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Contents

8.4.1 Introduction.....	3
8.4.9.1 Transmit power level control.....	3
8.4.9.1.2 Transmitter constellation error and test method.....	3
8.4.9.2 Transmitter channel bandwidth and RF carrier frequencies.....	4
8.4.10.1 Receiver sensitivity.....	5
8.6.2 Transmit spectral mask.....	6
12.2 WirelessMAN-OFDM and WirelessHUMAN(-OFDM) System Profiles....	6
12.2.1 WirelessMAN-OFDM and WirelessHUMAN(-OFDM) MAC Profiles....	7
12.2.1.1 ProfM3_PMP: Basic Packet PMP MAC System Profile.....	7
12.2.1.1.1 Conventions for MAC Management Messages.....	8
12.2.1.1.2 MAC Management Message Parameter Transmission Order....	9
12.2.1.2 ProfM3_Mesh: Basic Packet Mesh MAC System Profile.....	9
12.2.1.2.1 MAC Management message applicability.....	10
12.2.1.2.2 MAC Management Message Parameter Transmission Order....	11
12.2.2 WirelessMAN-OFDM and WirelessHUMAN(-OFDM) Physical Layer Profiles	11
12.2.2.1 ProfP3_1.75: WirelessMAN-OFDM PHY profile for 1.75 MHz channelization	13
12.2.2.2 ProfP3_3.5: WirelessMAN-OFDM PHY profile for 3.5 MHz channelization...	14
12.2.2.3 ProfP3_7: WirelessMAN-OFDM PHY profile for 7 MHz channelization.....	15
12.2.2.4 ProfP3_3: WirelessMAN-OFDM PHY profile for 3 MHz channelization.....	15
12.2.2.5 ProfP3_5.5: WirelessMAN-OFDM PHY profile for 5.5MHz channelization....	16
12.2.2.6 ProfP3_10: WirelessHUMAN PHY profile for 10 MHz channelization	17
12.2.3 WirelessMAN-OFDM RF profiles.....	18
12.2.3.1 RF profiles for 10 MHz channelization.....	18
12.2.3.1.1 profR10_1.....	18
12.2.3.1.2 profR10_2.....	18
12.2.3.1.3 profR10_3.....	19

8.4.1 Introduction

Change

The WirelessMAN-OFDM PHY is based on OFDM modulation and designed for NLOS operation in the 2–11 GHz frequency bands per 1.2.4. ~~For licensed bands, channel bandwidths allowed shall be limited to the regulatory provisioned bandwidth divided by any power of 2 no less than 1.25 MHz.~~

8.4.9.1 Transmit power level control

Change

~~The transmitter shall support monotonic power level control of 45 dB (30 dB for license exempt bands) minimum with a minimum step size of 1 dB and a relative accuracy of +/- 0.5 dB. The transmitter shall support monotonic power level control of 30 dB minimum with a minimum step size of 1 dB, a relative accuracy of +/- 0.5 dB for a SS and 10 dB minimum with a minimum step size of 1 dB and a relative accuracy of +/- 0.5 dB for a BS. Subscriber stations supporting subchannelization shall be capable of monotonic power level control of 50 dB minimum.~~

8.4.9.1.2 Transmitter constellation error and test method

Change

- a) Start of frame shall be detected.
- b) Transition from short sequences to channel estimation sequences shall be detected, and fine timing (with one sample resolution) shall be established.
- c) Coarse and fine frequency offsets shall be estimated.
- d) The packet shall be de-rotated according to estimated frequency offset.
- e) The complex channel response coefficients shall be estimated for each of the carriers.
- f) For each of the data OFDM symbols: transform the symbol into carrier received values, estimate the phase from the pilot carriers, de-rotate the carrier values according to estimated phase, and divide each carrier value with a complex estimated channel response coefficient. In the case of subchannelized transmission, the estimated channel response coefficient of the nearest allocated subcarrier shall be used for those subcarriers not part of the allocated subchannels.
- g) For each data-carrying subcarrier, find the closest constellation point and compute the Euclidean distance from it. In the case of subchannelized transmission, for data-carrying subcarriers not part of the allocated subchannels, the Euclidean distance shall be computed relative to 0+0j.
- h) Compute the RMS average of all errors in a packet. It is given by:

