

# Steps for CPE Installation Success



# Keys to Successful CPE Installations

- CONTACT CUSTOMERS/BUILD AWARENESS
- CONSIDERATIONS AHEAD OF OSP CONSTRUCTION
- IDENTIFYING CHALLENGES PRIOR SUBSCRIBER CUTOVER
- SELECTING CUSTOMER PREMISE PRODUCTS/TECHNOLOGIES
- DEFINE INSTALLATION PRACTICES AHEAD OF INSTALL
- PERFORM INSTALL
- WIFI TESTING
- DATA GATHERING
- CUSTOMER TRAINING/WALK THROUGH



## Contact customers/Build awareness

- Make customers aware of what to expect ahead of OSP construction and cutover
- Explain the purpose of the upgrade or overbuild
- Send out email blasts or information by mail
- Organize a town hall meeting



# Contact customers/Build awareness

- Use contact as opportunity
  - Provide information on services, upgrades, etc...
  - Get new customer signups or existing customers to upgrade services
  - Obtain alternate contact information for cutover scheduling



# Considerations Ahead of OSP Construction



# Considerations Ahead of OSP Construction

- Consider completing customer contacts/site visits ahead of construction
  - Identify best cable placement for burial to location
  - Identify ability to ground enclosure as needed
  - Select location optimal for gaining access to home wiring
  - Verify if an outlet is available
  - Consider completing some installation tasks while onsite



# Identify Early On Solutions for Challenging Locations

## Challenging Locations

- Multi-tenant Buildings
- Multi-line Businesses
- Locations with special access services

## Challenging Services Delivery

- Legacy TDM
  - DS0's, DS1's, DS3's
- Multi-tenant RF
- Static IP's
- Redundancy



# Solutions available

## Challenging Locations

- Consider multi-line VDSL or GFAST solutions
- Deploy indoor ONT's with fiber to each location
- Deploy MDU ONT's

## Challenging Services

- Deploy Pseudowire T1's
- Deploy mini channel banks at customer location for DS0's
- Deploy NID's off of non-access platforms for high end users or redundancy needs
- Ensure IPv4 space available for statics





# Selecting CPE Products/Technologies



# Selecting CPE Products/Technologies

- Rate of return companies
  - 12 inch rule
  - Consumer Broadband-Only Loops (CBOL)
- Services being provided
  - Voice, Data, Static Video, OTT Video
- Wireless Network
  - Managed or Unmanaged
  - Whole home or centrally located with best effort



# Selecting CPE Products/Technologies(Cont'd)



# Selecting CPE Products/Technologies(cont'd)

- Subscriber Location Type
  - Standard residential or business
  - Large business
  - Trailer house
  - Hog barn



# Considerations May Determine one of the Following

## One Box Solution

- Outdoor or Indoor ONT
- Indoor ONT with/without WIFI

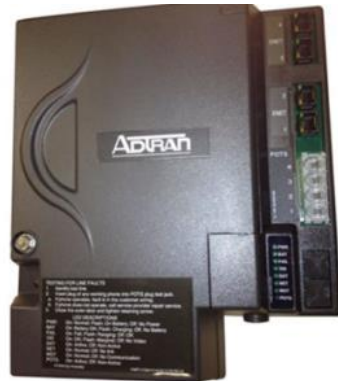
## Two Box Solution

- Outdoor or Indoor ONT
- WIFI Router/POTS
  - Possible subtended mesh devices



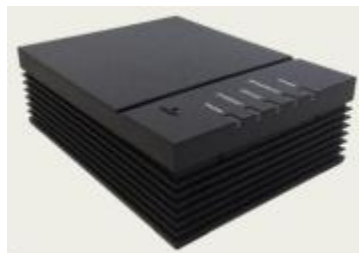
# One Box Solution

- Outdoor ONT
  - Provides outdoor access point for testing
  - Requires ONT enclosure grounding/bonding to AC
  - Optimal for locations where access can be challenging



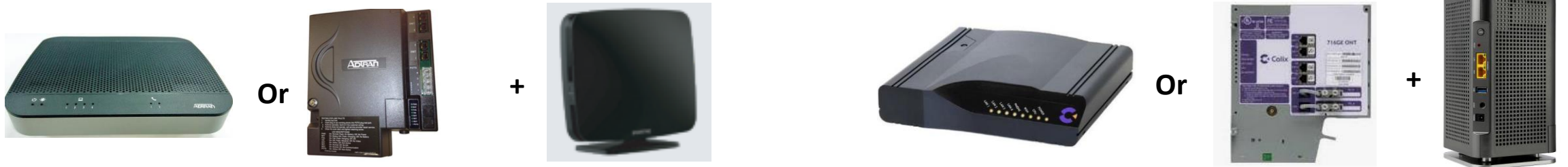
# One Box Solution (Cont'd)

