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Vanessa Countryman
Acting Secretary
Securities and Exchange Commission
100 F Street, N.E.
Washington, D.C. 20549

**Re: Comment Letter on MIAX, MIAX PEARL, and MIAX Emerald
Connectivity Fee Filings; File Nos. SR-MIAX-2019-10; SR-PEARL-
2019-08; SR-EMERALD-2019-11**

Dear Ms. Countryman:

Miami International Securities Exchange, LLC (“MIAX”), MIAX PEARL, LLC (“MIAX PEARL”), and MIAX Emerald, LLC (“MIAX Emerald”, collectively, the “MIAX Exchanges”) appreciate the opportunity to provide further information on the captioned connectivity fee filings filed by the MIAX Exchanges (the “Connectivity Fee Filings”).¹

In the Connectivity Fee Filings, the MIAX Exchanges provided a significant amount of detail regarding the connectivity alternatives and the proposed fees associated therewith, the market participants that purchase the connectivity alternatives and the impact of the proposed fees on such participants, and the costs incurred by the MIAX Exchanges associated with providing the connectivity alternatives, all in order to provide greater transparency into the connectivity alternatives and associated fees, and to “raise the bar” for exchange connectivity fee filings. The MIAX Exchanges believe that the fees proposed in the Connectivity Fee Filings are reasonable, equitable, and not unfairly discriminatory, and that the heightened information contained in the Connectivity Fee Filings provide a sufficient basis for the Commission to determine that the proposed fees are consistent with the Securities Exchange Act of 1934 (the “Act”).² Notwithstanding the foregoing, on March 29, 2019, the Commission issued its Order Disapproving Proposed Rule Changes to Amend the Fee Schedule on the BOX Market LLC Options Facility to Establish BOX Connectivity Fees for Participants and Non-Participants Who Connect to the BOX

¹ See Securities Exchange Act Release Nos. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10); 85317 (March 14, 2019), 84 FR 10380 (March 20, 2019) (SR-PEARL-2019-08); and 85316 (March 14, 2019), 84 FR 10350 (March 20, 2019) (SR-EMERALD-2019-11).

² 15 U.S.C. 78s.

Network (the “BOX Order”).³ In the BOX Order, the Commission highlighted a number of deficiencies it found in three separate rule filings by BOX Exchange LLC (“BOX”) to increase BOX’s connectivity fees that prevented the Commission from finding that BOX’s proposed connectivity fees were consistent with the Act. These deficiencies relate to topics that the Commission believes should be discussed in a connectivity fee filing. While the MIAX Exchanges believe that their Connectivity Fee Filings materially address those topics for discussion, the MIAX Exchanges are taking this opportunity to provide additional information *so that their Connectivity Fee Filings squarely and comprehensively address each and every topic raised for discussion in the BOX Order.*

In the BOX Order, the Commission stated that it “has historically applied a ‘market-based’ test in its assessment of market data fees....[and] [u]nder that test, the Commission considers ‘whether the exchange was subject to significant competitive forces in setting the terms of its proposal for [market data], including the level of any fees.’ If an exchange meets this burden, the Commission will find that its fee rule is consistent with the Act unless ‘there is a substantial countervailing basis to find that the terms’ of the rule violate the Act or the rules thereunder. If an exchange cannot demonstrate that it was subject to significant competitive forces, it must ‘provide a substantial basis, other than competitive forces...demonstrating that the terms of the [fee] proposal are equitable, fair, reasonable, and not unreasonably discriminatory.’”⁴

In the Connectivity Fee Filings, the MIAX Exchanges provided detailed information that justified its proposed fees under both a “market-based” test, as well as a “cost-based” test.

