

Dear customer

ROHM Co., Ltd. ("ROHM"), on the 1st day of April, 2024, has absorbed into merger with 100%-owned subsidiary of LAPIS Technology Co., Ltd.

Therefore, all references to "LAPIS Technology Co., Ltd.", "LAPIS Technology" and/or "LAPIS" in this document shall be replaced with "ROHM Co., Ltd." Furthermore, there are no changes to the documents relating to our products other than the company name, the company trademark, logo, etc.

Thank you for your understanding.

ROHM Co., Ltd. April 1, 2024



FEXK715x1_AN_Current-01

Bluetooth[®] low energy Module (MK71511/MK71521) Application Note Current consumption measurement for MK715x1 Evaluation Kit Mini

Issue Date: Oct. 16, 2020



NOTES

- 1) The information contained herein is subject to change without notice.
- 2) When using LAPIS Technology Products, refer to the latest product information (data sheets, user's manuals, application notes, etc.), and ensure that usage conditions (absolute maximum ratings, recommended operating conditions, etc.) are within the ranges specified. LAPIS Technology disclaims any and all liability for any malfunctions, failure or accident arising out of or in connection with the use of LAPIS Technology Products outside of such usage conditions specified ranges, or without observing precautions. Even if it is used within such usage conditions specified ranges, semiconductors can break down and malfunction due to various factors. Therefore, in order to prevent personal injury, fire or the other damage from break down or malfunction of LAPIS Technology Products, please take safety at your own risk measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. You are responsible for evaluating the safety of the final products or systems manufactured by you.
- 3) Descriptions of circuits, software and other related information in this document are provided only to illustrate the standard operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. And the peripheral conditions must be taken into account when designing circuits for mass production. LAPIS Technology disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, and other related information.
- 4) No license, expressly or implied, is granted hereby under any intellectual property rights or other rights of LAPIS Technology or any third party with respect to LAPIS Technology Products or the information contained in this document (including but not limited to, the Product data, drawings, charts, programs, algorithms, and application examples, etc.). Therefore LAPIS Technology shall have no responsibility whatsoever for any dispute, concerning such rights owned by third parties, arising out of the use of such technical information.
- 5) The Products are intended for use in general electronic equipment (AV/OA devices, communication, consumer systems, gaming/entertainment sets, etc.) as well as the applications indicated in this document. For use of our Products in applications requiring a high degree of reliability (as exemplified below), please be sure to contact a LAPIS Technology representative and must obtain written agreement: transportation equipment (cars, ships, trains, etc.), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems, etc. LAPIS Technology disclaims any and all liability for any losses and damages incurred by you or third parties arising by using the Product for purposes not intended by us. Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters, etc.
- 6) The Products specified in this document are not designed to be radiation tolerant.
- 7) LAPIS Technology has used reasonable care to ensure the accuracy of the information contained in this document. However, LAPIS Technology does not warrant that such information is error-free and LAPIS Technology shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.
- 8) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. LAPIS Technology shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.
- 9) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.
- 10) Please contact a ROHM sales office if you have any questions regarding the information contained in this document or LAPIS Technology's Products.
- 11) This document, in part or in whole, may not be reprinted or reproduced without prior consent of LAPIS Technology.

(Note) "LAPIS Technology" as used in this document means LAPIS Technology Co., Ltd.

Copyright 2020 LAPIS Technology Co., Ltd.

LAPIS Technology Co., Ltd.

2-4-8 Shinyokohama, Kouhoku-ku, Yokohama 222-8575, Japan http://www.lapis-tech.com/en/

Preface

This application note describes the current consumption of MK715x1 Evaluation Kit Mini (MK715x1EK1) and MK715x1 Evaluation Kit Mini Plus(MK715x1EK1P) equipped with Bluetooth[®] 5 compatible Bluetooth low energy module MK715x1 made by Lapis Technology.

The following related documents are available, so please refer to them if necessary.



MK715x1 Data Sheet

MK715x1 Evaluation Kit Mini (MK715x1EK1) Hardware Manual

Note: In this document, MK715x1 refers to both MK71511 and MK71521.

•Bluetooth[®] is a registered trademark of Bluetooth SIG, Inc.

•All other company and product names are the trademarks or registered trademarks of the respective companies.

