The recent standards Update of Q6/SG15 - Characteristics of optical components, subsystems and systems for optical transport networks

China Information Communication Technologies Group(CICT)
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WP2/15 at a glance

WP2/15	Optical technologies and physical infrastructures
Q5/15	Characteristics and test methods of optical fibres and cables, and installation guidance
Q6/15	Characteristics of optical components, subsystems and systems for optical transport networks
Q7/15	Connectivity, operation and maintenance of optical physical infrastructures
Q8/15	Characteristics of optical fibre submarine cable systems

SN	Technical Topics of this report
1	Hollow Core Fibres (Q5,Q6)
2	Beyond 1T (Q6)
3	Fibre optic sensing in optical communication networks（Q6）：**G.681 and TR**
4	TR.ION-aiDC/ION-2030 (Q6)
5	Draft revised Recommendation associate optical Components ：**G.671，G.672**
6	Topic 6: Draft revised Recommendation associate DWDM applications：**G.698.2，G.698.4**
7	Draft revised Recommendation associate optical interface（Q6）：**G.959.1, G.697，G.641**
8	Other draft revised Recommendation：**G.665, G.695**

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Topic 1： Hollow Core Fibres (Q5,Q6)

Progress status: No new TR and standard approval, further discussion.

➢ Recent Process:

Since 2025, Hollow Core Fibres is a hot topic and discussed .

This recent Email correspondence addressed the four key discussion points listed below:

- Optical, mechanical, and environmental properties of HCF,
- Fibre and cable attributes,
- Most prominent applications,
- Interoperability aspects.

Thirteen WDs were submitted during the Email correspondence, Experts met during the Q5,Q6/15 interim meeting on February 2026 to review the submitted contributions.

