Experiences with electronic identification in the companion animal market in Europe

Sven Hüther, Planet ID GmbH

Introduction

The electronic identification of animals only makes sense if there is a world-wide standard for coding and communication. This task has been fulfilled with the ISO norms 11784 and 11785 which have been in force since 1996. Several EC regulations as well as National laws have been established, based on the standards mentioned above. The market which has the highest number of identified animals with a transponder is the pet animal market. As this was the first market with big volumes, today we have a lot of experience gained in this sector.

Maybe it is superfluous to start with the definition of the identification products but as we hear a lot of different names for the animal's identifier, it is important for me that we use the same terms to avoid misunderstandings.

The product is always called the transponder when the 3 components Microchip, Antenna and surrounding material are assembled to a product to identify animals. The microchip is only part of it, as communication is not possible without antenna. The surrounding material is needed to protect the electronic components.

Microchip and code according to 11784:

At the time of the creation of the ISO standard and of the EC regulations only laser programed silicon was available. The ISO 11784 code was unchangeably programed in the chip at wafer level. Today, the majority of transponders are made of OTP silicon. OTP means One Time Programmable, the code might be entered at any time during production and the chip has then to be locked. The transponder is built without programing the chip according to ISO 11784. The code can be programed at any desired time during or after manufacturing.

The wafer is the first production step of the transponder. Depending on the size of the silicon chip there can be up to 20.000 chips on one wafer. In former times, with the laser programed silicon, sorting of transponders or producing sequential numbers was not possible, or better said, not economic.

The silicon chip has a minimum of 128 bits of which 64 bits are used for the code structure according to ISO 11784. The structure of the table in ISO 11784, as it is published in the ISO document, can confuse as the bit 1 usually is the bit 63, as it is the last programmed and the first bit to be read in ISO 11784.

I want to concentrate in this scheme on the use of bit 1, the animal bit, bit 17 to 26, the country code bits and bit 27 to 64, the unique or National ID code as well as on the amendments, which were created with the reserved bits.

It is important to set the animal bit correctly (bit 1 = 1) as there are industrial applications like the waste management industry in Germany which uses the standard ISO 11784 (bit 1 = 0) as well and the code only varies in the bit 1. If in the animal transponder the bit 1 is not set on 1; this has consequences for the readers according to ISO 11785 and to ISO 24631-6. They will either not display the code at all and then they need to clearly indicate "no animal code" or the code is being displayed and it has to be clearly indicated "industrial code".

From amendment 1 the retagging counter is important for livestock animals, companion animals won't use it. Amendment 2 regulates bit 15 which is needed for future transponders according to ISO 14223.

The animal code to be displayed on a hand held reader contains 15 digits of which 3 are either the ICAR issued manufacturer code or the country code according to ISO 3166. As there is no country with a code above 899 the manufacturer codes are all in the 9XX range. The 12 following digits are either the unique Animal ID Code or the unique National ID Code.

- Where issued transponders contain a manufacturer code, the manufacturer is the responsible party for the guarantee of the uniqueness of the issued transponder code.

- Where issued transponders contain a country code, the country, specifically the National Authority, is the responsible party for the guarantee of the uniqueness of the issued transponder code and to also ensure duplication of transponder codes does not occur. As such, it is therefore not the responsibility of the manufacturer to provide this guarantee, but rather the country.

- The aforementioned points are of acute and particular interest in countries where the responsibility for the identification of various animal species is not assigned to an individual Ministry.

In the last years the market has become much bigger, whilst in the early years there were around 15 to 20 companies, most of them actively working in the standardisation procedure. Today we have 120 companies, 54 with a full manufacturer code (987 – 934) and 66 with the shared manufacturer code 900 (a 3 digit allocation code has to be used in the animal ID and a range of 1 million codes is allocated to this 3 digit code). This number of codes goes from 900 ZZZ 000 000 000 to 900 ZZZ 000 999 999.

