranging over three symbols
reserved	1 bit	Shall be set to zero
} else if (UIUC == 13) {		
PAPR_Reduction_and_Safty _Zone_Allocation_IE()	32 bits	
} else if (UIUC == 14) {		
CDMA_Allocation_IE()	32 bits	
else if (UIUC == 15) {		
Extended UIUC dependent IE	*variable*	See subclauses following 8.4.5.4.3

Table 287—OFDMA UL-MAP IE format *(continued)*

Syntax	Size	Notes
} else {		
Duration	10 bits	In OFDMA slots (see 8.4.3.1)
Repetition coding indication	2 bits	0b00 – No repetition coding 0b01 – Repetition coding of 2 used 0b10 – Repetition coding of 4 used 0b11 – Repetition coding of 6 used
}		
Padding nibble, if needed	4 bits	Completing to nearest byte, shall be set to 0.
}		

CID
Represents the ~~assignment of the IE~~SS to which the IE is assigned.

UIUC
UIUC used for the burst.

OFDMA Symbol offset
The offset of the OFDMA symbol in which the burst starts, the offset value is defined in units of OFDMA symbols and is relevant to the Allocation Start Time field given in the UL-MAP message.

Subchannel offset
The lowest index subchannel used for carrying the burst, starting from subchannel 0. ~~When allocation of mini-subchannels is used, this offset will always be even numbered and will point to the first subchannel of the couple splitted into mini-subchannels and used in the allocation.~~

No. OFDMA Symbols
The number of OFDMA symbols that are used to carry the uplink Burst.

No. subchannels
The number of subchannels with subsequent indices.

Duration
Indicates the duration, in units of OFDMA slots, of the allocation.

Repetition coding indication
Indicates the repetition code used inside the allocated burst. Repetition shall be used only for UIUC indicating QPSK modulation.

When a ranging allocation (UIUC = 12) is present in the UL-MAP, and the SS is in ranging backoff state, it shall count the ranging opportunities present in the ranging region. Only ranging allocations allocated in permutation zones supported by the SS, and matching the type of backoff the SS is counting (ranging or BW request) shall be considered as containing relevant ranging opportunities.

8.4.5.4.1 UIUC Allocation

Change the second sentence of the first paragraph as indicated:

~~These tones~~ The data subcarriers within these subchannels may be used by all SSs to reduce PAPR of their transmissions.

Change Table 288 as indicated:

Table 288—OFDMA UIUC values

UIUC	Usage
0	FAST-FEEDBACK Channel
1–10	Different burst profiles
11	~~End of Map IE~~*Reserved*
12	CDMA Bandwidth Request, CDMA ranging
13	PAPR reduction allocation, Safety zone
14	CDMA Allocation IE
15	Extended UIUC

Delete the last (note) paragraph:

~~NOTE—The CDMA allocation UIUC provides (among other things) a function similar to the initial ranging UIUC used in other PHY options; therefore, instructions that relate to messages transmitted in the initial ranging UIUC shall apply to messages transmitted in the CDMA allocation UIUC as well.~~

8.4.5.4.2 PAPR reduction/Safety zone allocation IE

Change the fields descriptions below Table 289:

OFDMA Symbol offset
The offset of the OFDMA symbol in which the ~~burst~~PAPR-reduction/safety-zone starts, the offset value is defined in units of OFDMA symbols and is relevant to the Allocation Start Time field given in the UL-MAP message.

Subchannel offset
The lowest index subchannel used for ~~carrying~~ the ~~burst~~PAPR-reduction/safety-zone, starting from subchannel 0.

No. OFDMA Symbols.
The number of OFDMA symbols that are used ~~to carry~~for the uplink ~~Burst~~PAPR-reduction/safety-zone.

Number of subchannels
The number subchannels with subsequent indexes, used ~~to carry~~for the ~~burst~~PAPR-reduction/safety-zone.

8.4.5.4.3 CDMA allocation UL-MAP IE format

Change Table 290 as indicated:

Table 290—CDMA Allocation IE format

Syntax	Size	Notes
CDMA_Allocation_IE() {		
Duration	6 bits	
UIUC	4 bits	UIUC for transmission
Repetition Coding Indication	2 bits	0b00 – No repetition coding 0b01 – Repetition coding of 2 used 0b10 – Repetition coding of 4 used 0b11 – Repetition coding of 6 used
Frame Number Index	4 bits	LSBs of relevant frame number
Ranging Code	8 bits	
Ranging Symbol	8 bits	
Ranging subchannel	7 bits	
BW request mandatory	1 bit	1= yes, 0= no
}		

Insert the following text below Table 290:

Frame Number Index
Identifies the frame in which the CDMA code, which this message responds to, was transmitted. The 4 least significant bits of the frame number are used as the frame number index.

8.4.5.4.6 AAS IE format

Change the section as indicated:

Within a frame, the switch from non-AAS to AAS-enabled traffic is marked by using the extended UIUC = 15 with the AAS_UL_IE() to indicate that the subsequent allocation ~~until the end of the frame~~ shall be for AAS traffic. The AAS_UL_IE defines a UL AAS Zone that spans continuous OFDMA symbols until terminated by a Zone Switch IE, another AAS_UL_IE or the end of the UL frame. Multiple UL AAS Zones can exist within the same frame. When used, the CID in the UL-MAP_IE() shall be set to the broadcast CID. All UL bursts in the AAS portion of the frame may be preceded by an AAS preamble based on the indication in the AAS_UL_IE(). The preamble is defined in ~~8.4.9.4.3.1~~8.4.4.6.3.2.

