



SVIAZNOY ALLIANCE

DWDM SYSTEM ALMAZ

SVIAZNOY ALLIANCE is comprehensive implementation of complex technical projects from concept to commissioning followed by maintenance and technical support

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- Enterprise
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SVIAZNOY ALLIANCE

CUSTOMERS:

- telecom operators
- IT companies
- financial institutions
- data centers

ACTIVITY:

- Production of DWDM equipment
- Installation of equipment
- Technical support

AREAS:



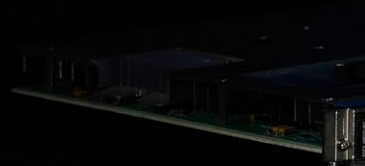
Enterprise



Long-haul



Metro



1

High-speed fiber optic transmission system

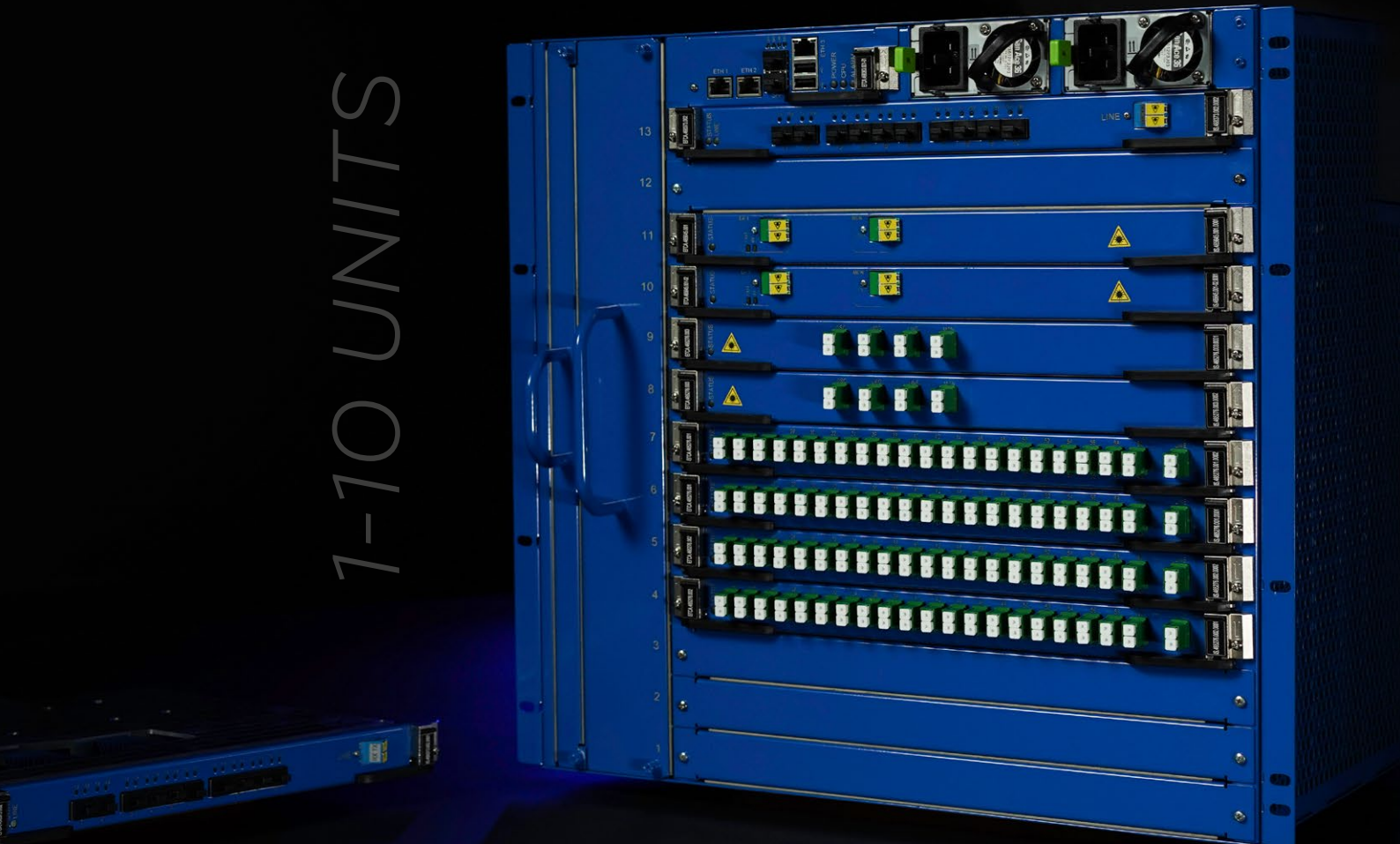
2

Up to 800 Gbit/s per wavelength

3

Long-haul transmission

1-10 UNITS



Solutions



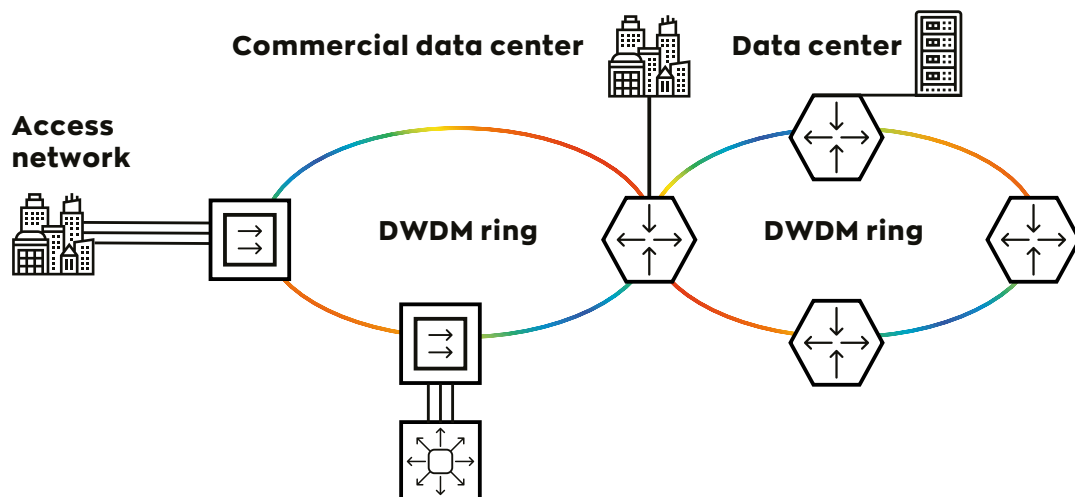
Enterprise

Enterprise networks have much more differentiated service profiles than backbone lines, where traffic is already aggregated into a common transport infrastructure.

