组会报告

徐益

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1 工作内容

1. 完善原 5GNR 单线程测试程序；
2. 设计基于子载波分割的系统结果。
3. 实现基于子载波分割的单线程系统。

2 完善原 5GNR 单线程测试程序

```
# test_tb_sgl_thrd

vesion 1.2

Build and Execution Instructions
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### Build:
> make

### Execution:
> ./main [-f filename]

### Clean:
> make clean

Change Log for Releases
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## version 1.2
    * 支持文件读取配置信息
    * 选择mkl的随机数生产函数
    * 使用fread代替原先的channel信息读取函数

## version 1.1
    * 修复了基于Base Graph 2的编码器异常问题
    * 选择更灵活的导频初始化方案
    * 实现有效子载波数的变化

## version 1.0
    * 实现了基于AVX2的5G LDPC编码器
```

```
31      * 实现了基于AVX2的High-Throughput OMS及NMS译码器
32      * 实现了基于AVX2的Low-Latency OMS及NMS译码器
33      * 搭建了AWGN信道的5G LDPC编译码性能测试平台
```

3 基于子载波分割的系统结果

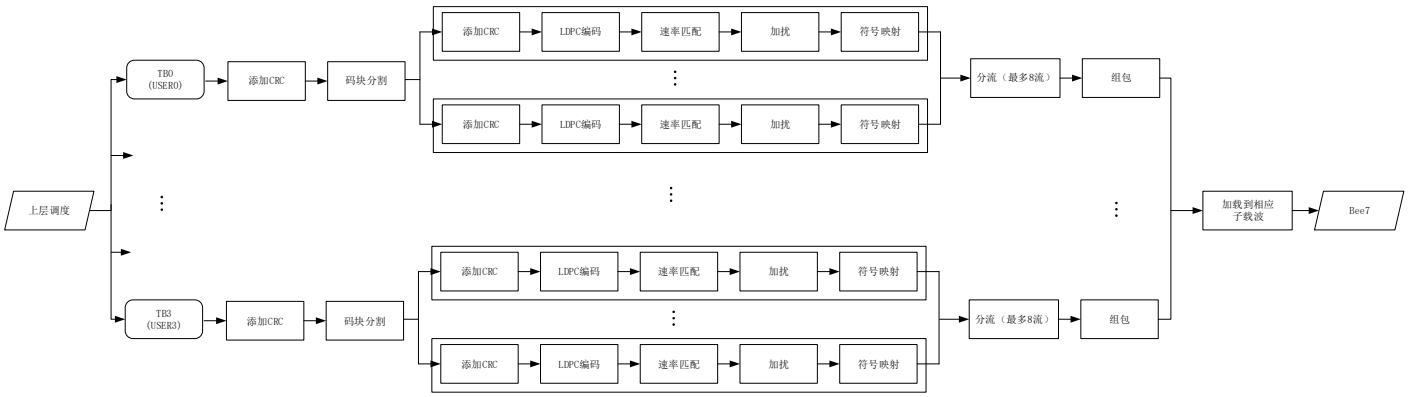


图 1: Tx 端系统结构

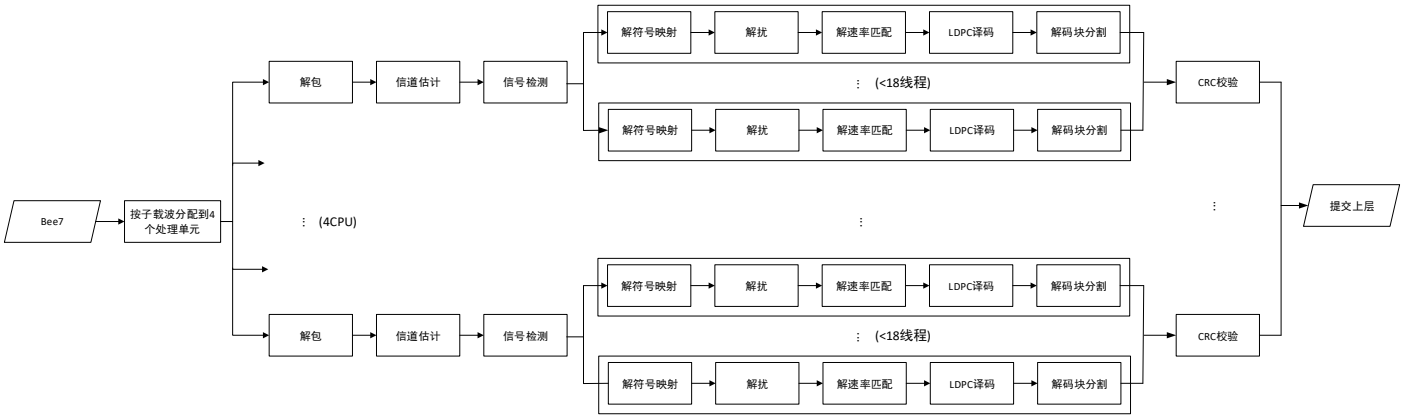


图 2: Rx 端系统结构

4 测试结果

```
1  ==================== Test No. 1 ====================
2  SNR:       30.00
3  Subframe: 1000
4  ---------------------- USER 0 ----------------------
5  CQI:    28(Q = 6, R = 948)
6  Stream: 1
7  -------------------- Throughput --------------------
8  tx_time:          0.2110s
9  rx_time:          0.5880s
10 tx_throughput:  86.7473Mbps
11 rx_throughput:  31.1282Mbps
```

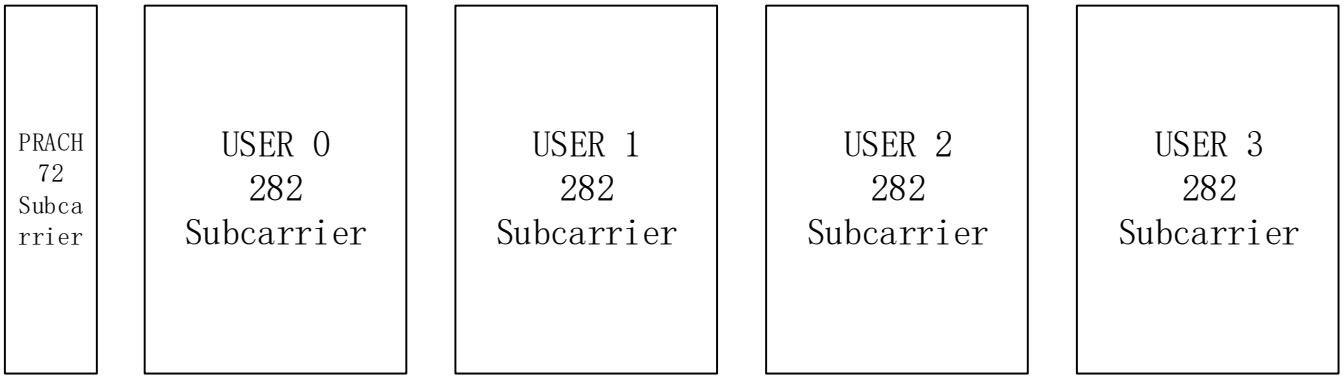
```
-------------------- Error Rate --------------------
BER:    0.00e+00(0/18304000)
FER:    0.00e+00(0/1000)
----------------------------------------------------
---------------------- USER 1 ----------------------
CQI:    27(Q = 6, R = 910)
Stream: 1
-------------------- Throughput --------------------
tx_time:         0.2019s
rx_time:         0.5822s
tx_throughput:  87.0252Mbps
rx_throughput:  30.1751Mbps
-------------------- Error Rate --------------------
BER:    0.00e+00(0/17568000)
FER:    0.00e+00(0/1000)
----------------------------------------------------
---------------------- USER 2 ----------------------
CQI:    26(Q = 6, R = 873)
Stream: 1
-------------------- Throughput --------------------
tx_time:         0.1999s
rx_time:         0.5902s
tx_throughput:  84.3236Mbps
rx_throughput:  28.5615Mbps
-------------------- Error Rate --------------------
BER:    0.00e+00(0/16856000)
FER:    0.00e+00(0/1000)