Table 293—OFDMA uplink AAS IE

Syntax	Size	Notes
AAS_UL_IE() {		
Extended UIUC	4 bits	AAS = 0x02
Length	4 bits	Length = 0x03
Permutation	2 bits	0b00 = PUSC permutation 0b01 = Optional PUSC permutation 0b10 = adjacent-subcarrier permutation 0b11 = *Reserved*
UL_PermBase	7 bits	
OFDMA symbol offset	8 bits	
Preamble indication	2 bits	~~0b00 = No preamble~~ ~~0b01 = Preamble used~~ ~~0b10-0b11 = *Reserved*~~ 0b00 - 0 symbols 0b01 - 1 symbols 0b10 - 2 symbols 0b11 - 3 symbols
~~**First bin index**~~	~~6 bits~~	~~When Permutation = 0b10, this indicates the index of the first band allocated to this AMC segment~~
~~**Last bin index**~~	~~6 bits~~	~~When Permutation = 0b10, this indicates the index of the last band allocated to this AMC segment~~
reserved	5 bits	Shall be set to zero
}		

Permutation

Defines the permutation used within the UL AAS Zone

UL_PermBase

Permutation Base for specified UL AAS Zone

OFDMA Symbol offset

The symbol offset of the UL AAS Zone. This is referenced to the ‘Allocation Start Time’ field in the UL-MAP. AAS Zone Length The duration of the UL AAS Zone, specified in number of OFDMA symbols.

Preamble Indication

Defines the number of UL AAS preambles to be used before each UL burst in the AAS Zone.

Following AAS_IE indicating AMC permutation the AMC type shall be 2x3 (2 bins by 3 symbols).

8.4.5.4.7 UL Zone switch IE format

Change the first paragraph as indicated:

In the UL-MAP, a BS may transmit UIUC = 15 with the ZONE_IE() to indicate that the subsequent allocations shall use a specific permutation. Zone IE() may appear ahead of all uplink allocation IE and indicate the permutation of the first and the following slots. If Zone_IE() does not appear ahead of all uplink allocation IEs, t~~T~~he uplink frame shall start in PUSC mode with UL_IDcell as indicated in the UCD message. Allocations subsequent to this IE shall use the permutation it instructs. No burst allocation, neither the ranging channel allocation, shall span multiple zones.

Change Table 294 as indicated:

Table 294—OFDMA uplink ZONE IE format

Syntax	Size	Notes
ZONE_IE() {		
Extended ~~D~~UIUC	4 bits	ZONE = 0x04
Length	4 bits	Length = 0x03
OFDMA symbol offset	7 bits	
Permutation	2 bits	0b00 = PUSC permutation ~~0b01 = PUSC permutation~~ ~~0b10 = Optional PUSC permutation~~ 0b01 = Optional PUSC permutation 0b~~11~~10 = Adjacent subcarrier permutation 0b11 = *Reserved*
PUSC UL_IDcell	7 bits	
AMC type	2 bits	Indicates the AMC type in case permutation type = 0b11, otherwise shall be set to 0. AMC type (NxM = N bins by M symbols): 0b00 - 1x6 0b01 - 2x3 0b10 - 3x2 0b11 - reserved
Use All SC indicator	1 bit	0 = Do not use all subchannels 1 = Use all subchannels
reserved	5 bits	Shall be set to zero
}		

8.4.5.4.8 Mini-subchannel allocation IE

Change Table 295 as indicated:

Table 295—Mini-subchannel allocation IE format

Syntax	Size	Notes
Mini_subchannel_allocation_IE() {		
Extended ~~D~~UIUC	4 bits	Mini_subchannel_allocation = 0x01
Length	4 bits	Length(M) = 0x0~~3~~7 if *M*=2 0x0~~4~~9 if *M*=3 0x0~~6~~f if *M*=6

Table 295—Mini-subchannel allocation IE format *(continued)*

Syntax	Size	Notes
CType	2 bits	0b00 – 2 mini-subchannels (defines M=2) 0b01 – 2 mini-subchannels (defines M=2) 0b10 – 3 mini-subchannels (defines M=3) 0b11 – 6 mini-subchannels (defines M=6)
Duration	~~10~~6 bits	In OFDMA slots
For (j=0; j<M; j++) {		
CID(j)	16 bits	
UIUC(j)	4 bits	Allowed values are 1–10
~~**Repetition(j)**~~	~~2 bits~~	~~Indicates the repetition code used inside the allocated burst for minisubchannel with index j~~ ~~0b00 – No repetition coding~~ ~~0b01 – Repetition coding of 2 used~~ ~~0b10 – Repetition coding of 4 used~~ ~~0b11 – Repetition coding of 6 used~~
}		
Padding	n bits	Padding bits shall be set to zero n = 0 if M=2 ~~2~~4 if M=3 0 if M=6
}		

8.4.5.4.10 FAST_FEEDBACK channels

Replace Equation (106) with the following equation (removing of the 1/sqrt(2) from the elements of the equation):

$$
\begin{aligned}
P0 &= \exp\left(j \cdot \frac{\pi}{4}\right) \\
P1 &= \exp\left(j \cdot \frac{3\pi}{4}\right) \\
P2 &= \exp\left(-j \cdot \frac{3\pi}{4}\right) \\
P3 &= \exp\left(-j \cdot \frac{\pi}{4}\right)
\end{aligned}
\qquad (106)
$$

8.4.5.4.10.3 Mode Selection Feedback

Change the first sentence of the first paragraph as indicated:

For SS that support the STC option (see 8.4.8), ~~W~~when the FAST-FEEDBACK subheader Feedback Type field is "11" or at a specific frame indicated in the CQICH_Alloc_IE(), the SS shall send its selection in terms of MIMO mode (STTD versus SM) or permutation mode on the assigned FAST-FEEDBACK channel.

