UNLEASH THE POWER OF LIMITLESS CONNECTIVITY
Operational Transformation

Execute the Upstream Makeover without Leaving Scars

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Agenda

• Heading Upstream: What, Why, When
• New Splits – Problem Statement
• In-Home Assessment test (iHAT)
• Add MUSL
• High-Split and DOCSIS 4.0
• Summary
Unleashing Upstream

The Time Has Come!

Low Split has served us well
We’ve consumed most of it
DOCSIS 3.1 ODFMA helps
New clean spectrum helps MORE
The usual balancing act
• Capacity vs Time
• Speed vs Time
• Make the most of a plant touch
DOCSIS 4.0 as North Star
Buy (Enough) Time

Keep ahead of demand (CAGR) w margin
Just imagine if a global pandemic forced everyone online! ...oh, wait
[Node split + Mid-Split] is a sweet spot for capacity lifespan for most of the network
High growth areas still most effectively managed with deep fiber solutions
Spectrum added to serve Capacity also enables new Speeds
Introducing DOCSIS 3.1 OFDMA

~2x the Spectrum, 3-4x the Capacity

- 4x 64-QAM DOCSIS 3.0
- All Comcast D3.0 Gateways are Low-Split Only

- Single 45 MHz D3.1 OFDMA Channel
- All Comcast D3.1 Gateways are Mid-Split capable (switchable) diplex
Changing the Split: Problem Statement

Not Made for Each Other

Carrier-to-Adjacent Channel Interference Ratio (CACIR)

Conditions Ripe for RF Challenges

- Low DS Rx + High US Tx (correlated)
- Leaky splitters
- Short coaxial runs
- Poor terminations
Split – the Difference

Yippee!

Yikes!
Running the CACIR Numbers

Very Small - But Not Negligible

![Graph showing the percentage of set-top boxes within the CACIR (dB) range. The graph highlights that 1.29% of set-top boxes fall within the specified range.](image-url)
Automated and Seamless Spectrum Activation

Discover Any To-Do’s Upfront

Full Diagnosis:
- DOCSIS is Blocked? Yes / No
- XG video is at Risk? Yes / No
- OR No QAM Video Service

Partial Diagnosis:
- DOCSIS is Blocked? Yes / No
- Cannot determine XG Video (no XG STB – legacy only STBs

Two Essential Assessment are Automated with iHAT (below)
iHAT’s Engine: Built-in DOCSIS OUDP Feature

Probe Home Readiness and Score the Result

PASS: Activate

FAIL: Remediate

4x SC-QAM
OFDMA
OUDP Probe

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Start-to-Finish

Construction Complete → Metrics = Solid → Configure CMTS → Unleash iHAT → Activate Ready Homes → Disposition Candidates for Remediation
New Awareness and Processes to Tailored to Mid-Split

*Confirm home isn’t in ‘remediation only’ mode before running periodic iHAT check*
Extra upstream BW and energy brings isolation across Tap ports into play

Same conceptual analysis as MS but probe measured at adjacent home STB(s)

DOCSIS 4.0 FDD methodology similar with High Split → Ultra High Split; PoE obviates drop amp concern

DOCSIS 4.0 FDX overlaps spectrum, by design, in the downstream and upstream

Protocol includes device isolation measurements (sounding) of DOCSIS 4.0 and DOCSIS 3.1 devices

“High-Split” process for DOCSIS 3.0 homes
Summary

New Spectrum, More Capacity, Higher Speeds, No Scars!

• The time has arrived for upstream action
• New spectrum delivers on both network and HSD products into the future
• Tools and processes developed for non-disruptive upgrades and operationalization
• Automation for scale is integrated with construction and back-office tools
• Unprecedented visibility into the home network for optimization and deployment of future products and services
• Let’s G00000000000000000000000000000 !
Thank You!

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