EasyGo test strategy

Annex 2.6 to
Joint Venture Agreement
Toll Service Provider Agreement

Document:	206
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Document Revision History

Version	Date	Author	Main changes
2.0	2013.02.27	LHB/SGA	Approved by ESC
3.0	2014.05.28	MHS/ASK	Generalised from CREATE to EasyGo
4.0	2014.09.04	MHS/SR	Minor changes
5.0	2016.01.12	HHA	New Ch. 4.4 (Notification requirements) and ch.5 (Annexes)
6.0	2017.11.20	ASK	Approved by ESC
6.1	2018.10.19	SR	Correction of appendix 2 – check list. Include text on how Service recipient are included in this document.
6.2	2018.11.28	ASK	Reviewed at the 22 Nov WG2 meeting
7.0	2018.12.07		Approved by ESC

1 Introduction

1.1 Scope of document

This document gives an overview of when testing is required, which tests to perform and how the tests shall be carried out. The required test steps and the extent of the testing may vary depending on the actual situation. Detailed test procedures and specifications are described in other documents and are referred to where relevant.

The document does not provide details regarding file formats/specification or details of the validations the actors (Toll Chargers = TC / Toll Service Providers = TSP) and the EasyGo HUB (EGH) should exercise during the file exchange. These details are described in documents 201, 203 and 207.

The tests described in this document do not include internal FAT or SAT testing performed by an actor (TC/TSP) on his equipment (e.g. RSE, CS or OBEs …) prior to the Integration Test1 (INT1), which is the first common testing between EasyGo and TCs/TSPs. It is a pre-condition prior to start of tests with EasyGo that an actor (TC/TSP) has a stable implementation of the required functionality on his test or production system depending on the test to be performed.

The goal of the testing described in this document is to verify the correct functionality and interfaces between an actor and the EGH and/or between actors. If the tests reveal internal problems in the systems of an actor (TC/TSP) or the EGH the tests are stopped and will only resume when such errors have been corrected.

This document distinguishes between EasyGo TSPs and external TSPs / EETS TSPs and between EasyGo TCs and external TCs. The external TCs and TSPs which have bilateral contracts with EasyGo TSPs and TCs respectively are often referred to as "service recipients". The requirements regarding testing are the same independent of the type of TC or TSP and this distinction will be removed in a later version of this document.

1.2 Test requirements in EETS context

Cooperation between EETS TSPs and TCs of an EETS domain is based on bilateral contractual agreements according to the EETS Decision (2009/750/EC). This means, that there is in general no direct contractual relationship between an EETS TSP and the EasyGo consortium itself.

But if in most cases the EGH will be used as the back-office interface of an EasyGo TC towards an EETS TSP and in most cases the EETS TSP will use his OBE in more than one EasyGo toll domain, it is required that testing follows the EasyGo test strategy and all suitable EasyGo test requirements apply in EETS context too.

1.3 Documents related to testing

The most important documents related to testing are shown in figure 1 below.
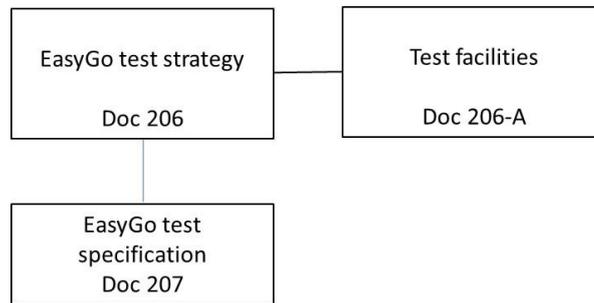
Figure 1 – Main documents related to testing

There are however, additional documents relevant for the testing and the following EasyGo documents include descriptions of aspects related to testing:

Doc no.	Document title	Reference
201	Requirements for central systems and EGH	The procedures of the back-office data exchange
202	Roadside and on-board equipment	
203	Technical requirements, data formats and interface specifications	The formats used in the back-office data exchange
206	EasyGo test strategy	
206-A	Test facilities in EasyGo	Gives an overview of test facilities for TCs, TSPs and EasyGo infrastructure and a description of TestLink
207	EasyGo test specification	Currently being updated to cover test specifications relevant for EasyGo
208	Requirements for VPN access to the EasyGo HUB	The information required to establish a connection to the EGH
304	Invoicing specifications	
307	EasyGo quality system	Defines Key Performance Indicators which may be used during trial operation
403	EasyGo processes	Defines: • Processes that shall be tested during E2E testing • Change management processes

Table 1 – Documents relevant for testing

1.4 Standards related to testing

Document Ref	Document title
ISO 13140-2	EFC - Evaluation of on-board and roadside equipment for conformity to CEN ISO/TS 13141 *) Part 1: Test suite structure and test purposes Part 2: Abstract test suite
ISO 13143	EFC - Evaluation of on-board and roadside equipment for conformity to CEN ISO/TS 12813 *) Part 1: Test suite structure and test purposes Part 2: Abstract test suite
TS 14907	EFC - Test procedures user and fixed equipment Part 1 Test procedures user and fixed equipment Part 2 Conformance test for the onboard unit application interface
EN15876	EFC - Evaluation of on-board and roadside equipment for conformity to EN 15509 Part 1: Test suite structure and test purposes Part 2: Abstract test suite
ISO TS 16401	EFC – Evaluation of equipment for conformity to CEN ISO/TS 17575-2 *) Part 1: Test suite structure and test purposes Part 2: Abstract test suite
ISO TS 16407	EFC – Evaluation of equipment for conformity to CEN ISO/TS 17575-1 *) Part 1: Test suite structure and test purposes Part 2: Abstract test suite
EN ISO 16410	EFC – Evaluation of equipment for conformity to CEN ISO/TS 17575-3 *) Part 1: Test suite structure and test purposes Part 2: Abstract test suite
CEN/ISO TS 17444-1	EFC - Charging performance Part 1: Metrics Part 2: Examination framework

*) Applies only for autonomous systems

Table 2 – Standards relevant for testing

2 General test principles

2.1 *What types of «events» need to be tested?*

Document 403 "EasyGo processes" defines the following main "events" that require testing:

1. Inclusion of new EasyGo TCs and TSPs
2. Inclusion of new external TCs and TSPs
3. Introduction of new OBEs by EasyGo TSPs
4. Introduction of new OBEs by external TSPs
5. Changes made by TCs, TSPs or EIM/EGH
6. A TC or TSP terminates operation, withdraws from the EasyGo service or no longer uses the EGH

Tests for new TCs and new TSPs (point 1) are different and must be described separately.

