



Engineering Standard

**Interface Specification of STEP Market Data Feed
of Shenzhen Stock Exchange 5th Trading System
(Ver 1.13)**

Shenzhen Stock Exchange

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REVISION LIST

| Date of Issue | Version | Communication Version | Comments |
|---------------|---------------|-----------------------|--|
| Oct 2013 | 0.10 | 1.00 | Establishment |
| Jan 2014 | 0.90 | 1.00 | Amendment based on feedback from the main market participants |
| Apr 2014 | 1.00 α | 1.00 | Amendment based on feedback on Ver0.90 |
| June 2014 | 1.00 β | 1.00 | <p>The same channel code is used in Level 1 snapshot data & Level 2 snapshot data during the auction period</p> <p>Add the statistic message of snapshot data channel</p> <p>Add a new switch type in Security Real-time Status Message</p> <p>Add two new fields "Contactor (tag=10184) " and "ContactInfo (tag=10185)"</p> <p>Add a note to the transmission format of time stamp field in Fast</p> <p>Revise some literal error</p> |
| Sep 2014 | 1.00 γ | 1.00 | <p>Add Business Rejection Message</p> <p>Add a "ChannelNo" field & "RawDataFormat" of Binary data field in the Announcements Message</p> <p>Add the missing field of Market Data Type "MDStreamID" in the Statistics of Snapshot Data Channel</p> <p>"0st digit" in the field of Trading Phase Code of the Product "TradingPhaseCode" adds a value of "A= After-hour-trading"</p> <p>Add "Cancellation of conversion", "Cancellation of resale", "Pledge", "Release of pledge" in the Type of Switch</p> <p>"After-hour-trading Block Trade" renamed to "After-hour-trading"</p> <p>Revise some literal error</p> |
| Jan 2015 | 1.00 δ | 1.00 | <p>"SecurityPreName" in "Real time status of security" is changed into "FinancialStatus";</p> <p>"Settlement Price" is deleted in the "MDEntryType" of Snapshot Data;</p> <p>"TimeInForce", "MaxPriceLevels" & "MinQty" are deleted in Order Tick Data</p> |

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| Aug 2015 | 1.00 | 1.00 | <p>Description of Cx character string is added.</p> <p>"Voting rights", "Equity pledge-style Repo", "Split in real time", "Combined in real time", "Covered opening", "market-maker quotation" added in section "Real time status of security"</p> <p>In "Market Data Types", "Pledge-style Repo" is added the description of channel code.</p> <p>"V: break for volatility" is added in the Trading Phase Code of section "Snapshot Data".</p> <p>"SecurityPreName" is deleted in the "Definition of Business Layer"</p> |
| June 2016 | 1.01 | 1.01 | <p>"round lot buy of eligible HK stocks", "round lot sell of eligible HK stocks", "Odd lot buy of eligible HK stocks", "Odd lot sell of eligible HK stocks" are added in the Security Switch Type of the Real time Status of Security.</p> <p>Market Real time Status Info is added.</p> <p>Real time market data of eligible HK stocks (630) is added in the Snapshot Data Category.</p> <p>Nominal price(xh), reference price(xi) is added in the Type of Market Data Entries.</p> |
| April 2017 | 1.02 | 1.02 | <p>More types are added to "Type of Market Data Entry" in "Snapshot Data", e.g. "weighted average price (9)", "the rise/fall BP of the weighted average price (xj)", "previous weighted average close price" (xk).</p> <p>Notes for Type of Market Data Entry are revised.</p> <p>Adding "Vendor Supplied System (VSS) should be able to support for adding a new Type of Market Data Entry, and may also ignore without any actions if VSS doesn't care about the new Type of Market Data Entry."</p> <p>Adding "Vendor Supplied System (VSS) should be able to support for adding a new switch type, and may also ignore without any actions if VSS doesn't care about the new switch type".</p> |
| Jan 2019 | 1.03 | 1.02 | <p>Add two more switches in Table 4-10 (List of Switch Type of Security Business Status), Options from ordinary to covered, & options from covered to ordinary.</p> |
| Sep 2019 | 1.04 | 1.02 | <p>Add CNI Indices in the Snapshot Data Category.</p> |
| Jan 2020 | 1.05 | 1.02 | <p>Add one more switch in Table 4-10: 34-Resale cancellation;</p> <p>Delete four switches: 18-Cancellation of conversion, 19-Cancellation of resale , 24-Split in real time, 25-Combined in real time.</p> |

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|------------|------|------|---|
| April 2020 | 1.06 | 1.02 | “After-hour-trading” renamed to “After-hour-trading Block Trade” ; Add “after-hour-trading” market data type; Add “after-hour-trading” snapshot message; Add new value of switch type in real time security status : 35- Security lending; Add 4.1 Interface compatibility requirement. |
| Aug 2020 | 1.07 | 1.02 | Add following MDEntryType during the opening stage of HK stocks: xr= price cap of buy order xs= price floor of buy order xt= price cap of sell order xu= price floor of sell order Provide 2 modes for tick data sending. |
| Dec 2020 | 1.08 | 1.02 | Add new definition to reference price (xi) of Market Data Entry in Snapshot Data. |
| Apr, 2021 | 1.09 | 1.11 | Add spot bond trading’s snapshot data、order tick data、transaction tick data; Adjust relevant bond market channel; Add placeholder tick data. |
| Jul, 2021 | 1.10 | 1.11 | “36-Bond put option and resale” is added in the Security Switch Type of the Real time Status of Security. |
| Aug, 2021 | 1.11 | 1.11 | Add spot bond trading’s bidding deal market data. |
| May, 2022 | 1.12 | 1.11 | Supplementary explanation for some quotation fields. |
| Jun, 2023 | 1.13 | 1.11 | (Revisions are all in red.) Add Message for Real time reference net value of funds |

Note:

Please note that this English translation is for reference only and is not the official version issued by SZSE. In the event of any inconsistency or conflict between Chinese original version and English translation version, the terms and conditions contained in the official Chinese version shall prevail.

GLOSSARY

| Abbreviation of Terms | Meanings |
|------------------------|--|
| Market Data GateWay | Access point for vendors or brokers to connect to Shenzhen Stock Exchange market data system. Market Data GateWay(MDGW) has two types: <ul style="list-style-type: none">➤ On-the –spot Version, transferred by satellite, has no data re-transmission functions,➤ Internet Version, transferred by leased line, has data re-transmission functions. |
| Vendor Supplied System | “VSS”, the server or system of Vendors/brokers allowed to access to Shenzhen Stock Exchange market data system. |
| STEP | Securities Trading Exchange Protocol |
| FIX | Financial Information Exchange |
| FAST | FIX Adapted for Streaming |

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Technical Specification of STEP Market Data Feed of Shenzhen Stock Exchange

1 INTRODUCTION

This document is provided to market participants like brokers, and information vendors to act as a guidance for their development with STEP protocol accessing to Shenzhen Stock Exchange (SZSE) 5th trading system for real-time market data. This specification document specifies contents of market data, necessary operation guidance, as well as data exchange format in details.

All the terms, message format and message streaming description in this document are consistent with STEP 1.2 and FIX 5.0 SP2, and also have a specific extension.

2 SESSION MANAGEMENT

The session management between Vendor Supplied System and Market Data GateWay complies with “Lightweight Fix Session Layer Protocol”. This Chapter only describes the specific mechanism of market data system.

2.1 Connection

2.1.1 Communication version

This interface specification's communication version is 1.02, this value should be filled into the DefaultAppVerID field of the Logon message. See "Fields definition of Session Layer" for detail.

2.1.2 Session

The accessing clients shall connect their system to Market Data GateWay(MDGW) via session. This connection is a standard TCP/IP point-to-point connection.

2.1.3 IP address and Port

Market Data Gateway provides two service ports for Vendor Supplied System, one is real-time data port (9129 as default) the other is re-transmission port (9130 as default). Each port can only establish one TCP/IP connection. Only Internet Version Market Data GateWay provides re-transmission port.

2.1.4 Security

Market Data GateWay and Vendor Supplied System shall be in the same security network. The data transmitted between the above two is unencrypted, and the security of data transmission shall be ensured by the accessing clients.

2.1.5 Flow Control

There is a flow control mechanism between Market Data GateWay and Vendor Supplied System. If the Vendor Supplied System cannot process the data transmitted from the Market Data GateWay in time, which results that the to-be-sent messages accumulated at the Market Data GateWay exceed the setting threshold, the Market Data Gateway shall disconnect with the Vendor Supplied System immediately. After the disconnection, Vendor Supplied System shall attempt to re-connect to the Market Data GateWay again.

2.2Session Management

2.2.1 Establishing a session

Vendor Supplied System can establish at most two sessions with the Market Data GateWay.

