UM1675
User manual

NFC-based weight recorder application on Android platform

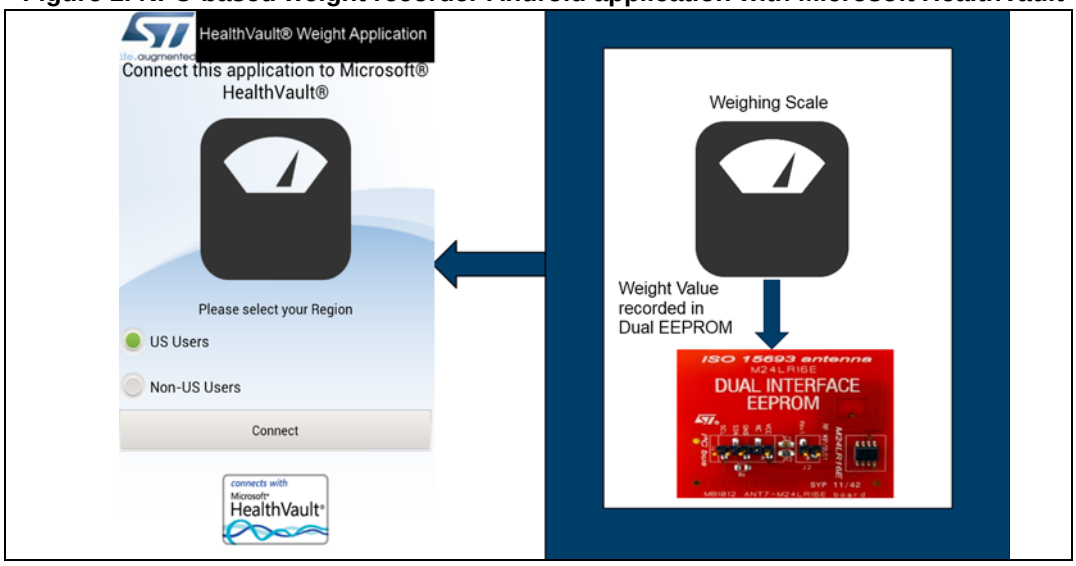
Introduction

The NFC-based weight recorder application based on Android 2.3.4 is a user-friendly solution using STMicroelectronics Dynamic NFC/RFID Tag (M24LRxxE) in the healthcare segment. The application is a complete solution integrated with Microsoft HealthVault®. It provides the user with an interface to record, maintain and monitor health data. The application uses the near field communication (NFC) technology to read the user's health information from STMicroelectronics Dynamic NFC/RFID Tag.

NFC is a wireless technology based on the radio frequency identification (RFID) which establishes a communication between devices in a close proximity.

The M24LRxxE is a Dynamic NFC/RFID Tag which targets a wide range of applications such as industrial, healthcare and consumer electronics. RFID (13.56 MHz) and I^2C are the two communication interfaces able to access the same blocks of EEPROM in the M24LRxxE. The device supports ISO 15693, NFC-V category of NFC communication.

Figure 1. NFC-based weight recorder Android application with Microsoft HealthVault



Note: The antenna shown is an M24LR16E-R antenna, which is a Dynamic NFC/RFID tag IC with RF and I^2C dual interface. ANTx-M24LRxxE was used as a reference board to emulate the NFC Weight Recorder Application. There is no demo board for NFC Weight Recorder. ANTx-M24LRxxE reference board has an M24LRxxE-R dual Interface EEPROM IC connected to a 15mm x 15mm 13.56 MHz etched RF double layer antenna on one side, and to an I^2C on the other side.

This antenna reference board, which allowed to validate the Android application, is available at Google Play Store: https://play.google.com.
The source code of the application along with APK file are available at ST website (refer to STSW-M24LR017).

