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Title	**OFDMA System Profiles Using AAS and ACP Options**
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Re:	CALL FOR REPLY COMMENTS ON LETTER BALLOT #11
Abstract	This document presents profiles for the 802.16a OFDMA mode using AAS and ACP options (supplementary text for letter ballot #11 reply comments)
Purpose	To be integrated into P802.16d/D1-2003 draft document
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OFDMA System Profiles Using AAS and ACP Options

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General

This contribution provides additional text for letter ballot #11. It replaces the previous version IEEE C802.16d-03/10 and is based on the formats, structures and information used in docs P802.16d/D1-2003 and IEEE C802.16d-03/29. Insert the following changes to the 802.16a Standard.

Section 4. Abbreviations and acronyms

Insert, maintaining alphabetical order:

ACP Adjacent Carrier Permutation (OFDMA AAS only)
DCP Distributed Carrier Permutation (OFDMA only)

Par 8.5.6.3 Optional permutations for AAS

1st Line - "distributed carrier permutation" becomes "distributed carrier permutation (DCP)"
2nd Line - "adjacent carrier permutation" becomes "adjacent carrier permutation (ACP)"

Section 12 : Insert the following sub-paras :

1.1 WirelessMAN-OFDMA System Profiles Using AAS and ACP Options

.
This subclause defines system profiles for systems operating with the WirelessMAN-OFDMA air interface for a BWA System providing Adaptive Multibeam (AMB) non-LOS coverage in the 2-11 GHz licensed frequency. The System is optimized for TDD duplexing, ARQ and Adaptive Antenna System (AAS) operation using the Adjacent Carrier Permutation (ACP) option of the OFDMA PHY. This system supports single or multi-channel configurations with full frequency reuse both within a cell and between cells resulting in payload efficiency up to 10-15 Mb/s per MHz of wide area spectrum allocation. This Profile does NOT support FDD, MSH or STC options of the Standard..

A system profile consists of four components: a MAC profile, a PHY profile, an RF profile and a power Class profile. The defined PHY and MAC profiles are listed in Table x1.

Table x1–MAC and PHY Profile Definitions

Identifier	Description
OFDMA_AAS/ACP_ProfM1	WirelessMAN-OFDMA basic packet PMP MAC Profile using AAS and ACP Options
OFDMA_AAS/ACP_ProfP1	WirelessMAN-OFDMA 1.25 MHz channel basic PHY Profile using AAS and ACP Options

The transmit power Class profiles, as shown in Table x2, are based on the maximum mean transmit power $P_{Tx,max}$ using all non-guard carriers, for which the transmitter requirements as defined in 8.5.12 are met. The actual transmit powers will vary considerably due to the dynamic assignment of BS adaptive antenna (spatial) co-efficients at the system level, in addition to the dynamic allocation and weighting of sub-channels for capacity or diversity purposes by the MAC and PHY layers.

Table x2–Power Classes Profiles

Identifier	Description
OFDMA_AAS/ACP_ProfC1	$P_{tx,\ max}$ +30 dBm

The RF profiles, as shown in Table x3, are based on the targeted frequency bands, as indicated.

Table x3–RF Profiles

Identifier	Description
OFDMA_AAS/ACP_ProfR1	1.25MHz Channel, 2150 – 2160MHz (e.g. US MDS1,2,2A)
OFDMA_AAS/ACP_ProfR2	1.25MHz Channel, 2305 – 2320MHz and 2345 – 2360 MHz (e.g. US WCS A,B,C,D)
OFDMA_AAS/ACP_ProfR3	1.25MHz Channel, 2500 – 2686MHz (e.g. US MDS/ITFS A1-G4)
OFDMA_AAS/ACP_ProfR4	1.25MHz Channel, 3400 – 3700MHz (e.g. CITEL, Asia and CEPT FWA)

Using these conventions, a sample system profile is shown in Table x4

Table x4–Sample of System Profile

Sample System Profile
{
OFDMA_AAS/ACP_ProfM1
OFDMA_AAS/ACP_ProfP1
OFDMA_AAS/ACP_ProfR1
OFDMA_AAS/ACP_ProfC1
}

1.2   WirelessMAN-OFDMA AAS/ACP System MAC Profiles

This subclause defines MAC profiles for systems operating with the WirelessMAN-OFDMA air interface using AAS and ACP Options.

1.2.1   Basic packet PMP MAC profile

Profile identifier: OFDMA_AAS/ACP_ProfM1.

Mandatory Features:
Support of Packet convergence sublayer
Support of Internet Protocol Ipv4
Support IEEE 802.3/Ethernet specific part
CRC functionality shall be supported for all connections
Support of dynamic services
Support of Best effort services
Support of Non-Real-Time Polling services
Support of CDMA based Initial and Periodic Ranging.
Support of Contention based CDMA bandwidth requests
Support of ARQ Options
Support of Advanced Antenna System (AAS) Option
Support of Adjacent Carrier Permutation (ACP) Option

1.2.1.1Conventions 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.