- Real-time market data session, to transmit real-time data
- Re-transmission session (provided by Internet Version Market Data GateWay), to re-transmit the missing data

The process of establishing a session shall refer to “Lightweight Fix Session Layer Protocol”.

2.2.2 Fault Tolerance

After a failure on the Vendor Supplied System or Market Data GateWay, Vendor Supplied System can re-establish a session with Market Data GateWay. After this re-establishment, Vendor Supplied System should get the missed data via the message recovery system in the application

layer.

2.2.3 Recovery

The session protocol used in the Market Data GateWay complies with “Lightweight Fix Session Layer Protocol”. The recovery mechanism in the session layer is only for compatibility with the standard FIX session protocol, and cannot be used as the real message recovery mechanism. Vendor Supplied System shall get the missed data via the message recovery mechanism in the application layer. The message recovery mechanism in the application layer please refers to 4.2.1 Re-sending Messages.

3 SERVICE DESCRIPTION

3.1 Market Data Types

The Market Data can be classified into several types in business contents. Each type is probably sent via one or multiple channels according to the data volume. Each Market Data GateWay can be configured to only accept market data from specific channels.

The channel code in each type shall be issued in the individual specification guidance.

Table 3-1 List of Market Data Issuance Channel

| Type | Area of Channel Code | Content of Channels |
|-------------------------|----------------------|--|
| Real time Market status | 1 | Real time status message of a security (f) |

| | | | |
|---|----------------------------|-----------|--|
| | | | Real time status message of the market (h) |
| Announcement | | 2 | Announcement messages (B) |
| SZSE Indices / statistics | | 10 | Snapshot (W) |
| CNI Indices | | 11 | Snapshot (W) |
| Real time reference net value of funds | | 12 | Snapshot (W) |
| snapshot data in the Auction | Equities | 101x | Snapshot (W) |
| | Funds | 102x | |
| | Convertible bonds | 103x | |
| | Warrants | 104x | |
| | Options | 105x | |
| Tick-by-tick data in the Auction | Equities | 201x | order tick data (UA201) transaction tick data (UA202) |
| | Funds | 202x | |
| | Convertible bonds | 203x | |
| | Warrants | 204x | |
| | Options | 205x | |
| Snapshot of After-hour-trading Block Trade | | 300x | Snapshot message (W) |
| Snapshot of After-hour-trading | | 301x | Snapshot message (W) |
| Snapshot of bond distribution | | 3021 | Snapshot message (W) |
| Tick-by-tick data of comprehensive financial services | | 400x | order tick data (UA201) transaction tick data (UA202) |
| Bond general pledged repo transaction data | snapshot data | 106x | Snapshot message (W) |
| | Tick data of matching deal | 206x | order tick data (UA201) transaction tick data (UA202) |
| Spot bond trading data | snapshot data | 107x | Snapshot message (W) |

| | | | |
|--------------------------------------|--|------|--|
| | Tick data of matching deal | 207x | order tick data (UA201) transaction tick data (UA202) |
| | Tick data of quoted price and large amount trade | 401x | Including bond matching large-amount declaration and transaction, intention declaration, click deal quotation and transaction, inquiry deal and negotiated deal. order tick data (UA201) transaction tick data (UA202) |
| Client user information report | | 5000 | Messages of clients information reports (UA003) |
| Real time data of eligible HK stocks | | 5001 | Snapshot message (W) |

Note: 'x' in the table represent number from 0 to 9;

3.2 Reception of Snapshot Data

The snapshot data including Real-time Status of Security is issued at regular time, and cannot be re-transmitted.

Each snapshot channel may have multiple types of market data, each type has its own issue frequency

3.3 Reception of Tick Data

Tick data supports re-transmission. Each tick data message delivered by the Market Data GateWay contains the channel code and sequence number of this message. The message sequence number starts from 1 and increases by 1 in each channel. If the sequence number jumps more than 1, it means some tick data is missing, and the Vendor Supplied System can request for the missing data by sending a re-transmission message.

After sending out the tick data in each channel, Market Data GateWay shall send out a channel ending message.

There is an independent heartbeat message with no sequence number at each channel's idle period. If the Vendor Supplied System has not received any heartbeat message more than 2 heartbeat intervals, which means a failure probably happened with Market Data GateWay, Vendor Supplied System shall disconnect with the Market Data GateWay and attempt to re-connect.

3.4 Reception of Announcement Messages

The Market Data GateWay send out announcement files via announcement messages. Each announcement file has a unique ID number.

For each new announcement file transmitted to the Market Data GateWay, it will be sent to the Vendor Supplied System via announcement messages by Market Data GateWay. For the possible missing announcement files before connecting with Market Data GateWay, Vendor Supplied System can request to re-transmit announcement summary first via re-transmission message. As the announcement summary contains ID numbers of all the issued announcements, Vendor Supplied System can request to re-transmit the missing announcement files one by one.

It is suggested that Vendor Supplied System request immediately to re-transmit announcement files after log on to the Market Data GateWay.

4 MESSAGE DEFINITION

4.1 Compatibility requirements

If VSS doesn't care about the following new data, it shall be able to neglect them automatically without any upgrade.

1. Messages from new market data channels.
2. New application layer messages from MDGW.
3. New category of market data in snapshot data message or tick data message (MDStreamID, tag1500).
4. New type of market data entry in snapshot data message (MDEntryType, tag269).
5. New type of switch in real time status of security message (SecuritySwitchType, tag10203).

4.2 Message Structure

All the application layer messages defined in this specification are consist of STEP message layer and FAST message layer. Details please refer to the following table.

Table 4-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|---|
| | Standard Header | Y | |
| 10201 | ChannelNo | Y | Channel code |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | Fast Message Body Message body may contain multiple FAST coding messages in this channel. FAST dictionary value of the decoder shall be reset before decoding of FAST message body. The format definition of FAST coding message, please refer to FAST Message Layer Definition in specific application messages. |
| | Standard Trailer | Y | |

Note: For details of FAST1.1 protocol standard, please refer to <http://www.fixprotocol.org/>

4.2.1 FAST template ID coding rules

Table 4-2 FAST Template ID Coding Rules

| Coding area | Description |
|-------------|-----------------------|
| 3000—3999 | Common message |
| 4000—15999 | Real-time market data |

4.3 Common Message

4.3.1 Channel Heartbeat

Table 4-4-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|---|
| | Standard Header | Y | MsgType=UA001 |
| 10201 | ChannelNo | Y | Code of the channel sending heartbeat message |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-4-2 FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|--------|-------------------|------|----------------------------|----------|--|
| 999 | TemplateID | Y | Default | Y | TemplateID=3001 |
| 10201 | ChannelNo | Y | None | N | Channel code |
| 1350 | AppLastSeq Num | Y | None | N | Sequence No. of the last market data message |
| 10205 | EndOfChannel | N | none | N | Ending remark of channel |

Note: The interval of channel heartbeat is 3 seconds.

4.3.2 Retransmitting Message

Vendor Supplied System sends out re-transmission messages to Market Data GateWay, who returns the re-transmission data needed, as well as a re-transmission message to indicate completion after re-transmission or the failure reason if the re-transmission fails. Market Data GateWay realizes a data re-transmission by “request-answer”, so when receiving multiple re-transmission requests, Market Data GateWay shall handle the requests in the order in which they arrive.

For tick data, whether a message is lost is judged by the channel code and message sequence No. When the message sequence No. received \leq the biggest message sequence No. received, it means that this message has been received and should be neglected. When the message sequence No. received $>$ the biggest message sequence No. received + 1 (For example, if the biggest message sequence No. received = 10, the new message sequence No. = 12), it means that there is a message lost, and it should request the missing data through re-transmission.

For announcement files, whether it has any missing or change can be judged by checking announcement summary. If any data missed or changed, it should request the missing or changed announcement files through re-transmission.

Table 4-5-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|---|
| | Standard Header | Y | MsgType=UA002 |
| 10201 | ChannelNo | Y | Corresponding Channel code of the re-transmission request |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-5-2 FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|--------|----------------|------|----------------------------|----------|---|
| 999 | TemplateID | Y | Default | Y | TemplateID=3002 |
| 10077 | ResendType | Y | None | N | Category of Re-transmission 1=tick by tick data 2=announcement message |
| 10201 | ChannelNo | Y | None | N | Channel code |
| 1182 | AppleBegSeqNum | N | none | N | The starting sequence No. Effective When ResendType=1, indicating the area of record No. |
| 1183 | ApplEndSeqNum | N | None | N | The ending sequence No. When ResendType=1, indicating the area of record No. When ApplEndSeqNum=0, Market Data GateWay will set ApplEndSeqNum value as the max value of this channel data record in the memory when receiving re-transmission |

| | | | | | |
|-------|--------------|---|------|---|---|
| | | | | | request. |
| 1472 | NewsID | N | None | N | Announcement index / value-added message index Effective when ResendType=2. Means requesting announcement summary when it is null. |
| 10076 | ResendStatus | N | None | N | Re-transmit status Only effective when the Market Data GateWay front-end processor returns to the Supplied Vendor System server. 1= finished 2=partly finished (part of requested data hasn't been returned yet) 3= no authority rights 4=data is not applicable |
| 58 | Text | N | None | N | Text Only effective when the Market Data GateWay front-end processor returns to the Supplied Vendor System server. If the request is rejected by Market Data GateWay front-end processor, the failure code shall be returned in this field. |

4.3.3 Client User Information Reporting Message

Vendor Supplied System should send the client user reporting message to Market Data GateWay at regular time, reporting the user number connected to Vendor Supplied System at the current time. Only Vendor Supplied System of a vendor shall send this message.

