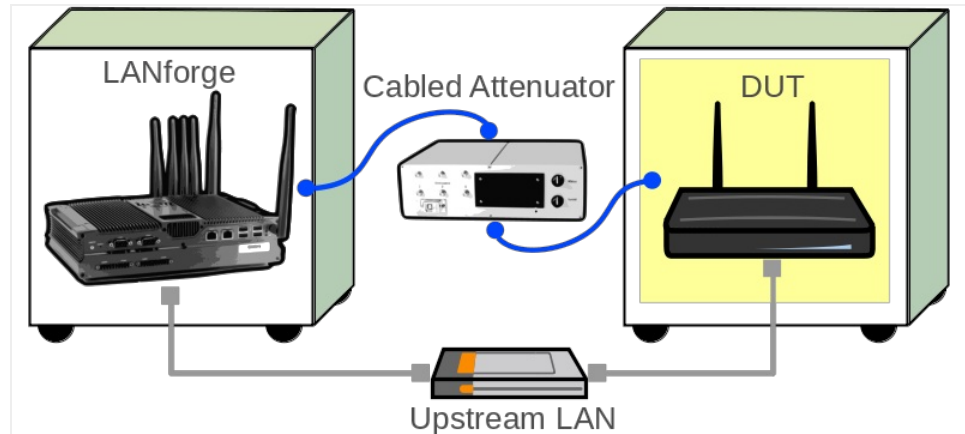


Advanced configuration options for TR-398 Issue-2/3 and Mesh on a 4-Chamber Setup

Goal: Explore advanced configuration options for a TR398 issue-3 mesh testbed. The testbed in this example supports both 32 real tri-band radios as well as 6 virtual-station dual-band radios. See the [TR398 testbed page](#) for more information.

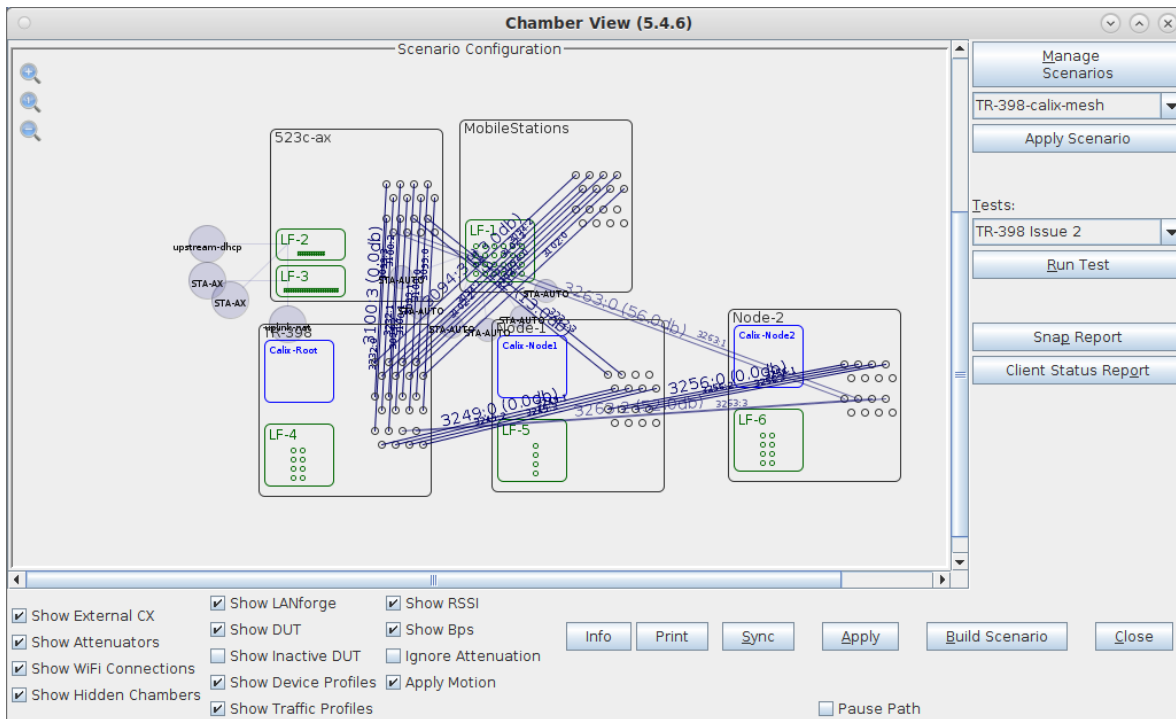
In this test scenario, a LANforge cluster (of three 523c and 3 521b systems) is used to emulate different station and AP scenarios and generate and receive traffic with a set of 3 meshed APs. This example assumes user has some experience with Chamber View and TR398, and has an appropriate LANforge TR398 testbed. Please contact support@candelatech.com for assistance in setting up the TR-398 testbed.



