RFID Standards

Abstract

Chapter 3 of Library Technology Reports *(vol. 48, no. 5) "RFID in Libraries: A Step toward Interoperability" discusses RFID standards. RFID has not been widely adopted in libraries partly because of the lack of standards. However, as of 2012, several key standards are in place, which provides an opportunity for moving toward interoperable RFID systems where libraries should be able to read each other's RFID tags, and tags and equipment should all work together regardless of the vendor or the library system being used. This chapter provides a brief history of the standards development process and articulates what needs to be done to take advantage of the standards now in place.*

One of the reasons RFID has not been more widely adopted in libraries is the lack of standards. Without standards, libraries couldn't be assured that their significant investment would be worthwhile. Those libraries that did go ahead and take the plunge early on have had to deal with the fallout of being early adopters: the need to replace tags, replace hardware, and find new vendors to support their proprietary systems. Libraries that had to replace their tags were in the toughest position because RFID tags cannot be simply pulled off a book or DVD. In fact, they cannot be removed from a CD or DVD, in most cases, without destroying the media. At least with books, it may be possible to disable the tag (sometimes by cutting the antenna) and then put another RFID tag inside the book (being careful to place it where it won't interfere with the old tag). Replacing RFID tags is not something you want to do if you can somehow avoid it. See table 3.1 for a summary of these issues.

Standards provide insurance that a library's investment in technology will benefit it in both the short term and long term. Standards also help ensure that old practices don't restrict the ways that new technology is employed. While it is easy for libraries to use RFID tags as glorified barcodes (writing only the barcode number on the tag), it is an unnecessarily limited way to use the technology. Standards provide guidelines for extending the use of RFID tags for libraries as well as the other stakeholders who could also benefit from reading or writing data to the tags.

Standards that take the entire life cycle of a library item into account can help ensure that the RFID tags are usable at each stage (e.g., supplier, jobber, retail, library, used bookstore). Suppliers, distributors, and retailers of books can benefit from RFID tags in books as much as libraries can. However, how the supplier or retailer uses the tags will be very different from how a library uses the tags. For example, there may be fields that the retailers find very useful (e.g., Title) that a library would choose to leave blank to ensure patron privacy is protected.

Data model standards specify fields that should be left "unlocked" to give maximum flexibility to everyone in the supply chain. Once an item moves from manufacturer to jobber to library, the library should have the option to limit the data written to the tag as it sees fit, keeping in mind its commitment to protecting patron privacy. Similarly, the way a library uses the tag should not impede how others in the book industry choose to use the tag.

Libraries also benefit from having tags placed in books well in advance of arriving in the library. While moving through the supply chain, these tagged books can be more efficiently managed, thereby reducing everyone's costs. Also, upstream suppliers could provide information on the tag that supports the library's receiving workflows (e.g., Supplier ID and Order Number).

The History of RFID Standards and Policies in the United States

It has been a long road to a comprehensive US Data Profile that specifies the tag that should be used in library implementations (ISO 18000-3, Mode 1) and what elements should be used and how they should be encoded (ISO 28560-2). It is worth a quick review of some of the issues that have been raised along the way and how they have been addressed in the revised recommendations from NISO (aka US Data Profile).[1]

Book Industry Study Group RFID Policy Statement (2004)

In 2004, the Book Industry Study Group convened an RFID task force of organizations related to the creation, publishing, distribution, and retail sales of books and their use in libraries. The goal of the task force was to "develop guidelines that would reduce the potential for misuse of personal information and to avoid the loss of trust of consumers and library users"[2] as it pertains to the use of RFID technology. The task force released a policy statement in which it set out five RFID Privacy Principles:

1. Implement and enforce an up-to-date organizational privacy policy that gives notice and full disclosure as to the use, terms of use, and any change in the terms of use for data collected via new technologies and processes, including RFID.
2. Ensure that no personal information is recorded on RFID tags which, however, may contain a variety of transactional data.
3. Protect data by reasonable security safeguards against interpretation by any unauthorized third party.
4. Comply with relevant federal, state, and local laws as well as industry best practices and policies.
5. Ensure that the four principles outlined above must be verifiable by an independent audit.[3]

ALA Intellectual Freedom Committee Privacy and Confidentiality Guidelines (2005)

In 2005, the ALA's Intellectual Freedom Committee and the Office for Information Technology Policy developed "RFID in Libraries: Privacy and Confidentiality Guidelines" which were based on the work of a task force convened by the Book Industry Study Group but went further. The guidelines were adopted by ALA Council at ALA's 2005 Midwinter Meeting. The guidelines and best practices included:

1. Notify users about the library's use of RFID technology.
2. Label all RFID tag readers clearly so users know they are in use.
3. Protect the data on RFID tags by using encryption if available.
4. Limit the information stored on the RFID tag to a unique identifier or barcode.
5. Block the public from searching the catalog by the unique identifier.
6. Store no personally identifiable information on any RFID tag.[4]

NISO RFID Working Group Recommended Practices (2008)

In 2006, the NISO RFID Working Group on RFID in U.S. Libraries was formed to focus on the use and implementation of RFID technology in libraries. In 2008, the group formally published *RFID in U.S. Libraries,* a Recommended Practice of the National Information Standards Organization (NISO RP-6-2008).[5] The working group was composed of RFID vendors, software application providers, two librarians, and two BISG consultants. The document included recommended practices as well as a data model to facilitate interoperability between RFID vendors' solutions and also to facilitate use of the RFID tag across the entire life cycle of a book. Therefore, the proposed data model included fields for circulation, security, and ILL as well as fields that could be used by book publishers and others in the supply chain.

The first recommendation listed in this document was that tags should comply with the guidelines developed by the BISG working group, stating "in particular, ensuring that data relating to individual persons should never be recorded on item tags."[6] However, the document did not mention the best practices guidelines that had been adopted by ALA in 2005. In addition, the data model included options for including the owner library, shelf location, title, and "local data" fields and provided no mandates for how the local fields could be used. This caused some concern for privacy advocates.

Library Technology Reports Special Issue on Privacy, Chapter Six: "RFID in Libraries" (2010)

The November–December 2010 issue of *Library Technology Reports* focused on privacy and freedom of information. Deborah Caldwell-Stone authored chapter 6 focusing on RFID and privacy. In it, she states that the NISO recommendations and data model reflected the "needs of the commercial entities that make up the supply chain and not the needs and concerns of libraries and librarians."[7] She stated that librarians "should assume a leadership role in developing best practices and standards . . . for RFID as part of their ethical obligation to protect library users' privacy."[8]

NISO RFID Revision Working Group's Recommended Practice and US Data Profile for Public Comment (2011)

Also in 2010, a new NISO working group, the NISO RFID Revision Working Group, was formed to revise the 2008 NISO recommendations. The goals of the Revision Working Group were as follows:

- To review existing RFID standards, assess the applicability of this technology in U.S. libraries and across the book publishing supply chain, and promote the use of RFID where appropriate.
- To examine and assess privacy concerns associated with the adoption of RFID technologies in libraries.
- To investigate the way RFID may be used for the circulation or sale of books and other media in the United States and make recommendations.
- To focus on security and data models for RFID tags, along with issues of interoperability and privacy.
- To create a set of recommendations for libraries with regard to a tag data model and other issues, with the specific goals for this revision of:
    a. Reviewing and updating information in the original document.
    b. Ensuring conformance between the approved ISO standard and the NISO recommended practice.
    c. Creating a set of recommendations for a U.S. data model standard.
    d. Providing specific examples to make implementation easier for manufacturers and libraries.[9]

In April 2011, the group issued its revision for public comment. In this document, NISO recommended that the United States adopt ISO 28560-2 as the US Data Profile (application standard).

In the 2011 revision of the NISO recommendations, the Revision Working Group recommended that the US adopt ISO 28560-2 and provided guidelines for how to use each of the fields recommended for inclusion in the US Data Profile. The Working Group received "input from RFID hardware manufacturers, solution providers (software and integration), library RFID users, distributors, processors, and related organizations."[10] All participants in the supply chain (manufacturers, suppliers, distributors, libraries) had been taken into account, but the proposed standard applied primarily to libraries.

The revision refers to a checklist (for libraries and vendors) that can be used to evaluate the degree of conformance with the ISO 28560 standards,[11] a set of recommended practices and procedures to ensure interoperability among US RFID implementations, and a list of suggestions to reduce the impact of migrating from nonconforming systems to conforming systems.

NISO Finalizes US Data Profile—28560-2 (2012)

In March 2012, the RFID revision was adopted, thus establishing ISO 28560-2 as the US Data Profile. The final document was largely unchanged from the version released for comment. Both the revision and the final document included a description of all the data elements included in the data profile and made recommendations about how to use them.

