PBLN51822 DataSheet

v0.0.5 kr

PBLN51822 DataSheet

개정이력

순번	버전	변경일	변경사유	변경내용	작성자	승인자
1	0.0.1	2014-02-12	최초작성	En 버전 변환	신세욱	고락곤
2	0.0.2	2016-12-05	Update	적합성평가 정보 기입	손오경	고락곤
3	0.0.3	2017-02-17	Update	모듈 사진 변경	한지현	이도현
			추가	인증 정보 추가	한지현	이도현
4	0.0.4	2017-02-20	Update	Memory 수정	한지현	이도현
5	0.0.5	2017-03-17	Update	SIG 인증 추가	한지현	이도현

Table of Contents

1. PBLN51822 Introduction

Key Features

PBLN51822은 저전력 2.4 GHz를 포함하는 System on Chip (SoC) 타입의 32 bit ARM® Cortex™-M0 CPU, flash memory, analog / digital peripheral들을 포함하는 제품입니다.
PBLN51822는 S1x0 SoftDevice Bluetooth® Low Energy Stack과 Nordic Semiconductor에서 제공하는 2.4 GHz Gazell 프로토콜을 지원합니다.
BLE Stack인 S1x0 SoftDevices 시리즈는 Nordic Semiconductor 홈페이지에서 무료로 배포하고 있으며, PBLN51822에서 지원됩니다.

internal buck DC/DC converter 및 internal LDO regulator 가 내장되어 있습니다.
EasyDMA를 이용하여 RX/TX packet 전송시 RAM에서 직접적으로 접근 가능합니다.

- 2.4 GHz transceiver
  - -93 dBm sensitivity in Bluetooth® low energy mode
  - 250 kbps, 1 Mbps, 2 Mbps supported data rates
  - TX Power -20 to +4 dBm in 4 dB steps
  - TX Power -30 dBm Whisper mode
  - 13 mA peak RX, 10.5 mA peak TX (0 dBm)
  - RSSI (1 dB resolution)
- ARM® Cortex™-M0 32 bit processor
  - 275 µA/MHz running from flash memory
  - 150 µA/MHz running from RAM
  - Serial Wire Debug (SWD)
- S1x0 series SoftDevice ready
- Memory
  - 256 kB embedded flash program memory
  - 16 kB RAM
- Support for non-concurrent multiprotocol operation
  - On-air compatibility with nRF24L series
- Flexible Power Management
  - Supply voltage range 1.8 V to 3.6 V
  - 2.5 µs wake-up using 16 MHz RCOSC
  - 0.4 µA @ 3 V OFF mode
  - 0.5 µA @ 3 V in OFF mode + 1 region RAM retention
  - 2.3 µA @ 3 V ON mode, all blocks IDLE
- 8/9/10 bit ADC - 8 configurable channels

- 31 General Purpose I/O Pins
- One 32 bit and two 16 bit timers with counter mode
- SPI Master
- Two-wire Master (I2C compatible)
- UART (CTS/RTS)
- CPU independent Programmable Peripheral Interconnect (PPI)
- Quadrature Decoder (QDEC)
- AES HW encryption
- Real Timer Counter (RTC)

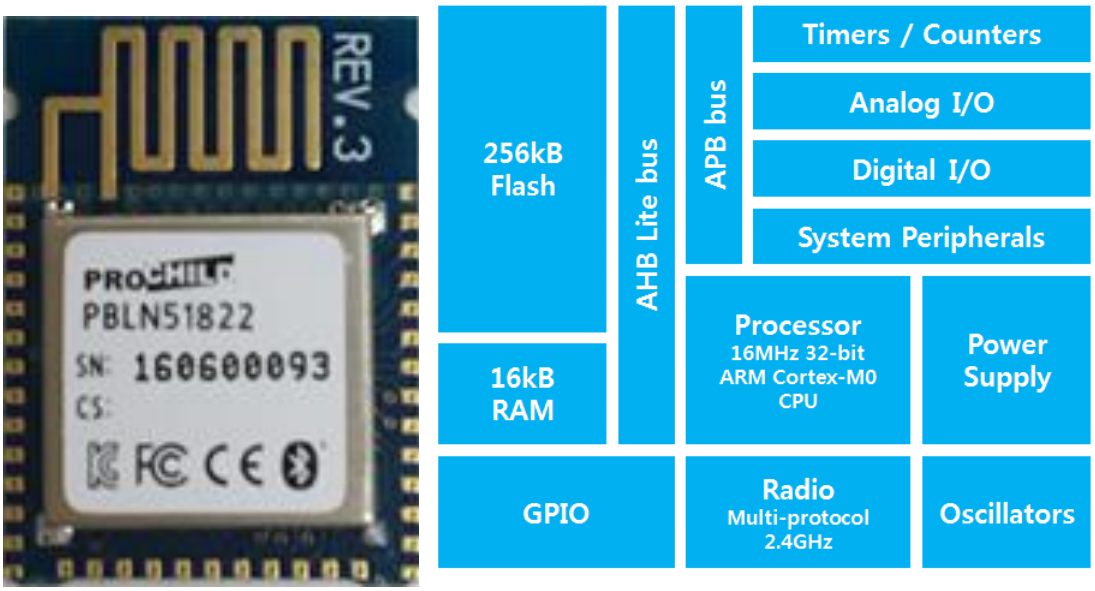
Applications

- Computer peripherals and I/O devices
  - Mouse
  - Keyboard
  - Multi-touch trackpad
- Interactive entertainment devices
  - Remote control
  - 3D Glasses
  - Gaming controller
- Personal Area Networks
  - Health/fitness sensor and monitor devices
  - Medical devices
  - Key-fobs + wrist watch
- Remote control toys