Table 4-6-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|--------------------------------|
| | Standard Header | Y | MsgType=UA003 |
| 10201 | ChannelNo | Y | Fixed at 5000 |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-6-2 FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|--------|-------------|------|----------------------------|----------|---|
| 999 | TemplateID | Y | Default | Y | TemplateID=3003 |
| 42 | OrigTime | Y | None | N | Originated time of data |
| 8934 | VersionCode | Y | None | N | Code of version 01=on-the-spot version 02=internet version |
| 8935 | UserNum | Y | none | N | Number of users The number of client users connected to this Vendor Supplied System at the current time |

4.3.4 Statistics of Snapshot Data Channel

Each snapshot channel shall send the statistic message of the snapshot channel.

Table 4-7-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|--------------------------------|
| | Standard Header | Y | MsgType=UA004 |
| 10201 | ChannelNo | Y | Channel code |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-7-2 FAST Message Layer Format

| Remark | Field Name | | Must | FAST Instruction Character | Occupied | Notes |
|--------|--------------|------------|------|----------------------------|----------|-------------------------|
| 999 | TemplateID | | Y | Default | Y | TemplateID=3004 |
| 42 | OrigTime | | Y | delta | N | Originated time of data |
| 10201 | ChannelNo | | Y | None | N | Channel code |
| 10208 | NoMDStreamID | | Y | None | N | No of market data types |
| | 1500 | MDStreamID | Y | Copy | Y | Market Data Type |
| | 10207 | StockNu | N | None | N | Number of stocks |

| | | | | | | |
|---|------|--------------------------|---|------|---|--|
| → | | m | | | | |
| | 8538 | Trading PhaseC ode | Y | Copy | Y | Close status 0 digit: "T" means in the continuous auction (all securities haven't closed) "E" means closed (all securities have been closed) |

Note: The interval of Snapshot Data Channel Statistics is 15 seconds.

4.3.5 Business Reject Message

A Business Reject Message is used to reject when an application layer message satisfies the session layer rules, but doesn't satisfy the rules of business layer. This message is used to report on the wrong retransmitted message and client user information report message declared by the user.

Table 4-8-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|--------------------------------|
| | Standard Header | Y | MsgType=j |
| 10201 | ChannelNo | Y | Channel number |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-8-2 FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|--------|------------|------|----------------------------|----------|-----------------|
| 999 | TemplateID | Y | Default | Y | TemplateID=3008 |

| | | | | | |
|-----|----------------------|---|------|---|---|
| 45 | RefSeqNum | N | none | N | Sequence number of the rejected message |
| 372 | RefMsgType | Y | none | N | Message type of the rejected message |
| 379 | BusinessRejectRefID | N | none | N | Business Layer ID of the rejected message |
| 380 | BusinessRejectReason | Y | none | N | Reasons of rejection |
| 58 | Text | N | none | N | Detailed description, at most 50 characters |

4.3.6 Placeholder Tick Message

This message is used by MDGW to provide interface compatibility to VSS.

If VSS is not upgraded to the latest communication version, MDGW may receive tick-by-tick messages that are not supported by the current communication version of VSS. At this time, MDGW will replace the message with a placeholder message, and send the placeholder message to VSS to ensure the continuity of ApplSeqNum among which it send to VSS. The ChannelNo and ApplSeqNum in the placeholder message are consistent with the original message.

Table 4-17-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|---|
| | Standard Header | Y | MsgType=UB002 |
| 10201 | ChannelNo | Y | The channel code corresponding to the channel sending the placeholder message |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-17-2 FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|--------|------------|------|----------------------------|----------|---------------------------------------|
| 999 | TemplateID | Y | default | Y | TemplateID=3005 |
| 10201 | ChannelNo | Y | None | N | Channel code |
| 1181 | ApplSeqNum | Y | None | N | Message record number Count from 1 |

4.4 Real time Market Data

4.4.1 Real time Market Status

STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|--------------------------------|
| | Standard Header | Y | MsgType=h |
| 10201 | ChannelNo | Y | Fixed at 0001 |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|--------|---------------------|------|----------------------------|----------|---|
| 999 | TemplateID | Y | Default | Y | TemplateID=4003 |
| 42 | OrigTime | Y | delta | N | Originated time of data |
| 10201 | ChannelNo | Y | copy | Y | Channel code |
| 1301 | MarketID | Y | none | N | market code |
| 1300 | MarketSegmentID | Y | None | N | Market segment ID, reserved |
| 336 | TradingSessionID | Y | None | N | Trading session ID |
| 625 | TradingSessionSubID | N | None | N | Trading session sub-ID |
| 340 | TradSesStatus | N | None | N | Trading session status, reserved |
| 341 | TradSesStartTime | N | None | N | Starting time of a trading session, reserved |
| 345 | TradSesEndTime | N | None | N | Ending time of a trading session, reserved |
| 834 | ThresholdAmount | N | None | N | Daily initial amount |
| 708 | PosAmt | N | None | N | Intraday remaining amount Fixed at 0.0000 when the amount is not available |
| 10210 | AmountStatus | N | None | N | Status of the amount |

Note:

1) The relationship among Market ID, Trading Session ID & Trading Session Sub-ID is as follow.

| MarketID | TradingSessionID | TradingSessionSubID |
|----------|------------------|---|
| HKEX | 1=Day, | 0=market close for the whole day 1=enter bid/offer price (opening call auctions period) 2=order matching (opening call auctions period) |

| | | |
|--|--|---|
| | | 3=continuous trading 4=order matching (closing call auctions period) 5=enter bid/offer price (closing call auctions period) 7=suspension 100=market not open 101=before order matching (opening call auctions period) 102=Exchange Intervention 103=market close 104=bid/offer cancelled 105=fixd at a reference price (closing call auctions period) 106=irrevocable(closing call auctions period) 107=random closing(closing call auctions period) |
|--|--|---|

2) Real time Market Status Message is released every 3 seconds.

4.4.2 Real time status of security

Table 4-9-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|-----------------|------|--|
| | Standard Header | Y | MsgType=f |
| 10201 | ChannelNo | Y | Channel code of the security information |
| 95 | RawDataLength | Y | Length of data in FAST message |

| | | | |
|----|------------------|---|-------------------|
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-9-2 FAST Message Layer Format

| Remark | Field Name | | Must | FAST Instruction Character | Occupied | Notes |
|--------|------------------|----------------------|------|----------------------------|----------|--|
| 999 | TemplateID | | Y | Default | Y | TemplateID=4001 |
| 42 | OrigTime | | Y | delta | N | Originated time of data |
| 10201 | ChannelNo | | Y | copy | Y | Channel code |
| 48 | SecurityID | | Y | none | N | Security code |
| 22 | SecurityIDSource | | Y | None | N | Source of a security code |
| 291 | FinancialStatus | | N | None | N | Security status |
| 10202 | NoSwitch | | N | None | N | Number of switch |
| → | 10203 | SecuritySwitchType | Y | None | N | Type of switch |
| | 10204 | SecuritySwitchStatus | Y | None | N | Status of security switch 'Y': open 'N': close |

Notes:

1) notes of Security Switch Type

Table 4-10 List of Switch Type of Security Business Status

| Type of Switch | Type Code | Remarks |
|-------------------|-----------|--|
| Margin buy | 1 | Applicable to the underlying security of margin buy |
| Short sell | 2 | Applicable to the underlying security of short selling |
| Fund Subscription | 3 | Applicable to ETF, LOF and other open-ended funds |

| | | |
|--------------------------------------|----|---|
| Fund Redemption | 4 | Applicable to ETF, LOF and other open-ended funds |
| Issue Subscription | 5 | Applicable to subscription code for online issuance |
| Conversion | 6 | Applicable to convertible bonds, preferred stocks in conversion resale; and exchangeable private bonds, exchangeable corporate bonds in exchange period |
| Resale | 7 | Applicable to enterprise bonds, corporate bonds, convertible bonds, private bonds, exchangeable private bonds, subordinated debts, ABS, preferred stocks, security firm short-term bonds, and exchangeable corporate bonds in conversion resale |
| Warrant exercise | 8 | Applicable to warrant or options in exercise period |
| Buy open | 10 | Applicable to derivatives like options |
| Sell open | 11 | Applicable to derivatives like options |
| Subscription of gold ETF in physical | 12 | Applicable to gold ETF |
| Redemption of gold ETF in physical | 13 | Applicable to gold ETF |
| Pre-accepted tender offer | 14 | Applicable to equities in tender offer |
| Cancellation of tender offer | 15 | Applicable to equities in tender offer |
| Pledge | 20 | Applicable to Pledge-style Repo securities |
| Release of pledge | 21 | Applicable to Pledge-style Repo securities |
| Voting rights | 22 | Applicable to preferred stocks |
| Equity pledge-style Repo | 23 | Applicable to securities allowed for equity pledge-style repo business |
| Covered opening | 26 | Applicable to derivatives like options |
| market-maker quotation | 27 | Applicable to securities supported for market-maker quotation, like options |
| round lot buy of eligible HK stocks | 28 | Applicable to southbound eligible stocks under HK Stock Connect |
| round lot sell of eligible HK stocks | 29 | Applicable to southbound eligible stocks under HK Stock Connect |

| | | |
|------------------------------------|----|--|
| Odd lot buy of eligible HK stocks | 30 | Applicable to southbound eligible stocks under HK Stock Connect |
| Odd lot sell of eligible HK stocks | 31 | Applicable to southbound eligible stocks under HK Stock Connect |
| Options from ordinary to covered | 32 | Applicable to options transferring from ordinary to covered. |
| Options from covered to ordinary | 33 | Applicable to options transferring from covered to ordinary. |
| Resale Cancellation | 34 | Applicable to enterprise bonds, corporate bonds, private bonds, exchangeable private bonds, subordinated debts, ABS, security firm short-term bonds, and exchangeable corporate bonds in resale cancellation period. |
| Securities lending | 35 | Applicable to contractual order or non-contractual order of securities lending or borrowing. |
| Bond put option and resale | 36 | Applicable to bonds and asset-backed securities in the put option and resale period. |

2) The internal of Real-time Status of Security is 15 seconds.

4.4.3 Announcements

Table 4-11-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|-----------------|------|--------------------------------|
| | Standard Header | Y | MsgType=B |
| 10201 | ChannelNo | Y | Fixed at 0002 |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |

| | | | |
|--|------------------|---|--|
| | Standard Trailer | Y | |
|--|------------------|---|--|

Table 4-11-2 FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|----------|---------------|------|----------------------------|----------|--|
| 999 | TemplateID | Y | Default | Y | TemplateID=4002 |
| 42 | OrigTime | N | None | N | Issuance time of announcements |
| 10201 | ChannelNo | Y | Copy | Y | Channel code |
| 147 2 | NewsID | N | None | N | Unique mark; Empty strings indicate announcement summary, which will be sent repeatedly. Whether an announcement has any missing or revision can also be told by an announcement summary. |
| 148 | Headline | Y | None | N | Announcement title |
| 10209 | RawDataFormat | Y | none | N | format of binary data |
| 95 | RawDataLength | Y | None | N | Length of binary data |
| 96 | RawData | Y | None | N | Binary data Note: non-FAST message |

Announcement Summaries

Announcement summary is an aggregate list of announcement files in text format which have been sent out already.

Table 4-12 Definition of Announcement Summaries

| | | |
|--------------------------|-----------|----------------------------|
| Number of Announcement | BulletNum | Data type: Integer |
| Identity of Announcement | ID1 | Data type: refer to NewsID |

| | | |
|----------------------|-------|-----------------------------------|
| Name of Announcement | NAME1 | Data type: refer to Headline |
| Size of Announcement | SIZE1 | Data type: refer to RawDataLength |
| Time of Announcement | TIME1 | Data type: refer to OrigTime |
| ... | ... | ... |

Below is a simple sample of the content in RawData:

BulletNum=2

ID1=szgg0001

NAME1=中小企业板交易公开信息

SIZE1=100245

TIME1=20071022-09:15:01

ID2=szgg0002

NAME2=深圳证券市场权证交易公开信息

SIZE2=25076

4.4.4 Snapshot Data

Table 4-13-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|-----------------|------|--------------------------------|
| | Standard Header | Y | MsgType=W |
| 10201 | ChannelNo | Y | Channel Code of the snapshot |
| 95 | RawDataLength | Y | Length of data in FAST message |

| | | | |
|----|------------------|---|-------------------|
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-13-2 FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|--------|------------|------|----------------------------|----------|--|
| 999 | TemplateID | Y | Default | Y | TemplateID=4101 |
| 42 | OrigTime | Y | Delta | N | Originated time of data |
| 10201 | ChannelNo | Y | Copy | Y | Channel Code |
| 1500 | MDStreamID | Y | Copy | Y | Category of market data 010=(equities, funds, bonds) snapshot data of cash auction; 020=snapshot data of bond general pledged repo; 030=snapshot data of bond distribution; 040=snapshot data of option auction; 060=After-hour-trading block trade snapshot with close price 061= After-hour-trading block trade snapshot with VWAP (Volume Weighted Average Price) 370=Snapshot of after-hour-trading 410=Snapshot of spot bond trading 630= Real time market data of eligible HK stocks 900=index 910=statistic indicators 920=snapshot data of CNI Indices |

| | | | | | | |
|-------|------------------|-------------|---|------|---|---|
| | | | | | | 930=Real time reference net value of funds |
| 48 | SecurityID | | Y | None | N | Security code |
| 22 | SecurityIDSource | | Y | None | N | Source of security code |
| 8538 | TradingPhaseCode | | Y | Copy | Y | Trading phase code of the product |
| 140 | PrevClosePx | | Y | None | N | Previous close price |
| 8503 | NumTrades | | Y | None | N | Number of trades |
| 387 | TotalVolumeTrade | | Y | None | N | Total volume of trades |
| 8504 | TotalValueTrade | | Y | None | N | Total value of trades |
| 10207 | StockNum | | N | None | N | Number of stock samples |
| 268 | NoMDEntries | | N | None | N | Number of market data entries |
| → | 269 | MDEntryType | Y | None | N | Type of Market Data Entries: 0=buy 1=sell 2=latest price 3=current index 4=open price 5=close price 7=highest price 8=lowest price 9=weighted average price X1=fluctuation 1 X2=fluctuation 2 X3= buy statistics(Volume and Weighted Average Price) X4= sell statistics (Volume and Weighted Average Price) |

| | | | | | |
|--|--|--|--|--|--|
| | | | | | <p> X5= PE ratio 1 X6=PE ratio 2 X7=fund NAV at T-1 X8=real-time NAV of funds (including 10PV of ETF) X9=warrants premium rate Xa=previous close index Xb=open index Xc=max index Xd=min index Xe=up price limit, 999999999.9999 indicates no limit for rise-limit price Xf=down price limit, -999999999.9999 indicates no limit for fall-limit price Xg= position quantity Xh= nominal price Xi= reference price Xj=the rise/fall BP of the weighted average price Xk= previous weighted average close price xl= close index xm = close index 2 (reserved) xn = close index 3 (reserved) xr= price cap of buy order xs= price floor of buy order xt= price cap of sell order xu= price floor of sell order </p> |
|--|--|--|--|--|--|

| | | | | | | | |
|-------|------------------------|-----------------------|-----------|---|------|---|--|
| | | | | | | | xv= latest execution price of matching deal |
| → | 270 | MDEntryPx | | N | None | N | price |
| → | 271 | MDEntrySize | | N | None | N | quantity |
| → | 1023 | MDPriceLevel | | N | None | N | level of a bid/offer in order book Starting from 1 |
| → | 346 | NumberOfOrders | | N | None | N | Number of total orders on this price level “0” indicates doesn’t show |
| → | 73 | NoOrders | | N | None | N | Number of orders disclosed at this price level “0” indicates doesn’t show |
| → | → | 38 | Order Qty | N | None | N | Quantity of orders |
| 1494 | NoComplexEventTimes | | | N | None | N | Number of cooling-off periods of VCM 0 or 1 1 means it’s in the cooling-off period of VCM, next is the starting and ending time of the cooling-off period. |
| → | 1495 | ComplexEventStartTime | | Y | None | N | Starting time of the cooling-off period |
| → | 1496 | ComplexEventEndTime | | Y | None | N | Ending time of the cooling-off period |
| 10233 | NoSubTradingPhaseCodes | | | N | None | N | Number of the trading phase subdivision |
| → | 10234 | SubTradingPhaseCode | | Y | None | N | Trading phase code corresponding to the trading type |
| → | 10235 | TradingType | | Y | None | N | Trading type 1=matching deal 2=negotiated deal 3=click deal 4=inquiry deal |

| | | | | | |
|-------|--------------------|---|------|---|-------------------------------------|
| | | | | | 5=bidding deal |
| 10220 | AuctionVolumeTrade | N | None | N | Volume of matching deal transaction |
| 10221 | AuctionValueTrade | N | None | N | Value of matching deal transaction |

