BTS2 FIX Certification Pack

Version 1.12
10 October, 2019

Document Revision

Version	Author	Description of Version	Date Completed
1.01	Ong Kian Wah	This document describes the BURSA BTS2 FIX Certification for Module A,B and C	15 April, 2013
1.02	Ong Kian Wah	Updated : Module A, B and C Added : Module D	15 May, 2013
1.03	Ong Kian Wah	Module E and F E1.01 : Limit-Day Orders with Minimum Quantity would be available in next release(17/06/2013).	31 May, 2013
1.04	Ong Kian Wah	Updated : Module E E1.01 : Limit-Day Orders with MinQTY is supported on this release.	04 June, 2013
1.05	Ong Kian Wah	Added : A4.08 Updated : Module F F1 – Single Quote per security F2 – Multiple Quotes per security F3 – Multiple Quotes with different security	07 June, 2013
1.06	Ong Kian Wah	Removed : A4.06 (replaces with A4.08) Updated : A4.01(optional) Updated : Module D	26 June, 2013
1.07	Ong Kian Wah	Removed : D1.05 Updated : Module D – Only Seller can initiate DBT	05 October, 2013
1.08	Ong Kian Wah	Added : Module E.E4 Added : Module G	01 August, 2014
1.09	Ong Kian Wah	Added : Module G4(GTC)	01 October, 2017

1.10	Ong Kian Wah	Updated : Move A1.04 to E.E5(RSS) Updated : Move A1.05 to E.E6(PDT) Added : Module E.E7(IDSS)	05 February, 2018
1.11	Ong Kian Wah	Added : Module E.E8(LOC/MOC) **(Self-certification)** Added : Module E.E9(LOO/MOO) **(Self-certification)** Added : Module E.E10(Iceberg) **(Self-certification)** Added : Module E.E11(OCO) **(Self-certification)**	10 December, 2018
1.12	Ong Kian Wah	Updated : Module A, C and G mandatory effective 29 September 2019 Added : Module E.E12(PSS) Updated : Module F support PSS	10 October. 2019

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1. Introduction

Audience and Purpose

The purpose of this document is to provide test cases and other necessary details to customers for successful completion of the BTS2 FIX certification.

This FIX Certification Test Cases Guide is intended to cover a range of functional elements for participant organisations and independent software vendors to certify their application in interfacing with the exchange BTS2 FIX gateway, based on the Financial Information eXchange (FIX) Protocol. The test cases are designed to ensure that a robust platform is in operation between participants and the exchange.

Instruments Used in Certification
Instruments to be used in certification will be provided by Exchange on the certification date.

Testing Arrangements
Prior to undertaking Certification, all participants are required to complete the connectivity setup to the Certification environment. Please refer to the network connection guide document "FIX Certification Environment VPN Connection Guide" at www.bursamalyasia.com\bts2.

Related Documentation
- FIX Certification Environment VPN Connection Guide
- BTS2-Onboarding To Certification Environment Guidelines
- BTS2 FIX Specification–Order Management
- BTS2 FIX Certification Test Log

2. Session Management

The Session Management Test assesses the ability to establish a connection and login. The Session Management Test forms the initial phase of the Certifications Tests. Connection to the system must be maintained throughout the full testing schedule. A failure to maintain connection at any point during the Certification Tests will constitute a failure of the Certification Test.

Please note that if at any point, a *heartbeat* message is not received after the *heartbeatInterval* periods have elapsed, the Customer Test environment will logoff the user and disconnect the session. This will also constitute a failure of the Certification Test.

The FIX Session Management is **prerequisites** prior to the Order Management Certification.

- Logon(A)
- Logout(5)
- Reject(3)
- Resend Request(2)
- Sequence Reset (Gap Fill)(4)
- Test Request(1)
- Heartbeat(0)

Important Note:
Prior to booking for Certification Tests, all participants are required to complete the FIX Session Management and submit the logs to Exchange.

3. Order Management

The Order Management test cases cover all order types supported by Exchange against the exchange rules and requirement.

The Order Management Certification package consists of several module parts;

Module	Description
A. Basic Trading [Mandatory effective 29 September 2019]	• Normal, Odd-Lot & Buy-In Market Segment • Limit and Market Order Types • Day and FAK(IOC) Validities • Order Restrictions Tagging
B. On-Market Married Transaction	• Cross Orders in Normal Market Segment
C. Client Amendment [Mandatory effective 29 September 2019]	• CDS Account Amendment at Order Level
D. Direct Business Transactions	• Trade Capture Report(DBT)
E. Advance Trading	• Other Order Types & Validities • Minimum Quantity • RSS, PDT and IDSS • Market-On-Close(MOC)/Limit-On-Close(LOC) • Market-On-Open(MOO)/Limit-On-Open(LOO) • Iceberg • One-Cancel-Other(OCO) • PSS
F. Market Maker	• Mass Quote • Support PSS(537=100 or 101)

> Implementation and usage of the trading features are subject to current and future Bursa Malaysia Securities rules and regulations, Trading Manual for participant organisations and all other relevant directives.

G. GTD/GTC Order ==[Mandatory effective 29 September 2019]==	• Good-till-Date • Good-till-Cancelled

Unless specified in the test case, the following market states apply:
- Trading session is in *Continuous Trading*;
- Instruments are in *Authorized/Open* mode;