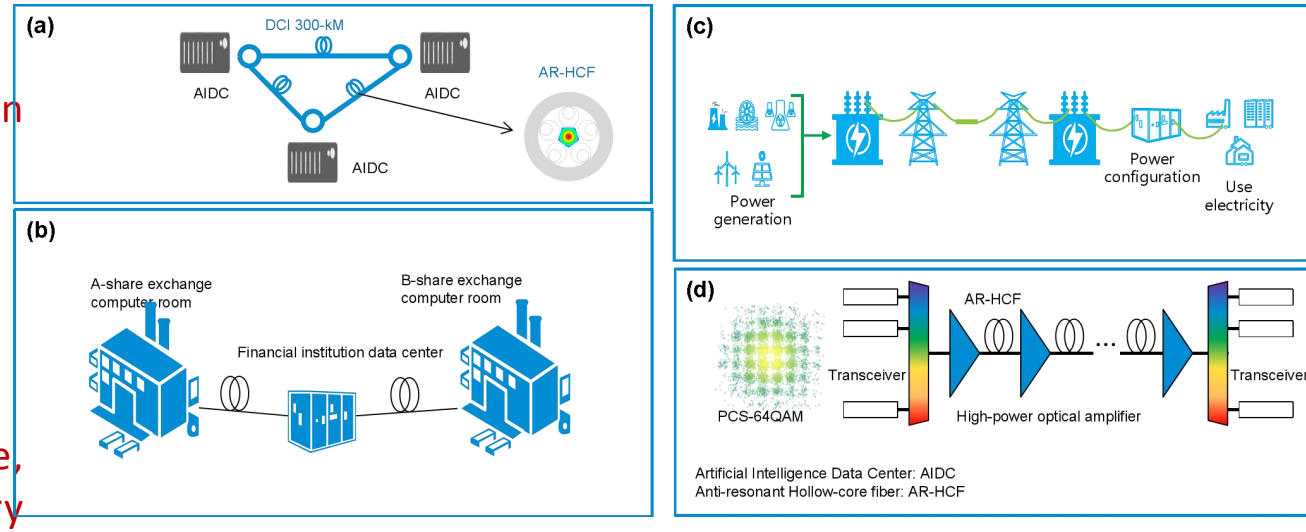

Figure-Application scenarios for hollow-core fibers

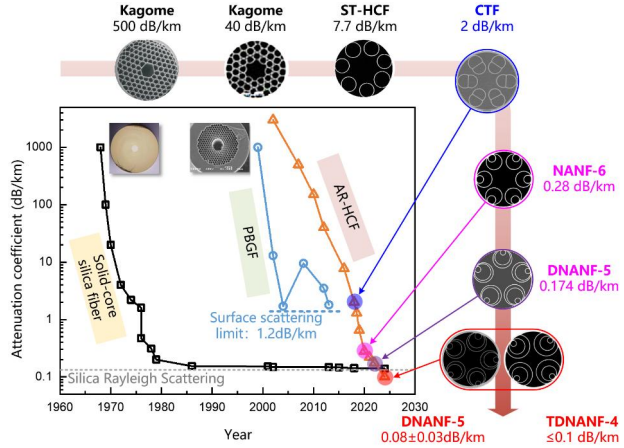

Figure- The loss reduction history of AR-HCFs compared to other fibres.

➢ Next step (Inclusion):

A continuous joint Q2/15, Q5/15, and Q6/15 Email correspondence will be conducted by a correspondence leader prior to the SG15 plenary meeting in July 2026.

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Topic 2：Beyond 1T (Q6) **Progress status: No new TR and standard approval, further discussion.**

After the discussion in the Pisa meeting 2026 February , the Q6 meeting agreed that it is premature to start the specification of B1T applications in the Recommendations managed by Q6 until Q6 achieves a common understanding of fundamental aspects.

An Email correspondence will be conducted by a correspondence leader prior to the SG15 plenary meeting in July 2026.

SN	Source	Brief description of content
1	WD06-10 (Adtran)	It proposed that Q6 continue progressing with the beyond 1T activities initially focusing on the 2 DSCs approach and provides input to Q11 to support the related decisions about the specification of the DSP frame for 1.6T and 1.2T long reach OTN interfaces.
2	WD06-33 (ZTE)	provided technical considerations in support if using two optical carriers for a B1T DWDM channel.
3	WD06-11 (CICT)	It provided analytical simulations of EEPN impact on single carrier, 2-DSC, and 4DSC performances. Combined with further application analysis, it was recommended that Q6 considers 2-DSC for both 1.6T 500km and 1000km metro/long-haul applications.
4	WD06-45 (Huawei)	It proposed that Q6 starts new work items to study the use cases and associated technologies to support B1T-OTN interfaces. As the specification of the DSP frames of B1T-OTN long reach interfaces by Q11/15 depends on the choice of the number of the digital subcarrier(s) to be defined by Q6/15, this contribution discussed how this subject may proceed forward.
5	WD06-41 (China Mobile)	It performed an analysis of system aspects and performance of 1.6T systems and proposed to consider a revision of the ITU-T G.696.1 standard for 1.6T and higher-speed long-haul transmission.
6	WD06-47 (Huawei)	It proposed that Q6 considers the optimization of PCS and DSCM in future studies on the optical technologies for B1T-OTN.

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Topic 3: Fibre optic sensing in optical communication networks (Q6)

SN	Standard number	Standard name	Brief description of content
1	G.681	Distributed Fibre Optic Sensing System for Terrestrial Optical Transmission System	Back-scattering type sensing. Including the technologies: DAS/DTS/DVS/DSS.
2	TR.fsc	Technical report on feed-forward sensing in optical communication networks	Feedforward sensing, Reuse oDSP of coherent receivers. Including the technologies: phase monitoring, SOP monitoring,Power profile estimation (PPE).

