

**CCASS/3 Messaging Specification for  
Participant Supplied System (PSS)**  
*Part 2 – Interface Specification*

**Version:** 3.5

**Date:** January 2016

## Modification History

Version	Date	Description and reason for modification	Changed Section(s)
1.0	05/12/2001	1 <sup>st</sup> Creation and reviewed by Technical Writer.  Functions for CCMS, View Circular and other messages update would be covered in a later revised release of the message specification.	N/A
2.0	06/05/2002	<ul style="list-style-type: none"> <li>- Notes added on the ordering of repeating blocks and fields</li> <li>- Restriction of PTR added. Usage of CTR is changed</li> <li>- Page number usage notes changed</li> <li>- Field usage in Sequence A (General Information) is updated.</li> <li>- Report handling notes update</li> <li>- Special Field Handling</li> <li>- Quiesce Point Concept</li> <li>- Addition of "CCASS and Market Date Date File" and "Market Report Availability Date Data File" and removal of "Announcement Information File" for Start-of-Day report download</li> <li>- Warning message handling in MT598</li> </ul>	<ul style="list-style-type: none"> <li>1.2</li> <li>1.3</li> <li>1.6</li> <li>1.7</li> <li>1.8</li> <li>1.9</li> <li>1.10</li> <li>A.2</li> <li>1.7</li> </ul>
3.0	02/08/2002	<ul style="list-style-type: none"> <li>- Added point 10 to indicate the field usage of Timestamp for update function.</li> <li>- Added point 11 to indicate the field usage of multiple enquiry function</li> <li>- Added point 12 to indicate the tag order in the message.</li> <li>- For out message, both ISIN and stock must exist.</li> <li>- Replace the words "Run Number" with "Version" in the Description column</li> <li>- The String "CSESM02" is replaced by the string "_CSESM02"</li> <li>- Add note to illustrate the last 3 character of each record is used to display "/ + Cr + Lf"</li> <li>- Add Start-of-Day report handling</li> <li>- Add A0008 error code</li> <li>- Add note to illustrate the three status MT598 support</li> <li>- Add note to illustrate asynchronous and broadcast message handling approach</li> <li>- Remove IMG report layout.</li> <li>- Add Section A.5 for PSS error codes listing</li> <li>- Add appendix 6 to illustrate the asynchronous and broadcast messages format from C/3</li> </ul>	<ul style="list-style-type: none"> <li>1.2</li> <li>1.2</li> <li>1.2</li> <li>1.4</li> <li>1.8</li> <li>1.8</li> <li>A.2</li> <li>1.8.3, 1.8.4</li> <li>1.8.4</li> <li>1.7</li> <li>1.11</li> <li>A.4</li> <li>A.5</li> <li>A.6</li> </ul>
	18/11/2002	- Modified wording for section 1.2	1.2

		- Modified wording for section 1.3 point 1	1.3
		- Modified wording for section 1.4, changed counterparty ID to participant ID	1.4
		- Added notes to explain the meaning of multiple and single enquiry	1.5
		- Modified arrangement of diagram; changed Page Indicator symbol from "PI" to "PNCI" in diagram	1.6
		- Changed format of sample MT598 message in 1.7	1.7
		- Changed error code in section 1.8.4	1.8
		- Change wording in section 1.9.4	1.9
		- Adding C/3 handling of characters outside of the described character set	1.2
		- Adding notes to clarify error message for SI and ISI input number	A.7
3.1	03/12/2007	- Adding STI file upload function - Remove report list in Appendix	1.2, Appendix A4
3.2	04/03/2010	- Remove MC901 Start-of-Day Report Download Function - Added more description on Multiple Enquiry Mode	Table of Contents, 1.8.3, 1.8.4, Appendix A3 1.5
3.3	12/08/2010	- Introduction of report zipping mechanism (including PGAPI) - Introduction of Change Hold Matched SI (LCHC) to PG	1.2 & 1.8
3.4	15/10/2010	- Including Designated Bank User information	1.4
3.5	29/01/2016	- Corporate Re-Branding Campaign	Logo, "HKEX", Font

# Table of Contents

<b>1</b>	<b>CCASS/3 Messaging Standard .....</b>	<b>5</b>
1.1	Notation Conventions .....	5
1.2	General Formatting Notes in Message Templates .....	5
1.3	Message and File Transaction Reference .....	8
1.4	BIC and ISIN .....	9
1.4.1	ISIN/Stock Code Field Presentation .....	11
1.4.2	BIC/Participant Id Field Presentation.....	11
1.4.3	Bank ID Field Presentation.....	12
1.5	Multiple vs. Single Enquiry .....	12
1.6	Page Number and Continuation Indicator .....	13
1.6.1	No Records Found .....	13
1.6.2	Records Found .....	14
1.7	Message Acknowledgements and Error Handling .....	15
1.7.1	Interpretation of MT598.....	15
1.8	Report Handling.....	18
1.8.1	Online Report Download .....	19
1.8.2	Overnight Report Download .....	19
1.8.3	Error Handling for Report Download Function.....	19
1.9	Special Field Handling .....	21
1.9.1	Enquiry Key Handling.....	21
1.9.2	Narrative Field Handling.....	21
1.9.3	Default Value Field Handling.....	21
1.9.4	Preparation Date Field Handling .....	22
1.10	Quiesce Point Concept .....	23
1.11	Asynchronous and Broadcast Message Handling .....	24
1.11.1	Normal Flow for Asynchronous and Broadcast Message Handling	24
1.11.2	Error Flow for Asynchronous and Broadcast Message Handling	24
<b>A.</b>	<b>Appendix.....</b>	<b>25</b>
A.1.	Sending Concurrent Transactions using PG-API .....	25
A.2.	Sample SI Message Flow .....	29
A.3.	PSS Error Code .....	31
A.4.	Asynchronous and Broadcast Message Code.....	33
A.5.	Error Message for SI and ISI number format .....	35

# 1 CCASS/3 Messaging Standard

## 1.1 Notation Conventions

This section explains the terminology used in this document:

- 1) Message-based and Online transactions are used interchangeably. They both refer to CCASS/3 (C/3) online functions such as Input SI, Input DI.
- 2) Batch Input and File Upload transactions are used interchangeably. They both refer to C/3 file transfer functions such as SI File Transfer, ATI File Transfer.
- 3) Update transactions refer to non-enquiry related transactions such as Input, Submit, Change, Cancel and Delete functions in C/3.
- 4) Input Messages refer to the messages that are received at C/3, where Output Messages refer to the messages that are sent from C/3.
- 5) ISO refers to ISO 15022.

## 1.2 General Formatting Notes in Message Templates

- 1) Individual fields within the template are shown, as required by C/3, to be either mandatory within a mandatory sequence (block), optional within a mandatory sequence (block), mandatory within an optional sequence (block), optional within optional sequence (block). The following rules shall be followed:
  - When a field is defined as mandatory, C/3 requires that this field must appear in the message even if this field is indicated as optional in ISO standard.
  - When a field or sequence is defined as optional, C/3 requires that this field or sequence may or may not appear in the message.
  - When a mandatory field is defined within an optional sequence, this field becomes mandatory if the optional sequence appears in the message. Otherwise, C/3 does not require this field to appear in the message.
  - When an optional field is defined within an optional sequence, the field may or may not appear in the message even if the optional sequence appears in the message. When optional sequence are used in the message, the mandatory fields within the same block must also appear in the message.
- 2) For individual fields or sequences defined as repetitive, C/3 requires that these fields or sequences may or may not repeat in the message.
- 3) For repeating blocks within each template, the order will appear as described in each message template.

For repeating fields within each block, the appearing order could be different given that the field numbers are the same; however, each field's meaning could be identify by its qualifier and value.

