

**Renesas Solution Starter Kit**

R20QS0005EJ0100

**Blood Pressure Monitoring Evaluation Kit for RL78/H1D**

Rev.1.00

Apr 19, 2018

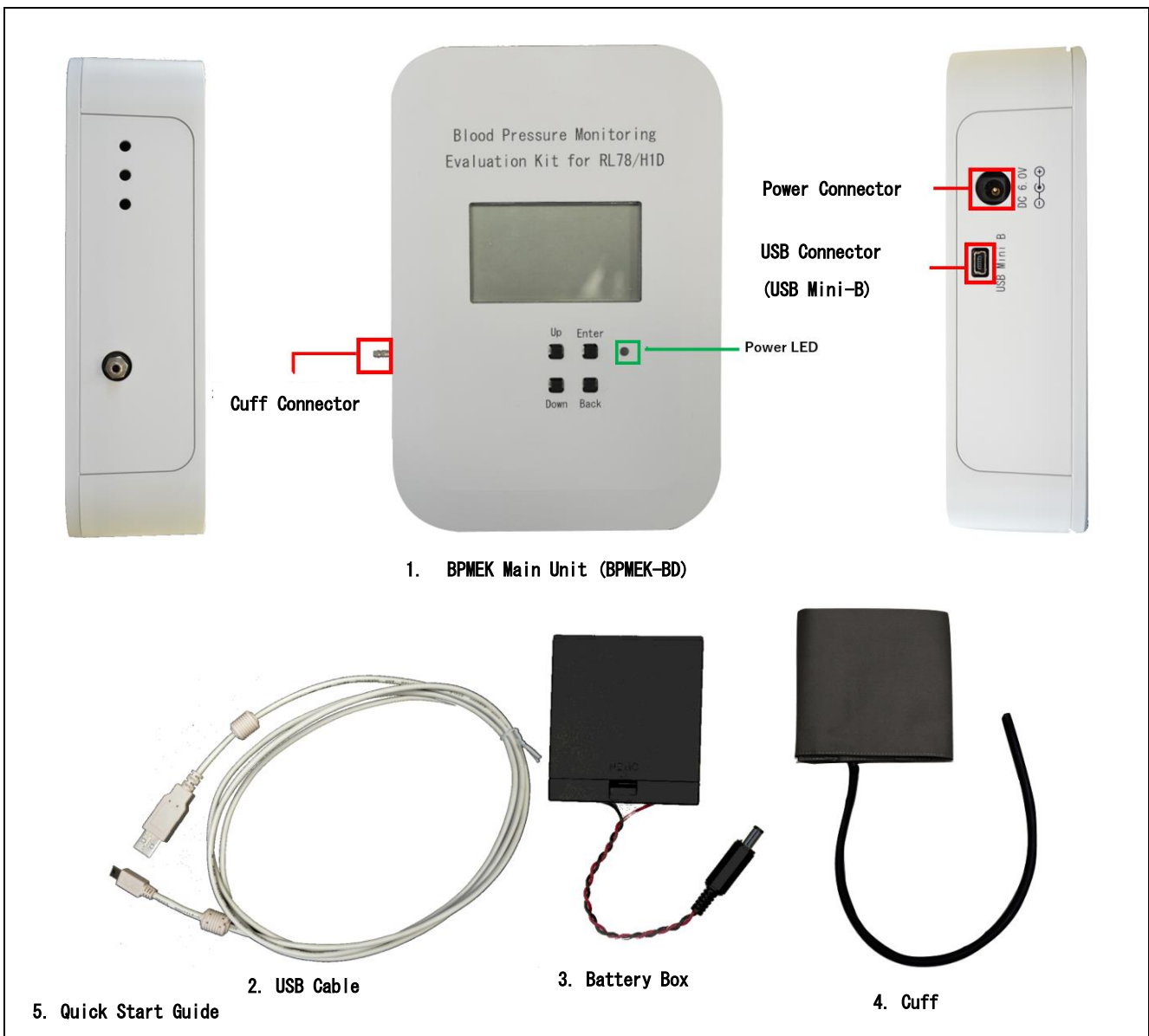
Thank you for purchasing the Blood Pressure Monitoring Evaluation Kit (Hereafter, it is abbreviated as BPMEK) RTK0EH0003S02001BR from Renesas Electronics.

This material explains the packing contents, the preparation of the use of this product, the execution procedure of the demonstration program and the PC GUI tool (Hereafter, it is abbreviated as BPMEK-GUI).

