

Appendix B – Operational Procedures and Additional Guidance for Obtaining SGD Funds Using SGS, MAS Bills and MAS FRN (Automated)

1 Operational Processes for Obtaining SGD Funds Using SGS, MAS Bills and MAS FRN

- 1.1 The Operating Window for obtaining SGD via SGS repo, MAS Bills repo or MAS FRN repo on an overnight basis is from 5.00 pm to 6.45 pm on each Business Day.
- 1.2 Eligible Counterparties shall initiate such a trade during the Operating Window by sending a **SWIFT MT543**¹ to the Authority (MEPS+ SWIFT BIC: MASGSGSM).
- 1.3 A haircut, as published on MAS website² shall be imposed on the transaction.
- 1.4 An Eligible Counterparty may use multiple issues of SGS, MAS Bills and/or MAS FRN as collateral to obtain SGD. However, every such SGS, MAS Bills or MAS FRN issue to be used by an Eligible Counterparty shall have a nominal value of at least S\$10 million.

2 Validation of Transactions

- 2.1 The SWIFT MT543 shall follow the message sequence as detailed in paragraph 4 of this Appendix. For the trade to be identified by MEPS+ as a repo trade using SGS, MAS Bills and MAS FRN at the SF, Eligible Counterparties must ensure that the SWIFT MT543 contains a mandatory identifier “**SPRO//SFREPO**” in field 70E. Without the identifier, the trade will be treated as a non-SF transaction. The trade will be queued, and eventually cancelled by the close of the MEPS+ operating hours.
- 2.2 Upon the identification of the SWIFT MT543 as a SF repurchase transaction, MEPS+ will proceed to validate the other trade details set out in the SWIFT MT543. Trades that fail the validation stage will be rejected.
- 2.3 After passing the validation stage, a SWIFT MT548 message will be sent to the Eligible Counterparty with the processing status and the reason code (if any) reflected in fields 25D and 24B (if any) respectively.
- 2.4 Eligible Counterparties who have access to MEPS+ Browse may refer to the SGS Transaction Details Enquiry screen to check if there are validation errors due to

¹ Except in a contingency procedure, Eligible Counterparties are not required to notify the Authority via the official dealing lines (refer to Clause 18.3 of the Agreement) to initiate automated transactions on the SF.

² <http://www.mas.gov.sg/Monetary-Policy-and-Economics/Central-Bank-Operations-and-Liquidity-Management/MAS-Standing-Facility.aspx>

incorrect construction of SWIFT MT543 messages. These will be shown in the form of SGS Return Codes as shown in the screenshot below. Eligible counterparties should refer to paragraph 5 of this Appendix for a set of commonly encountered validation errors³ and corresponding SGS Return Codes to identify the error.

The screenshot shows a web browser window with the title 'Welcome to MEPS+ and New CAS - Internet Explorer'. The main content area is titled 'Transaction Details Enquiry' and contains a table with the following data:

Transaction Information					
SGS Ref No	S201710061097084	ISIN Code	SG7CC1000004	Transaction Type	RPO
Trade Date	06-OCT-2017	Value Date	09-OCT-2017	Nominal Amount	10,000,000
CCY	SGD	Settlement Amount	9,779,300.00	Deal Price	0.00000
Accrued Interest Amount	0.00				
Deliverer Information					
Sender Ref	SFREPO02	Deliverer	ZYBQSGS0	Name	Participant Q
Received Timestamp	06-OCT-2017 13:57:42	Message Sender	ZYBQSGS0	Name	Participant Q
Custody Code	TRD	Channel	SWIFT		
Receiver Information					
Sender Ref		Receiver	MASGSGS0	Name	The Monetary Authority of Singapore
Received Timestamp		Message Sender		Name	
Custody Code	TRD	Channel			
Repo Closing Information					
Value Date	10-OCT-2017	CCY	SGD	Settlement Amount	9,779,897.48
Repo Rate	0.00000	Accrued Interest Amount	0.00		
Status Information					
Transaction Status	REJT	Return Code	SONL000065	Updated on	06-OCT-2017 13:57:42
Queue Seq No					

The 'Return Code' field, containing the value 'SONL000065', is circled in red in the original image. A 'Close' button is visible at the bottom of the window.

