
USER MANUAL

WIRELESS VIDEO DISTRIBUTION WIRELESS VIDEO BRIDGE GEN 2

REVISION HISTORY			
Date	Author	Description of Change	Version
December 16, 2016	Alexander Fitch	First Draft	0.0.1 Engineering Release
January 4 th	Alexander Fitch	Add Wall Mount instructions and FCC statements	0.0.2 Engineering Release

The purpose of this document is to communicate the technical information associated with the C61W and Wireless Video Bridge Gen2, and to provide an overview addressing how the new capabilities may impact the customer, agent and field technician.

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TERMINOLOGY

Term	Description
WVB	Wireless Video Bridge

I. OVERVIEW

The Wireless Video Bridge Technical Communication will cover all the aspects of Wireless Video and the Wireless Video Bridge.

A. WIRELESS VIDEO BRIDGE

The WVB Gen2 is a second generation Wireless Video Bridge that is targeted as a direct replacement to the WVB Gen1 with enhanced networking features.

The Wireless Video Bridge (WVB2) provides the ability to stream DIRECTV programming from a Genie server to the Genie Mini (C41W or higher) client wirelessly.

The Wireless Video Bridge provides video distribution throughout the home without the use of coaxial or CAT5 cables at every TV. The WVB2 creates a private network only accessible to DIRECTV products.

II. HARDWARE INFORMATION

A. WIRELESS VIDEO BRIDGE

1. Front Panel



FIGURE 1: WVB - FRONT PANEL

The front panel contains

- Multicolor status indicator LED.

The WVB2 is to be installed vertically (It is not to be placed in horizontal position)

The WVB2 can be wall-mounted using the mounting bracket provided. When using the mounting bracket, the WVB2 should remain positioned upright (not upside down).

2. Rear Panel



FIGURE 2: WVB - REAR PANEL

3. The rear panel contains

- Red reset button
- Add Client button
- Ethernet port
- Two Satellite in F connector
- DC power Inlet connector matching EPS10 external Power supply
- A green power indicator LED.



FIGURE 3 : SIDE VIEW WITH NEW LOGO

WVB2 Specifications

Size and Weight

- Height: 182”
- Width: 190”
- Depth: 182”
- Weight: 12.05 oz.

Packaging

- Carton
- Height: 10.25”
- Width: 4”
- Depth: 9”
- Weight: 2 lb.

Environmental Requirements

- Operating temperature: 32° to 122° F (0° to 50° C) for indoor units
- Storage temperature (No Damage): -40° to 150° F (-40° to 66° C)
- Relative humidity: 93% non-condensing

Ports and Interfaces

- 802.11n,ac Wi-Fi
- Coax Network SWiM input
- Coax Network SWiM output
- DC Power Input
- Inactive Ethernet Port

Power

- EPS10 External PSU
- AC external PSU -120v~60HZ, 18W
- Input: 12V DC 1.5A
- Active Current Consumption (DC) : 1.0A – 1.2A

III. MINIMUM REQUIREMENTS

The minimum requirements for a Wireless Video distribution are

- SWiM installation
- Genie server (HR34/HR44/HR54/H44+HDD)
- Wireless Video Bridge
- At least one wireless Genie Mini Client

IV. FEATURES

Functionally, the WVB Gen2 is identical to the WVB Gen1 with the exception of the following features:

A. 802.11AC SUPPORT.

802.11ac is the latest IEEE Wi-Fi standard which provides increased bandwidth and additional throughput over increased range compared to 802.11n (on which WVB Gen 1 is based). Increased throughput is required to sustain the level of video traffic required to support more concurrent clients which are a feature of the HS17 family of products with up to 7 HD clients supported or 2 Wireless 4K Clients and one Wireless HD client.

B. MoCA 2.0

MoCA 2.0 allows for increased frequency range and channel bandwidth, which leads to increased throughput over greater distances in comparison to MoCA 1.1. MoCA 2.0 is also backwards compatible with MoCA 1.1 and will therefore allow for operability with existing, MoCA 1.1 compliant products.

C. WIRELESS REPEATER FUNCTIONALITY

The WVB Gen2's ability to act as a wireless repeater indicates that the WVB Gen2 will offer a wireless solution for extending the range of the internal WVB of the HS17

D. WIRELESS PROTECTED SETUP

The WVB Gen 2 will contain an Add Client Button that will primarily be used with the HS17 eliminating the need to add the RVU Client through the "Add Client" Screen. If the user chooses, they also have the option of adding a RVU client through the "Add Client" screen just like the WVB Gen 1.

Feature Comparison between the WVB Gen1 and the WVB Gen2

Feature	WVB Gen1	WVB Gen2
MoCA	1.1	2.0
Wireless	802.11n	802.11n, ac
Ethernet	Yes (10/100)	Yes (10/100/1G)
F Connectors (female F-type)	2	2
Reset Button	Yes	Yes
Power LED	Yes	Yes
Status LED	Yes	Yes
Mechanicals (mm)	190x182x82	190x182x82
Weight (oz)	12.5	12.5
Power Supply	EPS10	EPS10
DFS Channel Support	Yes	Yes
Maximum Supported Number of Clients	3	5
Wi-Fi Band Operation	5GHz	5GHz
Minimum Throughput Over 3 Streams	72Mbps	120Mbps
WVB Range	80 feet, 5 walls	80 feet, 5 walls
MIMO Solution	4x4	4x4
DTV WPS Button	No	Yes
VA SNE Compliant	No	Yes

Feature	WVB Gen1	WVB Gen2
Bridge MoCA to Wi-Fi Traffic	Yes	Yes
Wireless Repeater Functionality	No	Yes

V. INSTALLATION

A. HOW THE WIRELESS VIDEO BRIDGE WORKS

- The Wireless Video Bridge Gen 2 (WVB2) is connected to the Genie server via the SWiM/MoCA network.
- The WVB2 acts as an access point for the C61W, creating the Wireless Video Network for wireless clients (C61W).
- The WVB2 delivers audio/video and the user interface wirelessly to the clients as if there was a traditional coax network in the home, and this connection is different and separate from the Wi-Fi connection to the customers Router.

