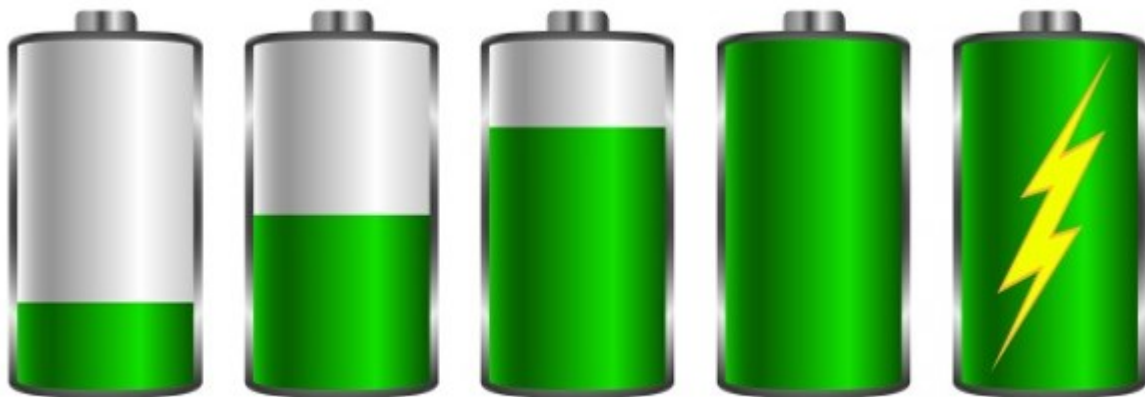


Version 1.1



TECHNICAL NOTE
TN_RF_17

*Battery Life Estimation on Wilow®
sensors (and how to Improve it!)*



DOCUMENT

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Updates

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1.0.1	24/04/2019	Fahd ESSID	Vocabulary update Chart Update
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1.1	14/07/2022	Seddik ATTIG	Battery life with Low Duty Cycle Battery life with Streaming Continuous Battery life with Streaming Burst

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1. TECHNICAL SUPPORT

For general contact, technical support, to report documentation errors and to order manuals, contact **BEANAIR® Technical Support Center** (BTSC) at:

tech-support@Beanair.com




For detailed information about where you can buy the Beanair equipment/software or for recommendations on accessories and components visit:

www.Beanair.com

To register for product news and announcements or for product questions contact BEANAIR®'s Technical Support Center (BTSC).

Our aim is to make this user manual as helpful as possible. Please keep us informed of your comments and suggestions for improvements. Beanair appreciates feedback from the users.

2. VISUAL SYMBOLS DEFINITION

Visual	Definition
	<p><u>Caution or Warning</u> – Alerts the user with important information about Beanair wireless sensor networks (WSN), if this information is not followed, the equipment /software may fail or malfunction.</p>
	<p><u>Danger</u> – This information MUST be followed if not you may damage the equipment permanently or bodily injury may occur.</p>
	<p><u>Tip or Information</u> – Provides advice and suggestions that may be useful when installing Beanair Wireless Sensor Networks.</p>

3. ACRONYMS AND ABBREVIATIONS

RJ45	Refers to the RJ45 cable. It refers to an Ethernet connection
dBm	The abbreviation for the power ratio in decibels (dB) of the measured power referenced to one milliwatt (mW)
Hz	Hertz

4. AIM OF THE DOCUMENT

The aim of this document is to describe the battery life performance of the BeanDevice® in streaming mode.

This document is not intended to display with an extreme precision the battery life you can expect from our BeanDevice®. However, you will have an estimated battery life of the BeanDevice® operating in an environment with an ambient temperature.

Please note that these computed values could change, depending strongly on your environment. By the way, you will find information about interferences on other Beanair documents.

5. TEST OVERVIEW

- The BeanDevice® Wilow® battery life is given with:
 - Different data acquisition modes and different sampling rate
 - Data logger feature enabled/disabled
 - Power mode
- An internal High-density Lithium-Ion rechargeable battery with a capacity of **900 mAh** Powers Each BeanDevice® Wilow®.