1. System configuration overview.

A. The status panel shows all 6 LANforge systems connected and available.

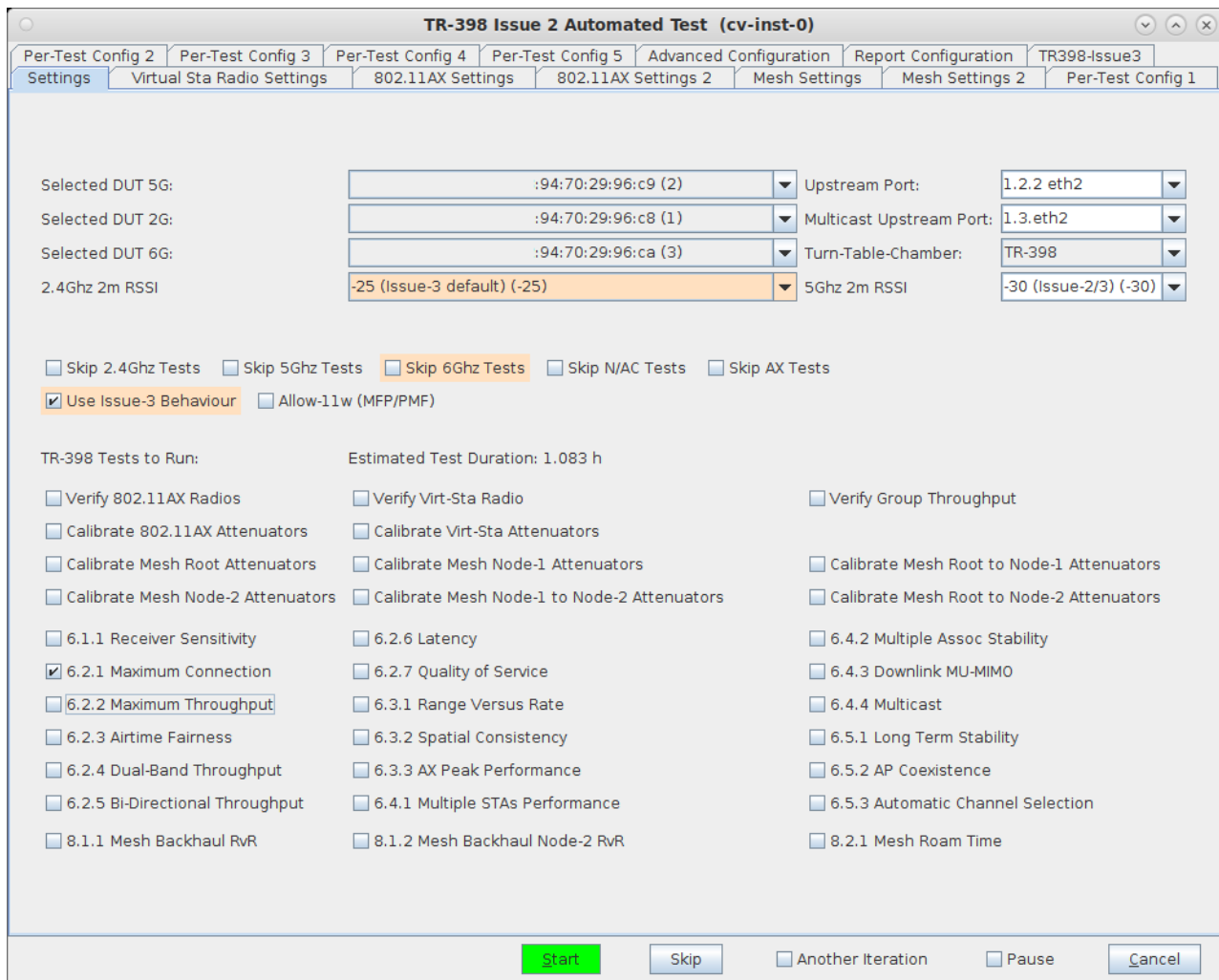
B. The Chamber View window shows the RF chambers, attenuated paths, APs, and LANforge systems.



