

Start of Data Delimiter with Hamming distance = 32

Frank Effenberger
Raymond W.K. Leung
Dongning Feng
Dongyu Geng

Huawei Technologies Co. Ltd

The upstream SOD Delimiter

- The SOD delimiter for upstream synchronization was addressed in 3av_0701_effenberg_1.pdf (pages 18-20) and was well discussed in the email reflector.
- One 66-bit SOD delimiter with minimum Hamming distance $\text{minHD} = 31$, (0x 0 54 AE F9 DA 78 3D C2 46), was presented in 3av_0701_effenberg_1.pdf.

SOD delimiters with minHD = 32

After an extensive search, 5 SOD delimiters with HD = 32 are found.

Delimiter 1:

- 0x 1 16 A2 DC 69 F0 CD EE 40
- 01 00010110 10100010 11011100 01101001 11110000 11001101 11101110
01000000
- $d_o = 33$; $d_e = 33$; $\{A_{32}=22, A_{33}=23, A_{34}=10, A_{35}=7, A_{37}=2, A_{39}=1\}$;
- Maximum run length = 6; DC balance = 32/34 (1/0).

Delimiter 2:

- 0x 0 41 BD B2 B3 D5 A7 C8 F0
- 00 01000001 10111101 10110010 10110011 11010101 10100111 11001000
11110000
- $d_o = 33$; $d_e = 33$; $\{A_{32}=27, A_{33}=23, A_{34}=5, A_{35}=3, A_{36}=3, A_{37}=1, A_{38}=1, A_{39}=1, A_{40}=1\}$;
- Maximum run length = 5; DC balance = 34/32 (1/0).

Delimiter 3:

- 0x 1 7F A0 96 0E 14 A7 33 66
- 01 01111111 10100000 10010110 00001110 00010100 10100111 00110011
01100110
- $d_o = 33$; $d_e = 33$; $\{A_{32}=24, A_{33}=21, A_{34}=9, A_{35}=4, A_{36}=5, A_{37}=2\}$;
- Maximum run length = 8; DC balance = 32/34 (1/0).

Burst delimiters with minimum Hamming distance (HD) = 32

Delimiter 4:

- 0x 1 5A E3 94 B6 66 C7 E0 03
- 01 01011010 11100011 10010100 10110110 01100110 11000111 11100000
00000011
- do =33; de = 33; {A32=23, A33=23, A34=10, A35=3, A36=4, A38=1, A39=1};
- Maximum run length = 11; DC balance = 32/34 (1/0).

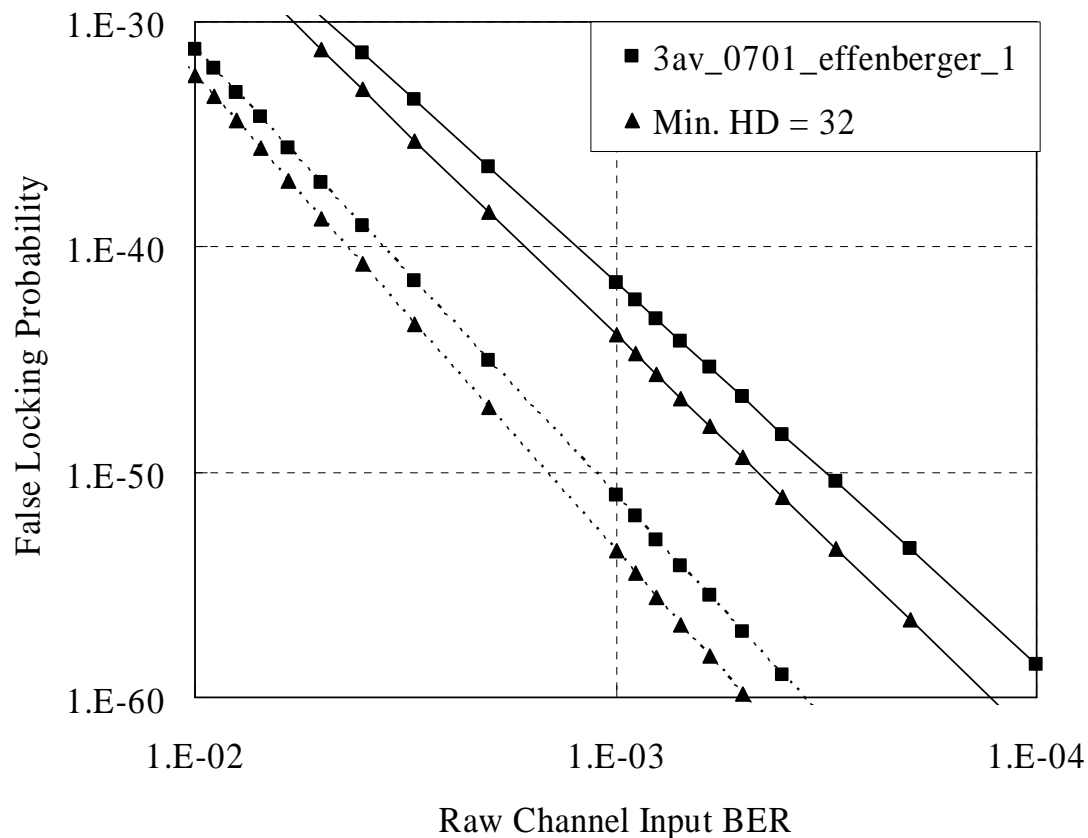
Delimiter 5:

- 0x 1 70 3A 08 6D ED 4E 99 66
- 01 01110000 00111010 00001000 01101101 11101101 01001110 10011001
01100110
- do =33; de = 33; {A32=27, A33=17, A34=11, A35=4, A36=2, A37=3, A39=1};
- Maximum run length = 6; DC balance = 32/34 (1/0).

Locking probabilities of the new SOD delimiters

The 5 new proposed delimiters and the old delimiter have roughly the same true locking probability.

However, all the 5 new proposed delimiters have lower false locking probability than the old delimiter for different threshold T due to the larger minimum Hamming distance.



Solid (Dashed, reps.) lines represent the threshold $T=15$ ($T=12$, reps.).

Thank You!