



SECURITIES INDUSTRY AUTOMATION CORPORATION

CQS

CONSOLIDATED QUOTATION SYSTEM

MULTICAST OUTPUT BINARY SPECIFICATION

**August 14, 2020
Version 2.8**

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

CONTENTS

| | |
|---|-----------|
| VERSION HISTORY | 4 |
| 1.0 INTRODUCTION | 8 |
| 1.1 BACKGROUND..... | 8 |
| 1.2 DUAL SITE REDUNDANCY | 8 |
| 1.3 SCOPE..... | 9 |
| 1.4 DATA FEED REFERENCE MATERIAL | 9 |
| 2.0 GENERAL DESIGN OF DATA DISTRIBUTION NETWORK | 10 |
| 3.0 TRANSMISSION CHARACTERISTICS | 11 |
| 3.1 TRANSMISSION BLOCK..... | 11 |
| 3.2 BLOCK DATA | 11 |
| 3.3 BLOCK PAD BYTE..... | 11 |
| 3.4 DATA TYPE..... | 12 |
| 3.4.1 Numeric Types..... | 12 |
| 3.4.2 Alpha/Alphanumeric/Special/Printable Types..... | 12 |
| 3.5 BLOCK HEADER..... | 13 |
| 3.5.1 Version | 13 |
| 3.5.2 Block Size | 13 |
| 3.5.3 Block Sequence Number..... | 14 |
| 3.5.4 Messages in Block | 14 |
| 3.5.5 Block Checksum | 14 |
| 3.5.6 Data Feed Indicator..... | 14 |
| 3.5.7 Retransmission Indicator..... | 15 |
| 3.5.8 SIP Block Timestamp..... | 15 |
| 3.6 RETRANSMISSION CAPABILITY | 16 |
| 4.0 MESSAGE HEADER | 17 |
| 4.1 MESSAGE LENGTH..... | 17 |
| 4.2 MESSAGE CATEGORY AND MESSAGE TYPE TABLE..... | 18 |
| 4.2.1 Message Category..... | 19 |
| 4.2.2 Message Type | 19 |
| 4.3 PARTICIPANT ID..... | 19 |
| 4.4 TIMESTAMP 1 | 20 |
| 4.5 PARTICIPANT REFERENCE NUMBER | 20 |
| 4.6 MESSAGE ID..... | 20 |
| 4.7 TRANSACTION ID..... | 20 |
| 5.0 MESSAGE ROUTING | 21 |
| 6.0 MESSAGE FORMATS | 23 |
| 6.2 CONTROL MESSAGES – CATEGORY C..... | 24 |
| 6.2.1 Start of Day – Category C Type A..... | 24 |
| 6.2.2 FINRA Close – Category C Type C..... | 24 |
| 6.2.3 Reset Block Sequence Number – Category C Type L..... | 24 |
| 6.2.4 FINRA Open – Category C Type O..... | 24 |
| 6.2.5 Disaster Recovery Data Center Activation – Category C Type P..... | 24 |
| 6.2.6 Line Integrity – Category C Type T..... | 25 |
| 6.2.7 End of Day – Category C Type Z..... | 25 |
| 6.3 MARKET STATUS MESSAGES – CATEGORY M..... | 26 |
| 6.3.1 Market-Wide Circuit Breaker Decline Level Status – Category M Type K..... | 26 |
| 6.3.2 Market-Wide Circuit Breaker Status – Category M Type L..... | 27 |
| 6.4 QUOTE MESSAGES – CATEGORY Q..... | 28 |
| 6.4.1 Auction Status – Category Q Type A..... | 28 |
| 6.4.2 Long Quote – Category Q Type L..... | 29 |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

| | | |
|------------|--|-----------|
| 6.4.3 | Short Quote – Category Q Type Q..... | 30 |
| 6.4.4 | Special Long Quote (FINRA ADF) with FINRA BBO Information – Category Q Type S..... | 31 |
| 6.4.5 | National Best Bid Short Appendage and National Best Offer Short Appendage..... | 33 |
| 6.4.6 | National Best Bid Long Appendage and National Best Offer Long Appendage..... | 34 |
| 7.0 | FIELD DESCRIPTIONS..... | 35 |
| | APPENDIX A: CQS CONFIGURATION..... | 62 |
| | APPENDIX B: GLOSSARY..... | 63 |
| | APPENDIX C: SUMMARY OF DAILY CQS MULTICAST LINE ACTIVITY..... | 68 |
| | APPENDIX E: CQS CLOSING ROUTINE..... | 70 |
| | APPENDIX F: NATIONAL BEST BID AND OFFER OVERVIEW..... | 71 |
| | APPENDIX G: QUOTE CONDITIONS..... | 73 |
| | APPENDIX H: SECURITY STATUS INDICATORS..... | 76 |
| | APPENDIX I: SYMBOL SUFFIXES EXAMPLES..... | 79 |
| | APPENDIX J: ASCII PRINTABLE TABLE (CHARACTER CODE 32-126)..... | 81 |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

VERSION HISTORY

| Version | Date | Description |
|---------|--------------------|---|
| 1.0 | July 1, 2016 | Initial Document |
| 1.1 | September 15, 2016 | <ul style="list-style-type: none"> ▪ Added: New Dedicated Test Symbols. |
| 1.2 | February 21, 2017 | <p><u>Added:</u></p> <ul style="list-style-type: none"> ▪ ‘Message Length’ field in Message Header and field description. ▪ New ‘Auction Status Category Q Type A’ message and field descriptions. <p><u>Corrected:</u></p> <ul style="list-style-type: none"> ▪ ‘Start of Day Category C Type A’ message typo to reflect ‘Category C Type N’ End of Test Cycle in Block Sequence Number field description. ▪ ‘Start of Day Category C Type A’ typo message typo to Category ‘C’ in Start of Test Cycle/End of Test Cycle field descriptions. ▪ Description for the transmission at 20:06 to be identified as ‘End of Day’. <p><u>Eliminated:</u></p> <ul style="list-style-type: none"> ▪ Administrative Message ‘Text Length’ field (Length is identified in Message Header). ▪ ‘Temporary Suffix’ field/descriptions which are no longer supported. <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ ‘Block Pad Byte’ description to include binary representation. ▪ Order of field appearances in Block Header and Message Header. ▪ ‘National BBO Indicator’ field moved from Message Header to Quote Message formats. ▪ Message Header ‘Transaction ID’ field Data Type. ▪ Message routing reverted to current Production routing. ▪ MWCBC Level 1, 2 and 3 Data Type representations. ▪ Data Type useable ‘signed integer’ values. ▪ Clarification on appearance of Bid /Offer Appendages following message formats. ▪ Retransmission code from ‘R’ back to ‘V’ to indicate Retransmission. ▪ Minor edits/clarification throughout document/removed verbiage associated with eliminated functionality. ▪ Binary and ASCII Protocol Differences and Notes. |
| 1.3 | May 5, 2017 | <p><u>Added:</u></p> <ul style="list-style-type: none"> ▪ CBOE Stock Exchange, Inc. (CBSX) Participant ID ‘W’ <p><u>Corrected:</u></p> <ul style="list-style-type: none"> ▪ MWCBC Levels implied decimal typo to be implied 6 decimals |
| 1.4 | June 2, 2017 | <p><u>Added:</u></p> <ul style="list-style-type: none"> ▪ New Dedicated Test Symbols: ZIEXT, ZEXIT & ZXIET <p><u>Corrected:</u></p> <ul style="list-style-type: none"> ▪ From: Reset Message Sequence Number / To: Reset Block Sequence Number |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

VERSION HISTORY

| Version | Date | Description |
|---------|-------------------|--|
| 1.5 | August 28, 2017 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ Use of only a subset of new National Best Bid and Offer (NBBO) Indicator Codes ‘A, G, O, T, and U’ upon Binary implementation for a transitional period (complete set of codes to be used at a future date) ▪ Block Sequence Number rollover limited to occur after 999,999,999 (instead of 3,999,999,999) for a transitional period ▪ From: NYSE MKT / To: NYSE American |
| 1.6 | February 14, 2018 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ From: National Stock Exchange / To: NYSE National, Inc. ▪ From: Bats EDGA Exchange / To: Cboe EDGA Exchange ▪ From: Bats EDGX Exchange / To: Cboe EDGX Exchange ▪ From: Bats BYX Exchange / To: Cboe BYX Exchange ▪ From: Bats BZX Exchange / To: Cboe BZX Exchange ▪ IEX status to Primary Listing Exchange ▪ Security Status Indicator value ‘X’ From: Equipment Changeover / To: Operational ▪ Description of Auction Status message |
| 1.7 | May 8, 2018 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ From: Financial Industry Regulatory Authority, Inc. (FINRA) / To: FINRA Alternative Display Facility (ADF) <p><u>Eliminated:</u></p> <ul style="list-style-type: none"> ▪ Binary and ASCII Protocol Differences and Notes |
| 1.8 | July 17, 2019 | <p><u>Added:</u></p> <p>New Dedicated Test Symbols: CTEST and MTEST</p> |
| 1.9 | October 25, 2019 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ <u>From: Chicago Stock Exchange / To: NYSE Chicago, Inc.</u> <p><u>Update:</u></p> <ul style="list-style-type: none"> ▪ <u>NYSE Chicago included in 20:00 OFFICIAL MARKET CLOSED</u> ▪ <u>NYSE Chicago included in 20:00 End of Participant Reporting</u> <p><u>Eliminated:</u></p> <ul style="list-style-type: none"> ▪ <u>16:33 Suspend Best Bid and Best Offer for: CHX</u> |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

VERSION HISTORY

| Version | Date | Description |
|---------|-------------------|---|
| 2.0 | December 4, 2019 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ Block Sequence Number limit to rollover occur after 4,294,967,295 ▪ Block Sequence Number to contain the Message Sequence Number in the Output Block ▪ SIP Block Timestamp for retransmitted block ▪ Block Sequence number on retransmitted blocks ▪ Summary of Daily Multicast Line Messages (Appendix C) ▪ Description of FINRA BBO LULD Indicator codes ▪ Start of Day message publication from three times to one time <p><u>Eliminated:</u></p> <ul style="list-style-type: none"> ▪ Security Status codes for Opening Delay and No Open/No Resume ▪ Dedicated Test Cycles scheduled prior to SOD ▪ ‘Start of Test Cycle - Category C Type M’ and ‘End of Test Cycle - Category C Type N’ messages ▪ Suspend BBO configuration to exclude participants from BBO ▪ CQS Closing Routing to publish closing quote on participant’s behalf at configured closing time ▪ Time Beacon publication ▪ Administrative Unformatted (Category A Type H) Message ▪ APPENDIX D: ADMINISTRATIVE MESSAGE TEXT SAMPLES |
| 2.1 | January 24, 2020 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ Block version from 0 to 1 ▪ Line Integrity publication interval from 60 seconds to 10 seconds ▪ SIP Block Timestamp for retransmitted block |
| 2.2 | February 5, 2020 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ Block version from 1 to 2 ▪ ‘Timestamp 1’ for any SIP generated messages from 0 to current time |
| 2.3 | February 20, 2020 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ Included redundant data stream for Retransmitted messages |
| 2.4 | February 25, 2020 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ End of Day (Category C Type Z) description to highlight that Line Integrity messages are published even after End of Day |
| 2.5 | March 27, 2020 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ Start of Day and End of Day Message transmission time |
| 2.6 | April 13, 2020 | <p><u>Modified:</u></p> <ul style="list-style-type: none"> ▪ Appendix C for Summary of Daily CQS Multicast Line Activity |
| 2.7 | May 15, 2020 | <p><u>Added:</u></p> <ul style="list-style-type: none"> ▪ MIAX Pearl Exchange, LLC (MIAX) Participant ID ‘H’ ▪ Members Exchange, LLC (MEMX) Participant ID ‘U’ |
| 2.7a | June 12, 2020 | <p><u>Clarification:</u></p> <ul style="list-style-type: none"> ▪ <u>SIP Block Timestamp in retransmission block</u> |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

VERSION HISTORY

| Version | Date | Description |
|----------------|-----------------|--|
| 2.8 | August 14, 2020 | <p><u>Added:</u></p> <ul style="list-style-type: none">▪ Security Status indicators for new Regulatory Halt Reason Codes (A, C, E, F, N, O and V) <p><u>Modified:</u></p> <ul style="list-style-type: none">▪ Renamed Regulatory Halt Reason Code D from News Dissemination to News Released▪ <u>Description of CQS Closing Routine</u> <p><u>Eliminated:</u></p> <ul style="list-style-type: none">▪ Removed invalid reference of previously decommissioned End of Participant Quote Reporting message |

1.0 INTRODUCTION

The Securities Industry Automation Corporation (SIAC) serves as the Processor for the Consolidated Quote Plan from its inception on August 1, 1978. In fulfilling its role as the Processor, SIAC plans, develops, operates, and maintains the Consolidated Quotation System (CQS).

1.1 Background

CQS receives transactions generated by participating U.S. Stock Exchanges and the FINRA Alternative Display Facility (ADF). In addition, CQS calculates the National ‘Best Bid and Best Offer’ (NBBO) and identifies the FINRA ‘Best Bid and Best Offer’ (FBBO).

CQS consolidates transactions that occurred on participating U.S. Stock Exchanges and the FINRA Alternative Display Facility (ADF) and disseminates this information via computer-to-computer linkages to the financial community in the U.S. and abroad.

Essential in ensuring the timely reporting of quote information are the CQS IP Multicast data streams. CQS has a unique set of IP Multicast addresses assigned to each of its data ‘lines’. Data generated by each participating Exchange and the FINRA Alternative Display Facility (ADF) is assembled in prescribed message formats and transmitted to the appropriate TCP/IP Processor address via the Participants’ private communications facility. As each message is received, it is merged with messages received from all Participants, and the consolidated message stream is transmitted simultaneously to all Data Recipients via their private communications facilities. Approved Data Recipients of the CQS service can redistribute CQS data worldwide to their customers as part of their individual services or use the data for their own purposes.

Note:

- It is recommended that Data Recipients subscribe to both the Consolidated Quotation System (CQS) and the Consolidated Tape System (CTS) in order to receive complete listed equity market data. Reference the CQS and CTS Specifications for further details at: www.ctapl.com.

1.2 Dual Site Redundancy

Computer systems that support the processing and dissemination of quote transactions are operational at primary and backup sites. The backup site provides recovery capability in the event of a disaster at the primary site. Through computerized communications equipment, CQS transaction data is disseminated from either the primary or backup site. The dual-site configuration provides system fold-over for a limited site disaster (system failure) or full site disaster (loss of facility).

In the event of a Primary Data Center failover to the Disaster Recovery site (Backup Data Center), data will be sourced via the Backup Data Center source addresses.

1.3 Scope

This specification defines the interface and message format requirements for recipients of the CQS data feed via connectivity to the National Market System (NMS) IP Multicast distribution network.

1.4 Data Feed Reference Material

Technical Specifications

For Technical Specifications visit www.ctaplan.com - and select Tech Specs tab for the following:

- CQS Multicast Output Specification
- CTS Multicast Output Specification
- Common IP Multicast Distribution Network Specification
- Automated Retransmission Facility User Guide

Consolidated Tape Association (CTA) Announcements

CTA Announcements including feed enhancements, traffic rates, etc. visit www.ctaplan.com

Future Data Feed Enhancements

Future enhancements and/or modifications may require system changes for your firm. Please refer to the CTA Plan website www.ctaplan.com to obtain the latest CTA Notifications and Technical Specification documents. **To automatically receive these Notifications and System Alerts, subscribe at: <https://www.ctaplan.com/subscribe>**

Data Feed Related Resources

For customers selecting to initiate ICE Global Network (IGN), formerly known as the Secure Financial Transaction Infrastructure (SFTI), connections to CQS:

- Submit a request at: <https://www.theice.com/contact-us/connectivity>
- Contact IGN Sales at: clientnetworks@theice.com
- For more information on IGN, including documentation such as Customer and Technical guides reach out to an IGN representative at: iceglobalnetwork-info@theice.com

2.0 GENERAL DESIGN OF DATA DISTRIBUTION NETWORK

The NMS IP Multicast distribution network disseminates all market data information in the form of multicast addressed IP datagrams.

Data available via the NMS IP Multicast distribution network includes:

CQS Real-Time Production Data

A copy of each CQS real-time production message is available from SIAC's production/primary site. These redundant copies are delivered via two distinct multicast data streams.

CQS Real-Time Retransmission Data

The retransmission data streams are available from SIAC's production/primary site, and are delivered via two redundant retransmission multicast data streams.

CQS After-Hours Playback Data

There are two sets of IP Multicast data feeds dedicated for after-hours playback test data. One set of IP Multicast data feeds supports the playback of production messages and the other set supports the playback of test messages. This playback data is made available via a single set of multicast data feeds.

IP Multicast Network Interface

The requirements for the NMS IP Multicast distribution network interface are defined in the document, 'Common IP Multicast Distribution Network Recipient Interface Specification' which can be accessed at website: <http://www.ctaplan.com> and select the Tech Specs tab.