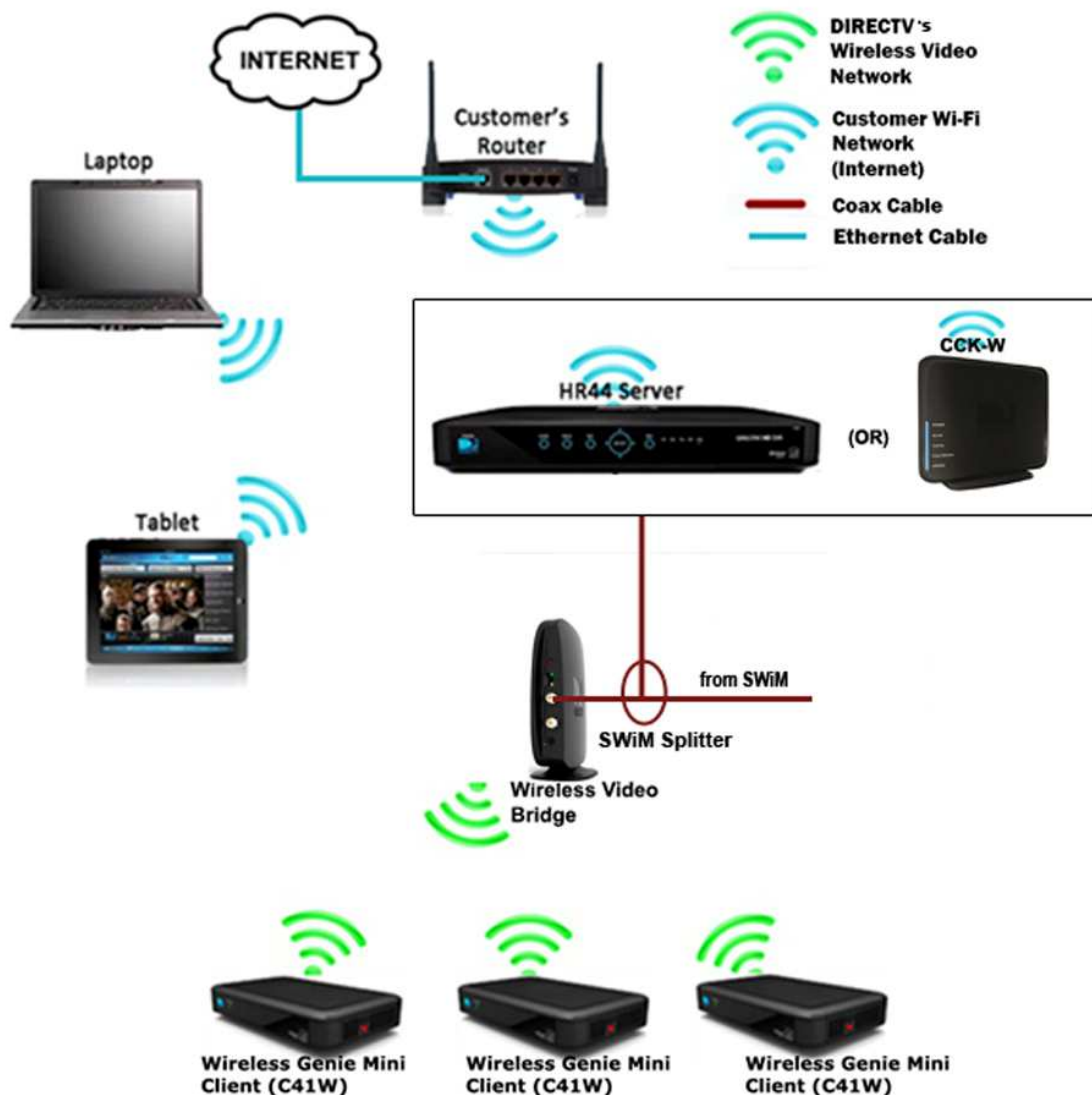





FIGURE 4: WI-FI & DIRECTV'S WIRELESS VIDEO NETWORK DIFFERENCES (NEW DIAGRAM)

B. INSTALLATION REQUIREMENTS

1. Minimum Distances

- The wireless devices require a minimum distance between each other to decrease risk of interference. The following are the required distances.
- HR54 or CCK-W and WVB2 must be a minimum of 4 feet apart
- HR54 or CCK-W and Wireless Router must be a minimum of 4 feet apart
- Wireless router and WVB2 must be a minimum of 4 feet apart
- WVB2 and Wireless Client (C61W) must be a minimum of 4 feet apart

	<i>Distance is physical distance NOT the length of the cable.</i>
	<i>Concrete, Brick, Stone or other high density material can limit the range for the wireless signal</i>
	<i>For proper placement of Genie, WVB2, Wireless Clients and Router a Wireless Video Bridge Survey should be performed.</i>

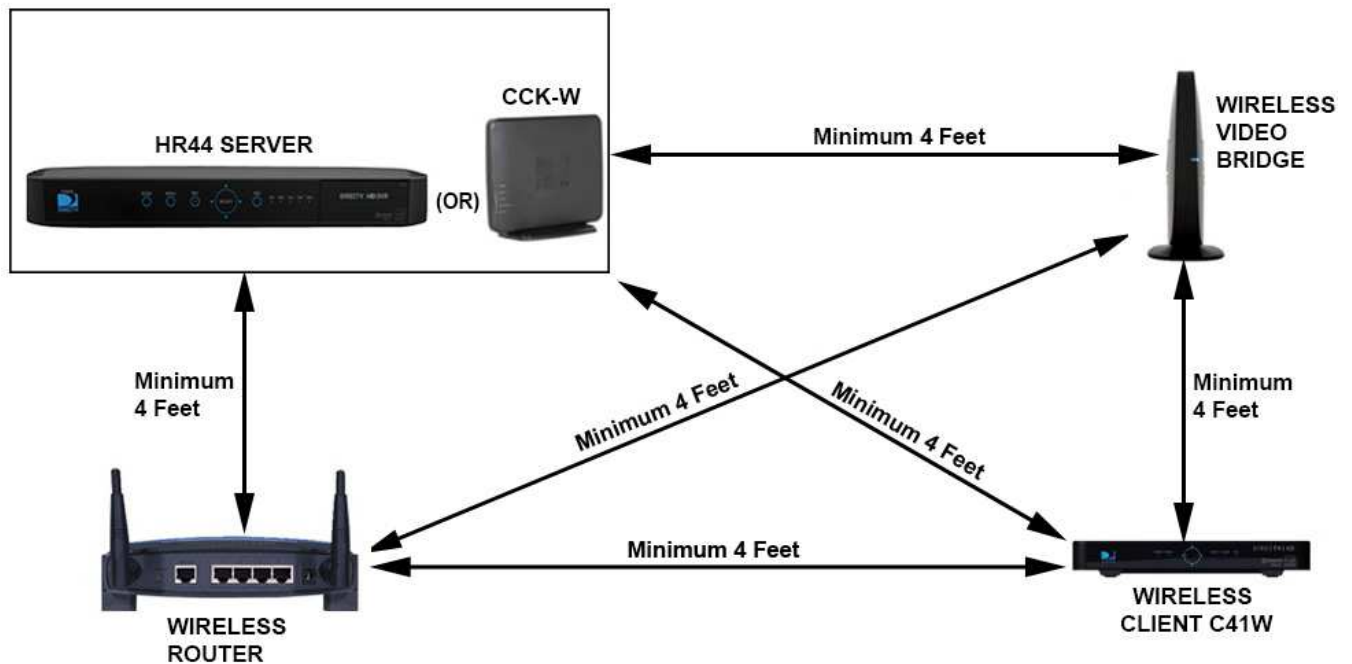


FIGURE 5: MINIMUM DISTANCES DIAGRAM

2. Maximum Distances

The WVB2 and the Wireless Client (C41W, C61W) should be placed no further than 80 feet apart and have no more than 5 internal walls between them. It is important to recognize this is guidance and home construction will significantly decrease range.

Walls and other barriers can decrease the range and significantly impact the maximum distances. Use signal strength to determine installation quality.

Below are examples of various barriers and how they degrade the signal and lower the maximum distance from the WVB2.

Standard	Medium	Strong	Extreme
<ul style="list-style-type: none"> • Plexiglas • Sheet plywood • Internal wall (2 layers drywall + 2"x4" studs) 	<ul style="list-style-type: none"> • Fir lumber • Non-stucco external wall (wood siding) • Wood floor/ceiling 	<ul style="list-style-type: none"> • Stucco wall (with diamond metal mesh) • Brick/Stone wall/fireplace • Double-pane tinted high efficiency door/window 	<ul style="list-style-type: none"> • Metal objects (ducting, appliance, enclosure, television)
<5 dB signal loss	5-10 dB	10-20 dB	>20 dB
No impact up to 5 barriers, 15 feet distance impact for each additional barrier	30 feet distance impact per barrier	45 feet distance impact per barrier	Potential link breakage with solid RED LED

Examples of operating range

- 65 feet with 5 internal walls + 1 standard barrier
- 50 feet with 5 internal walls + 1 medium barrier
- 35 feet with 5 internal walls + 1 strong barrier

3. Wall Mount Installation


- Drive the screws through the mounting plate to be fastened and into the wall. (See Step 1)
- Align the two slots at the bottom of the unit with the two pins on the mounting plate. (See step 2)
- Slide them until they lock in place (See step 3)



C. WIRELESS VIDEO BRIDGE SURVEY (AKA BEACON MODE)


The WVB2 survey is important to determine placement of the WVB2 and Wireless clients (C61W). As part of the initial WVB survey, the technician determines a central location to place the WVB2 to service the Wireless Clients (C61Ws). This is done by determining the following:

- Determine the Genie server (HR44/HR54) location
- Determine the client locations
- Determine the location of the WVB2.

	<p><i>The WVB2 must be installed in a vertical position using the permanently attached foot/pedestal. If the WVB2 is lying flat on its side, it can have a negative impact on the distance the clients can be from the WVB2.</i></p> <p><i>Do not place the WVB2 on the floor as it may be easily knocked on its side.</i></p>
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The following is the WVB2 survey/Beacon mode procedure. This procedure covers both new installs and upgrades.

- 1) The WVB2 is not to be connected to the SWiM/MoCA network until instructed.
- 2) Setup the wireless clients (C61W) in the location they will be used.

	<p><i>If the C41W, C61W is to be mounted behind the TV, it should be placed close to its final mounted position as possible to fully verify signal quality from the WVB.</i></p>
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- 3) Connect the wireless client (C41W, C61W) to the TV and power on. The wireless client (C41W, C61W) will boot up to the following “Connecting to Video Bridge” screen. (C41W, C61W with older software will have a “Continue” option, and C41W or C61Ws with new software will have a “Connect Now” option). The user need not wait for this screen to display; they may proceed with the next step.
 - If the client signal strength is poor, the Connect Now/Continue option is disabled.

