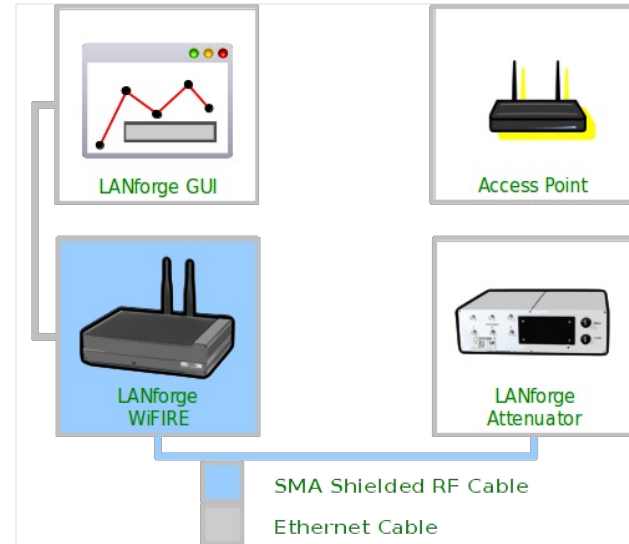
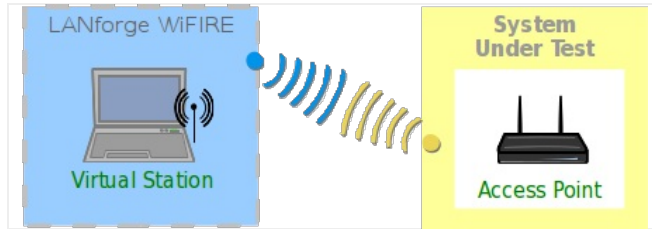


LANforge WiFi Rate v. Range Test

Goal: Compare WiFi performance for 'upload' traffic (client to AP) using a WiFi access point, a LANforge Attenuator and a LANforge Virtual Station. Traffic is generated by a RFC-2544 script on a Layer-3 UDP connection.

This demo consists of one WiFi access point and one CT523 LANforge WIFIRE machine connected to the LANforge Attenuator with coax SMA cables. (This is **not** over the air testing). This requires LANforge release 5.2.7 or higher.



1. Create Virtual Station

LANforge Manager Version(5.2.11)

Control Reporting Tear-Off Info Plugins

Stop All Restart Manager Refresh HELP

File-I/O Layer-4 Generic Test Mgr Test Group Resource Mgr Event Log Alerts Port Mgr Messages

Status Layer-3 L3 Endps VoIP/RTP VoIP/RTP Endps Armageddon WanLinks Attenuators Collision-Domains

