



**Office of Transport and Traffic Policy and Planning
Ministry of Transport**

Program Management Services : PMS



Central Clearing House Contractor Performance Evaluation Report No.2



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Program Management Service

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By

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Chapter 1 Introduction

1.1 Objectives

According to the section 4 of Program Management Service (PMS) contract scope of work; support the supervision of contractor work activities for implementation of CCH. It contains the following responsibilities;

(1) Support the supervision to ensure the contractor carry out the work according to specification and condition of contract such as smart card issuing, CCH establishment, and operation & maintenance as follows:

- Support the supervision of CCH system implementation and testing
- Support the supervision of interface work between the future transit system's Front-end which requires to launched the common ticketing system and the CCH's Back-end
- Support the verification activities to ensure that the CCH Contractor has implemented the system according to requirement.
- Support the supervision of interface work of the CCH and the transit Service Providers' Front-ends interface to ensure the work has been carried out according to Operation and Maintenance period.

(2) Support the supervision and management task according to contract as follows:

- Support the design verification according to Employer's requirements, outline design specification, and conceptual drawing
- Support the supervision of system development and installation work according to system development and Installation outline specification
- Support the supervision and monitoring of the CCH Contractor to ensure the works complete according to the contract
- Support the supervision, and approval of the completed work in order to support each milestone acceptance
- Support the supervision of work throughput in order to prepare the certificate, payment and review the CCH Contractor's invoice
- Support the supervision and provide recommendation related to any claims or contract provisions resulted by operations according to the contract (if any)

- Compile and verify the drawing that has to be provided and installed according to the Conditions of Contract
- Compile and make the file index and important notes which will be submitted to the Common Ticketing Office
- Follow up the contractor for preparation of Operation Manual and Training Manual and provide training for the Common Ticketing Office's staff
- Supervision the Test and Commissioning
- Support the supervision during the maintenance period at interval as necessary and appropriate during the time frame of PMS contract

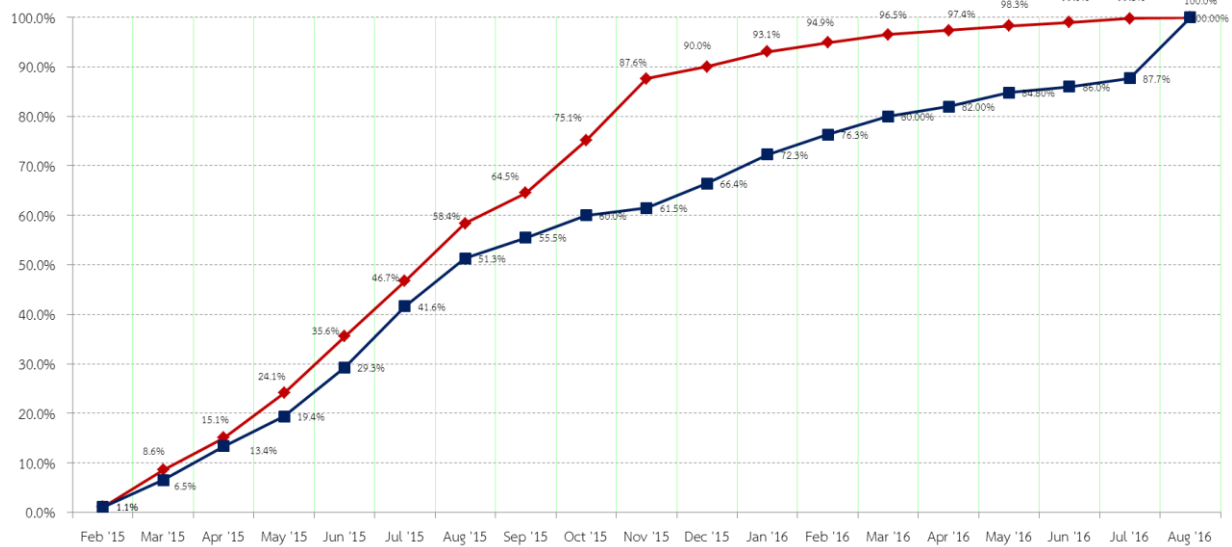
According to the Contract's conditions on report deliverable, the PMS consulting group has prepared a report to evaluate the CCH Contractor's performance. This report is the second CCH Contractor performance evaluation

1.2 Current Progress

The CCH implementation progress is divided into 5 sections consisting of System Design, System Development, Prototype, Test and Commissioning and Training. The works duration is in total of 18 months. The works after completion of test and commissioning phase are the Training and Technology Transfer phase the will be done between the 18th –24th month, Front-End Modification Phase the will be done between the 18th – 30th month and Maintenance phase for 2 years

Currently the CCH implementation project has completed the system design, implementation and test and commissioning at 15th August 2016 and of the training and technology transfers works and maintenance works are currently in progress

Chart 1-1 Central Clearing House Development Plan for 18 Months



Note The work progress estimation above is the progress of the works from the beginning to completion of system testing in month 18th that are the main works of the project

Chapter 2 Consultant Review Process

2.1 Document Reviews

The PMS Consulting Group has reviewed the Establishment of the Central Clearing House Project's documents submitted by the BSV Consortium to the OTP as follows:

- (1) Project Management Plans
- (2) Design Documents
- (3) Development Documents
- (4) Testing Documents
- (5) Training Documents
- (6) User Documents

The number of documents the BSV Consortium is required to submit and the document review status can be summarized as in **Table 2-1**.

Table 2-1 Current Status of the Central Clearing House Development Project's Documents

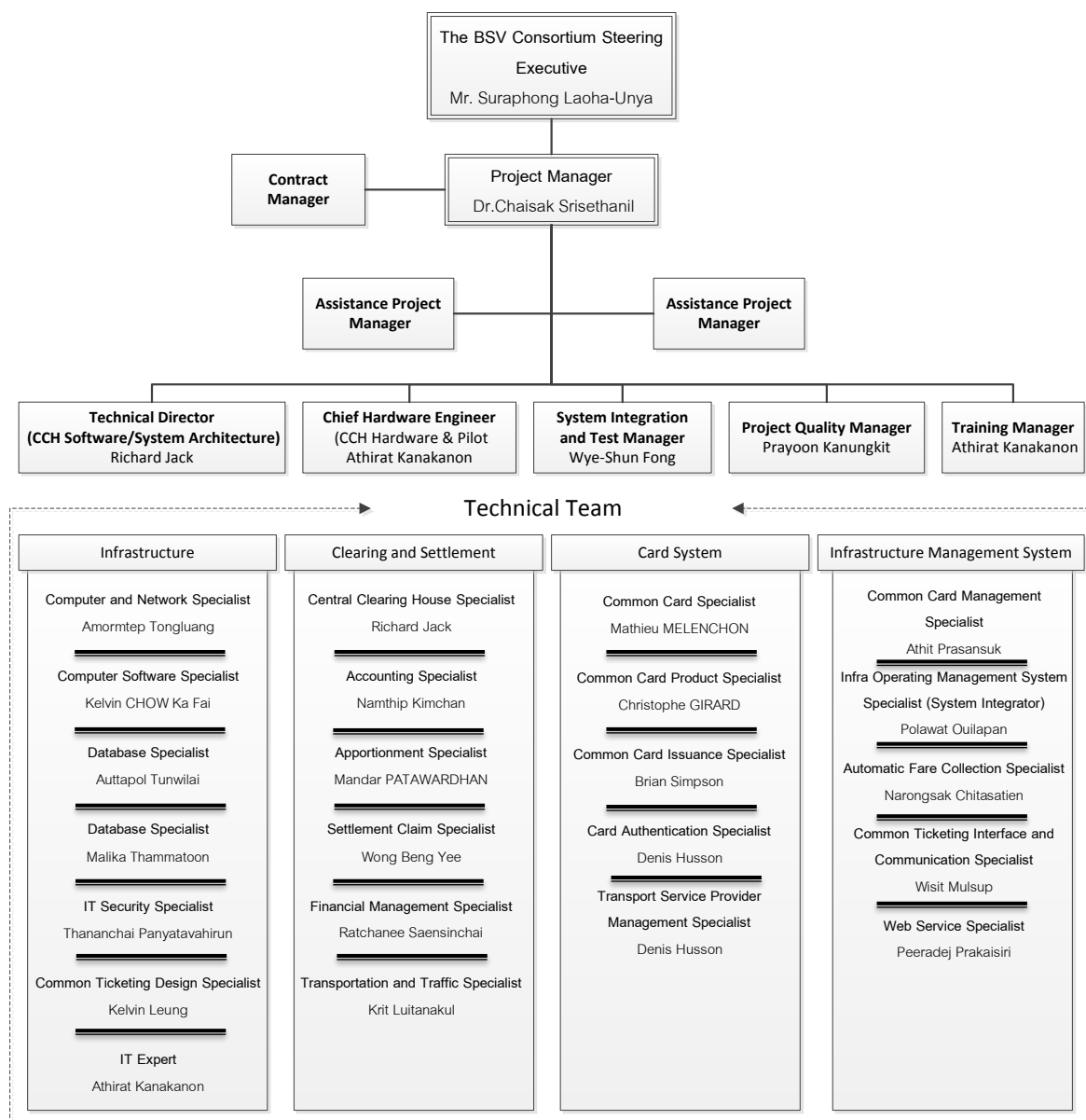
No.	Details	The Total Number of Documents	The Number of Documents received by PMS	The Number of Documents under PMS Reviews	The Number of Documents reviewed by PMS Completely
1	Project Management Plans	6	6	0	6
2	Design Documents				
	- System Architecture	7	7	0	7
	- Design Specifications	20	20	0	20
	- Interface	6	6	0	6
	- Detail Designs	28	28	0	28
3	Development Documents	5	5	0	5
4	Testing Documents	45	45	0	45
5	Training Documents	40	5	3	2
6	User Documents	27	5	0	5
	Total	184	127	3	124

2.1.1 Project Management

The BSV Consortium has submitted the project management-related documents consisting of organization management plan, quality management, main operational plan, document delivery schedule and project coordination plan, with details as follows:

1. Organization Management Plan shows organization management for the Establishment of the Central Clearing House, staff responsibilities, and staff qualifications consisting of project operation's main staff and technical staff, as shown in **Chart 2-1**.

Chart 2-1 BSV Consortium's Organization Plan



2. Draft of Quality Management Plan is drafted to assure that the performance, both system functions and efficiency, are accurate and appropriate according to the customer demands and predetermined period. The BSV Consortium's quality management plan draft involves activities, stages and various processes of the Central Clearing House development project.

3. Quality Management contains details about the quality management plan to ensure that the system functions and efficiency are accurate and appropriate according to the customer demands and predetermined period. The project's operating and supporting staff have to perform according to the details in the quality management document. During the operation, a quality management's responsible person probably improves or modifies the quality management document details to be suitable for the operation. The content consists of activities, steps and process of quality management certification for the Establishment of the Central Clearing House project. It also includes quality management methods, acceptable standard quality, and certification of quality, activities and their quality control.

4. Main Work Program is the project's main work program which explains activities' periods throughout the project agreement term, including holding meeting for coordination, meeting with the OTP and the PMS Consulting Group, and meetings with the third party. The meetings are to determine the Establishment of the Central Clearing House project's staff responsibility list for effective communication, and set a standard for document preparation and effective management of main documents.

5. Document Submission Schedule

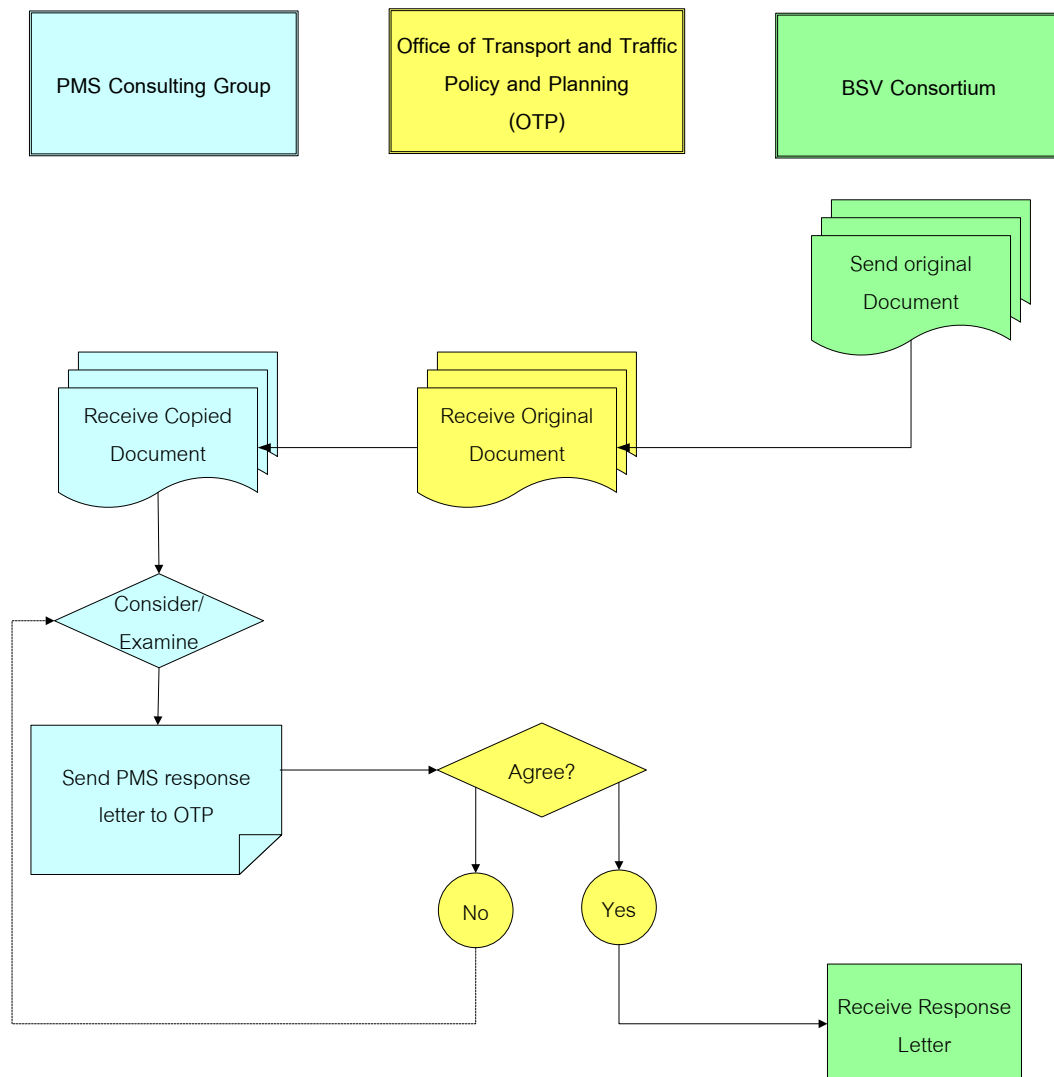
Document submission schedule identifies a list of documents to be submitted to the OTP. It consists of project management documents, design documents, system development documents, testing documents, user documents and training documents. The document list can be modified as the OTP sees fit. At the present, the actual document delivery plan is perform as shown in **Table 2-2**.

Table 2-2 BSV Consortium's Document Delivery Plan

Document List	Delivery Schedule	Actual Operating Period
Project Management Plans	March 2015 – May 2015	March 2015 – August 2015
Design Documents	March 2015 – August 2015	March 2015 – September 2015
Development Documents	August 2015 – November 2015	April 2015 – October 2015
Testing Documents	March 2015 – January 2016	March 2015 – August 2016
Training Documents	April 2016 – October 2016	In progress
User Documents	October 2016	In progress

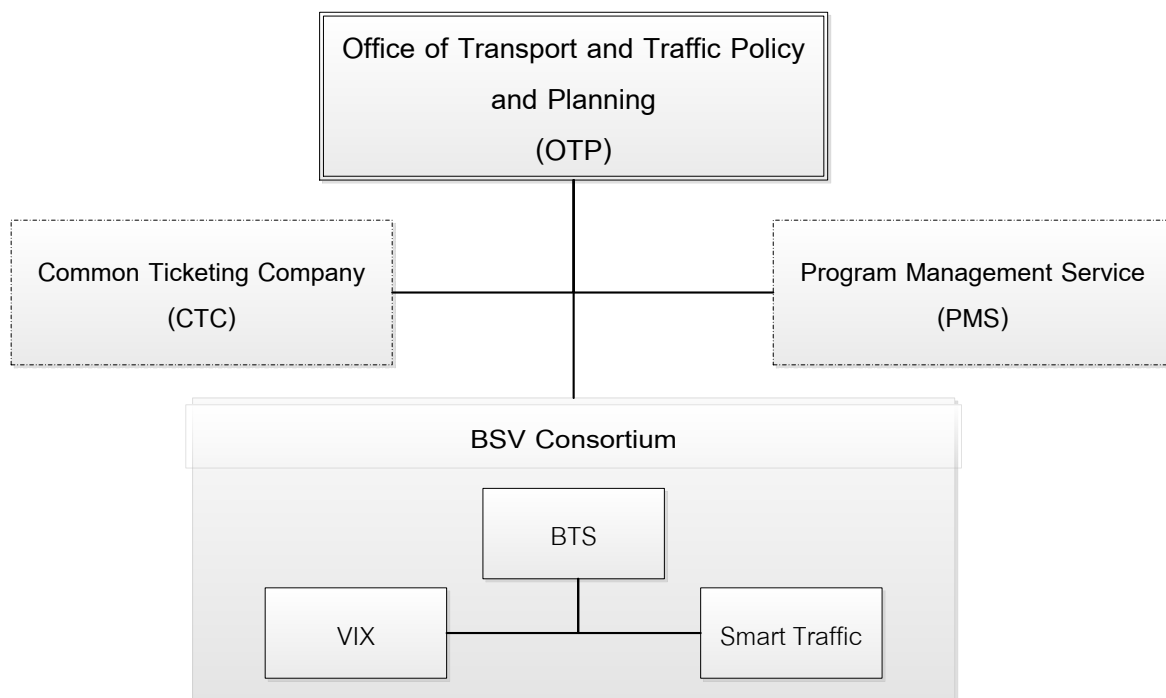
According to the BSV Consortium's document delivery and the OTP and PMS's consideration, the document delivery and consideration are performed according to the **Chart 2-2**.

Chart 2-2 BSV Consortium Documentation Process



6. Project Coordination Plan shows coordination plan in order to request for information from the related third party and to connect the system to the service providers' Front-ends throughout the project's term, to ensure that the performance is in accordance with the plan. The BSV Consortium is required to coordinate with internal departments to inform them before coordinating with the related third party, as shown in **Chart 2-3**.

Chart 2-3 Coordination Plan between Related Internal Departments



In the operation, the BSV Consortium has provided coordination plan with the related third party with details as shown in **Table 2-3**.

Table 2-3 Coordination Plan for BSV Consortium and Related Departments' Operations

No.	Details	Coordination	Agencies	Schedule
1	System Design			
1.1	Business Rules	Finalize the Business Rules Requirement and design approval	OTP/PMS/CTC/SP	3 rd Month
1.2	Card Data Definition	Finalize the Requirement and design approval	OTP/PMS/CTC/SP	3 rd Month
1.3	Parameter Data Definition	Finalize the Requirement and design approval	OTP/PMS/CTC/SP	3 rd Month
1.4	Transaction Data Definition	Finalize the Requirement and design approval	OTP/PMS/CTC/SP	3 rd Month

No.	Details	Coordination	Agencies	Schedule
1.5	System Security Design	Finalize the Requirement and design approval	OTP/PMS/CTC	3 rd Month
1.6	CCH System and Subsystem Function and Design	Approval on design specification	OTP/PMS/CTC	4 th Month
1.7	KMF Design and Function	Approval on design specification	OTP/PMS/CTC	4 th Month
1.8	CIPS Design and Function	Approval on design specification	OTP/PMS/CTC	4 th Month
1.9	Refund and Reload Design and Function	Approval on design specification	OTP/PMS/CTC	4 th Month
1.10	Central Clearing House (CCH) Report Specification	Review and approve the of design report	OTP/PMS/CTC	6 th Month
1.11	Prototype - Rail	Approval on list of functions to be test	OTP/PMS/CTC	4 th Month
1.12	Prototype - Toll	Approval on list of functions to be test	OTP/PMS/CTC	4 th Month
1.13	Prototype - NFC	Approval on list of functions to be test	OTP/PMS/CTC	4 th Month
1.14	Prototype - Retail	Approval on list of functions to be test	OTP/PMS/CTC	4 th Month
2	System Implementation			
2.1	Hardware Bill of Materials	Approval of Hardware Bill of Materials	OTP/PMS/CTC	6 th Month
2.2	Software Bill of Materials	Approval of Software Bill of Materials	OTP/PMS/CTC	6 th Month
2.3	Data Center	Acknowledge for location, security and facilities of Data Center and its facility	OTP/PMS/CTC	8 th Month
2.4	Server and accessory layout and rack diagram	Approval of layout and rack diagram	OTP/PMS/CTC	8 th Month
3	Test and Commissioning			
3.1	Test Plan	Approval of Test Plan	OTP/PMS/CTC	9 th Month
3.2	Functionality Acceptance Test	Participate in the Acceptance Test	OTP/PMS/CTC	11 th Month
3.3	System Integration Test with Prototypes	Participate in the Acceptance Test	OTP/PMS/CTC	12 th Month
4	Coordination with Front-End Upgrade			
4.1	Coordination on Integration design work	Participate in the Integration design	OTP/PMS/CTC/SP	10 th Month
4.2	Coordination on Integration test	Participate in the Integration test	OTP/PMS/CTC/SP	12 th Month
5	Technology Transfer			

No.	Details	Coordination	Agencies	Schedule
5.1	Training Material Preparation	Approval of training materials	OTP/PMS/CTC	7 th Month
5.2	Training Classes	Attend training session	OTP/CTC	9 th Month
6	Operation and Maintenance			
6.1	System Operation Manual	Review and approve Operation Manual	OTP/PMS/CTC	6 th Month
6.2	System Maintenance Manual	Review and approve Maintenance Manual	OTP/PMS/CTC	6 th Month

2.1.2 Design Documents

2.1.2.1 Summary of Design Document Submission

BSV Consortium, the common ticketing and CCH system contractor, have submitted 57 documents for system design consisting of;

1. Architecture Documents
2. Requirements Documents
3. Interface Documents
4. Design Documents

The detail of each document as shown below

1. Architecture Documents present the architecture design concept and relations between subsystem combined into the system in order to show the system overview including of Central Clearing House System, Security System, Common Ticketing Structure and various parameters.
2. Requirements Documents gather users and service providers' system requirements to be used for the detail design. It includes the OTP's requirements and suggestions obtained from coordination meeting and workshop.
3. Interface Documents show the interfacing, data transfer, with Transit's and Non-transit's front-end, banking system, and communication between transit and non-transit service providers, and card's users.
4. Design Documents shows details of CCH's sub-system components and the interface between subsystems and other related systems.

During the design stage, the PMS Consulting Group and BSV Consortium arrange the workshop to gather the opinion from related parties. The participants' suggestions and opinion were considered.

The BSV Consortium submitted all design documents to be completed in September 2015. The PMS Consulting Group reviewed the documents and gave the BSV Consortium feedback to correct the documents to be in accordance with the specification and the Establishment of the Central Clearing House's scope of works, General Specification, appendix 6, Business Rules and the Particular Specification. The list of design documents submitted and revised according to the OTP and PMS Consulting Group's suggestions by the BSV Consortium is summarized as follows:

Table 2-4 List of Common Ticketing and CCH Design Documents

No.	Document No.	Document Description	Revision
1	Architecture Documents		
1.1	BSVV.00001	System Architecture	2.0
1.2	BSVB.00010	Technical & Network Architecture	2.0
1.3	BSVV.00002	System Security Architecture	3.0
1.4	BSVB.00001	NC Card Data Definition	3.0
1.5	BSVB.00011	Configuration Parameters	2.0
1.6	BSVB.00012	Transaction Data Definition	2.0
1.7	BSVB.00013	NC Card Business Rules	2.0
2	Requirements Documents		
2.1	BSVB.00014	Access Control Subsystem Software Requirement Specification	2.0
2.2	BSVB.00015	Action List Management Subsystem Software Requirement Specification	1.0
2.3	BSVB.00016	Autoload Management Subsystem Software Requirement Specification	1.0
2.4	BSVB.00017	Card Inventory Management Subsystem Software Requirement Specification	1.0
2.5	BSVS.00003	Card Initialization and Personalization Subsystem Software Requirement Specification	2.0
2.6	BSVB.00018	Communication Subsystem Requirement Specification	1.0
2.7	BSVB.00101	Configuration Data Management Subsystem Software Requirement Specification	1.0
2.8	BSVB.00019	Device Management Subsystem Software Requirement Specification	1.0
2.9	BSVV.00003	Financial Management Subsystem Software Requirement Specification	1.0
2.10	BSVB.00020	Host Security Management Software Requirement Specification	2.0

No.	Document No.	Document Description	Revision
2.11	BSVV.00004	Issuer Subsystem Software Requirement Specification	1.0
2.12	BSVS.00004	Key Management Subsystem Software Requirement Specification	2.0
2.13	BSVV.00014	Online Enquiry Software Requirement Specification.	1.0
2.14	BSVB.00022	Report Management Subsystem Software Requirement Specification	1.0
2.15	BSVV.00023	Systems Management Subsystem Software Requirement Specification	2.0
2.16	BSVV.00005	Cardholder Website Software Requirement Specification	2.0
2.17	BSVB.00114	SP Website Software Requirement Specification	2.0
2.18	BSVB.00105	Payment Gateway Software Requirement Specification	1.0
2.19	BSVS.00078	SAM Requirement Specification	2.0
2.20	BSVS.00069	Refund and Reload Machine Software Requirement Specification	2.0
3	Interface Documents		
3.1	BSVB.00025	Bank Interface Specification	1.0
3.2	BSVV.00006	OTP CCH to Operator Interface Specification	2.0
3.3	BSVB.00026	Equipment Initialization Interface Specification	2.0
3.4	BSVV.00015	Online Enquiry Subsystem Interface Specification	2.0
3.5	BSVB.00106	Cardholder Website Payment Gateway Subsystem Interface Specification	1.0
3.6	BSVS.00079	SAM Interface Specification	2.0
4	Design Documents		
4.1	BSVB.00039	Access Control Subsystem Design Specification	2.0
4.2	BSVB.00040	Action List Management Subsystem Design Specification	2.0
4.3	BSVB.00041	Autoload Management Subsystem Design Specification	2.0
4.4	BSVB.00042	Card Inventory Management Subsystem Design Specification	1.0
4.5	BSVS.00009	Card Initialization and Personalization Subsystem Design Specification	2.0
4.6	BSVB.00043	Communications Subsystem System Design Specification	2.0
4.7	BSVB.00116	Configuration Data Management Subsystem Software Design Specification	2.0
4.8	BSVB.00044	Device Management Subsystem Software Design Specification	2.0
4.9	BSVV.00009	Financial Management Subsystem Software Design Specification	2.0
4.10	BSVB.00045	Host Security Management Subsystem Software Design Specification	1.0
4.11	BSVV.00010	Issuer Subsystem Design Specification	2.0

No.	Document No.	Document Description	Revision
4.12	BSVS.00010	Key Management Subsystem Design Specification	2.0
4.13	BSVV.00016	Online Enquiry Subsystem Design Specification	1.0
4.14	BSVB.00046	Report Management Subsystem Design Specification	2.0
4.15	BSVB.00047	Systems Management Subsystem Software Design Specification	2.0
4.16	BSVS.00011	Central Clearing House Equipment Rack Plan	2.0
4.17	BSVB.00048	Central Clearing House Network Design	2.0
4.18	BSVB.00049	Central Clearing House Server System Design	2.0
4.19	BSVV.00011	Cardholder Website Software Design Specification	2.0
4.20	BSVB.00115	SP Website Software Design Specification	2.0
4.21	BSVB.00107	Payment Gateway Subsystem Interface Specification	2.0
4.22	BSVS.00083	SAM Design Specification	2.0
4.23	BSVB.00104	System security architecture Design Specification	2.0
4.24	BSVS.00084	Reload and Refund Machine Software Design Specification	2.0
4.25	BSVB.00126	NFC Prototype Specification	1.0
4.26	BSVB.00127	Retail Prototype Specification	2.0
4.27	BSVS.00092	Toll Prototype Specification	1.0
4.28	BSVS.00093	Rail Prototype Specification	1.0

The suggestions and document consideration results are provided in **Appendix A**.

2.1.2.2 Consideration of Design Document

Currently, this task is completed and the BSV Consortium has already submitted the CCH design results to the CCH's CCH Acceptance Committee with the following details;

CCH Acceptance Committee Meeting No. 2/2015 on November 5, 2015. The meeting was arranged to explain the system details design. The Meeting's resolution is assigned the Committee to reconsider the Disbursement Form for the 1st Milestone – Design Approval and gave feedback and observation to the BSV Consortium for explanation or correction of the document.

CCH Acceptance Committee Meeting No. 3/2015 on November 25, 2015. The meeting was held to summarize the committee's suggestions and observation. The meeting resolution regarding the number of card issuers was that the number, from a maximum of 10 issuers, should be

increased to exceed 10 issuers. The BSV Consortium is assigned to search for the methods and prepare for documents providing additional information and reasons for such decision.

CCH Acceptance Committee Meeting No. 4/2015 on November 30, 2015. The BSV Consortium presented the principles for card issuer quantity increment without affecting the project's schedule which is already approved by the OTP. Moreover, the Meeting's resolution approved the design approval milestone.

Details of system design and design verification are shown in Chapter 3 in this report.

2.1.3 System Development Documents

2.1.3.1 Summary of System Development Documents Submission

The Central Clearing House development documents include the installation and commissioning plan. The development documents consist of;

1. The Central Clearing House (CCH) Development Report
2. Procurement Plan
3. Hardware Bill of Materials
4. Software Bill of Materials
5. Third Party Software Bill of Materials

BSV consortium has submitted the development documents completely in April 2016. The PMS Consulting Group has reviewed and made the suggestion to the development documents and the BSV consortium already update the document to be correct and complete follow the Contract. The list of development documents submitted and revised according to the OTP and PMS Consulting Group's suggestions by the BSV Consortium is summarized as follows:

Table 2-5 List of 2.1.3 System Development Documents

No.	Document No.	Document Description	Revision
1	BSVB.00128	CCH Development Report	1.0
2	BSVS.00012	Procurement Plan	2.0
3	BSVS.00001	Hardware Bill of Materials	1.0
4	BSVS.00002	Software Bill of Materials	2.0
5	BSVS.00080	Third Party Software Bill of Material	1.0

The suggestions and document consideration results are provided in **Appendix A**.

2.1.3.2 Consideration of Development Documents

Currently, the works has been completed and BSV consortium already delivers hardware and software to the Acceptance Committee for the Establishment of the Central Clearing House Project (CCH Acceptance Committee) for consideration. However, during procurement process, the BSV consortium has submitted the letter, 2 letters, to request the replacement of the obsoleted equipment and proposed the new equipment that newer model and higher performance than the existing one. The CCH Acceptance Committee has the consideration of the equipment replacement and milestone deliverable as follow

1. Consideration of the equipment replacement

BSV consortium submit the document to request for replacement of the CCH project's equipment totally 7 items

- The first request for replacement on 25 Nov 2015, submit the document to inform that 4 equipment are obsoleted, 1) Database Server 2) Application Server 3) Backup Management 4) External Storage, with the specification comparison for CCH Acceptance Committee consideration. The acceptance committee has the resolutions as follows:

CCH Acceptance Committee Meeting No. 2/2015 on November 5, 2015 the BSV Consortium explained reasons and necessities for the equipment replacement, and offered the proposed equipment including the comparison of properties. The committee considered the matter and agreed that the proposed equipment was of newer version and more effective than the existing one; therefore, they approved the BSV's request and asked them to prepare pricing comparison document and present it in the next Committee Meeting.

CCH Acceptance Committee Meeting No. 3/2015 on November 25, 2015 the BSV Consortium presented the equipment pricing comparison, and PMS Consulting Group is assigned to consider the appropriate pricing.

CCH Acceptance Committee Meeting No. 4/2015 on November 30, 2015, the PMS Consulting Groups informed that they considered the pricing comparison document and found that the proposed equipment prices were higher than the existing ones, but the BSV Consortium still confirmed through a letter to purchase them at the prices specified in the contract. The consultants found that it was for the government benefits. The Committee Meeting considered

the price comparison document and the consultants' opinion, and has the resolution to agreed that the BSV Consortium can purchase the equipment, and assigned the OTP to act as a coordinator for the amendment of contract.

○ The second request for replacement on 18 Mar 2016, submit the document to inform that 3 equipment are obsoleted, 1) Workstations 2) Printers 3) 55" LCD TV, with the specification comparison for CCH Acceptance Committee consideration. The acceptance committee has the resolutions as follows:

CCH Acceptance Committee Meeting No.1/2016 on 25th March 2016, the BSV Consortium explained reasons and necessities for the equipment replacement and offered the proposed equipment including the comparison of properties and confirm the procurement price same as state in the contract. The Committee Meeting considered the specification and pricing comparison document and the consultants' opinion, and has the resolution to agreed that the BSV Consortium can purchase the equipment, and assigned the OTP to act as a coordinator for the amendment of contract.

2. Consideration of the Milestone Deliverable

After the detailed design is approved, the BSV consortium provided and developed software according to the design and submitted it to the OTP with details about the inspection and delivery as follows:

PMS Consulting Group's Inspections

- On March 29, 2016 the PMS consulting group inspected tools and equipment under the installation at the Data Center
- On March 30, 2016 the PMS consulting group inspected the tools and equipment delivered to and installed at the OTP.
- On April 25, 2016 the PMS consulting group inspected the tools and equipment delivered to and installed at the Data Center.

Material Inspection Acceptance Committee Meeting No. 3/2016 On June 16, 2016, the BSV consortium delivered documents to request for performing the second delivery: the Central Clearing House system development approval. The Committee inspected the tools and software installed at the Data Center and OTP, and decided that the BSC consortium developed the CCH system completely and accurately in accordance with the final design details, and the CCH's

hardware and software purchased and installed were complete and accurate according to the material lists. As a result, the committee meeting resolved to accept the second delivery, the Central Clearing House system development approval.

After the material inspection acceptance committee decided to accept the work, the BSV consortium sent invoice to the OTP on June 17, 2016. The PMS consulting group inspected and found that the invoice was correct according to the work delivery.

The equipment and software delivery details, as well as inspection of equipment and software delivered are shown in **Chapter 4** in the report.

2.1.4 Testing Documents

2.1.4.1 Summary of Testing Document Submission

The CCH testing documents are divided into;

1. Test Plan
2. Test Procedure
3. Test Result

The BSV consortium delivered all system testing documents in August, 2016. The PMS consulting group inspected all documents according to the conditions under the testing, and considered on accuracy in accordance with the details of common ticket and Central clearing House under the design. The system testing documents delivered by the BSV consortium and modified according to the OTP's suggestion, as inspected by PMS consulting group are as follows:

Table 2-6 List of Testing Documents

No.	Document No.	Document Description	Revision
1	Test Plan		
1.1	BSVB.00005	Preliminary Test plan	2.0
1.2	BSVB.00068	Overall Inspection and Test Plan	2.0
1.3	BSVB.00069	Functional Acceptance Test Plan	2.0
1.4	BSVB.00070	System Integration Test Plan	1.0
1.5	BSVS.00072	System Acceptance Test Plan	1.0

No.	Document No.	Document Description	Revision
2	Test Procedure		
2.1	BSVB.00119	Access Control Subsystem Functional Acceptance Test Procedure	1.0
2.2	BSVB.00071	Actionlist Management Subsystem Functional Acceptance Test Procedure	1.0
2.3	BSVB.00072	Autoload Management Subsystem Functional Acceptance Test Procedure	1.0
2.4	BSVB.00120	Cardholder Website Functional Acceptance Test Procedure	1.0
2.5	BSVB.00073	Card Inventory Management Subsystem Functional Acceptance Test Procedure	1.0
2.6	BSVS.00022	Card Initialization and Personalization Subsystem Functional Acceptance Test Procedure	2.0
2.7	BSVB.00074	Communication Management Subsystem Functional Acceptance Test Procedure	1.0
2.8	BSVB.00075	Configuration Data Management Subsystem Test Procedure	2.0
2.9	BSVB.00076	Device Management Subsystem Functional Acceptance Test Procedure	1.0
2.10	BSVB.00077	Financial Management Subsystem Functional Acceptance Test Procedure	1.0
2.11	BSVB.00078	Host Security Management Subsystem Functional Acceptance Test Procedure	1.0
2.12	BSVB.00079	Issuer Management Subsystem Functional Acceptance Test Procedure	1.0
2.13	BSVS.00023	Key Management Subsystem Functional Acceptance Test Procedure	2.0
2.14	BSVB.00080	Online Enquiry Management Subsystem Functional Acceptance Test Procedure	1.0
2.15	BSVS.00085	Refund and Reload Machine Software Acceptance Test Procedure	2.0
2.16	BSVB.00081	Report Management Subsystem Functional Acceptance Test Procedure	1.0
2.17	BSVB.00121	SP Website Functional Acceptance Test Procedure	1.0
2.18	BSVB.00082	System Management Subsystem Functional Acceptance Test Procedure	2.0
2.19	BSVS.00071	System Integration Test Procedure	2.0
2.20	BSVS.00073	System Acceptance Test Procedure	1.0
3	Test Summary Report		
3.1	BSVB.00122	Access Control Subsystem Functional Acceptance Test Summary Report	1.0
3.2	BSVB.00083	Actionlist Management Subsystem Functional Acceptance Test Summary Report	1.0
3.3	BSVB.00084	Autoload Management Subsystem Functional Acceptance Test Summary Report	1.0
3.4	BSVB.00123	Cardholder Website Functional Acceptance Test Summary Report	1.0
3.5	BSVB.00085	Card Inventory Management Subsystem Functional Acceptance Test Summary Report	1.0
3.6	BSVS.00074	Card Initialization and Personalization Subsystem Functional Acceptance Test Summary Report	1.0
3.7	BSVB.00086	Communication Management Subsystem Functional Acceptance Test Summary Report	1.0

No.	Document No.	Document Description	Revision
3.8	BSVB.00087	Configuration Data Management Subsystem Test Summary Report	1.0
3.9	BSVB.00088	Device Management Subsystem Functional Acceptance Test Summary Report	1.0
3.10	BSVB.00089	Financial Management Subsystem Functional Acceptance Test Summary Report	1.0
3.11	BSVB.00090	Host Security Management Subsystem Functional Acceptance Test Summary Report	1.0
3.12	BSVB.00091	Issuer Management Subsystem Functional Acceptance Test Summary Report	1.0
3.13	BSVB.00092	Key Management Subsystem Functional Acceptance Test Summary Report	1.0
3.14	BSVB.00093	Online Enquiry Management Subsystem Functional Acceptance Test Summary Report	1.0
3.15	BSVS.00086	Refund and Reload Machine Functional Acceptance Test Summary Report	1.0
3.16	BSVB.00094	Report Management Subsystem Functional Acceptance Test Summary Report	1.0
3.17	BSVB.00124	SP Website Functional Acceptance Test Summary Report	1.0
3.18	BSVB.00095	System Management Subsystem Functional Acceptance Test Summary Report	1.0
3.19	BSVS.00075	System Integration Test Summary Report	1.0
3.20	BSVS.00076	System Acceptance Test Summary Report	1.0

The suggestions and document consideration results are provided in **Appendix A**.

2.1.4.2 Consideration of Design Document

Currently, this part of works are finished, and the BSV consortium has presented and submitted the results of Central Clearing House testing to the CCH project's material inspection acceptance committee as follows:

Material Inspection Acceptance Committee Meeting, No. 4/2016 On August 22, 2016, the BSV consortium sent documents to request for the third delivery, the system testing approval. The PMS consulting group requested the committee for the system inspection to be performed during August 16, 2016 – September 30, 2016. The committee considered the PMS consulting group's proposal and decided to acknowledge the system testing plan as well as all tests of the PMS consulting group for completion and accuracy of the Central Clearing House's functions in accordance with the OTP's requirements.

Material Inspection Acceptance Committee Meeting, No. 5/2016 On October 18, 2016, the committee performed a trial of the common ticket and Central Clearing House, and the PMS consulting group reported the trial results to the meeting. The meeting considered the results and decided to accept the delivery of system testing approval. Some parts of the report to be

corrected would be finished by the BSV consortium before the next delivery acceptance (approval of training and technology transfer).

After the committee decided to accept the system testing, the BSV consortium sent invoice to the OTP on October 19, 2016. The PMS consulting group inspected the invoice and found that it is accurate and accord with the system inspection.

The details of system testing and verification of the Central Clearing House system testing are shown in **Chapter 5** under this report.

2.1.5 Training Documents

2.1.5.1 Summary of Training Document Submission

The training documents consist of;

1. Technology Transfer
2. Training

The details of training documents as follow

1. Technology Transfer – the training aims to educate the participants on the CCH Contractor' technology which is used in the system development and the Contractors' experiences.
2. Training – the training documents are made for the users so that they are able to effectively use and maintain the CCH. The training is divided into 2 courses as follows:
 - 1) The CCH Operating Courses to create understanding about responsibility, activity and methods of the CCH's usage and management
 - 2) The CCH Maintenance Courses to create understanding about responsibility, activity and methods of the CCH's maintenance

Regarding progress at the end of October 2016, the BSV Consortium submitted the technology transfer and training plans to the OTP and PMS Consulting Group, and the PMS Consulting Group considered the matter. Their opinion over the plans is shown in **Appendix A**.

2.1.6 Operating and Maintenance Manual

2.1.6.1 Summary of Operating and Maintenance Submission

The operating and maintenance manual provided for the Establishment of the Central Clearing House Project will be in both Thai and English versions. Regarding progress at the end of October 2016, the BSV Consortium submitted the operation and maintenance manuals to the OTP and PMS Consulting Group, and the PMS Consulting Group considered the matter. Their opinion over the operation and maintenance manuals is shown in **Appendix A**.

2.2 Coordination Meeting Attendance

To make the project running in accordance with the schedule and requirements and responding to demands of the government, transit and non-transit service providers, the OTP, the PMS Consulting Group and the BSV Consortium arrange the coordination meeting with the third party and service providers. The workshop is arranged to publish the works result and gather related parties' suggestion and feedback which will be adapted and applied to the system design, so that the developed CCH is able to respond to the government's policies, service provider demands and the public benefits as much as possible.

Regarding the Establishment of the Central Clearing House Project's coordination meetings arranged during the project consist of the technical meeting, the public hearing, the workshop, project coordination meeting, and CCH Acceptance Committee Meeting. The meeting details are shown in **Table 2-7**.

Table 2-7 Details of the Establishment of the Central Clearing House Project Meetings

No.	Date	Meeting	Related person	Details
1.	17 Feb 15	Project Kickoff Meeting	OTP/PMS/BSV	OTP, PMS consulting group and BSV Consortium attended the project kickoff meeting. The BSV Consortium presented the project's implementation plan and main delivery schedule, and introduced the project's staff and coordinators.
2.	11 Mar 15	Technical Meeting No. 1	OTP/PMS/BSV	According to accelerating policy of the Ministry of Transport, the OTP, the PMS consulting group and BSV Consortium arrange the meeting to discuss on a guideline and framework in order to complete the common ticketing structure design as soon as possible. <u>The Meeting's Opinion:</u> The BSV Consortium should issue the card data structure within April 2015. The PMS consulting group also arrange the card structure workshop to acknowledge effects and opinion from related parties.

No.	Date	Meeting	Related person	Details
3.	9 Apr 15	Technical Meeting No. 2	OTP/PMS/BSV	- The BSV Consortium informed the meeting that their design process would be delayed, since the conclusion over card data requirements still could not be concluded. <u>The Meeting's Opinion:</u> The PMS Consulting Group arrange the workshop with the BMTA in order to obtain necessary information for the design as soon as possible. Regarding the financial report, since there was not CTC in place, the OTP and PMS Consulting Group had to consider and verify the report. - Related parties suggested about the common ticketing standard that more than a single technology or manufacturer should be allowed. <u>The Meeting's Opinion:</u> The BSV Consortium explained that such task was not in the scope. However; if the OTP wanted the common tickets to be compatible with other cards using other technologies, related parties can study those card structures for possibility and limitation, and then inform the BSV Consortium for further design modification.
4	27Apr 15	Public Hearing	OTP/PMS/BSV/ SP	The PMS consulting group and BSV arranged a public hearing seminar about the common ticket's overview and initial design to gather the opinion and suggestions for the design.
5	7 May 15	Workshop	OTP/PMS/BSV/ SP	The PMS consulting group and BSV arranged the workshop pertaining to the common ticket details and the overall CCH System for related parties' staff in order to gather and use their opinion and suggestions for the design. According to this workshop, the PMS Consulting Group and BSV Consortium modified the details design to accord with the opinion and suggestions gathered from the workshop;. 1. Increasing the number of system transfer from 2 times to 3 times to correspond with people transfer behavior, and 2. Maintaining the orders of card products as specified in the OTP's requirements, and CTC was allowed to modify as appropriate
6	14 May 15	Technical Meeting No. 3	OTP/PMS/BSV	This Technical Meeting No. 3 discussed the following matters; 1. Determination and definition of the PMS Consulting Group's comment categories 2. Implementation of non-transit business' Front-end 3. Issuer's Float management 4. Card product usage sequences

No.	Date	Meeting	Related person	Details
7	19 May 15	Project Coordination Meeting	OTP/PMS/BSV/C PEX/BMTA	Coordination Meeting discussed fare collection concept through Automatic Fare Collection System for Public Buses and Chao Phraya Express Boats, and listened to BMTA and Chao Phraya Express Boat's e-money card implementation plan.
8	8 June 15	Project Coordination Meeting	OTP/PMS/BSV/ Seoul City Government	OTP, PMS consulting group and BSV Consortium attended the meeting to listen to the Common Ticketing development experiences in Seoul, South Korea, which was presented by Seoul City Government's representatives.
9	15 June 15	Technical Meeting No. 4	OTP/PMS/BSV	Follow up design documents falling behind the submittal schedule that submitted by the BSV Consortium.
10	13 July 15	CCH Acceptance Committee Meeting	OTP/PMS/BSV	In this meeting, BSV Consortium presented the scope of implementation and timeframe according to the Contract, including the current progress to the CCH Acceptance Committee.
11	22 July 15	Technical Meeting No. 5	OTP/PMS/BSV	Discuss a management plan in a case of multiple card issuers. The meeting's resolution appointed BSV Consortium to proposed the alternatives and each alternative's pros and cons.
12	9 Sep 15	Workshop	OTP/PMS/BSV/S P	PMS Consulting Group and BSV Consortium arranged the workshop on the results of common ticketing and CCH system details design for the related parties' staff, in order to explain the design result from after gathered the suggestion from the workshop on May 7, 2015. The BSV Consortium improved the design according to the suggestions, and presented the result which could be used as the common ticketing system standard. Moreover, the attendees could apply it to their own designs in the future.
13	9 Sep 15	Technical Meeting No. 6	OTP/PMS/BSV	To summarize the PMS Consulting Group suggestions on BSV's design documents and accelerate design completion in order to submit it to the OTP as soon as possible
14	6 Oct 15	Project Coordination Meeting	OTP/PMS/BSV/ Ministry of Finance's working group	To attend and listen to the development and implementation details of the ITMX (Interbank Transaction Management and Exchange), which is related to e-money card payment standard, and ideas for Any ID (anonymous) payment project implementation from the Minister's consultant group in order to study the effects on Common Ticketing System Implementation and its involvement with both projects.

No.	Date	Meeting	Related person	Details
15	27 Oct 15	Project Coordination Meeting	OTP/PMS/BSV/BOT	To listen to e-money card business guideline over rules, regulations and implementation procedures required by the CTC
16	5 Nov 15	CCH Acceptance Committee Meeting	OTP/PMS/BSV	- The chairman of CCH Acceptance Committee informed the PMS Consulting Group and BSV Consortium to accelerate the Establishment of the Central Clearing House Project completion according to the government's policy to push forward the common ticketing system concretely. <u>The Meeting's Opinion:</u> The PMS Consulting Group and BSV Consortium revised the implementation plan to accelerate the task and presented it in the next Committee's meeting. - BSV Consortium presented the project management and design submit to the OTP for approval for the 1st Milestone <u>The Meeting's Opinion:</u> The CCH Acceptance Committee checked documents sent by BSV Consortium and gave opinion and suggestions to BSV Consortium to improve and complete the documents. - BSV Consortium proposed to change some equipment for used in the CCH project, since the manufacturers inform that they were discontinued. <u>The Meeting's Opinion:</u> The CCH Acceptance Committee considered the comparison of equipment specifications between those specified in the Contract and the proposed ones. They agreed that the proposed equipment was comparable to or better than the existing one. Therefore, the proposal was approved and assigned the BSV Consortium to submit the manufacturing cancellation letter and price comparison including price confirmation letter as specified in the a Contract.
17	10 Nov 15	Project Coordination Meeting	OTP/PMS/BSV/BMTA	The BMTA's staffs attended the meeting to listen to concept about the Fare Collection System using e-money card, common ticket participating guideline, and progress of Establishment of the Central Clearing House project, from the OTP, PMS Consulting Group and BSV Consortium.

No.	Date	Meeting	Related person	Details
18	25 Nov 15	CCH Acceptance Committee Meeting	OTP/PMS/BSV	- The CCH Acceptance Committee summarized the opinion and suggestions on the BSV Consortium's 1st Milestone <u>The Meeting's Opinion:</u> The committee agreed that the number of issuers should be increased to more than 10 from the previous at maximum of 10 issuers, and assigned the BSV to search for additional methods and rationale for such increment. - According to the Committee Meeting No. 3/2015 on November 25, 2015, the BSV presented pricing comparison documents between the equipment specified in the Contract and the proposed ones. <u>The Meeting's Opinion:</u> The PMS Consulting Group was assigned to consider for an appropriate pricing.
19	30 Nov 15	CCH Acceptance Committee Meeting	OTP/PMS/BSV	- BSV presented a principle for increasing the issuer number to another 20 afterwards. Such action did not affect the implementation schedule already propose to the OTP which considered that it was feasible. <u>The Meeting's Opinion:</u> The meeting approved the design. - PMS Consulting Group told the committee that they already considered the price comparison document and found that the proposed equipment' prices were higher than the existing ones, but the BSV assured through a letter that it would be purchased at the prices specified in the Contract, and they thought that it was for the government sector's benefits. <u>The Meeting's Opinion:</u> The meeting considered the comparison document and PMS consulting group's opinion. The Meeting's resolution approved BSV to purchase the proposed equipment, and OTP was assigned as a coordinator for the Contract amendment.
20	6 Jan 16	Material Acceptance Committee Meeting	OTP/PMS/BSV	The BSV presented guideline for the 2nd batch work delivery: The Central Clearing House System Development Approval, to the meeting for consideration on determination of the 2nd batch work acceptance guideline by the acceptance committee. <u>Meeting Resolutions:</u> The meeting acknowledged the guideline and decided to mainly adhere to the contract. The BSV was informed to deliver completed works, and the PMS was assigned to inspect the work before submitting it to the committee.

No.	Date	Meeting	Related person	Details
21	18 Feb 16	Project Coordination Meeting	OTP/PMS/BSV/ BMTA	- PMS consulting group acknowledged progress of provision regulation draft as well as e-Ticket system and GPS installation by the BMTA's officials. - PMS consulting group acknowledged plan of e-Ticket operation to be used with public buses by the BMTA's officials.
22	15 Mar 16	Project Coordination Meeting	OTP/PMS/BSV/ SRTET	- PMS consulting group acknowledged the operational plan and the progress on SRTET's workstation computer and center computer optimization. - PMS consulting group discussed with the SRTET's staff on guideline for optimization of the Airport Rail Link's automatic revenue collection systems in order to support the common ticketing operations.
23	25 Mar 16	Material Acceptance Committee Meeting	OTP/PMS/BSV	The BSV explained reasons and necessities for replacement of 3 devices: 1) computers 2) printers 3) 55-inch-monitor; and presented the replacement devices proposed including comparing specifications. Letter is provided to confirm that the devices would be purchased at prices specified in the contract. <u>Meeting Resolutions:</u> The meeting considered the comparison of specifications and prices, and the PMS consulting group's opinion, and found that the replacement devices proposed were of newer version and better quality, so the BSV's request was approved. The CTO coordinated for the amendment of contract. The Committee considered and decided that the replacement devices proposed by the BSV can be used.
24	16 Jun 16	Material Acceptance Committee Meeting	OTP/PMS/BSV	The Committee including related officials participated in acceptance testing of the CCH's hardware and software installed at the Data Center and OTP. Then, meeting was hold for the 2nd batch work acceptance consideration. The PMS consulting group reported the consideration result to the meeting. <u>Meeting Resolutions:</u> According to the BSV's second batch work delivery: the Central Clearing House System Development Approval, the PMS consulting group considered and decided that the operation was completed and consistent to the design details and all devices were completely and correctly provided as specified in the contract. As a result, the meeting approved the second batch work.

No.	Date	Meeting	Related person	Details
25	22 Jun 16	Workshop	OTP/PMS/BSV/ Non-Transit SP	- The consultant group held a workshop on technology transfer: "Preparedness for Participation in the Common Ticketing Operation". Details on the non-transit sector's preparedness to participate in the common ticketing system were presented, with topics as follows: - Roles for common ticketing system participation - System connection - Common ticketing system participation procedures - Operation process and common ticketing system's settlement procedures
25	23 Jun 16	Workshop	OTP/PMS/BSV/ Transit SP	- The consultant group held a workshop on technology transfer: "Preparedness for Participation in the Common Ticketing Operation". Details on the transit sector's preparedness to participate in the common ticketing system were presented, with topics as follows: - Roles for common ticketing system participation - System connection - Common ticketing system participation procedures - Operation process and common ticketing system's settlement procedures
26	27 Jun 16	Project Coordination Meeting	OTP/PMS/BSV/ BMTA	- PMS consulting group discussed with the BMTA's officials about: - Alternative procedures for common ticketing system participation - Operating term - Budget for each alternative procedure - Pros-Cons of each alternative
27	13 Jun 16	Project Coordination Meeting	OTP/PMS/BSV/ SRTET	- PMS consulting group acknowledged the operational plan and the progress on the SRTET's workstation computer and center computer optimization. - PMS consulting group discussed with the SRTET's officials on suitability of the SRTET's workstation and center computer specifications for the common ticketing operations - PMS consulting group discussed with the SRTET's officials about: - Expense for system optimization - Expense for participation in common ticketing system - Progress on the CTC establishment - Alternative procedures for common ticketing system participation

No.	Date	Meeting	Related person	Details
28	22 Oct 16	Material Acceptance Committee Meeting	OTP/PMS/BSV	The BSV sent documents for the 3rd batch work delivery: System Testing Approval. The PMS consulting group requested for time from the Committee in order to perform system verification, from August 16, 2015 to September 30, 2015. <u>Meeting Resolutions:</u> The Committee considered the PMS's proposal and acknowledged the system verification plan and all tests to be performed by the PMS for accuracy and completion of the CCH's functions according to the OTP's requirements.
29	18 Oct 16	Material Acceptance Committee Meeting	OTP/PMS/BSV	The Committee performed trial run on the common ticketing system and the CCH's systems. The PMS consulting group reported the results at the meeting. <u>Meeting Resolutions:</u> The meeting considered the PMS' trial results and approved the System Testing Approval work.

2.3 Each Installment Disbursement

In order to complete the Central Clearing House (CCH), the OTP has hired the BSV consortium consisting of the Bangkok Mass Transit Public Company Limited, Smart Traffic Co., Ltd., and VIX MOBILITY Pty Ltd., and the operation starts on February 10, 2015 throughout the 42-month operation. The details of disbursement are as follows:

Table 2-8 The payments details of the Establishment of the Central Clearing House Project

Installment Payment	Invoice Delivery Date	Payment Receipt Date	Service Fee (baht)	Advance Payment Deduction (baht)	Remaining Service Fee (baht)	VAT 7% (baht)	Net Payment VAT included (baht)
Advance payment when the contract is signed	June 22, 2015	October 2, 2015	-	-	-	-	50,691,975.00
1. Common Ticket design approval	December 15, 2015	March 11, 2015	47,375,677.57	7,106,351.64	40,269,325.93	2,818,852.82	43,088,178.75
2. CCH system development approval	June 17, 2016	August 16, 2016	110,543,247.67	16,581,487.15	93,961,760.52	6,577,323.23	100,539,083.75

Installment Payment	Invoice Delivery Date	Payment Receipt Date	Service Fee (baht)	Advance Payment Deduction (baht)	Remaining Service Fee (baht)	VAT 7% (baht)	Net Payment VAT included (baht)
3.System testing approval	October 19, 2016	-	78,959,462.61	11,843,919.39	67,115,543.22	4,698,088.02	71,813,631.24
4.Technology transfer and training approval	-	-	47,375,677.57	11,843,919.39	35,531,758.18	2,487,223.07	38,018,981.25
5a.Approval for project completion	-	-	6,316,757.01	-	6,316,757.01	442,172.99	6,758,930.00
5b.Approval for system integrity with service providers	-	-	9,475,135.52	-	9,475,135.52	663,259.49	10,138,395.01
6.Completion of maintenance according to requirements	-	-	15,791,892.52	-	15,791,892.52	1,105,432.48	16,897,325.00
Payment in Total			315,837,850.47	-	-	22,108,649.52	337,946,500.00

The PMS consulting group inspected the delivery of work quantities according to the BSV consortium's disbursement schedule as stipulated to the contract. The consulting group inspected the BSV consortium's invoice at the date of invoice delivery, so that the payment can be disbursed, as the details in **Table 2-8**.

Chapter 3 Central Clearing House and Common Ticketing System Design

3.1 Central Clearing House's Particular Specifications

The Establishment of the Central Clearing House (CCH)'s contract documents on CCH technical requirements specify project scope of work, system components, functions and efficiency. It consists of General Scope and Service Requirements (GSSR), General Specification (GS) and Particular Specification (PS). It can be summarized as follows:

3.1.1 General Scope and Service Requirements (GSSR)

It specifies all scope of work of the CCH Contractor and other common ticketing system related contractors, so that they understand the project's overview, works to be done and necessary coordination.

3.1.2 Particular Specification (PS)

It shows the CCH's technical particular specifications that has been specified the CCH's necessary functions to be provided by the contractors, including the card structure in order to support business rules as specified in the General Specification (GS) documents. The particular specifications can be summarized as follows:

3.1.2.1 System's Components

The CCH is a conceptual model which explains the CCH's interfacing format at the highest level through showing the interfacing details between the CCH and transit and non-transit service providers. The CCH shall be designed to contain the following subsystem's functions as follow;

- 1) Settlement system processes card usage data, both travelling and making payment, and also apportion for settlement for other service providers or card issuers.
- 2) Card system is divided into 2 sections; the first one is called Card Issuance System (CIS) which is responsible for card issuance, card life cycle management and verify various transactions, and the second one is called Card Management System (CMS) which collects important data and top-up and refund-related services.
- 3) Infrastructure Operating Management System (IOMS) acts as a channel for data transfer between the CCH systems and the service providers' Front-Ends. It also verifies steps of data transfer between the CCH and the Front-Ends.

- 4) Interface systems interfacing message between the CCH's subsystems, and between the CCH's systems and service providers' Fare Collection Systems.

3.1.2.2 The CCH's Main Responsibilities

The CCH is required to perform the following responsibilities;

- 1) Transaction clearing and settlement: collection/aggregation, insert /verification, claim and apportionment, and payment with ability to recover missing transactions
- 2) Settlement management and operation Functionality : common information, fare information, commission fee and SP information
- 3) Portal Services for SP, operation staff, and government. If required by the Employer, a separate portal for Card user.
- 4) Card Management and Issuance Functionality : including Card Issue, key, authentication, Blacklist information management
- 5) Reload and Refund Functionality
- 6) Purchase Functionality
- 7) Ledger management Functionality
- 8) SP Information Management Functionality
- 9) Equipment Management Functionality (EMF)
- 10) Operation Information Management Functionality (OIMF)
- 11) Data Transmission Functionality
- 12) Interface Functionality
- 13) Financial Functionality

3.1.2.3 System's Capability Specifications, Capacity and Extensibility

The Central Clearing House is required to be effective in order to support the common ticketing usage and expand the system after the common ticketing usage is increased, at least as follows:

- 1) The CCH system shall be capable of handling at least 10 million transactions/day at commencement.
- 2) The CCH system shall be capable of expanding to handling 20 million transactions/day
- 3) The system shall be designed to accommodate SPs in Thailand.

- 4) The system has to support at least 1,000 line/routes for Transit Service Providers.
- 5) Each Line/Route shall have a Line ID
- 6) Each Line/Route shall allow at least 20 ASCII characters as a Line/Route Description.
- 7) The system has to support least 250 stations for each Rail Line and at least 500 stops (250 stops each direction) for each Bus Route
- 8) Each station/stop within the line shall have a Station ID to identify the station/stop.
- 9) Each station/stop shall use at least 20 ASCII characters as a station/stop Description.
- 10) Each station/stop shall use at least 4 ASCII characters Station Short Code
- 11) End of day processing duration does not exceed 3 hours.
- 12) It has to be able to store data online for 6 months.
- 13) It has to be able to store data offline for 5 years.
- 14) It has to design the service providers' Front-End configuration data.
- 15) It has to design the interface between the CCH systems and service providers' Front-Ends.
- 16) It has to design transaction data to be received from the service providers' Front Ends.
- 17) It has to specify data required for financial reports and payment reports.
- 18) It has to design security systems.

3.1.2.4 Contactless Smart Card's Particular Specifications

- 1) Contactless Smart Card shall be certified to at least CC-EAL 4+ for both hardware and software, and a certification to CC-EAL 5+ or better for hardware is highly desirable.
- 2) Contactless Smart Card shall be able to support 3-DES and AES data encryption.
- 3) Contactless Smart Card shall be implemented to use with the card readers currently used in the mass transit systems in Thailand. Card reader updates are generally not required, but it is necessary for the software/firmware updates, including SAM for suitable in actual work.
- 4) Contactless Smart Card has to support clearing and top-up devices used in shops and convenient stores in Thailand. Moreover, the hardware should not require an update, but the software/firmware and SAM should be updated for suitable in actual work.
- 5) The proposed Contactless Smart Card file structure and layout shall provide complete and secure segregation of any private areas reserved for the use of Service Providers.

- 6) A common area for purse, transaction history (including transfers) and other shared data shall be provided; the data to be stored in the common area shall be agreed with the Employer.
- 7) the data layout shall be designed such that only a single Application is written to during a transaction. This is to reduce the possibility of transaction tearing when a passenger removes his card before a final 'commit' command has completed.
- 8) Contactless Smart Card shall have at least 8 kilobytes space of accessible data storage.
- 9) Collector and tourist cards shall be special anonymous adult CSCs printed with special images and bundled with an initial purse value. All collector and tourist cards shall be ineligible for refund of the bundled value, but shall be eligible for replacement with a normal CSC if they become corrupted.
- 10) The common tickets shall be capable of use in multiple transit modes, including (but not limited to) metro rail (BTS, Airport Link and MRT), public bus, river ferry, express boat ferry, public van, normal rail, high speed rail, expressway, Bus Rapid Transit, as well as various retail and leisure. Expansion to parking systems, taxis, private van and other modes both transit and non-transit shall be allowed for in Contactless Smart Card layout design.
- 11) shall be capable of expansion to support co-branded products, such as co-branded debit/credit cards from commercial banks with international payment standards (e.g. EMV compatible payment cards). The CCH system shall allow the owners of the different brands to be custodians of their own floats.
- 12) The design of common ticketing data layout shall be such that porting of this layout to alternative media, such as NFC devices, shall be achievable at minimum cost.