Change Table 298 as indicated:

Table 298—Encoding of payload bits for FAST-FEEDBACK slot

Value	Description
0b0000	STTD and PUSC/FUSC permutation
0b0001	STTD and adjacent-subcarrier permutation
0b0010	SM and PUSC/FUSC permutation
0b0011	SM and adjacent-subcarrier permutation
0b0100-0b1111	*reserved*

8.4.5.4.11 MIMO UL Basic IE format

Change the text under the 'Syntax' column for the 'extended DIUC' field to 'extended UIUC' in Table 299.

Insert the following field at the end of Table 299:

padding	*variable*	Number of bits required to align to byte length, shall be set to zero.

Insert the following field after the 'Duration' field in Table 299:

reserved	1 bit	Shall be set to zero

8.4.5.4.12 CQICH Allocation IE Format

Change the first sentence as indicated:

CQICH_Alloc_IE(), is introduced to dynamically allocate or de-allocate a CQICH to an SS. Once allocated, the SS transmit channel quality information on the assigned CQICH on ~~every~~ subsequent frames, until the SS receives a CQICH_Alloc_IE() to de-allocate the assigned CQICH.

Change the text under the 'Syntax' column for the 'extended DIUC' field to 'extended UIUC' in Table 300.

Change the text under the 'Notes' column for the 'Period (p)' field in Table 300 as indicated:

A CQI feedback is transmitted on the CQICH every ~~2p~~2^p frames.

Change the text under the 'Notes' column for the 'Padding' field in Table 300 as indicated:

~~The padding bits is used to ensure the IE size is integer number of bytes.~~ Number of bits required to align to byte length, shall be set to zero.

8.4.5.4.13 UL ACK channel

Change the second paragraph and Table 301 as indicated:

The ACK channel is orthogonally modulated. The acknowledgement bit B_n^{ACK} of the n-th ACK channel shall be "0" (ACK) if the corresponding downlink packet has been successfully received; otherwise, it shall be a "1" (NAK). The *k*-th orthogonal modulation symbol of the n-th ACK channel, $M_{n,k}^{ACK}$, ($k = 0,1,\ldots,8$ and $n = 0,1,\ldots,$ ~~1—~~ N_{ACK} -1) is made as shown in Table 301.

Table 301—Orthogonal Modulation for ACK channel

B_n^{ACK}	$M_{n,k}^{ACK}$
0	1, 1, 1, 1, 1, 1, 1, 1, 1
1	$1, \exp\left(j \cdot \frac{2\pi}{3}\right), \exp\left(j \cdot \frac{4\pi}{3}\right), \exp\left(j \cdot \frac{2\pi}{3}\right), \exp\left(j \cdot \frac{4\pi}{3}\right),$ $1, \exp\left(j \cdot \frac{4\pi}{3}\right), \exp\left(j \cdot \frac{2\pi}{3}\right)$

Change the third bullet of the last paragraph as indicated:

n ACK channel index from the set [0 ... ~~1—~~ N_{ACK} -1],

Insert the following text at the end of the section:

The ACK subcarriers of index 0~8 are mapped to subcarriers in the lowest tile, the ACK subcarriers of index 9~17 are mapped to subcarriers in the second tile, and the ACK subcarriers of index 18~26 are mapped to the subcarriers in the last tile. The indexing of subcarriers in each tile is performed starting from first symbol at the lowest subcarrier and continuing in an ascending manner through the subcarriers in the same symbol, then going to the next symbol at the lowest subcarrier and so on.

8.4.5.4.14 UL-MAP Physical Modifier IE

Change the first sentence of the first paragraph as indicated:

For SS that support the AAS option (see 8.4.4.6 and 8.4.4.7), ~~T~~the Physical Modifier Information Element indicates that the subsequent allocations shall utilize a preamble, which is either cyclically rotated in frequency or cyclically delayed [see Equation (104) and Equation (105)].

Change the text under the 'Notes' column of the 'Length' field in Table 302 as indicated:

Length = 0x0~~3~~1

Change the text under the 'size' column of the 'reserved' field in Table 302 as indicated:

~~7~~3 bits

8.4.5.6 Compressed maps

8.4.5.6.1 Compressed DL-MAP

Change the text under the 'size' column of the 'Map message length' field in Table 305 from "11" to "11 bits".

Change the text under the 'Syntax' column of the 'CRC appended' field in Table 305 from "CRC appended" to "reserved" insert under the 'Notes' column of the same field the following sentence:

Shall be set to zero

Insert the following field after the 'Sector ID' field in Table 305:

No. OFDMA symbols	8 bits	Number of OFDMA symbols in the DL sub-frame including all AAS/permutation zone.