Specifications

Frequency band	2.4GHz ISM (2.40000–2.4835GHz)
On-air data rate	250 kbps, 1 Mbps or 2 Mbps
Modulation	GFSK
Output power	Programmable: +4 to -20dBm in 4dB steps
Sensitivity	-92.5dBm Bluetooth low energy -96dBm at 250kb -90dBm at 1Mbs -85dBm at 2Mbs
Radio current consumption LDO at 1.8V	16mA - TX at +4dBM output power 10.5mA - TX at 0dBm output power 13mA - RX at 1Mbs

Radio current consumption DC-DC at 3V	10.5mA - TX at +4dBm output power 8.1mA - TX at 0dBm output power 9.5mA - RX at 1Mbs
Microcontroller	32-bit ARM Cortex M0
Program Memory	256kB Flash RAM 16kB
Oscillators	16MHz crystal oscillator 16MHz RC oscillator 32kHz crystal oscillator 32kHz RC oscillator (±250 ppm)
System current consumption	420nA - No RAM retention 530nA - 8k RAM retention 2μA - All peripherals in IDLE mode
Hardware Security	128-bit AES ECB/CCM/AAR co-processor
GPIO	31 configurable
Digital I/O	X2 Hardware SPI master 2X 2-wire master UART Quadrature demodulator
Peripherals	10-bit ADC RNG Temperature sensor RTC
PPI	16-channel
Voltage regulator	LDO (1.8 to 3.6V) LDO bypass (1.75 to 1.95V) Buck DC/DC (2.1 to 3.6V)
Timers/counters	2 x 16 bit, 1 x 24bit, 2 x 24bit, RTC

