Network Testing & Emulation Solutions

- Founded in 2000
- Focus on Network testing and Emulation Solutions
- WiFi test solutions since 2006
- Team of Networking Technologies and Firmware Experts
- Helping over 200 customers, design, develop and deploy high quality networking products

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Testbed Wiring Diagrams

TR-398

Wi-Fi In-Premises Performance Testing

(https://www.broadband-forum.org/download/TR-398.pdf)

TR-398 Test Plan Summary

6.1.1

Receiver Sensitivity Test

Test the Quality/Ability of the AP's receiver in being able to handle different coding schemes at different power levels .

6.2.1

Maximum Connection Test

The Maximum Connection test intends to verify that the Wi-Fi AP can support 32 STAs simultaneously connected with minimal packet loss and no disassociations taking place

6.2.2

Maximum Throughput Test

Test intends to measure the maximum throughput performance of the DUT.

6.2.3

Airtime Fairness Test

Verify the capability of Wi-Fi device to guarantee the fairness of airtime usage when handle a mix of clients using new and legacy 802.11 standards.

6.3.1

Range Versus Rate Test

Test measures the Throughput of the DUT with the station being at different distances from the AP.

6.3.2

Spatial Consistency Test

Test measures the performance of the AP at various antenna orientations with respect to the stations.

6.4.1

Multiple STAs Perf Test

Measure performance of the AP with multiple stations at different distances, to emulate the real world behavior.

6.4.2

Multiple Assoc/Disassoc Stability

In a multi client scenario, test if the AP throughput performance degrades with other clients connecting and disconnecting simultaneously

6.4.3

Downlink MU-MIMO Perf

Test to ensure the downlink throughput increases substantially with multiple clients and MU-MIMO enabled.

6.5.1

Long Term Stability

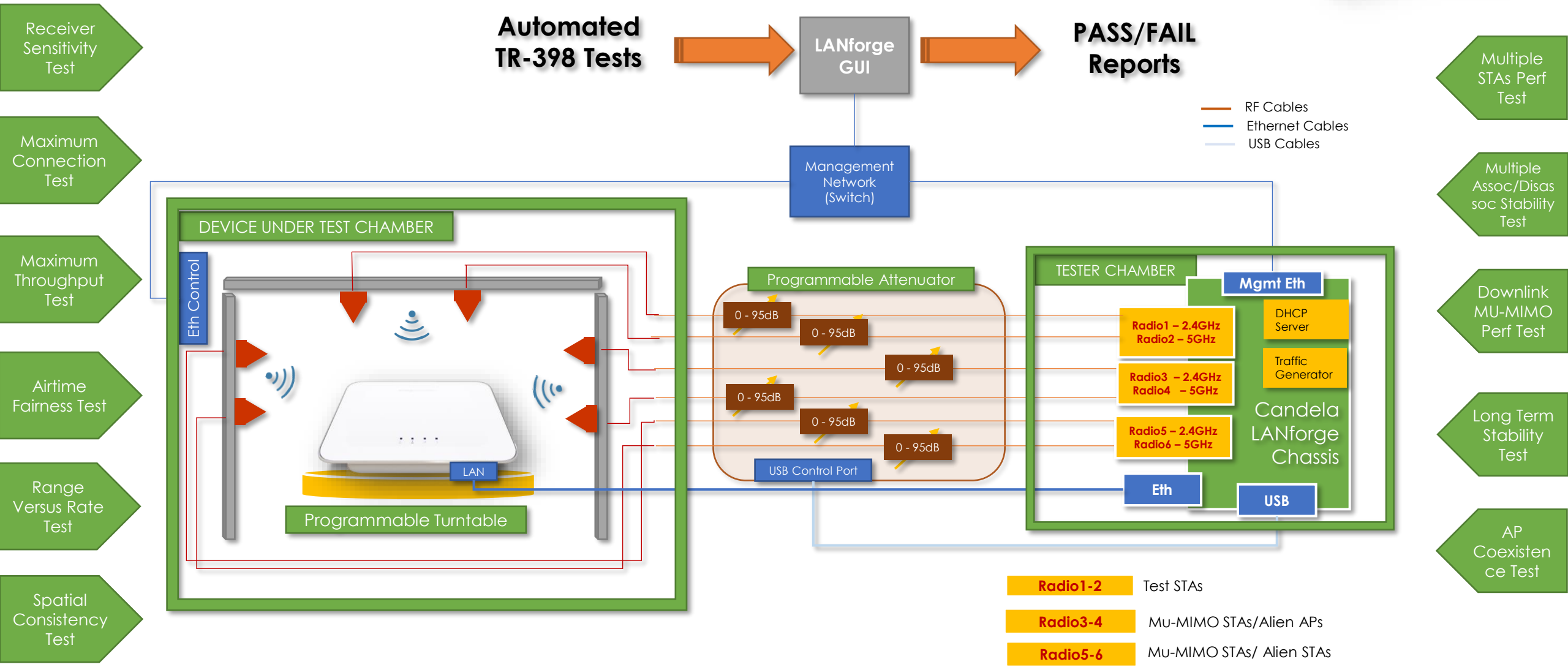
Test to make sure the AP can consistently achieve high throughput over a very long test duration.

