Baseline Proposal for Upstream Wideband Probing
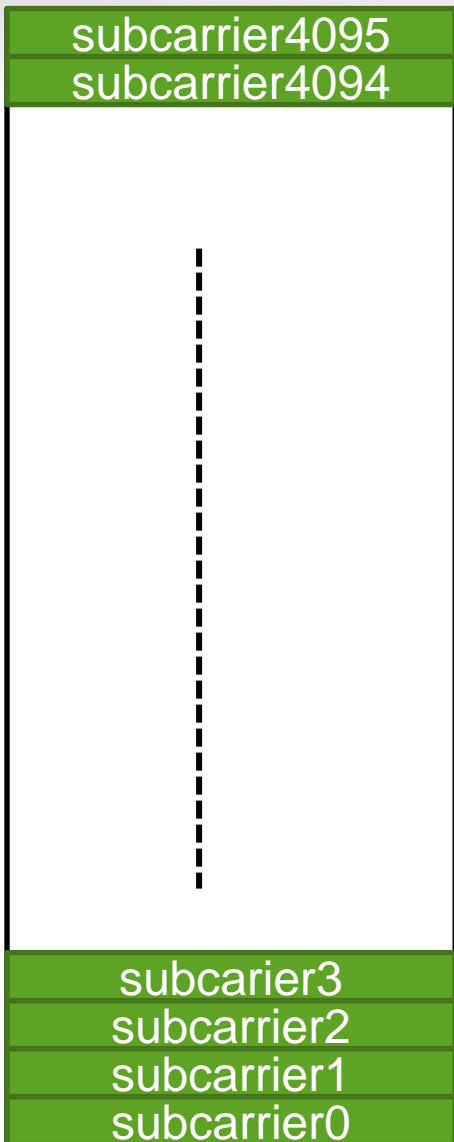
Syed Rahman

Introduction

- In upstream wideband probing a CNU transmits pilots spanning all active subcarriers. The OFDM symbol which is used for probing shall be defined as a *probing symbol*.

- The CLT uses the received *probing symbol* for:

  - *Upstream channel estimation*. The CLT computes the coefficients of the upstream pre-equalizer for each CNU and sends them back to that CNU.

  - *Upstream SNR measurement*. The CLT measures the SNR per sub-carrier and computes the upstream bit loading tables.
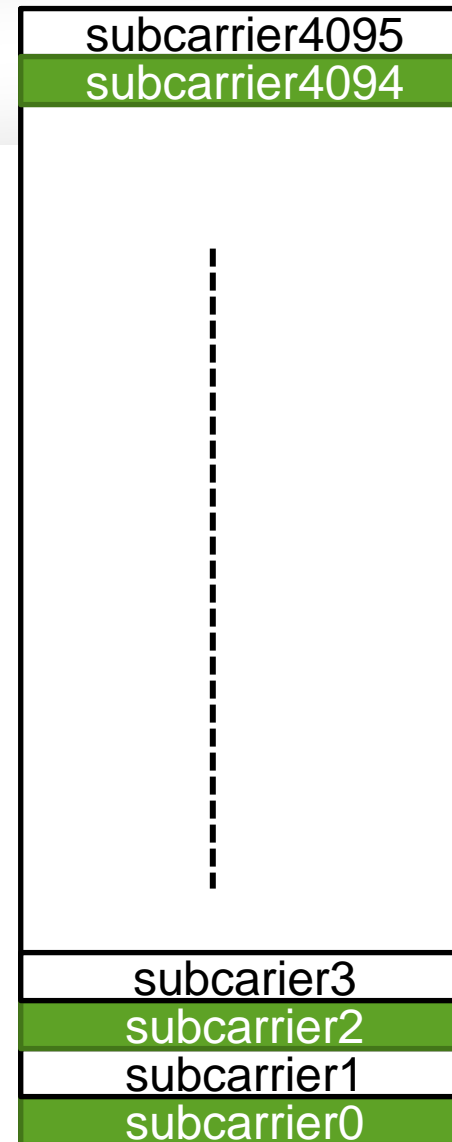
Probing Symbol

- Probing symbol pilots are BPSK symbols.

- Probing symbol pilot i is always associated with the i-th subcarrier of the symbol , where: i = 0, 1, ... , 4095 for 4K FFT

- Subcarriers are numbered in ascending order of frequency starting from 0

Subcarrier assignment

- The CLT allocates subcarriers within a probing symbol by sending two parameters to the CNU: "start subcarrier", and "subcarrier skipping".

- The range of "start subcarrier" is from 0 to 7. The range of "subcarrier skipping" is from 0 to 7.

- The "start subcarrier" parameter is the starting subcarrier number.

- The "subcarrier skipping" parameter is the number of subcarriers to be skipped between successive pilots.

- "Subcarrier skipping" = 0 implies no skipping of subcarriers (i.e., all subcarriers are used for probing).

