A1ll (Everest) UX Blueprint

Sony Mobile
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Table of Contents

Table of Contents

1 Document status

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About this document

The Product aims to work with Android phones that support the 4.0 Bluetooth low energy standard.

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Related document:

IXD-Blueprint_Everest_Device app.pdf

Status

- Draft
- Approved by UXC
- Development
- Integrated

2 Introduction
2.1 Background

General description
A1ll (Everest) is an activity bracelet that combines 24/7 activity tracking with the connection to Xperia's entertainment and communication features. A1ll is defined as one of the smart wearables that together with the data that the phone logs can provide information about how the user lives her life. The phone app Lifelog is used as the main interface for reading out life tracking data. There are LEDs and vibrations on the bracelet that mainly serve as indicators of phone activities (incoming call, notifications) and alarms.

The main feature for A1ll is the heart rate/pulse measurement and stress indication through heart rate variability that the HR sensor provide. The measurements are done continuously without the user having to do anything.

Designed for life
- As A1ll is designed to be worn all the time it has to be unintrusive, comfortable and durable

Know the best of you
- 24/7 activity tracking
- Find patterns
- Set goals in Lifelog and follow up
- Heart Rate Variations and pulse logging (continuously)

Everyday functionality
- Remote mode functionality - for a customized experience (e.g. media control can be selected)
- Use SmartBand together with external applications
- ~~Next generation proximity unlock~~ Capacitive sensor descoped
- Smart wake up

Scope
This document specifies the A1ll UI at functional level, so no technical details. Although, if technical limitations influence the usability and/or functional behaviour, they shall be defined.

The UI of the Lifelog app and Host app are defined in separate blueprints.

2.2 Constant values & Abbreviations

Constant values

KEY PRESS

Short press	Released within 2000 ms after pressed
Long press	Pressed for more than 2000-5 000 ms
Very long press	Pressed for more than 5000-10 000 ms
Very very long press	Pressed for more than 10 000 ms
Double click press	Max. 500 ms between the release of a short press and the down of the next short press.

Abbreviations and terms

AHA	Accessory Host Application
BT	Bluetooth
BLE	Bluetooth Low Energy
Device	The device that A1ll connects with (mobile phone or tablet)
GUI	Graphical User Interface
N/A	Not Applicable
TBD	To Be Decided/Defined
UI	User Interface
HRV	Heart Rate Variability
HR	Heart Rate

2.3 Product brief

A1ll is an activity bracelet that is meant to be worn all the time. As a whole the purpose of the product and Lifelog app is to support users in becoming more aware of their own lifestyles and to be alerted by important phone activities.

5 important usage goals are

1) To log and become aware of stress/intensity levels

Users should be able to create awareness of what makes them stressed/ exalted, relaxed and get motivated to stress less. Heart rate variability measurements are done continuously and can be viewed in Lifelog app.

2) To log and become aware of how much I move physically

Users should be able to log and set goals for physical activities such as steps, walking, running, swimming. Number of stairs and elevator riding should also be displayed in Lifelog. Other activities that are measured in Lifelog are various transports. While training it should be possible to measure pulse.

3) To log and become aware of sleep cycles

Users should be able to enter sleep mode automatically and log how many hours of sleep they have had, to understand the quality of sleep and look at a sleep cycle for detailed information.

4) To use it together with external apps

Users should be able to control or interact with external apps through e.g. tapping or gestures. An API makes it possible for external apps to get live sensor data and communicate through LEDs and vibrations.

5) To use it as a mobile phone extension

Users should be able to use the product as an extension to the mobile phone. For instance by being alerted of phone activities (notifications, calls, alarms). It should also be possible to control certain functionality on the phone by tapping in remote mode, e.g. media control or find phone.

Competitive strengths

Users will buy the product to become more aware of how they spend their time and to live a healthier, less stressful and more active life. The main differentiator and competitive strength of this product in comparison to similar products is the stress/exalted indications provided by the HRV sensor.

2.4 Prioritized use cases

Logging - discover life patterns so that I can change my behavior and live healthier

AS A: user I WANT TO: log my stress level continuously in everyday life and view the result in Lifelog (partly Lifelog req)

AS A: user I WANT TO: be able to log the following activities automatically using my accessory - steps, running, walking, sleep, swimming, ~~standing, sitting,~~ stairs, elevator. Being transported by car, train, bike, airplane can be detected by the phone/cloud (partly Lifelog req).

AS A: user I WANT TO: log my pulse when doing physical activities

AS A: user I WANT TO: be able to read out my sleep cycles in Lifelog that informs me about my sleep quality. E.g. if I'm stressed, if I toss and turn, how many hours of sleep etc. (partly Lifelog req)

AS A: user I WANT TO: be able to be informed about what impact various contexts (for instance music listening, entertainment, calendar events) has on my stress level (Lifelog req)

AS A: user I WANT TO: be encouraged in changing my behavior to the better. E.g. through notifications, weekly summaries etc. (Lifelog req)

Support in everyday life

AS A: user I WANT TO: be notified when there is a phone alarm, smart wake up, incoming call or notifications such as e-mail, sms/mms or facebook.

AS A: user I WANT TO: be able to silence or reject an incoming call.

AS A: user I WANT TO: be able to cancel or snooze a phone alarm or smart wake up.

AS A: user I WANT TO: be alerted by a smart wake up alarm that wakes me up at a set time when I am in light sleep.

AS A: user I WANT TO: be reminded when I leave my phone behind (off per default).

~~AS A: user I WANT TO: have a safe way of unlocking the phone by using the bracelet. No one else should be able to access my phone with my bracelet.~~ Note: Capacitive sensor descoped!

AS A: user I WANT TO: be able to meet new people that also are Lifeloggers. (TBD Work on finding use cases)

Product customization and SDK

AS A: user I WANT TO: use external apps that support my SmartBand for logging in real time and communicate through LEDs, vibrations and tap/gesture interaction.

AS A: user I WANT TO: control selected functionality from A1ll by tapping. E.g. manual logging of a certain activity or media player control.

AS A: user I WANT TO: be able to meet new people that also are Lifeloggers.

AS A: user I WANT TO: be able to have the logged data accessible for other applications. For instance, sport applications that can use A1ll data as input for more exact reading of activities. TBD

Offline cases

AS A: user I WANT TO: have all physical activities (listed above) logged in offline.

AS A: user I WANT TO: log stress level/ heart rate measurement in offline

AS A: user I WANT TO: be able to use smart wake up - both to be alerted, to snooze the alert and turn off the alert in offline.

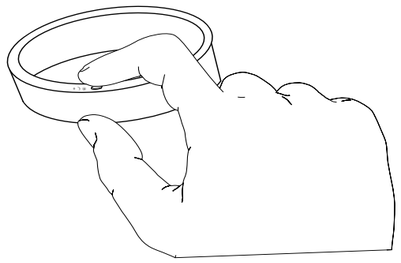
AS A: user I WANT TO: have my logged data that is stored during offline saved 24 hours.

3 Hardware requirements

- One hardware button
- Accelerometer
- BLE (Bluetooth Low Energy)
- NFC (Near Field Communication)
- Built-in battery
- Memory
- Vibrator
- 3 RGB LEDs
- Dimmer
- Heart rate sensor (HRV enabler)
- ~~Galvanic skin sensor (GSR)~~ DESCOPED
- Altimeter (barometric pressure sensor)
- ~~Capacitive sensor~~ DESCOPED
- Improved Activity Engine
- IP68 + IP66

4 Interactions Overview
4.1 Interactions

Key interactions



Long press (in off mode)

4.1.1 Turn on A1ll

If in OFF mode long press the key or use NFC to turn on A1ll. When turned on all three LEDs are lit in the white start up animation, then turned off.

Short press

4.1.2 Check connection status

Short press to view if A1ll is turned on and connected. If it is connected the connected animation is seen in cyan. If it is not connected the connected animation is seen in white.

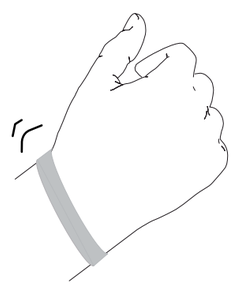
Tap interactions

Short press and tap (in idle or control mode)

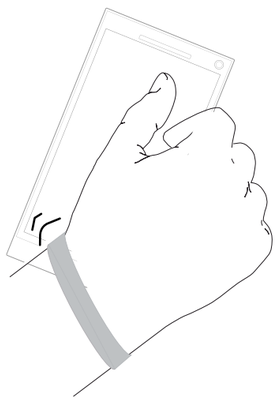
4.1.3 Remote mode interactions

Short press and tap to enter remote mode. Single, double and triple tap may be used to interact with the phone, the initial tapping sequence is treated as interaction. In remote mode all LEDs are green until the automatic time out.

Touch interactions



NFC touch to turn on, pair and connect

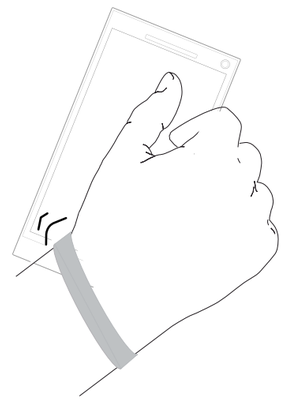


4.2.1 Turn on A1II, pair and connect

NFC touch in off mode/no AHA: Guide the user to AHA on Google Play/Bai-Du. A1II starts up in bonding mode.

From AHA can the user BT scan and connect to A1II as long as A1II is still in bonding mode, but a second NFC touch after installing AHA will always pair and connect A1II. A1II is now bonded to the phone.

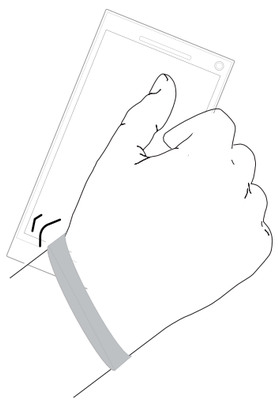
NFC touch to open AHA



4.2.2 Open AHA

NFC touch phone when connected to open AHA.

NFC touch to reconnect



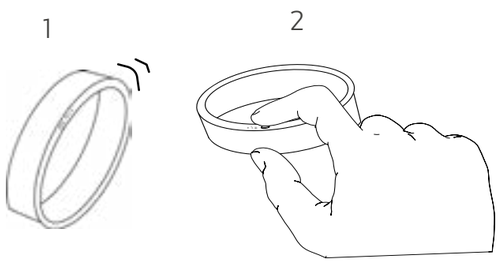
4.2.3 NFC touch to reconnect

If A1II has been paired and connected but lost the connection can NFC be used to reconnect.

5 Incoming events Overview

5.1 Incoming events

Event interactions



Incoming call (short press or long press)

5.1.1 Silence incoming call

Vibration and all LEDs blinking in white continuously indicate incoming call. Short press or long press to silence incoming call.

Smart wake up/alarm (short press and long press)

5.1.2 Snooze and dismiss Smart Wake up alarm

Vibration and all LEDs blinking in white continuously indicate Xperia alarm, Smart wake up only have the vibration. The LED animation and vibration pattern should differ slightly from Incoming call. Short press to snooze. Long press to dismiss the alarm. Long press is indicated with a short final vibration.

Event interactions

Battery low (short press to end notification)

5.2.1 Battery low

Battery low indication is indicated through vibration and blinking a red LED. The warning will be given at least once before running out of battery, but will not be given in “do not disturb” mode. The red LED continues to blink every 6 second for up to 5 minutes.

TBD exactly when to give battery warning depending on current battery consumption!

Battery charging (no key press)

5.2.2 Charging

Battery charging is indicated by a red, changing to yellow, RGB light. When battery is fully charged the same LED is green instead. A1ll is turned off during charging.

Incoming notification (short press to end notification)

5.2.3 Notification

Incoming notification is shown by the first LED blinking in white and the bracelet vibrates. It continues to blink every 6 second until the user looks at the notification in the phone or press the key. This continues for up to 5 minutes.

5.3 Incoming events Do Not Disturb mode

Don Not Disturb mode (DND)

A1II can be set in Do Not Disturb mode from AHA. DND can be scheduled and should work even if A1II is disconnected. In DND are all notifications turned off except for smart wake up and xperia alarm.

Note: Low battery warning should not be given during DND, independent of if A1II is connected or not.