The recommended practices were provided in order to promote procedures that would lead to installing the RFID early in the life cycle of the book. This way the tag could be used by publishers, distributors, and libraries (including for shelving, circulating, sorting, inventory, and security), as well as in interlibrary loan transactions. They also envisioned the tag being used in secondary markets such as secondhand books, returned books, and discarded or recycled books.

The hope is that the US Data Profile and associated recommendations will promote true interoperability between libraries. The Revision Working Group envisioned every library being able to use every other library's RFID tag regardless of the supplier, hardware, software, or ILS. They were attentive to the importance of protecting patron privacy while leveraging the technology. And they hoped the recommendations would lead to global interoperability and remain relevant and functional as the technology evolved.

The Revision Working Group supports most of the policy guidelines and best practices adopted by the ALA Intellectual Freedom Committee (IFC) in 2006; however, it does take issue with one recommendation. The IFC asserts that best practices dictate that only the barcode number should be stored on the tag. The Revision Working Group does not agree that only the barcode number should be stored on the tag. It does agree that no personally identifiable information should be stored on the tag, nor any transactional data regarding patron use.[12] The Group also suggests libraries blank out the Title and GS1-13 field if either has been used by upstream users (e.g., distributors).

While the Revision Working Group doesn't explicitly disagree with other IFC best practices, it would have been useful had it done so. For example, the IFC document encourages libraries to provide an RFID system from which a patron could "opt out." It isn't clear how this would protect patron privacy, because even if some patrons opted out (e.g., chose to use the barcode-only self check-out machines), the materials would still have RFID tags on them. The worry for privacy advocates is that someone will read the tag on a patron's in-circulation item, and using barcode-only equipment doesn't alleviate this concern.

Since 2006, the public's relationship to privacy has changed. Also, RFID technology has been widely adopted in many industries. And finally, with the latest standard, the AFI attribute is recommended. The AFI

Year	Libraries Worldwide Using RFID	US Library Activities	RFID Activities Worldwide
2003	100[*]	"RFID Technology for Libraries" (*Library Technology Reports*, Nov.–Dec. 2003) published.	ISO 15693 adopted. Walmart and Department of Defense request suppliers include RFID tags on pallets.
2004	>300[†]	BISC Policy Statement on RFID.	ISO 18000-3, Mode 1 adopted. FDA endorses use of RFID to combat drug counterfeiting.
2006		ALA IFC Privacy and Confidentiality Guidelines.	ISO 15692 Fixed Encoding Method (not library-specific) adopted. Gartner reports worldwide RFID spending expected to reach $504 million in 2005, $3 billion by 2010.[‡]
2006		Danish Data Model (DS/INF 163) for Libraries finalized.	EPC Gen2 standard finalized for UHF tags.
2007	600[§]		Defense Department stops requiring RFID tags on trucks and cargo; uses GPS and fleet management software instead.[‖]
2008		NISO RFID Working Group: Recommended Practice.	Gartner predicts worldwide RFID revenue will reach $1.2 billion in 2008; $3.5 billion by 2012.[#]
2009	1,500[**]		Worldwide RFID spending hits $5.56 billion.[††]
2011	2,400[‡‡]	ISO 28560 RFID for Libraries adopted. NISO tentatively recommends 28560-2 as US Data Profile.	IDTechEx predicts value of entire RFID market will be $5.84 billion in 2010.[§§]
2012	>3000[‖]	US Data Profile finalized.	IDTechEx report predicts 20 billion RFID tags annually will be required by apparel market alone within decade.[##]

[*] Richard Boss, "RFID Technology for Libraries," *Library Technology Reports* 39, no. 6 (November–December, 2003): 16. Boss reports that less than 200 libraries worldwide are using RFID. In his write-up on each of the RFID vendors including their customers, the list of US installations is well under 100.

[†] Scott Carlson, "Talking Tags," *Chronicle of Higher Education* 50, no. 48 (August 6, 2004): A29–A30. Over 300 in the US.

[‡] Gartner, "Gartner Says Worldwide RFID Spending to Surpass $3 Billion in 2010" (news release), December 13, 2005, www.gartner.com/press_releases/asset_141469_11.html.

[§] Richard Boss, "RFID Technology for Libraries," PLA Tech Notes, July 19, 2011, www.ala.org/pla/tools/technotes/rfidtechnology. Boss states, "By mid-2007, an estimated 600 libraries with as many as 850 facilities worldwide were using RFID systems. Those numbers had at least quadrupled by mid-2011 according to representatives of several companies contacted by the author."

