JPMORGAN CHASE & CO.
Notes Linked to the J.P. Morgan QUEST Cloud Computing Index

JPMORGAN CHASE FINANCIAL COMPANY LLC
Notes, Fully and Unconditionally Guaranteed by JPMorgan Chase & Co., Linked to the J.P. Morgan QUEST Cloud Computing Index

Each of JPMorgan Chase & Co. and JPMorgan Chase Financial Company LLC may, from time to time, offer and sell notes linked in whole or in part to the J.P. Morgan QUEST Cloud Computing Index (the "**Index**"). The issuer of the notes, as specified in the relevant terms supplement, is referred to in this underlying supplement as the "**Issuer**." The Issuer will be either JPMorgan Chase & Co. or JPMorgan Chase Financial Company LLC. For notes issued by JPMorgan Chase Financial Company LLC, JPMorgan Chase & Co., in its capacity as guarantor of those notes, is referred to in this product supplement as the "**Guarantor**."

This underlying supplement describes the Index, the relationship between JPMorgan Chase & Co., JPMorgan Chase Financial Company LLC and the sponsor of the Index and terms that will apply generally to notes linked in whole or in part to the Index and other relevant information. This underlying supplement supplements the terms described in the accompanying product supplement, the prospectus supplement and the prospectus. A separate term sheet or pricing supplement, as the case may be, will describe terms that apply to specific issuances of the notes, including any changes to the terms specified below. These term sheets and pricing supplements are referred to generally in this underlying supplement as terms supplements. The accompanying product supplement, the relevant terms supplement or another accompanying underlying supplement will describe any other index or reference asset to which the notes are linked. If the terms described in the relevant terms supplement are inconsistent with those described in this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus, the terms described in the relevant terms supplement will control. In addition, if this underlying supplement and the accompanying product supplement or another accompanying underlying supplement contain information relating to the Index, the information contained in the document with the most recent date will control.

Investing in the notes involves a number of risks. See "Risk Factors" beginning on page S-2 of the prospectus supplement, "Risk Factors" in the accompanying product supplement and "Risk Factors" beginning on page US-3 of this underlying supplement.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the notes or passed upon the accuracy or the adequacy of the relevant terms supplement, this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus. Any representation to the contrary is a criminal offense.

The notes are not bank deposits, are not insured by the Federal Deposit Insurance Corporation or any other governmental agency and are not obligations of, or guaranteed by, a bank.

<div align="center">

J.P.Morgan

</div>

April 13, 2023

TABLE OF CONTENTS

The Issuer and the Guarantor (if applicable) have not authorized anyone to provide any information other than that contained or incorporated by reference in the relevant terms supplement, this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement or the prospectus with respect to the notes offered by the relevant terms supplement and with respect to the Issuer and the Guarantor (if applicable). The Issuer and the Guarantor (if applicable) take no responsibility for, and can provide no assurance as to the reliability of, any other information that others may give you. The relevant terms supplement, together with this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus, will contain the terms of the notes and will supersede all other prior or contemporaneous oral statements as well as any other written materials including preliminary or indicative pricing terms, correspondence, trade ideas, structures for implementation, sample structures, fact sheets, brochures or other educational materials of the Issuer. The information in each of the relevant terms supplement, this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus may be accurate only as of the date of that document.

The notes are not appropriate for all investors and involve a number of risks and important legal and tax consequences that should be discussed with your professional advisers. You should be aware that the regulations of Financial Industry Regulatory Authority, Inc., or FINRA, and the laws of certain jurisdictions (including regulations and laws that require brokers to ensure that investments are suitable for their customers) may limit the availability of the notes. The relevant terms supplement, this underlying supplement, any other accompanying underlying supplement, the accompanying product supplement, the prospectus supplement and the prospectus do not constitute an offer to sell or a solicitation of an offer to buy the notes under any circumstances in which that offer or solicitation is unlawful.

In this underlying supplement, "we," "us" and "our" refer to the Issuer, unless the context requires otherwise, and "JPMorgan Financial" refers to JPMorgan Chase Financial Company LLC. To the extent applicable, the index described in this underlying supplement is deemed to be one of the "Indices" referred to in the accompanying product supplement.

SUMMARY

The J.P. Morgan QUEST Cloud Computing Index (the "**Index**") was developed and is maintained by J.P. Morgan Securities plc ("**JPMS plc**"). The description of the Index and methodology included in this underlying supplement is based on rules formulated by JPMS plc (the "**Rules**"). The Rules, and not this description, will govern the calculation and constitution of the Index and other decisions and actions related to its maintenance. The Rules in effect as of the date of this underlying supplement are attached as Annex A to this underlying supplement. The Index is the intellectual property of JPMS plc and its affiliates, and JPMS plc and its affiliates reserve all rights with respect to their ownership of the Index. The Index is reported by Bloomberg L.P. under the ticker symbol "JPNLPCCT Index."

The Index attempts to provide exposure to large-, mid- and small-capitalization companies in developed markets that may have ties to the cloud computing industry. The composition of the Index is determined in part based on the application of a natural-language algorithmic analysis of news articles and press releases (each, a "**news item**") performed by RavenPack International S.L. ("**RavenPack**"), a data analytics provider, with results made available through RavenPack databases accessible by the Constituent Determination Agent (as defined below). In connection with each quarterly rebalance, the Constituent Determination Agent consults the RavenPack databases to determine the number of included news items for each month over the preceding 24 months that are relevant to each potential Index constituent, counting only the first news item relating to a given event for a given potential Index constituent over each 24-hour period. The Constituent Determination Agent then determines, for each potential Index constituent, the average monthly percentage of those news items (as defined under "The J.P. Morgan QUEST Cloud Computing Index" in this underlying supplement, the "**Theme Relevance Score**") that use one or more words related to the cloud computing industry, including cloud computing, cloud storage, infrastructure as a service, platform as a service, software as a service, backend as a service, serverless computing, function as a service, cloud architecture, cloud engineering, cloud infrastructure, virtualization, grid computing, data-as-a-service, integration platform as a service, data platform as a service, cloud platform, cloud AI, data cloud, cloud data platform, cloud service, cloud compute, cloud virtual machine, cloud database, cloud security, virtual private cloud, cloud load balancing, cloud storage, cloud solutions, public cloud, private cloud, hybrid cloud, Amazon Web Services, Azure, Google Cloud and other similar terms. The Index then seeks to track the potential Index constituents with a Theme Relevance Score that exceeds a specified threshold and that meet the other eligibility criteria of the Index, with weights determined using an optimization model. Subject to liquidity and size constraints, a higher Theme Relevance Score will generally result in a higher weight and a lower Theme Relevance Score will generally result in a lower weight.

No assurance can be given that this methodology for identifying companies that may have ties to the cloud computing industry will be successful. See "Risk Factors" in this underlying supplement for additional information.

RavenPack's natural-language algorithm seeks to identify companies and events mentioned in news items and to identify the roles played by those companies in those events. The algorithm also assigns scores to those companies or events across a variety of metrics, including relevance and novelty:

- *Relevance.* The relevance score for an entity associated with a news item is an integer score between 0 and 100 that indicates how strongly related the mention of that entity is to the events included in that news item, with higher relevance scores indicating greater relevance. A relevance score of 0 means the entity was passively mentioned while a relevance score of 100 means the entity was prominent in the news story.

  The relevance of an entity in a news item is based on criteria established by RavenPack, including where the entity is first mentioned within the news item, how frequently it is mentioned, its role in the events of the news item and the number of entities mentioned in the news item. An entity will be assigned a relevance score of 100 only if it is found to be playing a key role in the first event detected in the headline of a story. Usually, a relevance score of at least 90 indicates that the entity is referenced in the main title or headline of the news item,

while lower relevance scores indicate references further in the story body. If an entity is identified only in a "source" role, then it is given a relevance score of 10. A source may be a publisher, data provider or firm that authored, originated or is referenced in the story.

Only news items with a relevance score of 70 or greater for the relevant entity are considered for purposes of determining the Theme Relevance Score of a potential Index constituent.

- *Novelty.* The novelty score of an event associated with a news item is a score between 0.00000 and 365.00000 that indicates how many calendar days have passed since a similar event was detected in an earlier news item. A value of 365.00000 means that the most recent news item with a similar event has a timestamp that is at least 365 days before the timestamp of the current news item. A value of 1.00000 means that the most recent news item with a similar event has a timestamp that is 24 hours before the timestamp of the current news item.

  Only news items with a novelty score of 1.00000 or greater for the relevant entity are considered for purposes of determining the Theme Relevance Score of a potential Index constituent.

On any given day, the closing level of the Index (the "**Index Level**") reflects the weighted performance of the Index constituents (without adjustment for dividends), converted into U.S. dollars. The Index Level was set equal to approximately 23.36 on June 30, 2008, the base date of the Index (the "**Index Base Date**"). The Index Calculation Agent (as defined below) began calculating the Index on a live basis on March 29, 2023.

JPMS plc is currently the sponsor of the Index (the "**Index Sponsor**"), the determination agent of the Index constituents (the "**Constituent Determination Agent**") and the determination agent of disruption events (the "**Disruption Determination Agent**"). Solactive AG ("**Solactive**") is currently the calculation agent of the Index (the "**Index Calculation Agent**"). The Index Calculation Agent is deemed to be JPMS plc for the period prior to March 16, 2023.

See "The J.P. Morgan QUEST Cloud Computing Index" in this underlying supplement for additional information about the Index.

No assurance can be given that the investment strategy used to construct the Index will achieve its intended results or that the Index will be successful or will outperform any alternative index or strategy that might reference the RavenPack databases or the Index constituents.

The Index is described as a "notional" or "synthetic" portfolio of assets because there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. The Index merely references certain assets, the performance of which will be used as a reference point for calculating the Index Level.

RISK FACTORS

*Your investment in the notes will involve certain risks. Investing in the notes is not equivalent to investing directly in the Index or any of the equity securities underlying the Index (the "**Constituents**"), or any futures contracts or exchange-traded or over-the-counter instruments based on, or other instruments linked to, any of the foregoing.* **You should consider carefully the following discussion of risks, as well as the discussion of risks included in the relevant terms supplement, the accompanying product supplement and any other accompanying underlying supplement, before you decide that an investment in the notes is appropriate for you.**

Capitalized terms used in this section without definition are as defined in "Summary" above.

Risks Relating to the Index

JPMS plc, the Index Sponsor, the Constituent Determination Agent and the Disruption Determination Agent, and Solactive, the Index Calculation Agent, may adjust the Index in a way that affects its level, and JPMS plc and Solactive have no obligation to consider your interests.

JPMS plc, one of our affiliates, currently acts as the Index Sponsor, the Constituent Determination Agent and the Disruption Determination Agent and is responsible for maintaining the Index and developing the guidelines and policies governing its composition and calculation. Solactive currently acts as the Index Calculation Agent and is responsible for calculating the Index and determining any adjustments upon the occurrence of corporation actions or other corporate events. In performing these duties, JPMS plc and Solactive may have interests adverse to the interests of the holders of the notes, which may affect your return on the notes, particularly where JPMS plc, as the Index Sponsor, the Constituent Determination Agent and the Disruption Determination Agent, and Solactive, as the Index Calculation Agent, are entitled to exercise discretion. The rules governing the Index may be amended at any time by the Index Sponsor, in its sole discretion. The rules also permit the use of discretion by the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent and the Disruption Determination Agent in relation to the Index in specific instances, including, but not limited to, the determination of whether to make an adjustment upon the occurrence of a corporation action or other corporate event and any adjustment to be made; whether to replace the Base Reference Index (as defined under "The J.P. Morgan QUEST Cloud Computing Index" below) with a substitute or successor upon the occurrence of certain events affecting the Base Reference Index and the selection of any substitute or successor; whether a market disruption has occurred; and the interpretation of the rules governing the Index. Although JPMS plc, acting as the Index Sponsor, the Constituent Determination Agent and the Disruption Determination Agent, and Solactive, acting as the Index Calculation Agent, will make all determinations and take all action in relation to the Index acting in good faith, it should be noted that JPMS plc and Solactive may have interests adverse to the interests of the holders of the notes and the policies and judgments for which JPMS plc or Solactive is responsible could have an impact, positive or negative, on the level of the Index and the value of your notes.

Although judgments, policies and determinations concerning the Index are made by JPMS plc, JPMorgan Chase & Co. ultimately controls JPMS plc. JPMS plc has no obligation to consider your interests in taking any actions that might affect the value of your notes. Furthermore, the inclusion of any Constituent in the Index is not an investment recommendation by us or JPMS plc of that Constituent. See "The J.P. Morgan QUEST Cloud Computing Index."

The Index may not be successful or outperform any alternative strategy that might be employed in respect of the RavenPack databases or the Constituents.

The Index follows a notional rules-based proprietary strategy that operates on the basis of pre-determined rules. No assurance can be given that the investment strategy on which the Index is based will be successful or that the Index will outperform any alternative strategy that might be employed in respect of the RavenPack databases or the Constituents.

The methodology used by the Index to identify companies that may have ties to the cloud computing industry and to weight the Constituents may be unsuccessful.

The composition of the Index is determined in part based on the application of a natural-language algorithmic analysis of news items performed by RavenPack, with results made available through RavenPack databases accessible by the Constituent Determination Agent. In connection with each quarterly rebalance, the Constituent Determination Agent consults the RavenPack databases to determine the number of included news items for each month over the preceding 24 months that are relevant to each potential Constituent, counting only the first news item relating to a given event for a given potential Constituent over each 24-hour period. This methodology relies on RavenPack's natural-language algorithm to identify companies and events mentioned in news items and to identify the roles played by those companies in those events.

Natural language algorithms tend to significantly underperform humans in understanding the meaning of text. For example, natural language algorithms may misunderstand the meaning of text due to a failure to identify the correct meaning of a word in context, a failure to identify the correct scope of qualifiers, a lack of common knowledge, an inability to draw inferences from open-ended statements or an inability to recognize sarcasm, irony or other tones, intentions or emotions. The methodology used to determine whether a news item is sufficiently relevant or novel to be considered for purposes of determining the Theme Relevance Scores may fail to include highly relevant news items or may include irrelevant news items, perhaps with a high rate of error. The algorithm does not learn from news items it processes or adapt to its environment and, as a static algorithm that will not be updated over time for purposes of the Index, will continue to use the same mathematical rules to process news items, even as news develops over time or as RavenPack creates newer versions of the algorithm. In addition, any news items considered for purposes of determining the Theme Relevance Scores may include material inaccuracies, and the RavenPack databases may not have access to all news items that could potentially be relevant. In addition, the use of a 24-month lookback period could cause companies that no longer have ties to the cloud computing industry to be included and could cause companies that have only recent ties to the cloud computing industry not to be included.

The Constituent Determination Agent determines the Theme Relevance Score for each potential Constituent based on the percentage of relevant news items that use one or more words related to the cloud computing industry, including cloud computing, cloud storage, infrastructure as a service, platform as a service, software as a service, backend as a service, serverless computing, function as a service, cloud architecture, cloud engineering, cloud infrastructure, virtualization, grid computing, data-as-a-service, integration platform as a service, data platform as a service, cloud platform, cloud AI, data cloud, cloud data platform, cloud service, cloud compute, cloud virtual machine, cloud database, cloud security, virtual private cloud, cloud load balancing, cloud storage, cloud solutions, public cloud, private cloud, hybrid cloud, Amazon Web Services, Azure, Google Cloud and other similar terms. This step of the methodology is a simple text search and does not make use of RavenPack's natural language algorithm to attempt to determine context or relevance to the relevant entity. The search terms are not comprehensive and may be under-inclusive in some respects, leading to relevant news items being excluded, and overly broad in other respects, leading to irrelevant news items being included. The search terms will not be updated over time in response to industry changes or otherwise. No assurance can be given that this methodology for identifying companies that may have ties to the cloud computing industry will be successful. Some, perhaps many, of the Constituents might have no ties to cloud computing, and a significant number of companies that do have ties to the cloud computing industry might be excluded from the Index. The listing, size, liquidity, data availability and other eligibility criteria could also exclude companies with strong ties to the cloud computing industry.

Subject to liquidity and size constraints, a higher Theme Relevance Score will generally result in a higher weight and a lower Theme Relevance Score will generally result in a lower weight. A higher Theme Relevance Score may not be indicative of closer ties to the cloud computing industry, and no assurance can be given that Constituents with higher Theme Relevance Scores will outperform Constituents with lower Theme Relevance Scores.

No assurance can be given that the methodology used by the Index to identify companies that may have ties to the cloud computing industry and to weight the Constituents will be successful or that it will outperform any alternative strategy.

The Index is subject to risks associated with cloud computing companies.

Cloud computing companies may have limited product lines, markets, financial resources or personnel. These companies typically face intense competition and potentially rapid product obsolescence. In addition, many cloud computing companies store sensitive consumer information and could be the target of cybersecurity attacks and other types of theft, which could have a negative impact on these companies. As a result, cloud computing companies may be adversely impacted by government regulations and may be subject to additional regulatory oversight with regard to privacy concerns and cybersecurity risk. These companies are also heavily dependent on intellectual property rights and may be adversely affected by loss or impairment of those rights. Cloud computing companies could be negatively impacted by disruptions in service caused by hardware or software failure, or by interruptions or delays in service by third-party data center hosting facilities and maintenance providers. Cloud computing companies, especially smaller companies, tend to be more volatile than companies that do not rely heavily on technology. The customers and/or suppliers of cloud computing companies may be concentrated in a particular country, region or industry. Any adverse event affecting one of these countries, regions or industries could have a negative impact on loud computing companies. Cloud computing companies may participate in monopolistic practices that could make them subject to higher levels of regulatory scrutiny and/or potential break ups in the future, which could severely impact the viability of these companies.

Industry sector concentration risks may adversely affect the value of the notes.

Because the Index's exposure will likely be concentrated in a limited number of industry sectors at any time, you will not benefit, with respect to an investment in notes linked to the Index, from the advantages of a diversified investment, and you will bear the risks of a concentrated investment, including the risk of greater volatility than may be experienced in connection with a diversified investment. You should be aware that other investments may be more diversified than the notes in terms of the number and variety of industry sectors. The Index is currently primarily concentrated in the information technology and industrial sectors. The exposure of the Index to industry sectors may vary over time.

Market or economic factors impacting information technology companies and companies that rely heavily on technological advances could have a major effect on the value of those companies. The value of stocks of information technology companies and companies that rely heavily on technology is particularly vulnerable to rapid changes in technology product cycles, rapid product obsolescence, government regulation and competition, both domestically and internationally, including competition from foreign competitors with lower production costs. Stocks of information technology companies and companies that rely heavily on technology, especially those of smaller, less-seasoned companies, tend to be more volatile than the overall market. Information technology companies are heavily dependent on patent and intellectual property rights, the loss or impairment of which may adversely affect profitability. Additionally, companies in the information technology sector may face dramatic and often unpredictable changes in growth rates and competition for the services of qualified personnel. These factors could affect the information technology sector and could affect the level of the Index and the value of your notes.

Industrial companies are affected by supply and demand both for their specific product or service and for industrial sector products in general. Aerospace and defense companies, a component of the industrial sector, can be significantly affected by government spending policies because companies involved in this industry rely, to a significant extent, on U.S. and foreign government demand for their products and services. Thus, the financial condition of, and investor interest in, aerospace and defense companies are heavily influenced by governmental defense spending policies, which are typically under pressure from efforts to control the U.S. and other government budgets. These factors could affect the industrial sector and could affect the level of the Index and the value of your notes.

The Index should not be compared to any other index or strategy sponsored by any of our affiliates (each, a "J.P. Morgan Index") and cannot necessarily be considered a revised, enhanced or modified version of any other J.P. Morgan Index.

The Index follows a notional rules-based proprietary strategy that may have objectives, features and/or constituents that are similar to those of other J.P. Morgan Indices. No assurance can be given that these similarities will form a basis for comparison between the Index and any other J.P. Morgan Index, and no assurance can be given that the Index would be more successful than or outperform any other J.P. Morgan Index. The Index operates independently and does not necessarily revise, enhance, modify or seek to outperform any other J.P. Morgan Index.

Your return on the notes will not reflect dividends or other distributions on the Constituents.

Your return on the notes will not reflect the return you would realize if you actually owned the Constituents and received the dividends or other distributions paid on the Constituents. This is because the Index Calculation Agent will calculate the level of the Index, in part, by reference to the closing prices of the Constituents without reflecting the dividends or other distributions paid on the Constituents.

Hypothetical back-tested data relating to the Index do not represent actual historical data and are subject to inherent limitations.

Hypothetical back-tested performance measures of the Index are purely theoretical and do not represent the actual historical performance of the Index and have not been verified by an independent third party. Hypothetical back-tested performance measures have inherent limitations. Hypothetical back-tested performance is derived by means of the retroactive application of a back-tested model that has been designed with the benefit of hindsight. Alternative modelling techniques might produce significantly different results and may prove to be more appropriate. Past performance, and especially hypothetical back-tested performance, is not indicative of future results. This type of information has inherent limitations and you should carefully consider these limitations before placing reliance on such information.

If the prices of the Constituents change, the level of the Index and the market value of your notes may not change in the same manner.

Owning the notes is not the same as owning the Constituents. Accordingly, changes in the prices of the Constituents may not result in a comparable change in the level of the Index or the market value of your notes.

The Index comprises notional assets and liabilities.

The exposure of the Index to the Constituents is purely notional and will exist solely in the records maintained by or on behalf of the Index Calculation Agent. There is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. Consequently, you will not have any claim against any of the Constituents.

The Index has a limited operating history and may perform in unanticipated ways.

The Index was established on March 29, 2023 and therefore has a limited operating history. Past performance should not be considered indicative of future performance.

The Index methodology may be modified upon the occurrence of certain extraordinary events.

As described under "The J.P. Morgan QUEST Cloud Computing Index — Extraordinary Events" below, certain extraordinary events may affect the ability of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent and the Disruption Determination Agent to reference data sources including the RavenPack databases, the optimization software, the Base Reference Index and other sources referenced by the Index. As described in the Rules, upon the occurrence of any of those extraordinary events, if practicable, a successor or replacement may be identified and the Rules will be amended accordingly, provided that the Index Sponsor may, in its discretion, at any time and without

notice, terminate the calculation or publication of the Index, including, without limitation, subsequent to the occurrence of an extraordinary event. The Index Sponsor is under no obligation to continue the calculation and publication of the Index.

The Index is subject to market risks.

The performance of the Index is dependent in part on the price performances of the Constituents. As a consequence, your investment in the notes is exposed to the price performances of the Constituents.

The Index is subject to risks associated with mid- and small-capitalization stocks.

Some of the Constituents are issued by mid- or small-capitalization companies. Mid- and small-capitalization companies may be less able to withstand adverse economic, market, trade and competitive conditions relative to larger companies. Mid- and small-capitalization companies are less likely to pay dividends on their stocks, and the presence of a dividend payment could be a factor that limits downward stock price pressure under adverse market conditions.

The Index is subject to risks associated with non-U.S. securities markets.

Some of the Constituents have been issued by non-U.S. companies. Investments in securities linked to the value of securities of non-U.S. issuers involve risks associated with the securities markets in those countries where the relevant non-U.S. securities are traded, including risks of volatility in those markets, governmental intervention in those markets and cross shareholdings in companies in certain countries. Also, there is generally less publicly available information about companies in some of these jurisdictions than about U.S. companies that are subject to the reporting requirements of the SEC, and generally non-U.S. companies are subject to accounting, auditing and financial reporting standards and requirements and securities trading rules different from those applicable to U.S. reporting companies.

The prices of securities in non-U.S. markets may be affected by political, economic, financial and social factors in those markets, including changes in a country's government, economic and fiscal policies, currency exchange laws or other laws or restrictions. Moreover, the economies of these countries may differ favorably or unfavorably from the economy of the United States in such respects as growth of gross national product, rate of inflation, capital reinvestment, resources and self-sufficiency. These countries may be subjected to different and, in some cases, more adverse economic environments.

Some or all of these factors may influence the level of the Index. The impact of any of the factors set forth above may enhance or offset some or all of any change resulting from another factor or factors. You cannot predict the future performance of the Index. The level of the Index may change in a manner that would adversely affect any payment on the notes.

The Index is subject to currency exchange risk.

Because the prices of the non-U.S. Constituents are converted into U.S. dollars for the purposes of calculating the level of the Index, the holders of the notes will be exposed to currency exchange rate risk with respect to each of the currencies in which the non-U.S. Constituents trade. An investor's net exposure will depend on the extent to which those currencies strengthen or weaken against the U.S. dollar and the relative weight of the non-U.S. Constituents denominated in each applicable currency. If, taking into account the weighting, the U.S. dollar changes in value relative to those currencies, the level of the Index and any payment on the notes may be adversely affected.

Of particular importance to potential currency exchange risk are:

- existing and expected rates of inflation;

- existing and expected interest rate levels;

- the balance of payments in the countries issuing those currencies and in the United States and between each country and its major trading partners;

- political, civil or military unrest in the countries issuing those currencies and in the United States; and

- the extent of governmental surpluses or deficits in the component countries and the United States.

All of these factors are, in turn, sensitive to the monetary, fiscal and trade policies pursued by the governments of various component countries, the United States and other countries important to international trade and finance.

The Issuer and the Guarantor (if applicable) have no control over exchange rates.

Foreign exchange rates can either float or be fixed by sovereign governments. Exchange rates of the currencies used by most economically developed nations are permitted to fluctuate in value relative to the U.S. dollar and to each other. However, from time to time governments and, in the case of countries using the euro, the European Central Bank, may use a variety of techniques, such as intervention by a central bank, the imposition of regulatory controls or taxes or changes in interest rates to influence the exchange rates of their currencies. Governments may also issue a new currency to replace an existing currency or alter the exchange rate or relative exchange characteristics by a devaluation or revaluation of a currency. These governmental actions could change or interfere with currency valuations and currency fluctuations that would otherwise occur in response to economic forces, as well as in response to the movement of currencies across borders. As a consequence, these governmental actions could adversely affect an investment in the notes.

The Issuer and the Guarantor (if applicable) will not make any adjustment or change in the terms of the notes in the event that exchange rates become fixed, or in the event of any devaluation or revaluation or imposition of exchange or other regulatory controls or taxes, or in the event of other developments affecting the U.S. dollar or any relevant foreign currency. You will bear those risks.

The relevant terms supplement or a separate underlying supplement will provide additional risk factors relating to any other index or reference assets to which the notes are linked.

