a connected world

ETSI

World Class Standards

annual report

april 2015

ETSI's Vision of a Connected World

Security

Home & Office

Better Living with ICT

Public Safety

Content Delivery

Interoperability

Networks

Connecting Things

Wireless Systems

Transportation

ETSI is a producer of globally applicable standards for Information and Communications Technologies (ICT), including fixed, mobile, radio, converged, broadcast and Internet technologies. The high quality of our work and our open approach to standardisation has seen our influence extend from our European roots to impact the world.

ETSI is officially recognised by the European Union as a European Standards Organisation. Our activities are driven by time to market and our standards help ensure the free movement of goods within the single European market, allowing enterprises in the EU to be more competitive.

ETSI is a not-for-profit organisation with more than 700 member organisations worldwide, drawn from 64 countries and five continents. Members include some of the world's leading companies and national administrations working alongside R&D organisations, smaller businesses and innovative start-ups.

ETSI is at the forefront of emerging technologies. We are building close relationships with research bodies and addressing the technical issues that will drive the economy of the future and improve life for the next generation.

ETSI is a world-renowned organisation with a solid reputation for technical excellence. We make our expertise available to our members and customers through a range of services for growing ideas and enabling technology.

Our 'clusters' (above) provide a simplified, yet comprehensive, way of identifying our different areas of expertise based on business relevance or application domain rather than our committee structure. Each cluster represents a major component of the global ICT architecture and brings together the work of those Technical Committees and other groups which share a common technological scope and vision. It is this joint scope and vision that gives each cluster its own identity; collectively the clusters represent the totality of ETSI's work, and demonstrate the way that technologies are converging into a connected world.

Annual Report 2014 (published April 2015)

Simon Hicks

Chairman of the General Assembly

Industry and government working together is one of the key drivers of ETSI. We play a strategic role in innovating for the benefit of our whole society.

In Europe, our Harmonised Standards are used by manufacturers to demonstrate compliance with a European Commission (EC) Directive, which allows them to sell their products in the single European market, the largest unified marketplace in the world. Throughout 2014 we prepared for the introduction of the new Radio Equipment Directive, revising our existing Harmonised Standards and developing new ones. We were also an active participant in the Information and Communications Technologies (ICT) Multi-Stakeholder Platform, co-ordinating standardisation efforts in support of EC policies. We continued to collaborate with CEN and CENELEC, our sister European Standards Organisations, and in February we produced our first joint European Standard.

But technologies are converging and becoming increasingly globalised. Our members are drawn from five continents and our standards are adopted all over the world. For example, we are leading the drive to achieve global standards for Co-operative Intelligent Transport Systems (ITS), and developing global Key Performance Indicators for the eco-efficiency of ICT equipment and networks. We are a key player in two global partnerships, 3GPP™ for the standardisation of mobile telecommunications and oneM2M for Machine-to-Machine (M2M) communications.

This report describes some of ETSI's many and varied achievements, demonstrating the impact of our work both in Europe and around the world.

Dirk Weiler

Chairman of the Board

2014 was the year our Industry Specification Groups (ISGs) came of age. They are proving very attractive to industry, bringing together key stakeholders, including non-members of ETSI, to shape urgently needed specifications. Our ISGs have now successfully kick-started several new technologies.

For example, with the support of over 250 companies, our ISG on Network Functions Virtualisation (NFV) completed its first phase of work in 2014, providing a baseline for NFV standardisation. We set up new ISGs to address Millimetre Wave Transmission and Mobile-Edge Computing. Driven by industry, both are expected to have a global impact.

The ISGs have also broadened our technological base, introducing new activities to our work programme and attracting new members – and new types of members, including some of the giants of our industry.

At the same time, we have seen major achievements in long-established areas of expertise including mobile and wireless systems and security, energy efficiency and broadcasting. We made significant progress in speech and multimedia transmission quality, public safety standards, LTE™ and ITS. And we are involved in ground-breaking work in M2M and some of the new technologies which will support the Internet of Things (IoT) such as Low Throughput Networks. We are looking forward to a bright and exciting future!

Luis Jorge Romero

Director-General

Our ultimate aim in standardising M2M communications is to connect all the individual devices which together make up the IoT. In 2014 that target edged considerably closer. The oneM2M global initiative, of which we are a founding partner, produced its first candidate release of specifications, containing the world's first global standards for M2M deployment, and in December we hosted a unique event which showcased these specifications in action in real-life situations. Related to M2M, together with EC DG CONNECT, we embarked on new work on smart appliances.

But the more things are connected, the greater the potential security risk. We continue to deliver world-leading security standards for specific technologies, but only a holistic approach will counter today's – and tomorrow's – security threats against individual users and our economy.

So we have also begun to address strategic issues such as protecting the Internet and the communications and business it carries. In 2014 we created a new committee on Cyber Security to tackle the growing threat of cyber attacks, and we began a new specification to protect against Trojan horse attacks. Robust security is a prerequisite in achieving commercial success and thus a crucial enabler of today's emerging technologies. In particular, it has a key role to play in the development of the IoT.

Details of this work and much more are described on the following pages. For what we plan to do next, please see our Work Programme 2015-16.

Widening our Horizons – an Overview of 2014

The evolution of technology accelerates every year and ETSI is evolving to keep pace with it. We have listened to our members and been bold and innovative. In so doing, we have maintained our position at the forefront in the standardisation of Information and Communications Technologies (ICT), not just in Europe but as a global player. In 2014 we saw major achievements in long-established areas of expertise, but we also welcomed new activities – and new members.

Industry Specification Groups (ISGs)

We are beginning to see the fruit of our ISGs. Set up to kick-start new technologies by giving them a solid, standardised foundation, they have also broadened our technological base. Some ISGs, like Low Throughput Networks (LTN) and Autonomic network engineering for the self-managing Future Internet, completed their initial tasks in 2014, and standardisation in these areas has now been taken up by our regular technical committees. ISGs have proved popular with industry because of their speed and flexibility, and industry is behind the three new groups launched in 2014, on an Embedded Common Interface for exchangeable Conditional Access/Digital Rights Management solutions, Mobile-Edge Computing and Millimetre Wave Transmission.

From the outset, our ISG on Network Functions Virtualisation attracted broad industry support from all over the world. The group reached a milestone in 2014, producing its second set of specifications and thus completing its first phase of work.

Machine-to-Machine Communications and the Internet of Things (IoT)

To realise its potential, we need to connect all the disparate devices which together make up the IoT. We are therefore developing an application-independent platform which will be capable of supporting a wide range of services, and in 2014 we embarked on new work aimed at using this service platform to interface with smart appliances. The oneM2M global partnership, of which we are a founding partner, produced its first candidate release of specifications.

Applying the benefits of technology to the health sector, we are developing standards for eHealth, Telemedicine, smart Body Area Networks and medical implants.

We are also addressing the transition from IPv4 to IPv6 and the technologies which will support the IoT such as LTN and Surface Mount Technology – our ISGs on these topics both produced key baseline specifications in 2014. We completed the Ultra Low Energy DECT™ Phase 2 specification for home automation networks.

Intelligent Transport Systems (ITS)

We published the first release of standards for the initial deployment of Co-operative ITS, which will enable vehicles made by different manufacturers to communicate with each other and with road infrastructure systems.

Wireless Systems

In 2014 considerable effort was devoted to preparation for the new Radio Equipment Directive, revising our existing Harmonised Standards and developing new ones to cover its extended scope.

We also provide the standards needed to manage the radio spectrum environment and to ensure safe co-existence between radio systems. To help meet the growing demands of the Internet and mobile communications, we are looking at improving the efficiency of spectrum usage, for example, through Reconfigurable Radio Systems and Television White Spaces. We continued to support new ways of exploiting the 5 GHz band, including wireless industrial automation, broadband links for ships, direct-air-to-ground communications for airline passengers and Radio Local Area Networks.

We play a leading role in the development of mobile communication through the Third Generation Partnership Project (3GPP™). We are also looking at ways of enhancing our Terrestrial Trunked Radio (TETRA) standard for mission- and business-critical applications, based on technologies such as LTE™.

Security

We continued to develop our world-renowned standards for smart cards, electronic signatures and security algorithms. But security is an integral part of all our standardisation activities. It is an important key to a connected world and a crucial factor in inspiring the consumer confidence necessary to achieve commercial success for the new technologies emerging in the IoT. So in 2014 we created a new committee on Cyber Security to counter the growing threat of cyber attacks. Our ISG on Quantum Key Distribution began work on a new specification for protection against Trojan horse attacks, and we are addressing mPayments.

Towards a Better Life

Recognising that, ultimately, technology should improve the quality of life, we are developing standards to minimise the environmental impact of ICT equipment. Design for All and accessibility were key topics in our human factors work, and we made good progress in speech and multimedia transmission quality and emergency calling and alerting. In the broadcasting arena, we focused on digital broadcasting, especially Ultra High-Definition TV, and we are addressing the transportation of video over powerlines.

Working in Partnership

We continue to collaborate with partners all over the world. In Europe we have a special relationship with CEN and CENELEC and in February we produced our first joint European Standard.

Last year we published 2 300 standards. But the measure of our success is not the quantity of documents produced, but their quality, and our standards continue to be recognised and adopted all over the world. In 2014, we broadened our horizons, introducing exciting new activities to complement our traditional strengths – and the view is looking good!

New Beginnings

We are constantly looking for new ways to extend our activities and to keep up to date with the latest developments in Information and Communications Technologies (ICT). In this way we are able to provide our members with the standards they need to develop their businesses with innovative services and equipment.

By getting involved in the development of a new technology, we are able to identify new areas for standardisation at an early stage. Standardisation contributes to customer confidence and enables interoperability. It can thus be critical to market success.

Industry Specification Groups

We introduced the Industry Specification Group (ISG) as a mechanism operating alongside our traditional standards development process in specific innovative areas. By their nature, ISGs can produce specifications quickly, offering an effective alternative to the creation of industry fora. We had 13 active ISGs in 2014.

Our ISGs have proved to be a flexible platform to bring together key stakeholders, including non-members of ETSI, to shape the industry. We have already nurtured a number of innovations in our ISGs and the output of some of our earliest groups has now entered mainstream ETSI standardisation. At the same time the ISGs have introduced new activities into our work programme and ETSI has been regenerated in the process.

Industry has recognised the effectiveness of the ISG. Over 250 companies have participated in the work of our ISG on Network Functions Virtualisation (NFV), which produced 11 specifications in 2014 to complete its first phase of work and a baseline for NFV standardisation. The new wave of ISGs established in 2014 – on Mobile-Edge Computing, Millimetre Wave Transmission and an Embedded Common Interface for exchangeable Conditional Access/ Digital Rights Management solutions – are driven by industry.

In Touch with R&D

We make every effort to keep up to date with the latest R&D. This triggers new standardisation activities and also contributes to our ongoing work.

In 2014 we participated in several European Commission (EC) funded projects. Project SUNRISE aims to ensure the successful implementation and evolution of the European Union (EU) Galileo Global Navigation Satellite System (GNSS) programmes by involving future users. Through our Forapolis™ service, we set up the Open GNSS User Forum to reach users of Location Based Services and Intelligent Transport Systems. With project SAGITER, we are developing GNSS standards under the EC's 'Space Mandate' (M/415), and in Project ANTILOPE we are helping to address the adoption and take up of standards and profiles for eHealth interoperability.

Throughout 2014 we worked as a partner in the Electronic Simple European Networked Services (e-SENS) Large Scale Pilot Project. The goal is to develop an interoperable European solution for electronic public services, comprising eJustice, eID, eDelivery and eSignatures, to make cross-border government services a reality and to support the mobility of citizens and businesses. We maintained informal liaison with a number of other projects.

We monitored activity related to Horizon 2020, the EU research funding programme. 50% of the objectives in the 2014/2015 Horizon 2020 calls within our domain include standardisation.