- 4) In the message templates for ISO messages, only the fields required by C/3 are used. Hence, C/3 will not process fields that are not defined in C/3, though valid for ISO Messaging Standard.
- 5) All Field Numbers used in the message templates for ISO messages correspond to the Field Numbers defined in ISO messages. As a result, there may be gap in the Field Numbers if certain fields are not used in C/3 but defined in ISO messages.
- 6) The qualifier, option/content, and data format of each field that are defined in the message template must be followed at all time, even if the scope of the definition is lesser than ISO Message definition. For example, C/3 will reject the message with the field length longer than that is defined in the message template.
- 7) The Data Source Scheme (DSS) is used to store C/3 proprietary codes and information within the ISO messages. The DSS's issuer code used by C/3 is "CCAS".
- 8) In general, amount, quantity and balance fields with "n" (numeric) format must be end with a decimal comma for non-decimal value. For decimal value, a decimal comma is used instead of the decimal point.
- 9) For Batch Input functions, the maximum number of records can be uploaded per file are defined. C/3 will reject the upload files if the total number of records contained in the file exceeds the limit. The field handling of PG file upload message is the same as C3T's. The list of upload files includes:
  - SI
  - ATI
  - ISI
  - STI
- 10) For Cancel transactions (e.g., Cancel SI, Revoke Matched SI), if the reference key(s) for that transaction matches with C/3 transaction, C/3 will perform cancellation without checking whether the field content submitted in the message are matched with C/3. For example, for Cancel SI function, if the SI Input Number and Timestamp fields are identical to an existing unsettled SI in C/3, than C/3 will perform cancellation. However, for the instruction to be processed successfully, PSS is required to populate the appropriate mandatory fields defined in the message template.
- 11) For Update transaction (e.g., Cancel SI, Change SI, Change Hold Matched SI, Change ISI etc), Timestamp from Enquire message need to be submitted together in the request message to indicates the timestamp of the returned record. The Update transaction will match the record's timestamp before any operation to preserve data integrity.
- 12) In case of multiple enquiry, if an enquiry key is provided in the message, the other message fields will not affect the enquiry processing.
- 13) Field order within the same sequence: In case where more than one field with same tag appears in the same sequence, those fields needed not be in any order.

- 14) For Update transactions, if the ISO's Preparation Date field does not appear in the message, C/3 will not perform the actual update function to its databases. Instead, C/3 will perform validation to the fields contained in the message. If validation errors are found, a MT598 message that contains warning/error codes and descriptions will be returned to PSS. In general, for update transactions, MT598 will be returned for all cases.
- 15) For date related fields (e.g., Preparation Date/Time), unless it is stated otherwise in the individual message template, the default field format is YYYYMMDD (where, YYYY= year, MM= month and DD = day).
- 16) The X character set used in C/3 Messaging Standard is referenced to S.W.F.T X Character Set. All fields defined with the X character set (e.g., SI Input Number, Field Id :20C:, format :PREV//9x) are required to use the set of characters defined for this character set only. The following characters are allowed in the X characters set:
- **Alphabetical Characters:** A to Z (uppercase) and a to z (lower case)
  - **Numeric Characters:** 0 to 9
  - **Special Characters:** / - ? : ( ) . , ' + SPACE CrLf

For characters outside of the above character sets, C/3 will replace those characters with “?”

---

## Message and File Transaction Reference

- 1) For message-based Input Message, the Participant Transaction Reference field (“PTR”), [Field Id, :20C::SEME] has the following characteristics and usage:
  - PTR is assigned by PSS to uniquely identify all update transactions. For example, PTR for Input SI cannot overlap with PTR for other update transactions. C/3 will reject the Input message that contains duplicate PTR.
  - For non-update or enquiry related functions, C/3 will not perform uniqueness checking for the PTR submitted. Thus, PSS can choose to send a dummy value for non-update or enquiry functions.
  - PTR is included in the Output Message [Field Id, :20C::PREV] to serve as a reference for the Input Message.
  - PTR does not appear in C/3 Reports (RMF) or Data Files (IMG).
  - PSS can resend the same transaction with the previous PTR if there is a “doubtful” update transaction (e.g., in transaction timeout scenario). If the transaction has been processed (e.g., successfully accepted or rejected with error in C/3), the resent transaction will be rejected; otherwise it will be accepted by C/3.
  - PTR is recycled daily.
  - Please note that a PTR containing all zeroes is not allowed. If a message is sent with a PTR that consists of 16 consecutive zeros, the message will not be processed and an error message will be returned.
- 2) For message-based Output Message, the C/3 Transaction Reference field (“CTR”), [Field Id, :20C::SEME] is a unique reference number assigned by C/3. This CTR is recycled daily.
- 3) For Batch Input File, a File Input Reference (“FIR”), [Field Id, :20C::FINR] has the following characteristics and usage:
  - FIR is assigned by PSS to uniquely identify the Batch Input transactions. For example, FIR for SI File Upload cannot overlap with FIR for ATI File Upload. C/3 will reject the Input file that contains duplicate FIR.
  - The Output message will indicate whether the file has been successfully uploaded to C/3. This FIR is included in Output Message [Field Id, 20C::PREV] to serve as a reference for the Input Message.
  - FIR does not appear in C/3 Reports (RMF) or Data Files (IMG).
  - PSS can resubmit the same file with the previous FIR if there is a “doubtful” file upload transaction (e.g., in transaction timeout scenario). If the file has been processed (e.g., successfully accepted or rejected with errors in C/3), the resubmitted file will be rejected; otherwise it will be accepted by C/3.
  - FIR is recycled daily.
- 4) For individual records in the Batch Input File, PSS can assign a dummy value for the PTR field, as this field will not be processed by C/3.



## 1.4 BIC and ISIN

This section illustrates the different scenarios where BIC and ISIN are supported and used in Block 4 of C/3 Messages.

### Online Transactions:

For online transactions, the ISIN code is optional to C/3. A participant can choose to use ISIN, C/3's stock code or both ISIN and C/3's stock code when submitting request message to C/3. In the Output Message, besides Stock Code, the corresponding ISIN Code and Stock Name will also be included in the message.

BIC is optional to C/3. A participant can choose to use BIC or C/3's Participant Id when submitting request message to C/3. However, both BIC and Participant Id cannot appear together in the same field of a message.

The following table shows the possible combination of Stock Code, ISIN, Participant Id and BIC fields that can be used and appeared in the Input and Output Messages respectively.

Input Message	Output Message	Remark
Stock Code	Stock Code and ISIN	C/3 will return both ISIN and Stock Code if only stock code is supplied by PSS.
ISIN	Stock Code and ISIN	C/3 will return both ISIN and Stock Code if only ISIN is supplied by PSS.
Stock Code and ISIN	Stock Code and ISIN	C/3 will return Stock Code and ISIN if both fields are supplied by PSS.  A transaction is rejected if Stock Code and ISIN are not matched.  For enquiry function which neither Stock Code nor ISIN are specified in the Input Message, both Stock Code and ISIN will be included in the Output Message.
Participant Id*	Participant Id	C/3 will return Participant Id if Participant Id is supplied by PSS.  For enquiry functions which neither Participant Id nor BIC are specified in the Input Message, only Participant Id will be included in the Output Message.
BIC	BIC	C/3 will return BIC if BIC is supplied by PSS.

### Batch Input/File Upload Transactions:

In the Message Content Sequence of the File Upload transactions (e.g., SI File Upload), both ISIN and BIC are optional to C/3. For ISIN/Stock Code, a participant can supply either ISIN, C/3's stock code or both ISIN and C/3's stock code in the file. For BIC/Participant Id, a participant can supply either BIC or C/3's Participant Id, but not both BIC and Participant Id in the file.