Traffic is generated in more locations and the set of services is more variable, requiring more flexibility and control from your optical transport platform. With ALMAZ Optical Transport Platform, you can optimize your network to provide exactly the support and performance you need.

With a modular architecture and the use of common hardware and software in a variety of form factors, ALMAZ can be configured to meet any enterprise network requirement.

Adaptive modulation makes available to choose a reasonable balance between distance and transmission speed from 100G to 800G depending on your requirements.



- scalability: from 1U to 10U chassis
- easy deployment and maintenance
- managed remotely via the built-in web interface or via any third party SNMP system or control system iTNEC-NMS-SWT
- high level of fault tolerance: carrier-class equipment (hardware redundancy and redundancy at the network level)

Long-Haul

Digital transformation requires telecom operators to be able to flexibly increase the bandwidth of backbone channels in a short time and with minimal capital investment.

For backbone telecom operators, the company offers high-speed equipment with a channel rate up to 800 Gbit/s, which provides up to 38 Tbit/s over single fiber pair.

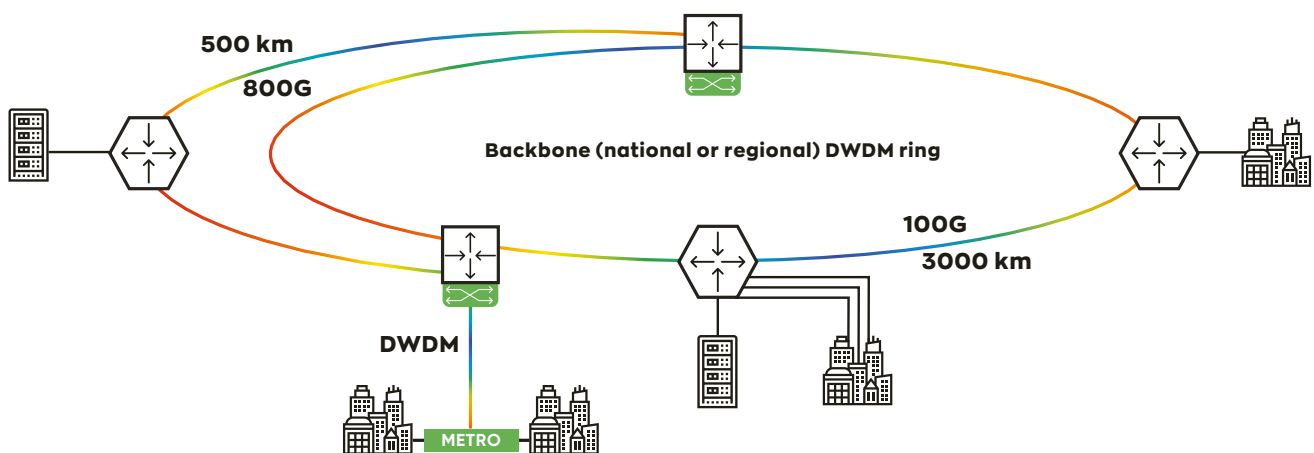
The DWDM platform has proven itself both at short distances and at extra-long spans, more than 3 000 km without regeneration.

Building the most balanced solution in terms of system capacity and transmission range is achieved by using the latest generation DWDM transponders.

The platform has a wide range of elements for building

DWDM networks of any length. The reliability of connections is ensured by the implementation of various protection schemes. Redundancy of information and optical channels, and redundancy of communication nodes is available. Many opportunities for managing and monitoring all network's nodes is carried out by network management system iTNEC-NMS-SWT.

Practical experience in building backbone networks allows us to foresee important features of projects and quickly resolve complex issues. To build the optimal network topology, our company uses its own network design center. Due to our team's experience and expertise, we can launch complex networks with minimal capital costs.



- a wide variety of equipment for building networks of complex topology and high fault tolerance requirements
- flexible network management and monitoring by management system iTNEC-NMS-SWT
- high throughput for backbone channels – up to 38 Tbit/s over single fiber pair on extended communication lines
- large selection of line interfaces

Metro

The company offers modern telecommunication equipment for metro networks (urban and regional networks), represented by a wide variety of technologies and, as a result, client interfaces.

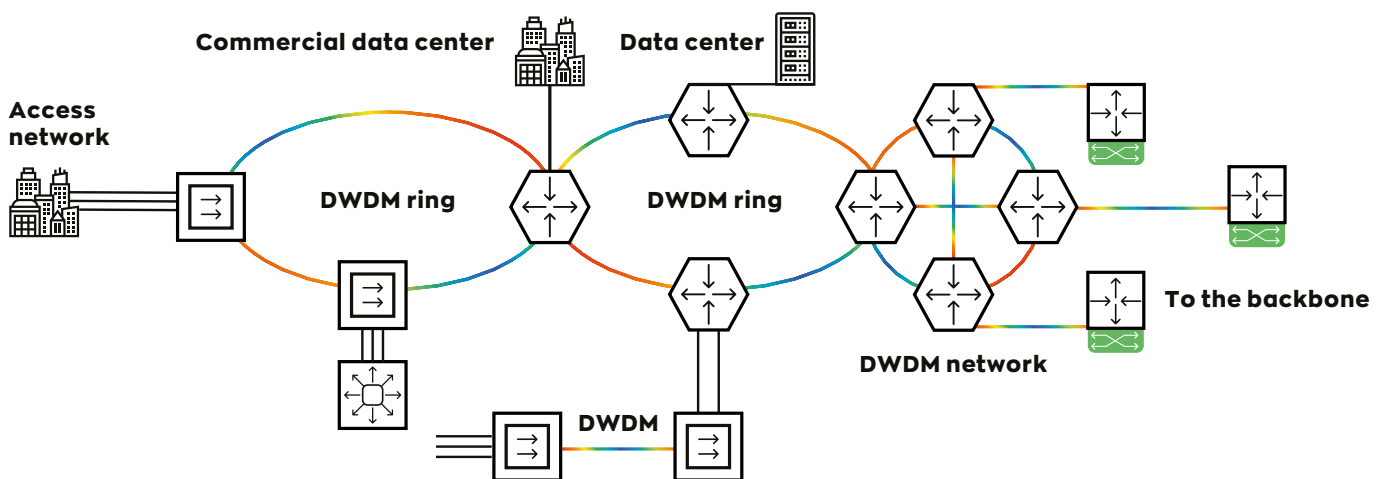
The multiservice line make available to combine systems from PDH and SDH to high-speed Ethernet data transmission systems into a single modern transport infrastructure. Clients from E1 to 400 GE are efficiently aggregated in optical links from 155 Mbps to high-speed 800 Gbit/s.

