

PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR 1.53(c).

06909
071207
U.S. PTO

Docket Number 06720.6055		Type a plus sign (+) inside this box =		+
INVENTOR(s)/APPLICANT(s)				
LAST NAME	FIRST NAME	MIDDLE INITIAL	RESIDENCE (CITY AND EITHER STATE OR FOREIGN COUNTRY)	
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TITLE OF INVENTION (500 characters max)				
FRAME STRUCTURE FOR IEEE 802.16m				
CORRESPONDENCE ADDRESS				
FINNEGAN, HENDERSON, FARABOW, GARRETT & DUNNER, L.L.P., Customer Number 22,852				
ENCLOSED APPLICATION PARTS (check all that apply)				
☒ Specification: 9 Pages ☐ Drawing(s): Sheets/ Figures				
☐ Other: Pages;				
METHOD OF PAYMENT				
☒ A check or money order is enclosed to cover the Provisional Application filing fees		PROVISIONAL FILING FEE \$200.00		
☒ The Commissioner is hereby authorized to charge any deficiency or credit any overpayment in fees to Deposit Account Number 06-0916.		Total Number of Pages of specification, drawings, sequence or computer listing, or other papers 9. If more than 100 pages, add \$250 for each additional 50 pages or fraction thereof.		
		\$ (Size Fee)		
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		TOTAL FILING FEE \$200.00		

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.

☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted on behalf of the patent practitioners associated with Customer Number 22,852,

SIGNATURE

Date July 12, 2007

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☐ Additional inventors are being named on separately numbered sheets attached hereto.

PROVISIONAL APPLICATION FILING ONLY

1. Frame structure for IEEE 802.16m

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2007/07/11

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Introduction

- † New standard 802.16m is being developed for next generation wireless 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 able to operate on the same RF carrier, with the same channel bandwidth; and should be able to operate on the same RF carrier with different channel bandwidths.
- † It is necessary to devise the frame structure of 802.16m frame supporting backward compatibility



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Proposed structure A

Frequency planning

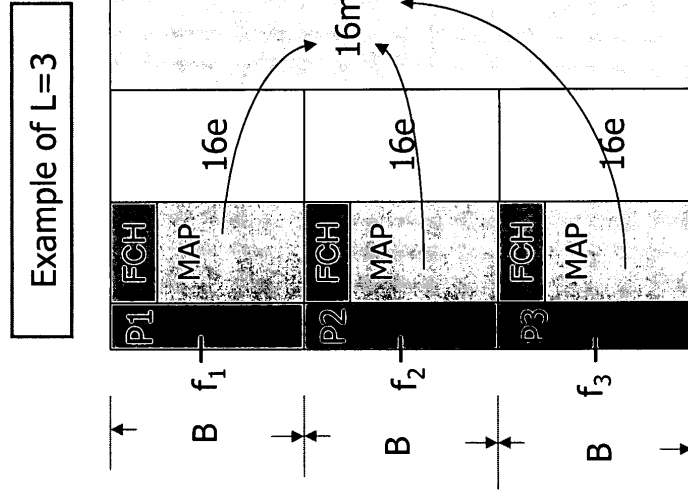
- Occupy the same band class as 802.16e
- A 802.16m channel uses multiple (L) contiguous 802.16e channels
- L BS's share the same 802.16m zone with L*B bandwidth (802.16e BW with B)

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

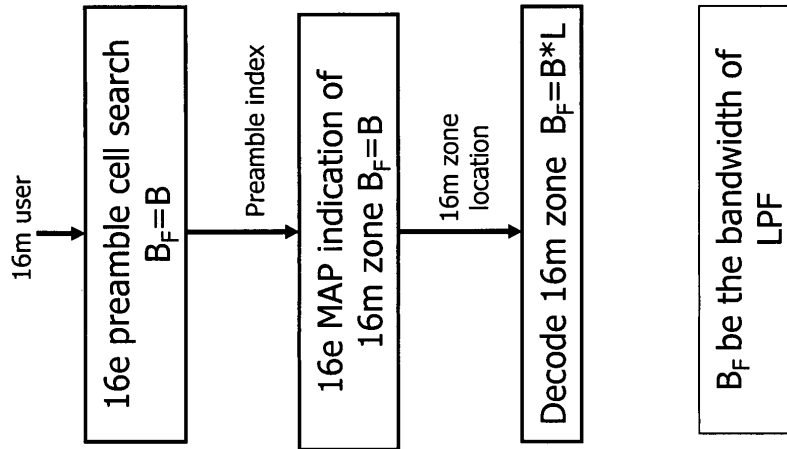
- 16e BS's transmit 16e data using subcarriers with BW B of their own, while share subcarriers with BW B*L in 16m zone.