Contents

1 Installing and launching the application 5

2 Creating an account (new user) 8

3 Allowing access to the user's profile 10

4 Updating the weight using M24LRxxE 11

5 Programming the M24LRxxE using NFC 12

6 Uploading the weight value to HealthVault 14

Appendix A Definitions 17

Revision history 18

List of tables

Table 1. Definitions for acronyms 17
Table 2. Document revision history 18

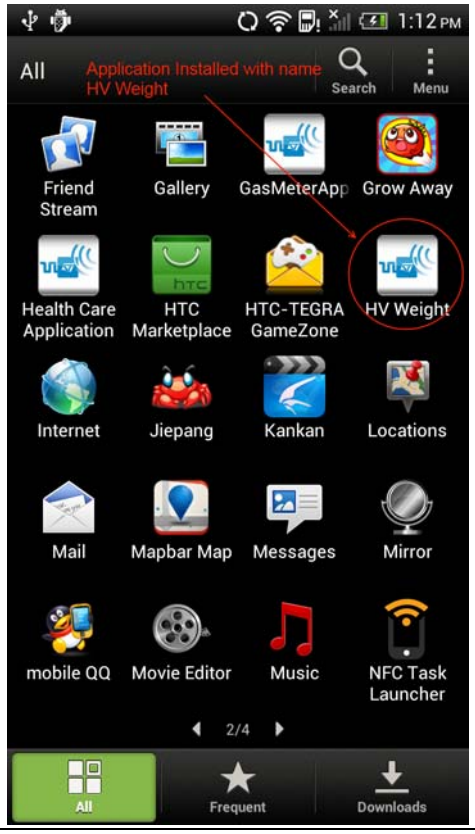
List of figures

Figure 1. NFC-based weight recorder Android application with Microsoft HealthVault 1
Figure 2. Launch the HealthVault weight application 5
Figure 3. Application main screen 6
Figure 4. Main Page establishing the connection 6
Figure 5. Sign in to HealthVault 7
Figure 6. Create a new account 8
Figure 7. Register a new user (enter personal details) 9
Figure 8. Register a new user (verification) 9
Figure 9. Authorize the user profile 10
Figure 10. Allow the application to connect to the user profile 10
Figure 11. Get/update the weight in Dynamic NFC/RFID Tag/M24LRxxE 11
Figure 12. Write the new weight value in Dynamic NFC/RFID Tag/M24LRxxE 12
Figure 13. Read the weight value from M24LRxxE/Dynamic NFC/RFID Tag 13
Figure 14. Upload the weight value to the HealthVault website 14
Figure 15. Value getting uploaded in your User Profile 15
Figure 16. Check the value uploaded in HealthVault 15
Figure 17. Login to check your uploaded value 16
Figure 18. Value displayed under Weight Measurement 16

1 Installing and launching the application

The NFC-based weight recorder application consists of an .apk file which can be installed in an Android-based NFC-supported mobile phone by browsing the application using any File Browser. After a successful installation of the .apk file, an "HV Weight" application appears in the Applications list. Select the application to launch it, as shown on *Figure 2*.

Figure 2. Launch the HealthVault weight application



The application is available on Google Play:

https://play.google.com/store/apps/details?id=com.microsoft.hsg.android.demo.weight

Launching the application opens the Application main screen, as shown on *Figure 3*.

Figure 3. Application main screen

After clicking the **US Users** or **Non-US Users** button, click **Connect** on the Application main screen to get connected to Microsoft HealthVault website, as shown on *Figure 3*.