Table of Contents

Preface ii Table of Contents iii 1. Start up measurement environment 1 1.1. Tool installation 1 1.2. Activation of Segger Embedded Studio. 1 1.3. Adding code to the application program 5 1.4. Build the application program 6 1.5. Writing the application program 6 1.6. Preparation of Evaluation Kit Mini 9 1.7. Connection with DC power analyzer 9 2. Current measurement 10 3. Measurement data 11 4. Current calculation tool provided by Nordic 15 Revision history 16	NOTES	i
Table of Contentsiii1. Start up measurement environment11.1. Tool installation11.2. Activation of Segger Embedded Studio11.3. Adding code to the application program51.4. Build the application project61.5. Writing the application program61.6. Preparation of Evaluation Kit Mini91.7. Connection with DC power analyzer92. Current measurement103. Measurement data114. Current calculation tool provided by Nordic15Revision history16	Preface	ii
1. Start up measurement environment 1 1.1. Tool installation 1 1.2. Activation of Segger Embedded Studio 1 1.3. Adding code to the application program 5 1.4. Build the application project 6 1.5. Writing the application program 6 1.6. Preparation of Evaluation Kit Mini 9 1.7. Connection with DC power analyzer 9 2. Current measurement 10 3. Measurement data 11 4. Current calculation tool provided by Nordic 15 Revision history 16	Table of Contents	iii
1.1. Tool installation11.2. Activation of Segger Embedded Studio.11.3. Adding code to the application program51.4. Build the application project61.5. Writing the application program.61.6. Preparation of Evaluation Kit Mini91.7. Connection with DC power analyzer92. Current measurement103. Measurement data.114. Current calculation tool provided by Nordic15Revision history16	1. Start up measurement environment	1
1.2. Activation of Segger Embedded Studio.11.3. Adding code to the application program51.4. Build the application project61.5. Writing the application program61.6. Preparation of Evaluation Kit Mini91.7. Connection with DC power analyzer92. Current measurement103. Measurement data114. Current calculation tool provided by Nordic15Revision history16	1.1. Tool installation	1
1.3. Adding code to the application program51.4. Build the application project61.5. Writing the application program61.6. Preparation of Evaluation Kit Mini91.7. Connection with DC power analyzer92. Current measurement103. Measurement data114. Current calculation tool provided by Nordic15Revision history16	1.2. Activation of Segger Embedded Studio	1
1.4. Build the application project .6 1.5. Writing the application program. .6 1.6. Preparation of Evaluation Kit Mini .9 1.7. Connection with DC power analyzer .9 2. Current measurement .10 3. Measurement data .11 4. Current calculation tool provided by Nordic .15 Revision history .16	1.3. Adding code to the application program	5
1.5. Writing the application program	1.4. Build the application project	6
1.6. Preparation of Evaluation Kit Mini	1.5. Writing the application program	6
1.7. Connection with DC power analyzer .9 2. Current measurement .10 3. Measurement data .11 4. Current calculation tool provided by Nordic .15 Revision history .16	1.6. Preparation of Evaluation Kit Mini	9
2. Current measurement	1.7. Connection with DC power analyzer	9
 Measurement data	2. Current measurement	10
4. Current calculation tool provided by Nordic	3. Measurement data	11
Revision history	4. Current calculation tool provided by Nordic	15
	Revision history	16

Start up measurement environment 1.

1.1. Tool installation

The current consumption is measured using the application "ble app pwr profiling" for current consumption measurement of the sample software of nRF5 SDK provided by Nordic.

Please download (free) the nRF5 SDK provided by Nordic from the following URL. https://www.nordicsemi.com/Software-and-tools/Software/nRF5-SDK

Unzip the downloaded ZIP file to any folder.

* Please do not use deep-paths and double-byte characters in the extracted folder.

There are multiple development tools as a software development environment. This time we will use Embedded Studio provided by Segger. Please download the IDE (Integrated Development Environment) "Embedded Studio for ARM" (free) provided by Segger from the following URL.

https://www.segger.com/downloads/embedded-studio/

Run the downloaded installation file. If you proceed with the installation according to the instructions, Embedded Studio and J-Link Device Driver will be installed.

1.2. Activation of Segger Embedded Studio

In order to use Segger Embedded Studio, activation (license authentication) operation is required first. When Embedded Studio is started for the first time, as shown in the figure below, the display screen indicating that the license has not been activated appears. You can perform activation operation from this screen. The MK715x1 has a Nordic chip, so it is a free license. Click "Activate Your Free License". The activation screen is displayed.