External TCs and TSPs (point 2) use the EGH for routing of data, but are not part of the EasyGo services. The tests required for these are less extensive than the tests required under point 1.

When a TSP introduces new OBEs (point 3), the testing depends on if the new OBEs are:

A. New type of OBEs not currently used in EasyGo
B. New batch of OBEs already used by the same TSP, but with changes in firmware (by supplier), new personalisation procedures (by TSP) or other changes
C. New batch of OBEs already used by another TSP
D. New batch of OBEs already used by the same TSP

Alternative A requires the most comprehensive testing while test procedures for B, C and D will be less extensive. Test procedures will differ for EasyGo basic and EasyGo+ OBEs.

Point 4 above has the same four alternatives as point 3, but external TSPs only have to verify that the transactions generated by their OBEs are sent correctly through the EGH.

Point 5 can be any type of change by TC, TSP or on the EGH and test requirements need to be defined on a case by case basis.

Point 6 does not require testing but needs to be verified by checklists, which are described in document 403.

Based on the above there are four main types of events to be tested:

	Test scenarios	Test procedures	Approval criteria
1	Inclusion of new EasyGo TC	Predefined	Predefined
2	Inclusion of new EasyGo TSP	Predefined	Predefined
3	Introduction of a new type of OBE by EasyGo TSP	Predefined	Predefined
4	Changes made by an EasyGo TC, TSP or EIM/EGH	Case by case	Case by case

Table 3 – Main test scenarios

Test procedures and approval criteria for test scenarios 1-3 can be/are predefined while scenario 4 needs to be described for each project.

Appendix 1 gives an overview of which processes need to be tested during E2E testing.

Appendix 2 includes check lists for each of the main test scenarios 1-4. These check lists can also be used to produce similar check lists for minor changes or inclusion of external TCs or TSPs which may require less extensive testing compared to these four.

2.2 Which interfaces need to be tested?

Figure 2 below shows the EasyGo actors and the data exchange interfaces subject to testing. The figure also shows the corresponding interfaces to be tested when EETS Providers shall connect to the EasyGo service (or to one or more EasyGo TCs).
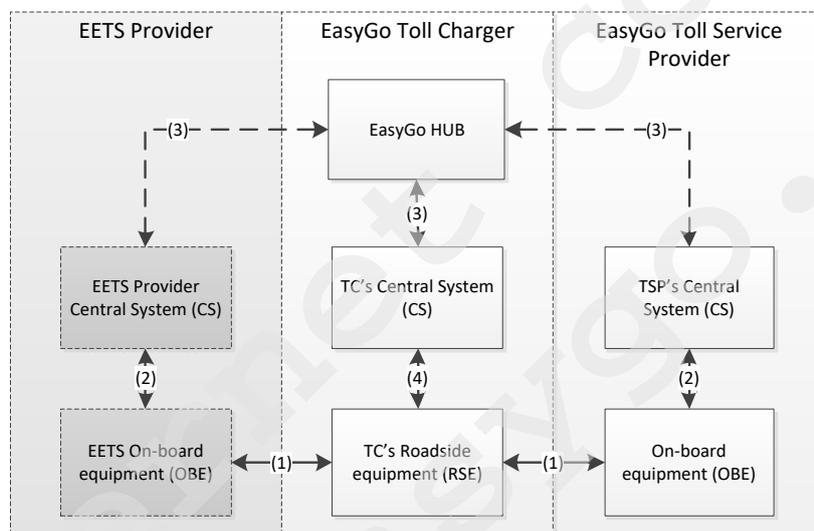

Figure 2 - EasyGo actors and data exchange interfaces subject to testing

The interfaces subject to testing are between TSP OBE and TC RSE – marked (1), and between TSP CS and TC CS via the EGH – marked (3) in the figure above.

The requirements and related test specifications for the interfaces are:

- Interface (1) between TSP OBE and TC RSE:

    o Document 202   Roadside and on-board equipment
    o Document 202 – F   Requirement specifications for EasyGo basic RSE and OBEs
    o
    o Document 207   EasyGo test specifications

- Interface (3) between TSP CS and TC CS via the EGH:

    o Document 201   Requirements for central systems and EGH
    o Document 203   Technical requirements data formats and interface specifications
    o Document 304   Invoicing specifications

- o Document 207   EasyGo test specification
- o Document 208   Requirements for VPN access to the EGH

The interfaces (2) and (4) in Figure 2 are internal and thus under the sole responsibility of the respective actor. Interface (2) between the TSP's CS and his OBE is applicable for personalisation purposes and software/firmware updates (if applicable). Interface (4) is between the TC's CS and RSE.

2.3 What types of tests shall be carried out?

The tests of any new or changed equipment shall verify its conformance to technical specifications, agreed operational procedures and the suitability for use within the context of EasyGo. Equipment is suitable for use if it works according to the defined EasyGo quality levels and fulfils the service level agreements defined within EasyGo. Depending of the actual type of new or changed equipment that is subject to testing, EasyGo management and WG2 will decide which test steps shall be performed and to which extent.