THE J.P. MORGAN QUEST CLOUD COMPUTING INDEX

The J.P. Morgan QUEST Cloud Computing Index (the "**Index**") was developed and is maintained by J.P. Morgan Securities plc ("**JPMS plc**"). The description of the Index and methodology included in this underlying supplement is based on rules formulated by JPMS plc (the "**Rules**"). The Rules, and not this description, will govern the calculation and constitution of the Index and other decisions and actions related to its maintenance. The Rules in effect as of the date of this underlying supplement are attached as Annex A to this underlying supplement. The Index is the intellectual property of JPMS plc and its affiliates, and JPMS plc and its affiliates reserve all rights with respect to their ownership of the Index. The Index is reported by Bloomberg L.P. under the ticker symbol "JPNLPCCT Index."

The Index attempts to provide exposure to large-, mid- and small-capitalization companies in developed markets that may have ties to the cloud computing industry. The composition of the Index is determined in part based on the application of a natural-language algorithmic analysis of news articles and press releases (each, a "**news item**") performed by RavenPack International S.L. ("**RavenPack**"), a data analytics provider, with results made available through RavenPack databases accessible by the Constituent Determination Agent (as defined below). In connection with each quarterly rebalance, the Constituent Determination Agent consults the RavenPack databases to determine the number of included news items for each month over the preceding 24 months that are relevant to each potential Index constituent, counting only the first news item relating to a given event for a given potential Index constituent over each 24-hour period. The Constituent Determination Agent then determines, for each potential Index constituent, the average monthly percentage of those news items (as defined below, the "**Theme Relevance Score**") that use one or more words related to the cloud computing industry, including cloud computing, cloud storage, infrastructure as a service, platform as a service, software as a service, backend as a service, serverless computing, function as a service, cloud architecture, cloud engineering, cloud infrastructure, virtualization, grid computing, data-as-a-service, integration platform as a service, data platform as a service, cloud platform, cloud AI, data cloud, cloud data platform, cloud service, cloud compute, cloud virtual machine, cloud database, cloud security, virtual private cloud, cloud load balancing, cloud storage, cloud solutions, public cloud, private cloud, hybrid cloud, Amazon Web Services, Azure, Google Cloud and other similar terms. The Index then seeks to track the potential Index constituents with a Theme Relevance Score that exceeds a specified threshold and that meet the other eligibility criteria of the Index, with weights determined using an optimization model. Subject to liquidity and size constraints, a higher Theme Relevance Score will generally result in a higher weight and a lower Theme Relevance Score will generally result in a lower weight.

No assurance can be given that this methodology for identifying companies that may have ties to the cloud computing industry will be successful. See "Risk Factors" in this underlying supplement for additional information.

On any given day, the closing level of the Index (the "**Index Level**") reflects the weighted performance of the Index constituents (without adjustment for dividends), converted into U.S. dollars. The Index Level was set equal to approximately 23.36 on June 30, 2008, the base date of the Index (the "**Index Base Date**"). The Index Calculation Agent (as defined below) began calculating the Index on a live basis on March 29, 2023.

No assurance can be given that the investment strategy used to construct the Index will achieve its intended results or that the Index will be successful or will outperform any alternative index or strategy that might reference the RavenPack databases or the Index constituents.

The Index is described as a "notional" or "synthetic" portfolio of assets because there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. The Index merely references certain assets, the performance of which will be used as a reference point for calculating the Index Level.

Composition of the Index and Index Rebalancing

Except under the circumstances described below, the Index is rebalanced quarterly on the last Index Scheduled Trading Day of March, June, September and December (each, a "**Scheduled Rebalancing**

Date") to reflect the composition and weighting of the Index determined in respect of the fifth immediately preceding London Scheduled Business Day (the "**Rebalance Selection Date**") in accordance with the methodology described below and in the Rules. In addition, March 16, 2023 (the "**Calculation Agent Succession Date**") was deemed to be a Scheduled Rebalancing Date.

An "**Index Scheduled Trading Day**" means a day other than a Saturday or Sunday (each, a "**Calculation Day**") on which each of the New York Stock Exchange, the Deutsche Börse Xetra, the London Stock Exchange and the Tokyo Stock Exchange is scheduled to be open for trading during its regular trading session, whether scheduled for a full-day regular trading session or a shortened-day regular trading session.

A "**London Scheduled Business Day**" means a day that is both (i) a Calculation Day and (ii) a day on which the London Stock Exchange is scheduled to be open for its regular trading session.

Identifying the Eligible Stocks. The stock universe for the Index, in respect of a Rebalance Selection Date, includes each of the constituents of the MSCI World Investable Market Index^{SM} (the "**Base Reference Index**"), as available to the Constituent Determination Agent at approximately 8:00 a.m. local time in London, United Kingdom on the London Scheduled Business Day that immediately follows that Rebalance Selection Date (the "**Data Reference Time**") (each, a "**Universe Stock**"). See the Rules for additional information about the various data sources referenced in determining the composition of the Index.

The Base Reference Index is designed to measure the equity market performance of the large-, mid- and small-cap segments of certain developed markets. The Base Reference Index currently consists of the following 23 developed market country indices: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Hong Kong, Ireland, Israel, Italy, Japan, the Netherlands, New Zealand, Norway, Portugal, Singapore, Spain, Sweden, Switzerland, the United Kingdom and the United States. The Base Reference Index covers approximately 99% of the free float-adjusted market capitalization in each country.

A Universe Stock in respect of a Rebalance Selection Date will be eligible to be included in the Index in respect of that Rebalance Selection Date (each, an "**Eligible Constituent**") if (a) that Universe Stock corresponds to a listed security (a "**Listing**") that is included in the RavenPack Analytics Data and RavenPack Mapping Data (collectively, the "**RavenPack Databases**"), (b) the RavenPack Databases include all of the inputs and related information for that Listing and its issuer (a "**Reference Entity**") necessary to make all of the determinations required under the methodology governing the Index and (c) that Listing and its Reference Entity satisfy the listing, size, liquidity, data availability and other criteria described under "— Eligibility Criteria" below (the "**Eligibility Criteria**"). In addition, any Index constituent already included in the Index with a positive weight on a Rebalance Selection Date will also be an Eligible Constituent in respect of that Rebalance Selection Date if the 1 Month Dollar Notational Trading Estimate (as defined in the Rules) in respect of that Rebalance Selection Date is not a disregarded value.

If, in respect of a Rebalance Selection Date, the inputs and related information necessary to make all of the determinations required under the methodology governing the Index is available in respect of fewer than 200 Reference Entities, then no changes will be made to the composition of the Index in connection with that Rebalance Selection Date and no rebalancing will occur on the associated Scheduled Rebalancing Date.

Calculating the Theme Relevance Scores. In respect of each Rebalance Selection Date, the Constituent Determination Agent determines the "**Theme Relevance Score**" for the Reference Entity associated with each Eligible Constituent by taking the average of the Monthly Theme Relevance Scores for that Reference Entity over the 24 calendar months preceding the calendar month in which that Rebalance Selection Date falls (the "**Reference Period**"). The "**Monthly Theme Relevance Score**" for a Reference Entity in respect of a calendar month is equal to the percentage of Relevant Stories for that Reference Entity and that calendar month that include any of the following key words: "cloud computing," "cloud storage," "Infrastructure as a service," "IaaS," "Platform as a service," "PaaS," "Software as a service," "SaaS," "backend as a service," "Serverless computing," "Function as a Service," "Cloud architecture," "Cloud engineering," "cloud infrastructure," "cloud infrastructures," "Virtualization,"

"Virtualisation," "Virtualized," "Virtualised," "grid computing," "data-as-a-service," "iPaaS," "Integration Platform as a Service," "dPaaS," "Data Platform as a Service," "cloud platforms," "cloud platform," "cloud AI," "data cloud," "cloud data platform," "cloud data platforms," "cloud services," "cloud service," "cloud compute," "cloud virtual machines," "cloud virtual machine," "cloud database," "cloud security," "virtual private cloud," "cloud load balancing," "cloud storage," "Cloud Solutions," "Cloud Solution," "public cloud," "private cloud," "hybrid cloud," "Amazon Web Services," "Azure," and "Google Cloud."

A news item will be a "**Relevant Story**" for a Reference Entity in respect of a calendar month if that news item (a) is included in the RavenPack Databases, (b) has a relevance score of 70 or more for that Reference Entity, (c) has a novelty score of 1.00000 or more for an event for that Reference Entity and (d) has a timestamp that falls within that calendar month. Each news item's timestamp corresponds to the time at which RavenPack receives that news item.

RavenPack's algorithm seeks to identify companies and events mentioned in news items and to identify the roles played by those companies in those events. The algorithm also assigns scores to those companies or events across a variety of metrics, including relevance and novelty:

- *Relevance.* The relevance score for an entity associated with a news item is an integer score between 0 and 100 that indicates how strongly related the mention of that entity is to the events included in that news item, with higher relevance scores indicating greater relevance. A relevance score of 0 means the entity was passively mentioned while a relevance score of 100 means the entity was prominent in the news story.

  The relevance of an entity in a news item is based on criteria established by RavenPack, including where the entity is first mentioned within the news item, how frequently it is mentioned, its role in the events of the news item and the number of entities mentioned in the news item. An entity will be assigned a relevance score of 100 only if it is found to be playing a key role in the first event detected in the headline of a story. Usually, a relevance score of at least 90 indicates that the entity is referenced in the main title or headline of the news item, while lower relevance scores indicate references further in the story body. If an entity is identified only in a "source" role, then it is given a relevance score of 10. A source may be a publisher, data provider or firm that authored, originated or is referenced in the story.

  Only news items with a relevance score of 70 or greater for the relevant entity are considered for purposes of determining the Theme Relevance Score of a potential Index constituent.

- *Novelty.* The novelty score of an event associated with a news item is a score between 0.00000 and 365.00000 that indicates how many calendar days have passed since a similar event was detected in an earlier news item. A value of 365.00000 means that the most recent news item with a similar event has a timestamp that is at least 365 days before the timestamp of the current news item. A value of 1.00000 means that the most recent news item with a similar event has a timestamp that is 24 hours before the timestamp of the current news item.

  Only news items with a novelty score of 1.00000 or greater for the relevant entity are considered for purposes of determining the Theme Relevance Score of a potential Index constituent.

The algorithm does not learn from news items it processes or adapt to its environment and, as a static algorithm that will not be updated over time for purposes of the Index, will continue to use the same mathematical rules to process news items, even as news develops over time or as RavenPack creates newer versions of the algorithm. No assurance can be given that this methodology for identifying companies that may have ties to the cloud computing industry will be successful. See "Risk Factors" in this underlying supplement for additional information.

Calculating the Number of Total Theme Relevant Stories. In respect of each Rebalance Selection Date, the Constituent Determination Agent determines the "**Total Theme Relevant Stories**" for the Reference Entity associated with each Eligible Constituent by aggregating the Number of Theme

Relevant Stories for that Reference Entity over the 24 calendar months preceding (and not including) the calendar month in which that Rebalance Selection Date falls. A news item will be counted towards the "**Number of Theme Relevant Stories**" for a Reference Entity if that news item (a) is included in the RavenPack Databases, (b) is a Relevant Story, (c) has a relevance score of 70 or more for that Reference Entity and (d) has a novelty score of 1.00000 or more for an event for that Reference Entity.

Determining the Preliminary Weights. In respect of each Rebalance Selection Date, the Constituent Determination Agent determines the number of Eligible Constituents (each, a "**Thematic Eligible Constituent**") that have been issued by a Reference Entity with a Theme Relevance Score in respect of that Rebalance Selection Date of more than 10% (the "**Thematic Relevance Score Threshold**"). If the number of Thematic Eligible Constituents is less than 30, then the Thematic Relevance Score Threshold will be reduced in increments of 2% until the number of Thematic Eligible Constituents is greater than or equal to 30. If the number of Thematic Eligible Constituents is still less than 30 after the Thematic Relevance Score Threshold has been reduced to 0%, then no changes will be made to the composition of the Index in connection with that Rebalance Selection Date and no rebalancing will occur on the associated Scheduled Rebalancing Date.

If the number of Thematic Eligible Constituents is greater than or equal to 30 in respect of that Rebalance Selection Date, the Constituent Determination Agent will determine the "**Theme Score Percentage**" of each Eligible Constituent as follows:

- in the case of an Eligible Constituent that is not a Thematic Eligible Constituent, 0%; and

- in the case of an Eligible Constituent that is a Thematic Eligible Constituent, (a) the Theme Relevance Score of the Reference Entity that issued that Thematic Eligible Constituent in respect of that Rebalance Selection Date *divided by* (b) the sum of the Theme Relevance Scores of each of the Reference Entities that issued a Thematic Eligible Constituent.

The Constituent Determination Agent will then attempt to determine the weights of the Eligible Constituents within the Index in respect of that Rebalance Selection Date using an optimization model (the "**Output Weights**"). Subject to constraints described below, the optimization model seeks to minimize the sum of the squares of the difference between the Output Weight of each Eligible Constituent and its Theme Score Percentage. Subject to the constraint described below, a higher Theme Score Percentage will generally result in a higher Output Weight and a lower Theme Score Percentage will generally result in a lower Output Weight. The constraints of this optimization are as follows:

- the sum of the Output Weights of the Eligible Constituents must be 100% and the Output Weight of each Eligible Constituent must be greater than or equal to 0%;

- the Output Weight of any Eligible Constituent that is not a Thematic Eligible Constituent must be 0%, *provided* that, if the Current Weight of that Eligible Constituent as notionally held by the Index on that Rebalance Selection Date is greater than the Maximum Liquidity Percentage for that Eligible Constituent in respect of that Rebalance Selection Date, the Output Weight of that Eligible Constituent must be the Current Weight of that Eligible Constituent as notionally held by the Index on that Rebalance Selection Date *minus* the Maximum Liquidity Percentage for that Eligible Constituent in respect of that Rebalance Selection Date;

- the Output Weight of each Eligible Constituent that is a Thematic Eligible Constituent must not be greater than or less than the Current Weight of that Eligible Constituent as notionally held by the Index on that Rebalance Selection Date by more than the Maximum Liquidity Percentage for that Eligible Constituent in respect of that Rebalance Selection Date; and

- the Output Weight of each Eligible Constituent that is a Thematic Eligible Constituent must not be greater than the smallest of (a) 5%, (b) the Maximum Liquidity Percentage for that Eligible Constituent in respect of that Rebalance Selection Date and (c) the Maximum Free Float Market Cap Percentage for that Eligible Constituent in respect of that Rebalance Selection Date (the "**Maximum Weight**"), *provided* that, if the Maximum Weight for that

Eligible Constituent in respect of that Rebalance Selection Date is less than the Current Weight of that Eligible Constituent as notionally held by the Index on that Rebalance Selection Date *minus* the Maximum Liquidity Percentage for that Eligible Constituent in respect of that Rebalance Selection Date, the Maximum Weight for that Eligible Constituent in respect of that Rebalance Selection Date will be deemed to be the Current Weight of that Eligible Constituent as notionally held by the Index on that Rebalance Selection Date *minus* the Maximum Liquidity Percentage for that Eligible Constituent in respect of that Rebalance Selection Date.

For purposes of determining the composition of the Index:

- the "**Current Weight**" of an Eligible Constituent as notionally held by the Index on a Rebalance Selection Date is calculated in the manner set forth in the Rules and is calculated based on the U.S. dollar value on that Rebalance Selection Date of the number of shares, if any, of that Eligible Constituent notionally held by the Index on that Rebalance Selection Date as compared to the U.S. dollar value on that Rebalance Selection Date of the shares of each of the Index constituents notionally held by the Index on that Rebalance Selection Date;

- the "**Maximum Liquidity Percentage**" of an Eligible Constituent on a Rebalance Selection Date is equal to the 1 Month Dollar Notional Trading Estimate *divided by* $1 billion, where the 1 Month Dollar Notional Trading Estimate is determined in the manner set forth in the Rules and represents an estimate of an average of the daily U.S. dollar value of the shares of that Eligible Constituent traded during the 30 calendar days ending on and including that Rebalance Selection Date, with the three highest and lowest daily values excluded in calculating that average; and

- the "**Maximum Free Float Market Cap Percentage**" of an Eligible Constituent on a Rebalance Selection Date is equal to 3% of the Dollar Base Reference Free-Float Market Capitalization (as defined in the Rules) *divided by* $200 million, where the Dollar Base Reference Free-Float Market Capitalization is determined in the manner set forth in the Rules and represents an estimate of the U.S. dollar value of the free-float market capitalization of that Eligible Constituent on that Rebalance Selection Date.

If the optimization model fails to produce Output Weights for the Eligible Constituents, then the Constituent Determination Agent will reduce the Thematic Relevance Score Threshold in increments of 2% until the optimization model produces Output Weights for the Eligible Constituent. If the optimization model fails to produce Output Weights for the Eligible Constituent after the Thematic Relevance Score Threshold has been reduced to 0%, then no changes will be made to the composition of the Index in connection with that Rebalance Selection Date and no rebalancing will occur on the associated Scheduled Rebalancing Date.

If the optimization model produces Output Weights for the Eligible Constituents, then those weights will be the "**Preliminary Weights**," *provided* that the Preliminary Weight of any Eligible Constituent with a weight from the optimization model of less than 0.0001% will be deemed to be 0%. Once the Preliminary Weights are determined, the Constituent Determination Agent provides a list of the Eligible Constituents with Preliminary Weights above 0% (the "**Preliminary Constituents**"), along with their Preliminary Weights, to the Index Calculation Agent. Notwithstanding the foregoing, if there are fewer than 30 Preliminary Constituents in respect of a Rebalance Selection Date, then no changes will be made to the composition of the Index in connection with that Rebalance Selection Date and no rebalancing will occur on the associated Scheduled Rebalancing Date.

Identifying the Constituents. In respect of each Scheduled Rebalancing Date, the Index Calculation Agent determines the "**Constituents**" as consisting of each Preliminary Constituent that has not been delisted from its primary exchange or quotation system or suspended from trading on its primary exchange or quotation system (other than a limitation of trading in shares of that Preliminary Constituent by reason of movements in price exceeding limits permitted by the relevant exchange or quotation system) from and including the immediately preceding Rebalance Selection Date to and including that

Scheduled Rebalancing Date. The "**Constituent Weight**" of each Constituent is equal to its Preliminary Weight.

Rebalancing the Index. Except under the circumstances described above, the Index will be rebalanced on each Scheduled Rebalancing Date to reflect the Constituents and the Constituent Weights determined in respect of the associated Scheduled Rebalancing Date. A Scheduled Rebalancing Date on which the Index is rebalanced is referred to herein as an "**Effective Rebalancing Date**." In the event that one or more Constituents is affected by a market disruption on an Effective Rebalancing Date, the Index may postpone or cancel its entry into, or postpone its exit from, its synthetic position in any such Constituent. See "— Index Market Disruption Events" below.

Eligibility Criteria

A Listing and its Reference Entity will satisfy the Eligibility Criteria in respect of a Rebalance Selection Date only if:

- that Reference Entity has a Theme Relevance Score in respect of that Rebalance Selection Date that is greater than 0%; and

- that Reference Entity has at least 50 Relevant Stories within the Reference Period in respect of that Rebalance Selection Date; and

- that Reference Entity has more than 20 Total Theme Relevant Stories in respect of that Rebalance Selection Date; and

- that Listing is represented in Thomson Reuters Datastream as accessed via QA Direct at approximately the Data Reference Time; and

- that Listing has a Dollar Base Reference Free-Float Market Capitalization in respect of that Rebalance Entry Selection Date; and

- that Listing is not subject to a suspension in trading on its primary exchange or quotation system that has occurred or is continuing on that Rebalance Selection Date (other than a limitation of trading in those shares by reason of movements in price exceeding limits permitted by its primary exchange or quotation system); and

- that Listing is associated with any of the following exchange codes in respect of that Rebalance Selection Date: "XNGS" (NASDAQ Global Select), "XNYS" (New York Stock Exchange), "XSWX" (SIX-Swiss Exchange), "XAMS" (Euronext Amsterdam), "XPAR" (Euronext Paris), "XTKS" (Tokyo Stock Exchange), "XLON" (London Stock Exchange), "XHKG" (Hong Kong Exchanges and Clearing), "XTSE" (Toronto Stock Exchange), "XETR" (Xetra), "XCSE" (Nasdaq Copenhagen), "XASX" (Australian Stock Exchange), "MTAA" (BrsaItaliana), "XMAD" (Bolsa de Madrid), "XBRU" (Euronext Brussels), "XSTO" (Nasdaq Stockholm), "XSES" (Singapore Exchange), "XDUB" (Irish Stock Exchange), "XHEL" (Nasdaq Helsinki), "XNMS" (NASDAQ Global Market), "XNCM" (NASDAQ Capital Market), "XOSL" (Oslo Bors), "XASE" (NYSE Mkt), "XLIS" (Euronext Lisbon), "XTAE" (Tel Aviv Stock Market), "XNZE" (New Zealand Exchange), "BATS" (CBOE BZX US), "XWBO" (Wiener Boerse AG), "FNSE" (First North Sweden), "XJAS" (Tokyo Stock Exchange Jasdaq), "XNGM" (Nordic Growth Market) or "FNFI" (First North Finland); and

- the sector of that Listing is included in one of the following associated Global Industry Classification Standard sectors: information technology, consumer discretionary and communication services; and

- that Listing has a 12 Month Dollar Notional Trading Estimate (as defined in the Rules) in respect of that Rebalance Selection Date of more than $1,000,000, where the 12 Month Dollar Notional Trading Estimate is determined in the manner set forth in the Rules and represents an estimate of an average of the daily U.S. dollar value of the shares of that

Eligible Constituent traded during the 364 calendar days ending on and including that Rebalance Selection Date, with the ten highest and lowest daily values excluded in calculating that average; and

- that Listing has a 1 Month Dollar Notional Trading Estimate in respect of that Rebalance Selection Date of more than $1,000,000; and

- in the case of any Reference Entity with multiple Listings that satisfy each of the above Eligible Criteria, that Listing is the Listing among those Listings with the highest 12 Month Dollar Notional Trading Estimate; and

- that Reference Entity is not J.P. Morgan Chase & Co., Visa Inc., MasterCard Inc., or any successors to any of those entities, and is not otherwise an affiliate of the Index Sponsor; and

- that Reference Entity is not subject to any applicable law, regulation, order or rule that would directly or indirectly prohibit or restrict holding, purchasing or selling securities of that Reference Entity or derivatives on, or other exposures to, those securities, as further described in the Rules.

Calculation of the Index Level

Except as described under "— Index Market Disruption Events" below, the Index Calculation Agent will calculate and publish the Index Level in respect of each Calculation Day as soon as reasonably practicable on or after that day. All Index Levels will be rounded to two decimal places for purposes of publication only before being published. The Index Calculation Agent may vary its rounding convention in its sole discretion, *provided* that it will not publish the Index Level with fewer than two decimal places. Notwithstanding anything to the contrary, the Index Calculation Agent may calculate and maintain the Index Level to greater accuracy for the determination of upcoming Index Levels or other calculations.

The Index Level was set equal to 23.3576658073456 on June 30, 2008, the Index Base Date. The calculation of the Index Level for each subsequent Calculation Day takes into account the Index Level in respect of the immediately preceding Calculation Day and the weighted performance of the Constituents (without adjustment for any dividends), converted into U.S. dollars, since the immediately preceding Calculation Day, subject to adjustments as described under "— Index Market Disruption Events" and "— Index Calculation Agent Adjustments Due to Corporate Actions and Corporate Events" below. See the Index Rules for additional information about the calculation of the Index Level.

If the Index Level on any Calculation Day is less than or equal to zero, the Index Level for that Calculation Day and each subsequent Calculation Day will be zero and the Index Calculation Agent will no longer calculate the Index Level as described above.

Index Market Disruption Events

The calculation and publication of the Index Level and the rebalancing of the Index will be affected by the occurrence of certain market disruptions relating to the Constituents. These events are set out in full in the Rules and include, without limitation, suspensions or disruptions of trading or data unavailability relating to the Constituents or related futures or option contracts that the Disruption Determination Agent determines in its sole discretion could materially interfere with the ability of market participants to transact in positions with respect to the Index, the Constituents or related futures or option contracts.

If a market disruption affecting a Constituent has occurred or is continuing on an Effective Rebalancing Date, that Effective Rebalancing Date will not be postponed, but the calculation and publication of the Index Level for that Effective Rebalancing Date and each subsequent Calculation Day will be postponed until the prices of all Constituents have been determined. If any Constituent exiting the Index on that Effective Rebalancing Date is affected by a market disruption, that Constituent will be removed from the Index at a price equal to its closing price on the next following Constituent Scheduled Trading Day for that Constituent on which that Constituent is no longer affected by a market disruption, *provided* that, if that market disruption persists for ten Calculation Days, that Constituent will be removed

at a price of zero. If any Constituent entering the Index on that Effective Rebalancing Date is affected by a market disruption, that Constituent will be added at a price equal to its closing price on the next following Constituent Scheduled Trading Day for that Constituent on which that Constituent is no longer affected by a market disruption, *provided* that, if that market disruption persists for ten Calculation Days, that Constituent will not be added to the Index. Any Constituent exiting or entering the Index on an Effective Rebalancing Date that is not affected by a market disruption will be removed from or added to the Index, as applicable, at a price equal to its closing price on that Effective Rebalancing Date.

Except as described above with respect to market disruptions affecting an Effective Rebalancing Date and subsequent Calculation Days, the Index Level will generally be calculated and published on each Calculation Day, even if one or more Constituents is affected by a market disruption. Under these circumstances, the Index Level will be calculated using the last non-disrupted closing prices for any Constituents affected by a market disruption. However, if more than 20% of the weight of the Index is affected by a market disruption, the publication of the Index Level will be postponed until less than 20% of the weight of the Index is affected by a market disruption or until the next Effective Rebalancing Date, whichever is earlier.

"**Constituent Scheduled Trading Day**" is defined in the Rules and generally means, in respect of a Constituent, any day on which the principal exchange or quotation system on which that Constituent is listed and each exchange or quotation system where trading has a material effect on the overall market for futures or options contracts relating to that Constituent are scheduled to be open for trading during their respective regular trading sessions.

See the Rules for additional information about market disruptions and their effects on the Index.

Index Calculation Agent Adjustments Due to Corporate Actions and Corporate Events

It is expected that the Index Calculation Agent will from time to time make adjustments to the composition of the Index (1) in respect of Corporate Actions that impact a Constituent, (2) in respect of Corporate Events that impact a Constituent Company and (3) in respect of other circumstances or events (collectively, "**Constituent Events**"). The Index Calculation Agent will make adjustments to the composition of the Index in respect of a Constituent affected by a Constituent Event that are consistent with the adjustments made by the calculation agent of the Solactive GBS Developed Markets All Cap USD Index PR (the "**Identified Reference Index**") in respect of that Constituent and that Constituent Event for purposes of maintaining the Identified Reference Index (or, if that Constituent is not included in the Identified Reference Index, consistent with the adjustment that would be made if that Constituent had been included in the Identified Reference Index).