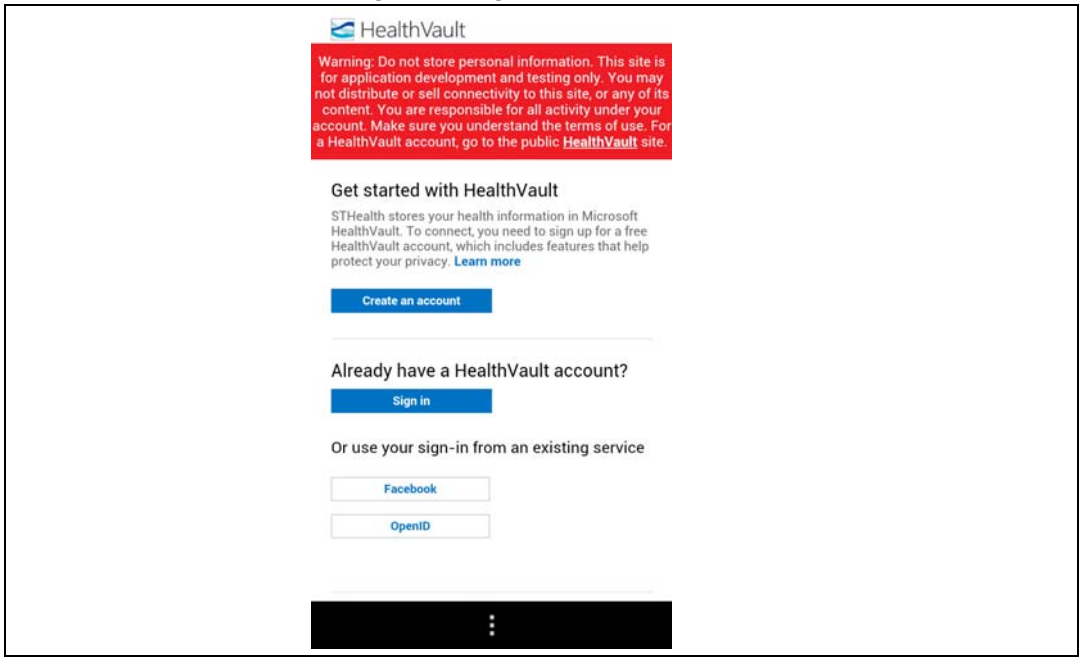
Note: *Check that the internet connection on the phone is correct, as the Application uses the Internet Connection to connect to Microsoft HealthVault website.*

Figure 4. Main Page establishing the connection

Figure 4 shows that the application is connecting to HealthVault website.

After a successful connection, the next screen displayed allows you to **Create an account** or to **Sign In** using an existing account, as shown on *Figure 5*.

Figure 5. Sign in to HealthVault



2 Creating an account (new user)

There are different ways to connect to Microsoft HealthVault website. In addition to the existing HealthVault account holders, the user can sign in using a Facebook/Open ID Account.

In case the user does not have any of the above-mentioned accounts, a new account can be created in a few steps, as described below:

1. Click the **Create an Account** option, as shown on *Figure 5*.
2. It redirects the application to a page with a form where the user enters personal details to register as a new user (see *Figure 6* and *Figure 7*).
3. After the user has entered all details, click the **Continue** button.

