PLACEPOD® UTILITY APPLICATION - Android USER MANUAL

This document describes the features and procedures for using the PlacePod Utility Application - Android.

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PNI Sensor
2331 Circadian Way
Santa Rosa, CA 95407, USA
Tel: (707) 566-2260

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This warranty does not cover wear and tear due to normal use, or damage to the Product as the result of improper installation, misuse, neglect of care, alteration, vandalism, theft, accident, or unauthorized repair.

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2 INTRODUCTION

This Android application enables communication with PNI's PlacePod Vehicle Detection Sensor using Bluetooth Low Energy (BLE).
The application is compatible with Android 7+ and has been tested on the following devices:

- HTC Desire 825
- Nexus 5
- Samsung Galaxy S7

There are two main groups of core functionality in this application. These include:

- Configuring a PlacePod
- Activating a PlacePod

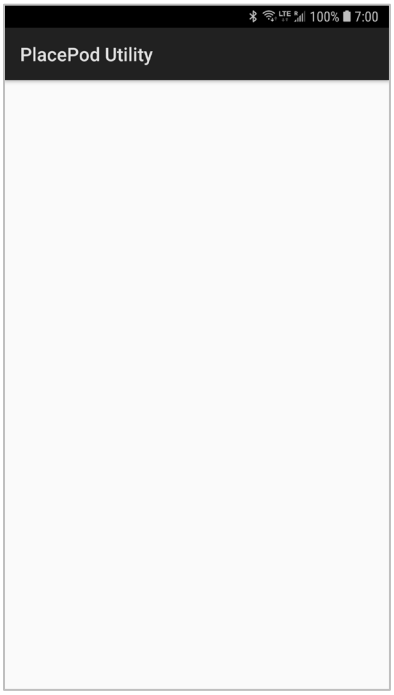

Figure 1: Application Loading Screen

Download the PlacePod Vehicle Detection Sensor Utility here:
https://www.pnicorp.com/download/placepod-utility-android/.

In order to install the APK file (Android application) allow installation from unknown sources (Settings -> Security -> check Unknown sources). In newer versions of Android, you can click on the downloaded file then click "Allow from this source". Installation instructions can be found in the Appendix of this manual.

3 BLE

Several functions can be accessed from the main BLE view. These include:

- Configuration (Config)
- Activate

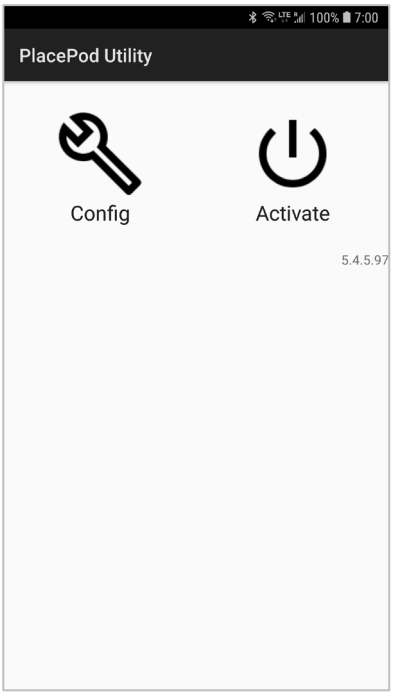

Figure 2: Application Main Screen

Selecting Config will bring you to a scan for sensors view titled “Service Type: Configuration” selecting Activate will bring you to a view titled “Service Type: Activation”.
Both pages will contain a table that will display PlacePods found using BLE. Please make sure your Bluetooth is turned on.

3.1 Scan for Sensors

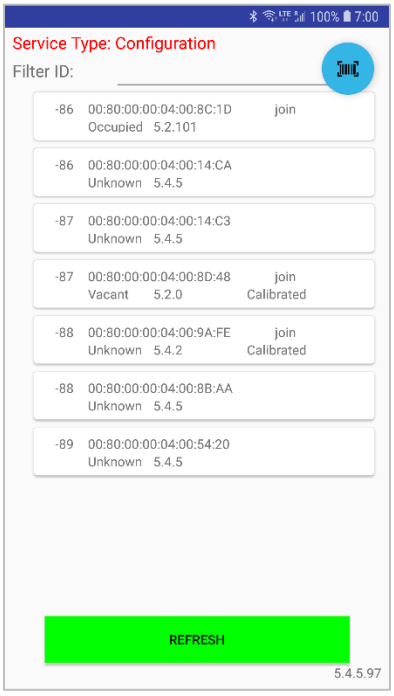

Figure 3: Scan for Sensors

The list auto-populates with PlacePods as they advertise. To clear the list, tap the **REFRESH** button, new packets will then re-populate the list. Any discovered PlacePods will remain displayed in the table and can be connected to. By default, PlacePods with a stronger RSSI reading should appear at the top of the list.