3.1 Module A : Basic Trading

No	Test Case	External Input	Exchange Input	Expected Results
A1	**Normal Market[762=NM]**	**Instrument = INST1**		
01	Limit-Day Order	01.Send Buy Order(Qty=5000) 04.Send Order Modification on Price	02. Send Sell Order(Qty=2000) 05. Send Sell Order(Qty=3000)	03.Partially Matched(Qty=2000) 06.Fully Matched(Qty=3000)
02	Limit-Day Order	01.Send Sell Order(Qty=6000) 04.Send Order Cancellation	02.Send Buy Order(Qty=1200)	03.Partially Matched(Qty=1200) 05.Remaining order qty cancelled
03	Limit-Day Order	01.Send Buy Order(Qty=7000) 04.Send Order Modification(Qty remaining=1000) 07.Send Order Modification(Qty remaining=1000) 10.Send Order Status Request(Optional) 11.Send Order Cancellation	02.Send Sell Order(Qty=2500) 05.Send Sell Order(Qty=500) 08.Send Sell Order(Qty=500)	03.Partially Matched(Qty=2500) 06.Partially Matched(Qty=500) 09.Partially Matched(Qty=500) 12.Remaining order qty cancelled
~~04~~	~~Limit-Day Sell Order, RSS*~~ ~~(54=5)~~	~~01.Send RSS Order(Qty=8000)~~ ~~04.Send Order Modification(Qty remaining=2000)~~ ~~07.Send Order Cancellation~~	~~02.Send Buy Order(Qty=5000)~~ ~~05.Send Buy Order(Qty=1000)~~	~~03.Partially Matched(Qty=5000)~~ ~~06.Partially Matched(Qty=1000)~~ ~~08.Remaining order qty cancelled~~
~~05~~	~~Limit-Day Sell Order, PDT~~ ~~(54=6)~~	~~01.Send PDT Order(Qty=9000)~~ ~~04.Send Order Cancellation~~	~~02.Send Buy order(Qty=5000)~~	~~03.Partially Matched(Qty=5000)~~ ~~05.Remaining order qty cancelled~~
06	Limit-FAK Order	03.Send Sell Order(Qty=10000)	01.Send Buy Order(Qty=2000) 02.Send Buy Order(Qty=3000)	04.Partially Matched(Qty=5000) 05.Remaining order qty expired
07	Market-FAK Order	01.Send Sell Order(Qty=8000)		02.Order rejected by system
08	Market-FAK Order	02.Send Sell Order(Qty=9000)	01.Send Buy Order(Qty=6500)	03.Partially Matched(Qty=6500) 04.Remaining order qty expired
09	Market-FAK Order	02.Send Buy Order(Qty=10000)	01.Send Sell Order(Qty=10000)	03.Full Matched(Qty=10000)

No	Test Case	External Input	Exchange Input	Expected Results
10	Market-Day Order	03.Send Sell Order(Qty=10000) 06.Send Order Cancellation	01.Send Buy Order(Qty=2000) 02.Send Buy Order(Qty=3000)	04.Partially Matched(Qty=5000) 05.Remaining order qty convert to Limit
A2	**Odd-Lot Market[762=OD]**	**Instrument = INST1**		
01	Odd-Lot Limit-Day Order	01.Send Buy Order(Qty=88) 04.Send Order Modification on Price	02.Send Sell Order(Qty=55) 05.Send Sell Order(Qty=33)	03.Partially Matched(Qty=55) 06.Fully Matched(Qty=33)
02	Odd-Lot Limit-Day Order	01.Send Sell Order(Qty=77) 04.Send Order Cancellation	02. Send Buy Order(Qty=66)	03.Partially Matched(Qty=66) 05.Remaining order qty cancelled
A3	**Buy-In Market[762=BI]**	**Instrument = INST2, INST3**		
01	Buy-In Market-FAK Order	02.Send Sell Buy-In Order(Qty=1500)	01.INST2 Buy-In Board(Qty=1000)	03.Partially Matched(Qty=1000) 04.Remaining order qty cancelled
02	Buy-In Market-FAK Order	02.Send Sell Buy-In Order(Qty=2000)	01.INST3 Buy-In Board(Qty=2000)	03.Fully Matched(Qty=2000)
A4	**Other[Normal Market]**	**Instrument = INST4**		
01	Order Mass Action Request [optional] by Client	01. Send FIVE Sell LIMIT Order(Qty=1000) 02. Send Order Mass Action Request		03.All Order Cancelled
02	Unsolicited Order Cancellation by Exchange	01.Send Buy LIMIT Order(Qty=2000) 04.Send Sell LIMIT Order(Qty=3000)	02.Cancel Single Order 05.Send Buy Order(Qty=2000) 07.Cancel Single Order	03.Order cancelled 06.Partially Matched(Qty=2000) 08.Remaining order qty cancelled
03	Unsolicited Mass Order Cancellation by Exchange	01.Send FIVE Buy LIMIT Order(Qty=4000)	02.Cancel Orders by FIX User ID	03.All Order Cancelled
04	Unsolicited Trade Cancellation by Exchange	01.Send Buy Limit Order(Qty=5000)	02.Send Sell Order(Qty=5000) 04.Cancel Trade	03.Fully Matched(Qty=5000) 05.Trade cancelled(Qty=5000)
05	Unsolicited Trade Cancellation by	01.Send Buy Limit Order(Qty=6000)	02.Send Sell Order(Qty=3000)	03.Partially Matched(Qty=3000)

No	Test Case	External Input	Exchange Input	Expected Results
	Exchange	08.Send Order Cancellation	04.Send Sell Order(Qty=2000) 06.Cancel 1st Trade(Qty=3000)	05.Partially Matched(Qty=2000) 07.Trade Cancelled(Qty=3000) 09.Remaining order qty cancelled
~~06~~	~~Order Created by Exchange~~	~~05.Send Order Cancellation(by OrderID)~~	~~01.Create Buy Order behalf(Qty=7000)~~ ~~03.Send Sell Order(Qty=5000)~~	~~02.Order Received by External~~ ~~04.Partially Matched(Qty=5000)~~ ~~06.Remaining order qty cancelled~~
07	Order Restrictions Tagging	01.Send Limit Order with 529 with value below: ~~9 – ASEAN Link~~ E – Algorithmic I – Internet M – DMA R – Broker Assisted		
08	Order Created by Exchange in Buy-In Board Eg, Auto or Manual Buy-In by the Exchanged due to fail trade. Note: The Exchange will submit a GTC or GTD Market Buy-In Buy Order on behalf of Defaulter. *		01.Create Buy-In BUY order on behalf (GTC order, Qty=8000) 03.Send Sell Order(Qty=2000) 05.Send Sell Order(Qty=4000) 08. Create Buy-In BUY order on behalf (GTD order, Qty=9000) 10.Send Sell Order(Qty=6000)	02.Order Received by Defaulter 04.Trade Received by Defaulter 06.Trade Received by Defaulter *07.Order remain in book until cancel** 09.Order Received by Defaulter 11.Trade Received by Defaulter *12.Order remain in book until expired** *This is to inform that any GTC/GTD unmatched order will carry forward to next day until it cancelled or expired.*

