**KOMONDOR DOUBT SKIMMER**

1. **Komondor features**:
   1. **What is done**:
      1. Packet transmission between TX and RX
      2. Acknowledgement between TX and RX
      3. **WLANs** operating at downlink AP to STA
      4. Packet collisions and timeouts.
         1. Timeouts are hardcoded to happen when more than **1 us** goes by after an expected reception
      5. **RTS/CTS**
      6. Variable MCS
      7. **Scenarios input (CSV files):**
         1. Random and deterministic generation of nodes
         2. System deterministic configuration
      8. **Scripting** for multiple executions
      9. **Statistics**:
         1. Packets okay vs. lost
         2. Throughput per AP (time transmitting in each channel)
         3. First version of hidden nodes
            1. To improve hidden-exposed nodes
   2. **What is expected / needed**:
      1. Deterministic backoff
      2. Traffic models (non-saturation)
      3. Packet buffering (selective ACKs)
      4. STA – AP association process
      5. **IEEE 802.11ax parameters**
         1. Headers
         2. Packet aggregation
      6. Node dynamism (turn ON/OFF with a random or deterministic scheduler)
      7. MIMO
      8. Beamforming
      9. Reproducibility (documentation)
         1. GitHub opened for the WN group (license)
         2. Collaborations (Alessandro)
      10. **Channel bonding agent (Sergio)**
      11. **TPC agent (Francesc)**
      12. When to start with NS3
2. **PHY layer**:
   1. **Power division in channels**: transmission power (e.g. 15 dBm) is divided uniformly among the transmission channels selected.
   2. **Packet loss**: a packet is lost if any of the following events occur:
      1. A) The power received in RX is less than the sensitivity corresponding to the MCS used in the transmission: P\_rx(M) < S(M)
      2. B) During the reception, the SINR is less than the Capture Effect (CE) threshold: SINR < CE. **Note**: it is deterministic (PER = 0 if accomplished, and PER = 1 if not accomplished).
         1. Comparison with CTMC Matlab Sergio
      3. C) RX is already receiving from other node.
      4. D) RX is already transmitting.
      5. Constant PER: if reasons A, B, C and D are accomplished, a constant PER is applied (e.g. 0.1).
   3. **Logical NACKs**: logical notifications that allow nodes to capture loss statistics containing the reasons why packets are lost.
   4. **Path loss models**:
      1. Free-space
      2. Others
3. **MAC layer**:
   1. **Contention Window (CW)**: double it if packet lost (RTS or DATA) and reset it to the minimum if DATA packet acknowledged.
   2. **Backoff**:
      1. Paused if P\_rx(primary) > CCA
      2. Resumed (look state diagram)
   3. **Modulation Coding Scheme (MCS)**:
      1. MCS negotiation protocol:  
         **a)** TX sends MCS request logically to the RX if *flag* is activated (e.g. no previous communication was established and MCS is unknown). This logical request includes the transmission power of the TX corresponding to one channel (e.g. 15 dBm).  
         **b)** RX receives the MCS request and it is able to determine the power that would be received in any number of channels (i.e. P\_rx(1) = P\_rx(2) – 3dB, etc.). Then, the RX determines the best[[1]](#footnote-1) MCS for each number of channels based just on the sensibility requirements[[2]](#footnote-2) per number of channels.  
         **c)** TX receives the MCS response. Then, it is able to known what modulation must be picked depending only on the number of channels of the transmission.
      2. MCS adaptation according to losses (not done yet).

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| MCS | S at 20 MHz (dBm) |
| B-PSK 1/2 | -82 |
| Q-PSK 1/2 | -79 |

Table 1: MCS and sensitivity

* 1. **Channel selection**:
     1. **Dynamic channel bonding**:
        1. Log2 SCB: pick all channels if free. If not, do not transmit.
        2. Log2 DCB: pick maximum free range available.
     2. **MCS vs. DCB**: to take into account not only the maximum number of channels available, but also the rate that can be provided by every combination of num channels + MCS**.**
  2. **Time values**:
     1. SIFS = 16 us
     2. DIFS = 34 us
     3. EB = (CW – 1) / 2
     4. Lambda = exp(1/EB)
        1. Mean lambda: 67.5 us (CW = 16) to 4.6 ms (CW = 1024)

1. **Evaluation and scenarios**
   1. Informational logs (validating and post-processing purposes)
   2. To define scenarios
   3. To fully validate the simulator (will take time)
   4. To know what to look for

1. The one maximizing the data rate. Packet error rate and other factors are not considered. [↑](#footnote-ref-1)
2. Considering only the Sensibility column corresponding to 1 channel (i.e. 20 MHz). [↑](#footnote-ref-2)