September 21, 2020

Ms. Vanessa Countryman
Secretary
U.S. Securities and Exchange Commission
100 F Street NE
Washington DC 20549-1090

Re: Partial Amendment No. 2 to Proposed Rule Change to Establish a Wireless Fee Schedule Setting Forth Available Wireless Bandwidth Connections and Associated Fees (File Nos. SR-NYSE-2020-05, SR-NYSEAMER-2020-05, SR-NYSEArca-2020-08, SR-NYSECHX-2020-02, SR-NYSENAT-2020-03) (the "Wireless Connections Proposals"); and Partial Amendment No. 2 to Proposed Rule Change to Amend the Schedule of Wireless Connectivity Fees and Charges to Add Wireless Connectivity Services (SR-NYSE-2020-11, SR-NYSEAMER-2020-10, SR-NYSEArca-2020-15, SR-NYSECHX-2020-05, SR-NYSENAT-2020-08) (the "Market Data Proposals" and collectively with the Wireless Connections Proposals, the "Proposals")

Dear Ms. Countryman:

McKay Brothers LLC ("McKay") and its affiliate Quincy Data LLC ("Quincy") (collectively, the "Firm")[1] appreciate the opportunity to comment on proposed amendment no. 2 by the NYSE Group, Inc. exchanges (collectively "the Exchanges" or each an "Exchange") to the Proposals, which relate to the wireless connections to third party exchange data centers (the "Wireless Connections") and the market data products available through those connections (collectively with the Wireless Connections, the "Wireless Services").[2]

While we appreciate the Exchanges' adoption of certain of the Firm's recommendations set forth in our most recent comment letter ("McKay Letter III"),[3] the Exchanges' efforts to

[1] Quincy is a market data distributor that provides equal access to low latency US equities market data that helps subscribers make tighter markets. McKay is a telecommunications service provider, affiliated with Quincy and using various technologies – often wireless – to offer low-latency data transport services, which likewise allow subscribers to manage risk more effectively and make tighter markets. We offer services on a level-playing field basis—meaning we make our best latencies available to all subscribers. We also provide small firm discounts to support greater diversity of market participants with access to low latency market data.

[2] *See* Letters from Martha Redding, Associate General Counsel and Assistant Secretary, NYSE Group Inc., to Vanessa Countryman, Secretary, Commission re: File No. SR-NYSE-2020-05 (September 10, 2020), https://www.sec.gov/comments/sr-nyse-2020-05/srnyse202005-7757518-223248.pdf ("Wireless Connections Amendment No. 2"); and File No. SR-NYSE-2020-11 (September 10, 2020), https://www.sec.gov/comments/sr-nyse-2020-11/srnyse202011-7757532-223232.pdf ("Market Data Amendment No. 2").

[3] Letter from Jim Considine, Chief Financial Officer, McKay, to Vanessa Countryman, Secretary, Commission re: File No. SR-NYSE-2020-05 and SR-NYSE-2020-11 (August 28, 2020), https://www.sec.gov/comments/sr-nyse-2020-11/srnyse202011-7707476-222871.pdf. The Exchanges appear to have adopted the following of our recommendations: (i) clarifying that the Exchanges would equalize fiber based on the path of the fiber rather than the straight-line distance above ground; (ii) expanding the definition of the Data Center Pole beyond just its use by affiliates of the Exchanges; and (iii) expanding the definition of the Data Center Pole to include other structures. The Firm has also submitted two other comment letters to the Proposals. *See* Letters from Jim Considine, Chief Financial Officer, McKay, to Vanessa Countryman, Secretary, Commission re: File No. SR-NYSE-2020-05 (March 10, 2020)

neutralize the advantages enjoyed by the Wireless Services are incomplete without, at a minimum, accounting for over-the-air geographic differences in connecting to third party data centers. Declining to account for over-the-air differentials is just one example of the Exchanges' continued refusal to effectively redress the geographic latency advantage enjoyed by the Wireless Services that does not comply with the Exchanges' obligations under the Securities Exchange Act of 1934 ("Exchange Act").[4] Thus, while we were pleased to see incremental improvement in amendment no. 2, we believe further work is necessary to effectively address the unfairly discriminatory and anticompetitive advantages arising from the Wireless Connections' use of the Data Center Pole and to adopt other measures to limit the opportunity for the rules to be circumvented. The suggested improvements set forth in McKay Letter III that have not yet been adopted by the Exchanges would be easy to implement and would promote consistency with Exchange Act requirements.

