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ANALYSIS METHODS AND RESEARCH ON THE EVALUATION OF THE PARAMETERS OF DISPERSION AND ATTENUATION OF OPTICAL LINE TERMINAL (OLT) AND OPTICAL AMPLIFIER (OA)

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The intensive development of optical fiber transmission systems using optical fiber cables in modern times requires a systematic approach to studying the transmission characteristics of optical fiber communication networks. In this regard, the systematic division of channels based on spectrum technologies (WDM & DWDM) is applied to important parameters of optical fiber communication networks—dispersion and attenuation.

Research indicates that the current state of Optical Line Terminal and their channel and terminal devices does not fully meet the requirements of the International Telecommunication Union (ITU) recommendation G.695 for effective operation of optical fiber transmission systems.

It is known that the dispersion of Optical Line Terminal (OLT) refers to the broadening of pulses. It should be noted that excessive broadening of pulses prevents the separation of optical signals at the receiver, as it overlaps with the next impulse.

Based on research, it has been possible to identify various types of dispersion. These include: modal dispersion; chromatic dispersion; polarization-mode dispersion; waveguide dispersion; material dispersion.

Chromatic dispersion is a crucial attribute that affects transmission performance on optical fibers. Due to chromatic dispersion, different frequency or wavelength components within the optical signal can move at different speeds, leading to pulse broadening. The amount of chromatic dispersion is a key factor limiting the distance over which optical signals can be transmitted in today's high-speed optical communication. For standard single-mode fibers, chromatic dispersion is determined to meet certain values. Therefore, measuring chromatic dispersion is essential for single-mode fibers.

The essential parameters for evaluating the effectiveness of an Optical Line Terminal (OLT) are the insertion loss, gain margin, and attenuation. Consequently, the evaluation of the development dynamics depending on the number of channels within the 50 GHz interval was obtained as a result of the calculation of the error margin. This compliance has been achieved in accordance with ITU-T G.652 recommendations.

References

1.Balayev R.Ə., Əlizadə M.N., Musayev İ.K.,"İntellektual Sistemlər və Texnologiyalar" Bakı-2016

2.Məmmədov İ.Ə., Gözəlov E.B., Məmmədov Ə.A.,"Naqilsiz Rabitə Texnologiyaları" Bakı-2012

3.Qəhrəmanzadə A.H." Rəqəmli Kommutasiya sistemləri və Şəbəkələri " Bakı-2004.