- 2.5 For the trade to pass the validation stage, a SWIFT MT543 should be configured as a new transaction (i.e. field 23G must be “NEWM”) with the correct details, as required in paragraphs 4 & 5 of this Appendix and the MEPS+ User Manual, and sent to the Authority within the Operating Window. MEPS+ will reject SWIFT MT543 if the type of operation is configured as preadvice (i.e. “PREA”) under field 23G.
- 2.6 Eligible Counterparties may send in a correctly formatted MT543 cancellation (i.e. “CANC” in field 23G) message to cancel automated SF repo trades that have not settled (i.e. first leg) due to a lack of securities⁴.
- 2.7 MEPS+ will calculate the first and second leg settlement amount. If the Eligible Counterparty’s first leg settlement amount differs from the MEPS+ calculated amount, the amount received by the Eligible Counterparty will be the MEPS+ calculated amount based on the formulae below:

³ Please refer to the MEPS+ User Manual for SGS, Chapter F for the complete set of error codes if the error code(s) you encountered is not in Appendix B. If there are any discrepancies between this list and the MEPS+ User Manual, the list in the MEPS+ User Manual shall prevail.

⁴ If the Eligible Counterparty has insufficient securities in its TRD account, transactions will be queued by the system until sufficient securities are credited into its SGS TRD account. If there is still insufficient securities by the end of MEPS+ operating hours, the trade will be cancelled by MEPS+.

(a) Formulae to be used for Treasury Bills and Cash Management Treasury Bills (collectively, SGS T-Bills) and MAS Bills

- Settlement amount in the first leg (to 2 decimal places) = (Nominal amount of securities/100) * Effective Price;
- Effective Price (to 3 decimal places) = Initial clean price x (1-haircut);
- Initial clean price (to 3 decimal places) = $100 - (N/365 \text{ (to 10 decimal places)} * Y)$,

N is number of days from Value Date to maturity date of the SGS T-Bills or MAS Bills;

Y is the previous Business Day's closing yield as published on the Authority's website⁵; and

- Initial clean price shall be calculated as at the date of the repurchase transaction using the above formulae; and
- Haircut to be applied will depend on the time to maturity as published on the Authority's website⁶.

(b) Formula to be used for SGS bonds⁷

- Settlement amount in the first leg (to 2 decimal places) = (Nominal amount of securities/100) * Effective Price;
- Effective price (to 2 decimal places) = (Initial dirty price)*(1 – Haircut);
- Initial dirty price (to 2 decimal places) = P + AI,

P is the previous Business Day's closing clean price as published on the Authority's website⁸;

⁵ For MAS Bills, refer to <https://www.mas.gov.sg/bonds-and-bills/MAS-Bill-Statistics>. For SGS T-Bills, refer to <https://www.mas.gov.sg/bonds-and-bills/treasury-bills-statistics>.

⁶ <http://www.mas.gov.sg/Monetary-Policy-and-Economics/Central-Bank-Operations-and-Liquidity-Management/MAS-Standing-Facility.aspx>

⁷ For avoidance of doubt, SGS bonds include both SGS (Market Development) and SGS (Infrastructure). The formula is for bonds with normal interest period of 6 months during the cum-interest period. For other formulae (e.g. ex-dividend period), please refer to Appendix I of the [Rules and Market Practices of the Singapore Government Securities Market](#).

⁸ <https://www.mas.gov.sg/bonds-and-bills/SGS-Bond-Statistics>

Accrued interest per S\$100 face value (AI) shall be calculated as at the date of the repurchase transaction, $AI = (\text{Coupon Rate}/2) * (N/E)$,

N is days between beginning of current coupon period and first leg settlement date;

E is number of days in the current coupon period where first leg settlement occurs; and

- Haircut to be applied will depend on the time to maturity as published on the Authority's website⁹.