- Indoor ONT
  - Can provide ONT only functionality or ONT/WIFI
  - Removes enclosure grounding requirement
  - Better fit for multi-tenant areas where separate ONT's are required
  - Eliminates pulling cables outside
  - Does require pulling fiber from outdoor enclosure to ONT location



# Two Box Solution

- Outdoor or Indoor ONT with separate WIFI router
  - Allows ONT to be placed near fiber entrance
  - Allows WIFI router to be centrally located-CAT5E to router instead of fiber
  - WIFI technology will continually change-ONT technology to stay static for a longer period of time





# Software Solutions

- Consider utilizing vendor software solutions in conjunction with hardware
  - Manage home router remotely
  - Gain subscriber analytics
  - Save truck rolls



# Defining Installation Practices



# Define Installation Practices Ahead of Install


- Every customer premise is unique-wiring practices and standards should not be
  - Come up with wiring standards that are to be followed for all technicians
    - Eases training of new staff as to what to expect in the field
    - Ensures a common approach to install regardless of the technician
    - CSR's work with customers more efficiently when common installation practices are used



# Define Installation Practices Ahead of Install(Cont'd)



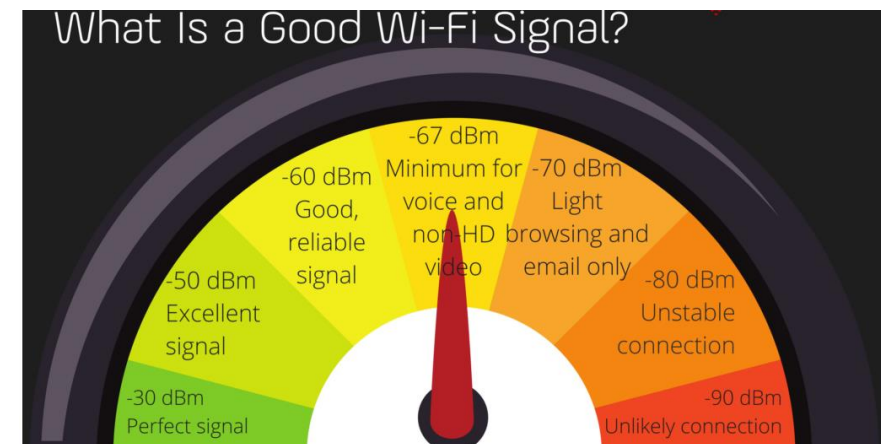
# Define Installation Practices Ahead of Install(Cont'd)

- Define what is acceptable when standards cannot be met
  - Wrapping wires on outside of customer location
  - Using  devices like E-Net over power, Coax or Wireless



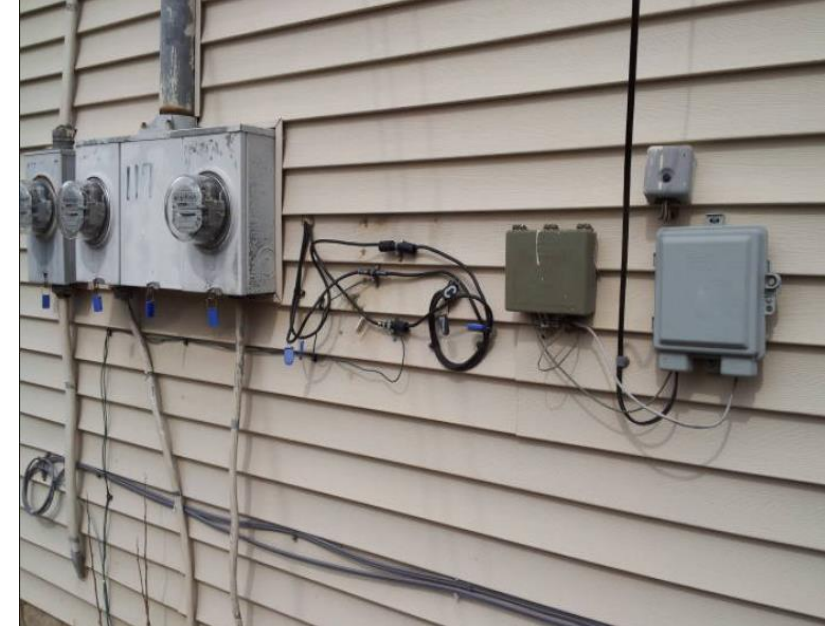
# Define Installation Practices Ahead of Install(Cont'd)