This BPMEK is not a medical equipment.

**1. Checking the Package Contents**

The following shows the package contents.



**Figure 1-1 Package Contents**

## 2. Connection

The following shows how to connect contents.

- Set 4 pieces of the AA battery (alkaline battery or nickel hydrogen chargeable battery) correctly in the battery box, and connect it with the power supply connector of the main body of the BPMEK (Hereafter, it is abbreviated as BPMEK-BD).
- Connect the mini-B connector of the USB cable with the USB connector of the BPMEK-BD, and the other side connector of the USB cable with the USB port of PC.

Note: When the driver is not installed automatically, download the driver that suits the operating system used from Future Technology Devices International Limited Web site.

<http://www.ftdichip.com/Drivers/VCP.htm>

- Connect the tube of the cuff with the cuff connector of the BPMEK-BD

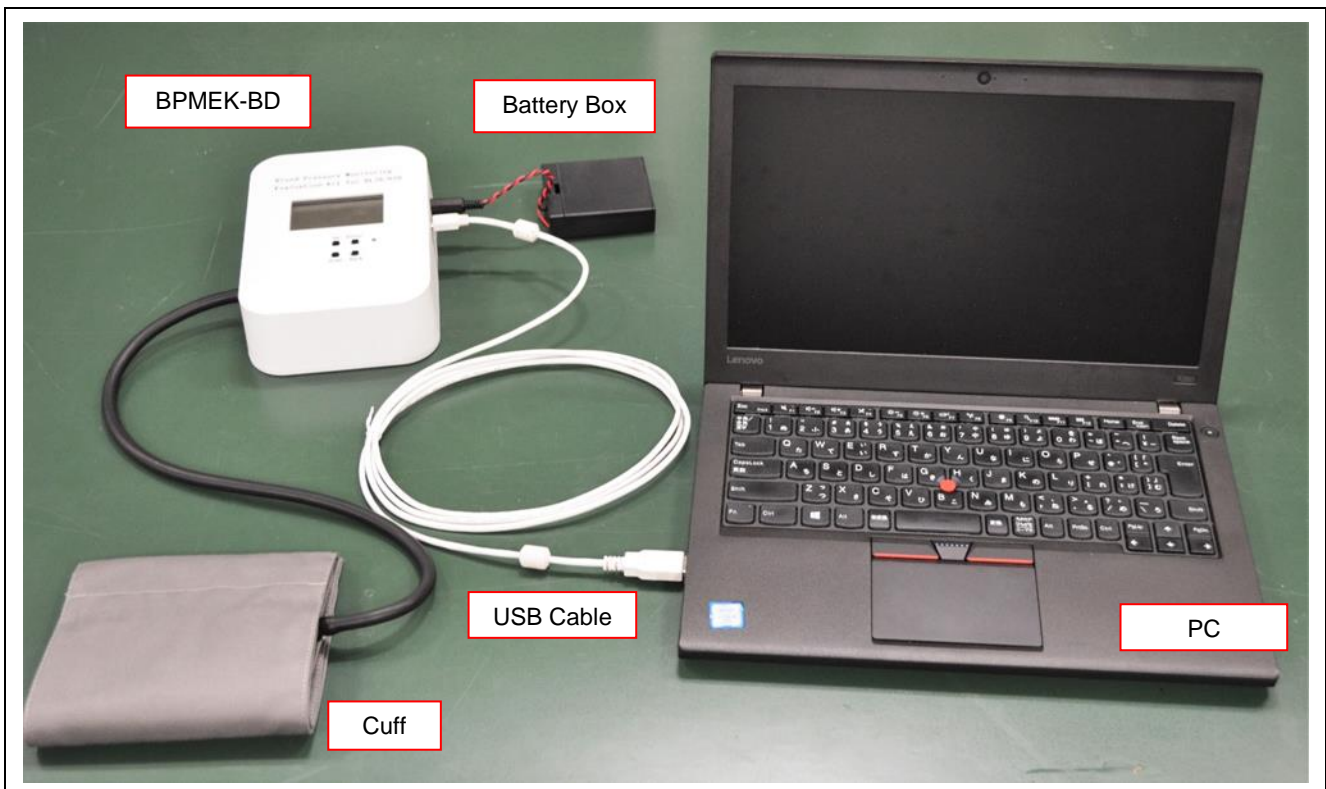


Figure 2-1 Connection with BPMEK-BD

### 3. User Interface

#### 3.1 Key and Buzzer

There are the following 4 keys on the BPMEK-BD.