(c) Formula to be used for MAS FRN

- Settlement amount in the first leg (to 2 decimal places) = (Nominal amount of securities/100) * Effective Price;
- Effective price (to 2 decimal places) = (Initial dirty price)*(1 – Haircut);
- Initial dirty price (to 2 decimal places) = P + AI,

P is the previous Business Day's closing clean price as published on the Authority's website¹⁰;

Accrued interest per S\$100 face value (AI) shall be calculated as at the date of the repurchase transaction,

$$AI = (\text{Coupon Rate in } \%) * (N/E)$$

N is the number of calendar days between beginning of current coupon period and first leg settlement date;

E is determined as follows–

i. if N falls between the issue date and the second interest payment date, E is the number of calendar days between the issue date (inclusive) and the second interest payment date (exclusive) of the MAS FRN; or

ii. if N falls between the X interest payment date and X+2 interest payment date of the MAS FRN, E is the number of calendar days between the X interest payment date (inclusive) and the X+2

⁹ <http://www.mas.gov.sg/Monetary-Policy-and-Economics/Central-Bank-Operations-and-Liquidity-Management/MAS-Standing-Facility.aspx>

¹⁰ For MAS FRN, refer to <https://eservices.mas.gov.sg/statistics/frn/FRNBenchmarkIssuePrices.aspx>

interest payment date (exclusive), where X is any even positive integer;

AI should be floored at zero (0) if the computed value is negative.

Coupon Rate in % =

Compounded SORA in % (rounded to 4 decimal places) +
Cut-off Spread in %

where

Cut-off Spread (%) is the Cut-off Spread published for the respective MAS FRN Auction¹¹, expressed in percentage terms;

Compounded SORA in % (rounded to 4 decimal places) =

$$\left[\frac{\text{End SORA Index}}{\text{Start SORA Index}} - 1 \right] \times \left[\frac{365}{\text{End SORA Date} - \text{Start SORA Date}} \right] \times 100$$

where

End SORA Date is two (2) Business Days (based on “SORA Publication Date”) prior to the first leg settlement date;

SORA Publication Date is set out in the Singapore Overnight Rate Average (SORA) Table on the MAS website¹²;

End SORA Index is the SORA Index on the End SORA Date;

SORA Index is set out in the Singapore Overnight Rate Average (SORA) Table on the MAS website¹³;

Start SORA Date is two (2) Business Days (based on “SORA Publication Date”) prior to the issue date of the MAS FRN (if no coupon has been issued) or the first day of the current coupon period of the MAS FRN (if a coupon has been previously issued);

Start SORA Index is the SORA Index on the Start SORA Date;

¹¹ For MAS FRN, refer to <https://eservices.mas.gov.sg/statistics/frn/FRNAuctions.aspx>

¹² For SORA Index and SORA Publication Date, refer to <https://eservices.mas.gov.sg/Statistics/dir/DomesticInterestRates.aspx>

¹³ For SORA Index and SORA Publication Date, refer to <https://eservices.mas.gov.sg/Statistics/dir/DomesticInterestRates.aspx>

- Haircut to be applied will depend on the time to maturity as published on the Authority's website¹⁴.

2.8 Likewise, if the Eligible Counterparty's second leg settlement amount differs from MEPS+ calculated amount, the amount debited from the Eligible Counterparty RTGS Account will be the MEPS+ calculated amount based on the formula below¹⁵:

- Settlement amount in the second leg (to 2 decimal places) = [(Settlement amount in the first leg) * (SF Borrowing Rate/100) * (No. of calendar days between first and second leg of transaction/365)] + (Settlement amount in the first leg).

2.9 For such scenarios mentioned in paragraph 2.7 and paragraph 2.8 above, a SWIFT MT548 message will be sent to the Eligible Counterparty with a message reflected in field 70E of the SWIFT MT548 informing the Eligible Counterparty that the amount computed by MEPS+ differed from their calculated first and/or second leg settlement amount(s).