- A CNU shall not transmit the probing sequence in any of the excluded subcarriers.
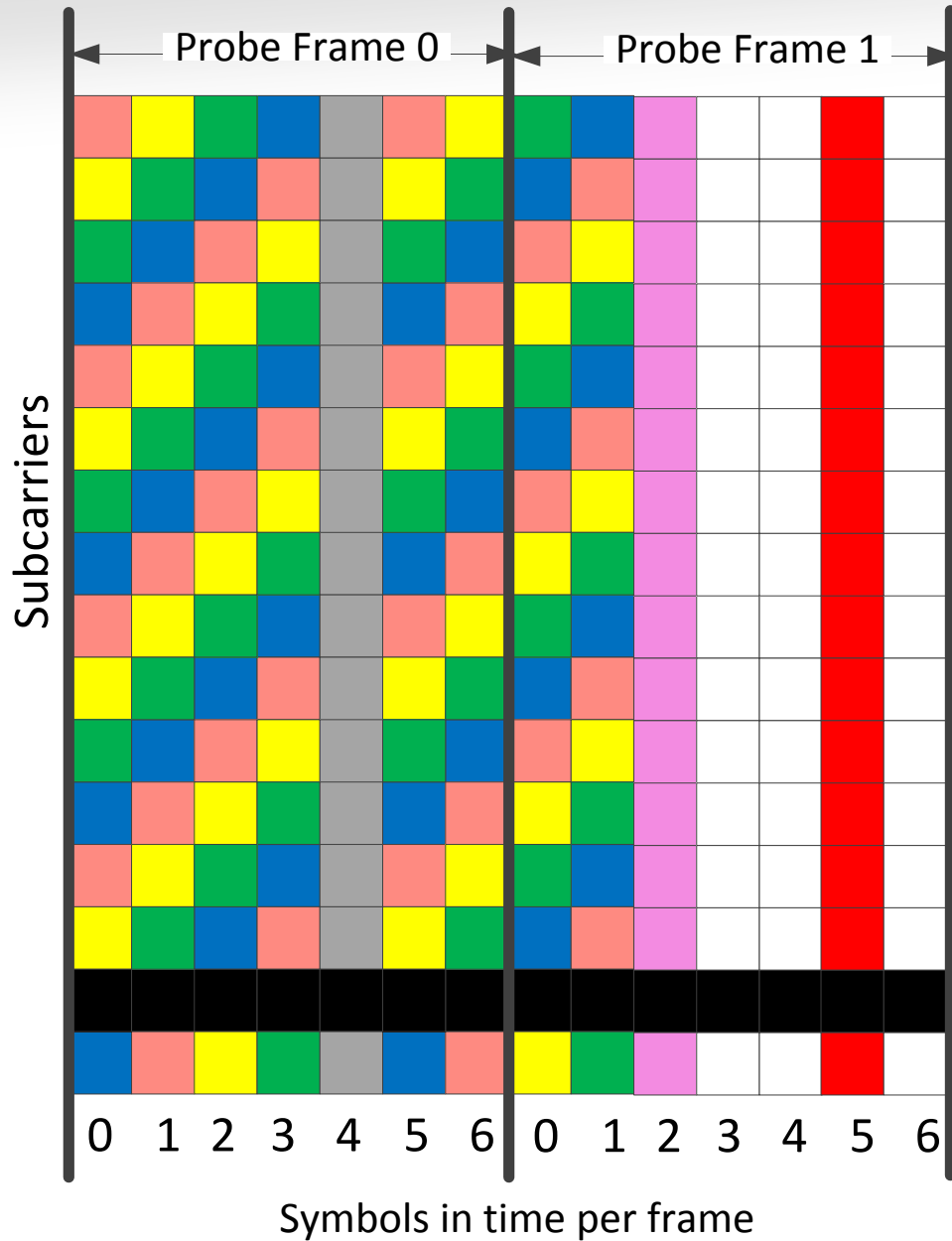
Start sub carrier = 0
Subcarrier skipping=0

Start sub carrier = 0
Subcarrier skipping=1

Staggering

- The probing can use a staggering scheme in which a group of CNUs share a probing frame in accordance to a specific staggering pattern.

- The CNU shall support staggering pattern for probing, when the staggering bit "st" is set to one. When "st" is set to zero, the staggering is off.

- The starting subcarrier of a CNU, in each successive OFDM symbol within the pattern, advances by one.

- Total number of OFDM symbols in each staggering pattern is given by *subcarrier skipping +1*

CM	Stagger	Probe Frame	Symbol In Frame	Start Subcarrier	Subcarrier Skipping
Blue	1	0	0	0	3
Green	1	0	0	1	3
Yellow	1	0	0	2	3
Salmon	1	0	0	3	3
Med gray	0	0	4	0	0
Blue	1	0	5	0	3
Green	1	0	5	1	3
Yellow	1	0	5	2	3
Salmon	1	0	5	3	3
Purple	0	1	2	0	0
Red	0	1	5	0	0

Black Row is the excluded sub-carrier

Figure:3 Example of Staggering

Motion:

Move to adopt rahman_syed_3bn_02_1113.pdf as the base line proposal for the upstream wideband probing.

Yes:

No:

Abstain:

Thank you

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