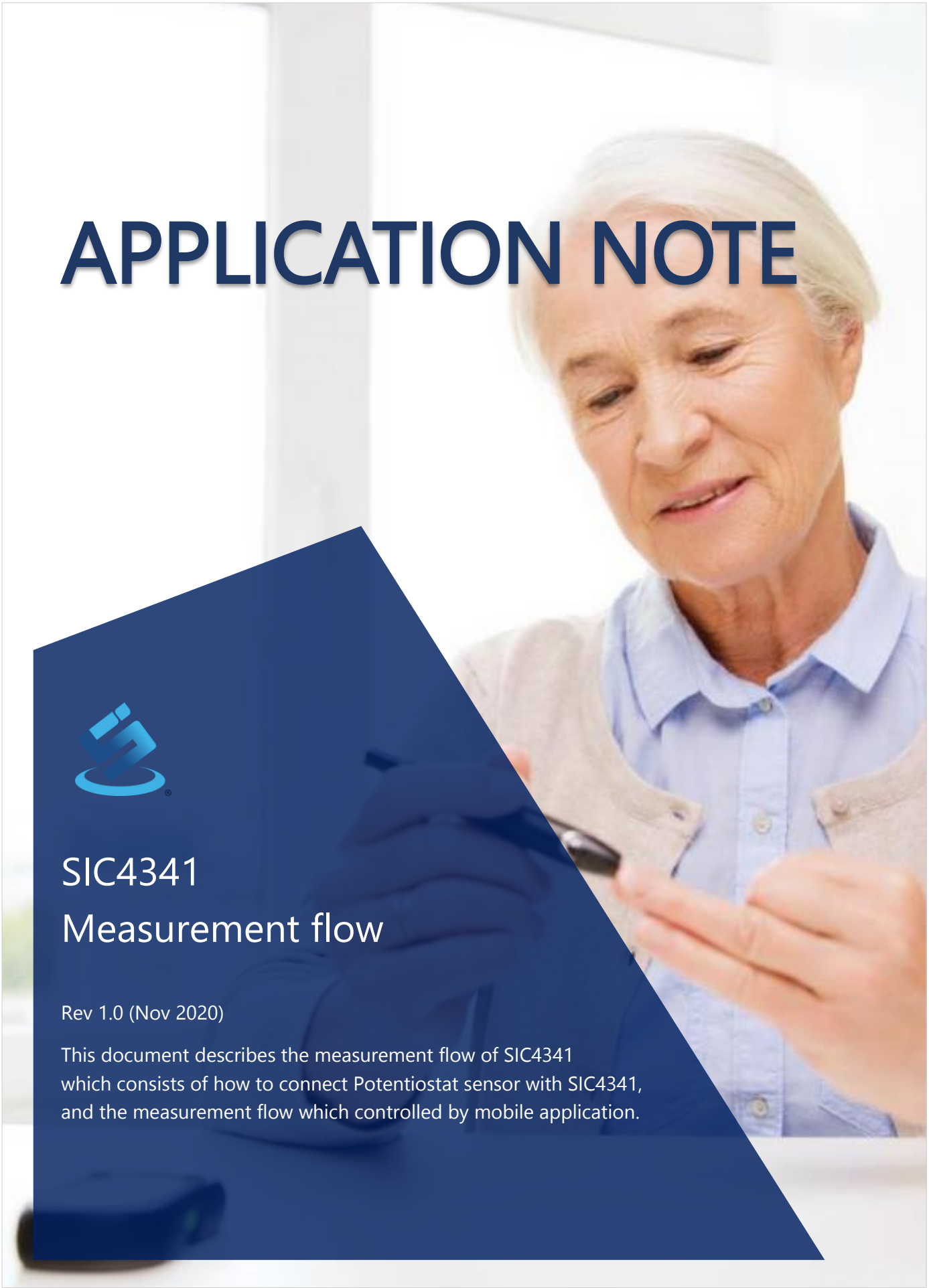
APPLICATION NOTE



SIC4341

Measurement flow

Rev 1.0 (Nov 2020)

This document describes the measurement flow of SIC4341 which consists of how to connect Potentiostat sensor with SIC4341, and the measurement flow which controlled by mobile application.

Revision History

Revision	Date	Description
1.0	November 2020	1st Release

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1. Introduction

SIC4341 is a 228-byte NFC tag IC with Potentiostat analog front-end. SIC4341 consists of an NFC Analog-Front-End circuit supporting ISO14443A, a sigma-delta ADC with effective resolution up to 10 bits, 2 units of 8-bit DAC, and a Potentiostat analog front-end circuit. SIC4341 is designed to create bias voltage across sensor and measure current feed through sensor.

