

CABLE-TEC EXPO® 2019

RAISING THE BAR.

SCTE • ISBE



NEW ORLEANS, LA
SEPT. 30-OCT. 3



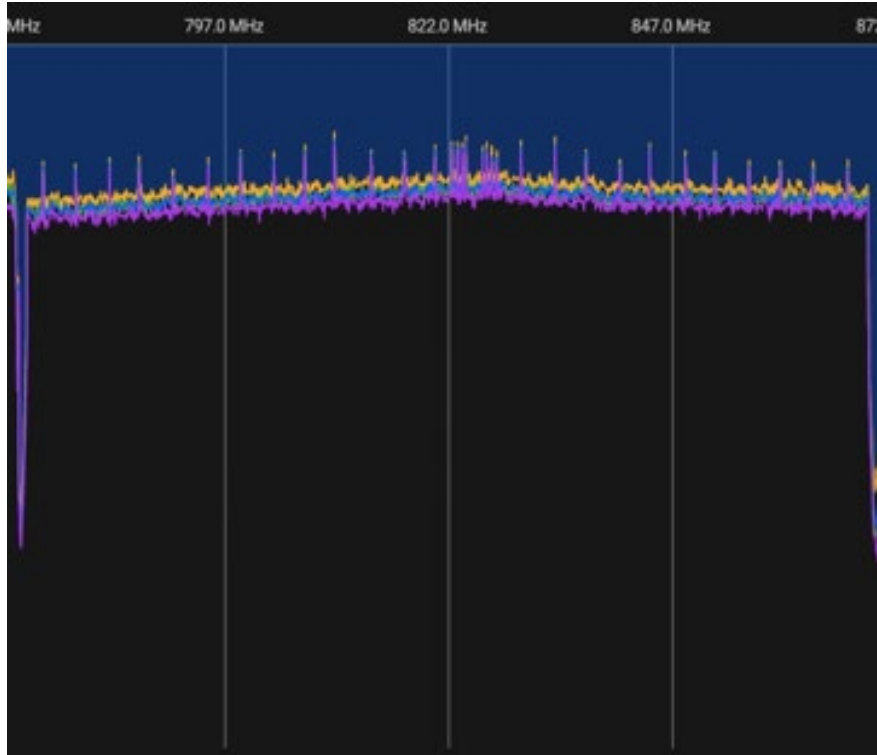


Transition to DOCSIS® 3.1 Network

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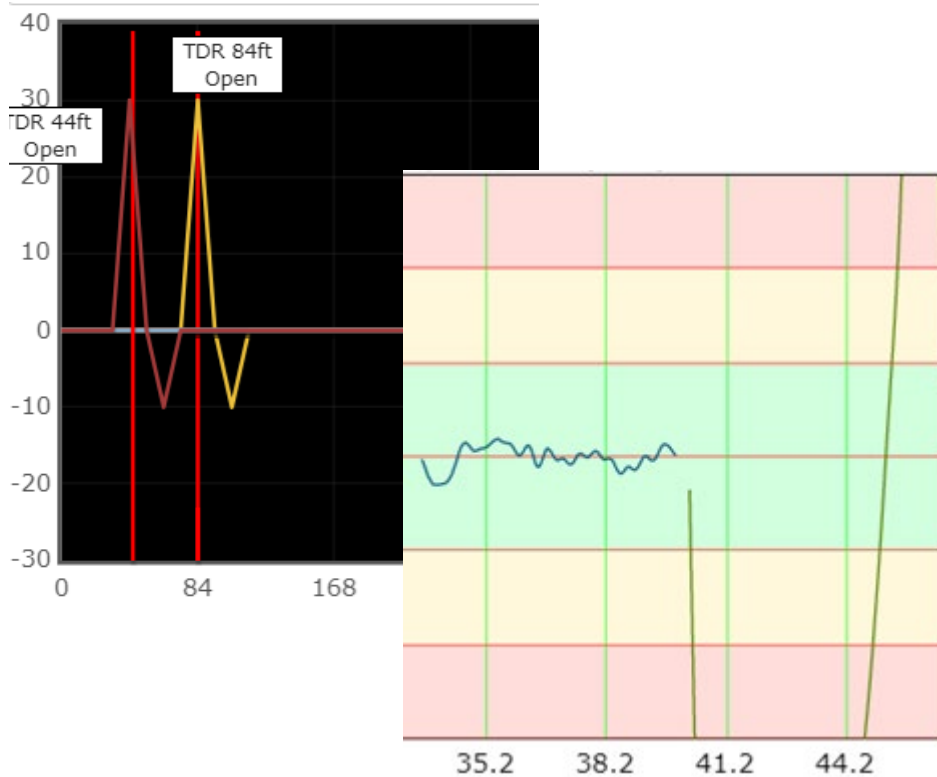


