

Deloitte.

REG SCI PLAYBOOK

As of OCTOBER 10, 2017



Agenda

Overview			
Guiding Principles			
Test Timeline and Break Points			
Test Scope Outline			
Symbols and CUSIPs			
Pre Test and Post Test			
Other Considerations			
Appendix			
DTCC Client Success Criteria			
SCI Entities Notification Process			
Coordinated Voluntary Test Date			
Regulation SCI Rule requirements			

Overview

- Regulation SCI requires that each SCI entity designate members/participants (participating members) to take part in the annually scheduled Business Continuity and Disaster Recovery Plan test.
- SCI entities have established criteria for the designation of applicable members that are required to participate in the annual Business Continuity and Disaster Recovery Plan test.
- The objective of the 2017 test is that SCI entities conduct a functional and performance testing of BC/DR plans with participating members to exercise and verify the ability to operate through a business continuity and/or disaster recovery event using backup sites, recovery facilities and backup communication capabilities.



2017 Test - Guiding Principles

	<u> </u>
Topic	Approach
2017 test date	• 2017 test to align with FIA test, SIFMA Classic and IIROC on Saturday October 14 th 2017
Environments connectivity	 Participating members should be able to operate from their production or DR environments Participating members who elect to operate from their production environments are required to conduct a separate connectivity test from their DR environment(s)
Designated Reg SCI contacts	 Reg SCI Entities notification to designated Reg SCI firms is included in the 2017 Reg SCI Playbook Participating members developed & communicated Reg SCI distribution emails to all SCI Entities by SIFMA
Test scripts communication and distribution	 Reg SCI Entities are responsible for communicating test scripts and other test requirements to their respective participating members Those Reg SCI Entities with public test scripts provided participating members with the address of a dedicated location on their website which houses all REG SCI communications, including test scripts
Connectivity testing	 Reg SCI Entities are responsible for providing connectivity testing prior to the 2017 Reg SCI BC/DR test Entities will work directly with participating members to provide network connectivity information Connectivity configuration used for pre-test must remain unchanged for 2017 Reg SCI BC/DR test date
Text Execution	• The 2017 annual Regulation SCI BC/DR test should not require manual intervention by participating member systems to execute the test (manual intervention refers to limited system or configuration changes)
	 The 2017 test is designed to verify that Reg SCI entities are able to demonstrate that they can support the maintenance of fair & orderly markets in the event the Reg SCI entities' business continuity and disaster recover recovery plans are activated
	 The 2017 test is an industry coordinated test (as required by Reg SCI), but it is not an end-to-end industry integrated test; it is a test for each individual SCI Entity to test its own BC/DR environment(s)
Text Scope	• The test is not systems capacity test; however the test should generate enough message traffic to support trading and dissemination of market data through the SIPs
	 2017 annual BC/DR test is not a pass/fail exercise for the participating members; However some SCI members based on their rulebook will publish pass/fail results (OCC will publish results if asked by regulators). Others will provide designated members with a scorecard outlining their capabilities and issues





Invested in America

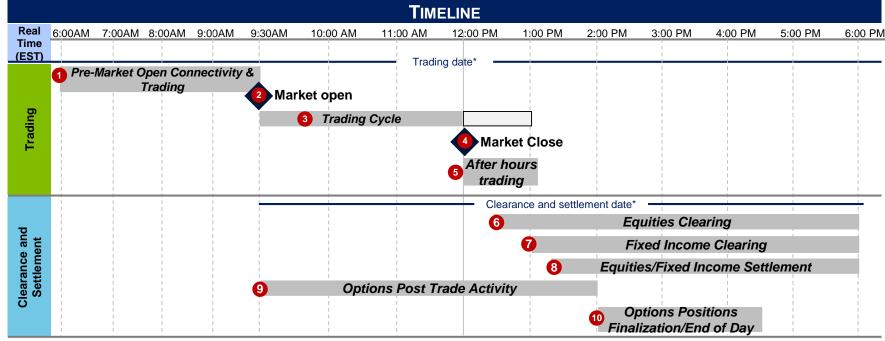
• The 2017 Regulation SCI BC/DR test is distinct from the classic SIFMA BC/DR test

issue on the participating member side, SCI entity, etc.)