3.2 Module B : On-Market Married Transaction

No	Test Case	External Input	Exchange Input	Expected Results
B1	**Normal Market[762=NM]**	**Instrument = INST1**		
01	OMMT/Cross Order	01.Send OMMT Order(Qty=1000)		02.Fully Matched(Qty=1000)
02	OMMT/Cross Order -Rejected	01.Send OMMT Order(Qty=2000) with invalid price		02.Order rejected with 2 execution report

3.3 Module C : Client Amendment

No	Test Case	External Input	Exchange Input	Expected Results
C1	**Normal Market[762=NM]**	**Instrument = INST1**		
01	Client Amendment on without matched order	01.Send Buy Limit-Day Order(Qty=2500) 02.Send Client Amendment 04.Send Order Cancellation		03.Client Amendment rejected 05.Remaining order qty cancelled
02	Client Amendment on Fully matched order	01.Send Buy Limit-Day Order(Qty=3500) 06.Send Client Amendment	02.Send Sell Order(Qty=2000) 04.Send Sell Order(Qty=1500)	03.Partially Matched(Qty=2000) 05.Fully Matched(Qty=1500)
03	Client Amendment on Partially matched order	01.Send Buy Limit-Day Order(Qty=4500) 04.Send Client Amendment 07.Send Order Modification on Price 08.Send Order Cancellation	02.Send Sell Order(Qty=2000) 05.Send Sell Order(Qty=1500)	03.Partially Matched(Qty=2000) 06.Partially Matched(Qty=1500) 09.Remaining order qty cancelled
04	Double Client Amendment	01.Send Buy Limit-Day Order(qty=5500) 04.Send Order Modification on Price 05.Send 1st Client Amendment(Account A to B) 06.Send Order Modification on Qty(qty=6000) *Qty remaining=4000 09.Send 2nd Client Amendment(Account B to C)	02.Send Sell Order(Qty=2000) 07.Send Sell Order(Qty=3000) 10.Send Sell Order(Qty=1000)	03.Partially Matched(Qty=2000) 08.Partially Matched(Qty=3000) 11.Fully Matched(Qty=1000)
05	Client Amendment after market closed	01.Send Buy Limit-Day Order(Qty=6500) 04.Send Order Cancellation 06.Send Client Amendment after market closed	02.Send Sell Order(Qty=2000)	03.Partially Matched(Qty=2000) 05.Remaining order qty cancelled

3.4 Module D : Direct Business Transaction

No	Test Case	External Input	Exchange Input	Expected Results
D1	Inter-Broker	**Broker X(eg, 0024501)** **Dealer A(eg, X001)**	**Broker Y(eg, 0087501)** **Dealer B(eg, Y001)**	
01	TradeCaptureReportRequest(AD)	01.Subscribe for TradeCaptureReport(263=1)		02.TradeCaptureReportRequest Ack
02	TradeCaptureReport -Accept the order	01.Send SELL DBT Order(Qty=10001) 05.Accept the order	02.Accept the order 04.Send SELL DBT Order(Qty=10002)	03.Fully Matched(Qty=10001) 06.Fully Matched(Qty=10002)
03	TradeCaptureReport -Withdraw the order	01.Send SELL DBT Order(Qty=20001) 02.Withdraw the SELL DBT Order	04.Send SELL DBT Order(Qty=20002) 05.Withdraw the Sell DBT Order	03.TradeCaptureReport - Cancel 06.TradeCaptureReport – Cancel
04	TradeCaptureReport -Decline the order	01.Send SELL DBT Order(Qty=30001) 05.Decline the order	02.Decline the order 04.Send SELL DBT Order(Qty=30002)	03.TradeCaptureReport - Decline 06.TradeCaptureReport - Decline
~~05~~	~~TradeCaptureReport~~ ~~-Time out~~	~~01.Send Buy DBT Order(Qty=40001)~~	~~03.Send Buy DBT Order(Qty=40002)~~	~~02.TradeCaptureReport - Cancel~~ ~~04.TradeCaptureReport – Cancel~~
06	TradeCaptureReport -Trade cancellation accepted	01.Send SELL DBT Order(Qty=138000) 04.Send Trade Cancellation request 09.Accept the order 13.Accept Trade Cancellation request	02.Accept the order 06.Accept Trade cancellation request 08.Send SELL DBT Order(Qty=148000) 11.Send Trade Cancellation request	03.Fully Matched(Qty=138000) 05.Trade Pending Cancel 07.Trade Cancelled 10.Fully Matched(Qty=148000) 12.Trade Pending Cancel 14.Trade Cancelled
07	TradeCaptureReport -Trade cancellation Declined	01.Send SELL DBT Order(Qty=238000) 04.Send Trade Cancellation request 09.Accept the order 13.Decline Trade Cancellation request	02.Accept the order 06.Decline Trade cancellation request 08.Send SELL DBT Order(Qty=248000) 11.Send Trade Cancellation request	03.Fully Matched(Qty=238000) 05.Trade Pending Cancel 07.TradeAmend Ack 10.Fully Matched(Qty=248000) 12.Trade Pending Cancel 14.TradeAmend Ack

D2	**Intra-Broker**	**Member X(eg, 0024501)** **Dealer A(eg, X001)**	**Member Y(eg, 0024502)** **Dealer B(eg, X002)**	
01	TradeCaptureReport -Accept the order	01.Send SELL DBT Order(Qty=10000) 05.Accept the order	02.Accept the order 04.Send SELL DBT Order(Qty=20000)	03.Fully Matched(Qty=10000) 06.Fully Matched(Qty=20000)
02	TradeCaptureReport -Trade cancellation	01.Send SELL DBT Order(Qty=30000) 04.Send Trade Cancellation request 07.Accept the order 09.Send Trade Cancellation request	02.Accept the order 06.Send SELL DBT Order(Qty=40000)	03.Fully Matched(Qty=30000) 05.Trade Cancelled 08.Fully Matched(Qty=40000) 10.Trade Cancelled
D3	**Intra-Broker** **Crossing Trade**	**Member X(eg, 0024501)** **Dealer A(eg, X001), Dealer B(eg, X002)**		
01	TradeCaptureReport -Crossing Trade	01.Send Crossing Trade(Qty=338000)		02.Fully Matched(Qty=338000)
02	TradeCaptureReport -Trade cancellation	01.Send Trade Cancellation(D3.01) request		02.Trade Cancelled
03	TradeCaptureReportRequest(AD)	01.Unsubscribe for TradeCaptureReport(263=2)		02.No TradeCaptureReportRequest Ack