If the ID of the PlacePod is known, results can be filtered by tapping on the search field and entering the PlacePod ID. Only devices that match or contain what is entered as a substring will be displayed. The search field is not case-sensitive.

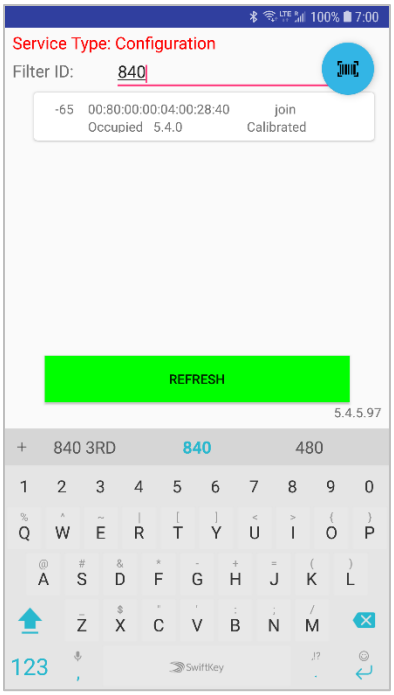

Figure 4: Scan for Sensor: Filter for ID

Tapping on a discovered PlacePod will attempt to connect to that PlacePod. This may take a few seconds because PlacePod is configured to advertise over BLE once every 10 seconds once they are activated. A loading icon should appear.

Please note: Due to the variability of manufacturers' implementations of Bluetooth hardware not all devices behave the same at this stage. Some devices may take up to 30 seconds to establish a connection. It may be prudent to give it 10 seconds or so then cancel (press back button) and try again.

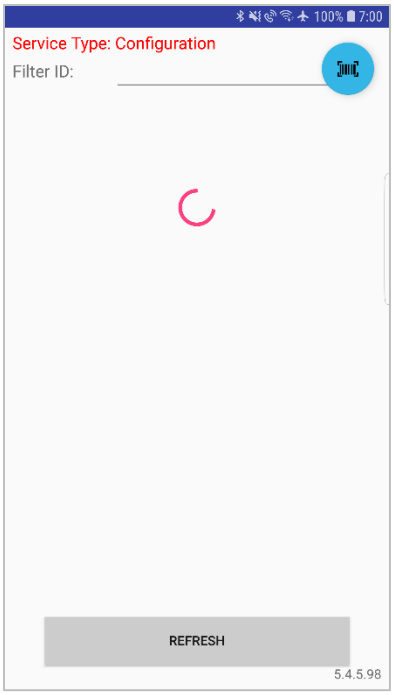

Figure 5: Connecting to Sensor

Tapping your Android's Back button will cancel the connection process. If a connection has not been established in a timely manner, press your Android's Back button, you can either re-tap on the same device to try and re-connect to it or start a new scan and make sure the Android device is within range of the PlacePod.

3.1.1 Label Scan for Sensors

Scan Label view can also be reached by tapping the barcode icon in the top right corner of the Scan for Sensors view.

Note: If this is the first time the camera is being accessed since installing the application the application will first ask permission to access the camera. Allow access to the camera.

The device's camera will turn on and will look for a valid label. Point the camera to the label on the bottom of the PlacePod. When the camera has detected a valid label a blue box will appear around the label.

Figure 6: Scanning PlacePod's Label

The PlacePod's ID will be taken from the label and used as a filter for the "Scan for Sensors" view.

3.2 Configuration

The configuration view allows for several commands to be sent to the PlacePod and change its internal settings. These commands include:

- Set Network Keys (AppEUI, AppKey used for Over The Air Activation (OTAA))
- Import Key
- Set Keep Alive Interval
- Set Frequency Sub Band (only if PlacePod is US915)
- Deactivate Sensor (Reset to factory defaults)
- Recalibrate
- Reboot
- Send Keep Alive
- Check Net Link

