

Telecommunication services regulations

MOEX Information Security

These regulations may be amended or supplemented at any time. The version in effect is available on the Operator website.

1. Terms and definitions

The following terms and definitions are used throughout the text below alongside the terms and definitions set out in the Telecommunications Services Rules of the MOEX Information Security Limited Liability Company (the "Operator"):

MOEX Trade Network – a dedicated computer network that gives technical access to the trading, clearing and payments systems, as well as to depository and auxiliary systems and services of entities within the Moscow Exchange Group;

Production and Game systems access network segment – logically and physically isolated part (segment) of the Operator's Network within the Co-location Facility designed to enable technical access to settlement, depository and other services within the production and gaming systems located in the MOEX Trade Network;

UAT systems access network segment – logically and physically isolated part (segment) of the Operator's Network within the Co-location Facility designed to enable technical access to the testing systems within the MOEX Trade Network;

Internet-access network segment - logically and/or physically isolated part (segment) of the Operator's network, designed for the Internet access (telematics telecommunication service delivery).

PTP clock synchronization network segment – logically and/or physically isolated part (segment) of the Operator's network designed for time synchronization with MOEX PTP Grandmaster using the Precision Time Protocol (PTP).

FIFO MFIX Trade Software-Access network segment means a logically and/or physically isolated part (segment) of the Operator's network designed to enable technical access to the FIFO MFIX Trade Gateway Software located in the MOEX Trade Network and designed to connect customer software to TS SHS Sub-systems of MOEX's FX, Precious Metals, Equity & Bonds and Deposit Markets.

SIMBA SPECTRA Software-Access network segment means a logically and/or physically isolated part (segment) of the Operator's network designed to enable technical access to the SIMBA SPECTRA Software located in the MOEX Trade Network and designed to connect customer software to TS SHS Sub-systems of MOEX's Derivatives Market.

2. Network connectivity requirements

2.1 Connection of Client's equipment to the Operator's network

2.1.1 Connection of the Client's equipment to the Operator's equipment to the Operator's network shall be made according to the requirements described in paragraph 2.1 and the following articles, depending on the type of Client's equipment and the Network Segment of the Operator:

- Server equipment is connected to the Production and Game Systems Network Segment as per paragraph 2.5 and network equipment as per paragraph 2.6;
- Server equipment is connected to the FIFO MFIX Trade Network Segment as per paragraph 2.7 and network equipment as per paragraph 2.8;
- Server equipment is connected to the Test System Network Segment as per paragraph 2.9 and network equipment as per paragraph 2.10;

- Equipment is connected to the PTP clock synchronization network segment as per paragraph 2.11;
 - Connection to the Production & Game Systems Segment for network traffic mirroring is described in paragraph 2.12;
 - Server equipment is connected to the SIMBA SPECTRA Network Segment as per paragraph 2.13 and network equipment as per paragraph 2.14;
- 2.1.2 Combination of connections to Production & Game Systems Segment and Test Systems Segment on a single device is possible, however connections to different network segments should use different dedicated ports (pair of ports).
- 2.1.3 The Client's equipment is connected to the Operator's equipment with cables supplied by the Operator. Interim equipment and cables from Clients are not allowed.
- 2.1.4 SFP modules (if needed) for connections on the Side of the Operator are provided by the Operator; for Client-side connections are provided by the Client.
- 2.1.5 On the Client equipment, the bandwidth and duplex port mode shall be set to "auto".
- 2.1.6 IP addresses are provided by the Operator as part of the relevant connection services. To receive IP addresses and network configuration, the Client shall submit the form given Appendix 4.
- 2.1.7 The Operator reserves separate address spaces (/24) from the range for internal use (RFC 1918) for the Client to connect to individual services.
- 2.1.8 On every connection, the Operator sends and receives traffic to/from specific IP-addresses allocated for the Client, provided that these IP addresses are in the address space reserved for the Client for using them within the relevant network segments and announced over this connection by the Client's network equipment towards the Operator's network equipment.
- 2.1.9 The level of broadcast traffic received from the Client equipment should not exceed 2 Mbit/s per connection.
- 2.1.10 When transmitting data, Ethernet frames filled with strictly consistent data are allowed, sending of shortened Ethernet frames, fragmentation of IP traffic, sending of unordered or fragmented TCP packets is prohibited.
- 2.1.11 Only the service protocols required for the connection to function, such as LACP, STP, BGP, IGMP, PIM, LLDP, BFD, for example, may be used. Protocols must be used strictly in accordance with the RFC standard and with an intensity necessary and sufficient for the normal functioning of the protocol. Protocol timer values must not be changed without prior agreement with the Operator.
- 2.1.12 When transmitting data destined for trading, settlement and depository service systems, it is prohibited to send data that does not comply with the access server protocol specification and is not intended for processing by the access server software process, including but not limited to packets with an incorrect MAC address, low TTL value, TCP port, not properly opened TCP session, etc.

2.2 **Connecting the Customer's equipment to the Internet.**

- 2.2.1 Connection of the Client's equipment to the Operator's equipment to the Internet-Access Network Segment shall be made according to the requirements set out in this paragraph and the following articles, depending on the type of Client's equipment:
- Connecting of server equipment and control interfaces to the Operator's equipment to the Internet-Access Network Segment is described in paragraph 2.3.
 - Connecting of network equipment and dedicated control interfaces of network devices to the Operator's equipment to the Internet-Access Network Segment is described in paragraph 2.4.
- 2.2.2 Combination of connections to the Internet-Access Network Segment and Network Segments of the Operator's network set out in paragraph 2.1 on a single device is possible, provided that connections to different network segments use different dedicated ports (pair of ports).
- 2.2.3 On the Client equipment, the bandwidth and duplex port mode shall be set to "auto".
- 2.2.4 IP addresses are issued by the Operator as part of the relevant services. To receive IP addresses and network configuration, the Client shall submit the form given Appendix 4.

