

ACCESSNET®-T Campus IP

The all-in-one solution
for small and regional
TETRA networks



Campus IP
ACCESSNET®-T



ROHDE & SCHWARZ

ACCESSNET®-T Campus IP At a glance

The ACCESSNET®-T Campus IP is a compact TETRA system solution that makes the powerful TETRA technology affordable for all network operators.

The ACCESSNET®-T Campus IP saves space, is easy to install and can be operated without expert-level knowledge. Featuring IP-based data transmission, it is fully in step with today's market and can be adapted to operational requirements and processes.

With the future in mind, the ACCESSNET®-T Campus IP keeps all doors open: Extra base stations and applications can be added and, if required, the existing system can be expanded to create a large system. In other words, today's investment will continue to be safe tomorrow.

Key facts

The R&S® ACCESSNET®-T Campus IP delivers the following features:

■ Compact

Base station and controller in a standard 19" cabinet occupying only 18 height units (HU)

■ Economical

Entry-level solution for small and medium-sized TETRA networks

■ Flexibly expandable

Applications for implementing operational processes can be added

■ Easily scalable

Can be expanded up to a large TETRA network



ACCESSNET®-T

Campus IP

Benefits and key features

The solution for small and regional TETRA networks

- Full-fledged mobile radio system based on TETRA technology for local and small regional networks with a maximum of three base stations and 21 voice channels
- Compact system: exchange, base station and gateways in one rack
- Calls to and from the telephone network via an SIP-based telephony interface

▷ [page 4](#)

Safe investment: can be expanded up to a large TETRA network

- Cost-effective basic model as entry-level solution
- Scalable and upgradeable from one to three base stations
- Optimal scalability: the system can be adapted to the user's current need
- Expandable up to a large ACCESSNET®-T system: the customer's investment in the ACCESSNET®-T Campus IP remains safe

▷ [page 5](#)

Flexible: additional applications possible

- Reliable ACCESSNET®-T common application programming interface (A-CAPI®) integrated
- Dispatcher as well as voice and data recording functionality (voice/SDS recorder) are offered as standard applications
- The A-CAPI® provides links to applications from qualified third-party manufacturers
 - Personal security systems
 - Locating people and terminals via automatic vehicle location (AVL)
 - Remote monitoring and remote control via supervisory control and data acquisition (SCADA)
 - Automated meter reading (AMR) and smart metering technology
 - Operational data acquisition in vehicles

▷ [page 6](#)

Fully in step with the market: IP-based exchange and networking

- Networking of base stations via existing IP networks as cost-effective solution
- Linking of applications and network management software via existing IP connections
- Gateways to the public telephone network and to local telephone systems via the leading-edge SIP technology

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The right solution for every customer

- Small-scale industry and small to medium-sized businesses with one site/campus
- Medium-to-large industrial companies with more than one site in a region and with multisite communications needs
- Companies and authorities with special communications requirements in special missions
- Event sites such as soccer stadiums, concert halls and trade fair grounds where the system is permanently installed

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Easy installation, configuration and operation

- Easy configuration and startup of the ACCESSNET®-T Campus IP by specialized vendors at delivery
- TETRA system can be used without specific knowledge being required

The solution for small and regional TETRA networks

Full-fledged mobile radio system

The ACCESSNET®-T CAMPUS IP is a full-fledged mobile radio system based on TETRA technology for local and small regional networks with a maximum of three base station sites. It is a cost-effective solution for newcomers to TETRA digital radio.

Compact system: exchange, base station and gateways in one rack

The system's compact design enables the operator to save site costs in the operating area. All that is required is space for a 19" rack. The system's power consumption and heat dissipation are low. This holds down the operating costs for power and air conditioning.

Calls from and to the telephone network via an SIP-based telephony interface

The SIP-based gateway makes calls possible from TETRA terminals to the telephone network as well as from the telephone network to TETRA terminals (PABX/PSTN gateway).

