



## DATA BENCHMARKING

Packet data is one of the greatest opportunities and greatest challenges for the wireless industry today. New packet data services drive subscriber and revenue growth. Operators use advertising to present competing packet data coverage claims to customers. Regulators carve out spectrum to encourage the growth of high speed wireless data in their country. Infrastructure vendors chase new technology contracts to secure future revenue growth. GWS began providing Data Benchmarking during the rollout of GPRS and 1XRTT in the United States, enhanced the offering in conjunction with major 3G operators and were the first to provide benchmarking services for fledgling 4G networks. Today, as operators deploy advanced 5G features, GWS is busy testing, measuring and providing benchmarking services across all generations of network technologies.

GWS' Data Benchmarking reports allow operators to compare performance between competitors, markets and technologies; evaluate performance trends over time; identify focus areas for competitive improvement; and evaluate Quality of Service problems. Data

Benchmarking reports utilizes key parameters that are independent of technology for comparison including:

**(RF) Connection Accessibility:** A metric of the user's ability to successfully activate a PDP session on the network.

**(RF) Connection Retainability:** A metric of the user's ability to successfully deactivate a PDP connection on the network.

**Task Accessibility:** A metric of the user's ability to successfully start a task. The successful task initiation rate is detailed by protocol and direction (HTTP, FTP downlink, FTP uplink).

**Task Retainability:** A metric of the user's ability to successfully complete a task. The successful task termination rate is detailed by protocol and direction.

**Throughput:** Throughputs are detailed per task type.

**Ping Delay:** Ping delay (round-trip) mean, percent of ping delay < 1 second and graphical distributions.

These industry leading Data Benchmarking reports provide extensive in depth analysis of collected, multi operator data including numerous figures, charts and maps such as:

## EVENTS

- Reselection Successes per task
- Percentage of Technology Changes
- Percentage of Tasks with high number of Reselections
- Effect on Mean Application Throughputs
- No Service Tasks
- Failed Tasks

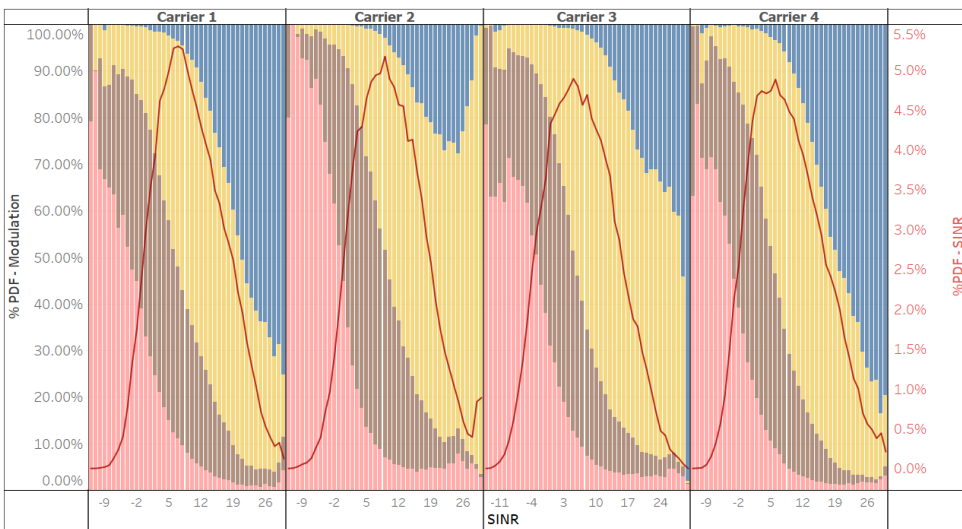
## FOLLOW DATA

- RSSI
- Application Task Mean Throughputs (downlink and uplink)
- Application Momentary Throughputs (downlink and uplink)
- RxLev versus Throughput
- Signal Quality versus Throughput

## MAPS

- Session Results (No Service Regions, RF Setup Fails, Session Setup Fails, RF Channel Drops, Session Timeouts)
- Application-level throughput (downlink and uplink)
- Reselection Count per Task (downlink and uplink)
- Mean Signal Quality (downlink only)
- RSSI
- Timeslot Usage
- Roaming
- Technology Usage

Modulation vs SINR (DL tasks)



■ 256QAM% ■ 64QAM% ■ 16QAM% ■ QPSK%



Global Wireless Solutions, Inc.  
23475 Rock Haven Way, #165  
Dulles, VA 20166

Tel: (703) 661-7000  
Fax: (703) 661-7001  
marketing@gwsolutions.com



www.gwsolutions.com

## EXPERIENCE MATTERS

Benchmarking for  
**28 YEARS**


Services provided in  
**25 COUNTRIES**


Tested  
**18,000 LOCAL MARKETS**


Driven and walked  
**16 MILLION MILES**


## ABOUT GWS

GWS is the world leader in testing wireless markets. Services include:

 **Voice and data benchmarking** – Network data and engineering analysis through drive, venue, and in-building testing

 **MobiStat™** – Interactive web-based reporting and mapping tool

 **OneMeasure™** – Configurable app for mobile and Wi-Fi network performance testing

 **OneScore™** – Network performance ranking combining engineering data with consumer research

 **Big Data Analytics** – Large scale network evaluations using big data tools and techniques