sales@candelatech.com
support@candelatech.com
+1 (360) 380-1618 [PST, GMT -8]

CT525-128-2ac LANforge WiFIRE two a/b/g/n/AC 2-radio WiFi Traffic Generator supporting 128 Virtual STA Interfaces

The CT525-128-2ac wireless traffic generator is an excellent choice for testing Access Points and other WiFi networks. The ath10k (a/b/g/n/ac) chipset NICs can support up to 64 stations per radio. __AX_AMT_PER_RAD_TXT__ Each of the Virtual Stations has its own IP address, IP port space, MAC address and routing table. The Virtual Stations can be assigned to communicate to a particular Access Point, use a particular SSID, and Open or WPA/WPA2 authentication assigned. More advanced 802.1X authentication is also included. Each radio can be configured independently of the other. Transmit power and channel/frequency is configured on a per-radio basis. Most other settings are configurable per virtual station.

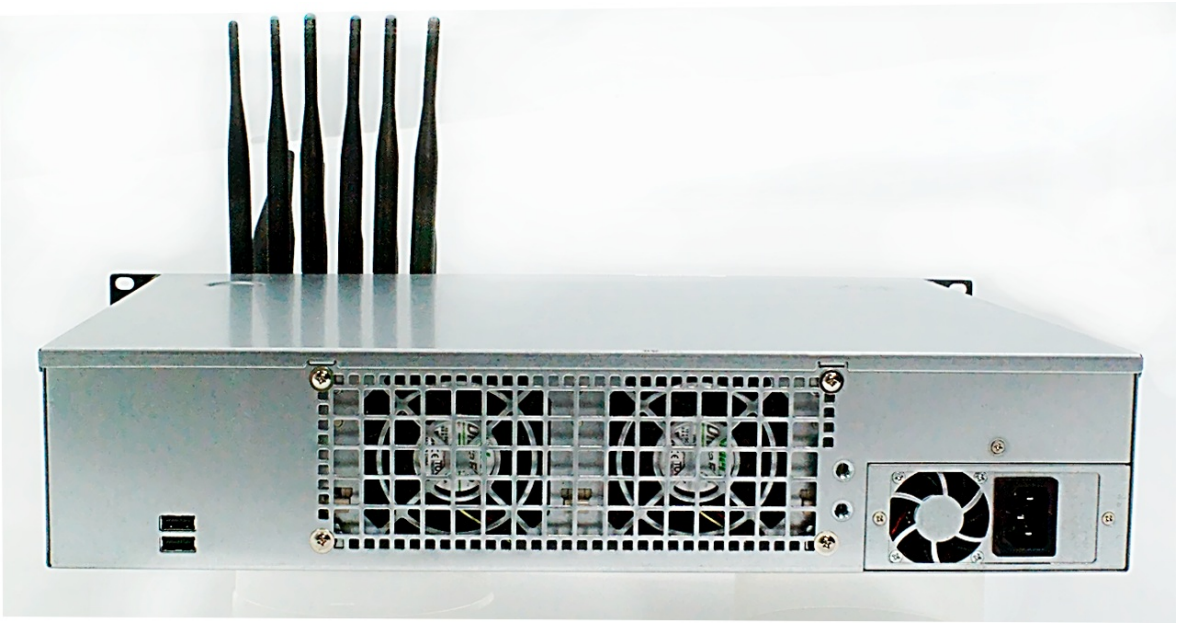
There are two a/b/g/n/AC WiFi radios per CT525-128-2ac and multiple LANforge systems can be clustered together for even more realistic radio interference patterns and increased traffic generation capability.

All virtual stations on the same radio must be on the same frequency, but as long as the protocol supports that frequency, the multiple protocols can be used concurrently. For instance, if the radio is configured for a 2.4Ghz channel, the stations can be /b, /g, /n, or /ax. If the radio is on a 5Ghz channel, the stations can be /a, /n, ac, or ax. The bandwidth can be configured for all protocols.

The Virtual Stations may be configured with all of the virtual interfaces on the same subnet, or different subnets, depending on the testing requirements. When used with something like VoIP, it allows all of the VoIP calls to use the standard IP ports (with one call per virtual interface).

