

The world's most deployed picocell

Fast, low-cost capacity & coverage for hard-to-reach places.
In-building / remote areas / Marine & Aviation / public spaces.

Low-cost – IP backhaul instead of expensive T1/E1
High-speed – supporting GSM, GPRS and EDGE
Flexible – fast, easy deployment
Simple – integrates easily with the core network
Proven – no cell distortion, interference or handover problems



nanoGSM[®]

**Fast, low-cost coverage and
capacity where you need it most**
The proven in-building solution

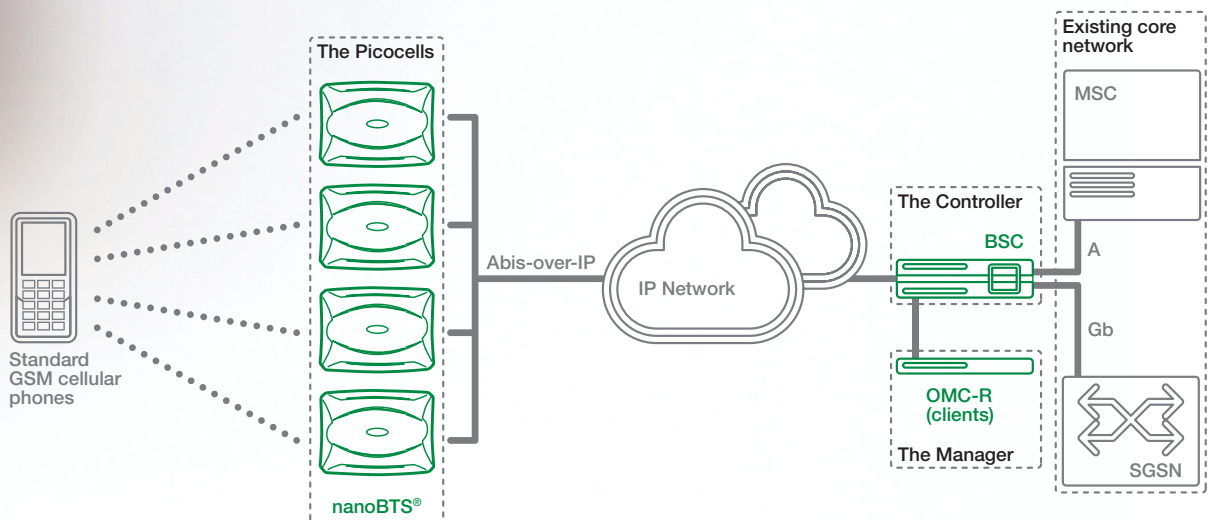
For years, mobile network planners have turned to repeaters for quick, cheap coverage inside buildings. Unfortunately, repeaters cause as many problems as they solve. They drain capacity from the macro network, distort the cell and can create havoc with interference, handover and manageability. Now, network planners tired of throwing money at in-building coverage problems have discovered a better way: nanoGSM from ip.access, the world's most deployed picocell.

Unlike repeaters, each nanoGSM picocell actually adds capacity to your network while avoiding cell distortion and interference issues, solving handover, and integrating with existing network management systems.

nanoGSM reduces capex with low-cost base stations and reduces opex with simple, straightforward IP backhaul. It's driving down the cost of adding coverage and capacity for operators all over the world.

How it works

nanoGSM is a proven, end-to-end solution carrying billions of minutes of traffic every year, all over the world. The simple, robust and flexible system is based on three components: the picocells, the controller and the manager.



The picocells

The nanoBTS picocells are complete GSM base stations that use the standard Um interface to the handset and an Abis interface carried over IP for the backhaul.

nanoBTS – A compact picocell, for GSM/GPRS/EDGE the nanoBTS is available in four variants covering the 850MHz, 900MHz, 1800MHz and 1900MHz bands.



The nanoBTS offers high-speed data rates with full support for EDGE and significant increase in voice capacity with half-rate AMR.

The base station offers:

- Indoor range up to 200m
- Low-cost IP backhaul
- Simple deployment – using a single Ethernet connection for power, traffic and signaling.
- Network Listen™ – supplements RF planning, allowing the planners to see into the difficult indoor environment to optimize coverage and avoid interference issues.

The controller

The nanoGSM Base Station Controller (BSC) handles and routes all the IP traffic between the picocells and your existing MSC and SGSN over the standard A and Gb



interfaces. There is also an option to connect into architectures with softswitch MSCs.

The BSC provides channel allocation and controls the power level algorithms and handover procedures for the picocells. The unit is engineered for high availability by combining selective redundancy with fast restart capabilities.

