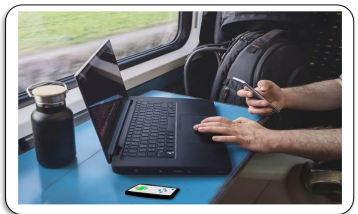
Ultra-Portable Equipment for Voice & Data Testing

vMobile™ in Hand

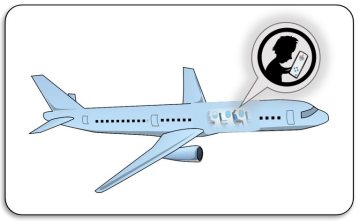
vMobile™ Interfaces

On the Bus

On the Train



On the Plane



In the Car

In the pocket/backpack

In the Drone

Overview

vMobile™ is GL's new offering under its wide variety of Voice and Data Quality Testing tools. The vMobile™ is a handheld ultra-portable device that brings true mobility to voice and data quality testing for any mobile phone and any mobile radio, changing the way automated drive and walk testing is performed. The vMobile™ is simple to setup and conduct operate for running these tests in order to benchmark both mobile phone networks and mobile radio networks.

The vMobile™ handheld device supports fully automated audio testing for mobile phones (any phone, any carrier, any network) including Voice Quality using POLQA, Delay measurements, Audio Dropout analysis, and full call control with Call Fail and Call Drop metrics. All tests include GPS location for plotting results and events within Google Maps using the GL WebViewer™. In addition, the vMobile™ device supports fully automated audio testing for mobile radios (including connectivity to any 4-Wire Analog device). This allows remote testing of mobile radios with automated PTT (Push to Talk) along with Voice Quality and Delay measurements.

The vMobile™ can be hand-carried for walk and drive testing (includes GPS) as well as left in labs and can work directly with GL's VQuad™ solution for very flexible end-to-end testing. All functionality and configuration of the vMobile™ is provided using the remote web-based Console and Console App which is installed on any Android or iOS device. In essence, the vMobile™ is an expansion of GL's current VQuad™ Voice and Data testing solution.

The vMobile™ handheld portable hardware includes two Bluetooth® modules (connecting to two mobile phones simultaneously), a 4-Wire analog port with PTT for connecting to any mobile radio or any analog headset interface, an embedded Wi-Fi module for communicating to the Central System, and an onboard GPS receiver. The user can easily select either Bluetooth or Analog mode The embedded Wi-Fi supports remote operation along with remote audio analysis and sends all results/events to a Central Database, accessed through GL WebViewer™ (web browser).

GL's Indoor Tracking System (ITS) functionality supports plotting voice quality results when GPS is not available (for instance indoors). The ITS allows viewing the results directly plotted on a user provided floorplan or map.

GL's Voice Analysis Tool (VAT™) application is used to analyze the audio content within any PCM audio files and generates a variety of audio metrics. VAT™ has a user-friendly interface to perform manual and automated analysis of multiple tests using a single PCM audio file received from the VQuad™, vMobile™, or any other applications.

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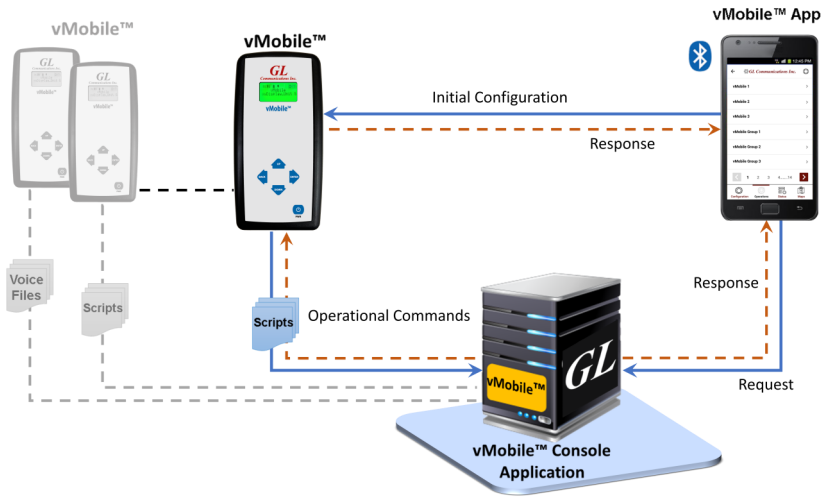
Main Features