Change the description of 'UL-MAP appended' and 'CRC appended' field below Table 305 as indicated:

UL-MAP appended
A value of 1 indicates a compressed UL-MAP (see ~~8.5.5.2.4.2~~8.4.5.6.2) is appended to the current compressed DL-MAP data structure.

CRC ~~appended~~
~~A value of one indicates a~~ CRC-32 value is appended to the end of the compressed map(s) data. The CRC is computed across all bytes of the compressed map(s) starting with the byte containing the Compressed map indicator through the last byte of the map(s) as specified by the Map message length field. The CRC calculation is the same as that used for standard MAC messages. ~~A value of zero indicates that no CRC is appended.~~

Insert the following text at the end of the section:

In case the UL-MAP is not appended to the DL-MAP, the UL-MAP (if such exists) message shall be always transmitted on the burst described by the first DL-MAP_IE of the DL-MAP.

8.4.5.7 AAS-FBCK-REQ/RSP message bodies

Change the description of 'CINR mean value' field below Table 308 as indicated:

CINR mean value
The mean CINR as measured on the element pointed to by data measurement type, frame number, and number of frames in the corresponding request. The ~~RSSI~~CINR is quantized as described in 8.3.9.2. When the AAS feedback response is unsolicited, this value corresponds to preceding frame.

8.4.6 OFDMA subcarrier allocations

8.4.6.1 Downlink

8.4.6.1.1 Preamble

Change the third paragraph as indicated:

Each segment uses ~~two~~one type~~s~~ of preamble out of the ~~six~~three sets in the following manner:

8.4.6.1.2 Symbol structure

8.4.6.1.2.1 Symbol structure for PUSC

Change the text under the 'Value' column of the 'Number of data subcarriers in each symbol per subchannel ' field in Table 310 from "4" to "24".

8.4.6.2 Uplink

Change the second paragraph as indicated:

The uplink supports 70 subchannels for PUSC permutation, and 96 subchannels for optional PUSC permuation. ~~where~~ ~~e~~Each transmission uses 48 data carriers as the minimal block of processing. Each new transmission for the uplink commences with the parameters as given in Table 313 for PUSC permutation, and with the parameters as given in Table 315 for optional PUSC permutation.

8.4.6.2.1 Symbol structure for subchannel (PUSC)

Change the first and second paragraphs as indicated:

A burst in the uplink is composed of three time symbols and one subchannel, within each burst, there are 48 data subcarriers and 24 fixed-location pilot subcarrier as shown in Table 313.

The subchannel is constructed from six uplink tiles, each tile has four successive active subcarriers and its configuration is illustrated in Figure 236.

8.4.6.2.2 Partitioning of subcarriers into subchannels in the uplink

Change the first bullet of the first paragraph as indicated:

1. Divide the 420 tiles into six groups, containing 70 adjacent tiles each. Tiles are considered adjacent if they have successive logical indices.

8.4.6.2.5 Additional optional symbol structure for PUSC

8.4.6.2.5.1 Symbol structure for subchannel

Change the first paragraph as indicated:

A burst in the uplink is composed of three time symbols and one subchannel, within each burst, there are 48 data subcarriers and six fixed-location pilot subcarrier. The subchannel is constructed from six uplink tiles, each tile has three successive active subcarriers and its configuration is illustrated in Figure 237.

8.4.6.3 Optional permutations for AAS and AMC subchannels

Change the paragraph below Figure 238 as indicated:

AMC allocations can be made by two mechanisms: by subchannel index reference in UL-MAP and DL-MAP, or by subchannel allocation in a band using H-ARQ map (defined in 6.3.2.3.43). Each UL or DL zone may include allocations from H-ARQ and normal map. For regular AMC allocations made by the DL-MAP or UL-MAP, and AMC subchannel of type $N \cdot M$ (where $N \cdot M = 6$) is defined as N contiguous bins (a slot consists of N bins by M symbols). The subchannels are numbered from the lowest (0) to the highest frequency, such that subchannel k ($k = 0 - 192/N$) consists of bins $N \cdot k$ to $N \cdot k + N - 1$.

A group of four rows of bins is called a physical band. ~~AMC subchannel consists of six contiguous bins in a same band.~~ For band-AMC allocations made by H-ARQ map message, an AMC slot consists of 6 contiguous bins in a same logical band defined in format configuration IE (6.3.2.3.43.2). There are four types of AMC subchannels which are different in the collection of 6 bins in a band. In the first type(default type), the available bins in a band are enumerated by starting from the lowest bin in the first symbol to the last bin in the symbol and then going to the lowest bin in the next symbol and so on. In the first type of AMC subchannel, a slot consists of 6 consecutive bins in this enumeration. In the second type of AMC subchannel, a slot is defined as 2 bins by 3 symbols. In the third type, a slot is defined as 3 bins by 2 symbols and in the fourth type a slot is defined as 1 bin by 6 symbols. In the last three types of AMC subchannel, enumeration of bins in a slot is the same as in the first type.

8.4.7 OFDMA ranging

Change the third sentence of the first paragraph as indicated:

Optionally, ranging channel can be composed of eight adjacent subchannels using the symbol structure defined in 8.4.6.2.5. Subchannels are considered adjacent if they have successive logical subchannel numbers.