3.5 Module E : Advance Trading

Buy Qty	Buy Price	Sell Price	Sell Qty
200	19.00(B1)	19.10(S1)	100
400	18.90(B2)	19.20(S2)	300
600	18.80(B3)	19.30(S3)	500
800	18.70(B4)	19.40(S4)	700
1000	18.60(B5)	19.50(S5)	900

Exchange Reference table for series of buy and sell orders.
Best Buy Price (B1-B5) and Best Sell Price (S1-S5) will provided by Exchange.

No	Test Case	External Input	Exchange Input	Expected Results
E1	MinQty	Instrument = INST1		
01	Limit-Day Orders with Minimum Quantity Market-Day Orders with Minimum Quantity	02.Send Buy Limit-Day Order (Qty=300@S1,MinQty=200) 04.Send Buy Limit-Day Order (Qty=300@S1,MinQty=100) 07.Send Order Modification on qty (Qty remaining=500, MinQty=100) 10.Send Sell Market-Day Order (Qty=3500,MinQty=3500) 12.Send Sell Market-Day Order (Qty=3500,MinQty=3000)	01.Send a series of buy and sell orders 08.Send Sell Order(Qty=500@S1)	03. Order expired, MinQty is not met 05.Partially matched(Qty=100) 06.Remaining order(Qty=200) 09.Fully matched(Qty=500) 11.Order expired, MinQty is not met 13.Fully matched(qty=3000) 14.Remaining order qty convert to Limit (Qty=500@B5)
02	Limit-FAK Orders with Minimum Quantity Market-FAK Orders with Minimum Quantity	02.Send Buy Limit-FAK Order (Qty=300@S1,MinQty=200) 04.Send Buy Limit-FAK Order (Qty=300@S1,MinQty=100) 07.Send Sell Market-FAK Order (Qty=3500,MinQty=3500) 09.Send Sell Market-FAK Order (Qty=3500,MinQty=3000)	01.Send a series of buy and sell orders	03. Order expired, MinQty is not met 05.Partially matched(Qty=100) 06.Remaining order expired(Qty=200) 08.Order expired, MinQty is not met 10.Fully matched(qty=3000) 11.Remaining order expired(qty=500)

E2	**Market At Best**	**Instrument = INST2**		
01	Market At Best(MAB)-Day Orders	02.Send Sell MAB-Day Order(Qty=300) 05.Send Order Modification(Qty remaining=500)	01. Send a series of buy and sell orders 06.Send Buy Order(Qty=500@B1)	03.Partially matched(Qty=200) 04.Remaining order qty convert to Limit (Qty=100@B1) 07.Fully matched(Qty=500)
02	Market At Best(MAB)-FAK Orders	01.Send Buy MAB-FAK Order(Qty=300)		02.Partially matched(Qty=100) 03.Remaining order expired

E3	**Stop Orders**	**Instrument = INST3**		
01	Stop Limit Orders TriggerPriceType=LastTrade(2) TriggerPriceDirection=Up Note: LastDonePrice < TrigerPrice	02.Send Buy Stop Limit-Day order (Qty=200,Order Price=19.20,TriggerPrice=19.08) 04.Send Order Modification on TriggerPrice (Trigger Price=19.10) 05.Send Order Modification on Order Price (Order Price=19.10) 09.Send Order Modification on Qty(Qty=500) 12.Send Order Cancellation	01. Send a series of buy and sell orders 06.Send Buy Order(Qty=100@19.10) 10.Send Sell Order(Qty=300@19.10)	03.Order with trigger in the book but no active(150=0,39=X) 07.Fully matched(qty=100) 08.Stop order is triggered but no matched(150=5,39=0) 11.Partially matched(qty=300) 13.Remaining order qty cancelled
02	Stop/Stop Loss Orders TriggerPriceType=LastTrade(2) TriggerPriceDirection=Down Note: LastDonePrice > TrigerPrice	01.Send Sell Stop Loss-Day order (Qty=3500,Trigger Price=19.00)	03.Send Sell Order(Qty=200@19.00)	02.Order with trigger in the book but no active(150=0,39=X) 04.Fully matched(qty=100) 05.Stop order is triggered(150=5,39=0) 06.Partially matched(qty=2800) 07.Remaining order qty convert to Limit (Qty=700@B5)

E4	**Fill or Kill Orders**	**Instrument = INST4**		
01	Limit-FOK Order		01.Send Buy Order(Qty=1000)	
		02.Send Sell Order(Qty=2000) 04.Send Sell Order(Qty=1000)		03.Order expired 05.Fully Matched(Qty=1000)
02	Market-FOK Order		01.Send Sell Order(Qty=2000)	
		02.Send Buy Order(Qty=2000)		03.Fully Matched(Qty=2000)
E5	**RSS**	**Instrument = INST5(RSS)**		
01	Limit-Day Sell Order, RSS (54=5)	01.Send RSS Order(Qty=8000)*Revised 1 04.Send Order Modification(Qty remaining=2000) 07.Send Order Cancellation	02.Send Buy Order(Qty=5000) 05.Send Buy Order(Qty=1000)	03.Partially Matched(Qty=5000) 06.Partially Matched(Qty=1000) 08.Remaining order qty cancelled
E6	**PDT**	**Instrument = INST6(PDT)**		
01	Limit-Day Sell Order, PDT (54=6)	01.Send PDT Order(Qty=9000) 04.Send Order Cancellation	02.Send Buy order(Qty=5000)	03.Partially Matched(Qty=5000) 05.Remaining order qty cancelled
E7	**IDSS**	**Instrument = INST7(IDSS)**		
01	Limit-Day Sell Order, IDSS (54=I)	01.Send IDSS Order(Qty=10000) 04.Send Order Modification(Qty remaining=2000) 07.Send Order Cancellation	02.Send Buy Order(Qty=5000) 05.Send Buy Order(Qty=1000)	03.Partially Matched(Qty=5000) 06.Partially Matched(Qty=1000) 08.Remaining order qty cancelled

Amend limit to Limit-FOK or Market-FOK is not allowed. FOK EFFECTIVELY MinQty=OrderQty, since MinQty is not allowed in order amendment.