• In the event of an unsuccessful test further analysis will be required to understand the root cause (i.e. is the

Proposed Test Timeline and Break Points

- Test Timeline and Breakpoints to follow the same outline of the 2016 test
- All exchanges and venues will follow a half trading day structure for the testing session



- 1 Exchanges to open their systems any time prior to market open
- Coordinated Market Open across SCI entities 9:30 AM ET
- Short trading day cycle 9:30 AM 12:00 PM ET [For OCC Exchange Mock Trading Cycle and Encore Daily Activity 9:30 AM-1:00 PM]
- Coordinated Market Close (Equities) 12:00 PM ET
- After hours trading 12:00 PM 1:00 PM ET
- Equities Clearing 12:30 PM 6:00 PM
 - Accept trades from the Exchanges trades will reject with invalid trade Date
- Exchanges may test additional functionality including IPO's limit up/limit down and trading halts
- DTCC will be able to accept transactions during the Clearance and Settlement window beginning at noon
 DTCC anticipates all 4 entities (Omgeo, FICC, NSCC, DTC) will be simultaneously during the clearing and settlement window

- Fixed Income Clearing 1:00 PM 6:00 PM
 - Trades submitted and matched, settlement totals calculated
- 8 Equities/Fixed Income Settlement 1:30 PM 6:00 PM
 - Deliver Orders and Payment Orders submitted and settled
 - CNS transactions and settlement totals processed
 - Fixed income settlement totals processed
- Options Post Trade Activity 9:30 AM 2:00 PM
- Options Positions Finalization / End of Day 2:00 PM 4:30 PM

*Trade and Clearance and settlement dates

- Trade date for Exchange Systems will be 10/14/2017
- Trade Date for the OCC Encore System will be 10/12/2017 (OCC to change date of 10/14/17 to 10/12/2017)
- Input transaction settlement date for DTCC entities will be 10/13/2017
- OCC's Business/Trade/Clearance date will be 10/12/2017
- OCC's settlement date will be 10/16/2017



Deloitte.

Test Scope Outline - Participating Members

The objective of the test scope outline is to provide consistent detail for the execution of the test as well as consistent set of requirements

Test Summary

- Participating Members can conduct the test from their production or DR environments
- Submit a representative sample of daily trade transactions to exchanges
- Work with Reg SCI entities to determine communication protocols
- Cover in-scope product types
- Clean all test data from systems prior to Monday market open



Test Scope Outline - Exchanges

The objective of the test scope outline is to provide consistent detail for the execution of the test as well as consistent set of requirements

Test Summary

- Conduct trade matching
- Transmit matched trades to clearing agencies to demonstrate connectivity to the clearing agency (NSCC will reject the trades at the CDTS gateway and a reject message will be transmitted back to the exchange over FIX connections)
- Receive and verify messages (pended/rejected trades and execution) if applicable
- Clean all test data from systems prior to Monday market open

Note: Exchanges to communicate additional functionality including IPO's limit up/limit down and trading halts

Test Scope Outline - Clearing Agencies

The objective of the test scope outline is to provide consistent detail for the execution of the test as well as consistent set of requirements

Test Summary

NSCC

- NSCC simulate trade executions on behalf of the exchanges
- Participating members access NSCC to inquire on trade data submissions that NSCC would simulate on behalf of the exchanges via web screens or automated output; to validate data & receive output from DTCC

OCC

- Exchanges will:
 - Transmit matched trades to OCC for processing throughout the mock trading cycle to OCC in real time
 - Submit balance sets and balance trades with OCC at close of Mock Trading Lifecycle
 - Receive and verify outbound DDS through connections to OCC's DR environment
 - Purge all test data from systems prior to market open for Monday, October 16 2017
- Firms will:
 - Submit post trade transactions to OCC utilizing the communication protocols normally used in production (External Encore, Real-time MQ, Batch SFTP or Batch NDM)
 - Receive and verify outbound DDS through connections to OCC's DR environments
 - Access on-demand and core reports through External Encore
 - Purge all test data from systems prior to market open for Monday, October 16 2017

Fixed Income Clearing (FICC)

Trades submitted and matched, settlement totals calculated

Omgeo

Trades submitted and matched/affirmed

DTC settlement test:

Deliver Order and Payment Order submitted; processed; and submitted for settlement



Test Scope Outline - SIPs

The objective of the test scope outline is to provide consistent detail for the execution of the test as well as consistent set of requirements

Test Summary

SIP - NASDAQ

- The NASDAQ SIP (UTP) will be available in Cermak
- The system of record is the binary version of the SIP feed which will be available during the Reg SCI and Industry BCP/DR test on 10/14

