Installation and Troubleshooting Guidelines
What is D2 Advantage™ Lite?

D2 Advantage Lite (D2 Lite) is a compact, centralized SWiM distribution system designed to service small MDU buildings that are 20 units or less. It eliminates the need to install individual dishes while providing the full range of DIRECTV services; including over 190 full-time HD channels, multi-room viewing capabilities, DIRECTV On Demand, MediaShare, local channels and international programming.
Advantages of D2 Lite

- **A simple, centralized distribution system**
  - Enhance building appearance without the clutter of multiple satellite dishes
  - Only one dish required per building
  - Residents only require the installation of a set-top box

- **Efficient and cost effective installation**
  - No need to access individual units when installing a centralized distribution system
  - Installation is simplified by utilizing existing technology and components
  - Reduces overall equipment and labor costs vs. traditional MDU and Dish on Balcony
  - System is powered from each activated unit, eliminating the cost and need for external power outlets

- **Multiple programming packages and agreements**
  - Residents are eligible for nationally offered rates
  - Residents are billed directly for their programming packages, equipment and services
The D2 Lite enclosure is a self-contained unit that houses the SWiM distribution parts required to successfully install a customer. The enclosure utilizes common components that are already deployed throughout the DIRECTV network.

- Slimline KaKu ODU
- SL5 LNB
- World Direct International ODU
D2 Lite Components Continued

- SWiM16 Module
- Band Stop Filter
  - MDU version
- PI-29z Power Inserter
D2 Lite Enclosures

- There are two (2) versions the D2 Lite enclosure.
- The key change is the removal of the Band Stop Filters and assorted connections located in the enclosure.
- The V2 enclosures require that a Band Stop Filter be installed on each APMT FEED as the unit homerun is installed and activated.
- Failure to install the Band Stop Filters will cause service issues with existing installed customers and constitute a failed installation at inspection requiring a truck roll to resolve.

Version 1: Band Stop Filters Installed

Version 2: Band Stop Filters Not Installed
D2 Lite System Components V1

- D2 Lite Enclosure V1
- Holland HRD2 Splitters
- Band Stop Filters
- SWiM16 Module(s)
- Green Label SWiM Splitters
- Mini RG6 Coax Cabling
D2 Lite System Components V2

- D2 Lite Enclosure V2
- SWiM16 Module(s)
- Mini RG6 Coax Cabling
- Holland HRD2 Splitters
- Green Label SWiM Splitters
D2 Lite (V1 & V2) can accommodate up to 2 SWiM16 modules, for a total of 32 SWiM tuners, in a single enclosure. The enclosure is shipped with one SWiM16 module fully installed and is pre-wired for one additional SWiM16 module. There are a total of 8 output ports available for use. The ports are labeled **APMT FEED 1,2,3,4,5,6,7,8**

- **APMT FEED ports 5, 6, 7, 8** are fed from SWiM module #2 (top SWiM module)

- **APMT FEED ports 1, 2, 3, 4** are fed from SWiM module #1 (bottom SWiM module)

The ports with a “*” next to them are wired to the SWiM splitters installed in the enclosure and will have a signal level approximately 4.5dBm lower than the other ports due to the loss of the SWiM splitter. These ports should be connected to the units with the shortest homerun lengths.
When arriving at a property that may qualify for a D2 Lite installation there are a few simple questions to ask before proceeding with any work on the property:

- Is the building between 2 and 20 units in size?
- Do I have landlord permission?
- Is there line of site for an ODU?
- Is there already a D2 Lite enclosure installed?
  - If a D2 Lite enclosure is already installed, the property does not have to be re-qualified and the customer installation can be completed
- Is there a suitable location to install a D2 Lite enclosure?
A proper and thoroughly executed site survey is the foundation of a successful and hassle free installation. Identifying obstacles and safety concerns upfront will ensure the installation goes smoothly. Items to pay attention to during the survey are, but not limited to:

### Location of ODU
- Installed in a location that is safely accessible by technicians
- Located on a structurally sound portion of the roof top or wall
- Provide proper line of sight free of trees, buildings or other obstructions
- Slimline Ka/Ku optimum line of sight provides for a 40° window
  - 10° left of the 99° orbital slot
  - 10° right of the 119° orbital slot
- World Direct International ODU (when applicable)
  - Ensure there is adequate space and proper line of sight to install the ODU