SEGGER Embedded Studio V4.30c	?	×
No commercial-use license detected		
 Embedded Studio could not find a commercial-use license on this computer or any attached J-Link. If you would like to evaluate this software or use it for educational or other non-commercial purposes, are welcome to do so by clicking Continue. If you do have a commercial-use license, but that license is temporarily unavailable, please continue to Embedded Studio as if it were present and click Continue. Are you using Embedded Studio with a Nordic Semiconductor device? You can use Embedded Studio free of charge for any project using Nordic Semiconductor of devices. 	you use	
Continue	Close	•

Fig. 1-1 Initial screen prompting for activation

If you are using a PC that does not have an internet connection environment, you can copy the URL address for activation by right-clicking on "Activate Your Free License" and selecting "Copy Link". It is also possible to perform the activation offline from another PC with an internet connection environment.

SEGGER Embedded Studio V4.30	c		?	×					
No commercial-use license detected									
Embedded Studio could not find a commercial-use license on this computer or any attached J-Link. If you would like to evaluate this software or use it for educational or other non-commercial purposes, you are welcome to do so by clicking Continue. If you do have a commercial-use license, but that license is temporarily unavailable, please continue to use Embedded Studio as if it were present and click Continue. Are you using Embedded Studio with a Nordic Semiconductor device? You can use Embedded Studio free of charge for any project using <u>Nordic Semiconductor</u> of devices.									
Activate Your Free Lice	Open Link								
Would you like to use En	Open in New Window	rcial purposes?							
Once you finish evaluation	Save Link	led Studio for your commercial purposes you ha	ve to						
purchase a license.	Copy Link								
→ <u>Read the License Agree</u> → <u>Buy a License</u>	<u>ment</u>								
		Continue	Close	e					

Fig. 1-2 Initial screen prompting for activation

If you enter the necessary information on the activation screen below, the "Request License" button will be enabled, so click this button. The activation key will be sent to the specified email address. * An error may occur if "Co., Ltd" is added to Company.

SEGGER Embedded Studio License Activation	?	×
Embedded Studio License Activation		
Please fill in the form below to request your Embedded Studio License Activation for Nordic Semiconductor Devices.		
E First Name		
Last Name		
Company		
E-Mail Address		
Intel(R) Ethernet Connection I219-V -		
Yes, I have read and do accept SEGGER's <u>Privacy Policy</u> .		
A Request License		
Server powered by Say A. A. A. E. Served © 2017-2019, <u>www.seagaer.com</u> , All rights reserved.		

Fig. 1-3 Activation screen

When activating online, you can select the MAC address from the pull-down menu, but when activating offline, you need to check the MAC address of your PC and enter it. You can check the MAC address information of your PC by selecting "Tools" \rightarrow "License Manager..." from the Embedded Studio menu and selecting "Diagnose Problems" from the License Manager screen.



Fig. 1-4 MAC address confirmation screen

Use Ctrl+C to copy the activation key included in the email sent by Segger. From the Embedded Studio menu, select "Tools" \rightarrow "License Manager..." If you select "Activate Embedded Studio" from the License Manager screen, the License Manager window will be displayed with the activation key entered, as shown below. Click the "Install License" button at the bottom left.

To	ols Wind	ow Help			
۵	Options	Alt+,			
	License M	anager			
3	Packag Show	SEGGER Embedded Studio for ARM V4.3 What do you want to do?	00 - License Manager ? X		~
δ	New F New B	No installed activation	Seder Embedded Studio for Akw V4.30: - License Manager Activate Embedded Studio	ŗ	^
	Brows Termir Admir	 Activate Embedded Studio I have received my license key and v Manage Activations I want to manage my installed Embed Diagnose Problems I ve been asked to send a license rep 	Enter activation key: Please check your e-mail client's inbox for an activation key.	×	
			Activation key status: Product: Embedded Studio for Cortex-M V4 Ethernet MAC Address Lock: 0000000000000 SUA Expiration Date: 12 2 2 2021 Install License		
			Back	Clos	se

Fig. 1-5 License key input screen

If the license installation is successful, the screen below will appear.

SEGGER Embedded Studio for ARM V4.30c - License Manager		?	×
G Manage Activations			
Installed licenses:			
Product			
Product: Embedded Studio for Cortex-M V4			
Ethemet MAC Address Lock			
Remove License			
	Back	Clo	ose

Fig. 1-6 Screen after entering license key

You can also see that it is licensed at the top of Embedded Studio.

