National RFID Data Profile Australia

National RFID Data Profile Working Group

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Introduction

This document has been prepared by a National RFID Data Profile (NRDP) working group established under the auspices of ALIA. The working group was established to consider issues relating to information elements that might be placed on RFID tags by Australian libraries and the extent to which such information might have an impact on future interoperability and the leverage to be gained through RFID technology. More broadly, the working group also looked at a number of other related issues that could potentially limit interoperability as RFID systems are progressively rolled out across the country.

This document assumes a basic understanding of what RFID is and how it might be usefully employed within a library service. Readers not in possession of this basic understanding are directed to Appendix C where a list of printed and online resources is presented.

This document

The conclusions of the working group are presented in this document, the purpose of which is to:

- Provide some necessary background information on RFID standards and interoperability issues within Australian libraries.
- To introduce ISO 28560, the new data standard for RFID in libraries and to offer guidelines for its use.
- Present a well considered data profile aimed at preserving and even improving interoperability following a migration to RFID.
- Present information for use when approaching the library RFID supplier community to ensure compliance with the National data profile for RFID.

Introduction to RFID standards for libraries

Standards for RFID tags & equipment

The library community has long recognised the value of standardised and open systems, particularly in the area of Information and Communications Technologies (ICTs) and this continues to be a topic of focus within discussions of RFID solutions. For many years there were no international standards in existence that had been specifically developed for the library application of RFID. However, standards did exist in the commercial RFID technology space and this is where library RFID suppliers first turned when considering a standards-based approach. It should also be noted that not all library RFID system suppliers originally based their solutions on standards and some proprietary RFID implementations still exist in Australia.

During the development of early library RFID systems, suppliers realised that a particular International Organization for Standardization (ISO) standard aimed primarily at smart-card applications could quite easily be repurposed to suit a smart-label application such as libraries. The standard in question was ISO/IEC 15693, first published in the year 2000. This multi-part standard defines three things specifically:

- Part one - the physical characteristics of the RFID tag.
- Part two - the "air interface" characteristics of the RFID tag.
- Part three - the command set for communication between the RFID tag and reader as well as other important aspects.

While the technical details of this standard are outside the scope of this document, some useful general comments can still be made. The standard, as originally intended, was meant to describe a "vicinity" smart-card implementation. A vicinity smart-card system is one that is characterised by its operation at a distance from the RFID reader. Whereas many smart-card systems require the card to be brought within a couple of centimetres of the reader to ensure correct operation, ISO/IEC 15693 systems could operate in environments where the smart-card would be read while perhaps as much as seventy centimetres away from the reader.

Manufacturers of library RFID systems realised that this sort of read range could be appropriate for a system employing smart-labels within library items and so this standard was selected by many suppliers as a basis on which to build their product offerings. While part one of the standard required the RFID tag to be the size of a standard credit card, the RFID manufacturers deviated from this to produce the array of tag sizes we see in current library systems. It was considered more important to maintain compatibility with parts two and three of the standard which actually specified how the tag would communicate etc. So for many years, when a library talked about "ISO compatibility" in discussions with prospective suppliers, what this really meant was whether the supplier's library solution complied with parts two and three of ISO/IEC 15693. One of the benefits of using this standard was that a library purchasing such a system was not locked into one supplier for ongoing purchases of tags – all tags compatible with the ISO standard should work correctly, regardless of the manufacturer.

During 2004, another multi-part standard was published which superseded ISO/IEC 15693. This standard was ISO/IEC 18000. Each part of this standard refers to communication with an RFID tag at a different range of frequencies. The part that refers to the tags generally used within the library application of RFID is ISO/IEC 18000 part three. For the purposes of this document we can consider the old standard and the new standard to be essentially the same.

So, the ISO standards published in 2000 and 2004 allowed libraries some freedom to source RFID tags and systems from different suppliers. Unfortunately, these standards didn't enable interoperability at the operational level between different supplier's RFID systems and this came as a great surprise and disappointment to many libraries. The reason behind this non-interoperability related to the way the tags were formatted for use in a supplier's system. The two standards were silent on the topic of *how* data should be stored on the RFID tags – what data, what order the data fields should take, how long each field should be etc. The individual suppliers had to devise their own unique strategy for storing information on the tags. Once a tag was formatted to store data according to one supplier's scheme it could no longer be read by a supplier using a different scheme.

