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ACEMIND

Deliverable D5.2

Initial Plan for Standardisation

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Abstract

This deliverable defines the standardisation plan for the ACEMIND project. It briefly describes the standardisation landscape in home networking and identifies standardisation groups relevant to the work done in ACEMIND.

The standardisation plan describes the capabilities within the ACEMIND project and especially of task 5.2 on standardisation for contributions to standardisation bodies. Several standardisation groups could be identified, that provide good, interesting, and promising opportunities for contributions by ACEMIND that have an impact on the developed standard.

Keyword list

Standardisation, IEEE, Bodies, Regulatory, Fora

Executive Summary

The landscape of organisations that define mechanisms for home networking or that have an influence on the definition of these home networking mechanisms is quite broad. There are several standardisation organisation, industry fora and consortia, as well as regulation authorities involved.

Several standardisation groups in different organisations have been identified, that are especially relevant for the work done within the ACEMIND project. Many of them have an impact on ACEMIND, but there is only little change that ACEMIND can influence them substantially for different reasons, such as not enough technical overlap or unaligned timelines.

However, several newly created standardisation groups could be identified where the concepts and results of the ACEMIND project can make a difference to these standards. There is at least one such group for HOME Network which is:

- IEEE 1905 or Hybrid Network

There are also several standardisation groups with minor opportunities for contributions by ACEMIND. For instance:

- AllSeen from AllJoyn

The ideas, concepts, and results of ACEMIND will be socialized with relevant partners for standardisation.

ACEMIND Task 5.2 on standardisation will support and coordinate the standardisation efforts of ACEMIND. The contributions will be made by ACEMIND partners already active in standardisation. Task 5.2 will continuously monitor the standardisation landscape and will provide information on new standardisation opportunities to the work packages. Task 5.2 will also update the standardisation plan according to the dynamics in the standardisation landscape with respect to home networking.

ACEMIND partners active in standardisation are mainly industry partners: Orange and Devolo.

Contributions to standardisation bodies as well as ACEMIND documents in support of ACEMINDs standardisation activities will be documented.

This document will be regularly updated. The next major update is due in month 18. The final version will be available on month 36.

Impact on the other Work-packages

The results of this deliverable impact different work packages of the ACEMIND project:

- In the WP3, the tasks 3.1 and 3.2, focused on the monitoring and management interface, can be enriched by the obtained results in this analysis, in particular with the adjustments regarding the definition of the offered services in the demo.
- Likewise, in the WP4, the task 4.1 is focused on the definition of Acemind final demonstrations. Thanks to the results coming from this analysis, the task can orientate the demonstration so that they are closer to the International Standards.
- Likewise, Dissemination process of the project will be impacted from this deliverable (publications activities)

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List of Acronyms

Acronym	Meaning
<ACEMIND>	<Advanced Convergent and Easily Manageable Innovative Networks Design>
AC	alternating current
ACK	acknowledgement
ADSL	asymmetric digital subscriber line
ANSI	American National Standards Institute
AODV	Ad hoc On-demand Distance Vector
AP	access point
AT	access and terminals; analogue & digital terminals
ATTM	access, terminals, transmission, and multiplexing
AV	audio-visual; audio/video
AVB	audio video bridging
BLE	BlueTooth Low Energy
BPSK	binary phase shift keying
BSS	basic service set
CaON	Converged and Optical Networks
CAT	category
CATV	cable television
CDMA	Code Division Multiple Access
CE	consumer electronics
CENELEC	European Committee for Electrotechnical Standardization (Comité Européen de Normalisation Electrotechnique)
CEPT	European Conference of Postal and Telecommunications Administrations
CERP	European Committee for Postal Regulation
CISPR	International Special Committee on Radio Interference (Comité Internationale Spécial des Perturbations Radioelectrotechnique)
CO	confidential
CPE	customer premises equipment
CSMA	carrier sense multiple access
CSMA/CA	carrier sense multiple access collision avoidance
CSMA/CD	carrier sense multiple access collision detection
CWMP	CPE WAN Management Protocol
DAA	detect and avoid

DCF	distributed coordination function
DHS	Digital Home Standard
DLNA	Digital Living Network Alliance
DSL	Digital Subscriber Line
DVB	digital video broadcasting
EC	European Commission
ECC	Electronic Communications Committee
Ecma	European Computer Manufacturers Association
EDCA	enhanced distributed channel access
EMC	electromagnetic compatibility
EN	European norm
ERM	Electromagnetic Compatibility and Radio Spectrum Matters
ET	Engineering and Technology
ETSI	European Telecommunications Standards Institute
BRAN	Broadband Radio Access Networks
EU	European Union
FCC	Federal Communications Commission
Gbps	Gigabit per second
GHz	Gigahertz
HD	high definition
HDTV	high definition television
HGI	Home Gateway Initiative
HILI	High Level Interface
HIP	Host Identity Protocol
hn	home networking
hnta	home networking terminal adapter
HPAV	HomePlug AV
HSI	high speed interface
HW	hardware
HWMP	Hybrid Wireless Mesh Protocol
ICT	information and communications technologies
ID	identifier
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IEEE-SA	IEEE Standards Association

IETF	Internet Engineering Task Force
IP	Internet Protocol
IPTV	internet protocol television
IR	infrared
IrDA	Infrared Data Association
ISM	industrial, scientific, and medical
ISO	International Organization for Standardization
IT	information technology
ITE	information technology equipment
ITU	International Telecommunication Union
ITU-R	International Telecommunication Union - Radiocommunication Sector
ITU-T	International Telecommunication Union - Telecommunication Standardization Sector
JEITA	Japan Electronics and Information Technology Industries Association
JTC	joint technical committee
L3MP	Layer 3 Mobility Prediction
LAN	local area network
LDPC	low density parity check
LiFi	Light Fidelity
LLC	Logical Link Control
MAC	media access control
MAN	metropolitan area network
MAP	mesh access point
Mbps	Megabit per second
MHz	Megahertz
MIB	management information base
MICS	media independent command service
MIES	media independent event service
MIH	media independent handover
MIIS	media independent information service
MIMO	multiple input multiple output
MIP	Mobile IP
MIPv4	Mobile Internet Protocol version 4
MIPv6	Mobile Internet Protocol version 6
MP	mesh point

NAT	network address translation
NGN	next generation networks
OFDM	orthogonal frequency division multiplexing
ACEMIND	Home Gigabit Access
PAR	project authorization request
PC	personal computer
PHY	physical layer
PLC	powerline communication
PLT	powerline telecommunications
PON	passive optical network
PT	project team
Q	question, quarter
QAM	quadrature amplitude modulation
QoS	quality of service
QPSK	quadrature phase shift keying
R&D	research and development
RES	Radio Equipment and Systems
REV	revision
RF	radio frequency
RFC	request for comments
SC	single carrier; study committee
SDTV	standard definition television
SG	study group
SIG	special interest group
SIP	Session Initiation Protocol
SME	small and medium enterprise
SOHO	small office / home office
Std	standard
SW	software
TC	technical committee
TCP	Transport Control Protocol
TDMA	time division multiple access
TG	task group
TS	technical specification
TV	television

UM	usage model
URL	uniform resource locator
UROOF	Ultra-wideband over Radio over Optical Fibre
US	United States
USB	universal serial bus
USB-IF	USB implementers forum
VDSL	very high speed digital subscriber line
VHT	very high throughput
VLAN	virtual local area network
VLC	visible light communications
VLCC	Visible Light Communications Consortium
VoIP	voice over internet protocol
WAN	wide area network
WCDMA	Wideband Code Division Multiple Access
WG	working group
Wi-Fi	wireless fidelity
WLAN	wireless local area network
WMM	Wi-Fi Multimedia
WP	workpackage
WPA	wireless protected access
WPAN	wireless personal area network
WWRF	Wireless World Research Forum
xDSL	any DSL technology

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Purpose of this document

This document develops and proposes a standardisation plan for the ACEMIND project. The ACEMIND project has several workpackages in the area of home networks that are influenced by standards and regulations but also can provide input to standardisation bodies.

