

BGAN Network Emulator Product Sheet

End-to-end test of your BGAN or GAN terminal on the bench

GateHouse offers the BGAN Network Emulator (BNE) for testing of user terminals (UT). The BNE is an off-the-shelf product, which has proven its worth through development of several BGAN terminals.

BNE enables essential and advanced testing of your BGAN terminal, including:

- Testing of end-to-end exchange of user data such as E-mail, FTP and Web Browsing.
- Load and stress testing of the terminal.
- Testing different effective Quality of Service (QoS) for PS services.
- Testing of user plane operation and user experience e.g. handover between beams due to mobility and simulation of different Link Quality Conditions and Spot Beam Configurations.
- Controlled and reproducible test environment.

The testing of a terminal in the lab, will help you to more easily identify where problems is located, and thereby avoid the real world problems with a lot more uncontrolled parameters e.g. allocated bandwidth, blockage or bit errors.

Technical description

BNE is used in a test bench setup integrated with a PLT performing the physical layer operation. This allows a BGAN and GAN terminal to be tested and operated as it would be on the real BGAN or GAN system.

BNE provides configuration file interface to be used for setting up of bearers and channels. Furthermore, a control interface is provided to allow BNE to be controlled remotely.

At run-time BNE logs events to a file. For debugging, the network traffic between the BNE and the PLT gives the detailed view of signaling and data. This can be captured using Ethereal and decoded using Inmarsat BGAN/UMTS decoder for Ethereal.

BGAN Features Supported

The BGAN part of BNE is a functional implementation of the BGAN Access Stratum for the Radio Network Controller (RNC) and emulates the sufficient parts of the UMTS Core Network (CN) to allow BGAN terminals to connect to the network and activate Packet Switched (PS) and Circuit Switched (CS) services.

USIM authentication, ciphering and integrity protection of signaling and data connection is supported to allow BNE to be used with a BGAN terminal having a test USIM card inserted.

Features:

- Packet Switched with up to 11 PDP contexts (primaries and secondaries)

- Circuit Switched
- SMS
- Header compression (PDCP - RFC 2507)
- Ciphering
- Network initiated events: detach, deregistration, and PDP deactivation
- Configure network to reject UT requests: registration, attach and PDP context activation
- Multi UT testing i.e. simultaneous testing of up to 16 terminals against one BNE
- Net2000 – Test end to end CS Voice (AMBE+2)

Supported Classes

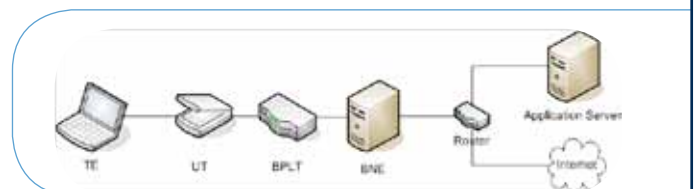
- Land Portable Class 1-3
- Aeronautical Class 6-7
- Maritime Class 8-9
- Land Mobile Class 10-11

Testing of services

The following examples show how the BNE can be used for building a test bench for testing of various services.

Testing of PS services

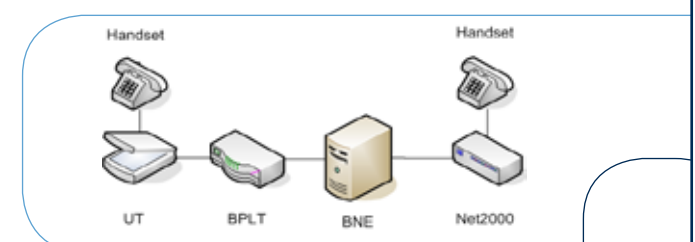
The figure shows the system overview of a BNE based



test bed where a laptop (TE) is connected to the UT as you would connect it to a UT in the field. The UT RF Interface is connected to a BPLT which serves as the physical layer for the network-side protocol stack. The UT registers and activates PS services with the BNE. The BNE enables forwarding and returning of IP packets through an Ethernet adapter on the BNE Host.

