

PowerProbe 6000 - Service Level Test Platform

Human perception of Service Quality

Versatile Probe Interoperability



▶ PowerProbe 500
IP/Analog probe



▶ PowerProbe 30
analog responder



▶ PowerProbe 50
RTP/IP responder



A single probe for TDM, IP and wireless active testing

Supports end-to-end testing to PowerProbe test probes and responders designed for hub, base station and enterprise installation.

Tektronix' PowerProbe 6000 active service quality test probe is designed for advanced triple-play Quality of Experience (QoE) testing over PSTN and next-generation IP, cellular and wireless broadband networks. With a broad range of wireline and air interfaces supporting all standard signalling protocols, the PowerProbe 6000 provides unparalleled active test access. Based on a flexible Linux and DSP-powered processing core, the PowerProbe supports a growing library of over 40 application-focused software test agents to cover your evolving test needs.

Remotely managed and highly secure, the PowerProbe 6000 enables scalable end-to-end, bi-directional voice, VoIP, fax/FoIP, video, and IP monitoring that faithfully measures over 330 user-perceived service quality metrics using an array of standards-based and patented algorithms.

Controlled by Tektronix' DirectQuality R7 active test automation OSS, the PowerProbe 6000 can perform on-demand or scheduled tests for monitoring, fault-management, SLA validation, installation, troubleshooting and provisioning applications.

Applications

- ▶ Proactive End-to-End QoE Monitoring
- ▶ VoIP / FoIP Service Validation
- ▶ Remote Troubleshooting
- ▶ Carrier / Peering Fabric Benchmarking
- ▶ Quality-Aware Least Cost Routing
- ▶ Video Conference Testing
- ▶ SLA Validation
- ▶ Trunk Testing

Active Test Capabilities

Voice/VoIP Transmission Quality

- ▶ Voice Impairments (ex: Delay, Echo, Noise)
- ▶ Quality Metrics (ex: MOS, R-factor)
- ▶ IP Impairments (ex: Packet loss, jitter)
- ▶ Legacy Trunk Testing

Streaming Media Quality (RTP)

- ▶ HDTV, IPTV, VoD, Mobile & Internet Video & VoIP Testing
- ▶ Quality Metrics (Jitter, Packet Loss, Delay, Noise)
- ▶ full RTCP-XR support

Call Connectivity

- ▶ Network Timers, Call Disposition Codes
- ▶ Performance Ratios, Billing Verification
- ▶ Standardized results over PSTN, Wireless & IP networks

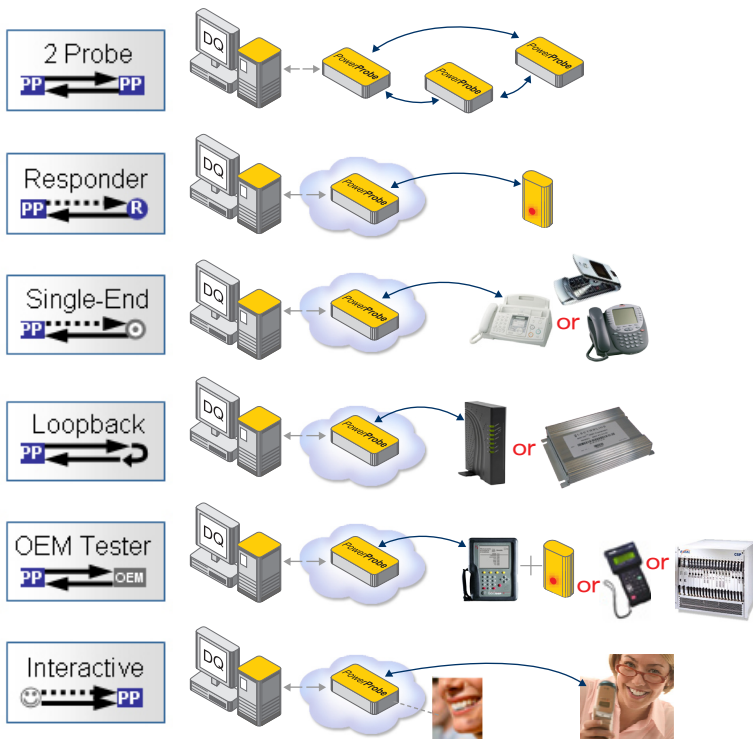
Fax/modem Transmission Quality

- ▶ Negotiated Parameters (ex: Baud Rate)
- ▶ Page transmission Performance
- ▶ T.38 (FoIP) and T.30 (standard fax) testing