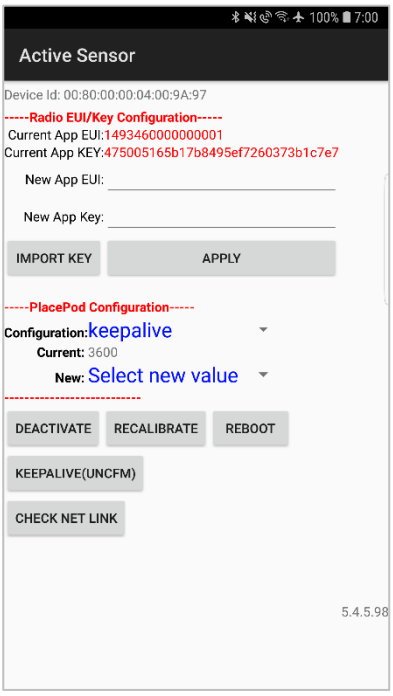

Figure 7: Main Configuration Window

The “PlacePodLogIn” window will appear first to allow you to log in to the PlacePod, if you select “Same pin for all device” then this window will not appear until the next time the app is run. You must select a password between 4-8 numbers and cannot use the default password of 901234 otherwise an error message will be displayed. If you input the incorrect password an Alert message will be displayed

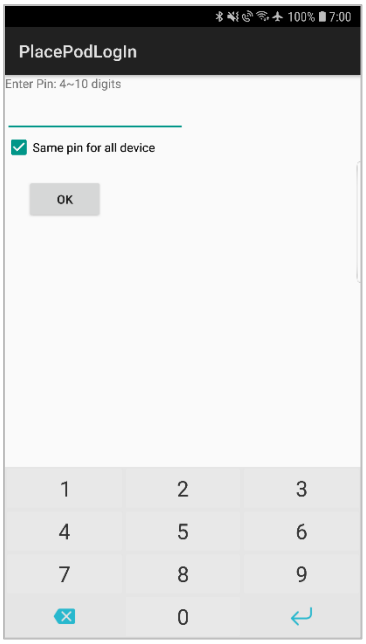

Figure 8: PlacePodLogIn Window

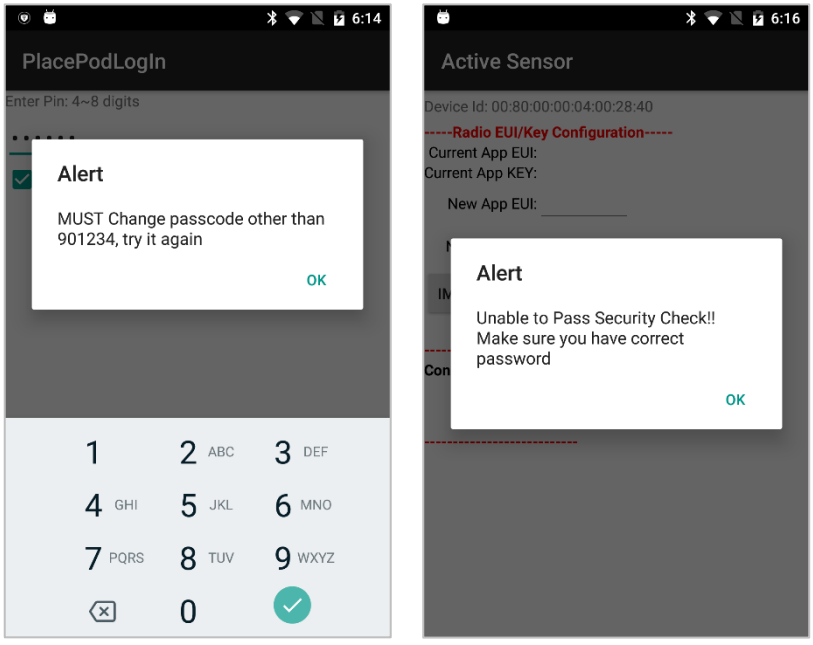

Figure 9: Alert messages for setting password

3.2.1 Set Network Keys

Program the PlacePod's AppEUI and AppKey used for the LoRa OTAA method.

The PlacePods current App EUI is shown in red at the top of the main configuration view. Tap the **IMPORT KEY** button to load new keys from a CSV file. You will need to navigate to the CSV file using your Android's built in file manager.

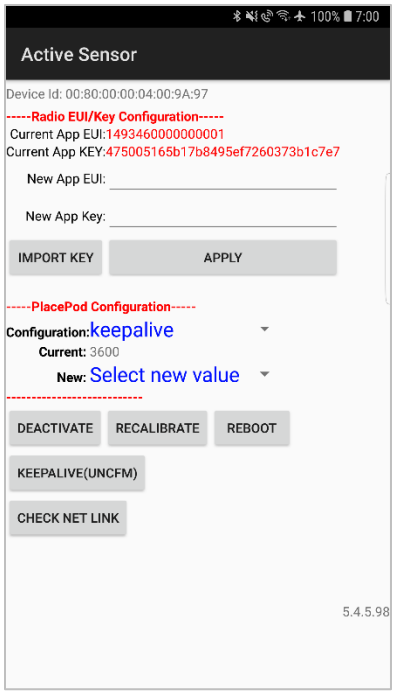

Figure 10: Set Network Keys

The user must provide a CSV file with the following format:
deviceId, appEui, appKey,
0000000000000001, 1234567890123456, 12345678901234567890123456789012
0000000000000002, 0987654321098765, 09876543210987654321098765432109

The deviceId header and fields are required, and at least one of the headers appEui or appKey must be included (both options will work). If a key field is left blank, then that value will not be updated.