3.0 TRANSMISSION CHARACTERISTICS

3.1 Transmission Block

Encapsulated within each IP packet is a single transmission Block. One type of transmission Block is used for all types of messages. A Block can have a maximum of 1,000 bytes inclusive of Block Header, Block Data, and Block Pad Byte.

| Block Structure | Length |
|---------------------------|----------|
| Block Header | 20 |
| Block Data | Variable |
| Block Pad Byte (optional) | 1 |

3.2 Block Data

The Block Data consists of one or more CQS messages.

A message consists of a Message Header, which is of fixed length and format and Message Data (Body), which is variable in length and format. Category C – Control messages are each sent in their own individual block.

The Block Data structure is as follows:

| Block Data Structure |
|----------------------|
| Message 1 Data |
| Message 2 Data |
| ~~~ |
| Message N Data |

3.3 Block Pad Byte

Byte. Unsigned integer contains binary zero (Hex 0x00). Only used when the size of a block consists of an odd number of bytes. In instances of odd number of bytes, the Block Pad Byte is added to the Block to ensure the Block is an even number of bytes.

3.4 Data Type

The following data types are used by CQS:

| Type | Value |
|--|---|
| NUMERIC – Big-Endian (Network Byte Order) | |
| byte | Big-Endian Unsigned 1 Byte Integer |
| short | Big-Endian Unsigned 2 Byte Integer |
| integer | Big-Endian Unsigned 4 Byte Integer |
| long | Big-Endian Unsigned 8 Byte Integer |
| ALPHA/ALPHANUMERIC/SPECIAL/PRINTABLE | |
| char | Single printable ASCII character |
| char [] | Fixed length printable ASCII characters |
| varchar [] | Variable lengths printable ASCII characters |

3.4.1 Numeric Types

1. All numeric fields will be in Big-Endian (Network Byte Order) format
2. Numeric types (byte, short, integer and long) represent sequence numbers, timestamps, prices and sizes
3. Prices represented by short fields have implied 2 decimal places
4. Prices represented by long fields have implied 6 decimal places
5. Any numeric value that is unused or does not apply to a given message type has a value set to 0

The maximum range values for the numeric fields are as follows:

- 1 byte unsigned integer: 0 – 255 (byte)
- 2 byte unsigned integer: 0 – 65,535 (short)
- 4 byte unsigned integer: 0 – 4,294,967,295 (integer)
- 8 byte unsigned integer: 0 – 18,446,744,073,709,551,615 (long)

Select values represented as 2's complement, will have signed integers with the following range:

- 8 byte signed integer: -9,223,372,036,854,775,808 to +9,223,372,036,854,775,807 (signed long)

3.4.2 Alpha/Alphanumeric/Special/Printable Types

1. ASCII printable character codes 32 – 126
2. Left justified and padded on the right with spaces for fixed length fields

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

3.5 Block Header

| Field | Length | Type |
|--------------------------|-----------|-------------|
| Version | 1 | Byte |
| Block Size | 2 | Short |
| Data Feed Indicator | 1 | Char |
| Retransmission Indicator | 1 | Char |
| Block Sequence Number | 4 | Integer |
| Messages In Block | 1 | Byte |
| SIP Block Timestamp | 8 | 2 x Integer |
| Block Checksum | 2 | Short |
| Total Length | 20 | |

3.5.1 Version

Byte. Indicates the CQS binary protocol version and allows for Block Header, Message Header and Message formats to be updated while still supporting previous versions of headers/message formats during transition. Version value is set to 2 for first/initial version for CTA Pillar SIP.

3.5.2 Block Size

Short. Indicate size in bytes of the entire transmission block.

3.5.3 Block Sequence Number

Integer. The Block Sequence Number denotes the sequence number of the first message in the block. If a Block contains more than one message, any messages following the first message are implicitly numbered sequentially. As such, the Block Sequence Number in the next Block is incremented by the number of messages published in the previous Block.

Block Sequence Number rollover occurs after 4,294,967,295. On a per multicast line basis, the Block Sequence Number on the multicast lines are set to zero at the start of each day, and incremented each time a block is transmitted, with the following exceptions:

1. The Block Sequence Number in retransmitted blocks contains the Message Sequence Number of the first message in the retransmitted Block
2. The Block Sequence Number field in the Block Header of a Category C Type L message (Reset Block Sequence Number) contains the number to which the Block Sequence Number counter is to be reset. This number is either one (1) in the event the sequence number rolls over from 4,294,967,295 or a number greater than the highest number previously transmitted.
3. The block containing a Category C Type A message (Start of Day) or Category C Type Z message (End of Day) contains the block sequence number of Zero.
4. The block containing a Category C Type T (Line Integrity) message contains the message sequence number of the last block transmitted, which was not a retransmitted block.
5. Should CQS experience a line failure and recovery, the Block Sequence number for the recovered multicast line(s) can be reset to a number greater than the last message sequence number transmitted once message transmission is resumed.

3.5.4 Messages in Block

Byte. The number of messages contained in the transmission block.

3.5.5 Block Checksum

Short. Lower 2 bytes of the 4 byte sum of all the bytes in the block, excluding this Block Checksum field.

3.5.6 Data Feed Indicator

Char. Value is 'Q' for Consolidated Quotation System (CQS).

3.5.7 Retransmission Indicator

Char. Contains either a ‘O’ (indicating an original message) or ‘V’ (indicating a retransmitted block).

3.5.8 SIP Block Timestamp

2 x Integer (pair of integers). Contains the block timestamp and is the SIP time that processing a block of messages is completed. The first integer contains the number of seconds from Epoch 1/1/1970, 00:00:00 UTC. The next integer contains the nanosecond portion of the time (e.g., 972402315).

Precision Time Protocol (PTP) is utilized to provide a standard method to synchronize devices on a network with sub-microsecond precision. The protocol synchronizes slave clocks to a master clock ensuring that events and timestamps in all devices use the same time base.

SIAC recommends to represent this time in HH:MM:SS.mmmμμμnnn format Eastern Time (ET) when communicating with SIAC.

For Retransmissions, the SIP Block Timestamp contains the timestamp representing when the first message in the retransmitted block was originally processed by SIP.

3.6 Retransmission Capability

CQS stores all data transmitted to the Data Recipients for a single trading day to facilitate data retransmission. If Data Recipients do not receive a block(s), a retransmission of the missed messages can be requested. Retransmission requests are accepted in the period following transmission of the Start of Day message and before the transmission of the End of Day message.

The following Message Category and Types are not included in retransmissions:

| Message Category | Message Type | Description |
|------------------|--------------|----------------|
| C | A | Start of Day |
| C | T | Line Integrity |

The Automated Retransmission Facility is utilized for automatically receiving and processing CQS block retransmission requests.

A Data Recipient may request automated retransmission(s) of missed messages by connecting directly through IGN, formerly known as SFTI, to the Automated Retransmission Facility via TCP/IP addresses and ports. A Data Recipient is required to enter their assigned user ID and password along with system, line, and message sequence number information. The requested message(s) are re-published over the dedicated Retransmission multicast streams. An '**Automated Retransmission Facility User Guide**' for automated retransmission requests can be accessed at the following website: <http://www.ctaplan.com> and select the Technical Specs tab.

All retransmitted CQS blocks contain only 'V' in the Retransmission Indicator field of the Block Header. The Block Sequence Number field in the Block Header of each retransmitted block contains the Message Sequence Number of the first message in the retransmitted block.

Note:

- It is the responsibility of the Data Recipient to ignore retransmitted messages not requested by them.

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

4.0 MESSAGE HEADER

The Message Header uniquely identifies the Category and Type of each message within a Block. The Message Header can represent an entire message or appears before the Message Body segment in each message transmitted. The Message Header contains the following bytes and conforms in all cases to the following data fields:

| Field | Length | Type |
|------------------------------|-----------|-------------|
| Message Length | 2 | Short |
| Message Category | 1 | Char |
| Message Type | 1 | Char |
| Participant ID | 1 | Char |
| Timestamp 1 | 8 | 2 x Integer |
| Message ID | 1 | Byte |
| Transaction ID | 4 | Integer |
| Participant Reference Number | 8 | Signed Long |
| Total Length | 26 | |

4.1 Message Length

Short. The Message Length identifies the total message length inclusive of the Message Header and Message Body.

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

4.2 Message Category and Message Type Table

| Message Category | Message Type | Value |
|----------------------|--------------|--|
| Control | | |
| C | A | Start of Day |
| C | C | FINRA Close |
| C | L | Reset Block Sequence Number |
| C | O | FINRA Open |
| C | P | Disaster Recovery Data Center Activation |
| C | T | Line Integrity |
| C | Z | End of Day |
| Market Status | | |
| M | K | Market-Wide Circuit Breaker Decline Level Status |
| M | L | Market-Wide Circuit Breaker Status |
| Quote | | |
| Q | A | Auction Status |
| Q | L | Long Quote |
| Q | Q | Short Quote |
| Q | S | Special Long Quote (FINRA ADF) with FBBO Information |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

4.2.1 Message Category

Char. The Message Category represents the message classification. Refer to Message Category and Message Type Table *section 4.2*.

4.2.2 Message Type

Char. The Message Type together with the Message Category identifies the message. Refer to Message Category and Message Type Table *section 4.2*.

4.3 Participant ID

Char. Participant ID identifies the Participant or Processor that generated the message.

| Code | Value |
|------|--|
| A | NYSE American, LLC (NYSE American) |
| B | NASDAQ OMX BX, Inc. (NASDAQ OMX BX) |
| C | NYSE National, Inc. (NYSE National) |
| D | FINRA Alternative Display Facility (ADF) |
| H | MIAX Pearl Exchange, LLC (MIAX) |
| I | International Securities Exchange, LLC (ISE) |
| J | Cboe EDGA Exchange, Inc. (Cboe EDGA) |
| K | Cboe EDGX Exchange, Inc. (Cboe EDGX) |
| L | Long-Term Stock Exchange, Inc. (LTSE) |
| M | NYSE Chicago, Inc. (NYSE Chicago) |
| N | New York Stock Exchange, LLC (NYSE) |
| P | NYSE Arca, Inc. (NYSE Arca) |
| S | Consolidated Quotation System |
| T | NASDAQ Stock Market, LLC (NASDAQ) |
| U | Members Exchange, LLC (MEMX) |
| V | Investors' Exchange, LLC. (IEX) |
| W | CBOE Stock Exchange, Inc. (CBSX) |
| X | NASDAQ OMX PSX, Inc. (NASDAQ OMX PSX) |
| Y | Cboe BYX Exchange, Inc. (Cboe BYX) |
| Z | Cboe BZX Exchange, Inc. (Cboe BZX) |

4.4 Timestamp 1

2 x Integer (pair of integers). Timestamp 1 is a Participant-provided timestamp. The first integer contains the number of seconds from Epoch 1/1/1970, 00:00:00 UTC. The next integer contains the nanosecond portion of the time (e.g., 972402315). For any messages generated by CQS, e.g., Messages generated on behalf of a Participant, Price Band messages, Control messages and Market Status messages, the Timestamp 1 field will be set to current SIP time.

- **If from an Exchange: Timestamp 1** denotes the time where the quote bid price and/or the offer price for a security is designated with an Exchange's Matching Engine Publication timestamp. Exchanges use a clock sync methodology ensuring that timestamps are accurate within tolerances of 100 microseconds or less. Exchanges shall provide the timestamp in terms of nanoseconds since Epoch.
- **If from the FINRA Alternative Display Facility (ADF): Timestamp 1** denotes the time of the quote bid price and/or the offer price for a security that a FINRA member reports to the FINRA Alternative Display Facility. FINRA shall provide such times to the Processor in nanoseconds since Epoch.

4.5 Participant Reference Number

Signed Long. Set to Zero. Participant Reference Number is a pass-thru of the inbound Participant Reference number assigned to a transaction. Zero, positive and negative Participant Reference Numbers will be sent.

4.6 Message ID

Byte. The Message ID identifies the individual message within the block beginning with number one (1).

4.7 Transaction ID

Integer. The Transaction ID will be populated by CQS and is **Reserved for Internal Use** only.

Note:

- Data Recipients should ignore/disregard this field to the extent that it does not impact their normal data processing.

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

5.0 MESSAGE ROUTING

In total, CQS messages are disseminated over **twenty-four (24)** IP multicast lines designated as:

1. Line 1 (**L1**) through Line 12 (**L12**) for Network ‘A’, (NYSE listed securities)
2. Line 1 (**L1**) though Line 12 (**L12**) for Network ‘B’ (Cboe BZX, NYSE ARCA and NYSE American listed securities)’.

Note: The ‘Primary Listing Market Participant ID’ field will explicitly identify the Listing Market associated with their listed security.

Messages will be routed over the twenty-four IP multicast lines according to the network and security symbol range distribution except the following:

1. Control (Category C) messages are distributed over all Network ‘A’ and Network ‘B’ lines.

Traffic for CQS Network ‘A’ and Network ‘B’ messages will be routed by network and security symbol to twenty-four (24) assigned multicast lines as follows:

| CQS NETWORK ‘A’ Symbol Range Distribution | | | CQS NETWORK ‘B’ Symbol Range Distribution | | |
|--|------|--------|--|------|--------|
| Multicast Lines | From | To | Multicast Lines | From | To |
| 1 | A | ANZZZZ | 1 | A | DZZZZZ |
| 2 | AO | BXZZZZ | 2 | E | EWZZZZ |
| 3 | BY | CRZZZZ | 3 | EX | GZZZZZ |
| 4 | CS | ELZZZZ | 4 | H | IWEZZZ |
| 5 | EM | GLZZZZ | 5 | IWF | KZZZZZ |
| 6 | GM | IQZZZZ | 6 | KJ | RMZZZZ |
| 7 | IR | LVZZZZ | 7 | RN | SKZZZZ |
| 8 | LW | NOZZZZ | 8 | SL | SPZZZZ |
| 9 | NP | PRZZZZ | 9 | SQ | UMZZZZ |
| 10 | PS | STZZZZ | 10 | UN | VNZZZZ |
| 11 | SU | USZZZZ | 11 | VO | XLEZZZ |
| 12 | UT | ZZZZZZ | 12 | XLF | ZZZZZZ |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

Message Routing: *continued*

Test Messages:

- CQS messages containing dedicated 'Test Symbols' for Listing Exchange NYSE will route to multicast lines for Network 'A' according to the network and security symbol range distribution.
- CQS messages containing dedicated 'Test Symbols' for Listing Exchanges Cboe BZX, IEX, NYSE ARCA and NYSE American will route to multicast lines for Network 'B' according to the network and security symbol range distribution.
- Dedicated 'Test Symbols' and their associated listing exchange are listed in the Field Descriptions section under the 'Security Symbol' field.

Note:

- Data Recipients are responsible for handling any symbol over any line. Redistribution of traffic may not occur intraday. Notification may not be sent to the Data Recipients regarding redistribution of traffic.

6.0 MESSAGE FORMATS

The Message Category and Message Type identify the Message and determine the format of the body. Each message transmitted by CQS consists of a Message Header and Message Body or Message Header only.

All messages formats have fixed field which is determined by reading the Message Header and Message Body.

A field description is provided as part of the Block Header format, Message Header format, Message Body or in the **Field Descriptions** section of this document.

6.2 Control Messages – Category C

Control messages consist of the standard **Message Header only**, and are **not** blocked with any other messages including Control messages.

When included in a retransmission sequence, the Retransmission Indicator field of a Control message contains code ‘V’; otherwise this field contains the alphabetic upper case character ‘O’ (meaning original message).

6.2.1 Start of Day – Category C Type A

The Start of Day message signals the start of normal data dissemination over the multicast lines. A single Start of Day message is sent with the Block Sequence Number field set to zero.

6.2.2 FINRA Close – Category C Type C

The FINRA Close message is transmitted by FINRA to CQS to indicate the Close state of FINRA Market Maker(s). All FINRA Market Maker quotes must be in either an Open or Close state where Open implies current and Close implies not current.

6.2.3 Reset Block Sequence Number – Category C Type L

The Reset Block Sequence Number message is transmitted when the block sequence number on an output multicast line requires resetting.

The Block Sequence Number field in the Reset Block Sequence Number message contains the number to which the Block Sequence Number counter is to be reset. This number is higher than the highest Block Sequence Number previously transmitted.

6.2.4 FINRA Open – Category C Type O

The FINRA Open message is transmitted by FINRA to CQS. This message indicates the Open state of FINRA Market Maker(s). All FINRA Market Maker quotes must be in either an Open or Close state, whereby Open implies ‘current’ and Close implies not current.

6.2.5 Disaster Recovery Data Center Activation – Category C Type P

The Disaster Recovery Data Center Activation message is transmitted to signify that the Consolidated Quotation System (CQS) has switched processing from the Primary Data Center to the Disaster Recovery Data Center. The Disaster Recovery Data Center Activation message is preceded by the transmission of Reset Block Sequence Number Category C Type L messages.

The Block Sequence Number field of the Disaster Recovery Data Center Activation message contains a number greater than the highest Block Sequence Number previously transmitted.