Some TETRA benefits

- TETRA radio systems are interference-free and have a better speech quality than conventional, analog radio systems
- Data can be transmitted at the same time voice is transmitted. Two examples of text-based transmission are short data service (SDS) and status messages
- Easy IP integration by means of packet data transmission
Example: transmission of data from a PC interconnected with a TETRA terminal to a server, e.g. for database queries or for SCADA (see page 7)
- Only registered terminals can set up and listen in on calls
- Support of various call types and priorities: multi-address calls and single-address calls (duplex and semi-duplex); high-priority calls and emergency calls are possible; emergency calls have the highest priority in the system and can supersede other calls
- High frequency economy: Featuring four logical channels on one frequency, TETRA offers the best possible use of frequency – at the price of one license

Safe investment: can be expanded up to a large TETRA network

Cost-effective basic model as entry-level solution

The ACCESSNET®-T Campus IP is available as a favorably priced, expandable basic model, which is the ideal entry-level solution to TETRA-based digital professional mobile radio (PMR).

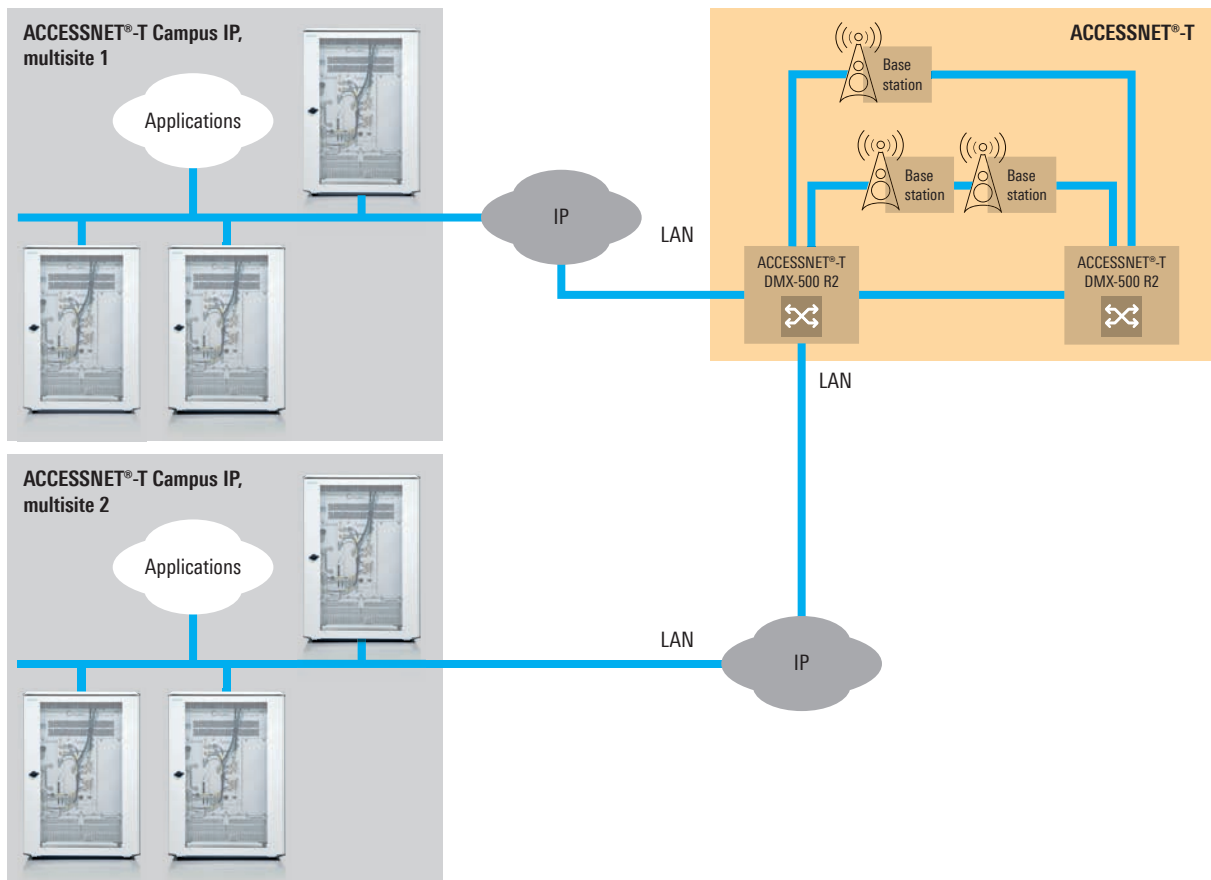
Scalable and upgradeable from one to three base stations