6 Gesture interactions - Example of partner possibilities

Not for RTL!

6.1 Show yourself to others

Bracelet users can select to turn on a social state that allows contact/info exchange between users that also are A1ll users. The "show yourself to others" setting is turned on in AHA and can be triggered when doing a certain gesture.

Gesture interactions

1

2

3

6.1.1 Turn on the setting

The "show yourself to others" setting is turned on in AHA. This will make your contact information available to others.

6.1.2 Meet people

When meeting a person you want to share your contact info with and discover that the other person also is wearing a bracelet your contact info can easily be exchanged.

6.1.3 Identify yourself to others

With a handshake the contact info is exchanged.

Note: only mutual infosharing should be possible.

TBD: decide what kind of gesture/s we should support. Handshake, hi-five?

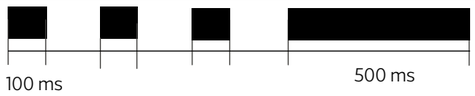
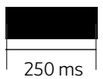
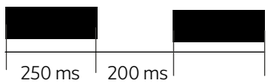
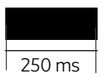
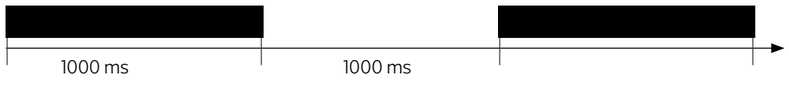
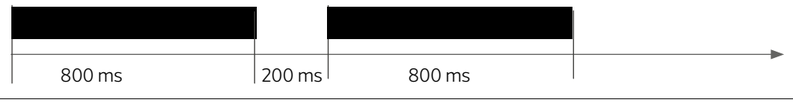
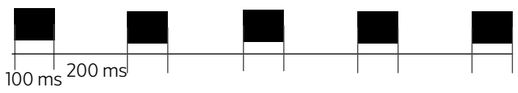
Another example: users can have it connected to Facebook. When doing a hi-five both persons are tagged and this can be posted on the person's walls. What is triggered is decided by the various apps.

7 Detailed interaction and event states

7.1 LED sequence key interactions

Mode	Power off	Idle	Remote mode	App mode	Notification	Incoming call	Alarm/Smart wake up
Short press	N/A	View status (turned on/connected). If connected LEDs are lit in cyan. If not connected LEDs are lit in white. TBD! Are they visible in all colored wristbands??	Exit remote mode, go to previous mode.	View status for connected	Stop blinking	Silence ring signal	Snooze
Short press + tap	N/A	Enter remote mode. All LEDs lit in green.	N/A (Exit remote mode on short press and ignore the tap)	Enter remote mode.	Enter remote mode.	Silence ring signal and enter remote mode.	Snooze and enter remote mode.
Double press	N/A	Manual HR(V) measurement.	Exit remote mode. Start manual HR(V) measurement.	Manual HR(V) measurement.	Manual HR(V) measurement.	Silence ring signal. Manual HR(V) measurement.	Snooze. Manual HR(V) measurement.
Long press	Power on and reconnect - all LEDs in white until connected, then cyan.	N/A	Exit remote mode, go to idle mode.	Exit app mode, go to idle mode.	Stop blinking	Silence ring signal	Turn off alarm
Very long press	Power on and reconnect - all LEDs in white until connected, then blue.	Power off - LEDs shut down one by one (ref. Ellis)	Power off	Power off	Power off	Power off	Power off
Very very long press	Factory data reset & bonding mode	N/A	N/A	N/A	N/A	N/A	N/A
Combined press 5 short press, then 15 sec longpress	Combined press for DFU mode and OTA. The start of the OTA sequence LED animation indicate 15 sec.	N/A	N/A	N/A	N/A	N/A	N/A

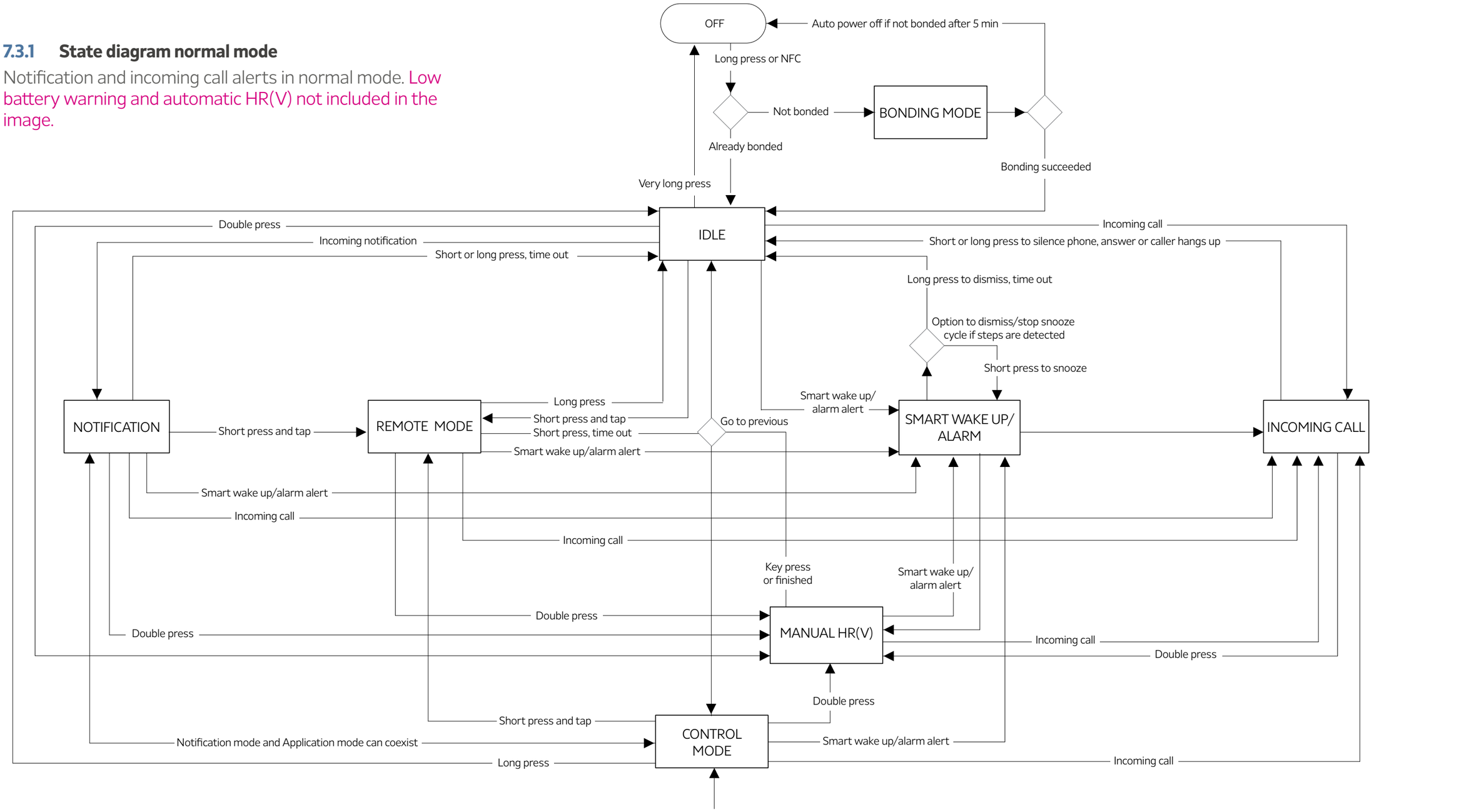
7.2 Vibration feedback

TYPE ORIGIN	NAME	VIBRATION	COMMENT
System	Power ON/OFF		Single vibration 500 ms
System	Factory data reset		Three short vibrations, then one longer 500 ms
System	Forgot phone warning		A sequence of 3 short vibrations. Then silence
System	Bonded and connected		Single vibration
AHA	Event notification (contact customizable?)		1 vibration (E-mail, SMS/MMS, calendar events etc)
System	Manual HRV successful		Single vibration
System	Manual HRV failure		Double vibration
System	Long press verification at alarm and app mode		Single vibration
AHA	Incoming call (contact customizable?)		Continues to vibrate until user interacts or caller hangs up
System/AHA	Smart wake up and alarm		Continues to vibrate up to 3 minutes
System	Battery is low indication		Five vibrations
System	Feedback for single, double or triple taps		Single, double or triple vibrations

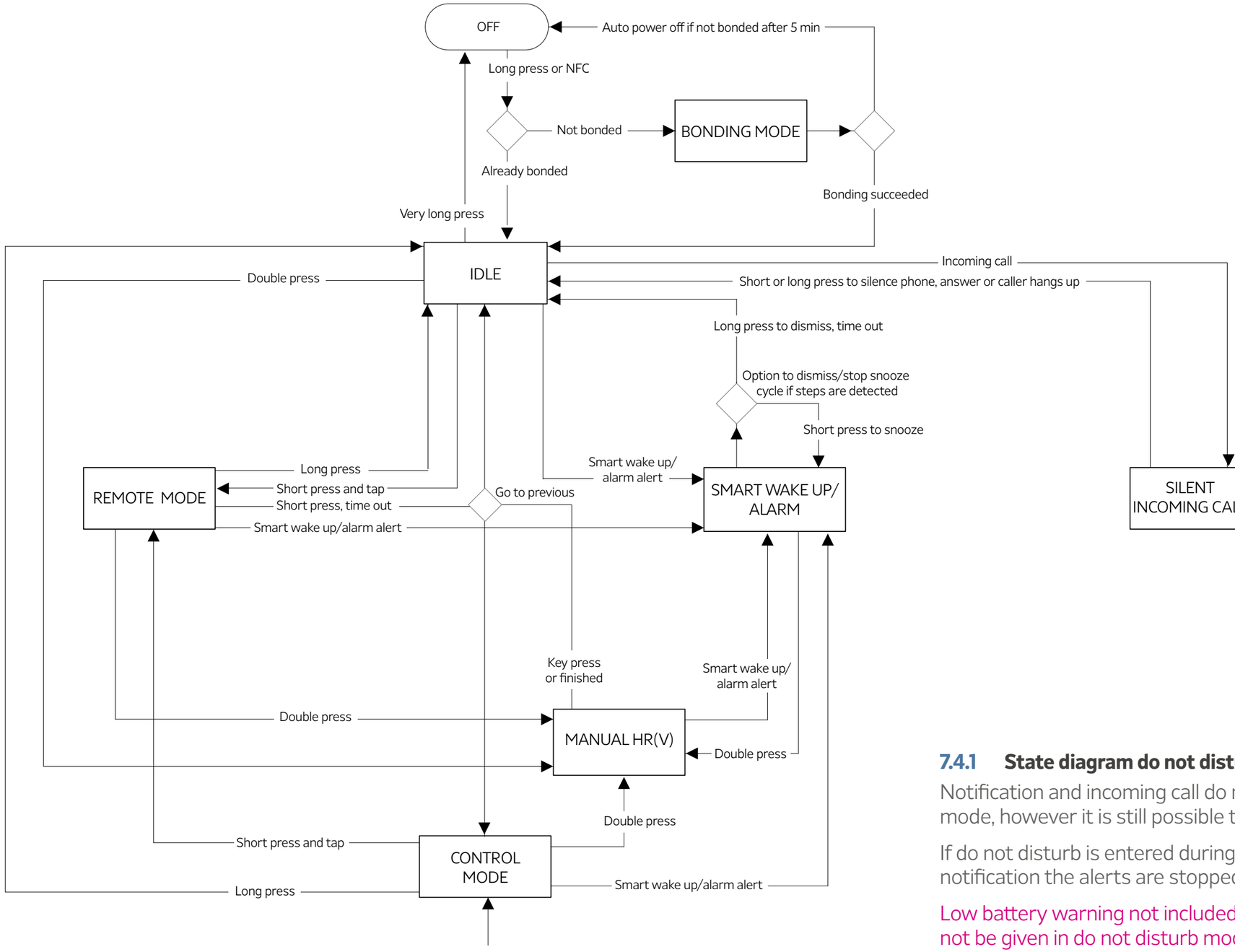
7.3 State diagram normal mode

7.3.1 State diagram normal mode

Notification and incoming call alerts in normal mode. Low battery warning and automatic HR(V) not included in the image.