3.1.3 General Specification (GS)

General Specification (GS) to be followed by the contractors consists of work plan, progress report, design specifications, necessary tests, test result submission, preparation of spare parts and system guarantee.

In the design and implementation of the common ticketing system and the CCH, it has to be designed to support business rules specified in the Appendix 6 of General Specification (GS).

The business rules can be summarized as follows:

- 1) Card management specifications have to be specified, i.e. card usage policy, card usage rules, and other card related specifications such as card issuance and distribution, etc.
- 2) Common tickets have to be divided into three types; Anonymous, Registered and Personalized.
- 3) Common tickets have to support concessionary types, such as adults, student/college student and elderly person, etc. includes staff card.
- 4) Card products consist of e-purse, common pass product, fixed journey product and loyalty products.
- 5) It has to support fare discount structure for transfer trips with the following discount conditions as follows:
 - Total distance not exceeding 20 kilometers
 - Transfer trip is made within 30 minutes.
 - Support two transfer trips (3 traveling trips)

3.2 Summary of Common Ticketing System Designs

According to all design documents submitted by the BSV Consortium, the design of common ticketing system and the CCH can be summarized and classified into common ticketing system standards which will be used by the OTP for publish as the national standard to Transit and Non-transit Service Providers for implement or modified their Fare Collection System in order to support the common ticketing system. In addition, the CCH design that consists of system architecture, system security and interface with related parties, as follows:

3.2.1 National Standard for Common Ticketing System

This section is specify the Business Rules, card data structure design, data format send from service providers to CCH, and data format send from CCH to service providers.

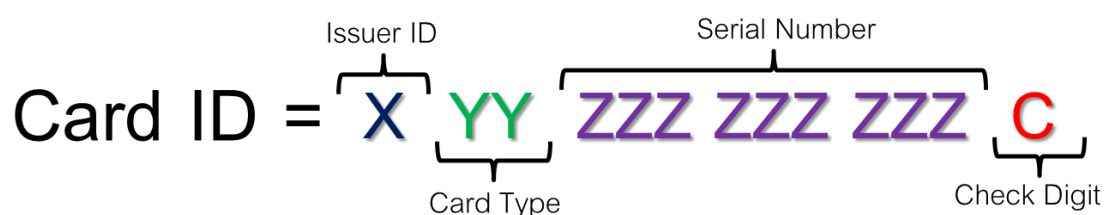
Business Rules

Business Rules show details of agreements, terms and conditions of common tickets. The transit and non-transit service providers who wish to receive payments for fare, fee, goods and service fee through the common tickets have to take this Business Rules to complement and support their Fare Collection System implementation or modification, in order to support such payment services via common tickets.

Business Rules for the Establishment of the Central Clearing House project specify technical details related to the common ticket uses such as Card ID, Card Type, Card Product, Functions, etc. This also covers card usage's terms and conditions and card control. The Business rules details can be summarized as follows:

common ticket's Card ID contains 13 digits. The first digit refers card issuer's ID from 0 – 9. Cards issued by CTC or co-branded cards' issuer ID is 1, while the issuer ID for the other card issuers is 2 – 9. The second and third digits refer to Card Type ranging from 00 – 63. The fourth and twelfth digits refer to card's Serial Number ranging from 000,000,000 - 999,999,999. The thirteenth digit refers to Check Digit and it is shown only on card.

Chart 3-1 Card ID



According to the workshop and the technical meeting, it could be observed that the card ID support only 10 card issuers, so it should have design or find out the alternative method in a case that more than 10 agencies are interested to participate as card issuers. The PMS Consulting Group and BSV receive the observations and discussed for possible alternative method without any effect on the project and concluded that if there are more than 10 card issuers in the future, the system will be able to support another 20 issuers through the following method;

1. The first 10 issuers use the card ID's first digit (ranging from 0-9) as the card issuer's number, while the second and third digits show the card's type as follows:

Chart 3-2: Card ID for the 1st – 10th Card Issuers

Card ID	X (Issuer ID)	Y ₁ Y ₂ (Card Type)	ZZZ ZZZ ZZZ (Serial No.)	C Check Digit
	0	00	000 000 000	
	1	01	000 000 001	
	2	02	000 000 002	
	3	.	.	
	4	.	.	
	5	.	.	
	6	.	.	
	7	.	.	
	8	.	.	
	9	63	999 999 999	
Total	10 Issuers	64 Types	999,999,999 Cards	

2. The eleventh card issuer onwards get the first (ranging from 2-7 and 9), and the second digit (ranging from 7-9) which show the card issuer's number, and the third digit (ranging from 0-9) shows the card's type, as follows:

Chart 3-3 Card ID for the 11th – 30th Card Issuers

Card ID	$X Y_1$ (Issuer ID)	Y_2 (Card Type)	$ZZZ ZZZ ZZZ$ (Serial No.)	C
	27	0	000 000 000	Check Digit
	28	1	000 000 001	
	29	2	000 000 002	
	37	3	.	
	38	4	.	
	39	5	.	
	47	6	.	
	48	7	.	
	49	8	.	
	57	9	.	
	58		.	
	59		.	
	67		.	
	68		.	
	69		.	
	77		.	
	78		.	
	79		.	
	97		.	
	98		999 999 999	
Total	20 Issuers	10 Types	999,999,999 Cards	

As for types of cardholders, common tickets created in the CCH Implementation project can be divided into 3 types as follows:

- (1) Anonymous – This card type does not contain personal data. Cardholder can issue the card at a designated sale point. If the card is lost, its remaining value cannot be refunded or replacement.
- (2) Register – This card type does not contain personal data. Cardholder can issue the card at a designated sale point. When the card is registered, the registered data will be kept in the CCH. If the card is lost, the cardholder can refund the remaining value. The cardholder also can request for issue a new card in case the cardholder identified the lost card's number correctly.
- (3) Personalize – This card type has language and birth date data written on the card and kept other personal data at the CCH. The CTC will issues this card type based on conditions, e.g. the card is issued for low-income people or issued as ID card or employee's card. After the card is received, the cardholder has to show his or her identity document to activate the card at a designated point. If the card is lost, the cardholder is able to refund the remaining value or request for a replacement.

Regarding particular data related to common tickets and card functions, the details are as follows:

- (1) Value top-up, Pass top-up, upgrade or penalty can be pay by cash or credit/debit card.
- (2) Common ticket's standard products are Common Purse Product, Common Pass Product, Fixed Journey Product and Common Loyalty Product.
- (3) Cardholder will receives fare discount for transfer trips when the payment is made through Common Purse and traveling according to the scheme and conditions specified by the CTC include Distance Travel Condition, Transfer Time Condition and Number of Transfer.

Regarding the specification to control Common Ticket usage such as Common Card Status Control, Blacklist Control, Card Expiry Date Control, Minimum Value for Entry Control, etc., and Card Operations such as card sale, new card value, top-up, replace/refund, etc., will be determined by the CTC, the system manager.

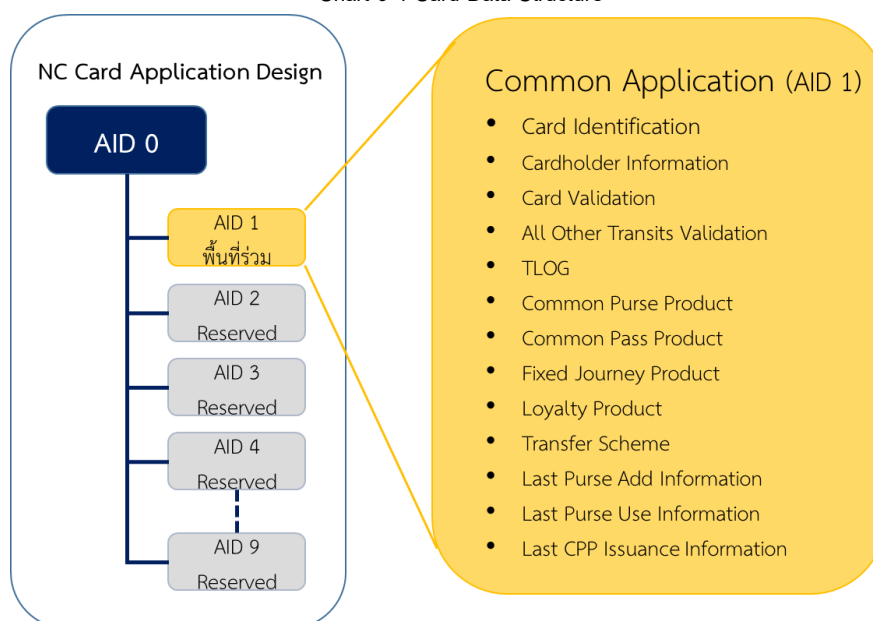
Card Data Structure

Common ticket is designed data storage area or application into 9 applications (AID 1-9); AID 1 is a common area or common application, and AID 2-9 are specific area for service providers. The CCH implementation project's card data structure is designed in the common area or application. The data contained in the common area is as follows:

- (1) *Card Identification* is a specific numbers for each common ticket which will be recorded in card at the Card Initialization stage. The card identification format conforms to the Business Rules.
- (1) *Cardholder Information* is cardholder's personal data which will be recorded for the Registered Card.
- (2) *Card Validation* is the Service providers' data that allow to be accessed for validation before the card is used.
- (3) *Each Transit Operator Validation* is the data validation for related mass transit service providers.
- (4) *Transaction Log* is the records of the latest transactions for 16 travel or card usage transaction.
- (5) *Common Purse* is the e-money used for transit fare payment and goods payment for retail shops. The CTC is able to determine the maximum e-money value to be stored in cards. The e-money will be recorded in satang in order to cover goods payment methods currently in use.
- (6) *Common Pass Product* is The product used for travel on all transit systems that agree and cooperate to provide services and receive payment by using the Common Pass Product, which is able to determine both trip based and period based types. The system is designed to support the common pass product determination up to 64 types.
- (7) *Fixed Journey Product* is the product used for travel on all transit systems that agree and cooperate to provide services and receive payment by using Fixed Journey Product. The fare will be deducted from the Common Purse Product and discount will be received when traveling according to the fixed routes.
- (8) *Common Loyalty Product* is the product that records points collected from usage value for reward redeem such as trip redeem, etc.

- (9) *Transfer Scheme* shows traveling details for the service providers to check and give discount according to the trip's conditions.
- (10) *Last Add Information* shows common purse's latest added value through various methods.
- (11) *Last Purse Use Information* shows the latest common purse product usage recorded in Transaction Log.
- (12) *Last Common Pass Issuance Information* shows the latest added Common Pass information through various methods.

Chart 3-4 Card Data Structure



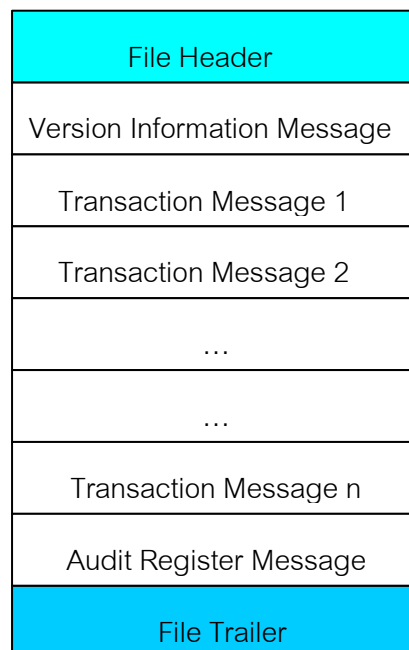
The card structure and data have to be consistent and support the application of Business Rules.

Transaction Data Definition

Details of Common Ticket's Transaction Data format which is created from card reader/writer are collected and transfer to the CCH for processing and clearing. This covers the following contents;

- (1) Data file structure and naming convention are the specifications for service providers to create the transaction message as mutually agreed.

Chart 3-5 Transaction Data Format



Data type are as follows:

- Initialization
- Card Issuance
- Usage
- Add Value
- Deduction
- Refund and Replacement
- Auto Add Value
- Reversal
- Recover

Configuration Parameters

The CCH will create configuration parameter files to be shared among service providers. They will be transferred to service providers' Automatic Fare Collection Systems (AFC), so that the AFC systems will be able to receive the payment by Common Ticket according to the CTC's conditions. It covers the following contents;

(1) Format and standard for parameters

SSS_PPV.XXX

SSS : Target ID

PPP : File Identifier

V : Version

XXX : Destination ID

For example: CTC_FBLA.SYS

Full Card Blacklist Table is transfer from CTC to Front-end System.

Type of parameters for all service providers and for a particular service provider.

List of Parameters

- Parameter Description
- Service Provider
- Station Topology
- Parameter Data
- Add Value Quota
- Card Sale Parameter Table
- CPP Scheme Table
- Fixed Journey Product Scheme Table
- Blacklist Parameter
- System Usage Data Table
- Transfer Scheme
- Online Reload Request

Table 3-1 Example of Parameters in Common Ticketing System

	30 Days 15 Trips (since issue date)	30 Days 15 Trips (since first use)	1 Day Pass	3 Days Pass	Seminar
	1	2	3	4	5
Pass Validity Duration Mode	1	2	2	2	3
Validity Duration	30	30	1	3	5
First Use Validity Duration	-	20	7	7	-
Fixed Start Date	-	-	-	-	11-May-15
Fixed End Date	-	-	-	-	15-May-15
Maximum Allowed Trips	15	15	4,095	4,095	4,095
Card Type Allowed List	1,2,3,15	1,2	1	15	1
Allowed Mode of Transport	00000011	00000001	00000011	00000001	00000011
Sale Price (Baht)	500	400	200	350	1,000

In addition to the Common Ticket standard as detailed above, the CCH Contractor also propose the specifications of card readers to be used with the designed common ticket, so that the service providers can use them as a guideline for card reader purchasing or a reference for decision making on the AFC modification. The card readers are divided into those for transit and non-transit service providers, as follows:

Table 3-2 Card Readers/Writers Specification for Transit Systems

Properties of Card Readers/Writers	Minimum Specifications	Specifications
<u>Standard Compliant</u>		
ICC Card	ISO 7816	ISO 7816
<u>Technical Specification</u>		
Power supply	12 V.	5-12 V.
Transmission Frequency	13.56MHz	13.56MHz
CPU	32 bit processor	32 bit processor or above
Flash Memory capacity	2 Mbyte	512 Mbyte or above
Card/CSC Reader communication distance	≥ 7 cm.	≥ 7 cm.
Interface	RS232, speed ≥115Kbps	RS232, speed ≥115Kbps
		RS422, speed ≥465Kbps (Optional)
		USB (Optional)

Properties of Card Readers/Writers	Minimum Specifications	Specifications
		3G / Wifi / Bluetooth (Optional)
		Ethernet (Optional)
Card Compliance	ISO 14443 TypeA (T=CL) Desfire	ISO 14443 TypeA (T=CL) or Type A/B/Felica
Hardware Compliance		Support EMVCo Level 1
Speaker		Buzzer or Speaker
SAM Slot	ISO 7816 T=0/1 Number of SAM Slot 2 slots	ISO 7816 T=0/1 Number of SAM Slot ≥ 4 slots
SAM Type	Support Native DESFire SAM	Support Native DESFire SAM, Java SAM, SAM
Special Feature	Anticollision	Anticollision
	Encrypted data transmission 3DES	Encrypted data transmission 3DES or AES
Environmental Specification		
Operating Temperature	0C to +55C	0C to +55C
Storage Temperature	-20C to +60C	-20C to +60C
RoHs Compliance	Support	Support
Operating Humidity	80%RH non-condensing.	80%RH non-condensing.

Table 3-3 Card Readers/Writers Specification for Non-Transit Systems

Properties of Card Readers/Writers	Minimum Specifications	Specifications
Standard Compliant		
ICC Card	ISO 7816	ISO 7816
Technical Specification		
Power supply	12 V.	5-12 V.
Transmission Frequency	13.56MHz	13.56MHz
CPU	32 bit processor or above	32 bit processor or above
Flash Memory capacity	128 Mbyte or above	512 Mbyte or above
Card/CSC Reader communication distance	4 cm.	≥ 4 cm.
Interface	RS232, speed ≥ 115 Kbps	RS232, speed ≥ 115 Kbps
		RS422, speed ≥ 465 Kbps (Optional)
		USB (Optional)
		3G / Wifi / Bluetooth (Optional)
		Ethernet (Optional)
Card Compliance	ISO 14443 TypeA (T=CL) DESFire	ISO 14443 TypeA (T=CL) or

Properties of Card Readers/Writers	Minimum Specifications	Specifications
		Type A/B/Felica
Hardware Compliance		Support EMVCo Level 1
Speaker		Buzzer or Speaker
SAM Slot	ISO 7816 T=0/1 Number of SAM Slot 2 slots	ISO 7816 T=0/1 Number of SAM Slot ≥ 5 slots
SAM Type	Support Java SAM	Support Native SAM, Java SAM, DESFire SAM
Special Feature		Anticollision
		Encrypted data transmission (3DES or AES)
Environmental Specification		
Operating Temperature	0C to +45C	0C to +45C
Storage Temperature	-20C to +60C	-20C to +60C
RoHs Compliance	Support	Support
Operating Humidity	80%RH non-condensing.	80%RH non-condensing.

3.2.2 The CCH System Design

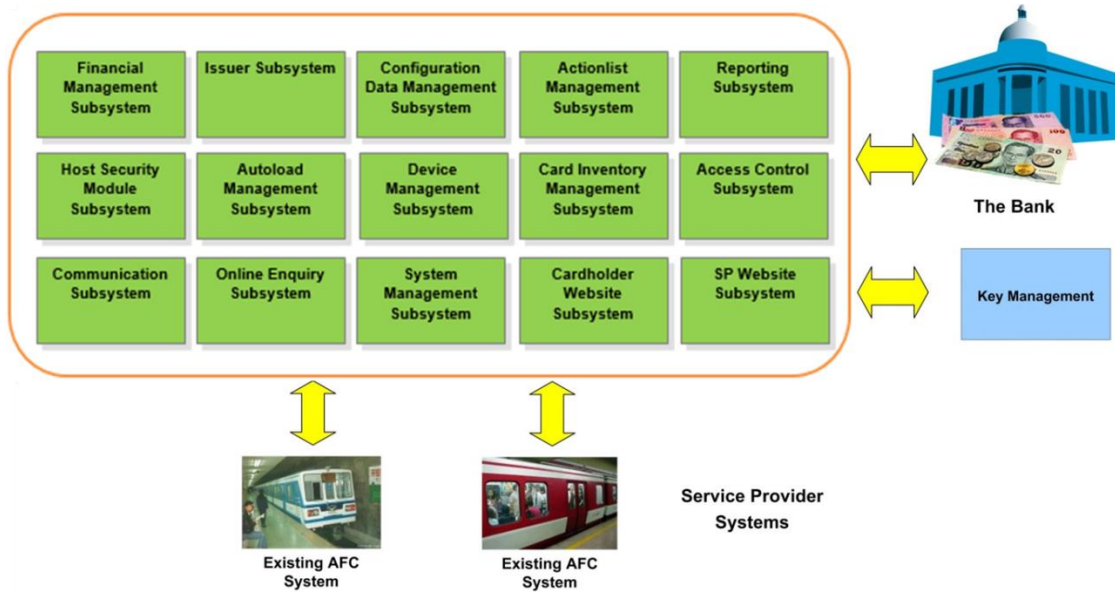
1) The CCH system

Designs of CCH system and system architecture are the system overview showing various subsystems' functions, including specify the function of each component. The designs can be divided into 3 main sections; System Architecture, Security Architecture, and Technical Architecture and Network Design.

System Architecture

The CCH Contractor design the system to support common ticket usage, both in transit and non-transit systems. It focuses on an ability to respond to mass transit business whose fare collections are more complicated than those in the non-transit business which focuses on using cards for payments. This covers transit fare management, ticket management in database, interface with equipment and transit systems on the stations, management of clearing and settlement among service providers, and generate reports to be used as information for mass transit fare management and public service planning for both government sectors and service providers.

Chart 3-6 System Architecture

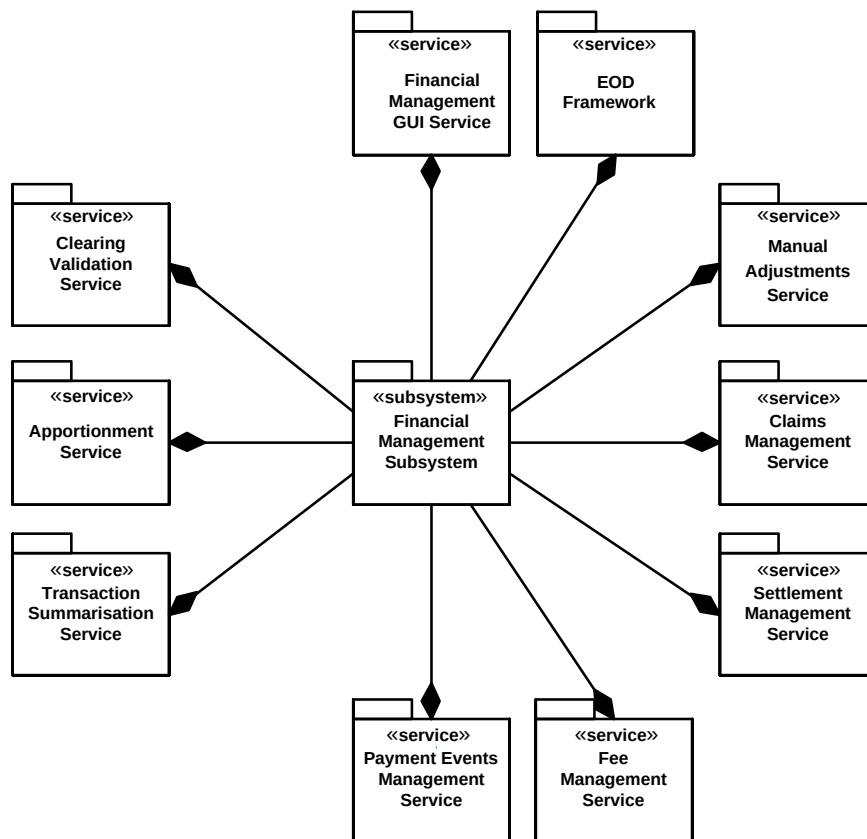


The CCH can be divided into subsystems, and each subsystem has separate responsibility for. They can work in collaboration so that the CCH performs in conformity with the OTP's regulations.

Each subsystem itself is fully functional, starts from receiving data and sending the processed data to other subsystem for further data processing, or storing the data in the database. The system, which is divided in to subsystem, is easy to design and maintenance. Moreover, if any subsystem encounters a problem, it can be fixed promptly. Important subsystems are in total of 15 subsystems as follows:

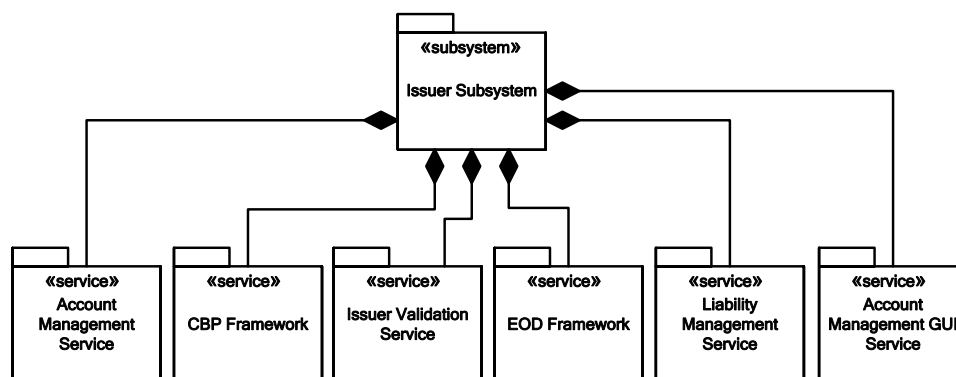
- (1) Financial Management Subsystem is responsible for validate transactions received from service providers, process the transactions, calculate fees, apportionment, settlement and claims received from service providers, e.g. some missing transactions.

Chart 3-7 Overview of Financial Management Subsystem



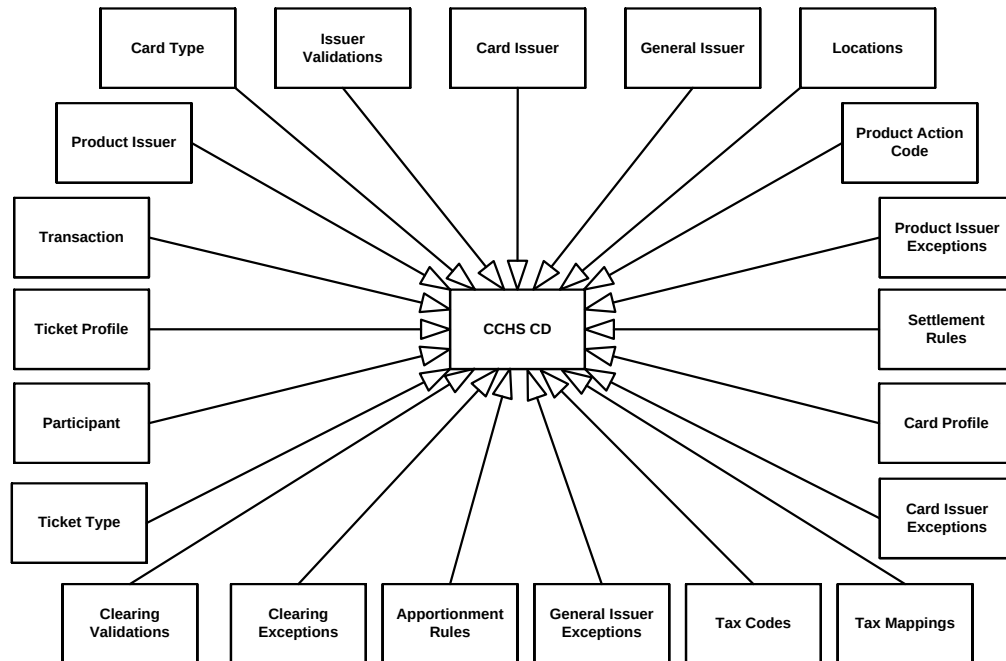
- (2) Issuer Management Subsystem is responsible for validate financial transaction, collect and manage cardholder's data include the expired accounts such as expired card, and manage cardholder's data for Register or Personalized card, and recover missing top-up transaction for lost cards.

Chart 3-8 Overview of Issuer Management Subsystem



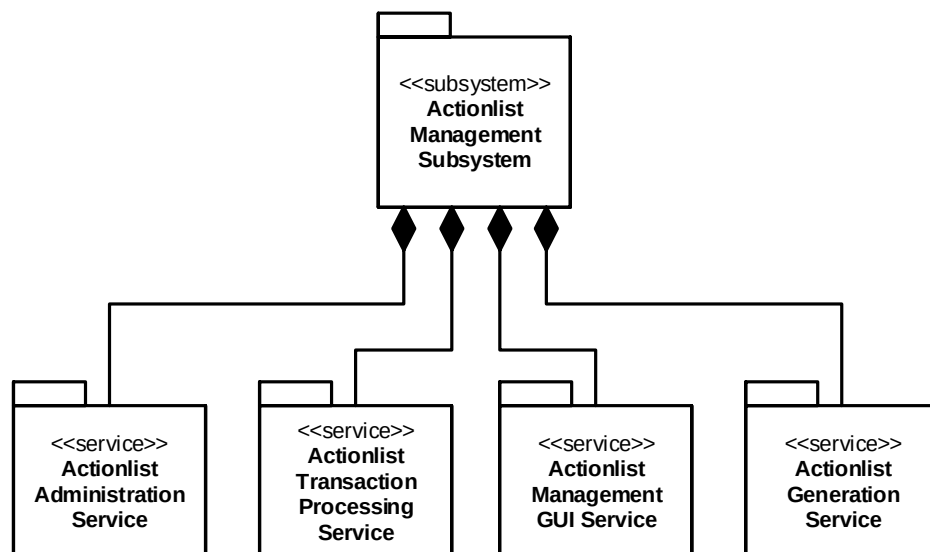
- (3) Configuration Management Subsystem is responsible for managing the configuration data for transfer to service providers' devices to be used for card data processing, e.g. card top-up or payment, etc.

Chart 3-9 Overview of Configuration Management Subsystem



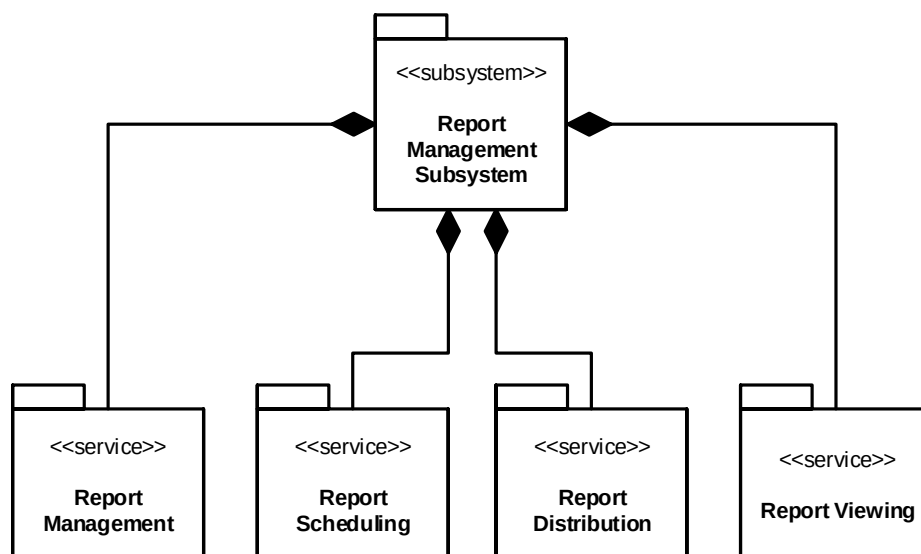
- (4) ActionList Management Subsystem is responsible for managing command list for Common Tickets. The command list will be prepared and transfer to service providers daily (or as required). After a card in the command list is tapped at a device which has already received the command, the command of that card will be activate, e.g. the card will be immediately suspended once it is tapped at the device, etc. After the command is activated, the device will inform the central system to remove such data from the Action List Management.

Chart 3-10 Overview of Action List Management Subsystem



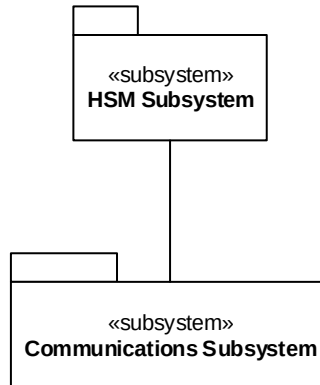
- (5) Report Management Subsystem is responsible for generate the Settlement Reports, e.g. Settlement Report, O/D Report, etc.

Chart 3-11 Overview of Report Management Subsystems



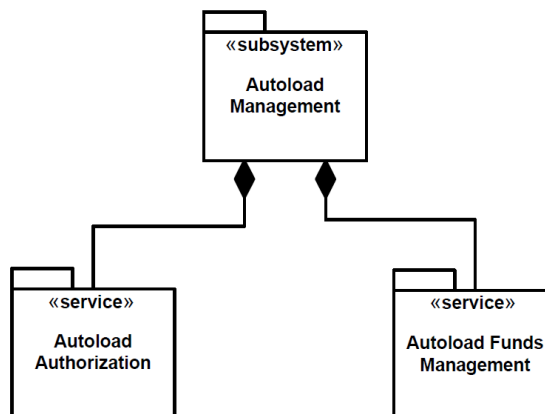
- (6) Host Security Management Subsystem is responsible for validate the transaction transfer from the service providers to the CCH.

Chart 3-12 Overview of Host Security Management Subsystem



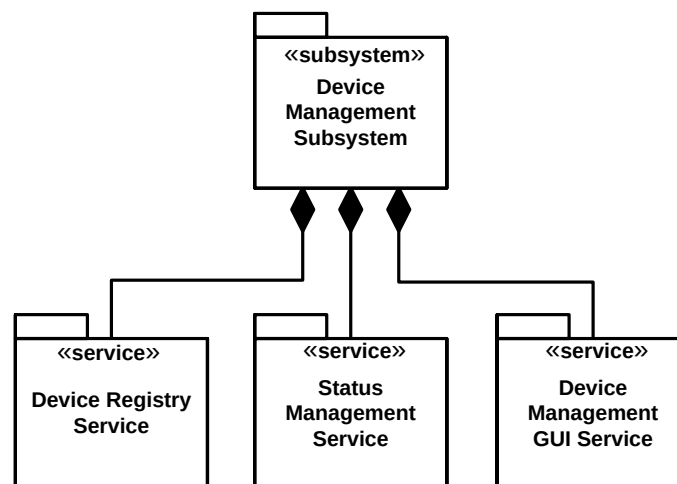
- (7) Autoload Management Subsystem is responsible for manage the automatic top-up for a card.

Chart 3-13 Overview of Autoload Management Subsystem



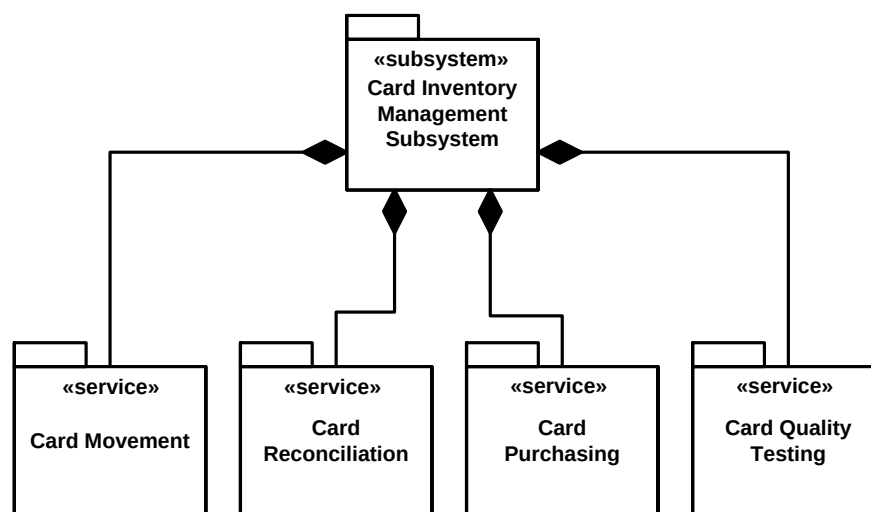
- (8) Device Management Subsystem is responsible for monitor and validate of the service provider's card readers, which have the transactions, and transfer them to the CCH.

Chart 3-14 Overview of Device Management Subsystem



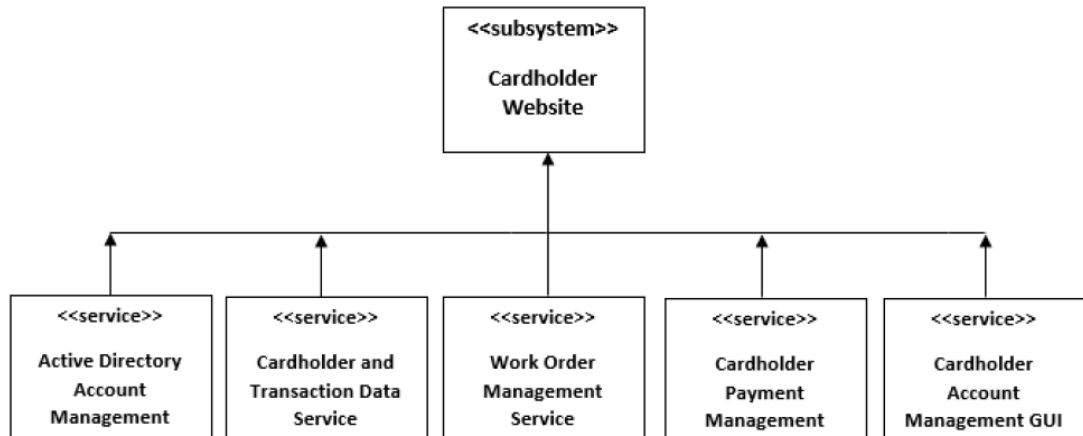
- (9) Card Inventory Subsystem is responsible for card stock management, including supervising card movement and card inventory in each shop.

Chart 3-15 Overview of Card Inventory Subsystem



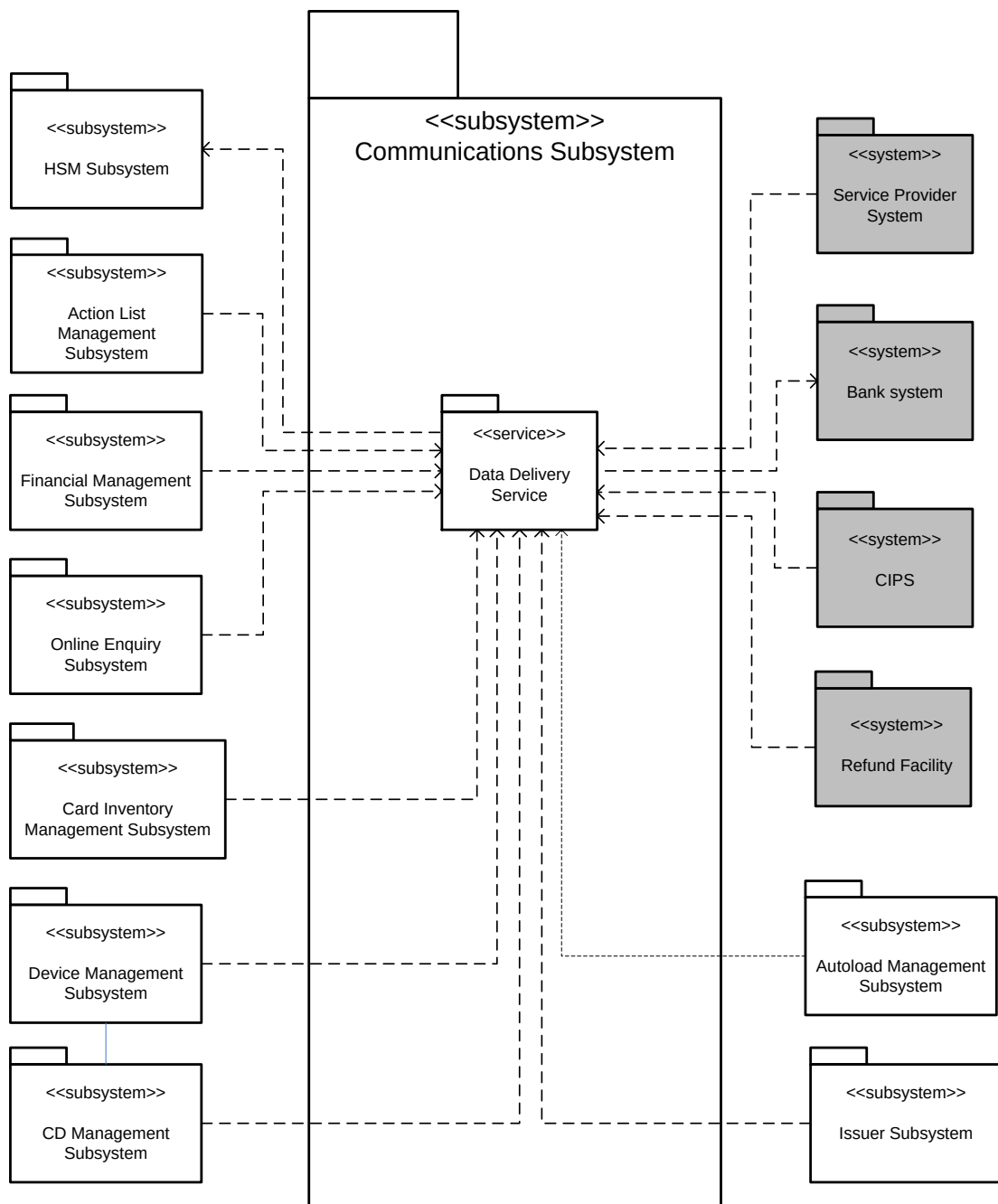
- (10) Cardholder Website Subsystem is responsible for providing services to cardholders such as registration/amendment of card information or personal data, check card usage check and online top-up, etc.

Chart 3-16 Overview of Cardholder Website Subsystem



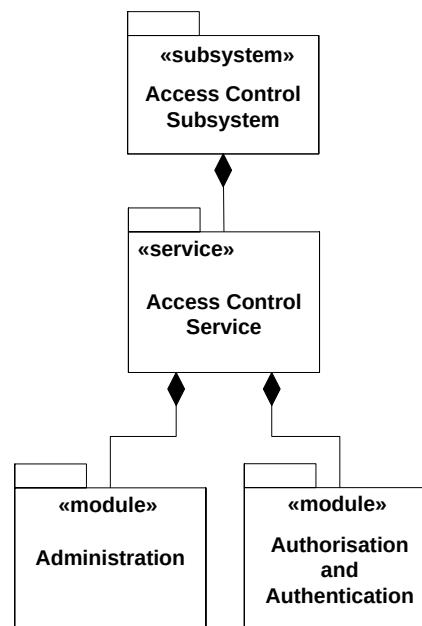
- (11) Communication Management Subsystem is responsible for communication both communicate among the CCH's subsystems, transfer for card usage data (UD) and configuration data (CD), and communicate between the service providers' devices and the CCH, and interface with banks' payment channels in the clearing and settlement process.

Chart 3-17 Overview of Communication Management Subsystem



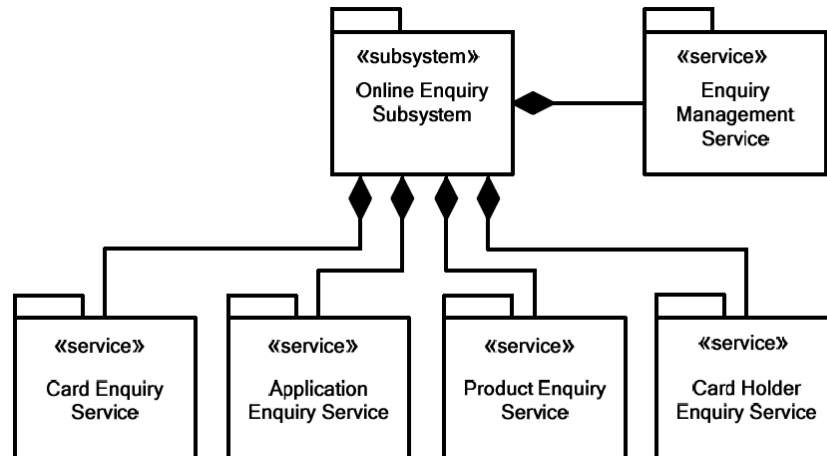
- (12) Access Control Subsystem is responsible for control the accessibility to the CCH's subsystem. The system's administrators will manage the subsystem user accounts, including the usage rights for each command. The users have to identify their user names and passwords before the access. The Access Control Subsystems will check the users' rights if they are permitted to access the screen or use each command.

Chart 3-18 Overview of Access Control Subsystem



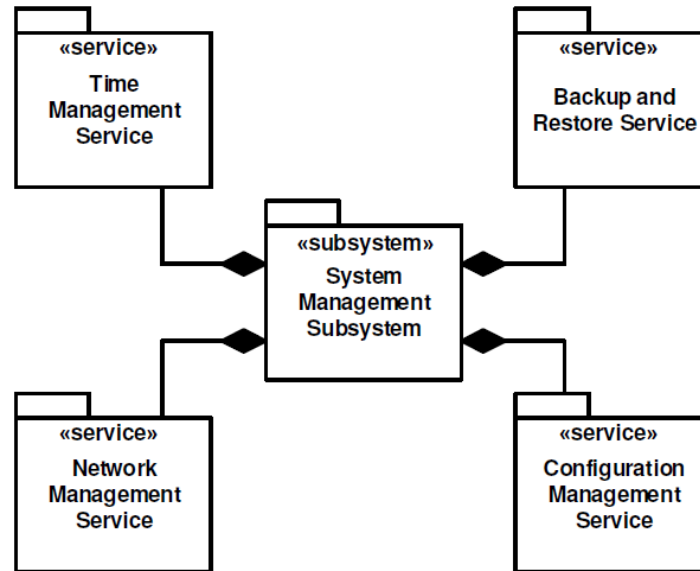
- (13) Online Enquiry Subsystem is responsible for monitoring card usage history and card account movement.

Chart 3-19 Overview of Online Enquiry Subsystem



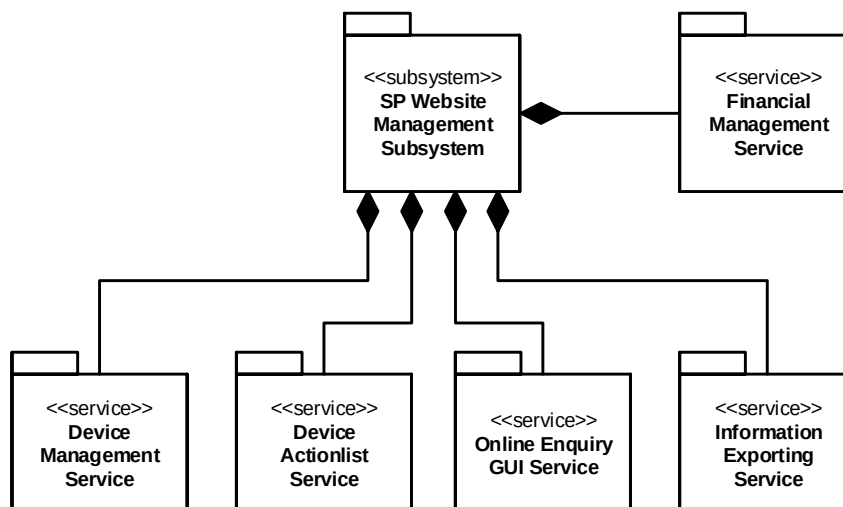
- (14) System Management Subsystem is responsible for checking the CCH's operational status.

Chart 3-20 Overview of System Management Subsystem



- (15) SP Website Subsystem is responsible for providing services to service providers who wish to register and manage the devices, both looks their devices' status data, as well as giving command to suspend their devices including access to view settlement data, card data and cardholder data.

Chart 3-21 Overview of SP Website Subsystem



Security Architecture

Overall, the common ticket based payment system divides the equipment into;

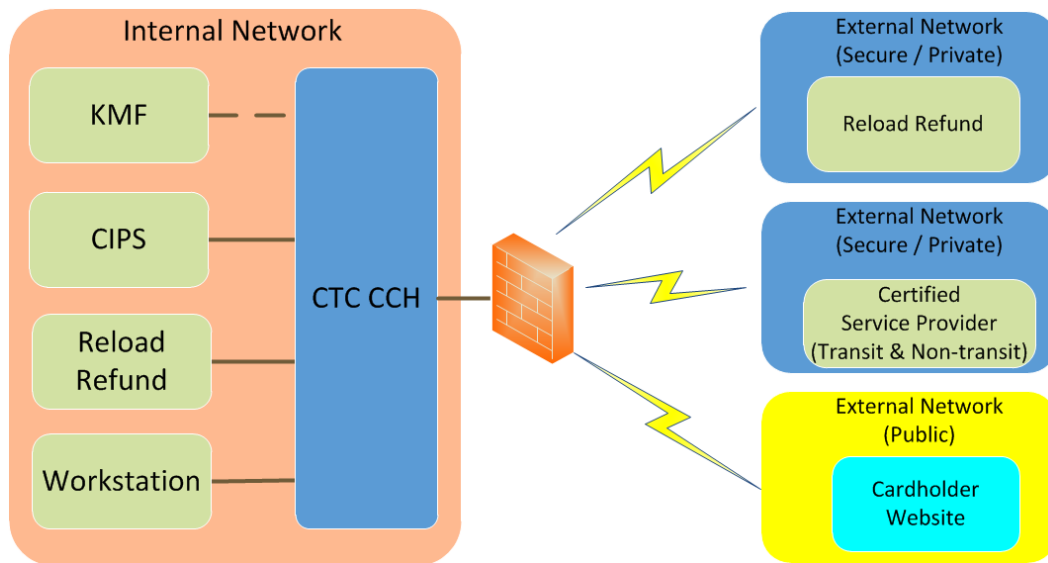
Tier 0 – Card or e-money media

Tier 1- Card reader

Tier 2-3 – Service providers' fare collection system devices depending on individual service provider's system design, and;

Tier 4 – The Central Clearing House's systems

Chart 3-22 Security Architecture



Security determination in common ticketing system can be classified as in Table 2-7.

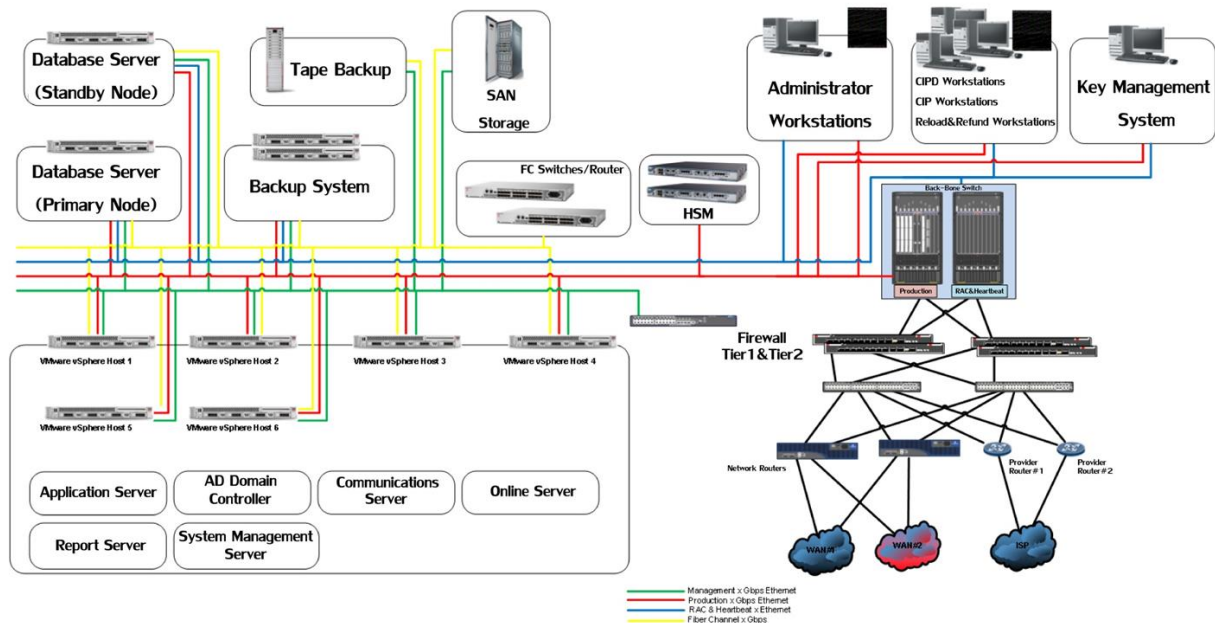
Table 3-4 Details of Each Security Level Application

Data	Disclosure Audience	Environments	Controls	Security Level	Key(s)
CD	SP	L4, L3 and Other L3 SP	Operating System Access Control	CD	
Card Data	Device	Public	Encrypted or Physically Secure storage Encrypted transmission from reader to card and return	Card	Key
Transaction (UD)	L2-L4	OTP L4 CCH, Other L3 SP	Secured Communication and MAC	Transaction	Key
Master Card keys	SAM, HSM, KMF	CIPD, KMF, Distribution SAM, SAM	Encrypted when transferred between SAMs	Master Key	
Derived Card Keys	Card Reader, Card,	Device, Card	Only generated when needed on device	Derived Key	

Data	Disclosure Audience	Environments	Controls	Security Level	Key(s)
	KMF		card reader		
Master Encryption Keys	SAM, HSM, KMF	CIPD, KMF, Distribution SAM, SAM	Encrypted when transferred between SAMs	Master Key	
MAC keys	SAM, HSM, KMF	SAM, HSM	Physically Secure	Master Key	MACK
Derived Encryption Keys	SAM, HSM, KMF	SAM, HSM	Derived, Physically secure environment	Derived Key	
SAM Activation/Access	SAM, HSM, KMF, Application	SAM, HSM, Applications	SAM access mechanism	Master	CHV
User Passwords	User, Login Screen	User storage, access control storage, computer memory	Access Control, Database encryption	Password	
System Programs and Configuration			Operating System Access Control, Physical Environment Access Control	Application	

Technical Architecture and Network Design

Chart 3-23 Network Architecture



2) Front-End Devices

Front-End devices provided for the Establishment of the Central Clearing House project consist of Card Initialization and Personalization (CIPD), and Reload and Refund Machine.

Card Initialization and Personalization Device (CIPD)

Card Initialization and Personalization Device allows operators to issue cards and record personal data before sending to the cardholders. The system's functions can be summarized as follows:

- Card Initialisation Service for initialize card. It has two types; manual and bulk initialization.
- Card Re-Initialisation Service for re-initialize card. It has two types; manual and bulk re-initialization.
- Card Personalisation Service for record cardholder's personal data in cards for both Level 1 and Level 2.
- Staff Card Creation for creating common ticketing system's staff cards
- Card Printing for printing cardholder's data on cards using desktop card printer
- Card Issuance and Sale Service for distributing card to customers
- Card Add Value Service for card top-up
- Card Add Value Reverse Service for top-up cancellation
- Card Activation for suspended card activation
- Card Disposal for recording data of cards to be disposed
- Card Online Enquiry for viewing card data in common ticketing system
- Card Enquiry and Analysis Service for viewing card data
- Standard Common Product Issuance for time-limited and trip-limited card issuance
- Standard Common Product Issuance Reversal for time-limited and trip-limited card cancellation
- Shift Management and Reporting Service for operators' shift management

Chart 3-24 Card Initialization and Personalization Device and interface with other Sub-systems

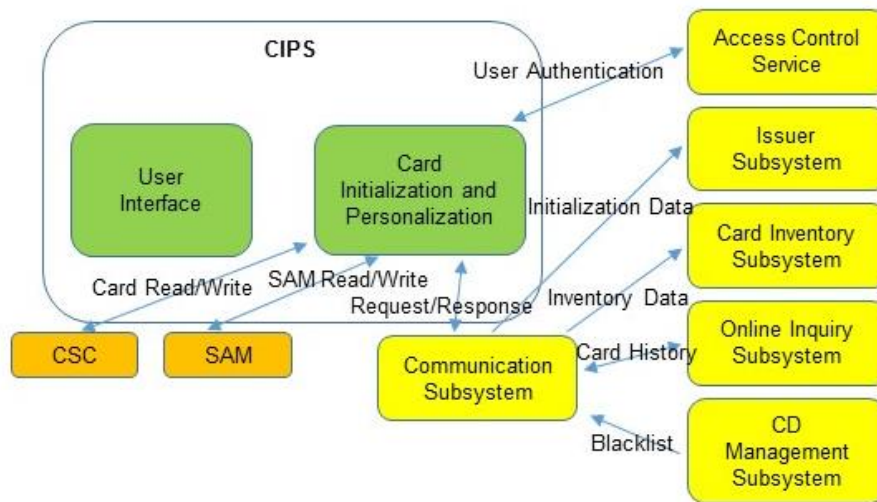


Chart 3-25 Card Initialization and Personalization Devices



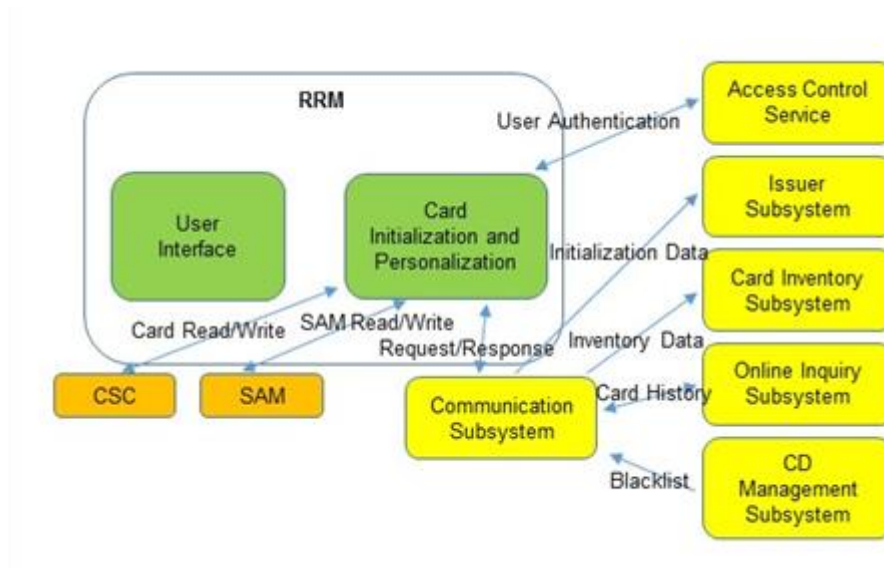
Reload and Refund Machine

Reload/Refund Machine is used for refund and reload. The system is able to;

- Card Issuance and Sale Service for purchasing card to consumers
- Card Add Value Service for card top-up
- Card Add Value Reverse Service for top-up cancellation
- Card Activation for activate the suspended card
- Auto-Top up for opening/closing/modifying automatic top-up service
- Card Refund for giving refund to cardholders whose cards are readable
- Defer Card Refund for giving refund to cardholders whose cards are damaged or lost
- Card Replacement for changing cards for cardholders whose cards are readable

- Defer Card Replacement for changing cards for cardholders whose cards are damaged or lost
- Card Online Enquiry for viewing card data in common ticketing system
- Card Enquiry and Analysis Service for viewing card data
- Shift Management and Reporting Service for operators' shift management

Chart 3-26 Reload and Refund Machine and interface with other Sub-systems

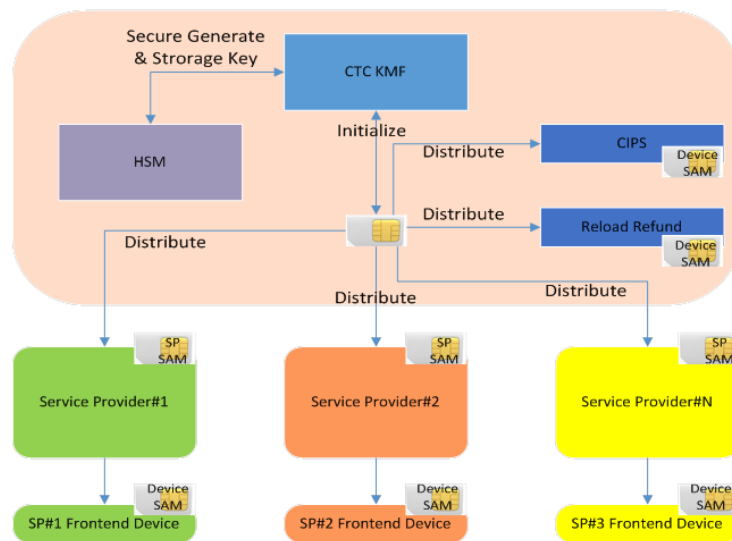


3) Common Ticket Security System

Key Management System (KMS)

The security monitoring system is Key Management System (KMS), which manages encryption/decryption and issues Certificate Authority in order to identify service providers. The KMS creates Public Key and Private Key to fill in the Secure Access Module (SAM), which will be sent to service providers. The service providers are able to use the Public Key and Private Key stored in the SAM for encrypt and decrypt the data sending to and receiving from the CCH.

Chart 3-27 Overview of Security Management System



SAM Standards and Details

This section shows guideline for SAM's design which is used in the Establishment of the Central Clearing House project. The SAM's specifications are as follows:

- SAM used in the project is able to work with general card readers that support ISO 7816 standard.
- Support encryption standards and electronic signatures such as DES, AES and RSA
- Able to store keys used for the encryption
- Able to determine methods for adding keys into the SAM or deleting them from the SAM
- Offer procedures for updating keys kept by service providers through key update files

4) Interface with related parties

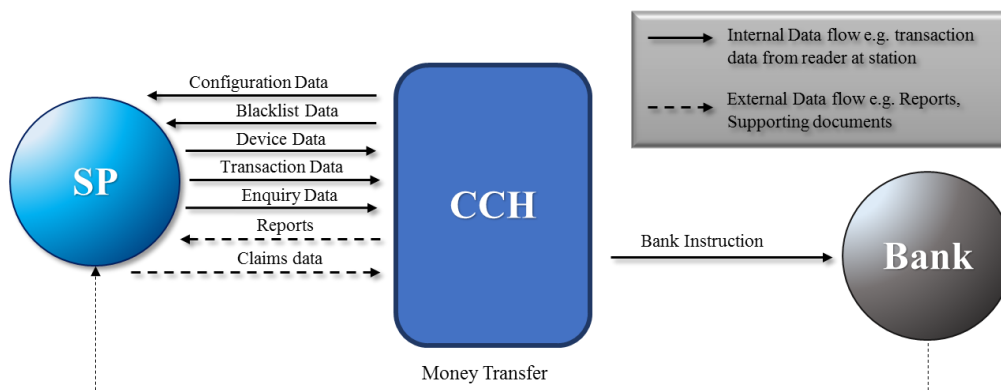
Determination of interface file formats that are used for transfer between the CCH and the third parties, service providers or banks. The Interface File can be classified into;

- (1) Operator Interface File determines usage data file format transfer from service providers to the CCH and configuration data file format transfer to service providers.
- (2) Equipment Initialization Interface File determines data file format, device interface and data transfer methods

Autoload Interface File This connection occurs when a bank provides an automatic top-up service for a client account. The CCH determines the Interface file format which is required to transfer from banks to the CCH such as blacklist, and cancellation/change of services.

Bank Interface File is a command format related to the settlement which is performed according to the NPMS standard of the Bank of Thailand. The transfer between the banks and the CCH is encrypted.

Chart 3-28 Interface with related parties



3.3 Inspection of Compliance with Specifications and Design Documents

According to the CCH design as summarized in 3.2, the PMS consulting group reviewed documents and monitored the system to ensure that it is complied with the specifications as stipulated in the Contract. The PMS Consulting Group compared the design details with the technical specifications in the Particular Specification and Business Rules as stated in Appendix 6 in the General Specification (GS) and create the traceability matrix as shown in **Table 3-6** and **Table 3-7**.