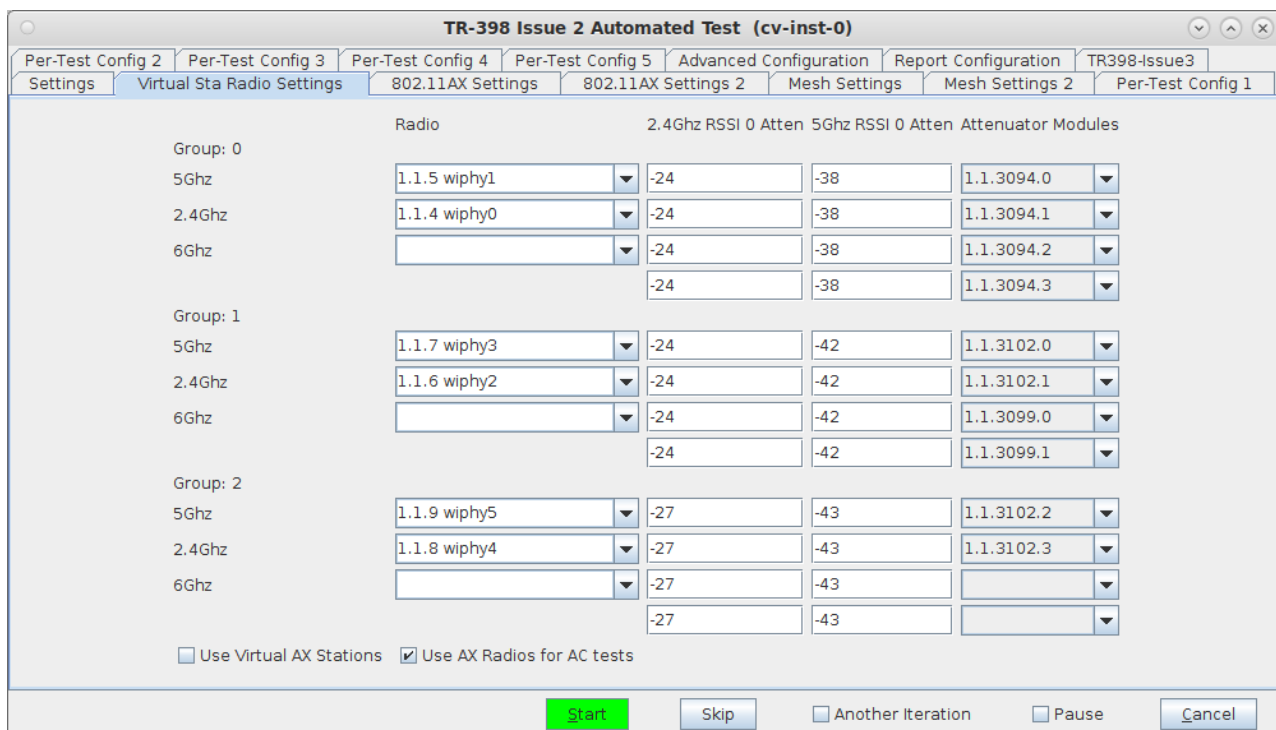
C. This setup uses LANforge as the upstream (WAN) port for the APs. This allows the testbed to be isolated from the lab network, and also facilitates running the APs in either bridge or routed mode.

Dup	Del	Resource Profile	Amount	Uses-1	Uses-2	Frequency	VLAN-ID	Maps To	Traffic
X		1.1 STA: STA-AUTO	1 (1)	wiphy0	AUTO	AUTO (-1 Mhz)	NA	DUT: Calix-Root Radio-1	NA
X		1.1 STA: STA-AUTO	1 (1)	wiphy1	AUTO	AUTO (-1 Mhz)	NA	DUT: Calix-Root Radio-2	NA
X		1.1 STA: STA-AUTO	1 (1)	wiphy2	AUTO	AUTO (-1 Mhz)	NA	DUT: Calix-Root Radio-1	NA
X		1.1 STA: STA-AUTO	1 (1)	wiphy3	AUTO	AUTO (-1 Mhz)	NA	DUT: Calix-Root Radio-2	NA
X		1.1 STA: STA-AUTO	1 (1)	wiphy4	AUTO	AUTO (-1 Mhz)	NA	DUT: Calix-Root Radio-1	NA
X		1.1 STA: STA-AUTO	1 (1)	wiphy5	AUTO	AUTO (-1 Mhz)	NA	DUT: Calix-Root Radio-2	NA
X		1.2 Upstream: upstream-dhcp	1 (1)	eth2	AUTO	AUTO (-1 Mhz)	NA	DUT: Calix-Root LAN	NA
X		1.2 STA: STA-AX	1 (1)	ALL-AX	AUTO	AUTO (-1 Mhz)	NA	DUT: Calix-Root Radio-2	NA
X		1.3 STA: STA-AX	1 (1)	ALL-AX	AUTO	AUTO (-1 Mhz)	NA	DUT: Calix-Root Radio-2	NA
X		1.2 Uplink: uplink-nat	1 (1)	eth3	eth2	AUTO (-1 Mhz)	NA	DUT: upstream LAN 192.168.100.1/24	NA

2. Launch the TR398 issue 2 test. Unless otherwise specified, this test is configured for TR398 issue3. The settings may be changed to run the TR398 issue 2 tests as user prefers.



3. The Virtual Sta Radio settings tab is for the radios supporting virtual stations (MTK7915 4x4 dual-band AX in this example). The zero-attenuation RSSI values are calibrated during testbed configuration. See [TR398 calibration cookbook](#) for instructions on how to do this.



4. The 802.11AX Settings tab is for configuring non-virtual-station radios, Intel AX210 in this case.

TR-398 Issue 2 Automated Test (cv-inst-0)

Per-Test Config 2 | Per-Test Config 3 | Per-Test Config 4 | Per-Test Config 5 | Advanced Configuration | Report Configuration | TR398-Issue3

Settings | Virtual Sta Radio Settings | 802.11AX Settings | 802.11AX Settings 2 | Mesh Settings | Mesh Settings 2 | Per-Test Config 1

The settings below apply to AX capable radios that do not support virtual stations.