I. Committing to a Level Playing Field

As stated in our most recent comment letter, the Exchanges should commit to establishing a durable level playing field with respect to wireless connectivity consistent with their statutory obligations.[5] The Exchanges have persistently resisted such a commitment throughout the evolution of the Proposals. For example, the Exchanges continue to deny that the Wireless Services are facilities of the Exchanges, yet have offered no explanation for why the Data Center Pole on the premises of the Mahwah data center ("Data Center") is not a facility of the Exchanges.[6] They refuse to meet their statutory obligations, including explaining the purported justifications for the continued exclusive use of the Data Center Pole ("space limitations, security concerns, and interference") in light of noted deficiencies in these justifications raised by commenters.[7] The Exchanges have even denied that the Wireless Services could possibly have a latency advantage.[8] We must also not forget that what gave rise to the Proposals in the first place was the Exchanges' overt steps to extend the latency advantage enjoyed by the Wireless Services by placing dishes on the roof of the Data Center.[9]

As a result of the Exchanges' posture and their continued lack of transparency, market participants can have no confidence that the Exchanges will not further seek to use their direct or indirect control over the Data Center to advantage the Wireless Services. Consequently, a more

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("McKay Letter I"), https://www.sec.gov/comments/sr-nyse-2020-05/srnyse202005-6950634-212524.pdf and (June 12, 2020) ("McKay Letter II"), https://www.sec.gov/comments/sr-nyse-2020-11/srnyse202011-7309398-218208.pdf.

[4] 15 U.S.C. 78f(b)(5) and (8).

[5] McKay Letter III at 2-4.

[6] The proposed definition of Data Center Pole continues to refer only to the "grounds" of the Mahwah data center rather than the premises or otherwise making clear that the Data Center Pole is a facility of the Exchanges. If the Exchange believes the Data Center Pole is not a facility of the Exchange, it should explain its rationale supporting this view.

[7] Wireless Connections Amendment No. 2 at n.29/30.

[8] Letter from Elizabeth K. King, Chief Regulatory Officer ICE, General Counsel and Corporate Secretary, NYSE, to Vanessa Countryman, Secretary, Commission re: the Wireless Filings at 17 (May 8, 2020) ("NYSE Letter I"), https://www.sec.gov/comments/sr-nyse-2020-05/srnyse202005-7168807-216593.pdf.

[9] *See* McKay Letter I at 9-10 (evidencing direct statements made to the Township of Mahwah regarding plans to establish a rooftop connection "to reduce the reliance on fiber and make the data delivery as fast as it can be").

comprehensive rule accounting for different ways in which a latency advantage could arise should be integrated into the Proposals. As stated in our previous comment letter, the proposed rules should be amended to prevent potential circumvention: (1) accounting for a different pole being the "closest commercial pole" with respect to certain data centers and (2) preventing private conduit systems from entering the Data Center other than through a public street right of way.[10]

The necessity for these additional safeguards would be substantially reduced if the Exchanges made a principles-based commitment toward creating a durable level playing field.[11] We strongly encourage them to do so. The chilling effect of these unfair competitive practices on competition is not theoretical.[12] Absent such a commitment to a level playing field, the Exchanges must address obvious loopholes in their proposed rules and justify the exclusive use of the Data Center Pole under the Exchange Act. Neither of the proposed amendments nor any of the Exchanges' comment letters have yet explained why the Wireless Services merit any advantage relative to competing wireless service providers (*e.g.*, an over-the-air advantage), as discussed further below.