The standardisation processes in the different organisations might look like a slow moving and rather fixed process from the outside. However, they have their own specific dynamics and might change rapidly. Especially the timelines might change frequently. Usually, standardisation efforts are driven by developments in the respective markets. On the other hand, existing standards influence the development and the markets. This means for the ACEMIND project, that it will be influenced by existing standards, but that it also has the chance to shape the development of standards whose timeline is well-aligned with the timeline of the developments in ACEMIND.

Nevertheless, the ACEMIND project is only one of the many players that influence the dynamics and the timelines of the standardisation bodies. Therefore, this standardisation plan is only valid for the current situation. It has to be revisited and adapted continuously.

The document tackles the standardisation of results of the ACEMIND project from different angles and from general to specific. Chapter 0 gives a very high-level overview of the areas within ACEMIND that could be considered for standardisation. The following 3 chapters go from the general picture of standardisation bodies, industry fora, and regulation bodies in the area of home networks, over standards relevant to the work in ACEMIND, to the actual standardisation plan in chapter 4. Already done contributions to standardisation bodies within the ACEMIND context done by partners are listed in part 0 and 4.3.

Standardisable Work within ACEMIND

The ACEMIND project contains five workpackages with two technical workpackages:

- WP 3: Advanced Convergent Hybrid Networks
- WP 4: Integration and Demonstration Activities

The technical workpackages WP 3-4 of the ACEMIND project can be mapped to two categories which are described in the following subsections. Workpackage WP 4 is the practical realisation of the research and technology developed in the other technical workpackages. Therefore, WP 4 will not be actively involved in providing submissions to standardisation bodies. However, the experiences within WP 4 with the ACEMIND technologies will give important feedback and input to standardisation activities within ACEMIND.

Communication Link Technologies

This category covers all research and technological development that is focussed at a single communication link between two devices.

There are several standardisation bodies and standardisation groups that deal with the definition and standardisation of the communication link between two devices. These are usually PHY and MAC specifications. Depending on the actual physical transmission medium, different standardisation bodies are responsible for different technologies.

Depending on the current state of the relevant standards and the maturity of the principles of the technology developed within ACEMIND, the partners involved in workpackages 3 to 4 can provide improvements or amendments to almost finished and existing standards. They can also make substantial contributions to future standards whose development started only very recently or will start in the near future.

Networking Aspects

This category all research and technological development that considers communication networks with many communication links. Such communication networks have usually more than two network nodes, every node can communicate with every other node, and the communication can be over more than a single link.

Networks that have only links of the same communication technology are often standardised in the same standardisation bodies or standardisation groups as the respective communication links. Networks that have links from different communication technologies are usually standardised in more or less separate standardisation bodies or groups, depending on the level of heterogeneity.

Workpackage 3, the Hybrid network and smart local network, is *the* networking workpackage within ACEMIND. Moreover, some parts of workpackages 2, and maybe also of workpackage 4, may fall into this category.

There are already several standards available that deal with the networking of communication devices. Because networking is a more general concept than a transmission technology, there is a more evolutionary approach in the development and progress of respective standards. The ACEMIND project will have to decide if it is sufficient to propose amendments to existing standards, for instance IEEE 1905 or if it is necessary to create a new standard which covers the ACEMIND networking aspects.

Architecture

Architectures in communications are often high-level concepts that need to be filled with actual mechanisms and processes. They structure complex systems for ease of implementation or for interoperability. The former does not require standardisation; on the contrary, it has to obey certain conventions defined by standards. The latter, however, needs some form of agreement, description, or definition in order to ensure the required level of interoperability.

Workpackage WP 3 is also the workpackage concerned with the architecture of the ACEMIND network. One of the goals is to provide interoperability over heterogeneous networks. This should require some additional form of standardisation. A likely place for this might be industry forums. Workpackage 4 might be partially involved in such activities, too.

Scenarios

This category is mainly driven by the market. The anticipated use of home networks by both the user and the vendors will drive the work in workpackage WP 2 and WP 4. There is no standardisation necessary for scenarios, although it is advantageous if their description follows some standardised methodology. However, scenarios can be useful input to standardisation bodies and especially to industry fora.

Standardisation Bodies Relevant for Home Networking

This chapter gives the big picture of standardisation bodies, industry fora, and regulation bodies that are relevant in the area of home networking. This is, of course, a rather long list. Some of the institutions are more relevant than others to the ACEMIND project. However, the whole set will provide a rather complete picture of the institutions that play a role in shaping the technology and the market of home networking.

The aim of this chapter is to provide a rather complete overview of the important institutions for standardisation of home networks. It is meant to outline the area of home networking. More detailed information on standardisation groups relevant for the work of the ACEMIND project are given in the next chapter.

Each section on an institution will provide a rough idea of its role in the area of home networking, sometimes with an additional focus on the scope of the ACEMIND project. For further information, the URL of the standardisation body, industry forum, or regulation body is given.

Standardisation Bodies

IEEE Standards Association (IEEE-SA)

The Standards Association of the Institute of Electrical and Electronics Engineers (IEEE-SA) hosts a plethora of standards and standardisation efforts in the fields of electrical and electronic engineering and computer science. The standardisation efforts are organized in so-called projects.

Website: http://standards.ieee.org

IEEE P802 – Standard for Local and Metropolitan Area Networks

The presumably most well-known project, and maybe also the biggest one, is project IEEE P802 on Local and Metropolitan Area Networks. It covers most of the wired and wireless communication technologies in the range from metropolitan to body area networks. The project has produced many standards with even more amendments and is still very active. The IEEE 802 LAN/MAN Standards Committee organises its work in working groups.

The home networks anticipated by ACEMIND will cover small installations of local area networks and personal area networks in all sizes as well as architectural issues of them. Therefore, the following working groups will be important for the ACEMIND project:

- IEEE 802.1 – High Level Interface (HILI)
- IEEE 802.2 – Logical Link Control (LLC)
- IEEE 802.3 – CSMA/CD
- IEEE 802.11 – Wireless LAN (WLAN)
- IEEE 802.15 – Wireless Personal Area Networks (WPAN)
- IEEE 802.19 – Coexistence Technical Advisory Group
- IEEE 802.21 – Media Independent Handover

Website: http://grouper.ieee.org/groups/802/

IEEE 802.1

The IEEE 802.1 Working Group develops standards and recommended practices for IEEE 802 LAN/MAN architecture, internetworking among IEEE 802 LANs, MANs and other wide area networks, IEEE 802 Security, IEEE 802 overall network management, and protocol layers above the MAC & LLC layers.