The ACCESSNET®-T Campus IP can be expanded from one up to three base stations with a total of 21 voice channels. The operator can therefore always optimally adapt the system to the current needs, e.g. to changing processes and operational environments.

Optimal scalability: the system can be adapted to the user's current needs

The ACCESSNET®-T Campus IP is part of the ACCESSNET®-T family of products from Rohde&Schwarz. If communications requirements grow, the individual ACCESSNET®-T Campus IP systems can seamlessly be integrated into a full-fledged ACCESSNET®-T system (for large regions or nationwide). The investment remains safe.

ACCESSNET®-T Campus IP – expansion up to a large TETRA network



Flexible: additional applications possible

ACCESSNET®-T common application programming interface (A-CAPI®) integrated

Like the other ACCESSNET®-T products, the ACCESSNET®-T Campus IP offers the ACCESSNET®-T common application programming interface (A-CAPI®). This means that all applications developed for ACCESSNET®-T are also available for the ACCESSNET®-T Campus IP.

Features of the A-CAPI® ACCESSNET®-T common application programming interface

- Easy, comprehensive access to data and services of the ACCESSNET®-T Campus IP
- Independent from the operating system of the application
- Based on standard interfaces and protocols

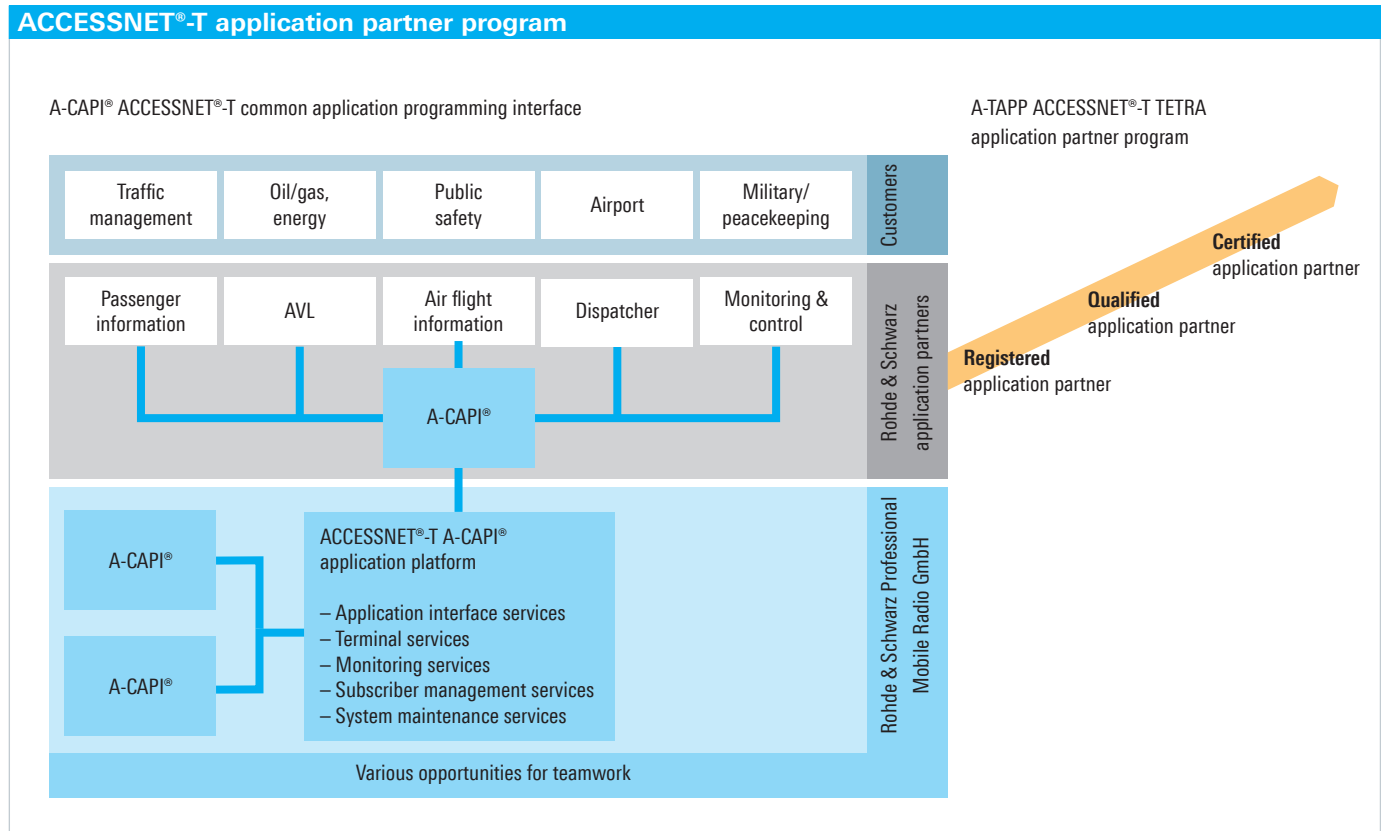
- Can be operated from a remote location via the customary transmission paths, e.g. LAN/WAN
- Supports multiple applications running simultaneously
- Comprehensive mechanisms for monitoring the connection between the application and the TETRA system as well as for checking for any unauthorized accesses
- Hides system-internal and TETRA-specific features so that applications can be created free of unnecessary content and therefore cost-effectively
- Ensures reliable separation between the TETRA system and the application with clear assignment of responsibilities for functionality, stability and maintenance

