

System Testing Plan for Public Transportation System

- Test Plan
- Test Design Specification
- Test Cases Specification

Project Team

Team1

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1 Introduction

1.1 Objectives

본 문서는 2014년 2학기 건국대학교 Software Engineering (2014SE) 수업에서 T1이 개발한 Public Transportation System (PTS)의 System Testing Plan (STP)을 위한 문서이다.

1.2 Background

PTS의 System Testing (ST)을 위하여 PTS의 Software Requirement Specification (SRS)에 대한 이해가 필요하다. SRS는 2014SE 수업홈페이지에 게재되어 있다.

System Testing은 통합된 각 모듈들이 원래 계획했던 대로 작동하는지, 시스템의 실제 동작과 원래 의도했던 요구사항과는 차이가 없는지 등을 판단하게 된다. 수행 시간, 파일 저장 및 처리 능력, 최대 부하, 복구 및 재시동 능력, 수작업 절차 등을 점검한다.

1.3 Scope

본 STP는 대중교통시스템 (PTS)을 이용하여 진행되어 지는 일련의 프로세스들에 대한 ST를 명세하고 있다.

1.4 Project plan

완성된 PTS의 Software(SW)를 ST하기위한 본 계획서를 작성한다.

본 계획서에 작성된 내용에 기반하여 ST를 수행한다.

ST에 대한 결과를 STR(System Testing Result) 리포트를 작성한다.

1.5 Configuration management plan

SASD를 이용하여 SW를 구현한 후, System Testing (ST)를 수행한다.

1.6 References

2014-SE PTS SRS Ver 1.0

2014-SE PTS SRA Ver 3.0

2 Test items

2.1 Software requirements specification

2.1.1 Product functions

(1) Terminal Tag

버스, 지하철 5개 각 역에서 태그를 할 경우 조건들을 따져서 승차, 하차 여부와 잔액을 비교하여 버스, 지하철에 탑승 여부를 결정한다.

(2) Settlement

하루가 지날 때 한번씩 정산이 이루어 진다.

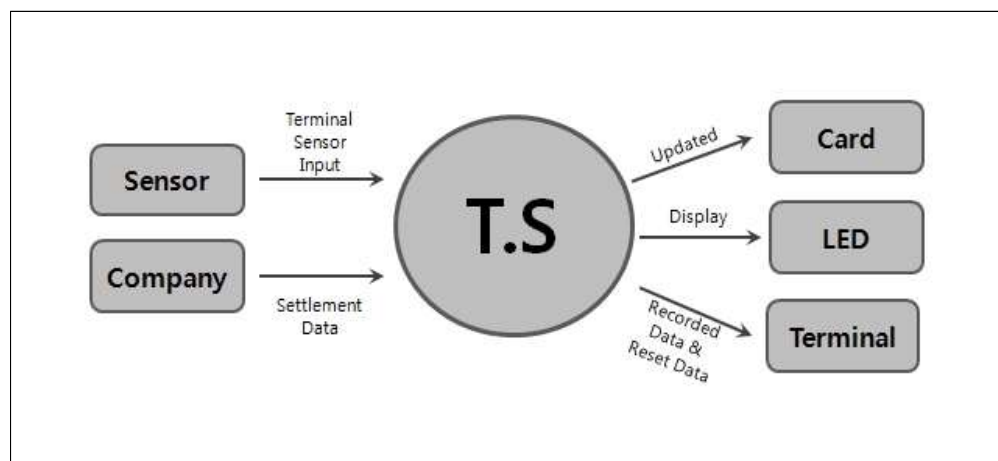
2.1.2 Constrains

- (1) 하루는 3분으로 가정한다.
- (2) 교통카드는 저장된 텍스트 파일로 가정하고, 교통카드 태그 행위를 해당 파일을 입력하는 것으로 가정한다.

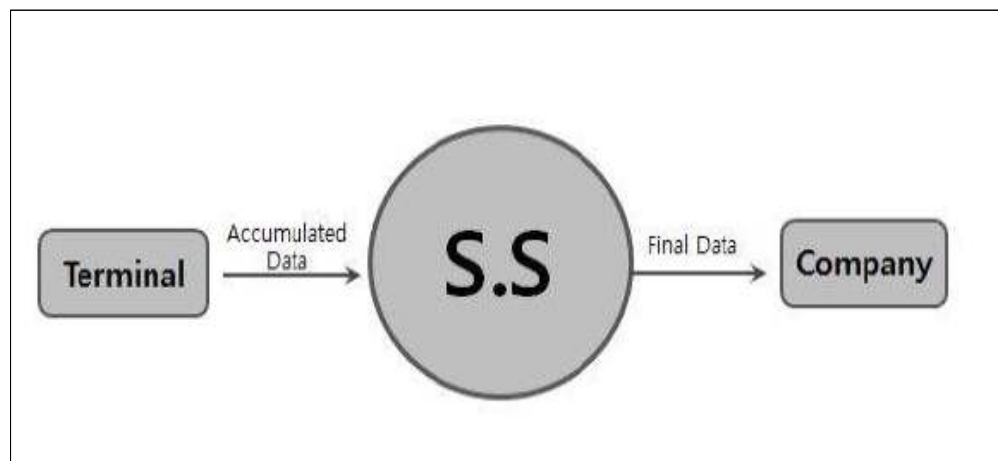
2.2 Software requirements analysis

2.2.1 Basic System Context Diagram

(1) Terminal System



(2) Settlement System



2.2.2 Event List

(1) Terminal System

Input / Output Event	Description
Terminal Sensor Input	단말기 센서에 태그 되었을 때 교통카드의 정보
Updated	단말기 시스템 안에서 계산된 결과를 가지고 갱신시킬 카드의 정보
Display	단말기 시스템 안에서 계산된 결과를 가지고 LED 화면에 출력할 정보 (Wait Mode / Correct Mode / Warning Mode)
Settlement Status	Company에서 보내준 정산 완료 여부 정보
Recorded Data	터미널에 누적계산기록에 기록될 결제 정보
Reset Data	터미널 누적계산기록을 초기화시킬 여부를 결정할 정보

(2) Settlement System

Input / Output Event	Description
Accumulated Data	각각의 Terminal에서 누적된 data
Final Bus Data	Settlement System에서 정산된 Bus Company 지분 또는 Hold를 결정하는 데이터
Final Metro Data	Settlement System에서 정산된 Metro Company 지분 또는 Hold를 결정하는 데이터

3 Approach

요구사항에 정의되어 있는 기능들을 확인하기 위한 시나리오를 작성한다. 작성한 시나리오에 기반하여 Testing design 및 Test cases를 작성하여 Testing을 수행한다.