The following table shows the possible combination of Stock Code, ISIN, Participant Id and BIC fields that can be used in the File Upload format.

File Upload (Input) – Message Content Sequence	Remark
Stock Code	PSS can supply only Stock Code in the file.
ISIN	PSS can supply only ISIN in the file.
Stock Code and ISIN	PSS can supply both Stock Code and ISIN. A transaction will not be process in C/3 if Stock Code and ISIN are not matched.
Participant Id*	PSS can supply only Participant Id.
BIC	PSS can supply only BIC.

However, in the Message Control Record Sequence of the File Upload transactions, both BIC and Participant Id are treated as separate fields in the files. A participant can supply BIC, Participant Id or both BIC and Participant Id in the file.

File Upload (Input) – Control Record Sequence	Remark
Participant Id	PSS can supply only Participant Id.
BIC	PSS can supply only BIC.
Participant Id and BIC	PSS can supply both Participant Id and BIC. A transaction will not be processed if Participant Id and BIC are not matched.

### **Reports (IMG and RMF formats):**

For Reports that sent from C/3, the Stock Code, ISIN and Participant Id will appear in the reports. The following table shows the possible combination of Stock Code, ISIN and Participant Id fields that can appear in the Reports.

If Participant is Designated Bank User, only Bank ID should be used in Input and Output Report Message.

Reports	Remark
Stock Code and ISIN	Both Stock Code and ISIN will appear in the reports as stated in the reports' layout.
Participant Id*	Participant Id will appear in the reports as stated in the reports' layout.
Bank ID	Bank ID will appear in the reports as stated in the reports' layout.

\*Note: Counterparty Id is handled the same way as Participant Id in C/3.

### 1.4.1 ISIN/Stock Code Field Presentation

The following table demonstrates the presentation of ISIN and Stock Code in the message:

Field Id	Message Direction	Field Format <sup>1</sup>	Description	Scenario	Example <sup>2</sup>
35B	Input	[[ISIN1!e12!c] [/2!a/5n]	ISIN  Stock Code	Only ISIN is present	:35B:ISIN HK0001000014
				Only Stock Code is present	:35B:/HK/00001
				Both ISIN and Stock Code are present	:35B:ISIN HK0001000014 /HK/00001
	Output	[[ISIN1!e12!c] /2!a/5n1!e15x	ISIN Stock Code and Stock Description	Only Stock Code is present when that stock does not have any ISIN code	:35B:/HK/00001 CHEUNG KONG
				Both ISIN and Stock Code are present	:35B:ISIN HK0001000014 /HK/00001 CHUENG KONG

Note:

- 1) There is a line break between ISIN and Stock Code.
- 2) “HK0001000014” is ISIN code and “00001 CHUENG KONG” is Stock Code and Stock Name stored in C/3. In general case, Stock Name is appeared in the Output Message only.

### 1.4.2 BIC/Participant Id Field Presentation

The following table demonstrates the presentation of BIC and Participant/Counterparty Id in the message:

Field Id and Option <sup>1</sup>	Field Format	Description	Scenario	Example <sup>2</sup>
95P	:4!c//4!a2!a2!c[3!c]	BIC	BIC code is present	:95P::DEAG//CHASHKHH  Note: “DEAG” is a qualifier and “CHASHKHH” is the BIC code.
95R	:4!c/4!c/6!x	Participant Id or Counterparty Id	Participant Id is present	:95R::DEAG/CCAS/B00502

Note:

- 1) In some cases, Participant/Counterparty Id may not be represented using Tag Id 95 (e.g., Tag Id 97 in MT536 message). In this case, the corresponding Tag Id and formats for the Participant/Counterparty Id will be stated in the individual message template.

- 2) “CCAS” is the Data Source Scheme (DSS) Issuer Code and “B00502” is the participant Id assigned by C/3.

### 1.4.3 Bank ID Field Presentation

The following table demonstrates the presentation of BIC Bank Id in the message:

Field Id and Option <sup>1</sup>	Field Format	Description	Scenario	Example <sup>2</sup>
20C	:4!c//3!n	Bank ID	Bank ID is present	:20C::INDX//004  Note: “INDX” is a qualifier and “004” is the Bank ID.

## 1.5 Multiple vs. Single Enquiry

For Enquiry functions, both multiple and single enquiry modes are supported in C/3. The following highlights the key features from Messaging Standard viewpoint in each mode.

### Multiple Enquiry Mode:

- Multiple enquiry mode is used for enquiring list of records which fulfil the criteria of the submitted field(s). Also, only part of the fields will be returned for each record in the list.
- All multiple enquiry functions support next page enquiry capability. Depending on the Page Indicator/Continuation Indicator (details will be supplied in the next section) resided in the Output Message, PSS could proceed enquiry in the next page by providing the enquiry-keys. Please note that next page enquiry must be performed within 60 seconds of the previous enquiry.
- All multiple enquiry functions support the enquiry-keys concept. The enquiry-key(s) is a next page indicator consists of possible one to multiple fields. These enquiry-keys are returned to PSS in the enquiry Output Message. PSS is required to include these enquiry-keys in the enquiry Input Message for retrieving next page of records.
- All multiple enquiry functions support a maximum number of records for each response page or Output Message. The Page Indicator/Continuation Indicator will show if there are more pages for the enquiry. Only if there are more pages for the enquiry, the Output Message will provide the enquiry-keys.
- The maximum number of records for each enquiry Output Message is specified in the “Maximum Records<sup>1</sup>” field of each message template.

### Single Enquiry Mode:

- Single enquiry mode is used for enquiring all fields’ detail of a particular record.

<sup>1</sup> The Maximum Records field will be defaulted to “1” for the non-multiple enquiry mode functions.

- Certain single enquiry functions return a timestamp field in the enquiry Output Message. The timestamp indicates the specific point of time a record is being changed. It is used in the corresponding Change and Cancel functions.
- For Output Message, if there is no records found in C/3, a common message (e.g., MT598) will be returned.

### Page Number and Continuation Indicator

In C/3, the Output Message for a multiple enquiry function can be presented in:

- ISO statement format
- User-defined statement format

In each of these message formats, the “Page Number/Continuation Indicator” field (“PNCI”) is used to indicate if there are more messages or records from C/3. In a statement message, one statement or message is considered as one page. Depending on the number of records returning from C/3, the statement message may consist zero, one, more than one or the maximum number of records defined in the message.

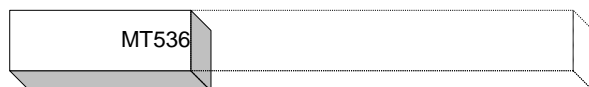
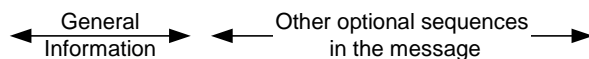
The following table shows the mapping of the Message Standard to the Message Reference. It also provides a comparison between ISO and User-defined statements message format and their corresponding Message References:

Message Standard	Output Message Reference
ISO	MT536 – Enquire Stock Account Balance (by Account), etc. MT537 – Enquire Due/Overdue Position.
User-defined	MC175 – Enquire Cash Prepayment (Multiple). MC305 – Enquire ISI Counterparty List (Multiple). Others. (including the rest of the non-ISO multiple enquiry messages)

The following scenarios illustrate the different Output Messages from C/3 and the possible values in the PNCI field. As the presentation of the PNCI in both ISO statement and user-defined statement format are similar, the following examples demonstrate ISO statement message format only.

#### 1.6.1 No Records Found

No record is found from PSS’s enquiry transaction.