Notes:

1) Market Data Entry for various businesses is listed as below.

| Type of Market Data Entry | Cash market call auctions (010) | Bond general pledged repurchase (020) | Bond Distribution (030) | After-hour trading block trade (060, 061) | HK eligible stocks (630) | Indices (900) | After-hour trading (370) | CNI Indice (920) | Options (040) | Spot bond trading (410) | Real time reference net value of funds (930) |
|---------------------------|---------------------------------|---------------------------------------|-------------------------|---|--------------------------|---------------|--------------------------|-------------------|---------------|-------------------------|--|
| 0 | ● | ● | ● | ● | ● | | ● | | ● | ● | |
| 1 | ● | ● | ● | ● | ● | | ● | | ● | ● | |
| 2 | ● | ● | ● | | ● | | | | ● | ● | |
| 3 | | | | | | ● | | ● | | | |
| 4 | ● | ● | ● | | | | | | ● | ● | |
| 5 | | ● | | | | | | | | ● | |
| 7 | ● | ● | ● | | ● | | | | ● | ● | |
| 8 | ● | ● | ● | | ● | | | | ● | ● | |
| 9 | | ● | | | | | | | | ● | |
| X1 | ● | ● | ● | | | | | | ● | ● | |
| X2 | ● | ● | ● | | | | | | ● | ● | |
| X3 | ● | ● | ● | | | | | | ● | ● | |
| X4 | ● | ● | ● | | | | | | ● | ● | |

| | | | | | | | | | | | |
|----|---|---|--|--|---|---|--|---|---|---|---|
| X5 | ● | | | | | | | | | | |
| X6 | | | | | | | | | | | |
| X7 | ● | | | | | | | | | | |
| X8 | ● | | | | | | | | | | ● |
| X9 | ● | | | | | | | | | | |
| Xa | | | | | | ● | | ● | | | |
| Xb | | | | | | ● | | ● | | | |
| Xc | | | | | | ● | | ● | | | |
| Xd | | | | | | ● | | ● | | | |
| Xe | ● | | | | ● | | | | ● | | |
| Xf | ● | | | | ● | | | | ● | | |
| Xg | | | | | | | | | ● | | |
| Xh | | | | | ● | | | | | | |
| Xi | | | | | ● | | | | ● | | |
| Xj | | ● | | | | | | | | | |
| xk | | ● | | | | | | | | | |
| xl | | | | | | | | ● | | | |
| xm | | | | | | | | ● | | | |
| xn | | | | | | | | ● | | | |
| xr | | | | | ● | | | | | | |
| xs | | | | | ● | | | | | | |
| xt | | | | | ● | | | | | | |
| xu | | | | | ● | | | | | | |
| xv | | ● | | | | | | | | ● | |

2) notes for Type of Market Data Entry

| Type of Market Data Entry | Notes |
|---------------------------|---|
| 0, 1 | <p>Market Data Entry is buy (0), sell (1), where MDEntryPx shows the price, MDEntrySize shows the quantity of orders, MDPriceLevel shows the priority of level, numbered in sequence from 1. A smaller number shows a higher priority (Level 1 data discloses 5 levels at most, and Level 2 data discloses 10 levels at most). NumberOfOrders shows number of total orders on this level. Repeated pairs of NoOrders, OrderQty show the order details at this level (For Level 1 data, not available. For Level 2 data, the first 50 orders at most are disclosed.)</p> <p>For after-hour trading business, only three fields of "MDEntryType", "MDEntryPx", "MDEntrySize" are released.</p> |
| 2 | <p>MDEntryPx shows the latest execution price, When the market category is "010=spot (stocks, funds, etc.) centralized auction trading snapshots" or "040=options centralized auction trading snapshots" , if the securities have closed and there are transactions on the day, the MDEntryPx field indicates the securities' closing price; When the market type is "410 = bond spot trading snapshot quotation" or "020=bond general pledged repurchase transaction matching snapshot market", MDEntrySize represents transaction method that produce the latest price, the specific values are described as follows:</p> <p>0.01=matching deal 0.02=negotiated deal 0.03=click deal 0.04=inquiry deal 0.05=bidding deal No meaning for other fields. If a security doesn't have an execution, this entry will not be released.</p> |
| 3 | MDEntryPx shows the current index value, no meaning for other fields. If an open index is not available, this entry will not be released. |
| 4 | MDEntryPx shows the opening execution price, no meaning for other fields. If a security doesn't have an execution, this entry will not be released. |
| 5 | MDEntryPx shows the closing execution price, no meaning for other fields. |

| | |
|--------|---|
| | If the securities are not closed, this entry will not be published; if the securities are closed and traded on that day, the closing price of the day will be posted; if the securities have closed and no trades have been traded on that day, the previous closing price will be posted. |
| 7 | MDEntryPx shows the highest price, no meaning for other fields. If a security doesn't have an execution, this entry will not be released. |
| 8 | MDEntryPx shows the lowest price, no meaning for other fields. If a security doesn't have an execution, this entry will not be released. |
| 9 | MDEntryPx shows the weighted average price for the execution volume. If a security doesn't have an execution, this entry will not be released. |
| x1 | MDEntryPx shows fluctuation 1, no meaning for other fields. Fluctuation 1 equals the latest price minus the previous close price. If a security doesn't have an execution, this entry will not be released. |
| x2 | MDEntryPx shows fluctuation 2, no meaning for other fields. Fluctuation 2 equals the latest price minus the last latest price. If an open price is available, Fluctuation 2 equals the latest price minus the previous close price. If a security doesn't have an execution, this entry will not be released. |
| x3, x4 | This entry is the aggregate total order of buy (x3), sell (x4) within the effective auctions range in the order book, where MDEntryPx shows the weighted average price of order quantity, MDEntrySize shows the total quantity of orders, no meaning for other fields. |
| x5 | MDEntryPx shows PE ratio 1, no meaning for other fields. This entry is only released for equities. |
| x6 | MDEntryPx shows PE ratio 2, no meaning for other fields. This entry is for reservation and not released currently. |
| x7 | MDEntryPx shows NAV of funds, no meaning for other fields. NAV is generally at T-1. For some funds (overseas market invested funds), it may show NAV at T-x ($x \geq 1$, e.g. funds invested in the US market, $x=2$). This entry is only released for funds. |
| x8 | MDEntryPx shows the real-time NAV of funds (including 10PV of ETF), no meaning for other fields. This entry is only released for funds. |

| | |
|----|---|
| x9 | MDEntryPx shows the warrants premium rate, no meaning for other fields. This entry is only released for warrants. |
| xa | MDEntryPx shows the previous close index, no meaning for other fields. |
| xb | MDEntryPx shows the open index, no meaning for other fields. If an open index is not available, this entry will not be released. |
| xc | MDEntryPx shows the highest index, no meaning for other fields. If an open index is not available, this entry will not be released. |
| xd | MDEntryPx shows the lowest index, no meaning for other fields. If an open index is not available, this entry will not be released. |
| xe | MDEntryPx shows the up price-limit, no meaning for other fields. 999999999.9999 indicates no limit for rise-limit price. For HK eligible stocks, it represents the up price limit when in a cooling-off period. It represents the up price limit of closing auction when in a closing auction period. |
| xf | MDEntryPx shows the down price-limit, no meaning for other fields. For securities whose price could be negative, -999999999.9999 indicates no limit for fall-limit price; while for securities whose price could not be negative, this field represents price tick which indicates no limit for fall-limit price. For instance, here stays 0.01 for stock cash auctions. For HK eligible stocks, it represents the down price limit when in a cooling-off period. It represents the down price limit of closing auction when in a closing auction period. |
| xg | MDEntrySize shows the position quantity of an option contract, no meaning for other fields. |
| xh | MDEntryPx shows the nominal price, no meaning for other fields. |
| xi | MDEntryPx shows the reference price, no meaning for other fields. For HK eligible stocks, it represents the reference price when in a cooling-off period. It represents the reference price of closing auction when in a closing auction period, it represents the reference price of opening auction when in opening auction period. For option auction, it represents the circuit breaker reference price. |
| xj | MDEntryPx shows the rise/fall BP of the weighted average price, no meaning for other fields. |

| | |
|----|---|
| | <p>The rise/fall BP of the weighted average price equals to the difference of the weighted average interest rate on the real-time quantity minus previous closing weighted average interest rate times 100, rounding to digits.</p> <p>This entry is only released for pledged repurchase.</p> <p>If a security doesn't have an execution, this entry will not be released.</p> |
| xk | <p>MDEntryPx shows the previous closing weighted average interest rate of a pledged repurchase, no meaning for other fields.</p> <p>This entry is only released for pledged repurchase.</p> |
| xl | MDEntryPx shows the closing index. |
| xm | Reserved |
| xn | Reserved |
| xr | <p>MDEntryPx shows the price cap of buy order, no meaning for other fields.</p> <p>For HK eligible stocks, it represents the price cap of buy order of opening auction when in opening auction period.</p> |
| xs | <p>MDEntryPx shows the price floor of buy order, no meaning for other fields.</p> <p>For HK eligible stocks, it represents the price floor of buy order of opening auction when in opening auction period.</p> |
| xt | <p>MDEntryPx shows the price cap of sell order, no meaning for other fields.</p> <p>For HK eligible stocks, it represents the price cap of sell order of opening auction when in opening auction period.</p> |
| xu | <p>MDEntryPx shows the price floor of sell order, no meaning for other fields.</p> <p>For HK eligible stocks, it represents the price floor of sell order of opening auction when in opening auction period.</p> |
| xv | <p>MDEntryPx shows the latest price of the matching deal, no meaning for other fields.</p> <p>If a security doesn't have an execution, this entry will not be released.</p> |