Partner program

Rohde&Schwarz offers a partner program for its TETRA systems in addition to A-CAPI®. So far, more than 20 independent companies have already signed onto the Rohde&Schwarz application partner program, and they have developed a large number of customer-specific applications for the ACCESSNET®-T.

Standard applications

With regard to standard applications, Rohde&Schwarz offers dispatcher and voice/data recording functionality (SDS/voice recorder).



The A-CAPI® provides links to applications from qualified third-party manufacturers

The ACCESSNET®-T Campus IP also enables users to link to applications from third-party manufacturers. The system can therefore be optimally adapted to customer requirements.

Personal security systems

For personnel in security-critical areas, i.e. in law enforcement, in forensic institutions, in power plants and industry, solutions for personal security are available that can be used together with the TETRA system of the ACCESSNET®-T Campus IP. If an accident occurs, an emergency call can be automatically triggered by means of sensors in the terminals or the subscriber can activate an alarm directly by means of an emergency button on the terminal. The A-CAPI® interface can be used to couple the TETRA system with radiolocation systems to enable rescue teams to find people in distress quickly and to provide them with first aid right away.

Locating people and terminals via automatic vehicle location (AVL)

AVL is an optional expansion of the ACCESSNET®-T Campus IP dispatcher system. The AVL expansion allows users to display current position data of terminals on a map. Terminals determine their position at adjustable intervals by means of GPS and then send this data to the dispatcher by means of SDS. This data is displayed on a map at the dispatcher workstation. Users can therefore display not only the current position of individual terminals but also movement profiles in order to optimize work procedures and processes.

The AVL system can be implemented either as a dispatch and operations control center for controlling and managing vehicle fleets or as an alarm center for monitoring, alarms and control functions.

Remote monitoring and remote control via supervisory control and data acquisition (SCADA)

SCADA is a concept for monitoring and controlling any kind of technical processes, and customarily for controlling and monitoring facilities physically located far from the control center (remote monitoring and remote control). Data acquisition usually starts with a local control system and contains the mechanism for coupling with measuring equipment and status information (for example, switch settings). The data is then forwarded to the parent instance of the SCADA system, where it is presented in a user-friendly format.