- Enter key
- Bask Key
- Up Key
- Down Key

It is possible to operate them by a short pressing and a long pressing of the key.

Table 3-1 shows the key detection specifications.

**Table 3-1 Key Detection Specification**

Key Detection	Specification
Short pressing	Pressing of less than 0.5 seconds
Long pressing	Pressing for 0.5 seconds or more

The key accepted according to the buzzer sound can be confirmed.

#### 3.2 Buzzer

Table 3-2 shows the buzzer specification.

**Table 3-2 Buzzer Specification**

Notification Sound	Specification
Acceptance sound at key short pressing	(60 ms buzzer ON -> 60 ms buzzer OFF) x 1 time
Acceptance sound at key long pressing	(60 ms buzzer ON -> 60 ms buzzer OFF) x 2 times
Operational error sound	(60 ms buzzer ON -> 60 ms buzzer OFF) x 2 times *1
Operation voltage decrease detection sound	(500 ms buzzer ON -> 500 ms buzzer OFF) x 2 times
Abnormal pressure detection sound	(200 ms buzzer ON -> 200 ms buzzer OFF) x 10 times

\*1: After the acceptance sound generates, the operational error sound generates.

Operational error at short pressing: (60 ms buzzer ON -> 60 ms buzzer OFF) x 3 times

Operational error at long pressing: (60 ms buzzer ON -> 60 ms buzzer OFF) x 4 times

## 4. How to Use

### 4.1 In case of BPMEK-BD Only (without BPMEK-GUI)

The Blood Pressure Monitoring demonstration program (Hereafter, it is abbreviated as BPMEK-FW.) has been written in the main body of the BPMEK-BD.

The Blood Pressure Monitoring Mode Application of the BPMEK-FW can be started according to the following procedures, and pressure measurement during pressurization and decompression of the cuff is possible.

The following shows the state transition of the BPMEK-FW. The BPMEK-FW cannot output blood pressure values.