6.2.6 Line Integrity – Category C Type T

The Line Integrity message is transmitted over the multicast lines at intervals of ten (10) seconds to verify continued integrity of multicast transmission. The Line Integrity message transmission does not interrupt a transmission in progress.

The Block Sequence Number is not incremented for Line Integrity messages. The Block Sequence Number field will contain the Sequence Number of the last transmitted message.

6.2.7 End of Day – Category C Type Z

The End of Day message is transmitted over the multicast lines to advise all Data Recipients that there are no further messages to be transmitted for the day.

The Block Sequence Number field of the End of Day message will be zero.

Note:

- Under normal conditions, upon receiving the End of Day Category C Type Z message, it is the Data Recipient's responsibility to terminate their production CQS output multicast line feeds from SIAC.
- System will continue to publish Line Integrity (Category C Type T) Messages until the CQS multicast lines are brought down

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

6.3 Market Status Messages – Category M

Market Status messages are used to provide market data information.

Unless otherwise noted, detailed information on each field is contained in alphabetical order in the **Field Descriptions** section of this document.

6.3.1 Market-Wide Circuit Breaker Decline Level Status – Category M Type K

The Market-Wide Circuit Breaker Decline Level Status message is used to report the calculated Level 1, Level 2 and Level 3 threshold values for the current trading day necessary to trigger a circuit breaker. Levels are reset each trading day based on the closing value of the S&P 500 Index. If Levels are set as a result of inaccurate activity, Levels will be reset and disseminated. The most recently disseminated Levels will be in effect for that trading day.

Note:

- MWCB levels are index values (not prices) and have implied 6 decimal places.
- The Market-Wide Circuit Breaker Decline Level Status Message will be disseminated by CQS on a daily trading day basis at approximately 7:00 am and at 8:00 am ET; and additional occurrences if necessary, e.g., due to erroneously set Levels.

| Field Name | Length | Type |
|---------------------|-----------|-------------|
| MWCB Level 1 | 8 | Signed Long |
| MWCB Level 2 | 8 | Signed Long |
| MWCB Level 3 | 8 | Signed Long |
| Reserved | 1 | TBD |
| Total Length | 25 | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

6.3.2 Market-Wide Circuit Breaker Status – Category M Type L

The Market-Wide Circuit Breaker Status message is used to report the Market-Wide Circuit Breaker threshold Level that has been breached. Each Level will be disseminated only once during the trading day, unless a Level is breached as a result of erroneous activity. The most recently disseminated breached Level will be in effect.

The duration of Market-Wide Circuit Breaker Level 1 and Level 2 Regulatory Trading Halts is fifteen minutes. Following Level 3 Market-Wide Circuit Breaker Regulatory Trading Halts, trading will be halted for the remainder of the trading day and carried over to the following trading day in a Regulatory Trading Halted state.

| Field Name | Length | Type |
|---|---------------|-------------|
| Market-Wide Circuit Breaker Level Indicator | 1 | Char |
| Reserved | 1 | TBD |
| Total Length | 2 | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

6.4 Quote Messages – Category Q

6.4.1 Auction Status – Category Q Type A

The Auction Status message is used when a Participant in a CTA eligible security, Local Issue or a Bond reports requires Auction Information. Primary Listing Markets using an automated reopening will calculate Auction Collars, in compliance with rules around prices for re-opening, when applicable and will publish the Auction Status message. The initial Auction Collar will be published after the LULD Trading Pause. The ‘Number of Extensions’ field will reflect when a new Auction Status message has been published. The first Auction Collar extension, at the time of the LULD Trading Pause, will be set to zero (0) indicating the first Auction Status message and will increment by one (1) for each new Auction Status message sent during the LULD Trading Pause event.

| Field Name | Length | Type |
|---------------------------------------|------------|------------|
| Security Symbol | 11 | Char [] |
| Instrument Type | 1 | Char |
| Auction Collar Reference Price | 8 | Long |
| Auction Collar Upper Threshold Price | 8 | Long |
| Auction Collar Lower Threshold Price | 8 | Long |
| Number of Extensions | 1 | Byte |
| Short Sale Restriction Indicator | 1 | Char |
| Primary Listing Market Participant ID | 1 | Char |
| Financial Status Indicator | 1 | Char |
| Reserved (for future use) | 62 | TBD |
| Total Length | 102 | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

6.4.2 Long Quote – Category Q Type L

The Long Quote message is used to report quote data for a CTA eligible Equity, Local Issue or Bonds. This message can also be used to report trading suspensions in a security, price indications and trading range indications. The Long Quote message is used by FINRA ADF only when either no FINRA BBO exists or there is no FINRA BBO change and will not be used to remove FINRA ADF from the NBBO. The Limit Up-Limit Down (LULD) Indicator is not applicable to FINRA ADF quotes.

| Field Name | Length | Type |
|---------------------------------------|-----------|-------------|
| Security Symbol | 11 | Char [] |
| Instrument Type | 1 | Char |
| Quote Condition | 1 | Char |
| Security Status Indicator | 1 | Char |
| Bid Price / Lower Limit Price Band | 8 | Long |
| Bid Size | 4 | Integer |
| Offer Price / Upper Limit Price Band | 8 | Long |
| Offer Size | 4 | Integer |
| Retail Interest Indicator | 1 | Char |
| Settlement Condition | 1 | Char |
| Market Condition | 1 | Char |
| FINRA Market Maker ID | 4 | Char [] |
| FINRA BBO Indicator | 1 | Char |
| Timestamp 2 | 8 | 2 x Integer |
| Short Sale Restriction Indicator | 1 | Char |
| Primary Listing Market Participant ID | 1 | Char |
| Financial Status Indicator | 1 | Char |
| SIP Generated Message Identifier | 1 | Char |
| Limit Up-Limit Down (LULD) Indicator | 1 | Char |
| National BBO LULD Indicator | 1 | Char |
| National BBO Indicator | 1 | Char |
| Total Length | 61 | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

6.4.3 Short Quote – Category Q Type Q

The Short Quote message is used to report Bid and Offer quote information for **CTA eligible Equity only** (not used for Local Issues or Bonds) if the quote meets all the criteria and message format requirements, otherwise Long Quote message is used.

| The Short Quote has the following criteria: | |
|---|---|
| 1. | Instrument Type is implied ‘CTA Eligible Equity’. |
| 2. | Quote Condition is implied ‘Regular’ quote condition. |
| 3. | Settlement Condition is implied regular way settlement. |
| 4. | Market Condition is implied normal auction market. |
| 5. | Quote is <u>not</u> from FINRA ADF. |

| Field Name | Length | Type |
|---------------------------------------|-----------|----------|
| Security Symbol | 5 | Char [] |
| Bid Price | 2 | Short |
| Bid Size | 2 | Short |
| Offer Price | 2 | Short |
| Offer Size | 2 | Short |
| Primary Listing Market Participant ID | 1 | Char |
| National BBO Indicator | 1 | Char |
| Total Length | 15 | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

6.4.4 Special Long Quote (FINRA ADF) with FINRA BBO Information – Category Q Type S

The Special Quote (FINRA ADF) with FINRA BBO Information message is used only by FINRA to report the FINRA Best Bid and FINRA Best Offer for their Market Makers for CTA eligible Equity, Local Issue or Bond information Makers inclusive of changes to any existing FINRA BBO. The FINRA Best Bid and FINRA Best Offer will be used in the National Best Bid and Best Offer (NBBO) calculation.

| Field Name | Length | Type |
|----------------------------------|--------|-------------|
| Security Symbol | 11 | Char [] |
| Instrument Type | 1 | Char |
| Quote Condition | 1 | Char |
| Security Status Indicator | 1 | Char |
| Bid Price | 8 | Long |
| Bid Size | 4 | Integer |
| Offer Price | 8 | Long |
| Offer Size | 4 | Integer |
| Retail Interest Indicator | 1 | Char |
| Settlement Condition | 1 | Char |
| Market Condition | 1 | Char |
| FINRA Market Maker ID | 4 | Char [] |
| FINRA Best Bid Quote Condition | 1 | Char |
| FINRA Best Bid Price | 8 | Long |
| FINRA Best Bid Size | 4 | Integer |
| FINRA Best Bid Market Maker ID | 4 | Char [] |
| FINRA Best Offer Quote Condition | 1 | Char |
| FINRA Best Offer Price | 8 | Long |
| FINRA Best Offer Size | 4 | Integer |
| FINRA Best Offer Market Maker ID | 4 | Char [] |
| Timestamp 2 | 8 | 2 x Integer |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

Special Long Quote (FINRA ADF) with FINRA BBO Information, *continued*

| Field Name | Length | Type |
|---------------------------------------|---------------|-------------|
| Short Sale Restriction Indicator | 1 | Char |
| Primary Listing Market Participant ID | 1 | Char |
| Financial Status Indicator | 1 | Char |
| SIP Generated Message Identifier | 1 | Char |
| FINRA BBO LULD Indicator | 1 | Char |
| National BBO LULD Indicator | 1 | Char |
| National BBO Indicator | 1 | Char |
| Total Length | 94 | |

6.4.5 National Best Bid Short Appendage and National Best Offer Short Appendage

The National Best Bid Short Appendage and/or National Best Offer Short Appendage is generated whenever a new quote has caused a new National Best Bid and/or new National Best Offer and the Best Bid and/or Best Offer data meets all criteria. If any of the criteria are **not** met, the National Best Bid Long Appendage and/or the National Best Offer Long Appendage format are used. If it is determined that a National Best Bid Short Appendage and/or National Best Offer Short Appendage is required, the appropriate Best Bid and Best Offer information is appended following either the Short Quote, Long Quote or Special Long Quote (FINRA ADF) with FINRA BBO Information message. In instances when both a National Best Bid Short Appendage and a National Best Offer Short Appendage are generated, the National Best Bid Short Appendage will be appended first followed by the National Best Offer Short Appendage.

| National Best Bid Short Appendage and National Best Offer Short Appendages have the following criteria: | |
|---|---|
| 1. | Quote Condition is implied 'Regular' for the Best Bid and Best Offer. |
| 2. | No FINRA Best Bid and/or FINRA Best Offer are involved in generating the National Best Bid and National Best Offer. |

National Best Bid Short Appendage:

| Field Name | Length | Type |
|-------------------------|----------|-------|
| Best Bid Participant ID | 1 | Char |
| Best Bid Price | 2 | Short |
| Best Bid Size | 2 | Short |
| Total Length | 5 | |

National Best Offer Short Appendage:

| Field Name | Length | Type |
|---------------------------|----------|-------|
| Best Offer Participant ID | 1 | Char |
| Best Offer Price | 2 | Short |
| Best Offer Size | 2 | Short |
| Total Length | 5 | |

Note: For a transitional period only, both the National Best Bid and Offer (NBBO) will be generated in Short or Long Appendages when a new quote results in a new National Best Bid or Best Offer.

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

6.4.6 National Best Bid Long Appendage and National Best Offer Long Appendage

The National Best Bid Long Appendage and/or National Best Offer Long Appendage are generated whenever a new quote has caused a new National Best Bid and/or new National Best Offer. If it is determined that a new National Best Bid Long Appendage and/or National Best Offer Long Appendage is required, the appropriate Best Bid and Best Offer information is appended following either the Short Quote, Long Quote or Special Long Quote (FINRA ADF) with FINRA BBO Information message. In instances when both a National Best Bid Long Appendage and a National Best Offer Long Appendage are generated, the National Best Bid Long Appendage will be appended first followed by the National Best Offer Long Appendage.

National Best Bid Long Appendage:

| Field Name | Length | Type |
|--------------------------------|-----------|----------|
| Best Bid Participant ID | 1 | Char |
| Best Bid Quote Condition | 1 | Char |
| Best Bid Price | 8 | Long |
| Best Bid Size | 4 | Integer |
| FINRA Best Bid Market Maker ID | 4 | Char [] |
| Total Length | 18 | |

National Best Offer Long Appendage:

| Field Name | Length | Type |
|----------------------------------|-----------|----------|
| Best Offer Participant ID | 1 | Char |
| Best Offer Quote Condition | 1 | Char |
| Best Offer Price | 8 | Long |
| Best Offer Size | 4 | Integer |
| FINRA Best Offer Market Maker ID | 4 | Char [] |
| Total Length | 18 | |

Note: For a transitional period only, both the National Best Bid and Offer (NBBO) will be generated in Short or Long Appendages when a new quote results in a new National Best Bid or Best Offer.

