

TECHNOLOGY ENABLED CARE



Telecare Resource Centre

A guide for planning IAT & UAT

December 2021

1. Background

Local telecare services moving to Digital Telecare need to ensure that the service is robust and reliable before it is rolled out to clients. This document forms part of the Testing Support Pack and provides advice for local telecare services on the planning required to implement the testing which should be used in the move to digital. This guide will focus on creating a plan to cover two types of testing which the local telecare service will be responsible for undertaking:

- 1) Internal Acceptance Testing (IAT) — to ensure that system issues are identified and rectified prior to users being connected to the digital solution.
- 2) User Acceptance Testing (UAT) — to ensure that the system provides an acceptable level of service to users.

The scope of, and plan for, IAT and UAT testing will vary between local telecare services, but should be designed to ensure:

- Sufficient test results are received to ensure that the solution testing is robust.

This will impact the number of test devices deployed, the duration of testing, and the frequency of test calls.

- Test configurations are representative of actual planned deployments.

This will impact the range of alarm devices and peripherals included in the testing, and the location of the staff asked to test devices (ie a representative mix of urban, rural and very rural locations).

This document will first outline these two kinds of testing in greater detail, before proceeding to outline what is required to create a testing plan.

1.1 IAT

IAT is completed by local telecare service staff in order to ensure that system issues are identified and rectified prior to users being connected to the digital solution. It is suggested that IAT could be completed at the same time as penetration testing. This is because no real user data needs to be entered onto the digital solution to complete the testing, and so there is no risk of compromise of user data.

To complete IAT, local telecare services will provide their staff with digital equipment and peripherals that mimic the installations that will be installed for “real” users. The staff will then be asked to make a series of test calls using the devices, with the results of this testing being logged by both the member of staff and the ARC, to ensure that results of testing are audited.

1.2 UAT

Following successful completion of the IAT and Penetration Testing, the next stage of testing can commence. This tests the solution with users, first those considered “Low Risk” and then those considered “High Risk”. These terms will be explored in greater detail in the following section.

A representative sample of both low risk and high-risk users should be recruited to support testing.

Prior to testing, a Roll-Back Plan should be developed. This plan will detail the steps that will be completed to remove digital telecare and reinstate users' analogue service, to be used in the event that unacceptable issues are identified with the performance or reliability of the digital service.

The test users will be provided with digital telecare equipment and asked to place test calls, in addition to their regular telecare use. The tests to be completed are the same as those used for the IAT stage.

Once testing has been completed, if the success criteria have been met, then User Migration can commence with that user group (e.g. low risk or high risk).

If the testing has highlighted unacceptable issues, then these will be addressed and some or all of the User testing will be repeated to ensure issues have been addressed.

Following successful completion of the Low Risk User testing, the next stage of testing can commence. This repeats the process and tests the solution with "High Risk" users.

2. Scope

In order to successfully plan for IAT and UAT it is important to have a clearly defined scope, to ensure that sufficient variables are tested to accurately reflect actual deployment, and that sufficient results are gathered to provide robust findings.

The key variables which need to be defined are as follows:

- Range of devices and peripherals to be tested;
- User groups – identification of 'high' and 'low' risk users;
- Geographical variance – e.g. very rural, semi-rural and urban;
- Property type – e.g. detached stone-built house, flat in tower block, tenement flat, new build.

The devices to be tested will be informed by the procurement process and in that sense will already be defined. For the others, TEC Cymru strongly recommend local telecare services seek input from a range of staff from across the service, including but not limited to:

- Managers;
- IT;
- ARC Call Takers;
- Technicians;
- Responders.

This breadth of knowledge and experience will ensure that the planned tests will represent as accurate a reflection of planned deployments as possible. TEC Cymru can facilitate a workshop to support this.

2.1 Range of device and peripherals

This will be informed by the procurement process, but it is important that IAT is completed for all devices and peripherals BEFORE being passed to an actual user.

The number of these devices procured will also inform the approach to testing, or conversely the desired approach to testing could inform the number of devices procured. If testing multiple devices will there be enough of each device for every testing participant to take home one of each, or will there need to be a rota system?

