

including whether the proposed rule change is consistent with the Act. Comments may be submitted by any of the following methods:

Electronic Comments

- Use the Commission's internet comment form (<http://www.sec.gov/rules/sro.shtml>); or
- Send an email to rule-comments@sec.gov. Please include File Number SR-CboeEDGX-2019-064 on the subject line.

Paper Comments

- Send paper comments in triplicate to Secretary, Securities and Exchange Commission, 100 F Street NE, Washington, DC 20549-1090.

All submissions should refer to File Number SR-CboeEDGX-2019-064. This file number should be included on the subject line if email is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's internet website (<http://www.sec.gov/rules/sro.shtml>). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed rule change that are filed with the Commission, and all written communications relating to the proposed rule change between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for website viewing and printing in the Commission's Public Reference Room, 100 F Street NE, Washington, DC 20549 on official business days between the hours of 10:00 a.m. and 3:00 p.m. Copies of such filing also will be available for inspection and copying at the principal office of the Exchange. All comments received will be posted without change. Persons submitting comments are cautioned that we do not redact or edit personal identifying information from comment submissions. You should submit only information that you wish to make available publicly. All submissions should refer to File Number SR-CboeEDGX-2019-064, and should be submitted on or before November 27, 2019.

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.⁸³

Jill M. Peterson,

Assistant Secretary.

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SECURITIES AND EXCHANGE COMMISSION

[Release No. 34-87433; File No. SR-EMERALD-2019-35]

Self-Regulatory Organizations; MIAX Emerald, LLC; Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Amend Its Fee Schedule

October 31, 2019

Pursuant to Section 19(b)(1) of the Securities Exchange Act of 1934 ("Act"),¹ and Rule 19b-4 thereunder,² notice is hereby given that on October 22, 2019, MIAX Emerald, LLC ("MIAX Emerald" or "Exchange"), filed with the Securities and Exchange Commission ("Commission") a proposed rule change as described in Items I and II below, which Items have been prepared by the Exchange. The Commission is publishing this notice to solicit comments on the proposed rule change from interested persons.

I. Self-Regulatory Organization's Statement of the Terms of Substance of the Proposed Rule Change

The Exchange is filing a proposal to amend the MIAX Emerald Fee Schedule (the "Fee Schedule") to adopt the Exchange's system connectivity fees.

The Exchange previously filed the proposal on August 23, 2019 (SR-EMERALD-2019-31). That filing has been withdrawn and replaced with the current filing (SR-EMERALD-2019-35).

The text of the proposed rule change is available on the Exchange's website at <http://www.miaxoptions.com/rule-filings/emerald>, at MIAX's principal office, and at the Commission's Public Reference Room.

II. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

In its filing with the Commission, the Exchange included statements concerning the purpose of and basis for the proposed rule change and discussed any comments it received on the proposed rule change. The text of these

statements may be examined at the places specified in Item IV below. The Exchange has prepared summaries, set forth in sections A, B, and C below, of the most significant aspects of such statements.

A. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

1. Purpose

The Exchange is refiling its proposal to amend the Fee Schedule in order to provide additional analysis of its baseline revenues, costs, and profitability (before the proposed fee change) and the Exchange's expected revenues, costs, and profitability (following the proposed fee change) for its network connectivity services. This additional analysis includes information regarding its methodology for determining the baseline costs and revenues, as well as expected costs and revenues, for its network connectivity services. The Exchange is also refiling its proposal in order to address certain points raised in the only comment letter received by the Commission on the Exchange's prior proposal to increase connectivity fees.³ In order to determine the Exchange's baseline costs associated with providing network connectivity services, the Exchange conducted an extensive cost review in which the Exchange analyzed every expense item in the Exchange's general expense ledger to determine whether each such expense relates to the provision of network connectivity services, and, if such expense did so relate, what portion (or percentage) of such expense actually supports the provision of network connectivity services. The sum of all such portions of expenses represents the total actual baseline cost of the Exchange to provide network connectivity services. (For the avoidance of doubt, no expense amount was allocated twice.) The Exchange is presenting the results of its cost review in a way that corresponds directly with the Exchange's 2018 Audited Unconsolidated Financial Statement, the relevant section of which is attached [sic] hereto as Exhibit 3, which is publicly available as part of the Exchange's Form 1 Amendment.⁴ The

³ See Letter from John Ramsay, Chief Market Policy Officer, Investors Exchange LLC ("IEX"), to Vanessa Countryman, Secretary, Commission, dated October 9, 2019 ("Third IEX Letter," as further described below).

⁴ See the complete Audited Unconsolidated Financial Statement of MIAX Emerald, LLC, as of December 31, 2018, which is listed under Exhibit D of MIAX Form 1 Amendment 2019-7 Annual

⁸³ 17 CFR 200.30-3(a)(12).

¹ 15 U.S.C. 78s(b)(1).

² 17 CFR 240.19b-4.

purpose of presenting it in this manner is to provide greater transparency into the Exchange's actual and expected revenues, costs, and profitability associated with providing network connectivity services. Based on this analysis, the Exchange believes that its proposed fees are fair and reasonable because they will permit recovery of less than all of the Exchange's costs for providing the network connectivity services and will not result in excessive pricing or supra-competitive profit, when comparing the Exchange's total annual expense associated with providing the network connectivity services versus the total projected annual revenue the Exchange projects to collect for providing the network connectivity services.

Specifically, the Exchange proposes to amend Sections 5(a) and (b) of the Fee Schedule to adopt the network connectivity fees for the 1 Gigabit ("Gb") fiber connection and the 10Gb ultra-low latency ("ULL") fiber connection, which are charged to both Members⁵ and non-Members of the Exchange for connectivity to the Exchange's primary/secondary facility. The Exchange also proposes to adopt network connectivity fees for the 1Gb and 10Gb fiber connections for connectivity to the Exchange's disaster recovery facility. Each of these connections (with the exception of the 10Gb ULL) are shared connections (collectively, the "Shared Connections"), and thus can be utilized to access the Exchange and both of the Exchange's affiliates, Miami International Securities Exchange, LLC ("MIAX") and MIAX PEARL, LLC ("MIAX PEARL"). The 10Gb ULL connection is a dedicated connection ("Dedicated Connection"), which provides network connectivity solely to the trading platforms, market data systems, and test system facilities of MIAX Emerald. These proposed fees are collectively referred to herein as the "Proposed Fees." The amounts of the Proposed Fees for the Shared Connections are the same amounts that are currently in place at MIAX and MIAX PEARL.⁶ While the Exchange is new and only launched trading on March 1, 2019, since: (i) All of the Proposed Fees (except for the fee relating to the 10Gb ULL connection)

relate to Shared Connections, and thus are the same amounts as are currently in place at MIAX and MIAX PEARL; (ii) all of the Members of MIAX Emerald are also members of either MIAX and/or MIAX PEARL, and most of those Members already have connectivity to the Exchange via existing Shared Connections (without paying any new incremental connectivity fees), the Exchange is providing similar information to that which was provided in the MIAX and PEARL Fee Filings, including providing detail about the market participants impacted by the Proposed Fees, as well as the costs incurred by the Exchange associated with providing the connectivity alternatives, in order to provide transparency and support relating to the Exchange's belief that the Proposed Fees are reasonable, equitable, and non-discriminatory, and to provide sufficient information for the Commission to determine that the Proposed Fees are consistent with the Act.

The Exchange initially filed the Proposed Fees on March 1, 2019, designating the Proposed Fees immediately effective.⁷ The First Proposed Rule Change was published for comment in the **Federal Register** on March 20, 2019.⁸ The First Proposed Rule Change provided information about the market participants impacted by the Proposed Fees, as well as the additional costs incurred by the Exchange associated with providing the connectivity alternatives, in order to provide transparency and support relating to the Exchange's belief that the Proposed Fees are reasonable, equitable, and non-discriminatory, and to provide sufficient information for the Commission to determine that the Proposed Fees are consistent with the Act.

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 Network (the "BOX Order").⁹ 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.

After the BOX Order was issued, the Commission received four comment letters on the First Proposed Rule Change.¹⁰

The Second SIFMA Letter argued that the Exchange did not provide sufficient information in its First Proposed Rule Change to support a finding that the proposal should be approved by the Commission after further review of the Proposed Fees. Specifically, the Second SIFMA Letter argued that the Exchange's market data fees and connectivity fees were not constrained by competitive forces, the Exchange's filing lacked sufficient information regarding cost and competition, and that the Commission should establish a framework for determining whether fees for exchange products and services are reasonable when those products and services are not constrained by significant competitive forces.

