

# Omni-Q for Mobile Data Service Assurance

## Quality Assurance for High Speed Mobile Broadband and Data Services

The deployment of high speed wireless data networks, the mass adoption of 3G handsets and the decreasing price of data based services have all contributed to a significant increase in revenue for both CDMA2000 and UMTS Operators. The success of wireless data services, with data traffic increasing by as much as 400% per year, presents many challenges to the service provider. Engineers must understand and rectify problems arising from IP network congestion, inadequate radio resources, IP mobility and data network abuse, while constantly expanding the data network to cater for high speed data services and an ever increasing subscriber base.

- Would you like to increase customer loyalty and satisfaction by improving the quality of mobile data services?
- Do you need to know about network problems causing service down time or degradation of Quality of Service?
- Do you want to provide prompt and effective Customer Care Service to subscribers, especially for high speed mobile broadband services?
- Would you like to minimize troubleshooting cycles resulting from network and service complexity?
- Would you like to increase the Quality of Service for mobile broadband subscribers by reducing IP network congestion, solving mobility problems and limiting data network abuse?



## Benefits

- Provides Real Customer Experience analysis
- Reduces customer churn for roamers
- Ensures sustained QoS for High Speed Internet and 3G Data Services
- Guarantees customer satisfaction for mobile broadband services

## RADCOM's Solution

RADCOM's Omni-Q service assurance system provides a comprehensive solution that meets all the challenges that mobile service providers face when delivering high speed data services.

### Real Customer Experience

By monitoring sessions that are meaningful to the end user, such as complete HTTP page downloads and large HTTP file downloads, Omni-Q provides real insight into customer experience (CEM) for mobile broadband and "walled garden" WAP portals. Over 20 TCP metrics are measured for each TCP packet for all HTTP sessions for all subscribers 24/7. By analyzing these measurements in real time and applying business intelligence, Omni-Q provides realistic insight not only into the end user quality of experience, but also into the corresponding quality of the service provider's TCP/IP networks.

### Monitoring SLA (QVIP)

Omni-Q QVIP enables the service provider to view statistical service quality reports for both individual subscribers and groups of subscribers, such as enterprise accounts, and to receive alarms whenever a certain KPI falls below a pre-defined threshold. Baseline reports compare data service quality indicators to daily and weekly averages and provide an effective indication of service degradation.

### Identifying Top Offenders

Although most subscribers utilize wireless Internet access in a responsible manner, there are always a small number of end users who consume exorbitant data network resources. Some examples of this phenomenon are bandwidth hogs, who constantly use P2P applications to download multi-media content, and email spammers.

Omni-Q may be used to identify and monitor network abusers. By being aware of these subscribers, operators can apply sanctions or restrictions in order to optimize the availability of network resources for the entire subscriber base.

### Monitoring Data Roaming

Roaming subscribers present service providers with a relatively effortless source of increased revenue, requiring minimal investment compared to that required for gaining new subscribers or even maintaining existing customers.

Loss of roaming revenue is often due to network problems that go undetected. To avoid losing potential revenue, services must be maintained. With Omni-Q, service providers can spot data roaming traffic problems before roamers leave their network, making it possible to prevent revenue leakage by improving the quality of the network.

### Monitor Network Activity

The Omni-Q system captures all activity on the data network and creates a rich set of data records (CDRs) for all subscriber sessions. Correlation between interfaces such as IU-PS, Gn and Gi allows system users to view complete subscriber sessions even when the relevant information is captured by more than one probe. Omni-Q's unique ability to capture and analyze both network traffic and individual subscriber sessions, means that users have complete visibility into the data network without the need to request ad hoc reports. The Omni-Q database typically retains CDRs and signaling data for over a week, thus facilitating in-depth troubleshooting for problems that occurred today, yesterday or even last week.

