Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**
Title	**Proposed Changes to WirelessMAN-SC PHY**
Date Submitted	**2003-10-31**

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Re:	TGd call for comments
Abstract	Proposed changes to WirelessMAN-SC PHY
Purpose	Harmonization with HiperACCESS
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Proposed Changes to WirelessMAN-SC PHY

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Goals:

The aim of this document is to propose modifications on the IEEE-PHY layer, 10-66 GHz. Main proposed changes are in the FEC and in the RF-Parameters. Note that the proposed FEC is also adopted in the IEEE-PHY layer below 10-11 GHz as well.

In summary, the changes are covering:

- Replacement of the IEEE-Type 1-3 FEC coding scheme by a concatenated Reed Solomon (with T=8) and inner convolutional code (memory 6, mother code rate _), where several PHY modes are specified (similar as PHY modes in Hiperaccess and IEEE below 11 GHz). The IEEE-existing Type 1 (RS only) is already covered by the concatenated coding scheme (case where the inner code rate is one). The Type 2 (RS*BCC) and Type 3 RS*PCC) shall be deleted. Type 4 (BTC) could stay.
- Modifications to the radio frequency parameters

This contribution has two parts:

- The first document, clause 8.2 of IEEE 802.16, describes the proposed changes to FEC and RF in depth as editing markups directly inserted in Chap. 8, and
- The present document which contains additional proposals for changes to other Chapters (e.g. 1, 10, 11, 12).

Proposed Changes:

8.2.4.1 FDD operation

Figure 144 should be aligned with Figure 46 or vice versa. Figure 144 prints better. Figure 46 should be replaced with a copy of Figure 144.

8.2.6.1 Uplink sub-frame

Initial maintenance in Figure 160 should be changed to initial ranging.

10.1 Global values

On page 556, line 37, change the minimum SS Ranging Response processing time to 10 ms.

Rationale: 1 ms is very short and requires again a complete processing of messages in HW and excludes processing in SW. 10 ms does not slow down the ranging process considerably.

11. TLV ENCODINGS

11.1.1.2 Uplink burst profile encodings

In Table 280 (UCD burst profile encodings-WirelessMAN-SC) the FEC parameters shall be in-lined with the changes in Chap. 8. Please replace from 3rd 6th rows (red-marked) by:

Table 280-UCD burst profile encodings-WirelessMAN-SC

Name	Type (1-Byte)	Length	Value (variable length)
Modulation type	1	1	1 = QPSK, 2=16-QAM, 3=64-QAM
..	..	..	..
FEC Code Type	5	1	1 = Concatenated Coding Scheme 2 = BTC 3-255= Reserved
RS information bytes (K)	6	1	6-239
RS parity bytes (R)	7	1	R =16 (error correction capability T=8)
Inner code rates	8	1	1 = reserved (valid only for DL). 2 = 2/3 (only for QPSK) 3 = 5/6 (only for 64-QAM) 4 = 7/8 (only for 16-QAM) 5 = 1, no inner coding (for all modulations) 6-255 = Reserved
BTC row code type	9	1	.....
...	...	...	...

11.1.2.2 Downlink burst profile encodings

In Table 285 (DCD burst profile encodings-WirelessMAN-SC) the FEC parameters shall be in-lined with the changes in Chap. 8.
Please replace from 2nd - 5th rows (red-marked) by:

Table 280-UCD burst profile encodings-WirelessMAN-SC

Name	Type (1-Byte)	Length	Value (variable length)

Modulation type	1	1	1 = QPSK 2 =16-QAM, 3 =64-QAM
FEC Code Type	2	1	1 = Concatenated Coding Scheme 2 = BTC 3-255= Reserved
RS information bytes (K)	3	1	6-239
RS parity bytes (R)	4	1	R =16 (error correction capability T=8)
Inner code rates	5	1	1 = 1/2 (only for QPSK and used only for downlink control portion). 2 = 2/3 (only for QPSK) 3 = 5/6 (only for 64-QAM) 4 = 7/8 (only for 16-QAM) 5 = 1, no inner coding (for all modulations) 6-255 = Reserved
BTC row code type	6	1	.....
...	...	...	...