Table 3-5 Traceability Matrix (Volume 3 Part 3 : Particular Specification: PS)

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
1	INTRODUCTION						
1.1	Introduction	Information					
1.2	Definitions						
2	SYSTEM FUNCTIONAL OVERVIEW						
2.1	Overview	Information					
2.2	The Disaggregation of Functions	BSVB.00010 Rev.2.0	Technical and Network Architecture	Technical Architecture Overview	Clause 2	✓	
		BSVV.00001 Rev.2.0	System Architecture	System Design	Clause 2		
2.3	Smart Cards	BSVB.00001 Rev.3.0	NC Card Data Definition	Card File Description	Clause 4	✓	
		BSVS.00009 Rev.2.0	Card Initialization and Personalization Subsystem Design Specifications	Card Initialization Service Card Personalization Service	Clause 3 Clause 5		
		BSVB.00116 Rev.2.0	Configuration Data Management Subsystem Software Design Specification	Data Design	Clause 5.2		

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
2.4	Front-End Systems	BSVV.00002 Rev.3.0	Clause 2	System Security Architecture	System Design	✓	
2.5	The CCH System						
2.5.1	Overview						
2.5.1 (A)	Clearing/Settlement system	BSVV.00009 Rev.2.0	5.1.1.1.1	Financial Management Subsystem Design Specification	Transaction validation	✓	
		BSVV.00010 Rev.2.0	5.1	Issuer Subsystem Design Specification	Module Design		
2.5.1 (B)	Card system	BSVV.00010 Rev.2.0	5.1.13	Issuer Subsystem Design Specification	Card State TP Sub-Module Design	✓	
2.5.1 (C)	Infrastructure Operating Management System	BSVB.00043 Rev.2.0	5.1	Communication Subsystem Design Specification	Design Module	✓	
2.5.1 (D)	Back End System	BSVB.00043 Rev.2.0	2.2	Communication Subsystem Design Specification	Data Decomposition	✓	
2.5.1 (E)	System of Common Ticketing	BSVB.00043 Rev.2.0	2.2	Communication Subsystem Design Specification	Data Decomposition	✓	
2.5.2	CCH main Functionalities						

Technical Specifications		Design Documents				Compliance	Note
No.	Description		Document	Clause	Description		
2.5.2 (A)	System and Functional description						
a)	Clearing/Settlement system	BSVV.00009 Rev.2.0	Financial Management Subsystem Design Specification	5.1	Design Module	✓	
b)	Card system	BSVV.00010 Rev.2.0 BSVB.00042 Rev.1.0	Issuer Subsystem Design Specification Card Inventory Management Subsystem Design Specification	5.1 5.1	Design Module Design Module	✓	

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
c)	Infrastructure Operating Management System(IOMS)	BSVB.00043 Rev.2.0	5.1	Configuration Management Subsystem Design Specification	Design Module	✓	
		BSVB.00044 Rev.2.0	4.1.1.1	Device Management Subsystem Design Specification	Device Registry Maintenance Module Design		
		BSVB.00047 Rev.2.0	5	System Management Subsystem Design Specification	Network Management Service		
		BSVB.00040 Rev.2.0	5.1	Action List Management Subsystem Design Specification	Design Module		
		BSVB.00041 Rev.2.0	5.1	Autoload Management Subsystem Design Specification	Design Module		

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
d)	Interface system	BSVB.00043 Rev.2.0 Communication Subsystem Design Specification	2.2	Data Decomposition		✓	
		BSVB.00039 Rev.2.0 Access Control Subsystem Design Specification	5.1	Design Module			
		BSVW.00011 Rev.2.0 Cardholder Website Subsystem Design Specification	5.1	Design Module			
		BSVB.00115 Rev.2.0 SP Website Subsystem Design Specification	5.1	Design Module			
		BSVW.00016 Rev.1.0 Online Enquiry Management Subsystem Design Specification	5.1	Design Module			
2.5.3	Scheme Authority (CTO) Interface	BSVB.00046 Rev.2.0 Report Management Software Design Specification	2.1.3 2.1.4	Report Schedule Report Distribution		✓	
2.5.4	Regulatory Environment	BSVW.00009 Rev.2.0 Financial Management Subsystem Design Specification	5	Design		✓	
		BSVB.00046 Rev.2.0 Report Management Software Design Specification	6.1.1.10 6.1.1.13	F013 E-money Service Report 1.1 F017 E-money Service Report 1.2			

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
2.5.5	CCH List of Primary Functions The Common Ticketing System	BSVB.00040 Rev.2.0 BSVB.00043 Rev.2.0 BSVB.00044 Rev.2.0 BSWV.00009 Rev.2.0 BSWV.00010 Rev.2.0 BSWV.00011 Rev.2.0	5.1.3 5.2.8 5.1 4.1.1.1 3.1 5.1 2.1.14.1.3 5.1 5.2.1 2.1.2	Action List Management Subsystem Design Specification Communication Subsystem Design Specification Device Management Subsystem Design Specification Financial Management Subsystem Design Specification Issuer Subsystem Design Specification Cardholder Website Software Design Specification	Action List Administration Service Blacklist Information Module Design Device Registry Maintenance Module Design Financial Management Subsystem Dependencies Module Design Issuer Subsystem Decomposition Module Design Card Account Design Active Directory Account Management Decomposition	✓	
2.6	Technical Requirements	BSVB.00010 Rev.2.0	2.1	System Capacity		✓	
2.7	Business Requirements						

Technical Specifications		Design Documents				Compliance	Note
No.	Description		Document	Clause	Description		
2.8	Security Requirements	BSVS.00039 Rev.2.0	Access Control Design Specification	5.1.1	Administration Module	✓	
		BSW.00002 Rev.3.0	System Security Architecture	2	System Design		
2.9	Regulatory Compliance	BSVS.00010 Rev.2.0	Key Management Subsystem Software Design Specification	2	CCH Key Management Scheme	✓	
2.10	System Topology and Capacities	BSVB.00010 Rev.2.0	Technical and Network Architecture	Appendix B	Data Storage Calculation	✓	
		BSW.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1	Module Design		
		BSVB.00043 Rev.2.0	Configuration Management Subsystem Design Specification	5.2.1	Card Account Design		
				5.1	Module Design		
2.11	Equipment quantities	BSVS.00001	Hardware Bill of Materials	2	Hardware Bill of Materials	✓	
3	SCOPE OF SUPPLY						

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
3.1	Central Clearing House System The contractor shall design, supply, deliver, install and test a Central Clearing House System as described in Chapter 4.	BSVB.00043 Rev.2.0 BSVB.00010 Rev.2.0 BSVB.00126 Rev1.0	5.1 5 6	Communication Subsystem Design Specification Technical and Network Architecture NFC Prototype Specification	Design Module Disaster Recovery Management System Nodes All Submission contents	✓	
3.2	Contactless Smart Cards and Data Layout	BSVB.00001 Rev.3.0	2	NC Card Data Definition	Card General Description	✓	
3.3	Data Centre and Office Space	Letter No. BSV.OTP.1190.P2500.18.01.2016, 18 Jan 16, Request for approval of the CCH Data Center rental Letter No. BSV.OTP.1230.P2500.08.06.2016, 8 Jun 16, Request for approval of Milestone#2 CCH Development				✓	
3.4	Project Scope	BSV.00001 Rev.2.0		System Architecture	All Submission contents	✓	
4	PARTICULAR SPECIFICATIONS OF CCH SYSTEM						
4.1	Clearing/Settlement System						
4.1.1	Objective	Noted					

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
4.1.2	Clearing/Settlement Functionality (CSF)	BSVB.00043 Rev.2.0	5.1.2	Communication Subsystem Design Specification	FTP Module	✓	
		BSVB.00046 Rev.2.0	5.1.5	Report Management Software Design Specification	SFTP Module		
		BSV.00009 Rev.2.0	5.1	Financial Management Subsystem Dependencies	Functional Requirements		
		BSW.00010 Rev.2.0	3.1	Subsystem Design Specification	Financial Management Subsystem		
			5.1	Issuer Subsystem Design Specification	Module Design		
4.1.3	Financial Functionality (FF)	BSVB.00046 Rev.2.0	5.1.5	Report Management Software Design Specification	Financial Reports	✓	
		BSW.00009 Rev.2.0	5.1	Financial Management Subsystem Design Specification	Module Design		
		BSW.00010 Rev.2.0	5.1	Issuer Subsystem Design Specification	Module Design		

Technical Specifications		Design Documents				Compliance	Note
No.	Description		Document	Clause	Description		
4.1.4	Settlement Management Operation Functionality (SMOF)	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	5.1.2.5	FTP CD Collaborations	✓	
		BSW.00009 Rev.2.0	Financial Management Subsystem Design Specification	5.1	Module Design		
		BSVB.00046 Rev.2.0	Report Management Software Design Specification	5.1.5	Configuration Data Reports		
4.1.5	Settlement Report Service Functionality (SRSF)	BSVB.00046 Rev.2.0	Report Management Software Design Specification	2.1 5.1	Module Decomposition Functional Requirements	✓	
4.2	Card System	BSVB.00045	Host Security Management Subsystem Design Specification	2.2.1	UD Verification Service Decomposition	✓	
		BSW.00009 Rev.2.0	Financial Management Subsystem Design Specification	2.1.1.2 3.1	Clearing Validation Service Financial Management Subsystem Dependencies		
		BSW.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1	Module Design		
		BSVS.00010 Rev.2.0	Key Management Subsystem Design Specification	5.1	Module Design		

Technical Specifications		Design Documents				Compliance	Note
No.	Description		Document	Clause	Description		
4.2.1	Objective	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	5.1.2	FTP Module	✓	
4.2.2	Card Issuance System (CIS)						
4.2.2 (A)	Functional Requirements	BSVS.00039 Rev.2.0	Access Control Design Specification	4.1.1	Authentication and Authorization Interface	✓	
		BSVB.00040 Rev.2.0	Action List Management Subsystem Design Specification	2.1	Action List Management Subsystem Decomposition		
		BSVB.00042 Rev.1.0	Card Inventory Management Subsystem Design	5.1	Module Design		
		BSVB.00091 Rev.2.0	Issuer Subsystem Design Specification	5.1	Module Design		
		BSVS.00009 Rev.1.0	Card Initialization and Personalization Subsystem Design Specification	5.1	Module Design		
		BSVS.00084 Rev.2.0	Refund and Reload Machine Design Specification	5.1	Module Design		
4.2.2 (B)	Key Management System (KMS)	BSVS.00010 Rev.2.0	Key Management Subsystem Software Design Specification	2	CCH Key Management Scheme	✓	

Technical Specifications		Design Documents				Compliance	Note
No.	Description		Document	Clause	Description		
4.2.2 (C)	Card Application Management Functionality (CAMF)	BSVS.00010 Rev.2.0	Key Management Subsystem Software Design Specification	2	CCH Key Management Scheme	✓	
4.2.2 (D)	Card Authentication Management Functionality (CAUMF)	BSVB.00045 Rev.2.0	Host Security Management Subsystem Design Specification	9.1.2	Storing Application Key With Software	✓	
4.2.2 (E)	Common Card Personalization Management System (CPMS)	BSVS.00009 Rev.2.0	Card Initialization and Personalization Subsystem Design Specifications	2.2	Product Functions	✓	
4.2.3	Card Management System (CMS)						
4.2.3 (A)	Functional Requirement	BSVV.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1 5.2.1	Module Design Card Account Design	✓	

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
4.2.3 (B)	Reload & Refund Management Functionality (RRMF)	BSVB.00041 Rev.2.0	5.1.1	Autoload Management	Autoload Authorization Service	✓	
			5.1.5	Subsystem Design Specification	Autoload for Low Income Card		
		BSVB.00046 Rev.2.0	5.1.1	Report Management Software	Financial Reports		
			5.1.3	Design Specification	Sales Reports		
		BSVS.00084 Rev.2.0	6	Refund and Reload Machine	Card Add Value Service		
			9	Software Design Specifications	Auto Top-up Activation / Change of Service / Disable		
		BSVS.00009 Rev.2.0	12	Card Initialization and	Card Add Value Service		
			13	Personalization Subsystem Design Specifications	Card Add Value Reverse Service		
		BSW.00009 Rev.2.0	5.1.4	Financial Management	Settlement Management Service		
				Subsystem Design Specification	Detailed Design		
		BSW.00010 Rev.2.0	5.1	Issuer Subsystem Design Specification	Module Design		
		BSW.00014 Rev.1.0	5.1.1	Online Enquiry Subsystem	Card Enquiry Service		
			5.1.3	Design Specification	Product Enquiry Service		
		BSW.00011 Rev.1.0	5.1	Cardholder Website Subsystem Design Specification	Module Design		
		BSVB.00106 Rev.1.0		Cardholder Website Payment Gateway Interface Specification	All Submission Contents		

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
4.2.3 (C)	Card Purchasing Functionality	BSW.00010 Rev.2.0	5.1	Issuer Subsystem Design Specification	Module Design	✓	
(a)	Offline purchase service requirements	BSVS.00009 Rev.2.0	9	Card Initialization and Personalization Subsystem Design Specifications	Card Issuance and Sale Service		
(b)	Online Purchase Service Requirements	BSVS.00084 Rev.2.0	5	Refund and Reload Machine Software Design Specifications	Card Issuance and Sale Service		
(c)	Buying Service requirements	BSVB.00046 Rev.2.0	5.1.3	Report Management Software Design Specification	Sales Reports		
4.2.4	Common Ticket Ledger Management Functionality (CTLMF)	BSVB.00046 Rev.2.0	5.1.4	Report Management Software Design Specification	Exception Reports	✓	
		BSW.00010 Rev.2.0	5.1	Issuer Subsystem Design Specification	Module Design		
4.2.5	Merchant Information Management Functionality (MIMF)	BSVB.00116 Rev.2.0	2.2.3	Configuration Data Management Subsystem Software Design Specification	SP CD Decomposition	✓	
4.2.6	Card Report Service Functionality (CRSF)	BSW.00014 Rev.1.0	5.1.1	Online Enquiry Subsystem Design Specification	Card Enquiry Service	✓	
		BSVB.00115 Rev.2.0	5.1.3	SP Website Subsystem Design Specification	Product Enquiry Service All Submission contents		

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
4.3	Infrastructure Operating Management System (IOMS)						
4.3.1	Objective	BSVB.00040 Rev.2.0	4.2	Action List Management Subsystem Design Specification	Communication Subsystem	✓	
		BSVB.00043 Rev.2.0	2.2	Communication Subsystem Design Specification	Data Decomposition		
			5.1.2.5		FTP CD Collaborations		
			5.1.5.2		Settlement Instruction File Collaborations		
			5.1.7.2		System Usage Data Collaboration		
		BSVB.00044 Rev.2.0	2.1.4	Device Management Subsystem Design Specification	Device Management GUI Service Decomposition		
		BSVB.00115 Rev.2.0		SP Website Subsystem Design Specification	All Submission contents		
		BSVB.00047 Rev.2.0	5	System Management Subsystem Design Specification	Network Management Service		
4.3.2	SP Interface Management Functionality (SIMF)						

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
4.3.2 (A)	Sending/receiving Information for SP types	BSVB.00043 Rev.2.0	4.1	Communication Subsystem Design Specification	Subsystem Interface	✓	
4.3.2 (B)	Equipment Management Functionality (EMF)	BSVB.00044 Rev.2.0	4.1.1 4.1.2 4.1.3	Device Management Subsystem Design Specification	Device Registry Service Design Status Management Service Design Device Management GUI Service Design	✓	
4.3.2 (C)	Operation Information Management Functionality (OIMF)	BSVB.00043 Rev.2.0 BSVB.00040 Rev.2.0 BSVB.00116 Rev.2.0 BSVS.00045 Rev.1.0 BSVB.00044 Rev.2.0	5.1.2.5 5.1.3 2.2.3 2.1.3	Communication Subsystem Design Specification Action List Management Subsystem Design Specification Configuration Data Management Subsystem Software Design Specification Host Security Management Subsystem Software Design Specification Device Management Subsystem Design Specification	FTP CD Collaborations Action List Administration Service SP CD Decomposition All Submission Contents Status Management Service Decomposition	✓	

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
4.3.2 (D)	Sending Operational Information to reader device Downloading information to Front End device	BSVB.00011 Rev.2.0	15	Configuration Parameters	AFC Equipment Configuration Data Table	✓	
		BSVS.00045 Rev.1.0	2.1.3	Host Security Management Subsystem Software Design Specification	Status Management Service Decomposition		
		BSVB.00043 Rev.2.0	5.1.2.5	Communication Subsystem Design Specification	FTP CD Collaborations		
4.3.2 (E)	Portal Web Service Functionality (PWSF)	BSVW.00011 Rev.2.0		Cardholder Website Subsystem Design Specification	All Submission Contents	✓	
		BSVB.00115 Rev.2.0		SP Website Subsystem Design Specification	All Submission Contents		
4.3.2 (F)	Data Transmission Functionality (DTF)	BSVB.00043 Rev.2.0	5.1.2 5.1.5	Communication Subsystem Design Specification	FTP Module SFTP Module	✓	
4.3.2(G)	Administration Management Functionality	BSVS.00039 Rev.2.0	5	Access Control Management Subsystem Design Specification	Design	✓	
		BSVB.00047 Rev.2.0		System Management Subsystem Design Specification	All Submission Contents		

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
4.4	Interface System	BSVB.00043 Rev.2.0		Communication Subsystem Design Specification	All Submission Contents	✓	
4.4.1	Overview						
4.4.2	Functional Requirements						
4.5	Call Centre Function						
4.5.1	Functional Requirements	BSVV.00010 Rev.2.0	5.1	Issuer Subsystem Design Specification	Module Design	✓	
4.5.2	Facility Requirements	Note		Facility provide by CTC		✓	
4.6	System Design Principle and Standard						
4.6.1	Open-Based Architecture	BSVV.00001 Rev.2.0	2.3	System Architecture	Software Design		
4.6.2	Flexibility and Scalability	BSVB.00116 Rev.2.0		Configuration Data Management Subsystem Software Design Specification	All Submission Contents	✓	
4.6.3	Reliability, Maintenance	BSVV.00001 Rev.2.0 BSVB.00047 Rev.2.0	2.3	System Architecture System Management Subsystem Design Specification	Software Design All Submission Contents	✓	

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
4.6.4	Maximizing availability	BSVV.00001 Rev.2.0	2.3	System Architecture	Software Design	✓	
4.6.5	Secured and protected data	BSVB.00043 Rev.2.0	5.1.2	Communication Subsystem Design Specification	FTP Module	✓	
		BSVB.00045 Rev.2.0	5.1.5	Host Security Management Subsystem Design Specification	SFTP Module		
			2.2.1		UD Verification Service Decomposition		
		BSVB.00010 Rev.2.0	5	Technical and Network Architecture	Disaster Recovery Management		
5	INTERFACE BETWEEN CCH AND PARTICIPANTS						
5.1	Overview						
5.1.1	Purpose of this Chapter						

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
5.1.2	Scope	BSVB.00011 Rev.2.0 BSVB.00012 Rev.2.0 BSVB.00025 Rev.1.0 BSVV.00006 Rev.2.0 BSVV.00015 Rev.2.0	Configuration Parameters Transaction Data Definition OTP CCH to Bank Interface Specification OTP CCH to Operator Interface Specification Online Enquiry Subsystem Interface Specification	All Submission Contents All Submission Contents All Submission Contents All Submission Contents All Submission Contents		✓	
5.2	AFC Equipment Configuration Data						
5.2.1	Process Overview	BSVB.00040 Rev.2.0 BSVB.00116 Rev.2.0	Action List Management Subsystem Design Specification Configuration Data Management Subsystem Software Design Specification	Design AFC Equipment Configuration Data Table		✓	
5.3	Particular Requirements of the Configuration Process						

Technical Specifications		Design Documents				Compliance	Note
No.	Description		Document	Clause	Description		
5.3.1	Scope of work	BSVB.00011 Rev.2.0	Configuration Parameter		All Submission contents	✓	
5.3.2	Efficiency	BSVB.00116 Rev.2.0	Configuration Data	4	AFC Equipment Configuration Data Table		
5.3.3	Implementation Date-time		Management Subsystem				
5.3.4	Integrity		Software Design Specification				
5.3.5	Handshake	BSVB.00040 Rev.2.0	Action List Management	2.2.4.1	Active Blacklist		
5.3.6	Content of Configuration Data		Subsystem Design Specification	5.2.1	Blacklist		
5.4	Usage Data (UD)						
5.4.1	Overview						
5.4.2	Transaction Data (TD) from Other Systems	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	5.1	Module Design	✓	
		BSVB.00012 Rev.2.0	Transaction Data Definition	4	Transaction Message Header and Transaction Information Definition		
		BSVV.00006 Rev.2.0	OTP CCH to Operator Interface Specification	3	Interface Specification		
5.4.3	Device Going Into Service	BSVB.00044 Rev.2.0	Device Management Subsystem Design Specification	2.1.3	Status Management Service Decomposition	✓	

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
5.4.4	Device Going Out of Service	BSVB.00044 Rev.2.0	2.1.3	Device Management Subsystem Design Specification	Status Management Service Decomposition	✓	
5.4.5	National Card Transaction Data	BSVB.00012 Rev.2.0 BSW.00006 Rev.2.0	4 3	Transaction Data Definition OTP CCH to Operator Interface Specification	Transaction Message Header and Transaction Information Definition Interface Specification	✓	
5.5	Daily Financial Process						
5.5.1	Daily Financial Position	BSVB.00025 Rev.1.0 BSW.00009 Rev.2.0	2 5.1.4 5.1.9	OTP CCH to Bank Interface Specification Financial Management Subsystem Design Specification	CCH Bank Interface Requirements Settlement Management Service Detailed Design Payment Events Management Service Design	✓	
5.5.2	Approval of Financial Position	BSVB.00025 Rev.1.0 BSW.00009 Rev.2.0	2 5.1.4 5.1.9	OTP CCH to Bank Interface Specification Financial Management Subsystem Design Specification	CCH Bank Interface Requirements Settlement Management Service Detailed Design Payment Events Management Service Design	✓	

Technical Specifications		Design Documents				Compliance	Note
No.	Description		Document	Clause	Description		
5.5.3	Claim	BSVB.00025 Rev.1.0	OTP CCH to Bank Interface Specification	2	CCH Bank Interface Requirements	✓	
		BSW.00009 Rev.2.0	Financial Management Subsystem Design Specification	5.1.6	Claims Management Service Detailed Design		
				5.1.9	Payment Events Management Service Design		
5.6	SAM Management						
5.6.1	New SAM Request	BSVB.00044 Rev.2.0	Device Management Subsystem Design Specification	4	Design	✓	
		BSVS.00010 Rev.2.0	Key Management Subsystem Software Design Specification		All Submission Contents		
		BSVS.00079 Rev.2.0	SAM Interface Specification	3	Key Update Interface		
		BSVS.00083 Rev.2.0	SAM Design Specification		All Submission Contents		

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
5.6.2	Kill SAM Request	BSVB.00044 Rev.2.0 Device Management Subsystem Design Specification BSVS.00010 Rev.2.0 Key Management Subsystem Software Design Specification BSVS.00079 Rev.2.0 SAM Interface Specification BSVS.00083 Rev.2.0 SAM Design Specification	4 3	Design All Submission Contents Key Update Interface All Submission Contents			
5.6.3	New Equipment Type Registration	BSVB.00044 Rev.2.0 Device Management Subsystem Design Specification BSVS.00010 Rev.2.0 Key Management Subsystem Software Design Specification BSVS.00079 Rev.2.0 SAM Interface Specification BSVS.00083 Rev.2.0 SAM Design Specification	4 3	Design All Submission Contents Key Update Interface All Submission Contents			
5.7	Transmission Characteristics	BSVB.00043 Rev.2.0 Communication Subsystem Design Specification	5.1	Module Design			
5.8	System Maintenance						

Technical Specifications		Design Documents				Compliance	Note
No.	Description		Document	Clause	Description		
5.9	Messaging	BSVB.00045 Rev.2.0	Host Security Management Subsystem Design Specification	9.1.2	Storing Application Key With Software	✓	
5.10	Support of Smart Card Processes						
5.10.1	Communications Protocol	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	5.1	Module Design	✓	
5.10.2	Query - Response List	BSVB.00043 Rev.2.0 BSVS.00009 Rev.2.0 BSVS.00084 Rev.2.0 BSW.00015 Rev.2.0 BSW.00016 Rev.2.0	Communication Subsystem Design Specification Card Initialization and Personalization Subsystem Design Specification Refund and Refund Machine Software Subsystem Design Specification Online Enquiry Subsystem Interface Specification Online Enquiry Subsystem Design Specification	5.1 16 17 15 16 2.1 4.1 5.1	Module Design Card Online Enquiry Card Online Enquiry and Analysis Service Card Online Enquiry Card Online Enquiry and Analysis Service All Submission Contents Online Enquiry Subsystem Online Enquiry Subsystem Interface Online Enquiry Subsystem Design	✓	

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
5.11	Message Formatting and Privacy Protection	BSVB.00043 Rev.2.0 BSVB.00045 Rev.2.0	5.1 2.2.1	Communication Subsystem Design Specification Host Security Management Subsystem Design Specification	Module Design UD Verification Service Decomposition	✓	
6	SMART CARD REQUIREMENTS						
6.1	Scope and Purpose	BSVB.00001 Rev.3.0	4	NC Card Data Definition	Card File Description	✓	
6.1.1	Scope						
6.1.2	Important Notes						
6.2	Smart Card Specifications	BSVB.00001 Rev.3.0	2	NC Card Data Definition	Card General Description	✓	
6.2.1	Applicability of international standards		4		Card File Description		
6.2.2	Specific CSC Requirements						
6.2.3	Smart Card Identifier						
6.3	Smart Card Applications						
6.3.1	General	BSVB.00001 Rev.3.0	3	NC Card Data Definition	Card Layout Design	✓	
6.3.2	Common (Public) Application	BSVB.00001 Rev.3.0	4.1	NC Card Data Definition	Common Application	✓	

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
6.3.3	Service Provider (Private) Application	BSVB.00001 Rev.3.0	NC Card Data Definition	4.2-4.9	Reserved Application (AID 2-9)	✓	
6.4	Smart Card Products						
6.4.1	General	BSVB.00001 Rev. 3.0	NC Card Data Definition	2.7, 3.2	Application Master Key Settings, Card File Design	✓	
6.4.2	Client Identification	BSVV.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1 5.2	Module Design Data Design	✓	
6.4.3	Traveler class	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	✓	
6.4.4	Concessions Types	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	✓	
6.4.5	Staff Passes	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	✓	
6.4.6	Common Purse Product	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	✓	
6.4.7	Common Products	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	✓	
6.4.8	Provider Specific Products (for information only)						
6.4.9	Control Data						

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document		Clause	Description		
6.4.10	Transaction Record Register	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application Transaction Message Data Records	✓	
		BSVB.00012 Rev.2.0	Transaction Data Definition	5			
		BSVS.00009 Rev.2.0	Card Initialization and Personalization Subsystem Design Specification				
		BSVS.00084 Rev.2.0	Refund and Refund Machine Software Subsystem Design Specification				
6.4.11	Last Add-value register	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application Transaction Message Data Records	✓	
		BSVB.00012 Rev.2.0	Transaction Data Definition	5			
		BSVS.00009 Rev.2.0	Card Initialization and Personalization Subsystem Design Specification				
		BSVS.00084 Rev.2.0	Refund and Refund Machine Software Subsystem Design Specification				

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document		Clause	Description		
6.4.12	Last Usage Register	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	✓	
		BSVB.00012 Rev.2.0	Transaction Data Definition	5	Transaction Message Data Records		
		BSVS.00009 Rev.2.0	Card Initialization and Personalization Subsystem Design Specification				
		BSVS.00084 Rev.2.0	Refund and Refund Machine Software Subsystem Design Specification				
6.4.13	Journey Tracking Register	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	✓	
		BSVB.00012 Rev.2.0	Transaction Data Definition	5	Transaction Message Data Records		
6.4.14	Data Scratchpad	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	✓	
6.4.15	Common Loyalty Product	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	✓	
Annex 1	Prototypes						

Technical Specifications		Design Documents				Compliance	Note
No.	Description	Document	Clause	Description			
1	Definition of 'Prototype'	BSVB.00126 Rev1.0		NFC Prototype Specification		✓	
2	Prototype Hardware Requirements	BSVS.00093 Rev.1.0		Rail Prototype Specification			
3	Required functionality of prototype	BSVS.00092 Rev.1.0		Toll Prototype Specification			
4	Testing requirements	BSVB.00127 Rev.2.0		Retail Prototype Specification			
5	Testing using prototype						
6	Integration Testing using modified Front End Systems						

Table 3-6 Traceability Matrix (Volume 3 Part 2 : General Specification (GS) - Annex 6: Business Rules)

Technical Specification		Design Document				Compliance	Note
No.	Description	Document		Clause	Description		
GS ANNEX6	BUSINESS RULES						
1.2	General Principles on Common Card						
1.2.1	General	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 1.1	General Principle on Common Card	✓	
1.2.2	Types of Common Card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 1.1	General Principle on Common Card	✓	
1.2.3	Interoperable Card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 2.1	Global Concepts	✓	
1.3	Ownership of the National Standard	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 1.1	General Principle on Common Card	✓	
2	COMMON CARD ISSUERS	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 1.1	General Principle on Common Card	✓	
3	CARD MANAGEMENT						
3.1	Overview	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9	Card Operations	✓	
3.1.1	National Card and Co-Branded Card Initialization	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.1	Card Initialization	✓	
3.1.2	Co-Issued Card Initialization						

Technical Specification		Design Document				Compliance	Note
No.	Description	Document		Clause	Description		
3.2	Card Sales						
3.2.1	General	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.3	Card Sale	✓	
3.2.2	Deposit	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.3.2	Deposit		
3.2.3	Initial Stored Value	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.3.3	Initial Common Purse Value		
3.2.4	Issuance Fee	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.3.4	Issuance Fee		
3.2.5	Sales Price						
3.2.5(A)	Common Purse Sale Price	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.3.5	Sales Price	✓	
3.2.5 (B)	Trip /Journey Common Card Sale Price	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.3.5	Sales Price	✓	
3.3	Card Service Centre	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 2.1.5	Card Service Centre	✓	
3.3.1 (A)	CTC's Dedicated Service Centre						
3.3.1 (B)	Authorized Service Centre						
3.4	Blacklist Management	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.5	Blacklist Control	✓	
3.5	Common Card Status						

Technical Specification		Design Document				Compliance	Note
No.	Description	Document		Clause	Description		
3.5.1	General	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3	Common Card Status Control	✓	
3.5.2	Uninitialized card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3.2	Uninitialized Card		
3.5.3	Initialized card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3.3	initialized Card		
3.5.4	Issued card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3.4	Issued Card		
3.5.5	Lost/Stolen card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3.5	Lost/Stolen Card	✓	
		BSVB.00040 Rev.2.0	Action List Management Subsystem Design Specification	5.1.2 5.1.3	Action List Generation Service Action List Administration Service		
3.5.6	Refunded card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3.6	Refund Card	✓	
3.5.7	Replaced card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3.7	Replaced Card	✓	
3.5.8	Expired card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3.8	Expired Card	✓	
3.5.9	Idle card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3.9	Idle Card		
3.5.10	Invalid card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.3.10	Invalid Card		
3.6	Off-Peak Discount Functionality	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 4.2	Off-Peak Discount Functionality	✓	
4	COMMON CARD PERSONALIZATION						

Technical Specification		Design Document				Compliance	Note
No.	Description	Document		Clause	Description		
4.1	National Card and Co-Branded Card Personalization	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.1.1	National Card and Co-Branded Card Personalization	✓	
4.1.1	Level 0: Anonymous Card						
4.1.2	Level 1: Registered Card						
4.1.3	Level 2: Personalized Card						
4.1.4	Disclosure of Personal Information and Confidentiality						
5	COMMON CARD TYPE (TRAVELER CLASS)						
5.1.1	General	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.2	Common Card Type	✓	
5.1.2	Types of Common Card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.2.1	Type of Common Card	✓	
5.1.2 (A)	Standard Common Card (Default Card)						
5.1.2 (B)	Staff Common Card						
5.1.2 (C)	Concessionary Common Card						
5.2	Concessionary Card's Rules	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 4	Card Promotion	✓	
5.2.1	Fare Discount	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 4.1	Concessionary Card's Rules	✓	
5.2.2	Free Top-up	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 4.1	Concessionary Card's Rules	✓	

Technical Specification		Design Document				Compliance	Note
No.	Description	Document		Clause	Description		
5.3	The Low-Income Card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.2.3	Low Income Common Card	✓	
5.3.1	Issuing the Low-Income Card						
5.3.2	Uses of Low-Income Card						
5.3.3	Expiry						
5.3.4	Negative Value in the Low-Income Card						
6	COMMON CARD PRODUCTS						
6.1.1	Overview	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.3	Common Card Product	✓	
6.1.2	Standard Common Card Products	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.3.2	Standard Common Card Products	✓	
6.1.3	Specific Issuer Product	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.3.3	Specific Issuer Product	✓	
6.2	Standard Common Card Products						
6.2.1	Common Purse (store value)	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.4.1	Common Purse (store value)	✓	
6.2.2	Common Pass Product	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.4.2	Common Pass Product	✓	
6.2.2(A)	Description						
6.2.2(B)	Condition of Uses						

Technical Specification		Design Document				Compliance	Note
No.	Description	Document		Clause	Description		
6.2.3	Fixed Journey product	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.4.3	Fixed Journey Product	✓	
6.2.3(A)	Description						
6.2.3(B)	Condition of Uses						
6.2.4	Common Loyalty Product	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.4.4	Fixed Loyalty Product	✓	
6.3	Specific Issuer Product	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.5	Specific Issuer Product	✓	
6.3.1	Co-Branded Card Product						
6.3.2	Co-Issued Card Product						
6.4	Common Product Issuer	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.6	Common Product Issuer	✓	
6.5	Product Hierarchy						
6.5.1	Multiple Product on the Card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.7	Product Hierarchy	✓	
6.5.2	Multiple Promotion in the Card on Non-Transit Transaction	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.7	Product Hierarchy	✓	
7	Refund and Replacement of Common Card						
7.1	Refund of Common Purse	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.13	Card Refund	✓	
7.2	Refund of Lost/Stolen Card						

Technical Specification		Design Document				Compliance	Note
No.	Description	Document		Clause	Description		
7.3	Replacement of Damaged Common Card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.14	Card Replacement	✓	
7.3.1	Non-Replaceable Damaged Cards						
7.3.2	Replaceable Damaged Cards						
7.3.3	Refund of Invalid Card						
8	Disclosure of Transaction Report	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 10	Card Transaction Constraint	✓	
8.1	Transaction Report						
8.2	Request for Transaction Report						
8.3	Traffic Report						
9	TOP-UP						
9.1	General	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.7	Purse Top-up Value	✓	
9.2	Automatic Top-up	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.8	Automatic Top up	✓	
9.2.1 (A)	Automatic Common Purse Top-Up	BSVB.00041	Autoload Management Subsystem Software Design Specification	Clause 5.1	Module Design		
9.2.1 (B)	Automatic Renewing Period-based product						
10	TRANSFER SCHEME						

Technical Specification		Design Document				Compliance	Note
No.	Description	Document		Clause	Description		
10.1	General						
10.2	Transfer Rules						
10.2.1	General Conditions	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 4.4	Transfer Scheme	✓	
10.2.1 (A)	Distance travelled condition	BSVB.00001 Rev.3.0	NC Card Data Definition	Clause 4	Card File Description		
10.2.1 (B)	Transfer Time condition						
10.2.1 (C)	Number of Transfers						
10.2.2	Applications of the Transfer Scheme						
10.2.3	Transfer Scheme Renewal						
11	TRANSACTION FEE						
11.1	General rules in Transaction Fee	BSW.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Clause 2.1.1	Financial Management Subsystem Decomposition	✓	
11.2	Merchant Discount Rate ("MDR")	BSW.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Clause 5.1.5	Fee Management Service Detailed Design	✓	
11.3	Interchange fee	BSW.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Clause 5.1.5	Fee Management Service Detailed Design	✓	

Technical Specification		Design Document				Compliance	Note
No.	Description	Document	Document	Clause	Description		
11.4	Data Processing fee	BSVV.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Clause 5.1.5	Fee Management Service Detailed Design	✓	
12	REVENUE APPORTIONMENT RULES						
12.1	General	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 6	Trip Fare Computing	✓	
12.2	Revenue Apportionment Rules for Transfer Scheme	BSVV.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Clause 5.1.2	Apportioned service Detail design		

Chapter 4 Development of the Central Clearing House

4.1 Specifications for Central Clearing House System Development

The Central Clearing House system development includes provision of tools and equipment for the project. According to the material lists specified in the contract, the following equipment and software to be delivered are as follows:

1. Hardware

Table 4-1 List of Hardware (Contract)

No.	Details	Unit	Quantity
1	Server		
1.1	Database Server		
1.1.1	Sun Server X4-2: model family	set	2
1.2	Application Server		
1.2.1	Sun Server X4-2: model family	set	6
1.3	Backup Management		
1.3.1	Sun Server X4-2: model family	set	2
2	Issuer & Authentication		
2.1	Card Initialized & Personalize Device (Whole Set)	set	2
2.2	Refund and Reload	set	2
2.3	Key Management Facility (Whole Set)	set	2
3	Storage		
3.1	StorageTek SL150 modular tape library: model family	set	1
3.2	Pillar Axiom 600 storage system: rackmounted base	set	1
4	SAN Switch		
4.1	Brocade 300 Switch	set	2
5	Others		
5.1	Sun Rack II 1242/1242E	set	1
5.2	Sun Rack II 1242,Non-Conf Ship	set	1
5.3	Gemen HSM	set	2
5.4	MIFARE DESFire EV1	EA	100,000
5.5	CSC Reader/Writer	set	5
5.6	NFC Phone	EA	5
5.7	Data Center Rental for 3 years	-	1

2. Software

Table 4-2 List of Software (Contract)

No.	Details	Unit	Quantity
1	Database Management System		
1.1	Oracle Database Enterprise Edition Per Processor	EA	8
1.1.1	Diagnostics Pack	EA	8
1.1.2	Tuning Pack	EA	8
1.1.3	Partitioning	EA	8
1.1.4	Database Vault	EA	8
1.1.5	OLAP	EA	8
1.1.6	Advanced Security	EA	8
2	Web Application Service		
2.1	Crystal Reports Server (User license)	EA	5
2.2	CCH MASS License (CCH)	EA	1
3	Web Server		
3.1	McAfee	EA	5
3.2	VMware vCenter Server 5 Standard for vSphere 5 (Per Instance)	EA	1
3.3	VMware vSphere 5 Enterprise for 1 processor	EA	12
4	Tools		
4.1	Symantec NetBackup	EA	2
4.2	Maximo Asset Management	EA	1
4.3	Nagios System Maintenance	EA	1
4.4	MS Project Pro	EA	5

3. Network

Table 4-3 List of Network (Contract)

No.	Details	Unit	Quantity
1	Core Switch		
	HP 10508-V Switch Chassis	EA	2
2	Router		
	HP MSR3044 Router	EA	2
3	ME Switch		
	HP HI 5500-24G-4SFP w/2 Intf SIts Switch	EA	2
4	L2 Switch		
	HP 5120-24G EI Switch	EA	2
5	Firewall		
5.1	FortiGate 800C Series	EA	2
5.2	Juniper SRX650		2
6	Computer / Workstation		
	Dell PowerEdge T320	EA	24
7	A4 Laser colour printer		
	HP LaserJet Pro 200 Color M251nw	EA	2
8	A3 Laser colour printer		
	HP Color LaserJet CP5225	EA	1
9	55 inches monitor		
	LG WL30 55"	EA	2

4. Prototype

Table 4-4 List of Prototype (Contract)

No.	Details	Unit	Quantity
1	Mass Rapid Transit (Rail) Prototype	System	1
2	Toll Prototype	System	1
3	Near Field Communication Prototype	System	1
4	Non – Transit prototype	System	1

4.2 Summary of Central Clearing House System Development

The Central Clearing House system development can be divided into provision of devices for the data center and device installation at the Office of Transport and Traffic Policy and Planning (OTP), and development of the CCH software and software installation in the devices. Details of the devices and software are as follows:

4.2.1 Central Clearing House Software Development

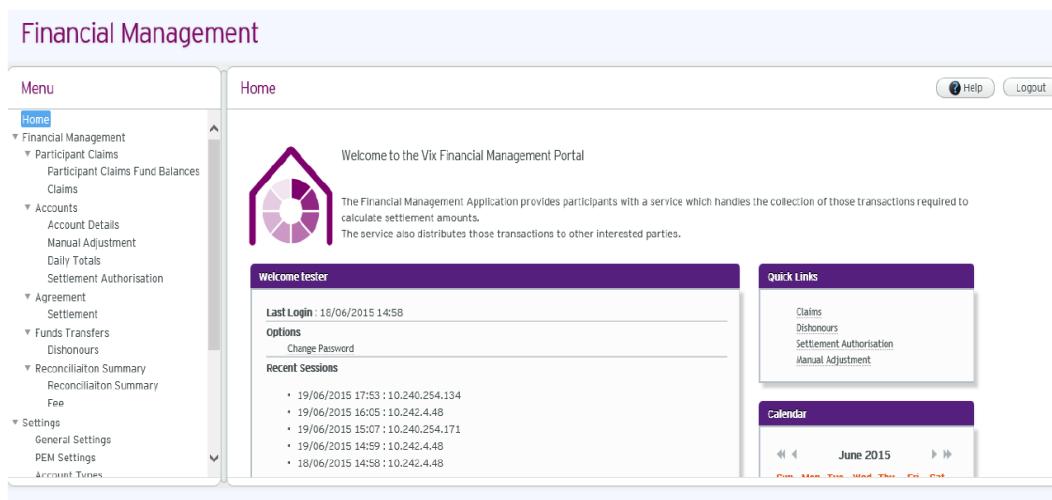
The Central Clearing House software development is to develop a program to ensure that the subsystems are able to function according to the specifications. Moreover, the software development also includes user interface development. The CCH software can be divided into 3 parts as follows:

The Central Clearing House Software consisting of;

Financial Management Subsystem

- Main Functions
 - Verification function for transaction received from various service providers
 - Fare allocation for related service providers according to agreements on fare allocation among service providers
 - Transaction summary which summarizes all transaction made each day for the settlement
 - Settlement amount calculation for each service provider as specified in agreements on the settlement
 - Calculation of service fees to be charged from the service providers

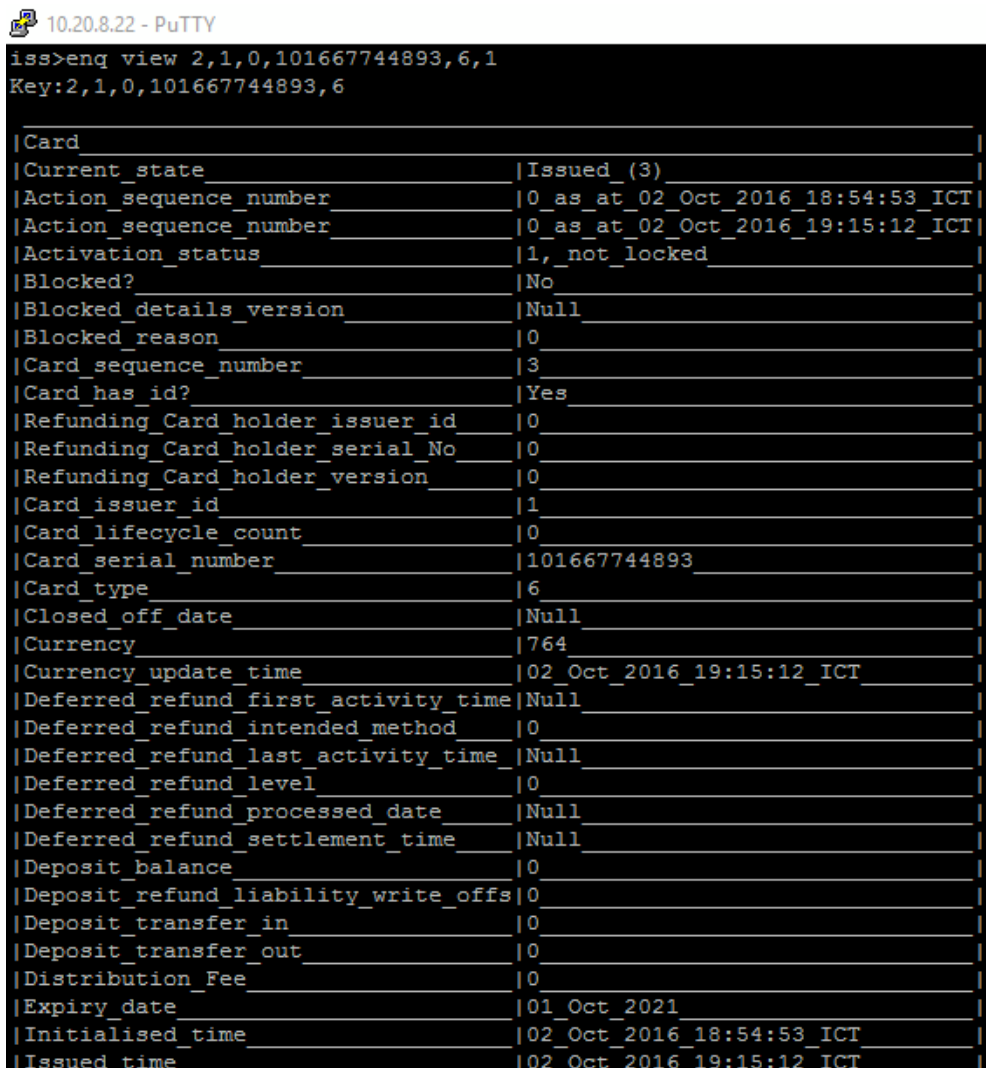
Chart 4-1 Sample of Financial Management Subsystem User Interface



Issuer Management Subsystem

- Main Functions
 - Transaction verification to check whether the account or product data is consistent with the main account data, and whether it has real identification
 - Data storage and verification for main account including closing of expired account such as expired card, and register and personalized card user data
 - Calculation of card obligations arising from card top-up by the user and money return request
 - Top-up retrieve function for lost cards

Chart 4-2 Sample of Issuer Management Subsystem User Interface



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iss>eng view 2,1,0,101667744893,6,1
Key:2,1,0,101667744893,6

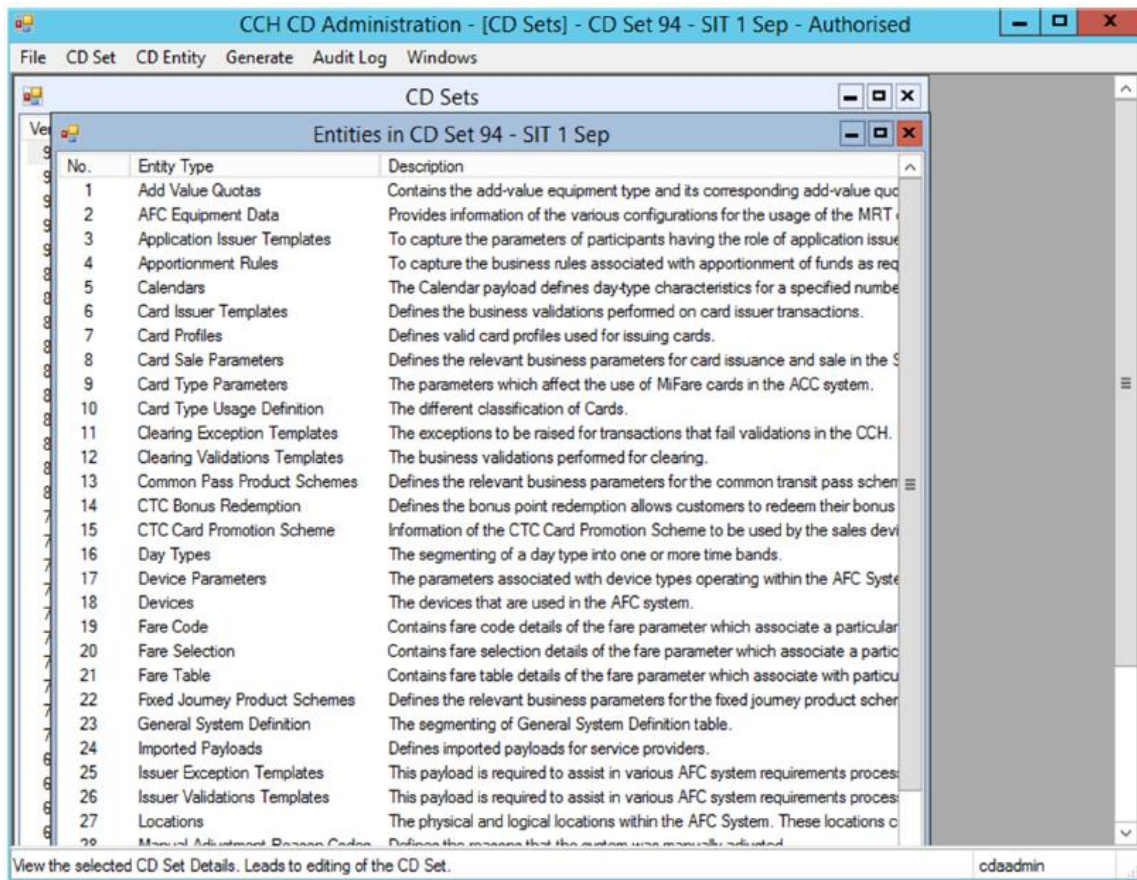
|Card|
|Current_state_|Issued_(3)|
|Action_sequence_number_|0_as_at_02_Oct_2016_18:54:53_ICT|
|Action_sequence_number_|0_as_at_02_Oct_2016_19:15:12_ICT|
|Activation_status_|1,_not_locked|
|Blocked?_|No|
|Blocked_details_version_|Null|
|Blocked_reason_|0|
|Card_sequence_number_|3|
|Card_has_id?_|Yes|
|Refunding_Card_holder_issuer_id_|0|
|Refunding_Card_holder_serial_No_|0|
|Refunding_Card_holder_version_|0|
|Card_issuer_id_|1|
|Card_lifecycle_count_|0|
|Card_serial_number_|101667744893|
|Card_type_|6|
|Closed_off_date_|Null|
|Currency_|764|
|Currency_update_time_|02_Oct_2016_19:15:12_ICT|
|Deferred_refund_first_activity_time_|Null|
|Deferred_refund_intended_method_|0|
|Deferred_refund_last_activity_time_|Null|
|Deferred_refund_level_|0|
|Deferred_refund_processed_date_|Null|
|Deferred_refund_settlement_time_|Null|
|Deposit_balance_|0|
|Deposit_refund_liability_write_offs_|0|
|Deposit_transfer_in_|0|
|Deposit_transfer_out_|0|
|Distribution_Fee_|0|
|Expiry_date_|01_Oct_2021|
|Initialised_time_|02_Oct_2016_18:54:53_ICT|
|Issued time_|02_Oct_2016_19:15:12_ICT|

```

Configuration Data Management Subsystem

- Main Functions
 - Configuration data management and approval such as fare data management, product data or data about card expiry date, etc.
 - Creation of configuration data set in XML file format in order to prepare to send it to each related service provider
 - Sending configuration data to each related service provider

Chart 4-3 Sample of Configuration Data Management Subsystem User Interface



Action List Management Subsystem

- Main functions
 - Adding card or device numbers in the commands
 - Command list management
 - Preparation of data related to command report management for delivery

Chart 4-4 Sample of Action List Management Subsystem User Interface

[Blacklists](#) > [Card Blacklist](#)

Search Card Blacklist

[Create Card Blacklist Entry](#)

The number of individual card entries in the blacklist with a state of CURRENT is 2.

The number of card range entries in the blacklist with a state of CURRENT is 0.

Category

Card Serial Number

Card Type

Filter Search Results

State

Future

Pending

Current

Deleted

Actioned

Creation Date

From

to

Activation Date

From

to

Last Modification Date

From

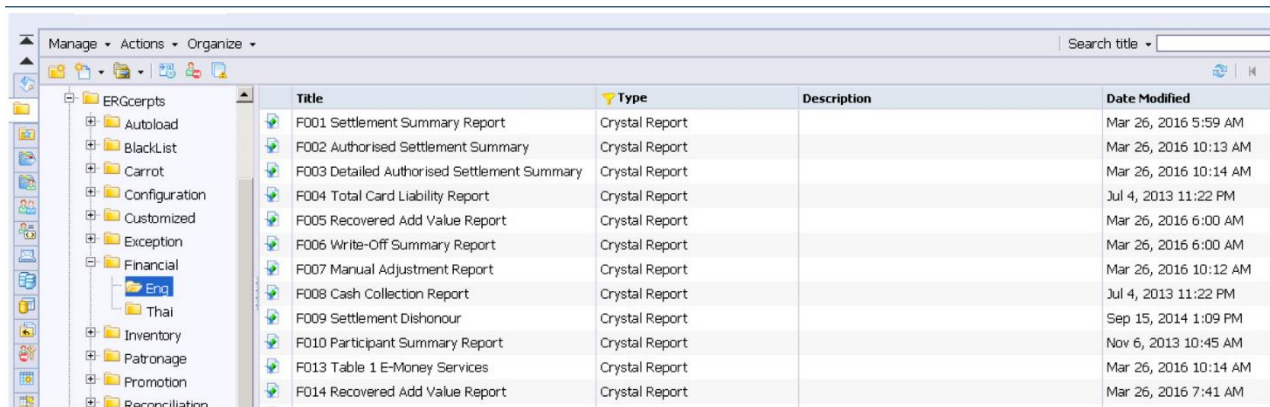
to

[Search](#)

Report Management Subsystem

- Main functions
 - Report setting management
 - Report scheduling such as daily, monthly, etc.
 - Identify report recipients who receive the reports via electronic mail

Chart 4-5 Sample of Report Management Subsystem User Interface



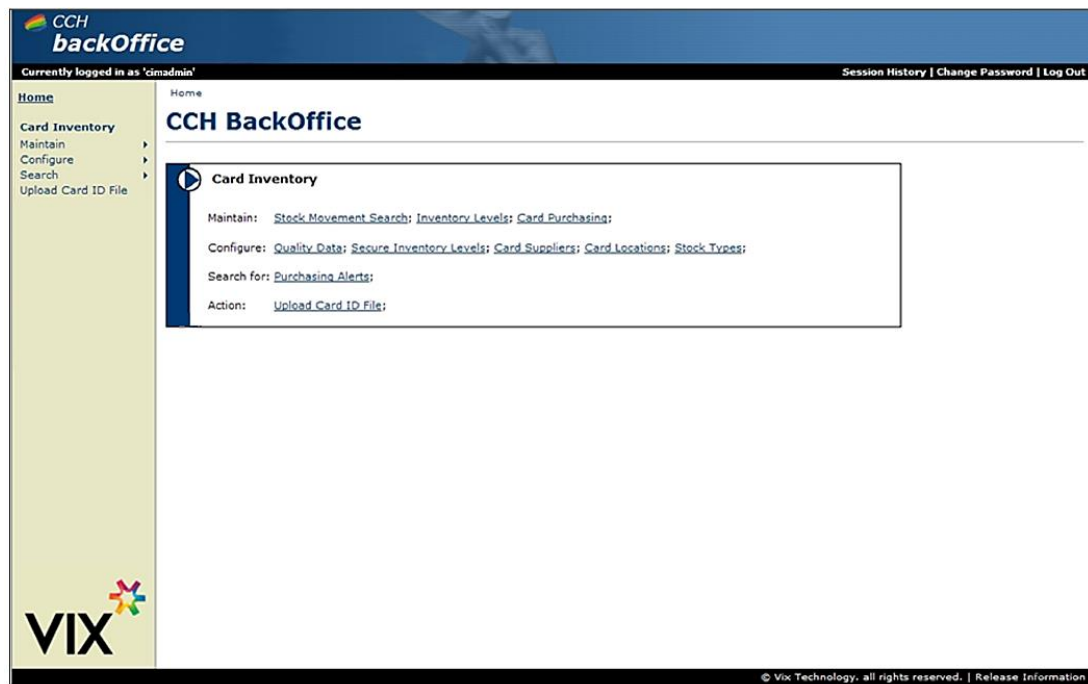
The screenshot displays a software interface with a menu bar (Manage, Actions, Organize), a search bar, and a left-hand navigation pane. The main area shows a table of reports. The navigation pane includes folders like ERGcerpts, Autoload, BlackList, Carrot, Configuration, Customized, Exception, Financial (with a sub-folder 'Eng'), Thai, Inventory, Patronage, Promotion, and Reconciliation.

Title	Type	Description	Date Modified
F001 Settlement Summary Report	Crystal Report		Mar 26, 2016 5:59 AM
F002 Authorised Settlement Summary	Crystal Report		Mar 26, 2016 10:13 AM
F003 Detailed Authorised Settlement Summary	Crystal Report		Mar 26, 2016 10:14 AM
F004 Total Card Liability Report	Crystal Report		Jul 4, 2013 11:22 PM
F005 Recovered Add Value Report	Crystal Report		Mar 26, 2016 6:00 AM
F006 Write-Off Summary Report	Crystal Report		Mar 26, 2016 6:00 AM
F007 Manual Adjustment Report	Crystal Report		Mar 26, 2016 10:12 AM
F008 Cash Collection Report	Crystal Report		Jul 4, 2013 11:22 PM
F009 Settlement Dishonour	Crystal Report		Sep 15, 2014 1:09 PM
F010 Participant Summary Report	Crystal Report		Nov 6, 2013 10:45 AM
F013 Table 1 E-Money Services	Crystal Report		Mar 26, 2016 10:14 AM
F014 Recovered Add Value Report	Crystal Report		Mar 26, 2016 7:41 AM

Card Inventory Management Subsystem

- Main functions
 - Card's activities in various places
 - Calculation of quantity of card inventory in various locations

Chart 4-6 Sample of Card Inventory Management Subsystem User Interface



Cardholder Website

- Main functions
 - Determination of usage, user account management including user authentication
 - Cardholder data access
 - Advance top-up via website through credit/debit card payment. However, in the card verification stage, payment data and steps as well as payment cancellation data are in accordance with Payment Gateway system requirements. Under the Central Clearing House system, Krung Thai Bank Public Company Limited's payment gateway is used.

Chart 4-7 Sample of Cardholder Website User Interface

MY MANGMOOM CARD

WELCOME

PRODUCT VIEW

CARD DETAILS

TOP-UP

HISTORY

MY DETAILS

CONTACT US

LOGOUT

Welcome to Mangmoom Account Detail

My Details

Name : AdultOnlineReload Card

Email: teerapongb@bkkps.co.th

Address: Address Online Reload

[Update details](#)

My Recent Activity

The final balance shown in recent activity may differ from the actual balance of your card due to pending transactions. Please view the balance page to see the most up to date card balance.

Card Number	Date / Time	Location	Transaction Type	Amount	Product Balance
101667744892	03/10/2016 03:51 PM	Cardholder website	Link Card		-
101667744892	03/10/2016 08:10 AM	Nana Station	Purse Use On Exit, Nana Station, 0 sections, Store Value Card (SVC)	31.00	-
101667744892	03/10/2016 08:00 AM	Phaya Thai Station	Purse Use On Entry, Phaya Thai Station, Store Value Card (SVC)		-

SP Website

- Main functions
 - Retrospective settlement data access
 - Card and cardholder data access
 - Device status access (devices of service providers who access the system, only)
 - Sending command to restrain one's own device functions (devices of service providers who access the system, only)
 - Duplicating data related to service providers who access the system in CVS file format

Chart 4-8 Sample of SP Website User Interface

backOffice

Currently logged in as 'bts_ow'

Device Status > [Device Status search](#) > Device Status select

Select Device Status

Device Id	Sam Id	Status	Device Type	Participant	Location	Equipment Number	Version Change Time	Active	Blacklisted
AAB12B46	AA812B46	Registered	4403	Bangkok Transit System	Mo chit	MCH		Y	N
60FA35C7	60FA35C7	Registered	4403	Bangkok Transit System	Phaya Thai	PYT		Y	N
20E624F5	20E624F5	Registered	4403	Bangkok Transit System	Nana	NNA		Y	N

Displaying results 1 - 3 of 3

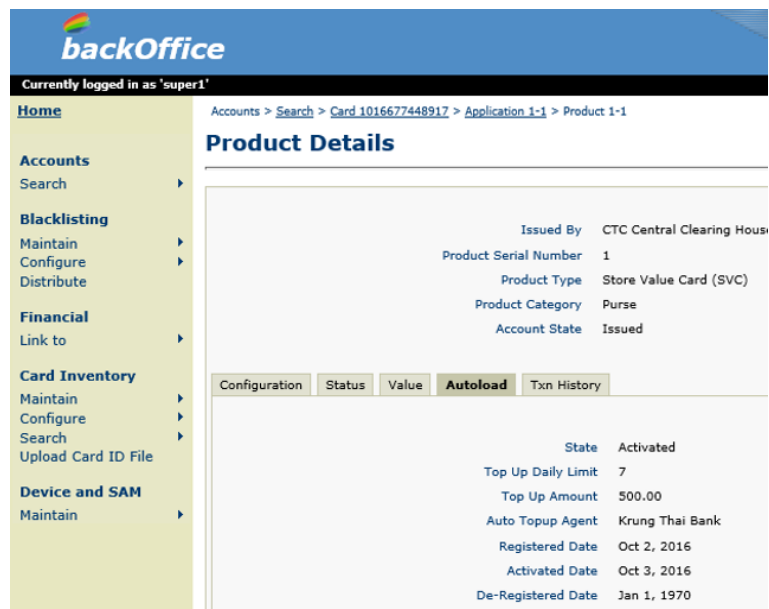
VIX

Autoload Management Subsystem

- Main functions

- Storing cardholder's personal data sent from a bank operating as automatic top-up service provider in the system
- Verifying files sent from a bank operating as automatic top-up service provider
- Receiving and sending the Registration, Acknowledgement, Request Change, Unregistration, Request Blacklist files with a bank operating as automatic top-up service provider
- Creating the Personalize Exception file when any error occurs in the file sending process
- Creating the Summary Autoload file and sending the file to a bank operating as automatic top-up service provider

Chart 4-9 Sample of Autoload Management Subsystem User Interface



Device Management Subsystem

- Main functions
 - SAM and device registration data management
 - Device status management

Chart 4-10 Sample of Device Management Subsystem User Interface

backOffice

Currently logged in as 'devadmin'

Home

Device Status > [Device Status search](#) > Device Status select

Select Device Status

Device Id	Sam Id	Status	Device Type	Participant	Location	Equipment Number	Version Change Time	Active	Blacklisted
D2B5F399	D2B5F399	Registered	4402	CTC Card Operation Center	CTC Card Storage	RRM_01		N	N
BE9D22EC	BE9D22EC	Registered	4403	Bangkok Mass Transit Authority	Bus No. 1 Inbound Station 201	R1C9		Y	N
AD716580	AD716580	Registered	4403	Bangkok Mass Transit Authority	Bus No. 4 Inbound Station 235	R4EB		N	N
AA812B46	AA812B46	Registered	4403	Bangkok Transit System	Mo chit	MCH		Y	N
8EEF5339	8EEF5339	Registered	4403	Expressway Authority	Chim Phli	SR01		N	N
845CA30B	845CA30B	Registered	4401	CTC Card Operation Center	CTC Card Storage	CIPS_03		N	N
831B964F	831B964F	Registered	4403	Bangkok Mass Transit Authority	Bus No. 2 Inbound Station 212	R2D4		N	N
7E958F0A	7E958F0A	Registered	4403	Bangkok Mass Transit Authority	Bus No. 1 Inbound Station 208	R1D0		Y	N
74FCA0B6	74FCA0B6	Registered	4403	Expressway Authority	Bang Na km.6 Outbound Entry	B18C		Y	N
60FA35C7	60FA35C7	Registered	4403	Bangkok Transit System	Phaya Thai	PYT		Y	N

Displaying results 1 - 10 of 22

1 2 3

Access Control Subsystem

- Main functions
 - Subsystem access management
 - User account management
 - User rights authentication
 - User rights allocation

Chart 4-11 Sample of Access Control Subsystem User Interface

accessControl

Currently logged in as 'accadmin'

Home

Access Control > [Users](#)

Manage Users

[New User](#)

☒ Enabled
 ☒ Expired
 ☒ Restricted
 ☒ Disabled
 ☒ Locked
 Show

Username	Name
abl	ABL Read-only
accadmin	Access Control Admin
✗ accdis	Test Disabled
⚠ accex	Test Expired
🔒 acclocked	Test Locked
🔒 accmf	Test Max Failed Login Attempts
accpcp	Test Password Change Period
accphc	Test Password History
⚠ accplp	Test Password Life Period
⚠ accpnp	Test Password Nag Period
accres	Test Update Restriction
accse	Test Session Expire
acctest1	Test Update User
actionlist	Test Actionlist User
admin	Administrator
boi_cardholder	boi edit cardholder
bts_sw	SP Website
cdaadmin	CDA Administrator
cdareadonly	CDA Readonly
cimadmin	CIM Admin
cipsadmin	CIPS Administrator
cipsoperator	CIPS Operator User
cipssupervisor	CIPS Supervisor
devadmin	Devman Admin
devreadonly	Devman Readonly
finadmin1	finadmin1

Communication Subsystem

- Main functions
 - Receiving usage data
 - Sending configuration data to service providers' devices
 - Coordination for data transfer between the Central Clearing House subsystems
 - Coordination for data transfer between the Central Clearing House subsystem as well as external systems
 - Coordination for connection with bank payment channels in payment process for bank account clearing and settlement

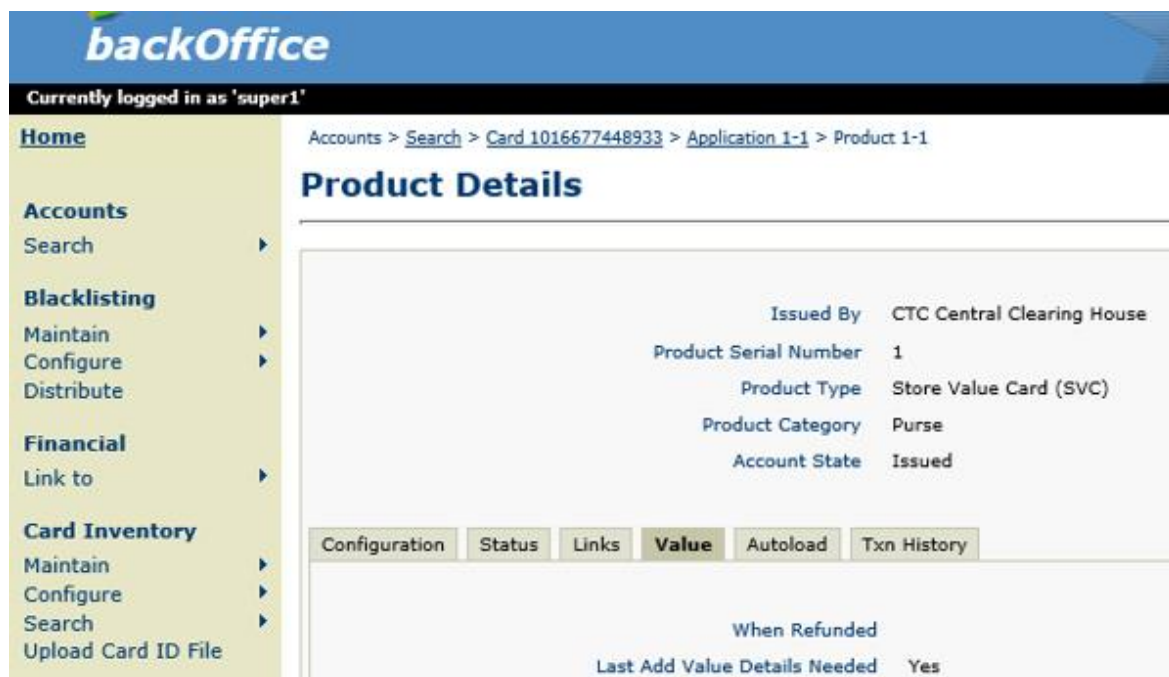
Chart 4-12 Sample of Communication Subsystem User Interface