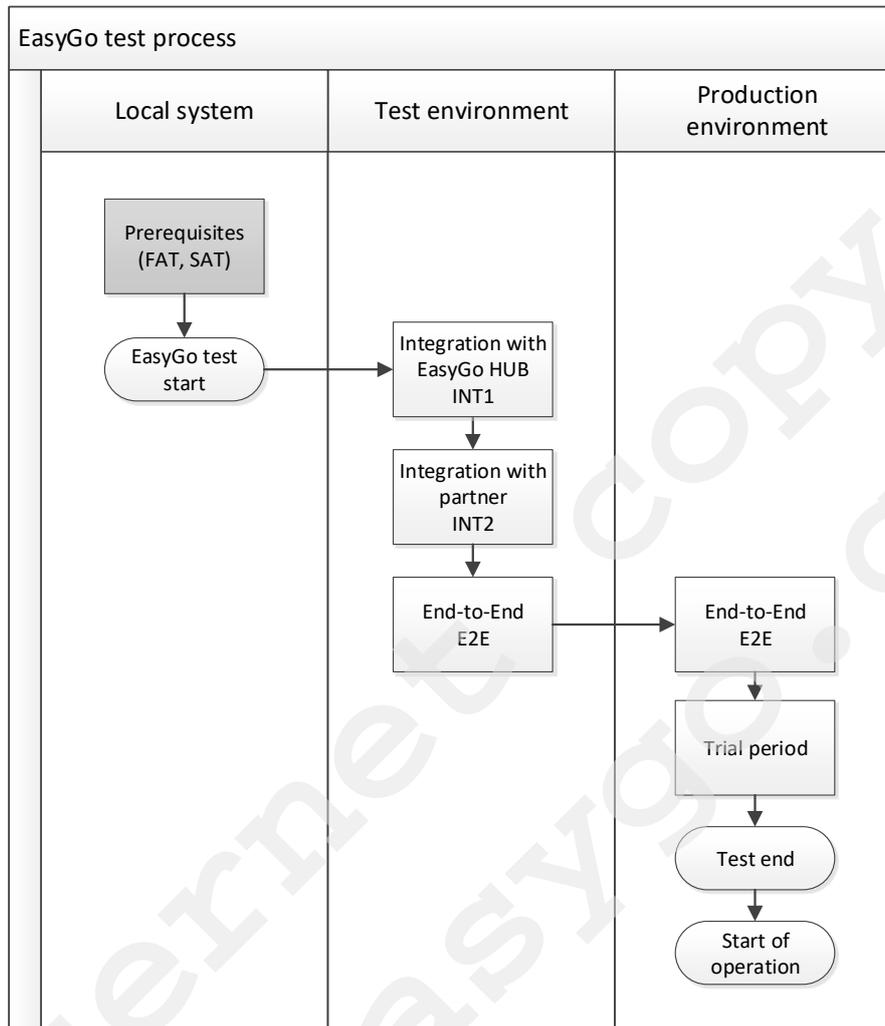Figure 3 below shows the joint tests to be specified and performed within the scope of EasyGo.

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Figure 3 - EasyGo test steps

The test steps are:

Integration test 1 - INT1

This test shall verify the data exchange between the TC's/TSP's CS and the EGH and include the following file types: ACT, AIT, TST, NAT, HGV, TIF and TIC. The detailed test procedure for each of these are described in document 207.

A TC must verify that he can read all the OBEs issued by EasyGo TSPs. Transactions of all the types of OBEs shall be included in the INT1 test. (OBE – RSE – CS_{TC} – EGH).

The INT1 must be carried out with a satisfactory result before INT2 can commence.

Integration test 2 - INT2

This test shall verify the data exchange between the TC's CS and the TSP's CS (via the EGH) and include the following file types: ACT, AIT, TST, NAT, HGV, TIF and TIC. The detailed test procedure for each of these are described in document 207.

A TC must verify that he can read all the OBEs issued by EasyGo TSPs. Transactions of all the types of OBEs shall be included in the INT2 test. (OBE – RSE – CS_{TC} – EGH - CS_{TSP}).

The INT2 must be carried out with a satisfactory result before E2E tests can commence.

End to end test - E2E

E2E tests are defined as: "*An EasyGo contract/OBE is established by a TSP. This valid OBE is detected by a TC's RSE and a transaction including correct price is generated and transferred through the EGH to the TSP's CS and cleared. A corresponding invoice is generated according to this contract with the TSP and the TC is paid accordingly. The TSP is generating a corresponding issuer fee invoice for the TC which is paid*"

A TC needs to test and verify all relevant EasyGo processes in which he has a role. These are (See Appendix 1 "*Processes to be tested during E2E test*"):

Process	Involves
4.3 - Originate EFC context data	TC, HUB, TSP
4.6 - Distribute validation data	TC, HUB, TSP
5.1 - Data exchange RSE - OBE	TC, TSP
5.2 - TC generates transactions	TC, HUB, TSP
5.3 - TC reports billing details to TSP (TIF)	TC, HUB, TSP

Table 4 – Processes to be tested during E2E for TC

See also Appendix 1 "*Processes to be tested during E2E test*".

A new TC needs to perform E2E tests with all types of OBEs. If he only provides the EasyGo+ service, he does not have to test EasyGo basic OBEs.

A new TSP needs to test and verify all EasyGo processes in which he has a role. These are:

Process	Involves
4.3 - Originate EFC context data	TC, HUB, TSP
4.5 - Open a contract	TSP
4.6 - Distribute validation data	TC, HUB, TSP
5.1 - Data exchange RSE - OBE	TC, TSP
5.2 - TC generates transactions	TC, HUB, TSP
5.3 - TC reports billing details to TSP (TIF)	TC, HUB, TSP
5.5 - TSP claims payment from SU for service usage	TSP
5.7 - Change contract data	TSP
5.8 - Exchange OBE	TSP
5.9 - Close contract	TSP

Table 5 – Processes to be tested during E2E for TSP

The E2E tests in test environment must be carried out with a satisfactory result before E2E tests can commence in the production environment.

Trial operation

When the E2E tests have been completed and approved the trial operation may start.

The preparation for the trial operation should start at a much earlier stage to acquire and prepare the SUs (drivers and organisations) involved in the trial operation. Transaction

handling, customer service or other processes (e.g. claim handling) during the trial operation shall be part of the normal service even if special attention and handling is necessary to some extent. It is important that the customer service and operations personnel are informed and receive adequate training in advance.

During the trial operation, real ("friendly") service users will use all the EasyGo functions for paying their tolls.

Approval criteria for each of the above test steps shall be defined in the test specifications by the test manager. They shall as a minimum include the approval of the individual test steps as well as start and finalisation of trial operation and start of commercial operation.