11.4.2.2.2 10-66 GHz PHY SS downlink FEC types

In the Table the values shall be in-lined with the changes in Chap. 8. Please replace first row (red-marked) by:

Type	Type (1-Byte)	Value	Scope
5.12.5	1	Bit #0: Code Type 1 as Table 130 Bit #1: Code Type 2 as Table 130 Bit #2-7: *Reserved*, shall be set to 0.	SBC-REQ (see 6.4.2.3.23) SBC-RSP (see 6.4.2.3.24)

11.4.2.2.2 10-66 GHz PHY SS uplink FEC types

In the Table the values shall be in-lined with the changes in Chap. 8. Please replace first row (red-marked) by:

Type	Type (1-Byte)	Value	Scope
5.12.6	1	Bit #0: Code Type 1 as Table 130 Bit #1: Code Type 2 as Table 130 Bit #2-7: *Reserved* , shall be set to 0.	SBC-REQ (see 6.4.2.3.23) SBC-RSP (see 6.4.2.3.24)

11.4.2.2.3 10-66 GHz PHY SS downlink FEC types

In the Table the values shall be in-lined with the changes in Chap. 8. Please replace first row (red-marked) by:

Type	Type (1-Byte)	Value	Scope
5.12.5	1	Bit #0: Code Type 1 as Table 130 Bit #1: Code Type 2 as Table 130 Bit #2-7: *Reserved*, shall be set to 0.	SBC-REQ (see 6.4.2.3.23) SBC-RSP (see 6.4.2.3.24)

11.4.2.2.4 10-66 GHz PHY SS uplink FEC types

In the Table the values shall be in-lined with the changes in Chap. 8. Please replace first row (red-marked) by:

Type	Type (1-Byte)	Value	Scope
5.12.6	1	Bit #0: Code Type 1 as Table 130 Bit #1: Code Type 2 as Table 130 Bit #2-7: *Reserved* , shall be set to 0.	SBC-REQ (see 6.4.2.3.23) SBC-RSP (see 6.4.2.3.24)

12.1.2.1 WirelessMAN-SC 25 MHz Channel Profile

Please in-line the mandatory features with the changes in Chap. 8. Please replace the changes as follows (red-marked) by:

- Frame Duration of 1 ms
- QPSK and 16-QAM for the DL
- QPSK for the UL
- ....
- RS outer code with T = 8
- Inner code rate with r=1/2 (only for QPSK used only for downlink control portion),
- Inner code rate with r=2/3 (only for QPSK, uplink and downlink)
- Inner code rate with r=7/8 (only for 16-QAM, downlink)
- Inner code rate with r=1 (for UL and DL).
- RS-block length of 6-239.

In Table 313 please change the following rows (red-marked) by:

Table 313-SS Minimum Performance requirements for profP1

Capability	Minimum Performance
Tx Dynamic range	> = 40 dB
...	....
Tx RF frequency accuracy (after locking to the BS)	± 1 ppm
...	
Ramp up/down time	8 symbols
.....	....
BER Performance threshold for coded QPSK & RS, BER= 10^{-3}	-98 + 10log(25) dBm
BER Performance threshold for coded 16-QAM & RS, BER= 10^{-3}	-91 + 10log(25) dBm
BER Performance threshold for coded 64-QAM & RS, BER= 10^{-3}	-82 + 10log(25) dBm
BER Performance threshold for coded QPSK & RS, BER= 10^{-6}	-96 + 10log(25) dBm
BER Performance threshold for coded 16-QAM & RS, BER= 10^{-6}	-89 + 10log(25) dBm
BER Performance threshold for coded 64-QAM & RS, BER= 10^{-6}	-80 + 10log(25) dBm

In Table 314 please change the following rows (red-marked) by:

Table 314-BS Tx Minimum Performance requirements for profP1

Capability	Minimum Performance
...	....
Tx RF frequency accuracy	± 8 ppm
...	...