- 2.2.5 The Operator reserves some address spaces (/24) from the range for internal use (RFC 1918).
- 2.2.6 On every connection, the Operator sends and receives traffic to/from specific IP-addresses allocated for the Client, provided that these IP addresses are in the address space reserved for the Client for using them within the Internet-Access Network Segment.
- 2.2.7 The level of broadcast traffic received from the Client equipment should not exceed 2 Mbit/s per connection.
- 2.2.8 Network connection between the Client's equipment and Internet is secured by the network firewalls of the Operator according to the configuration agreed with the Client.
- 2.2.9 The Operator's network devices shall not be used for outgoing connections from network ports of the Client's independent equipment management modules (HP ILO Advanced, IBM RSA, DELL DRAC, IPMI, etc.) and mgmt ports to the Internet.
- 2.2.10 It is not allowed to apply an access policy that allows Internet inbound connections to the Client's equipment via standard remote management ports (22/tcp, 23/tcp, 3389/tcp), as well as ports (80/tcp, 443/tcp, 5900/tcp) in case of independent management modules, without limiting the range of Internet IP addresses.
- 2.2.11 The Client's equipment is connected to the Operator's equipment with cables supplied by the Operator. Interim equipment and cables from Clients are not allowed.
- 2.2.12 SFP modules (if needed) for connections on the Side of the Operator are provided by the Operator; for Client-side connections are provided by the Client.
- 2.2.13 Only the service protocols required for the connection to function, such as LACP, STP, BGP, IGMP, PIM, LLDP, BFD, for example, may be used. Protocols must be used strictly in accordance with the RFC standard and with an intensity necessary and sufficient for the normal functioning of the protocol. Protocol timer values must not be changed without prior agreement with the Operator.
- 2.2.14 When transmitting data, Ethernet frames filled with strictly consistent data are allowed, sending of shortened Ethernet frames, fragmentation of IP traffic, sending of unordered or fragmented TCP packets is prohibited.

2.3 Server equipment and management interfaces connection to Operator's equipment on the Internet-access segment

- 2.3.1 Server equipment and dedicated management interfaces (mgmt-port) of the network devices are connected to the Internet-Facing Segment through the Operator's equipment using 1 Gbit/s ports on the Operator side.
- 2.3.2 The server hardware is connected to the Operator's equipment by using a pair of ports (two ports for each connection) in a redundant group mode (LACP, IEEE 802.3AX/IEEE 802.3ad). The Operator provides ports on two different devices in each pair. On the Operator's side, each pair of ports is allocated on two different network devices.
- 2.3.3 Network interface pairs on the Client's server equipment used for connection to the Operator's equipment must have network group (LACP, IEEE 802.3AX / IEEE 802.3ad) configured. Each pair of ports on the Client side shall be set to Active-Active mode.
- 2.3.4 LACP group should be configured with 30 seconds timeout.
- 2.3.5 Connection of management interfaces for Client equipment management modules (HP ILO Advanced, IBM RSA, DELL iDRAC, IPMI, etc.) with a single dedicated control module interface 100BASE-TX/1000BASE-TX is done through one port on the Operator's side. In this case the network group mode is not configured and requirements set out in p. 1.4.2, 1.4.3 and 1.4.4 are not applicable.
- 2.3.6 Connections to 1 Gbit/s ports on the Operator's equipment are through 1000BASE-T/1000BASE-TX over UTP Cat5e/Cat6 copper cables using RJ45 connectors. The Client can also use network interfaces with RJ45 connectors or SFP ports with 1000BASE-T modules.

2.4 **Connection of network equipment to the Operator's equipment in Internet-Access Segment**

- 2.4.1 Client network equipment or their dedicated management interfaces (mgmt-port) are connected to the Internet-access network segment through the Operator's equipment with 1 Gbit/s ports on the Operator's side.
- 2.4.2 Network equipment connection to the Operator is done by pair of ports (two ports for each connection). On the Operator's side, each pair of ports is allocated on two different network devices. On the Client's side, it is recommended to terminate each link on different network devices, however having 2 links connected to a single network device is also allowed.
- 2.4.3 Network device dedicated management interfaces (mgmt port) are connected via one port on the Operator's equipment. In this case, the BGP dynamic routing protocol is not configured and paragraphs 2.4.5, 2.4.6, 2.4.7, and 2.4.8 are not applicable.
- 2.4.4 Connections to 1 Gbit/s ports on the Operator's equipment are through 1000BASE-T/1000BASE-TX over UTP Cat5e/Cat6 copper cables using RJ45 connectors. The Client can also use network interfaces with RJ45 connectors or SFP ports with 1000BASE-T modules.
- 2.4.5 Network interfaces on the Client network equipment used for connection to the Operator must operate in L3 mode, have unique MAC addresses and do not have interim elements which allow changing the switching logic.
- 2.4.6 The Client's network equipment used to connect to the Operator must support the BGP dynamic routing protocol.
- 2.4.7 BGP dynamic routing protocol is used between the Client's network equipment and the Operator's network facilities. Other dynamic routing protocols as well as static routing protocols do not apply.
- 2.4.8 To establish connection, the Client shall use the network settings provided by the Operator, i.e. BGP timings, Operator's AS number, AS number used by the Client which is within the internal use range (AS64512-AS65534). Using the Client's own public AS number can be used at the Client's request on the Client side.
- 2.4.9 The Operator accepts /32-/24 network subnet prefixes from the address space reserved for Client for each Client network equipment connection.
- 2.4.10 It is possible to use administrative methods of route extension to set preferred route selection between different Client connections.
- 2.4.11 The Client is allowed to use IP addresses from its reserved address spaces without notifying the Operator. In this case, the Operator does not accept and send traffic from/to these addresses.
- 2.4.12 If the Client uses overlapping IP address ranges for its network equipment and server equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment connection if this network equipment announces this IP address within /24 to /32 length prefix, otherwise the priority will be set for the server connection.
- 2.4.13 If the Client uses overlapping IP ranges for different network equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment announcing this IP address within the most specific prefix.
- 2.4.14 Client network equipment facing the Operator equipment shall operate through LLDP protocol (if technically possible).