3 Test planning, management and reporting

3.1 Test planning

The test plan needs to define, for each test step, which parts of the systems of the actor(s) and the EGH need to be tested and defines the sequence of the tests.
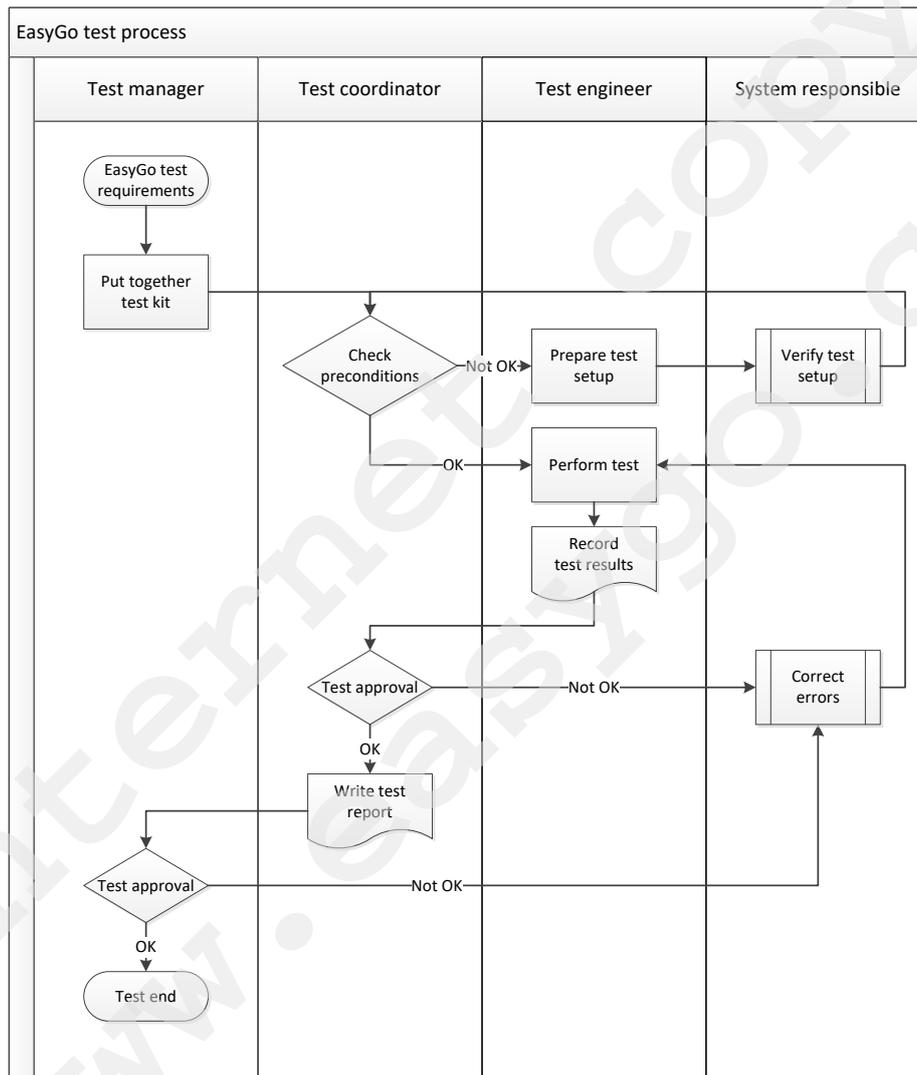
The process for each test is shown in fig 4 below:

Figure 4 - EasyGo test process

3.2 Test organisation

Each actor shall define the required personnel to perform the tests as shown in fig 5 below:
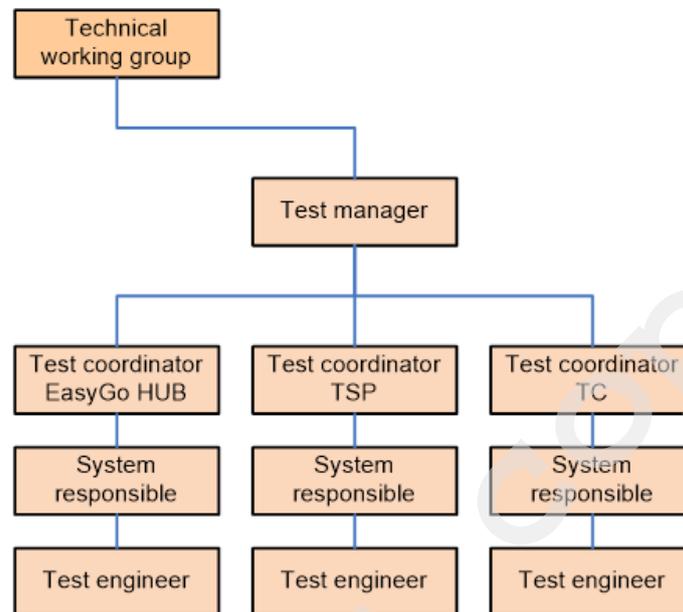
Figure 5 - EasyGo test personnel

The test manager is appointed by WG2.

The test coordinator, system responsible and test engineer are appointed by each actor or the EGH operation (Appointed party) involved in testing a system / an implementation. These different roles may be performed by the same physical person.

The implementation and testing of new or changed functionality will as a minimum be performed by actors that will be affected and the EGH operation. Other EasyGo TCs, TSPs and/or external actors are involved in tests to the extent necessary to secure that the new/changed functionality works throughout the entire EasyGo services.

Test role	Responsibility (function)	Reports to
EasyGo management (EM)	Prepare an overall plan agreed by all involved parties for the implementation before handing over plan to WG2 (see also chapter 3.6 and check lists in appendix 2)	EasyGo Steering Committee
Technical working group (WG2)	Responsible for detailed planning, overall execution and follow up of implementation and testing Appoints the test manager. (see also chapter 3.6 and check lists in appendix 2)	EasyGo management
Test manager (WG2)	Responsible for all administrative and operational aspects of testing. Defines test plan including milestones and timing Approves test reports by actors Provide status reports on progress and final test report for approval.	WG2

Test role	Responsibility (function)	Reports to
Test coordinator (local)	Responsible at each actor and the EGH operation for organisation, execution, documentation and approval of tests.	Test manager
System responsible (local)	Responsible for a particular system module: - EGH - ACFC responsible[1] - TSP (CS–HUB) responsible - TSP (CS–PE) responsible - TSP (customer relations) - TSP (financial relations) - TC (CS–HUB) responsible - TC (RSE-OBE) responsible - TC (RSE-CS) responsible - TC (financial relations)	Test coordinator
Test engineer (local)	Executing the test activities	System responsible/test coordinator

Table 6 – Roles and responsibilities in testing

For each new project, test persons at relevant organisations are appointed prior to the start of the project.

With respect to testing the incorporation of a new actor (TC/TSP) into EasyGo or the change of equipment by an existing actor, it will be the new actor or actor introducing the change who shall perform the necessary tests with the support of the existing actors (TC/TSP) to verify the EasyGo functionality while WG2 will supervise and approve the tests.

3.3 Test tracking

A test tracking and bug tracking tool (TestLink) is made available for the EasyGo tests. Details of the tool (description of use, user login, password and URL) shall be provided by test manager to the test personnel. See also document 206-A "Test facilities in EasyGo". Minor changes can be tested/documented without the use of the TestLink.

3.4 Test reports

Test reports shall be written by the test coordinator. Sufficient detailed test documentation shall be included to enable the test manager to approve the report.

EasyGo test status levels:

   I.   Not started
  II.   In progress
 III.   Local test failed

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[1] The ACFC is not (directly) a part of EasyGo but is acting on behalf of Norwegian TCs or TSPs

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IV. Local test passed
V. EasyGo rejection of test report
VI. EasyGo approval of test report

When providing a test report, each test shall be identified by a name and a number.