The CT525-128-2ac is a 2U rackmount system. It has 6 antennas. It will fit into a standard rackmount cabinet. No additional hardware or software is required, but it is suggested that you manage the system using the LANforge GUI on a separate machine. The CT525-128-2ac can also be managed over a serial console in text mode or through a directly connected monitor, mouse and keyboard.

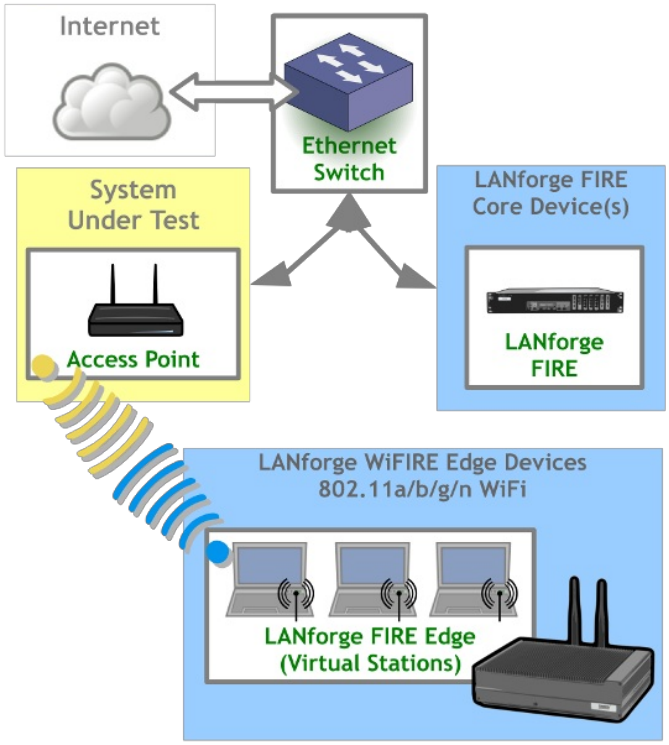
Performance exceeds 900Mbps per 802.11AC radio: Open | WPA2 | TCP-DL-30sta | UDP-Netgear-64sta | TCP-Netgear-64sta | UDP-LANforge-AP-64sta | TCP-LANforge-AP-64sta | Hunt-Open | Hunt-WPA2



NOTE: This product may have a different hardware configuration than the system pictured above. Refer to your official quote for details.

Example Network Diagram

LANforge WiFIRE
Virtual Station Traffic Generator



LANforge WiFIRE supports 802.11 Virtual Stations and Access Points*. To the System Under Test, it appears as if there are multiple PCs sitting inside the LANforge system generating independent traffic streams over Wireless NICs.

Many Virtual Station interfaces are supported per LANforge WiFIRE machine. LANforge can send traffic from one physical interface on the local machine to another interface on that same machine. Each physical and virtual interface can be configured on the same, or on different IP subnets.

In the configuration on the left, the LANforge FIRE Core can be one physical Ethernet interface and act as the server. The LANforge FIRE Edge can be the Virtual Station interfaces configured on the WiFi radio. Both interfaces can be on the same machine or multiple LANforge machines can be clustered together for increased traffic generation capacity.

* All system support 802.11 a/b/g/n.
Some systems support 802.11ac as well.

Candela Technologies Inc., 2417 Main Street, Suite 201, P.O. Box 3285, Ferndale, WA 98248, USA
www.candelatech.com | sales@candelatech.com | +1 360 380 1618