Revised 1 : Revised of RSS rules where RSS orders can only be entered at a price or above the best prevailing sell price.

E8	LOC/MOC	(Self-certification)
01	LOC - BUY Order (59=7) **ON-CLOSE orders can be submitted ONLY before the Pre-Closing phase, i.e. Pre-Opening and Continuous Trading phases.**	01. Send a series of buy and sell orders below BEFORE pre-closing phase *you can select any instrument & price but remain the qty as below.*

01. Send a series of buy and sell orders below BEFORE pre-closing phase
you can select any instrument & price but remain the qty as below.

Instrument A			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
2000	1.99(B1)	2.00(S1)	1000
4000	1.98(B2)	2.01(S2)	3000
3000	1.97(B3)	2.03(S3)	1500

02. Send LOC-Buy Order (**Qty=3000, Price=2.01 or S2***) BEFORE pre-closing phase
If you select different instrument & price, LOC order price equal to your S2 price level.

03. Verify the LOC(triggered) and order book at start of the pre-closing

Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
3000	2.01(LOC)	2.00	1000
2000	1.99	2.01	3000
4000	1.98	2.03	1500
3000	1.97		

04. Verify the LOC(matching) and order book at closing

Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
2000	1.99	2.01	1000
4000	1.98	2.03	1500
3000	1.97		

When triggered, Limit-On-Close(LOC) orders will be converted to LIMIT orders with SESSION(59=S) as validity and if they are not fully matched at Closing, they will be expired automatically.
In addition, triggered LOC orders are checked against Last Price Limits and Static Price Limits.

02	MOC - BUY Order (59=7)	01. Send a series of buy and sell orders below BEFORE pre-closing phase

01. Send a series of buy and sell orders below BEFORE pre-closing phase
* you can select any instrument & price but remain the qty as below.

Instrument B			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
2000	1.99	2.00	1000
4000	1.98	2.01	3000
3000	1.97	2.03	1500

02. Send MOC-Day Buy Order (**Qty=5000**) BEFORE pre-closing phase

03. Verify the MOC(triggered) and order book at start of the pre-closing

Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
5000	(MOC)	2.00	1000
2000	1.99	2.01	3000
4000	1.98	2.03	1500
3000	1.97		

04. Verify the MOC(matching) and order book at closing

Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
2000	1.99	2.03	500
4000	1.98		
3000	1.97		

When triggered, Market-On-Close(MOC) orders will be converted to MARKET orders with SESSION(59=S) as validity and if they are not fully matched at Closing, they will be expired automatically.

The different between MOC and Normal Market Order(40=1) orders with DAY(59=0) as validity.
Normal Market Order will be carry into next trading phase(i.e TAL), if they are not fully matched.

E9	LOO/MOO	(Self-certification)
01	LOO - BUY Order (59=2) **ON-OPEN orders can be submitted ONLY during the first Pre-Opening phase(POP1), i.e. 8:30-9:00AM.**	01. Send a series of buy and sell orders below ON first pre-opening phase ** you can select any instrument & price but remain the qty/TOV as below.*

01. Send a series of buy and sell orders below ON first pre-opening phase
* you can select any instrument & price but remain the qty/TOV as below.

Instrument A(TOP=2.01, TOV=3000)			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
1000	2.03(S3)	2.00(S1)	2000
2000	2.02(B2)	2.01(S2)	3000
1500	1.99(B3)	2.03(S3)	1000

02. Send LOO- Buy Order (**Qty=3500, Price=2.03 or S3***) ON first pre-opening phase
* If you select different instrument & price, LOO order price equal to your S3 price level.

03. Verify the LOO(triggered) and order book at start of the opening

Post-Opening(OP=2.01)			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
1500	1.99	2.01	2000
		2.03	1000

04. Verify the LOO(matching) and order book at continuous-trading

Continuous-Trading			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
500	2.03(LOO)		
1500	1.99		

05. Verify the LOO(Expired) at end of this phase

When triggered, Limit-On-Open(LOO) orders will be converted to LIMIT orders with SESSION(59=S) as validity and partially matched orders will be carry into Continuous Trading(CNT1) phase.
On-Open orders carried into Continuous Trading phase will EXPIRED at the end of this CNT1 phase, i.e 12:30pm.

In addition, triggered LOO orders are checked against Dynamic Price Limits and Static Price Limits.

02	MOO - BUY Order (59=2)	01. Send a series of buy and sell orders below ON first pre-opening phase *you can select any instrument & price but remain the qty/TOV as below.*

01. Send a series of buy and sell orders below ON first pre-opening phase
you can select any instrument & price but remain the qty/TOV as below.

Instrument B(TOP=2.01, TOV=3000)			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
1000	2.03(S3)	2.00(S1)	2000
2000	2.02(B2)	2.01(S2)	3000
1500	1.99(B3)	2.03(S3)	1000

02. Send MOO- Buy Order (**Qty=3500**) ON first pre-opening phase

03. Verify the MOO(triggered) and order book at start of the opening

Post-Opening(OP=2.01)			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
1500	1.99	2.01	2000
		2.03	1000

04. Verify the MOO(matching) and order book at continuous-trading

Continuous-Trading			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
1500	2.01(MOO)	2.03	1000
1500	1.99		

05. Verify the MOO(Expired) at end of this phase

When triggered, Market-On-Open(MOO) orders will only match at Opening Price(OP) and orders will be expired if cannot matched.
Partially matched orders will be converted to LIMIT orders with limit price as Opening Price with SESSION(59=S) as validity and will be carry into Continuous Trading(CNT1) phase.
On-Open orders carried into Continuous Trading phase will EXPIRED at the end of this CNT1 phase, i.e 12:30pm.