4 Item pass/fail criteria

<Table 2 System Test Design Identification> 참조

5 System test design specification

5.1 Test design specification identifier

T1_PTS.STC.Number

5.2 Features to be tested

5.2.1 요금 테스트

(1) 기본요금

1) 버스, 각 지하철 역을 태그시 1050원에 기본요금이 부과된다.

(2) 1회 환승 후 하차 요금

1) 버스(승차), 버스(하차), 지하철(승차) 후 지하철을 하차할 때 1개 역이 차이가 날 경우 300원이 부과되고 2개역이 차이가 날 때는 600원이 부과된다.

2) 지하철(승차), 지하철(하차), 버스(승차) 후 버스를 하차할 때 승차와 하차사이의 시간이 30초가 지날 때마다 100원이 초과로 부과된다.

(3) 미정산 요금

1) 지하철에서 버스 환승 후 하차 시 단말기를 태그 하지 않는 경우 지하철에 승차 시 1750원의 요금이 부과된다.

2) 버스에서 지하철 환승 후 하차 시 단말기를 태그 하지 않는 경우 버스에 승차 시 1650원의 요금이 부과된다.

3) 지하철 기본요금 부과 후 하차 시 단말기를 태그 하지 않는 경우 지하철, 버스 승차 시 1250원의 요금이 부과된다.

4) 버스 기본요금 부과 후 하차 시 단말기를 태그 하지 않는 경우 지하철, 버스 승차 시 1050원의 기본요금이 부과된다.

5) 전날 지하철 환승 탑승 후 하차 미태그 후 다음날 지하철 또는 버스를 탑승 시 1650원의 요금이 부과된다.

6) 전날 버스 환승 탑승 후 하차 미태그 후 다음날 지하철 또는 버스를 탑승 시 1750원의 요금이 부과된다.

7) 전날 지하철 기본요금 탑승 후 하차 미태그 후 다음날 지하철 또는 버스를 탑승 시 1250원의 요금이 부과된다.

8) 전날 버스 기본요금 탑승 후 하차 미태그 후 다음날 지하철 또는 버스를 탑승 시 1050원의 요금이 부과된다.

5.2.2 환승 가능한 시간 테스트

(1) 버스에서 지하철로 환승할 때 15초 이내로 태그해야 환승이 가능하다.

(2) 지하철에서 버스로 환승할 때 15초 이내로 태그해야 환승이 가능하다.

5.2.3 잔액 부족 테스트

(1) 잔액이 모자를 경우 태우지 않는다.

(2) 버스 환승 최고 부과금액인 700원이 남아 있지 않으면 버스로 환승시키지 않는다.

(3) 지하철 환승 최고 부과금액인 600원이 남아 있지 않으면 지하철로 환승시키지 않는다.

5.2.4 정산시스템 테스트

5.2.5 기타 요구사항 만족 테스트

5.3 Approach refinements

PTS는 SRS의 Specific Requirements에 나온 모든 동작을 명세 된 내용과 동일하게 수행해야 한다. 각 시나리오들이 정해진 순서의 입력을 받았을 때, SRS에 명세 된 동작을 수행해야 한다.

5.4 Test identification

T1_PTS.STC.Number.Number

5.5 Feature pass/fail criteria

6 System test case specification

<Table 2 System Test Design Identification>참조

<Table 3 Test Cases Identification>참조

6.1 Test case specification identifier

6.2 Test items

6.3 Input specifications

6.4 Output specifications

7 Testing tasks

<Table 1 Testing Tasks & Schedule>

Task	Predecessor tasks	Special skills	Effort	Finish date
(1) STP 작성	T1.PTS.2014.SRS, T1.PTS,2014,SRA T1.PTS 구현 완료		5	
(2) Test case specification 작성		PTS에 대한 지식	2	
(3) ST를 위한 인력 배치			1	
(4) ST를 위한 환경 구축			1	
(5) ST 수행			3	
(6) ST report 작성			2	

8 Environmental needs

PTS를 실행하기 위한 PC – Cygwin 필요

9 System test deliverables

10 Schedules

<Table 1 Testing Tasks & Schedule> 참조

<Table 2 System Test Design Identification>

Identifier	Feature	Valid / Invalid value
T1.PTS.STC.000	요금 테스트	기본요금, 환승 후 요금, 미정산 요금 등 태그 했을 시 나올 수 있는 모든 요금을 계산한다. 계산한 값과 txt파일에 저장된 값 두 개가 정확한지 확인한다.
T1.PTS.STC.001	환승 가능한 시간 테스트	탑승 하차 후 환승 가능한 시간을 확인한다.
T1.PTS.STC.002	잔액 부족 테스트	요금이 부족 했을 때 버스, 지하철을 태우는지 확인한다. 버스, 지하철에 태우지 않았을 때 txt파일에 저장되지 않는지 확인한다.
T1.PTS.STC.003	정산 시스템 테스트	하루(180초)동안 태그를 한 후 하루가 지났을 때 정산이 제대로 완료 됐는지 확인한다.
T1.PTS.STC.004	정산 완료 신호 테스트	정산 프로그램이 제대로 작동하면 정산 완료 후 터미널 시스템이 정상적으로 계속 작동하고 정산 시스템이 제대로 작동 안하거나 정지해 있으면 다음날 터미널 시스템이 정상 작동하면 안되는지 확인한다.
T1.PTS.STC.005	정산 시스템 주기 테스트	하루 주기로 작동하는지 확인한다.
T1.PTS.STC.006	텍스트 파일	SRS 요구조건에 맞게 텍스트 파일이 저장되 있는지 확인한다.