Silicon Craft Technology PLC. (SIC) creates this document to describe the measurement flow of SIC4341. It consists of how to connect Potentiostat sensor with SIC4341 IC, and the measurement flow which are controlled by the Android application.

2. SIC4341 with Potentiostat sensor

Generally, Potentiostat device in the market is a huge device which is designed to use only for a lab equipment. SIC4341 with the built-in Potentiostat interface can reduce the size of the Potentiostat and able to make it as a portable device which can be used generally by everyone.

SIC4341 is NFC Tag type 2 with Potentiostat sensor interface circuit. Potentiostat sensor load is possible to be connected to IO[0], IO[1], and IO[2] pins (as Figure 1) which can be remapped to Reference Electrode (RE), Working Electrode (WE), and Counter Electrode (CE) depends on electrode footprint.

SIC4341 can control the voltage difference (bias voltage) between Working Electrode (WE) and Reference Electrode (RE) and it will measure the current flow between Working Electrode (WE) and Counter Electrode (CE).

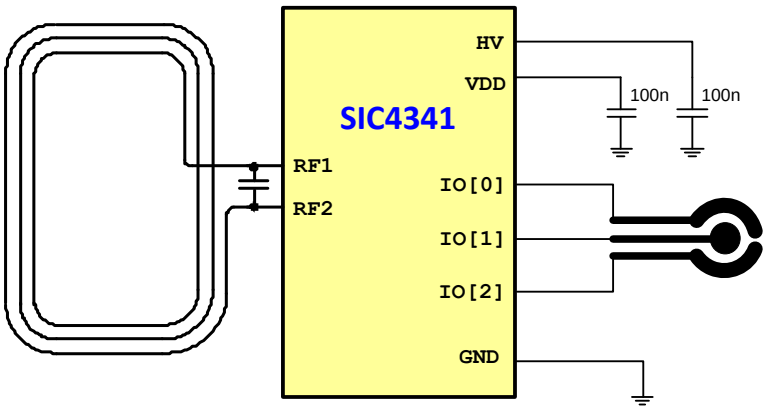

Figure 1: Basic SIC4341's connection with electrode

To measure the value from Potentiostat sensor, SIC4341 will harvest the power from mobile for running the operation. The bias voltage can be controlled by DAC of SIC4341 and the result from sensor will be sent to ADC of SIC4341 as shown in Figure 2.

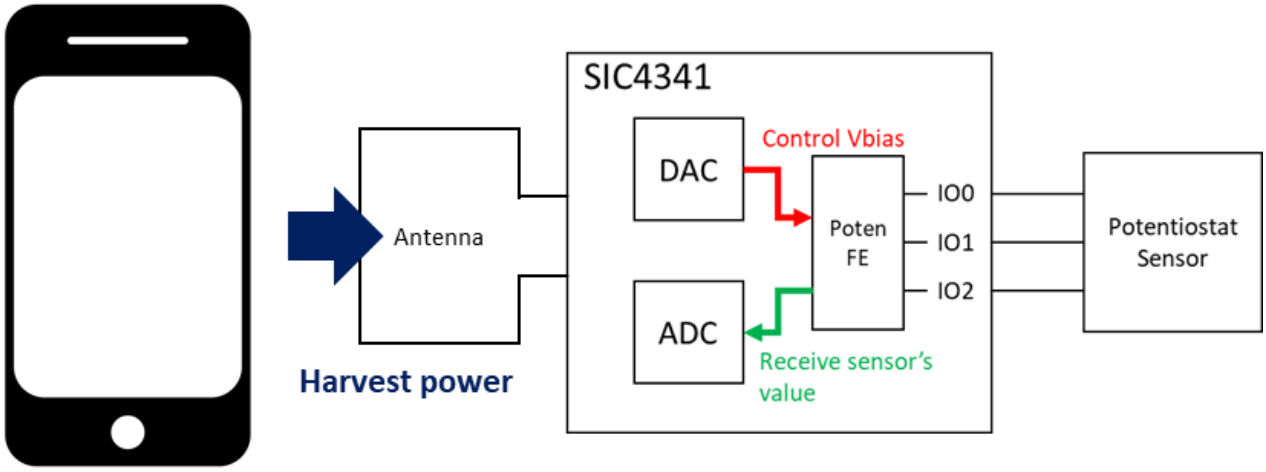

Figure 2: SIC4341 Block diagram for sensor measurement

From the block diagram in Figure 2, the specification of DAC and ADC of SIC4341 is shown in Table 1