The following table identifying the test and the reported result shall be applied.

Test name	Each test shall be identified by a name and a number	No.:
Description	Describe purpose and what to be tested	
Precondition	Describe the preparations, the test setup and the preconditions to be met prior to the test	
Expected result	Describe expected type of result and how this should be expressed (proof of result)	
	Acceptance criteria cannot be defined on a general level and shall be defined for each test setup.	
Actual result	Write the actual result of the test	
Test status	State the status of the test	
Deviations	State the deviation if a test failed	
Comment	Give a comment when appropriate for a passed test and always when a test has failed	

Table 7 – Test reporting

3.5 Deviations

During execution of the tests, deviations (i.e. errors or failure to meet the requirements) may be encountered. Deviations will be classified into a severity class and dealt with as follows:

Severity class	Definition	Action
A	The deviation needs to be corrected before tests can continue	After correction, the concerned tests are repeated
B	The deviation may be corrected by changing: a) The requirement, and/ or b) The test procedure	ad a) The assessment of the consequences of the change in requirement is done by the actor and is documented in the test report ad b) The test procedure is changed, the test is executed in accordance with the new procedure, and the change is logged in the test report (Applicable only in case of changed requirements or if test procedure is defined imperfect)
C	Deviation with minor consequences which can be: a) Accepted, or b) Corrected at a later stage	The evaluation of the deviation is done by the test coordinator and is documented in the test report along with the possible corrective actions.

Table 8 – Categorisation of errors and deviations

Categorisation of the deviations is done by the test coordinator in cooperation with the system responsible. The test report shall not be approved by the test manager if there are deviations of severity class "A" or "B".

All class A deviations shall be corrected and the test repeated.

The requirements or test procedure shall be corrected for all class B deviations and the tests shall be repeated.

Remaining class C deviations shall be included in an action plan (including responsible part for corrections, retesting and a time schedule) prior to EasyGo approval of the test report.

3.6 Responsibilities

EasyGo management and technical working group WG2

EM shall prepare an overall plan for the implementation. When the plan is agreed between all involved parties the plan is handed over to WG2 for detailed planning and execution. WG2 is responsible for:

- definition of a test schedule between the EGH operation and all involved actors
- production of detailed test procedures including approval criteria
- nomination of a test manager
- supervision of the test progress and reporting it to the EM
- checking the quality of the test documentation
- verification of the test results of each test and reporting them to the EM
- reporting of any topics it cannot solve to the EM, if necessary

Appointed party (AP) / EGH

The EGH is the central cluster equipment of the TCs and is therefore considered a part of the TC role. The EGH is operated by an "Appointed party" which reports to WG2 during testing.

The Appointed party will be in charge of performing any tests regarding:

- communication interfaces of the office data exchange (e.g. VPN connection)
- data formats of the back-office data exchange interfaces to the actors (TC/TSP)
- security for the interfaces or equipment employed by the TSP
- central system of the EGH (including operating system, database and application …)

The Appointed party is responsible for the:

- nomination of a test coordinator to participate in WG2 meetings on testing
- nomination of a system responsible with sufficient knowledge about the system under test (SUT)
- provision of sufficient test resources to meet the test schedule agreed in WG2
- documenting the test results including test protocols and proof documents
- reporting the results to WG2

Toll Charger

The TC is in charge of performing any tests regarding:

- communication interfaces of the back-office data exchange (e.g. VPN connection)
- data formats of the back-office data exchange interfaces to the EGH
- communication between the Road Side Equipment (RSE) and the OBE through the DSRC interface
- data transfer between RSE and the central system of the TC
- central system of the TC which could influence the overall availability and performance of the EasyGo services

The TC is responsible for:

- nomination of a test coordinator to participate in WG2 meetings on testing
- nomination of a system responsible with sufficient knowledge about the SUT
- documenting the test results including test protocols and proof documents
- reporting the results to the WG2
- provision of sufficient test resources to meet the test schedule agreed in WG2

Toll Service Provider

The TSP is in charge of performing any tests regarding:

- communication interfaces of the back-office data exchange (e.g. VPN connection)
- data formats of the back-office data exchange interfaces to the EGH
- OBEs in use (e.g. software/firmware update where applicable)
- introduction of new OBEs
- personalisation of OBEs (where applicable)
- security for the interfaces or equipment employed by the TSP
- central system of the TSP which could influence the overall availability and performance of the EasyGo services
- invoicing in the name and on behalf of the TC
- payment of mutually agreed transactions to TC

The TSP is responsible for the:

- nomination of a test coordinator to participate in WG2 meetings on testing
- nomination of a system responsible with sufficient knowledge about the SUT
- provision of sufficient test resources to meet the test schedule agreed in WG2
- documenting the test results including test protocols and proof documents
- reporting the results to WG2
- recruiting of test users for the trial period. During the trial period, the recruited test users will be responsible for following the instructions received from their TSP regarding the trial period including giving feedback to the TSP as requested.

4 Appendix 1 – Processes to be tested during E2E test

The table below shows the EasyGo processes defined by document 403 "EasyGo processes. The column "Participation in process" shows who is involved in each process and therefore needs to take part in the tests. The entity which normally initiates the process is marked in yellow. Not all processes require technical testing and the column "Test" indicates which processes should be tested as part of E2E tests.

	Chapter	EasyGo processes	Participation in process					Test
			SU	TC	EGH	TSP	EIM	
Preconditions	4.1	Add new TC *		X	X	X	X	
	4.2	Add new TSP *		X	X	X	X	
	4.3	Originate EFC context data		X	X	X	X	X
	4.4	Exchange of trust objects **		X	X	X		
	4.5	Open a contract	X			X		X
	4.6	Distribute validation data		X	X	X		X
Operation	5.1	Data exchange RSE – OBE	X	X		X		X
	5.2	TC generates transactions (C1 – C8)	X	X		X		X
	5.3	TC reports billing details to TSP		X	X	X		X
	5.4	TC claims payment from TSP for service usage *		X		X		
	5.5	TSP claims payment from SU for service usage	X			X		X
	5.6	TSP claims issuer fee from TC *			X	X		
	5.7	Change contract data	X			X		X
	5.8	Exchange OBE	X			X		X
	5.9	Close contract	X			X		X
	5.10	Handle customer relations	X	X		X		
	5.11	KPI management ***		X	X	X	X	
Changes	6.1	Handle change request *		X	X	X	X	
	6.2	New equipment/updates by TC, TSP or in EasyGo infrastructure		X	X	X	X	X
	6.3	Termination of operation by TC or TSP *		X	X	X	X	