The IEX Letter argued that the Exchange did not provide sufficient information in its First Proposed Rule Change to support a finding that the proposal should be approved by the Commission and that the Commission should extend the time for public comment on the First Proposed Rule Change. Despite the objection to the Proposed Fees, the IEX Letter did find that "MIAX has provided more transparency and analysis in these filings than other exchanges have sought to do for their own fee increases."¹¹ The IEX Letter specifically argued that the Proposed Fees were not constrained by competition, the Exchange should provide data on the Exchange's actual costs and how those costs relate to the product or service in question, and whether and how MIAX Emerald and its affiliates considered changes to transaction fees as an alternative to offsetting exchange costs.

The Second Healthy Markets Letter did not object to the First Proposed Rule

Filing at <https://www.sec.gov/Archives/edgar/vpr/1900/19003680.pdf>.

⁵ The term "Member" means an individual or organization approved to exercise the trading rights associated with a Trading Permit. Members are deemed "members" under the Exchange Act. See Exchange Rule 100.

⁶ See SR-MIAX-2019-46 and SR-PEARL-2019-33 (the "MIAX and PEARL Fee Filings").

⁷ See Securities Exchange Act Release No. 85316 (March 14, 2019), 84 FR 10350 (March 20, 2019) (SR-EMERALD-2019-11) (the "First Proposed Rule Change").

⁸ *Id.*

⁹ See Securities Exchange Act Release No. 85459 (March 29, 2019), 84 FR 13363 (April 4, 2019) (SR-BOX-2018-24, SR-BOX-2018-37, and SR-BOX-2019-04).

¹⁰ See Letter from Joseph W. Ferraro III, SVP & Deputy General Counsel, MIAX, to Vanessa Countryman, Acting Secretary, Commission, dated April 5, 2019 ("MIAX Letter"); Letter from Theodore R. Lazo, Managing Director and Associate General Counsel, SIFMA, to Vanessa Countryman, Acting Secretary, Commission, dated April 10, 2019 ("Second SIFMA Letter"); Letter from John Ramsay, Chief Market Policy Officer, IEX, to Vanessa Countryman, Acting Secretary, Commission, dated April 10, 2019 ("IEX Letter"); and Letter from Tyler Gellasch, Executive Director, Healthy Markets, to Brent J. Fields, Secretary, Commission, dated April 18, 2019 ("Second Healthy Markets Letter").

¹¹ See IEX Letter, pg. 1.

Change and the information provided by the Exchange in support of the Proposed Fees. Specifically, the Second Healthy Markets Letter stated that the First Proposed Rule Change was “remarkably different,” and went on to further state as follows:

The instant MIAx filings—along with their April 5th supplement—provide much greater detail regarding users of connectivity, the market for connectivity, and costs than the Initial MIAx Filings. They also appear to address many of the issues raised by the Commission staff’s BOX disapproval order. This third round of MIAx filings suggests that MIAx is operating in good faith to provide what the Commission and staff seek.¹²

On April 29, 2019, the Exchange withdrew the First Proposed Rule Change.¹³

The Exchange refiled the Proposed Fees on April 30, 2019, designating the Proposed Fees immediately effective.¹⁴ The Second Proposed Rule Change was published for comment in the **Federal Register** on May 16, 2019.¹⁵ The Second Proposed Rule Change provided further cost analysis information to squarely and comprehensively address each and every topic raised for discussion in the BOX Order, the IEX Letter and the Second SIFMA Letter to ensure that the Proposed Fees are reasonable, equitable, and non-discriminatory, and that the Commission should find that the Proposed Fees are consistent with the Act.

On May 21, 2019, the Commission issued the Staff Guidance on SRO Rule Filings Relating to Fees.¹⁶

The Commission received two comment letters on the Second Proposed Rule Change, after the Guidance was released.¹⁷ The Second IEX Letter and the Third SIFMA Letter argued that the Exchange did not provide sufficient information in its Second Proposed Rule Change to justify the Proposed Fees based on the Guidance and the BOX Order. Of note, however, is that unlike their previous comment letter, the Third SIFMA Letter

did not call for the Commission to suspend the Second Proposed Rule Change. Also, Healthy Markets did not comment on the Second Proposed Rule Change.

On June 26, 2019, the Exchange withdrew the Second Proposed Rule Change.¹⁸

The Exchange refiled the Proposed Fees on June 26, 2019, designating the Proposed Fees immediately effective.¹⁹ The Third Proposed Rule Change was published for comment in the **Federal Register** on July 16, 2019.²⁰ The Third Proposed Rule Change bolstered the Exchange’s previous cost-based discussion to support its claim that the Proposed Fees are fair and reasonable because they will permit recovery of the Exchange’s costs and will not result in excessive pricing or supra-competitive profit, in light of the Guidance issued by Commission staff subsequent to the Second Proposed Rule Change.

The Commission received three comment letters on the Third Proposed Rule Change.²¹

Neither the Third Healthy Markets Letter nor the Fourth SIFMA Letter called for the Commission to suspend or disapprove the Proposed Fee Increases. In fact, the Third Healthy Markets Letter acknowledged that “it appears as though MIAx is operating in good faith to provide what the Commission, its staff, and market participants the information needed to appropriately assess the filings.” The Third IEX Letter only reiterated points from the Second IEX Letter and failed to address any of the new information in the Fifth Proposed Rule Change concerning the Exchange’s revenue figures, cost allocation or that the Proposed Fee Increases did not result in excessive pricing or a supra-competitive profit for the Exchange.

On August 23, 2019, the Exchange withdrew the Third Proposed Rule Change.²²

The Exchange refiled the Proposed Fee Increases on August 23, 2019, designating the Proposed Fee Increases immediately effective.²³ The Fourth Proposed Rule Change was published for comment in the **Federal Register** on July 16, 2019.²⁴ The Fourth Proposed Rule Change provided greater detail and clarity concerning the Exchange’s cost methodology as it pertains to the Exchange’s expenses for network connectivity services, using a line-by-line analysis of the Exchange’s general expense ledger to determine what, if any, portion of those expenses supports the provision of network connectivity services.

The Commission received only one comment letter on the Fourth Proposed Rule Change, twelve days after the comment period deadline ended.²⁵ Of note, no member of the Exchange commented on the Fourth Proposed Rule Change. Also, no issuer or other person using the facilities of the Exchange commented on the Fourth Proposed Rule Change. Also, no industry group that represents members, issuers, or other persons using the facilities of the Exchange commented on the Fourth Proposed Rule Change. Also, no operator of an options market commented on the Fourth Proposed Rule Change. Also, no operator of a high performance, ultra-low latency network, which network can support access to three distinct exchanges and provides premium network monitoring and reporting services to customers, commented on the Fourth Proposed Rule Change. Rather, the only comment letter came from an operator of a single equities market (equities market structure and resulting network demands are fundamentally different from those in the options markets),²⁶ which operator also has a fundamentally different business model (and agenda) than does the Exchange. That letter—the Third IEX Letter—called for, among other things, the Exchange to explain its basis for concluding that it incurred substantially higher costs to provide lower-latency connections and further describe the nature and closeness of the relationship

¹² See SR-EMERALD-2019-20.

¹³ See Securities Exchange Act Release No. 86344 (July 10, 2019), 84 FR 34030 (July 16, 2019) (SR-EMERALD-2019-24) (the “Third Proposed Rule Change”).

¹⁴ *Id.*

¹⁵ See Letter from John Ramsay, Chief Market Policy Officer, IEX, to Vanessa Countryman, Acting Secretary, Commission, dated August 8, 2019 (“Third IEX Letter”); Letter from Tyler Gellasch, Executive Director, Healthy Markets, to Vanessa Countryman, Acting Secretary, Commission, dated August 5, 2019 (“Third Healthy Markets Letter”); and Letter from Theodore R. Lazo, Managing Director and Associate General Counsel and Ellen Greene, Managing Director Financial Services Operations, SIFMA, to Vanessa Countryman, Acting Secretary, Commission, dated August 5, 2019 (“Fourth SIFMA Letter”).

¹⁶ See SR-EMERALD-2019-24.

¹⁷ See Securities Exchange Act Release No. 86839 (August 30, 2019), 84 FR 47009 (September 6, 2019) (SR-EMERALD-2019-31) (the “Fourth Proposed Rule Change”).

¹⁸ *Id.*

¹⁹ See *supra* note 3.

²⁰ See *infra* pages 16 to 18 (describing the differences in equity market structure and options market structure).

¹² See Second Healthy Markets Letter, pg. 2.