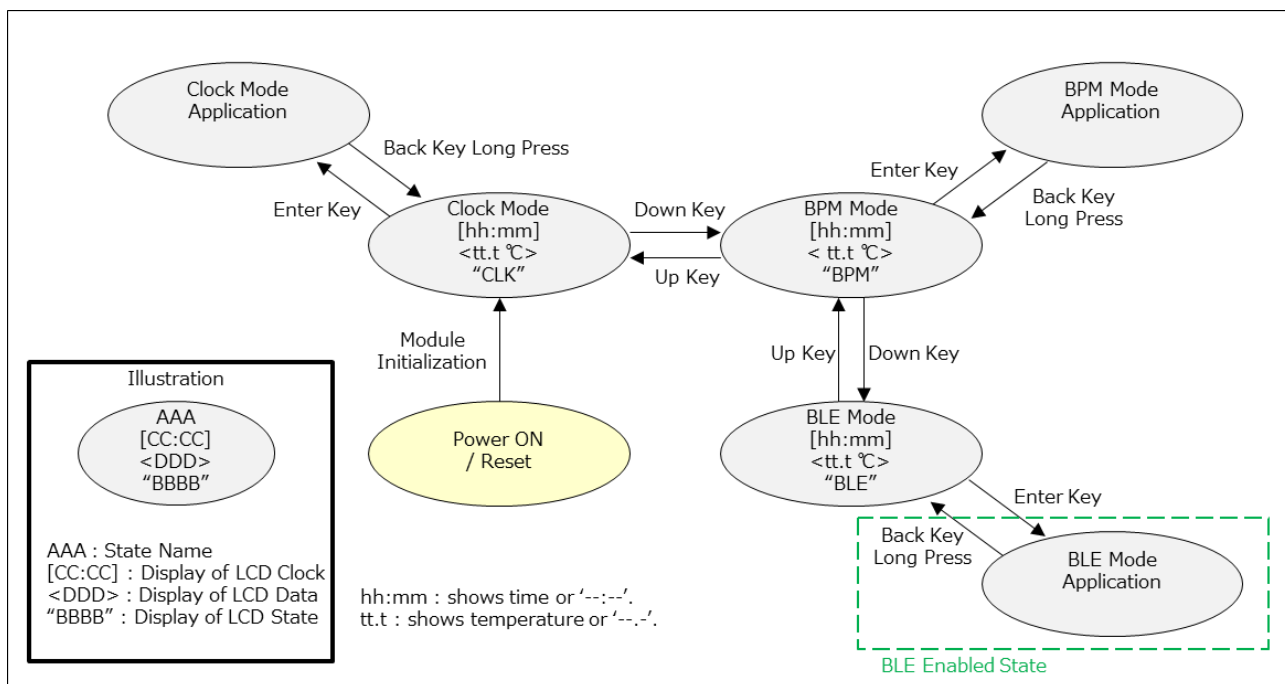


Figure 4-1 State Transition Diagram of BPMEK-FW

The following <xxx> shows the LCD Data part (the middle of the display).  
The following "xxx" shows the LCD State part (the left-lower of the display).

1. Supply the power. When supplying the power, the Power LED lights up.

After supplying the power, the air pump motor is in the stop state, the solenoid valve in in the opened state and the cuff is in the atmospheric state.

After the all symbols of the LCD are displayed. After that the "CLK" at the LCD State part is displayed.



Figure 4-2 Display after Supplying Power

- Execute the short pressing of the Down key. The “BPM” at the LCD State part is displayed.

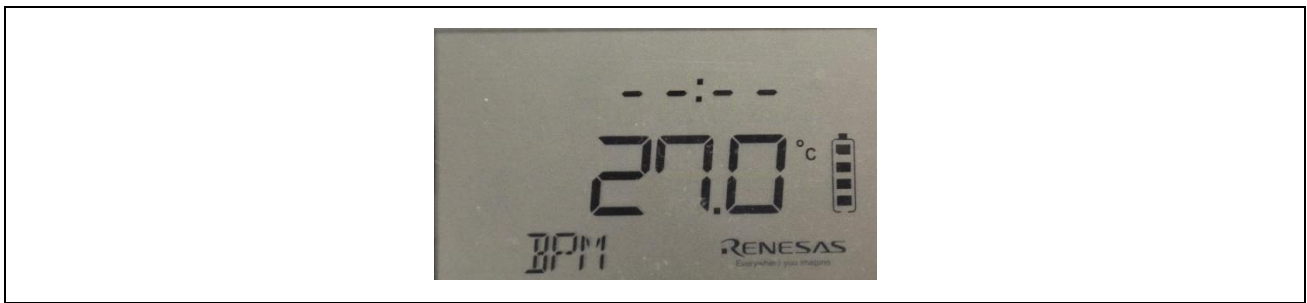


Figure 4-3 Display of “BPM” at LCD State Part

- Execute the short pressing of the Enter key. The “MEAS” at the LCD State part is displayed.



Figure 4-4 Display of “MEAS” at LCD State Part

- Execute the short pressing of the Enter key. The “BLK0” at the LCD State part is displayed.



Figure 4-5 Display of “BLK0” at LCD State Part

- Execute the short pressing of the Enter key. It moves in the measurement start state of the Blood Pressure Monitoring mode application, the “MEAS” at the LCD State part is displayed.

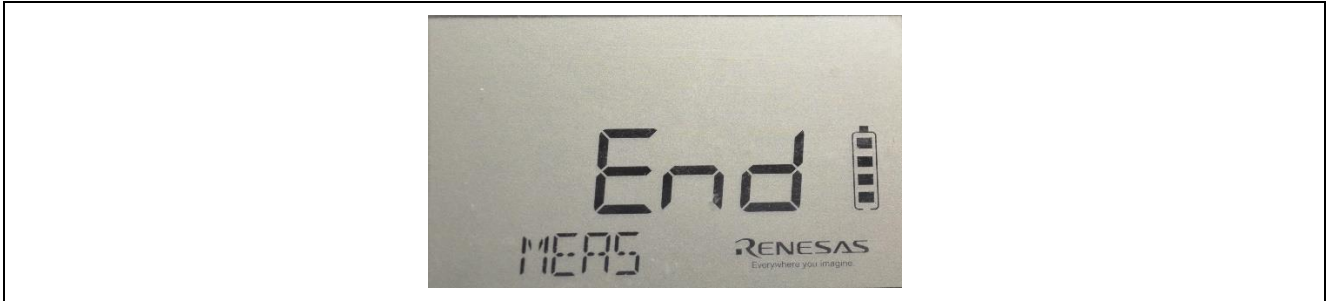


Figure 4-6 Display of Measurement Start State (“MEAS” and <0 mmHg>)

By short pressing the Enter key, it starts to pressurize the cuff, after that decompresses.

