

8140

TETRA AirAnalyzer

AEROFLEX
A passion for performance.



Ensuring Safe and Reliable Communication When You Need It Most

Mobile networks following the TETRA standard form a basis for successful operation in the police and emergency services, airports, railways and for many other professional users. These user groups demand reliable and safe network operation at best possible radio coverage.

These high requirements can be fulfilled with Aeroflex's 8140 TETRA AirAnalyzer, a unique and versatile tool to continuously analyze and maintain a TETRA network. It is also suited to examine issues during the introduction of new system technology and to perform interoperability tests in system development.

The TETRA AirAnalyzer is supported by a software package for the following tasks:

- Protocol analysis using message sequence charts (MSC) to display in detail the complex flow of communication in the signaling protocol between TETRA radio and base station
- Quality of service analyzer to chart issues within a radio cell over a given time period, including statistical evaluation
- Voice decoder monitoring and recording the ongoing voice communication in the network
- Measurement of channel and modulation parameters with the TETRA physical data analyzer
- GPS-assisted radio coverage measurements
- TETRA scanner to survey spectrum utilization
- Decoding of communication under static or dynamic air interface encryption

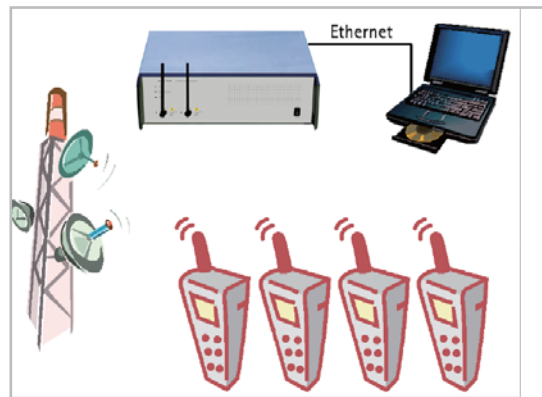


Figure 1: The analysis system comprises the 8140 TETRA AirAnalyzer connected to a PC

Fast Data Capture, Comprehensive Analysis

Two powerful and highly sensitive measurement receivers form the heart of the 8140 TETRA AirAnalyzer. These receivers pick up the bidirectional communication between TETRA mobile stations and a base station. All time slots in the downlink and uplink of a selectable channel are analyzed simultaneously.

The TETRA AirAnalyzer decodes the data received on the radio channel in real time and forwards them to a PC for further processing. Various PC applications can analyze the data under different aspects. The analysis can be performed either online or offline, using the data received and stored at a later date.

Packet data transmission can also be processed by the TETRA AirAnalyzer and are stored for further analysis with third-party applications like Wireshark® or other IP packet sniffers.

Suspect Faults in the Message Flow?

The Tetra MSC application visualizes the signaling messages received over the air interface in a clear and concise way. Thanks to the structured layout, users can easily identify which message is transmitted on what protocol layer. The messages are individually tagged with a time stamp and the relevant RF parameters, such as frame number, frequency offset and signal strength. Signaling messages not conforming to TETRA standard EN 300 392 are marked with a different color. With a click on the marked message, the application displays a detailed error description.

A number of filter functions eases fault tracing because the user can reduce the messages displayed to those which are of interest in the case at hand.

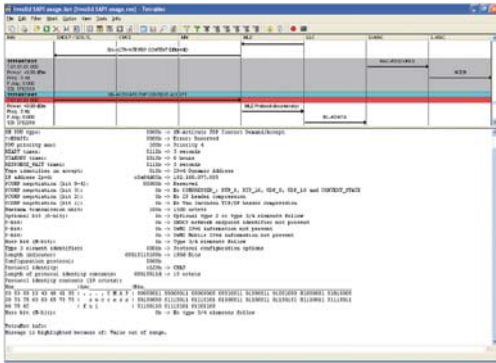


Figure 2: Invalid messages are clearly marked in the message sequence chart

Analyzing Voice Communication and Voice Quality

The 8140 TETRA AirAnalyzer and its associated PC software can output and store voice data received over the air interface, enabling users to evaluate the voice quality and to observe communications over the network. With the voice decoder function, users can monitor speech on two time slots and record it in Wave sound format for later analysis. The direction and time slot can be selected on a straight forward user interface.