Under the market-based test, the MIAX Exchanges provided extensive analyses in order to demonstrate that the MIAX Exchanges were subject to significant competitive forces in setting their proposed fees. These analyses included detail and metrics regarding the number and types of members that purchase each of the MIAX Exchanges’ connectivity alternatives, the competition among options exchanges, the competition for connectivity to the MIAX Exchanges from third-party resellers of connectivity, the differences in market structure between the options markets and the equities markets, etc. Most notably, the MIAX Exchanges demonstrated that not all options market participants are forced to join the MIAX Exchanges, nor are they forced to connect to the MIAX Exchanges, nor are they forced to purchase the market data of the MIAX Exchanges. The MIAX Exchanges demonstrated this through comparison of the number of members of the MIAX Exchanges versus the number of members of other options exchanges.⁵

There are significant differences between the options markets and the equities markets. In particular, option market participants are not forced to connect to (and purchase market data from) all options markets. Again, this is proven by the number of members of the MIAX Exchanges versus the number of members at other options exchanges. Not only do the MIAX Exchanges

³ See Securities Exchange Act Release No. 85459 (March 29, 2019) (SR-BOX-2018-24, SR-BOX-2018-37, SR-BOX-2019-04).

⁴ See BOX Order at 16-17.

⁵ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 9-10.

have less than half of the number of members as certain other options exchanges, but there are also a number of members of the MIAX Exchanges that do not connect directly to the MIAX Exchanges. Further, of the number of members that connect directly to the MIAX Exchanges, many such members do not purchase market data from the MIAX Exchanges. Gone are the days when the retail brokerage firms (the Fidelity's, the Schwab's, the eTrade's) were members of the options exchanges – they are not members of the MIAX Exchanges, they do not purchase connectivity to the MIAX Exchanges, and they do not purchase market data from the MIAX Exchanges.

Instead, market participants choose to join an options exchange based on their particular business needs. It is a choice. Because it is a choice, the MIAX Exchanges must set reasonable pricing, otherwise prospective members would not join and existing members would leave. It is also a choice to purchase connectivity from an exchange. Because it is a choice, the MIAX Exchanges must set reasonable connectivity pricing, otherwise prospective members would not connect and existing members would disconnect or connect through a third-party reseller of connectivity.

The MIAX Exchanges provide their members and prospective members with information about the available connectivity alternatives.⁶ The decision of which type of connectivity to purchase is based on the business needs of the firm. For example, if the firm wants to receive the top-of-market data feed product or depth data feed product, due to the amount/size of data contained in those feeds, such firm would need to purchase either the 10Gigabit (“Gb”) or 10Gb ULL connection. The 1Gb connection is too small to support those data feed products. The MIAX Exchanges note that there are 12 members that *only* purchase the 1Gb connectivity alternative. Thus, while there is a meaningful percentage of purchasers of only 1Gb connections (12 of 33), by definition, those 12 members purchase connectivity that cannot support the top-of-market data feed product or depth data feed product and thus they do not purchase such data feed products. This shows that purchasing market data is a business decision/choice, and thus the pricing for it is constrained by competition.

Further, in addition to competition for options members and options order flow, there is also competition for purchasing connectivity to the MIAX Exchanges. The MIAX Exchanges sell direct connectivity to third-party non-members, who in turn resell that connectivity to multiple market participants over that same connection, including both members and non-members of the MIAX Exchanges. These firms (typically extranets and service bureaus) who purchase such direct connectivity to the MIAX Exchanges (and the MIAX Exchanges disclosed the number of such firms in the Connectivity Fee Filings) compete directly with the MIAX Exchanges in selling connectivity to the MIAX Exchanges. When connectivity is re-sold by a third-party, the MIAX Exchanges do not receive any connectivity revenue from that sale. It is entirely between the third-party and the purchaser. Thus, this competition constrains the ability of the MIAX Exchanges to set their connectivity prices, as this indirect connectivity is a substitute for direct connectivity. The

⁶ See the MIAX Connectivity Guide at https://www.miaxoptions.com/sites/default/files/page-files/MIAX_Connectivity_Guide_v3.6_01142019.pdf.