Radio	2.4Ghz RSSI	0 Atten	5Ghz RSSI	0 Atten	Attenuator Modules
Group: 0					
1.2.wiphy0	-30	-44	1.1.3100.3		
1.2.wiphy1	-30	-44	1.1.3100.2		
1.2.wiphy2	-30	-44	NA		
1.2.wiphy3	-30	-44	NA		
Group: 1					
1.2.wiphy4	-30	-42	1.1.3100.1		
1.2.wiphy5	-30	-42	1.1.3100.0		
1.2.wiphy6	-30	-42			
1.2.wiphy7	-30	-42			
Group: 2					
1.2.wiphy8	-33	-45	1.1.3099.3		
1.2.wiphy9	-33	-45	1.1.3099.2		
1.2.wiphy10	-33	-45			
1.2.wiphy11	-33	-45			

Another Iteration
 Pause

5. The 802.11AX Settings 2 tab is for configuring additional non-virtual-station radios, Intel AX210 in this case. Some testbeds will have different attenuators for groups 2-7. The testbed in this example uses splitter-combiners so that all radios in groups 2-7 go through the same attenuator, so there are no attenuators configured on this second AX settings tab.

TR-398 Issue 2 Automated Test (cv-inst-0)

Per-Test Config 2 | Per-Test Config 3 | Per-Test Config 4 | Per-Test Config 5 | Advanced Configuration | Report Configuration | TR398-Issue3

Settings | Virtual Sta Radio Settings | 802.11AX Settings | 802.11AX Settings 2 | Mesh Settings | Mesh Settings 2 | Per-Test Config 1

The settings below apply to AX capable radios that do not support virtual stations.

Radio	Radio	2.4Ghz RSSI	0 Atten	5Ghz RSSI	0 Atten	Attenuator Module
Group: 3						
1.3.wiphy0	1.3.wiphy5	-25	-30			
1.3.wiphy10	1.3.wiphy15	-25	-30			
Group: 4						
1.3.wiphy1	1.3.wiphy6	-25	-30			
1.3.wiphy11	1.3.wiphy16	-25	-30			
Group: 5						
1.3.wiphy2	1.3.wiphy7	-25	-30			
1.3.wiphy12	1.3.wiphy17	-25	-30			
Group: 6						
1.3.wiphy3	1.3.wiphy8	-25	-30			
1.3.wiphy13	1.3.wiphy18	-25	-30			
Group: 7						
1.3.wiphy4	1.3.wiphy9	-25	-30			
1.3.wiphy14	1.3.wiphy19	-25	-30			

Another Iteration
 Pause

6. The Mesh Settings tab has information needed to run the Mesh test cases. This includes the DUT information for the node-1 and node-2 mesh chambers, attenuator mappings between chambers, and some scanning configuration.

TR-398 Issue 2 Automated Test (cv-inst-0)

Per-Test Config 2 | Per-Test Config 3 | Per-Test Config 4 | Per-Test Config 5 | Advanced Configuration | Report Configuration | TR398-Issue3

Settings | Virtual Sta Radio Settings | 802.11AX Settings | 802.11AX Settings 2 | **Mesh Settings** | Mesh Settings 2 | Per-Test Config 1

Node-1 DUT 5G: :94:70:29:9a:d1 (2)

Node-1 DUT 2G: :94:70:29:9a:d0 (1)

Node-2 DUT 5G: :94:70:29:99:8d (2)

Node-2 DUT 2G: :94:70:29:99:8c (1)

Use 2-band pass/fail

Background Scan Module: simple RSSI Threshold: -65

Short Interval: 30 Long Interval: 300

Radio 2.4Ghz RSSI 0 Atten 5Ghz RSSI 0 Atten Attenuator Modules

Group 0: Root to Node-1

-43	-63	1.1.3249.0
-43	-63	1.1.3249.1
-43	-63	1.1.3249.2
-43	-63	1.1.3249.3

Group 1: Mobile Station to Root

5Ghz 1.3.18 wiphy21 -34 -60 1.1.3232.0

2.4Ghz 1.3.18 wiphy21 -34 -60 1.1.3232.1

-34	-60	
-34	-60	

Group 2: Mobile Station to Node-1

-33	-41	1.1.3232.2
-33	-41	1.1.3232.3
-33	-41	
-33	-41	

Another Iteration
 Pause

7. The Mesh Settings 2 tab has additional mapping information needed for a 3-node mesh testbed.

TR-398 Issue 2 Automated Test (cv-inst-0)

Per-Test Config 2 | Per-Test Config 3 | Per-Test Config 4 | Per-Test Config 5 | Advanced Configuration | Report Configuration | TR398-Issue3