Obviously, in addition to standards for tags and equipment, RFID library systems also required standards for information storage.

Standards for information storage

The global library community responded in two ways to the realisation that ISO standard systems weren't delivering all of the value expected. The first response was to develop national initiatives that essentially resulted in a range of country-wide methods for RFID tag data storage. Possibly the most well known of these is the Danish Data Model specification. The term "Data Model" essentially refers to an agreed set of item or bibliographic data fields, which are then stored on the RFID tag in a prescribed manner. All libraries that subscribe to this scheme then have the tag-level interoperability that is sought. Similar projects also occurred in The Netherlands, France and Finland resulting in information storage specifications that were all different and therefore unique to each country.

The second response was to approach ISO with the aim of developing an international standard for the storage of information on RFID tags. A project was commenced in 2006 with representatives from libraries around the world and in 2011 the standard was published. This new standard, known as ISO 28560 provides for a wide range of information objects to be placed on the tags and formally describes the methods for doing so.

ISO 28560 has three parts. The first part is a list of data objects or elements that libraries might choose to place on their RFID tags. These elements relate to bibliographic or item specific data - examples include the title, the MARC or ONIX media format, the owning institution identifier etc. This list may grow over time but currently in the standard there are approximately thirty elements. Part two of the standard takes these data elements and encodes them on the RFID tag by means of an ISO standardised encoding module and allows freedom by individual libraries in the selection of which elements they will employ. Only one data element is mandatory for

all RFID tags under part two - the primary item identifier (generally the existing barcode number in retrospective conversions). The standard also contains a "content parameter" element - analogous to a table of contents for use in situations where several data elements are present on the tag. Using a combination of parts one and two of the standard, libraries have complete control over which (if any) data elements they will employ in addition to the mandatory primary identifier.

Part three of the standard takes the same list of data elements from part one but takes a different approach to how these will be used on the tag. Instead of offering complete flexibility to the library in terms of data element selection, part three organises the data elements into sets known as Blocks. In place of the mandatory element contained in part two, part three of the standard employs a mandatory set of data elements called the Basic Block. The Basic Block includes the primary item ID but also includes the owner library code, set information, and a type-of-usage parameter. In addition to the Basic Block, part three of the standard allows for Extension Blocks containing other sets of elements aimed at acquisitions processes, inter library loans, enhanced item identification etc. Part three reflects the approach taken by the Danish Data Model published in 2005 and supported by many RFID suppliers.

These two ways of encoding information on library RFID tags are not designed to be interoperable. It is anticipated that the decision to implement ISO 28560 using either the part two or part three encoding method will be made at a national level to enable country-wide interoperability.

During 2006, an encoding scheme corresponding to parts one and two was accepted by Standards Australia as appropriate for use in Australian libraries. With this in mind, Australian libraries considering the purchase of a new RFID system should ensure that it is based on ISO 28560 parts 1 & 2. ***No Australian library should implement an RFID system based on parts 1 & 3 of the new standard.***

The NRDP working group has identified a number of interoperability issues for Australian libraries moving to RFID, some of which may be mitigated by careful implementation and use of the new ISO standard. The following sections deal with these issues and also provide specific instruction on the use of ISO 28560.

National RFID data profile for Australian libraries

Rationale behind the data profile

A common profile based on ISO 28560 will allow libraries to enhance interoperability and facilitate resource sharing within a variety of contexts. The combination of the library item's ID number and the owning institution's ISIL code enables a system of unique item identification across all library sectors as well as all states and territories.

ISO 28560 parts 1&2 have been designed to permit libraries to select from a range of data elements to be placed in their RFID tags. The table in Appendix A, from the standard, provides a list of the data elements that may be included in the memory of RFID tags. Up to a point, the selection and use of these data elements will be determined by each library according to needs. In the case of Australian libraries, the NRDP working group has formalised two aspects of the standard:

1. The minimum set of data elements that will be placed on all RFID tags. This represents the "data profile" for Australian libraries.