SEGGER Embedded Studio for ARM V4.30c (64-bit) Non-Commercial License											
<u>F</u> ile	<u>E</u> dit	<u>V</u> iew	<u>S</u> earch	<u>N</u> avigate	<u>P</u> roject	<u>B</u> uild	<u>D</u> ebug	T <u>a</u> rget	<u>T</u> ools	<u>W</u> indow	<u>H</u> elp
	After activation										
🧼 SE	SEGGER Embedded Studio for ARM V4.30c (64-bit) - Licensed to Semiconductor										
<u>F</u> ile	<u>E</u> dit	<u>V</u> iew	<u>S</u> earch	<u>N</u> avigate	<u>P</u> roject	<u>B</u> uild	<u>D</u> ebug	T <u>a</u> rget	Tools	Window	<u>H</u> elp

Fig. 1-7 Display example before and after activation

X"Non-Commercial License" may be displayed even after activation. In this case, the activation will be reflected by opening the Embedded Studio project once.

1.3. Adding code to the application program

The application "ble_app_pwr_profiling" does not enter DCDC mode, it is necessary to add code to work in DCDC mode to the application program.

Start Embedded Studio and select "File" -> "Open Solution..." from the menu to open the project file selection window. Select the project file (*.emProject) of "ble_app_pwr_profiling" and click open button.

Since the project files used by MK71511 and MK71521 are different, select the project file according to the evaluation kit.

MK71511: ble_app_pwr_profiling_pca10040e_s112.emProject MK71521: ble_app_pwr_profiling_pca10040_s132.emProject



Fig. 1-8 Open project file

When the project opens, select the source code "main.c" from the GUI left window and insert "sd_power_dcdc_mode_set(NRF_POWER_DCDC_ENABLE)" immediately after "ble_stack_init();" on line 783.



1.4. Build the application project

After adding the setting to enter DCDC mode, please perform the build. From the Embedded Studio menu, select "Build" -> "Build <project name>" to start the build. When the build is completed normally, "Build complete" is displayed in the window under the GUI.

Bui	ld	Debug	Target	Tools	Window	Help		
* 1	Build ble_app_pwr_profiling_pca10040_s132							
	Rebuild ble_app_pwr_profiling_pca10040_s132							
	Cle	ean ble_app	_pwr_prof	iling_pca	10040_s132			



Fig. 1-10 Build the project

1.5. Writing the application program

After the build is complete, write to the evaluation kit mini. Take the MK71521 Evaluation Kit Mini as an example. Connect the evaluation kit mini to a PC via USB to supply power. Connect the evaluation kit mini and J-Link. The figure below is a connection diagram when using MK71521EK1 and J-Link LITE. %Pay attention to the orientation of the cable connection. (Red circle)



Fig. 1-11 Connection between MK71521 Evaluation Kit Mini and J-Link LITE

From the Embedded Studio menu, select "Target" \rightarrow "Connect J-Link".

The display at the bottom of the GUI window changes from "Disconnected (J-Link)" to the display shown below.

Targ	get	Tools	Window	Help					
2	Con	nect J-Lii	nk						
×.	Disc	onnect							
to a	Reco	onnect							
i ≣	Atta	ch Debug	gger						
Outpu	ıt								
Show:	Target	t	- *	🀐 Tasks	•				
	onnecti omplete	ing 'J-Link' u :d	ising 'USB'						
					CortexM4 on J-Link	📓 66,148,325 Cycles	Built OK	INS R+	W Ln 784 Co

Fig. 1-12 Connection between J-Link and target board

Erase the Flash ROM by selecting "Target" -> "Erase All" from the Embedded Studio menu. The following message will be displayed in the lower GUI window.

Targ	get Tools Window Help							
2	Connect J-Link							
X	Disconnect J-Link							
۰	Reconnect J-Link							
<mark>i</mark> j≣	Attach Debugger							
•	Reset J-Link							
↓≣	Download ble_app_pwr_profiling_pca10040_s132							
√≣	Verify ble_app_pwr_profiling_pca10040_s132							
	Erase All							
Outp	nut						<i>8</i> 4	×
Show	Target 👻 🌱 Tasks 💌							
2	Preparing target for download Completed							^
	Erasing Chip Working							
	I-Link: Flash download: Total time needed: 0.066s (Prepare: 0.051s, Con Working	mpare: 0.000s, E	rase: 0.009s, Program:	0.000s, Verify:				~
	CortexM	14 on J-Link	🗕 2,090,518 Cycles	Built OK	INS R+W	Ln 784 Col	51	

Fig. 1-13 Erase Flash ROM

From the Embedded Studio menu, select "Target" \rightarrow "Download <project name>" to write to the Flash ROM. The application program and SoftDevice will be written.