Table 1: Specification of SIC4341 DAC and ADC

DAC Specification	
Bias voltage	-0.8 V to 0.8 V
Applied potential resolution	5mV
Applied potential accuracy	±2.5mV
ADC Specification	
Current ranges	2.5uA and 20uA
Measured current resolution	0.4% or ±10nA at 2.5uA range 0.2% or ±40nA at 20uA range

3. Flow of measurement

Figure 3 shows the flow of how to use SIC4341 with Potentiostat sensor. In this flow, the action of a usage is separated into physical action (in blue) and in-app action (in green).

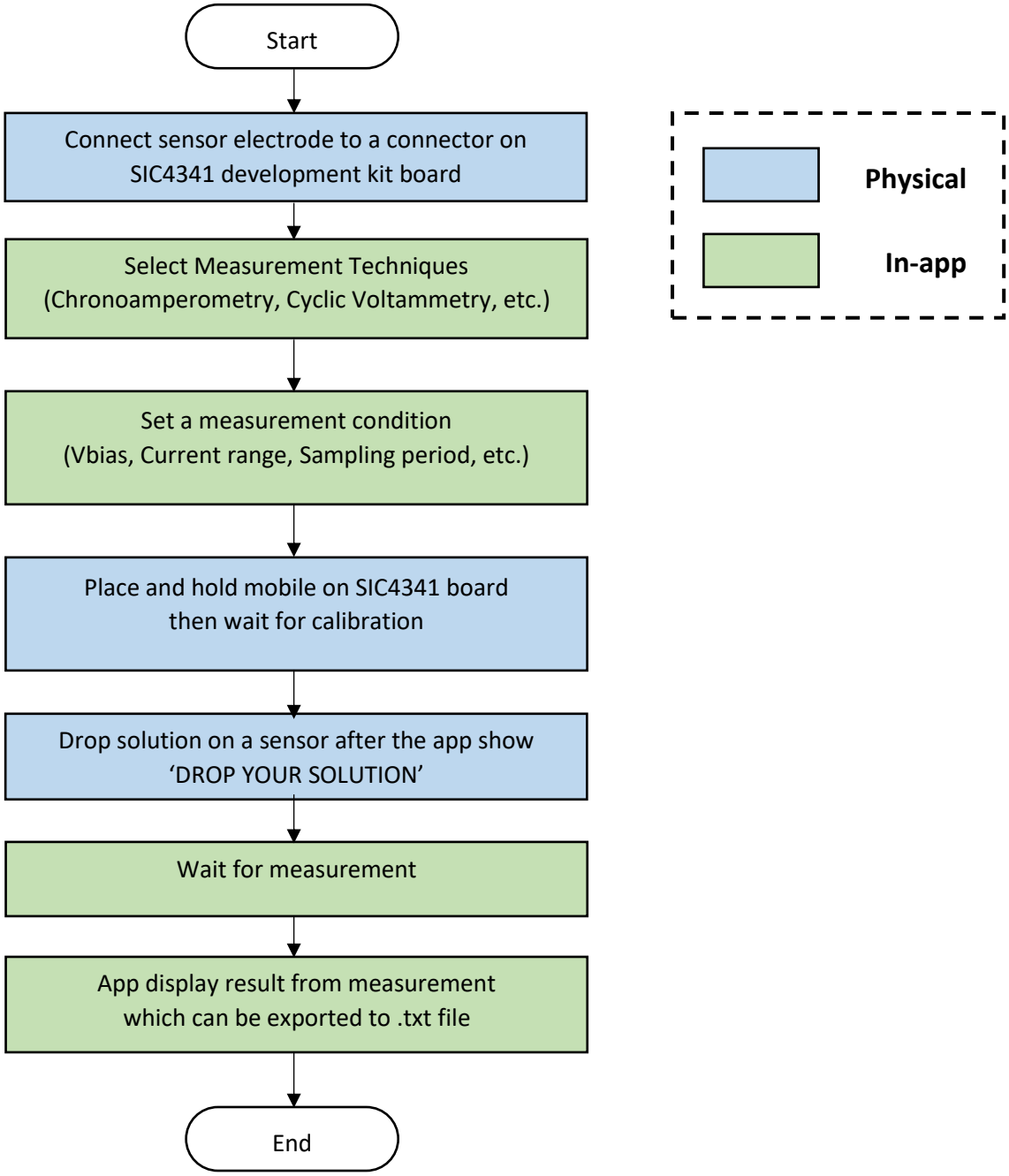

Figure 3: Flow of How to use SIC4341 with Potentiostat sensor

Figure 4 shows the operation of SIC4341 includes the operation of the app to control SIC4341 and operation of SIC4341 to send bias voltage and receive the value from the sensor.

