



Voice over LTE (VoLTE) — Maximizing the Customer Experience



Delivering the best possible VoLTE customer experience is a major goal of operators around the world. Users expect superior voice service and operators must ensure that they meet customer needs and form the foundation for integrated IP multimedia applications.

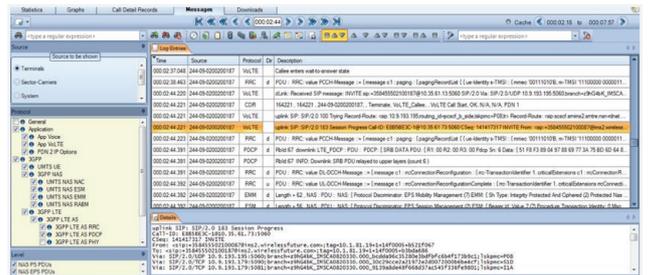
VoLTE brings substantial benefits to both users and operators, but as a low-latency, real-time, point-to-point service with guaranteed bandwidth end-to-end, there are many challenges that it imposes on the network:

- End-to-end service quality in real-time
- IMS call-control correlation with the user plane
- Handoffs to 2G/3G/WiFi networks

To maximize the customer experience, operators need to manage all stages of the service delivery. Viavi Solutions help optimize service quality, reduce total cost of ownership, and accelerate time-to-revenue.

Pre-Deployment Testing

Before any service is deployed, lab testing must validate that it meets customer expectations of quality. The testing must emulate 1000s of user devices, exercising the network with VoLTE calls along with other LTE traffic. CapacityAdvisor™ delivers these capabilities with configurable call-arrival rates and hold times. In addition, SART (Signaling Analyzer Real Time) and PacketInsight™ can be used for interoperability and voice quality testing, correlating the user and control plane in real time.



3GPP LTE/S4E Interfaces (Signaling and User Plane)

Call Id	Duration	Status	Setup Time	Cl	S	U	M	S	P	I	I	I	I	I	S	S	S	E	S
0	1:02:46.7																		
1	1:56:79.9																		
2	18:54:77.1																		
3	2:12:59.5																		

Parent Call Id	EPS Bearer Id	Service Type	QCI	Status	S1-U MCG	S1-U R-Enc	S1-U Alter	S1-U Delay	S1-U Drop
1	6	Others	6						
1	5	SIP	5						
1	6	Others	6						

CapacityAdvisor and SART application windows

RF Considerations

With increasing complexity in the RAN (LTE-Advanced, MIMO, HetNets, SON), it is more important than ever to have a resilient radio infrastructure. To evaluate this, the Base Station Analyzer (BSA) provides RF signal analysis for VoLTE such as showing resource block activity and highlighting any potential modulation issues. The BSA supports not only LTE but also LTE-A, MIMO, and eMBMS as well as integrated fiber and CPRI testing with its unique RFoCPRI™ capability.

Active Testing from the Handset and the Network

Performing end-to-end testing provides not only voice quality metrics but also associated RAN metrics. RANAdvisor™ TrueSite™ can do this during an indoor or outdoor walk test in real time. It calculates R-Factor MOS and PESQ scores, RAN metrics mapped to the location, and IMS negotiation parameters. VoLTE can be analyzed in parallel with other data services on multiple handsets.



TrueSite app on a mobile device

The QT-600 Ethernet probe actively tests the backhaul portion of the network with Y.1564 and VoIP active calls, and tests that differentiated services code point (DSCP) bits are handled properly. It can simulate the customer mix of traffic across all the DSCP bits that a provider may be using. This is important to ensure that VoLTE is given the proper prioritization no matter what the traffic mix is on the backhaul transport network. The QT-600 can also place an actual VoLTE call to measure call setup and voice quality.

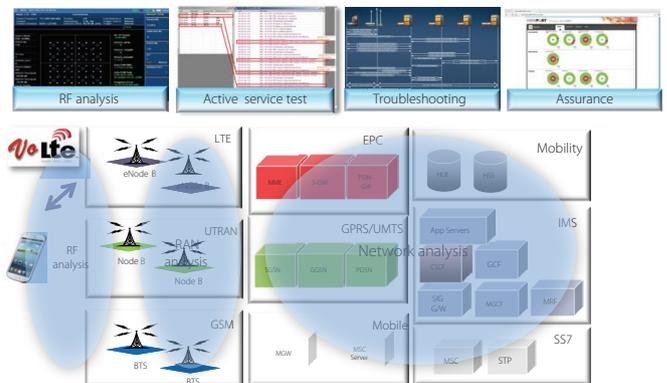


QT-600 Ethernet probe

Managing End-to-End Service Quality

To maximize the customer experience once VoLTE is operational, monitoring is needed to correlate the control plane and user plane in real-time, provide real-time KPIs, and use geolocated intelligence to surgically pinpoint service-affecting issues. The xSIGHT platform provides SMARTAnalytics calculated for the customer experience based on a comprehensive set of user plane and control plane KPIs. These KPIs provide highly granular insight into the VoLTE service including pre-call registration with the IMS, call setup performance, in-call audio quality, and mobility events such as cell or eNodeB transitions and CSFB or SRVCC handoffs. This approach of metric-guided, proactive monitoring delivers insightful VoLTE-specific information on a network-wide basis in real-time. Combining pro-active monitoring with in-context troubleshooting capabilities is the most productive way to manage VoLTE service quality end-to-end.

ariesoGEO™ provides unrivalled insight into the performance of VoLTE calls in the RAN. The patterns of poor experience events such as dropped and blocked calls with VoLTE is very different to those for traditional voice calls. Specific optimization is required to ensure that premium customers do not get a poor experience of this flagship feature. ariesoGEO provides clear insight into exactly where customer-impacting issues are arising and lets operators focus engineering resources directly on those areas.



Managing VoLTE end-to-end



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