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Source(s)	Hassan Yaghoobi Jose Puthenkulam Siavash Alamouti Dov Andelman Intel Zion Haddad Runcom Seung Joo Maeng Samsung Sean Cai ZTE John Humbert Ivy Kelly Sprint
Re:	IEEE 802.16e/D5a
Abstract	This contribution specifies a recommendation for 802.16e profiles including Power Level, MAC and PHY basic profiles.
Purpose	Adoption
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1 Introduction

The purpose of this contribution is to specify the recommendations for 802.16e profiles including Power Level, MAC and PHY basic profiles covered in Sections 2, 3 and 4 respectively.

2 WirelessMAN-OFDMA Power Class Profiles

Class Identifier	Transmit Power (dBm)
Class 1	**17 ≤PTx max < 20**
Class 2	**20 ≤PTx max < 23**
Class 3	**23 ≤PTx max < 30**
Class 4	**30 ≤PTx max**

3 Combined Fixed/Mobile (802.16e) OFDMA MAC Profiles

All the non-mandatory features that are not called out explicitly in here are not required for implementation of MAC profile.

3.1 Basic Packet PMP MAC Profile: OFDMA_ProfM2

Mandatory Features:

1. Support of Packet convergence sublayer.
2. CRC functionality shall be supported for all connections.
3. Support of BS initiated dynamic services.
4. Support of Best effort services.
5. Support of Non-Real-Time Polling services.
6. Support of CDMA based Initial and Periodic Ranging.
7. Support of Contention based CDMA bandwidth requests.
8. Support of Hand Off.
9. Support of Regular and Compressed MAPs.

3.2 Conventions for MAC Management Messages

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

1. Service Class Names should not be used.
2. No TLVs besides HMAC Tuples shall be reported back in DSA-ACK messages.
3. DSC-REQ messages shall not contain Request/Transmission Policy, Fixed vs. Variable Length SDU Indicator, SDU Size, ATM Switching, or Convergence Sublayer Specification TLVs.

3.3 MAC Management Message Parameter Transmission Order

Systems implementing the profile OFDMAe_ProfM1 shall transmit the TLV encoded parameters for mandatory features in the respective messages. Those systems only include the parameters listed under the respective message in its transmission of said messages plus any parameters necessary for optional features. Parameters with defined default values should be omitted if the desired value coincides with the default one.

4 Combined Fixed/Mobile (802.16e) OFDMA PHY Profiles

If one of the PHY profiles has a parameter, which is different from the parameter defined by the common parameters section, then the values stated in the PHY profile override the value stated in the common parameters section.

The following tables describe different RF spectrum band classes considerd.

RF Spectrum Band Class 1: 2.3-2.7 GHz (Licensed Band Only)

Identifier	Description
OFDMA_profM2	Mobile WirelessMAN-OFDMA basic packet PMP MAC Profile
OFDMA_profP10	Mobile WirelessMAN-OFDMA 5 MHz channel basic PHY Profile
OFDMA_profP11	Mobile WirelessMAN-OFDMA 8.75 MHz channel basic PHY Profile
OFDMA_profP12	Mobile WirelessMAN-OFDMA 10 MHz channel basic PHY Profile

RF Spectrum Band Class 2: 3.3-3.7 GHz

Identifier	Description
OFDMA_profM2	Mobile WirelessMAN-OFDMA basic packet PMP MAC Profile
OFDMA_profP10	Mobile WirelessMAN-OFDMA 5 MHz channel basic PHY Profile
OFDMA_profP12	Mobile WirelessMAN-OFDMA 10 MHz channel basic PHY Profile

RF Spectrum Band Class 3: 1.0-2.2 GHz

Identifier	Description
OFDMA_profM2	Mobile WirelessMAN-OFDMA basic packet PMP MAC Profile
OFDMA_profP13	TBD

RF Spectrum Band Class 4: Below 1.0 GHz

Identifier	Description
OFDMA_profM2	Mobile WirelessMAN-OFDMA basic packet PMP MAC Profile
OFDMA_profP14	TBD

4.1 General Implementation Requirements

All the non-mandatory features that are not called out explicitly in here are not required for implementation of any PHY profiles.

The following features must be supported by all PHY profiles:

Guard Time

BS shall be capable of using at least one allowed value.
SS shall be capable of detecting and using entire set of allowed values

Frame Duration

BS and SS shall be capable of using at least one allowed value.

