



# UM11127

## Android APP manual for the temperature logger demo

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User manual  
COMPANY PUBLIC

### Document information

Information	Content
Keywords	NHS3100, temperature logger, PCB
Abstract	This UM shows how to use the NHS3100 Temperature Logger Android APP. Together with an NHS3100 Demo PCB NHS3100TEMODB, a single-chip, cost-effective and fully configurable cold chain monitoring solution is demonstrated.



## Revision history

Rev	Date	Description
v3	2018-07-10	Complete rework. Updated screenshots.
v2	2016-01-22	Added more pictures.
v1	2015-05-06	First issue.

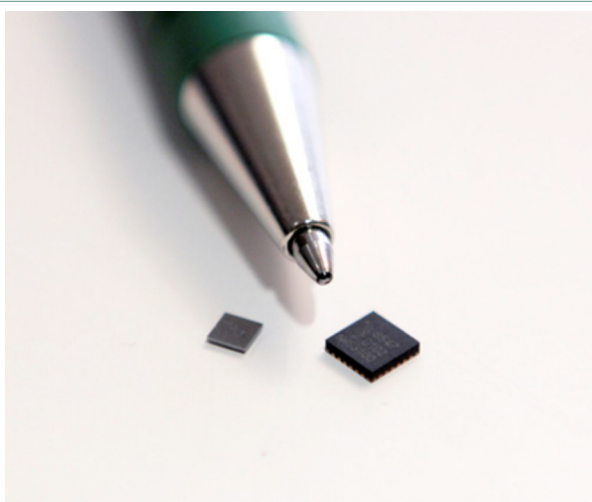
## 1 NHS3100 PCB temperature logger demo

### 1.1 Welcome

Thank you for your interest in our NHS3100 temperature logger chip.

A cost-effective, small, and fully configurable cold chain monitoring solution, based on the NXP Semiconductors NHS3100 chip, can easily be demonstrated using this APP and the NHS3100 Demo PCB NHS3100TEMODB.

All communication with the chip – both configuration and data read-out – occurs via the NFC interface.



aaa-030803

a. Chip real size



aaa-030804

Figure 1.

b. PCB

Figure 2. NHS3100 temperature logger

### 1.2 Prerequisites

To demonstrate the cold chain monitoring solution yourself, you need:

- An NHS3100 demo PCB NHS3100TEMODB. More information about the PCB and how to order them can be found at [https://www.nxp.com/pages/:NHS3100TEMOADK?tab=Buy\\_Parametric\\_Tab](https://www.nxp.com/pages/:NHS3100TEMOADK?tab=Buy_Parametric_Tab).
- A coin cell battery of type CR1225 or compatible. This type of battery is best suited for use cases targeting room and fridge temperatures.
  - Insert the coin cell in the coin cell holder on the demo PCB. The negative electrode of the battery should be at the bottom, closest to the PCB.
- An NFC enabled Android smartphone running 5.0 Lollipop or higher.
  - Any NFC-enabled phone can read out the status text messages.  
**On Android**, it can be done without an APP.

On iOS, it can be done using a generic NFC APP, such as the Tag Info of NXP Semiconductors (see <https://itunes.apple.com/us/app/nfc-taginfo-by-nxp/id1246143596>).

- Any NFC-enabled phone can also read out the full temperature data that is logged and stored on the chip. On iOS, it can be done using the Temperature Logger APP - see <https://itunes.apple.com/us/app/nhs3100-temperature-logger/id1288590548>. Due to access restrictions with the NFC reader on every iPhone, only reading is possible - one cannot start, stop or restart a monitoring session, only do a full read-out of the status and all gathered data.
- The Temperature Logger APP running on Android has no such restrictions. Download it from the Google Play Store at <https://play.google.com/store/apps/details?id=com.nxp.nhs31xx.demo.tlogger> or use the QR code to install the APP on your Android device.

**Note:** Newly ordered PCBs already have a coin cell inserted.

**Note:** This manual only focuses on the usage and functionality of the **Android** Temperature Logger APP.



aaa-030805

Figure 3. QR code for installing app

## 2 NHS3100 demo PCB

This demo board consists of the following:

1. An NHS3100 IC in an HVQFN24 package U1
2. An SWD connector J9
3. A coin cell holder for standalone operations BT1
4. One SW controllable LED D1
5. A tactile switch SW3 connected to the RESETN pin
6. A tactile switch SW2 connected to the WAKEUP pin
7. All PIOs of the IC P0x
8. GND and VDDBAT
9. Antenna coil connections LA and LB, connected with the NFC antenna on the back (not pictured)