- Fully automated voice and data testing supports any mobile phone or mobile radio network
- Automation includes Python scripting and remote operation of multiple vMobile™ units
- Can operate either in Bluetooth mode or Analog mode (connect to any 4-Wire Analog device including Mobile Radio with PTT)
- Onboard battery can be extended to 24+ hours of operation using small portable USB-C external battery
- Handheld and portable including several remote options for operation and configuration
- Drive and Walk testing fully supported using GPS or GL's ITS (Indoor Tracking System) for plotting and viewing results
- Supports satellite communication testing through Bluetooth® and wired headset connections to satellite phones and radios
- Supports Voice Quality Testing using POLQA (ITU-P.863) and PESQ (ITU-P.862) algorithms
- Supports One-Way and Round-Trip delay measurements accurate to less than 1ms
- Supports several audio metrics including Signal and Noise levels, Power, Frequency, and Audio Dropout analysis
- vMobile™ scripting is fully automated, including conditional statements
- Bluetooth supports both Narrowband (8000 sampling) and Wideband (16000 sampling)
- Supports fully automated operation including voice and enabling PTT
- Analog PTT supports Narrowband (8000 sampling), Wideband (16000 sampling), and Super-Wideband (48000 sampling)
- Fully automated tests while sending events/results to Central System for analysis. Access results using the GL WebViewer™ (web browser) which includes Custom Reports and displaying results directly within Google Maps (WebViewer™)
- Full Audio Analysis using GL VAT™ that supports One Way and Round Trip Delay measurements, Signal and Noise Levels, Speech Activity, Audio Dropout Analysis along with additional analytical functions
- Control and configuration of vMobile™ using the vMobile™ Console (web browser) as well as the vMobile™ Console app (Android and IOS supported). Get status, configure, and fully operate the vMobile™ (both manual and automated tests)

Operations and Controlling vMobile™



The vMobile™ Console application for Android/IOS devices can be used to monitor, configure, and operate vMobile™ units. In addition the app can be used to write vMobile™ scripts and upgrade vMobile™ units when necessary. Multiple vMobile™ units can be controlled from one vMobile™ app.

The vMobile™ Console, running on the central system, has the same functionality as the vMobile™ app. In addition, the Console and Console app can access Bluetooth and Error logs from the individual vMobile™ units. Configuration settings include connections to the Central System and Console, Wi-Fi Network connection, Bluetooth connection for the mobile test phones, sample rate, mode of operation (Bluetooth or Analog PTT), all configured from the Console and Console app.

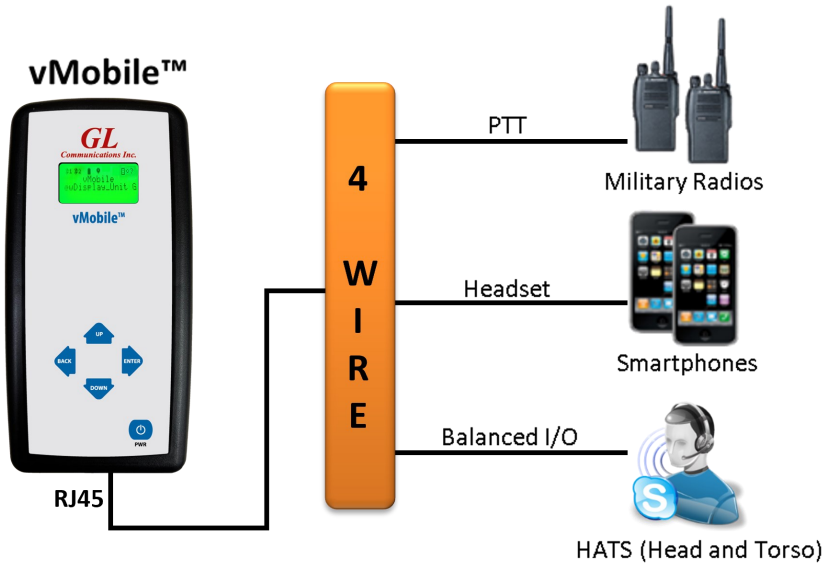
vMobile™ can also work with VQuad™ solution (vMobile™ in the field and VQuad™ with Dual UTA HD or VQuad™ Probe in the lab or static location). Both the systems connect to Central System and WebViewer™. Central Database with WebViewer™ allows access to all events and results while also plotting results on Google Maps.