Key Features & Benefits

Versatile Test Layouts

The PowerProbe 6000 can be used in six unique test configurations, based on the availability of other test probes/responders and installed PowerProbe test agents. Results from various test layouts can be combined together to provide detailed results from core to end-user.



- Advanced On-Net QoS Testing and Monitoring
- Day-of-Install & Troubleshooting Tests in the Field
- Off-Net Testing Requiring No Far-End Probe
- Test to SBCs, Subscriber Phone Adapters & CATV Transponders
- Test to Handheld Testers & Network Elements
- Interactive Test Agents for Customer Support

All-in-one test platform

Powerful and scalable probe that handles Voice, VoIP, Fax, Internet, Video and Modem testing in a single, compact unit.

Single-Ended Testing

Perform voice, VoIP, fax and data service and transmission quality to any region worldwide without any far-end test equipment using single-ended test agents and public IVR, faxes, and modems as far-end terminations.

Loopback Testing

Test VoIP service quality to enterprise Session Border Controllers (SBCs) and cable VoIP subscribers' telephone adapters from a T1/E1 or IP interface using industry unique loopback testing.

True User-Perceived MOS

Highly repeatable, accurate MOS scores and quality metrics calculated using leading standards-based algorithms from a complete array of analog and IP measurements.

Interactive Testing

Host interactive, IVR-based VoIP testing for self-install customers and technicians to test their lines. Measure MOS, echo, noise, DTMF transmission, fax connection and Caller ID.