### Locating a complaint ground source
- Local fire/electrical code compliant
- NEC compliant
Site Survey Continued

**Location D2 Lite Enclosure**
- Safely accessible to technicians after initial installation
- Centrally located to all the units being serviced by the system
- Located in area where the enclosure can installed
  - Horizontally on a wall surface
  - Properly installed on a NPRM
- Out of direct sunlight (when possible)
- Secure location
  - Cannot be easily tampered with
  - Out of direct line/access of high traffic areas

**Cable Path from ODU to D2 Lite Enclosure**
- Shortest possible distance
- Should not exceed
  - 100’ RG6
  - 150’ RG11

**Cable Path from D2 Lite Enclosure to each unit**
- Shortest possible distance
- Should not exceed
  - 150’ RG6
  - 200’ RG11
Property Concerns

- Discuss the installation procedure with the property owner

- Ensure the property owner agrees with:
  - ODU placement
  - Cable routing from ODU to D2 Lite enclosure
  - D2 Lite enclosure placement
  - Cable routing from D2 Lite enclosure to customer units

- Provide detailed timeline for completion of the installation

- Provide regular updates on the progress of the installation
Follows current DIRECTV approved installation methods
- Refer to the Standard Professional Installation Guidelines (SPIG) for more information
  - Available on the DWS
- Visit [http://satinstallinstalltraining.com](http://satinstallinstalltraining.com) for additional information

An AIM is required for the proper installation and alignment of the ODU(s)

Mount as inconspicuously as possible
- Avoid the front side (street facing) of the building
  - Unless other locations present safety hazards to persons, equipment or property
  - Line of sight cannot be obtained elsewhere

**SL5S and SL3S LNBs are not authorized and will NOT work with the D2 Lite system**
Grounding and Bonding

- Follows current DIRECTV approved installation methods
  - Refer to the *Standard Professional Installation Guidelines (SPIG)* for more information
    - Available on the DWS
  - Visit [http://satinstallinstalltraining.com](http://satinstallinstalltraining.com) for additional information
- Must adhere to all NEC, state and local codes
  - Whichever more stringent
- Use building “house” ground whenever possible
- Use a ground block to bond the ODU and D2 Lite enclosure to the building ground
- Ground block must be installed after the ODU and before the D2 Lite enclosure
  - Should be located where the best access to a suitable ground location is
- Do NOT use an ODU attachment, adjustment screw or bolt as the ground and/or bond point
- Maintain proper bend radius at all times
  - Follows RG6 bend radius rules
    - 2.75” radius (5.5” diameter)
All cabling from the ODU(s) to the D2 Lite enclosure will be DIRECTV approved

- **RG6**
  - Solid copper core
  - Copper clad steel (CCS) is not acceptable
  - Will not exceed 100’ in length
  - Maintain proper bend radius of 2.75” (5.5” diameter)

- **RG11**
  - Copper Clad Steel (CCS) can be used if DIRECTV approved
  - Will not exceed 150’ in length
  - Maintain proper bend radius of 4.75” (9.5” diameter)

- **Plenum, Riser and Flooded cable will be used when site conditions require it**
Cabling will be installed

- Most direct route available
- Professionally
  - Properly attached to the building
  - Loose cabling should be tied together
    - Typically there will be 4-6 cables pulled depending on the number of ODU's
    - Cables will be neatly bundled together
  - Zip ties should NOT be evenly spaced along the cable route
  - Maintain proper bend radius for the cable type installed
    - RG6 2.75” (5.5” diameter)
    - RG11 4.75” (9.5” diameter)

- Cable lengths not to exceed
  - 100’ RG6
  - 150’ RG11
Outdoor connections

- Approved connectors
- Approved weather boots and seals
- Will be tightened to 30” lbs.

Connect cabling to ODU(s)

- Slimline SL5 LNB requires 4 coax connections
- World Direct LNB requires 1 coax connection
- Service loop will be installed at each ODU
  - Maintain proper bend radius for cable type being used
- Weather boots and seals will be installed as required
D2 Lite Enclosure Installation

**Enclosure Placement**
- Safely accessible to technicians after initial installation
- Located in area where the enclosure can be installed
  - Horizontally on a wall surface
  - Properly installed on a NPRM
- Out of direct sunlight (when possible)
- Secure location
  - Cannot be easily tampered with
  - Out of direct line/access of high traffic areas
- When using RG6
  - Within 150’ of farthest unit
  - Within 100’ of ODU
- When using RG11
  - Within 200’ of farthest unit
  - Within 150’ of ODU

