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CT523c-8w7i-2w7m4-10g-cu LANforge WiFIRE WiFi-7 10 radio Traffic Generator Supporting 224 Virtual STA Interfaces

The CT523c-8w7i-2w7m4-10g-cu wireless traffic generator is an excellent choice for testing Access Points and other WiFi networks. The 4x4 MTK7996 WiFi-7 (a/b/g/n/ac/AX/BE) chipset NICs can support 36 virtual stations per band per NIC. They are packaged as three single-band radios (tri-band, tri-concurrent). Each of the Virtual Stations has its own IP address, IP port space, MAC address and routing table. Each Station has its own IP address, IP port space, MAC address and routing table. The Stations can be assigned to communicate to a particular Access Point, use a particular SSID, and have WPA2/WPA3 or enterprise authentication. Each radio can be configured independently of the other radios. Transmit power and channel/frequency is configured on a per-radio basis. Most other settings are configurable per station.

There are 8 Intel be200 tri-band 2x2 wifi-7 and two MTK79996 tri-band tri-concurrent 4x4 wifi-7 WiFi radios per CT523c-8w7i-2w7m4-10g-cu 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 other supported modes. If the radio is on a 5Ghz channel, the stations can be /a, /n, ac, or other supported modes. 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 CT523c-8w7i-2w7m4-10g-cu has 12 antenna and is small and quiet enough to sit on a desk or work bench. The CT523c-8w7i-2w7m4-10g-cu has no free slots to support additional NICs. Existing STA licenses may be used or additional STA licenses may be purchased (please contact sales for licensing options). 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 CT523c-8w7i-2w7m4-10g-cu can also be managed over a serial console in text mode or through a directly connected monitor, mouse and keyboard.

Performance exceeds 8Gbps

Larger Images: With Antennas No Antennas Front

NOTE: This product may have a different hardware configuration than the system pictured above.

Refer to your official quote for details.

Example Network Diagram

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 CT523c-8w7i-2w7m4-10g-cu WiFi NIC(s).