2.5 **Connection of server equipment to Operator's equipment in Production and Game Systems Access Segment**

- 2.5.1 Server equipment connection to production and game systems network is provided through the Operator's equipment using 10 Gbit/s and 1 Gbit/s ports.
- 2.5.2 The server hardware is connected to the Operator's equipment by using a pair of ports (two ports for each connection) in a redundant group mode (LACP, IEEE 802.3AX/IEEE 802.3ad). The Operator provides ports on two different devices in each pair. On the Operator's side, each pair of ports is allocated on two different network devices.

- 2.5.3 Network interface pairs on the Client's server equipment used for connection to the Operator's equipment should have trunking configured (IEEE 802.1q) for redundancy (LACP, IEEE 802.3AX / IEEE 802.3ad). Each pair of ports on the Client side shall be set to Active-Active mode.
- 2.5.4 LACP group should be configured with 30 seconds timeout.
- 2.5.5 Connections to 10 Gbit/s ports on the Operator equipment are done through 10GBASE-SR standard with duplex multimode fiber cables with LC-LC connectors and 10GBASE-SR modules. On its side, the Client can use 10GBASE-SR modules on network interfaces with SFP+ ports or QSFP ports with SFP+ adapter modules.
- 2.5.6 Connections to 1 Gbit/s ports on the Operator's equipment are through 1000BASE-T/1000BASE-TX over UTP Cat5e/Cat6 copper cables using RJ45 connectors. The Client can also use network interfaces with RJ45 connectors or SFP ports with 1000BASE-T modules.

2.6 **Connection of network equipment to Operator's equipment in Production and Game systems access segment**

- 2.6.1 The network equipment is connected to the Production and Game systems access segment through the Operator's equipment using 10 Gbit/s ports on the Operator's side.
- 2.6.2 Network equipment connection to the Operator is done by pair of ports (two ports for each connection). On the Operator's side, each pair of ports is allocated on two different network devices. The Client is recommended to have ports on two different devices in each pair; it is also allowed to have ports on a single device in each pair.
- 2.6.3 Connections to 10 Gbit/s ports on the Operator equipment are done through 10GBASE-SR standard with duplex multimode fiber cables with LC-LC connectors and 10GBASE-SR modules. On its side, the Client can use 10GBASE-SR modules on network interfaces with SFP+ ports or QSFP ports with SFP+ adapter modules.
- 2.6.4 Network interfaces on the Client network equipment used for connection to the Operator must operate in L3 mode, have unique MAC addresses and do not have interim elements which allow changing the switching logic.
- 2.6.5 The Client's network equipment used to connect to the Operator must support the BGP dynamic routing protocol.
- 2.6.6 BGP dynamic routing protocol is used between the Client's network equipment and the Operator's network facilities. Other dynamic routing protocols as well as static routing protocols do not apply.
- 2.6.7 To establish connection, the Client shall use the network settings provided by the Operator: IP addresses of the peering network, BGP timings, Operator's AS number, AS number used by the Client which is within the internal use range (AS64512-AS65534). Using the Client's own public AS number can be used at the Client's request on the Client side.
- 2.6.8 On every Client network equipment connection, the Operator accepts /32-/24 network subnet prefixes from the Client's address spaces.
- 2.6.9 It is possible to use administrative methods of route extension to set preferred route selection between different Client connections.
- 2.6.10 The Client is allowed to use IP addresses from its reserved address spaces without notifying the Operator. In this case, the Operator does not accept and send traffic from/to these addresses.
- 2.6.11 If the Client uses overlapping IP address ranges for its network equipment and server equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment connection if this network equipment announces this IP address within /24 to /32 length prefix, otherwise the priority will be set for the server connection.
- 2.6.12 If the Client uses overlapping IP ranges for different network equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment announcing this IP address within the most specific prefix.
- 2.6.13 If data is to be received via multicast technology, Client-side equipment must support PIM-SSM.
- 2.6.14 Client network equipment facing the Operator equipment shall operate through LLDP protocol (if

technically possible).

- 2.6.15 Client network equipment facing the Operator equipment shall operate through BFD protocol (if technically possible).

2.7 Connection of the server equipment to the Operator's equipment in the FIFO MFIX Trade segment

- 2.7.1 Server equipment connection to FIFO MFIX Trade segment is done through the Operator's equipment using 10 Gbit/s ports on the Operator's side.
- 2.7.2 Server equipment is connected to the Operator through one port per connection. Network group mode is not configured. On the Operator's side, a pair of ports on two different physical devices is allocated to provide cold standby.
- 2.7.3 Connections to 10 Gbit/s ports on the Operator equipment are done through 10GBASE-SR standard with duplex multimode fiber cables with LC-LC connectors and 10GBASE-SR modules. On its side, the Client can use 10GBASE-SR modules on network interfaces with SFP+ ports or QSFP ports with SFP+ adapter modules.