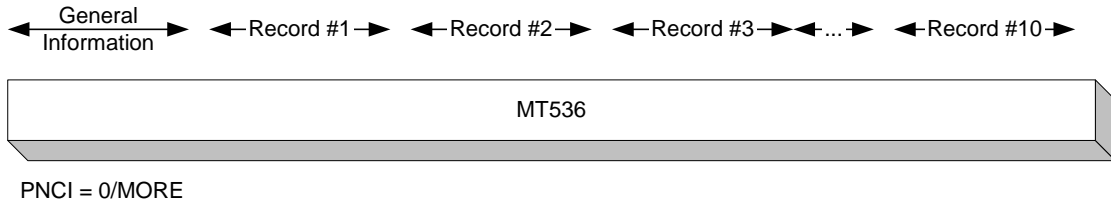


The optional sequences will not appear

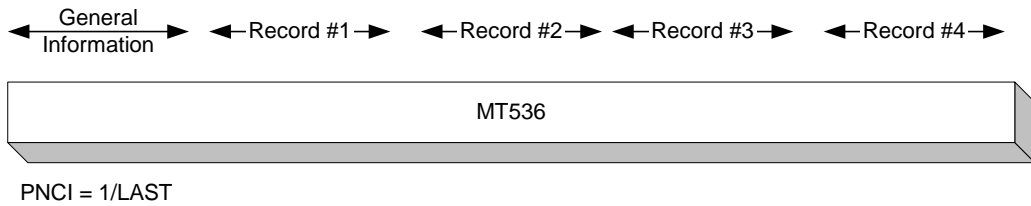
PNCI = 0/LAST

**1.6.2 Records Found**

A) More than 1 records found and records are formatted in a single message. More records can be obtained from C/3, assuming the maximum number of records can be stored in a single message is 10 and there are in total 14 records found in C/3’s database for this enquiry.

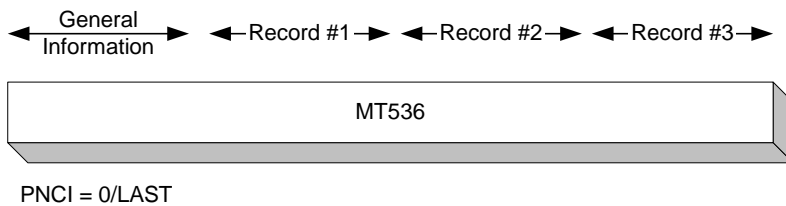


If PSS performs next enquiry to obtain the subsequent records or page from C/3, the following format will appear (assuming the remaining 4 records are returning from C/3):



- For multiple enquiry response message, there is only one PNCI field per message and it is indicated as “0/MORE” for the first page and “1/LAST” for the second page if it is the last one. If there are total of 3 pages, the display of the PNCI field will be as follow:
  - First Page “0/MORE”
  - Second Page “1/MORE”
  - Third Page “2/LAST”
- For multiple enquiry response message, Page Number will indicate order of the return page with 0 indicating the first page, but Continuation Indicator will indicate as “LAST” as there are no more records to be returned from C/3.

B) More than 1 records found; no more records can be obtained for next page from C/3. All records can be fit into one single message or page by using one enquiry message only (assuming there are only 3 records returning from C/3).



## 1.7 Message Acknowledgements and Error Handling

All message-based transactions sent from PSS will be validated real-time in C/3. If there are errors found in the validation, a MT598 Output Message with Error Codes and Descriptions will be returned to PSS.

MT598 messages support three different transaction statuses. The three statuses are SUCC, WARN and FAIL, which represent success, warning and error accordingly. For SUCC status, the transaction is completed successfully. For WARN status, the transaction is not executed, and only warning messages will return. For FAIL status, the transaction is not executed due to application or system error, and error messages will return.

For MT598 message that has a SUCC status, it contains informative and warning messages (if any) encountered through C/3 processing. For MT598 message that has a WARN status, it contains only warning messages encounter through C/3 processing. For MT598 message that has a FAIL status, it contains only error messages encounter through C/3 processing. In each MT598 message, it could display more than one messages of the type it supports or does not display any message. For example, a MT598 message with WARN status may contains two warning messages or may not contain any message.

For Batch Input transactions, the real-time validation is only applied to the general file/message format such as file layout. If there is errors found, a MT598 message with Error Codes and Messages will be returned to PSS. The MT598 message will display the line number of the error record within the error message. The content-level validation (e.g., insufficient stock quantity) will be performed when the file is being processed in C/3. In this case, the status of the file processing will be presented in a report format to participant (e.g., SI Batch Input Control Report).

Most of the message-based update transactions will also receive MT598 as the response message if there is no error found in the message. This is a positive acknowledgement from C/3 to indicate that the message has been successfully processed or acknowledged by C/3. For Batch Input transactions, a MT598 message is used to indicate that the upload-file is received successfully in C/3. The following table depicts the usage of MT598 to represent different acknowledgement status from C/3:

Transaction Type	Acknowledgement Status		
	Successful	Error	Warning
Message-based (majority of the update transactions)	MT598 with Status Field (Tag Id, 25D) = SUCC	MT598 with Status Field (Tag Id, 25D) = FAIL	MT598 with Status Field (Tag Id, 25D) = WARN

### 1.7.1 Interpretation of MT598

The following examples illustrate the usage of the MT598 and in C/3:

#### 1.7.1.1 MT598

##### Successful Receipt of Input SI Transaction (MT541)

```
{4:<CRLF>
:20:99999999<CRLF>
```

```
:12:541<CRLF>
:77E: <CRLF>
:20C::PREV//1234567890<CRLF>
:25D::PROC/SUCC<CRLF>
:20C::SIIN//88990011<CRLF>
:70E::ERRE//EMSG/RECORD ADDED SUCCESSFULLY<CRLF>
/ENUM/-2003<CRLF>
-}
```

In the above example, field Id,

- “20” represents C/3 Transaction Reference number generated from C/3.
- “12” is a mandatory field of the message and default value is used for this field. No processing logic is needed for this field
- “77E” is a mandatory field of the message. This is no value for this field.
- “20C” represents the PTR received from PSS.
- “25D” indicates that the SI transaction is successfully processed in C/3.
- “20C” with “SIIN” qualifier, represents the SI Input Number returned from C/3.
- “70E” with “ERRE” qualifier, indicates the informational/warning code and informational/warning message for the input transaction.

#### **Warning Receipt of Input SI Transaction (MT541)**

```
{4:<CRLF>
:20:99999999<CRLF>
:12:111<CRLF>
:77E: <CRLF>
:20C::PREV//5555555555<CRLF>
:25D::PROC//WARN<CRLF>
:70E://ERRE/EMSG/WARNING APPEARS IN TRANSACTION<CRLF>
/ENUM/-2004<CRLF>
-}
```

In the above example, field Id,

- “20” represents C3 Transaction Reference number generated from C/3.
- “12” is a mandatory field of the message and default value is used for this field. No processing logic is needed for this field.
- “77E” is a mandatory field of the message. This is no value for this field.
- “20C” represents PTR received from PSS.
- “25D” indicates that the SI transaction encountered warning during processing in C/3.
- “70E” with “ERRE” qualifier, indicates the warning code and warning message for the input transaction.



