|  |  |  |
| --- | --- | --- |
| The International Teleocmmunication Union - Connecting the World. | **International telecommunication union****Telecommunication Standardization Bureau** |  |
|  | Geneva, 11 March 2020 |
| **Ref:** | **TSB Circular 236**SG15/HO | **To:**- Administrations of Member States of the Union |
| **Tel:** | +41 22 730 6356 |
| **Fax:** | +41 22 730 5853 |
| **E-mail:** | tsbsg15@itu.int | **Copy to:**- ITU-T Sector Members;- ITU-T Associates;- ITU Academia; - The Chairman and Vice-Chairmen of Study Group 15;- The Director of the Telecommunication Development Bureau;- The Director of the Radiocommunication Bureau |
| **Subject:** | **Mergers of Questions Q6/15 and Q7/15 into Q6/15, and Q15/15 and Q18/15 into Q18/15** |

Dear Sir/Madam,

1 At the request of the Chairman of Study Group 15, *"Networks, Technologies and Infrastructures for Transport, Access and Home",* I have the honour to inform you that, in accordance with the provisions of Resolution 1, Section 7, § 7.2.2, of WTSA (Hammamet, 2016), by reaching consensus among those present in its meeting in Geneva from 27 January to 7 February 2020:

a. Agreed to merge Questions 6/15 *“Characteristics of optical systems for terrestrial transport networks"* and Question 7/15 “*Characteristics of optical components and subsystems*” into Question 6/15

b. Agreed to merge Questions 15/15 “*Communications for smart grid*" and Question 18/15 “*Broadband in-premises networking*” into Question 18/15.

2 TSAG, in its meeting in Geneva from 10-14 February 2020, endorsed these mergers of the Questions.

3 **Annexes 1** and **2** give explanatory summaries about the reasons for the mergers of Q6/15 and Q7/15, and Q15/15 and Q18/15, respectively.

4 **Annexes 3** and **4** contain updated Q6/15 and Q18/15, respectively.

Yours faithfully,

*(signed)*

Chaesub Lee
Director of the Telecommunication
Standardization Bureau

**ANNEX 1
Reasons for merger of Question 6/15 and Question 7/15**

Current Q7/15, *Characteristics of optical components and subsystems*, experiences a lower level of contribution than many other SG15 questions. SG15 believes it would be more efficient to manage this work by merging Q7/15 into Q6/15, *Characteristics of optical systems for terrestrial transport networks*.

**ANNEX 2
Reasons for merger of Questions 15/15 and Question 18/15**

Current Q15/15, *Communications for smart grid*, has experienced a reduced level of contributions and attendance. SG15 believes it would be more efficient to manage the work by merging Q15/15 into Q18/15, *Broadband in-premises networking*.

 **ANNEX 3
Updated text of Q6/15**

**Question 6/15 - Characteristics of optical components, subsystems and systems for optical transport networks**

(Continuation of merged Questions 6/15 and 7/15)

### Motivation

Optical fibre networks are deployed in telecommunication systems worldwide. Structural reforms leading to increased privatisation of telecommunications networks create an operating environment requiring optical networking and interconnection among different carriers.

Developments are being fuelled by the need for improved network efficiency, customer demand for ever higher bit rate data services, high-speed Internet access, and other innovative services.

 This leads to a push for higher bit-rate (Terabit/s) optical transport systems in the intra-office, inter-office, metro and long distance networks of the various network operators.

The Question defines specifications needed for physical layer interfaces of point-to-point and WDM systems, to enable the evolution of optical networks to support the ubiquitous availability of next-generation high-bandwidth services. To the greatest extent possible, these specifications should enable transverse compatibility (black-box and/or black-link) in a multi-vendor, multi-network-operator environment.

Furthermore the increasing complexity of optical networks has brought about an increasing diversity of active, passive and hybrid or dynamic/adaptive optical components and subsystems with functions differing with the application. This Question also addresses the high level need for specifications expressed by the system Recommendations and network operators. It serves as an interface to the component level standards generated outside of ITU-T in organizations such as IEC.

The following major Recommendations, in force at the time of approval of this Question, fall under its responsibility: G.640, G.661, G.662, G.663, G.664, G.665, G.666, G.667, G.671, G.672, G.680, G.691, G.692, G.693, G.694.1, G.694.2, G.695, G.696.1, G.697, G.698.1, G.698.2, G.698.3, G.698.4, G.955, G.957, G.959.1 and G.911.

### Questions

What system aspects and physical layer characteristics are necessary to enable longitudinally compatible and transversely compatible optical systems in intra-office, inter-office, metro and long distance networks?

What components aspects and desirable characteristics need to be specified to support intra-office, inter-office, metro and long-distance networks, and additionally, local access networks and submarine networks?

What enhancements to existing draft or published Recommendations and what new Recommendations are necessary to specify interfaces for optical transport systems, employing both direct detect and coherent technologies, with bit rates at 25 Gbit/s and above, and, if necessary, taking account of the flexible DWDM grid?

