



Rethinking Sensing Technology

(BeanDevice[®] 2.4GHz AN-V/AN-mV/AN-420) – DAQ Accuracy Tests with Static & Dynamic Data Acquisition Mode – Youssef SHAHIN, Technical Support Engineer
Version document V1.0 – Date 09.11.2020

Berlin, Germany

Tests Description:

The improvement of accuracy is available on the following products:

- BeanDevice® 2.4GHz AN-V-10V/AN-V-5V/AN-mV/AN-420

For Static modes (Low Duty Cycle and Alarm measurement mode) and Dynamic mode (Streaming measurement mode) on Firmware version V7.6

Test session 1: Test on static measurement mode

Configure the BeanDevice with Low Duty Cycle Measurement Mode for 2 min with a refreshment cycle of 2s
The tests are performed on both Battery and mains power.

Test session 2: Test on dynamic measurement mode

Put the BeanDevice on Streaming mode for 1min with different sampling rate (10Hz,100Hz,400Hz)
The tests are performed on both Battery and mains power.

List of Equipment used:

- **1 BeanDevice 2.4 GHz AN-mV, SW version V7.6**
- **1 BeanDevice 2.4 GHz AN-mV, SW version V7.1**

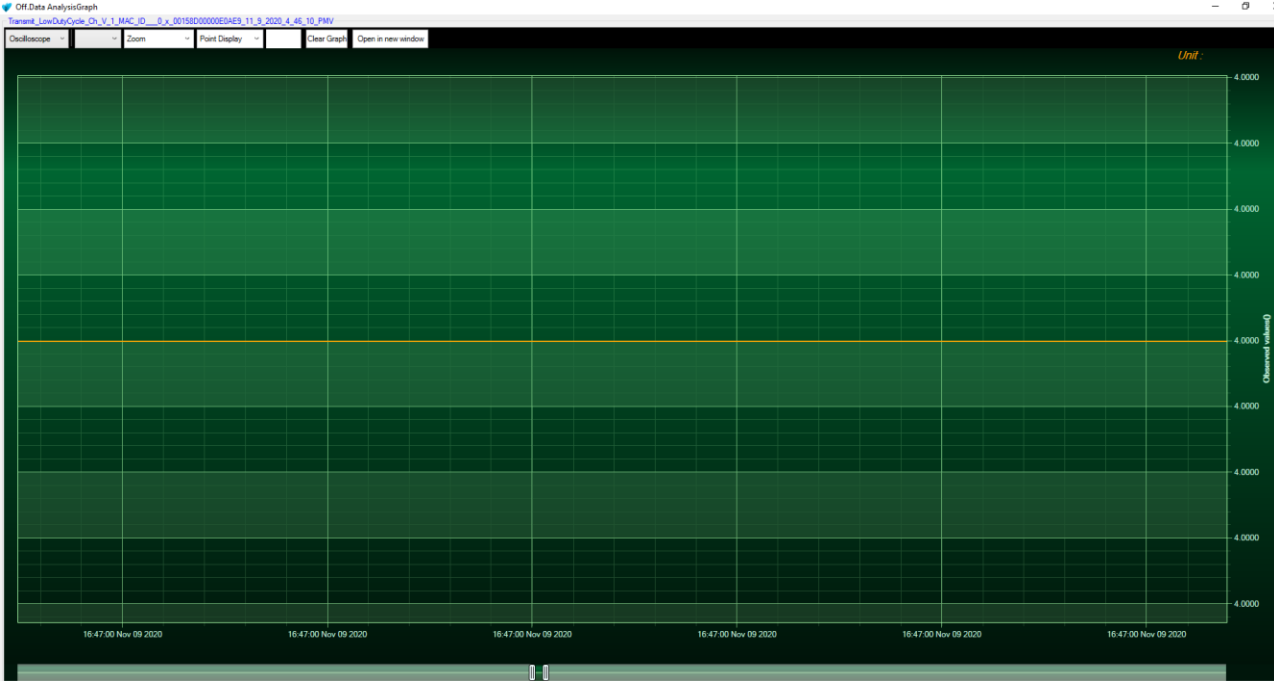
- **1 BeanDevice 2.4 GHz AN-V-10V /AN-V-5V, SW version V7.6**
- **1 BeanDevice 2.4 GHz AN-V-10V/AN-V-5V, SW version V7.1**

- **1 BeanDevice 2.4 GHz AN-420, SW version V7.6**
- **1 BeanDevice 2.4 GHz AN-420, SW version V7.1**

- **Calibrator: Beamex MC-2, Voltage Generator with a accuracy of $\pm 0.01\%$ on the full scale**

DAQ accuracy tests on Beandevice® AN-V-10V with Static measurement mode on SW 7.1

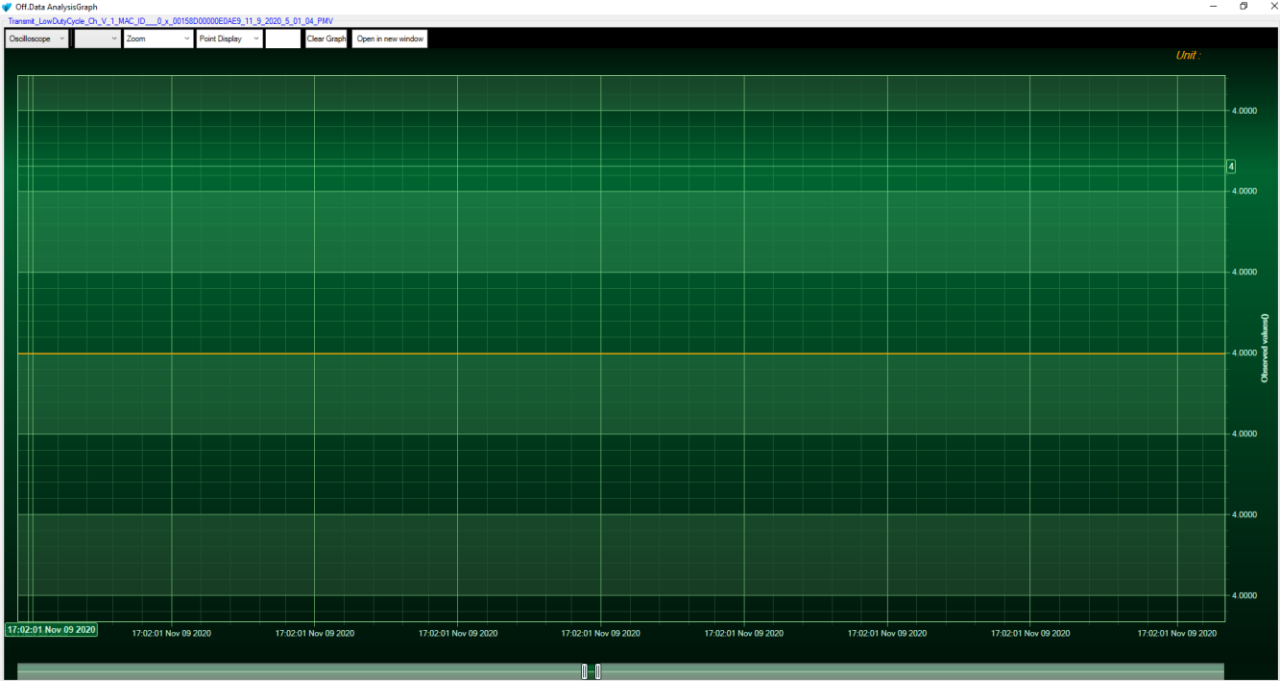
Mains Power



Injected Value: 4V

DAQ mode: LowDutyCycle 2s

Battery Power

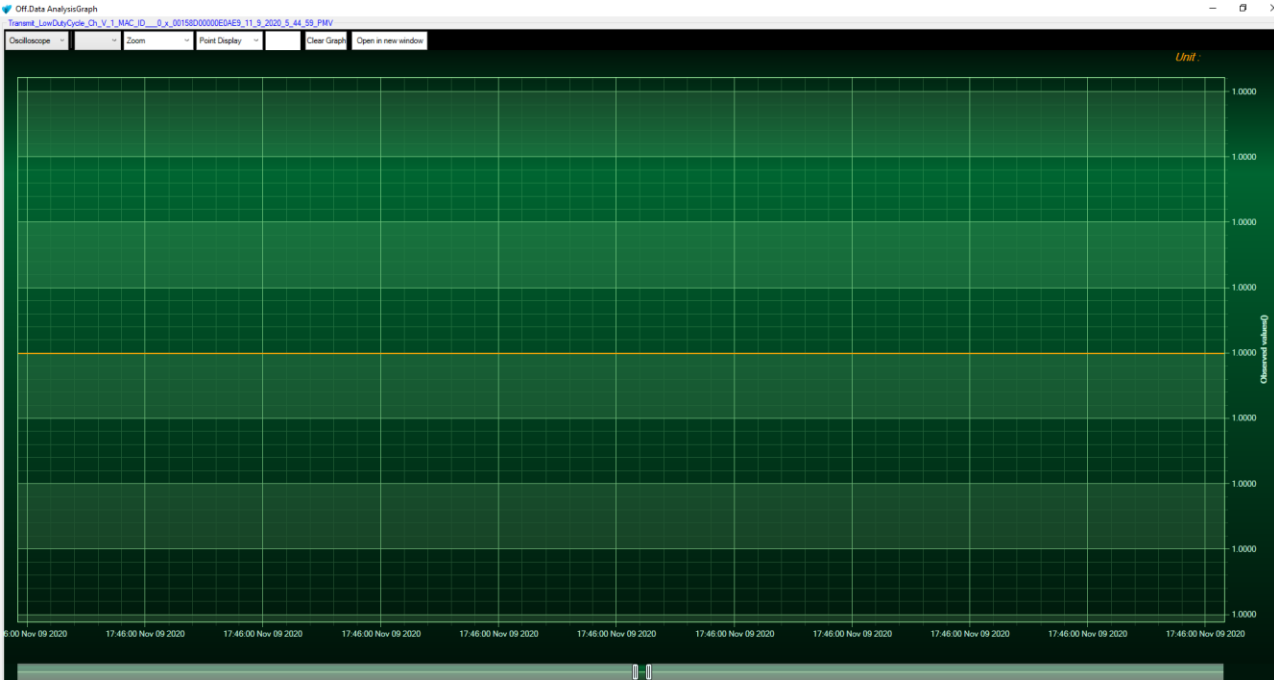


Injected value: 4V

Channel 1	Using mains power	Using battery power
AN-V-10V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevice® AN-V-10V with Static measurement mode on SW 7.6

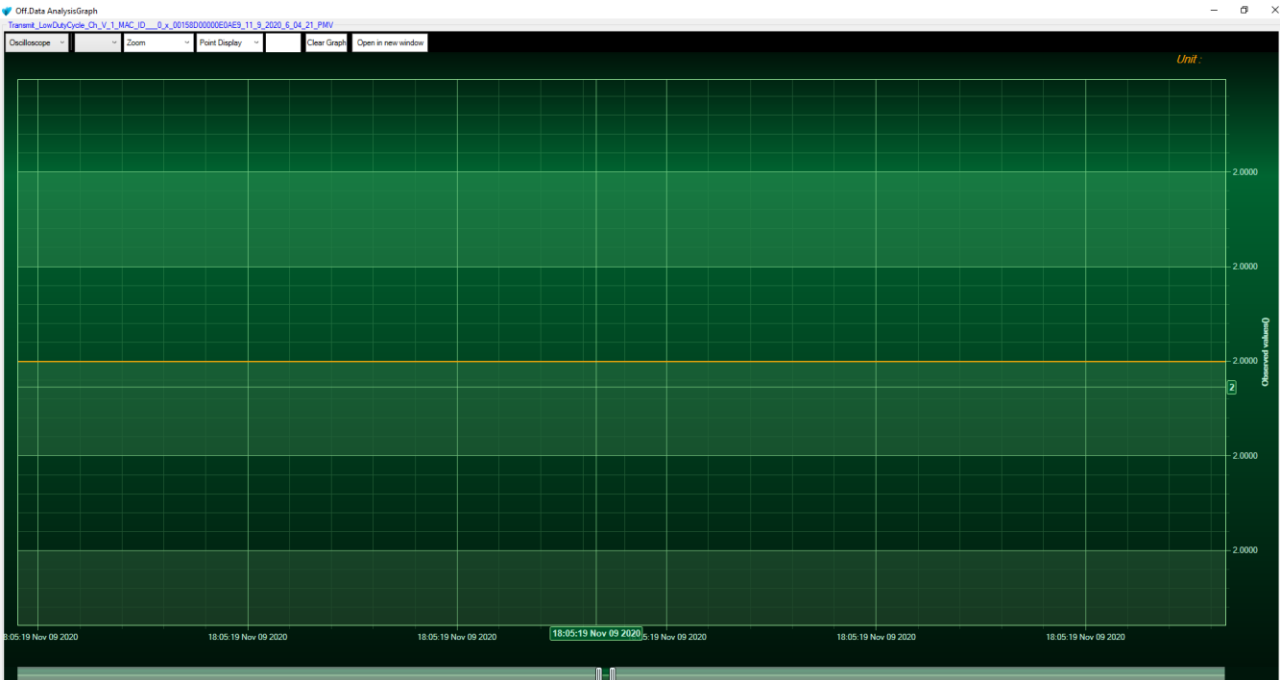
Mains Power



Injected Value: 1V

DAQ mode: LowDutyCycle 2s

Battery Power

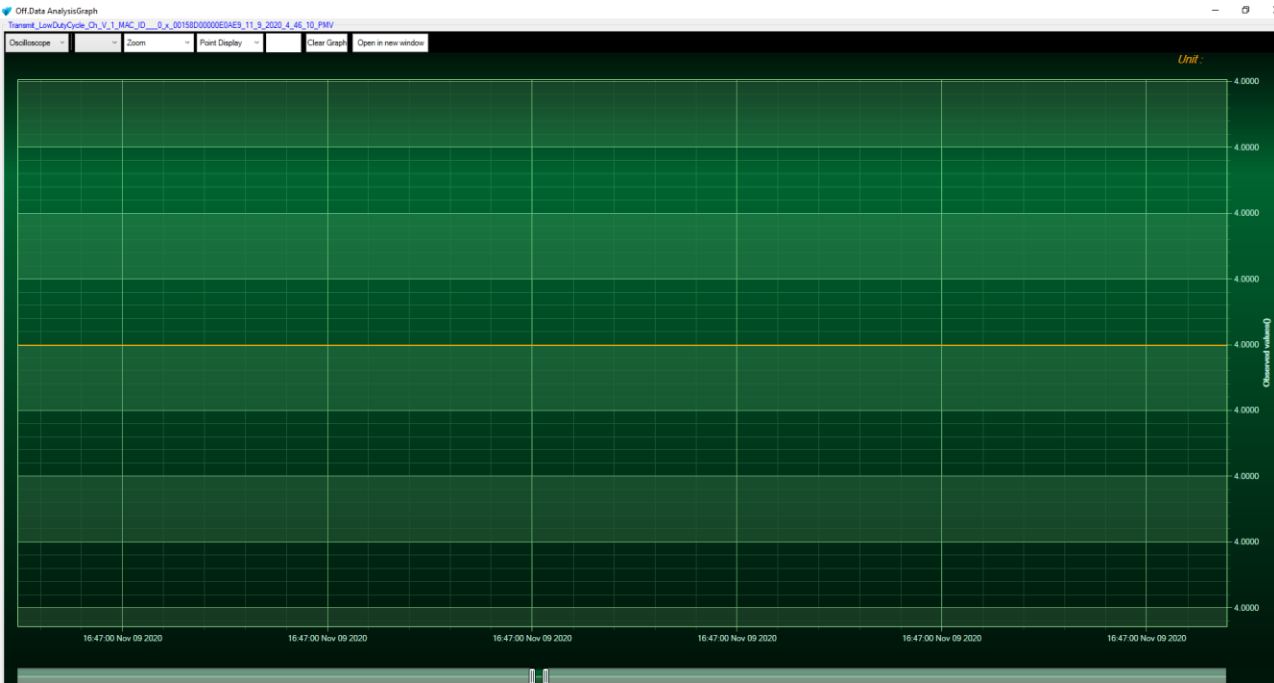


Injected value: 2V

Channel 1	Using mains power	Using battery power
AN-V-10V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevice® AN-V-10V with Dynamic measurement mode on SW 7.1

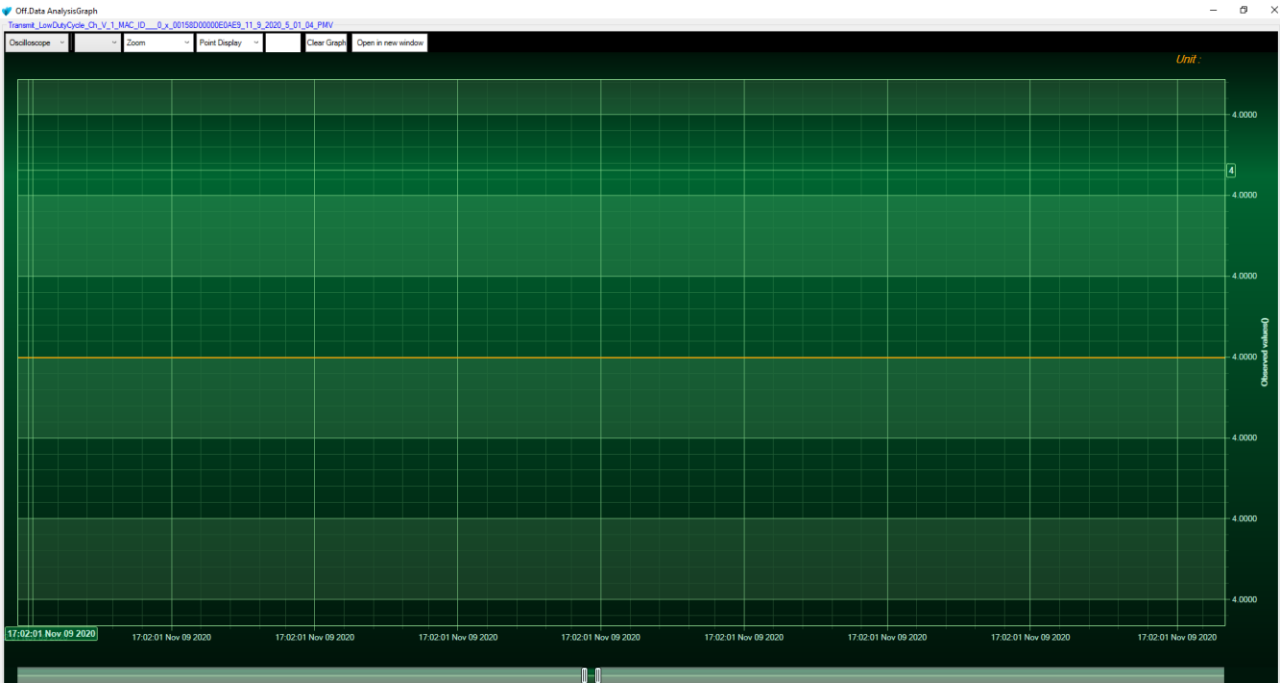
Mains Power



Injected Value: 4V

DAQ mode: Streaming mode @ 10Hz

Battery Power

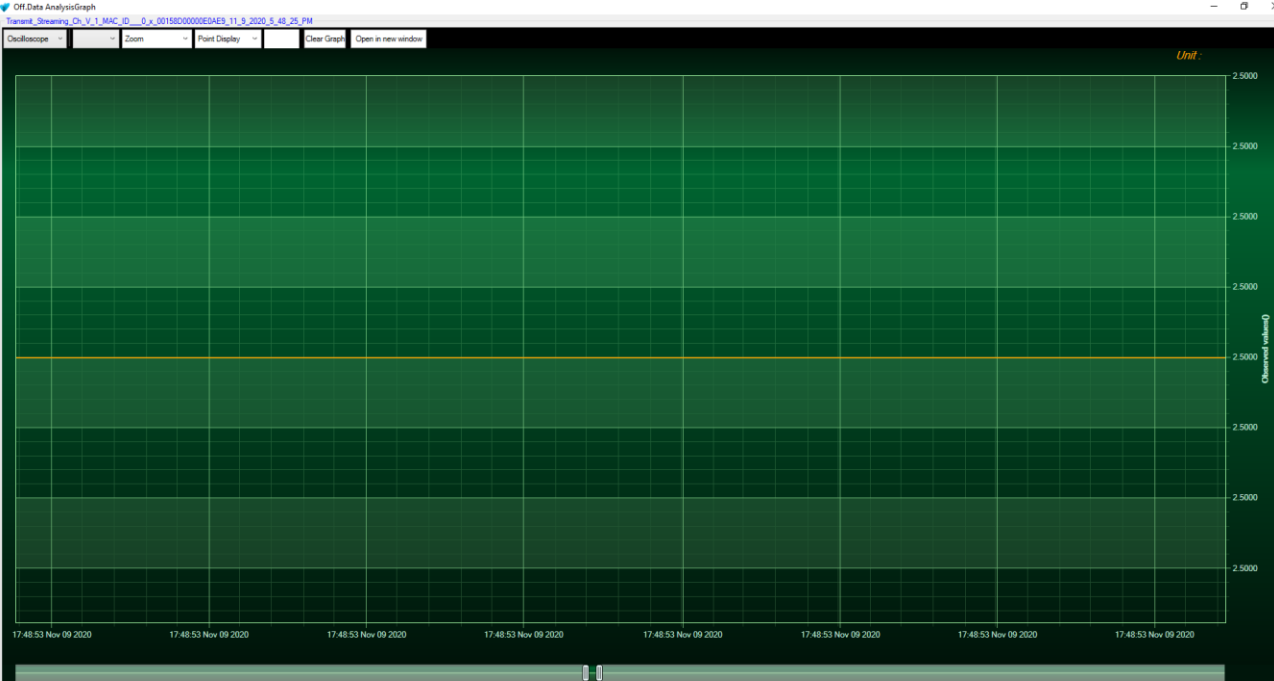


Injected value: 4V

Channel 1	Using mains power	Using battery power
AN-V-10V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevice® AN-V-10V with Dynamic measurement mode on SW 7.6

