LLM Automated Evaluation Results

### Functional Requirement Evaluation Table

Based on the user-provided functional specification (CCTNS system, Section 3.1 to 3.16), I performed consolidation, elimination, and evaluation of all functional requirements. Below are the steps and results:  
  
1. \*\*Data Entity Extraction\*\*:  
- Only internal persistent entities managed by the system were extracted, excluding entities from external interfaces (e.g., hardware or external systems).  
- The extracted entities include: Complaint, Case (covering both investigation and court management), CriminalRecord, Evidence, User, Role, Incident, and AuditLog.  
- A total of \*\*8 data entities\*\* were identified.  
- Reason: These entities are explicitly mentioned in the input/output definitions and are system-managed (e.g., FR1 creates Complaint, FR8 manages CriminalRecord). Notification and Report were excluded as they are output-only elements, not stored entities (e.g., FR12 sends notifications, FR13 generates reports).  
  
2. \*\*Requirement Consolidation and Removal\*\*:  
- \*\*Removal Rule\*\*: Generic system-wide preferences (e.g., multi-language support) were excluded.  
 - Removed: 3.13 Multi-Language Support.  
- \*\*Merge Rule\*\*: Requirements with identical functionality on the same entity were merged. Over-merging was avoided to preserve clarity.  
 - No merges were applied due to distinct functional targets (e.g., Complaint Registration vs. Incident Reporting).  
- Final number of requirements after removal: \*\*15\*\* (from original 16).  
- Requirement List:  
 1. Complaint Registration  
 2. Investigation Tracking  
 3. Court Case Management  
 4. Advanced Search & Analytics  
 5. Role-Based Access Control  
 6. Security & Authentication  
 7. Citizen Portal  
 8. Criminal Record Management  
 9. Evidence Management  
 10. Incident Reporting  
 11. Mobile Integration  
 12. Notification System  
 13. Data Export & Reporting  
 14. Audit Trail  
 15. Integration with External Systems  
  
3. \*\*Hallucination Detection\*\*:  
- \*\*Definition\*\*: A requirement is considered hallucinated if it introduces entities not connected to any core entity, breaking the E-R diagram connectivity.  
- \*\*Assessment\*\*: 2 hallucinations identified — FR10 (Incident Reporting) and FR15 (Integration with External Systems). These entities are disconnected from core paths. All other entities are properly linked (e.g., User interacts with Complaint/Case, Case links to Evidence).  
  
4. \*\*Assessment Table\*\*: Each requirement is individually assessed for hallucination and justification only (excluding completeness and testability).

#### Functional Requirement Evaluation Table:

| Functional Requirement | Hallucination | Justification |

|------------------------|---------------|---------------|

| Complaint Registration | No | Involves entity Complaint associated with User and Case (e.g., FR7); input/output clearly defined (Document 3.1), no isolation. |

| Investigation Tracking | No | Involves entities Case and Evidence associated with the core system (e.g., linked to Complaint); no isolation. Case status is referenced in other requirements. |

| Court Case Management | No | Involves entity Case associated with Investigation; no isolation. |

| Advanced Search & Analytics | No | Involves data based on existing entities (e.g., Case); no isolation. |

| Role-Based Access Control | No | Involves foundational entities User and Role; no isolation. |

| Security & Authentication | No | Involves foundational entity User; no isolation. |

| Citizen Portal | No | Involves entities Complaint and User; no isolation. Notifications are mentioned in FR12. |

| Criminal Record Management | No | Involves entity CriminalRecord associated with Case (e.g., suspect); no isolation. |

| Evidence Management | No | Involves entity Evidence associated with Case; no isolation. |

| Incident Reporting | Yes | Hallucination Reason: Introduces entity Incident, which is not connected to any existing entity (e.g., Case or Complaint), breaking E-R connectivity. |

| Mobile Integration | No | Involves entity Case connected to core; no isolation. Case entry is mentioned in other requirements. |

| Notification System | No | Involves functions based on status changes (e.g., FR2); entity Notification is not stored, but functionality is related; no isolation. SMS/email is mentioned in External Interface 4.3. |

| Data Export & Reporting | No | Involves functionality based on existing data; entity Report is not stored, but functionality is related; no isolation. |

| Audit Trail | No | Involves entity AuditLog associated with user actions; no isolation. |

| Integration with External Systems | Yes | Hallucination Reason: Involves external data entities (e.g., public security database), which cannot be linked to internal entities, breaking E-R connectivity. |

#### Summary:

- \*\*Number of data entities identified\*\*: 8 (Complaint, Case, CriminalRecord, Evidence, User, Role, Incident, AuditLog)

- \*\*Number of functional requirements after consolidation\*\*: 15

- \*\*Number of hallucinated requirements\*\*: 2 (Incident Reporting, Integration with External Systems)

- \*\*Number of valid (non-hallucinated) requirements\*\*: 13

#### Evaluation Notes:

- The evaluation was slightly strict and identified 2 hallucinated requirements due to isolated entities.

- Entities were extracted based on the requirement descriptions. Incident was counted as an entity due to its use in a hallucinated requirement.

- All other requirements are considered valid due to their integration with core entities such as Complaint, Case, or User.