A feature of the Metro segment is complex topologies. Circuit switching at the optical or electrical levels provides

the flexibility of the optical infrastructure. For this the equipment line includes ROADM devices in a modern CDC configuration (Colorless, Directionless, Contentionless), and OTN x-connect is also supported.

The equipment makes possible to gradually scale throughput, reduce capital costs for network construction and provide for the development of the operator in the future.

Units of different generations are compatible with each other, which provides customers with a seamless transition to new solutions.



- high capacity – from 155 Mbps up to 800 Gbit/s per wavelength
- multiservice – transparent transfer of any client services: E1 (PDH), STM-1...256 (SDH), 1GE...400 GE (Ethernet data network traffic), OTU1...OTUCn (OTN), CPRI/eCPRI mobile traffic, FC800...FC3200 (network traffic)
- support optical (ROADM) and electrical (OTN-XC) switching
- coherent and non-coherent systems up to 80 DWDM channels

Alien Wavelength Technology

Expansion of existing OTN/DWDM networks and the need to increase channel capacity are some of the most common issues that the company's specialists have to solve. It is not always possible to expand the bandwidth of already installed equipment, so ALMAZ proposes to use the Alien wavelength technology.

To increase the capacity of the system using this technology, it is enough to install a minimum set of individual channel equipment (transponder or aggregator) and configure it to work together with the linear equipment of another vendor. Alien Wavelength Technology enables companies to modernize cost-optimized networks and reduce dependence on current equipment vendors.

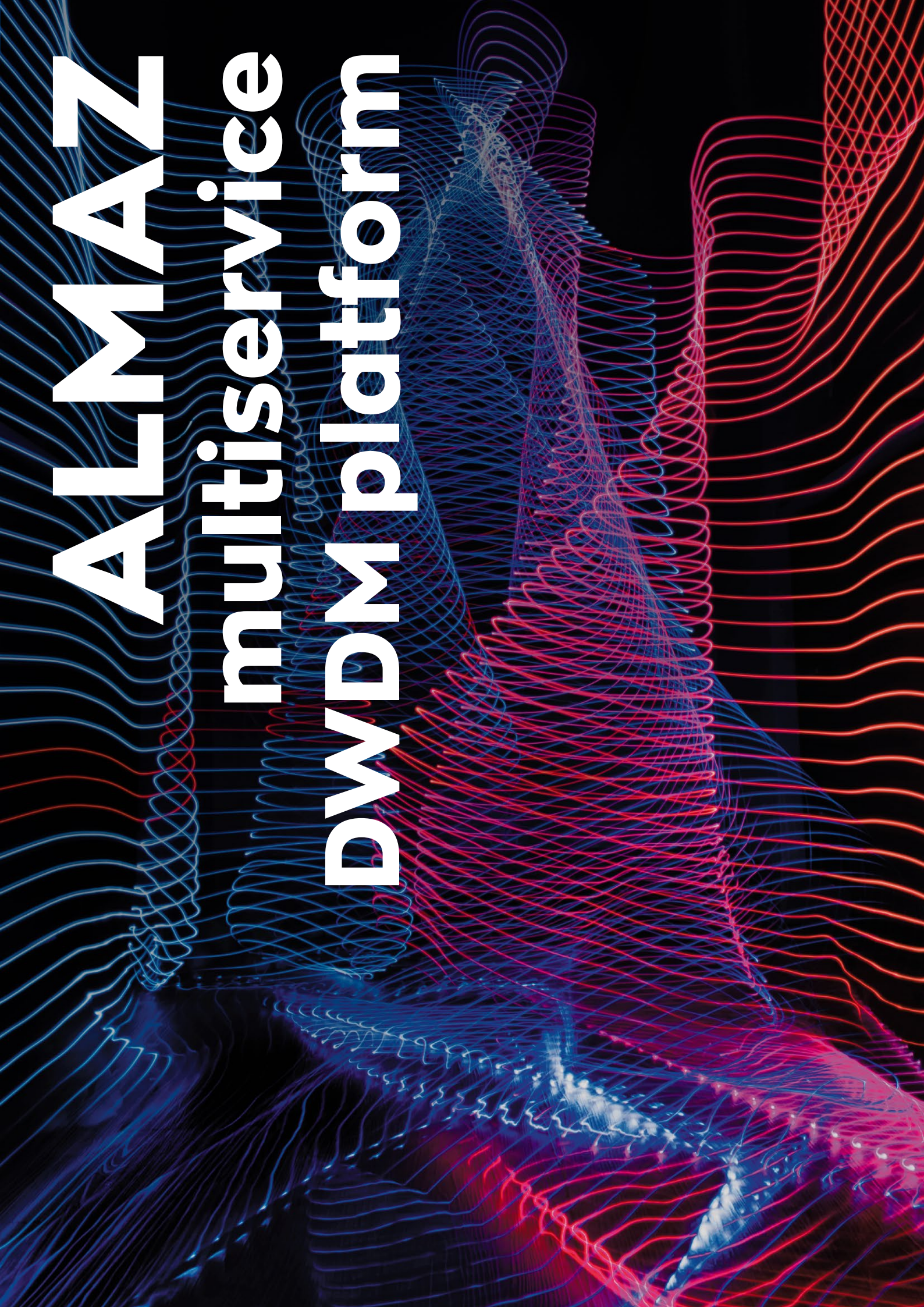
The platform supports the transmission of any client signals by units in an "alien" frequency grid without interrupting third-party traffic. A wide range of transceiver equipment and several types of chassis make it possible to find an effective solution for increasing line capacity.

The use of the "alien wavelength" technology requires a preliminary study of the optical path, therefore, to implement this task, the employees of the company's scientific department conduct additional measurements of the line parameters.