<Table 3 Test Cases Identification>

Test case identifier	Input specification	Output specification
T1.PTS.STC.000.000	(CardData) M,999050,1_3 (TerminalData) B,1,1050,0_3	(Terminal.txt) YYYYMMDDHHMM,B,1,988900,0_8 (Card.txt)YYYYMMDDHHMM,B,0,988900,0_9
T1.PTS.STC.000.001	(CardData)B,0,988900,0_9 (TerminalData) B,0,0,0_9	(Terminal.txt) YYYYMMDDHHMM,M,1,1050,1_7 (Card.txt) YYYYMMDDHHMM,M,1,987850,1_7
T1.PTS.STC.000.002	(CardData) 201503060008,M,1,736400,1_1 201503060016,M,0,736200,3_1 201503060032,B,1,736200,0_1 (TerminalData) 201503060008,M,1,1050,1_1 201503060016,M,0,200,3_1 201503060032,B,1,0,0_1	(Terminal) 현재요금 : 1050, 잔액 : 98950 (Terminal.txt) 201412010808,B,1,988900,0_8 (Card.txt)201412010808,B,0,988900,0_9
T1.PTS.STC.000.003	(CardData) 201503070056,M,1,733050,1_3 201503070104,M,0,733050,1_4 201503070120,B,1,733050,0_2 (TerminalData) 201503070056,M,1,1050,1_3	(Terminal.txt)201503070616,B,0,100,0_3 (Card.txt)201503070616,B,0,732950,0_3

	201503070104,M,0,0,1_4 201503070120,B,1,0,0_2	
T1.PTS.STC.000.004	(CardData) 201503071304,M,1,731900,1_5 201503071312,M,0,731900,1_6 201503071320,B,1,731900,0_4 (TerminalData) 201503071304,M,1,1050,1_5 201503071312,M,0,0,1_6 201503071320,B,1,0,0_4	(Terminal.txt)201503072248,B,0,200,0_5 (Card.txt)201503072248,B,0,731700,0_5
T1.PTS.STC.000.005	(CardData) 201503090952,M,1,729300,1_1 201503091008,M,0,729300,1_2 201503091008,B,1,729300,0_1 (TerminalData) 201503090952,M,1,1050,1_1 201503091008,M,0,0,1_2 201503091008,B,1,0,0_1	(Terminal.txt) 201503092024,B,0,200,0_2 (Card.txt) 201503092024,B,0,729100,0_2
T1.PTS.STC.000.006	(CardData) 201503081032,M,1,1050,1_1 201503081048,M,0,0,1_2 201503081056,B,1,0,0_1	(Terminal.txt)201503082320,B,0,300,0_2 (Card.txt)201503082320,B,0,730350,0_2

	(TerminalData) 201503081032,M,1,730650,1_1 201503081048,M,0,730650,1_2 201503081056,B,1,730650,0_1	
T1.PTS.STC.000.007	(CardData) 201504060004,M,1,550750,1_5 201504060004,M,0,550750,1_6 201504060008,B,1,550750,0_2 (TerminalData) 201504060004,M,1,1050,1_5 201504060004,M,0,0,1_6 201504060008,B,1,0,0_2	(Terminal.txt) 201504062344,B,0,500,0_3 (Card.txt) 201504062344,B,0,550250,0_3
T1.PTS.STC.000.008	(CardData) 201504170016,M,1,97200,1_3 201504170016,M,0,97200,1_4 201504170016,B,1,97200,0_1 (TerminalData) 201504170016,M,1,1050,1_3 201504170016,M,0,0,1_4 201504170016,B,1,0,0_1	(Termina.txtl) 201504180024,B,1,1750,0_1 (Card.txt) 201504180024,B,1,95450,0_1
T1.PTS.STC.000.009	(CardData)	(Terminal.txt)

	<p>201504180032,M,0,95450,1_2 201504180032,M,1,94400,1_3 201504180032,M,0,94400,1_4 (TerminalData) 201504180032,M,1,1050,1_3 201504180032,M,0,0,1_4 201504180032,B,1,0,0_3</p>	<p>201504190456,B,1,1750,0_1 (Card.txt) 201504180032,B,1,94400,0_3</p>
<p>T1.PTS.STC.000.010</p>	<p>(CardData) B,1,715050,0_5 B,0,715050,0_6 M,1,715050,5_1) (TerminalData) B,1,1050,0_5 B,0,0,0_6 M,1,0,5_1</p>	<p>(Card.txt) YYYYMMDDHHMM,M,0,715050,5_2 (Termianl.txt) YYYYMMDDHHMM,M,0,0,5_2</p>
<p>T1.PTS.STC.000.011</p>	<p>(CardData) B,1,712950,0_11 B,0,712950,0_12 M,1,712950,5_3 (TerminalData) B,1,1050,0_11</p>	<p>(Card.txt) YYYYMMDDHHMM,M,0,712650,4_1 (Termianl.txt) YYYYMMDDHHMM,M,0,300,4_1</p>

	B,0,0,0_12 M,1,0,5_3	
T1.PTS.STC.000.012	(CardData) B,1,711600,0_1 B,0,711600,0_2 M,1,711600,5_1 (TerminalData) B,1,1050,0_1 B,0,0,0_2 M,1,0,5_1	(Card.txt) YYYYMMDDHHMM,M,0,711000,3_1 (Terminal.txt) YYYYMMDDHHMM,M,0,600,3_1
T1.PTS.STC.000.013	(CardData) B,1,709950,0_3 B,0,709950,0_4 M,1,709950,5_2 (TerminalData) B,1,1050,0_3 B,0,0,0_4 M,1,0,5_2	(Card.txt) YYYYMMDDHHMM,M,0,709350,2_1 (Terminal.txt) YYYYMMDDHHMM,M,0,600,2_1
T1.PTS.STC.000.014	(CardData) B,1,704550,0_13 B,0,704550,0_14	(Card.txt) YYYYMMDDHHMM,M,0,704250,1_1 (Terminal.txt)