¹³ See SR-EMERALD-2019-11.

¹⁴ See Securities Exchange Act Release No. 85839 (May 10, 2019), 84 FR 22192 (May 16, 2019) (SR-EMERALD-2019-20) (the “Second Proposed Rule Change”) (Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Adopt System Connectivity Fees).

¹⁵ *Id.*

¹⁶ See Staff Guidance on SRO Rule Filings Relating to Fees (May 21, 2019), at <https://www.sec.gov/tm/staff-guidance-sro-rule-filings-fees> (the “Guidance”).

¹⁷ See Letter from John Ramsay, Chief Market Policy Officer, IEX, to Vanessa Countryman, Acting Secretary, Commission, dated June 5, 2019 (the

between the identified costs and connectivity products and services as stated in the Exchange's cost allocation analysis.

On October 22, 2019, the Exchange withdrew the Fourth Proposed Rule Change.²⁷

The Exchange is now refiling the Proposed Fees to provide additional analysis of its baseline revenues, costs, and profitability (before the proposed fee change) and the Exchange's expected revenues, costs, and profitability (following the proposed fee change) for its network connectivity services. This additional analysis includes information regarding its methodology for determining the baseline costs and revenues, as well as expected costs and revenues, for its network connectivity services. The Exchange is also refiling its proposal in order to address certain points raised in the Third IEX Letter. The Exchange believes that the Proposed Fees are consistent with the Act because they (i) are reasonable, equitably allocated, not unfairly discriminatory, and not an undue burden on competition; (ii) comply with the BOX Order and the Guidance; (iii) are supported by evidence (including data and analysis), constrained by significant competitive forces; and (iv) are supported by specific information (including quantitative information), fair and reasonable because they will permit recovery of the Exchange's costs (less than all) and will not result in excessive pricing or supra-competitive profit. Accordingly, the Exchange believes that the Commission should find that the Proposed Fees are consistent with the Act. The proposed rule change is immediately effective upon filing with the Commission pursuant to Section 19(b)(3)(A) of the Act.

The Exchange offers to both Members and non-Members various bandwidth alternatives for connectivity to the Exchange, to its primary and secondary facilities, consisting of a 1Gb fiber connection and a 10Gb ULL fiber connection. The 10Gb ULL offering uses an ultra-low latency switch, which provides faster processing of messages sent to it in comparison to the switch used for the other types of connectivity. The Exchange also offers to both Members and non-Members various bandwidth alternatives for connectivity to the Exchange, to its disaster recovery facility, consisting of a 1Gb fiber connection and a 10Gb connection.

For the Shared Connections, the Exchange's MIA Express Network Interconnect ("MENI") can be

configured to provide Members and non-Members of the Exchange network connectivity to the trading platforms, market data systems, test systems, and disaster recovery facilities of the Exchange and its affiliates, MIA and MIA PEARL, via a single, shared connection. Any Member or non-Member can purchase a Shared Connection.

For the Dedicated Connection, the Exchange's MENI is configured to provide Members and non-Members of the Exchange network connectivity to the trading platforms, market data systems, test systems, and disaster recovery facilities of the Exchange. Any Member or non-Member can purchase a Dedicated Connection. The Exchange determined to design its network architecture in a manner that offered 10Gb ULL connections as dedicated connections (as opposed to shared connections) in order to provide cost saving opportunities for itself and for its Members, by reducing the amount of equipment that the Exchange would have to purchase and to which the Members would have to connect. Accordingly, the Exchange is able to offer to its Members 10Gb ULL connectivity at a lower price point than is offered on MIA and MIA PEARL, the price difference being reflective of the lower cost to the Exchange.

For the Shared Connections, Members and non-Members utilizing the MENI to connect to the trading platforms, market data systems, test systems and disaster recovery facilities of the Exchange, MIA, and MIA PEARL via a single, shared connection are assessed only one monthly network connectivity fee per connection, regardless of the trading platforms, market data systems, test systems, and disaster recovery facilities accessed via such connection. Thus, since all of the Members of MIA Emerald are also members of either MIA and/or MIA PEARL, and most of those Members already have connectivity to the Exchange via existing Shared Connections, most Members of MIA Emerald have instant connectivity to the Exchange without paying any new incremental connectivity fees, as more fully-detailed below.

The Exchange proposes to establish the monthly network connectivity fees for such connections for both Members and non-Members. As discussed above, the amounts of the Proposed Fees for the Shared Connections are the same amounts that are currently in place at MIA and MIA PEARL. The amount of the Proposed Fee for the Dedicated Connection is offered at a substantial discount to the amount currently in

place at MIA and MIA PEARL. The reasons for the substantial discount are that the Dedicated Connection offers access to only a single market (the Exchange), whereas the 10Gb ULL connection offered by MIA and MIA PEARL offers access to two markets (MIA and MIA PEARL), as well as cost savings the Exchange was able to achieve (and thus pass through to its Members) as a result of a dedicated architecture. The network connectivity fees for connectivity to the Exchange's primary/secondary facility will be as follows: (a) 1,400 for the 1Gb connection; and (b) \$6,000 for the 10Gb ULL connection. The network connectivity fees for connectivity to the Exchange's disaster recovery facility will be as follows: (a) \$550 for the 1Gb connection; and (b) \$2,750 for the 10Gb connection.

2. Statutory Basis

The Exchange believes that its proposal to amend its Fee Schedule is consistent with Section 6(b) of the Act²⁸ in general, and furthers the objectives of Section 6(b)(4) of the Act²⁹ in particular, in that it provides for the equitable allocation of reasonable dues, fees and other charges among Exchange Members and issuers and other persons using any facility or system which the Exchange operates or controls. The Exchange also believes the proposal furthers the objectives of Section 6(b)(5) of the Act³⁰ in that it is designed to promote just and equitable principles of trade, to remove impediments to and perfect the mechanism of a free and open market and a national market system, and, in general to protect investors and the public interest and is not designed to permit unfair discrimination between customer, issuers, brokers and dealers.

The Commission has repeatedly expressed its preference for competition over regulatory intervention in determining prices, products, and services in the securities markets. In Regulation NMS, the Commission highlighted the importance of market forces in determining prices and SRO revenues and, also, recognized that current regulation of the market system "has been remarkably successful in promoting market competition in its broader forms that are most important to investors and listed companies."³¹

The Exchange believes that its proposal is consistent with Section

²⁸ 15 U.S.C. 78f(b).

²⁹ 15 U.S.C. 78f(b)(4).

³⁰ 15 U.S.C. 78f(b)(5).

³¹ See Securities Exchange Act Release No. 51808 (June 9, 2005), 70 FR 37496 (June 29, 2005).

²⁷ See SR-EMERALD-2019-31.

6(b)(4) of the Act, in that the Proposed Fees are fair, equitable and not unreasonably discriminatory, because the fees for the connectivity alternatives available on the Exchange, as proposed, are constrained by significant competitive forces. The U.S. options markets are highly competitive (there are currently 16 options markets) and a reliance on competitive markets is an appropriate means to ensure equitable and reasonable prices.

The Exchange acknowledges that there is no regulatory requirement that any market participant connect to the Exchange, or that any participant connect at any specific connection speed. The rule structure for options exchanges are, in fact, fundamentally different from those of equities exchanges. In particular, options market participants are not forced to connect to (and purchase market data from) all options exchanges, as shown by the number of Members of MIAX Emerald as compared to the much greater number of members at other options exchanges (as further detailed below). MIAX Emerald is a brand new exchange, having only commenced operations in March 2019. Not only does MIAX Emerald have less than half the number of members as certain other options exchanges, but there are also a number of the Exchange's Members that do not connect directly to MIAX Emerald. Further, of the number of Members that connect directly to MIAX Emerald, many such Members do not purchase market data from MIAX Emerald. There are a number of large market makers and broker-dealers that are members of other options exchanges but not Members of MIAX Emerald. For example, the following are not Members of MIAX Emerald: The D. E. Shaw Group, CTC, XR Trading LLC, Hardcastle Trading AG, Ronin Capital LLC, Belvedere Trading, LLC, Bluefin Trading, and HAP Capital LLC. In addition, of the market makers that are connected to MIAX Emerald, it is the individual needs of the market maker that require whether they need one connection or multiple connections to the Exchange. The Exchange has market maker Members that only purchase one connection and the Exchange has market maker Members that purchase multiple connections. It is all driven by the business needs of the market maker. Market makers that are consolidators that target resting order flow tend to purchase more connectivity than market makers that simply quote all symbols on the Exchange. Even though non-Members purchase and resell 10Gb ULL connections to both Members and non-

Members, no market makers currently connect to the Exchange indirectly through such resellers.

