

**МИНИСТЕРСТВО ЦИФРОВОГО РАЗВИТИЯ, СВЯЗИ И
МАССОВЫХ КОММУНИКАЦИЙ РОССИЙСКОЙ ФЕДЕРАЦИИ
МОСКОВСКИЙ ТЕХНИЧЕСКИЙ УНИВЕРСИТЕТ СВЯЗИ И
ИНФОРМАТИКИ**

ТЕРМИНОЛОГИЯ СТРУКТУРИРОВАННЫХ КАБЕЛЬНЫХ СЕТЕЙ
Учебное пособие

Москва, 2022

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Рекомендовано УМО по образованию в области
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Для студентов, обучающихся по специальности
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УДК 42

Т.В. Кожевникова, Б.Н. Фомичев. Терминология структурированных кабельных сетей

Приведен краткий англо-русский словарь наиболее употребляемых в области структурированных кабельных сетей терминов, снабженный их развернутыми толкованиями, и комплекс заданий, направленных на усвоение включенных в словарь терминов.

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Московский технический университет
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Учебное пособие «Терминология структурированных кабельных сетей» предназначено для студентов, обучающихся по направлению «Телекоммуникации» по специальностям 20.09.00 «Сети связи и системы коммутации», 20.10.00 «Многоканальные телекоммуникационные системы», 20.18.00 «Защищенные системы связи», 07.17.00 «Физика и техника оптической связи», а также аспирантов по специальности 05.12.13 «Системы, сети и устройства телекоммуникаций».

Оно состоит из краткого англо-русского словаря терминов, снабженного их развернутыми толкованиями, и комплекса заданий, направленных на усвоение включенных в словарь терминов.

Вошедшие в словарь термины были отображены по принципу частотности употребления на основе анализа значительного количества оригинальных англоязычных текстов по структурированным кабельным сетям.

Задания по ассимиляции терминов носят весьма разнообразный характер. В них термины рассматриваются как в изолированном виде, так и в контексте и предназначены как для активного, так и для пассивного усвоения. Тексты, предлагаемые в заданиях, взяты только из новейшей оригинальной англоязычной литературы и не подвергались никакой авторской адаптации.

Учебное пособие может использоваться в аудиторной и внеаудиторной самостоятельной работе студентов и аспирантов, указанных выше специальностей в качестве приложения к учебнику Кожевниковой Т.В. «Английский язык для университетов и институтов связи»-М; Радио и связь, 2003. Кроме того, оно может быть полезно широкому кругу специалистов в области структурированных кабельных сетей, совершенствующих свой уровень владения профессионально ориентированным английским языком.

Task 1. *Read the following text. Translate the unslerlined words into Russian using the vocabulary given in the end of the book.*

Within customer premises the importance of the cabling infrastructure is similar to that of other fundamental building utilities such as heating, lighting and mains power. As with other utilities, interruptions to service can have serious impact. Poor quality of service due to lack of design foresight, use of inappropriate components, incorrect installation, poor administration or inadequate support can threaten an organization's effectiveness.

Historically, the cabling within a premises comprised both application specific and multipurpose networks. Appropriate use of the International Standard will enable a controlled migration to generic cabling. Certain circumstances may warrant the introduction of application specific cabling; these instances should be minimized.

Task 2. *Read the text given in task 1 again and translate the following words and word combinations into Russian.*

Fundamental, must impact, interruptions to service, serious impact, poor quality, luck, design foresight, inappropriate, components, controlled migration, circumstances, warrant, introduction, instances.

Task 3. *Retell the text from task 1.*

Task 4. *Translate the following word combinations into Russian. Use the vocabulary given in the end of the book*

Application independent generic cabling system; open market for cabling components; flexible cabling scheme; building professionals; accomodation **FFF** of cabling; initial planning; refurbishment; stundardisation bodies; current product; product development; multi-vendor cabling; ropper cabling; premises geography; general pfice environment; life expectancy.

Task 5. *Translate the following sentences into English.*

1. Структурированная кабельная система используется в коммерческих помещениях, расположенных в отдельных зданиях или группах зданий одного комплекса.
2. Данная структурированная кабельная система предназначена для огром-

ных помещений площадью 1000000 м².