When writing is completed, "Download successful" is displayed in the window below the GUI.

Targ	get Tools Window Help			
2	Connect J-Link			
X	Disconnect J-Link			
3	Reconnect J-Link			
<mark>∏</mark> ≣	Attach Debugger			
-	Reset J-Link			
ţ⊒	Download ble_app_pwr_profiling_pca10040_s132			
√≣	Verify ble_app_pwr_profiling_pca10040_s132			
Outp	ıt	ū	a M	×
Show:	Target 🔹 🍢 🍾 Tasks 💌			
2	Preparing target for download			^
i	Downloading 's132_nrf52_6.1.1_softdevice.hex' to J-Link Download successful	147.0 KB in 2.7s 52.9 KB/s	ОК	
2	Downloading 'ble_app_pwr_profiling_pca10040_s132.elf' to J-Link Download successful	11.0 KB in 0.2s 40.1 KB/s	ОК	•
		Disconnected (J-Link) 📀 Built OK 🛛 INS 🛛 R+W Ln 784 0	Col 51	

Fig. 1-14 Program writing in Embedded Studio

1.6. Preparation of Evaluation Kit Mini

Remove the resistor R18 (0 Ω) to measure the current consumption of the BLE module alone.



Fig. 1-15 MK715x1 Evaluation Kit DIP-SW with R18 (0Ω) Location

Set all DIP-SW to off.



1.7. Connection with DC power analyzer

Use a Keysight DC power analyzer (N6705).

Connect the Output + side of the DC power analyzer to JP1 2pin of the evaluation kit and the Output - side to the GND of the evaluation kit.

*J-Link remove from Evaluation Kit Mini

	DC power analy Manufacturer: Model number	zer Keysight : N6705
	OUTPUT +	OUTPUT -
R19 SCLK S10 P20 P18 P21 P19 P17 P14 P12 P16 F 19 P1 A P15 MK715 x1 - EK 1 P19 P17 P14 P12 P16 F R22 OSC1 P10 P20 P18 P21 P19 P17 P14 P12 P16 F R22 OSC1 P10 P20 P18 P21 P19 P17 P14 P12 P16 F R22 OSC1 P10 P17 P16 F R24 P17 P16 F R25 P10 P17 P16 F R25 P10 P17 P16 F R26 P10 P17 P16 F R26 P10 P17 P16 F R26 P17 P16 F	PIS PI3 PI1 PI0 P09	POT POS GD VDD X CN3 X C

Fig. 1-17 Connection diagram between MK715x1 Evaluation Kit Mini and DC power analyzer

2. Current measurement

After power on, if you set the DIP-SW 1 to OFF \rightarrow ON \rightarrow OFF, Advertise will start with the device name of "Nordic_Power_Mgmt". Use the DC power analyzer to get the current consumption during Advertise. %Advertise will stop in 30 seconds. If stopped, DIP-SW 1 to OFF \rightarrow ON \rightarrow OFF, again to restart Advertise.

Launch BLE Tool on your smartphone while running Advertise and search for the device name of "Nordic_Power_Mgmt". Select "Nordic_Power_Mgmt" to start Connect. When Connect is completed, the screen changes to the screen shown below (right). Use the DC power analyzer to obtain the current consumption at the time of Connect.

*Download the smartphone application "BLE Tool" from Google Play or the App Store.





Screen when device name "Nordic_Power_Mgmt" is detected

Screen when connecting

Fig. 2-1 BLE Tool screen

3. Measurement data

The measurement data of the current consumption is shown below.





1 ms / 🔻 Offset: 0 s Points: 2048 🔻 Period: 0 s Trigger Scope Run Button 🔻 Mode: Auto 💌 Slope: 🚣 Level: ---

	STATE	Current Consumption [mA]	Actual Period [us]	Current Consumption × Actual Period [mA·us]
1	Idle	0.0011	25716	28
2	Pre-processing	2.1	71	149
3	Crystal ramp-up	1.4	496	694
4	Standby	0.4	970	388
5	Start radio	4.4	88	387
6	Radio Tx	5.7	329	1875
\bigcirc	Radio switch	2.3	156	359
8	Radio Rx	5.6	47	263
9	Standby	1.0	262	262
10	Start radio	4.5	93	419
1	Radio Tx	5.7	316	1801
(12)	Radio switch	2.2	157	345
(13)	Radio Rx	5.6	48	269
(14)	Standby	0.9	261	235
(15)	Start radio	4.7	90	423
(16)	Radio Tx	5.9	315	1859
1	Radio switch	2.3	160	368
(18)	Radio Rx	5.5	49	270
(19)	Post-processing	1.0	376	376
			0.03 sec	10770