```
* * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/convertSpEquivLists.pl 1>
>/afc/erglcadaptor/scripts/dbgLogPipe.pl info convertSpEquivLists > /dev/null) 2>
>/afc/erglcadaptor/scripts/dbgLogPipe.pl error convertSpEquivLists > /dev/null)' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/actionlist-import.sh' 1> /dev/null 2>&1 #ERGLcadaptor
20,50 * * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/ftp-users.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/ftp-importer.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/spooler.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/decomp.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/td-forwarding.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/adapt.sh' 1> /dev/null 2>&1 #ERGLcadaptor
13 * * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/pd-exporter.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/mf-exporter.sh' 1> /dev/null 2>&1 #ERGLcadaptor
1 3 * * * * * su - root -c '. .profile; /afc/erglcadaptor/scripts/expire.sh' 1> /dev/null 2>&1 #ERGLcadaptor
```

Online Enquiry Management Subsystem

- Main functions
 - Accessing data related to cards and cardholders such as each card's specific data, application and related products, etc.
 - Accessing various data related to cardholders

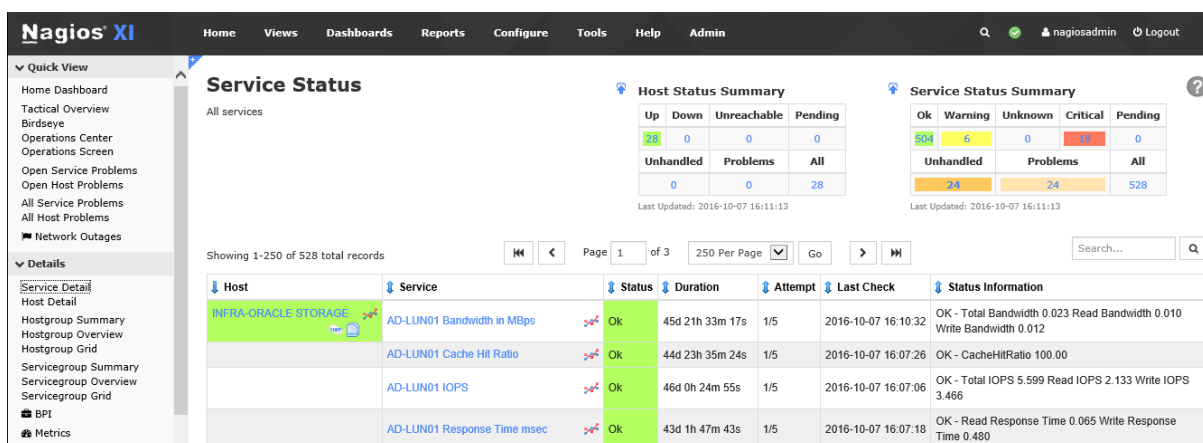
Chart 4-13 Sample of Online Enquiry Management Subsystem User Interface



System Management Subsystem

- Main functions
 - Network system management
 - Time synchronization for subsystems
 - Data backup and retrieval

Chart 4-14 Sample of System Management Subsystem User Interface



Host Security Management Subsystem

- Main functions
 - Verification of card usage data sent from service providers

Chart 4-15 Sample of Host Security Management Subsystem User Interface

```
OnLine>QI

Echo: OFF
Current number of key group: 8
Current number of key versions each group: 15
Current number of key indices each version: 16
Host command version: Expanded Hex
Enable IC key inter group access: No
Enable X9.17 import IC key: No
Enable X9.17 export IC key: No
Card/Password Authorization: Smart Card
Current number of authorization officer: 2
IC HOST COMMAND AUTHORIZATION ENABLED.
Local Master Key Check = 93A1 96A2 FC6C 82B6

Old LMK loaded: No
```

Front End Software consists of;

Card Initialization and Personalization System

- Main functions
 - Card Initialisation
 - Card Personalisation
 - Common Ticketing staff card creation
 - Printing cardholder data on the front
 - Card issue and distribution for customers
 - Top-up function
 - Top-up cancellation function
 - Activation of cards that are previously suspended
 - Data record for cards to be disposed
 - Access of card data in the system
 - Card data access
 - Co-products issue
 - Cancellation of co-product issue
 - Management of staff working shifts
 - Reload function
 - Change of cards for cardholders

Chart 4-16 Card Initialisation and Personalization System User Interface

Card Initialisation and Personalisation System v.1.6

Card Initialisation | Card Issuance | Card Services | Card Enquiry | Report & Log | Settings

Card Initialisation

Card Type: Adult CTC

Quantity:

Destination: Card reader

Submit

Refund and Reload Machine

- Main functions
 - Card issue and distribution for customers
 - Top-up
 - Top-up cancellation
 - Activation of cards that are previously suspended
 - Data record for cards to be disposed
 - Access of card data in the system
 - Card data access
 - Co-products issue
 - Cancellation of co-product issue
 - Management of staff working shifts
 - Reload
 - Change of cards for cardholders

Chart 4-17 Sample of Refund and Reload Machine User Interface

Reload and Refund Machine v.1.6

Card Personalization | Card Issuance | **Card Services** | Card Enquiry | Report & Log | Settings

Card Add Value (2/3)

Card Add Value | Reload Amount: 100

Void Card Add Value | Payment Means Type: Cash

Card Activation | Credit/Debit Card Number

Card Disposal

Auto Top Up Updates | Submit

Card Refund

Defer Card Refund

Card Replacement

Defer Card Replacement

System Security Software consists of:

Key Management System Machine

- Main functions
 - Security code set issuance
 - User rights determination for service providers

Chart 4-18 Sample of Key Management System Machine User Interface

SAM

PERSONALIZATION SAM

SAM Profile: -- Select --

SAM Marriage Key: -- Select --

Personalize

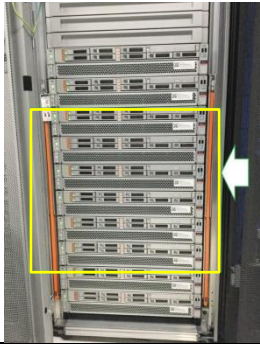
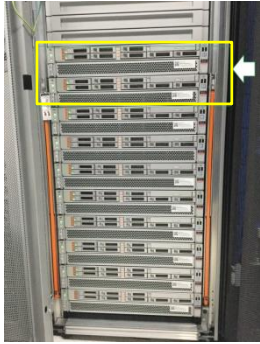
In addition to the software development, the BSV consortium have to provide the third party software, install it, configure the host computer, database, and provide appropriate network, so that the Central Clearing House system will be completed for the next testing process.

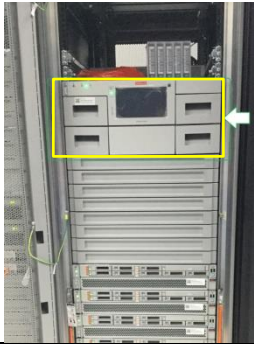
4.2.2 Device Provision and Installation

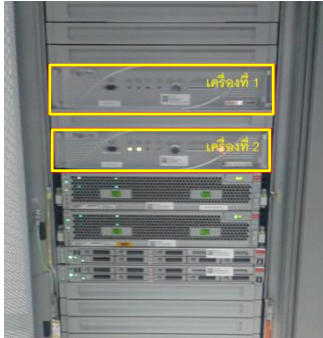
The BSV consortium, which develops the Central Clearing House system, provides devices for the CCH and also installs software that is developed or purchased. Such devices for the CCH are to be installed at the data center and the Office of Transport and Traffic Policy and Planning (OTP). Details of hardware, software and network devices to be provided are as follows:

1. List of Hardware

Table 4-5 Hardware Provision Details

No.	Details	Unit	Quantity		Location of Installation
1	Server				
1.1	Database Server				
1.1.1	Oracle Server X5-2L <u>Specifications</u> ● CPU: 2xE5-2690v3 Intel 12Core 2.6GHz ● Memory: 128 GB ● Hard Disk: 2x600 GB 10000 rpm 2.5-inch SAS-2 HDD ● I/O: 2xDual 16Gbps FC HBA : 2xDual 10Gbps FC HBA	Set	2		ServerRack#1, Data Centre
1.2	Application Server				
1.2.1	Oracle Server X5-2L <u>Specifications</u> ● CPU: 2xE5-2690v3 Intel 12Core 2.6GHz ● Memory: 64 GB ● Hard Disk: 2x600 GB 10000 rpm 2.5-inch SAS-2 HDD ● I/O: 2xDual 16Gbps FC HBA : 2xDual 10Gbps FC HBA	Set	6		ServerRack#1, Data Centre
1.3	Backup Management				
1.3.1	Oracle Server X5-2L <u>Specifications</u> ● CPU: 2xE5-2690v3 Intel 12Core 2.6GHz ● Memory: 64 GB ● Hard Disk: 2x600 GB 10000 rpm 2.5-inch SAS-2 HDD ● I/O: 2xDual 16Gbps FC HBA : 2xDual 10Gbps FC HBA	Set	2		ServerRack#1, Data Centre
2	Issuer & Authentication				

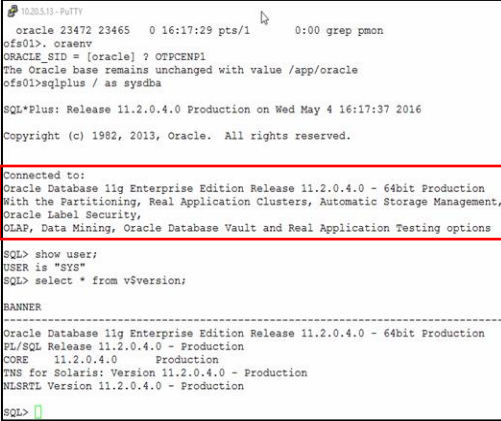
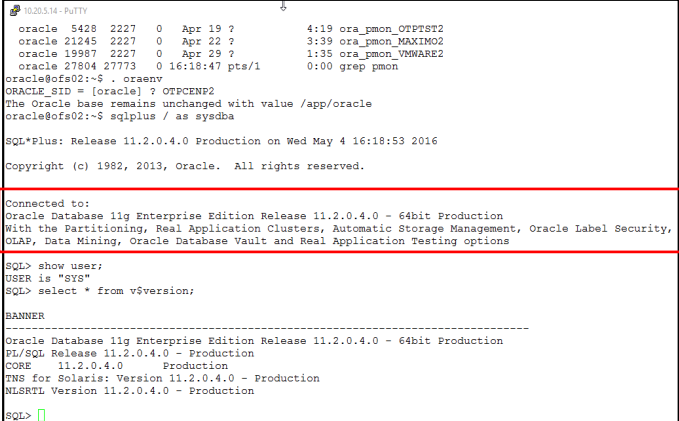
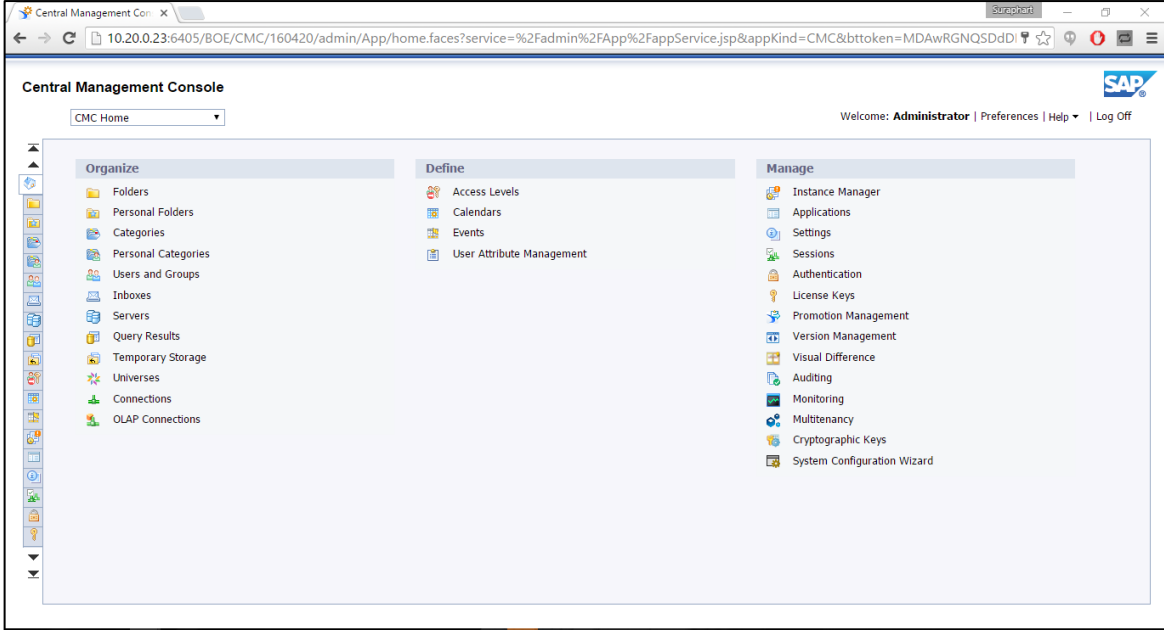
No.	Details	Unit	Quantity		Location of Installation
2.1	Card Initialized & Personalize Device (Whole Set)	Set	2		Office of Transport and Traffic Policy and Planning
2.2	Refund and Reload (Whole Set)	Set	2		Office of Transport and Traffic Policy and Planning
2.3	Key Management Facility (Whole Set)	Set	2		Office of Transport and Traffic Policy and Planning
3	Storage				
3.1	StorageTek SL150 modular tape library: model family <u>Specifications</u> : ● 1 HP LTO5 half-height 8 Gb FC for StorageTek SL150 ● base unit with 30 slots and 1 LTO5 half-height 8 Gb FC tape drive	Set	1		ServerRack#1, Data Centre
3.2	Oracle FS1-2 Flash Storage <u>Specifications</u> : Oracle Storage Drive Enclosure ● DE2-48P with Forty –Eight 1.2 TB 10000 rpm 2.5-inch SAS HDDs ● DE2-24C with twenty-four 8 TB 7200 rpm 3.5-inch SAS HDDs ● DE2-7P with seven 400 GB SAS SSDs ● Cache Memory 384 GB ● Disk : 7 x 400 GB SSD : 48 x 900 GB SAS 10K : 24 x 4TB SAS 7.2K	Set	1		ServerRack#2, Data Centre

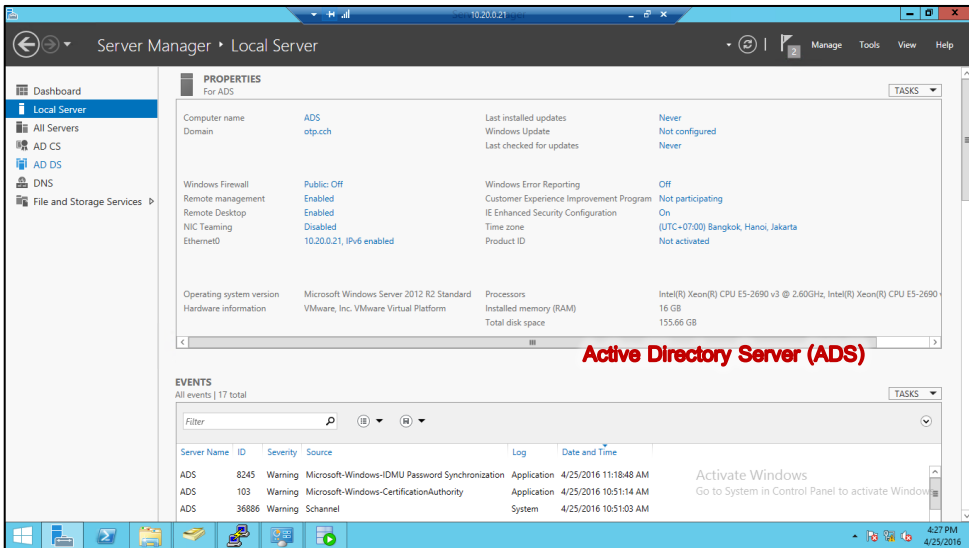
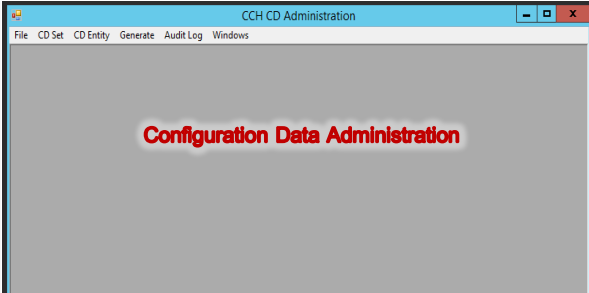
No.	Details	Unit	Quantity		Location of Installation
4	SAN Switch				
4.1	Brocade 300 Switch <u>Specifications:</u> • Eight 8 Gb activated ports and E_port • 4x8 FC ports. Includes eight 8 Gb SFP short wave optic modules	Set	2		ServerRack#1 (at the back), Data Centre
5	Others				
5.1	Sun Rack II 1242/1242E <u>Specifications :</u> • Height: 199.8cm (78.7 in.) • Width: 60cm (23.6 in.) • Depth: 120cm (47.2 in.) • Weight: 150.6 kg (332 lbs.) empty	EA	1		Data Centre
5.2	Sun Rack II 1242,Non-Conf Ship <u>Specifications :</u> • Height: 199.8cm (78.7 in.) • Width: 60cm (23.6 in.) • Depth: 120cm (47.2 in.) • Weight: 150.6 kg (332 lbs.) empty	EA	1		Data Centre
5.3	Gemen HSM	Set	2		ServerRack#2, Data Centre

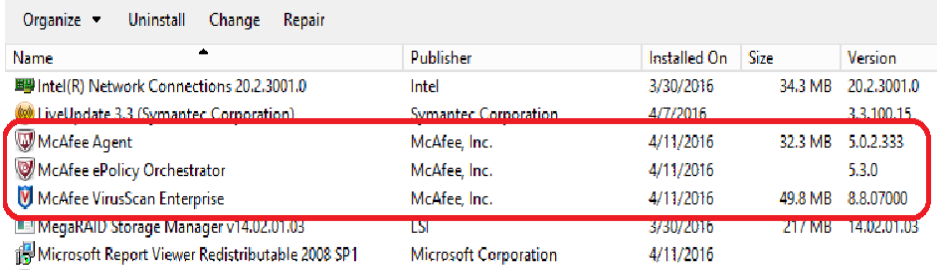
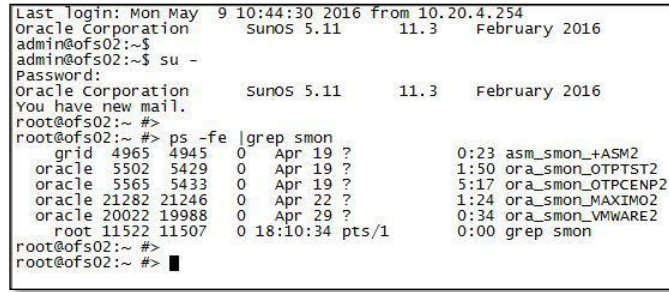
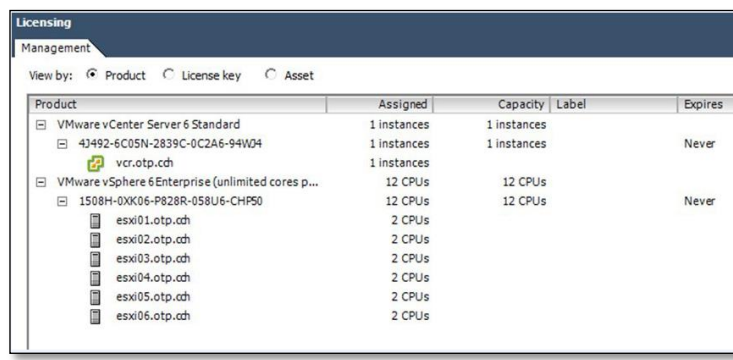
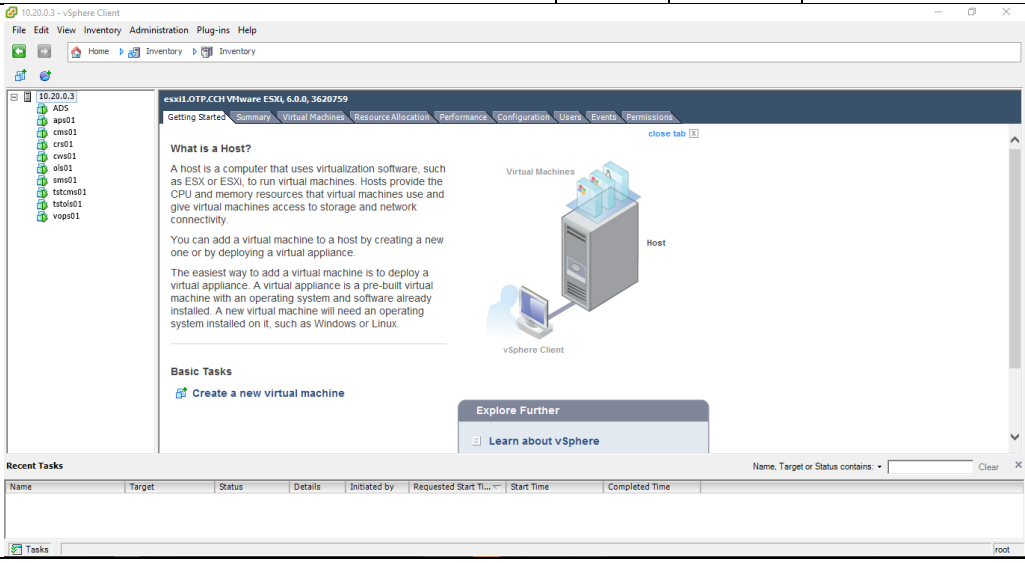
No.	Details	Unit	Quantity		Location of Installation
5.4	MIFARE DESFire EV1	EA	100,000	- General Cards - 80,000 Cards - Student Cards - 10,000 Cards - Senior Cards - 10,000 cards 	To be stored at the Office of Transport and Traffic Policy and Planning
5.5	CSC Reader/Writer HID Omnikey5421	EA	5		To be stored at the Office of Transport and Traffic Policy and Planning
5.6	NFC Phone Samsung 갤럭시 Galaxy S6	EA	5		To be stored at the Office of Transport and Traffic Policy and Planning
5.7	Data Center Rental for 3 years	-	1		Data Centre, The Cloud, CS Loxinfo

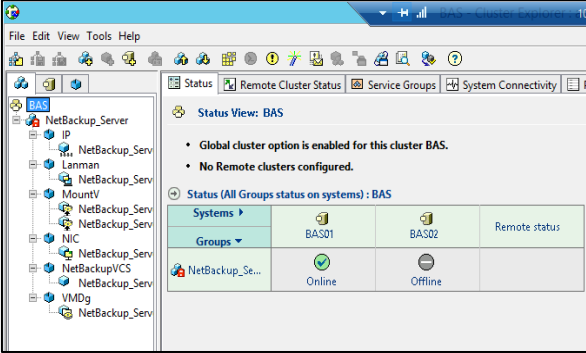
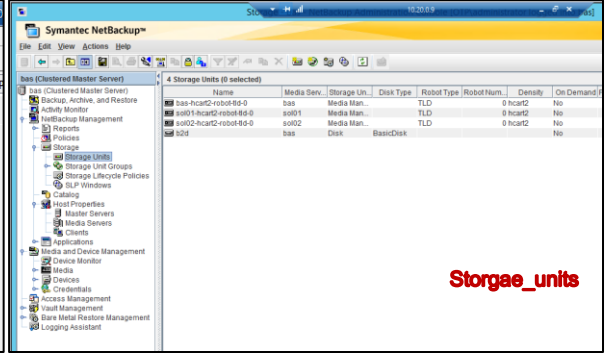
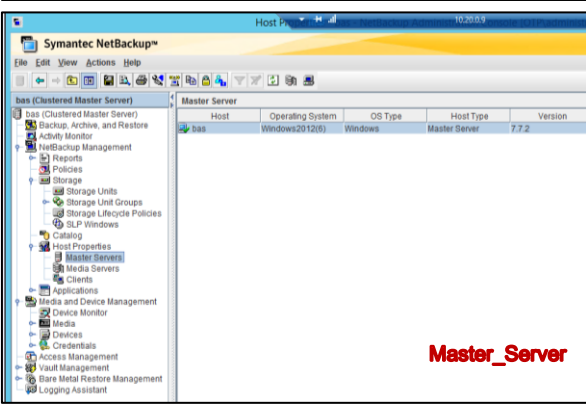
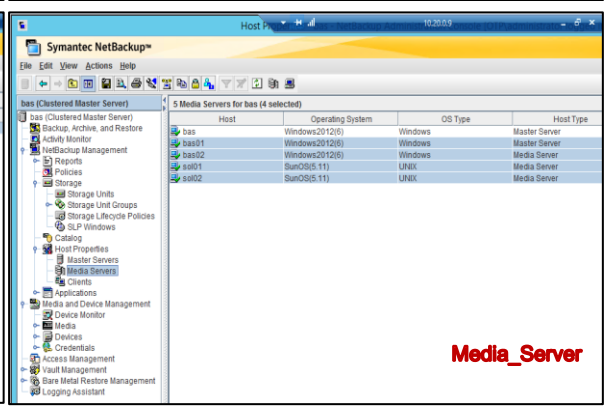
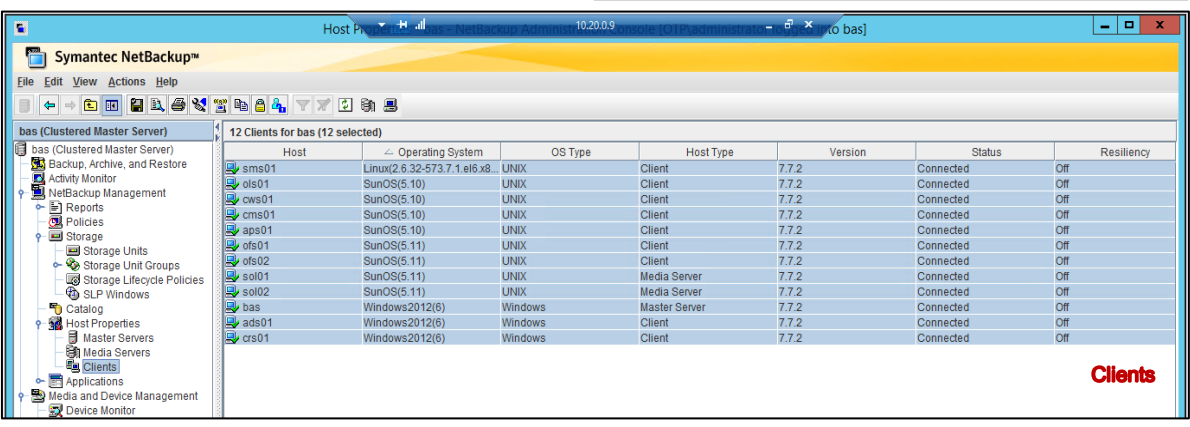
2. List of Software

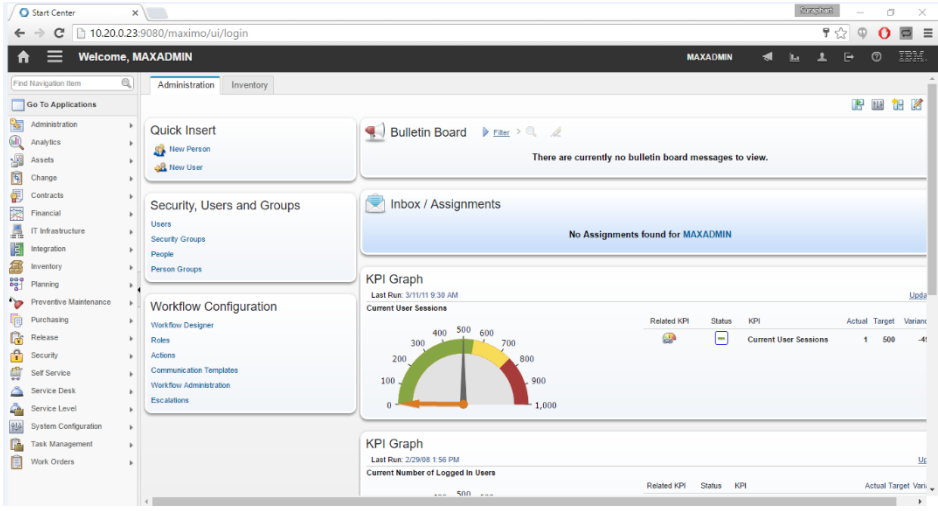
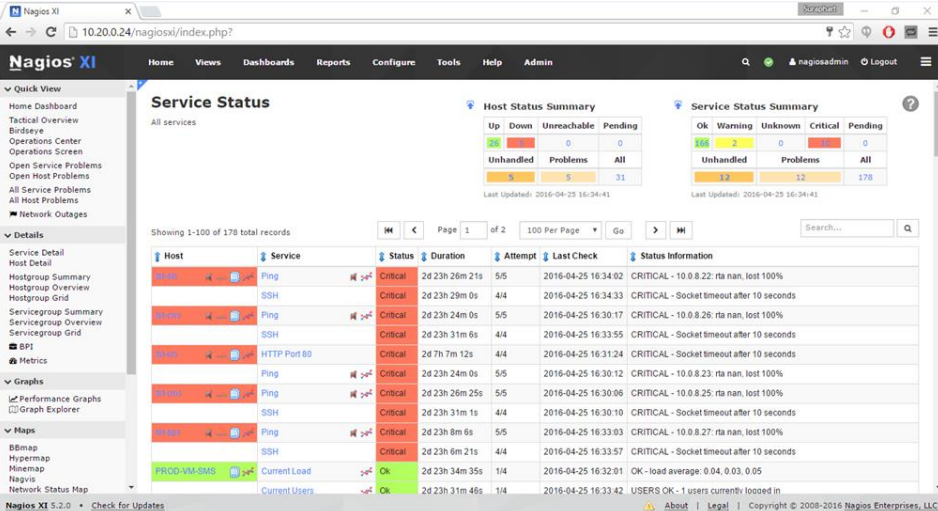
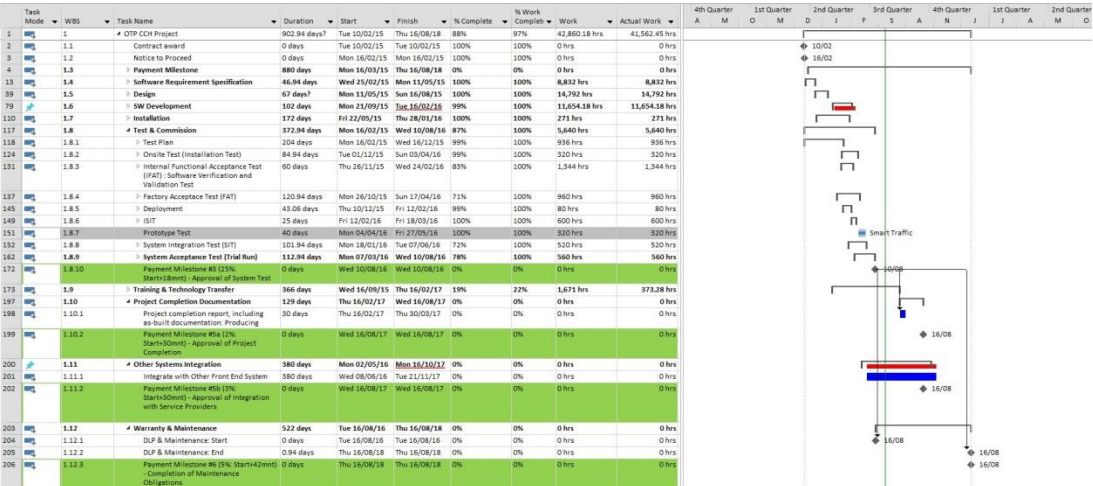
Table 4-6 Software Provision Details

No.	Details	Unit	Quantity	Installation
1	Database Management System			
1.1	Oracle Database Enterprise Edition Per Processor - Diagnostics Pack - Tuning Pack - Partitioning - Database Vault - OLAP - Advanced Security	Rights	8	CCH Database Server
	 			
2	Web Application Service			
2.1	Crystal Report Server 2013 WIN INTL	Rights	5	CCH Application Server
				

No.	Details	Unit	Quantity	Installation
2.2	CCH MASS License (CCH)	Rights	1	CCH Application Server
	 Active Directory Server (ADS) <pre> root@sms01 ~]# /usr/local/nagios/bin/nagios -h Nagios Core 4.1.1 Copyright (c) 2009-present Nagios Core Development Team and Community Contributors Copyright (c) 1999-2009 Ethan Galstad Last Modified: 08-19-2015 License: GPL Website: https://www.nagios.org Usage: /usr/local/nagios/bin/nagios [options] <main_config_file> Options: -v, --verify-config Verify all configuration data (-v -v for more info) -s, --test-scheduling Shows projected/recommended check scheduling and other diagnostic info based on the current configuration files. -T, --enable-timing-point Enable timed commentary on initialization -x, --dont-verify-paths Deprecated (Don't check for circular object paths) -p, --precache-objects Precache object configuration -u, --use-precached-objects Use precached object config file -d, --daemon Starts Nagios in daemon mode, instead of as a foreground process -W, --worker /path/to/socket Act as a worker for an already running daemon Visit the Nagios website at https://www.nagios.org/ for bug fixes, new releases, online documentation, FAQs, information on subscribing to the mailing lists, and commercial support options for Nagios. root@sms01 ~]# </pre> System Management Server (SMS) <pre> otpccms - PuTTY login as: root Server refused our key root@otpccms's password: Last login: Wed May 4 15:53:22 2016 from 10.20.0.254 Oracle Corporation SunOS 5.10 Generic Patch January 2005 Oracle Corporation SunOS 5.10 Generic Patch January 2005 You have new mail. root@cms01:~ #> hostname cms01 root@cms01:~ #> getpkgver.pl [NORM] Node Package Version Status Report [NORM] [NORM] Hostname : [cms01] [NORM] Node Type : [cms] [NORM] Node Name : [Communication_Server_OTP_CMS] [NORM] Node Software BOM Version : [1.10] [NORM] Status : [UP TO DATE] </pre> Communication Server (CMS) <pre> otpols - PuTTY Oracle Corporation SunOS 5.10 Generic Patch January 2005 You have new mail. root@ols01:~ #> hostname ols01 root@ols01:~ #> getpkgver.pl [NORM] Node Package Version Status Report [NORM] [NORM] Hostname : [ols01] [NORM] Node Type : [ols] [NORM] Node Name : [Online_Server_OTP_OLS] [NORM] Node Software BOM Version : [1.10] [NORM] Status : [UP TO DATE] </pre> Online Server (OLS) <pre> otpsaps - PuTTY login as: root Server refused our key root@otpsaps's password: Last login: Wed May 4 15:54:04 2016 from 10.20.0.254 Oracle Corporation SunOS 5.10 Generic Patch January 2005 Oracle Corporation SunOS 5.10 Generic Patch January 2005 You have new mail. root@aps01:~ #> hostname aps01 root@aps01:~ #> getpkgver.pl [NORM] Node Package Version Status Report [NORM] [NORM] Hostname : [aps01] [NORM] Node Type : [aps] [NORM] Node Name : [Application_Server_OTP_APS] [NORM] Node Software BOM Version : [1.10] [NORM] Status : [1 PACKAGE REQUIRES UPDATING] </pre> Application Server (APS) <pre> otpccws - PuTTY login as: root Server refused our key root@otpccws's password: Last login: Wed May 4 15:54:31 2016 from 10.20.0.254 Oracle Corporation SunOS 5.10 Generic Patch January 2005 Oracle Corporation SunOS 5.10 Generic Patch January 2005 You have new mail. root@cws01:~ #> hostname cws01 root@cws01:~ #> getpkgver.pl [WARN] Could not get package information for VIXnrpe [NORM] [NORM] Node Package Version Status Report [NORM] [NORM] Hostname : [cws01] [NORM] Node Type : [cws] [NORM] Node Name : [Web Server VSS WSV] [NORM] Node Software BOM Version : [1.10] [NORM] Status : [1 PACKAGE REQUIRES UPDATING] </pre> Cardholder Website Server (CWS)  Configuration Data Administration			

No.	Details	Unit	Quantity	Installation
3	Web Server			
3.1	McAfee VirusScan Enterprise	Rights	26	CCH Database Server, Application Server and Backup Management
				
3.2	VMware vCenter Server 6 Standard for vSphere	Rights	1	CCH Application Server
	 			
3.3	VMware vSphere 6 Enterprise for 1 processor	Rights	12	CCH Application Server
				

No.	Details	Unit	Quantity	Installation
4	Tools			
4.1	Symantec NetBackup	Rights	5	CCH Backup Management
     Storage_units Master_Server Media_Server Clients				

No.	Details	Unit	Quantity	Installation
4.2	IBM Maximo Asset Management Authorized User License + SW Subscription	Rights	1	CCH Application Server
				
4.3	Nagios XI 100-Node License	Rights	1	CCH Application Server
				
4.4	Microsoft Project Professional 2013	Rights	5	The Common Ticketing Office (CTO)'s computer
				

3. List of Network

Table 4-7 Network Provision Details

No.	Details	Unit	Quantity		Installation Location
1	Core Switch HP 10508-V Switch Chassis <u>Specifications:</u> • Distributed architecture with separation of data and control planes • Support 8 interface module slots • All hot-swappable modules • Support IRF technology virtualizes up to 4 chassis • Provide 10GbE ports 1/10G BASE-T at least 24 ports • Provide 1GbE ports 1G BASE-T at least 144 ports • Provide 1GbE ports SFP at least 96 ports • Support 40GbE ports • Support Multiple internal power supplies • Support IPv4 static routes, RIP, OSPF, ISIS, and BGP • Support IPv6 static routes, RIPng, OSPFv3, IS-ISv6, and BGP4+ • Throughput up to 5.7 Bpps Fabric • Switching capacity up to 9.3 Tbps Fabric • Routing table size up to 256K IPv4 / 8K IPv6 • MAC address table up to 512K	ea	2	 	Install at ServerRack#1, ServerRack#2, Data Centre
2	Router HP MSR3044 Router <u>Specifications</u> • Provide 4 HMIM slots 4 SIC slots, or 2 DSIC slots, or a combination • Provide 3 RJ-45 1000BASE-T ports • Provide 2 SFP fixed Gigabit Ethernet SFP ports • Support IPv4 static routes, RIP, OSPF, ISIS, and BGP • Support IPv6 static routes, RIPng, OSPFv3, IS-ISv6, and BGP4+ • Support Virtual Private LAN Service • Support Network Address Translation • Throughput Up to 3.5 Mpps (64-byte packets) • Routing table size 500000 entries (IPv4), 500000 entries (IPv6) • Forwarding table size 500000 entries (IPv4), 500000 entries (IPv6) • MAC address table up to 32K	ea	2	 	Install at ServerRack#1, ServerRack#2, Data Centre

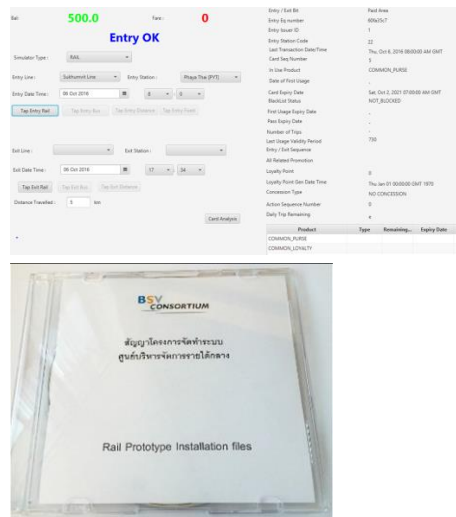
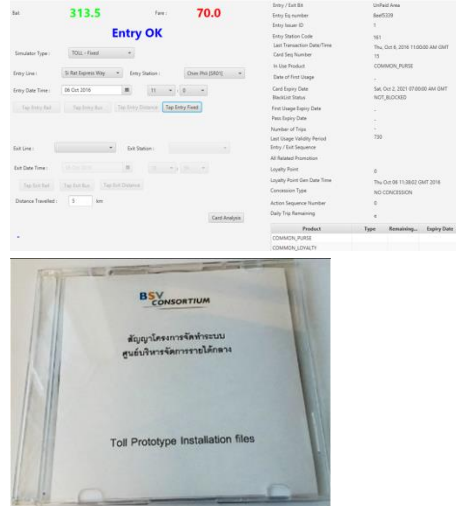
No.	Details	Unit	Quantity	Installation Location	
3	ME Switch				
	HP H1 5500-24G-4SFP w/2 Intf Slt Switch <u>Specifications</u> ● Provide 24 RJ-45 autosensing 10/100/1000 ports ● Provide 4 fixed Gigabit Ethernet SFP ports ● Provide 2 SFP+ 10GbE ports ● Support 2 expansion module slots ● Support 10G port ● Provide 1RJ-45 serial console port ● Provide 1 RJ-45 out-of-band management port ● Support IRF technology virtualizes up to 9 unit ● Support IPv4 static routes, RIP, OSPF, ISIS, and BGP ● Support IPv6 static routes, RIPng, OSPFv3, IS-ISv6, and BGP4+ ● Provide 2 power supply ● Throughput up to 130.9 million pps ● Routing/Switching capacity 176 Gb/s ● Routing table size 12000 entries (IPv4), 6000 entries (IPv6) ● MAC address table up to 32K	ea	2	 	Install at ServerRack#1, ServerRack#2, Data Centre
4	L2 Switch				
	HP 5120-24G EI Switch <u>Specifications</u> ● Provide 20 RJ-45 autosensing 10/100/1000 ports ● Provide 4 4 dual-personality ports SFP ports ● Provide 1RJ-45 serial console port ● Support IPv4 static routes ● Support IPv6 static routes ● Throughput up to 35.7 million pps ● Routing/Switching capacity 48 Gb/s ● Routing table size 32 entries (IPv4) ● MAC address table up to 16K	ea	2	 	Install at ServerRack#1, ServerRack#2, Data Centre

No.	Details	Unit	Quantity		Installation Location
5	Firewall				
5.1	FortiGate 800C Series <u>Specifications</u> ● Firewall Throughput 20 Gbps ● Interfaces 10/100/1000 x 12 port ● GE SFP or 10/100/1000 Shared Interfaces x 8 port ● 10/100/1000 Bypass Interfaces x 2 pairs ● Internal Storage 60 GB ● Concurrent Sessions 7 Million ● New Sessions/Second 190,000 ● Firewall Policies 10,000 ● SSL-VPN Throughput 1.3 Gbps	ea	2	 	Install at ServerRack#1, ServerRack#2, Data Centre
5.2	JuniperSRX650 <u>Specifications</u> ● Firewall Throughput 7 Gbps ● Interfaces 10/100/1000 x 20 port ● Memory (DRAM) 2 GB ● Flash memory 2 GB CF internal on SRE ● Firewall Throughput 30 Mpps ● Concurrent Sessions 512 K ● New Sessions/Second 35,000 ● Firewall Policies 8,192 ● Routing (Packet Mode) PPS 1000Kpps		2	 	Install at ServerRack#1, ServerRack#2, Data Centre
6	Computer / Workstation				
	Dell Precision Tower 5810 <u>Specifications</u> ● Intel Xeon E5-16.3 V3 (Four Core, 10MB Cache, 2.8GHz) ● 8GB RAM (2x4GB) 2133MHz DDR4 RDIMM ECC ● Hard Drive 500GB 3.5inch 7.2K RPM SATA HDD Fix Precision Workstation ● Optical Drive DVD+RW, 19 in 1 Media Card Reader ● Dell E2016H 19.5" Monitor	ea	24		Office of Transport and Traffic Policy and Planning

No.	Details	Unit	Quantity		Installation Location
7	A4 Laser colour printer				
	HP Color LaserJet Pro 200 M252dw <u>Specifications</u> • Laser Printing Technology • Connection: 1 Hi-speed USB 2.0 port; 1 Host USB, 1 Ethernet 10/1000 Base-TX • 150-sheet capacity • Printing resolution 600 x 600 pixels per inch (dpi) • Printing speed 19 pages per minute	ea	2		Office of Transport and Traffic Policy and Planning
8	A3 Laser colour printer				
	HP Color LaserJet CP5225 <u>Specification</u> • Laser Printing Technology • Normal printing speed 20 pages per minute • Printing resolution 600 x 600 pixels per minute (dpi)	ea	1		Office of Transport and Traffic Policy and Planning
9	55 inches monitor				
	LG Ultra HD Smart TV 55 <u>Specifications</u> • 55" Monitor • Display resolution 3840 x 2160 • Video Processor True 4K Engine • Surround System Ultra Surround • Speaker System 2.0Ch Speaker system (20W) • 3 HDMI ports, 3 USB ports, WiFi Direct, WiDi, MHL	ea	2		Office of Transport and Traffic Policy and Planning

4. List of Prototype

Table 4-8 Prototype Provision Details

No.	Details	Unit	Quantity		Installation Location
1	Mass Rapid Transit (Rail) Prototype	ea	1		Office of Transport and Traffic Policy and Planning
2	Toll Prototype	ea	1		Office of Transport and Traffic Policy and Planning
3	Near Field Communication Prototype	ea	1		Office of Transport and Traffic Policy and Planning

No.	Details	Unit	Quantity	Installation Location
	Non – Transit prototype	ea	1	Office of Transport and Traffic Policy and Planning

4.3 Compliance Inspection

According to the Material List of the Central Clearing House system provision project as summarized in 4.1, the PMS consulting group reviews the documents and validates the devices provided by the BSV consortium as well as considering and providing suggestions to the OTP. The BSV consortium requests for modification on the specifications of devices to be provided, because of discontinuation, and believes that the devices provided for the Central Clearing House system provision project are correct and consistent with the Material List. Devices to replace those discontinued are of equivalent or better quality and efficiency, and they are compatible, as shown in **Table 4-9**, which compares the devices specified in the Material List and those provided.

Table 4-9 Comparison of Material List of the CCH project

No.	Devices as specified in the contract			Devices as Provided			Consistency		Note	
	Details		Unit	Quantity	Details	Unit	Quantity	Accuracy		Completeness
Hardware										
1	Server				Server					
1.1	Database Server				Database Server					
1.1.1	Sun Server X4-2: model family		Set	2	Oracle Server X5-2L	Set	2	✓	✓	Modification proposed on November 25, 2015. The PMS consulting group and the OTP considered and decided that the devices proposed for replacement are of equivalent or better quality, and the devices are compatible.
1.2	Application Server				Application Server					
1.2.1	Sun Server X4-2: model family		Set	6	Oracle Server X5-2L	Set	6	✓	✓	
1.3	Backup Management				Backup Management					
1.3.1	Sun Server X4-2: model family		Set	2	Oracle Server X5-2L	Set	2	✓	✓	
2	Issuer & Authentication				Issuer & Authentication					
2.1	Card Initialized & Personalize Device (Whole Set)		Set	2	Card Initialized & Personalize Device (Whole Set)	Set	2	✓	✓	
2.2	Refund and Reload		Set	2	Refund and Reload (Whole Set)	Set	2	✓	✓	
2.3	Key Management Facility (Whole Set)		Set	2	Key Management Facility (Whole Set)	Set	2	✓	✓	
3	Storage				Storage					
3.1	StorageTek SL150 modular tape library: model family		Set	1	StorageTek SL150 modular tape library: model family	Set	1	✓	✓	
3.2	Pillar Axiom 600 storage system: rackmounted base		Set	1	Oracle FS1-2 Flash Storage	Set	1	✓	✓	Modification proposed on November 25, 2015. The PMS consulting group and the OTP considered and decided that the devices proposed for replacement are of equivalent or better quality, and the devices are compatible.
4	SAN Switch				SAN Switch					
4.1	Brocade 300 Switch		Set	2	Brocade 300 Switch	Set	2	✓	✓	

No.	Devices as specified in the contract			Devices as Provided			Consistency		Note
	Details	Unit	Quantity	Details	Unit	Quantity	Accuracy	Completeness	
5	Others			Others					
5.1	Sun Rack II 1242/1242E	Set	1	Sun Rack II 1242/1242E	EA	1	✓	✓	
5.2	Sun Rack II 1242,Non-Conf Ship	Set	1	Sun Rack II 1242,Non-Conf Ship	EA	1	✓	✓	
5.3	Gemen HSM	Set	2	Gemen HSM	Set	2	✓	✓	
5.4	MIFARE DESFire EV1	EA	100,000	MIFARE DESFire EV1	EA	100,000	✓	✓	
5.5	CSC Reader/Writer	Set	5	CSC Reader/Writer	EA	5	✓	✓	
5.6	NFC Phone	EA	5	NFC Phone	EA	5	✓	✓	
5.7	Data Center Rental for 3 years	-	1	Data Center Rental for 3 years	-	1	✓	✓	
Software									
1	Database Management System			Database Management System					
1.1	Oracle Database Enterprise Edition Per Processor • Diagnostics Pack • Tuning Pack • Partitioning • Database Vault • OLAP • Advanced Security	Rights	8	Oracle Database Enterprise Edition Per Processor • Diagnostics Pack • Tuning Pack • Partitioning • Database Vault • OLAP • Advanced Security	Rights	8	✓	✓	
2	Web Application Service			Web Application Service					
2.1	Crystal Reports Server (User license)	Rights	5	Crystal Report Server 2013 WIN INTL	Rights	5	✓	✓	
2.2	CCH MASS License (CCH)	Rights	1	CCH MASS License (CCH)	Rights	1	✓	✓	
3	Web Server			Web Server					

No.	Devices as specified in the contract			Devices as Provided			Consistency		Note
	Details	Unit	Quantity	Details	Unit	Quantity	Accuracy	Completeness	
3.1	McAfee	Rights	5	McAfee VirusScan Enterprise	Rights	26	✓	✓	The software provided has usage rights exceeding the quantities specified in the Material List, and the excessive part does not have additional cost. The PMS consulting group and the OTP considered and decided that the quantities of software rights provided are proper and sufficient for the project execution and usage.
3.2	VMware vCenter Server 5 Standard for vSphere 5 (Per Instance)	Rights	1	VMware vCenter Server 6 Standard for vSphere	Rights	1	✓	✓	The software provided is of newer version than that specified in the Material List. The PMS consulting group and the OTP considered that such provision is in accordance with the contract conditions indicating that the software provided must be of the latest updated version at the date of delivery.
3.3	VMware vSphere 5 Enterprise for 1 processor	Rights	12	VMware vSphere 6 Enterprise for 1 processor	Rights	12	✓	✓	The software provided is of newer version than that specified in the Material List. The PMS consulting group and the OTP considered that such provision is in accordance with the contract conditions indicating that the software provided must be of the latest updated version at the date of delivery.
4	Tools			Tools					

No.	Devices as specified in the contract			Devices as Provided			Consistency		Note
	Details	Unit	Quantity	Details	Unit	Quantity	Accuracy	Completeness	
4.1	Symantec NetBackup	Rights	2	Symantec NetBackup	Rights	5	✓	✓	The software provided has usage rights exceeding the quantities specified in the Material List, and the excessive part does not have additional cost. The PMS consulting group and the OTP considered and decided that the quantities of software rights provided are proper and sufficient for the project execution and usage.
4.2	Maximo Asset Management	Rights	1	IBM Maximo Asset Management Authorized User License + SW Subscription	Rights	1	✓	✓	
4.3	Nagios System Maintenance	Rights	1	Nagios XI 100-Node License	Rights	1	✓	✓	
4.4	MS Project Pro	Rights	5	Microsoft Project Professional 2013	Rights	5	✓	✓	
Network									
1	Core Switch			Core Switch					
	HP 10508-V Switch Chassis	EA	2	HP 10508-V Switch Chassis	EA	2	✓	✓	
2	Router			Router					
	HP MSR3044 Router	EA	2	HP MSR3044 Router	EA	2	✓	✓	
3	ME Switch			ME Switch					
	HP H1 5500-24G-4SFP w/2 Intf Slt's Switch	EA	2	HP H1 5500-24G-4SFP w/2 Intf Slt's Switch	EA	2	✓	✓	
4	L2 Switch			L2 Switch					
	HP 5120-24G EI Switch	EA	2	HP 5120-24G EI Switch	EA	2	✓	✓	

No.	Devices as specified in the contract			Devices as Provided			Consistency		Note
	Details	Unit	Quantity	Details	Unit	Quantity	Accuracy	Completeness	
5	Firewall			Firewall					
5.1	FortiGate 800C Series	EA	2	FortiGate 800C Series	EA	2	✓	✓	
5.2	JuniperSRX650		2	JuniperSRX650		2	✓	✓	
6	Computer / Workstation			Computer / Workstation					
	Dell PowerEdge T320	EA	24	Dell Precision Tower 5810	EA	24	✓	✓	Modification proposed on March 18, 2016. The PMS consulting group and the OTP considered and decided that the devices proposed for replacement are of equivalent or better quality, and the devices are compatible.
7	A4 Laser colour printer			A4 Laser colour printer					
	HP LaserJet Pro 200 Color M251nw	EA	2	HP Color LaserJet Pro 200 M252dw	EA	2	✓	✓	Modification proposed on March 18, 2016. The PMS consulting group and the OTP considered and decided that the devices proposed for replacement are of equivalent or better quality, and the devices are compatible.
8	A3 Laser colour printer			A3 Laser colour printer					
	HP Color LaserJet CP5225	EA	1	HP Color LaserJet CP5225	EA	1	✓	✓	
9	55 inches monitor			55 inches monitor					

No.	Devices as specified in the contract			Devices as Provided			Consistency		Note
	Details	Unit	Quantity	Details	Unit	Quantity	Accuracy	Completeness	
	LG WL30 55"	EA	2	LG Ultra HD Smart TV 55	EA	2	✓	✓	Modification proposed on March 18, 2016. The PMS consulting group and the OTP considered and decided that the devices proposed for replacement are of equivalent or better quality, and the devices are compatible.
Prototype									
1	Mass Rapid Transit (Rail) Prototype	System	1	Mass Rapid Transit (Rail) Prototype	System	1	✓	✓	
2	Toll Prototype	System	1	Toll Prototype	System	1	✓	✓	
3	Near Field Communication Prototype	System	1	Near Field Communication Prototype	System	1	✓	✓	
	Non – Transit prototype	System	1	Non – Transit prototype	System	1	✓	✓	

Chapter 5 Testing of the Central Clearing House System

5.1 Requirements for Central Clearing House System Testing

The Central Clearing House system testing aims to ensure that the CCH system developed is able to operate accurately and completely in accordance with the OTP's requirements and the design. According to the Attachment 4; Testing for Completion of the Central Clearing House System Development Project and General Specification (GS), types of testing and requirements related to the testing to be performed for the system delivery are identified, which can be summarized as follows:

5.1.1 Types of Testing

For the Central Clearing House system testing, the system developer has to perform testing on the CCH system developed, to ensure that the system is able to operate accurately according to the OTP's requirements. The testing is divided into 7 parts as follows:

- 1) Type test
- 2) Software Verification and Validation Test
- 3) Factory Acceptance Test
- 4) System Interface Test
- 5) Onsite Test
- 6) System Integration Test
- 7) System Acceptance Test

5.1.2 Testing Requirements

According to the Attachment 4; Testing for Completion of the Central Clearing House System Development Project and General Specification (GS), definition and scope of each test are identified as follows:

1) Type test

- Type Test require for any equipment not previously proven in service, the Contractor shall undertake the thorough type tests of pre- production units to the satisfaction of Employer's Representative. The Contractor shall identify in its design submissions any equipment in this category, or equipment that differs significantly from that already in service elsewhere.

- Type tests shall be carried out on specific items to ensure that they perform their intended functions when subjected to all permutations and combinations of external conditions as defined in their design criteria. Type tests for specific items may be omitted where the Contractor is able to produce documentation from previous tests that meets the requirements of Employer

2) Software Verification and Validation Test

- During the software development and writing phase, the Contractor shall conduct a structured verification and validation test regime for all versions, modules and complete software packages before release for installation on-site into the final pre-commissioned operational system.
- The Contractor shall provide full details of the overall verification and validation testing method, a description of each test and details of release and version tested together with information regarding the pre-assembled source code and release notes regarding revisions and changes.
- For each software release version both internally and for installation on the Project, the Contractor shall provide appropriate documentation regarding the software version, release notes and test certification.
- The Contractor shall prepare a full software verification and validation test report for submission to and approval by the Employer 30 (thirty) days prior to commencement of system acceptance testing.

3) Factory Acceptance Test

- All materials, equipment, components, subassemblies, unit assemblies (including software, cables and wiring) shall be subject to factory acceptance tests unless otherwise agreed by Employer's Representative. Notification of these tests shall be submitted to Employer's Representative in advance of carrying out any test together with information on any previous testing which relates to the items being tested. Employer's Representative will then determine whether to attend such tests or which, if any, items may be accepted based on previous supply or experience.

- Factory acceptance tests shall include, but not be limited to:
 - ✓ physical inspection
 - ✓ dimension check
 - ✓ electrical check
 - ✓ calibration
 - ✓ output check
 - ✓ operational performance including full functional testing
 - ✓ capacity test
 - ✓ flash-over test
 - ✓ insulation test
 - ✓ stability test
- Where processor based test equipment is to be used, then tests shall also include verification of the software and version used.

4) System Interface Test

- The purpose of the system interface testing is to develop and prove the various interfaces both internally and with External Interfacing Parties. Interfaces may include, but not be limited to, electrical, protocol, software, physical and mechanical.
- The Contractor shall test such interfaces in an appropriate laboratory environment, system test model or on-site at External Interfacing Parties' premises.
- Certain interface tests will be required to be conducted at External Interfacing Parties' premises such as railway operators' premises on operational system. The Contractor shall fully coordinate with the external interfacing party to plan such activities and prepare full details in respect of risk avoidance to the operational systems and recovery plans in case of any issues arising during the testing.
- The Contractor shall prepare a test report for submission to the Employer regarding each system interface test, including full details of the test location, test procedure, interface, equipment and/or software tested, attending parties, test results and subsequent required actions.

5) Onsite Test

- The Contractor shall install and test all items of on-site equipment and systems in a progressive sequence and in accordance with the overall testing program.
- During and on completion of installation, the Contractor shall undertake onsite inspection, safety and electrical testing of all cables, wiring, equipment, instrumentation and protection devices prior to powering on of any equipment and systems.
- On completion of any required installation tests, the Contractor shall conduct commissioning and configuration tests for each item of equipment, followed by subsystems and combined systems culminating in complete standalone functional tests to verify the correct operation of all apparatus and, where appropriate, correct response to the respective control commands or monitored function.
- Following completion of these onsite tests to the satisfaction of Employer's Representative, the Contractor shall prepare the Contract Services for formal demonstration of compliance.

6) System Integration Test

- The Contractor, in conjunction with the External Interfacing Parties, shall submit to Employer's Representative for approval the requirements, procedures and schedules for the System Integration Test ("SIT") Plan. The conduct of the SIT Plan shall include a period of test running prior to the System Acceptance Test for the CCH and Prototypes. The SIT Plan is to clearly demonstrate that the completed work required to commence the Systems Acceptance Test for the CCH and Prototypes, meet the specified performance criteria, function in a coordinated and integrated manner with each other, the associated building services, E&M installations and infrastructure/equipment provided by the External Interfacing Parties, and operate without any adverse effects on the surrounding environment. They are also to ensure that the functions, operational characteristics of the systems and the control of the various systems have been satisfactorily integrated.
- The Contractor shall be required to act as the lead contractor in conducting SIT and as such shall be required to produce the overall SIT Plan in coordination with method statements for the tests incorporating the requirements of the External Interfacing Parties

participating in the SIT. The SIT Plan shall be submitted to Employer's Representative for acceptance at least 4 (four) months before the date scheduled for commencement of the SIT. In the event of a disagreement on the time to carry out SIT among the External Interfacing Parties participating in the SIT, the Contractor, as lead contractor, shall refer the matter to Employer's Representative for further direction and final determination.

- Employer may issue instructions to the Contractor for particular work or actions required of the External Interfacing Parties to be included in the SIT Plan. In addition, the Contractor shall make good all major defects and close all major punch list items that affect the operation, control and safety of the CCH System within the SIT test running period so as to permit the uninhibited commencement of the subsequent System Acceptance Test for CCH System and Prototypes.
- The Contractor shall submit the SIT Plan showing all the tests to be performed within allocated times. It is the responsibility of the Contractor to interface with the External Interfacing Parties in order to confirm sharing time slots as shown in the SIT Plan and programming of individual tests in such a manner as to minimize inconvenience to one another.
- SIT shall begin after individual tests of each sub-system have been completed successfully on all sub-systems and major defects found have been rectified and the corresponding items re-tested successfully to the satisfaction of Employer's Representative. The Contractor shall prepare and submit to Employer's Representative for approval the specific procedures the Contractor proposes to adopt for testing of the interfaces and compatibility among all systems/sub-systems. In particular, SIT shall include tests to demonstrate by simulation operation of the CCH System at maximum operating capacity and to demonstrate the operational performance the CCH System under selected degraded mode conditions.
- The SIT period shall include sufficient time to rectify and re-test any equipment indicated to be problem areas without diminishing the time allowed for system acceptance.
- The Contractor shall make all arrangements, including temporary provisions in the CCH System, to ensure safety during testing and minimum impact to External Interfacing Parties.

- Test running is to ensure that the functions and operations of the various systems are satisfactorily integrated. Employer's Representative may issue instructions to the Contractor for particular work or actions required during this period.
- It is recognized that certain parts of SIT will involve connection to External Interfacing Parties' operational systems. The Contractor shall fully coordinate with the External Interfacing Party to plan such activities and prepare full details in respect of risk avoidance to the operational systems and recovery plans in case of any issues arising during the testing.

7) System Acceptance Test

- Following successful completion of the SIT, to the satisfaction of the Employer's Representative and after all major defects and deficiencies found during conduct of the SIT have been rectified to the satisfaction of Employer's Representative, the Contractor shall perform the Systems Acceptance Test for CCH System and Prototypes.
- Systems Acceptance Test for the CCH System and Prototypes will involve a period of approximately 3 (three) months to demonstrate the CCH System and interface with Prototypes, can provide safe and reliable services under simulated commercial operation conditions.
- The Systems Acceptance Test for the CCH and Prototypes shall involve deployment of a limited quantity of Test NC media. During the Systems Acceptance Testing the test teams shall use the Test NC media for all their applicable transactions on these Prototypes. The Contractor shall provide test reports and collate all results. At the end of each Systems Acceptance Test period the Contractor shall be required to submit a report with their test results, demonstrating interoperability in respect of the Common Ticket System performance. These reports will be analyzed and considered by the Contractor and the Works Acceptance Committee accordingly.
- During these tests, the Contractor shall demonstrate that all procedures for normal and degraded operations and maintenance activities are being performed as planned and that the performance of the CCH System meets all requirements of the Contract (including the Specifications).

- The Contractor shall allow for attendance of the Works Acceptance Committee over the whole of the system acceptance period.
- At least 2 (two) months before the expected commencement of the Systems Acceptance Test for the CCH and Prototypes, the Contractor shall prepare and submit to the Employer's Representative for approval of the Test plan.
- Following the completion of Systems Acceptance Test for the CCH and Prototypes, the Employer shall issue a Certificate of Substantial Completion for the Project and maintenance of the CCH shall commence.

5.2 Summary of Central Clearing House and Common Ticketing System Testing

Testing in the Central Clearing House system development project can be divided as follows:

- 1) Type test
- 2) Software Verification and Validation Test
- 3) System Interface Test
- 4) System Integration Test
- 5) System Acceptance Test

The testing in the Central Clearing House system development project does not require Factory Acceptance Test, since the PMS consulting group considers and decides that compositions of devices/systems used in the CCH project are commonly sold, and they already have actual service history. The onsite test is included as a part of the system development, and the PMS consulting group has already inspected and found that the onsite test is complete and accurate according to the OTP's requirements.

5.2.1 Type test

Material list inspection is performed at the Office of Transport and Traffic Policy and Planning (OTP). The PMS consulting group attends the observation and provides some suggestions for problems occurred during the test.

The system devices used for the Type Test consists of three categories as follows:

- **Card Initialisation and Personalisation System**

All functions of the card initialization and personalization system will be tested, from card data management to card disposal, as well as inspection of SAM used, and review of report. The testing topics can be summarized as follows:

- System inspector is able to verify the SAM's keys.
- The users are able to select and update the reader device's configuration as well as Card Mapping.
- The system is able to verify Shift Management and Report Service.
- The system is able to perform Initialisation, Personalisation and Issuance for all types of tickets.
- Card Initialisation and Personalisation System is able to print tickets accurately and perform activation and disposal of tickets.

Chart 5-1 Sample of Card Initialisation and Personalisation System Testing

The figure displays four screenshots of the 'Card Initialisation and Personalisation System v.1.6' interface, demonstrating various system functions:

- Card Initialisation:** Shows a sidebar with 'Card Initialisation', 'Card Re-Initialisation', and 'Card Personalisation'. The main area has fields for 'Card Type' (Adult CTC), 'Quantity', 'Destination' (Card reader), and a 'Submit' button.
- Card Personalization (Level 2) (2/3):** A detailed form for personalizing a card. It includes fields for 'Surname', 'ID Type', 'Date of Birth', 'Gender', 'Address', 'Telephone', 'Email', 'Employee Sub-Type', 'Employee ID', and 'Employee SP ID'. It also has fields for 'Name', 'ID Number', 'Blood Group', 'Language', 'City Code', 'Mobile Phone', and 'Work Phone'. A photo upload section is visible on the right.
- Card Sale (2/3):** A form for card sale transactions. It includes fields for 'Type of Card' (Adult CTC), 'Card Deposit' (50 Baht), 'Issuance Fee' (30 Baht), 'Payment Means Type' (Cash), 'Credit/Debit Card Number', 'Add Purse Value' (100), and 'Total Value' (180 Baht). A 'Submit' button is at the bottom.
- Card Replacement (2/4):** A form for card replacement. It includes fields for 'Card Type ID' (Adult CTC), 'Personalized Level' (2), 'Purse Value' (100 Baht), 'Card Deposit' (50 Baht), and 'Existing Valid Products'. A large box on the right says 'Place the replacement card on contactless smartcard reader'. A 'Submit' button is at the bottom.

- Results of Card Initialisation and Personalisation System Testing

In the Card Initialisation and Personalisation System Testing, the PMS consulting group concluded that it passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some minor and routine defects which do not affect the system operation were found, but they must be solved for the optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

- Refund and Reload Machine

All refund and reload machine functions as well as SAM used are tested, including report verification. The testing topics can be summarized as follows:

- System inspector is able to verify the SAM's keys.
- The users are able to select and update the reader device's configuration as well as Card Mapping.
- The system is able to verify Shift Management and Report Service.

- The system is able to perform Personalisation, Issuance, Card Sale, Add Value, Activation, Disposal, Refund, Replacement and Analyst.

Chart 5-2 Sample of Refund and Reload Machine Testing

The figure displays three screenshots of the 'Reload and Refund Machine v.1.6' software interface. Each screenshot shows a sidebar menu on the left and a main content area on the right.

Top Screenshot: Card Sale (2/3)

Card Issuance	Type of Card	Adult CTC
Card Deposit	50 Baht	
Card Sale	Issuance Fee	30 Baht
Card Printing	Payment Means Type	Cash
	Credit/Debit Card Number	
	Add Purse Value	100
	Total Value	180 Baht

Submit

Bottom Left Screenshot: Card Add Value (2/3)

Card Add Value	Reload Amount	100
Void Card Add Value	Payment Means Type	Cash
Card Activation	Credit/Debit Card Number	

Submit

Bottom Right Screenshot: Card Refund (2/3)

Card Add Value	Card No	101888999999
Void Card Add Value	Card Type	Adult CTC
Card Activation	Balance	600 Baht
Card Disposal	Deposit	50 Baht
Auto Top Up Updates	Refund Fee	5 Baht
	Refund Amt.	645 Baht

OK Cancel

Results of Refund and Reload Machine Testing

According to Refund and Reload Machine Testing, the PMS consulting group concluded that the machines passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some minor and routine defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

- **Key Management System**

All functions of key management system are tested. The testing topics can be summarized as followed;

- The users are able to access the system.
- The system administrator is able to manage the system user data.
- The system provides functions to manage SAM various keys in the system.
- The system provide functions to manage Certification Authority Certificate.
- The system administrator is able to upload License files.

Chart 5-3 Sample of Key Management System Testing

The screenshot displays the SAM (Service Access Manager) web application interface. On the left is a dark sidebar menu with the 'otp' logo at the top. The menu items include 'SAM Master Key', 'SAM Profile', 'SAM' (highlighted), 'Personalization', 'Read SAM', 'List SAM', 'Reset SAM', 'SAM Update', 'CIPS SAM', 'SAM Marriage Key', and 'Logout'. The main content area has a header with the title 'SAM' and a navigation bar with links for 'Admin', 'CCH', 'SAM', 'Service Provider', 'Key Management', 'License Management', and 'admin user'. Below the header, the 'PERSONALIZATION SAM' section is visible, containing two dropdown menus labeled 'SAM Profile' and 'SAM Marriage Key', both set to '-- Select --'. A blue 'Personalize' button is located below these dropdowns.

Results of Key Management System Testing

According to the key management system testing, the PMS consulting group concluded that the system passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some routine defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

5.2.2 Software Verification and Validation Test

Software verification and validation test is conducted at the Office of Transport and Traffic Policy and Planning (OTP). The PMS consulting group participates to observe and gives some suggestions for problems occurred during the test.

The Central Clearing House software verification and validation test consists in total of 13 subsystems as follows:

- **Access Control Management Subsystem**

Under Access Control Management Subsystem testing, all functions of Access Control Management Subsystem are tested such as user account management, usage rights allocation, etc. The testing topics can be summarized as follows:

- Subsystem is able to create a user account and access it through an individual user account.
- It is able to allocate accessibility for the CCH functions including Financial Management Subsystem.
- It is able to screen data in order to access the user account and/or roles with different status, including modifying and deleting accounts and/or roles that are not in use.
- It is able to identify profiles for user accounts, and manage the profiles' data.
- It is able to record user's usage data every time.
- The system administrator is able to modify the password and password-related data.

Chart 5-4 Sample of Access Control Management Subsystem Testing

accessControl
Currently logged in as 'accadmin'

[Home](#)
[Users](#)
[Roles](#)
[Profiles](#)
[Permissions](#)
[Sessions](#)
[Password Validation](#)

Access Control > [Users](#)
Manage Users

[New User](#) ▶

☒ Enabled
 ☒ Expired
 ☒ Restricted
 ☒ Disabled
 ☒ Locked
 [Show](#)

Username	Name
abl	ABL Read-only
accadmin	Access Control Admin
✗ accdis	Test Disabled
⚠ accex	Test Expired
🔒 acclocked	Test Locked
🔒 accmf	Test Max Failed Login Attempts
accpcp	Test Password Change Period
accphc	Test Password History
⚠ accplp	Test Password Life Period
⚠ accpnp	Test Password Nag Period
accres	Test Update Restriction
accse	Test Session Expire
acctesti	Test Update User
actionlist	Test Actionlist User
admin	Administrator
boi_cardholder	boi edit cardholder
bts_sw	SP Website
cdaadmin	CDA Administrator
cdareadonly	CDA Readonly
cimadmin	CIM Admin
cipsadmin	CIPS Administrator
cipsoperator	CIPS Operator User
cipssupervisor	CIPS Supervisor
devadmin	Devman Admin
devreadonly	Devman Readonly
finadmin1	finadmin1

Results of Access Control Management Subsystem Testing

According to the Access Control Management Subsystem testing, the PMS consulting group concluded that the subsystem passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some minor defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

- **Action List Management Subsystem**

Under the Action List Management Subsystem testing, all functions of Action List Management Subsystem related to creating blacklist, and sending blacklist and whitelist to devices are tested. The testing topics can be summarized as follows:

- The system is able to control to allow only user accounts with action list management subsystem usage rights allocated to access the system.
- The system users are able to manage the cards and devices' blacklist, as well as the blacklist duration.
- The system is able to create whitelist when automatic top-up payment via website channels is made for cardholders.

Chart 5-5 Sample of Action List Management Subsystem Testing

backOffice

Currently logged in as 'actionlist'

Home

Blacklisting

Maintain

Configure

Distribute

Blacklists > Card Blacklist > Card Blacklist Search Results

Card Blacklist Search Results

Create Card Blacklist Entry

Activation	Issuer	Card Serial No	To	State	Action	Reason
Oct 2, 2016	CTC Central Clearing House	1016677448891		Current	Block	Bad Debt
Oct 3, 2016	CTC Central Clearing House	1016677448974		Current	Block	Bad Debt
Oct 3, 2016	CTC Central Clearing House	1014564445559		Current	Block	Bad Debt

Displaying results 1 - 3 of 3

Results of Action List Management Subsystem Testing

According to the Action List Management Subsystem testing, the PMS consulting group concluded that the system passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some routine defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

- Autoload Management Subsystem

Under the Autoload Management Subsystem testing, all functions of Autoload Management Subsystem are tested, e.g. importing files into the system, exporting files to devices, transferring files with banks, etc. The testing topics can be summarized as follows:

- The system is able to import cardholder's personal data sent by banks via Communication Management Subsystem, and accurately store it in Offline Server.
- The system is able to receive and send the Registration, Acknowledgement, Request Change, Unregistration, Request Blacklist files in order to communicate with banks through Communication Management Subsystem.
- The system is able to create the Personalise Exception files when any errors are found during transfer through Communication Management Subsystem.
- The system is able to create the Summary Autoload files and send them to banks.

Chart 5-6 Sample of Autoload Management Subsystem Testing

backOffice

Currently logged in as 'super1'

Accounts > Search > Card 1016677448917 > Application 1-1 > Product 1-1

Product Details

Issued By	CTC Central Clearing House
Product Serial Number	1
Product Type	Store Value Card (SVC)
Product Category	Purse
Account State	Issued

Configuration | Status | Value | **Autoload** | Txn History

State	Activated
Top Up Daily Limit	7
Top Up Amount	500.00
Auto Topup Agent	Krung Thai Bank
Registered Date	Oct 2, 2016
Activated Date	Oct 3, 2016
De-Registered Date	Jan 1, 1970

Results of Autoload Management Subsystem Testing

According to the Autoload Management Subsystem testing, the PMS consulting group concluded that it passed the test, since no defects, which are critical and major defects that affect the system operations, and minor and routine defects that do not affect the system operations, were found during the test.

- **Card Inventory Management Subsystem**

Under the Card Inventory Management Subsystem testing, all functions of Card Inventory Management Subsystem, e.g. importing cards to the system, distributing cards and managing card inventory, etc. the testing topics can be summarized as follows:

- The system is able to control to allow only user accounts receiving usage rights to access the Card Inventory Management Subsystem.
- The system is able to manage and monitor Stock Supplier, Graphic Type, Secure Inventory Level and Stock Purchase Order functions.
- The system is able to manage Card Manufacture's ID File in order to prevent repeating ID numbers of cards purchased.
- The system user is able to view and manage card inventory. Usage data will be recorded and stored so that the data can be used when necessary.
- The system is able to view data, manage and monitor cards, in case of loss.
- The users are able to check the card inventory. If the quantity is going to be depleted, the system will display users the warning.

Chart 5-7 Sample of Card Inventory Management Subsystem Testing

Upload Record ID	File Name	Upload Timestamp	State	Staff ID	Number of Card
33	MF_20161003_003100.sqlite	03/10/2016 00:31:01	Extract Completed		
32	MF_20161003_003100.sqlite	03/10/2016 00:31:00	Extracting		
31	/afc/data/import/cim/_20161002.csv	03/10/2016 00:28:07	Import Completed		
30	/afc/data/import/cim/_20161002.csv	03/10/2016 00:28:00	Importing		
29	/afc/data/import/cim/_20161002.csv	03/10/2016 00:25:20	Upload Completed	super1	94

Displaying results 1 - 5 of 5

Results of Card Inventory Management Subsystem Testing

According to the Card Inventory Management Subsystem testing, the PMS consulting group concluded that it passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some routine defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

- **Communication Management Subsystem**

Under the Communication Management Subsystem testing, all functions of Communication Management Subsystem are tested. The testing topics can be summarized as follows:

- The system's ability to import EI, MF and EL to desired directory, as well as its ability to manage files with incorrect name defined
- The system's ability to manage Parameter Data and Transaction Data files

Chart 5-8 Sample of Communication Management Subsystem Testing