A "**Corporate Action**" is an event that impacts shares or shareholders with a prescribed ex-date and includes, without limitation, distributions, capital increases, capital repayments, rights issues, entitlement offers, stock conversions, share splits (sub-division), reverse share splits (consolidation) and scrip issues (capitalization or bonus issue).

A "**Corporate Event**" is an event that impacts a company or its shares or shareholders and that may impact an index (depending on its rules), including without limitation, a de-listing, liquidation, bankruptcy, insolvency, winding-up, nationalization, consolidation, amalgamation, merger, binding share exchange, acquisition, takeover offer, exchange offer, tender offer or similar event.

Because the Index is a price return index, it is expected that no adjustment or change will be made to the Index to account for the declaration or payment of a distribution in the form of an ordinary or extraordinary cash dividend.

Extraordinary Events

Certain extraordinary events may affect the ability of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent and the Disruption Determination Agent to reference data sources including the RavenPack Databases, the optimization software, the Base Reference Index and the Identified Reference Index. As described in the Rules, upon the occurrence of any of those extraordinary

events, if practicable, a successor or replacement may be identified and the Rules will be amended accordingly, *provided* that the Index Sponsor may, in its discretion, at any time and without notice, terminate the calculation or publication of the Index, including, without limitation, subsequent to the occurrence of an extraordinary event. The Index Sponsor is under no obligation to continue the calculation and publication of the Index.

Corrections

If any publicly available financial or other information used in any calculation or determination is subsequently corrected or if the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent identifies an error or omission in any of the calculations or determinations in respect of the Index, and if the Index Sponsor determines that the correction, error or omission is material, then an adjustment or correction may be made to the Index Level.

The Index Sponsor and the Index Calculation Agent

JPMS plc is currently the sponsor of the Index (together with any successor sponsor or assign, the "**Index Sponsor**"). The Index Sponsor may appoint a successor sponsor or assign, delegate or transfer any or all of its rights, obligations or responsibilities in its capacity as Index Sponsor in connection with the Index to one or more entities (including an unrelated third party) that the Index Sponsor determines is appropriate.

The Index Sponsor is also responsible for the appointment of the calculation agent of the Index (the "**Index Calculation Agent**"), the determination agent of the Constituents (the "**Constituent Determination Agent**") and the determination agent of disruption events (the "**Disruption Determination Agent**"), each of which may be the Index Sponsor, an unrelated third party or an affiliate or subsidiary of the Index Sponsor. Solactive AG is currently the Index Calculation Agent, and JPMS plc is currently the Constituent Determination Agent and the Disruption Determination Agent. The Index Calculation Agent is deemed to be JPMS plc for the period prior to the Calculation Agent Succession Date. The Index Sponsor may at any time or for any reason terminate the appointment of any of the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent and appoint an alternative entity (or entities) as that entity's replacement. Each of the Index Calculation Agent, the Constituent Determination Agent and the Disruption Determination Agent (unless that entity is the same entity as the Index Sponsor) must obtain written permission from the Index Sponsor prior to any delegation or transfer of that entity's responsibilities or obligations in connection with the Index.

The Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent and the Disruption Determination Agent are responsible for making calculations and determinations as described above and in the Rules.

Index Sponsor, Index Calculation Agent, Constituent Determination Agent and Disruption Determination Agent Determinations

Each of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent and the Disruption Determination Agent will act in good faith and in a commercially reasonable manner in making determinations, interpretations and calculations pursuant to the Rules. All determinations, interpretations and calculations of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent relating to the Rules will be final, subject to the "Corrections" section above. No person shall be entitled to make any claim against the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent, the Disruption Determination Agent or any Relevant Person in respect of any determinations, interpretations or calculations of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent.

None of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent, the Disruption Determination Agent and any of their respective affiliates and subsidiaries and any of their respective directors, officers, employees, representatives, delegates and agents (each, a "**Relevant Person**") will be under any obligation to revise any determination, interpretation or calculation made or

action taken for any reason in connection with the Rules or the Index or have any responsibility to any person (whether as a result of negligence or otherwise) for any determinations, interpretations or calculations made or anything done (or omitted to be determined or done) in connection with the Index or any use to which any person may put the Index or the Index Levels.

An action (or failure to act) on the part of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent in relation to the Index may have a detrimental effect on the Index Level or the volatility of the Index. The Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent may make certain determinations or calculations based on information obtained from publicly available sources without independently verifying that information.

Amendment of the Rules; Termination of the Index

Economic, market, regulatory, legal, financial or other circumstances may arise that may necessitate or make desirable an amendment of the Rules. Notwithstanding the foregoing, the Index Sponsor may amend the Index Rules as it deems appropriate. These amendments may include (without limitation), correcting or curing any errors, omissions or contradictory provisions; modifications to the methodology described in the Rules that are necessary or desirable in order for the calculation of the Index to continue notwithstanding any change to any economic, market, regulatory, legal, financial or other circumstances; or modifications of a formal, minor or technical nature.

Following any amendment, the Index Sponsor will make available (as soon as practicable) the amended version of the Rules and will include the effective date of that amendment in the new version of the Rules. However, the Index Sponsor is under no obligation to inform any person about any amendments to the Index (except as required by law or regulation).

The Index Sponsor may, in its sole discretion, at any time and without notice, terminate the calculation and publication of the Index.

SUPPLEMENTAL TERMS OF THE NOTES

The following supplemental terms of the notes supplement, and to the extent they are inconsistent, supersede, the description of the general terms of the notes set forth in the accompanying product supplement. Except as noted below, capitalized terms used in this section without definition are as defined in "The J.P. Morgan QUEST Cloud Computing Index" above.

Postponement of a Determination Date

Notes linked solely to the Index

Notwithstanding any contrary provision in the accompanying product supplement, for notes linked solely to the Index, the following provisions will apply. If a Determination Date (as defined in the accompanying product supplement) is a Disrupted Day (as defined in the accompanying product supplement), the applicable Determination Date will be postponed to the immediately succeeding scheduled trading day that is not a Disrupted Day.

In no event, however, will any Determination Date be postponed to a date that is after the applicable Final Disrupted Determination Date (as defined in the accompanying product supplement). If a Determination Date is or has been postponed to the applicable Final Disrupted Determination Date and that day is a Disrupted Day, the calculation agent will determine the closing level of the Index for that Determination Date on that Final Disrupted Determination Date in accordance with the formula for and method of calculating the closing level of the Index last in effect prior to the commencement of the market disruption event (or prior to the non-trading day), using the closing price of one share of each Constituent (or, if a market disruption event or a non-trading day that affected that Constituent has occurred, the calculation agent's good faith estimate of the closing price of one share of that Constituent that would have prevailed but for that suspension or limitation or non-trading day) on the scheduled trading day immediately preceding that Final Disrupted Determination Date.

Notes linked to the Index and other reference assets

If the notes are linked to the Index and other reference assets, the provisions relating to postponement of a Determination Date as set forth in the accompanying product supplement will apply, except that if a Determination Date is or has been postponed to the applicable Final Disrupted Determination Date and, on that day, the closing level of the Index has not been established in accordance with the postponement provisions of the accompanying product supplement that apply prior to the applicable Final Disrupted Determination Date, the closing level of the Index for that Determination Date will be determined by the calculation agent on the applicable Final Disrupted Determination Date in accordance with the formula for and method of calculating the closing level of the Index last in effect prior to the commencement of the market disruption event (or prior to the non-trading day) , using the closing price of one share of each Constituent (or, if a market disruption event or a non-trading day that affected that Constituent has occurred, the calculation agent's good faith estimate of the closing price of one share of that Constituent that would have prevailed but for that suspension or limitation or non-trading day) on the scheduled trading day immediately preceding that Final Disrupted Determination Date.

Additional Defined Terms

Notwithstanding any contrary definition in the accompanying product supplement, a "**scheduled trading day**" is, unless otherwise specified in the relevant terms supplement, a day, as determined by the calculation agent, on which (a) each of the following exchanges is scheduled to be open for trading for their respective regular trading sessions: the relevant exchanges for the Constituents and the principal options and futures exchanges relating to the Constituents, and (b) banking institutions in the City of New York are not scheduled to be authorized or required by law, regulation or executive order to close.

Notwithstanding anything to the contrary in the accompanying product supplement, a "**trading day**" is, unless otherwise specified in the relevant terms supplement, a day, as determined by the calculation agent, on which (a) trading is generally conducted on the relevant exchanges for the Constituents and the

principal options and futures exchanges relating to the Constituents and (b) banking institutions in the City of New York are not otherwise authorized or required by law, regulation or executive order to close.

Notwithstanding any contrary definition in the accompanying product supplement, "**relevant exchange**" for the Index means the primary exchange or market of trading for any Constituent (or any combination thereof) included in the Index.

Market Disruption Events

Notwithstanding any contrary provision in the accompanying product supplement, the following provisions will apply to notes linked in whole or in part to the Index. With respect to the Index or any relevant successor index (as defined in the accompanying product supplement), a "**market disruption event**," unless otherwise specified in the relevant terms supplement, means:

(1) any suspension of, or limitation on, trading imposed by any relevant exchange for the Index;

(2) any other event has occurred that disrupts or impairs the ability of market participants in general to effect transactions in, or obtain market values for, any Constituents that compose 20% or more of the level of the Index;

(3) the closure of any relevant exchange for the Index prior to its scheduled closing time unless that earlier closing time is announced at least one hour prior to the actual closing time;

(4) the failure of any relevant exchange with respect to the Index to open;

(5) the closure of a material number of leading commercial banks in the City of New York prior to their scheduled weekday closing time; or

(6) the failure of the Index Calculation Agent to calculate and publish the official closing level of the Index (or that successor index),

in each case as determined by the calculation agent in its sole discretion; and

- in the case of an event described in clause (1), (2), (3) or (4) above, a determination by the calculation agent in its sole discretion that the applicable event described above materially interfered with our ability or the ability of any of our affiliates to adjust or unwind all or a material portion of any hedge with respect to the notes.

A limitation on the hours or number of days of trading will not constitute a market disruption event with respect to the Index or any relevant successor index if the limitation results from an announced change in the regular business hours of the relevant exchange or market.

Discontinuation of the Index; Alteration of Method of Calculation

The provisions relating to the discontinuation of an index as set forth in the accompanying product supplement will apply, except that, if the calculation agent is to determine the closing level of the Index or any successor index for any Determination Date or other relevant date because no successor index is available at that time, or the calculation agent has previously selected a successor index and publication of that successor index is discontinued prior to, and that discontinuation is continuing on, that Determination Date or other relevant date, then the closing level of the Index will be computed by the calculation agent in accordance with the rules governing the Index or successor index, as applicable, last in effect prior to that discontinuation.

ANNEX A

J.P. Morgan QUEST Thematic Price Return Series
Index Rules

J.P.Morgan

Notices, Disclaimers and Conflicts

Each capitalised term used in this section but not otherwise defined has the meaning set forth in other parts of the Index Rules.

None of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent or the Index Calculation Agent endorses or makes any representation or warranty, express or implied, in connection with any security, transaction, fund, structured deposit or other financial product or investment (each, a "**Product**") that references the Index including as to the advisability of purchasing or entering into a Product or the results to be obtained by any party using the Index in connection with a Product. Furthermore, none of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent or the Index Calculation Agent has any obligation or liability in connection with the administration, marketing or trading of any Product and is not obliged to enter into or promote any Product.

The Index is the exclusive property of the Index Sponsor and no one may reproduce, distribute or disseminate this document or any information contained in this document (the Index Rules, such Index Rules being subject to the Adjustment Provisions) or any Index Level without the prior written consent of the Index Sponsor. This document is not intended for distribution to, or use by, any person in a jurisdiction in which such distribution or use is prohibited by law or regulation.

None of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent or the Index Calculation Agent has any liability whatsoever in such capacity to any person who uses the Index or any Index Level in any circumstances.

Potential conflicts of interest may arise in connection with or exist between the structure and operation of the Index and the conduct of business activities of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent, the Index Calculation Agent or any affiliate of the Index Sponsor or Index Calculation Agent (each, a "**Relevant Person**").

In connection with its businesses, the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent, the Index Calculation Agent or any Relevant Person may enter into or promote, offer or sell transactions or Products (structured or otherwise) that reference the Index, the Index Level or any Constituent of the Index. In addition, the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent, the Index Calculation Agent and any Relevant Person may have, or may have had, interests (including general commercial interests related to this Index or any Constituent) or positions, or may buy, sell or otherwise trade positions in or relating to the Index, the Index Level, or any Constituent of the Index, or may invest or engage in transactions with other persons, or on behalf of such persons relating to any of these. Such activity could give rise to a conflict of interest, and such conflict may have an impact, positive or negative, on the level of the Index. The Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent, the Index Calculation Agent and the Relevant Persons do not have (a) any duty to consider the circumstances of any person when participating in such transactions or (b) any duty to conduct themselves in a manner that is favourable to anyone with exposure to the Index.

None of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent or the Index Calculation Agent is under any obligation to continue the calculation, publication or dissemination of the Index or the Index Level. The Index Sponsor may terminate the calculation and publication of the Index or the Index Level at any time without notice. The Index Sponsor may delegate or transfer to a third party some or all of the functions of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent or the Index Calculation Agent in relation to the Index. Further information relating to the identity and role of third parties that are non-affiliates of J.P. Morgan, in respect of this Index, is available on request to the Index Sponsor.

The following further information is available at https://www.jpmorganindices.com:

(i)   supplemental disclosure on the Index Sponsor's governance and oversight framework;

(ii)   information on complaints handling; and

(iii)   in respect of Indices for which the Index Sponsor is J.P. Morgan Securities plc, further information on conflicts of interest.

Except as provided in the following sentence, none of the Index Sponsor, the Constituent Determination

Agent, the Disruption Determination Agent or the Index Calculation Agent gives any representation, warranty or undertaking, of any type (whether express or implied, statutory or otherwise) in relation to the Index, as to (i) the condition, satisfactory quality, performance or fitness for purpose of the Index, (ii) the results to be achieved by an investment in any Product, (iii) any data included in or omitted from the Index, (iv) the use of the Index in connection with a Product, (v) the level of the Index at any time on any day, (vi) the veracity, currency, completeness or accuracy of the information on which the Index is based (and without limitation, none of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent or the Index Calculation Agent accepts any liability to any investor in a Product for any errors or omissions in that information or the results of any interruption to it and none of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent or the Index Calculation Agent shall be under any obligation to advise any person of any such error, omission or interruption), or (vii) any other matter. To the extent any such representation, warranty or undertaking could be deemed to have been given by any of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent or the Index Calculation Agent, it is excluded save to the extent that such exclusion is prohibited by law.

To the fullest extent permitted by law, none of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent and the Index Calculation Agent shall have any liability or responsibility to any person or entity (including, without limitation, any investor in any Product) for any loss, damages, costs, charges, expenses or other liabilities howsoever arising, including, without limitation, liability for any special, punitive, indirect or consequential damages (including loss of business, loss of profit, loss of time and loss of goodwill), even if notified of the possibility of the same, arising in connection with the design, compilation, calculation, maintenance or sponsoring of the Index or the Index Level or in connection with any Product.

Each of the Index Sponsor, the Constituent Determination Agent, the Disruption Determination Agent or the Index Calculation Agent may make certain determinations or calculations based on information obtained from publicly available sources without independently verifying such information, and none of them accepts any responsibility or liability in respect of such determinations, calculations or information.

Notwithstanding anything to the contrary, nothing in these Index Rules should be construed to be investment advice or a recommendation to purchase a specific Product or enter into any transaction. Nothing in these Index Rules or any other communication between you and us should be deemed to or be construed as creating a "fiduciary relationship" or any relationship of agency or trust. J.P. Morgan and its subsidiaries, officers, directors, employees and agents, are not your fiduciary and do not accept any duty of care with respect to any person. You should make your own investment decision based on your own judgment and on your own examination of the specific Product that you are purchasing or transaction you are entering into, and you should consult your own legal, regulatory, investment, tax, accounting and other professional advisers as you deem necessary in connection with any purchase of a Product or entry into any transaction relating to any Product.

The foregoing notices, disclaimers and conflicts disclosure is not intended to be exhaustive. Anyone reading the Index Rules should seek such advice as that person considers necessary from that person's professional, legal, tax or other advisers or otherwise, without reliance on the Index Sponsor, Constituent Determination Agent, Disruption Determination Agent, Index Calculation Agent or any Relevant Person to satisfy that person that such person fully understands the Index Rules and the risks associated with the Index. Any person interested in obtaining exposure to the Index shall make and shall be deemed to make its own investment decision based upon its own judgment and its own examination of the Relevant Persons and the relevant security or financial instrument.

The Index Rules have been developed with the possibility of one or more entities, with the written permission of the Index Sponsor, entering into or promoting, offering or selling Products (structured or otherwise) linked to the Index and hedging such Products in any manner that such entity sees fit.

Index).

THIS DOCUMENT IS IMPORTANT. YOU SHOULD NOT INVEST IN A PRODUCT LINKED TO THE INDEX UNLESS YOU HAVE ENSURED THAT YOU FULLY UNDERSTAND THE NATURE OF SUCH AN INVESTMENT AND THE RISKS INVOLVED AND ARE SATISFIED THAT THE INVESTMENT IS SUITABLE AND APPROPRIATE FOR YOUR CIRCUMSTANCES AND OBJECTIVES. IF YOU ARE IN ANY DOUBT ABOUT THIS YOU SHOULD TAKE ADVICE FROM AN APPROPRIATELY QUALIFIED ADVISER. EVEN IF YOU ARE A HIGHLY SOPHISTICATED INVESTOR WHO REGULARLY TRANSACTS IN PRODUCTS LINKED TO INDICES OF THIS TYPE, YOU ARE STRONGLY ADVISED TO TAKE SUCH ADVICE IN ANY EVENT.

Part A: General Rules

1.   This Document

This document comprises the rules and methodology (the "**Index Rules**") for the J.P. Morgan QUEST Thematic Price Return Series (the "**Series**"). The Index Rules apply to each Index described in each Applicable Module of Part C, and set out the rules and the basis on which each Index will be calculated.

The Index Rules for each Index comprise:

1.   this Part A (General Rules), which sets out the general rules applicable to each Index within the Series;
2.   the Part B (Annex), RavenPack Reference Data Module; and
3.   the Part C (Applicable Module), which sets out information relating to a specific Index, including (without limitation): (1) the name of the Index and the Bloomberg ticker; (2) the Index Currency; (3) the Keyword Logic; and (4) other specific rules or information applicable to the Index.

The provisions and variables set out in this Part A are applicable to each particular Index set out in an Applicable Module separately and individually. Accordingly, these Index Rules should be read and construed, in the case of each particular Index, as referring solely to that singular, individual Index.

2.   Overview of the Index

2.1   Objective of the Index

The following introduction is intended to describe the objective of the Index in general terms.

Each Index within the Series is a designed to track the price return of a notional basket (the "**Long Basket**") of equity securities (the "**Constituents**") selected from a pre-set universe and weighted based on the relevance of a pre-set list of keywords to the issuers of such securities, subject to portfolio liquidity and concentration limits.

Each Index is a "price return" index, and therefore will not take into account dividends paid on the Constituents.

The Index is a rules-based strategy that tracks, in accordance with the rules and methodology of the Index Rules, the return of long only exposures to a periodically rebalanced basket of equity constituents that are selected pursuant to the implementation of specified criteria and an optimization methodology, together intended to provide targeted exposure to equity constituents that exhibit relatively strong observed association with pre-set key words, as further described below. The Constituent Determination Agent and the Index Calculation Agent seek to achieve this objective by following the rules-based methodology set out in these Index Rules.

The index methodology relies on a third party database and its associated third party software to conduct natural language processing of news articles and press releases in order to identify companies associated with the specified key words. The use of alternative key words or the use of alternative written materials would result in the selection of different companies. The Index may fail to achieve its objective of providing exposure to performance associated with the key words – given that the performance of equity constituents and of the Index may be affected by many additional factors beyond the intended more narrow key word-related exposures of the equity constituents.

The third party database and its associated third party software is not owned, produced, developed, maintained or administered by the Index Sponsor, the Constituent Determination Agent or the Index Calculation Agent. None of the Index Sponsor, the Constituent Determination Agent or the Index Calculation Agent makes any representation, warranty or other recommendation or endorsement (whether express or implied) whatsoever of the third party database and its associated third party software or to any results that the use of such may produce.

None of the Index Sponsor, the Constituent Determination Agent or the Index Calculation Agent makes any representation, warranty or other recommendation or endorsement (whether express or implied) whatsoever of the key words selected for use in conducting the natural language processing or to any results that the use of such may produce.

2.2   Overview of the methodology of the Index

The following overview of the methodology of the Index is intended merely to summarize the methodology which will be applicable to the Index in general terms. It is not intended to be exhaustive and the methodology set forth in Sections 4 and 5 and the remainder of these Index Rules will govern in the event of any inconsistency.

The Index is rebalanced on each Effective Rebalancing Date as set out in the relevant Applicable Module and the constituents and weights assigned to each of the constituents comprising the Long Basket are selected by the Constituent Determination Agent in accordance with the methodology described in these Index Rules.

The Constituent Determination Agent, in respect of each Rebalance Selection Date, will determine the Eligible Constituents, using the rules and methodology set forth in Section 3, the Annex (RavenPack Reference Data Module) and the relevant Applicable Module.

The Constituent Determination Agent will determine the Preliminary Constituents that will compose the Long Basket, subject to Sections 5.1, 10 and 11, in respect of each Effective Rebalancing Date, based on the Eligible Constituents, the Theme Relevance Scores and third-party Optimizer Software specified in the relevant Applicable Module using the methodology set forth in Section 4. The Constituent Determination Agent and the Index Calculation Agent (as applicable) will perform their respective roles in accordance with the methodology set forth in Sections 3, 4 and 5.

The Index Calculation Agent, subject to the occurrence of any Market Disruption Event or any Extraordinary Event, will calculate and publish the Index Level in respect of each Calculation Day, subject to and in accordance with these Index Rules by implementing the following four steps:

Step 1: Determining the Eligible Constituents and the Theme Relevance Scores: The Constituent Determination Agent, in respect of each Rebalance Selection Date, using the methodology and rules set forth in Section 3 will determine the Eligible Constituents and the Theme Relevance Scores as applicable.

Step 2: Selecting the Constituents and determining the Constituent Weights: The Constituent Determination Agent, in respect of each Rebalance Selection Date, shall use, among other things, the Eligible Constituents, the Theme Relevance Scores and an optimization methodology in order to determine the Preliminary Constituents and the Preliminary Constituent Weights. The Portfolio Optimization Methodology, further described in Section 4.1, shall involve, among other parameters further described below, (i) the use of the Optimizer Software, which will be subject to certain constraints as described in Section 4.1(b), which include liquidity constraints, and (ii) the use of the a portfolio optimization relaxation procedure under the circumstances specified in Section 4.1(c).

The Constituent Determination Agent will provide the Index Calculation Agent with information regarding the Preliminary Constituents and the Preliminary Constituent Weights in respect of each Rebalance Selection Date so that the Index Calculation Agent can perform the calculations in connection with the Index Calculation Agent's role, as further described below.

Step 3: Rebalancing the Index: Subject to Section 10 and Section 11, the Index will be rebalanced on each Effective Rebalancing Date as set out in the relevant Applicable Module, using the Preliminary Constituents and the Preliminary Constituent Weights determined by the Constituent Determination Agent in the previous step, as determined by the Index Calculation Agent subject to and in accordance with Sections 5.1 and 5.2.

Step 4: Calculating the Index Level: The final step is for the Index Calculation Agent to calculate and publish the Index Level in respect of each Calculation Day, using the methodology set forth in Section 5.2.

The Index Level will never be less than zero.

Terms not otherwise defined in these Index Rules have the meanings set forth in Section 13.

No assurance can be given that the investment strategy used to construct the Index will be successful or that the Index will outperform any alternative basket or strategy that might be constructed from the Eligible Constituents. Furthermore, no assurance can be given that the key words will be relevant to the Eligible Constituents, or that the key words may not be more relevant to other securities not selected by the Index.

The Index is described as a notional basket of assets because there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. The Index merely references certain assets, the performance of which will be used as a reference point for calculating the Index Level.

3. Determining the Eligible Constituents

3.1 Determining Reference Entities and Listings

In respect of each Rebalance Selection Date (t), the Constituent Determination Agent shall determine:

(i)   the set of reference entities (together the "**Reference Entities**", and each a "**Reference Entity**" or "**Reference Entity (i)**"); and

(ii)   the set of listings in respect of each Reference Entity comprised in the set of Reference Entities (together, in respect of the set of Reference Entities, the "**Listings**", and in respect of each Reference Entity (i) considered separately, the "**Listings (i)**" of such Reference Entity (i) and each, a "**Listing (i)**"),

as equal to the Active RavenPack Entity Identifier-Listing Pairs in respect of (a) the relevant Mapping Reference Date and (b) the relevant Query Date, where both such dates (a) and (b) are set equal to the first weekday of the calendar month within which Rebalance Selection Date (t) falls, in accordance with the methodology set out in Part I of the Annex.

For the avoidance of doubt, there may be multiple Listings (i) in respect of each Reference Entity (i). One or more than one Listing may relate to the same issuer. This is the case when each Listing trades separately.

In respect of each Rebalance Selection Date (t) and each Reference Entity (i), the Constituent Determination Agent shall determine each RavenPack Entity Identifier (i) in accordance with the methodology set out in the Annex.

3.2   Determining Relevant Story Identifiers

In respect of relevant month (m), the Constituent Determination Agent shall determine the relevant story Identifiers (the "**Relevant Story Identifiers**") as the Unique Story Identifiers in respect of the following inputs in accordance with the methodology set out in Part II of the Annex:

(i)   "**Logic constructed on Keywords and Textual Operators**" set as $Keyword\ Logic$

(ii)   "**Start Timestamp**" set as (YYYY-MM-DD 00:00:00.000) where YYYY,MM,DD is the year, month and date of $Start\ Date$ respectively

(iii)   "**End Timestamp**" set as (YYYY-MM-DD 00:00:00.000) where YYYY,MM,DD is the year, month and date of $End\ Date$ respectively

Where:

$Keyword\ Logic$	means the Keyword Logic specified in the relevant Applicable Module.
$Start\ Date$	means the first calendar day of the relevant month.
$End\ Date$	means the first calendar day of the month following the relevant month.