3. Кабельная система, определенная данным Международным стандартом, поддерживает широкий диапазон услуг, включая голосовые, видео, передачу изображения, текста и данных.
4. Необходимо определить структуру и минимальную конфигурацию кабельной системы, а также требования к работе определенных кабельных соединений
5. При установке и монтаже кабельной системы необходимо учесть требования противопожарной безопасности
6. В данном стандарте предлагается следующее определение кабельного элемента: кабельный элемент – наименьшая составляющая кабеля; кабельный элемент может быть защищен.
7. Конфигурация кабельной системы должна соответствовать требованиям, изложенным в разделе 5
8. Вся кабельная система состоит из соединений, уровень которых соответствует стандарту
9. Во многих сериях интерфейс сети общего пользователя является точкой соединения оборудования провайдера сети и кабельной системы помещений пользователя.

Task 6. *Read the following terms. Translate them into Russian. Try to give their definition in English.*

Application, balanced cable, building backbone cable, building distributor, building entrance facility, cable unit, campus backbone cable, campus distributor, channel, cross-connect, equipment cable, equipment room, floor distributor, horizontal cable, hybrid cable, individual work area, interconnect, jumper, keying, optical fibre cable, optical fibre duplex adapter, patch cord, patch panel.

Task 7. *Read the following definitions. Find the corresponding terms from the ones given in the frame*

Work area cable; permanent link; transition point; twisted pair; telecommunications outlet; shielded twisted pair cables; public network interface; telecommunications closet; unshielded twisted pair cable; splice; work area; telecommunications; star quad.

location in the horizontal cabling where a change of cable form takes place; for example flat cable connects to round cable or cables with differing numbers of elements are joined;

a cable element which consists of two insulated conductors twisted together in a regular fashion to form a balanced transmission line;

an electrically conducting cable comprising one or more pairs none of which is shielded. There may be an overall shield, in which case the cable is referred to as unshielded twisted pair with an overall shield;

a building space where the occupants interact with telecommunications terminal equipment;

a cable connecting the telecommunications outlet to the terminal equipment;

the transmission path between two mated interfaces of generic cabling, excluding equipment cables, work area cables and cross-connections;

a point of demarcation between public and private network. In many cases the public network interface is the point of connection between the network provider's facilities and the customer premises cabling;

an electrically conducting cable comprising one or more elements, each of which is individually shielded. There may be an overall shield, in which case the cable is referred to as a shielded twisted pair cable with an overall shield;

a joining of conductors and fibres, generally from separate sheaths;

a cable element which comprises four insulated conductors twisted together. Two diametrically facing conductors form a transmission pair;

a branch of technology concerned with the transmission, emission and reception of signs, signals, writing, images and sounds; that is, information of any nature by cable, radio, optical or other electromagnetic systems. The term telecommunications has no legal meaning when used in this International Standard;

an enclosed space for housing telecommunications equipment, cable terminations, and cross-connect cabling. The telecommunications closet is a recognized cross-connect point between the backbone and horizontal cabling subsystems;
a fixed connecting device where the horizontal cable terminates. The telecommunications outlet provides the interface to the work area cabling.

Task 8. *Read the text below and answer the following questions:*

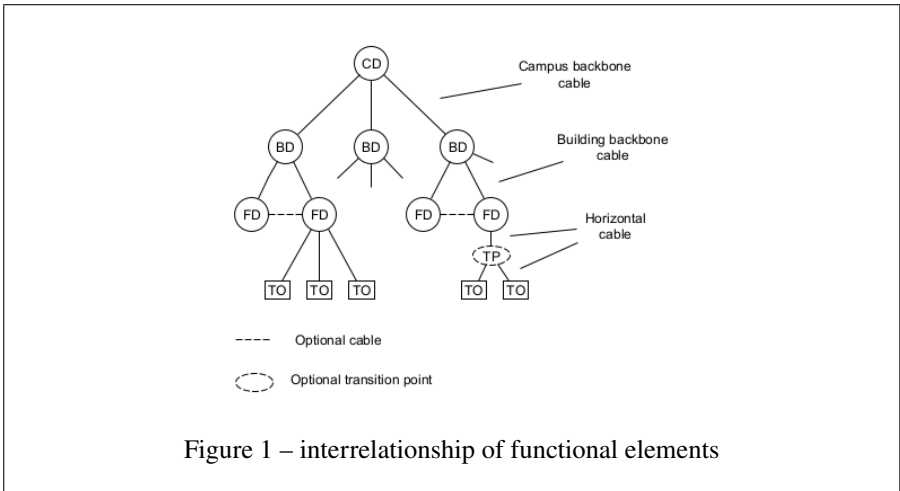
1. How many subsystems does generic cabling contain?
2. What do distributors provide?
3. What does the campus backbone cabling subsystem include?
4. Where does the building backbone cabling subsystem include?
5. How should all cabling elements at the FT be terminated?
6. What does the work area cabling do?
7. What assumptions have been made?
8. What is a general cabling?
9. What does the number and type of subsystems depend upon?