1.2.1.2 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.

1.3   WirelessMAN-OFDMA AAS/ACP PHY Profiles

This subclause defines PHY profiles for systems operating with the WirelessMAN-OFDMA air interface using the AAS and ACP Options.

1.3.1   Common Parameters

Table x5 and table x6 defines parameters that are common all 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.

Table x5 lists the minimum performance requirements needed for all profiles

Table x5: Minimum performance requirements for all profiles

Capability	Minimum performance

Tx Dynamic range
   BS
   SS
	10 dB
	40 dB

Tx Power Level minimum adjustment step	1 dB
Tx Power Level minimum relative step accuracy	± 0.5 dB

BS Tx Spectral flatness, when using all subchannels.
  Absolute difference between adjacent carriers (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 1702 active tones:
    Carriers -425 to -1 and +1 to +425:
    Carriers -851 to -425 and +425 to +851:
	0.06 dB
	
	±2 dB
	+2/-4 dB

SS Tx Spectral flatness, when using all subchannels.
  Absolute difference between adjacent carriers (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 1696 active tones:
    Carriers -424 to -1 and +1 to +424:
    Carriers -848 to -424 and +424 to +848:
	0.06 dB
	
	±2 dB
	+2/-4 dB

Spectral mask (OOB)	Local regulation
Tx relative constellation error: QPSK-1/1 16QAM-3/4	-22.4 dB -28.2 dB
Rx linearity IIP3	> -7 dBm
Rx max. input level on-channel reception tolerance	-30 dBm
Rx max. input level on-channel damage tolerance	0 dBm

Number Of Sub-Channels Supported when receiving/transmitting
   SS
   BS
	
	1-32
	1-32

1st Adjacent channel rejection at BER=10^{-6} for 3 dB degradation C/I 16QAM-3/4	 30 dB
2nd Adjacent channel rejection at BER=10^{-6} for 3 dB degradation C/I 16QAM-3/4	 80 dB
TTG	≥ 200 ìs
RTG	≥ 5 ìs
Reference time tolerance	$(T_g/T_b)/2$ ìs

Table x6 lists all optional PHY components and whether their implementation is required to comply with all PHY profiles.

Table x6: Optional feature requirements for all profiles

Feature	Required?	Conditions / Notes
BTC	No	
CTC	No	
64 QAM	No	
STC	No	
FDD	No	
TDD	Yes	
AAS	Yes	SS shall be capable of supporting AAS option and shall use the AAS alert_slots process. The BS polling process for SS bandwidth requests shall be used.
ACP	Yes	SS shall be capable of supporting ACP option.
T_g/T_b	1/32	

1.3.2   WirelessMAN-OFDMA 1.25 MHz channel basic PHY Profile

Profile identifier: OFDMA_AAS/ACP_ProfP1.

Mandatory features:

Licensed band usage only.
TDD Duplex Operation Only
Channel bandwidth BW = 1.25 MHz
BS shall select Frame Duration =3}.

Systems implementing OFDMA_AAS/ACP_ProfP1 shall meet the minimum performance requirements listed in Table x7:

Table x7: Minimum performance requirements for OFDMA_ProfP1

Capability	Performance
BER performance threshold, BER=10^{-6} (using all Sub-channels BS/SS) QPSK-1/1	Better than -90 dBm
16QAM-3/4 (Add to sensitivity $10*\log_{10}$(NumberOfSubChannelsUsed/32) when using less sub-channels in the BS Rx)	Better than -80 dBm
Reference frequency tolerance BS SS to BS synchronization tolerance	+/- 1 ppm 2 Hz

1.3.3   WirelessMAN-OFDMA RF profiles

1.3.3.1 RF profiles for 1.25 MHz channels

1.3.3.1.1   OFDMA_AAS/ACP_ProfR1

Mandatory features:
RF channels: center frequency 2150.625 + n· 1.25 MHz, $\forall n \in \{0,1, …,7\}$

1.3.3.1.2   OFDMA_AAS/ACP _ProfR2

Mandatory features:
RF channels: center frequency 2305.625 + n· 1.25 MHz, $\forall n \in \{0,1, …,12\}$
                 center frequency 2345.625 + n· 1.25 MHz, $\forall n \in \{13,14, …,24\}$

1.3.3.1.3   OFDMA_AAS/ACP _ProfR3

Mandatory features:
RF channels: center frequency 2500.625 + n· 1.25 MHz, $\forall n \in \{0,1, …,150\}$

1.3.3.1.4   OFDMA_AAS/ACP _ProfR4

Mandatory features:
RF channels: center frequency 3400.625 + n· 1.25 MHz, $\forall n \in \{0,1, …,240\}$