

PLE-52M

DATA SHEET v1.5



BLE MODULE

PLE-52M

PLE-52M module is a BLE module based on BT 5.0. It was developed using Nordic's nRF52810 chipset.

Revision History

No	Version	Date	Page	Description
1	0.1	2019-03-28	All	First release
2	0.2	2019-04-10	6	Add application
3	1.0	2019-04-30	All	Second release
4	1.1	2019-05-14	1	Edit introduction
5	1.2	2020-02-17	6	Add notice
6	1.3	2020-03-19	6	Edit Recommended PCB guide
7	1.4	2020-03-31	6	Edit Recommended PCB guide
8	1.5	2020-04-23	8	Edit Antenna Performance image

Table of Contents

1. Introduction

1.1 Applications

2. Specifications

2.1 Module Block Diagram

2.2 Chipset Specifications (nRF52810)

3. Layout

3.1 Dimensions

3.1.1 Pin Assignment

3.2 Recommended PCB guide

3.3 Schematic options

3.3.1 32.768 external crystal

3.3.2 DC/DC mode

4. Antenna

5. Certification

5.1 KC

1. Introduction



PLE-52M

The PLE-52M module was developed using Nordic Semiconductor's [nRF52810 QFAA](#).

The [nRF52810](#) is the baseline member of the nRF52 Series SoC family. It meets the challenge of bringing Bluetooth 5 feature sets and protocol concurrency to applications at a price point that makes adding Bluetooth 5 connectivity to an application compelling. It is an ideal candidate for less complex applications and also as a Bluetooth 5 connectivity processor in larger applications.

The nRF52810 has protocol support for Bluetooth 5, ANT and 2.4 GHz proprietary stacks. It is extremely power efficient, and is our smallest SoC with its 2.482 x 2.464 mm CSP package.

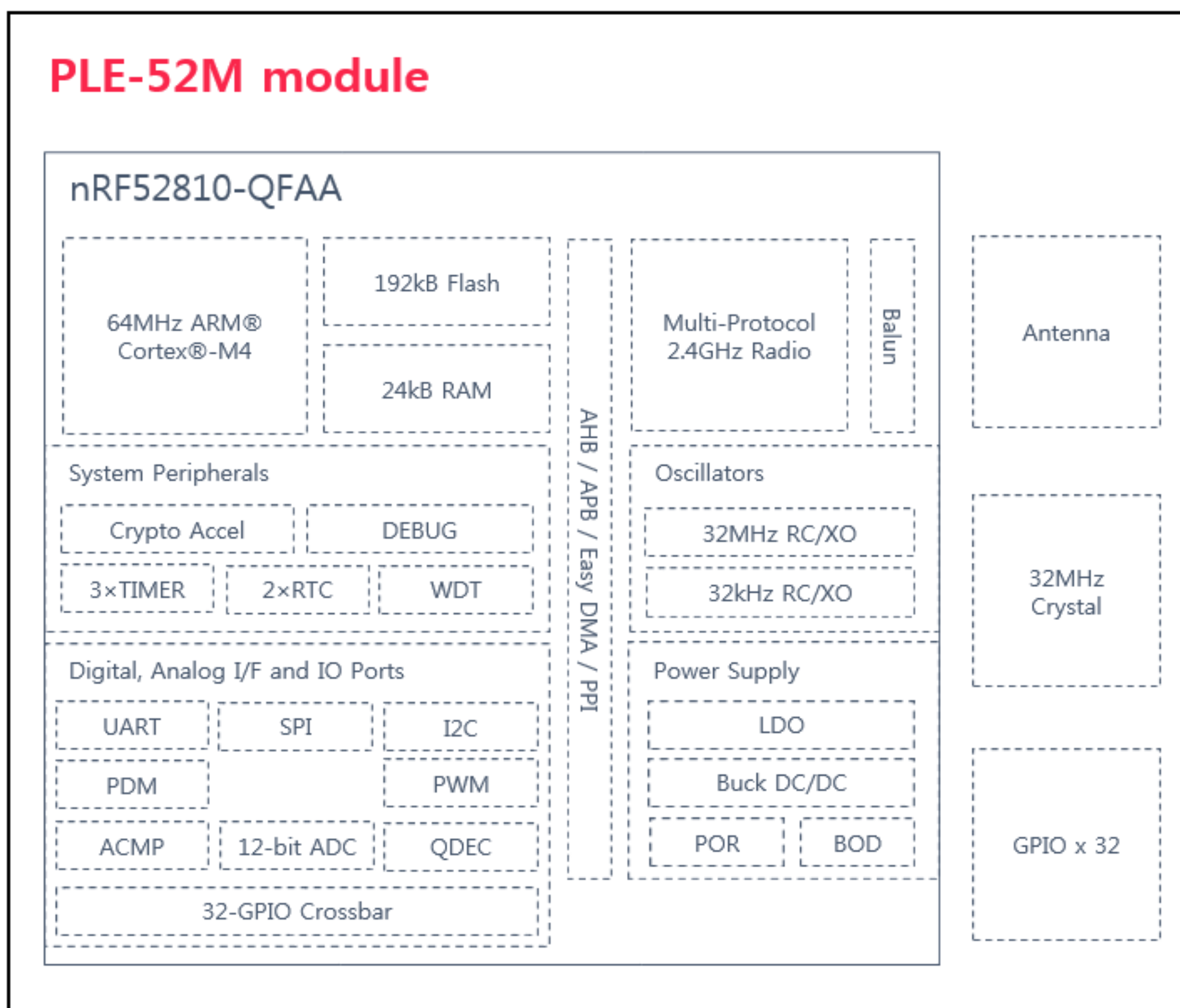
It is built around an ARM® Cortex™-M4 CPU running at 64 MHz. It has numerous digital peripherals and interfaces such as PDM, PWM, UART, SPI and TWI. It also has a capable 12-bit ADC. Exceptionally low energy consumption is achieved using a sophisticated on-chip adaptive power management system.

