

March 2019

**Association of Commercial Banknote Issuers
Framework for the Testing of Automatic Banknote Handling Machines**

1. Introduction

Maintaining confidence in the currency requires that cash users trust the physical integrity of the banknotes of the Scottish and Northern Ireland issuing banks that form the Association of Commercial Banknote Issuers (the “S&NI Banks”). In support of this and following a review of current practice, the S&NI Banks have decided to publish this new voluntary framework document for the testing of automatic banknote handling machines with counterfeit notes and with genuine notes of varying fitness levels. The framework will set minimum standards, which manufacturers of such machines will be able to demonstrate that their machines are capable of meeting.

2. Objectives.

- 2.1 To check that models of automatic banknote handling machines sold for use into the UK market do not give value for counterfeit notes.
- 2.2 To test example models of machines, at least annually, to verify that they continue to meet the minimum standards set pursuant to section 2.1.
- 2.3 To facilitate these objectives the S&NI Banks will procure that its test provider (the Test Provider) , will check that:
 - (a) machines accept genuine banknotes (both new and circulated)
 - (b) machines either reject or separate any suspect banknotes, depending on their end use/functionality.
 - (c) where appropriate, customer information relating to the deposit of counterfeit banknotes is retained for customer operated business machines.

Further details of the tests are set out in Section 7 and Appendix 1.

3. Scope

3.1 Tests will be carried out on banknote handling machines that accept banknotes issued by the S&NI Banks only. Only banknotes issued by the S&NI Banks will be used in tests and references in this framework to “**notes**” or “**banknotes**” are to banknotes issued by the S&NI Banks.

3.2 Manufacturers of banknote handling machines described in Section 3.3 below, including manufacturers of host machines incorporating another manufacturer’s authentication device, will be permitted to submit machines for testing. Agents, suppliers or distributors are not eligible to submit machines for testing, but the Test Provider may, at its discretion, extend testing to a supplier or distributor that is officially nominated by the manufacturer, such nomination to be confirmed by the manufacturer, if the manufacturer is based outside the United Kingdom and cannot participate in person.

3.3 The following types of banknote handling machines are eligible for testing (and for the purposes of this framework are referred to as “**machines**”):

- (a) Point of sale machines (manual or automatic insertion) where an automatic indication is made that a suspect banknote is identified.
- (b) Desktop note counters with authentication sensors.
- (c) Desktop fitness sorters with authentication sensors.
- (d) Note acceptors/bill validators (single note readers).
- (e) Business machines (bunch note acceptors, customer self service and teller assist).
- (f) Recycling machines (note accepting and recycling and those that also fitness sort).
- (g) Medium speed note sorters (around 10-15 banknotes per second).
- (h) High speed note sorters (around 40 banknotes per second).
- (i) Recycling machines for anonymous customer transactions.
- (j) Any other machines where the machine differentiates between genuine and counterfeit and/or fit and unfit notes without human assistance.

3.4 The following types of banknote handling machines are not eligible for testing as part of this framework:

- (a) Equipment where a person makes a judgement about whether a note is suspect, e.g. magnifying equipment, UV lamps, IR viewers, felt-tip detector pens.
- (b) ATM's that dispense only without authentication.
- (c) Equipment not CE marked (European Safety Directive).
- (d) Equipment not intended to handle S&NI banknotes

4. Conditions for participation in the testing framework

4.1 Each manufacturer wishing to take part in the framework shall enter into an agreement with the S&NI Banks before testing commences in respect of a machine. In the event of any conflict or inconsistency between the framework and the bilateral agreement, the bilateral agreement shall take precedence. The form of the agreement includes provisions, among others, in respect of confidentiality, the publication of test results by the ACBI and a disclaimer of liabilities. This framework document and the agreement shall together form the terms and conditions applicable to manufacturers in respect of their participation in the testing framework. This framework may be revised or amended by the S&NI Banks (following consultation with the Test Provider) at any time. The S&NI Banks will endeavour to give notice of any amendment but reserve the right to introduce amendments with immediate effect if necessary.

4.2 Commencement of the testing is conditional on manufacturers submitting certain technical information on the equipment to be tested before testing takes place. Details of the information required to be submitted is available on request from the test provider. If the manufacturer is not able to disclose the information required because of confidentiality obligations that it might have to a supplier then the Test Provider would engage directly with that supplier to receive this information prior to testing taking place. Information shared with the Test Provider will be considered confidential unless otherwise indicated by the manufacturer. In accordance with Section 7.3 the Test Provider will however seek permission to publish information required as part of the publication of test results described in Appendix 2.

5. Scheduling

5.1 The Test Provider aims to accommodate testing as quickly as scheduling will allow on a first-come–first-served basis. The Test Provider will notify manufacturers when a particular machine is scheduled for an annual re-test and the manufacturer should then contact the Test Provider to

schedule a re-test within eight weeks of the date of such notification. The S&NI Banks reserve the right to remove the results in respect of a machine(s) from the list of test results published on the ACBI website if the manufacturer of that machine does not re-schedule the annual re-test within this timeframe.