Proposed structure A

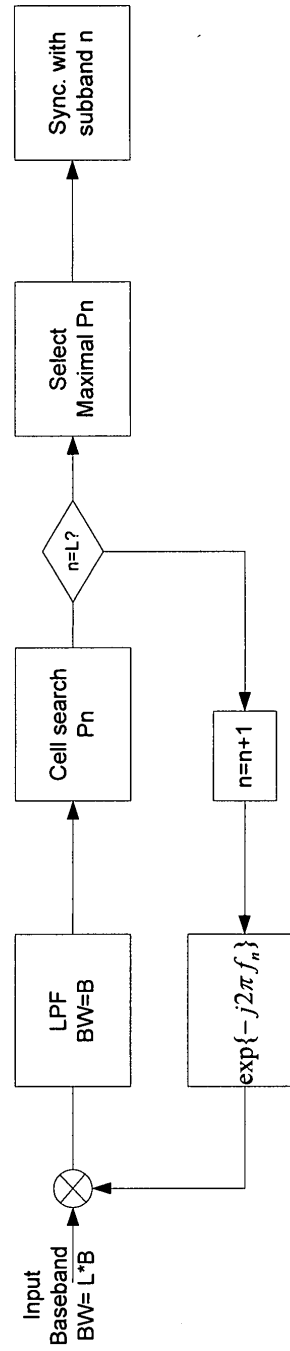
Cell search by 16m user

- Baseband BW of $L \cdot B$
- 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 $L \cdot B$



Proposed structure A

- # 16e preamble cell search by 16m user
 - RF synthesizer sweeps bands with band size of $L \cdot B$
 - 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
 - ▶ Filter the low-pass signal with $BW \cdot B$
 - ▶ Detect the preamble signal in $BW \cdot B$
 - ▶ Select the preamble with maximal detected power as desired preamble



Frame structure B

Frequency planning

- Use the same band class as 16e

Backward compatibility

- 16e preamble/FCH/MAP are kept unchanged
- Adjust the duty cycle so that 16e subframes are shorten in a frame with the other unused portion left for 16m service
- 16m data can be informed by 16e MAP. In case 16e signal can not provide information of 16m service, 16m preamble is optionally given to 16m user for cell search

BS cooperation

- 16e/16m BS's share the same BW with TDMA-like approach
- 16e zone can vanish if 16m preamble is given

16m service detection

- Detection of 16e preamble/FCH/MAP, or
- Detection of 16m preamble/FCH/MAP



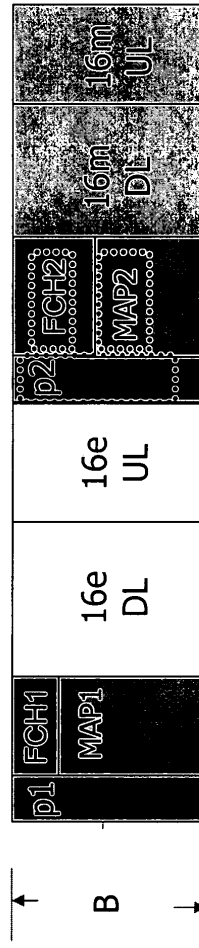
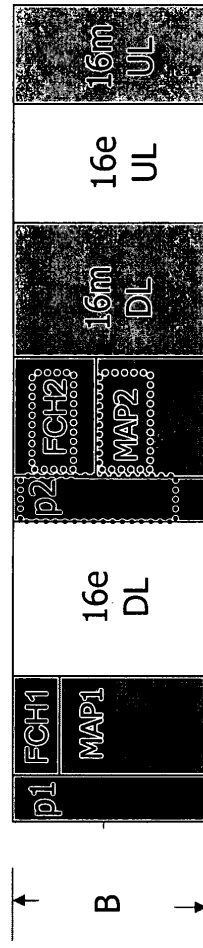
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Frame structure B

Example of a multi-standard frame



option p1: 16e preamble p2: 16m preamble

Summary

Structure A

- An OFDMA system with multiple zones
- A specific resource (BW) sharing scheme
 - ▶ Multiple BS share channel with BW B*L
 - ▶ Independent allocation zone vs. cooperative allocation zone
- A specific cell search scheme
 - ▶ 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



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Summary

Structure B

- An OFDMA system with multiple DL (UL) subframes from multiple standards
- Multiple DL (UL) subframes are transmitted by different BS's
- Adjust duty cycles for legacy and new systems in non-overlapping time subframe to optimize the bandwidth utilization and performance
- When only 16m and 16e are present in the frame, at least one of 16e preamble and 16m midamble is given in each frame



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**U.S. DEPARTMENT OF COMMERCE
PATENT AND TRADEMARK OFFICE
FEE RECORD SHEET**

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