2.8 Connection of the network equipment to the Operator's equipment in the FIFO MFIX Trade segment

- 2.8.1 The network equipment is connected to the FIFO Gateway access segment through the Operator's equipment using 10 Gbit/s ports on the Operator's side.
- 2.8.2 Network equipment is connected to the Operator through one port per connection. On the Operator's side, a pair of ports on two different physical devices is allocated to provide cold standby.
- 2.8.3 Connections to 10 Gbit/s ports on the Operator equipment are done through 10GBASE-SR standard with duplex multimode fiber cables with LC-LC connectors and 10GBASE-SR modules. On its side, the Client can use 10GBASE-SR modules on network interfaces with SFP+ ports or QSFP ports with SFP+ adapter modules.
- 2.8.4 Network interfaces on the Client network equipment used for connection to the Operator must operate in L3 mode, have unique MAC addresses and do not have interim elements which allow changing the switching logic.
- 2.8.5 The Client's network equipment used to connect to the Operator must support the BGP dynamic routing protocol.
- 2.8.6 BGP dynamic routing protocol is used between the Client's network equipment and the Operator's network facilities. Other dynamic routing protocols as well as static routing protocols do not apply.
- 2.8.7 To establish connection, the Client shall use the network settings provided by the Operator: IP addresses of the peering network, BGP timings, Operator's AS number, AS number used by the Client which is within the internal use range (AS64512-AS65534). Using the Client's own public AS number can be used at the Client's request on the Client side.
- 2.8.8 It is possible to use administrative methods of route extension to set preferred route selection between different Client connections.
- 2.8.9 The Client is allowed to use IP addresses from its reserved address spaces without notifying the Operator. In this case, the Operator does not accept and send traffic from/to these addresses.
- 2.8.10 If the Client uses overlapping IP address ranges for its network equipment and server equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment connection if this network equipment announces this IP address within /24 to /32 length prefix, otherwise the priority will be set for the server connection.
- 2.8.11 If the Client uses overlapping IP ranges for different network equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment announcing this IP address within the most specific prefix.
- 2.8.12 Client network equipment facing the Operator equipment shall operate through LLDP protocol (if technically possible).

2.8.13 Client network equipment facing the Operator equipment shall operate through BFD protocol (if technically possible).

2.9 **Connection of server equipment to Operator's equipment in UAT Systems Access Segment**

2.9.1 Server equipment is connected to the UAT Systems Access Segment through the Operator's equipment using 10 Gbit/s and 1 Gbit/s ports on the Operator's side.

2.9.2 It is recommended that server hardware is connected to the Operator's equipment by using a pair of ports (two ports for each connection) in a redundant group mode (LACP, IEEE 802.3AX/IEEE 802.3ad). The Operator provides ports on two different devices in each pair. In this case, on the Operator's side, each pair of ports is allocated on two different network devices. It is permitted, but not recommended, to connect the server equipment to the Operator's equipment through a single port.

2.9.3 Network interface pairs on the Client's server equipment used for connection to the Operator's equipment should have trunking configured (IEEE 802.1q) for redundancy (LACP, IEEE 802.3AX / IEEE 802.3ad). In case one port is used to connect to the Operator's equipment, the port must be configured to IEEE 802.1q trunk.

2.9.4 It is recommended that LACP group is configured to 30 seconds timeout. Each pair of ports on the Client side shall be set to Active-Active mode.

2.9.5 Connections to 10 Gbit/s ports on the Operator equipment are done through 10GBASE-SR standard with duplex multimode fiber cables with LC-LC connectors and 10GBASE-SR modules. On its side, the Client can use 10GBASE-SR modules on network interfaces with SFP+ ports or QSFP ports with SFP+ adapter modules.

2.9.6 Connections to 1 Gbit/s ports on the Operator's equipment are through 1000BASE-T/1000BASE-TX over UTP Cat5e/Cat6 copper cables using RJ45 connectors. The Client can also use network interfaces with RJ45 connectors or SFP ports with 1000BASE-T modules.

2.10 **Connection of network equipment to Operator's equipment in UAT Systems Access Segment**

2.10.1 Network equipment is connected to the UAT Systems Access Segment through the Operator's equipment using 10 Gbit/s and 1 Gbit/s ports on the Operator's side.

2.10.2 It is recommended that network equipment is connected to the Operator through a pair of ports (two ports for each connection). Connection through one port is permitted. In case a pair of ports is used on the Operator's side, each pair of ports is allocated on two different network devices. On the Client's side, it is recommended to terminate each link on different network devices, however having 2 links connected to a single network device is also allowed.

2.10.3 Connections to ports on the Operator equipment at 10 Gbit/s are done through 10GBASE-SR standard with duplex multimode fiber cables with LC-LC connectors and 10GBASE-SR modules. On its side, the Client can use 10GBASE-SR modules on network interfaces with SFP+ ports or QSFP ports with SFP+ adapter modules.

2.10.4 Connections to 1 Gbit/s ports on the Operator equipment are done through 1000BASE-LX standard with duplex multimode fiber cables with LC-LC connectors and 1000BASE-LX/LH modules.

2.10.5 Network interfaces on the Client network equipment used for connection to the Operator must operate in L3 mode, have unique MAC addresses and do not have interim elements which allow changing the switching logic.

2.10.6 The Client's network equipment used to connect to the Operator must support the BGP dynamic routing protocol.

2.10.7 BGP dynamic routing protocol is used between the Client's network equipment and the Operator's network facilities. Other dynamic routing protocols as well as static routing protocols do not apply.

2.10.8 To establish connection, the Client shall use the network settings provided by the Operator: IP addresses of the peering network, BGP timings, Operator's AS number, AS number used by the Client which is within the internal use range (AS64512-AS65534). Using the Client's own public AS number

can be used at the Client's request on the Client side.