MIAX Exchanges note that non-members purchase and resell all three connectivity options, including 1Gb, 10Gb, and 10Gb ULL connectivity alternatives.⁷

Finally, the MIAX Exchanges noted that their market share in the U.S. options markets was approximately 10% in 2018. Since, as demonstrated above, there is no requirement to join or connect to (or purchase market data from) the MIAX Exchanges, the MIAX Exchanges are aware of no evidence that a combined market share of less than 10% provides the MIAX Exchanges with anti-competitive pricing power in a competitive marketplace. Thus, this competition constrains the ability of the MIAX Exchanges to set their connectivity prices.⁸

Under the cost-based test, the MIAX Exchanges gave a detailed breakdown of the specific costs associated with maintaining and enhancing their network, for which the proposed fees are designed to offset. The MIAX Exchanges stated the increased costs to the MIAX Exchanges associated with supporting their network are due to several factors, including increased costs associated with maintaining and expanding a team of highly-skilled network engineers (the MIAX Exchanges also hired additional network engineering staff in 2017 and 2018), increasing fees charged by the MIAX Exchanges' third-party data center operator, and costs associated with projects and initiatives designed to improve overall network performance and stability, through the MIAX Exchanges' research and development ("R&D") efforts. In order to provide more detail and to quantify the MIAX Exchanges' increased costs, the MIAX Exchanges note that increased costs are associated with the infrastructure and increased headcount to fully-support the advances in infrastructure and expansion of network level services, including customer monitoring, alerting and reporting. Additional technology expenses were incurred related to expanding the MIAX Exchanges' Information Security services, enhanced network monitoring and customer reporting, as well as Regulation SCI mandated processes associated with network technology. All of these additional expenses have been incurred by the MIAX Exchanges since they last increased their connectivity fees on January 1, 2017. Examples include an approximate 70% increase in technology-related personnel costs in infrastructure, due to expansion of services/support; an approximate 10% increase in data center costs due to price increases and footprint expansion; an approximate 5% increase in vendor-supplied dark fiber due to price increases and expanded capabilities; and a 30% increase in market data connectivity fees, due to price increases and network expansion for greater resiliency.⁹

The MIAX Exchanges also discussed how they incurred significant capital expenditures over this same period to upgrade and enhance the underlying technology components, as more fully detailed below. Further, because the costs of operating a data center are significant and not economically feasible for the MIAX Exchanges, the MIAX Exchanges do not operate their own data centers, and instead contract with a third-party data center provider. The MIAX Exchanges

⁷ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 12.

⁸ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 10.

⁹ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 14-15.

note that larger, dominant exchange operators own/operate their data centers, which offers them greater control over their data center costs. Because those exchanges own and operate their data centers as profit centers, the MIAX Exchanges are subject to additional costs. As a result, the MIAX Exchanges are subject to fee increases from their data center provider, which the MIAX Exchanges experienced in 2017 and 2018 of approximately 10%, as cited above. Certain recently developed network aggregation and monitoring tools provide the MIAX Exchanges with the ability to measure network traffic with a much more granular level of variability. This is important as members of the MIAX Exchanges demand a higher level of network determinism and the ability to measure variability in terms of single digit nanoseconds. Also, the MIAX Exchanges routinely conduct R&D projects to improve the performance of the network's hardware infrastructure. As an example, in the last year, the MIAX Exchanges' R&D efforts resulted in a performance improvement, requiring the purchase of new equipment to support that improvement, and thus resulting in increased costs in the hundreds of thousands of dollars range.

In the BOX Order, the Commission noted that a commenter stated that an exchange should assess differences among exchanges in the use and value of their connectivity, and provide information about the magnitude and allocation of the applicable costs on the exchange. A commenter argues that connectivity charges outside of the exchange context are significantly lower and that an exchange should explain the reasons for the exchange's upcharge.¹⁰