The argument that all broker-dealers are required to connect to all exchanges is not true in the options markets. The options markets have evolved differently than the equities markets both in terms of market structure and functionality. For example, there are many order types that are available in the equities markets that are not utilized in the options markets, which relate to mid-point pricing and pegged pricing which require connection to the SIPs and each of the equities exchanges in order to properly execute those orders in compliance with best execution obligations. In addition, in the options markets there is a single SIP (OPRA) versus two SIPs in the equities markets, resulting in fewer hops and thus alleviating the need to connect directly to all the options exchanges. Additionally, in the options markets, the linkage routing and trade through protection are handled by the exchanges, not by the individual members. Thus not connecting to an options exchange or disconnecting from an options exchange does not potentially subject a broker-dealer to violate order protection requirements. 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 MIAX Emerald or its affiliates, MIAX and MIAX PEARL, they do not purchase connectivity to MIAX Emerald, and they do not purchase market data from MIAX Emerald. The Exchange further recognizes that the decision of whether to connect to the Exchange is separate and distinct from the decision of whether and how to trade on the Exchange. The Exchange acknowledges that many firms may choose to connect to the Exchange, but ultimately not trade on it, based on their particular business needs.

To assist prospective Members or firms considering connecting to MIAX Emerald, the Exchange provides information about the Exchange's available connectivity alternatives in a Connectivity Guide, which contains detailed specifications regarding, among other things, throughput and latency for each available connection.³² The decision of which type of connectivity to purchase, or whether to purchase connectivity at all for a particular exchange, 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 a 10Gb ULL connection. The 1Gb connection is too small to support those data feed products. MIAX Emerald notes that there are twelve (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 twelve (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. Accordingly, purchasing market data is a business decision/choice, and thus the pricing for it is constrained by competition.

There is competition for connectivity to MIAX Emerald and its affiliates. MIAX Emerald competes with eight (8) non-Members, who resell MIAX Emerald connectivity. These are resellers of MIAX Emerald connectivity—they are not arrangements between broker-dealers to share connectivity costs. Those non-Members resell that connectivity to multiple market participants over that same connection, including both Members and non-Members of MIAX Emerald (typically extranets and service bureaus). When connectivity is re-sold by a third-party, MIAX Emerald does not receive any connectivity revenue from that sale. It is entirely between the third-party and the purchaser, thus constraining the ability of MIAX Emerald to set its connectivity pricing as indirect connectivity is a substitute for direct connectivity. In fact, there are currently seven (7) non-Members that purchase 1Gb direct connectivity that are able to access MIAX Emerald, MIAX and MIAX PEARL. Those non-Members resell that connectivity to eight (8) customers, some of whom are agency broker-dealers that have tens of customers of their own. Some of those eight (8) customers also purchase connectivity directly from MIAX Emerald and/or its affiliates, MIAX and MIAX PEARL. Accordingly, indirect connectivity is a viable alternative used by non-Members of MIAX Emerald, constraining the price that MIAX Emerald is able to charge for connectivity to its Exchange.

³² See the MIAX Connectivity Guide at https://www.miaxoptions.com/sites/default/files/page-files/MIAX_Connectivity_Guide_v3.6_01142019.pdf.

The Exchange,³³ MIAx,³⁴ and MIAx PEARL³⁵ are comprised of 41 distinct members amongst all three exchanges, excluding any additional affiliates of such members that are also members of the Exchange, MIAx, MIAx PEARL, or any combination thereof. Of those 41 distinct members, 28 of those distinct members are Members of MIAx Emerald. (Currently, there are no Members of MIAx Emerald that are not also members of MIAx or MIAx PEARL, or both.) Of those 28 distinct Members of MIAx Emerald, there are 6 Members that have no connectivity to the Exchange. Members are not forced to purchase connectivity to the Exchange, and these Members have elected not to purchase such connectivity. Of note, these same 6 Members also do not have connectivity to either MIAx or MIAx PEARL. These Members either trade indirectly through other Members or non-Members that have connectivity to the Exchange, or do not trade and conduct another type of business on the Exchange. Of the remaining 22 distinct Members of MIAx Emerald, *all* 22 of those distinct Members already had connectivity to the Exchange via existing Shared Connections, thus providing all such 22 MIAx Emerald Members with instant connectivity to the Exchange without paying any new incremental connectivity fees.

Further, of those 22 Members, 14 of such Members elected to purchase additional connectivity to the Exchange, including additional Shared Connections and additional Dedicated Connections. The Exchange made available in advance to all of its prospective Members its proposed connectivity pricing (subject to regulatory clearance), in order for those prospective Members to make an informed decision about whether to become a Member of the Exchange and whether to purchase connectivity to the Exchange. Accordingly, each such Member made the decision to become a Member of the Exchange and to purchase connectivity to the Exchange, knowing in advance the connectivity pricing. And the vast majority of the additional connectivity purchased by those Members were for Dedicated

Connections, the most expensive connectivity option.

As a result, of those 22 Members, through existing Shared Connections, newly purchased Shared Connections, and newly purchased Dedicated Connections: 14 Members have 1Gb (primary/secondary) connections; 13 Members have 10Gb ULL (primary/secondary) connections; 3 Members have 10Gb (disaster recovery) connections; and 10 Members have 1Gb (disaster recovery) connections, or some combination of multiple various connections. All such Members with those Shared Connections and Dedicated Connections trade on MIAx Emerald.

The 6 Members who have not purchased any connectivity to the Exchange are still able to trade on the Exchange indirectly through other Members or non-Member service bureaus that are connected. These 6 Members who have not purchased connectivity are not forced or compelled to purchase connectivity, and they retain all of the other benefits of membership with the Exchange. Accordingly, Members have the choice to purchase connectivity and are not compelled to do so in any way.

In addition, there are 5 non-Member service bureaus that already have connectivity to the Exchange via existing Shared Connections, thus providing all 5 of those non-Member service bureaus with instant connectivity to the Exchange without paying any new incremental connectivity fees. These non-Members freely purchased their connectivity from one of the Exchange's affiliates, either MIAx or MIAx PEARL, in order to offer trading services to other firms and customers, as well as access to the market data services that their connections to the Exchange provide them, but they are not required or compelled to purchase any of the Exchange's connectivity options.

The Exchange believes that the Proposed Fees are fair, equitable and not unreasonably discriminatory because the connectivity pricing is directly related to the relative costs to the Exchange to provide those respective services, and does not impose a barrier to entry to smaller participants. Accordingly, the Exchange offers two direct connectivity alternatives and various indirect connectivity (via third-party) alternatives, as described above. MIAx Emerald recognizes that there are various business models and varying sizes of market participants conducting business on the Exchange. The 1Gb direct connectivity alternative is 1/10th the size of the 10Gb ULL direct

connectivity alternative. Because it is 1/10th of the size, it does not offer access to many of the products and services offered by the Exchange, such as the ability to quote or receive certain market data products. Approximately just less than half of MIAx Emerald, MIAx and MIAx PEARL Members that connect (15 out of 33) purchase 1Gb 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 (which require a 10Gb connection). The 1Gb direct connection is generally purchased by market participants that utilize less bandwidth and also generally do not require the high touch network support services provided by the Exchange. Accordingly, these connections consume the least resources of the Exchange and are the least costly to the Exchange to provide. The market participants that purchase 10Gb ULL direct connections utilize the most bandwidth and also generally do require the high touch network support services provided by the Exchange. Accordingly, these connections consume the most resources of the Exchange and are the most costly to the Exchange to provide. Accordingly, the Exchange believes the allocation of the Proposed Fees (\$6,000 for a 10Gb ULL connection versus \$1,400 for a 1Gb connection) are reasonable based on the resources consumed by the respective type of connection—lowest resource consuming members pay the least, and highest resource consuming members pay the most, particularly since higher resource consumption translates directly to higher costs to the Exchange. The 10Gb ULL connection offers optimized connectivity for latency sensitive participants. This lower latency is achieved through more advanced network equipment, such as advanced hardware and switching components, which translates to increased costs to the Exchange.

The Exchange launched trading on March 1, 2019. Thus, at the time that the 14 Members who elected to purchase connectivity to the Exchange, the Exchange was untested and unproven, and had 0% market share of the U.S. options industry. For September of 2019, the Exchange had only a 0.81% market share of the U.S. options industry in Equity/Exchange Traded Fund ("ETF") classes according to the OCC.³⁶ For September of 2019, the

³³ The Exchange has 28 distinct Members, excluding affiliated entities. See MIAx Emerald Exchange Member Directory, available at <https://www.miaxoptions.com>.

