Update on IEEE 802 Activities relevant to 3650-3700 MHz

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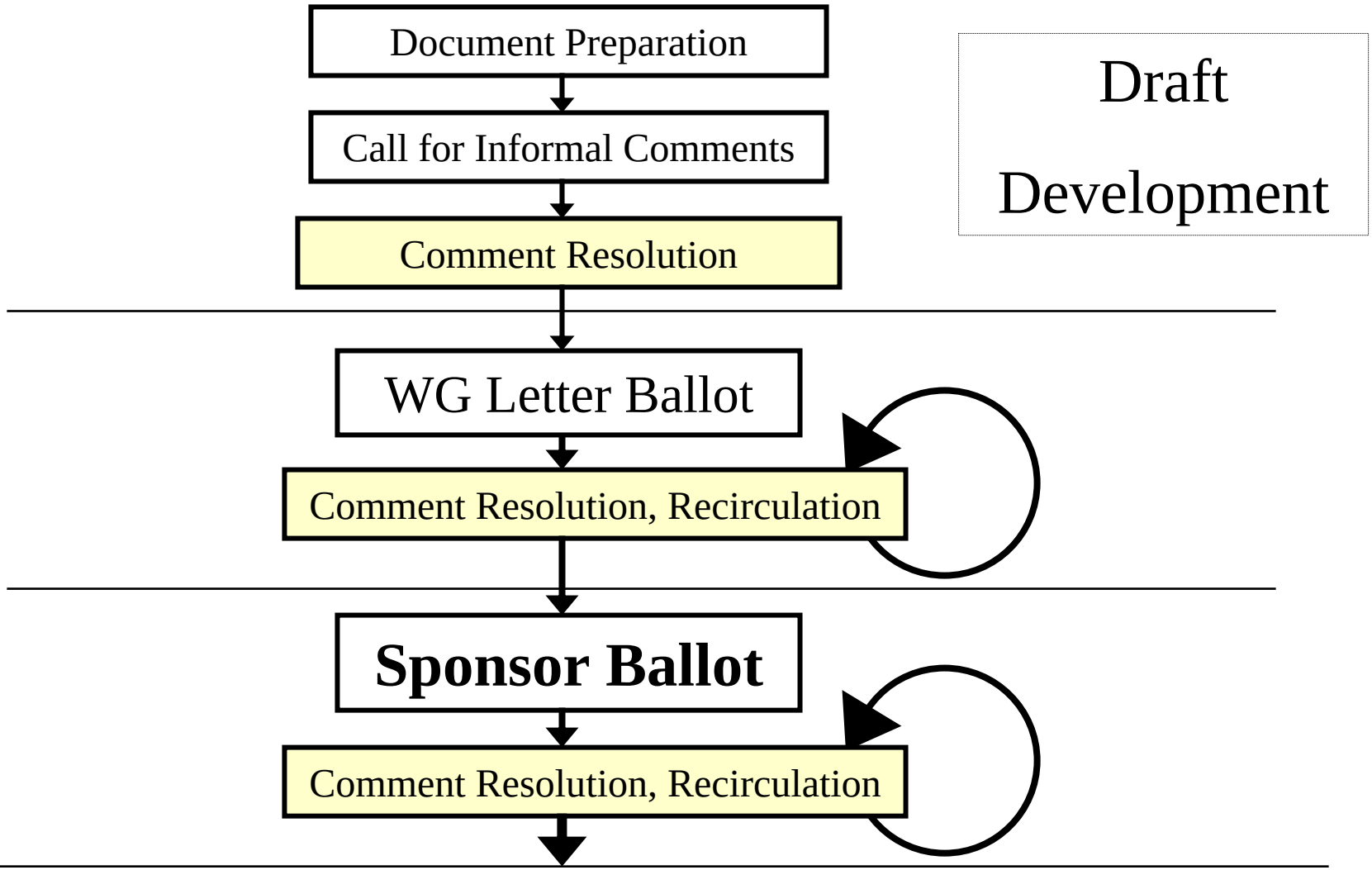
Existing 802.11 and 802.16 Features

	IEEE Std 802.11	IEEE Std 802.16
Industry Name	• Wi-Fi	• WiMAX
Primary Current Use	• Local Area, Unlicensed	• Metropolitan Area, Licensed
Multiple Access	• CSMA/CA • Contention-based	• TDMA/OFDMA • Scheduled
Control	• Distributed	• Centralized
Connection	• Connectionless	• Connection-oriented
Physical Layer	• Mainly OFDM	• Mainly OFDM
Frequency selection	• DFS specified	• DFS specified