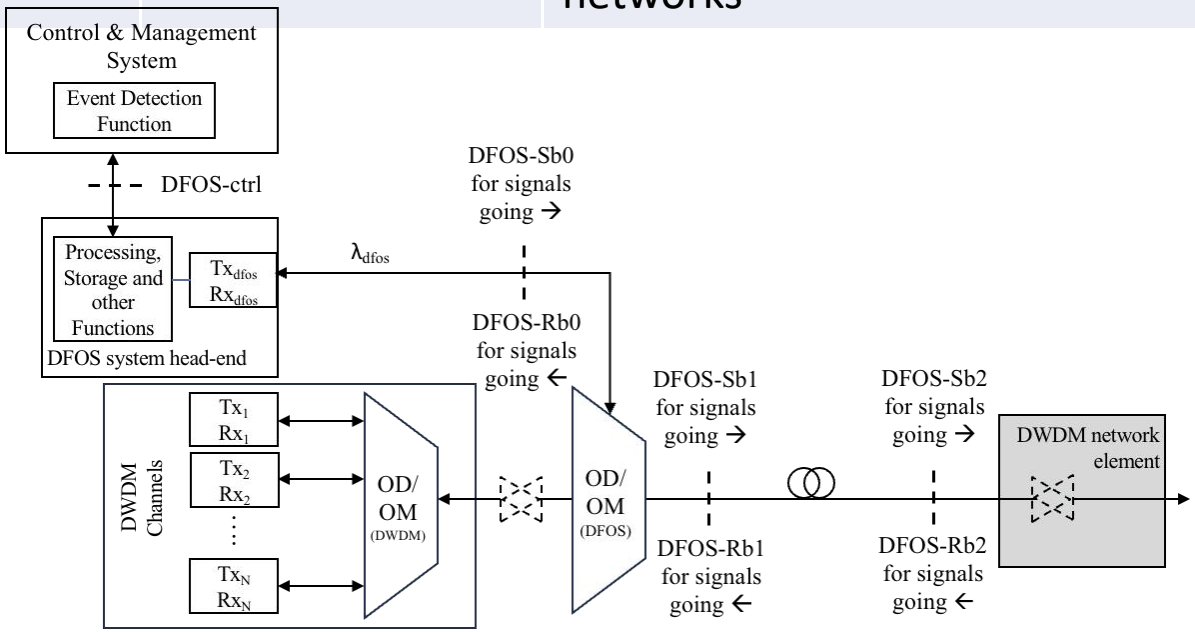

Figure – Reference diagram of back-scattering type sensing. Out-of-band sensing wavelength, bi-directional DWDM transmission

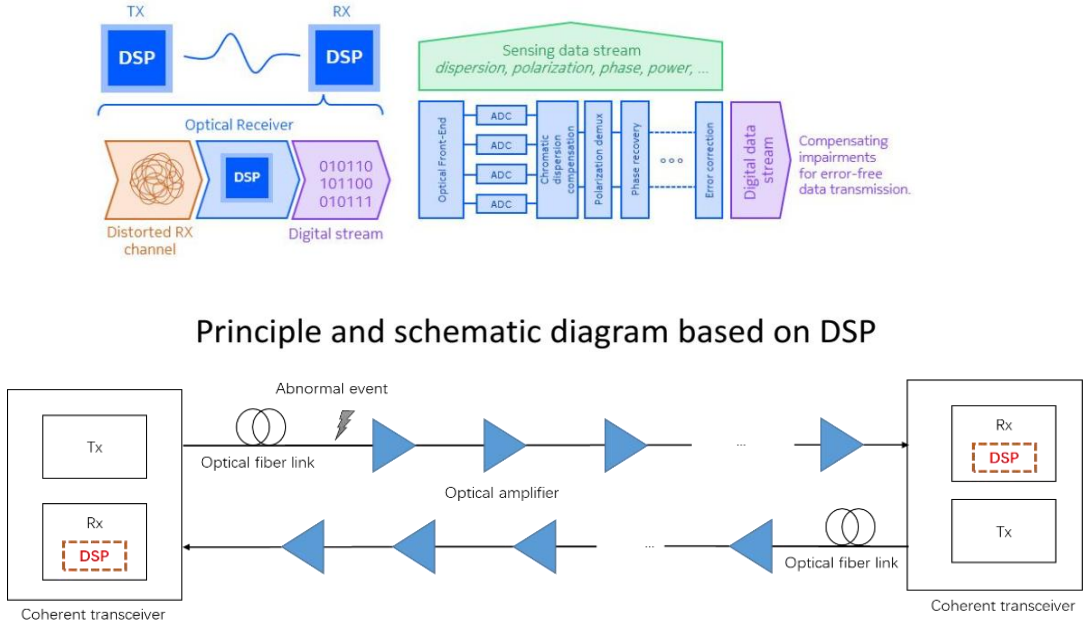

Figure – FSC chematic diagram of the overall framework of the system

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Topic 4: TR.ION-aiDC/ION-2030 (Q6) Progress status: a first draft of TR.ION-aiDC is done.

