ATS-N/MA: Part III: Manner of Operations

Item 7: Order Types and Attributes	
a. Identify and explain each order type offered by the NMS Stock ATS. In your explanation, include the following: i. priority, including the order type's priority upon order entry and any subsequent change to priority (if applicable); whether and when the order type can receive a new time stamp; the order type's priority vis-à-vis other orders on the book due to changes in the NBBO or other reference price; and any instance in which the order type could lose execution priority to a later arriving order at the same price; ii. conditions, including any price conditions (e.g., how price conditions affect the rank and price at which it can be executed; conditions on the display or non-display of an order; or conditions on executability and routability); iii. order types designed not to remove liquidity (e.g., post-only orders), including what occurs when such order is marketable against trading interest on the NMS Stock ATS when received; iv. order types that adjust their price as changes to the order book occur (e.g., price sliding orders or pegged orders) or have a discretionary range,	AlphaX US offers trading in all Regulation NMS common stock, exchange-traded products ("ETPs") and American depository receipts ("ADRs"), all of which are Regulation NMS securities. AlphaX US allows Participants to place firm orders. In addition to firm orders, AlphaX US allows Participants to submit conditional orders. AlphaX US executes the orders according to Participant specifications and order priority rules. Order Types AlphaX US maintains a dark batch auction order book, which has the following order types: Market Orders: Market Orders are orders to buy or sell a stated amount of a security that is to be executed at or in between the National Best Bid and Offer (the "NBBO") in the matching process (the "Match Event"). Limit Orders: Limit Orders are orders to buy or sell a stated amount of a security at a specified price or better that are to be executed in the Match Event. Peg Orders: Peg order prices change dynamically with the market until their specified durations are met, the orders are filled, or their limit prices are reached. 1. Midpoint Peg Orders: Midpoint Peg Orders are orders to buy or sell a stated amount of a security that are to be executed only at the midpoint price of the NBBO or better in the Match Event. AlphaX US accepts Midpoint Peg Orders with or without a limit price, and Midpoint Peg Orders are eligible to match with all order types, in order to provide the opportunity for price improvement. 2.Primary Peg Orders: Primary Peg Orders are orders to buy at the NBB, or sell at the NBO, a stated amount of a security that is to be executed only at the primary peg in the Match Event. Orders may be submitted with or without a limit price. Participants also have the option to implement an offset to the primary price for this order type. 3. Marketable Peg Orders: Marketable Peg Orders are orders to buy at or below the NBO, or sell at or above the NBB, a stated amount of a security that is to be executed in the Match Event. Orders may be submitted with or without a limit price. Participants also have the option to implement an offset to the NBBO for this order type.

including an order's rank and price upon order entry and whether such prices or rank may change based on the NBBO or other market conditions when using such order type; when the order type is executable and at what price the execution would occur; whether the price at which the order type can be executed ever changes; and if the order type can operate in different ways, the default operation of the order type; v. whether an order type is eligible for routing to other Trading Centers; vi. the time-in-force instructions that can be used or not used with each order type; vii. the circumstances under which order types may be combined with another order type, modified, replaced, canceled, rejected, or removed from the NMS Stock ATS; and viii. the availability of order types across all forms of connectivity to the NMS Stock ATS and differences, if any, in the availability of an order type across those forms of connectivity.	AlphaX US does not offer post-only orders or price sliding orders. Conditional Orders Conditional orders are instructions to AlphaX US that Participants want to interact with the order book on a conditional basis. Conditional orders never execute. Instead, when conditional orders would otherwise match with contra party orders, the conditional orders are canceled by AlphaX US, and invitations are sent to the originating Participants, inviting them to send firm-up response orders. Participants who send firm orders can choose not to interact with conditional orders on an order-by-order basis through their FIX or BIN connection. The default setting is for firm orders to interact with conditional orders. Conditional orders can elect to interact only with other conditional orders on an order-by-order basis. Please refer to Part III, Item 9.a for more details on the handling of conditional orders. Order Instructions AlphaX US accepts orders with time-in-force ("TIF") instructions of Day, Immediate or Cancel ("IOC"), or Enhanced IOC ("EIOC"). An IOC is automatically converted to an Auction or Cancel ("AOC") TIF upon receipt by AlphaX US. Further details are as follows: 1. Day is the default TIF instruction. Day orders are held by AlphaX US on its order book from the time of receipt until the end of Regular Trading Hours or such time that a "cancel" instruction is sent by the Participant, whichever comes first. If unfulfilled by the end of Regular Trading Hours, Day orders are automatically canceled, and any Participant who submitted a Day order is notified through the system. 2.AOC orders (i.e., orders sent with the IOC tag) are held until the completion of the next Match Event, and if unexecuted, are automatically canceled. AOC orders may be submitted with or without a limit price. AOC orders are only eligible for firm orders and cannot be used for conditional orders. 3.EIOC orders are firm IOC orders that can trade against firm orders (including those triggered from conditional orders) or conditional orders. AlphaX US will hold EIOC orders for at least one Match Event. If no match is possible at the first Match Event following EIOC order arrival then AlphaX US will cancel back the EIOC order to the Participant (consistent with current AOC behavior). If a contra-side conditional order is identified in the first Match Event following receipt of the EIOC order, the EIOC order will be held on the book for 150 milliseconds from the time AlphaX US sends a firm-up request (the "Hold Period")