1.1 Applications

- Beacons
- Network processor
- Disposable medical sensors
- PC peripherals
- Remote controls
- Fitness sensors
- Toys
- Logistics and tagging
- Airfuel wireless charging

2. Specifications

2.1 Module Block Diagram



PLE-52M MODULE BLOCK DIAGRAM

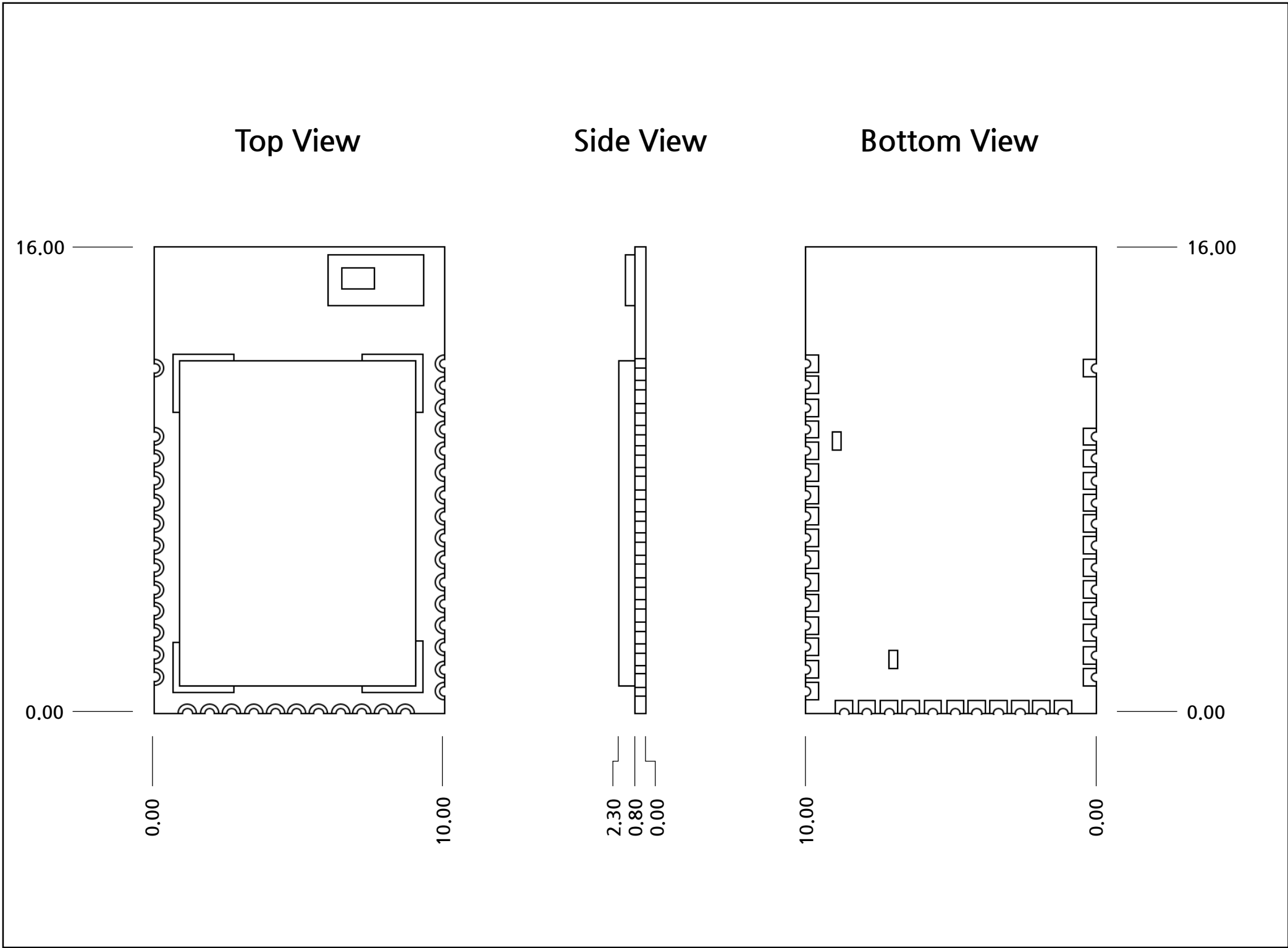
2.2 Chipset Specifications (nRF52810)