Quick Start Guide

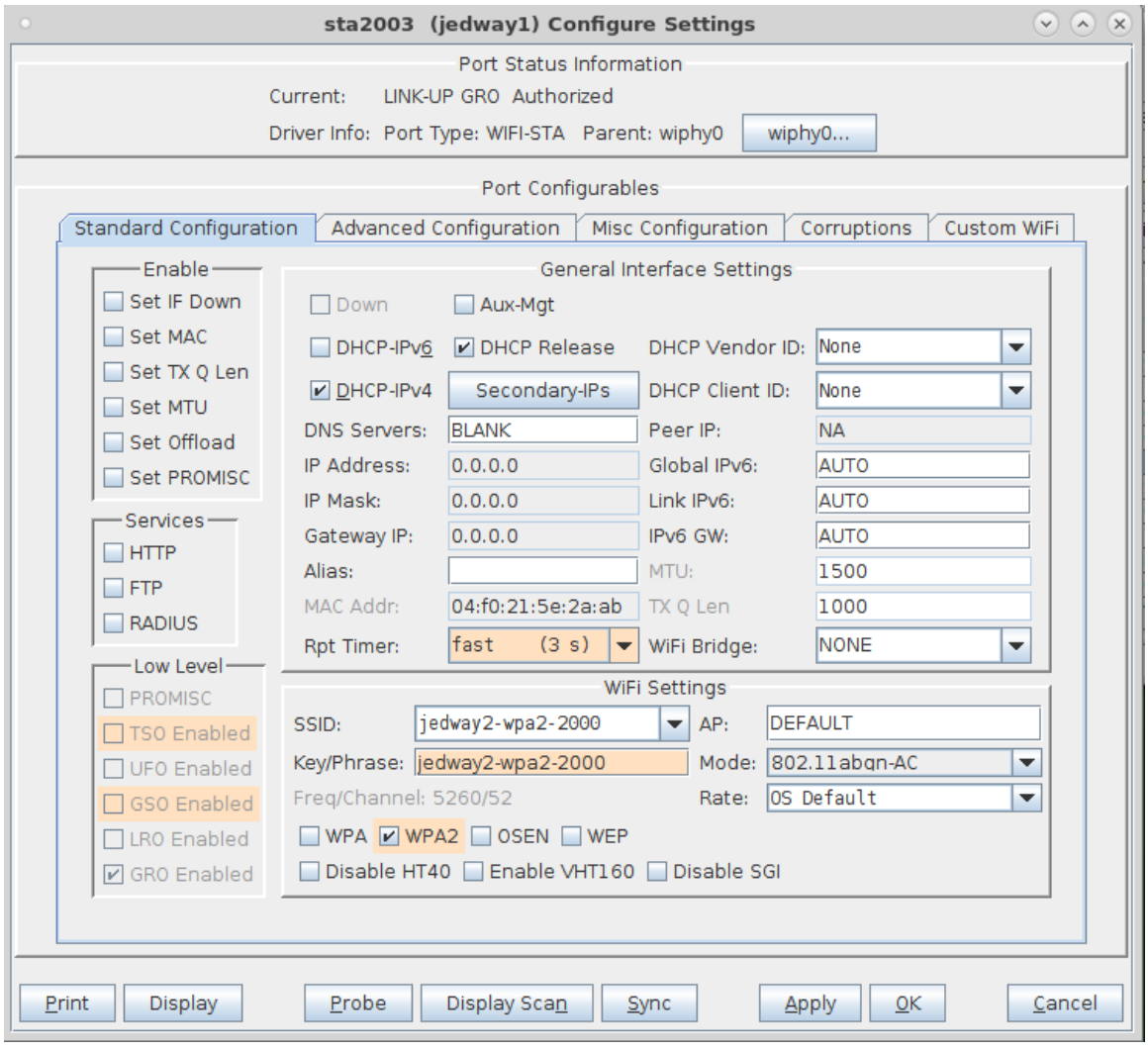
1. Connect Management Ethernet port to Management network or management PC. If connecting directly to a PC, an Ethernet cross-over cable should be used.
2. Connect eth1 wired Ethernet interface to wired Ethernet interface on the AP or network under test. This usually is considered the 'server' side of the network.
3. The Client side of the network will be the Virtual Stations configured on the CT525-128-2ac WiFi NIC(s).
4. Connect power to standard US or European AC power source. If using external battery pack, then connect to that instead. Click button to power on the unit.
5. The CT525-128-2ac should now boot. If DHCP is enabled on the Management network, the CT525-128-2ac will automatically acquire an IP address. If DHCP is not available, the IP address will be set to **192.168.1.101**.
6. Install the LANforge-GUI on a separate management PC or Laptop, or use VNC or remote-desktop programs to access the LANforge system directly. Windows, MAC-OS and Linux GUIs are supported: Select the correct one from the web page served from the LANforge system and install it.
7. Start the LANforge-GUI on the management PC and click the 'Discover' button. It should find the

CT525-128-2ac appliance and add the IP address to the drop-down box in the Connect widget. Press 'Connect' and you will be connected to the CT525-128-2ac.