The Connectivity Fee Filings discussed the different prices charged for connectivity among other options exchanges. For example, Nasdaq PHLX LLC and Nasdaq ISE, LLC each charge a monthly fee of \$2,500 for each 1Gb connection, \$10,000 for each 10Gb connection and \$15,000 for each 10Gb ULL connection, which the equivalent of the MIAX Exchanges' 10Gb ULL connection. NYSE American LLC and NYSE Arca, Inc. each charge a monthly fee of \$5,000 for each 1Gb circuit, \$14,000 for each 10Gb circuit and \$22,000 for each 10Gb LX circuit, which is the equivalent of the MIAX Exchanges' 10Gb ULL connection. While the MIAX Exchanges' proposed connectivity fees are substantially lower than the exchanges cited above, the MIAX Exchanges believe that they offer significant value to members over other exchanges in terms of network monitoring and reporting, which they believe is a competitive advantage, and differentiates their connectivity versus connectivity to other exchanges. The Connectivity Fee Filings discuss the network monitoring tools (some of which were developed in-house, and some of which are licensed from third-parties), that continually monitor, detect, and report network performance, many of which serve as significant value-adds to the members of the MIAX Exchanges and enable the MIAX Exchanges to provide a high level of customer service. These tools detect and report performance issues, and thus enable the MIAX Exchanges to proactively notify a member (and the SIPs) when the MIAX Exchanges detect a problem with a member's connectivity. The costs associated with the maintenance and improvement of existing tools and the development of new tools resulted in significant increased cost to the MIAX Exchanges since February 2017. Certain recently developed network aggregation and monitoring tools provide the MIAX Exchanges with the ability to measure network traffic with a much more granular level of variability. This is important as members of the MIAX Exchanges demand a higher level of network determinism and the ability to measure variability in terms of single digit nanoseconds.

¹⁰ See BOX Order at 19-20.

The MIAX Exchanges use the revenue received from connectivity fees to offset a portion of the costs associated with maintaining and enhancing the MIAX Exchanges' network.¹¹

And while there may be connectivity charges outside of the exchange context that are significantly lower, there are also connectivity charges outside of the exchange context that are higher. For example, AT&T sells dedicated internet connectivity to business enterprises at higher rates than the MIAX Exchanges sell dedicated exchange connectivity to market participants. A 1Gb AT&T connection starts at \$2,405/month for dedicated internet (other 1Gb options with cybersecurity start between \$2,435-\$2,633/month). A 10Gb AT&T connection starts at \$12,029/month for dedicated internet (other 10Gb options with cybersecurity start between \$12,059-\$12,257/month).¹² Nevertheless, whether such non-exchange connectivity pricing is higher or lower, it is providing access to a different service than is offered by the MIAX Exchanges. Thus, the MIAX Exchanges do not believe that this is a relevant point for comparison/analysis for determining whether the MIAX Exchanges' proposed fees for connectivity to their exchange services are consistent with the Act. The MIAX Exchanges have made a business decision to invest in and offer a superior network infrastructure, as part of their overall options exchange services offering. The significant costs associated with maintaining this network infrastructure are directly tied to the amount of the connectivity fees that must be charged to access it, in order to recover those costs.

*In the BOX Order, the Commission noted that a commenter stated that BOX's proposed connectivity pricing is not associated with the relative usage of various market participants and may impose a large fixed barrier to entry to smaller participants.*¹³

The Connectivity Fee Filings discussed, at great length, the number and types of participants and the connectivity choice they are purchasing from the MIAX Exchanges. In particular, the MIAX Exchanges stated that they believe that the fees are equitably allocated among members and non-members, as evidenced by the fact that the fee increases are allocated across all connectivity alternatives, and there is not a disproportionate number of members purchasing any alternative – fourteen (14) members purchased 1Gb connections, ten (10) members purchased 10Gb connections, fifteen (15) members purchased 10Gb ULL connections, four (4) non-members purchased 1Gb connections, two (2) non-members purchased 10Gb connections, and one (1) non-member purchased 10Gb ULL connections. The MIAX Exchanges recognize that the relative fee increases are 27% for the 1Gb connection, 10.9% for the 10Gb connection, and 9.4% for the 10Gb ULL connection, but the MIAX Exchanges believe that percentage increase differentiation is appropriate, given the different levels of service provided and the largest percentage increase being associated with the lowest cost connection.¹⁴

¹¹ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 15-17.

¹² See <https://www.business.att.com/products/dedicated-internet/#/>.

¹³ See BOX Order at 20.

¹⁴ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 13.