7.4 State diagram do not disturb mode



7.4.1 State diagram do not disturb mode

Notification and incoming call do not alert in do not disturb mode, however it is still possible to silence calls.

If do not disturb is entered during incoming call or notification the alerts are stopped.

Low battery warning not included in the image but should not be given in do not disturb mode.

8 Setting up

8.1 Pairing, bonding and connecting

AS A: user I WANT TO: experience that the setup including pairing and connecting is smooth and easy.

AS A: user I WANT TO: experience that A1ll keeps track of my activities and syncs with the phone without noticing it.

A1ll has to be bonded (by pairing) and connected from a BLE device in order for all features and functionality to work. Once A1ll has been paired from another BLE device it becomes bonded to that device only and is able to log activities, do heart rate measurements and have Smart wake up functioning even when it is not connected to the bonded device.

When starting A1ll for the first time (when A1ll has not been bonded to a device) and after a hardware reset, A1ll will automatically enter bonding mode. If A1ll is turned on and has been bonded before, A1ll will advertise for reconnection from the bonded device instead.

A1ll can only be bonded to one device at a time, which makes it impossible for a second device to pair and connect a bonded A1ll.

BLE (Bluetooth low energy), and Android version 4.4 or higher for an Android device, is required in order to use A1ll.

Which iOS version is required?

8.2 Sync with phone

Whenever the user enters the Lifelog app she should see that activities are up to date.

Sync between A1ll and phone occurs when ever needed and in the following cases:

- Whenever opening the Lifelog app (reasoning: the user must have accurate step counting data)

- Whenever opening the Host App (reasoning: the user must have accurate log data, TBD which log data will be presented in AHA)

- Whenever the user makes a change in AHA settings

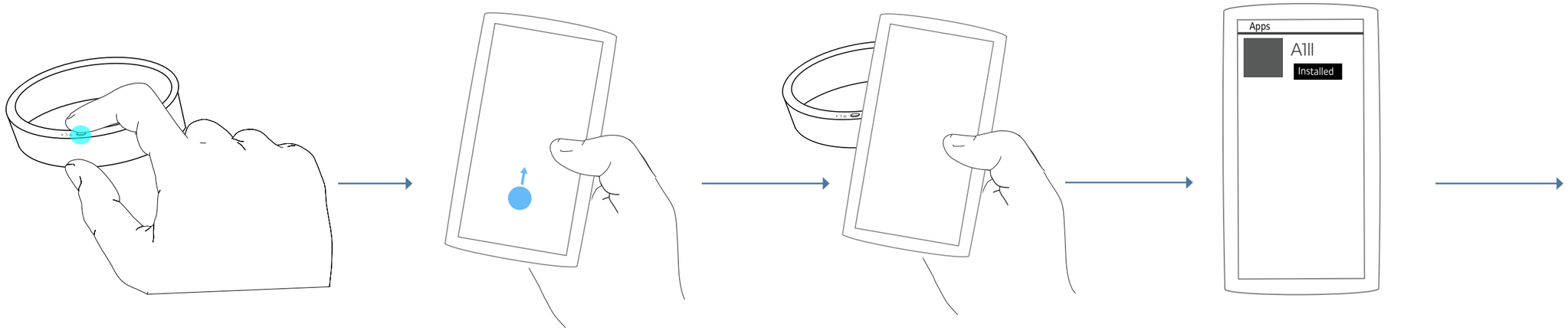
- Whenever there is an incoming notification from the phone

- Whenever pressing a key or tap or using gestures

- On request by 3rd party application that supports A1ll.

Expected result: the user can see that data has been updated whenever opening the Lifelog app. As long as the user has the Lifelog app or AHA open the user should be able to see how for instance step counter data is updated in best effort real time.

8.3 First time pairing and connecting through NFC



8.3.1 A1II can be ON or OFF

A1II can be either ON or OFF if the user wants to connect through NFC.

NOTE: Inform the user that A1II needs be fully charged before starting to use it (if necessary?).

8.3.2 Unlock the device

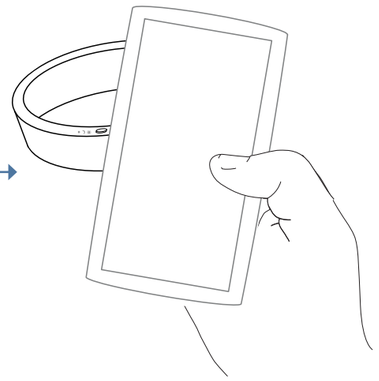
The user needs to make sure that the phone has NFC on.

8.3.3 NFC touch

Hold A1II to the NFC detection area of the device. A1II starts up in bonding mode and the phone will prompt the user to install AHA from e.g. Google Play.

8.3.4 A1II app download

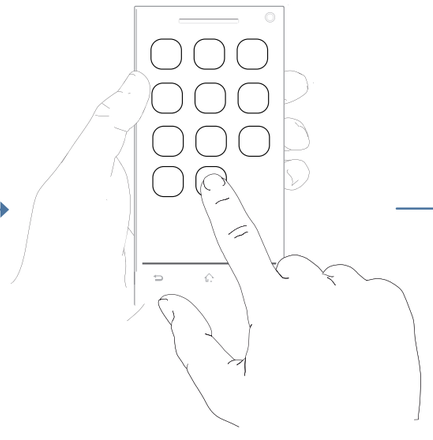
Having installed the application it will be placed on the app tray.



8.3.5 Use case 1: NFC touching

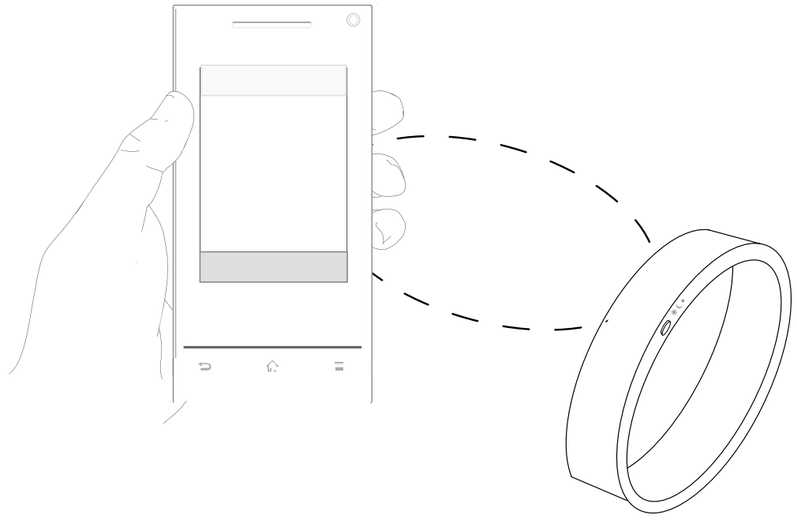
When NFC touching a second time, after having downloaded AHA, it will trigger AHA to start and try to connect to Everest.

Note: AHA will open even if already connected.



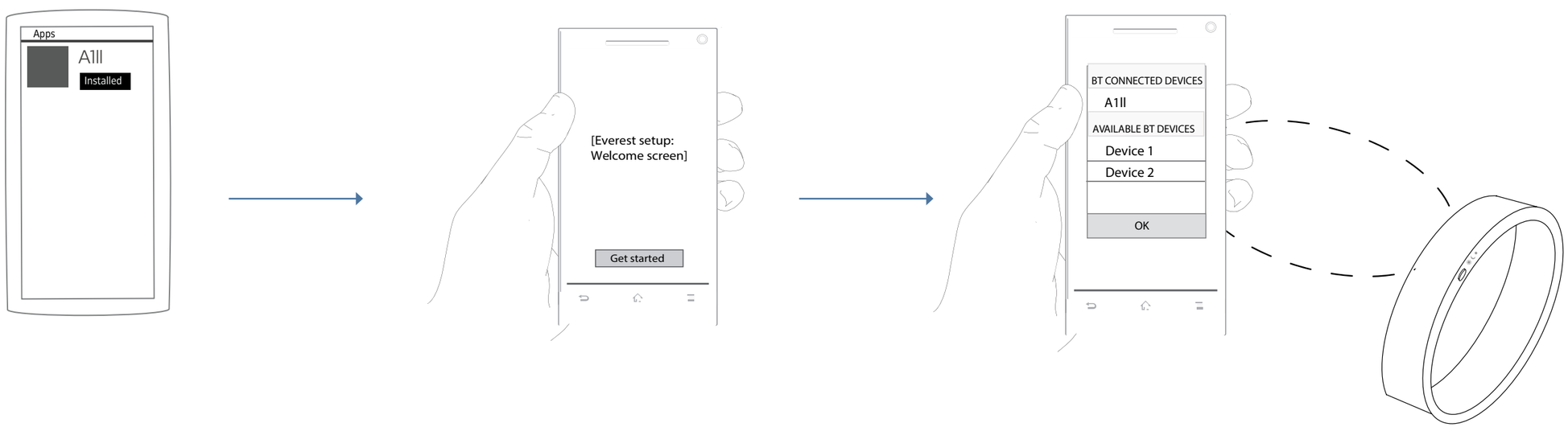
8.3.6 Use case 2: Opening AHA manually

If the user chooses to open AHA directly instead of NFC touch a second time a setup guide will tell the user to NFC touch a second time or do a manual Bluetooth pairing from AHA.



8.3.7 AIII is paired, bonded and connected

8.4 First time pairing and connecting manually



8.4.1 A1II app download

The user downloads AHA. Having installed the application it will be placed on the app tray.

8.4.2 Setup guide

When the user opens AHA for the first time there is a welcome screen.

A setup guide informs the user to NFC touch or start up A1II manually - A1II will be in bonding mode if it has not been paired before.

8.4.3 Search for BT devices

If the user started up A1II by a NFC touch will AHA know which BT device to connect to.

If not there is a text explaining to the user that she needs to search for A1II in order to pair and connect.

Available BT devices are listed in AHA and the user can select the right device and complete the pairing (bonding) and connection.

Setup flow TBD and synced with A3 and SWAP!

As part of the setup flow there is a promotion of the Lifelog app. If the user has the app she is encouraged to start using it.

8.5 Second time pairing, bonding and connecting

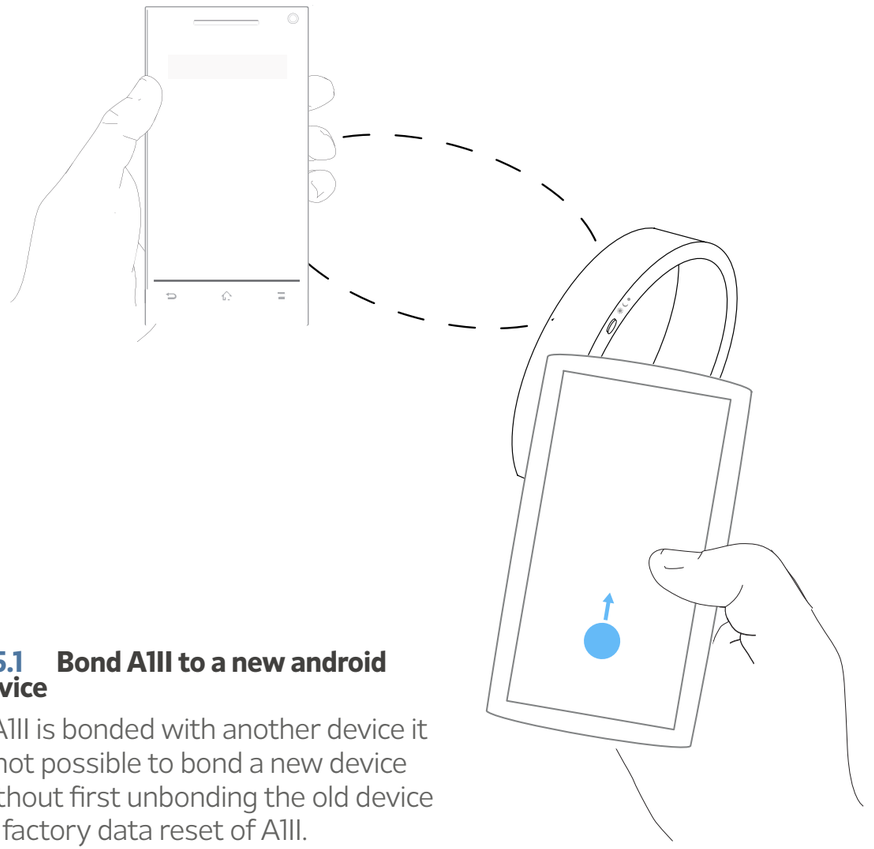
BONDING AND CONNECTING WITH A NEW ANDROID DEVICE

AS A: user I WANT TO: bond and connect my A1II with a new phone.