**Failure in Change Stock Borrowing Request Transaction (MC111)**

```
{4:<CRLF>
:20:99999999<CRLF>
:12:111<CRLF>
:77E: <CRLF>
:20C::PREV//5555555555<CRLF>
:25D::PROC/FAIL<CRLF>
:70E:: //ERRE/EMSG/BORROW REQUEST NUMBER NOT FOUND<CRLF>
/ENUM/-2005<CRLF>
-}
```

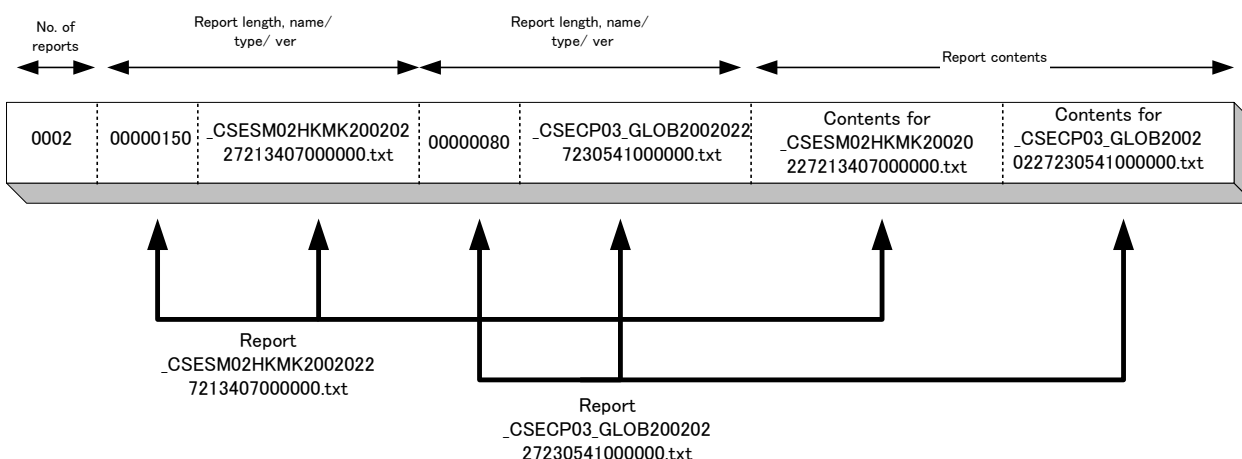
In the above example, field Id,

- “20” represents C3 Transaction Reference number generated from C/3.
- “12” is a mandatory field of the message and default value is used for this field. No processing logic is needed for this field.
- “77E” is a mandatory field of the message. This is no value for this field.
- “20C” represents PTR received from PSS.
- “25D” indicates that the Stock Borrowing Request transaction is failed to process in C/3.
- “70E” with “ERRE” qualifier, indicates the error code and error message for the failed transaction.

## 1.8 Report Handling

All fields or parameters in the C/3's report are of fixed length and there is no Tag Id to associate with the individual field. The following table shows the fields in a report Output Message, MC902:

No.	Field Name (fixed length, without Tag Id)	Description
1.	Number of Reports	The total number of reports contained in the Output Message This field consists of 4 digits
<i>Repetitive Sequence</i>		
2.	Report Length	Indicate the length of the Report in bytes This field consists of 8 digits
3.	Report Name, Market, Report Version and Type	Indicate the Report Name, Type and Report Version that are being concatenated.  For example, _CSESM02HKMK20020227213407000000.rmf means Report _CSESM02 for Hong Kong Market created at year 2002 Feb 27 <sup>th</sup> 21:34:07 and 000000 millisecond in RMF format, where "rmf" means RMF and "img" means IMG files types.  This field consists of 36 characters
<i>Repetitive Sequence</i>		
4.	Report Contents	Contents of the report(s) with their corresponding layout defined in IMG or RMF format  This field's length is indicated by the Report Length field mentioned above



In the above example, there are 2 reports contained in the message as indicated in the # of report field. Each report is identified by its length, name, type, version and contents in the message as shown.

A new report download mechanism with zip file approach was introduced to PG in December 2010. a new API was introduced which will return reports as zip stream rather than ISO message, such that the report size is no longer bound by the message length limitation.

Therefore, if participants would like to receive report Output Message MC902, they need to use Input Message MC901 and MC 905 for Online Report Download and Overnight Report Download respectively. For retrieving zip file, participants need to use Input Message MZ901 and MZ905 accordingly. The MZ message layouts are the same as their MC counter, except that the message ID is different so that PG is able to produce the output differently.

### **1.8.1 Online Report Download**

For the online report download function, PSS is responsible for initializing the report download request.

In each report download request message, it could contain a single or multiple reports information. For each request, C/3 will return the reports that are available for download at the time of the Online Report Download request.

### **1.8.2 Overnight Report Download**

For the overnight report download(ONRD) function, PSS is responsible for initializing the ONRD download request.

Same as the existing ONRD function, the ONRD request report list is determined by the Report Profile stored in the C/3. For each PG, it could only support one Report Profile. The Report Profile that a PG support is determined by the user ID stored in the smart card that used for PG logon. For each request, C/3 will return the reports that are available for download at the time of the ORND request.

During the ONRD process, C/3 will mark the download flags for the downloaded reports in the Report Profile when C/3 sends out the reports.

If any error occurs in the request during C/3 returned the reports to PG, the reports that are marked as downloaded will not be return to PSS in the subsequence ONRD requests. PSS will have to download the file during daytime.

PSS is responsible to initialize ONRD download request(s) until all reports are received. In case all reports are downloaded successfully, if PSS send another request for ONRD function, C/3 will return a system response text file(described in 1.8.3) containing response code A004 with message ONRD DONE to PSS indicating ONRD completed.

### **1.8.3 Error Handling for Report Download Function**

In case there are errors occurs during the processing of Online Report and ONRD request message, according response message will return to PSS in a system response text file. Below is the list of possible response codes and messages that used for response:

A0001 INVALID HEADER/TRAILER FORMAT – Message header or trailer is incorrect

A0002 INVALID PARTICIPANT ID IN BLOCK 2 MESSAGE – Participant ID in header block does not match the Participant ID used for PG smart card logon

A0003 INVALID BLOCK 4 FORMAT – Syntax error occur in Block 4

A0004 ONRD DONE – ONRD completed

A0005 REPORT DOWNLOAD UNSUCCESSFUL – Error occurs when downloading a specific report

A0006 REPORT NOT AVAILABLE – Report is not available for download at the time of request

A0007 SYSTEM ERROR – System error occurs when downloading a specific report

A0008 INVALID CCASS DATE – Report enquiry message's CCASS date is not valid

A0009 INVALID PARTICIPANT ID IN BLOCK 4 MESSAGE – Participant ID in block 4 does not match the participant ID used for PG smartcard logon

For response messages A0001 to A0004, A0008 and A0009, they will appear in a standard system response text file named SYS00000000000000000000000000000000.txt

For response messages A0005 to A0007, they will appear in the corresponding report files that encountered error.

For example, if there are a total of five report download requests in one message, and there are errors occur while downloading the second and forth report, a total of five reports will still be returned to PSS. However, the report content for both the second and forth reports will contain error code and error message depending on the cause of the error, e.g. A0005, A0006 or A0007.

However, no matter how many download requests there are in one request message, if error occurs due to error in the header/trailer block, participant ID mismatch, or block 4 format syntax error, only one single file named "SYS00000000000000000000000000000000.txt" will return to PSS.

## 1.9 Special Field Handling

### 1.9.1 Enquiry Key Handling

This section discusses the usage of the enquiry key field in multiple and single enquiry messages.

For multiple enquiry functions, C/3 supports an enquiry key for retrieving a complete result set on a one page per request basis. The enquiry key for enquiring about the next page is returned within a specific field of the response message. The enquiry key will expire within one minute after C/3 return the enquiry key value to PSS.

If the enquiry response only consists of a single page, it would not contain an enquiry key within the response message.

To enquire for the subsequent page, PSS should apply the enquiry key received from the previous response message to the request message.

For each Participant, there is a fixed number of enquiry sessions that can co-exist within the same point of time. A new enquiry session is initiated when the participant retrieves the first page of enquiry information. This limitation on enquiry sessions prevents participants from initiating excessive enquiry requests to degrade the C/3 system performance. Each newly initiated enquiry session on C/3 has a fixed timeout interval. If the participant does not enquire about the next page information within the timeout interval, the enquiry session will be terminated by C/3 and subsequent next page enquiries will be rejected. The participant will need to initiate a new enquiry session by enquiry about the first page information. If a next page enquiry is made within the timeout interval, the timeout interval will be renewed.