Website: http://grouper.ieee.org/groups/802/1

Among all the standardisation groups within IEEE 802 related to LAN, the description of some groups relevant for home networking activities can be found below

IEEE 802.1D-2004 MAC Bridges

The standard IEEE 802.1D-2004 defines the functionalities of MAC bridges. It is the fundamental standard of interworking between IEEE 802 devices. It defines the mechanisms for forwarding frames from one IEEE 802 segment to another, without leaving the MAC address space. IEEE 802.1Q defines the spanning tree protocol that disables ports at bridges in order to avoid loops by uncontrolled forwarding and broadcasting at bridges. In the 2004 version, the spanning tree protocol has been replaced by the Rapid Spanning Tree Protocol. The standard also contains a special clause on the integration of IEEE 802.11 networks.

IEEE 802.1Q-2005 Virtual LANs

The standard IEEE 802.1Q-2005 defines virtual LANs and the necessary extensions of existing LAN mechanisms, for instance, the Multiple Spanning Tree Protocol.

Virtual LAN means having multiple logical networks using a single physical network. The network of the user is completely separated from the network of other users, for instance, different departments, although the frames are transmitted over the very same network infrastructure. This is achieved by inserting a VLAN ID or VLAN tag into the frame header. This distinguishes the frames from different virtual LANs. Because of the VLAN tag, the use of IEEE 802.1Q is often called VLAN tagging.

VLAN tagging is sometimes “reused” for other mechanisms, especially the assignment of different priority classes to frames. Here, each priority class has its own virtual LAN, and the VLAN tag will be interpreted as priority in the network nodes.

IEEE 802.1X

IEEE 802.1X is a standard for controlling access to a LAN by requiring passing an Authentication protocol. It is applicable to the ports of MAC Bridges, ports for Servers or Routers, and the ports of Access Points in WLANs.

It defines a process in which the Port being requested (the Authenticator) challenges the Supplicant and the Supplicant communicates via the Authenticator to the Authentication Server. The Supplicant and the Authentication Server must share some secret information, and the Authenticator and the Authentication Server must have trusted contact as well.

The protocol has been standardized as IEEE 802.1X. IEEE 802.11-2007 uses the protocol for authentication. IEEE 802.1X may be a useful ingredient to provide security in the ACEMIND network.

IEEE 802.1X was published in 2004. It is currently being revised under project 802.1X-REV to establish security associations for 802.1AE MAC Security in order to facilitate secure communication over publicly accessible LAN/MAN media for which security has not otherwise been defined, and to allow the use of IEEE Std 802.1X, already widespread and supported by multiple vendors, in additional applications.

IEEE 802.2 Logical Link Control

The IEEE 802.2 Working Group develops standards for Logical Link Control (LLC). It is currently inactive (in "hibernation") with no new projects in development. Its completed work is a published standard (ANSI/IEEE Standard 802.2, ISO/IEC 8802-2:1998).

IEEE 802.11 Wireless LANs

The standard IEEE 802.11defines Wireless LANs or Wi-Fi Networks. In infrastructure mode, a network of access points (APs) provides wireless access to clients, which are called non-AP stations in the IEEE 802.11 terminology. Wireless transmission is usually only between the client and the access point, the communication between the access points is often wired. In ad hoc mode, clients can talk directly with each other without the need of an access point.

IEEE 802.11 contains a number of definitions of physical layers, which are usually known by the letter of their amendment. These are IEEE 802.11 a/b/g/h/n then ac/ad/ah/HEW. The media access to the air interface is an important part of the standard. IEEE 802.11 defines a distributed coordination function (DCF) as basic media access mechanism, which provides CSMA/CA to the WLAN nodes. The standard also contains IEEE 802.11e for QoS support and IEEE 802.11i, usually referred to by its marketing name WPA2, for security.

IEEE 802.11 is the main and dominant technology for wireless data communication in home networks. There are several active amendments to this standard, some of them are important to ACEMIND, for instance, IEEE 802.11k Radio Resource Management, IEEE 802.11s Mesh Networking, IEEE 802.11n High Throughput PHY & MAC. These amendments will build on the existing standard IEEE 802.11-2007.

IEEE 802.15.7 – Visible Light Communications

The interest in VLC in this standardisation body started in late 2007 and was initiated by Samsung. The group was granted SG status in March 2007. Besides Samsung, there is interest from the Visible Light Communications Consortium (VLCC) in Japan, members of WWRF, industry, and a number of other institutions. A PHY and a MAC layer for short-range optical wireless communications using visible light in optically transparent media are defined. The visible light spectrum extends from 380 nm to 780 nm in wavelength. The standard is capable of delivering data rates sufficient to support audio and video multimedia services and also considers mobility of the visible link, compatibility with visible-light infrastructures, impairments due to noise and interference from sources like ambient light and a MAC layer that accommodates visible links. The standard adheres to applicable eye safety regulations. In terms of use cases, both, high-speed short-range scenarios (e.g., mobile to mobile) and medium-range applications (e.g., positioning and traffic guidance) have been discussed.

It should also be noted that there already exist Japanese standards for VLC (e.g., cp-1221 JEITA; focus on low bit rate, slim standard). These together with IEEE 802.11 for IR will be considered as a useful 'starting point' for work in this area.

Web site: http://www.ieee802.org/15/pub/TG7.html

IEEE P1901 – Standard for Broadband over Power Line Networks: Medium Access Control and Physical Layer Specifications

The project P1901 is one in a group of IEEE projects concerned with broadband communications over power line. It specifies a single standard for the MAC layer and PHY layer for broadband communication over power line networks. Other IEEE projects concerned with broadband power line communications are

- IEEE P1675 – Standard for Broadband over Power Line Hardware
- IEEE P1775 – Standard for Powerline Communication Equipment - Electromagnetic Compatibility (EMC) Requirements – Testing and Measurement Methods

Website: http://grouper.ieee.org/groups/1901/

IEEE P1905.1 – "Convergent Digital Home Networks"

The IEEE P1905.1 working group[1] was created in November 2010, thanks to both the results obtained during the OMEGA project and the interest of manufacturers in "layer 2.5 convergence" concepts. The aim of P1905.1 is to facilitate the usage of new services everywhere in the home, by defining a unified framework for multi-interface devices as shown in Figure below.

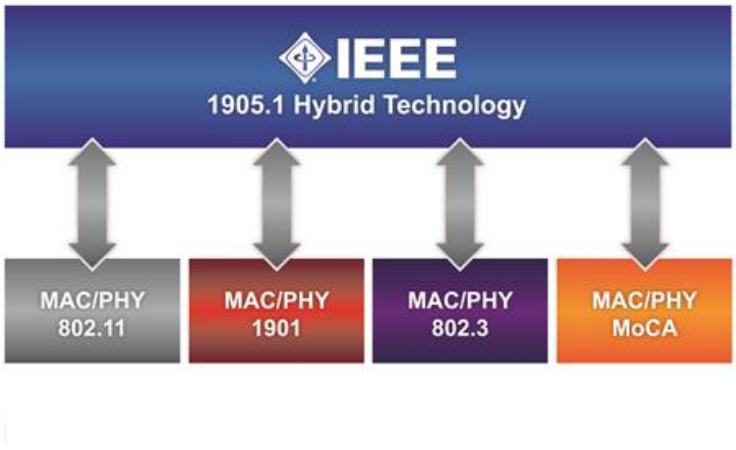

Figure 1 – *IEEE P1905.1 interfaces with legacy technologies*

[1] IEEE P1905.1 http://grouper.ieee.org/groups/1905/1/

The ACEMIND consortium is widely represented in IEEE P1905.1 as **Orange** is member of the IEEE P1905.1 working group and **devolo** is also member. A first version of the IEEE P1905.1 standard is available and certification process is on-going (http://www.nvoy.org/). Further enhancements of this standard are already envisioned by another working group.