3.3   Determining Number of Theme Relevant Stories

In respect of relevant month (m) and for each RavenPack Entity Identifier (i), the Constituent Determination Agent shall determine the number of theme relevant stories (the "**Number of Theme Relevant Stories**") by implementing the following steps:

(1.)   Determine the Filtered Entries in respect of following inputs in accordance with the methodology set out in Part III of the Annex:

i	Field Name	Operator	Input Value
1	RP_ENTITY_ID	"is equal to"	RavenPack Entity Identifier (i)
2	RP_STORY_ID	"is included in"	$Relevant\ Story\ Ids$
3	ENTITY_TYPE	"is equal to"	"COMP"
4	NEWS_TYPE	"is included in"	$News\ Type$
5	RELEVANCE	"is equal to or greater than"	$Relevance\ Threshold$
6	EVENT_SIMILARITY_DAYS	"is equal to or greater than"	$Novelty\ Threshold$

(2.)   Determine the Number of Theme Relevant Stories as the number of unique values in RP_STORY_ID column of the Filtered Entries.

Where:

$Relevant\ Story\ Ids$	means the Relevant Story Identifiers in respect of relevant month (m) determined pursuant to Section 3.2.
$News\ Type$	means the News Type specified in the relevant Applicable Module.

Relevance Threshold		means the Relevance Threshold specified in the relevant Applicable Module.	
Novelty Threshold		means the Novelty Threshold specified in the relevant Applicable Module.	

3.4 Determining Number of Relevant Stories

In respect of relevant month (m) and for each RavenPack Entity Identifier (i), the Constituent Determination Agent shall determine the number of relevant stories (the "**Number of Relevant Stories**") by implementing the following steps:

(1.) Filter for the list of entries in respect of following inputs in accordance with the methodology set out in Part III of the Annex.

i	Field Name	Operator	Input Value
1	RP_ENTITY_ID	"is equal to"	RavenPack Entity Identifier (i)
3	ENTITY_TYPE	"is equal to"	"COMP"
4	NEWS_TYPE	"is included in"	*News Type*
5	RELEVANCE	"is equal to or greater than"	*Relevance Threshold*
6	EVENT_SIMILARITY_DAYS	"is equal to or greater than"	*Novelty Threshold*
7	TIMESTAMP_UTC	"is equal to or greater than"	*Start Timestamp*
8	TIMESTAMP_UTC	"is less than"	*End Timestamp*

(2.) Determine the Number of Relevant Stories as the number of unique values in RP_STORY_ID columns of the filtered list of entries.

Where

News Type	means the News Type specified in the relevant Applicable Module.
Relevance Threshold	means the Relevance Threshold specified in the relevant Applicable Module.
Novelty Threshold	means the Novelty Threshold specified in the relevant Applicable Module.
Start Timestamp	set as (YYYY-MM-DD 00:00:00.000) where YYYY,MM,DD is the year, month and date of the first calendar day of the relevant month (m) respectively
End Timestamp	set as (YYYY-MM-DD 00:00:00.000) where YYYY,MM,DD is the year, month and date of the first calendar day of the month following the relevant month (m) respectively

3.5 Calculating the Monthly Theme Relevance Scores

In respect of relevant month (m) and for each RavenPack Entity Identifier (i), the Constituent Determination Agent shall calculate the monthly theme relevance score (the "**Monthly Theme Relevance Score**") as follows:

$$Monthly\ Theme\ Relevance\ Score_i^m = \frac{Number\ of\ Theme\ Relevant\ Stories_i^m}{Number\ of\ Relevant\ Stories_i^m}$$

If $Number\ of\ Relevant\ Stories_i^m$ is 0 for RavenPack Entity Identifier (i) in respect of relevant month (m), then $Monthly\ Theme\ Relevance\ Score_i^m$ shall be considered a disregarded value.

Where:

$Number\ of\ Theme\ Relevant\ Stories_i^m$	means the Number of Theme Relevant Stories in respect of relevant month (m) and Reference Entity ID (i) determined pursuant to Section 3.3.
$Number\ of\ Relevant\ Stories_i^m$	means the Number of Relevant Stories in respect of relevant month (m) and Reference Entity ID (i) determined pursuant to Section 3.4.

3.6 Calculating the Theme Relevance Scores

In respect of each Rebalance Selection Date (t) and for each RavenPack Entity Identifier (i), the Constituent Determination Agent shall calculate the theme relevance score (the "**Theme Relevance Score**") as follows:

$$Theme\ Relevance\ Score_i^t = \frac{\sum_{n=1}^{Lookback} Monthly\ Theme\ Relevance\ Score_i^{t-n}}{Lookback\ Counter_i}$$

If $Lookback\ Counter_i$ is less than Lookback Threshold specified in the relevant Applicable Module for RavenPack Entity Identifier (i) in respect of Rebalance Selection Date (t), then $Theme\ Relevance\ Score_i^t$ shall be considered a disregarded value.

Where:

$Monthly\ Theme\ Relevance\ Score_i^{t-m}$	means the Monthly Theme Relevance Score in respect of relevant month $t-n$ and Reference Entity ID (i) determined pursuant to Section 3.5 where $t-n$ is the nth month preceding and not including the month of Rebalance Selection Date (t) and Monthly Theme Relevance Score is not a disregarded value.
$Lookback\ Counter_i$	means the number of months in the previous n months (where n is equal to the Score Lookback specified in the relevant Applicable Module) preceding and not including the month of Rebalance Selection Date (t) where Monthly Theme Relevance Score is not a disregarded value.
$Lookback$	means the Score Lookback specified in the relevant Applicable Module.

3.7   Calculating the Total Theme Relevant Stories

In respect of each Rebalance Selection Date (t) and for each Reference Entity (identified by RavenPack Entity Identifier (i)), the Constituent Determination Agent shall calculate the total theme relevant stories (the "**Total Theme Relevant Stories**") as follows:

$$Total\ Theme\ Relevant\ Stories_i^t = \sum_{n=1}^{Lookback} Number\ of\ Theme\ Relevant\ Stories_i^{t-n}$$

$Number\ of\ Theme\ Relevant\ Stories_i^{t-n}$	means the Number of Theme Relevant Stories in respect of relevant month $t-n$ and Reference Entity Identifier (i) determined pursuant to Section 3.3 where $t-n$ is the nth month preceding and not including the month of Rebalance Selection Date (t).
$Lookback$	means the Score Lookback specified in the relevant Applicable Module.

3.8   Calculating the Total Relevant Stories

In respect of each Rebalance Selection Date (t) and for each RavenPack Entity Identifier (i), the Constituent Determination Agent shall calculate the total relevant stories (the "**Total Relevant Stories**") as follows:

$$Total\ Relevant\ Stories_i^t = \sum_{n=1}^{Lookback} Number\ of\ Relevant\ Stories_i^{t-n}$$

$Number\ of\ Relevant\ Stories_i^{t-n}$	means the Number of Relevant Stories in respect of relevant month $t-n$ and Reference Entity ID (i) determined pursuant to Section 3.4 where $t-n$ is the nth month preceding and not including the month of Rebalance Selection Date (t).
$Lookback$	means the Score Lookback specified in the relevant Applicable Module.

3.9   Calculation of Dollar Notional Trading Estimate for each Listing

In respect of each Rebalance Selection Date (t), Trading Lookback Window in days (referred as "$\mathbf{n_{TLB}}$" below and whose value is specified in the remaining sub-sections of this Section 3 below, as applicable), Trimming Exclusion Window in days (referred as "$\mathbf{x_{TEW}}$" below and whose value is specified in the remaining sub-sections of this Section 3 below, as applicable) and for each Listing (i) for each Reference Entity (i) in the set of all Reference Entities applicable for such Rebalance Selection Date (t) determined in accordance with Section 3.2 above, the Constituent Determination Agent shall determine the dollar notional trading estimate (the "**Dollar Notional Trading Estimate**"), in accordance with the following three steps:

a) In respect of each calendar day (d) that (a) occurs from but excluding the day that is n_{TLB} calendar days prior to Rebalance Selection Date (t) to and including Rebalance Selection Date (t) and (b) for which the Consolidated Volume in respect of Listing (i) is available from the Share Data Source at approximately

the Data Reference Time, the Constituent Determination Agent shall determine the consolidated traded notional quantity (the "**Consolidated Traded Notional Quantity**"). The Consolidated Traded Notional Quantity is calculated as the notional quantity (expressed in USD) traded on the relevant exchanges applicable for Listing (i) on calendar day (d), in accordance with the following formula:

$$\text{Consolidated Traded Notional Quantity}_i^d = \frac{Consolidated\ Volume_i^d}{AM_{i,Volume}^d} \times Price_i^d \times AM_{i,Price}^d \times FX_i^d$$

Where:

$Consolidated\ Volume_i^d$ means the Consolidated Volume in respect of calendar day (d) and Listing (i), as available from the Share Data Source at approximately the Data Reference Time.

$AM_{i,Volume}^d$ means the Adjustment Multiplier in respect of calendar day (d) and Listing (i), as available from the Share Data Source at approximately the Data Reference Time.

$Price_i^d$ means the most recent Official Closing Price, expressed in the relevant currency unit, in respect of calendar day (d) and Listing (i), as available from the Share Data Source at approximately the Data Reference Time.

$AM_{i,Price}^d$ means the Adjustment Multiplier in respect of the date associated with $Price_i^d$ and Listing (i), as available from the Share Data Source at approximately the Data Reference Time.

FX_i^d means the Selection Currency Rate in respect of calendar day (d) for the currency and the date associated with $Price_i^d$, as available from the FX Data Source at approximately the Data Reference Time.

Data	Data Source	Identifier	Currency Identifier
consolidated volume	Share Data Source	"ConsolVol"	Not applicable
official closing price	Share Data Source	"Close_"	"ISOCurrCode"

b) In respect of each calendar day (d) that (a) occurs from but excluding the day that is n_{TLB} calendar days prior to Rebalance Selection Date (t) to and including Rebalance Selection Date (t) and (b) for which the Primary Volume in respect of Listing (i) is available from the Share Data Source at approximately the Data Reference Time, the Constituent Determination Agent shall determine the primary traded notional quantity (the "**Primary Traded Notional Quantity**"). The Primary Traded Notional Quantity is calculated as the notional quantity (expressed in USD) traded on the primary exchange of Listing (i) on calendar day (d), in accordance with the following formula:

$$\text{Primary Traded Notional Quantity}_i^d = \frac{Primary\ Volume_i^d}{AM_{i,Volume}^d} \times Price_i^d \times AM_{i,Price}^d \times FX_i^d$$

Where:

$Primary\ Volume_i^d$ means the Primary Volume in respect of calendar day (d) and Listing (i), as available from the Share Data Source at approximately the Data Reference Time.

$AM_{i,Volume}^d$ means the Adjustment Multiplier in respect of calendar day (d) and Listing (i), as available from the Share Data Source at approximately the Data Reference Time.

$Price_i^d$ means the most recent Official Closing Price, expressed in the relevant currency unit, in respect of calendar day (d) and Listing (i), as available from the Share Data Source at approximately the Data Reference Time.

$AM^d_{i,Price}$	means the Adjustment Multiplier in respect of the date associated with $Price^d_i$ and Listing (i), as available from the Share Data Source at approximately the Data Reference Time.
FX^d_i	means the Selection Currency Rate in respect of calendar day (d) for the currency and the date associated with $Price^d_i$, as available from the FX Data Source at approximately the Data Reference Time

Data	Data Source	Identifier	Currency Identifier
primary volume	Share Data Source	"Volume"	Not applicable
official closing price	Share Data Source	"Close_"	"ISOCurrCode"

c) The Constituent Determination Agent shall determine the Dollar Notional Trading Estimate in respect of Listing (i) and Rebalance Selection Date (t) as the trimmed average (being the arithmetic average of all values after first excluding certain values, as described below) of the Consolidated Traded Notional Quantities, if a sufficient number of Consolidated Traded Notional Quantities is available, as specified below, or otherwise as the alternative trimmed average (being the arithmetic average of all values after first excluding certain values, as described below) of the Primary Traded Notional Quantities, in accordance with the following steps:

i. In the case in which the number of Consolidated Traded Notional Quantities computed in Step a) in respect of Listing (i) and Rebalance Selection Date (t) is greater than the product of 2 times x_{TEW}, the Constituent Determination Agent shall select all such Consolidated Traded Notional Quantities excluding the x_{TEW} highest values and the x_{TEW} lowest values (such selected Consolidated Traded Notional Quantities, the "**Selected Traded Notional Quantities**"), and then the Constituent Determination Agent shall compute the Dollar Notional Trading Estimate in respect of Listing (i) and Rebalance Selection Date (t) as the arithmetic average of such Selected Traded Notional Quantities.

ii. In the case in which the condition in the immediately preceding paragraph (i) is not satisfied, in the case in which both (x) the number of Consolidated Traded Notional Quantities computed in Step a) in respect of Listing (i) and Rebalance Selection Date (t) is less than or equal to the product of 2 times x_{TEW}, and (y) the number of Primary Traded Notional Quantities computed in Step b) in respect of Listing (i) and Rebalance Selection Date (t) is greater than the product of 2 times x_{TEW}, the Constituent Determination Agent shall select all such Primary Traded Notional Quantities excluding the x_{TEW} highest values and the x_{TEW} lowest values (such selected Primary Traded Notional Quantities, the "**Selected Traded Notional Quantities**"), and then the Constituent Determination Agent shall compute the Dollar Notional Trading Estimate in respect of Listing (i) and Rebalance Selection Date (t) as the arithmetic average of such Selected Traded Notional Quantities.

iii. In the case in which both the condition in the immediately preceding paragraph (i) is not satisfied and the conditions in the immediately preceding paragraph (ii) are not satisfied, in the case in which both (x) the number of Consolidated Traded Notional Quantities computed in Step a) in respect of Listing (i) and Rebalance Selection Date (t) is less than or equal to the product of 2 times x_{TEW}, and (y) the number of Primary Traded Notional Quantities computed in Step b) in respect of Listing (i) and Rebalance Selection Date (t) is less than or equal to the product of 2 times x_{TEW}, then the Dollar Notional Trading Estimate in respect of Listing (i) and Rebalance Selection Date (t) shall be considered a disregarded value.

3.10 Calculation of 1 Month Dollar Notional Trading Estimate for each Listing

In respect of each Rebalance Selection Date (t) and for each Listing (i), the Constituent Determination Agent shall determine the 1 month dollar notional trading estimate (the "**1 Month Dollar Notional Trading Estimate**") as the Dollar Notional Trading Estimate determined pursuant to Section 3.9 in respect of such Rebalance Selection Date (t) and Listing (i), with a trading lookback window (the "**Trading Lookback Window**") set to 30 days and a trimming exclusion window (the "**Trimming Exclusion Window**") set to n days where n is equal to the 1 Month Dollar Trading Trim Window specified in the relevant Applicable Module.

3.11 Calculation of 12 Month Dollar Notional Trading Estimate for each Listing

In respect of each Rebalance Selection Date (t) and for each Listing (i), the Constituent Determination Agent shall determine the 12 month dollar notional trading estimate (the "**12 Month Dollar Notional Trading Estimate**") as

the Dollar Notional Trading Estimate determined pursuant to Section 3.9 in respect of such Rebalance Selection Date (t) and Listing (i), with a trading lookback window (the "**Trading Lookback Window**") set to 364 days, trimming exclusion window (the "**Trimming Exclusion Window**") set to n days where n is equal to the 12 Month Dollar Trading Trim Window specified in the relevant Applicable Module.

3.12   Calculation of Dollar Base Reference Free-Float Market Capitalization for each Universe Stock

In respect of each Rebalance Selection Date (t) for each Universe Stock (i), the Constituent Determination Agent shall determine the dollar base reference free-float market capitalization (the "**Dollar Base Reference Free-Float Market Capitalization**") as follows:

$$DFFMC_i^t = \frac{Shares_i^t}{AM_{i,Shares}^t} \times Inclusion\ Factor_i^t \times Price_i^t \times AM_{i,Price}^t \times FX_i^t$$

Where:

$Shares_i^t$ means the end-of-day number of shares for Universe Stock (i) in respect of Rebalance Selection Date (t), as available from the Base Reference Data Source at approximately the Data Reference Time.

$AM_{i,Shares}^t$ means the Adjustment Multiplier of Eligible Stock (i) in respect of Rebalance Selection Date (t), as available from the Share Data Source at approximately the Data Reference Time.

$Inclusion\ Factor_i^t$ means the inclusion factor for Universe Stock (i) in respect of Rebalance Selection Date (t), as available from the Base Reference Data Source at approximately the Data Reference Time.

$Price_i^t$ means, in respect of Universe Stock (i) and Rebalance Selection Date (t), the most recent official closing price, expressed in the relevant currency unit, as available from the Share Data Source at approximately the Data Reference Time.

$AM_{i,Price}^t$ means the Adjustment Multiplier of Eligible Stock (i) in respect of the date associated with the official closing price of $Price_i^t$, as available from the Share Data Source at approximately the Data Reference Time.

FX_i^t means the Selection Currency Rate in respect of Rebalance Selection Date (t) for the currency associated with the official closing price of $Price_i^t$, as available from the FX Data Source at approximately the Data Reference Time.

Data	Data Source	Identifier	Currency Identifier	IBES Unreported Financial Year Identifier
end-of-day number of shares	Base Reference Data Source	"NextShares"	Not applicable	Not applicable
inclusion factor	Base Reference Data Source	"TotIncFactor"	Not applicable	Not applicable
official closing price	Share Data Source	"Close_"	"ISOCurrCode"	Not applicable

3.13   Determining the Eligible Constituents

In respect of each Rebalance Selection Date (t), the Constituent Determination Agent shall determine the eligible constituents (together, the "**Eligible Constituents**", and each an "**Eligible Constituent**") as including (without duplication) (x) each Constituent with a non-zero Current Weight in respect of Rebalance Selection Date (t) as determined by the Index Calculation Agent pursuant to Section 5.2(b) for which the 1 Month Dollar Notional Trading Estimate in respect of Rebalance Selection Date (t) is not a disregarded value (with the understanding that the Theme Relevance Score in respect of Rebalance Selection Date (t) to be used for such constituent will be 0 (zero) for the purpose of determining the output weight pursuant to the formulae and algorithms set out in Section 4 below if such constituent is not separately to be included in the relevant sub-set determined pursuant to (y)) and (y) the relevant sub-set of all the Listings of all the Reference Entities determined pursuant to Section 3.1 for which each particular Listing (i), separately considered, both corresponds to a Universe Stock and satisfies each and every one of the following conditions (applied in the same order as mentioned below) on such Rebalance Selection Date (t) in respect of such particular Listing (i):

(i)   Reference Entity for such Listing (i) has a Theme Relevance Score in respect of the relevant Rebalance Selection Date (t) and RavenPack Entity Identifier (i) as determined pursuant to Section 3.6 that is
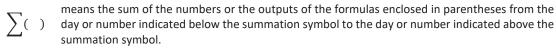
greater than the Preliminary Theme Relevance Score Threshold specified in the relevant Applicable Module and the Theme Relevance Score is not a disregarded value; and

(ii) Reference Entity for such Listing (i) has a number of Total Relevant Stories in respect of relevant Rebalance Selection Date (t) and RavenPack Entity Identifier (i) as determined pursuant to Section 3.8 that is greater than the Total Relevant Stories Threshold specified in the relevant Applicable Module; and

(iii) in the case where Total Theme Relevant Stories Threshold is set out in the relevant Applicable Module, Reference Entity for such Listing (i) has a number of Total Theme Relevant Stories in respect of relevant Rebalance Selection Date (t) and RavenPack Entity Identifier (i) as determined pursuant to Section 3.7 that is greater than the Total Theme Relevant Stories Threshold specified in the relevant Applicable Module; and

(iv) Listing (i) is represented in the Share Data Source at approximately the Data Reference Time in respect of such Rebalance Selection Date (t); and

(v) Listing (i) has a Dollar Base Reference Free-Float Market Capitalization in respect of Rebalance Selection Date (t), as determined pursuant to Section 3.12; and

(vi) Listing (i) is not subject to a suspension in trading in shares of such Universe Stock on the relevant Exchange that has occurred on the Rebalance Selection Date or is continuing on the Rebalance Selection Date, which suspension is not a limitation of trading in such shares by reason of movements in price exceeding limits permitted by the relevant Exchange; and

(vii) Listing (i) is associated with an Exchange Market Identifier Code included in the Eligible Exchange MIC List specified in the relevant Applicable Module; and

(viii) in the case where Associated GICS Sectors are set out in the relevant Applicable Module, the sector of Listing (i) (identified as the sector associated with such constituent as determined by the Global Industry Classification Standard (GICS®) and as reported by the Base Reference Data Source at approximately the Data Reference Time) shall be included in the list of Associated GICS Sectors specified in the relevant Applicable Module; and

(ix) 12 Month Dollar Notional Trading Estimate in respect of the relevant Rebalance Selection Date (t) and such Listing (i) as determined pursuant to Section 3.11 is greater than the 12 Month Dollar Trading Threshold specified in the relevant Applicable Module; and

(x) 1 Month Dollar Notional Trading Estimate in respect of the relevant Rebalance Selection Date (t) and such Listing (i) as determined pursuant to Section 3.10 is greater than the 1 Month Dollar Trading Threshold specified in the relevant Applicable Module; and

(xi) in the case of a Reference Entity with multiple Listings associated with a single RavenPack Entity Identifier (i), each of which satisfy all of the above criteria, such Listing (i) is the Listing among such multiple Listings with the highest 12 Month Dollar Notional Trading Estimate, as determined pursuant to Section 3.11; and

(xii) Reference Entity for such Listing (i) is not J.P. Morgan Chase & Co., Visa Inc., MasterCard Inc., or any successors to any of those entities, and is not otherwise an affiliate of the Index Sponsor; and

(xiii) Reference Entity for such Listing (i) is not subject to (and, holding a position in any financial asset, transaction or interest in or relating to Reference Entity is not subject to, or but for the consequent disposal or termination thereof would otherwise be subject to) any applicable law, regulation, order or rule (including, for the avoidance of doubt and without limitation, any tax law) that, as formally or informally interpreted, applied, exercised or operated by any court, tribunal or regulatory authority (or any representative thereof) with competent jurisdiction (including, without limitation, the Office of Foreign Assets Control, the U.S. Commodity and Futures Trading Commission, the U.S. Securities and Exchange Commission or any exchange or trading facility), would prohibit or restrict (as of any date that falls on or after such Rebalance Selection Date (t)) any market participants that are brokers or financial intermediaries (individually or collectively) to directly or indirectly hold, acquire or dispose of (in whole or in part) securities of such Reference Entity, or derivative exposures to securities of such Reference Entity, or any financial asset, transaction or interest in or relating to such Reference Entity.

In respect of a Rebalance Selection Date (t), the Constituent Determination Agent will review whether, with respect to each of the Reference Entities, the inputs and related information necessary to make all of the determinations relevant to this Section 3.13 (the "**Evaluation Data**") are available. If, in respect of such Rebalance Selection Date (t), the Evaluation Data is available with respect to a number of Reference Entities that is equal to or greater than the Source Data Threshold Number, the Constituent Determination Agent will identify the Eligible Constituents pursuant to this Section 3.13 as of such date using such Evaluation Data. If the

Evaluation Data is not available on such date with respect to a number of Reference Entities that is equal to or greater than the Source Data Threshold Number, then the provisions of Section 10.3 will apply.

3.14 Mathematical functions

Certain mathematical symbols and functions are used in the Index Rules. Unless otherwise specified, the following symbols and functions will have the following meanings:

$\sum(\ )$ means the sum of the numbers or the outputs of the formulas enclosed in parentheses from the day or number indicated below the summation symbol to the day or number indicated above the summation symbol.

$|\ |$ means the absolute value of the number or the output of the formula enclosed in vertical lines.

$ABS()$ means the absolute value of the number or the output of the formula enclosed in parentheses.

$MAX()$ means the highest value among the numbers or the outputs of the formulas enclosed in parentheses.

$MIN()$ means the lowest value among the numbers or the outputs of the formulas enclosed in parentheses.

4. Determining the Preliminary Constituents and Preliminary Constituent Weights

4.1 Portfolio Optimization Methodology

For the portfolio optimization methodology (the "**Portfolio Optimization Methodology**"), in respect of each Rebalance Selection Date (t), the Constituent Determination Agent shall determine the Output Portfolio in accordance with Section 4.1.

The Output Portfolio, determined by the Constituent Determination Agent in accordance with the methodology described below, shall be the result of minimizing the objective function specified in Section 4.1(a) (the "**Objective Function**") subject to the optimization constraints specified in Section 4.1(b) (the "**Optimization Constraints**"), using the Optimizer Software.

If, in respect of Rebalance Selection Date (t), the Constituent Determination Agent is unable to determine the Output Portfolio using the Optimizer Software before 11.00 am local time in London, United Kingdom, on the day that falls two London Scheduled Business Days after Rebalance Selection Date (t), owing to a temporary technical failure such as, without limitation, a corruption of relevant software libraries or a temporary failure in the computing facilities (a "**Temporary Optimizer Software Failure**"), then: (i) the Constituents comprised in the Index shall not be rebalanced and re-weighted on the Scheduled Rebalancing Date immediately following Rebalance Selection Date (t) and (ii) the Constituents of the Index shall remain the same as immediately prior to such Scheduled Rebalancing Date, subject to any adjustments to Constituents pursuant to these Index Rules (although the percentage contribution of each Constituent to the Index Level may differ from the weight applicable on the immediately preceding Effective Rebalancing Date prior to such Rebalancing Selection Date (t)). If a Temporary Optimizer Software Failure occurs for two consecutive Rebalance Selection Dates, then the provisions set out in Section 11.8 shall apply.

(a) Objective Function

In respect of Rebalance Selection Date (t), the Constituent Determination Agent shall determine the Objective Function in accordance with the following formula:

$$\sum_{i=1}^{N(t)} \left(w_i^t - \frac{Theme\ Relevance\ Score_i^t \times Include_i}{\sum_{i=1}^{N(t)} Theme\ Relevance\ Score_i^t \times Include_i} \right)^2$$

Where:

$N(t)$ means the number of Eligible Constituents in respect of Rebalance Selection Date (t) determined pursuant to Section 3.13.

$Theme\ Relevance\ Score_i^t$ means the Theme Relevance Score in respect of Rebalance Selection Date (t) and RavenPack Entity Identifier (i) corresponding to Eligible Constituent (i) determined pursuant to Section 3.6 and Section 3.13.

$Include_i$ means a quantity defined as:

- 1 (one) if the $Theme\ Relevance\ Score_i^t$ is greater than the Thematic Relevance Score Threshold specified in the relevant Applicable Module.
- Otherwise, 0 (zero).

w_i^t means the output weight associated with Eligible Constituent (i) in the Output Portfolio (the "**Output Weight**") in respect of Rebalance Selection Date (t).

(b) Optimization Constraints

In respect of Rebalance Selection Date (t), the Constituent Determination Agent shall determine the Optimization Constraints in accordance with the following formulas:

1. Delta Constraint: The delta (the "**Delta**") of the Output Portfolio is constrained to be equal to one, in accordance with the following formula:

$$\sum_{i=1}^{N(t)} w_i^t = 1$$

Where:

$N(t)$ means the number of Eligible Constituents in respect of Rebalance Selection Date (t) determined pursuant to Section 3.13.

w_i^t means the Output Weight associated with Eligible Constituent (i) in the Output Portfolio in respect of Rebalance Selection Date (t).