4.2 TDD-Specific PHY Profiles Features

Mandatory features:

- TDD operation
- Center frequency for uplink is not reported in the UCD channel encoding

4.3 Minimum Performance Requirements (for all PHY profiles)

Lists the minimum performance requirements needed for all profiles:

Capability	Performance Requirement
Tx Dynamic range	

SS BS	**≥ 30 dB** **≥ 10 dB**
Tx Power Level minimum adjustment step	**≤1 dB**
Tx Power Level minimum relative step accuracy	**≤+/- 0.5 dB**
BS and SS Spectral flatness, when using all subchannels. Absolute difference between adjacent subcarriers: (2.5dB should be added for Pilot carriers within the symbol due to their boosting). Deviation of average energy in each carrier from the measured energy averaged over all active tones: Spectral lines from –*Nused*/4 to –1 and +1 to *Nused*/4 Spectral lines from –*Nused*/2 to –*Nused*/4 and +*Nused*/4 to *Nused*/2	**≤ 0.1 dB** **≤ ±2 dB from the measured energy averaged over all *Nused* active tones** **≤ +2/–4 dB from the measured energy averaged over all *Nused* active tones**
Spectral mask	**Local regulation**
Tx relative constellation error QPSK-1/2 QPSK-3/4 16QAM-1/2 16QAM-3/4 4QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported)	 **≤ -16.4 dB** **≤ -18.2 dB** **≤ -23.4 dB** **≤ -25.2 dB** **≤ -29.7 dB** **≤ -31.4 dB**
Rx max. input level on-channel reception tolerance	**≥ -30 dBm**
Rx max. input level on-channel damage tolerance	**≥ 0 dBm**
1st 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**
2nd 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**
SSTTG and SSRTG: TDD H-FDD	 **≤ 50 us** **≤ 100 us**
Reference time tolerance	**± (Tb/32)/10**

4.4 Mobile WirelessMAN-OFDMA 5 MHz channel basic PHY Profile: OFDMA_profP10

Table *nnn*—Minimum Performance requirements for OFDMA_ProfP10

Capability	Performance Requirement
Channel Bandwidth	***5* MHz**
FFT Size	***TBD***
Operation Mode	**Licensed bands only**
BER performance threshold, BER=10-6 (using all subchannels BS/SS) QPSK-1/2 QPSK-3/4 16QAM-1/2	 **≤ -86 dBm** **≤ -84 dBm** **≤ -79 dBm** **≤ -77 dBm**

16QAM-3/4 4QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported) (Add to sensitivity 10*log10(NumberOfSub ChannelsUsed/TotalNumberOfSubchannels) when using less subchannels in BS Rx	**≤ -72 dBm** **≤ -71 dBm**
Reference frequency tolerance BS SS to BS synchronization tolerance	 **±2*10^{-6}** **2% subcarrier spacing (TBD based on FFT size)**
Frame duration code set	**{4}**

4.5 Mobile WirelessMAN-OFDMA 8.75 MHz channel basic PHY Profile: OFDMA_profP11

Table *nnn*—Minimum Performance requirements for OFDMA_ProfP11

Capability	Performance Requirement
Channel Bandwidth	***8.75*** **MHz**
FFT Size	***TBD***
Operation Mode	**Licensed bands only**
BER performance threshold, BER=10-6 (using all subchannels BS/SS) QPSK-1/2 QPSK-3/4 16QAM-1/2 16QAM-3/4 4QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported) (Add to sensitivity 10*log10(NumberOfSub ChannelsUsed/TotalNumberOfSubchannels) when using less subchannels in BS Rx	 **≤ -83 dBm** **≤ -81 dBm** **≤ -76 dBm** **≤ -84 dBm** **≤ -70 dBm** **≤ -68 dBm**
Reference frequency tolerance BS SS to BS synchronization tolerance	 **±2*10^{-6}** **2% subcarrier spacing (TBD based on FFT size)**
Frame duration code set	**{4}**

4.6 Mobile WirelessMAN-OFDMA 10 MHz channel basic PHY Profile: OFDMA_profP12

Table *nnn*—Minimum Performance requirements for OFDMA_ProfP12

Capability	Performance Requirement
Channel Bandwidth	***10*** **MHz**
FFT Size	***TBD***
Operation Mode	**Licensed bands only**
BER performance threshold, BER=10-6 (using all subchannels BS/SS) QPSK-1/2 QPSK-3/4 16QAM-1/2 16QAM-3/4 4QAM-2/3 (if 64-QAM supported) 64QAM-3/4 (if 64-QAM supported) (Add to sensitivity 10*log10(NumberOfSub ChannelsUsed/TotalNumberOfSubchannels)	 **≤ -83 dBm** **≤ -81 dBm** **≤ -76 dBm** **≤ -74 dBm** **≤ -69 dBm** ***≤ -68 dBm***

when using less subchannels in BS Rx	
Reference frequency tolerance BS SS to BS synchronization tolerance	 **±2*10^{-6}** **2% subcarrier spacing (TBD based on FFT size)**
Frame duration code set	**{4}**

4.7 Mobile WirelessMAN-OFDMA 10 MHz channel basic PHY Profile: OFDMA_profP13

TBD

4.8 Mobile WirelessMAN-OFDMA 10 MHz channel basic PHY Profile: OFDMA_profP14

TBD

5 References

[1] IEEE P802.16-2004 Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed Broadband Wireless Access Systems

[2] IEEE P802.16-REVe/D5a-2004 Standard for Local and metropolitan area networks Part 16: Air Interface for Fixed Amendment for Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands