CSMA-Radio Mobile meeting criteria

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1. Unauthorized Network Access Impact on throughput

Collisions are detected and resolved, no notable extra bandwidth lost.

2. Establish Peer-to-peer Connectivity Without A priori Knowledge

Medium access with CSMA schemes does not need a priori knowledge.

3. Throughput

Theoretically optimal (including overheads), natural spatial reuse.

4. Delay

Close to optimal, in distribution does not depend on the number of connected STAs (only on the load).

5. Maximum Number of Nodes

At its level of implementation CSMA-RM is regardless of the size of the network, the performance are insensitive to the number of nodes.

6. Ability to Serve Data, Voice, And Video (Time Bounded Services)

CSMA schemes are oriented to asynchronous access. Nevertheless various time bounded schemes can take advantage of CSMA-RM: broadcasted bandwidth reservation or priority management. Time bounded connections are indifferently point to point or multi point.

7. Transparent to PHY Layer

CSMA-RM addresses the access over a single channel As long the access on the channel is time division, CSMA-RM is adaptable without limitation. Slotted, synchronized media are OK. Parameters are tunable to match PHY performance. Multi-channel media need duplication of CSMA-RM (one for each channel).

8. Robustness with Collocated Networks

Robustness, resource sharing and spatial reuse are natural and optimal.

9. Battery Power Consumption

The problem is PHY layer oriented. Nevertheless CSMA is completely limited sensing protocol: stations can switch off between their own transmission periods. If the PHY layer allows so, the time used to transmit key can be used by receivers to commute from low cost DSP to high cost DSP.

10. Critical delay which Limits Large Area Coverage

CSMA-RM is tunable according to any PHY performance. If propagation delays are very large with respect to packet size, then CSMA-RM is tunable to deferred collision detection and resolution (like with satellite communications).

11. Fairness of Access

Accesses are automatically given with respect to STAs' needs. Collisions are detected in a fair way, collisions resolutions are done on fairness bases or with regard to a priority management.

12. MAC Needs to Enforce Insensitivity to Capture Effect.

Capture is a natural effect, collision are detected on an independent basis but collisions frequently result in captures with errors.

13. Support for Priority Traffic

CSMA-RM involves optional priorities. Extendable to more general priority management [INRIA93d].

14. Ability to Support Non-reciprocal Traffic

High reliability provided for any mode of transmission: mono-point, multi-point.

15. Time to Market and Complexity

Direct extension of CSMA-CD used within ISO 8802.3.

16. Ability to Work in Simple, Small, Large Systems

At its level of implementation CSMA-RM is regardless of the size of the network, the performance are insensitive to the number of nodes.

17. Ability to support Handcuff/Roaming Between Service Areas

The decentralized nature and broadcast ability of CSMA-RM greatly helps the support of such services.

18. Implication on Complexity of PHY

No complexity implications. Expected basic PHY primitives are: transmission, carrier sense and reception. The problem of Hidden Nodes can be handled via enhanced carrier sense: for example, busy tone.

19. Ability to Support Broadcast (Multi-cast)

Broadcast is natural and efficient on one hop transmission. Store and forward facilities implemented above CSMA-RM can use air-air routing via AP and air-cable routing via backbone.

20. Preservation of MSDU's Order

MSDU are transmitted in the order of their submissions to CSMA-RM layer. The only way to destroy such order is that MSDU take different path within store and forward facilities.

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