Testing of CS Voice (AMBE+2)

For the purpose of testing CS services there are a few different ways to add a CS user data plane to the BNE.



The example above shows how CS Voice (AMBE+2) can be tested. BNE is integrated up against the Net2000 box from DVSI and makes it possible to establish CS calls to and from a standard BGAN UT to test the voice codec and the echo canceller etc.

Send and received Short Text Message (SMS)

The BNE is an ideal tool for testing a terminal's SMS functionality. It is possible to use either the terminal's user interface to enter and send SMSs or it can be automated by writing scripts that automatically send SMSs using the AT command interface. The BNE can send SMSs to the terminal by using its scripts language. This enables users to thoroughly test the terminal's SMS functionality, by automatically sending SMS with varying sizes, frequency, context etc. to the terminal.

The SMS functionality makes it possible to test the terminal's support for Over the Air Provisioning (OTAP).

Testing of Mobility

The BNE can be used to test and validate application operation of BGAN UTs in scenarios where the UT is mobile. This includes the aeronautical, maritime, and land-vehicular UE classes and mobile versions of the Land Portable UE classes.

The position information is spoofed to the UT by the user, and the handover to another narrow beam is done by the BNE.

Testing of Multi UT

The purpose of the Multi UT feature is to enable the user to test user application in a congested satellite traffic environment and the focus is on the application side and not the actual UT.

The GAN extension is a functional implementation of the GAN Control and Connection Layer for the Satellite Access Node (SAN) and emulates sufficient parts of the GAN Service Layer and Host Management Elements to allow GAN terminals to connect to the GAN network and activate Packet Switched (PS) services.

Features:

- Packet Switched data traffic

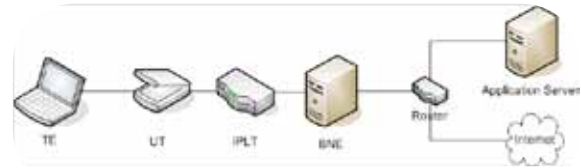
Supported Classes

- M4 Land Class
- Inmarsat-F77 (Maritime) Class
- M4 Aeronautical Classes
- Fleet-55 (Maritime) Class

The following example show how the BNE can be used for building a test bench.

Testing of PS service

The GAN feature allows customers to test the terminal's PS data performance as described in BGAN. The same test tools can be used for testing GAN and BGAN, which makes



it possible to test multiple protocols in the same test bed. Since the test set-up is the same it will be possible to compare performance of GAN and BGAN terminals with a limited number of unknown parameters.

Roadmap

Support for additional satellite protocols (e.g. GPS and Thuraya) can be added as optional software modules.

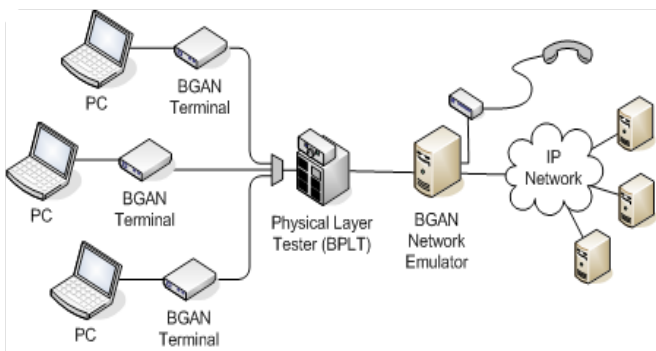
Support for new terminal classes are added when Inmarsat expands the BGAN system.

GateHouse prefers to work closely with our customers, which means that customer requirements can be added as part of the BNE on request.

References

The following companies have benefited from using the BNE in their development and test program

- EMS
- JRC
- Inmarsat
- Some customers do not want disclosure



GAN Features Supported

GateHouse has developed a GAN extension to the BNE that will allow customers to use the same test bed to test the user data plane of BGAN and GAN terminals.

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