AS A: user I WANT TO: know which phone A1II automatically reconnects with.

A1II can only be bonded and connected with one android device at a time. If the user wants to switch from an old bonded phone to a new unbonded phone it is necessary to unbond the first phone before bonding the second phone. Unbonding the first phone can only be done by factory data reset of A1II. After factory data reset will the next connected android device be kept as the only bonded device that can connect to A1II.

If the user unpairs A1II from the bonded phone it is still possible to re-pair from that phone only (A1II is still bonded to the phone).



8.5.1 Bond A1II to a new android device

If A1II is bonded with another device it is not possible to bond a new device without first unbonding the old device by factory data reset of A1II.

8.6 General bonding and connecting through NFC: UI flow

A1ll modes after NFC touch

Initial state	Action	Result
A1ll OFF and has not been bonded and connected before	NFC touch	Power on and bonding mode, the phone can connect
A1ll OFF but has been bonded and connected before	NFC touch	Power on and reconnectable from the bonded phone
A1ll ON and in bonding mode	NFC touch	Connected by the new phone that is now bonded
A1ll ON and connected	NFC touch	Open AHA
A1ll ON and disconnected but have been connected before	NFC touch	Reconnect (A1ll advertises for reconnection)
A1ll ON or OFF but is bonded with another device	NFC touch	Nothing (an unbonded phone might power on A1ll but should not connect)

9 Disconnect and reconnect

AS A: user I WANT TO: experience that the logged data is always up to date in Lifelog.

If A1ll looses connection with the bonded device the following should happen

1) A1ll disconnected icon should appear in the status bar. If the Out-of-range alert is turned on (view separate chapter) then A1ll should vibrate.

2) A1ll should advertise for reconnection.

Disconnect and reconnect flow

1. A1ll and the bonded device are connected
2. The 2 devices loose connection due to e.g. out of range or Bluetooth off in connected phone/tablet. If Bluetooth is turned on again AHA shall try to reconnect.
3. A1ll advertises for reconnection the first 30 minutes and after 30 minutes 40 seconds every 30 minutes.
4. Whenever there has been a successful reconnect with the bonded device it should be visible in the status bar.

A1ll will advertise for reconnection in the following cases:

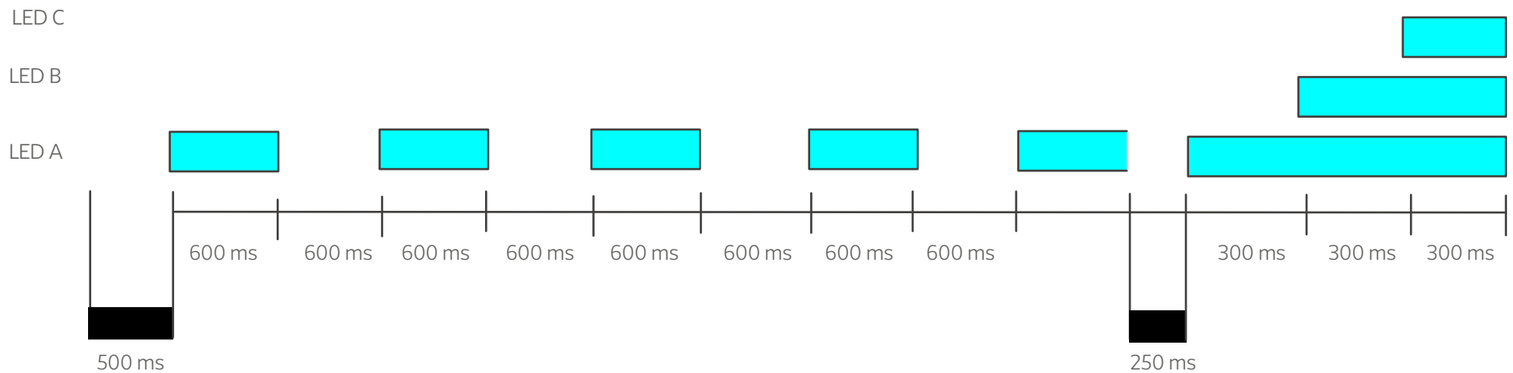
- Advertise automatically when disconnected
- Advertise at power ON
- Advertise manually
  Pressing the key will result in advertising when A1ll is disconnected.
- Advertise at NFC
  A NFC touch when A1ll and the BT device are disconnected will result in advertising.

10 Power ON A1ll

10.1 Power ON A1ll for the first time or after factory data reset

The power on vibration indicates that A1ll is starting up. When the user presses the key to turn on A1ll for the first time A1ll will enter bonding mode and LED A will blink continuously until connected. When A1ll is connected bonding mode stops with a short vibration and a connected status animation is displayed.

Note: If there is a failure in bonding will A1ll power off after 5 minutes.

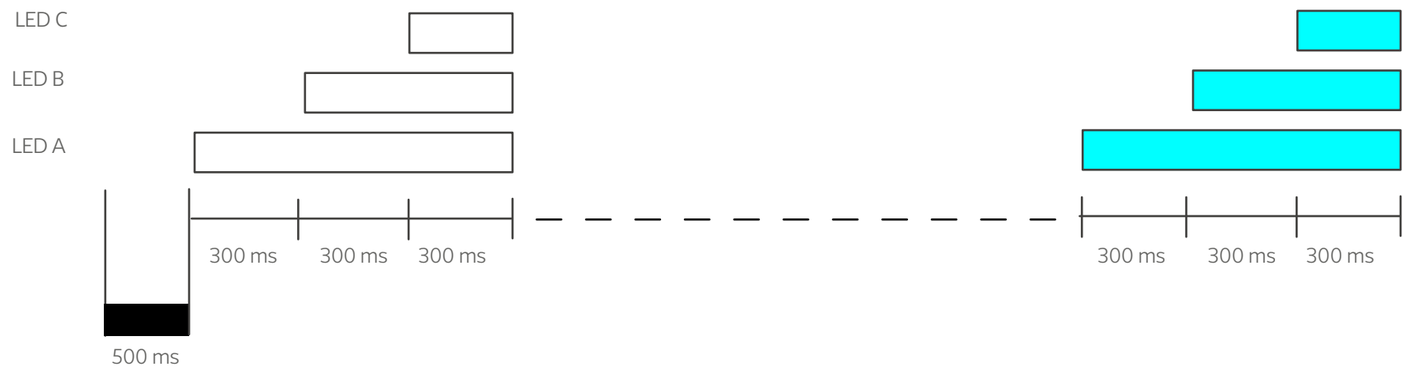


10.1.1 Power ON when unbonded

A1ll stars up in bonding mode . A short vibration indicates when A1ll is bonded to the phone, followed by the connected animation when the connection is completed.

10.2 Power ON A1ll when already bonded

Pressing the key to turn on an already bonded A1ll will generate a power on vibration and then connected status is displayed with white LEDs since A1ll is not connected yet. As soon as AHA succeeds to reconnect the connected status animation is displayed in cyan.

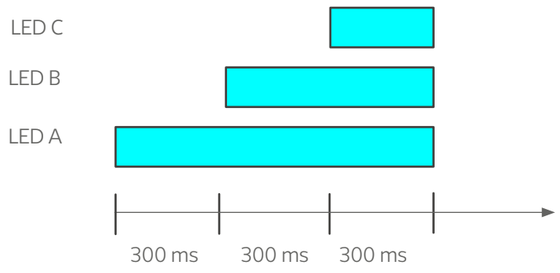


10.2.1 Power ON when already bonded

The connected status animation is used at start up and again when finally connected.

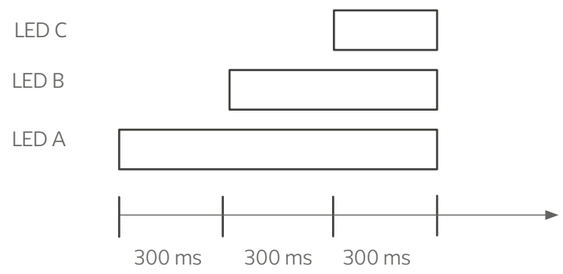
10.3 Connection status when turned on

Key short press when A1II is turned on generates a connected status LED animation. The LEDs are lit in cyan if A1II is connected and white if not connected.



10.3.1 Short press when connected

The connected status animation uses cyan when connected.



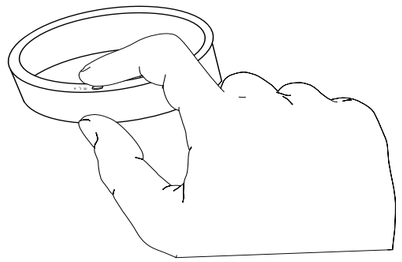
10.3.2 Short press when disconnected

The connected status animation uses white when disconnected.

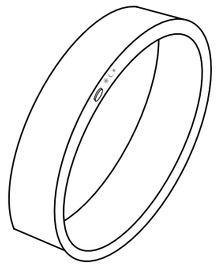
11 Turning OFF and Factory data reset

11.1 Turning OFF A1ll

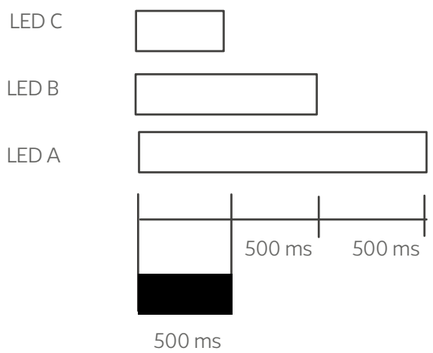
The user needs to very long press the key in order to turn A1ll OFF. If there is a HRV measurement going on then the HRV should be interrupted and the device should be turned off.



11.1.1 Very Long press the key to turn off A1ll



11.1.2 All three LEDs are lit and then turned off, one by one.



11.1.3 Power OFF sequence.

The power OFF sequence uses white LEDs.

11.2 Factory data reset

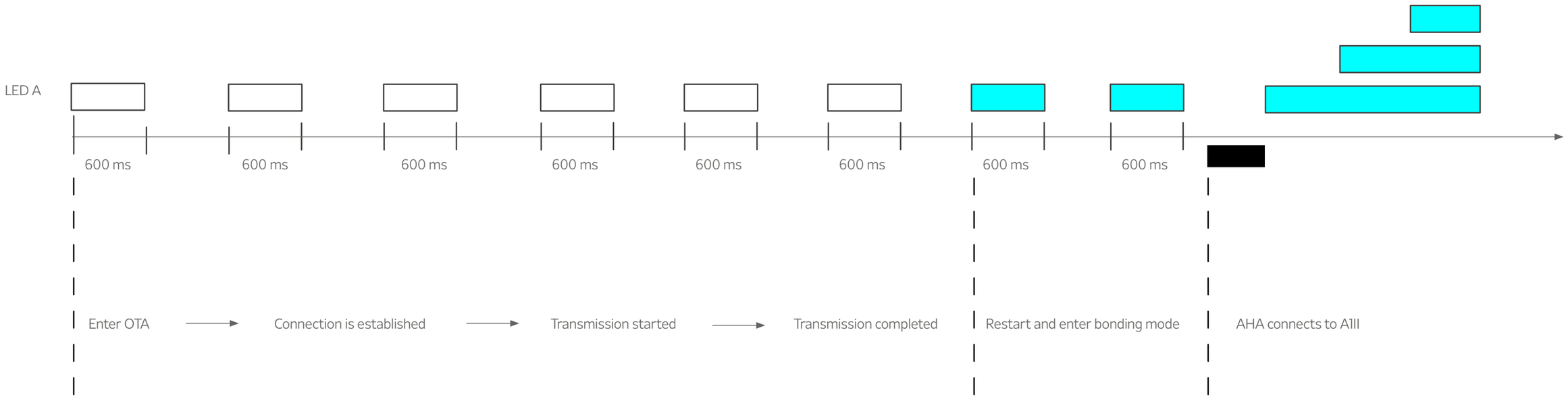
Factory data reset can only be done from power OFF mode. A more than 10 second long press (very very long press) generates a factory data reset. Factory data reset will clear all data but not roll back firmware updates. After factory data reset A1ll automatically starts up in bonding mode. Factory data reset is the only way to connect A1ll to a new device if already bonded to another device.

