Standard Operating Procedure

Ring Test Measurements – Sample Device Distribution

PURPOSE:

All ICAR approved laboratories must participate in annual ring test measurements. This ensures devices tested at any ICAR approved laboratory will receive comparable test results. This Standard Operating Procedure (SOP) outlines the procedures by which ICAR approved laboratories choose the sample device type and then conduct the necessary quantity of test measurements to provide an accurate summary of their individual lab results. ICAR can then review these results to measure overall uniformity between ICAR approved laboratories.

Note: It is automatically assumed within this SOP that the current versions of ISO 24631-1 and ISO 24631-3 are the ISO standards used for conducting the tests pertinent for the Ring Test measurements.

PROCEDURE:

- 1. Four RFID device types are chosen of which
 - (a) two types are HDX and two are FDX-B
 - (b) every one of the two HDX and FDX-B types have a ferrite coil and an air coil.

Thus a total of 20 samples will be chosen consisting of:

- (a) 5 FDX ferrite coil
- (b) 5 HDX ferrite coil
- (c) 5 FDX air coil
- (d) 5 HDX air coil
- 2. All samples will be circulated to the ICAR approved laboratories for the Ring Test measurements in the following order: IMA DLG SAIT IMA. Test duration shall not exceed a four weeks period.
- 3. The measurements are obtained and recorded in three trials for each sample device. Between the trials the samples are completely removed from the Helmholtz coils and test fixtures.
- 4. The measured parameters will consist of:
 - (a) Ambient temperature [°C] and relative humidity [%]
 - (b) Code structure details: ID code (D)¹, Country code (D), Data blog flag (B)¹, Retagging counter (D), User information field (B), Reserved field (B), RUDI bit (B), Animal bit (B), CRC (H)¹
 - (c) Resonance frequency [kHz], sidebands high/low [kHz]
 - (d) Minimal activating magnetic field strength [A/m]
 - (e) Modulation parameters:
 FDX-B mode: Modulation amplitude U_{MA} [mV], bitlength [μs], bitlength stability [μs] at 0.6, 1.2, 5 and 10 A/m,
 HDX mode: Modulation amplitude U_{MA} [mV], frequency '0' and '1' [kHz], frequency stability '0' and '1' [kHz] at 0.6, 1.2, 5 and 10 A/m
- 5. On completion of measurements, each laboratory will send a summary of results to the chair of ICAR SC utilising the ICAR Ring Test Sample Device Measurement Template as outlined in Annex 1.
- 6. The ICAR SC chair will keep the Ring Test results confidential until each laboratory has submitted the report and any irregularities, mistakes or concerns are communicated and cleared with the respective lab manager. The reports representing the labs' best effort will be released to all labs by the ICAR SC chair.
- 7. At the invitation of the ICAR SC chair a teleconference will be organized to discuss the Ring Test results.

¹ D = decimal; B = binary; H = hexadecimal

Standard Operating Procedure Ring Test Measurements – Sample Device Measurement Template

Annex 1: Measurement template

HDX mode:

Туре	ID code	Country code	Data blog flag	Retag counter	User info	Reserved field	RUDI bit	Animal bit	CRC	Resonance frequency	Sideband high	Sideband low	Min. activ. field strength
	D	D	В	D	В	В	В	В	Н	[kHz]	[kHz]	[kHz]	[A/m]
air coil													
ferrite coil													

Туре	Field strength	Modulation amplitude U _{MA}	Frequency '0'	Frequency '1'	Frequency stability '0'	Frequency stability '1'
	[A/m]	[mV]	[kHz]	[kHz]	[kHz]	[kHz]
air coil	0.6					
	1.2					
	5.0					
	10.0					
ferrite coil	0.6					
	1.2					
	5.0					
	10.0					

FDX-B mode:

Туре	ID code	Country code	Data blog flag	Retag counter	User info	Reserved field	RUDI bit	Animal bit	CRC	Resonance frequency	Sideband high	Sideband low	Min. activ. field strength
	D	D	В	D	В	В	В	В	Н	[kHz]	[kHz]	[kHz]	[A/m]
air coil													
ferrite coil													

Туре	Field strength	Modulation amplitude U _{MA}	Bitlength	Bitlength stability
	[A/m]	[mV]	[µs]	[µs]
air coil	0.6			
	1.2			
	5.0			
	10.0			
ferrite coil	0.6			
	1.2			
	5.0			

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10.0		