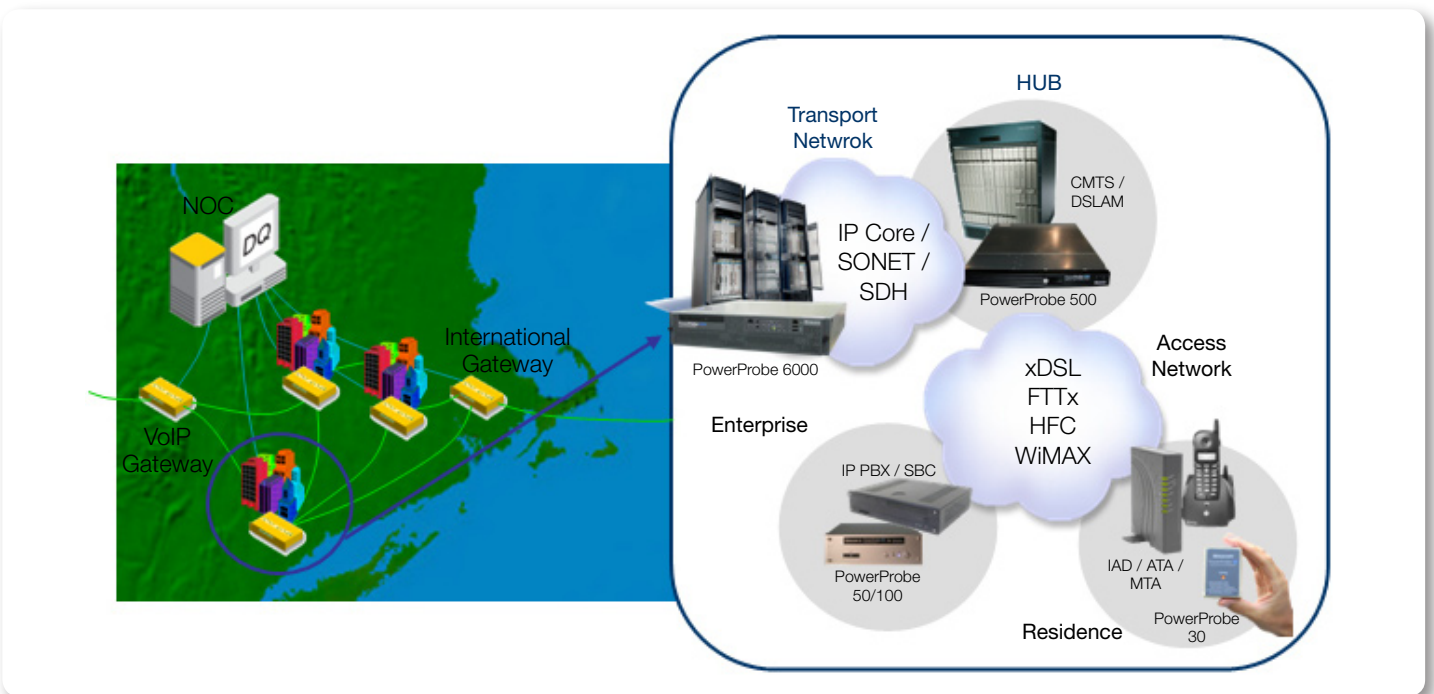
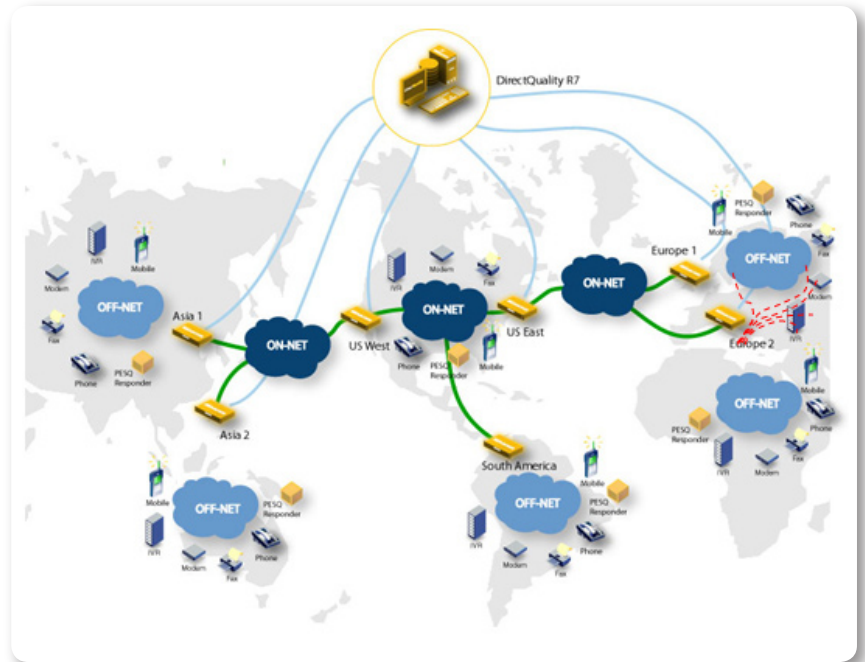
Network Performance

Automatically analyze network status during call progress using an E.180-based database of worldwide tones and Call Disposition Codes (CDC) to perform detailed connectivity analysis including ASR, ABR, CCR, and NER.

Global Network Implementation

The PowerProbe 6000 can be deployed network-wide in main switching centers and at the edge of the network. A variety of advanced tests including VoIP stress testing, RTP streaming, and Fax-over-IP validation enable thorough service quality and SLA monitoring of the core network.

Industry-unique single-ended testing provides off-net coverage and standardized quality testing for least-cost routing applications over IP Peering and PSTN partner carrier routes.