The horizontal cabling subsystem extends from FD(s) to the TO(s). The subsystem includes the horizontal cables, the mechanical termination of the horizontal cables at the FD, the cross-connections at the FD and the TOs

Horizontal cables should be continuous from the FD to the TOs. If necessary, one TP is permitted between an FD and any TO. The transmission characteristics of the horizontal cabling shall be maintained. The incoming and outgoing pairs and fibres at the TP shall be connected so that a 1:1 correspondence is maintained. All cable elements at the TP shall be mechanically terminated. The TP shall not be used as a point of administration (that is, not used as a cross-connect), and application specific equipment shall not be located there. The TP may only contain passive connecting hardware.

The work area cabling connects the TO to the terminal equipment. It is non-permanent and application specific and therefore lies outside the scope of this International Standard. Assumptions have been made concerning the length and the transmission performance of the work area cable; these assumptions are identified when relevant.

The generic cabling is a hierarchial star structure which may take the form shown in figure 1. The number and type of subsystems that are included in generic cabling implementation depends upon the geography and size of the campus or building, and upon the strategy of the user. For example, in a campus having only one building the primary distribution point is the BD, and there is no need for a campus backbone cabling subsystem. On the other hand, one large building may be treated as a campus, with a campus backbone subsystem and several BDs. Further information on the application of the cabling structure is given in the **JJJ**.



Cables shall be installed between adjacent levels in the structure. This forms a hierarchial star as shown in figure 1, and provides the high degree of flexibility needed to accomodate a variety of applications. Annex D details how to configure various networks within the boundaries of the hierarchial star topology. These topologies are

established by the interconnection of the cable elements at cross-connects, and at the application specific equipment.

For some applications, additional direct connections between FDs or DBs are desirable and are permitted. The building backbone cable may also interconnect FDs. However, such connections shall be in addition to those required for the basic hierarchical star topology.

Task 9. *Read the text 8 again and find the English equivalents of the following sentences:*

1. Распределительные пункты обеспечивают конфигурацию кабельной системы для поддержки различных топологий, таких как шина, звезда и кольцо.
2. Подсистема магистрального кабеля в комплексе зданий проходит от СД к ВД, обычно расположенным в отдельных зданиях.
3. Расположенные в зданиях магистральные кабели не должны содержать ТР; медные магистральные кабели не должны иметь сплайсов.
4. Кабельная система рабочей области соединяет ТО с терминальным оборудованием.
5. Количество и тип подсистем, входящих в структурированную кабельную систему, зависит от географии и размера комплекса зданий или отдельного здания, а также от стратегии пользователя.

Task 10. *Write out all the terms from text 8, translate them into Russian, make up 10 sentences with these terms.*

Task 11. *Think over a title for text 8. Retell the text.*

Task 12. *Read the text and find the sentences the beginnings of which are given below. Translate them into Russian*

- The design of general . . .
- A minimum of one TO . . .

- When a TO is . . .
- Emerging balanced cable . . .

Telecommunications outlets

TOs are located on the wall, floor, or elsewhere in the work area, depending on the design of the building. The design of generic cabling should provide for TOs to be installed in readily accessible locations throughout the usable floor space.

A high density of TOs will enhance the flexibility of the cabling to accommodate changes. In many countries two TOs are provided to serve a maximum of $10m^2$ of usable floor space.

TOs may be presented singly, or in groups, but each work area shall be served by a minimum of two.

A minimum of one TO served by 100 Ω or 120 Ω cable shall be provided at each work area (100 Ω preferred). Other TOs shall be supported by either balanced cable or by fibre optical cable. In the horizontal cabling, at least one TO shall be configured as specified in item b of balanced or optical fibre cable or at least one TO shall be served by either class D or optical class. When a TO is supported by balanced cable, 2 pairs or 4 pairs shall be provided at each TO; all pairs shall be terminated. If less than four pairs are provided, the outlet shall be clearly marked. Emerging balanced cable applications may be limited by differential delay of pairs that serve a single telecommunications outlet.