*Includes mostly administrative processes which do not require technical testing.
**Exchange of security keys is done bilaterally and does not involve technical testing. Testing of functionality of security keys is done as part of process 5.1
***KPI procedures not part of technical testing, but should be used during trial operation

Table 9 - EasyGo processes

5 Appendix 2 – Check lists

5.1 New toll charger

Type of event/project/change:	Inclusion of a new EasyGo TC (General party/Limited party/Service recipient)				
Type of TC	Free flow or barrier				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**
Application requirements	• Formal application (In case of Service Recipient the EasyGo TSP apply) • Toll Domain Statement / description of toll domain • Description of organisation / applicant • Final accounts last year • Traffic volumes • Fee structure	TC			
Information on «Event / change»	• Application from TC received by ESC / EM • ESC / EM clarify issues if required • EM prepare recommendation for ESC • Application/recommendation put to ESC for approval	TC ESC/EM/TC EM EM			
Decision	• ESC approves application and mandates EM to proceed • Contractual documents prepared and sent to new TC for signature • Event / project included in "overview of local projects"	ESC ESC/EM EM			

Overall plan	• Description of change/project (as basis for deciding what is required by EasyGo organisations)
	 • Information to WGs
	 • Define who needs to be involved (and in what way)
	 • Identify main contact person(s)/roles at all relevant involved parties
	 • Prepare preliminary overall plan for project/change
	 • Get approval on overall plan
	     o from all involved parties
	     o fromWG2
	 • Update document 404
		EM			

Type of event/project/change:	Inclusion of a new EasyGo TC (General party/Limited party/Service recipient)				
Type of TC	**Free flow or barrier**				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**
	• Submit overall plan to WG2				

Test plan	• Overall plan received from EM
	• Prepare detailed test plan (CS and RSE)
	    o Detailed tests to be performed including approval criteria for each of INT1, INT2 and E2E
	    o Preliminary plan for trial operation
	    o Prerequisites for testing (See below)
	    o Appoint personnel / roles / responsibilities
	    o Time schedule
	• Detailed test plan agreed in WG2 (incl. all involved parties)
	• Agreed plan distributed to all involved parties plus EM/ESC
		WG2			

Prerequisites	• TC confirms FAT/SAT on RSE and CS carried out and approved
	• TC confirm reception of OBEs from all TSPs
	• Identification of processes to be tested in E2E tests:
	    o EasyGo processes
	    o Local TC processes
	    o Special TSP processes
	• Identification and availability of personnel required to take part in testing at all involved parties
	• The time line of the tests needs to reflect data/information exchange between TC and TSP. Example: When the TC sends TIF files to the TSP, he can agree with the TSP to handle it immediately to avoid the waiting times of the normal schedule for TIF/TIC files.
	• TestLink used for INT1, INT2, and E2E tests
	• Confirm all prerequisites fulfilled				

INT1 (OBE-RSE-CS$_{TC}$-EGH)	• Set up new TC in EGH • Select test cases available in TestLink • Test CS – EGH data exchange • Test OBE – RSE – CS$_{TC}$ transaction generation	TC/WG2			

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Type of event/project/change:	Inclusion of a new EasyGo TC (General party/Limited party/Service recipient)				
Type of TC	**Free flow or barrier**				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**

	• Test OBE – RSE – CS_{TC} – EGH transaction generation
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved INT1 test
	• Reporting to EM:
	   o Activity started
	   o Regular status with description of deviations and corrective actions
	   o Activity finalised				

INT2
 	
(OBE-RSE-CS_{TC}-EGH-CS_{TSP})
	• Test OBE-RSE-CS_{TC}-EGH-CS_{TSP}
	• All types of files
	• Select test cases available in TestLink
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved INT2 test
	• Report to EM
	   o Activity started
	   o Regular status with description of deviations and corrective actions
	   o Activity finalised
		TC/WG2/TSP			

E2E – Test environment	• OBE-RSE-CS_{TC}-EGH-CS_{TSP} – SU
	• Confirm test facilities for the TC and provide input to table according to chapter 2 in 206-A
	• Select test cases available in TestLink
	• Perform tests of all processes
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved E2E test in test environment
	• Report to EM
	   o Activity started
	   o Regular status with description of deviations and corrective actions
		TC/WG2/TSP			

Type of event/project/change:	Inclusion of a new EasyGo TC (General party/Limited party/Service recipient)				
Type of TC	**Free flow or barrier**				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**
	○ Activity finalised • When approved – shift to production environment				
E2E – Production environment	• Same as above but in production environment • Select test cases available in TestLink • Approval criteria: everything works / passed in TestLink • Documentation of performed and approved E2E test in production environment • Report to EM 　○ Activity started 　○ Regular status with description of deviations and corrective actions 　○ Activity finalised	TC/WG2/TSP			
Trial operation	• Tests means verification of selected KPIs • Detailed plan should be made well in advance of the trial operation and include: 　○ Requirements for trial operation proposed by new TC and will depend if one small new TC or country etc. 　○ Choice of KPIs to monitor specifically during trial operation 　○ Recruitment and "education" of test users 　○ Approval criteria's to be defined by new TC in dialogue with EasyGo (Toll Domain Statement) 　○ Formal approval before regular operation (Everybody involved agree) • Report to EM 　○ Activity started 　○ Regular status with description of deviations and corrective actions	TC/WG2/ TSP/SU			
Final approval	• WG2 confirms (to EM) that all tests have been performed and approved	WG2/EM++			

Type of event/project/change:	Inclusion of a new EasyGo TC (General party/Limited party/Service recipient)				
Type of TC	Free flow or barrier				
Main steps	Check list per step	Responsibility	Prelim. dates	Actual dates	Confirm action
	• EM informs ESC and all involved parties that the new TC is approved for regular operation • Document 404 (and 402 if relevant), easygo.com and intranet are updated accordingly				

Detailed test procedures for RSE and CS are described in documents 202-G and 207 respectively.