SIP-SIAC

- The OPRA SIP and CTS/CQS SIP will be available in Cermak
- Firms can contact connectivity@nyse.com for any questions on connecting to DR in Cermak
- General questions on SIP support can be addressed to (cqs-cts-opra@siac.com)



Test Scope Outline - FINRA

The objective of the test scope outline is to provide consistent detail for the execution of the test as well as consistent set of requirements

Test Summary

FINRA will create test scripts for each facility and send them to the firms who have been identified to test. Testing will include the following FINRA facilities:

- TRACE (Fixed Income Corporate & Agency Debt and Securitized Products; treasuries are not required in 2017)
- ORF (Over the Counter Equities)
- NY and Nasdaq TRF (for firms who report NMS trades to the TRFs)
- OTCBB (Over the counter Bulletin Board quoting)
- OATS (NMS stocks and OTC equity securities)



Equities and Options Symbols and CUSIPs

- Production or Test Symbols will be used for trading
- Test Symbols will be used for clearing (minimum of one test symbol)
- Testing using production symbols is encourage using the below symbols to support triggering market infrastructures/SIPs. It is noted that testing is not limited to the production symbols below
- Production data will be used by FINRA for OTC equities testing (FINRA will accept any valid production symbol)

Production Symbols* ——

#	Symbol
1	CSCO
2	F
3	MSFT
4	GE
5	BAC
6	SPX (CBOE proprietary product)
7	SPXW (CBOE proprietary product)
8	VIX (CBOE proprietary product)

* Not Comprehensive - SCI entities may require specific Options to support their testing

Invested in America

Test Symbols

#	Exchange	Symbol
1	BATS	ZBZX
2	BATS	ZTEST
3	BATS	ZVZZT
4	BATS	ZWZZT
5	NASDAQ	ZJZZT
6	NASDAQ	ZVZZC
7	NASDAQ	ZXYZ.A
8	NASDAQ	ZXZZT
9	NYSE	NTEST Z (NTEST.Z Comstock)
10	AMEX	ATEST Z (ATEST.Z Comstock)
11	ARCA	PTEST Z (PTEST.Z Comstock)
12	IEX	ZIEXT
13	IEX	ZEXIT
14	IEX	ZXIET



Equities Symbols and CUSIPs - FINRA Securities List

#	FINRA Reporting Facility	Symbol	CUSIP
1		ALAD	010722106
2		DASTY	237545108
3	ORF	KIMTF	Y47601102
4	(non clearing test cases)	KNMCY	
5		VGMTF	
6		FLEW	
7	OTOODD Overting as	BNNP	063770101
8	OTCCBB Quoting	CCSB	
9		TEVA4384553	88167AAE1
10		FHLN4384850	3130A8T52
11		CHRC4383282	377080AZ9
12	TRACE – Fixed Income	FMCC4364001	3128MJYM6
13	(Corporate & Agency Debt and Securitized Products)	KMX4303812	14313XAC4
14		SLNO3612001	81619PAD9
15		BAC4347376	06053Y678
16		FNMA3522427	01F0306A1

#	FINRA Reporting Facility	Symbol	CUSIP
17		ALLY	02005N100
18		CAT	149123101
19	FINRA TRFs	NKE	654106103
20	(Nasdaq and NYSE)	AAPL	037833100
21		EBAY	278642103
22		NFLX	64110L106

SCI entities test scripts and exchange contact information

BATS

Link to test script: http://cdn.batstrading.com/resources/schedule_update/2017/Bats-2017-Regulation-SCI-BCP-DR-Test-Plan.pdf

BOX

BOX has communicated the test scope and framework to designated SCI participants.

CBOE/C2

Link to CBOE test script: http://www.cboe.com/publish/RegCir/RG17-068.pdf
Link to C2 test script: http://www.c2exchange.com/publish/RegCir_C2/C2RG17-026.pdf

CHX

- Link to CHX test script dated 8/3/17: http://www.chx.com/notices/customer-service/
- SIFMA members that wish to test their DR sites can connect to CHX from <u>7:30-9:30am (CST)</u> where both NY4 and CH2 datacenters are both open
- CHX Required Participants for the Reg SCI test must connect between <u>9:30-11am (CST)</u> to our NY4 datacenter. *Only NY4* will be available during this window.
- For example- if a SIFMA member with an established connection to NY4 wishes to test with CHX, they can do so anytime during CHX's testing day. However, a SIFMA member with an established connection to CH2 will only be able to test from 7:30-9:30am (CST).