4. Connect power to standard US or European AC power source. If using external battery pack, then

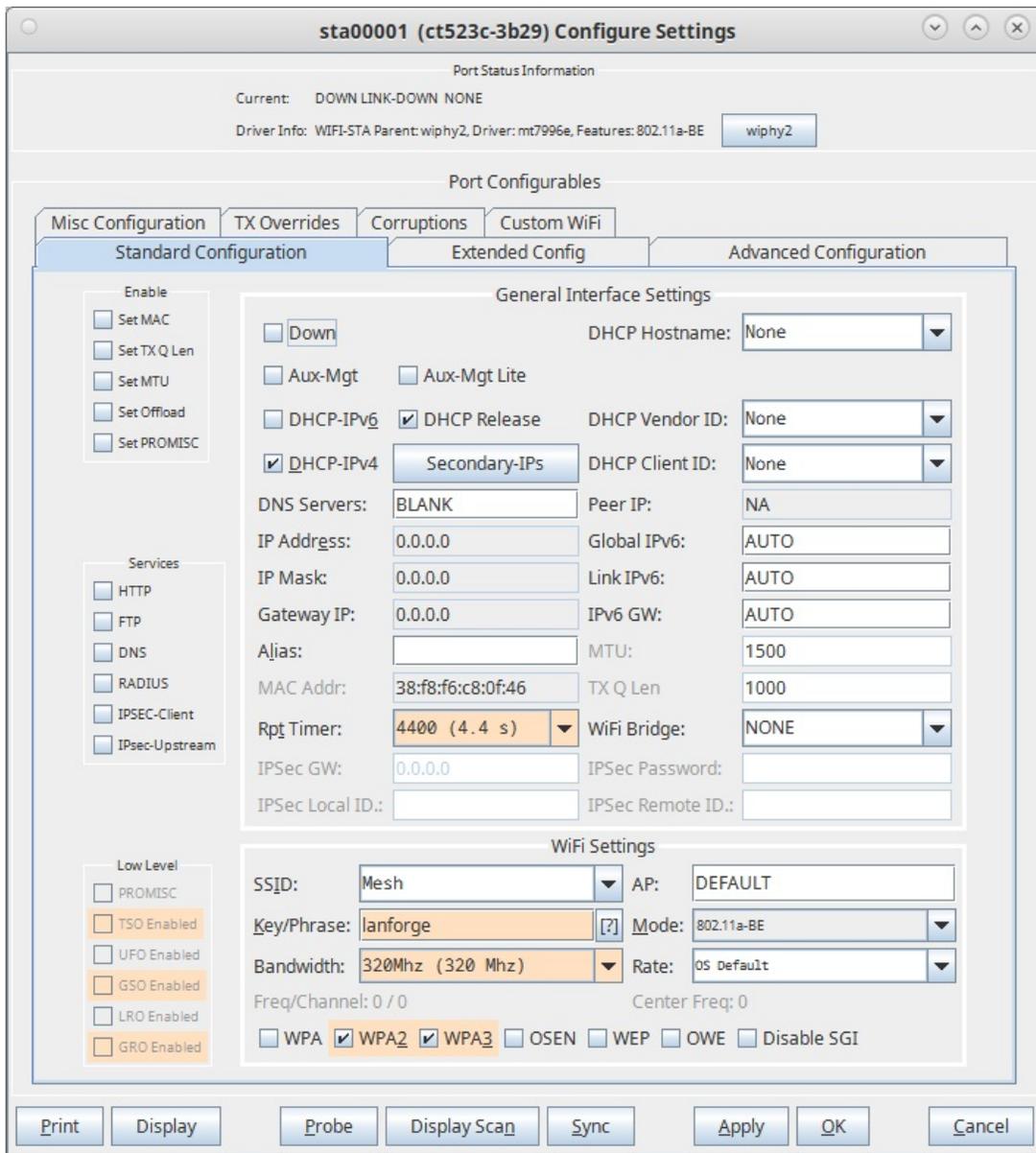connect to that instead. Click button to power on the unit.

5. The CT523c-8w7i-2w7m4-10g-cu should now boot. If DHCP is enabled on the Management network, the CT523c-8w7i-2w7m4-10g-cu 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 CT523c-8w7i-2w7m4-10g-cu appliance and add the IP address to the drop-down box in the Connect widget. Press 'Connect' and you will be connected to the CT523c-8w7i-2w7m4-10g-cu.

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 224 Virtual Station interfaces per CT523c-8w7i-2w7m4-10g-cu 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

sta00001 (ct523c-3b29) Configure Settings

Port Status Information

Current: DOWN LINK-DOWN NONE

Driver Info: WIFI-STA Parent: wiphy2, Driver: mt7996e, Features: 802.11a-BE [wiphy2]

Port Configurables

| Misc Configuration | TX Overrides | Corruptions | Custom WiFi |

| Standard Configuration | Extended Config | Advanced Configuration |

Enable
- ☐ Set MAC
- ☐ Set TX Q Len
- ☐ Set MTU
- ☐ Set Offload
- ☐ Set PROMISC

Services
- ☐ HTTP
- ☐ FTP
- ☐ DNS
- ☐ RADIUS
- ☐ IPSEC-Client
- ☐ IPsec-Upstream

Low Level
- ☐ PROMISC
- ☐ TSO Enabled
- ☐ UFO Enabled
- ☐ GSO Enabled
- ☐ LRO Enabled
- ☐ GRO Enabled

General Interface Settings

- ☐ Down
- ☐ Aux-Mgt   ☐ Aux-Mgt Lite
- ☐ DHCP-IPv6   ☑ DHCP Release
- ☑ DHCP-IPv4   [Secondary-IPs]

DNS Servers:	BLANK
IP Address:	0.0.0.0
IP Mask:	0.0.0.0
Gateway IP:	0.0.0.0
Alias:	
MAC Addr:	38:f8:f6:c8:0f:46
Rpt Timer:	4400 (4.4 s)
IPSec GW:	0.0.0.0
IPSec Local ID.:	