- If the user selects Setup Instructions the instructions screen is displayed.

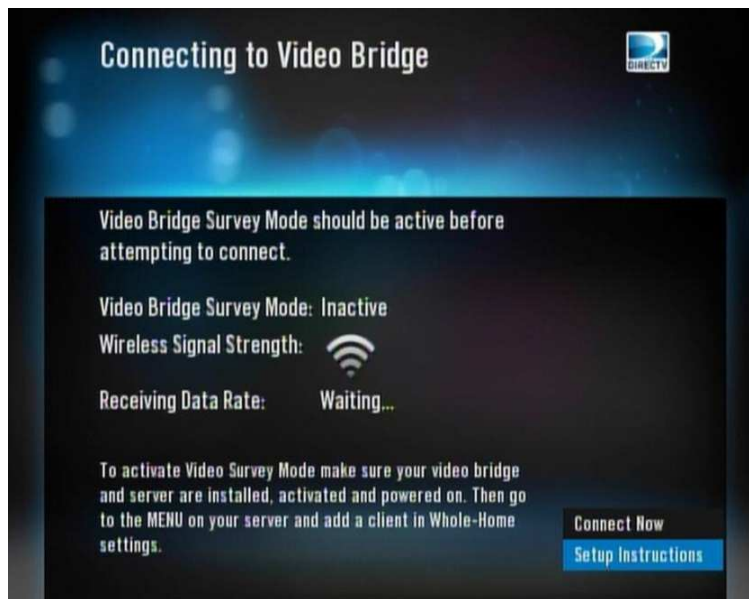


FIGURE 6: C41W SIGNAL STRENGTH SCREEN


4) Select the placement for the WVB2

Select a location for the WVB2 based on the following factors:

- Best location to provide GREEN LED to all wireless clients(C41W, C61Ws) (use 5 walls and 80 feet as the guide)
- Access to the coax SWiM network. Do not connect the WVB2 to the coax network yet.

5) Power on the WVB2 and observe the power up sequence. The WVB boots up to a state referred to as 'Survey mode' or 'Beacon Mode' where it transmits a signal for wireless clients (C41W, C61W). The WVB boot sequence is as follows:

- WVB2 LED flashes BLUE during boot up.
- The boot up takes approximately two minutes.
- Once boot up has completed, the WVB2 LED alternates GREEN/YELLOW.
- The WVB2 is now in Video Bridge Survey/Beacon mode.

	<p><i>Wireless Video Bridge Survey/Beacon mode works only on WVB2 and clients that have not previously been paired (factory fresh) or clients that have been reset to factory defaults.</i></p>
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6) The signal strength on every wireless client (C41W, C61W) should be checked by ensuring that the Network LED is GREEN

- If one or more of the wireless clients' (C41W, C61W) network LED are not green, the WVB2 will need to be relocated to an area that maximizes range and minimizes interference. Refer to Troubleshooting section for more details.
 - If more than one wireless clients (C41W, C61W) will be installed and a GREEN LED cannot be achieved on all wireless clients (C41W, C61W) the technician has the following options:
 - Use a wired client (C41/C51/C61). Follow existing guidelines to install the wired client if needed.
 - Use more than one WVB2. Choose a location for the first WVB2 that covers most of the wireless clients (C41W, C61W) and choose another location for a second WVB2 to cover the wireless client(s) (C61W) that have poor signal coverage.
- 7) Do not proceed if the signal strength is marginal (yellow network LED's on the wireless client (C61W(s)) A yellow network LED on the wireless client (C61W) indicates poor signal strength to the WVB2. Consider moving the WVB2, adding another WVB or using a wired client.

D. WVB INSTALLATION

Once the WVB2 survey is complete and the optimal locations for the WVB2(s) and wireless clients (C61W) have been determined, installation can begin.

- 1) If not previously performed, install the ODU/SWiM and run the coax cable to the WVB location(s) (do not connect the coax to the WVB2 yet).
- 2) If not previously performed, install, update the software and activate the Genie server
- 3) Connect the WVB2 to the SWiM/MoCA network (if more than one WVB2 is used, connect all WVB2's to the SWiM/MoCA network)
- 4) If WVB2 is not powered on, power on the WVB2. After a short delay (less than 1 minute) the LED should be Solid GREEN. Note: The LED will be solid BLUE if the Genie server previously had ANY clients (wired or wireless) paired to it. If not solid GREEN or solid BLUE refer to Troubleshooting section. (Full boot takes about two minutes).
- 5) On the Genie server verify OSD "A wireless video bridge has been found and configured successfully". Select OK to clear the OSD. This often takes only 30 seconds however it can take up to several minutes.

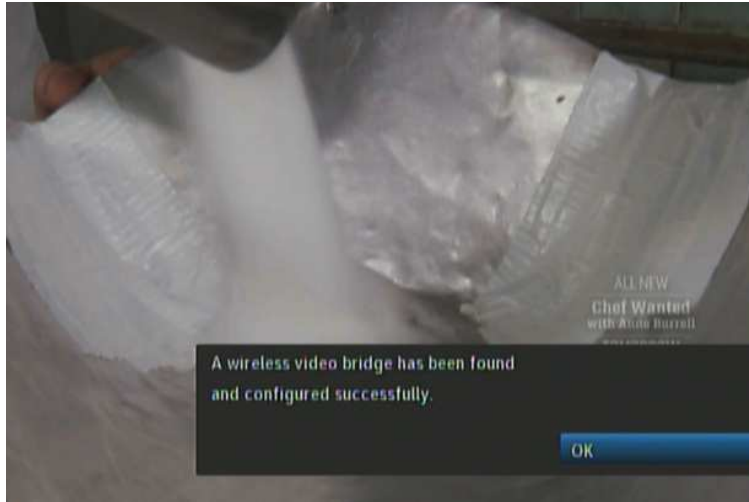


FIGURE 7: GENIE-WVB FOUND OSD

- 6) If the OSD does not display on the Genie server, check the WVB2 LED and refer to the troubleshooting section.
- 7) Verify all WVB2s are connected to the Genie server by checking the WVB status under *Whole Home > Video Bridge > Video Bridge Status* on the Genie server.
 - Each WVB in the system should show ACTIVE.
- 8) Installation of the WVB2 is complete once all WVB2s appear ACTIVE on the Genie server's Video Bridge Status screen and all WVB2s have a solid GREEN or solid BLUE LED. (This means that the Genie server and the WVB2 are connected, even though you may not have a wired or wireless client connected).

E. ADDING WIRELESS CLIENTS (C61W)

Once the WVB2 is properly configured by the Genie server, the wireless client(s) (C61W) can be added. The WVB2's network status light should be Solid GREEN or BLUE (if previous clients were connected)

- 1) On the Genie server, go to "Add a Client" from the "Whole Home" menu and note the PIN displayed on the screen. (These steps will change in Goliath and when in Lenient mode or Full Client Tracking mode. See FE-TC D-088 Goliath/Flower Tech Comm) Keep the Genie server on this screen until all wireless clients (C61Ws) are installed and are at live video.



FIGURE 8: GENIE "ADD A CLIENT" SCREEN

- 2) Approximately ~30 seconds after entering the "Add a Client" screen at the Genie Server, the WVB will have a flashing LED that alternates between GREEN and BLUE. This indicates that the system is in the proper state to add a wireless client (C61W).
- 3) If not already powered on, power ON one of the wireless clients (C41W, C61Ws)
- 4) On the wireless client (C41W, C61W), select the "Connect Now"/"Continue" button while in the "Connecting to Video Bridge" screen to begin client connection and registration.



FIGURE 9: C41W "CONNECTING TO VIDEO BRIDGE" SCREEN

- 5) "Attempting to connect to video bridge..." will be displayed.

- The network led may flash RED while you are on this screen
- After this screen, it is common to see a momentary (3-5 seconds) gray screen before the Enter PIN screen appears.
- If “Unable to connect to Video Bridge” OSD appears, see Troubleshooting.



FIGURE 10: C41W "ATTEMPTING TO CONNECT TO VIDEO BRIDGE" SCREEN

- 6) When wireless connection between the WVB2 and wireless client (C41W, C61W) completes, enter the PIN provide by the Genie server. (This process will change in Goliath and when in Lenient mode or Full Client Tracking mode. The PIN will no longer be required. See FE-TC D-088 Goliath/Flower Tech Comm for all related changes)




FIGURE 11: C41W "ENTER PIN" SCREEN

- At any time throughout the installation, the Software Download OSD may appear. If the OSD appears, then select “OK, Download” to start the download. Do NOT exit Add Client on the Genie server until the download completes.