Settings | Virtual Sta Radio Settings | 802.11AX Settings | 802.11AX Settings 2 | Mesh Settings | **Mesh Settings 2** | Per-Test Config 1

2.4Ghz RSSI 0 Atten 5Ghz RSSI 0 Atten Attenuator Modules

Group 3: Mobile Station to Node-2

-34	-46	1.1.3263.0
-34	-46	1.1.3263.1
-34	-46	
-34	-46	

Group 4: Node-1 to Node-2

-52	-59	1.1.3256.0
-52	-59	1.1.3256.1
-52	-59	1.1.3256.2
-52	-59	1.1.3256.3

Group 5: Root to Node-2

-38	-59	1.1.3263.2
-38	-59	1.1.3263.3
-38	-59	
-38	-59	

Another Iteration
 Pause

8. The Per-Test Config tabs provide tunable settings for individual test cases. Each entry field will have a tool-tip to explain what it does in more detail. The sections will only be active if the respective test case is selected on the Settings tab.

TR-398 Issue 2 Automated Test (cv-inst-0)

Per-Test Config 2 | Per-Test Config 3 | Per-Test Config 4 | Per-Test Config 5 | Advanced Configuration | Report Configuration | TR398-Issue3

Settings | Virtual Sta Radio Settings | 802.11AX Settings | 802.11AX Settings 2 | Mesh Settings | Mesh Settings 2 | Per-Test Config 1

Calibrate Zero Attenuation RSSI

Calibration Mode: Calibration NSS:

Calibrate against LANforge AP

2.4Ghz LANforge AP Calibration Radio:

5Ghz LANforge AP Calibration Radio:

2.4Ghz Mesh Node-1 LANforge AP Calibration Radio:

5Ghz Mesh Node-1 LANforge AP Calibration Radio:

2.4Ghz Mesh Node-2 LANforge AP Calibration Radio:

5Ghz Mesh Node-2 LANforge AP Calibration Radio:

6.1.1 Receiver Sensitivity Test

Stop RX-Sens at pass

RxSens Start Step:

RxSens-Rate:

RxSens Rotation Degrees:

6.2.1 Maximum Connection Test (32-STA)

Max-CX Offered Load: Randomize Offered Load Allow Maximum NSS Enable 6Ghz-80

Use Group-0 Radios Use Group-1 Radios Use Group-2 Radios

Max-CX 2Ghz N rate:

Max-CX 5Ghz AC rate:

Max-CX 2Ghz AX rate:

Max-CX 5Ghz AX rate:

Max-CX 6Ghz AX rate:

Ramp Duration:

Max-CX 6Ghz-80Mhz AX rate:

STA Count:

6.2.2 Maximum TCP Throughput Test

Throughput N 2Ghz rate:

Throughput AC 5Ghz rate:

Throughput AX 2Ghz rate:

Throughput AX 5Ghz rate:

Throughput AX 6Ghz rate:

Start Skip Another Iteration Pause Cancel

9. The Per-Test Config 2 tab.

TR-398 Issue 2 Automated Test (cv-inst-0)

Per-Test Config 2 | Per-Test Config 3 | Per-Test Config 4 | Per-Test Config 5 | Advanced Configuration | Report Configuration | TR398-Issue3

Settings | Virtual Sta Radio Settings | 802.11AX Settings | 802.11AX Settings 2 | Mesh Settings | Mesh Settings 2 | Per-Test Config 1

6.2.3 Airtime Fairness Test

ATF Max NSS: ATF Attenuation:

6.2.4 Dual-Band Throughput Test

Unlimited TCP Speed Enable 2.4-40 + 5G-160 Enable 2.4-40 + 6G-160 Enable 5G-80 + 6G-160

Low-Band Radio: High-Band Radio:

6.2.5 Bidirectional UDP Throughput Test

Max allowed packet loss%: Allow Maximum NSS

Enable 5g-160 Enable 6g-80

Skip First Attenuation Step Skip Second Attenuation Step Skip Third Attenuation Step

