Frame structure for IEEE 802.16

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Introduction

- New standard 802.16m is being developed for next generation w
  communication
    - Enhanced spectrum efficiency
    - Higher speed
- Backward compatibility
    - 802.16m shall be backward compatible with legacy system 802.16e
    - Systems based on IEEE 802.16m and 802.16e systems shall be ab
      operate on the same RF carrier, with the same channel bandwidth;
      should be able to operate on the same RF carrier with different char
      bandwidths.
- It is necessary to devise the frame structure of 802.16m frame
  supporting backward compatibility

Proposed structure A

■ Frequency planning
 - Occupy the same band class as 802.16e
  - A 802.16m channel uses multiple (L) contiguous 802.16e channels
  - L BS's share the same 802.16m zone with L*B bandwidth (802.16e BW with B)

■ Backward compatibility
  - 16e preamble/FCH/MAP are kept unchanged
  - Only new DL (UL) 16m zones are appended (resource allocation is done by BS cooperation)

■ BS cooperation
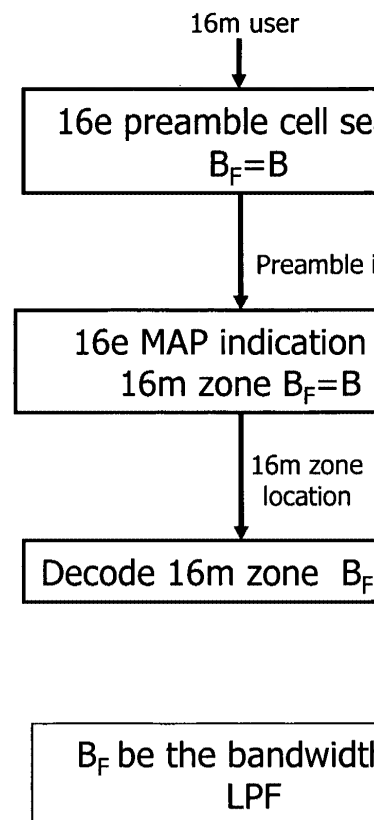 - 16e BS's transmit 16e data using subcarreirs with BW B of their own, while share subcarriers with BW B*L in 16m zone.

Example o

B f_1 | P1 | FCH | MAP | 16

B f_2 | P2 | FCH | MAP | 16

B f_3 | P3 | FCH | MAP | 16
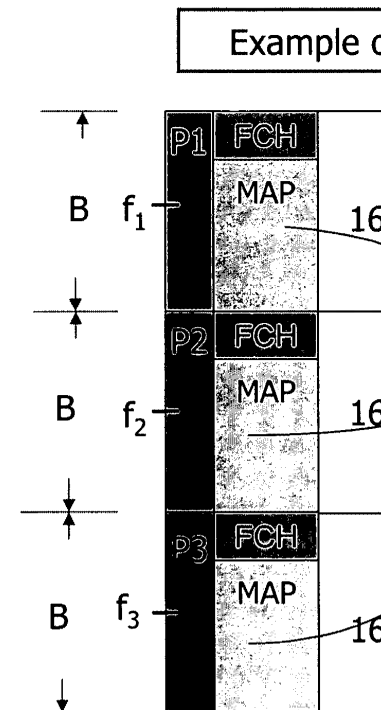
# Proposed structure A

- ## Cell search by 16m user
    - Baseband BW of L*B
    - Detect 16e preamble with BW of B
    - Decode FCH/MAP to decide the location of 16m zone
    - Retrieve 16m zone with BS with BW of L*B

16m user

| 16e preamble cell se... |
| $B_F=B$ |

Preamble i...

| 16e MAP indication |
| 16m zone $B_F=B$ |

16m zone location

| Decode 16m zone B_F |

| B_F be the bandwidth... |
| LPF |

Proposed structure A

⊞ 16e preamble cell search by 16m user
- ⦾ RF synthesizer sweeps bands with band size of L*B
- ⦾ For each band, decide target preamble in each of 16e subband
  - ▸ Partition the band into several 16e subbands
  - ▸ Transform each of the subband signal to baseband using freq. offset manipulation
  - ▸ Filter the low-pass signal with BW B
  - ▸ Detect the preamble signal in BW B
  - ▸ Select the preamble with maximal detected power as desired preamble
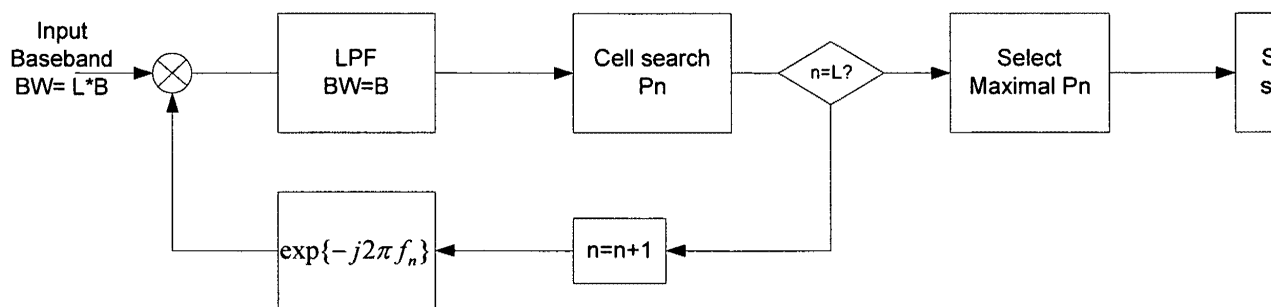
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