Will testing extend to all peripherals, or will it focus on the basic alarm and pendant, with a separate more intensive look at other peripherals once alarm devices have been approved?

This latter approach is possible as by definition Low Risk user testing focuses on users with basic alarm/pendant packages, so testing of environmental monitors, pressure monitors etc etc can be conducted concurrently with the first round of UAT.

2.2 Users

local telecare services will decide what constitutes a 'low risk' and 'high risk' user, but the Digital Office recommends that the following definitions be used as a basis for this:

Low Risk User - this is a user who is only supplied with a pendant, rather than a more complex telecare package, and for whom a short period of unavailability of the telecare service would be tolerable.

High Risk User - this is a user who has a complex telecare package, and/or a user for whom a short period of unavailability of the telecare service would not be tolerable.

2.3 Geographical variance and property type

These two points jointly seek to map out the environmental factors which could impact service delivery and thus should be covered by either IAT or UAT. For instance you don't want to reach migration only to find out that one device doesn't work for citizens living in a particular area or property type.

The relevant factors here will be heavily relative to the individual service and the area it covers. Some local telecare services may not have any areas which could be constituted as 'very rural', while for others what counts as 'urban' would be seen as 'rural' by others!

This is why it is important to involve as broad a range of staff as possible from right across the service in defining what the relevant factors are, and to ensure that nothing is missed.

2.4 Testing Plan

With a clearly defined scope providing a firm foundation, a testing plan can then be developed. A template for this is provided within the Digital Telecare Testing Pack, and this document will now explore each of its sections.

To save large amounts of duplication the below plan holds true for both IAT and UAT, with the notable exception that discussion of rotating devices is more appropriate for IAT. With UAT it is more likely that each volunteer will test just one device to minimize disruption to the citizen.

3.1 Devices to be tested

A clear list of all devices and associated peripherals which will be included in the testing.

3.2 Number of testers

This defines the number of staff or citizens who will be involved in testing. If more than one device is to be tested it is a good idea to split testers into multiple groups to enable all devices to be tested simultaneously. For instance if you were testing three alarm devices with 12 volunteers, you might split them into three groups of 4.

3.3 Testing schedule

The dates over which the tests will take place.

If testing multiple devices with multiple groups the testing period should be broken down into equal 'sprints' to enable each group to test each device.

For instance:

Group	Device by sprint		
	Sprint 1	Sprint 2	Sprint 3
1	Device 1	Device 2	Device 3
2	Device 2	Device 3	Device 1
3	Device 3	Device 1	Device 2

You will then need to define the frequency and times for test calls within the identified period. This will be influenced by both the capacity of the ARC to receive the test calls, and the goodwill of the volunteers to place them.

It is a good idea to stagger tests throughout the day both to reduce pressure on the ARC, and to ensure devices perform consistently.

For example:

Participants will be asked to place at least one test call a day during one of three time slots, and more if possible, a rota has been created to ensure even spread across the day. These time slots are:

AM	4am – 12pm
PM	12pm – 8pm
EVE	8pm – 4am

3.4 Testing Format

At it's heart, a test involves the volunteer triggering their alarm and ensuring that the call goes through to the ARC on the first attempt, that the connection and quality are acceptable, and from an ARC perspective that the correct record is displayed when they do so.

A more comprehensive set of parameters can be found in Appendix 1. Not all of these will be relevant for every test. For instance with IAT if alarms are configured at the ARC, and simply need to be turned on at the volunteers home, then queries relating to installation will not be relevant.

Test data will fall into two categories, that which is recorded during the test call, and that which is gathered behind the scenes.

3.4.1 Test call data

This is data which can be gathered by the volunteer or the ARC receiver during the call without need to access further systems and includes such things as voice quality for both the caller and the receiver, did the call connect first time, which line the call is received on at the ARC, is the correct record displayed, did the call drop-off at all etc.

A simple online form is a quick and efficient way of gathering this data without adding an additional burden on either the volunteer or the receiver. A template using Microsoft Forms can be made available by TEC Cymru at request.

3.4.2 Behind the scenes for test data

As well as the information recorded during the call it will also be worth tracking a few other factors. Using the Device Management Platforms it is recommended that readings of device signal strength is recorded a number of times a week, as well as a detailed record of missed heartbeats and other alerts.

