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## Axia Whitepaper on Orientation Positions for Testing: Orientation Testing on Pharmaceutical Syringes

The Axia Institute, January 2023 | By Dr. Bahar Aliakbarian and Ethan Claucherty

### Abstract

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This case study conducted by the Axia Institute aims to provide testing protocols and determine the effects of sample orientation and drug formulation on the readability of RAIN RFID-tagged syringes. The experiment was inspired by the GS1's S Grade Testing Protocol in the Tagged Item Performance Protocol (TIPP). Testing was performed on three different orientations of two unique drug-filled RAIN RFID-tagged syringes and compared them with the same syringes filled with water to see the various effects that orientation and drug formulation would have on tag readability.

The study reveals that different sample positions and different liquid formulations have an impact on the sensitivity and backscatter results. Orientations with the plunger up provided results that were consistent, repeatable, and faster which makes this orientation the preferred choice for testing and verifying the tag readability at multiple testing facilities.

The study's results will help professionals repeat and validate tag performance using a standardized approach, although it does not reveal the nature of the drug formulation and the RAIN RFID tag design that was embedded into the syringes. These preliminary results can guide future research to develop new pharmaceutical grades that align with GS1's TIPP guidelines.