National / Regional Implementation

The PowerProbe 6000 is commonly deployed at switch and/or gateway locations on-net, acting as primary test-heads for network-wide monitoring. Tektronix' PowerProbe 500 IP/Analog probes installed in hubs and access nodes provide cost-effective test coverage to the network edge. PowerProbe 100 enterprise probes and PowerProbe 30 & 50 responders extend DirectQuality's reach to end-user premises for true end-to-end service quality monitoring, installation, provisioning, SLA validation and troubleshooting applications.

Enabling Next-Generation Network Innovation

The screenshot displays the PowerProbe 6000 web management interface. On the left, the 'Probe Properties' window is open, showing tabs for Identification, Location, Network, Software, Disks, and Dialing Options. The 'Test Software' section lists:

Description	Action	Version	Status
Voice Test Engine	<Restart> <Stop> <View>	2.1, build 106	Running
Fax and Modem Test Engine	<Restart> <Stop> <View>		Running
Real Time Protocol Test Engine	<Restart> <Stop> <View>	3.0, build 108	Running
Analog Module Driver	<Restart>	5.1 FP1 build 25NFS	Running

The 'Probe Database' section lists:

Description	Action	Version	Status
Test Engine Database	<Restart>	7.2.3	Running

The main 'Probes' window shows a table of active probes:

Probe	Status	Action	Type	Country	City	Modules	IP Address/Host Name	Usage	Tones Update	Needs Update
CBW PP500 #07 (NYC)	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	USA	New York City, NY	2	10.201.0.7	Restricted		Yes
CBW PP500 #08 (WDC)	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	USA	Washington, DC	2	10.201.0.8	Restricted		Yes
CBW PP500 #09	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Canada	Minacom City	2	10.201.0.9	Restricted		Yes
CBW PP500 #10	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Canada	Minacom City	2	10.201.0.10	Restricted		Yes
CBW PP500 #11	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Canada	Minacom City	2	10.201.0.11	Restricted		Yes
CBW PP500 #12	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Canada	Minacom City	2	10.201.0.12	Restricted		Yes
CBW PP500 #13	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Canada	Minacom City	2	10.201.0.13	Restricted		Yes
CBW PP500 #14	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Canada	Minacom City	2	10.201.0.14	Restricted		Yes
CBW PP500 #15	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Canada	Minacom City	2	10.201.0.15	Restricted		Yes
C.W PP500 #01	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Netherlands	St. Maarten	2	10.201.0.1	Restricted		Yes
C.W PP500 #02	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Netherlands	Arad	2	10.201.0.2	Restricted		Yes
C.W PP500 #03	Available	<Ping> <Restart> <Stop> <View>	PowerProbe 500	Netherlands	Arad	2	10.201.0.3	Restricted		Yes

The 'Maintenance Windows' window shows a table of scheduled tasks:

Name	Duration	Recurrence	Impact	Schedule
Batch File Test	15 min.	Once	None	Monday June, 19 from 15:30 to 15:45
Database Backup	1 hour(s)	Weekly	Prevent logons	Every Sunday from 10:00 to 11:00
Probe Update	3 hour(s)	Once	Block tests	Saturday June, 24 from 12:51 to 15:51
System Cleanup	30 min.	Daily	Block tests	Every day from 20:00 to 20:30
System Update	2 hour(s)	Once	Prevent logons	Saturday August, 12 from 12:54 to 14:54

Remote Management

The DirectQuality R7 test OSS allows you to configure any PowerProbe 6000 remotely from any web browser - assess probe and test port status, upload and activate new test agents, backup probe configuration, change IP address and probe name, and load international dialling tones – all within a DISA-approved security framework.

