



## **GigaMAN® Latency / Jitter / Loss Clarified**

### ***Introduction:***

GigaMAN is a Layer 1 (physical) service, and so does not measure or report Layer 2 information. This document provides further details for customers concerned with specifics of GigaMAN performance in these areas. SBC provides this information for customers to understand the benefits of the GigaMAN design and components, and how they enable a high quality transport service to meet customer performance objectives of higher layer services and applications.

GigaMAN service does not have objectives for latency, jitter or packet loss. These measurements are normally considered for delay sensitive traffic offered over switched or routed networks, where the potential for congestion and different routes may result in variable packet delivery rate and sequence. GigaMAN is a private line optical service, with latency (microseconds) primarily a function of distance over fiber optics (propagation). All packets are transported in the sequence originated by customer's equipment; with no packet switching, routing or congestion within the GigaMAN network.

### Latency

As noted above, GigaMAN is a layer 1 service, so packet performance is not measured or reported by SBC. However, GigaMAN service is a private line optical service with a serial signal sent at 1.25Gbps, physical layer rate, with no packet switching or routing within the SBC GigaMAN network. Each GigaMAN service includes a dedicated, full Gigabit path, so there should be no delays associated with packet delivery, other than microsecond delays associated with signal propagation (i.e. the speed of light over distance) over fiber and via the electronics on each end and in the middle.

The actual latency will vary by circuit length and the electronics used in the specific circuit design, but is roughly estimated at 10 to 50 microseconds, with distance associated signal propagation being the major factor. And you can't get much better propagation than the speed of light over fiber! Since customers concerned with latency are looking for maximum latency thresholds in milliseconds, GigaMAN exceeds this threshold by an order of magnitude.

### Jitter

See above information about Latency. Because the GigaMAN signal rides a dedicated optical path, with no packet switching or network congestion, the variation of packet delivery (jitter) should be essentially zero, as it always travels the same physical path.

### Packet Loss

See above information about Latency and Jitter. Because the GigaMAN signal rides a dedicated optical path, with no packet switching or network congestion, there are no normal conditions that cause "dropped packets" or packet loss. A GigaMAN circuit that is operating correctly will deliver egress customer data in the same sequence as the ingress (first in, first out). Frame count and error checking is performed by the customer's layer 2 device, but there are no normal conditions that would cause a packet to be lost.

### Voice over IP (VoIP)

GigaMAN is an excellent solution for high performance transport of any information, including VoIP, that can be carried via Ethernet standard protocols. As long as the VoIP packets are encapsulated in Ethernet, the nature of the packets is transparent to GigaMAN. Because of the private line, low latency/jitter nature of GigaMAN, it should be an excellent choice to support VoIP. Since it is a Layer 1 service, the performance of the VoIP is primarily dependent on the customer's equipment and traffic loading design, but it's worth noting that GigaMAN latency/jitter is among the lowest available for any transport service.