IMAGINE THE POSSIBILITIES...
CONVERGING ACCESS NETWORKS

Make the Most of What You’ve Got: How Cable Modems Can Deliver Economical Cell Site Transport

Bill Beesley
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Fujitsu

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Amphenol Broadband Solutions
## FCC 3.5 GHz 2020 Auction top 20

<table>
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<tr>
<th>Company</th>
<th>Number of Licenses Won</th>
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<td>1  Verizon</td>
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<td>8  Mediacom</td>
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Full list available at [https://docs.fcc.gov/public/attachments/DA-20-1009A2.pdf](https://docs.fcc.gov/public/attachments/DA-20-1009A2.pdf)
Introduction

New technologies, new possibilities

- CableLabs Low Latency xHaul/Low Latency DOCSIS
- Telecom Infrastructure Project vRAN Fronthaul Project Group
  - Non-Ideal Fronthaul
- SDN
  - Unified management of fiber xHaul, DOCSIS BSOD and RAN
Convergence of technologies

Common Public Radio Interface (CPRI)

- Separates Remote Radio Unit from Base Band Unit
  - Ultra-low latency <75 μs
  - Allows for distributed antennas
- BBU can now be placed at base of tower or at central location
- Historically only done over dark fiber
  - See low latency above
  - Requires transparent communications between RRU and BBU

Industry term is “Fronthaul”
TIP vRAN Fronthaul Project Group

- Non Ideal Fronthaul
- First round of testing completed last year
  - BT – G.Fast
  - Cable Labs – HFC
  - TIM – PON
  - Airtel – multi-hop microwave

Cable Labs

- Low latency DOCIS/xHaul
  - Does not yet support fronthaul – but could easily support non-ideal fronthaul

https://telecominfraproject.com/vran/
Much to consider

- HFC Capacity
  - Serving group size and bandwidth consumption
- Value of bandwidth
  - Wireless radios consume max bandwidth with one subscriber connected
  - As you decrease latency in DOCSIS, you subscribe more upstream bandwidth
  - Wireless ARPU vs Residential/Commercial Broadband
- HFC reliability vs Customer expectation
  - Reliability and resiliency
    - Only Cox uses a ring architecture
    - Response time

It might make economic and operational sense to deploy fiber even where HFC is available
New operational challenges

- Carriers require higher service levels
- How will service be deployed consistently and repeatedly?
  - Coordination with wireless operator
- How will service health be monitored and managed?
  - How will HFC services management be unified with existing fiber services?
- Who will install, repair and maintain?
  - What new tools will they need?
  - What new training is required?

Deploying the first service is easy
Deploying the next 1000 is hard
Software driven network

- Need unified topology views of HFC and Fiber based xHaul
- Operations teams will need to shift from managing technology to managing a service
- Services will need to be created in both HFC network and fiber network domains
  - Ideally, this is automated

As service complexity increases, software automation will become critical to prevent operations bloat
Conclusion

HFC will be one tool—not the only one

- 5G will drive millions of new antenna deployments
- Fiber deep initiatives will allow support for some
- Still need HFC where fiber is not practicable
  - Rural areas
  - Where fiber assets are constrained
    - High cost build areas
    - Or where it will take too long to construct
- But this won’t be the same as current residential/commercial HFC
  - New training
  - New tools
  - New support processes

HFC will be a valuable tool for supporting wireless deployments
Should we?

- Asset Value
  - Bandwidth
  - Serving group size
  - Other customers

- Customer expectations
  - Reliability and resiliency
  - Response time
Thank You!

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