Workshops

We regularly organise workshops to facilitate early consensus-building, to stimulate new standardisation activities and to fertilise ongoing technical work. In addition to the well-established annual workshops which have become unmissable features in the calendar, highlights of 2014 included the oneM2M Showcase in December 2014 which was co-located with the 5th ETSI Machine-to-Machine Workshop, and two joint ETSI/EC Smart Appliances workshops. In July, together with the EC, we co-organised a workshop on the Internet of Things (IoT), as a result of which new work on the IoT will be introduced in 2015. As part of our work for the Smart Security Platform and again in partnership with the EC, we also organised an mPayments workshop. In May we hosted a workshop on Telemedicine and in June the first ETSI workshop on Human Factors in ICT. The 2nd ETSI workshop on Quantum-Safe Cryptography was held in October in Ottawa, Canada.
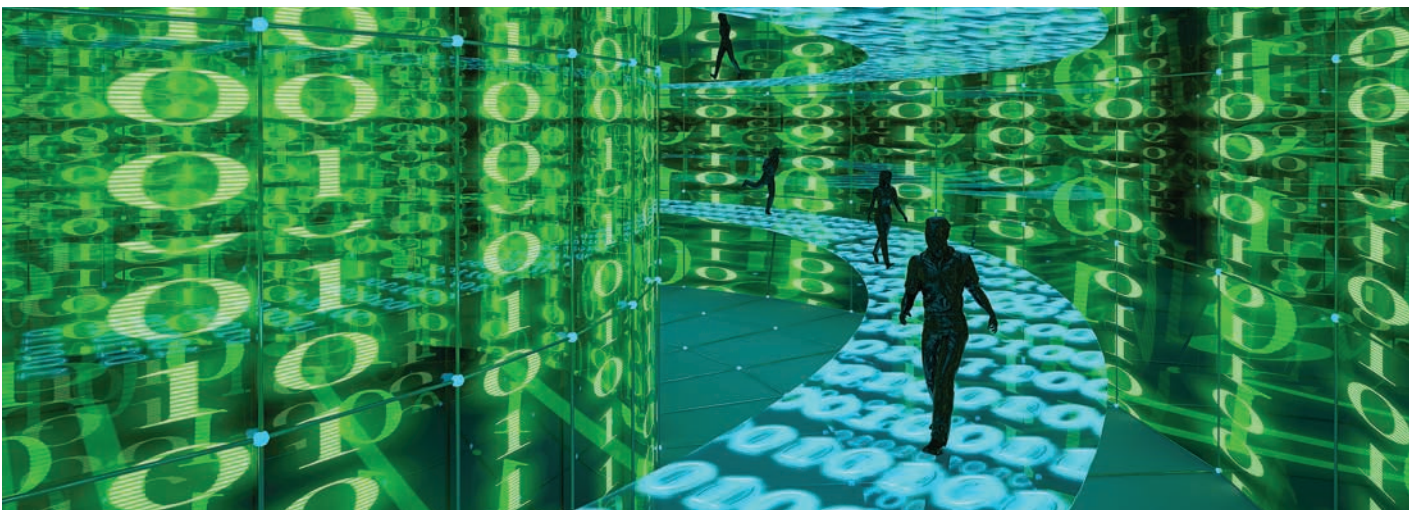
Connecting Things

Integrating Objects to Create New Networked Services

An ever increasing number of everyday machines and objects are now embedded with sensors or actuators and have the ability to communicate over the Internet. Collectively they make up the 'Internet of Things' (IoT). The IoT draws together various technologies including Radio Frequency Identification (RFID), Machine-to-Machine (M2M) service platforms and Wireless Sensor Networks (WSNs). Potential applications and services include smart devices, smart cities, smart grids, the connected car, eHealth, home automation and energy management, public safety and remote industrial process control.

Machine-to-Machine Communications

The communication required to enable the IoT to achieve its potential is complicated by the fact that the individual devices that make up the IoT have disparate platforms, proprietary software, protocols and networking options. In ETSI we are working to overcome these obstacles.

ETSI and oneM2M

ETSI is one of the founding partners in oneM2M, the global partnership which was launched to ensure the most efficient worldwide deployment of M2M communications systems. oneM2M brings together 12 partners including seven of the world's leading Information and Communications Technologies (ICT) Standards Development Organisations (SDOs), as well as representatives of different industry sectors.

At present, the complexity of seamlessly connecting all the disparate devices which together make up the IoT is hampering its growth. oneM2M offers a way to overcome this complexity at a level above that of the individual device or user. oneM2M will provide a standardised interface so that different devices can be connected, irrespective of the underlying network. It will include functionality for device management, subscription, notification, location and much more.

Further information at www.oneM2M.org

oneM2M achieved a major milestone in 2014. In August, the initiative produced its first candidate release of specifications, inviting feedback from industry with a view to publication of the final version of Release 1 in January 2015.

Release 1 represents the world's first global standards for M2M deployment. It is a set of 10 specifications covering requirements, architecture, protocols, security solutions and mapping to common industry protocols. Together they will ensure optimised M2M interworking and create a foundation platform for IoT devices and applications. Release 1 uses established protocols to allow applications across different industry segments to communicate with each other, and the platform that has been created is already useable over several underlying transport technologies, including Wi-Fi, Internet Protocol, fixed line and cellular.

Adoption began almost immediately. In December, two operators in Korea announced that they would make the first commercial deployments of IoT platforms based on oneM2M specifications.

A Technical Report analysing security solutions for the oneM2M system was also produced.

In parallel with the finalisation of Release 1, the collection of the requirements for Release 2 continued. Release 2 will add new functionality, including improvements to security and further development of abstraction and semantics plus enhancements and interfaces for some of the most widely used IoT protocols, to create a larger library of interfaces. Scaling will also be an important topic.

One of the highlights of 2014 was three days of M2M events held at our headquarters in December. A unique Showcase event, at which oneM2M's specifications were demonstrated in real-life situations, was co-located with the fifth ETSI M2M workshop.

Our own Smart Machine-to-Machine Communications committee is addressing the application-independent 'horizontal' service platform within the M2M architecture which will be capable of supporting a wide range of services. In 2014 we completed work on the interworking between M2M area network technologies and the ETSI M2M architecture, and updated and improved our existing specifications. In addition, by the end of the year, we had almost completed interoperability test descriptions for the M2M interfaces.

We made good progress with an ETSI Technical Report (TR) on smart cities, analysing their impact on the IoT environment and, in response to European Commission (EC) Mandate M/441 on Smart Metering, we are developing a TR on the security of smart energy infrastructures with the ultimate aim of reducing energy usage.

Smart Appliances

In 2014 we embarked on a new area of work, proposing the use of the service platform to interface with smart appliances, allowing 'plug and play' connectivity. In the future, domestic and industrial appliances will be highly intelligent, networked smart devices, forming complete energy consuming, producing and managing systems. These systems will need open interfaces so that they can communicate with service platforms from different energy service providers and allow the addition of new appliances from different vendors. Interoperability and testing will be key factors in a successful IoT ecosystem.

In 2014 we completed an action plan for a new standard, based on our M2M specifications. In co-ordination with this initiative, the EC launched a "Study on the available semantics assets for the interoperability of Smart Appliances". Together with the EC, we organised two open workshops on Smart M2M Appliances, one in May, in Brussels, Belgium, and the other at our headquarters in October. In May, we began work on our first specifications for smart appliances, which include a framework for smart appliances communication, development of the ontology and conformance testing.

Spectrum Requirements

We are working with the European Conference of Postal and Telecommunications Administrations (CEPT) to find additional spectrum for RFID, short range devices (SRDs) and smart metering. We published a new Harmonised Standard for SRDs in the 870 - 876 MHz range, which includes devices aimed at reducing CO_2 emissions and improving the quality of life.

Wireless Industrial Automation

As part of our development of standards to exploit the 5 GHz band, we made good progress with a new Harmonised Standard for radio equipment to be used in the 5 725 - 5 875 MHz band for wireless industrial automation. We began work on a new TR on methods and concepts.

We are also revising our Harmonised Standard for 2,4 GHz wideband transmission systems in response to issues raised by the wireless automation industry over the use of SRDs in factories, for example in robotic arms.

eHealth

Our eHealth Project (EP eHEALTH) is developing a glossary of terms to clarify the vocabulary used for eHealth issues. We also introduced new work describing use cases for eHealth standards with a view to identifying gaps in standardisation.

Our Electromagnetic Compatibility and Radio Spectrum Matters committee (TC ERM) is addressing Telemedicine solutions for the 'Internet polyclinic'. We are developing a TR analysing the economic, legal and technical issues for the implementation of a Telemedicine solution and examining use cases, and an ETSI Technical Specification (TS) covering the protocol requirements to ensure interoperability, as well as the security and maximum quality for the transmission of confidential data. We organised a workshop on Telemedicine in May which attracted interest around the world.

Body Area Networks (BAN)

The potential of BAN technology, using small, low power devices, is expanding rapidly. Applications include health and wellness monitoring, sports training, personalised medicine (e.g. heart monitors) and personal safety. There is need for a specific and dedicated technology, optimised for BAN with features such as ultra-low power radio, a lower complexity Medium Access Control (MAC) protocol for extended autonomy, enhanced robustness in the presence of interference and interoperability when communicating over heterogeneous networks in the future IoT. Other key issues to be addressed include Quality of Service and security.

In 2014 our Smart Body Area Network committee (TC SmartBAN) made good progress with a TS on low complexity MAC and routeing requirements for SmartBAN. We are looking at simpler – and also possibly lower cost – solutions with extended battery life. We are

also developing a TR which will define service and application enablers, data representation and transfer formats, and identify the required management and control information. Other work will provide a system description for SmartBANs, including an overview and use cases, and we are developing a specification to define an ultra-low power Physical Layer for on-body communications between a hub and sensor nodes.
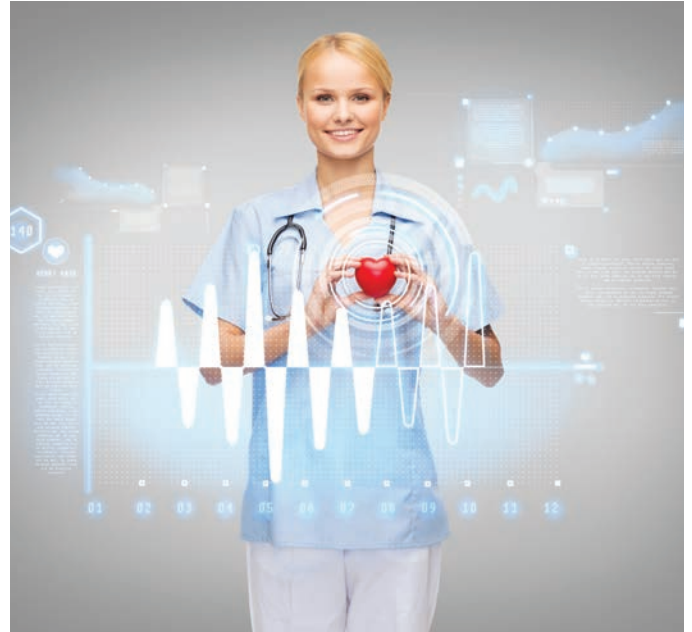
Medical Devices

We develop standards for radio communications equipment for medical devices. In 2014 we produced a new Harmonised Standard aimed at improving the compatibility of cochlear implant systems with low power active medical implants and ensuring adequate spectrum sharing mechanisms within the 2 483,5 - 2 500 MHz band.

Recognising the need to provide more robust mitigation techniques for critical uses such as medical applications, we are producing a TR on Ultra Wide Band (UWB) mitigation techniques and we began work on two new System Reference documents on mitigation techniques for UWB and medical, wellness and assisted living applications.

Enabling the IoT

Many of the connecting objects in M2M and the IoT need only low throughput connectivity. Our Industry Specification Group (ISG) on Low Throughput Networks (LTN) was set up to specify a new ultra narrowband radio technology for very low data rates for ultra long autonomy devices. In September, we published three specifications on, respectively, LTN use cases, a dedicated architecture, and interfaces and protocols. These provide the foundation for mainstream standardisation work which was then taken up by TC ERM.

Many communications modules used for M2M applications are now connected and attached using Surface Mount Technology, a process whereby the module is soldered directly on the circuit board rather than through mechanical connectors. In October our ISG on Surface Mount Technique (ISG SMT) completed a baseline specification describing the mechanical and electrical aspects of the modules which will help create a market for communications modules that are cheaper, more versatile and easier to integrate.

Wireless Systems

Towards a Fully Connected Wireless World

Radio technology is an integral part of our daily lives. We use it for mobile phones, for broadcast radio and television, in Wireless Local Area Network and cordless technology, Global Navigation Satellite Systems (GNSS), Radio Frequency Identification (RFID) and short range devices (SRDs). ETSI creates the standards which define many of these radio technologies and systems.

We also provide the standards which the regulatory authorities in Europe – and elsewhere – use to manage the radio spectrum environment and to ensure safe co-existence between all the systems which compete for use of limited spectrum resources.

Supporting the European Regulatory Environment

We provide a broad range of Harmonised Standards by which manufacturers are able to demonstrate that their products comply with a European Commission (EC) Directive, allowing them to be placed on the market or put into service and helping to create a large, unified European market. Our standards also enable administrations to ensure that users can use spectrum without interference. We help to harmonise the use of spectrum throughout the EU (usually by producing System Reference documents).
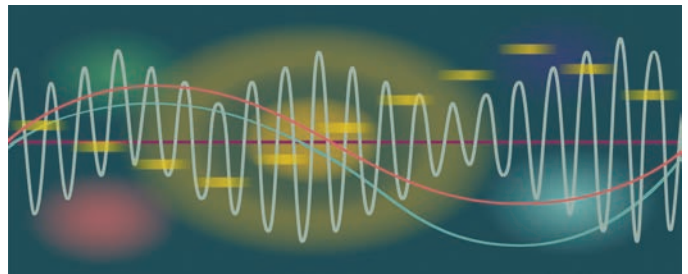
The new Radio Equipment Directive (RED), which will replace the Radio and Telecommunications Terminal Equipment (R&TTE) Directive, was adopted in April 2014 and will be applied in the Member States from June 2016. In addition to communication equipment, for the first time the new Directive also covers all products that deliberately use radio waves for communication or for determining their position, including equipment operating at frequencies below 9 kHz. The EMC and Low-Voltage Directives were also revised in 2014. In preparation for the application of these Directives, we worked with the EC on the drafting of a mandate for Harmonised Standards. We also began to review our existing Harmonised Standards and to prepare the new ones needed to cover the RED's extended scope. We began work on a guide for our committees on the production of Harmonised Standards under the RED.