When purchasing products to identify animals, it is important to work with manufacturers who take care of their responsibilities, as there is a lot of work which is not obvious in the product itself. The company needs to have the product tested to get an ICAR manufacturer and product code. This so called conformance test according to ISO 24631-1 has to be conducted for each product to be sold. A positive result will be published on the ICAR website. Consequently, **ALL** products which are not listed on the ICAR webpage are not approved for animal use.

Part of the conformance test, since 2004, is the code of conduct which contains the rules to be respected and to be signed. A company database has to be maintained to guarantee each single production step and particularly the uniqueness of the produced codes. If a company uses OTP silicon, the ISO 11784 code must be stored in the manufacturer's data base together with the UID (serial number of each single chip) as this is the only way to guarantee uniqueness.

It has taken many years for the administrative basics to be put in place and during the same time technical improvements and developments have made major advances which require adaptation of the administration. This is an imbalance as the development of technology runs faster than the development of administration.

Unfortunately, our experience over the years has shown quite a chaotic picture across the companion animal transponder market in Europe and it is of great importance to take into consideration that all problems arising with wrong codes will become a problem for the animal and its owner. These problems arise as either the politicians have not taken the needed decision, techniques are more advanced than administration or companies have not taken care of their responsibilities. Which of these is the case does not matter for the animal and its owner.

When analysing registration data I have found various types of wrong animal transponder codes including: senseless codes, no animal codes, double codes, missing product codes, and wrong allocation codes in the shared manufacturer code. This is the result of a lack of harmonised regulation and coordination.

Several times we have seen official, proven cases of double codes with 2 different animals carrying the same transponder number. The responsibility is on the side of the country if the country code is used. The conditions for the use of country code officially is the allocation of a manufacturer and equivalent product code which is to be used to ask the National Authority how to handle the country code. This means the potential manufacturers addresses to ICAR and tests his transponders in an ICAR accredited laboratory. He then receives from ICAR the ICAR manufacturer code as well as the test results and the product code. With these documents the manufacturer who wants to use a country code, which is always the proper property of a country, needs to address to the National Authority to get information how to use the country code in the National identification scheme.

The manufacturers with a full manufacturer code have a total of 274.877.906.944 (2^{38}) numbers and can easily be distinguished in the manufacturer code itself as long as no fraud happens.

It is quite complicated to distinguish the manufacturers with a shared manufacturer code. They have the manufacturer code 900 in common and in addition a 3 digit allocation code in the animal ID number. 1.000.000 codes from 900 ZZZ 000 000 000 to 900 ZZZ 000 999 999 (ZZZ = ICAR issued allocation code) will be allocated to him. In this case the manufacturer's use of the country code of the Ukraine was unauthorised and

the programed number conforms to ISO 11784 but it is not a valid animal transponder.

As Germany is one of the biggest markets and as there is no regulation for companion animals, all possible wrong codes can be found in the most important German pet data base Tasso (member of EPN). All 3 digit allocation codes for the shared manufacturer code 900 are pair numbers except one. When analysing the registration data of the data base Tasso we found manufacturers with a shared manufacturer code and a non-existing 3 digit allocation code, which means the manufacturer of these transponders can neither be distinguished nor traced.

There are also senseless codes registered as in the sample where it seems as if one has been trying to program the German telephone number in the code (usually 0049), but unfortunately, these people have not understood ISO or/and have never read any relevant document, sometimes there might also be a lack of understanding the language.

Programing a code according to ISO 11784 is always the task of the ICAR approved manufacturer and not of any user or distributor. 049 as are a lot of other codes are not valid country codes according to ISO 3166. Until today in Germany the country code used for electronic identification is only regulated for horses, sheep and goats, and the structure for cattle as well. This is regulation according to the National law VVVO (Viehverkehrsverordnung), which is the responsibility of the Ministry of Agriculture and does not extend beyond agricultural animals. As in the German federal system the responsibility for the different animal species varies between Ministries and in addition between National and Regional levels (Länder) there has been a lack of coordination and communication concerning the identification of animals. The ideal situation is a specified, common regulation on EC level.