II. Over-the-Air Latency Advantage

The Exchanges declined to account for over-the-air latency differentials in proposed amendment no. 2, arguing that any measurement of over-the-air latency "would be arbitrary at best," no provider of wireless services "follows the geodesic route," and such wireless network routes are "changeable and not publicly available."[13] This is a straw man argument suggesting that there is no way to account for the geodesic, over-the-air latency advantage (or disadvantage) without knowing the routes of competitors.[14]

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[10] *See* McKay Letter III at 6-8. The Exchange states that "[t]he Exchange does not believe that addressing the potential use of any hypothetical pole outside the data center grounds would further the goals of the proposed rule." Wireless Connections Amendment No. 2 at 6. This is precisely the problem. The Exchanges do not set a goal of fully and transparently eliminating the advantage of the Wireless Services relative to competitors, and, at the same time, propose a rule with loopholes that could be exploited in the future. Given that the Exchanges still believe that a proposed rule change was never required with respect to a pole on the premises of the Data Center, they are highly unlikely to file a proposed rule change with respect to any private conduit system constructed into the Data Center. This gap would allow for ICE Data Services ("IDS") to build a pole on adjacent private property and revive a latency advantage for the Wireless Services without public notice and comment or Commission review and approval for consistency with the Exchange Act. **Because any such private conduit system (*i.e.*, any conduit system not entering through the public street right of way) would have to be built on the premises of the Exchange, it would be a facility of the Exchange and appropriately subject to Commission oversight.** Moreover, the certain negative impact such a pole would have on fair competition in connecting to the Exchanges demonstrates the critical need for Commission oversight over this potential end-around of the Exchanges' proposed rules.

[11] *See* McKay Letter III at 2-4.

[12] As we have previously noted, after approval in 2013 of a proposal by Nasdaq to place wireless equipment for a single provider on the roof of its data center over objections from the Firm, it took the Firm six years to create a connectivity network that it believed could compete with the Nasdaq's latency advantaged preferred vendor. *See* McKay Letter II at 5.

[13] Wireless Connections Amendment No. 2 at 6.

[14] NYSE Comment Letter I at 17. The Exchanges previously tried this same argument when they denied the existence of any latency advantage in their first comment letter, claiming that the Exchanges "cannot describe the magnitude of an advantage they do not believe" the Wireless Services have and without "comparable information" regarding competitors' wireless networks. NYSE Comment Letter I at 17. It was in response to this straw man to

The over-the-air latency advantage of the Data Center Pole is not arbitrary, and the wireless networks' respective routes are unnecessary for determining the magnitude of the geographic advantage. That is, irrespective of the route taken from Nasdaq Inc.'s ("Nasdaq") data center in Carteret to the Mahwah Data Center, the minimum distance that must be traveled is shorter via the Data Center Pole than via the closest commercial pole.[15] This can be demonstrated by comparing the measurements from each of the four corners of the Carteret data center to the Data Center Pole relative to those same measurements to the current closest commercial pole (the Cross River pole east of the Data Center), as detailed in Appendix A.

The over-the-air advantage enjoyed by the Data Center Pole is almost the same (within two feet) from all of the starting points chosen on the Carteret data center. The measurements in Appendix A make clear that irrespective of the precise starting point at the Carteret data center, the Data Center Pole maintains a geographic advantage over the path to the closest commercial pole.[16] It is this *easily calculated* 157-foot over-the-air geographic advantage (with respect to the connection to Nasdaq), that must be accounted for to effectively equalize the Wireless Services' latency advantage over the closest commercial pole.[17]

Over-the-air differences in geographic distance should be accounted for because they are a fixed part of the advantage that arises from the exclusive use of the Data Center Pole and can thwart gaming of the proposed rules.[18] If the goal is to place the Data Center Pole on more equal footing with the closest commercial pole and eliminate advantages arising from the Data Center Pole's closer geographic proximity to the Data Center, then effectively achieving this goal necessarily requires consideration of over-the-air differentials. Notably, accounting for over-the-air differences with respect to each third party data center would, in certain cases, inure to the

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help clarify the Exchanges' apparent confusion that the Firm stated that "the relevant comparison" of the latency advantage is the fiber length to the respective poles into the Data Center—the language the Exchanges now cite to avoid addressing over-the-air latency advantages. *See* Amendment No. 2 at 6 (citing McKay Letter II at 8). The fiber length into the data center is *not* the only advantage enjoyed by the Data Center Pole. **The Data Center Pole also enjoys the over-the-air geographic advantage relative to certain third party data centers and insulation from competition for frequency licenses pursuant to Federal Communications Commission rules applicable to all other wireless service providers**.