- 2.10.9 On every Client network equipment connection, the Operator accepts /32-/24 network subnet prefixes from the Client's address spaces.
- 2.10.10 It is possible to use administrative methods of route extension to set preferred route selection between different Client connections.
- 2.10.11 The Client is allowed to use IP addresses from its reserved address spaces without notifying the Operator. In this case, the Operator does not accept and send traffic from/to these addresses.
- 2.10.12 If the Client uses overlapping IP address ranges for its network equipment and server equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment connection if this network equipment announces this IP address within /24 to /32 length prefix, otherwise the priority will be set for the server connection.
- 2.10.13 If the Client uses overlapping IP ranges for different network equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment announcing this IP address within the most specific prefix.
- 2.10.14 If data is to be received via multicast technology, Client-side equipment must support PIM-SSM.
- 2.10.15 Client network equipment facing the Operator equipment shall operate through LLDP protocol (if technically possible).
- 2.10.16 Client network equipment facing the Operator equipment shall operate through BFD protocol (if technically possible).

2.11 **Connection of equipment to Operator's equipment in PTP Clock Synchronization Network Segment**

- 2.11.1 Client equipment is connected to the Precise time service access segment using PTP protocol (Precision Time Protocol) and via the Operator's equipment with the use of fiber and copper network ports.
- 2.11.2 It is recommended that equipment is connected to the Operator's equipment through a pair of ports (two ports per connection). Connection through one port is permitted. On the Client's side, it is recommended to terminate each link on different network devices, however having 2 links connected to a single network device is also allowed. In case a pair of ports is used, each pair of ports on the Operator's side is allocated on two different network devices translating separate PTP domain information.
- 2.11.3 Connection to ports on the Operator's equipment is made:
 - Using 10GBASE-SR with duplex multimode fiber optic cables with LC-LC connectors and 10GBASE-SR modules;
 - Using 1000BASE-LX with duplex multimode fiber optic cables with LC-LC connectors and 1000BASELX/LH modules;
 - Using 1000BASE-T/1000BASE-TX with copper UTP Cat5e/Cat6 cables with RJ45 connectors.
- 2.11.4 The Client may use network interfaces with LC-LC connectors for duplex multimode fiber optic cables, with RJ45 connectors for UTP copper cables, with SFP+ connectors or QSFP connectors with SFP module adaptors using 10GBASE-SR or 1000BASE-LX/LH modules for multimode fiber optic cables and 1000BASE-T for UTP copper cables.
- 2.11.5 To establish connection, the Client shall use PTP domain IDs provided by the Operator. Peering IP addressing, dynamic or static routing are not used.
- 2.11.6 The Operator sends PTP multicast traffic of one independent PTP domains on each connection port.
- 2.11.7 Client network equipment facing the Operator equipment shall operate through LLDP protocol (if technically possible).

2.12 **Equipment connection to the Operator equipment in Production, Game and UAT systems access segment for network traffic mirroring**

- 2.12.1 Client equipment is connected to the Production, Game and UAT systems access segment for network

traffic mirroring through the Operator's equipment with 1 Gbit/s or 10 Gbit/s ports depending on mirrored ports.

2.12.2 Client equipment connection to the Operator is done through a pair of ports (two ports per connection) or one port per connection, depending on the scheme of the mirrored connection.

2.12.3 Connections to 10 Gbit/s ports on the Operator equipment are done through 10GBASE-SR standard with duplex multimode fiber cables with LC-LC connectors and 10GBASE-SR modules. On its side, the Client can use 10GBASE-SR modules on network interfaces with SFP+ ports or QSFP ports with SFP+ adapter modules.

2.12.4 Connections to 1 Gbit/s ports on the Operator's equipment are through 1000BASE-T/1000BASE-TX over UTP Cat5e/Cat6 copper cables using RJ45 connectors. The Client can also use network interfaces with RJ45 connectors or SFP ports with 1000BASE-T modules.

2.12.5 Peering IP addressing, dynamic or static routing are not used.

2.12.6 On each connection port, the Operator transmits mirrored traffic from one port of mirrored connection.

2.12.7 Client network equipment facing the Operator equipment shall operate through LLDP protocol (if technically possible).

2.13 **Connection of server equipment to Operator's equipment in SIMBA SPECTRA Access Segment**

2.13.1 Server equipment connection to SIMBA SPECTRA segment is done through the Operator's equipment using 10 Gbit/s ports on the Operator's side.

2.13.2 Server equipment is connected to the Operator through a pair of ports (two ports for each connection). Network group mode is not configured. On the Operator's side, a pair of ports on two different physical devices is allocated to provide standby.

2.13.3 Connections to 10 Gbit/s ports on the Operator equipment are done through 10GBASE-SR standard with duplex multimode fiber cables with LC-LC connectors and 10GBASE-SR modules. On its side, the Client can use 10GBASE-SR modules on network interfaces with SFP+ ports or QSFP ports with SFP+ adapter modules.

2.14 **Connection of network equipment to Operator's equipment in SIMBA SPECTRA Access Segment**

2.14.1 The network equipment is connected to the SIMBA SPECTRA access segment through the Operator's equipment using 10 Gbit/s ports on the Operator's side.

2.14.2 Network equipment connection to the Operator is done by pair of ports (two ports for each connection). On the Operator's side, a pair of ports on two different physical devices is allocated to provide standby.

2.14.3 Connections to 10 Gbit/s ports on the Operator equipment are done through 10GBASE-SR standard with duplex multimode fiber cables with LC-LC connectors and 10GBASE-SR modules. On its side, the Client can use 10GBASE-SR modules on network interfaces with SFP+ ports or QSFP ports with SFP+ adapter modules.

2.14.4 Network interfaces on the Client network equipment used for connection to the Operator must operate in L3 mode, have unique MAC addresses and do not have interim elements which allow changing the switching logic.

2.14.5 The Client's network equipment used to connect to the Operator must support the BGP dynamic routing protocol.

2.14.6 BGP dynamic routing protocol is used between the Client's network equipment and the Operator's network facilities. Other dynamic routing protocols as well as static routing protocols do not apply.

2.14.7 To establish connection, the Client shall use the network settings provided by the Operator: IP addresses of the peering network, BGP timings, Operator's AS number, AS number used by the Client which is within the internal use range (AS64512-AS65534). Using the Client's own public AS number can be used at the Client's request on the Client side.