6.5.2

AP Coexistence

Test to make sure the AP can achieve good performance in the presence of other neighboring APs and clients

TR-398 Testbed Setup

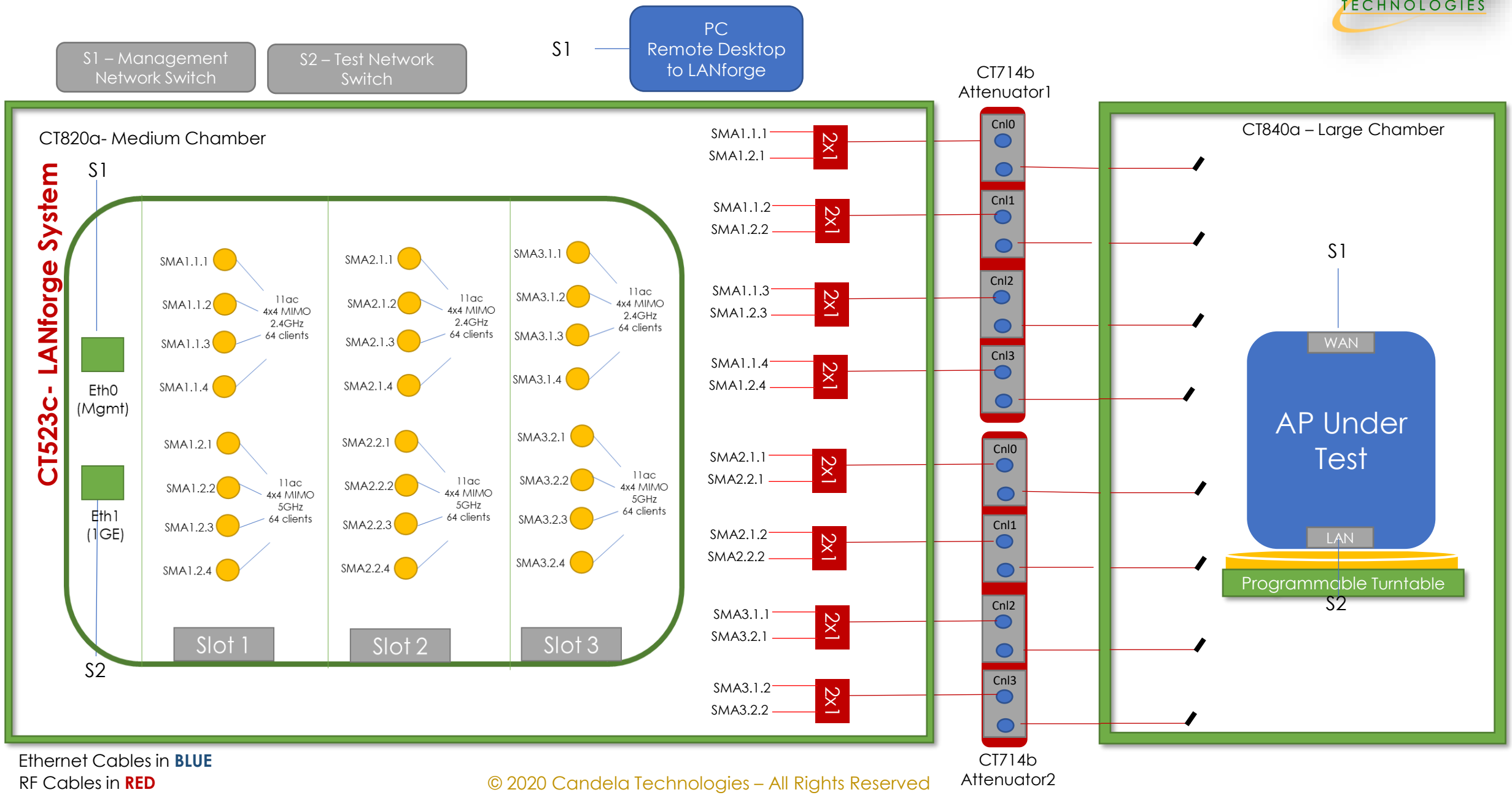


TR-398 Testbed installation notes.

- **2D Chamber**
  - Use 60cm and/or 1m SMA Male to SMA Male cables to connect the directional antenna to the wall.
  - The directional antennas mount on the rails on both sides and the back of the chamber, and should point towards the DUT AP.
  - DUT AP sits on the rotational platform in the middle of the chamber.

- **Medium Chamber**
  - This holds the LANforge system.
  - Use 16 30cm cables to connect radios to the '2' side of the 2-1 splitters.
  - Use 8 60cm cables to connect 2-1 splitters to the walls.
  - Ensure all splitter/combiners are inside the chamber.

Testbed Wiring Diagram



Ethernet Cables in **BLUE**
RF Cables in **RED**

TR-398 Testbed Bill of Materials (BOM)

- ✓ Hardware
  - ✓ LANforge Systems Units
    - ✓ CT-523c-3ac2-db – 1unit
      - ✓ 4x4 MIMO 11ac Wave2 Single Band 5GHz radio – 3 units (64 clients per radio)
      - ✓ 4x4 MIMO 11ac Wave2 Single Band 2.4GHz radio – 3 units (64 clients per radio)
  - ✓ RF Enclosures
    - ✓ CT820a Medium Chambers – 1 unit (for Tester)
    - ✓ CT840a Large Chamber with Turntable – 1 unit (for DUT)
  - ✓ CT714b Programmable Attenuators – 2 units
  - ✓ 2x1 Splitters – 8 units
  - ✓ RF Cables
    - ✓ Short SMA Male (with pin) -SMA Male (with pin) - 32 units
    - ✓ Long SMA Male (with pin) -SMA Male (with pin) - 16 units
  - ✓ RF Antennas – 8 units
- ✓ Software
  - ✓ SW1001m 1GE 1000 Traffic Stream Licenses – 1 unit
  - ✓ SW1001sta virtual station licenses – 384 Virtual Stations
  - ✓ SW-398 : TR-398 automation software license
- ✓ Support/Warranty
  - ✓ 1-year hardware and software support