Disp: 10.1.0.10:0.0 Sniff Packets Clear Counters Reset Port Delete

Rpt Timer: medium (8 s) Apply View Details Create Modify Batch Modify

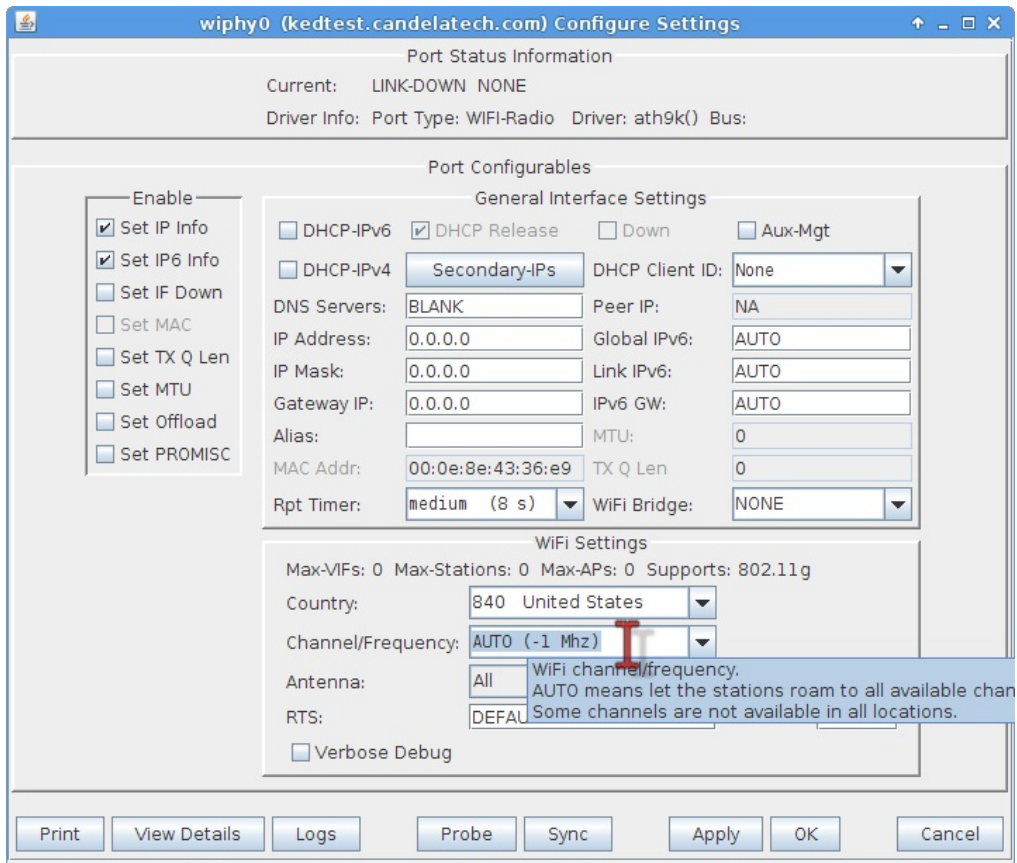
All Ethernet Interfaces (Ports) for all Resources.

Port	Pha...	Down	IP	SEC	Alias	RX Bytes	RX Pkts	Pps RX	bps RX	TX Bytes	TX Pkts	Pps TX	bps TX
1.1.15	<input type="checkbox"/>	<input type="checkbox"/>	10.26.10.1	0	ppp5	0	0	0	0	0	0	0	0
1.42.00	<input type="checkbox"/>	<input type="checkbox"/>	192.168.100.42	0	eth0	10,086	98	6	5,519	85,866	68	4	46,985
1.42.01	<input type="checkbox"/>	<input type="checkbox"/>	0.0.0.0	0	eth1	5,702	80	5	3,099	832	13	0	452
1.42.02	<input type="checkbox"/>	<input type="checkbox"/>	0.0.0.0	0	wiphy0	0	0	0	0	0	0	0	0
1.42.03	<input type="checkbox"/>	<input type="checkbox"/>	0.0.0.0	0	wiphy1	0	0	0	0	0	0	0	0
1.42.04	<input type="checkbox"/>	<input type="checkbox"/>	0.0.0.0	0	wiphy2	0	0	0	0	0	0	0	0
1.42.05	<input type="checkbox"/>	<input type="checkbox"/>	0.0.0.0	0	wlan0	0	0	0	0	0	0	0	0
1.42.06	<input type="checkbox"/>	<input type="checkbox"/>	0.0.0.0	0	wlan1	0	0	0	0	0	0	0	0

Logged in to: 192.168.100.26:4002 as: Admin

A. Select radio **wiphy1** and click **Modify**

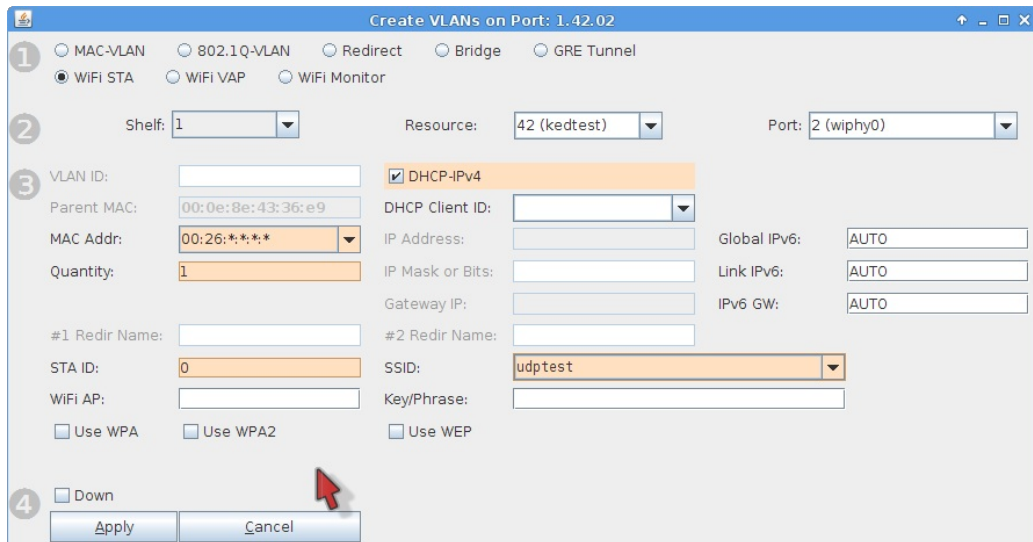
- B. Set the frequency of the radio to **Auto**