**Any order amendment on partially matched order will change the validity from Session(59=S) to Day(59=0). Only 59=0 is supported for inbound at this moment. Day orders will be expired at the end of market closed, i.e 17:30pm.

E10	Iceberg	(Self-certification)

01 | Iceberg Order
LIMIT-DAY-SELL

An Iceberg order has 2 quantities:
-Order Quantity(38)
-Visible Quantity(1138)

Maximum Order Quantity is still 500,000 and minimum Visible Quantity is 10% of Order Quantity.

01. Send Iceberg-LIMIT-DAY Sell order(**Qty=20,000, Price=2.00 or S1, Visible Qty=5,000**)

you can select any instrument & price but remain the qty as above.

Instrument A			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
		2.00(S1)	5,000

02. Send NORMAL-LIMIT-DAY Sell order(**Qty=10,000, Price=2.00 or S1**)

If you select different instrument & price, order price equal to your S1 price level.

Continuous-Trading			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
		2.00(S1)	15,000

03. Send NORMAL-LIMIT-DAY Buy order(**Qty=18,000, Price=2.00 or S1**)

If you select different instrument & price, order price equal to your S1 price level.

04. Verify the order book and matching sequence

Continuous-Trading			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
		2.00(S1)	2,000

MatchSeq#	Order	OrderQty	MatchQty	BalanceQty	MarketQty
1	Iceberg	20,000	5,000	15,000	5,000
2	Normal Sell(02)	10,000	10,000	0	0
3	Iceberg	20,000	3,000	12,000	2,000

Each time the Visible Quantity(i.e 5,000) is FULLY matched, it be replenished until the total Order Quantity is FULLY matched.
Each time the Visible Quantity is replenished, the order will lose its priority and gain a new one based on the latest replenishment's date and time.

02	Continue from E10.01

Continuous-Trading			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
		2.00(S1)	2,000

05. Send NORMAL-LIMIT-DAY Sell order(**Qty=5,000, Price=2.01 or S2**)
* If you select different instrument & price, order price equal to your S2 price level.

Continuous-Trading			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
		2.00(S1)	2,000
		2.01(S2)	5,000

06. Send NORMAL-LIMIT-DAY Buy order(**Qty=15,000, Price=2.01 or S2**)
* If you select different instrument & price, order price equal to your S2 price level.

07. Verify the order book and matching sequence

Continuous-Trading			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
		2.01(S2)	2,000

MatchSeq#	Order	OrderQty	MatchQty	BalanceQty	MarketQty
1	Iceberg	20,000	5,000	15,000	5,000
2	Normal Sell(02)	10,000	10,000	0	0
3	Iceberg	20,000	3,000	12,000	2,000
4	Iceberg	20,000	2,000	10,000	5,000
5	Iceberg	20,000	5,000	5,000	5,000
6	Iceberg	20,000	5,000	0	0
7	Normal Sell(05)	5,000	3,000	2,000	2,000

The entire Order Quantity(i.e 20,000) of an Iceberg order will have priority to match first before next price(i.e. S2).

E11	OCO	(Self-certification)

01	One-Cancel-Other Order
	
	OCO consist of TWO orders linked together:
	- One LIMIT order
	- One STOP order
		Prerequisite: must complete the Module E3(Stop Orders)
		
		01. Send a series of buy and sell orders below
		* you can select any instrument & price but remain the qty as below.
		
		Instrument A
		(table below)
		With condition: LastDonePrice > TrigerPrice, i.e LDP = 2.00
		
		02. Send a OCO order with following requirement:
		  - LIMIT-DAY Sell order(Qty=5,000, Price=2.01 or S2)
		  - STOP-LIMIT-DAY Sell order(Qty=5,000, Price=1.99 or B1, trigger price=1.99 or B1, TriggerPriceType=LastTrade(2) TriggerPriceDirection=Down)
		
		Instrument A
		(table below)
		
		03. Send NORMAL-LIMIT-DAY Buy order(**Qty=1,000, Price=2.00 or S1)**
		* If you select different instrument & price, order price equal to your S1 price level.
		
		Instrument A
		(table below)

Instrument A

Buy Qty	Buy Price	Sell Price	Sell Qty
2000	1.99(B1)	2.00(S1)	1000
4000	1.98(B2)	2.01(S2)	3000
3000	1.97(B3)	2.03(S3)	1500

Instrument A

Buy Qty	Buy Price	Sell Price	Sell Qty
2000	1.99(B1)	2.00(S1)	1000
4000	1.98(B2)	2.01(S2)	8000
3000	1.97(B3)	2.03(S3)	1500

Instrument A

Buy Qty	Buy Price	Sell Price	Sell Qty
2000	1.99(B1)	2.01(S2)	8000
4000	1.98(B2)	2.03(S3)	1500
3000	1.97(B3)		

04. Send NORMAL-LIMIT-DAY Buy order(**Qty=5,000, Price=2.01 or S2**)

* If you select different instrument & price, order price equal to your S2 price level.

Instrument A			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
2000	1.99(B1)	2.01(S2)	3000
4000	1.98(B2)	2.03(S3)	1500
3000	1.97(B3)		

05. Verify the OCO order and trade
- LIMIT-DAY Sell order (Partially matched=2,000, balance=3,000)
- STOP-LIMIT-DAY Sell order (Expired by trading systems)

If LIMIT order is partially or fully matched, the STOP order will be automatically expired. If the STOP order is triggered, the LIMIT order will be automatically expired.

If one of the orders is cancelled by the trader or the Exchange, the other is cancel as well automatically.