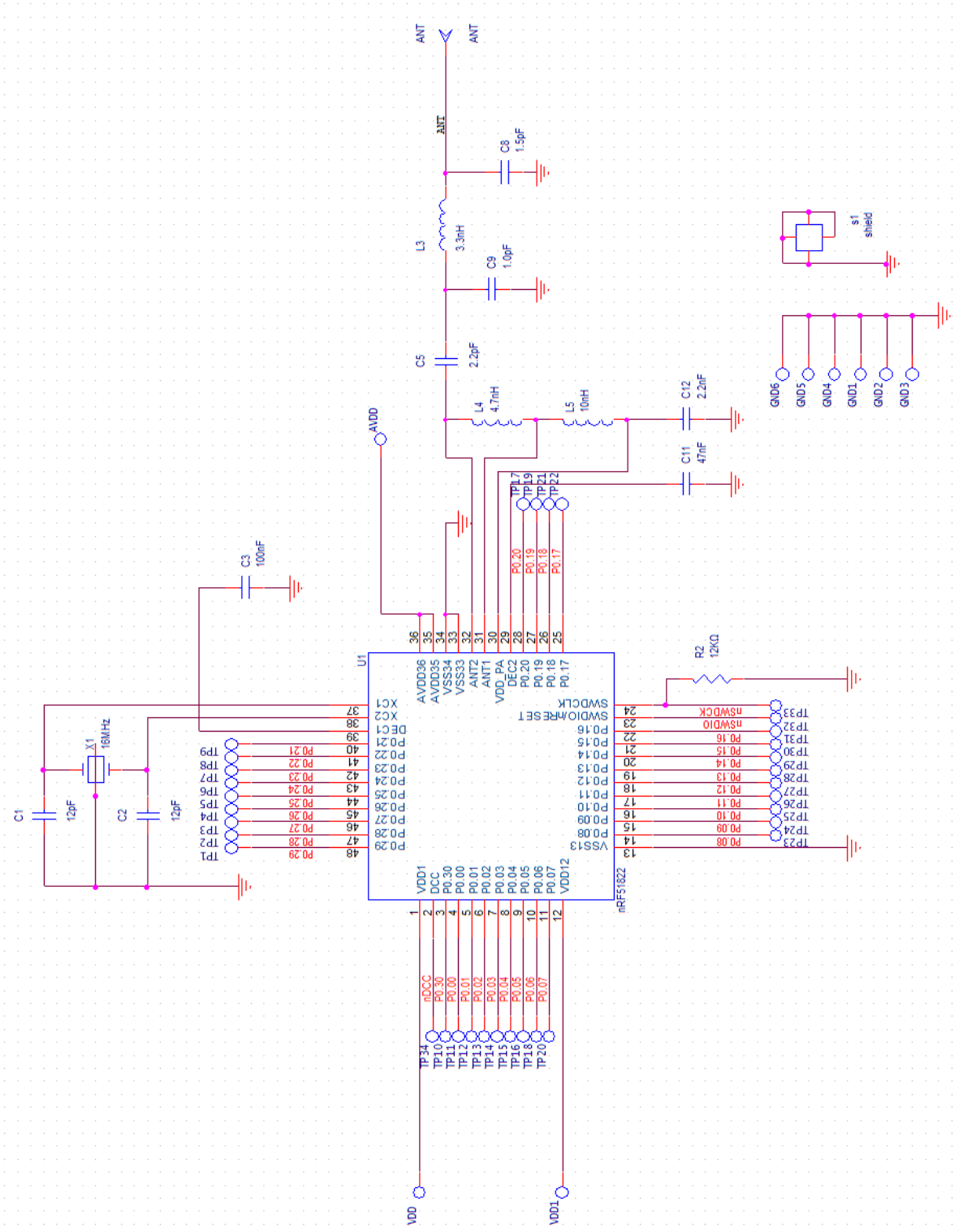


- Power supply features:
  - Supervisor hardware to manage power on reset, brownout, and power fail
  - Supply voltage range of 1.8 to 3.6 V using internal LDO regulator
  - Low voltage mode of 1.75 to 1.95 V (external voltage regulator is required)
  - Supply voltage range of 2.1 to 3.6 V using internal buck DC/DC converter

- Baseband controller
  - EasyDMA RX and TX packet transfer directly to and from RAM
  - Dynamic payload length
  - On-the-fly packet assembly/disassembly and AES CCM payload encryption
  - 8 bit, 16 bit, and 24 bit CRC check (programmable polynomial and initial value)

Note: EasyDMA is an integrated DMA implementation requiring no configuration to take advantage of flexible data management and avoids copying operations to and from RAM.

