The Incremental Redundancy H-ARQ for Convolutional Coding

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Jun Wu,Wenzhong Zhang,Wenfeng Zhang
Yonggang Fang,Keqiang Zhu,Mary,Chion,
Irving Wang

Voice: 858-554-0387

ZTE San Diego Inc
10105 Pacific Heights Blvd
San Diego, CA 92121, USA

Fax: 858-554-0894
E-mail: jwu@ztesandiego.com

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Assist in clarifying C802.16e-04_246r1.pdf contribution document.

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The ideas behind our proposal

- **The conventional Chase Combing (CC) always retransmits the same FEC block, for high rate code, the punctured bit will never have a chance to be transmitted.**
- **Here we proposed a Incremental Redundancy (IR) method which take the puncture pattern into account, and try to balance the bit to be transmitted.**

The Simulation

- **The IR H-ARQ scheme is evaluated over both AWGN and uncorrelated Rayleigh fading channel. The modulation is QPSK. The channel coding scheme is _ punctured convolutional code based on _ mother code.**
- **The original puncture pattern is [1,0,1;1,1,0] as Table 317 in 802.16 D5;**
- **The puncture pattern for the n-th retransmission is generated by cyclically shifting n columns based on the original puncture pattern in the current standard.**
- **So the puncture patterns for the 1st, 2nd, and 3rd retransmission are [1,1,0;0,1,1], [0,1,1;1,0,1] and [1,0,1;1,1,0], respectively.**

The bit and block error rate for block size 512 bytes

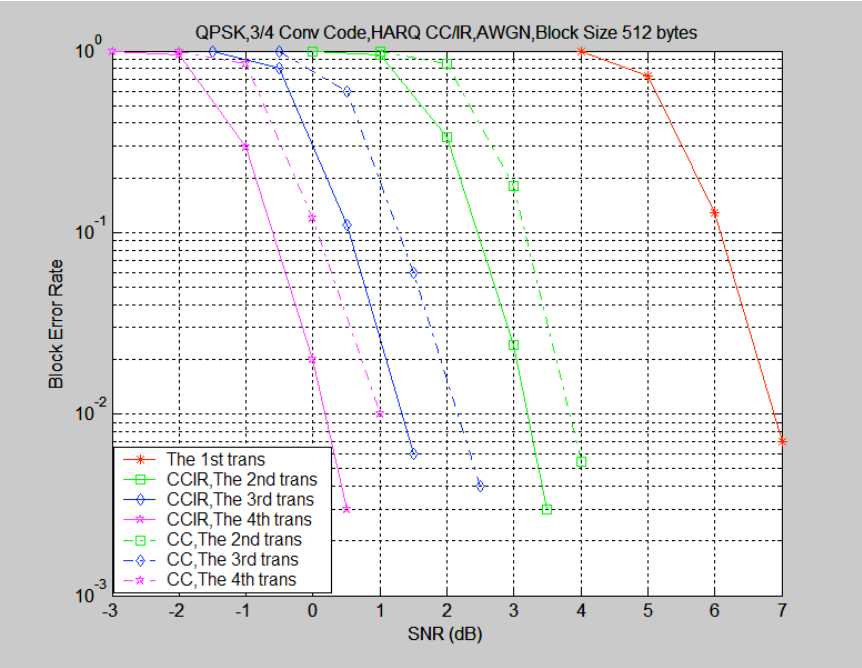

Fig.1 The block error rate of IR and CC H-ARQ scheme over AWGN, block 512 bytes

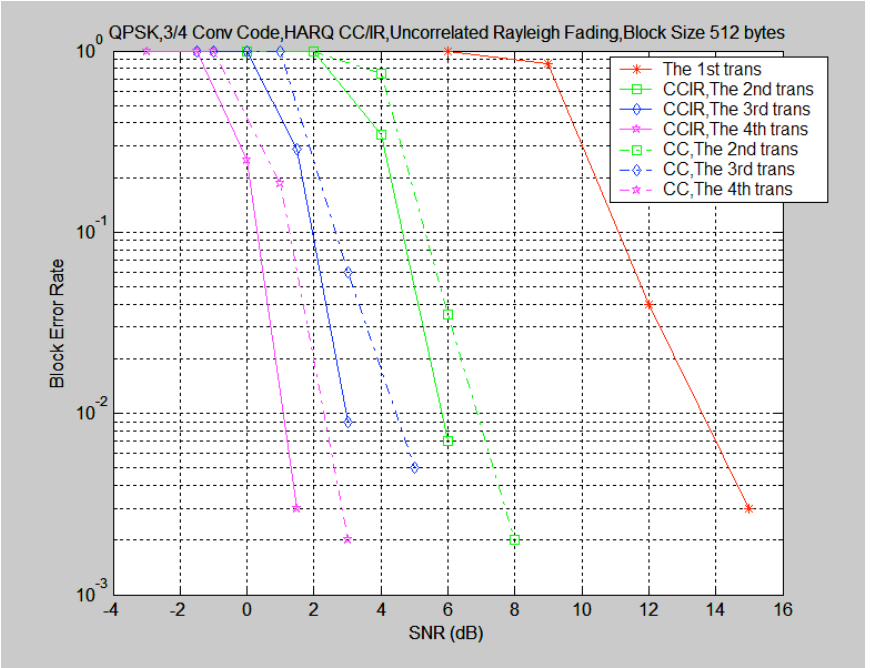

Fig.2 The block error rate of IR and CC H-ARQ scheme over uncorrelated Rayleigh fading, block 512 bytes

