**SCHEDULE 3**

**TESTING PROCEDURES**

# INTRODUCTION

* 1. This schedule sets out the approach to Testing and the different Testing activities to be undertaken, including the preparation and agreement of the Test Success Criteria, Test Strategy and the Test Plans.
	2. Test Certificates will be issued in accordance with the process in this schedule where required by the Implementation Plan and/or as defined in the Test Strategy.

# RISK

## The issue of a Test Certificate shall not operate to transfer any risk that the Deliverable will meet and/or satisfy the Authority's requirements for that Deliverable as set out in the Specification or elsewhere in this agreement (**Deliverable Requirements**). Consequently, the grant of a Test Certificate shall not affect the Authority's right subsequently to reject all or any element of the Deliverables to which a Test Certificate relates, where it is discovered that the applicable Deliverable Requirements are not met and/or satisfied.

# TESTING OVERVIEW

## All Tests conducted by the Supplier shall be conducted in accordance with the Test Strategy and the Test Plans.

## The Supplier shall propose Test Management Tools, for the Authority approval.

## The Supplier shall be responsible for providing and maintaining:

### the environment(s) within the Supplied System that will be used for Testing;

### the Test Management Tools (and shall, upon request from the Authority, provide access to the Test Management Tools to the Authority's Representatives who are engaged in the Testing. Access to this tool will be provided from the commencement of Testing); and

### the Authority’s access to the environments, for the purposes of the Authority deploying its own test execution tools, in order to support the Testing conducted by the Authority.

## For the avoidance of doubt, the Test Management Tools will be shared by the Authority and the Supplier, and used to capture issues resulting from joint test phases and allow the tracking of those issues, through to resolution.

## The Supplier shall ensure that there is a collaborative approach to all Testing including, but not limited to:

### engagement of the Authority test and product teams in the Test activity that takes place as part of development and integration sprints including but not limited to the joint creation and provision of Test Case definitions, ensuring appropriate coverage and evaluation of results of Testing;

### Testing of each User Story Test Success Criteria (where applicable);

### Testing of non-functional features and system configurations;

### joint ‘end to end’ Testing that exercises multiple components of the Supplied System;

### support for the Authority’s final acceptance Testing;

### support for any Private Beta Testing Phase (as defined below); and

### support for any Wider Private Beta Testing Phase (as defined below).

## Wherever possible, Testing should be automated and repeatable with a continuous approach and drive to make Testing automated and repeatable.

## The Supplier shall submit Deliverables for Testing in accordance with the Milestones and dates set out in the Implementation Plan.

## Any Disputes between the Authority and the Supplier regarding Testing shall be referred to the Authorised Representatives for resolution.

# TEST STRATEGY

## Appendix 1 sets out the outline Test Strategy. The Supplier shall provide the detailed Test Strategy to the Authority for approval in accordance with the Plan Approval Process and in accordance with the Milestones and dates set out in the Implementation Plan.

## The Test Strategy shall include:

### an overview of how Testing will be conducted in relation to each Deliverable covering people, process and technology;

### the process to be used to create and accept Test conditions that will be Tested;

### the process to be used to execute, capture and record Test results and the categorisation of Test Issues;

### the method for mapping the expected Test results to the Test Success Criteria;

### the procedure to be followed should a Deliverable, deployment, feature or other component fail to satisfy the Test Success Criteria or to produce unexpected results, including a procedure for the resolution of Test Issues;

### the procedure to be followed to sign off each Test at each stage of testing;

### the process for the production and maintenance of Test Reports and reporting, including templates for the Test Reports and the Test Issue Management Log, and a sample plan to resolve Test Issues;

### the names and contact details of the Authority's and the Supplier's Test representatives;

### a high level identification of the resources required for Testing, including facilities, infrastructure, personnel and the Authority and/or third party involvement in the conduct of the Tests;