12 OTA and DFU mode

12.1 OTA sequence

The different modes during a OTA sequence have the same LED indication, constant white blinking. When the update is completed A1II enters bonding mode and AHA can reconnect.

Firmware update shall not be possible if the battery level is too low, A1II must then indicate this to AHA.



12.1.1 OTA sequence.

13 Automatic logging of physical activities - an overview

A1ll should be able to log steps, walking, running, swimming, number of stairs, elevator riding and sleeping. All activity tracking should work offline. Other activities e.g. transportation and app usage are detected by the phone. What and how the logged data is visualized is decided by the Lifelog team. Ask Lifelog team about which activities they commit to. Some short time logged data will also be visualized in AHA.

GENERAL

AS A: user I WANT TO: be able to experience that all my activities contribute to improved health.

Comment: Today we have steps as the unit that all sport activities presumably contributes to. When we have swimming (and eventually other physical activities detected) it may be more reasonable to have calories as the value that physical activities contributes to.

STEPS

AS A: user I WANT TO: know the number of steps I have taken during a day (only seen in Lifelog and AHA since A1ll have no display).

AS A: user I WANT TO: know how I am progressing compared to the set goal.

SLEEP

AS A: user I WANT TO: know for how long time I have slept.

AS A: user I WANT TO: be able to view a sleep cycle on a detailed level.

AS A: user I WANT TO: get an indication of whether my night sleep has been of good quality or not.

It should be possible to log sleep automatically. The transition from step logging to sleep logging should occur seamlessly. In Lifelog it should be possible to view sleep cycles, light sleep, deep sleep, for how long time and if the sleep has been of good quality or not (by registering toss and turn?)

RUNNING and WALKING

AS A: user I WANT TO: know the distance I have run/walked, for how long time and how many calories I have burnt.

AS A: user I WANT TO: to be able to view my Heart rate level (possibly measured more often during training).

Running and walking both add to the Steps data in Lifelog.

SWIMMING

AS A: user I WANT TO: know how many lapses I have swum.

AS A: user I WANT TO: know for how long time I have swum.

AS A: user I WANT TO: know how many calories I have burnt when swimming.

Discuss: Possibility to manually set the length of the pool to get distance? Possibility to measure different swim styles? What If auto detection not possible?

NUMBER OF STAIRS and ELEVATOR

AS A: user I WANT TO: know how many number of stairs I have taken (up or down).

AS A: user I WANT TO: know when I've been riding the elevator.

14 Remote mode
14.1 Overview

AS A: user I WANT TO: control certain functionality from A1ll by tapping.
AS A: user I WANT TO: design which functionality should be linked to tapping.

Examples
AS A: user I WANT TO: have a simple way to control the media player.

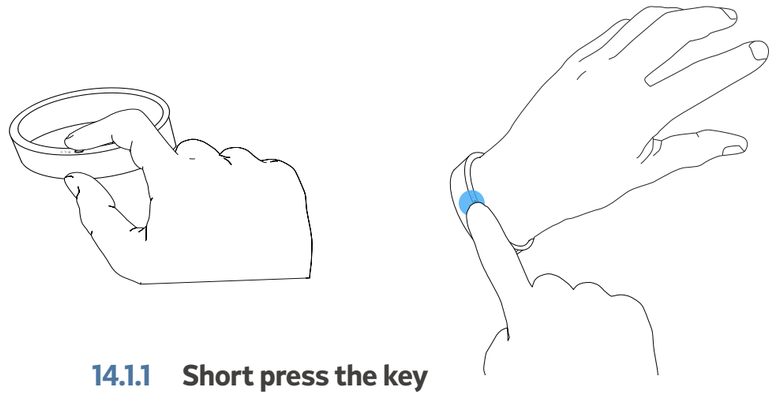
It is possible to control a set of up to three actions from A1ll by tapping one, two or three times. In AHA it is possible to select which set of actions that should be controlled. The user can also design a custom set of actions containing one to three actions.

The user enters remote mode by single, double or triple tap after key short press, the initial tap sequence is handled as an action. When in remote mode all three LEDs are lit in green. As long as A1ll is in remote mode single tap, double tap and triple tap is detected and can be linked to the current set of actions that the user has selected in AHA. Vibration feedback indicates if single, double or triple tap was detected.

The hardware has a time out for how long A1ll can be in remote mode but a new tap can restart the time out. Disconnect, incoming call, alarm/ Smart Wake up alarm or a new key press will make A1ll exit remote mode.

In remote mode all steps (and possible sleep states) are still logged.

NOTE: Remote mode should only be accessible when connected.



14.1.1 Short press the key and tap to enter remote mode.

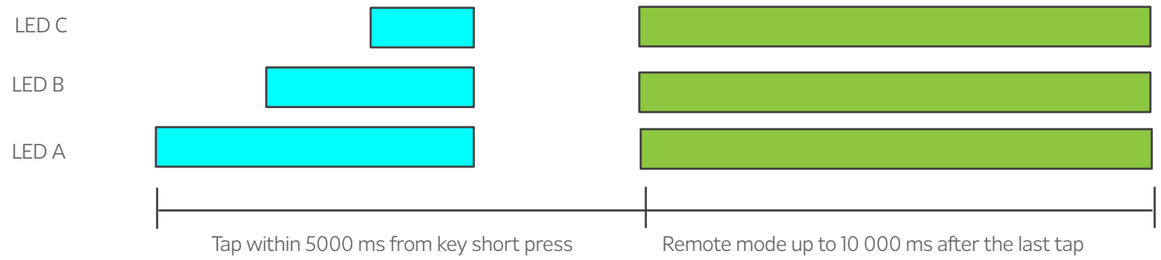
14.1.2 All LEDs are lit in green when in remote mode.

14.2 Remote mode - LED and vibration feedback

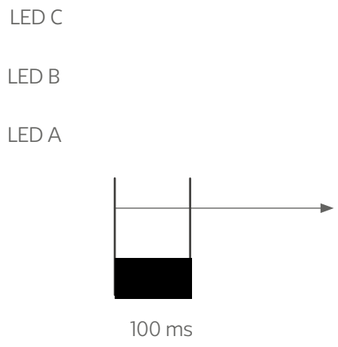
When connected A1II enters remote mode if the user taps within 5000 ms after key short press. Remote mode has a time out 10 000 ms after the last tap sequence. Key short or long press will exit remote mode directly. A1II goes back to idle or control mode depending on previous mode.

Double and triple tap must have less than 500 ms between the taps.

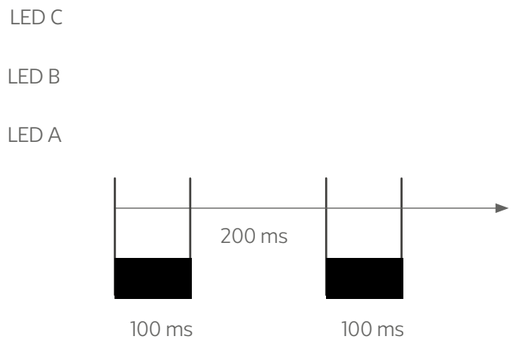
Single, double and triple tap have corresponding vibration feedback with a 500 ms delay ensuring that the whole tap sequence was finished.



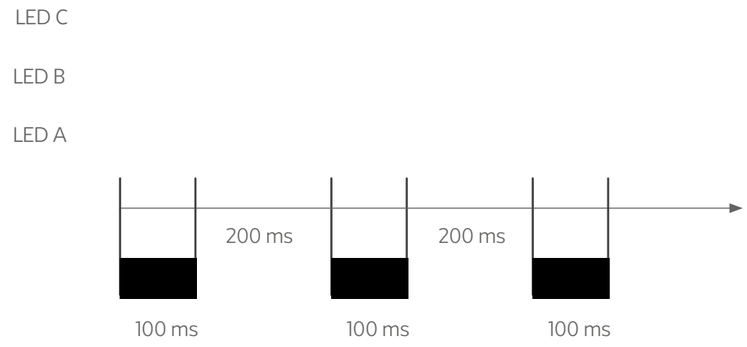
14.2.1 LEDs in Remote mode



14.2.2 Vibration feedback after single tap



14.2.3 Vibration feedback after double tap



14.2.4 Vibration feedback after triple tap

14.3 Application mode - extension guidelines

Open extension protocol descoped and replaced by native remote mode

Extensions can get raw accelerometer data from A1ll, this will enable extensions to use A1ll for e.g. gaming or guitar playing. A small protocol for tap interaction is provided but counted steps and sleep data is not provided.

Extension developers can do the following:

- Create their own design pattern for how to interact with A1ll using the raw accelerometer data.

- Use the pre defined tapping protocol for interaction.

Extension developers are limited by the following:

- Extensions can not use keypresses

- Extensions can not use vibrations.

- For Extensions that want to use tapping to control media, we suggest that they will use the same pattern as defined for Media player (view next chapter).

- There will be no warning saying that the battery may run out very fast.

- It is up to Extension developers to define and explain their chosen interaction pattern to the user.

TBD

- Explore if the SmartBand should send data to other apps that are not identified as Control-apps. For instance Runtastic? No tap interactions may be necessary?

- There is no 15 seconds time out from AHA for extensions that use sensor data.

14.4 Remote mode - Life bookmark (Selected per default or not?)

Life bookmark Removed!

AS A: user I WANT TO: to tag the moment from my A1ll and have it saved for personal remembrance.

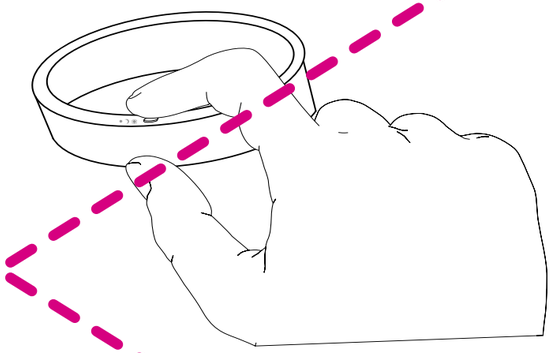
When adding a Life bookmark from A1ll a Heart Rate Variation (HRV) measurement is done and logged together with the time and place in Lifelog. The purpose of Life bookmark is to tag a memorable moment.

TBD: Should AHA try to initiate HRV after LB, how many attempts?

TBD: if the user is running the pulse is logged instead of HRV

If the user has selected Life bookmark as an action to control in remote mode then she can press the key and tap the dedicated tap sequence to enter remote mode and save a Life bookmark. If the user has phone applications up and running the activities will be added to the Life bookmark. The life bookmark will also register activities up to 10 minutes before and after the bookmark was taken. For instance, if the user takes a photo using her phone she needs to Life bookmark it within 10 minutes.

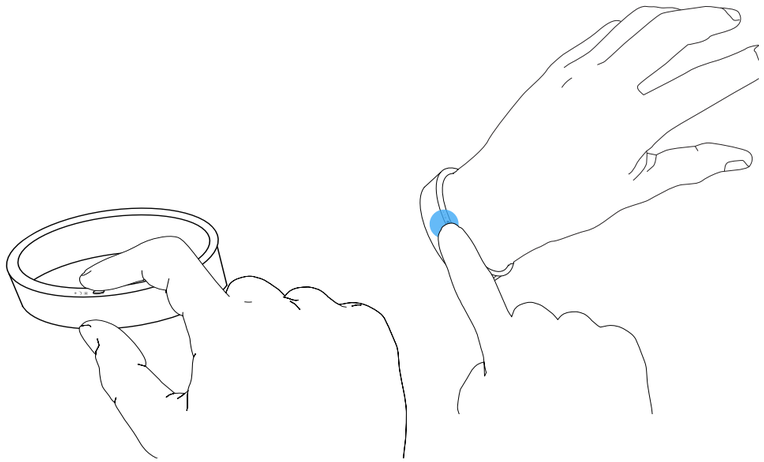
Life bookmark will not be possible to add from A1ll when disconnected!