Protocol support	Bluetooth 5/ANT/2.4 GHz proprietary
Microprocessor	64 MHz 32-bit ARM Cortex-M4
Memory	192 KB Flash + 24 KB RAM
On-air data rate	2 Mbps/1 Mbps
TX power	Programmable from +4 to -20 dBm in 4 dB steps
Sensitivity	Bluetooth 5: -93 dBm at 2 Mbps -96 dBm at 1 Mbps ANT: -93 dBm at 1 Mbps 2.4GHz: -93 dBm at 2 Mbps -96 dBm at 1 Mbps
Radio current consumption DC/DC at 3V	7.0 mA at +4 dBm TX power, 4.6 mA at 0 dBm TX power, 4.6 mA in RX at 1 or 2 Mbps
Oscillators	64 MHz from 32 MHz external crystal or internal 32 kHz from crystal, RC or synthesized
System current consumption DC/DC at 3 V	0.3 μ A in System OFF, no RAM retention 0.5 μ A in System OFF, full RAM retention 0.6 μ A in System ON, no RAM retention 0.8 μ A in System ON, full RAM retention 1.5 μ A in System ON, full RAM retention and RTC
Hardware security	128-bit AES CCM, ECB, AAR
Digital interfaces	SPI master/slave TWI master/slave UART PWM QDEC PDM
Analog interfaces	3 \times 32 bit Timer 2 \times 24 bit RTC PPI – 20 channels 4 \times GPIOTE Watchdog Timer True RNG BPROT – flash protection
Peripherals	12-bit/200 ksps ADC, RNG, Temperature sensor, GP comparator
Voltage supply	1.7 to 3.6 V LDO or DC/DC
Package options	6 \times 6 QFN48 with 32 GPIO