What systems and physical layer considerations are necessary for optical transport systems optimized for new applications for example metro applications, including mobile fronthaul and backhaul?

What enhancements should be made to existing draft or published Recommendations to reflect technological developments, further reduce the cost and power consumption of optical fibre communication systems?

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

General considerations for optical systems used to transport OTN, Ethernet, CPRI and other protocols using several types of single-mode fibre. Statistical and semi-statistical power budget approaches:

Specifications to enable transverse and longitudinal compatibility in single-channel and multichannel optical systems.

* System models, reference configurations and reference points to support optical interface specification methodologies.
* Specifications of interfaces inside a DWDM link, taking the flexible grid into account.
* Evaluation of the quality of an optical channel end-to end enabling routing decisions in all optical networks (e.g. transmitter’s quality metric, such as error vector magnitude, accumulated effects of degradations, transients, etc.).
* Physical layer architectures including new technologies to increase optical transmission systems capacity.
* Linear and nonlinear propagation effects.
* Performance monitoring.
* Application of forward error correction (FEC) techniques to terrestrial optical transmission systems (e.g. to enhance system margin or to relax optical parameter specifications).
* Enhanced statistical design approaches.
* Availability/reliability aspects of optical systems.

Further study items:

* Active devices and sub-systems such as Optical Amplifiers (OAs), including parameter definitions and measurement, classification of devices and sub-systems, optical nonlinearities, polarization, dispersion, noise and transients.
* Passive components such as splices and connectors, attenuators and terminators, M-by-N branching components (such as splitters and combiners), wavelength optical multiplexers and demultiplexers, optical filters, optical isolators and circulators and dispersion compensators.
* Worst-case transmission parameter values (for all environments and to end-of-life) for passive components in digital applications.
* Components and subsystems for use in bi-directional transmission systems on a single fibre.
* Specification of fixed Optical Add/Drop Multiplexers (OADMs) and re-configurable Optical Add/Drop Multiplexers (ROADMs) and Optical Cross-Connects (OXCs).

Safety aspects of considered components, including aspects of operation at high optical power levels.

### Tasks

Tasks include, but are not limited to:

Enhance Recommendations G.640, G.661, G.662, G.663, G.664, G.665, G.666, G.667, G.671, G.672, G.680, G.691, G.692, G.693, G.694.1, G.694.2, G.695, G.696.1, G.697, G.698.1, G.698.2, G.698.3, G.698.4, G.955, G.957 and G.959.1.

Develop new Recommendations, e.g. Supplements and/or combine existing Recommendations from progress on the above study points.

Enhance the text of G.Sup39.

### Relationships

**Recommendations:**

 G.6xx and G.9xx Series**Questions:**

Q2/15, Q5/15, Q8/15, Q10/15, Q11/15, Q12/15, Q13/15, Q14/15, Q16/15

**Study Groups:**

ITU-T SG5

ITU-T SG13

ITU-T SG12 network performance objectives

**Standardization bodies, forums and consortia:**

IEC SC86B on optical passive components

IEC SC86C on active components and dynamic components including all types of optical amplifiers, on system measurement test methods and on optical amplifier test methods

IEC TC76 on laser safety and aspects of safe laser operation

OIF on optical systems interfaces

IEEE 802.3 on optical systems interfaces

IETF CCAMP working group

 **ANNEX 4
Updated text of Q18/15**

## Question 18/15 – Technologies for in-premises networking and related access applications

(Continuation of Question 15/15, 18/15 & 19/15)

### 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 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.9977 and G.9979.,
* 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 to support this broad scope of applications with a single technology, facilitating synergies across application fields.

### Question

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 the G.9951 through G.9954, G.9960 through G.9964, G.9991, G.995x and G.990x series, G.9972, G.9973, G.9977 and G.9979 Recommendations:

* 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 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?
* 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 communications 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.

### 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.9977 and G.9979,
	+ G.995x and G.990x series,
	+ G.999x series
* Production of new Recommendations in the G.996x, G.999x, G.995x, G.990x series and G.997x series.
* Definition of requirements for advanced service delivery over heterogeneous networks.

NOTE − An up-to-date status of work under this Question is contained in the SG15 Work Programme at [http://www.itu.int/ITU-T/workprog/wp\_search.aspx?sg=15](https://www.itu.int/ITU-T/workprog/wp_search.aspx?sg=15)

### Relationships

**Recommendations:**

* G.995x series, G.996x series, G.999x series, G.997x series, J.190 through J.192
* G.991.x series, G.992.x series, G.993.x series, G.994.1, G.995.1, G.996.1, G.997.1, G.998.x series, G.995x series
* G.995x and G.996x series

**Questions:**

* Q1/15, Q2/15, Q4/15, Q5/15, Q16/15, Q1/9, Q2/9, Q5/9, Q6/9, Q7/9, Q8/9

**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
* ITU-T SG16 on multimedia aspects
* TSAG

**Standardisation bodies, forums and consortia:**

* 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
* IETF
* 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

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_