	M,1,704550,5_4 (TerminalData) B,1,1050,0_13 B,0,0,0_14 M,1,0,5_4	YYYYMMDDHHMM,M,0,300,1_1
T1.PTS.STC.000.015	(CardData) B,1,701850,0_5 B,0,701850,0_6 M,1,701850,4_1 (TerminalData) B,1,1050,0_5 B,0,0,0_6 M,1,0,4_1	(Card.txt) YYYYMMDDHHMM,M,0,701550,5_2 (Terminal.txt) YYYYMMDDHHMM,M,0,300,5_2
T1.PTS.STC.000.016	(CardData) B,1,700500,0_7 B,0,700500,0_8 M,1,700500,4_2 (TerminalData) B,1,1050,0_7 B,0,0,0_8 M,1,0,4_2	(Card.txt) YYYYMMDDHHMM,M,0,700500,4_3 (Terminal.txt) YYYYMMDDHHMM,M,0,0,4_3

<p>T1.PTS.STC.000.017</p>	<p>(CardData) B,1,699450,0_9 B,0,699450,0_10 M,1,699450,4_4 (TerminalData) B,1,1050,0_9 B,0,0,0_10 M,1,0,4_4</p>	<p>(Card.txt) YYYYMMDDHHMM,M,0,699150,3_1 (Terminal.txt) YYYYMMDDHHMM,M,0,300,3_1</p>
<p>T1.PTS.STC.000.018</p>	<p>(CardData) B,1,698100,0_11 B,0,698100,0_12 M,1,698100,4_5 (TerminalData) B,1,1050,0_11 B,0,0,0_12 M,1,0,4_5</p>	<p>(Card.txt) YYYYMMDDHHMM,M,0,697500,2_1 (Terminal.txt) YYYYMMDDHHMM,M,0,600,2_1</p>
<p>T1.PTS.STC.000.019</p>	<p>(CardData) B,1,696450,0_1 B,0,696450,0_2 M,1,696450,4_1 (TerminalData)</p>	<p>(Card) YYYYMMDDHHMM,M,0,695850,1_1 (Terminal) YYYYMMDDHHMM,M,0,600,1_1</p>

	B,1,1050,0_1 B,0,0,0_2 M,1,0,4_1	
T1.PTS.STC.000.020	(CardData) B,1,694800,0_3 B,0,694800,0_4 M,1,694800,3_1 (TerminalData) B,1,1050,0_3 B,0,0,0_4 M,1,0,3_1	(Card) YYYYMMDDHHMM,M,0,694200,5_1 (Terminal) YYYYMMDDHHMM,M,0,600,5_1
T1.PTS.STC.000.021	(CardData) B,1,691800,0_5 B,0,691800,0_6 M,1,691800,3_2 (TerminalData) B,1,1050,0_5 B,0,0,0_6 M,1,0,3_2	(Card) YYYYMMDDHHMM,M,0,691500,4_1 (Terminal) YYYYMMDDHHMM,M,0,300,4_1
T1.PTS.STC.000.022	(CardData) B,1,690450,0_7	(Card) YYYYMMDDHHMM,M,0,690450,3_4

	<p>B,0,690450,0_8 M,1,690450,3_3 (TerminalData) B,1,1050,0_7 B,0,0,0_8 M,1,0,3_3</p>	<p>(Terminal) YYYYMMDDHHMM,M,0,0,3_4</p>
<p>T1.PTS.STC.000.023</p>	<p>(CardData) B,1,689400,0_9 B,0,689400,0_10 M,1,689400,3_5 (TerminalData) B,1,1050,0_9 B,0,0,0_10 M,1,0,3_5</p>	<p>(Card) YYYYMMDDHHMM,M,0,689100,2_2 (Terminal) YYYYMMDDHHMM,M,0,300,2_2</p>
<p>T1.PTS.STC.000.024</p>	<p>(CardData) B,1,688050,0_11 B,0,688050,0_12 M,1,688050,3_6 (TerminalData) B,1,1050,0_11 B,0,0,0_12 M,1,0,3_6</p>	<p>(Card) YYYYMMDDHHMM,M,0,687450,1_1 (Terminal) YYYYMMDDHHMM,M,0,600,1_1</p>

<p>T1.PTS.STC.000.025</p>	<p>(CardData) B,1,684300,0_3 B,0,684300,0_4 M,1,684300,2_2 (TerminalData) B,1,1050,0_3 B,0,0,0_4 M,1,0,2_2</p>	<p>(Card) YYYYMMDDHHMM,M,0,683700,5_1 (Terminal) YYYYMMDDHHMM,M,0,600,5_1</p>
<p>T1.PTS.STC.000.026</p>	<p>(CardData) B,1,682650,0_5 B,0,682650,0_6 M,1,682650,2_3 (TerminalData) B,1,1050,0_5 B,0,0,0_6 M,1,0,2_3</p>	<p>(Card) YYYYMMDDHHMM,M,0,682050,4_1 (Terminal) YYYYMMDDHHMM,M,0,600,4_1</p>
<p>T1.PTS.STC.000.027</p>	<p>(CardData) B,1,681000,0_7 B,0,681000,0_8 M,1,681000,2_4 (TerminalData)</p>	<p>(Card) YYYYMMDDHHMM,M,0,680700,3_1 (Terminal) YYYYMMDDHHMM,M,0,300,3_1</p>

	B,1,1050,0_7 B,0,0,0_8 M,1,0,2_4	
T1.PTS.STC.000.028	(CardData) B,1,677350,0_3 B,0,677350,0_4 M,1,677350,2_1 (TermianlData) B,1,1050,0_3 B,0,0,0_4 M,1,0,2_1	(Card) YYYYMMDDHHMM,M,0,677350,2_2 (Terminal) YYYYMMDDHHMM,M,0,0,2_2
T1.PTS.STC.000.029	(CardData) B,1,676300,0_5 B,0,676300,0_6 M,1,676300,2_3 (TermianlData) B,1,1050,0_5 B,0,0,0_6 M,1,0,2_3	(Card) YYYYMMDDHHMM,M,0,676000,1_2 (Terminal) YYYYMMDDHHMM,M,0,300,1_2
T1.PTS.STC.000.030	(CardData) B,1,674950,0_7	(Card) YYYYMMDDHHMM,M,0,674650,5_1