SN	Standard number	Standard name	Brief description of content
1	TR.ION-aiDC	Technical report on Optical technologies in ION-2030 for data centres optimized for AI	This new TR investigates the use of optical technologies, including optical circuit switching (OCS) in data centre architectures for ION-2030. It will cover data centre interconnection (DCI) and intra-data centre networks (DCN) and data centre access (DCA) as entry points, as well as analyse the implications of AI workloads on these technologies.

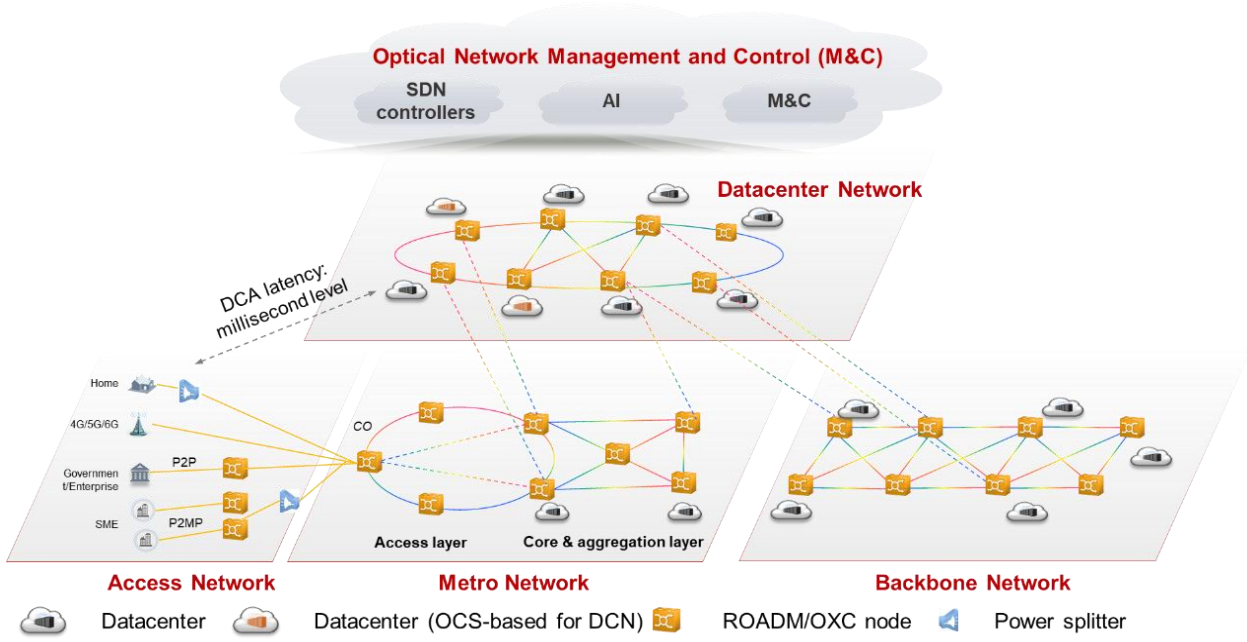

Figure 1: Target Architecture of data centre (DC) optical connection

Summary

- Overview of current DCI and DCN architectures and their issues in scaling in energy efficiency, capacity and computational power, due to the introduction of AI
- Optical technologies to face these open issues, including, but not limited to, OCS, optical transceivers for DCI and - optical transceivers for DCN
- Requirements and developments requested to these technologies to meet the growth of traffic and computational power due to AI
- Impact of other relevant aspects (DCA, control and management, monitoring, security, …) on optical technologies
- Potential Standardization Directions

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Topic 5: Draft revised Recommendation associate optical Components（Q6）