5.2 New toll service provider

Type of event/project/change:	Inclusion of a new EasyGo TSP or Service Recipient				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**
Application requirements	• Formal application (In case of Service Recipient the EasyGo TSP apply) • Description of organisation / applicant • Final accounts last year				
Information on «Event / change»	• Application received from TSP • ESC / EM clarify issues if required • EM prepare recommendation for ESC • Application/recommendation put to ESC for approval	TC ESC/EM/TC EM EM			
Decision	• ESC approves application and mandates EM to proceed • Contractual documents prepared and sent to new TSP for signature • Event / project included in "overview of local projects"	ESC ESC/EM EM			

Overall plan	• Description of change/project (as basis for deciding what is required by EasyGo organisations)
	• Define who needs to be involved (and in what way)
	• TCs to take part in tests identified and available
	• Identify contact persons (roles) at all involved parties
	• Prepare overall plan for project/change
	• Get approval on overall plan
	    o from all involved parties
	    o fromWG2
	• Update document 404
	• Submit overall plan to WG2
		EM			

Test plan	• Overall plan received from EM
	• Prepare detailed test plan (CS and OBE)
	    o Detailed tests to be performed including approval criteria for each of INT1, INT2 and E2E
	    o Preliminary plan for trial operation
	    o Appoint personnel / roles / responsibilities
	    o Time schedule
	• Detailed test plan agreed in WG2 (incl. all involved parties)
		WG2++			

Type of event/project/change:	Inclusion of a new EasyGo TSP or Service Recipient				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**
	• Agreed plan distributed to all involved parties plus EM				

Prerequisites	• TSP confirm:
	   o Certification of OBE and FAT/SAT on CS carried out and approved
	   o All relevant local TC processes identified
	• Identification and availability of personnel required to take part in testing at all involved parties
	• TestLink used for INT1, INT2, and E2E tests
	• Confirm all prerequisites fulfilled
		TSP/WG2			

INT1
(CS$_{TSP}$-EGH)
	• Set up new TSP in EGH
	• Select test cases available in TestLink
	• Test CS – EGH data exchange
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved INT1 test
	• Report to EM
	   o Activity started
	   o Status with deviations and corrective actions
	   o Activity finalised
		TSP/WG2			

INT2
(OBE-RSE-CS$_{TC}$-EGH-CS$_{TSP}$)
	• Test OBE-RSE-CS$_{TC}$-EGH-CS$_{TSP}$
	• All types of files
	• Select test cases available in TestLink
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved INT2 test
	• Report to EM
	   o Activity started
	   o Status with deviations and corrective actions
	   o Activity finalised
		TSP/WG2/TC			

E2E – Test environment	• OBE-RSE-CS$_{TC}$-EGH-CS$_{TSP}$ – SU • Confirm test facilities for the TSP and provide input to table according to chapter 2 in 206-A • Select test cases available in TestLink • Perform tests of all processes • Approval criteria: everything works / passed in TestLink	TSP/WG2/TC			

Type of event/project/change:	Inclusion of a new EasyGo TSP or Service Recipient				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**

	• Documentation of performed and approved E2E test in test environment
	• Report to EM
	    o Activity started
	    o Status with deviations and corrective actions
	    o Activity finalised
	• When approved – shift to production environment				

E2E – Production environment	• Same as above but in production environment
	• Select test cases available in TestLink
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved E2E test in production environment
	• Report to EM
	    o Activity started
	    o Status with deviations and corrective actions
	    o Activity finalised
		TSP/WG2/TC			

Trial operation	• Tests means verification of selected KPIs
	• Detailed plan should be made well in advance of the trial operation and include:
	    o Requirements for trial operation proposed by new TSP
	    o Choice of KPIs to monitor specifically during trial operation
	    o Recruitment and "education" of test users
	    o Approval criteria's to be defined by new TSP in dialogue with EasyGo
	• Formal approval before regular operation (Everybody involved agree)
	• Report to EM
	    o Activity started
	    o Status with deviations and corrective actions
		TSP/WG2/ TC/SU			

Final approval	• WG2 confirms (to EM) that all tests have been performed and approved	WG2/EM++			

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Type of event/project/change:	Inclusion of a new EasyGo TSP or Service Recipient				
Main steps	Check list per step	Responsibility	Prelim. dates	Actual dates	Confirm action
	• EM informs ESC and all involved parties that the new TSP is approved for regular operation • Document 404 (and 402 if relevant), easygo.com and intranet are updated accordingly				

Detailed test procedures for OBE and CS are described in documents 202-E, 202-F and 207 respectively.

5.3 New type of OBE

Type of event/project/change:	Inclusion of new type of OBE by EasyGo TSP or Service Recipient				
Main steps	**Check list per step**	**Respons-ibility**	**Prelim. dates**	**Actual dates**	**Confirm action**
Application requirements	• An EasyGo TSP does not have to apply to EasyGo to introduce a new type of OBE. He does, however, have to provide certification of the new type of OBE	TSP			
Information on «Event / change»	• The TSP should inform EM about the new OBE as early as possible and at least six months prior to introduction to users	TSP			
Decision	• Event included in "overview of local projects"	EM			

Overall plan	• Description of change/project (as basis for deciding what is required by EasyGo organisations)
	• Define who needs to be involved (and in what way)
	• Identify contact persons (roles) at all involved parties
	• Prepare overall plan for project/change
	• Get approval on overall plan
	    o from all involved parties
	    o fromWG2
	• Update document 404
	• Submit overall plan to WG2
		EM			

Test plan	• Overall plan received from EM
	• Prepare detailed test plan
	    o Detailed tests to be performed including approval criteria for each of INT1, INT2 and E2E
	    o Preliminary plan for trial operation
	    o Appoint personnel / roles / responsibilities
	    o Time schedule
	• Detailed test plan agreed in WG2 (incl. all involved parties)
	• Agreed plan distributed to all involved parties plus EM
		TSP/WG2			

Prerequisites	• TSP confirm: o Certification of OBE provided • TCs to take part in tests identified and available				

Type of event/project/change:	Inclusion of new type of OBE by EasyGo TSP or Service Recipient				
Main steps	Check list per step	Respons-ibility	Prelim. dates	Actual dates	Confirm action
	• Identification and availability of personnel required to take part in testing at all involved parties • TestLink used for INT1, INT2, and E2E tests • Confirm all prerequisites fulfilled				

INT1
(OBE-RSE-CS_{TC}-EGH)
	• Set up new TSP in EGH
	• Select test cases available in TestLink
	• Test CS – EGH data exchange
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved INT1 test
	• Report to EM
	    o Activity started
	    o Status with deviations and corrective actions
	    o Activity finalised				

INT2
(OBE-RSE-CS_{TC}-EGH-CS_{TSP})
	• Test OBE-RSE-CS_{TC}-EGH-CS_{TSP}
	• All types of files
	• Select test cases available in TestLink
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved INT2 test
	• Report to EM
	    o Activity started
	    o Status with deviations and corrective actions
	    o Activity finalised				