We are developing the necessary standards to support the EU's longer-term policy for spectrum use, particularly of the Ultra High Frequency (UHF) TV band (the 'Digital Dividend') and we contributed to work by the Radio Spectrum Policy Group on the future use of the UHF band (470 - 790 MHz).

Reconfigurable Radio Systems (RRS)

Network resources are struggling to meet the growing demands of the Internet and mobile communications. We are therefore looking at increasing the efficiency of spectrum usage, for example, through the exploitation of RRS, TV White Spaces (TVWS) and Licensed Shared Access (LSA), mobile device reconfiguration and synergies between systems. In December, we organised a two-day workshop on RRS.

In response to EC Mandate M/512, we are working on RRS, the intelligent radio devices which can characterise, and act upon, their environment, thus opening up the opportunity for the sharing of unused spectrum among multiple services and radio networks. In 2014 our RRS committee (TC RRS) produced its first European Standard (EN), on the radio reconfiguration requirements for mobile devices. We are also developing ENs on the related architecture and mobile device information models and protocols, as well as an ETSI Technical Specification (TS) on the reconfigurable radio frequency interface for mobile devices. Work continued on RRS in intra-operator scenarios.

We published an ETSI Technical Report (TR) defining RRS use cases for the introduction of mechanisms to enable the dynamic Declaration of Conformity, which is a crucial factor in the introduction of new features, especially radio applications.

LSA allows for the co-existence of the original incumbent with a new cellular operator in the same frequency band. In 2014 we published a TS outlining the relevant system requirements for the operation of mobile broadband systems in the 2 300 - 2 400 MHz band under LSA and began to prepare a TS on the system architecture.

We completed several new TSs on UHF TVWS (the areas of spectrum between allocated frequency bands that are unused by the spectrum owner over a given time in a given location). Work also continued on the operation of Cognitive Radio Systems.

Broadband Radio Access Networks

Our Broadband Radio Access Networks committee (TC BRAN) focused on Wireless Access Systems (WAS), completing a new Harmonised Standard for WAS operating in the UHF spectrum. We finalised a TR on weblistings of TVWS databases and another describing the system architecture, an economic model and the technical requirements for a Broadband Wireless Access (BWA) system providing 1 Gbit/s per km². We updated our EN on 5 GHz high performance Radio Local Area Networks (LANs) and began work on a TR on BWA and backhauling for remote rural communities.

We embarked on three new TRs on additional mitigation techniques to enable sharing with various incumbent services (transport, radar and the Earth Exploration Satellite Service) operating in the 5 GHz extension bands.

RFID

We updated our EN for SRD radio equipment in the 9 kHz - 25 MHz band, which includes requirements for wireless power transfer. We are also developing a TR describing wireless power transmission. As a result, wireless chargers will be covered and data rates up to 6,8 Mbit/sec will be enabled for applications such as national ID cards, passports and Near Field Communications (NFC).

Ultra Wide Band (UWB)

We published a new three-part EN on SRDs using UWB technology for communications for generic, automotive/railway and location tracking applications. We began drafting a new part covering building material analysis and object discrimination and characterisation.

Satellite Communications

In 2014 the primary focus of our Satellite Earth Stations and Systems committee (TC SES) was on standards to allow high speed Internet access to fixed terminals or terminals on the move (in aeroplanes, ships or vehicles). Satellite communications during emergency situations and standards defining mobile satellite systems operating in low frequency bands (under 3 GHz) were also priority topics.

Work continued on the SL satellite radio interface (Mobile Satellite Service terminals for geostationary systems operating in the L band) and several new TSs on GNSS based location systems. We also addressed the environmental impact of satellite broadband networks and the use of LTE™ in satellite networks. We developed a System Reference document on cognitive radio techniques applied to satellite communications systems and completed a TR on hybrid satellite/terrestrial broadband network architecture.

Advanced Mobile Communications Technologies – 3GPP™

ETSI and 3GPP

ETSI is one of the founding partners of the Third Generation Partnership Project (3GPP), in which we come together with six other regional standardisation organisations worldwide, plus market associations and several hundred individual companies, to develop specifications for advanced mobile communications technologies. Based on the evolution of GSM™, which was defined by ETSI, 3GPP has developed UMTS™, LTE and LTE-Advanced technologies.

3GPP is supported by ETSI's Mobile Competence Centre (MCC).

Further information at: www.3gpp.org

3GPP created a new working group – the first in nearly ten years – to handle mission-critical applications, concentrating initially on the primary functionality of press-to-talk.

In 2014, the Release 12 specifications were frozen, with final alignment of protocols scheduled for March 2015. Release 12 encompasses around 150 new top-level 'Features', organised into nearly 1000 individual items of work. Some of these build on the IP Multimedia Subsystem, for example, simplifying the transport and delivery of the Short Message Service without recourse to legacy circuit-switched infrastructure. This opens the way for non-E.164 numbering schemes to meet the demand expected from machine-type communications.

On the radio side, 3GPP addressed the possibility of aggregating two or more carriers, uplink and/or downlink, within the same band or across two or more bands to maximise use of the bandwidth available to individual operators.

More sharing of infrastructure amongst operators offers potential for improving technical and economic performance. The notion of offloading data transmission to wireless LANs has led to the innovation of extending the available 3G/4G bandwidth by running those services, using 3GPP standards, in unlicensed bands, just as Wi-Fi currently does. Discussions about 'LTE-unlicensed' are ongoing. Meanwhile, further studies continued into congestion mitigation, both in the radio access network and in the core (fixed) network.

Release 12 also included around 60 top-level studies (producing 3GPP-internal Technical Reports), most of which lead to new or revised specifications in Release 13.

3GPP also introduced work on a potential new radio access technology for Ultra-Low Complexity and Low Throughput for use in Machine-to-Machine technology and work started in earnest on the stage 1 (requirements specification) for Release 13.

In addition, 3GPP continues to improve the 3G Universal Terrestrial Radio Access and High Speed Packet Access, as well as 2G GSM.

Mobile Standards Group

Our Mobile Standards Group (TC MSG) provides the regulatory standards needed to support the deployment of GSM, UMTS and LTE networks in Europe. In 2014 we revised the EN on GSM base stations in line with 3GPP Releases 11 and 12, especially to support the medium range and local area multicarrier base station and Extended GSM-R (ER-GSM, GSM for railways) 900 band features. We completed our work on the Release 12 version of the Harmonised Standard on mobile stations by including support to ER-GSM 900 and a downlink multicarrier feature. Work continued on the Release 12 Harmonised Standard for base stations. We made good progress with the seventh edition of the Harmonised Standards for base stations and user equipment for IMT.

We published a TR which makes publicly available the technical framework for the separate sale of roaming services in the EU. As a result, European citizens will be able to switch roaming services without changing either their SIM cards or their telephone numbers.

New Technologies

Our Industry Specification Group on the Open Radio Equipment Interface (ISG ORI) updated its control and management and interface specifications and added IQ data compression to its requirements specification. Mobile operators can now deploy their systems more efficiently and users will be able to enjoy improved, more economical mobile services.

We established a new ISG on millimetre Wave Transmission (mWT) as a global pre-standardisation initiative to prepare for the large scale use of millimetre wave spectrum in current and future networks.

Our ISG on Mobile-Edge Computing (MEC) was set up to create specifications to enable the hosting of third-party applications in a multi-vendor Mobile-edge Computing environment.

Better Living with ICT

Technologies for a Better Life

While technological progress has improved the way we communicate for both social and business purposes and opened up exciting new opportunities, we are careful to minimise any adverse social consequences. Part of our work involves making products and services simpler to use, safer and more efficient. We are also committed to identifying energy efficiency solutions that mitigate the impact on climate change of the growing use of Information and Communications Technologies (ICT). The ultimate goal is to ensure that ICT improve the quality of life for all.

Energy Efficiency for ICT

A key focus in 2014 was standards for reducing the eco-environmental impact of ICT equipment in support of European Commission (EC) Mandate M/462 which aims to "enable efficient energy use in fixed and mobile information and communication networks".

Our Environmental Engineering committee (TC EE) produced an ETSI Standard (ES) on the power management capabilities of fixed network nodes, which was developed in co-operation with the EU Research Project ECONET (low Energy COnsumption NETworks). Dubbed 'the Green Abstraction Layer', this standard enables operators for the first time to manage the energy consumption of telecom networks easily, offsetting network performance and capacity against energy costs.

We worked with the International Telecommunication Union (ITU) to develop a joint specification to provide industry with a uniform way to measure the environmental impact of ICT. In ETSI the specification was published as a revised version of our ES on the Life Cycle Assessment (LCA) of ICT goods, networks and services. The LCA methodology allows manufacturers and operators to determine the environmental impact of a telecommunication product from the raw material or components until the end of its life, as well as how to measure the environmental impact of a complete telecommunication network or service.

We published two new ESs on measurement methods for the energy efficiency of wireless access network equipment and core networks and completed a new European Standard (EN) for the energy efficiency of wireline access equipment.

We revised our EN for the classification of tests in different environmental situations and published an ES on thermal management in outdoor enclosures. We extended our multipart ES on the requirements for the control and monitoring of power and cooling systems used in telecommunication and data infrastructures, with the aim of monitoring and reducing power consumption. We published a new part for battery systems and we are adding a part covering ICT equipment.

A new ETSI Technical Report (TR) provides guidelines on power supplies for customers' ICT devices which use renewable energy sources.

Work continued on an EN on the alternating current power supply interface for ICT equipment connected to a 400V DC source. We began new work on a supporting ES on transient voltages

at the 400V DC interface and, in co-operation with the ITU's Telecommunication Standardisation sector (ITU-T), on an ES which will specify the architecture for connecting renewable energy sources to 400V power systems.

We began updating our EN on the power supply requirements for equipment connected to a 48V DC voltage source and the associated ES on transient voltages on 48V DC power networks. New work began on an ES on the colour and marking of DC cables and connecting devices.

We produced two new parts for our EN on equipment practice for the racks and sub-racks used in telecommunications.

Work was initiated on a new EN on network standby mode for household and office equipment in support of EU Regulation 801/2013.

Our Access, Terminals, Transmission and Multiplexing committee (TC ATTM) and our Industry Specification Group on Operational energy Efficiency for Users (ISG OEU) are developing tools to enable ICT users to improve their energy management of networks and sites in compliance with the Kyoto Protocol on climate change and the reduction of greenhouse gas emissions. In 2014, we continued with the development of 'Global Key Performance Indicators' (KPIs) to support the deployment of eco-efficient networks and sites and to monitor the energy management of deployed broadband. These new KPIs will describe the best practices, most efficient equipment and solutions to build sustainable operational networks, sites and data centres. In response to EC Mandate M/462, these KPIs are being upgraded to ENs with the aim of appending them to potential new European legislation supporting the development of efficient ICT products and components.

The ultimate aim of ISG OEU is a set of global KPIs for broadband fixed and mobile access. In 2014 we made good progress with specifications for the measurement of the energy consumption of operational information technology servers, and introduced parallel work on storage units and broadband fixed access. We also completed an early draft of a definition of global KPI modelling for green smart cities.

Our Integrated Broadband Cable Telecommunication Networks committee (TC CABLE) made good progress with global KPIs to provide a baseline for measuring the energy consumption of cable access networks and its components and is developing a TR on identifying the key energy-consuming components of the cable access network.

Access for All

Our Human Factors committee (TC HF) champions the importance of the user experience in ensuring that developments in technology are usable by all people in society, including the elderly, the young and those with disabilities. A 'Design for All' approach helps ensure that everyone has the same access to devices, systems and services. By widening access, it also enables European companies to meet the needs of many more users, thus improving their competitive position in global markets. Design for All and accessibility were key topics in our human factors work in 2014.

We made good progress with the updating of our ES on the provision of relay services in Europe which enable people with speech or hearing impairments to communicate with users of standard telephony using other means of communication (such as video or text), either directly or through an interpreter.
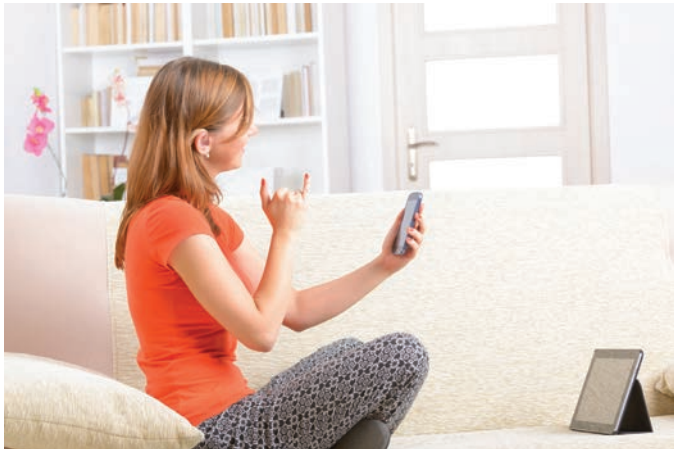
We completed our work in response to EC Mandate M/473, publishing an ETSI Guide (EG) on identifying Design for All aspects in all our standards. This will be implemented as part of our standards-making process in 2015.

