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Title	**Default parameter sets for SBC-REQ/RSP for OFDMA PHY**	
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Re:	Call for contributions, IEEE P802.16e-2005 Sponsor Ballot	
Abstract	This document suggests changes in TGe Draft Document IEEE 802.16e-2005 to define default parameter sets in SBC-REQ/RSP for OFDMA PHY	
Purpose	Adopt into the current TGe working draft	
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Default parameter sets for SBC-REQ/RSP for OFDMA PHY

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1 Motivation for the Changes

In the current standard, lots of functions and parameter values need to be negotiated via SBC-REQ/RSP messages. Transmission of SBC-REQ message on network entry includes significant amount of bytes in uplink. It is necessary to transmit at least 100 bytes for SBC-REQ message for a typical deployment scenario. This is equivalent to 5 subchannels in frequency domain in a certain symbol, assuming 12 data symbols in UL subframe with QPSK 1/2. Using UL PUSC permutation, this translates into 120 (24x5) subcarriers in a symbol that each MS has to transmit in order to finish network entry. Moreover, the SBC-REQ cannot be fragmented.
The necessity to transmit 5 subchannels significantly reduces the cell coverage, which is normally designed based on the assumption of minimum 1 subchannel data transmission, thus resulting in 7 dB loss in coverage.

This contribution addresses this problem and proposes a solution which involves a new TLV for SBC-REQ/RSP which defines several sets of functions and/or values. Based on this solution, SBC-REQ message can be transmitted in just 2 subchannels, thus resulting in significant improvement of 4 dB in UL link budget.

2 Detailed Text Changes

[Insert new subclause 11.8.3.7.20:]

11.8.3.7.20 OFDMA parameter sets

This field indicates different parameter sets supported by a WirelessMAN-OFDMA PHY

MS. This field is not used for other PHY specifications. If necessary, MS and BS may send additional TLV's to override functions and values defined in the parameter sets of this TLV.

Type	Length (bytes)	Value	Scope
204	1	Bit#0: support OFDMA PHY parameter set A Bit#1: support OFDMA PHY parameter set B Bit#2-#4: HARQ parameters set 0b000: HARQ set 1 0b001: HARQ set 2 0b010: HARQ set 3 0b011: HARQ set 4 0b100: HARQ set 5 0b101-0b111: reserved Bit#5: support OFDMA MAC parameters set A Bit#6: support OFDMA MAC parameters set B Bit#7: reserved Note: Bit#0 and #1 shall not be set to 1 together. Bit#5 and #6 shall not be set to 1 together.	SBC-REQ SBC-RSP

The following tables define 'OFDMA PHY parameter set A, OFDMA PHY parameter set B, HARQ set 1, HARQ set 2, HARQ set 3, HARQ set 4, and HARQ set 5, respectively.

Sets	Items	Sub-items	References

OFDMA PHY parameter set A	Subscriber transition gap	SSTTG = 50 usec	11.8.3.1
		SSRTG = 50 usec	
	OFDMA SS demodulator	64QAM	11.8.3.7.2
		CTC	
		HARQ chase	
	OFDMA SS modulator	CTC	11.8.3.7.3
		HARQ chase	
	OFDMA SS CINR measurement capability	Physical CINR measurement from the preamble	11.8.3.7.9
		Physical CINR measurement for a permutation zone from pilot subcarriers	
	OFDMA SS uplink power control support	Uplink open loop power control support	11.8.3.7.11
	OFDMA MAP capability	Extended HARQ IE capability	11.8.3.7.12
		Sub MAP capability for first zone	
	Uplink control channel support	Enhanced FAST_FEEDBACK	11.8.3.7.13
		UL ACK	

