3.5 GHz Band and DSA/SAS Applications

MOTOROLA SOLUTIONS

Some Initial Thoughts on 3.5 GHz…

- New opportunity for truly dynamic large scale spectrum sharing
  - A large amount of spectrum potentially available…
    - 100 -150 MHz of quasi-licensed spectrum
    - Potential for orderly sharing of spectrum among large number of services …
    - Potential to segment the spectrum into multiple general operating classes…
  - New paradigm in spectrum management…
    - High level framework (e.g., non-interference, priority access, etc.) drives spectrum usage
    - Readily allows new services to be quickly added to the band…
  - Near real-time database technology exists and can support operation…
    - Can facilitate orderly co-existence among multiple / mixed services
    - Database update rates on the order of minutes possible…
    - Improves spectrum utilization / efficiency
    - Database security and privacy are key issues (protecting user information)
  - Priority Access tier is key to success…
    - This tier differentiates usage from traditional secondary access (e.g., unlicensed TVWS)
    - Having well defined priority levels increases predictability of use
    - Enforcement of priority access significantly improves value of the spectrum

Some Potential Applications…

- A wide range of applications are possible…
  - Enterprise/Commercial class WLAN/small cell coverage
    - Relatively low power usage over well defined areas (indoor/outdoor)
    - Some guarantees of QOS are helpful for these applications
  - High reliability hospital WLAN/small cell coverage
    - High priority spectrum use (typically indoors and low power)
    - Otherwise, similarities to the Enterprise/Commercial class above (within very limited areas)
  - High reliability higher powered incident area networks
    - Very geographically-limited and time-limited uses (e.g., at large incident scenes)
    - Short-term deployments (e.g., a few hours) over relatively small coverage areas (e.g., hundreds of meters) at temporary-fixed sites
    - Requires high priority access through the SAS Database
  - High powered wider area networks
    - Critical Infrastructure uses (e.g., Smartgrid), WISP usage, etc.
  - Low power consumer class WLANs
    - Fit best into General Authorized Access tier

Other 3.5 GHz Considerations…

- May be advantageous to segment band to cover subsets of similar uses…
  - Roughly group uses according to power levels, priority levels, etc.
  - Ensures that groups of users have spectrum access in at least portion of band
  - May be helpful in managing interference issues

- Detailed modeling of uses possible in SAS Databases…
  - Realistic modeling of incumbent exclusion zones is needed…
    - Deployment specific to protect incumbents from interference of varying users
  - Can take into account varying transmitter deployments
    - Variable transmit power levels, OOBE levels, interference tolerances, antenna patterns/heights, location accuracy, indoor/outdoor usage, etc.
  - Can provide generalized data about operating environment
    - FCC TAC *Interference Limits* approach possible to allow users to make informed decisions about the interference environment

- Spectrum sharing testbeds are important…
  - Prove out key concepts in realistic operating environments…