	to give the conditional order time to firm up and execute. Once AlphaX US receives the firm-up order from the contraside conditional order, the EIOC order will match with that firm-up order, in whole or in part, and any residual of the EIOC order will be cancelled back immediately. During the Hold Period, the EIOC order will be eligible to match at subsequent Match Events, will be eligible to match with firm orders until the earlier of AlphaX US receiving a firm-up order from a contraside conditional order or the end of the Hold Period, and AlphaX US will cancel back any remaining unmatched volume on the EIOC order. If an EIOC order is revised during the Hold Period, then the EIOC order will remain in the book awaiting the firm up contra-side order and will follow the prioritization rules outlined in Part III, Item 7, under Order Amendment. A revised EIOC order will not extend the Hold Period. In the event that an EIOC order arrives and finds both a contra-side firm order and contra-side conditional order with which it is eligible to match, the EIOC order will, at the next Match Event, only match with contra-side firm order (and will not trigger the contra-side conditional order), and AlphaX US will cancel back any remaining unmatched volume on the EIOC order. If AlphaX US does not receive a firm up order from the contraside conditional order, AlphaX US will cancel back the EIOC order at the end of the Hold Period. Minimum Execution Quantity AlphaX US offers a minimum quantity modifier for order execution. The minimum quantity modifier allows a Participant to request a minimum share amount on an order execution, such that if the available liquidity is below the minimum quantity amount, the order will not execute. AlphaX US does not combine contra-orders to meet a minimum execution quantity. Routing AlphaX US does not support the routing of orders to any other venue. Message Priority Incoming orders and related messages are processed in the order in which they are received by AlphaX US. Match Priority An order's match priority is based on price and the time at which such order is received relative to other orders. Each order receives a sequence number on arrival, based on order

	of arrival into AlphaX US, which is used to determine time priority. Matching priority is constrained by PP (which are counterparty selection and minimum execution quantity). Matching instructions are specified in accordance with the FIX and BIN protocols described above in Part III, Item 5.a, and defined by industry standard FIX tags and agreed upon BIN tags defined for these matching instructions. Orders received by AlphaX US during the Pre-Market Order Acceptance Period are given a sequence number on arrival and will sit in the order book until Regular Trading Hours and then are matched pursuant to the matching priority of price/time, constrained by PP (as described in the paragraph above). The time priority is determined by the sequence number assigned to an order at the time of its receipt by AlphaX US. Orders submitted to AlphaX US outside the Regular Trading Hours and the Pre-Market Order Acceptance Period are not accepted. For all eligible securities, AlphaX US only executes if Limit-Up-Limit-Down ("LULD") bands are present, and the effective price of a potential match is not constrained by a LULD band. Order Amendment An open order may be amended by a Participant as long as the amendment is received by AlphaX US before a Match Event occurs. If an order amendment is received during a Match Event and there is still an open order at the conclusion of the Match Event, the amendment will be processed at the conclusion of the Match Event. If the order has been filled during the Match Event and no open order remains, the amendment will be rejected at the end of the Match Event. Order amendments are processed in the order in which they are received by AlphaX US and assigned a sequence number. Amendments of existing order size only keep their original sequence number for purposes of time priority if the change is a decrease in the order size. If the order size is increased, the price is altered in any way, or any other change is made, the sequence number is updated to the next sequence number for a new order, and the new sequence number is used for ranking priority. Order Cancellation An open order may be canceled by a Participant to the extent the cancellation order is received and processed by AlphaX US before a Match Event occurs. If an order cancellation is received during a Match Event and there is still an open order at the conclusion of the Match Event, the cancellation will be processed at the conclusion of the Match Event. If the order