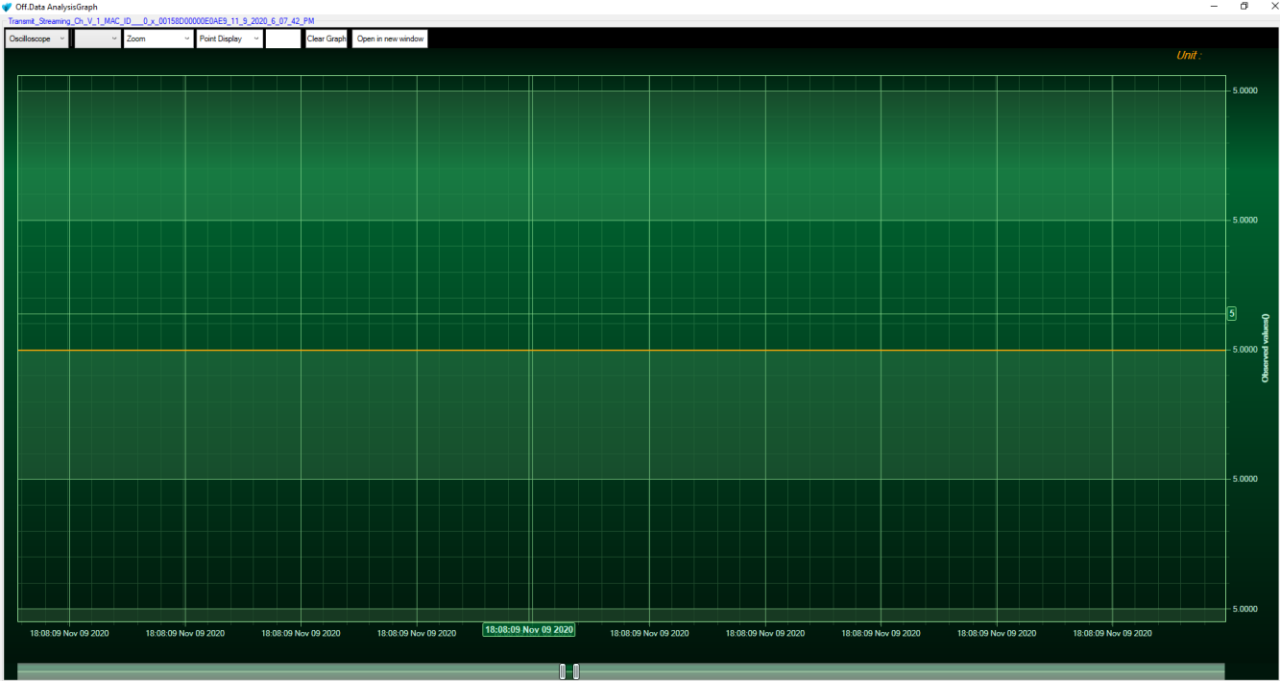
Mains Power



Injected Value: 2.5V

DAQ mode: Streaming mode @ 10Hz

Battery Power

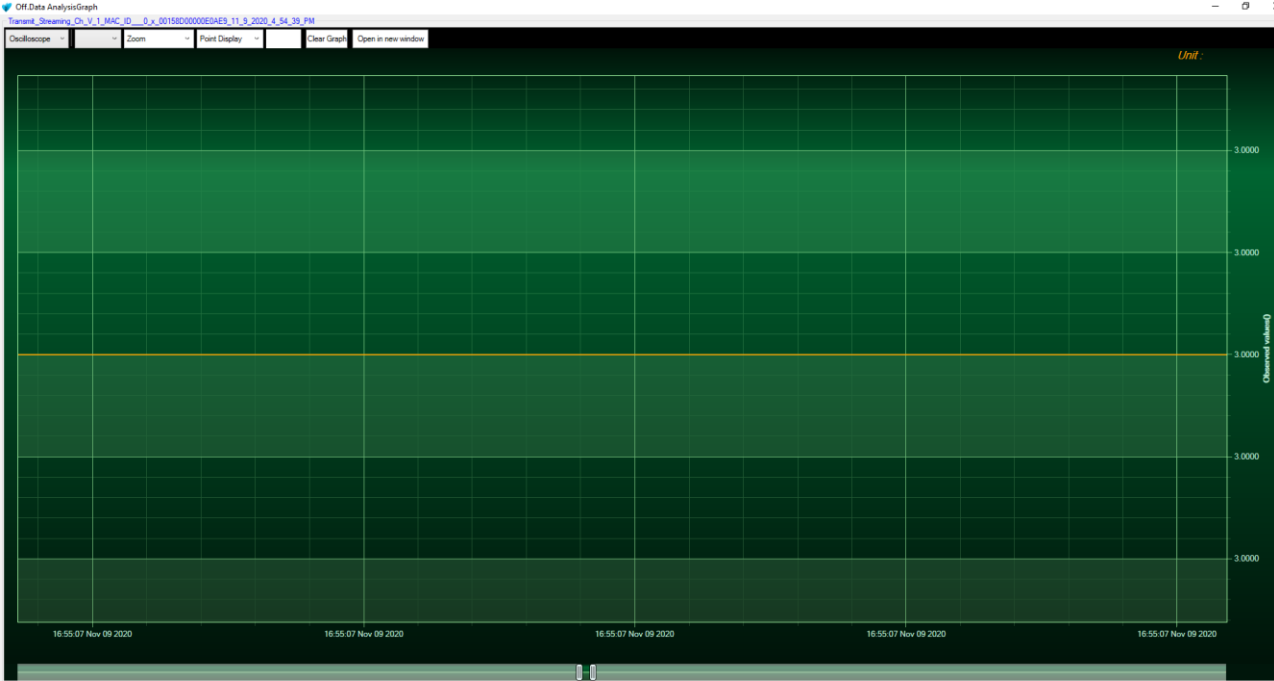


Injected value: 5V

	Using mains power	Using battery power
Channel 1		
AN-V-10V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevise® AN-V-10V with Dynamic measurement mode on SW 7.1

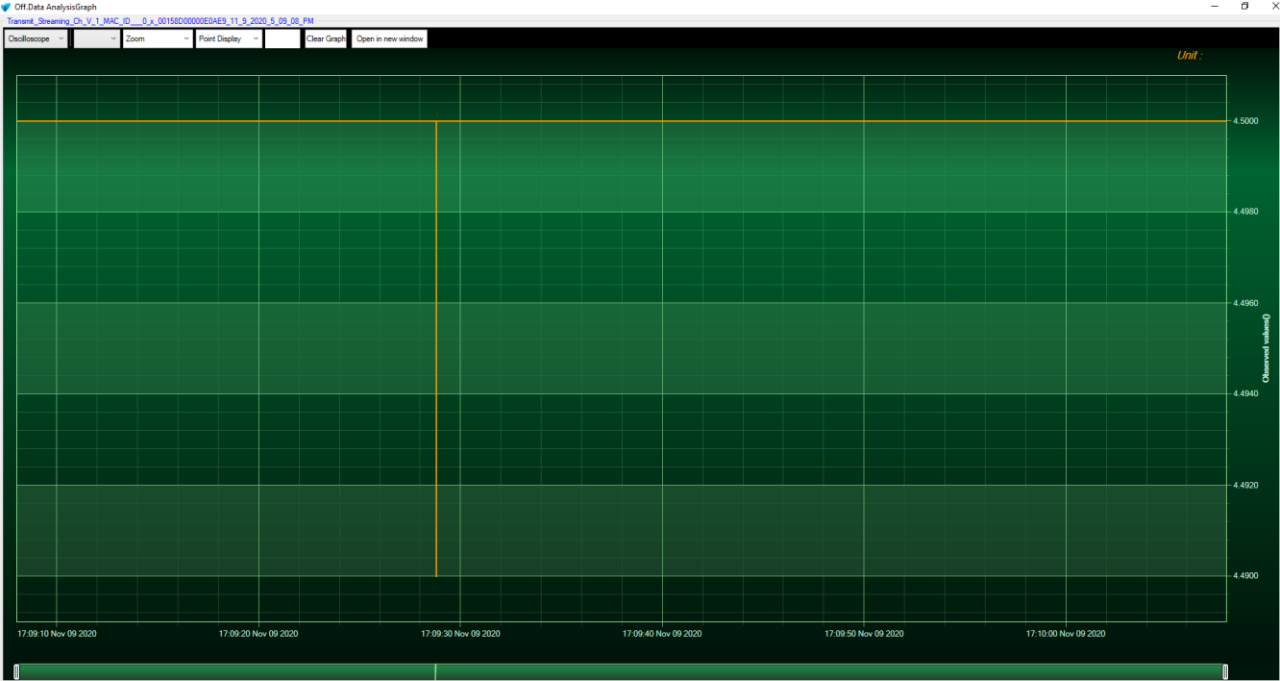
Mains Power



Injected Value: 3V

DAQ mode: Streaming mode @ 100Hz

Battery Power

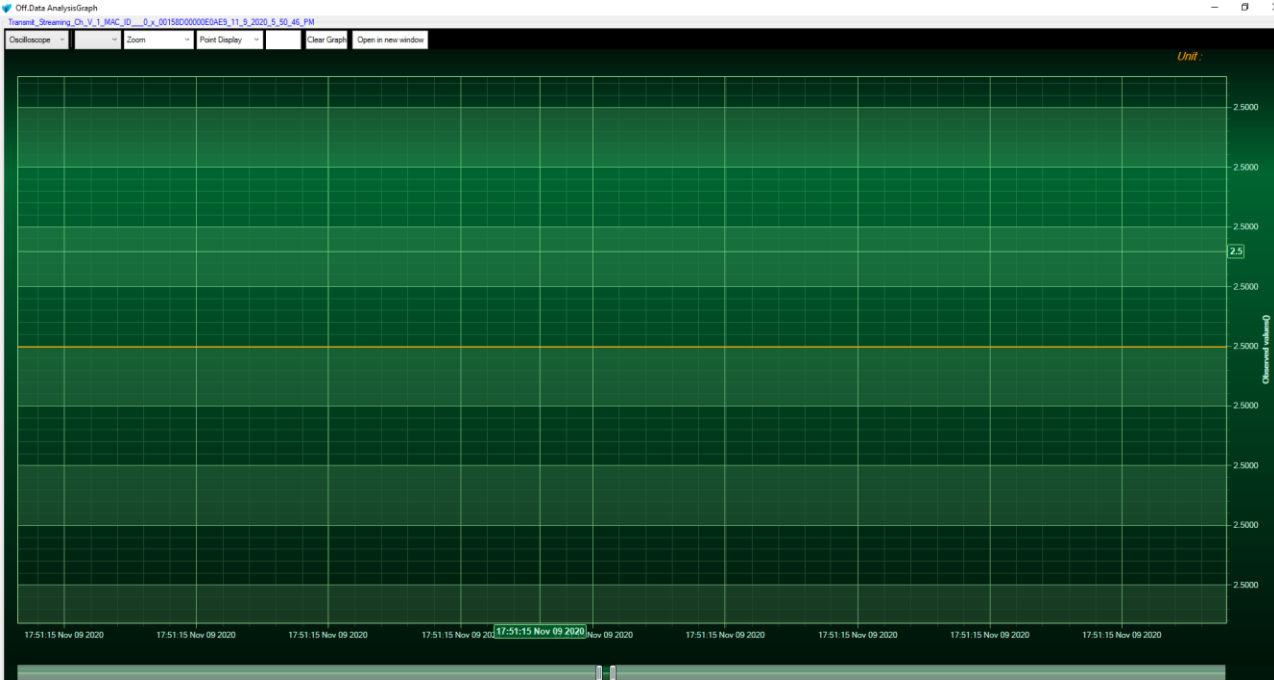


Injected value: 4.5V

Channel 1	Using mains power	Using battery power
AN-V-10V	± 0.01%	± 0.025%

DAQ accuracy tests on Beandevice[®] AN-V-10V with Dynamic measurement mode on SW 7.6

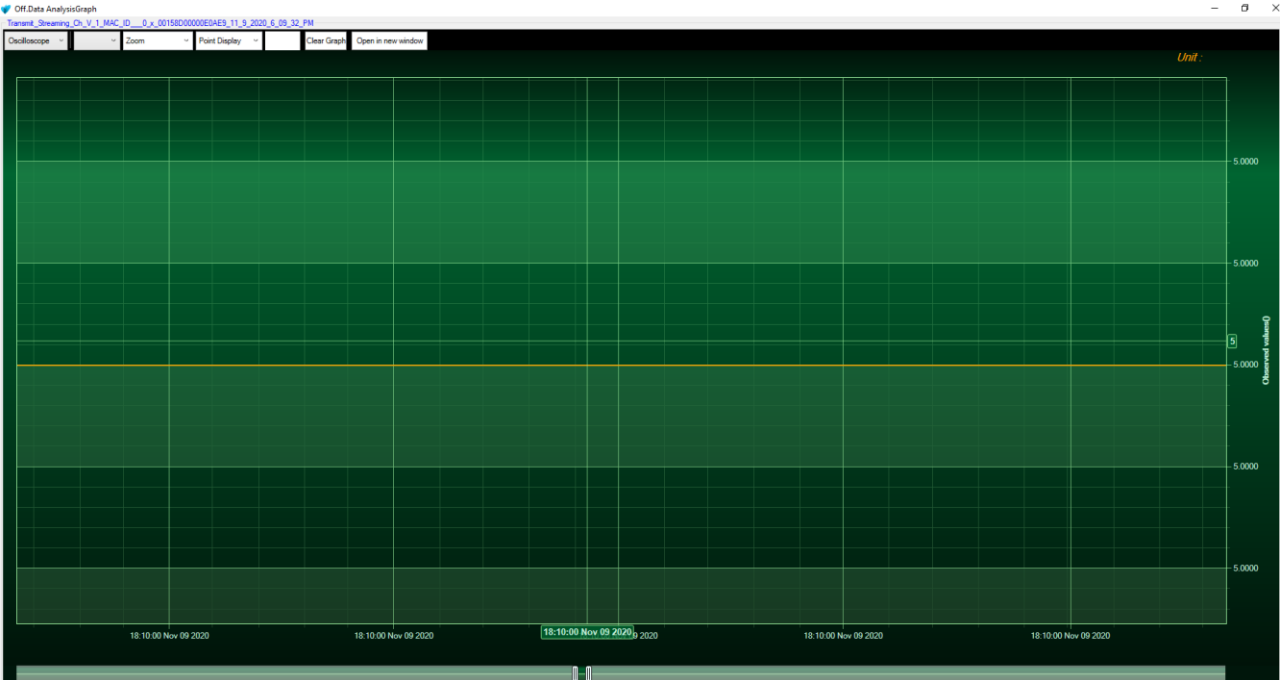
Mains Power



Injected Value: 2.5V

DAQ mode: Streaming mode @ 100Hz

Battery Power

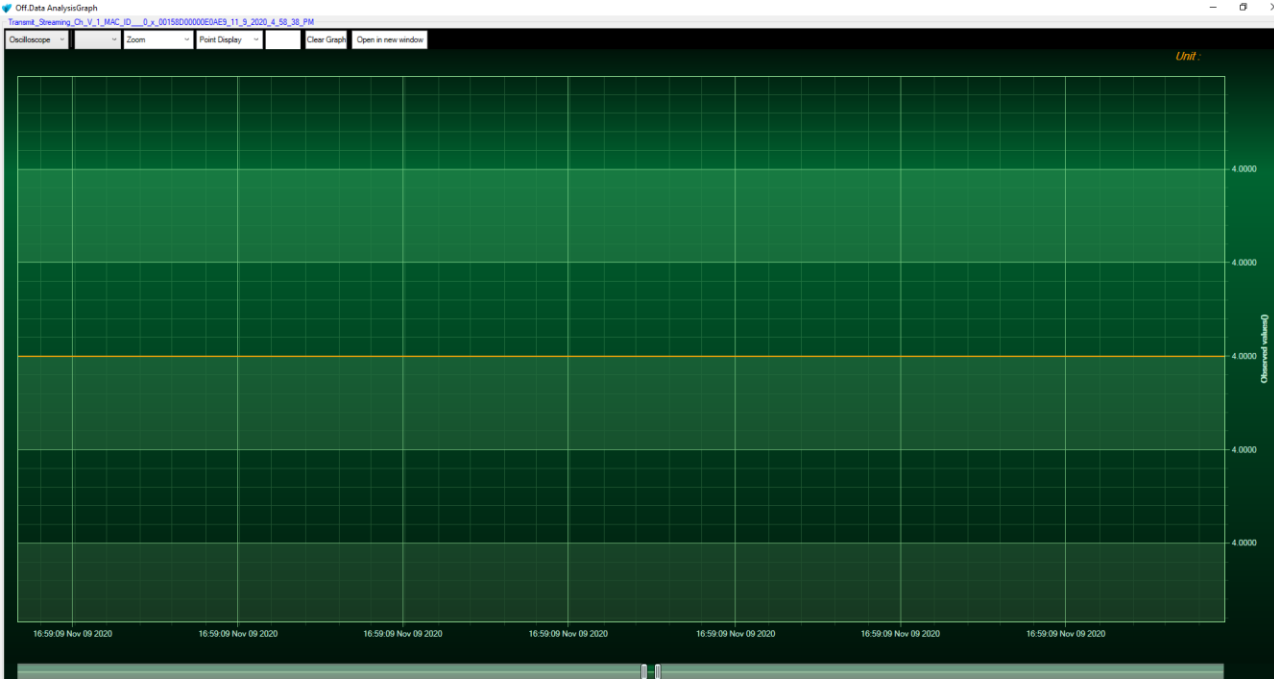


Injected value: 5V

Channel 1	Using mains power	Using battery power
AN-V-10V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevice® AN-V-10V with Dynamic measurement mode on SW 7.1