3 Settlement of Transactions

3.1 Trades that pass the validation stage will be accepted and settled, subject to the Eligible Counterparty having sufficient securities in its SGS Trade ("TRD") account. If the Eligible Counterparty does not have sufficient securities in its SGS TRD account, the SF repurchase transaction will be queued.

3.2 Settlement of SGD obtained via repurchase of SGS, MAS Bills and MAS FRN will be through the Eligible Counterparty's RTGS Account and SGS TRD account with the Authority.

3.3 For the first leg of a SGS repo, MAS Bills or MAS FRN repo transaction, the nominal amount of SGS, MAS Bills or MAS FRN will be transferred from the Eligible Counterparty's SGS TRD account to the Authority's SGS TRD account and the SGD will be released into the Eligible Counterparty's RTGS Account with the Authority on Value Date. If the full amount of the SGS, MAS Bills and/or MAS FRN fails to be transferred, the transaction will be queued and shall be cancelled by the end of MEPS+ operating hours.

¹⁴ <https://www.mas.gov.sg/monetary-policy/liquidity-facilities/mas-standing-facility>

¹⁵ MEPS+ will calculate the second leg settlement amount based on the number of calendar days the principal amount is borrowed from the Authority.

- 3.4 After the funds for the first leg of a SGS repo, MAS Bills or MAS FRN repo transaction have been credited to the Eligible Counterparty's RTGS Account, a SWIFT MT547 message will be sent to notify the Eligible Counterparty.
- 3.5 It is the responsibility of Eligible Counterparties to monitor the status of their trade. Eligible Counterparties must ensure they receive SWIFT MT548 and SWIFT MT547 messages to confirm that trades have been validated and settled respectively. In the absence of such SWIFT messages from MEPS+, typically within 5 minutes, Eligible Counterparties should contact the Authority via our official dealing lines¹⁶ immediately. Trade requests sent after the close of the Operating Window, based on MEPS+ system time, will be rejected.
- 3.6 The Eligible Counterparty shall have SGD available in its RTGS Account with the Authority by 12.00pm on T+1 for settlement of the second leg of the transaction.
- 3.7 The SGD will be automatically debited from the Eligible Counterparty's RTGS Account and the SGS, MAS Bills or MAS FRN will be automatically transferred from the Authority's SGS TRD account to the Eligible Counterparty's SGS TRD account.
- 3.8 The Authority shall not be responsible for any trades that fail to settle, including due to incorrect construction of SWIFT messages, incorrect trade details, or failure to comply with any procedure or requirement for the process.

¹⁶ Refer to clause 18.3 of the Agreement.

4 SWIFT MT543 Message Format for Automated SF Repurchase Trades (Fields are mandatory unless stated otherwise)

No.	SWIFT Field Tag/Name	Usage Description	Usage Requirements	Example
Headers Information				
1	Block 1	Sending member	<ul style="list-style-type: none"> 8-character BIC format. Must be an Eligible Counterparty who has entered into a GMRA with MAS. 	OCBCSGSG
2	Block 2	Receiving member	<ul style="list-style-type: none"> Must be MEPS+ SWIFT BIC. 	MASGSGSM
3	Block 2: Message Type	Consists of 3 digits which define the MT number of the message being input.	<ul style="list-style-type: none"> Must be MT543. 	543
Mandatory Sequence A – General Information				
4	16R: Start of Block			:16R:GENL
5	20C: Sender's Reference	Sender's unique reference number	<ul style="list-style-type: none"> Each MT543 sent by the same sender on the same Value Date must have unique reference number. Qualifier 'SEME' must be used. 	:20C::SEME//SAMPLESFREPO
6	23G: Function of the Message	Identifies the function of the message.	<ul style="list-style-type: none"> Code 'NEWM' must be used when sending a new SF Repo transaction. Code 'CANC' must be used when canceling a previously sent MT543 where the first leg of the transaction initiated by the MT543 was not settled due to a lack of securities. 	:23G:NEWM
7	16S: End of Block			:16S:GENL

