

R-961,2,3,4 TetraNode Base Station Systems

General Description

The carrier Base Station System (BSS) are compact base station solutions for up to four TETRA transceivers. Due to its modular design, the BSS can be deployed economically for virtually any base station application with the lowest possible installation cost.

The superior RF performance and robust protection against high signal interference offers unmatched coverage and quality of service. This allows for deployment of less base stations, reducing initial and recurring site acquisition cost.

The highly power efficient design of the BSS components reduces power consumption and heat dissipation. This results in a significant reduction of operational expenditure. The wide temperature range and low power consumption potentially eliminates the need for cooling systems, or at least reduce overall power consumption for site installations.

The BSS is available for frequencies ranging from 350 to 470 MHz, as well as 800 MHz. The BSS is supplied as an optimized 19" rack enclosure with passive cooling for highest system reliability.

Additional Details

The BSS can be ordered in a number of configurations, providing a platform of which the capacity can grow as needed. Different Radio Frequency Distribution System (RFDS) components are available, of which the exact configuration will be tailored for the given application. Up to two-way channel diversity is supported, whereby a duplexer can be utilized to combine the transmit antenna with one of the receiver antennas.

The combining network can take advantage of the multiple receivers to provide a fully symmetrical, no-single-point-of-failure base station system using two BSS's. The operating capacity of two carriers will be reduced to one carrier only if certain vital components fail, whether it is the transmit antenna, cable or combining component.

The BSS offers a transmit power of 40 Watts when using combining by-pass, or 25 Watts with combining included.



Key Features

- Modular design
- Capacity can grow as needed, with a minimum of one and a maximum of four transceivers
- Best-of-class receiver sensitivity and output power
- High power efficiency
- Automatic Main Control Channel changeover
- TEDS-ready (requires IP link transmission)
- Redundancy options for BSS operation and transmission link redundancy
- Support of multi-service IP transmission links
- Extensive set of maintenance features

Fallback operation of the BSS can be obtained with the optional R-815 Fallback Site Controller (FSC). The FSC provides basic TETRA functionality, allowing continuous operation using local site trunking with full capacity when the transmission link to the serving TNX is not available.

The optional redundant IP equipment and transmission link capability ensures the highest possible availability of the entire system.

Frequency and timing reference is provided internally by means of the TBS-SYN component. Availability of a GPS signal allows for improved handover performance, including seamless cell re-selection, but is not essential for operation of the BSS; thanks to the highly stable frequency source, the BSS can operate for up to 10 years without a GPS signal.

The BSS also provides the capability to monitor up to 10 digital and 2 analog external signals, which is useful for site and equipment monitoring.

Extensive features are included to allow remote operation, configuration, fault finding and firmware uploads. The maintenance features and configuration are operated remotely over the transmission link with the R-910 Network Management System (NMS).

The R96X systems will be delivered in 2 types of enclosures .

- Compact 12U high 19"rack
- Compact 32U high 19"rack

12U is suitable for 1 to 2 carriers and the 32U is suitable for 1 to 4 carriers . Special cabinets are on customer requests.



Technical specifications

General

- Frequency bands 360 - 380 MHz; 380 - 400 MHz 410 - 430 MHz; 450 - 470 MHz 806 - 870 MHz
- Duplex spacing 5, 10 or 45 MHz; Specials on request
- Operating bandwidth 5 MHz for 10 MHz spacing; 2.5 MHz for 5 MHz spacing; 19 MHz for 45 MHz spacing
- Air interface TETRA according EN 300 392-2
- RF specifications TETRA according EN 300 394-1
- Combiner options Wide band hybrid combiner; Standard or by-pass operation
- Duplexer options With or without duplexer

Receiver

- Sensitivity, static Typical -120 dBm Minimum -119 dBm
- Sensitivity, dynamic Typical -112 dBm
- Dynamic Range Max. input -10 dBm (BER 0%)

Transmitter

- Transmit power 44 dBm / 25 W with combining (on top of cabinet) 46 dBm / 40 W for by-pass combining
- Intermodulation > 70 dB attenuation
- VSWR of antenna < 1.4:1
- Frequency accuracy $\pm 0.2 \text{ ppm} \leq 520 \text{ MHz}$ $\pm 0.1 \text{ ppm} > 520 \text{ MHz}$ for 10 years without GPS

Transmission link

- IP network (standard) Ethernet 10/100 Mbps
- IP network (option) IP router for E1 or X.21
- IP network bandwidth 64 kbps per carrier (with packet header compression)
- High availability options Fallback Site Controller and/or redundant transmission links

Power supply

- Power supply voltage +18 to +36 V_{DC}, or -36 to -72 V_{DC}, or 110 / 115 / 230 V_{AC}
- Power consumption, typical 490 W (400 MHz) (2 carriers, full TX power) 550 W (800 MHz)

Mechanical 12U

- Dimensions (W x D x H) 600 x 600 x 770 mm
- Weight Max. 95 kg

Mechanical 32U

- Dimensions (W x D x H) 600 x 600 x 1650 mm
- Weight Max. 198 kg

Environmental

- Operating temperature -25 to 55 °C
- Storage temperature -40 to 85 °C
- Humidity < 95% at +40 °C, non-condensing

Ordering specifications

Deliverable system 19" frame

- R-961- (D) One carrier Base Station
 - One R-8070 carrier
 - RF- sub system
 - Diversity
- R-962- (D) One carrier Base Station
 - Two R-8070 carrier
 - RF- sub system
 - Diversity
- R-963- (D) One carrier Base Station
 - Three R-8070 carrier
 - RF- sub system
 - Diversity
- R-964- (D) One carrier Base Station
 - Four R-8070 carrier
 - RF- sub system
 - Diversity

Options

- Compact 12U high 19"rack
- Compact 32U high 19"rack
- Fallback site controller (R-815)

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TetraNode Mission Critical Communications