IEEE 802 Projects relevant to 3.65-3.7 GHz

P802.11y 3650-3700 MHz Operation in USA	P802.16h Improved Coexistence Mechanisms for License-Exempt Operation
• Project to amend IEEE Std 802.11 • Project Authorization Date: March 16, 2006 • Status: Draft development • Appears to be progressing rapidly	• Project to amend IEEE Std 802.16 • Project Authorization Date: December 10, 2004 • Status: Draft development • Third “Working Document” under review by Working Group

IEEE 802 Project Development Process



P802.11y: History and Status

- Task Group y (TGy): initial meeting 19 April 2006
- Bi-weekly teleconference meetings
- Accepted Task Group Purpose, Principles, Vision
- Working Document in process

P802.11y: Current Approach

- **Aim to meet FCC requirements for 3650-3700 MHz**
  - adapt existing/emerging standards to meet current rules
    - priority to meet FCC 05-56 requirements
- **Use pre-existing OFDM mode**
  - Originally defined for 5 GHz band operation in 802.11a-1999
  - Include 5, 10, 20 MHz channels
  - No backward compatibility to 2.4 GHz mode
- **Updates 802.11 Annex I, J**
  - Region-specific regulatory details
- **Use DFS for quieting the channel and detecting other users**
  - IEEE 802.11h (subclause 11.6 DFS procedures)
  - IEEE P802.11-REVma-D7.0 (subclause 11.10 DFS Procedures)

P802.11y Mobility Approach

Potential enhancements for mobile operation in 3.65-3.7 GHz band under discussion

- FCC 05-56 specifies that mobile stations may operate only under the positive control of enabling base station.
- P802.11y can specify Base Station enablement of mobile
- Base Station call sign in geographic coordinates

P802.16h: History and Status

- ***Current* 802.16 is primarily for licensed bands**
  - Subscriber stations under control of base station, ensuring local coexistence
  - Coexistence between base stations assumed to be coordinated by license holder
  - No base station coexistence specified in case of non-exclusive operation
- ***Current* 802.16 supports elements of non-exclusive operation**
  - WirelessHUMAN (High-speed Unlicensed Metropolitan Area Network) designation defined
  - Provides: MAC support, channel numbering, transmit spectral mask; primarily targeted at 5-6 GHz
  - Supports: DFS, uniform channel spreading, and TPC to protect primary users
    - IEEE 802.16 (subclause 6.3.15) specifies DFS per ITU-R M.1652 and local regulation
- **P802.16h addresses broad range of coexistence techniques**
  - For general case of non-exclusive use
  - Not limited specifically to 3.65-3.7 GHz operation
- **802.16's License-Exempt Task Group has prepared three Working Documents**
  - Subject to Working Group (WG) review and comment
  - Third WG review in progress

P802.16h: Current Approach

- **Define a WirelessMAN-CX (coexistence) designation**
- **Enhance DFS support for protected primary users**
- **Utilize 802.16's Time Division Multiple Access basis**
  - Allocate slots, in a collaborative or non-collaborative system realization, for inter-system spectrum sharing
- **Support *collaborative* and *non-collaborative* coexistence mechanisms:**
  - *Collaborative:*
    - Coordination is synchronized over the air or over backhaul links
    - Each BS can know the location of all other BS
  - *Non-collaborative:*
    - Detect other systems by radio sensing
    - 'Detect and avoid' for robust operation
    - Dynamic Channel Selection (DCS)

P802.16h Mobility Approach

Potential enhancements for mobile operation in 3.65-3.7 GHz band

- Existing IEEE Std 802.16 (through 802.16e amendment) specifies fully-mobile terminals in licensed bands.
- FCC 05-56 specifies that mobile stations may operate only under the positive control of enabling base station.
- FCC 05-56 should be easily met because, in the fundamental 802.16 operation, terminals transmit in time slots allocated by base station.

References

- IEEE Std 802.11h-2003 “Spectrum and Transmit Power Management Extensions in the 5GHz band in Europe
- IEEE P802.11-REV-ma/D7.0 “Wireless LAN Medium Access Control (MAC) and Physical Layer (PHY) specifications. (Combines 2003 Edition of 802.11 plus the 802.11g, 802.11h, 802.11i, and 802.11j Amendments)
- IEEE Std 802.16-2004, "IEEE Standard for Local and metropolitan area networks - Part 16: Air Interface for Fixed Broadband Wireless Access Systems"
- IEEE Std 802.16e-2005 and Corrigendum 1, "IEEE Standard for Local and metropolitan area networks - Part 16: Air Interface for Fixed and Mobile Broadband Wireless Access Systems - Amendment 2: Physical and Medium Access Control Layers for Combined Fixed and Mobile Operation in Licensed Bands"