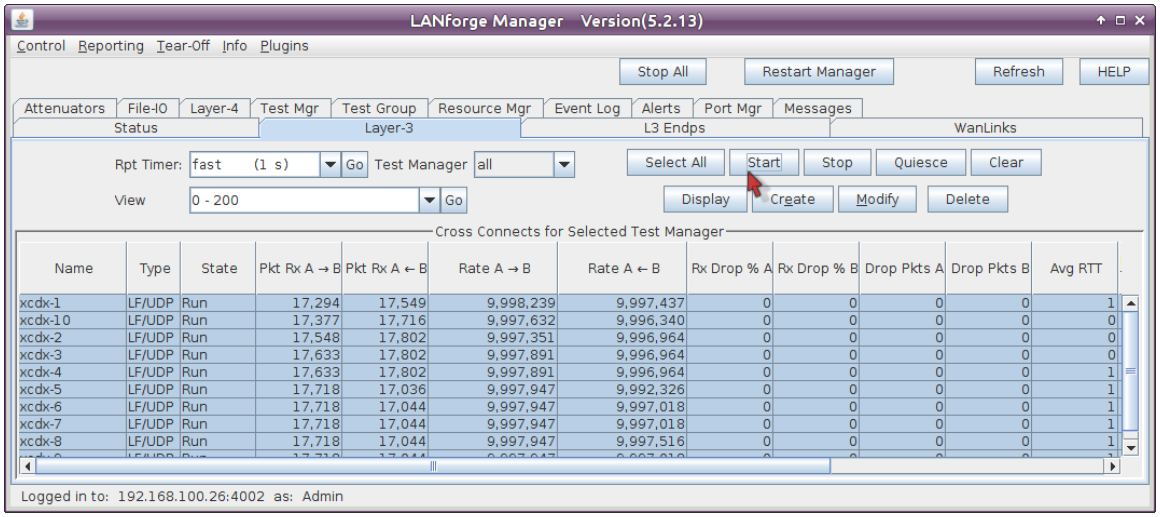
8. Select the Port Mgr tab in the GUI. Double-click on the device called 'wiphy0'. This is the Radio device, and should be configured for the correct, channel, country-code, etc. Next, select one or more of the Virtual Station interfaces and click 'Modify'. Enter the correct IP address information, SSID and WPA/WPA2 password (if Enabled). After applying these changes, the Virtual Station interface should associate with the AP and be ready to send traffic. You may create up to 128 Virtual Station interfaces per CT525-128-2ac with the 'Create' button.
9. Once the interfaces are configured correctly, you can click on the Layer 3, VOIP/RTP and other LANforge-FIRE related GUI tabs and configure/modify/start/stop particular traffic patterns that utilize the virtual stations and wired Ethernet interface. In most cases, you will want one of the FIRE endpoints to be on the wired interface and the other to be on the WiFi Virtual Station interface. It is also valid to generate traffic between two Virtual Station interfaces. The GUI Chamber View window provides some automated test suites. Contact support if you have suggestions for improvements.
10. Any GUI modifications take place immediately after you click 'Submit' or 'OK'.