Quality Indicator per Operator by 5 Minutes Periods

Health Indicator	1:00 AM	1:05 AM	1:10 AM	1:15 AM	1:20 AM	1:25 AM	1:30 AM	1:35 AM	1:40 AM	1:45 AM	1:50 AM	1:55 AM	Total (5 Minutes)
Operator Country													
<a href="#">USA / PUERTO RICO</a>	100	0.000	0.000	100	100.000	100.000	100	100	0.000	0.000	60.000	100.000	760
<a href="#">FRANCE</a>	61.824	62.379	62.169	62.295	61.867	62.238	61.908	62.135	62.431	62.714	62.441	62.753	747.153
<a href="#">AUSTRIA</a>	0.000	60.000	50.000	66.667	35.714	58.333	100.000	25.000	57.143	50.000	100.000	50.000	652.857
<a href="#">BELGIUM</a>	46.259	47.290	52.847	50.389	52.333	55.502	50.652	51.385	49.526	47.391	52.194	46.618	604.368
<a href="#">POLAND</a>	49.639	49.107	49.515	51.179	51.259	50.943	49.856	50.461	49.649	50.426	49.778	49.663	601.473
<a href="#">ITALY</a>	37.895	37.215	36.740	39.545	40.754	39.367	38.355	37.844	37.374	37.761	36.232	39.103	460.204

The above shows a quality indicator for all roaming and interconnect links and sends alarms whenever there is a drop in the Quality of Service.

# RADCOM Omni-Q

Network, service and customer experience monitoring for multi-technologies and multi-users on a single unified platform

## Multi-Purpose

Omni-Q not only captures and analyses network protocols, but also monitors services such as HTTP, MMS, SMTP, POP3, DNS, Radius and FTP.

By analyzing complete subscriber sessions, such as Web browsing and file downloads, Omni-Q provides in-depth visibility into real customer experience both for individual subscribers and groups of subscribers.

## Multi-Technology

RADCOM's commitment to evolving technologies ensures that customers receive the ideal solution for current technologies such as CDMA2000 1x/EVDO, GPRS/UMTS 3G (HSPA+) and for future technologies such as LTE.

## Multi-User

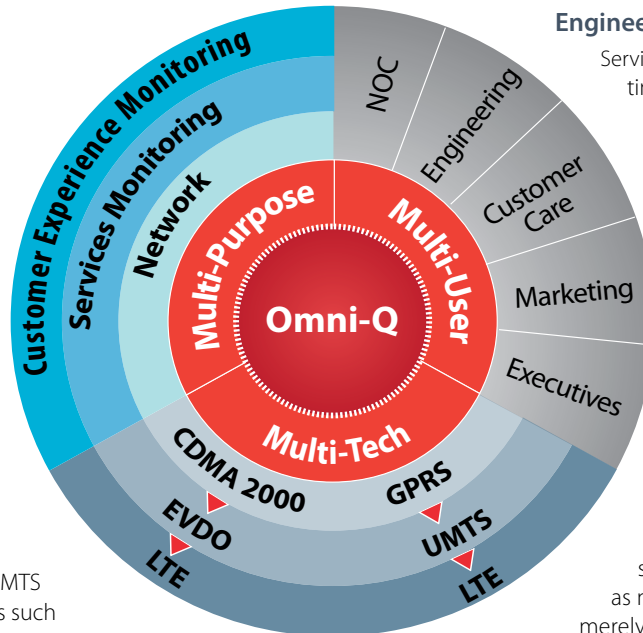
The Omni-Q system meets the mobile data service assurance needs of many departments such as Customer Care, Engineering, the NOC and Marketing.

### Customer Care Portal

In the time it takes for a Care Center representative to take a call, a detailed subscriber report has already been prepared. This report not only shows all subscriber activity over the requested time period, but also includes a Quality of Experience indicator for services such as HTTP. By simply clicking on the table below, a detailed list of sessions is displayed, showing the QoE per location and time.

	Total	Successful	Failed	QoE
Voice incoming	61	60	1	98
Voice Outgoing	52	50	2	96
SMS received	22	20	2	90
SMS sent	15	10	5	66
HTTP (WAP/B0)	11	9	2	81
MMS	6	4	1	66
SMTP	12	10	2	83
POP3	8	8	0	100
FTP	8	8	0	100

The Customer Care portal shows both summary and detailed subscriber activity information including Quality of Experience measurements.