- If deploying managed WIFI or Whole Home WIFI, identify what this means for customer premise coverage
  - Define testing parameters
  - Define where coverage is expected
  - Communicate with subscriber as to where WIFI signal is utilized



# *How Important is a Customer Premise Install?*

- Many gel-filled twisted pair plants installed in early 80's-Today's fiber plant estimated to last 30-40 years
- Fiber plant, optical electronics, and remote management software tools reduce customer premise issues/truck rolls
- Make sure customer premise wiring is built to last
- Truck rolls are expensive



# Performing Installation





# Perform Installation- Greeting Customer

- Show up on time
- Ensure staff are practicing good hygiene
- Make sure staff are promoting your company brand and image
- Competitive markets versus non-competitive can have impact on presentation
- Make sure customer is at least 18 years old and capable of making decisions



# Perform Installation- Develop plan

- Verify services present at the location-ensure service orders are accurate
- Determine all devices that require wiring and/or WIFI connectivity
- Come up with a game plan of how to achieve the install with some potential alternates in mind
- Never ask the customer where they would like to place equipment until you know you can meet expectations
- Identify early on if install will require additional help or additional time
- Make sure customer is on board with your plan before executing



# Perform Installation- Things a plan should not include

- Wires wrapping outside of location (with some exceptions)
- Wires running across the floor
- Wiring demarcation
  - Avoid placing in common living area
  - Avoid easily accessible locations to kids and animals
  - Avoid inaccessible locations
- Electronics Location
  - Avoid crawl spaces or other damp areas
  - Avoid placing in normally inaccessible areas
  - Avoid placing in sleeping areas (blinking lights)



# Home Penetration

- Penetrate home near fiber enclosure
  - Whether conduit or bare cables, make sure bit is properly sized
  - Be aware of surrounding (AC Power, water lines)
  - When drilling concrete, try to avoid blowout on the back side of the concrete
  - Make sure hole is properly sealed. Water damage can be very expensive



## Establish Demarcation Point

- Establish demarcation point for all or most cabling in the location
- Ensure location provides accessibly to fish walls and access existing home wiring
- Newer homes should have a location established



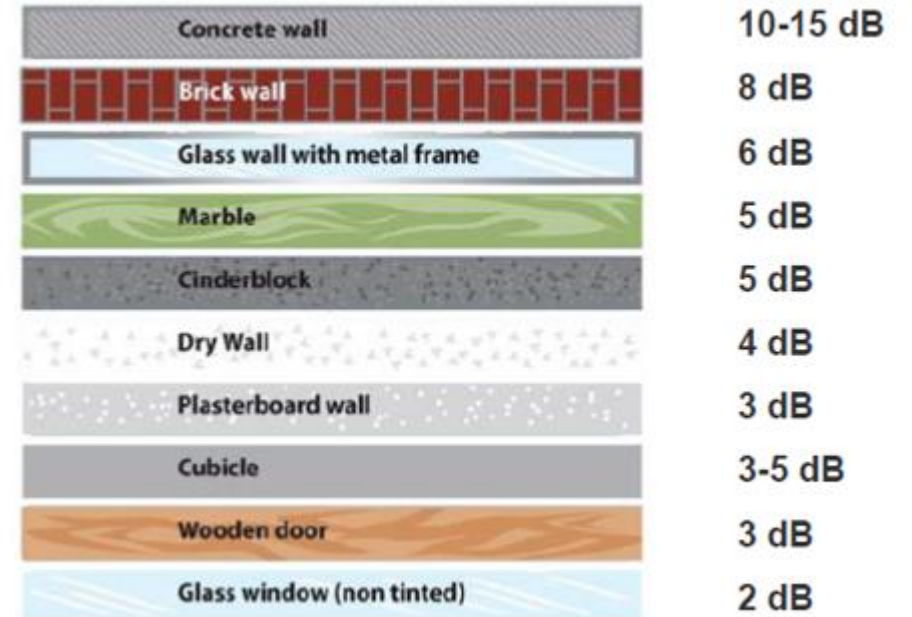
# Cable Runs and Termination

- Where possible, fish walls and install low voltage cut in boxes where existing termination boxes do not exist
- When fishing fiber, faceplates are available for termination points
  - Utilize ruggedized fiber jumpers
- Test all Category cables for continuity once terminated



# Wireless Device Installation

- Install Wireless Router
  - Ideal location-high, central, and unobstructed view
  - Avoid signal inhibitors
  - Avoid basements
  - Install WIFI router and test signal prior to pulling cables to ensure placement is optimal