Four main technologies are supported (Ethernet, 802.11, MoCA and P1901), but the standard is extendable to future layer 2 technologies. It defines an abstraction layer to layer 3 and facilitates seamless integration for multi-interface devices. For the end user, it simplifies setup of new devices and provides mobility inside the home. Frame transmission is more robust, and advanced network management features, like topology discovery and QoS metrics, are included. The validation of the standard is done and a certification program is also defines. The design of P1905.1 abstraction layer is a light software layer above the existing MAC/PHY technologies. There is no modification of the underlying technologies in order to provide full backward compatibility. All control/management frames generated by the P1905.1 layer are using a new header and a flexible payload made of different type-length-value (TLVs). To ease co-existence, a dedicated Ethertype and a multicast MAC address have been allocated to this standard by the IEEE. For data frames generated by P1905.1 terminals, the framing is transparent: no extra header is inserted. We can more or less say that the P1905.1 layer takes care of Ethernet frames with IEEE 802.1p priority and provides bridging to the underlying technologies. The forwarding is done on the fields defined in the Ethernet frames: source address, destination address, priority, and Ethertype. Nevertheless, the P1905.1 working group is aware that a second release is ongoing to cover new use cases, new technologies, and new performance. We can imagine that year 2014 will be a good timeline for new functions or technical propositions. ACEMIND will get the opportunity to bring inputs on green management, sensor technology integration and seamless handover for P1905.1a.

ETSI

The European Telecommunications Standards Institute (ETSI) produces globally-applicable standards for Information and Communications Technologies (ICT), including fixed, mobile, radio, converged, broadcast and internet technologies. The standardisation activities addressing specific technology areas are done in Technical Committees and their Task Groups.

Website: http://www.etsi.org

Concerning the home network proposal, there are works between semantics and abstraction layers: (http://workshop.etsi.org/2012/201210_M2MWORKSHOP/02_TheETSIM2MStandard/ABSTRACTION_SEMANTICS_ELLOUMI.pdf)

ITU-T

The International Telecommunication Union (ITU-T) is a section of the United Nations that is dedicated to international technical standards for telecommunications. Study Group 15 is responsible for standards for access technologies (including DSL and optical) and backbone technologies. Question 4 (Q.4/SG15) is the subgroup which is developing the G.hn recommendation on home-networking PHY and MAC layers; however, their main focus is xDSL transceivers. Question 1 (Q.1/SG15) is the subgroup which is developing the G.hnta recommendation on home networking transport architecture; their general responsibility is the coordination of access network transport standardisation.

Website: http://www.itu.int/ITU-T/studygroups/com15/index.asp and Creation of a Focus Group (http://www.itu.int/en/ITU-T/focusgroups/m2m/Pages/default.aspx)

ISO – International Organization for Standardization

The International Organisation for Standardisation (Organisation internationale de normalisation), widely known as ISO, is an international standard-setting body composed of representatives from various national standards organisations. ISO is a network of the national standards institutes of 157 countries, one member per country, with a Central Secretariat in Geneva, Switzerland, that coordinates the system.

To deal with the consequences of substantial overlap in areas of standardisation and work related to information technology, ISO and IEC formed a Joint Technical Committee known as the ISO/IEC JTC1. Its official mandate is to develop, maintain, promote and facilitate IT standards required by global markets meeting business and user requirements.

Website: http://www.iso.org

IEC

The International Electrotechnical Commission (IEC) prepares and publishes international standards for all electrical, electronic and related technologies — collectively known as "electrotechnology". The IEC also manages conformity assessment schemes that certify that equipment, systems or components conform to its International Standards. The latter is of direct relevance for the optical activities within ACEMIND (LiFi) since allowable laser emission levels of optical transmitters are regulated by IEC standard EN60825-1: 2007 (Safety of Laser Products) and IEC62471:2006 (Photobiological Safety of Lamps and Lamp Systems).

Website: http://www.iec.ch

CENELEC

CENELEC is the European organisation responsible for electrical and electronic standardisation. To improve efficiency many standards are now developed at the international level, hence CENELEC has a parallel working arrangement with the International Electrotechnical Commission (IEC) including CISPR. The primary committees are:

- TC 210: Main committee for EMC standards. This group is also responsible for liaison on behalf of CENELEC with ETSI and CISPR;
- SC 205A: Product committee for powerline communication systems.

Website: http://www.cenelec.eu

IETF

The Internet Engineering Task Force (IETF) is a large open international community of network designers, operators, vendors, and researchers concerned with the evolution of the Internet architecture and the smooth operation of the Internet. It develops Internet standards, called RFCs, and deals in particular with standards of the TCP/IP and Internet protocol suite. The IETF is open to any interested individual.

The actual technical work of the IETF is done in its working groups, which are organized by topic into several areas (e.g., routing, transport, security, etc.).

In principle, the different working groups of the IETF are not interesting for contributions by ACEMIND because they are located in the IP domain and not in the MAC address domain. However, the work of the IETF is relevant to ACEMIND for several reasons:

- The Internet Protocol will run on top of the ACEMIND home network, so IP mechanisms will have their requirements to the underlying ACEMIND network as well as the underlying ACEMIND network will impact the performance of the IP mechanisms
- Many of the mechanisms developed in the IETF working groups in the IP domain can be adapted and used in the MAC address space.
- The IETF provides many security mechanisms that might be used in the ACEMIND security architecture.

For instance, TRILL is a layer 2 solution designed by IETF to provide redundant/multi-path topology in data centers. The main goal is to replace the spanning tree architecture and to bring “link state” routing intelligence at layer 2. The base protocol specification was published in July 2011 as RFC6325 and commercial products are

available by Cisco, Broadcom, Blade Networks (IBM), etc. A software solution is available in Solaris Express where the implementation is done in kernel space. Up to now, there is no Linux implementation available.

Technologies supported by TRILL are Point-to-Point Protocol (PPP) and Ethernet. If Wi-Fi and PLC need to be supported, they are hidden by an Ethernet port bridged to this technology. The path selection protocol used for the control plane is Intermediate System to Intermediate System Protocol (IS-IS) with extra Type-Length-Values (TLVs) to carry TRILL information (defined in RFC 6326). Data frames are encapsulated in a new TRILL header (6 bytes) containing ingress, egress and hop count information to avoid loops. To achieve scalable forwarding performance, part of the implementation is done in hardware. Costs of TRILL chipset are not very high and it is possible to imagine TRILL adoption for other markets like small office or home networks in the future.

Website: http://www.ietf.org

KNX

The KNX standard is based on EIB, EHS and BatiBUS. Via the KNX medium to which all bus devices are connected (twisted pair, radio frequency, power line or IP/Ethernet), they are able to exchange information. Bus devices can either be sensors or actuators needed for the control of building management equipment such as: lighting, blinds/shutters, security systems, energy management, heating, ventilation and air-conditioning systems, signalling and monitoring systems, interfaces to service and building control systems, remote control, metering, audio/video control, white goods, etc.