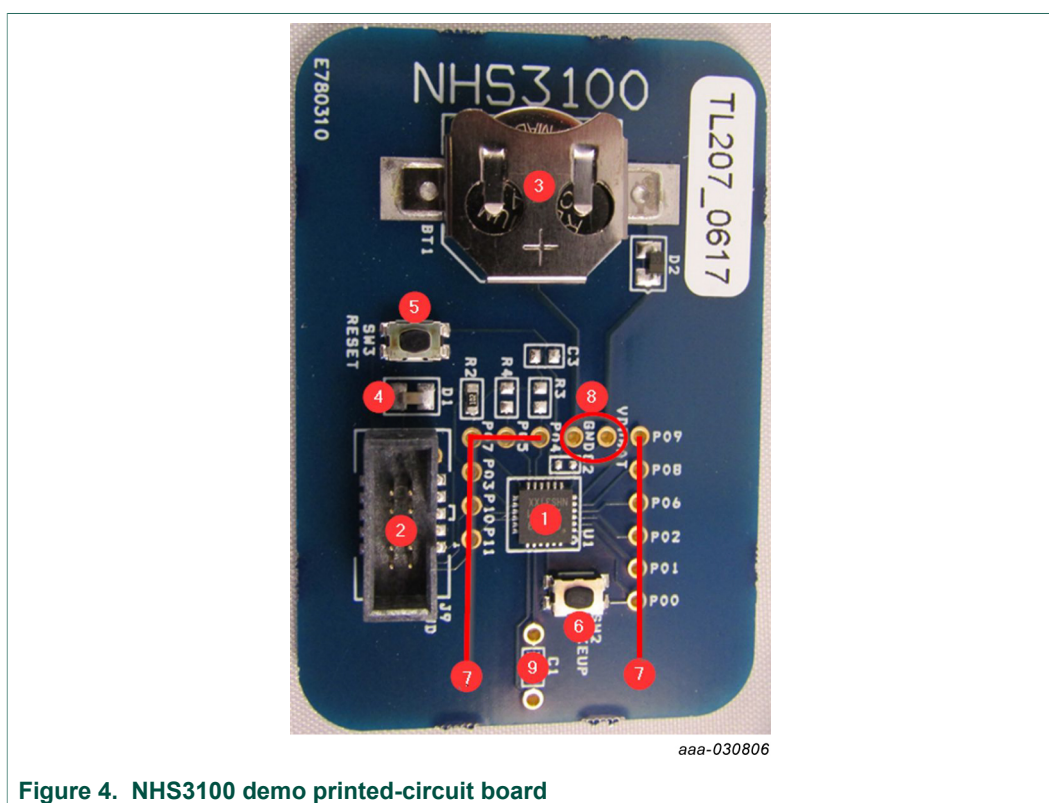


Figure 4. NHS3100 demo printed-circuit board

### 3 Overview

This demonstrator app is simple. It incorporates 4 screens. Each screen can be accessed by swiping left or right.

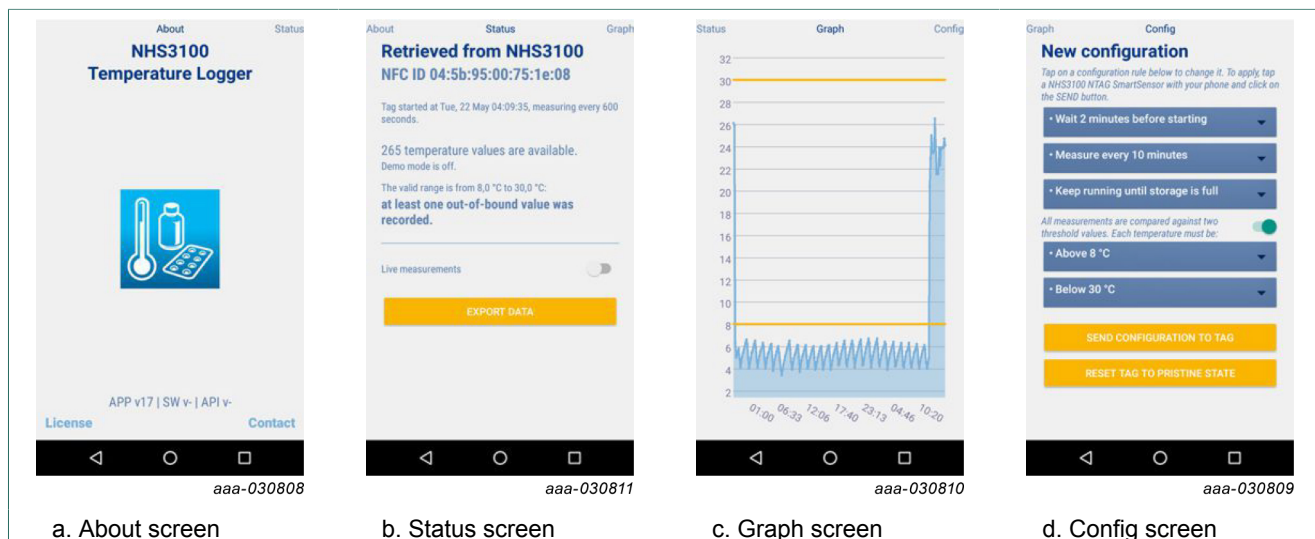


Figure 5. Temperature logger demo app

#### 3.1 About

This screen is the initial screen when the app is launched. You can accept or reject the license agreement, and find contact information from here.

