UNLEASH THE POWER OF LIMITLESS CONNECTIVITY
Wireline Access Network

Practical Implementation of Profile Management Application (PMA) to Improve Data Throughput in the Presence of Impairments

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Practical Implementation of PMA

What is PNM? ≠ PMA
Practical Implementation of PMA

What is RxMER per Subcarrier?

Nimble RxMER Chart

<table>
<thead>
<tr>
<th>Average Deviation</th>
<th>Average RxMER</th>
<th>Freq at Max RxMER</th>
<th>Freq at Min RxMER</th>
<th>Max RxMER</th>
<th>Min RxMER</th>
<th>Modem Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>-5.40</td>
<td>29.85</td>
<td>744.92</td>
<td>880.67</td>
<td>40.00</td>
<td>22.25</td>
<td>0.03</td>
</tr>
</tbody>
</table>

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What is PMA

• Makes OFDM & OFDMA perform better
  • Optimizes data throughput
  • Improves robustness
  • Continuously adjusts based on impairments
  • Right hand image is PMA architecture
Why PMA?

PMA optimizes downstream OFDM and upstream OFDMA efficiency

• How? Let’s look at an example
• In the presence of impairments, such as a roll-off, not all subcarriers will be supported equally
• A flat profile of 4096-QAM is not ideal if roll-off, suckouts, standing waves, LTE ingress and other impairments are present
• PMA will identify which specific sub-carriers should be dropped to 2046-QAM, 1024-QAM or even 512-QAM to maximize throughput
• This occurs on a sub-carrier, but sub-carrier basis
• Every subcarrier has optimal data transmission to the subscriber's modem which can result in a 10-40% efficiency improvement in the DOCSIS network
Typical RxMER of all Modems in a Given Fiber Node
Recommended PMA Profile from Fiber Node
Old vs New Profile

Profile without PMA:
• ofdm ds-profile 0 default-modulation 256qam
• ofdm ds-profile 1 default-modulation 1024qam
• ofdm ds-profile 2 default-modulation 2048qam
• ofdm ds-profile 3 default-modulation 4096qam

Profile with PMA:
• ofdm ds-profile 0 default-modulation 64qam
• ofdm ds-profile 1 default-modulation 256qam
• ofdm ds-profile 2 low-freq-edge 807000000 high-freq-edge 817000000 64qam
• ofdm ds-profile 2 low-freq-edge 817000000 high-freq-edge 877000000 512qam
• ofdm ds-profile 2 low-freq-edge 877000000 high-freq-edge 903000000 64qam
• ofdm ds-profile 3 default-modulation 4096qam

Segmented profile
Operational Benefits

• 15% to 40% capacity increase on a channel
• 200 to 400 Mbps extra capacity on each OFDM channel
• Like upstream dynamic modulation – profiles can compensate for impairments, keeping subscribers online
• Reduces CSR calls and truck rolls
• Places PLC location – helps prevent outages
• Telemetry data can be used as a proactive tool
• Per cable modem profiles can be generated if CMTS supports it
Summary

- PMA analyses the pre-collected data and produces optimized profiles ready for your CMTS
- Once you apply the optimized profiles to the CMTS, you will realize improved OFDM / OFDMA performance when impairments are present
- A 10-40% efficiency improvement in the DOCSIS network
- Improves robustness for increased subscriber QoE
- Can provide per-cable modem profiling when vendors support it
Thank You!

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