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SERIES G: TRANSMISSION SYSTEMS AND MEDIA,  
DIGITAL SYSTEMS AND NETWORKS

Multimedia Quality of Service and performance – Generic  
and user-related aspects

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## **Quality of service metrics for the assessment of the impact of fixed geographic structures on telephony quality and call stability**

Recommendation ITU-T G.1027

ITU-T G-SERIES RECOMMENDATIONS  
**TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS**

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## Recommendation ITU-T G.1027

### Quality of service metrics for the assessment of the impact of fixed geographic structures on telephony quality and call stability

#### Summary

Often poor call stability or degradation in speech quality is associated with natural or artificial, geographic or topological structures such as tunnels, ravines, or noise barriers. Recommendation ITU-T G.1027 is an extension of Recommendation ITU-T G.1034 where it defines a set of metrics that describes call stability and changes of speech quality related to the above structures.

#### History

| Edition | Recommendation | Approval   | Study Group | Unique ID*                                                                   |
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#### Keywords

Call stability, mobile network, quality of experience (QoE), quality of service (QoS), spatially resolved information.

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\* To access the Recommendation, type the URL <http://handle.itu.int/> in the address field of your web browser, followed by the Recommendation's unique ID. For example, <http://handle.itu.int/11.1002/1000/11830-en>.

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## Introduction

Recommendation ITU-T G.1027 builds on the concepts and definitions given in Recommendation ITU-T G.1034. While Recommendation ITU-T G.1034 defines metrics for mobile telephony communication during rail travel, based on actual measurement data from telephony tests on trains. Also defining two key metrics i.e., local drop probability (LDP) that describes the local call stability, and call completion probability (CCP) which predicts the expected call stability or telephone calls of selected length. This Recommendation defines a set of respective metrics that describe call stability and speech quality related to fixed geographical structures.

Often poor call stability is associated with geographic or topological structures which are a challenge when attempting to achieve good mobile network coverage. Tunnels are a prime example of these types of structures however, there can be other areas along a track where mobile network coverage is poor (e.g., ravines or noise barriers), or where other degradations take place such as larger areas with radio signal interference.

Since typically the duration to travel through such structures are rather short, usage of CCP (or the conventional key performance indicator (KPI) "call-drop rate", for this matter) can be deemed unnecessary. To provide some typical real numbers: With a travel speed of 60 km/h, the time per km of the tunnel length is only one minute. Even in a country like Switzerland, only a few tunnels are longer than three km, so the travel time in the tunnel would be three minutes, and respectively shorter when higher speeds are considered. In contrast, it takes about 15 to 30 seconds of poor coverage to seriously degrade speech quality. Even though a shorter time of poor network coverage may suffice, negative impacts of call stability has direct effects on handover/handoff failures or even other hard effects of poor call continuity management.

Typically, quality of service (QoS) is not uniform over a given travel time or route. To improve overall QoS, places or structures where call stability or call quality is especially poor need to be identified; this basic task is conveniently supported by the LDP. Since, actual improvements require an optimization effort or investment, respective metrics play a key role in this process by providing guidance on prioritization and result verification.