

**Radio Frequency Identification RFID. Expert witness approaches  
RFID in Courts of Law and Data Privacy Authorities** <https://goo.gl/bQDcbh>  
Attorney at Law Avv. Achille Campagna [www.avvocatocampagna.com](http://www.avvocatocampagna.com) and  
Dr. **Miguel Gallardo @APEDANICA** Tel +34 902998352 [apedanica.ong@gmail.com](mailto:apedanica.ong@gmail.com)

## QUESTIONS FOR INTERNATIONAL RFID EXPERT WITNESSING

**What data can be stored into these tags? What technology would be necessary to read the tags, I mean could an end-user customer do it? And a shop owner?**

Considering Spanish authority (Agencia Española de Protección de Datos) [https://www.agpd.es/portalwebAGPD/canaldocumentacion/publicaciones/common/Guias/Guia\\_RFID.pdf](https://www.agpd.es/portalwebAGPD/canaldocumentacion/publicaciones/common/Guias/Guia_RFID.pdf)  
and Italian Garante GUIDE <http://www.garanteprivacy.it/documents/10160/10704/1382767>

FUNDAMENTALS AND GENERAL CONCEPTS FOR EXPERT WITNESSING ANALYSIS ON RFID RISKS  
SECURITY (ENHANCED PREVENTION SECURITY OR CRIMINAL USES FOR SMART FRAUDS AND NON  
AUTHORIZED USE OR HACKING OR FARADAY JAILS).

[RFID Can Be Hacked: Here's How, & What You Can Do To Stay Safe](#)

PRIVACY (GOVERNMENT AUTHORITIES, CIVIL ACTIONS OR CRIMINAL CASES)

RELEVANT SPANISH DATA PROTECTION REAL CASE AGAINST RFID (CAIXA CARDS FOR E-BANKING)  
[http://www.agpd.es/portalwebAGPD/resoluciones/recursos\\_reposicion/rr\\_sobre\\_procedimientos\\_sancionados/res/common/pdfs/REPOSICION-PS-00002-2015\\_Resolucion-de-fecha-24-09-2015\\_Art-ii-culo-9-LOPD.pdf](http://www.agpd.es/portalwebAGPD/resoluciones/recursos_reposicion/rr_sobre_procedimientos_sancionados/res/common/pdfs/REPOSICION-PS-00002-2015_Resolucion-de-fecha-24-09-2015_Art-ii-culo-9-LOPD.pdf)

AT THIS MOMENT RFID IS MENTIONED IN 14 JUDICIAL SENTENCES IN SPAIN, MOST OF THEM ON  
LABOUR CONFLICTS. SEARCH RFID AT <http://www.poderjudicial.es/search/indexAN.jsp>

IN ENGLISH, IT CAN BE INTERESTING TO SEARCH IN GOOGLE PLAINTIFF rfid ext:pdf AND KEY WORDS  
(many related with patents and industrial rights conflicts and licenses on RFID technology advances)

## EXPERT WITNESS ANSWERS TO LAWYER QUESTIONS

### - **What data can be stored into these tags?**

No one strictly personal. Personal data checking must be beyond the reading system with access control to sensitive databases. The best option is to codify everything in every tag, even using cryptography algorithms. Ref. **International Journal of RFID Security and Cryptography (IJRFIDSC)** <http://infonomics-society.ie/ijrfidsc/>

**RFID** links with credit cards ID or any personal data must be protected, and very carefully in health applications. No patient or personal illness must be identified. Privacy authorities can stop and bill any RFID application in Europe, and labour unions can use it to protect labour rights of employees. Many labor trials are much more complex and expensive if there is any chance to question or claim about RFID. **We recommend to study country by country and case by case jurisprudence.**

**- What technology would be necessary to read the tags, I mean could an end-user customer do it? And a shop owner?**

RFID applications must be functionally well designed, and at least, have permissions configured in software. For instance, if a relational database with SQL instructions (ORACLE, MyBase, IBM DB2, MS SQL server), GRANT and REVOKE access permissions for individual users or groups must be strictly controlled and recorded. Any RFID proprietary software solution can be configured, but if the application has been programmed with no customer control, anything can happen if the programmer is smart and malicious (back doors, companies directives and/or employees and/or suppliers and/or customers hidden frauds and so on). Company dependency on RFID providers can very sensitive and any change expensive and dangerous.