2. PBLN51822 Schematic

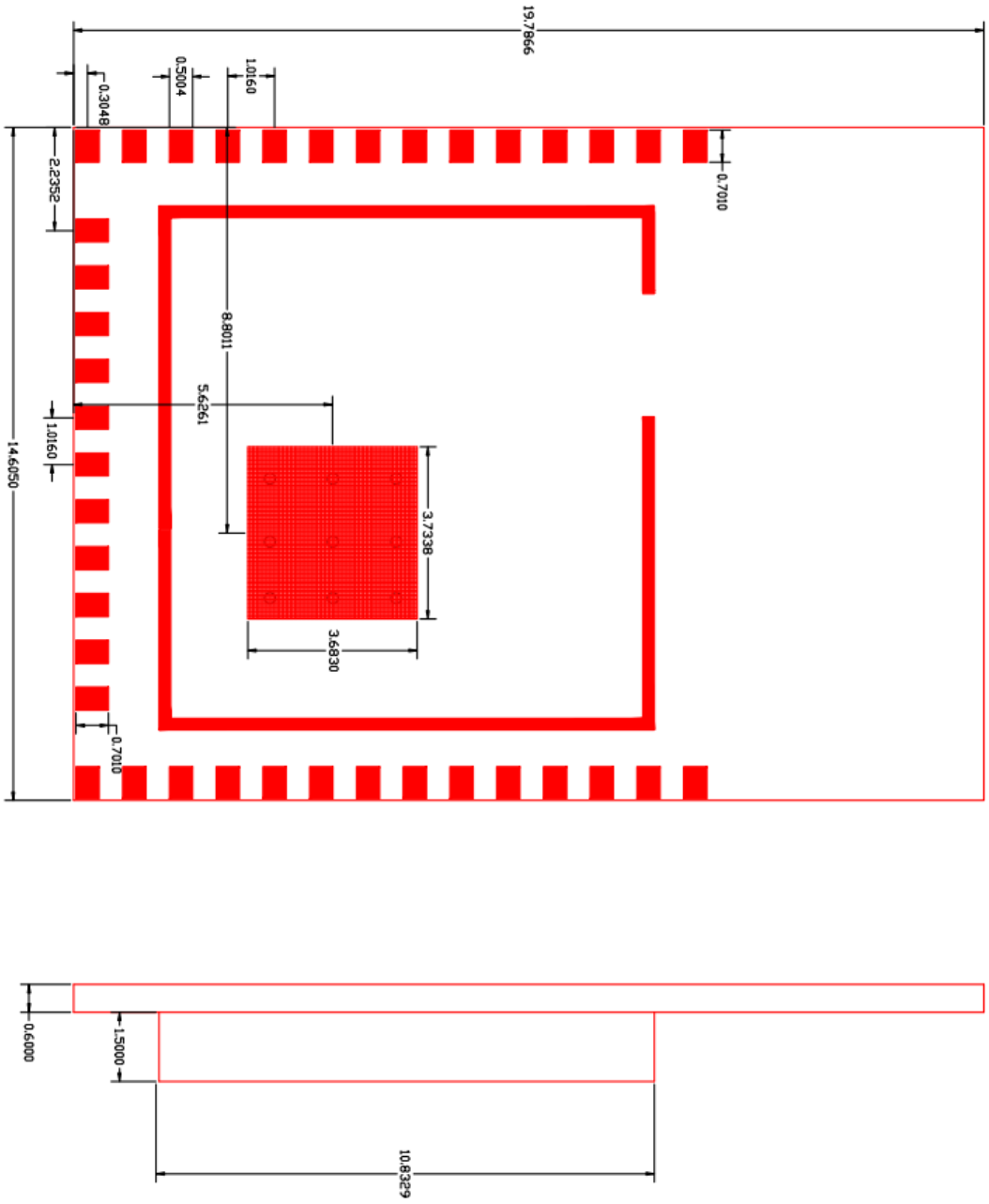


3. PBLN51822 Pinout

Pin	Module Pin Name	Pin Name	Pin Function	Description
1	GND	VSS	Power	Ground (0 V)
2	VCC_nRF	AVDD	Power	Analog Power supply
3	P0.21	P0.21	Digital I/O	General purpose I/O pin
4	P0.22	P0.22	Digital I/O	General purpose I/O pin
5	P0.23	P0.23	Digital I/O	General purpose I/O pin
6	P0.24	P0.24	Digital I/O	General purpose I/O pin
7	P0.25	P0.25	Digital I/O	General purpose I/O pin
8	P0.26	P0.26 AIN0 XL2	Digital I/O Analog input Analog output	General purpose I/O pin ADC input 0 Connection for 32.768 kHz crystal
9	P0.27	P0.27 AIN1 XL1	Digital I/O Analog input Analog input	General purpose I/O pin ADC input 1 Connection for 32.768 kHz crystal or external 32.768 kHz clock reference
10	P0.28	P0.28	Digital I/O	Digital I/O General purpose I/O pin

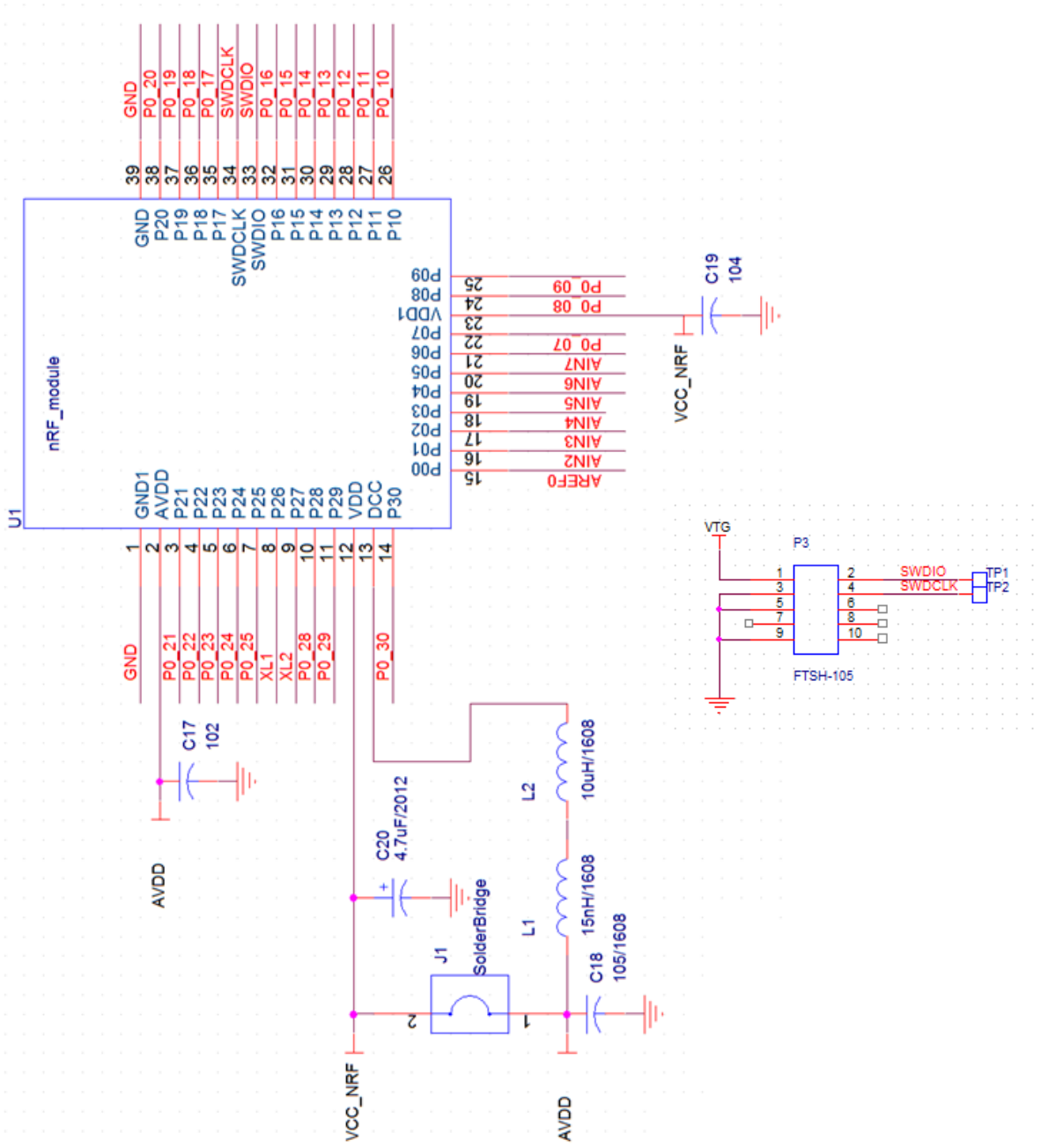
11	P0.29	P0.29	Digital I/O	Digital I/O General purpose I/O pin
12	VCC_nRF	VDD	Power	Power supply
13		DCC	Power	DC/DC output voltage to external LC filter
14	P0.30	P0.30	Digital I/O	General purpose I/O pin
15	P0.00	P0.00 AREF0	Digital I/O Analog input	General purpose I/O pin ADC Reference voltage
16	P0.01	P0.01 AIN2	Digital I/O Analog input	General purpose I/O pin ADC input 2
17	P0.02	P0.02 AIN3	Digital I/O Analog input	General purpose I/O pin ADC input 3