The BeanDevice® Wilow® used during these tests:

- BeanDevice® Wilow® AX3D $\pm 2g/\pm 10g$
- BeanDevice® Wilow® Hi-INC $\pm 15B/\pm 30B$
- BeanDevice® Wilow® X-INC $\pm 15B/\pm 30B/\pm 2g/\pm 10g$

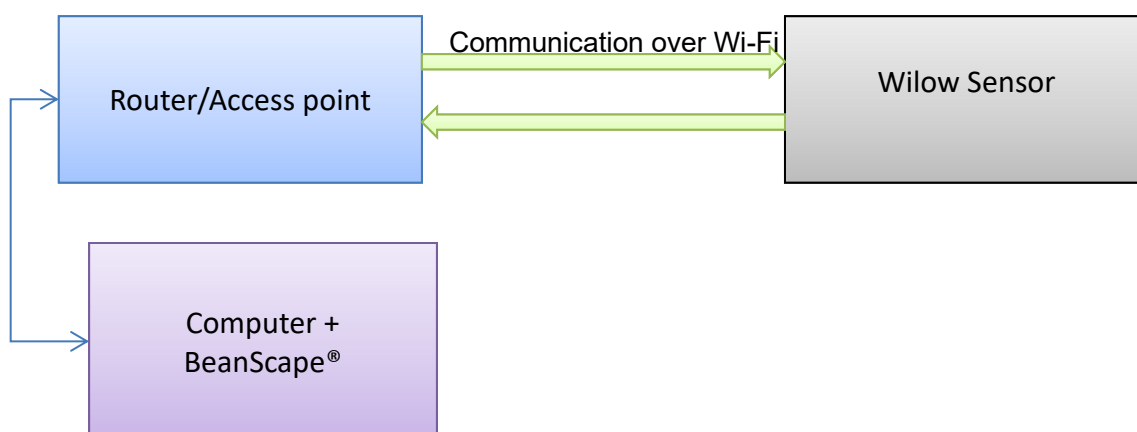


Figure 1: Global presentation of the system

- All the streaming mode tests were performed with continuous monitoring option.
- BeanDevice® Wilow® battery life is valuated at a room temperature of 25°C.

6. A DEDICATED TOOLKIT TO ESTIMATE THE BATTERY LIFE

Based on our field tests, we built a toolkit to estimate the battery life based on the measurement mode and the power mode configuration.

This toolkit is built with excel and is extremely easy to use:

Yellow field are the inputs you should configure (Beandevicé® Type , Measurement regime, datalogger enabled/disabled).

Example for Low Duty Cycle (LDCDA) measurement mode

- Beandevicé® Type : select from the scroll list the type of BeanDevice platform
- Choose the measurement cycle
- Datalogger Enabled/Disabled

Battery Life estimation at 25degC with battery saver mode enabled with battery saver mode enabled and Listening Cycle of 65535 seconds			
BeanDevice Type	Input	BeanDevice Willow HI-inc 15B/30B	
BeanDevice Type	Input	BeanDevice Hi-INC Willow 15B/30B	
Measurement cycle - unit Seconds (min 2s, max 86400s)	Input	BeanDevice Hi-INC Willow 15B/30B	
Datalogger enabled ?	Input	BeanDevice Willow AX-3D 2G/10G	yes
Battery life with self-discharge 5% (nb of days) at 25degC	Output	BeanDevice Willow X-INC 15B/30B/2G/10G	87.36

Then select the measurement cycle and datalogger enabled/disabled and you will get battery life .

This toolkit is available on the following weblink:

7. BATTERY LIFE DURING LOW DUTY CYCLE DATA ACQUISITION

All the testes are done at 25°C with battery saver mode enabled and Listening Cycle of 65535 seconds.

