



Cable Telephony Test

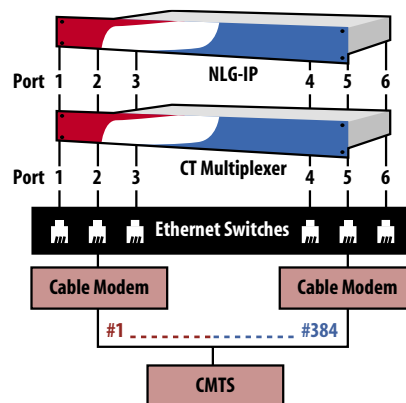
Introducing the Fortissimo and Allegro Call Generators

The Fortissimo and Allegro product lines are the world's smallest, high-capacity network load generation products designed to test and qualify the cable telephony network. Developers responsible for system and interoperability testing can effectively evaluate maximum traffic rate, call completion, calling features, and voice and video call quality of service (QoS). Fortissimo and Allegro call generators provide end-to-end testing of cable telephony systems. With these tools, developers can:

- Simulate "on-net" calls between cable subscribers
- Replicate "off-net" calls between cable subscribers and PSTN subscribers
- Run regression tests to verify new eMTA and CMTS software releases under load
- Simulate SIP phones and POTS lines connected to eMTAs
- Verify that CMTS interoperates with multiple eMTA product lines and various manufacturers

Cable Telephony Multiplexor

For developers of next generation voice systems the Fortissimo Cable Telephony Multiplexor is a stand-alone unit that works in conjunction with the Fortissimo IP Call Generator. Developers can simulate uniquely configured SIP traffic through cable modems. In addition, the unit provides unique Ethernet MAC addresses and VLAN support.



Highlights

- Characterize system performance (calls per hour)
- Identify system capacity (simultaneous calls)
- Benchmark voice quality
- Quantify voice path impairments
- Verify calling features
- Test voice response and voicemail systems
- Automate regression testing
- Test network quality end-to-end

Key Features

Fortissimo Call Generators (IP, Analog, and DS3)

- Measure audio quality via MOS, PSQM, PESQ, and R-factor along with delay, packet loss, attenuation, and signal-to-noise ratio
- Verify voice path presence for each call with real audio
- Simulate 192 SIP or 96 MGCP endpoints
- Support DNS, endpoint registration, and authentication
- Provide unique IP and Ethernet MAC addresses per endpoint via NLG-CTM, and support 802.1Q VLAN tags
- Replicate up to 100 2-wire loop start lines, 50 4-wire handset/headset circuits, or 32 FAX circuits
- Simulate one DS3 circuit, 28 T1, or 21 E1 circuits, or one OC-3/STM-1 circuit
- Support SIP, MGCP, CAS, PRI, SS7, and GR303 signaling

Allegro Call Generators (IP, Analog, and T1/E1)

- Measure audio quality via MOS, PSQM, PESQ, and R-factor along with delay, packet loss, attenuation, and signal-to-noise ratio
- Verify voice path presence for each call with real audio
- Simulate 8 SIP or MGCP endpoints and support DNS, endpoint registration, and authentication
- Support 4 POTS lines
- Simulate up to 4 T1/E1 spans
- Support SIP, MGCP, SS7, PRI, and CAS signaling

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Applications

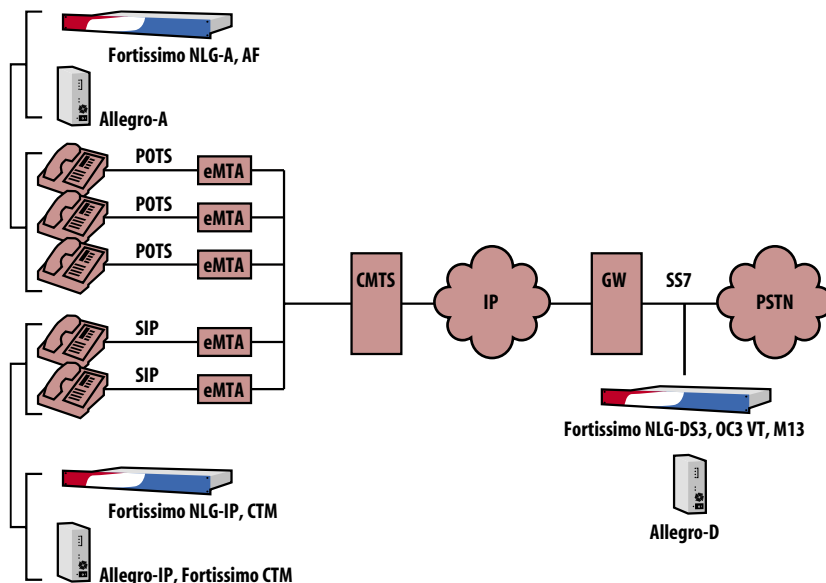
Fortissimo or Allegro call generators are connected to eMTA units and are used to generate telephone traffic into the cable telephony system. Calls are placed either "on-net" between cable subscribers connected to eMTAs or "off-net" between cable subscribers connected to eMTAs and PSTN subscribers over SS7 trunks.

System Test

- **Performance Testing:** verify the overall performance of the cable telephony system under load by measuring maximum calls per hour or second, maximum number of simultaneous calls, and maximum simultaneous seize attempts without dial tone failures
- **QoS Testing:** measure voice call quality (MOS, PESQ, PSQM, R-factor) and video call quality (Skew Factor, Media Delivery Index)
- **Stability Testing:** verify the stability of the cable telephony system by measuring call completion rates over long time durations

Interoperability Test

- **QoS Testing:** measure voice call quality (MOS, PESQ, PSQM, R-factor) and video call quality (Skew Factor, Media Delivery Index)
- **Calling Feature Verification:** verify proper performance of calling features under load including call waiting, call forwarding, call hold, 3-way calling, etc.
- **Failover Testing:** in the event of network element failure confirm that system properly switches to backup units by verifying call and voice paths are not lost and measuring voice path dropouts
- **System Response Testing:** measure Dial Tone Delay and Post Dial Delay
- **Fax Testing:** test Fax transmission and receipt via T.30 (analog) or T.38 (IP) under load



QoS Measurements

- Voice Quality Scores
 - R-factor
 - MOS
 - PSQM
 - PESQ
- Impairment Data
 - One-way and Round-trip Delay
 - Packet Loss
 - Receive Level, Circuit Noise and SNR

Conductor GUI

- Windows interface for Fortissimo and Allegro
- Simple test creation and execution
- Comprehensive statistics and error reporting
- Test Scheduler and Traffic Profiler utilities
- Control individual units/spans/channels/lines
- Control small or large systems – up to 32 Fortissimo and Allegro Units and up to 10 Million Calls/Hour
- Listen to voice path at the workstation

XpresScript – Graphical Scripting Tool

- Create new call flows or edit existing sequences
- Icons contain commonly used script fragments
- Interconnect "drag and drop" icons
- User-defined parameter names, statistics and error reports
- Compile and check syntax
- Generate script text along with call flow diagram
- Standalone or accessed via Conductor GUI

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