18	P0.03	P0.03 AIN4	Digital I/O Analog input	General purpose I/O pin ADC input 4
19	P0.04	P0.04 AIN5	Digital I/O Analog input	General purpose I/O pin ADC input 5
20	P0.05	P0.05 AIN6	Digital I/O Analog input	General purpose I/O pin ADC input 6
21	P0.06	P0.06 AIN7 AREF1	Digital I/O Analog input Analog input	General purpose I/O pin ADC input 7 ADC Reference voltage
22	P0.07	P0.07	Digital I/O	General purpose I/O pin
23	VCC_nRF	VDD	Power	Power supply
24	P0.08	P0.08	Digital I/O	General purpose I/O pin
25	P0.09	P0.09	Digital I/O	General purpose I/O pin
26	P0.10	P0.10	Digital I/O	General purpose I/O pin
27	P0.11	P0.11	Digital I/O	General purpose I/O pin
28	P0.12	P0.12	Digital I/O	General purpose I/O pin
29	P0.13	P0.13	Digital I/O	General purpose I/O pin
30	P0.14	P0.14	Digital I/O	General purpose I/O pin
31	P0.15	P0.15	Digital I/O	General purpose I/O pin
32	P0.16	P0.16	Digital I/O	General purpose I/O pin
33	SWDIO	SWDIO/nRESET	Digital I/O	System reset (active low). Also HW debug and flash programming I/O
34	SWDCLK	SWDCLK	Digital input	HW debug and flash programming I/O
35	P0.17	P0.17	Digital I/O	General purpose I/O pin
36	P0.18	P0.18	Digital I/O	General purpose I/O pin
37	P0.19	P0.19	Digital I/O	General purpose I/O pin
38	P0.20	P0.20	Digital I/O	General purpose I/O pin
39	GND	VSS	Power	Ground (0 V)