It is also important to note that once a PSS has initiated a new enquiry session through a PG, all subsequent next page enquiries pertaining to the same enquiry session must be submitted to C/3 through the original PG. For participants planning to deploy multiple PGs to connect to C/3, this point must be noted.

### 1.9.2 Narrative Field Handling

This section describes the handling of the sub-fields within a narrative field (Tag ID: 70D, 70E, 72).

All the narrative fields are listed as mandatory fields. To represent an empty value for a sub-field within a narrative field, a text string "NULL" will be used. This applies for both input and output message. Also, for all sub-fields that listed within a narrative, they do not have to be listed in a particular order.

For input message, in case there is no input value for an optional field, a text string "NULL" should be input for that field.

For output message, in case there is no output value for an optional field, a text string "NULL" will appear in that field.

### 1.9.3 Default Value Field Handling

Default value field is required to fulfil the ISO message standard. C/3 will not perform any processing on any default value fields.

#### 1.9.4 Preparation Date Field Handling

Preparation date is used only for transaction type functions such as input, delete, cancel and revoke. For enquiry type function such as single and multiple enquiry, preparation date field is not used.

Preparation date has two different usages for C/3; it allows a participant to have a choice to send a transaction message to C/3 just for checking if there are any warnings during validation of the message by inputting the correct Preparation Date or to indicate an actual intention to execute the transaction by inputting the correct one.

For transaction type message, if the preparation date exists but it does not correspond to the current CCASS date, an error message will return. If the preparation date exists and corresponds to the current CCASS date, C/3 will proceed on the message execution. If the preparation date does not exist, C/3 will not proceed with the message execution, but it will return any warning messages returned by C/3 after message validation.

## 1.10 Quiesce Point Concept

In the case of catastrophic system failures, HKEX could declare that the entire C/3 will need to roll back to a previous Quiesce Point (i.e. a certain time in the past). All update type transactions performed by any participants after the Quiesce Point will be lost in C/3. All participants will therefore need to perform all necessary enquiries to find out whether their previously input transactions around the Quiesce Point still remain on C/3. Once they have ascertained those transactions that do not exist on C/3 anymore after the Quiesce Point roll back, they will need to re-enter them to C/3. In the case of Quiesce Point recovery, HKEX will announce to all participants the time of the Quiesce Point that C/3 will roll back to.

## 1.11 Asynchronous and Broadcast Message Handling

Asynchronous and Broadcast (A/B) message is downloaded from C/3 to PSS through the implementation of PG-API callback in PSS. When A/B messages are available in C/3, PG-API's callback will be invoked for dispatching messages to PSS. For A/B message, please note that the session ID within block 1 is a default value and do not involve any C/3 processing.

Messages received from the PG-API are sorted in ascending order by the timestamp of each message.

In case of multiple broadcast messages for which each of the broadcast messages consists of multiple lines, these broadcast messages will be split line by line and each line will be prepared as individual PG message. Please note that those individual PG messages which compose the same broadcast message will share the same timestamp but with different line number so as to indicating the ordering of the PG messages (i.e. lines in the broadcast message).

### 1.11.1 Normal Flow for Asynchronous and Broadcast Message Handling

The A/B messages are downloaded from C/3 to PSS periodically. It could happen that an A/B message is represented by multiple PG messages (i.e. multiple lines). Within each batch of PG messages, if a multiple-line A/B message exists, all the related PG messages will carry the same timestamp and be included within the same batch. For each batch of PG messages, PSS could determine all the PG messages constituting a complete A/B message by grouping those PG messages based on the timestamp field.

To determine the last line of a multiple line A/B message, PSS could do it in two ways.

First, PSS could identify whether it is the last line by keeping track of the timestamp of those PG messages. A different timestamp in the next PG message will indicate a beginning of another A/B message. In other words, the previous PG message will be the end of the previous A/B message.

Second, the last PG message within the batch must be the end of that A/B message.

### 1.11.2 Error Flow for Asynchronous and Broadcast Message Handling

In case there is unexpected system failure occur during downloading of A/B message, PSS could continue subscribing A/B message from the last A/B message they received through the use of the sequence number.

The sequence number for each A/B message is unique for both single line and multiple-line messages. When PSS is uncertain if it has missed some messages from C/3 due to unexpected system outage, PSS could invoke the PG-API method call with the sequence numbers of the last received asynchronous message and broadcast message.



## A. Appendix

### A.1. Sending Concurrent Transactions using PG-API

The following example illustrates the submission of concurrent messages. In the example, it is assumed that all participant data that to be sent to C/3 are consolidated and stored in PSS Central Message Database. The PSS application will spawn new threads to poll for the new records in the database. If new records are found, PSS will then format them into C/3 format or transactions, and send these transactions to C/3 (via PG) concurrently.

Note: The PSS application development team can have many other choices to implement the concurrent submission.

#### 1) PSS Main Program

```

package com.pss;

import com.hkex.pg.client.PGDriver;
import com.hkex.pg.client.PGConnection;

// for testing purpose, in order to terminate the program
import java.io.InputStreamReader;
import java.io.BufferedReader;

public class SamplePSS {

    public static void main (String[] args) throws Exception {

        // Initialise PGAPI library and load server configuration files.
        // Do it once per Java process.
        PGDriver.init("c:\\ccass3\\pg\\pgapi.config");

        // Connect to PG server Connection1.
        PGDriver pg = new PGDriver("Connection1");

        // Logon to the PG server.
        String sessionID = pg.logon("partId1","password"); //userid and pswd in PG

        // Create three connections to the PG server for the three online process.
        PGConnection pgcon1 = pg.getConnection();
        PGConnection pgcon2 = pg.getConnection();
        PGConnection pgcon3 = pg.getConnection();

        // assign a connection to each of the PSS Internal online processing thread.
        PssPgOnline online1 = new PssPgOnline(pgcon1, sessionID);
        PssPgOnline online2 = new PssPgOnline(pgcon2, sessionID);
        PssPgOnline online3 = new PssPgOnline(pgcon3, sessionID);

        // start the processing threads.
        online1.start();
        online2.start();
        online3.start();

        // some other processes.....
        // .....

        // For testing press enter to exit program.
    }
}

```

```

System.out.print("Press enter to end program...");
String ending = (new BufferedReader(new InputStreamReader( System.in ))).readLine();

// tell process thread to stop running after processing the outstanding request.
online1.pleaseStop();
online2.pleaseStop();
online3.pleaseStop();

// wait for the threads to stop process.
online1.join();
online2.join();
online3.join();

// logoff
pg.logoff();

}

}

```

## 2) Read from PSS message database for new data and send converted data to C/3

This is to be run as a thread.

```

package com.pss;

import com.hkex.pg.client.PGConnection;
import java.util.zip.CRC32;
import com.pss.internalapi.*; //developed by PSS to handle PSS message database

// Each online process is running in its own java thread.
public class PssPgOnline extends Thread
{
    long POLLING_INTERVAL = 5000;

    PGConnection conn;
    String sessionID;
    boolean runFlag;

    // Each online thread has its dedicated PG server connection.
    // Session ID is for composing the block 1 of C3 message.
    public PssPgOnline(PGConnection pgconn, String sessionID)
    {
        conn = pgconn;
        this.sessionID = sessionID;
        runFlag = false;
    }

    // start running.
    public void start()
    {
        super.start();
        runFlag = true;
    }

    // set run flag to false so that the thread stop after processing the
    //outstanding request.
    public void pleaseStop()
    {
        runFlag = false;
    }

    // poll PSS message database for PSS Internal messages
    protected com.pss.internalapi.PSSMessage getMessageFromDatabase() throws Exception
    {
        // check database to see if there is a internal messages available to process.
    }
}