5.2 If a machine fails a test, the manufacturer should schedule a re-test as soon as practicable and the Test Provider will accommodate the re-test as soon as reasonably practicable. The S&NI Banks reserve the right to remove the results in respect of a machine(s) from the list of test results published on the ACBI website if the manufacturer fails a test; until such time that it passes a re-test.

5.3 In addition to the above, manufacturers can re-submit their machines at any time, for example following an update to their software, subject to there being available slots in the testing schedule and subject to Section 6.2 below.

6. Location, duration and cost of testing

6.1 Tests are conducted at the premises of the Test Provider and, subject to section 6.2 below, will be free of charge.

6.2 Where Manufacturers request tests that are considered by the relevant Test Provider (following consultation with the Test Provider) to be outside the scope of this Framework (including, for example, requests for multiple testing outside of the Framework's testing and annual retest cycle, such as may arise during the development phase of new equipment), the Test Provider reserves the right to make a reasonable charge for these tests . The amount of such charge will be notified in advance and may include the reasonable costs that may be incurred by the Test Provider and/or the S&NI Banks in connection with this.

6.3 Tests are conducted by the Test Provider's personnel in the presence of a nominated official of a manufacturer in accordance with the test procedures set out in Section 7 and Appendix 1. The Test Provider would normally expect this to take place over the course of one day.

6.4 Manufacturers will pay for their own expenses e.g. travel and accommodation, and the packaging and transportation of machines to and from the testing location in all circumstances.

6.5 Manufacturers may request an alternative test location where it is inefficient or impractical to carry out a test at the premises of the Test Provider, for example in relation to large machines that are logistically difficult to move. Any new location will be subject to agreement between the Test Provider and Manufacturer. In such circumstances, the Manufacturer may be required to meet the reasonable costs that may be incurred by the Test Provider and/or the S&NI Banks in connection with this (including travel and accommodation).

6.6 Manufacturers are encouraged to loan their machines to the Test Provider so that additional tests with new counterfeit types can be performed by the Test Provider in-between regular testing. In the event of a failure being found with a new counterfeit type, the manufacturer will be asked to update their machine as appropriate and re-submit for testing; section 5.2 above would apply to such re-test.

6.7 Manufacturers will be able to access the counterfeit library provided by the Test Provider to record and analyse information for later evaluation (“data grabbing exercises”) outside of the testing regime.

7. Types of tests and testing procedures.

7.1 Prior to the commencement of testing, manufacturers must enter into the agreement with the S&NI Banks referred to in Section 4.1 above and supply the information referred to in Section 4.2¹ to the Test Provider. Once the agreement has been signed and the information provided, the tests will be conducted in the following order:

- (a) Recognition test with genuine banknotes (new and used notes) – all machines
- (b) Detection test with counterfeit banknotes – all machines

Details of each of these tests and the procedure are set out in Appendix 1.

7.2 As soon as reasonably practicable following a test taking place, the Test Provider shall endeavour to agree the test results with the manufacturer and the manufacturer shall confirm its agreement of the test results by signing an acceptance in the form set out in Appendix 2.

7.3 By signing the acceptance form as set out in Appendix 2, the manufacturer hereby agrees to the publication on the ACBI website of the test results in respect of a machine that passes a test, together with the information set out in Appendix 2, which for the avoidance of doubt, shall not be deemed to be confidential information. The parties recognise that some of the information listed in Appendix 2 is confidential information; however by signing the acceptance form the manufacturer is agreeing that from the date of signature of the acceptance form such information will no longer be deemed to be confidential information.

7.4 In the event that (i) a machine fails a test, or (ii) the Test Provider and the manufacturer are unable to agree the results of a test, the test results shall not be published in accordance with clause 7.3.

7.5 The S&NI Banks will ensure (i) that the test results shall be provided to the ACBI by the Test Provider as soon as reasonably practicable following agreement between the Test Provider and the manufacturer and (ii) that the test results shall be published on the ACBI website within one month of the date of their receipt by the ACBI, except that no test results shall be published until the date which is 6 months following the date of the commencement of the framework.