The BSC combines a processor module, signalling gateway, media gateway and frame relay gateway. It is housed in a 4U high compact PCI chassis for easy installation in a low-cost package.

The nanoBTS BSC is also provided in a software variant called the softBSC, an application supported on a standard Linux® OS. The softBSC supports all the same features as the hardware BSC.

The manager

The OMC-R (Operations and Maintenance Centre – Radio) provides all the facilities needed for the operation and maintenance of the nanoGSM picocells and controller.

Alarm management

The alarm management module collates all alarms according to severity, acknowledgement status, probable cause, equipment and managed object identification and timestamp. The context sensitive help feature assists the user in interpreting the alarms and suggests repair instructions.

Configuration management

The configuration management module enables all parameters on multiple BSCs and BTSs to be monitored and provisioned remotely. Wizards are used to simplify the setting up of new BSS sites and the A-interface.


Performance management

Performance management files are collated automatically to a central repository. Users have the option of either exporting the raw PM data to third-party analysis tools or computing various KPI's on a subset of the data. The results of this KPI computation is then either exported as a CSV file or visualised as a graph.

Proven & reliable

nanoGSM is a proven, end-to-end solution carrying billions of minutes of traffic every year, for more than 35 operators all over the world, working live with core networks from all major vendors. Ask for references.





The enterprise market

Poor coverage and quality are major causes of business customer churn. nanoGSM helps you win and keep business customers by giving them their own private cell.

- Differentiate from commodity networks
- Increase revenues from voice and data
- Offer competitive in-office tariffs
- Decrease churn

Because it's quick and cost-effective to deploy, the nanoGSM delivers rapid payback and ongoing revenues from businesses with 10 to 1000 users.

The bottom line

nanoGSM is the fastest, most cost-effective way to add capacity and coverage to the hardest-to-reach parts of your GSM network, especially in buildings.

And our partners have created added-value solutions around nanoGSM to take the benefits to remote rural areas and special situations including marine, aviation and public spaces.

nanoGSM advantages

- Fast coverage and capacity
- Lower capex than distributed antennas
- Lower opex, with IP backhaul
- Easy, flexible deployment
- No cell distortion, interference or handover problems
- Easy to integrate and manage

About ip.access

ip.access is the world leader in harnessing the power of IP to drive down costs and improve coverage and capacity for mobile operators.

Our whole systems expertise combines world-class skills in radio, IP, integration and management – especially for difficult in-building challenges.

Our 2G picocell solution is the world's most deployed and our 3G femtocell solution is the winner of numerous industry awards, including the prestigious GSM Association Award for Best Radio Access Product.

ip.access solutions are used by many of the world's most successful mobile operators.

Technical specifications

The picocells

Um radio interface

Model	GSM 850	GSM 900	GSM 1800	GSM 1900
Transmit frequencies	869–894MHz	925–960MHz	1805–1880MHz	1930–1990MHz
Channel spacing	200kHz	200kHz	200kHz	200kHz
Max. output power	+20dBm	+20dBm	+23dBm	+23dBm
— EDGE 8PSK (MCS 5–9)	+20dBm	+20dBm	+13dBm	+13dBm
Output power control		12 steps	12 steps	12 steps
Receive frequencies	824–849MHz	880–915MHz	1710–1785MHz	1850–1910MHz
Channel spacing	200kHz	200kHz	200kHz	200kHz
Performance	GSM 05:05	GSM 05:05	GSM 05:05	GSM 05:05
Receive gain control	26 steps	26 steps	26 steps	26 steps

Internal antennas

Integral antennas for TX, RX and NetworkListen™
On-board 0dBi omni-directional (nominal)
Optional external antenna connections

Internal clock frequency

Better than 100ppb as per GSM 05.10 pico

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/F, PDCH or Dynamic PDCH/TCH

Additionally TS1 may be SDCCH/8 + SACCH/C8 (with optional CBCH)

Multi TRX (non C0)

TS0-7 = TCH/F

Additionally TS1 may be SDCCH/8 + SACCH/C8

System services

Security

Air Interface – A5/1, A5/3

Abis over IP interface:

- Signalling and management – TLS / AES
- Voice - secure RTP / AES

System features

Channel assignment and classmark

Directed retry based on load, power and cell priority

Handover

BTS software update via BSC

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 (full and half-rate, all codecs)