To operate a SCADA system, data transmission between the individual components of the SCADA must be carried out transparently and without any corruption by the transmission system. The actual SCADA data is not changed by the ACCESSNET®-T Campus IP.

Automated meter reading (AMR) and smart metering technology

Many countries already have laws according to which the consumer must be permitted to monitor costs by asking the energy provider to report how much electricity and gas have been consumed as of the current day. By adding the ACCESSNET®-T Campus IP to its portfolio, Rohde&Schwarz is offering a cost-effective solution for small and regional energy providers. The ACCESSNET®-T Campus IP can be used as a transparent transmission platform for transmitting data collected by the smart meters to the main control center.

Operational data acquisition in vehicles

Comprehensive operating data can be recorded from vehicles, e.g. the filling level of gritting trucks. This data is forwarded to the control center via the ACCESSNET®-T Campus IP and then visualized there. The continuously updated information enables operators of vehicle fleets and dispatchers to optimally plan and control the deployment of their vehicles.

Fully in step with the market: IP-based exchange and networking

Networking of base stations via existing IP networks as cost-effective solution

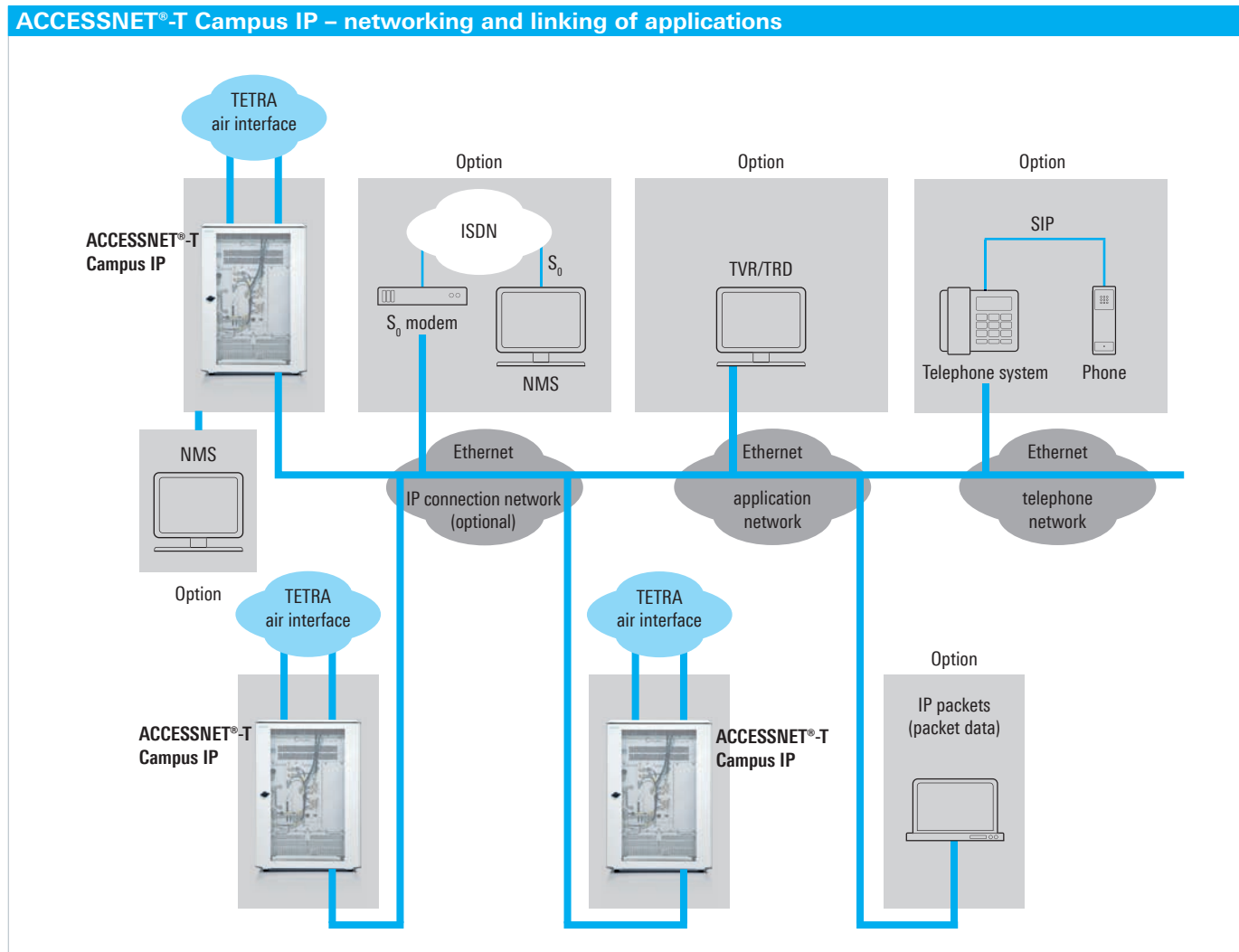
IP networking of base stations in a multicell ACCESSNET®-T Campus IP network makes it possible to use the existing IP infrastructure (for example, a LAN). This eliminates the cost-intensive networking of base stations via E1 lines.