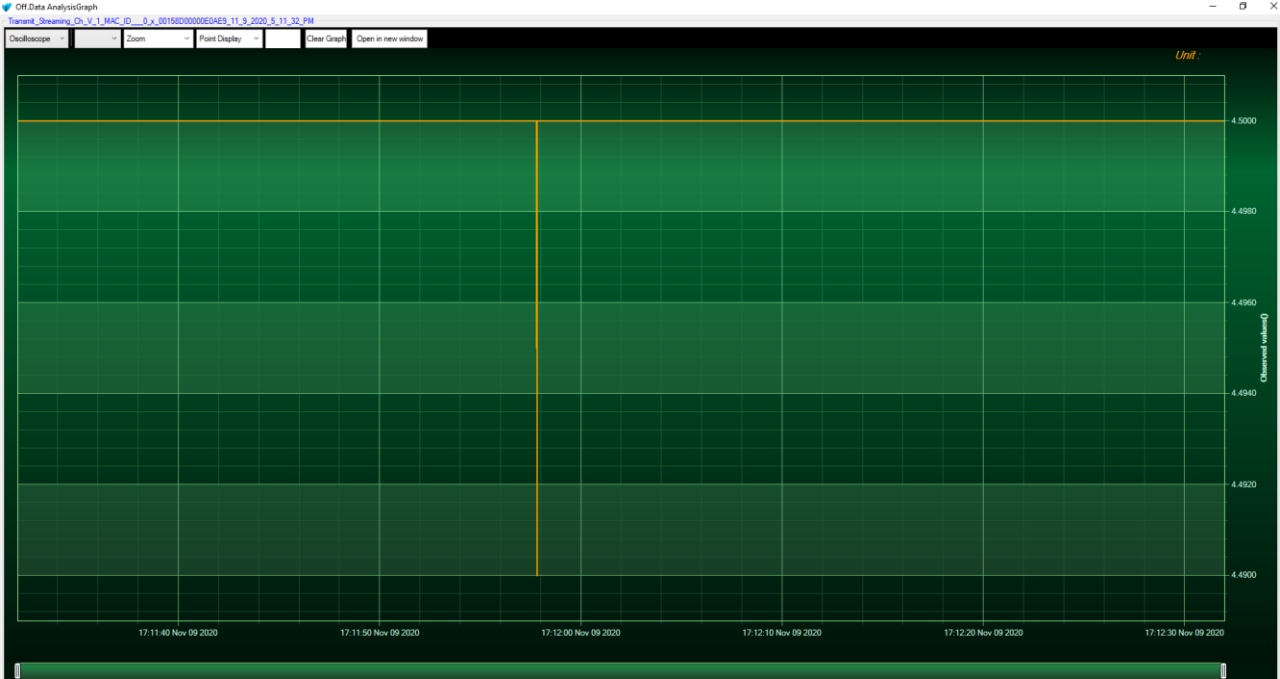
Mains Power



Injected Value: 4V

DAQ mode: Streaming mode @ 400Hz

Battery Power

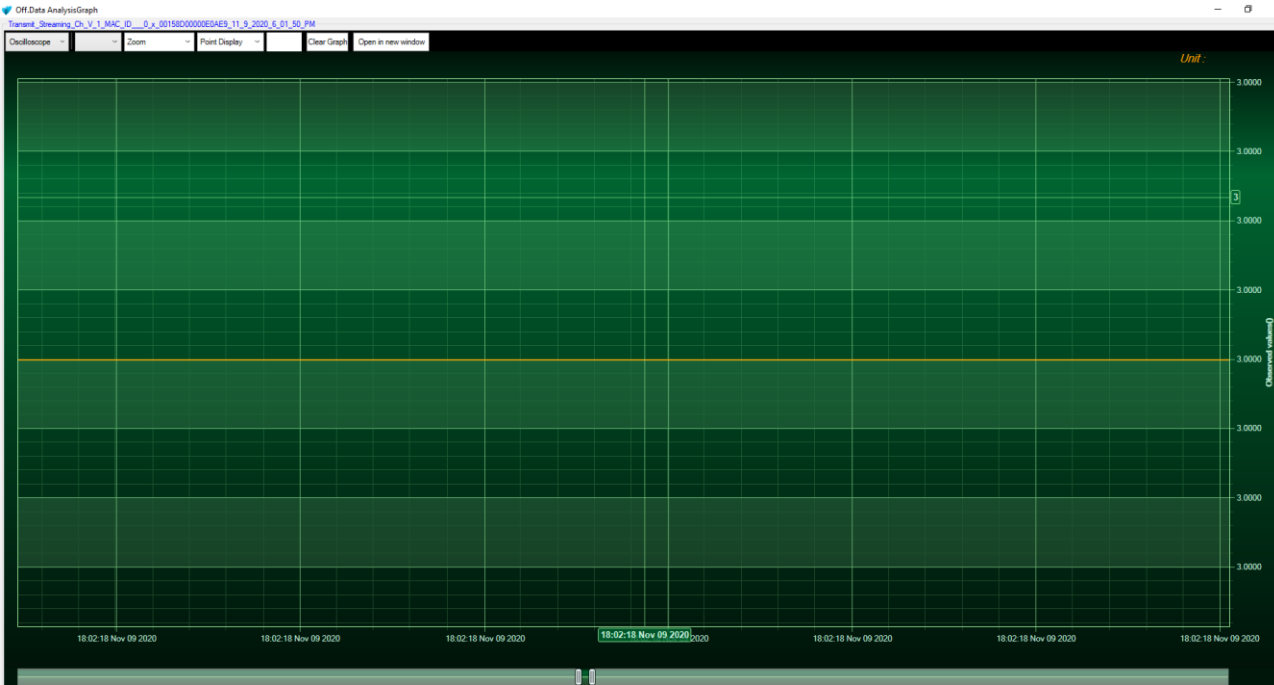


Injected value: 4.5V

Channel 1	Using mains power	Using battery power
AN-V-10V	± 0.01%	± 0.005V or 0.05%

DAQ accuracy tests on Beandevic[®] AN-V-10V with Dynamic measurement mode on SW 7.6

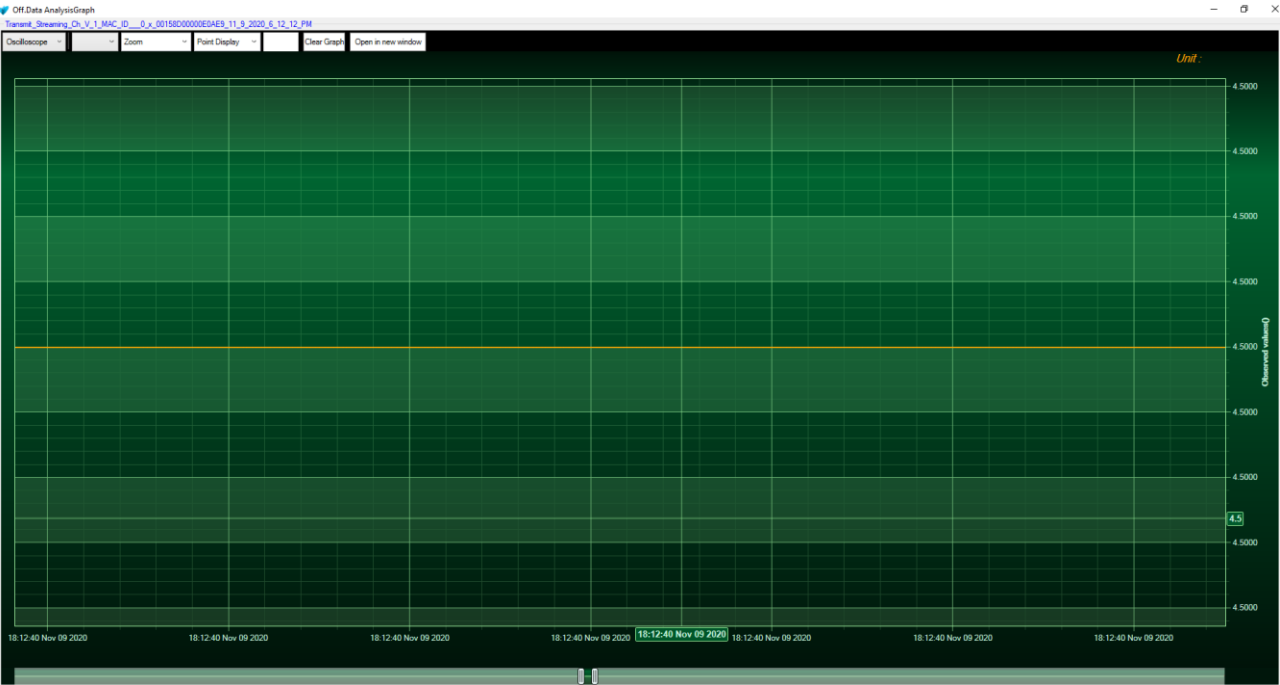
Mains Power



Injected Value: 3V

DAQ mode: Streaming mode @ 400Hz

Battery Power



Injected value: 4.5V

	Using mains power	Using battery power
Channel 1		
AN-V-10V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevise® AN-V-10V

Channel 1	Power mode	DAQ mode	accuracy Results (in %) on firmware version 7.1	accuracy Results (in %) on firmware version 7.6
AN-V-10V	Battery	LCDC	±0.01%	±0.01%
		Streaming 10Hz	±0.01%	±0.01%
		Streaming 100Hz	±0.025%	±0.01%
		Streaming 400Hz	±0.05%	±0.01%
	Mains Power supply	LCDC	±0.01%	±0.01%
		Streaming 10Hz	±0.01%	±0.01%
		Streaming 100Hz	±0.01%	±0.01%
		Streaming 400Hz	±0.01%	±0.01%

DAQ accuracy tests on Beandevice® AN-420 with Static measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 5mA

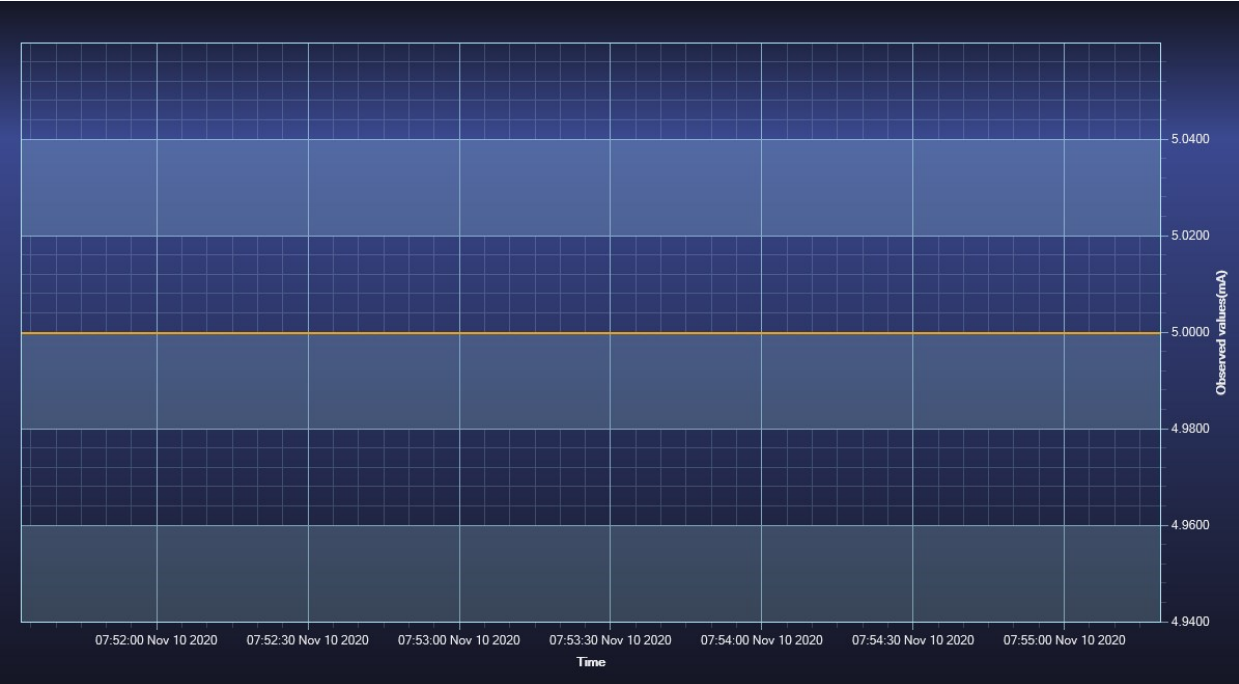
DAQ mode: LowDutyCycle 2s

Injected value: 5mA

Channel 1	Using mains power	Using battery power
AN-420	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevic[®] Process DAQ AN-420 with Static measurement mode on SW 7.6

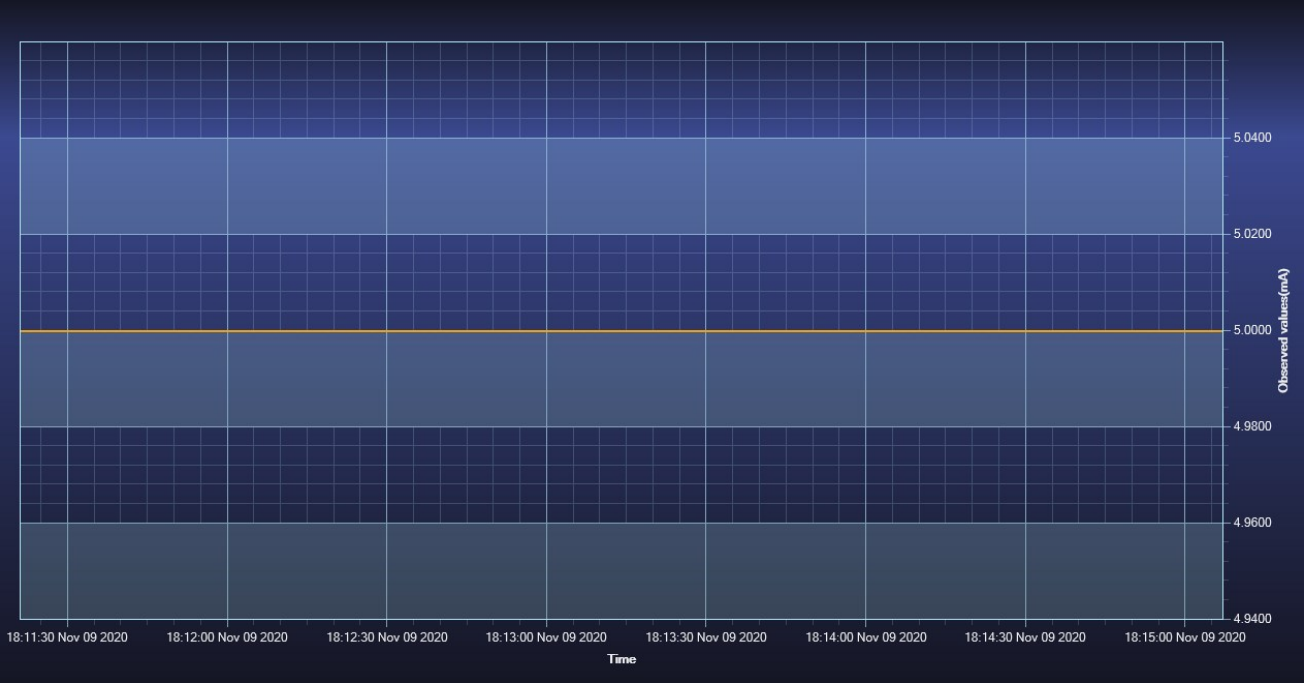
Mains Power



Injected Value: 5mA

DAQ mode: LowDutyCycle 2s

Battery Power

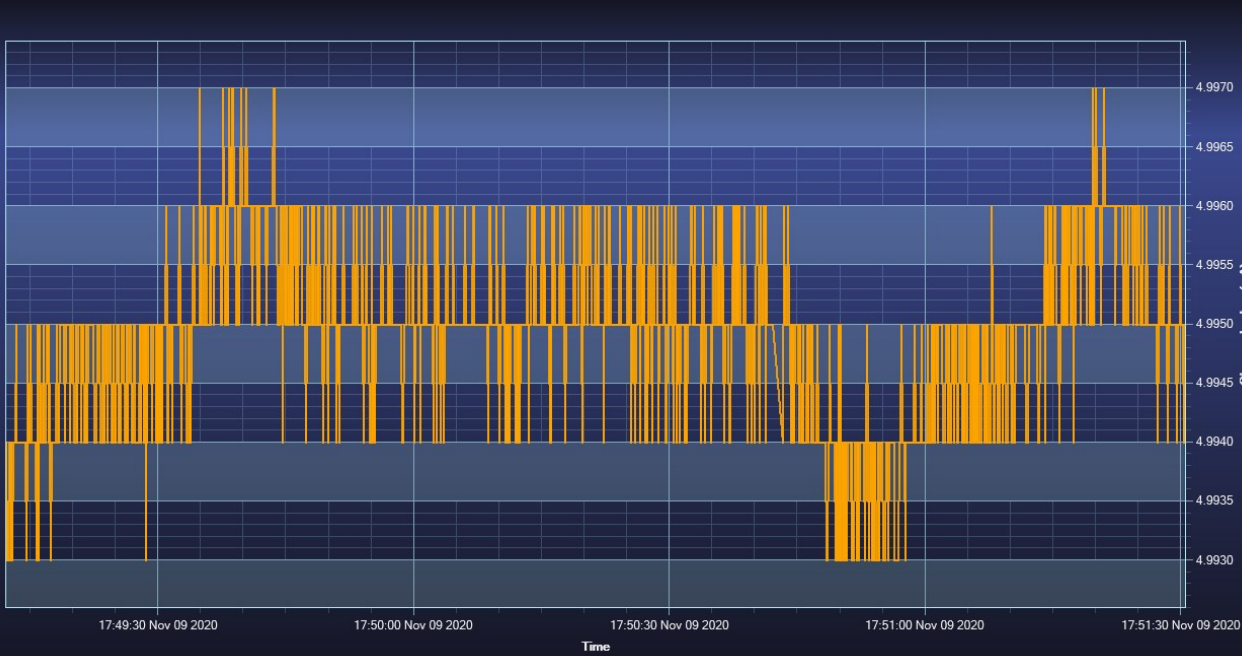


Injected value: 5mA

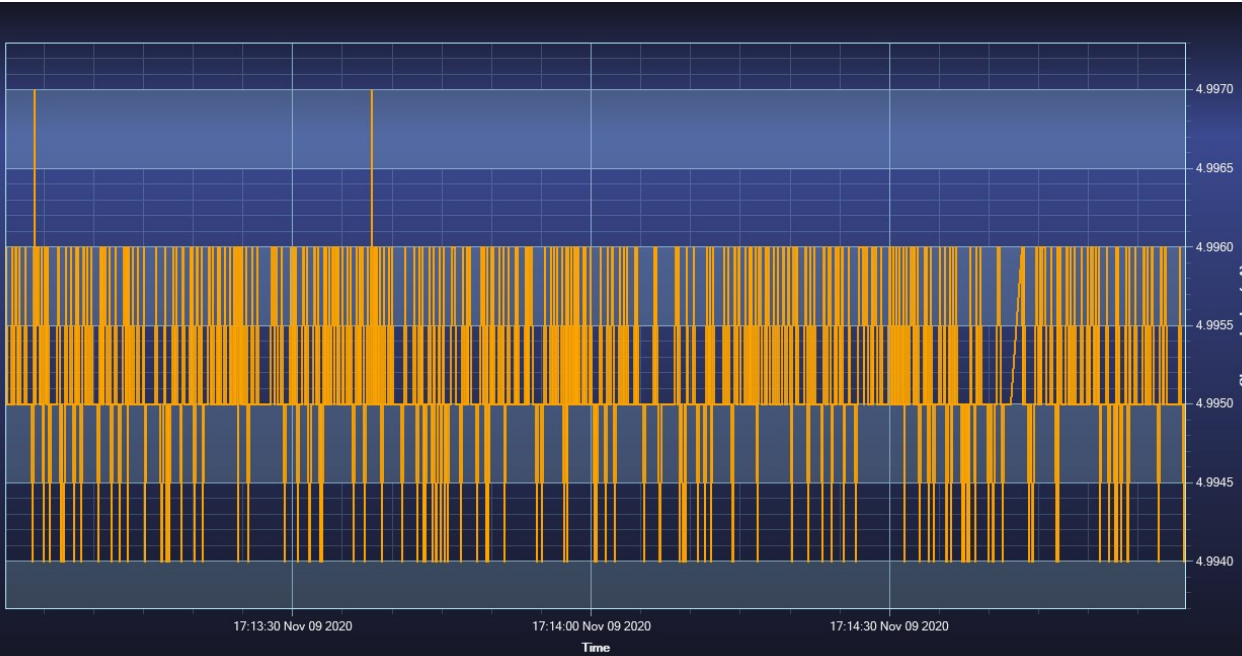
Channel 1	Using mains power	Using battery power
AN-420	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevic[®] Process DAQ AN-420 with Dynamic measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 5mA