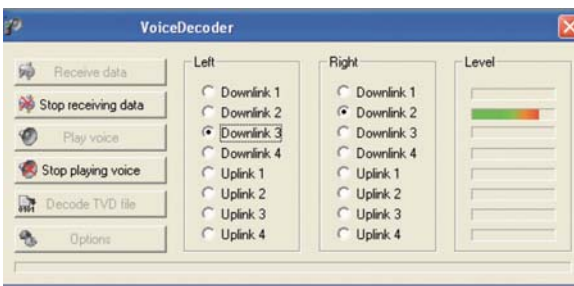


Figure 3: Voice playback and storage can be triggered once the direction and time slots have been selected

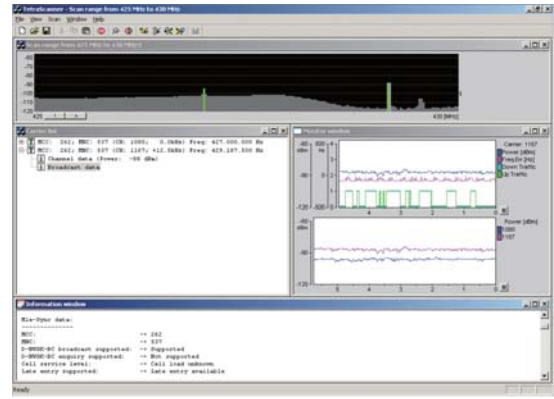


Figure 4: The Tetra Scanner application provides an overview on spectrum occupation, load and traffic

Finding TETRA Carrier Problems

The TETRA scanner searches for TETRA carriers in a user-defined frequency range. In addition to the available TETRA channels, the broadcast parameters are displayed for each carrier with a main control channel. This feature helps to easily identify network configuration problems. The channels available can be monitored because the usage of time slots for traffic (TCH) is displayed and permanently updated. Associated measurement values, such as received signal strength or frequency error, are shown in a diagram. This tool offers an easy way to check the results of network planning in real life, so that the network can be optimized if necessary. The current network status in regard to quality and quantity can be evaluated, so the tool can be used to find the best possible utilization of resources. With a GPS mouse connected to the computer, the 8140 TETRA AirAnalyzer can even be turned into a full featured drive test receiver with real-time storage of the current position.

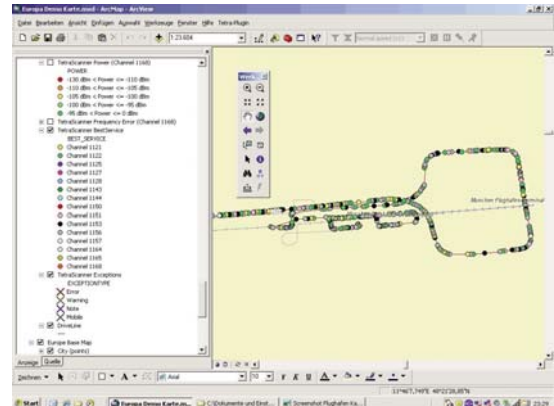


Figure 5: With the 8166 Coverage Test Option and ESRI ArcGIS the 8140 becomes a powerful drive test receiver

Extending the Range of Possibilities With Options

8165 TETRA QoS Analyzer

The optional 8165 TETRA QoS Analyzer application provides an easy way to evaluate the quality of service; the results of the QoS parameters are displayed graphically for easier interpretation. In the TETRA AirAnalyzer, quality of service means more than just radio coverage: To ensure that the TETRA network for safety-critical operations can perform the required service, more data are of importance. Call setup time, number of queued calls and associated wait time, call priorities and cell load are important parameters to describe the network quality. Emergency services have high demands on these parameters for safely performing their tasks.

In order to ease the evaluation of the quality of service in a fast and comfortable way, the results are displayed easily readable, either in graphical or tabular format.

8160 Static Air Interface Encryption Option, 8161 Static/Dynamic Air Interface Encryption Option

In organizations ensuring public safety and security, voice calls and data transmission over the TETRA network are confidential by nature and therefore protected by air interface encryption. In these types of networks, the functionality of the 8140 TETRA AirAnalyzer is ensured by the 8161 static/dynamic air interface encryption option. The encryption algorithm (TEA 1 through 4) and the encryption keys must be provided by the user.

8162 DMO Option

One of the strengths of the TETRA standard is the possibility to communicate between two radios in Direct Mode Option (DMO), without the need to be attached to a radio network. With the 8162 DMO option, the TETRA AirAnalyzer also analyzes DMO and DMO gateway signaling messages.