```

```

// if there is, load the message to a com.pss.internalapi.PSSMessage object and return it.
// if there is no message, return null;

return null;
}

// Translate the PSS Internal message to C3 message before sending to PG
protected com.pss.internalapi.C3Message translateToC3(com.pss.internalapi.PSSMessage pssData) throws Exception
{
    //processing logic to translate message
    // 1. compose block 1 using Session ID from PGDriver.logon()
    // 2. compose block 2 to block 3
    // 3. compose block 4 content from the PSSMessage
    // 4. calculate block 5 CRC value.

    com.pss.internalapi.C3Message msgC3 = new com.pss.internalapi.C3Message();
    //.....

    return msgC3;
}

// Translate the C3 message response to PSS Internal format.
protected com.pss.internalapi.PSSMessage translateToInternal(byte msg[]) throws Exception
{
    //processing logic to translate message
    com.pss.internalapi.PSSMessage msgPSS = new com.pss.internalapi.PSSMessage();
    // .....

    return msgPSS;
}

// Send this message to PG server
protected byte[] sendIt(com.pss.internalapi.C3Message source) throws Exception
{
    String pss_c3_msg = new String(source.getData());

    // send it to server.
    return conn.submit(pss_c3_msg.getBytes());
}

// start processing by polling for availability of message from PSS database.
public void run()
{
    while(runFlag) // run until stopped by caller.
    {
        try
        {
            // poll message
            com.pss.internalapi.PSSMessage pssData = getMessageFromDatabase();

            if(pssData == null) // no message available
            {
                // sleep a few seconds to wait for message.
                this.sleep(POLLING_INTERVAL);
            }
            else
            {
                // message available
                com.pss.internalapi.C3Message c3msg = translateToC3(pssData);
                byte response[] = sendIt(c3msg);

                com.pss.internalapi.PSSMessage responseC3 = translateToInternal(response);

                // process the response C3 message.
                // .....
            }
        } catch (Exception e)
        {
            // handle the exception
            // .....
        }
    }
} // while

```

```
}  
}
```

### 3) Compose C/3 Message Content

```
package com.pss.internalapi;  
  
public class C3Message  
{  
    public C3Message()  
    {  
        //C3 message processing ...  
    }  
  
    public byte[] getData()  
    {  
        // C3 message touchup...  
        return null;  
    }  
}
```

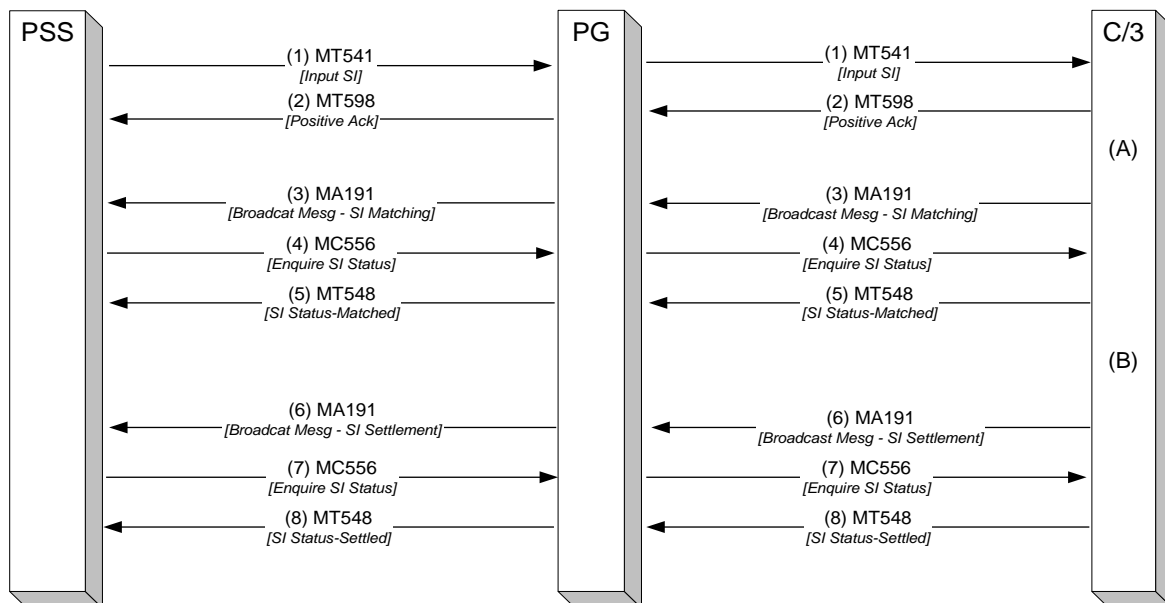
### 4) Compose PSS Internal Message

```
package com.pss.internalapi;  
  
public class PSSMessage  
{  
    public PSSMessage()  
    {  
        // PSS Internal Message processing ...  
    }  
}
```

## A.2. Sample SI Message Flow

The following flow diagram demonstrates how the SI transactions are supported using C/3 Messaging Standard. The scope of the message flow covers from PSS submits an Input SI transaction until the completion of periodic batch settlement run in C/3.

Note: It is assumed that the participant has performed the “PG User Sign-On” to C/3 using Smart Card on PG, and PSS has successfully logon to PG using PG-API (e.g., Logon()). It is also assumed that this SI transaction can be matched and settled on the same day.



1. PSS submits an Input SI transaction. PSS sends an Input SI transaction with Payment Method= “DvP” and Instruction Types= “Receive” (hence MT541 is used).

2. C/3 acknowledges the receipt of the Input SI transaction synchronously. Upon successfully validated and processed of the Input SI transaction in C/3, a MT598 acknowledgment message is returned to PSS. The MT598 contains the SI Input Number that is generated by C/3.

(A) SI Matching Batch is successfully processed in C/3 (e.g., at 10am)

3. A SI Matching broadcast message is sent from C/3. Upon the completion of the SI matching process in C/3, a MA191 message with the appropriate message content (e.g., “Periodic SI Matching has been completed”) will be sent to PSS.

Thus, in order to check the matching status of the SI transaction that sent previously, PSS can then send an enquiry message (e.g., MC556) to C/3.

4. PSS submits Enquire SI (Single) transaction to PG. PSS submits MC556 with the appropriate SI Input Number (e.g., using field Id :20C) to enquire the matching status of the

- check the matching status of the SI. SI.  
PSS is not required to submit MC556 prior to the receiving of MA191 broadcast message. This is because, under C/3 normal operation flow, the matching status of a SI transaction will only be updated upon the completion of the SI Matching process. Besides, avoid sending MC556 continuously to check the SI statuses will also reduce unnecessary network traffic from travelling over C/3 WAN.
5. C/3 returns SI status to PSS.  
The response (Output) message, MT548 is sent from C/3 synchronously upon receiving of the MC556. The status of the SI will be indicated in the message (e.g., Field Id, 25D with its value MTCH/MACH for a matched SI).  
Alternatively, PSS can choose to submit a MC557 (Enquire SI –multiple) to enquire the matching status of the SI, in which a MC558 will be returned.
- (B) Periodic Batch Settlement is successfully processed in C/3 (e.g., at 10:30am)*
6. A SI Settlement broadcast message is sent from C/3.  
Upon the completion of the SI Settlement process in C/3, a MA191 message with the appropriate message content (e.g., “Periodic batch settlement has been completed”) will be sent to PSS.  
Thus, in order to check the settlement status of the SI transaction that has been sent previously, PSS can then send an enquiry message (e.g., MC556) to C/3.
7. PSS submits Enquire SI (Single) transaction to check the settlement status of the SI.  
PSS submits MC556 with the appropriate SI Input Number (e.g., using field Id :20C) to enquire the settlement status of the SI.  
As in step no. 4 above, PSS is not required to submit MC556 prior to the receiving of MA191 broadcast message.  
Please note that the same MC556 message is used to enquire the settlement status of the SI transaction also.
8. C/3 returns SI status to PSS.  
The response (Output) message, MT548 is sent from C/3 synchronously upon receiving of the MC556. The status of the SI will be indicated in the message (e.g., Field Id, 25D with its value SETT/SETD of a matched SI).