DAQ mode: Streaming mode @ 10Hz

Injected value: 5mA

Channel 1	Using mains power	Using battery power
AN-420	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevic[®] Process DAQ AN-420 with Dynamic measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 5mA

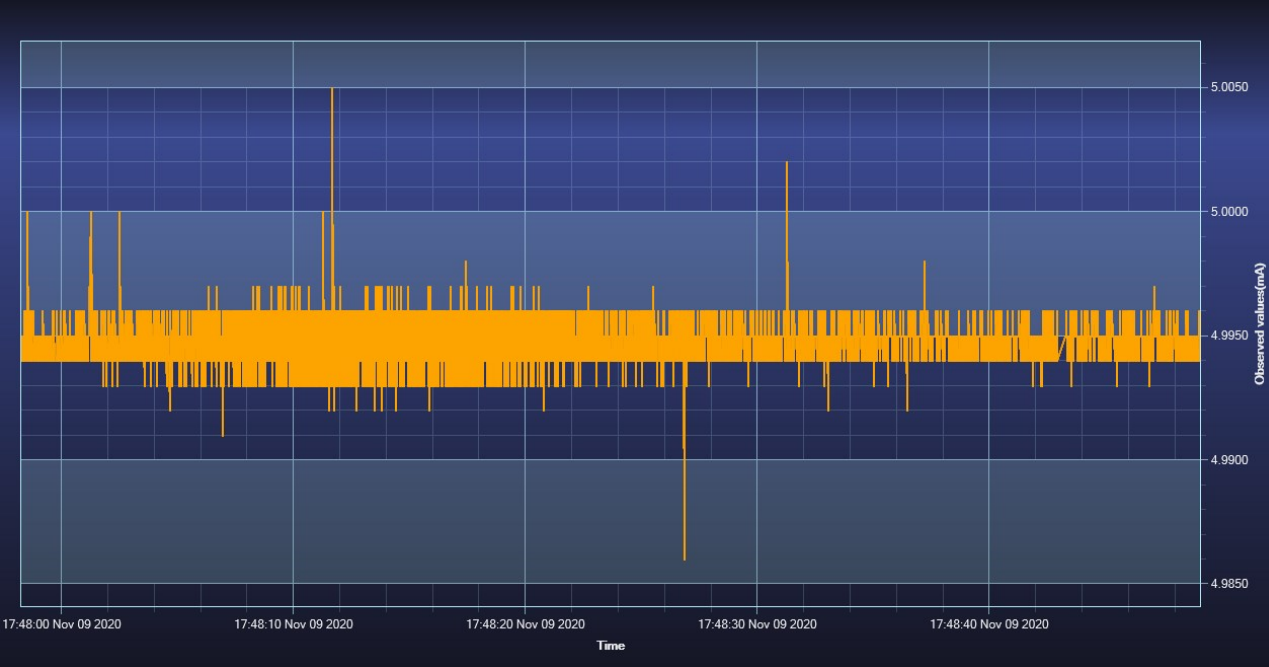
DAQ mode: Streaming mode @ 10Hz

Injected value: 5mA

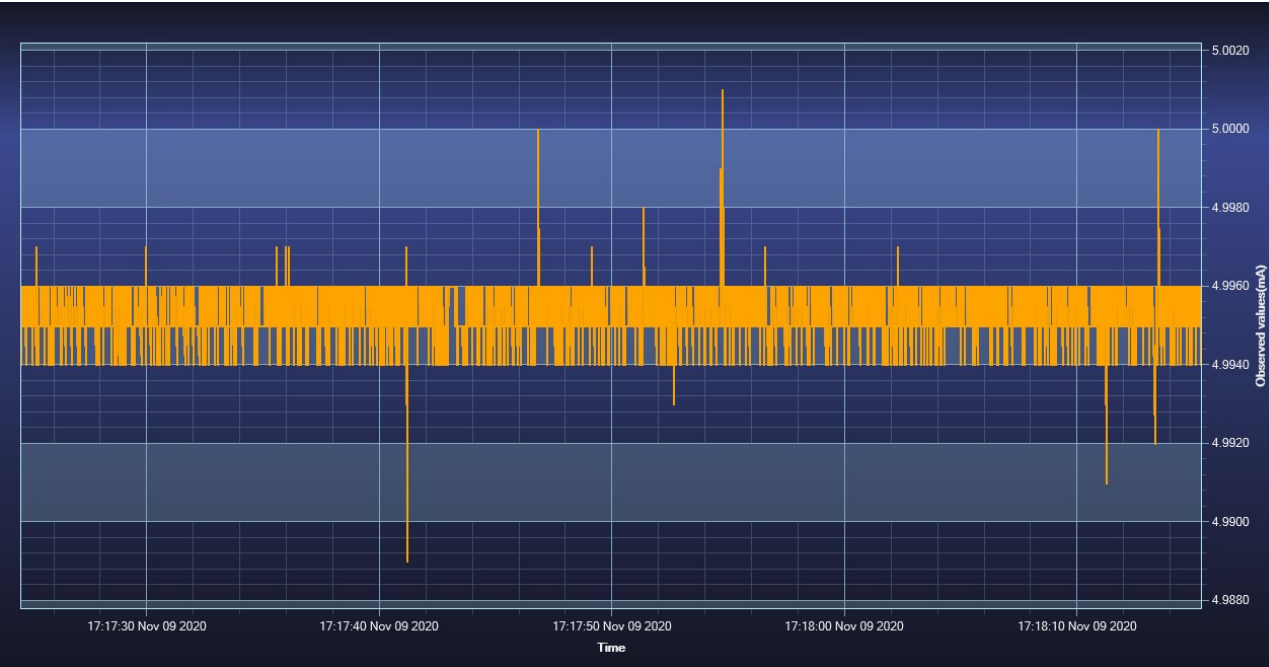
Channel 1	Using mains power	Using battery power
AN-420	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevic[®] Process DAQ AN-420 with Dynamic measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 5mA

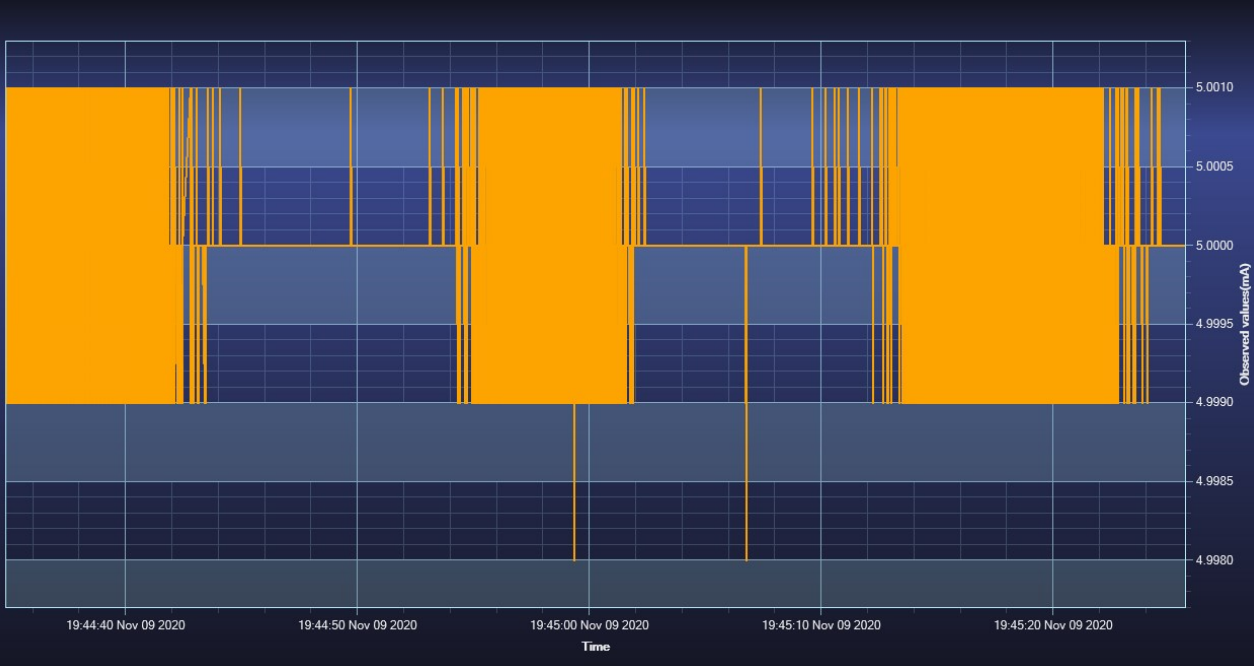
DAQ mode: Streaming mode @ 100Hz

Injected value: 5mA

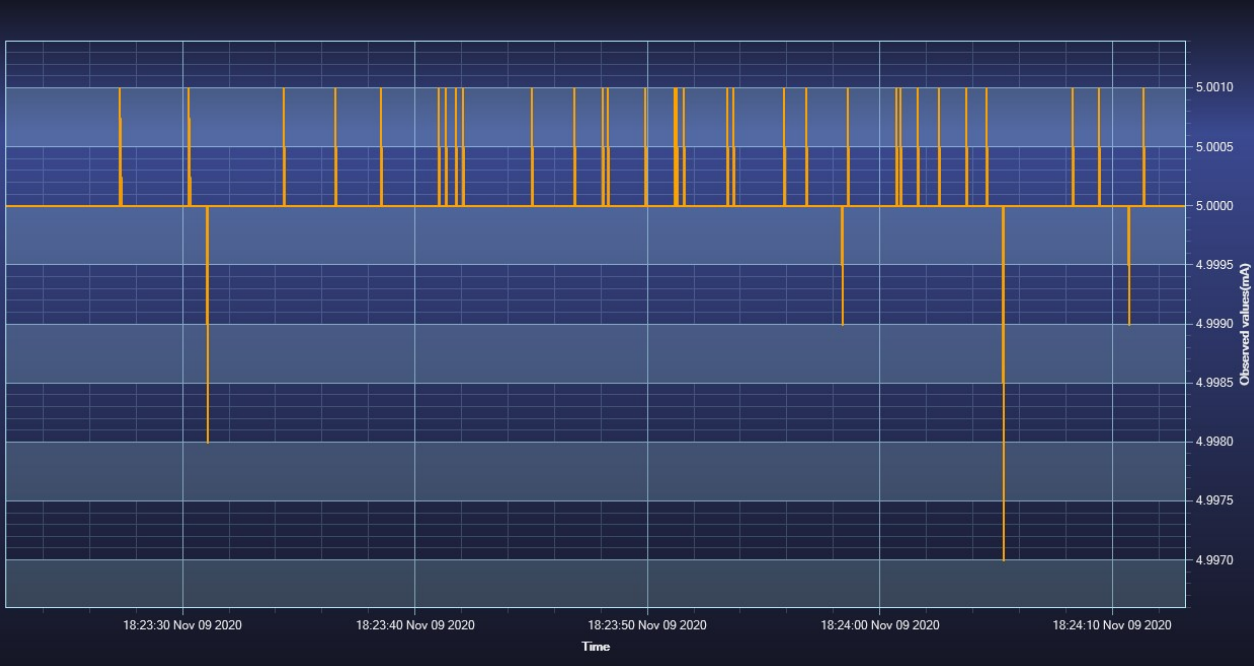
Channel 1	Using mains power	Using battery power
AN-420	± 0.04%	± 0.03%

DAQ accuracy tests on Beandevic[®] Process DAQ AN-420 with Dynamic measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 5mA

DAQ mode: Streaming mode @ 100Hz

Injected value: 5mA

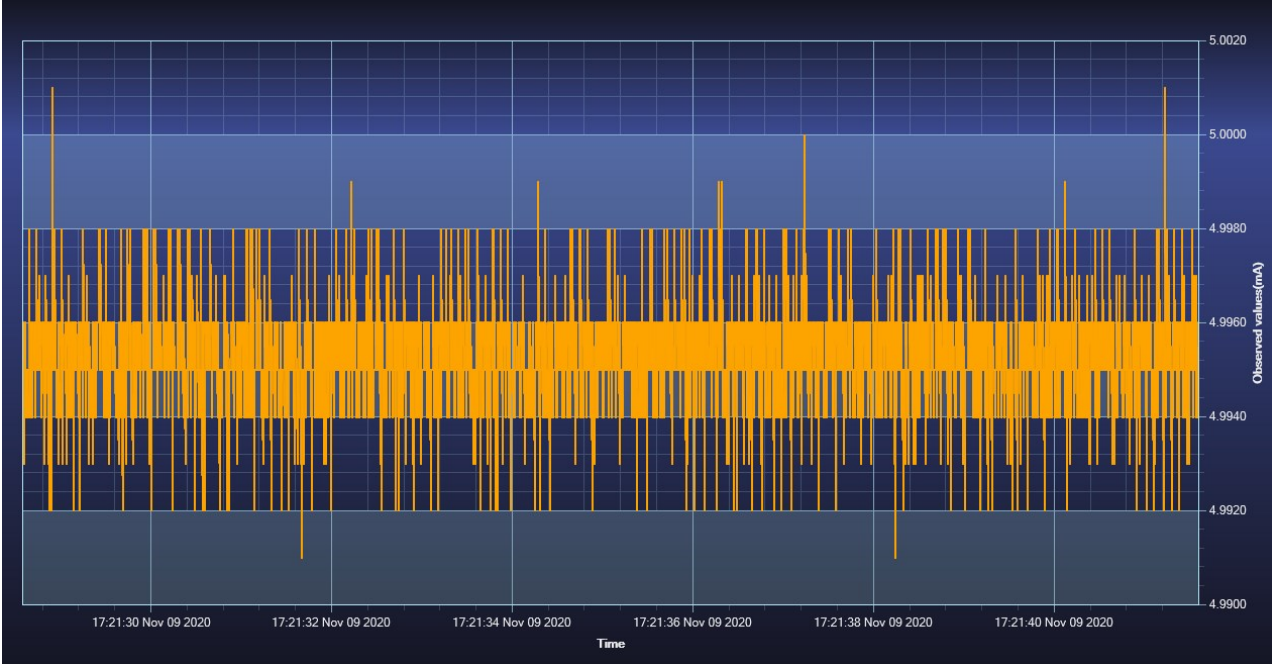
Channel 1	Using mains power	Using battery power
AN-420	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevic[®] Process DAQ AN-420 with Dynamic measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 5mA

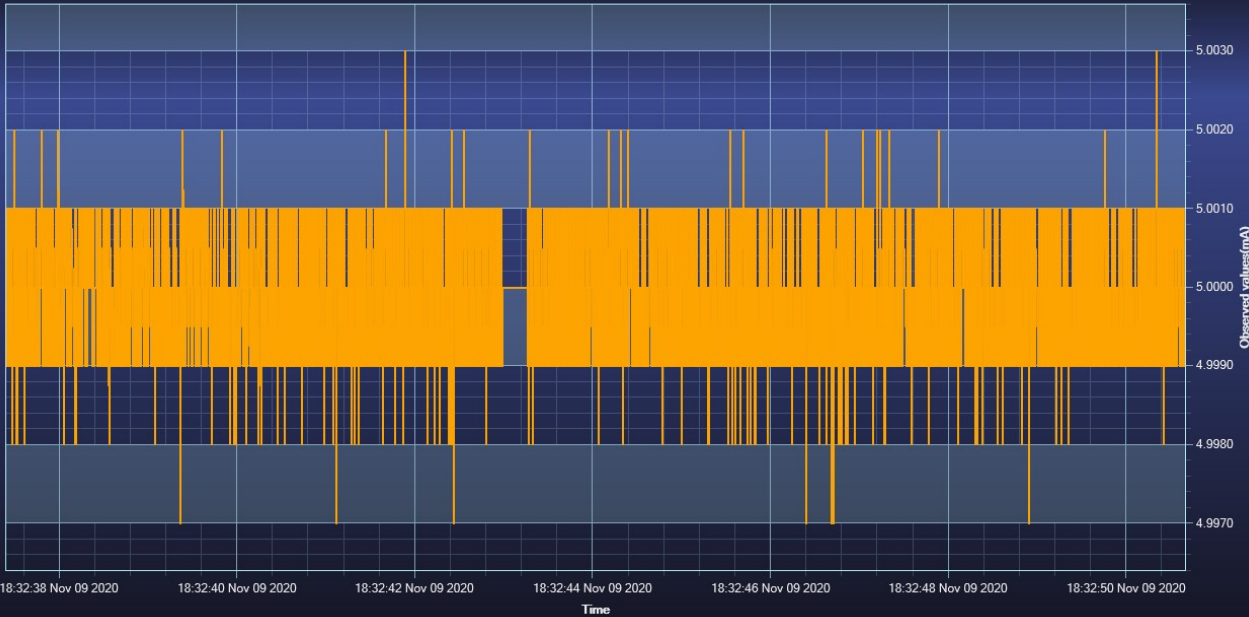
DAQ mode: Streaming mode @ 400Hz

Injected value: 5mA

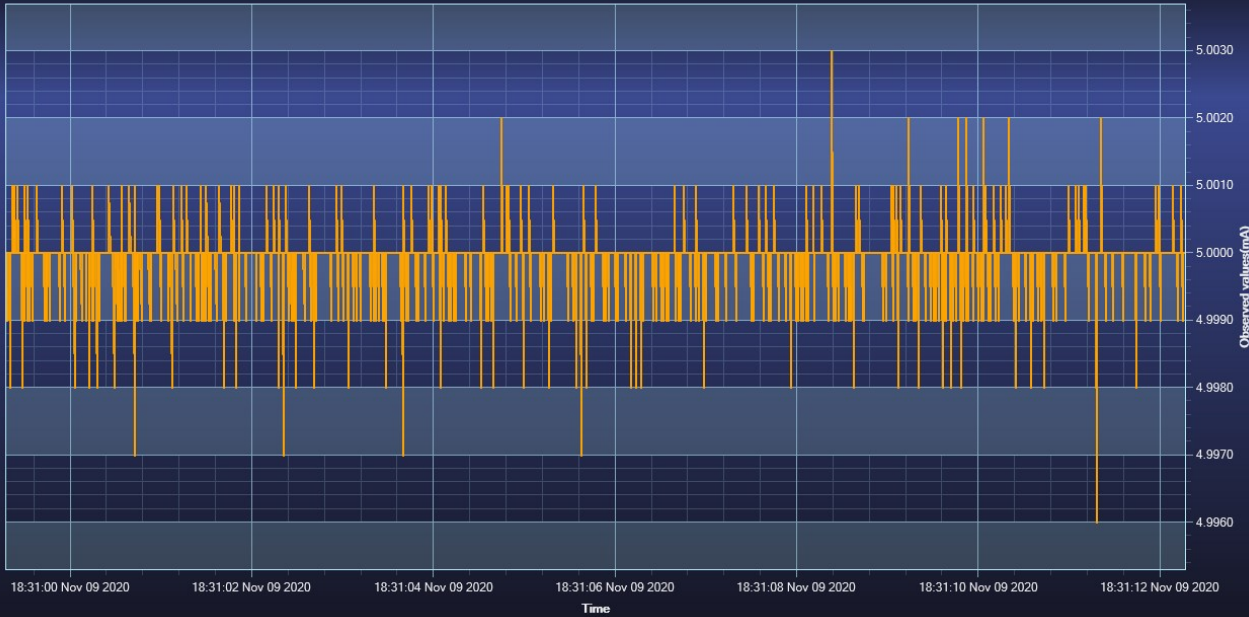
Channel 1	Using mains power	Using battery power
AN-420	$\pm 0.04\%$	$\pm 0.025\%$

