July 2014

What are standards and why are they important?

Produced by the TETRA and Critical Communications Association
Critical Communications Broadband Group

v 1.0 – Issued 2nd July, 2014

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Index

Introduction

There have been many examples throughout society where technology suppliers have developed their own proprietary hardware or software rather than following open standards or waiting for standards to be defined by industry. Today many governments around the world are in favour of new technology programmes that follow and adopt requisite well defined standards.

This paper discusses the importance of 'standards', their importance in the technology market place and the benefits to user organisations.

What is a standard?

Standards exist to support all aspects of conformity assessment and to facilitate the implementation of integrated solutions, including compatibility or connectivity with other products, services and systems.

In its simplest term and as defined by the European Telecommunications Standards Institute (ETSI) a standard is a *"document, established by consensus and approved by a recognized body, that provides, for common and repeated use, rules, guidelines or characteristics for activities or their results, aimed at the achievement of the optimum degree of order in a given context"*.

A standard for a product is therefore any document that establishes provisions that have the effect of reducing unnecessary variety in the marketplace, and thereby enables economies of scale to occur, with a consequent reduction in the unit cost of production. In an efficient market system, these reduced costs are passed on along the supply chain to the eventual purchaser.

Typically, a product standard takes into account the latest state of the art and contains provisions that, if adhered to, result in a product that delivers what the purchaser might reasonably expect – in other words, fitness for purpose.

The implication of this is that product standards are inescapably linked to product quality and fitness for purpose, as well as to stable, well-defined production processes.

The requirements of the global professional communications community for Mission Critical voice and data services are currently satisfied by a range of voice-centric Private Mobile Radio (PMR) technologies including TETRA, , P25, and GSM-R, all of which have been developed around agreed and open standards.

Good examples of the power of standardisation include the ETSI GSM™ and TETRA mobile communication technologies, as well and the GSM successors (3G, LTE, etc...). All are truly global phenomena, in which the Standards Development Organisation (SDO) ETSI has played a leading role. Although TETRA and GSM were originally envisaged as solutions just for Europe, these technologies have subsequently been deployed world-wide. As a result, travellers today can communicate and use familiar services in every corner of the world – all thanks to standardisation.

What is not a Standard

Technologies that have been developed by a single company are called proprietary technologies. Such technologies typically can only be procured from that supplier. As a result, there is no competitive eco system that gives purchasers the comfort that they can obtain equipment from a variety of suppliers and safe in the knowledge that they will be compatible with each other.

It is possible for a proprietary technology to be offered to a Standards Defining Organisation to be translated into a standard. Only when an SDO has adopted that technology can it be classed as a standard.

Sometimes manufacturers offer to make the details of their technology open and available for others to copy and then claim that the technology is a standard. But such technologies have not undergone the rigorous evaluation of a Standards Development Organisation (SDO) and cannot therefore be classed as a standard.

Similarly, suppliers who create a technology whilst standards development is in progress sometimes describe their technology as a “pre-standard”. This is not a definition that is recognised by any SDO and is simply a marketing exercise. If a standard is not yet issued then any technology offered in advance of the standard must, by definition, be classed as proprietary. There is no guarantee that equipment purchased ahead of a standard will become compliant to that standard or is capable of being upgraded to that standard. Purchasers should be aware of the risks associated with purchasing equipment in advance of a recognised standard being issued.

Standards serve a variety of purposes – the benefits to the user

In the domain of Information and Communication Technologies (ICT), including TCCA's area of competence in the critical mobile communications sector, standards have special significance:

- **Interconnection and interoperability**. This is particularly important for open markets, where users can 'mix and match' equipment and services from different sources and suppliers, and where suppliers can benefit from, and pass on, economies of scale. The ability of networks and devices to work together relies on products and services complying with standards.
- **Regulations and legislation**. Standards are frequently referenced by regulators and legislators for protecting user and business interests, and in support of international policies.
- **Safety and reliability**. Adherence to standards helps ensure safety, reliability, fitness for purpose and environmental care. As a result, users perceive standardised products and services as more dependable – this in turn raises user confidence, increasing sales and the take-up of new technologies.
- **Business benefits**. Standards provide a solid foundation upon which to develop new technologies and to enhance existing practices. Specifically they:
    - Open up market access and enable suppliers to compete on a level playing field;
    - Provide economies of scale and support sustainable cost;
    - Encourage innovation;
    - Increase awareness of technical developments and initiatives;
    - Enhance consumer choice by acting as a foundation for new features and options. Mass production based on standards provides a greater variety of accessible products to consumers.

The power and authority of standards

Standards are produced for many different products and services, and may be created for company, national, regional or global application. They may be used on a voluntary basis, or made mandatory by company policy, national or international regulation, or by law.

For example in Europe there are three different categories of standard:

- International standard – a standard adopted by an International Standardisation Body (ISB)
- European standard – a standard adopted by a European standardisation body
- National standard – a standard adopted by a national standardization body and made available to the public

The TCCA has a global focus and promotes the development and global adoption of international standards.

Why we need standards

We may not be aware of them, but we use standards every day, in all aspects of our daily lives – in communications, media, healthcare, food, transport, construction, furniture, energy, and so on.

Some standards have been around for hundreds or even thousands of years – weights and measures, for example. It is also thought that the railway Standard Gauge is derived from the grooves worn into the ground by Roman chariots and carts. Users of carriages and wagons in later centuries found that the ride was more comfortable if the wheels fitted into those grooves. Then, when the first railways adopted the available carriages and wagons, the track spacing was determined by their wheels. That spacing was thus 'standardised', saving all the additional cost and effort of devising a new 'standard'.'

Wi-Fi is a good example of the benefits of common standards. Travel anywhere in the world and you can log onto Wi-Fi hotspots to access email, Internet and Social Media services. Imagine how inconvenient it would be if each country used a different technology. Industry benefits from such common standards too, with lower development costs and cheaper components. These benefits are passed to the consumer in lower equipment prices.

Where would we be without standards?

Consider what the world would be like without standards:

- Products might not work as expected
- They may be of inferior quality
- They may be incompatible with other equipment – in fact they may not even connect with them
- In extreme cases, non-standardised products may be dangerous
- Customers would be restricted to one manufacturer or supplier
- Manufacturers would be obliged to invent their own individual solutions to even the simplest needs, with limited opportunity to compete with others in a wider market

Definitions and abbreviations

2G	2nd Generation Cellular radio technology
3G	3rd Generation Cellular radio technology
3GPP	3rd generation Partnership Project – the organisation responsible for the LTE standard
4G	4th Generation cellular radio technology
CCBG	Critical Communications Broadband Group. A working group of the TETRA and Critical Communications Association
ETSI	European Telecommunications Standards Institute
GSM-R	Global System for Mobile Communications - Railways
LTE	Long Term Evolution – the latest standard for cellular communications. LTE provides higher data rates than 3G UMTS but is not quite a 4G technology
MCMBB	Mission Critical Mobile Broadband
PMR	Private Mobile Radio technology provides group based radio communications for business and professional users
TCCA	TETRA and Critical Communications Association (see www.tandcca.com)
TETRA	Terrestrial Trunked Radio - a digital trunked mobile radio technology