- If the Software Download fails, it will reboot itself. Once the client boots, the wireless client (C41W, C61W) will be in one of three states ,
 - Live TV: Do Nothing. If the download OSD appears, select “OK Download”.
 - Enter PIN screen: If the download OSD appears, select “OK Download”. If the download OSD does not appear, enter the PIN (even if you may have previously entered the PIN).
 - Select a Server OSD: Verify the Gene server is in the Add Client screen, and ensure that the WVB LED is alternating Blue/Green.
- 7) Once the PIN is entered, the user selects “Adds a New Location” on the Client.
- 8) If the user does not have enough Client services on the account, the user will get a ‘Call DIRECTV’ screen on the Client. The user must call DIRECTV to add the Client to their account.
- 9) If the user has enough Client services (or once they call DIRECTV to add the client service), the user will be taken to the “Name the Client”.
- 10) User names the Client, and will have the option to copy/don’t copy the location settings from a Genie server or another Client.
- The wireless client (C41W, C61W) may go to gray screen, may have a flashing RED network LED, and/or may display the Wireless Connection Lost OSD.
 - The OSD will clear, and the network LED will go back to Green after 10 – 20 seconds.
 - If gray screen persists and the network LED is Green, then change the channel to restore video.
 - If the above symptoms occur, the rest of the setup will be skipped, and the installer should program the remote.
- 11) Complete the wireless client (C61W) setup by programming the remote and selecting “Watch DIRECTV”
- 12) If a 2nd and/or 3rd wireless client (C61W) are needed, start from Step (3) of Add a Wireless Client. If more than 3 clients are to be added (4-8 C61Ws), place the other wireless client(s) (C61W) in standby before adding the additional clients. No more than 3 clients can be powered on at the same time.
- 13) After all wireless clients (C61W) have been added, go to the Genie server and select DONE on the “Add a Client” screen.



Do NOT exit the Add Client screen on the Genie server while the wireless client (C61W) is downloading software.

	<p>After selecting <i>Done</i>, the wireless client (C61W) may go to gray screen, may have a flashing RED network LED, and/or may have the Wireless Connection Lost OSD. The OSD should disappear and the LED will go back to Green.</p> <p>If gray screen persists, then wait 2 minutes before troubleshooting.</p>
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- 14) All wireless clients (C61W) that are ON should have solid GREEN network LEDs. After 1-2 minutes the WVB2 LED should display a solid BLUE.

F. FINAL CHECKS

- 1) Turn on the Genie server and up to 3 clients.
- 2) Run System Test on the Genie server and ensure there are no Error Codes.
- 3) Confirm that the LED on the WVB2 is Solid Blue.
- 4) Ensure the network LED on Clients 1, 2 and 3 (wired and wireless) is GREEN and confirm Live TV (If internet connected, press the “Dash” (-) button. The client will display “Internet connected”).
- 5) If the customer has more than 3 clients, put Clients 1, 2 and 3 into Standby, and turn on clients 4, 5 and 6.
- 6) Reconfirm that the LED on the WVB2 should still be Solid Blue.
- 7) Ensure the network LED on the Client 4, 5 and 6 is GREEN and confirm LiveTV.
- 8) If the customer as a 7th and 8th client, put the other Clients into Standby and turn on Clients 7 and 8.
- 9) Reconfirm that the LED on the WVB2 should still be Solid Blue.
- 10) Ensure the network LED on clients 7 and 8 is GREEN and confirm LiveTV.

The following diagram shows the connection between the Genie, WVB2 and C61W.

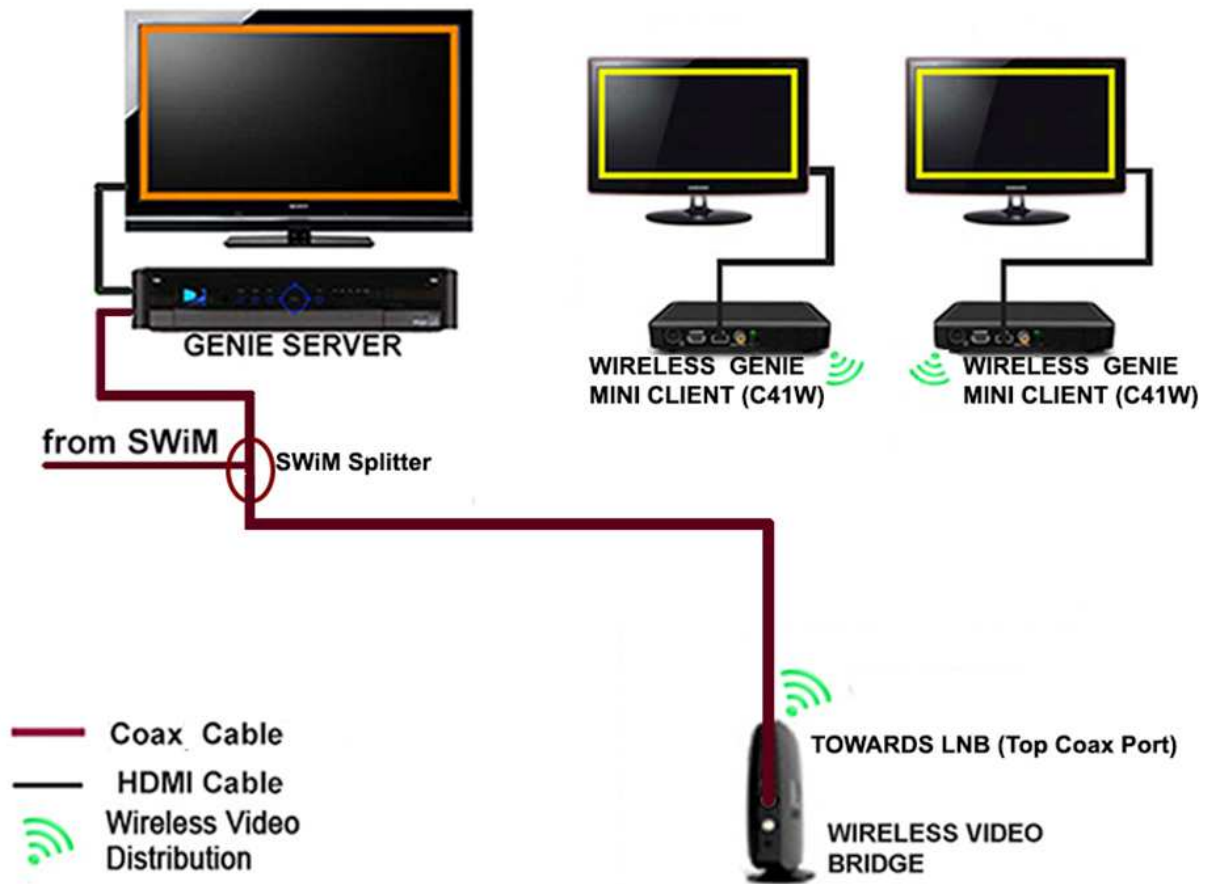


FIGURE 12: WVB AND C41W INSTALLATION DIAGRAM

The diagram on the following page depicts an *alternate* approved installation for a Genie, WVB2 and C61W setup:

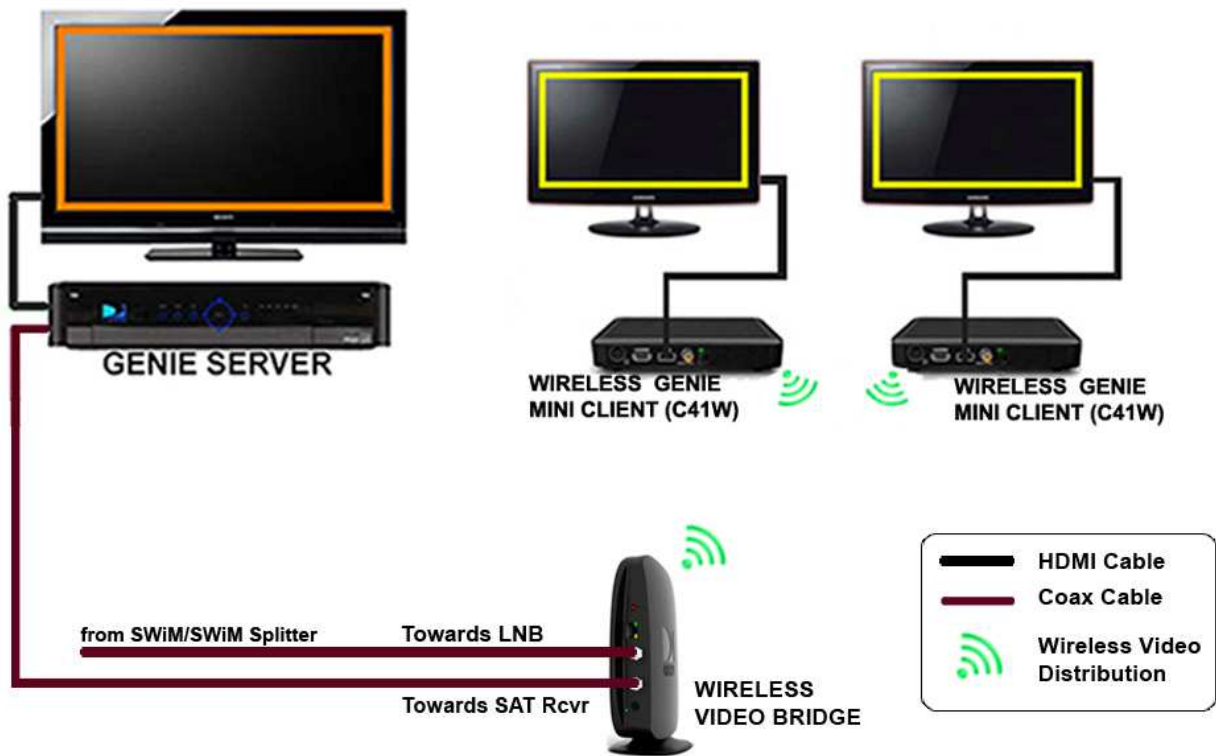


FIGURE 13: WVB AND C41W INSTALLATION DIAGRAM (ALTERNATE INSTALLATION)

G. REMOVE WVB2 FROM THE GENIE SERVER

This process is only intended to be used if the WVB2 is to be permanently removed from the Genie server. If replacing a WVB2, go to the “Replace WVB” section in this document. If more than one WVB2 has been installed and a WVB is removed permanently, this procedure should be performed to stop an error from occurring on the Genie server. (These steps will change in Goliath and when in Lenient mode or Full Client Tracking mode. see FE-TC D-088 Goliath/Flower Tech Comm)

- 1) Navigate to Menu -> Settings & Help -> Settings.

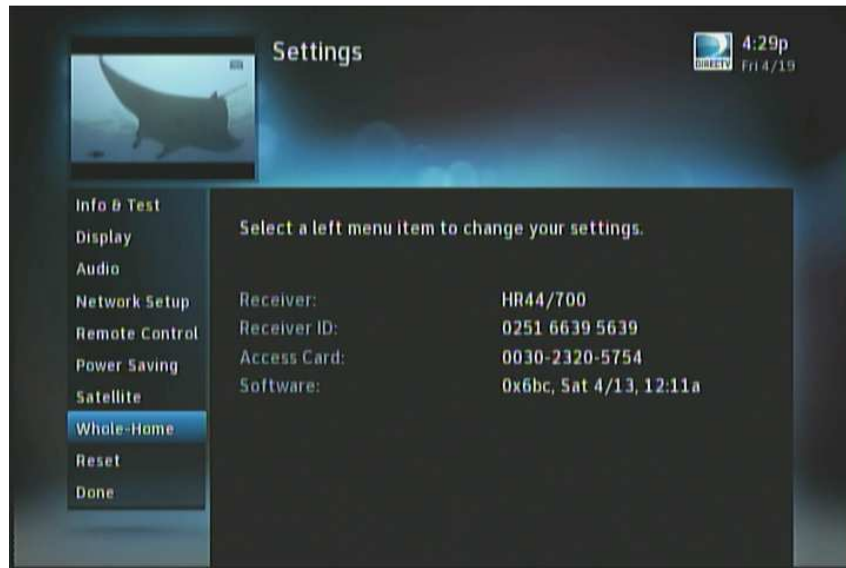


FIGURE 14: GENIE SETTINGS SCREEN

2) Select Whole-Home -> Video Bridge.



FIGURE 15: GENIE SELECT VIDEO BRIDGE SCREEN

3) If a WVB2 is configured to the network, the “Remove Video Bridges” option is enabled.



FIGURE 16: GENIE REMOVE VIDEO BRIDGES SCREEN

- 4) Select the option Remove Video Bridges. The screen will list all the WVB2's that are configured to the network. Select "Continue" to remove the WVB2.

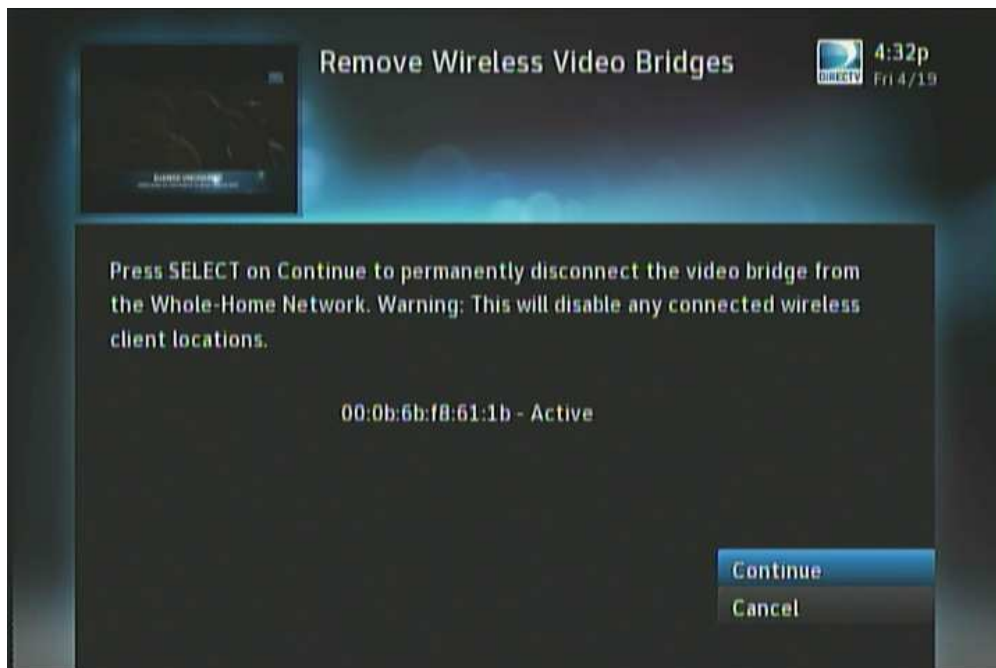


FIGURE 17: GENIE REMOVE WIRELESS VIDEO BRIDGES SCREEN 1

- 5) Follow the on-screen instructions and press "-" to complete the removal of the WVB2.



FIGURE 18: GENIE REMOVE WIRELESS VIDEO BRIDGES SCREEN2

- 6) A successful completion OSD will appear. Press “OK”.

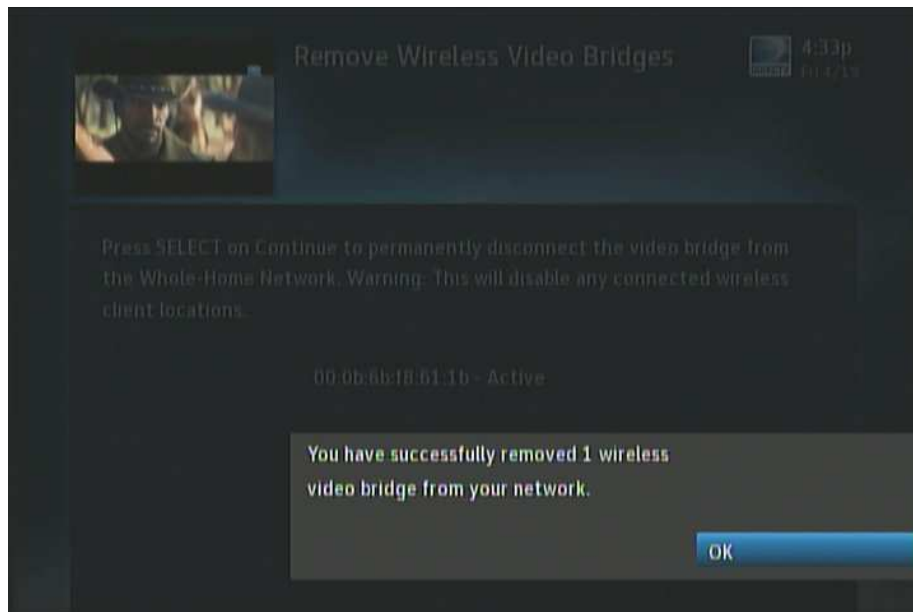


FIGURE 19: GENIE - WVB REMOVAL CONFIRMATION SCREEN

- 7) The removal will cause the wireless clients (C61Ws) that are paired with this WVB2 to disconnect from the wireless network.