DAQ accuracy tests on Beandevic[®] Process DAQ AN-420 with Dynamic measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 5mA

DAQ mode: Streaming mode @ 400Hz

Injected value: 5mA

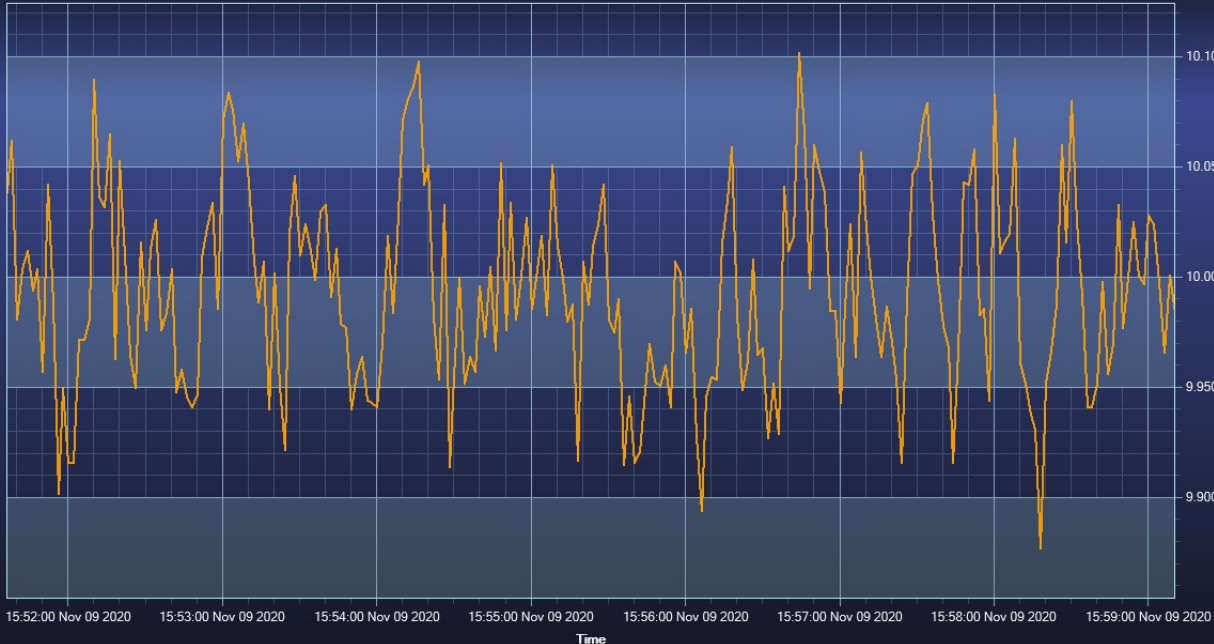
Channel 1	Using mains power	Using battery power
AN-420	± 0.015%	± 0.017%

DAQ accuracy tests on Beandevic[®] Process DAQ AN-V-420

Channel 1	Power mode	DAQ mode	accuracy Results on firmware version 7.1	accuracy Results on firmware version 7.6
AN-420	Battery	LCDC	±0.01%	±0.01%
		Streaming 10Hz	±0.01%	±0.01%
		Streaming 100Hz	±0.03%	±0.01%
		Streaming 400Hz	±0.025%	±0.017%
	Mains Power supply	LCDC	±0.01%	±0.01%
		Streaming 10Hz	±0.01%	±0.01%
		Streaming 100Hz	±0.04%	±0.01%
		Streaming 400Hz	±0.04%	±0.015%

DAQ accuracy tests on Beandevic[®] AN-mV with Static measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 10mV

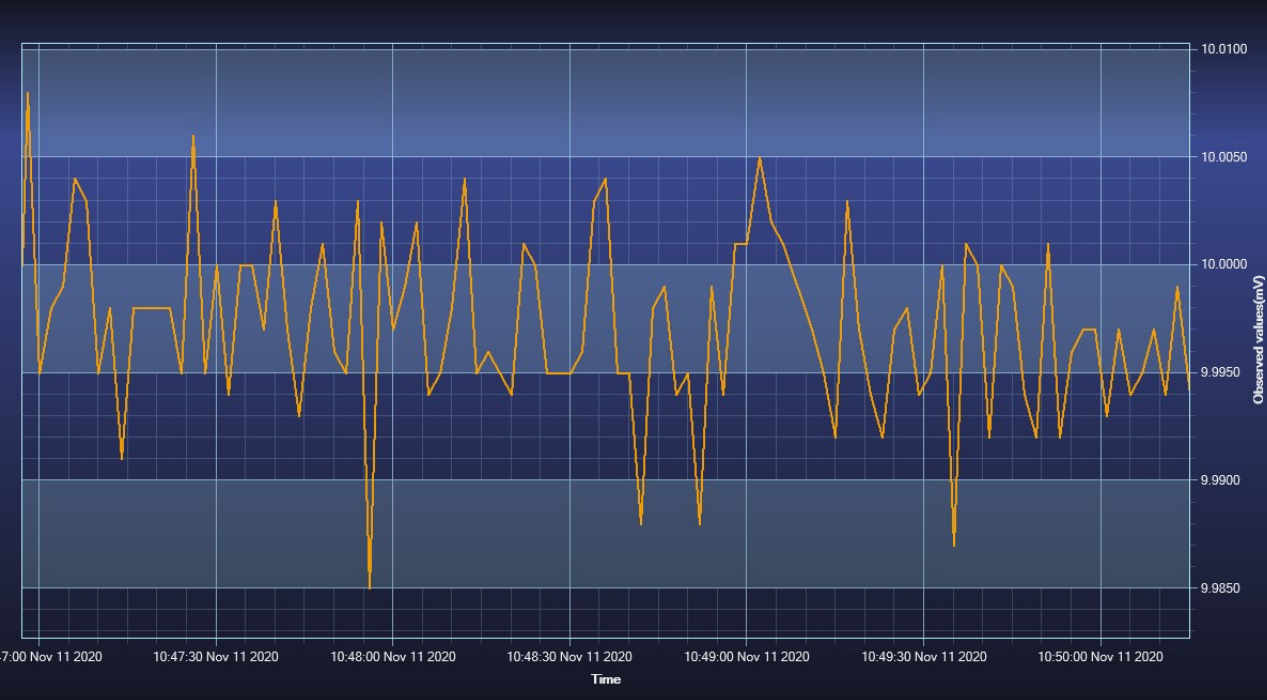
DAQ mode: LowDutyCycle 2s

Injected value: 10mV

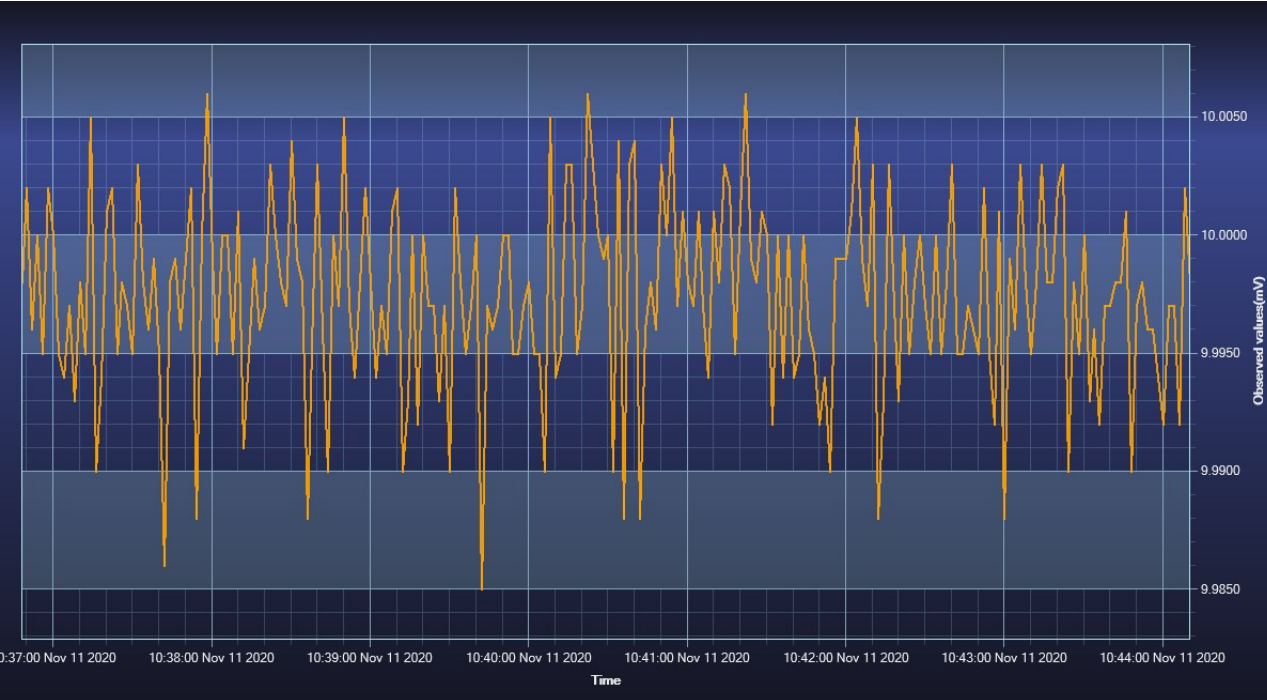
Channel 1	Using mains power	Using battery power
AN-mV	± 0.28%	± 0.16%

DAQ accuracy tests on Beandevic[®] AN-mV with Static measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 10mV

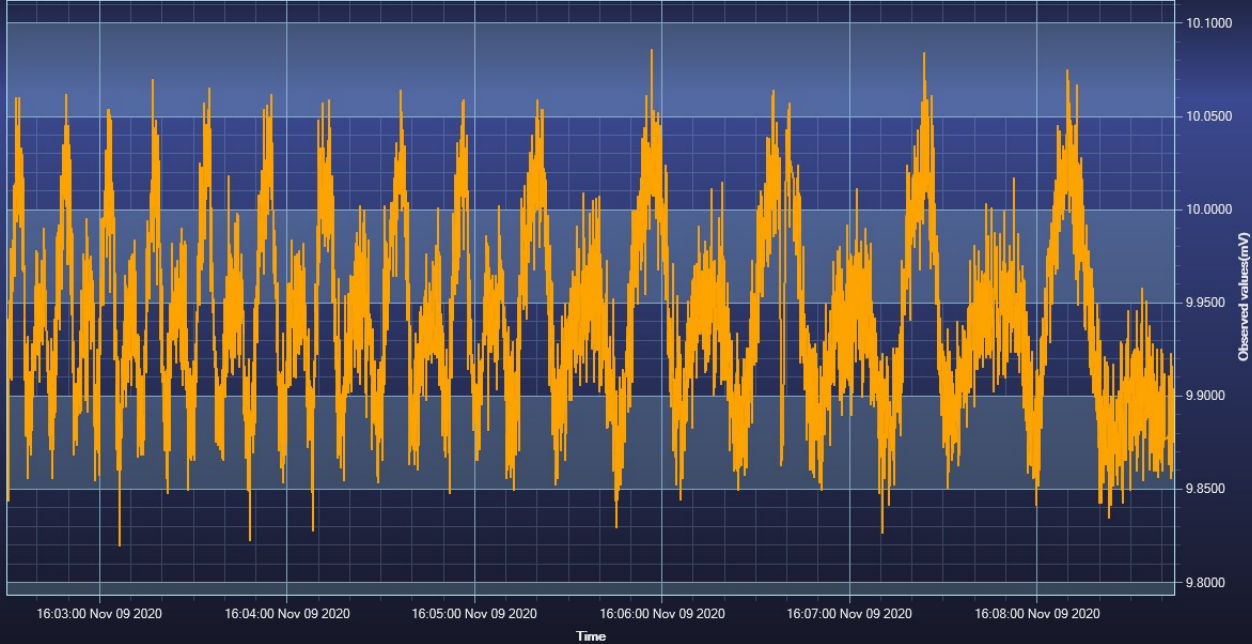
DAQ mode: LowDutyCycle 2s

Injected value: 10mV

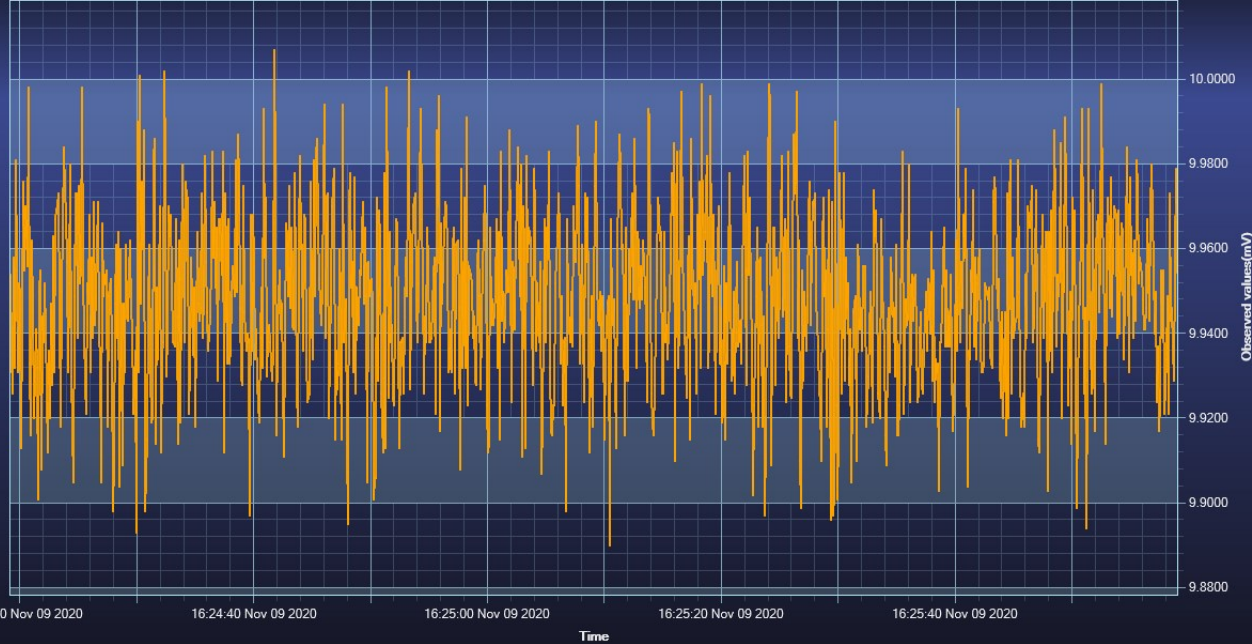
Channel 1	Using mains power	Using battery power
AN-mV	$\pm 0.027\%$	$\pm 0.025\%$

DAQ accuracy tests on Beandevice[®] AN-mV with Dynamic measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 10mV

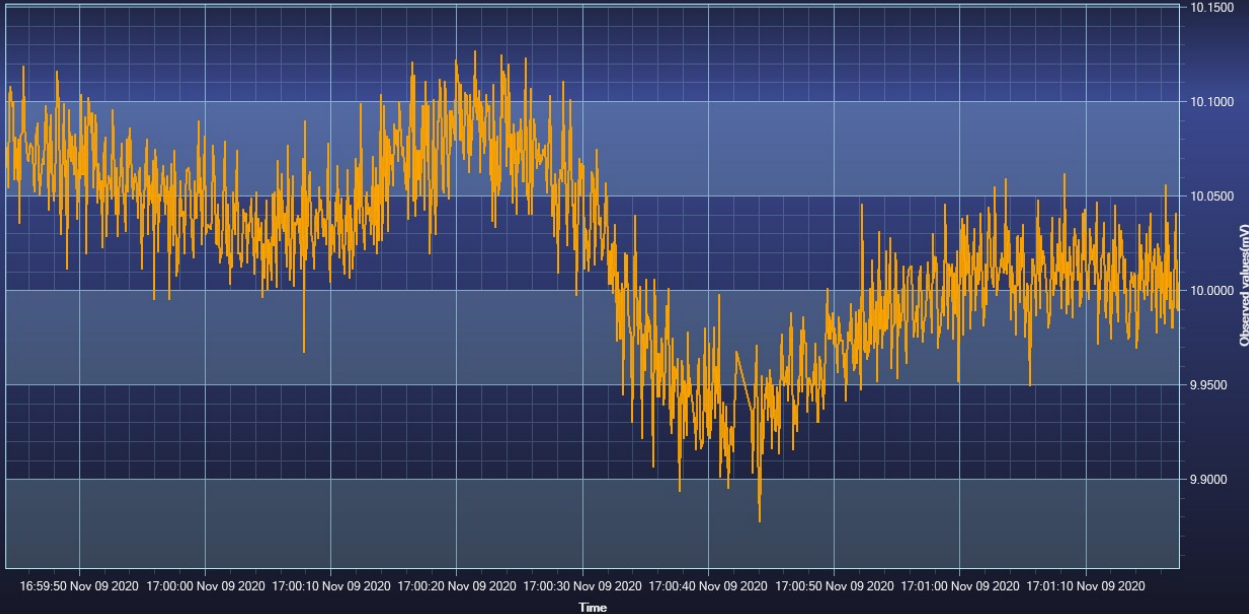
DAQ mode: Streaming mode @ 10Hz

Injected value: 10mV

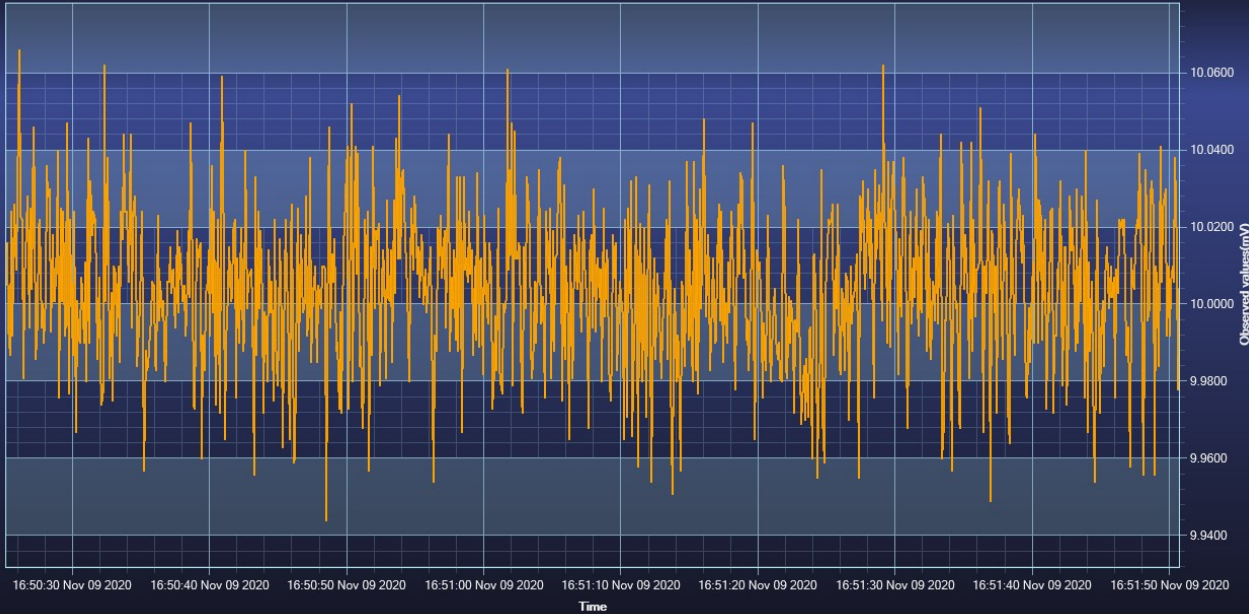
Channel 1	Using mains power	Using battery power
AN-mV	± 0.35%	± 0.15%