The MIAX Exchanges noted that 1Gb connections are purchased primarily by Electronic Exchange Members (“EEM”); 10Gb ULL connections are purchased primarily by higher bandwidth market makers quoting all products across all markets and targeting mid-market resting orders; and 10Gb connections are purchased by higher bandwidth EEMs and lower bandwidth market makers. The vast majority of those members purchased multiple such connections with the actual number of connections depending on the member’s throughput requirements based on the volume of their quote/order traffic and market data needs associated with their business model.¹⁵

The MIAX Exchanges believe that their connectivity pricing is associated with relative usage of the various market participants and does not impose a barrier to entry to smaller participants. In fact, this is the very reason why there are three direct connectivity alternatives and various indirect connectivity (via third-party) alternatives. The MIAX Exchanges recognize the various business models and varying sizes of market participants conducting business on the MIAX Exchanges. Because of this variation, there is no one-size-fits-all connectivity, and the MIAX Exchanges offer three direct choices and indirect choices. The 1Gb direct connectivity alternative is 1/10th the size of the 10Gb direct connectivity alternative. It is also the most popular direct connectivity alternative offered by the MIAX Exchanges, with just about half of the members that connect (14 of 33) purchasing the 1Gb direct connections. The 1Gb direct connection can support the sending of orders and the consumption of all market data feed products, other than the top-of-market data feed product or depth data feed product. (These products require a 10Gb connection.) The 1Gb direct connection is generally purchased by market participants that utilize less bandwidth. The market participants that purchase 10Gb ULL direct connections utilize the most bandwidth, and those are the participants that consume the most resources from the network. As each 10Gb ULL direct connection fee is \$9,300 (versus \$1,400 for a 1Gb connection), the MIAX Exchanges believe that the fees are reasonably allocated among members, based on the network resources consumed by the market participants – lowest bandwidth consuming members pay the least, and highest bandwidth consuming members pay the most, particularly since higher bandwidth consumption translates to higher costs to the MIAX Exchanges. Finally, market participants that are less latency sensitive can purchase 10Gb direct connections and quote in all products on the exchanges and consume all market data feeds of all exchanges, and such 10Gb direct connections are priced lower than the 10Gb ULL direct connections, offering smaller sized market makers a lower cost alternative. Finally, market participants that utilize even less bandwidth also have the option of purchasing connectivity to the MIAX Exchanges from third-party extranets and service bureaus, which the MIAX Exchanges understand is offered at a lower cost than the MIAX Exchanges’ lowest cost direct connectivity alternative. The connectivity option that market participants purchase is dependent upon each market participant’s business model.

In the BOX Order, the Commission noted that a commenter stated that the exchange should provide information necessary to support its conclusions and evaluate its proposal’s consistency

¹⁵ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 11-12.

*with the Act, such as the number or types of firms impacted by the fee changes or the quantitative and qualitative impacts of the fee changes on market participants and the exchange.*¹⁶

The Connectivity Fee Filings discussed, at great length, the number and types of participants impacted by the fee changes and the quantitative and qualitative impacts of the fee changes in order to support its conclusions that its proposed fees are consistent with the Act. This was also proven by the fact that, of those members and non-members that bought multiple connections, no firm dropped any connections beginning August 1, 2018, when MIAX and MIAX PEARL first increased their fees (MIAX Emerald was not yet operational). Nor did MIAX and MIAX PEARL lose any members. Furthermore, MIAX and MIAX PEARL did not receive any comment letters or official complaints from any member or non-member purchaser of connectivity regarding the increased fees regarding how the fee increase was unreasonable, unduly burdensome, or would negatively impact their competitiveness amongst other market participants.¹⁷

*In the BOX Order, the Commission noted that, when using a cost-based argument for why the proposed fees are reasonable, an exchange must provide information as to the level of the costs it incurs that would offset the exchange's costs or other supporting factual bases for its conclusion.*¹⁸

The Connectivity Fee Filings (as supplemented by this comment letter above), provide significant detail as to the level of the costs the MIAX Exchanges incur in operating, maintaining, and enhancing their network. In particular, the MIAX Exchanges provide both the categories of costs, percentage of such cost increases since the last time the MIAX Exchanges increased connectivity fees, and significant details regarding what comprises each category of costs. (An approximate 70% increase in technology-related personnel costs in infrastructure, due to expansion of services/support; an approximate 10% increase in data center costs due to price increases and footprint expansion; an approximate 5% increase in vendor-supplied dark fiber due to price increases and expanded capabilities; and a 30% increase in market data connectivity fees, due to price increases and expansion of the market data network for greater resiliency.)¹⁹ Of note, regarding market data connectivity fee increased cost, this is the cost associated with the MIAX Exchanges consuming connectivity/content from the equities markets in order to operate their options exchanges, so the MIAX Exchanges are effectively paying their competitors for this connectivity.