Automated Call Control via Bluetooth®

The Bluetooth® modules on vMobile™ connect to two independent mobile phones to perform automated voice quality analysis along with delay measurements on Bluetooth® enabled mobile devices.

- Mobile (3G, VoLTE, VoWi-Fi, VoFemto, 5G) network with both NB and WB voice
- Supports any Mobile phone, any Carrier and any Network
- Voice Quality Analysis using POLQA algorithm of recorded voice files, supporting legacy as well as 5G and VoLTE networks
- Bluetooth® connectivity also supports RSSI, Battery level functions, and Network identity

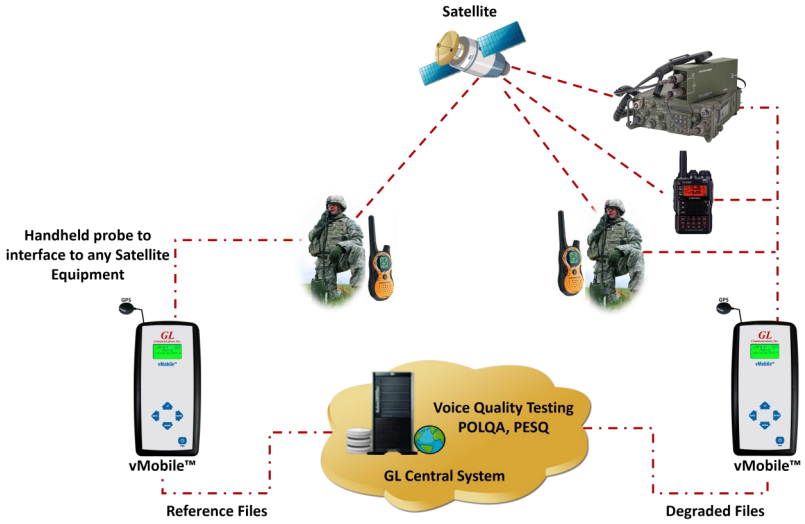
Automated Analog (4-Wire) Testing



The vMobile™ can interface with mobile phones via wireless Bluetooth or mobile radios via wired headset for voice quality testing. When connected to a mobile radio, fully automated PTT operation is available within the vMobile™ automated scripting. In addition, the vMobile™ 4-Wire analog interface replaces any analog headset for any device.

- Connect to any mobile radio as an analog headset or replace an analog headset to the device
- Connect to any mobile phone via wireless Bluetooth headset
- Fully automated testing including control of device and performing voice quality analysis
- Supports GPS along with GL's Indoor Tracking System (ITS) for automated drive and walk testing

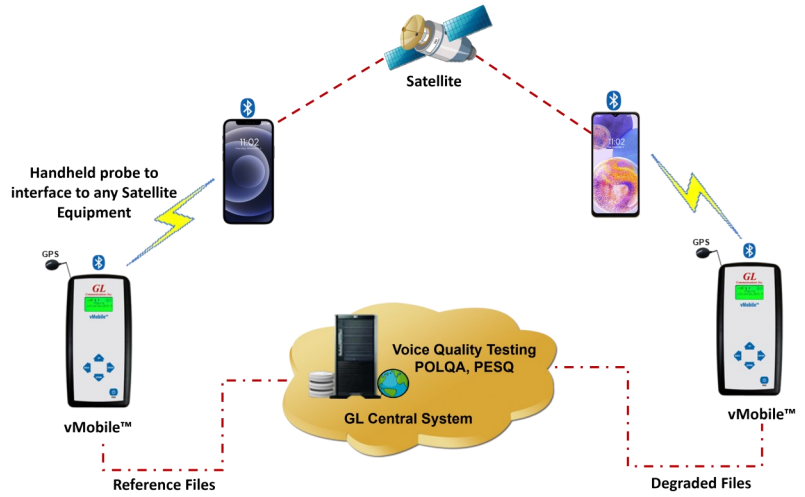
Voice Testing over Satellite Networks



Voice Quality Testing of Radios over Satellite

Satellite communications networks handle diverse traffic, from commercial internet to mission critical communications. Unfortunately, satellite networks are prone to numerous network impairments, such as reduced bandwidth, long latency, packet loss and jitter. These impairments affect user experience, especially for voice traffic or other streaming services. Poor voice quality impacts government and military operations as well as private internet use.

