



DMR Interoperability Process

DMR Association

Introduction

This white paper gives the background to the development of the DMR Interoperability Process by the DMR Association, explains the value of the process to users and manufacturers and will help users and potential users of DMR systems get value from the Association's work to establish formal interoperability testing

This paper includes the following sections:

1. Background to the development of the DMR Interoperability (IOP) Process
2. The role of the European Telecommunications Standards Institute (ETSI)
3. Brief introduction to the DMR standard
4. Short description of the DMR Association
5. The DMR Interoperability Process
6. DMR Interoperability (IOP) Certificates
7. Limitations of the process
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1. Background to the development of the DMR Interoperability Process

The Digital Mobile Radio (DMR) Association developed the DMR Interoperability (IOP) Process in order to ensure users and equipment suppliers would benefit from a truly open multi-vendor market for DMR 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 and eliminates different and incompatible implementations of the DMR standard. The Interoperability process provides a formal and consistent test mechanism that enables competing manufacturers to test that their products are compatible.

One of the purposes of the DMR IOP 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 to be confident that these products are compatible with each other.

Users can be sure that products awarded a DMR Interoperability (IOP) Certificate have been rigorously tested and the functions listed in the certificate are interoperable. 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 and gives them confidence that should they incorporate a second supplier in future that existing equipment will not become obsolete.

2. ETSI – European Telecommunications Standards Institute

The European Telecommunications Standards Institute (ETSI) is an independent, non-profit organisation, whose mission is to produce telecommunications standards for today and for the future. ETSI has, amongst many other radio standards, created the DMR standard.

Based in Sophia Antipolis (France), ETSI is officially responsible for the standardisation of Information and Communication Technologies (ICT) within Europe. In practice, many ETSI standards have been taken up globally. ETSI's standards are created by consensus amongst its members.

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

3. DMR – Digital Mobile Radio

DMR is a digital Public Access Mobile Radio (PAMR) and Private Mobile Radio (PMR) technology designed for users that wish to replace existing analogue systems with a “plug and play” digital upgrade that uses existing frequency licences and provides a similar feature set combined with the benefits of new digital technology such as improved range, higher call quality and seamless integration with data services.

DMR supports point-to-point and point-to-multipoint communications over a conventional repeater based (Tier II) or trunked infrastructure (Tier III) and, by the use of Direct Mode, radio to radio communication without infrastructure.

DMR provides for voice, data and other supplementary services. Today, products designed to its specifications are sold in all regions of the world.

The DMR standard consists of four documents. These can be downloaded free of charge from the ETSI website.

More details can be found at: <http://www.dmrassociation.org/what-is-dmr.htm>

4. The DMR Association

The DMR Association is focused on building on the success of the DMR standard through a combination of interoperability testing, certification, education and awareness. The Association also seeks to ensure that buyers of DMR technology gain value through the competition and choice derived from products built to an open multi-vendor standard.

The DMR Association includes members representing a broad cross-section of the industry, including many of the world's leading device and network suppliers. The DMR Association is open to manufacturers, end users, regulators, standards organisations, test houses and others with an interest in promoting and driving DMR innovation and adoption worldwide.

A list of members of the DMR Association is available at:
<http://www.dmrassociation.org/Members-of-the-DMR-Association.htm>

5. DMR Interoperability Process

The DMR Interoperability Process is managed by the Technical Working Group (TWG) of the DMR Association.