[‖] Sandra I Erwin, "Tracking Military Supplies No Longer Requires RFID," *National Defense* (online magazine), May 2007, www.nationaldefensemagazine.org/archive/2007/May/Pages/TrackingMilitary2637.aspx.

[#] Gartner, "Gartner Says Worldwide RFID Revenue to Surpass $1.2 Billion in 2008" (news release), February 25, 2008, www.gartner.com/it/page.jsp?id=610807.

[**] Deborah Caldwell-Stone, "RFID in Libraries," chapter 6, in "Privacy and Freedom of Information in 21st-Century Libraries," *Library Technology Reports* 46, no. 8 (November–December 2010): 38. Caldwell-Stone states, "As of 2009, 1,500 libraries employ RFID applications in 2,500 facilities." Her source is an older version of the PLA Tech Note article "RFID Technology for Libraries" written by Richard Boss.

[††] Peter Harrop, "RFID - Progress in Mid 2009," July 9, 2009, http://www.printedelectronicsworld.com/articles/rfid-progress-in-mid-2009-00001508.asp?sessionid=1.

[‡‡] Boss, "RFID Technology for Libraries," PLA Tech Notes.

[§§] Raghu Das and Peter Harrop, RFID Forecasts, Players and Opportunities 2011–2012 (Cambridge, MA: IDTechEx, 2011), www.idtechex.com/research/reports/rfid_forecasts_players_and_opportunities_2011_2021_000250.asp.

[‖] "Description," in "RFID in Libraries," NXP website, www.nxp.com/applications/rf-identification/library.html#design-considerations. NXP states that over 3,000 libraries worldwide have introduced RFID to millions of customers.

[##] Peter Harrop and Raghu Das, Apparel RFID 2011–2012 (Cambridge, MA: IDTechEx, January 2012), www.idtechex.com/research/reports/apparel-rfid-2011-2021-000256.asp.

Table 3.1
Timeline showing library and worldwide RFID activities.

attribute adds an additional level of protection against unauthorized reading of the tag by readers outside of the library industry.

It is time for the IFC to update the best practices document so that it provides implementable recommendations that do not simply restate the library's traditional approach to protecting patron privacy but that take into account the privacy protections patrons expect and desire today. And it is important that those who develop the best practices have a

strong understanding of the benefits and limits of RFID technology in libraries.

Components of US Data Profile

There are many ways to implement ISO 28560-2. According to ISO 28560-2, only one field is mandatory, and the rest are optional. The ISO standard allows for some fields to be locked, and it provides some guidelines for how to use certain fields. When a field is locked, it cannot be changed. The advantage of locking a field is that it provides additional assurances that the tag data cannot be accidentally or intentionally modified. If a library has chosen to lock a field but then later needs to change the data, the tag will have to be replaced. The Data Profile includes specific recommendations for how the ISO standard should be implemented in the United States and when fields should or should not be locked.

Mandatory Data Elements

The US Data Profile includes two mandatory data elements: Primary Object ID (i.e., barcode) and Tag Content Key. The field Owner Library is also recommended. The reason Owner Library is recommended is that the combination of the Primary Object ID with the Owner Library provides for a nationally (and possibly globally) unique item identifier. This has ramifications for how the tags could be used to support ILL and resource-sharing workflows. The UK Data Profile, also based on ISO 28560-2, makes Owner Library mandatory (this is the only difference between the US and UK Data Profiles).

By limiting the mandatory fields to just the barcode number and tag content key, the Revision Working Group provided a way for libraries to continue to use the tags much like they do today. This minimalist approach provides an acceptable way forward for libraries for whom patron privacy concerns are paramount.

Optional Data Elements

There are 22 optional elements included in the US Profile (see table 3.2 for complete list). Two of the fields included in ISO 28560-2 have been excluded from the US Data Profile. These are MARC Media Format (in favor of the ONIX Media Format field) and Supplier Invoice Number (although Supplier Identifier and Order Number were included).

Fields Using ISIL Codes

Owner Library and ILL Borrowing Institution refer to ISIL codes. The ISIL Registration Authority will issue US libraries an ISIL code for the purposes of using the code on RFID tags. Alternatively, an OCLC code could be used, as these are ISIL-compatible. If the Owning Library or ILL Borrowing Institutions do not have an ISIL or ISIL-compatible code, the standard states that the Alternative Owner Library and Alternative ILL Borrowing Institution fields should be used instead.