	has been filled during the Match Event and no open order remains, the cancellation will be rejected at the end of the Match Event. A cancellation order cancels all remaining open quantities on the open order. Cancellation orders are processed in the order in which they are received by AlphaX US.
Item 9: Conditional Orders and Indications of Interest	
a. Does the NMS Stock ATS send or receive any messages indicating trading interest (e.g., IOIs, actionable IOIs, or conditional orders)?	●Yes ☐No
If yes, identify and explain the use of the messages, including information contained in messages (e.g., price or size minimums), how the message is transmitted (e.g., order management system, smart order router, FIX), when the message is transmitted (e.g., automatically by the ATS, or upon the sender's request), the type of Persons that receive the message (e.g., Subscribers, Trading Centers), responses to conditional orders or IOIs (e.g., submission to firm-up conditional orders), and the conditions under which the message might result in an execution in the ATS (e.g., response time parameters, interaction, and matching).	As noted in Part III, Item 7.a, conditional orders are instructions to AlphaX US that Participants want to interact with the order book on a conditional basis. Conditional orders never execute, and are never routed away to another trading venue. AlphaX US accepts conditional orders sent over either the FIX or BIN protocol. A conditional order must be sent with the TIF of "Day" and, requires the same information as a firm order (i.e., symbol, order type, quantity, price if applicable, and side). There are no additional restrictions on conditional orders. Participants may also select to use PP on conditional orders (counterparty selection and/or minimum execution quantity). A conditional order sits on the order book until a contra-order is received. Contra-orders can be either conditional or firm orders. Conditional orders allow liquidity seekers to express interest with symbol, order type, quantity, price if applicable, and side. Price is required for limit orders, but is not required for Market or Peg order types. Conditional orders reside in the AlphaX US order book. If AlphaX US receives a contra-order that fulfills the characteristics of a conditional order (i.e., price and PP), the Participant who sent the conditional order will receive a firm-up request from AlphaX US to "firm-up" the conditional order with a firm-up order. The Participant will also receive a cancel on the original conditional order. Specifically, AlphaX US will determine whether there is an eligible contra-order during a Match Event, and generate the firm-up request and conditional order cancel immediately following the Match Event. Firm-up requests and resulting firm-up orders all expire 150 milliseconds from the time AlphaX US sends the firm-up requests to the Participant. Once conditional orders firm-up, they follow the same order requirements and matching methodology as firm orders, as described in Part III, Item 7, and have no additional requirements. Specifically, AlphaX US will first look to price and then to time, and considers PP before it matches orders in a