- transmission of client signals to any distance in an "alien grid" of wavelengths
- optimization of the cost of modernization of communication networks
- rapid capacity expansion within the current infrastructure

ALMAZ multiservice DWDM platform



DWDM System

ALMAZ Telecom

Telecommunication equipment for high-speed optical communication networks

The «Almaz» is an efficient platform based on modern DWDM/OTN technologies designed for high-speed transport networks. It supports up to 800 Gbps per lambda, with a total system capacity of up to 16 Tbps over a single fiber pair. Almaz comes in 1/3/6/10RU form factor chassis and can be housed in 19/21» telecom racks. DWDM Almaz Telecom is optimized for high-speed transponders: 100, 200, 400, 600 and 800 Gbit/s.

Platform for any topology

A wide range of transponder/muxponder modules with flexible settings of line interface modes caters to the needs of operators in building metro, regional, and backbone optical networks. A diverse selection of amplifiers (EDFA, RAMAN, EAM, ROPA, hybrid EDFA+RAMAN) enables the deployment of long and ultra-long-haul single-span lines. The availability of electrical and optical cross-connect modules allows the creation of complex network topologies. To ensure connection reliability, software-hardware mechanisms are in place to support 1+1 optical and electrical level protection. Forward error correction (FEC) mechanisms, including Super-FEC, HD-FEC, and SD-FEC, provide significant operational margins and increase the length of regeneration links.

Specifications

- Form factor from 1 to 10U
- A wide range of equipment for speeds from 155 Mbps to 800 Gbit/s
- ROADM: WSS 1x1, 1x2, 1x4, 1x9
- Optical amplifiers: EDFA, RAMAN, EAM, ROPA and hybrid EDFA+RAMAN
- Carrier grade management system

Reliability

- 1+1 redundancy of control and power units
- Integration with OTDR system for real-time fiber health monitoring

Network scalability and upgrade

The platform enables a rapid increase of network capacity by adding modules to the available slots in the chassis or by increasing the line bitrate of optical channels. Network reconfiguration and expansion can be carried out without interrupting communication. A wide selection of client interfaces facilitates seamless upgrading of outdated communication lines to modern high-speed, next-generation network.

A new level of network management and infrastructure monitoring

The carrier-class management system is designed for centralized control of DWDM network and seamless integration with external IT systems (OSS/BSS). The NMS provides comprehensive information about the network structure and the overall state of communication channels at various levels of network organization. The embedded OTDR module allows operators to monitor the condition of the optical infrastructure in real-time, preventing network failures and minimizing downtime.

Efficiency

- High density of client interfaces
- Up to 1.2 Tbit/s per slot
- Quick installation on current communication lines
- "Alien Wavelength" technology support

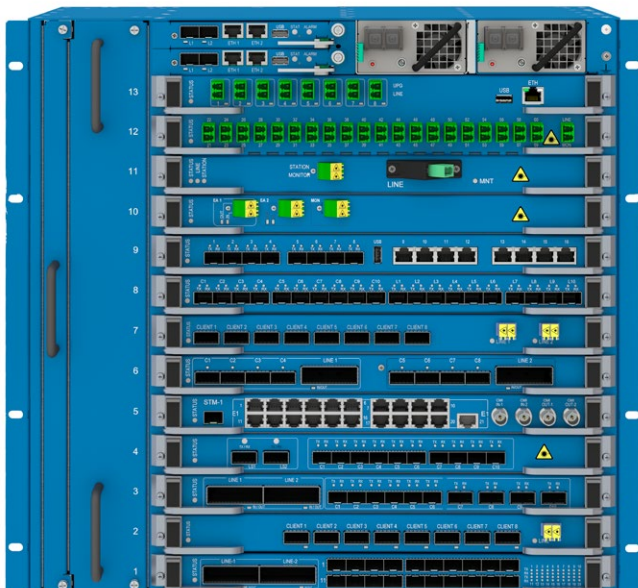
Certification

- Departmental certification
- Equipment in the register of innovative products recommended for purchase

Chassis use

	iTN15600-E-DC10U2	iTN15600-E-DC6U2
Slots in chassis	13	7
Control unit redundancy	1+1 (variant with no redundancy is available)	1+1 (variant with no redundancy is available)
Power supply redundancy	1+1	1+1
Management system	NMS iTNEC-NMS-SWT	NMS iTNEC-NMS-SWT
Air flow direction	lateral (left to right)	lateral (left to right)
Power supply modules	AC 220 B 50 Hz / DC 36-72 V	AC 220 B 50 Hz / DC 36-72 V
Dimensions (W x H x D)	482 x 441 x 340 mm	482 x 258,2 x 340 mm
Working temperature	from +5 to +40 °C	from +5 to +40 °C
Maximum humidity	80 % (at +25 °C)	80 % (at +25 °C)
Chassis power consumption (without equipment)	160 W	113 W
Chassis weight (without equipment)	12 kg	8,6 kg

	iTN15600-E-DC3U2	iTN15600-E-DC1U2
Slots in chassis	3	monoblock
Control unit redundancy	1+1 (variant with no redundancy is available)	no
Power supply redundancy	1+1	1+1
Management system	NMS iTNEC-NMS-SWT	NMS iTNEC-NMS-SWT
Air flow direction	lateral (left to right)	lateral (left to right)
Power supply modules	AC 220 B 50 Hz / DC 36-72 V	AC 220 B 50 Hz / DC 36-72 V
Dimensions (W x H x D)	482 x 136,2 x 340 mm	482 x 44 x 378 mm
Working temperature	from +5 to +40 °C	from +5 to +40 °C
Maximum humidity	80 % (at +25 °C)	80 % (at +25 °C)
Chassis power consumption (without equipment)	63 W	50 W
Chassis weight (without equipment)	7,4 kg	5,3 kg



DWDM System

ALMAZ Data Center

High-speed equipment for data center interconnections

A feature of the data center infrastructure is the presence of cold and hot aisles and the corresponding equipment cooling scheme in the data center. An important requirement for telecom equipment is the support of high-speed clients, their efficient aggregation in a high bandwidth channel.

DCI chassis allow operators to set up high-capacity DWDM links to connect data centers within a city or over longer distances. Through the compact platform it is possible both effectively accommodate up to 2 (iTN15600-E-DC3U2D) or 6 (iTN15600-E-DC6U2D) high-

speed aggregators, and an optical line system in one chassis. With the help new of cards in the DCI version, it is possible to organize information transfer up to 2.4 Tbit/s in one iTN15600-E-DC3U2D chassis, and up to 7.2 Tbit/s in the iTN15600-E-DC3U2D chassis

Responding to the needs of data center clients, within the framework of the DCI line, Sviaznoy Alliance has developed cards with a wide range of multi-service client interfaces including high speed Fibre Channel storage protocol options along with Ethernet clients up to 400GE.