$$\text{Error}_{\text{RMS}} = \frac{1}{N_f} \sum_{i=1}^{N_f} \frac{\sum_{j=1}^{L_P} \left[\sum_{\substack{k=-N_{\text{used}}/2 \\ k \neq 0}}^{N_{\text{used}}/2} \left\{ (I(i,j,k) - I_0(i,j,k))^2 + (Q(i,j,k) - Q_0(i,j,k))^2 \right\} \right]}{\sum_{j=1}^{L_P} \left[\sum_{\substack{k=-N_{\text{used}}/2 \\ k \neq 0}}^{N_{\text{used}}/2} \left\{ I_0(i,j,k)^2 + Q_0(i,j,k)^2 \right\} \right]} \quad (65)$$

$$Error_{RMS} = \frac{\sum_{i=1}^{N_f} \sum_{j=1}^{L_P} \left[\sum_{k=1}^{N_{FFT}} \left\{ (I(i,j,k) - I_0(i,j,k))^2 + (Q(i,j,k) - Q_0(i,j,k))^2 \right\} \right]}{N_f \cdot P_0 \cdot L_P \cdot N_{FFT}} \quad (65a)$$

where

L_P is the length of the packet;

N_f is the number of frames for the measurement;

$(I_0(i,j,k), Q_0(i,j,k))$ denotes the ideal symbol point of the i^{th} frame, j^{th} OFDM symbol of the frame, k^{th} carrier of the OFDM symbol in the complex plane;

$(I(i,j,k), Q(i,j,k))$ denotes the observed point of the i^{th} frame, j^{th} OFDM symbol of the frame, k^{th} carrier of the OFDM symbol in the complex plane;

P_0 is the average power of the constellation.

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8.4.9.2 Transmitter channel bandwidth and RF carrier frequencies

For licensed bands, channel bandwidths allowed shall be limited to the regulatory provisioned bandwidth divided by any power of 2, rounded down to the nearest multiple of 250 kHz, resulting in a channel bandwidth no less than 1.25 MHz.

If the resulting channel bandwidth is an odd multiple of 250 kHz, then for any band for which support is claimed, the RF carrier shall only be tunable to every odd multiple of 125 kHz within that band. If the resulting channel bandwidth is an even multiple of 250 kHz, then for any band for which support is claimed, the RF carrier shall only be tunable to every even multiple of 125 kHz within that band. For FDD systems, support shall be claimed separately for UL and DL.

For example, if the regulatory provisioned bandwidth is 14 MHz between 3400 and 3414 MHz, then the allowed channel bandwidths are those shown in Table 116.bi.1

Table 116.bi.1—Example of channelization for licensed bands

Channelization (MHz)	Center frequencies (MHz)
14 MHz	3407
7 MHz	$3403.5 + n \cdot 0.25 \quad n \in \{0 \dots 28\}$
3.5 MHz	$3401.75 + n \cdot 0.25 \quad n \in \{0 \dots 42\}$
1.75 MHz	$3400.875 + n \cdot 0.25 \quad n \in \{0 \dots 49\}$

For license-exempt bands, see 8.6.1

8.4.10.1 Receiver sensitivity

Change

The bit error rate (BER) shall be less than 10^{-6} at the power levels shown in Table 116bj for standard message and test conditions. If the implemented bandwidth is not listed, then the values for the nearest smaller listed bandwidth shall apply. The minimum input levels are measured as follows:

- At the antenna connector or through a calibrated radiated test environment,
- Using the defined standardized message packet formats, and
- Using an AWGN channel.

The receiver minimum input level sensitivity (R_{SS}) shall be (assuming 5 dB implementation margin and 7 dB Noise Figure):

$$R_{SS} = -102 + SNR_{Rx} + 10 \cdot \log(BW) + 10 \cdot \log\left(\frac{N_{subchannels}}{4}\right) \tag{65a}$$

where

SNR_{Rx} the receiver SNR as per Table 116bk in dB

BW the channel bandwidth in MHz

$N_{subchannels}$ the number of allocated subchannels (default 4 if no subchannelization is used)

Table 116bj—Receiver minimum input level sensitivity (dBm)

Bandwidth (MHz)	QPSK		16-QAM		64-QAM	
	1/2	3/4	1/2	3/4	2/3	3/4
1.5	-91	-89	-84	-82	-78	-76
1.75	-90	-87	-83	-81	-77	-75
3	-88	-86	-81	-79	-75	-73
3.5	-87	-85	-80	-78	-74	-72
5	-86	-84	-79	-77	-72	-71
6	-85	-83	-78	-76	-72	-70
7	-84	-82	-77	-75	-71	-69
10	-83	-81	-76	-74	-69	-68
12	-82	-80	-75	-73	-69	-67
14	-81	-79	-74	-72	-68	-66
20	-80	-78	-73	-71	-66	-65

Table 116bj (as well as Table 116bi) are derived assuming 5 dB implementation loss, a Noise Figure of 7 dB and receiver SNR and E_b/N_0 values as listed in Table 116bk.