3. Layout

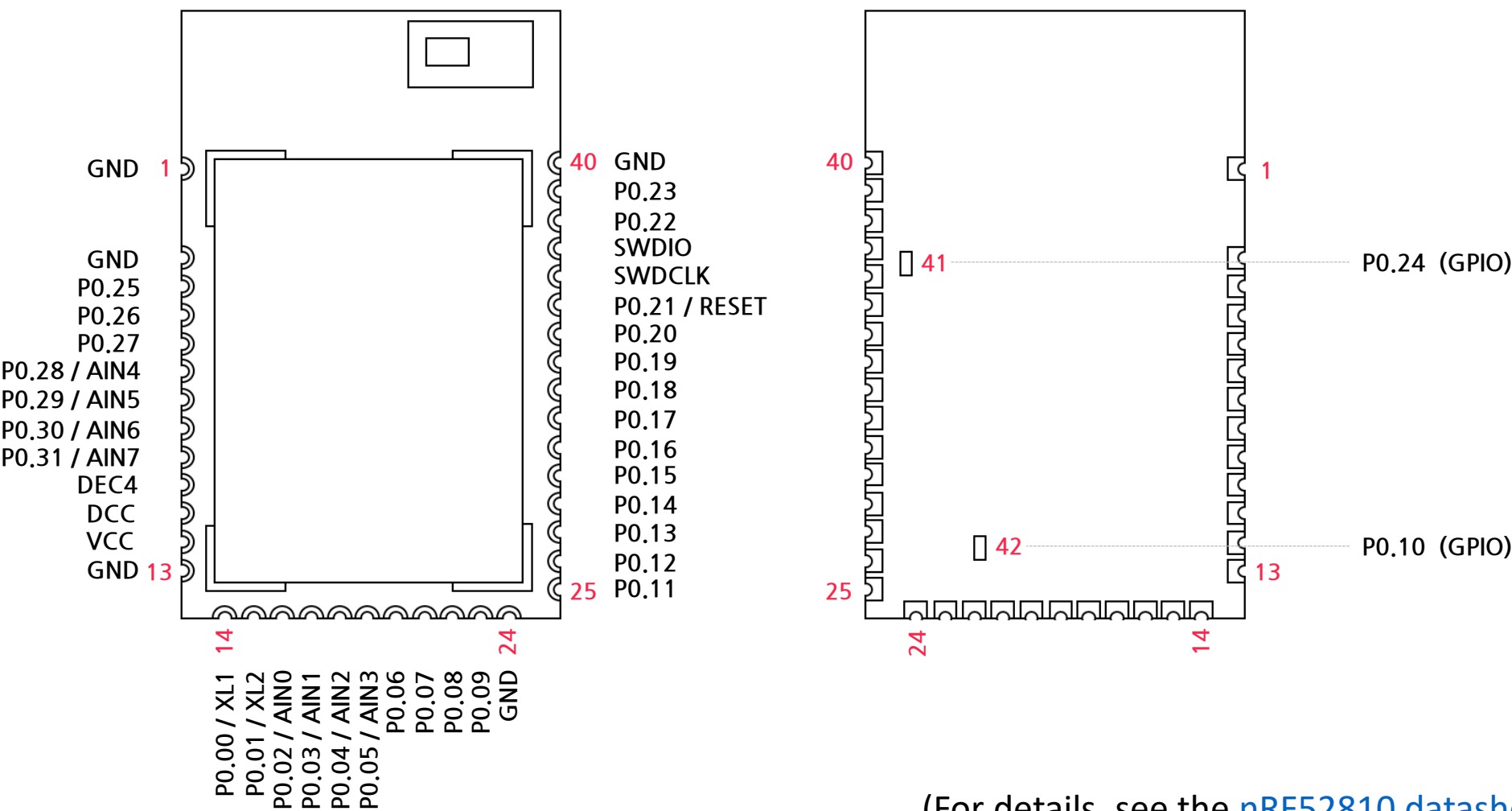
3. 1 Dimensions

[unit : mm]