2. For some of the optional data elements, the conditions under which they may be used – specifically what values may be used with the particular data elements.

Essentially this means that while some data elements from the list in Appendix A are mandatory for all libraries and all tags, all of the remaining data elements are optional for individual libraries but some of these optional elements have controls in place covering their usage.

Data profile for Australian libraries

The National data profile is shown in the following table:

n	Name of the data element	Description	
1	Primary item identifier	Unique item identifier	Mandatory
2	Content parameter	Specifies the structure of the tag data	
3	Owner institution (ISIL)	The ISIL code for the institution that owns the item	

From the complete list in Appendix A, three elements have been selected to form the foundation of every RFID tag within Australian libraries. *All* libraries should ensure that these elements are present on every RFID tag within their collections. To this foundation may be added additional elements should an individual library or consortial group find such elements useful for their local needs. Both the mandatory elements in the table above and also a number of optional elements are described in the following sections.

Mandatory data elements

Primary item identifier

This is the unique number identifying the item on the library's database. Most commonly this number will be the barcode number currently existing on the item. At the point of conversion to RFID this number will be read from the barcode and written into the memory of the RFID tag as the first data element. One of the benefits of the software encoder employed by ISO 28560 is the special function where the first data element on the RFID tag may be quickly read in what amounts to an "express" read. In this way, systems developers are able to capture the item identifier without needing to read all of the data on the tag. This may be useful in contexts where speed of reading is paramount such as automated item returns & sorting etc.

Content parameter

This is not a library data item but represents a sort of table of contents regarding the information on the tag. RFID readers may use the content parameter to rapidly locate specific data elements or to determine what extra data might be stored on the tag without reading all of the tag's memory. This element may also be useful in optimising performance of an RFID system. The content parameter must be set as per ISO 28560 and is based on the Australian data profile plus any additional data elements chosen by individual libraries.

Owner library code (ISIL)

This is a library or related institution identifier. The ISIL standard ISO 15511 employs country and sometimes regional code prefixes to create globally unique identifiers. In Australia, the use of National Union Catalogue (NUC) codes is sufficiently common to allow the ISIL code to be generated from the NUC as described in the standard. This may be done at the time of conversion to RFID and essentially entails prefixing a two digit county code and a region code to the NUC code. The library identifier may be used to determine the owner of the library material and can be useful for automated returns as well as in other contexts. As per ISO 15511 and ISO 3166-2, the ISIL code will be set as AU-STA:nnnn where STA is the three digit state code (VIC, NSW etc) and nnnn is the existing NUC code for the individual library.

Notes on the use of optional RFID tag information

Overview

While the use of other data elements in addition to the National data profile is optional, some detail regarding how these elements should or could be used has been provided in the interests of maximising interoperability. Some optional data elements have controls regarding their use whereas for other elements usage guidelines are offered. The following table summarises the sections to follow:

Mandatory	*Controlled*	*Usage guidelines*
Unique Item ID	MARC Media code	Set information
Content parameter	Type of usage code	Shelf location
ISIL code		ONIX media format
		Item title

Controlled data elements

The following two elements have controls associated with them in the interests of national interoperability.

n	Name of the data element	Description	
8	MARC media format	MARC 21 category of material descriptor	Optional

The MARC media format data element represents a MARC 21 category of media descriptor and is a compound of two letters defined by position 6 and 7 in the leader of a MARC 21 record. There are many uses for this element, for example:

- Several RFID solutions now employ lockable circulating cases to allow CDs and DVDs to be securely borrowed by means of self-service. The unlocking mechanism is incorporated into the self-service system ensuring that these items do not leave the library without sounding the alarm if they have not been borrowed and unlocked. Unfortunately, many libraries are not consistently able to identify items that have been housed in locking cases due to variable cataloguing practices over time. Placing the media format on the tag itself removes any database variability and also allows the self-service systems to operate correctly in the event that the library management system is unavailable due to system or network failure.

Within the National data profile, if an individual library selects this element, the following codes should be used when identifying media types.