- A. Click **OK**

- C. On the Port Modify tab, click **Create**

- D. Create virtual station with these paramters:

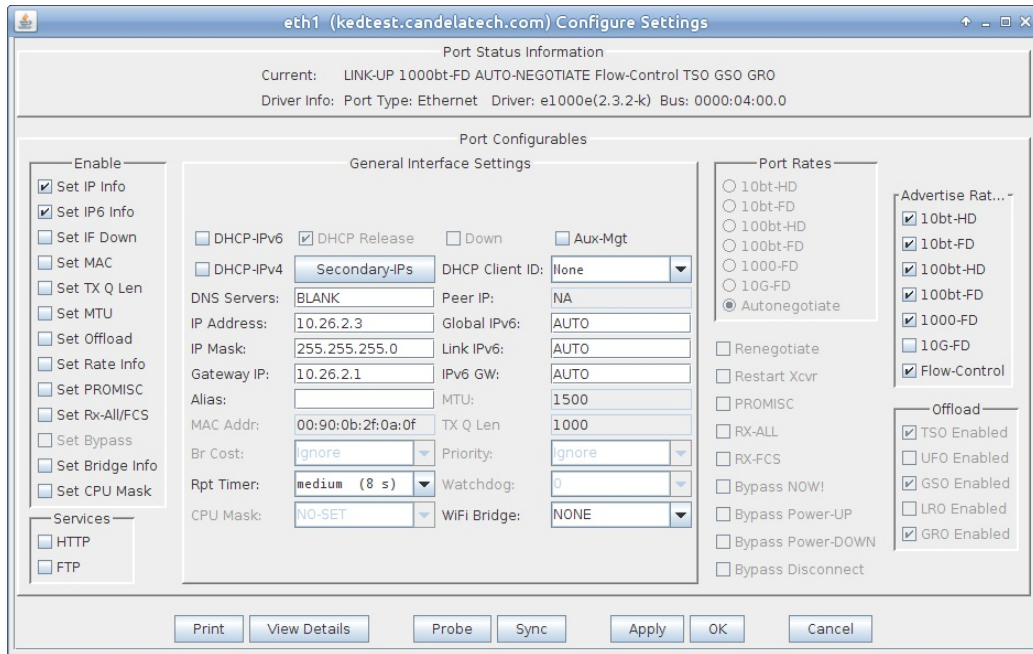


- A. Select **Wifi STA**
- B. Choose **DHCP-IPv4**
- C. Quantity **1**
- D. Station ID **0**
- E. SSID **'udptest'**
- F. Click **Apply**

- 2. Create upstream port wired to AP

- A. Wire the **eth1** port into the upstream connection of the AP under test.
- B. On the **Ports** tab, click on the **eth1** port

