**Test cases**

**Legend for test cases:** F = Functional, N = Negative, E = Edge, P = Permission.

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| **Functional Cases** | | | | |
| **ID** | **Summary** | **Preconditions** | **Steps** | **Expected Result** |
| F1 | Successfully reassign a route before campaign start with no conflicts. | Campaign **CA** starts on 2025-09-15, Route **R1** (10:00–12:00, Indoor) is assigned to **A1**. Receiver **A3** is free and certified Indoor. | Manager reassigns R1 from A1 → A3. | Success; audit row logged; 2 emails sent (A1, A3); route locked for 24h. |
| F2 | Allow reassignment across campaigns with valid conditions. | Campaign **CB**, Route **R3** (Outdoor) initially assigned to **A4**. Receiver **A3** has Outdoor capability, campaign not started. | Manager reassigns R3 → A3. | Success; audit row includes cross-campaign context; 2 emails; 24h lock. |
| F3 | Ensure lock expires and reassignment is possible after 24 hours. | R1 locked from previous reassignment. Clock advanced 24h+. | Manager reassigns R1 again. | Allowed; audit row logged; emails sent; new 24h lock applied. |
| F4 | Successfully reassign multiple routes in one action. | Routes R5, R6 (CA, Indoor) belong to A1; A3 is available. | Select both routes → reassign to A3. | All succeed; audit row per route; 2 emails per route; locks applied. |

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| **Negative Cases** | | | | |
| **ID** | **Summary** | **Preconditions** | **Steps** | **Expected Result** |
| N1 | Block reassignment after campaign has started. | Campaign **CC** started on 2025-09-10. Route R4 (09:00–11:00) assigned to A2. | Manager attempts reassignment. | Error message; audit failure row; no emails sent. |
| N2 | Block reassignment if target agent already has overlapping route. | R1 (CA 10:00–12:00, Indoor) belongs to A1; A2 has route overlap 10:30–12:30. | Manager tries reassign  R1 → A2. | Error “Receiver has conflicting schedule”; audit failure row; no emails. |
| N3 | Block reassignment between different location types. | R3 (Outdoor) in CB → A4; attempt reassignment to A1 (Indoor only). | Manager reassigns  R3 → A1. | Blocked; audit failure LocationTypeMismatch; no emails. |
| N4 | Block reassignment of a route still under lock. | R1 reassigned <24h ago, currently locked. | Manager attempts another reassignment. | Blocked; audit failure Locked; no emails. |
| N5 | Block reassignment if agent is unchanged. | R1 belongs to A1. | Manager tries reassign  R1 → A1. | Blocked; audit failure NoOp; no emails. |
| N6 | Block reassignment to inactive agent. | A5 inactive. R1 eligible. | Manager reassigns  R1 → A5. | Blocked; audit failure AgentInactive; no emails. |
| N7 | Block reassignment if route or campaign is invalid. | Route R99 not in system OR Campaign archived. | Manager attempts reassignment. | Blocked; audit failure NotFound or CampaignState; no emails. |

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| **Edge Cases** | | | | |
| **ID** | **Summary** | **Preconditions** | **Steps** | **Expected Result** |
| E1 | Block reassignment if attempted exactly at start timestamp. | Campaign CA start = 2025-09-15 09:00. Route eligible. | At 09:00:00 attempt reassignment. | Blocked; audit failure Policy. |
| E2 | Allow reassignment just before start. | CA start 09:00; current 08:59. | Reassign R1 → A3. | Allowed; audit success; emails sent; lock applied. |
| E3 | Validate overlap logic at exact boundary. | Agent has route 10:00–12:00; new route window 12:00–14:00. | Manager reassigns overlapping route. | Allowed if end is non-inclusive; blocked if inclusive (confirm policy). |
| E4 | Ensure overlap detection works across day boundary. | Receiver has route 22:00–02:00; new route 00:30–01:30. | Attempt reassignment. | Blocked due to overlap. |
| E5 | Ensure correct time normalization across time zones. | Campaign time UTC-3, agent time UTC. | Reassign around midnight UTC. | Blocked; audit failure InvalidLocationType. |
| E6 | Block reassignment if location type undefined. | Route R8 has null location type. | Attempt reassignment. | Blocked; audit failure InvalidLocationType. |