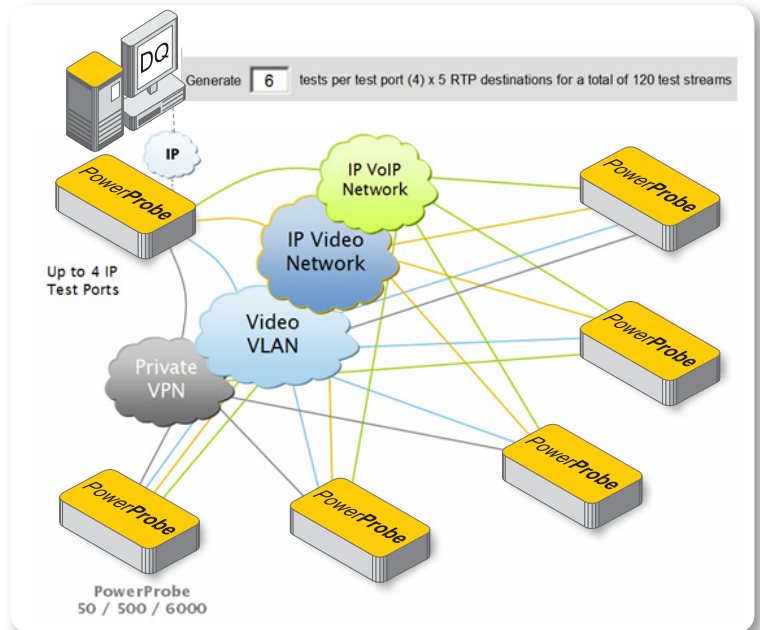
DirectQuality automates probe maintenance, and can perform required updates and backups within predefined maintenance windows, maximizing test system performance and availability.

Automated Resource Scheduling

PowerProbe test port and resource availability are automatically managed by the DirectQuality R7 test automation OSS.

Active tests between probes can be configured and scheduled in one-to-one or one-to-many layouts for simplified network-wide service monitoring – DirectQuality manages scheduling conflicts and automatically executes tests when requested ports become available.

The DirectQuality OSS also knows the test agents installed on each probe, simplify test automation by displaying only valid probe / test combinations.

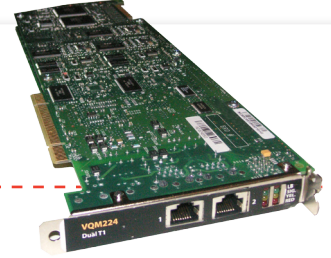


Test Modules

A wide variety of test interfaces and supported signaling protocols permits testing of any network and service type.



Call/Speech Quality & Trunk Testing



VQM4	Analog (FXO)	2 test ports
VQM12	Analog (FXO)	6 test ports
VQM24	T1	12 test channels
VQM224	Dual T1	24 test channels
VQM30	E1	15 test channels
VQM230	Dual E1	30 test channels



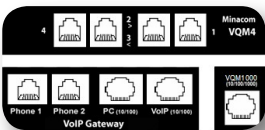
Fax/Modem Quality

VQM38	Analog (FXO)	1 Fax test port
VQM92	Analog (FXO)	1 Modem test port



VoIP Performance

VQM1000	Ethernet 10/100/1000 (RTP/RTCP, ICMP, DNS, etc.)	1 GigE test port ▶ multiple simultaneous tests
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Signaling Gateways

VoIP Gateway	Ethernet 10/100 (MGCP/SIP/ H.323/SCCP)	supports VQM 4, 12, 38, 92 modules ▶ 2 analog (FXO) inputs
SS7 Gateway (VQM7)	4x T1/E1 (ISUP)	supports VQM 24, 224, 30, 230 modules
Wireless Gateways	GSM 850/1900, 900/1800 MHz CDMA 800, 1900 MHz TDMA 800, 1900 MHz	supports VQM 4, 12, 38, 92 modules ▶ 2 analog (FXO) inputs

Enabling Next-Generation Network Innovation

An industry-leading range of test agents gives you unrivalled service quality visibility.