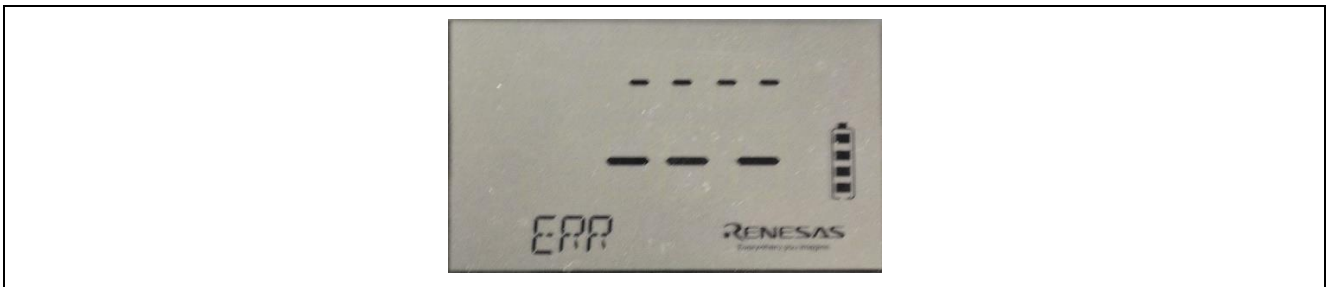
During measuring, the data acquired from the pressure sensor is converted using the A/D Converter, and the pressure value (unit: mmHg) is displayed in the LCD Data part.

After finishing measurement, the “End” at the LCD State part is displayed. By short pressing the Enter key, it goes back to the measurement start state and the “MEAS” is displayed at the LCD State part shown in Figure 4-6.



**Figure 4-7 Display of Measurement End State (“MEAS” and <End>)**

If you want to abort measuring during measuring, execute the long pressing of the Back key. After aborting the measurement, it goes back to the measurement start state and the “ERR” at the LCD State part is displayed.



**Figure 4-8 Display of Measurement Abort State (“ERR” and <- - ->)**

Execute the long pressing of the Back key again so that the “MEAS” is displayed at the LCD State part shown in Figure 4-6.

### 4.2 In case of BPMEK-BD with BPMEK-GUI

It is possible to receive the data from the BPMEK-BD by starting the BPMEK-GUI.

The BPMEK-GUI can analyze the data of the filter processing etc. of the received data.

Please download the BPMEK-GUI as follows.

<https://www.renesas.com/bpm-rssk>

Please set the BPMEK-GUI according to the following procedures before it begins to measure it when you see the measurement result on the BPMEK-GUI.

1. Supply the power to the BPMEK-BD and connect the BPMEK-BD to PC with USB cable.
2. Execute the BPMEK-GUI. The COM Port Setting window is displayed as shown below. Select the COM port in COM Port Setting Window and Click “Set”.