KNX is approved as an International Standard (ISO/IEC 14543-3) as well as a European Standard (CENELEC EN 50090 and CEN EN 13321-1) and Chinese Standard (GB/Z 20965). KNX is therefore future proof. KNX products made by different manufacturers can be combined.

Website: http://www.knx.org/

Industry Fora and Consortia

Home Gateway Initiative (HGI)

The HGI[2] was founded by major broadband service providers (BSPs) in 2004. Many leading vendors of digital home equipment joint the HGI which is shaping the way for home delivered IP services. The Home Gateway Initiative is developing requirements for residential gateways that provide end-to-end service delivery, in order to promote interoperability and volumes. They will not produce a standard of their own, but plan to contribute to other standards bodies on the basis of any gaps they see in existing work done by ITU H.610, Broadband Forum (formerly DSL Forum), DLNA, OSGi Alliance, etc.

The Home Gateway & Network Architectures group defines the HW/SW architecture and requirements, including security functions; the QoS working group identifies QoS interfaces to map WAN QoS to LAN QoS; the Remote Operation & Device Management working group defines common operator requirements for remote management of CPE.

The HGI publishes requirements for digital home building blocks. These building blocks are the digital home hardware and software which connect consumers and services. This includes home gateways, home networks, and home network devices. HGI projects are triggered by the service-oriented vision of the BSP members and built on the technical collaboration of all the HGI participants. The HGI welcomes BSPs and vendors from across the globe. The members represent the entire spectrum of players in the broadband home area.
Most of ACEMIND's industrial partners are also members of the HGI. Additionally, Orange is treasurer of the group.

At the end of 2011, the main on-going activities in the HGI which have contact points with the ACEMIND objectives are related to the definition of key performance indicators for evaluating the performance of home networking technologies. This includes the definition of requirements for energy saving in home network infrastructure devices. In general, the HGI Business Group is developing scenarios considering the coexistence of different home networking technologies within the home environment.

This group is dominated by the European telcos: France Telecom, BT, Telecom Italia, Telefonica, TeliaSonera, and KPN. Nevertheless CPE, software and silicon vendors (such as SPiDCOM) are very active as well.

Ecma International

Ecma International is an international, private (membership-based) industry association dedicated to the standardisation of information and communication systems. The aims of Ecma International are to develop, in co-operation with the appropriate national, European and international organisations standards and technical reports in order to facilitate and standardize the use of Information Communication Technology (ICT) and Consumer Electronics (CE), to encourage the correct use of standards by influencing the environment in which they are applied, and to publish these standards and technical reports in electronic and printed form. The publications can be freely copied by all interested parties without restrictions. Ecma International is driven by industry to meet the needs of industry, generating a healthy competitive landscape based on differentiation of products and services, rather than technology models, generating confidence among vendors and users of new technology. The Ecma procedures consist of a set of by-laws, rules and a code of conduct in patent matters. Five categories of members assure a wide participation of the industry and interested organisations in the work of Ecma International. Amongst others, Ecma International cooperates with ETSI, ISO, IEC, ITU, and CENELEC.

Website: http://www.ecma-international.org

[2] HGI website http://www.homegatewayinitiative.org/

Wi-Fi Alliance

The Wi-Fi Alliance certifies and promotes IEEE 802.11 wireless LAN technologies. The task groups of the Wi-Fi Alliance produce certification plans for different Wi-Fi functionalities of IEEE 802.11 devices in order to ensure interoperability between IEEE 802.11 devices of different vendors. The Wi-Fi logo is a very well established trademark indicating certified interoperability and a specified set of functionalities. Wi-Fi has become a synonym for IEEE 802.11 WLANs amongst consumers.

Website: http://www.wi-fi.org

HomePlug Powerline Alliance

The HomePlug Powerline Alliance, Inc. is an industry-led initiative. It was established to create specifications for home high-speed powerline networking products and command & control among platforms within the home, and broadband access services to the home. The Alliance accelerates demand for HomePlug-enabled products and services worldwide through the sponsorship of market and user education programs. Membership in the Alliance has grown to include more than 75 industry-leading companies.

HomePlug Powerline Alliance created several specifications for PLC standards, among them HomePlug 1.0, HomePlug AV, HomePlug BPL and HomePlug Command Control.

Website: www.homeplug.org

ZigBee Alliance

The Zigbee Alliance promotes and publishes application profiles to enable the development of interoperable products in the fields of home automation, building automation, smart grid, and health care. Zigbee is based on the IEEE 802.15.4 standard. The Zigbee community and Zigbee based products can profit from the extension of the layer 2.5 convergence towards low data rate networks. An integration of Zigbee PHY and MAC layers into the ACEMIND concept can improve Zigbee's market penetration. Developed concepts and approaches will be presented to the Zigbee Alliance.

Website: http://www.zigbee.org/

Zwave

Z-Wave propose s to put the power of home control and monitoring in a smartphone. With a smart phone, tablet or PC it is possible to control and access Z-Wave devices at home. Z-Wave is a wireless technology that makes regular household products, like lights, door locks and thermostats "smart". Z-Wave products "talk" to each other wirelessly and securely and can be accessed and controlled on phone, tablet or pc. Currently there are nearly 1000 different Z-Wave products that all work together.

Website: http://www.z-wave.com/

BlueTooth 4.0 and BlueTooth Low Energy

BlueTooth is a industry-driven specification for short distance wireless communications. It is design for PAN (Personal Area Networks).The PHY and MAC layer of BlueTooth had been initially standardised in IEEE 802.15.1 but this standard is not used anymore for recent versions of the specification.

BlueTooth 4.0 has approved in 2010, however the most recent version of the specification is BlueTooth 4.1 approved in Dec. 2013 (which consists into a software update of BT 4.0).

BlueTooth 4.0 specification includes BlueTooth Low Energy (BLE), design for smart applications such as fitness, healthcare or security. Maximum PHY rate of BLE is 1 Mbps with an application rate approx.. 250 kbps. Power consumption of BLE is 10 to 100 lower than conventional BlueTooth depending on the application.

Website: http://www.bluetooth.com/

HomeGrid Forum

The HomeGrid Forum supports the development of a next-generation single coax, powerline and phone line standard for home networking, promotes its wide adoption, and ensures compliance and interoperability.

HomeGrid has launched three work groups: a G.hn Contribution Work Group, a Compliance & Interoperability Work Group and a Marketing Work Group with the goals of helping to establish industries' technical requirements, ensuring interoperability, branding and marketing of HomeGrid Certified Products.

The purpose of HomeGrid Forum is to:

- Develop and maintain the next-generation of home networking using the wiring found in homes (Coax cable, power and phone lines).
- Create and maintain a compliance program to enable an ecosystem of interoperable products based on the ITU-T G.hn specification.
- Encourage and promote the adoption and widespread utilization of the HomeGrid Brand.

Website: http://www.homegridalliance.org

Infrared Data Association (IrDA)

The Infrared Data Association (IrDA) is a non-profit organisation whose goal is to develop globally adopted specifications for infrared wireless communication. There are special interest groups within IrDA, *e.g.*, on the technical requirements for communicating at data rates exceeding 100 Mbit/s.