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

7.0 FIELD DESCRIPTIONS

| Field Name | Length | Description |
|--------------------------------------|---------------|---|
| Auction Collar Reference Price | 8 | Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero. The Auction Collar Reference Price represents the price used by the exchange to establish the Auction Collar. |
| Auction Collar Lower Threshold Price | 8 | Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero. Represents the latest lower threshold price of the Auction Collar. The lower threshold price of the Auction Collar is the lowest price of the auction collar, if any. |
| Auction Collar Upper Threshold Price | 8 | Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero. Represents the latest upper threshold price of the Auction Collar. The upper threshold price of the Auction Collar is the highest price of the auction collar, if any. |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|---------------------------|--------|--|
| Best Bid Participant ID | 1 | <p>Char. Space-filled.</p> <p>Identifies the Participant that submitted the Best Bid on a consolidated basis.</p> <p>Refer to Participant ID field description for Participant codes.</p> |
| Best Bid Price | 2 or 8 | <p>2 Short. Short have implied 2 decimal places and a maximum price of \$655.35.</p> <p>8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615.</p> <p>Short or Long Optional set to zero.</p> <p>Represents the Best Bid Price on a consolidated basis.</p> |
| Best Bid Quote Condition | 1 | <p>Char. Space-filled.</p> <p>Identifies the Quote Condition associated with the Best Bid Price on a consolidated basis.</p> |
| Best Bid Size | 2 or 4 | <p>2 Short. Short have a maximum size of 65,535</p> <p>4 Integer. Integer has a maximum size of 4,294,967,295</p> <p>Short or Integer Optional set to zero.</p> <p>Represents the Best Bid Size associated with the Best Bid Price on a consolidated basis.</p> <p>Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000, etc.). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are in 1, 10, 25 or 50 share round-lots.</p> |
| Best Offer Participant ID | 1 | <p>Char. Space-filled.</p> <p>Identifies the Participant that submitted the Best Offer on a consolidated basis.</p> <p>Refer to Participant ID field description for Participant codes.</p> |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|----------------------------|--------|--|
| Best Offer Price | 2 or 8 | <p>2 Short. Short have implied 2 decimal places and a maximum price of \$655.35.</p> <p>8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Short or Long Optional set to zero.</p> <p>Represents the Best Offer Price on a consolidated basis.</p> |
| Best Offer Quote Condition | 1 | <p>Char. Space-filled.</p> <p>Identifies the Quote Condition associated with the Best Offer Price on a consolidated basis.</p> |
| Best Offer Size | 2 or 4 | <p>2 Short. Short have a maximum size of 65,535</p> <p>4 Integer. Integer has a maximum size of 4,294,967,295 Short or Integer Optional set to zero.</p> <p>Represents the Best Offer Size associated with the Best Bid Price on a consolidated basis.</p> <p>The Best Offer Size in units of trade represents the number of round-lots associated with the Best Bid Price for a security on a Consolidated basis.</p> <p>Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are in 1, 10, 25 or 50 share round-lots.</p> |
| Bid Price | 2 or 8 | <p>2 Short. Short have implied 2 decimal places and a maximum price of \$655.35.</p> <p>8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Short or Long Optional set to zero.</p> <p>Represents the highest price a prospective buyer is prepared to pay at a particular time for a security.</p> <p>When the Bid Price and the Bid Size fields are set to zeroes, it represents a ‘No Bid’ quote, a ‘No Quote’ (i.e., neither a Bid nor an Offer, which zeroes out the quote) or Trading Halt condition. If the Bid Size is set to zero and there is a Bid Price, it represents either a Trading Range Indication or a Price Indication.</p> |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|------------------------------------|--------|--|
| Bid Price / Lower Limit Price Band | 8 | <p>Long. Implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615.</p> <p>Bid Price: represents the highest price a prospective buyer is prepared to pay at a particular time for a security.</p> <p>When the Bid Price and the Bid Size fields are set to zeroes, it represents a ‘No Bid’ quote, a ‘No Quote’ (i.e., neither a Bid nor an Offer, which zeroes out the quote) or Trading Halt condition. If the Bid Size is set to zero and there is a Bid Price, it represents either a Trading Range Indication or a Price Indication.</p> <p>Lower Limit Price Band: represents the lower price band value for a security.</p> <p>When the Security Status Indicator field code is ‘Limit Up-Limit Down Price Band’, the Lower Limit Price Band value will be contained in the Bid Price/Lower Limit Price Band fields.</p> <p>When the Lower Limit Price Band field is set to zero, it identifies that the previous Price Bands have been removed and are no longer effective for a security.</p> |
| Bid Size | 2 or 4 | <p>2 Short. Short have a maximum size of 65,535</p> <p>4 Integer. Integer has a maximum size of 4,294,967,295 Short or Integer Optional set to zero.</p> <p>The Bid Size identifies the number of round-lots, for a security.</p> <p>Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000, etc.). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are in 1, 10, 25 or 50 share round-lots.</p> <p>When the Bid Size field is all zeroes, it represents a ‘No Bid’ quote, a ‘No Quote’ (i.e., neither a Bid nor an Offer, which zeroes out the quote), a Trading Range Indication, or a Price Indication.</p> |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | | | | | | | | | | | | | |
|----------------------------|--|---|------|-------|-------|--|---|---------------------|---|------------------------------------|---|---|---|-------------|---|------------------------|---|--|---|--|---|--|---|--|---|--|
| Financial Status Indicator | 1 | <p>Char.</p> <p>Identifies the financial status of the security.</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">0</td><td>Financial Status Not Applicable</td></tr> <tr><td style="text-align: center;">1</td><td>Bankrupt</td></tr> <tr><td style="text-align: center;">2</td><td>Below Continuing Listing Standards</td></tr> <tr><td style="text-align: center;">3</td><td>Bankrupt & Below Continuing Listing Standards</td></tr> <tr><td style="text-align: center;">4</td><td>Late Filing</td></tr> <tr><td style="text-align: center;">5</td><td>Bankrupt & Late Filing</td></tr> <tr><td style="text-align: center;">6</td><td>Below Continuing Listing Standards & Late Filing</td></tr> <tr><td style="text-align: center;">7</td><td>Bankrupt, Below Continuing Listing Standards & Late Filing</td></tr> <tr><td style="text-align: center;">8</td><td>Creations Suspended (for Exchange Traded Products)</td></tr> <tr><td style="text-align: center;">9</td><td>Redemptions Suspended (for Exchange Traded Products)</td></tr> <tr><td style="text-align: center;">A</td><td>Liquidation (for Exchange Traded Products)</td></tr> </tbody> </table> | Code | Value | 0 | Financial Status Not Applicable | 1 | Bankrupt | 2 | Below Continuing Listing Standards | 3 | Bankrupt & Below Continuing Listing Standards | 4 | Late Filing | 5 | Bankrupt & Late Filing | 6 | Below Continuing Listing Standards & Late Filing | 7 | Bankrupt, Below Continuing Listing Standards & Late Filing | 8 | Creations Suspended (for Exchange Traded Products) | 9 | Redemptions Suspended (for Exchange Traded Products) | A | Liquidation (for Exchange Traded Products) |
| Code | Value | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | Financial Status Not Applicable | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | Bankrupt | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | Below Continuing Listing Standards | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | Bankrupt & Below Continuing Listing Standards | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | Late Filing | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | Bankrupt & Late Filing | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | Below Continuing Listing Standards & Late Filing | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | Bankrupt, Below Continuing Listing Standards & Late Filing | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | Creations Suspended (for Exchange Traded Products) | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | Redemptions Suspended (for Exchange Traded Products) | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | Liquidation (for Exchange Traded Products) | | | | | | | | | | | | | | | | | | | | | | | | | |
| FINRA BBO Indicator | 1 | <p>Char.</p> <p>For FINRA ADF, represents the FINRA BBO state of the FINRA ADF quote.</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr><td style="text-align: center;">Space</td><td>FINRA BBO Indicator Not Applicable (used by Participants other than FINRA ADF)</td></tr> <tr><td style="text-align: center;">A</td><td>No FINRA BBO Change</td></tr> <tr><td style="text-align: center;">B</td><td>No FINRA BBO Exists</td></tr> </tbody> </table> | Code | Value | Space | FINRA BBO Indicator Not Applicable (used by Participants other than FINRA ADF) | A | No FINRA BBO Change | B | No FINRA BBO Exists | | | | | | | | | | | | | | | | |
| Code | Value | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space | FINRA BBO Indicator Not Applicable (used by Participants other than FINRA ADF) | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | No FINRA BBO Change | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | No FINRA BBO Exists | | | | | | | | | | | | | | | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | |
|--------------------------------|---|--|------|-------|-------|------------------------------------|---|---|---|--|---|--|---|---|
| FINRA BBO LULD Indicator | 1 | <p>Char.</p> <p>Indicates the affect that the Limit Up-Limit Down Price Bands have on the FINRA Best Bid and FINRA Best Offer (FBBO).</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space</td> <td>Limit Up-Limit Down Not Applicable</td> </tr> <tr> <td style="text-align: center;">A</td> <td>FINRA Best Bid <u>and/or</u> FINRA Best Offer are Executable</td> </tr> <tr> <td style="text-align: center;">B</td> <td>FINRA Best Bid outside Price Band – FINRA Best Bid is Non-Executable</td> </tr> <tr> <td style="text-align: center;">C</td> <td>FINRA Best Offer outside Price Band – FINRA Best Offer is Non-Executable</td> </tr> <tr> <td style="text-align: center;">D</td> <td>FINRA Best Bid <u>and</u> FINRA Best Offer outside Price Band – FINRA Best Bid <u>and</u> FINRA Best Offer are Non-Executable</td> </tr> </tbody> </table> <p>Note 1: CQS will republish the FINRA Best Bid and FINRA Best Offer if existing FBBOs require adjustments as a result of Limit Up-Limit Down Price Band changes (e.g., an FBBO update to Executable from Non-Executable [or vice-versa]). Price Band messages will contain the <u>latest</u> National and modified FINRA BBO LULD Indicators.</p> | Code | Value | Space | Limit Up-Limit Down Not Applicable | A | FINRA Best Bid <u>and/or</u> FINRA Best Offer are Executable | B | FINRA Best Bid outside Price Band – FINRA Best Bid is Non-Executable | C | FINRA Best Offer outside Price Band – FINRA Best Offer is Non-Executable | D | FINRA Best Bid <u>and</u> FINRA Best Offer outside Price Band – FINRA Best Bid <u>and</u> FINRA Best Offer are Non-Executable |
| Code | Value | | | | | | | | | | | | | |
| Space | Limit Up-Limit Down Not Applicable | | | | | | | | | | | | | |
| A | FINRA Best Bid <u>and/or</u> FINRA Best Offer are Executable | | | | | | | | | | | | | |
| B | FINRA Best Bid outside Price Band – FINRA Best Bid is Non-Executable | | | | | | | | | | | | | |
| C | FINRA Best Offer outside Price Band – FINRA Best Offer is Non-Executable | | | | | | | | | | | | | |
| D | FINRA Best Bid <u>and</u> FINRA Best Offer outside Price Band – FINRA Best Bid <u>and</u> FINRA Best Offer are Non-Executable | | | | | | | | | | | | | |
| FINRA Best Bid Market Maker ID | 4 | <p>Char [4]. Left justified, space-filled.</p> <p>Contains the FINRA ADF provided FINRA Best Bid Market Maker identifier of the Market Maker that had the FINRA Best Bid (FBBO).</p> | | | | | | | | | | | | |
| FINRA Best Bid Price | 8 | <p>8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero.</p> <p>Contains the FINRA ADF provided FINRA Best Bid Price that is the FINRA Best Bid (FBBO).</p> | | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|----------------------------------|--------|--|
| FINRA Best Bid Quote Condition | 1 | Char. Space-filled. Contains the FINRA ADF provided FINRA Best Bid Quote Condition associated with the FINRA Best Bid Price that had the FINRA Best Bid (FBBO). |
| FINRA Best Bid Size | 4 | 4 Integer. Integer has a maximum size of 4,294,967,295 Optional set to zero. Contains the FINRA ADF provided FINRA Best Bid Size associated with the FINRA Best Bid Price that had the FINRA Best Bid (FBBO). Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000, etc.). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are in 1, 10, 25 or 50 share round-lots. |
| FINRA Best Offer Price | 8 | 8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Optional set to zero. Contains the FINRAADF provided Best FINRA Offer Price that is the FINRA Best Offer (FBBO). |
| FINRA Best Offer Size | 4 | Integer. Integer has a maximum size of 4,294,967,295 Optional set to zero. Contains the FINRA ADF provided FINRA Best Offer Size associated with the FINRA Best Offer Price that had the FINRA Best Offer (FBBO). Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000, etc.). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are in 1, 10, 25 or 50 share round-lots. |
| FINRA Best Offer Market Maker ID | 4 | Char [4]. Left justified, space-filled. Contains the FINRA ADF provided FINRA Best Offer Market Maker identifier of the Market Maker that had the FINRA Best Offer (FBBO). |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | |
|----------------------------------|---------------------|---|------|-------|---|---------------------|---|-------------|---|----------------|---|-----------------|
| FINRA Best Offer Quote Condition | 1 | <p>Char. Space-filled.</p> <p>Contains the FINRA ADF provided FINRA Best Offer Quote Condition associated with the Best FINRA Offer Price that had the FINRA Best Offer (FBBO).</p> | | | | | | | | | | |
| FINRA Market Maker ID (MMID) | 4 | <p>Char [4]. Left justified, space-filled.</p> <p>Contains the FINRA Market Maker ID of the quoting participant on FINRA's Alternative Display Facility (ADF) or the FINRA ADF Identifier 'FNRA'.</p> <p>Note: The FINRA ADF MMID 'FNRA' will be identified in CQS quote messages as follows:</p> <ul style="list-style-type: none"> ➤ Whenever CQS, on behalf of FINRA, generates closing quotes upon receiving FINRA Close (Category C Type C) message (<i>Reference Appendix E – Closing Routine</i>), quote messages will be generated containing the following characteristics: <ul style="list-style-type: none"> ▪ Participant ID 'D' in the Message Header ▪ Quote Condition 'L' – Market Maker Closed (FINRA) ▪ Zero-filled bid and/or offer prices and zero-filled bid and/or offer sizes ➤ Whenever CQS on behalf of FINRA ADF removes FINRA from the Best Bid and Best Offer, CQS will generate quote messages containing the following characteristics: <ul style="list-style-type: none"> ▪ Participant ID 'D' in the Message Header ▪ Quote Condition 'R' – Regular ▪ Zero-filled bid and/or offer prices and zero-filled bid and/or offer sizes <p>Note: When CQS is the originator of a quote message the SIP Generated Message Identifier field will be populated with 'S'.</p> | | | | | | | | | | |
| Instrument Type | 1 | <p>Char.</p> <p>Identifies the instrument type relevant to the quote.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">0</td> <td>CTA Eligible Equity</td> </tr> <tr> <td style="text-align: center;">1</td> <td>Local Issue</td> </tr> <tr> <td style="text-align: center;">2</td> <td>Corporate Bond</td> </tr> <tr> <td style="text-align: center;">3</td> <td>Government Bond</td> </tr> </tbody> </table> | Code | Value | 0 | CTA Eligible Equity | 1 | Local Issue | 2 | Corporate Bond | 3 | Government Bond |
| Code | Value | | | | | | | | | | | |
| 0 | CTA Eligible Equity | | | | | | | | | | | |
| 1 | Local Issue | | | | | | | | | | | |
| 2 | Corporate Bond | | | | | | | | | | | |
| 3 | Government Bond | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | |
|--------------------------------------|--|--|------|-------|-------|------------------------------------|---|--|---|--|
| Limit Up-Limit Down (LULD) Indicator | 1 | <p>Char.</p> <p>Indicates the affect the Quote has on the Limit Up-Limit Down Price Band range.</p> <p>An Offer Price that is below the Lower Limit Price Band, or a Bid Price that is above the Upper Limit Price Band is identified as follows:</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space</td> <td>Limit Up-Limit Down Not Applicable</td> </tr> <tr> <td style="text-align: center;">A</td> <td>Bid Price above Upper Limit Price Band – Bid is Non-Executable</td> </tr> <tr> <td style="text-align: center;">B</td> <td>Offer Price below Lower Limit Price Band Offer is Non-Executable</td> </tr> </tbody> </table> <p>Note 1: If a Bid or an Offer is marked as Non-Executable, it will not qualify for inclusion in the BBO calculations.</p> <p>Note 2: CQS will modify and republish a quote if existing Participant quotations require adjustments as a result of Limit Up-Limit Down Price Band changes, e.g., an update to a Bid/Offer Price to Executable from Non-Executable (or vice-versa). Price Band messages will contain the latest National and FINRA BBO LULD Indicators as well as the National and FINRA Best Bids and Best Offers.</p> <p>Note 3: CQS will be identified as the source of a republished Quote in the SIP Generated Message Identifier field, and the Message Header Participant ID field will identify the Participant that initiated the original Quote message.</p> <p>Note 4: Limit Up-Limit Down' is not applicable to Local Issues or Bonds.</p> | Code | Value | Space | Limit Up-Limit Down Not Applicable | A | Bid Price above Upper Limit Price Band – Bid is Non-Executable | B | Offer Price below Lower Limit Price Band Offer is Non-Executable |
| Code | Value | | | | | | | | | |
| Space | Limit Up-Limit Down Not Applicable | | | | | | | | | |
| A | Bid Price above Upper Limit Price Band – Bid is Non-Executable | | | | | | | | | |
| B | Offer Price below Lower Limit Price Band Offer is Non-Executable | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | |
|--|-----------------------|---|------|-------|-------|-----------------------|---|------------------|---|------------------|---|------------------|
| Market Condition | 1 | <p>Char.</p> <p>Identifies the market condition of a quote for a security. Crossed Market and Locked Market are only applicable to Government Bonds. In cases of a Normal Auction Market, the Bid Price must be less than the Offer Price. In cases of a Crossed Market, the Bid Price must be greater than the Offer Price. In cases of a Locked Market, the Bid Price must be equal to the Offer Price.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #e1f5fe;">Code</th> <th style="background-color: #e1f5fe;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space</td> <td style="text-align: center;">Normal Auction Market</td> </tr> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">Crossed Market</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">Locked Market</td> </tr> </tbody> </table> | Code | Value | Space | Normal Auction Market | A | Crossed Market | B | Locked Market | | |
| Code | Value | | | | | | | | | | | |
| Space | Normal Auction Market | | | | | | | | | | | |
| A | Crossed Market | | | | | | | | | | | |
| B | Locked Market | | | | | | | | | | | |
| Market-Wide Circuit Breaker (MWCB) Level Indicator | 1 | <p>Char.</p> <p>Identifies the threshold level that was breached.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #e1f5fe;">Code</th> <th style="background-color: #e1f5fe;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space</td> <td style="text-align: center;">MWCB Not Applicable</td> </tr> <tr> <td style="text-align: center;">1</td> <td style="text-align: center;">Level 1 Breached</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">Level 2 Breached</td> </tr> <tr> <td style="text-align: center;">3</td> <td style="text-align: center;">Level 3 Breached</td> </tr> </tbody> </table> | Code | Value | Space | MWCB Not Applicable | 1 | Level 1 Breached | 2 | Level 2 Breached | 3 | Level 3 Breached |
| Code | Value | | | | | | | | | | | |
| Space | MWCB Not Applicable | | | | | | | | | | | |
| 1 | Level 1 Breached | | | | | | | | | | | |
| 2 | Level 2 Breached | | | | | | | | | | | |
| 3 | Level 3 Breached | | | | | | | | | | | |
| MWCB Level 1 | 8 | <p>Signed Long. MWCB Level 1 value represents an <u>index value (i.e., not a price) and has implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807.</p> <p>Identifies the daily established drop level value (trigger value) associated with each Decline Level:</p> <ul style="list-style-type: none"> ▪ Level 1 = 7% of Previous Close S&P 500 Value | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|--------------|--------|---|
| MWCB Level 2 | 8 | <p>Signed Long. MWCB Level 2 value represents an <u>index value (i.e., not a price)</u> and has <u>implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807.</p> <p>Identifies the daily established drop level value (trigger value) associated with each Decline Level:</p> <ul style="list-style-type: none"> ▪ Level 2 = 13% of Previous Close S&P 500 Value |
| MWCB Level 3 | 8 | <p>Signed Long. MWCB Level 3 value represents an <u>index value (i.e., not a price)</u> and has <u>implied 6 decimal places</u> and a maximum value of -9,223,372,036,854.775808 to +9,223,372,036,854.775807.</p> <p>Identifies the daily established drop level value (trigger value) associated with each Decline Level:</p> <ul style="list-style-type: none"> ▪ Level 3 = 20% of Previous Close S&P 500 Value |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | | | | | | | |
|-------------------------------|---|--|------|-------|--------|--|---|--|----|--|----|---|----|---|----|---|----|---|---|---|
| National BBO Indicator (NBBO) | 1 | <p>Char.</p> <p>Indicates the affect the new quote has on the National BBO. If it is determined that a new National BBO appendage is required, the appropriate BBO information is appended following the Short Quote or Long Quote message. A National appendage is not present, if it is determined that the current quote is the new National BBO or does not affect the BBO.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space*</td> <td>Indicates that the new quote did not meet the BBO requirements. This quote is not included in the BBO.</td> </tr> <tr> <td style="text-align: center;">A</td> <td>No Best Bid change, No Best Offer change New quote does not affect the Best Bid or Best Offer. No appendage is required.</td> </tr> <tr> <td style="text-align: center;">B*</td> <td>No Best Bid change, Quote contains Best Offer New quote does not affect the Best Bid, but is the Best Offer. No appendage is required.</td> </tr> <tr> <td style="text-align: center;">C*</td> <td>No Best Bid Change, Best Offer Short Appendage New quote does not affect the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Short Appendage.</td> </tr> <tr> <td style="text-align: center;">D*</td> <td>No Best Bid Change, Best Offer Long Appendage New quote does not affect the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Long Appendage.</td> </tr> <tr> <td style="text-align: center;">E*</td> <td>No Best Bid Change, No Best Offer New quote does not affect the Best Bid, and there is no Best Offer. No appendage is required.</td> </tr> <tr> <td style="text-align: center;">F*</td> <td>Quote contains Best Bid, No Best Offer Change New quote is itself the Best Bid, but does not affect the Best Offer. No appendage is required.</td> </tr> <tr> <td style="text-align: center;">G</td> <td>Quote contains Best Bid, Quote contains Best Offer New quote is itself the Best Bid and Best Offer. No appendage is required.</td> </tr> </tbody> </table> <p>*Indicator Codes to be used in the future</p> | Code | Value | Space* | Indicates that the new quote did not meet the BBO requirements. This quote is not included in the BBO. | A | No Best Bid change, No Best Offer change New quote does not affect the Best Bid or Best Offer. No appendage is required. | B* | No Best Bid change, Quote contains Best Offer New quote does not affect the Best Bid, but is the Best Offer. No appendage is required. | C* | No Best Bid Change, Best Offer Short Appendage New quote does not affect the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Short Appendage. | D* | No Best Bid Change, Best Offer Long Appendage New quote does not affect the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Long Appendage. | E* | No Best Bid Change, No Best Offer New quote does not affect the Best Bid, and there is no Best Offer. No appendage is required. | F* | Quote contains Best Bid, No Best Offer Change New quote is itself the Best Bid, but does not affect the Best Offer. No appendage is required. | G | Quote contains Best Bid, Quote contains Best Offer New quote is itself the Best Bid and Best Offer. No appendage is required. |
| Code | Value | | | | | | | | | | | | | | | | | | | |
| Space* | Indicates that the new quote did not meet the BBO requirements. This quote is not included in the BBO. | | | | | | | | | | | | | | | | | | | |
| A | No Best Bid change, No Best Offer change New quote does not affect the Best Bid or Best Offer. No appendage is required. | | | | | | | | | | | | | | | | | | | |
