# Test Suite: Notification Service

## 📁 Module: Event Consumption

| **TC ID** | **Test Case Description** | **Input** | **Expected Result** | **Priority** |
| --- | --- | --- | --- | --- |
| TC\_001 | Consume valid task event from Kafka | Valid event JSON | NotificationService receives and processes event | High |
| TC\_002 | Consume malformed task event | Invalid event JSON | Event is discarded, error is logged | High |
| TC\_003 | Duplicate event handling | Same event twice | Event is de-duplicated or idempotent | Medium |

## 📁 Module: User Preference Validation

| **TC ID** | **Test Case Description** | **Input** | **Expected Result** | **Priority** |
| --- | --- | --- | --- | --- |
| TC\_004 | User has all channels enabled | Event with user ID | Email, SMS, and WhatsApp notifications sent | High |
| TC\_005 | User has only email enabled | Event with user ID | Only Email sent | High |
| TC\_006 | User has opted out of all channels | Event with user ID | No notification sent, log skipped | Medium |

## 📁 Module: Template Rendering

| **TC ID** | **Test Case Description** | **Input** | **Expected Result** | **Priority** |
| --- | --- | --- | --- | --- |
| TC\_007 | Render template with valid placeholders | Template + data | Final rendered message is correct | High |
| TC\_008 | Render template with missing fields | Template + partial data | Error is logged, message not sent | High |
| TC\_009 | Versioned template support | Template v1 vs v2 | Correct version is rendered | Medium |

## 📁 Module: Channel Dispatch

### 📄 Email

| **TC ID** | **Test Case Description** | **Input** | **Expected Result** | **Priority** |
| --- | --- | --- | --- | --- |
| TC\_010 | Send valid email | User email + message | Email sent successfully | High |
| TC\_011 | Email server down | Valid input | Retry triggered, failure logged | High |

## 📄 SMS

| **TC ID** | **Test Case Description** | **Input** | **Expected Result** | **Priority** |
| --- | --- | --- | --- | --- |
| TC\_012 | Send valid SMS | User phone + message | SMS sent | High |
| TC\_013 | Invalid phone number | Wrong input | Validation error, not sent | High |

## 📄 WhatsApp

| **TC ID** | **Test Case Description** | **Input** | **Expected Result** | **Priority** |
| --- | --- | --- | --- | --- |
| TC\_014 | Send valid WhatsApp message | Valid user + template | Message sent | High |
| TC\_015 | WhatsApp gateway timeout | Valid input | Retry logic initiated | Medium |

## 📁 Module: Retry & Failure Handling

| **TC ID** | **Test Case Description** | **Input** | **Expected Result** | **Priority** |
| --- | --- | --- | --- | --- |
| TC\_016 | Retry on transient failure | Temporary channel failure | Retry 3 times with exponential backoff | High |
| TC\_017 | Retry exhausted | Continuous failure | Message marked as failed | High |

## 📁 Module: Logging & Auditing

| **TC ID** | **Test Case Description** | **Input** | **Expected Result** | **Priority** |
| --- | --- | --- | --- | --- |
| TC\_018 | Log successful delivery | Any channel | Log contains success entry with timestamp | High |
| TC\_019 | Log failure | Failed message | Error logged with reason | High |

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| **Test Case ID** | **Description** | **Input** | **Expected Result** | **Priority** |
| --- | --- | --- | --- | --- |
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| TC\_002 | Consume malformed task event | Invalid event JSON | Event is discarded, error is logged | High |
| TC\_003 | Duplicate event handling | Same event twice | Event is de-duplicated or idempotent | Medium |
| TC\_004 | User has all channels enabled | Event with user ID | Email, SMS, and WhatsApp notifications sent | High |
| TC\_005 | User has only email enabled | Event with user ID | Only Email sent | High |
| TC\_006 | User opted out of all channels | Event with user ID | No notification sent, log skipped | Medium |
| TC\_007 | Render template with placeholders | Template + data | Final rendered message is correct | High |
| TC\_008 | Render template with missing fields | Template + partial data | Error logged, message not sent | High |
| TC\_009 | Versioned template support | Template v1 vs v2 | Correct version is rendered | Medium |
| TC\_010 | Send valid email | User email + message | Email sent successfully | High |
| TC\_011 | Email server down | Valid input | Retry triggered, failure logged | High |
| TC\_012 | Send valid SMS | User phone + message | SMS sent | High |
| TC\_013 | Invalid phone number | Wrong input | Validation error, not sent | High |
| TC\_014 | Send valid WhatsApp message | Valid user + template | Message sent | High |
| TC\_015 | WhatsApp gateway timeout | Valid input | Retry logic initiated | Medium |
| TC\_016 | Retry on transient failure | Temporary failure | Retry 3 times with exponential backoff | High |
| TC\_017 | Retry exhausted | Continuous failure | Message marked as failed | High |
| TC\_018 | Log successful delivery | Any channel | Log contains success entry with timestamp | High |
| TC\_019 | Log failure | Failed message | Error logged with reason | High |