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WiMAX Test, Load and Stress solutions by PRISMA Engineering for Operators

First WiMAX Load & Stress Testing Solution

As operators roll out new WiMAX services they need to assure themselves that their network is robust, scalable and resilient. Deploying a new technology is always a risk, and the wise operator will do everything possible to minimise risk factors. The key to reducing risk is testing to ensure that the network does indeed perform as desired under load.

The LSU WiMAX from PRISMA is the industry's first WiMAX load & stress testing solution. It is based on PRISMA's well proven hardware and software platform which is used by some of the largest wireless mobile operators and leading infrastructure vendors to test 2, 2.5 and 3G networks and network elements.

With the new LSU WiMAX, WiMAX operators as well as system integrators and equipment vendors can now load & stress test their WiMAX networks and network elements to validate performance and determine real versus theoretical limits. Furthermore the same equipment can be used to monitor the behaviour of the deployed WiMAX network.

Why Load&Stress Testing?

The key reason for an operator to undertake its own testing is because every network is different. This is particularly true with a new technology such as WiMAX where the rules for best practice have yet to be fully determined and where there have been limited large scale deployments.

Different architectures show different modes of degradation under stress and what may work well for one service model may be unacceptable for another. It is critical to determine practical maxima for numbers of subscribers, subscriber range and so on for the particular services offered and to determine the effect of proprietary vendor features such as packet classification and prioritisation.

Moreover operators are likely to offer different combinations of voice, video and data services, with differing tiers of data service and different qualities of video. Operators would be well advised to validate vendor claims to ensure that the required services can be deployed at the planned densities of subscribers per segment.

The ideal is for a gradual/graceful degradation of service, which is equal for all subscribers, if and when overload occurs. Moreover it is key to test what happens so that service degradation can be managed correctly. As a general rule it is more acceptable to lose or drastically curtail non-premium services than to reduce availability of premium services. It is rare that the first attempt to engineering the network to perform in this manner is correct and thus testing needs to be done to verify that the correct actions occur.

Stress tests simulate worst case conditions and thus can provide assurance that network will continue to function under such conditions. Moreover stress testing allows for operators to correctly size their networks so as to provide a consistent customer experience as the number of subscribers increases and to verify that the introduction of new services will not affect existing ones

LSU WIMAX

PRISMA Engineering provides a complete solution for WiMAX network testing with or without mobility (802.16d / 802.16e).

The LSU Wi-MAX is able to simulate all WiMAX network elements and can fully monitor every WiMAX interface. Two families of simulators are available - one for field and one for the laboratory equipment testing:

- Simulation of a population of Subscriber Stations / Customer Premises Equipments
- Simulation of the other stationary elements of the network such as Base Stations, ASN-GW and HA