| B* | No Best Bid change, Quote contains Best Offer New quote does not affect the Best Bid, but is the Best Offer. No appendage is required. | | | | | | | | | | | | | | | | | | | |
| C* | No Best Bid Change, Best Offer Short Appendage New quote does not affect the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Short Appendage. | | | | | | | | | | | | | | | | | | | |
| D* | No Best Bid Change, Best Offer Long Appendage New quote does not affect the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Long Appendage. | | | | | | | | | | | | | | | | | | | |
| E* | No Best Bid Change, No Best Offer New quote does not affect the Best Bid, and there is no Best Offer. No appendage is required. | | | | | | | | | | | | | | | | | | | |
| F* | Quote contains Best Bid, No Best Offer Change New quote is itself the Best Bid, but does not affect the Best Offer. No appendage is required. | | | | | | | | | | | | | | | | | | | |
| G | Quote contains Best Bid, Quote contains Best Offer New quote is itself the Best Bid and Best Offer. No appendage is required. | | | | | | | | | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | |
|---|--------|-------------|--|
| National BBO Indicator (NBBO) <i>continued</i> | 1 | Char. | |
| | | Code | Value |
| | | H* | Quote contains Best Bid, Best Offer Short Appendage New quote is itself the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Short Appendage. |
| | | I* | Quote contains Best Bid, Best Offer Long Appendage New quote is itself the Best Bid, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Long Appendage. |
| | | J* | Quote contains Best Bid, No Best Offer New quote is itself the Best Bid, and there is no Best Offer. No appendage is required. |
| | | K* | No Best Bid, No Best Offer Change There is no Best Bid, and the quote does not affect the Best Offer. No appendage is required. |
| | | L* | No Best Bid, Quote contains Best Offer There is no Best Bid, and the quote is itself the Best Offer. No appendage is required. |
| | | M* | No Best Bid, Best Offer Short Appendage There is no Best Bid, a new Best Offer is generated and the new Best Offer is contained in the Best Offer Short Appendage. |
| | | N* | No Best Bid, Best Offer Long Appendage There is no Best Bid, a new Best Offer is generated and the new Best Offer is contained in the Best Offer Long Appendage. |
| | | O | No Best Bid, No Best Offer There is no Best Bid, and no Best Offer. No appendage is required. |
| *Indicator Codes to be used in the future | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | |
|---|--------|-------------|--|
| National BBO Indicator (NBBO) <i>continued</i> | 1 | Char. | |
| | | Code | Value |
| | | P* | Best Bid Short Appendage, No Best Offer Change A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Short Appendage, but the quote does not affect the Best Offer. |
| | | Q* | Best Bid Long Appendage, No Best Offer Change A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Long Appendage, but the quote does not affect the Best Offer. |
| | | R* | Best Bid Short Appendage, Quote contains Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Short Appendage, and the quote is the Best Offer. |
| | | S* | Best Bid Long Appendage, Quote contains Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Long Appendage, and the quote is the Best Offer. |
| | | T* | Best Bid Short Appendage, Best Offer Short Appendage A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Short Appendage, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Short Appendage. |
| | | U | Best Bid Long Appendage, Best Offer Long Appendage A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Long Appendage, a new Best Offer is generated and the new Best Offer information is contained in the Best Offer Long Appendage. |
| *Indicator Codes to be used in the future | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | |
|---|--|---|------|-------|----|--|----|--|
| National BBO Indicator (NBBO) <i>continued</i> | 1 | Char. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">V*</td> <td> Best Bid Short Appendage, No Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Short Appendage, and there is no Best Offer. </td> </tr> <tr> <td style="text-align: center;">W*</td> <td> Best Bid Long Appendage, No Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Long Appendage, and there is no Best Offer. </td> </tr> </tbody> </table> <p>*Indicator Codes to be used in the future</p> | Code | Value | V* | Best Bid Short Appendage, No Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Short Appendage, and there is no Best Offer. | W* | Best Bid Long Appendage, No Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Long Appendage, and there is no Best Offer. |
| Code | Value | | | | | | | |
| V* | Best Bid Short Appendage, No Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Short Appendage, and there is no Best Offer. | | | | | | | |
| W* | Best Bid Long Appendage, No Best Offer A new Best Bid is generated and the new Best Bid information is contained in the Best Bid Long Appendage, and there is no Best Offer. | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | | | | | | | | | | | |
|-----------------------------|---|--|------|-------|-------|------------------------------------|---|--|---|--|---|--|---|--|---|---|---|---|---|---|---|---|---|--|
| National BBO LULD Indicator | 1 | <p>Char.</p> <p>Indicates the affect that the Limit Up-Limit Down Price Band changes have on the National Best Bid and National Best Offer.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td>Space</td> <td>Limit Up-Limit Down Not Applicable</td> </tr> <tr> <td style="text-align: center;">A</td> <td>National Best Bid and / or National Best Offer are Executable</td> </tr> <tr> <td style="text-align: center;">B</td> <td>National Best Bid below Lower Limit Price Band – National Best Bid is Non-Executable</td> </tr> <tr> <td style="text-align: center;">C</td> <td>National Best Offer above Upper Limit Price Band – National Best Offer is Non-Executable</td> </tr> <tr> <td style="text-align: center;">D</td> <td>National Best Bid below Lower Limit Price Band and National Best Offer above Upper Limit Price Band – National Best Bid and National Best Offer are Non-Executable</td> </tr> <tr> <td style="text-align: center;">E</td> <td>National Best Bid equals Upper Limit Price Band – National Best Bid is in Limit State</td> </tr> <tr> <td style="text-align: center;">F</td> <td>National Best Offer equals Lower Limit Price Band – National Best Offer is in Limit State</td> </tr> <tr> <td style="text-align: center;">G</td> <td>National Best Bid equals Upper Limit Price Band – National Best Bid is in Limit State and National Best Offer above Upper Limit Price Band – National Best Offer is Non-Executable</td> </tr> <tr> <td style="text-align: center;">H</td> <td>National Best Bid below Lower Limit Price Band – National Best Bid is Non-Executable and National Best Offer equals Lower Limit Price Band – National Best Offer is in Limit State</td> </tr> <tr> <td style="text-align: center;">I</td> <td>National Best Bid equals Upper Limit Price Band and National Best Offer equals Lower Limit Price Band (Crossed - <u>NOT</u> in Limit State)</td> </tr> </tbody> </table> | Code | Value | Space | Limit Up-Limit Down Not Applicable | A | National Best Bid and / or National Best Offer are Executable | B | National Best Bid below Lower Limit Price Band – National Best Bid is Non-Executable | C | National Best Offer above Upper Limit Price Band – National Best Offer is Non-Executable | D | National Best Bid below Lower Limit Price Band and National Best Offer above Upper Limit Price Band – National Best Bid and National Best Offer are Non-Executable | E | National Best Bid equals Upper Limit Price Band – National Best Bid is in Limit State | F | National Best Offer equals Lower Limit Price Band – National Best Offer is in Limit State | G | National Best Bid equals Upper Limit Price Band – National Best Bid is in Limit State and National Best Offer above Upper Limit Price Band – National Best Offer is Non-Executable | H | National Best Bid below Lower Limit Price Band – National Best Bid is Non-Executable and National Best Offer equals Lower Limit Price Band – National Best Offer is in Limit State | I | National Best Bid equals Upper Limit Price Band and National Best Offer equals Lower Limit Price Band (Crossed - <u>NOT</u> in Limit State) |
| Code | Value | | | | | | | | | | | | | | | | | | | | | | | |
| Space | Limit Up-Limit Down Not Applicable | | | | | | | | | | | | | | | | | | | | | | | |
| A | National Best Bid and / or National Best Offer are Executable | | | | | | | | | | | | | | | | | | | | | | | |
| B | National Best Bid below Lower Limit Price Band – National Best Bid is Non-Executable | | | | | | | | | | | | | | | | | | | | | | | |
| C | National Best Offer above Upper Limit Price Band – National Best Offer is Non-Executable | | | | | | | | | | | | | | | | | | | | | | | |
| D | National Best Bid below Lower Limit Price Band and National Best Offer above Upper Limit Price Band – National Best Bid and National Best Offer are Non-Executable | | | | | | | | | | | | | | | | | | | | | | | |
| E | National Best Bid equals Upper Limit Price Band – National Best Bid is in Limit State | | | | | | | | | | | | | | | | | | | | | | | |
| F | National Best Offer equals Lower Limit Price Band – National Best Offer is in Limit State | | | | | | | | | | | | | | | | | | | | | | | |
| G | National Best Bid equals Upper Limit Price Band – National Best Bid is in Limit State and National Best Offer above Upper Limit Price Band – National Best Offer is Non-Executable | | | | | | | | | | | | | | | | | | | | | | | |
| H | National Best Bid below Lower Limit Price Band – National Best Bid is Non-Executable and National Best Offer equals Lower Limit Price Band – National Best Offer is in Limit State | | | | | | | | | | | | | | | | | | | | | | | |
| I | National Best Bid equals Upper Limit Price Band and National Best Offer equals Lower Limit Price Band (Crossed - <u>NOT</u> in Limit State) | | | | | | | | | | | | | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|--|--------|--|
| National BBO LULD Indicator, <i>continued</i> | 1 | <p>Note 1: CQS will modify and republish an NBBO if existing NBBO's require adjustments as a result of Limit Up-Limit Down Price Band changes (e.g., an update to an NBBO to Executable from Non-Executable (or vice-versa). Price Band messages will contain the latest National and FINRA BBO LULD Indicators as well as the National Best Bids and Best Offers.</p> <p>Note 2: CQS will be identified as the source of a republished NBBO in the SIP Generated Message Identifier field, and the Message Header Participant ID field will identify the Participant that initiated the original Quote message.</p> <p>Note 3: CQS will populate the 'National BBO LULD Indicator' field with a 'Space' as follows:</p> <ul style="list-style-type: none"> (a) Prior to regular trading hours and after regular trading hours. (b) When the current quote does not affect the NBBO (e.g., BBO non-qualifying quote conditions such as Non-Firm quotes). (c) When Price Bands are not in effect (e.g., Price Bands with zero values prevailing). (d) Until the Price Band for a symbol is published. (e) If no eligible quotes have taken place. |
| Number of Extensions | 1 | <p>Byte. Optional set to zero.</p> <p>Identifies the number of manual or automatic extensions the applicable auction has received. The first Auction Collar extension, at the time of the LULD Trading Pause, will be set to zero (0) indicating the first Auction Status message and will increment by one (1) for each new Auction Status message sent during the LULD Trading Pause event.</p> |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|--------------------------------------|--------|---|
| Offer Price | 2 or 8 | <p>2 Short. Short have implied 2 decimal places and a maximum price of \$655.35.</p> <p>8 Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615. Short or Long Optional set to zero.</p> <p>Represents the lowest price acceptable to a prospective seller at a particular time for a security.</p> <p>When the Offer Price and the Offer Size fields are all set to zeroes, this represents a ‘No Offer’ quote, a ‘No Quote’ (i.e., neither a Bid nor an Offer, which zeroes out the quote) or Trading Halt condition. If the Offer Size is set to zero and there is an Offer Price, it represents either a Trading Range Indication or a Price Indication.</p> |
| Offer Price / Upper Limit Price Band | 8 | <p>Long. Long have implied 6 decimal places and a maximum price of \$18,446,744,073,709.551615.</p> <p>Offer Long Price: represents the lowest price acceptable to a prospective seller at a particular time for a security.</p> <p>When the Offer Price and the Offer Size fields are all set to zeroes, this represents a ‘No Offer’ quote, a ‘No Quote’ (i.e., neither a Bid nor an Offer, which zeroes out the quote) or Trading Halt condition. If the Offer Size is set to zero and there is an Offer Price, it represents either a Trading Range Indication or a Price Indication.</p> <p>Upper Limit Price Band: represents the upper price band value for a security.</p> <p>When the Security Status Indicator field code is ‘Limit Up-Limit Down Price Bands, the Upper Limit Price Band value will be contained in the Offer Price/Upper Limit Price Band field.</p> <p>When the Upper Limit Price Band field is set to zero, it identifies that the previous Price Bands have been removed and are no longer effective.</p> |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---------------------------------------|---|---|------|-------|-------|---|---|---------------|---|---------------|---|---------------|---|-----------|---|------------|---|-----|---|-----------|---|-----------|---|------|---|--------------|---|------|---|-----------|---|--------|---|------------------|---|-----|---|------|---|----------------|---|----------|---|----------|
| Offer Size | 2 or 4 | <p>2 Short. Short have a maximum size of 65,535</p> <p>4 Integer. Integer has a maximum size of 4,294,967,295 Short or Integer Optional set to zero.</p> <p>The Offer Size identifies the number of round-lots, for a security.</p> <p>Primarily, a unit of trade or round-lot consists of 100 shares or multiples thereof (e.g., 200, 1000, 5000, etc.). Certain securities trade in round-lot multiples other than 100 shares; other units of trade are in 1, 10, 25 or 50 share round-lots.</p> <p>If the Offer Size is set to zero and there is an Offer Price, it represents either a Trading Range Indication or a Price Indication.</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Primary Listing Market Participant ID | 1 | <p>Char.</p> <p>Identifies the Primary Listing Market for a security.</p> <table border="1" style="margin-left: 40px;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td>Space</td> <td>Primary Listing Market Participant ID Not Applicable</td> </tr> <tr> <td>A</td> <td>NYSE American</td> </tr> <tr> <td>B</td> <td>NASDAQ OMX BX</td> </tr> <tr> <td>C</td> <td>NYSE National</td> </tr> <tr> <td>D</td> <td>FINRA ADF</td> </tr> <tr> <td>H</td> <td>MIAX Pearl</td> </tr> <tr> <td>I</td> <td>ISE</td> </tr> <tr> <td>J</td> <td>Cboe EDGA</td> </tr> <tr> <td>K</td> <td>Cboe EDGX</td> </tr> <tr> <td>L</td> <td>LTSE</td> </tr> <tr> <td>M</td> <td>NYSE Chicago</td> </tr> <tr> <td>N</td> <td>NYSE</td> </tr> <tr> <td>P</td> <td>NYSE Arca</td> </tr> <tr> <td>T</td> <td>NASDAQ</td> </tr> <tr> <td>U</td> <td>Members Exchange</td> </tr> <tr> <td>V</td> <td>IEX</td> </tr> <tr> <td>W</td> <td>CBSX</td> </tr> <tr> <td>X</td> <td>NASDAQ OMX PSX</td> </tr> <tr> <td>Y</td> <td>Cboe BYX</td> </tr> <tr> <td>Z</td> <td>Cboe BZX</td> </tr> </tbody> </table> | Code | Value | Space | Primary Listing Market Participant ID Not Applicable | A | NYSE American | B | NASDAQ OMX BX | C | NYSE National | D | FINRA ADF | H | MIAX Pearl | I | ISE | J | Cboe EDGA | K | Cboe EDGX | L | LTSE | M | NYSE Chicago | N | NYSE | P | NYSE Arca | T | NASDAQ | U | Members Exchange | V | IEX | W | CBSX | X | NASDAQ OMX PSX | Y | Cboe BYX | Z | Cboe BZX |
| Code | Value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space | Primary Listing Market Participant ID Not Applicable | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | NYSE American | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | NASDAQ OMX BX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | NYSE National | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D | FINRA ADF | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | MIAX Pearl | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| I | ISE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| J | Cboe EDGA | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| K | Cboe EDGX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L | LTSE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| M | NYSE Chicago | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | NYSE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| P | NYSE Arca | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| T | NASDAQ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U | Members Exchange | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| V | IEX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | CBSX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| X | NASDAQ OMX PSX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Y | Cboe BYX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Z | Cboe BZX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------------|--|--|------|-------|-------|--|---|--|---|--|---|-----------------------------------|---|---|---|---|---|---|---|---|---|--|---|-------------------------------------|---|--|---|---|---|---|---|---|
| Quote Condition | 1 | <p>Char.</p> <p>Denotes a particular condition applicable to the quote. The Quote Condition is used to determine whether a quote qualifies for the Best Bid and Best Offer calculation. When the Quote Condition field is not provided, the Security Status Indicator field will be provided.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space</td> <td>Quote Condition Not Applicable When Quote Condition is space filled, the Security Status Indicator field must contain a value other than space.</td> </tr> <tr> <td style="text-align: center;">A</td> <td>Slow Quote on Offer Side (Eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">B</td> <td>Slow Quote on Bid Side (Eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">C</td> <td>Closing (Not eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">E</td> <td>Slow Quote Due to LRP or Gap Quote on the Bid Side (ONLY OFFER SIDE is eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">F</td> <td>Slow Quote Due to LRP or Gap Quote on the Offer Side (ONLY BID SIDE is eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">H</td> <td>Slow Quote on the Bid and Offer Sides (Eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">L</td> <td>Closed Market Maker (FINRA) (Not eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">N</td> <td>Non-Firm Quote (Not eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">O</td> <td>Opening Quote (Eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">R</td> <td>Regular (FINRA Open) (Eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">U</td> <td>Slow Quote Due to Liquidity Replenishment Point (LRP), or Gap Quote on Both the Bid and Offer Sides (Not eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">W</td> <td>Slow Quote Due to Set Slow List on Both the Bid and Offer Sides (Eligible for BBO)</td> </tr> <tr> <td style="text-align: center;">4</td> <td>On Demand Intra-Day Auction (Not eligible for BBO)</td> </tr> </tbody> </table> | Code | Value | Space | Quote Condition Not Applicable When Quote Condition is space filled, the Security Status Indicator field must contain a value other than space. | A | Slow Quote on Offer Side (Eligible for BBO) | B | Slow Quote on Bid Side (Eligible for BBO) | C | Closing (Not eligible for BBO) | E | Slow Quote Due to LRP or Gap Quote on the Bid Side (ONLY OFFER SIDE is eligible for BBO) | F | Slow Quote Due to LRP or Gap Quote on the Offer Side (ONLY BID SIDE is eligible for BBO) | H | Slow Quote on the Bid and Offer Sides (Eligible for BBO) | L | Closed Market Maker (FINRA) (Not eligible for BBO) | N | Non-Firm Quote (Not eligible for BBO) | O | Opening Quote (Eligible for BBO) | R | Regular (FINRA Open) (Eligible for BBO) | U | Slow Quote Due to Liquidity Replenishment Point (LRP), or Gap Quote on Both the Bid and Offer Sides (Not eligible for BBO) | W | Slow Quote Due to Set Slow List on Both the Bid and Offer Sides (Eligible for BBO) | 4 | On Demand Intra-Day Auction (Not eligible for BBO) |
| Code | Value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Space | Quote Condition Not Applicable When Quote Condition is space filled, the Security Status Indicator field must contain a value other than space. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| A | Slow Quote on Offer Side (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B | Slow Quote on Bid Side (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| C | Closing (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| E | Slow Quote Due to LRP or Gap Quote on the Bid Side (ONLY OFFER SIDE is eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| F | Slow Quote Due to LRP or Gap Quote on the Offer Side (ONLY BID SIDE is eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| H | Slow Quote on the Bid and Offer Sides (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| L | Closed Market Maker (FINRA) (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| N | Non-Firm Quote (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| O | Opening Quote (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| R | Regular (FINRA Open) (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| U | Slow Quote Due to Liquidity Replenishment Point (LRP), or Gap Quote on Both the Bid and Offer Sides (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W | Slow Quote Due to Set Slow List on Both the Bid and Offer Sides (Eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | On Demand Intra-Day Auction (Not eligible for BBO) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | |
|--------------------------------------|--|--|------|-------|-------|--|---|------------------------------|---|--------------------------------|---|--|
| Quote Condition, <i>continued</i> | | Note: If a BBO qualifying Bid or Offer is marked as Non-Executable in the 'Limit Up-Limit Down (LULD) Indicator' field, the Non-Executable Bid or Offer side will <u>not qualify</u> for inclusion in the BBO calculations. | | | | | | | | | | |
| Reserved | 1 | Space-filled. Field is reserved for future use. | | | | | | | | | | |
| Retail Interest Indicator | 1 | <p>Char.</p> <p>When Retail Price Improvement (RPI) interest is priced better than the Protected Best Bid or Offer (PBBO) by a minimum of \$0.001, an indication of interest on the Bid, Offer, or both the Bid and Offer will identify that interest will be eligible to interact with incoming Retail Order interest.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space</td> <td>Retail Interest Indicator Not Applicable</td> </tr> <tr> <td style="text-align: center;">A</td> <td>Retail Interest on Bid Quote</td> </tr> <tr> <td style="text-align: center;">B</td> <td>Retail Interest on Offer Quote</td> </tr> <tr> <td style="text-align: center;">C</td> <td>Retail Interest on both the Bid and Offer Quotes</td> </tr> </tbody> </table> | Code | Value | Space | Retail Interest Indicator Not Applicable | A | Retail Interest on Bid Quote | B | Retail Interest on Offer Quote | C | Retail Interest on both the Bid and Offer Quotes |
| Code | Value | | | | | | | | | | | |
| Space | Retail Interest Indicator Not Applicable | | | | | | | | | | | |
| A | Retail Interest on Bid Quote | | | | | | | | | | | |
| B | Retail Interest on Offer Quote | | | | | | | | | | | |
| C | Retail Interest on both the Bid and Offer Quotes | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | |
|--|---|---|--|-------------------|-----------------------|
| Security Status Indicator | 1 | Char. | | | |
| | | The Security Status Indicator field is used to report trading suspensions in a security, price indications, trading range indications, LULD Price Bands and Market Wide Circuit Breaker activity. When the Security Status Indicator is provided, the Quote Condition field must be space filled. | | | |
| | | | | | |
| | | Code | Value | Regulatory | Non Regulatory |
| | | Space | Security Status Indicator Not Applicable When Security Status Indicator is space filled, the Quote Condition field must contain a value other than space. | | |
| | | A | Additional Information Requested* | X | |
| | | C | Regulatory Concern* | X | |
| | | D | News Released (formerly News Dissemination) | X | |
| | | E | Merger Effective* | X | |
| | | F | ETF Component Prices Not Available* | X | |
| | | G | Trading Range Indication | | |
| | | I | Order Imbalance | | X |
| | | M | Limit-Up-Limit Down (LULD) Trading Pause | X | |
| | | N | Corporate Action* | X | |
| | | O | New Security Offering* | X | |
| | | P | News Pending | X | |
| | | V | Intraday Indicative Value Not Available* | X | |
| | | T | Resume** | | |
| | | X | Operational | | X |
| | | Y | Sup-Penny Trading | | X |
| Z | Reserved *** | | | | |
| 0 | Limit Up-Limit Down (LULD) Price Band | | | | |
| 1 | Market-Wide Circuit Breaker Level 1 – Breached | X | | | |
| 2 | Market-Wide Circuit Breaker Level 2 – Breached | X | | | |
| 3 | Market-Wide Circuit Breaker Level 3 – Breached | X | | | |
| 9 | Republished Limit Up-Limit Down (LULD) Price Band | | | | |
| * Future use (Halt Reason Code currently not active) | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