[15] For example, assume two cars drive from Union Station in Washington, D.C., with the goal of reaching the New York Stock Exchange's headquarters at 11 Wall Street. However, Driver X is allowed to park across the street from the entrance and Driver Y must park two blocks north of the building. Driver X still has shorter distance to travel than Driver Y irrespective of the routes they choose to take.

[16] Competing wireless service providers may take different routes between third party data centers and the Mahwah data center as they are free to take whatever route best serves them. Where competing wireless services providers are <u>not</u> free in their route design is in final point of arrival at the destination of the Mahwah data center.

[17] We note that the measurement we provided in our previous comment letter stated that the over-the-air difference was 167 feet. McKay Letter III at 6 and 13. We have proposed, in Appendix A, a simplified measurement which is more easily verifiable through public data sources. *See* n.28.

[18] For example, if the Exchanges moved the Data Center Pole (or built a new pole) further south on the Data Center premises, they could improve the Wireless Services latency advantage through the air, while the fiber routes to the respective poles remained equalized.

benefit of the Wireless Services, as in the case of the connection to the Cboe Global Market's ("Cboe") data center in Secaucus.[19]

If the Exchanges decline to address the over-the-air differences that provide an advantage for Wireless Services to certain third party data centers, they must explain why it is consistent to do so under the Exchange Act. Merely asserting that their proposal (*i.e.*, equalizing latency between the Data Center Pole to the newly defined "Patch Panel Point" (or "Production Point" in the case of market data) relative to the closest commercial pole) as "a reasonable approach" is insufficient to justify retaining a fixed over-the-air latency advantage.[20] These are unvarying distances that can be easily addressed, and, indeed, we have provided a procedure here in Appendix A to explain the method.

III. Ensuring the Fastest Connection Method Is Available with Respect to the Receipt of Market Data and the Continued Need for Transparency

With respect to the Market Data Proposals, the Exchanges should specify in proposed Rule 3.14 (or at a minimum make an affirmative representation in the Proposals) that the connection method for receipt of market data distributed to the Wireless Services is no faster than the connection method for distributing market data to the commercial poles. As we noted in our second comment letter, there are many ways in which the Exchange can advantage one party over another.[21] This could include sending market data for certain parties but not others through additional network switches from the "Production Point" where market data is initially distributed. Thus, while the fiber lengths may be equal, there may be additional network switches adding latency that market data distributed to the commercial poles may have to pass through that market data distributed to the Data Center Pole may not. Accordingly, proposed Rule 3.14 should be amended to provide that market data or other information distributed from the Production Point will be distributed to the commercial poles in the same manner and using the same methods as it is to the Wireless Services.

There is little transparency regarding how the inner workings of the Exchanges connectivity and market data distribution infrastructure operate. For example, the Exchanges determined not to amend the Wireless Connections Proposals to equalize latency to customer cabinets and instead only to the "Patch Panel Point" because "the length of the fiber path from the Patch Panel Point to each customer cabinet in the space used for co-location in the data center ('Customer Cabinet') is the same."[22] There is no way for market participants to know this fact without a representation from the Exchanges. Indeed, as the Exchanges point out, exchange data centers "are not required to normalize their connections."[23] Thus, instead of dismissing our good-faith question regarding why the Exchanges did not propose in amendment no. 1 to equalize to customer cabinets, the Exchange might instead codify in their rules that fiber is equalized from

[19] McKay Letter III at 13 (noting that the over-the-air differential from the route of Mahwah to Secaucus is actually more favorable to the closest commercial pole rather than the Data Center Pole by ~ 62 feet).

[20] Wireless Connections Amendment No. 2 at 6 of 22.

[21] McKay Letter II at 9.

[22] Wireless Connections Amendment No. 2 at 6 of 22.

