

BGAN Network Emulator

Complete control of your
Inmarsat BGAN test environment

BGAN Network Emulator

The most comprehensive network emulation for both manual and automated BGAN terminal testing – in a controlled and reproducible environment.

Testing off-air with the BNE

The BGAN Network Emulator (BNE) enables controlled and advanced testing of your BGAN user terminals (UTs).

The BNE enables you to test and repeat any scenario in your lab. When testing a terminal, you want to know how it responds to the unpredictable behaviour of a live network and link such as allocated bandwidth, blockage or bit errors. By testing off-air with the BNE you can reproduce any scenario – no matter if this means best or worst possible conditions. Furthermore,

you can test as many times as you require, without the restrictions of either limited airtime or line-of-sight.

Supported Classes

- Land Portable Class 1, 2, 3
- Aeronautical Class 4, 6, 7, 15
- Maritime Class (5), 8, 9, 14
- Land Mobile Class 10, 11 (12)



TEST TERMINALS FOR
LAND, MARITIME AND AVIATION



Benefits

- Emulate all BGAN functionality in a controlled sandbox environment
- Validate user experience e.g. during handover between beams
- Create, execute, reproduce and document test scenarios
- Avoid exposure on the live network
- Test and document terminal performance
- Test end-to-end exchange of user data such as E-mail, FTP and Web Browsing
- Assure quality in any event (e.g. signal degradation, traffic shaping (queuing, QoS), congestion)

Use cases



END-TO-END TEST OF YOUR TERMINAL - ON THE BENCH!

Testing of Packet Switched data services

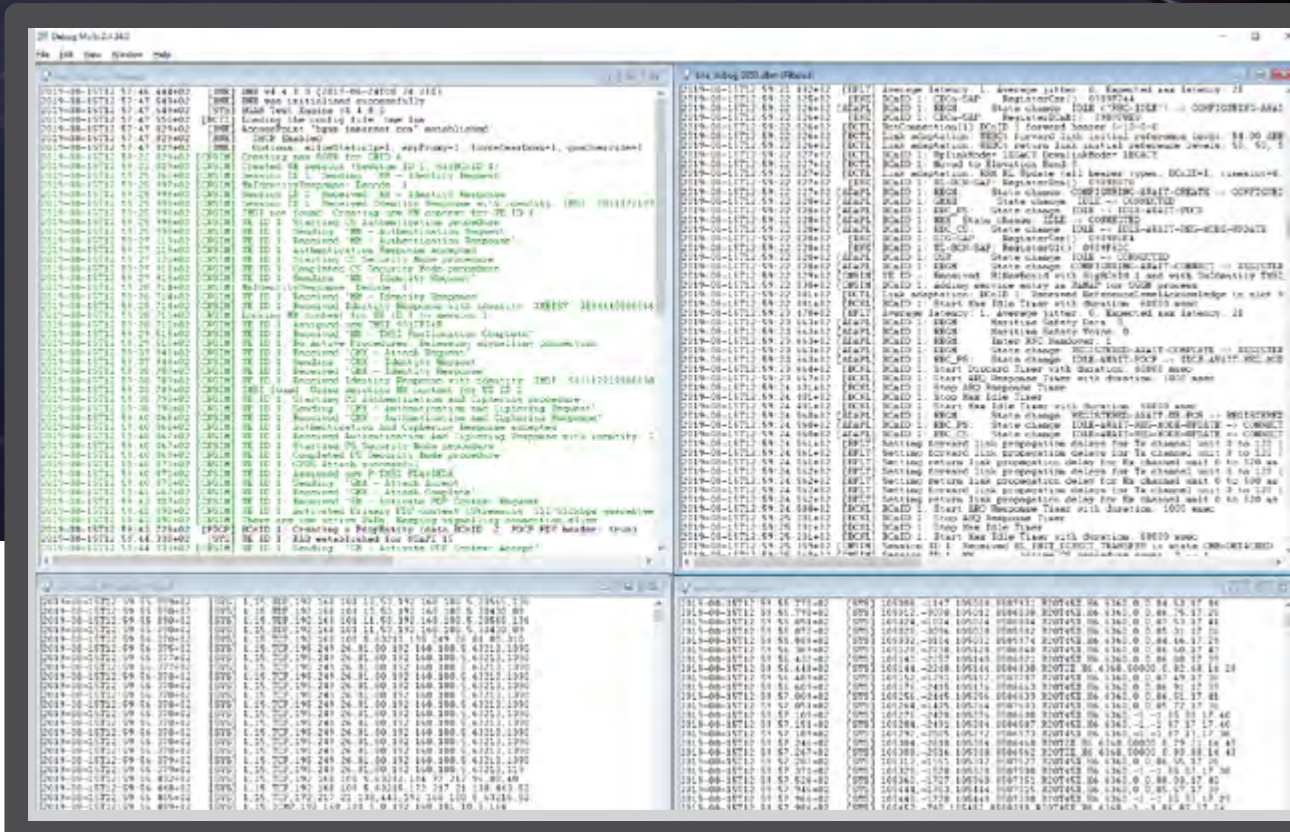
With the BNE it is possible to control test execution and validate your terminal's behaviour on RF interface to the BGAN satellite network when running packet switched data services. You can configure and execute any test case and the BNE will put a verdict. Furthermore you get full visibility into the actual signalling and data transfer using the built-in logging facilities. Using Debmulti you can follow messages exchanged between terminal and emulator which is useful for debugging protocol behaviour.