Media type	Code
Standard sized circulating & unlockable DVD case	gm
Audio books	im
Monographs or general item code	am
Magazines	as
Toys	rm
Kits	om

Note that not all the codes need to be used but a valid code should be placed on every tag if this element is employed. For example:

- A library deciding to use the MARC media format element purely for the purpose of identifying locked DVD cases that the self-service machine may be required to unlock, may perhaps put the code "gm" in these items and place the generic code "am" in all other material.

Of course a library using this data element may also choose to set the correct value for all media types regardless of the specific use in mind. Given the strategic infrastructure aspect in an RFID implementation, this approach might well pay dividends in the future as RFID equipment continues to evolve.

n	Name of the data element	Description	Optional
5	Type of usage	Additional qualifying information about the item	

The *type of usage* data element provides additional qualifying information about the item, for example the type of material and its use within the library. One example might be:

- The identification of non-circulating material in situations where the self-service systems have no access to the library database due to a server or network outage. Employing this element on the tag allows the self-service unit to prohibit the loan of reference material when information on the circulation status of the item is unavailable from the library management system.

Other examples include the identification of library equipment for loan, the discrimination of borrowers and material where RFID is used for membership cards, and special handling required for certain items when using sorting systems such as fragile, over or under sized items etc. Within the National data profile, if this element is used by an individual library, the following codes, taken from ISO 28560, should be used when identifying the usage context.

Type of usage	Code
Acquisitions item – non specific use	00
Circulating item	10
Circulating item which cannot be sorted by machine	12
Non circulating item	20
No type of usage for this item	60
Discarded item	70
Borrower card – non specific use	80
Borrower card – Adult	81
Borrower card – Young adult	82
Borrower card – Child	83
Library equipment – non specific type of equipment	90

Note that not all the codes need to be used but a valid code should be placed on every tag if this element is employed. For example:

- If the type of usage element is used primarily to identify the circulating status of items (to control the loan of reference material by means of tag data) only the codes for either circulating or non circulating must be used.

- If the use of this element is to identify circulating items that cannot be put through a sorting machine (too big, too small, fragile etc) the code "12" might be put only into the tags on these particular items with the code "60" placed in everything else.

Of course a library using this data element may also choose to set the correct value for all usage types regardless of the specific use in mind. Given the strategic infrastructure aspect in an RFID implementation, this approach might well pay dividends in the future as RFID equipment continues to evolve.

Usage guidelines for data elements

The following four data elements have usage guidelines associated with them in the interests of national interoperability or effective use

n	*Name of the data element*	*Description*	
4	Set information	Number of parts in item and ordinal part number	Optional

The *set information* data element may be used to manage or control items that are composed of more than one physical object. Examples include a DVD case and a DVD, a book and a software CD, a music CD with a CD case and a booklet. In these cases, the RFID tags themselves could be used to ensure that, at points of circulation, all of the items making up the set are present. One usage context might be where a library, at the point of returns processing, only opens DVD cases to check whether the DVD is actually inside. When using a case tag and a hub tag which are associated as a set, the possibility exists to generate alerts only on incomplete sets – obviating the need to open every case for checking. Other circulation contexts exist also.

ISO 28560 allows for three different methods of set control.

1. A situation where the number of parts in the set is known and all of the items in the set carry RFID tags – as is the case in the examples used previously.

2. A situation where the number of parts in the set is known but not all items carry an RFID tag – in this case an operator may simply be prompted to manually count the parts.

3. A situation where the total number of parts in the set is not known or may increase over time – in this case the set needs to be checked using local knowledge or processes.

The choice of set control method will be determined by the individual library choosing to employ this data element and will be influenced by the nature of the sets themselves as well as the degree and nature of the control required. It should be noted that limitations do exist with set management. These limitations arise from the physics of RFID and the difficulty of reading RFID tags that are located in very close proximity or are masked by other materials such as metal.