1. You can accept or revise your agreement with the license of the app by tapping the logo.
2. Tapping on *License* pops up the full license agreement.
3. Tapping on *Contact* pops up the contact information to where you can direct all questions and requests.
4. When a tag has been detected, it lists its tag id here. When the tag is an NHS3100, it additionally lists version information of the firmware running on the IC.

#### 3.2 Status

The status screen gives the full status information as fetched from the NHS3100 IC. It provides an interpreted view of the status bytes that were retrieved immediately when the tag was tapped.

### 3.3 Data

New samples are read out from the NHS3100 IC. When a tag is held close to the NFC antenna of the phone, the previously fetched data samples are immediately restored from the internal storage of the phone.

1. To see the individual sample values, tap on the graph.
2. Samples that lie outside the range defined by the thresholds are colored differently.

### 3.4 Config

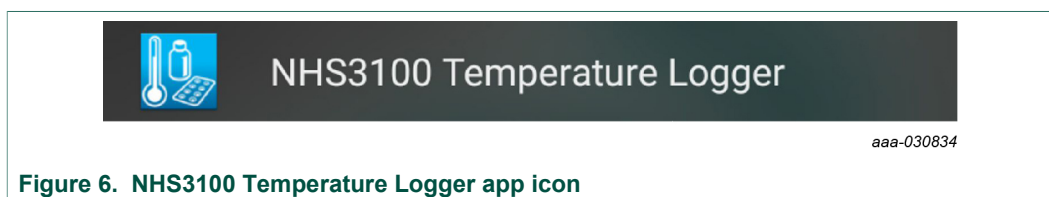
You can set up a new monitoring session on the NHS3100 IC with the last screen.

## 4 Quick start guide

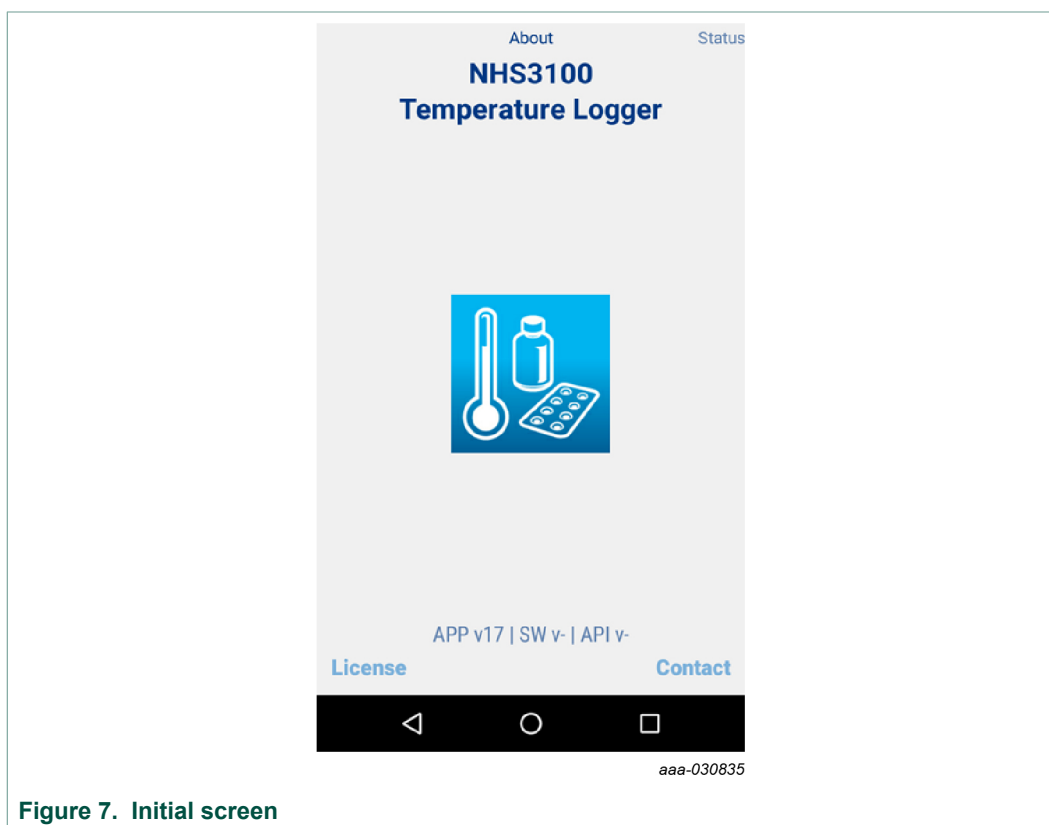
The Android app NHS3100 Temperature Logger can be used for all interactions with the demonstrator board.

### 4.1 Launching app

After installation of the app, look for the Temperature Logger app icon.



Tap the icon and the initial screen is shown.