8.4.7.1 Initial-ranging transmissions

Replace Figure 239 with the following figure:

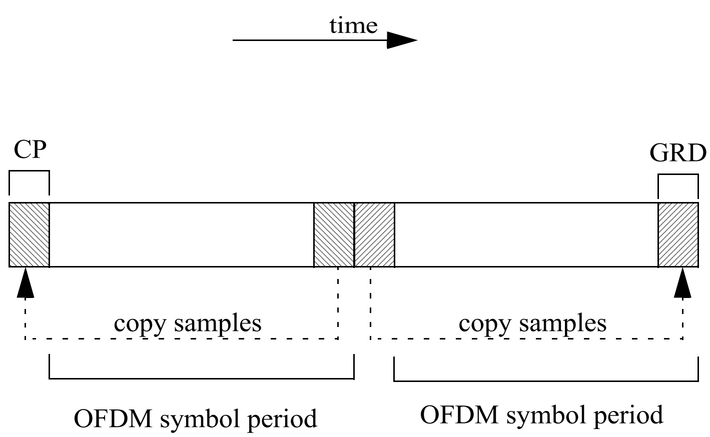

Figure 239—Initial-ranging transmission for OFDMA

Insert the following sentence below Figure 239:

The transmitted signal is according to 8.4.2.5, equation (100), except that $0 \le t \le 2T_s$.

Replace Figure 240 with the following figure:

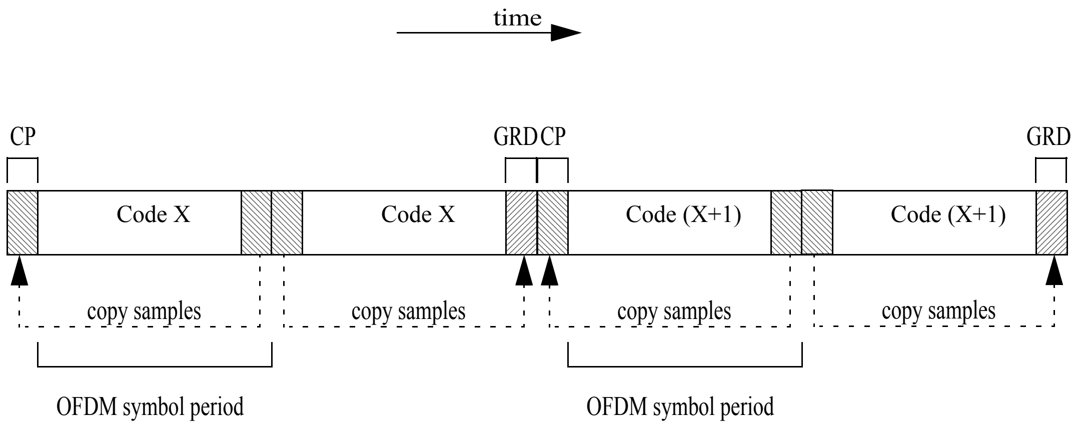

Figure 240—Initial-ranging transmission for OFDMA, using two consecutive initial ranging codes

8.4.7.3 Ranging codes

Change the third sentence of the second paragraph as indicated:

These bits are used to modulate the subcarriers in a group of six (eight for the permutation defined in 8.4.6.2.5) adjacent subchannels, where subchannels are considered adjacent if they have successive logical subchannel numbers.

Insert new section 8.4.7.4:

8.4.7.4 Ranging and BW request opportunity size

For CDMA ranging and BW request, the ranging opportunity size is the number of symbols required to transmit the appropriate ranging/BW request code (1,2,3 or 4 symbols), and is denoted N_1. N_2 denotes the number of subchannels required to transmit a ranging code (6 or 8, see 8.4.7.3). In each ranging/BW request allocation, the opportunity size (N_1) is fixed and conveyed by the corresponding UL_MAP_IE that defines the allocation.

The ranging allocation is subdivided into slots of N_1 OFDMA symbols by N_2 subchannels, in a time first order, i.e. the first opportunity begins on the first symbol of the first subchannel of the ranging allocation, the next opportunities appear in ascending order in the same subchannel, until the end of the ranging/BW request allocation (or until there are less than N_1 slots in the current subchannel), and then the number of subchannel is incremented by N_2. The ranging allocation is not required to be a whole multiple of N_1 symbols, so a gap may be formed (that can be used to mitigate interference between ranging and data transmissions). Each CMDA code will be transmitted at the beginning of the corresponding slot. See Figure 243a.

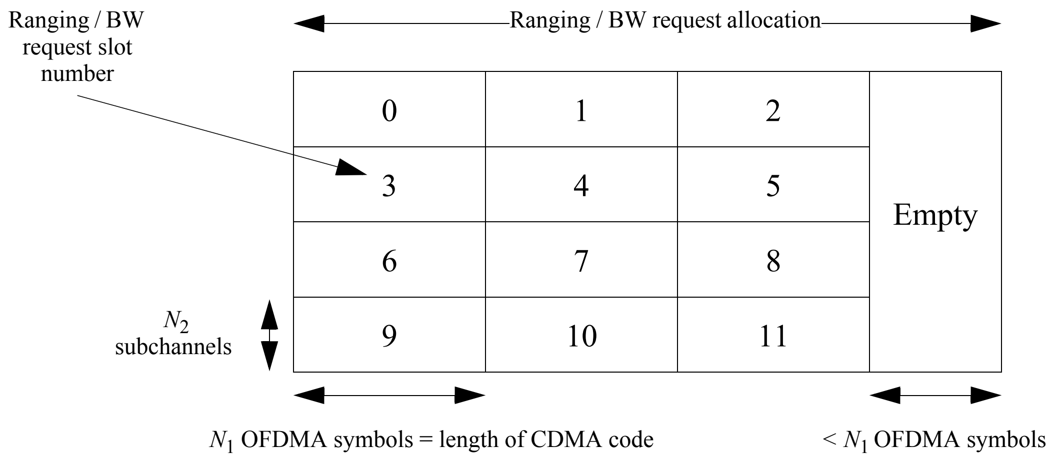

Figure 243a—Ranging/BW request opportunities

8.4.9 Channel coding

Change the second sentence of the first paragraph as indicated:

When repetition cod~~e~~ing is used, the allocation for the transmission shall always include an even number of adjacent subchannels, where subchannels are considered adjacent if they have successive logical subchannel numbers.