Specifications

- Form factor from 1 to 10U
- A wide range of equipment for speeds from 155 Mb/s to 800 Gbit/s
- Carrier grade management system

Efficiency

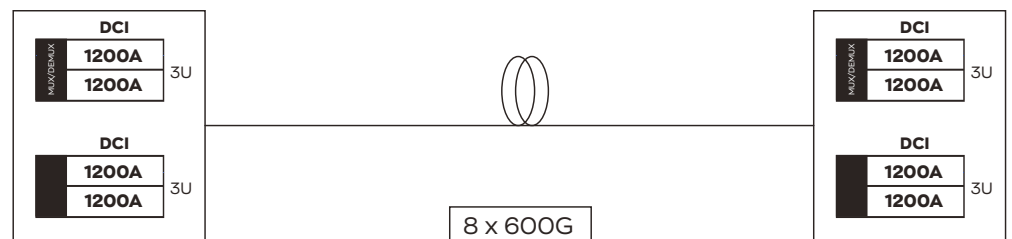
- High density of client interfaces
- Up to 1.2 Tbit/s per slot
- Support for «Alien Wavelength» technology

Certification

- Departmental certification
- Equipment in the register of innovative products recommended for purchase

Reliability

- 1+1, 2+1, 3+1 redundancy of control and power units
- Advanced cooling system with data center design



Optical budget up to 15.5 dB (Pre-Amp)

Optical budget up to 19.2 dB (Pre-Amp + Booster)

Compact monoblock solutions

The transceiver units and optical equipment of Almaz line can be implemented in a compact 1U package. Such a monoblock design is an independent system with integrated control units. Monoblocks can be implemented both with the classic "left to right" blowing option, and in the data center version, with "front to back" blowing.

A distinctive feature of 1U solutions is the ability to organize networks with personalized data processing algorithms.

Such compact solutions are in demand in the banking sector, where security issues are in the first place.

Chassis use

	iTN15600-E-DC10U2D	iTN15600-E-DC6U2D
Slots in chassis	11	7
Control unit redundancy	1+1 (version without redundancy is available)	1+1 (version without redundancy is available)
Power supply redundancy	1+1 or 3+1	1+1 or 2+1
Management system	NMS iTNEC-NMS-SWT	NMS iTNEC-NMS-SWT
Air flow direction	frontal	frontal
Power supply modules	modules AC 220 V 50 Hz / DC 36-72 V	modules AC 220 V 50 Hz / DC 36-72 V
Dimensions (W x H x D)	482 x 444 x 470 mm	482 x 264 x 470 mm
Working temperature	from +5 to +40 °C	from +5 to +40 °C
Maximum humidity	80 % (at +25 °C)	80 % (at +25 °C)
Chassis power consumption (without equipment)	180 W	120 W
Chassis weight (without equipment)	14 kg	10 kg

	iTN15600-E-DC3U2D	iTN15600-E-DC1U2D
Slots in chassis	3	monoblock
Control unit redundancy	1+1 (version without redundancy is available)	no
Power supply redundancy	1+1	1+1
Management system	NMS iTNEC-NMS-SWT	NMS iTNEC-NMS-SWT
Air flow direction	frontal	frontal
Power supply modules	modules AC 220 V 50 Hz / DC 36-72 V	modules AC 220 V 50 Hz / DC 36-72 V
Dimensions (W x H x D)	482 x 133 x 470 mm	482 x 44 x 470 mm
Working temperature	from +5 to +40 °C	from +5 to +40 °C
Maximum humidity	80 % (at +25 °C)	80 % (at +25 °C)
Chassis power consumption (without equipment)	60 W	—
Chassis weight (without equipment)	7 kg	—

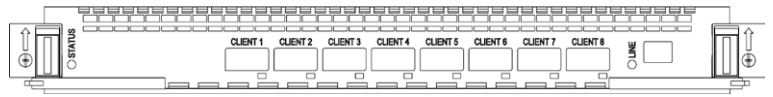


Units



iTN15600-I-T800IC

Muxponder Line Card



DATA CENTER **TELECOM**

- aggregation of up to 8 x 100G clients
- independent 800G transmission at each wavelength

DATASHEET

Line interfaces 1 x LC/UPC DWDM

200G

Modulation format	DP-P-16QAM (95 GBaud)
FEC	SD-FEC
Redundancy support	no
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	5 dBm

400G

Modulation format	DP-P-16QAM (95/85 GBaud)
FEC	SD-FEC
Redundancy support	no
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	5 dBm

600G

Modulation format	DP-P-64QAM (95/85 GBaud)
FEC	SD-FEC
Redundancy support	no
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	5 dBm

800G

Modulation format	DP-P-64QAM (95/91.6 GBaud)
FEC	SD-FEC
Redundancy support	no
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	5 dBm

Client interfaces

8 x QSFP28

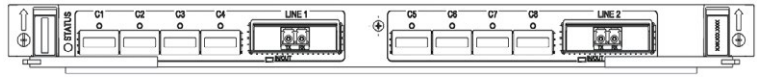
4 x QSFP28, 1 x QSFP-DD

2 x QSFP-DD

Transmission protocols	200G/400G/600G 100GE/OTU4	200G/400G/600G 2 x 100GE/OTU4 (QSFP-28) 1 x 400GE (QSFP-DD)	200G/600G — 400G 1 x 400GE (QSFP-DD)
	800G 100GE	800G 4 x 100GE (QSFP-28) 1 x 400GE (QSFP-DD)	800G 2 x 400GE (QSFP-DD)
Power consumption	up to 160 W		

iTN15600-I-D400QQ

Muxponder Line Card



DATA CENTER **TELECOM**

- aggregation of up to 2 x (4 x 100G) clients
- independent 400G transmission at each wavelength

DATASHEET

Line interfaces **2 x CFP2**

2 x 100G

Modulation format	DP-QPSK/DP-DQPSK
FEC	SC-FEC/O-FEC
Redundancy support	yes
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency rage	191.275 – 196.125 THz
Transmitter output power	-4 dBm

2 x 200G

Modulation format	DP-QPSK/DP-8QAM/DP-16QAM
FEC	O-FEC
Redundancy support	yes
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency rage	191.275 – 196.125 THz
Transmitter output power	-8.5 dBm/-9 dBm/-8 dBm

