nymi™

Liveness Detection

Operational Considerations

The Nymi Band™ is a wearable device that enables seamless interactions between users and multiple digital systems. It contains an On-Body Detection system to help assure that the Nymi Band is used only by the individual assigned during an enrollment process.

The Nymi Band must be activated by its enrolled user before it can be used.
The figure on the next page illustrates the activation process as a sequence of steps.

Revision History

The following table outlines the revision history for this document

Version	Date	Revision History
1.0	2021	First release
2.0	November 30, 2023	Editorial changes and fixed typos

Activation Timeline

PROCESSOR

Nymi Band is bound to user's corporate identity using cryptographic keys stored in the processor.

FINGERPRINT SENSOR

Matches fingerprint to fingerprint template generated at enrollment.

LIVENESS DETECTION

After fingerprint matching, band evaluates signal between Fingerprint Bezel and Bottom Panel for liveness.

ON-BODY DETECTION

Sensors (Capacitance, Light & Movement) ensure the band is active only while being worn.

1

User wears their Nymi Band

On-Body Detection determines if band is on wrist & prompts user to place finger on sensor with fingerprint icon.

2

User places finger on sensor

Fingerprint Matching algorithm compares presented fingerprint to securely stored fingerprint template.

1s

3

Detection & evaluation

If Fingerprint Matching and **Liveness Detection** are enabled, the user's signal is compared to a standard ECG template.

10s

4

Display screen shows a check mark for success

If ECG signal detected, the Nymi Band is **activated.**

5

User continues to wear Nymi Band

On-Body Detection **continuously monitors** band is on the user. Once the band is removed, it is **de-activated.**

There are several elements involved in the activation process:

- The Processor stores cryptographic key material used to bind the user's corporate identity to a particular Nymi Band. It also stores a template of the user's fingerprint. This data is generated during enrollment and securely stored inside the Nymi Band.
- The Fingerprint Sensor matches the user's fingerprint to the fingerprint template to identify the user. It takes about 1 second and has a false accept rate of 1in 20,000. This means the assigned user must be present to activate the Nymi Band. Importantly, the user's fingerprint data never leaves the Nymi Band which increases both security and privacy.
- The On-Body Detection system continually assesses whether the Nymi Band is located on the user's wrist. If the Nymi Band is removed from the wrist, it will de-activate.
- The Liveness Detection is an optional system that uses electrocardiogram (ECG) during activation to increase confidence that the presented fingerprint is from a human wearing the Nymi Band. This takes about 10 seconds. While it increases confidence that the assigned user is activating the Nymi Band, it cannot prevent them from sharing it with someone else.

The use of Liveness Detection is optional either on a per-user basis or globally for all users.[1]

As one of many layered controls, it can improve identity assurance however it will also affect the user experience (UX):

- For all users, activation will take an additional 10-15 seconds. This happens once per day.
- In some environments, checking a user's ECG can be difficult because it is sensitive to noise caused by movement, dry skin, environmental contaminants (such as dust or grease), and electromagnetic interference from high-powered electrical systems. As a result, the user may need several attempts to activate their Nymi Band.

When user experience is paramount, Nymi recommends customers disable Liveness Detection.

Nymi's Customer Success Team will consult with customers to determine the best setting for their deployment.

The table below summarizes some of the information given above and can be used to make an informed decision regarding use of Liveness Detection.

Category	Liveness Enabled	Liveness Disabled
Fingerprint Authentication	Required	Required
On-Body Detection	Required	Required
Liveness Detection	Enabled	Disabled
Time to Authenticate	11 seconds	1 seconds
Fingerprint Success Rate [1]	97%	97%
Liveness Detection Success Rate [2]	95%	-
False Acceptance Rate	1:20,000	1:20,000

[1] Figure is based on internal studies performed by Nymi.
[2] Figure is based on internal studies performed by Nymi.