8.6.2 Transmit spectral mask

Change

Table 116ct—Transmit spectral mask parameters

Channelization (MHz)	A	B	C	D
20	9.5	10.59	19.5	29.5
10	4.75	5.245	9.75	14.75

Replace 12.2

12.2 WirelessMAN-OFDM and WirelessHUMAN(-OFDM) System Profiles

This subclause defines system profiles for systems operating with the WirelessMAN-OFDM air interface and with the WirelessHUMAN interface where it uses the OFDM PHY.

A system profile consists of five components: a MAC profile, a PHY profile, a RF profile, a duplexing selection and a power class. The defined PHY and MAC profiles are listed in Table 153.

Table 153—MAC and PHY profile definitions

Identifier	Description
profM3_PMP	WirelessMAN-OFDM basic packet PMP MAC profile
profM3_Mesh	WirelessMAN-OFDM basic packet Mesh MAC profile
profP3_1.75	WirelessMAN-OFDM 1.75 MHz channel basic PHY profile
profP3_3.5	WirelessMAN-OFDM 3.5 MHz channel basic PHY profile
profP3_7	WirelessMAN-OFDM 7 MHz channel basic PHY profile
profP3_3	WirelessMAN-OFDM 3 MHz channel basic PHY profile
profP3_5.5	WirelessMAN-OFDM 5.5 MHz channel basic PHY profile
profP3_10	WirelessHUMAN(-OFDM) 10 MHz channel basic PHY profile

The transmit power class profiles, as shown in Table 154, are based on the maximum mean transmit power $P_{Tx,max}$ using all non-guard carriers, for which the transmitter requirements as defined in 8.4.8 are met.

Table 154—Power Classes profiles

Identifier	Transmit power performance
profC3_17	$17 \leq P_{Tx,max} < 20$ dBm
profC3_20	$20 \leq P_{Tx,max} < 23$ dBm
profC3_23	$P_{Tx,max} \geq 23$ dBm

The duplexing shall be selected as follows: A system shall implement TDD and/or FDD. A FDD SS system may be implemented as half-duplex. A FDD BS system must respect the half-duplex nature of half-duplex SSs.

Using these conventions, a sample system profile is shown in Table 155. This sample system profile may also be represented by a concatenation of the profile components: profM3_PMP_P3_10_R10_1_TDD_C3_17.

Table 155—Sample system profile

Sample system profile
{
profM3_PMP
profP3_10
profR10_1
TDD
profC3_17
}

12.2.1 WirelessMAN-OFDM and WirelessHUMAN(-OFDM) MAC Profiles

This subclause defines MAC profiles for systems operating with the WirelessMAN-OFDM air interface and with the WirelessHUMAN interface where it uses the OFDM PHY.

12.2.1.1 ProfM3_PMP: Basic Packet PMP MAC System Profile

This profile specifies a set of capability requirements when a system is operating in the mandatory PMP mode. Table 156 lists the optional MAC features and designates whether they shall or may be implemented to comply with this profile.

Table 156—Optional feature requirements profM3_PMP

Optional Feature	Required?	Conditions/Notes
Packet convergence sublayer	Yes	
Payload header suppression	No	
Ipv4	Yes	
Ethernet	Yes	
ATM convergence sublayer	No	
Provisioned connections	No	
Classification of packets on incoming physical port	No	
Multicast polling groups	No	
Multicast polling	No	
CRC functionality	Yes	Elective per connection
Dynamic services	Yes	
Unsolicited grant service functionality	No	
Real-Time Polling services	No	
Best effort services	Yes	
Non-Real-Time Polling services	Yes	
TEK encryption algorithms: 3-DES EDE with 128-bit key (type 1) RSA with 1024-bit key	No Yes	
Undecodable initial ranging feature	Conditional	Required for SS. Not required for BS.
ARQ	No	
Mesh	No	if used, apply profM4
AAS	No	
DFS	Conditional	Required when intended for license exempt bands. Not required when intended for licensed bands.