14.5 Remote mode - Media Player

AS A: user I WANT TO: to be able to control media by using the bracelet.

The user can select media player actions in AHA as the set of actions to be controlled through tapping in remote mode. Media player actions will control the last used player that supports play/pause, previous and next intents. All three LEDs are constantly lit in green while in remote mode. Remote mode times out back to previous mode 10 seconds after the last tap.



14.5.1 Press and tap

Short press the key and tap an action.

14.5.2 LEDs are green

Three LEDs are lit in green while in remote mode. The user can tap new actions without a key press until remote mode times out.

Tap interactions

Single tap - Play/pause

If media is off media should start playing

If media is on media should stop playing

Double tap - Next track

If media is off media should go to next track

If media is on media should go to next track

Triple tap - Previous track

If media is off media should go to previous track

If media is on media should go to previous track

14.6 Remote mode - Functionality supported by AHA

FEATURE	ACTION	COMMENT
Media player	play/pause	Based on android key events
Media player	next track	Based on android key events
Media player	previous track	Based on android key events
Camera	take picture	Based on android key events
Camera	start/stop movie recording	Based on android key events
Find phone	start/stop sound	
Phone speaker TBD	turn ON/OFF	
Phone ringtone & notification volume TBD	switch ON/silent	
Phone ringtone & notification volume TBD	switch ON/vibration	
A1ll Do Not Disturb TBD	switch ON/OFF	

NOTE! This list will be completed in AHA blueprint, A1ll is only responsible for sending single, double or triple tap

15 Control mode

15.1 Overview

AS A: user I WANT TO: use external apps that are compatible with my SmartBand for real time logging and interaction through LEDs, vibrations, tapping and gesture.

AS A: user I WANT TO: use my SmartBand to play e.g. a game running on my phone.

AS A: user I WANT TO: use my SmartBand together with e.g. a physical training app running on my phone.

AS A: user I WANT TO: have an easy start up and flexibility between different external apps that can utilize my SmartBand.

AS A: user I WANT TO: be in charge of when an external app takes control over my SmartBand.

General description of control mode

Control mode is initiated from the phone. External applications running on the phone can ask AHA to get control over the sensors, vibrations and LEDs on A1II. However steps and sleep shall still be logged during control mode. The button on A1II is not part of the API for control mode.

The user have to confirm in e.g. a popup when entering control mode. TBD if AHA or the external app should ask the user for permission.

TBD how AHA should handle control mode requests from multiple apps, require that the app runs in foreground?

Interrupting control mode

The user can long press the key to stop control mode, the external app can then not take control over A1II again until the user has accepted it from the phone.

Control mode can also be interrupted in the following cases, it is up to the external app to decide if control mode automatically should resume after the interruption, or if the user will have to confirm it.

- Incoming call
- Xperia alarm notification
- Smart wake up alarm
- Remote mode
- Lost connection
- Low battery warning
- Manual HRV

Ordinary notifications can be passed to A1II in control mode and in that case override the vibrations and LED signals sent from the external application. It shall be possible for the external application to support the user in turning off notifications during the control mode session.

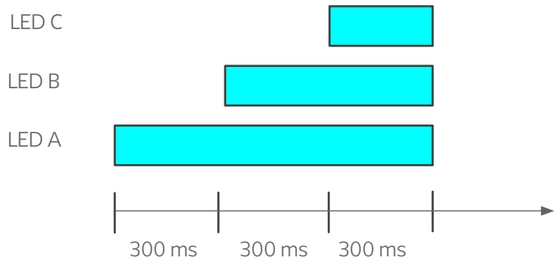
Note! The external app will have to explain for the user how to interact with A1II, how to end control mode and which SmartBand notification features will

15.2 Key interactions in control mode

- Short press - View connection status
- Long press - Exit control mode

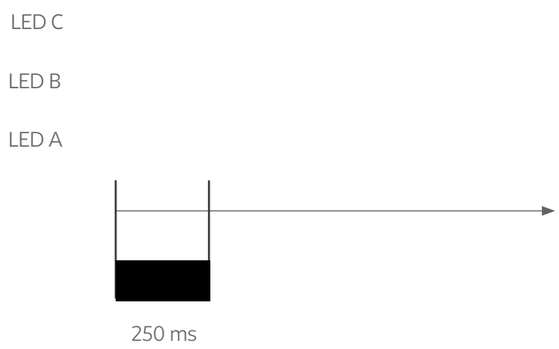
In control mode can the app take control over the LEDs. Key short press will however always override the app and the LEDs animate connection status. The app resumes control over the LEDs directly after the animation.

Long press in control mode will stop control mode and set A1II in idle mode.



15.2.1 Short press in control mode

Control mode requires that A1II is connected. The usual connected animation in cyan will be played at key short press. This animation overrides the applications LED control.



15.2.2 Long press in control mode

Long press in control mode ends the control mode session and the external application loses control of A1II. A short vibration is used as long press feedback.

16 Heart rate measurements

16.1 Automatic HR(V) measurement

AS A: user I WANT TO: be able to log Heart rate level automatically on a regular basis

AS A: user I WANT TO: be able to decide when the Heart rate measurements should be done i.e. in what contexts. E.g. during physical activities, entertainment, every day etc.

There is no indication on the bracelet to signal that an automatic HRV is going on.

TBD! How often the Heart rate measurements are done depends on battery drainage and may be controlled from AHA. This is also where settings for which activities that should be measured more often can be configured, e.g. if automatic HR(V) is time scheduled or triggered by the accelerometer. Automatic HR(V) shall also work offline.

TBD Still under discussion!

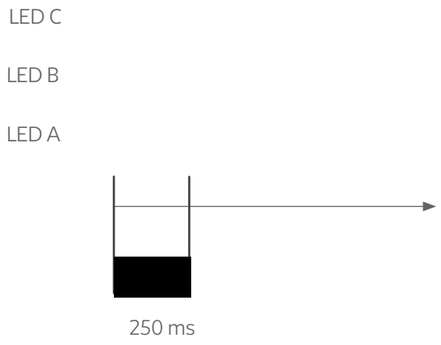
16.2 Manual HR(V) measurement

AS A: user I WANT TO: be able to initiate a single Heart rate measurement from my A1II.

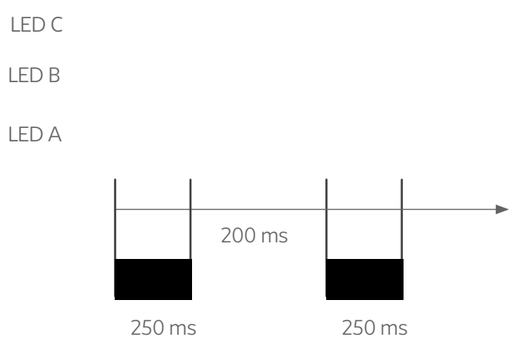
AS A: user I WANT TO: get an indication whether my manual HRV measurement finished successful or not.

A manual HRV measurement can be initiated from AHA when connected, but also by key double press on A1II when e.g. disconnected. The LEDs indicate ongoing manual HRV measurement with an orange dimming animation. A successful HRV session is followed by a single vibration, a double vibration indicate corrupt/aborted session. Incoming call and alarm is passed through during manual HRV (even if it might disturb the session) but notifications and low battery warning are delivered after the session. Control mode is paused by manual HRV and any key press will abort manual HRV.

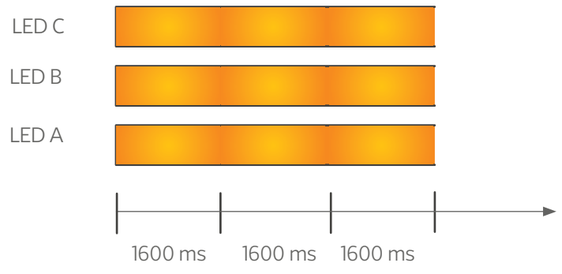
TBD if AHA should have a setting for choosing between manual HRV or HR measurement, depends on if the sensor can register both at the same time.



16.2.1 Vibration feedback after successful HRV data

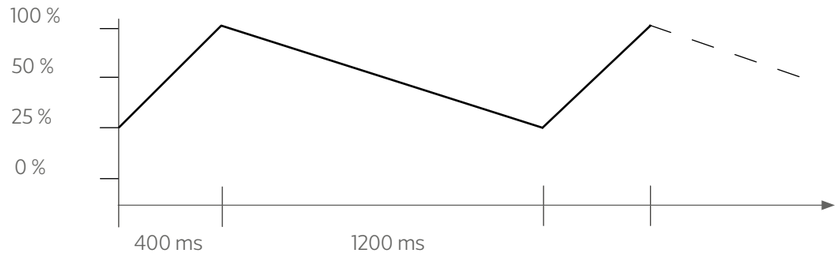


16.2.2 Vibration feedback after corrupt HRV data



16.2.3 LEDs during ongoing HRV measurement

All three LEDs are repeatedly dimmed in orange between 25 % and 100 % color brightness.



16.2.4 Dimming of all three LEDs simultaneously 25 % - 100% color brightness

All three LEDs are repeatedly dimmed between 25 % and 100 % color brightness.

17 Alarm
17.1 Xperia alarm and Smart wake up

AS A: user I WANT TO: be alerted by xperia alarms and Smart wake up

AS A: user I WANT TO: be able to choose between snoozing or turning off the alarm from the bracelet.

AS A: user I WANT TO: plan the alarms on a weekly basis.

In addition to ordinary xperia alarm notification A1ll has a Smart wake up alarm, which means that A1ll will wake the user up when s/he is in light sleep. In AHA the user can select at what time and for how long the Smartband should start to detect light sleep.

For instance, if the user has set a Smart wake up for 07:00 with a 30 minutes wake up widow, A1ll will alert sometime between 06:30 and 07:00 when the user is in light sleep.

If the alarm is set for 07:00 with a 30 minutes wake up widow, but A1ll is only detecting deep sleep, or that the user is awake, the alarm will alert at 07:00.

Snooze and turn off Xperia/Smart wake up alarm

If the user wants to silence the alerting alarm and snooze, the user can short press the key. After 15 minutes (snooze time could be configurable in AHA for smart wake up and is a setting for xperia alarm) the alarm will go off again. If the user wants to turn off the alerting alarm she needs to long press the key. As an option in AHA the user can also select to automatically turn off snoozing alarms when steps are detected. Auto silent time is 3 minutes for smart wake up and is a setting in Xperia alarm.

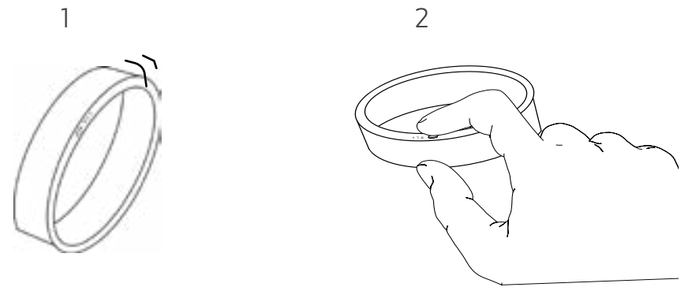
Schedule several Smart wake up alarms

It shall be possible to add up to five (5) Smart wake up alarms with a weekly repeat function.

The alarm has to be set when A1ll is connected and shall be stored on the accessory in order to function when disconnected.

Xperia alarm

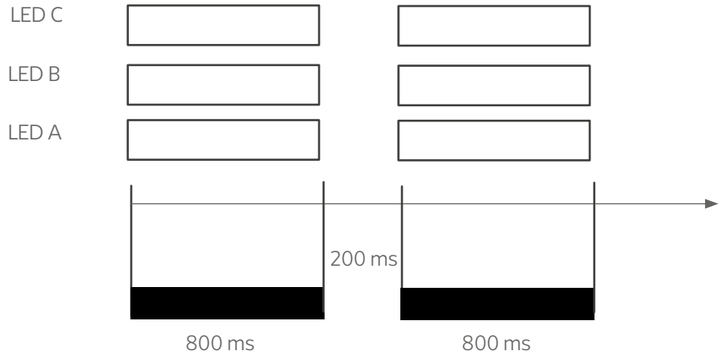
Ordinary alarm notification will only work when A1ll is connected to a Xperia device with the native xperia alarm app. Xperia alarm will not work offline.