DAQ accuracy tests on Beandevice® AN-mV with Dynamic measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 10mV

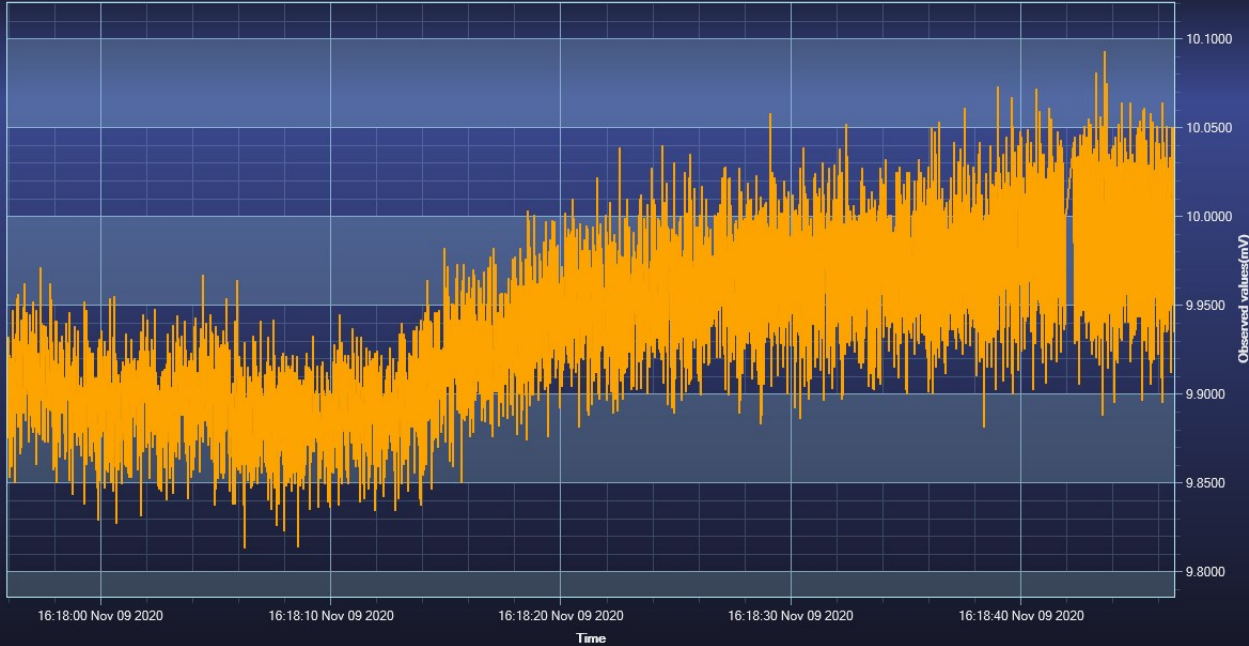
DAQ mode: Streaming mode @ 10Hz

Injected value: 10mV

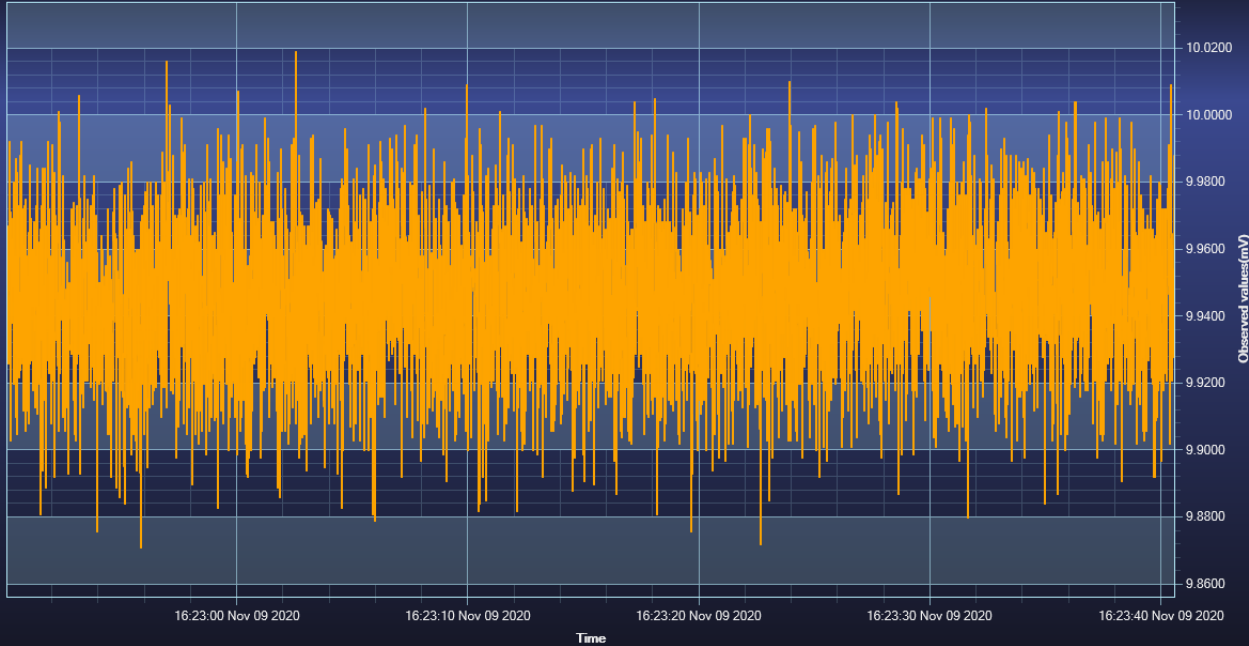
Channel 1	Using mains power	Using battery power
AN-mV	± 0.32%	± 0.15%

DAQ accuracy tests on Beandevice[®] AN-mV with Dynamic measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 10mV

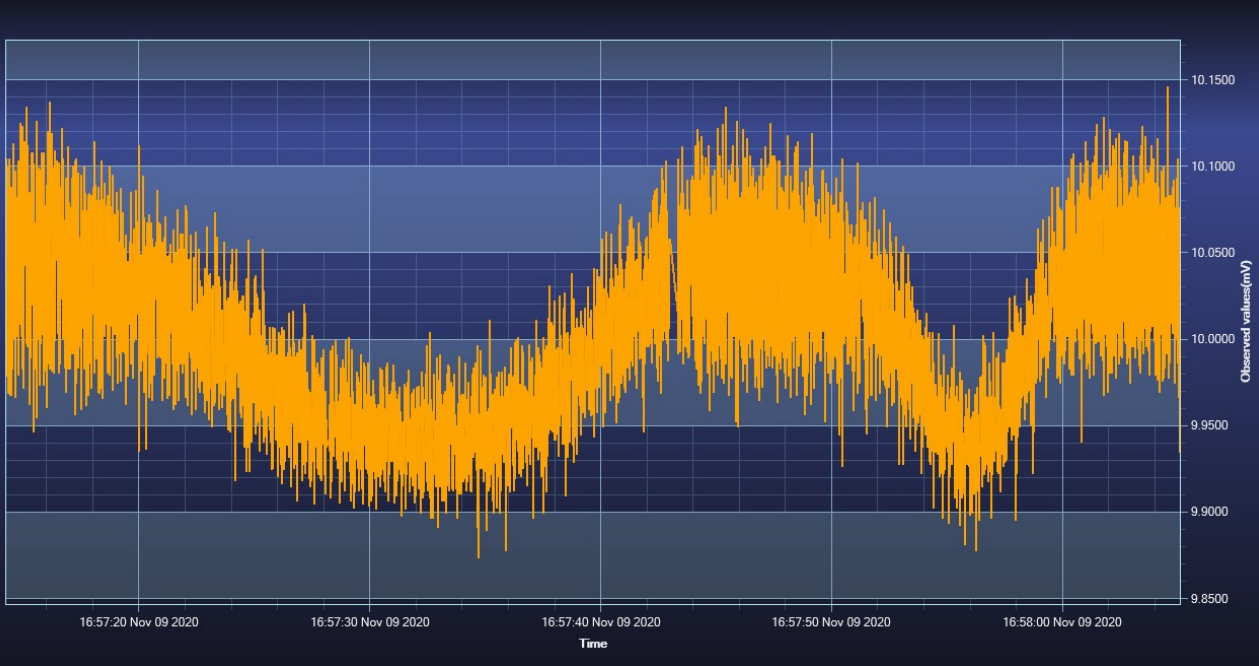
DAQ mode: Streaming mode @ 100Hz

Injected value: 10mV

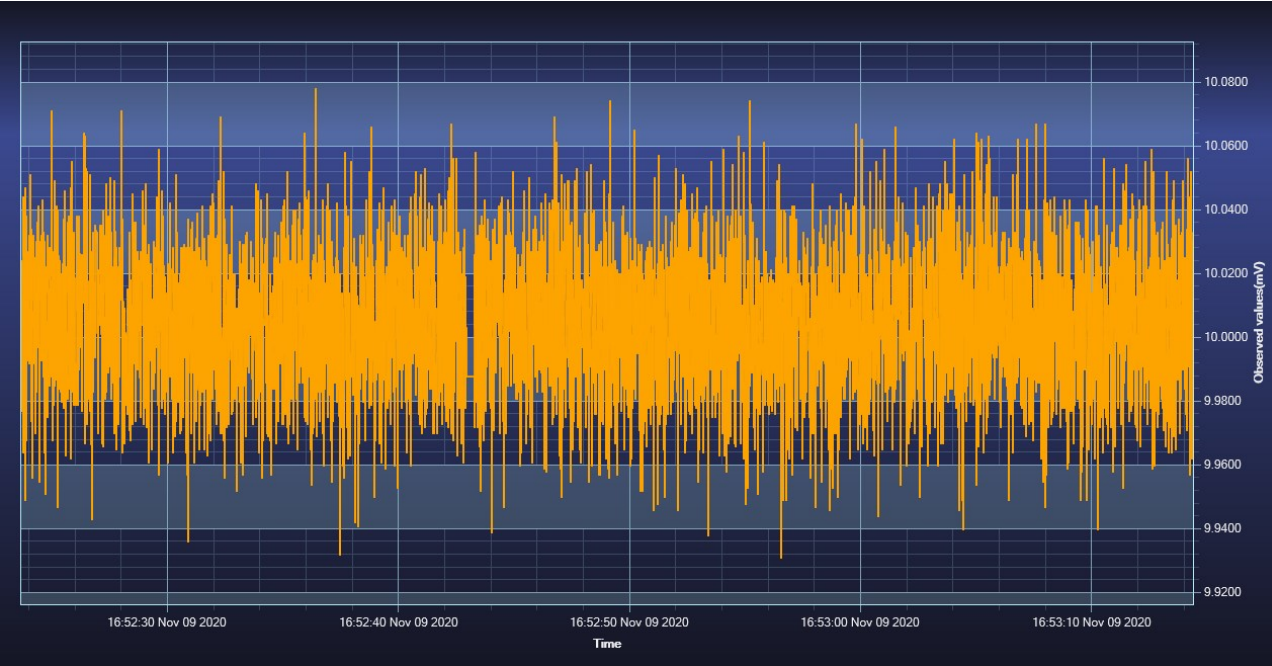
Channel 1	Using mains power	Using battery power
AN-mV	$\pm 0.35\%$	$\pm 0.18\%$

DAQ accuracy tests on Beandevic[®] AN-mV with Dynamic measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 10mV

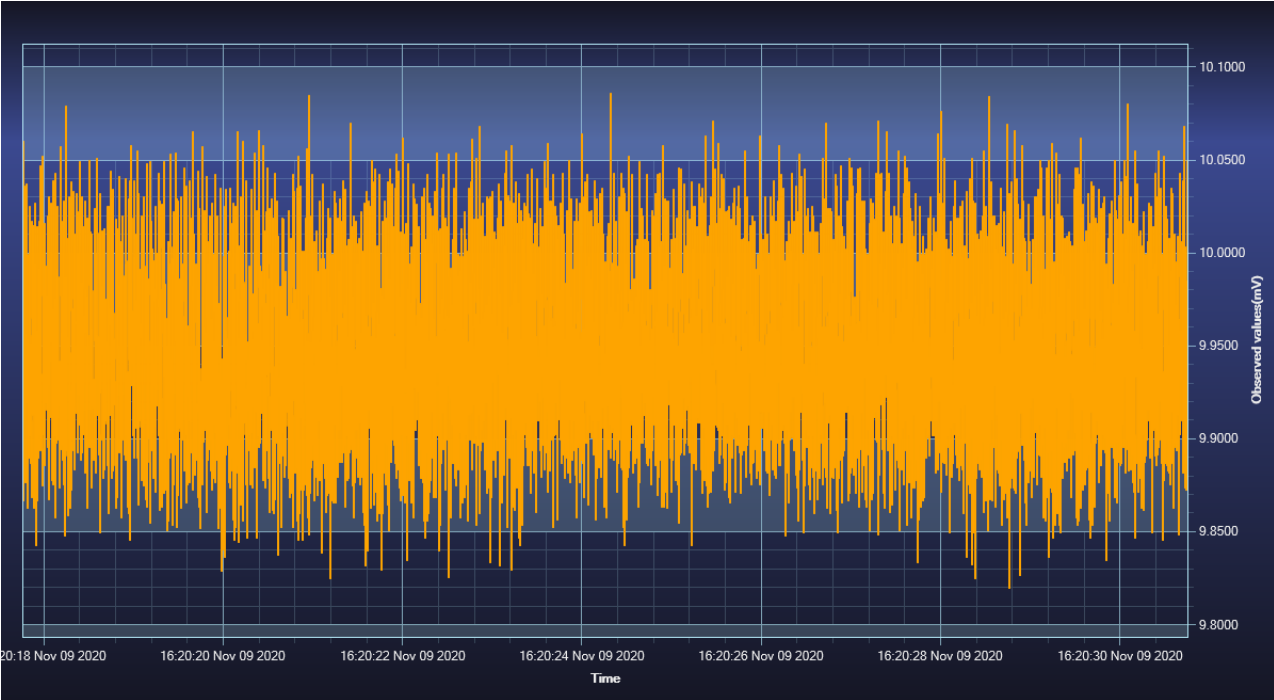
DAQ mode: Streaming mode @ 100Hz

Injected value: 10mV

Channel 1	Using mains power	Using battery power
AN-mV	± 0.35%	± 0.18%

DAQ accuracy tests on Beandevice[®] AN-mV with Dynamic measurement mode on SW 7.1