- 2.14.8 It is possible to use administrative methods of route extension to set preferred route selection between different Client connections.
- 2.14.9 The Client is allowed to use IP addresses from its reserved address spaces without notifying the Operator. In this case, the Operator does not accept and send traffic from/to these addresses.
- 2.14.10 If the Client uses overlapping IP address ranges for its network equipment and server equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment connection if this network equipment announces this IP address within /24 to /32 length prefix, otherwise the priority will be set for the server connection.
- 2.14.11 If the Client uses overlapping IP ranges for different network equipment connections, the absolute priority for inbound and outbound traffic from/to a specific IP address will be set for network equipment announcing this IP address within the most specific prefix.
- 2.14.12 Client network equipment facing the Operator equipment shall operate through LLDP protocol (if technically possible).
- 2.14.13 Client network equipment facing the Operator equipment shall operate through BFD protocol (if technically possible).

3. VPN (Virtual Private Network) connection to the Operator equipment over the Internet

- 3.1 Secure access to the Operator's Production and Game systems access segment is performed over the Client's Internet connection provided by the telematics service operator as chosen by the Client.
- 3.2 Recommended Internet connection bandwidth is 4 Mbit/s per gateway/terminal used.
- 3.3 To establish connection, the Client shall use the network settings provided by the Operator: the domain name or IP address of the VPN gateway and account details.
- 3.4 To enable connection to services within the Production & Game Systems Access Segment, the Operator reserves specific IP addresses for the Client using the RFC 1918 space.

4. Organisation and provision of structured cabling systems

4.1 Cross-connection between the Client's equipment and the equipment of the Authorised Network Service Provider in the Colocation Facility

- 4.1.1 Connections of the Client's colocated equipment to Authorised Network Service Provider's equipment are done by the Operator at the Client's request as part of the service in question, upon approval by the Authorised Network Service Provider.
- 4.1.2 The equipment of Authorised Network Service Providers is placed in dedicated telco cabinets within the Colocaton Facility (MMR).
- 4.1.3 The Operator provides the Clinet with a list of Authorized Network Service Providers having presence within the Colocation Facility.
- 4.1.4 To arrange a x-connect to the Authorized Network Service Provider within the Colocation Facility, the Client shall submit the request form set out in Appendix 8 after ordering the service in question. This request form shall specify sufficient information to identify the Client equipment and port on it to establish the x-connect into.
- 4.1.5 The Operator provides the x-connect between the Client's equipment and the Authorized Network Service Provider after receiving from the provider a proper LOA containing equipment identification details and specific port to establish the x-connect into within the Colocation Facility as well as additional information: cable type, bandwidth, etc.
- 4.1.6 The Operator, at its own discretion, provides the x-connect between the Client equipment and the Authorized Network Service Provider using its own technical means including patch cords, cables, patch panels, etc.
- 4.1.7 The fiber connection lines are done with duplex multi-mode fiber cables with LC-LC connectors.
- 4.1.8 Copper connection lines are done with copper UTP Cat5e/Cat6 cables with RJ45 connectors.

4.1.9 Connections of the Client's colocated equipment to Authorised Network Service Provider's equipment are done by the Operator at the Client's request as part of the service in question, upon approval by the Authorised Network Service Provider.

4.2 **Cross-connection between two pieces of the Client's co-located equipment**

4.2.1 The section rules apply to the following types of cross-connections:

- Between two pieces of the Client co-located equipment which are placed in different Client's cabinets;
- Between two pieces of the Client equipment one of which is located within the shared cabinet;
- Between two pieces of the Client equipment both of which are located within the shared cabinet.

4.2.2 Cross connections between pieces of the Client's equipment are organized by the Operator at the Client's request as part of the service.

4.2.3 To arrange a x-connect, the Client shall submit the x-connect request form set out in Appendix 5 after ordering the service in question. The x-connect request shall contain information sufficient to identify the Client's equipment and the port on it for each side of the x-connect.

4.2.4 To establish the cross-connection, the Operator use at its own discretion technical means including patch cords, cables, patch panels, cable trays, etc.

4.3 **Cross-connection between a Client's equipment and the equipment of another Customer in the Colocation Facility**

4.3.1 Cross-connections between the Client's equipment (the "Initiating Client") and the equipment of another Client (the "Accepting Client") are performed by the Operator at the request of the initiating Client as part of the service in question, after receiving confirmation from the accepting Client.

4.3.2 To have cross connection established, the Initiating Client shall, after ordering the relevant services, send a request form according to the sample set out Appendix 6. This request form shall specify information sufficient to identify the Initiating Client's equipment and the port on it allocated by the Client for the cross connection.

4.3.3 The Operator shall organise the cross-connection between the equipment of the Initiating Client and the equipment of the Accepting Customer after receiving the authorisation letter for the organisation of the cross-connection from the Accepting Customer according to the sample given in Appendix 5. The authorization letter shall contain information sufficient to identify the Accepting Client's equipment and the port on it allocated by the Client for the cross-connection.

4.3.4 To establish the cross-connection, the Operator use at its own discretion technical means including patch cords, cables, patch panels, cable trays, etc.

4.3.5 The fiber connection lines are done with duplex multi-mode fiber cables with LC-LC connectors.

4.3.6 Copper connection lines are done with copper UTP Cat5e/Cat6 cables with RJ45 connectors.

5. **Cabling works**

5.1 Any cross-connect works, incl. connecting, moving or disconnecting, on any Operator equipment, including patch panels are done only by the Operator representatives.

6. **Timing of works**

6.1 The following time interval names are set:

- Business hours — 8:00-24:00 Moscow time on business days;
- Non-business hours — 0:00-8:00 on business days, around the clock on other days;
- Maintenance hours — 10:00-18:00 at weekends and public holidays.