2 x 300G

Modulation format	DP-8QAM
FEC	O-FEC
Redundancy support	yes
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency rage	191.275 – 196.125 THz
Transmitter output power	-10 dBm

2 x 400G

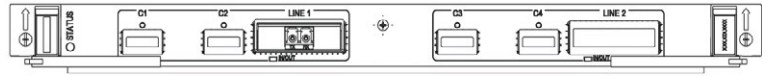
Modulation format	DP-16QAM
FEC	O-FEC
Redundancy support	yes
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency rage	191.275 – 196.125 THz
Transmitter output power	-11 dBm

Client interfaces **8 x QSFP28/QSFP56 (4 x QSFP28 in 1 x CFP2)**

Transmission protocols	up to 2 x [4 x 100GE/OTU4] (QSFP28) up to 2 x [2 x 200GE] (QSFP-28)
Power consumption	up to 140 W

iTN15600-I-D200DQ

Muxponder Line Card



DATA CENTER

TELECOM

- aggregation up to 2 x (1 x 100G) clients
- independent transmission of 200G on each wavelength

DATASHEET

Line interfaces 2 x CFP2

2 x 100G

Modulation format	DP-QPSK/DP-DQPSK
FEC	7% HD FEC / 15% SD FEC
Redundancy support	yes
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	- 15...1 dBm

2 x 200G

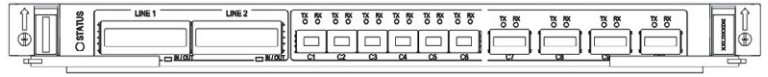
Modulation format	DP-8QAM/DP-16QAM
FEC	15% SD FEC
Redundancy support	yes
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	- 15...1 dBm

Client interfaces 4 x QSFP28 (2 x QSFP28 in 1 x CFP2)

Transmission protocols	100GE/OTU4
Power consumption	up to 90 W

iTN15600-I-DTQ5DQC

Muxponder Line Card



DATA CENTER

TELECOM

- aggregation of up to 10 multiservice signals with a total capacity of up to 200 Gbit/s
- transmission over 100G at two wavelengths (or up to 200G at one wavelength)

DATASHEET

Line interfaces **2 x CFP2**

2 x 100G redundancy

Modulation format	DP-QPSK/DP-DQPSK
FEC	7 % HD FEC / 15 % SD FEC
Redundancy support	yes
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	-15...+1 dBm

1 x 200G

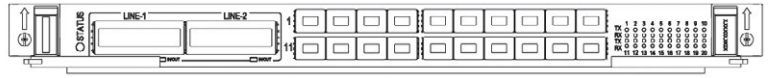
Modulation format	DP-8QAM/DP-16QAM
FEC	15 % SD FEC
Redundancy support	no
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	-15...+1 dBm

Client interfaces **6 x SFP+/SFP28, 4 x QSFP+/QSFP28**

Transmission protocols	Total client capacity up to 100G	Total client capacity up to 200G
	<ul style="list-style-type: none"> • up to 6 x 10GE, CPRI7-9, OTU2/OTU2e, STM 64, FC 800/1200/1600 (SFP+/SFP28) • up to 3 x 25GE (eCPRI), 3200 FC (SFP28) • up to 2 x 40GE, OTU3 (QSFP28/QSFP+) • up to 1 x 100GE/OTU4 (QSFP28/QSFP+) 	<ul style="list-style-type: none"> • up to 6 x 10GE/25GE (eCPRI), CPRI7-9, OTU2/OTU2e, STM-64, FC 800/1200/1600/3200 (SFP+/SFP28) • up to 4 x 40GE, OTU3 (QSFP28/QSFP+) • up to 2 x 100GE/OTU4 (QSFP28/QSFP+)
Power consumption	2 x 100G redundancy up to 140 W	1 x 200G redundancy up to 125 W

iTN15600-I-DTQ5DTC

Muxponder Line Card



DATA CENTER

TELECOM

- aggregation of up to 20 multiservice signals with a total capacity of up to 200 Gbit/s
- transmission over 100G at two wavelengths (or up to 200G at one wavelength)

DATASHEET

Line interfaces 2 x CFP2

2 x 100G redundancy

Modulation format	DP-QPSK/DP-DQPSK
FEC	7 % HD FEC/15 % SD FEC
Redundancy support	yes
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	-15...1 dBm

1 x 200G

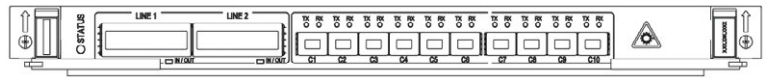
Modulation format	DP-8QAM/DP-16QAM
FEC	15 % SD FEC
Redundancy support	no
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	-15...1 dBm

Client interfaces 20 x SFP+/SFP28

Transmission protocols	Total client capacity up to 100G <ul style="list-style-type: none">• up to 6 x 10GE, CPRI7-9, OTU2/OTU2e, STM 64, FC 800/1200/1600 (SFP+/SFP28)• up to 3 x 25GE (eCPRI), 3200 FC (SFP28)• up to 2 x 40GE, OTU3 (QSFP28/QSFP+)• up to 1 x 100GE/OTU4 (QSFP28/QSFP+)	Total client capacity up to 200G <ul style="list-style-type: none">• up to 6 x 10GE/25GE (eCPRI), CPRI7-9, OTU2/OTU2e, STM-64, FC 800/1200/1600/3200 (SFP+/SFP28)• up to 4 x 40GE, OTU3 (QSFP28/QSFP+)• up to 2 x 100GE/OTU4 (QSFP28/QSFP+)
	Power consumption	2 x 100G redundancy up to 140 W

iTN15600-I-DTQ5DC

Muxponder Line Card



DATA CENTER

TELECOM

- aggregation of up to 10 x 10G clients
- transmission up to 100 Gbit/s over one wavelength with 1+1 redundancy

DATASHEET

Line interfaces **2 x CFP2**

200G

Modulation format	DP-QPSK/DP-DQPSK
FEC	7 % HD FEC /15 % SD FEC
Redundancy support	no
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	-15...1 dBm

2 x 100G

Modulation format	DP-8QAM/DP-16QAM
FEC	15 % SD FEC
Redundancy support	yes (100G)
Frequency grid	50 GHz / 100 GHz / FlexGrid (in 6.25 GHz increments)
Frequency range	191.25 – 196.1 THz
Transmitter output power	-15...1 dBm