Repetitive Optional Subsequence A1 – Linkages				
8	16R: Start of Block			:16R:LINK
9	13A: Linked Transaction	MT number of the linked transaction	<ul style="list-style-type: none"> This field is optional and will be used only if the field 23G is "CANC". Qualifier 'LINK' must be used when present. 	
10	20C: Previous Reference	Reference of the linked message that was previously sent.	<ul style="list-style-type: none"> This field is mandatory only when field 23G is "CANC". Qualifier 'PREV' is to be used, when present. This field must contain the sender reference (SEME) of the message (MT543) previously sent by the Eligible Counterparty. 	
11	16S: End of Block			:16S:LINK
Mandatory Sequence B – Trade Details				
12	16R: Start of Block			:16R:TRADDET
13	98A: Trade Date	The Business Day on which a Financial Institution enters into a transaction to obtain SGD funds from the Authority on an overnight basis via the SF.	<ul style="list-style-type: none"> Qualifier 'TRAD' must be used. Date must be in YYYYMMDD format. Date must be equal to the current Value Date. Only option A is accepted. 	:98A::TRAD//YYYYMMDD

14	98A: Settlement Date	Repurchase first leg settlement date	<ul style="list-style-type: none"> • Qualifier 'SETT' must be used. • Date must be in YYYYMMDD format. • This field must be equal to the current Value Date. • For cancellation request (where "CANC" is reflected in field 23G), this field must be equal to the current Value Date. • Backdated transactions will not be accepted. 	:98A::SETT/YYYYMMDD
15	35B: Identification of the financial instrument	Identifies the financial instrument/SGS that is to be traded.	<ul style="list-style-type: none"> • ISIN code must be used for identification of the financial instrument to be collateralised. 	:35B::ISIN SG1234567890
16	70E: Narrative	Settlement Instruction Processing Narrative	<ul style="list-style-type: none"> • SF identifier, "SPRO//SFREPO", must be included to identify the trade as an automated SF trade. 	:70E::SPRO//SFREPO
17	16S: End of Block			:16S::TRADDET
Repetitive Mandatory Sequence C – Financial Instrument/Account				
18	16R: Start of Block			:16R::FIAC
19	36B: Quantity of Financial Instrument	Total quantity of financial instrument to be settled.	<ul style="list-style-type: none"> • Qualifier 'SETT' must be used. • Code 'FAMT' must be used for the Quantity Type Code. 	:36B::SETT//FAMT/10000000,
20	97A: Safekeeping account	Safekeeping account that holds the securities.	<ul style="list-style-type: none"> • Qualifier 'SAFE' must be used. • TRD accounts must be used here to indicate the account for delivering the securities. • Only option A is accepted. 	:97A::SAFE//TRD
21	16S: End of Block			:16S::FIAC

Optional Sequence D – Two Leg Transaction Details				
22	16R: Start of Block			:16R:REPO
23	98A: Repurchase Date Opt A: Date	Date/time at which the repurchase agreement will be reversed (second leg).	<ul style="list-style-type: none"> • Qualifier 'TERM' must be used. • Option A must be used here. System will do an auto reversal on the repurchase date. 	:98A::TERM//YYYYMMDD
24	19A: Repurchase Amount	Cash amount to be settled in the second leg of the repurchase agreement.	<ul style="list-style-type: none"> • Qualifier 'TRTE' must be used. • If the repurchase amount differs from the MEPS+ calculated amount, trade will be settled based on the MEPS+ calculated settlement amount in the second leg of the transaction. 	:19A::TRTE//SGD9876643,21
25	16S: End of Block			:16S:REPO
Mandatory Sequence E – Settlement Details				
26	16R: Start of Block			:16R:SETDET
27	22F: Type of settlement transaction	Type of settlement transaction contained in the settlement details of the message.	<ul style="list-style-type: none"> • Qualifier 'SETR' must be used. • Indicator used must be 'REPU'. 	:22F::SETR//REPU
28	16S: End of Block			:16S:SETDET
Repetitive Mandatory Subsequence E1 – Settlement Parties				
29	16R: Start of Block			:16R:SETPRTY
30	95P: Receiving Agent	Receiving agent	<ul style="list-style-type: none"> • Qualifier 'REAG' must be used. • 8-character BIC format. • Must be MAS SWIFT BIC. 	:95P::REAG//MASGSGSG