DTCC

Link to test script: test scripts will be shared and tailored to DTCC's designated participants

FINRA

 Link to test script: FINRA's test scripts are confidential and will only be shared with FINRA's designated participants





SCI entities test scripts and exchange contact information

IEX

Link to test script: https://iextrading.com/docs/IEX%202017%20DR%20Test%20Playbook.pdf

MIAX and MIAX PEARL

• Link to test script: http://www.miaxoptions.com/alerts/2017/07/13/miax-options-miax-pearl-reg-sci-sifma-bcp-test-day-plan-october-14-2017-3

NASDAQ

- Nasdaq's test script includes equities and listed-options for Nasdaq, PHLX, BX, ISE, Gemini and Mercury: http://www.nasdagtrader.com/MicroNews.aspx?id=ORA2017-35
- Nasdaq test alert: http://www.nasdaqtrader.com/MicroNews.aspx?id=ORA2017-50

NYSE

Link to test Link to test script:
 https://www.nyse.com/publicdocs/nyse/markets/nyse/NYSE_Group_Reg_SCI_Testing_Script_Notice_ September 29 Reminder.pdf

OCC

- Individualized test strategies will be developed for each registered participant tailored to individual business models.
- OCC Testing requirements are posted at: <u>OCC Information Memos</u> <u>https://www.theocc.com/clearing/clearing-infomemos/infomemos1.jsp#41456 2017 BC/DR Industry Test Scripts</u>

OTC Markets

OTC Markets' test scripts are confidential and will only be shared with designated participants

SIFMA Classic Test

- SIFMA Classic Test scripts vary depending on the scope of testing offered by each test entity, an overview of test scope is available in the Summary of Components spreadsheet on the SIFMA test site at: https://www.sifma.org/resources/general/2017-industry-wide-business-continuity-test/
- Detailed test scripts will be shared directly by test entities with firms who have registered to test against them





Other Considerations

Connectivity

SCI entities to work with participating members to define communication protocols in-scope

Orders

Average number of shares is used with a minimum of 2 orders (no max)

Registration

- The 2017 Regulation SCI BC/DR test is distinct from the classic SIFMA BC/DR test
- Registration to the 2017 Regulation SCI BC/DR test is done through the SCI entities

Success Criteria

 DTCC has outlined the capabilities, designee activity and evidence for inbound and outbound activity with FICC, NSCC, DTC and Omgeo which will be used to determine whether testing has been successful (see chart on Page 19)



Pre Test and Post Test

Pre/Post-test Requirements and Guidelines

	DTCC	осс	CBOE /C2	IEX	NYSE Group	NASDAQ	FINRA
Availability for Pre Testing	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Availability for Reg SCI Post Testing		Yes – validation of prod to prod connectivity once testing is complete and OCC production environment is back up					
Pre- Testing Required	Yes	Yes	Strongly recommended	Strongly recommended		Yes	
Post - Testing Required		No (Optional)		No			
Connectivity Testing Required	No	Yes	Yes	Strongly recommended	No	No	
Pre Test Contact Information	Kevin Hanley, 212-855-8092 khanley@dtcc.co m	occDRtest@theocc.com	Dushone Embrey-Thomas 312-786-8816 embreyd@cboe.c om Todd Furney 312-786-7824 furneyt@cboe.co m API api@cboe.com	marketops@iextra		david.lawn@nasda qomx.com	
Reg SCI Pre Testing Dates	8/12/20179/9/2017	07/29/201708/05/201709/09/2017	• 9/9/2017	• 9/9/2017	6/3/20177/8/2017	• 9/9/2017	• 9/9/2017
Comments on Reg SCI Pre Testing	Full functionality available	Connectivity testing only	Connectivity testing only	Full functionality during 9/9 pretest, including auctions		Full functionality available	Connectivity testing only
Reg SCI Post Testing Dates		10/14/2017 following test10/15/2017					
Comme sifn	na [.]						