```
* * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/convertSpEquipLists.pl 1>
>/afc/erglcadaptor/scripts/dbglogPipe.pl info convertSpEquipLists > /dev/null) 2>
>/afc/erglcadaptor/scripts/dbglogPipe.pl error convertSpEquipLists > /dev/null)' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/actionlist-import.sh' 1> /dev/null 2>&1 #ERGLcadaptor
20,50 * * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/ftp-users.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/ftp-importer.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/spooler.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/decomp.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/td-forwarding.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/adapt.sh' 1> /dev/null 2>&1 #ERGLcadaptor
13 * * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/pd-exporter.sh' 1> /dev/null 2>&1 #ERGLcadaptor
* * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/mf-exporter.sh' 1> /dev/null 2>&1 #ERGLcadaptor
1 3 * * * * * su - root -c '.profile; /afc/erglcadaptor/scripts/expire.sh' 1> /dev/null 2>&1 #ERGLcadaptor
```

Results of Communication Management Subsystem Testing

According to the Communication Management Subsystem testing, the PMS consulting group concluded that it passed the test, since no defects, which are critical and major defects that affect the system operations, and minor and routine defects that do not affect the system operations, were found during the test.

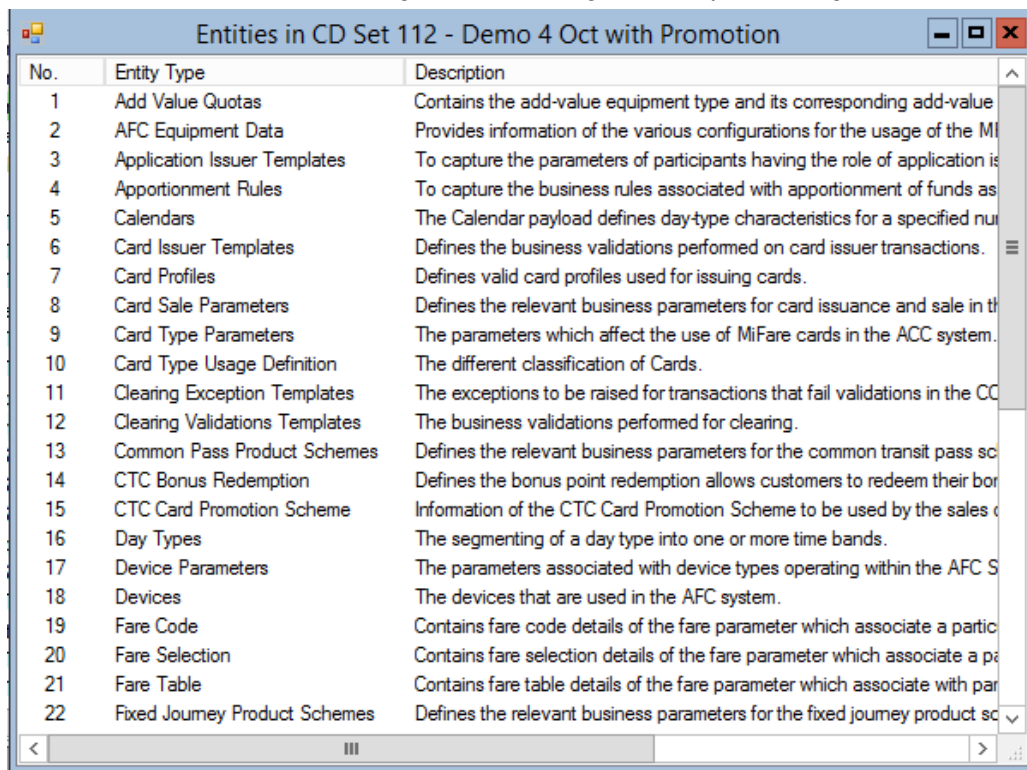
- **Configuration Data Management Subsystem**

Under the Configuration Data Management Subsystem testing, all functions of Configuration Data Management Subsystem such as determination of card type,

usage conditions and each card type's fare, etc. The testing topics can be summarized as follows:

- The system authorizes users to have different accessibility depending on individual account's usage rights as specified in the Access Management Subsystem.
- The system has User Interface that is able to deal with the OTP and CCH-related entities.
- Configuration settings specified in the system are accurate compared to the related entities in CD Application.

Chart 5-9 Sample of Configuration Data Management Subsystem Testing



No.	Entity Type	Description
1	Add Value Quotas	Contains the add-value equipment type and its corresponding add-value
2	AFC Equipment Data	Provides information of the various configurations for the usage of the Mi
3	Application Issuer Templates	To capture the parameters of participants having the role of application is
4	Apportionment Rules	To capture the business rules associated with apportionment of funds as
5	Calendars	The Calendar payload defines day-type characteristics for a specified nu
6	Card Issuer Templates	Defines the business validations performed on card issuer transactions.
7	Card Profiles	Defines valid card profiles used for issuing cards.
8	Card Sale Parameters	Defines the relevant business parameters for card issuance and sale in th
9	Card Type Parameters	The parameters which affect the use of MiFare cards in the ACC system.
10	Card Type Usage Definition	The different classification of Cards.
11	Clearing Exception Templates	The exceptions to be raised for transactions that fail validations in the CC
12	Clearing Validations Templates	The business validations performed for clearing.
13	Common Pass Product Schemes	Defines the relevant business parameters for the common transit pass sc
14	CTC Bonus Redemption	Defines the bonus point redemption allows customers to redeem their bor
15	CTC Card Promotion Scheme	Information of the CTC Card Promotion Scheme to be used by the sales c
16	Day Types	The segmenting of a day type into one or more time bands.
17	Device Parameters	The parameters associated with device types operating within the AFC S
18	Devices	The devices that are used in the AFC system.
19	Fare Code	Contains fare code details of the fare parameter which associate a partic
20	Fare Selection	Contains fare selection details of the fare parameter which associate a pe
21	Fare Table	Contains fare table details of the fare parameter which associate with par
22	Fixed Journey Product Schemes	Defines the relevant business parameters for the fixed journey product sc

Results of Configuration Data Management Subsystem Testing

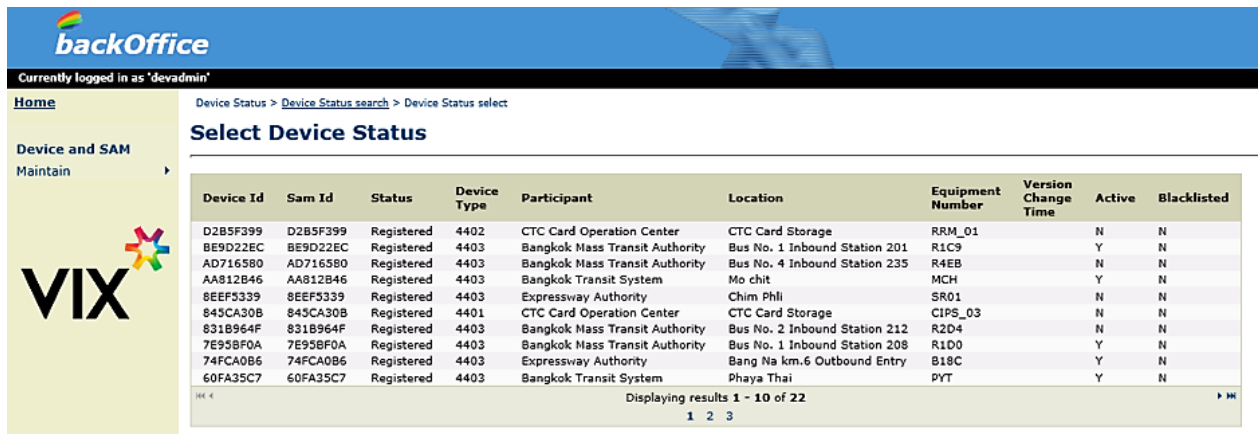
According to the Configuration Data Management Subsystem testing, the PMS consulting group concluded that it passed the test, since no defects, which are critical and major defects that affect the system operations, and minor and routine defects that do not affect the system operations, were found during the test.

- **Device Management Subsystem**

Under the Device Management Subsystem testing, all functions of Device Management Subsystem are tested such as new device registration, device status management, etc. The testing topics can be summarized as follows:

- The system is able to control and provide different accessibility to the users depending on individual account's usage rights as specified in the Access Management Subsystem.
- The system is able to manage data of devices under the CCH system.
- The users are able to access via GUI in order to add various devices' data into the CCH system.
- The system is able to store data of devices that contain more than 1 SAM.
- The system users are able to add multiple devices' data at a time by sending the data through CSV files.
- The users are able to manage status of devices in the CCH system.

Chart 5-10 Sample of Device Management Subsystem Testing



Device Id	Sam Id	Status	Device Type	Participant	Location	Equipment Number	Version Change Time	Active	Blacklisted
D2B5F399	D2B5F399	Registered	4402	CTC Card Operation Center	CTC Card Storage	RRM_01		N	N
BE9D22EC	BE9D22EC	Registered	4403	Bangkok Mass Transit Authority	Bus No. 1 Inbound Station 201	R1C9		Y	N
AD716580	AD716580	Registered	4403	Bangkok Mass Transit Authority	Bus No. 4 Inbound Station 235	R4EB		N	N
AA812B46	AA812B46	Registered	4403	Bangkok Transit System	Mo chit	MCH		Y	N
8EEF5339	8EEF5339	Registered	4403	Expressway Authority	Chim Phli	SR01		N	N
845CA30B	845CA30B	Registered	4401	CTC Card Operation Center	CTC Card Storage	CIPS_03		N	N
831B964F	831B964F	Registered	4403	Bangkok Mass Transit Authority	Bus No. 2 Inbound Station 212	R2D4		N	N
7E95BFOA	7E95BFOA	Registered	4403	Bangkok Mass Transit Authority	Bus No. 1 Inbound Station 208	R1D0		Y	N
74FCA0B6	74FCA0B6	Registered	4403	Expressway Authority	Bang Na km.6 Outbound Entry	B18C		Y	N
60FA35C7	60FA35C7	Registered	4403	Bangkok Transit System	Phaya Thai	PYT		Y	N

Displaying results 1 - 10 of 22

Results of Device Management Subsystem Testing

According to the Device Management Subsystem testing, the PMS consulting group concluded that the system passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some minor defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

- **Financial Management Subsystem**

Under the Financial Management Subsystem testing, all functions of Financial Management Subsystem are tested, e.g. adjustment of agreement set, service provider account and adjustment, etc. The testing topics can be summarized as follows:

- The system's ability to allocate different accessibility to the users depending on individual user account's rights as specified in the Access Management Subsystem.
- The system's ability to authorize service providers to view related financial data only of their own
- The system's ability to determine that the users are able to change their passwords on web application
- The system has agreement set management function for various applications.
- The system users are able to access the financial management subsystem via web application in order to manage settlement and fee agreement.
- The users who receive Financial Authority Level 1 rights are able to make Manual Adjustment.
- The system is able to use Add, Enquiry and Account Entries functions.
- The system users are able to manage Financial Apportionment Function.
- The system has functions for inspection of transaction, source location, product types, business date, reconciliation, participant ID and invalid destination location in the system.

Chart 5-11 Sample of Financial Management Subsystem Testing

Financial Management

Menu

- Home
- Financial Management
 - Participant Claims
 - Participant Claims Fund Balances
 - Claims
 - Accounts
 - Account Details
 - Manual Adjustment
 - Daily Totals**
 - Settlement Authorisation
 - Agreement
 - Settlement
 - Fee
 - Funds Transfers
 - Dishonours
 - Agreement Sets
 - Settings

Daily Totals

Parameters

Account Id: Settlement Date: Participant Name: Account Type:

Settlement Date	Participant	Account Id	Account Type	Status	Daily Total	Number of Authorisat
13/07/2016	CTC	E00CTCTHB01	Exception	Pending	THB500.00	0
12/07/2016	CTC	E00CTCTHB01	Exception	Approved	THB375.00	2
10/07/2016	CTC	E00CTCTHB01	Exception	Approved	THB450.00	2
06/07/2016	CTC	E00CTCTHB01	Exception	Approved	THB450.00	2
05/07/2016	CTC	E00CTCTHB01	Exception	Approved	THB450.00	2
13/07/2016	CTC	S00CTCTHB00	Settlement	Pending	THB50.00	0

Results of Financial Management Subsystem Testing

According to the Financial Management Subsystem testing, the PMS consulting group concluded that it passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some minor and routine defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

- **Host Security Management Subsystem**

Under the Host Security Management Subsystem testing, all functions of Host Security Management Subsystem are tested. The testing topics can be summarized as follows:

- HSM devices are able to manage TD files received from the API.
- HSM devices are able to verify the MAC.

Chart 5-12 Sample of Host Security Management Subsystem Testing

```
OnLine>QI

Echo: OFF
Current number of key group: 8
Current number of key versions each group: 15
Current number of key indices each version: 16
Host command version: Expanded Hex
Enable IC key inter group access: No
Enable X9.17 import IC key: No
Enable X9.17 export IC key: No
Card/Password Authorization: Smart Card
Current number of authorization officer: 2
IC HOST COMMAND AUTHORIZATION ENABLED.
Local Master Key Check = 93A1 96A2 FC6C 82B6

Old LMK loaded: No
```

Results of Host Security Management Subsystem Testing

According to the Host Security Management Subsystem testing, the PMS consulting group concluded that it passed the test, since no defects, which are critical and major defects that affect the system operations, and minor and routine defects that do not affect the system operations, were found during the test.

- **Issuer Management Subsystem**

Under the Issuer Management Subsystem testing, all functions of Issuer Management Subsystem are tested, e.g. card account creation, card data access, closing card accounts when the cards are expired, etc. The testing results can be summarized as follows:

- Ticket issuers are able to create the card accounts.
- The system is able to allocate various statuses for Initialisation and Personalisation.
- The system always save old data when cards are replaced with new ones.
- Card accounts will be closed when the cards are expired.
- Card's balance will be by the system in case of data loss.
- The system is able to give refund.
- The system is able to correctly accept transaction after the process is completed at the end of transaction date (End of Day Process: EOD).
- The system is able to verify an issue execution and Use on Exit of the FJP.
- The system is able to verify products and applications specified in the cards.

Chart 5-13 Sample of Issuer Management Subsystem Testing

10.20.8.22 - PuTTY