— Support of ARQ is defined as the minimum capability to support 8 simultaneous ARQ connections

12.2.1.1.1 Conventions for MAC Management Messages

The following rules shall be followed when reporting parameters in MAC Management messages:

- Service Class Names should not be used.
- No TLVs besides Error Encodings and HMAC Tuples shall be reported back in DSA-RSP and DSC-RSP messages.
- No TLVs besides HMAC Tuples shall be reported back in DSA-ACK messages.

— DSC-REQ messages shall not contain Request/Transmission Policy, Fixed vs. Variable Length SDU Indicator, SDU Size, ATM Switching, or Convergence Sublayer Specification TLVs.

12.2.1.1.2 MAC Management Message Parameter Transmission Order

TLVs within MAC Management messages shall be ordered as follows. Parameters for optional features shall occur after those listed for support of mandatory features. Features that are defined optional, but are mandated by the implemented Profile, if any, shall be ordered as optional. Both mandatory and optional TLVs shall subsequently be sequenced in order of increasing Type value. Parameters with defined default values should be omitted if the desired value coincides with the default one.

12.2.1.2 ProfM3_Mesh: Basic Packet Mesh MAC System Profile

This profile specifies a set of capability requirements when a mesh enabled system is operating in the optional mesh mode. Table 157 lists the optional MAC features and designates whether they shall or may be implemented to comply with this profile.

Table 157—Optional feature requirements profM3_Mesh

Optional Feature	Required?	Conditions/Notes
Packet convergence sublayer	Yes	
Payload header suppression	No	
Ipv4	Yes	
Ethernet	Yes	
ATM convergence sublayer	No	
Provisioned connections	No	
Classification of packets on incoming physical port	No	
Multicast polling groups	N/A	
Multicast polling		
CRC functionality	Yes	
Dynamic services	Yes	
Unsolicited grant service functionality	N/A	
Real-Time Polling services	N/A	
Best effort services	Yes	
Non-Real-Time Polling services	N/A	
TEK encryption algorithms:		
3-DES EDE with 128-bit key (type 1)	No	
RSA with 1024-bit key	Yes	
Undecodable initial ranging feature	N/A	
ARQ	Yes	
AAS	No	
DFS	Conditional	Required when intended for license exempt bands. Not required when intended for licensed bands.

1 — Support of ARQ functionality is mandatory as a capability, but may be turned on or off on a per packet
 2 basis. ARQ shall be used when the reliability bit in the Mesh CID is set to 1, and shall not be used other-
 3 wise. ARQ parameters shall be set to:

4 —ARQ Window Size = 64_{DEC}

5 —ARQ Retry Timeout = $\lceil 2 \cdot T_F \rceil_{DEC}$, with T_F the PHY dependent frame duration in μ s.

6 —ARQ Fragment Lifetime = $\lceil T_F/2 \rceil_{DEC}$, with T_F the PHY dependent frame duration in μ s.

7 —ARQ RX Purge Time Timeout = $\lceil 2 \cdot T_F \rceil_{DEC}$, with T_F the PHY dependent frame duration in μ s.

8 —ARQ Sync Loss Timeout = 0

9 —ARQ Deliver in Order = 0

12.2.1.2.1 MAC Management message applicability

10 For a mesh-enabled system, the messages below and the corresponding functionality are always mandatory
 11 to implement:

12 MSH-NCFG

13 MSH-NENT

14 MSH-DSCH

15 MSH-CSCH

16 MSH-CSCF

17 REG-REQ

18 REG-RSP

19 PKM-REQ

20 PKM-RSP

21 SBC-REQ

22 SBC-RSP

23 TFTP-CPLT

24 TFTP-RSP

25 RES-CMD

26 For a mesh enabled system, the following messages and the corresponding functionality are mandatory/
 27 optional whenever they are correspondingly optional/mandatory for a PMP system:

28 ARQ-Feedback

1 When operating in the mesh mode, the messages below and the corresponding functionality are not used
 2 (they are however implemented to support the mandatory PMP mode).
 3