4. PBLN51822 Layout



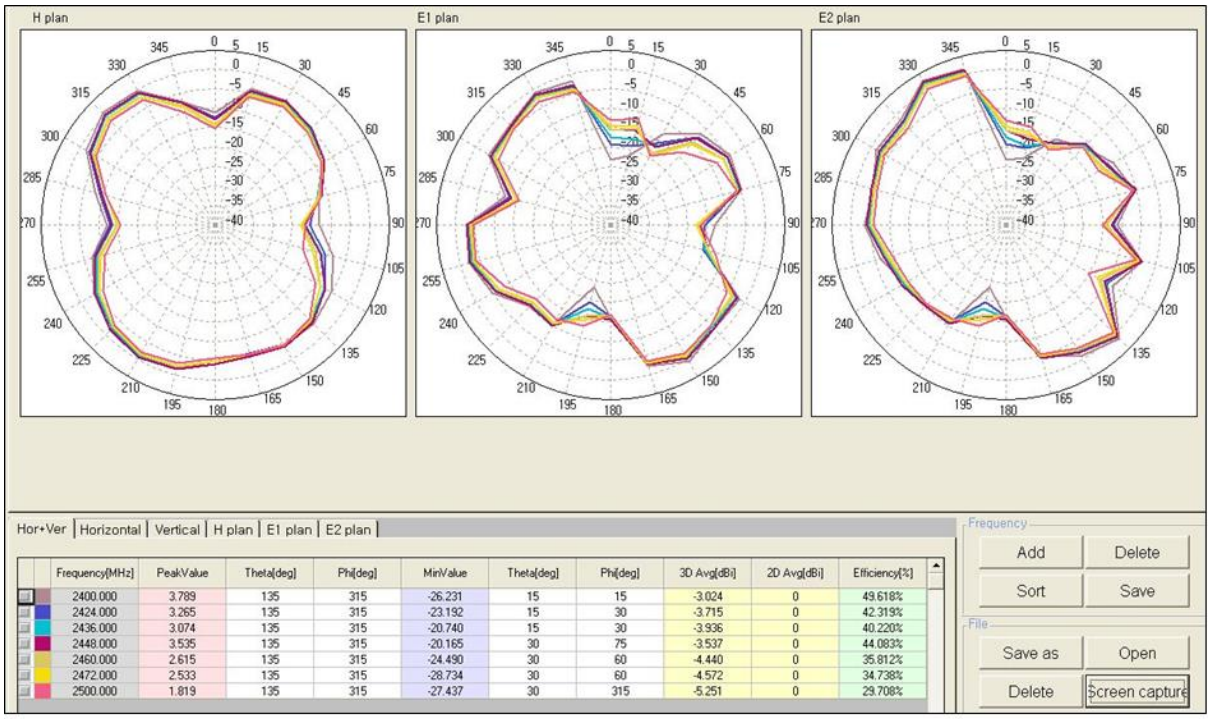
※ unit of standard length = mm

5. PBLN51822 Reference



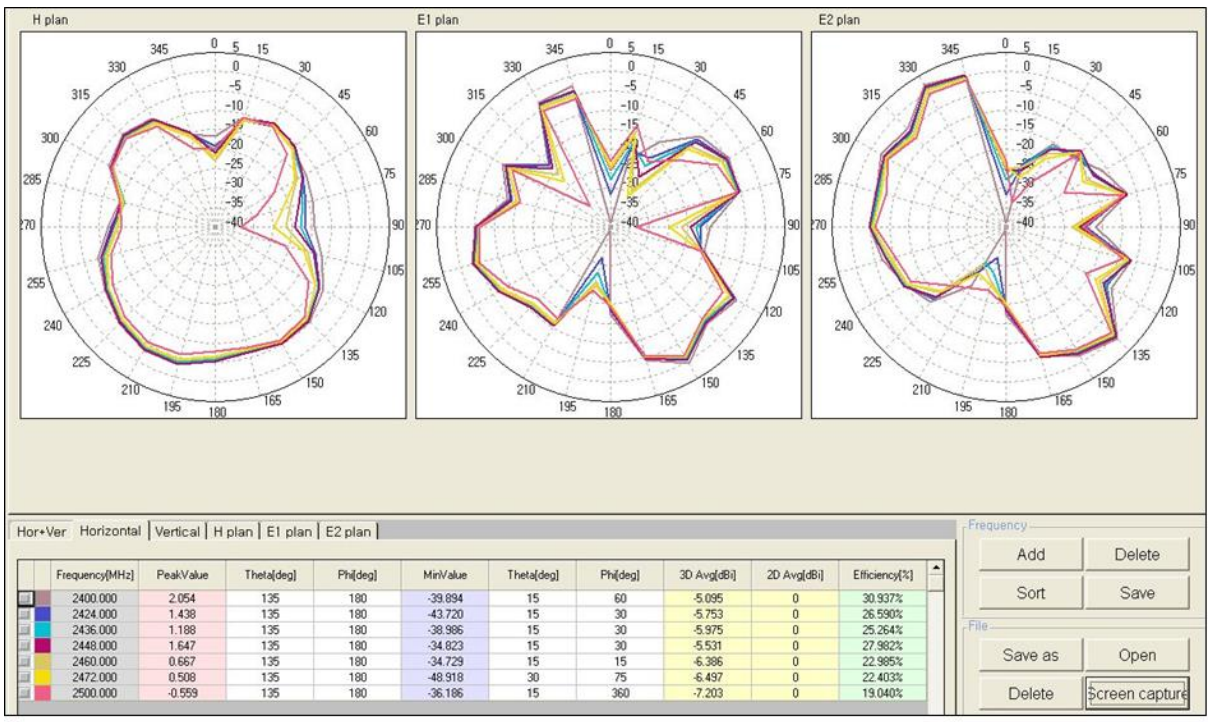
6. PBLN51822 Antenna Pattern

6.1. PBLN51822 H-V Pattern



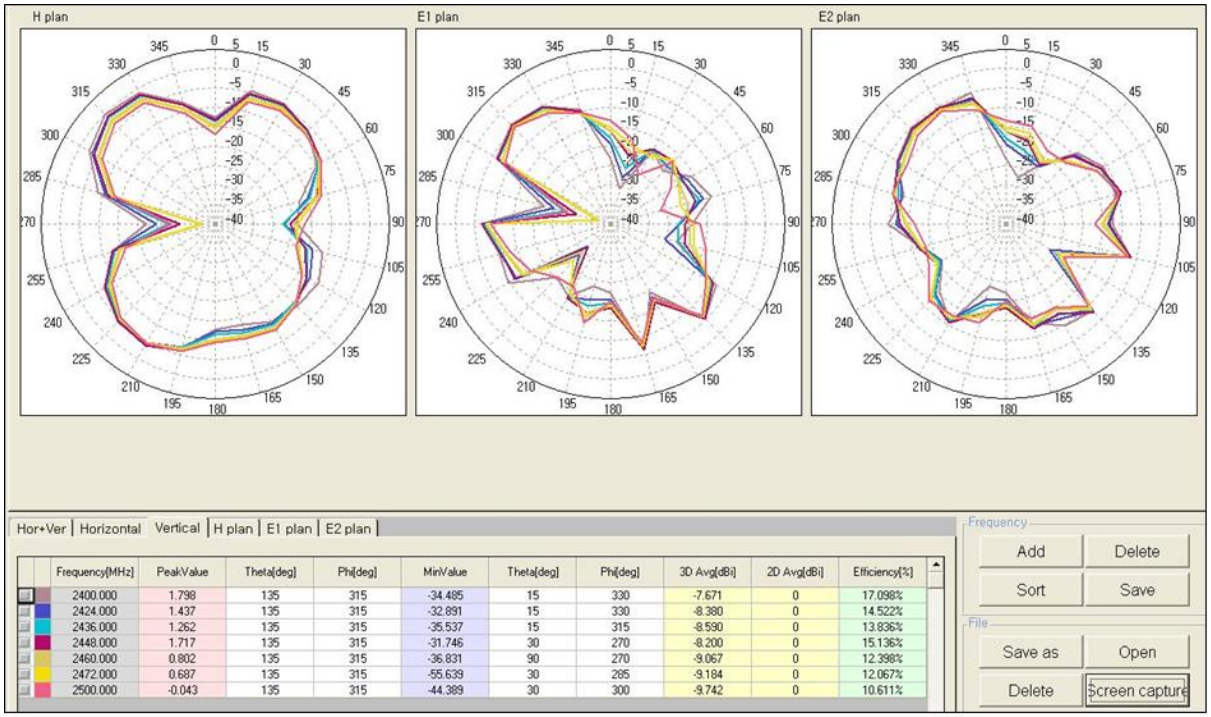
Frequency[MHz]	PeakValue	Theta[deg]	Phi[deg]	MinValue	Theta[deg]	Phi[deg]	3D Avg[dBi]	2D Avg[dBi]	Efficiency[%]
2400.000	3.789	135	315	-26.231	15	15	-3.024	0	49.618%
2424.000	3.265	135	315	-23.192	15	30	-3.715	0	42.319%
2436.000	3.074	135	315	-20.740	15	30	-3.936	0	40.220%
2448.000	3.535	135	315	-20.165	30	75	-3.537	0	44.083%
2460.000	2.615	135	315	-24.490	30	60	-4.440	0	35.812%
2472.000	2.533	135	315	-28.734	30	60	-4.572	0	34.738%
2500.000	1.819	135	315	-27.437	30	315	-5.251	0	29.708%

6.2. PBLN51822 H Pattern



Frequency[MHz]	PeakValue	Theta[deg]	Phi[deg]	MinValue	Theta[deg]	Phi[deg]	3D Avg[dBi]	2D Avg[dBi]	Efficiency[%]
2400.000	2.054	135	180	-39.894	15	60	-5.095	0	30.937%
2424.000	1.438	135	180	-43.720	15	30	-5.753	0	26.590%
2436.000	1.188	135	180	-38.986	15	30	-5.975	0	25.264%
2448.000	1.647	135	180	-34.823	15	30	-5.531	0	27.982%
2460.000	0.667	135	180	-34.729	15	15	-6.386	0	22.985%