C. Configure **eth1** port with an upstream IP, like 10.26.2.3

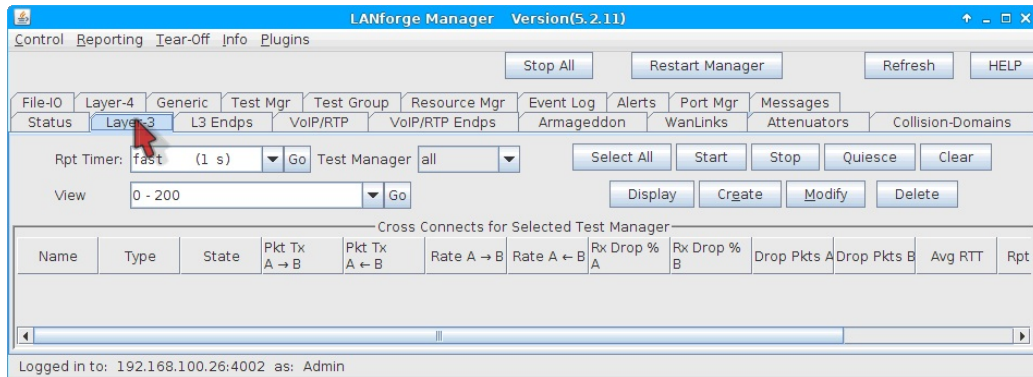


D. Set the **Gateway** to the AP wired interface IP.

E. Click **OK**

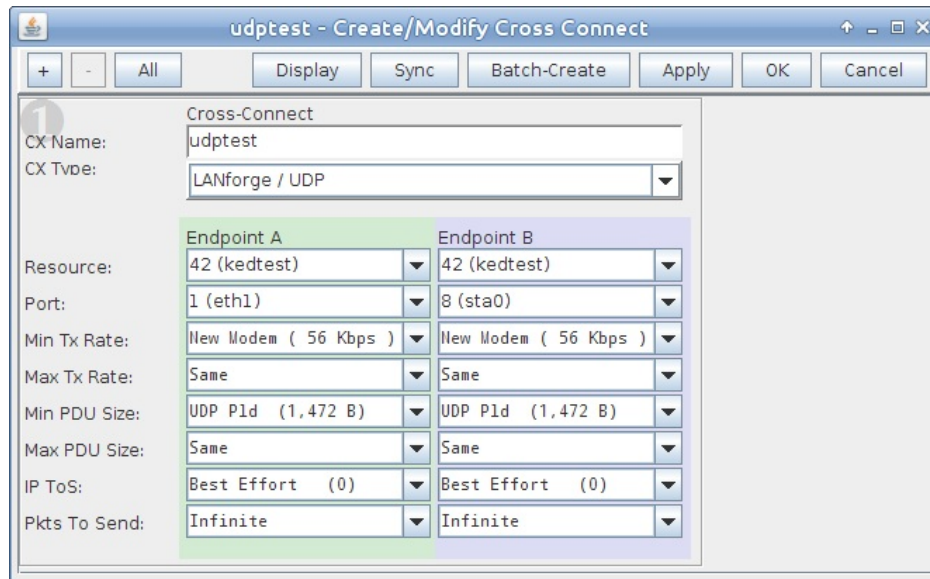
3. Create and Test Cross Connect

A. Go to the **Layer 3** tab



A. Click **Create**

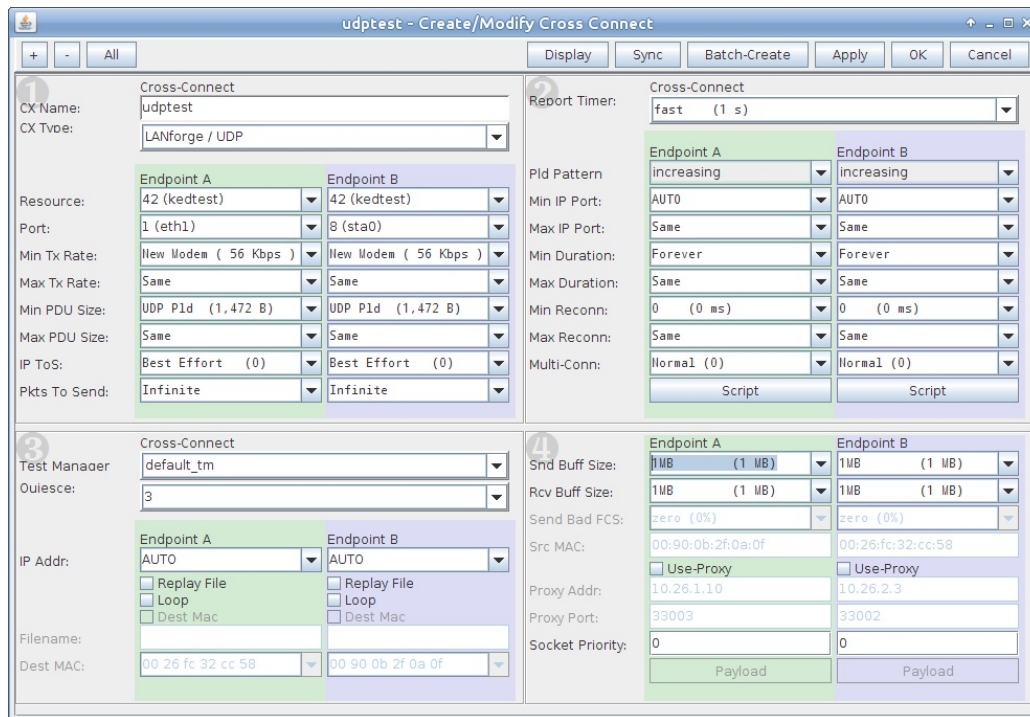
B. Create a cross connect with these qualities:



- A. Make sure Endpoint A is **eth1**
- B. Make sure Endpoint B is **sta0**
- C. Min PDU Size for both should be **1472**
- D. **NOTE:** These rate and PDU size settings will be manipulated by the script we setup later.

C. Next, expand the screen to **Level 4** using the [+] button.

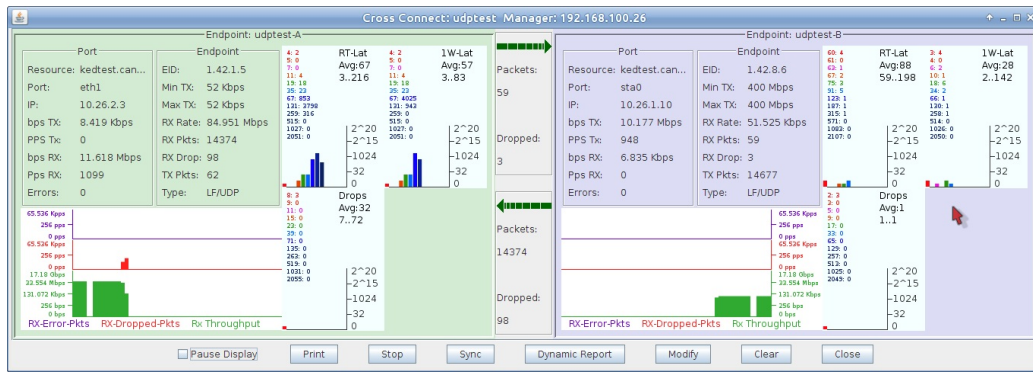
D. Configure the send buffer on **Endpoint B** to **1 MB**



A. Click **OK**

E. On the **Layer 3** tab, click **Start** to verify the AP and Station can connect

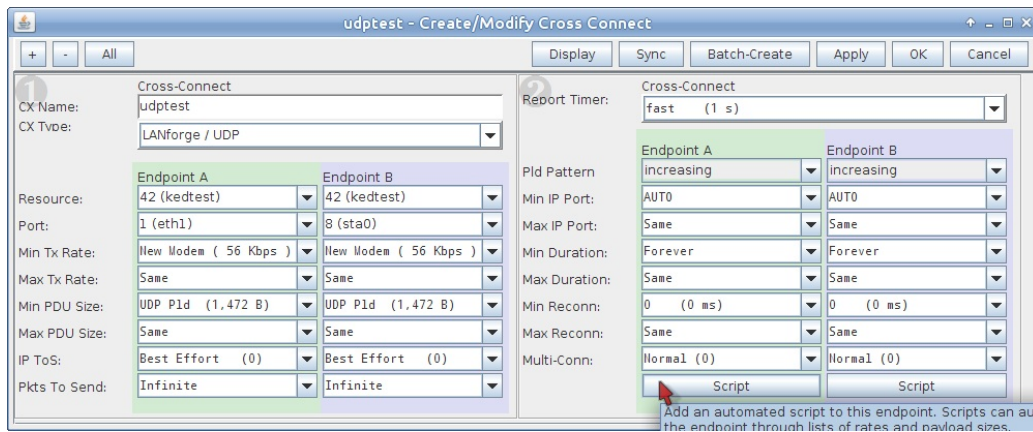
F. Click the **Display** button to monitor throughput