4 DL-MAP
 5 DCD
 6 DSA-ACK
 7 DSA-REQ
 8 DSA-RSP
 9 DSC-ACK
 10 DSC-REQ
 11 DSC-RSP
 12 DSD-RSP
 13 DSX-RVD
 14 UCD
 15 UL-MAP
 16 CLK-CMP
 17 DBPC-REQ
 18 DBPC-RSP
 19 DREG-CMD
 20 MCA-REQ
 21 MCA-RSP
 22 RNG-REQ
 23 RNG-RSP
 24
 25
 26
 27
 28
 29

30 Generally, the following procedures are different for a mesh node and a PMP node:
 31

32 Synchronization
 33 Network entry
 34 Scheduling
 35

36 **12.2.1.2.2 MAC Management Message Parameter Transmission Order**

37 TLVs within MAC Management messages shall be ordered as follows. Parameters for optional features
 38 shall occur after those listed for support of mandatory features. Features that are defined optional, but are
 39 mandated by the implemented Profile, if any, shall be ordered as optional. Both mandatory and optional
 40 TLVs shall subsequently be sequenced in order of increasing Type value. Parameters with defined default
 41 values should be omitted if the desired value coincides with the default one.
 42
 43
 44
 45

46 **12.2.2 WirelessMAN-OFDM and WirelessHUMAN(-OFDM) Physical Layer Profiles**

47 This subclause defines PHY profiles for systems operating with the WirelessMAN-OFDM and WirelessHU-
 48 MAN(-OFDM) air interface.
 49

50 The following set of parameters are common to all defined PHY profiles and shall be complied with in order
 51 to comply with each individual profile.
 52
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Table 158 lists the optional PHY features and designates whether they shall or may be implemented.

Table 158—Optional PHY feature requirements

Optional Feature	Required?	Conditions/Notes
BTC	No	
CTC	No	
64-QAM	No	
sub-channelization	No	
STC	No	
Focused contention BW requesting	No	
T_g/T_b	Conditional	BS shall be capable of using at least one value. SS shall be capable of using entire set

Table 159 lists the minimum performance basic requirements for all defined profiles.

Table 159—Minimum Performance basic requirements

Capability	Minimum Performance
Tx Dynamic range SS SS (if subchannelization supported) BS	≥ 30 dB ≥ 50 dB ≥ 10 dB
Tx Power Level minimum adjustment step	≤ 1 dB
Tx Power Level minimum relative step accuracy	$\leq \pm 0.5$ dB
Tx Spectral flatness Absolute difference between adjacent carriers: Deviation of average energy in each carrier from the measured energy averaged over all 200 active tones: Carriers -50 to -1 and +1 to +50: Carriers -100 to -50 and +50 to +100:	≤ 0.06 dB $\leq \pm 2$ dB $\leq \pm 4$ dB
Spectral mask (OOB)	Local regulation
Tx relative constellation error: QPSK-1/2 QPSK-3/4 16QAM-1/2 16QAM-3/4 64QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported)	≤ -19.4 dB ≤ -21.2 dB ≤ -26.4 dB ≤ -28.2 dB ≤ -32.7 dB ≤ -34.4 dB
Rx linearity IIP3	≥ -10 dBm

Table 159—Minimum Performance basic requirements (continued)

Capability	Minimum Performance
Rx max. input level on-channel reception tolerance	≥ -30 dBm
Rx max. input level on-channel damage tolerance	≥ 0 dBm
1 st adjacent channel rejection at BER= 10^{-6} for 3 dB degradation C/I 16QAM-3/4 64QAM-3/4 (if 64-QAM supported)	≥ 11 dB ≥ 4 dB
non-adjacent channel rejection at BER= 10^{-6} for 3 dB degradation C/I 16QAM-3/4 64QAM-3/4 (if 64-QAM supported)	≥ 30 dB ≥ 23 dB
TTG and RTG	≤ 5 μ s
Reference frequency tolerance BS Mesh system	$\leq \pm 4$ ppm $\leq \pm 20$ ppm

12.2.2.1 ProfP3_1.75: WirelessMAN-OFDM PHY profile for 1.75 MHz channelization

Mandatory features:

- Licensed band usage only
- Channel bandwidth $BW = 1.75$ MHz
- BS shall select Frame duration from code set PMP:{4,7,12}. SSSs shall be capable of operating with any of the Frame Durations indicated in the code set.