6.2 The Client must set up and make changes to the network configuration of the equipment in the

Operator networks in non-business hours.

6.3 Further time limitations may apply due to the following reasons:

- The Exchange opens markets on a non-business day (the trading day is deemed to a business day);
- The Exchange runs release, load or other testing (the testing day is deemed to be a business day);
- The MOEX trading platform release is upcoming as well as wide-scale works in the MOEX network, Colocation Facility, Operator's equipment or infrastructure; in this case, Moscow Exchange reserves the right to apply moratorium on any changes in the Operator's networks for the day of the event and several days prior to the event;
- Public holidays;
- Any other reasons upon additional notification from colo@moex.com.

7. Planning and coordination of setup and changes in the Client network equipment configuration

- 7.1 Setup and changes in configuration of the Client network equipment connected to the Operator network segments that may potentially affect the Operator network functionality shall be approved by the Operator.
- 7.2 To agree the timing and scope of maintenance, the Client shall submit a request and obtain approval from the Operator network specialists beforehand (at least 1 business day before the planned maintenance).
- 7.3 Depending on scope and complexity of works, the Operator reserves the right to request detailed documented plans of changes, to the point of specifying particular network equipment or individual ports configuration as well as postponing the maintenance to more suitable time interval.
- 7.4 If necessary (in the Operator's opinion), the Client shall contact and keep in touch with the Operator representatives in order to mutually coordinate the maintenance process.
- 7.5 Changes in client equipment configuration shall be completed in reasonable time before the markets open so that the Operator specialists could confirm that Moscow Exchange network performance is not affected.

8. Service request procedure

- 8.1 In order to submit the service request, the Client should contact the Operator using technical support public contacts.
- 8.2 Every unit of the Client equipment delivered to the Colocation Facility is given a unique ID (the "MOEX-ID"). Labels with MOEX-IDs are put on three sides of the equipment (upper, front and back panels) to ensure unambiguous identification of the equipment inside the rack.
- 8.3 When ordering services that require physical access of the Operator representatives to the Client equipment, the Client must specify MOEX-ID to avoid improper identification.
- 8.4 The following information may be required to perform certain maintenance works:
- Full name of the Client representative;
 - Equipment name and labeling;
 - Model and serial number;
 - Number of interfaces and ports;
 - Number of racks and units;
 - IP addresses, numbers of IP protocols, number of TCP/UDP ports; traffic direction;
 - IP addresses purposes;
 - Other information.
- 8.5 To avoid any possible mistakes, this information shall be provided via an e-mail.
- 8.6 In order to provide technical service or provide specific confidential information, the Client and/or its

representative must be properly authorized.

8.7 Detailed description of authentication and authorization methods are described in paragraph 9 "Client authorization" of this document.

8.8 Confirmation by the other party is required for certain works, including:

- a notification from the operator stating its readiness to connect is needed for the service "Connection of Customer's equipment to the equipment of an accredited telecommunications operator in the Colocation Facility" which shall specify equipment, connection port, and additional information: type of line and bandwidth;
- the consent of the other party is required (executed according to the form set out in Appendix No. 5) in case of cross-connection within the Colocation Facility with the equipment of another customer.

9. Client authorization

9.1 To order technical service, receive confidential information or material assets (equipment) as well as access equipment to perform planned or emergency maintenance, client representatives shall be authorized.

9.2 Client's and its reps' personal Data used for authentication, as well as the powers of attorney of the Client representatives are specified in the Client Authorization form (in the form of power of attorney), as specified in Appendix 1 to the present Rules and Conditions which should be signed by authorized Client representative in accordance with the law and the company constituent documents. The Client Authorization Form is provided to the Operator.

9.3 The Client Authorization Form is deemed accepted by the Operator for use in client authentication and his trustees upon receipt of the signed copy.

9.4 Client Authorization Forms are assigned unique numbers and can be executed at any time during the contract term, in this case, once the new Client Authorization Form version is signed, the previous Client Authorization Form becomes void.

9.5 The Operator accepts the following authorization methods:

- Requests received from the email address specified in the colocation agreement as primary contact email address;
- Requests from the person authorized by the Client acting in accordance with the Client Authorization Form (in power of attorney form) stated in Appendix 1 of the present Rules and Conditions - for actions to which the representative has been authorized by the Client.

9.6 In case of the authorized person's dismissal or appointment of a new authorized person by the Client, as well as in case of any change of Client information stated in the Client Authorization form, the Client is obliged immediately to inform the Operator by contacting technical support and then submit an updated Client Authorization Form to the Operator within three (3) calendar days.

9.7 The Operator interacts with the Client on the following questions:

- Organizational matters;
- Technical questions/issues, requests for technical service.

10. Alerts

10.1 In order to receive alerts from the Technical Centre, the Client shall send a list of e-mail addresses to colo@moex.com. The list is accepted only from the Client's employees who are entitled to interact with the Operator on technical issues according to the Client Authorisation section of these Regulations.

11. Standard recommended forms for requesting maintenance work and confirmation letters:

Appendix 1. Client authorization form

Appendix 2. Sample request form for connection to the Operator

Appendix 3. IP address sample request form

Appendix 4. Firewall rules change request form for Internet access to equipment

Appendix 5. Sample application form for a cross-connection of the Client's equipment

Appendix 6. Sample request form to organise a cross-connection with equipment of another customer

Appendix 7. Sample authorisation letter to set up a cross-connection

Appendix 8. Sample application to set up a cross-connection with the equipment of an Authorised Network Service Provider

Appendix 9. Sample application form for the dismantling of the cross-connection

On the date of this Authorization Form signature, the previous Authorization Form #____ dated _____ 20__, including its power of attorney is revoked and becomes void.

In witness thereof, this Client Authorization Form is signed by the authorized representative of the Client (the head of the legal entity or any other person duly authorized to do so in accordance with the law and the company's constituent documents)*.