3) Virtual matched price in the call auction are showed in bid/offer price level, where buy 1 and sell 1 show virtual matched price and quantity, buy 2/sell 2 shows the bid left quantity /offer left quantity at this virtual matched price. Suppose the virtual matched price is 15.4000, matched quantity is 3200, bid left quantity is 1200, then the following Market Data Entry shall show in the snapshot.

| MDEntryType | MDEntryPx | MDEntrySize | MDPriceLevel |
|-------------|-----------|-------------|--------------|
| 0 | 15.4000 | 3200.00 | 1 |

| | | | |
|---|---------|---------|---|
| 1 | 15.4000 | 3200.00 | 1 |
| 0 | 0.0000 | 1200.00 | 2 |

4) The first 2 digits of “TradingPhaseCode” are used, the value of each digit is explained as follows:

4.1) The value of the No.0 digit of “TradingPhaseCode” is as follows:

| Trading phase code | Cash market call auctions (010) | Bond pledged general repurchase (020) | Bond Distribution (030) | Options (040) | After-hour trading block trade (060, 061) | After-hour trading (370) | Spot bond trading (410) |
|------------------------------------|---------------------------------|---------------------------------------|-------------------------|---------------|---|--------------------------|-------------------------|
| S=start (before the market opened) | ● | ● | ● | ● | ● | ● | ● |
| O=Opening call auction | ● | | | ● | | | |
| T=Continuous bidding | ● | ● | ● | ● | ● | ● | ● |
| B=Closed | ● | ● | ● | ● | ● | ● | ● |
| C=Closing call auction | ● | | | ● | | | |
| E=Closed market | ● | ● | ● | ● | ● | ● | ● |
| H=Temporary trading halts | ● | | | ● | ● | ● | |
| A=After-hours Dealing | | | | | ● | ● | |
| V=Volatility interruption | ● | | | ● | | | |

| Trading phase code | Indices (900) | HK eligible stocks (630) | CNI Indice (920) | Real time reference net value of funds (930) |
|-----------------------------------|---------------|--------------------------|-------------------|---|
| S=start(before the market opened) | | ● | ● | ● |
| O=Opening call auction | ● | ● | | ● |

| | | | | |
|---------------------------|---|---|---|---|
| T=Continuous bidding | ● | ● | ● | ● |
| B=Closed | | ● | | ● |
| C=Closing call auction | | ● | | ● |
| E=Closed market | ● | ● | ● | ● |
| H=Temporary trading halts | | ● | | ● |
| A=After-hours Dealing | | | | |
| V=Volatility interruption | | | | ● |

4.2) The value of the No.1 digit of the transaction phase code is as follows:

| Trading phase code | Cash market call auctions (010) | Bond general pledged repurchase (020) | Bond Distribution (030) | Options (040) | After-hour trading block trade (060, 061) | After-hour trading (370) | Spot bond trading (410) | Real time reference net value of funds (930) |
|-------------------------|---------------------------------------|--|-------------------------------|------------------|--|--------------------------------|-------------------------------|---|
| 0=normal status | ● | ● | ● | ● | ● | ● | ● | ● |
| 1=All day suspension | ● | ● | ● | ● | ● | ● | ● | ● |

5) The first digit of "SubTradingPhaseCode" is used, the value of each digit is explained as follows:

5.1) The value of the No.0 digit of "SubTradingPhaseCode" is:

| SubTradingPhaseCode | Matching deal | Negotiated deal | Click deal | Inquiry deal | Bidding deal |
|-----------------------------------|---------------|-----------------|------------|--------------|--------------|
| S=start(before the market opened) | ● | ● | ● | ● | ● |

| | | | | | |
|--|---|---|---|---|---|
| O=Opening call auction | ● | | | | |
| T=Continuous bidding | ● | ● | ● | ● | ● |
| B=Closed | ● | ● | ● | ● | ● |
| E=Closed market | ● | ● | ● | ● | ● |
| H=Temporary trading halts | ● | ● | ● | ● | ● |
| V=Circuit breaker stage/close the market to resume aggregate auction | ● | | | | |

6) The value of the following fields for Real time reference net value of funds (MDStreamID: 930) is fixed to 0:
PrevClosePx、NumTrades、TotalVolumeTrade、TotalValueTrad

4.4.5 Tick Data

Tick data contains order tick and transaction tick, which are both sent out in the same data stream according to the originated time. The sequence number of order tick and transaction tick in the same channel (ApplSeqNum) is in a sequence order.

There are two sending mode for tick data:

Mode 1, send order tick data in UA201 message, and transaction tick data in UA202 message.

As order data and transaction data may alternately present (in extreme circumstance one order and one transaction alternately present), under this mode, two types of data are packaged into different STEP messages, which lead to large load occupied by the STEP message head, low encode and decode efficiency, and high bandwidth occupations.

Mode 2, send both order tick data and transaction tick data in UB001 message.

Package order tick data and transaction tick data into one STEP message may lower the load occupied by the message head, increase the

encode and decode efficiency and lower the bandwidth occupations.

Default sending mode of MDGW is Mode 1, and participants can modify the configuration of MDGW to adopt Mode 2.

4.4.5.1 Order Tick

Table 4-14-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|-------------------------------------|
| | Standard Header | Y | MsgType=UA201 |
| 10201 | ChannelNo | Y | Channel Code of the tick order data |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-14-2 FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|--------|------------|------|----------------------------|----------|---|
| 999 | TemplateID | Y | Default | Y | TemplateID=4201 |
| 10201 | ChannelNo | Y | Copy | Y | Channel Code |
| 1181 | ApplSeqNum | Y | Increment | Y | Message record number Starting from 1 |
| 1500 | MDStreamID | Y | Copy | Y | Category of market data 011=(equities, funds, bonds) tick data of cash auction; |

| | | | | | |
|----|------------------|---|------|---|--|
| | | | | | 021= tick data of bond general pledged repo; 041= tick data of option auction; 051= tick interest quote data of negotiable trade 052= tick quote data of negotiable trade 071= tick data of security lending 411= tick data of spot bond trading's matching deal 413= tick data of spot bond trading's click deal 415= tick data of spot bond trading's declaration of intent 416= tick data of spot bond trading's bidding deal 417= tick data of spot bond trading's large amount matching deal |
| 48 | SecurityID | Y | None | N | Security code |
| 22 | SecurityIDSource | Y | None | N | Source of security code |
| 44 | Price | Y | None | N | Order price |
| 38 | OrderQty | Y | None | N | Order quantity |
| 54 | Side | Y | None | N | Side of buy or sell 1=buy 2=sell G: borrow F: lend |
| 40 | OrdType | N | None | N | Type of order 1: market price 2: limit price |

| | | | | | |
|-------|------------------|---|-------|---|--|
| | | | | | U: Same-side Best Price |
| 664 | ConfirmID | N | None | N | Confirmed ID of a quote When ConfirmID is null, here means an indication of interest Otherwise it means a quote. |
| 8911 | ExpirationDays | N | None | N | expiration, in days |
| 8906 | ExpirationType | N | None | N | Type of expiration |
| 60 | TransacTime | Y | Delta | N | Time of order |
| 10184 | Contactora | N | none | N | contact person |
| 10185 | ContactInfo | N | None | N | Contact information |
| 117 | QuoteID | N | none | N | Quote message ID, applicable to click deal market data only |
| 10211 | MemberID | N | none | N | Transaction member's ID |
| 10212 | InvestorType | N | none | N | Investor type |
| 10213 | InvestorID | N | none | N | Investor ID |
| 10214 | InvestorName | N | none | N | Investor name |
| 10215 | TraderCode | N | none | N | Trader code |
| 10216 | SettlPeriod | N | none | N | Settlement period |
| 63 | SettlType | N | none | N | Settlement type |
| 10219 | Memo | N | none | N | Memo |
| 198 | SecondaryOrderID | N | none | N | Secondary Exchange Order ID MDStreamID=416(bidding deal tick), indicates bidding session ID |
| 10238 | BidTransType | N | none | N | Bid transaction type 1=Bid reservation declaration 2=Bid initiation declaration |

| | | | | | |
|-------|-----------------|---|------|---|--|
| | | | | | 3=Bid price declaration |
| 10239 | BidExecInstType | N | none | N | Bid transaction method |
| 1148 | LowLimitPrice | N | none | N | Low limit price |
| 1149 | HighLimitPrice | N | none | N | High limit price Non-existent or 0= No high limit price |
| 110 | MinQty | N | none | N | Minimum transaction quantity |
| 75 | TradeDate | N | none | N | Trade date |