2472.000	0.508	135	180	-48.918	30	75	-6.497	0	22.403%
2500.000	-0.559	135	180	-36.186	15	360	-7.203	0	19.040%

6.3. PBLN51822 V Pattern



Frequency[MHz]	PeakValue	Theta[deg]	Phi[deg]	MinValue	Theta[deg]	Phi[deg]	3D Avg[dBi]	2D Avg[dBi]	Efficiency[%]
2400.000	1.798	135	315	-34.485	15	330	-7.671	0	17.098%
2424.000	1.437	135	315	-32.891	15	330	-8.380	0	14.522%
2436.000	1.262	135	315	-35.537	15	315	-8.590	0	13.836%
2448.000	1.717	135	315	-31.746	30	270	-8.200	0	15.136%
2460.000	0.802	135	315	-36.831	90	270	-9.067	0	12.398%
2472.000	0.687	135	315	-55.639	30	285	-9.184	0	12.067%
2500.000	-0.043	135	315	-44.389	30	300	-9.742	0	10.611%

7. 적합성 평가 정보

7.1. KC

BD1D-A53B-EAB1-FDBA

방송통신기자재등의 적합인증서

Certificate of Broadcasting and Communication Equipments

상호 또는 성명 *Trade Name or Applicant*	(주) 프로차일드
기자재 명칭 *Equipment Name*	특정소출력 무선기기(무선데이터통신시스템용 무선기기)
기본모델명 *Basic Model Number*	PBLN51822
파생모델명 *Series Model Number*	
인증번호 *Certification No.*	MSIP-CRM-pro-PBLN51822
제조자/제조국가 *Manufacturer/ Country of Origin*	(주) 프로차일드 / 한국
형식기호 *Type Identification*	LARN8-IO4P2402/2480TR0.00005F2D40
인증연월일 *Date of Certification*	2014-02-18
기타 *Others*	

위 기자재는「전파법」제58조의2 제2항에 따라 인증되었음을 증명합니다.