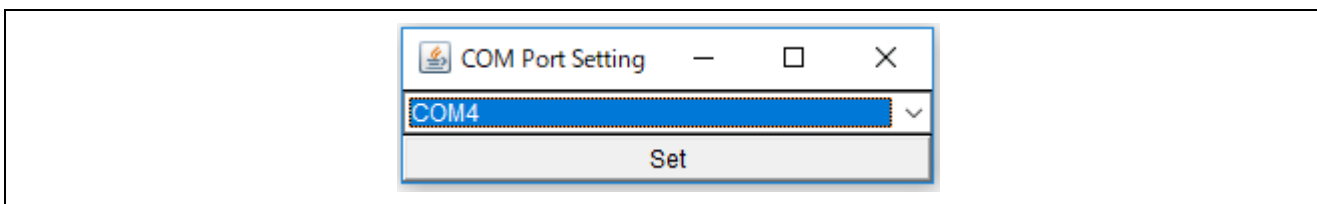


Figure 4-9 COM Port Setting Window

3. The following is displayed.

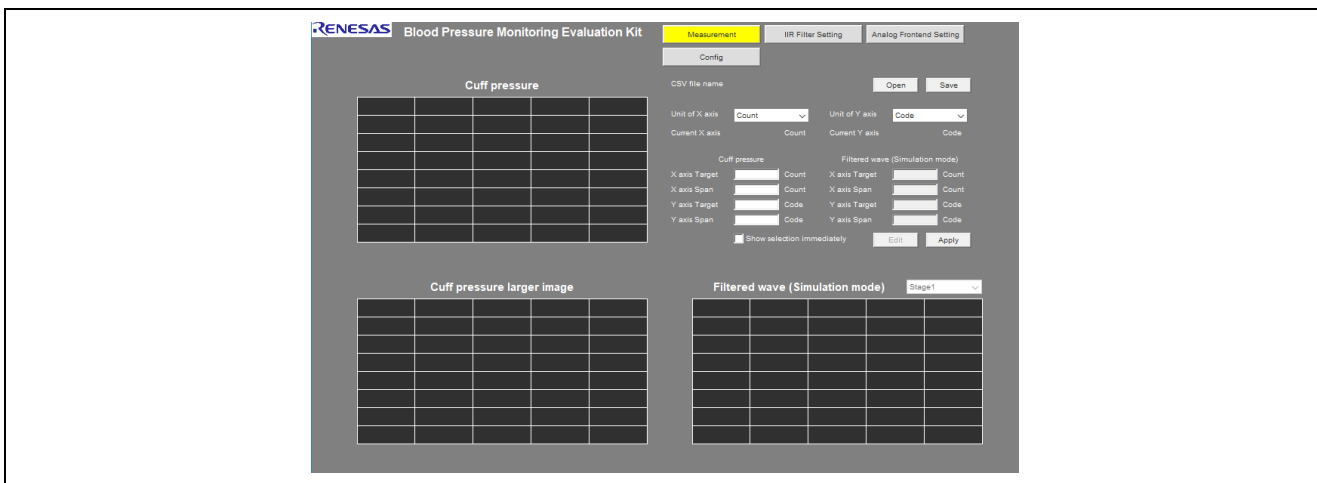


Figure 4-10 Measurement Display

- Execute the Blood Pressure Monitoring Mode Application of the BPM-SW. When the measurement is finished, the measurement data is drawn on the Cuff pressure graph as shown below. For the operation method, refer to "4.1 In case of BPMEK-BD Only (without BPMEK-GUI)".

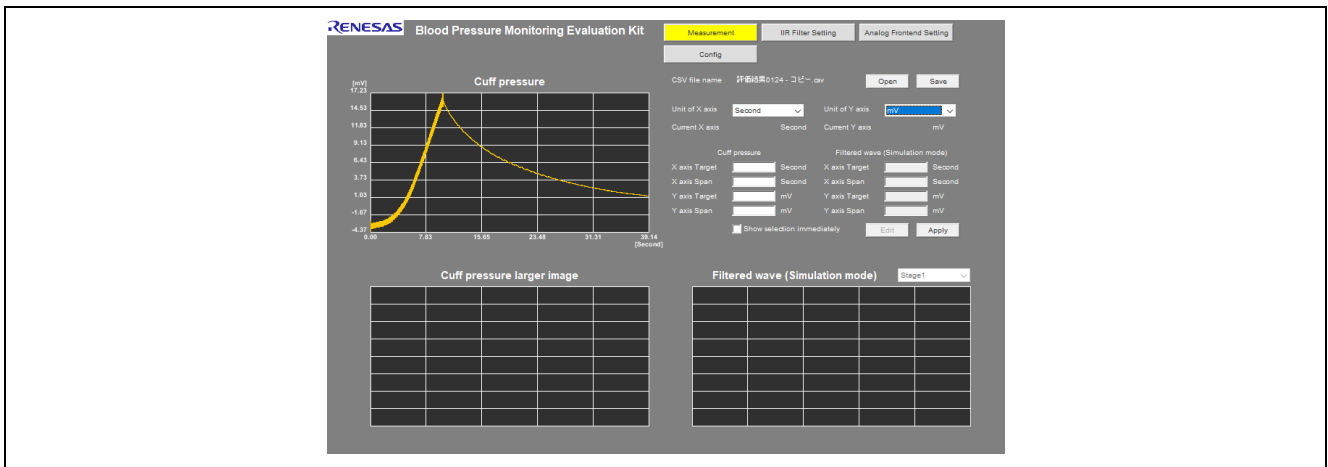


Figure 4-11 Measurement Display after Finishing Measurement



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**Revision History**

<b>Rev.</b>	<b>Date</b>	<b>Description</b>	
		<b>Page</b>	<b>Summary</b>
1.00	Apr 19, 2018	-	First Release

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