Send and receive Short Text Message (SMS)

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 sends 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 SMSs with varying sizes, frequency, context etc. to the terminal.

Testing of Mobility

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

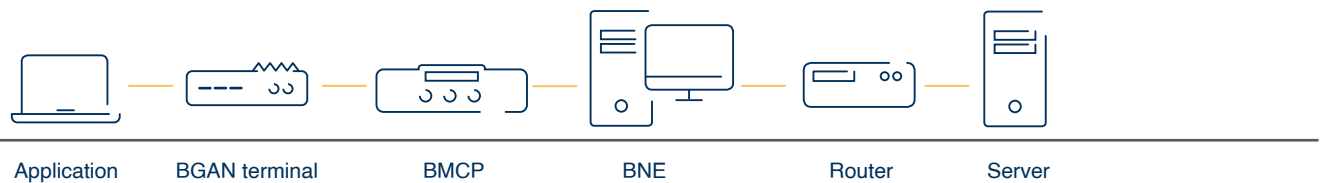


```
482+02 [BPLT] Average latency: 1. Average jitter: 0. Expected max latency: 21
.025+02 [BNE] BcN1 ID: CBCn-SAP: RegisterCar(): 0909F744
.026+02 [ADAPL] BcN1 ID: REGM: State change: IDLE ("RRC-IDLE") -> CONFIGURING-AWA
.026+02 [BNE] BcN1 ID: CBCn-SAP: RegisterBcM(): 0909F8E8
.026+02 [BCTL] BctConnection(1) BcN1 ID forward bearer 6-13-0-0
.026+02 [BCTL] Link adaptation: UEBCt forward link initial reference level: 54.00 dB
.026+02 [BCTL] Link adaptation: UEBCt return link initial reference levels: 55. 55.
.027+02 [BCTL] BcN1 ID: UplinkMode=LEGACY DownlinkMode=LEGACY
.027+02 [BCTL] BcN1 ID: Moved to Elevation Band 0
.027+02 [BCTL] Link adaptation: RRM RL Update (all bearer types, BcN1=1, timeslot=0)
.027+02 [BNE] BcN1 ID: UL-BCn-SAP: RegisterBcn(): 0909F870
.027+02 [ADAPL] BcN1 ID: REGM: State change: CONFIGURING-AWAIT-CREATE -> CONFIGUR
.028+02 [ADAPL] BcN1 ID: GMHM: State change: IDLE -> CONNECTED
.028+02 [ADAPL] BcN1 ID: RBC_PS: State change: IDLE -> IDLE-AWAIT-PDCP
.028+02 [ADAPL] BcN1 ID: MMH: State change: IDLE -> CONNECTED
.028+02 [ADAPL] BcN1 ID: RBC_CS: State change: IDLE -> IDLE-AWAIT-REG-MODE-UPDATE
.028+02 [BNE] BcN1 ID: SIG-SAP: RegisterSar(): 0909F6F4
.028+02 [BNE] BcN1 ID: UL-BCn-SAP: RegisterUl(): 0909F62C
.028+02 [ADAPL] BcN1 ID: SSR: State change: IDLE -> CONNECTED
.028+02 [ADAPL] BcN1 ID: REGM: State change: CONFIGURING-AWAIT-CONNECT -> REGISTR
.029+02 [CNSIM] UE ID - Received: RlNevBcnid with SigBcnid 1 and with UeIdentity TMS
.030+02 [CNSIM] BcN1 ID: Adding service entry in RANap for SGSN process
.881+02 [BCTL] Link adaptation: BcN1 ID: Received ReferenceLevelacknowledge in slot
.881+02 [BCNL] BcN1 ID: Start Max Idle Timer with duration: 60000 msec
```