LANforge WiFIRE Related Images

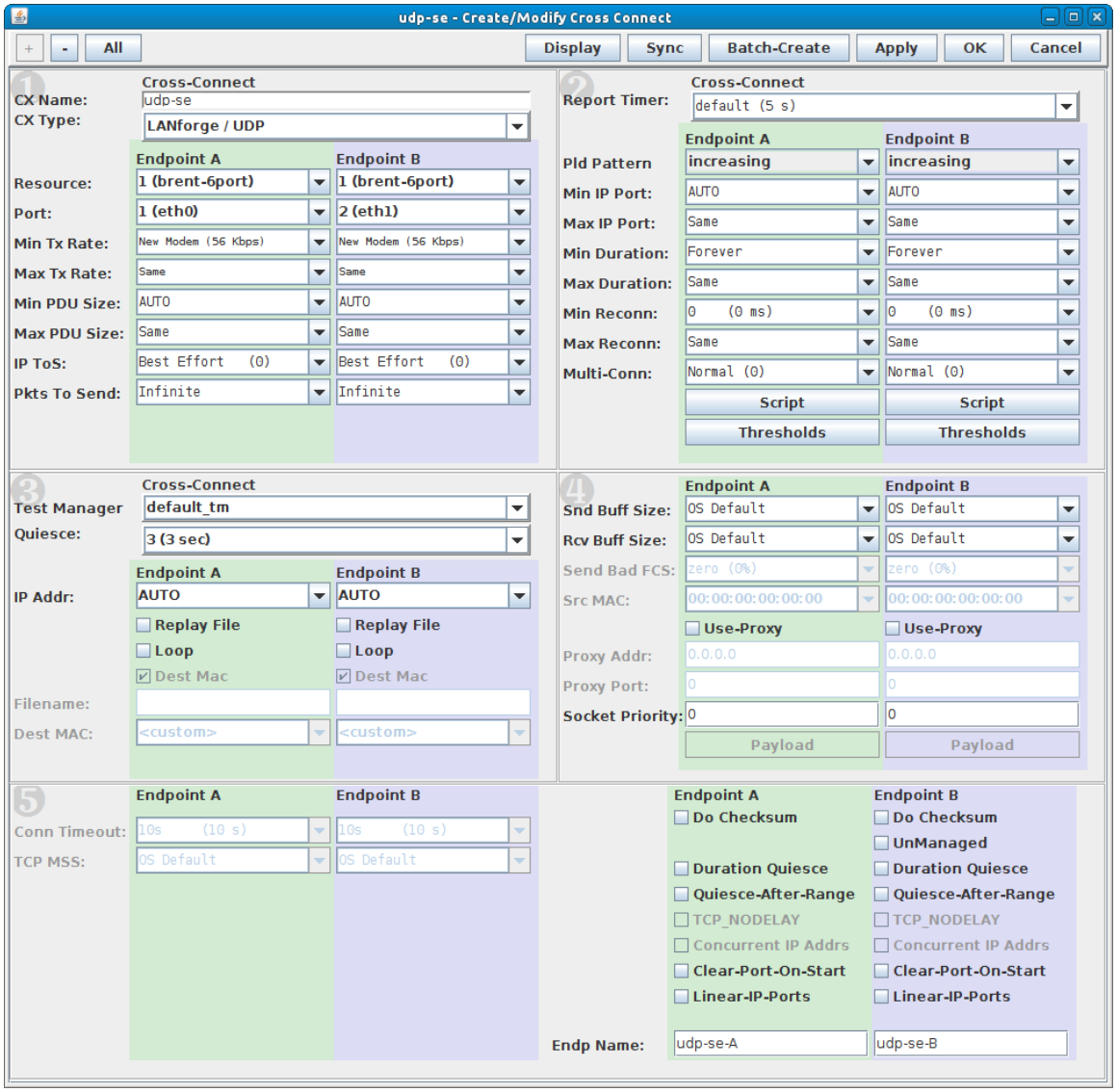
Virtual Station Configuration Screen



Layer 3 (Ethernet, UDP, TCP) Connections



Layer 3 Create/Modify Screen



Software Features

1. Supports real-world protocols:
    1. Layer 2: Raw-Ethernet.
    2. 802.1Q VLANs.
    3. PPPoE: Integrated PPPoE support.
    4. Layer 3: IPv4, IPv6, UDP/IP, IGMP Multicast UDP, TCP/IP.
    5. Layer 4-7: FTP, HTTP, HTTPS, TFTP, SFTP, SCP
    6. 802.11a/b/g/n/AC Wireless Station (up to 128 per machine).
    7. Layer 4-7: TELNET, PING, DNS, SMTP, NMAP (via add-on script).
    8. File-IO: NFSv3, NFSv4, CIFS, iSCSI.
2. Supports up to 1000 concurrent TCP connections with base license package.
3. The CT525-128-2ac is able to push around 950Mbps on each 802.11AC radio, depending on the protocols mix, wireless mode and environment, and speed of the network under test. Supports at least 60 VoIP (SIP, RTP) calls if appropriate licenses are purchased. When all two a/b/g/n/AC radios are configured on different channels, combined maximum download speed exceeds 1800Mbps (**NOTE: See these graphs for download results using two 802.11AC-wave1 3x3 radios: Open | WPA2 | TCP-DL-30sta | UDP-Netgear-64sta | TCP-Netgear-64sta | UDP-LANforge-AP-64sta | TCP-LANforge-AP-64sta | Hunt-Open | Hunt-WPA2**)
4. Supports real-world compliance with ARP protocol.

