Requirement Document for the Development, Production, and Integration of infrared-sensitive phosphor tailored Taggant-Embedded Printing Ink for security marking applications.

1. Introduction

The growing incidence of counterfeiting and forgery has intensified the demand for advanced security features in public documents and critical products. Conventional measures—such as design/print-based features, holograms, and ultraviolet (UV) security—though effective, are now widely accessible and vulnerable to duplication. To stay ahead of counterfeiters, innovative, covert, and technologically advanced solutions are essential.

2. Objective

The objective is to develop, produce, and integrate infrared-sensitive phosphor–tailored Taggant-Embedded Printing Ink for high-security marking applications. The technology should enable:

- Invisible and covert security marking.
- Non-clonable authentication features.
- Contactless and distance-based detection methods.

These features are critical for mission-sensitive and high-security applications.

3. Scope of Work

3.1 Development of IR-Sensitive Taggant Ink

The ink should be engineered with the following features:

- Enhanced Security via Multi-Band Decay Signatures – Multiple emission bands with distinct decay times, providing unique fingerprints for authentication.
- High Brightness & Optical Performance – Ensures detection in varied lighting and environmental conditions.
- Optimized Particle Size (<2.5 μm) – Seamless integration with inks, coatings, and polymers; improves durability and print quality.
- Customizable Emission & Tunable Decay – Allows multi-tiered, client-specific security configurations.
- Indigenous Development (Make in India) – 100% designed and manufactured in India for cost-effectiveness and supply-chain security.

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- Long-Term Stability – Resistance to humidity, UV exposure, and temperature variations.
- Distance-Based & Contactless Authentication – Detectable above 2 cm height using IR light at 980 nm.
- Audible Verification – Beep or "OK/Pass" signals for quick field authentication.
- Exclusive Forensic Readability – Readers must reject taggants from non-authorized sources.

3.2 Production & Supply of Taggant Ink

Vendors must demonstrate in-house capacity to produce bulk quantities of visible and invisible inks with the following properties:

- Compatibility with Letterpress, Flexo, and Offset printing.
- High mileage, excellent lightfastness (Blue Wool Scale > 5), and fast drying.
- Vegetable-based formulation (>70% renewable content, free from mineral oils).
- Resistance to alkali and soap.
- Stable storage between 5 °C and 35 °C under ambient conditions.

3.3 Design & Development of Taggant Readers

A compact, handheld detection device must be developed with:

- Excitation Source – IR light (980 nm, LED-based).
- Indicators – Visual (LED) and audible (beep/pass signals).
- Detection Capability – Non-contact authentication at ≥2 cm distance.
- Form Factor – Portable, lightweight, and rugged for field use.
- Performance – Rapid, reliable on-site authentication of tagged prints.

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4. Eligibility Criteria

No	Requirement	Document required
1	Bidder/vendor must be a company or firm registered in India, recognized as a **startup under Kerala Startup Mission**	Certificate of Incorporation/Registration
2	GST registration and PAN	Copy of GST certificate and PAN
3	Registered office in Kerala	Proof of address/certificate

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