³⁴ MIAx has 38 distinct Members, excluding affiliated entities. See MIAx Exchange Member Directory, available at <https://www.miaxoptions.com>.

³⁵ MIAx PEARL has 36 distinct Members, excluding affiliated entities. See MIAx PEARL Exchange Member Directory, available at <https://www.miaxoptions.com>.

³⁶ See Exchange Market Share of Equity Products—2019, The Options Clearing Corporation, Continued

Exchange's affiliate, MIAx, had only 3.87% market share of the U.S. options industry in Equity/ETF classes according to the OCC.³⁷ For September of 2019, the Exchange's affiliate, MIAx PEARL, had only 5.30% market share of the U.S. options industry in Equity/ETF classes according to the OCC.³⁸ The Exchange is not aware of any evidence that a combined market share less than 10% provides the Exchange with anti-competitive pricing power. This, in addition to the fact that not all broker-dealers are required to connect to all options exchanges, supports the Exchange's conclusion that its pricing is constrained by competition. Certainly, an untested and unproven exchange, with less than 1% market share in any month, and no rule or requirement that a market participant must join or connect to it, does not have anti-competitive pricing power, with respect to setting the pricing for the Dedicated Connections or the Shared Connections. If the Exchange 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 the Exchange, all knowing, in advance, the connectivity fees, the Exchange believes the Proposed Fees are reasonable, equitable, and not unfairly discriminatory.

Separately, the Exchange is not aware of any reason why market participants could not simply drop their connections and cease being Members of the Exchange if the Exchange were to establish unreasonable and uncompetitive price increases for its connectivity alternatives. Market participants choose to connect to a particular exchange and because it is a choice, MIAx Emerald 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. No options market participant is required by rule, regulation, or competitive forces to be a Member of the Exchange. As evidence of the fact that market participants can and do disconnect from exchanges based on connectivity pricing, see the R2G Services LLC ("R2G") letter based on BOX's proposed rule changes to increase its connectivity fees (SR-BOX-2018-24, SR-BOX-

2018-37, and SR-BOX-2019-04).³⁹ The R2G Letter stated, "[w]hen BOX instituted a \$10,000/month price increase for connectivity; we had no choice but to terminate connectivity into them as well as terminate our market data relationship. The cost benefit analysis just didn't make any sense for us at those new levels." Accordingly, this example shows that if an exchange sets too high of a fee for connectivity and/or market data services for its relevant marketplace, market participants can choose to disconnect from the exchange.

Several market participants choose not to be Members of the Exchange and choose not to access the Exchange, and several market participants are proposing to access the Exchange indirectly through another market participant. To illustrate, the Exchange has only 34 total Members (including all such Members' affiliate Members). However, Cboe Exchange, Inc. ("Cboe") has over 200 members,⁴⁰ Nasdaq ISE, LLC has approximately 100 members,⁴¹ and NYSE American LLC has over 80 members.⁴² If all market participants were required to be Members of the Exchange and connect directly to the Exchange, the Exchange would have over 200 Members, in line with Cboe's total membership. But it does not. The Exchange only has 34 Members.

Further, since there are 41 distinct members amongst all three exchanges, and only 28 of those distinct members decided to become Members of MIAx Emerald, there were 13 distinct members that decided *not* to become Members of MIAx Emerald. This further reinforces the fact that all market participants are not required to be Members of the Exchange and are not required to connect to the Exchange. It is a choice whether to join and it is a choice to connect. Therefore, the Exchange believes that the Proposed Fees are fair, equitable, and non-discriminatory, as the fees are competitive.

³⁹ See Letter from Stefano Durdic, R2G, to Vanessa Countryman, Acting Secretary, Commission, dated March 27, 2019 (the "R2G Letter").

⁴⁰ See Form 1/A, filed August 30, 2018 (<https://www.sec.gov/Archives/edgar/vpr/1800/18002831.pdf>); Form 1/A, filed August 30, 2018 (<https://www.sec.gov/Archives/edgar/vpr/1800/18002833.pdf>); Form 1/A, filed July 24, 2018 (<https://www.sec.gov/Archives/edgar/vpr/1800/18002781.pdf>); Form 1/A, filed August 30, 2018 (<https://www.sec.gov/Archives/edgar/data/1473845/999999999718007832/9999999997-18-007832-index.htm>).

⁴¹ See Form 1/A, filed July 1, 2016 (<https://www.sec.gov/Archives/edgar/vpr/1601/16019243.pdf>).

⁴² See <https://www.nyse.com/markets/american-options/membership#directory>.

With respect to the now MIAx Emerald Members that had Shared Connections in place as of August 1, 2018 (via a previously purchased Shared Connection from MIAx or MIAx PEARL), the Exchange finds it compelling that all of those Members continued to purchase those Shared Connections after August 1, 2018, when MIAx and MIAx PEARL increased the connectivity fees for the Shared Connections to the current amounts proposed by the Exchange herein. In particular, the Exchange believes that the Proposed Fees for the Shared Connections are reasonable because MIAx and MIAx PEARL, which charge the same amount for the Shared Connections, did not lose any Members (or the number of Shared Connections each Member purchased) or non-Member Shared Connections when MIAx and MIAx PEARL proposed to increase the connectivity fees for the Shared Connections on August 1, 2018. For example, with respect to the Shared Connections maintained by now Members of MIAx Emerald who had Shared Connections in place as of July 2018, 12 Members purchased 1Gb connections. The vast majority of those Members purchased multiple such connections, the number of connections depending on their throughput requirements based on the volume of their quote/order traffic and market data needs associated with their business model. After the fee increase, beginning August 1, 2018, the same 12 Members purchased 1Gb connections. Furthermore, the total number of connections did not decrease from July to August.

Further, with respect to the Shared Connections maintained by now Members of MIAx Emerald who had Shared Connections in place as of July 2018, of those Members and non-Members that bought multiple connections, no firm dropped any connections beginning August 1, 2018, when MIAx and MIAx PEARL increased its fees. Furthermore, the Exchange understands that MIAx and MIAx PEARL did not receive any official comment letters or complaints from any now Members of MIAx Emerald who had Shared Connections in place as of July 2018 regarding the increased fees regarding how the change was unreasonable, unduly burdensome, or would negatively impact their competitiveness amongst other market participants. These facts, coupled with the discussion above, showing that it is not necessary to join and/or connect to all options exchanges and market participants can disconnect if pricing is

available at <https://www.theocc.com/webapps/exchange-volume>.

³⁷ *Id.*

³⁸ *Id.*

set too high (the R2G example),⁴³ demonstrate that the Exchange's fees are constrained by competition and are reasonable and not contrary to the Law of Demand. Therefore, the Exchange believes that the Proposed Fees are fair, equitable, and non-discriminatory, as the fees are competitive.

The Exchange believes that the Proposed Fees are equitably allocated among Members and non-Members, as evidenced by the fact that the fees are allocated across all connectivity alternatives according to the Exchange's costs to provide such alternatives, and there is not a disproportionate number of Members purchasing any alternative—14 Members have 1Gb (primary/secondary) connections; 14 Members have 10Gb ULL (primary/secondary) connections; 3 Members have 10Gb (disaster recovery) connections; and 11 Members have 1Gb (disaster recovery) connections, or some combination of multiple various connections.

Further, the Exchange believes that the fees are equitably allocated as the users of the higher bandwidth connections consume the most resources of the Exchange. Also, these firms account for the vast majority of the Exchange's trading volume. The purchasers of the 10Gb ULL connectivity account for approximately 76% of the volume on the Exchange. For example, for all of September 2019, 2.2 million contracts of the 2.9 million contracts executed were done by the top market making firms on the Exchange in simple (non-complex) volume. The Exchange further believes that the fees are equitably allocated, as the amount of the fees for the various connectivity alternatives are directly related to the actual costs associated with providing the respective connectivity alternatives. That is, the cost to the Exchange of providing a 1Gb network connection is significantly lower than the cost to the Exchange of providing a 10Gb ULL network connection. Pursuant to its extensive cost review described above, the Exchange believes that the average cost to provide a 10Gb ULL network connection is approximately 4 to 6 times more than the average cost to provide a 1Gb connection. The simple hardware and software component costs alone of a 10Gb ULL connection are not 4 to 6 times more than the 1Gb connection. Rather, it is the associated premium-product level network monitoring, reporting, and support services costs that accompany a 10Gb ULL connection which cause it to be 4 to 6 times more costly to provide than

the 1Gb connection. As discussed above, the Exchange differentiates itself by offering a "premium-product" network experience, as an operator of a high performance, ultra-low latency network with unparalleled system throughput, which network can support access to three distinct options markets and multiple competing market-makers having affirmative obligations to continuously quote over 750,000 distinct trading products (per exchange), and the capacity to handle approximately 18 million quote messages per second. The "premium-product" network experience enables users of 10Gb ULL connections to receive the network monitoring and reporting services for those approximately 750,000 distinct trading products. There is a significant, quantifiable amount of research and development ("R&D") effort, employee compensation and benefits expense, and other expense associated with providing the high touch network monitoring and reporting services that are utilized by the 10Gb ULL connections offered by the Exchange. These value add services are fully-discussed herein, and the actual costs associated with providing these services are the basis for the differentiated amount of the fees for the various connectivity alternatives.