	<p>B,0,674950,0_8 M,1,674950,1_3 (TermianIData) B,1,1050,0_7 B,0,0,0_8 M,1,0,1_3</p>	<p>(Terminal) YYYYMMDDHHMM,M,0,300,5_1</p>
<p>T1.PTS.STC.000.031</p>	<p>(CardData) B,1,673600,0_1 B,0,673600,0_2 M,1,673600,1_1 (TermianIData) B,1,1050,0_1 B,0,0,0_2 M,1,0,1_1</p>	<p>(Card) YYYYMMDDHHMM,M,0,673000,4_1 (Terminal) YYYYMMDDHHMM,M,0,600,4_1</p>
<p>T1.PTS.STC.000.032</p>	<p>(CardData) B,1,671950,0_3 B,0,671950,0_4 M,1,671950,1_2 (TermianIData) B,1,1050,0_3 B,0,0,0_4</p>	<p>(Card) YYYYMMDDHHMM,M,0,671350,3_1 (Terminal) YYYYMMDDHHMM,M,0,600,3_1</p>

	M,1,0,1_2	
T1.PTS.STC.000.033	(CardData) B,1,670300,0_5 B,0,670300,0_6 M,1,670300,1_3 (TerminalData) B,1,1050,0_5 B,0,0,0_6 M,1,0,1_3	(Card) YYYYMMDDHHMM,M,0,669700,3_2 (Terminal) YYYYMMDDHHMM,M,0,600,3_2
T1.PTS.STC.000.034	(CardData) B,1,664100,0_9 B,0,664100,0_10 M,1,664100,1_6 (TerminalData) B,1,1050,0_9 B,0,0,0_10 M,1,0,1_6	(Card) YYYYMMDDHHMM,M,0,664100,1_7 (Terminal) YYYYMMDDHHMM,M,0,0,1_7
T1.PTS.STC.000.035	(CardData) M,1,657950,1_15 M,0,657950,1_16 B,1,657950,0_14	(Card) YYYYMMDDHHMM,M,1,656200,1_17 (Terminal) YYYYMMDDHHMM,M,1,1750,1_17

	(TermianIData) M,1,1050,1_15 M,0,0,1_16 B,1,0,0_14	
T1.PTS.STC.000.036	(CardData) B,1,653900,0_17 B,0,653900,0_18 M,1,653900,1_18 (TermianIData) B,1,1050,0_17 B,0,0,0_18 M,1,0,1_18	(Card) YYYYMMDDHHMM,B,1,652250,0_19 (Terminal) YYYYMMDDHHMM,B,1,1650,0_19
T1.PTS.STC.000.037	(CardData) M,1,650150,1_21 (TermianIData) M,1,1050,1_21	(Card) YYYYMMDDHHMM,B,1,648900,0_20 (Terminal) YYYYMMDDHHMM,B,1,1250,0_20
T1.PTS.STC.000.038	(CardData) M,1,637050,1_3 M,0,637050,1_4 M,1,636000,1_5 (TermianIData)	(Card) YYYYMMDDHHMM,M,0,637050,1_4 (Terminal) YYYYMMDDHHMM,B,1,1250,0_1

	M,1,1050,1_3 M,0,0,1_4 M,1,1050,1_5	
T1.PTS.STC.000.039	(CardData) B,1,625600,0_3 (TermianIData) B,1,1050,0_3	(Card) YYYYMMDDHHMM,M,1,624550,1_1 (Terminal) YYYYMMDDHHMM,M,1,1050,1_1
T1.PTS.STC.000.040	(CardData) B,1,621850,0_6 B,0,621850,0_7 B,1,620800,0_8 (TermianIData) B,1,1050,0_6 B,0,0,0_7 B,1,1050,0_8	(Card) YYYYMMDDHHMM,M,1,619750,1_2 (Terminal) YYYYMMDDHHMM,M,1,1050,1_2
T1.PTS.STC.000.041	(CardData) M,1,618700,1_4 (TermianIData) M,1,1050,1_4	(Card) YYYYMMDDHHMM,M,1,617050,1_1 (Terminal) YYYYMMDDHHMM,M,1,1650,1_1
T1.PTS.STC.000.042	(CardData)	(Card)

	M,1,616000,1_3 (TermianIData) M,1,1050,1_3	YYYYMMDDHHMM,B,1,614350,0_1 (Terminal) YYYYMMDDHHMM,B,1,1650,0_1
T1.PTS.STC.000.043	(CardData) B,1,613300,0_3 (TermianIData) B,1,1050,0_3	(Card) YYYYMMDDHHMM,M,1,611550,1_1 (Terminal) YYYYMMDDHHMM,M,1,1750,1_1
T1.PTS.STC.000.044	(CardData) B,1,608850,0_3 (TermianIData) B,1,1050,0_3	(Card) YYYYMMDDHHMM,B,1,607100,0_1 (Terminal) YYYYMMDDHHMM,B,1,1750,0_1
T1.PTS.STC.001.001	(CardData) 201503271656,B,1,603350,0_7 201503271712,B,0,603350,0_8 (TermianIData) 201503271656,B,1,1050,0_7 201503271712,B,0,0,0_8	(Card) 201503271720,M,1,603350,1_2 (Terminal) 201503271720,M,1,0,1_2
T1.PTS.STC.001.002	(CardData) 201503280032,B,1,600650,0_1 201503280032,B,0,600650,0_2	(Card) 201503280136,M,1,600650,1_1 (Terminal)

	(TermianIData) 201503280032,B,1,1050,0_1 201503280032,B,0,0,0_2	201503280136,M,1,0,1_1
T1.PTS.STC.001.003	(CardData) 201503281056,B,1,593550,0_11 201503281120,B,0,593550,0_12 (TermianIData) 201503281056,B,1,1050,0_11 201503281120,B,0,0,0_12	(Card) 201503281320,M,1,593550,1_3 (Terminal) 201503281320,M,1,0,1_3
T1.PTS.STC.001.004	(CardData) 201503281920,B,1,588150,0_19 201503281920,B,0,588150,0_20 (TermianIData) 201503281920,B,1,1050,0_19 201503281920,B,0,0,0_20	(Card) 201503282128,M,1,587100,1_5 (Terminal) 201503282128,M,1,1050,1_5
T1.PTS.STC.001.005	(CardData) 201503290336,M,0,581600,1_8 201503290336,M,1,580550,1_9 201503290344,B,1,579300,0_2 201503290352,B,0,579300,0_3 (TermianIData)	(Card) 201503290408,M,1,579300,1_10 (Terminal) 201503290408,M,1,0,1_10