PLE-52M MODULE DIMENSIONS

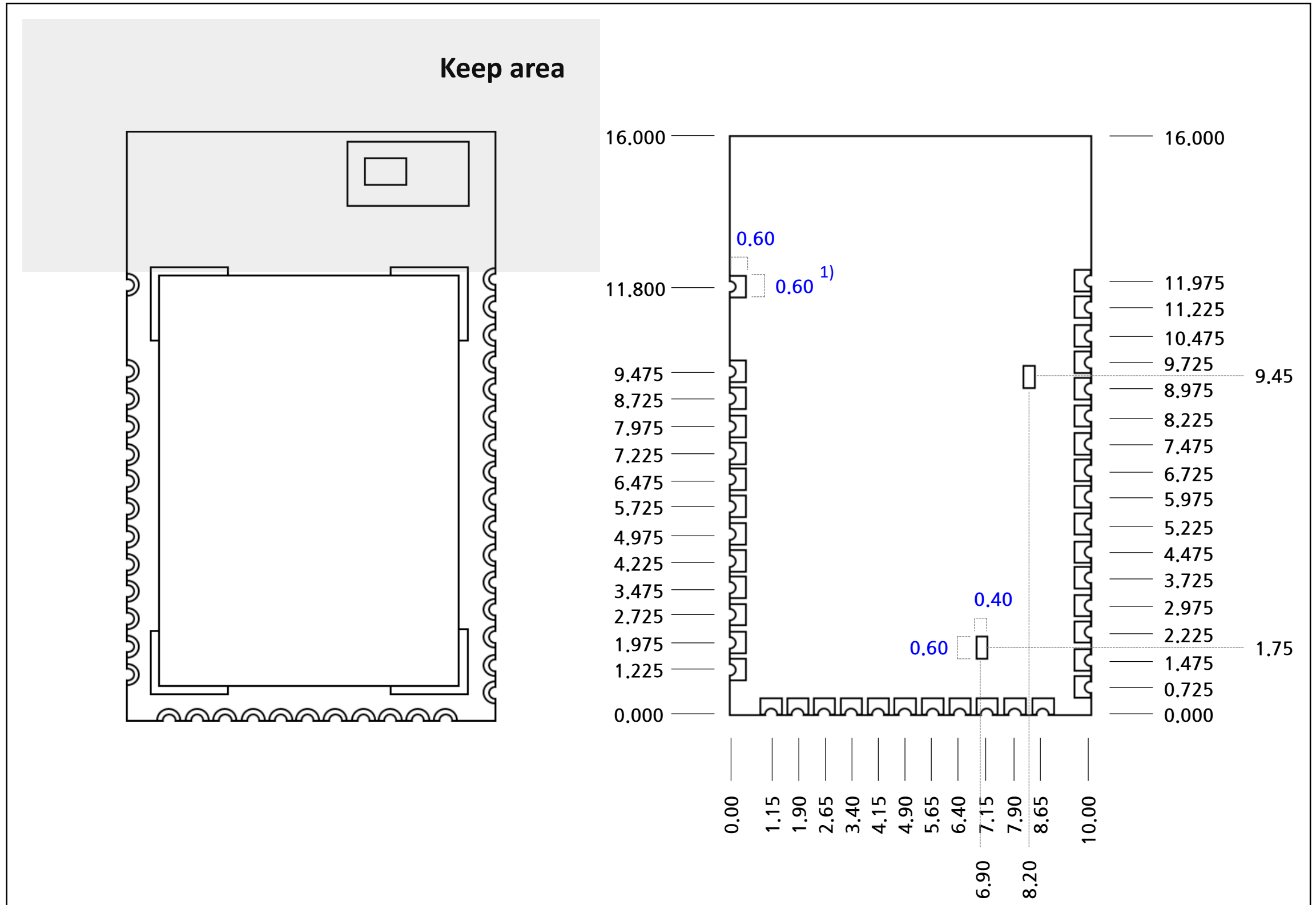
3. 1. 1 Pin assignment



Pin	Name	Description	Pin	Name	Description
1	GND		22	P0.08	GPIO
2	GND		23	P0.09	GPIO
3	P0.25	Low drive, low frequency I/O only.	24	GND	
4	P0.26	Low drive, low frequency I/O only.	25	P0.11	GPIO
5	P0.27	Low drive, low frequency I/O only.	26	P0.12	GPIO
6	P0.28 / AIN4	Low drive, low frequency I/O only.	27	P0.13	GPIO
7	P0.29 / AIN5	Low drive, low frequency I/O only.	28	P0.14	GPIO
8	P0.30 / AIN6	GPIO	29	P0.15	GPIO
9	P0.31 / AIN7	GPIO	30	P0.16	GPIO
10	DEC4		31	P0.17	GPIO
11	DCC		32	P0.18	GPIO
12	VCC		33	P0.19	GPIO
13	GND		34	P0.20	GPIO
14	P0.00 / XL1	GPIO	35	P0.21 / RESET	RESET
15	P0.01 / XL2	GPIO	36	SWDCLK	Serial wire debug clock input
16	P0.02 / AIN0	GPIO	37	SWDIO	Serial wire debug I/O
17	P0.03 / AIN1	GPIO	38	P0.22	GPIO
18	P0.04 / AIN2	GPIO	39	P0.23	GPIO
19	P0.05 / AIN3	GPIO	40	GND	
20	P0.06	GPIO	41	P0.24	GPIO
21	P0.07	GPIO	42	P0.10	GPIO

3. 2 Recommended PCB guide

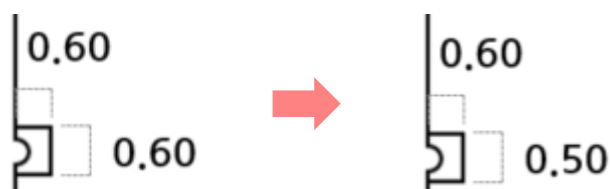
[unit : mm]



PLE-52M PCB FOOTPRINT

1)

PAD 간의 간격(0.15mm)이 좁기 때문에 정 Size로 PAD를 그리게 되면 SMT시 과납, 모듈 실장 위치에 따른 쇼트가 발생할 수 있습니다. 따라서 아래와 같이 모듈의 PAD Size 보다 작게 설계하시는 것을 권장합니다.