VI. TROUBLESHOOTING FOR OSD AND DIAGNOSTICS

H. CLIENT SYMPTOMS AND TROUBLESHOOTING

4. Wireless Client (C61W) Grey/Black screen no Banner

Technician Troubleshooting:

- 8) If the wireless client (C61W) network LED is Green, then follow normal Gray/Black screen troubleshooting.
 - Change channels
 - Turn off the wireless client (C61W) for 15 seconds and then turn it back on.
 - Verify the customer's TV is on the correct input
 - Verify cables and connection to the TV is good (including trying a different cable and input to the TV)

If the LED is not Green, or normal Gray/Black troubleshooting does not resolve then continue to step 2.

- 9) Run system test on the Genie server. Troubleshoot any error codes that appear (see Genie error code table).
 - a. If there are no error codes, check the LED status light on WVB2.
 - b. If LED is not BLUE then see WVB2 LED status troubleshooting
 - c. If WVB2 LED is BLUE, then check LED status light on the wireless client (C61W)
 - d. If LED is not Solid GREEN then see wireless client (C61W) LED status troubleshooting
 - e. Extra steps for Technicians ONLY (The "Excellent"/"Good" text that is referenced below is already in the Genie servers screens, however they should not be used until the Genie Server has the Goliath Software)
- 10) On the Genie Server go to Setting & Help >/ Settings > Info & Test > More System Info
- 11) Scroll down to the Wireless Client(s) that is having the issue and look at its "RSSI".
- 12) If the RSSI does not show "Excellent" then troubleshoot the same as a "Yellow" Network LED on the C61W"

Note: "Good" status is normally acceptable unless the customer is complaining of intermittent issues. "Good" indicates that the Network LED is Green, but it might be on the edge of going to "Yellow". RSSI value of "Excellent" helps to ensure that there are enough margins to overcome interferences in the customer's home.

 - a. If internet connected, power-cycle the router.
 - b. Reset the WVB2
 - c. Reset the Genie server, and wait for it to boot up to video

- d. If the client does not have LiveTV, reset the client, wait for client network LED to turn Green and wait 2 minutes.
- e. If not resolved, agents setup a service call
- f. If not resolved, Technicians:

If the server is connected to the router wirelessly (HR44 internal Wi-Fi/CCK-W) then change to a BB-DECA, and refer to “Resetting a Genie with Clients” section above. If still unresolved, escalate to FPR.

Agent Troubleshooting:

- 1) Verify the TV is on.
- 2) On the C61W, verify the front power button lights up solid blue.
 - a. If blinking Blue, there is a software download in progress. Wait 5 minutes
 - b. If no blue light, troubleshoot for Receiver Will Not Turn On.
- 3) Channel up or down
- 4) If video does not return, then turn the C61W Off, then On
- 5) If video does not appear, then Press Guide on the remote.
 - a. If the Guide appears, then Continue to Step 6
 - b. If the Guide does not appear, then follow the below to check connections and Input
 - Press the Input button on the DIRECTV remote.
 1. Ask the customer to slowly cycle through the TV's video inputs.
 2. If one input setting gives a clear picture with the Guide, advise the customer to set the TV to that input for DIRECTV service.
 - If using HDMI:
 1. Turn the TV off and on to reinitialize the HDMI port.
 - a) If successful, escalate to NET -- noting the customer's TV model.
 2. Verify the HDMI cable is connected to the HDMI jack on receiver and TV.
 3. Disconnect and reconnect the cable from the receiver to the TV; make sure the connections are secure.
 - a) This re-establishes the 2 way communication between the receiver and the customer's TV.
 - b) If successful, escalate to NET -- noting the customer's TV model.
 4. Try an alternate HDMI jack.
 - a) Some TVs have more than one HDMI input; make sure to change the TV input to match the alternate HDMI jack.
 5. If there's an A/V receiver or any other device attached, remove it; run the HDMI cable directly from the receiver to the TV.
 6. Try using component cables (i.e., 10-pin Connector) with audio cables and change the TV input to Component -- Offer Cords & Cables if needed.

- 6) Run a system test on the Genie server.
- 7) If no diagnostic code, check the color of the Network LED on the C61W.
 - a. Not solid green: Troubleshoot per the LED color.
 - b. Solid Green: Continue.
- 8) Check the color of the Network LED on the Wireless Video Bridge.
 - a. Not solid blue: Troubleshoot per the LED color.
 - b. Solid Blue: Continue.
- 9) If issue persists, reboot the C61W.
 - a. When rebooting C61W, pay attention to any screens that appear during the bootup. If the initial screen appears (Hello, Your DIRECTV receiver is starting up), but Live TV does not appear then you may need further troubleshooting after rebooting the Genie Server
- 10) If issue persists, reboot the Genie Server
- 11) If issue persists, and during the C61W boot up, did the customer see the “Hello, Your DIRECTV receiver is starting up” screen?
 - a. If Yes, then reset the C61W to Factory Default setting
 1. On the C61W pressing and holding the DIRECTV Logo Power button for 5-10 seconds (This is the Power button, NOT the Red Reset button)
 2. When the power button is released, the receiver will reboot up to factory defaults.
 3. Does the customer now see video
 - a) If no, then Offer a Service Call
 - b) If yes, then C61W was probably in a resolution that their TV does not support. Since the customer has reverted their C61W to factory default, you now need to help , the customer with some of their settings
 - i. Remote
 - If the customer is not using the RC71 or higher remote, then you can skip this step. If they have an RC71, reset the remote to IR mode, then reprogram the RF mode
 - I. On the remote, press and hold MUTE and Select.
 - II. Green LED blinks twice.
 - III. Press 9-8-7
 - IV. Green LED blinks Red for less than a second times <<yes RED is correct, the remote spec says green flash 4x but that is not how the remote works>>
 - V. The remote should now control the C61W and the TV setting should remain
 - VI. If the customer wished to be in RF mode, then follow Enable RF for the Genie Remote
 - ii. If needed, help the customer with setting up Favorites, Parental Controls, Resolution and TV

- b. If Nothing was seen during the C61W boot up, then Offer a Service Call.
5. C61W Program Banner displayed, no Video on TV
Troubleshooting: Refer to Troubleshooting steps above.
6. C61W Video/Audio on TV but no Menu, Guide or List displays
Troubleshooting: Refer to troubleshooting steps above.
7. Freeze Frame/Pixelization on wireless client (C61W)
Troubleshooting: Refer to Troubleshooting steps above.
8. C61W does not display the Enter PIN screen
Troubleshooting:
 - 13) If the Genie server is not in “Add a Client” screen, put the Genie server in the Add Client mode and follow the installation procedures.
 - 14) If that does not resolve the issue,
 - Agents set up a service call.
 - Technicians – Follow installation steps.
9. Wireless client (C61W): Add a Client failed (does not display video after Add a Client exited)
Troubleshooting: Refer to Troubleshooting steps above (Gray/Black screen troubleshooting).
10. Wireless Client (C61W) Network LED Failures (Bad Wireless Connection)
Symptom
 - WVB2 has a Solid Red LED
 - And/or Wireless Client has Yellow, Red or Blinking Red Network LEDProbable Cause
 - Poor placement of the WVB2 and/or Wireless ClientInstaller Training Troubleshooting
 - 1) For Yellow or Solid Red Network LED on the Wireless Client:
 - a) Ensure there are no obstacles around the WVB2 or the Wireless Client that would degrade signal quality.
 - b) Try moving the WVB2 to a better location to improve the signal to the Wireless Client locations. Remember the minimum distance guidelines to separate the WVB2 from other wireless devices like the customer’s router, an HR44 with built-in WiFi, or, for example, a Playstation with a WiFi connection.
 - 2) For a blinking Red network LED on the Wireless Client:
 - a) Put the Genie Server back into “Add Client” mode (Menu > Settings & Help > Settings > Whole Home > Manage Clients > Add Client)

- b) If the Wireless Connection was lost while watching video, the “Wireless Connection Lost” screen will appear. (if the Wireless Client was in Standby, “Select a Server/ No Server Detected” will appear and will change to the Wireless Connection Lost OSD)



- c) Select “More Info, then “Reset Connection” from the C61W on-screen display





- d) The follow the installation steps to check the signal strength and pair the Wireless Client

I. OSD TROUBLESHOOTING

11. Genie server OSD:

“Wireless Connection Lost. The connection to wireless video bridge has been lost. Please make sure all wireless video bridges are connected and have power. If the problem persists call DIRECTV at 1-800-531-5000”

Probable Cause:

- The WVB2 lost connection to the Genie server
- The WVB2 lost power or is rebooting
- Troubleshooting should focus on the connection from the WVB2 to the Genie server

Troubleshooting

15) Check if the clients are having a problem. If yes, troubleshoot client symptoms.