E2E – Test environment	• OBE-RSE-CS_{TC}-EGH-CS_{TSP} – SU
	• Confirm test facilities for the TSP and provide input to table according to chapter 2 in 206-A
	• Select test cases available in TestLink
	• Perform tests of all processes
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved E2E test in test environment
	• Report to EM
	    o Activity started
	    o Status with deviations and corrective actions				

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Type of event/project/change:	Inclusion of new type of OBE by EasyGo TSP or Service Recipient				
Main steps	**Check list per step**	**Respons-ibility**	**Prelim. dates**	**Actual dates**	**Confirm action**
	o Activity finalised • When approved – shift to production environment				

E2E – Production environment	• Same as above but in production environment
	• Select test cases available in TestLink
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved E2E test in production environment
	• Report to EM
	    o Activity started
	    o Status with deviations and corrective actions
	• Activity finalised				

Trial operation	• Tests means verification of selected KPIs
	• Detailed plan should be made well in advance of the trial operation and include:
	    o Requirements for trial operation proposed by new TSP
	    o Choice of KPIs to monitor specifically during trial operation
	    o Recruitment and "education" of test users
	    o Approval criteria's to be defined by new TSP in dialogue with EasyGo
	• Formal approval before regular operation (Everybody involved agree)
	• Report to EM
	    o Activity started
	• Status with deviations and corrective actions				

Final approval	• WG2 confirms (to EM) that all tests have been performed and approved • EM informs ESC and all involved parties that the new OBE is approved for regular operation •				

Detailed test procedures for new types of OBEs are described in document 202-E and 202-F

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5.4 New equipment/updates by TC, TSP or in EasyGo infrastructure

Type of event/project/change:	New equipment/updates by TC, TSP or in EasyGo infrastructu				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**
Information on «Event / change»	- Application from TC received by ESC / EM - ESC / EM clarify issues if required - EM prepare recommendation for ESC - Application/recommendation put to ESC for approval	TC ESC/EM/TC EM EM			
Decision (ESC)	- A proposal for change of EGH is made by EM, WG2 or by any EasyGo party or TSP - EM prepares a recommendation describing the change, the costs and an implementation plan - ESC approves application and mandates EM to proceed - Event / project included in "overview of local projects"	EM, TSP, TC EM/AP ESC/EM EM			
Overall plan	- Description of change/project (as basis for deciding what is required by EasyGo organisations) - Information to WGs - Define who needs to be involved (and in what way) - Identify main contact person(s)/roles at all relevant involved parties - Prepare preliminary overall plan for project/change - Get approval on overall plan - from all involved parties - fromWG2 - Submit overall plan to WG2	EM/AP			
Test plan	- Overall plan received from EM - Prepare detailed test plan - Detailed tests to be performed including approval criteria for each of INT1, INT2 and E2E - Preliminary plan for trial operation - Prerequisites for testing (See below) - Appoint personnel / roles / responsibilities	WG2/AP			

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Type of event/project/change:	New equipment/updates by TC, TSP or in EasyGo infrastructu				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**
	o Time schedule • Detailed test plan agreed in WG2 (incl. all involved parties) • Agreed plan distributed to all involved parties plus EM/ESC				

Prerequisites	• Identification of processes to be tested in E2E tests:
	   o EasyGo processes
	   o Local TC processes
	   o Special TSP processes
	 • Identification and availability of personnel required to take part in testing at all involved parties
	 • TestLink used for INT1, INT2, and E2E tests
	 • Confirm all prerequisites fulfilled
		WG2/AP			

INT1
 	
(OBE-RSE-CS$_{TC}$-EGH)
	• Select test cases available in TestLink
	 • Test CS – EGH data exchange
	 • Test OBE – RSE – CS$_{TC}$ – EGH transaction generation
	 • Approval criteria: everything works / passed in TestLink
	 • Documentation of performed and approved INT1 test
	 • Reporting to EM:
	   o Activity started
	   o Regular status with description of deviations and corrective actions
	   o Activity finalised
		AP/WG TC/TSP			

INT2
 	
(OBE-RSE-CS$_{TC}$-EGH-CS$_{TSP}$)
	• Test OBE-RSE-CS$_{TC}$-EGH-CS$_{TSP}$
	 • All / relevant types of files
	 • Select test cases available in TestLink
	 • Approval criteria: everything works / passed in TestLink
	 • Documentation of performed and approved INT2 test
	 • Report to EM
	   o Activity started
	   o Regular status with description of deviations and corrective actions
	   o Activity finalised
		AP/WG TC/TSP			

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Type of event/project/change:	New equipment/updates by TC, TSP or in EasyGo infrastructu				
Main steps	**Check list per step**	**Responsibility**	**Prelim. dates**	**Actual dates**	**Confirm action**

E2E – Test environment	• OBE-RSE-CS$_{TC}$-EGH-CS$_{TSP}$ – SU
	• Confirm test facilities and provide input to table according to chapter 2 in 206-A
	• Select test cases available in TestLink
	• Perform tests of all/relevant processes
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved E2E test in test environment
	• Report to EM
	   o Activity started
	   o Regular status with description of deviations and corrective actions
	   o Activity finalised
	• When approved – shift to production environment
		AP/WG TC/TSP			

E2E – Production environment	• Same as above but in production environment
	• Select test cases available in TestLink
	• Approval criteria: everything works / passed in TestLink
	• Documentation of performed and approved E2E test in production environment
	• Report to EM
	   o Activity started
	   o Regular status with description of deviations and corrective actions
	   o Activity finalised
		AP/WG TC/TSP			

Trial operation	• Tests means verification of selected KPIs
	• Detailed plan should be made well in advance of the trial operation and include:
	   o Requirements for trial operation proposed by AP
	   o Choice of KPIs to monitor specifically during trial operation
	   o Recruitment and "education" of test users
		AP/WG TC/TSP/SU			

Type of event/project/change:	New equipment/updates by TC, TSP or in EasyGo infrastructu				
Main steps	Check list per step	Responsibility	Prelim. dates	Actual dates	Confirm action
	o Approval criteria's to be defined by AP in dialogue with WG2 o Formal approval before regular operation (Everybody involved agree) • Report to EM o Activity started o Regular status with description of deviations and corrective actions				
Final approval	• WG2 confirms (to EM) that all tests have been performed and approved • EM informs ESC and all involved parties that the new functionality is operational • Relevant documents are updated	WG2/AP EM++			

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