By the Client:

_____/_____
Signed Name, surname

_____ 20__

* If the signatory is acting on the basis of the power of attorney with the right of substitution, the following documents shall also be submitted:

- *the original or a notarized copy of the power of attorney confirming the powers of the person to sign the form;*
- *the document confirming the powers of the person who issued the power of attorney or the notarized copy thereof, or the extract therefrom certified with the signature of the authorized person and the seal (if any).*

Appendix 2. Sample request form for connection to the Operator

Request for connection to the Operator's equipment

Please connect to the Operator's equipment under agreement No ____/CLZ dated _____20____.

Connection parameters:

Segment: Productions and Game; UAT network, FIFO Gateway, SIMBA SPECTRA, Internet

Connection type (L2/L3): _____

Equipment label: _____

Port name/number: _____

Title
Name, surname
Contact details

Note: *please submit this request to colo@moex.com by using the authorized email address.*

Appendix 3. IP address sample request form

IP address request form

We request the following IP addresses to be allocated in accordance with the agreement No.____/CLZ dated __ ____ 20__:

Production & Game Systems Access Segment:

Access to trading:

FAST feed:

Equity & Bond Market FAST feed:

FX and Precious Metals Markets FAST feed:

Derivatives Market FAST feed:

FullOrderLog FAST feed:

SIMBA SPECTRA feed:

(paired addresses for FeedA and FeedB are specified to obtain FAST and SPECTRA SIMBA)

UAT Systems Access Segment:

Access to trading:

FAST feed:

(paired addresses for FeedA and FeedB are specified to obtain FAST)

Internet Access Segment:

Access to the Internet:

Access to the Internet (management interface):

Title

Name, surname

Contact details

Note: *please submit this request to colo@moex.com by using the authorized email address.*

Appendix 4.

Firewall rules change request form for Internet access to equipment

Firewall rules change request

In accordance with colocation agreement №____/CLZ as of __ _____ 20_ please make changes into the firewall rules for inbound/outbound (select appropriate) internet access as follows:

Add permissions:

Inbound/outbound traffic	IP address(es) in private network	Internet IP address(es)	List of protocols/ports

Remove existing permissions:

Inbound/outbound traffic	IP address(es) in private network	Internet IP address(es)	List of protocols/ports

Title

Name, surname

Contact details

Note: *please submit this request to colo@moex.com by using the authorized email address.*

Appendix 5.

Sample request form for a cross-connection for the Client's equipment

Cross-connect sample request form

Pursuant to Agreement No. ___/CLZ dated __ _____ 20__, we request that a cross-connection between equipment of (Client's name) within the Colocation Facility be organised.

Cross-connection parameters:

Line type: _____

1.

MOEX ID: _____

Port name/number: _____

Connector type: _____

2.

MOEX ID: _____

Port name/number: _____

Connector type: _____

Title
Name, surname
Contact details

Note: *please submit this request to colo@moex.com by using the authorized email address.*

Appendix 6.

Sample request form to organise a cross-connection with equipment of another customer

(To be completed by the **Initiating Client**,
I.e. the party paying for the cross-connection service)

Request form to organise a cross-connection with equipment of another customer

In accordance with the agreement No____/CLZ dated __ _____ 20__, we request to establish a cross-connection between equipment of (name of the Initiating Client) and equipment of (name of the Client) within the Colocation Facility.

Cross-connection parameters:

Line type: _____

Details of (name of the initiating client)

MOEX ID: _____

Port name/number: _____

Connector type: _____

The cross-connection parameters on the (client name) side are provided by (client name).

Title
Name, surname
Contact details

Note: *please submit this request to colo@moex.com by using the authorized email*

Appendix 7.

Sample authorisation letter for a cross-connection with equipment of another customer

(To be completed by the completed by the Initiating Client's **counterparty**,
i.e. the Party receiving the cross connection)

Authorisation letter for a cross-connection with equipment of another customer

(Name of the Client) hereby authorises a cross-connection between the equipment placed within the Collocation Facility in accordance with Agreement No.____/CLZ of __ _____ 20__ and the equipment of (name of the Initiating Client) placed in the Collocation Facility.

Cross-connection parameters:

Line type: _____

Details of (name of the Client)

MOEX ID: _____

Port name/number: _____

Connector type: _____

The cross-connection parameters on the (initiating client name) side are provided by (initiating client name).

Title

Name, surname

Contact details

Note: *please submit this request to colo@moex.com by using the authorized email*

Appendix 8.

Sample request form to set up a cross-connection with the equipment of an Authorised Network Service Provider

(To be completed by the **Initiating Client**)

Request form to set up a cross-connection with the equipment of an Authorised Network Service Provider

In accordance with the agreement No ____/CLZ dated __ _____ 20__, we ask to establish a cross-connection between equipment of (name of the Initiating Customer) and equipment of an authorised network service provider (name of the provider) within the Colocation Facility.

Line parameters:

Line type: _____

Details of (name of the initiating client)

MOEX ID: _____

Port name/number: _____

Connector type: _____

Connection parameters on the (name of the operator) side are provided by (name of the provider).

Title

Name, surname

Contact details

Note: *please submit this request to colo@moex.com by using the authorized email*

Appendix 9. Sample request form for termination of a connection to the Operator's equipment

(To be completed by the **Initiating Client**)

Request form for termination of the connection line

Please terminate connection to the Operator's equipment pursuant to agreement No ____/CLZ dated _____20____.

Connection parameters:

Segment: Productions and Game; UAT network, FIFO Gateway, SIMBA SPECTRA, Internet

Connection type (L2/L3): _____

Operator ID: _____

Port name/number: _____

Title

Name, surname

Contact details

Note: *please submit this request to colo@moex.com by using the authorized email*