DHCP Hostname:	None
DHCP Vendor ID:	None
DHCP Client ID:	None
Peer IP:	NA
Global IPv6:	AUTO
Link IPv6:	AUTO
IPv6 GW:	AUTO
MTU:	1500
TX Q Len:	1000
WiFi Bridge:	NONE
IPSec Password:	
IPSec Remote ID.:	

WiFi Settings

SSID:	Mesh	AP:	DEFAULT
Key/Phrase:	lanforge [?]	Mode:	802.11a-BE
Bandwidth:	320Mhz (320 Mhz)	Rate:	OS Default

Freq/Channel: 0 / 0   Center Freq: 0

☐ WPA ☑ WPA2 ☑ WPA3 ☐ OSEN ☐ WEP ☐ OWE ☐ Disable SGI

[Print] [Display]   [Probe] [Display Scan] [Sync]   [Apply] [OK]   [Cancel]

Layer 3 (Ethernet, UDP, TCP) Connections

LANforge Manager   Version(5.2.13)

Control Reporting Tear-Off Info Plugins

Stop All   Restart Manager   Refresh   HELP

Attenuators | File-IO | Layer-4 | Test Mgr | Test Group | Resource Mgr | Event Log | Alerts | Port Mgr | Messages
Status | Layer-3 | L3 Endps | WanLinks

Rpt Timer: fast (1 s) Go Test Manager all   Select All   Start   Stop   Quiesce   Clear
View   0 - 200   Go   Display   Create   Modify   Delete

Cross Connects for Selected Test Manager

Name	Type	State	Pkt Rx A → B	Pkt Rx A ← B	Rate A → B	Rate A ← B	Rx Drop % A	Rx Drop % B	Drop Pkts A	Drop Pkts B	Avg RTT
xcdx-1	LF/UDP	Run	17,294	17,549	9,998,239	9,997,437	0	0	0	0	1
xcdx-10	LF/UDP	Run	17,377	17,716	9,997,632	9,996,340	0	0	0	0	0
xcdx-2	LF/UDP	Run	17,548	17,802	9,997,351	9,996,964	0	0	0	0	0
xcdx-3	LF/UDP	Run	17,633	17,802	9,997,891	9,996,964	0	0	0	0	0
xcdx-4	LF/UDP	Run	17,633	17,802	9,997,891	9,996,964	0	0	0	0	1
xcdx-5	LF/UDP	Run	17,718	17,036	9,997,947	9,992,326	0	0	0	0	1
xcdx-6	LF/UDP	Run	17,718	17,044	9,997,947	9,997,018	0	0	0	0	1
xcdx-7	LF/UDP	Run	17,718	17,044	9,997,947	9,997,018	0	0	0	0	1
xcdx-8	LF/UDP	Run	17,718	17,044	9,997,947	9,997,516	0	0	0	0	1

Logged in to: 192.168.100.26:4002 as: Admin

Layer 3 Create/Modify Screen

udp-se - Create/Modify Cross Connect

+ - All   Display   Sync   Batch-Create   Apply   OK   Cancel

① Cross-Connect
CX Name: udp-se
CX Type: LANforge / UDP

	Endpoint A	Endpoint B
Resource:	1 (brent-6port)	1 (brent-6port)
Port:	1 (eth0)	2 (eth1)
Min Tx Rate:	New Modem (56 Kbps)	New Modem (56 Kbps)
Max Tx Rate:	Same	Same
Min PDU Size:	AUTO	AUTO
Max PDU Size:	Same	Same
IP ToS:	Best Effort (0)	Best Effort (0)
Pkts To Send:	Infinite	Infinite

② Cross-Connect
Report Timer: default (5 s)

