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Title	**Optional Dedicated Pilots in the TD-Zone of OFDMA**
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Re:	IEEE P802.16-REVe/D5-2004
Abstract	This contribution proposes the addition of an optional field to the TD-Zone-IE()to indicate whether the pilot symbols are broadcast or dedicated (in which case an MSS should use only the pilots in its allocation for channel estimation).
Purpose	Adoption of proposed changes into P802.16e
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Optional Dedicated Pilots in the TD-Zone of OFDMA

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1 Introduction

This contribution proposes the addition of an optional field to the TD-ZONE-IE() to indicate that the pilot symbols in the specified zone are dedicated rather than broadcast. The purpose is to provide better support for the use of DL transmissions based on open-loop precoding (Section 8.4.8.3.5) and DL transmissions that exploit the uplink Channel Sounding methodology (Section 8.4.6.2.7). The first bit flag informs the MSS that the pilot symbols are beamformed (precoded) in the same way as the data and that an MSS should use only the pilots contained in its allocation for channel estimation. The second bit flag indicates whether the midamble (if present) is precoded/beamformed or not. If these two bits are not included in the transmission of the TD-ZONE-IE(), then the pilots are to be assumed by default to be broadcast pilots, as in the current specification.

2 Specific Text Changes

---------- Beginning of Text Changes ----------

[In Section 8.4.5.3.4, modify Table 277a as follows (Modifications in RED):]

Table 277a – OFDM downlink TD_ZONE IE format

Syntax	Size (bits)	Notes
STC_ZONE_IE() {		
Extended DIUC	4	STC/ZONE=0x01
Length	4	Length = 0x02 or 0x03
Permutation	2	00=PUSC permutation 01=FUSC permutation 10=Optional FUSC permutation 11=Optional adjacent subcarrier permutation
Use all SC indicator	1	0 = Do not use all subchannels 1 = Use all subchannels
STC	2	0b00=No transmit diversity 0b01=STC using 3 antennas 0b10=STC using 4 antennas 0b11=FHDC using 2 antennas
Matrix Indicator	2	Antenna STC/FHDC matrix (See 8.4.8) 00 = Matrix A 01 = Matrix B 10 = Matrix C (applicable to 3 or 4 antennas only)

		11 = reserved
IDcell	6	
Midamble presence	1	0 = not present 1 = present
Midamble boosting	1	0 = no boost 1 = Boosting (3dB)
2/3 antennas select	1	0 = STC using 2 antennas 1 = STC using 3 antennas Selects 2/3 antennas when STC=01
If length=0x03 {		
Dedicated Pilots	1	0 = Pilot symbols are broadcast 1 = Pilot symbols are dedicated. An MSS should use only pilots specific to its burst for channel estimation
Dedicated Midamble	1	0 = Midamble is broadcast 1 = Midamble is dedicated. An MSS should use only the subcarriers of the Midamble corresponding to its burst for channel estimation
Reserved	6	Shall be set to zero
}		
}		

[Add the following text at the end of Section 8.4.5.3.4:]

Dedicated Pilots and Dedicated Midamble

The optional fields Dedicated Pilots and Dedicated Midamble are used to support the use of open loop precoding or closed-loop transmissions in which the MSS has no knowledge of the precoding / beamforming matrix (e.g., DL transmissions enabled with the optional uplink channel sounding methodology of Section 8.4.6.2.7). When the data allocations are precoded / beamformed in the STC zone, then setting the Dedicated Pilots bit to 1 means the pilot symbols are precoded / beamformed with the same precoding / beamforming matrix used on the corresponding data subcarriers. In this case, an MSS should use only the pilots that are specific to its allocation for channel estimation. When the Midamble is present and dedicated, the BS will precode / beamform the subcarriers of the Midamble with the same precoding / beamforming matrix used on the corresponding subcarriers in the first symbol following the Midamble. If the TD_Zone_IE() does not include the last byte that contains the Dedicated Pilots and Dedicated Midamble bits, then the pilots and midamble are broadcast by default (and an MSS may use any of the pilot symbols for channel estimation).

---------- End of Text Changes ----------