4.4.5.2 Transaction Tick

Table 4-15-1 STEP Message Layer Format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|--------------------------------------|
| | Standard Header | Y | MsgType=UA202 |
| 10201 | ChannelNo | Y | Channel Code of the transaction tick |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body |
| | Standard Trailer | Y | |

Table 4-15-2 FAST Message Layer Format

| Remark | Field Name | Must | FAST Instruction Character | Occupied | Notes |
|--------|------------|------|----------------------------|----------|-----------------|
| 999 | TemplateID | Y | Default | Y | TemplateID=4202 |
| 10201 | ChannelNo | Y | Copy | Y | Channel Code |

| | | | | | |
|-------|---------------|---|-----------|---|---|
| 1181 | ApplSeqNum | Y | Increment | Y | Message record number Starting from 1 |
| 1500 | MDSStreamID | Y | Copy | Y | Category of market data 011=(equities, funds, bonds) tick data in call auction of spot market; 021= tick data of bond general pledge-style repo; 041= tick data of call auction in options; 051= tick data of indication of interest of negotiable trade 052= tick data of quote of negotiable trade 071= tick data of security lending 411= tick data of spot bond trading's matching deal 412= tick data of spot bond trading's negotiated deal 413= tick data of spot bond trading's click deal 414= tick data of spot bond trading's inquiry deal 416= tick data of spot bond trading's bidding deal 417= tick data of spot bond trading's large amount matching deal |
| | | | | | |
| 10116 | BidApplSeqNum | N | None | N | Index of buy order Starting from 1, 0 stands for no related orders |

| | | | | | |
|-------|------------------|---|-------|---|---|
| 10117 | OfferApplSeqNum | N | None | N | Index of sell order Starting from 1, 0 stands for no related orders |
| 48 | SecurityID | Y | None | N | Security code |
| 22 | SecurityIDSource | Y | None | N | Source of security code |
| 31 | LastPx | N | None | N | Transaction price |
| 32 | LastQty | Y | None | N | Transaction volume |
| 150 | ExecTrype | Y | None | N | Type of Execution 4=Cancelled, voluntary or automatic cancellation execution report F=Trade, transaction execution report |
| 60 | TransacTime | Y | Delta | N | Time of transaction |
| 10216 | SettlPeriod | N | None | N | Settlement period |
| 63 | SettlType | N | None | N | Settlement type |
| 198 | SecondaryOrderID | N | none | N | Secondary Exchange Order ID MDStreamID=416(bidding deal tick), indicates bidding session ID |
| 10239 | BidExecInstType | N | none | N | Bid transaction method 1=single subject winning the bid 2=multiple subjects single price winning the bid 3=multiple subjects multiple price winning the bid |
| 10243 | MarginPrice | N | none | N | Marginal price The bidding transaction method is used to reveal the marginal price of the bidding transaction when the bidding is won by multiple entities at a single price or the bidding is won by |

| | | | | | |
|--|--|--|--|--|--|
| | | | | | multiple entities at multiple prices; this field is meaningless for other bidding transaction methods, fixed fill -999999999.9999. |
|--|--|--|--|--|--|

4.4.5.3 Tick order and tick transaction

Table 4-14-1 STEP message layer format

| Remark | Field Name | Must | Notes |
|--------|------------------|------|--|
| | Standard Header | Y | MsgType=UB001 |
| 10201 | ChannelNo | Y | Channel Code of the tick data |
| 95 | RawDataLength | Y | Length of data in FAST message |
| 96 | RawData | Y | FAST Message Body, Message format refer to TemplateID = 4201 and TemplateID = 4202 |
| | Standard Trailer | Y | |

注:

1) VSS can differentiate tick order and tick transaction by TemplateID in Fast data flow.

5 DATA DICTIONARY

5.1 Type of Data

Table 5-1 Definition of Data Type

| Type of Data | Definition of Type | Notes |
|----------------|--------------------|---|
| Price | N13(4) | Price |
| Qty | N15 (2) | Quantity |
| Amt | N18 (4) | Amount |
| SeqNum | N18 | Sequence number, positive number |
| Boolean | C1 | 'Y'=True / Yes, 'N'=False / No |
| Length | N9 | Length Means the length of data in byte, positive number |
| UTCTimeStamp | C21 | Stamp of UTC (Universal Coordinated Time) time YYYYMMDD-HH:MM:SS.sss YYYY=0000-9999, MM=01-12, DD=01-31, HH=00-23, MM=00-59, SS=00-60 (seconds), sss=000-999 (milliseconds) Note: Time stamp is transmitted in int64 in Fast, the format is YYYYMMDDHHMMSSsss. |
| LocalTimeStamp | C21 | Stamp of local time YYYYMMDD-HH:MM:SS.sss YYYY=0000-9999, MM=01-12, DD=01-31, HH=00-23, MM=00-59, SS=00-60 (seconds), sss=000-999 (milliseconds) Note: Time stamp is transmitted in int64 in Fast, the format is YYYYMMDDHHMMSSsss. |
| NumLnGroup | N9 | Repeated number Means the number of repeated group, positive number |
| LocalMktDate | C8 | Date of local market Format: YYYYMMDD, YYYY=0000-9999, MM=01-12, DD=01-31 Note: Date is transmitted in uint32 in Fast, the format is YYYYMMDD. |

Notes:

1) Notes for Type of Data

- ✓ Cx stands for character string, 'x' stands for the max length of string. The characters in a string can only be numbers, capital letters, small letters and spaces, unless it is expressly stated. Spaces needn't to be added when the actual length of character string is shorter than the max length. Character string uses UTF-8 coding.
- ✓ Nx stands for decimal integer, 'x' stands for the maximum number of digits (not including Plus-Minus sign). Integers can be positive or negative numbers unless it is expressly stated.
- ✓ Nx(y) stands for floating numbers, 'x' stands for the total digit number of integer and decimal, not including the decimal point. 'y' stands for the digit number of decimal, zeros should be added when there are no adequate number. For instance, for N5(3) 18.460 is legal while neither 18.46 nor 18.4600 is legal at all. The floating number can be positive or negative, unless it is expressly stated.

5.2 Fields Definition of Session Layer

Table 5-2 Definition of Session Layer

| Tag | Field Name | Type | Notes |
|------|------------------|------------------|---|
| 49 | SenderCompID | C20 | ID of receiver |
| 52 | SendingTime | UTCTimestam p | Sending time of message |
| 56 | TargetCompID | C20 | ID of sender |
| 58 | Text | C200 | Text, Could include Chinese characters, means 200 bytes at maximum |
| 347 | MessageEncoding | C16 | Character coding type in the message coding UTF8 |
| 1408 | DefaultCstmAppID | C32 | Default application version ID in FIX message of this session. This tag |

| | | | |
|--|--|--|---|
| | | | <p>is a further requirement to tag1137+tag1407.</p> <p>Should be STEP1.20_SZ_n.xy, where n.xy is the Communication version. For instance, when the Communication version is Ver1.00, this tag should be STEP1.20_SZ_1.00. When the Communication version is Ver1.01, this tag should be STEP1.20_SZ_1.01.</p> |
|--|--|--|---|