6.2.6 Latency Test

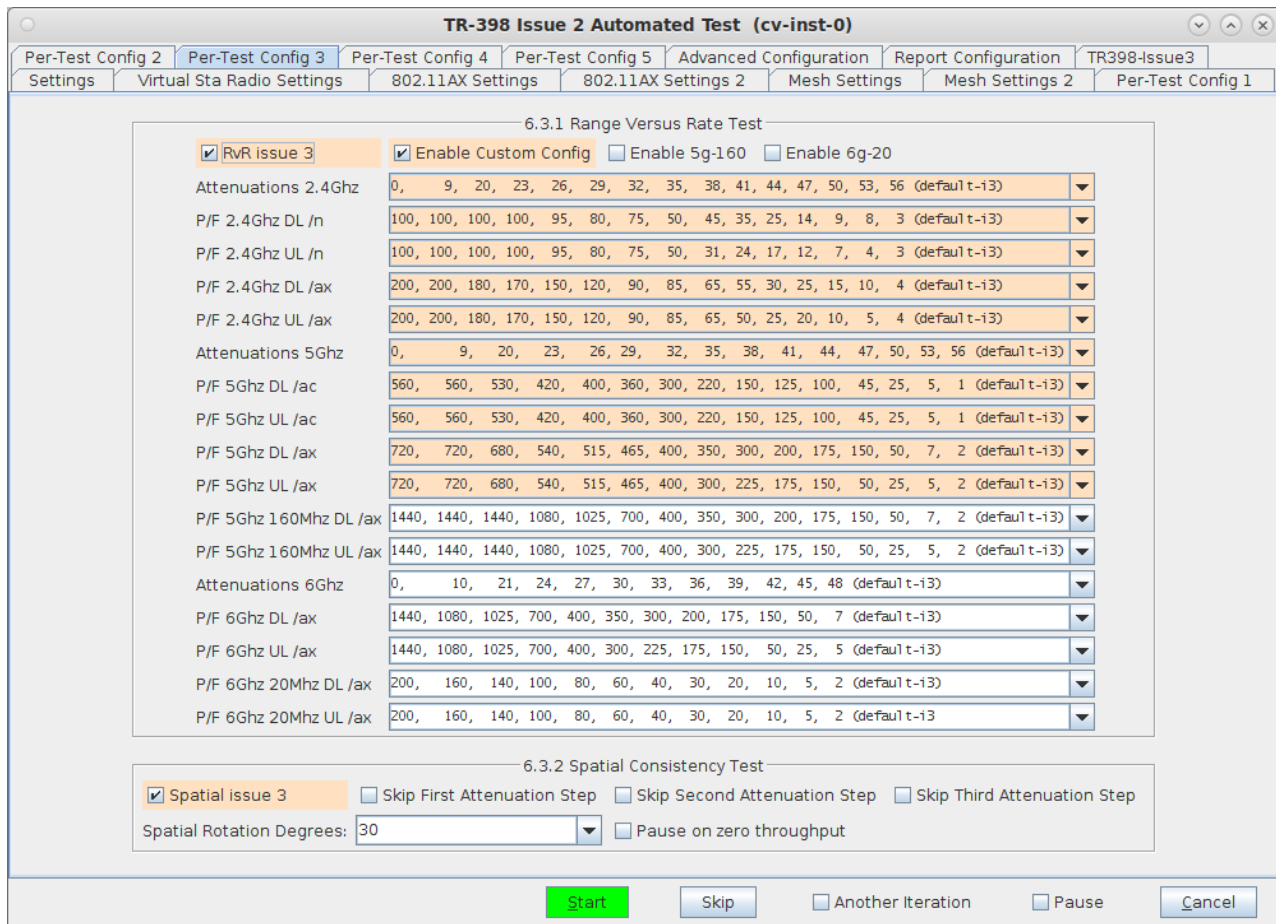
One-Way Download Latency

6.2.7 Quality of Service Test

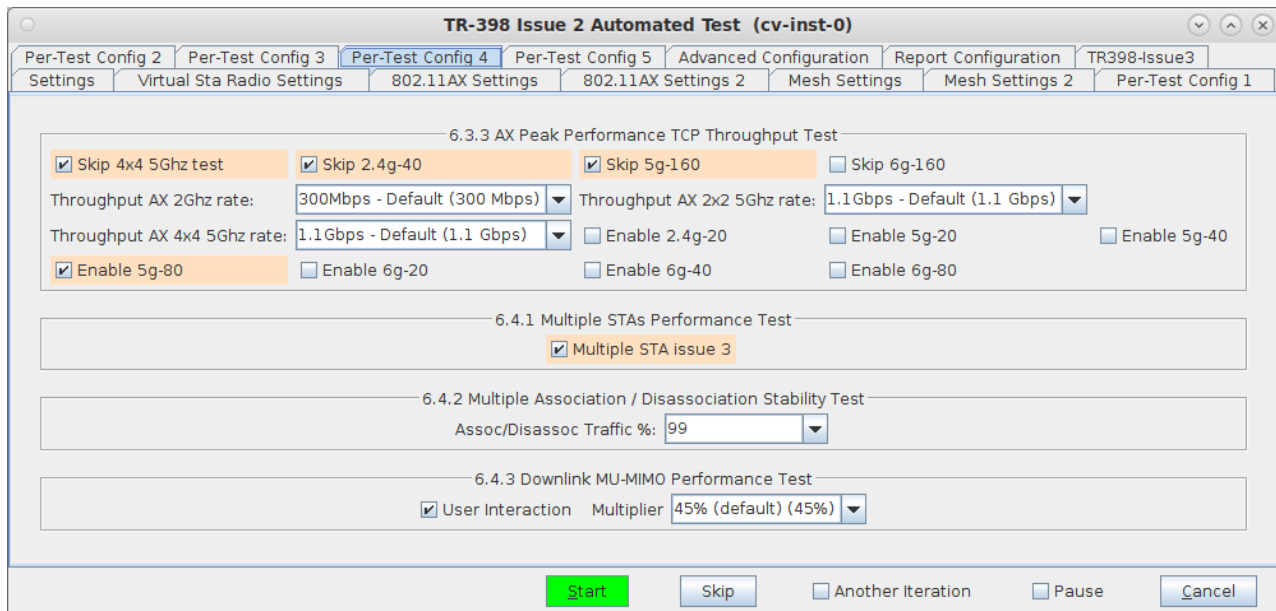
Pass/Fail High-Limit