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| **Permission Cases** | | | | |
| **ID** | **Summary** | **Preconditions** | **Steps** | **Expected Result** |
| P1 | Manager can reassign routes in their campaign. | Manager of CA, Route R1 eligible. | Attempt reassignment. | Success. |
| P2 | Manager cannot reassign routes outside their campaign. | Manager of CB tries to reassign in CA. | Attempt reassignment. | Blocked; audit failure PermissionDenied. |
| P3 | Non-manager cannot perform reassignments. | Logged as Viewer or Agent. | Attempt reassignment. | Reassign button hidden/disabled; audit not triggered. |
| P4 | Ensure audit logs visible only to authorized roles. | Manager vs Admin vs Compliance roles. | Try to access audit logs. | Manager sees scoped entries; Admin/Compliance see full. |
| P5 | Block reassignment if API called without permission token. | Invalid token. | Call API /reassignRoute directly. | 403 Forbidden; audit logs entry for failed attempt. |

**Test Data Tables**

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| **Campaigns** | | | | | |
| **ID** | **Name** | **Start Date/Time (UTC-3)** | **Status** | **Location Type** | **Notes** |
| CA | Campaign A | 2025-09-15 09:00 | Scheduled | Indoor | Used for happy/negative tests |
| CB | Campaign B | 2025-09-18 10:00 | Scheduled | Outdoor | Used for cross-campaign tests |
| CC | Campaign C | 2025-09-10 08:00 | Started | Indoor | Used to test “after start” |

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| **Agents** | | | | |
| **ID** | **Name** | **Active** | **Location Capability** | **Notes** |
| A1 | Ana Silva | Yes | Indoor | Original owner of most CA routes |
| A2 | Bruno Dias | Yes | Indoor | Has overlapping route 10:30 - 12:30 |
| A3 | Carla Nunes | Yes | Indoor & Outdoor | Free slots, flexible for positive cases |
| A4 | Diego Rocha | Yes | Outdoor only | For mismatch scenarios |
| A5 | Inactive | No | Indoor | Used to test inactive agent case |

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| **Routes** | | | | | |
| **Route ID** | **Campaign** | **Location** | **Window (UTC-3)** | **Assigned Agent** | **Notes** |
| R1 | CA | Indoor | 2025-09-16 | 10:00 - 12:00 | A1 | Happy path / overlap case |
| R2 | CA | Indoor | 2025-09-15 | 09:30 - 11:30 | A1 | Boundary with campaign start |
| R3 | CB | Outdoor | 2025-09-19 | 14:00 - 18:00 | A4 | Cross-campaign + mismatch |
| R4 | CC | Indoor | 2025-09-10 | 09:00 - 11:00 | A2 | Used for “after start” negative case |
| R5 | CA | Indoor | 2025-09-17 | 13:00 - 15:00 | A1 | For bulk reassignment |
| R6 | CA | Indoor | 2025-09-17 | 15:00 - 17:00 | A1 | For bulk reassignment |

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| **Test Case Mapping** | |
| **Test Case** | **Data Setup Used** |
| F1 - Happy Path | R1 (CA, Indoor) -> A3 |
| F2 - Cross Campaign | R3 (CB, Outdoor) -> A3 |
| F3 - Unlock after 24h | Reassign R1, then after 24h repeat |
| F4 - Bulk reassignment | R5 & R6 (CA, Indoor) -> A3 |
| N1 - After start | R4 (CC) -> any agent |
| N2 - Overlap | R1 (CA, 10-12) -> A2 (10:30 - 12:30 booked) |
| N3 - Mismatch | R3 (Outdoor) -> A1/A2 (Indoor only) |
| N4 - 24h Lock | R1 reassign twice within 24h |
| N5 - Same agent | R1 -> A1 |
| N6 - Inactive | R1 -> A5 |
| N7 - Invalid route | Route R99 or archived campaign |
| E1/E2 - Time boundary | R2 (CA 09:30 - 11:30) at start time |
| E3 - Micro overlap | New route R7 12-14; agent has R8 10-12 |
| E4 - Overnight | Custom route crossing midnight |
| E5 - Timezone/DST | Simulated UTC vs UTC-3 |
| E6 - Unknown type | Custom route R8 with null location |