### Engineering Portal

Service level troubleshooting is often very time consuming, as complex network architecture makes pinpointing the source of the problem difficult.

Omni-Q reduces the problem resolution cycle by providing the necessary tools to alert the engineer and to pinpoint the source of the problem. Omni-Q performs end-to-end correlation and combines data session legs into a complete session view for all subscribers 24/7.

### Network Operations Portal

Network Operations need to know about any network problem that degrades the Quality of Service for subscribers. For data services, such as mobile broadband, it is not sufficient merely to be aware of service failures, since problems such as network congestion could contribute to low Quality of Service for the end user.

Omni-Q dashboard provides alarms and "drill down" capabilities to enable the engineer to quickly and efficiently pinpoint the source of the problem.

### Marketing Portal

In order to run successful campaigns, marketing must have visibility into the popularity, usage and customer experience for all WAP and internal Web sites. Omni-Q provides detailed reports for monitoring any WAP or Web URL, and not only provides performance and usage information but also provides end user Quality of Experience while downloading from a Web site.

APN	Application	Total Data UL	Total Data DL	SGSN ID
.wap.juice.com	WTP/WSP	895	393	1
.wap.juice.com		895	393	
.internet	DNS	7051	4132	1
.internet		7051	4132	
.www.jeans	DNS	2987	8140	1
.www.jeans	HTTP	3332	12160	1
.www.jeans.com		3086	9480	
.mms.jeans.com	WTP/WSP	3373	782	1
.mms.jeans.com	HTTP	24290	15896	1
.mms.jeans.com		14994	9599	
.mms.juice.com	HTTP	7560	26194	1
.mms.juice.com		7560	26194	
.deltabank.com	DHCP(BOOTP)	25840	29270	1

Marketing reports show most visited Websites including performance, usage and quality information for each site. Ideal for optimizing Internet and internal WAP sites.

## About RADCOM

RADCOM develops, manufactures, markets and supports innovative network test and service assurance solutions for communications service providers and equipment vendors. The Company specializes in next-generation Cellular as well as IMS, Voice, Data and VoIP networks. Its solutions are used in the development and installation of network equipment and in the maintenance of operational networks. The Company's products facilitate fault management, network service performance monitoring and analysis, troubleshooting and pre-mediation. RADCOM's shares are listed on the NASDAQ Capital Market under the symbol RDCM. For more information, please visit [www.RADCOM.com](http://www.RADCOM.com)



## Omni-Q Mobile Data Solution Benefits

The Solution	Benefits
Engineering portals	Optimize and maintain Quality of Service for mobile broadband and high speed data services. Reduce service downtime by quickly resolving problems.
Network throughput analysis	Provide visibility into customer experience for mobile Internet. Troubleshoot mobile broadband quality problems caused by network congestion.
QDash (Dashboard)	Notification of any problem affecting the Quality of Service and customer experience. Fast analysis of service and network problems
QRoam (Roaming)	Receive alerts whenever there is a degradation in the QoS for any roaming or interconnect partner. Drill down to the cause of the problem quickly and efficiently.
QVIP (SLA Management)	Proactively monitor and maintain the Quality of Service for VIPs and corporate accounts. Increase customer satisfaction.
Top Offenders reports	Optimize network efficiently by identifying and dealing with bandwidth hogs and email spammers.
Marketing reports	Increase revenues from "Walled Garden" WAP portals by monitoring performance and usage.
High performance probes	Small footprint. Cost effective.

## Omni-Q: a Convergence Solution

Omni-Q is a monitoring solution for multiple services such as Voice, Video, IPTV and Data, employing a comprehensive array of service and network performance and measurement methodologies to continuously analyze service performance and quality.

With its enhanced correlation capabilities, Omni-Q offers the service provider full end-to-end visibility of the network across technologies. Omni-Q displays performance and quality measurements from both the signaling and the user planes, based on a broad range of active and non-intrusive hardware and software probes.

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