The MIAX Exchanges believe that this level of detailed costs, as well as the detailed information regarding the number and types of members that are purchasing this connectivity, support a finding that the proposed fees are reasonable and equitable.

¹⁶ See BOX Order at 21-22.

¹⁷ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 12-13.

¹⁸ See BOX Order at 24.

¹⁹ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 14-15.

In the BOX Order, the Commission states that the exchange should explain why it is appropriate to consider certain cost items when evaluating whether the connectivity fees are consistent with the Act. The exchange should address how its costs to maintain and implement ongoing improvements to the trading systems relate to connectivity and whether, for example, transaction fees or other fees offset those improvements to the trading systems.²⁰

In the Connectivity Fee Filings, the MIAX Exchanges stated that the proposed fees allowed the MIAX Exchanges to recover a portion (less than all) of the costs incurred by the MIAX Exchanges associated with providing and maintaining the necessary hardware and other infrastructure to support this technology, as well as to offer enhanced monitoring and network performance reporting to market participants, since the last time MIAX and MIAX PEARL increased their connectivity fees. Put simply, the costs to the MIAX Exchanges to provide these services have increased considerably over this time, as more fully detailed and quantified herein.²¹

The increased costs associated with supporting the MIAX Exchanges' network are due to several factors, including increased costs associated with maintaining and expanding a team of highly-skilled network engineers (the MIAX Exchanges also hired additional network engineering staff in 2017 and 2018), increasing fees charged by the MIAX Exchanges' third-party data center operator, and costs associated with projects and initiatives designed to improve overall network performance, stability, monitoring and customer performance reports, through the MIAX Exchanges' R&D efforts.²² These costs to maintain and implement ongoing improvement to the network relate directly to connectivity fees. The second largest expense of the MIAX Exchanges is the operation and maintenance of its data center network infrastructure. Connectivity fees, which are charged for accessing the MIAX Exchanges' data center network infrastructure, are directly related to the network. Certain other fees charged by the MIAX Exchanges also offset costs and are thus related to the network (such as port fees, for example), but such port fee revenue is significantly lower than connectivity fee revenue for the MIAX Exchanges. The MIAX Exchanges do not allocate transaction fee revenue to offset costs associated with their network infrastructure.

In the BOX Order, the Commission states that the exchange should offer any explanation for why the fees are different for the different types of connections, and why the disparity is reasonable and equitable.²³

In the Connectivity Fee Filings, the MIAX Exchanges stated that the relative fee increases are 27% for the 1Gb connection, 10.9% for the 10Gb connection, and 9.4% for the 10Gb ULL connection. The proposed fees for the connectivity alternatives are \$1,400 for the 1Gb connection; \$6,100 for the 10Gb connection; and \$9,300 for the 10Gb ULL connection (for MIAX Emerald,

²⁰ See BOX Order at 23.

²¹ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 13-14.

²² See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 14-15.

²³ See BOX Order at 23.

the 10Gb ULL connection is \$6,000). The MIAX Exchanges believe that percentage increase differentiation is appropriate, given the different levels of service provided and the largest percentage increase being associated with the lowest cost connection. The MIAX Exchanges note that, given the total number of connections purchased across all three connectivity alternatives, the net amount of the total increase is borne by the 10Gb and 10Gb ULL purchasers, since those connection types are considerably more expensive than the 1Gb connection type.²⁴

Also as discussed above, the 1Gb connection alternative is 1/10 the size of the connection of the 10Gb connection. The 1Gb connection can support order information, as well as the consumption of all market data feed products offered by the MIAX Exchanges, with the exception of the top-of-market data feed product and depth data feed product. Due to the relative size of those products (which are greater than 1Gb in size), a purchaser of the top-of-market data feed product or depth data feed product would be required to purchase the 10Gb line in order to properly receive such data, without any negative bandwidth issues. The price of the 1Gb connection is \$1,400 per month. The price of the 10Gb connection is \$6,100 per month. The 10Gb connection alternative is 10 times the size of the 1Gb. Thus, this connection alternative supports access to more services, such as quoting and all market data products, including the top-of-market data feed product and depth data feed product. Thus, the MIAX Exchanges believe that it is reasonable and equitable to assess a fee for the 10Gb connection that is approximately 4 times as expensive as the 1Gb connection.