Client interfaces **10 x SFP+/SFP28**

Transmission protocols	Total client capacity up to 200G Aggregation in 200G (CFP2): <ul style="list-style-type: none"> • up to 10 x 10GE, CPRI7-9, OTU2/OTU2e, STM-64, FC 800/1200 (SFP+/SFP28) • up to 6 x 1600 FC (SFP+/SFP28) • up to 3 x 25GE (eCPRI), 3200 FC (SFP28) 	
Power consumption	2 x 100G redundancy up to 140 W	1 x 200G redundancy up to 125 W

iTN15600-I-x10C

Transponder Line Card



DATA CENTER **TELECOM**

Unit of 1/2/6 transponders for transmission of one/two/six independent 10G signals

iTN15600-I-C10C

Transponder Line Card

DATASHEET

Line Interfaces 1 x SFP+

Modulation formats	10G (OTU2)
FEC	EFEC G.709 / G.975.1 1.77 %, 12 %, 13 %
Redundancy support	no
Switching support	no
Frequency grid	determined by the installed module
Wavelength range	determined by the installed module
Output power of the transmitter	determined by the installed module

Client interfaces 1 x SFP+

Transmission protocols	1GFC, 2GFC, 4GFC, 8GFC, OTU2, 10GE, STM-64
Power consumption	up to 18 W

iTN15600-I-D10C

Transponder Line Card

DATASHEET

Line Interfaces 2 x SFP+

Modulation formats	10G (OTU2)
FEC	EFEC G.709 / G.975.1 1.77 %, 12 %, 13 %
Redundancy support	yes (1+1)
Switching support	no
Frequency grid	determined by the installed module
Wavelength range	determined by the installed module
Output power of the transmitter	determined by the installed module

Client interfaces 2 x SFP+

Transmission protocols	1GFC, 2GFC, 4GFC, 8GFC, OTU2, 10GE, STM-64
Power consumption	up to 20 W

iTN15600-I-S10C

Transponder Line Card

DATASHEET

Line Interfaces 6 x SFP+

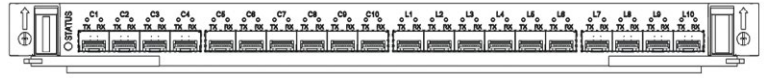
Modulation formats	10G (OTU2)
FEC	EFEC G.709 / G.975.1 1.77 %, 12 %, 13 %
Redundancy support	yes (1+1)
Switching support	no
Frequency grid	determined by the installed module
Wavelength range	determined by the installed module
Output power of the transmitter	determined by the installed module

Client interfaces 6 x SFP+

Transmission protocols	1GFC, 2GFC, 4GFC, 8GFC, OTU2, 10GE, STM-64
Power consumption	up to 60 W

iTN15600-I-T10C

Transponder Line Card



DATA CENTER

TELECOM

Unit of 10 transponders for transmission of 10 independent 10G signals

DATASHEET

Line Interfaces 10 x SFP+

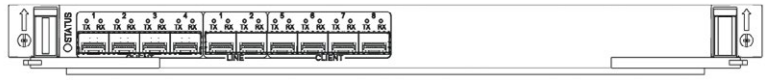
Modulation formats	10G (OTU2/OTU2e*) * OTU2e support on 4 line ports
FEC	FEC G.709, G.975.1 I.3 / on request G.975.1 I.7 7%
Redundancy support	yes (1+1)
Switching support	yes
Frequency grid	determined by the installed module
Wavelength range	determined by the installed module
Output power of the transmitter	determined by the installed module

Client interfaces 10 x SFP+

Transmission protocols	10GE, OTN OTU2/OTU2e (no FEC), SDH STM-64 * OTU2/OTU2e support on 4 client ports
Power consumption	up to 100 W

iTN15600-I-D10D3C

Muxponder Line Card D10G



DATA CENTER **TELECOM**

- aggregation of up to 8 multi-service low-speed clients with a total capacity of 10 Gbit/s
- switching to two linear 10G OTN interfaces (supporting 1+1 redundancy)

DATASHEET

Line Interfaces **2 x SFP+**

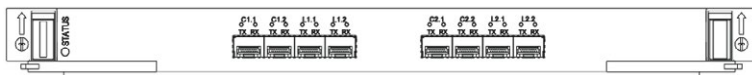
Modulation formats	10G (OTU2)
FEC	FEC G.709 / G.975.1 1.3 / G.975.1 1.7 7%
Redundancy support	yes (1+1)
Switching support	yes
Frequency grid	determined by the installed module
Wavelength range	determined by the installed module
Output power of the transmitter	determined by the installed module

Client Interfaces **8 x SFP+**

Transmission protocols	up to 8 x STM-16, OTU1 (FEC G.709), 2GFC, GE, STM-1/STM-4
Power consumption	up to 50 W

iTN15600-I-Q3S

Transponder Line Card



DATA CENTER **TELECOM**

Unit of four transponders for the transmission of four independent low-speed signals (up to 2.5 Gbit/s)

DATASHEET

Line Interfaces **4 x SFP**

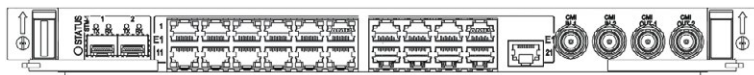
Modulation formats	2.5G (OTU1)
FEC	FEC G.709 / G.975.1 1.3
Redundancy support	no
Switching support	no
Frequency grid	determined by the installed module
Wavelength range	determined by the installed module
Output power of the transmitter	determined by the installed module

Client interfaces **4 x SFP**

Transmission protocols	1GE, STM-1/4/16 (SFP)
Power consumption	up to 50 W

iTN15600-I-DS21E

Muxponder Line Card



DATA CENTER

TELECOM

- aggregation of 21 E1 streams
- transmission in one line signal 155 Mbps (STM-1)

DATASHEET

Line Interfaces **1 x SFP**

Line interface speed	155 Mbps (STM1)
Modulation formats	NRZ
Redundancy support	no
Switching support	no
Wavelength range	determined by the installed module
Output power of the transmitter	determined by the installed module

Client interfaces **21 x RJ45**

Transmission protocols	E1
Power consumption	up to 20 W

ITN15600-OLA-xx HYBRID

COMBINATION OF A DISTRIBUTED RAMAN AMPLIFIER AND ERBIUM AMPLIFIER
IN THE FORM OF A SINGLE SLOT DEVICE

- reduction of the effective noise factor of the amplifier
- increase in signal transmission rate due to less impact of low noise factor on more complex modulation forms
- increasing the distance between amplifying nodes and reducing the cost of network operation