Set Info

Set Info allows the library to encode information about multipart sets onto the tag. The field contains the total number of items in the set and the part number of the item to which the tag is affixed. Some libraries are already taking advantage of this data element.

Type of Usage

Type of Usage is a field that provides additional information about the intended use of the item. For example, an item can be tagged as a circulating item or as reference material or as adult material (e.g., R-rated movie). Using the tag this way would allow the circulation and security system to prevent a patron from checking out a reference book while the ILS was down or a teen from checking out an R-rated movie.

Title

It is unfortunate that the proposed data profile doesn't specify that Title should remain unlocked. If locked, information about the content of the tagged item is stored on the tag Title. None of the other fields contain any personally identifying information or even specific information about the content of the item, so even if they were locked, it wouldn't pose a particular privacy concern. Title, however, is a field that many libraries would choose to leave blank once an item goes into circulation.

UCC/ISBN/ISSN

Another field, GS1-13, raises the same concerns as Title. GS1-13, or the UCC Code, as it is known in the United States, can be used for the ISBN or ISSN by pre-pending "978" or "979" (ISBN) or "977" (ISSN) to the number. ISBNs are easy enough to associate with a particular title. While some libraries might want to use this field to provide additional services for patrons, many others will insist that this field be left blank on circulating material. Specifying that this field remain unlocked would have provided support for this latter group.

The ISBN could be used in interesting ways for library patrons. For example, electronic reader's advisory services can be provided based on the ISBN. Recommendations could be provided to patrons based on items they are checking out or returning or perhaps

Field	Category	Purpose/Codes	Locking
Primary Item ID	Mandatory	Item identification	Optional
Tag Content Key	Mandatory	Determining what other data is on the tag	No
Owner Library	Optional	Use ISIL Code (see ISO 15511)	Optional
Set Info	Optional	Item properties	Optional
Type of Usage	Optional	Coded list of type of item usage	Optional
Shelf Location	Optional	To support inventory (LC or Dewey call number)	Optional
ONIX Media Format	Optional	Item properties (ONIX code list)	Optional
Supplier Identifier	Optional	Acquisitions processing	Not recommended
Order Number	Optional	Acquisitions processing	Not recommended
ILL Borrowing Institution	Optional	Use ISIL Code (see ISO 15511)	No
ILL Borrowing Transaction ID	Optional	ILL transaction tracking	No
GS1-13 (UCC and ISBN)	Optional	Identification	Optional
Alternative unique item identifier (reserved)	Optional but should not be used until defined by ISO 28560	Identification	Not recommended
Local Data—A	Optional	For local or regional use	Optional
Local Data—B	Optional	For local or regional use	Optional
Title	Optional	Identification	Optional
Product Identifier (local)	Optional	Identification	Optional
Media Format	Optional	Item properties (no code list defined)	Optional
Supply Chain Stage	Optional	For multi-use (coded list)	No
Alternative Item Identifier	Optional	Item identification	Optional
Alternative Owner Library Identifier	Optional	Item identification (for codes not ISIL compliant)	Optional
Subsidiary of Owner Library	Optional	Item Identification	Optional
Alternative ILL Borrowing Institution	Optional	Support for ILL for non-ISIL code	No
Local Data—C	Optional	For local or regional use	Optional

Table 3.2
Fields included in US Data Profile based on ISO 28560, *RFID in U.S. Libraries.*

at a special Get Recommendations kiosk that could be used to find another book like the one they'd just enjoyed reading.

Each library will need to find the right balance between patron privacy concerns and providing convenient and expansive library services. The trend has been toward more convenience with much less concern about privacy, but this varies quite a bit from community to community.[13]

Shelf Location

The Shelf Location field can be used to specify where an item should be shelved. In addition to encoding the actual LC or Dewey number in this field, the library could also specify Adult Fiction or Entrance Display in this field. This field could be useful when sorting material based on information on the RFID tag. For example, the sorter could be programmed to sort all Adult Fiction to one bin and Entrance Display to another. While this is possible already, it requires the sorter to communicate with the ILS. With the information on the RFID tag, the additional sorting granularity could be accomplished independent of an ILS connection.

Fields Supporting Receiving Processing

Supplier Identifier and Order Number could contain data useful in the receiving functions of a library. If these fields are used, new items arriving at the library could be received without needing to individually scan each item. This would dramatically improve the receiving workflows in the library's technical services department.