17.1.1 Alarm and Smart wake up

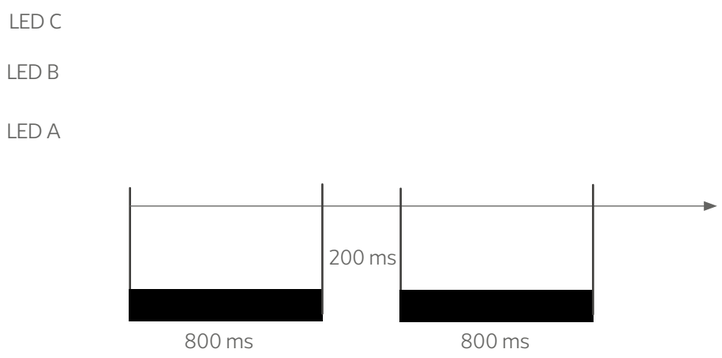
A1ll will vibrate and blink when there is a Xperia alarm and only vibrate when there is a Smart wake up. The user short press the key to snooze or long press to turn off the alarm.

17.2 Alarm vibration and LED patterns



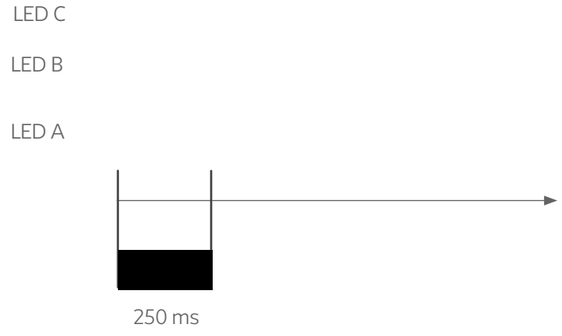
17.2.1 Xperia alarm vibration and LED blinking intervals

Continuous vibration and white blinks from all LEDs.



17.2.2 Smart wake up vibration intervals

Smart wake up has the same vibration pattern as Xperia alarm, but Smart wake up does not use LEDs.



17.2.3 Long press during alerting alarm

A short vibration is used as long press feedback when turning off an alerting alarm.

18 Incoming call

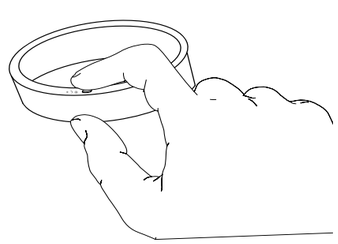
AS A: user I WANT TO: be alerted when there is an incoming call.

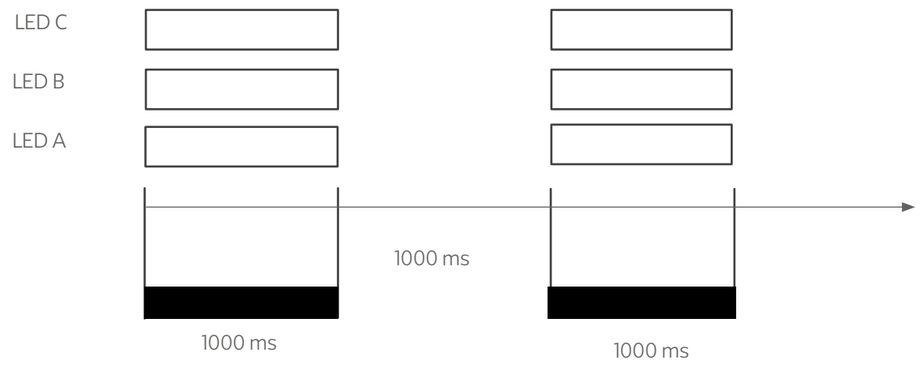
AS A: user I WANT TO: be able to silence an incoming call

Notification for incoming call consists of continuous vibrations with all 3 LEDs blinking in white until the user short or long press the A1II key. This will silence the incoming call signal/vibration on the phone and stop the vibration and LED blinking on A1II.

1

2





18.2.1 Incoming call

A1II vibrates and blinks when there is an incoming call.

When the user presses the key the phone and A1II are silenced.

18.2.2 Vibrations and LED blinking intervals

Continuous vibrations and white blinks from all LEDs until the key is pressed, call is answered or the caller hangs up.

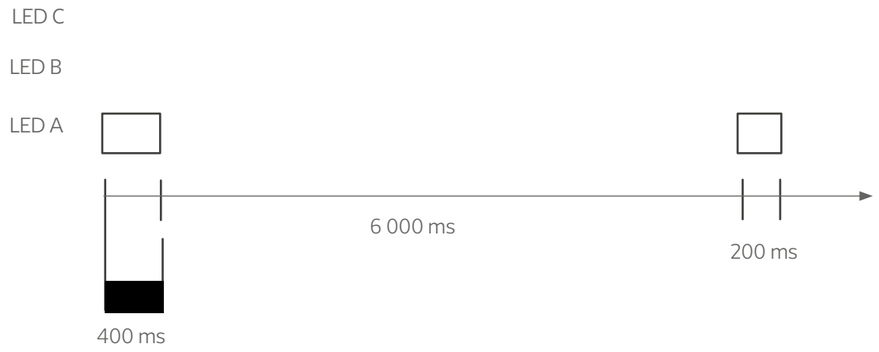
TBD if it should be possible to customize incoming call notification from selected contacts

19 Notifications

19.1 General notification

AS A: user I WANT TO: be alerted by A1ll for incoming notifications in the phone.

A1ll supports notifications from Android and iOS devices via a vibration and LED pattern (view image). The first time the LED blinks it comes with a vibration, then one LED blink every 6 second. If the user press the key or reads the notification in the phone the LED will stop blinking. If the user don't press the key or read the notification on the phone the notification will time out after 5 min. A new notification will prolong the notification timeout.



19.1.1 Notification in the phone notification tray, e.g. incoming SMS/MMS or mail

A vibration notifies the user of an incoming notification. It blinks every 6 seconds for up to 5 minutes. Short/long key press or reading the notification will stop the blinking.

TBD if notifications should be customized in some way depending of type of notification and contact, how to handle iOS?

19.2 Low battery notification

AS A: user I WANT TO: be alerted by the bracelet when the battery is low.

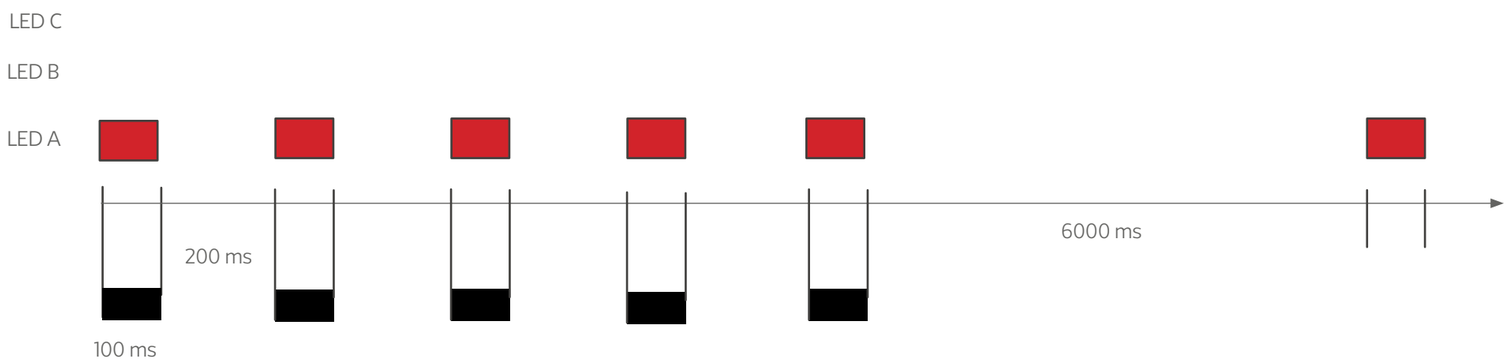
AS A: user I WANT TO: not be disturbed by the low battery warning during do not disturb mode.

1. A1ll is ON. (Charger is not connected)

2. When battery level is beneath a certain level A1ll will vibrate five times combined with a red LED. There will also be a popup from AHA that notifies the user of A1ll running out of battery. The red LED should continue to blink every 6 second the same way as a notification would do.

TBD if there should be one or many low battery warnings and at which percentage level depending on battery consuming mode and scheduled Do Not Disturb.

TBD how to handle low battery warning during incoming call, app mode etc.



19.2.1 Low battery notification

Five short vibrations and a pop up in AHA indicates low battery. After the initial five blinks and vibrations the red LED blinks every 6 second for 5 minutes, or until the key is pressed or the pop up is dismissed.

20 Charging battery TBD!!

20.1 Charging battery

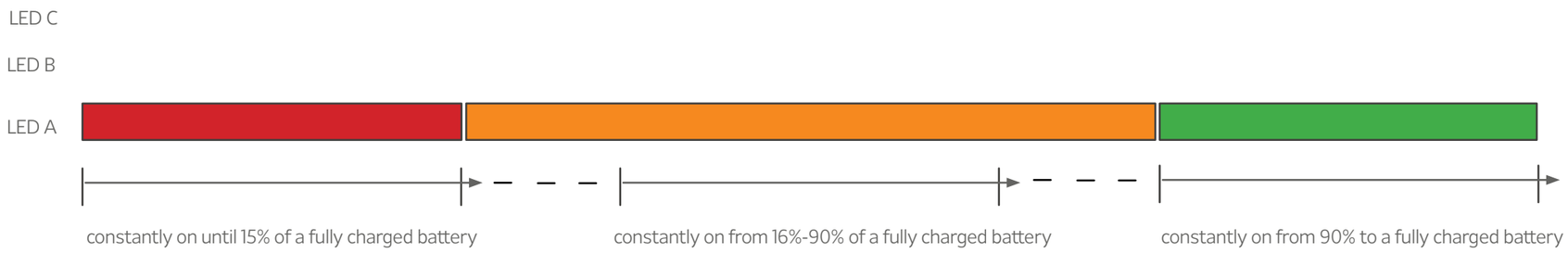
AS A: user I WANT TO: know when battery is fully charged and ready to use.

A1ll can be charged using a usb wall charger or a computer.

1. A1ll is ON or OFF (Charger is connected)

2. LED A is constantly on in red and then in orange as long as the charger is connected and battery is not fully charged. Even if the battery is completely drained shall the LED light up immediately when connecting the charger.

3. When A1ll is fully charged (90-100%) LED A is constantly on in green.



20.1.1 Battery charging

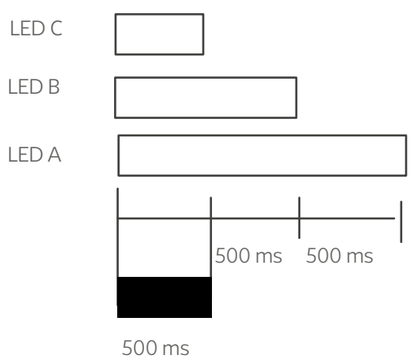
LED A is constantly on in red, then in orange. When having reached fully charged (90%) it is green.

TBD exact values for changing color

20.2 Turning off when running out of battery

AS A: user I WANT TO: be notified when A1ll is automatically turned off due to empty battery.

When A1ll is ON and out of battery the regular turning off animation/ vibration is initiated. This will happen when battery level is below 1%.



20.2.1 Notification when turning off due to low battery

LED and vibration indication when turning off because of empty battery.