	Match Event. Therefore, even if Participant A's order is offering the best price for Participant B's order, the orders will not match if either Participant has chosen not to trade with the other. At the start of the Match Event, price will be the first factor in ranking orders for matching. PP will then be considered, and may restrict some orders from interacting. When multiple orders have the same price and there are no disqualifying PP, time is the ultimate tie breaker. Time is determined by the sequence number assigned to an order at the time AlphaX US sends the firm-up request. To illustrate, when a contra-order is identified in a Match Event that fits the criteria of the conditional order (i.e., the order is able to match based on price priority and without PP constraints), at the conclusion of the Match Event, AlphaX US sends the Participant who placed the conditional order a firm-up request that discloses the counterparty trading interest (i.e., symbol and side) as well as a cancel on the conditional order at the same time. If there is more than one conditional order eligible to receive a firm-up request, the firm-up requests will be sent based on the Match Event priority methodology of price/time, constrained by PP (counterparty selection and minimum execution quantity). The firm-up request is assigned a new sequence number at the time of creation and that sequence number is used on the firm-up order for the purpose of matching priority if a firm-up order is received. In the case where more than one firm-up request is sent in response to a contra-order, AlphaX US will send the firm-up requests in the same sequence in which the original conditional orders arrived, so the firm-up requests and any resulting firm-up orders will maintain their time priority within their newly assigned sequence numbers. If a Participant firms up its conditional order and there is only one contra-order that is still available, the orders will match in the next Match Event. If there are multiple contra-order firm-up requests sent, AlphaX US will wait for all responses or 150 milliseconds, whichever comes first, and then match orders in the next Match Event following the receipt of all firm-up orders. If a conditional order does not firm up, the firm-up request expires after 150 milliseconds. If a conditional order has firmed up but the contra-order is no longer available (i.e., if the contra-order is also a conditional order that has not firmed up), AlphaX US will make an attempt to match in the last available Match Event before the firm-up order expires at the conclusion of the 150 millisecond holding period from the time AlphaX US sent the firm-up request to the Participant. If the firm-up order does not match during this final attempt, it will be canceled. Regardless of whether there are multiple or single firm-up requests, the firm-up requests all expire after 150 milliseconds. If a Participant attempts to send a firm-up order after the firm-up

	request has expired, AlphaX US will send a reject message informing that Participant the firm-up ID is invalid/expired. As noted in Part III, Item 15, Participants may decline or ignore firm-up requests. However, if a Participant decides to submit a firm order in response to a firm-up request, that Participant may change the order price or quantity originally noted in the conditional order. Conditional orders follow the same cancel and amend policies as firm orders, as described above in Part III, Item 7. So, if the order size is increased, the price is altered in any way, or any other change is made, the sequence number is updated to the next sequence number for a new order, and the new sequence number is used for ranking priority. AlphaX US will monitor rates on both firm-up response and cancellation after a firm-up order is sent but prior to execution. AlphaX US may restrict a Participant's utilization of conditional orders based on this information. AlphaX US does not wait to execute a firm order if it is able to execute the firm order in a Match Event prior to a firm-up on a contra conditional order. Firm orders can opt out of interacting with conditional orders on an order-by-order basis.Conditional orders can elect to interact only with other conditional orders on an order-by-order basis. Conditional Order Examples (All examples below are listed in the order in which the actions occur.) 1. Example of a Conditional Firm-Up Request with One Conditional Contra-Order: a. AlphaX US receives a conditional order from Participant ABC to buy 10,000 shares of ZVZZT with a limit of 153.79 and no PP attached to the order b. AlphaX US receives a conditional order from Participant XYZ to sell 10,000 shares of ZVZZT with a limit of 153.77 and no PP attached to the order c. During the next Match Event, AlphaX US identifies the potential match between these two orders and sends a firm-up request to both Participant ABC and Participant XYZ, as well as a cancel on both conditional orders at the conclusion of the Match Event d. 50 milliseconds later, AlphaX US receives a firm-up order from Participant XYZ to sell 10,000 shares of ZVZZT with a limit of 153.77 e. AlphaX US continues to conduct Match Events in ZVZZT at its scheduled Match Event Intervals