5. Supports ToS (QoS) settings for TCP/IP and UDP/IP connections.
6. Uses publicly available Linux and Windows network stacks for increased standards compliance.
7. Utilizes libcurl for FTP, HTTP and HTTPS (SSL), TFTP and SCP protocols.
8. Supports file system test endpoints (NFS, CIFS, and iSCSI file systems, too!). File system mounts can use the virtual interface feature for advanced testing of file server applications.
9. Supports custom command-line programs, such as telnet, SMTP, and ping.
10. Comprehensive traffic reports include: Packet Transmit Rate, Packet Receive Rate, Packet Drop %, Transmit Bytes, Receive Bytes, Latency, Jitter, various Ethernet driver level counters, and much more.
11. Supports generation of reports that are ready to be imported into your favorite spread-sheet.
12. Allows packet sniffing and network protocol decoding with the integrated Wireshark protocol sniffer.
13. GUI runs as Java application on Linux, MAC and Microsoft Operating Systems (among others).
14. GUI can run remotely, even over low-bandwidth links to accommodate the needs of the users.
15. Central management application can manage multiple units, tests, and testers simultaneously.
16. Includes easy built-in scripting for iterating through rates and packet sizes, with automated reporting. Also supports scriptable command line interface (telnet) which can be used to automate test scenarios. Perl libraries and example scripts are provided!
17. Automatic discovery of LANforge data generators simplifies configuration of LANforge test equipment.
18. LANforge traffic generation/management software is supported on Linux and MS Windows.

Hardware Specification

1. High-End Intel Multi-Core 2U rackmount server.
2. Operating System: Fedora Linux with customized Linux kernel.
3. Up to 28 10/100/1000 Ethernet ports on PCIe bus. Additional interface for management.
4. High-availability Ethernet hardware bypass option available.
5. Quad-Core Intel processor.
6. 7 PCIe low profile slots.
7. Optional NICs include: 4-port 10/100/1000 copper, 2-port 10/100/1000 copper, 2-port 1Gbps fibre, 2-port 10Gbps fibre, 2-port 10Gbps copper (CX4), 802.11a/b/g/n WiFi NIC, 802.11a/b/g/n/AC WiFi NIC.
8. 16 GB or more RAM.
9. 120 GB or larger SSD Hard Drive.
10. Weight: 20.4 lbs or 9.3 kg.
11. Dimensions: 17 x 18 x 3 inches (18-inch deep standard 2U rackmount server) Metric: 432 x 457 x 76 mm.
12. 520W power supply w/PFC, 100 - 240 VAC, 50 - 60 Hz, 7 - 3 Amps
13. Estimated Power Usage: 2.1 Amps @ 120 VAC under load, 1.4 Amps idle.

14. ROHS compliant.
15. Two Atheros/Qualcomm 802.11a/b/g/n/AC 3x3 MIMO with three external antenna each. Supports up to 128 virtual stations (64 per a/b/g/n/AC radio).
16. Antenna-to-Radio association: See labels on chassis.

Additional Feature Upgrades

Unless otherwise noted in the product description, these features usually cost extra:

- WanPaths (LANforge-ICE feature set)
- Virtual Interfaces: MAC-VLANs, 802.1Q VLANs, WiFi stations, etc
- FIRE Connections: Base FIRE license includes 1000 active connections.
- WiFi RF Attenuator: Adjust WiFi signal strength in a controllable manner.
- RF Noise generator: Generate modulated WiFi RF noise.
- RF Noise / Radar Simulator: Simulate RADAR pulses and other non-modulated RF noise.
- SMA RF Cable Bundle: Used to cable LANforge WiFIRE radios to device-under-test.
- LANforge-ICE Network Emulation.
- VOIP: Each concurrent call over the included package requires a license.
- VoIP-Mobile Audio Quality Testing using POLQA/PESQ.
- Mobile-Mobile Audio Quality Testing using POLQA/PESQ.
- Armageddon: Each pair of ports requires a license if not already included.
- RF Chambers for WiFi testing.
- External battery pack: 12+ hours for CT520, CT523, CT92X and other platforms.

Candela Technologies Inc., 2417 Main Street, Suite 201, P.O. Box 3285, Ferndale, WA 98248, USA
www.candelatech.com | sales@candelatech.com | +1 360 380 1618

Last modified: Mon Feb 3 05:56:21 PM PST 2025