Website: http://www.irda.org

LiFi consortium

The Li-Fi consortium is a non-profit organization, devoted to introduce optical wireless technology. The Li-Fi consortium's charter members are a leading group of international technology companies and research institutions in optical communication technology. The groupe is based on a collectively developed concept and roadmap to establish a new wireless technology in the market, which exceeds the abilities and qualities of wireless RF technology.

The Li-Fi Consortium has several purposes:

- Promote optical wireless communications up to the multi-gigabit range in all their implementations;
- Inform potential implementers of the companies and resources available to help them achieve their product goals;
- Create whole solutions in anticipation of customer needs, and
- Coordinate with standardization groups and other industry organizations to provide OEM customers with a complete ensemble of technical and marketing support.

Website: http://www.lificonsortium.org/

Wireless World Research Forum (WWRF)

The objective of the Wireless World Research Forum is to formulate visions on strategic future research directions in the wireless field, among industry and academia, and to

generate, identify, and promote research areas and technical trends for wireless system technologies.

Website: http://www.wireless-world-research.org

Digital Living Network Alliance (DLNA)

The Digital Living Network Alliance (DLNA) is an initiative to promote interoperability between consumer electronic devices, PCs and mobile handsets in the home. More than 100 member companies are working on providing seamless interaction between consumer electronics (CE), mobile devices, and personal computers (PCs). It produces interoperability guidelines for networked media devices.

Broadband Forum

The Broadband Forum is a consortium of approximately 200 leading industry players covering telecommunications, equipment, computing, networking and service-provider companies. They work to ensure that service providers are able to roll out, as well as introduce, new services quickly and effectively, using common platforms and practices that makes all they do easily scalable, and economical. Historically, their focus has been on the utilization of DSL technology, encompassing issues of auto-configuration, flow-through provisioning, and equipment interoperability; however, some of their work can be applied as well to other technologies for broadband access to the residence, such as PONs. The Broadband Forum has progressively moved its scope of interest from the access line to the LAN operation, and produced numerous Technical Reports on monitoring and management of LAN environments. Here again ACEMIND can find common matters of interest.

Website: http://www.broadband-forum.org (http://www.dslforum.org)

GreenTouch

GreenTouch is a consortium initiated by Alcatel Lucent gathering universities, manufacturers, and telecommunication operators in order to reduce power consumption in communication networks. Power consumption principally covers “required power” to ensure high QoS services and radio coverage of 4G network services

Website: http://www.greentouch.org/

Initative EEBus

EEbus is a consortium initiated by German companies, universities, manufacturers, and telecommunication operators in order to reduce power consumption in communication networks and devices.

EEBus is the interface between Smart Grid, Smart Consumers and between all Smart Devices. Via the networking technology EEBus, energy providers and electronic devices can communicate with each other and in this way optimally control consumption. This is part of the horizontal networking concept through which the IP world (power industry) and mainly non-IP world (house networking) will be connected. This enables a significant peak shifting within the power supply system. For example: the washing machine receives a signal

which comes from the current, expected and possibly self-generated power supply. The machine starts when it makes the most economic sense. Also, an energy-efficient freezer might turn itself down in such a way that it uses significantly less electricity during load peaks.

Website: http://www.eebus.org/en/eebus-technology-concept/

Agora

Agora was born when several large French companies and SMEs (with an opening to international partners) joined forces to design and distribute components, products and terminals that would communicate with services to provide better «smart home» living. The idea was to jointly review all ways to enable domestic technologies to communicate, interact and cooperate. The partners' shared goal was to provide residents of «smart homes» with more fluid, more economical, more efficient services by building a bridge linking everything together. This «bridge», this new household language could improve the management of energy, communications, comfort, entertainment, security, home care services and e-health, while protecting personal data.

Website: http://www.reseau-domiciliaire.fr/home

AllJoyn

AllJoyn This consortium wants to give a Common Language for the Internet of Everything: Homes, cars, and the things around are getting smarter every day. AllJoyn™ is the open source project that lets the compatible smart things around us recognize each other and share resources and information across brands, networks, and operating systems. Initially developed by Qualcomm Innovation Center, Inc, and hosted by the AllSeen Alliance, AllJoyn gives manufacturers and developers the tools they need to propose new ways for smart things to work together.

Website: https://www.alljoyn.org/

Qivicon

Initiated by Deutsche Telekom, Qivicon is a growing alliance based on Prosyst mBS Smart Home SDK (OSGi), with the goal of providing a vendor-independent range of smart home offerings.

Communication web sites :

- http://www.prosyst.com/what-we-do/smart-home-smart-energy/products/
- http://www.osgi.org/wiki/uploads/CommunityEvent2012/Developing%20Applications%20for%20Your%20Smart%20Home%20with%20QIVICON_Kai%20Kreuzer%20Jochen%20Hiller%20Andreas%20Kraft.pdf

Others

In the smart home landscape many products and mechanisms stemming from individual manufacturers' specific vision have appeared on the market. An exhaustive list of these would be too much bulky, therefore only a few of them are listed here:

- The solution MQTT (Message Queuing Telemetry Transport) promoted by IBM (in partnership with Eurotech) : until now this mechanism was assigned to the Wide Area Network only.
- The Samsung Smart Home Platform SHP (smart TVs, home appliances, ...)
- The LG Link (Bluetooth watch with SMS display) or ThinQ (intelligent fridge)
- The Lowe's Iris home management system
- Centralized home control mechanism by companies such as Revolv or Ivee
- AHAM Assessment of Communication Standards for Smart Appliances: http://www.aham.org/ht/a/GetDocumentAction/i/50696

- Connected Home Appliances-Object Modeling (ANSI/AHAM CHA-1-2003) (R2007): http://www.aham.org/ahamca/ht/d/ProductDetails/sku/4040-140-140/from/714/pid/60165
- Connecting Living Smart Home certification program: http://www.connected-living.org/en/projects/smart_home_building_certification_program/
- European Committee of Domestic Equipment Manufacturers: http://www.ceced.org/ (under E-Business)
- Smart Grid Research Consortium (SGRC): http://www.smartgridresearchconsortium.org/index.htm
- OTT initiatives :
    - Google (android@Home):
    - Microsoft (HomeOS): http://research.microsoft.com/en-us/projects/homeos/
- Open source solutions : for instance Arduino, Raspberry Pi, Python, panStamps (for computer experts)

Regulatory Bodies

CEPT

The European Conference of Postal and Telecommunications Administrations - CEPT - was established in 1959 and has two Committees that report to the CEPT Plenary. These are CERP (dealing with postal matters) and ECC (Electronic Communications Committee), responsible for electronic communications matters.

The main tasks of the ECC are to develop policies on electronic communications activities in a European context and forward plan and harmonize the efficient use of the radio spectrum, satellite orbits and numbering resources within Europe. Another important task is the development of European common positions and proposals for use in the framework of international and regional bodies.

The ECC has permanent Working Groups (WGs) and project teams (PTs). In addition, task groups can be established for well-defined tasks.

Website: http://www.cept.org

Federal Communications Commission – FCC

The Federal Communications Commission (FCC) is an independent United States government agency, directly responsible to Congress. The FCC was established by the Communications Act of 1934 and is in charge of regulating interstate and international communications by radio, television, wire, satellite and cable. The FCC's jurisdiction covers the 50 states of the U.S., the District of Columbia, and U.S. possessions.