The bit and block error rate for block size 64 bytes

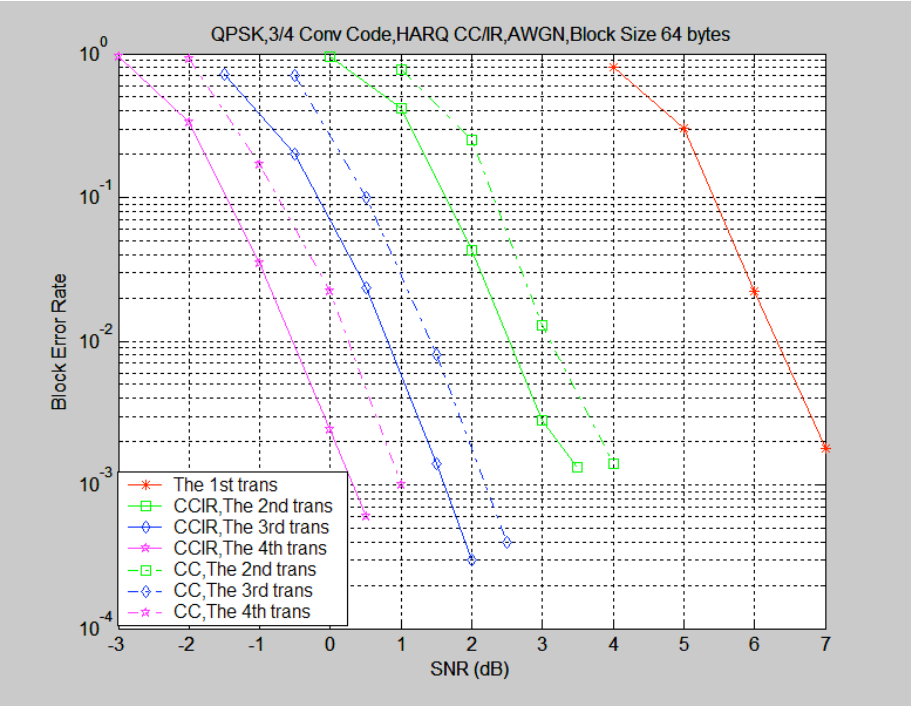

Fig.3 The block error rate of IR and CC H-ARQ scheme over AWGN, block 64 bytes

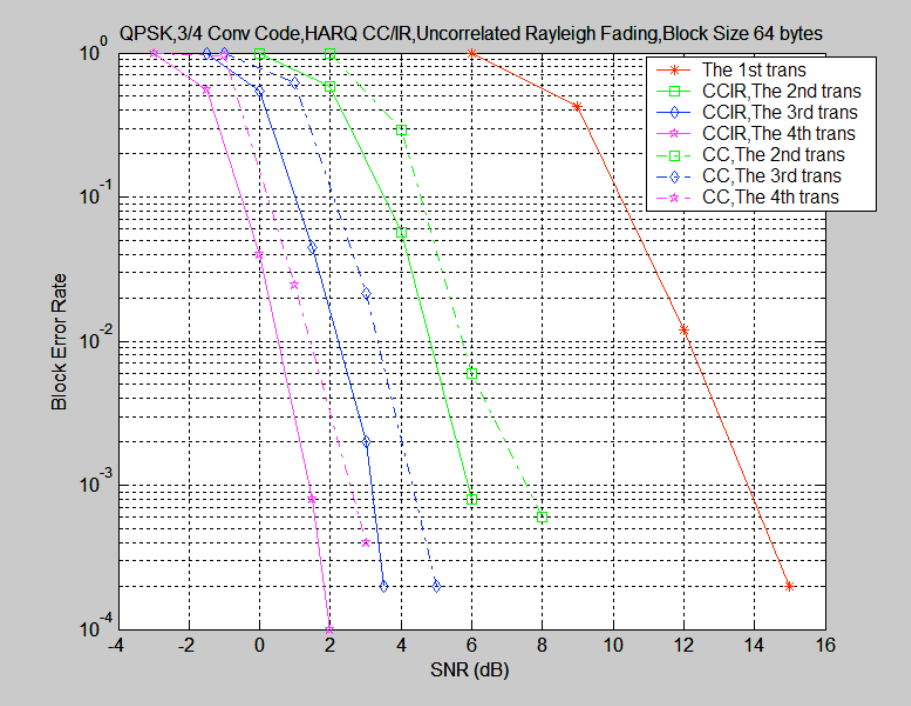

Fig.4 The block error rate of IR and CC H-ARQ scheme over uncorrelated Rayleigh fading, block 64 bytes

Proposed Text

- A change in the H-ARQ mode is signaled using the “H-ARQ Compact_DL-MAP IE format for Switch H-ARQ Mode” (see section 6.3.2.3.43.6.7). The definitions of the H-ARQ modes are defined in Table AAA.

H-ARQ Mode	Description
0	CTC Incremental Redundancy
1	CC Incremental Redundancy
2…5	Reverse

- Add the following text :

  6.3.17.1 Subpacket generation

  H-ARQ operates at the FEC block level. When Convolutional Coding Incremental Redundancy is defined, the FEC encoder generates subpackets based on the cyclically shifted version of the original puncture pattern. The subpackets are combined by the receiver FEC decoder as part of the decoding process.