OFDM

Initial Configuration

Keep it simple to start

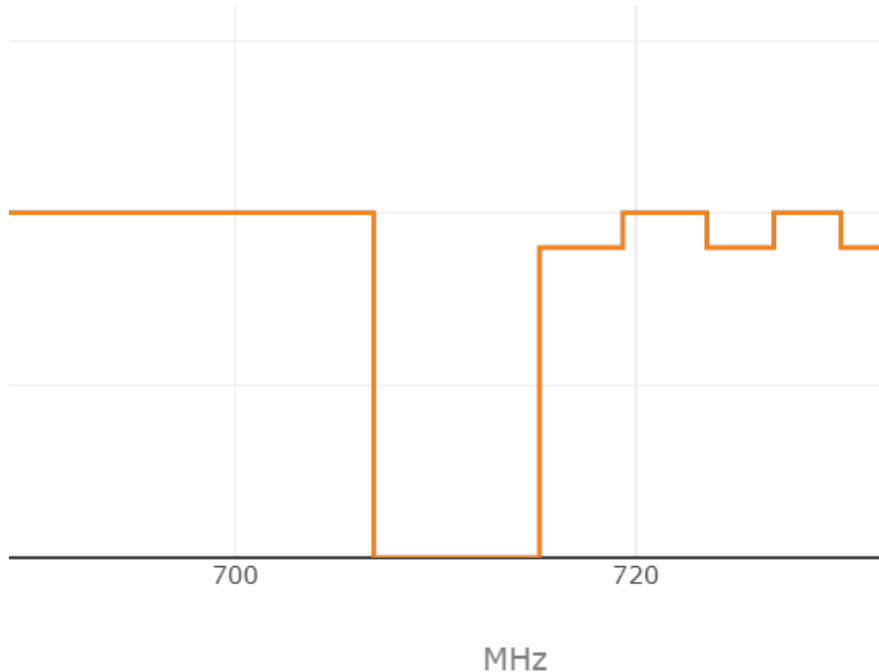
- Single DS Profile
 - Profile A @ 256-QAM
- PLC
 - Keep in clean spectrum
 - Avoid new 600, 700 MHz wireless spectrum assignments
- Data Only Channel (Non-primary)



PNM

Proactive Network Maintenance provides

- Reliability Gains
- Capacity Gains
- Cable Modem Monitoring
- Information for Front-line Staff
- Dispatching the right staff



PMA

DS Profiles/Variable Bit Loading

DS Profiles (Total of 8)

- DS Profile A @ 256-QAM (Flat)
- DS Profiles 1-7
 - Used for Variable Bit Loading

Variable Bit Loading

- Provides zones of different modulation.
- Adjusts for changed plant conditions.