8164 TETRA AirAnalyzer Office Software

The application software for the TETRA AirAnalyzer is protected with a USB dongle. In order to be able to use the applications on a second PC for offline analysis of captured data, the 8164 TETRA AirAnalyzer office software can be used with exactly the same functionality and options as the first license. The additional software license comes on a separate USB dongle.

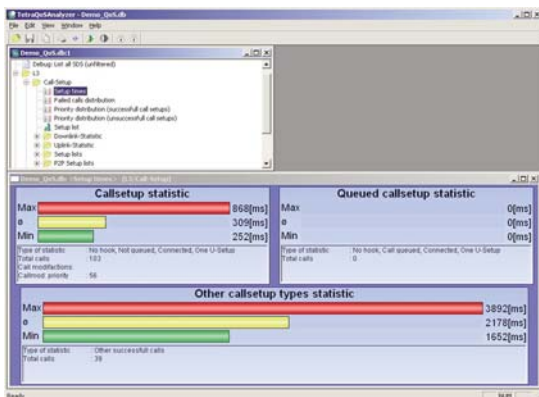


Figure 6: Network performance under real-life conditions can be evaluated with the 8165 TETRA QoS Analyzer.

SPECIFICATIONS

The published accuracies are determined in accordance with GUM (Guide to the Expression of Uncertainty in Measurement) and EA (European Co-operation for Accreditation) application document EA4/02: "Expressions of the Uncertainty of Measurements in Calibration".

RECEIVER

Frequency Range

400 MHz version: 360 to 473 MHz

800 MHz version: 804 to 931 MHz

Connection

Two N-type sockets

Input Impedance

50 Ω

Input VSWR

<1.5 (typ.)

Reference Frequency Uncertainty

<10⁻⁷

Max. Input Power

0 dBm

Typical Sensitivity

<-106 dBm dynamic

<-115 dBm static

GENERAL DATA

Casing

19" rack-mount model, 3 HU

Temperature Range

0°C to +50°C

Voltage Supply

Wide AC input range with power factor correction

95 V to 250 V

Power Consumption

<60 W

Weight

<15 kg (33 lbs.)

Data Connection

100 Base-T Ethernet, RJ-45

ORDERING INFORMATION

8140 TETRA AirAnalyzer 800 MHz	M 860539
8140 TETRA AirAnalyzer 400+800 MHz	M 860538
8140 TETRA AirAnalyzer 400 MHz	M 860 546
8160 Static Air Interface Encryption	M 860 544
8161 Static/Dynamic Air Interface Encryption	M 860 561
8162 DMO Option	M 860 545
8164 AirAnalyzer Office Software	M 860 547
8165 TETRA QoS Analyzer	M 860 562
8166 Coverage Test Software Option	M 860567
ESRI ArcGIS Software	M 860568
8171 DC Power Supply (12 – 18 V)	M 860 541
8172 DC Power Supply (18 – 36 V)	M 860 542
8173 DC Power Supply (36 – 72 V)	M 860 543

CHINA Beijing

Tel: [+86] (10) 6539 1166
Fax: [+86] (10) 6539 1778

CHINA Shanghai

Tel: [+86] (21) 5109 5128
Fax: [+86] (21) 5150 6112

CHINA Shenzhen

Tel: [+86] (755) 3301 9358
Tel: [+86] (755) 3301 9356

FINLAND

Tel: [+358] (9) 2709 5541
Fax: [+358] (9) 804 2441

FRANCE

Tel: [+33] 1 60 79 96 00
Fax: [+33] 1 60 77 69 22

GERMANY

Tel: [+49] 8131 2926-0
Fax: [+49] 8131 2926-130

HONG KONG

Tel: [+852] 2832 7988
Fax: [+852] 2834 5364

INDIA

Tel: [+91] 80 [4] 115 4501
Fax: [+91] 80 [4] 115 4502

KOREA

Tel: [+82] (2) 3424 2719
Fax: [+82] (2) 3424 8620

SCANDINAVIA

Tel: [+45] 9614 0045
Fax: [+45] 9614 0047

UK Stevenage

Tel: [+44] (0) 1438 742200
Fax: [+44] (0) 1438 727601
Freephone: 0800 282388

USA

Tel: [+1] (316) 522 4981
Fax: [+1] (316) 522 1360
Toll Free: 800 835 2352

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www.aeroflex.com
info-test@eroflex.com



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