	Endpoint A	Endpoint B
Pld Pattern	increasing	increasing
Min IP Port:	AUTO	AUTO
Max IP Port:	Same	Same
Min Duration:	Forever	Forever
Max Duration:	Same	Same
Min Reconn:	0 (0 ms)	0 (0 ms)
Max Reconn:	Same	Same
Multi-Conn:	Normal (0)	Normal (0)
	Script	Script
	Thresholds	Thresholds

③ Cross-Connect
Test Manager: default_tm
Quiesce: 3 (3 sec)

	Endpoint A	Endpoint B
IP Addr:	AUTO	AUTO
	☐ Replay File	☐ Replay File
	☐ Loop	☐ Loop
	☑ Dest Mac	☑ Dest Mac
Filename:		
Dest MAC:	<custom>	<custom>

④

	Endpoint A	Endpoint B
Snd Buff Size:	OS Default	OS Default
Rcv Buff Size:	OS Default	OS Default
Send Bad FCS:	zero (0%)	zero (0%)
Src MAC:	00:00:00:00:00:00	00:00:00:00:00:00
	☐ Use-Proxy	☐ Use-Proxy
Proxy Addr:	0.0.0.0	0.0.0.0
Proxy Port:	0	0
Socket Priority:	0	0
	Payload	Payload

⑤

	Endpoint A	Endpoint B
Conn Timeout:	10s (10 s)	10s (10 s)
TCP MSS:	OS Default	OS Default

Endpoint A	Endpoint B
☐ Do Checksum	☐ Do Checksum
	☐ UnManaged
☐ Duration Quiesce	☐ Duration Quiesce
☐ Quiesce-After-Range	☐ Quiesce-After-Range
☐ TCP_NODELAY	☐ TCP_NODELAY
☐ Concurrent IP Addrs	☐ Concurrent IP Addrs
☐ Clear-Port-On-Start	☐ Clear-Port-On-Start
☐ Linear-IP-Ports	☐ Linear-IP-Ports

Endp Name: udp-se-A   udp-se-B

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/AX/BE Wireless Stations (up to 224 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 CT523c-8w7i-2w7m4-10g-cu is able to download about 8Gbps WiFi throughput, depending on the protocols mix, wireless mode and environment, and speed of the network under test.

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 Appliance with quiet fan and 4 slots.

2. Operating System: Fedora Linux with customized 64-bit Linux kernel.

3. Two 1Gbps Ethernet ports, room for four additional NICs

4. Intel be200 802.11a/b/g/n/AC/BE 2x2 tri-band WiFi-7 radio. Radio vendor information. Supports a single station per radio.

5. be200: MLO eMLSR: Supported, listens to max of 2 links.

6. be200: MLO MLMR: Not supported.

7. be200: 320Mhz, 4096 QAM, OFDMA, Puncturing, MU-MIMO, 2.4, 5, 6Ghz supported.

8. Mediatek 802.11a/b/g/n/AC/AX/BE 4x4 MIMO tri-band tri-concurrent mtk7996 chipset radio with four external antenna (internal splitter/combiner combines the 3 bands). Supports up to 36 virtual stations per radio per band.

9. Antenna-to-Radio association: See labels on chassis.

10. Intel 2-port 10G-BaseT (rj45) network adapter card, PCI-e x8, 5GT/s bus. Supports 100Mbps, 1Gbps, 2.5Gbps, 5Gbps and 10Gbps base-t

11. CPU: Intel I7-12700TE 3.40GHZ (UP TO 4.60GHZ) 25MB LGA 1700 35W

12. DB9 Serial console (115200 8 N 1) for console management & initial configuration.

13. HDMI, VGA, USB ports for desktop usage.

14. 32 GB RAM.

15. Dual 240+ GB Solid State Hard Drives (RAID Mirror).

16. Larger storage drives available.

17. External power supply (brick) supplying 9.5AMP at 24VCD, 230W. Input: 100-240V, 3AMP 50-60Hz

18. Weight: 12 lbs

19. Dimensions: 8 x 11 x 8 inches   Metric: 200 x 280 x 200 mm.

20. Operating Temperature: -10 ~ 60°C.

21. Certification: CE, FCC, RoHS

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.