Many libraries are already using EDI (electronic data interchange) in their workflows. EDI allows items to be ordered and invoiced electronically. Theoretically, receiving can also be performed electronically,

but it is usually implemented last (if at all). This is partly because libraries often receive partial orders and also because they feel more confident verifying that the packing slip actually matches what is in the shipment. Libraries are more comfortable unpacking the box, scanning in each item as received, and putting it on a book cart.

Using Supplier Identifier and Order Number, the library could receive all items in a box and verify the contents without actually having to handle each item or even opening the box. An RFID tunnel is a piece of equipment designed for this purpose and it is common outside of the United States. Only recently has one RFID vendor included an RFID tunnel in its product line for sale to US libraries.

Fields Supporting ILL Processing

Using ILL Borrowing Institution and ILL Borrowing Transaction ID could eliminate much of the paperwork and labor associated with performing ILL transactions. The ILL Borrowing Institution (perhaps in combination with other fields) can be used in sorting systems to route outbound ILL items to the appropriate delivery route and location (if part of a closed delivery system) or to the shipping department if the item needs to be sent out via a shipping service.

The ILL Borrowing Transaction ID represents the key to the entire ILL transaction in terms of both the borrowing and lending libraries' workflow. Whatever ILL software is used to initiate the transaction, the data is associated with a transaction ID. By writing that transaction ID to the tag, each library is freed from filling out paperwork that needs to travel with the item. Referencing the transaction ID in the shared ILL software would simply pull up all the pertinent information.

Local Data Fields

The proposed profile also includes three Local Data fields. These fields are there to provide even more flexibility for the library. The data model does not specify the size of these fields, so the library can really use them in whatever way it likes.

Supply Chain Stage

Many people involved in library RFID (this author included) hope to see tags placed in new items at the manufacturer stage so that they can be used for multiple purposes along the way. The Supply Chain Stage field exists to support this vision. Once an item becomes a library item, this field would be encoded with "64." The data model defines other numbers that are associated with other stages including manufacturer (16),

publisher (24), distributor (32), and jobber (48). This field is used so that fields can be interpreted correctly depending on where they are in the supply chain. For example, the Primary Item Identifier in a library is the library's barcode number. However, a book distributor may encode the EPC code as the Primary Identifier.

Subsidiary of an Owner Library

This field is to be used in addition to the Owner Institution field (or Alternative Owner Institution field). It does not use ISIL or ISIL-compatible codes. It can be a short alphanumeric string to identify individual outlets associated with a library. The expectation is that this field will be used to identify home branches for material owned by the Owner Institution. This field could also be used to support floating or rotating collections management.

Notes

1. NISO RFID Revision Working Group, *RFID in U.S. Libraries,* Recommended Practice of the National Information Standards Organization, NISO RP-6-2012 (Baltimore, MD: NISO, March 2012), v, www.niso .org/apps/group_public/download.php/8269/RP-6 -2012_RFID-in_US_Libraries.pdf.
2. Book Industry Study Group, *Radio Frequency Identification,* BISG Policy Statement POL-002 (New York: BISG, September 2004), 1.
3. Ibid., 2.
4. See "RFID in Libraries: Privacy and Confidentiality Guidelines," www.ala.org/offices/oif/statementspols/ otherpolicies/rfidguidelines.
5. NISO RFID Working Group, *RFID in U.S. Libraries,* Recommended Practice of the National Information Standards Organization, NISO RP-6-2008 (Baltimore, MD: NISO, December 2007), www.niso.org/publications/rp/RP-6-2008.pdf.
6. Ibid., viii.
7. Deborah Caldwell-Stone, "RFID in Libraries," chapter 6, in "Privacy and Freedom of Information in 21st-Century Libraries," *Library Technology Reports* 46, no. 8 (November–December 2010): 42.
8. Ibid.
9. NISO RFID Revision Working Group, *RFID in U.S. Libraries,* Recommended Practice of the National Information Standards Organization, NISO RP-6-201x, draft for public comment (Baltimore, MD: NISO, April 2011), iv, www.niso.org/apps/group_public/down load.php?document_id=6508.
10. Ibid.
11. Ibid. The checklist is available from http:// biblstandard.dk/rfid/docs/conformance_28560-2.pdf.
12. See section 6, "Privacy," in NISO RFID Revision Working Group, *RFID in U.S. Libraries* (March 2012), 36–38.
13. Anita L. Allen, *Unpopular Privacy: What Must We Hide* (New York: Oxford University Press, 2011).