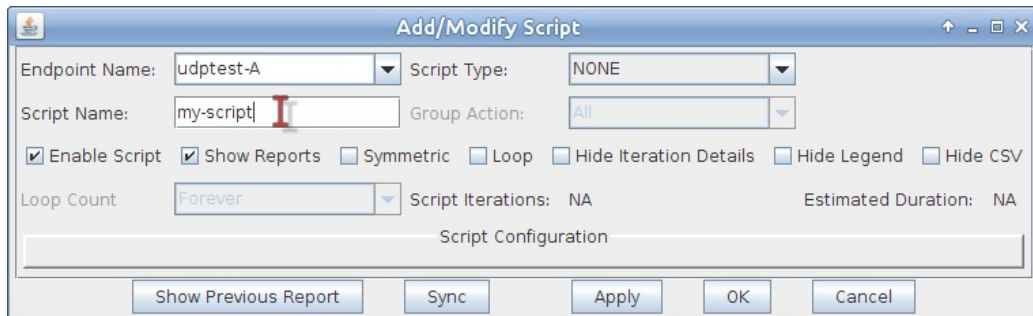
G. Only a short confirmation is necessary, click **Stop** on the Layer 3 tab

4. Configure Scripting for Cross Connect

- A. On the **Layer-3** tab, click **Modify**
- B. In the Level 2 box, click Endpoint A **Script** button



C. The Cross Connect Script window displays with no parameters



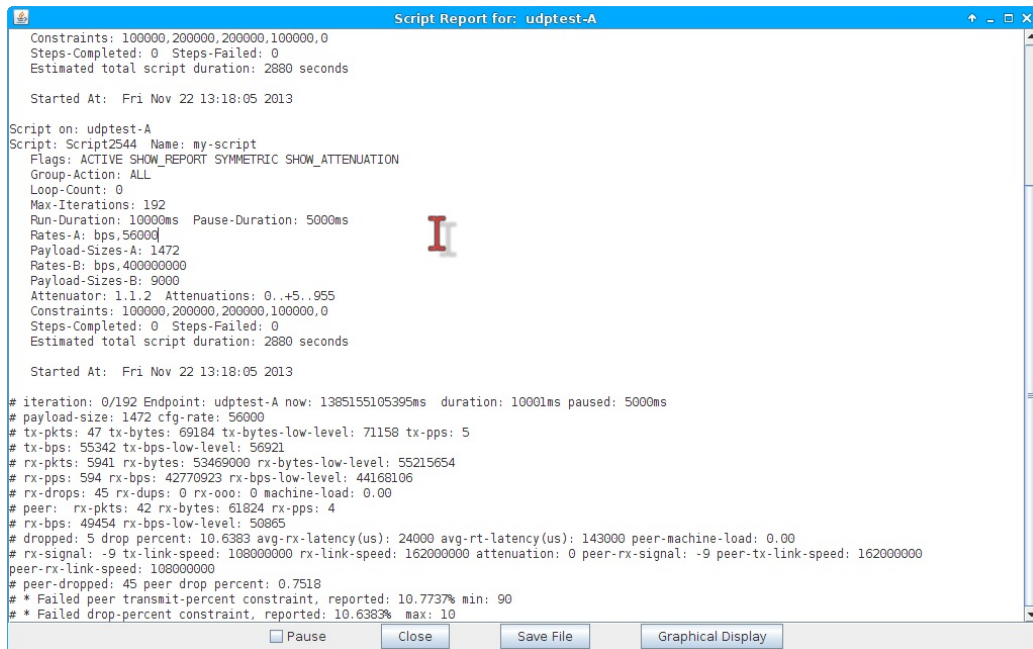
D. Select Script Type: **RFC-2544**. Set the following parameters:

- A. Select **Symmetric**. This will increment both the A and B rates and payload sizes. (Instead of just side A).
- B. Select **Show Attenuation**. This displays attenuation levels in the report.
- C. Run Duration: **10 sec**. This is how long each rate setting will be held.
- D. Pause Duration: **2 sec**. We give it some time to transition.
- E. Max Drop Percent **10%**
- F. Max Jitter **200ms**
- G. Max RT Latency **200ms**
- H. Rates A: **56kbps**. This sets the client upload target rate.
- I. Rates B: **400Mbps**. This sets the client download target rate.
- J. Pld A: **1472** This sets the client (sta0) MTU. This is a 1500 byte wire packet.
- K. Pld B: **9000** This sets the upstream (eth1) MTU.
- L. Attenuator Resource: **1.1.2**. You can find your attenuator resources in the **Attenuator** tab.
- M. Attenuation: **0..+5..955**. This is shorthand for: Begin at zero dB attenuation, increase in 0.5dB steps, until 955 dB of attenuation. Individual dB steps could also be specified.
- N. Click **OK**

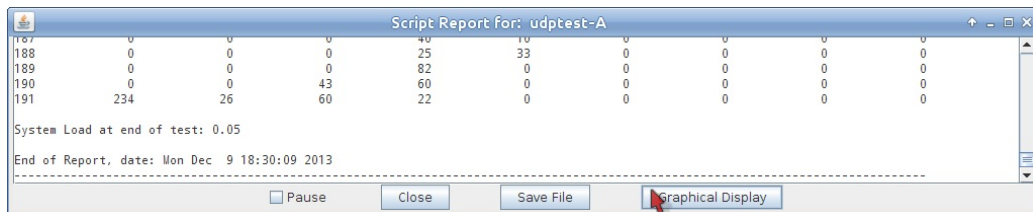
E. On the **Create/Modify Cross Connect** window, click **OK**

5. Run the Cross Connect and Generate a Report

A. On the **Layer-3** tab, click **Start**



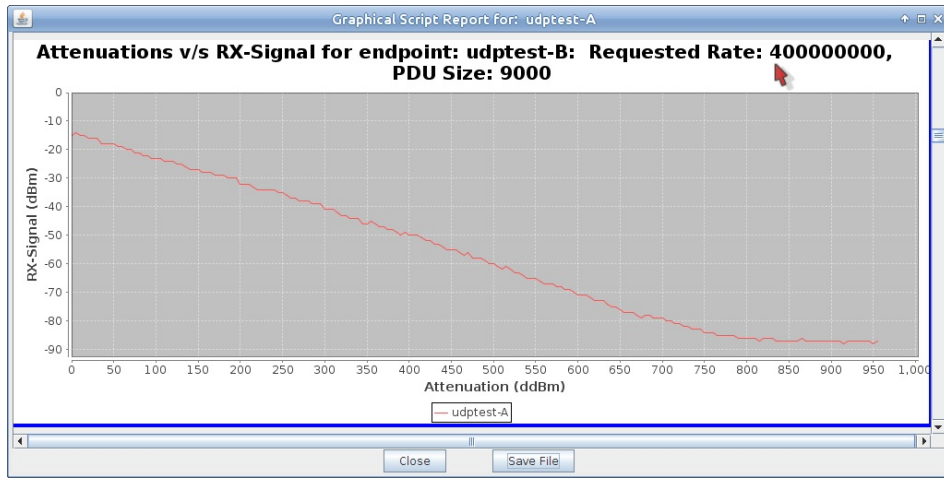
B. The Scripting Report window will appear



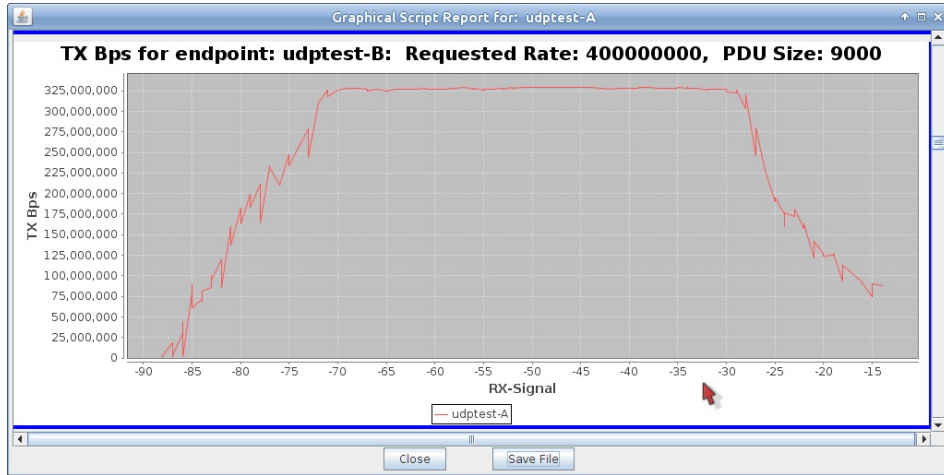
- When the script completes, you can view the graphed results.
- Click on **Graphical Display** and a window with the graphical report will display
- Scroll to the top of the window to view the graphs. Highlights are shown below.
- Attenuation v. RX signal, endpoint A