TC HF and our Special Committee on Emergency Telecommunications (SC EMTEL) began new work on guidelines for presenting alerting messages to users with special needs.

We completed our activities related to EC Mandate M/376, publishing an EN which specifies ICT accessibility requirements and testing methods in a form that is suitable for use in public procurement.

In June, we hosted the first ETSI workshop on Human Factors in ICT. The event introduced the committee's work and identified opportunities to improve the accessibility of ICT products and services through standardisation, particularly to meet the needs of users in the light of the development of smart devices and smart cities.

Media Quality and the User Experience

In 2014, our Speech and Multimedia Transmission Quality committee (TC STQ) continued its work on terminals using super-wideband (bandwidth up to 14 kHz) and fullband for conversational services for teleconferences and audio-visual applications. We published a TR on perceptually motivated parameters, defining more closely the audio quality, the loudness and fidelity of speech, and a new ETSI Technical

Specification (TS) on transmission requirements for super-wideband handheld (handset and handsfree) terminals aimed at optimising the end-to-end quality. We began work on a TS which will provide objective test methods for speech quality performance when using mobile terminals on super-wideband and fullband in the presence of background noise.

We revised the series of ESs which define the transmission requirements for narrowband Voice over Internet Protocol (VoIP) terminals from a Quality of Service (QoS) perspective, to bring our standards into line with the latest international standards.

We updated the ESs on requirements and test methods for analogue handsets connected to Public Switched Telephone Networks (PSTNs) and work continued on the development of reference load and background traffic profiles.

In 2014, we focused particularly on the delay introduced by network elements and jitter caused by the access bandwidth limitations of reference connection scenarios and updated the relevant publications accordingly.

We made good progress with a new TR on the QoS aspects of voice services in LTE™ networks and revised our TS which defines the design objectives related to the performance of IP Multimedia Subsystem/PSTN Emulation System/Voice over LTE exchange.

We continued to revise our standards including the EG on background noise simulation techniques and the background noise database. In addition, a new TS was published in August, defining a sound field reproduction method for testing modern terminals which includes a background noise database. Work continued on referencing, benchmarking methods and background traffic load profiles, to ensure the comparability of test results, as well as the handling of measurement uncertainties in the field of electro-acoustics and the acoustic output of headphone equipment for call centre agents. We published an improved version of our EG on acoustic safety limits.

We are developing a new TS to improve listening quality for people with impaired hearing.

We published a TS to provide a monitoring architecture for Quality of Experience and another aimed at developing a website that can be used for subjective testing.

We began work on the possible use of emotion detectors as a test instrument for the detection of sentimental content in test sentences and a TR on bandwidth calculations and prioritisation in VoIP systems.

Our User Group works with our other committees to ensure the needs of users are considered. In 2014 the group focused particularly on the quality of telecommunication services and new mobile Internet services arising from the growth in the use of smartphones. The group also continued to gather data on the specific needs of visually impaired people.

Safety

Our Safety committee (TC Safety) monitored developments in electromagnetic fields, electrical safety and safety in cable television systems.

Content Delivery

Facilitating Content Consumption Whatever the Platform

The Internet, mobile communications and broadcasting are converging. But the standardisation of these different areas has traditionally followed different paths, so they do not interoperate across the same platforms. We are addressing the urgent need to align the diverse specifications for content delivery in a converged environment supporting Internet Protocol Television (IPTV), mobile TV and broadcast TV – for the benefit of both the industry and the consumer.

Broadcasting

Our standardisation of broadcast systems, programme transmission and receiving equipment is dealt with in a Joint Technical Committee which brings us together with the European Broadcasting Union (EBU) and the European Committee for Electrotechnical Standardisation (CENELEC) – JTC Broadcast.

JTC Broadcast's current work is focused on digital broadcasting. In 2014 the JTC was especially active in Ultra High-Definition TV (UHDTV) and related areas. In particular, the JTC finalised a new version of the ETSI Technical Specification (TS) on Digital Video Broadcasting (DVB) Audio Video Coding which now includes High Efficiency Video Coding (HEVC) and the first phase of DVB UHDTV.

In April, the JTC released AC-4, an innovative codec for next generation digital audio compression for audio-only and audio for video delivery. AC-4 offers an advanced sound experience to meet modern entertainment requirements including home theatres, online streaming and video games. Work began in December on Part 2, which will enable an improved consumer audio experience. A revised version of the AC-3 specification was also published in August.

In the radio area, the JTC produced a set of TSs to support hybrid digital radio. This included the core look-up process for RadioDNS, a standardised way for radio receivers to locate IP resources that support the broadcast radio experience. In addition, the established digital radio applications for visual content (SlideShow) and service and programme information were revised and extended to provide the same encoding for both broadcast and IP delivered radio, permitting for the first time common authoring by broadcasters and decoding and presentation in devices.

The JTC continued to update its popular DVB service specifications, describing the necessary metadata for TV broadcast. The DVB-SI (Service Information) specification enables all the various components of a video service to work together. The new version published in May provides the necessary updates for the Common Interface, CI Plus v1.4, and additional audio coding schemes. The JTC began to address companion screens and streams and UHDTV.

The existing DVB IPTV standards were reviewed with a view to updating them to take account of IPv6.

The JTC produced a new TS on extensions to the CI Plus v1.4 specification which makes it easier to replace set-top boxes with a small module plugged into the TV.

DVB Return Channel Satellite 2 (DVB-RCS2), which defines the only standardised interactive satellite system, was revised with the addition of implementation guidelines.

The JTC completed a multipart standard on DVB-S2 for broadcasting, interactive services, news gathering and other broadband satellite applications which will bring more spectral efficiency to professional satellite applications as well as enable new operational modes such as channel bonding.

Content Delivery

We set up a new Industry Specification Group (ISG) on the Embedded Common Interface (ECI) for exchangeable Conditional Access (CA)/Digital Rights Management (DRM) solutions to develop a standardised system architecture for general purpose, software-based, embedded and exchangeable CA/DRM systems. This will counter market fragmentation and allow consumers to continue using equipment and content they have previously paid for, after a move or a change of network provider, or to access content from multiple service providers from the same device. The group began work on three specifications. The first will cover the framework for an ECI in seven parts, the first two of which we published in September. Work continues on the other two specifications, which will address system validation and test cases.

We made good progress with an ETSI Technical Report (TR) analysing the existing solutions for interoperable multimedia customer premises equipment for CA/DRM.

Other Aspects

Our Electromagnetic Compatibility and Radio Spectrum Matters committee (TC ERM) investigated new ways to meet the spectrum needs of Programme Making and Special Events (PMSE) devices – the wireless microphones, in-ear monitors, talk-back links, audio links etc. which are used to support multimedia productions in TV broadcast, stage shows and sporting events. We produced a TR on the possible use of cognitive interference mitigation techniques to allow usage of hitherto unavailable spectrum and to facilitate spectrum sharing. We also updated our European Standard (EN) on wireless microphones in the 25 MHz - 3 GHz band.

At the request of the European Commission, we have been analysing co-existence issues stemming from its Digital Dividend Decision, including co-existence between cable television and new LTE™ mobile phones operating in the 800 MHz band. We are co-operating with CENELEC in the creation and revision of the standards to control LTE interference with short range devices.

The localisation industry is engaged in making computer software (and associated materials) linguistically and culturally appropriate to users in different locations. Our ISG on Localisation Industry Standards (LIS) is producing specifications to ensure quality and efficiency.

Networks

Fulfilling the Promise of Unlimited Bandwidth

Today's consumers expect communications services to be easily accessible and available everywhere, on whatever devices they are using. Technically, this means networks must converge. We provide a comprehensive set of standards for access network technologies.

Network Functions Virtualisation

Network Functions Virtualisation (NFV) involves implementing network functions in software which can run on a range of industry standard server hardware, and which can be moved to, or introduced in, various locations in a network as required, without the need to install new physical equipment. This will simplify the roll-out of network services, reduce deployment and operational costs and encourage innovation.

Reaching a major milestone in 2014, our NFV Industry Specification Group (ISG) completed the first phase of NFV specifications, producing 11 new specifications towards the development of an open, interoperable NFV ecosystem. We also prepared a Proof of Concept (PoC) framework and, by the end of the year, numerous NFV PoCs had already demonstrated NFV's capabilities. In November we began work on Phase 2 which includes 28 new documents, including the first normative specifications.

Network Access

Our Access, Terminals, Transmission and Multiplexing committee (TC ATTM) made good progress with ETSI Technical Specifications (TSs) on the use of single mode optical fibre and plastic optical fibre systems for home cabling. We began to update our TSs on the general engineering of networks.
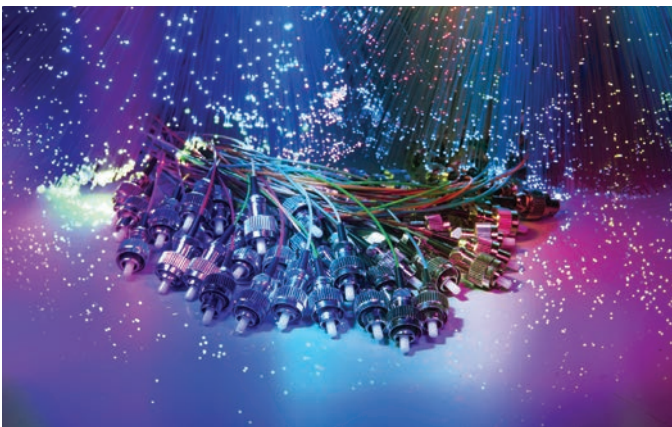
We completed a major revision of our European Standard on the characteristics and requirements of point-to-point equipment and antennas in fixed radio systems and made good progress with an ETSI Technical Report (TR) on energy efficiency metrics for point-to-point radio systems.

We are leading work globally on the standardisation of reverse power feeding. In September, we published a TS on the requirements for reverse power feeding for Fibre to the Distribution Point (FTTdp) whereby the node at the distribution point can be powered from the customer premises equipment.

Cable

In 2014 our Integrated Broadband Cable Telecommunication Networks committee (TC CABLE) completed a three-part TS for the Data Over Cable Service Interface Specification (DOCSIS) version 3.1, which defines the fourth generation of broadband cable modem technology. We published an ETSI Standard (ES) on mechanisms to support Layer-2 Virtual Private Networks over the DOCSIS cable broadband network, which addresses the needs of a distributed workforce. Other achievements included an ES defining a distributed implementation of broadband headend equipment (Cabinet-DOCSIS). Work continued on home routers to define a core set of features for multiple subscriber devices to gain access to high-speed data services using DOCSIS, and on measurement methods for the network performance of broadband data services.

We completed an ES on the Converged Cable Access Platform Operational Support System Interface (CCAP-OSSI), defining the management interface into key Hybrid Fibre Coaxial access platforms for high speed data services and narrowcast digital video.

In response to changes in spectrum allocation as part of the Digital Dividend, we published a TS on the operation of cable equipment in the cable frequency band to enable co-existence between services delivered across RF cable networks and mobile communication services in the 800 MHz band.

We also addressed the evolving electromagnetic environment.

Numbering, Naming, Addressing and Routeing

Our Network Technologies committee (TC NTECH) completed a TR on the use of Domain Name System (DNS) protocol in managed networks. We published an analysis of scenarios for implementing ENUM-based mechanisms to enable number portability when telephony services are provided using Voice over IP technology.

Transition to IPv6

We completed a plan and testing methodology to verify the compliance of equipment and systems with our standards on the transition of broadband cable networks from IPv4 to IPv6. We began work on a set of industry test descriptions to provide interoperability and test cases, and we are outlining a transition strategy for network operators.

End-to-End Network Architectures

In 2014, our End-to-End Network Architectures Project (EP E2NA) focused particularly on the fixed segment and interconnection to other networks. We published a TR which reviews standardisation activities related to the location of transcoders for voice and video communications inside and across networks.

Autonomic Future Internet

We published a TS on scenarios, use cases and requirements for autonomic management, based on the Group Specifications (GSs) produced by our former ISG on Autonomic network engineering for the self-managing Future Internet. Work continues on a TS outlining the Generic Autonomic Network Architecture (GANA) reference model and on its application onto concrete use cases. To raise confidence in autonomic systems, we are developing guidelines for testability and certification, and we have begun work on a framework for PoC platforms illustrating key aspects of autonomic network engineering.
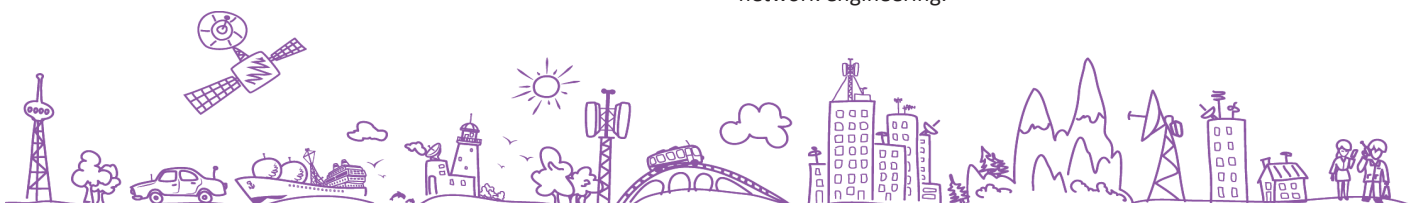
Home and Office

Connecting Devices in the Home and Office

The variety of devices that need to be interconnected is growing rapidly and most require broadband. The new services being developed are creating a 'Connected Home' and a 'Connected Office'. Our standardisation for home and office focuses on three aspects: home and office wireless, home and office interconnection, and home and office requirements, including Quality of Service (QoS) and security.