| | | |
|--|--|---|
| | | <p>** Used to indicate that trading for a Participant is no longer suspended in a security which had been Trading Halted.</p> <p>*** Indicator Code currently not in use</p> <p>Note: If the Security Status Indicator is populated with either a regulatory or a non-regulatory status, it will result in the NBBO being recalculated excluding the Participant from the NBBO if that Participant was part or all of the NBBO.</p> |
|--|--|---|

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------|--------------|--|------------------|-------------|------|-----|-----|-------|-------|-------|--------------|---------------|-----|-------|--------------|-----------|-----|-----|-----|-----|-------|--------------|----------|------|-------|------|--------------|-----|-------|-------|-------|--------------|
| Security Symbol | 5 or 11 | <p>Char [5] or [11]. Left justified, space-filled.</p> <p>Contains the security symbol. Suffixes start with one of the following characters with no embedded spaces: (1) ASCII Period (.), (2) lower case p, (3) lower case r, or (4) lower case w.</p> <p>Note: CQS will allow for a base or root symbol to consist of from one (1) up to six (6) characters with the remaining characters in the security symbol field available for possible suffixes.</p> <p>Identification of Test Data: The purpose of a Test Message is to have a mechanism whereby end-to-end connectivity and functionality between the CQS Participant and Data Recipient can be tested prior to the opening or during normal operational hours.</p> <p>Messages with any of the dedicated test symbols will be included in Participant statistics (e.g., National BBO calculations), but will be excluded in quote counts, etc.</p> <p>Alphanumeric Test Symbols are reserved for future use.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #ADD8E6;">Listing Exchange</th> <th style="background-color: #ADD8E6;">Test Symbol</th> </tr> </thead> <tbody> <tr><td rowspan="6">NYSE</td><td>CBO</td></tr> <tr><td>CBX</td></tr> <tr><td>CTEST</td></tr> <tr><td>MTEST</td></tr> <tr><td>NTEST</td></tr> <tr><td>01N thru 12N</td></tr> <tr><td rowspan="3">NYSE American</td><td>IBO</td></tr> <tr><td>ATEST</td></tr> <tr><td>01A thru 12A</td></tr> <tr><td rowspan="6">NYSE Arca</td><td>IGZ</td></tr> <tr><td>ZVV</td></tr> <tr><td>ZZK</td></tr> <tr><td>ZZZ</td></tr> <tr><td>PTEST</td></tr> <tr><td>01P thru 12P</td></tr> <tr><td rowspan="4">Cboe BZX</td><td>ZBZX</td></tr> <tr><td>ZTEST</td></tr> <tr><td>ZTST</td></tr> <tr><td>01Z thru 12Z</td></tr> <tr><td rowspan="4">IEX</td><td>ZIEXT</td></tr> <tr><td>ZEXIT</td></tr> <tr><td>ZXIET</td></tr> <tr><td>01V thru 12V</td></tr> </tbody> </table> | Listing Exchange | Test Symbol | NYSE | CBO | CBX | CTEST | MTEST | NTEST | 01N thru 12N | NYSE American | IBO | ATEST | 01A thru 12A | NYSE Arca | IGZ | ZVV | ZZK | ZZZ | PTEST | 01P thru 12P | Cboe BZX | ZBZX | ZTEST | ZTST | 01Z thru 12Z | IEX | ZIEXT | ZEXIT | ZXIET | 01V thru 12V |
| Listing Exchange | Test Symbol | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NYSE | CBO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | CBX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | CTEST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | MTEST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | NTEST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 01N thru 12N | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NYSE American | IBO | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ATEST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 01A thru 12A | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| NYSE Arca | IGZ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ZVV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ZZK | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ZZZ | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | PTEST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 01P thru 12P | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cboe BZX | ZBZX | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ZTEST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ZTST | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 01Z thru 12Z | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IEX | ZIEXT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ZEXIT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | ZXIET | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 01V thru 12V | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | | | | | | | |
|----------------------------------|--------------------------------------|--|------|-------|-------|--------------------------------------|---|----------------------------------|---|----------------------------------|---|------------------------------------|---|----------------------------------|
| Settlement Condition | 1 | <p>Char. Identifies the settlement condition for a security.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space</td> <td style="text-align: center;">Regular Way Settlement</td> </tr> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">Cash (only) Settlement</td> </tr> <tr> <td style="text-align: center;">B</td> <td style="text-align: center;">Next Day (only) Settlement</td> </tr> </tbody> </table> | Code | Value | Space | Regular Way Settlement | A | Cash (only) Settlement | B | Next Day (only) Settlement | | | | |
| Code | Value | | | | | | | | | | | | | |
| Space | Regular Way Settlement | | | | | | | | | | | | | |
| A | Cash (only) Settlement | | | | | | | | | | | | | |
| B | Next Day (only) Settlement | | | | | | | | | | | | | |
| Short Sale Restriction Indicator | 1 | <p>Char. Identifies whether or not a Short Sale Restriction is in effect. A Short Sale Restriction is to be in effect if a security's price decreases by 10% or more from the previous day's closing price. Once activated, the Short Sale Restriction will remain in effect for the remainder of the day as well as the following day, unless deactivated.</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="background-color: #ADD8E6;">Code</th> <th style="background-color: #ADD8E6;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space</td> <td style="text-align: center;">Short Sale Restriction Not in Effect</td> </tr> <tr> <td style="text-align: center;">A</td> <td style="text-align: center;">Short Sale Restriction Activated</td> </tr> <tr> <td style="text-align: center;">C</td> <td style="text-align: center;">Short Sale Restriction Continued</td> </tr> <tr> <td style="text-align: center;">D</td> <td style="text-align: center;">Short Sale Restriction Deactivated</td> </tr> <tr> <td style="text-align: center;">E</td> <td style="text-align: center;">Short Sale Restriction in Effect</td> </tr> </tbody> </table> | Code | Value | Space | Short Sale Restriction Not in Effect | A | Short Sale Restriction Activated | C | Short Sale Restriction Continued | D | Short Sale Restriction Deactivated | E | Short Sale Restriction in Effect |
| Code | Value | | | | | | | | | | | | | |
| Space | Short Sale Restriction Not in Effect | | | | | | | | | | | | | |
| A | Short Sale Restriction Activated | | | | | | | | | | | | | |
| C | Short Sale Restriction Continued | | | | | | | | | | | | | |
| D | Short Sale Restriction Deactivated | | | | | | | | | | | | | |
| E | Short Sale Restriction in Effect | | | | | | | | | | | | | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description | | | | | | |
|----------------------------------|--------------------------------------|---|------|-------|-------|--------------------------------------|---|-------------------------------|
| SIP Generated Message Identifier | 1 | <p>Char.</p> <p>Identifies CQS as the originator of a message, used in instances when:</p> <ul style="list-style-type: none"> ▪ CQS is the originator of a republished Quote message (used when CQS republishes the LULD and/or LULD BBO Indicators as a result of a Price Band change). When CQS republishes a Quote message, the Participant ID field in the Message Header will identify the Participant that initiated the original message. ▪ CQS is the originator of a Price Band message. The Participant ID field in the Message Header and the ‘SIP Generated Message Identifier’ field will both be populated with code ‘S’ identifying CQS as the originator of the message. <table border="1" style="margin-left: 40px;"> <thead> <tr> <th style="text-align: center;">Code</th> <th style="text-align: center;">Value</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">Space</td> <td>SIP Generated Message Not Applicable</td> </tr> <tr> <td style="text-align: center;">S</td> <td>Consolidated Quotation System</td> </tr> </tbody> </table> | Code | Value | Space | SIP Generated Message Not Applicable | S | Consolidated Quotation System |
| Code | Value | | | | | | | |
| Space | SIP Generated Message Not Applicable | | | | | | | |
| S | Consolidated Quotation System | | | | | | | |