Task 13. *Ask 5 questions to the text from task 12. Retell the text.*

Task 14. *Compose sentences of your own with the following words and word combinations from text 12:*

Telecommunications outlet, serve, balanced cable, generic cabling, design, horizontal cabling, floor space, application, optical fibre cable.

Task 15. *Read the following words and word combinations and translate them into Russian:*

Telecommunications closet, equipment rooms, earthing, entrance facilities, bonding, electromagnetic capability, passive components, local regulations, pathway, private network, premises cabling, backbone cabling subsystem, cable length, point

of termination, balanced cable, cabling link, performing component, mechanical termination, total length, differing requirements, maximum cable length, work area cable, interconnect floor distributor, crossconnect, performance characteristics, patch cords, flexible cable, transition point, inclusion, hierarchical level, individual cable, entire distance. hierarchical star, signal degradation, keep track of cables, entire distance, hybrid cable, multiunit cable, accomodating ring.

Task 16. *Read the text given below. Translate it into Russian. Then ask your neighbour to translate it from Russian into English sentence after sentence.*

There shall be no more than two hierarchical levels of cross-connects in the backbone cabling to limit signal degradation for passive systems and to simplify administration in keeping track of cables and connections. No more than one cross-connect shall be passed through to reach the CD when starting from a FD.

A single backbone cabling cross-connect may meet the cross-connect needs of the entire backbone subsystem. Backbone cabling cross-connects may be located in telecommunications closets or equipment rooms. See annex D for guidance on accomodating ring, bus, tree, etc. configurations within the hierarchical star.

The star topology is applicable to the cable elements of the transmission medium, such as individual fibres or pairs. Depending on the physical characteristics of a site, cable elements that are terminated at different locations may be part of the same cable over a portion of the distance, or may use individual cables over the entire distance. Hybrid and multi-unit cables that meet the requirements of 8.3 may be used in the backbone cabling subsystem.

Task 17. *Read the following text and together with your neighbour, compose a dialogue on its basis.*

The performance of a permanent link is specified at and between interfaces to the link. The permanent link comprises only passive sections of cable and connecting hardware. A transition point may also be included in the horizontal subsystem. Active and passive application specific hardware is not addressed by the International Standard.

The optical fibre and balanced cable links are connected together using an optical fibre to balanced cable converter, a cross-connect and two equipment cables. Interfaces to the cabling are at each end of a permanent link. Interfaces to the cabling

are specified at the TO and at any point where application specific equipment is connected to the cabling; the work area and equipment cables are not included in the permanent link.

Interfaces to the cabling are at each end of a permanent link. Interfaces to the cabling are specified at the TO and at any point where application specific equipment is connected to the cabling; the work area and equipment cables are not included in the permanent link.

The performance of the channel is specified at and between interfaces to the channel. The cabling comprises only passive sections of cable connecting hardware, work area cords, equipment cords and patch cords.

The optical fibre and balanced cabling channels are connected together using an optical fibre to balanced cable converter. There are four channel interfaces; one at each end of the copper channel, and one at each end of the optical fibre channel. Equipment connections are not considered to be part of the channel. All work area, equipment cables and patch cords are included in the channel.

Consideration should be given, when specifying and designing cabling, to the possible future connection of cabling subsystems to form longer links and channels. The performance of these longer links and channels will be lower than that of any of the individual subsystem links and channels from which they are constructed. Measurement of permanent links and channels should be made, initially, upon installation of each cabling subsystem. Testing of combined subsystems should be performed as required by the application.

Task 18. *Read the following sentences. Put them in the right order to make a text. Read this text and retell it.*

1. The performance requirements of single-mode and multimode optical fibre permanent links/channels are considered in this clause.
2. The performance requirements for optical fibre permanent links/channels assume that each optical fibre permanent link/channel employs a single optical wavelength in one transmission window only.
3. There are no special requirements for generic cabling concerning wavelength

multiplexing.

4. Application standards employing wavelength multiplexing are not yet available for listing.
5. The requirements for the wavelength multiplexing and demultiplexing components will be found in the application standards.
6. All application specific hardware for wavelength multiplexing is installed in the equipment area and in the work area.