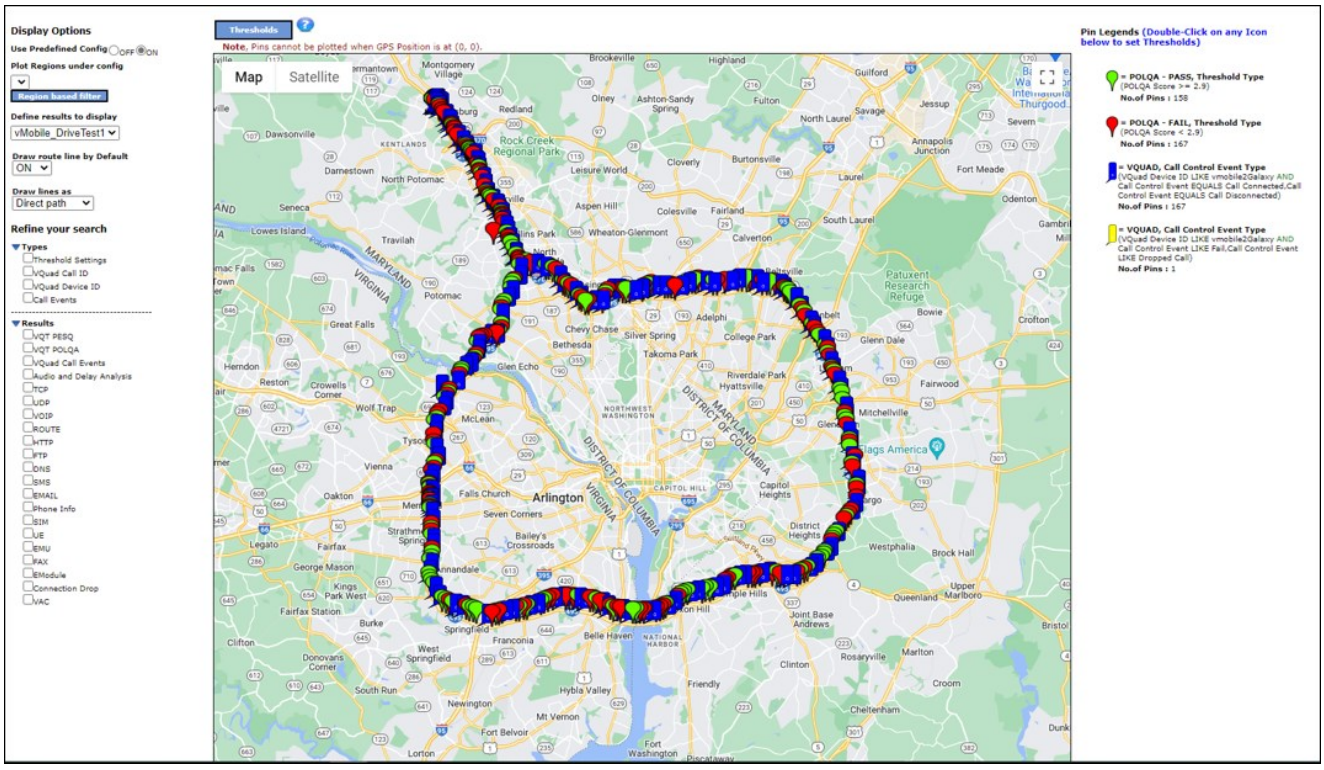
GL's test tools assess user experience over the satellite network. Key metrics include Voice Quality scores (Mean Opinion Score), measuring delay, and detecting dropouts. GL's equipment connects with endpoint devices like satellite phones and radios, allowing for detailed monitoring and analysis of satellite networks. These tools capture key performance indicators to evaluate the quality and reliability of communications. For Voice Quality Testing, the latest industry standard algorithms are supported, including POLQA (per ITU-T P.863) and PESQ (per ITU-T P.862).



Voice Quality Testing of Radios over Satellite

With GL's vMobile™, users can send and receive voice and data traffic over satellite networks. This handheld device connects to satellite phones and radios via Bluetooth® or wired connections. vMobile™ manages call functions, such as placing and answering calls, sending, and receiving audio, and disconnecting calls. The vMobile™ records audio from the satellite network and sends the file to WebViewer™, a central database, for voice quality analysis. WebViewer™ offers a web-based dashboard for easy access to results. vMobile™ can also store files locally for later upload if needed. Multiple vMobile™ devices can connect to the same WebViewer™. Furthermore, multiple users can simultaneously connect to WebViewer™ to execute tests and view results. Results are displayed on Google Maps for location-based analysis and identifying areas of poor voice and data quality.

