TETRA ASSOCIATION

The TETRA Association
14 Blandford Square
Newcastle upon Tyne
NE1 4HZ
United Kingdom
Tel: +44 191 231 4328
Fax: +44 191 245 3802

TETRA Interoperability and Certification explained

Issued by the TETRA Association
August 2011

The TETRA Association
Registered Office
Richmond House, Broad Street
Ely, Cambridgeshire, CB7 4AH, UK
Registration No.4155039 in UK
VAT Registration Number GB 755 4236 24

Introduction

This paper explains the background to the development of the TETRA Interoperability process, its benefits to users and manufacturers, makes some recommendations for users and potential users of TETRA systems and finally includes a set of frequently asked questions.

This paper is broken down into the following sections:

1. Why the Interoperability (IOP) process was developed
2. The role of the European Telecommunications Standards Institute (ETSI) in TETRA
3. A brief introduction to the TETRA standard
4. A short description of the TETRA Association
5. TETRA Interoperability Certification process
6. TETRA IOP Certificates
7. Frequently asked Questions and Answers

1. INTEROPERABILITY DEVELOPED FOR GOOD REASONS

The TETRA Association developed the Interoperability Certification process in order to ensure users and equipment suppliers would benefit from a truly open multi-vendor market for TETRA systems and equipment.

A healthy, competitive, open, multi-vendor market brings proven benefits to users such as choice of equipment, choice of supplier, continuous development of new products with increased functionality and improved price performance. For manufacturers, it provides a growing market, eliminates different and incompatible implementations of the TETRA standard and the Interoperability Certification process provides a formal test forum that enables competing manufacturers to test that their products are compatible.

Users can be confident that products awarded an IOP certificate have been rigorously tested and the functions listed in the certificate fully meet the TETRA standard. This allows users who select equipment from a number of suppliers to reduce the amount of system integration and testing that they need to undertake.

2. ETSI - EUROPEAN TELECOMMUNICATIONS STANDARDS INSTITUTE

The European Telecommunications Standards Institute (ETSI) is an independent, non-profit making organisation, whose mission is to produce telecommunications standards for today and for the future.

Based in Sophia Antipolis (France), ETSI is officially responsible for the standardisation of Information and Communication Technologies (ICT) within Europe.

ETSI's standards are created by consensus amongst its members.

ETSI has, amongst many other standards, created the TETRA standard.

Further information about ETSI can be found at its web site: www.etsi.org.

3. TETRA – TERRESTRIAL TRUNKED RADIO

TETRA is the modern digital Private Mobile Radio (PMR) and Public Access Mobile Radio (PAMR) technology designed for police, ambulance and fire services, security services, utilities, military, fleet management, transport services, closed user groups, factory site services, mining and many other organisations that have a need for secure private radio communications.

TETRA supports point-to-point and point-to-multipoint communications over a TETRA infrastructure and, by the use of Direct Mode, without a TETRA infrastructure.

TETRA provides many advantages over other digital and analogue systems. More details can be found at:

www.etsi.org/tetra and at www.tetra-association.com

4. THE TETRA ASSOCIATION – AN ETSI PARTNER ORGANISATION

The TETRA Association, also known as the TETRA MoU (Memorandum of Understanding) Association, was established in December 1994 to create a forum which would act on behalf of all parties wanting to encourage the development and use of TETRA systems. This included user organisations, manufacturers, application providers, integrators, operators, test houses and telecom agencies.

Today, August 2011, the TETRA Association represents over 160 organisations from all continents of the world.

TETRA is now widely established with more than 2000 contracts placed for TETRA equipment. These contracts are for equipment that is in use in over 120 countries.

Interoperability Certificates have been issued by the TETRA Association to ten manufacturers and a growing number of manufacturers have equipment under development and are preparing to enter the certification process. As a measure of the success that the TETRA Association has had with this process, it is estimated that well over half of the operational TETRA network fleets use terminals from more than one manufacturer.

A goal of the TETRA Association is to provide a forum for all parties interested in TETRA that will enable them to encourage the adoption of the standard and support initiatives to obtain appropriate levels of spectrum such that growth in operational TETRA systems is not restricted by regulation.