**- RFIDs may be subject to special regulations/requirements on radiofrequency?**

Yes. there are Spectrum limits and recommendations. Governments should encourage and facilitate RFID applications when considering spectrum licensing and allocation. Governments, manufacturers, standardisation bodies and other stakeholders should co-operate at international level to ensure interoperability, to consider harmonisation of frequency bands as appropriate, to limit harmful interference with other radio devices and users, and to ensure that devices operating within the specified frequency bands comply with the electrical power, radio standards and policy set for those systems, and encourage the development of internationally compatible applications. The exemption of licenses for frequency usage in RFID applications is a recognised licensing option, and is known to be a driver for RFID technology adoption.

See more at <http://www.oecd.org/sti/ieconomy/40892347.pdf>

<http://www.rfidjournal.com/site/faqs>

**Do all countries use the same low-, high and ultra-high frequencies?**

Most countries have assigned the 125 kHz or 134 kHz area of the radio spectrum for low-frequency systems, and 13.56 MHz is used around the world for high-frequency systems. But UHF RFID systems have only been around since the mid-1990s and countries have not agreed on a single area of the UHF spectrum for RFID. Europe uses 868 MHz for UHF and the U.S. uses 915 MHz. Until recently, Japan did not allow any use of the UHF spectrum for RFID, but it is looking to open up the 960MHz area for RFID. Many other devices use the UHF spectrum, so it will take years for all governments to agree on a single UHF band for RFID. Government's also regulate the power of the readers to limit interference with other devices. Some groups, such as the Global Commerce Initiative, are trying to encourage governments to agree on frequencies and output. Tag and reader makers are also trying to develop systems that can work at more than one frequency, to get around the problem.

**- How does it work with WIFI for example?**

Examples can be very simple prototypes up to smart city technologies using state of the art approaches. We recommend (and update with state of the art advances)

*“A Study of Wi-Fi RFID Tags in Citywide Wireless Networks How well do Wi-Fi RFID tags work in outdoor Wi-Fi networks and is it possible to build commercial services based on Wi-Fi RFID tags in citywide wireless networks?”* by Henrik Ljøgdø Moen at <http://www.diva-portal.org/smash/get/diva2:347512/FULLTEXT01.pdf>

## - An International company using RFID successfully and risks

In Spain, the most famous is Zara on [Share capital - inditex.com](#)  
Inditex seems to avoid to inform RFID details. There are some local newspapers trying to discover Zara RFID secrets. For instance

[Quién controla el RFID de Inditex - Modaes.es](#)

1 oct. 2014 - En España, Reino Unido y Portugal, todos los establecimientos Zara ya operan con RFID. El objetivo del grupo es expandir la herramienta a ...

[El secreto de Zara para controlar stock: etiquetas RFID ...](#)

19 abr. 2015 - Las etiquetas RFID sirven para identificar cada prenda, permitiendo localizarlas durante todo el proceso de distribución y venta

However, there is no secret at all but a company RFID oriented philosophy and long time investments. INDITEX publish very detailed documents about

[RFID PROJECT - News - inditex.com](#)

[https://www.inditex.com/documents/10279/32381/RFID\\_esp\\_low.pdf/3cd4a31b-600c-4879-a61e-49a302ee8db7](https://www.inditex.com/documents/10279/32381/RFID_esp_low.pdf/3cd4a31b-600c-4879-a61e-49a302ee8db7)

And there are clearly RFID promotional explanations at

[Inditex CEO Announces RFID Expansion Plans - RFID Journal](#)

17 jul. 2014 - Already using **RFID** at 700 of its **Zara** stores, the **company** expects to ...**Zara** sales associates use a handheld **RFID** reader to take **inventory** of .