Cordless Voice and Broadband Communication

Our Digital Enhanced Cordless Telecommunications (DECT™) specification is the leading standard around the world for digital cordless telecommunications. New Generation DECT builds upon the convergence of the Internet and telecommunications and introduces advanced features such as high quality wideband (7 kHz) and super-wideband (14 kHz) voice, support of Internet telephony and broadband data connections. It also includes additional security features (authentication and encryption), with new algorithms based on the Advanced Encryption Standard (AES).

Our DECT committee (TC DECT) completed its work on New Generation DECT. In January, we published the specifications for additional features for extended wideband speech services including phone book handling, answering machine control, handset capability enquiry, security enhancements and an energy-saving 'ECO mode'. We also completed the specification for Software Update Over The Air (SUOTA, which allows a DECT device to download and upgrade its software from a remote server over the air), a maintenance update of the system specification and the corresponding test specification. Together this work can now be considered as a solid base for starting the DECT Forum's CAT-iq 3.0 certification programme.

The key focus for our work in 2014 then became Ultra Low Energy (ULE) DECT. DECT ULE is characterised by low power consumption, good QoS and wider coverage than competing technologies. We completed the Phase 2 specification for home automation networks. It includes regional variants of ULE for the US and Japan, and additional features suitable for a broader range of application scenarios such as support for hybrid devices which use ULE and non-ULE services (e.g. voice), SUOTA, a compatibility mode for base stations that also support No-Emissions Mode (NEMo) and a connectionless downlink (the capability to transmit ULE messages to multiple devices), and repeater compatibility support for base stations and mobile stations to extend the range of the DECT system.

Possible applications that can be built with ULE Phase 2 include simple medical pendant alarms (for instance to monitor heart rate or movement and including an alarm button and additional voice capability), lighting controls, residential hubs and gateways, and intercoms, entry-phones and other Machine-to-Machine (M2M) devices with an audio capability.

Other work in 2014 concerned the possible use of the 1 900 - 1 920 MHz band for DECT in addition to 1 880 - 1 900 MHz, the standard frequency band in Europe. If approved, this extension would provide additional capacity for various M2M applications, smart appliances and streaming audio.

Powerline Communications

Smart Metering

In 2014, our Powerline Telecommunications committee (TC PLT) made good progress with the powerline communication requirements for smart meters, in response to European Commission Mandate M/441. A new ETSI Technical Report (TR) was published in January which highlights available powerline technologies and features that could be used for smart metering both in the home and in outdoor networks, using low and medium voltage electricity grids between the utilities and meters in the home. A new TS on the co-existence of narrowband powerline telecommunication (PLT) technologies for smart grid applications was almost complete.

PLT and Premium TV Services

We have been addressing the transportation of video over powerlines, in response to the advent of 4K video streaming and video on demand services for Ultra High-Definition Television (UHDTV) and new advances in technology such as High Efficiency Video Coding (HEVC), which rely on high performance PLT modems. In December 2014 we published a TR on the requirements for very high bitrate services such as UHD/4K video.

We are developing specifications for short range powerline modems, using a Powerline High-Definition Multimedia Interface (PHDMI). One use of this technology would be to simplify the installation of home cinema.

Mitigation of Interference

We are working on the co-existence of Digital Subscriber Line (DSL) modems and PLT at customers' premises. Good progress was made with a new TS on spectral management for PLT which aims to minimise interference between neighbouring networks, enabling the efficient sharing of the power allocation for broadband PLT modems operating in a network.

Work continued on the co-existence of Very high bit rate DSL 2 (VDSL2) and PLT modems using Dynamic Spectral Management.

Transportation

Bringing the Power of ICT to People on the Move

Information and Communication Technologies (ICT) are revolutionising the transport sector, increasing efficiency, reliability and safety and reducing energy consumption. ETSI supports road, railways, aviation and maritime transportation with activities which are carried out by key industry players and therefore reflect true market demand.

Intelligent Transport Systems (ITS)

Our ITS committee (TC ITS) is leading the drive to achieve global standards for Co-operative ITS which will enable vehicles made by different manufacturers to communicate with each other and with the road infrastructure systems. Reaching a major milestone in 2014, in co-operation with the European Committee for Standardisation (CEN) and in response to European Commission (EC) Mandate M/453, we published our first set of standards to enable the initial deployment of Co-operative ITS. Release 1 was announced at the 6th ETSI ITS Workshop in February in Berlin, Germany, an event which has become a major annual success.

We then began work on the requirements for Release 2. Among various new features and functionalities, we will include specifications to protect vulnerable road users such as cyclists and motor cycle riders, for Co-operative Adaptive Cruise Control (C-ACC) and for platooning. We began work on three pre-studies into relevant use cases and we addressed the spectrum requirements to support Release 2.

We also started work on mitigation techniques to avoid interference between European CEN Dedicated Short Range Communication equipment and ITS. Other work included Local Dynamic Maps, cross layer Decentralised Congestion Control (DCC) for the management of Co-operative ITS and Intersection Collision Risk Warning (ICRW). We are addressing conformance testing, which will be crucial for the commercial deployment of Co-operative ITS.

We added vehicle communications to our specification on the planning and reservation of electric vehicle energy supplies, thus completing our work on electric vehicle charging in response to EC Mandate M/468.

Automotive Radar

In the Ultra Wide Band (UWB) automotive radar area, we revised the European Standard (EN) on narrowband radar equipment in the 24,05 - 24,25/24,50 GHz band and we are updating our ENs for ground based vehicular radar in the 76 - 77 GHz range and high resolution automotive radar in the 77 - 81 GHz range.

Aviation

For many years we have developed the Harmonised Standards needed for Air Traffic Management (ATM) equipment under the Radio and Telecommunications Terminal Equipment (R&TTE) Directive. Throughout 2014 we continued to support EC Mandate M/405, upgrading the ENs for the Data Link Services system. We completed our work on the ground-based VHF Digital Link (VDL) Mode 4 radio transceivers for the aeronautical mobile service; work on Mode 2 was expected to be finalised early in 2015. We are adding multilateration (MLAT) equipment to our EN on the Advanced Surface Movement Guidance and Control System (A-SMGCS).

We published a System Reference document aimed at extending the technology used to prevent accidents on the roads to accidents involving helicopters, using radar to increase a pilot's field of vision.

Railways

Our Railway Telecommunications committee maintains the GSM-R (GSM for railways) standard. Our major task in 2014 was to update the ETSI Technical Specification on receiver parameters to resolve interference issues with public systems. We also addressed co-existence issues with UHF Radio Frequency Identification. We made good progress incorporating the 3 MHz of additional spectrum allocated to GSM-R into the Third Generation Partnership Project (3GPP™) radio access standard. This will extend applications to the rail system and help meet urban and suburban transport needs. Work to incorporate Internet Protocol (IP) into the core network and interface specifications continued.

We are developing a set of standards for Communication Based Train Control urban rail systems to improve the standardisation of equipment for all types of public rail transport and we began a feasibility study into the use of GSM-R radio performance enhancements and resource optimisation.

Maritime

Work continued on the development of ENs for man overboard devices for Digital Selective Calling (DSC) and we published an EN on Automatic Identification System protocols. We produced a new Harmonised Standard for coastal surveillance, vessel traffic systems and harbour radars. Other work addressed VHF equipment, DSC equipment and devices transmitting on Global Maritime Distress and Safety System frequencies.

Satellite

We made good progress with a new EN on Earth Stations on Mobile Platforms (ESOMPs) operating with non-geostationary satellites in the Ka band. When published, this will facilitate the introduction of new equipment for satellite broadband access on board aircraft and vessels. At the end of 2014, work began aimed at adding new antenna types for ESOMPs operating with geosynchronous orbit satellite systems.

Exploiting the 5 GHz Band

The 5 GHz band is a key focus for standardisation because parts of it can be easily – or are already – harmonised in Europe. In 2014 we made good progress with standards for various transportation applications exploiting this frequency band including broadband communication links for ships and fixed off-shore installations, ITS and urban rail.

Security

Standards for Secure, Reliable Communications

Information Security standards are essential to ensure interoperability among systems and networks, compliance with legislation and adequate levels of security. These standards provide the means for protecting the user and creating a more secure and profitable environment for the industrial sector.

Cyber Security

The Internet has become a critical infrastructure for both businesses and individual users but this has brought with it an increase in both the variety and quantity of cyber-threats. The different methods governing secure transactions in the various EU Member States sometimes make it difficult to assess the respective risks and to ensure adequate security. In 2014, we therefore set up a new Cyber Security committee (TC CYBER) to increase privacy and security for organisations and citizens across Europe.

There was widespread support for the establishment of the new committee. At its first meeting in May, it drew up an initial plan of work which includes eight ETSI Technical Reports (TRs) and an ETSI Guide (EG). We are looking in particular at the security of infrastructures, devices, services and protocols, as well as security tools and techniques to ensure security.

We are developing a TR on protection measures for Information and Communications Technologies (ICT) in critical infrastructures, specifically power and transport which underpin all of the other critical infrastructures. The report will address resilience, Machine-to-Machine (M2M) communications and eHealth.

Other TRs concern security assurance, monitoring the security of Network Functions Virtualisation (NFV) using the Structured Threat Information eXpression (STIX) model, the protection and retention of personally identifiable information, security aspects of Lawful Interception (LI) and Data Retention (DR) interfaces, a security baseline for LI for NFV and related platforms, a global Cyber Security ecosystem and platform security technology. The EG will cover the post Quantum Computing impact on ICT security, as this will affect the choice and strength of algorithms in the future.

In addition, TC CYBER works with the Cyber Security Co-ordination Group (CSCG), an advisory body which brings us together with the European Committee for Standardisation (CEN), the European Committee for Electrotechnical Standardisation (CENELEC) and various security-related European institutions. In February, the CSCG presented the European Commission (EC) with 'Recommendations for a Strategy on European Cyber Security Standardisation' which made proposals for the governance, harmonisation and globalisation of the fight against cyber-threats.

Smart Cards

In 2014 our Smart Card Platform committee (TC SCP) extended the requirements specification which enables subscription-related data in an embedded UICC (eUICC) to be changed without its physical removal or replacement in the end-device. A major achievement was the resolution of the management of credentials for the eUICC: it was agreed that there will be one Profile Management Credential for the creation of the container and transport of profiles, one for the enabling/disabling of profiles and one for the deletion of those profiles. Good progress was made on the definition of the common description format of the profile.

We upgraded our test specifications and developed new ones, including one which will provide tests for the remote management of the UICC based on any of the secured packet structures specified by TC SCP. This will be of particular interest to implementers/issuers of UICCs which have applications loaded, customised or deleted over the lifetime of the UICC – typically UICCs used as a secure element for mobile contactless communication or as an eUICC. We completed a TR on test environment integrity and test case execution.

We continued to support multiple secure elements for mobile contactless communication over the Near Field Communication (NFC) interface. We completed the requirements for new contactless features by adding use cases and requirements to answer interoperability issues between the UICC and other potential contactless execution environments. This will address problems encountered when applications are provided by different service providers using different environments. We then began work on the technical realisation of the requirements.

The requirements for optimisation of the access to the UICC over the terminal interface were completed and work began on their technical realisation.

To ensure that non-3GPP applications do not make the UICC unresponsive for a length of time incompatible with authentication timeouts, which could block the making of calls, we increased the power available to the UICC to deal with the on-board generation of cryptographic elements and defined a maximum processing time for applications. At the same time we enhanced the specification of the power supply conditions for the UICC to ensure that the latest technology used by silicon manufacturers can be used for UICCs.

In 2014 we closed Release 12 of the Smart Card specifications and began the definition of the requirements for Release 13 and their technical realisation.

Electronic Signatures

In 2014, our Electronic Signatures and Infrastructures committee (TC ESI) embarked on a revision of all its draft European Standards (ENs) and specifications to harmonise them with the new 'eIDAS Regulation' (Regulation (EU) No 910/2014 on electronic identification and trust services for electronic transactions in the internal market and repealing Directive 1999/93/EC) that came into force in September 2014. At the same time, to increase the potential global impact of our standards and specifications, we began revising the terminology used and emphasising the distinction in their content between industry best practices and the regulatory requirements of the eIDAS Regulation.

In addition, we continued to work on the second phase of our response to the EC mandate on Electronic Signature Standardisation, M/460. The goal of M/460 is the mutual recognition and the cross-border interoperability of electronic signatures throughout Europe, by providing a Rationalised Framework for electronic signature standardisation. To ensure the alignment of standards and avoid overlapping work, we are co-operating with CEN.