[23] *Id.*

the Patch Panel Point to customer cabinets and specify the tolerance of some such equalization (*e.g.*, within one foot, one inch, *etc.*)

Moreover, if it is true that fiber is equalized from the Patch Panel Point to each customer cabinet, it is curious why the Exchanges would not simplify the proposed rules to equalize to each customer cabinet. In other words, why create a newly defined term of "Patch Panel Point" to equalize fiber lengths to if the practical effect of doing so is in fact to equalize to customer cabinets. The Exchanges provide no explanation for taking this approach, which would seem to leave open the possibility of unequal fiber lengths from the Patch Panel Point to customer cabinets in the future, particularly without this inchoate policy codified in the Exchanges' rules.

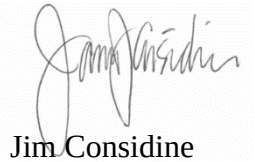
* * *

We support the Commission's recognition of the need for greater scrutiny and transparency in the area of exchange connectivity and market data services on the premises of exchange data centers. We are likewise appreciative of the Exchanges' notable steps toward neutralizing the geographic latency advantage through the proposed amendments.

However, we believe that the Exchange Act requires a level playing field whereby no market participant or wireless service provider is afforded a structural advantage arising from an exchange's direct or indirect control over its data center. We recognize that the perfect should not be the enemy of the good, and therefore believe that, for present purposes, the additional modifications described above and in McKay Letter III should be adopted, coupled with additional transparency and rigorous oversight by the Commission. Accordingly, we continue to encourage the Exchanges, including other exchanges such as Nasdaq, to commit to and work toward creating a level playing field and cease using direct or indirect control of their data centers to favor their services or those of a select vendor over others. In the absence of such commitment from exchanges, we believe Commission rulemaking or interpretive guidance may be necessary to prevent the use of connectivity advantages arising from an exchange's direct or indirect control over its data center.

Thank you for the opportunity to contribute to this important discussion. Please contact us with any questions at (312) 948-9188.

Sincerely,



Jim Considine
Chief Financial Officer
McKay Brothers, LLC

cc: The Hon. Jay Clayton, Chairman
The Hon. Hester M. Peirce, Commissioner
The Hon. Elad L. Roisman, Commissioner
The Hon. Allison Herren Lee, Commissioner
The Hon. Caroline Crenshaw, Commissioner

Mr. Brett Redfearn, Director, Division of Trading and Markets
Mr. Christian Sabella, Deputy Director, Division of Trading and Markets
Ms. Elizabeth Baird, Deputy Director, Division of Trading and Markets
Mr. David S. Shillman, Associate Director, Division of Trading and Markets
Mr. John Roeser, Associate Director, Division of Trading and Markets

S.P. Kothari, Director, Division of Economic and Risk Analysis

APPENDIX A

Over-the-Air Adjustment Procedure

Process:

1. Determine the latitude and longitude of the Data Center Pole and the closest commercial pole.
2. Choose a set of points representing the third party data center (*e.g.*, Carteret NY11, Secaucus NY4) such as each of the corners of the third party data center.
3. Use Vincenty's inverse formula to calculate the geodesic distance between each of the points chosen and both the Data Center Pole and the closest commercial pole.
4. Calculate for each point on the third party data center the difference in geodesic distance to the Data Center Pole and the closest commercial pole.
5. Choose one of the points and document the rationale for why this point was chosen for the purpose of calculating the over-the-air adjustment, thus determining the over-the-air adjustment length (the "Adjustment") for each third party data center.
6. After equalizing the length of the fiber connection between the Data Center Pole and the closest commercial pole, modify the length of the fiber from the Data Center Pole used for services involving each third party data center to account for the Adjustment (whether positive or negative) within a tolerance of one-foot.[24]
7. Document the calculation inputs and outputs and publish them to promote transparency, just and equitable principles of trade, and a free and open market; and to prevent manipulative acts and practices.

Example:

(1) Latitude and Longitude[25] of the Data Center Pole and the closest commercial pole:

	Latitude	Longitude
Data Center Pole	41.07854	-74.15195
Cross River Pole[26]	41.07871	-74.14951

(2) Points chosen to represent the Nasdaq data center at Carteret:

	Latitude	Longitude
SW Carteret	40.58367	-74.24432
NW Carteret	40.58514	-74.2439

[24] A tolerance of one foot should account for any imprecision in measuring and cutting the fiber to account for the Adjustment and is a commonly used standard in financial markets colocation.

