

Question 3/15 – Technologies for in-premises networking and related access applications

(Continuation of Question 18/15)

1 Motivation

The continuing demand for an ever-increasing device connectivity to offer new services to the customer and to optimize the installation and management of infrastructure will require the development of new networking technologies. As an example,

- The continuing customer demand for ever higher bit rate data services, high-speed Internet access and other innovative services, and the ongoing needs of network operators to leverage in-premises connectivity for distributing within the home IPTV and other applications.
- There is a growing interest worldwide in providing support for the integration of new technologies and applications aimed at sustainably addressing energy independence and modernization of the aging power grid, e.g., utility scale renewable energy sources, distributed energy resources, Plug-in Electric Vehicles, and Demand-Side Management. For supporting the above technologies and applications, it is necessary to ensure the availability of a modern, flexible, and scalable communications network that will tie together the functions of "monitoring" and "control." Information and communication technologies will allow utilities to remotely locate, isolate, and restore power outages more quickly, thus increasing the stability of the grid. Information and communication technologies will also facilitate the integration of time-varying renewable energy sources into the grid, enable a better and more dynamic control of the load, and will also empower consumers with tools for optimizing their energy consumption.

Whilst the focus of the group is in-premises networking, some technical developments may be needed to adapt these technologies to other contexts (e.g., access, industrial).

These new technologies will require the development of new Recommendations and enhancements to existing Recommendations covering all requirements and implementation aspects of new deployments. These studies will include, but are not limited to physical layer transport, the transport of higher layer protocols, the management and testing of in-premises systems, security aspects, spectral management aspects and energy saving techniques as well as the definition of communication network architectures and requirements.

The following major Recommendations, in force at the time of approval of this Question, fall under its responsibility:

- J.190 through J.192,
- G.9951 through G.9954,
- G.9960 through G.9964, G.9972, G.9973, G.9976 through G.9980,
- G.999x series
- G.995x, and G.990x series

The target audience for this question are the technology suppliers, chipset vendors, equipment vendors, cable operators, service providers and utilities active in the domain of providing networking solutions for their users or infrastructures. A global audience will be targeted to facilitate a unified approach to support this broad scope of applications with a single technology, facilitating synergies across application fields.

2 Question

Study items to be considered include, but are not limited to:

- What performance characteristics should heterogeneous networks possess in order to satisfactorily transport data streams associated with specific services as these streams are passed through the communication network to the terminal device?
- What enhancements are needed to Recommendations G.9951 through G.9954, G.9960 through G.9964, G.9991, G.995x and G.990x series, G.9972, G.9973, G.9976 through G.9980:
 - in the light of design, network deployment experience, and evolving service requirements?
 - to optimise the transport of IP-based services?
 - to ensure efficiency and scalability in large networks?
 - to support new smart applications?
- What new Recommendations or revisions to existing Recommendations are needed:
 - for transceivers for heterogeneous networking over various mediums such as phone-line, coaxial, data (e.g. CAT5), power cables, optical fibre and wireless?
 - for narrowband and broadband transceivers for networking using free space optical communication, including visible light communication (VLC)?
 - to carry out line testing?
 - to enable higher bit rates to be achieved by means of MIMO?
 - to enable transport of higher layer protocols?
 - to optimize the quality-of-experience to the end user?
 - to provide secure admission to an in-premises network?
 - to facilitate coexistence between various technologies sharing the same spectrum?
 - to facilitate inter-domain communication between different mediums to optimize the choice of delivery path for data and ensure end-to-end QoS and QoE?
 - to support timing synchronization mechanisms necessary for audio/video delivery?
 - to support ultra-high-definition video service?
 - for transceivers supporting Smart Grid application in the transmission, distribution and in-premises domains?
 - What enhancements to existing and developing Recommendations are required to provide energy savings directly or indirectly?
 - What new requirements should be developed to enhance existing Recommendations and allow them to support emerging energy related applications?
- What enhancements:
 - to existing Recommendations are required to provide energy savings directly or indirectly in Information and Communication Technologies (ICTs) or in other industries?
 - to developing or new Recommendations are required to provide such energy savings?
- What mechanisms for:
 - network management should be employed to provision new network-based advanced services to devices connected to the heterogeneous networks?

- application management should be employed to provision advanced applications to devices connected to the heterogeneous networks?
 - security should be employed to provide protection of the heterogeneous networks?
 - seamless interconnection should be employed between multiple devices for advanced services in heterogeneous networks?
 - mechanisms should be employed to support efficient, less cumbersome and low maintenance on heterogeneous networks?
- Study items include, but are not limited to:
- Requirements for advanced service capabilities over heterogeneous networks.
 - Modulation, coding, digital signal processing, transport techniques, tools for spectrum management (including dynamic spectrum management), real noise environments over multiple communication media, handshaking procedures, testing procedures, physical layer management procedures, protocols for PLC coexistence, energy saving techniques and transport of higher layer protocols.
 - These studies should take account of the different regulatory environments around the world.
 - Transceiver to higher layer inter-connection techniques.
- These studies will include any specific requirements:
- To optimise the transport of IP-based services.
 - To optimise the transport of Ethernet based services.
 - To support the management of heterogeneous networking systems operating over various mediums.

3 Tasks

Tasks include, but are not limited to:

- Maintenance and enhancements of existing Recommendations
 - J.190 through J.192,
 - G.9951 through G.9954,
 - G.9960 through G.9964, G.9972, G.9973, G.9976 through G.9980,
 - G.995x and G.990x series,
 - G.999x series
- Production of new Recommendations in the G.990x, G.995x, G.996x, G.998x, and G.999x, series.
- Definition of requirements for advanced service delivery over heterogeneous networks.

An up-to-date status of work under this Question is contained in the SG15 work programme (https://www.itu.int/ITU-T/workprog/wp_search.aspx?sp=17&q=3/15).

4 Relationships

Recommendations:

- None

Questions:

- Q1/15, Q2/15, Q4/15, Q5/15, Q7/15

Study Groups:

- ITU-R SG1 and SG5
- ITU-T SG5 on EMC and various copper cable topics
- ITU-T SG9 on television and sound programme transport (in particular, Q1/9, Q2/9, Q5/9, Q6/9, Q7/9, Q8/9)
- ITU-T SG16 on multimedia aspects
- TSAG

Other bodies:

- ATIS Committee STEP
- Broadband Forum
- ETSI ATTM, EE
- HomeGrid Forum
- IEC CISPR I on EMC requirements
- IEC TC57 WG20 on power line communication
- IEC TC69 on power line communication for electric vehicles
- IEC on energy efficiency and smart grid communications related standards
- IEEE 802.1, 802.3, 802.11, 1901, 1905
- ISO/IEC JTC1/SC25 on interconnection of information technology equipment
- MoCA on multimedia over coax
- TIA TR-41 on spectral management considerations
- TTC (Japan)
- TTA (Korea)
- CCSA
- G3-PLC Alliance
- PRIME Alliance
- SAE on energy efficiency and smart grid communications related standards
- CENELEC TC210 WG11