¹ Available on request as a separate document.
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8. Disclaimer

- 8.1 Manufacturers are responsible for updating and re-testing machine(s) regularly in accordance with the framework.
- 8.2 Business owners and/or users of machines are responsible for checking that the machines they use are still supported by the manufacturer and that they have the latest updates installed.
- 8.3 The publication or non-publication of results in respect of a machine does not contain or imply a recommendation or endorsement by the S&NI Banks or Test Provider for the use or non-use of such machine and manufacturers may not represent or imply that the S&NI Banks or the Test Provider has given or made such an endorsement or recommendation.
- 8.4 No warranty or representation is given or implied by the S&NI Banks or the Test Provider that all machines of the model type tested will in use detect, correctly identify and/or reject or separate counterfeit and/or genuine and/or composed banknotes without error and/or is fit for purpose and manufacturers may not represent or imply that the S&NI Banks or the Test Provider has given or made such a warranty or representation.
- 8.5 Liability of the S&NI Banks or the Test Provider for any claim, loss, damage or expense of any kind or nature suffered or incurred by a manufacturer, howsoever caused in respect of the participation of that manufacturer in the framework will be dealt with in the agreement that manufacturer will enter into with the S&NI Banks in accordance with section 4.1. Neither the S&NI Banks nor the Test Provider will be liable for any claim, loss, damage or expense of any kind or nature suffered or incurred by any other party, howsoever caused in respect of the participation of any manufacturer in the framework.
- 8.6 No permission express or implied is given by the S&NI Banks or the Test Provider to a manufacturer to, and the manufacturer may not, make use of the S&NI Banks or the Test Provider's name, logo or brand or any information about the S&NI Banks or the Test Provider acquired by the manufacturer through its dealings with the S&NI Banks or the Test Provider for any purpose.
- 8.7 At the collective discretion of S&NI Banks (following consultation with the Test Provider) and without notice, the agreement may be terminated and a manufacturer's machine removed from

the published list of test results if it is considered that there has been a breach of sections 8.3, 8.4 or 8.6 above. Without prejudice to this clause or clauses 8.3, 8.4 or 8.6, manufacturers may create a hyperlink from its website to this framework on the ACBI website, and may inform its customers that its machine(s) has been tested.

Appendix 1 Tests to be carried out.

For the purposes of these tests the following definitions and actions are defined:-

Category	Classification	Properties	Treatment	Treatment
1	Not recognised as a S&NI banknote	Machine does not recognise the image as a S&NI banknote	Reject	No value to be given
2	Suspect counterfeit banknotes	Machine recognises the image but it does not conform to the template for a genuine banknote and one or more authentication features missing or clearly out of tolerance	<p>Customer operated business machines with a sorting and retention facility: Suspect counterfeit notes² should be retained³ and not given back to the customer.</p> <p>Notes should be identified to the particular customer and removed from circulation and handed to the police in accordance with the Forgery and Counterfeiting Act 1981⁴.</p> <p>Staff operated sorting machines: Suspect counterfeit notes should be outsorted or clearly identified to the user that they are suspect and removed from circulation and handed to the police in accordance with the Forgery and Counterfeiting Act 1981.</p> <p>All other machines : Suspect counterfeit notes should be rejected by the machine, in some cases such as manual desktop devices a visual or audible signal is sufficient. Where a member of staff is present, they should retain the notes and hand them to the police in accordance with the Forgery and Counterfeiting Act 1981.</p> <p>More information on what to do with a counterfeit banknote can be found at WWW.ACBI.org.uk</p>	No value to be given

² These are notes where the machine knows or has sufficient reason to believe that the note is counterfeit. Manufacturers should obtain their own legal advice with respect to the Forgery and Counterfeiting Act 1981.

³ Some exceptions apply; please see the relevant section 2.

⁴ Under Home Office guidelines, financial institutions are allowed to return suspect notes back to the issuing banks via the banking system, if there is no reasonable chance of a successful prosecution, i.e. If the notes cannot be identified to a particular person. (These are known as 'dead utterings'.)

1 Recognition of genuine banknotes.

The test pack size will be determined by the type of machine to be tested, i.e. single manual feed or bunch note feed/accept. It will contain new notes and used notes of varying fitness levels. Unfit notes will not be used. The breakdown for each issuer is detailed in Annex 1. Each issuer is responsible for advising the test provider which genuine notes are to be included. New design banknotes are added following their public release into circulation.

Results:

There is no pass/ fail mark for this test.

The percentage of genuine notes accepted in all orientations by the machine are reported. e.g. 90% accepted in all orientations. The machine is tested only with the denominations and designs included in the genuine note acceptance algorithm set by the manufacturer.

2 Detection of counterfeit notes

The counterfeit test pack will comprise counterfeit notes from each relevant denomination and class. The Test Provider will decide, based on information supplied by the National Crime Agency, when to include a counterfeit note type according to a perceived threat level, based on quantity **and/ or** quality of notes detected from circulation. The test pack will contain at least five notes of each of the counterfeit classes that make up 90% of the total number of counterfeits in the last 12 months; and at least one of each of the remaining classes considered relevant. In addition, if a counterfeit class is deemed to be a threat but is seen in very few numbers at least five notes will be included. In addition, the test pack will contain composed notes that are more than 50% composed of counterfeit parts.

Results.