	f. After an additional 30 milliseconds, AlphaX US receives a firm-up order from Participant ABC to buy 10,000 shares of ZVZZT with a limit of 153.79 g. Both of the firm-up orders are entered into the order book and will participate in the next scheduled Match Event. The Match Event will follow its price/time priority. Assuming there are no other orders with a more aggressive price or time priority, these two orders will match in this Match Event h. 10,000 shares are traded at 153.78 2. Example of a Conditional Firm-Up Request with Multiple Conditional Contra-Orders: a. AlphaX US receives a conditional order from Participant ABC to buy 10,000 shares of ZVZZT with a limit of 153.79 and no PP attached to the order b. AlphaX US receives a conditional order from Participant XYZ to sell 5,000 shares of ZVZZT with a limit of 153.77 and no PP attached to the order c. AlphaX US receives a conditional order from Participant DEF to sell 5,000 shares at a limit of 153.77 and no PP attached to the order d. During the next Match Event, AlphaX US identifies the potential match between the buy side order and both of the sell side orders, and at the conclusion of the Match Event sends a firm-up request to all three brokers, as well as a cancel on all three conditional orders e. 50 milliseconds later, AlphaX US receives a firm-up order from Participant XYZ to sell 5,000 shares of ZVZZT with a limit of 153.77 f. AlphaX US continues to conduct Match Events in ZVZZT at its scheduled Match Event Intervals without including the firm-up order from Participant XYZ in the Match Events g. After an additional 30 milliseconds, AlphaX US receives a firm-up order from Participant ABC to buy 10,000 shares of ZVZZT with a limit of 153.79 h. AlphaX US will hold both firm-up orders on the order book without participating in any Match Events, so the third order has an opportunity to firm-up i. After an additional 20 milliseconds, AlphaX US receives a firm-up order from Participant DEF to sell 5,000 shares of ZVZZT with a limit of 153.77 j. All three of the firm-up orders are entered into the order book and will participate in the next scheduled Match Event. The Match Event will follow its price/time priority, and assuming there are no other orders in the Match Event with a more aggressive price or time priority, the buy order will match against both sell side orders k. 5,000 shares are traded at 153.78 between Participant ABC and Participant XYZ, and an additional 5,000 shares are traded at 153.78 between Participant ABC and Participant DEF

	3. Example of a Conditional Firm-Up Request with a Conditional Contra-Order that Does Not Firm-Up: a. AlphaX US receives a conditional order from Participant ABC to buy 10,000 shares of ZVZZT with a limit of 153.79 and no PP attached to the order b. AlphaX US receives a conditional order from Participant XYZ to sell 5,000 shares of ZVZZT with a limit of 153.77 and no PP attached to the order c. During the next Match Event, AlphaX US identifies the potential match between these two orders and sends a firm-up request to both Participant ABC and Participant XYZ, as well as a cancel on both conditional orders d. 50 milliseconds later, AlphaX US receives a firm-up order from Participant XYZ to sell 10,000 shares of ZVZZT with a limit of 153.77 e. AlphaX US continues to conduct Match Events in ZVZZT at its scheduled Match Event Intervals without including the firm-up order from Participant XYZ f. In the last available Match Event before the firm-up order expires (150 milliseconds since the firm-up request was sent), there has still been no firm-up order from Participant ABC. AlphaX US includes the firm-up order from Participant XYZ in this Match Event to see if there are any other potential matches. At the end of that Match Event, any remaining open shares on the firm-up order from Participant XYZ are canceled back g. It is now 150 milliseconds since the firm-up request was sent by AlphaX US to Participant ABC and no firm-up order has been sent by Participant ABC to AlphaX US, the firm-up request for Participant ABC has now expired, and AlphaX US will reject any firm-up order sent from Participant ABC after this time 4. Example of a Conditional Firm-Up Request with a Firm Contra-Order: a. AlphaX US receives a conditional order from Participant ABC to buy 10,000 shares of ZVZZT with a limit of 153.79 and no PP attached to the order b. AlphaX US receives a firm order from Participant XYZ to sell 10,000 shares of ZVZZT with a limit of 153.77 and no PP attached to the order c. During the next Match Event, AlphaX US identifies the potential match between these two orders and at the conclusion of the Match Event sends a firm-up request to Participant ABC and a cancel on their conditional order d. AlphaX US continues to conduct Match Events at its scheduled Match Event Intervals for ZVZZT, and the firm order from Participant XYZ is on the order book available to trade in every Match Event

	e. After 100 milliseconds, AlphaX US receives a firm-up order from Participant ABC to buy 10,000 shares of ZVZZT with a limit of 153.79 f. AlphaX US includes the firm-up order from Participant ABC in the order book, which will participate in the next scheduled Match Event. The firm-up order is eligible to participate with the original firm order from Participant XYZ (if it is still available) or any other order in the book, based on price/time priority (constrained by PP) g. If there is still a contra-order available, a trade will occur in that Match Event. If there is no longer a contra-order available, AlphaX US will send a cancellation on that firm-up order to Participant XYZ at the conclusion of the Match Event.