2. Minimum Constituents Count: The minimum constituents count (the "**Minimum Constituents Count**") of the Output Portfolio is constrained to be greater than or equal to the Minimum Number Threshold specified in the relevant Applicable Module, in accordance with the following formula:

$$\sum_{i=1}^{N(t)} Include_i^t \geq MNT$$

Where:

$N(t)$ means the number of Eligible Constituents in respect of Rebalance Selection Date (t) determined pursuant to Section 3.13.

$Include_i^t$ means a quantity defined as:

- 1 (one) if the $Theme\ Relevance\ Score_i^t$ is greater than the Thematic Relevance Score Threshold specified in the relevant Applicable Module.
- Otherwise, 0 (zero).

MNT Means the Minimum Number Threshold specified in the relevant Applicable Module.

3. First Preliminary Upper Bound: The first preliminary upper bound (the "**First Preliminary Upper Bound**") in respect of Rebalance Selection Date (t) for each Eligible Constituent (i) is calculated in accordance with the following formula:

$$FPUB_i^t = MIN(ATWC_i^t, \frac{DNTE_i^t \times MHLR}{LN}, \frac{DFFMC_i^t \times FFMCR}{LN})$$

Where:

$FPUB_i^t$ means the First Preliminary Upper Bound in respect of Eligible Constituent (i) and Rebalance Selection Date (t)

$ATWC_i^t$ means the Applicable Target Weight Cap defined as:

$$TWC \times Include_i^t$$

where

(a) TWC means the Target Weight Cap specified in the relevant Applicable Module.

(b) $Include_i^t$ is a quantity defined as:

- 1 (one) if the Theme Relevance Score of Eligible Constituent (i) in respect of Rebalance Selection Date (t) is greater than the Thematic Relevance Score Threshold.
- Otherwise, 0 (zero).

$DNTE_i^t$ means the 1 Month Dollar Notional Trading Estimate in respect of Eligible Constituent (i) and Rebalance Selection Date (t), determined pursuant to Section 3.10.

$DFFMC_i^t$ means the Dollar Base Reference Free-Float Market Capitalization in respect of Eligible Constituent (i) and Rebalance Selection Date (t), determined pursuant to Section 3.12.

$MHLR$ means the Maximum Holding Liquidity Ratio specified in the relevant Applicable Module.

$FFMCR$ Means the Maximum Free Float Market Cap Ratio specified in the relevant Applicable Module.

LN means the Liquidity Notional specified in the relevant Applicable Module.

4. Final Upper/Lower Bounds: The final upper bound (the "**Final Upper Bound**") and the final lower bound (the "**Final Lower Bound**") in respect of Rebalance Selection Date (t) for each Eligible Constituent (i) are calculated in accordance with the following formulas:

If the $Theme\ Relevance\ Score_i^t$ is greater than the Thematic Relevance Score Threshold specified in the relevant Applicable Module:

$$LB_i^t = MAX\left(0, w_{C,i}^t - \frac{DNTE_i^t \times MTLR}{LN}\right)$$

$$UB_i^t = MIN\left(MAX\left(FPUB_i^t, w_{C,i}^t - \frac{DNTE_i^t \times MTLR}{LN}\right), w_{C,i}^t + \frac{DNTE_i^t \times MTLR}{LN}\right)$$

otherwise:

$$LB_i^t = MAX\left(0, w_{C,i}^t - \frac{DNTE_i^t \times MTLR}{LN}\right)$$

$$UB_i^t = MAX\left(0, w_{C,i}^t - \frac{DNTE_i^t \times MTLR}{LN}\right)$$

Where:

$Theme\ Relevance\ Score_i^t$	means the Theme Relevance Score in respect of Rebalance Selection Date (t) and RavenPack Entity Identifier (i) corresponding to Eligible Constituent (i) determined pursuant to Section 3.6 and Section 3.13.
LB_i^t	means the Final Lower Bound in respect of Eligible Constituent (i) and Rebalance Selection Date (t).
UB_i^t	means the Final Upper Bound in respect of Eligible Constituent (i) and Rebalance Selection Date (t).
$w_{C,i}^t$	means the Current Weight in respect of Eligible Constituent (i) and Rebalance Selection Date (t), as determined by the Index Calculation Agent pursuant to Section 5.2(b), if Eligible Constituent (i) is a Constituent in respect of the Effective Rebalancing Date immediately preceding Rebalance Selection Date (t), or otherwise means zero.
$DNTE_i^t$	means the 1 Month Dollar Notional Trading Estimate in respect of Eligible Constituent (i) and Rebalance Selection Date (t), determined pursuant to Section 3.10.
$MTLR$	means the Maximum Trading Liquidity Ratio specified in the relevant Applicable Module.
LN	means the Liquidity Notional specified in the relevant Applicable Module.

(c)   Optimizer Software result

The Optimizer Software which is used as part of the Optimization Methodology will return a primal status. If the primal status equals "Optimal", then the Constituent Determination Agent shall use such Output Portfolio which satisfies this acceptance condition (the "**Selected Output Portfolio**") for the purposes of Section 4.1. If the primal status does not equal "Optimal", then the Constituent Determination Agent shall reduce the Thematic Relevance Score Threshold by the Optimization Relaxation Step Size and repeat the steps in this Section 4 above until the Optimizer Software returns a primal status equal to "Optimal".

If, after the Thematic Relevance Score Threshold is reduced to zero (0), the Optimizer Software does not return a primal status equal to "Optimal", then a relaxation event (a "**Relaxation Event**") shall be deemed to have occurred and: (i) the Constituents comprised in the Index shall not be rebalanced and re-weighted on the Scheduled Rebalancing Date immediately following Rebalance Selection Date (t) and (ii) the Constituents of the Index shall remain the same as immediately prior to such Scheduled Rebalancing Date, subject to any adjustments to Constituents pursuant to these Index Rules (although the percentage contribution of each Constituent to the Index Level may differ from the weight applicable on the immediately preceding Effective Rebalancing Date prior to such Rebalance Selection Date (t)).

4.2 Filtering small weights and providing the Preliminary Constituents and Weights

In respect of each Rebalance Selection Date (t), the Constituent Determination Agent shall remove from the Selected Output Portfolio all Eligible Constituents associated with a weight whose value is less than the Small Weight Threshold Percentage, and the remaining Eligible Constituents within the Selected Output Portfolio shall compose the "**Filtered Output Portfolio**". In the event of such a removal, the sum of the weights of the remaining Eligible Constituents within the Selected Output Portfolio will be less than 100%.

Subject to Section 4.1(c) and subject to the occurrence of a Temporary Optimizer Software Failure, the set of constituents within the Filtered Output Portfolio shall be deemed to be the "**Preliminary Constituents**" and their associated weights shall be deemed to be the "**Preliminary Constituent Weights**"; provided that, in respect of Rebalance Selection Date (t), in the event that the number of Preliminary Constituents within the Filtered Output Portfolio is less than the Minimum Number Threshold (a "**Minimum Constituent Number Failure**", then: (i) the Constituents comprised in the Index shall not be rebalanced and re-weighted on the Scheduled Rebalancing Date immediately following Rebalance Selection Date (t) and (ii) the Constituents of the Index shall remain the same as immediately prior to such Scheduled Rebalancing Date, subject to any adjustments to Constituents pursuant to these Index Rules (although the percentage contribution of each Constituent to the Index Level may differ from the weight applicable on the immediately preceding Effective Rebalancing Date prior to such Rebalance Selection Date (t)).

The Constituent Determination Agent, in respect of each Rebalance Selection Date (t) and subject to Section 4.1(c) and subject to the occurrence of a Temporary Optimizer Software Failure or a Minimum Constituent Number Failure, shall provide the Index Calculation Agent with the list of the Preliminary Constituents and the Preliminary Constituent Weights. The Index Calculation Agent shall use the list of the Preliminary Constituents and the Preliminary Constituent Weights for the calculation set forth in Section 5.

5. Determining the Constituents and Constituent Weights, Rebalancing the Index and Determining the Index Level

5.1 Determination of the Constituents and Constituent Weights

The Index Calculation Agent, in respect of each Effective Rebalancing Date (k), using the information provided by the Constituent Determination Agent pursuant to Section 4.2, will determine (1) whether, from and including the immediately preceding Rebalance Selection Date associated with such Effective Rebalancing Date to and including such Effective Rebalancing Date (the "**Determination Period**"), a Preliminary Constituent has been delisted from the relevant Exchange (each, a "**Delisted Constituent**") and (2) whether a suspension in trading of a Preliminary Constituent on the relevant Exchange has occurred on such Effective Rebalancing Date or is continuing on such Effective Rebalancing Date that is not a limitation of trading in such instruments by reason of movements in price exceeding limits permitted by the relevant Exchange (each, a "**Suspended Constituent**"). The Index Calculation Agent shall remove from the list of the Preliminary Constituents each of the Delisted Constituents and each of the Suspended Constituents and shall adjust the list of the Preliminary Constituents to account for such removal. The remaining constituents on the list of adjusted Preliminary Constituents that are not affected by the occurrence of a delisting event during the Determination Period and that are not affected by the occurrence or continuation of a suspension event shall be deemed to be the "**Constituents**" in respect of such Effective Rebalancing Date (k). The Preliminary Constituent Weights in respect of the Constituents shall be deemed to be the "**Constituent Weights**" in respect of such Effective Rebalancing Date (k). The number of Constituents shall be deemed to be the "**Number of Constituents**" in respect of such Effective Rebalancing Date (k).

5.2 Calculation of Index Level in respect of a Calculation Day (t)

(a) Calculation of the Index Level

Subject to the Adjustment Provisions, the Index Calculation Agent will calculate the Index Level for each Calculation Day (t) as follows:

In respect of the Index Base Date:

$$\text{Index}_t = \text{Index Base Level}$$

On each Calculation Day (t) after the Index Base Date:

$$\text{Index}_t = \frac{\sum_{i=1}^{NL(k)} \left(\text{NOSH}_i^k \times P_i^t \times \text{FX}_i^t \right)}{\text{Divisor}^t}$$

If on a Calculation Day (t) the Index Level is equal to zero (0) then for all subsequent Calculation Days the Index Level shall be equal to zero (0) and in such case the formula above shall not be used to calculate the Index Level for any subsequent Calculation Day.

Where:

$Index_t$ means the Index Level in respect of Calculation Day (t).

$Index\ Base\ Level$ means the Index Base Level specified in the relevant Applicable Module.

Effective Rebalancing Date (k) means, in respect of a Calculation Day (t):
- if Calculation Day (t) is the Index Base Date, the Index Base Date
- if Calculation Day (t) falls after the Index Base Date, the immediately preceding Effective Rebalancing Date.

$NL(k)$ means the Number of Constituents in respect of Effective Rebalancing Date (k) as determined pursuant to Section 5.1.

$NOSH_i^k$ means the number of shares (the "**Number of Shares**") in respect of Constituent (i) and Effective Rebalancing Date (k), which is an amount calculated in accordance with the following formula:

$$NOSH_{Long,i}^k = \frac{W_i^k}{P_i^{RSD} \times FX_i^{RSD}}$$

Where:

Rebalance Selection Date (RSD) means, in respect of Effective Rebalancing Date (k), the immediately preceding Rebalance Selection Date associated with such Effective Rebalancing Date (k).

W_i^k means, in respect of Constituent (i) and Effective Rebalancing Date (k), the Constituent Weight, as determined pursuant to Section 5.1.

P_i^{RSD} means the Closing Price of Constituent (i) in respect of Rebalance Selection Date (RSD).

FX_i^{RSD} means the FX Rate of Constituent (i) in respect of Rebalance Selection Date (RSD).

P_i^t means, in respect of Calculation Day (t), the Closing Price of the "ith" Constituent, "**Constituent (i)**", in respect of Calculation Day (t).

FX_i^t means the FX Rate of Constituent (i) in respect of Calculation Day (t).

$Divisor^t$ means the divisor of the Long Basket (the "**Basket Divisor**") in respect of Calculation Day (t), which is an amount calculated in accordance with the following formulas:

(a) If Calculation Day (t) is the Index Base Date:

$$Divisor^t = \frac{\sum_{i=1}^{NL(k)}\left(NOSH_i^k \times P_i^t \times FX_i^t\right)}{Index\ Base\ Level}$$

(b) If Calculation Day (t) is not the Index Base Date:

$$Divisor^t = \frac{1}{Index_{t-1}} \times \sum_{i=1}^{N(k)}\left(NOSH_i^k \times (P_i^{t-1} \times FX_i^{t-1})\right)$$

Where:

Calculation Day (t-1) means, in respect of Calculation Day (t), the Calculation Day immediately preceding such Calculation Day (t).

P_i^{t-1} means the Closing Price of Constituent (i) in respect of Calculation Day (t-1).

FX_i^{t-1} means the FX Rate of Constituent (i) in respect of Calculation Day (t-1).

Index_{t-1} means the Index Level in respect of Calculation Day (t-1).

(b) Determination of the Current Weights

In respect of each Rebalance Selection Date (t) that falls after the Index Base Date, the Index Calculation Agent shall determine the current weight (the "**Current Weight**") in respect of each constituent that is a Constituent in respect of the Effective Rebalancing Date immediately preceding such Rebalance Selection Date (t) ("**Effective Rebalancing Date (k)**"), as follows:

$$\text{Current Weight}_i^t = \frac{\text{NOSH}_i^k \times P_i^t \times \text{FX}_i^t}{\sum_{j=1}^{N(k)} \text{NOSH}_j^k \times P_j^t \times \text{FX}_j^t}$$

Where:

NOSH_i^k means the Number of Shares in respect of Constituent (i) and Effective Rebalancing Date (k), as determined pursuant to Section 5.2(a), subject to any adjustments to Constituents pursuant to these Index Rules.

P_i^t means the Closing Price of Constituent (i) in respect of Rebalance Selection Date (t).

FX_i^t means the FX Rate of Constituent (i) in respect of Rebalance Selection Date (t).

$N(k)$ means the Number of Constituents in respect of Effective Rebalancing Date (k) as determined pursuant to Section 5.1.

NOSH_j^k means the Number of Shares in respect of Constituent (j) and Prior Rebalancing Date (k), as determined pursuant to Section 5.2(a), subject to any adjustments to Constituents pursuant to these Index Rules.

P_j^t means the Closing Price of Constituent (j) in respect of Rebalance Selection Date (t).

FX_j^t means the FX Rate of Constituent (j) in respect of Rebalance Selection Date (t).

6. Certain General Terms relating to the Index

6.1 Publication and availability of the Index Rules

The Index Rules are published by J.P. Morgan Securities plc of 25 Bank Street, Canary Wharf, London E14 5JP, in its capacity as the Index Sponsor.

Copies of the Index Rules may be obtained by holders or potential holders of Products linked to the Index free of charge on request from the Index Sponsor at its principal office in London against such proof of status and upon such terms as the Index Sponsor may in its reasonable discretion require.

6.2 Amendments

Economic, market, regulatory, legal, financial or other circumstances may arise that may necessitate or make desirable an amendment of the Index Rules.

Notwithstanding the foregoing, the Index Sponsor may amend the Index Rules as it deems appropriate. Such amendments may include (without limitation):

- correcting or curing any errors, omissions or contradictory provisions; or

- modifications to the methodology described in the Index Rules (including, without limitation, a change in the frequency of calculation of the Index Level) that are necessary or desirable in order for the calculation of the Index to continue notwithstanding any change to any economic, market, regulatory, legal, financial or other circumstances as of the Index Live Date; or

- modifications of a formal, minor or technical nature; or

The Index Sponsor will notify the Index Calculation Agent and the Constituent Determination Agent (if a different entity than the Index Sponsor) before making an amendment pursuant to this Section 6.2. The Index Sponsor

may, but is not obliged to, take into account the views of the Index Calculation Agent or the Constituent Determination Agent regarding any proposed amendment.

Following any amendment, the Index Sponsor will make available (as soon as practicable) the amended version of the Index Rules and will include the effective date of such amendment in the new version of the Index Rules. However, the Index Sponsor is under no obligation to inform any person about any amendments to the Index (except as required by law or regulation, further information in respect of which is available here: https://www.jpmorganindices.com).

The Index Sponsor may, in its sole discretion, at any time and without notice, terminate the calculation and publication of the Index.

6.3   No advice or offer of securities

The Index Rules do not constitute investment, tax, legal, accounting, regulatory or other advice, including within the meaning of Article 53 of the Financial Services and Markets Act 2000 (Regulated Activities) Order 2001 or investment advice within the meaning of Article 4(4) of the Markets in Financial Instruments Directive 2004/39/EC or otherwise.

The Index Rules neither constitute an offer to purchase or sell securities nor constitute specific advice in whatever form (investment, tax, legal, accounting or regulatory) in respect of any Product that may be linked to the Index.

6.4   The Index is synthetic

The Index references a "notional" or synthetic exposure to the Constituents and there is no actual portfolio of assets to which any person is entitled or in which any person has any ownership interest. The Index merely references certain synthetic exposures the performance of which are used as reference points for calculating Index Levels.

7. Index Sponsor, Index Calculation Agent, Constituent Determination Agent and Disruption Determination Agent

7.1 Identity of Index Sponsor, Index Calculation Agent, Constituent Determination Agent and Disruption Determination Agent

The sponsor of the Index specified in Section 3 (the "**Index Sponsor**", which term includes any successor in such capacity) may delegate or transfer any of its obligations or responsibilities in connection with the Index to one or more entities that it determines are appropriate.

The Index Sponsor is responsible for, among other things, the creation and design of the Index, the documentation of the Index Rules, and the appointment of (i) the calculation agent of the Index (the "**Index Calculation Agent**"), which may be the Index Sponsor, an unrelated third party or an affiliate or subsidiary of the Index Sponsor, (ii) the determination agent of the Constituents (the "**Constituent Determination Agent**"), which may be the Index Sponsor, an unrelated third party or an affiliate or subsidiary of the Index Sponsor and (iii) the determination agent of disruption events (the "**Disruption Determination Agent**"), which may be the Index Sponsor, an unrelated third party or an affiliate or subsidiary of the Index Sponsor. The Index Sponsor is also responsible for determining whether an Extraordinary Event has occurred and the related adjustments set forth in Section 11 of these Index Rules.

Each of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent and the Disruption Determination Agent, each as of the Index Live Date, is specified in the relevant Applicable Module. In the case of an Index Calculation Agent, a Constituent Determination Agent or a Disruption Determination Agent that is not at such time an affiliate of the Index Sponsor, such entity must obtain written permission from the Index Sponsor prior to any delegation or transfer of such entity's responsibilities or obligations in connection with the Index.

The Index Sponsor may at any time or for any reason terminate the appointment of any of the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent and appoint an alternative entity (or entities) as such entity's replacement.

The Index Calculation Agent is responsible for:

(i) determining the Constituents and the Constituent Weights in respect of each Effective Rebalancing Date, in accordance with Section 5.1 of the Index Rules; and

(ii) calculating the Index Level in respect of each Calculation Day, in accordance with Section 5.2 of the Index Rules; and

(iii) determining the Current Weights in respect of each Rebalance Selection Date (t) that falls after the Index Base Date, in accordance with Section 5.2(b) of the Index Rules; and

(iv) determining any adjustment upon the occurrence of certain events set forth in Section 11.7 of the Index Rules.

The Disruption Determination Agent is responsible for determining whether a Market Disruption Event has occurred and for making related determinations pursuant to the provisions set forth in Sections 10.1 and 10.2 of the Index Rules, and informing the Index Calculation Agent of any such determinations.

If the Index Sponsor determines that a relevant event has occurred, and if the Index Calculation Agent, Constituent Determination Agent or the Disruption Determination Agent fails to make that determination, then the Index Sponsor may instruct one or more of the Index Calculation Agent, the Constituent Determination Agent and the Disruption Determination Agent to consider such event and whether there should be related consequences and adjustments in accordance with the Index Rules to take account of such event.

The Constituent Determination Agent is responsible for determining the Eligible Constituents, the Preliminary Constituents and the Preliminary Constituent Weights in accordance with the Index Rules.

The Index Sponsor may delegate or transfer any of its obligations or responsibilities in connection with the Index to one or more entities as it determines appropriate.

The Index is a rules-based Index and none of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent and the Disruption Determination Agent will exercise any discretion or independent judgment in the implementation of the methodology of the selection, weighting and ongoing rebalancing of the Index apart from limited circumstances that are expressly contemplated in these Index Rules.

7.2 Index Sponsor, Index Calculation Agent, Constituent Determination Agent and Disruption Determination Agent standards

Each of the Index Sponsor, Index Calculation Agent, Constituent Determination Agent and Disruption Determination Agent shall act in good faith and in a commercially reasonable manner in respect of determinations, interpretations and calculations made by it pursuant to the Index Rules.

7.3 Index Sponsor, Index Calculation Agent, Constituent Determination Agent and Disruption Determination Agent determinations

An action (or failure to act) on the part of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent in relation to the Index may have a detrimental effect on the Index Level or the volatility of the Index.

The Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent may make certain determinations or calculations based on information obtained from publicly available sources without independently verifying such information and accepts no responsibility or liability for any consequent loss or damage.

All determinations, interpretations and calculations of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent relating to the Index Rules shall be final, conclusive and binding, provided that if the Index Sponsor identifies an error or omission in any of the determinations, interpretations or calculations in respect of the Index made by the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent, the Index Sponsor may, if the Index Sponsor determines that such error, omission or correction (as the case may be) is material and that it is practicable, adjust or correct the relevant determination, interpretation or calculation to take into account such correction as soon as it is reasonably practicable to do so. No person shall be entitled to make any claim against the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent, the Disruption Determination Agent or any Relevant Person in respect of any such determinations, interpretations or calculations of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent. None of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent, the Disruption Determination Agent or any Relevant Person shall:

(a)   be under any obligation to revise any determination, interpretation or calculation made or action taken for any reason in connection with the Index Rules or the Index; or

(b)   have any responsibility to any person for any determination, interpretation or calculation made or anything done (or omitted to be done) (whether as a result of negligence or otherwise) in respect of the Index Rules or the Index or in respect of the publication of the Index Level (or failure to publish such level) or any use to which any person may put the Index or the Index Levels.

8.   Index Levels

8.1   Index Base Level and Index Base Date

The Index Base Level and the Index Base Date are specified in the relevant Applicable Module.

8.2   Publication of Index Levels

Subject to the Adjustment Provisions and the Disruption Provisions set out in Section 10, the Index Calculation Agent will publish the Index Level of the Index in respect of each Calculation Day as soon as reasonably practicable on or after such Calculation Day. The Index Level or any subsequent correction to the Index Level will be published on Bloomberg on the Index Bloomberg Ticker page (as specified in the relevant Applicable Module) or by means of such other information source as the Index Sponsor may determine in its reasonable discretion. Notwithstanding anything to the contrary, the Index Sponsor may cease calculation and publication of the Index Level at any time in its sole discretion and nothing in this document shall be construed as an agreement by the Index Sponsor to continue to calculate the Index Level if the Index Sponsor has elected to cease publication.

All Index Levels are rounded to 2 decimal places for purposes of publication only before being published. The Index Calculation Agent may vary its rounding convention in its sole discretion provided that it will not publish the Index Level with fewer than two decimal places. Notwithstanding anything to the contrary, the Index Calculation Agent may calculate and maintain the Index Level to greater accuracy for the determination of upcoming Index Levels or other calculations.

8.3 Index Live Date

Subject to the Adjustment Provisions, the Index Calculation Agent has been calculating the Index Level and publishing it in respect of each Calculation Day in accordance with the methodology set forth in these Index Rules from the Index Live Date specified in the relevant Applicable Module.

9. Corrections in respect of the Index

If any publicly available financial or other information (including, but not limited to, the Closing Price of a Constituent or any other level, price or rate related to a Constituent or any variable, input or other matter used for any calculation or determination relevant to the Index Level for any Calculation Day) published or otherwise made available by the relevant recognized financial or other information source selected by the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent and used in any calculation or determination is subsequently corrected, or the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent identifies an error or omission in any of its calculations or determinations in respect of the Index or the Index Sponsor identifies an error or omission in any of the Index Calculation Agent's, the Constituent Determination Agent's or the Disruption Determination Agent's calculations or determinations in respect of the Index, the Index Sponsor may or the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent may only with the prior consent of the Index Sponsor, in any case if the Index Sponsor determines that such error, omission or correction (as the case may be) is material and that it is practicable, adjust or correct the relevant calculation or determination to take into account such correction as soon as it is reasonably practicable to do so.

10. Disruption Provisions

10.1 Consequences of Market Disruption Event on a Calculation Day that is not an Effective Rebalancing Date and is not a Disruption Resolution Calculation Day

If a Calculation Day (i) that is not an Effective Rebalancing Date and (ii) that is not a Disruption Resolution Calculation Day, is a Disrupted Day (a "**Disrupted Constituent Calculation Day**") in respect of any Constituent (for the purposes of this Section 10.1, a "**Disrupted Constituent**"), then:

A. if the Disruption Determination Agent determines that the Disrupted Constituents comprise less than 20 percent of the level of the Index, then the Disruption Determination Agent shall notify the Index Calculation Agent of such determination, and the Index Calculation Agent shall calculate the Index Level for such Disrupted Constituent Calculation Day, using (i) in respect of the each of the Constituents that are not affected by a Market Disruption Event, the Closing Price of such Constituent in respect of such Disrupted Constituent Calculation Day, and (ii) in respect of each of the Disrupted Constituents, the official closing price of such Disrupted Constituent for the Constituent Scheduled Trading Day for such Disrupted Constituent immediately preceding such Disrupted Constituent Calculation Day that was not a Disrupted Day for such Disrupted Constituent; or

B. if the Disruption Determination Agent determines that the Disrupted Constituents comprise 20 percent or more of the level of the Index, then the Disruption Determination Agent shall notify the Index Calculation Agent of such determination, and the Index Calculation Agent will suspend the publication of the Index Level until the earlier of (i) the first following Calculation Day that is either (x) not a Disrupted Day for any Constituent or (y) is a Disrupted Day in respect of which the Disrupted Constituents comprise less than 20 percent of the level of the Index, in which case the provisions set forth in Section 10.1(A) shall apply, and (ii) the Effective Rebalancing Date immediately following such Disrupted Constituent Calculation Day if such Effective Rebalancing Date is a Disrupted Day, in which case the provisions of Section 10.2(B) will apply.