Sample of FIX message for OCO

< 8=FIXT.1.1|9=213|35=D|49=012|56=USR|34=577|52=20181206-06:54:04|50=012915|453=1|448=myTraderID|447=C|452=11|11=OCO001|48=9148|762=NM|22=99|1=000000042|38=5000|40=2|44=2.01|54=2|60=20181206-06:54:04|59=0|528=P|529=R|58=LIMIT-ORDER|10=103|

< 8=FIXT.1.1|9=261|35=D|49=012|56=USR|34=578|52=20181206-06:54:04|50=012915|453=1|448=myTraderID|447=C|452=11|11=OCO002|48=9148|762=NM|22=99|1=000000042|38=5000|40=4|44=1.99|54=2|60=20181206-06:54:04|59=0|528=P|529=R|58=STOP-ORDER|583=OCO001|1100=4|1101=1|1102=1.99|1107=2|1109=D|10=084|

02	One-Cancel-Other Order

Instrument A(Continue)			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
2000	1.99(B1)	2.01(S1)	3000
4000	1.98(B2)	2.03(S3)	1500
3000	1.97(B3)		

With condition: LastDonePrice > TrigerPrice, i.e LDP = 2.01

06. Send a OCO order with following requirement:
  - LIMIT-DAY Sell order(Qty=5,000, Price=2.02 or S2)
  - STOP-LIMIT-DAY Sell order(Qty=5,000, Price=1.99 or B1, trigger price=1.99 or B1, TriggerPriceType=LastTrade(2)
                    TriggerPriceDirection=Down)

Instrument A			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
2000	1.99(B1)	2.01(S1)	3000
4000	1.98(B2)	2.02(S2)	5000
3000	1.97(B3)	2.03(S3)	1500

07. Send NORMAL-LIMIT-DAY Sell order(**Qty=1,000, Price=1.99 or B1)**
* If you select different instrument & price, order price equal to your B1 price level.

Instrument A			
Buy Qty	**Buy Price**	**Sell Price**	**Sell Qty**
4000	1.98(B2)	1.99(B1)	4000
3000	1.97(B3)	2.01(S1)	3000
		2.03(S3)	1500

05. Verify the OCO order and trade
  - LIMIT-DAY Sell order (Expired by trading systems)
  - STOP-LIMIT-DAY Sell order (Triggered and convert to LIMIT-DAY, partially match=1,000, balance=4,000)

E12	PSS	Instrument = INSTX(PSS)		
01	Limit-Day Sell Order, PSS (54=V)	01.Send PSS Order(Qty=9000) 04.Send Order Cancellation	02.Send Buy order(Qty=5000)	03.Partially Matched(Qty=5000) 05.Remaining order qty cancelled

3.6 Module F : Market Maker

Table F1.01

Bid Qty	Bid Price	Offer Price	Offer Qty
200	Best Bid	Best Offer	200

Table F1.02

Bid Qty	Bid Price	Offer Price	Offer Qty
300	Best Bid	Best Offer	300

Table F1.03

Bid Qty	Bid Price	Offer Price	Offer Qty
		Best Offer	400

No	Test Case	External Input	Exchange Input	Expected Results
F1	**Normal Market[762=NM]**	**Instrument = INST1**		
01	Submit MassQuote (Table F1.01)	01. Submit 1 quotes (1 bids & 1 offers) for security INST1	02. Send Sell Order(Qty=100)	03. Partially Matched Best Bid (Qty=100)
	Submit MassQuote (Table F1.02) - *ALL previous quotes for INST1 will be cancelled*	04. Submit 1 quotes (1 bids & 1 offers) for security INST1	05. Send Buy Order (Qty=300)	06. Fully Matched Best Offer (Qty=300)
	Submit MassQuote (Table F1.03) - *ALL previous quotes for INST1 will be cancelled*	07. Submit 1 single-sided quote (1 offers) for security INST1	08. Send Buy Order (Qty=300)	09. Partially Matched Best Offer (Qty=300)
	Submit MassQuote to cancel	10. Submit 1 quote with BidPx, BidSize, OfferPx and OfferSize equal to "0"		11. ALL outstanding quotes cancelled.

Table F2.01

Bid Qty	Bid Price	Offer Price	Offer Qty
200	Best Bid	Best Offer	200
200	Best Bid – 1 tick	Best Offer + 1 tick	200
200	Best Bid – 2 tick	Best Offer + 2 tick	200

Table F2.02

Bid Qty	Bid Price	Offer Price	Offer Qty
300	Best Bid	Best Offer	300
300	Best Bid – 1 tick	Best Offer + 1 tick	300

Table F2.03

Bid Qty	Bid Price	Offer Price	Offer Qty
400	Best Bid	Best Offer	400
400	Best Bid – 1 tick	Best Offer + 1 tick	400
		Best Offer + 2 tick	400

No	Test Case	External Input	Exchange Input	Expected Results
F2	**Normal Market[762=NM]**	**Instrument = INST1**		
01	Submit MassQuote (Table F2.01)	01. Submit 3 quotes (3 bids & 3 offers) for security INST1	02. Send Sell Order(Qty=100)	03. Partially Matched Best Bid (Qty=100)
	Submit MassQuote (Table F2.02) - *ALL previous quotes for INST1 will be cancelled*	04. Submit 2 quotes (2 bids & 2 offers) for security INST1	05. Send Buy Order (Qty=300)	06. Fully Matched Best Offer (Qty=300)
	Submit MassQuote (Table F3.03) - *ALL previous quotes for INST1 will be cancelled*	07. Submit 2 quotes & 1 single-sided quote (2 bids & 3 offers) for security INST1	08. Send Sell Order (Qty=800)	09. Fully Matched ALL Bids (Qty=400+400)
	Submit MassQuote to cancel	10. Submit 1 quote with BidPx, BidSize, OfferPx and OfferSize equal to "0"		11. ALL outstanding quotes cancelled.