The 10Gb ULL connection offers optimized connectivity for latency sensitive participants and is approximately single digit microseconds faster in round trip time for connection oriented traffic to the MIAX Exchanges than the 10Gb connection. This lower latency is achieved through more advanced network equipment, such as advanced hardware and switching components. These components are more costly for the MIAX Exchanges to maintain than the costs for standard 10Gb connections. The price of the 10Gb ULL connection is \$9,300 per month, versus \$6,100 per month for the 10Gb. While the 10Gb connection is the same “size” as the 10Gb ULL connection, the 10Gb ULL connection offers lower latency. Thus, the MIAX Exchanges believe that it is reasonable and equitable to assess a fee for the 10Gb ULL connection that is approximately 50% greater than the 10Gb connection.

In the BOX Order, the Commission notes that a commenter states the exchange should discuss the reasonableness of the fees, relative to the benefits to users of the various potential exchange connectivity offerings, such as subscribing to the 10 gigabit connection, the Non-10 gigabit connection, or connecting through a third party.²⁵

The Connectivity Fee Filings (as supplemented by this comment letter above), provide significant detail as to the reasonableness of the fees, as they relate to the services that are offered through each of the connectivity alternatives, as described above.

²⁴ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 13.

²⁵ See BOX Order at 23-24.

In the BOX Order, the Commission notes that an exchange should offer information that would support a claim that its connectivity services are becoming more costly to produce.²⁶

The Connectivity Fee Filings (as supplemented by this comment letter above), provide significant cost detail showing how its connectivity services are becoming more costly to provide, as shown through the increased cost to maintain and enhance the MIAX Exchanges' network infrastructure, which their connectivity fees are intended to offset, as described above.

In the BOX Order, the Commission notes that an exchange should provide support for an assertion that the proposed fees will offset the exchange's costs. For example, the exchange could provide information as to whether the monthly costs associated with connectivity always exceed the projected monthly revenues from connectivity or provide detail as to the frequency of the costs (e.g., whether the costs are all marginal costs, fixed costs, or one-time implementation costs).²⁷

The Connectivity Fee Filings (as supplemented by this comment letter above), provide significant cost detail regarding the costs associated with maintaining and enhancing the MIAX Exchanges' network infrastructure, including monitoring and customer performance reports, which the connectivity fees are intended to offset. The MIAX Exchanges use connectivity fees to offset the costs associated with maintaining and enhancing their network infrastructure, as well as network monitoring and customer reporting. The total annual connectivity fees that the MIAX Exchanges collect are less than the total annual expense (CapEx and OpEx) of the MIAX Exchanges associated with maintaining and enhancing their network infrastructure in a given year. Additionally, while some of the expense is fixed, much of the expense is not fixed, and thus increases as the number of connections increase. For example, new 1Gb, 10Gb, and 10Gb ULL connections require the purchase of additional hardware to support those connections as well as enhanced monitoring and reporting of customer performance that the MIAX Exchanges provide. And 10Gb ULL connections require the purchase of specialized, more costly hardware. Further, as the total number of all connections increase, the MIAX Exchanges need to increase their data center footprint and consume more power, resulting in increased costs charged by their third-party data center provider. Accordingly, cost to the MIAX Exchanges is not fixed. As they increase, the MIAX Exchanges look to offset that cost through increased connectivity fees.

In the BOX Order, the Commission notes that an exchange should provide information to establish that competition constrains the exchange's pricing decisions. For example, the exchange could provide information regarding the extent to which the establishment of [increase in] connectivity fees on the Exchange impacted order flow on the Exchange.²⁸

The Connectivity Fee Filings (as supplemented by this comment letter above), clearly establish that competition (both exchange competition and connectivity competition) constrain the MIAX Exchanges' pricing decisions. The MIAX Exchanges did not experience any decrease in connections when they increased their fees. After the first fee increase, beginning August 1, 2018,

²⁶ See BOX Order at 24.

