Global Xpress Link Emulator

Off-air test and demonstrations of Ka-band solutions

The Global Xpress Link Emulator (GLE) offers a user-friendly network sandbox environment which enables exchange of IP data via an emulated Global Xpress connection providing realistic bandwidth and latency. The tool enables the user to verify and demonstrate functionality of GX solutions at all times, in all places, in any scenario – without use of a terminal and costly airtime.

Challenges

There are significant challenges related to proving or demonstrating solution performance via on-air satellite links.

> *'I really hope we have good network conditions when we conduct the customer demo today'*

> *'Solution test and demo is cumbersome and expensive'.*

These statements are often made when the topic is on-air satcom solution testing and demonstration.

On-air testing requires bringing a terminal and antenna to the required destination and to establish line of sight to the satellite. This can be a challenging task if the destination is in an airport, at a customer site (security regulations) or at an indoor trade show (LoS).

Once on-air, the user has no insight into the conditions of the network at the given time and place. Will many other users take up bandwidth? Will there be weather fades? Will many other users take up bandwidth? And how will that affect the user experience? There is no control over the test or demo environment.

Many developers and re-sellers have access to demo airtime to sell their solutions which can be limited to one specific airtime package. But how will a solution perform with a different airtime package? Would a cheaper airtime plan be sufficient and allow the customer to save money? On-air testing and demo is what has been the norm for many years – what solutions developers are used to carry out. However, there is an alternative in form of off-air testing.

An off-air alternative for GX solution testing is the GX Link Emulator.

The GLE benefits

- Requires no terminal and antenna (no set-up, no LoS)
- Small and lightweight tool, easily carried in hand luggage - no security clearance necessary
- Offers all GX airtime plans – switch between them with a click
- Provides a controllable test and demo environment that can be set-up to fit the user's bespoke needs
- Verify and show your customers' solution performance in worst case and perfect network conditions

Test and demo efficiently

By testing in a controlled and reproducible environment, you can more easily identify when problems arise with regards to your solutions performance. The predictable environment makes planning and execution of test processes very efficient just as you are in control of what user experience your customer demonstrations deliver.
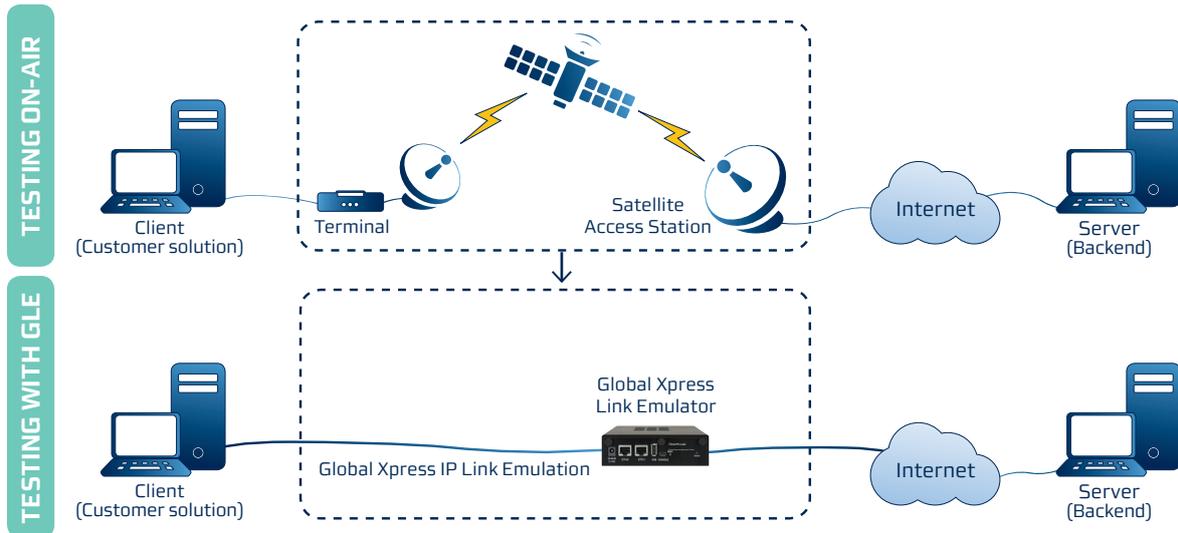
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Fig. 1 - On-air vs off-air test set-up

Anywhere, any time

With the GLE you are no longer dependent on bringing a terminal or having line-of-sight. Nor are you limited to the network and link conditions available at your physical location. You are therefore able to verify and demonstrate solutions on-site, at your customer or at tradeshows, while showcasing any thinkable scenario.

How does it work?

The GLE is a one box solution that replaces the terminal, satellite link and ground station. All you need to set up for test or demo is the GLE, a laptop to run the GX solution, Internet and cables to connect. The GLE allows for solution testing and verification, on an emulated GX link, as if the user was connected to the real GX network. The GLE is configured through a web server, embedded in the GLE hardware unit. The web user interface allows the user to simulate a range of real life scenarios such as network congestion and bandwidth degradation and offers graphs and counters to monitor and optimise data throughput.