*If using a mix of RG6 and RG11 follow the distance rules for each cable type*
D2 Lite Enclosure Installation Continued

Mounting Options

Wall Mount

- Backplane is designed to be installed on 16” O.C. studs
- Mounted to the wall with 4 lag bolts
- DIRECTV logo facing outward and right side up
- SL5 FEED / World Direct / APMT FEED ports facing to the RIGHT
Mounting Options Continued

Concrete Block

- Can be mounted on standard 8”x8”x16” concrete blocks using block clips when installed on a NPRM
- DIRECTV logo facing upward
- SL5 FEED / World Direct / APMT FEED ports facing towards the center of the NPRM mount (towards the ODU mast)
  - This will ensure that the cabling is not accidentally “bumped” into when others are on the rooftop
**Service Loop at the enclosure**

- Allows for easy removal/replacement of the front plate assembly when adding an additional SWiM-16 module.

- **RG6**
  - 24” minimum diameter loop

- **RG11**
  - Depending on the type of RG11 used the diameter of the loop may exceed 24”

If a spare cable is pulled: terminate the cable with the proper connector and properly weather seal the connector.
Connect from ODU(s) to enclosure

- Slimline SL5 LNB coax cables are connected to the 4 **SL5 FEED (IN)** inputs
- World Direct LNB coax cable is connected to the single **WORLD DIRECT (IN)** input
Installing in the Unit

- Follows current DIRECTV approved residential installation methods
  - Refer to the *Standard Professional Installation Guidelines (SPIG)* for further information
  - Visit [http://satinstalltraining.com](http://satinstalltraining.com) for additional information

- Each unit will have a dedicated homerun to the D2 Lite enclosure
  - D2 Lite is **NOT** intended to be used with shared services (i.e. cable internet)
    - 29V 1.4A being passed on the homerun line
  - If shared services are provided over coax the installation operator is solely responsible for those shared services
Homeruns should not exceed maximum cable distance

- RG6 should not exceed 150’
- RG11 should not exceed 200’
- Line amplifiers are **NOT** approved and will not be used

New homerun cabling should be installed

- In the most direct route available between the enclosure and the unit
- Professionally
  - Properly attached to the building (where/when applicable)
  - Loose cabling should be tied together
    - Multiple homerun cables may be installed along the same cable path
    - Cables should be neatly bundled together
  - Zip ties should NOT be evenly spaced along the cable route
  - Maintain proper bend radius of the cable type installed
Installing in the Unit Continued

- **Existing homerun cables may be used if**
  - They are in good condition
  - RG6 or RG11 cable
    - RG59 should not be utilized
  - There are no splices/barrels existing in the cable run
  - Splices/barrels do not have to be installed to complete the homerun cabling
After the homerun cabling is in place, before beginning the equipment installation in the unit

- Connect the homerun to the D2 Lite enclosure
  - Use one of the available APMT FEED (OUT) ports
    - Ports 1, 2, 3, 4 are connected to SWiM16 #1
    - Ports 5, 6, 7, 8 are connected to SWiM16 #2 (when installed)

**REMEMBER:** the ports with the “*” have a signal level 4.5dBm lower than the other ports and should be connected to the units with the shortest homerun lengths

- All homeruns should be tagged at the D2 Lite enclosure to ensure easy unit/homerun identification in the future
Installing in the Unit Continued

- The unit equipment install follows standard DIRECTV installation practices
  - A PI-29 Power Inserter must be installed in every unit
    - The PI-29 provides the required voltage to the D2 Lite enclosure to power the SWiM16 module(s)
  - 2 and 4 way splitters may be installed in the unit
    - Properly terminate any open (unused) ports on the splitters
  - SWiM tuner count, for any single unit, cannot exceed 8 tuners
  - Any compatible SWiM receiver/device can be installed in the unit
  - All DIRECTV programming, services and national offers are available to the customer

*Note:* Due to the unique design of the Holland splitters in the D2 Lite enclosure up to 8 PI-29 power inserters can be connected to the D2 Lite enclosure *without* causing an “overvoltage” or “power overload” situation.
The D2 Lite enclosure needs be tested after it is installed and prior to activating the first customer on each SWiM module. Testing should take place after the homerun wiring is completed and the power inserter is installed and powered on. These steps can also be used to troubleshoot the D2 Lite system.