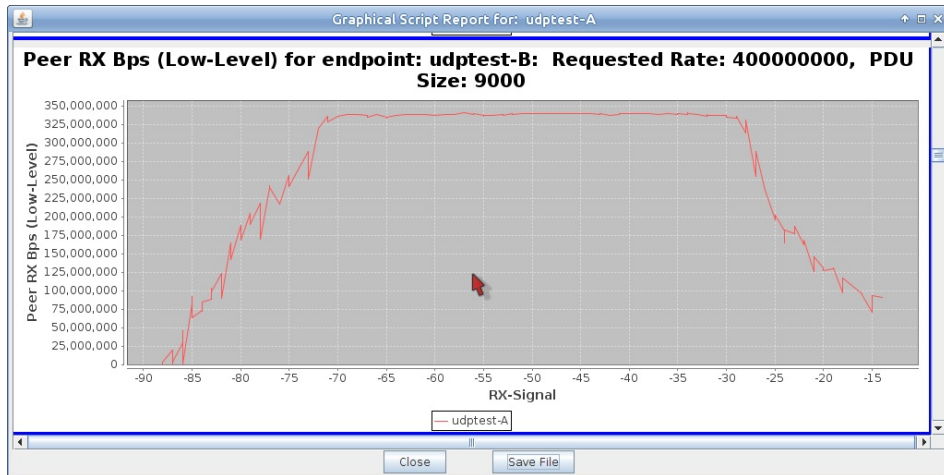
E. Attenuation v. RX signal, endpoint B



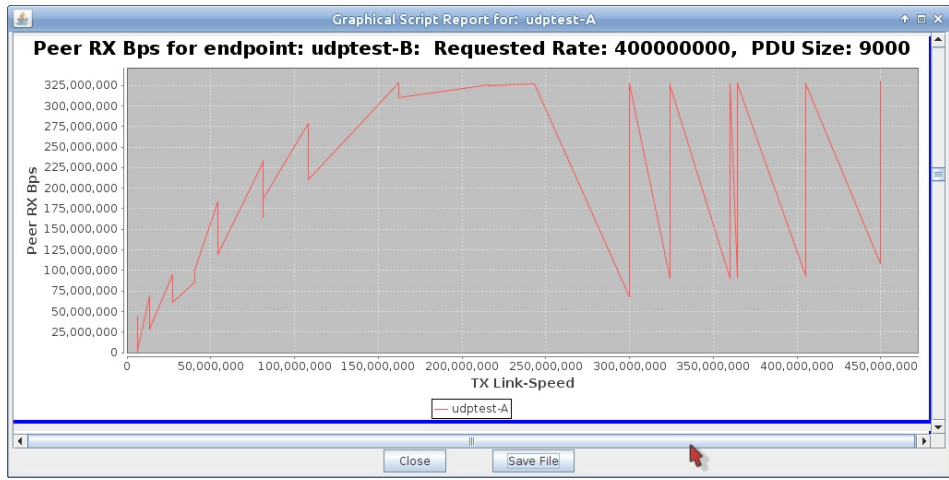
F. TX rate (UDP payload) v. RX signal, endpoint B



G. RX rate including frame headers (UDP payload with frame headers) v. RX signal, endpoint B



H. RX rate v. TX link speed. You see a sawtooth pattern because all attenuations are included.



I. Click on **Save File** and your browser will appear the the HTML copy of the report.