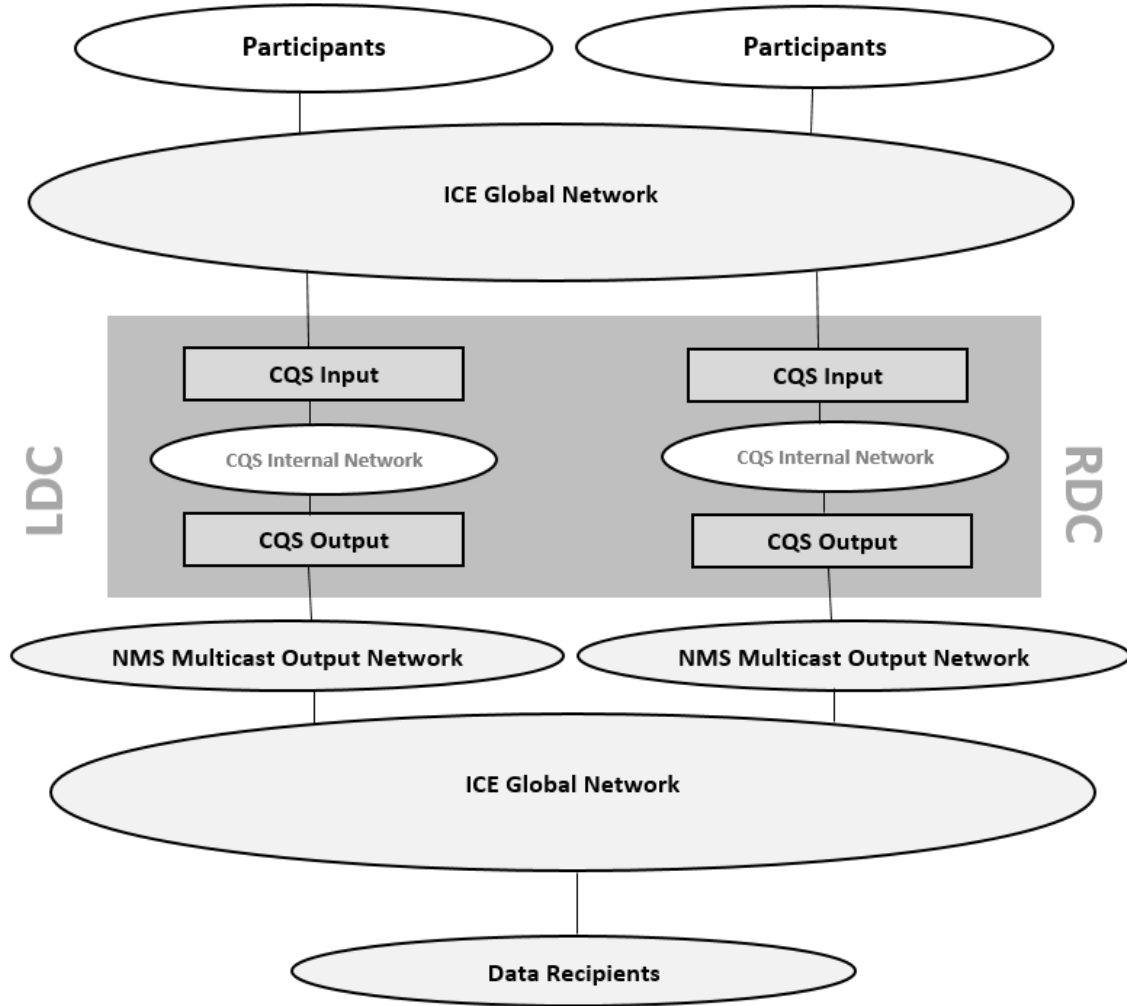
CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

FIELD DESCRIPTIONS

| Field Name | Length | Description |
|-------------|--------|--|
| Timestamp 2 | 8 | <p>2 x Integer (pair of Integers). Optional set to zero.</p> <p>Timestamp 2 is a FINRA Alternative Display Facility (ADF)-provided timestamp represented in nanoseconds since Epoch. The first integer contains the number of seconds from Epoch 1/1/1970, 00:00:00 UTC. The next integer contains the nanosecond portion of the time (e.g., 972402315). If Timestamp 2 is not provided, this field will be set to zero. For any messages generated by CQS, e.g., messages generated on behalf of a Participant, Administrative messages and Control messages, the Timestamp 2 field will be set to zero.</p> <ul style="list-style-type: none"> ▪ If from an Exchange: Timestamp 2 field will be set to zero. ▪ If from the FINRA Alternative Display Facility (ADF): <ul style="list-style-type: none"> ▪ If the FINRA ADF provides a proprietary feed of its quotation information, then FINRA will publish the time of the quotation as also published on the facility’s proprietary feed. FINRA shall provide such times to the Processor in nanoseconds since Epoch. ▪ If the FINRA ADF does not have a proprietary quotation feed then the Timestamp 2 field will be set to zero. |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

APPENDIX A: CQS CONFIGURATION



CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

APPENDIX B: GLOSSARY

| Term | Description |
|--|---|
| Below Continuing Listing Standards | A financial status designation pertaining to Tape ‘A’ and Tape ‘B’ listed securities. The status identifies a company, whose issue is listed on the New York Stock Exchange, the NYSE American Stock Market or on one of the participating U.S. Stock Exchanges, and has failed to meet established listings standards. The listing exchange will subsequently review the appropriateness of continuing to list the issue, and may decide to commence the process of delisting the issue. |
| Cash (Only) Settlement | A security settling in cash all day on a participant or consolidated basis, such as a Common, Preferred or Right that is nearing expiration. Participants can elect to report different settlements in the same security during the day based on their own settlement requirements. For example, one participant can report quotes as cash (only) settlement while another participant can report quotes as regular or next day settlement. |
| Creations Suspended (For Exchange Traded Products) | A financial status designation used to denote the ability to create new shares of this Exchange Traded Product (ETP) has been temporarily suspended by the ETP Issuer. ETPs that are closed for Creations typically are allowed to continue trading on the listing market once the ETP Issuer publishes the press release. |
| Crossed Market | Indicates a Bid Price, which is greater than the Offer Price for a security for a quote. (Only applicable to Bonds.) |
| CTA Eligible Equity | Generally, any common stock, rights, long-term warrants or preferred stock which becomes registered on any national securities exchange or is admitted to unlisted trading privileges thereon and which at the time of such registration or at the commencement of such trading substantially meets the original listing requirements of the NYSE or the NYSE American Stock Market for such securities. |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

GLOSSARY

| Term | Description |
|--|--|
| Late Filing | A financial status designation pertaining to Tape 'A' and Tape 'B' issues (i.e. issues listed on the NYSE, the NYSE American Stock Market or on one of the participating U.S. Stock Exchanges). The status identifies a company, which has failed to meet established listings standards for filing its annual reports. |
| Limit Up-Limit Down (LULD) Price Band | <p>The Limit Up-Limit Down Price Band represents a price range which is set at a percentage level above and below the average price of a security over the immediately preceding five (5) minute period. Price Bands prevail for a minimum of thirty (30) seconds. During a Limit State Price Bands will not be disseminated and will recommence when Limit State is terminated.</p> <p>For further details related to Limit Up-Limit Down, reference the following: http://www.sec.gov/news/press/2011/2011-84.htm</p> <p>Note1: There are no sizes associated with LULD Price Bands. Note2: 'Limit Up-Limit Down' Price Bands are republished every 30 seconds at clock time.</p> |
| Limit Up-Limit Down (LULD) Trading Pause | Denotes a five-minute regulatory trading halt (pause) for an individual security that does not exit a Limit State within 15 seconds. |
| Limit State | Indicates that a National Best Bid is equal to the Upper Limit Price Band, or that a National Best Offer is equal to the Lower Limit Price Band. |
| Liquidation (For Exchange Traded Products) | A financial status designation used to denote that the ETP Issuer announced the ETP will be liquidated and NYSE ARCA announced the date the ETP will be suspended from trading. |
| Local Issue | A Local Issue is an issue that does not meet the NYSE American Stock Market or NYSE listing requirements (is not CTA eligible) but is traded at one or more participating U.S. Stock Exchanges. |
| Locked Market | Indicates an identical Bid and Offer Price for a security for a quote. (Only applicable to Bonds.) |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

GLOSSARY

| Term | Description |
|--|--|
| Market-Wide Circuit Breaker Level 1 – 7% Decline | This Regulatory Trading Halt is used to denote that trading is suspended due to the S&P 500 Index reaching a 7% decline level below its closing value on the previous trading day. A Level 1 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: before 3:25 p.m. ET – duration 15 minutes; at or after 3:25 p.m. ET – trading shall continue, unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt. |
| Market-Wide Circuit Breaker Level 2 – 13% Decline | This Regulatory Trading Halt is used to denote that trading is suspended due to the S&P 500 Index reaching a 13% decline level below its closing value on the previous trading day. A Level 2 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: before 3:25 p.m. ET – duration 15 minutes; at or after 3:25 p.m. ET – trading shall continue, unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt. |
| Market-Wide Circuit Breaker Level 3 – 20% Decline | This Regulatory Trading Halt is used to denote that trading is suspended due to the S&P 500 Index reaching a 20% decline level below its closing value on the previous trading day. A Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: at any time during regular trading hours, trading shall Halt and <u>not</u> Resume for the remainder of the trading day. |
| Next Day (Only) Settlement | Same definition as cash (only) settlement except settlement is next day. |
| Non-Regulatory or Trading Halt | An operational or Trading Halt for a Participant due to Order Imbalance, Order Influx or Operational. |
| Normal Auction Market | Where the quote bid price is less than the offer price for a security for a Participant. |
| On Demand Intra-Day Auction | This quote condition is used to provide additional clarity to the CQS Participants and allow them to take part in an auction which will enhance liquidity in the marketplace. It is anticipated that this quote condition will be input into CQS by Participants with a zero bid price, zero bid size, zero offer price, and zero offer size and disseminated over the CQS multicast output lines. |
| Price Indication | Reflects an approximate price range of what a security's trading range (bid and offer prices) will be when trading resumes after a Trading Halt. |
| Redemptions Suspended (For Exchange Traded Products) | A financial status designation used to denote the ability to redeem shares of this ETP has been suspended by the ETP Issuer. ETPs that are closed for redemption will remain halted on the listing market. |
| Regular Way Settlement | The settlement date is within three (3) business days following the date of the transaction. |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

GLOSSARY

| Term | Description |
|---|--|
| Regulatory Halt - Additional Information Requested | Denotes a regulatory trading halt when the primary market has requested additional information from the issuer of the security. Trading is suspended until the primary market has received and reviewed the requested information. |
| Regulatory Halt - Corporate Action | Denotes a regulatory trading halt when the primary market determines a halt is necessary pending the outcome of a Corporate Action event. Trading is suspended until the results of the Corporate Action are confirmed and the security is suitable for trading. |
| Regulatory Halt - ETF Component Prices Not Available | Denotes a regulatory trading halt when a significant percentage of an ETF's weight is invested in components in which pricing is not available. Trading is suspended until the primary market determines that such condition no longer exists. |
| Regulatory Halt - Intraday Indicative Value Not Available | Denotes a regulatory trading halt when the Intraday Indicative Value of an ETF is not being disseminated or is being disseminated incorrectly. Trading is suspended until the primary market determines that such condition no longer exists. |
| Regulatory Halt - Merger Effective | Denotes a regulatory trading halt in connection with a security being suspended in connection with a merger. Trading is suspended indefinitely. |
| Regulatory Halt - New Security Offering | Denotes a regulatory trading halt in connection with a new security offering. Trading is suspended until the new security is admitted to trading on the primary listing exchange during the primary trading session. |
| Regulatory Halt - News Pending | Denotes a regulatory Trading Halt due to an expected news announcement, which may influence the security. A Trading Halt may be continued once the news has been disseminated. |
| Regulatory Halt - News Released | Denotes a regulatory trading halt when relevant news influencing the security is being disseminated. Trading is suspended until the primary market determines that an adequate time has passed to allow for full dissemination of the news into the market. |
| Regulatory Halt - Regulatory Concern | Denotes a regulatory trading halt due to an ongoing regulatory concern regarding the suitability of trading in a security. Trading is suspended until the primary market determines the security is suitable for trading. |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

GLOSSARY

| Term | Description |
|--|---|
| Republished Limit Up-Limit Down Price Band | Indicates that the Price Band being disseminated is a republication of the latest Price Band for a security. |
| Resume | This quote condition along with zero-filled bid, offer and size fields is used to indicate that trading for a Participant is no longer suspended in a security which had been Trading Halted. |
| Short Sale Restriction | A restriction designed to control short selling from further driving down the price of a security any day in which the price declines by 10% or more from the previous day's closing price. Once the Short Sale Restriction is activated, a Short Sale Restriction would be in effect in that security for the remainder of the day as well as the following day, unless deactivated. |
| Sub-Penny Trading | Indicates a non-regulatory Trading Halt for a security whose price may fall below \$1.05, possibly leading to a sub-penny execution. |
| Trading Halt | Temporary halt in trading in a particular security for a Participant. |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

APPENDIX C: SUMMARY OF DAILY CQS MULTICAST LINE ACTIVITY

Time Ranges shown have approximate end times indicated, are dependent on daily traffic volume and are subject to change based on a Participant's hours of operation. Times are represented in *Eastern Time* (ET).

| Time (ET) | Transmission / Events |
|--|---|
| 01:00 | Line Integrity Messages* |
| 01:30 | Start of Day – Control Message |
| 01:31 – 20:05 | Trading Range Indications Short Sale Restriction Trading Halts Price Indications Resumes Test Data** |
| 01:33 – 20:05 | Reset Block Sequence Number Message – Control Message Retransmission Messages |
| 04:00 - 20:00 | Market Status Messages Quote Messages Auction Status Messages |
| 04:00 | <i>OFFICIAL MARKET OPEN: NASDAQ & NYSE ARCA</i> |
| 07:00 (Iteration 1) 08:00 (Iteration 2) | Market-Wide Circuit Breaker (MWCB) Decline Level – Market Status Message |
| 07:00 | <i>OFFICIAL MARKET OPEN: Cboe BYX, Cboe BZX, Cboe EDGA, Cboe EDGX, NYSE Chicago, NASDAQ OMX BX, NYSE American & NYSE National</i> |
| 08:00 | <i>OFFICIAL MARKET OPEN: FINRA ADF, IEX, NASDAQ OMX PSX</i> |
| 09:30 | <i>OFFICIAL MARKET OPEN: NYSE</i> |
| 09:30 – 16:00 | LULD Price Band Messages |

* Line Integrity Messages are transmitted at intervals of approximately ten (10) seconds throughout the day ending when the CQS multicast lines are brought down.

** Test Data for Test Symbols is disseminated after the Start of Day message and continues throughout the day up till End of Day message.

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

APPENDIX C: SUMMARY OF DAILY CQS MULTICAST LINE ACTIVITY, *continued*

| Time (ET) | Transmission / Events |
|-----------|---|
| 16:00 | <i>OFFICIAL MARKET CLOSED: NYSE</i> |
| 17:00 | <i>OFFICIAL MARKET CLOSED: IEX & NASDAQ PSX</i> |
| 18:30 | <i>OFFICIAL MARKET CLOSED: FINRA ADF</i> |
| 19:00 | <i>OFFICIAL MARKET CLOSED: NASDAQ OMX BX</i> |
| 20:00 | <i>OFFICIAL MARKET CLOSED: Cboe BYX, Cboe BZX, Cboe EDGA, Cboe EDGX, NASDAQ, NYSE ARCA, NYSE American, NYSE National & NYSE Chicago</i> |
| 20:05 | End of Day*** |

*** All CQS Participant Lines are brought down (Dependent on all Participants being closed).

Afterhours Test Data Dissemination:

- CQS Multicast Data Recipients are reminded that test data dissemination over CQS multicast data feeds can commence as early as **8:30 P.M. ET** and terminate as late as **11:00 P.M. ET** during business weekdays and any time during Saturdays, Sundays and Market holidays. This test period is accommodated to allow testing opportunities for Participants and Data Recipients, as well as to provide test time to rectify any production problems that may have occurred the prior business day. Multicast data feed recipients should take the necessary precautions to protect their systems against any adverse impact (e.g., database corruption) if processing data throughout the test dissemination period. During the test period, note that test data can be disseminated over all CQS multicast channels (e.g., Production, Retransmission or Playback Test Group IP addresses).

APPENDIX E: CQS CLOSING ROUTINE

A Participant can individually close a security by sending in a closing quote to CQS. CQS disseminates this closing quote over the Multicast Line and appends a new NBBO, excluding that Participant, if that Participant was part of the current NBBO.

Additionally upon receiving FINRA Close (Category C Type C) message from FINRA, CQS disseminates Closing Quote (Quote Condition L) for any securities where FINRA had previously quoted a BBO eligible FINRA Best Bid and Offer.

APPENDIX F: NATIONAL BEST BID AND OFFER OVERVIEW

National Best Bid and Best Offer calculations are performed for each Market Center beginning at various times (between 4:00 a.m. and 9:30 a.m. ET) whenever a new qualifying quote is received after a Participant Market Open. If it is determined that the new quote or FINRA provided FBBO has caused a new National BBO, the appropriate National BBO information is appended to the new Short Quote, Long Quote or Special Long Quote (FINRA ADF) with FINRA BBO Information quote message. Appendages are not added if it is determined that the current quote does not affect the National BBO.

A new quote can be the entire new National BBO quote (both Bid and Offer). In addition, the National BBO and FINRA provided FBBO can indicate a Crossed Market where the Bid price is higher than the Offer price or a Locked Market where both the Bid and the Offer prices are the same.

CQS generates a National BBO based on the following criteria in this order:

- **Price** - Exchanges with highest Bid and lowest Offers have overall priority.
- **Size** - Largest size takes precedence when multiple Exchanges submit the same Bid and/or Offer price.
- **Time** - Earliest time takes precedence when multiple Exchanges submit the same Bid and/or Offer price with the same size.