```
iss>enq view 2,1,0,101667744893,6,1
Key:2,1,0,101667744893,6
```

Card	
Current_state	Issued (3)
Action_sequence_number	0_as_at_02_Oct_2016_18:54:53_ICT
Action_sequence_number	0_as_at_02_Oct_2016_19:15:12_ICT
Activation_status	1,_not_locked
Blocked?	No
Blocked_details_version	Null
Blocked_reason	0
Card_sequence_number	3
Card_has_id?	Yes
Refunding_Card_holder_issuer_id	0
Refunding_Card_holder_serial_No	0
Refunding_Card_holder_version	0
Card_issuer_id	1
Card_lifecycle_count	0
Card_serial_number	101667744893
Card_type	6
Closed_off_date	Null
Currency	764
Currency_update_time	02_Oct_2016_19:15:12_ICT
Deferred_refund_first_activity_time	Null
Deferred_refund_intended_method	0
Deferred_refund_last_activity_time	Null
Deferred_refund_level	0
Deferred_refund_processed_date	Null
Deferred_refund_settlement_time	Null
Deposit_balance	0
Deposit_refund_liability_write_offs	0
Deposit_transfer_in	0
Deposit_transfer_out	0
Distribution_Fee	0
Expiry_date	01_Oct_2021
Initialised_time	02_Oct_2016_18:54:53_ICT
Issued_time	02_Oct_2016_19:15:12_ICT

Results of Issuer Management Subsystem Testing

According to the Issuer Management Subsystem testing, the PMS consulting group concluded that it passed the test, since no defects, which are critical and major defects that affect the system operations, and minor and routine defects that do not affect the system operations, were found during the test.

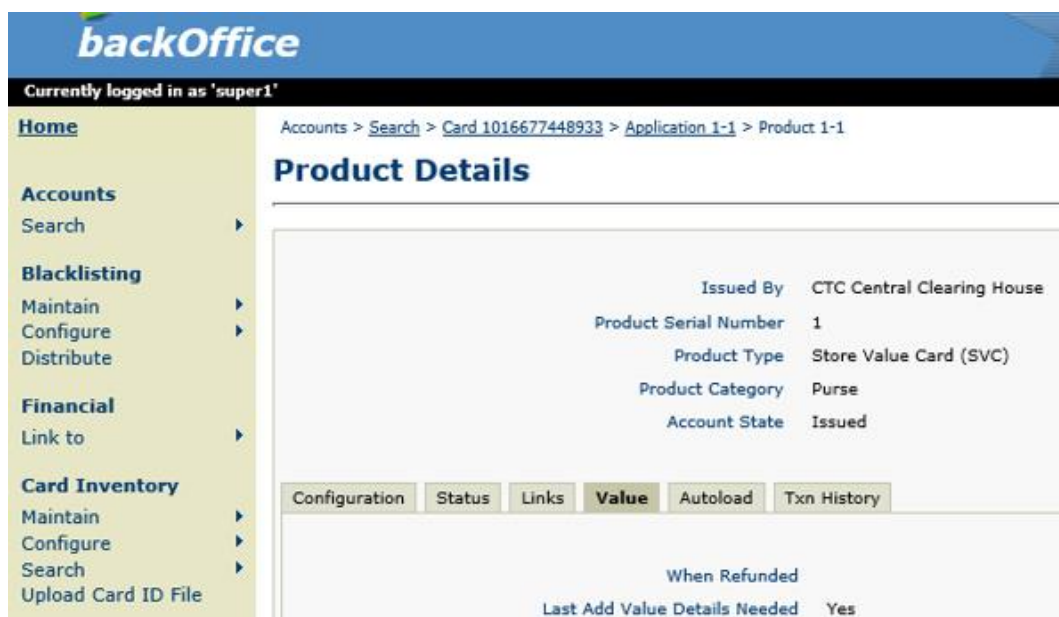
- **Online Enquiry Management Subsystem**

Online Enquiry Management Subsystem is used for accessing various data related to the cards and cardholders such as cardholder data, specific card data, application and related products, etc. The testing topics (Test Cases) can be summarized as follows which cover all functions of the subsystems:

- The system users are able to access the system through issuer management subsystem's website.

- The system users are able to search for card and application data through identifying either Card Life Cycle or none.
- The system users are able to search for the product data through identifying either Card Life Cycle and Product Serial Number or none.
- The users are able to access and edit cardholder data.

Chart5-14 Sample of Online Enquiry Management Subsystem Testing



Results of Online Enquiry Management Subsystem Testing

According to the Online Enquiry Management Subsystem testing, the PMS consulting group concluded that the system passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some minor and routine defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

• Report Management Subsystem

Under the Report Management Subsystem testing, all functions of Report Management Subsystem are tested. The testing topics can be summarized as follows:

- The system authorizes only users who have access to the Report Management Subsystem.
- The users are able to manage the report scheduling.
- The system is able to correctly issue the reports according to data entry.

Chart 5-15 Sample of Report Management Subsystem Testing



Common Ticket Company
35 Rama VI Thung Phaya Thai, Ratchathewi,
Bangkok 10400

S009 Card Sales Summary Report
All Participants

Business Date : 22/06/2016 to 30/09/2016

Business Date	Participant	Location	Card Type	Card Count	Deposit Value	Card Issue Fee
14/09/2016	201 CTC Card Operation Center	301-CTC Card Storage Station	Mangmoom Adult v1	6	300.00	180.00
			Mangmoom Low Income v1	5	-	-
			Mangmoom Student v1	5	250.00	150.00
Location Total				16	550.00	330.00
Participant Total				16	550.00	330.00
Date Total				16	550.00	330.00
Grand Total				16	550.00	330.00

Results of Report Management Subsystem Testing

According to the Report Management Subsystem testing, the PMS consulting group concluded that it passed the test, since no defects, which are critical and major defects that affect the system operations, and minor and routine defects that do not affect the system operations, were found during the test.

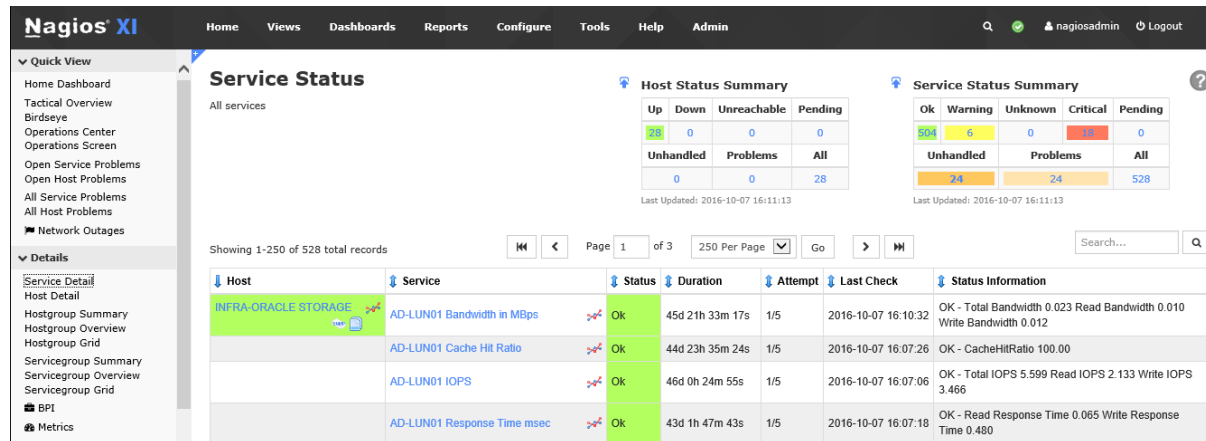
- **System Management Subsystem**

Under the System Management Subsystem testing, all functions of System Management Subsystem are tested. The testing topics can be summarized as follows:

- The system is able to check the server's errors when problems are found.
- The system is able to alert when disk's capacity is running short.
- The system is able to perform time synchronization to be consistent with the host computer that controls the time.
- The system is able to perform server data backup.

- The system is able to retrieve lost data.
- The system will monitor software installed, and alert when a user is trying to improperly modify the software.

Chart 5-16 Sample of System Management Subsystem Testing



Results of System Management Subsystem Testing

According to the System Management Subsystem testing, the PMS consulting group concluded that it passed the test, since no defects, which are critical and major defects that affect the system operations, and minor and routine defects that do not affect the system operations, were found during the test.

5.2.3 System Interface Test

The System Interface Test was performed at the Office of Transport and Traffic Policy and Planning (OTP). The PMS consulting group observed the test and gave some suggestions for problems occurred during the test.

The Central Clearing House system interface consists of 2 subsystems as follows:

- **Cardholder Website Subsystem**

Under the Cardholder Website Subsystem testing, all functions of Cardholder Website Subsystem such as user account creation and access, etc. are tested. The testing topics can be summarized as follows:

- The system provides functions that allow cardholders to create user accounts.
- The system allows only cardholders who have user accounts in the system to use the system.

- Cardholders are able to view their own information such as products, remaining balance, usage history, etc.
- Cardholders are able to edit their information through cardholder website by themselves.

Chart 5-17 Sample of Cardholder Website Subsystem Testing

MY MANGMOOM CARD

WELCOME

PRODUCT VIEW

CARD DETAILS

TOP-UP

HISTORY

MY DETAILS

CONTACT US

LOGOUT

Welcome to Mangmoom Account Detail

My Details

Name : AdultOnlineReload Card

Email: teerapongb@bkkps.co.th

Address: Address Online Reload

[Update details](#)

My Recent Activity

The final balance shown in recent activity may differ from the actual balance of your card due to pending transactions. Please view the balance page to see the most up to date card balance.

Card Number	Date / Time	Location	Transaction Type	Amount	Product Balance
101667744892	03/10/2016 03:51 PM	Cardholder website	Link Card		-
101667744892	03/10/2016 08:10 AM	Nana Station	Purse Use On Exit, Nana Station, 0 sections, Store Value Card (SVC)	31.00	-
101667744892	03/10/2016 08:00 AM	Phaya Thai Station	Purse Use On Entry, Phaya Thai Station, Store Value Card (SVC)		-

Results of Cardholder Website Subsystem Testing

According to the Cardholder Website Subsystem Testing, the PMS consulting group concluded that the system passed the test, since critical and major defects which affect the system operation were not found during the test.

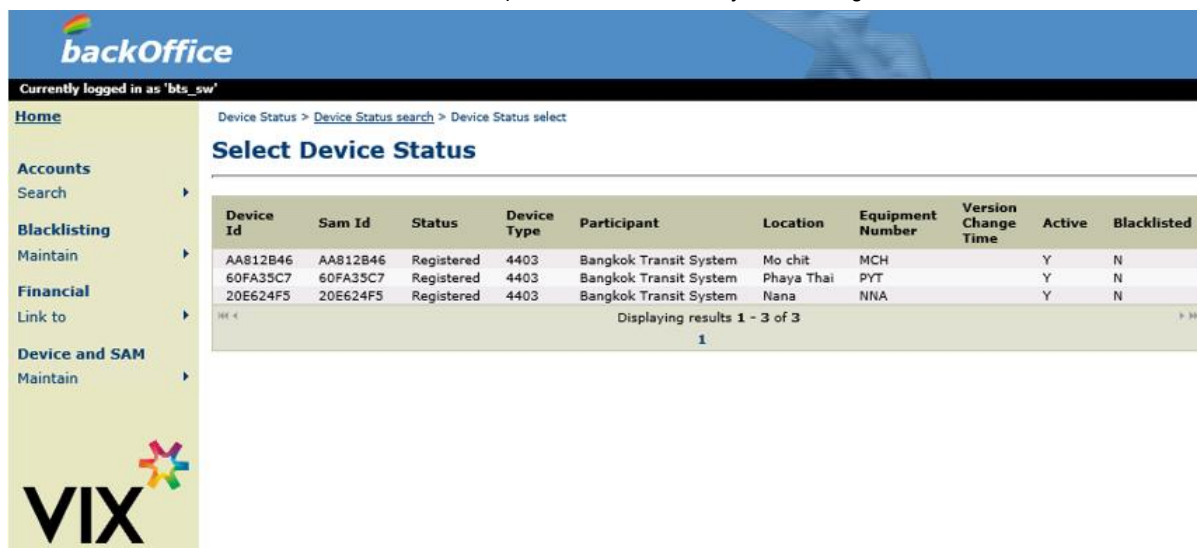
However, during the test some minor and routine defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

- **SP Website Subsystem**

Under the SP Website Subsystem testing, all functions of SP Website Subsystem are tested. The testing topics can be summarized as follows:

- The service providers' user accounts can be accessed on the service provider website in order to view the account's information and export the CSV files.
- The service providers are able to access only their own information and data.

Chart 5-18 Sample of SP Website Subsystem Testing



backOffice

Currently logged in as 'bts_sw'

Home

Accounts

Search

Blacklisting

Maintain

Financial

Link to

Device and SAM

Maintain

VIX

Device Status > Device Status search > Device Status select

Select Device Status

Device Id	Sam Id	Status	Device Type	Participant	Location	Equipment Number	Version Change Time	Active	Blacklisted
AA812B46	AA812B46	Registered	4403	Bangkok Transit System	Mo chit	MCH		Y	N
60FA35C7	60FA35C7	Registered	4403	Bangkok Transit System	Phaya Thai	PYT		Y	N
20E624F5	20E624F5	Registered	4403	Bangkok Transit System	Nana	NNA		Y	N

Displaying results 1 - 3 of 3

1

Results of SP Website Subsystem Testing

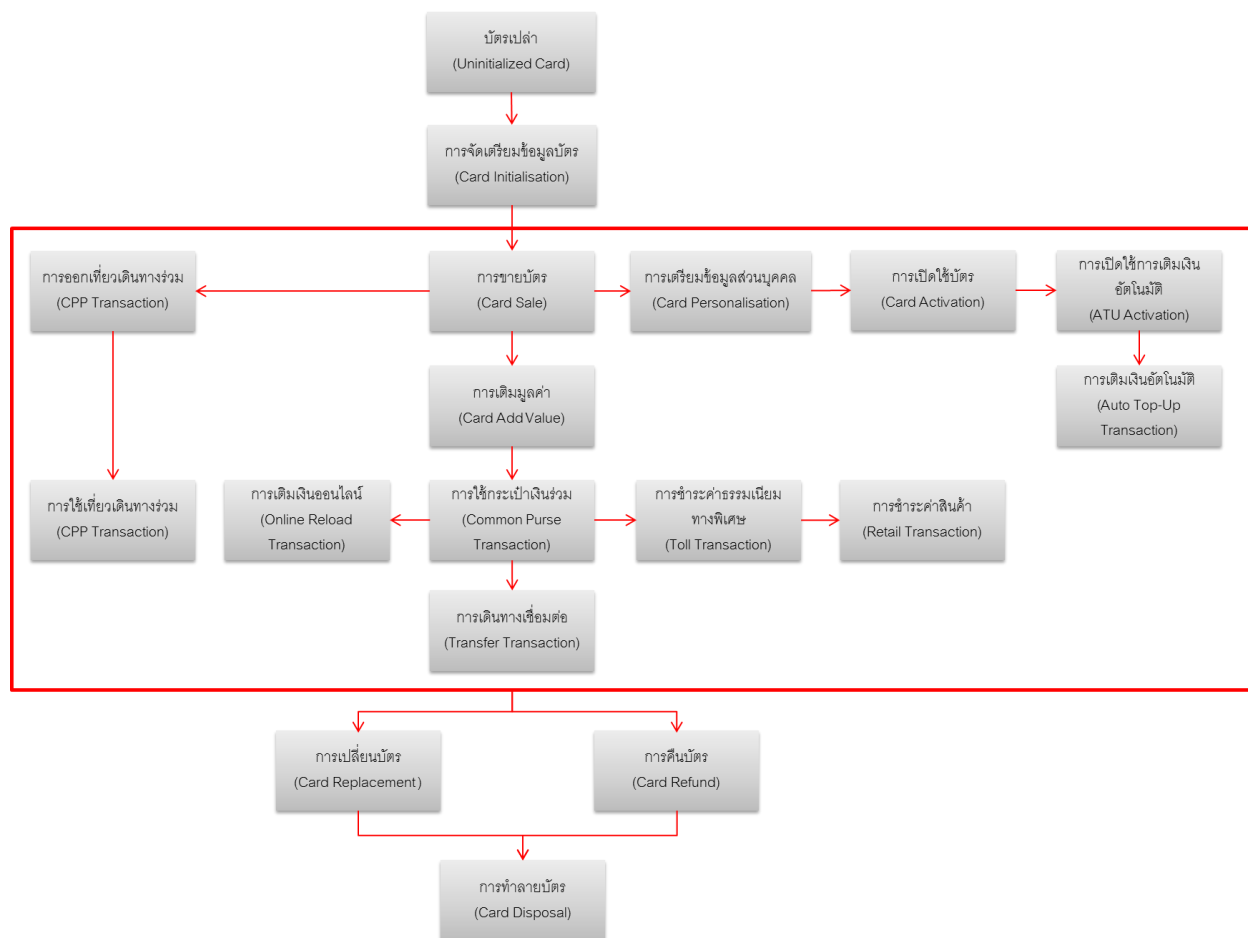
According to the SP Website Subsystem Testing, the PMS consulting group concluded that the system passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some minor and routine defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

5.2.4 System Integration Test

This test aims to inspect the integration of subsystems and to ensure that the cards can be accurately used and that the cards support Mangmoom Card according to the requirements. Under the System Integration test for the Central Clearing House Project, card usage from the start (Card Initialization) to the end of card life cycle (Card Disposal) are tested. Use of cards for fare, fee, product and service payment will be tested with the Prototype.

Chart 5-19 Overview of Card Life Cycle



After a transactions is completed, the device will send all transactions to process at the Central Clearing House. The testing topics can be summarized as follows:

- Testing on parameters prepared for the testing from the CCH system to the Card Initialization and Personalization System, Refund and Reload Machine and prototype.
- Testing on devices' SAM preparation such as the Card Initialization and Personalization System's SAM, Rail Prototype's SAM, etc.
- Testing on card preparation such as card data management, card issue, card distribution, pass top-up, etc.
- Testing on card usage with the prototype, including testing on card usage for interchange trips, testing on cards and devices under blacklist, automatic top-up and online top-up.
- Testing on change of cards, money return and card disposal

Results of System Integration Test

According to the System Integration Test, the PMS consulting group concluded that the system passed the test, since critical and major defects which affect the system operation were not found during the test.

However, during the test some minor and routine defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends)

5.2.5 System Acceptance Test

The System Acceptance Test aims to ensure that the Central Clearing House and common ticketing systems are able to operate effectively and in accordance with the requirements. This includes inspection on security and stability of the system operation. The test is divided into 2 parts as follows:

- Card Usage Testing on Devices and Prototype

In the card usage testing on devices and prototype, card usage related transactions are created such as card purchase, value top-up, card usage for fare/fee/product/service payment, replacement and return of cards.

- Virtual Card Trial Run

In the virtual card test, transactions will be sent to the Central Clearing House for data processing through a simulation program for 4 consecutive weeks. The quantity of transactions used in the test is divided into 5 million transactions per day during normal operations, and 10 million transactions per day which is the highest daily quantity supported by the system. The transaction quantity's details are as follows:

Table 5-1 Transaction Quantity used for Virtual Card Usage Test

No.	Service Provider	Transaction Quantity per Day per Card Type (Transaction)	Card Type (Type)	Total Transaction Quantity per Day
Transaction quantity per day during normal operations				
1	Public bus service providers	90,000	14	1,260,000
2	BTS (Green Line)	90,000	14	1,260,000
3	BEM (Purple Line)	97,500	14	1,365,000
4	Expressway service providers	60,000	14	840,000
5	Shops	30,000	14	420,000
Total (Transaction quantity per day during normal operations)				5,145,000
The highest transaction quantity supported by the system				
1	Public bus service providers	180,000	14	2,520,000
2	BTS (Green Line)	180,000	14	2,520,000
3	BEM (Purple Line)	195,000	14	2,730,000
4	Expressway service providers	60,000	14	840,000
5	Shops	120,000	14	1,680,000
Total (The highest quantity supported by the system)				10,290,000

Results of System Acceptance Test

According to the System Acceptance Test, the PMS consulting group concluded that it passed the test, since critical and major defects which affect the system operation were not found during the test. Moreover, according to the virtual card usage test, the system is able to process the data and finish it within 3 hours as specified in the requirements.

However, during the test some minor defects which do not affect the system operation were found, but they must be solved for the system's optimal efficiency. The PMS consulting group informed the system developer that the defects must be completely solved before the last delivery of work (the contract term ends).

5.3 Compliance Test

According to the Central Clearing House system test as summarized in 5.2, the PMS consulting group reviewed the documents and verified the system to ensure that it complies with the contract's requirements, and it is suitable for the usage. The consulting group compared the testing details with the Technical Requirement Documents: Particular Specification and Business Rules as specified in Attachment 6, the General Specification (GS). Design detail comparison is also performed through creating the test's Traceability Matrix, as shown in **Table 5-2** and **Table 5-3**.

Table 5-2 Test Traceability Matrix (Volume 3 Part 3: Particular Specification:PS)

Technical Specification		Design			Testing				Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
1	INTRODUCTION								
1.1	Introduction	Info							
1.2	Definitions								
2	SYSTEM FUNCTIONAL OVERVIEW								
2.1	Overview	Info							
2.2	The Disaggregation of Functions	BSVB.00010 Rev.2.0 BSVV.00001 Rev.2.0	Clause 2 Clause 2	Technical Architecture Overview System Design	Noted				✓
2.3	Smart Cards	BSVB.00001 Rev.3.0 BSVS.00009 Rev.2.0 BSVB.00116 Rev.2.0	Clause 4 Clause 3 Clause 5 Clause 5.2	Card File Description Card Initialization Service Card Personalization Service Data Design	BSVB.00075 Rev.2.0 BSVS.00022 Rev.2.0 BSVS.00071 Rev.2.0 BSVS.00076 Rev.1.	Clause 4 Clause 4 Clause 4 Clause 4	Test Case Test Case Test Case Test Case		✓
2.4	Front-End Systems	BSVV.00002 Rev.3.0	Clause 2	System Design	To be tested when the system integrated with SPs' Front End System (Milestone#4)				
2.5	The CCH System								
2.5.1	Overview								

Technical Specification		Design			Testing				Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
2.5.1 (A)	Clearing/Settlement system	BSVV.00009 Rev.2.0	5.1	Transaction validation	BSVB.00077 Rev.1.0	Clause 4	Financial Management Subsystem FAT Procedure	Test Case	✓
		BSVV.00010 Rev.2.0		Module Design	BSVB.00079 Rev.1.0	Clause 4	Issuer Management Subsystem FAT Procedure	Test Case	
					BSVS.00071 Rev.2.0	Clause 4	SIT Test Procedure	Test Case	
					BSVS.00073 Rev.1.0	Clause 4	SAT Test Procedure	Test Case	
2.5.1 (B)	Card system	BSVV.00010 Rev.2.0	5.1.13	Card State TP Sub-Module Design	BSVB.00079 Rev.1.0	Clause 4	Issuer Management Subsystem FAT Procedure	Test Case	✓
2.5.1 (C)	Infrastructure Operating Management System	BSVB.00043 Rev.2.0	5.1	Design Module	BSVB.00074 Rev.1.0	Clause 4	Communication Management Subsystem FAT Procedure	Test Case	✓
2.5.1 (D)	Back End System	BSVB.00043 Rev.2.0	2.2	Data Decomposition	BSVB.00074 Rev.1.0	Clause 4	Communication Management Subsystem FAT Procedure	Test Case	✓
2.5.1 (E)	System of Common Ticketing	BSVB.00043 Rev.2.0	2.2	Data Decomposition	BSVB.00074 Rev.1.0	Clause 4	Communication Management Subsystem FAT Procedure	Test Case	✓
2.5.2	OCH main Functionalities								
2.5.2 (A)	System and Functional description								
a)	Clearing/Settlement system	BSVV.00009 Rev.2.0	5.1	Design Module	BSVB.00077 Rev.1.0	Clause 4	Financial Management Subsystem FAT Procedure	Test Case	✓
					BSVB.00081 Rev.1.0	Clause 4	Report Management Subsystem FAT Procedure	Test Case	
b)	Card system	BSVV.00010 Rev.2.0	5.1	Design Module	BSVB.00079 Rev.1.0	Clause 4	Issuer Management Subsystem FAT Procedure	Test Case ReTest Case	✓
		BSVB.00042 Rev.1.0	5.1	Design Module	BSVB.00073 Rev.1.0	Clause 4	Card Inventory Management Subsystem FAT Procedure	Test Case ReTest Case	

Technical Specification		Design			Testing				Compliance	
No.	Description	Design Document		Clause	Description	Testing Document			Description	
c)	Infrastructure Operating Management System(OMS)	BSVB.00043 Rev.2.0	Configuration Management Subsystem Design Specification	5.1	Design Module	BSVB.00075 Rev.2.0	Configuration Management Subsystem FAT Procedure	Clause 4	Test Case ReTest Case	✓
		BSVB.00044 Rev.2.0	Device Management Subsystem Design Specification	4.1.1.1	Device Registry Maintenance Module Design	BSVB.00076 Rev.1.0	Device Management Subsystem FAT Procedure	Clause 4	Test Case ReTest Case	
		BSVB.00047 Rev.2.0	System Management Subsystem Design Specification	5	Network Management Service	BSVB.00082 Rev.1.0	System Management Subsystem FAT Procedure	Clause 4	Test Case	
		BSVB.00040 Rev.2.0	Action List Management Subsystem Design Specification	5.1	Design Module	BSVB.00071 Rev.1.0	Action List Management Subsystem FAT Procedure	Clause 4	Test Case ReTest Case	
		BSVB.00041 Rev.2.0	Autoload Management Subsystem Design Specification	5.1	Design Module	BSVB.00072 Rev.1.0	Autoload Management Subsystem FAT Procedure	Clause 4	Test Case ReTest Case	
d)	Interface system	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	2.2	Data Decomposition	BSVB.00074 Rev.1.0	Communication Management Subsystem FAT Procedure	Clause 4	Test Case	✓
		BSVB.00039 Rev.2.0	Access Control Subsystem Design Specification	5.1	Design Module	BSVB.00119 Rev.1.0	Access Control Subsystem FAT Procedure	Clause 4	Test Case	
		BSVV.00011 Rev.2.0	Cardholder Website Subsystem Design Specification	5.1	Design Module	BSVB.00120 Rev.1.0	Cardholder Website Subsystem FAT Procedure	Clause 4	Test Case	
		BSVB.00115 Rev.2.0	SP Website Subsystem Design Specification	5.1	Design Module	BSVB.00121 Rev.1.0	SP Website Subsystem FAT Procedure	Clause 4	Test Case	
		BSVV.00016 Rev.1.0	Online Enquiry Management Subsystem Design Specification	5.1	Design Module	BSVB.00080 Rev.1.0	Online Enquiry Management Subsystem FAT Procedure	Clause 4	Test Case	
2.5.3	Scheme Authority (CTO) Interface	BSVB.00046 Rev.2.0	Report Management Software Design Specification	2.1.3 2.1.4	Report Schedule Report Distribution	BSVB.00081 Rev.1.0	Report Management Subsystem FAT Procedure	Clause 4	Test Case	✓

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document	Clause	Description		Testing Document	Clause	Description		
2.5.4	Regulatory Environment	BSVV.00009 Rev.2.0 Financial Management Subsystem Design Specification	5	Design	BSVB.00077 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4	Test Case	✓	
		BSVB.00046 Rev.2.0 Report Management Software Design Specification	6.1.1.10 6.1.1.13	F013 E-money Service Report 1.1 F017 E-money Service Report 1.2	BSVB.00081 Rev.1.0	Report Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-RS-02-010 - Test ID: OTP-RS-02-010	Test Case - F013 E-money Service Report 1.1 - F017 E-money Service Report 1.2		
2.5.5	CCH List of Primary Functions The Common Ticketing System	BSVB.00040 Rev.2.0 Action List Management Subsystem Design Specification	5.1.3 5.2.8	Action List Administration Service Blacklist Information	BSVB.00071 Rev.1.0	Action List Management Subsystem FAT Procedure	Clause 4	Test Case	✓	
		BSVB.00043 Rev.2.0 Communication Subsystem Design Specification	5.1	Module Design	BSVB.00074 Rev.1.0	Communication Management Subsystem FAT Procedure	Clause 4	Test Case		
		BSVB.00044 Rev.2.0 Device Management Subsystem Design Specification	4.1.1.1	Device Registry Maintenance Module Design	BSVB.00076 Rev.1.0	Device Management Subsystem FAT Procedure	Clause 4	Test Case		
		BSVV.00009 Rev.2.0 Financial Management Subsystem Design Specification	3.1 5.1	Financial Management Subsystem Dependencies Module Design	BSVB.00077 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4	Test Case		
		BSVV.00010 Rev.2.0 Issuer Subsystem Design Specification	2.1.14.1.3 5.1 5.2.1	Issuer Subsystem Decomposition Module Design Card Account Design	BSVB.00079 Rev.1.0	Issuer Management Subsystem FAT Procedure	Clause 4	Test Case		
		BSVV.00011 Rev.2.0 Cardholder Website Software Design Specification	2.1.2	Active Directory Account Management Decomposition	BSVB.00120 Rev.1.0	Cardholder Website Subsystem FAT Procedure	Clause 4	Test Case		
2.6	Technical Requirements	BSVB.00010 Rev.2.0 Technical and Network Architecture	2.1	System Capacity	BSVS.00071 Rev.2.0	SIT Procedure	Clause 4	Test Case	✓	
2.7	Business Requirements				BSVS.00073 Rev.1.0	SAT Procedure	Clause 4	Test Case		

Technical Specification		Design				Testing				Compliance	
No.	Description	Design Document		Clause	Description	Testing Document			Clause	Description	
2.8	Security Requirements	BSVS.00039 Rev.2.0	Access Control Design Specification	5.1.1	Administration Module	BSVB.00119 Rev.1.0	Access Control Subsystem FAT Procedure	Clause 4	Test Case	✓	
		BSVV.00002 Rev.3.0	System Security Architecture	2	System Design	BSVB.00074 Rev.1.0	Communication Management Subsystem FAT Procedure	Clause 4	Test Case		
2.9	Regulatory Compliance	BSVS.00010 Rev.2.0	Key Management Subsystem Software Design Specification	2	CCH Key Management Scheme	BSVS.00023 Rev.2.0	Key Management Subsystem FAT Procedure	Clause 4	Test Case	✓	
2.10	System Topology and Capacities	BSVB.00010 Rev.2.0	Technical and Network Architecture	Appendix B	Data Storage Calculation	BSVB.00079 Rev.1.0	Issuer Management Subsystem FAT Procedure	Clause 4	Test Case	✓	
		BSVV.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1 5.2.1	Module Design Card Account Design	BSVB.00075 Rev.2.0	Configuration Data Management Subsystem FAT Procedure	Clause 4	Test Case		
		BSVB.00043 Rev.2.0	Configuration Management Subsystem Design Specification	5.1	Module Design						
2.11	Equipment quantities	BSVS.00001	Hardware Bill of Materials	2	Hardware Bill of Materials	Notes					
3	SCOPE OF SUPPLY										
3.1	Central Clearing House System The contractor shall design, supply, deliver, install and test a Central Clearing House System as described in Chapter 4.	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	5.1	Design Module	BSVB.00068 Rev.2.0	Functional Acceptance Test Plan		All Submission contents	✓	
		BSVB.00010 Rev.2.0	Technical and Network Architecture	5	Disaster Recovery Management System Nodes	BSVB.00070 Rev.1.0	System Integration Test Plan		All Submission contents		
		BSVB.00126 Rev.1.0	NFC Prototype Specification	6	All Submission contents	BSVB.00072 Rev.1.0	System Acceptance Test Plan		All Submission contents		
3.2	Contactless Smart Cards and Data Layout	BSVB.00001 Rev.3.0	NC Card Data Definition	2	Card General Description	BSVS.00071 Rev.2.0	SIT Procedure	Clause 4	Test Case	✓	
						BSVS.00073 Rev.1.0	SAT Procedure	Clause 4	Test Case		
3.3	Data Centre and Office Space	Letter No. BSV.OTP.1190.P2500.18.01.2016, 18 Jan 16, Request for approval of the CCH Data Center rental Letter No. BSV.OTP.1230.P2500.08.06.2016, 8 Jun 16, Request for approval of Milestone#2 CCH Development			Noted						

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document		Clause	Description	Testing Document		Clause	Description	
3.4	Project Scope	BSVV.00001 Rev.2.0	System Architecture		All Submission contents	Noted				
4	PARTICULAR SPECIFICATIONS OF CCH SYSTEM									
4.1	Clearing/Settlement System									
4.1.1	Objective	Noted				Noted				
4.1.2	Clearing/Settlement Functionality (CSF)	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	5.1.2 5.1.5	FTP Module SFTP Module Functional Requirements	BSVB.00074 Rev.1.0	Communication Subsystem FAT Procedure	Clause 4	Test Case	✓
		BSVB.00046 Rev.2.0	Report Management Software Design Specification	5.1		BSVB.00077 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4	Test Case	
		BSVV.00009 Rev.2.0	Financial Management Subsystem Design Specification	3.1	Financial Management Subsystem Dependencies Module Design	BSVB.00081 Rev.1.0	Report Management Subsystem FAT Procedure	Clause 4	Test Case	
		BSVV.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1 5.1	Module Design Module Design	BSVB.00079 Rev.1.0	Issuer Management Subsystem FAT Procedure	Clause 4	Test Case	
4.1.3	Financial Functionality (FF)	BSVB.00046 Rev.2.0	Report Management Software Design Specification	5.1.5	Financial Reports	BSVB.00077 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4	Test Case	✓
		BSVV.00009 Rev.2.0	Financial Management Subsystem Design Specification	5.1	Module Design	BSVB.00081 Rev.1.0	Report Management Subsystem FAT Procedure	Clause 4	Test Case	
		BSVV.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1	Module Design	BSVB.00079 Rev.1.0	Issuer Management Subsystem FAT Procedure	Clause 4	Test Case	

Technical Specification		Design			Testing				Compliance		
No.	Description	Design Document		Clause	Description	Testing Document			Clause	Description	
4.1.4	Settlement Management Operation Functionality (SMOF)	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	5.1.2.5	FTP OD Collaborations	BSVB.00074 Rev.1.0	Communication Subsystem FAT Procedure	Clause 4	Test Case	✓	
		BSVV.00009 Rev.2.0	Financial Management Subsystem Design Specification	5.1	Module Design	BSVB.00077 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4	Test Case		
		BSVB.00046 Rev.2.0	Report Management Software Design Specification	5.1.5	Configuration Data Reports	BSVB.00081 Rev.1.0	Report Management Subsystem FAT Procedure	Clause 4	Test Case		
4.1.5	Settlement Report Service Functionality (SRSF)	BSVB.00046 Rev.2.0	Report Management Software Design Specification	2.1 5.1	Module Decomposition Functional Requirements	BSVB.00081 Rev.1.0	Report Management Subsystem FAT Procedure	Clause 4	Test Case	✓	
4.2	Card System	BSVB.00045 Rev.2.0	Host Security Management Subsystem Design Specification	2.2.1	UD Verification Service Decomposition	BSVB.00078 Rev.1.0	Host Security Management Subsystem FAT Procedure	Clause 4	Test Case	✓	
		BSVV.00009 Rev.2.0	Financial Management Subsystem Design Specification	2.1.1.2 3.1	Clearing Validation Service Financial Management Subsystem Dependencies	BSVB.00077 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4	Test Case		
		BSVV.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1	Module Design	BSVB.00079 Rev.1.0	Issuer Management Subsystem FAT Procedure	Clause 4	Test Case		
		BSVS.00010 Rev.2.0	Key Management Subsystem Design Specification	5.1	Module Design	BSVS.00023 Rev.2.0	Key Management Subsystem FAT Procedure	Clause 4	Test Case		
4.2.1	Objective	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	5.1.2	FTP Module	BSVB.00074 Rev.1.0	Communication Subsystem FAT Procedure	Clause 4	Test Case	✓	
4.2.2	Card Issuance System (CIS)										

Technical Specification		Design			Testing				Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
4.2.2 (A)	Functional Requirements	BSVS.00039 Rev.2.0	4.1.1	Authentication and Authorization Interface	BSVB.00119 Rev.1.0	Clause 4	Access Control Subsystem FAT Procedure	Test Case	✓
		BSVB.00040 Rev.2.0	2.1	Action List Management Subsystem Design Specification	BSVB.00071 Rev.1.0	Clause 4	Communication Management Subsystem FAT Procedure	Test Case	
		BSVB.00042 Rev.1.0	5.1	Card Inventory Management Subsystem Design	BSVB.00073 Rev.1.0	Clause 4	Card Inventory Management Subsystem FAT Procedure	Test Case	
		BSVB.00091 Rev.2.0	5.1	Issuer Subsystem Design Specification	BSVB.00079 Rev.1.0	Clause 4	Issuer Management Subsystem FAT Procedure	Test Case	
		BSVS.00009 Rev.1.0	5.1	Card Initialization and Personalization Subsystem Design Specification	BSVS.00022 Rev.2.0	Clause 4	CIPS FAT Procedure	Test Case	
		BSVS.00084 Rev.2.0	5.1	Refund and Reload Machine Design Specification	BSVS.00071 Rev.2.0	Clause 4	RRM FAT Procedure	Test Case	
							SIT Procedure	Test Case	
4.2.2 (B)	Key Management System (KMS)	BSVS.00010 Rev.2.0	2	Key Management Subsystem Software Design Specification	BSVS.00023 Rev.2.0	Clause 4	Key Management Subsystem FAT Procedure	Test Case	✓
4.2.2 (C)	Card Application Management Functionality (CAMF)	BSVS.00010 Rev.2.0	2	Key Management Subsystem Software Design Specification	BSVS.00023 Rev.2.0	Clause 4	Key Management Subsystem FAT Procedure	Test Case	✓
4.2.2 (D)	Card Authentication Management Functionality (CAUMF)	BSVB.00045 Rev.2.0	9.1.2	Host Security Management Subsystem Design Specification	BSVB.00078 Rev.1.0	Clause 4	Host Security Management Subsystem FAT Procedure	Test Case	✓
4.2.2 (E)	Common Card Personalization Management System (CPMS)	BSVS.00009 Rev.2.0	2.2	Card Initialization and Personalization Subsystem Design Specifications	BSVS.00022 Rev.2.0	Clause 4, - Test ID: OTP-CIPS-03-XXX	CIPS FAT Procedure	Test Case - Card Initialization	✓
					BSVS.00071 Rev.2.0	Clause 4 - Test ID: OTP-CIPSRM-04-001 - Test ID: OTP-CIPSRM-06-001	SIT Procedure	Test Case - Card Initialization - Card Personalization	
4.2.3	Card Management System (CMS)								

Technical Specification		Design			Testing				Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
4.2.3 (A)	Functional Requirement	BSVV.00010 Rev.2.0	5.1 5.2.1	Module Design Card Account Design	BSVB.00079 Rev.1.0	Clause 4	Issuer Management Subsystem FAT Procedure	Test Case	✓
4.2.3 (B)	Reload & Refund Management Functionality (RRMF)	BSVB.00041 Rev.2.0	5.1.1 5.1.5	Autoload Authorization Service Autoload for Low Income Card	BSVB.00072 Rev.1.0	Clause 4	Autoload Management Subsystem FAT Procedure	Test Case	✓
		BSVB.00046 Rev.2.0	5.1.1 5.1.3	Financial Reports Sales Reports	BSVB.00081 Rev.1.0	Clause 4	Report Management Subsystem FAT Procedure	Test Case	
		BSVS.00084 Rev.2.0	6 9	Card Add Value Service Auto Top-up Activation / Change of Service / Disable	BSVS.00085 Rev.1.0	Clause 4	RRM FAT Procedure	Test Case	
		BSVS.00009 Rev.2.0	12 13	Card Add Value Service Card Add Value Reverse Service	BSVS.00022 Rev.2.0	Clause 4, - Test ID: OTP-CIPS-05-001 - Test ID: OTP-CIPS-05-001	- Test ID: OTP-RRM-05-007 - Test ID: OTP-RRM-05-001 - Void Card Add Value	- Card Refund - Card Add Value - Void Card Add Value	
		BSVV.00009 Rev.2.0	5.1.4	Settlement Management Service Detailed Design	BSVB.00079 Rev.1.0	Clause 4	CIPS FAT Procedure	Test Case	
		BSVV.00010 Rev.2.0	5.1	Module Design	BSVB.00120 Rev.1.0	Clause 4	Issuer Management Subsystem FAT Procedure	Test Case	
		BSVV.00014 Rev.1.0	5.1.1 5.1.3	Card Enquiry Service Product Enquiry Service	BSVB.00080 Rev.1.0	Clause 4	Cardholder Website Subsystem FAT Procedure	Test Case	
		BSVV.00011 Rev.1.0	5.1	Module Design	BSVB.00120 Rev.1.0	Clause 4	Online Enquiry Management Subsystem FAT Procedure	Test Case	
		BSVB.00106 Rev.1.0		All Submission Contents			Cardholder Website Subsystem FAT Procedure	Test Case	

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document	Clause	Description		Testing Document	Clause	Description		
4.2.3 (C)	Card Purchasing Functionality	BSVV.00010 Rev.2.0	5.1	Module Design		Report Management Subsystem FAT Procedure	Clause 4	Test Case		✓
(a)	Offline purchase service requirements	BSVS.00009 Rev.2.0	9	Card Issuance and Sale Service		RRM FAT Procedure	Clause 4 - Test ID: OTP-RRM-05-001 - Test ID: OTP-RRM-05-002	Test Case - Card Issuance - Card Sale		
(b)	Online Purchase Service Requirements	BSVS.00084 Rev.2.0	5	Card Issuance and Sale Service		CIPS FAT Procedure	Clause 4 - Test ID: OTP-CIPS-05-001 - Test ID: OTP-CIPS-05-001	Test Case - Card Issuance - Card Sale		
(c)	Buying Service requirements	BSVB.00046 Rev.2.0	5.1.3	Sales Reports		Issuer Management Subsystem FAT Procedure	Clause 4	Test Case		
4.2.4	Common Ticket Ledger Management Functionality (CTLMF)	BSVB.00046 Rev.2.0	5.1.4	Exception Reports		Report Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-RS-06-xxx	Test Case - Exception Reports		✓
4.2.5	Merchant Information Management Functionality (MIMF)	BSVV.00010 Rev.2.0	5.1	Module Design		Issuer Management Subsystem FAT Procedure	Clause 4	Test Case		
4.2.5	Merchant Information Management Functionality (MIMF)	BSVB.00116 Rev.2.0	2.2.3	SP CD Decomposition		Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-RS-03-001	Test Case - Manage Entity - Participants		✓
4.2.6	Card Report Service Functionality (CRSF)	BSVV.00014 Rev.1.0	5.1.1 5.1.3	Card Enquiry Service Product Enquiry Service		Online Enquiry Subsystem FAT Procedure	Clause 4	Test Case		✓
		BSVB.00115 Rev.2.0		All Submission contents		SP Website Subsystem FAT Procedure	Clause 4	Test Case		
4.3	Infrastructure Operating Management System (IOMS)									

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document		Clause	Description	Testing Document		Clause	Description	
4.3.1	Objective	BSVB.00040 Rev.2.0	Action List Management Subsystem Design Specification	4.2	Communication Subsystem	BSVB.00071 Rev.1.0	Action List Management Subsystem FAT Procedure	Clause 4	Test Case	✓
		BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	2.2 5.1.2.5 5.1.5.2	Data Decomposition FTP CD Collaborations Settlement Instruction File Collaborations	BSVB.00074 Rev.1.0	Communication Subsystem FAT Procedure	Clause 4	Test Case	
				5.1.7.2	System Usage Data Collaboration	BSVB.00076 Rev.1.0	Device Management Subsystem FAT Procedure	Clause 4	Test Case	
		BSVB.00044 Rev.2.0	Device Management Subsystem Design Specification	2.1.4	Device Management GUI Service Decomposition	BSVB.00121 Rev.1.0	SP Website Subsystem FAT Procedure	Clause 4	Test Case	
		BSVB.00115 Rev.2.0	SP Website Subsystem Design Specification		All Submission contents	BSVB.00082 Rev.1.0	System Management Subsystem FAT Procedure	Clause 4	Test Case	
		BSVB.00047 Rev.2.0	System Management Subsystem Design Specification	5	Network Management Service					
4.3.2	SP Interface Management Functionality (SIMF)									
4.3.2 (A)	Sending/receiving Information for SP types	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	4.1	Subsystem Interface	BSVB.00074 Rev.1.0	Communication Subsystem FAT Procedure	Clause 4	Test Case	✓
4.3.2 (B)	Equipment Management Functionality (EMF)	BSVB.00044 Rev.2.0	Device Management Subsystem Design Specification	4.1.1 4.1.2 4.1.3	Device Registry Service Design Status Management Service Design Device Management GUI Service Design	BSVB.00076 Rev.1.0	Device Management Subsystem FAT Procedure	Clause 4	Test Case	✓

Technical Specification		Design			Testing				Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
4.3.2 (C)	Operation Information Management Functionality (OIMF)	BSVB.00043 Rev.2.0	5.1.2.5	FTP CD Collaborations	BSVB.00074 Rev.1.0	Clause 4	Communication Subsystem FAT Procedure	Test Case	✓
		BSVB.00040 Rev.2.0	5.1.3	Action List Administration Service	BSVB.00071 Rev.1.0	Clause 4	Action List Management Subsystem FAT Procedure	Test Case - Administration Services	
		BSVB.00116 Rev.2.0	2.2.3	SP CD Decomposition	BSVB.00075 Rev.2.0	Clause 4	Configuration Data Management Subsystem FAT Procedure	Test Case - PD File Attributes - AFC Equipment Configuration Data	
		BSVS.00045 Rev.1.0		All Submission Contents	BSVB.00078 Rev.1.0	Clause 4	Host Security Management Subsystem FAT Procedure	Test Case	
		BSVB.00044 Rev.2.0	2.1.3	Status Management Service Decomposition	BSVB.00076 Rev.1.0	Clause 4	Device Management Subsystem FAT Procedure	Test Case	
4.3.2 (D)	Sending Operational Information to reader device Downloading information to Front End device	BSVB.00011 Rev.2.0	15	AFC Equipment Configuration Data Table	BSVB.00074 Rev.1.0	Clause 4	Communication Subsystem FAT Procedure	Test Case	✓
		BSVS.00045 Rev.1.0	2.1.3	Status Management Service Decomposition	BSVB.00075 Rev.2.0	Clause 4	Configuration Data Management Subsystem FAT Procedure	Test Case - AFC Equipment Configuration Data	
		BSVB.00043 Rev.2.0	5.1.2.5	FTP CD Collaborations	BSVB.00078 Rev.1.0	Clause 4	Host Security Management Subsystem FAT Procedure	Test Case	
4.3.2 (E)	Portal Web Service Functionality (PWSF)	BSVV.00011 Rev.2.0		All Submission Contents	BSVB.00120 Rev.1.0	Clause 4	Cardholder Website Subsystem FAT Procedure	Test Case	✓
		BSVB.00115 Rev.2.0		All Submission Contents	BSVB.00121 Rev.1.0	Clause 4	SP Website Subsystem FAT Procedure	Test Case	
4.3.2 (F)	Data Transmission Functionality (DTF)	BSVB.00043 Rev.2.0	5.1.2 5.1.5	FTP Module SFTP Module	BSVB.00074 Rev.1.0	Clause 4	Communication Subsystem FAT Procedure	Test Case	✓

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document		Clause	Description	Testing Document		Clause	Description	
4.3.2(G)	Administration Management Functionality	BSVS.00039 Rev.2.0	Access Control Management Subsystem Design Specification	5	Design	BSVB.00119 Rev.1.0	Access Control Management Subsystem FAT Procedure	Clause 4	Test Case	✓
		BSVB.00047 Rev.2.0	System Management Subsystem Design Specification		All Submission Contents	BSVB.00082 Rev.1.0	System Management Subsystem FAT Procedure	Clause 4	Test Case	
4.4	Interface System	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification		All Submission Contents	BSVB.00074 Rev.1.0	Communication Subsystem FAT Procedure	Clause 4	Test Case	✓
4.4.1	Overview									
4.4.2	Functional Requirements									
4.5	Call Centre Function									
4.5.1	Functional Requirements	BSVV.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1	Module Design	BSVB.00079 Rev.1.0	Issuer Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-IM-02-013 - Test ID: OTP-IM-04-010ry	Test Case - Card Transaction History - Card Transaction History – Configurable - Product Transaction History - Product Transaction History - Configurable	✓
4.5.2	Facility Requirements	Note	Facility provide by CTC			Noted				
4.6	System Design Principle and Standard									
4.6.1	Open-Based Architecture	BSVV.00001 Rev.2.0	System Architecture	2.3	Software Design	BSVS.00073 Rev.1.0	SAT Procedure	Clause 4	Test Case	✓
4.6.2	Flexibility and Scalability	BSVB.00116 Rev.2.0	Configuration Data Management Subsystem Software Design Specification		All Submission Contents	BSVB.00075 Rev.2.0	Configuration Data Management Subsystem FAT Procedure	Clause 4	Test Case	✓

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document		Clause	Description	Testing Document		Clause	Description	
4.6.3	Reliability, Maintenance	BSVV.00001 Rev.2.0 BSVB.00047 Rev.2.0	System Architecture System Management Subsystem Design Specification	2.3	Software Design All Submission Contents	BSVB.00082 Rev.1.0	System Management Subsystem FAT Procedure	Clause 4	Test Case	✓
4.6.4	Maximizing availability	BSVV.00001 Rev.2.0	System Architecture	2.3	Software Design	BSVS.00073 Rev.1.0	SAT Procedure	Clause 4	Test Case	✓
4.6.5	Secured and protected data	BSVB.00043 Rev.2.0 BSVB.00045 Rev.2.0 BSVB.00010 Rev.2.0	Communication Subsystem Design Specification Host Security Management Subsystem Design Specification Technical and Network Architecture	5.1.2 5.1.5 2.2.1 5	FTP Module SFTP Module UD Verification Service Decomposition Disaster Recovery Management	BSVB.00074 Rev.1.0 BSVB.00078 Rev.1.0	Communication Subsystem FAT Procedure Host Security Management Subsystem FAT Procedure	Clause 4 Clause 4	Test Case Test Case	✓
5	INTERFACE BETWEEN CCH AND PARTICIPANTS									
5.1	Overview									
5.1.1	Purpose of this Chapter									
5.1.2	Scope	BSVB.00011 Rev.2.0 BSVB.00012 Rev.2.0 BSVB.00025 Rev.1.0 BSVV.00006 Rev.2.0 BSVV.00015 Rev.2.0	Configuration Parameters Transaction Data Definition OTP CCH to Bank Interface Specification OTP CCH to Operator Interface Specification Online Enquiry Subsystem Interface Specification		All Submission Contents All Submission Contents All Submission Contents All Submission Contents All Submission Contents	BSVS.00071 Rev.2.0 BSVS.00073 Rev.1.0	SIT Procedure SAT Procedure	Clause 4 Clause 4	Test Case Test Case	✓
5.2	AFC Equipment Configuration Data									

Technical Specification		Design				Testing			Compliance
No.	Description	Design Document		Clause	Description	Testing Document		Clause	Description
5.2.1	Process Overview	BSVB.00040 Rev.2.0	Action List Management Subsystem Design Specification	5	Design AFC Equipment Configuration Data Table	BSVB.00075 Rev.2.0 BSVS.00071 Rev.2.0	Configuration Data Management Subsystem FAT Procedure SIT Procedure	Clause 4 - Test ID: OTP-CD-03-021 Clause 4 - Test ID: OTP-CIPSRM-02-001 - Test ID: OTP-CIPSRM-03-001	Test Case - AFC Equipment Configuration Test Case - CD Download - Card Mapping Download
5.3	Particular Requirements of the Configuration Process								
5.3.1	Scope of work	BSVB.00011 Rev.2.0	Configuration Parameter		All Submission contents	BSVB.00075 Rev.2.0	Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-021	Test Case - AFC Equipment Configuration
5.3.2	Efficiency	BSVB.00116 Rev.2.0	Configuration Data Management Subsystem Software Design Specification	4	AFC Equipment Configuration Data Table				Test Case - CD Download - Card Mapping Download
5.3.3	Implementation Date-time								
5.3.4	Integrity	BSVB.00040 Rev.2.0	Action List Management Subsystem Design Specification	2.2.4.1 5.2.1	Active Blacklist Blacklist	BSVS.00071 Rev.2.0	SIT Procedure	Clause 4 - Test ID: OTP-CIPSRM-02-001 - Test ID: OTP-CIPSRM-03-001	
5.3.5	Handshake								
5.3.6	Content of Configuration Data								
5.4	Usage Data (UD)								
5.4.1	Overview								
5.4.2	Transaction Data (TD) from Other Systems	BSVB.00043 Rev.2.0	Communication Subsystem Design Specification	5.1	Module Design	BSVB.00074 Rev.1.0	Communication Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CS-05-001	Test Case - CMS Imports the TD file to the expected directory (CTC Issued Card)
		BSVB.00012 Rev.2.0	Transaction Data Definition	4	Transaction Message Header and Transaction Information Definition			- Test ID: OTP-CS-05-002	- CMS Imports the TD file to the expected directory (Other Issuer Card)
		BSVV.00006 Rev.2.0	OTP CCH to Operator Interface Specification	3	Interface Specification	BSVS.00071 Rev.2.0	SIT Procedure	Clause 4	Test Case

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document		Clause	Description	Testing Document		Clause	Description	
5.4.3	Device Going Into Service	BSVB.00044 Rev.2.0	Device Management Subsystem Design Specification	2.1.3	Status Management Service Decomposition	BSVB.00076 Rev.1.0	Device Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-DW-05-001	Test Case - Update Device Status	✓
5.4.4	Device Going Out of Service	BSVB.00044 Rev.2.0	Device Management Subsystem Design Specification	2.1.3	Status Management Service Decomposition	BSVB.00076 Rev.1.0	Device Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-DW-05-001	Test Case - Update Device Status	✓
5.4.5	National Card Transaction Data	BSVB.00012 Rev.2.0 BSVV.00006 Rev.2.0	Transaction Data Definition OTP CCH to Operator Interface Specification	4 3	Transaction Message Header and Transaction Information Definition Interface Specification	BSVS.00071 Rev.2.0 BSVS.00073 Rev.1.0	SIT Procedure SAT Procedure	Clause 4 Clause 4	Test Case Test Case	✓
5.5	Daily Financial Process									
5.5.1	Daily Financial Position	BSVB.00025 Rev.1.0 BSVV.00009 Rev.2.0	OTP CCH to Bank Interface Specification Financial Management Subsystem Design Specification	2 5.1.4 5.1.9	CCH Bank Interface Requirements Settlement Management Service Detailed Design Payment Events Management Service Design	BSVB.00098 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-FM-08-004 - Test ID: OTP-FM-08-005	Test Case - Daily Total – Add Record - Daily Total – Account Entries	✓
5.5.2	Approval of Financial Position	BSVB.00025 Rev.1.0 BSVV.00009 Rev.2.0	OTP CCH to Bank Interface Specification Financial Management Subsystem Design Specification	2 5.1.4 5.1.9	CCH Bank Interface Requirements Settlement Management Service Detailed Design Payment Events Management Service Design	BSVB.00098 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-FM-08-004 - Test ID: OTP-FM-08-005	Test Case - Daily Total – Add Record - Daily Total – Account Entries	✓

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document		Clause	Description	Testing Document		Clause	Description	
5.5.3	Claim	BSVB.00025 Rev.1.0	OTP CCH to Bank Interface Specification Financial Management Subsystem Design Specification	2 5.1.6 5.1.9	OCH Bank Interface Requirements Claims Management Service Detailed Design Payment Events Management Service Design	BSVB.00088 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-FM-07-001 - Test ID: OTP-FM-07-002	Test Case - Claims – Maintain Claim - Claims – Authorise Claim	✓
5.6	SAM Management									
5.6.1	New SAM Request	BSVB.00044 Rev.2.0 BSVS.00010 Rev.2.0 BSVS.00079 Rev.2.0 BSVS.00083 Rev.2.0	Device Management Subsystem Design Specification Key Management Subsystem Software Design Specification SAM Interface Specification SAM Design Specification	4 3	Design All Submission Contents Key Update Interface All Submission Contents	BSVB.00076 Rev.1.0 BSVS.00023 Rev.2.0	Device Management Subsystem FAT Procedure Key Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-DM-05-001 Clause 4	Test Case - Update Device Status Test Case	✓
5.6.2	Kill SAM Request	BSVB.00044 Rev.2.0 BSVS.00010 Rev.2.0 BSVS.00079 Rev.2.0 BSVS.00083 Rev.2.0	Device Management Subsystem Design Specification Key Management Subsystem Software Design Specification SAM Interface Specification SAM Design Specification	4 3	Design All Submission Contents Key Update Interface All Submission Contents	BSVB.00076 Rev.1.0 BSVS.00023 Rev.2.0	Device Management Subsystem FAT Procedure Key Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-DM-05-001 Clause 4	Test Case - Update Device Status Test Case	✓
5.6.3	New Equipment Type Registration	BSVB.00044 Rev.2.0 BSVS.00010 Rev.2.0 BSVS.00079 Rev.2.0 BSVS.00083 Rev.2.0	Device Management Subsystem Design Specification Key Management Subsystem Software Design Specification SAM Interface Specification SAM Design Specification	4 3	Design All Submission Contents Key Update Interface All Submission Contents	BSVB.00076 Rev.1.0 BSVS.00023 Rev.2.0	Device Management Subsystem FAT Procedure Key Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-DM-05-001 Clause 4	Test Case - Update Device Status Test Case	✓

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document	Clause	Description		Testing Document	Clause	Description		
5.7	Transmission Characteristics	BSVB.00043 Rev.2.0	5.1	Module Design		BSVB.00074 Rev.1.0	Clause 4	Communication Subsystem FAT Procedure	Test Case	✓
5.8	System Maintenance									
5.9	Messaging	BSVB.00045 Rev.2.0	9.1.2	Storing Application Key With Software		BSVB.00078 Rev.1.0	Clause 4	Host Security Management Subsystem FAT Procedure	Test Case	✓
5.10	Support of Smart Card Processes									
5.10.1	Communications Protocol	BSVB.00043 Rev.2.0	5.1	Module Design		BSVB.00074 Rev.1.0	Clause 4	Communication Subsystem FAT Procedure	Test Case	✓
5.10.2	Query - Response List	BSVB.00043 Rev.2.0	5.1	Module Design		BSVB.00074 Rev.1.0	Clause 4	Communication Subsystem FAT Procedure	Test Case	✓
		BSVS.00009 Rev.2.0	16	Card Online Enquiry		BSVS.00022 Rev.2.0	Clause 4	CIPS FAT Procedure	Test Case	
			17	Card Online Enquiry and Analysis Service		BSVS.00085 Rev.1.0	Clause 4	RRM FAT Procedure	Test Case	
		BSVS.00084 Rev.2.0	15	Card Online Enquiry		BSVB.00080 Rev.1.0	Clause 4	Online Enquiry Subsystem FAT Procedure	Test Case	
			16	Card Online Enquiry and Analysis Service						
		BSVV.00015 Rev.2.0		All Submission Contents						
		BSVV.00016 Rev.2.0	2.1	Online Enquiry Subsystem						
			4.1	Online Enquiry Subsystem Interface						
			5.1	Online Enquiry Subsystem Design						
5.11	Message Formatting and Privacy Protection	BSVB.00043 Rev.2.0	5.1	Module Design		BSVB.00074 Rev.1.0	Clause 4	Communication Subsystem FAT Procedure	Test Case	✓
		BSVB.00045 Rev.2.0	2.2.1	UD Verification Service Decomposition		BSVB.00078 Rev.1.0	Clause 4	Host Security Management Subsystem FAT Procedure	Test Case	

Technical Specification		Design			Testing				Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
6	SMART CARD REQUIREMENTS								
6.1	Scope and Purpose	BSVB.00001 Rev.3.0		Card File Description	BSVS.00022 Rev.2.0	Clause 4	Test Case		✓
6.1.1	Scope		4		BSVS.00085 Rev.1.0	Clause 4	Test Case		
6.1.2	Important Notes				BSVS.00071 Rev.2.0	Clause 4	Test Case		
					BSVS.00073 Rev.1.0	Clause 4	Test Case		
6.2	Smart Card Specifications	BSVB.00001 Rev.3.0	2	Card General Description	CIPS FAT Procedure	Clause 4, - Test ID: OTP-CIPS-03-XXX	Test Case - Card Initialization		✓
6.2.1	Applicability of International standards		4	Card File Description	SIT Procedure	Clause 4 - Test ID: OTP-CIPSRM-04-001 - Test ID: OTP-CIPSRM-06-001	Test Case - Card Initialization - Card Personalization		
6.2.2	Specific CSC Requirements								
6.2.3	Smart Card Identifier								
6.3	Smart Card Applications								
6.3.1	General	BSVB.00001 Rev.3.0	3	Card Layout Design	Noted				
6.3.2	Common (Public) Application	BSVB.00001 Rev.3.0	4.1	Common Application	CIPS FAT Procedure SIT Procedure	Clause 4 - Test ID: OTP-CIPS-03-XXX Clause 4 - Test ID: OTP-CIPSRM-04-001 - Test ID: OTP-CIPSRM-06-001	Test Case - Card Initialization Test Case - Card Initialization - Card Personalization		✓
6.3.3	Service Provider (Private) Application	BSVB.00001 Rev.3.0	4.2-4.9	Reserved Application (AID 2.9)	Noted				
6.4	Smart Card Products								
6.4.1	General	BSVB.00001 Rev. 3.0	2.7, 3.2	Application Master Key Settings, Card File Design	BSVS.00022 Rev.2.0	Clause 4 - Test ID: OTP-CIPS-03-XXX	Test Case - Card Initialization		✓

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document		Clause	Description	Testing Document		Clause	Description	
6.4.2	Client Identification	BSVV.00010 Rev.2.0	Issuer Subsystem Design Specification	5.1 5.2	Module Design Data Design	BSVB.00079 Rev.1.0	Issuer Management Subsystem FAT Procedure	Clause 4	Test Case	✓
6.4.3	Traveler class	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	BSVS.00022 Rev.2.0 BSVS.00071 Rev.2.0	CIPS FAT Procedure SIT Procedure	Clause 4, - Test ID: OTP-CIPS-03-XXX Clause 4 - Test ID: OTP-CIPSRM-04-001 - Test ID: OTP-CIPSRM-06-001	Test Case - Card Initialization Test Case - Card Initialization - Card Personalization	✓
6.4.4	Concessions Types	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	BSVB.00075 Rev.2.0	Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-015	Test Case - Manage Card Type Parameters	✓
6.4.5	Staff Passes	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	BSVB.00075 Rev.2.0	Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-015	Test Case - Manage Card Type Parameters	✓
6.4.6	Common Purse Product	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application					
6.4.7	Common Products	BSVB.00001 Rev.3.0	NC Card Data Definition	4.1	Common Application	BSVB.00075 Rev.2.0	Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-006 - Test ID: OTP-CD-03-033	Test Case - Manage Common Pass Product Scheme - Manage Fixed Journey Product Scheme	✓
6.4.8	Provider Specific Products (for information only)	Note	Noted							
6.4.9	Control Data									

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document		Clause	Description	Testing Document		Clause	Description	
6.4.10	Transaction Record Register	BSVB.00001 Rev.3.0 BSVB.00012 Rev.2.0 BSVS.00009 Rev.2.0 BSVS.00084 Rev.2.0	NC Card Data Definition Transaction Data Definition Card Initialization and Personalization Subsystem Design Specification Refund and Refund Machine Software Subsystem Design Specification	4.1 5	Common Application Transaction Message Data Records	BSVS.00022 Rev.2.0 BSVS.00085 Rev.1.0 BSVS.00071 Rev.2.0 BSVS.00073 Rev.1.0	CIPS FAT Procedure RRM FAT Procedure SIT Procedure SAT Procedure	Clause 4 Clause 4 Clause 4 Clause 4	Test Case Test Case Test Case Test Case	✓
6.4.11	Last Add-value register	BSVB.00001 Rev.3.0 BSVB.00012 Rev.2.0 BSVS.00009 Rev.2.0 BSVS.00084 Rev.2.0	NC Card Data Definition Transaction Data Definition Card Initialization and Personalization Subsystem Design Specification Refund and Refund Machine Software Subsystem Design Specification	4.1 5	Common Application Transaction Message Data Records	BSVS.00022 Rev.2.0 BSVS.00085 Rev.1.0 BSVS.00071 Rev.2.0 BSVS.00073 Rev.1.0	CIPS FAT Procedure RRM FAT Procedure SIT Procedure SAT Procedure	Clause 4 Clause 4 Clause 4 Clause 4	Test Case Test Case Test Case Test Case	✓
6.4.12	Last Usage Register	BSVB.00001 Rev.3.0 BSVB.00012 Rev.2.0 BSVS.00009 Rev.2.0 BSVS.00084 Rev.2.0	NC Card Data Definition Transaction Data Definition Card Initialization and Personalization Subsystem Design Specification Refund and Refund Machine Software Subsystem Design Specification	4.1 5	Common Application Transaction Message Data Records	BSVS.00022 Rev.2.0 BSVS.00085 Rev.1.0 BSVS.00071 Rev.2.0 BSVS.00073 Rev.1.0	CIPS FAT Procedure RRM FAT Procedure SIT Procedure SAT Procedure	Clause 4 Clause 4 Clause 4 Clause 4	Test Case Test Case Test Case Test Case	✓
6.4.13	Journey Tracking Register	BSVB.00001 Rev.3.0 BSVB.00012 Rev.2.0	NC Card Data Definition Transaction Data Definition	4.1 5	Common Application Transaction Message Data Records	BSVS.00071 Rev.2.0 BSVS.00073 Rev.1.0	SIT Procedure SAT Procedure	Clause 4 Clause 4	SIT Test Case SAT Test Case	✓

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description			
6.4.14	Data Scratchpad	BSVB.00001 Rev.3.0	4.1	Common Application						
6.4.15	Common Loyalty Product	BSVB.00001 Rev.3.0	4.1	Common Application	BSVB.00075 Rev.2.0	Clause 4 - Test ID: OTP-CD-03-005	Test Case - Manage CTC Card Promotion			✓
Annex 1	Prototypes									
1	Definition of 'Prototype'	BSVB.00126 Rev1.0			SIT Procedure	Clause 4	Test Case			✓
2	Prototype Hardware Requirements	BSVS.00093 Rev.1.0			SAT Procedure	Clause 4	Test Case			
3	Required functionality of prototype	BSVS.00092 Rev.1.0								
4	Testing requirements	BSVB.00127 Rev.2.0								
5	Testing using prototype									
6	Integration Testing using modified Front End Systems				To be tested when the system integrated with SPs' Front End System (Milestone#4)					

Table 5-3 Test Traceability Matrix (Volume 3 Part 2 : General Specification (GS) - Annex 6: Business Rules)

Technical Specification		Design			Testing				Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
GS ANNEX6	BUSINESS RULES								
1.2	General Principles on Common Card								
1.2.1	General	BSVB.00013 Rev.2.0	Clause 1.1	General Principle on Common Card	Noted				
1.2.2	Types of Common Card	BSVB.00013 Rev.2.0	Clause 1.1	General Principle on Common Card	Noted				
1.2.3	Interoperable Card	BSVB.00013 Rev.2.0	Clause 2.1	Global Concepts	Noted				
1.3	Ownership of the National Standard	BSVB.00013 Rev.2.0	Clause 1.1	General Principle on Common Card	Noted				
2	COMMON CARD ISSUERS	BSVB.00013 Rev.2.0	Clause 1.1	General Principle on Common Card	Noted				
3	CARD MANAGEMENT								
3.1	Overview	BSVB.00013 Rev.2.0	Clause 9	Card Operations					
3.1.1	National Card and Co-Branded Card Initialization	BSVB.00013 Rev.2.0	Clause 9.1	Card Initialization	BSVS.00022 Rev.2.0	Clause 4 - Test ID: OTP-CIPSS-03-XXX	CIPS FAT Procedure	Test Case - Card Initialization	✓
3.1.2	Co-Issued Card Initialization				BSVS.00075 Rev.1.0	Clause 4 - Test ID: OTP-CIPSSRM-04-001 - Test ID: OTP-CIPSSRM-06-001	SIT Procedure	Test Case - Card Initialization - Card Personalization	
3.2	Card Sales								

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document	Clause	Description		Testing Document	Clause	Description		
3.2.1	General	BSVB.00013 Rev.2.0	Clause 9.3	Card Sale		BSVS.00075 Rev.2.0	Clause 4	Test Case - Manage Card Sale Parameter		✓
3.2.2	Deposit	BSVB.00013 Rev.2.0	Clause 9.3.2	Deposit		BSVS.00022 Rev.2.0	Clause 4, - Test ID: OTP-CIPS-04-001 - Test ID: OTP-CIPS-04-002	Test Case - Card Issuance - Card Sale		
3.2.3	Initial Stored Value	BSVB.00013 Rev.2.0	Clause 9.3.3	Initial Common Purse Value			Clause 4	Test Case - Card Issuance - Card Sale		
3.2.4	Issuance Fee	BSVB.00013 Rev.2.0	Clause 9.3.4	Issuance Fee		BSVS.00085 Rev.2.0	Clause 4 - Test ID:OTP-RRM-04-001 - Test ID:OTP-RRM-04-002	Test Case - Card Issuance - Card Sale		
						BSVS.00075 Rev.1.0	Clause 4 - Test ID: OTP-CIPSRRM-04-002 - Test ID: OTP-CIPSRRM-05-001	Test Case - Card Issuance - Card Sale		
3.2.5	Sales Price									
3.2.5(A)	Common Purse Sale Price	BSVB.00013 Rev.2.0	Clause 9.3.5	Sales Price		BSVS.00075 Rev.2.0	Clause 4	Test Case - Manage Card Sale Parameter		✓
						BSVS.00022 Rev.2.0	Clause 4 - Test ID: OTP-CIPS-04-001 - Test ID: OTP-CIPS-04-002	Test Case - Card Issuance - Card Sale		
						BSVS.00085 Rev.2.0	Clause 4 - Test ID:OTP-RRM-04-001 - Test ID:OTP-RRM-04-002	Test Case - Card Issuance - Card Sale		
						BSVS.00075 Rev.1.0	Clause 4 - Test ID: OTP-CIPSRRM-04-002 - Test ID: OTP-CIPSRRM-05-001	Test Case - Card Issuance - Card Sale		

Technical Specification		Design				Testing				Compliance
No.	Description	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 9.3.5	Description	BSVS.00075 Rev.2.0	Testing Document	Clause	Description	
3.2.5 (B)	Trip /Journey Common Card Sale Price				Sales Price		Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-006 - Test ID: OTP-CD-03-033	Test Case - Manage Common Pass Product Scheme - Manage Fixed Journey Product Scheme	✓
						BSVS.00022 Rev.2.0	CIPS FAT Procedure	Clause 4 - Test ID: OTP-CIPS-04-004 - Test ID: OTP-CIPS-04-005	Test Case - FJP Card Issuance - CPP Card Issuance	
						BSVS.00085 Rev.2.0	RRM FAT Procedure	Clause 4 - Test ID: OTP-CIPS-04-004 - Test ID: OTP-CIPS-04-005	Test Case - FJP Card Issuance - CPP Card Issuance	
						BSVS.00071 Rev.2.0	SIT Procedure	Clause 4 - Test ID: OTP-CIPSRRM-05-004 - Test ID: OTP-CIPSRRM-05-005	Test Case - FJP Card Issuance - CPP Card Issuance	
3.3	Card Service Centre	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 2.1.5	Card Service Centre	BSVS.00022 Rev.2.0	CIPS FAT Procedure	Clause 4	Test Case	✓
3.3.1 (A)	CTC's Dedicated Service Centre					BSVS.00085 Rev.2.0	RRM FAT Procedure	Clause 4	Test Case	
3.3.1 (B)	Authorized Service Centre									
3.4	Blacklist Management	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 7.5	Blacklist Control	BSVS.00071 Rev.1.0	Action List Management Subsystem FAT Procedure	Clause 4	Test Case	✓
						BSVS.00071 Rev.2.0	SIT Procedure	Clause 4 - Test ID: OTP-RR-04-001	Test Case - Blacklist Card	
						BSVS.00073 Rev.1.0	SAT Procedure	Clause 4 - Test ID: OTP-RR-04-001	Test Case - Blacklist Card	
3.5	Common Card Status									

Technical Specification		Design				Testing			Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Testing Document	Clause	Description	Compliance
3.5.1	General	BSVB.00013 Rev.2.0	Clause 7.3	Common Card Status Control	BSVS.00022 Rev.2.0	CIPS FAT Procedure	Clause 4	Test Case - Card Initialization	✓
3.5.2	Uninitialized card	BSVB.00013 Rev.2.0	Clause 7.3.2	Uninitialized Card	BSVS.00071 Rev.2.0	SIT Procedure	Clause 4	Test Case - Card Initialization	
3.5.3	Initialized card	BSVB.00013 Rev.2.0	Clause 7.3.3	Initialized Card				- Card Initialization	
3.5.4	Issued card	BSVB.00013 Rev.2.0	Clause 7.3.4	Issued Card				- Card Personalization	
3.5.5	Lost/Stolen card	BSVB.00013 Rev.2.0	Clause 7.3.5	Lost/Stolen Card	BSVS.00071 Rev.1.0	Action List Management Subsystem FAT Procedure	Clause 4	Test Case	✓
		BSVB.00040 Rev.2.0	5.1.2 5.1.3	Action List Generation Service Action List Administration Service					
3.5.6	Refunded card	BSVB.00013 Rev.2.0	Clause 7.3.6	Refund Card	BSVS.00085 Rev.2.0	RRM FAT Procedure	Clause 4	Test Case - Card Refund	✓
					BSVS.00071 Rev.2.0	SIT Procedure	Clause 4	Test Case - Card Refund	
					BSVS.00073 Rev.1.0	SAT Procedure	Clause 4	Test Case - Card Refund	
								- Card Refund	
3.5.7	Replaced card	BSVB.00013 Rev.2.0	Clause 7.3.7	Replaced Card	BSVS.00085 Rev.2.0	RRM FAT Procedure	Clause 4	Test Case - Card Replacement	✓
					BSVS.00071 Rev.2.0	SIT Procedure	Clause 4	Test Case - Card Replacement	
					BSVS.00073 Rev.1.0	SAT Procedure	Clause 4	Test Case - Card Replacement	
								- Defer Card Replacement	
3.5.8	Expired card	BSVB.00013 Rev.2.0	Clause 7.3.8	Expired Card	BSVS.00022 Rev.2.0	CIPS FAT Procedure	Clause 4	Test Case	✓
3.5.9	Idle card	BSVB.00013 Rev.2.0	Clause 7.3.9	Idle Card	BSVS.00085 Rev.2.0	RRM FAT Procedure	Clause 4	Test Case	
3.5.10	Invalid card	BSVB.00013 Rev.2.0	Clause 7.3.10	Invalid Card					

Technical Specification		Design				Testing				Compliance
No.	Description	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause	Description	BSVS.00075 Rev.2.0	Testing Document	Clause	Description	
3.6	Off-Peak Discount Functionality			Clause 4.2	Off-Peak Discount Functionality		Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-026 - Test ID: OTP-CD-03-027 - Test ID: OTP-CD-03-028 - Test ID: OTP-CD-03-029 - Test ID: OTP-CD-03-030	Test Case - Time Table - Time Selection - Fare Code - Fare Table - Fare Selection	✓
4	COMMON CARD PERSONALIZATION									
4.1	National Card and Co-Branded Card Personalization	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.1.1	National Card and Co-Branded Card Personalization	BSVS.00022 Rev.2.0	CIPS FAT Procedure	Clause 4 - Test ID: OTP-CIPS-03-XXX	Test Case - Card Initialization	✓
4.1.1	Level 0: Anonymous Card									
4.1.2	Level 1: Registered Card									
4.1.3	Level 2: Personalized Card					BSVS.00071 Rev.2.0	SIT Procedure	Clause 4 - Test ID: OTP-CIPSRRM-04-001 - Test ID: OTP-CIPSRRM-06-001 - Test ID: OTP-CIPSRRM-05-002	Test Case - Card Initialization - Card Personalization - Card Printing	
4.1.4	Disclosure of Personal Information and Confidentiality									
5	COMMON CARD TYPE (TRAVELER CLASS)									
5.1.1	General	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.2	Common Card Type					
5.1.2	Types of Common Card	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 3.2.1	Type of Common Card	BSVS.00075 Rev.2.0	Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-003	Test Case - Card Type Usage Definition	✓
5.1.2 (A)	Standard Common Card (Default Card)					BSVS.00071 Rev.2.0	SIT Procedure	Clause 4	Test Case	
5.1.2 (B)	Staff Common Card					BSVS.00073 Rev.1.0	SAT Procedure	Clause 4	Test Case	
5.1.2 (C)	Concessionary Common Card									
5.2	Concessionary Card's Rules	BSVB.00013 Rev.2.0	NC Card Business Rules	Clause 4	Card Promotion					

Technical Specification		Design				Testing			Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Testing Document	Clause	Description	Compliance
5.2.1	Fare Discount	BSVB.00013 Rev.2.0	Clause 4.1	Concessionary Card's Rules	BSVS.00071 Rev.2.0	SIT Procedure	Clause 4 - Test ID: OTP-RAIL-01-001 - Test ID: OTP-RAIL-01-002 - Test ID: OTP-RAIL-01-003 - Test ID: OTP-RAIL-01-004 - Test ID: OTP-TOLL-01-001 - Test ID: OTP-TOLL-01-002 - Test ID: OTP-RR-02-001	Test Case - RAIL/BUS Common Purse Txn. - RAIL/BUS CPP Txn. - RAIL/BUS FJP Txn. - Common Purse Transfer - Common Purse Txn. (Distance Based) - Common Purse Txn. (Fix Price) - Retail Purse Txn. Test Case - RAIL/BUS Common Purse Txn. - RAIL/BUS CPP Txn. - RAIL/BUS FJP Txn. - Common Purse Transfer - Common Purse Txn. (Distance Based) - Common Purse Txn. (Fix Price) - Retail Purse Txn..	✓
					BSVS.00073 Rev.1.0	SAT Procedure	Clause 4 - Test ID: OTP-RAIL-01-001 - Test ID: OTP-RAIL-01-002 - Test ID: OTP-RAIL-01-003 - Test ID: OTP-RAIL-01-004 - Test ID: OTP-TOLL-01-001 - Test ID: OTP-TOLL-01-002 - Test ID: OTP-RR-02-001		
5.2.2	Free Top-up	BSVB.00013 Rev.2.0	Clause 4.1	Concessionary Card's Rules	BSVS.00071 Rev.2.0	SIT Procedure	Clause 4 - Test ID: OTP-RAIL-01-001	Test Case - RAIL/BUS Common Purse Txn. (Free Top-up @Entry Gate)	✓
					BSVS.00073 Rev.1.0	SAT Procedure	Clause 4 - Test ID: OTP-RAIL-01-001	Test Case - RAIL/BUS Common Purse Txn. (Free Top-up @Entry Gate)	

Technical Specification		Design			Testing			Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description	
5.3	The Low-Income Card	BSVB.00013 Rev.2.0	Clause 3.2.3	Low Income Common Card	BSVS.00022 Rev.2.0	Clause 4	Test Case - Card Initialization	✓
5.3.1	Issuing the Low-Income Card					- Test ID: OTP-CIPS-03-XXX		
5.3.2	Uses of Low-Income Card				BSVS.00071 Rev.2.0	Clause 4	Test Case - Card Personalization - RAIL/BUS Common Purse Txn. - RAIL/BUS CPP Txn. - RAIL/BUS FJP Txn. - Common Purse Transfer - Common Purse Txn. (Distance Based)	
5.3.3	Expiry					- Test ID: OTP-CIPSRM-06-001 - Test ID: OTP-RAIL-01-001 - Test ID: OTP-RAIL-01-002 - Test ID: OTP-RAIL-01-003 - Test ID: OTP-RAIL-01-004 - Test ID: OTP-TOLL-01-001		
5.3.4	Negative Value in the Low-Income Card					- Test ID: OTP-TOLL-01-002 - Test ID: OTP-RR-02-001		
6	COMMON CARD PRODUCTS				BSVS.00073 Rev.1.0	Clause 4	Test Case - RAIL/BUS Common Purse Txn. - RAIL/BUS CPP Txn. - RAIL/BUS FJP Txn. - Common Purse Transfer - Common Purse Txn. (Distance Based) - Common Purse Txn. (Fix Price) - Retail Purse Txn.	
						- Test ID: OTP-RAIL-01-001 - Test ID: OTP-RAIL-01-002 - Test ID: OTP-RAIL-01-003 - Test ID: OTP-RAIL-01-004 - Test ID: OTP-TOLL-01-001		
						- Test ID: OTP-TOLL-01-002 - Test ID: OTP-RR-02-001		
6.1.1	Overview	BSVB.00013 Rev.2.0	Clause 3.3	Common Card Product	Noted			✓

Technical Specification		Design			Testing			Compliance	
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
6.1.2	Standard Common Card Products	BSVB.00013 Rev.2.0	NC Card Business Rules	Standard Common Card Products	BSVS.00022 Rev.2.0	CIPS FAT Procedure	Clause 4 - Test ID: OTP-CIPS-04-001 - Test ID: OTP-CIPS-04-002 - Test ID: OTP-CIPS-04-004 - Test ID: OTP-CIPS-04-005	Test Case - Card Issuance - Card Sale - FJP Card Issuance - CPP Card Issuance	✓
					BSVS.00085 Rev.2.0	RRM FAT Procedure	Clause 4 - Test ID: OTP-RRM-04-001 - Test ID: OTP-RRM-04-002 - Test ID: OTP-CIPS-04-004 - Test ID: OTP-CIPS-04-005	Test Case - Card Issuance - Card Sale - FJP Card Issuance - CPP Card Issuance	
					BSVS.00071 Rev.2.0	SIT Procedure	Clause 4 - Test ID: OTP-CIPSRRM-04-002 - Test ID: OTP-CIPSRRM-05-001 - Test ID: OTP-CIPSRRM-05-004 - Test ID: OTP-CIPSRRM-05-005	Test Case - Card Issuance - Card Sale - FJP Card Issuance - CPP Card Issuance	
6.1.3	Specific Issuer Product	BSVB.00013 Rev.2.0	NC Card Business Rules	Specific Issuer Product	To be tested when the system integrated with SPs' Front End System (Milestone#4)				✓
6.2	Standard Common Card Products								
6.2.1	Common Purse (store value)	BSVB.00013 Rev.2.0	NC Card Business Rules	Common Purse (store value)	BSVS.00075 Rev.2.0	Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-004	Test Case - Manage Card Sale Parameter	✓
					BSVS.00022 Rev.2.0	CIPS FAT Procedure	Clause 4 - Test ID: OTP-CIPS-04-001 - Test ID: OTP-CIPS-04-002	Test Case - Card Issuance - Card Sale	
					BSVS.00085 Rev.2.0	RRM FAT Procedure	Clause 4, - Test ID: OTP-RRM-04-001 - Test ID: OTP-RRM-04-002	Test Case - Card Issuance - Card Sale	
					BSVS.00071 Rev.2.0	SIT Procedure	Clause 4 - Test ID: OTP-CIPSRRM-04-002 - Test ID: OTP-CIPSRRM-05-001	Test Case - Card Issuance - Card Sale	

Technical Specification			Design			Testing			Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