	201503290336,M,0,0,1_8 201503290336,M,1,1050,1_9 201503290344,B,1,1250,0_2 201503290352,B,0,0,0_3	
T1.PTS.STC.001.006	(CardData) 201503291032,M,1,575100,1_16 201503291032,M,0,575100,1_17 201503291040,B,1,575100,0_7 201503291040,B,0,575100,0_8 (TermianlData) 201503291032,M,1,1050,1_16 201503291032,M,0,0,1_17 201503291040,B,1,0,0_7 201503291040,B,0,0,0_8	(Card) 201503291152,M,1,575100,1_18 (Terminal) 201503291152,M,1,0,1_18
T1.PTS.STC.001.007	(CardData) 201503291632,M,1,574050,1_20 201503291632,M,0,574050,1_21 201503291640,B,1,574050,0_9 201503291648,B,0,574050,0_10 (TermianlData) 201503291632,M,1,1050,1_20	(Card) 201503291848,M,1,574050,1_22 (Terminal) 201503291848,M,1,0,1_22

	201503291632,M,0,0,1_21 201503291640,B,1,0,0_9 201503291648,B,0,0,0_10	
T1.PTS.STC.001.008	(CardData) 201503300008,M,1,571950,1_1 201503300024,M,0,571950,1_2 201503300024,B,1,571950,0_1 201503300032,B,0,571950,0_2 (TermianlData) 201503300008,M,1,1050,1_1 201503300024,M,0,0,1_2 201503300024,B,1,0,0_1 201503300032,B,0,0,0_2	(Card) 201503300240,M,1,570900,1_3 (Terminal) 201503300240,M,1,1050,1_3
T1.PTS.STC.001.009	(CardData) 201503300616,M,1,569850,1_5 201503300632,M,0,569850,1_6 (TermianlData) 201503300616,M,1,1050,1_5 201503300632,M,0,0,1_6	(Card) 201503300640,B,1,569850,0_3 (Terminal) 201503300640,B,1,0,0_3
T1.PTS.STC.001.010	(CardData) 201503301544,M,1,567050,1_9	(Card) 201503301704,B,1,567050,0_4

	201503301552,M,0,567050,1_10 (TermianIData) 201503301544,M,1,1050,1_9 201503301552,M,0,0,1_10	(Terminal) 201503301704,B,1,0,0_4
T1.PTS.STC.001.011	(CardData) 201503302136,M,1,564250,1_13 201503302152,M,0,564250,1_14 (TermianIData) 201503302136,M,1,1050,1_13 201503302152,M,0,0,1_14	(Card) 201503302352,B,1,564250,0_5 (Terminal) 201503302352,B,0,0,0_6
T1.PTS.STC.001.012	(CardData) 201504010400,B,1,563200,0_1 201504010408,B,0,563200,0_2 201504010416,M,1,563200,1_1 201504010432,M,0,563200,1_2 (TermianIData) 201504010400,B,1,1050,0_1 201504010408,B,0,0,0_2 201504010416,M,1,0,1_1 201504010432,M,0,0,1_2	(Card) 201504010440,B,1,563200,0_3 (Terminal) 201504010440,B,1,0,0_3
T1.PTS.STC.001.013	(CardData)	(Card)

	201504071344,M,1,546900,1_6 201504071408,M,0,546900,1_7 (TermianlData) 201504071344,M,1,0,1_6 201504071408,M,0,0,1_7	201504071608,B,1,546900,0_5 (Terminal) 201504071608,B,1,0,0_5
T1.PTS.STC.001.014	(CardData) 201504080608,M,1,544100,1_3 201504080616,M,0,544100,1_4 (TermianlData) 201504080608,M,1,1050,1_3 201504080616,M,0,0,1_4	(Card) 201504080824,B,1,543050,0_1 (Terminal) 201504080824,B,1,1050,0_1
T1.PTS.STC.001.015	(CardData) 201504080824,B,1,543050,0_1 201504081224,B,0,543050,0_2 201504081232,M,1,543050,1_5 201504081400,M,0,543050,1_6 (TermianlData) 201504080824,B,1,1050,0_1 201504081224,B,0,0,0_2 201504081232,M,1,0,1_5 201504081400,M,0,0,1_6	(Card) 201504081400,B,1,543050,0_3 (Terminal) 201504081400,B,1,0,0_3

T1.PTS.STC.001.016	(CardData) 201504081744,B,1,542000,0_5 201504081752,B,0,542000,0_6 201504081800,M,1,542000,1_7 201504081808,M,0,542000,1_8 (TermianlData) 201504081224,B,0,0,0_2 201504081232,M,1,0,1_5 201504081400,M,0,0,1_6 201504081400,B,1,0,0_3	(Card) 201504082008,B,1,542000,0_7 (Terminal) 201504081736,B,0,0,0_4
T1.PTS.STC.001.017	(CardData) 201504090024,B,1,539200,0_3 201504090032,B,0,539200,0_4 201504090040,M,1,539200,1_1 201504090048,M,0,539200,1_2 (TermianlData) 201504090024,B,1,1050,0_3 201504090032,B,0,0,0_4 201504090040,M,1,0,1_1 201504090048,M,0,0,1_2	(Card) 201504090408,B,1,538150,0_5 (Terminal) 201504090408,B,1,1050,0_5
T1.PTS.STC.002.001	(CardData)	(Card)

	201504092056,B,0,500,0_6 (TermianIData) 201504092056,B,0,0,0_6	201504092056,B,0,500,0_6 (Terminal) 201504092056,B,0,0,0_6
T1.PTS.STC.002.002	(CardData) 201504110104,B,1,1450,0_1 201504110120,B,0,1450,0_2 201504110136,M,1,1450,1_1 (TermianIData) 201504110104,B,1,1050,0_1 201504110120,B,0,0,0_2 201504110136,M,1,0,1_1	(Card) 201504110136,M,1,1450,1_1 (Terminal) 201504110136,M,1,0,1_1
T1.PTS.STC.002.003	(CardData) 201504111656,M,0,1500,1_2 201504111856,M,1,450,1_3 201504111912,M,0,450,1_4 (TermianIData) 201504111656,M,0,0,1_2 201504111856,M,1,1050,1_3 201504111912,M,0,0,1_4	(Card) 201504111920,B,1,450,0_3 (Terminal) 201504111920,B,1,0,0_3
T1.PTS.STC.002.004	(CardData) 201504120216,B,1,2450,0_1	(Card) 201504120240,B,1,800,0_3