In 2014, we continued to work on the draft ENs and specifications for the Rationalised Framework, addressing signature creation and validation, Trust Service Providers and business guidelines. We completed an ETSI Special Report (SR) on extending the Rationalised Framework to cover standardisation on registered eDelivery. We updated several of our ETSI Technical Specifications (TSs) in the context of the Rationalised Framework including those on Trusted Lists, requirements for conformity assessment bodies assessing Trust Service Providers and cryptographic suites, and we began revising our TS on signature validation procedures and policies.

Lawful Interception and Data Retention

We are pioneering the development of standards for LI and DR for the investigation of terrorism and serious criminal activity, and our LI standards are being adopted around the world.

In 2014, work continued on LI and DR in Cloud and virtual services. We made good progress with specifications for the dynamic triggering of interception and for a warrant electronic interface between two systems for the exchange of information relating to the establishment and management of LI.

As well as updating existing LI and DR standards and specifications by adding new services, we continued to maintain our seven-part TS on the handover interface and service-specific details for Internet Protocol delivery as well as the TS on the handover interface for the request and delivery of Retained Data, which enables governments to implement the requirements of the European Directive on Data Retention. Work continued on new specifications for an internal network interface for LI, and for security for LI and DR systems.

New work in 2014 included the creation of a dictionary of common parameters to simplify future standardisation and two new SRs: one on LI and Retained Data standards and concepts, the other on LI for LTE™. We also began to update the specification for an LI interface for Terrestrial Trunked Radio (TETRA).

ETSI Security Workshop
The 9th ETSI Security Workshop was held in Sophia Antipolis in January 2014, with the theme of Cyber Security. It attracted around 125 participants. A new ETSI White Paper on Security was released during the event.

Security Algorithms

Our Security Algorithms Group of Experts (SAGE) is recognised the world over for its work on authentication and encryption mechanisms for different technologies, and plays a vital role in protecting user privacy and preventing fraud and unauthorised access to public and private telecommunications networks.

SAGE's new second set of 3G authentication and key generation algorithms, TUAK, was published by the Third Generation Partnership Project (3GPP™) early in 2014. TUAK will provide an alternative to the existing MILENAGE algorithm, in case MILENAGE is ever compromised. It can also be used for both LTE and GSM™/General Packet Radio Service (GPRS) and can be pre-installed alongside MILENAGE in eUICCs. This will help future-proof devices with eUICCs which may have to remain operational for many years.

Other Aspects of Security

Security is currently a key issue in TETRA. We are undertaking a major study into the possible replacement of the TETRA air interface encryption algorithm, we contributed to 3GPP on the requirements for critical communications security, with the aim of ensuring that the special needs of users are taken into account in the latest edition of the LTE standard, and we revised the TS on the rules for management for the TETRA standard encryption algorithm, TEA2.

Our Industry Specification Group (ISG) on Quantum Key Distribution (QKD) began work on a new specification for protection against Trojan horse attacks. We also made good progress with a specification on the characterisation of optical components for QKD systems.

Our ISG on Information Security Indicators (ISG ISI) is addressing the measurement of information security risks. In 2014 we published Key Performance Indicators to evaluate the maturity of security event detection and made good progress with guidelines for testing the effectiveness of detection capabilities.

Our ISG on Identity and access management for Networks and Services (ISG INS) was set up to develop pre-standardisation consensus on identity management protocols and architectures. In March the group completed its task with the publication of a specification containing the requirements of a global distributed discovery mechanism of identifiers, providers and capabilities.

Interoperability

Interconnecting in a Multi-polar World

Interoperability is driven by market demand. It is crucial in a multi-vendor, multi-network and multi-service environment and is one of the reasons why we develop standards. Interoperability gives users much greater choice of products, and allows manufacturers to benefit from the economies of scale of a wider market.

A Unique Approach to Technical Quality and Interoperability

Our technical committees apply best working practices to ensure that our standards are well-specified and testable and thus provide a solid basis for the implementation of robust and interoperable products. Many of our standards undergo comprehensive validation through interoperability events and we develop conformance test specifications to accompany our standards.

Our Centre for Testing and Interoperability (CTI) is a centre for excellence, providing hands-on expertise in standards validation through the organisation of our world-renowned Plugtests™ events, the development of test specifications and the application of 'best practice' specification methodologies.

Test Specifications

In 2014 we continued to develop conformance test specifications for Intelligent Transport Systems (ITS), Digital Enhanced Cordless Telecommunications (DECT™), IPv6 transitioning and security protocols such as Diameter.

In support of the Third Generation Partnership Project (3GPP™), we embarked on the creation of conformance test specifications for key features of LTE™ and LTE-Advanced. These test suites are used by external organisations such as the Global Certification Forum to provide certification schemes for mobile devices, thus ensuring worldwide interoperability. In 2014, test efforts were targeted particularly at carrier aggregation, Internet Protocol (IP) Multimedia Subsystem (IMS), especially IMS Voice over LTE (VoLTE) and IMS emergency services, Machine-to-Machine (M2M) communications, LTE broadcast, small cells enhancements affecting mobile device implementation, and location based services (LTE positioning).

Our Core Network and Interoperability Testing committee (TC INT) assists the telecommunications industry with the deployment of core network equipment by offering the market high quality test specifications. Interoperability is particularly important to the provision of good Quality of Service and Quality of Experience in complex end-to-end systems such as IMS running over LTE.

Working with Partners in Industry

Interoperability events require close co-operation with industry, industrial fora and other organisations. In 2014 we organised 10 Plugtests events, with varying formats to meet the specific needs of our members and the industries we serve. Our Plugtests events are often supported by the European Commission (EC).

Among the highlights of 2014 was the first 'ETSI NFV PoC Zone', organised in Dusseldorf, Germany, in October as an integral part of the SDN & OpenFlow World Congress. This event showcased a dozen or more multi-vendor Proof of Concept (PoC) projects that were developed according to the framework drawn up by our Industry Specification Group on Network Functions Virtualisation (ISG NFV). The occasion offered a unique opportunity for a first-hand exchange of information about the current status of NFV technology and the interoperability of our NFV solutions.

Industry is driving our standardisation activities in ITS. In October, in partnership with ERTICO-ITS Europe, we organised the third eCall Interoperability Testfest in Vigo, Spain. Interoperability is a critical factor in the successful deployment of the eCall in-vehicle emergency call service. Our work is playing a key role in helping manufacturers to meet expected EC requirements that all new models of cars should have eCall modems fitted by early 2018.

In the broadcasting area, we have been addressing Digital Cinema, which has introduced new opportunities for the distribution of films. In June in Paris, France, we organised the Mezzanine Film Format Plugfest to test a new specification developed by the Commission Supérieure Technique which is designed to enable the digitisation and conservation of cinematographic works on modern digital distribution channels with the high quality required.

Our interoperability testing can play a key role in the development of new technologies. For example, over a nine-day period in June-July 2014, we enabled 27 companies to join together to help bring the small cell mass market closer. In partnership with the Small Cell Forum, we organised the second Small Cell LTE interoperability event in Paris. The event focused particularly on Self Optimising Networks and VoLTE. Due to the enlarged technical scope of the event, attendance almost doubled compared with last year, with 65 engineers on site from 15 different countries. Companies involved included equipment vendors, test tool vendors and providers of test network infrastructure.

To minimise the costs involved for participants, some of our activities are organised remotely. For example, in 2014 we held two remote events for the validation of our electronic signature standards which each lasted six weeks. One event, for our new standards for the Associated Signature Container (ASiC), provided full test coverage of the specifications including the testing of signature evolution, simulating real life situations. In response to a request from the EC, we also organised a Plugtests event on eSignature validation for representatives of EU Member States. This event, which enabled participants to test eSignature validation tools and to cross-validate eSignatures in any of the ETSI advanced signature formats (XAdES, PAdES, CAdES, and ASiC), was extended by two weeks due to its popularity – 62 companies and 100 people – which reflects both the importance of this issue and the usefulness of Plugtests events.

Focus on M2M and the Internet of Things (IoT)

In 2014 we carried out several important testing and interoperability initiatives to support two of our key strategic topics – M2M and the IoT. We organised the first M2M Plugtests event for the ETSI M2M architecture, which offered test sessions for vendors to assess the level of interoperability of their implementations and verify the correct interpretation of our M2M standards. In December we hosted the oneM2M Showcase, a unique series of live demonstrations and presentations of oneM2M interoperable solutions.

We also organised the fourth Constrained Application Protocol (CoAP) Plugtests event in London in March, collocated with a meeting of the Internet Engineering Task Force (IETF).

New Approaches

We are constantly looking for new ways to support our standardisation activities and to meet the needs of our members. For example, we have started to introduce PoC and technology evaluations and in 2014 we developed a generic PoC framework, based on the ISG NFV PoC experience, for adaptation by other ETSI committees. We also began to look at working practices such as hackathons and the impact of Open Source development on standardisation and testing.

Methods for Testing and Specification

Our Methods for Testing and Specification committee (TC MTS) creates standards for testing and specification languages, and provides frameworks and methodologies to enable our committees to produce documents that are easy to understand and easy to use. Its work is therefore critical to the market success of numerous technologies.

Test Description Language

In 2014, the main focus of TC MTS's work was the development of Test Description Language (TDL). TDL represents the next generation of testing languages and fills the methodology gap in existing test specification languages, such as Testing and Test Control Notation version 3 (TTCN-3), between the simple expression of what needs to be tested, i.e. the test purposes described in prose or Test Purpose Language (TPLan), and the complex coding of the executable tests in TTCN-3. TDL exploits the benefits of model-based software engineering and offers higher quality tests through better design and by making them easier to review by non-testing experts. Its introduction will improve and accelerate test development without sacrificing quality. TDL will be used primarily for functional testing, but could also be used for other types of testing.

The introduction of TDL is being driven by industry, which is looking to us to lead the way in its development. In April 2014, we published our first ETSI Standard (ES) on TDL, which provides a description of the meta-model and the semantics of its elements. Phase 2 of TDL development continued throughout the year with work on test execution, adding the necessary language functionality to integrate TDL test descriptions into test automation frameworks. This includes a revision of the meta-model and the addition of three new parts which, when completed, will provide a standardised concrete graphical syntax for end-users, a TDL exchange format to foster tool interoperability and extensions for advanced test objective specifications.

TTCN-3

At the same time, we continued to maintain TTCN-3, which is widely used the world over, dealing with numerous change requests to align with recent developments. Further work was undertaken on conformance testing, which was extended to cover the use of Extensible Markup Language (XML) in TTCN-3. For the first time conformance testing coverage of the core language clauses reached 100%.

Security Testing

We also continued to address security testing and in June we published an ETSI Technical Report (TR) describing industrial case studies. Good progress was made with a TR on security testing terminology, and with two ETSI Guides (EGs), one on the security assurance lifecycle and the other on risk-based security testing methodologies.

Major International User Conference

In September 2014, we organised the second ETSI User Conference in Advanced Automated Testing (UCAAT) in Munich, Germany. Another highly successful conference, it attracted over 150 delegates from 22 countries. We plan to launch TDL to the world at the next UCAAT in October 2015.

Public Safety

Mission-critical Communications to Rely on

Communication is a key factor in an emergency situation, both small incidents such as a man overboard as well as major natural disasters.

TETRA

The future vision for Terrestrial Trunked Radio (TETRA) is an evolution towards a fully integrated and seamless Information and Communications Technologies solution, providing narrowband/wideband/broadband wireless communications for mission- and business-critical Professional Mobile Radio (PMR) applications. Broadband will be a crucial factor in this, to supply the high data speeds required for various key applications including streaming video from the scene of an incident.

With narrowband and wideband TETRA standards successfully established, our TETRA and Critical Communications Evolution committee (TC TCCE) is therefore focusing on standardising a broadband extension to the TETRA standard and we are working closely with European regulators in attempts to gain the necessary spectrum allocations for broadband services for Public Protection and Disaster Relief (PPDR) users.

To minimise the work required and to optimise the standardisation process, the plan is to enhance existing standards for technologies, such as LTE™, by the development of interfaces and applications to make them suitable for mission-critical applications. In 2014, we channelled considerable effort into the development of an architecture encompassing a range of application layer interfaces to LTE. We published an ETSI Technical Report (TR) on the critical communications architectural reference model and the second part of a TR on user requirements for mission-critical broadband communications. Both the architectural reference model and the architecture itself include a Group Call facility, one of the principal requirements to enable the full range of mission-critical TETRA services to operate over LTE.

Other work in 2014 included revision of the TETRA base standard, to increase the frequency range of TETRA down to 138 MHz, and the addition of Voice to the TETRA Enhanced Data Service channels, to improve spectral efficiency.

Emergency Calling and Alerting

Our Emergency Telecommunications committee (SC EMTEL) embarked on a new study into methods of delivering positional information from smartphones to the Public Safety Answering Point during emergency calls. We are defining alerting libraries which will enable alerting messages to be encoded from keywords or even generated automatically, and then decoded in the receiver into the user's preferred language. We initiated a study into the best means of presenting alerting messages to users with special needs such as the elderly, the very young or those with disabilities.

Other achievements in 2014 included the publication of good practice guidelines for the design of mobile handsets to help minimise the number of false and accidental emergency calls, and the development of good practice guidelines for emergency calls made from private networks operated by large companies, hotels etc.