Task 19. *Give the following a two way translation.*

- All cables shall meet the applicable safety requirements as specified by the relevant local authorities.
- Из-за ограничений некоторых услуг связи использование описанных ниже кабелей для поддержки других применений не всегда дает приемлемое качество предоставляемых услуг.
- The user is advised to consult standards associated with the planned service or equipment in order to determine any specific limitation.
- Требования к потерям при затухании даны только для дискретных частот.
- They have to be fulfilled, however, for all intermediate frequencies.
- Требования к промежуточным частотам устанавливаются посредством линейной интерполяции между двумя специфическими частотами по семи – логарифмической шкале.
- For multimode and single-mode fibre a conservative conversion value for unit propagation delay of 5.00 ns/m (0.667 c) may be used.
- Эта величина может использоваться для расчета задержки в канале без проверки.

Task 20. Give a summary of text 17.

Task 21. Fill in the blanks with the words from the frame. Translate the sentences received into Russian.

Outlets; horizontal; backbone; crosstalk; connectors; category; units; transmission; optical fibre; network; cabling; connecting; installed cabling systems; cross-connect jumpers

1. In the ____ cabling subsystem cables that contain more than two pairs shall meet the requirements.
2. In the ____ cabling subsystem when multiple telecommunications ____ are served by a single cable the near-end ____ of cable elements that extend to any two or more outlets shall meet the requirements.
3. The ____ may be of the same type or of different types, and of the same ____ or of
4. different categories.
5. Unless otherwise specified all ____ shall be tested in a mated state.
6. When required such devices are not considered to be part of the ____ and may have significant detrimental effects on ____ performance.
7. The three parts to the requirements for ____ cable are the optical fibre requirements, the cable ____ performance and the physical cable requirements.
8. The ____ hardware shall be designed to operate reliably for temperature ranging from -10C to 60C.
9. Cables used for ____ and patch cords are subject to the performance requirements.
10. The manner and care with which the cabling is implemented are a significant factor in the performance and ease of administration of ____.

Task 22. Read the following extracts. Put them in the right order so as to form a text. Read the text and retell it

1. Unless the network analyser is equipped with balanced outputs, baluns are required to provide transmission continuity to the balanced test leads. Test baluns shall be RFI (Radio Frequency Interference) shielded and shall comply with the specifications listed in table

Таблица 1 – Test balun performance characteristics (1 MHz - 100 MHz)

Parameter	Value
Impedance, primary 1)	50 Ω (unbalanced)
Impedance, secondary 2)	100 Ω , 20 Ω or 150 Ω (balanced)
Attenuation	1,2 dB max.
Return loss, bi-directional	20 dB min.
Power rating	0.1 min.
Longitudinal balance	50 dB min.
1) Primary impedance may differ, if necessary to accommodate analyser outputs other than 50 Ω . 2) Balanced outputs of the best baluns shall be matched to the nominal impedance of the test leads 3) Measured per ITU-T Recommendations G.117 and 0.9	

2. Balanced test leads are used for connections to and from the test sample. Test leads shall be taken from cables that meet or exceed requirements for the highest performance 100 Ω , 120 Ω or 150 Ω cable given in clause 8 or annex C. The balanced test leads shall be limited to a length of 65 mm between each balun and the connector under test. If used, coaxial cable assemblies extending to and from test equipment should be as short as possible. It is recommended that they do not exceed the balanced test leads at the point they are connected to the baluns. In addition, separation between the active conductors of the product under test and the balun ground plane (if present) shall be at least 50 mm. If

the balanced test leads are shielded. the shield shall be connected in common with the balun casing on at least one end.

3. For pairs not under test, impedance matching terminations are not required on the near end. Product orientation, with respect to near-end and far-end, may affect measurement results. Due to these effects, the connector shall be tested in the orientation that best reflects installed field use. Products that are intended to receive near-end signals from either orientation (for example, those that may be used as TOs as well as in telecommunications closets for patching) shall be tested in both orientations for NEXT loss, attenuation, and return loss.
4. For crosstalk measurements, near-end of the transmission test setup corresponds to the end from which test signals are applied. Far-end is defined as the end of the product under test that is not directly connected to measurement equipment. For NEXT loss and return loss measurements, pairs at the far-end are terminated with impedance matching terminations.
5. Impedance matching terminations for the balanced test leads and the product under test shall be matched to the nominal impedance of the test leads (in particular 100Ω, 120Ω or 150Ω) with a tolerance not to exceed $\pm 3\%$ ($\pm 1\%$ precision metal film or precise low inductance resistors are recommended), throughout the Frequency range from 1 MHz to 100 MHz.