1. Cash validation only machines:

A pass is awarded if all the counterfeit notes are rejected and or outsorted and notified to the user for all orientations accepted.

2. Business machines. (Machines that are used in financial institutions for the re-circulation of banknotes, i.e. those likely to be used and owned by professional cash handlers, finance and credit institutions, whether operated by customers or staff only)

- **Staff operated machines:** Pass if all counterfeit notes rejected and or outsorted and notified to the user as suspect counterfeit notes for all orientations accepted.

- **Customer operated machines:** Pass if all counterfeit notes retained as suspect counterfeit by the machine for all orientations accepted.
 - *Exception 1 Withdrawn series counterfeit notes can be rejected if the machine does not contain a template for that genuine banknote design. This functionality will be tested with genuine withdrawn series notes to verify correct operation.*

 - *Exception 2 In certain cases, when it can be demonstrated by physical evidence, the machine is allowed to reject a counterfeit note back to the customer, if the machine is not able to identify the document as being one object, for example, due to thickness or is not able to identify the document as a valid item, for example if the size of the banknote is smaller or bigger than the tolerance of a genuine banknote of that denomination.*

4 Tracing system test

Manufacturers of customer operated business machines should demonstrate that customer information can be retained in the event that a banknote is identified as suspect.

Pass if it can be demonstrated that the machine has the capability to identify retained suspect counterfeit notes to a particular customer/transaction.

Appendix 2

Form of agreement of test results and information to be published by the ACBI

Framework for the Testing of Banknote Handling Machines

End of Day Test Results (version 4 November 2017)

- (a) Date of the test:
- (b) Name of the Manufacturer:
- (c) Type of machine:
- (d) Model number:
- (e) Software and or Firmware and or Note/Table Set:
- (f) Additional machines models (untested) also included ⁵:
- (g) Test pack versions/issue numbers used during the test:
- (h) Results of the tests are:
 - i. Recognition of genuine notes: 100 % accepted in all orientations
 - ii. Detection of counterfeit notes: pass fail
 - iii. Tracing system test: pass fail not applicable
- (i) Software/Firmware that will be de-listed:
- (j) Schedule 1 has been supplied and is up to date
- (k) Number of machines currently in use; - UK

We hereby agree that the information set out above is correct and the company agrees to the publication of this information⁶ (if full pass awarded) by the ACBI on its web site.

Signed by..... For and on behalf of

Signed by..... For and on behalf of the Test Provider

Date

⁵ The manufacture signs this agreement to certify that the additional untested machines contain the exact same bill validator unit and authentication software version as the tested machine and will perform as the tested machine.

⁶ Schedule 1 information is confidential and will not be published.

Annex 1 Details of the Genuine Note test Pack

Machines are tested against designs and denominations included in the software template.

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	£5	£10	£20	£50	£100
Bank of Ireland	2013 <input type="checkbox"/> 2019 <input type="checkbox"/>	2013 <input type="checkbox"/> 2019 <input type="checkbox"/>	2008 <input type="checkbox"/> 2013 <input type="checkbox"/>	2004 <input type="checkbox"/> 2013 <input type="checkbox"/>	2005 <input type="checkbox"/>
First Trust	n/a	1998 <input type="checkbox"/>	1998 <input type="checkbox"/>	n/a	n/a
Dankse	n/a	2005 NB <input type="checkbox"/> 2013 DB <input type="checkbox"/> 2019 DB	2005 NB <input type="checkbox"/> 2013 DB <input type="checkbox"/>	n/a	n/a
Clydesdale	2016 <input type="checkbox"/>	2017 <input type="checkbox"/>	2009 <input type="checkbox"/>	2009 <input type="checkbox"/>	2009 <input type="checkbox"/>
Ulster	2007 <input type="checkbox"/> 2019 <input type="checkbox"/>	2008 <input type="checkbox"/> 2014 <input type="checkbox"/> 2019 <input type="checkbox"/>	2007 <input type="checkbox"/>	1997 <input type="checkbox"/>	n/a
Royal Bank of Scotland	2016 <input type="checkbox"/>	2017 <input type="checkbox"/>	1989 <input type="checkbox"/>	2005 <input type="checkbox"/>	n/a
Bank of Scotland	2016 <input type="checkbox"/>	2017 <input type="checkbox"/>	2007 <input type="checkbox"/>	2007 <input type="checkbox"/>	2007 <input type="checkbox"/>

Large test pack

All denominations	10 Circulated Notes
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Small test pack

All denominations	3 Circulated Notes
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Pass rate: Number of genuine notes accepted in all orientations

= number of notes accepted in all orientations (*exclude designs not handled by the machine*) / total number in pack used *100%

Pass Rate for machine: _____ %

Notes:

1. In accordance with advice from the Scottish banks, manufacturers are free to exclude older design series of notes from their active templates but may wish to check with their customers before doing so.