Insert the following sentence as the end of the section:

Repetition shall only be applied to QPSK modulation.

8.4.9.2 Encoding

Change the first paragraph as indicated:

The coding method used as the mandatory scheme will be the tail-biting convolutional encoding specified in 8.4.9.2.1, and the optional modes of encoding in 8.4.9.2.2 and 8.4.9.2.3 ~~shall~~may be also supported.

8.4.9.4 Modulation

8.4.9.4.2 Data modulation

Insert the following text at the end of the section:

In the downlink, data subcarriers which belong to slots that are not allocated in the DL-MAP shall not be transmitted (zero energy). Data subcarriers which are part of a gap allocation (DIUC=13) shall be modulated at the BS discretion.

8.4.9.4.3 Pilot modulation

Change the third paragraph as indicated:

In the downlink~~, and for the~~ optional uplink ~~tile~~PUSC structure and AMC structure each pilot shall be transmitted with a boosting of 2.5 dB over the average non-boosted power of each data tone. The Pilot subcarriers shall be modulated according to Equation (135):

Insert the following text at the end of the section:

In the downlink, for PUSC, FUSC, AMC and optional FUSC permutations, all pilots (of the segment, in case of PUSC) shall be modulated, whether or not all the subchannels are allocated in the DL-MAP. For AMC permutation in AAS zone, the BS is not required to modulate the pilots that belong to bins that are not allocated in the DL-MAP, or are allocated as gaps (UIUC=13).

8.4.11 Channel quality measurements

8.4.11.2 RSSI mean and standard deviation

Change the second paragraph as indicated:

Mean and standard deviation statistics shall be reported in units of dBm and dB, respectively. To prepare such reports, statistics shall be quantized in 1 dB increments, ranging from –40 dBm (encoded 0x53) to –123 dBm (encoded 0x00). Values outside this range shall be assigned the closest extreme value within the scale. The standard deviation shall be quantized in 0.5dB increments (i.e. standard deviation < 0.5dB encoded 0x00, 0.5dB ≤ standard deviation < 1.0dB encoded 0x01).

10. Parameters and constants

10.1 Global values

Delete the row with value "T16" under the name column from Table 342.

Change the max value for 'SS downlink management message processing time' field in Table 342 to 2.5 ms.

Insert the following entries to table Table 342:

Table 342—Parameters and constants

System	Name	Time reference	Minimum value	Default value	Maximum value
BS, SS	FAST-FEEDBACK processing time	The time allowed between the end of the burst carrying the FASTFEEDBACK subheader and the start of the UL-subframe carrying the FAST-FEEDBACK response	TDD: Frame duration FDD: 1/2 Frame duration		
BS, SS	Ranging Correction Retries			16	

10.4 Well-known addresses and identifiers

Change Table 345 as indicated:

Table 345—CIDs

CID	Value	Description
Initial ranging	0x0000	Used by SS and BS during initial ranging process.
Basic CID	0x0001– *m*	The same value is assigned to both the DL and UL connection.
Primary management	*m*+1 – 2*m*	The same value is assigned to both the DL and UL connection.
Transport CIDs and secondary Mgt CIDs	2*m*+1–0xFEFE	For the secondary management connection, the same value is assigned to both the DL and UL connection.
AAS initial ranging CID	0xFEFF	A BS supporting AAS shall use this CID when allocating a Initial Ranging period for AAS devices.

Table 345—CIDs *(continued)*

CID	Value	Description
Multicast polling CIDs	0xFF00–0xFFF~~D~~C	An SS may be included in one or more multicast polling groups for the purposes of obtaining bandwidth via polling. These connections have no associated service flow.
Fragmentable Broadcast CID	0xFFFC	Used by the BS for transmission of management broadcast information with fragmentation.
Padding CID	0xFFFE	Used for transmission of padding information by SS and BS.
Broadcast CID	0xFFFF	Used for broadcast information that is transmitted on a downlink to all SS.

11. TLV encodings

11.3 UCD management message encodings

Insert the following entry to Table 353:

Table 353—UCD PHY-specific channel encodings — WirelessMAN-OFDMA

Name	Type (1 byte)	Length	Value
UL AMC Allocated subchannels range.	173	2	This parameter specifies the range of sub-channels allocated to the segment in the UL, when using the AMC permutation with regular MAPs (see 8.4.6.3). The first byte N_0 shall correspond to the first subchannel and last byte N_1 corresponds to the index of the last sub-channel plus 1. Only subchannels in the range $N_0 \le s \le N_1$ shall not be used by the SS on that segment.