Invested in America

Pre Test and Post Test

Pre/Post-test Requirements and Guidelines

	UBS (ATS)	снх	вох	MIAX & PEARL	OTC Markets	BATS
Availability for Pre Testing	Yes	Yes	Yes	Yes – beginning 8/1 every weekday from 9am to 5pm, or upon request.	Yes	Yes
Availability for Reg SCI Post Testing						
Pre- Testing Required	No	No	Yes	Yes	Yes	Yes
Post - Testing Required						
Connectivity Testing Required	No		Yes	Yes	Yes	Yes
Pre Test Contact Information	Charles Seremetis 212-713-2080 email <u>ats@ubs.com</u>	312-663-2934	Robert Bessette (514-866-2000 rbessette@boxexch ange.com	Amy Neiley aneiley@MiaxOption s.com Chaz Palmeri cpalmeri@miaxoptio ns.com 609-897-7302	mcorrao@otcmarke ts.com	Jeromy Hiserote 913 815 7295 jhiserote@bats.c om
Reg SCI Pre Testing Dates		• 9/9/2017	• 9/9/2017	After 10/2/2017, earlier by request		• 9/9/2017
Comments on Reg SCI Pre Testing	Test Inputs Data. Purged after test.	Connectivity testing only	Connectivity testing only	Connectivity testing only		Connectivity testing only
Reg SCI Post Testing Dates						
Comments						

17

Appendix

RegSCI DR Test – DTCC Client Success Criteria

SCI Entity		Inbound to DTCC*			outbound from DTCC		Criteria
SCI Entity	Capabilities	Designee Activity	Evidence	Capabilities	Designee Activity	Evidence	Criteria
FICC	FICC will enable the following capabilities for data submission: • Web Interface • File Interface (FTP/NDM) • MQ Interface	Designees to submit trade input using one of the following interfaces: • Web Interface • File Interface (FTP/NDM) • MQ Interface	FICC will submit evidence of the trade input status using the web interface.	FICC will enable the following capabilities for data inquiry: • Web Interface • File Interface (FTP/NDM) • MQ Interface	Each designee can confirm their capability in one of 2 ways: 1. Receipt of automated machine readable output from FICC, or; 2. Verification of FICC data processing through the FICC Web Interface, File Interface, or MQ interface.	_	Firms are able to submit evidence for successful receipt o 1 Input and 1 output transaction
NSCC	NSCC will enable data submission through FIX	Designees to send inputs using FIX interfaces	Each designee will need to submit evidence (Screenshots) for inputs being sent to NSCC / Exchanges	NSCC will enable the following capabilities for data inquiry: • Web Interface (Settlement) • File Interface (FTP/NDM) • MQ Interface • FIX	Each designee can confirm their capability in one of 2 ways: 1. Receipt of automated machine readable output from NSCC, or; 2. Verification of NSCC data processing through the Settlement Web Interface, File Interface, FIX or MQ interface.	Each designee will need to submit evidence for at least one of the following: 1. Screen shot of the receipt date/time of the message or file sent by NSCC to the designee; or; 2. Screen shot of pre and post data processing for the test transaction	Firms are able to submit evidence for successful receipt of 1 Input and 1 outputransaction
DTC	DTC will enable the following capabilities for data submission: • Web Interface • File Interface (FTP/NDM) • MQ Interface	Designees to send inputs using one of the following interfaces: • Web Interface • File Interface (FTP/NDM) • MQ Interface	Each designee will need to submit evidence (Screenshots) for inputs being sent to DTC	DTC will enable the following capabilities for data inquiry: • Web Interface • File Interface (FTP/NDM) • MQ Interface	Each designee can confirm their capability by validating the settlement figures through: the Settlement Web Interface, File Interface, or MQ interface.	Each designee will need to submit evidence for at least one of the following: 1. Screen shot of the receipt date/time of the message or file sent by DTC to the designee; or; 2. Screen shot of pre and post data processing for the test transaction	Firms are able to submit evidence for successful receipt o 1 Input and 1 outpu transaction
Omgeo	Omgeo will enable the following capabilities for data submission: • Web Interface • File Interface (CCF/MTI) • MQ Interface • FIX	Designees to send inputs using one of the following interfaces: • Web Interface • File Interface (CCF/MTI) • MQ Interface • FIX	Each designee will need to submit evidence (Screenshots) for inputs being sent to Omgeo	Omgeo will enable the following capabilities for data inquiry: • Web Interface • File Interface (CCF, MTI) • MQ Interface • PTS	Each designee can confirm their capability in one of 2 ways: 1. Receive automated machine readable output from Omgeo, or; 2. Validate the matched trade through: the Web Interface, File Interface, MQ interface or PTS.	Each designee will need to submit evidence for at least one of the following: 1. Screen shot of the receipt date/time of the message or file sent by Omgeo to the designee; or; 2. Screen shot of pre and post data processing for the test transaction	Firms are able to submit evidence for successful receipt of 1 Input and 1 output transaction