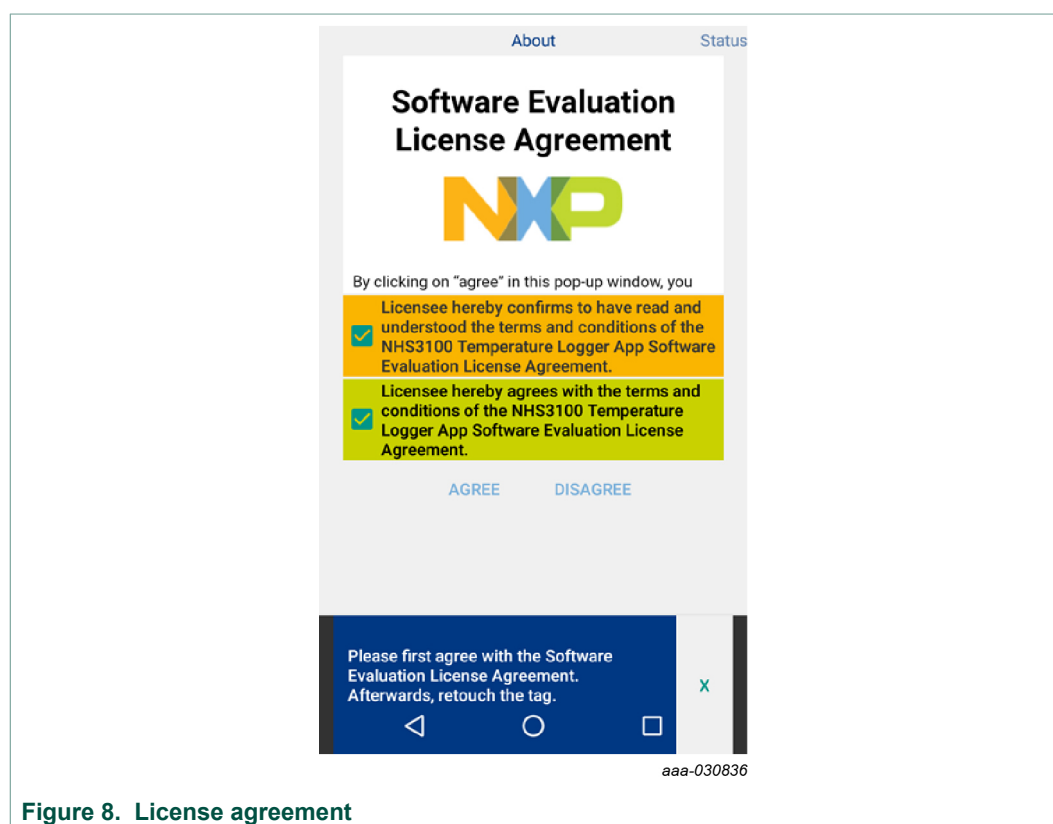




## 4.2 Accept license

Hold the NHS3100 demonstrator close to the NFC antenna of the phone is located.

- The location of the NFC antenna is not always apparent. It depends on manufacturer and phone type. It may take a few attempts to find the optimal location for NFC communication.
- The first time you launch the app, a popup appears containing the license agreement. The license agreement must be accepted before communication is allowed. After reading and accepting the license agreement, you must remove and retouch the tag before you can continue.



### 4.3 Tap demonstrator

Tap the PCB (again). A small notification appears near the bottom of the screen telling you that the phone has found an NFC tag. When communication with an NHS3100 IC is established, a second notification appears informing you that an NHS3100 tag has been found (see [Figure 9](#)).



**Figure 9. Displaying the second notification with information about the tapped PCB**

If the second notification is not shown, then most likely the NHS3100 tag does not yet contain the Temperature Logger firmware. To flash the IC with the correct firmware, follow the steps as outlined on [https://www.nxp.com/pages/:NHS3100?tab=In-Depth\\_Tab](https://www.nxp.com/pages/:NHS3100?tab=In-Depth_Tab).

## 4.4 Set configuration

Swipe left or right until the *Config* screen is displayed. Enter a number of seconds as the interval between temperature measurements. Optionally, fill in the lower and upper boundaries for the temperature alarm. When done, click the *Send configuration to tag* button.