**SWiM #1**

- In the unit
  - Run EIV+ at the **SIGNAL TO IRD** port on the power inserter
  - If EIV+ fails troubleshoot issue to resolution

- At the D2 Lite enclosure
  - Run EIV+ at **APMT FEEDs 2,3,4** (assumes APMT FEED 1 is connected to the homerun and power inserter)
  - If EIV+ fails at any port, replace D2 Lite enclosure
  - **DO NOT ATTEMPT TO REPLACE ANY COMPONENTS IN THE D2 Lite enclosure**

**SWiM #2 (if installed)**

- Same as SWiM #1 using **APMT FEEDs 5,6,7,8**
The removal of existing ODUs is a requirement of installing D2 Lite

ODUs will be removed as customers are installed onto the D2 Lite system

Removal of existing ODUs consists of:
- Removing the LNB and LNB support arm
- Removing the reflector
- Removing the mount support arm
- If a NPRM removal of the NPRM mount

**ALWAYS LEAVE THE ODU FOOT AND MONOPOLE FEET IN PLACE!!!!!**
- Removing the ODU foot and monopole feet can result in damage to roof material and cause the area to leak

Proper disposal of all ODU materials
- Subject to local laws and ordinances
Compliance inspections will be conducted on a minimum of 25% of all D2 Lite installations.

Inspections are conducted by the Field Operations team and local market QA inspectors.

Notification of the inspection will be sent at least three (3) business days in advance.

The installation team is highly encouraged to attend the inspection.

Upon completion of the inspection, the installation team will be notified of the inspection results within three (3) business days.

Discrepancies found during the inspection are expected to be resolved within five (5) days of notification.
Items of interest during the inspection, but not limited to:

- Proper installation of the ODU(s)
- Proper grounding/bonding of the ODU and system
- Proper installation of the D2 Lite enclosure
- Proper service loop(s) installed at the D2 Lite enclosure
- Cabling from the ODU to the D2 Lite enclosure
- Homerun cabling: cabling from the D2 Lite enclosure to the unit(s)

EIV+ tests will be run on an open port of the D2 Lite enclosure when possible

At no time during the inspection will an active customer be taken out of service
D2 Advantage Lite Installation Diagram

**ODU Location**

Ground Blocks should be bonded per local electrical or NEC code

**D2 Advantage Lite Enclosure Location**

Stack of Quad Ground Block

RG-6 coaxial cable

**Inside Each Unit**

SWiM Compatible Receiver

A splitter can be installed on the “Signal to IRD” port to service additional receivers when required.

Up to 150' of RG-6 coaxial cable
D2 Advantage Lite Installation Diagram V2

**ODU Location**

- SLS
  - 99° 101° 105° 110° 139°
- World Direct
  - 95°

- Quad Ground Block
- Dual Ground Block

- RG-6 coaxial cable

**Inside Each Unit**

- SWiM Compatible Receiver
- SWiM Compatible Receiver

- 2 Way Splitter

- This can be a 2 or 4 Way Green Label SWiM Splitter. Verify proper signal levels out of the splitter before installing receivers.

**D2 Advantage Lite Enclosure Location**

- SL5 Feed
  - #1* #2* #3 #4
- World Direct
- APMT Feed (OUT)
  - #1* #5* #3 #7
  - #2* #6* #4 #8

- D2 Advantage Lite Enclosure Front Panel (right facing)

- Up to 150' of RG-6 coaxial cable
D2 Lite Installation Diagrams V2 – 1 Receiver

D2 Advantage Lite Installation Diagram V2

ODU Location

Ground Blocks should be bonded per local electrical or NEC code

Inside Each Unit

A splitter can be installed on the “Signal to IRD” port to service additional receivers when required.

Up to 150’ of RG-6 coaxial cable

Band Stop Filter

Quad Ground Block

Dual Ground Block
D2 Advantage Lite Installation Diagram V2

**ODU Location**

Ground Blocks should be bonded per local electrical or NEC code

**Inside Each Unit**

- SWiM Compatible Receiver
- 2 Way Splitter

This can be a 2 or 4 Way Green Label SWiM Splitter. Verify proper signal levels out of the splitter before installing receivers.

- Up to 150' of RG-6 coaxial cable
References

**Standard Professional Installation Guidelines (SPIG)**
- Available on the Dealer Website
- **http://satinstalltraining.com**
  - Username: revolution
  - Password: training
- **DWS – Dealer Website**
- **Distributor**
It's QUESTION TIME!!