21 Xperia at hand features

21.1 New generation proximity unlock

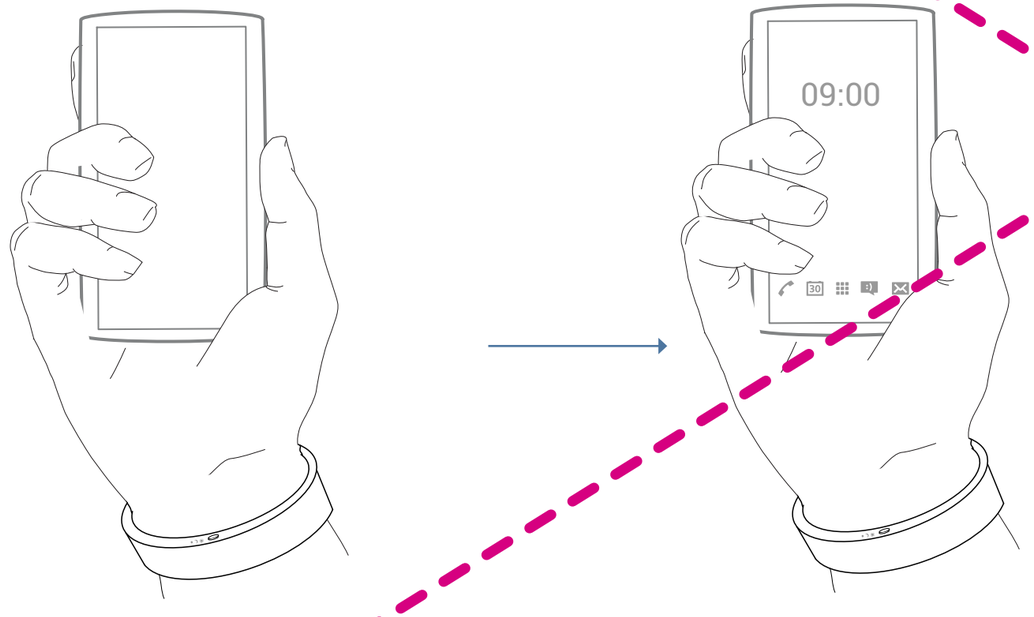
Descoped since the capacitive sensor is descoped!

AS A: user I WANT TO: have a safe way of unlocking the phone by using the bracelet. No one else should be able to access my phone with my bracelet.

When the distance between A1ll and the device is xx meter away it should be possible to unlock the phone without using a pin code or pattern etc.

Every time the user puts the bracelet on and it is connected to the phone the user needs to enter his unlock pin code on the phone. A unique code is then sent from the phone to the bracelet.

The device is locked whenever the user is not nearby. When the user presses the power button on the device, A1ll can bypass the screen lock. By pressing the key the user wakes the screens and the phone is unlocked automatically.



21.1.1 Wake up the device

INPUT: press the power key on the device, while wearing A1ll.

21.1.2 The device is unlocked

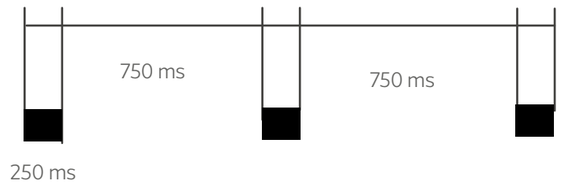
21.2 Out-of-range alert

When the distance between A1ll and the device causes a disconnection, A1ll will warn the user with vibrations. Due to the uncertainties of connectivity and signal strength it is impossible to set a fixed distance.

The function will be set to OFF in AHA per default.

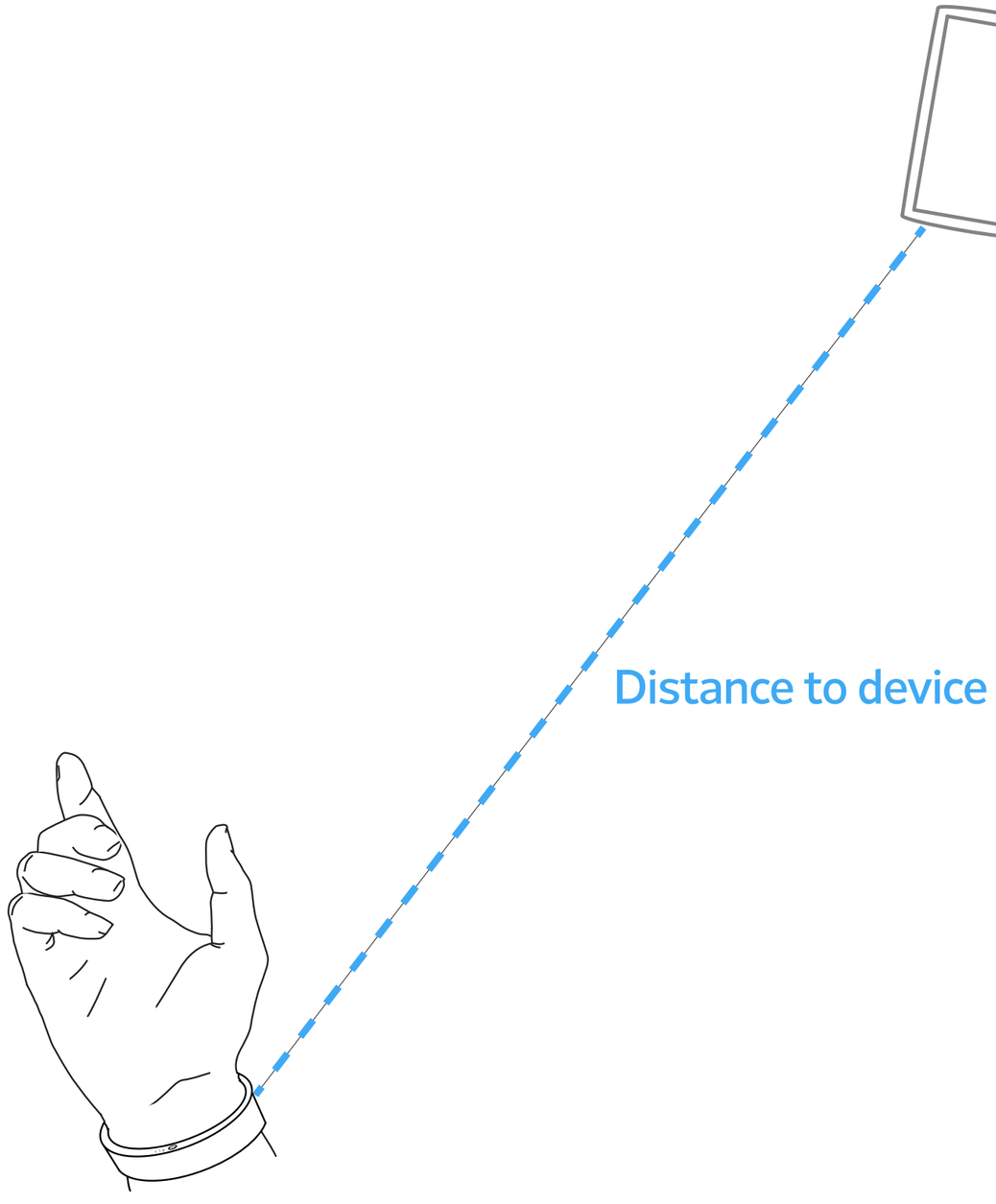
Design rationale: Users that are in their home or when working in an area that is quite big will not want to be reminded of having left their phone behind as this has been done intentionally. If the user get's reminded of this s/he will probably feel that the bracelet disturbs rather than helps.

Out of range alert is disabled when do not disturb is on.



21.2.1 Event: Out-of-range alert

Out of range alert if the user has enabled the Out-of-range alert in AHA .



22 Document history

Document Name /Metadoc revision	Changes	Document Author	Modification Date
IXD-Blueprint_A1ll_Accessory.pdf	• First draft	Sofia Dahlgren	2014-05-07
IXD-Blueprint_A1ll_Accessory.pdf	• Heart rate measurement is clarified	Sofia Dahlgren	2014 w 26.2
IXD-Blueprint_A1ll_Accessory.pdf	• Updated document based on review comments from 27/6 -14	Sofia Dahlgren	2014 w 27.3
IXD-Blueprint_A1ll_Accessory.pdf	• Startup flow updated	Sofia Dahlgren	2014 w 33.5
IXD-Blueprint_A1ll_Accessory.pdf	• HRV functionality clarified, • HRV that is initiated manually is out of scope • Specific notifications for reaching step goal is taken out of BP • Showing progress on bracelet is taken out of BP	Sofia Dahlgren	2014 w 34.3
IXD-Blueprint_A1ll_Accessory.pdf	• Show yourself to others added	Sofia Dahlgren	2014 w 34.5
IXD-Blueprint_A1ll_Accessory.pdf	• Key press table updated. Old info about HRV initiated on demand is deleted.	Sofia Dahlgren	2014 w 35.2
IXD-Blueprint_A1ll_Accessory.pdf	• 5.4.2 updated text • 8.1 corrected errors in text • Night mode is no longer mentioned • 17.3.1 is updated with complete text • 17.1 Low battery warning specified • Charging colors and length of charging in percentage updated	Sofia Dahlgren	2014 w 36.4

Document Name /Metadoc revision	Changes	Document Author	Modification Date
IXD-Blueprint_A1ll_Accessory.pdf	• Added double press in order to 1) have media control less accessible and thereby activate media control by mistake 2) to use short press to indicate when the device is connected and turned on 3) to make it clearer for the user when the user enters app mode (in colored wrist bands it may be difficult to differentiate between blue and green)	Sofia Dahlgren	2014-09-010
IXD-Blueprint_A1ll_Accessory.pdf	• Galvanic skin sensor (GSR) descoped. • Turn on LED animation updated in chapter 10. • Connected status animation added as white or cyan. • OTA added in chapter 12. • State machine diagram added . • 6.1 LED sequence key interactions updated. • Reject incoming call added on long press. • First time setup updated • Low battery warning updated • General clarifications.	Nils Hellstrand	2014-09-26
IXD-Blueprint_A1ll_Accessory.pdf	• 14. Remote control mode added and extensions descoped. • 15. Application mode initiated from the phone added. • 6.3 State diagram added • 6.4 State diagram for do not disturb added • 3. Capacitive sensor descoped. • 21.1 New generation proximity unlock descoped.	Nils Hellstrand	2014-10-08

Document Name /Metadoc revision	Changes	Document Author	Modification Date
IXD-Blueprint_A1ll_Accessory.pdf	• 3. Hardware requirement - HRV sensor added. • 5.3 Do Not Disturb added • 15.2 Key interactions in application mode added • Logging sitting/standing descoped • 7.2 Vibration feedback - Long press verification added for incoming call, alarm, remote and application mode.	Nils Hellstrand	2014-10-13
IXD-Blueprint_A1ll_Accessory.pdf	• 3. Hardware requirement details updated. • 15.2 Orange LEDs for application mode removed. • 7.3 Notifications supported during application mode. • 7.3 Reject incoming call removed • 14 Remote control mode only accessible when connected. • 16 HR measurement - TBD added for manual measurement. • 17.1 Alarm - stop snooze when detecting steps added. • 18 Incoming call - TBD added for contact customization. • 19 Notifications - TBD added for customization and iOS.	Nils Hellstrand	2014-10-17

Document Name /Metadoc revision	Changes	Document Author	Modification Date
IXD-Blueprint_A1ll_Accessory.pdf	• 7.2 Vibration feedback for tapping and manual HRV added. • 8.5 Second time pairing and connecting added. • 10.3 Connection status when turned on added. • 14.1 Remote control mode initiated by short press and tap • 14.2 Remote control mode - LED and vibration feedback added. • 14.6 Remote control mode - Functionality supported by AHA added. • 16.2 Manual HR(V) measurement added	Nils Hellstrand	2014-10-23
XD-Blueprint_A1ll_Accessory.pdf	• Support for up to 7 smart wake up alarms with repeat. • Updated comments about A1ll being bonded and not paired to a BT device • 14.6 Comments added to functionality supported by AHA in remote control mode	Nils Hellstrand	2014-11-03
XD-Blueprint_A1ll_Accessory.pdf	• 14 Remote control mode renamed to Remote mode. • 15 Application mode renamed to Control mode. • 8.5 Unbond from phone removed, only possible by factory data reset. • 11.2 Factory reset specified to Factory data reset. • SRS requirements added to BP • Life bookmark removed from remote mode and integrated with manual HRV at double press. • 14.2 Remote mode time out changed to 10 seconds.	Nils Hellstrand	2014-11-14

Document Name /Metadoc revision	Changes	Document Author	Modification Date
IXD-Blueprint_A1ll_Accessory.pdf	• Life bookmark removed. • Manual HR(V) LED dimming updated. • 7.1 LED sequence key interactions - Combined press for DFU mode added. • 17.1 only support for up to 5 smart wake up alarms. • 8.6 Open AHA at NFC touch when connected.	Nils Hellstrand	2014-12-05