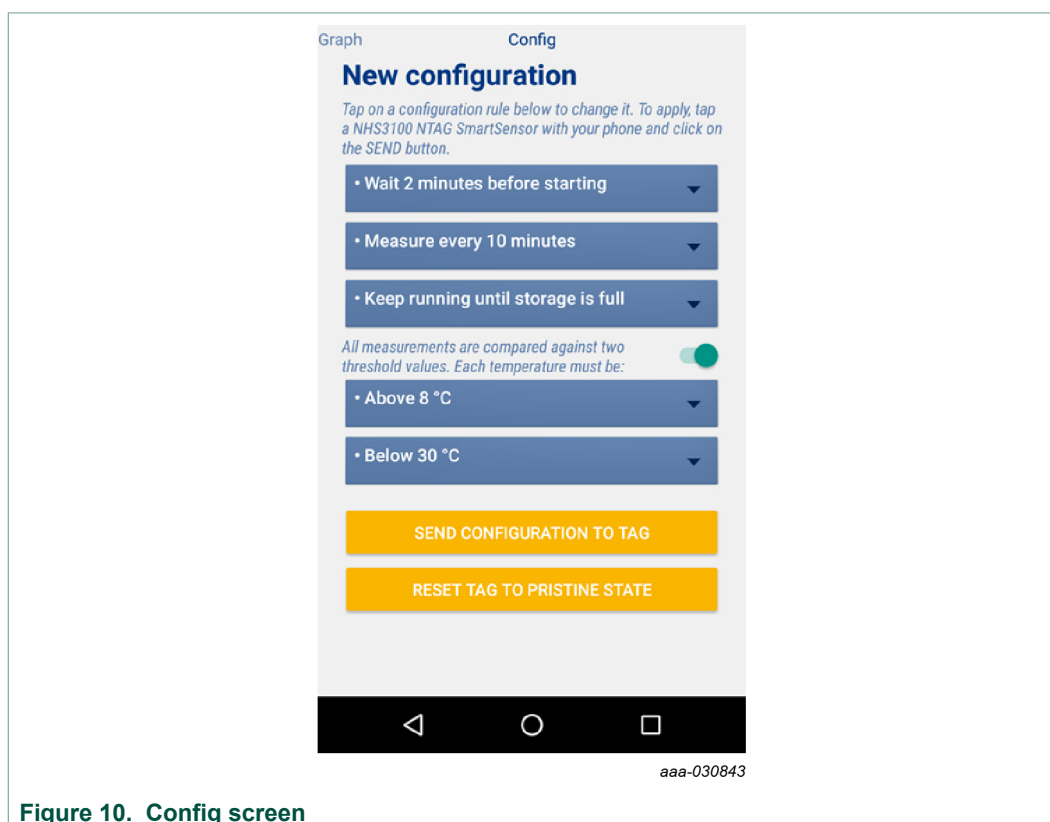
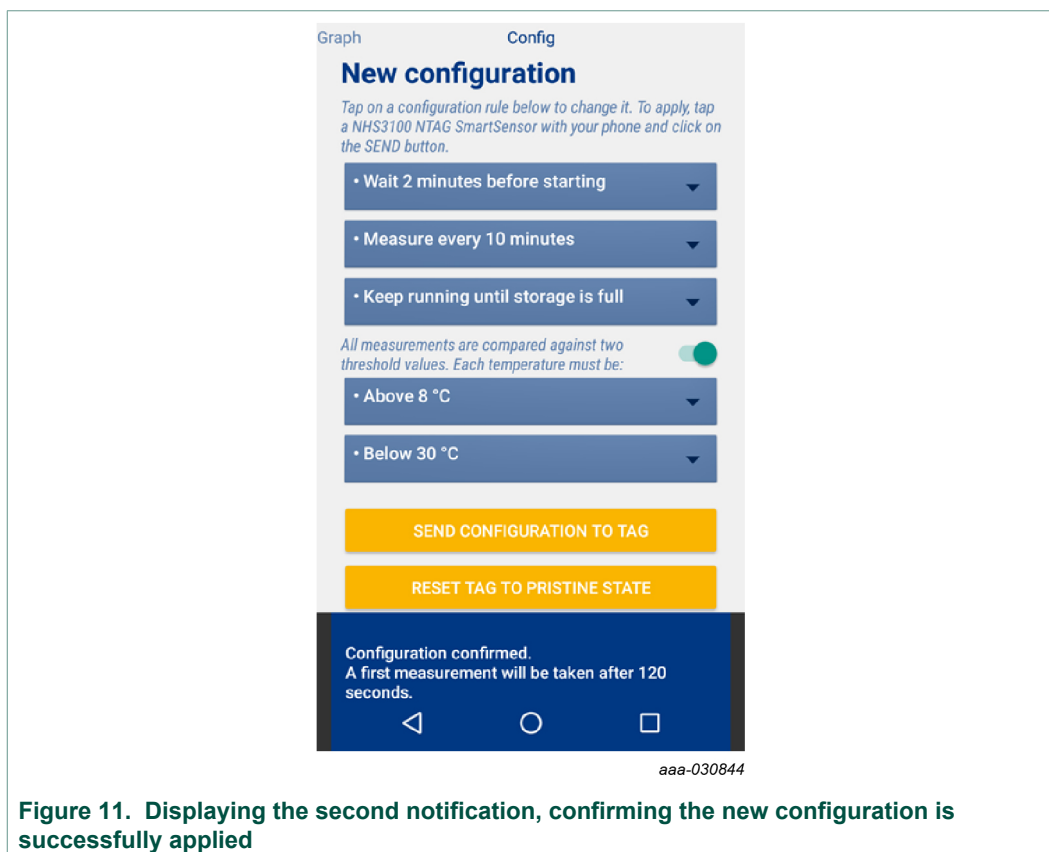


Figure 10. Config screen

Next, two notifications appear: the first, very briefly, notifying that the configuration has been sent to the demo PCB. The second notification provides a confirmation from the NHS3100 IC. When the confirmation is given, the demo PCB is fully set up and has started measuring using your configuration.



