

# Taking the stress from TETRA test

Although test and measurement equipment vendors have in recent years poured much of their resources into developing instruments for cellular communications and wireless networking, an arguably greater technical challenge is posed by the test requirements of professional mobile radio (PMR). In cellular communications, the volumes allow sample testing to be performed on some of the parameters to reduce the cost of test, but this is not an option for a system that is to be used by the emergency services where life or death may depend on it operating to specification. Through-life support costs of the equipment are also important for systems that are generally publicly funded.

Aeroflex has affirmed its commitment to the PMR sector with the launch this month of the IFR 3900 Series, its next generation portable digital radio test set platform. The instrument is being released initially with capability for the European TETRA standard, which is currently predicted to be the fastest-growing of the four digital PMR standards and also has particularly stringent test requirements that require a state-of-the-art tester. The other digital trunked radio standards are Tetrapol, APCO25 and EDACS, and future models in the series are anticipated to address some or all of these standards.

## Flexibility

The IFR 3900 Series is designed using a digital architecture that has the ability both to support the defined specifications in existing standards and to be ready for future requirements, since TETRA in particular is still evolving in terms of data rates and overall performance. This flexibility is provided by the use of software-defined options or "PMR personalities" that provide the



**The Aeroflex IFR 3901 is a TETRA test set, the first model based on the new 3900 series digital PMR platform**

measurement and signalling capabilities for specific complex digital modulation and protocols as well as a range of general-purpose measurement facilities.

The initial model in the series has a TETRA personality: the Aeroflex IFR 3901 provides support for mobile terminal and base station testing, and includes all the test capabilities required by manufacturers, system operators and support organisations. The software and hardware architecture will allow the TETRA personality to evolve alongside the TETRA standard.

The IFR 3901 is the successor to Aeroflex's existing IFR 2968 TETRA Radio Test Set, and provides several advantages compared with the earlier instrument, which nevertheless remains available. The test set has been made easier to use by the implementation of

base station emulation and test mode operation as separate systems, along with the replacement of the deeply nested test menus with a graphical windows-like user interface. Better measurement accuracy and measurement dynamic range allow for a higher manufacturing test yield, and the instrument provides up to 9 times improvement in the speed of TETRA measurements compared with the IFR 2968. The new test set is 20% lighter at 15.9kg than its predecessor, improving its portability for field applications and offering a significantly smaller footprint to reduce required bench space

## Control

Usability has been improved with graphical navigation and control via front panel keys, or alternatively using a mouse and keyboard. The use of a colour, sunlight-readable display enhances the visual differentiation and interpretation of settings, results, limits and status. The display can be customised to

show the measurements of interest in configurable graphical tiles that can be viewed either individually in detail or collectively showing key information.

The Aeroflex IFR 3900 digital radio test platform incorporates a RF receiver, signal generator, DSP subsystems and integrated instrument applications software. Direct input of signal power up to 125W is supported, providing compatibility with almost all practical mobile and infrastructure test requirements. A low power input is also provided for more sensitive measurements such as off-air analysis. Transmitter tests to ETSI EN 300 394-1 are supported, including burst power, power profile, modulation accuracy, residual carrier, frequency error and timing error. Power profile testing incorporates a full 70dB burst dynamic

range and pass/fail assessed against a TETRA or user-defined mask, and can be averaged over up to 250 bursts. Modulation accuracy can be examined using manual inspection of phase and amplitude on phase trajectory and constellation diagrams, and also quantified by a numerical error vector measurement (EVM). In receiver testing the 3901 uses TT loopback for automatic BER, RBER and MER tests. T1 loopback BER measurement is

supported for manual testing of radios in special test modes.

Extensive I/O and storage facilities are supplied as standard, including GPIB, USB, RS232, and IP-addressable Ethernet connections. The Ethernet connection allows remote firmware upgrade and instrument option enable, as well as remote login for technical support. Triggering and synchronisation interfaces are provided for measurement along with configurable single and dual-

port duplex RF input/output configuration and analogue/modulation input/output. Printers and other peripherals can readily be connected, and the platform incorporates an integral 20GB hard disk.

### Company Information

**Aeroflex**

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