

nanoGSM™

GSM-over-IP picocells for in-building coverage and capacity



nanoBTS™ EDGE/AMR

The new nanoBTS EDGE/AMR picocellular basestation represents a significant step on the migration path to higher data rates and more supported users. Based on the world beating nanoBTS GSM/GPRS basestation it delivers the same features and functionality for GSM voice and GPRS but with the addition of high-speed EDGE data and improved voice quality and capacity using AMR coding.

For operators moving to higher speed data networks by deploying EDGE, there is a strong requirement to provide high quality coverage in buildings. With ip.access revolutionary GSM-over-IP technology it is possible to bring cost effective high-speed coverage to the user where they most need and use it.

increased data capacity

For many of the new data services the majority of use will be indoors where the EDGE BTS will be physically close to the user. The quality of the signal can be correspondingly higher, so the higher rate data coding schemes will be available to the user. The nanoBTS EDGE/AMR supports all the EDGE coding schemes from MCS1- MCS9 giving a maximum nominal data rate of 414kbps which is up to three times the maximum data rate of the GSM/GPRS model. The BTS also monitors for the optimum RF conditions for data transfer and alters the data throughput to achieve the fastest rates This ensures the best possible user experience and maximizes the use of the available spectrum.

improved voice quality and capacity

In networks where AMR capable handsets are being deployed the new coding scheme can be used to improve the quality of voice calls, improving the user experience. In addition, as the quality of the AMR half rate coding is very similar to the standard full rate GSM, half rate AMR can be used to double the number of voice channels available per BTS. Erlang models show that this increases the number of supported users by up to three times, improving the return on investment for the BTS.

easy deployment

Picocells offer a lower cost alternative to the traditional antenna based approach to providing GSM coverage and capacity within buildings. Due to the small size and deployment flexibility, the nanoBTS can easily achieve coverage where needed. The quick and simple installation using existing Ethernet wiring for both data and power avoids the need for the expensive site surveys, cabling installations and access to roof and floor spaces typical of distributed antenna systems (DAS). The unique Network Listen™ function supplements the conventional RF planning process, allowing the planners to see into the difficult indoor environment to optimize the coverage.

For operators with existing nanoBTS deployments the EDGE unit can be added to an existing installation using the multi TRX capability. Both units then operate as a single cell to give up to 22 channels of voice together with the high data rates of 414kbps of the highest EDGE coding schemes.

key features

- Up to 3 times the data rate with EDGE support
- Up to 3 times the number of supported users with half rate AMR
- Support for EDGE coding MCS1-MCS9
- Indoor coverage up to 125,000m²
- Single 10/100 Ethernet connection
- Smallest footprint in the industry

applications

- Dedicated coverage for SME premises
- In-building capacity and coverage for large corporate offices
- Stand-alone in-fill for shopping malls, airports or undergrounds
- Delivering GSM access on ships, aeroplanes and rural areas

scalable system architecture

The nanoBTS is a complete GSM basestation that conforms to the picocell standard and delivers "GSM-over-IP". It combines a standard U_m air interface, which supports the more than 1 billion GSM handsets in use globally, with an IP based backhaul, which can take advantage of the existing IP broadband infrastructure.

There are two versions of the nanoBTS EDGE/AMR for operation in the 1800 and 1900MHz GSM frequency bands. For applications requiring even greater capacity up to 4 nanoBTS can be combined into a multiple TRX cell, increasing the number of supported users per TRX by up to 200%.

The nanoBTS GPRS/GSM and the nanoBTS EDGE/AMR are controlled by the nanoGSM BSC basestation controller. System configuration, performance and fault reporting is handled by the nanoGSM OMC-R management system.



technical specification

U_m radio interface

transmit frequencies

GSM 1800 model	1805 to 1880MHz
GSM 1900 model	1930 to 1990MHz
Channel spacing	200kHz
Max. output power:	
GMSK (CS 1-4/MCS 1-4)	+23dBm
8PSK (MCS 5-9)	+13dBm
Static power control	6 steps (2dB each)
Dynamic power control	6 steps (2dB each)

receive frequencies

GSM 1800	1710 to 1785MHz
GSM 1900	1850 to 1910MHz
Channel spacing	200kHz
Performance	GSM 05:05
Gain control steps	26

antennas

Integral antennas for TX, RX and NetworkListen™
0dBi omni-directional (nominal)
Connectors for external antennas

channel support

Each nanoBTS supports a single TRX and can act as a standalone BTS
Up to 4 nanoBTS can also be connected to act as a Multi-TRX BTS
Single TRX or C0 of MultiTRX
TS0 = full BCCH, Combined BCCH or Combined BCCH with CBCH
TS1-7 = TCH, PDCH or Dynamic PDCH/TCH
Additionally TS1 may be SDCCH/8 + SACCH/C8 (with optional CBCH)
Multi TRX (non C0)
TS0-7 = TCH
Additionally TS1 may be SDCCH/8 + SACCH/C8
Internal clock frequency
Better than 100ppb as per GSM 05.10 pico

user services

teleservices

Telephony
Short Message Service MT/PP
Short Message Service MO/PP
Short Message Service CB single message for user cell description

speech format support

GSM FR and EFR
AMR (TCH_AFS and TCH_AHS)

encryption support

A5/1
A5/2

circuit switched data

Single slot BS20 at up to 14.4kb/s
BS21-26, plus BS61, BS81

GPRS and EDGE support

GPRS Coding schemes CS1-4 || E-GPRS Modulation and coding schemes | MCS1-9 |
Multi-slot class	10
Dynamic PDCH for optimising mix of service for voice/data	
Link adaptation	
E-GPRS incremental redundancy and dynamic window size	

interface connection

signalling and traffic Abis/IP || Single RJ45 auto-negotiate 10/100 Ethernet supporting PoE | |
| Timing Interface Bus (TIB) providing nanoBTS interconnect for multi-TRX functionality | |

physical

dimensions and weight

Height	205mm
Width	275mm
Depth	63mm
Weight	2kg

power

Power consumption 13W || Input supply | 38 - 50 volt DC |
| Power over Ethernet (PoE) | |

operational

Temperature -5°C to +45°C ambient || Humidity | 5% - 90% non-condensing |

standards

CE marked
UL and FCC listed

mounting

The nanoBTS EDGE/AMR is provided with a mounting bracket.
For multi TRX a second BTS can be mounted on top of the first
Power-over-Ethernet can be provided locally using the supplied Ethernet inserter or remotely using a PoE switch

Copyright © ip.access 2005. nanoGSM and nanoBTS are trademarks of ip.access ltd. All other trademarks are acknowledged. This document contains advance information, subject to change without notice. No responsibility is assumed by ip.access for the use of this information, nor for infringements of patents or other rights of third parties. This document is the property of ip.access and implies no license under patents, copyrights or trade secrets. No part of this publication may be copied, reproduced, stored in a retrieval system, or transmitted, in any form of any means, electronic, photographic, or otherwise, or used as the basis for manufacture or sale of any items without the prior written consent of ip.access.

ip.access ltd

Building 2020 ■ Cambourne Business Park ■ Cambourne ■ Cambridge ■ CB3 6DW ■ UK
T +44(0)1954 713700 ■ F +44(0)1954 713799 ■ info@ipaccess.com
www.ipaccess.com