A talking book set provides a useful example. If the set exists on the shelf in a case with all of the CDs stacked on top of each other (as is common) this set will be problematic for RFID. The metal in the individual disks will mask the RFID tags on discs located under and above and so tagging all of the disks will not be effective. These limitations should be discussed with prospective suppliers and configurations should be tested before committing to a tagging plan incorporating RFID set management.

n	Name of the data element	Description	
6	Shelf location	Code for location of the item	Optional

This optional element is designed to describe the physical location of an item within the library. It could be a Call Number used for sorting items by means of a sorting machine or even a floor number within a multi storey building. As it only references the specific library in which the items are located, any suitable code system may be used. *If a library service wishes to encode an item's call number on the RFID tag, it is recommended that this data element be used for the purpose.*

n	Name of the data element	Description	
7	ONIX media format	ONIX media descriptor	Optional

This data element allows for the identification of an item's media type using the ONIX system of codes. It is recommended that for the purposes of identifying media types that MARC Media format data element be used instead for this purpose.

n	Name of the data element	Description	
17	Title	Title of the item	Optional

No controls are imposed on the use of the *Title* data element however some guidance is offered. When selecting the Title data element, libraries should give consideration to the desired use to which the title information might be put and therefore how much of the title actually needs to be stored in the tag. Obviously some titles may be very long and might consume considerable tag memory. For example, if the purpose is to identify an individual item causing an alarm at the security gates, only enough of the title is required to enable the item to be located amongst a relatively low number of items carried by the borrower. In this instance a truncated title might, from a practical perspective, be perfectly adequate for the purpose. It may be useful to discuss with prospective suppliers the possibility of limiting the length of the Title data element to, for example, twenty to thirty characters.

Compatibility with existing data profiles

The National RFID data profile is a subset of and therefore compatible with all existing consortial or state-wide data profiles including:

- The Swift consortium data profile
- The South Australian public library data profile administered by PLS
- The West Australian public library profile developed by the WA RFID working group
- The data profile developed by the SSROC group of libraries in NSW

Migration to ISO 28560 parts 1&2

For many libraries that already have an RFID system or may be currently implementing with a supplier that does not yet support ISO 28560, migration to the new standard will be required at a later stage. Fortunately, several vendors are devising ways for libraries to make an almost seamless transition to the new standard. Most typically these involve reading the old data format at the point of item return and then rewriting the tag's memory with essentially the same data but in the new ISO standard format. All new items added to the library's collections subsequently are processed using the new standard.

These seamless transition strategies make an important assumption – that the data required under ISO 28560 1&2 *is already contained on the tag*, albeit in a proprietary format. This is particularly important if item-specific data is employed such as item title, call number, media identifier etc. What this means for libraries who are about to implement RFID is that, for the National data profile plus any additional optional data elements selected by an individual library, this data must be placed on the tags – even if the supplier is not yet using the standardised data format. As long as the required data exists on the tag a seamless transition to the new standardised format is possible.

Many of the existing supplier data models (and the national initiatives) can contain similar data fields to those in the National data profile as well as some of the optional data elements already discussed. The following table provides an example of what data would need to be placed onto the tag if the supplier employs the widely used Danish Data Model and plans a future seamless migration to the National data profile under the new ISO standard:

Danish data model element name	*ISO 28560 element name*
Primary item identifier	Primary item identifier
N/A – generated at conversion	Content parameter
Country of owner library / Owner library	Owner library code (ISIL)
Number of parts in an item Ordinal part number	Set information
Media format	MARC media format
Type of usage	Type of usage

While fields in a proprietary or existing national model might not always map precisely to ISO 28560, for example the Media Format in the Danish Data Model is not a MARC identifier, care at the conversion stage can result in useful data mapping between the two. The main point is to ensure that, to the extent possible, the tag contains as much information as will be required following a migration to ISO 28560. It is likely that any requirement to retrieve missing data by accessing the library management system or implementing a manual step will greatly slow the migration process itself.

Another aspect to consider is the way that RFID circulation equipment might react when presented with tags from other libraries containing optional data elements beyond the mandatory specification. This situation could easily arise in Australian libraries due to the number of optional data elements offered by ISO 28560. As part of their implementation of the new standard, suppliers should take care to ensure that unexpected data elements do not in any way disrupt the normal operation of a library's staff or self-circulation systems.