Circuit switched data

- Single slot BS20 at up to 9.6kb/s
- BS21-26, plus BS61, BS81

GPRS support

Coding schemes 1-4

Multi-slot class 10

Dynamic PDCH for optimising mix of service for voice/data

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

Physical

Electrical interface

Single RJ45 auto-select 10/100 Ethernet supporting PoE

Timing Interface Bus (TIB) providing nanoBTS interconnect for multi-TRX functionality

Dimensions & weight

	GSM 850/900	GSM 1800/1900
Height	224mm	205mm
Width	295mm	275mm
Depth	63mm	63mm
Weight	2kg	2kg

Power

Power consumption

13W

Input supply

38 – 50 volt DC

Operational

Temperature

–5°C to +45°C ambient

Humidity

5–90% non-condensing

Standards

CE marked

UL and FCC listed

Mounting

The nanoBTS is provided with a mounting bracket for wall or ceiling mounting

Power-over-Ethernet via supplied adapter or from PoE switch

For multi TRX a second BTS can be mounted on top of the first

The manager

Management

Alarms

Details of all alarms reported by nanoBTS and nanoGSM BSC

Alarm lifecycle management

Custom alarm views with configurable alarm filtering

Optional SNMP interface for integration with 3rd party fault management packages

Configuration

Provisioning and re-configuring nanoBTS and nanoGSM BSC

MIB Attribute display and modification

Lock, unlock & shutdown

Site copy and object create & delete

Transaction journal for change auditing

Configuration wizards

Circuit interface (CIC) of the A interface to an MSC

Site create for new BSS

Performance

Configures collection of GSM 12.04 and other BSC and BTS performance measurements for off-line analysis

A-bis supervision function for detection of network, round trip time and user traffic faults.

Help

Context sensitive information for selected managed object, MIB package, attribute and alarm

Back-up and restore

Interfaces

Protocols

BSC to OMC-R server	CORBA
Client to Server	CORBA

Network interface

IP over Ethernet

Physical platform

Linux	server/client
Solaris	client
Windows 2000	client

The controller

GSM feature support

Generic support

All frequency variants of nanoBTS

SMS, GSM FR/EFR/AMR speech, single slot CSD, GPRS, E-GPRS

Mobile station phase 1,2 and 2+

Other supported features

Channel assignment and classmark

Directed retry based on load, power and cell priority

Handover

Dynamic GPRS timeslot allocation (Dynamic PDCH)

Paging and location areas

BTS software download via BSC

Redundancy on SS7 links

US regulation pack (E911)

Multiple TRX

Subscriber trace

O&M

Configuration management

Fault management

Performance management

Interfaces and protocols

Abis interface to the nanoBTS

TCP/IP signalling, control and management – TLS security

UDP/IP packet and bearer streams – secure RTP
10/100baseT(x) via RJ45 connector

A interface to MSC

BSSMAP and DTAP carried by SCCP (signalling)

64kbits/s PCM speech / CSD

Structured E1/T1

4 or 8 E1/T1 with capacity for future 16 E1/T1

RJ45 connectors

O&M to OMC-R

CORBA-based to allow distributed OMC-R

Functionality

10/100baseT(x) via RJ45 connector
(may be shared with Abis or separate)

Gb to SGSN

Frame Relay interface for direct connectivity to a SGSN

Structured E1/T1

4 x E1/T1

Gb over IP based interworking to the SGSN

RJ45 connectors BSC to config manager

TCP/IP (private protocol)

Physical

Platform

Compact PCI chassis with rear access to all traffic ports

Redundancy

Selective use of redundancy on vulnerable components (3PSUs, 7 fans, RAID disks) and hot-plug capability for all modules

Dimensions & weight

Height	178mm (4U)
Width	448mm (19")
Depth	441mm
Weight	13kg

Temperature

Operating	0°C to +50°C
Storage	-20°C to +70°C

Humidity

Operating	10 to 90% non-condensing
Storage	10 to 90% non-condensing

Power

Power consumption	400W
Input supply options	90-250 volts AC or 36-75 volts DC

Standards

CE and FCC approved

Mounting

The compact PCI chassis can be mounted within a standard 19" rack (IEC 60297)

softBSC

The softBSC application provides the following IP-based interfaces:

- 'A-bis' interface to the nanoBTS
- 'A' interface to the core network (soft-switch MSC)
- 'Gb' interface to the core network (IP SGSN)

An optional RTP Multiplexer may be used to reduce the bandwidth requirements on the A-bis interface and to allow BTS to operate from behind a NAT at the local site.

Minimum hardware recommendations are:

1GB memory

40 GB disk space

Standard Linux platform with appropriate interfaces for network connectivity



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