APPENDIX F: NATIONAL BEST BID AND OFFER OVERVIEW, continued

BBO Considerations

There are several trading conditions that affect the calculations of a National BBO for a security, including:

Non-Qualifying Quote Conditions

If a quote with a non-qualifying quote condition is entered from a Participant which made up part or all of the current National BBO, CQS will calculate and append a new National BBO.

Participant Overall Halt in Trading

If a Participant were to halt trading in all securities during the trading day (due to computer failure, market shutdown, etc.), CQS, when instructed by the Participant, can send a 'Zero Quote' for only those issues in which that Participant had an outstanding BBO eligible quote. A new National BBO is calculated and, if necessary appends a new National BBO.

FINRA BBO

FINRA provides a FINRA calculated FBBO and the FBBO is included in the National BBO calculations.

If part of the new FINRA BBO is also part of the new National BBO, the appropriate National BBO information is also appended to the Short Quote, Long Quote or Special Long Quote (FINRA ADF) with FINRA BBO Information message.

APPENDIX G: QUOTE CONDITIONS

The quote condition determines whether a quote qualifies to be included in the calculation of the National BBO. The National BBO calculation is performed whenever a new qualifying quote with price and size filled Bid and/or Offer is received from a Participant. For quotes with BBO eligible quote conditions containing zero-filled price and size Bid and Offer information, the National BBO is recalculated excluding the Participant that transmitted the BBO eligible quote condition with zero-filled prices and sizes.

The quote conditions may be viewed as belonging to two classes:

1. Those that qualify for inclusion in the National Best Bid & Offer (BBO) calculations.
2. Those that do not qualify for inclusion in the National Best Bid & Offer (BBO) calculations.

BBO Eligible Quotes

Quote Condition A – Slow Quote on the Offer Side

This condition indicates that the current offer is in ‘Slow’ quote mode. While in this mode, auto-execution is not eligible on the Offer side and can be traded through pursuant to anticipated Regulation NMS requirements.

Quote Condition B – Slow Quote on the Bid Side

This condition indicates that the current bid is in ‘Slow’ quote mode. While in this mode, auto-execution is not eligible on the Bid side and can be traded through pursuant to anticipated Regulation NMS requirements.

Quote Condition E – Slow Quote due to Liquidity Replenishment Point (LRP) or Gap Quote on the Bid Side - Only OFFER SIDE is eligible for BBO

This quote condition is used to indicate that the current Bid is in ‘Slow’ quote mode due to a Liquidity Replenishment Point (LRP) or Gap Quote. While in this mode, auto-execution is not eligible, the quote is then considered Slow on the Bid side and can be traded through, as per Regulation NMS.

APPENDIX G: QUOTE CONDITIONS

BBO Eligible Quotes

Quote Condition F - Slow Quote due to Liquidity Replenishment Point (LRP) or Gap Quote on the Offer Side - Only BID SIDE is eligible for BBO

This quote condition is used to indicate that the current Offer is in Slow quote mode due to a Liquidity Replenishment Point (LRP) or Gap Quote. While in this mode, auto-execution is not eligible, the quote is then considered Slow on the Offer side and can be traded through, as per Regulation NMS.

Quote Condition H - Slow Quote on the Bid and Offer Sides

This condition indicates that the quote is a 'Slow' quote on both the Bid and Offer sides. While in this mode, auto-execution is not eligible on the Bid and Offer sides, and either or both sides can be traded through pursuant to anticipated Regulation NMS requirements.

Quote Condition O - Opening Quote

This condition can be disseminated to indicate that this quote was the opening quote for a security for that Participant.

Quote Condition R - Regular (for FINRA - Market Maker Open)

This condition is used for the majority of quotes to indicate a normal trading environment. It is also used by the FINRA Market Makers in place of Quote Condition 'O' to indicate the first quote of the day for a particular security. The condition may also be used when a Market Maker re-opens a security during the day.

Quote Condition W – Slow Quote Due to Set Slow List on both Bid and Offer Sides

This quote condition is used to indicate that the quote is a Slow Quote on both the Bid and Offer sides due to a Set Slow List that includes High Price securities. While in this mode, auto-execution is not eligible, the quote is then considered Slow on the Bid and Offer sides and either or both sides can be traded through, as per Regulation NMS.

APPENDIX G: QUOTE CONDITIONS

BBO Ineligible Quotes

Quote Condition C - Closing Quote

This condition can be disseminated to indicate that this quote was the last quote for a security for that Participant.

Quote Condition L - Market Maker Quotes Closed (FINRA)

This condition is disseminated by each individual FINRA Market Maker to signify either the last quote of the day or the premature close of an individual Market Maker for the day. In the latter case, the Market Maker can re-open by transmitting a quote accompanied by the Quote Condition R.

Quote Condition N - Non-Firm Quote

This quote condition suspends a Participant's firm quote obligation for a quote for a security.

Quote Condition U - Slow Quote due to Liquidity Replenishment Point (LRP) or Gap Quote on both the Bid and Offer Sides

This quote condition is used to indicate that the quote is a Slow Quote on both the Bid and Offer sides due to a Liquidity Replenishment Point (LRP) or Gap Quote. While in this mode, auto-execution is not eligible, the quote is then considered Slow on the Bid and Offer sides, and either or both sides can be traded through, as per Regulation NMS.

Quote Condition 4 – On Demand Intra-Day Auction

This quote condition is used to provide additional clarity to the industry participants and to allow participants to take part in an auction which will enhance liquidity in the marketplace.

APPENDIX H: SECURITY STATUS INDICATORS

In addition to the Quote Condition field determining whether a quote qualifies to be included in the calculation of the National BBO the Security Status field is also considered in the calculation of the National BBO. If the Security Status Indicator is populated with either a regulatory or a non-regulatory status (other than Market Wide Circuit Breaker Levels), it will result in the BBO being recalculated excluding the Participant from the BBO if that Participant was part or all of the BBO.

Security Status Indicator 1 – Market-Wide Circuit Breaker Level 1 – Breached

This security status indicator is used to indicate that trading is suspended due to the S&P 500 Index reaching a 7% decline level below its closing value on the previous trading day. A Level 1 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: before 3:25 p.m. ET – duration 15 minutes; at or after 3:25 p.m. ET – trading shall continue, unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt.

Security Status Indicator 2 – Market-Wide Circuit Breaker Level 2 – Breached

This security status indicator is used to indicate that trading is suspended due to the S&P 500 Index reaching a 13% decline level below its closing value on the previous trading day. A Level 2 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: before 3:25 p.m. ET – duration 15 minutes; at or after 3:25 p.m. ET – trading shall continue, unless there is a Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt.

Security Status Indicator 3 – Market-Wide Circuit Breaker Level 3 – Breached

This security status indicator is used to indicate that trading is suspended due to the S&P 500 Index reaching a 20% decline level below its closing value on the previous trading day. A Level 3 Market-Wide Circuit Breaker Regulatory Trading Halt would operate as follows: at any time during regular trading hours, trading shall Halt and not Resume for the remainder of the trading day.

Security Status Indicator A - Additional Information Requested

This security status indicator is used to indicate a regulatory Trading Halt when the primary market has requested additional information from the issuer of the security. Trading is suspended until the primary market has received and reviewed the requested information.

Security Status Indicator C - Regulatory Concern

This security status indicator is used to indicate a regulatory Trading Halt due to an ongoing regulatory concern regarding the suitability of trading in a security. Trading is suspended until the primary market determines the security is suitable for trading

Security Status Indicator D - News Released

This regulatory Trading Halt is used when relevant news influencing the security is being disseminated. Trading is suspended until the primary market determines that an adequate time has passed to allow for full dissemination of the news into the market.

Security Status Indicator E - Merger Effective

This security status indicator is used to indicate a regulatory Trading Halt in connection with a security being suspended in connection with a merger. Trading is suspended indefinitely.

Security Status Indicator F - ETF Component Prices Not Available

The regulatory trading halt is used when a significant percentage of an ETF's weight is invested in components in which pricing is not available. Trading is suspended until the primary market determines that such condition no longer exists.

Security Status Indicator G - Trading Range Indication

The trading range indication is used to denote the probable trading range (bid and offer prices, no sizes) of a security that is **not** Trading Halted. The Trading Range Indication is used prior to or after the opening of a security.

Security Status Indicator I - Order Imbalance

This non-regulatory Trading Halt is used when there is a significant imbalance of buy or sell orders.

Security Status Indicator M – Limit Up-Limit Down (LULD) Trading Pause

This regulatory Trading Halt is used to indicate conditions in which a stock experiences a 10% or more change in price over a five minute period.

Security Status Indicator N - Corporate Action

This security status indicator is used to indicate a regulatory Trading Halt when the primary market determines a halt is necessary pending the outcome of a Corporate Action event. Trading is suspended until the results of the Corporate Action are confirmed and the security is suitable for trading.

Security Status Indicator O- New Security Offering

This security status indicator is used to indicate a regulatory Trading Halt in connection with a new security offering. Trading is suspended until the new security is admitted to trading on the primary listing exchange during the primary trading session.

APPENDIX H: SECURITY STATUS INDICATORS

Security Status Indicator P - News Pending

This security status indicator is used to indicate a regulatory Trading Halt due to an expected news announcement, which may influence the security. A Trading Halt may be continued once the news has been disseminated.

Security Status Indicator V - Intraday Indicative Value Not Available

The regulatory trading halt is used when the Intraday Indicative Value of an ETF is not being disseminated or is being disseminated incorrectly. Trading is suspended until the primary market determines that such condition no longer exists.

Security Status Indicator T - Resume

This security status indicator along with zero-filled bid, offer and size fields is used to indicate that trading for a Participant is no longer suspended in a security which has been Trading Halted.

Security Status Indicator X - Operational

This non-regulatory Trading Halt is used when the ability to trade a security by a Participant is temporarily inhibited due to technical reasons.

Security Status Indicator Y – Sub-Penny Trading

This non-regulatory Trading Halt is used to indicate a Trading Halt for a security whose price may fall below \$1.05, possibly leading to a sub-penny execution.

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

APPENDIX I: SYMBOL SUFFIXES EXAMPLES

| | Suffix | Description |
|----------|-----------------------|--|
| A | .A | Series (or Class) A - <i>Also</i> Series B-T & V-Z |
| | .A.CL | Series A Called - <i>Also</i> Series B-T & V-Z |
| | .A.CV | Series A Convertible - <i>Also</i> Series B-T & V-Z |
| | .Aw | Series A When Issued - <i>Also</i> Series B-T & V-Z |
| C | .CL | Called |
| | .CT | Certificates |
| | .CV | Convertible |
| | .CVR | Contingent Value Right |
| | .CV.CL | Convertible Called |
| D | .DP | Amount of most recent dividend to go 'ex- distribution' |
| | .DV | Accumulated dividend per share net expenses, through and including the previous day's close of trading |
| E | .EC | EMERGING COMPANY MARKETPLACE SM |
| | .EU | Estimated cash amount per creation unit |
| F | .F.N | Foreign News |
| I | .ID | Index – differentiates an index from a stock with the same root symbol |
| | .IV | Intra-Day Net Asset Value per share |
| M | .MN | Mini |
| N | .NV | Net Asset Value per share as at the close on the previous day's close of trading |
| P | .PO | Percent Paid |
| | .PP | Partial Paid |
| | .PT.CL | Part Called |
| | p | Preferred |
| | pA | Preferred Series A - <i>Also</i> Series B-T & V-Z |
| | pA.CV | Preferred Series A Convertible - <i>Also</i> Series B-T & V-Z |
| | pA.CL | Preferred Series A Called - <i>Also</i> Series B-T & V-Z |
| | pAw | Preferred Series A When Issued - <i>Also</i> Series B-T & V-Z |
| | pw | Preferred When Issued |
| | p.CL | Preferred Called |
| p.CV | Preferred Convertible | |

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

APPENDIX I: SYMBOL SUFFIX EXAMPLES

| | Suffix | Description |
|----------|---------------|---|
| P | p.CV.CL | Preferred Convertible Called |
| | p.WD | Preferred When Distributed |
| | pCA | Indicates Class A of a Second Category of Preferred - <i>Also</i> Class B-K and M-S |
| R | r | Rights |
| | rw | Rights When Issued |
| S | .SC | Small Corporate - Offering Registration |
| | .SD | Stamped |
| | .SM | Mini Settlement |
| | .SO | Current shares outstanding in thousands |
| | .SP | Special |
| | .SV | Settlement |
| T | .TC | Total cash amount per creation unit |
| | .TT | Tier II Securities |
| U | .U | Units – (A combination of securities composed of two or more warrants, common stocks, preferred stocks and/or bonds.) |
| V | .VR | Variable Common Right |
| W | .WD | When Distributed |
| | w | When Issued |
| | .WS | Warrants |
| | .W.WS | With Warrants |
| | .WS.A | Warrants Series A - <i>Also</i> Series B-T & V-Z |
| | .WSw | Warrants When Issued |

Note:

- Any combination of suffixes can be represented. Root Symbols for Government Bonds, e.g., TB, TN, US and ZC, and root symbols for Corporate Bonds, e.g., GMC are always followed by a three (3) upper case character suffix.
- Suffixes start with one of the following characters with no embedded spaces: a) ASCII Period (‘.’); b) Lower case ‘p’; c) Lower case ‘r’; d) Lower case ‘w’.

CONSOLIDATED QUOTATION SYSTEM (CQS) PILLAR
MULTICAST OUTPUT BINARY SPECIFICATION

APPENDIX J: ASCII PRINTABLE TABLE (Character Code 32-126)

| ASCII | DEC | Description |
|---------|-----|-------------------|
| <space> | 32 | Space |
| ! | 33 | Exclamation |
| " | 34 | Double quotes |
| # | 35 | Number |
| \$ | 36 | Dollar |
| % | 37 | Percent |
| & | 38 | Ampersand |
| ' | 39 | Single Quote |
| (| 40 | Open Parenthesis |
|) | 41 | Close Parenthesis |
| * | 42 | Asterisk |
| + | 43 | Plus |
| , | 44 | Comma |
| - | 45 | Hyphen |
| . | 46 | Period |
| / | 47 | Slash or Divide |
| 0 | 48 | Zero |
| 1 | 49 | One |
| 2 | 50 | Two |
| 3 | 51 | Three |
| 4 | 52 | Four |
| 5 | 53 | Five |
| 6 | 54 | Six |
| 7 | 55 | Seven |
| 8 | 56 | Eight |
| 9 | 57 | Nine |
| : | 58 | Colon |
| ; | 59 | Semicolon |
| < | 60 | Less than |
| = | 61 | Equals |
| > | 62 | Greater than |
| ? | 63 | Question mark |
| @ | 64 | At symbol |
| A | 65 | Uppercase A |
| B | 66 | Uppercase B |
| C | 67 | Uppercase C |
| D | 68 | Uppercase D |
| E | 69 | Uppercase E |
| F | 70 | Uppercase F |
| G | 71 | Uppercase G |
| H | 72 | Uppercase H |
| I | 73 | Uppercase I |
| J | 74 | Uppercase J |
| K | 75 | Uppercase K |
| L | 76 | Uppercase L |
| M | 77 | Uppercase M |
| N | 78 | Uppercase N |
| O | 79 | Uppercase O |
| P | 80 | Uppercase P |

| ASCII | DEC | Description |
|-------|-----|------------------------|
| Q | 81 | Uppercase Q |
| R | 82 | Uppercase R |
| S | 83 | Uppercase S |
| T | 84 | Uppercase T |
| U | 85 | Uppercase U |
| V | 86 | Uppercase V |
| W | 87 | Uppercase W |
| X | 88 | Uppercase X |
| Y | 89 | Uppercase Y |
| Z | 90 | Uppercase Z |
| [| 91 | Opening bracket |
| \ | 92 | Backslash |
|] | 93 | Closing bracket |
| ^ | 94 | Caret |
| _ | 95 | Underscore |
| ` | 96 | Grave accent |
| a | 97 | Lowercase a |
| b | 98 | Lowercase b |
| c | 99 | Lowercase c |
| d | 100 | Lowercase d |
| e | 101 | Lowercase e |
| f | 102 | Lowercase f |
| g | 103 | Lowercase g |
| h | 104 | Lowercase h |
| i | 105 | Lowercase i |
| j | 106 | Lowercase j |
| k | 107 | Lowercase k |
| l | 108 | Lowercase l |
| m | 109 | Lowercase m |
| n | 110 | Lowercase n |
| o | 111 | Lowercase o |
| p | 112 | Lowercase p |
| q | 113 | Lowercase q |
| r | 114 | Lowercase r |
| s | 115 | Lowercase s |
| t | 116 | Lowercase t |
| u | 117 | Lowercase u |
| v | 118 | Lowercase v |
| w | 119 | Lowercase w |
| x | 120 | Lowercase x |
| y | 121 | Lowercase y |
| z | 122 | Lowercase z |
| { | 123 | Opening Brace |
| | 124 | Vertical Bar |
| } | 125 | Closing Brace |
| ~ | 126 | Equivalency Sign-Tilde |
| | | |
| | | |
| | | |