The Exchange believes that its proposal is consistent with Section 6(b)(4) of the Act because the Proposed Fees will permit recovery of the Exchange's costs and will not result in excessive or supra-competitive profit. The Proposed Fees will allow the Exchange to recover a portion (less than all) of the costs incurred by the Exchange associated with providing and maintaining the necessary hardware and other infrastructure as well as network monitoring and support services in order to provide the network connectivity services. The Exchange believes that it is reasonable and appropriate to establish its fees charged for use of its connectivity at a level that will partially offset the costs to the Exchange associated with maintaining and enhancing a state-of-the-art exchange network infrastructure in the U.S. options industry.

The costs associated with making the network accessible to Exchange Members and non-Members, through the expansion associated with new Shared Connections and Dedicated Connections, as well as the general expansion of a state-of-the-art infrastructure, are extensive, have increased year-over-year in the past two years, and are projected to increase year-over-year in the future. This is due to several factors, including costs

associated with maintaining and expanding a team of highly-skilled network engineers, fees charged by the Exchange's third-party data center operator, and costs associated with projects and initiatives designed to improve overall network performance and stability, through the Exchange's R&D efforts.

In order to provide more detail and to quantify the Exchange's costs, the Exchange notes that costs are associated with the infrastructure and headcount to fully-support the advances in infrastructure and expansion of network level services, including customer monitoring, alerting and reporting. The Exchange incurs technology expenses related to establishing and maintaining Information Security services, enhanced network monitoring and customer reporting, as well as Regulation SCI mandated processes, associated with its network technology. Additionally, the Exchange incurred costs in the expansion/buildout of the network leading up to the launch of operations, and the network maintenance costs continue to increase year-over-year. 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 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 MIAX Emerald and its affiliates provide. And 10Gb ULL connections require the purchase of specialized, more costly hardware. Further, as the total number of all connections increase, MIAX Emerald and its affiliates need to increase their data center footprint and consume more power, resulting in increased costs charged by their third-party data center provider. Accordingly, the cost to MIAX Emerald and its affiliates is not entirely fixed. Just the initial fixed cost buildout of the network infrastructure of MIAX Emerald and its affiliates, including both primary/secondary sites and disaster recovery, was over \$30 million.

A more detailed breakdown of the expense increases since the initial phases of the buildout of the Exchange over two years ago include the following: With respect to the network, there has been an approximate 70% increase in technology-related personnel costs in infrastructure, due to expansion of services/support (increase of approximately \$800,000); an approximate 10% increase in datacenter costs due to price increases and footprint expansion (increase of approximately \$500,000); an

⁴³ See *supra* note 39.

approximate 5% increase in vendor-supplied dark fiber due to price increases and expanded capabilities (increase of approximately \$25,000); and a 30% increase in market data connectivity fees (increase of approximately \$200,000). Of note, regarding market data connectivity fee cost, this is the cost associated with MIAX Emerald consuming connectivity/content from the equities markets in order to operate the Exchange, causing MIAX Emerald to effectively pay its competitors for this connectivity.

There was also significant capital expenditures over this same period to upgrade and enhance the underlying technology components. The Exchange believes that it is reasonable and appropriate to establish its fees charged for use of its connectivity at a level that will partially offset the costs to the Exchange associated with the buildout, maintenance, and enhancement of its network infrastructure.

Further, because the costs of operating a data center are significant and not economically feasible for the Exchange, the Exchange does not operate its own data centers, and instead contracts with a third-party data center provider. The Exchange notes 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 Exchange is subject to additional costs. Connectivity fees, which are charged for accessing the Exchange's data center network infrastructure, are directly related to the network and offset costs such costs.

Further, the Exchange invests significant resources in network R&D to improve the overall performance and stability of its network. For example, the Exchange has a number of 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 Exchange's Members and enable the Exchange to provide a high level of customer service. These tools detect and report performance issues, and thus enable the Exchange to proactively notify a Member (and the SIPs) when the Exchange detects a problem with a Member's connectivity. In fact, the Exchange often receives inquiries from other industry participants regarding the status of networking issues outside of the Exchange's own network environment that are impacting the industry as a whole via the SIPs, including inquiries from regulators,

because the Exchange has a superior, state-of-the-art network that, through its enhanced monitoring and reporting solutions, often detects and identifies industry-wide networking issues ahead of the SIPs. The Exchange also incurs costs associated with the maintenance and improvement of existing tools and the development of new tools.

Certain recently developed network aggregation and monitoring tools provide the Exchange with the ability to measure network traffic with a much more granular level of variability. This is important as Exchange Members demand a higher level of network determinism and the ability to measure variability in terms of single digit nanoseconds. Also, routine R&D projects to improve the performance of the network's hardware infrastructure result in additional cost. As an example, in the last year, 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 sum, the costs associated with maintaining and enhancing a state-of-the-art exchange network in the U.S. options industry is a significant expense for the Exchange that also increases year-over-year, and thus the Exchange believes that it is reasonable to offset a portion of those costs through establishing network connectivity fees, which are designed to recover those costs, as proposed herein. Overall, the Proposed Fees are projected to offset only a portion of the Exchange's network connectivity costs. The Exchange invests in and offers a superior network infrastructure as part of its overall options exchange services offering, resulting in significant costs associated with maintaining this network infrastructure, which are directly tied to the amount of the connectivity fees that must be charged to access it, in order to recover those costs. In fact, the Exchange often receives inquiries from other industry participants regarding the status of networking issues outside of the Exchange's own network environment that are impacting the industry as a whole via the SIPs, including inquiries from regulators, because the Exchange has a superior, state-of-the-art network that, through its enhanced monitoring and reporting solutions, often detects and identifies industry-wide networking issues ahead of the SIPs. As detailed in the Exchange's 2018 Audited Unconsolidated Financial Statements, the Exchange only has four primary sources of revenue: Transaction fees,

access fees (of which network connectivity constitute the majority), regulatory fees, and market data fees. Accordingly, the Exchange must cover all of its expenses from these four primary sources of revenue.

The Proposed Fees are fair and reasonable because they will not result in excessive pricing or supra-competitive profit, when comparing the total annual expense of MIAX Emerald associated with providing network connectivity services versus the total projected annual revenue of the Exchange associated with providing network connectivity services. For 2018, the total annual expense associated with providing network connectivity services for MIAX Emerald was approximately \$4.7 million. The \$4.7 million in total annual expense is comprised of the following, all of which are directly related to the provision of network connectivity services by MIAX Emerald to its respective Members and non-Members: (1) Third-party expense, relating to fees paid by MIAX Emerald to third-parties for certain products and services; and (2) internal expense, relating to the internal costs of MIAX Emerald to provide the network connectivity services. All such expenses are more fully-described below, and are mapped to MIAX Emerald's 2018 Statements of Operations and Member's Deficit (the "2018 Financial Statements"). The \$4.7 million in total annual expense is directly related to the provision of network connectivity services and not any other product or service offered by the Exchange. It does not, as the Third IEX Letter baselessly claims, include general costs of operating matching systems and other trading technology. (And as stated previously, no expense amount was allocated twice.) As discussed, the Exchange conducted an extensive cost review in which the Exchange analyzed every expense item in the Exchange's general expense ledger (this includes over 150 separate and distinct expense items) to determine whether each such expense relates to the provision of network connectivity services, and, if such expense did so relate, what portion (or percentage) of such expense actually supports the provision of network connectivity services, and thus bears a relationship that is, "in nature and closeness," directly related to network connectivity services. The sum of all such portions of expenses represents the total actual baseline cost of the Exchange to provide network connectivity services.