Website: http://www.fcc.gov/

ITU-R

The International Telecommunications Union is a United Nations agency responsible for information and communications technologies. The ITU Radiocommunication Sector (ITU-R) plays a vital role in the global management of the radio-frequency spectrum and satellite orbits. It ensures the rational, equitable, efficient and economical use of the radio-frequency spectrum by all radiocommunication services. Furthermore, it carries out studies and approves recommendations on radiocommunication matters.

The primary objective of ITU-R is to ensure interference-free operations of radiocommunication systems. This is ensured through implementation of the Radio Regulations and Regional Agreements, and the efficient and timely update of these instruments through the processes of the World and Regional Radiocommununication Conferences.

Website: http://www.itu.int/ITU-R

CISPR

CISPR - International Special Committe on Radio Interference - is concerned with developing norms for detecting, measuring and comparing electromagnetic interference in electric devices, publishing and establishing uniform requirements for the electromagnetic immunity. It is a special committee under the sponsorship of the International Electrotechnical Commissions (IEC)

As its full name implies, CISPR's principal task is at the higher end of the frequency range, from 9 kHz upwards, preparing standards that offer protection of radio reception from interference sources such as electrical appliances of all types, the electricity supply system, industrial, scientific and electromedical RF, broadcasting receivers (sound and TV) and, increasingly, IT equipment (ITE).

CISPR's publications are basically norms regarding measurement of radiated and conducted interference. They specify cable lengths, measurement device configurations and grounding measures, so that results become more comparable. The norms also concern themselves with immunity from external interference. With the CISPR

norms, companies can require compliance to a specific norm from a supplier, instead of doing all the measurements internally (and having to develop an internal norm to be able to compare their own measurements).

Until now, over thirty CISPR standards have been published. Some of the better known ones are:

- CISPR 10 - Organisation, Rules, and Procedures of the CISPR. (1971)
- CISPR 11 - Industrial, Scientific, and Medical (ISM) Radio-Frequency Equipment - Electromagnetic Disturbance Characteristics - Limits and Methods of Measurement.
- CISPR 14 - Electromagnetic Compatibility - Requirements for Household Appliances, Electric Tools, and Similar Apparatus: 1) Emissions, 2) Immunity.
- CISPR 22 - Information Technology Equipment - Radio Disturbance Characteristics - Limits and Methods of Measurement.
- CISPR 24 - Information Technology Equipment - Immunity characteristics - Limits and Methods of Measurement.
- CISPR 25 - Radio disturbance characteristics for the protection of receivers used on board of vehicles, boats, and on devices - Limits and Methods of Measurement.

Relevant Standards and Standardisation Plan for ACEMIND

Finally, this part provides the standardisation plan for ACEMIND. It contains the essence of the overview on standardisation in the area of home networking and its impact on the ACEMIND network on different levels. After describing ACEMIND's resources, capabilities, and possibilities for participating in the standardisation processes and for providing contributions to standardisation groups, the planned contributions will be listed in the following sections. It is distinguished between contributions to newly created standardisation groups, to ongoing standardisation efforts, and to possible new standardisation groups that would have to be initiated by ACEMIND. Each of these categories requires a different amount of resources to be spent as well as they have a different degree of impact by ACEMIND.

The relevant existing standards will set the limits for the solution space of the working groups of the ACEMIND project. Some limits are very strict, especially for safety or if interoperability with other non-ACEMIND devices is required. Other limits are flexible. The selection of existing standards relevant to ACEMIND is listed below. On the other hand, the ACEMIND project can have an impact on currently ongoing standardisation work in areas relevant to the work of ACEMIND. However, this depends on many things, for instance, on a good match between the timelines of the standardisation work and the work done in ACEMIND. A selection of relevant standardisation work to ACEMIND is listed in section 0. The sections on the different working groups, task groups, or study groups will give some more specific information on these task groups as well as some information on their timelines.

The aim of this chapter is to give the reader an overview of the standardisation groups whose work really affects the work of the ACEMIND project, be it through existing standards or through ongoing standardisation work. Especially the latter is meant to give an overview of standardisation groups where it might be useful to provide contributions to the standardisation. Moreover, this chapter will give provide enough information on the different standardisation groups so that the reader will be able to understand the decisions for or against contributions by ACEMIND to a certain standardisation group.

Organisation of Standardisation Work within ACEMIND

Organisation

In the area of telecommunications, standardisation is an important means for the success of communications technologies. It is of utmost importance for interoperability between devices of different vendors. It fosters adoption of new technologies by end users and creates new markets or extends existing markets. A research project such as ACEMIND that aims at bringing its results into the market, standardisation cannot be neglected.

However, the main focus of the ACEMIND project is and has to be the research on the corresponding topics in home networking. Pushing these results into standardisation is important, but it must not divert so many resources that the research results will suffer.

Moreover, the logical order is research-development-standardisation in the development process of communication technologies. Of course, there are gray zones in the border areas with lots of interactions between these different stages of research, development, and standardisation. Experience has shown that research, well-founded knowledge, and experience are necessary to produce useful standards in an effective way.

The strategy within the ACEMIND project with respect to standardisation is therefore to provide enough resources for achieving the scientific goals of ACEMIND efficiently and to provide enough support for standardisation so that the results of the ACEMIND project can have an impact on standards. This is reflected in the resource allocations to the workpackages and tasks.

The goal of task 5.2 "Standardisation" of workpackage 5 "Dissemination and Standardisation" is the support of the ACEMIND standardisation efforts which is documented in this document.

Support for Standardisation Efforts

Task 5.2 supports the standardisation efforts by ACEMIND through

- steering and controlling the standardisation activities of ACEMIND
- coordination of standardisation efforts of the ACEMIND workpackages

- monitoring of ACEMIND standardisation activities
- providing a global ACEMIND view on the standardisation landscape of home networking relevant to ACEMIND
- information on new standardisation groups relevant for ACEMIND
- setting up and continuously updating the ACEMIND standardisation plan.

Contributions to Standardisation Bodies

Contributions to standardisation bodies will be driven by the partners. They have the necessary technical expertise to compile contributions and to participate. Task 5.2 will point out relevant standardisation bodies for ACEMIND.

Several ACEMIND partners are already active in several groups of standardisation bodies and industry fora relevant to ACEMIND. These activities of the partners, which are actually outside of ACEMIND, will be leveraged to provide contributions to relevant standardisation bodies and industry fora containing ACEMIND results. Task 5.2 does not have any resources available to sponsor significant standardisation activities by itself. The basic requirement is mutual benefit for the standardisation activities of the partners and for ACEMIND. However, this model might also lead to situations where a standardisation opportunity cannot be used by ACEMIND.

ACEMIND will also socialize its ideas and results amongst key partners in standardisation. This will be done by presentations in plenary sessions, tutorial sessions, and groups on next generation technologies. This will generate broader support of ACEMIND concepts, especially amongst companies and institutions outside of the ACEMIND project. This leads to more standardisation opportunities for ACEMIND, more momentum in the standardisation processes, as well as to reduced efforts by ACEMIND due to bigger involvement by others.

Note, that it is strongly recommended that contributions to standard bodies should not be identified as outputs of the ACEMIND project, that is, ACEMIND itself is the contributor, unless full agreement within all ACEMIND collaborators has been achieved about this contribution.