Table F3.01 for security INST1

Bid Qty	Bid Price	Offer Price	Offer Qty
200	Best Bid	Best Offer	200
200	Best Bid − 1 tick	Best Offer + 1 tick	200

Table F3.02 for security INST2

Bid Qty	Bid Price	Offer Price	Offer Qty
300	Best Bid	Best Offer	300
300	Best Bid − 1 tick	Best Offer + 1 tick	300

Table F3.03 for security INST1

Bid Qty	Bid Price	Offer Price	Offer Qty
400	Best Bid	Best Offer	400
200	Best Bid − 1 tick	Best Offer + 1 tick	200

Table F3.04 for security INST2

Bid Qty	Bid Price	Offer Price	Offer Qty
500	Best Bid	Best Offer	500
500	Best Bid − 1 tick	Best Offer + 1 tick	500

No	Test Case	External Input	Exchange Input	Expected Results
F3	**Normal Market[762=NM]**	**Instrument = INST1 & INST2**		
01	Submit MassQuote (Table F3.01 & F3.02) Submit MassQuote (Table F3.03) - *ALL previous quotes for INST1 will be cancelled* Submit MassQuote (Table F3.04) - *ALL previous quotes for INST2 will be cancelled* Submit MassQuote to cancel quotes for security INST1 & INST2	01. Submit 2 quotes (2 bids & 2 offers) each for security INST1 & INST2 02. Submit 2 quotes (2 bids & 2 offers) for security INST1 05. Submit 2 quotes (2 bids & 2 offers) for security INST2 08. Submit 1 quote (BidPx, BidSize, OfferPx and OfferSize equal to "0") each for INST1 and INST2	03. Send Buy Order (Qty=300) for security INST1 06. Send Sell Order (Qty=500) for security INST2	04. Partial Matched Best Offer (Qty=300) for security INST1 07. Fully Matched Best Bid (Qty=500) for security INST2 09. ALL outstanding quotes for security cancelled.

3.7 Module G : GTD/GTC Order

Module G certification required 3 days to completed the test cases. Each day required 10-15 minutes.

Definition of "T day". Example, Today 25/08/2014. Maximum expiry date of GTD/GTC is 30 Calendar day.
T   = 25/08/2014
T+1   = 26/08/2014
T+2   = 27/08/2014
T+30 = 24/09/2014
T+31 = 25/09/2014

No	Test Case	External Input	Exchange Input	Expected Results
G1	T day			
01	GTD Limit-Day Order, INST1 Expire Date = T+1	01.Send Buy GTD Order(Qty=1000)	02.Change the reference price/Last done price to ensure the carry forward GTD order price is outside of static price limit on next day	
02	GTD Limit-Day Order, INST2 Expire Date = T+1	01.Send Sell GTD Order(Qty=2000)	02.Send Buy Order(Qty=1000) 04.Halt the stock	03.Partially Matched(Qty=1000)
03	GTD Limit-Day Order, INST3 Expire Date = T+2	01.Send Buy GTD Order(Qty=3000) 02.Send Order modification on price	03.Halt the stock	
04	GTD Limit-Day Order, INST4 Expire Date = T+2	01.Send Sell GTD Order(Qty=4000)	02.Send Buy Order(Qty=2000) 04.Halt the stock	03.Partially Matched(Qty=2000)
05	GTD Market-Day Order, INST5 Expire Date = T+2	02.Send Sell Order(Qty=5000)	01.Send Buy Order(Qty=3000) 05.Halt the stock	03.Partially Matched(Qty=3000) 04.Remaining order qty convert to GTD Limit-Day Order
06	GTD Limit-Day Order, INST6 Expire Date = T+31	01.Send Sell GTD Order(Qty=1000)		02. Order rejected

Exchange will halt the stock to avoid the order matched by external parties.
Exchange will halt the stock to avoid the order matched by external parties before 8:30am and resume the market during certification period.

#Carry forward GTD order execution report will send out at 6:00am. If FIX client connect to FIX server before 6:00am will get the execution report real time. If FIX client connect after 6:00am then FIX client need to send a resend_request to request all the execution report.

No	Test Case	External Input	Exchange Input	Expected Results
G2	**T + 1 day**			
01	Continue from section G1.01	01.Verify the order execution report(qty=1000)		02.Order is cancelled due to outside of static price limit(378=3) at 6:00am *#Order cancel due to corporation actions will have same execution report message except 378=0*
02	Continue from section G1.02	01.Verify the order execution report(qty=1000) 02.Send Order Modification(QtyRemaining=2000) 05.Send Order Modification on Expire Date to T+2 *(Step 05 is optional)*	03.Send Buy Order(Qty=1000) 06.Halt the stock	04.Partially Matched(Qty=1000) *# Order expired at 5:30pm if step 05 is skipped*
03	Continue from section G1.03	01.Verify the order execution report(qty=3000) 02.Send Order cancellation		03.Order cancelled(378=99)
04	Continue from section G1.04	01.Verify the order execution report(qty=2000) 02.Send Order modification on price	03.Send Buy Order(Qty=1000) 05.Halt the stock	04.Partially Matched(Qty=1000)
05	Continue from section G1.05	01.Verify the order execution report(qty=2000)	02.Send Buy Order(Qty=2000)	03.Fully Matched(Qty=2000)

 # Exchange will halt the stock to avoid the order matched by external parties before 8:30am.

No	Test Case	External Input	Exchange Input	Expected Results
G3	T + 2 day			
01	Continue from section G2.01	N/A		
02	Continue from section G2.02	01.Verify the order execution report(qty=1000) 02.Wait order to expired		03.Order expired at 5:30pm
03	Continue from section G2.03	N/A		
04	Continue from section G2.04	01.Verify the order execution report(qty=1000) 02.Wait order to expired		03.Order expired at 5:30pm
05	Continue from section G2.05	N/A		

No	Test Case	External Input	Exchange Input	Expected Results
G4	T day			
01	GTC Limit-Day Order, INST1	01.Send Buy GTC Order(Qty=1000)	02.Change the reference price/Last done price to ensure the carry forward GTD order price is outside of static price limit on next day	
02	GTC Limit-Day Order, INST2	01.Send Sell GTC Order(Qty=2000)	02.Send Buy Order(Qty=1000) 04.Halt the stock	03.Partially Matched(Qty=1000)
03	GTC Limit-Day Order, INST3	01.Send Buy GTC Order(Qty=3000) 02.Send Order modification on price	03.Halt the stock	

Tester should verify the order execution report on next day
Exchange may set the Maximum expiry date of GTC is **3 Calendar day** for certification purpose only.