5.3 Fields Definition of Business Layer

Table 5-3 Definition of Business Layer

| Tag | Field Name | Type | FAST Type | Notes |
|-----|------------------|--------------------|-----------|--|
| 22 | SecurityIDSource | C4 | String | Source of security code 102=Shenzhen Stock Exchange 103=Hong Kong Exchange |
| 31 | LastPx | Price | Int64 | Transaction price |
| 32 | LastQty | Qty | Int64 | Transaction volume |
| 38 | OrderQty | Qty | Int64 | Number of orders |
| 40 | OrdType | C1 | String | Type of orders 1: market price 2: limit price U: best price of this party |
| 42 | OrigTime | LocalTimest amp | String | Time of origination |

| | | | | |
|-----|---------------|--------------------|--------|--|
| 44 | Price | Price | Int64 | Price of orders |
| 45 | RefSeqNum | SeqNum | Int64 | Sequence number of reference |
| 48 | SecurityID | C8 | String | Security code |
| 54 | Side | C1 | String | Side of buy or sell 1=buy 2=sell G: borrow F: lend |
| 58 | Text | C8 | String | Text string in free format, Could include Chinese characters, means 200 bytes at maximum Exceeding characters will be cut off automatically. |
| 60 | TransacTime | LocalTimest amp | String | Time of orders |
| 63 | SettlType | N3 | ulnt16 | Settlement type 103=Multilateral netting 104=Gross settlement |
| 73 | NoOrders | NumInGrou p | ulnt32 | Number of orders disclosed at this price level |
| 75 | TradeDate | LocalMktDat e | ulnt32 | Trade date |
| 95 | RawDataLength | Length | N/A | Length of binary data |
| 96 | RawData | C* | N/A | variable-length binary data |
| 110 | MinQty | Qty | Int64 | Minimum transaction quantity |
| 117 | QuotID | C10 | String | Quotation message ID |
| 140 | PrevClosePx | Price | Int64 | Previous close price |

| | | | | |
|-----|---------------------|----------------|--------|--|
| 148 | Headline | C128 | N/A | Headline of announcements Could include Chinese characters, means 128 bytes at maximum |
| 150 | ExecType | C1 | String | Type of execution 4-Cancelled, means cancelled F=Trade, means have executed |
| 198 | SecondaryOrderID | C16 | String | Secondary Exchange Order ID |
| 268 | NoMDEntries | NumInGroup | uint32 | Number of market data entries |
| 269 | MDEntryType | C2 | String | Type of market data entries |
| 270 | MDEntryPx | N18(6) | Int64 | Price |
| 271 | MDEntrySize | Qty | Int64 | Quantity |
| 291 | FinancialStatus | C15 | String | Security status A=listed companies morning disclosure B= listed companies afternoon disclosure Can display 8 status concurrently at most, separate by spaces. |
| 336 | TradingSessionID | C4 | string | ID of trading session 1=intra-day |
| 340 | TradSesStatus | N4 | uint32 | Status of trading session |
| 341 | TradSesStartTime | LocalTimeStamp | string | Starting time of trading session |
| 345 | TradSesEndTime | LocalTimeStamp | string | Ending time of trading session |
| 372 | RefMsgType | C8 | String | Message type of rejected messages |
| 379 | BusinessRejectRefID | C10 | String | Business Layer ID of the rejected message |

| | | | | |
|------|----------------------|--------|--------|--|
| 380 | BusinessRejectReason | N5 | ulnt32 | Reasons of rejection 20106=error in field value 20107=message type not supported 29999=others |
| 346 | NumberOfOrders | N9 | Int64 | Number of total orders at this price level |
| 387 | TotalVolumeTrade | Qty | Int64 | Total volume of trades |
| 625 | TradingSessionSubID | C4 | string | Sub-ID of trading session |
| 664 | ConfirmID | C8 | String | Confirmed ID of a quote |
| 708 | PosAmt | Amt | Int64 | Remaining amount of intraday |
| 834 | ThredholdAmount | Amt | Int64 | Initial amount of each day |
| 999 | TemplateID | N4 | ulnt32 | ID of template |
| 1023 | MDPriceLevel | N2 | ulnt32 | level of a bid/offer in order book |
| 1148 | LowLimitPrice | Price | Int64 | Low limit price |
| 1149 | HighLimitPrice | Price | Int64 | High limit price Non-existent or 0=No high limit price |
| 1181 | ApplBegSeqNum | SeqNum | Int64 | Sequence number of messages |
| 1182 | ApplBegSeqNum | SeqNum | Int64 | Starting sequence number |
| 1183 | ApplEbdSeqNum | SeqNum | Int64 | Ending sequence number |
| 1189 | TimeTo Expiration | N4 | ulnt32 | Expiration, in days |
| 1300 | MarketSegmentID | C8 | string | Code of market segment |
| 1301 | MarketID | C8 | string | Market code XHKG=HK connect |
| 1328 | Reject Text | C16 | String | Explanation for reject reasons Could include Chinese characters, means 16 bytes at maximum |
| 1350 | ApplLastSeqNum | SeqNum | Int64 | Record number of the last market data |

| | | | | |
|-------|-----------------------|--------------------|--------|---|
| | | | | message |
| 1472 | NewsID | C8 | String | Index of announcements / value-added information |
| 1494 | NoComplexEventTimes | NumInGroup | UInt32 | Number of cooling-off periods of VCM |
| 1495 | ComplexEventStartTime | LocalTimest amp | String | Starting time of the cooling-off period |
| 1496 | ComplexEventEndTime | LocalTimest amp | string | Ending time of the cooling-off period |
| 1500 | MDStreamID | C3 | String | Market data type |
| 8503 | NumTrades | N18 | Int64 | Number of trades |
| 8504 | TotalValueTrade | Amt | Int64 | Total value of trades |
| 8538 | TradingPhaseCode | C8 | String | Trading phase code of the product |
| 8901 | SecurityPreName | C4 | String | Prename of security |
| 8906 | ExpirationType | N2 | UInt32 | Type of expiration 1 stands for fixed term |
| 8911 | ExpirationDays | N4 | UInt32 | Expiration, in days |
| 8912 | FixedPriceType | N1 | UInt32 | Type of fixed price, suitable for After-hour-trading block trade |
| 8934 | VersionCode | C16 | String | Version code |
| 8935 | UserNum | N4 | UInt32 | Number of users |
| 10076 | ResendStatus | N2 | UInt32 | Status of resending |
| 10077 | ResendType | N2 | UInt32 | Type of resending |
| 10116 | BidApplSeqNum | SeqNum | Int64 | Index of buy order |
| 10117 | OfferApplSeqNum | SeqNum | Int64 | Index of sell order |
| 10184 | Contactord | C12 | String | Contact person |

| | | | | |
|-------|----------------------|------------|--------|---|
| | | | | Could include Chinese characters, means 12 bytes at maximum |
| 10185 | ContactInfo | C30 | String | Contact information Could include Chinese characters, means 30 bytes at maximum |
| 10201 | ChannelNo | N4 | ulnt32 | Channel code |
| 10202 | NoSwitch | NumInGroup | ulnt32 | Number of switches |
| 10203 | SecuritySwitchType | N4 | ulnt32 | Type of switches |
| 10204 | SecuritySwitchStatus | Boolean | String | Status of switch |
| 10205 | EndOfChannel | Boolean | String | Ending mark of channel |
| 10207 | StockNum | N9 | ulnt32 | Number of stock samples |
| 10208 | NoMDStreamID | NumInGroup | ulnt32 | Number of market data types |
| 10209 | RawDataFormat | C8 | String | Format of Binary data, such as TXT, PDF, DOC etc. |
| 10210 | AmountsStatus | C1 | String | Status of amounts 1=amounts cannot be used 2=amounts can be used |
| 10211 | MemberID | C6 | String | Dealers code |
| 10212 | InvestorType | C2 | String | Investor type 01=Self-employed 02=Asset Management 03=Institutional Broker 04=Personal broker |
| 10213 | InvestorID | C10 | String | Investor ID |

| | | | | |
|-------|------------------------|------------|--------|--|
| 10214 | InvestorName | C120 | String | Investor name |
| 10215 | TraderCode | C8 | String | Trader code |
| 10216 | SettlPeriod | N2 | ulnt8 | Settlement period |
| 10219 | Memo | C160 | String | Memo Which could contain Chinese characters, up to 160 bytes |
| 10220 | AuctionVolumeTrade | Qty | Int64 | Auction Volume of matching deal |
| 10221 | AuctionValueTrade | Amt | Int64 | Auction value of matching deal |
| 10233 | NoSubTradingPhaseCodes | NumInGroup | ulnt32 | Number of the trading phase subdivision |
| 10234 | SubTradingPhaseCode | C8 | String | Trading phase code corresponding to the trading type |
| 10235 | TradingType | N1 | ulnt32 | Trading type 1=matching deal 2=negotiated deal 3=click deal 4=inquiry deal 5=bidding deal |
| 10238 | BidTransType | N2 | ulnt32 | Bid transaction type 1=Bid reservation declaration 2=Bid initiation declaration 3=Bid price declaration |
| 10239 | BidExecInstType | N2 | ulnt32 | Bid transaction method 1=single subject winning the bid 2=multiple subjects single price winning the bid |

| | | | | |
|-------|-------------|-------|-------|---|
| | | | | 3=multiple subjects multiple price winning the bid |
| 10243 | MarginPrice | Price | Int64 | <p>Marginal price</p> <p>The bidding transaction method is used to reveal the marginal price of the bidding transaction when the bidding is won by multiple entities at a single price or the bidding is won by multiple entities at multiple prices.</p> |

THE END