7.1.1 BeanDevice® Willow® AX-3D (±2g/±10g)

<i>BeanDevice® Willow</i>	<i>Measurement Cycle (min 2s, max 86400s)</i>	<i>Battery life with self-discharge 5% (nbr of days)</i>
AX3D ±2g/±10g	2s	2.42
	600s	80.36
	7200s	89.15
	86400	89.98

7.1.2 BeanDevice® Willow® HI-INC® (±15 B/±30B)

<i>BeanDevice® Willow</i>	<i>Measurement Cycle (min 2s, max 86400s)</i>	<i>Battery life with self-discharge 5% (nbr of days)</i>
Hi-INC ±15B/±30B	2s	1.62
	600	76.21
	7200s	89.15
	86400	89.94

7.1.3 BeanDevice® Willow® X-INC 15B/30B/2G/10G

<i>BeanDevice® Willow</i>	<i>Measurement Cycle (min 2s, max 86400s)</i>	<i>Battery life with self-discharge 5% (nbr of days)</i>
Hi-INC ±15B/±30B	2s	1.46
	600	74.93
	7200s	89.15
	86400	89.92

8. BATTERY LIFE DURING STREAMING CONTINUOUS MODE DATA ACQUISITION

All the testes are done at 25°C with battery saver mode enabled and Listening Cycle of 65535 seconds.

8.1.1 BeanDevice® Willow® AX-3D (±2g/±10g)

<i>BeanDevice® Willow</i>	<i>Sampling rate (min 10Hz, max 2000Hz)</i>	<i>Battery life (hh:mm)</i>
AX3D ±2g/±10g	10	21h:11m
	100	19h:46m
	500	14h:50m
	1000	13h:41m
	2000	11h:52m

8.1.2 BeanDevice® Willow® HI-INC® (±15 B/±30B)

<i>BeanDevice® Willow</i>	<i>Sampling rate (min 10Hz, max 2000Hz)</i>	<i>Battery life (hh:mm)</i>
Hi-INC ±15B/±30B	10	17h:48m
	100	16h:28m
	500	13h:41m
	1000	12h:32m
	2000	11h:07m

8.1.3 BeanDevice® Wilow® X-INC 15B/30B/2G/10G

<i>BeanDevice® Wilow</i>	<i>Sampling rate (min 10Hz, max 2000Hz)</i>	<i>Battery life (hh:mm)</i>
X-INC 15B/30B/2G/10G	10	16h:10m
	100	15h:36m
	500	11h:24m
	1000	10h
	2000	9h:10m

9. BATTERY LIFE DURING STREAMING BURST MODE DATA ACQUISITION

All the testes are done at 25°C with battery saver mode enabled.

In Streaming Burst: **Listening Cycle = Data Acquisition Cycle** (this is cannot be changed)

9.1.1 BeanDevice® Wilow® AX-3D (±2g/±10g)

BeanDevice® Wilow	Sampling rate (min 10Hz, max 2000Hz)	Data acquisition Cycle in seconds (min 2s, max 86400s)	Data acquisition Duration in seconds	Battery life with self-discharge (nbr of days)
AX3D ±2g/±10g	10	7200	20	57.65
			600	9.27
			3600	1.74
	500		20	49.90
			600	6.68
			3600	1.22
	2000		20	44.87
			600	5.42
			3600	0.98

9.1.2 BeanDevice® Wilow® HI-INC® (±15 B/±30B)

BeanDevice® Wilow	Sampling rate (min 10Hz, max 2000Hz)	Data acquisition Cycle in seconds (min 2s, max 86400s)	Data acquisition Duration in seconds	Battery life with self-discharge (nbr of days)
Hi-INC ±15B/±30B	10	7200	20	53.93
			600	7.91
			3600	1.46
	500		20	48.10
			600	6.20
			3600	1.13

			20	43.41
	2000		600	5.10
			3600	0.92

9.1.3 BeanDevice® Wilow® X-INC 15B/30B/2G/10G

<i>BeanDevice® Wilow</i>	<i>Sampling rate (min 10Hz, max 2000Hz)</i>	<i>Data acquisition Cycle in seconds (min 2s, max 86400s)</i>	<i>Data acquisition Duration in seconds</i>	<i>Battery life with self-discharge (nbr of days)</i>
X-INC 15B/30B/2G/10G	10	7200	20	51.83
			600	7.25
			3600	1.33
	500		20	43.98
			600	5.22
			3600	0.94
	2000		20	39.09
			600	4.25
			3600	0.76