As discussed above, the Exchange differentiates itself by offering a "premium-product" network

experience, as an operator of a high performance, ultra-low latency network with unparalleled system throughput, which network can support access to three distinct options markets and multiple competing market-makers having affirmative obligations to continuously quote over 750,000 distinct trading products (per exchange), and the capacity to handle approximately 18 million quote messages per second. The “premium-product” network experience enables users of 10Gb ULL connections to receive the network monitoring and reporting services for those approximately 750,000 distinct trading products. Thus, the Exchange is acutely aware of and can isolate the actual costs associated with providing such a service to its customers, a significant portion of which relates to the premium, value-add customer network monitoring and support services that accompany the service, as fully-described above. IEX, on the other hand, does not offer such a network, and thus has no legal basis to offer a qualified opinion on the Exchange’s costs associated with operating such a network. In fact, IEX differentiates itself as a provider of low cost connectivity solutions to an intentionally delayed trading platform—quite the opposite from the Exchange. Thus, there is no relevant comparison between IEX network connectivity costs and the Exchange’s network connectivity costs, and IEX’s attempt to do so in the Third IEX Letter is ill-informed and self-serving.⁴⁴

For 2018, total third-party expense, relating to fees paid by MIAX Emerald to third-parties for certain products and services for the Exchange to be able to provide network connectivity services, was \$728,246. This includes, but is not limited to, a portion of the fees paid to: (1) Equinix, for data center services, for the primary, secondary, and disaster recovery locations of the MIAX Emerald trading system infrastructure; (2) Zayo Group Holdings, Inc. (“Zayo”) for connectivity services (fiber and bandwidth connectivity) linking MIAX Emerald’s office locations in Princeton, NJ and Miami, FL to all data center locations; (3) Secure Financial Transaction Infrastructure (“SFTI”),⁴⁵

which supports connectivity and feeds for the entire U.S. options industry; (4) various other services providers (including Thompson Reuters, NYSE, Nasdaq, and Internap), which provide content, connectivity services, and infrastructure services for critical components of options connectivity; and (5) various other hardware and software providers (including Dell and Cisco, which support the production environment in which Members and non-Members connect to the network to trade, receive market data, etc.).

All of the third-party expense described above is contained in the information technology and communication costs line item under the section titled “Operating Expenses Incurred Directly or Allocated From Parent” of the 2018 Financial Statements. For clarity, only a portion of all fees paid to such third-parties is included in the third-party expense herein (only the portion that actually supports the provision of network connectivity services), and no expense amount is allocated twice. Accordingly, MIAX Emerald does not allocate its entire information technology and communication costs to the provision of network connectivity services.

For 2018, total internal expense, relating to the internal costs of MIAX Emerald to provide the network connectivity services, was \$4,031,491. This includes, but is not limited to, costs associated with: (1) Employee compensation and benefits for full-time employees that support network connectivity services, including staff in network operations, trading operations, development, system operations, business, etc., as well as staff in general corporate departments (such as legal, regulatory, and finance) that support those employees and functions; (2) depreciation and amortization of hardware and software used to provide network connectivity services, including equipment, servers, cabling, purchased software and internally developed software used in the production environment to support connectivity for trading; and (3) occupancy costs for leased office space for staff that support network connectivity services. The breakdown of these costs is more fully-described below.

All of the internal expenses described above are contained in the following line items under the section titled “Operating Expenses Incurred Directly or Allocated From Parent” in the 2018 Financial Statements: (1) Employee

compensation and benefits; (2) Depreciation and amortization; and (3) Occupancy costs. For clarity, only a portion of all such internal expenses are included in the internal expense herein (only the portion that supports the provision of network connectivity services), and no expense amount is allocated twice. Accordingly, MIAX Emerald does not allocate its entire costs contained in those line items to the provision of network connectivity services.

MIAX Emerald’s employee compensation and benefits expense relating to providing network connectivity services was \$3,262,226, which is only a portion of the \$10,193,837 total expense for employee compensation and benefits that is stated in the 2018 Financial Statements. MIAX Emerald’s depreciation and amortization expense relating to providing network connectivity services was \$416,807, which is only a portion of the \$616,785 total expense for depreciation and amortization that is stated in the 2018 Financial Statements. MIAX Emerald’s occupancy expense relating to providing network connectivity services was \$352,458, which is only a portion of the \$732,720 total expense for occupancy that is stated in the 2018 Financial Statements.

The total projected MIAX Emerald revenue for providing network connectivity services, on a full year run rate, is \$3.0 million. However, since MIAX Emerald was launched on March 1, 2019, it did not start collecting revenue for network connectivity services until March 1, 2019. Thus, for 2018, MIAX Emerald’s expense for providing network connectivity services was approximately \$4.7 million, while its revenue for providing network connectivity services was \$0. For 2019, MIAX Emerald projects 10 full months of revenue for network connectivity services (March 1–December 31), of \$2.5 million, however it also projects increased expense for providing network connectivity services for 2019, as compared to 2018. Nevertheless, utilizing 2018 expense figures, for 2019, MIAX Emerald’s expense for providing network connectivity services would be approximately \$4.7 million, while its revenue for providing network connectivity services would be \$2.5 million. On a fully annualized basis, utilizing 2018 expense figures and 2019 projected revenue extrapolated out to a full year run rate, MIAX Emerald’s expense for providing network connectivity services would be approximately \$4.7 million, while its revenue for providing network connectivity services would be \$3

⁴⁴ See Third IEX Letter, pg. 5.

⁴⁵ In fact, on October 22, 2019, the Exchange was notified by SFTI that it is again raising its fees charged to the Exchange by approximately 11%, without having to show that such fee change complies with the Act by being reasonable, equitably allocated, and not unfairly discriminatory. It is unfathomable to the Exchange that, given the critical nature of the infrastructure services provided by SFTI, that its fees are not required to be rule-filed with the Commission pursuant to Section 19(b)(1) of the Act and Rule

19b–4 thereunder. See 15 U.S.C. 78s(b)(1) and 17 CFR 240.19b–4, respectively.

million. Accordingly, for both 2018 and 2019, the total MIAx Emerald projected revenue for providing network connectivity services during 2018 (\$0) and during 2019 (\$2.5 million) is less than total actual and projected MIAx Emerald expense for providing network connectivity services for 2018 (\$4.7 million) and 2019 (greater than \$4.7 million).

For the avoidance of doubt, none of the expenses included herein relating to the provision of network connectivity services relate to the provision of any other services offered by MIAx Emerald. Stated differently, no expense amount of the Exchange is allocated twice.

Accordingly, the Proposed Fee Increases are fair and reasonable because they do not result in excessive pricing or supra-competitive profit, when comparing the actual network connectivity costs to the Exchange versus the projected network connectivity annual revenue, including the increased amount. Additional information on overall revenue and expense of the Exchange can be found in the Exchange's 2018 Financial Statements.

The Exchange also believes its proposal to offer 10Gb ULL connections as dedicated connections furthers the objectives of Section 6(b)(5) of the Act⁴⁶ in that it is designed to promote just and equitable principles of trade, to remove impediments to and perfect the mechanism of a free and open market and a national market system, and, in general to protect investors and the public interest and is not designed to permit unfair discrimination between customer, issuers, brokers and dealers. In particular, for the Dedicated Connection, the Exchange's MENI is configured to provide Members and non-Members of the Exchange network connectivity to the trading platforms, market data systems, test systems, and disaster recovery facilities of the Exchange. Any Member or non-Member can purchase a Dedicated Connection. The Exchange determined to design its network architecture in a manner that offered 10Gb ULL connections as dedicated connections (as opposed to shared connections) in order to provide cost saving opportunities for itself and for its Members, by reducing the amount of equipment that the Exchange would have to purchase and to which the Members would have to connect. A dedicated 10Gb ULL connection does not offer any unfair advantage over a shared 10Gb ULL connection, as is being offered solely as a cost-saving

measure to the Exchange and its Members.