16) If no, educate customer that the OSD was temporary and choose to ignore OSD.

12. Wireless Client (C61W) OSD:

“Wireless Connection Lost. The connection to wireless video bridge has been lost. Please make sure all wireless video bridges and server are properly connected and that this client is within range of the wireless video bridge”

Probable Cause:

- The WVB2 lost connection to the Genie server
- The WVB2 lost power or is rebooting

- The wireless client (C61W) is not in range of the WVB2

Troubleshooting

- 17) Check the C61W LED and troubleshoot accordingly.
- 18) If LED is GREEN, troubleshoot as per C61W Grey/Black screen symptoms.


13. Wireless Client (C61W) OSD:

“Select a Server. No Servers Were detected. Check your network connections”

Technician Troubleshooting:

- 19) Verify the wireless client (C61W) network LED is Green
 - If the LED is Green, allow 2 minutes for the Live TV to return
- 20) If the wireless client (C61W) network LED is blinking Red, reset the WVB2 (this is needed in case the WVB2 has not loaded the new software)
- 21) Treat the same as Genie Server OSD “Wireless Connection Lost”

Agent Troubleshooting

	<p><i>Troubleshooting should focus on the connection from the Wireless Video Bridge to the Genie server..</i></p>
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- 22) Run system test on the Genie server
- 23) If no diagnostic code, ensure Wireless Video Bridge lights is solid BLUE.
 - If light is not solid blue, troubleshoot as per the LED color.
 - If light is solid blue, continue.
- 24) Ensure the Coax cables on the Wireless Video Bridge and Server is properly attached " and finger tight.
- 25) Reset the Wireless Video Bridge.
- 26) Reset the Genie server.
- 27) If issue persists, schedule a service call.

14. Wireless Client (C61W) OSD:

“Connecting to Video Bridge”

Probable Cause and Troubleshooting:

- 28) Make sure the Genie server is in the Add a Client Screen.
- 29) Follow the normal installation process starting at Connect Now on the wireless client (C61W).

15. Wireless Client (C61W) OSD:

“Unable to connect to Video Bridge. Make sure that the video bridge is in survey mode and this client is within range of your video bridge signal”

Probable Cause and Troubleshooting:

- 30) Select the OK button will bring the user back to connect to video bridge screen
- 31) Ensure the Genie server is on the Add Client Screen,
- 32) Ensure that the WVB2 LED is alternating Blue/Green.
- 33) Make sure you are not selecting “Connect now” or “Continue” on more than one client at a time.

J. GENIE SERVER ERROR CODE TABLE

The Genie server has additional error codes for troubleshooting the WVB2 and wireless clients (C61W). These are listed in the table below. These codes may be displayed after running system test on the Genie server.

Diagnostic Code	Text	Cause	Troubleshooting Steps for Tech Training	Troubleshooting Steps for Agents
89 (Genie only)	<p>“Unable to connect to the Wireless Video Bridge(s) on your network. In order to display any video the receiver needs to be connected to a Wireless Video Bridge. Please verify that all Wireless Video Bridges on your network are powered on and have the coaxial cable connected. Select “Test Again” to see if this has solved the issue.”</p> <p>Diagnostic Code: 89</p>	<p>The Genie server does not detect the WVB2</p>	<ol style="list-style-type: none"> 1) Determine if the WVB2 was deliberately removed from the network by the customer. If it was, walk customer through removing the WVB2 from the Genie by using the system menus. 2) Ensure all WVB2s are powered on. 3) . 	<ol style="list-style-type: none"> 1) Ensure the Wireless Video Bridge is powered ON by checking if the DC jack power LED is lit up GREEN. 2) Is the LED light on the Wireless Video Bridge blinking RED? <ul style="list-style-type: none"> • YES: Reset the Wireless Video Bridge. <ul style="list-style-type: none"> ◦ If Wireless Video Bridge's LED light continues to blink Red, “Replace WVB2”. • NO: Continue. 3) Ensure that the coax cables to the Wireless Video Bridge and Server are properly connected " and finger tight. 4) Delete all WVB2s from Genie Server by going to Menu > Settings & Help > Settings > Whole-Home > Remove Video Bridge (Add Why Component: WVB2s will be reacquired by the Genie Server after the below resets are completed) 5) Reset the Wireless Video Bridge. 6) Reset the Genie server. <p>If issue persists, schedule a service call.</p>

Diagnostic Code	Text	Cause	Troubleshooting Steps for Tech Training	Troubleshooting Steps for Agents
90 (Genie only)	<p>“One or more of the Wireless Video Bridges on your network reports an error. You may experience poor quality or intermittent loss of video on your wireless clients. Please reset your Wireless Video Bridge(s) using the red reset button on the back panel. Select \"Test Again\" to see if this has solved the issue.”</p> <p>Diagnostic Code: 90</p>	WVB2 Internal Error. (Hardware Issue)	<ol style="list-style-type: none"> 1) Perform a reset on the WVB2. 2) If WVB2 continues to blink Red, replace the WVB2. 3) 	<p>Note: If the customer has more than one Wireless Video Bridge, advise customer to find the one that DOES NOT have a solid blue light.</p> <ol style="list-style-type: none"> 1. Reset the Wireless Video Bridge. 2. If issue persists, Replace the WVB2 that has a blinking Red LED.
91 (Genie only)	<p>“One or more of the Wireless Video Bridges on your network reports an error. You may experience poor quality or intermittent loss of video on your wireless clients. Please check the coaxial cable connection to your Wireless Video Bridge(s) then reset them using the red reset button on the back panel. Select \"Test Again\" to see if this has solved the issue.”</p> <p>Diagnostic Code: 91</p>	WVB2 MoCA Error.	Troubleshoot the MoCA / Coax network. Verify cabling and connectors.	<ul style="list-style-type: none"> • If the customer has more than one Wireless Video Bridge, advise customer to find the one that DOES NOT have a solid blue light. • Although issues may be seen on the C61W, the issue is not with the communication between the Wireless Video Bridge and C61W. <ol style="list-style-type: none"> 1) Ensure that the coax cables to the Wireless Video Bridge and Genie Server are properly connected and finger tight. 2) If issue persists, schedule a service call
92 (Genie only)	<p>“One or more of the Wireless Video Bridges on your network reports an error. You may experience poor quality or intermittent loss of video on your wireless clients. Please reset your Wireless Video Bridge(s) using the red reset button on the back panel. Select \"Test Again\" to see if this has solved the issue.”</p> <p>Diagnostic Code: 92</p>	WVB2 Ethernet Error.	Should not occur. Escalate to NET, NET to escalate to STB Field Support..	<p>Should not occur.</p> <p>Escalate to NET, NET to escalate to STB Field Support.</p>



VII. OTHER TROUBLESHOOTING

K. WVB2 LED TROUBLESHOOTING

LED State	Description	Troubleshooting Steps	Troubleshooting Steps for Agents
Off	Device not powered	1) Plug in the approved power supply to a reliable power source..	1) Check the Power LED on the rear panel of the Wireless Video Bridge. It should be GREEN. 2) If not Green, plug in the Power Supply, then if still not Green then replace Power Supply 3) If green, replace WVB2
Solid Blue	Normal Operation Wireless clients (C61W) should have a connection to the Genie server.	No Action.	No Action
Blink Blue	Booting up. Start within 10 seconds of power ON.	1) Normal WVB2 boot up process, takes approximately 2 minutes.	1) Wait for Boot up. 2) Normal Wireless Video Bridge boot up process, takes approximately 2 minutes 3) It may take an additional 3-5 minutes for the C61W to get video
Solid Green	Good Connection to the Genie server but No Clients paired with WVB2.	1) Follow “Adding Wireless Clients” steps to pair and register the Wireless Clients.	1) Wireless Clients need to be powered ON so that the Registration process can start. 2) Complete the steps to add a wireless client.
Blinking Green	Bridge in Survey/Beacon Mode MoCA network connected No communication from Genie server to the WVB2	This is normal when initially connecting to the MoCA network. Allow 5 minutes for the LED to change to Solid Green.	This is normal when initially connecting to the SWiM / MoCA network. Allow 5 minutes for the LED to change to Solid Green.
Blink Green and Yellow	Wireless Video Bridge Survey /Beacon Mode. No MoCA Network Established	1) Normal Wireless Video Bridge survey/Beacon mode without MoCA network connected. 2) Used to position the WVB2 and Clients during the Wireless Video Bridge survey/Beacon Mode. 3)	1) Normal Wireless Video Bridge Survey mode without a coax network connected. 2) Used to position the Wireless Video Bridge and Clients during the installation. 3) <u>Offer a service call.</u>
Blink Green and Blue	Wireless Client Add mode	1) Normal state when adding wireless clients (C61W). 2) See Adding Wireless Client for next	1) Normal state when adding wireless clients. 2) Should turn solid BLUE