3.5 Logistics

As alluded to above a clear plan will need to be created for how participants will receive their devices and peripherals (if using) and when and how any change over will take place.

3.6 Reporting

Weekly reports should be created throughout testing to provide updates on how the devices are performing and to help identify emergent issues.

A clear escalation process should be in place, and a check-point meeting should take place towards the end of each sprint to determine whether testing should proceed for each device, or whether testing needs to be halted for some or all of the devices due to the issues uncovered.

A final testing report should be created and a meeting held to formally decide whether success criteria were met, and if so to approve the start of the next round of testing and/or user migration depending on the stage that has been reached.

Appendix 1 – Testing Parameters

Test	Test Detail	Frequency	Expected Result
Installation (1)	User installs alarm device in their home and checks that device connects to ARC and works by making an alarm call.	Checked once at initial installation of each alarm device.	All/XX% of alarm devices connect to ARC and can make an alarm call on first attempt.
Installation (2)	Prior to dispatch of alarm device, peripherals are configured with the device. On installation of the alarm device the user checks that peripherals are correctly configured and functioning by triggering each in turn.	Checked once at initial installation of each alarm device.	All/XX% of peripherals trigger an alarm call on first attempt that connects to ARC.
Alarm Call Response	User makes test calls (pressing alarm button on device) to the ARC to check that calls connect and are presented to the ARC correctly.	Each user makes XX test calls per day over a period of XX.	All/XX% of alarm calls are successfully connected to the ARC. Defined as: <ul style="list-style-type: none"> User is able to speak to the ARC call taker. ARC call taker is presented with correct information on the user and device and can speak to the user.
Peripherals	User makes test calls (pressing alarm button on alarm pendant) to the ARC to	Each user makes XX test calls per day over a period of XX.	All/XX% of test calls initiated by the pendant works correctly and generates an alarm call

Test	Test Detail	Frequency	Expected Result
Note that this test is different to the one above in that the call is initiated on a peripheral, not the alarm device itself. These need to remain distinct tests.	check that calls connect and are presented to the ARC correctly.		which is successfully connected to the ARC. Defined as: <ul style="list-style-type: none"> User is able to speak to the ARC call taker. ARC call taker is presented with correct information on the user and device and can speak to the user.
Voice Quality	User makes test calls to the ARC. User and ARC speak to each other for sufficient time to determine the quality of the voice on the call.	Included as part of the Alarm Call Response test above.	For all/XX% of calls, voice quality (for both the ARC and the User) is at least as good as that of an analogue telecare call (in the subjective opinion of the ARC & User).
Voice Reliability	User makes test calls to the ARC. User and ARC speak to each other for 1 minute to check on the reliability of the voice call.	Included as part of the Alarm Call Response test above.	No instances of calls being dropped (cut off) prior to the call being ended by the User/ARC.
Connection Reliability (1)	Check on the Device Management Platform to determine how long the mobile connection to each alarm device has been active.	Check connection to each alarm device on a weekly basis.	All connections are stable for at least 1 week .
Connection Reliability (2)	Check on the Device Management Platform / ARC platform for failed heartbeat “pings” to alarm devices to	Check for failed “pings” to each alarm device on a weekly basis.	No / No more than XX instances of either: <ul style="list-style-type: none"> xx successive lost pings to an alarm device

Test	Test Detail	Frequency	Expected Result
	determine any periods when connection was lost.		<ul style="list-style-type: none"> xx total lost pings to an alarm device. <p>As 'pings' are a relatively new phenomena part of the purpose of this test is to create a baseline.</p>
Reconfiguration	<p>ARC staff are able to successfully reconfigure Alarm Devices remotely using the Device Management Platform.</p> <p>What reconfiguration can we complete to check this?</p>	<p>XX reconfigurations of each alarm device are completed over a period of XX.</p>	<p>All / XX% of reconfigurations are completed successfully.</p>
Usability	<p>Users are able to use the devices without issues or additional training.</p>	<p>Once per user at the end of trial period.</p>	<p>Users report that digital devices are as straightforward to use as the analogue devices they replace.</p>