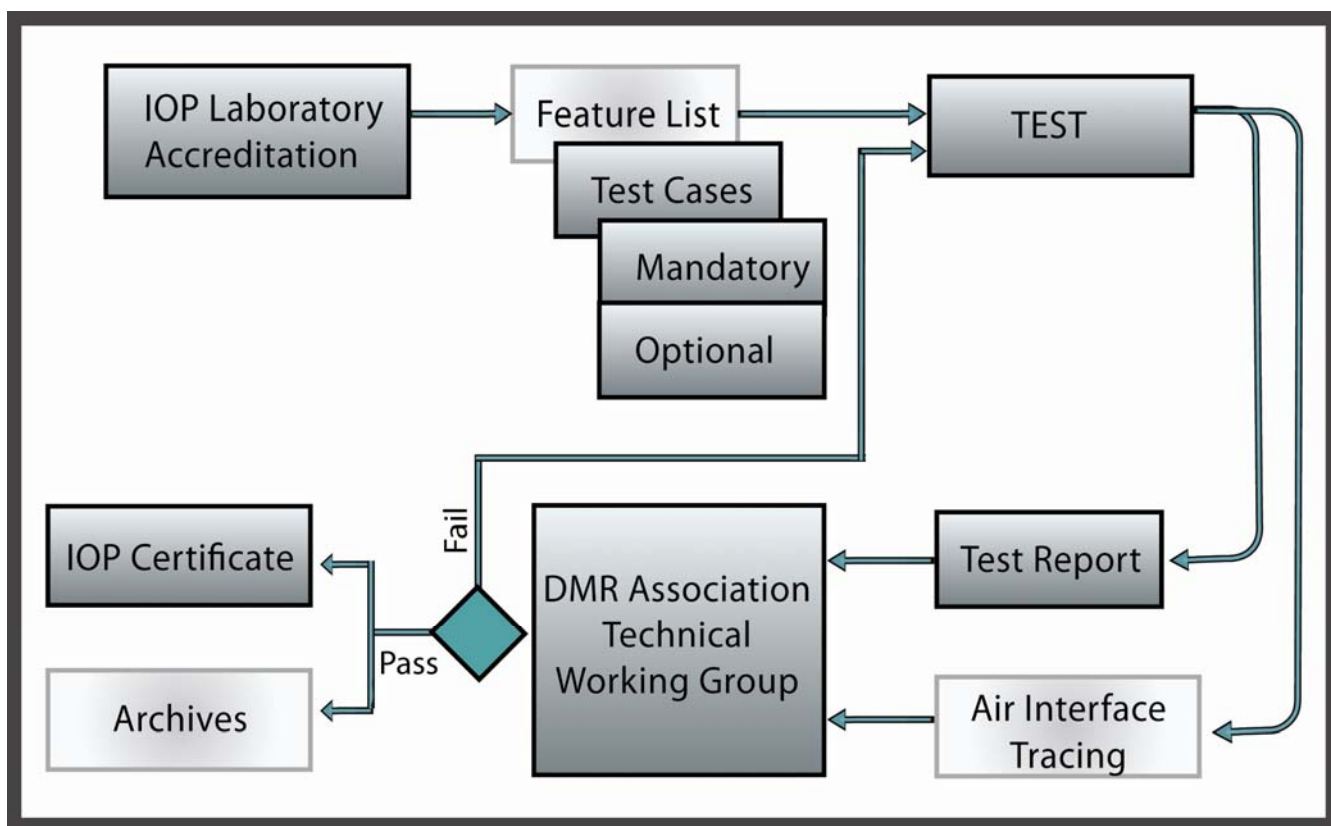
The DMR Association TWG has established lists of mandatory and optional interoperability features for conventional (Tier II) and trunked (Tier III) DMR based on the published DMR standard. In order to be certified as interoperable with a second manufacturer for a particular tier, a DMR equipment manufacturer must be interoperable with that manufacturer for the mandatory features. In addition the two manufacturers can opt to seek interoperability certification for some or all optional features by testing the equipment against each other for those features using the defined test process.

The DMR Association TWG has documented laboratory quality standards and procedures that need to be adhered to by any laboratory wishing to run a test session. Before setting up a test session manufacturers must declare that their laboratory meets the quality criteria set out by the TWG.

For both mandatory and optional features, the DMR Association TWG has specified test procedures which determine how each test is to be run to demonstrate interoperability. In addition there are detailed test report forms that need to be completed. At the time tests are run the test process requires that air interface messages are captured and stored. At the time of testing there is a visual inspection of the air interface logs to ensure that there is nothing in them which contradicts the results of the tests. If both manufacturers involved in a test agree that interoperability has been demonstrated by the testing, the test reports and log files are sent to the DMR Association Technical Working Group. Results are then presented to a meeting of the full Technical Working Group for confirmation.

This process is summarised in diagram 1 below.

Diagram 1: DMR Interoperability Process



Through this process users can be assured

- that both vendors agree interoperability;
- there is detailed documented evidence of this at both the functional level and from the air interface record;
- the tests have been set up so that they can be reproduced if required and will be identical between test sessions
- that the tests have taken place in a laboratory that has been set up to industry accepted quality standards
- the test results have been peer reviewed by technically skilled representatives of manufacturers in the industry.

Testing may be carried out in a multi-vendor or bilateral vendor environment and tests the interaction between products from two or more different manufacturers. Test sessions and the whole certification process are funded by the participating manufacturers.

6. DMR Interoperability Certificates

The results presented in the DMR Interoperability Certificates are derived from evaluating the results of functional testing and from signalling information from the over the air interface logs between live equipment. This analysis ensures interoperability between manufacturers' products is subject to a high level of checking.

Certificates are hardware platform specific and software release specific. However, products not directly used in a test session but which belong to the same model class, (meaning equipment that manufacturers have determined, through engineering analysis or internal functional testing, to be functionally equivalent to the products tested) may be declared interoperable by manufacturers.

DMR Interoperability Certificates and summary test reports are published on the DMR Association web site. The goal is that certificates are published within 2 months after a test session is completed. The certificates detail which features have been tested, whether interoperability has been achieved and any other relevant details.

7. Limitations of the process

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

The interoperability process is voluntary, and an organisation is free to purchase a solution from one or more manufacturers which may or may not have been tested for interoperability. However the user organisation will have greater confidence in purchasing equipment that has undergone interoperability testing.

The certificate only certifies that the two tested products are compatible as detailed in the certificate text. DMR IOP Certificates are produced as a result of functional testing and analysis of the signalling log files which verifies that the signalling is as expected from the results of the functional testing.

A DMR IOP 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 DMR IOP Process and if required need to be verified by other methods.

A DMR IOP Certificate does not mean that a product is type approved. All products need to be type approved according to local regulation as appropriate.

8. Additional information

For further details or to have any other questions answered please contact the DMR Association via the following website link.

<http://www.dmrassociation.org/contact-dmr-association.htm>

About the DMR Association

The DMR Association is focused on making DMR the most widely supported 21st Century digital radio standard for the business world. Through a combination of interoperability testing, certification, education, and awareness, the Association seeks to ensure that business buyers of today's digital radio technology gain ongoing value through the competition and choice derived from an open, multi-vendor value chain.



www.dmrassociation.org