Figure 6. Create a new account

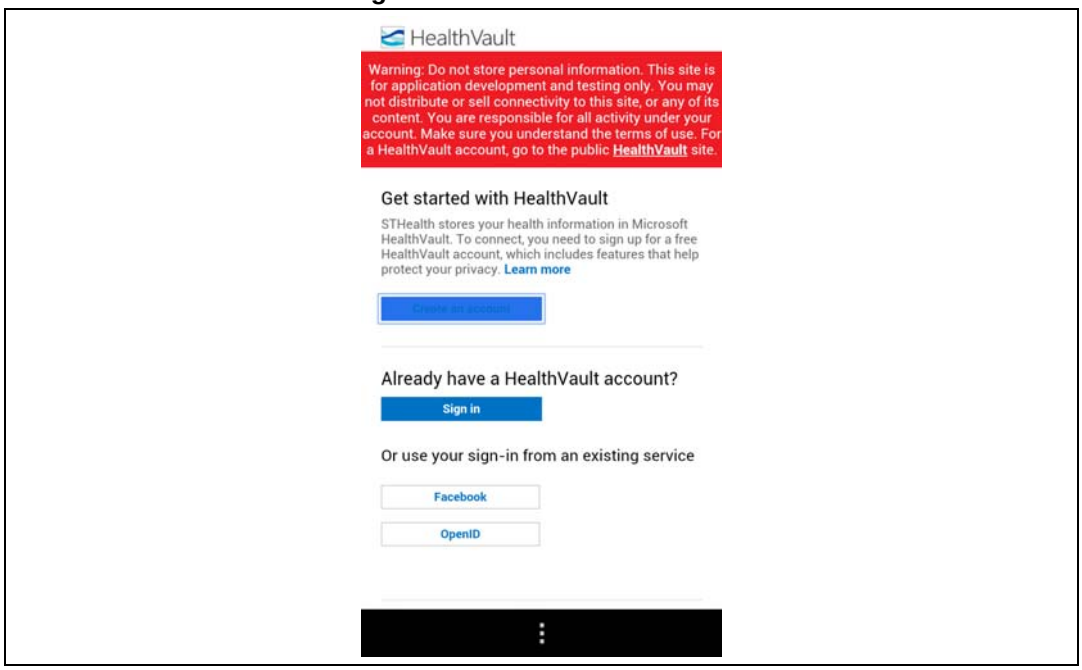


Figure 7. Register a new user (enter personal details)

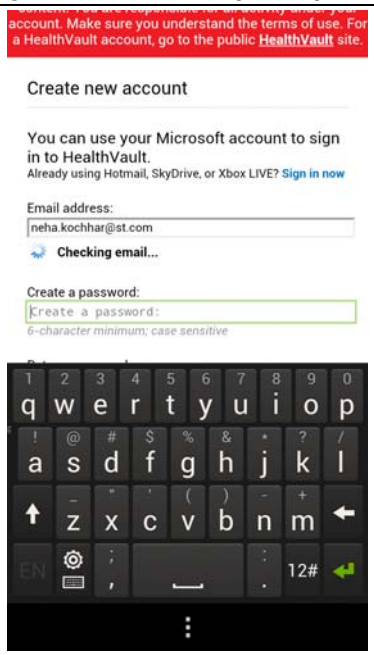
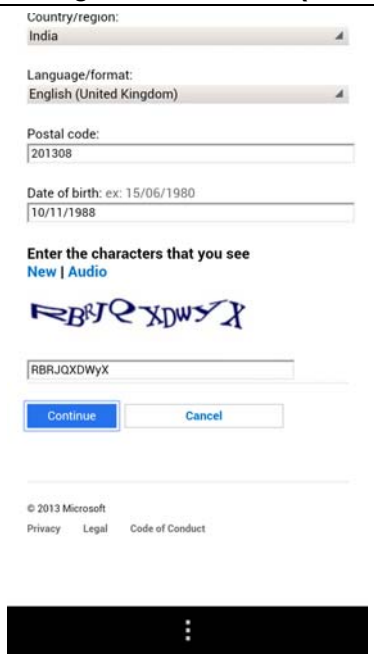


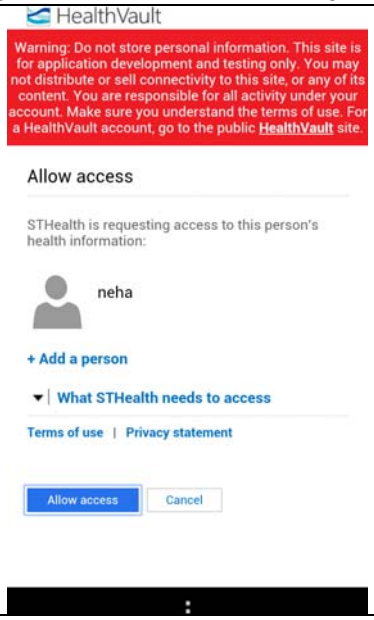
Figure 8. Register a new user (verification)