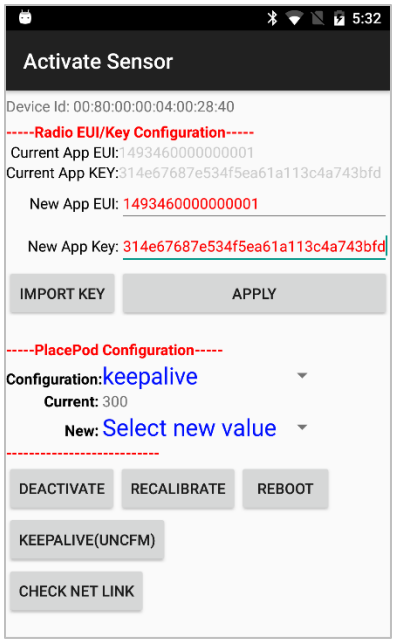

Figure 11: Network keys set successfully

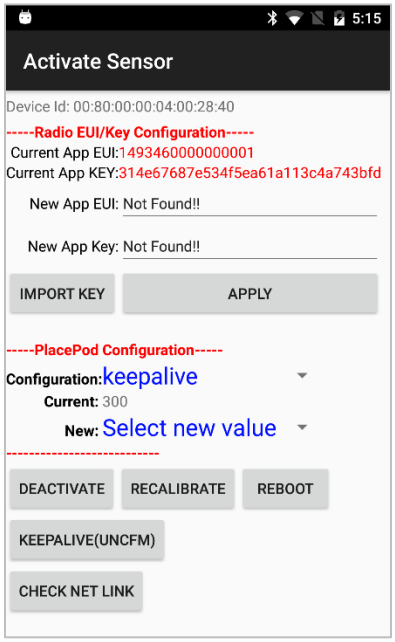

Figure 12: CSV Error

Please confirm that the values being set are correct as incorrect values will cause the PlacePod to fail to join the network. Press the **APPLY** button to update the PlacePods keys. A successful update of the keys will cause the Current App EUI / Key numbers to blank out and the new ones' font will turn red. If the CSV is improperly formatted the new fields will display "Not Found!!".

3.2.2 Set Keep Alive Interval

By default, the PlacePod will send a keep-alive message once every hour. This option allows this interval to be changed.
Note: Any changes to this setting will significantly impact PlacePod's battery life. The current options include:

- 1 minute
- 5 minutes
- 30 minutes
- 1 hour
- 2 hours
- 4 hours
- 8 hours
- 12 hours

The initial value shown just under the selection field is the PlacePod's current setting.

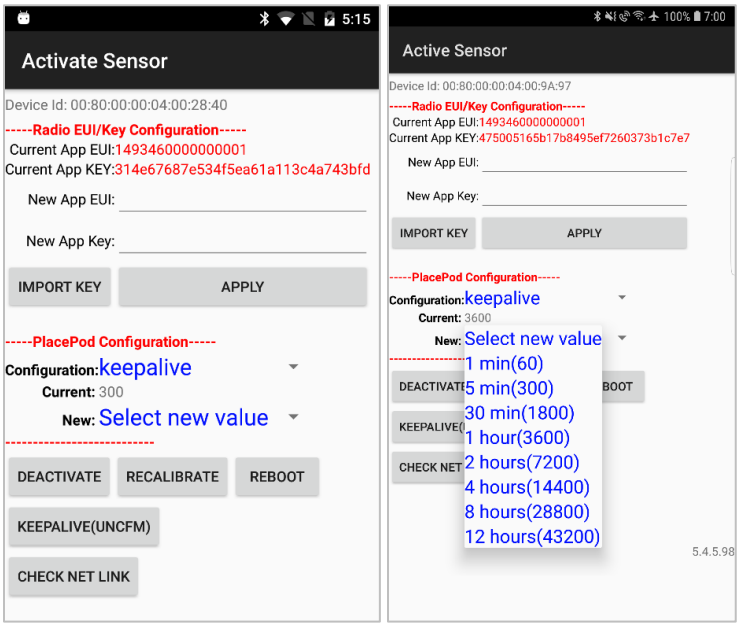

Figure 13: Setting Keep Alive Interval

Selecting a different value will update the "Current:" field to reflect the new keepalive interval. It is automatically sent to the PlacePod.