31	97A: Safekeeping Account	Safekeeping account held by the party specified in this sequence.	<ul style="list-style-type: none"> • Qualifier 'SAFE' must be used. • TRD accounts must be used here to indicate the account for receiving the securities. • Only option A is accepted. 	:97A::SAFE//TRD
32	95P: Place of settlement	The requested place of settlement from the Eligible Counterparty.	<ul style="list-style-type: none"> • Qualifier 'PSET' will be used. • MEPS+ SWIFT BIC must be used. 	:95P::PSET//MASGSGSM
33	16S: End of Block			:16S:SETPRTY
Repetitive Mandatory Subsequence E3 - Amounts				
34	16R: Start of Block			:16R:AMT
35	19A: Settlement Amount	The total settlement amount for the first leg of the transaction.	<ul style="list-style-type: none"> • Qualifier 'SETT' must be used. • If the repurchase amount differs from the MEPS+ calculated amount, trade will be settled based on the MEPS+ - calculated settlement amount in the first leg of the transaction. 	:19A::SETT//SGD9876543,21
36	16S: End of Block			:16S:AMT

5 Validation Errors for Automated SF Repo Trades in MEPS+ Browse Transaction Enquiry¹⁷

No.	Error message	SGS SONL Return Code ¹⁸
1	Automated SF is not enabled.	SONL000027
2	Settlement Date invalid for cancellation/ILF closing/SF opening (i.e. must be current Value Date).	SONL000065
3	SF window is not open yet.	SONL000070
4	SF window has ended.	SONL000071
5	Field 20C: Duplicate message reference found in system	SONL000124
6	Field 35B: ISIN specified is not found in the system.	SONL000074
7	Sender Member Code's custody code is invalid.	SONL000083
8	Sender Member Code not allowed conducting ILF/SF transactions.	SONL000061
9	Field 35B: Security specified is not eligible for ILF/SF.	SONL000078
10	Field 35B: Date on which the security specified matures is one day or less after the Value Date.	SONL000079
11	Field 36B: Nominal Amount of securities must be in multiples of the specified denomination.	SONL000081
12	Field 36B: Nominal Amount of securities does not meet the minimum size required for SF repo transaction.	SONL000162
13	Field 36B: Nominal Amount of securities does not meet the incremental size for SF repo transaction.	SONL000163
14	Receiving Agent not allowed to conduct ILF/SF transactions.	SONL000104

¹⁷ For non-MEPS+ Browse participants, please refer to the MEPS+ user manual for SGS, Chapter F, for the list of errors based on field 24B and 25D of MT548.

¹⁸ This is a selected list of commonly encountered errors. If you encounter errors not listed in the list above, please refer to the SGS System User Manual (Participant) for a complete list of SGS Return Code. If there are any discrepancies in error codes, the list in the MEPS+ user manual for SGS, Chapter F, shall prevail.

No.	Error message	SGS SONL Return Code ¹⁸
15	Maturity Date falls on a non-working day.	SONL000086
16	Maturity Date is later than the maturity date of the security specified in field 35B.	SONL000087
17	SF tenor period is invalid.	SONL000164
18	SF haircut setting is not defined for the ISIN tenor period / Standing Facility tenor period.	SONL000165
19	Settlement Amount does not meet the minimum repo value.	SONL000112
20	Settlement Amount does not meet the minimum settlement value.	SONL000113
21	The instruction is queued due to insufficient repo securities.	SONL001001
22	The instruction is queued due to existing queue.	SONL001002
23	Trade Date invalid for SF Repo (i.e. must be equal to current date).	SONL000166