### the technical environments required to support the Tests at each stage of testing; and

### the procedure for managing the configuration of the Test environments.

* 1. Where requested by the Authority, the Supplier shall include within its Test Strategy a commitment to undertake phased Testing in accordance with the following sequence:
		1. identification, development and presentation by the Supplier of the minimum viable product ("**MVP**") relating to the AVA and the Supplied System (or the relevant component or Deliverable relating to the Supplied System), which the Supplier proposes for deployment, and the scope of which MVP is agreed by the Authority (the "**Beta Service**");
		2. a private the Authority-only Testing of the Beta Service functionality restricted to specific potential Users and/or Franchise Operators (as appropriate) invited by the Authority ("**Private Beta Testing Phase**"). This initial Testing phase of the Beta Service will be aimed at examining and providing confidence to the Authority in relation to key elements of the Beta Service such as the end processes and integrations, to provide confidence to the Authority in the ability of the Supplied System (as modified from time to time to accommodate the functionality contemplated by the relevant Beta Service) to support the AVA;
		3. following the Private Beta Testing Phase, the Beta Service will then be subject to controlled public Testing by trailing the Beta Service with a larger subset of potential Users and/or Franchise Operators (as appropriate), each of whom shall be invited to participate by the Authority ("**Wider Private Beta Testing Phase**"). the Authority shall be permitted from time to time to incrementally increase the number of invited Users for the duration of the Wider Private Beta Testing Phase, and shall be permitted to stipulate whether there shall also be an incremental increase from time to time in the number of AVA hardware instances that may be used for the purposes of this Wider Private Beta Testing Phase; and
		4. any issues, defects, problems or areas for improvement identified by the Authority during the Private Beta Testing Phase and/or the Wider Private Beta Testing Phase shall be resolved by the Supplier, to the Authority’s satisfaction, prior to the issue of the relevant Test Certificate.

## The Test Strategy shall be applied to any Service enhancements that are progressed by the Authority.

# TEST PLAN

## The Supplier shall develop Test Plans applicable to the relevant phases of the Implementation Plan in accordance with the Test Strategy and shall submit such Test Plans to the Authority for approval, acting reasonably, in accordance with the Plan Approval Process. Each Test Plan shall be submitted as soon as practicable but, in any event, no later than the Test Plan Milestone Dates set out in the Implementation Plan.

## Each Test Plan shall include as a minimum:

### the relevant Test definition and the purpose of the Test, the Milestone to which it relates, the requirements being Tested and, for each Test, the specific Test Success Criteria to be met;

### a detailed procedure for the Tests to be carried out, including:

#### the timetable for the Tests including start and end dates;

#### the Testing mechanism; and

#### the detailed Test Success Criteria;

### the specification of the Test data, including its source, scope, volume and management, a request (if applicable) for relevant Test data to be provided by the Authority and the extent to which it is equivalent to live operational data;

### Test scripts and Test Cases where appropriate;

### Test pre-requisites and the mechanism for measuring them;

### expected Test results, including:

#### a mechanism to be used to capture and record Test results; and

#### a method to process the Test results to establish their content;

### description of the nature of collaborative Test Approach and the Authority role in testing, dates and methods for the execution of tests and inspection of Test in order to establish that the Test Success Criteria have been met;

### the mechanism for ensuring the quality, completeness and relevance of the Tests;

### the format and an example of Test progress reports and the process with which the Authority accesses daily Test schedules;

### the process with which the Authority and Supplier teams will review Test Issues and progress on a timely basis;

### the re-Test procedure, the timetable and the resources which would be required for re-Testing; and

### the decision making process for escalation from a re-test situation to specific remedial action to resolve the problem/Test Issue.

## The Test Approach shall include as a minimum:

### which phases of testing within the Implementation Plan the Test Approach is applicable to; and

### a description of how a collaborative approach will be achieved covering people, process and technology in the joint creation of Test Case definitions, execution of tests, evaluation of tests results, remediation of failed tests and re-testing.

# TEST SUCCESS CRITERIA

The Supplier and the Authority will agree the Test Success Criteria pursuant to paragraph 5.1 as an integral part of the applicable Test Plan. The Test Success Criteria shall, unless the parties agree in writing, be consistent with (as the context permits) the outline Achievement Criteria set out in Schedule 2 (Implementation Plan).