10.2 Consequences of Market Disruption Event on an Effective Rebalancing Date or on a Disruption Resolution Calculation Day

If the Disruption Determination Agent has determined that an Effective Rebalancing Date is a Disrupted Day (the "**Disrupted Rebalancing Date**") in respect of any Incoming Constituent or any Outgoing Constituent (for the purposes of this Section 10.2, each a "**Disrupted Constituent**") then the Disruption Determination Agent shall notify the Index Calculation Agent of such determination, and:

A. the relevant Effective Rebalancing Date shall remain the Effective Rebalancing Date, as originally scheduled for each Incoming Constituent and each Outgoing Constituent that is not a Disrupted Constituent (for the purposes of this Section 10.2, a "**Non-Disrupted Constituent**") and the Closing Price for each such Non-Disrupted Constituent for such Effective Rebalancing Date will be used in the calculation of the Index Level pursuant to Section 5.2 for such Effective Rebalancing Date; and

B. for each Disrupted Constituent that is an Outgoing Constituent, the Index Calculation Agent shall use the Closing Price for such Disrupted Constituent as of the first following Constituent Scheduled Trading Day for such Disrupted Constituent that is not a Disrupted Day for the Disrupted Constituent (the "**First Following Non-Disrupted Day**"), unless such Disrupted Constituent remains a Disrupted Constituent for each of the Calculation Days immediately following the Effective Rebalancing Date to and including the tenth Calculation Day following the Effective Rebalancing Date (the "**Disruption Determination Date**" for such Disrupted Constituent that is an Outgoing Constituent), in which case the Disrupted Constituent shall be removed from the Index at a deemed Closing Price of zero, and the Index Sponsor shall adjust the Index and the Index Rules as appropriate to account for such removal as soon as practicable and notify the Index Calculation Agent of any such determination; and

C. for each Disrupted Constituent that is an Incoming Constituent, the Index Calculation Agent shall use the Closing Price for such Disrupted Constituent as of the first following Constituent Scheduled Trading Day that is not a Disrupted Day for the Disrupted Constituent (the "**First Following Non-Disrupted Day**") as the Closing Price of the Disrupted Constituent for such Effective Rebalancing Date, unless such Disrupted Constituent remains a Disrupted Constituent for each of the Calculation Days immediately following the Rebalancing Date to and including the tenth Calculation Day following the Effective Rebalancing Date (the "**Disruption Determination Date**" for such Disrupted Constituent that is an

Incoming Constituent), in which case, the Disruption Determination Agent (i) shall not include such Disrupted Constituent as a Constituent of the Index and (ii) shall adjust the Index and the Index Rules as appropriate to account for not including such Disrupted Constituent as soon as practicable following such determination not to include the Disrupted Constituent and notify the Index Calculation Agent of any such determination.

D. The Index Calculation Agent shall calculate the Index Level in respect of any Disruption Resolution Calculation Day on the last day on which a valuation is determined in accordance with the provisions set out in paragraphs (B) and (C) above. The Index Calculation Agent shall publish the Index Level in respect of each such Disruption Resolution Calculation Day.

"**Disruption Resolution Calculation Day**" means, each Calculation Day, from but excluding the Disrupted Rebalancing Date to and including the earlier date to occur of: (i) the last First Following Non-Disrupted Day for an Outgoing Constituent or an Incoming Constituent and (ii) the Disruption Determination Date, if any, for an Outgoing Constituent or an Incoming Constituent.

10.3 Consequences of Data Source Disruption Event in respect of a Rebalance Selection Date

Unless a Data Source Disruption Event occurs on a Rebalance Selection Date (t) (the "**Data Source Disrupted Date**"), the Constituent Determination Agent shall carry out the methodology as set forth in Section 4.

In respect of a Data Source Disrupted Date: (i) the Constituents comprised in the Index shall not be rebalanced and re-weighted on the Scheduled Rebalancing Date immediately following such Data Source Disrupted Date and (ii) the Constituents of the Index shall remain the same as immediately prior to such Scheduled Rebalancing Date, subject to any adjustments to Constituents pursuant to these Index Rules (although the percentage contribution of each Constituent to the Index Level may differ from the weight applicable on the immediately preceding Effective Rebalancing Date prior to such Date Source Disrupted Date).

11. Extraordinary Events

11.1 Cancellation of relevant license or other right

If, at any time, any relevant license or other right granted to the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent (or any of their Affiliates) (together the "**Relevant Parties**") to use or refer to the level of or other information for any Constituent or any licenses or other rights used in any of the determinations or calculations set forth in these Index Rules (including but not limited to in respect of or from the Identified Reference Index, the Optimizer Software, the Share Data Source, the FX Data Source or the News Reference Data Source) ("**Index-specific Affected Information**") is terminated, or is otherwise disputed, impaired, replaced by the third party data provider or ceases (for any reason), then the Index Sponsor may: (i) (a) find a replacement data source or provider or select an alternative source of information having characteristics substantially similar to information available from the relevant source of the Affected Information used by the Relevant Parties in the context of any determination or calculation set forth in these Index Rules, (b) determine a date on which such replacement is effective, and (c) adjust the Index Rules as it determines to be appropriate to account for such replacement or (ii) cease publication of the Index on such date as is determined by the Index Sponsor.

If, at any time, any non-affiliate of the Index Sponsor, which may include from time to time the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent (or any of their Affiliates) or any other party (together the "**Relevant Parties**"), takes any action or makes any notification that relates to any use or reference to the level of or other information for any Constituent or any information used in any of the determinations or calculations set forth in these Index Rules (including but not limited to in respect of or from the Identified Reference Index, the Optimizer Software, the Share Data Source, the FX Data Source or the News Reference Data Source) ("**Index-specific Affected Information**") or that relates to any use of or reference to any information (whether such use or reference is actual, past, present, potential or future) used or referenced in any determinations or calculations made by or for the Index Sponsor or any Affiliate of the Index Sponsor (whether such use or reference is actual, past, present, potential or future, and whether or not related to any index), then the Index Sponsor may: (i) (a) find a replacement data source or provider or select an alternative source of information having characteristics substantially similar to information available from the relevant source of the Affected Information used by the Relevant Parties in the context of any determination or calculation set forth in these Index Rules, (b) determine a date on which such replacement is effective, and (c) adjust the Index Rules as it determines to be appropriate to account for such replacement, (ii) replace any of the

Relevant Parties or alter the role of any of the Relevant Parties, or (iii) cease publication of the Index on such date as is determined by the Index Sponsor.

11.2   Change in Law

Without prejudice to the ability of the Index Sponsor to amend the Index Rules, the Index Sponsor may, in respect of the Index, exclude any Constituent (an "**Affected Constituent**") affected by the occurrence of a Change in Law, and if it excludes an Affected Constituent, then the Index Sponsor may adjust the Index Rules as it determines to be appropriate to account for such exclusion on such date(s) selected by the Index Sponsor.

11.3   Successor currency or change to an underlying currency

If, at any time, any Associated Currency or other currency used in connection with these Index Rules is lawfully eliminated, converted, redenominated or exchanged for any successor currency, then such currency shall be deemed replaced by such successor currency.

To the extent that any such elimination, conversion, redenomination or exchange results in two or more currencies that were formerly associated with the original currency, the Index Sponsor may modify these Index Rules to account for such elimination, conversion, redenomination or exchange. For example, the Index Sponsor may select one of the applicable currencies to be a successor currency or amend the formulas for calculating the Index to account for the new exchange rate, if any.

11.4   Base Reference Index

If the level of the Base Reference Index: is (a) not calculated and is not announced by the Base Reference Index Sponsor, but is calculated and announced by a successor sponsor acceptable to the Index Sponsor, or (b) replaced by a successor index using, in the determination of the Index Sponsor, the same or a substantially similar formula for and method of calculation as used in the calculation of the Base Reference Index, then the Base Reference Index will be deemed to be the successor index so calculated and announced by that successor sponsor described in clause (a) above or that successor index described in clause (b) above, as the case may be, with effect from the date of such relevant event, and the Index Sponsor may make such adjustments to the Index Rules as it determines are appropriate to account for such change.

If on or prior to any Calculation Day, (a) the Base Reference Index Sponsor makes a material change in the formula for or the method of calculating the Base Reference Index or in any other way materially modifies the Base Reference Index (other than a modification prescribed in that formula or method to maintain the Base Reference Index in the event of routine occurrences), (b) the Base Reference Index Sponsor cancels the Base Reference Index or (c) there are ten (10) consecutive Calculation Days with respect to which the inputs and information related to the Base Reference Index that are necessary to make determinations pursuant to the Index Rules are not available, then the Index Sponsor shall select a replacement index for the Base Reference Index with the same or a substantially similar formula for and method of calculation as used in calculation of the Base Reference Index, provided that if the Index Sponsor determines that it cannot select such a replacement index, then the Index Sponsor (i) may make such adjustment(s) that it determines to be appropriate to any variable, calculation methodology, valuation terms or any other rule in relation to the Index to account for such event, which may include, without limitation, selecting a replacement index for the Base Reference Index that does not have the same or a substantially similar formula for and method of calculation as used in calculation of the Base Reference Index or (ii) may terminate the Index.

11.5   Identified Reference Index

If the level of the Identified Reference Index: is (a) not calculated and is not announced by the Identified Reference Index Sponsor, but is calculated and announced by a successor sponsor acceptable to the Index Sponsor, or (b) replaced by a successor index using, in the determination of the Index Sponsor, the same or a substantially similar formula for and method of calculation as used in the calculation of the Identified Reference Index, then the Identified Reference Index will be deemed to be the successor index so calculated and announced by that successor sponsor described in clause (a) above or that successor index described in clause (b) above, as the case may be, with effect from the date of such relevant event, and the Index Sponsor may make such adjustments to the Index Rules as it determines are appropriate to account for such change.

If on or prior to any Calculation Day, (a) the Identified Reference Index Sponsor makes a material change in the formula for or the method of calculating the Identified Reference Index or in any other way materially modifies the Identified Reference Index (other than a modification prescribed in that formula or method to maintain the

Identified Reference Index in the event of routine occurrences), (b) the Identified Reference Index Sponsor cancels the Identified Reference Index or (c) there are ten (10) consecutive Calculation Days with respect to which the inputs and information related to the Identified Reference Index that are necessary to make determinations pursuant to the Index Rules are not available, then the Index Sponsor shall select a replacement index for the Identified Reference Index with the same or a substantially similar formula for and method of calculation as used in calculation of the Identified Reference Index, provided that if the Index Sponsor determines that it cannot select such a replacement index, then the Index Sponsor (i) may make such adjustment(s) that it determines to be appropriate to any variable, calculation methodology, valuation terms or any other rule in relation to the Index to account for such event, which may include, without limitation, selecting a replacement index for the Identified Reference Index that does not have the same or a substantially similar formula for and method of calculation as used in calculation of the Identified Reference Index or (ii) may terminate the Index.

11.6   Index Calculation Agent Adjustments Due to Corporate Actions, Corporate Events and Changes to the Composition of the Identified Reference Index

With respect to any determination (each, an "**Actual Identified Reference Index Adjustment Determination**") in respect of an Identified Reference Index as to whether or not (1) any change to the composition of the Identified Reference Index will be made or (2) any adjustment will be made, in any case by the Identified Reference Index Sponsor or the Identified Reference Index Calculation Agent pursuant to the established methodology, procedures and guidelines for the Identified Reference Index, the Index Calculation Agent shall consider each such Actual Identified Reference Index Adjustment Determination. Each Identified Reference Index Adjustment Determination will be a determination to make or not make an adjustment and to make or not make a change (such adjustment, omission of an adjustment, change and omission of a change, each being considered an "**Actual Identified Reference Index Adjustment Outcome**"). An Actual Identified Reference Index Adjustment Outcome includes an adjustment or change that (x) is already effective or has already been implemented in the Identified Reference Index or (y) will be effective or implemented in the Identified Reference Index in the future. An Actual Identified Reference Index Adjustment Outcome includes the omission of an adjustment or change that results from an Actual Identified Reference Index Adjustment Determination.

If any Constituent of the Index is not at any time also a current component of an Identified Reference Index, the Index Calculation Agent shall make a determination (each, a "**Simulated Identified Reference Index Adjustment Determination**") in respect of an Identified Reference Index as to whether or not if such Constituent were also a current component of an Identified Reference Index (1) any change to the composition of the Identified Reference Index would be made or (2) any adjustment would be made, in any case by the Identified Reference Index Sponsor or the Identified Reference Index Calculation Agent pursuant to the established methodology, procedures and guidelines for the Identified Reference Index, and the Index Calculation Agent shall consider each such Simulated Identified Reference Index Adjustment Determination. Each Simulated Identified Reference Index Adjustment Determination will be a determination to make or not make an adjustment and to make or not make a change (such adjustment, omission of an adjustment, change and omission of a change, each being considered a "**Simulated Identified Reference Index Adjustment Outcome**"). A Simulated Identified Reference Index Adjustment Outcome includes an adjustment or change that (x) would already be effective or would have already been implemented in the Identified Reference Index or (y) would be effective or implemented in the Identified Reference Index in the future. A Simulated Identified Reference Index Adjustment Outcome includes the omission of an adjustment or change that results from a Simulated Identified Reference Index Adjustment Determination.

In respect of each such Actual Identified Reference Index Adjustment Outcome and each Simulated Identified Reference Index Adjustment Outcome, the Index Calculation Agent shall make a consistent adjustment to the Index hereunder (each, a "**Consistent Adjustment Outcome**"), taking into account the similarities and differences between the methodology and composition of the Identified Reference Index and the methodology and composition of the relevant Index. In respect of an Actual Identified Reference Index Adjustment Outcome that did involve an adjustment or a change or a Simulated Reference Index Adjustment Outcome that would involve an adjustment or a change, the Index Calculation Agent may determine that the appropriate Consistent Adjustment Outcome is to make no adjustment or change, due to the differences between the methodology and composition of the Identified Reference Index and the methodology and composition of the relevant Index. In respect of an Actual Identified Reference Index Adjustment Outcome that did not involve an adjustment or a change or a Simulated Identified Reference Index Adjustment Outcome that would not involve an adjustment

or a change, the Index Calculation Agent may determine that the appropriate Consistent Adjustment Outcome is to make an adjustment or change, due to the differences between the methodology and composition of the Identified Reference Index and the methodology and composition of the relevant Index.

The Index Calculation Agent shall determine the timing and manner of making effective any such Consistent Adjustment Outcome, taking into account the methodology and composition of the relevant Index. In addition, the Index Calculation Agent may, with the prior consent of the Index Sponsor, make adjustments to the rules of the relevant Index to the extent necessary to account for such Consistent Adjustment Outcome.

The Index Calculation Agent will be solely responsible for the determination and calculation of any such Consistent Adjustment or the determination that no adjustment should be made, and any related determinations and calculations.

It is expected that the Identified Reference Index Calculation Agent will make Actual Identified Reference Index Adjustment Determinations and will determine Actual Identified Reference Index Adjustment Outcomes for the Identified Reference Index and will make Simulated Identified Reference Index Adjustment Determinations and will determine Simulated Identified Reference Index Adjustment Outcomes for the Identified Reference Index from time to time (1) in respect of Corporate Actions that impact a Constituent, (2) in respect of Corporate Events that impact a Constituent Company and (3) in respect of other circumstances or events (collectively, "**Constituent Events**"). In respect of a particular Constituent Event, it is expected that the Consistent Adjustment Outcome in respect of an Actual Identified Reference Index Adjustment Outcome or Simulated Identified Reference Index Adjustment Outcome will be similar to the adjustment or change (or lack of an adjustment or change) that the relevant index calculation agent or the Base Reference Index Sponsor would choose to make to the Base Reference Index.

A "**Corporate Action**" is an event that impacts shares or shareholders with a prescribed ex-date and includes, without limitation, distributions, capital increases, capital repayments, rights issues, entitlement offers, stock conversions, share splits (sub-division), reverse share splits (consolidation) and scrip issues (capitalization or bonus issue). A "**Corporate Event**" is an event that impacts a company or its shares or shareholders and that may impact an index (depending on its rules), including without limitation, a de-listing, liquidation, bankruptcy, insolvency, winding-up, nationalisation, consolidation, amalgamation, merger, binding share exchange, acquisition, takeover offer, exchange offer, tender offer or similar event.

The Index is a price return index. To the extent that an Actual Identified Reference Index Adjustment Determination results in an adjustment or change to the Identified Reference Index to account for the declaration or payment of a distribution in the form of an ordinary cash dividend, it is expected that no adjustment or change will be made to the Index.

11.7   Index Cancellation

If the Index Sponsor determines that no adjustment, exclusion or substitution that the Index Calculation Agent or it could make following an Extraordinary Event or any other event described in these Index Rules will produce a commercially reasonable result in respect of the Index, then the Index Sponsor may request (i) the Constituent Determination Agent cease performing its role as Constituent Determination Agent, (ii) the Disruption Determination Agent cease performing its role as Disruption Determination Agent and (iii) Index Calculation Agent cease calculating and publishing the Index from a date determined by the Index Sponsor. Notwithstanding this section, none of the Index Sponsor, the Index Calculation Agent, the Constituent Determination Agent or the Disruption Determination Agent is under any obligation to continue the calculation, publication and dissemination of the Index.

11.8   Prolonged Technical Issue related to the Optimizer Software

If the Constituent Determination Agent determines that on any Rebalance Selection Date (the "**Affected Rebalance Selection Date**") a Temporary Optimizer Software Failure has occurred, subject to the provisions set out in Section 4.1, and that a second Temporary Optimizer Software Failure occurs for the Rebalance Selection Date immediately following the Affected Rebalance Selection Date, then the Index Sponsor may, but is not obliged to, replace the Optimizer Software with a substitute optimizer that has the same or substantially similar

characteristics as the current Optimizer Software that is available on commercially reasonable terms and the Index Sponsor may make such adjustments to these Index Rules as it determines to be appropriate to account for such event on such dates as selected by the Index Sponsor; provided that if the Index Sponsor determines that there is no such substitute optimizer available on commercially reasonable terms, then the Index Sponsor (i) may replace the Optimizer Software with a substitute optimizer that has similar characteristics as the current Optimizer Software and may make such adjustments to these Index Rules as it determines to be appropriate to account for such event on such dates as selected by the Index Sponsor or (ii) may terminate the Index.

12. Hypothetical Back-Tested Levels

Any Index Level prior to the Index Live Date is a hypothetical, back-tested level. Such levels should not be taken as an indication of future performance, and no assurance can be given as to the levels or performance of the Index on a future date. Back-tested results are achieved by means of a retroactive application of a back-tested model designed with the benefit of hindsight. The Index Sponsor or the Index Calculation Agent, in calculating hypothetical back-tested index levels, may have applied the disruption provisions and any other provisions (including but not limited to the Extraordinary Events) specified in these Index Rules differently than it otherwise would have applied such provisions in a "live" calculation scenario. Additionally, the precision and rounding of the levels of the Index or a Constituent (or other calculated values) may differ from the methodology applied on a going-forward basis. In calculating the hypothetical back-tested levels, the Index Sponsor or the Index Calculation Agent may have made certain assumptions in respect of the timing surrounding the publication of certain indicators, Closing Prices and Index Levels. These assumptions may have a material impact on the hypothetical back-tested levels occurring on or before the Index Live Date. No representation is made that any Product that references the Index will or is likely to achieve returns similar to any hypothetical back-tested returns. Alternative modelling techniques or assumptions might provide different results. Finally, hypothetical back-tested past performance is neither an indicator nor a guarantee of future performance or returns. Actual results and performance may vary compared to such hypothetical back-tested levels.

13. Definitions of Terms

In respect of the Index, in addition to the terms defined in the Annex (RavenPack Reference Data Module) below the terms defined in this Section 13 below have the following meaning in the Index Rules:

"**1 Month Dollar Notional Trading Estimate**"	has the meaning given to it in Section 3.10.
"**1 Month Dollar Trading Threshold**"	has the meaning given to it in the relevant Applicable Module.
"**1 Month Dollar Trading Trim Window**"	has the meaning given to it in the relevant Applicable Module.
"**12 Month Dollar Notional Trading Estimate**"	has the meaning given to it in Section 3.11.
"**12 Month Dollar Trading Threshold**"	has the meaning given to it in the relevant Applicable Module.
"**12 Month Dollar Trading Trim Window**"	has the meaning given to it in the relevant Applicable Module.
"**Acceptance Condition**"	has the meaning given to it in Section 4.1(c).
"**Actual Identified Reference Index Adjustment Determination**"	has the meaning given to it in Section 11.6.
"**Actual Identified Reference Index Adjustment Outcome**"	has the meaning given to it in Section 11.6.
"**Adjustment Multiplier**"	means, in respect of a Listing (and the Eligible Constituent related to such Listing) and a Calculation Day, the Corporate Action Multiplier for the instrument of the Eligible Constituent Type of such Eligible Constituent associated with the most recent Corporate Action Effective Date that falls on or before such Calculation Day, if there is such a Corporate Action Multiplier, or 1 (one) if there is no such a Corporate Action Multiplier.
"**Adjustment Provisions**"	means in relation to these Index Rules or any Eligible Constituent or Constituent (as applicable), all relevant provisions of these Index Rules that provide for any adjustment, delay, modification, cancellation or determination in relation to the Index, any Eligible Constituent or Constituent (as applicable), the valuation procedure for a Constituent or the Index Rules (including, without limitation, as set forth in Sections 10, 11 and 12).
"**Affected Constituent**"	has the meaning given to it in Section 11.2.
"**Affected Information**"	has the meaning given to it in Section 11.1.
"**Affected Rebalance Selection Date**"	has the meaning given to it in Section 11.8.
"**affiliate**"	means in relation to any entity (the "**First Entity**"), any entity controlled, directly or indirectly, by the First Entity, any entity that controls, directly or indirectly, the First Entity or any entity directly or indirectly under common control with the First Entity. For these purposes "**control**" means ownership of a majority of the voting power of an entity.
"**Associated Currency**"	means, in respect of an Eligible Constituent or a Constituent (as applicable), the currency in respect of which the Eligible Constituent or the Constituent (as applicable) is denominated, as determined by the Constituent Determination Agent or the Index Calculation Agent (as applicable).
"**Associated GICS Sectors**"	has the meaning given to it in the relevant Applicable Module.
"**Base Reference Data Source**"	means MSCI data, which is accessed via QA Direct.
"**Base Reference Index**"	has the meaning given to it in the relevant Applicable Module.

"**Calculation Day (t)**"	means the Calculation Day in respect of which a calculation or determination is being made.
"**Calculation Day**"	has the meaning given to it in the relevant Applicable Module.
"**Change in Law**"	means, in respect of the Index, on or after the Index Live Date, the Index Sponsor determines that: due to (i) the adoption of, or any change in, any applicable law, regulation, order or rule (including, for the avoidance of doubt and without limitation, (x) any tax law or (y) adoption or promulgation of new regulations authorized or mandated by existing statute) or (ii) due to the promulgation of, or any change in, the announcement or statement of the formal or informal interpretation, application, exercise or operation by any court, tribunal or regulatory authority (or any representative thereof) with competent jurisdiction of any applicable law, regulation, order or rule (including, without limitation, rules or regulations promulgated or implemented by the U.S. Commodity and Futures Trading Commission, the U.S. Securities and Exchange Commission or any exchange or trading facility), (x) it is or would be contrary to such law, regulation, order or rule for any market participants that are brokers or financial intermediaries (individually or collectively) to hold, acquire or dispose of (in whole or in part) any financial asset, transaction or interest in or relating to an Eligible Constituent or Constituent (as applicable) or (y) holding a position in any financial asset, transaction or interest in or relating to an Eligible Constituent or Constituent (as applicable) is (or, but for the consequent disposal or termination thereof, would otherwise be) in excess of any allowable position limit(s) applicable to any market participants that are brokers or financial intermediaries (individually or collectively) under any such law, regulation, order or rule.
"**Closing Price**"	means, subject to the provisions set out in Section 10 (Disruption Provisions) in respect of a Constituent and a Calculation Day, the official closing price expressed in the relevant currency unit for such Constituent for such Calculation Day, or if such Calculation Day is a Disrupted Day in respect of such Constituent or is a day on which the Exchange in respect of such Constituent is not scheduled to be open for trading during its regular trading session, the official closing price expressed in the relevant currency unit for such Constituent in respect of the Constituent Scheduled Trading Day for such Constituent immediately preceding such Calculation Day that is not a Disrupted Day.
"**Consistent Adjustment Outcome**"	has the meaning given to it in Section 11.6.
"**Consolidated Traded Notional Quantity**"	has the meaning given to it in Section 3.9.
"**Constituent**"	has the meaning given to it in Section 5.1.
"**Constituent (i)**"	has the meaning given to it in Section 5.2(a).
"**Constituent Company**"	means, in respect of an Eligible Constituent or a Constituent (as applicable) and the Index, the issuer of such Eligible Constituent or Constituent (as applicable).
"**Constituent Determination Agent**"	has the meaning given to it in Section 7.1.
"**Constituent Events**"	has the meaning given to it in Section 11.6.
"**Constituent Scheduled Trading Day**"	means, in respect of a Constituent, any day on which the relevant Exchange and the relevant Related Exchange in respect of such Constituent are scheduled to be open for trading during their respective regular trading session(s).

"**Constituent Weights**"	has the meaning given to it in Section 5.1.
"**Corporate Action**"	has the meaning given to it in Section 11.6.
"**Corporate Action Effective Date**"	means, in respect of a Corporate Action Multiplier for an Eligible Constituent and a calendar day, the corporate action effective date associated with such Corporate Action Multiplier, as identified by the "AdjDate" identifier in the Share Data Source.
"**Corporate Action Multiplier**"	means, in respect of an Eligible Constituent and a calendar day, the corporate action multiplier for such Eligible Constituent in respect of such calendar day, as identified by the "CumAdjFactor" identifier in the Share Data Source.
"**Corporate Event**"	has the meaning given to it in Section 11.6.
"**Current Weight**"	has the meaning given to it in Section 5.2(b).
"**Data Reference Time**"	has the meaning given to it in the relevant Applicable Module.
"**Data Source**"	shall include as applicable the Share Data Source, the FX Data Source, the News Reference Data Source and the Base Reference Data Source.
"**Data Source Disrupted Date**"	has the meaning given to it in Section 10.3.
"**Data Source Disruption Event**"	means, in respect of a Rebalance Selection Date, the occurrence of an event where the number of Reference Entities with respect to which Evaluation Data is available is less than the Source Data Threshold Number for any reason (including, without limitation, due to missing data not being available or data considered to be a disregarded value for some Eligible Constituents or due to technology issues affecting the Constituent Determination Agent, the applicable Data Source or Data Sources, or the means by which such data is accessed or other factors that result in such unavailability).
"**Delisted Constituent**"	has the meaning given to it in Section 5.1.
"**Delta**"	has the meaning given to it in Section 4.1(b).
"**Determination Period**"	has the meaning given to it in Section 5.1.
"**Disrupted Constituent**"	has the meaning given to it in Section 10.1 or Section 10.2 (as the case may be).
"**Disrupted Day**"	means, in respect of a Constituent, any Constituent Scheduled Trading Day or Calculation Day (as the case may be) on which a relevant Exchange or any relevant Related Exchange fails to open for trading during its regular trading session or on which a Market Disruption Event for that Constituent has occurred.
"**Disrupted Calculation Day**"	has the meaning given to it in Section 10.1.
"**Disrupted Rebalancing Date**"	has the meaning given to it in Section 10.2.
"**Disruption Determination Agent**"	has the meaning given to it in Section 7.1.
"**Disruption Determination Date**"	has the meaning given to it in Section 10.2.
"**Disruption Resolution Calculation Day**"	has the meaning given to it in Section 10.2.
"**Divisor**"	has the meaning given to it in Section 5.2(a).
"**Dollar Notional Trading Estimate**"	has the meaning given to it in Section 3.9.
"**Early Closure**"	means the closure on any Exchange Business Day of any relevant Exchange(s) or any relevant Related Exchange(s) prior to its Scheduled Closing Time unless such earlier closing time is announced by such Exchange(s) or such Related Exchange(s), as the case may be,

at least one hour prior to the earlier of (a) the actual closing time for the regular trading session on such Exchange(s) or such Related Exchange(s) on such Exchange Business Day and (b) the submission deadline for orders to be entered into the Exchange or Related Exchange system for execution at the Scheduled Closing Time on such Exchange Business Day.