Note: Changing the keep-alive value to something lower than the default can drastically reduce the PlacePod's battery life and thus should only be used in short intervals or for lab testing.

3.2.3 Set Frequency Sub Band (NA915 MHz PlacePod Only)

This setting will only be visible if the connected PlacePod is a NA915 PlacePod. Under PlacePod Configuration, select from the **Configuration:** dropdown “FSB”.

The PlacePod can be configured to the frequency sub band (FSB) the PlacePod will transmit the LoRa messages over. The current options include:

- Hopping
- 1: 902.3 ~ 903.7 kHz
- 2: 903.9 ~ 905.3 kHz[Default]
- 3: 905.5 ~ 906.9 kHz
- 4: 907.1 ~ 908.5 kHz
- 5: 908.7 ~ 910.1 kHz
- 6: 910.3 ~ 911.7 kHz
- 7: 911.9 ~ 913.3 kHz
- 8: 913.5 ~ 914.9 kHz

Note: Before changing the FSB ensure that the gateway the PlacePod will connect to is also configured to use the same sub band.

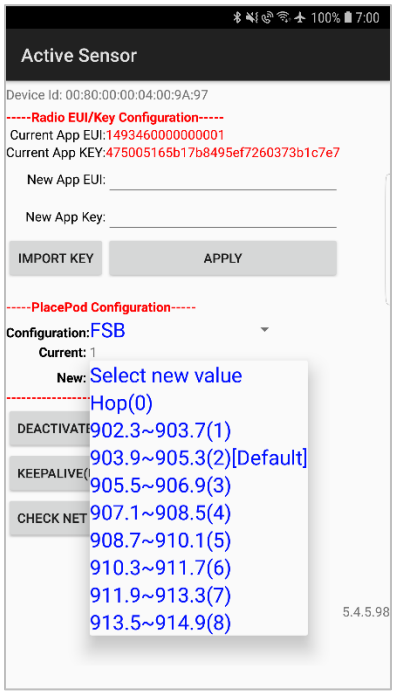

Figure 14: Setting FSB

The initial value shown just under the selection field is the PlacePod’s current setting.

Selecting a different value will update the “Current:” field to reflect the new keepalive interval. It is automatically sent to the PlacePod.

Note: If the user has recently activated or rebooted their PlacePod and is trying to change this setting, there is a chance that changing the FSB won't work. If this happens, wait a few seconds and try again until the command goes through.

3.2.4 Deactivate Sensor

This command will deactivate the sensor and return it to shipping mode. This will also clear any stored passwords and require the PlacePod to be activated.

Pressing the **DEACTIVATE** button will deactivate the sensor. The configuration window will close and a new message will display indicating the sensor has been successfully deactivated.

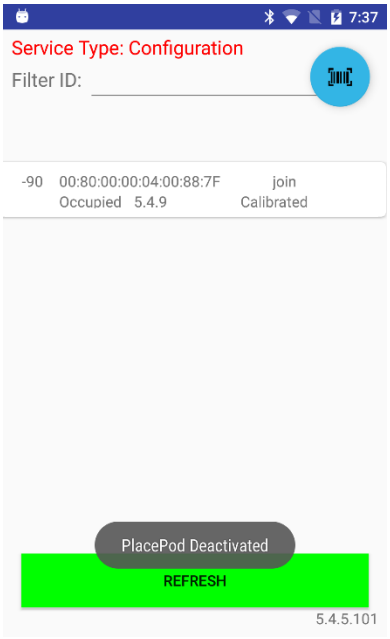

Figure 15: Deactivated PlacePod

3.2.5 Recalibrate

The Recalibrate command will initiate a calibration process on the PlacePod which sets the baseline for a vacant parking space. The calibration process takes 5 seconds and there should be no car present in the space and adjacent space during this process. During the calibration process, the sensor reports an Unknown state. After calibration is completed the state should appear as Vacant. If not, please make sure no cars are parked in adjacent parking spaces and re-initiate the calibration command.
After installing the PlacePod into its parking space, you must recalibrate the sensor using the Recalibrate command. If calibration is not performed, then the PlacePod's vehicle detection algorithms will not function properly.