Basic features and usage scenarios
Congestion

A satellite link is shared with other users, which makes it a variable in a test scenario. A connecting user may strike gold and have a channel all to himself, but can also end up in a network that is congested and only get a fraction of expected bandwidth. Varying levels of congestion is therefore something you need to test to make sure that your solution provides a useful response in any level of congestion. The GLE enables you to test different congestion scenarios. You can either use one of the pre-defined load-scenarios (light, medium or heavy load) or create a customized congestion scenario.This feature helps improve solution robustness
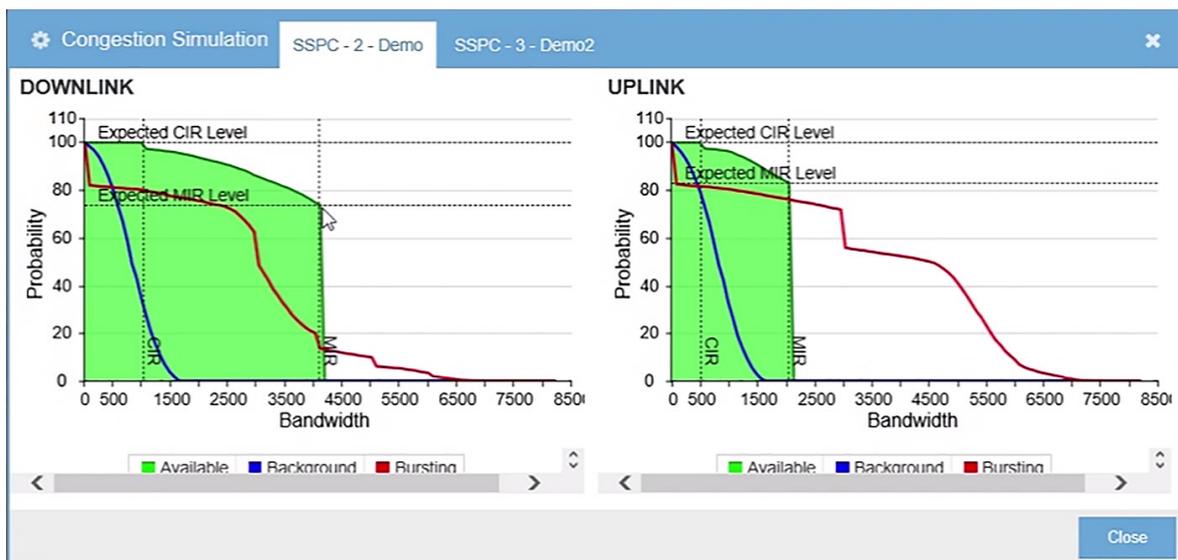

Fig. 2 - From the congestion simulation menu the user can read the expected probability that CIR and MIR is obtained in any given congestion scenario with any service plan.

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and saves time and (travel) costs associated with testing in a congested spot beam which may be far away.

Service Plans
The GLE allows you to work with multiple service plans (SSPCs). You can work with just one service plan at the time or combine and prioritize them as needed. Furthermore, you can prioritize queues within the different service plans. The GLE incorporates all the service plans from Inmarsat from all business units. You can also create your own service plan, where you can customize the settings of any variable: uplink, downlink and so forth. Using this feature you can optimize your value proposition and provide the best solution user experience at minimum cost.

Signal Degradation (Channel Parameters)
On the live network, you will undoubtedly encounter varying QoS. Factors such as weather fade, terrain or less than optimal equipment may lead to latency, jitters, outburst or just a generally low bandwidth. Solutions must be designed to cope with these many variable factors and still produce a useful response to the user. The GLE allows the user to test scenarios with different levels of degradation of the signal.

Network settings
In the network settings menu, you can set up the IP address to either static or DHCP. The GLE also offers you to configure TCP PEP Acceleration, multicast streams, SVN and more.

Add-on Features
In addition to the basic features of the GLE you may want to add some features, depending on your specific test needs.

SNR managed bandwidth
With this feature, the bandwidth of the data link is adapted to selected SNR level. SNR can be specified manually or change over time by Fading. The fading of the SNR can be caused by for example weather conditions for a real satellite link. Two fading profiles are offered: 1) Linear fade-in and -out to and from a given level. 2) Automatically vary the SNR level over time with given average level, standard deviation and rate of change. The application will hereby be affected by bandwidth changes reflecting the satellite link. Skew can be emulated to provide different uplink and downlink bandwidth.

Network Service Device (NSD)
The GLE can be put into a mode in which it supports all features and the full interface required by an NSD. This includes VLAN trunking, BGP, IP-Address assignment and SVNs. This mode can both be used to verify the NSD as well as applications attached to the NSD. The GLE has standard configurations to be used with the NSD, but the GLE can also be configured for specific needs.

Handover
The GLE can emulate satellite switch, beam handover and blockage. In any case data transmission is blocked for at given time specified by the user. In case of a beam handover data buffers are maintained and transmission resumed. For satellite switch and blockage data buffered in the GLE is discarded before resuming transmission.

SNMP including MIB
The GLE exports a Simple Network Management Protocol (SNMP) interface for querying the Management Information Base (MIB). MIB information fields related to SNR follow the SNR values of the GLE and all other fields are manually configured.

Open API
The GLE supports an open REST/JSON API for controlling core functionality and retrieving statistics from the GLE.

Contact
Unsure how the GLE can create value for your business? We will gladly answer any further questions you may have. Contact us for an online meeting, where we can go through your specific challenges. We look forward to helping you.

Testimonial
"We recommend that new GX applications and solutions are thoroughly tested in any number of network scenarios and in different bandwidth conditions before being introduced to the market. GateHouse's GLE tool allows application developers and Value Added Manufacturers (VAMs) to do part of this in a controlled environment and can reduce the cost of testing in the process." – Olaf Rostbakken, Director of GX Simulation and Modelling, Inmarsat

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