Sets	Items	Sub-items	References

OFDMA PHY parameter set B	Subscriber transition gap	SSTTG = 50 usec	11.8.3.1
		SSRTG = 50 usec	
	OFDMA SS demodulator	64QAM	11.8.3.7.2
		CTC	
		STC	
		HARQ chase	
		Dedicated pilot	
	OFDMA SS modulator	CTC	11.8.3.7.3
		HARQ chase	
	OFDMA SS permutation support	AMC 2x3 support	11.8.3.7.4
	OFDMA SS MIMO uplink support	Single-antenna Collaborative SM	11.8.3.7.6
	OFDMA SS CINR measurement capability	Physical CINR measurement from the preamble	11.8.3.7.9
		Physical CINR measurement for a permutation zone from pilot subcarriers	
		Effective CINR measurement for a permutation zone from pilot subcarriers	
	OFDMA SS uplink power control support	Uplink open loop power control support	11.8.3.7.11
	OFDMA MAP capability	Extended HARQ IE capability	11.8.3.7.12
		Sub MAP capability for first zone	
	Uplink control channel support	Enhanced FAST_FEEDBACK	11.8.3.7.13
		UL ACK	
	OFDMA MS CSIT capability	CSIT compatibility type A	11.8.3.7.14
		Sounding response time capability = next frame	
		Max number of simultaneous sounding instructions = 2	
		SS does not support P values of 9 and 18 when supporting CSIT type A = 0 (SS support P values of 9 and 18)	
	OFDMA SS demodulator for MIMO support	2-antenna STC matrix A	11.8.3.7.5
		2-antenna STC matrix B vertical coding	
	OFDMA SS modulator for MIMO support	Capable of single antenna	11.8.3.7.16

HARQ parameters	Items	Sub-items	References

HARQ set 1	The number of UL HARQ channel	Number of UL HARQ channels = 4	11.8.3.7.3
	The number of DL HARQ channel	Number of DL HARQ channels = 4	11.8.3.7.2
	HARQ Chase combining and CC-IR buffer capability	Downlink HARQ buffering capability for chase combining: K = 20	11.8.3.7.19.2
		Aggregation Flag for DL = 0 (OFF)	
		Uplink HARQ buffering capability for chase combining: K = 20	
		Aggregation Flag for UL = 0 (OFF)	
	Maximum number of burst per frame capability in HARQ	Maximum number of UL HARQ bursts per HARQ enabled MS per frame = 2	11.8.3.7.15
		Indicates whether the maximum number of UL HARQ bursts per frame = not included	
		Maximum number of DL HARQ bursts per HARQ enabled MS per frame = 2	

HARQ parameters	Items	Sub-items	References
HARQ set 2	The number of UL HARQ channel	Number of UL HARQ channels = 4	11.8.3.7.3
	The number of DL HARQ channel	Number of DL HARQ channels = 4	11.8.3.7.2
	HARQ Chase combining and CC-IR buffer capability	Downlink HARQ buffering capability for chase combining: K = 20	11.8.3.7.19.2
		Aggregation Flag for DL = 1 (ON)	
		Uplink HARQ buffering capability for chase combining: K = 20	
		Aggregation Flag for UL = 0 (OFF)	
	Maximum number of burst per frame capability in HARQ	Maximum number of UL HARQ bursts per HARQ enabled MS per frame = 2	11.8.3.7.15
		Indicates whether the maximum number of UL HARQ bursts per frame = not included	
		Maximum number of DL HARQ bursts per HARQ enabled MS per frame = 2	

HARQ parameters	Items	Sub-items	References

HARQ set 3	The number of UL HARQ channel	Number of UL HARQ channels = 8	11.8.3.7.3
	The number of DL HARQ channel	Number of DL HARQ channels = 16	11.8.3.7.2
	HARQ Chase combining and CC-IR buffer capability	Downlink HARQ buffering capability for chase combining: K = 16	11.8.3.7.19.2
		Aggregation Flag for DL = 1 (ON)	
		Uplink HARQ buffering capability for chase combining: K = 20	
		Aggregation Flag for UL = 1 (ON)	
	Maximum number of burst per frame capability in HARQ	Maximum number of UL HARQ bursts per HARQ enabled MS per frame = 2	11.8.3.7.15
		Indicates whether the maximum number of UL HARQ bursts per frame = not included	
		Maximum number of DL HARQ bursts per HARQ enabled MS per frame = 5	