11.4 DCD management message encodings

11.4.1 DCD channel encodings

Insert the following field to Table 358:

Table 358—DCD channel encoding

Name	Type (1 byte)	Length	Value (variable length)	PHY scope
Permutation type for broadcast region in H-ARQ zone	19	1	0 = PUSC 1 = FUSC 2 = optional FUSC 3 = AMC	OFDMA

11.4.2 Downlink burst profile encodings

Delete the fields 'DIUC mandatory exit threshold' and 'DIUC minimum entry threshold' from Table 360, Table 361, Table 362 and Table 363.

11.7 REG-REQ/RSP management message encodings

11.7.8 SS capabilities encodings

Change section 11.7.8.6 to 11.8.4 and change its scope to SBC-REQ SBC-RSP

Change section 11.7.8.7 to 11.8.5 and change its scope to SBC-REQ SBC-RSP

Change section 11.7.8.8 to 11.8.6 and change its scope to SBC-REQ SBC-RSP

11.8 SBC-REQ/RSP management message encodings

11.8.3 Physical Parameters Supported

11.8.3.7 WirelessMAN-OFDMA specific parameters

11.8.3.7.2 OFDMA SS demodulator

Change the section as indicated:

This field indicates the different demodulator options supported by a WirelessMAN-OFDMA PHY SS for downlink reception. This field is not used for other PHY specifications. A bit value of 0 indicates “not supported” while 1 indicates “supported.”

Type	Length	Value	Scope
151	1	Bit #0: 64-QAM Bit #1: BTC Bit #2: CTC Bit #3: STC Bit #4: AAS Diversity Map Scan Bit #5: ~~AAS Direct Signaling~~*Reserved*; shall be set to zero Bit #6: H-ARQ Bit #7: *Reserved*; shall be set to zero	SBC-REQ (see 6.3.2.3.23) SBC-RSP (see 6.3.2.3.24)

11.8.3.7.3 OFDMA SS modulator

Change the section as indicated:

This field indicates the different modulator options supported by a WirelessMAN-OFDMA PHY SS for uplink transmission This field is not used for other PHY specifications. A bit value of 0 indicates “not supported” while 1 indicates “supported.”

Type	Length	Value	Scope
152	1	Bit# 0: 64-QAM Bit# 1: BTC Bit# 2: CTC Bit# 3: AAS Diversity Map Scan Bit# 4: ~~AAS Direct Signaling~~*Reserved*; shall be set to zero Bit# 5: H-ARQ Bits# 6–7: *Reserved*; shall be set to zero	SBC-REQ (see 6.3.2.3.23) SBC-RSP (see 6.3.2.3.24)
153	1	The number of HARQ ACK Channel	SBC-REQ (see 6.3.2.3.23) SBC-RSP (see 6.3.2.3.24)

Change the numbering of section 11.8.3.7.5 to 11.8.3.7.4

11.8.3.7.4 OFDMA SS Permutation support

Change the section as indicated:

This field indicates the different optional OFDMA permutation modes (optional PUSC, optional FUSC and AMC) supported by a WirelessMAN-OFDMA SS. A bit value of 0 indicates “not supported” while 1 indicates “supported.”

Type	Length	Value	Scope
154	1	Bit# 0: Optional PUSC support Bit# 1: Optional FUSC support Bit# 2: AMC 1x6 support with normal map Bit# 3: AMC 2x3 support with normal map Bit# 4: AMC 3x2 support with normal map Bit# 5: AMC support with H-ARQ map Bits# ~~3~~6–7: *Reserved*, shall be set to zero	SBC-REQ (see 6.3.2.3.23) SBC-RSP (see 6.3.2.3.24)

Note: AMC support with normal map (bits #2-4) refers to support of AMC subchannelization using DL-MAP_IE or UL-MAP_IE. When AMC support using H-ARQ map (bit #5) is indicated, all AMC types indicated in format configuration IE (6.3.2.3.43.2) are supported when using AMC with H-ARQ map.

11.13 Service Flow management encodings

Change the fourth paragraph as indicated:

The CC indicates the status for the dynamic service (DSx-xxx) messages. The value ~~may~~ appear in the Confirmation Code field of a DSx message ~~or as the value of a TLV-encoded error parameter~~.

Delete the last paragraph:

~~In the case CC = “reject-not-supported-parameter” or CC = “reject-not-supported-parameter-value”, the corresponding TLV(s) may be returned to caller in DSx-RSP message. In the case of CC = “reject-not-supported-parameter-value,” the value field of the returned TLV should contain the closest value that is supported.~~

11.13.4 QoS parameter set type

Change the first paragraph as indicated:

This parameter shall appear within every service flow encoding. It specifies the proper application of the QoS Parameter Set: to the Provisioned set, the Admitted set, and/or the Active set. The QoS Parameter Set is a subset of the following parameter set:

— traffic priority (11.13.5)
— maximum sustained traffic rate (11.13.6)
— maximum traffic burst (11.13.7)
— minimum reserved traffic rate (11.13.8)
— vendor specific QoS parameters (11.13.10)
— tolerated jitter (11.13.13)
— maximum latency (11.13.14)

When two QoS Parameter Sets are the same, a multibit value of this parameter may be used to apply the QoS parameters to more than one set. A single message may contain multiple QoS parameter sets in separate type 145/146 service flow encodings for the same service flow. This allows specification of the QoS Parameter

Sets when their parameters are different. Non-QoS parameters shall appear only in the first Service Flow Management Encodings. Bit 0 is the LSB of the Value field.