Linking of applications and network management software via existing IP connections

All applications (for example, dispatcher, voice and data recording, network management and applications from third party manufacturers) are cost-effectively linked to the ACCESSNET®-T Campus IP via existing IP networks. As a result, the physical separation of infrastructure and workstations can be implemented easily and conveniently.

Gateways to the public telephone network and to local telephone systems via the leading-edge SIP technology

SIP is the packet-oriented protocol for state-of-the-art telephone systems. SIP telephone systems are already present in many companies, transmitting the voice information via IP networks. When the integrated SIP gateway is used, the ACCESSNET®-T Campus IP supports the connection of compliant telephone systems.



The right solution for every customer

Small-scale industry and small to medium-sized businesses with one site/campus

Customer requirements

- ▮ Individual, group and emergency calls
- ▮ VoIP gateway as telephony interface
- ▮ Subscriber installation and subscriber management of the entire system via a service laptop (performed by a specialized vendor)

Solution with the ACCESSNET®-T Campus IP

- ▮ ACCESSNET®-T Campus IP (single-site) with one base station and with one or two TETRA carriers
- ▮ Telephony interface to the PSTN/PABX network
- ▮ Remote maintenance modem

Medium-to-large industrial companies with more than one site in a region and multisite communications needs

Customer requirements

- ▮ Individual, group and emergency calls
- ▮ VoIP gateway as telephony interface
- ▮ Subscriber installation and subscriber management of the entire system via a service laptop (performed by a specialized vendor)
- ▮ Connected dispatcher workstation for controlling subscribers in the network; for example, the dispatcher performs call-forwarding and switching between subscribers, assigns jobs and monitors subscribers

Solution with the ACCESSNET®-T Campus IP

- ▮ ACCESSNET®-T Campus IP base stations (multisite) with up to four carriers for each base station and a maximum of six carriers in one system
- ▮ Telephony interface to the PSTN/PABX network
- ▮ Remote maintenance modem
- ▮ Dispatcher licenses (up to four possible)

Companies and authorities with special communications requirements in special missions

Customer requirements

- ▮ Applications such as personal security systems, voice recording
- ▮ Expanded dispatcher functions:
 - Monitoring of calls at a terminal without the subscriber noticing
- ▮ Location-finding via GPS: automatic vehicle location (AVL)
- ▮ Data transmission between TETRA terminals and over servers connected via IP, e.g. databases
- ▮ Voice recording

Solution with the ACCESSNET®-T Campus IP

- ▮ ACCESSNET®-T Campus IP base stations (multisite) with up to four carriers per base station and a maximum of six carriers in one system
- ▮ Telephony interface
- ▮ Remote maintenance modem
- ▮ Expanded dispatcher licenses (up to four possible) with additional functions such as monitoring (call monitoring)
- ▮ AVL expansion for the dispatcher for locating people/terminals
- ▮ A-CAPI® interface for linking to applications, e.g. personal security systems
- ▮ Packet data interface for IP data transmission between terminals and databases, for example
- ▮ Voice recording: software license in line with number of voice channels in the system