We are working on enhancements to the ETSI Technical Specification (TS) for EU-Alert, the European Public Warning System which uses the Cell Broadcast Service.

We made good progress in 2014 on an ETSI Standard (ES) on the functional architecture for emergency caller location determination and transport in Europe in support of European Commission Mandate M/493 on the Location Enhanced Emergency Call Service. The architecture is intended to cover a situation where different service providers and network operators need to co-operate to determine the location of an emergency caller. We began work on a new ES aimed at delivering applicable protocol specifications.

We have been working with the Third Generation Partnership Project (3GPP™) on eCall, the in-vehicle emergency call service which will automatically relay data about an accident from a vehicle to the emergency services. eCall is based on GSM™ and UMTS™ networks. In April we published a TR which, for the first time, will also enable an in-vehicle emergency call facility in LTE. We have begun to develop conformance tests to validate eCall high level application requirements.

Other Aspects of Public Safety Standardisation

We are working on the deployment of a satellite-based emergency telecommunication network for use, for example, by first responders in mass casualty incidents on the road or railways in the countryside and those caused by a major earthquake in an urban environment. We published a TS which establishes a formal system for categorising devices with Emergency Communication Cells over Satellite capabilities, to assist in the procurement of communications systems.

We undertook a survey to ascertain the level of interest in industry in the potential benefits of synergies between PPDR/civil PMR, military and commercial domains.

We are also creating standards for maritime safety equipment and working on various mechanisms for road safety through the use of Intelligent Transport Systems.

We held an ETSI Summit in November 2014 to discuss the future of Critical Communications.

Working in Partnership

Working with Europe

We place a high value on our partnership with the European Commission (EC) and the European Free Trade Association (EFTA). As a European Standards Organisation (ESO), we provide world-class standards and specifications to support European Union (EU) legislation and public policies. In 2014 we further developed our relationships with relevant EC departments.

We worked on a number of existing EC mandates and commented on draft standardisation requests being prepared on eInvoicing, urban Intelligent Transport Systems (ITS), privacy by design and the draft related to Harmonised Standards under the new Radio Equipment Directive (RED). We welcomed the Annual Union Work Programme for European Standardisation which was issued in July 2014 and will be used as a planning tool to prepare for possible future mandates.

We completed our first release of standards for Co-operative ITS in response to Mandate M/453, which was welcomed by the EC. We remained heavily committed in mandated areas such as electronic signatures (M/460), space standardisation (M/496) and enhanced emergency calls (M/493). We continued to address the smart grids mandate (M/490) and the smart metering mandate (M/441). In many of these areas, we co-operated closely with our sister ESOs, the European Committee for Standardisation (CEN) and the European Committee for Electrotechnical Standardisation (CENELEC).

We participated in all of the meetings of the EC's Committee on Standards that took place in 2014 and all four meetings of the Information and Communications Technologies (ICT) Multi-Stakeholder Platform. We regularly took part in meetings of the Task Force on the Rolling Plan for ICT Standardisation and contributed to the final outcome. We worked with the EC in the development of procedures for the preparation of mandates (the 'Vademecum') to ensure that the standardisation process remains responsive to the rapid technological changes in the ICT industry. We also participated in some of the working groups set up to evaluate specifications submitted by public authorities for consideration as Common Technical Specifications for ICT public procurement. We were an observer in various Member State committees and their working groups (including the Telecommunication Conformity Assessment and Market Surveillance Committee (TCAM) Expert Group, the Communications Committee (COCOM) and the Radio Spectrum Committee (RSCOM)). We also participated in the Radio Spectrum Policy Group (RSPG) and assisted in the development of radio spectrum policy in the EU.

Throughout 2014 we continued to develop and maintain Harmonised European Standards (ENs) in support of the Radio and Telecommunications Terminal Equipment (R&TTE) and Electromagnetic Compatibility (EMC) Directives. With the adoption of the new RED, we also began to review all of our Harmonised Standards produced under the R&TTE Directive and to create the new ones required to cover the RED's extended scope. Our aeronautical work in support of the Single European Sky (SES) Interoperability Regulation is badly affected by the proposed update to the Regulation (SES2+) where the standardisation element of the interoperability regulation (and hence the role of the ESOs) seems to have been removed. We hope for resolution of this issue in 2015.

Collaboration between the ESOs

Co-operation and collaboration with CEN and CENELEC continued throughout 2014. In February we produced the first tangible fruit of our updated three-way co-operation agreement, an EN developed by a Joint Working Group of all three ESOs. Produced in response to EC Mandate M/376, it deals with the accessibility requirements for the public procurement of ICT products and services in Europe.

In 2014 the ESOs continued to work closely together in areas such as ITS, smart grids, smart metering and electronic signatures to ensure that together we develop a coherent set of standards and avoid overlapping work. The Joint Presidents' Group ensures management level co-ordination, and informal exchanges take place between our technical committees. By working together on appropriate topics, especially those which are the subject of EC standardisation mandates, we ensure that industry benefits from a more integrated European standardisation system.

Working with NSOs and SMEs

We value our close relationships with National Standards Organisations (NSOs), Small and Medium-sized Enterprises (SMEs), micro-enterprises and start-ups.

In 2014, the number of SMEs and micro-enterprises joining ETSI continued to rise and they now represent about a quarter of our membership. We produced a promotional video to showcase the participation of SMEs in standardisation.

Approximately half of our NSOs are members of ETSI, but all play a central part in our standards-making process through the handling of the approval procedure for our ENs. In addition, NSOs are connected at a local level to industry in sectors beyond ICT, which is increasingly important as the scope of our work broadens into other sectors. To promote greater mutual understanding and to increase the involvement of NSOs in our work, we have introduced meetings with them prior to each General Assembly. These have been well received. Discussions with individual NSOs continued in parallel and we took part in two NSO-organised workshops in 2014, in Ireland and in Norway.

Partnership Agreements

Over the years we have built up a portfolio of partnership agreements with fora, consortia and international and regional Standards Development Organisations (SDOs) around the world. Experience has shown that working with others is the best way to achieve alignment between our standards and those produced elsewhere, to avoid the duplication of effort and to ensure that our work is widely accepted and implemented. Co-operation reduces fragmentation in standardisation and is a key factor when dealing with the convergence of technologies. Our investment in partnerships is also an important means by which we ensure our activities keep abreast of market needs.

By the end of 2014, our partnership agreements portfolio numbered 90 active partnerships. During the year, we entered into new Memoranda of Understanding (MoUs) with the Global Certification Forum (GCF), the Open Networking Foundation (ONF) and the Metro Ethernet Forum (MEF). In addition, Letters of Intent (LoIs) were signed with the European Institute of Innovation & Technology (EIT) ICT Labs, ADCO R&TTE and the European Association of National Metrology Institutes (EURAMET).

Partnerships were renewed with the Continua Health Alliance, the European Network and Information Security Agency (ENISA), the SIMalliance, the Office of the Assistant Secretary for Research and Technology (OST-R), the Wireless Innovation Forum (WInnForum), the DECT Forum, the Home Gateway Initiative, the TM Forum and the Telecommunications Industry Association (TIA). Our partnership with the Next Generation Mobile Networks (NGMN) Alliance was upgraded from an MoU to a full Co-operation Agreement.

Global Collaboration

Technologies are converging and becoming increasingly globalised. Our members operate in a global business environment and are drawn from five continents. And the impact of our standards extends beyond the borders of Europe. So, although originally established to produce standards for Europe, we now work with partners worldwide, producing standards for global use and opening up opportunities for our members all over the world.

GSC-18

In 2014, we hosted the 18th meeting of the Global Standards Collaboration (GSC), a senior-level gathering of the world's leading ICT standards organisations. GSC-18 focused on three topics which are central to our own current work programme: critical communications, Machine-to-Machine communications and software-defined networking. The new, more focused GSC format adopted in 2014 improved the opportunities for exchanging and sharing information about work in the different regions.

Seconded Experts in Emerging Markets

In an evolving international standardisation landscape, we continue to place special emphasis on bridging the gap with new players in emerging markets and regions. In partnership with CEN and CENELEC, the EC and EFTA, we have therefore appointed 'Seconded Experts' to intensify co-operation on standardisation issues with these regions.

At the end of 2014, our Seconded European Standardisation Expert in India (SESEI) completed the second year of his three-year posting. As a result of his presence on the ground, we have been able to promote our work and develop new synergies with local partners. Highlights of 2014 included organising a conference in Delhi, the 'Indo-European dialogue on ICT standards and Emerging Technologies', followed the next day by a workshop on security and energy efficiency. These two events provided a platform for us to present our latest work and for the local ICT community to share their needs. Project SESEI also played a central role in building links with the new Telecommunications Standards Development Society, India (TSDSI). One result of this was TSDSI's warmly welcomed application to join the Third Generation Partnership Project (3GPP™) as an Organisational Partner.

Our global outreach also includes China. A new Seconded European Standardisation Expert for China (SESEC) was appointed in 2014 for a third three-year phase. After a training period in Europe, the new Expert took up her posting in Beijing in December.

Forapolis™ Support Services

Drawing on over two decades of ETSI experience, Forapolis offers personalised support services to various standardisation and partnership initiatives. We provide these services, on a cost-recovery basis, for the benefit of ETSI members, by delivering high quality support to third party organisations where our members are involved. Forapolis continued to support five partners in 2014.

Intellectual Property Rights

Our Intellectual Property Rights (IPR) Policy is highly regarded around the world. We work constantly to improve it, consulting widely with our members, the European Patent Organisation (EPO), the EC, the United States Government and relevant partner organisations, to meet the needs of our members, public authorities and the ICT industry in general. In particular in 2014 we considered issues of injunctive relief, reciprocity and the definition of FRAND (fair, reasonable and non-discriminatory) terms.

ETSI officials contributed the views and interests of the standardisation community in conferences and workshops worldwide on patents, standards and the interplay between them.

Specialist Task Forces and Other Funded Projects

Specialist Task Forces (STFs) are groups of highly skilled experts sent by ETSI members to work together for limited periods to perform specific technical work under the direction of an ETSI committee. A similar mechanism has been adopted to support 'Funded Projects' for the Third Generation Partnership Project (3GPP™) partners and for R&D projects funded by the European Commission (EC) and the European Free Trade Association (EFTA).

Altogether, 39 STFs and other funded projects were active during 2014, involving 129 experts for an equivalent of about 25 man/years.

The financial investment was about 2,85 M€. In addition, a voluntary contribution equivalent to 450 k€ was provided by voluntary funding and/or experts working free of charge.

EC/EFTA Funding

We continued to collaborate with the EC and EFTA during 2014 and in June we signed a new Framework Partnership Agreement (FPA) with the EC, along with the Operating Grant for 2014. The EFTA versions were also signed before the end of the year.

The EC reduced its budget for standardisation by 25% for 2014 compared with 2013, which resulted in a significant decrease in the amount available for Operating Grants for the European Standards Organisations (ESOs). In our case, our Operating Grant went down from 3,385 M€ in 2013 to 2,5 M€ in 2014. However, we were able to achieve the finalisation and full payment of the 2013 Operating Grant. Despite a small increase in the EC standardisation budget for 2015, following discussions with the EC, we expect the 2015 Operating Grant to be concluded for between 2,2 and 2,3 M€.

The EC's ability to co-finance action grants was also affected by ongoing issues related to lump sum financing, and we are awaiting a Decision from the EC before we can submit proposals for 2015. In 2014, this issue resulted in only four action grants being finalised with the EC.

We have continued to manage and invoice the action grants received from the EC/EFTA efficiently, and we finalised and closed actions started in 2010 onwards. The actions signed in 2014 covered activities related to Cloud Standards Co-ordination, accessibility and emergency communications, plus the organisation of Plugtests™ interoperability events.

Technical areas in which funded resources were invested in 2014

Technical area	Spent (k€)
3GPP TTCN test specifications	903
Satellite Earth Stations & Systems (SES)	491
Electronic Signatures & Infrastructures (ESI)	300
Intelligent Transport Systems (ITS)	262
Methods for Testing & Specification (MTS)	232
Core Network and Interoperability Testing (INT)	191
Digital Enhanced Cordless Telecommunications (DECT™)	126
R&D projects – EC/EFTA funding	120
Broadband Cable Telecommunication Networks (CABLE)	99
Mobile Standards Group (MSG)	66
Powerline Telecommunications (PLT)	47
Human Factors (HF)	14
EMC and Radio Spectrum Matters (ERM)	9

Figures are rounded to the nearest k€.

Funding sources in 2014
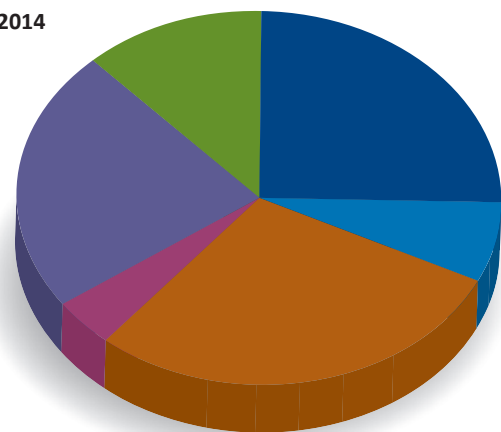
|	
ETSI funding	25%
ETSI voluntary contribution	7%
EC/EFTA Mandates/ICT	29%
EC/EFTA R&D	4%
3GPP Partners funding	23%
3GPP voluntary contribution	12%

Standards Production

In 2014 we published over 2 300 standards, specifications, reports and guides, bringing the total published since our establishment in 1988 to almost 37 000.