It is required of suppliers who wish to comply with the National data profile to provide means which allow the library, by means of parameter settings, to:

Option 1. Instruct the self-service system to use the optional data elements on the tag in an appropriate way, even though the local library might not support this element. An example might be found in a library not using the *Set Information* data element for their own material but where a borrower attempts to borrow an item at the self-service kiosk sourced from another library that does use the set information on their tags. In this case the self-service kiosk should manage the transaction using the set information data and, in the case of an incomplete set, alert the borrower etc.

Option 2. Disregard the additional information on the tag. So, in the previous example, the self-service system would ignore the set information data and process the loan as a single item regardless of missing parts etc.

Option 3. Prevent the transaction and refer the borrower to the staff. In this case the loan is not allowed and the item must be taken to a staff member.

The action to be taken may depend on which optional data element is encountered, as well as individual library policy. RFID suppliers should permit the library to set up a table with appropriate instructions for each optional element that might be encountered.

Other interoperability & standards issues

Ultra High Frequency (UHF) RFID systems

There are several RFID system implementations in Australian libraries that are based on Ultra High Frequency technology. This technology is employed in supply chain applications of RFID as well as many other application areas whereas the majority of library RFID systems are based on High Frequency (HF) technology. While it is possible to debate which technology platform is most suitable for library RFID, the fact remains that there is fundamentally no interoperability between UHF and HF RFID systems. This is not simply a function of data model usage; it actually goes to the heart of how the two technologies operate.

ISO 28560 explicitly excludes all RFID technologies except for those based on the High Frequency ISO standards that were mentioned at the outset. For this reason, the National RFID data profile is at this time limited to RFID systems based on HF tags. It is possible that ISO 28560 may in the future be extended to cover UHF RFID systems as well and at this point users of this technology may adopt the National profile.

Compliance testing of RFID tags

Given the significant consequences resulting from an unexpected lack of compliance with the new ISO standard, it is strongly recommended that libraries who are implementing RFID systems or who are migrating to the new standard ensure through independent third party testing that their supplier's encoding conforms with the standard. Currently, compliance testing within Australia is only available through Sybis. Compliance request forms may be obtained using the following link:

http://www.sybis.com.au/Pages/compliance_test.html

Physical item security by means of the RFID tag

ISO 28560 describes a mechanism for securing library material using the RFID tag itself instead of using additional security labels or strips. Of course an individual library is free to adopt RFID tag based security or to combine it with an electromagnetic security system as local needs dictate. While the National data profile does not prescribe the security methodology to be used, all RFID tags on circulating material must conform to the standard when they leave the institution and enter the public space.

Specifically, the Application Family Identifier (AFI) and the Data Storage Format Identifier (DSFID) fields must be set as per the new ISO standard, regardless of the item security infrastructure employed within a specific library. These two fields are located in the system area of the RFID tag's memory and are used to indicate to RFID readers what kind of an item the tag is attached to. While this is important from a security perspective as items move between libraries, it is also important in the broader RFID context to ensure that library RFID tags are not being read by readers from other application areas.