# TESTING

## The Supplier shall manage the progress of Testing in accordance with the relevant Test Plan and Test Approach.

## The Supplier shall notify the Authority at least five Working Days (or such other period as the parties may agree) in advance of the date, time and location of the relevant Tests.

## The Authority may raise but not close Test Issues during the Test processes including for Tests executed jointly during sprint cycles.

## The Supplier shall provide a Test Report on completion of each Test. Each Test Report shall provide a report on the Testing conducted in respect of the relevant Deliverables, including:

### an overview of the Testing conducted;

### the Tests that were not completed together with the Supplier's explanation of why those Tests were not completed; and

### the Test Success Criteria that passed, failed or which were not Tested, and any other relevant categories, in each case grouped by severity level in accordance with paragraph 8.1 together with the Supplier's explanation of why any criteria have not been met.

1. **TEST ISSUE SEVERITY LEVELS**
	1. For the purposes of this schedule Test Issues shall be categorised in accordance with the criteria set out in the table below. Prior to the applicable Go-Live Milestone Date, Test Issues shall be categorised by reference to the Test Issue Severity Levels set out in the table below by considering what business impact the Test Issue would have had (or would be likely to have had), if the Test Issue has arisen at a time when the Scheme was "Live".

| **Test Issue Severity Level** | **Description of Test Issue** |
| --- | --- |
| 1 | Showstopper. A Test Issue that causes a total failure or material degradation of the overall Supplied System, Operational Services or relevant system component e.g. the AVA Back Office System is unavailable or AVA units are not relaying metrics back to the AVA Back Office System. There is no workaround to the Test Issue.  |
| 2 | Major. A Test Issue that causes a material degradation to the Services for example as a result of a failure of an individual system component e.g. a failure of one or more of the metrics e.g braking but not the whole AVA Back Office System. There must be a workaround that has been accepted by the Authority. A resolution will be required. |
| 3 | Minor. The Supplied System/component continues to operate and/or a workaround to the effect is available. A resolution will be required.  |
| 4 | Cosmetic. A Test Issue that has no Supplied System or operational impact. The Supplied System /component is not working exactly as defined. A resolution may be required. |

# TEST ISSUES

## Where a Test Report identifies a Test Issue, the parties shall agree the classification of the Test Issue using the severity criteria set out in the table in paragraph 8.

## The Test Issue Management Log shall log Test Issues to reflect the severity classifications allocated to each Test Issue pursuant to paragraph 9.1.

## The Supplier shall be responsible for maintaining the Test Issue Management Log and for ensuring that its contents accurately represent the current status of each Test Issue at all times. The Supplier will ensure that the Test Issue Management Log is available for access to the Authority at all times.

## The relevant Authority Authorised Representative, for the purposes of the Implementation Services, shall confirm the classification of any Test Issue unresolved at the end of a Test phases in consultation with the Supplier. If the parties are unable to agree the classification of any unresolved Test Issue, the Dispute shall be dealt with in accordance with the Dispute Resolution Procedure.

# TEST WITNESSING

## The Authority may, in its sole discretion, require the attendance at any Test of one or more witnesses. Witnesses will be selected by the Authority, each of whom will have appropriate skills to fulfil the role of a Test Witness. Test Witnesses may include representatives of Franchise Operators and other Authority system suppliers whose systems are being interfaced with the Supplied System.

## The Supplier shall give the Test Witnesses access to any documentation and Testing environments reasonably necessary and requested by the Test Witnesses to perform their role as a Test Witness in respect of the relevant Tests.

## The Test Witnesses will actively review the Test documentation and will attend and engage in the performance of the Tests on behalf of the Authority so as to enable the Authority to gain an informed view of whether a Test Issue may be closed or whether the relevant Deliverable should be re-Tested. Under the Authority’s supervision, Test Witnesses may be involved in the execution of any Test.

## The Test Witnesses will be required to verify that the Supplier conducted the Tests in accordance with the Test Success Criteria and the relevant Test Plan.