3 Allowing access to the user's profile

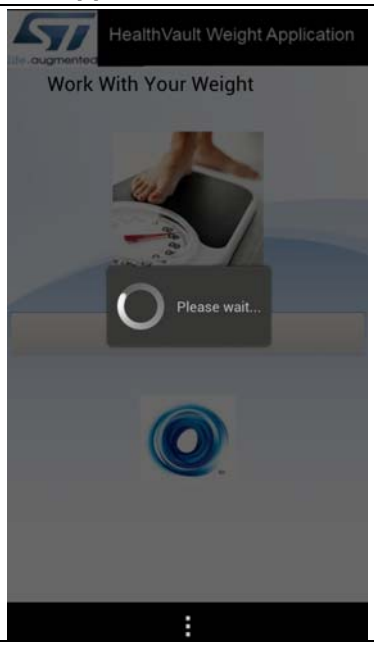
Once all personal details have been entered and the **Continue** button has been pressed (see *Figure 8*), the user is requested to **Allow access** to his/her profile, as shown on *Figure 9*.

Figure 9. Authorize the user profile



The application tries to connect to Microsoft HealthVault website in order to authorize the application to access the user profile (see *Figure 10*).

Figure 10. Allow the application to connect to the user profile



4 Updating the weight using M24LRxxE

The user can make changes in the Dynamic NFC/RFID Tag through the application.

- To change the Weight Value recorded:
  - click the **Update Weight** option, as shown on *Figure 11*.
- To directly retrieve the Weight Value recorded in the Dynamic NFC/RFID Tag:
  - click the **Get Weight** option, as shown on *Figure 11*.

Figure 11. Get/update the weight in Dynamic NFC/RFID Tag/M24LRxxE

Note: The antenna shown is an M24LR16E-R antenna, which is a Dynamic NFC/RFID tag IC with RF and I^2C dual interface.

5 Programming the M24LRxxE using NFC

In order to record a new weight value in the Dynamic NFC/RFID Tag through the application, the user needs to click the **Update Weight** option, as explained in *Section 4: Updating the weight using M24LRxxE*. The application is redirected to the **Enter Weight Value to Write in M24LR Device** page, as shown on *Figure 12*.

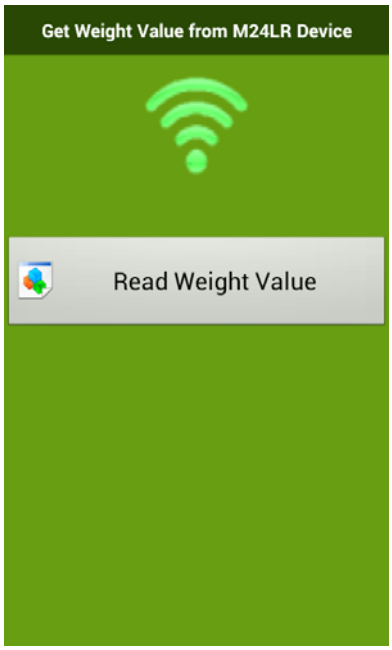
Figure 12. Write the new weight value in Dynamic NFC/RFID Tag/M24LRxxE

Enter the weight value and bring the NFC compatible phone close to the M24LRxxE device so that the signal can turn from red to green, then click the **Write Weight Value** to program the device with the weight value entered.

If the user just wants to retrieve the value already recorded from the Dynamic NFC/RFID Tag, he/she must click the **Get Weight** button, as explained in *Section 4: Updating the weight using M24LRxxE*. It will then take the application to the **Get Weight Value from M24LR Device** page, as shown on *Figure 13*. By default, the signal shown on the screen is red. The user needs to bring the mobile phone close to the Dynamic NFC/RFID Tag to have the color change to green.

The red color shows that no Tag has been found/detected. The green color shows that a Tag was found in close proximity (see *Figure 13*).