Results in WebViewer™ - From Drive Test



- Drive testing any Wireless phone or mobile radio with real-time GPS mapping using embedded vMobile™ GPS receiver
- GPS used for location and One Way Delay accurate timing
- All vMobile™ events and results include GPS location (latitude and longitude)
- GPS information is automatically sent to central database and accessed via Google Maps feature in WebViewer™

vMobile™ Hardware Specifications

Physical Dimensions	• **Length** : 7" • **Width** : 3.5" • **Height** : 1.5"
Power requirements	• USB Type C Connector, +5V @ 650mA (max)
External Connections	• 2x Bluetooth® modules for connecting to any mobile phone as wireless headset • 1x Embedded Wi-Fi module • 1x Onboard GPS with External Antenna interface • 1x 4-wire Analog RJ45 supporting Mobile Radio with PTT • 1x 3.5mm Stereo Monitor Port (Speaker) • 1x Bluetooth connection supporting Status, Configuration, Operation using the supplied iOS and Android Console App
LEDs	• Charging LED (Green) • Power LED (Blue)
Drive Space	• Available hard drive space of 5GB
4-Wire Analog (PTT)	**Input & Output** • Impedance 600 Ohms • Narrow Band: – Frequency Range: **204Hz to 3404Hz** – Sampling: **8k Samples/sec** – TX/RX Output level range: **0dBm to -50dBm** – TX/RX Level Accuracy: **+/- 1dB** • Wide Band: – Frequency Range: **204Hz to 6808Hz** – Sampling: **16k Samples/sec** – TX/RX Output level range: **0dBm to -50dBm** – TX/RX Level Accuracy: **+/- 1dB** • Super-Wide Band: – Frequency Range: **204Hz to 20000Hz** – Sampling: **48k Samples/sec** – TX/RX Output level range: **0dBm to -50dBm** – TX/RX Level Accuracy: **+/- 1dB**

vMobile™ Hardware Specifications (Contd.)

Bluetooth	**Input & Output** • Narrow Band: – Frequency Range: **204Hz to 3404Hz** – Sampling: **8k Samples/sec** – TX/RX Output level range: **0dBm to -50dBm** – TX/RX Level Accuracy: **+/- 1dB** • Wide Band: – Frequency Range: **204Hz to 7200Hz** – Sampling: 16**k Samples/sec** – TX/RX Output level range: **0dBm to -50dBm** – TX/RX Level Accuracy: **+/- 1dB**
Audio Monitor	• Used for Stereo headphones or external speaker • 3.5mm Stereo Balanced Output
Battery Capacity	• Battery life: 4+ hours – With a 6000mAh external battery: **Extended up to 13 hours** – With a 10000mAh external battery: **Extended up to 18 hours** – With a 20000mAh external battery: **Extended up to 38 hours** • The vMobile™ battery takes **2 hours** to charge fully from **0% to 100%**
Temperature	• Operation: **5C to 45C** • Storage: **-10C to 60C**
Humidity	• 10% to 95%, non-condensing

Buyer's Guide

Item No	Product Description
VQT291	vMobile™
VQT008	Voice Analysis Tool (VAT™)
VQT600	VQuad™ NetTest Data Server Solution (Requires annual license renewal to remain functional)
VQT601	Mobile Device Controller (MDC) Software
VQT611	Target Data Server (1 Gbps)

Item No	Related Hardware
VQT204	GPS for Dual UTA
VQT251	Dual UTA HD Next generation Dual UTA with FXO Wideband support
VQT252	Dual UTA HD – Bluetooth Option
VQT280	VQuad™ Probe HD (with Dual UTA HD)

Item No	Related Software
VQT010	VQuad™ Software (Stand Alone)
VQT002	Voice Quality Testing (PESQ only)
VQT006	Voice Quality Testing (POLQA)
VQT007	VQT POLQA v3, server license for 20 nodes
VQT014	Voice Quality Testing (VQT) POLQA Auto™
VQT014U	Upgrade from VQT POLQA to VQT POLQA Auto™
VQT040	Webviewer™

Note: PCs which include GL hardware/software require Intel or AMD processors for compliance.

For more information, refer to vMobile™ – Ultra-Portable Equipment for Voice & Data Testing webpage.