Start Skip Another Iteration Pause Cancel

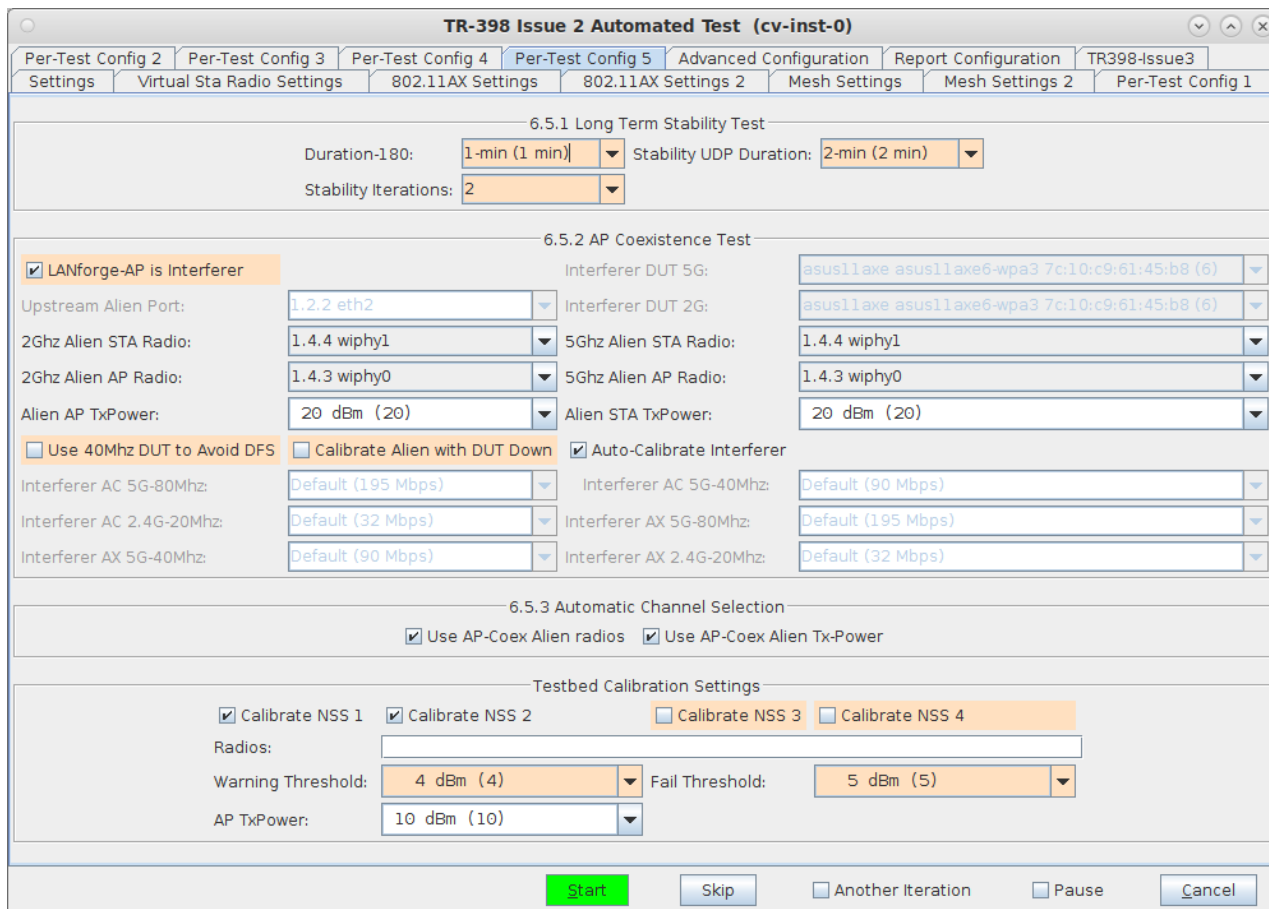
10. The Per-Test Config 3 tab allows setting specific attenuations and pass/fail for the RvR and spatial consistency tests.