It is verified that foregoing equipment has been certificated under the Clause 2, Article 58-2 of Radio Waves Act.

2014년(Year) 02월(Month) 18일(Date)

국립전파연구원장 국립전파연구원장인

Director General of National Radio Research Agency

※ 인증 받은 방송통신기자재는 반드시 **"적합성평가표시"**를 부착하여 유통하여야 합니다.
위반시 과태료 처분 및 인증이 취소될 수 있습니다.

7.2. FCC

3/18/2016 FCC - OET TCB Form 731 Grant of Equipment Authorization

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification

Issued Under the Authority of the

Federal Communications Commission

By:

TCB

Siemic Inc.
775 Montague Expressway
Milpitas, CA 95035

Date of Grant: 03/18/2016

Application Dated: 03/18/2016

PROCHILD INC.
RM.806, 8FL, KURO ACE TECHNO TOWER #197-48,
KURO, KURO-GU,
SEOUL, 152-053
South Korea

Attention: Rak-Gon Ko , Chief R&D Center Manager

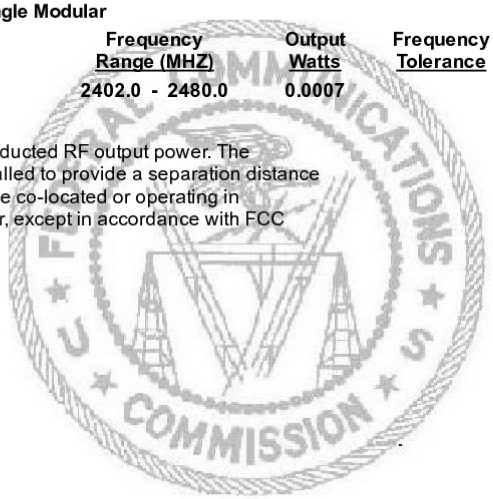
NOT TRANSFERABLE

EQUIPMENT AUTHORIZATION is hereby issued to the named GRANTEE, and is VALID ONLY for the equipment identified hereon for use under the Commission's Rules and Regulations listed below.

FCC IDENTIFIER: 2AEEY-PBLN51822
Name of Grantee: PROCHILD INC.
Equipment Class: Digital Transmission System
Notes: Bluetooth Module
Modular Type: Single Modular

Grant Notes	FCC Rule Parts	Frequency Range (MHZ)	Output Watts	Frequency Tolerance	Emission Designator
	15C	2402.0 - 2480.0	0.0007		

Singular Modular. Listed power is maximum conducted RF output power. The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter, except in accordance with FCC multi- transmitter product procedures.



https://apps.fcc.gov/oetcf/tcb/reports/Tcb731GrantForm.cfm 1/1

7.3. CE

SIEMIC

CE2200

Statement of opinion with respect to the presumption of
Compliance of a product with the essential requirements of

R&TTE DIRECTIVE 1999/5/EC

Certificate Number	R-16032108
Certificate Holder	PROCHILD INC.
Address	RM.806, 8FL, KURO ACE TECHNO TOWER #197-48, KURO,KURO-GU, SEOUL 152-053, KOREA
Manufacturer	PROCHILD INC.
Product Type/Description	Bluetooth Module
Trade Name	Ubiquitous generation PROCHILD
Model Number	PBLN51822

Applied / Complied Harmonized Standards		Complied
R&TTE Directive 1999/5/EC, Article 3(1)(a) ■ Health & Safety	EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 EN 62311: 2008	Y
R&TTE Directive 1999/5/EC, Article 3(1)(b) ■ EMC	EN 301 489 -1 V1.9.2, EN 301 489-17 V2.2.1	Y
R&TTE Directive 1999/5/EC, Article 3(2) ■ Radio	EN 300 328 V1.9.1	Y

Authorized By: Leslie Bai

Issue Date: March 21, 2016 Director of Certification

PS: This Certificate is Issued in Accordance with Annex IV of the R&TTE Directive 1999/5/EC and is only valid in Conjunction with the Following Annex I.

775 Montague Expressway, Milpitas, CA 95035, USA
Tel: 408 526 1188, Fax: 408 526 1088,
Website: www.siemic.com, Email: info@siemic.com

7.4. SIG

QDL Bluetooth® Qualified Design Listing

The Bluetooth SIG Hereby Recognizes

PROCHILD
Member Company

Bluetooth 4.0 Single Mode Device(PBLN51822)
Qualified Design Name

Declaration ID: D022180
Qualified Design ID: 53293
Specification Name: 4.0
Product Type: End Product
Model Number: PBLN51822
Listing Date: 04 February 2014
Assessment Date: 03 February 2014
Hardware Version Number: 1.0
Software Version Number: 1.0

This certificate acknowledges the *Bluetooth*® Specifications declared by the member were achieved in accordance with the *Bluetooth* Qualification Process as specified within the *Bluetooth* Specifications and as required within the current PRD

Bluetooth® SPECIAL INTEREST GROUP