HARQ parameters	Items	Sub-items	References
HARQ set 4	The number of UL HARQ channel	Number of UL HARQ channels = 8	11.8.3.7.3
	The number of DL HARQ channel	Number of DL HARQ channels = 16	11.8.3.7.2
	HARQ Chase combining and CC-IR buffer capability	Downlink HARQ buffering capability for chase combining: K = 20	11.8.3.7.19.2
		Aggregation Flag for DL = 1 (ON)	
		Uplink HARQ buffering capability for chase combining: K = 20	
		Aggregation Flag for UL = 1 (ON)	
	Maximum number of burst per frame capability in HARQ	Maximum number of UL HARQ bursts per HARQ enabled MS per frame = 2	11.8.3.7.15
		Indicates whether the maximum number of UL HARQ bursts per frame = not included	
		Maximum number of DL HARQ bursts per HARQ enabled MS per frame = 5	

HARQ parameters	Items	Sub-items	References

HARQ set 5	The number of UL HARQ channel	Number of UL HARQ channels = 8	11.8.3.7.3
	The number of DL HARQ channel	Number of DL HARQ channels = 16	11.8.3.7.2
	HARQ Chase combining and CC-IR buffer capability	Downlink HARQ buffering capability for chase combining: K = 22	11.8.3.7.19.2
		Aggregation Flag for DL = 1 (ON)	
		Uplink HARQ buffering capability for chase combining: K = 20	
		Aggregation Flag for UL = 1 (ON)	
	Maximum number of burst per frame capability in HARQ	Maximum number of UL HARQ bursts per HARQ enabled MS per frame = 2	11.8.3.7.15
		Indicates whether the maximum number of UL HARQ bursts per frame = not included	
		Maximum number of DL HARQ bursts per HARQ enabled MS per frame = 5	

The following tables define 'OFDMA MAC parameter set A and OFDMA MAC parameter set B, respectively.

Sets	Items	Sub-items	References
OFDMA MAC parameter set A	Capabilities for construction and transmission of MAC PDUs	Ability to receive requests piggybacked with data	11.8.2
		No ability to use 3-bit FSN values used when forming MAC PDUs on non-ARQ connections	
	PKM Version Support	PKM version 2	11.8.4.1
	Authorization policy support	EAP-based authorization at the initial network entry	11.8.4.2
		EAP-based authorization at re-entry	
	MAC (Message Authentication Code) Mode	CMAC	11.8.4.3
	PN window size	PN Window Size in PNs = 128	11.8.4.4
	Power save class types capability	Power save class type I supported.	11.8.5
	Extension capability	No support of extended subheader format	11.8.6
	HO Trigger metric support	BS CINR mean = Yes	11.8.7
		BS RSSI mean = Yes	
		Relative delay = No	
		BS RTD = No	
	Association type support	No support of association	11.8.8

Sets	Items	Sub-items	References

OFDMA MAC parameter set B	Capabilities for construction and transmission of MAC PDUs	Ability to receive requests piggybacked with data	11.8.2
		No ability to use 3-bit FSN values used when forming MAC PDUs on non-ARQ connections	
	PKM Version Support	PKM version 2	11.8.4.1
	Authorization policy support	EAP-based authorization at the initial network entry	11.8.4.2
		EAP-based authorization at re-entry	
	MAC (Message Authentication Code) Mode	CMAC	11.8.4.3
	PN window size	PN Window Size in PNs = 128	11.8.4.4
	Power save class types capability	Power save class type I supported.	11.8.5
	Extension capability	Support of extended subheader format	11.8.6
	HO Trigger metric support	BS CINR mean = Yes	11.8.7
		BS RSSI mean = Yes	
		Relative delay = No	
		BS RTD = Yes	
	Association type support	No support of association	11.8.8