11.13.19 CS specific service flow encodings

11.13.19.3 Packet CS encodings for configuration and MAC messaging

Delete section 11.13.19.3.3 and all its sub-sections

~~11.13.19.3.3 Classifier error parameter set~~

Delete section 11.13.19.3.6 and all its sub-sections

~~11.13.19.3.6 PHS error parameter set~~

11.13.19.4 ATM CS Encodings for Configuration and MAC Messaging

Delete section 11.13.19.4.4

~~11.13.19.4.4 ATM Classifier Error Parameter Set~~

12. System profiles

12.1 WirelessMAN-SC (10–66 GHz) system profiles

12.1.1 WirelessMAN-SC MAC system profiles

12.1.1.3 Conventions for MAC Management messages for profiles profM1 and profM2

Change the second bullet of the first paragraph as indicated:

— No TLVs besides ~~Error Encodings and~~ HMAC Tuples shall be reported back in DSA-RSP and DSC-RSP messages.

12.1.1.4 MAC Management message Parameter Transmission Order

12.1.1.4.20 DSA-RSP—BS Initiated Service Addition

Change the section as indicated:

— Uplink Service Parameters
— ~~Service Flow Error Parameter Set(s) (one per errored parameter)~~
  ~~Errored Parameter~~
  ~~Error Code~~
  ~~Error Message (optional)~~
— Downlink Service Parameter(s)
— ~~Service Flow Error Parameter Set(s) (one per errored parameter)~~
  ~~Errored Parameter~~
  ~~Error Code~~
  ~~Error Message (optional)~~
— HMAC Tuple

12.1.1.4.23 DSC-RSP—BS Initiated Service Change

Change the section as indicated:

— Uplink Service Parameters
— ~~Service Flow Error Parameter Set(s) (one per errored parameter)~~
  ~~Errored Parameter~~
  ~~Error Code~~
  ~~Error Message (optional)~~
— Downlink Service Parameter(s)
— ~~Service Flow Error Parameter Set(s) (one per errored parameter)~~
  ~~Errored Parameter~~
  ~~Error Code~~
  ~~Error Message (optional)~~
— HMAC Tuple

12.1.1.6 Message parameters specific to profM2

12.1.1.6.2 Packet CS Parameters for DSA-RSP—BS Initiated

Change the section as indicated:

- Packet Classification Rule(s) (uplink service flows only, default is no classification)
- ~~Classifier Error Parameter Set(s) (one per errored parameter)~~
  ~~Classifier Rule ID~~
  ~~Errored Parameter~~
  ~~Error Code~~
  ~~Error Message (optional)~~
- PHS Rule(s)
- ~~PHS Error Parameter Set(s) (one per errored parameter)~~
- ~~PHSI~~
  ~~Errored Parameter~~
  ~~Error Code~~
  ~~Error Message (optional)~~

12.1.1.6.4 Packet CS Parameters for DSC-RSP—BS Initiated

Change the section as indicated:

- Uplink Service Parameters
- ~~Service Flow Error Parameter Set(s) (one per errored parameter)~~
  ~~Errored Parameter~~
  ~~Error Code~~
  ~~Error Message (optional)~~
- Downlink Service Parameter(s)
- ~~Service Flow Error Parameter Set(s) (one per errored parameter)~~
  ~~Errored Parameter~~
  ~~Error Code~~
  ~~Error Message (optional)~~

12.4 WirelessMAN-OFDMA and WirelessHUMAN(-OFDMA) system profiles

12.4.2 WirelessMAN-OFDMA and WirelessHUMAN(-OFDMA) MAC Profiles

12.4.2.1 Basic Packet PMP MAC Profile

12.4.2.1.1 Conventions for MAC Management Messages

Change the second bullet of the first paragraph as indicated:

- No TLVs besides ~~Error Encodings and~~ HMAC Tuples shall be reported back in DSA-RSP and DSC-RSP messages.

12.4.3 WirelessMAN-OFDMA and WirelessHUMAN(-OFDMA) System PHY Profiles

12.4.3.2 WirelessMAN-OFDMA 1.25 MHz channel basic PHY Profile

Change Table 414 as indicated:

Table 414—Minimum performance requirements for OFDMA_ProfP1

Capability	Minimum performance
Channel bandwidth	1.25 MHz
Operation mode	Licensed bands only
Tx Dynamic range SS BS	 ≥ 40 dB ≥ 10 dB
Tx relative constellation error: QPSK-1/2 16-QAM-3/4	 ≤ –22.4 dB ≤ –28.2 dB
~~1st adjacent channel rejection at BER=10^{-6} for 3 dB degradation C/I~~ ~~16-QAM-3/4~~	 ~~≥ 30dB~~
~~2nd adjacent channel rejection at BER=10^{-6} for 3 dB degradation C/I~~ ~~16-QAM-3/4~~	 ~~≥ 80 dB~~
BER performance threshold, BER=10^{-6} (using all subchannels BS/SS) QPSK-1/2 16-QAM-3/4 [Add to sensitivity 10*log10(NumberOfSub-ChannelsUsed/32) when using less subchannels in the BS Rx]	 ≤ –90 dBm ≤ –80 dBm
Reference frequency tolerance BS SS to BS synchronization tolerance	 ≤ ± 1*10^{-6} ≤ 2 Hz
TTG (TDD only)	≥ 200 µs
RTG (TDD only)	≥ 5 µs
Frame duration code set	{4,7}