SN	Standard number	Standard name	Progress status
1	G.671	Transmission characteristics of optical components and subsystems	The Q6 meeting agreed to include NXN optical switches(large scale optical switches)
2	G.672	Characteristics of multi-degree reconfigurable optical adddrop multiplexers	WD06-43R1 proposed text and A.1 form for revision to add multi-granular MD-ROADM in G.672

Annex A

A.1 Justification for proposed draft revised ITU-T G.671 "Transmission characteristics of optical components and subsystems"

Question:	6/15	**Proposed ITU-T Recommendation**	Montreal, 29 June-10 July 2026
Reference and title:	ITU-T G.671 Transmission characteristics of optical components and subsystems		
Base text:	In-force version Recommendations G.671	**Timing:**	2027
Editor(s):	Jing Dai (China Information Communication Technologies Group) daij@fiberhome.com	**Approval process:**	AAP
Scope (defines the intent or object of the Recommendation and the aspects covered, thereby indicating the limits of its applicability): The scope of the in-force Recommendation G.671 remains as it is, except that the N×N Switches (large scale optical switches) is included.			
Summary (provides a brief overview of the purpose and contents of the Recommendation, thus permitting readers to judge its usefulness for their work): It is proposed to add N×N switches in G.671, and modifying the parameters table.			
Relations to ITU-T Recommendations or to other standards (approved or under development): G.672			
Liaisons with other study groups or with other standards bodies: No			
Supporting members that are committing to contributing actively to the work item: China Information Communication Technologies Group (CICT), China Unicom, China Telecommunications Corporation, China Academy of Information and Communications Technology (CAICT)			

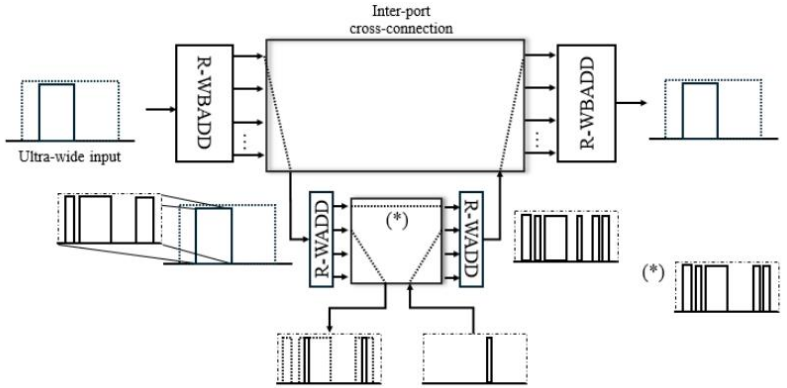

Figure IV.5 – Switching of individual wavelength channels within a waveband using a multi-granular MD-ROADM.

Topic 6: Draft revised Recommendation associate DWDM applications (Q6)

SN	Standard number	Standard name	Progress status
1	G.698.4	G.metro(Multichannel bi-directional DWDM applications with port agnostic single-channel optical interfaces)	The Q6 meeting agreed to include in G.698.4 self-tuning mechanisms according to WD06-24
2	G.698.2	Amplified multichannel dense wavelength division multiplexing applications with single channel optical interfaces	To add 800G application codes. To align ETCC methodology to draft standard D2.3 of P802.3dj

13.2 State machine for a self-tuning HEE

The behaviour of a self-tuning HEE is defined as a state machine operating on the values of the TOM field in the HTMC. Since the TEE can tune to the required central frequency on its own, compared to the state machine in Figure 11-2, only a subset of states is used, as follows:

S0: HEE transmitter switched off in standby mode;

S1: HEE transmitter switched off and query the existing working wavelength (frequency) information, based on which the configurable wavelength range of the newly added Tx is determined;

S2: HEE transmitter selecting a wavelength within the configurable range and getting the paired TEE Tx wavelength in accordance with Table 8-2;

S3: HEE transmitter waiting for the feedback message from the TEE;

S4: HEE transmitting updating the working wavelength information table by adding its wavelength information to the existing working wavelength range, sending traffic (i.e., regular operation).

The state machine behaviour is illustrated in Figure 13-1.