Approaching the market

Appendix B provides a checklist that may be used in discussions with prospective RFID suppliers. The checklist is aimed at ensuring that all RFID systems installed in Australian libraries comply with the National data profile. A brief flowchart for libraries considering a market approach is provided which takes into account the issues discussed in previous sections.
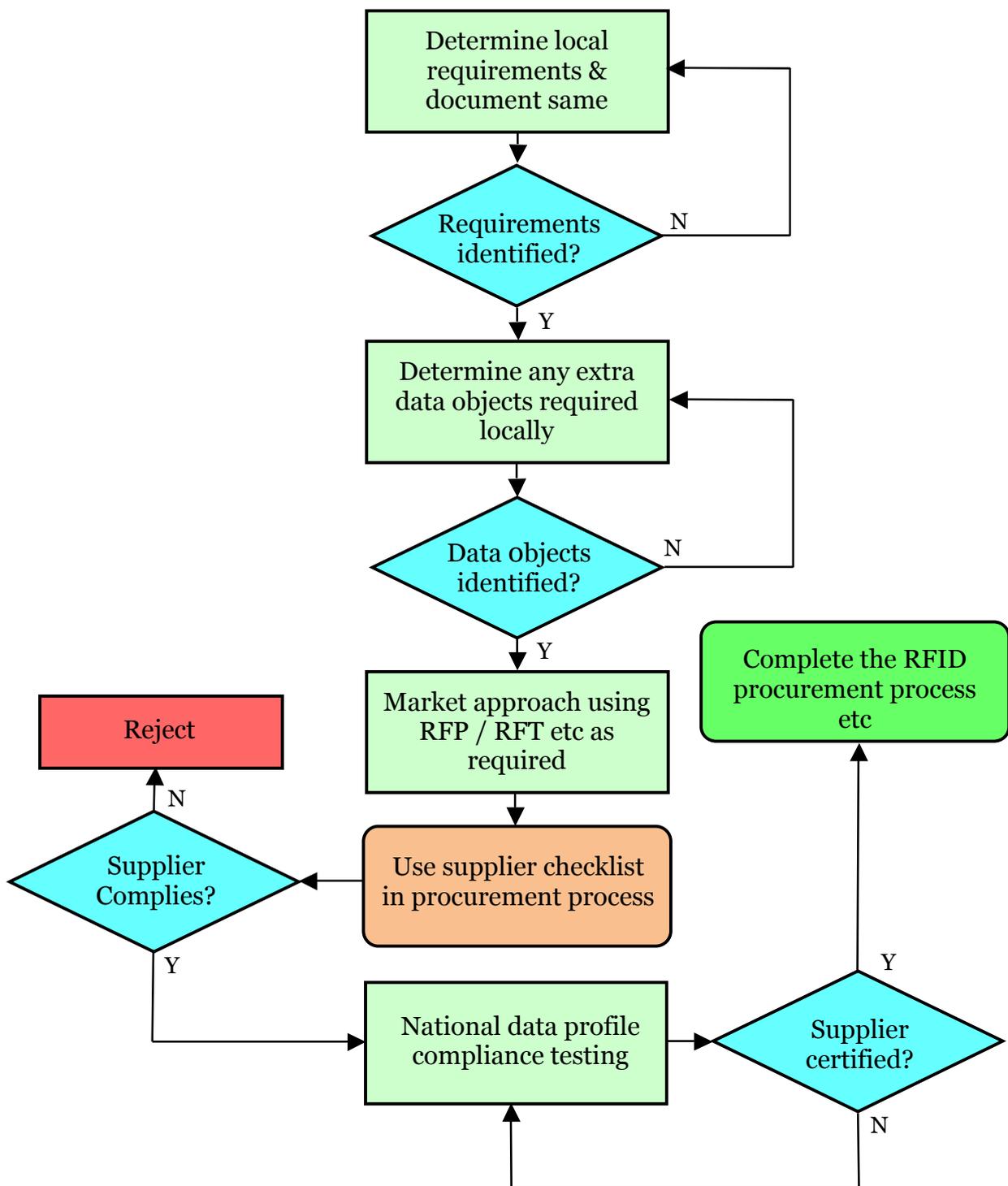
Appendix A – ISO 28560 data elements

n	Name of the data element	Description	
1	Primary item identifier	Unique item identifier	Mandatory
2	Content parameter	Specifies the structure of the tag data	
3	Owner institution (ISIL)	The ISIL code for the institution that owns the item	
4	Set information	Number of parts in item and ordinal part number	Optional
5	Type of usage	Additional qualifying information about the item	
6	Shelf location	Code for location of the item	
7	ONIX media format	ONIX media descriptor	
8	MARC media format	MARC 21 category of material descriptor	
9	Supplier identifier	Code for identification of supplier of the item	
10	Order number	Number meaningful to the library and to the supplier of the item	
11	ILL borrowing institution (ISIL)	ISIL code for the institution borrowing the item	
12	ILL borrowing transaction number	Number identifying an inter-library loan transaction	
13	GS1 product identifier	GTIN-13 code of GS1	
14	Alternative unique item identifier	Reserved - possibly encoding in new tag architectures	
15	Local data A	Any locally defined purpose	
16	Local data B	Any locally defined purpose	
17	Title	The title/titles of the library item	
18	Product identifier local	Product identifier not based on GTIN-13	
19	Media format (other)	Media descriptor other than ONIX or MARC	
20	Supply chain stage	The stage of the supply chain in which the item currently resides	
21	Supplier invoice number	Invoice number meaningful to the library and to the supplier of the item	
22	Alternative item identifier	Optional identifier for an item	
23	Alternative owner library	Code for the library institution other than ISIL	
24	Subsidiary of an owner library	Internal code defined within a library institution	
25	Alternative ILL borrowing institution	Code for the ILL borrowing institution other than ISIL	
26	Local data C	Any locally defined purpose	
27	Reserved for future use		
28	Reserved for future use		
29	Reserved for future use		
30	Reserved for future use		
31	Reserved for future use		
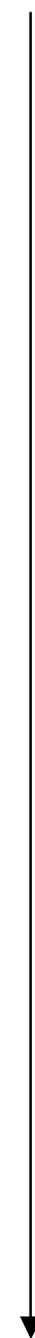
Appendix B – RFID supplier checklist