^{* -} Inbound processing for NSCC is out of scope for 2017 since exchanges are not participating



2017 Test - SCI Entities Notification Process

SCI Entity	Notification Status	Notification Date	Comments
NYSE Group •	Notified	• 5/4/2017	
FINRA •	Notified	• 4/20/2017	 2017 Reg SCI DR Test designation emails sent to qualifying firms for; TRACE, ORF, Nasdaq TRF, NYSE TRF, OTCBB and OATS
CHX •	Notified	• 7/17/2017	
CBOE/C2 •	Notified		 General circular for CBOE/C2 issued week of 5/1/2017 (include initial test script). Individual notifications have been sent out to firms that are required to participate for CBOE and C2.
BOX •	Notified		
IEX •	Notified	• 4/3/2017	
occ ·	Notified	• 11/30/2016	 OCC published information memo #40922 (3/31/2017) which documents OCC 2017 Reg SCI BC/DR Industry Testing Strategy
MIAX Options•	Notified	• 4/19/2017	
MIAX Pearl •	Notified	• 7/10/2017	
OTC Markets •	Notified	• 5/5/2017	
NASDAQ Exchanges	Notified	• 2/17/2017	 Covers: Nasdaq PHLX, Nasdaq Stock Market, Nasdaq Options Market, Nasdaq BX, ISE, ISE Gemini and ISE Mercury
NSX •	N/A	• N/A	• Exchange is inoperable – there will not be a 2017 Reg SCI test
BATS •	Notified		Notification occurred 15 calendar days following the end of Q217
DTCC .	Notified		
MSRB •	N/A	• N/A	Test directly with FICC
UBS (ATS) •	Notified	• 6/5/2017	



2017 Test - Coordinated Voluntary Test Date

- Coordinated voluntary pre-Reg SCI BD/DR test date 9/9/2017.
- A few SCI entities will not be available that date and are providing their test in an alternative date

SCI Entity	Pre-test schedule	Comments
NYSE Group	• 6/3; 7/8/2017	
FINRA	• 9/9/2017	
CHX	• 9/9/2017	
CBOE/C2	• 9/9/2017	 Schedule with the API Group prior to 9/9 if participating
BOX	• 9/9/2017	
IEX	• 9/9/2017	
OCC	• 7/29; 8/5; 9/9/2017	 Firms are required to test with OCC on one of the three pre-connectivity test dates.
MIAX Options	• 9/9/2017	 Pre-test schedule 8/1/17 to 10/13/17 9am to 5pm weekdays or upon request.
MIAX Pearl	• 9/9/2017	See MIAX Options
OTC Markets		
NASDAQ Exchanges	• 9/9/2017	
NSX	N/A	
BATS	• 9/9/2017	DR components available to test connectivity at all times
DTCC	• 8/12/2017	Note: Participation on 9/9 mandatory; if unable to
D100	• 9/9/2017	participate must test on 8/12.
Global OTC		
Broadridge	 8/21/2017 – Connectivity Test 	
	 9/23/2017 – Client DR Test 	



Regulation SCI Rule requirements

- An SCI entity's BC/DR plan, including its backup systems, each SCI entity shall: (a) establish standards for the designation of those members or participants that the SCI entity reasonably determines are, taken as a whole, the minimum necessary for the maintenance of fair and orderly markets in the event of the activation of such plans; (b) designate members or participants pursuant to the standards established and require participation by such designated members or participants in scheduled functional and performance testing of the operation of such plans, in the manner and frequency specified by the SCI entity, provided that such frequency shall not be less than once every 12 months; and (c) coordinate the testing of such plans on an industry- or sector-wide basis with other SCI entities [Regulation SCI Rule 1004 and FAQs]
- Conduct the initial functional and performance testing of BC/DR plans with designated members or participants no later than November 2, 2016 [Regulation SCI FAQs]
- SCI entities are not required to conduct all functional and performance testing at once and in
 coordination with other SCI entities all at the same time.... if, to meet the requirements of the rule, a
 single annual test cannot be properly conducted, SCI entities have flexibility to design their testing
 to include, for example, weekend testing and testing in segments over the course of a year [SCI
 Adopting Release and FAQ's]