EC 998/2003 and National rules

The EC 998/2003 regulates the travelling with pets for non-commercial reasons in the European community. The animal has to be accompanied by an EU Animal Passport which is linked to the transponder according to ISO 11784. If the transponder is not ISO compliant the pet owner has to bring the equivalent reader to read the code for control purposes. There is no common way of printing, issuing and monitoring of the passport system in the member states. The best pet passport comes from Switzerland (non EU country) which has integrated a field for the database, in which the animal is registered. In Germany the Vets are requested to stamp the barcode for the prevention of changing the sticker. In Belgium there is a new way with full page stickers for the whole EU passport page.

There is no common use of a transponder code structure in the frame of ISO 11784 nor is the use of the country code specified in detail for harmonised use across Europe. It will be impossible to transfer all the expertise required to understand the details of a code, to be able to distinguish between correct and fraud. How will a disease eradication programme or a successful prophylaxis as well as a successful milk control work, if the

basis of all, the pure animal ID, is not trustworthy? How can this work be done effectively at border, customs or transport control stations?

According to EC 998/2003 the registration of companion animals is not mandatory, but the major reason to identify the animal for the pet owner is the reunification when lost and found. So it is the best way to take care of the registration of the animal and owner in a database which is a member of a database network on European level (like European Pet Network, EPN, and www.europetnet.com).

In the United Kingdom DEFRA has strictly forbidden the use of the British country code for pets to prevent eventual duplication with other animal species. For Belgium it is the same situation. Nevertheless there is unauthorized use of the country code in Belgium without consequences.

Switzerland has a safe and monitored system, where the ICAR manufacturer code is written in the Animal ID number. Uniqueness is being checked on the National pet database ANIS (member of EPN).

Denmark has a structured scheme which is very close to that in place in the Netherlands, where the country allocation code is 991 – the ICAR manufacturer code on position 5 and 6. Position 4 will then be a 2 for the delegation of the responsibility for the uniqueness of the codes back to the manufacturer.

The French Government has decided to require that all pets born in France are identified with a transponder with the French country code within a very well structured and regulated system. To enter the market, players must go through a harmonization procedure with the DGAL (Ministry of Agriculture, France) which allows fraud to be detected very quickly. It is the safest system around, as the responsibility for pets, as well as agricultural animals, is coordinated by a single authority at the National level. The position 4 and 5 will be programed with a species code and position 6 and 7 with the homologation code given by the French Ministry of Agriculture. Nevertheless there are still gaps to be filled with the technical improvements of the RFID products. The homologation code is the 2 digit code given by the National Authority for having successfully passed the homologation procedure (tests, documents etc).

From a Veterinary Practitioner point of view it doesn't make sense to distinguish the animal species with a special species code as this ends in identifying animals with transponders where the chip number is wrong. Obviously it is very important to always be able to detect and distinguish the manufacturer in the chip code.

Unfortunately only a few countries have established a system for the use of the country code. This is the reason why transponders are wrongly programed, which will cause problems in the future, and the countries often are not aware of their responsibility.

Conclusions

The administration needs to catch up the technical improvements right in time to have always technical adapted regulation as particularly in the electronics there is always an on-going work, which might have major influence in the desired aim of a Government.

This is partly related to a lack of application homogeneity, to a lack of coordinated rules and consequences. There are countries with a kind of over-regulation like France with expensive regular tests which are partly superfluous, but, better than no regulation at all. For the animal owner, as well as for the animal, it is necessary that rules will be established to protect them. All problems being created in the identification sector lead to a problem which concerns the animal and its owner.

My personal experience is that a lot of people, major decision makers, those responsible for tenders, and control etc., are, in most cases, not interested in technical details. But we are dealing with technology and so we need to look a little closer at the details of the standards and in particular at the code structure of ISO 11784. When the standard was finalized, there was only laser programed silicon available and the regulations, laws, required tests etc. were based on the existing technical parameters.

All in all, the market is still young and has shown sufficient experience to be able to establish a simple, cost effective procedure across the EC on behalf of the consumer and his/her pet, an industry which represents a turnover of **13,5 billion €** (www.fediaf.org).

An authority across Europe which has the power to support and to control the EC member-countries could be the tool of choice. A consulting group in the name of the EC could help the member countries to establish a uniform and well understandable system.