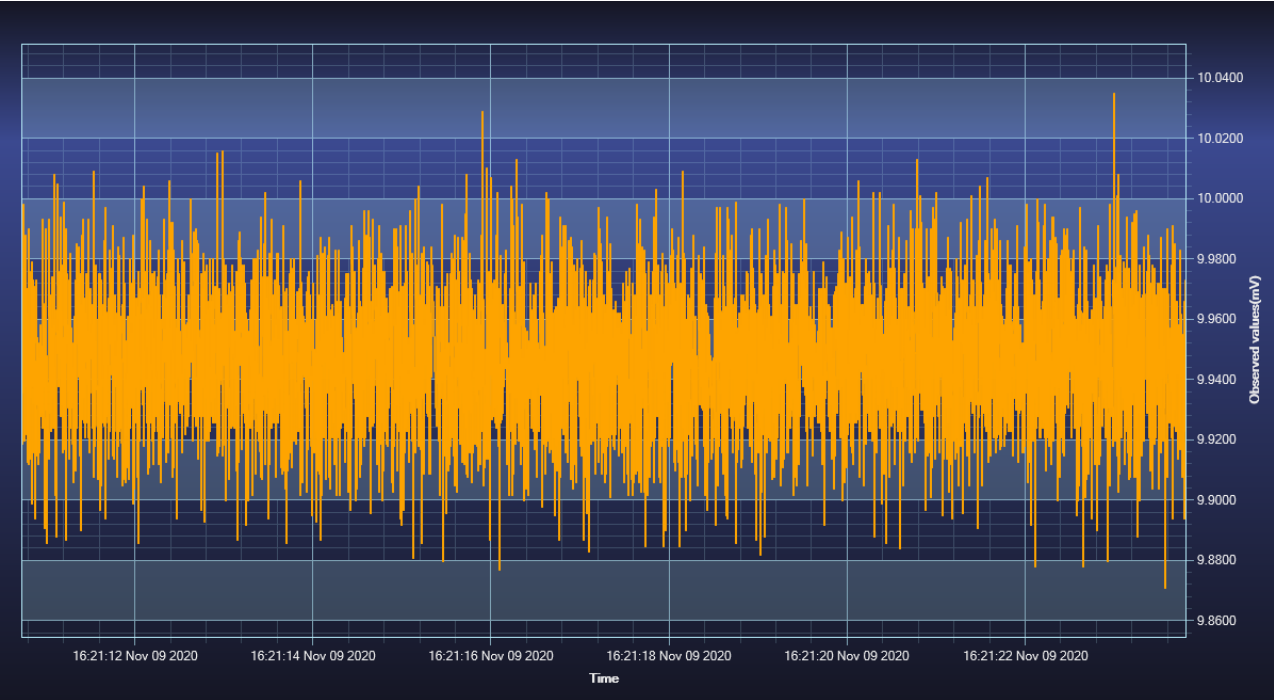
Mains Power



Injected Value: 10mV

DAQ mode: Streaming mode @ 400Hz

Battery Power

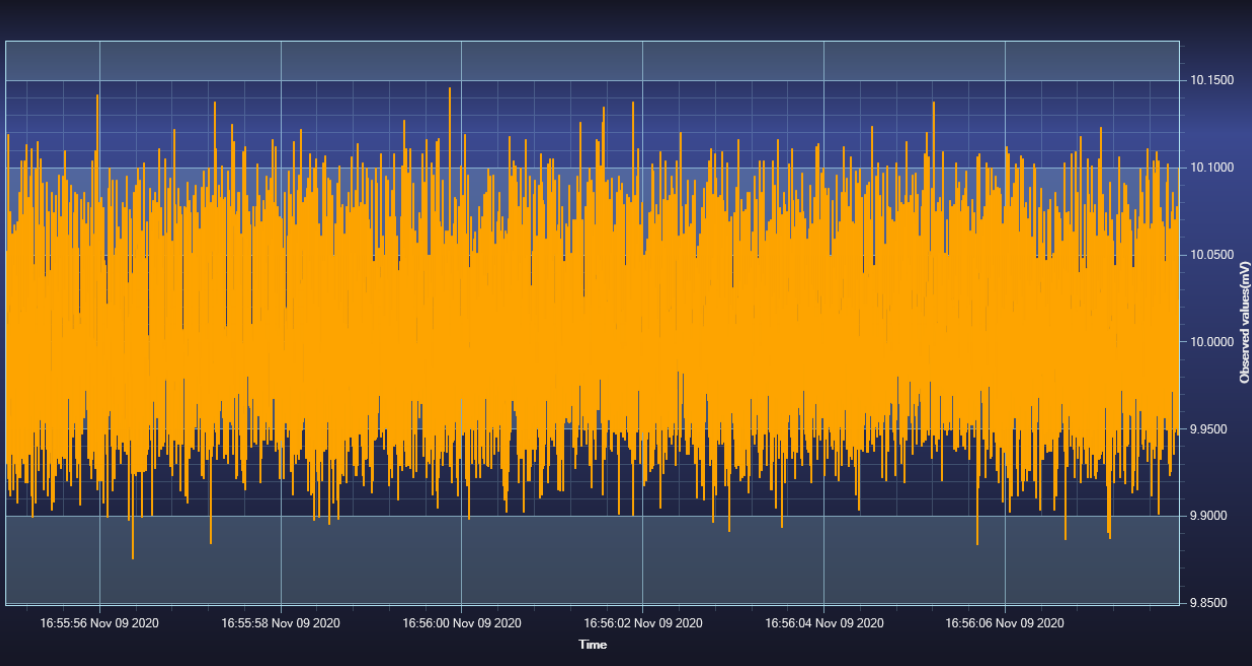


Injected value: 10mV

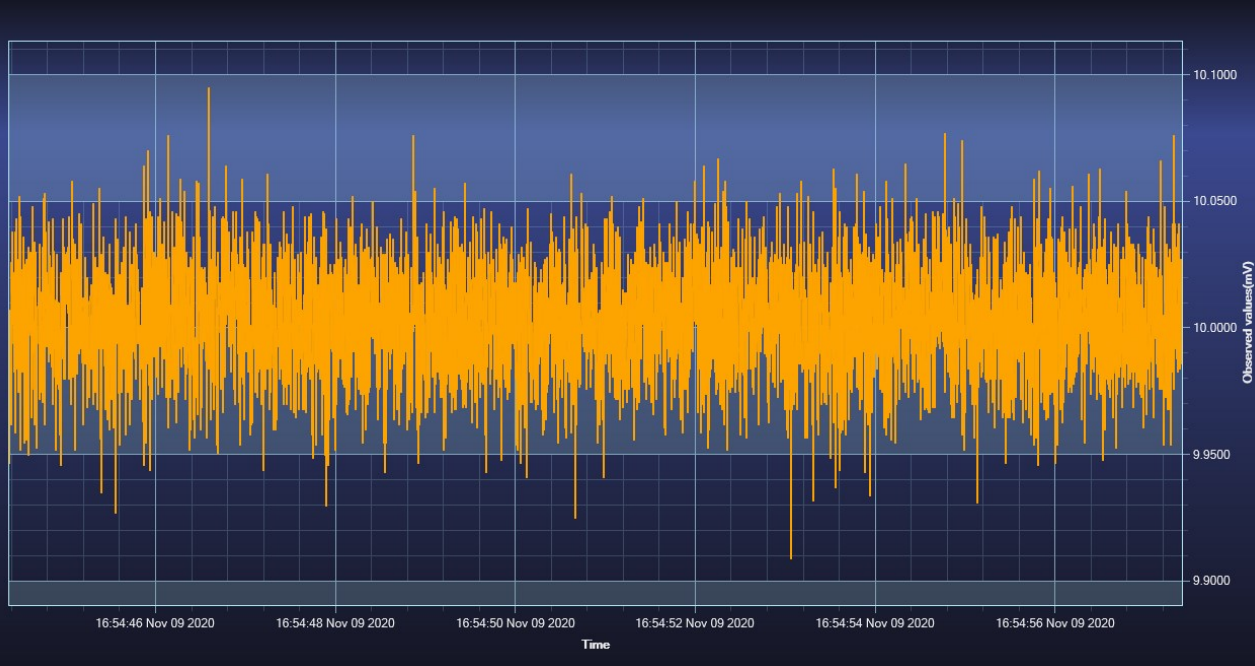
Channel 1	Using mains power	Using battery power
AN-mV	± 0.32%	± 0.21%

DAQ accuracy tests on Beandevic[®] AN-mV with Dynamic measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 10mV

DAQ mode: Streaming mode @ 400Hz

Injected value: 10mV

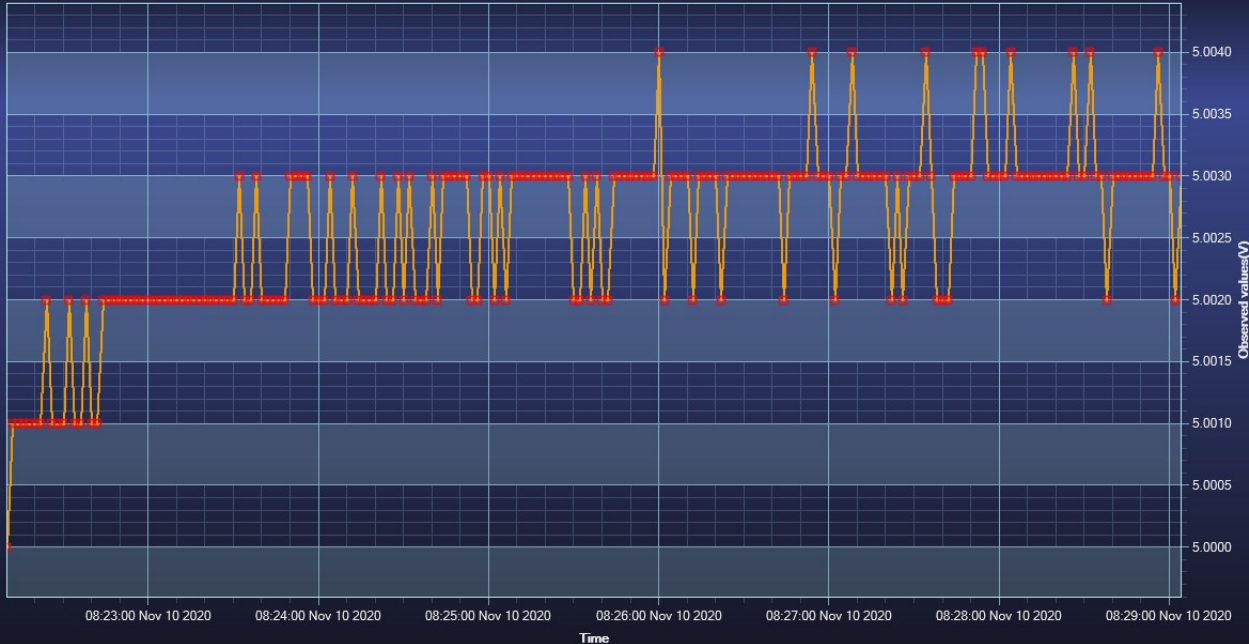
Channel 1	Using mains power	Using battery power
AN-mV	± 0.3%	± 0.2%

DAQ accuracy tests on Beandevise® AN-mV

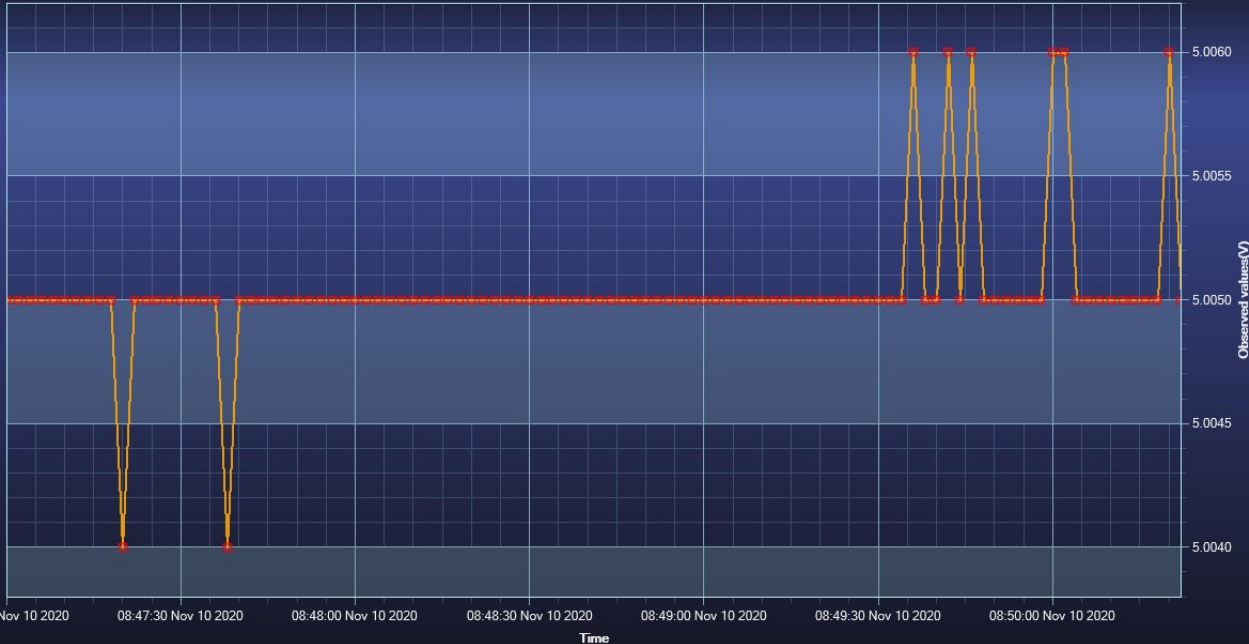
Channel 1	Power mode	DAQ mode	accuracy Results on firmware version 7.1	accuracy Results on firmware version 7.6
AN-mV	Battery	LCDC	±0.16%	±0.025%
		Streaming 10Hz	±0.15%	±0.15%
		Streaming 100Hz	±0.18%	±0.18%
		Streaming 400Hz	±0.21%	±0.2%
	Mains Power supply	LCDC	±0.28%	±0.027%
		Streaming 10Hz	±0.35%	±0.32%
		Streaming 100Hz	±0.35%	±0.35%
		Streaming 400Hz	±0.32%	±0.3%

DAQ accuracy tests on Beandevic[®] AN-V-5V with Static measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 5V

DAQ mode: LowDutyCycle 2s

Injected value: 5V

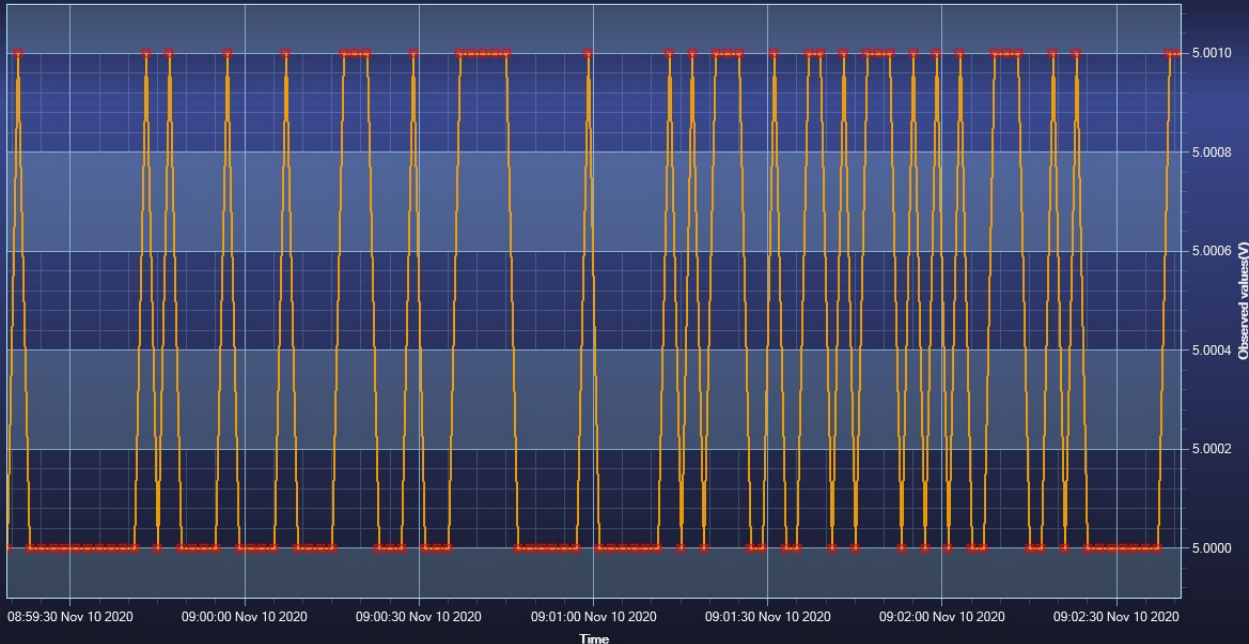
Channel 1	Using mains power	Using battery power
AN-V-5V	± 0.02%	± 0.01%

DAQ accuracy tests on Beandevic[®] AN-V-5V with Static measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 5V

DAQ mode: LowDutyCycle 2s

Injected value: 5V

Channel 1	Using mains power	Using battery power
AN-V-5V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevic[®] AN-V-5V with Dynamic measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 5V

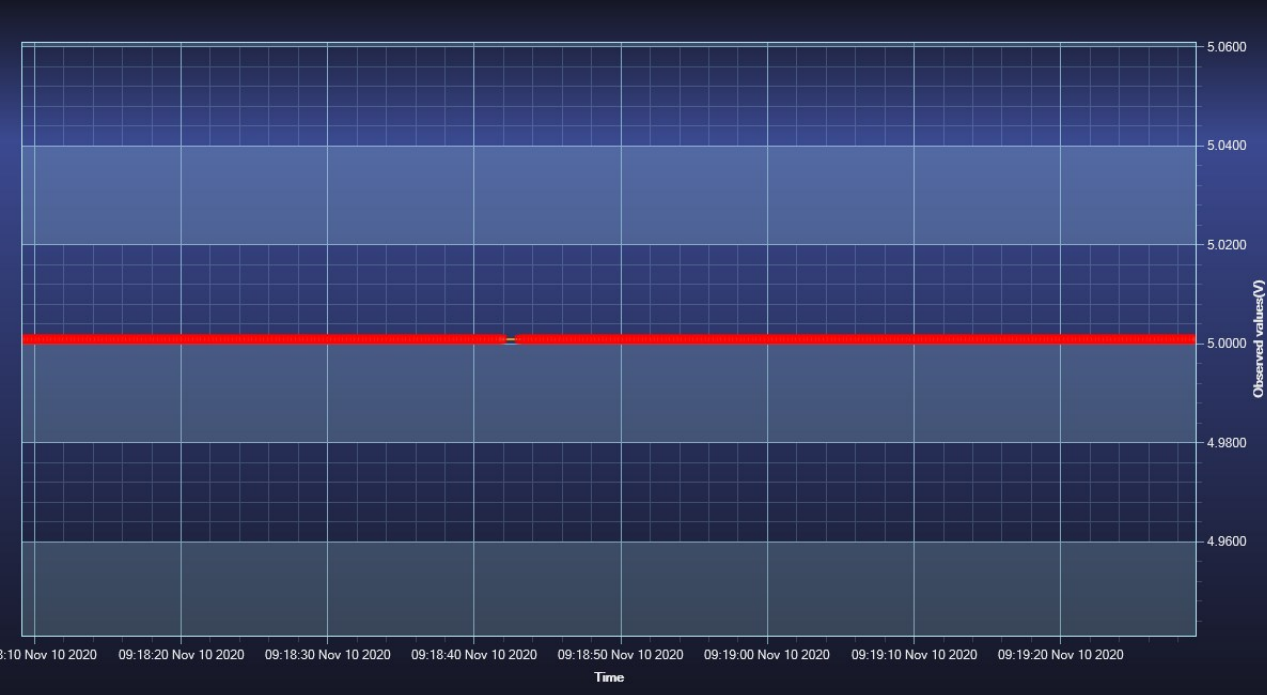
DAQ mode: Streaming mode @ 10Hz

Injected value: 5V

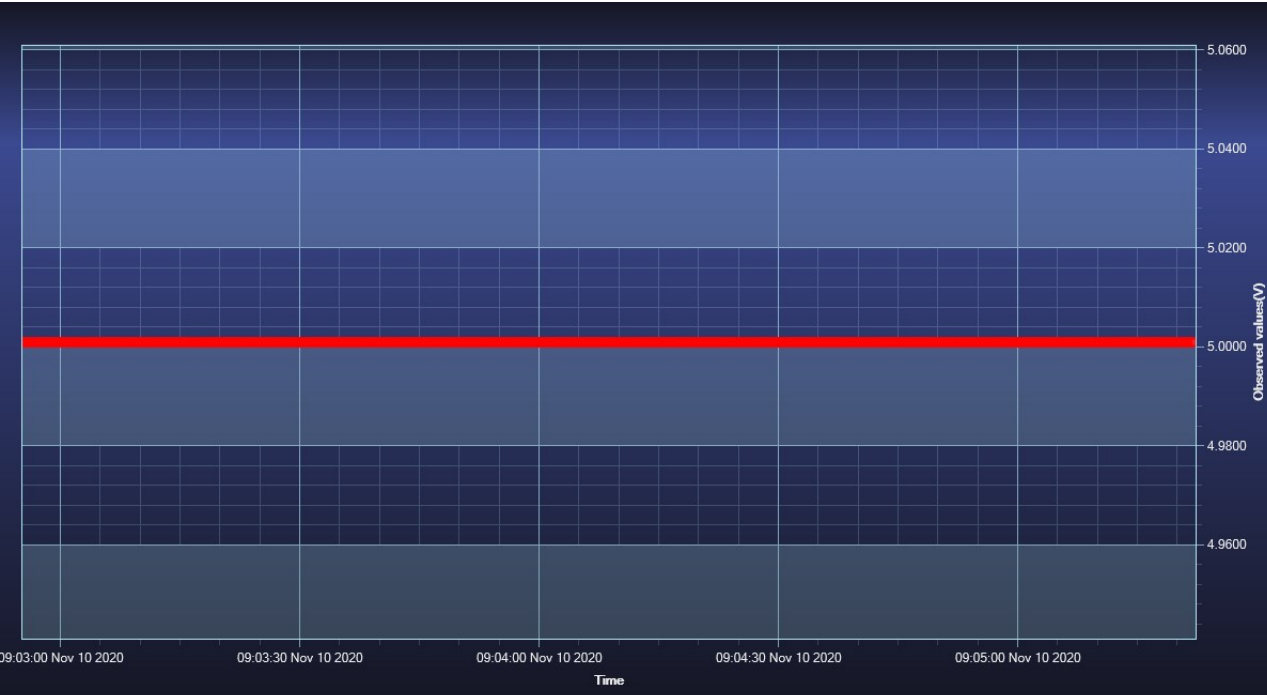
Channel 1	Using mains power	Using battery power
AN-V-5V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevice® AN-V-5V with Dynamic measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 5V