	201504120216,B,0,2450,0_2 201504120232,M,1,2450,1_1 (TermianIData) 201504120216,B,1,1050,0_1 201504120216,B,0,0,0_2 201504120232,M,1,0,1_1	(Terminal) 201504120240,B,1,1650,0_3
T1.PTS.STC.002.005	(CardData) 201504121224,B,0,500,0_4 (TermianIData) 201504121224,B,0,0,0_4	(Card) 201504121224,B,0,500,0_4 (Terminal) 201504121224,B,0,0,0_4
T1.PTS.STC.002.006	(CardData) 201504130256,B,1,450,0_1 201504130320,B,0,450,0_2 (TermianIData) 201504130256,B,1,1050,0_1 201504130320,B,0,0,0_2	(Card) 201504130408,M,1,450,1_1 (Terminal) 201504130408,M,1,0,1_1
T1.PTS.STC.002.007	(CardData) 201504131944,M,1,1450,1_3 201504131952,M,0,1450,1_4 201504132000,B,1,1450,0_3 (TermianIData)	(Card) 201504132000,B,1,1450,0_3 (Terminal) 201504132000,B,1,0,0_3

	201504131944,M,1,1050,1_3 201504131952,M,0,0,1_4 201504132000,B,1,0,0_3	
T1.PTS.STC.002.008	(CardData) 201504140944,M,0,3500,1_2 201504141048,M,1,2450,1_3 201504141104,M,0,2450,1_4 201504141104,B,1,2450,0_1 (TermianlData) 201504140944,M,0,0,1_2 201504141048,M,1,1050,1_3 201504141104,M,0,0,1_4 201504141104,B,1,0,0_1	(Card) 201504141112,M,1,700,1_5 (Terminal) 201504141112,M,1,1750,1_5
T1.PTS.STC.003.000	Input=Terminal_Data{ M,1,1050 M,0,0 M,1,1050 M,0,200 M,1,1050 M,0,0 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{0, ,B} Settled_Metro_Fee.txt{5650,201412191144,M}
T1.PTS.STC.003.001	Input= Terminal_Data{ M,1,1050 M,0,0	Output=Settled_Bus_Fee.txt{3150,201412212032,B} Settled_Metro_Fee.txt{3350,201412211024,M}

	<p>M,1,1050 M,0,0</p> <p>M,1,1050 M,0,200</p> <p>B,1,1050 B,0,0</p> <p>B,1,1050 B,0,0</p> <p>B,1,1050 B,0,0}</p>	
T1.PTS.STC.003.002	<p>Input=Terminal_Data{</p> <p>B,1,1050 B,0,0</p> <p>B,1,1050 B,0,0</p> <p>B,1,1050 B,0,0</p> <p>M,1,1050 M,0,200</p> <p>M,1,1050 M,0,0</p> <p>M,1,1050 M,0,200}</p>	<p>Output=Settled_Bus_Fee.txt{3150,201412230304,B}</p> <p>Settled_Metro_Fee.txt{3550,201412230904,M}</p>
T1.PTS.STC.003.003	<p>Input=Terminal_Data{</p> <p>B,1,1050 B,0,0</p> <p>M,1,1050 M,0,0</p> <p>B,1,1050 B,0,0</p> <p>M,1,1050 M,0,200</p> <p>B,1,1050 B,0,0</p> <p>M,1,1050 M,0,0}</p>	<p>Output=Settled_Bus_Fee.txt{3150,201412251408,B}</p> <p>Settled_Metro_Fee.txt{3550,201412251736,M}</p>
T1.PTS.STC.003.004	<p>Input=Terminal_Data{</p>	<p>Output=Settled_Bus_Fee.txt{1575,201412270712,B}</p>

	B,1,1050 B,0,0 M,1,0 M,0,0 B,1,1050 B,0,0}	Settled_Metro_Fee.txt{525,201412270312,M}
T1.PTS.STC.003.005	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 M,0,0 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{1575,201412281448,B} Settled_Metro_Fee.txt{525,201412281144,M}
T1.PTS.STC.003.006	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 M,0,300 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{590,201501020136,B} Settled_Metro_Fee.txt{1809,201501020600,M}
T1.PTS.STC.003.007	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 M,0,300 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{1640,201501031936,B} Settled_Metro_Fee.txt{759,201501031448,M}
T1.PTS.STC.003.008	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 B,0,0 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{1575,201501041432,B} Settled_Metro_Fee.txt{525,201501040952,M}
T1.PTS.STC.003.009	Input=Terminal_Data{	Output=Settled_Bus_Fee.txt{525,201501060240,B}

	M,1,1050 M,0,0 B,1,0 B,0,0 M,1,1050 M,0,0}	Settled_Metro_Fee.txt{1575,201501060712,M}
T1.PTS.STC.003.010	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 B,0,300 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{1809,201501091512,B} Settled_Metro_Fee.txt{590,201501090144,M}
T1.PTS.STC.003.011	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 B,0,300 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{759,201501111408,B} Settled_Metro_Fee.txt{1640,201501111808,M}
T1.PTS.STC.003.012	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 M,0,300 B,1,0 B,0,0 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{820,201501140224,B} Settled_Metro_Fee.txt{1578,201501140608,M}
T1.PTS.STC.003.013	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 M,0,300 B,1,0 B,0,0	Output=Settled_Bus_Fee.txt{1870,201501121456,B} Settled_Metro_Fee.txt{528,201501121032,M}