Test Agents

► Call & Speech Quality



- Caller ID
- Conferencing
- DTMF Transparency
- Echo & Noise (Fax)
- Echo & Noise (Human)
- Fax Connection
- Fax Transmission
- ITU-T PESQ
- IVR
- MCI VQES
- Network Timers/CDC
- Speech and DTMF

► Connectivity Testing



- Ring Detection
- Alert (Ring) Detection
- Answer Detection

► Legacy Trunk Testing



- ROTL 100
- ROTL 102
- ROTL 105
- ROTL 108

► Fax/Modem Testing



- Fax Connection
- Fax Transmission
- Modem Connection

► Internet / IP Services



- DNS Resolution
- Ping
- RTP Streamer
- Trace Route
- Video Connection
- Video MOS

► Cable VoIP



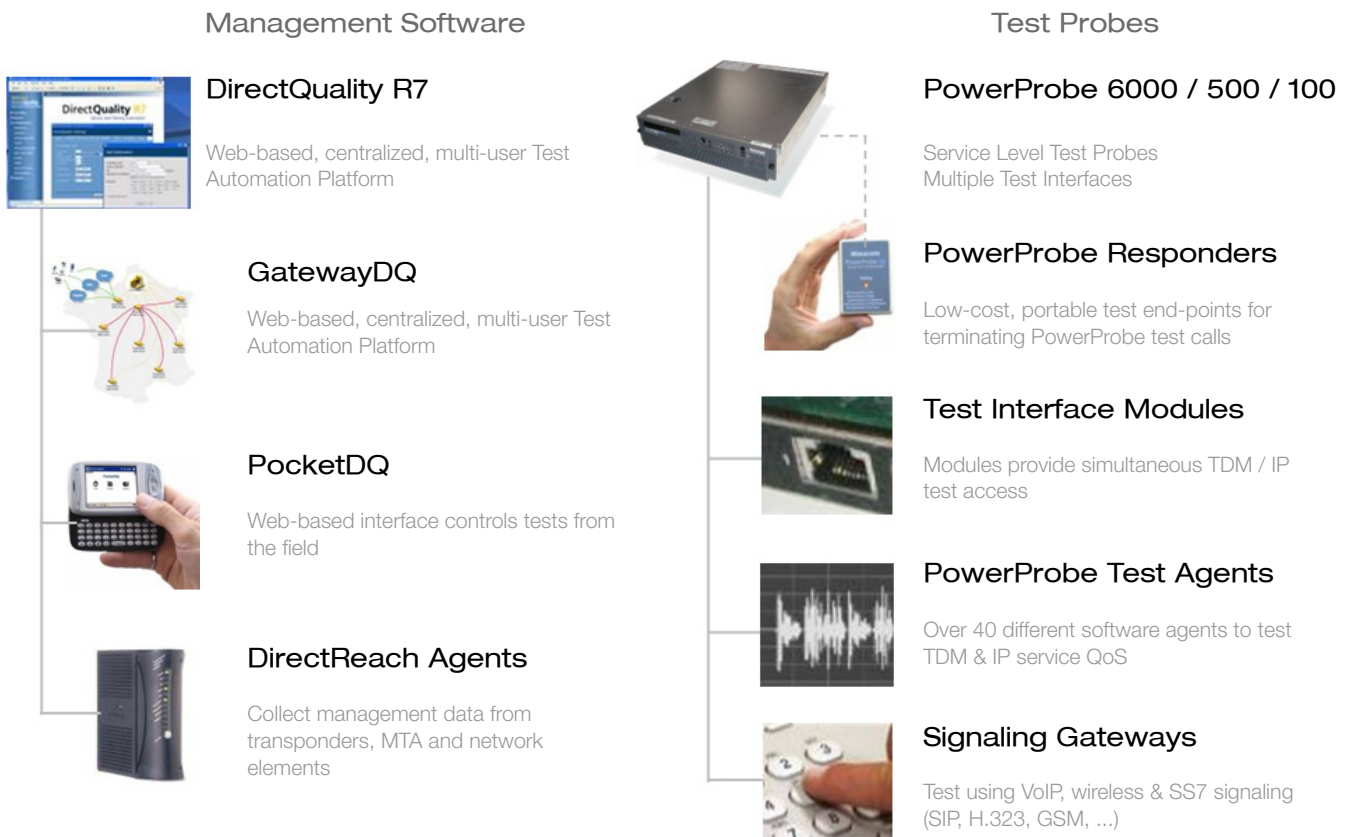
- MTA VoIP Loopback
- Transponder RTP Loopback
- Transponder eMTA Voice-Path
- Tollgrade VoIP Responder