Figure 13. Read the weight value from M24LRxxE/Dynamic NFC/RFID Tag

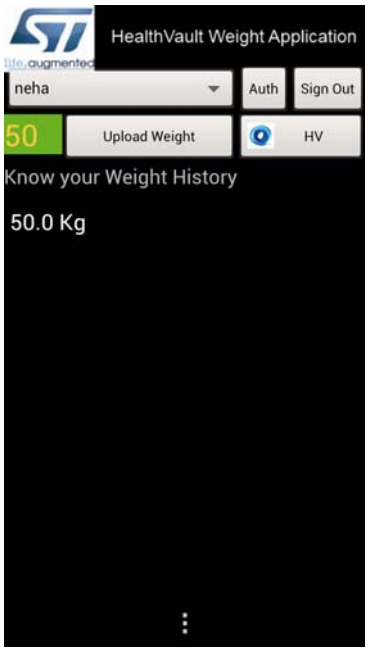


After the signal has turned green, click the **Read Weight Value** button. The mobile phone must be in close proximity of the Tag/Dynamic NFC/RFID Tag while it is reading data or when **Read Weight Value** is clicked.

6 Uploading the weight value to HealthVault

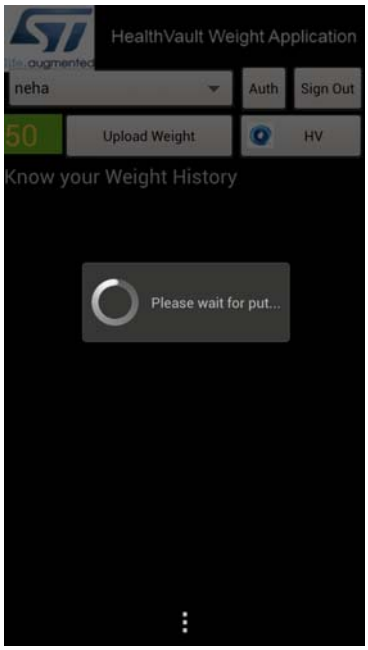
After a successful extraction of the weight value from the M24LRxxE device, the application displays the weight value in a green-colored box, as shown on *Figure 14*, along with the user name.

Figure 14. Upload the weight value to the HealthVault website



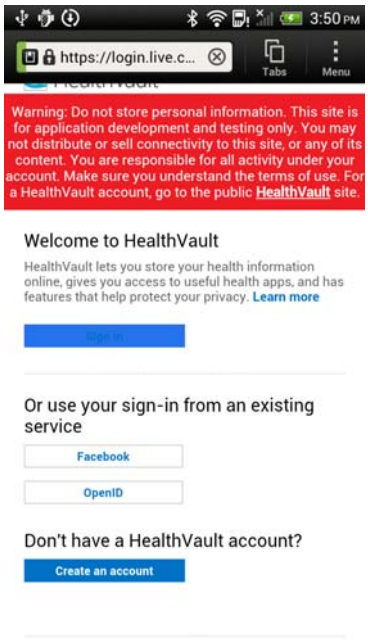
- Click the **Auth** button in the drop-down list located above the green-colored box in case no name is displayed (due to an internet connection loss during the login). Otherwise, the user is already authorized, as was done in *Section 3: Allowing access to the user's profile*.
- The weight value shown in the green-colored box is expressed in Kg (Kilograms).
- Below **Know your Weight History**, you can see the list of values recorded in your User Profile on Microsoft HealthVault, the same unit (e.g. Kg) being used.
- Click the **Upload Weight** button to upload the value shown in the green-colored box to Microsoft HealthVault. Please wait for some time while the application uploads the value to your User Profile on HealthVault.