²⁷ See BOX Order at 24.

²⁸ See BOX Order at 29.

the same number of members purchased the same number of connections. Furthermore, the total number of connections did not decrease from July to August 2018, and in fact one member even purchased two (2) additional 10Gb ULL connections in August 2018, after the fee increase. After the first fee increase, beginning August 1, 2018, the same non-members purchased the same number of connections across all available alternatives and two (2) additional non-members purchased three (3) more connections after the fee increase.²⁹

Moreover, MIAX Emerald, which was a brand new exchange with zero percent (0%) market share, established connectivity fees and saw a significant uptake in number of members joining and members and non-members establishing connectivity to MIAX Emerald. If MIAX Emerald were to attempt to establish unreasonable connectivity pricing, then no market participant would join or connect. Therefore, since 28 distinct members joined MIAX Emerald and 14 of those distinct members purchased additional connectivity to MIAX Emerald, all knowing, in advance, the connectivity fees, the MIAX Exchanges believe that the setting of their fees were constrained by competition.³⁰

The MIAX Exchanges did not experience any noticeable change (increase or decrease) in order flow sent by its market participants as a result of the fee increase.

In the BOX Order, the Commission notes that an exchange should provide information regarding the extent to which members and non-members are continuing to purchase connectivity services from the Exchange.³¹

The Connectivity Fee Filings (as supplemented by this comment letter above), provided extensive details regarding which members and non-members continue to purchase connectivity, after the first fee increases. To summarize, of those members and non-members that bought multiple connections, no firm dropped any connections beginning August 1, 2018, when MIAX and MIAX PEARL first increased their fees. Nor did MIAX or MIAX PEARL lose any members. Furthermore, MIAX and MIAX PEARL did not receive any official comment letters or complaints from any members or non-members regarding the increased fees regarding how the change was unreasonable, unduly burdensome, or would negatively impact their competitiveness amongst other market participants.³²

In the BOX Order, the Commission notes that an exchange should discuss whether there are alternatives to the exchange-provided connectivity services and, if so, how many firms pursue those alternatives.³³

²⁹ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 12.

³⁰ See Securities Exchange Act Release No. 84 FR 10350 (March 20, 2019) (SR-EMERALD-2019-11) at 8-9.

³¹ See BOX Order at 29.

³² See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 12-13.

³³ See BOX Order at 29-30.

The Connectivity Fee Filings (as supplemented by this comment letter above), provided extensive details regarding the alternatives to the exchange-provided connectivity services and how many firms pursue those alternatives. To summarize, there are currently 9 non-members that purchase connectivity to the MIAX Exchanges. They resell that connectivity to 11 customers, some of whom are agency broker-dealers that have tens of customers of their own. Some of those 11 customers also purchase connectivity directly from the MIAX Exchanges. Accordingly, the MIAX Exchanges believe that there is a reasonable alternative to (direct substitute for) purchasing connectivity directly from the MIAX Exchanges.³⁴

*In the BOX Order, the Commission notes that, if an exchange is relying on total platform theory to justify its pricing, then an exchange should provide data and analysis concerning the exchange's sources and amounts of revenue, costs, and gross margin that would bear on the issue of whether the exchange's aggregate return on joint products is constrained by competition at the platform level and that the total platform theory applies to the exchange.*³⁵

The MIAX Exchanges are not relying on the total platform theory to justify their pricing, therefore no discussion is necessary on this topic.

The MIAX Exchanges hope that this comment letter provides greater transparency concerning their Connectivity Fee Filings, so that they squarely and comprehensively address each and every topic raised for discussion in the BOX Order. The MIAX Exchanges believe that the proposed fees are reasonable, equitable, and non-discriminatory, and otherwise consistent with the Act.

If you have further questions, please do not hesitate to call me at [REDACTED].

Sincerely,



Joseph W. Ferraro III
SVP & Deputy General Counsel

³⁴ See Securities Exchange Act Release No. 85318 (March 14, 2019), 84 FR 10363 (March 20, 2019) (SR-MIAX-2019-10) at 12.

³⁵ See BOX Order at 30.