And there are news about their suppliers like this ones

[Checkpoint Systems Implements RFID at Inditex Distribution](#)

[Tyco Wins Chain-wide Contract From Inditex - RFID Journal](#)

[RFID Rollout at Inditex - GS1 Germany](#)

**OTHER COMPANY SUCCESS:** RADIO FREQUENCY IDENTIFICATION (RFID) IN HEALTHCARE BENEFITS, LIMITATIONS, RECOMMENDATIONS, RECOMMENDATIONS A HIBCC White Paper HIBCC White Paper  
<http://www.hibcc.org/publication/view/rfid-in-healthcare-benefits-limitations-recommendations-complete-white-paper/>

**RISK: Discovering Suppliers' Customers by means of Statistical Disclosure Attacks**

<http://infonomics-society.ie/wp-content/uploads/ijrfidsc/published-papers/volume-3-2014/Discovering-Suppliers-Customers-by-means-of-Statistical-Disclosure-Attacks.pdf>

There are not general solutions for RFID security. Risks are “ad hoc” problems.

## **Resources and suppliers**

Industrial rights are very conflictive in RFID. Many problems can become from providers litigations. **We recommend open and clear industry standards.** Very advanced systems and devices ahead of RFID standards can be useless quite soon.

### [What Are the Leading RFID Companies? - Ask The Experts](#)

RFID hardware to read tags is available from many sources, with or without software. Complete applications and devices from the same provider can be found for instance at <https://kathrein-rfid.de/en/home.html>

<http://www.gunnebogateway.com/wp-content/uploads/2015/04/RFID-Catalogue.pdf>

WI-FI RFID READERS <http://www.atlasrfidstore.com/wi-fi-rfid-readers/>

ThingMagic Astra-EX Integrated RFID Reader - Wi-Fi

Wifi Rfid Reader - AliExpress.com

WiFi NFC/RFID Reader - Tracient Technologies

[Wi-Fi Location-Based Services 4.1 Design Guide - RFID Tag](#)

Industrial RFID devices (only hardware with no software)

<http://www.balluff.com/balluff/MUS/en/products/overview-industrial-rfid.jsp>

Very cheap RFID hardware elements can be found at AliBaba e-commerce site

[http://www.alibaba.com/trade/search?fsb=y&IndexArea=product\\_en&CatId=&SearchText=rfid](http://www.alibaba.com/trade/search?fsb=y&IndexArea=product_en&CatId=&SearchText=rfid)

**RFID forecastings:** [Global RFID Market 2015-2020 - Readers, Tags, Software](#)  
... [Global RFID in Healthcare Market Analysis 2015-2019](#)

**We RECOMMEND:** **Securing Low-cost RFID Systems: A Research Survey**

<http://infonomics-society.ie/wp-content/uploads/ijrfidsc/published-papers/volume-3-2014/Securing-Low-cost-RFID-Systems-A-Research-Survey.pdf>

**We RECOMMEND** RFID Software Interface Standards (White paper)

[http://www.intermec.com/public-files/white-papers/en/RFIDSfwStandards\\_web\\_wp.pdf](http://www.intermec.com/public-files/white-papers/en/RFIDSfwStandards_web_wp.pdf)



**Radio Frequency Identification RFID expert witness approaches  
RFID in Courts of Law and Data Privacy Authorities**

Attorney at Law Avv. Achille Campagna [www.avvocatocampagna.com](http://www.avvocatocampagna.com) and

Dr. **Miguel Gallardo** @APEDANICA Tel +34 902998352 [apedanica.ong@gmail.com](mailto:apedanica.ong@gmail.com)

<https://docs.google.com/document/d/18QZgrulSV-0nFNyYS26W53tP0T6TWoTaYHjQ4wZYNNQ/edit>