LED State	Description	Troubleshooting Steps	Troubleshooting Steps for Agents
		steps	<p>once Genie server is out of this mode.</p> <p>3) Complete the steps to add a wireless client</p>
Solid Yellow	<p>MoCA Network Established. MoCA Phy Rate < 180 Mbps</p> <p>(Note: Although issues will be seen on the wireless client (C61W), the issues is not with the communication between the WVB2 and C61W)</p>	<p>Troubleshoot the MoCA / Coax network. Verify cabling and connectors.</p>	<p>1) Ensure the Coax cables on the Wireless Video Bridge and Genie Server are properly attached and finger tight.</p> <p>2) If issue persists, <u>offer a service call</u>.</p>
Blink Yellow	<p>No MoCA Network Detected.</p> <p>(Note: Although issues will be seen on the wireless client (C61W), the issues is not with the communication between the WVB2 and C61W)</p>	<p>Troubleshoot the MoCA / Coax network. Verify cabling and connectors..</p>	<p>1. Ensure the Coax cables on the Wireless Video Bridge and Genie Server are properly attached and finger tight.</p> <p>2. Reset Wireless Video Bridge by unplugging and plugging it back in (same as pressing the reset button).</p> <p>3. Reset the Genie server.</p> <p>4. If issue persists, offer a service call.</p>
Solid Red	<p>The WVB2 has a good connection to the Genie server; however there is a Poor Wireless connection to one or more wireless clients (C61W).</p>	<p>Follow “Wireless Client (C61W) Network LED Failures” troubleshooting, above, focusing on the Wireless Client(s) that has a Yellow or Red Network LED</p>	<p>1. Ensure that the Wireless Video Bridge is in a vertical position.</p> <p>2. If possible, ensure that there are no obstructions (e.g., cabinets or TV).</p> <p>3. Did the customer move the Wireless Video Bridge?</p> <p>a) YES: Move the Wireless Video Bridge back to its original location.</p> <p>b) NO: Continue.</p> <p>4. Did the customer move any C61W from its original location?</p> <p>a) YES: Ensure all C61W is in a location where its Network Status LED is GREEN.</p> <ul style="list-style-type: none"> ▪ If customer cannot get a GREEN LED, explain that the range between C61W and the Wireless Video Bridge is limited and either: <ul style="list-style-type: none"> i. Have customer move the C61W back to the original location, or ii. If the customer does not want to move the C61W back to



LED State	Description	Troubleshooting Steps	Troubleshooting Steps for Agents
			the original location, offer a <u>Relocate</u> . b) NO: If issue persists, <u>offer a service call</u> .
Blink Red	Device Error Detected	1) Perform a reset on the WVB2. 2) If WVB2 continues to blink Red, replace the WVB2.	1. Perform a reset on the Wireless Video Bridge. 2. If issue persists, Replace the WVB2

L. WIRELESS CLIENT C61W TROUBLESHOOTING

Power LED State	Network LED State	Description	Troubleshooting Steps for Tech Training	Troubleshooting Steps for Agents
OFF	OFF	Device not powered	1) Plug in the approved power supply to a reliable power source).	See normal troubleshooting for Receiver Will Not Turn On
Flashing Blue	Any	Client is updating Software	Allow the C61W to finish downloading. Update could complete 2-3 minutes	Allow the C61W to finish downloading. Update may take 2-3 minutes
ON	OFF	Wireless client (C61W) booting	Allow wireless client (C61W) to finish booting. wireless client (C61W) should boot in 1-2 minutes	Allow C61W to finish booting. • May take 1-2 minutes
ON	GREEN	Normal operation	1) This means the customer had a good connection to the WVB2. .	No Troubleshooting needed on the C61W.
ON	YELLOW	wireless client (C61W) connected; But poor connection to the WVB2. This may adversely affect performance. Focus should be on WVB2 placement.	1) Follow “Wireless Client (C61W) Network LED Failures” troubleshooting above	1. Ensure that the Wireless Video Bridge is in a vertical position. 2. If possible, ensure that there are no obstructions (e.g., cabinets or TV). 3. Did the customer move the Wireless Video Bridge? a) YES: Move the Wireelss Video Bridge back to its original location. b) NO: Continue. 4. Did the customer move the C61W from its original location? a) YES: Ensure the C61W is in a location where its Network Status LED is GREEN. ▪ If customer cannot get a GREEN LED, explain that the <u>range between C61W and the Wireless Video Bridge is limited</u> and either: i. Have customer move the C61W back to the original location, or ii. If the customer does not want to move the C61W back to the original location, offer a



Power LED State	Network LED State	Description	Troubleshooting Steps for Tech Training	Troubleshooting Steps for Agents
				<p><u>Relocate.</u> If issue persists, <u>offer a service call.</u></p>
ON	RED	Wireless Client (C61W) Connected. But poor signal strength; This may adversely affect the performance	1) Follow “Wireless Client (C61W) Network LED Failures” troubleshooting above	<ol style="list-style-type: none"> 1) Ensure that the Wireless Video Bridge is in a vertical position. 2) If possible, ensure that there are no obstructions (e.g., cabinets or TV). 3) Did the customer move the Wireless Video Bridge? <ol style="list-style-type: none"> a. YES: Move the Wireless Video Bridge back to its original location. b. NO: Continue. 4) Did the customer move the C61W from its original location? <ol style="list-style-type: none"> a. YES: Ensure the C61W is in a location where its Network Status LED is GREEN. <ol style="list-style-type: none"> i. If customer cannot get a GREEN LED, explain that the <u>range between C61W and the Wireless Video Bridge is limited</u> and either: <ol style="list-style-type: none"> 1. Have customer move the C61W back to the original location, or 2. If the customer does not want to move the C61W back to the original location, offer a <u>Relocate.</u> b. NO: 5) If issue persists, <u>offer a service call.</u>
ON	Blinking RED	Wireless client (C61W) not connected to the WVB2.	1) Follow “Wireless Client (C61W) Network LED Failures” troubleshooting above.	<ol style="list-style-type: none"> 1) Ensure that the Wireless Video Bridge is in a vertical position. 2) If possible, ensure that there are no obstructions (e.g., cabinets or TV). 3) Did the customer move the Wireless Video Bridge? <ol style="list-style-type: none"> a. YES: Move the Wireless Video Bridge back to its original location. b. NO: Continue. 4) Did the customer move the C61W from its original location? <ol style="list-style-type: none"> a. YES: Ensure the C61W is in a location where its Network Status LED is GREEN. <ol style="list-style-type: none"> i. If customer cannot get a GREEN LED, explain that the <u>range between C61W and the Wireless Video Bridge is limited</u> and either:



Power LED State	Network LED State	Description	Troubleshooting Steps for Tech Training	Troubleshooting Steps for Agents
				<ol style="list-style-type: none"> 1. Have customer move the C61W back to the original location, or 2. If the customer does not want to move the C61W back to the original location, offer a <u>Relocate</u>. b. NO: Continue 5) If the WVB2 was just reset, allow 3-5 minutes for the C61W connect and show live video.(The C61W Network LED should change to green) 6) If still flashing red. <ol style="list-style-type: none"> a. Reset the wireless settings b. Then perform the steps for Add a Wireless Client 7) If issue persists, <u>offer a service call</u>.



VIII. FCC STATEMENTS

A. Federal Communication Commission Interference Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

For operation within 5.15 ~ 5.25GHz / 5.47 ~5.725GHz frequency range, it is restricted to indoor environment.

B. For Mobile Device Usage

a. Radiation Exposure statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

C. For country code selection usage (WLAN devices)

Note: The country code selection is for non-US model only and is not available to all US model. Per FCC regulation, all WiFi product marketed in US must fixed to US operation channels only.

i.