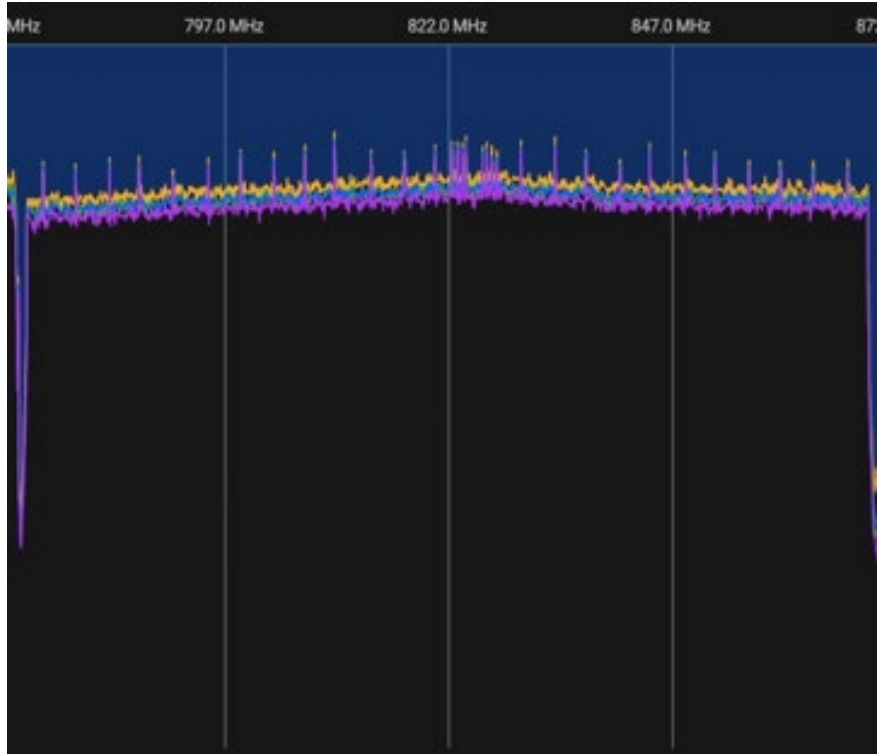


PMA

Capacity Gains

With a DS Profile A of 256-QAM across the whole channel I have seen gains of 40% by utilizing PMA.

- Often See Base Modulation move to 4096-QAM from 256-QAM
- Utilizing 1-4 Variable Bit Loading zones per profile.

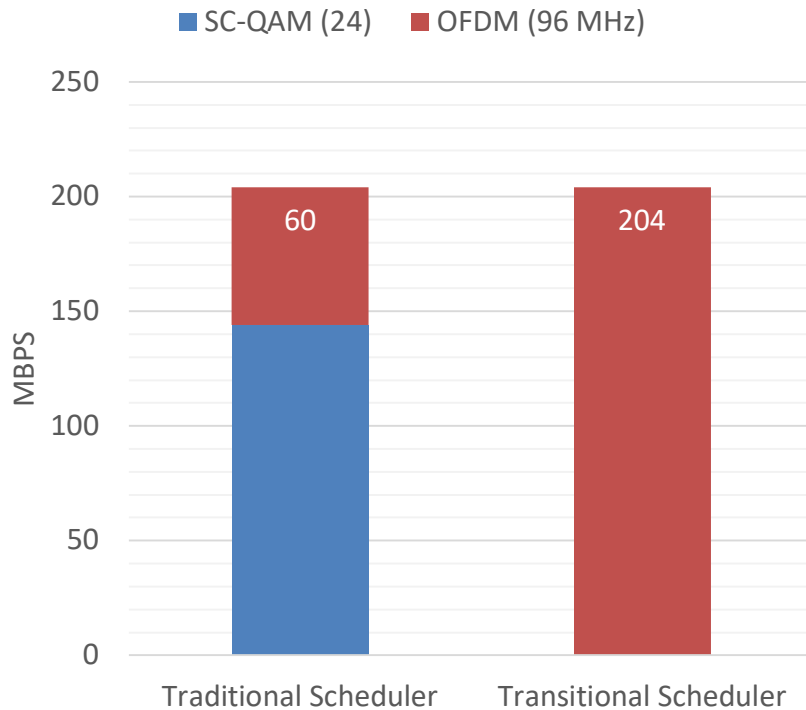


OFDM

POST PMA Configuration

PMA add complex after analysis

- 8 DS Profiles
 - Profile A @ 256-QAM
 - Profile 1-7 using VBL
- To deploy at scale, full automation of the PMA process will be required