Systems implementing profP3_1.75 shall meet the minimum performance requirements listed in Table 160:

Table 160—Minimum Performance requirements for profP3_1.75

Capability	Minimum Performance
T_b	$= 128$ μ s

Table 160—Minimum Performance requirements for profP3_1.75 (continued)

Capability	Minimum Performance
BER performance threshold, BER=10 ⁻⁶ QPSK-1/2 QPSK-3/4 16QAM-1/2 16QAM-3/4 64QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported)	≤ -90 dBm ≤ -87 dBm ≤ -83 dBm ≤ -81 dBm ≤ -77 dBm ≤ -75 dBm
Threshold change if subchannelization used	10 · log($N_{subchannels}/4$)
Reference frequency tolerance SS to BS synchronization tolerance	156.25 Hz
Reference time tolerance	≤ (T_g/T_b)/2 μs

12.2.2.2 ProfP3_3.5: WirelessMAN-OFDM PHY profile for 3.5 MHz channelization

Mandatory features:

- Licensed band usage only
- Channel bandwidth $BW = 3.5$ MHz
- BS shall select Frame duration from code set PMP:{4,7,12}, Mesh:{8}. SSs shall be capable of operating with any of the Frame Durations indicated in the code set.

Systems implementing profP3_3.5 shall meet the minimum performance requirements listed in Table 161:

Table 161—Minimum Performance requirements for profP3_3.5

Capability	Minimum Performance
T_b	= 64 μs
BER performance threshold, BER=10 ⁻⁶ QPSK-1/2 QPSK-3/4 16QAM-1/2 16QAM-3/4 64QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported)	≤ -87 dBm ≤ -85 dBm ≤ -80 dBm ≤ -78 dBm ≤ -74 dBm ≤ -72 dBm
Threshold change if subchannelization used	10 · log($N_{subchannels}/4$)
Reference frequency tolerance SS to BS synchronization tolerance Mesh to Mesh synchronization tolerance	≤ 312.5 Hz ≤ 468.75 Hz
Reference time tolerance	≤ (T_g/T_b)/2 μs

12.2.2.3 ProfP3_7: WirelessMAN-OFDM PHY profile for 7 MHz channelization

Mandatory features:

- Licensed band usage only
- Channel bandwidth $BW = 7$ MHz
- BS shall select Frame duration from code set PMP:{4,7,12}, Mesh:{3}. SSs shall be capable of operating with any of the Frame Durations indicated in the code set.

Systems implementing profP3_7 shall meet the minimum performance requirements listed in Table 162:

Table 162—Minimum Performance requirements for profP3_7

Capability	Minimum Performance
T_b	$= 32 \mu s$
BER performance threshold, BER= 10^{-6} QPSK-1/2 QPSK-3/4 16QAM-1/2 16QAM-3/4 64QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported)	≤ -84 dBm ≤ -82 dBm ≤ -77 dBm ≤ -75 dBm ≤ -71 dBm ≤ -69 dBm
Threshold change if subchannelization used	$10 \cdot \log(N_{subchannels}/4)$
Reference frequency tolerance SS to BS synchronization tolerance Mesh to Mesh synchronization tolerance	≤ 625 Hz ≤ 937.5 Hz
Reference time tolerance	$\leq (T_g/T_b)/2 \mu s$

12.2.2.4 ProfP3_3: WirelessMAN-OFDM PHY profile for 3 MHz channelization

Mandatory features:

- Licensed band usage only
- Channel bandwidth $BW = 3$ MHz
- BS shall select Frame duration from code set PMP:{4,7,12}, Mesh:{8}. SSs shall be capable of operating with any of the Frame Durations indicated in the code set.

Systems implementing profP3_3 shall meet the minimum performance requirements listed in Table 163:

Table 163—Minimum Performance requirements for profP3_3

Capability	Minimum Performance
T_b	$= 73\frac{1}{7}\mu s$
BER performance threshold, BER= 10^{-6} QPSK-1/2 QPSK-3/4 16QAM-1/2 16QAM-3/4 64QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported)	$\leq -88\text{dBm}$ $\leq -86\text{ dBm}$ $\leq -81\text{ dBm}$ $\leq -79\text{ dBm}$ $\leq -75\text{ dBm}$ $\leq -73\text{ dBm}$
Threshold change if subchannelization used	$10 \cdot \log(N_{subchannels}/4)$
Reference frequency tolerance SS to BS synchronization tolerance Mesh to Mesh synchronization tolerance	$\leq 273.44\text{ Hz}$ $\leq 410.16\text{ Hz}$
Reference time tolerance	$\leq (T_g/T_b)/2\mu s$

12.2.2.5 ProfP3_5.5: WirelessMAN-OFDM PHY profile for 5.5MHz channelization

Mandatory features:

- Licensed band usage only
- Channel bandwidth $BW = 5.5\text{ MHz}$
- BS shall select Frame duration from code set PMP: $\{4,7,12\}$, Mesh: $\{8\}$. Ss shall be capable of operating with any of the Frame Durations indicated in the code set.