Concrete wall	10-15 dB
Brick wall	8 dB
Glass wall with metal frame	6 dB
Marble	5 dB
Cinderblock	5 dB
Dry Wall	4 dB
Plasterboard wall	3 dB
Cubicle	3-5 dB
Wooden door	3 dB
Glass window (non tinted)	2 dB

# WiFi Signal Testing

- Wireless testing can be completed with a tablet or phone and one of many testing apps
- WiFi testing units available on the market that complete more intuitive tests
- Recording WiFi testing results from installation can be helpful tool for future troubleshooting





# Ideal Signal Strength

Signal Strength		Required for
-30 dBm	Max achievable signal strength. The client can only be a few feet from the AP to achieve this. Not typical or desirable in the real world.	N/A
-67 dBm	Minimum signal strength for applications that require very reliable, timely packet delivery.	VoIP/VoWiFi, streaming video
-70 dBm	Minimum signal strength for reliable packet delivery.	Email, web
-80 dBm	Minimum signal strength for basic connectivity. Packet delivery may be unreliable.	N/A
-90 dBm	Approaching or drowning in the noise floor. Any functionality is highly unlikely.	N/A



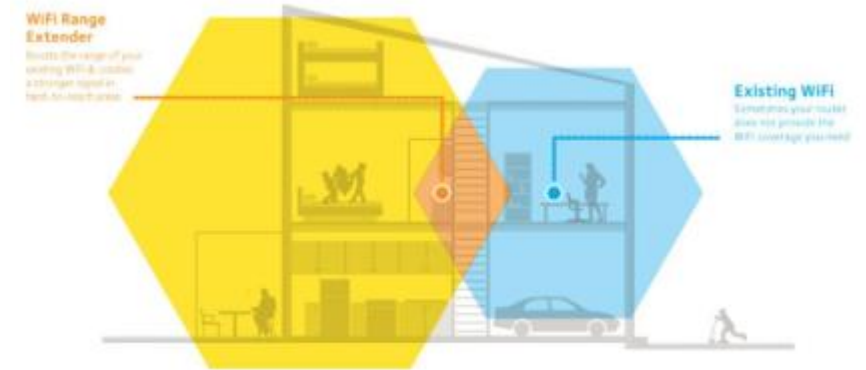
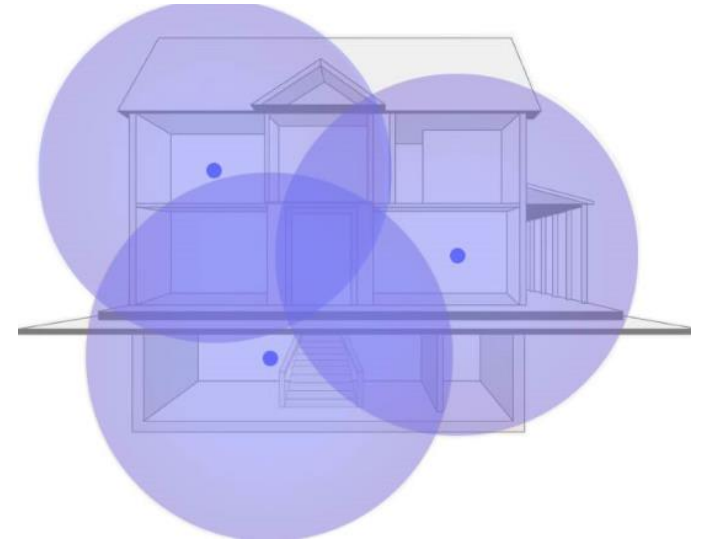
# WIFI Router Setup

- Following optimal placement and connection of data:
  - Configure pertinent router uplink settings
  - Enable wireless channels(2.4Ghz/5Ghz)
  - Configure router security
  - Modify wireless channels away from utilized channels in neighborhood



# WiFi Router Coverage

- When Whole Home WiFi is provided and coverage requirements are not met, consider mesh wireless devices
- Avoid using wireless extender due to reduction in bandwidth to half
- Mesh works best but can be expensive
- Most current generation routers provide ample coverage for most single family homes



# Gathering Data Onsite



# Data Gathering-Take advantage of premise visit

- Utilize time of installation to gather as much data as possible about installation
  - Optical light readings
  - Pictures
  - Descriptions of Equipment Placement
  - WIFI Test Results
  - Serial numbers
  - Special notes
- Store data in subscriber records for future reference-  
CSR troubleshooting tool



# Customer Training/Walkthrough



# Customer Training/Walk Through

- Make sure customer is thoroughly trained on all installed products
- Provide handout information such as IPTV channel lineups
- Demonstrate video services
- Make customer aware of any major WIFI dead zones
- Show customer where everything is installed



# Questions?