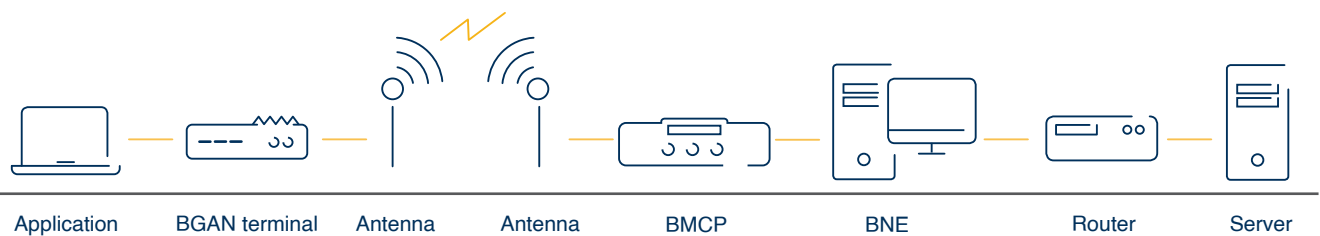
Example of the BGAN Network Emulator Debmulti logging tool in action.

Technical description

— BGAN Network Emulator Wired Setup —



— BGAN Network Emulator Wireless Setup —



The BNE is a functional implementation of the BGAN Access Stratum for the Radio Network Controller (RNC) that emulates the UMTS Core Network (CN) to allow BGAN terminals to connect to the network, activate Packet Switched (PS), Circuit Switched (CS) services and SMS. USIM authentication, ciphering and integrity protection of signalling

and data connection is supported to allow the BNE to be used with a BGAN terminal having a test USIM card inserted.

The BNE is used in a test bench setup integrated with a BGAN Physical Layer Tester on Multi-Platform Channel (BMCP) implementing the physical layer. This allows a BGAN terminal to be tested and operated as it

would be on the live network. The BNE provides a configuration file interface to be used for setting up of bearers and channels. Furthermore, an interface allows the BNE to be controlled remotely. At run-time the BNE logs events to a file. For debugging, the network traffic between the BNE and the BPLT gives a detailed view of signalling and data.

Features

▶ Supported Terminal Classes

- Land-Portable (Class 1, 2, 3)
- Land-Mobile (Class 10, 11, 12)
- Maritime (Class (5), 8, 9, 14)
- Aeronautical (Class 4, 6, 7, 15)

▶ Services

- Background IP
- Streaming IP
- Multiple Access Points
- Short Message Service (SMS)
- Voice calling (*loopback, file, net2000 handset*)
- ISDN calling (*loopback, file, PPP data*)
- Maritime Safety Data Service
- SwiftBroadband Oceanic Safety Service
- Regional SAS

▶ User Interface

- Programmatical configuration & control

▶ Air-Interface

- Ciphering
- Idle Data Connection (RAB) Release
- Beam activation delay
- Dynamic Beam and coverage gain map
- Network impairments

- User data plane load impairment
- Forward link noise impairment
- Beam and coverage gain pattern
- Return link noise impairment emulation
- User configurable spot beam map

▶ Configurability

- Configurable system broadcast information
- Configurable frequency allocation
- Configurable bearer tables, link condition tables
- Configurable bearer type and code rate
- Configurable lower layer protocol parameters

▶ Logs & Traces

- Debmulti logging tool
- High level logging and detailed logging
- Lower layer tracing (e.g. frequency, timing)

▶ Operation

- Manual testing
- Automated testing

▶ Other

- BGAN test SIM-card required (Delivered by GateHouse)
- Multi-channel (Aero)
- Multi-user

▶ You get:

- BNE software
- Remote software updates
- Test sim card
- License key
- BMCP (optional)
 - RF coupler
 - Antenna cable
- Training, installation, support (optional)

▶ You already have:

- BGAN terminal
- Router
- GPS simulator (fixed or mobility)
- Tool for generating data:
 - PCs
 - Application + server

UNLIMITED, ON-THE-BENCH TESTING AND COMPLETE CONTROL OF YOUR TEST ENVIRONMENT!

Visit gatehouse.com to schedule a demo.