## 4.5 Wait

To start logging, move the NHS3100 demonstrator away from the phone. When the connection is lost, the phone gives you a notification. Wait for some time to give the NHS3100 IC the chance to take a few measurements. This time depends on the measurement interval that was configured.

## 4.6 Read-out

Bring the NHS3100 demonstrator back in range of the NFC antenna of the phone. As in step 2, two notifications appear. However, the second notification now also provides the number of measurements which are available on the NHS3100 IC. A full read-out begins automatically. When all samples have been read, you receive a notification.

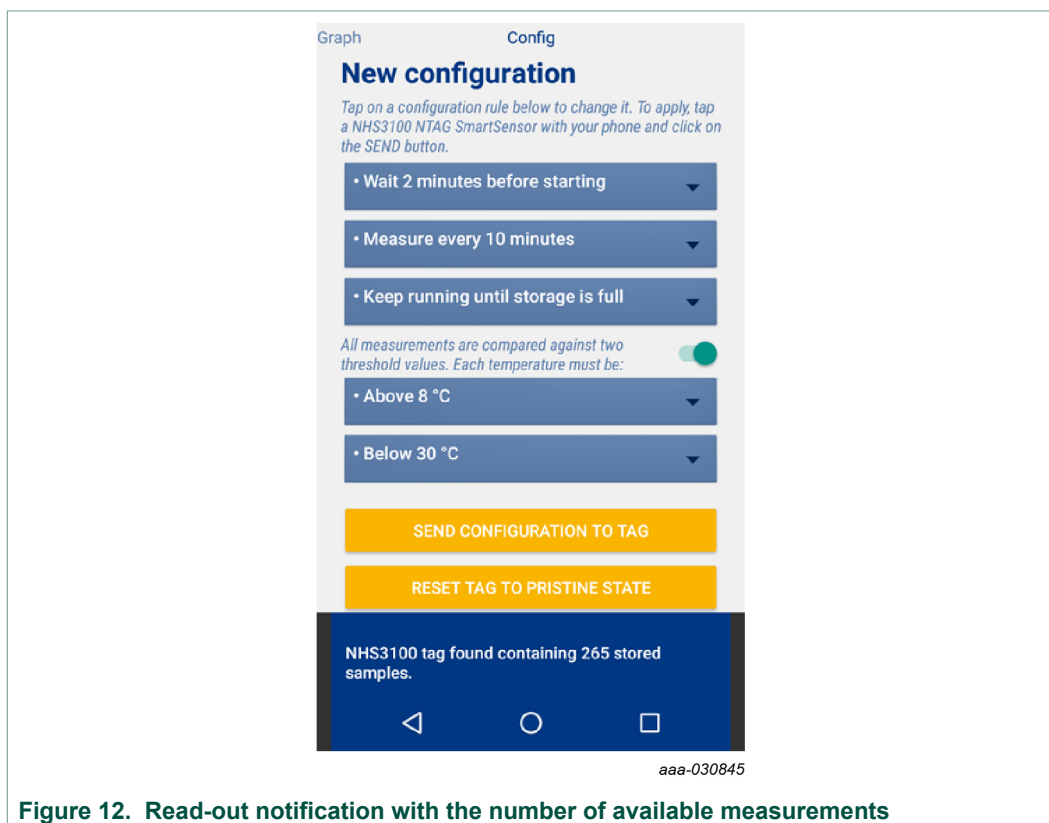


Figure 12. Read-out notification with the number of available measurements

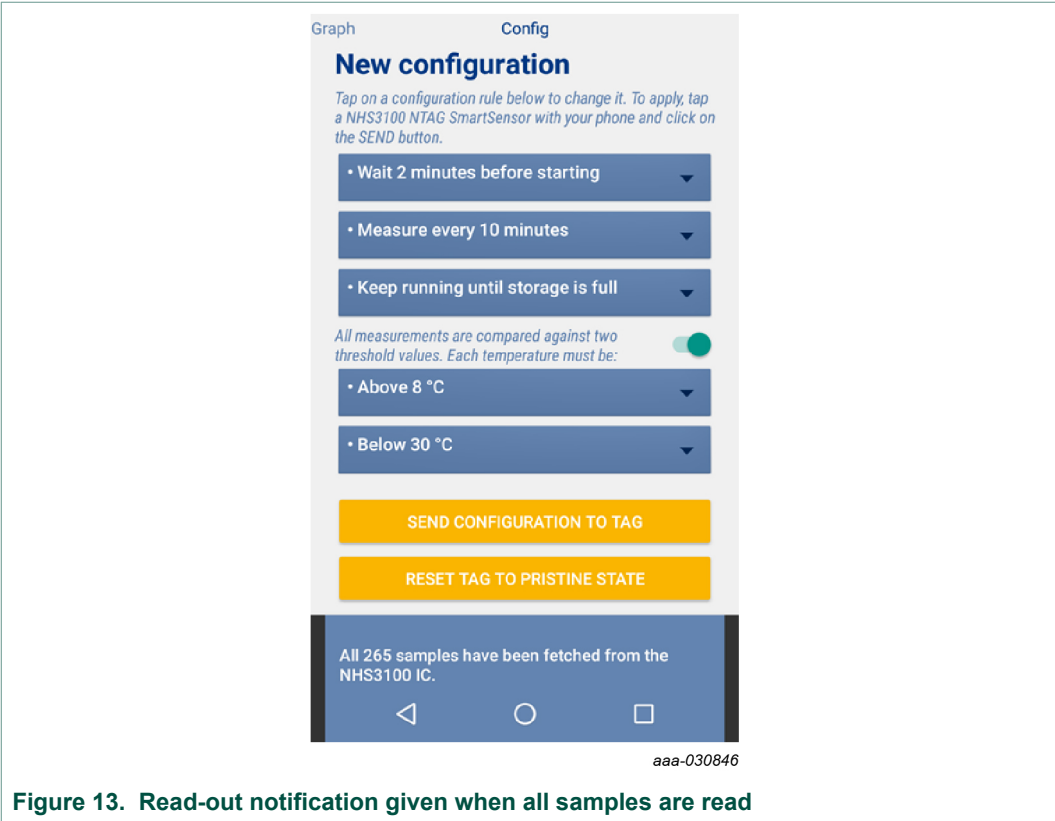


Figure 13. Read-out notification given when all samples are read

## 4.7 Check status

To see the status overview that was given, swipe right to the Status screen.

Here you also export the temperature values to a CSV file. That file can then be copied to your PC and imported in a spreadsheet for further inspection.

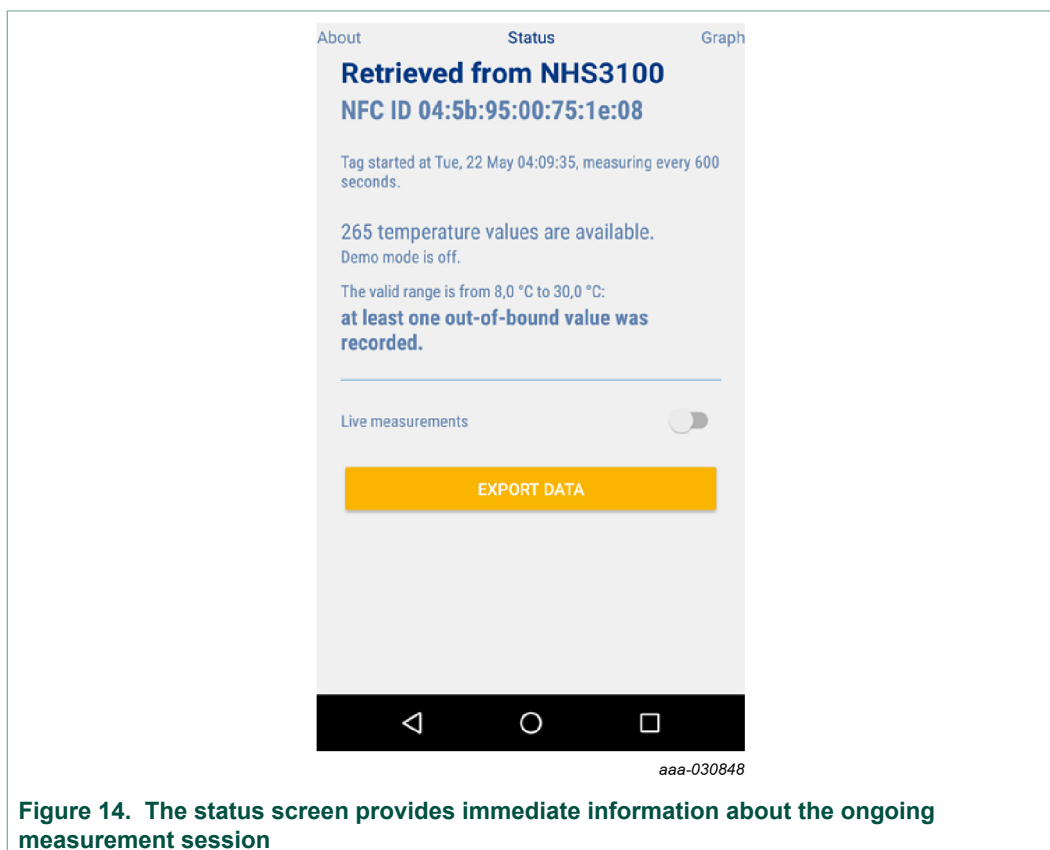
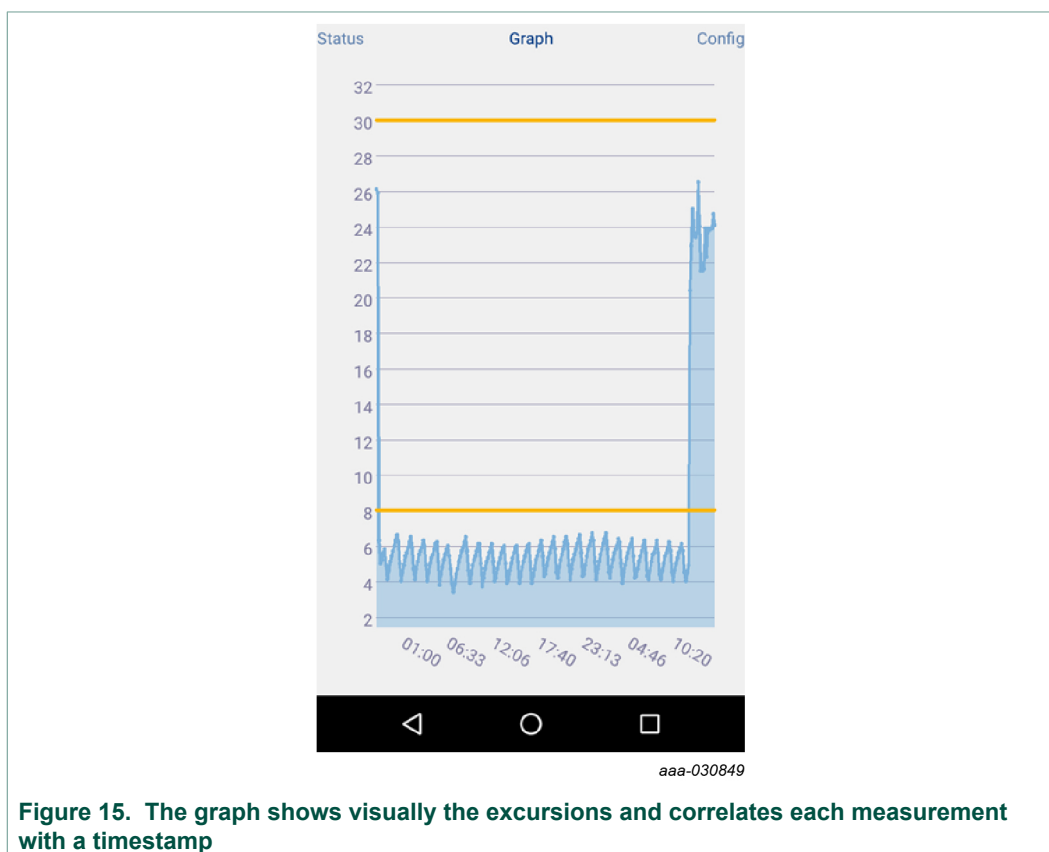