Further information can be found at: www.tetra-association.com

5. TETRA Interoperability Certification Process

The official TETRA interoperability testing and certification process is managed by the Technical Forum (TF) of the TETRA Association. The TF's targets and priorities are set each year in agreement with the Operators & Users Association (OUA) which is another sub-group of the TETRA Association.

For each TETRA feature that is to be certified, a TETRA Interoperability Profile (TIP) specification is created in the working groups established under the TF. The draft TIP specification is subjected to open Members' Enquiry (ME) to give all the members of the TETRA Association an equal opportunity to comment before the TIP is approved by the TF. Each TIP is based on ETSI TETRA standards. As they constitute an agreed interpretation of the ETSI TETRA standards they may reduce the number of available implementation options of TETRA functionality when compared to the ETSI standard. This is to ensure that all manufacturers interpret the TETRA standards in a consistent fashion and that TETRA equipment from different manufacturers is interoperable.

The interfaces covered, or planned to be covered, by TIP specifications and certification are the Trunked Mode (TMO) air interface between the infrastructure and a radio terminal, the Direct Mode (DMO) air interface between two radio terminals, the Inter-System Interface (ISI) between two infrastructures and the Peripheral Equipment Interface (PEI) between a radio terminal and a data terminal. Currently, TIP specifications have been produced for the TMO and DMO air interfaces, PEI and ISI whilst IOP certificates have only been issued for the TMO and DMO air interfaces.

In addition to a TIP, a detailed Interoperability Test Plan document is produced for each feature using the same procedure. The Test Plan contains a detailed list of test cases to be run on the products to be tested. The Test Plan is a detailed document that ensures that the tests are repeatable and identical in all test sessions. After the TIP and Test Plan have been approved, test sessions can be conducted for that feature between manufacturers.

The TETRA Association has contracted ISCOM (Istituto Superiore delle Comunicazioni e tecnologie dell'Informazione), a laboratory of the Italian Ministry of Communications to act as an independent certification authority for TETRA. ISCOM is responsible for scheduling and supervising IOP test sessions and for issuing IOP certificates.

After each test session, ISCOM analyses the test results and will then issue a detailed official Interoperability Certificate which will list each feature and function that has successfully passed its test.

The IOP certification testing is carried out in a multi-vendor environment and tests the interaction between products from different manufacturers.

Currently all certification testing focuses on functionality on the OSI model layer three and is therefore frequency band independent. The physical layer functionality is not evaluated in interoperability testing.

Test sessions and the whole certification process are funded by the participating manufacturers.

6. TETRA IOP CERTIFICATES

The results presented in the TETRA Interoperability Certificates are derived from evaluating the signalling information over the air interface between live TETRA terminals and live TETRA infrastructures (in the case of TMO air interface certification). This detailed analysis of the signalling across the interface ensures compliance with the TIP specification and also compliance with the standard. Hence the IOP certification also serves as standards compliance testing even though the main target is to ensure interoperability between manufacturers' products.

Certificates are hardware platform specific and software release specific. This means that all new releases of a protocol stack will require products using this stack to be retested and before an Interoperability Certificate can be issued.

To reduce unnecessary re-testing, a manufacturer may officially declare that a certain protocol stack (software version) is used in several products by issuing a "Statement of Commonality". This declaration means that all products using this stack will exhibit the same protocol behaviour. This is verified through a process known as "spot check testing" which is faster to complete. The specific tests performed under "spot check testing" are decided by ISCOM who ensure that sufficient testing is undertaken to provide a level of confidence that the products listed in the "Statement of Commonality" do behave identically. Each specific terminal will still require its own specific Interoperability Certificate.