The Exchange notes that other exchanges have similar connectivity alternatives for their participants, including similar low-latency connectivity. For example, Nasdaq PHLX LLC ("Phlx"), NYSE Arca, Inc. ("Arca"), NYSE American LLC ("NYSE American") and Nasdaq ISE, LLC ("ISE") all offer a 1Gb, 10Gb and 10Gb low latency ethernet connectivity alternatives to each of their participants.⁴⁷ The Exchange further notes that Phlx, ISE, Arca and NYSE American each charge higher rates for such similar connectivity to primary and secondary facilities,⁴⁸ however the Exchange also notes that the Exchange's 10Gb ULL connection is dedicated solely to one market (the Exchange) whereas the Exchange believes that other exchanges offer a shared 10Gb ULL connection to multiple markets. While MIAx Emerald's proposed connectivity fees are substantially lower than the fees charged by Phlx, ISE, Arca and NYSE American, MIAx Emerald believes that it offers significant value to Members over other exchanges in terms of network monitoring and reporting, which MIAx Emerald believes is a competitive advantage, and differentiates its connectivity versus connectivity to other exchanges. Additionally, the Exchange's proposed connectivity fees to its disaster recovery facility are within the range of the fees charged by other exchanges for similar connectivity alternatives.⁴⁹

B. Self-Regulatory Organization's Statement on Burden on Competition

The Exchange does not believe that the proposed rule change would place certain market participants at the Exchange at a relative disadvantage compared to other market participants or affect the ability of such market

participants to compete. In particular, the Exchange has received no official complaints from Members, non-Members (extranets and service bureaus), third-parties that purchase the Exchange's connectivity and resell it, and customers of those resellers, that the Exchange's fees or the Proposed Fees are negatively impacting or would negatively impact their abilities to compete with other market participants or that they are placed at a disadvantage.

The Exchange believes that the Proposed Fees do not place certain market participants at a relative disadvantage to other market participants because the connectivity pricing is associated with relative usage of the various market participants and does not impose a barrier to entry to smaller participants. As described above, the less expensive 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. Accordingly, the Proposed Fees do not favor certain categories of market participants in a manner that would impose a burden on competition; rather, the allocation of the Proposed Fees reflects the network resources consumed by the various size of market participants—lowest bandwidth consuming members pay the least, and highest bandwidth consuming members pays the most, particularly since higher bandwidth consumption translates to higher costs to the Exchange.

Inter-Market Competition

The Exchange believes the Proposed Fees do not place an undue burden on competition on other SROs that is not necessary or appropriate. In particular, options market participants are not forced to connect to (and purchase market data from) all options exchanges, as shown by the number of Members of the Exchange as compared to the much greater number of members at other options exchanges (as described above). Not only does MIAx Emerald have less than half the number of members as certain other options exchanges, but there are also a number of the Exchange's Members that do not connect directly to MIAx Emerald. There are a number of large market makers and broker-dealers that are members of other options exchange but not Members of MIAx Emerald. Additionally, other exchanges have similar connectivity alternatives for their participants, including similar

⁴⁷ See Phlx and ISE Rules, General Equity and Options Rules, General 8, Section 1(b). Phlx and ISE each charge a monthly fee of \$2,500 for each 1Gb connection, \$10,000 for each 10Gb connection and \$15,000 for each 10Gb Ultra connection, which the equivalent of the Exchange's 10Gb ULL connection. See also NYSE American Fee Schedule, Section V.B, and Arca Fees and Charges, Co-Location Fees. NYSE American and Arca 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 the equivalent of the Exchange's 10Gb ULL connection.

⁴⁸ *Id.*

⁴⁹ See Nasdaq ISE, Options Rules, Options 7, Pricing Schedule, Section 11.D. (charging \$3,000 for disaster recovery testing & relocation services); see also Cboe Exchange, Inc. ("Cboe") Fees Schedule, p. 14, Cboe Command Connectivity Charges (charging a monthly fee of \$2,000 for a 1Gb disaster recovery network access port and a monthly fee of \$6,000 for a 10Gb disaster recovery network access port).

⁴⁶ 15 U.S.C. 78f(b)(5).

low-latency connectivity, but with much higher rates to connect.⁵⁰ The Exchange is also unaware of any assertion that its existing fee levels or the Proposed Fees would somehow unduly impair its competition with other options exchanges. To the contrary, if the fees charged are deemed too high by market participants, they can simply disconnect.

While the Exchange recognizes the distinction between connecting to an exchange and trading at the exchange, the Exchange notes that it operates in a highly competitive options market in which market participants can readily connect and trade with venues they desire. In such an environment, the Exchange must continually adjust its fees to remain competitive with other exchanges. The Exchange believes that the proposed changes reflect this competitive environment.

C. Self-Regulatory Organization's Statement on Comments on the Proposed Rule Change Received From Members, Participants, or Others

Written comments were neither solicited nor received.

III. Date of Effectiveness of the Proposed Rule Change and Timing for Commission Action

The foregoing rule change has become effective pursuant to Section 19(b)(3)(A)(ii) of the Act,⁵¹ and Rule 19b-4(f)(2)⁵² thereunder. At any time within 60 days of the filing of the proposed rule change, the Commission summarily may temporarily suspend such rule change if it appears to the Commission that such action is necessary or appropriate in the public interest, for the protection of investors, or otherwise in furtherance of the purposes of the Act. If the Commission takes such action, the Commission shall institute proceedings to determine whether the proposed rule should be approved or disapproved.

IV. Solicitation of Comments

Interested persons are invited to submit written data, views, and arguments concerning the foregoing, including whether the proposed rule change is consistent with the Act. Comments may be submitted by any of the following methods:

Electronic Comments

- Use the Commission's internet comment form (<http://www.sec.gov/rules/sro.shtml>); or

- Send an email to rule-comments@sec.gov. Please include File Number SR-EMERALD-2019-35 on the subject line.

Paper Comments

- Send paper comments in triplicate to Secretary, Securities and Exchange Commission, 100 F Street NE, Washington, DC 20549-1090.

All submissions should refer to File Number SR-EMERALD-2019-35. This file number should be included on the subject line if email is used. To help the Commission process and review your comments more efficiently, please use only one method. The Commission will post all comments on the Commission's internet website (<http://www.sec.gov/rules/sro.shtml>). Copies of the submission, all subsequent amendments, all written statements with respect to the proposed rule change that are filed with the Commission, and all written communications relating to the proposed rule change between the Commission and any person, other than those that may be withheld from the public in accordance with the provisions of 5 U.S.C. 552, will be available for website viewing and printing in the Commission's Public Reference Room, 100 F Street NE, Washington, DC 20549, on official business days between the hours of 10:00 a.m. and 3:00 p.m. Copies of the filing also will be available for inspection and copying at the principal office of the Exchange. All comments received will be posted without change. Persons submitting comments are cautioned that we do not redact or edit personal identifying information from comment submissions. You should submit only information that you wish to make available publicly. All submissions should refer to File Number SR-EMERALD-2019-35 and should be submitted on or before November 27, 2019.

For the Commission, by the Division of Trading and Markets, pursuant to delegated authority.⁵³

Jill M. Peterson,

Assistant Secretary.

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SECURITIES AND EXCHANGE COMMISSION

[Release No. 34-87432; File No. SR-PEARL-2019-33]

Self-Regulatory Organizations; MIA X PEARL, LLC; Notice of Filing and Immediate Effectiveness of a Proposed Rule Change To Amend the MIA X PEARL Fee Schedule

October 31, 2019.

Pursuant to Section 19(b)(1) of the Securities Exchange Act of 1934 ("Act"),¹ and Rule 19b-4 thereunder,² notice is hereby given that on October 22, 2019, MIA X PEARL, LLC ("MIA X PEARL" or "Exchange") filed with the Securities and Exchange Commission ("Commission") a proposed rule change as described in Items I, II, and III below, which Items have been prepared by the Exchange. The Commission is publishing this notice to solicit comments on the proposed rule change from interested persons.

I. Self-Regulatory Organization's Statement of the Terms of Substance of the Proposed Rule Change

The Exchange is filing a proposal to amend the MIA X PEARL Fee Schedule (the "Fee Schedule") to modify certain of the Exchange's system connectivity fees.

The Exchange previously filed the proposal on August 23, 2019 (SR-PEARL-2019-25). That filing has been withdrawn and replaced with the current filing (SR-PEARL-2019-33).

The text of the proposed rule change is available on the Exchange's website at <http://www.miaoptions.com/rule-filings/pearl> at MIA X PEARL's principal office, and at the Commission's Public Reference Room.

II. Self-Regulatory Organization's Statement of the Purpose of, and Statutory Basis for, the Proposed Rule Change

In its filing with the Commission, the Exchange included statements concerning the purpose of and basis for the proposed rule change and discussed any comments it received on the proposed rule change. The text of these statements may be examined at the places specified in Item IV below. The Exchange has prepared summaries, set forth in sections A, B, and C below, of the most significant aspects of such statements.

⁵⁰ See *supra* note 47.

⁵¹ 15 U.S.C. 78s(b)(3)(A)(ii).

⁵² 17 CFR 240.19b-4(f)(2).

⁵³ 17 CFR 200.30-3(a)(12).

¹ 15 U.S.C. 78s(b)(1).

² 17 CFR 240.19b-4.