The following checklist may be used by a library service when discussing a possible migration to RFID with a supplier. For the supplier's solution to be compatible with the National data profile designed to preserve interoperability, a positive response must be provided for every item in the checklist. If the supplier plans for future compliance with a requirement, the date for compliance should be entered into the checklist. The date may then be incorporated into a supply contract.

	Requirement	*Yes*	*No*	*Date*
1	Hardware and tags must comply with ISO 15693 2&3 and/or ISO 18000-3 Mode 1			
2	RFID tags supplied must have a minimum of 1024 bits of user memory			
3	RFID tags supplied must support the AFI and DSFID fields in the system area of the tag			
4	The National data profile must be supported under an implementation of ISO 28560 parts 1&2			
5	A supplier's implementation of the National data profile under ISO 28560 parts 1&2 should be independently certified using a sample tag provided for that purpose			
6	Some libraries may add additional optional data elements to their tags and these items may travel to a library where the optional data elements are not used locally. RFID circulation devices such as self-service loans and returns must be capable of operating with these optional or unexpected data elements beyond the National data profile. Specifically, for each of the optional elements from ISO 28560-1, a library must be able to configure RFID circulation devices to: 1. Ignore the optional data element 2. Use the optional data element for its intended purpose 3. Cancel the transaction, refer the user to a staff member			
7	As ISO 28560 specifies the mechanism by which RFID tag based item security will be accomplished, the supplier should ensure that the correct AFI codes are maintained in all item circulation states.			
8	In order that a seamless transition may be made from pre ISO 28560 implementations, the supplier must agree to place the data on to the tags that will later be mapped into the ISO 28560 data elements. Other data models such as the Danish Data Model etc may be temporarily used for this purpose			
9	The supplier should commit to (and broadly describe) a seamless transition method from any pre ISO 28560 data model to an implementation of ISO 28560 1&2 sufficient to support the requirements stated above			

Appendix C – Useful RFID resources

Books

Radio Frequency Identification Handbook for Librarians. Connie K. Haley, Lynne A. Jacobsen, Shai Robkin. Published by Libraries Unlimited.

A good general introduction, if somewhat USA focussed.

Making the Most of RFID in Libraries. Martin Palmer. Published by Facet Publishing.

A good general introduction from a librarian in the UK with some excellent information on managing an RFID implementation within a public library service.

The RFID Handbook. Klaus Finkenzeller. Published by Wiley.

The gold standard of technical references for RFID. Covers a range of topics from the physics of RFID through to RFID standards and application areas.

Online resources

www.sybis.com.au

Some useful RFID whitepapers and also links to RFID libraries and suppliers.

http://www.idtechex.com/knowledgebase

IDTechEx database of RFID case studies – subscription required

http://www.rfidjournal.com/whitepapers/10

Well regarded publication. Whitepapers available – subscription required

http://www.goldcoast.qld.gov.au/attachment/library/papers_online07_right_time.pdf

Case study of RFID implementation at Gold Coast City Council

http://biblstandard.dk/rfid/

A link to the ISO 28560 project website

http://www.ifla.org/en/about-rfid

Newly established IFLA RFID special interest group

http://www.bic.org.uk/e4libraries/11/RFID-/

Book Industry Communication – UK RFID resources site

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