Optical fiber amplifiers ITN15600-OLA-xx

EDFA, RAMAN, HYBRID

LINE OF ERBIUM AMPLIFIERS (EA) AND RAMAN AMPLIFIERS (RA) WITH POWER UP TO 1 W FOR BUILDING LONG COMMUNICATION LINES IN C-BAND (1529-1561 NM)

- configurations in the form of a one-section or two-section amplifier
- low noise factor
- output power and gain stabilization modes for EA and gain stabilization for RA with counter-pumping
- preservation of channel gain when changing the number of channels
- low non-uniformity of the amplification spectrum in the C-band

	EA	RA	HA
Spectral range	1529-1561 nm	1529-1561 nm	1529-1561 nm
Signal output power	+10 ... +26 dBm	—	+16 ... +23 dBm
Maximum Raman pump power at the line input	—	30 dBm	26 dBm
Number of Raman-pumping laser diodes	—	4	2
Gain Range	11-18, 14-24, 25-36, 20-35	10-20 (for Backward, ***)	4-7 for RA * ***, 11-18, 14-24 for EA *
Maximum unevenness	1.5 dB	1.2 dB	1.6 dB
Noise factor	+6...+9 dB	-3 ... -1 dB	+1 ... +2.5 dB

Operation Mode

Control Pump power	—	yes	—
Control Output Signal Power	yes	—	yes
Control Gain	yes	yes (for Backward)	yes

Additional Features

Single-section or two-section amplifier's configurations	yes	—	yes
APR	yes	yes	yes

EA – ERBIUM AMPLIFIER

RA – RAMAN AMPLIFIER

HA – HYBRID AMPLIFIER

* controlled by the general parameter of the (total) gain HA

** depends on gain

*** SMF-28 Fiber, Loss 0.2dB/km

iTN15600-OCM Optical Monitoring Channel Card

Line Spectrum Control

- work in the C-band 1528-1558 nm
- channel grid with a step of 50 GHz
- optical switch on the fourth line

Optical multiplexers and demultiplexers

CONTROLLED OPTICAL UNITS FOR INPUT AND OUTPUT OF CHANNELS

- the multiplexer used to combine the signals that came to the line input at different wavelengths
- support 40 or 48 channels
- when the light propagation changes, the multiplexer becomes a demultiplexer
- passive multiplexers without power meters and tunable attenuators have lower attenuation and lower priced

	MU40AP 40x Channels Multiplexer Card	MU40A 40x Channels Multiplexer Card	DMDU8AP 8x Channels IN/OUT Card	DMDU4AP 4x Channels IN/OUT Card	DMDU2AP 2x Channels IN/OUT Card	DMDU1AP 1x Channels IN/OUT Card
Interval between channels	100 GHz	100 GHz	100 GHz	100 GHz	100 GHz	100 GHz
Number of I/O channels	40/0	40/0	8/8	4/4	2/2	1/1
Power meter	yes	no	yes	yes	yes	yes
Attenuator adjustment range	0-15 dB	0-15 dB	0-15 dB	0-15 dB	0-15 dB	0-15 dB
Attenuator step	0.1 dB	0.1 dB	0.1 dB	0.1 dB	0.1 dB	0.1 dB
Power consumption	45 W	45 W	15 W	15 W	15 W	15 W

CD-F reconfigurable multiplexer FLEX iTN15600-xxROADM

BUILDING OF MULTI-CONNECTED NODES OF ADD/DROP CHANNELS WITH CD-F FUNCTIONALITY

- building of multi-connected nodes with connectivity up to 9
- add/drop up to 72 channels in the current terminal connection
- monitoring and equalization of the channel spectrum
- support for CD-F functionality

Parameter	14ROADM	19ROADM
Channel spectrum width tuning step	12.5 GHz	12.5 GHz
Frequency range	191.30 ... 196.05 GHz	191.30 ... 196.05 GHz
Maximum node connectivity	4	9
Maximum number of input/output channels on one CD-F termination (COMD-3-4)	36	36
Maximum number of input/output channels on one CD-F termination (COMD-2-8)	72	72

OTDR

MONITORING THE STATE OF OPTICAL INFRASTRUCTURE IN REAL TIME

- constant and continuous monitoring of the state of the line
- the ability to prevent accidents on the network
- in the event of an accident - reducing downtime on the network due to the synchronous operation of data transmission equipment and monitoring the state of the infrastructure

OTDR

Central wavelength	1626+-3 nm
Number of tested fibers	up to 12
Distance measurement ranges	0.5 km, 1 km, 2 km, 3 km, 5 km, 10 km, 20 km, 40 km, 80 km, 160 km, 260 km
Pulse width	5 ns, 10 ns, 30 ns, 100 ns, 300 ns, 1 μs, 3 μs, 10 μs, 20 μs
Dynamic range	40 dB (1 port), 36 dB (12 ports)
Distance accuracy	from 1.5 m (range up to 5 km) to 165 m (range up to 260 km)
Insertion loss at 1528-1563nm	≤1.5 dB
Insertion loss at 1510 nm	≤1.5 dB

iTN15600-xxROADM Reconfigurable Optical Multiplexer Card

FLEXIBLE ADD/DROP CHANNELS IN STANDARD 50 GHZ CHANNEL GRID FOR NETWORK UPGRADE AND RESERVATION

- redirection of optical channels on large network nodes of termination and cross-switching
- channel power balancing
- selective combining of channels into one DWDM drop signal

ROADM parameter

	12	14	19
Interval between channels	50 GHz	50 GHz	50 GHz
Number of channels	96	96	96
Frequency range	191.30...196.05 THz	191.30...196.05 THz	191.30...196.05 THz
Line Loss Line In - R Out/Drop	4 dB	—	2.5 dB
Line Loss R In/ Add - Line Out	6.5 dB	7.5 dB	7.5 dB
Channel loss, "blocked" state	40 dB	40 dB	40 dB
Attenuator adjustment range	0...15 dB	0...15 dB	0...15 dB
Attenuator step	0.1 dB	0.1 dB	0.1 dB
Attenuator switching time	≤ 250 ms	≤ 250 ms	≤ 1500 ms
Channel switching time	≤ 850 ms	≤ 850 ms	≤ 2000 ms
Power consumption no more	10 W	10 W	35 W



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