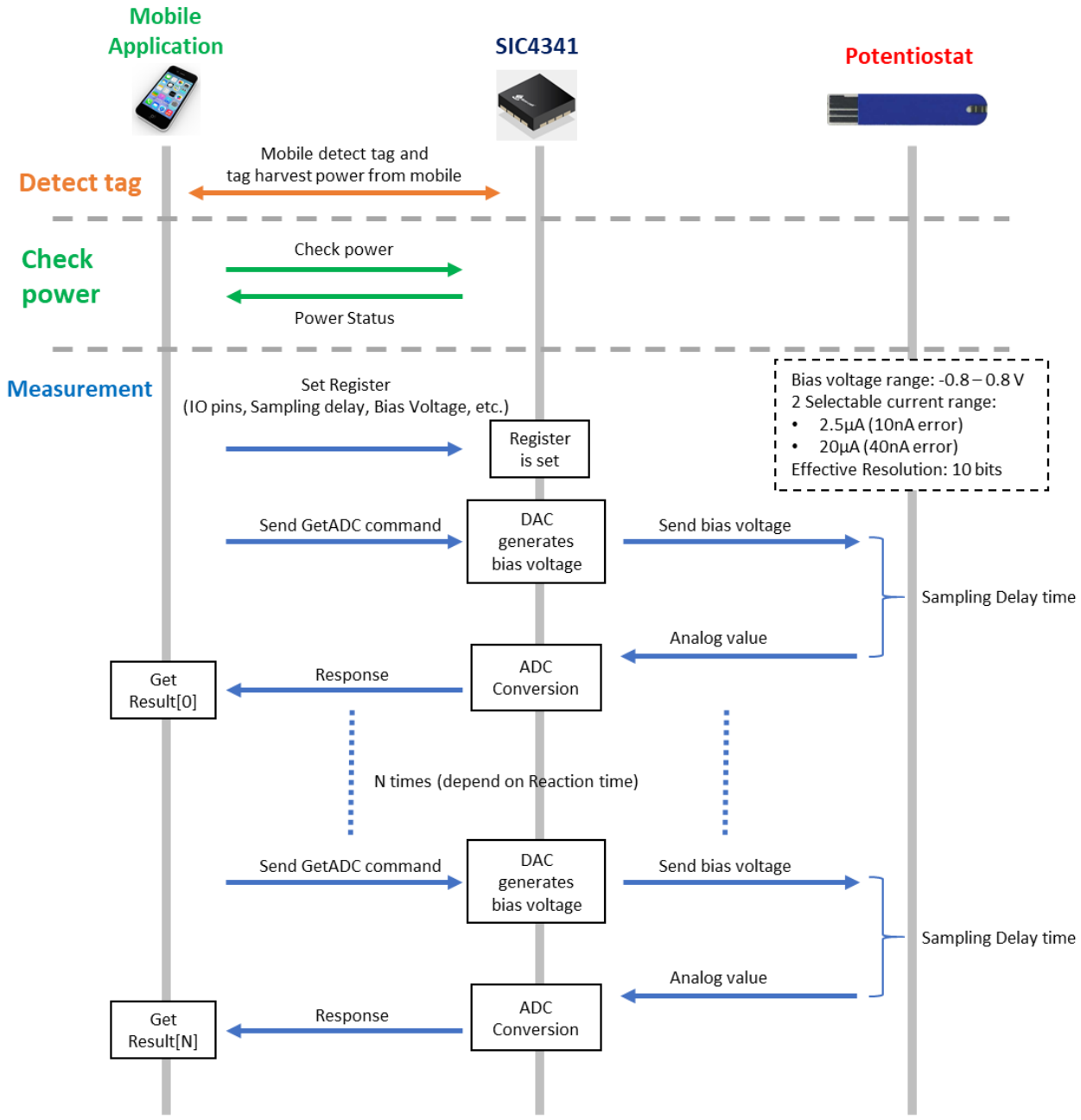

Figure 4: Operation of SIC4341 measurement

4. Legal Information

4.1 Disclaimer

- The information described herein is subject to change without notice.

- Although the IC contains a static electricity protection circuit, static electricity or voltage that exceeds the limit of the protection circuit should not be applied.

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