6.2.2 6.2.2(A) 6.2.2(B)	Common Pass Product Description Condition of Uses	BSVB.00013 Rev.2.0	Clause 3.4.2	Common Pass Product	BSVS.00075 Rev.2.0 Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-006	Test Case - Manage Common Pass Product Scheme Test Case - CPP Card Issuance Test Case - CPP Card Issuance Test Case - CPP Card Issuance	✓	
6.2.3 6.2.3(A) 6.2.3(B)	Fixed Journey product Description Condition of Uses	BSVB.00013 Rev.2.0	Clause 3.4.3	Fixed Journey Product	BSVS.00075 Rev.2.0 Configuration Data Management Subsystem FAT Procedure	Clause 4 Test Result - Test ID: OTP-CD-03-033	Test Case - Manage Fixed Journey Product Scheme Test Case - FJP Card Issuance Test Case - FJP Card Issuance Test Case - FJP Card Issuance	✓	
6.2.4	Common Loyalty Product	BSVB.00013 Rev.2.0	Clause 3.4.4	Fixed Loyalty Product	BSVS.00075 Rev.2.0 Configuration Data Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-CD-03-005	Test Case - Manage CTC Card Promotion	✓	
6.3 6.3.1 6.3.2	Specific Issuer Product Co-Branded Card Product Co-Issued Card Product	BSVB.00013 Rev.2.0	Clause 3.5	Specific Issuer Product	To be tested when the system integrated with Co-branded/Co-Issuer's Front End System (Milestone#4)				
6.4	Common Product Issuer	BSVB.00013 Rev.2.0	Clause 3.6	Common Product Issuer	Refer to Clause 6.1.1-6.1.3 and 6.2.1-6.2.4				
6.5	Product Hierarchy								

Technical Specification		Design				Testing			Compliance
No.	Description	Design Document	Clause	Description		Testing Document	Clause	Description	
6.5.1	Multiple Product on the Card	BSVB.00013 Rev.2.0	Clause 3.7	Product Hierarchy		BSVS.00071 Rev.2.0	Clause 4 - Test ID: OTP-RAIL-01-001 - Test ID: OTP-RAIL-01-002 - Test ID: OTP-RAIL-01-003	Test Case - RAIL/BUS Common Purse Txn. - RAIL/BUS CPP Txn. - RAIL/BUS FJP Txn.	✓
						SVS.00076 Rev.1.0	Clause 4 - Test ID: OTP-RAIL-01-001 - Test ID: OTP-RAIL-01-002 - Test ID: OTP-RAIL-01-003	Test Case RAIL/BUS Common Purse Txn. RAIL/BUS CPP Txn. RAIL/BUS FJP Txn.	
6.5.2	Multiple Promotion in the Card on Non-Transit Transaction	BSVB.00013 Rev.2.0	Clause 3.7	Product Hierarchy		BSVS.00071 Rev.2.0	Clause 4 - Test ID: OTP-TOLL-01-001 - Test ID: OTP-TOLL-01-002 - Test ID: OTP-RR-02-001	Test Case - Common Purse Txn. (Distance Based) - Common Purse Txn. (Fix Price) - Retail Purse Txn.	✓
						SVS.00076 Rev.1.0	Clause 4 - Test ID: OTP-TOLL-01-001 - Test ID: OTP-TOLL-01-002 - Test ID: OTP-RR-02-001	Test Case - Common Purse Txn. (Distance Based) - Common Purse Txn. (Fix Price) - Retail Purse Txn.	
7	Refund and Replacement of Common Card								
7.1	Refund of Common Purse	BSVB.00013 Rev.2.0	Clause 9.13	Card Refund		BSVS.00085 Rev.2.0	Clause 4 - Test ID: OTP-RRM-05-007	Test Case - Card Refund	✓
7.2	Refund of Lost/Stolen Card					BSVS.00071 Rev.2.0	Clause 4 - Test ID: OTP-CIPSRM-04-008 - Test ID: OTP-CIPSRM-04-007	Test Case - Card Refund - Card Defer Refund	
						BSVS.00073 Rev.1.0	Clause 4 - Test ID: OTP-CIPSRM-04-008 - Test ID: OTP-CIPSRM-04-007	Test Case - Card Refund - Card Defer Refund	

Technical Specification		Design			Testing			Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description	
7.3	Replacement of Damaged Common Card	BSVB.00013 Rev.2.0	NC Card Business Rules	Card Replacement	SIT Procedure	Clause 4 - Test ID: OTP-CIPSRRM-06-005	Test Case - Defer Card Replacement	✓
7.3.1	Non-Replaceable Damaged Cards							
7.3.2	Replaceable Damaged Cards				SAT Procedure	Clause 4 - Test ID: OTP-CIPSRRM-06-005	Test Case - Defer Card Replacement	
7.3.3	Refund of Invalid Card							
8	Disclosure of Transaction Report	BSVB.00013 Rev.2.0	NC Card Business Rules	Card Transaction Constraint	Report Management Subsystem FAT Procedure	Clause 4	Test Case	✓
8.1	Transaction Report						-	
8.2	Request for Transaction Report				SIT Procedure	Clause 4	Test Case - Report Verification	
8.3	Traffic Report				SAT Procedure	Clause 4	Test Case - Report Verification	
9	TOP-UP							
9.1	General	BSVB.00013 Rev.2.0	NC Card Business Rules	Purse Top-up Value	CIPS FAT Procedure	Clause 4 - Test ID: OTP-CIPS-05-001	Test Case - Card Add Value	✓
					RRM FAT Procedure	Clause 4 - Test ID:OTP-RRM-05-001	Test Case - Card Add Value	
					SIT Procedure	Clause 4 - Test ID: OTP-CIPSRRM-06-002 - Test ID: OTP-RR-01-001	Test Case - Card Add Value - Purse Add Value (Retail)	
					SAT Procedure	Clause 4 - Test ID: OTP-CIPSRRM-01-001 - Test ID: OTP-RR-01-001	Test Case - Card Add Value - Purse Add Value (Retail)	

Technical Specification		Design				Testing				Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description			
9.2	Automatic Top-up	BSVB.00013 Rev.2.0 BSVB.00041	Clause 9.8	Automatic Top up	Autoload Management	Clause 4	Test Case	✓		
9.2.1 (A)	Automatic Common Purse Top-Up		Clause 5.1	Module Design	Subsystem FAT Procedure	Clause 4	Test Case			
9.2.1 (B)	Automatic Renewing Period-based product				SIT Procedure	- Test ID: OTP-RAIL-01-005 - Test ID: OTP-RR-03-001	- Common Purse Auto Top Up - Auto Top Up(Retail)			
10	TRANSFER SCHEME				SAT Procedure	Clause 4	Test Case			
10.1	General									
10.2	Transfer Rules	BSVB.00013 Rev.2.0 BSVB.00001 Rev.3.0	Clause 4.4	Transfer Scheme	SIT Procedure	Clause 4	Test Case	✓		
10.2.1	General Conditions		Clause 4	Card File Description			- Common Purse Transfer			
10.2.1 (A)	Distance travelled condition						Test Case			
10.2.1 (B)	Transfer Time condition						- Common Purse Transfer			
10.2.1 (C)	Number of Transfers									
10.2.2	Applications of the Transfer Scheme				SAT Procedure	Clause 4	- Common Purse Transfer			
10.2.3	Transfer Scheme Renewal									
11	TRANSACTION FEE									

Technical Specification		Design				Testing			Compliance
No.	Description	Design Document	Clause	Description	Testing Document	Clause	Description		
11.1	General rules in Transaction Fee	BSW.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Financial Management Subsystem Decomposition	BSVB.00089 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-FM-05-001 - Test ID: OTP-FM-06-002	Test Case - Manage Fee Agreement - Account Entries with Fee Agreement By Volume - Account Entries with Fee Agreement By Volume	✓
11.2	Merchant Discount Rate (MDR*)	BSW.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Fee Management Service Detailed Design			- Test ID: OTP-FM-06-002		
11.3	Interchange fee	BSW.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Fee Management Service Detailed Design					
11.4	Data Processing fee	BSW.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Fee Management Service Detailed Design					
12	REVENUE APPORTIONMENT RULES								
12.1	General	BSVB.00013 Rev.2.0	NC Card Business Rules	Trip Fare Computing	BSVB.00089 Rev.1.0	Financial Management Subsystem FAT Procedure	Clause 4 - Test ID: OTP-FM-09-001	Test Case - Apportionment rules: Purse use on exit transaction can be portioned - Absolute and Remainder portions	✓
12.2	Revenue Apportionment Rules for Transfer Scheme	BSW.00009 Rev.2.0	Financial Management Subsystem Software Design Specification	Apportioned service Detail design			- Test ID: OTP-FM-09-002	- Apportionment rules: Purse use on exit transaction can be portioned - Relative and Remainder portion	
							- Test ID: OTP-FM-09-004	- Apportionment rules: Multiride Issue transaction can be portioned - Absolute and Remainder portions	
							- Test ID: OTP-FM-09-005	- Apportionment rules: Multiride Issue transaction can be portioned - Relative and Remainder portions	

Chapter 6 Others works

According to the Central Clearing House system development project's scope, works that have to be executed by the BSV consortium as the CCH system developer after the completion of system test in August 2016, consists of the CCH's technology transfer and training provision for the OTP and the common ticketing management's officials, providing supports for connecting the service providers' revenue collection systems to the CCH systems, and system maintenance.

6.1 Training and Technology Transfer

At the moment, the BSV consortium starts sending the CCH system's user, maintenance and training manuals, as well as the operational plan and qualifications of trainees attending each training course. It is expected that the training is started in the mid-December, 2016, with approximately 6-week training period.

Table 6-1 Overview of Training

Category	Course	Training Period	Ticket and Computer Engineering Dept.	System Connectivity Dept.	Common Ticketing and Settlement System Management Dept.	Common Ticket and Settlement Management Dept.	Customer Relations Dept.	Finance and Accounting Dept.	Products and Marketing Dept.	Business Development Dept.
CCH Operation Training	CCH Overview	4Hr	X	X	X	X	X	X	X	X
	Access Control Subsystem	4Hr	X		X					
	Device Management Subsystem	4Hr	X		X	X				
	Configuration Data Administration Subsystem	8Hr	X		X	X				
	Card Inventory Management Subsystem	8Hr	X		X	X		X		
	Financial Management Subsystem	16Hr	X		X	X		X		
	Actionlist Subsystem	4Hr	X		X	X				
	Report Management Subsystem	4Hr	X	X	X	X		X		
	SP Website Subsystem	8Hr	X	X	X	X		X		
	Customer Website Subsystem	4Hr	X	X	X	X				
	Key Management System	16Hr	X	X	X	X				
	Card Initialization and Personalization Subsystem	16Hr	X	X	X	X				
	Refund and Reload Machine (RRM)	16Hr	X	X	X	X				
CCH Maintenance Training	System Administration	8Hr		X						
	On-Line Server (OLS) Administration	8Hr		X						
	Off-Line Server Administration	4Hr		X						
	Host Security Management	16Hr		X						
	Communications	4Hr		X						
	Account Management	8Hr		X						
	Key Management System (KMS) Maintenance	16Hr	X	X						
	Card Initialization and Personalization Subsystem(CIPS) Maintenance	16Hr	X	X						
	Refund and Reload Machine (RRM) Maintenance	16Hr	X	X						
	Minimum quantity of trainees		3	3	3	4	1	1	1	1
	Quantity of officials for the actual operations									

Table 6-2 Training Plan

		Training Causes	Hour	Week					
				1	2	3	4	5	6
CCH Operation Training (3 Weeks)	1	CCH Overview	4Hr						
	2	Access Control Subsystem	4Hr						
	3	Device Management Subsystem	4Hr						
	4	Configuration Data Administration Subsystem	8Hr						
	5	Card Inventory Management Subsystem	8Hr						
	6	Financial Management Subsystem	16Hr						
	7	Actionlist Subsystem	4Hr						
	8	Report Management Subsystem	4Hr						
	9	SP Website Subsystem	8Hr						
	10	Customer Website Subsystem	4Hr						
	11	Key Management System	16Hr						
	12	Card Initialization and Personalization Subsystem	16Hr						
	13	Refund and Reload Machine (RRM)	16Hr						
CCH Maintenance Training (3 Weeks)	1	System Administration	8Hr						
	2	On-Line Server (OLS) Administration	8Hr						
	3	Off-Line Server Administration	4Hr						
	4	Host Security Management	16Hr						
	5	Communications	4Hr						
	6	Account Management	8Hr						
	7	Key Management System (KMS) Maintenance	16Hr						
	8	Card Initialization and Personalization Subsystem(CIPS) Maintenance	16Hr						
	9	Refund and Reload Machine (RRM) Maintenance	16Hr						

The trainees are required to have the following qualifications, at a minimum:

Ticket and Computer Engineering Department (Ticketing System Engineer)

- Background in Electronic Engineering or Engineering
- Knowledge in AFC system (at least 3 years)

System Connectivity Department (System Engineer)

- Background in Computer Engineering
- Programming language skill
- Knowledge in Network communication, Network security (at least 3 years)

Common Ticketing and Settlement Management Department (Software Engineer and supervising automatic fare collecting system)

- Background in Computer Engineering
- Server System Administrator (at least 3 years)
- Knowledge in Database system especially Oracle database (at least 3 years)
- Knowledge in server hardware, operating system, storage (at least 3 years)

Customer Relation Department

- Background in customer service.
- Good Computer skill

Finance and Accounting Department

- Background in Accounting (at least 3 years)
- Good Computer skill

Product and Marketing Department

- Background in Marketing
- Good Computer skill

Business Development Department

- Background in Business development.
- Good Computer skill

6.2 Supports for connecting the service providers' fare collecting systems to the CCH systems

At the moment, the Central Clearing House system is tested and ready to connect to the automatic fare collecting systems of the transit and non-transit service providers.

6.3 System Maintenance

The CCH system maintenance period is 2 years, starting from the date of the Material Acceptance Committee's decision to accept the third delivery, the system testing, on October 18, 2016.

Chapter 7 Performance Evaluation and Suggestions

7.1 Performance Evaluation

Regarding the performance evaluation of the Establishment of the Central Clearing House Project, the PMS Consulting Group evaluates the project's management, workmanship, equipment used in the project, and the project's achievement. The evaluation can be classified into project management evaluation, project works evaluation, and overall project completion evaluation. The PMS Consulting Group evaluates the BSV Consortium's performance based on the following criteria;

Table 7-1 PMS Consulting Group's Scoring Criteria

Scoring Criteria	Score Rating
Very Good	5
Good	4
Average	3
Fair	2
Poor	1

1. Project Management

The project management does not only focus on proficiency of the main project personnel who manage and control the project such as project manager or specialists, but also evaluate the Contractor's organization, including the work plan, document delivery plan and project coordination.

Table 7-2 Project Management Evaluation

No.	Details	Scoring				
		1	2	3	4	5
1	Project Management					
1.1	Appropriateness of Contractor's organization overview					✓
1.2	Working in cooperation and coordination between employers and employer's representatives				✓	
1.3	Meeting Attendance					✓
1.4	Response/works according to employers' suggestions/opinion					✓
1.5	Delivery of main operational plan and updated plan				✓	
1.6	Delivery of project-related documents				✓	

No.	Details	Scoring				
		1	2	3	4	5
1.7	Informing employers about project's delay, problems and corrections in order to complete the task within the schedule					✓
Total		32/35				

The Consultants' Opinion

The PMS consulting group considers the overview of project management and finds that the BSV's Organization Chart is appropriate for the project's operation. The BSV Consortium assigns Project Manager and Assistant Project Manager for overall management. Quality Manager is responsible for control the works quality include project documents, project timeline and project coordination. In addition, there is a head of technical groups related to hardware and software, training and testing.

Regarding meeting attendance and project coordination, the BSV Consortium sends their representatives to attend a weekly meeting for the project's progress report and discussion about problem solutions with the OTP and PMS consulting group regularly. Moreover, they also attend coordination meetings with transit service providers and banks.

Currently, the BSV consortium has already sent the design, system development and testing documents. Manuals, i.e. user, maintenance and training manuals, are under the preparation, and they are sent to the PMS consulting group for review. The document delivery and review are expected to be completed in November, 2016.

2. Project Work

In the project's works, the Contractors have to provide proficient and sufficient staff for effective operation and keeping up with the timeframe as stipulated in the Contract. They also have to provide necessary software and equipment for the project's works. It includes coordination with employers and the third party to acquire necessary information for the works.

Table 7-3 Project Performance Evaluation

No.	Details	Scoring				
		1	2	3	4	5
2	Project Works					
2.1	Total works effectiveness					✓
2.2	Providing sufficient equipment for works					✓
2.3	Providing necessary software for works					✓
2.4	Quality of workmanship					✓
2.5	Providing sufficient staff for works				✓	
Total		19/20				

The Consultants' Opinion

At the beginning, the manpower provided by the BSV Consortium are suitable for the project's works and in accordance with the OTP's requirements. They are experienced in the CCH's development. This includes supporting staff in various departments. The PMS Consulting Group and the OTP believe that they are sufficient for the project's works for keeping up with the timeframe stipulated in the Contract. However, the works is behind the schedule, so the PMS consulting group suggests that the BSV Consortium should recruits the additional staff to speed up the works and completes it within the schedule.

In the project, the BSV Consortium provides software as stipulated by the Contract for use in both the Microsoft Project which is responsible for works plan management throughout the project, and Alfresco program which is responsible for control and management of all incoming and outgoing documents, including providing equipment such as computers for the project.

The consulting group inspected and concluded that the devices provided under the Central Clearing House system development project, as well as devices, software and tools provided for the project operations, are accurate, appropriate and sufficient for the operations.

3. Project's Overall Completion

This section focuses on the project evaluation results whether they are in consistent with the project's requirements and objectives and whether the project is operated according to the Contract's timeframe. This evaluates the completion of each works pertaining design, system implementation and testing.

Table 7-4 Evaluation of Project Overall Success

No.	Details	Scoring				
		1	2	3	4	5
3	Consistency between the works and the employer's requirements					
3.1	The works is corrected and complied with the requirements					✓
3.2	The operation is completed according to the scope of works as stipulated in the Contract					✓
3.3	The project's works is in consistent with the timeframe and completed according to the schedule stipulated in the contract					✓
Total		15/15				

The Consultants' Opinion

Currently, the CCH system design, development and testing are already completed according to the contract's term. The PMS consulting group supervised and inspected all stages of the operations, from the system design to the completion of testing, and concluded that the BSV consortium's performances are complete and accurate in accordance with the OTP's requirements and the contract, regarding the system design, development and testing works.

Regarding the design's correction and completion, the PMS Consulting Group check the BSV Consortium's design and decide that its design already meets to the OTP's requirements.

7.2 Suggestions

- The Office of Transport and Traffic Policy and Planning (OTP) should establish the Common Ticketing Company (CTC), so that the CTC can be managed as soon as possible.
- Currently, the BSV consortium is under preparation for providing trainings and technology transfer, so the CTC's officials as the system's managers should

attend the trainings to learn, understand and operate the system effectively.

- Currently, the Central Clearing House system is ready for connecting to the service providers' revenue collection systems. The common ticket implementation requires the CTC as a mediator to negotiate with various service providers, and define business plan and policy.
- The CCH system should be used and operated when the system is still under the BSV consortium's responsibility, in case there is any inconvenience or necessity for improvement, the BSV consortium can solve it promptly.

Appendix A Summary of the Consultant Opinions on Documents of the Central Clearing House Project

Summary of the Consultant Opinions on Documents of the Central Clearing House Project

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
1	Project Management Document						
1.1	BSVB.00003	Staff Organization Plan	1.0	17 Mar 15	The document is consistent with the requirements.	No Objection	
1.2	BSVB.00004	Outline Quality Management Plan	1.0	17 Mar 15	Add efficiency rate and documents related to Quality Assurance regarding the project	No Objection with Comments	
			2.0	3 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
1.3	BSVB.00009	Quality Management Plan	1.0	3 Jul 15	Add details on each unit's responsibilities, e.g. Project Steering Committee and add Quality Assurance Process Flow for clarification.	Request for more information	
			2.0	6 Aug 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
1.4	BSVB.00002	Submittal Schedule	1.0	17 Mar 15	Add the system maintenance manual in the table of documents, provide document status control system, e.g. Excel Reconsider document delivery date since a large number of documents will be sent at the same day.	No Objection with Comments	
			2.0	19 May 15	Check expected delivery date of documents for each system to ensure that Requirements Specification will be sent before Design Specification	No Objection with Comments	
			3.0	28 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
			4.0	29 Aug 16	The document is consistent with the requirements.	No Objection	
1.5	BSVB.00006	Initial Work Program	1.0	17 Mar 15	1. Add minor work details for each item and testing schedule 2. Check document format no. specified to ensure it conforms to the practical one. 3. Clearly identify responsibilities of each meeting's attendees	No Objection with Comments	
			2.0	19 May 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
1.6	BSVB.00008	Coordinated Implementation Plans	1.0	12 May 15	The document is consistent with the requirements.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2	Design Document						
2.1	Architectural Document						
2.1.1	BSW.00001	System Architecture	1.0	23 Apr 15	1. Add details of system architecture figures 2. Thoroughly check, edit and add details on subsystems in the document 3. Add details on security systems 4. Check communication system design and internal and external connections	No Objection with comments	
			2.0	28 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.1.2	BSVB.00010	Technical & Network Architecture	1.0	23 Apr 15	1. Clarify details of the CCH system's overview chart 2. Thoroughly check, edit and add details on subsystems in the document 3. Add details on system specifications 4. Add details on system restoration plan	No Objection with comments	
			2.0	28 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.1.3	BSV.00002	System Security Architecture	1.0	19 May 15	1. Consider to add Web Safeguard for safe Web Portal access for the COH 2. Add details on methods, devices and modules of System Security Architecture	No Objection with comments	
			2.0	16 Jun 15	Add details on data encoding for security, e.g. cardholders' name and telephone number	No Objection with comments	
			3.0	14 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.1.4	BSVB.00001	NC Card Data Definition	1.0	9 Mar 15	1. Add details on system connection management according to GS Annex 6 Business Rules, Clause 10.2.1(A), Expressway's transaction management and card reader's files 2. System's ability to select Alternative/Second-source CSC	No Objection with comments	
			2.0	11 Jun 15	Clarify further data on card supply from other distributors	No Objection with comments	
			3.0	10 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.1.5	BSVB.00011	Configuration Parameters	1.0	11 Jun 15	Verify the document's data.	No Objection with comments	
			2.0	10 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.1.6	BSVB.00012	Transaction Data Definition	1.0	11 Jun 15	Add data in the document completely, e.g. data of devices issuing route-specific trip-based products, etc.	No Objection with comments	
	2.0		10 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection		
2.1.7	BSVB.00013	NC Card Business Rules	1.0	11 Jun 15	Edit and clarify information about system transitional period	No Objection	
			2.0	10 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.2	Requirements Document						
2.2.1	BSVB.00014	Access Control Subsystem Software Requirement Specification	1.0	28 May 15	Add details on Cardholder Web Portal and SP Web Portal to ensure that document delivered conforms to the requirement	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.2.2	BSVB.00015	Action List Management Subsystem Software Requirement Specification	1.0	16 Jun 15	The document is consistent with the requirements.	No Objection	
2.2.3	BSVB.00016	Autoload Management Subsystem Software Requirement Specification	1.0	16 Jun 15	Add details on relations between Autoload and cardholders regarding cooperation and processes	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.
2.2.4	BSVB.00017	Card Inventory Management Subsystem Software Requirement Specification	1.0	10 Jun 15	The document is consistent with the requirements.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.2.5	BSVS.00003	Card Initialization and Personalization Subsystem Software Requirement Specification	1.0	28 Jul 15	1. Correct Card Level to be identical to BSVB.00013 NC Card Business Rule 2. Clearly identify message about personal data printing on Personalized cards	No Objection with comments	
			2.0	28 Aug 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.2.6	BSVB.00018	Communication Subsystem Requirement Specification	1.0	18 Jun 15	Check and confirm that the developed system uses Communication Middleware software and add Online Communication's technical specifications	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.
2.2.7	BSVB.00101	Configuration Data Management Subsystem Software Requirement Specification	1.0	16 Jun 15	Add details on transit routes and bus stops, as well as service providers' device parameters	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.
2.2.8	BSVB.00019	Device Management Subsystem Software Requirement Specification	1.0	28 May 15	Add details on function displaying device status when ON, so that the document contains thorough details according to the requirements	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.2.9	BSV.00003	Financial Management Subsystem Software Requirement Specification	1.0	9 Jun 15	Add details on Multi Card Issuer System section, and edit connection section according to the requirements	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.
2.2.10	BSVB.00020	Host Security Management Software Requirement Specification	1.0	26 Jun 15	1. Add details on TCP/IP protocol and Key Export function 2. Check RS232 usage for communication between Control Console and HSM 3. For Export Function encoding, security in data transfer should be considered. 4. HSM should support both Online and Offline operations without any effect on its efficiency.	No Objection with comments	
			2.0	28 Aug 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.2.11	BSV.00004	Issuer Subsystem Software Requirement Specification	1.0	9 Jun 15	Add details on Issuer Validation Service so that the document contains complete information and for effective operations	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.2.12	BSVS.00004	Key Management Subsystem Software Requirement Specification	1.0	28 Jul 15	Add details on connection with HSM and administrator systems through TCP/IP protocol	No Objection with comments	
	2.0		2.0	28 Aug 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.2.13	BSWV.00014	Online Enquiry Software Requirement Specification	1.0	11 Jun 15	The document is consistent with the requirements.	No Objection	
2.2.14	BSVB.00022	Report Management Subsystem Software Requirement Specification	1.0	16 Jun 15	Add details to clarify financial report and reconciliation	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.
2.2.15	BSWV.00023	Systems Management Subsystem Software Requirement Specification	1.0	16 Jun 15	Add Self-diagnostics, Archival and System Operation Log Management functions in Maintenance Management	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.2.16	BSVV.00005	Cardholder Software Requirement Specification	1.0	19 Jun 15	1. Add details on website accessibility via cardholder's mobile phone 2. Edit some data that identifies requirement as "if any", since such data, e.g. product inventory, transaction amount or fine is necessary for the service	No Objection with comments	
	2.0		2.0	29 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.2.17	BSVB.00114	SP Website Software Requirement Specification	1.0	16 Jun 15	Add details on requirements for Offline Database such as Offline Database Mode operation	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.2.18	BSVB.00105	Payment Gateway Software Requirement Specification	1.0	26 Jun 15	The document is consistent with the requirements.	No Objection	
2.2.19	BSVS.00078	SAM Requirement Specification	1.0	28 Jul 15	1. Add requirements for connection between KMS and SAM Personalization 2. Confirm whether provision of SAM Personalization devices is in the work's scope	No Objection with comments	
			2.0	28 Aug 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.2.20	BSVS.00069	Refund and Reload Machine Software Requirement Specification	1.0	28 Jul 15	1. Edit Card Level in the document to be identical with BSVB.00013 NC Card Business Rule 2. Correct requirements for personal data printing on cards	No Objection with comments	
			2.0	28 Aug 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
			Interface Documents				
2.3.1	BSVB.00025	Bank Interface Specification	1.0	24 Jun 15	Add details on Financial File and Operational File's layout, key attributes and formats	No Objection	
2.3.2	BSV.00006	OTP CCH to Operator Interface Specification Details incorporated into Front End CCH-L3 Detailed Interface Specification	1.0	16 Jun 15	Term referring "service providers" should be on the same standard for the whole document	No Objection with comments	
			2.0	13 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.3.3	BSVB.00026	Equipment Initialization Interface Specification	1.0	26 Jun 15	Verify Service Provider ID, SP ID and Location code in the document	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.3.4	BSV.00015	Online Enquiry Subsystem Interface Specification	1.0	11 Jun 15	Add details on Online Interface between SP and CCH	No Objection with comments	
	2.0		13 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection		
2.3.5	BSVB.00106	Cardholder Website Payment Gateway Subsystem Interface Specification	1.0	26 Jun 15	The document is consistent with the requirements.	No Objection	
2.3.6	BSVS.00079	SAM Interface Specification	1.0	17 Aug 15	Check SAM Interface's details to ensure that it is complete for SAM management	Request for more Information	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4	Design Documents						
2.4.1	BSVB.00039	Access Control Subsystem Design Specification	1.0	31 Jul 15	Add table of abbreviations and definitions according to the standard document	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.2	BSVB.00040	Action List Management Subsystem Design Specification	1.0	31 Jul 15	Edit document structure to accord with the standard document	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.4.3	BSVB.00041	Autoload Management Subsystem Design Specification	1.0	13 Aug 15	1. Edit document structure to accord with the standard document 2. Provide more information about cardholder <<subsystem>> and cardholder <<database>>	No Objection with comments	
	2.0		2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.4	BSVB.00042	Card Inventory Management Subsystem Design Specification	1.0	31 Jul 15	Check Offline Server Inventory Management Module's data transfer	No Objection with comments	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.
2.4.5	BSVS.00009	Card Initialization and Personalization Subsystem Design Specification	1.0	17 Aug 15	Provide details on difference between this document and BSVS.00003 CIPS Software Requirement Specification	Request for more Information	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.4.6	BSVB.00043	Communications Subsystem System Design Specification	1.0	13 Aug 15	1. Correct document structure to accord with the standard document, and edit words with the same definition for consistency to be on the same standard 3. Details on difference between CIPD and Reload and Refund Facility 4. Check correlation between the documents 5. Consider using retrieval of transaction or repetitive items using FTP or SFTP for data sending reliability	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.7	BSVB.00116	Configuration Data Management Subsystem Software Design Specification	1.0	31 Jul 15	Add table of contents and tables/figures	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.4.8	BSVB.00044	Device Management Subsystem Software Design Specification	1.0	31 Aug 15	1. Check definition of Device ID instead of SAM ID, since both IDs are different, and edit the use of Device ID in case the device doesn't have SAM, since they're not compatible 2. Add complete tables/figures	No Objection with comments	
	2.0			22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.9	BSV.00009	Financial Management Subsystem Software Design Specification	1.0	14 Aug 15	1. Add tables/figures 2. Add definition of banking monetary transfer fee for accurate calculation 3. Zero Balance shouldn't exist since according to fee collection model proposed, the CCH collects fee from SP	No Objection with comments	
			2.0	28 Aug 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.10	BSVB.00045	Host Security Management Subsystem Software Design Specification	1.0	13 Aug 15	Check to ensure that data can be sent through TCP/IP instead of RS232	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.4.11	BSV.00010	Issuer Subsystem Design Specification	1.0	29 Jul 15	1. Edit document structure to accord with the standard document	No Objection with comments	
	2.0			28 Aug 15	2. Add complete table/figure names The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.12	BSVS.00010	Key Management Subsystem Design Specification	1.0	13 Aug 15	It's consistent with the requirements.	No Objection	
	2.0			15 Sept 15	It's consistent with the requirements.	No Objection	The BSV adds document details on functions
2.4.13	BSW.00016	Online Enquiry Subsystem Design Specification	1.0	22 Jul 15	It's consistent with the requirements.	No Objection	
2.4.14	BSVB.00046	Report Management Subsystem Design Specification	1.0	13 Aug 15	1. Edit document structure to accord with the standard document and add complete table/figure names 2. Add Auto Top-up Activation Transaction report by Service Provider 3. Confirm capacity of report edition when the CTC undertakes the operation, weekly/monthly/ad-hoc report issue	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.4.15	BSVB.00047	Systems Management Subsystem Software Design Specification	1.0	13 Aug 15	1. Add all missing charts 2. Provide references for use of ORACLE RAC for DR System, e.g. system efficiency testing results	No Objection with comments	
	2.0		2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.16	BSVS.00011	Central Clearing House Equipment Rack Plan	1.0	28 Aug 15	In Rack Planning, Host Security Management systems should be included.	Request for more Information	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.17	BSVB.00048	Central Clearing House Network Design	1.0	13 Aug 15	1. Check ORA-INT IP of Oracle DB1 and ORA-INT IP for Vmware ESX11 2. Add LAN Topology chart for clarification 3. Consider adding N/W Configuration for DR center	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.4.18	BSVB.00049	Central Clearing House Server System Design	1.0	13 Aug 15	1. The server's capacity planning should contain data about all memory units, CPU Capacity, and references to support the consideration on suitability of the devices 2. Add Server Configuration chart for clarification	Request for more Information	
	2.0		2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.19	BSV.00011	Cardholder Website Software Design Specification	1.0	6 Aug 15	1. Clearly identify storage period for Cardholder Transaction 2. Edit cardholder data to be identical with the data specified in BSVB.00013 Rev.2.0 NC Card Business Rule 3. Check personal data to ensure it is identical	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.20	BSVB.00115	SP Website Software Design Specification	1.0	13 Aug 15	1. Add data downloading function in Excel format upon the user's request 2. Correct overlapped charts	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.4.21	BSVB.00107	Payment Gateway Subsystem Interface Specification	1.0	13 Aug 15	1. Check Data Flow chart whether payment confirmation stage is provided in order to prevent fraud 2. Consider editing Data Flow regarding making shop transactions related payments for better money transfer security.	Request for more Information	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.22	BSVS.00083	SAM Design Specification	1.0	17 Aug 15	Add details on processes/functions between SAM, card and Host System	No Objection with comments	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.23	BSVB.00104	System security architecture Design Specification	1.0	7 Aug 15	1. Identify difference between this document and BSVV.00002 Rev.3.0 System Security Architecture, e.g. document's scope or introduction added. 2. Identify reasons for using GPG encrypted for communication between Non-transit and CCH systems instead of SP SAM	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
2.4.24	BSVS.00084	Refund and Reload Machine Software Design Specification	1.0	17 Aug 15	Check the document contents since the details are similar to BSVS.00009 Rev.1.0 CIPS Design Specification	Request for more Information	
			2.0	22 Jul 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.25	BSVB.00126	NFC Prototype Specification	1.0	17 Feb 16	The document is complete and consistent with the requirements.	No Objection	
2.4.26	BSVB.00127	Retail Prototype Specification	1.0	11 Apr 16	Add Retail Prototype details	No Objection with comments	
			2.0	3 May 16	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
2.4.27	BSVS.00092	Toll Prototype Specification	1.0	3 May 16	The document is complete and consistent with the requirements.	No Objection	
2.4.28	BSVS.00093	Rail Prototype Specification	1.0	3 May 16	The document is complete and consistent with the requirements.	No Objection	
3	Development Document						
3.1	BSVB.00128	Complete Central Clearing House System Application Development	1.0	25 Mar 16	The document is complete and consistent with the requirements.	No Objection	
3.2	BSVS.00012	Procurement Plan	1.0	28 Aug 15	Correct details about the document's objectives and adjust the operational plan to comply with the contract's term	No Objection with comments	
			2.0	15 Sept 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
3.3	BSVS.00001	Hardware Bill of Materials	1.0	28 Aug 15	The document is complete and consistent with the requirements.	No Objection	
3.4	BSVS.00002	Software Bill of Materials	1.0	30 Aug 15	Check the SMS Server's operation systems since they're not consistent with those specified in BSVB.00048 Central Clearing House Network Design	No Objection with comments	
			2.0	5 Oct 15	The BSV checked and edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
3.5	BSVS.00080	Third party Software Bill of Materials	1.0	28 Aug 15	Check the software lists properly to be consistent with those specified in the contract.	No Objection	The BSV provides explanations for the consultant's comments explaining that the missing software is developed by the consortium with details specified in BSVS.00002. The consultant considers that the document has complete and proper details.
4	Testing Documents						
4.1	BSVB.00005	Preliminary Test plan	1.0	17 Mar 15	Add Availability Test in the test plan	Objection	
			2.0	19 May 15	The BSV added some details in the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
4.2	BSVB.00068	Overall Inspection and Test Plan	1.0	6 Aug 15	Consider conducting Performance Test during Trial Run & User Acceptance Test. Add each group's responsibilities, both inspectors and the participants in all tests.	No Objection with comments	
			2.0	29 Sept 15	The BSV replied the consultant's comments and edits the documents accordingly, and the consultant has no further comment.	No Objection	
4.3	BSVB.00069	Functional Acceptance Test Plan	1.0	11 Aug 15	The BSV is required to identify Payment Gateway testing methods in the plan.	No Objection with comments	
			2.0	29 Jan 16	The BSV replied the consultant's comments and edits the documents accordingly, and the consultant has no further comment.	No Objection	
4.4	BSVB.00070	System Integration Test Plan	1.0	8 Jul 16	The document is complete and consistent with the requirements.	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.
4.5	BSVS.00072	System Acceptance Test Plan	1.0	15 Jul 16	The document is complete and consistent with the requirements.	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.
4.6	BSVB.00071	Actionlist Management Subsystem Functional Acceptance Test Procedure	1.0	29 Dec 15	The document is complete and consistent with the requirements.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
4.7	BSVB.00072	Autoload Management Subsystem Functional Acceptance Test Procedure	1.0	9 May 16	The document is complete and consistent with the requirements.	No Objection	
4.8	BSVB.00073	Card Inventory Management Subsystem Functional Acceptance Test Procedure	1.0	29 Dec 15	The document is complete and consistent with the requirements.	No Objection	
4.9	BSVS.00022	Card Initialization and Personalization Subsystem Functional Acceptance Test Procedure	1.0	17 Dec 15	Correct subsystems regarding the system access	No Objection with comments	
			2.0	22 Jan 16	The BSV replied the consultant's comments and edits the documents accordingly, and the consultant has no further comment.	No Objection	
4.10	BSVB.00074	Communication Management Subsystem Functional Acceptance Test Procedure	1.0	18 Mar 16	The document is complete and consistent with the requirements.	No Objection	
4.11	BSVB.00075	Configuration Data Management Subsystem Functional Acceptance Test Procedure	1.0	17 Feb 16	Correct details about Parameters used in the tests	No Objection with comments	
			2.0	9 May 16	The BSV replied the consultant's comments and edits the documents accordingly, and the consultant has no further comment.	No Objection	
4.12	BSVB.00076	Device Management Subsystem Functional Acceptance Test Procedure	1.0	21 Dec 15	The document is complete and consistent with the requirements.	No Objection	
4.13	BSVB.00077	Financial Management Subsystem Functional Acceptance Test Procedure	1.0	9 May 16	The document is complete and consistent with the requirements.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
4.14	BSVB.00078	Host Security Management Subsystem Functional Acceptance Test Procedure	1.0	29 Jan 16	The document is complete and consistent with the requirements.	No Objection	
4.15	BSVB.00079	Issuer Management Subsystem Functional Acceptance Test Procedure	1.0	9 May 16	The document is complete and consistent with the requirements.	No Objection	
4.16	BSVS.00023	Key Management Subsystem Functional Acceptance Test Procedure	1.0	17 Dec 15	The BSV is required to review and edit some of potential test results.	No Objection with comments	
			2.0	22 Jan 16	The BSV replied the consultant's comments and edits the documents accordingly, and the consultant has no further comment.	No Objection	
4.17	BSVB.00080	Online Enquiry Management Subsystem Functional Acceptance Test Procedure	1.0	9 May 16	The document is complete and consistent with the requirements.	No Objection	
4.18	BSVB.00081	Report Management Subsystem Functional Acceptance Test Procedure	1.0	30 Mar 16	The document is complete and consistent with the requirements.	No Objection	
4.19	BSVB.00082	System Management Subsystem Functional Acceptance Test Procedure	1.0	18 Jan 16	Add testing list to cover the system's entire functions	No Objection with comments	
			2.0	30 Mar 16	The BSV replied the consultant's comments and edits the documents accordingly, and the consultant has no further comment.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
4.20	BSVS.00071	System Integration Test Procedure	1.0	15 Jul 16	Add and edit testing procedures to be consistent with the usage conditions as best as possible	No Objection with comments	
	2.0		2.0	2 Aug 16	The BSV replied the consultant's comments and edits the documents accordingly, and the consultant has no further comment.	No Objection	
4.21	BSVS.00073	System Acceptance Test Procedure	1.0	2 Aug 16	Explain verification process of parameters sent to the devices and usage data returned to the CCH	No Objection	The BSV provides explanations for the consultant's comments, which are sufficient to decide that the document complies with the requirements.
4.22	BSVB.00083	Actionlist Management Subsystem Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.23	BSVB.00084	Autoload Management Subsystem Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.24	BSVB.00085	Card Inventory Management Subsystem Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.25	BSVS.00074	Card Initialization and Personalization Subsystem Functional Acceptance Test Summary Report	1.0	25 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.26	BSVB.00086	Communication Management Subsystem Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.27	BSVB.00087	Configuration Data Management Subsystem Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
4.28	BSVB.00088	Device Management Subsystem Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.29	BSVB.00089	Financial Management Subsystem Functional Acceptance Test Summary Report	1.0	25 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.30	BSVB.00090	Host Security Management Subsystem Functional Acceptance Test Summary Report	1.0	1 Aug 16	The document is complete and consistent with the requirements.	No Objection	
4.31	BSVB.00091	Issuer Management Subsystem Functional Acceptance Test Summary Report	1.0	25 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.32	BSVB.00092	Key Management Subsystem Functional Acceptance Test Summary Report	1.0	25 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.33	BSVB.00093	Online Enquiry Management Subsystem Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.34	BSVB.00094	Report Management Subsystem Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.35	BSVB.00095	System Management Subsystem Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.36	BSVS.00075	System Integration Test Summary Report	1.0	16 Aug 16	The document is complete and consistent with the requirements.	No Objection	
4.37	BSVS.00076	System Acceptance Test Summary Report	1.0	16 Aug 16	The document is complete and consistent with the requirements.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
4.38	BSVS.00085	Refund and Reload Machine Software Acceptance Test Procedure	1.0	17 Dec 15	Check names of the subsystems under the test specified in the documents	No Objection with comments	
			2.0	22 Jan 16	The BSV replied the consultant's comments and edits the documents accordingly, and the consultant has no further comment.	No Objection	
4.39	BSVS.00086	Refund and Reload Machine Functional Acceptance Test Summary Report	1.0	25 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.40	BSVB.00119	Access Control Subsystem Functional Acceptance Test Procedure	1.0	21 Dec 15	The document is complete and consistent with the requirements.	No Objection	
4.41	BSVB.00120	Cardholder Website Functional Acceptance Test Procedure	1.0	9 May 16	The document is complete and consistent with the requirements.	No Objection	
4.42	BSVB.00121	SP Website Functional Acceptance Test Procedure	1.0	9 May 16	The document is complete and consistent with the requirements.	No Objection	
4.43	BSVB.00122	Access Control Subsystem Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.44	BSVB.00123	Cardholder Website Functional Acceptance Test Summary Report	1.0	25 Jul 16	The document is complete and consistent with the requirements.	No Objection	
4.45	BSVB.00124	SP Website Functional Acceptance Test Summary Report	1.0	21 Jul 16	The document is complete and consistent with the requirements.	No Objection	

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
5	User Documents						
5.1	BSVS.00013	Card Initialization and Personalization Subsystem Operating Manual	-	-	-	-	The document is under preparation by the BSV.
5.2	BSVS.00014	Card Initialization and Personalization Subsystem Maintenance Manual	-	-	-	-	The document is under preparation by the BSV.
5.3	BSVS.00077	Key Management Subsystem Operating Manual	-	-	-	-	The document is under preparation by the BSV.
5.4	BSVS.00016	Key Management Subsystem Maintenance Manual	-	-	-	-	The document is under preparation by the BSV.
5.5	BSVS.00017	Database Maintenance Manual	-	-	-	-	The document is under preparation by the BSV.
5.6	BSVS.00018	Refund and Reload Machine Operating Manual	-	-	-	-	The document is under preparation by the BSV.
5.7	BSVS.00019	Refund and Reload Machine Maintenance Manual	-	-	-	-	The document is under preparation by the BSV.
5.8	BSVS.00029	Card Initialization and Personalization Subsystem Operating Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.9	BSVS.00030	Card Initialization and Personalization Subsystem Maintenance Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.10	BSVS.00038	Key Management Subsystem Operating Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.11	BSVS.00039	Key Management Subsystem Maintenance Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
5.12	BSVS.00047	Database Maintenance Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.13	BSVS.00048	Refund and Reload Machine Operating Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.14	BSVS.00049	Refund and Reload Machine Maintenance Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.15	BSVS.00081	Network Operating Manual	-	-	-	-	The document is under preparation by the BSV.
5.16	BSVS.00082	Network Maintenance Manual	-	-	-	-	The document is under preparation by the BSV.
5.17	BSVS.00089	Network Operating Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.18	BSVS.00090	Network Maintenance Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.19	BSVB.00108	Server Administration Manual	1.0	19 Jan 16	The document is complete and consistent with the requirements.	No Objection	
5.20	BSVB.00109	CCH Operating Manual	1.0	6 Sept 16	Update system and user interface usage procedure for each subsystems and make them conform to the OTP's CCH	No Objection with comments	
5.21	BSVB.00110	CCH Maintenance Manual	1.0	19 Jan 16	Update system maintenance procedure and make it conform to the OTP's CCH	No Objection with comments	
5.22	BSVB.00111	Server Administration Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
5.23	BSVB.00112	CCH Operating Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.24	BSVB.00113	CCH Maintenance Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
5.25	BSVB.00050	Project Glossary	1.0	3 Aug 15	Thoroughly check and collect abbreviations and glossary specified in the documents sent by the BSV.	No Objection with comments	
			2.0	15 Sept 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection	
5.26	BSVB.00117	Cardholder & SP Website Operating Manual	1.0	19 Jan 16	Update system maintenance procedure and make it conform to the OTP's CCH	No Objection with comments	
5.27	BSVB.00118	Cardholder & SP Website Operating Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
6	Training Documents						
9.1	BSVS.00005	Technology Transfer Program	1.0	30 Aug 15	Correct document structure to be in accordance with the standard document	No Objection with comments	
	2.0		29 Sept 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection		
9.2	BSVS.00020	Training Program	1.0	30 Aug 15	The BSV is required to consider providing additional training on Source Code regarding system maintenance training.	No Objection with comments	
	2.0		29 Sept 15	The BSV edits the documents according to the consultant's comments, and the consultant has no further comment.	No Objection		
9.3	BSVB.00097	Access Control Subsystem Training Manual	1.0	30 Sept 16	The document is complete and consistent with the requirements.	No Objection	
9.4	BSVB.00098	Action List Management Subsystem Training Manual	1.0	30 Sept 16	The document is complete and consistent with the requirements.	No Objection	
9.5	BSVB.00099	Autoload Management Subsystem Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.6	BSVB.00100	Card Inventory Management Subsystem Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.7	BSVS.00007	Card Initialization and Personalization Subsystem Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.8	BSVB.00027	Communication Subsystem Training Manual	-	-	-	-	The document is under preparation by the BSV.

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
9.9	BSVB.00028	Configuration Data Administration Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.10	BSVB.00029	Device Management Subsystem Training Manual	1.0	30 Sept 16	The document is complete and consistent with the requirements.	No Objection	
9.11	BSVB.00030	Financial Management Subsystem Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.12	BSVB.00031	Host Security Management Subsystem Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.13	BSVB.00032	Account Management Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.14	BSVS.00008	Key Management Subsystem Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.15	BSVB.00033	On Line Server Administration Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.16	BSVB.00034	Report Management Subsystem Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.17	BSVB.00035	Systems Management Subsystem Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.18	BSVB.00036	Central Clearing House Overview Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.19	BSVB.00037	Off Line Server Administration Training Manual	-	-	-	-	The document is under preparation by the BSV.

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
9.20	BSVB.00038	Cardholder & SP Website Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.21	BSVS.00087	Refund and Reload Machine Training Manual	-	-	-	-	The document is under preparation by the BSV.
9.22	BSVS.00050	Access Control Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.23	BSVS.00051	Action List Management Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.24	BSVS.00052	Autoload Management Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.25	BSVS.00053	Card Inventory Management Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.26	BSVS.00054	Card Initialization and Personalization Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.27	BSVS.00055	Communication Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.28	BSVS.00056	Configuration Data Administration Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.29	BSVS.00057	Device Management Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.30	BSVS.00058	Financial Management Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.

No.	Number.	Documents	Issue	Date	Consideration		Note
					Comments	Results	
9.31	BSVS.00059	Host Security Management Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.32	BSVS.00060	Account Management Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.33	BSVS.00061	Key Management Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.34	BSVS.00062	On Line Server Administration Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.35	BSVS.00063	Report Management Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.36	BSVS.00064	Systems Management Subsystem Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.37	BSVS.00065	Central Clearing House Overview Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.38	BSVS.00066	Off Line Server Administration Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.39	BSVS.00067	Cardholder & SP Website Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.
9.40	BSVS.00088	Refund and Reload Machine Training Manual (Thai)	-	-	-	-	The document is under preparation by the BSV.

Appendix B Table of Incoming and Outgoing Documents for the Central Clearing House Project

Table of Incoming Documents
The Central Clearing House (CCH) System Development Project

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
1	IN0001	BSV	BSV.OTP.1000.P2500.09.03.2015	9 Mar 15	Document Submission for Approval, No. BSVB.00001 Rev1.0: NC Card Data Definition	OTP	9 Mar 15	/	/	11 Mar 15	
2	IN0002	BSV	BSV.OTP.1002.P2500.17.03.2015	17 Mar 15	Document Submission for Approval, No. BSVB.00002 Rev1.0: Submittal Schedule	OTP	17 Mar 15	/	/	18 Mar 15	
3	IN0003	BSV	BSV.OTP.1003.P2500.17.03.2015	17 Mar 15	Document Submission for Approval, No. BSVB.00003 Rev1.0: Staff Organization Plan	OTP	17 Mar 15	/	/	18 Mar 15	
4	IN0004	BSV	BSV.OTP.1004.P2500.17.03.2015	17 Mar 15	Document Submission for Approval, No. BSVB.00004 Rev1.0: Outline Quality Plan	OTP	17 Mar 15	/	/	18 Mar 15	
5	IN0005	BSV	BSV.OTP.1005.P2500.17.03.2015	17 Mar 15	Document Submission for Approval, No. BSVB.00005 Rev1.0: Preliminary Test Plan	OTP	17 Mar 15	/	/	18 Mar 15	
6	IN0006	BSV	BSV.OTP.1006.P2500.17.03.2015	17 Mar 15	Document Submission for Approval, No. BSVB.00006 Rev1.0: Initial Work Program	OTP	17 Mar 15	/	/	18 Mar 15	
7	IN0007	BSV	BSV.OTP.1007.P2500.25.03.2015	25 Mar 15	Submission of Monthly Progress Report- March 15	OTP	27 Mar 15	/	/	30 Mar 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
8	IN0008	BSV	BSV.OTP.1009.P2500.22.04.2015	22 Apr 15	Document Submission for Approval, No. BSW.00001 Rev1.0: Technical and Network Architecture	OTP	23 Apr 15	/	/	27 Apr 15	
9	IN0009	BSV	BSV.OTP.1008.P2500.22.04.2015	22 Apr 15	Document Submission for Approval, No. BSVB.00010 Rev.1.0: System Architecture	OTP	23 Apr 15	/	/	27 Apr 15	
10	IN0010	BSV	BSV.OTP.1012.P2500.11.05.2015	11 May 15	Submission of Monthly Progress Report-March 15 (Revised Edition)	OTP	12 May 15	/		12 May 15	
11	IN0011	BSV	BSV.OTP.1011.P2500.11.05.2015	11 May 15	Document Submission for Approval, No. BSVB.00008 Rev1.0: Coordinated Implementation Plan	OTP	12 May 15	/		12 May 15	
12	IN0012	BSV	BSV.OTP.1013.P2500.15.05.2015	15 May 15	Submission of Explanations of Comments for Approval, BSVB.00003 Rev.1.0: Staff Organization Plan	OTP	19 May 15	/	/	19 May 15	
13	IN0013	BSV	BSV.OTP.1014.P2500.15.05.2015	15 May 15	Document Submission for Approval, No. BSVB.00005 Rev 2.0: Preliminary Test Plan	OTP	19 May 15	/	/	19 May 15	
14	IN0014	BSV	BSV.OTP.1015.P2500.18.05.2015	15 May 15	Document Submission for Approval, No. BSVB.00006 Rev2.0: Initial Work Program	OTP	19 May 15	/	/	19 May 15	
15	IN0015	BSV	BSV.OTP.1010.P2500.18.05.2015	18 May 15	Document Submission for Approval, No. BSW.00002 Rev.1.0: System Security Architecture	OTP	19 May 15	/	/	19 May 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
16	IN0016	BSV	BSV.OTP.1016.P2500.18.05.2015	18 May 15	Document Submission for Approval, No. BSVB.00002 Rev 2.0: Submittal Schedule	OTP	19 May 15	/	/	19 May 15	
17	IN0017	BSV	BSV.OTP.1017.P2500.25.05.2015	25 May 15	Submission of Monthly Progress Report-April 15	OTP	25 May 15	/	/	26 May 15	
18	IN0018	BSV	BSV.OTP.1018.P2500.25.05.2015	25 May 15	Submission of Monthly Progress Report-May15	OTP	25 May 15	/	/	26 May 15	
19	IN0019	BSV	BSV.OTP.1020.P2500.28.05.2015	28 May 15	Document Submission for Approval, No. BSVB.00014 Rev. 1.0: Access Control Subsystem Software Requirement Specification	OTP	28 May 15	/	/	28 May 15	
20	IN0020	BSV	BSV.OTP.1021.P2500.28.05.2015	28 May 15	Document Submission for Approval, No. BSVB.00019 Rev.1.0: Device Management Subsystem Requirement Specification	OTP	28 May 15	/	/	28 May 15	
21	IN0021	BSV	BSV.OTP.1023.P2500.04.06.2015	4 Jun 15	Document Submission for Approval, No. BSW.00003 Rev.1.0: Financial Management Software Requirements Specification	OTP	5 Jun 15	/	/	8 Jun 15	
22	IN0022	BSV	BSV.OTP.1027.P2500.08.06.2015	8 Jun 15	Document Submission for Approval, No. BSW.00004 Rev.1.0: Issuer Subsystem Software Requirement Specification	OTP	9 Jun 15	/	/	9 Jun 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
23	IN0023	BSV	BSV.OTP.1028.P2500.09.06.2015	9 Jun 15	Document Submission for Approval, No. BSVB.00017 Rev.1.0: Card Inventory Management Subsystem Requirement Specification	OTP	10 Jun 15	/	/	11 Jun 15	
24	IN0024	BSV	BSV.OTP.1029.P2500.10.06.2015	10 Jun 15	Document Submission for Approval, No. BSW.00014 Rev.1.0: Online Enquiry Software Requirement Specification	OTP	11 Jun 15	/	/	11 Jun 15	
25	IN0025	BSV	BSV.OTP.1030.P2500.10.06.2015	10 Jun 15	Document Submission for Approval, No. BSVB.00001 Rev.2.0: NC Card Data Definition	OTP	11 Jun 15	/	/	11 Jun 15	
26	IN0026	BSV	BSV.OTP.1025.P2500.11.06.2015	11 Jun 15	Document Submission for Approval, No. BSVB.00011 Rev.1.0: Configuration Parameters	OTP	11 Jun 15	/	/	11 Jun 15	
27	IN0027	BSV	BSV.OTP.1026.P2500.11.06.2015	11 Jun 15	Document Submission for Approval, No. BSVB.00013 Rev.1.0: NC Card Business Rule	OTP	11 Jun 15	/	/	11 Jun 15	
28	IN0028	BSV	BSV.OTP.1031.P2500.11.06.2015	11 Jun 15	Document Submission for Approval, No. BSVB.00012 Rev.1.0: Transaction Data Definition	OTP	11 Jun 15	/	/	11 Jun 15	
29	IN0029	BSV	BSV.OTP.1033.P2500.11.06.2015	11 Jun 15	Document Submission for Approval, No. BSW.00015 Rev.1.0: Online Enquiry Subsystem Interface Specification	OTP	16 Jun 15	/	/	16 Jun 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
30	IN0030	BSV	BSV.OTP.1032.P2500.12.06.2015	12 Jun 15	Document Submission for Approval, No. BSW.00002 Rev.2.0: System Security Architecture	OTP	15 Jun 15	/	/	16 Jun 15	
31	IN0031	BSV	BSV.OTP.1035.P2500.12.06.2015	12 Jun 15	Document Submission for Approval, No. BSVB.00015 Rev.1.0: Action List Management Subsystem Software Requirement Specification	OTP	15 Jun 15	/	/	16 Jun 15	
32	IN0032	BSV	BSV.OTP.1037.P2500.12.06.2015	12 Jun 15	Document Submission for Approval, No. BSVB.00023 Rev.1.0: System Management Subsystem Requirement Specification	OTP	15 Jun 15	/	/	16 Jun 15	
33	IN0033	BSV	BSV.OTP.1038.P2500.12.06.2015	12 Jun 15	Document Submission for Approval, No. BSVB.00016 Rev.1.0: Autoload Management Subsystem Software Requirement Specification	OTP	15 Jun 15	/	/	16 Jun 15	
34	IN0034	BSV	BSV.OTP.1039.P2500.12.06.2015	12 Jun 15	Document Submission for Approval, No. BSVB.00114 Rev.1.0: SP Website Software Requirement Specification	OTP	15 Jun 15	/	/	16 Jun 15	
35	IN0035	BSV	BSV.OTP.1040.P2500.12.06.2015	12 Jun 15	Document Submission for Approval, No. BSW.00006 Rev.1.0: OTP to CCH Interface Specification	OTP	15 Jun 15	/	/	16 Jun 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
36	IN0036	BSV	BSV.OTP.1034.P2500.12.06.2015	12 Jun 15	Document Submission for Approval, No. BSVB.00101 Rev.1.0: Configuration Data Management Subsystem Software Requirement Specification	OTP	15 Jun 15	/	/	16 Jun 15	
37	IN0037	BSV	BSV.OTP.1036.P2500.12.06.2015	12 Jun 15	Document Submission for Approval, No. BSVB.00022 Rev.1.0: Report Management Subsystem Software Requirement Specification	OTP	15 Jun 15	/	/	16 Jun 15	
38	IN0038	BSV	BSV.OTP.1041.P2500.16.06.2015	16 Jun 15	Document Submission for Approval, No. BSVB.00018 Rev.1.0: Communication Subsystem Software Requirement Specification	OTP	17 Jun 15	/	/	16 Jun 15	
39	IN0039	BSV	BSV.OTP.1043.P2500.18.06.2015	18 Jun 15	Document Submission for Approval, No. BSW.00005 Rev.1.0: Cardholder Software Requirement Specification	OTP	19 Jun 15	/	/	22 Jun 15	
40	IN0040	BSV	BSV.OTP.1049.P2500.25.06.2015	25 Jun 15	Document Submission for Approval, No. BSVB.00020 Rev.1.0: Host Security Management Software Requirement Specification	OTP	26 Jun 15	/	/	29 Jun 15	
41	IN0041	BSV	BSV.OTP.1048.P2500.25.06.2015	25 Jun 15	Document Submission for Approval, No. BSVB.00106 Rev.1.0: Cardholder Website Payment Gateway Interface Specification	OTP	26 Jun 15	/	/	29 Jun 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
42	IN0042	BSV	BSV.OTP.1047.P2500.25.06.2015	25 Jun 15	Document Submission for Approval, No. BSVB.00105 Rev.1.0: Payment Gateway Software Requirement Specification	OTP	26 Jun 15	/	/	29 Jun 15	
43	IN0043	BSV	BSV.OTP.1046.P2500.25.06.2015	25 Jun 15	Document Submission for Approval, No. BSVB.00025 Rev.1.0: OTP CCH to Bank Interface Specification	OTP	26 Jun 15	/	/	29 Jun 15	
44	IN0044	BSV	BSV.OTP.1045.P2500.25.06.2015	25 Jun 15	Document Submission for Approval, No. BSVB.00026 Rev.1.0: Equipment Initialization Interface File Specification	OTP	26 Jun 15	/	/	29 Jun 15	
45	IN0045	BSV	BSV.OTP.1050.P2500.01.07.2015	1 Jul 15	Submission of Explanations of Comments for Approval, No. BSVV.00004 Rev.1.0: Issuer Subsystem Software Requirement Specification	OTP	3 Jul 15	/	/	3 Jul 15	
46	IN0046	BSV	BSV.OTP.1051.P2500.02.07.2015	2 Jul 15	Document Submission for Approval, No. BSVB.00009 Rev.1.0: Quality Management Plan	OTP	3 Jul 15	/	/	3 Jul 15	
47	IN0047	BSV	BSV.OTP.1052.P2500.02.07.2015	2 Jul 15	Document Submission for Approval, No. BSVB.00004 Rev.2.0: Outline Quality Management Plan	OTP	3 Jul 15	/	/	3 Jul 15	
48	IN0048	BSV	BSV.OTP.1053.P2500.06.07.2015	6 Jul 15	Submission of Monthly Progress Report- June 2015	OTP	7 Jul 15	/	/	7 Jul 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
49	IN0049	BSV	BSV.OTP.1055.P2500.09.07.2015	9 Jul 15	Document Submission for Approval, No. BSVB.00011 Rev.2.0: Configuration Parameters	OTP	10 Jul 15	/	/	10 Jul 15	
50	IN0050	BSV	BSV.OTP.1056.P2500.09.07.2015	9 Jul 15	Document Submission for Approval, No. BSVB.00012 Rev.2.0: Transaction Data Definition	OTP	10 Jul 15	/	/	10 Jul 15	
51	IN0051	BSV	BSV.OTP.1057.P2500.09.07.2015	9 Jul 15	Document Submission for Approval, No. BSVB.00013 Rev.2.0: NC Card Business Rules	OTP	10 Jul 15	/	/	10 Jul 15	
52	IN0052	BSV	BSV.OTP.1054.P2500.09.07.2015	9 Jul 15	Document Submission for Approval, No. BSVB.00013 Rev.3.0: NC Card Data Definition	OTP	10 Jul 15	/	/	10 Jul 15	
53	IN0053	BSV	BSV.OTP.1060.P2500.13.07.2015	13 Jul 15	Document Submission for Approval, No. BSW.00015 Rev.2.0: Online Enquiry Subsystem Interface Specification	OTP	14 Jul 15	/	/	14 Jul 15	
54	IN0054	BSV	BSV.OTP.1058.P2500.13.07.2015	13 Jul 15	Document Submission for Approval, No. BSW.00002 Rev.3.0: System Security Architecture	OTP	14 Jul 15	/	/	14 Jul 15	
55	IN0055	BSV	BSV.OTP.1059.P2500.13.07.2015	13 Jul 15	Document Submission for Approval, No. BSW.00006 Rev.2.0: OTP CCH to Operator Interface Specification	OTP	14 Jul 15	/	/	14 Jul 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
56	IN0056	BSV	BSV.OTP.1071.P2500.22.07.2015	22 Jul 15	Submission of Explanations of Comments for Approval, No. BSVB.00019 Rev. 1.0: Device Management Subsystem Software Requirement Specification	OTP	22 Jul 15	/	/	22 Jul 15	