"**Eligible Exchange MIC List**"	has the meaning given to it in the relevant Applicable Module.
"**Effective Rebalancing Date**"	has the meaning given to it in the relevant Applicable Module.
"**Effective Rebalancing Date (k)**"	has the meaning given to it in Section 5.2(a).
"**Eligible Constituent (i)**"	means the Eligible Constituent corresponding to integer (i).
"**Eligible Constituents**"	has the meaning given to it in Section 3.13.
"**End Timestamp**"	has the meaning given to it in Section 3.2.
"**Exchange Business Day**"	means, in respect of a Constituent, any Constituent Scheduled Trading Day on which the relevant Exchange and the relevant Related Exchange, if any, in respect of such Constituent are open for trading during their respective regular trading session(s), notwithstanding any such relevant Exchange or relevant Related Exchange closing prior to their Scheduled Closing Time.
"**Exchange Disruption**"	means any event (other than an Early Closure) that disrupts or impairs (as determined by the Disruption Determination Agent) the ability of market participants in general (i) to effect transactions in, or obtain market values for the Constituent on an Exchange or (ii) to effect transactions in, or obtain market values for, futures or options contracts relating to the Constituent on any relevant Related Exchange.
"**Exchange**"	means in respect of an Eligible Constituent or a Constituent (as applicable), the principal exchange or quotation system on which the Eligible Constituent or the Constituent (as applicable) is listed (or any successor to such exchange or quotation system or any substitute exchange or quotation system to which trading in such Eligible Constituent or Constituent (as applicable) has temporarily relocated, provided that the Disruption Determination Agent or the Index Calculation Agent (as applicable) has determined that there is comparable liquidity for such Eligible Constituent or Constituent (as applicable) on such temporary substitute exchange or quotation system as on the original Exchange), as determined by the Disruption Determination Agent or the Index Calculation Agent (as applicable).
"**Exchange Market Identifier Code**"	means in respect of a Listing and a Selection Day, the ISO Market Identification Code (MIC) from the Base Reference Data Source at approximately the Data Reference Time.
"**Extraordinary Event**"	means any event described in Section 11 (Extraordinary Events).
"**Filtered Output Portfolio**"	has the meaning given to it in Section 4.2.
"**Final Lower Bound**"	has the meaning given to it in Section 4.1(b).
"**Final Upper Bound**"	has the meaning given to it in Section 4.1(b).
"**First Following Non-Disrupted Day**"	has the meaning given to it in Section 10.2.
"**First Preliminary Upper Bound**"	has the meaning given to it in Section 4.1(b).
"**FX Data Source**"	means (a) Thomson Reuters Datastream, which is accessed via QA Direct, for Selection Currency Rate determinations made by the Constituent Determination Agent, or (b) the WM Company, which is accessed via Bloomberg by reference to page WMCO (or any

	successor to such page or service) in respect of FX Rate determinations made by the Index Calculation Agent.
"**FX Rate**"	means, in respect of a Constituent and a calendar day (t), (a) the most recent closing spot rate corresponding to the number of units of the Index Currency for which one unit of the relevant Associated Currency may be exchanged in respect of a calendar day that falls on or before calendar day (t) (the "**First Rate**") as determined by the Index Calculation Agent by reference to the FX Data Source, or (b) one (1) divided by the most recent closing spot rate corresponding to the number of units of the relevant Associated Currency for which one unit of the Index Currency may be exchanged in respect of a calendar day that falls on or before calendar day (t) (the "**Second Rate**") as determined by the Index Calculation Agent by reference to the FX Data Source, if the Second Rate is more recent than the First Rate.
"**Identified Reference Index Calculation Agent**"	has the meaning given to it in the relevant Applicable Module.
"**Identified Reference Index**"	has the meaning given to it in the relevant Applicable Module.
"**Identified Reference Index Sponsor**"	has the meaning given to it in the relevant Applicable Module.
"**Incoming Constituent**"	means, in respect of an Effective Rebalancing Date, a constituent that has been selected pursuant to Sections 4 and 5 to be included in the Index with effect from but excluding such Effective Rebalancing Date.
"**Index**"	has the meaning given to it in Section 1.
"**Index Base Date**"	has the meaning given to it in the relevant Applicable Module.
"**Index Base Level**"	has the meaning given to it in the relevant Applicable Module.
"**Index Bloomberg Ticker**"	has the meaning given to it in the relevant Applicable Module.
"**Index Calculation Agent**"	has the meaning given to it in Section 7.1.
"**Index Currency**"	has the meaning given to it in the relevant Applicable Module.
"**Index Level**"	means the level of the Index as determined and calculated in accordance with Section 5.2(a).
"**Index Live Date**"	has the meaning given to it in the relevant Applicable Module.
"**Index Rationale**"	has the meaning given to it in the relevant Applicable Module.
"**Index Rules**"	has the meaning given to it in Section 1.
"**Index Scheduled Trading Day**"	has the meaning given to it in the relevant Applicable Module.
"**Index Sponsor**"	has the meaning given to it in Section 7.1.
"**Keyword Logic**"	has the meaning given to it in the relevant Applicable Module.
"**Liquidity Notional**"	has the meaning given to it in the relevant Applicable Module.
"**Listing(s)**" or "**Listing(s) (i)**"	has the meaning given to it in Section 3.1.
"**Logic constructed on Keywords and Textual Operators**"	has the meaning given to it in Section 3.2.
"**London Scheduled Business Day**"	means each day that is both (i) a Calculation Day and (ii) a day on which the London Stock Exchange is scheduled to be open for its regular trading session.
"**Long Basket**"	has the meaning given to it in Section 2.
"**Lookback Threshold**"	has the meaning given to it in the relevant Applicable Module.
"**Market Disruption Event**"	means, in relation to a Constituent, the occurrence or existence of (i) a Trading Disruption, (ii) an Exchange Disruption, in the case of clause

(i) or clause (ii) at any time during the one hour period that ends at the Scheduled Closing Time for such Constituent, or (iii) an Early Closure, which in the case of clause (i), clause (ii) or clause (iii) the Disruption Determination Agent determines is material.

"**Maximum Holding Liquidity Ratio**"	has the meaning given to it in the relevant Applicable Module.
"**Maximum Trading Liquidity Ratio**"	has the meaning given to it in the relevant Applicable Module.
"**Minimum Constituent Number Failure**"	has the meaning given to it in Section 4.2.
"**Monthly Theme Relevance Scores**"	has the meaning given to it in Section 3.5.
"**News Reference Data Source**"	means RavenPack Analytics Data as set out in the Annex.
"**News Type**"	has the meaning given to it in the relevant Applicable Module.
"**Non-Disrupted Constituent**"	has the meaning given to it in Section 10.2.
"**Novelty Threshold**"	has the meaning given to it in the relevant Applicable Module.
"**Number of Constituents**"	has the meaning given to it in Section 5.1.
"**Number of Relevant Stories**"	has the meaning given to it in Section 3.4.
"**Number of Shares**"	has the meaning given to it in Section 5.2(a).
"**Number of Theme Relevant Stories**"	has the meaning given to it in Section 3.3.
"**Objective Function**"	has the meaning given to it in Section 4.14.1(a).
"**Optimization Constraints**"	has the meaning given to it in Section 4.1.
"**Optimization Relaxation Step Size**"	has the meaning given to it in the relevant Applicable Module.
"**Optimizer Software**"	has the meaning given to it in Sections 2.
"**Outgoing Constituent**"	means, in respect of an Effective Rebalancing Date, a constituent that was a Constituent immediately prior to such Effective Rebalancing Date.
"**Output Weight**"	has the meaning given to it in Section 4.1(a).
"**Portfolio Optimization Methodology**"	has the meaning given to it in Section 4.1.
"**Preliminary Constituents**"	has the meaning given to it in Section 4.2.
"**Preliminary Constituent Weights**"	has the meaning given to it in Section 4.2.
"**Preliminary Theme Relevance Score Threshold**"	has the meaning given to it in the relevant Applicable Module.
"**Primary Traded Notional Quantity**"	has the meaning given to it in Section 3.9.
"**Product**"	has the meaning given to it in the Section entitled "Notices, Disclaimers and Conflicts".
"**Rebalance Selection Date (RSD)**" or "**Rebalance Selection Date (t)**"	means the Rebalance Selection Date in respect of which the rebalancing selection is made.
"**Rebalance Selection Date**"	has the meaning given to it in the relevant Applicable Module.
"**Reference Entity(ies)**"	has the meaning given to it in the relevant Applicable Module.
"**Related Exchange**"	means, in relation to an Eligible Constituent or a Constituent (as applicable), each exchange or quotation system where trading has a material effect (as determined by the Constituent Determination Agent or the Index Calculation Agent, as applicable) on the overall market for futures or options contracts relating to the relevant Eligible Constituent or Constituent (as applicable).

"**Relaxation Event**"	has the meaning given to it in Section 4.1(c).
"**Relevance Threshold**"	has the meaning given to it in the relevant Applicable Module.
"**Relevant Parties**"	has the meaning given to it in Section 11.1.
"**Relevant Person**"	has the meaning given to it in the Section entitled "Notices, Disclaimers and Conflicts".
"**Relevant Story Identifiers**"	has the meaning given to it in Section 3.2.
"**Scheduled Closing Time**"	means, in respect of an Exchange or Related Exchange and a Constituent Scheduled Trading Day, the scheduled weekday closing time of such Exchange or Related Exchange on such Constituent Scheduled Trading Day, without regard to after hours or any other trading outside of the regular trading session hours.
"**Score Lookback**"	has the meaning given to it in the relevant Applicable Module.
"**Selected Output Portfolio**"	has the meaning given to it in Section 4.1(c).
"**Selected Traded Notional Quantities**"	has the meaning given to it in Section 3.9.
"**Selection Currency Rate**"	means, in respect of a calendar day (t) and a currency in which a relevant financial metric is denominated (a "**Metric Currency**"), as specified in the relevant table, (a) the most recent closing spot rate corresponding to the number of units of the Index Currency for which one unit of the Metric Currency may be exchanged in respect of a calendar day that falls on or before calendar day (t) (the "**First Rate**") as determined by the Constituent Determination Agent by reference to the FX Data Source, or (b) one (1) divided by the most recent closing spot rate corresponding to the number of units of the Metric Currency for which one unit of the Index Currency may be exchanged in respect of a calendar day that falls on or before calendar day (t) (the "**Second Rate**") as determined by the Constituent Determination Agent by reference to the FX Data Source, if the Second Rate is more recent than the First Rate.
"**Share Data Source**"	means Thomson Reuters Datastream, which is accessed via QA Direct.
"**Simulated Identified Reference Index Adjustment Determination**"	has the meaning given to it in Section 11.7.
"**Simulated Identified Reference Index Adjustment Outcome**"	has the meaning given to it in Section 11.7.
"**Small Weight Percentage Threshold**"	has the meaning given to it in the relevant Applicable Module.
"**Source Data Threshold Number**"	has the meaning given to it in the relevant Applicable Module.
"**Start Timestamp**"	has the meaning given to it in Section 3.2.
"**Suspended Constituent**"	has the meaning given to it in Section 5.1.
"**Target Weight Cap**"	has the meaning given to it in the relevant Applicable Module.
"**Temporary Optimizer Software Failure**"	has the meaning given to it in Section 4.1.
"**Theme Relevance Scores**"	has the meaning given to it in Section 3.6.
"**Thematic Relevance Score Threshold**"	has the meaning given to it in the relevant Applicable Module.
"**Total Relevant Stories**"	has the meaning given to it in Section 3.8.
"**Total Relevant Stories Threshold**"	has the meaning given to it in the relevant Applicable Module.

"**Total Theme Relevant Stories**"	has the meaning given to it in Section 3.7.
"**Total Theme Relevant Stories Threshold**"	has the meaning given to it in the relevant Applicable Module.
"**Trading Disruption**"	means any suspension of or limitation imposed on trading by the relevant Exchange or Related Exchange or otherwise and whether by reason of movements in price exceeding limits permitted by the relevant Exchange or Related Exchange or otherwise: (a) relating to the Constituent on the Exchange; or (b) in futures or options contracts relating to the relevant Constituent on any relevant Related Exchange.
"**Trading Lookback Window**"	has the meaning given to it in Section 3.10 or Section 3.11, as applicable.
"**Trimming Exclusion Window**"	has the meaning given to it in Section 3.10 or Section 3.11, as applicable.
"**Universe Stocks**"	has the meaning given to it in the relevant Applicable Module.

14. Versions of the Index Rules and Index Adjustments

Any amendment or adjustment to the Index Rules for the Index and the effective date of any such amendment or adjustment may but does not have to be reflected in a revised version of the Index Rules. Copies of the latest issue of the Index Rules or details of relevant adjustments (where not reflected in a revised version of the Index Rules) are available as specified in Section 6.1.

Version	Date	Amendment
1.0	October 8, 2021	Not applicable (First release)
2.0	November 22, 2021	Addition of Applicable Module 2.0 for the J.P. Morgan QUEST e-Sports Index
3.0	March 29, 2023	Addition of Applicable Module 3.0 for the J.P. Morgan QUEST Cloud Computing Index

15. Disclaimers

Solactive AG

The Index (and any financial instrument referencing the Index) is not sponsored, promoted, sold or supported in any other manner by Solactive AG nor does Solactive AG offer any express or implicit guarantee or assurance either with regard to the results of using the Index and/or Index trade mark or the Index Level at any time or in any other respect. The Index is calculated and published by Solactive AG. Solactive AG uses its best efforts to ensure that the Index is calculated correctly. Irrespective of its obligations towards the issuer of any financial instrument, Solactive AG has no obligation to point out errors in the Index to third parties including but not limited to investors and/or financial intermediaries of any financial instrument. Neither publication of the Index by Solactive AG nor the licensing of the Index or Index trade mark for the purpose of use in connection with the financial instrument constitutes a recommendation by Solactive AG to invest capital in said financial instrument nor does it in any way represent an assurance or opinion of Solactive AG with regard to any investment in this financial instrument.

RavenPack

EACH INDEX IN THE J.P. MORGAN QUEST SERIES (THE "JPM INDEX") IS NOT SPONSORED, ENDORSED, SOLD OR PROMOTED BY RAVENPACK. RAVENPACK MAKES NO REPRESENTATION, CONDITION OR WARRANTY, EXPRESS OR IMPLIED, TO THE OWNERS OF PRODUCTS LINKED TO THE JPM INDEX OR ANY OTHER PERSON REGARDING THE ADVISABILITY OR SUITABILITY OF INVESTING IN ANY SUCH PRODUCT. RAVENPACK'S ONLY RELATIONSHIP TO J.P. MORGAN IS THE LICENSING OF USE BY J.P. MORGAN OF THE RAVENPACK ANALYTICS SERVICE. THE RAVENPACK ANALYTICS SERVICE, ANY COMPONENT THEREOF, THE CONTENTS THEREIN, AND ANY ACCOMPANYING DOCUMENTATION HAVE BEEN PROVIDED TO JPMORGAN ON AN "AS IS", "AS AVAILABLE" BASIS AND RAVENPACK AND ITS LICENSORS DO NOT MAKE ANY AND HEREBY SPECIFICALLY DISCLAIM ANY REPRESENTATIONS, ENDORSEMENTS, GUARANTEES, OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, WITHOUT LIMITATION, ANY OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, OR NONINFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. NEITHER RAVENPACK NOR ITS AFFILIATES OR ITS LICENSORS (THE "RAVENPACK PARTIES") SHALL HAVE ANY RESPONSIBILITY OR LIABILITY FOR ANY ERRORS OR OMISSIONS NOR SHALL THEY BE LIABLE FOR ANY DAMAGES, WHETHER DIRECT OR INDIRECT, SPECIAL OR CONSEQUENTIAL, EVEN IF THEY HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. FURTHERMORE, RAVENPACK OR THE RAVENPACK PARTIES SHALL HAVE NO RESPONSIBILITY OR LIABILITY FOR DELAYS OR FAILURES DUE TO CIRCUMSTANCES BEYOND THEIR CONTROL. RAVENPACK IS NOT RESPONSIBLE FOR DETERMINING THE NATURE, POTENTIAL VALUE, AND SUITABILITY FOR ANY PERSON OF ANY PARTICULAR SECURITY, TRANSACTION OR INVESTMENT STRATEGY AND NEITHER RAVENPACK NOR ITS LICENSORS GIVE ANY SUCH ADVICE OR RECOMMENDATIONS.

MSCI

The Base Reference Index (the "**MSCI Index**") as set out in the relevant Applicable Module was used by the Index Sponsor as the reference universe for selection of the companies included in the Index. MSCI does not in any way sponsor, support, promote or endorse the Index. MSCI was not and is not involved in any way in the creation, calculation, maintenance or review of the Index. The MSCI Index was provided to the Index Sponsor on an "as is" basis. MSCI, each of its affiliates and each other person involved in or related to compiling, computing or creating the MSCI Index (collectively, the "**MSCI Parties**") expressly disclaim all warranties (including, without limitation, any warranties of originality, accuracy, completeness, timeliness, non-infringement, merchantability and fitness for a particular purpose). Without limiting any of the foregoing, in no event shall any MSCI Party have any liability for any direct, indirect, special, incidental, punitive, consequential (including, without limitation, lost profits) or any other damages in connection with the MSCI Index or the Index.

Part B: Annex (RavenPack Reference Data Module)

Table A   **RavenPack Reference Data Structure**

S. No.	Data Table Name	Description
1	RavenPack Mapping Data as of a Mapping Reference Date	RavenPack supplies a proprietary reference data service for the companies it tracks and monitors in the media. The reference files of this service are provided on a daily basis. The Constituent Determination Agent uses such reference files to map the relevant universe of reference entities relevant for the purposes of the Index to the relevant RavenPack universe of reference entities. The RavenPack Mapping Data as of a Mapping Reference Date denotes the mapping data download as of approx. 6 am Coordinated Universal Time ("**UTC**") on each day (each a "**Mapping Reference Date**"). Entities tracked by RavenPack are identified using the RP_ENTITY_ID and for each entity the mapping file lists identifying information such as names and securities together with the validity dates for each value. The mapping database is updated on a daily basis between 00:00 UTC and 02:00 UTC and contains information pertaining to entities in RavenPack's universe including the entity name and security identifiers such as CUSIP, SEDOL, ISIN and TICKER. For the purposes of such RavenPack Mapping Data, the "Unprocessed" Category refers to data produced by Ravenpack, and the "Processed" Category refers to data which is produced as per the methodology set out in Table B "Field Description" below.
2	RavenPack Analytics Data	RavenPack produces analytics data organized as datasets in a tabular format. Whenever an entity such as a company, organization, product, currency etc. is mentioned in the news, RavenPack produces records about those entities. A single news story can yield multiple records depending on number of entities mentioned and event classification.

Table B   **Fields associated with RavenPack Mapping Data as of a Mapping Reference Date**

S. No.	Field Name	Category	Field Description

1	RP_ENTITY_ID	Unprocessed	A unique and permanent entity identifier assigned by RavenPack. Every entity tracked is assigned a unique identifier comprised of 6 alphanumeric characters.
2	ENTITY_TYPE	Unprocessed	The type of entity associated with a particular RP_ENTITY_ID.
3	DATA_TYPE	Unprocessed	This field categorizes types of data relevant to this version of the product. For example, the types include but are not limited to COUNTRY, ENTITY_NAME, NAME, COUNTRY, CUSIP, ENTITY_NAME, ISIN, SEDOL.
4	DATA_VALUE	Unprocessed	The value of the DATA_TYPE during the time indicated by the RANGE_START and RANGE_END.
5	RANGE_START	Unprocessed	A DATA_VALUE is valid from this date. An empty RANGE_START means that the DATA_VALUE has no start date and was valid from or before the year 2000.
6	RANGE_END	Unprocessed	A DATA_VALUE is valid until this date. An empty RANGE_END means that the DATA_VALUE has no end date and is thus still valid.
7	RANGE_START_PC	Processed	Date from Field Name RANGE_START where empty RANGE_START is replaced by 1-Jan-2000.
8	RANGE_END_PC	Processed	Date from Field Name RANGE_END where empty RANGE_END is replaced by Mapping Reference Date.

Table C   Fields associated with RavenPack Analytics Data

S. No.	Field Name	Category	Field Description
1	TIMESTAMP_UTC	Unprocessed	The Date/Time (YYYY-MM-DD hh:mm:ss.sss) at which the news item was received by RavenPack servers in UTC.
2	RP_STORY_ID	Unprocessed	A 32 character alphanumeric identifier that uniquely identifies each document in the RavenPack Analytics data.
3	RP_ENTITY_ID	Unprocessed	A unique and permanent entity identifier assigned by RavenPack. Every entity tracked is assigned a unique identifier comprised of 6 alphanumeric characters.
4	ENTITY_TYPE	Unprocessed	The type of entity associated with a particular RP_ENTITY_ID.

5	ENTITY_NAME	Unprocessed	The official name of the entity identified by the RP_ENTITY_ID.
6	COUNTRY_CODE	Unprocessed	The two character ISO-3166 country code associated with an entity. Companies and organizations are associated with the country of incorporation, currencies are associated with the country where the central bank resides. Entities such as commodities have a country code of XX as they are global and not associated with any specific country.
7	RELEVANCE	Unprocessed	An integer score between 0 and 100 that indicates how strongly related the mention of an entity is to the underlying news story, with higher values indicating greater relevance.
8	EVENT_SENTIMENT_SCORE	Unprocessed	A granular score between -1.00 and +1.00 with 2 decimal places that represents the news sentiment for a given entity by measuring various proxies sampled from the news.
9	EVENT_RELEVANCE	Unprocessed	An integer between 0 and 100 that reflects the relevance of the event in the story.
10	EVENT_SIMILARITY_KEY	Unprocessed	A unique 32 character key that identifies similar events in the RavenPack Analytics data. All stories with similar events across the entire archive and those arriving on the real-time feed share the same similarity key.
11	EVENT_SIMILARITY_DAYS	Unprocessed	A granular number with up to 5 decimal places which indicates the number of days since a story with a similar event was detected over the last 365 days. Values range between 0.00000 and 365 inclusive. A value of 365 means that the most recent story with a similar event may have occurred 365 or more days in the past. The value 0.00000 means a story with a similar event occurred at the exact same timestamp.
12	TOPIC	Unprocessed	A subject or theme of events detected by RavenPack. This is the highest level of the RavenPack event taxonomy.
13	GROUP	Unprocessed	A collection of related events. This is the second highest level of the RavenPack event taxonomy.
14	TYPE	Unprocessed	A class of events, the constituents of which share similar characteristics.

15	SUB_TYPE	Unprocessed	A subdivision of a particular class of events.
16	PROPERTY	Unprocessed	A generic named attribute of an event such as an entity, role, or string extracted from a matched event type. When applicable, the role played by the entity in the event is detected and tagged.
17	FACT_LEVEL	Unprocessed	An indicator of how close the event relates to a fact.
18	RP_POSITION_ID	Unprocessed	A unique and permanent identifier for positions assigned by RavenPack. Every position tracked is assigned a unique entity identifier comprised of 6 alphanumeric characters.
19	POSITION_NAME	Unprocessed	The position held by an individual within the entity involved in a specific news event.
20	EVALUATION_METHOD	Unprocessed	A period of time used to measure changes from previous levels in an event.
21	MATURITY	Unprocessed	For events related to debt, this named attribute indicates the period of time for which a financial instrument remains outstanding.
22	EARNINGS_TYPE	Unprocessed	For events about earnings this named attribute indicates the type of calculation method used for reporting.
23	EVENT_START_DATE_UTC	Unprocessed	The date when the event starts in UTC.
24	EVENT_END_DATE_UTC	Unprocessed	The date when the event ends in UTC.
25	REPORTING_PERIOD	Unprocessed	A period on a financial calendar that acts as a basis for reporting business information.
26	REPORTING_START_DATE_UTC	Unprocessed	The start of the reporting period associated with the event.
27	REPORTING_END_DATE_UTC	Unprocessed	The end of the reporting period associated with the event.

28	RELATED_ENTITY	Unprocessed	An entity that relates directly to another entity within the context of the same event in a story.
29	RELATIONSHIP	Unprocessed	The type of relationship between entities reported in the RELATED_ENTITY field.
30	CATEGORY	Unprocessed	A unique tag to label, identify, and recognize a particular type and property of an entity-specific news event. The category is a canonical version of the event that has been captured.
31	EVENT_TEXT	Unprocessed	A short text summary of an event captured in a document.
32	NEWS_TYPE	Unprocessed	Classifies the type of news story into one of the defined categories.
33	RP_SOURCE_ID	Unprocessed	A unique and permanent news source identifier assigned by RavenPack. Every news provider tracked is assigned a unique identifier comprised of 6 alphanumeric characters.
34	SOURCE_NAME	Unprocessed	The official name for the news source.
35	CSS	Unprocessed	A sentiment score between -1.00 and 1.00 that represents the news sentiment of a given story by combining various sentiment analysis techniques.
36	NIP	Unprocessed	A granular score between -1.00 and 1.00 with up to 2 decimal places that represents the degree of impact a news flash has on the market over the following two-hour period.
37	PEQ	Unprocessed	A score that represents the news sentiment of the given news item according to the PEQ classifier, which specializes in identifying positive and negative words and phrases in articles about global equities. Scores can take values of -1, 0, or 1 indicating negative, neutral, or positive sentiment, respectively.
38	BEE	Unprocessed	A score that represents the news sentiment of the given story according to the BEE classifier, which specializes in news stories about earnings evaluations. Scores can take values of -1, 0, or 1 indicating negative, neutral, or positive sentiment, respectively.