## The Test Witnesses may produce and deliver their own, independent reports on Testing, which may be used by the Authority to assess whether the Test Success Criteria have been met.

## The Test Witnesses may raise Test Issues on the Test Issue Management Log in respect of any Testing.

## The Test Witnesses may require the Supplier to demonstrate the modifications made to any defective Deliverable before a Test Issue is closed.

# TEST QUALITY AUDIT

## Without prejudice to its rights pursuant to clause 34 (Audit), the Authority may perform on-going quality audits in respect of any part of the Testing (each a **"Testing Quality Audit"**).

## The focus of the Testing Quality Audits will be on:

### adherence to an agreed methodology;

### adherence to the agreed Testing process;

### review of status and key development issues; and

### identification of key risk areas.

## The Supplier shall allow sufficient time in the Test Plan to ensure that adequate responses to a Testing Quality Audit can be provided.

## The Authority will give the Supplier at least five Working Days' written notice of the Authority’s intention to undertake a Testing Quality Audit and the Supplier may request, following receipt of that notice, that any Testing Quality Audit be delayed by a reasonable time period if in the Supplier’s reasonable opinion, the carrying out of a Testing Quality Audit at the time specified by the Authority will materially and adversely impact the Implementation Plan.

## A Testing Quality Audit may involve document reviews, interviews with the Supplier personnel involved in or monitoring the activities being undertaken pursuant to this schedule, the Authority witnessing Tests and demonstrations of the Deliverables to the Authority. Any Testing Quality Audit shall be limited in duration to a maximum time to be agreed between the Supplier and the Authority on a case by case basis not to be unreasonably withheld or delayed. The Supplier shall provide all reasonably necessary assistance and access to all relevant documentation required by the Authority to enable it to carry out the Testing Quality Audit.

## If the Testing Quality Audit gives the Authority concern in respect of the Testing Procedures or any Test, the Authority will discuss the outcome of the Testing Quality Audit with the Supplier, giving the Supplier the opportunity to provide feedback in relation to specific activities, and subsequently prepare a written report for the Supplier detailing the same to which the Supplier shall, within a reasonable timeframe, respond in writing.

## In the event of an undisputedly inadequate response to the written report from the Supplier, the Authority (acting reasonably) may withhold a Test Certificate (and consequently delay the grant of a Milestone Achievement Certificate) until the issues in the report have been addressed to the reasonable satisfaction of the Authority.

# OUTCOME OF TESTING

## Deliverables will complete Testing for a particular Test and a Test Certificate (in the form set out in Appendix 2 of this schedule) shall be issued by the Authority when the Deliverables satisfy the Test Success Criteria in respect of that Test without any Test Issues.

## Without prejudice to any other rights or remedies of the Authority if the Deliverables (or any relevant part) do not satisfy the Test Success Criteria for a Test then at the request of the Authority the Supplier shall rectify the cause of the failure and re-submit the Deliverables (or the relevant part) to Testing.

###

### **APPENDIX 1**

**Outline Test Strategy**

[***Note: Supplier’s Tender to include a draft outline Test Strategy***]

**APPENDIX 2**

**Test Certificate**

To: [**NOTE: insert supplier details**]

From: Transport for Greater Manchester

[***Date***]

Dear Sirs,

**TEST CERTIFICATE**

Deliverables: [**NOTE:** **insert description of Deliverables**]

We refer to the agreement (**"Agreement"**) relating to the provision of a AVA Back Office System, on-board AVA units and related services in support of Audio Visual Announcements between (1) Transport for Greater Manchester (**"The Authority"**); (2) Greater Manchester Combined Authority and (3) [**NOTE: insert supplier details**] (**"Supplier"**) dated [**NOTE: insert date**].

The definitions for terms capitalised in this certificate are set out in the definitions of the Agreement.

[We confirm that the Deliverables listed above have been tested successfully in accordance with the Test Plan relevant to those Deliverables.]

Yours faithfully

[Name]

[Position]

acting on behalf of Transport for Greater Manchester