Task 23. *Revise the information received in tasks 1-22. Enlarge it with your own knowledge of cabling systems. Compose a story devoted to that subject.*

Task 24. *Find in the vocabulary English terms corresponding to the following Russian definitions:*

- кабель, проложенный методом открытой проводки на опорах вне и между зданиями без защиты от воздействий внешней среды;
- соединительный кабель, используемый для подключения оборудования в рабочей области;
- система прокладки кабелей между подвесным или фальшпотолком и структурной поверхностью над ним;

- цилиндрический кабелепровод;
- физический канал передачи сигналов между распределительными пунктами зданий;
- площадь этажа, которую можно использовать под офисы;
- среда, обеспечивающая распространение электромагнитных сигналов;
- проводник без разъемов для коммутации на кронах;
- разъем для подключения оборудования к структурированной кабельной системе;
- площадь помещения, отведенная пользователю.

Task 25. *Read the following terms. Find their Russian definitions in the vocabulary. Translate them into English.*

Alien crosstalk, crossover, delay, linkage, mode, twisted pair, termination, in conduit, user code, warranty, straight cable, splice, record, interconnect panel, horizontal cabling, identifier, fiber to the desk, firestop, entrance facility, duct, active equipment, balanced transmission, unshielded twisted pair, raceway, trough, plug, protocol, octopus, grounding electrode, furniture cluster, class, cabinet, alternate entrance.

СЛОВАРЬ ТЕРМИНОВ СКС

Английские термины	Русские термины	Толкование
Access floor	Фальшпол	Пол, состоящий из съемных и взаимозаменяемых панелей, фиксируемых на опорах, который обеспечивает доступ к сформированному таким образом пространству.
Active equipment	Активное оборудование	Электронные, электронно-оптические и оптоэлектронные устройства, осуществляющие обработку, коммутацию, формирование и преобразование электрических и/или оптических сигналов их передачу и получение с использованием дополнительных источников энергии.

Adapter	Адаптер	<p>Соединительный элемент с разнотипными разъемами, позволяющий:</p> <ul style="list-style-type: none"> • подключать несимметричные кабельные разъемы; • изменять последовательность (перекрестный адаптер) или число задействованных проводников в разъемах; • изменять волновое сопротивление (волновой адаптер).
	Соединитель	<p>Механический элемент, обеспечивающий совмещение оптических осей и механическую фиксацию двух симметричных разъемов.</p>

Administration	Администрирование	Определенные стандарты, правила организации, маркировки, обозначения элементов кабельной инфраструктуры, исполнения документации и эксплуатации кабельных систем.
Aerial cable	Воздушный кабель	Кабель, проложенный методом открытой проводки на опорах вне и между зданиями без защиты от воздействий внешней среды.
Air blown fiber	Пневматическая прокладка волокна	Метод монтажа волоконно-оптических систем, при котором предварительно прикладываются полые трубки, после чего с помощью избыточного давления воздуха проталкивается волокно. Метод обеспечивает возможность замены волокон.

Alien crosstalk	Межкабельные наводки	Нежелательные электромагнитные сигналы от приложенных в жгутах смежных кабелей. Измеряется как отношение сигнала, подаваемого на кативную витую пару (пары) одного кабеля, к сигналу, наведенному в контрольной паре другого кабеля. Единица измерения – децибел.
Alternate entrance	Резервный вход	Дополнительный ввод телекоммуникационных кабелей в здание по маршруту, отличающемуся от основного ввода, для резервирования служб сетей общего пользования и частных сетей.
Antenna entrance	Антенный вход	Кабельный канал от антенны до соответствующего оборудования.
Application	Приложение	Определенный метод передачи данных или протокол, обеспечивающий взаимодействие терминалов в сети.

Array connector	Многоволоконный разъем	Несимметричный миниатюрный кабельный разъем, обеспечивающий разъемное соединение многоволоконного кабеля (состоящего, например, из четырех, восьми или двенадцати волокон) с модулями, имеющими соответствующее число волокон
Attenuation	Затухание	Уменьшение мощности сигнала в результате потерь, характеризующееся отношением его параметров на входе и выходе линии/канала. Единица изменений – децибел.
Attenuation crosstalk ratio (ACR)	Отношение затухания к двунаправленным (перекрестным) наводкам	Параметр, характеризующий превышение уровня сигнала над уровнем наводок. Позволяет оценить качество сигналов двунаправленной передачи по двум витым парам. Вычисляется в децибелах (дБ).