	INTERFACES							SIGNALING											
	Analog		T1		E1		Analog Fax/Modem		IP	Wireline			VoIP			Wireless			
	VQM 4	VQM 12	VQM 24	VQM 24	VQM 30	VQM 230	VQM 38	VQM 92	VQM 1000	PRIS	SS7	Analog	SIP	MGCP	3rd Party	SCCP	CDMA	TDMA	GSM
Caller ID	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Conferencing	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
DTMF Transparency	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Echo & Noise (Fax)	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Echo & Noise (Human)	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fax Connection	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fax Transmission	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
ITU-T PESQ	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IVR	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MCI VQES	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Network Timers/CDC	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Speech and DTMF	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Ring Detection			✓	✓								✓	✓	✓	✓	✓	✓	✓	✓
Alert (Ring) Detection			✓	✓	✓	✓				✓	✓								
Answer Detection			✓	✓	✓	✓				✓	✓								
ROTL 100			✓	✓						✓	✓								
ROTL 102			✓	✓						✓	✓								
ROTL 105			✓	✓						✓	✓								
ROTL 108			✓	✓						✓	✓								
Fax Connection	✓	✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Fax Transmission	✓	✓					✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Modem Connection							✓	✓			✓								
DNS Resolution									✓										
Ping									✓										
RTP Streamer									✓										
Trace Route									✓										
Video Connection									✓					✓	✓				
Video MOS									✓										
MTA VoIP Loopback			✓	✓	✓	✓			✓	✓				✓					
Transponder RTP Loopback									✓										
Transponder eMTA Voice-Path			✓	✓	✓	✓			✓	✓				✓					
Tollgrade VoIP Responder	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Ordering Information

- PP-600-007 PowerProbe 6000 modular test probe, 2U x 19" rackmount, AC Powered.
3 Test Module Slots, 2 VoIP Gateway Slots, Xeon Processor, 10/100/1000 on board, 120/240 VAC Power Supply, Test O/S.
- PP-600-008 PowerProbe 6000 modular test probe, 2U x 19" rackmount, DC Powered.
3 Test Module Slots, 2 VoIP Gateway Slots, Xeon Processor, 10/100/1000 on board, -48 VDC Power Supply, Test O/S.
- PP-600-005 Portable PowerProbe 6000 modular test probe, AC Powered.
3 Test Module Slots, LAN Card, Xeon Processor, 120/240 VAC Power Supply, Test O/S.
- PP-600-005B Portable PowerProbe 6000 modular test probe, AC Powered, Europe.
3 Test Module Slots, LAN Card, Xeon Processor, PFC 120/240 VAC Power Supply for Europe, Test O/S.
- PP-600-105 Redundant AC Power Supply for PP-600-007.
- PP-600-007/8 also available in NEBS L3 chassis, please consult your account manager.
See page 6 and 7 for a complete list of test interface modules and supported active test agents.

The DirectQuality R7 Test Solution Platform



Tektronix' Communications Business Division –

Enabling Next-Generation Network Innovation

Tektronix' Communications Business enables the world's largest network operators and equipment manufacturers to design, build, test, deploy and manage current and advanced communication networks.

With the convergence of voice, data and video into the latest generation IP multiservice mobile and fixed networks, the requirements for monitoring and testing networks and their elements are becoming more complex every day. Leveraging a 60- year heritage of enabling innovation, Tektronix empowers network operators and equipment manufacturers to lead the way toward fixed mobile convergence, broadband wireless access and triple play services by supporting current and advanced protocols, applications and architectures, such as IP multimedia subsystems (IMS), 3G wireless, WiMAX and IPTV.

As a result of our dedication to innovation, as well as our customers, Tektronix' systems manage more than 30 percent of the world's calls, and our network diagnostic and performance monitoring solutions are installed in 110 carrier networks in 43 countries.

For Further Information

Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology.

Please visit www.tektronix.com

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