Figure 14. The status screen provides immediate information about the ongoing measurement session

## 4.8 View graph

Swipe to find the Graph screen. Here all logged values over time are plotted. The example picture below show a monitoring session where the demonstrator was not placed in the fridge in time; and where it was removed well before the monitoring session ended. While in the fridge, the different times when the cooling engine was started - at the top of the small spikes just above 6 degrees Celsius - are clearly visible.



**Figure 15.** The graph shows visually the excursions and correlates each measurement with a timestamp



## 5 Troubleshooting

### 5.1 The tag is not recognized

- **Is the NFC functionality on the phone enabled?**  
If it is not enabled, enable it. If it is, try disabling and reenabling it.
- **Is the tag positioned correctly?**  
Move the tag slowly over the back of the phone from top to bottom until you find the location of the NFC antenna on the phone. Some phones depict an NFC logo on the back to help you aiming correctly.
- **Is the tag distance optimal?**  
On most phones, touching the tag with the phone yields the best results; on other phones it is better to maintain a small distance. The maximum distance you can expect to reach is about 5 cm.
- **Is the battery voltage level still sufficient?**  
Battery voltage should be greater than 1.72 V. Check or replace the battery, and retry.

### 5.2 The tag is recognized, but the measurement values are not read out

- **Is it recognized as an NHS3100 tag?**  
To be sure that the tag is correctly recognized as an NHS3100, check the notifications that briefly pop up. If not, the IC may not have flashed the correct temperature logger application.
- **Is the tag empty?**  
When the tag is touched, check the notifications that pop up. The number of available measurement values is also given. For a complete status overview, check the *Status screen*.
- **Is the connection already lost?**  
The phone must have a continuous connection or communication halts and must be restarted. Move the tag away and then back within range of the phone again. To know what the current state of the communication between tag and reader is, check the notifications that pop up.

### 5.3 The connection is not stable

- **Is the tag held in a fixed position?**  
The connection of the phone with the tag must be maintained continuously. Try to minimize the movements of the tag relative to the phone.

### 5.4 Reporting

- When problems persist or when this manual fails to clarify behavior, report the matter to us. Reporting to us helps us to help you. It also helps to improve the demo and the underlying software.
- Include the demo PCB HW number and phone details such as manufacturer, model, and OS version.

## 6 Follow-up

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For more information about this demo, the targeted use case, or the NHS3100 IC, check out the different web pages and materials offered at <https://www.nxp.com/NTAGSMARTSENSOR>.

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