FlexWave™ nanoBTS™ EDGE/AMR

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

The new FlexWave™ nanoBTS™ EDGE/AMR picocellular base station represents a significant step on the migration path to higher data rates and more supported users. Based on the FlexWave nanoBTS GSM/GPRS base station 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 industry-leading GSM-over-IP technology it is possible to bring cost effective high-speed coverage to the user where they most need and use it.

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 125,000m^2 (1.4 million ft^2)
- Single Ethernet connection for Abis over IP to BSC
- Smallest footprint in the industry

Applications

- Dedicated coverage for SME premises
- In-building capacity and coverage for large corporate offices
- Hybrid indoor/outdoor applications when deployed with FlexWave microBTS
- Campus, stadiums, subways, tunnels
- Delivering GSM access on ships, airplanes and rural areas

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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 FlexWave nanoBTS EDGE/AMR supports all the EDGE coding schemes from MCS1- MCS9 giving a maximum nominal data rate of 414kpbs 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 FlexWave 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 FlexWave nanoBTS deployments the EDGE unit can be combined with an existing GSM/GPRS installation using the multi TRX capability. All the units then operate as a single cell together with the high data rates of 414kbps of the highest EDGE coding schemes.

Scalable System Architecture

The FlexWave nanoBTS is a complete GSM base station that conforms to the picocell standard and delivers "GSM-over-IP". It combines a standard Um air interface, which supports the more than 2 billion GSM handsets in use globally, with an IP based backhaul, which can take advantage of the existing IP broadband infrastructure.

There are four versions of the FlexWave nanoBTS EDGE/AMR for operation in the 850MHz, 900MHz, 1800MHz and1900MHz GSM frequency bands. For applications requiring even greater capacity up to 4 FlexWave nanoBTS can be combined into a multiple TRX cell, increasing the number of simultaneous calls up to 62 using half rate AMR.

The FlexWave nanoBTS GPRS/GSM and the FlexWave nanoBTS EDGE/AMR are controlled by the FlexWave Base Station Controller (BSC). System configuration, performance and fault reporting is handled by the FlexWave OMC-R Management System.

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Specifications

U_m RADIO INTERFACE

TRANSMIT FREQUENCIES

GSM 850 Model:	869 to 894MHz
GSM 900 Model:	925 to 960MHz
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)	
850 and 900:	+20dBm
1800 and 1900:	+23dBm
8PSK (MCS 5-9)	
850 and 900:	+20dBm
1800 and 1900:	+13dBm
Static Power Control:	6 steps (2dB each)
Dynamic Power Control:	6 steps (2dB each)

RECEIVE FREQUENCIES

GSM 850:	824 to 849MHz
GSM 900:	880 to 915MHz
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 (full and half-rate, all codecs)
Security:	Air Interface – A5/1, A5/2 Abis over IP interface • Signalling and management – TLS / AES • Voice - secure RTP / AES
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

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Interface Connection:	Single RJ45 auto-negotiate 10/100 Ethernet supporting PoE Timing Interface Bus (TIB) providing nanoBTS interconnect for multi-TRX functionality

PHYSICAL SPECIFICATIONS

Dimensions:	205mm x 275mm x 63mm (8.1" x 10.8" x 2.5")
Weight:	2kg (4.4 lbs)
Power consumption:	13W
Input supply:	38 - 50 volt DC
Power over Ethernet (PoE):	
Operational Temperature:	-5°C to +45°C ambient
Operational Humidity:	5% - 90% non-condensing
Standards:	CE marked UL and FCC listed
Mounting:	The FlexWave 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

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