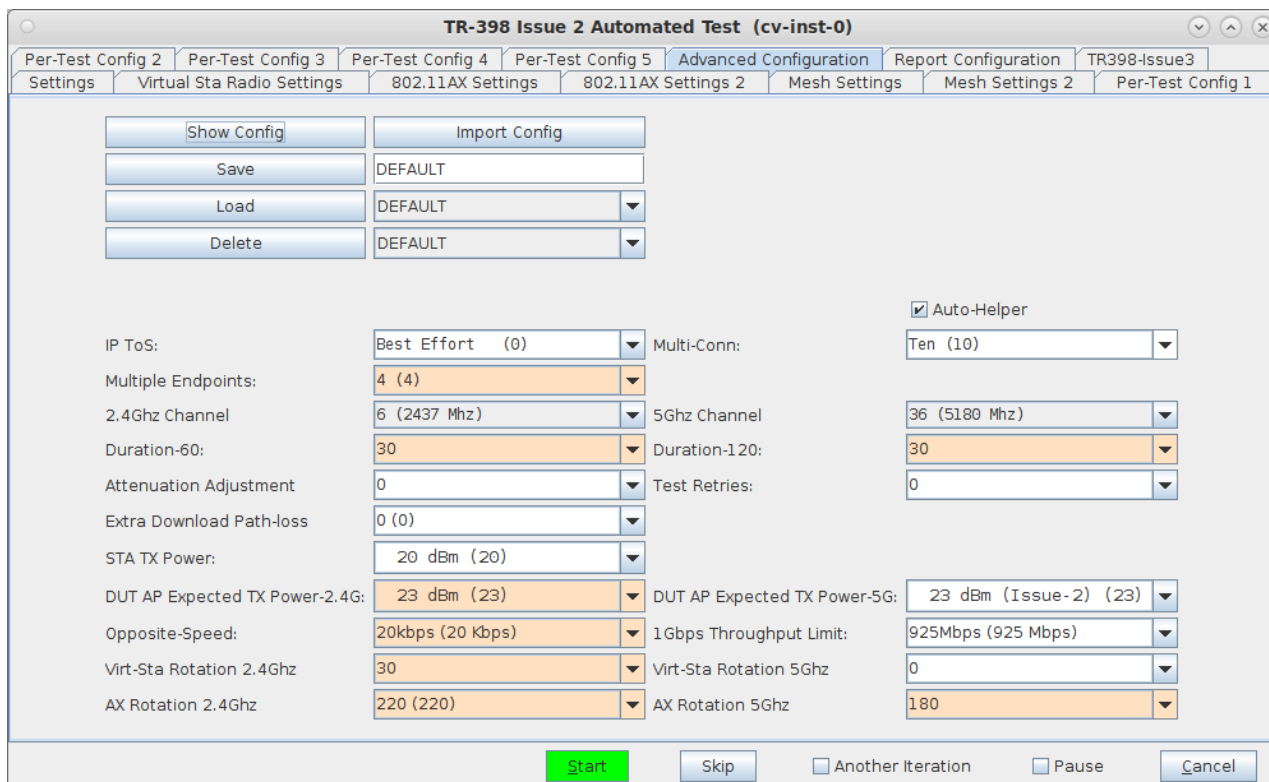
11. The Per-Test Config 4 tab allows tuning the peak-performanc tests and others.



12. The Per-Test Config 5 tab.



- The Advanced Configuration tab has settings that apply to many tests. The top section is for saving and loading test configurations. The Import Config window will let one paste in a full or partial test configuration file to apply those changes easily. The Rotation fields at the bottom allow the user to specify optimal rotations to run tests which do not explicitly control the turntable. Use the Rate vs Orientation test to find optimal rotations.



- The Report Configuration tab allows customizing the report generated by the TR398 test cases..

TR-398 Issue 2 Automated Test (cv-inst-0)

Per-Test Config 2
 Per-Test Config 3
 Per-Test Config 4
 Per-Test Config 5
 Advanced Configuration
 Report Configuration
 TR398-Issue3

Settings
 Virtual Sta Radio Settings
 802.11AX Settings
 802.11AX Settings 2
 Mesh Settings
 Mesh Settings 2
 Per-Test Config 1

Show Events
 Show Log Entries
 Auto Save Report
 Print Logs to Terminal

Collect CSV Data

Graph Background Color:
Test Rig ID:
Instance Name: cv-inst-0

Test Tag:
KPI Test Id:

Operator Information:

DUT Information Override:

Report Location:

Test Folder Prefix:

Notes to be added near the top of the report:

 Another Iteration
 Pause

15. The Issue-3 page is for experimental test cases. At time of writing, this tab is not needed. The ATF test case will be executed if the 'Use Issue-3 Behaviour' checkbox is selected on the Settings page.

TR-398 Issue 2 Automated Test (cv-inst-0)

Per-Test Config 2
 Per-Test Config 3
 Per-Test Config 4
 Per-Test Config 5
 Advanced Configuration
 Report Configuration
 TR398-Issue3

Settings
 Virtual Sta Radio Settings
 802.11AX Settings
 802.11AX Settings 2
 Mesh Settings
 Mesh Settings 2
 Per-Test Config 1

Proposed and in-development TR398-issue3 test cases.

Issue-3 Airtime Fairness

 Another Iteration
 Pause