----------------------------------------------------
---------------------- USER 3 ----------------------
CQI:    25(Q = 6, R = 822)
Stream: 1
-------------------- Throughput --------------------
tx_time:         0.2020s
rx_time:         0.6006s
tx_throughput:  78.5387Mbps
rx_throughput:  26.4139Mbps
-------------------- Error Rate --------------------
BER:    0.00e+00(0/15864000)
FER:    0.00e+00(0/1000)
----------------------------------------------------
====================================================

==================== Test No. 2 ====================
SNR:      30.00
Subframe: 1000
---------------------- USER 0 ----------------------
CQI:    28(Q = 6, R = 948)
Stream: 8
```

```
-------------------- Throughput --------------------
tx_time:         1.1928s
rx_time:         6.1965s
tx_throughput: 122.9147Mbps
rx_throughput:  23.6609Mbps
-------------------- Error Rate --------------------
BER:    8.38e-02(12284381/146616000)
FER:    1.00e+00(1000/1000)
--------------------------------------------------
---------------------- USER 1 ----------------------
CQI:    27(Q = 6, R = 910)
Stream: 7
-------------------- Throughput --------------------
tx_time:         0.9922s
rx_time:         5.2682s
tx_throughput: 124.1132Mbps
rx_throughput:  23.3748Mbps
-------------------- Error Rate --------------------
BER:    0.00e+00(0/123144000)
FER:    0.00e+00(0/1000)
--------------------------------------------------
---------------------- USER 2 ----------------------
CQI:    26(Q = 6, R = 873)
Stream: 6
-------------------- Throughput --------------------
tx_time:         0.8729s
rx_time:         4.5764s
tx_throughput: 115.9995Mbps
rx_throughput:  22.1259Mbps
-------------------- Error Rate --------------------
BER:    0.00e+00(0/101256000)
FER:    0.00e+00(0/1000)
--------------------------------------------------
---------------------- USER 3 ----------------------
CQI:    25(Q = 6, R = 822)
Stream: 5
-------------------- Throughput --------------------
tx_time:         0.7178s
rx_time:         3.8162s
tx_throughput: 110.6650Mbps
rx_throughput:  20.8166Mbps
-------------------- Error Rate --------------------
BER:    0.00e+00(0/79440000)
FER:    0.00e+00(0/1000)
--------------------------------------------------
==================================================
```