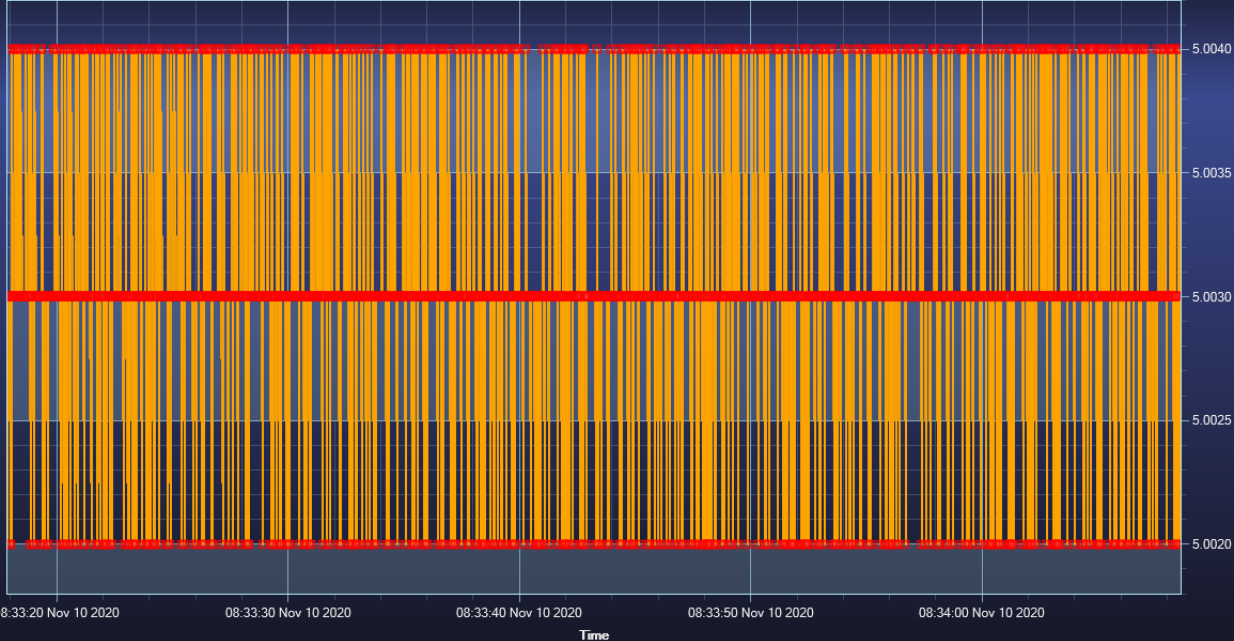
DAQ mode: Streaming mode @ 10Hz

Injected value: 5V

Channel 1	Using mains power	Using battery power
AN-V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevice® AN-V-5V with Dynamic measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 5V

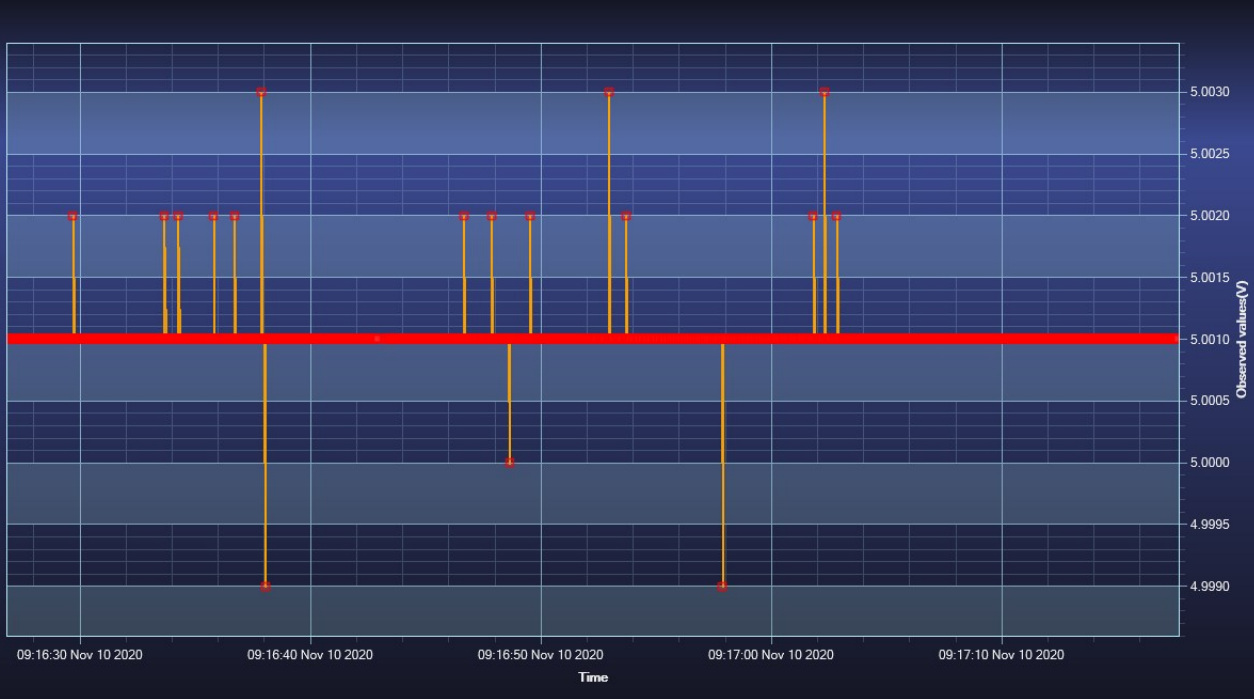
DAQ mode: Streaming mode @ 100Hz

Injected value: 5V

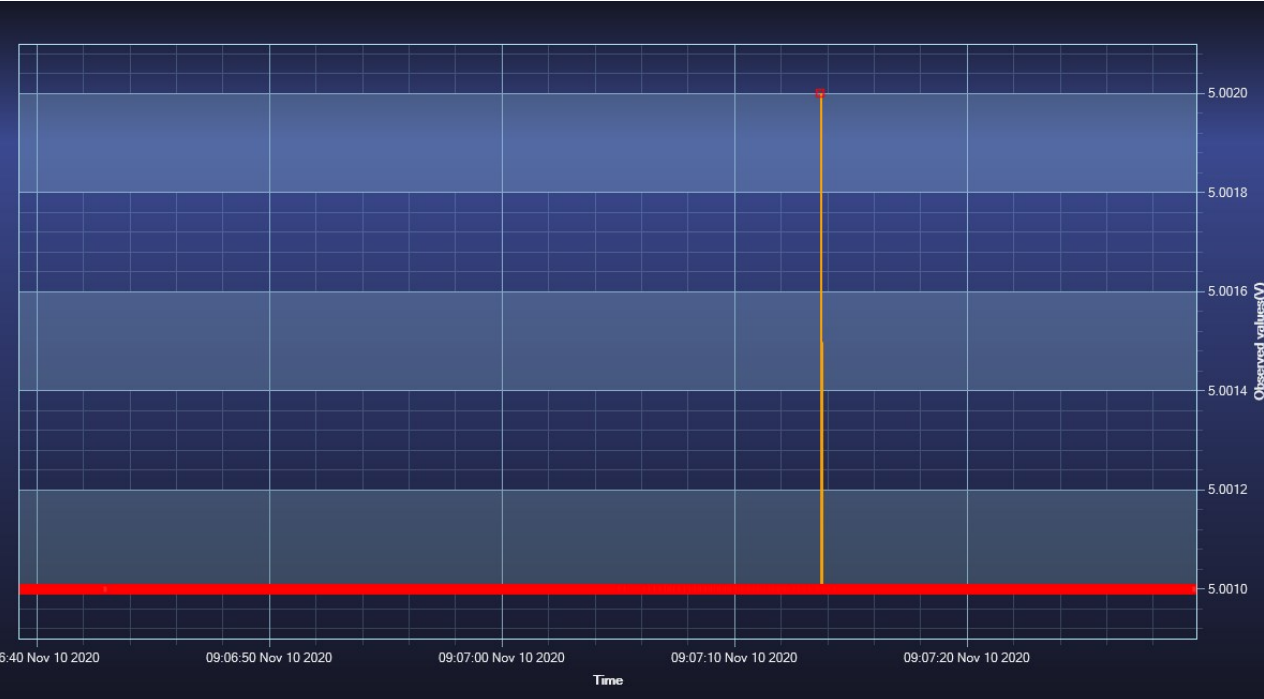
Channel 1	Using mains power	Using battery power
AN-V-5V	± 0.01%	± 0.01%

DAQ accuracy tests on Beandevice® AN-V-5V with Dynamic measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 5V

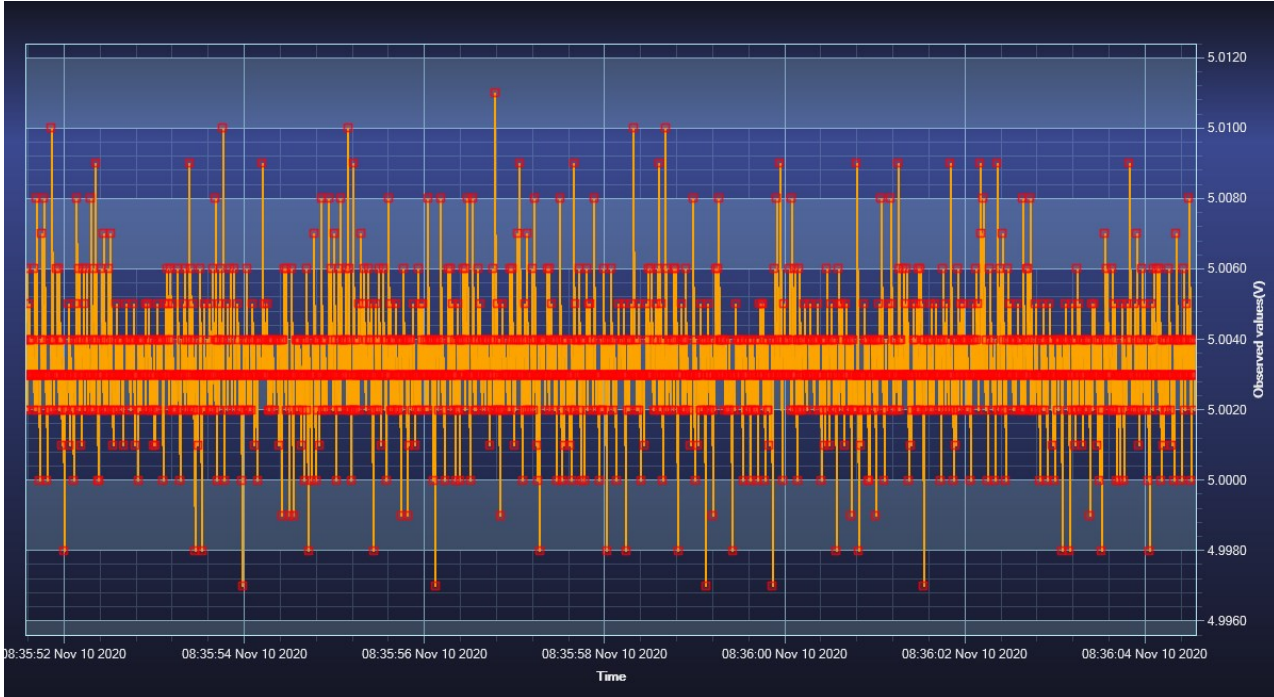
DAQ mode: Streaming mode @ 100Hz

Injected value: 5V

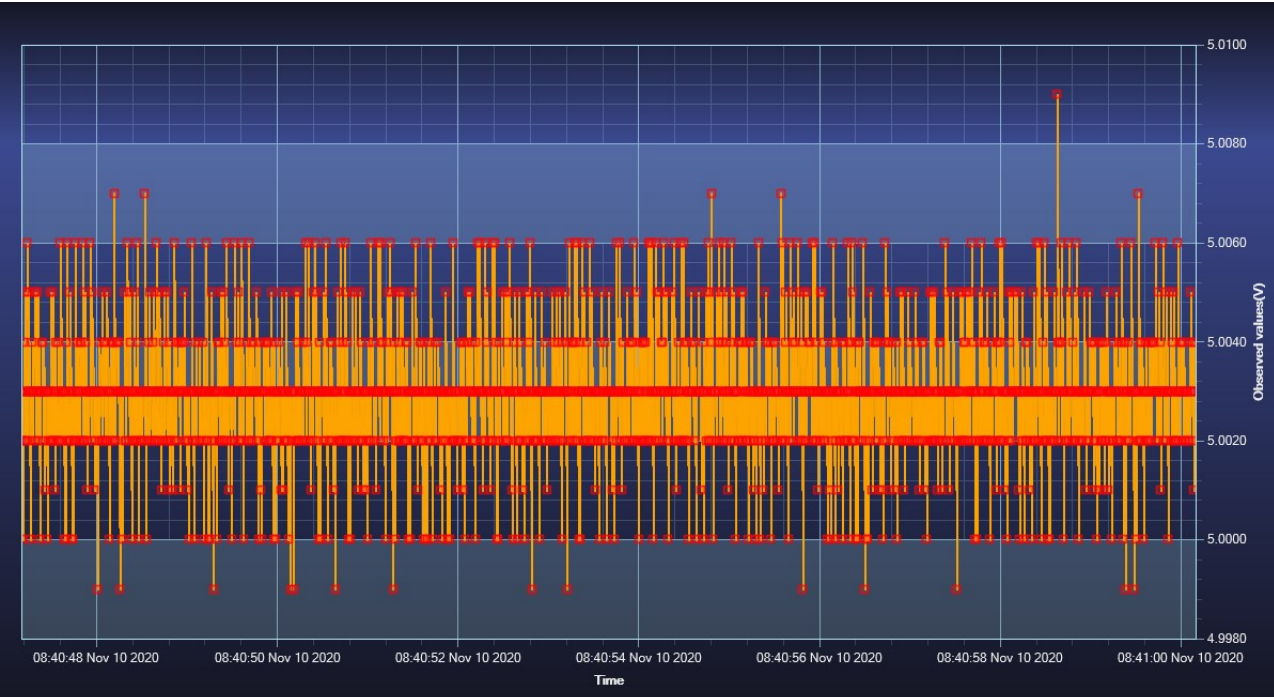
Channel 1	Using mains power	Using battery power
AN-V-5V	± 0.02%	± 0.01%

DAQ Accuracy tests on Beandevic[®] AN-V-5V with Dynamic measurement mode on SW 7.1

Mains Power



Battery Power



Injected Value: 5V

DAQ mode: Streaming mode @ 400Hz

Injected value: 5V

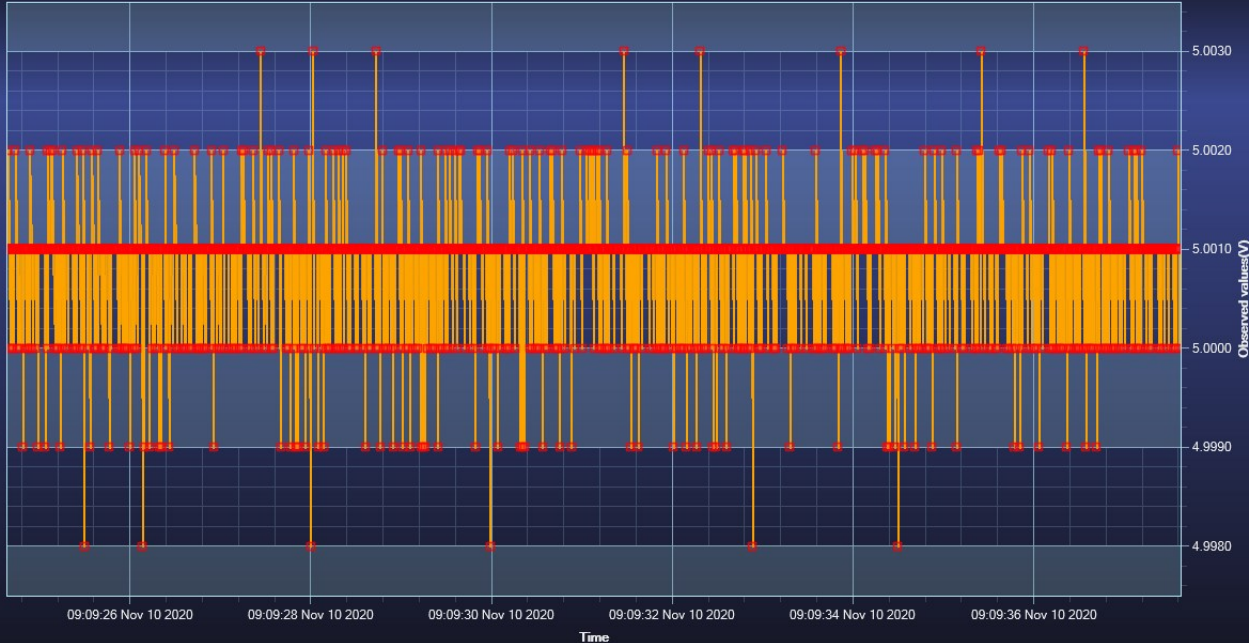
Channel 1	Using mains power	Using battery power
AN-V-5V	± 0.07%	± 0.05%

DAQ Accuracy tests on Beandevic[®] AN-V-5V with Dynamic measurement mode on SW 7.6

Mains Power



Battery Power



Injected Value: 5V

DAQ mode: Streaming mode @ 400Hz

Injected value: 5V

Channel 1	Using mains power	Using battery power
AN-V-5V	± 0.05%	± 0.05%

DAQ Accuracy tests on Beandevic[®] AN-V-5V

Channel 1	Power mode	DAQ mode	accuracy Results on firmware version 7.1	accuracy Results on firmware version 7.6
AN-V-5V	Battery	LCDC	±0.01%	±0.01%
		Streaming 10Hz	±0.01%	±0.01%
		Streaming 100Hz	±0.01%	±0.01%
		Streaming 400Hz	±0.05%	±0.05%
	Mains Power supply	LCDC	±0.02%	±0.01%
		Streaming 10Hz	±0.01%	±0.01%
		Streaming 100Hz	±0.01%	±0.02%
		Streaming 400Hz	±0.07%	±0.05%

Conclusion:

BeanDevice	Power mode	DAQ Mode	accuracy Results on firmware version 7.1	accuracy Results on firmware version 7.6
AN-V-10V	Battery	LCDC	$\pm 0.01\%$	$\pm 0.01\%$
		Streaming 10Hz	$\pm 0.01\%$	$\pm 0.01\%$
	Mains Power supply	LCDC	$\pm 0.01\%$	$\pm 0.01\%$
		Streaming 10Hz	$\pm 0.01\%$	$\pm 0.01\%$
AN-V-5V	Battery	LCDC	$\pm 0.01\%$	$\pm 0.01\%$
		Streaming 10Hz	$\pm 0.01\%$	$\pm 0.01\%$
	Mains Power supply	LCDC	$\pm 0.02\%$	$\pm 0.01\%$
		Streaming 10Hz	$\pm 0.01\%$	$\pm 0.01\%$
AN-V-420	Battery	LCDC	$\pm 0.01\%$	$\pm 0.01\%$
		Streaming 10Hz	$\pm 0.01\%$	$\pm 0.01\%$
	Mains Power supply	LCDC	$\pm 0.01\%$	$\pm 0.01\%$
		Streaming 10Hz	$\pm 0.01\%$	$\pm 0.01\%$
AN-mV	Battery	LCDC	$\pm 0.16\%$	$\pm 0.025\%$
		Streaming 10Hz	$\pm 0.15\%$	$\pm 0.15\%$
	Mains Power supply	LCDC	$\pm 0.28\%$	$\pm 0.027\%$
		Streaming 10Hz	$\pm 0.35\%$	$\pm 0.32\%$



Headquarter :

Beanair GmbH
Wolfener Straße 32 - 34
12681 Berlin - Germany

Middle-East and Africa branch office

Beanair Tunisia
Rue de Kairouan –
4000 Sousse Tunisia

Email: info@beanair.com
www.beanair.com
www.space-wireless.com

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