The time taken to produce our standards continued to fall in 2014 as a result of further improvements to our procedures.

The number of deliverables published, for each of the years 1991 - 2014
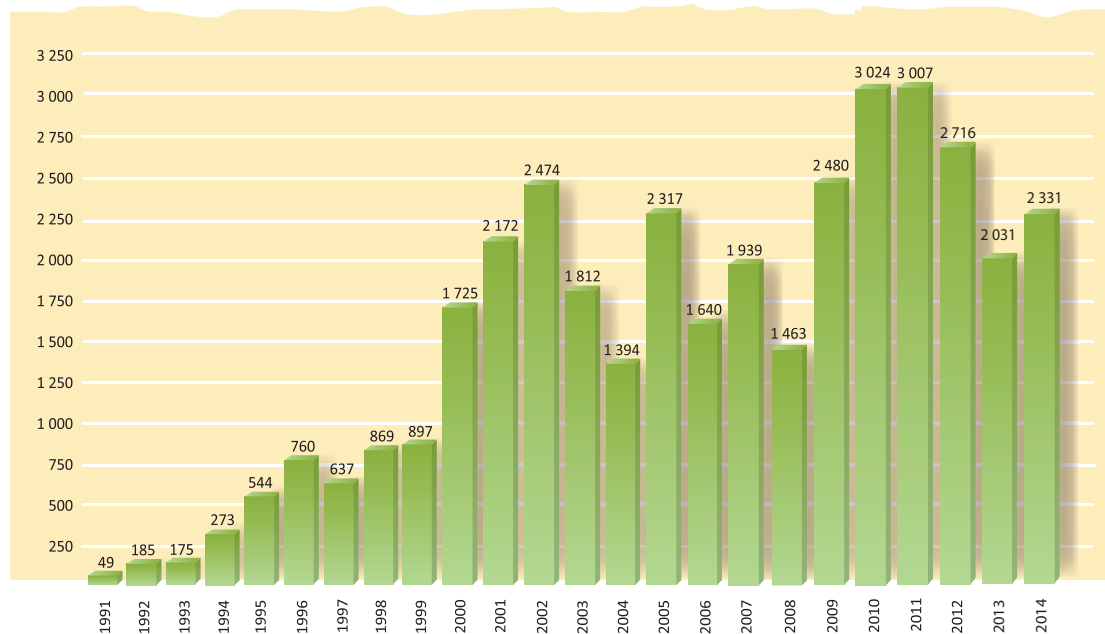
Distribution by type of published document	in 2014	Total since 1988
Technical Specification (TS) [1]	2 025	28 119
Technical Report (TR) [2]	195	3 076
ETSI Standard (ES)	26	727
European Standard (telecommunications series) (EN) [3]	46	4 605
ETSI Guide (EG)	5	242
Special Report (SR)	2	84
Group Specification (GS)	32	79
TOTAL	2 331	36 932

[1]   Includes GSM™ Technical Specification (GTS)

[2]   Includes old deliverable types: Technical Committee Reference Technical Report (TCR-TR), Technical Committee Technical Report (TC-TR) and ETSI Technical Report (ETR)

[3]   Includes amendments and old deliverable types: European Telecommunication Standard (ETS), Interim ETS (I-ETS) and Technical Basis for Regulation (TBR)
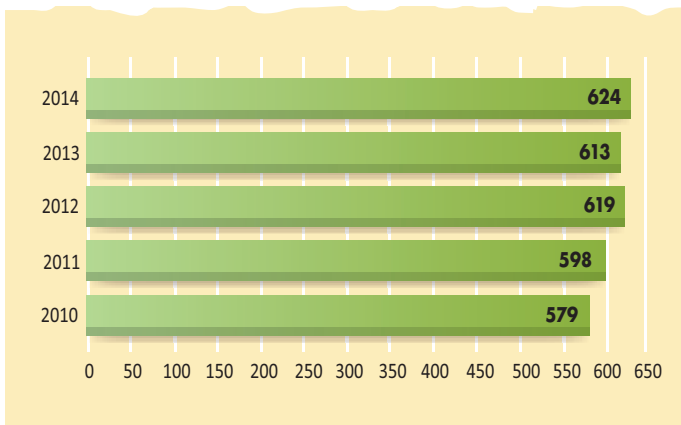
Membership

Membership numbers rose slightly in 2014. Our global reach spread even further as we welcomed Botswana and Montenegro to ETSI. Overall membership (all categories) is now drawn from 64 different countries and provinces, from across five continents. By the end of the year, we had a total of 767 members, made up of 624 Full Members drawn from 42 European countries, 120 Associate Members and 23 Observers. 112 of our members are Small and Medium-sized Enterprises (SMEs), of which 76 are micro-enterprises.

The European Commission and the European Free Trade Association Secretariat, which hold special roles as Counsellors, attend the General Assembly and the ETSI Board and continue to play an active part in our work.
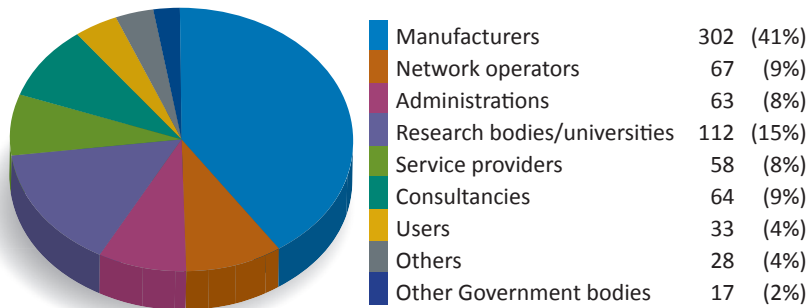
Building Developments
The upgrading of our meeting facilities was completed in April 2014 with the extension of our main Athena Amphitheatre from 170 to 240 seats, in time to host its first large event in May, our eHealth workshop on Telemedicine.

Evolution of ETSI Full Membership

Year	Members
2014	624
2013	613
2012	619
2011	598
2010	579

Full and Associate Membership by category

Category	Number	Percent
Manufacturers	302	(41%)
Network operators	67	(9%)
Administrations	63	(8%)
Research bodies/universities	112	(15%)
Service providers	58	(8%)
Consultancies	64	(9%)
Users	33	(4%)
Others	28	(4%)
Other Government bodies	17	(2%)

Membership by type

	1-1-2014	31-12-2014
Full Members	613	624
Associate Members	115	120
Observers	23	23
Total	751	767

Overall membership by country/province

Country/province	Number
Albania	2
Andorra	1
Australia	4
Austria	14
Belgium	26
Bosnia Herzegovina	2
Botswana	1
Brazil	1
Bulgaria	4
Canada	9
China	10
– Taiwan (Province of China)	11
Croatia	2
Cyprus	2
Czech Republic	5
Denmark	15
Egypt	1
Estonia	3
Finland	12
Former Yugoslav Republic of Macedonia	1
France	96
Georgia	1
Germany	118
Greece	5
Hungary	4
Iceland	1
India	6
Indonesia	1
Ireland	12
Israel	9
Italy	31
Japan	9
Jordan	1
Korea	3
Latvia	1
Lesotho	1
Lithuania	1
Luxembourg	8
Malaysia	1
Malta	2
Moldova	1
Montenegro	1
Netherlands	31
Norway	16
Poland	10
Portugal	4
Qatar	2
Romania	4
Russian Federation	8
Serbia	1
Singapore	1
Slovakia	3
Slovenia	3
South Africa	3
Spain	21
Sweden	23
Switzerland	22
Turkey	7
Ukraine	1
United Arab Emirates	4
United Kingdom	114
United States of America	48
Uzbekistan	1
Yemen	1
64 COUNTRIES OR PROVINCES IN TOTAL	**767**

Financial Situation

The management of the finances of ETSI is described by
- the budget report
- the financial statements (balance sheet and income and expenditure statement) which are established according to French laws and regulations.

Mr Patrick Aumeras, whose auditor's mandate was renewed by the 55th General Assembly, has audited the 2014 ETSI accounts and certified that the annual financial statements are true, sincere and give a fair view of the activities carried out during the past financial year.

Budget Maintenance
In total, compared with 2013, both income and expenditure decreased by 4,1%, or roughly 1,04 M€. The result of the year is a net result of 28 k€ after having made provision of 870 k€ in credit notes to be issued to Members to offset the excess of income over expenditure. This net result of 28 k€ compares with a net result of 32 k€ in 2013.

The key points of the budget management are the following:

Expenditure – Secretariat costs were 4,7% under budget and lower by 4,1% compared with 2013. The main reason for this reduction stems from the termination of the law suit in the US that enabled a significant diminution of the legal fees committed for our defence costs. Close monitoring of the expenditure budget along with delays in implementing some planned projects also contributed to the budget underspend. Partners' services are delivered on a cost recovery model. 4,2 M€ were spent on experts' costs for Specialist Task Forces and other standardisation related technical experts.

Income – Members' contributions (14,6 M€) increased by 2,5% compared with 2013 and funded roughly 60% of the budget. EC/EFTA payments amounted to 3,9 M€ to cover expenses related to the operation of the European standardisation platform and standardisation projects. With two partners significantly reducing or terminating their service contracts, income generated by support services supplied to fora and consortia (Forapolis™) amounted to 0,5 M€, which represents a 50% decrease compared with 2013.

Financial Statements for the Year 2014
The final accounts and the balance sheet are summarised below. The fiscal accounting period is 1 January 2014 - 31 December 2014.

Statement of Income and Expenditure Year 2014

	Income (€)	Expenditure (€)
Income	24 214 086	
Purchases		10 096 732
Expenses		14 176 646
Financial income and expenses	129 302	44 355
Extraordinary income & expenses	4 220	1 821
TOTAL	**24 347 608**	**24 319 554**

There was a net result of 28 054 € in 2014.

Summary of the Balance Sheet
Assets

Net amounts at:	31 Dec 2013 (€)	31 Dec 2014 (€)
Fixed assets	7 263 080	7 925 695
Debtors	16 407 286	16 805 507
Securities/cash	7 556 008	6 314 568
Prepaid expenses	166 742	168 047
TOTAL ASSETS	**31 393 116**	**31 213 817**

Liabilities

Net amounts at:	31 Dec 2013 (€)	31 Dec 2014 (€)
Equity	8 278 661	8 278 661
Provisions	2 112 303	579 160
Balance carried forward	231 714	264 074
Result of the year	32 360	28 054
Creditors	5 187 891	5 899 523
Deferred revenue	15 550 187	16 164 345
TOTAL LIABILITIES	**31 393 116**	**31 213 817**

Figures are rounded to the nearest €.

2014 Budget statements

INCOME	(k€)	EXPENDITURE	(k€)
Members' contributions and Observer fees net of credit notes	13 726	Secretariat staff costs	12 746
EC/EFTA contracts	3 975	Other Secretariat costs	6 172
3GPP™ Partners	2 445	Special projects	388
Voluntary contributions	1 208	European Friends of 3GPP	353
Forapolis	505	Provision and losses	457
European Friends of 3GPP	543	Experts' costs	4 156
Sales	218		
Plugtests™	31		
Financial income	125		
Other income	1 524		
TOTAL INCOME	**24 300**	**TOTAL EXPENDITURE**	**24 272**

In 2014, there was a net result of 28 k€.

ETSI
World Class Standards

- 2G, 3G, 4G Mobile Communications
- Air Traffic Management
- Automotive Radar
- Autonomic Systems
- Body Area Networks
- Broadband Wireless Access
- Broadcasting
- Cable Networks
- Cloud Technology
- Cognitive Radio
- Cyber Security
- DECT™
- Digital Mobile Radio
- Digital Rights Management
- eHealth
- Electromagnetic Compatibility
- Electronic Signatures
- Emergency Communications
- Energy Saving
- Environmental Aspects
- Fixed-line Access
- Fixed Radio Links
- Human Factors
- Identity Management
- IMS Network Testing
- Intelligent Transport
- Internet of Things
- Interoperability
- Lawful Interception

- Machine-to-Machine Communications
- Maritime Communications
- Media Content Distribution
- Millimetre Wave Transmission
- Mobile Communications
- Mobile-Edge Computing
- Network Functions Virtualisation
- Next Generation Networks
- Powerline Communications
- Protocols
- Public Safety Systems
- Quality of Service
- Quantum Key Distribution
- Radio Regulations
- Radio Systems
- Railway Communications
- Safety
- Satellite Communications
- Security
- Security Algorithms
- Short-range Radio
- Smart Appliances
- Smart Cards
- Smart Metering
- Software Defined Radio
- Telemedicine
- Testing
- Terrestrial Trunked Radio (TETRA)
- Wireless Medical Devices

To find out about our plans for the future, see our Work Programme 2015-16.

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