**Audit & Email Verification**

**Audit (UI or API)**

**Fields to verify per reassignment:**

* routeID, fromAgentId, toAgentId, fromCampaignId, toCampaignId
* requestedBy (userId/role), timestamp (UTC), result (Success/Failure + reason)
* lockUntil (UTC+24h)
* correlationId (for linking emails/events)

**Steps:**

**1.** Perform reassignment (per test). **2.** Open Audit page (or call GET /audit?routeId=R# / query logs). **3.** Assert a new entry with exact values above; timestamps within 1 min of action;

lockUntil = timestamp + 24h. **4.** For failures, confirm result.reason matches error shown to user (policy, overlap, mismatch, lock, permission).

**Emails (mock or test inbox)**

**Expectation per success:** 2 emails sent (sender: no-reply@oppizi.com)

* **Subject:** “Route R# reassigned” (agent-specific variant)
* **Body:** includes routeId, campaign, window, from -> to, effective date, support link
* **Headers/Meta:** delivered once each (no duplicates), correlationId matches audit

**Steps:**

**1.** Using Mailhog/Mailtrap/test inbox: search by routeId or correlationId. **2.** Verify 2 recipients (source and receiver).  **3.** Open content -> validate required fields and timestamps. **4.** Optional: hit notifications API/webhook log for type=email, event=reassignment, correlationId.

## **Sample Bug Report**

**ID:** OPP-231  
 **Severity:** High  
 **Priority:** P1  
 **Environment:** Staging v1.24.3

**Summary:** Reassignment allowed at exact campaign start time (should be blocked before start).

**Description:**

* **Preconditions:**
  + Campaign **CA** start = 2025-09-15 09:00
  + Route **R2** (09:30–11:30)
  + User role = Manager (CA)
* **Steps to Reproduce:**
  + At 2025-09-15 09:00:00, open CA → Routes → R2 → Reassign.
  + Choose **A3** as receiver, confirm dialog.
  + Observe system behavior.
* **Expected Result:**
  + Reassignment blocked with error message: *“Reassignment only before campaign start.”*
  + No emails triggered.
  + Audit entry with Failure/Policy.
* **Actual Result:**  
  + Reassignment **succeeds**.
  + 2 confirmation emails sent (A1, A3).
  + Audit marks Success.
  + 24h lock applied incorrectly.
* **Evidence:**
  + Screenshot: reassign-success-090000.png
  + Audit payload: audit-R2.json
  + Mailhog IDs: MH-8832 (A1), MH-8833 (A3)
* **Notes:**  
   Boundary condition not enforced (>= instead of > check). High risk of violating campaign start policy.

## **Assumptions & Risks**

**Assumptions**

* “Before start” means **strictly < startTime** (not ≤).
* Time windows are **[start, end)** (end is non-inclusive).
* Location type comparison is **exact** (Indoor vs Outdoor taxonomy consistent).
* Lock applies to the **route**, not the **agent**; also prevents any further changes to that route for 24h.
* Emails are required **only on success**; failures write audit with reason, no email.

**Risks**

* Time-zone/DST misalignment can flip allow/deny at boundaries.
* Simultaneous conditions in bulk reassignments (two managers act simultaneously).
* Partial success in bulk may leave inconsistent locks/audits if not transactional.
* Inaccurate agent availability (cache) → false “no overlap” decisions.
* Email delivery delays causing user confusion despite success.

## **Regression Impact Checklist**

* Campaign lifecycle (create/edit dates, status transitions)
* Agent availability & scheduling (conflict detection service, timezone handling)
* Route assignment UI & APIs (single + bulk)
* Permissions (manager scopes, cross-org access)
* Audit logging service (write reliability, viewer permissions, export)
* Notification system (email templating, queueing, idempotency)
* Locks & concurrency (24h lock storage, expiry jobs, retries)
* Mobile/Field app sync (updated assignments to agents)

### **Execution Notes**

* Run **functional first** (F1/F2), then **negative**, then **edges**, then **permissions**.
* Capture **timestamps** and **correlationId** for each run to pair audit ↔ emails.
* Reset locks or advance clock in test env to validate **F3** reliably.