In Table 315 please change the following rows (red-marked) by:

Table 314-BS Rx Minimum Performance requirements for profP1

Capability	Minimum Performance
...	....
BER Performance threshold for coded QPSK & RS, BER= 10^{-3}	-98 + 10log(25) dBm
BER Performance threshold for coded 16-QAM & RS, BER= 10^{-3}	-91 + 10log(25) dBm
BER Performance threshold for coded 64-QAM & RS, BER= 10^{-3}	-82 + 10log(25) dBm
BER Performance threshold for coded QPSK & RS, BER= 10^{-6}	-96 + 10log(25) dBm
BER Performance threshold for coded 16-QAM & RS, BER= 10^{-6}	-89 + 10log(25) dBm
BER Performance threshold for coded 64-QAM & RS, BER= 10^{-6}	-80 + 10log(25) dBm
...	...

12.1.2.2 WirelessMAN-SC 28 MHz Channel Profile

Please in-line the mandatory features with the changes in Chap. 8. Please replace the changes as follows (red-marked) by:

- Frame Duration of 1 ms
- ....
- RS outer code with T = 8
- Inner code rate with r=1/2 (only for QPSK used only for downlink control portion),
- Inner code rate with r=2/3 (only for QPSK, uplink and downlink)
- Inner code rate with r=7/8 (only for 16-QAM, downlink)
- Inner code rate with r=1 (for UL and DL).
- ...
- RS-block length of 6-239.

In Table 316 please change the following rows (red-marked) by:

Table 316-SS Minimum Performance requirements for profP2

Capability	Minimum Performance
Tx Dynamic range	> = 40 dB
...	....
Tx burst timing size	up to ± 0.5 of a symbol
Tx burst timing accuracy	up to ± 0.25 of a symbol
..	
Tx RF frequency accuracy (after locking to the BS)	± 1 ppm

Ramp up/down time	8 symbols
.....	....
BER Performance threshold for coded QPSK & RS, BER= 10^{-3}	-98 + 10log(28) dBm
BER Performance threshold for coded 16-QAM & RS, BER= 10^{-3}	-91 + 10log(28) dBm
BER Performance threshold for coded 64-QAM & RS, BER= 10^{-3}	-82 + 10log(28) dBm
BER Performance threshold for coded QPSK & RS, BER= 10^{-6}	-96 + 10log(28) dBm
BER Performance threshold for coded 16-QAM & RS, BER= 10^{-6}	-89 + 10log(28) dBm
BER Performance threshold for coded 64-QAM & RS, BER= 10^{-6}	-80 + 10log(28) dBm

In Table 317 please change the following rows (red-marked) by:

Table 317-BS Tx Minimum Performance requirements for profP2

Capability	Minimum Performance
...	....
Tx RF frequency accuracy	± 8 ppm
...	...
Ramp up/down time	8 symbols

In Table 318 please change the following rows (red-marked) by:

Table 318-BS Rx Minimum Performance requirements for profP2

Capability	Minimum Performance
...	....
BER Performance threshold for coded QPSK & RS, BER= 10^{-3}	-98 + 10log(28) dBm
BER Performance threshold for coded 16-QAM & RS, BER= 10^{-3}	-91 + 10log(28) dBm
BER Performance threshold for coded 64-QAM & RS, BER= 10^{-3}	-82 + 10log(28) dBm

BER Performance threshold for coded QPSK & RS, BER= 10^{-6}	-96 + 10log(28) dBm
BER Performance threshold for coded 16-QAM & RS, BER= 10^{-6}	-89 + 10log(28) dBm
BER Performance threshold for coded 64-QAM & RS, BER= 10^{-6}	-80 + 10log(28) dBm
...	...