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ScotEID information on Low Frequency Advanced Transponders **18/02/2015**

1. The proposed updating of LF standards through ISO14223 reflects acknowledgement of advances being made in LF technology. In particular, the addition of anti-collision capabilities and extended data storage in the form of "Advanced LF Transponders". During December 2014 ScotEID carried out an evaluation using Texas Instruments Advanced HDX transponders read with an Agrident 550 fixed reader configured to read anti-collision. As a result of the testing ScotEID has several reservations about the suitability of LF Advanced Transponders for livestock identification.

2. Firstly, testing has revealed unexpected tendencies to produce "ghost" misreads. A ghost read being numbers-reads from the transponder that do not exist. Industry contacts have, informally, attributed this to a "bug" in a "beta" release of the silicon.

3. Secondly, although the addition of extended data storage has potential for holding data in addition to the animal ID, the speed at which LF can transmit the data is slow. Tests suggest that reading the extended memory of an Advanced Transponder takes approximately 3.5 seconds to read 40 bytes. In addition, reading the ISO11784 number (non-extended memory) on an Advanced transponder takes around one second when operating in anti-collision mode when other Advanced transponders are in the read field; approximately ten times longer than expected for a Conventional LF transponder. This will be problematic as animals will require to be held longer in a precise position in order for the transponder to be read. The data rate is proportional to the frequency used.

4. Thirdly, although anti-collision properties are desirable, ScotEID tests confirm that problems arise when Conventional and Advanced LF transponders are present within the read field at the same time. Specifically, neither transponder can be read by an advanced reader if both types of LF transponder are present (turning anti-collision off rectifies this, but rather defeats the object of having Advanced LF). Given that all LF transponders currently in use lack anti-collision properties, the introduction of Advanced LF transponders and readers will lead to a mix across the industry and thus potential systemic read failures, confusion among users and additional capital requirements to replace existing equipment. The dairy sector where conventional LF transponder collars are used for parlour identification, automated feeders and robotic milking machines might be particularly affected.

5. Finally, the technical advances offered by Advanced LF transponders do not (indeed cannot) offer an extension of the distance over which LF transponders can be read. Tests suggest that Advanced LF transponders have a shorter reading distance than Conventional LF transponders – c.50cm vs. c.70cm - with a fixed reader at optimum orientation. Although this limitation may be addressed in future releases, fundamentally, the reading distance of LF is constrained by reliance on near-field, magnetic signals. This matters because reading distance affects not only management convenience but also animal welfare and staff health & safety since it determines the need to restrain cattle and/or to use handheld reading equipment in close proximity to animals' eyes.

6. In summary, the introduction of Advanced LF transponders does not address industry preferences for faster reading at greater distances, and may actually reduce LF EID performance. Moreover, its introduction is likely to confuse users and will incur additional capital costs.