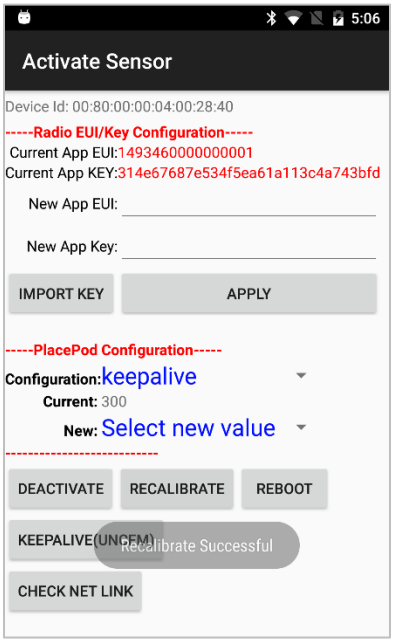

Figure 16: Recalibration Successful

3.2.6 Reboot

This command will cause the PlacePod to reboot. This is useful if the PlacePod has had some settings changed and you want to verify everything is working as intended.

Press the **REBOOT** button this will send the reboot command and the PlacePod will reboot. The Active sensor view will close. An overlay will appear saying the command was successfully sent.

The PlacePod will disconnect from BLE when this command is sent.

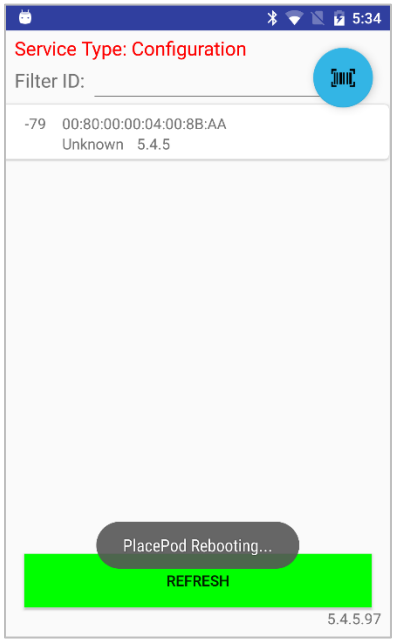

Figure 17: PlacePod Rebooted

3.2.7 Send Keep Alive

This command will tell the PlacePod to send a Keepalive message to the Lora network, this can be used to test connectivity.

Pressing **KEEPALIVE(UNCFM)** will cause the PlacePod to send out an unconfirmed keep alive packet to the network.

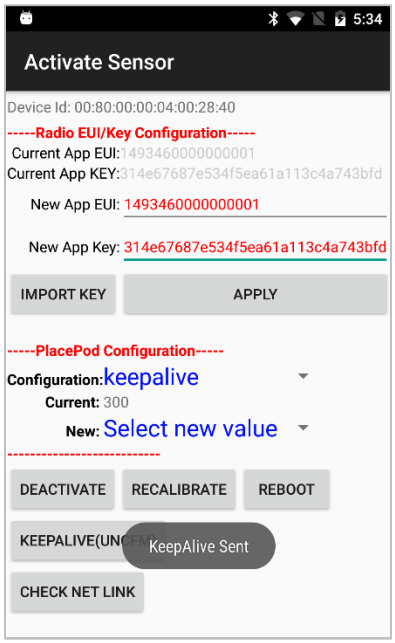

Figure 18: Keep Alive Sent

3.2.8 Verify Gateways

This command will tell the PlacePod to send a LoRa message in order to verify the number of gateways within range.

Pressing **Send** will cause the PlacePod to send out a network link check (LoRa MAC command). The number of gateways the PlacePod was able to connect to will be displayed.

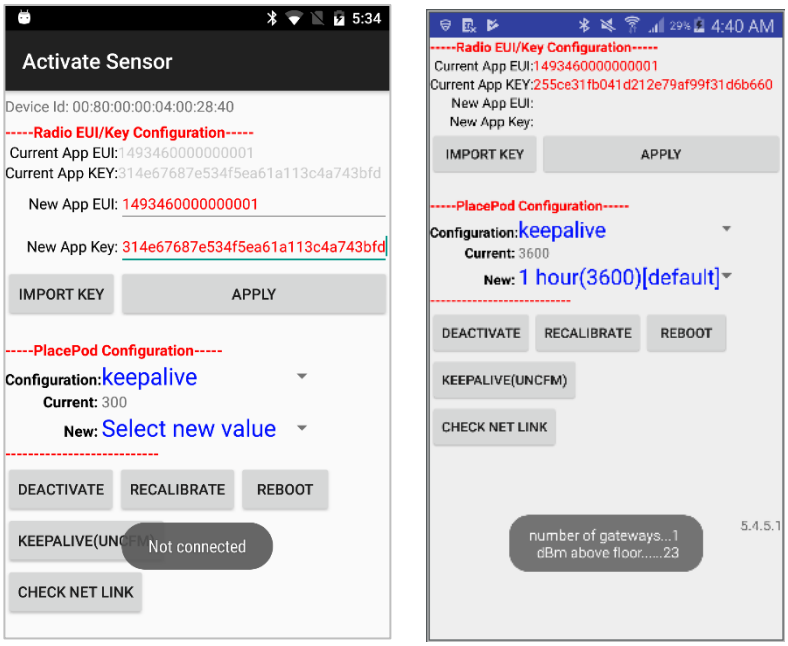

Figure 19: Check number of Gateways

3.3 Activation Settings

After selecting the PlacePod to activate from the "Scan for Sensors" view. The "Inactive Sensor" view will be displayed. The first line shows your Device ID and the dropdown menu allows you to select the FSB.