Figure 15. Value getting uploaded in your User Profile



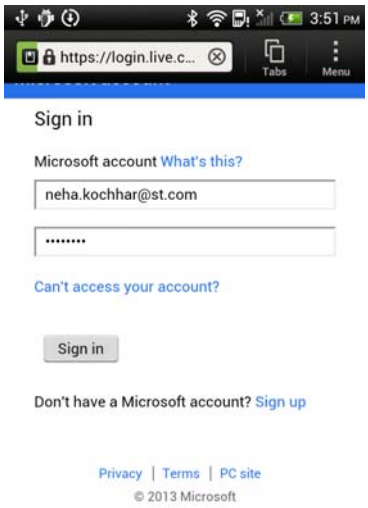
After the value has been successfully uploaded to Microsoft HealthVault, Click the **HV** button on *Figure 14* to direct the application to the HealthVault page (*Figure 16*).

Figure 16. Check the value uploaded in HealthVault



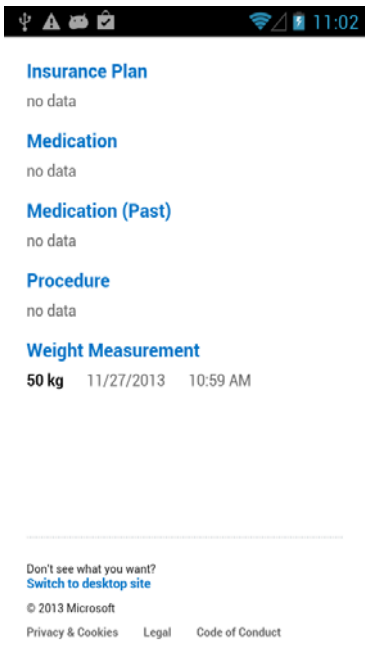
Enter your Login Credentials (Username and Password) to view the value uploaded to your specific Profile on HealthVault, as shown on *Figure 17*.

Figure 17. Login to check your uploaded value



The uploaded value is displayed in the **Weight Measurement** section, as shown on *Figure 18*.

Figure 18. Value displayed under Weight Measurement



Appendix A Definitions

Table 1. Definitions for acronyms

Acronym	Definition	Comment
NFC	Near field communication	
RFID	Radio frequency identification	
EEPROM	Electrically erasable programmable read only memory	
HV	HealthVault	

Revision history

Table 2. Document revision history

Date	Revision	Changes
06-Feb-2014	1	Initial release.

Please Read Carefully:

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.

ST PRODUCTS ARE NOT DESIGNED OR AUTHORIZED FOR USE IN: (A) SAFETY CRITICAL APPLICATIONS SUCH AS LIFE SUPPORTING, ACTIVE IMPLANTED DEVICES OR SYSTEMS WITH PRODUCT FUNCTIONAL SAFETY REQUIREMENTS; (B) AERONAUTIC APPLICATIONS; (C) AUTOMOTIVE APPLICATIONS OR ENVIRONMENTS, AND/OR (D) AEROSPACE APPLICATIONS OR ENVIRONMENTS. WHERE ST PRODUCTS ARE NOT DESIGNED FOR SUCH USE, THE PURCHASER SHALL USE PRODUCTS AT PURCHASER’S SOLE RISK, EVEN IF ST HAS BEEN INFORMED IN WRITING OF SUCH USAGE, UNLESS A PRODUCT IS EXPRESSLY DESIGNATED BY ST AS BEING INTENDED FOR “AUTOMOTIVE, AUTOMOTIVE SAFETY OR MEDICAL” INDUSTRY DOMAINS ACCORDING TO ST PRODUCT DESIGN SPECIFICATIONS. PRODUCTS FORMALLY ESCC, QML OR JAN QUALIFIED ARE DEEMED SUITABLE FOR USE IN AEROSPACE BY THE CORRESPONDING GOVERNMENTAL AGENCY.

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.
Information in this document supersedes and replaces all information previously supplied.
The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.

© 2014 STMicroelectronics - All rights reserved

STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

www.st.com