Documentation of Contributions to Standardisation

The technical work packages of ACEMIND report their contributions to standardisation bodies and industry fora to task 5.2. An overview of these contributions will be maintained in chapter 7. The documents will be collected in the repository of the ACEMIND project.

Furthermore, an overview of ACEMIND documents supporting the relevant standardisation activities by ACEMIND partners will be maintained and the standardisation plan as well.

Relevant Standardisation Work

This section describes standardisation work that could be relevant for the technical work of ACEMIND. The description will give some detail that indicates why this standard is relevant to ACEMIND. The standards in this section are ongoing, but the potential for contributions by ACEMIND is quite different. Some are almost finished and have no room for introducing new concepts while others have just started and can be shaped very efficiently.

IEEE 1905.1a

The IEEE 1905.1a is a newly launched group, aiming first to enlarge the list of connectivities/functionnalities under the convergence umbrella of IEEE 1905. This includes for instance ITU G.hn and HomePNA. 1905.1a is an amendment to include new technologies and to fix some issues. The timeline of the working group is constrainted by the sponsor and the target date for the first draft standard is May 2014.

The main contribution of the first 2014 meeting is a generic method to include new PHY/MAC technologies: it is based on OUI and XML description file. Any organization or SDO who want to add a new technology is able to do it without any request to IEEE 1905 working group (no PAR, no ID assignment).
This approach was supported by G.hn and Homegrid participants and included in the working document (pre-draft document).

The working group has setup a deadline (end of April 2014) to consider technical contribution. It means that the scope of new features will be limited and some features listed in the PAR will not be addressed.

The other topics under discussion inside the working group are:

- New diagnostics TLV with Manufacturer/Model name, IPv4/v6 information
- Procedure to select a unique registrar
- Clarification of Non-1905 neighbor definition
- Support of 802.11ak (General Link amendment)
- New message to wake up an interface
- New message to measure RTT for a multi-hop path

Actions for Others partners (IHP and Devolo ?)

- Refine and retune the 1905.1 document in order to complete some sentences or graphs.

The target is to add new technology such as Visible Light Communication (VLC) or IEEE 802.15.7. The 1905.1a proposes a generic method to include new PHY/MAC technologies. This is based on OUI and XML description file. But the IEEE 802.15.7 protocol use a 16 or 64 bits address instead of 48 bits address like 802.3 standard. This gives difficult opportunities to propose the VLC standard as new technology for 1905.

IEEE 1905.2

Today, there is no plan to start a new release 1905.2.

IEEE 802.15 VLC

The standard is finished and there is actually no room for introducing new concepts while others have just started and can be shaped very efficiently.

IrDA

The standard is finished and there is actually no room for introducing new concepts while others have just started and can be shaped very efficiently.

UpnP/ HGI/ AllJoyn

The UPnP Forum opened recently a new task force for the Internet of Things. The UPnP perspective on the Internet of Things is to provide a widely implemented solution with open-source implementations and free development tools on most any popular operating system. Such solution will apply to things based on IP with sufficient processing power and also things on other networks that can be proxied through a bridge. The requirements will address an architecture to support diverse new devices in diverse locations and on diverse networks, a reliable security model and standardized IoT device interfaces. The solution will leverage the UPnP Device Architecture (Discovery, security, management, control, eventing, IPv6, etc), the existing DCPs (Lights/switches, thermostat, blinds, A/V, SensorManagement) and the Cloud architecture based on XMPP. The schedule is to have final requirements and a proposed architecture by end of May and then on June the formation of an IoT working committee to develop the specification.

Synergies with other Groups

Contributions to scientific groups

The working groups is a good opportunity to promote ACEMIND technical results through different groups and using plenary sessions to globally present the project in order to interest partners in further enhancements and standardisation of ACEMIND concepts and results.

Synergies with other collaborative projects

This subsection lists other collaborative projects, where ACEMIND might leverage synergies between itself and those projects in order to promote ACEMINDs ideas, concepts, and results for (common) contributions to standardisation including Celtic Plus, National Projects and FP7 Projects.

Summary of Standardisation Plan

The contributions of ACEMIND ideas, concepts, and results to standardisation groups will be done by ACEMIND partners already active in the respective standardisation groups. These partners are mostly amongst the industrial partners of the ACEMIND project.

A list of interesting and good opportunities for ACEMIND to provide substantial contributions to international and global standards has been developed within the standardisation plan. For each partners at least one promising standardisation group for contributions with an impact has been identified:

- Orange Labs and Devolo will contribute to the upcoming IEEE 1905.1a standards for new technologies and features.

The ideas, concepts and results of ACEMIND will be socialized with relevant partners for standardisation in the area of home networking, especially in the Celtic Plus meeting and with other Celtic Plus projects.

The following Table 1: provides an overview of the relevance of the identified standardisation groups to the different partners and topics and lists also the partners currently active in these standardisation groups. The structure of Table 1: is as follows:

- The top row lists all the standardisation groups where ACEMIND plans to contribute or at least to closely follow.
- The first column contains the ACEMIND partner.
- The "participation level" lists the level of activities in these groups by ACEMIND. There are the following levels:
    - *contribution:* contribution by ACEMIND is planned
    - *maybe contribution:* ACEMIND is actively following and monitoring this group and will provide contributions if it becomes necessary or an opportunity arises.
    - *following:* ACEMIND is following / monitoring this group, but contributions are currently not planned.
    - *evaluation:* ACEMIND will further evaluate the impact and the potential for contributions of these standardisation groups

Committee	IEEE P1905.1a	IEEE P1905.2	UPnp	IEEE 802.15.7	XXX	YYY	ZZZ
Partner							
Orange Labs	contribution	maybe contribution	following				
OledComm				following			
IHP							
Devolo							
Arçelik							
UoA							
Invea-Tech							

Table 1: **Relation of Standardisation partner X and topics X active ACEMIND**

Contributions to Standardisation Bodies by ACEMIND Partners

IEEE 1905.1a

February 2014:

- Presentation “to be defined”

March 2014:

- Presentation “to be defined”

Conclusion

The discussion on the landscape of standardisation and industry fora in the area of home networking as well as the discussion of standardisation activities relevant to ACEMIND in this standardisation plan lead to a list of interesting and good opportunities for ACEMIND to provide substantial contributions to international and global standards. For each of the technical workpackages has been identified at least one promising standardisation group for contributions with an impact to international fora.

The ideas, concepts and results of ACEMIND will be socialized with relevant partners for standardisation in the area of home networking. This provides a solid basis for goal of ACEMIND to have an impact on global standards. ACEMIND Task 5.2 on Standardisation will support the standardisation efforts of the ACEMIND project by coordinating them and providing a forum for documenting and monitoring relevant standardisation activities.

The ACEMIND standardisation activities are driven by the respective partners. The contributions to the standardisation groups will be done by partners that are already active in these groups. These are mainly amongst the industrial partners.

Despite the good and promising opportunities for standardisation of ACEMIND concepts, we must not forget that standardisation is a dynamic process independent from the technical achievements of ACEMIND. This means that anticipated and planned opportunities for standardisation can simply disappear, but also that new opportunities arise suddenly. Therefore, task 5.2 and the respective partners will constantly monitor the standardisation processes and update the ACEMIND standardisation plan.