### **A.3. PSS Error Code**

This Section covers the error codes PSS would encounter when error occurs during normal operation. The error codes are divided in to four different types: configuration file related error, PG server related error, PSS connectivity related error and PG message transmission related error.

#### **Configuration File Related Error**

This group of error codes will occur if any PG-API's configuration properties files are missing when starting PSS.

30010=Configuration file not found.

30020=Exception code file not found.

30060=Configuration file missing parameter.

#### **PG Server Related Error code**

This group of error codes will occur if PG encounters errors when accessing C/3.

31030=MT servlet not found in configuration.

31040=Post to MT servlet failed.

31060=PG not authorized to access the servlet.

#### **PSS Connectivity Related Error Code**

This group of error codes will occur if PSS encounters errors when accessing PG server.

30510=Invalid session id.

30520=Does not have logon token.

30530=Logon token has expired.

30540=Failed to init PGConnectionManager.

30550=Failed to create PGConnectionManager.

30560=Invalid Async Callback implementation.

30570=Unexpected system message returned.

30580=Connection object not available.

30590=IO exception in communicating with PG server.

30600=Failed to connect to PG Server.

30610=Unknown event ID

**PG Message transmission Related Error Code**

This group of error codes will occur if there are formatting error in the message sent by PSS.

32501=Missing message threshold parameter.

32510=Missing block1 in the message.

32520=Missing block2 in the message.

32530=Missing block3 in the message.

32540=Missing block4 in the message.

32550=Missing block5 in the message.

32560=Invalid message format.

32570=Invalid message checksum.

32580=Invaild block1 message format.

32590=Invaild block2 message format.

32600=Invaild block3 message format.

32610=Invaild block4 message format.

32620=Invaild block5 message format.

32630=Invalid application ID.

32640=Invalid header file.

32650=Unknown message priority.

32660=Unexpected message.

32670=Failed to get session ID from message.

32680=Error in parsing block 4 content (regular expression field error)

32690=Invalid timestamp

32700=Failed to get input stream



## A.4. Asynchronous and Broadcast Message Code

This section will cover the possible asynchronous and broadcast message PSS will receive from C/3.

### Asynchronous Messages

Below are the list of asynchronous messages available from C/3.

Broker / Custodian User related:

- SI BATCH INPUT CONTROL REPORT IS NOW AVAILABLE.
- ISI BATCH INPUT CONTROL REPORT IS NOW AVAILABLE.
- AD-HOC MARKS CALCULATION COMPLETED. PLEASE RETRIEVE CRMIM01 REPORT FOR DETAILS.
- SCHEDULED INTRA-DAY MARKS CALCULATION COMPLETED. PLEASE RETRIEVE CRMIM01 REPORT FOR DETAILS.
- DAY-END MARKS CALCULATION COMPLETED. PLEASE RETRIEVE CFIPM01 REPORT. DAY-END MARKS TO BE DEBITED FROM CCASS MONEY LEDGER #02/03 ACCOUNTS: ZZ,ZZZ,ZZZ,ZZ9.99
- ESTIMATED DAY-END MARKS AMOUNT (BEFORE CCMS OBLIGATION COLLATERALISATION) BASED ON CURRENT POSITIONS: ZZ,ZZZ,ZZZ,ZZ9.99

Designated Bank User related:

- DDI/DCI/EPI REJECTION LISTING IS NOW AVAILABLE

### Broadcast Messages

Since there is a length limit on broadcast message, please note that some of the broadcast messages are composed of more than one line, and are sent in different broadcast responses.

Broker / Custodian User related:

- PROVISIONAL CLEARING STATEMENT IS NOW AVAILABLE.
- FINAL CLEARING STATEMENT IS NOW AVAILABLE.
- PERIODIC BATCH SETTLEMENT HAS BEEN COMPLETED.
- FINAL BATCH SETTLEMENT HAS BEEN COMPLETED.
- SETTLED POSITION REPORT IS NOW AVAILABLE.
- PERIODIC SI MATCHING HAS BEEN COMPLETED.
- PRELIMINARY CONFIRMATION REPORT IS NOW AVAILABLE.
- FINAL CONFIRMATION REPORT IS NOW AVAILABLE.

- INPUT ATI FUNCTION IS NOW AVAILABLE.
- MAINT SUBSCR INSTR NOW AVAILABLE UP TO 16:15.
- ELECTRONIC CHATS PYMT INST RPT IS NOW AVAILABLE.
- CCR BATCH INPUT CONTROL REPORT IS NOW AVAILABLE.
- INTRA-DAY ISI/SI FULL LIST IS NOW AVAILABLE.
- BUY-IN NOTIFICATION REPORT IS NOW AVAILABLE.
- INPUT SI/ISI FUNCTION IS NOW AVAILABLE
- EIPO BATCH INPUT CONTROL REPORT IS NOW AVAILABLE
- TENDER INSTR BATCH CONTROL REPORT IS AVAILABLE.
- MARKS FIGURE HAS BEEN UPDATED.

The below broadcast message is delivered in two separate broadcast response.

- INTRA-DAY MARKS AND COLLATERAL COLLECTION REPORT
- IS NOW AVAILABLE.

The below broadcast message is delivered in four separate broadcast response.

- THE RELEASE OF ON-HOLD CNS ALLOCATED SHARES HAS BEEN
- COMPLETED. CNS SHARES ALLOCATED ON CURRENT DAY WILL BE
- AVAILABLE IF THERE IS MSI GENERATION AND NO OUTSTANDING
- CNS MONEY SETTLEMENT OBLIGATIONS

The below broadcast message is delivered in two separate broadcast response.

- CCASS FUNDING PROJECTION REPORT FOR DESIGNATED
- BANK IS NOW AVAILABLE

Designated Bank User related:

- INTRADAY PMT INSTR LIST IS NOW AVAILABLE FOR BANKS.
- ELECTRONIC CHATS PYMT INST RPT IS NOW AVAILABLE.
- REJECT DDI/EPI INPUT CONTROL REPORT IS AVAILABLE

- DDI/DCI/EPI REJECTION LISTING IS NOW AVAILABLE
- DDI/DCI/EPI LISTING IS NOW AVAILABLE
- DDI/DCI/EPI LISTING DATA FILES ARE NOW AVAILABLE
- DDI/DCI/EPI EXCEPTION LISTING IS NOW AVAILABLE
- INVESTOR CONFIRMATION REPORT IS NOW AVAILABLE

The below broadcast message is delivered in two separate broadcast response.

- CCASS FUNDING PROJECTION REPORT FOR DESIGNATED
- BANK IS NOW AVAILABLE

The below broadcast message is delivered in two separate broadcast response.

- DDI/DCI/EPI LISTING FOR IP RELATED TRANSACTIONS
- REPORT IS NOW AVAILABLE

## **A.5. Error Message for SI and ISI number format**

If there is error encounter for the SI or ISI number field, one possible error messages return will be:

“INPUT NUMBER MUST BE A POSITIVE INTEGER UP TO 8 DIGITS”

Please note that for PG message input, for both SI and ISI number requires input of 9 digits including the prefix; in cases this error message is encounter, 9 digits is still required as input of both SI and ISI number.