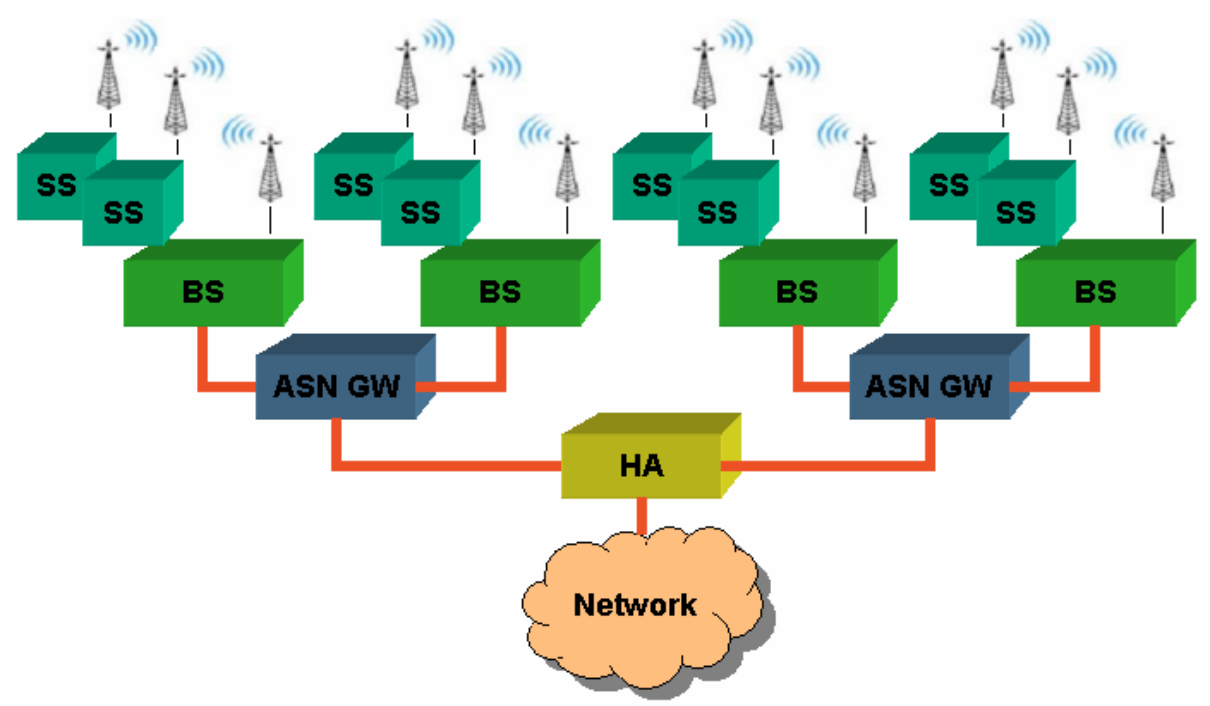
WLS/T Transportable version (Field tests)

- 335mm (13.2")(W) x 250mm (9.8")(D) x 88mm (3.5")(H)
- One sector
- Up to 10-40 Mb/s depending on encryption mode

WLS/L Lab friendly version

- Rack mountable box, 19"(482.6mm) x 23.3"(590.36mm) x 3.5"(88.9mm)
- Up to 40-160 Mb/s depending on encryption mode
- One box per sector, stackable multiple sectors
- WLS interworking for simulating MS mobility

Client application can control multiple WLS in parallel to simulate complex networks or larger numbers of CPEs



The LSU Wi-MAX is able to simulate very large numbers of devices – up to 1024 SS/CPE instances has been tested – and to generate 40-160 Mbps of traffic in thousands of different streams. It can also simulate range effects by modifying the power of the signal transmitted to/from simulated groups of subscribers located at different distances. The result is that it is possible to test equipment for their behaviour in handling asymmetric situations where closer subscribers could potentially starve their more remote fellows of bandwidth.

Typical Applications

Edge Testing

- A highly user-friendly interface
  - No need to use a programming language
  - Wide range of "ready to run" test scripts provided
  - Simply configure multiple instances of SSs / CPEs and related Service Flows.
  - Real time monitoring windows to track test progress
- Internal IP data traffic generator
  - FTP, HTTP, VoIP and video streaming packets
  - Simulate thousands of end user devices connected to the stations.
- Distance effects
  - Modify the power of the signal transmitted to/from simulated groups of subscribers located at different distances

The LSU Wi-MAX can be used as the sole test tool or as a provider of background load while using other devices to test a specific application.

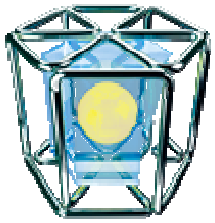
Core Device Simulator

- Simulate as needed
  - ASN GW if testing base stations or HA
  - BS and HA if testing ASN GW
- In either case
  - IP data generator to overload with traffic (FTP, HTTP, VoIP, Video Streaming packets)
  - Multiple state machines simulating multiple devices
- Customization services available

A single LSU Wi-MAX can oversubscribe most core network devices and traffic can be reduced if appropriate control plane signals are received.

Monitoring

- Monitor all interfaces (simultaneously) and in parallel to simulation
- Capture traffic to replay in simulations
- Capture and decode control plane messages for analysis
  - Customized decodes of proprietary protocols available



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Mobile Networks Testing Solutions

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