Total Average Current 359 uA

<Measurement condition>

DUT	MK71511 Evaluation Kit Mini		
Voltage 3.0V			
Regulator	DCDC		
TX power	0dBm		
Role	Advertising		
Interval	30ms		
Payload (TX)	21Byte		
Application Soft	ble app pwr profiling pca10040e s112(%DCDC:Enable)		

MK71511 evaluation kit mini Connection



	STATE	Current Consumption [mA] Actual Period [us]		Current Consumption × Actual Period [mA·us]
1	Idle	0.0011	27926	31
2	Pre-processing	2.5	78	195
3	Crystal ramp-up	1.3	502	653
4	Standby	0.4	947	379
5	Start radio	3.2	44	141
6	Window widening + Radio Rx	5.9	86	507
\bigcirc	Radio switch	2.1	151	317
8	Radio Tx	5.9	46	271
9	Post-processing	1.6	220	352
			0.03 sec	2846

Total Average Current95 uA

<measurement condition=""></measurement>			
DUT	MK71511 Evaluation Kit Mini		
Voltage	3.0V		
Regulator	DCDC		
TX power	0dBm		
Role	Connection		
Interval	30ms		
Payload (TX & RX)	0Byte		
Application Soft	ble app pwr profiling pca10040e s112(%DCDC:Enable)		





	STATE	Current Consumption [mA]	Actual Period [us]	Current Consumption × Actual Period [mA·us]	
1	Idle	0.0011	25732	28	
2	Pre-processing	3.5	71	249	
3	Crystal ramp-up	1.4	506	708	
4	Standby	0.4	933	373	
5	Start radio	5.0	101	505	
6	Radio Tx	6.2	322	1996	
\bigcirc	Radio switch	3.0	161	483	
8	Radio Rx	6.4	45	288	
9	Standby	1.4	257	360	
10	Start radio	4.7	95	447	
1	Radio Tx	6.2	314	1947	
(12)	Radio switch	2.8	163	456	
(13)	Radio Rx	6.4	45	288	
14	Standby	1.3	258	335	
15	Start radio	4.9	93	456	
16	Radio Tx	6.4	314	2010	
1	Radio switch	3.0	165	495	
(18)	Radio Rx	6.4	45	288	
19	Post-processing	1.6	380	608	
			0.03 sec	12320	

Total Average Current

411 uA

<Measurement condition>

DUT MK71521 Evaluation Kit Mini		
Voltage	3.0V	
Regulator	DCDC	
TX power	0dBm	
Role	Advertising	
Interval	30ms	
Payload (TX)	21Byte	
Application Soft	ble_app_pwr_profiling_pca10040_s132(*DCDC: Enable)	



MK71521 evaluation kit mini Connection

	STATE	Current Consumption [mA]	Actual Period [us]	Current Consumption × Actual Period [mA·us]	
1	Idle	0.0011	27945	31	
2	Pre-processing	3.8	87	331	
3	Crystal ramp-up	1.4	488	683	
4	Standby	0.4	950	380	
(5)	Start radio	4.1	45	185	
6	Window widening + Radio Rx	6.5	87	566	
$\overline{\mathcal{O}}$	Radio switch	2.8	152	426	
8	Radio Tx	6.4	39	250	
9	Post-processing	2.6	207	538	
			0.03 sec	3388	

Total Average Current 11

113uA

<measurement condition=""></measurement>			
DUT	MK71521 Evaluation Kit Mini		
Voltage	3.0V		
Regulator	DCDC		
TX power	0dBm		
Role	Connection		
Interval	30ms		
Payload (TX & RX)	0Byte		
Application Soft	ble app pwr profiling pca10040 s132(% DCDC: Enable)		

4. Current calculation tool provided by Nordic

You can also calculate the current consumption using the "Online Power Profiler", a current calculation tool provided by Nordic. The Online Power Profiler is the following URL. https://devzone.nordicsemi.com/nordic/power/

*It does not support nRF52811 used in MK71511.



Fig. 4-1 Online Power Profiler site screen

Revision history

		Page		
Document No.	Issue date	Before revision	After revision	Remarks
FEXK715x1_AN_Current-01	Oct. 16, 2020	_	_	First edition