Systems implementing profP3_5.5 shall meet the minimum performance requirements listed in Table 164:

Table 164—Minimum Performance requirements for profP3_5.5

Capability	Minimum Performance
T_b	$= 39\frac{67}{77}\mu s$

Table 164—Minimum Performance requirements for profP3_5.5 (continued)

Capability	Minimum Performance
BER performance threshold, BER=10 ⁻⁶	
QPSK-1/2	≤ -85 dBm
QPSK-3/4	≤ -83 dBm
16QAM-1/2	≤ -78 dBm
16QAM-3/4	≤ -76 dBm
64QAM-2/3 (if 64-QAM supported)	≤ -72 dBm
64QAM-3/4 (if 64-QAM supported)	≤ -70 dBm
Threshold change if subchannelization used	$10 \cdot \log(N_{subchannels}/4)$
Reference frequency tolerance	
SS to BS synchronization tolerance	≤ 501.30 Hz
Mesh to Mesh synchronization tolerance	≤ 751.95 Hz
Reference time tolerance	≤ $(T_g/T_b)/2 \mu s$

12.2.2.6 ProfP3_10: WirelessHUMAN PHY profile for 10 MHz channelization

Mandatory features:

- License-exempt band usage only
- Channel bandwidth $BW = 10$ MHz
- TDD operation
- BS shall select Frame duration from code set PMP:{4,7,12}, Mesh:{3}. SSs shall be capable of operating with any of the Frame Durations indicated in the code set.
- DFS capability
 - Ability to detect primary users with received signal strength in excess of -67 dBm
 - Ability to switch channel within 300 μs

Systems implementing profP3_10 shall meet the minimum performance requirements listed in Table 165:

Table 165—Minimum Performance requirements for profP3_10

Capability	Minimum Performance
T_b	$= 22.4 \mu s$
Spectral mask (IB): $f_0 \pm 0$ MHz $f_0 \pm 4.75$ MHz $f_0 \pm 5.25$ MHz $f_0 \pm 9.75$ MHz $f_0 \pm 14.75$ MHz	Linear interpolation between points: 0 dBr 0 dBr -27 dBr -32 dBr -50 dBr
BER performance threshold, BER= 10^{-6} QPSK-1/2 QPSK-3/4 16QAM-1/2 16QAM-3/4 64QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported) Threshold change if subchannelization used	≤ -83 dBm ≤ -81 dBm ≤ -76 dBm ≤ -74 dBm ≤ -69 dBm ≤ -68 dBm $10 \cdot \log(N_{subchannels}/4)$
Reference frequency tolerance SS to BS synchronization tolerance Mesh to Mesh synchronization tolerance	≤ 892.5 Hz ≤ 1339 Hz
Reference time tolerance	$\leq (T_g/T_b)/2 \mu s$

12.2.3 WirelessMAN-OFDM RF profiles

For licensed bands, no explicit RF profiles are defined. A compliant system shall adhere to the requirements of 8.4.9.2 for the specified supported bands.

12.2.3.1 RF profiles for 10 MHz channelization

12.2.3.1.1 profR10_1

Mandatory features:

- RF channels: $5000 + n \cdot 5$ MHz, $\forall n \in \{55, 57, 59, 61, 63, 65, 67\}$
- Spectral mask: See 8.6.2

12.2.3.1.2 profR10_2

Mandatory features:

- RF channels: $5000 + n \cdot 5$ MHz, $\forall n \in \{148, 150, 152, 154, 156, 158, 160, 162, 164, 166\}$
- Spectral mask: See 8.6.2

12.2.3.1.3 profR10_3

Mandatory features:

- RF channels: : $5000 + n \cdot 5$ MHz, $\forall n \in \{147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169\}$
- Spectral mask: See 8.6.2

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