Abstract: This contribution proposes updates to the current draft 3.0.6 of G.698.2 to align ETCC methodology to draft standard D2.3 of P802.3dj, which documents significant progress in IEEE 802.3dj since the last Q6/15 meeting Geneva, 13 – 24 October 2025.

1 Introduction

IEEE 802.3dj has progressed on the methodology for computation of transmitter ETCC since the last Q6/15 meeting. Much of the development is documented in A receiver-agnostic approach to ETCC, presented at the November 2025 plenary meeting of IEEE 802.3. The authors of that contribution highlighted two practical issues with the previously proposed ETCC approach: NSR_{RX} and EC_{RX} are not directly measurable due to the lack of a "ideal Tx"; and de-embedding NSR_{RX} and EC_{RX} from NSR_{TRX} and EC_{TRX} can yield inconsistent results for $\Delta RSNR_{TX}$ (ETCC). The updated methodology involves the addition of noise-whitening step after compensation of the measurement receiver complex transfer-function. The authors demonstrated success in applying the new methodology to a model dataset and to an 800ZR module measurement dataset provided by Keysight in October 2025. IEEE 802.3dj subsequently incorporated the updated methodology in draft D2.3 of P802.3dj, as liaised in [221-GEN] LS/i on IEEE P802.3dj draft D2.3.

This contribution proposes updates to the current draft 3.0.6 of G.698.2 to align ETCC methodology to draft standard D2.3 of P802.3dj. These updates are to section 8.2.22 and Annex B.

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Topic 7: Draft revised Recommendation associate optical interface (Q6)

SN	Standard number	Standard name	Progress status
1	**G.959.1**	Optical transport network physical layer interface	The Q6 meeting agreed to generate a new draft of G.959.1, including 200G PAM4-based 800G application codes.
2	**G.697**	Optical Monitoring for Dense Wavelength Division Multiplexing Systems	The Q6 meeting agreed to generate a new draft of G.697, **including new OSNR calculation method based on IEC TR 61282-12.**
3	**G.641**	Terrestrial free space optics for mobile backhaul with short reach interfaces	The Q6 meeting agreed to add 25G applications in G.641.

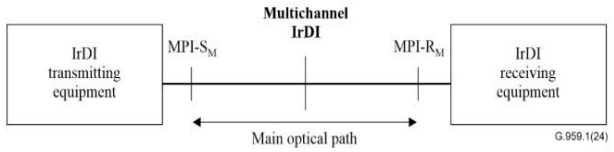


Figure 6-1 – Multichannel IrDI reference configuration

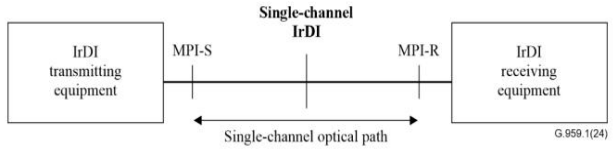


Figure 6-2 – Single-channel IrDI reference configuration

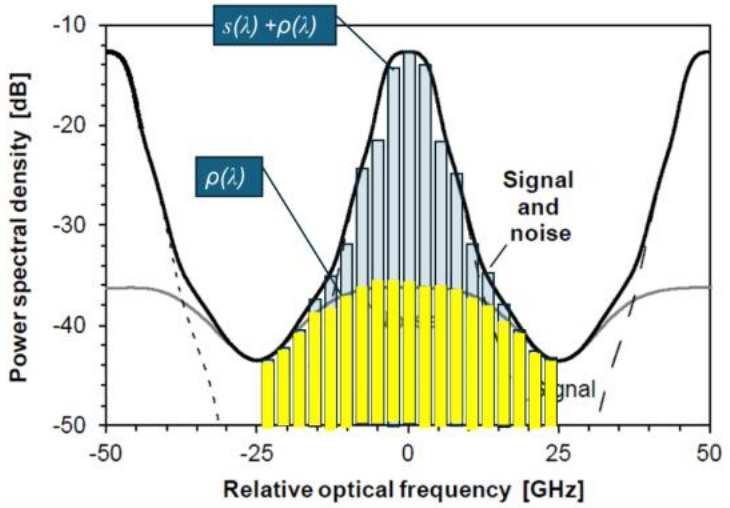
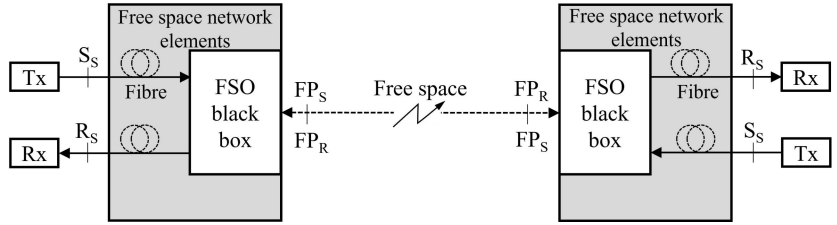