[25] All latitudes and longitudes are expressed in the WGS-84 World Geodetic System.

[26] We note that the closest commercial pole may be different for different third party data centers, as explained in our previous comment letter. McKay Letter III at 6-7.

ATC tower	40.58523	-74.24358
NE Carteret	40.58468	-74.24249
SE Carteret	40.58373	-74.2432

(3) Distances calculated[27] expressed in meters:

	SW Carteret	NW Carteret	ATC Tower	NE Carteret	SE Carteret
Data Center Pole	55505.188	55338.583	55324.91	55372.636	55485.407
Cross River Pole	55553.132	55386.484	55372.719	55420.084	55533.016

(4) Over-the-air differences to each of the points representative of Carteret (a negative number means that the Data Center Pole is closer than the closest commercial pole):

	SW Carteret	NW Carteret	ATC Tower	NE Carteret	SE Carteret
Over-the-air difference (meters)	-47.944	-47.901	-47.809	-47.448	-47.609
(feet)	-157.30	-157.16	-156.85	-155.67	-156.20

Regardless of the point from which one measures at Nasdaq's Carteret data center, the over-the-air difference is the same within two feet. This demonstrates that the advantage is not arbitrary, but rather fixed within a reasonable tolerance.

While there can be some slight variability depending on how exactly this is calculated, there is no question that there is a material geodesic advantage for the Wireless Services to the Data Center Pole relative to the closest commercial pole. The Exchanges need only adopt a reasonable and documented approach to this calculation, as explained further below.

(5) The ATC Tower is a reasonable choice because it represents the exit point designed by Nasdaq and is used by the majority of market participants.

a. Based on this choice, the Exchanges should add 47.8 meters (156.85 feet) to its fiber length to the Data Center Pole to compensate for the over-the-air advantage (after equalizing the length of the fiber connection as between the Data Center Pole and the closest commercial pole into the Data Center).

Adopting a Reasonable and Transparent Approach to Calculating Over-the-Air Differences:

We note that the calculation of the over-the-air adjustment has some inherent variability. This variability is immaterial provided the Exchanges adopt a reasonable, transparent, consistent, and documented approach. The variability comes from the following sources:

[27] The following calculator was used for our calculations: https://www.cqsrg.org/tools/GCDistance/.

- *Distance Calculation* – The procedure used to calculate the distance between two points defined by a latitude and a longitude.
    - This is influenced by the elevation of the points and also by the method used (*e.g.*, follow the ground or calculating the geodesic distance on a model of the geoid).
    - We propose to use Vincenty's inverse formula which is easy to implement and accurate to better than one inch.[28]
- *Coordinates* – The choice of the coordinates of the Data Center Pole and the closest commercial pole.
    - One could choose, for example, the center of the pole, one of the points on the radius of the pole, or the actual location of the antennas. This can lead to slight variation between these coordinates.
    - The variation can be of the order of 6 ft in the current case. We submit that any reasonable assumptions can be used as long as they are documented (*i.e.*, the coordinates of the point chosen are provided).
- *Reference Point* – The choice of the reference point at the third party data center.
    - The variation introduced by this choice is less than two feet in the case of Carteret to NYSE.
    - We submit that any reasonable assumptions can be used as long as it is documented (*i.e.*, the coordinates of the point chosen is provided).

[28] We based the calculation of 167 feet in our previous letter on a three-dimensional measurement accounting for changes in elevation and terrain using Google Earth and private LiDAR data sources. Vincenty's inverse formula applied here yielding 157 feet ignores changes in elevation and terrain by assuming the earth is a smooth ellipsoid and then measuring the distance between two points. Vincenty's inverse formula offers a simplified approach and, in the case of the Carteret to Mahwah route, would benefit the Wireless Services with a shorter over-the-air fiber adjustment relative to a three-dimensional measurement accounting for changes in elevation and terrain.