5 有 PRACH 情况下的资源分配问题

方法一：



方法二：

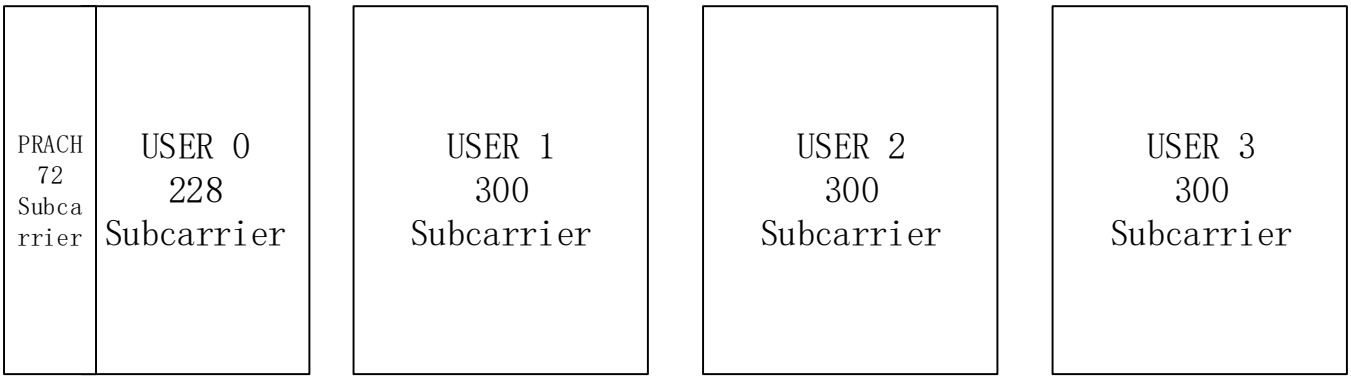


图 3: 两种方案