Pressing **ACTIVATE PLACEPOD** will activate the PlacePod on the selected frequency to send out an unconfirmed keep alive packet to the network. In order to configure this device return to the "Configuration" section and select it from there.

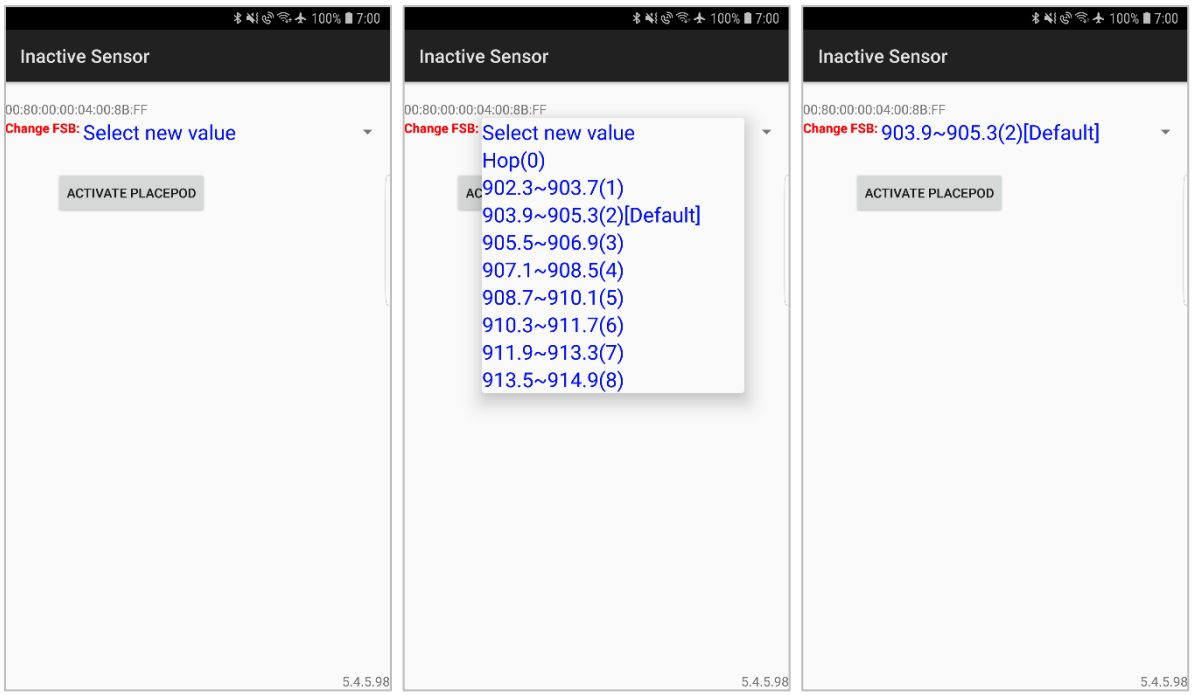

Figure 20: Activating PlacePod

For Customer Support, please contact PNI Sensor at: https://www.pnicorp.com/support/

4 APPENDIX I – INSTALLING AN ANDROID APPLICATION USING ADB

There are a few different methods for installing the application onto an Android device. This guide will focus on using the Android Debug Bridge (ADB).

1. Download the SDK Platform Tools, which includes ADB, from:

   https://developer.android.com/studio/releases/platform-tools.html
2. Extract the files anywhere onto the computer.
3. Copy the PlacePod Utility Application (APK file provided by PNI) into the extracted folder.
4. Open a command prompt and navigate to the "platform-tools" folder previously extracted.
5. Ensure that the android phone is plugged in and USB debugging is enabled. Please refer to the following link for information on how to enable USB Debugging:

   https://developer.android.com/studio/command-line/adb.html
6. Run "adb devices" command to get a list of devices connected.