	B,1,1050 B,0,0}	
T1.PTS.STC.003.014	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 M,0,300 B,1,0 B,0,200 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{975,201501171456,B} Settled_Metro_Fee.txt{1623,201501171808,M}
T1.PTS.STC.003.015	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 M,0,300 B,1,0 B,0,200 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{2025,201501201304,B} Settled_Metro_Fee.txt{573,201501200304,M}
T1.PTS.STC.003.016	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 B,0,0 M,1,0 M,0,0 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{350,201501211704,B} Settled_Metro_Fee.txt{1750,201501212144,M}
T1.PTS.STC.003.017	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 B,0,0 M,1,0 M,0,0	Output=Settled_Bus_Fee.txt{1400,201501221200,B} Settled_Metro_Fee.txt{700,201501220936,M}

	B,1,1050 B,0,0}	
T1.PTS.STC.003.018	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 B,0,200 M,1,0 M,0,300 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{1400,201501221200,B} Settled_Metro_Fee.txt{700,201512200936,M}
T1.PTS.STC.003.019	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 B,0,200 M,1,0 M,0,300 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{530,201501241640,B} Settled_Metro_Fee.txt{2068,201501241832,M}
T1.PTS.STC.003.020	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 M,0,0 B,1,0 B,0,200 M,1,0 M,0,300 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{1580,201501252248,B} Settled_Metro_Fee.txt{1018,201501252016,M}
T1.PTS.STC.003.021	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 M,1,1750	Output=Settled_Bus_Fee.txt{525,201501261544,B} Settled_Metro_Fee.txt{2475,201501261608,M}

	M,0,200}	
T1.PTS.STC.003.022	Input=Terminal_Data{ M,1,1750 M,0,200 M,1,1050 M,0,200}	Output=Settled_Bus_Fee.txt{0,,B} Settled_Metro_Fee.txt{3200,201501280312,M}
T1.PTS.STC.003.023	Input=Terminal_Data{ M,1,1750 M,0,200 B,1,0 B,0,200 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{1889,201501302000,B} Settled_Metro_Fee.txt{1310,201501301056,M}
T1.PTS.STC.003.024	Input=Terminal_Data{ B,1,1750 B,0,0 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{2800,201502040216,B} Settled_Metro_Fee.txt{0,,M}
T1.PTS.STC.003.025	Input=Terminal_Data{ B,1,1750 B,0,0 M,1,0 M,0,300 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{1157,201502060512,B} Settled_Metro_Fee.txt{1942,201502060616,M}
T1.PTS.STC.003.026	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 B,1,1650 B,0,0}	Output=Settled_Bus_Fee.txt{2175,201502090616,B} Settled_Metro_Fee.txt{525,201502090552,M}

T1.PTS.STC.003.027	Input=Terminal_Data{ M,1,1650 M,0,0 M,1,1050 M,0,200}	Output=Settled_Bus_Fee.txt{0,,B} Settled_Metro_Fee.txt{2900,2015}
T1.PTS.STC.003.028	Input=Terminal_Data{ M,1,1650 M,0,0 B,1,0 B,0,200 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{} Settled_Metro_Fee.txt{}
T1.PTS.STC.003.029	Input=Terminal_Data{ B,1,1650 B,0,0 B,1,1050 B,0,0}	Output=Settled_Bus_Fee.txt{2700,201502150944,B} Settled_Metro_Fee.txt{0,,M}
T1.PTS.STC.003.030	Input=Terminal_Data{ B,1,1650 B,0,0 M,1,0 M,0,300 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{1072,201502170904,B} Settled_Metro_Fee.txt{1927,201502171024,M}
T1.PTS.STC.003.031	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 B,1,1650 M,1,1050 M,0,0}	Output=Settled_Bus_Fee.txt{2175,201502300928,B} Settled_Metro_Fee.txt{1575,201502300952,M}
T1.PTS.STC.003.032	Input=Terminal_Data{ M,1,1050 B,1,1250	Output=Settled_Bus_Fee.txt{975,201502231136,B} Settled_Metro_Fee.txt{3373,201502231200,M}

	B,0,0 M,1,0 M,0,300 B,1,0 M,1,1750}	
T1.PTS.STC.003.033	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,1050 B,0,0 M,1,0}	Output=Settled_Bus_Fee.txt{525,201502251552,B} Settled_Metro_Fee.txt{1575,201502261640,B}
T1.PTS.STC.003.034	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 M,0,300 M,1,1050}	Output=Settled_Bus_Fee.txt{590,201502261640,B} Settled_Metro_Fee.txt{1809,201502261728,M}
T1.PTS.STC.003.035	Input=Terminal_Data{ M,1,1050 M,0,0 B,1,0 B,0,0 B,1,1050}	Output=Settled_Bus_Fee.txt{1575,201502271624,B} Settled_Metro_Fee.txt{525,201502271552,M}
T1.PTS.STC.003.036	Input=Terminal_Data{ B,1,1050 B,0,0 M,1,0 M,0,300 B,1,0}	Output=Settled_Bus_Fee.txt{820,201502281104,B} Settled_Metro_Fee.txt{528,201502281048,M}
T1.PTS.STC.004.000	Input=Clock(YYYYMMDDHHmm	Output=Settled_Bus_Fee.txt{Settled_Fee,Last_Tag,Transportation}

	=YYYYMMDD0000)	Settled_Metro_Fee.txt{Settled_Fee,Last_Tag,Transportation} OK.txt{NULL}
T1.PTS.STC.005.000	Input= Day1{정산완료 신호}, Day2{NULL}	Output=Day1.Terminal_Data 정상 생성 Day2.Terminal_Data 정상 생성
T1.PTS.STC.006.000	Input=Clock(YYYYMMDDHHmm =YYYYMMDD0000) 시스템 상 하루는 180초 이므로, 180초 마다 HHmm는 0000이 된다.	Output=Settled_Bus_Fee.txt{Settled_Fee,Last_Tag,Transportation} Settled_Metro_Fee.txt{Settled_Fee,Last_Tag,Transportation} OK.txt{NULL}
T1.PTS.STC.007.000	Input=Tag	Output=Card_Data.txt{Tag_time,Transportation,On_Board,Balance,TerminalID_Count}
T1.PTS.STC.007.001	Input=Tag	Output=Terminal_Data.txt{Tag_time,Transportation,On_Borad,Fee,TerminalID_Count}
T1.PTS.STC.007.002	Input=Clock(YYYYMMDDHHmm =YYYYMMDD0000)	Output=Settled_Fee.txt{Last_Tag,Settled_Fee,Transportation}