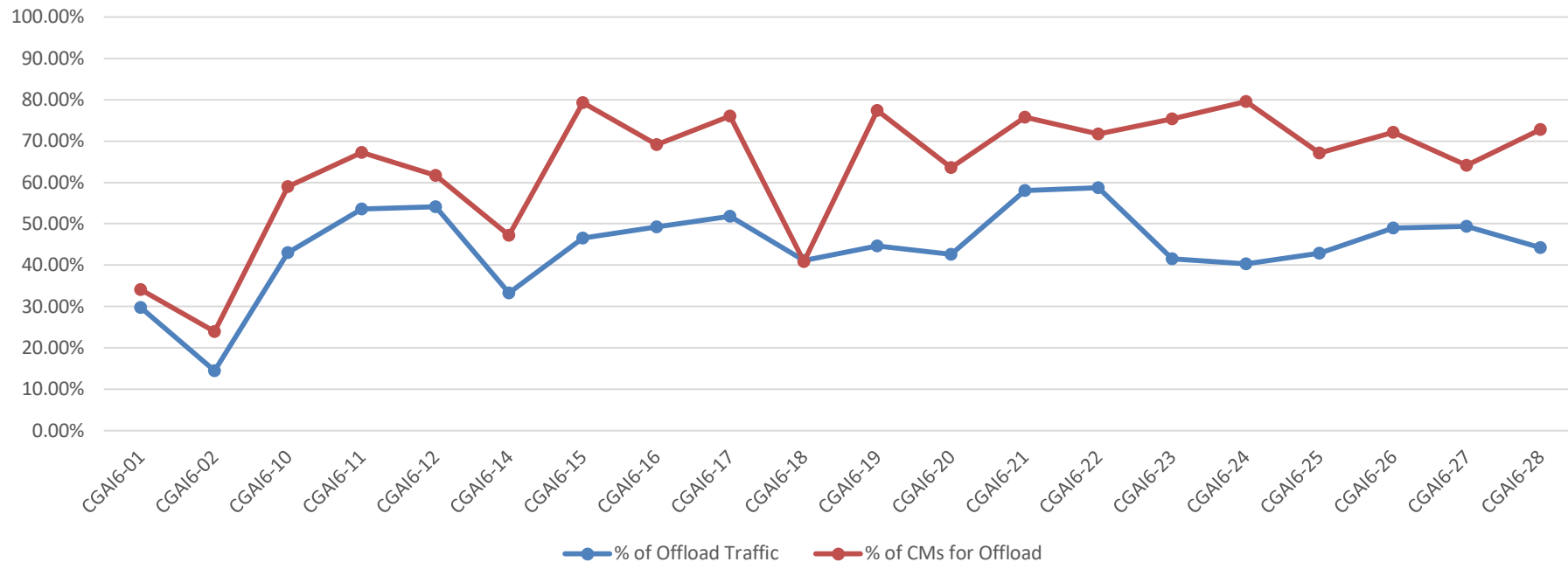


MAC Schedulers

Need for two different MAC schedulers:

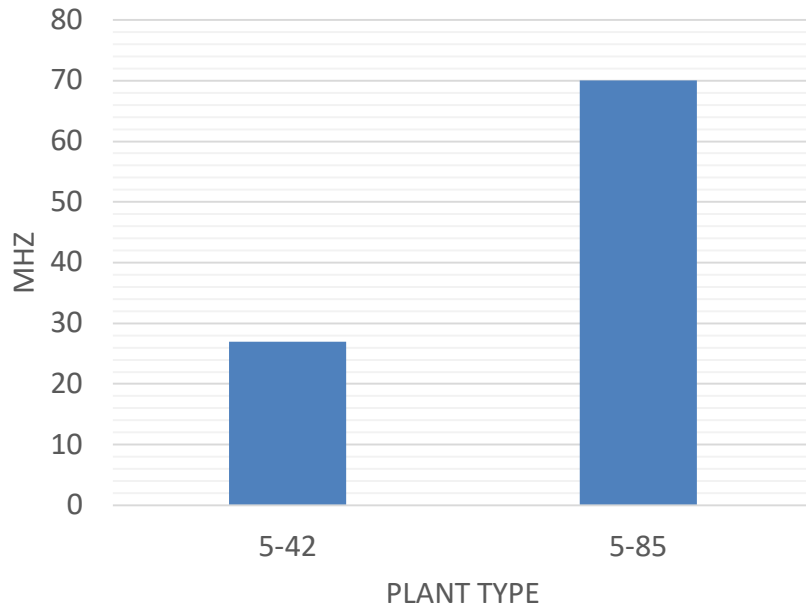
- Traditional
 - Tries to balance all DOCSIS channels to be equal
 - Forces CM Migration at a faster rate
- Transitional
 - Has DOCSIS 3.1 CMs favor OFDM/OFDMA until capacity is used.
 - Allows for instant offloading

Cable Modem Distribution



Cable Modem Distribution in a Mid-split Configuration

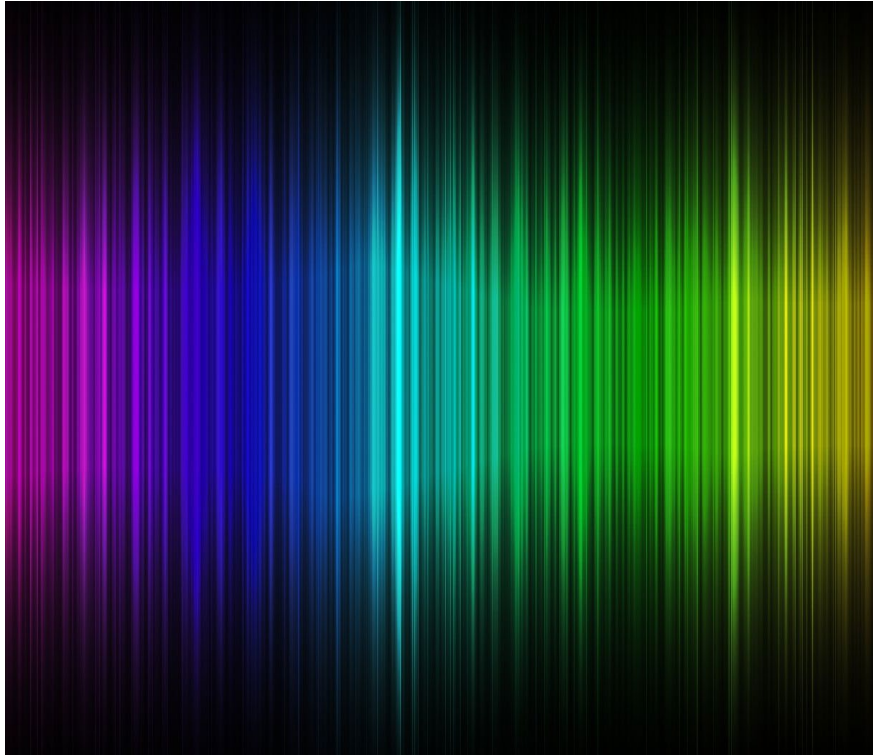
Available Spectrum (MHz)



Mid-split (5-85 MHz Return)

Mid-split adds ~150% more upstream spectrum.

- Benefits
 - More Upstream Capacity
 - Clean Spectrum
 - Great Place for OFDMA
- Risks
 - CM Not Following Specifications
 - 5-42 MHz Drop Amplifiers



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OFDMA

Finding spectrum for OFDMA...

In order to bring up an OFDMA channel you need at least 10 MHz of spectrum. Most operators will wait for Mid-split or High-split before enabling.



OFDMA

Deployment

- IUCs
 - IUC 13 – Set to 64-QAM
 - IUC 12 – Set to 256-QAM
 - IUC 11 – Set to 1024-QAM
- Variable Bit Loading
 - Utilize after IUC13 to maximize your capacity.

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Thank You!

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