57	IN0057	BSV	BSV.OTP.1070.P2500.22.07.2015	22 Jul 15	Submission of Explanations of Comments for Approval, No. BSVB.00018 Rev. 1.0: Communication Subsystem Software Requirement Specification	OTP	22 Jul 15	/	/	22 Jul 15	
58	IN0058	BSV	BSV.OTP.1069.P2500.22.07.2015	22 Jul 15	Submission of Explanations of Comments for Approval, No. BSVB.00101 Rev. 1.0: Configuration Data Management Subsystem Software Requirement Specification	OTP	22 Jul 15	/	/	22 Jul 15	
59	IN0059	BSV	BSV.OTP.1068.P2500.22.07.2015	22 Jul 15	Submission of Explanations of Comments for Approval, No. BSVB.00022 Rev. 1.0: Report Management Subsystem Software Requirement Specification	OTP	22 Jul 15	/	/	22 Jul 15	
60	IN0060	BSV	BSV.OTP.1066.P2500.22.07.2015	22 Jul 15	Submission of Explanations of Comments for Approval, No. BSVB.00016 Rev. 1.0: Autoload Management Subsystem Software Requirement Specification	OTP	22 Jul 15	/	/	22 Jul 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
61	IN0061	BSV	BSV.OTP.1067.P2500.22.07.2015	22 Jul 15	Submission of Explanations of Comments for Approval, No. BSVB.00025 Rev. 1.0: OTP CCH to Bank Interface Specification	OTP	22 Jul 15	/	/	22 Jul 15	
62	IN0062	BSV	BSV.OTP.1062.P2500.22.07.2015	22 Jul 15	Document Submission for Approval, No. BSVB.00023 Rev.2.0: System Management Subsystem Software Requirement Specification	OTP	22 Jul 15	/	/	22 Jul 15	
63	IN0063	BSV	BSV.OTP.1061.P2500.22.07.2015	22 Jul 15	Document Submission for Approval, No. BSVB.00014 Rev.2.0: Access Control Subsystem Software Requirement Specification	OTP	22 Jul 15	/	/	22 Jul 15	
64	IN0064	BSV	BSV.OTP.1063.P2500.22.07.2015	22 Jul 15	Document Submission for Approval, No. BSVB.00114 Rev.2.0: SP Website Software Requirement Specification	OTP	22 Jul 15	/	/	22 Jul 15	
65	IN0065	BSV	BSV.OTP.1064.P2500.22.07.2015	22 Jul 15	Document Submission for Approval, No. BSVB.00026 Rev.2.0: Equipment Initialization Interface File Specification	OTP	22 Jul 15	/	/	22 Jul 15	
66	IN0066	BSV	BSV.OTP.1065.P2500.22.07.2015	22 Jul 15	Document Submission for Approval, No. BSW.00016 Rev. 1.0: Online Enquiry Subsystem Design Specification	OTP	22 Jul 15	/	/	22 Jul 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
67	IN0067	BSV	BSV.OTP.1072.P2500.27.07.2015	27 Jul 15	Document Submission for Approval, No. BSVS.00003 Rev.1.0: Card Initialization and Personalization Subsystem Software Requirement Specification	OTP	28 Jul 15	/	/	28 Jul 15	
68	IN0068	BSV	BSV.OTP.1073.P2500.27.07.2015	27 Jul 15	Document Submission for Approval, No. BSVS.00004 Rev.1.0: Key Management Subsystem Software Requirement Specification	OTP	28 Jul 15	/	/	28 Jul 15	
69	IN0069	BSV	BSV.OTP.1074.P2500.27.07.2015	27 Jul 15	Document Submission for Approval, No. BSVS.00069 Rev.1.0: Refund and Reload Machine Software Requirement Specification	OTP	28 Jul 15	/	/	28 Jul 15	
70	IN0070	BSV	BSV.OTP.1075.P2500.27.07.2015	27 Jul 15	Document Submission for Approval, No. BSVS.00078 Rev.1.0: SAM Requirement Specification	OTP	28 Jul 15	/	/	28 Jul 15	
71	IN0071	BSV	BSV.OTP.1076.P2500.27.07.2015	27 Jul 15	Document Submission for Approval, No. BSW.00001 Rev.2.0: System Architecture	OTP	28 Jul 15	/	/	28 Jul 15	
72	IN0072	BSV	BSV.OTP.1077.P2500.27.07.2015	27 Jul 15	Document Submission for Approval, No. BSVB.00002 Rev.3.0: Submittal Schedule	OTP	28 Jul 15	/	/	28 Jul 15	
73	IN0073	BSV	BSV.OTP.1078.P2500.29.07.2015	29 Jul 15	Document Submission for Approval, No. BSW.00010 Rev.1.0: Issuer Subsystem Design Specification	OTP	3 Aug 15	/	/	4 Aug 15	

No.	Scan Doc.	From	Document No.	Document Dated	Details	To	Document Receipt Date	Document Received		Date of Assignment from OTP	Note
								Hard copy	Soft Copy		
74	IN0074	BSV	BSV.OTP.1083.P2500.31.07.2015	31 Jul 15	Document Submission for Approval, No. BSVB.00040 Rev.1.0: Action List Management Subsystem Design Specification	OTP	3 Aug 15	/	/	4 Aug 15	
75	IN0075	BSV	BSV.OTP.1079.P2500.29.07.2015	29 Jul 15	Submission of Explanations of Comments for Approval, No. BSVV.00003 Rev.1.0: Financial Management Software Requirements Specification	OTP	3 Aug 15	/	/	4 Aug 15	
76	IN0076	BSV	BSV.OTP.1085.P2500.31.07.2015	31 Jul 15	Document Submission for Approval, No. BSVB.00044 Rev.1.0: Device Management Subsystem Software Design Specification	OTP	3 Aug 15	/	/	4 Aug 15	
77	IN0077	BSV	BSV.OTP.1080.P2500.29.07.2015	29 Jul 15	Document Submission for Approval, No. BSV.00005 Rev.2.0: Cardholder Website Software Requirement Specification	OTP	3 Aug 15	/	/	4 Aug 15	
78	IN0078	BSV	BSV.OTP.1082.P2500.31.07.2015	31 Jul 15	Document Submission for Approval, No. BSVB.00039 Rev.1.0: Access Control Subsystem Design Specification	OTP	3 Aug 15	/	/	4 Aug 15	
79	IN0079	BSV	BSV.OTP.1084.P2500.31.07.2015	31 Jul 15	Document Submission for Approval, No. BSVB.00042 Rev.1.0: Card Inventory Management Subsystem Design Specification	OTP	3 Aug 15	/	/	4 Aug 15	

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80	IN0080	BSV	BSV.OTP.1086.P2500.31.07.2015	31 Jul 15	Document Submission for Approval, No. BSVB.00116 Rev.1.0: Configuration Data Management Subsystem Software Design Specification	OTP	3 Aug 15	/	/	4 Aug 15	
81	IN0081	BSV	BSV.OTP.1081.P2500.31.07.2015	31 Jul 15	Document Submission for Approval, No. BSW.00009 Rev.1.0: Financial Management Subsystem Software Design Specification	OTP	3 Aug 15	/	/	4 Aug 15	
82	IN0082	BSV	BSV.OTP.1087.P2500.03.08.2015	3 Aug 15	Monthly Progress Report - July 2015	OTP	4 Aug 15	/	/	4 Aug 15	
83	IN0083	BSV	BSV.OTP.1089.P2500.06.08.2015	6 Aug 15	Document Submission for Approval, No. BSVB.00009 Rev.2.0: Quality Management Plan	OTP	7 Aug 15	/	/	10 Aug 15	
84	IN0084	BSV	BSV.OTP.1088.P2500.03.08.2015	3 Aug 15	Document Submission for Approval, No. BSVB.00050 Rev.1.0: Project Glossary	OTP	7 Aug 15	/	/	10 Aug 15	
85	IN0085	BSV	BSV.OTP.1090.P2500.06.08.2015	6 Aug 15	Document Submission for Approval, No. BSW.00011 Rev.1.0: Cardholder Website Software Design Specification	OTP	11 Aug 15	/	/	13 Aug 15	
86	IN0086	BSV	BSV.OTP.1091.P2500.06.08.2015	6 Aug 15	Document Submission for Approval, No. BSW.00068 Rev.1.0: Overall Inspection and Test Plan	OTP	11 Aug 15	/	/	13 Aug 15	

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87	IN0087	BSV	BSV.OTP.1092.P2500.07.08.2015	7 Aug 15	Document Submission for Approval, No. BSVB.00104 Rev. 1.0: System Security Architecture Design Specification	OTP	11 Aug 15	/	/	13 Aug 15	
88	IN0088	BSV	BSV.OTP.1094.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVB.00115 Rev. 1.0: SP Website Software Design Specification	OTP	14 Aug 15	/	/	17 Aug 15	
89	IN0089	BSV	BSV.OTP.1095.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVB.00041 Rev. 1.0: Autoload Management Subsystem Design Specification	OTP	14 Aug 15	/	/	17 Aug 15	
90	IN0090	BSV	BSV.OTP.1096.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVB.00043 Rev. 1.0: Communications Subsystem Software Design Specification	OTP	14 Aug 15	/	/	17 Aug 15	
91	IN0091	BSV	BSV.OTP.1097.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVB.00045 Rev. 1.0: Host Security Management Subsystem Software Design Specification	OTP	14 Aug 15	/	/	17 Aug 15	
92	IN0092	BSV	BSV.OTP.1098.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVB.00046 Rev. 1.0: Report Management Subsystem Design Specification	OTP	14 Aug 15	/	/	17 Aug 15	

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93	IN0093	BSV	BSV.OTP.1099.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVB.00047 Rev. 1.0: System Management Subsystem Software Design Specification	OTP	14 Aug 15	/	/	17 Aug 15	
94	IN0094	BSV	BSV.OTP.1100.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVB.00048 Rev. 1.0: Central Clearing House Network Design	OTP	14 Aug 15	/	/	17 Aug 15	
95	IN0095	BSV	BSV.OTP.1101.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVB.00049 Rev. 1.0: Central Clearing House Server System Design	OTP	14 Aug 15	/	/	17 Aug 15	
96	IN0096	BSV	BSV.OTP.1102.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVB.00107 Rev. 1.0: Payment Gateway Subsystem Design Specification	OTP	14 Aug 15	/	/	17 Aug 15	
97	IN0097	BSV	BSV.OTP.1105.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVS.00010 Rev. 1.0: Key Management Subsystem Design Specification	OTP	14 Aug 15	/	/	17 Aug 15	
98	IN0098	BSV	BSV.OTP.1103.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVS.00079 Rev. 1.0: SAM Interface Specification	OTP	17 Aug 15	/	/	17 Aug 15	

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99	IN0099	BSV	BSV.OTP.1104.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVS.00009 Rev.1.0: Card Initialization and Personalization Subsystem Design Specification	OTP	17 Aug 15	/	/	17 Aug 15	
100	IN0100	BSV	BSV.OTP.1108.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVS.00083 Rev.1.0: SAM Design Specification	OTP	17 Aug 15	/	/	17 Aug 15	
101	IN0101	BSV	BSV.OTP.1106.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVS.00011 Rev.1.0: Central Clearing House Equipment Rack Plan	OTP	17 Aug 15			17 Aug 15	
102	IN0102	BSV	BSV.OTP.1109.P2500.13.08.2015	13 Aug 15	Document Submission for Approval, No. BSVS.00084 Rev.1.0: Refund and Reload Machine Software Design Specification	OTP	17 Aug 15	/	/	17 Aug 15	
103	IN0103	BSV	BSV.OTP.1115.P2500.24.08.2015	24 Aug 15	Document Submission for Approval, No. BSW.00009 Rev.2.0: Financial Management Subsystem Software Design Specification	OTP	27 Aug 15	/	/	28 Aug 15	
104	IN0104	BSV	BSV.OTP.1116.P2500.24.08.2015	24 Aug 15	Document Submission for Approval, No. BSW.00010 Rev.2.0: Issuer Subsystem Design Specification	OTP	27 Aug 15	/	/	28 Aug 15	

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105	IN0105	BSV	BSV.OTP.1117.P2500.24.08.2015	24 Aug 15	Document Submission for Approval, No. BSW.00009 Rev.2.0: Card Initialization and Personalization Subsystem Software Requirement Specification	OTP	27 Aug 15	/	/	28 Aug 15	
106	IN0106	BSV	BSV.OTP.1118.P2500.24.08.2015	24 Aug 15	Document Submission for Approval, No. BSVS.00004 Rev.2.0: Key Management Subsystem Software Requirement Specification	OTP	27 Aug 15	/	/	28 Aug 15	
107	IN0107	BSV	BSV.OTP.1119.P2500.24.08.2015	24 Aug 15	Document Submission for Approval, No. BSVS.00069 Rev.2.0: Refund and Reload Machine Software Requirement Specification	OTP	27 Aug 15	/	/	28 Aug 15	
108	IN0108	BSV	BSV.OTP.1120.P2500.24.08.2015	24 Aug 15	Document Submission for Approval, No. BSVS.00078 Rev.2.0: SAM Requirement Specification	OTP	27 Aug 15	/	/	28 Aug 15	
109	IN0109	BSV	BSV.OTP.1121.P2500.26.08.2015	26 Aug 15	Document Submission for Approval, No. BSW.00011 Rev.2.0: Cardholder Website Software Design Specification	OTP	27 Aug 15	/	/	28 Aug 15	
110	IN0110	BSV	BSV.OTP.1122.P2500.26.08.2015	26 Aug 15	Document Submission for Approval, No. BSVS.00001 Rev.1.0: Hardware Bill of Materials	OTP	27 Aug 15	/	/	28 Aug 15	

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111	IN0111	BSV	BSV.OTP.1123.P2500.26.08.2015	26 Aug 15	Document Submission for Approval, No. BSVS.00080 Rev.1.0: Third Party Software Bill of Materials	OTP	27 Aug 15	/	/	28 Aug 15	
112	IN0112	BSV	BSV.OTP.1124.P2500.26.08.2015	26 Aug 15	Document Submission for Approval, No. BSVS.00012 Rev.1.0: Procurement Plan	OTP	27 Aug 15	/	/	28 Aug 15	
113	IN0113	BSV	BSV.OTP.1125.P2500.31.08.2015	31 Aug 15	Document Submission for Approval, No. BSVS.00005 Rev.1.0: Technology Transfer Program	OTP	31 Aug 15	/	/	2 Sept 15	
114	IN0114	BSV	BSV.OTP.1126.P2500.31.08.2015	31 Aug 15	Document Submission for Approval, No. BSVS.00002 Rev.1.0: Software Bill of Materials	OTP	31 Aug 15	/	/	2 Sept 15	
115	IN0115	BSV	BSV.OTP.1127.P2500.31.08.2015	31 Aug 15	Document Submission for Approval, No. BSVS.00020 Rev.1.0: Training Program	OTP	31 Aug 15	/	/	2 Sept 15	
116	IN0116	BSV	BSV.OTP.1130.P2500.08.09.2015	8 Sept 15	Submission of Detailed Design	OTP	9 Sept 15	/	/	10 Sept 15	
117	IN0117	BSV	BSV.OTP.1128.P2500.10.09.2015	10 Sept 15	Document Submission for Approval, No. BSVS.00079 Rev.2.0: SAM Interface Specification	OTP	14 Sept 15	/	/	15 Sept 15	
118	IN0118	BSV	BSV.OTP.1131.P2500.10.09.2015	10 Sept 15	Document Submission for Approval, No. BSVS.00009 Rev.2.0: Card Initialization and Personalization Subsystem Design Specification	OTP	14 Sept 15	/	/	15 Sept 15	

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119	IN0119	BSV	BSV.OTP.1132.P2500.10.09.2015	10 Sept 15	Document Submission for Approval, No. BSVS.00084 Rev.2.0: Refund and Reload Machine Software Design Specification	OTP	14 Sept 15	/	/	15 Sept 15	
120	IN0120	BSV	BSV.OTP.1135.P2500.10.09.2015	10 Sept 15	Document Submission for Approval, No. BSVB.00104 Rev.2.0: System Security Architecture Design Specification	OTP	14 Sept 15	/	/	15 Sept 15	
121	IN0121	BSV	BSV.OTP.1134.P2500.10.09.2015	10 Sept 15	Submission of Explanations of Comments for Approval, No. BSVB.00107 Rev.1.0: Payment Gateway Subsystem Design Specification	OTP	14 Sept 15	/	/	15 Sept 15	
122	IN0122	BSV	BSV.OTP.1133.P2500.10.09.2015	10 Sept 15	Submission of Explanations of Comments for Approval, No. BSVB.00042 Rev.1.0: Card Inventory Management Subsystem Design Specification	OTP	14 Sept 15	/	/	15 Sept 15	
123	IN0123	BSV	BSV.OTP.1136.P2500.10.09.2015	10 Sept 15	Document Submission for Approval, No. BSVS.00083 Rev.2.0: SAM Design Specification	OTP	14 Sept 15	/	/	15 Sept 15	
124	IN0124	BSV	BSV.OTP.1137.P2500.10.09.2015	10 Sept 15	Document Submission for Approval, No. BSVS.00010 Rev.2.0: Key Management Subsystem Design Specification	OTP	14 Sept 15	/	/	15 Sept 15	

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125	IN0125	BSV	BSV.OTP.1138.P2500.10.09.2015	10 Sept 15	Document Submission for Approval, No. BSVS.00011 Rev.2.0: Central Clearing House Equipment Rack Plan	OTP	14 Sept 15	/	/	15 Sept 15	
126	IN0126	BSV	BSV.OTP.1139.P2500.14.09.2015	14 Sept 15	Document Submission for Approval, No. BSVB.00039 Rev.2.0: Access Control Subsystem Design Specification	OTP	15 Sept 15	/	/	15 Sept 15	
127	IN0127	BSV	BSV.OTP.1140.P2500.14.09.2015	14 Sept 15	Document Submission for Approval, No. BSVB.00040 Rev.2.0: Actionlist Management Subsystem Design Specification	OTP	15 Sept 15	/	/	15 Sept 15	
128	IN0128	BSV	BSV.OTP.1141.P2500.14.09.2015	14 Sept 15	Document Submission for Approval, No. BSVB.00041 Rev.2.0: Autoload Management Subsystem Design Specification	OTP	15 Sept 15	/	/	15 Sept 15	
129	IN0129	BSV	BSV.OTP.1142.P2500.14.09.2015	14 Sept 15	Document Submission for Approval, No. BSVB.00116 Rev.2.0: Configuration Data Management Subsystem Software Design Specification	OTP	15 Sept 15	/	/	15 Sept 15	
130	IN0130	BSV	BSV.OTP.1143.P2500.14.09.2015	14 Sept 15	Document Submission for Approval, No. BSVB.00044 Rev.2.0: Device Management Subsystem Software Design Specification	OTP	15 Sept 15	/	/	15 Sept 15	

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131	IN0131	BSV	BSV.OTP.1144.P2500.14.09.2015	14 Sept 15	Document Submission for Approval, No. BSVB.00047 Rev.2.0: System Management Subsystem Software Design Specification	OTP	15 Sept 15	/	/	15 Sept 15	
132	IN0132	BSV	BSV.OTP.1145.P2500.14.09.2015	14 Sept 15	Document Submission for Approval, No. BSVB.00115 Rev.2.0: SP Website Software Design Specification	OTP	15 Sept 15	/	/	15 Sept 15	
133	IN0133	BSV	BSV.OTP.1146.P2500.14.09.2015	14 Sept 15	Document Submission for Approval, No. BSVB.00050 Rev.2.0: Project Glossary	OTP	15 Sept 15	/	/	15 Sept 15	
134	IN0134	BSV	BSV.OTP.1147.P2500.14.09.2015	14 Sept 15	Document Submission for Approval, No. BSVB.00043 Rev.2.0: Communication Subsystem Software Design Specification	OTP	15 Sept 15	/	/	15 Sept 15	
135	IN0135	BSV	BSV.OTP.1148.P2500.15.09.2015	15 Sept 15	Document Submission for Approval, No. BSVS.00012 Rev.2.0: Procurement Plan	OTP	16 Sept 15	/	/	17 Sept 15	
136	IN0136	BSV	BSV.OTP.1149.P2500.15.09.2015	15 Sept 15	Document Submission for Approval, No. BSVB.00020 Rev.2.0: Host Security Management Software Requirement Specification	OTP	16 Sept 15	/	/	17 Sept 15	
137	IN0137	BSV	BSV.OTP.1150.P2500.16.09.2015	16 Sept 15	Submission of Explanations of Comments for Approval, No. BSVB.00045 Rev.2.0: Host Security Management Subsystem Software Design Specification	OTP	16 Sept 15	/	/	17 Sept 15	

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138	IN0138	BSV	BSV.OTP.1151.P2500.15.09.2015	15 Sept 15	Document Submission for Approval, No. BSVB.00046 Rev.2.0: Report Management Subsystem Design Specification	OTP	16 Sept 15	/	/	17 Sept 15	
139	IN0139	BSV	BSV.OTP.1154.P2500.15.09.2015	15 Sept 15	Document Submission for Approval, No. BSVB.00010 Rev.2.0: Technical and Network Architecture	OTP	16 Sept 15	/	/	17 Sept 15	
140	IN0140	BSV	BSV.OTP.1156.P2500.16.09.2015	16 Sept 15	Request for Device Replacement Approval for the Central Clearing House Project (CCH)	OTP	16 Sept 15	/	/	17 Sept 15	
141	IN0141	BSV	BSV.OTP.1157.P2500.18.09.2015	18 Sept 15	Submission of Monthly Progress Report - August 2015	OTP	21 Sept 15	/	/	21 Sept 15	
142	IN0142	BSV	BSV.OTP.1152.P2500.15.09.2015	15 Sept 15	Document Submission for Approval, No. BSVB.00048 Rev.2.0: Central Clearing House Network Design	OTP	18 Sept 15	/	/	18 Sept 15	
143	IN0143	BSV	BSV.OTP.1153.P2500.15.09.2015	15 Sept 15	Document Submission for Approval, No. BSVB.00049 Rev.2.0: Central Clearing House Server System Design	OTP	18 Sept 15	/	/	18 Sept 15	
144	IN0144	BSV	BSV.OTP.1155.P2500.15.09.2015	15 Sept 15	Document Submission for Approval, No. BSVB.00068 Rev.2.0: Overall Inspection Test Plan	OTP	29 Sept 15	/	/	29 Sept 15	

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145	IN0145	BSV	BSV.OTP.1160.P2500.28.09.2015	28 Sept 15	Document Submission for Approval, No. BSVS.00005 Rev.2.0: Technology Transfer Program	OTP	29 Sept 15	/	/	29 Sept 15	
146	IN0146	BSV	BSV.OTP.1161.P2500.28.09.2015	28 Sept 15	Document Submission for Approval, No. BSVS.00020 Rev.2.0: Training Program	OTP	29 Sept 15	/	/	29 Sept 15	
147	IN0147	BSV	BSV.OTP.1159.P2500.29.09.2015	29 Sept 15	Submission of Final Design	OTP	29 Sept 15	/	/	30 Sept 15	
148	IN0148	BSV	BSV.OTP.1164.P2500.05.10.2015	5 Oct 15	Submission of Explanations of Comments for Approval, No. BSVS.00080 Rev.1.0: Third party Software Bill of Materials	OTP	6 Oct 15	/	/	6 Oct 15	
149	IN0149	BSV	BSV.OTP.1163.P2500.05.10.2015	5 Oct 15	Document Submission for Approval, No. BSVS.00002 Rev.2.0: Software Bill of Materials	OTP	6 Oct 15	/	/	6 Oct 15	
150	IN0150	BSV	BSV.OTP.1166.P2500.13.10.2015	13 Oct 15	Submission of Project Plan, Work Organizational Management Plan, Work Delivery Schedule and Common Ticket Design Report	OTP	14 Oct 15	/	/	15 Oct 15	
151	IN0151	BSV	BSV.OTP.1167.P2500.15.10.2015	15 Oct 15	Submission of Monthly Progress Report - September 2015	OTP	19 Oct 15	/	/	19 Oct 15	
152	IN0152	BSV	BSV.OTP.1169.P2500.10.11.2015	10 Nov 15	Document Submission for Approval, No. BSVB.00069 Rev.1.0: Functional Acceptance Test Plan	OTP	11 Nov 15	/	/	11 Nov 15	

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153	IN0153	BSV	BSV.OTP.1168.P2500.04.11.2015	4 Nov 15	Submission of the First Delivery: Approval of Common Ticket Design	OTP	4 Wk. 57	/	/	25 Nov 15	
154	IN0154	BSV	BSV.OTP.1170.P2500.25.11.2015	25 Nov 15	Request for Device Replacement Approval for Central Clearing House Project (CCH)	OTP	26 Nov 15	/	/	26 Nov 15	
155	IN0155	BSV	BSV.OTP.1171.P2500.01.12.2015	1 Dec 15	Document Submission for Approval, No. BSVB.00119 Rev.1.0: Access Control Functional Acceptance Test Procedure	OTP	3 Dec 15	/	/	3 Dec 15	
156	IN0156	BSV	BSV.OTP.1172.P2500.01.12.2015	1 Dec 15	Document Submission for Approval, No. BSVB.00076 Rev.1.0: Device Management Functional Acceptance Test Procedure	OTP	3 Dec 15	/	/	3 Dec 15	
157	IN0157	BSV	BSV.OTP.1158.P2500.30.11.2015	30 Nov 15	Explanations of Alternative Designs to Increase the Number of Issuer IDs	OTP	30 Nov 15	/	/	30 Nov 15	
158	IN0158	BSV	BSV.OTP.1177.P2500.08.12.2015	8 Dec 15	Document Submission for Approval, No. BSVB.00076 Rev.1.0: Actionlist Management Subsystem Functional Acceptance Test Procedure	OTP	11 Dec 15	/	/	14 Dec 15	
159	IN0159	BSV	BSV.OTP.1178.P2500.08.12.2015	8 Dec 15	Document Submission for Approval, No. BSVB.00073 Rev.1.0: Card Inventory Management Subsystem Functional Acceptance Test Procedure	OTP	11 Dec 15	/	/	14 Dec 15	

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160	IN0160	BSV	BSV.OTP.1179.P2500.09.12.2015	9 Dec 15	Submission of Monthly Progress Report - October 2015	OTP	11 Dec 15	/	/	14 Dec 15	
161	IN0161	BSV	BSV.OTP.1180.P2500.09.12.2015	9 Dec 15	Submission of Monthly Progress Report - November 2015	OTP	11 Dec 15	/	/	14 Dec 15	
162	IN0162	BSV	BSV.OTP.1181.P2500.14.12.2015	14 Dec 15	Request for Common Ticket's Art Work Format for Central Clearing House Project (CCH)	OTP	15 Dec 15	/	/	17 5.00. 60	
163	IN0163	BSV	BSV.OTP.1174.P2500.14.12.2015	14 Dec 15	Document Submission for Approval, No. BSVS.00023 Rev.1.0: Key Management Subsystem Functional Acceptance Test Procedure	OTP	15 Dec 15	/	/	17 5.00. 60	
164	IN0164	BSV	BSV.OTP.1175.P2500.14.12.2015	14 Dec 15	Document Submission for Approval, No. BSVS.00085 Rev.1.0: Reload and Refund Machine Software Functional Acceptance Test Procedure	OTP	15 Dec 15	/	/	17 5.00. 60	
165	IN0165	BSV	BSV.OTP.1173.P2500.14.12.2015	14 Dec 15	Document Submission for Approval, No. BSVS.00022 Rev.1.0: Card Initialization and Personalization Subsystem Functional Acceptance Test Procedure	OTP	15 Dec 15	/	/	17 5.00. 60	

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166	IN0166	BSV	BSV.OTP.1183.P2500.04.01.2016	7 Jan 16	Document Submission for Approval, No. BSVB.00082 Rev.1.0: System Management Subsystem Functional Acceptance Test Procedure	OTP	5 Jan 16	/	/	7 Jan 16	
167	IN0167	BSV	BSV.OTP.1187.P2500.12.01.2016	12 Jan 16	Document Submission for Approval, No. BSVS.00085 Rev.2.0: Reload and Refund Machine Software Functional Acceptance Test Procedure	OTP	14 Jan 16	/	/	14 Jan 16	
168	IN0168	BSV	BSV.OTP.1185.P2500.12.01.2016	12 Jan 16	Document Submission for Approval, No. BSVS.00022 Rev.2.0: Card Initialization and Personalization Subsystem Functional Acceptance Test Procedure	OTP	14 Jan 16	/	/	14 Jan 16	
169	IN0169	BSV	BSV.OTP.1186.P2500.12.01.2016	12 Jan 16	Document Submission for Approval, No. BSVS.00023 Rev.2.0: Key Management Subsystem Functional Acceptance Test Procedure	OTP	14 Jan 16	/	/	14 Jan 16	
170	IN0170	BSV	BSV.OTP.1184.P2500.11.01.2016	13 Jan 16	Request for Information on Bank's Payment Gateway for Online Payment for Central Clearing House Project (CCH)	OTP	15 Jan 16	/	/	19 Jan 16	
171	IN0171	BSV	BSV.OTP.1190.P2500.18.01.2016	18 Jan 16	Request for Data Center Rental Approval for Central Clearing House Project (CCH)	OTP	19 Jan 16	/	/	19 Jan 16	

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172	IN0172	BSV	BSV.OTP.1188.P2500.18.01.2016	18 Jan 16	Document Submission for Approval, No. BSVB.00069 Rev.2.0: Functional Acceptance Test Plan	OTP	21 Jan 16	/	/	21 Jan 16	
173	IN0173	BSV	BSV.OTP.1189.P2500.18.01.2016	18 Jan 16	Host Security Management Subsystem Functional Acceptance Test Procedure Rev.1.0	OTP	21 Jan 16	/	/	21 Jan 16	
174	IN0174	BSV	BSV.OTP.1191.P2500.19.01.2016	19 Jan 16	Document Submission for Approval, No. BSVB.00108 Rev.1.0: Server Administration Manual	OTP	21 Jan 16	/	/	21 Jan 16	
175	IN0175	BSV	BSV.OTP.1193.P2500.19.01.2016	19 Jan 16	Document Submission for Approval, No. BSVB.00110 Rev.1.0: CCH Maintenance Manual	OTP	21 Jan 16	/	/	21 Jan 16	
176	IN0176	BSV	BSV.OTP.1194.P2500.19.01.2016	19 Jan 16	Document Submission for Approval, No. BSVB.00117 Rev.1.0: Cardholder & SP Website Operating Manual	OTP	21 Jan 16	/	/	21 Jan 16	
177	IN0177	BSV	BSV.OTP.1195.P2500.21.01.2016	21 Jan 16	Submission of Monthly Progress Report - December 2015	OTP	25 Jan 16	/	/	25 Jan 16	
178	IN0178	BSV	BSV.OTP.1196.P2500.04.02.2016	4 Feb 16	Document Submission for Approval, No. BSVB.00075 Rev.1.0: Configuration Data Management Subsystem Functional Acceptance Test Procedure	OTP	9 Feb 16	/	/	9 Feb 16	

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179	IN0179	BSV	BSV.OTP.1197.P2500.04.02.2016	4 Feb 16	Document Submission for Approval, No. BSVB.00126 Rev.1.0: NFC Prototype Specification	OTP	9 Feb 16	/	/	9 Feb 16	
180	IN0180	BSV	BSV.OTP.1199.P2500.07.03.2016	7 Mar 16	Document Submission for Approval, No. BSVB.00074 Rev.1.0: Communication Management Subsystem Functional Acceptance Test Procedure	OTP	9 Mar 16	/	/	9 Mar 16	
181	IN0181	BSV	BSV.OTP.1200.P2500.08.03.2016	8 Mar 16	Informing problems about development of the Central Clearing House (CCH) system caused by a lack of Payment Gateway technical data	OTP	10 Mar 16	/	/	10 Mar 16	
182	IN0182	BSV	BSV.OTP.1201.P2500.14.03.2016	14 Mar 16	Document Submission for Approval, No. BSVB.00081 Rev.1.0: Report Management Subsystem Functional Acceptance Test Procedure	OTP	17 Mar 16	/	/	17 Mar 16	
183	IN0183	BSV	BSV.OTP.1202.P2500.16.03.2016	16 Mar 16	Document Submission for Approval, No. BSVB.00082 Rev.2.0: System Management Subsystem Functional Acceptance Test Procedure	OTP	22 Mar 16	/	/	22 Mar 16	
184	IN0184	BSV	BSV.OTP.1203.P2500.18.01.2016	18 Mar 16	Request for Device Replacement Approval for Central Clearing House Project (CCH)	OTP	22 Mar 16	/	/	22 Mar 16	

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185	IN0185	BSV	BSV.OTP.1205.P2500.23.03.2016	23 Mar 16	Submission of Monthly Progress Report - January 2016	OTP	25 Mar 16	/	/	25 Mar 16	
186	IN0186	BSV	BSV.OTP.1206.P2500.24.03.2016	24 Mar 16	Document Submission for Approval, No. BSVB.00127 Rev. 1.0: Retail Pretotype Specification	OTP	25 Mar 16	/	/	25 Mar 16	
187	IN0187	BSV	BSV.OTP.1208.P2500.30.03.2016	30 Mar 16	Submission of Completed CCH's Application Development Document	OTP	30 Mar 16	/	/	5 Apr 16	
188	IN0188	BSV	BSV.OTP.1209.P2500.30.03.2016	30 Mar 16	Completed Hardware Installation	OTP	30 Mar 16	/	/	30 Mar 16	
189	IN0189	BSV	BSV.OTP.1212.P2500.19.04.2016	19 Apr 16	Submission of the CCH development Report	OTP	20 Apr 16	/	/	20 Apr 16	
190	IN0190	BSV	BSV.OTP.1213.P2500.19.04.2016	19 Apr 16	Completed Software Installation	OTP	21 Apr 16	/	/	21 Apr 16	
191	IN0191	BSV	BSV.OTP.1215.P2500.22.04.2016	22 Apr 16	Document Submission for Approval, No. BSVB.00127 Rev.2.0: Retail Pretotype Specification	OTP	25 Apr 16	/	/	25 Apr 16	
192	IN0192	BSV	BSV.OTP.1218.P2500.25.04.2016	25 Apr 16	Document Submission for Approval, No. BSVB.00121 Rev.1.0: SP Website Functional Acceptance Test Procedure	OTP	28 Apr 16	/	/	28 Apr 16	
193	IN0193	BSV	BSV.OTP.1219.P2500.25.04.2016	25 Apr 16	Document Submission for Approval, No. BSVB.00079 Rev. 1.0: Issuer Management Subsystem Functional Acceptance Test Procedure	OTP	28 Apr 16	/	/	28 Apr 16	

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194	IN0194	BSV	BSV.OTP.1216.P2500.27.04.2016	27 Apr 16	Document Submission for Approval, No. BSVB.00129 Rev. 1.0 Software Installation Report	OTP	29 Apr 16	/	/	29 Apr 16	
195	IN0195	BSV	BSV.OTP.1220.P2500.26.04.2016	26 Apr 16	Document Submission for Approval, No. BSVS.00092 Rev. 1.0: Toll Prototype Specification	OTP	29 Apr 16	/	/	29 Apr 16	
196	IN0196	BSV	BSV.OTP.1221.P2500.26.04.2016	26 Apr 16	Document Submission for Approval, No. BSVS.00093 Rev. 1.0: Rail Prototype Specification	OTP	29 Apr 16	/	/	29 Apr 16	
197	IN0197	BSV	BSV.OTP.1223.P2500.29.04.2016	29 Apr 16	Document Submission for Approval, No. BSVB.00075 Rev.2.0: Configuration Data Management Subsystem Functional Acceptance Test Procedure	OTP	4 May 16	/	/	4 May 16	
198	IN0198	BSV	BSV.OTP.1224.P2500.29.04.2016	29 Apr 16	Document Submission for Approval, No. BSVB.00077 Rev. 1.0: Financial Management Subsystem Functional Acceptance Test Procedure	OTP	4 May 16	/	/	4 May 16	
199	IN0199	BSV	BSV.OTP.1225.P2500.03.05.2016	3 May 16	Document Submission for Approval, No. BSVB.00120 Rev. 1.0: Cardholder Website Functional Acceptance Test Procedure	OTP	4 May 16	/	/	4 May 16	

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200	IN0200	BSV	BSV.OTP.1226.P2500.03.05.2016	3 May 16	Document Submission for Approval, No. BSVB.00072 Rev.1.0: Autoload Management Subsystem Functional Acceptance Test Procedure	OTP	4 May 16	/	/	4 May 16	
201	IN0201	BSV	BSV.OTP.1227.P2500.03.05.2016	3 May 16	Document Submission for Approval, No. BSVB.00080 Rev.1.0: Online Enquiry Management Subsystem Functional Acceptance Test Procedure	OTP	4 May 16	/	/	4 May 16	
202	IN0202	BSV	BSV.OTP.1222.P2500.27.04.2016	27 Apr 16	The CCH Mass License Delivery	OTP	4 May 16	/	/	4 May 16	
203	IN0203	BSV	BSV.OTP.1230.P2500.08.06.2016	8 Jun 16	The Second Delivery, Approval for Central Clearing House Development	OTP	8 Jun 16	/	/	8 Jun 16	
204	IN0204	BSV	BSV.OTP.1232.P2500.22.06.2016	22 Jun 16	Submission of Monthly Progress Report - February, March, April and May 2016	OTP	24 Jun 16	/	/	26 Jun 16	
205	IN0205	BSV	BSV.OTP.1233.P2500.04.07.2016	4 Jul 16	Document Submission for Approval, No. BSVB.00070 Rev.1.0: System Integration Test Plan	OTP	6 Jul 16	/	/	7 Jul 16	
206	IN0206	BSV	BSV.OTP.1236.P2500.08.07.2016	8 Jul 16	Document Submission for Approval, No. BSVB.00083 Rev.1.0: Actionlist Management Subsystem Functional Acceptance Test Summary Report	OTP	11 Jul 16	/	/	12 Jul 16	

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207	IN0207	BSV	BSV.OTP.1237.P2500.08.07.2016	8 Jul 16	Document Submission for Approval, No. BSVB.00085 Rev.1.0: Card Inventory Management Subsystem Functional Acceptance Test Summary Report	OTP	11 Jul 16	/	/	12 Jul 16	
208	IN0208	BSV	BSV.OTP.1235.P2500.08.07.2016	8 Jul 16	Document Submission for Approval, No. BSVB.00122 Rev.1.0: Access Control Subsystem Functional Acceptance Test Summary Report	OTP	11 Jul 16	/	/	12 Jul 16	
209	IN0209	BSV	BSV.OTP.1240.P2500.08.07.2016	8 Jul 16	Document Submission for Approval, No. BSVB.00088 Rev.1.0: Device Management Subsystem Functional Acceptance Test Summary Report	OTP	11 Jul 16	/	/	12 Jul 16	
210	IN0210	BSV	BSV.OTP.1234.P2500.07.07.2016	7 Jul 16	Document Submission for Approval, No. BSVS.00072 Rev.1.0: System Acceptance Test Plan	OTP	11 Jul 16	/	/	12 Jul 16	
211	IN0211	BSV	BSV.OTP.1239.P2500.08.07.2016	8 Jul 16	Document Submission for Approval, No. BSVB.00087 Rev.1.0: Configuration Data Management Subsystem Functional Acceptance Test Summary Result	OTP	11 Jul 16	/	/	12 Jul 16	
212	IN0212	BSV	BSV.OTP.1241.P2500.08.07.2016	8 Jul 16	Document Submission for Approval, No. BSVS.00071 Rev.1.0: System Integration Test Procedure	OTP	11 Jul 16	/	/	12 Jul 16	

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213	IN0213	BSV	BSV.OTP.1238.P2500.08.07.2016	8 Jul 16	Document Submission for Approval, No. BSVB.00086 Rev.1.0: Communication Management Subsystem Functional Acceptance Test Summary Report	OTP	11 Jul 16	/	/	12 Jul 16	
214	IN0214	BSV	BSV.OTP.1244.P2500.11.07.2016	11 Jul 16	Document Submission for Approval, No. BSVB.00094 Rev.1.0: Report Management Subsystem Functional Acceptance Test Summary Report	OTP	13 Jul 16	/	/	14 Jul 16	
215	IN0215	BSV	BSV.OTP.1242.P2500.11.07.2016	11 Jul 16	Document Submission for Approval, No. BSVB.00084 Rev.1.0: Autoload Management Subsystem Functional Acceptance Test Summary Report	OTP	13 Jul 16	/	/	14 Jul 16	
216	IN0216	BSV	BSV.OTP.1243.P2500.11.07.2016	11 Jul 16	Document Submission for Approval, No. BSVB.00093 Rev.1.0: Online Enquiry Management Subsystem Functional Acceptance Test Summary Report	OTP	13 Jul 16	/	/	14 Jul 16	
217	IN0217	BSV	BSV.OTP.1245.P2500.11.07.2016	11 Jul 16	Document Submission for Approval, No. BSVB.00124 Rev.1.0: SP Website Functional Acceptance Test Summary Report	OTP	13 Jul 16	/	/	14 Jul 16	

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218	IN0218	BSV	BSV.OTP.1246.P2500.11.07.2016	11 Jul 16	Document Submission for Approval, No. BSVB.00095 Rev.1.0: System Management Subsystem Functional Acceptance Test Procedure	OTP	13 Jul 16	/	/	14 Jul 16	
219	IN0219	BSV	BSV.OTP.1253.P2500.13.07.2016	13 Jul 16	Document Submission for Approval, No. BSVB.00123 Rev.1.0: Cardholder Website Functional Acceptance Test Summary Report	OTP	15 Jul 16	/	/	21 Jul 16	
220	IN0220	BSV	BSV.OTP.1248.P2500.13.07.2016	13 Jul 16	Document Submission for Approval, No. BSVB.0089 Rev.1.0: Financial Management Subsystem Functional Acceptance Test Summary Report	OTP	15 Jul 16	/	/	21 Jul 16	
221	IN0221	BSV	BSV.OTP.1250.P2500.13.07.2016	13 Jul 16	Document Submission for Approval, No. BSVB.00091 Rev.1.0: Issuer Management Subsystem Functional Acceptance Test Summary Report	OTP	15 Jul 16	/	/	21 Jul 16	
222	IN0222	BSV	BSV.OTP.1252.P2500.13.07.2016	13 Jul 16	Document Submission for Approval, No. BSVS.00086 Rev.1.0: Reload and Refund Machine Functional Acceptance Test Summary Report	OTP	15 Jul 16	/	/	22 Jul 16	

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223	IN0223	BSV	BSV.OTP.1247.P2500.13.07.2016	13 Jul 16	Document Submission for Approval, No. BSVS.00074 Rev.1.0: Card Initialization and Personalization Subsystem Functional Acceptance Test Summary Report	OTP	15 Jul 16	/	/	22 Jul 16	
224	IN0224	BSV	BSV.OTP.1251.P2500.13.07.2016	13 Jul 16	Document Submission for Approval, No. BSVB.00092 Rev.1.0: Key Management Subsystem Functional Acceptance Test Summary Report	OTP	15 Jul 16	/	/	22 Jul 16	
225	IN0225	BSV	BSV.OTP.1254.P2500.15.07.2016	15 Jul 16	Document Submission for Approval, No. BSVB.00073 Rev.1.0: System Acceptance Test Procedure	OTP	15 Jul 16	/	/	22 Jul 16	
226	IN0226	BSV	BSV.OTP.1255.P2500.13.07.2016	13 Jul 16	Document Submission for Approval, No. BSVS.00071 Rev.2.0: System Integration Test Procedure	OTP	27 Jul 16	/	/	27 Jul 16	
227	IN0227	BSV	BSV.OTP.1249.P2500.13.07.2016	13 Jul 16	Document Submission for Approval, No. BSVB.00090 Rev.1.0: Host Security Management Subsystem Functional Acceptance Test Summary Report	OTP	29 Jul 16	/	/	29 Jul 16	
228	IN0228	BSV	BSV.OTP.1256.P2500.28.07.2016	28 Jul 16	Document Submission about Individual Device Testing Completion	OTP	2 Aug 16	/	/	2 Aug 16	

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229	IN0229	BSV	BSV.OTP.1257.P2500.28.07.2016	28 Jul 16	Submission of Document regarding Completion of Testing, and System and its Development Verification	OTP	2 Aug 16	/	/	2 Aug 16	
230	IN0230	BSV	BSV.OTP.1258.P2500.28.07.2016	28 Jul 16	Submission of Document regarding Completion of Testing and System Connectivity	OTP	2 Aug 16	/	/	2 Aug 16	
231	IN0231	BSV	BSV.OTP.1259.P2500.09.08.2016	9 Aug 16	Submission of Explanations of Comments for Approval, No. BSVB.00070 Rev. 1.0: System Integration Test Plan	OTP	15 Aug 16	/	/	15 Aug 16	
232	IN0232	BSV	BSV.OTP.1261.P2500.09.08.2016	9 Aug 16	Submission of Explanations of Comments for Approval, No. BSVS.00073 Rev. 1.0: System Acceptance Test Procedure	OTP	15 Aug 16	/	/	15 Aug 16	
233	IN0233	BSV	BSV.OTP.1260.P2500.09.08.2016	9 Aug 16	Submission of Explanations of Comments for Approval, No. BSVS.00072 Rev. 1.0: System Acceptance Test Plan	OTP	15 Aug 16	/	/	15 Aug 16	
234	IN0234	BSV	BSV.OTP.1264.P2500.10.08.2018	10 Aug 16	Submission of Testing Report Documents	OTP	15 Aug 16	/	/	15 Aug 16	
235	IN0235	BSV	BSV.OTP.1263.P2500.10.08.2016	10 Aug 16	Submission of Documents regarding Completion of System Integration Test	OTP	15 Aug 16	/	/	15 Aug 16	
236	IN0236	BSV	BSV.OTP.1262.P2500.10.08.2016	10 Aug 16	Submission of Testing Completion Documents for System Acceptance	OTP	15 Aug 16	/	/	15 Aug 16	

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237	IN0237	BSV	BSV.OTP.1266.P2500.10.08.2016	10 Aug 16	Document Submission for Approval, No. BSVS.00076 Rev.1.0: System Acceptance Test Summary Report	OTP	15 Aug 16	/	/	15 Aug 16	
238	IN0238	BSV	BSV.OTP.1265.P2500.10.08.2016	10 Aug 16	Document Submission for Approval, No. BSVS.00075 Rev.1.0: System Integration Test Summary Report	OTP	15 Aug 16	/	/	15 Aug 16	
239	IN0239	BSV	BSV.OTP.1267.P2500.15.08.2016	15 Aug 16	The Third Delivery, System Testing Approval	OTP	15 Aug 16	/	/	15 Aug 16	
240	IN0240	BSV	BSV.OTP.1268.P2500.15.08.2016	15 Aug 16	Submission of Monthly Progress Report - June and July 2016	OTP	15 Aug 16	/	/	15 Aug 16	
241	IN0241	BSV	BSV.OTP.1269.P2500.29.08.2016	29 Aug 16	Document Submission for Approval, No. BSVB.00002 Rev.4.0: Submittal Schedule	OTP	31 Aug 16	/	/	31 Aug 16	
242	IN0242	BSV	BSV.OTP.1270.P2500.06.07.2016	6 Sept 16	Document Submission for Approval, No. BSVB.00109 Rev.1.0: CCH Operating Manual	OTP	8 Sept 16	/	/	8 Sept 16	
243	IN0245	BSV	BSV.OTP.1272.P2500.29.09.2016	29 Sept 16	Document Submission for Approval, No. BSVB.00098 Rev.1.0: Action List Management Subsystem Training Manual	OTP	30 Sept 16	/	/	30 Sept 16	
244	IN0246	BSV	BSV.OTP.1273.P2500.29.09.2016	29 Sept 16	Document Submission for Approval, No. BSVB.00029 Rev.1.0: Device Management Subsystem Training Manual	OTP	30 Sept 16	/	/	30 Sept 16	

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245	IN0247	BSV	BSV.OTP.1271.P2500.29.09.2016	29 Sept 16	Document Submission for Approval, No. BSVB.00097 Rev.1.0: Access Control Subsystem Training Manual	OTP	30 Sept 16	/	/	30 Sept 16	
246	IN0248	BSV	BSV.OTP.1275.P2500.05.10.2016	5 Oct 16	Submission of Monthly Progress Report - August 2016	OTP	12 Oct 16	/	/	12 Oct 16	
247	IN0249	BSV	BSV.OTP.1274.P2500.05.10.2016	5 Oct 16	Submission of Monthly Progress Report - September 2016	OTP	12 Oct 16	/	/	12 Oct 16	

Table of Outgoing Documents

The Central Clearing House (CCH) System Development Project

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1	out001	2015/004	17 Mar 15	Result of Consideration of NC Card Data Definition Document	PMS	OTP	/	/	
2	out002	2015/005	3 Apr 15	Result of Consideration of Central Clearing House Project Document	PMS	OTP	/	/	
3	out003	2015/007	11 May 15	Result of Consideration of System Architecture Rev.1.0 and Technical Architecture Rev.1.0	PMS	OTP	/	/	Cancelled
4	out004	2015/010	27 Jul 15	Result of Consideration of Coordinated Implementation Plan Rev.1.0	PMS	OTP	/	/	
5	out005	2015/011	3 Jun 15	Result of Consideration of Initial Work Program Rev.2.0	PMS	OTP	/	/	
6	out006	2015/012	3 Jun 15	Result of Consideration of System Security Architecture Rev.1.0	PMS	OTP	/	/	
7	out007	2015/013	3 Jun 15	Result of Consideration of Comment Explanation Document: Staff Organization Plan Rev.1.0	PMS	OTP	/	/	
8	out008	2015/014	8 Jun 15	Result of Consideration of Submittal Schedule Rev.2.0	PMS	OTP	/	/	
9	out009	2015/015	9 Jun 15	Result of Consideration of Preliminary Test Plan Rev.2.0	PMS	OTP	/	/	
10	out010	2015/016	12 Jun 15	Result of Consideration of Access Control Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
11	out011	2015/017	12 Jun 15	Result of Consideration of Data Management Subsystem Requirement Specification Rev.1.0	PMS	OTP	/	/	
12	out012	2015/018	24 Jun 15	Result of Consideration of Financial Management Software Subsystem Requirement Specification Rev.1.0	PMS	OTP	/	/	
13	out013	2015/019	24 Jun 15	Result of Consideration of Issuer Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	

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14	out014	2015/020	24 Jun 15	Result of Consideration of Card Inventory Management Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
15	out015	2015/021	25 Jun 15	Result of Consideration of NC Card Business Rules Rev.1.0	PMS	OTP	/	/	
16	out016	2015/022	25 Jun 15	Result of Consideration of Configuration Parameters Rev.1.0	PMS	OTP	/	/	
17	out017	2015/023	25 Jun 15	Result of Consideration of NC Card Data Definition Rev.2.0	PMS	OTP	/	/	
18	out018	2015/024	25 Jun 15	Result of Consideration of Transaction Data Definition Rev.1.0	PMS	OTP	/	/	
19	out019	2015/025	25 Jun 15	Result of Consideration of Online Enquiry Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
20	out020	2015/026	30 Jun 15	Result of Consideration of Online Enquiry Subsystem Interface Specification Rev.1.0	PMS	OTP	/	/	
21	out021	2015/027	30 Jun 15	Result of Consideration of System Security Architecture Rev.2.0	PMS	OTP	/	/	
22	out022	2015/028	30 Jun 15	Result of Consideration of Action List Management Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
23	out023	2015/029	30 Jun 15	Result of Consideration of System Management Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
24	out024	2015/030	30 Jun 15	Result of Consideration of Autoload Management Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
25	out025	2015/031	30 Jun 15	Result of Consideration of SP Website Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
26	out026	2015/032	30 Jun 15	Result of Consideration of OTP CCH to Operator Interface Specification Rev.1.0	PMS	OTP	/	/	
27	out027	2015/033	30 Jun 15	Result of Consideration of Configuration Data Management Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	

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28	out028	2015/034	30 Jun 15	Result of Consideration of Report Management Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
29	out029	2015/035	1 Jul 15	Result of Consideration of Communication Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
30	out030	2015/036	1 Jul 15	Result of Consideration of Cardholder Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
31	out031	2015/038	7 Jul 15	Result of Consideration of Cardholder Website Payment Gateway Interface Specification Rev.1.0	PMS	OTP	/	/	
32	out032	2015/039	7 Jul 15	Result of Consideration of Payment Gateway Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
33	out033	2015/040	7 Jul 15	Result of Consideration of OTP CCH to Bank Interface Specification Rev.1.0	PMS	OTP	/	/	
34	out034	2015/041	7 Jul 15	Result of Consideration of Equipment Initialization Interface File Specification Rev.1.0	PMS	OTP	/	/	
35	out035	2015/042	7 Jul 15	Result of Consideration of Host Security Management Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
36	out036	2015/043	16 Jul 15	Result of Consideration of Comment Explanation: Issuer Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	
37	out037	2015/044	16 Jul 15	Result of Consideration of Quality Management Plan Rev.1.0	PMS	OTP	/	/	
38	out038	2015/045	16 Jul 15	Result of Consideration of Outline Quality Plan Rev.2.0	PMS	OTP	/	/	
39	out039	2015/046	20 Jul 15	Result of Consideration of NC Card Data Definition Rev.3.0	PMS	OTP	/	/	
40	out040	2015/047	20 Jul 15	Result of Consideration of Configuration Parameters Rev.2.0	PMS	OTP	/	/	
41	out041	2015/048	20 Jul 15	Result of Consideration of Transaction Data Definition Rev.2.0	PMS	OTP	/	/	
42	out042	2015/049	20 Jul 15	Result of Consideration of NC Card Business Rules Rev.2.0	PMS	OTP	/	/	
43	out043	2015/050	23 Jul 15	Result of Consideration of System Architecture Rev.1.0	PMS	OTP	/	/	

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44	out044	2015/051	23 Jul 15	Result of Consideration of Technical and Network Architecture Rev.1.0	PMS	OTP	/	/	
45	out045	2015/052	23 Jul 15	Result of Consideration of System Security Architecture Rev.3.0	PMS	OTP	/	/	
46	out046	2015/053	23 Jul 15	Result of Consideration of Online Enquiry Subsystem Interface Specification Rev.2.0	PMS	OTP	/	/	
47	out047	2015/054	23 Jul 15	Result of Consideration of OTP CCH to Operator Interface Specification Rev.2.0	PMS	OTP	/	/	
48	out048	2015/055	29 Jul 15	Result of Consideration of SP Website Software Requirement Specification Rev.2.0	PMS	OTP	/	/	
49	out049	2015/056	29 Jul 15	Result of Consideration of Equipment Initialization Interface File Specification Rev.2.0	PMS	OTP	/	/	
50	out050	2015/057	29 Jul 15	Result of Consideration of System Management Subsystem Software Requirement Specification Rev.2.0	PMS	OTP	/	/	
51	out051	2015/058	29 Jul 15	Result of Consideration of Access Control Subsystem Software Requirement Specification Rev.2.0	PMS	OTP	/	/	
52	out052	2015/059	29 Jul 15	Result of Consideration of Online Enquiry Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	
53	out053	2015/060	29 Jul 15	Result of Consideration of Comment Explanation: Configuration Data Management Subsystem Software Requirement Specification Rev. 1.0	PMS	OTP	/	/	
54	out054	2015/061	29 Jul 15	Result of Consideration of Comment Explanation: OTP CCH to Bank Interface Specification Rev.1.0	PMS	OTP	/	/	
55	out055	2015/062	29 Jul 15	Result of Consideration of Comment Explanation: Report Management Subsystem Software Requirement Specification Rev.1.0	PMS	OTP	/	/	

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56	out056	2015/063	29 Jul 15	Result of Consideration of Comment Explanation: Device Management Subsystem Requirement Specification Rev.1.0	PMS	OTP	/		/	
57	out057	2015/064	29 Jul 15	Result of Consideration of Comment Explanation: Communication Subsystem Software Requirement Specification Rev. 1.0	PMS	OTP	/		/	
58	out058	2015/065	29 Jul 15	Result of Consideration of Comment Explanation: Autoload Management Subsystem Software Requirement Specification Rev. 1.0	PMS	OTP	/		/	
59	out059	2015/066	8 Aug 15	Result of Consideration of Card Initialization and Personalization Subsystem Software Requirement Specification Rev. 1.0	PMS	OTP	/		/	
60	out060	2015/067	8 Aug 15	Result of Consideration of Key Management Subsystem Software Requirement Specification Rev. 1.0	PMS	OTP	/		/	
61	out061	2015/068	8 Aug 15	Result of Consideration of Refund and Reload Machine Software Requirement Specification Rev. 1.0	PMS	OTP	/		/	
62	out062	2015/069	8 Aug 15	Result of Consideration of SAM requirement Specification Rev. 1.0	PMS	OTP	/		/	
63	out063	2015/070	8 Aug 15	Result of Consideration of Submittal Schedule Rev.3.0	PMS	OTP	/		/	
64	out064	2015/071	8 Aug 15	Result of Consideration of System Architecture Rev.2.0	PMS	OTP	/		/	
65	out065	2015/074	14 Aug 15	Request for Consideration for Common Ticketing Standard Document Delivery	PMS	OTP	/		/	
66	out066	2015/075	14 Aug 15	Result of Consideration of Issuer Subsystem Design Specification Rev.1.0	PMS	OTP	/		/	
67	out067	2015/076	14 Aug 15	Result of Consideration of Action List Management Subsystem Design Specification Rev.1.0	PMS	OTP	/		/	
68	out068	2015/077	14 Aug 15	Result of Consideration of Comment Explanation: Financial Management Software Requirement Specification Rev.1.0	PMS	OTP	/		/	

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69	out069	2015/078	14 Aug 15	Result of Consideration of Device Management Subsystem Software Design Specification Rev.1.0	PMS	OTP	/	/	
70	out070	2015/079	14 Aug 15	Result of Consideration of Cardholder Website Software Requirement Specification Rev.2.0	PMS	OTP	/	/	
71	out071	2015/080	14 Aug 15	Result of Consideration of Access Control Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	
72	out072	2015/081	14 Aug 15	Result of Consideration of Card Inventory Management Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	
73	out073	2015/082	14 Aug 15	Result of Consideration of Configuration Data Management Subsystem Software Design Specification Rev.1.0	PMS	OTP	/	/	
74	out074	2015/083	14 Aug 15	Result of Consideration of Financial Management Subsystem Software Design Specification Rev.1.0	PMS	OTP	/	/	
75	out075	2015/084	17 Aug 15	Result of Consideration of Quality Management Plan Rev.2.0	PMS	OTP	/	/	
76	out076	2015/085	17 Aug 15	Result of Consideration of Project Glossary Rev.1.0	PMS	OTP	/	/	
77	out077	2015/086	24 Aug 15	Result of Consideration of SP Website Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	
78	out078	2015/087	24 Aug 15	Result of Consideration of Overall Inspection and Test Plan Rev.1.0	PMS	OTP	/	/	
79	out079	2015/088	24 Aug 15	Result of Consideration of Cardholder Website Software Design Specification Rev.1.0	PMS	OTP	/	/	
80	out080	2015/089	24 Aug 15	Result of Consideration of System Security Architecture Design Specification Rev.1.0	PMS	OTP	/	/	
81	out081	2015/090	26 Aug 15	Result of Consideration of Key Management Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	

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82	out082	2015/091	26 Aug 15	Result of Consideration of Payment Gateway Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	
83	out083	2015/092	26 Aug 15	Result of Consideration of Central Clearing House Server System Design Rev.1.0	PMS	OTP	/	/	
84	out084	2015/093	26 Aug 15	Result of Consideration of Central Clearing House Network Design Rev.1.0	PMS	OTP	/	/	
85	out085	2015/094	26 Aug 15	Result of Consideration of System Management Subsystem Software Design Specification Rev.1.0	PMS	OTP	/	/	
86	out086	2015/095	26 Aug 15	Result of Consideration of Host Security Management Subsystem Software Design Specification Rev.1.0	PMS	OTP	/	/	
87	out087	2015/096	26 Aug 15	Result of Consideration of Communication Subsystem Software Design Specification Rev.1.0	PMS	OTP	/	/	
88	out088	2015/097	26 Aug 15	Result of Consideration of Autoload Management Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	
89	out089	2015/098	31 Aug 15	Result of Consideration of Report Management Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	
90	out090	2015/099	31 Aug 15	Result of Consideration of Card Initialization and Personalization Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	
91	out091	2015/100	31 Aug 15	Result of Consideration of SAM Interface Specification Rev.1.0	PMS	OTP	/	/	
92	out092	2015/101	31 Aug 15	Result of Consideration of SAM Design Specification Rev.1.0	PMS	OTP	/	/	
93	out093	2015/102	31 Aug 15	Result of Consideration of Refund and Reload Machine Software Design Specification Rev.1.0	PMS	OTP	/	/	
94	out094	2015/103	9 Sept 15	Result of Consideration of Refund and Reload Machine Software Requirement Specification Rev.2.0	PMS	OTP	/	/	

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95	out095	2015/104	9 Sept 15	Result of Consideration of Key Management Subsystem Software Requirement Specification Rev.2.0	PMS	OTP	/	/	
96	out096	2015/105	9 Sept 15	Result of Consideration of Card Initialization and Personalization Subsystem Design Specification Rev.2.0	PMS	OTP	/	/	
97	out097	2015/106	9 Sept 15	Result of Consideration of Issuer Subsystem Design Specification Rev.2.0	PMS	OTP	/	/	
98	out098	2015/107	9 Sept 15	Result of Consideration of Financial Management Subsystem Software Design Specification Rev.2.0	PMS	OTP	/	/	
99	out099	2015/108	9 Sept 15	Result of Consideration of Central Clearing House Rack Plan Rev.1.0	PMS	OTP	/	/	
100	out100	2015/109	10 Sept 15	Result of Consideration of SAM Requirement Specification Rev.2.0	PMS	OTP	/	/	
101	out101	2015/110	11 Sept 15	Result of Consideration of Procurement Plan Rev.1.0	PMS	OTP	/	/	
102	out102	2015/111	11 Sept 15	Result of Consideration of Third Party Software Bill of Materials Rev.1.0	PMS	OTP	/	/	
103	out103	2015/112	17 Sept 15	Result of Consideration of Technology Transfer Program Rev.1.0	PMS	OTP	/	/	
104	out104	2015/113	17 Sept 15	Result of Consideration of CCH Software Bill of Materials Rev.1.0	PMS	OTP	/	/	
105	out105	2015/114	17 Sept 15	Result of Consideration of Training Program Rev.1.0	PMS	OTP	/	/	
106	out106	2015/115	17 Sept 15	Result of Consideration of Payment Gateway Subsystem Design Specification Rev.1.0	PMS	OTP	/	/	

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107	out107	2015/116	17 Sept 15	Result of Consideration of Card Inventory Management Subsystem Design Specification Rev. 1.0	PMS	OTP	/	/	
108	out108	2015/117	17 Sept 15	Result of CCH Device Replacement Consideration	PMS	OTP	/	/	
109	out109	2015/118	18 Sept 15	Result of Consideration of Hardware Bill of Materials Rev. 1.0	PMS	OTP	/	/	
110	out110	2015/119	24 Sept 15	Result of Consideration of Central Clearing House Network Design Rev. 2.0	PMS	OTP	/	/	
111	out111	2015/120	24 Sept 15	Result of Consideration of Central Clearing House Server System Design Rev. 2.0	PMS	OTP	/	/	
112	out112	2015/121	24 Sept 15	Result of Consideration of Cardholder Website Software Design Specification Rev. 2.0	PMS	OTP	/	/	
113	out113	2015/122	24 Sept 15	Result of Consideration of SP Website Subsystem Software Design Specification Rev. 2.0	PMS	OTP	/	/	
114	out114	2015/123	24 Sept 15	Result of Consideration of Report Management Subsystem Design Specification Rev. 2.0	PMS	OTP	/	/	
115	out115	2015/124	24 Sept 15	Result of Consideration of Key Management Subsystem Design Specification Rev. 2.0	PMS	OTP	/	/	
116	out116	2015/125	24 Sept 15	Result of Consideration of System Security Architecture Design Specification Rev. 2.0	PMS	OTP	/	/	
117	out117	2015/126	24 Sept 15	Result of Consideration of Communication Subsystem Software Design Specification Rev. 2.0	PMS	OTP	/	/	
118	out118	2015/127	24 Sept 15	Result of Consideration of Device Management Subsystem Software Design Specification Rev. 2.0	PMS	OTP	/	/	

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119	out119	2015/128	24 Sept 15	Result of Consideration of System Management Subsystem Software Design Specification Rev. 2.0	PMS	OTP	/	/	/	
120	out120	2015/129	24 Sept 15	Result of Consideration of Project Glossary Rev. 2.0	PMS	OTP	/	/	/	
121	out121	2015/130	24 Sept 15	Result of Consideration of Configuration Data Management Subsystem Software Design Specification Rev. 2.0	PMS	OTP	/	/	/	
122	out122	2015/131	24 Sept 15	Result of Consideration of Card Initialization and Personalization Subsystem Design Specification Rev. 2.0	PMS	OTP	/	/	/	
123	out123	2015/132	24 Sept 15	Result of Consideration of Refund and Reload Machine Software Design Specification Rev. 2.0	PMS	OTP	/	/	/	
124	out124	2015/133	24 Sept 15	Result of Consideration of Central Clearing House Equipment Rack Plan Rev. 2.0	PMS	OTP	/	/	/	
125	out125	2015/134	24 Sept 15	Result of Consideration of SAM Interface Specification Rev. 2.0	PMS	OTP	/	/	/	
126	out126	2015/135	24 Sept 15	Result of Consideration of SAM Design Specification Rev. 2.0	PMS	OTP	/	/	/	
127	out127	2015/136	24 Sept 15	Result of Consideration of Technical and Network Architecture Rev. 2.0	PMS	OTP	/	/	/	
128	out128	2015/138	24 Sept 15	Result of Consideration of Comment Explanation: Host Security Management Subsystem Software Design Specification Rev. 2.0	PMS	OTP	/	/	/	
129	out129	2015/139	24 Sept 15	Result of Consideration of Access Control Subsystem Design Specification Rev. 2.0	PMS	OTP	/	/	/	
130	out130	2015/140	24 Sept 15	Result of Consideration of Action List Management Subsystem Design Specification Rev. 2.0	PMS	OTP	/	/	/	

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131	out131	2015/141	24 Sept 15	Result of Consideration of Autoload Management Subsystem Design Specification Rev. 2.0	PMS	OTP	/	/	
132	out132	2015/142	25 Sept 15	Result of Consideration of the CCH system and Common Ticket's Detailed Design	PMS	OTP	/	/	
133	out133	2015/143	28 Sept 15	Result of Procurement Plan Rev. 2.0 Consideration	PMS	OTP	/	/	
134	out134	2015/144	6 Oct 15	Result of Final Design Consideration	PMS	OTP	/	/	
135	out135	2015/146	8 Oct 15	Result of Consideration of Overall Inspection and Test Plan Rev. 2.0	PMS	OTP	/	/	
136	out136	2015/147	8 Oct 15	Result of Consideration of Training Program Rev. 2.0	PMS	OTP	/	/	
137	out137	2015/148	8 Oct 15	Result of Consideration of Technology Transfer Program Rev. 2.0	PMS	OTP	/	/	
138	out138	2015/152	16 Oct 15	Result of Consideration of CCH Software Bill of Material Rev. 2.0	PMS	OTP	/	/	
139	out139	2015/154	30 Oct 15	Result of Consideration of the Project Plan, Organizational Management Plan, Work Delivery Schedule, and Common Ticketing System Design Report	PMS	OTP	/	/	
140	out140	2015/157	19 Nov 15	Result of Consideration of BSVB.00069 Rev. 1.0 Functional Acceptance Test Plan	PMS	OTP	/	/	
141	out141	2015/158	25 Nov 15	Result of Consideration in order to Support the CCH Developer's Request for the First Installment of Payment	PMS	OTP	/	/	
142	out142	2015/159	26 Nov 15	Result of Consideration on Device Replacement Approval for the Central Clearing House Project (CCH)	PMS	OTP	/	/	
143	out143	2015/160	30 Nov 15	Result of Consideration on Alternative Designs to Increase the Number of Issuers	PMS	OTP	/	/	
144	out144	2015/161	21 Dec 15	Result of Consideration of Device Management Functional Acceptance Test Procedure Rev. 1.0	PMS	OTP	/	/	
145	out145	2015/162	21 Dec 15	Result of Consideration of Access Control Functional Acceptance Test Procedure Rev. 1.0	PMS	OTP	/	/	

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146	out146	2015/163	30 Dec 15	Result of Consideration of Card Initialization and Personalization Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
147	out147	2015/164	30 Dec 15	Result of Consideration of Reload and Refund Machine Software Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
148	out148	2015/165	30 Dec 15	Result of Consideration of Key Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
149	out149	2015/166	30 Dec 15	Result of Consideration of Card Inventory Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
150	out150	2015/167	30 Dec 15	Result of Consideration of Actionlist Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
151	out151	2016/002	18 Jan 16	Result of Consideration of System Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
152	out152	2016/003	20 Jan 16	Common Ticket Printing Format Proposal	PMS	OTP	/	/	
153	out153	2016/004	20 Jan 16	Result of Data Center Rental Approval Consideration for the Central Clearing House Project	PMS	OTP	/	/	
154	out154	2016/005	20 Jan 16	Determination of Bank Payment Gateway for Online Payment for the Central Clearing House Project	PMS	OTP	/	/	
155	out155	2016/006	25 Jan 16	Result of Consideration of Refund and Reload Machine Software Functional Acceptance Test Procedure Rev.2.0	PMS	OTP	/	/	
156	out156	2016/007	25 Jan 16	Result of Consideration of Key Management Subsystem Functional Acceptance Test Procedure Rev.2.0	PMS	OTP	/	/	
157	out157	2016/008	25 Jan 16	Result of Consideration of Card Initialization and Personalization Functional Acceptance Test Procedure Rev.2.0	PMS	OTP	/	/	

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158	out158	2016/011	29 Jan 16	Result of Consideration of CCH Maintenance Manual Rev.1.0	PMS	OTP	/	/	
159	out159	2016/012	29 Jan 16	Result of Consideration of Functional Acceptance Test Plan Rev.2.0	PMS	OTP	/	/	
160	out160	2016/013	29 Jan 16	Result of Consideration of Cardholder and SP Website Operating Manual Rev.1.0	PMS	OTP	/	/	
161	out161	2016/014	29 Jan 16	Result of Consideration of Host Security Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
162	out162	2016/015	9 Feb 16	Result of Consideration of Server Administration Manual Rev.1.0	PMS	OTP	/	/	
163	out163	2016/016	17 Feb 16	Result of Consideration of NFC Prototype Specification Rev.1.0	PMS	OTP	/	/	
164	out164	2016/017	17 Feb 16	Result of Consideration of Configuration Data Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
165	out165	2016/020	10 Mar 16	Suggestions and Solutions for Lack of Payment Gateway Technical Data	PMS	OTP	/	/	
166	out166	2016/021	21 Mar 16	Result of Consideration of Communication Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
167	out167	2016/022	23 Mar 16	Result of Consideration on Device Replacement Approval for the Central Clearing House Project (CCH)	PMS	OTP	/	/	
168	out168	2016/023	29 Mar 16	Result of Consideration of System Management Subsystem Functional Acceptance Test Procedure Rev.2.0	PMS	OTP	/	/	
169	out169	2016/024	29 Mar 16	Result of Consideration of Report Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
170	out170	2016/026	11 Apr 16	Result of Consideration of Retail Prototype Specification Rev.1.0	PMS	OTP	/	/	

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171	out171	2016/027	11 Apr 16	Result of Consideration on CCH's Completed Application Development	PMS	OTP	/	/	
172	out172	2016/029	25 Apr 16	Result of Consideration on Completed Software Installation	PMS	OTP	/	/	
173	out173	2016/030	25 Apr 16	Result of Consideration of the Central Clearing House Development Report	PMS	OTP	/	/	
174	out174	2016/031	3 May 16	Result of Consideration of Retail Prototype Specification Rev.2.0	PMS	OTP	/	/	
175	out175	2016/032	3 May 16	Result of Consideration of Toll Prototype Specification Rev.1.0	PMS	OTP	/	/	
176	out176	2016/033	3 May 16	Result of Consideration of Rail Prototype Specification Rev.1.0	PMS	OTP	/	/	
177	out177	2016/034	4 May 16	Result of Consideration of Software Installation Report Rev.1.0	PMS	OTP	/	/	
178	out178	2016/035	9 May 16	Result of Consideration of Issuer Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
179	out179	2016/036	9 May 16	Result of Consideration of SP Website Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
180	out180	2016/037	9 May 16	Result of Consideration of Financial Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
181	out181	2016/038	9 May 16	Result of Consideration of Autoload Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
182	out182	2016/039	9 May 16	Result of Consideration of Online Enquiry Management Subsystem Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	
183	out183	2016/040	9 May 16	Result of Consideration of Cardholder Website Functional Acceptance Test Procedure Rev.1.0	PMS	OTP	/	/	

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184	out184	2016/041	9 May 16	Result of Consideration of Configuration Data Management Subsystem Functional Acceptance Test Procedure Rev.2.0	PMS	OTP	/	/	
185	out185	2016/042	24 May 16	Result of Consideration on Completed Hardware Installation	PMS	OTP	/	/	
186	out186	2016/043	9 Jun 16	Result of Consideration on the Second Delivery: The Central Clearing House System Development Approval	PMS	OTP	/	/	
187	out187	2016/045	8 Jul 16	Result of Consideration of System Integration Test Plan Rev.1.0	PMS	OTP	/	/	
188	out188	2016/046	15 Jul 16	Result of Consideration of System Acceptance Test Plan Rev.1.0	PMS	OTP	/	/	
189	out189	2016/047	15 Jul 16	Result of Consideration of System Integration Test Procedure Rev.1.0	PMS	OTP	/	/	
190	out190	2016/048	21 Jul 16	Result of Consideration of BSVB.00122 Rev.1.0 Access Control Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
191	out191	2016/049	21 Jul 16	Result of Consideration of BSVB.00083 Rev. 1.0 Actionlist Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
192	out192	2016/050	21 Jul 16	Result of Consideration of BSVB.00085 Rev. 1.0 Card Inventory Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
193	out193	2016/051	21 Jul 16	Result of Consideration of BSVB.00086 Rev. 1.0 Communication Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
194	out194	2016/052	21 Jul 16	Result of Consideration of BSVB.00087 Rev. 1.0 Configuration Data Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	

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195	out195	2016/053	21 Jul 16	Result of Consideration of BSVB.00088 Rev. 1.0 Device Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
196	out196	2016/054	21 Jul 16	Result of Consideration of BSVB.00084 Rev. 1.0 Autoload Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
197	out197	2016/055	21 Jul 16	Result of Consideration of BSVB.00093 Rev. 1.0 Online Enquiry Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
198	out198	2016/056	21 Jul 16	Result of Consideration of BSVB.00094 Rev. 1.0 Report Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
199	out199	2016/057	21 Jul 16	Result of Consideration of BSVB.00095 Rev. 1.0 System Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
200	out200	2016/058	21 Jul 16	Result of Consideration of BSVB.00124 Rev. 1.0 SP Website Functional Acceptance Test Summary Report	PMS	OTP	/	/	
201	out201	2016/059	25 Jul 16	Result of Consideration of BSVB.00123 Rev. 1.0 Cardholder Website Functional Acceptance Test Summary Report	PMS	OTP	/	/	
202	out202	2016/060	25 Jul 16	Result of Consideration of BSVB.00091 Rev. 1.0 Issuer Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
203	out203	2016/061	25 Jul 16	Result of Consideration of BSVB.00089 Rev. 1.0 Financial Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	

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204	out204	2016/062	25 Jul 16	Result of Consideration of BSVS.00086 Rev.1.0Reload and Refund Machine Functional Acceptance Test Summary Report	PMS	OTP	/	/	
205	out205	2016/063	25 Jul 16	Result of Consideration of BSVB.00092 Rev.1.0 Key Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
206	out206	2016/064	25 Jul 16	Result of Consideration of BSVS.00047 Rev.1.0 Card Initialization and Personalization Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
207	out207	2016/065	1 Aug 16	Result of Consideration of BSVB.00090 Rev.1.0 Host Security Management Subsystem Functional Acceptance Test Summary Report	PMS	OTP	/	/	
208	out208	2016/066	2 Aug 16	Result of Consideration of BSVS.00073 Rev.1.0 System Acceptance Test Procedure	PMS	OTP	/	/	
209	out209	2016/067	2 Aug 16	Result of Consideration of BSVS.00017 Rev.2.0 System Integration Test Procedure	PMS	OTP	/	/	
210	out210	2016/068	9 Aug 16	Result of Consideration on Completion of the System and its Development Verification	PMS	OTP	/	/	
211	out211	2016/069	9 Aug 16	Result of Consideration on Individual Device Testing Completion	PMS	OTP	/	/	
212	out212	2016/070	9 Aug 16	Result of Consideration on Completion of System Connectivity Testing	PMS	OTP	/	/	
213	out213	2016/071	16 Aug 16	Result of Consideration of Comment Explanation: BSVB.00070 Rev.1.0 System Integration Test Plan	PMS	OTP	/	/	
214	out214	2016/072	16 Aug 16	Result of Consideration of Comment Explanation: BSVS.00072 Rev.1.0 System Acceptance Test Plan	PMS	OTP	/	/	

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							By Hand	e-Mail	
215	out215	2016/073	16 Aug 16	Result of Consideration of Comment Explanation: BSVS.00073 Rev. 1.0 System Acceptance Test Procedure	PMS	OTP	/	/	
216	out216	2016/074	16 Aug 16	Result of Consideration of BSVS.00075 Rev.1.0 System Integration Test Summary Report	PMS	OTP	/	/	
217	out217	2016/075	16 Aug 16	Result of Consideration of BSVS.00076 Rev. 1.0 System Acceptance Test Summary Report	PMS	OTP	/	/	
218	out218	2016/076	16 Aug 16	Result of Consideration on System Integration Testing Completion	PMS	OTP	/	/	
219	out219	2016/077	16 Aug 16	Result of Consideration on Testing Completion for System Acceptance	PMS	OTP	/	/	
220	out220	2016/078	16 Aug 16	Result of System Testing Report Consideration	PMS	OTP	/	/	
221	out221	2016/079	16 Aug 16	Result of Consideration on the Third Delivery: System Testing Approval	PMS	OTP	/	/	
222	out222	2016/080	1 Sept 16	Request for information for the Common Ticketing System Management Project	PMS	BEM	/	/	
223	out223	2016/081	1 Sept 16	Request for information for the Common Ticketing System Management Project	PMS	MRTA	/	/	
224	out224	2016/082	1 Sept 16	Request for information for the Common Ticketing System Management Project	PMS	SRTET	/	/	
225	out225	2016/083	1 Sept 16	Request for information for the Common Ticketing System Management Project	PMS	BTSC	/	/	
226	out226	2016/085	20 Sept 16	Result of Consideration of BSVB.00100 Rev.1.0 CCH Operating Manual	PMS	OTP	/	/	
227	out227	2016/086	20 Sept 16	Result of Consideration on the Third Delivery: System Testing Approval	PMS	OTP	/	/	

No.	Scan Doc	Document No.	Document Dated	Description	From	To	Receive		Note
							By Hand	e-Mail	
228	out228	2016/088	14 Oct 16	Result of Consideration of BSVB.00029 Rev. 1.0 Device Management Subsystem Training Manual	PMS	OTP	/	/	
229	out229	2016/089	14 Oct 16	Result of Consideration of BSVB.00098 Rev. 1.0 Action List Management Subsystem Training Manual	PMS	OTP	/	/	
230	out230	2016/090	14 Oct 16	Result of Consideration of BSVB.00097 Rev. 1.0 Access Control Subsystem Training Manual	PMS	OTP	/	/	