Figure III.5 noise and signal power spectrum density defined in [b-IEC TR 61282-12]



Topic 8:Other draft revised Recommendation (Q6)

SN	Standard number	Standard name	Progress status
1	**G.665**	Generic characteristics of Raman amplifiers and Raman amplified subsystems	The Q6 meeting agreed to generate a new draft of G.665, **including the new definitions for gain spectrum parameters**
2	**G.695**	Optical Interfaces for Coarse Wavelength Division Multiplexing Applications	WD06-42 contained the new draft of revised Recommendation G.695, including optical tributary signal class PAM4 200G.

A.1 justification for proposed draft revised ITU-T G.665 "Generic characteristics of Raman amplifiers and Raman amplified subsystems"

Question:	Q6/15	**Proposed revised ITU-T Recommendation**	Pisa, 9-12 February 2026
Reference and title:	Revision of ITU-T G.665 "Generic characteristics of Raman amplifiers and Raman amplified subsystems"		
Base text:	In-force version Recommendation G.665	**Timing:**	2027
Editor(s):		**Approval process:**	AAP

Scope (defines the intent or object of the Recommendation and the aspects covered, thereby indicating the limits of its applicability):

The scope of in-force Recommendation G.665 remains as it is. The related definitions of gain spectrum parameters are modified and added.

Summary (provides a brief overview of the purpose and contents of the Recommendation, thus permitting readers to judge its usefulness for their work):

It is proposed to modify and add the related definitions of gain spectrum parameters.

Relations to ITU-T Recommendations or to other standards (approved or under development):

G.661, G.664

Liaisons with other study groups or with other standards bodies:

None.

Supporting members that are committing to contributing actively to the work item:

ZTE Corporation, China Unicom, China Information Communication Technologies Group (CICT), Ministry of Communications, Department of Telecommunications (India); Indian Institute of Technology Madras; Indian Institute of Technology Hyderabad

Table 8-3 – Maximum attenuation versus the number of discrete reflectances for PAM4 200G application code

Maximum attenuation (dB)		Number of discrete reflectances > -55 dB and ≤ -45 dB								
		0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Number of discrete reflectance >-45 dB and ≤ -35dB	0 to 3	4	4	4	4	4	4	4	4	4
	4	4	4	4	4	4	3.9	3.9	3.9	3.9
	5	3.9	3.9	3.9	3.9	3.9	3.8	3.8	3.8	3.8
	6	3.8	3.8	3.8	3.8	3.7	3.7	3.7	3.7	— (Note)
	7	3.5	3.5	3.5	— (Note)	— (Note)	— (Note)	— (Note)	— (Note)	— (Note)

Note: The indicated combination of reflectances does not provide a supported maximum channel insertion loss.

Q6 Future direction of work

The next SG15 Plenary (Montreal, 29 June 2026 – 10 July 2026).。

The current highest priorities of Q6 are

- -to submit for consent G.697.
- -to submit for consent G.672.
- -to submit for agreement TR.fsc.
- -to progress with TR.ION-aiDC.
- -to progress with G.681.
- -to include 800G DWDM applications in G.698.2.
- -to include 200G applications in G.959.1.
- -to include 200G applications in G.695.
- -to include self-tuning applications in G.698.4.

•The following correspondence activities

-Correspondence on TR.fsc.

-Correspondence on smart optical modules.

-Correspondence on B1T.

-Correspondence on TR.ION-aiDC.

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Thanks !