   Note: If the device is not listed ensure that USB Debugging is enabled, and the correct USB drivers are installed. Drivers can be found at: *https://developer.android.com/studio/run/win-usb.html*

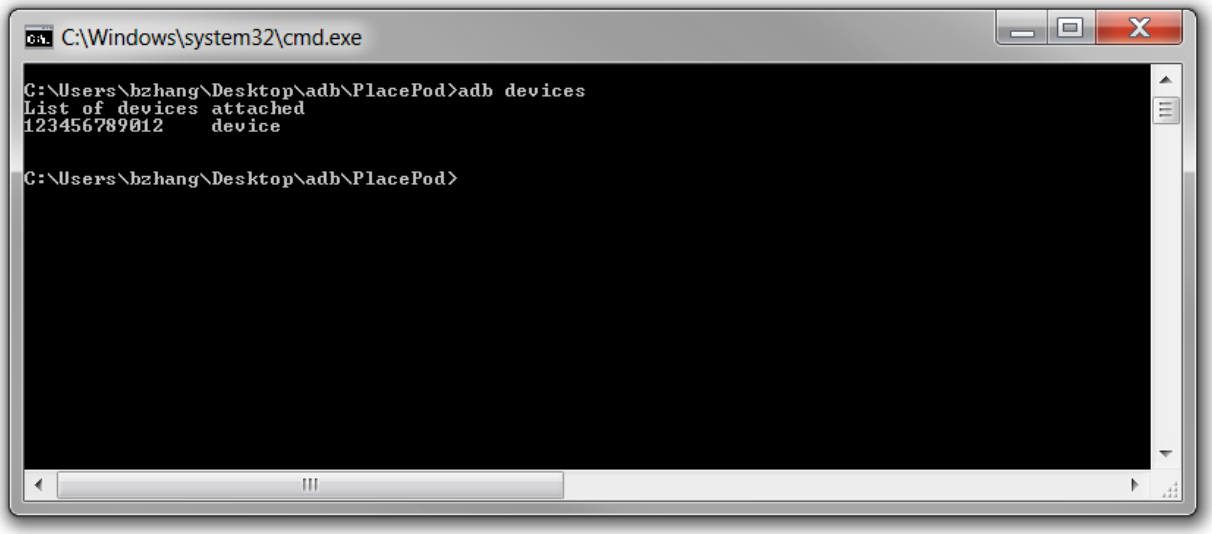

Figure A.1: "adb devices" shows currently connected devices

7. Run “adb install PlacePodUtility-v5.4.5.106.apk” command. This will install the Application.

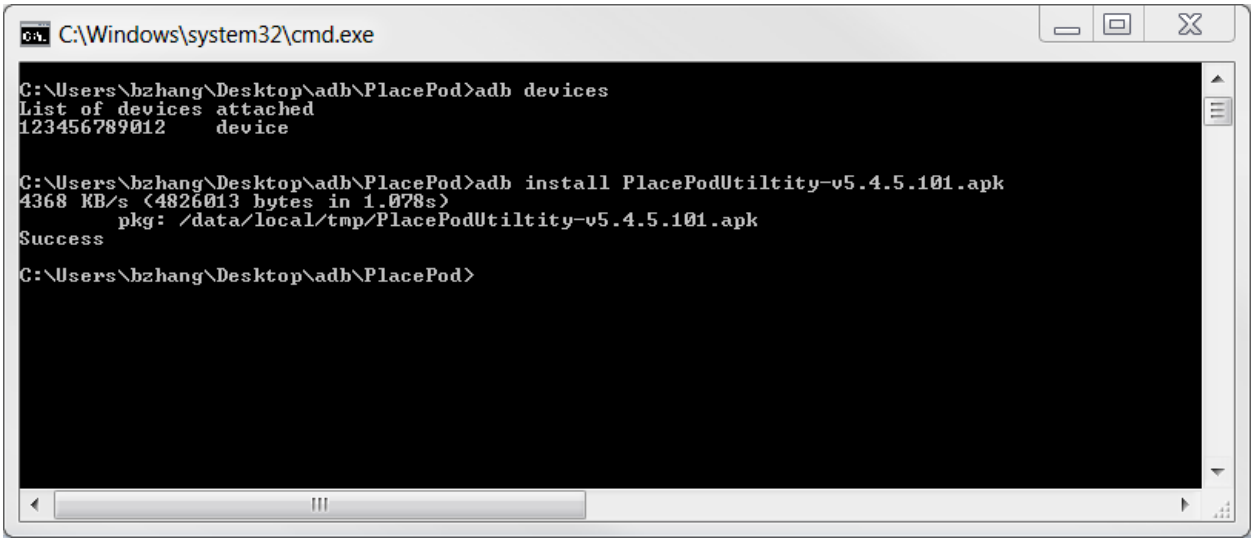

Figure A.2: Android application successfully installed