39	BMQ	Unprocessed	A score that represents the news sentiment of the given story according to the BAM classifier, which specializes in news stories about mergers, acquisitions, and takeovers. Scores can take values of -1, 0, or 1 indicating negative, neutral, or positive sentiment, respectively.
40	BAM	Unprocessed	A score that represents the news sentiment of the given story according to the BAM classifier, which specializes in news stories about mergers, acquisitions, and takeovers. Scores can take values of -1, 0, or 1 indicating negative, neutral, or positive sentiment, respectively. This sentiment score is based on RavenPack's expert consensus methodology and has been trained on stories that lead up to a pre-identified mergers, acquisitions, and takeover events.
41	BCA	Unprocessed	A score that represents the news sentiment of the given news story according to the BCA classifier, which specializes in reports on corporate action announcements. Scores can take values of -1, 0, or 1 indicating negative, neutral, or positive sentiment, respectively. This sentiment score is based on RavenPack's expert consensus methodology and has been trained on stories that lead up to a pre-identified corporate action announcement.
42	BER	Unprocessed	A score that represents the news sentiment of the given story according to the BER classifier, which specializes in news stories about earnings releases. Scores can take values of -1, 0, or 1 indicating negative, neutral, or positive sentiment, respectively. This sentiment score is based on RavenPack's expert consensus methodology.
43	ANL_CHG	Unprocessed	A score that represents a change in recommendation by an analyst firm in the form of a numerical score. When the mention of a company in a story matches the criteria for ANL-CHG, scores can take values of -1, 0, or 1, indicating a downgrade, neutral, or upgrade rating, depending on the recommendation change by the analyst. This analytic is based on the event category results of a) analyst-ratings-change-positive and b) analyst-ratings-change-negative. This analytic contains values only for news stories that disclose changes in analyst recommendations.

44	MCQ	Unprocessed	A score that represents the news sentiment based on the tone; applicable only towards the most relevant entities mentioned in a story. The score is derived from a combination of analytics values produced by the BMQ, BEE, BCA, and ANL-CHG classifiers. An MCQ score can have a non-neutral value when the relevance score for an entity is 90 or higher and either there is an ANL-CHG score or all of BMQ, BEE, and BCA scores are positive (1) and neutral (0) or negative (-1) and neutral (0). Entities with a relevance of less than 90 will always have a neutral score. The logic behind this analytic is to detect consistent sentiment classifications, discarding combinations where these classifiers may have contradictory scores. MCQ scores can take values of -1, 0, or 1 indicating negative, neutral, or positive sentiment, respectively.
45	RP_STORY_EVENT_INDEX	Unprocessed	An integer representing the sequence in which each record is presented within a document. This integer must be less than or equal to the RP_STORY_EVENT_COUNT.
46	RP_STORY_EVENT_COUNT	Unprocessed	Represents the total entity records published by RavenPack per news story.
47	PRODUCT_KEY	Unprocessed	Identifies which content set the record came from. For RavenPack analytics, the product key is always "RPA".
48	PROVIDER_ID	Unprocessed	Identifies the provider of the content.
49	PROVIDER_STORY_ID	Unprocessed	An alphanumeric character identifier to uniquely identify the news story in the provider's universe.
50	HEADLINE	Unprocessed	The headline or summary text for the document.
51	Document Search	Unprocessed	The 'Document Search' functionality available in Ravenpack API allows to filter for entries that contain logic constructed on words and operators with in the entire document.
51	Headline Search	Unprocessed	The 'Headline Search' functionality Ravenpack API allows to filter for entries that contain logic constructed on words and operators with in the headline.

Table D   Operators associated with filtering entries

S. No.	Operator	Filtering Logic
1	"is equal to"	Select entries with a value equal to the Input Value in respect of Field Name
2	"is greater than"	Select entries with a value greater than the Input Value in respect of Field Name
3	"is equal to or greater than"	Select entries with a value greater than or equal to the Input Value in respect of Field Name
4	"is less than"	Select entries with a value less than the Input Value in respect of Field Name
5	"is less than or equal to"	Select entries with a value less than or equal to the Input Value in respect of Field Name
6	"is included in"	Select entries with a value equal to any element of the set of the Input Values in respect of Field Name

Part I   Determination of Active RavenPack Entity Identifier-Listing Pairs

In respect of a Mapping Reference Date and a Query Date, the Constituent Determination Agent will determine the active RavenPack entity identifier listing pairs (the "**Active RavenPack Entity Identifier-Listing Pairs**") by implementing the following steps:

(1) Apply the following filters to RavenPack Mapping Data as of a Mapping Reference Date to the get the filtered list of entries:

Field Name	Operator	Input Value
DATA_TYPE	"is equal to"	SEDOL
RANGE_START_PC	"is less than"	Query Date
RANGE_END_PC	"is equal to or greater than"	Query Date

(2) Values in RP_ENTITY_ID and DATA_VALUE columns of the filtered list of entries represent the Active RavenPack Entity Identifier-Listing Pairs. There may be more than one listing present per RavenPack Entity Identifier.

Part II   Determination of Unique Story Identifiers

In respect of Logic constructed on Keywords and Textual Operators, Start Timestamp and End Timestamp, the Constituent Determination Agent will determine the unique story identifiers (the "**Unique Story Identifiers**") by implementing the following steps:

(1) Apply the following filters to RavenPack Analytics Data to the get the filtered list of entries:

Field Name	Operator	Input Value
Document Search	"is equal to"	Logic constructed on Keywords and Textual Operators
ENTITY_TYPE	"is equal to"	COMP
TIMESTAMP_UTC	"is equal to or greater than"	Start Timestamp
TIMESTAMP_UTC	"is less than"	End Timestamp

(2) Unique Values in RP_STORY_ID columns of the filtered list of entries represent the Unique Story Identifiers.

Part III   Determination of Filtered Entries

In respect of list of field names, operators and values, the Constituent Determination Agent will determine the filtered entries (the "**Filtered Entries**") by applying the following filters to RavenPack Analytics Data.

i	Field Name	Operator	Input Value
1	Field Name 1	Operator 1	Value 1
2	Field Name 2	Operator 2	Value 2
3	…	…	…
4	Field Name N	Operator N	Value N

The following illustrates some examples of Filtered Entries using lists of field names, operators and values. Table D lists the operators which can be used while determining the Filtered Entries. Field Names must belong to the list of field names in Table B.

a. ("ENTITY_NAME", "is equal to", "Apple Inc.") returns entries with "ENTITY_NAME " as "Apple Inc."
b. ("ENTITY_NAME", "is equal to", ("Apple Inc." OR "Microsoft Corp.") returns entries with "RP_ENTITY_ID" as either "Apple Inc." or "Microsoft Corp."
c. (("ENTITY_NAME", "is equal to", "Apple Inc."), ("RELEVANCE", "Greater than", 70)) returns entries with "ENTITY_NAME" as "Apple Inc." with Relevance Score greater than 70.
d. (("ENTITY_NAME", "is equal to", "Apple Inc."), ("RELEVANCE", "Greater than", 70), ("TYPE", "is equal to", "acquisition")) returns entries with "ENTITY_NAME" as "Apple Inc.", "RELEVANCE" "is greater than" 70 and "Type" as "acquisition".

Definitions of Certain Terms in respect of this Annex

"**Active RavenPack Entity Identifier-Listing Pairs**"	has the meaning given to it in Part I.
"**Filtered Entries**"	has the meaning given to it in Part III.
"**Input Value**"	has the meaning given to it in the relevant Tables of Part I, Part II or Part III, as applicable.
"**Mapping Reference Date**"	has the meaning given to it in Table A.
"**Operator**"	has the meaning given to it in Table D.
"**Query Date**"	means any day that the Constituent Determination Agent executes a query in respect of the RavenPack Mapping Data as of a Mapping Reference Date available from RavenPack.
"**RavenPack**"	means RavenPack or any successor or assign.
"**RavenPack Analytics Data**"	has the meaning given to it in Table A.
"**Ravenpack API**"	means an interface provided by RavenPack for requesting Reference Data from RavenPack which is accessible to the Constituent Determination Agent through Ravenpack website (https://app.ravenpack.com/) or through HTTPS requests made to Ravenpack web server.
"**RavenPack Entity Identifier**"	means, in respect of any Reference Entity, a Mapping Reference Date and a Query Date, the value of the field "RP_ENTITY_ID" set out in Table B above for such Reference Entity on such date.
"**RavenPack Mapping Data as of a Mapping Reference Date**"	has the meaning given to it in Table A.
"**Unique Story Identifiers**"	has the meaning given to it in Part II.

Part C: Applicable Modules

Applicable Module 1.0   J.P. Morgan QUEST Cyber Security Index

Name of the Index	J.P. Morgan QUEST Cyber Security Index
Index Bloomberg Ticker	JPNLPCYB <Index>
Index Currency	USD
Keyword Logic	("Cyber Security" OR "Cybersecurity" OR "firewalls" OR "malware protection" OR "antivirus software" OR "anti-virus software" OR "cyber-defence" OR "cyberdefence" OR "cyber-defense" OR "cyberdefense" OR "anti-spam") NOT ("Forward-looking statements" W/P ("cybersecurity" OR "cyber security"))
Index Base Level	100.00
Index Base Date	September 30, 2021
Index Live Date	October 8, 2021
Index Sponsor	J.P. Morgan Securities plc or any successor or assignee. See Section 7.1.
Index Calculation Agent	Solactive AG or any successor or assignee. See Section 7.1.
Identified Reference Index	Solactive GBS Developed Markets All Cap USD Index PR (Bloomberg: SDMACUP Index)
Identified Reference Index Sponsor	Solactive AG
Identified Reference Index Calculation Agent	Solactive AG
Constituent Determination Agent	J.P. Morgan Securities plc or any successor or assignee. See Section 7.1.
Disruption Determination Agent	J.P. Morgan Securities plc or any successor or assignee. See Section 7.1.
Relevance Threshold	70
Novelty Threshold	1
News Type	'PRESS-RELEASE', 'FULL-ARTICLE'
Score Lookback	24
Preliminary Theme Relevance Score Threshold	0%
Thematic Relevance Score Threshold	10%

Optimization Relaxation Step Size	2%
Total Relevant Stories Threshold	50
Lookback Threshold	6
1 Month Dollar Trading Threshold	1,000,000
12 Month Dollar Trading Threshold	1,000,000
1 Month Dollar Trading Trim Window	3
12 Month Dollar Trading Trim Window	10
Liquidity Notional	USD 200 million
Maximum Holding Liquidity Ratio	20.0%
Maximum Trading Liquidity Ratio	20.0%
Maximum Free Float Market Cap Ratio	3.00%
Target Weight Cap	5.00%
Small Weight Threshold Percentage	0.0001%
Source Data Threshold Number	200
Minimum Number Threshold	30
Optimizer Software	Means MOSEK, a third-party software for convex optimisation (the "**MOSEK**"), version 9.1.13 or any successor or updated version as implemented by the Index Calculation Agent from time to time. The Index Calculation Agent uses the Python Fusion API of MOSEK for the application within the Index. Further details regarding MOSEK are published under the following website: http://www.mosek.com.
Calculation Day	Means each weekday that is not a Saturday or a Sunday
Index Scheduled Trading Day	Means each Calculation Day on which each of the New York Stock Exchange, the Xetra Exchange, the London Stock Exchange and the Tokyo Stock Exchange is scheduled to be open for trading during its regular trading session, whether scheduled for a full-day regular trading session or a shortened-day regular trading session

Scheduled Rebalancing Date	Means (1) the Index Base Date and (2) the last Index Scheduled Trading Day of March, June, September and December
Effective Rebalancing Date	Means (1) the Index Base Date and (2) in respect of a Scheduled Rebalancing Date in respect of which a Data Source Disruption Event does not occur for the related Rebalance Selection Date, a Relaxation Event does not occur for the related Rebalance Selection Date and a Minimum Constituent Number Failure does not occur for the related Rebalance Selection Date, that Scheduled Rebalancing Date
Rebalance Selection Date	Means, in respect of a Scheduled Rebalancing Date, the Calculation Day that is five London Scheduled Business Days immediately preceding that Scheduled Rebalancing Date
Data Reference Time	Means, in respect of a Rebalance Selection Date, 08:00 am local time in London, United Kingdom on the London Scheduled Business Day that immediately follows that Rebalance Selection Date
Base Reference Index	MSCI World IMI Index (Bloomberg: MXWOIM Index)
Base Reference Index Sponsor	MSCI Inc
Universe Stocks	Means, in respect of a Rebalance Selection Date, each of the constituent stocks included in the Base Reference Index, as available to the Constituent Determination Agent from the Base Reference Data Source at approximately the Data Reference Time.
Eligible Exchange MIC List	'XNGS' (NASDAQ Global Select), 'XNYS' (New York Stock Exchange), 'XSWX' (SIX-Swiss Exchange), 'XAMS' (Euronext Amsterdam), 'XPAR' (Euronext Paris), 'XTKS' (Tokyo Stock Exchange), 'XLON' (London Stock Exchange), 'XHKG' (Hong Kong Exchanges And Clearings), 'XTSE' (Toronto Stock Exchange), 'XETR' (Xetra), 'XCSE' (Nasdaq Copenhagen), 'XASX' (Australian Stock Exchange), 'MTAA' (BrsaItaliana), 'XMAD' (Bolsa De Madrid), 'XBRU' (Euronext Brussels), 'XSTO' (Nasdaq Stockholm), 'XSES' (Singapore Exchange), 'XDUB' (Irish Stock Exchange), 'XHEL' (Nasdaq Helsinki), 'XNMS' (NASDAQ Global Market), 'XNCM'(NASDAQ Capital Market), 'XOSL' (Oslo Bors), 'XASE' (NYSE Mkt), 'XLIS' (Euronext Lisbon), 'XTAE' (Tel Aviv Stock Market), 'XNZE' (New Zealand Exchange), 'BATS' (CBOE BZX US), 'XWBO' (Wiener Boerse AG), 'FNSE' (First North Sweden), 'XJAS' (Tokyo Stock Exchange Jasdaq), 'XNGM' (Nordic Growth Market), 'FNFI' (First North Finland)

Applicable Module 2.0   J.P. Morgan QUEST e-Sports Index

Name of the Index	J.P. Morgan QUEST e-Sports Index
Index Bloomberg Ticker	JPNLPESP <Index>
Index Currency	USD
Keyword Logic	("esports" OR "esport" OR "e-sports" OR "e-sport" OR "webgames" OR "webgame" OR "mobile game" OR "mobile games" OR "mobile gaming" OR "online game" OR "online games" OR "online gaming" OR "video games" OR "video game" OR "video gaming" OR "computer games" OR "computer game" OR "computer gaming" OR "cloud gaming" OR "electronic sport" OR "electronic sports")
Index Base Level	100.00
Index Base Date	September 1, 2021
Index Live Date	November 22, 2021
Index Sponsor	J.P. Morgan Securities plc or any successor or assignee. See Section 7.1.
Index Calculation Agent	Solactive AG or any successor or assignee. See Section 7.1.
Identified Reference Index	Solactive GBS Developed Markets All Cap USD Index PR (Bloomberg: SDMACUP Index)
Identified Reference Index Sponsor	Solactive AG
Identified Reference Index Calculation Agent	Solactive AG
Constituent Determination Agent	J.P. Morgan Securities plc or any successor or assignee. See Section 7.1.
Disruption Determination Agent	J.P. Morgan Securities plc or any successor or assignee. See Section 7.1.
Relevance Threshold	70
Novelty Threshold	1
News Type	'PRESS-RELEASE', 'FULL-ARTICLE'
Score Lookback	24
Preliminary Theme Relevance Score Threshold	0%
Thematic Relevance Score Threshold	10%
Optimization Relaxation Step Size	2%

Total Relevant Stories Threshold	50
Lookback Threshold	6
1 Month Dollar Trading Threshold	1,000,000
12 Month Dollar Trading Threshold	1,000,000
1 Month Dollar Trading Trim Window	3
12 Month Dollar Trading Trim Window	10
Liquidity Notional	USD 200 million
Maximum Holding Liquidity Ratio	20.0%
Maximum Trading Liquidity Ratio	20.0%
Maximum Free Float Market Cap Ratio	3.00%
Target Weight Cap	5.00%
Small Weight Threshold Percentage	0.0001%
Source Data Threshold Number	200
Minimum Number Threshold	30
Optimizer Software	Means MOSEK, a third-party software for convex optimisation (the "**MOSEK**"), version 9.1.13 or any successor or updated version as implemented by the Index Calculation Agent from time to time. The Index Calculation Agent uses the Python Fusion API of MOSEK for the application within the Index. Further details regarding MOSEK are published under the following website: http://www.mosek.com.
Calculation Day	Means each weekday that is not a Saturday or a Sunday
Index Scheduled Trading Day	Means each Calculation Day on which each of the New York Stock Exchange, the Xetra Exchange, the London Stock Exchange and the Tokyo Stock Exchange is scheduled to be open for trading during its regular trading session, whether scheduled for a full-day regular trading session or a shortened-day regular trading session
Scheduled Rebalancing Date	Means (1) the Index Base Date and (2) the last Index Scheduled Trading Day of March, June, September and December

Effective Rebalancing Date	Means (1) the Index Base Date and (2) in respect of a Scheduled Rebalancing Date in respect of which a Data Source Disruption Event does not occur for the related Rebalance Selection Date, a Relaxation Event does not occur for the related Rebalance Selection Date and a Minimum Constituent Number Failure does not occur for the related Rebalance Selection Date, that Scheduled Rebalancing Date
Rebalance Selection Date	Means, in respect of a Scheduled Rebalancing Date, the Calculation Day that is five London Scheduled Business Days immediately preceding that Scheduled Rebalancing Date
Data Reference Time	Means, in respect of a Rebalance Selection Date, 08:00 am local time in London, United Kingdom on the London Scheduled Business Day that immediately follows that Rebalance Selection Date
Base Reference Index	MSCI World IMI Index (Bloomberg: MXWOIM Index)
Base Reference Index Sponsor	MSCI Inc
Universe Stocks	Means, in respect of a Rebalance Selection Date, each of the constituent stocks included in the Base Reference Index, as available to the Constituent Determination Agent from the Base Reference Data Source at approximately the Data Reference Time.
Eligible Exchange MIC List	'XNGS' (NASDAQ Global Select), 'XNYS' (New York Stock Exchange), 'XSWX' (SIX-Swiss Exchange), 'XAMS' (Euronext Amsterdam), 'XPAR' (Euronext Paris), 'XTKS' (Tokyo Stock Exchange), 'XLON' (London Stock Exchange), 'XHKG' (Hong Kong Exchanges And Clearings), 'XTSE' (Toronto Stock Exchange), 'XETR' (Xetra), 'XCSE' (Nasdaq Copenhagen), 'XASX' (Australian Stock Exchange), 'MTAA' (BrsaItaliana), 'XMAD' (Bolsa De Madrid), 'XBRU' (Euronext Brussels), 'XSTO' (Nasdaq Stockholm), 'XSES' (Singapore Exchange), 'XDUB' (Irish Stock Exchange), 'XHEL' (Nasdaq Helsinki), 'XNMS' (NASDAQ Global Market), 'XNCM'(NASDAQ Capital Market), 'XOSL' (Oslo Bors), 'XASE' (NYSE Mkt), 'XLIS' (Euronext Lisbon), 'XTAE' (Tel Aviv Stock Market), 'XNZE' (New Zealand Exchange), 'BATS' (CBOE BZX US), 'XWBO' (Wiener Boerse AG), 'FNSE' (First North Sweden), 'XJAS' (Tokyo Stock Exchange Jasdaq), 'XNGM' (Nordic Growth Market), 'FNFI' (First North Finland)

Applicable Module 3.0   J.P. Morgan QUEST Cloud Computing Index

Name of the Index	J.P. Morgan QUEST Cloud Computing Index
Index Bloomberg Ticker	JPNLPCCT <Index>
Index Currency	USD
Keyword Logic	("cloud computing" OR "cloud storage" OR "Infrastructure as a service" OR "IaaS" OR "Platform as a service" OR "PaaS" OR "Software as a service" OR "SaaS" OR "backend as a service" OR "Serverless computing" OR "Function as a Service" OR "Cloud architecture" OR "Cloud engineering" OR "cloud infrastructure" OR "cloud infrastructures" OR "Virtualization" OR "Virtualisation" OR "Virtualized" OR "Virtualised" OR "grid computing" OR OR "data-as-a-service" OR "iPaaS" OR "Integration Platform as a Service" OR "dPaaS" OR "Data Platform as a Service" OR "cloud platforms" OR "cloud platform" OR "cloud AI" OR "data cloud" OR "cloud data platform" OR "cloud data platforms" OR "cloud services" OR "cloud service" OR "cloud compute" OR "cloud virtual machines" OR "cloud virtual machine" OR "cloud database" OR "cloud security" OR "virtual private cloud" OR "cloud load balancing" OR "cloud storage" OR "Cloud Solutions" OR "Cloud Solution" OR "public cloud" OR "private cloud" OR "hybrid cloud" OR "Amazon Web Services" OR "Azure" OR "Google Cloud")
Index Base Level	23.3576658073456
Index Base Date	30 June 2008
Calculation Agent Succession Date	16 March 2023
Index Level in respect of the Calculation Agent Succession Date	100.00
Index Live Date	29 March 2023
Index Sponsor	J.P. Morgan Securities plc or any successor or assignee. See Section 7.1.
Index Calculation Agent	In respect of each day after the Calculation Agent Succession Date, Solactive AG or any successor or assignee. See Section 7.1.
	In respect of the period commencing on and including the Index Base Date and ending on and including the Calculation Agent Succession Date, the Index Calculation Agent is deemed to be J.P. Morgan Securities plc.
Identified Reference Index	Solactive GBS Developed Markets All Cap USD Index PR (Bloomberg: SDMACUP Index)
Identified Reference Index Sponsor	Solactive AG
Identified Reference Index Calculation Agent	Solactive AG
Constituent Determination Agent	J.P. Morgan Securities plc or any successor or assignee. See Section 7.1.

Disruption Determination Agent	J.P. Morgan Securities plc or any successor or assignee. See Section 7.1.
Relevance Threshold	70
Novelty Threshold	1
News Type	'PRESS-RELEASE', 'FULL-ARTICLE'
Score Lookback	24
Preliminary Theme Relevance Score Threshold	0%
Thematic Relevance Score Threshold	10%
Optimization Relaxation Step Size	2%
Total Relevant Stories Threshold	50
Total Theme Relevant Stories Threshold	20
Lookback Threshold	6
1 Month Dollar Trading Threshold	1,000,000
12 Month Dollar Trading Threshold	1,000,000
1 Month Dollar Trading Trim Window	3
12 Month Dollar Trading Trim Window	10
Liquidity Notional	USD 200 million
Maximum Holding Liquidity Ratio	20.0%
Maximum Trading Liquidity Ratio	20.0%
Maximum Free Float Market Cap Ratio	3.00%
Target Weight Cap	5.00%
Small Weight Threshold Percentage	0.0001%

Source Data Threshold Number	200
Minimum Number Threshold	30
Optimizer Software	Means MOSEK, a third-party software for convex optimisation (the "**MOSEK**"), version 9.1.13 or any successor or updated version as implemented by the Index Calculation Agent from time to time. The Index Calculation Agent uses the Python Fusion API of MOSEK for the application within the Index. Further details regarding MOSEK are published under the following website: http://www.mosek.com.
Calculation Day	Means each weekday that is not a Saturday or a Sunday
Index Scheduled Trading Day	Means each Calculation Day on which each of the New York Stock Exchange, the Xetra Exchange, the London Stock Exchange and the Tokyo Stock Exchange is scheduled to be open for trading during its regular trading session, whether scheduled for a full-day regular trading session or a shortened-day regular trading session
Scheduled Rebalancing Date	Means (1) the Index Base Date, (2) the Calculation Agent Succession Date and (2) the last Index Scheduled Trading Day of March, June, September and December
Effective Rebalancing Date	Means (1) the Index Base Date and (2) in respect of a Scheduled Rebalancing Date in respect of which a Data Source Disruption Event does not occur for the related Rebalance Selection Date, a Relaxation Event does not occur for the related Rebalance Selection Date and a Minimum Constituent Number Failure does not occur for the related Rebalance Selection Date, that Scheduled Rebalancing Date
Rebalance Selection Date	Means, in respect of a Scheduled Rebalancing Date, the Calculation Day that is five London Scheduled Business Days immediately preceding that Scheduled Rebalancing Date
Data Reference Time	Means, in respect of a Rebalance Selection Date, 08:00 am local time in London, United Kingdom on the London Scheduled Business Day that immediately follows that Rebalance Selection Date
Base Reference Index	MSCI World IMI Index (Bloomberg: MXWOIM Index)
Base Reference Index Sponsor	MSCI Inc
Universe Stocks	Means, in respect of a Rebalance Selection Date, each of the constituent stocks included in the Base Reference Index, as available to the Constituent Determination Agent from the Base Reference Data Source at approximately the Data Reference Time.
Eligible Exchange MIC List	'XNGS' (NASDAQ Global Select), 'XNYS' (New York Stock Exchange), 'XSWX' (SIX-Swiss Exchange), 'XAMS' (Euronext Amsterdam), 'XPAR' (Euronext Paris), 'XTKS' (Tokyo Stock Exchange), 'XLON' (London Stock Exchange), 'XHKG' (Hong Kong Exchanges And Clearings), 'XTSE' (Toronto Stock Exchange), 'XETR' (Xetra), 'XCSE' (Nasdaq Copenhagen), 'XASX' (Australian Stock Exchange), 'MTAA' (BrsaItaliana), 'XMAD' (Bolsa De Madrid), 'XBRU' (Euronext Brussels), 'XSTO' (Nasdaq Stockholm), 'XSES' (Singapore Exchange), 'XDUB' (Irish Stock Exchange), 'XHEL' (Nasdaq Helsinki), 'XNMS'

	(NASDAQ Global Market), 'XNCM'(NASDAQ Capital Market), 'XOSL' (Oslo Bors), 'XASE' (NYSE Mkt), 'XLIS' (Euronext Lisbon), 'XTAE' (Tel Aviv Stock Market), 'XNZE' (New Zealand Exchange), 'BATS' (CBOE BZX US), 'XWBO' (Wiener Boerse AG), 'FNSE' (First North Sweden), 'XJAS' (Tokyo Stock Exchange Jasdaq), 'XNGM' (Nordic Growth Market), 'FNFI' (First North Finland)
Associated GICS Sectors	Information Technology, Consumer Discretionary and Communication Services