Event sites such as soccer stadiums, concert halls and trade fair grounds where the system is permanently installed

Customer requirements

- ▮ Large number of voice channels in limited space

Solution with the ACCESSNET®-T Campus IP

- ▮ ACCESSNET®-T Campus IP base station (single-site) with four TETRA carriers (15 voice channels and one main control channel)
- ▮ Subscriber installation and network management via local interface

Specifications in brief

General data		
Air interface specification		in line with EN300392-2 (TETRA V+D)
Air interface testing		in line with EN300394-1, V2.3.1
Frequency range		380 MHz to 470 MHz others on request
Frequency step		6.25 kHz
Carrier spacing, hybrid combiner		≥ 50 kHz
Duplex spacing	at ≤ 470 MHz	≥ 10 MHz (others on request)
Operating mode		duplex
Synchronization		GPS
Output power		
Transmitter output		nom. 47 dBm
TOC (TX/RX female antenna connector)	without transmitter coupling	nom. 44 dBm
With hybrid coupler	2 carriers	nom. 41 dBm
Static sensitivity, TOC	without diversity (TCH7.2, BER 4%)	better than -119 dBm
Dynamic sensitivity, TOC	without diversity	
	TU50 (TCH7.2, BER 4%)	better than -113 dBm
	in line with EN300392-2, class A	better than -108 dBm
	in line with EN300392-2, class B	better than -110 dBm
Receiver diversity		2x (with equipped diversity receive path)
Power consumption	with one carrier with 47 dBm transmit power	350 W
	with two carriers, each with a transmit power of 47 dBm	550 W
Power supply	AC	nom. 240 V
	DC	nom. 48 V, optional
Dimensions	W × H × D	600 mm × 910 mm × 600 mm (23.6 in × 35.8 in × 23.6 in)
Weight		approx. 90 kg (198.4 lb)

Ordering information

Excerpt

The following ordering information shows part of the available configurations and options of the ACCESSNET®-T Campus IP as an example.

Description	Order No.
ACCESSNET®-T Campus IP, basic model with following functions: <ul style="list-style-type: none">▪ High-power base station with one TETRA carrier (three voice channels, one main control channel)▪ TETRA speech and data services (SDS), including packet data transmission between terminals▪ Error management and signaling via configurable alarm contacts▪ 100 V to 240 V AC power supply	78.5500.7518.xx ¹⁾
Telephony Interface to PSTN/PABX Network	85.5500.7660.00
A-CAPI® Interface for max. 2 external applications	85.5500.7676.00
Packet Data Interface Software License (Network License)	85.5500.7682.00
ACD-300 Dispatcher Basic Software License	85.0015.6000.01
Voice Recording Software License, 3 Voice Channels	85.0015.6000.05
Network Management Basic Software License <ul style="list-style-type: none">▪ NMC-311 error management▪ NMC-312 subscriber management▪ Hardware dongle (USB token)	86.5500.7718.00
Software License, multisite 1, carrier for using an existing single-site base station in multisite systems	86.5500.7599.00

¹⁾ Depends on frequency range.



Service you can rely on

- | Worldwide
- | Local and personalized
- | Customized and flexible
- | Uncompromising quality
- | Long-term dependability

About Rohde & Schwarz

Rohde & Schwarz is an independent group of companies specializing in electronics. It is a leading supplier of solutions in the fields of test and measurement, broadcasting, radiomonitoring and radiolocation, as well as secure communications. Established 75 years ago, Rohde & Schwarz has a global presence and a dedicated service network in over 70 countries. Company headquarters are in Munich, Germany.

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Certified Quality System

ISO 9001

Certified Environmental System

ISO 14001

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Subject to change

*0.14 €/min within German wireline network; rates may vary in other networks (wireline and mobile) and countries.