7. FREQUENTLY ASKED QUESTIONS AND ANSWERS

a. Does that mean that a user organisation can only purchase equipment with IOP Certificates?

    a. No. This is a voluntary process, and an organisation is free to purchase a solution from one or more vendors. However the user organisation will have greater confidence in purchasing equipment that has undergone Interoperability testing. It is therefore recommended by the TETRA Association that user organisations always require formal IOP Certificates from their vendors.

b. Does the Certificate guarantee compliance to TETRA standards?

    a. The IOP Certificate only certifies that the two tested products are compatible as detailed in the Certificate text. IOP Certificates are produced as a result of detailed analysis of the signalling log files which verifies that the signalling is in compliance with the TIP specification(s). As the TIP specifications are refinements to the standard and often reduce the options available within the standard, the Certificates also serve as evidence of compliance to relevant part(s) of the TETRA standards.

c. How often are Certificates issued?

    a. Manufacturers are encouraged to perform Interoperability Certification testing at major software releases, and when new features are being introduced. Time for a test session is reserved with the Certification Authority (ISCOM), who will invite other interested manufacturers and witness the tests. The goal is that Certificates are then published within 2 months after the test session is completed.

d. Where can a user organisation get visibility of planned test session and available Certificates?

    a. Certificates are posted on the TETRA Association website, www.tetra-association.com -> Interoperability -> Certificates.
    A schedule of planned test sessions can be found in the same area of the web site.

e. Does the interoperability certification restrict competition?

    a. No. On the contrary, the purpose of the interoperability certification process is to encourage competition. It creates a market of multiple and mutually compatible products. It enables customers to have the ability to select the most appropriate products for their needs and be confident that these products are compatible with each other. The process is not intended to be used as means to artificially restrict competition.

f. When customers want to purchase certified products, how can they find out what features and products have already been certified?

    a. All Interoperability Certificates are public domain documents and available on the Association website at:

       www.tetra-association.com -> Interoperability -> Certificates.

    b. Customers preparing tenders are encouraged to check which features are covered by existing certificates before specifying their requirements in order to ensure that certified products are available with the features that they require. Customers will find that for some features there are certificates available for most manufacturers' products, whereas for some new features the certification process is still underway and testing and certificates are in the process of being produced manufacturer by manufacturer.

g. In case that there are none or only a few certificates issued for a specific feature, how can a customer evaluate which certificates may be issued in near future?

    a. The Association's website, www.tetra-association.com -> Interoperability -> Certificates, has a publicly available list of recently conducted test sessions and the participating manufacturers. As the evaluation process will still be ongoing it does not guarantee which manufacturer or product will achieve a certificate for which feature. But it can be used as an aid to evaluate the possible availability of new certificates during a tendering process. The Association's website also contains a public list of future test sessions. This enables a user organisation to forecast the possible availability of new certificates during the next 6 to 9 months.

h. How should certificates be specified in a tendering process when the availability of issued certificates for a wanted feature is limited?

    a. The intention of the IOP process is to increase competition, not to restrict it. Customers are encouraged to adjust their requirements for IOP certificates in the tendering process so that healthy competition is maintained whilst still requiring the evidence of interoperability (an IOP certificate) from manufacturers as early as possible. This may require in some cases setting the final delivery date for certificates in different milestones of the process: prequalification, tender submission, contract signature, product acceptance etc.

i. Is one single terminal Certificate valid for all TETRA Infrastructures?

    a. No. A Certificate is only valid for the terminal and infrastructure which were used during the test. The hardware and software release of both terminal and infrastructure are detailed in the Certificate.

j. Does a Certificate guarantee full compatibility?
    a. A Certificate applies to the interface between two specified products and for the specified functions only. A user organisation should ensure that its functionality requirements are covered by the Certificates. Functionality requirements that do not relate to signalling interfaces such as the user interface and language are not covered by the IOP process and if required need to be verified by other methods.

k. Does an IOP Certificate mean that the product is type approved?
    a. No, all products needs to be type approved according to local regulation as appropriate.

l. How can my company participate in the IOP process?
    a. Your organisation needs to be a member of the TETRA Association. Membership details can be found at the Association's website: www.tetra-association.com. If you are a member then contact the Chairman of the Technical Forum via email at TFchairman@tetra-association.com.

m. More information?
    a. For further details or to have any other questions answered please contact the Chairman of the TF via email at TFchairman@tetra-association.com.