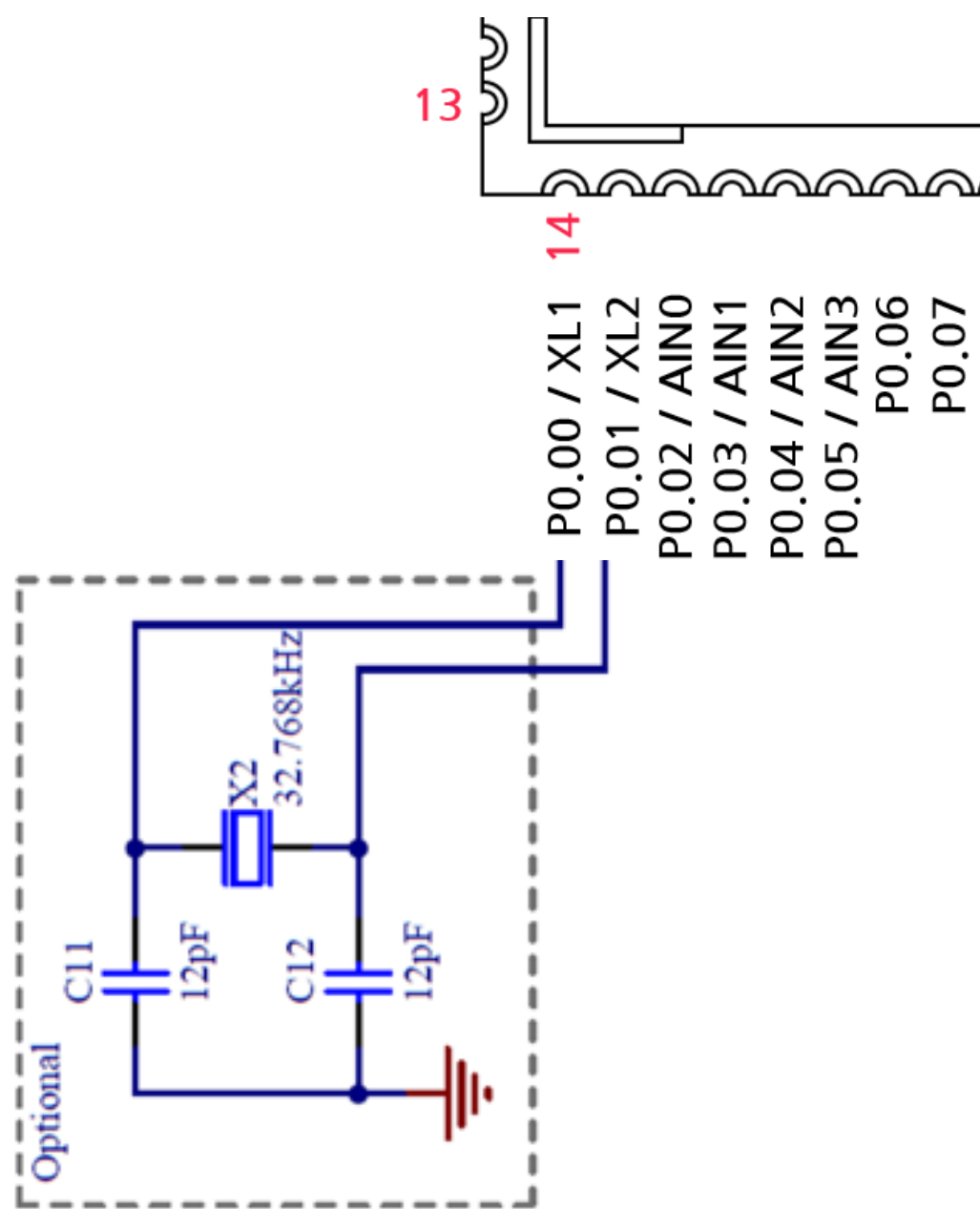
[실제 PAD Size]

[권장 PAD Size]

3. 3 Schematic options

3. 3. 1 32.768kHz external crystal (optional)

Internal or external crystal can be set in F / W.

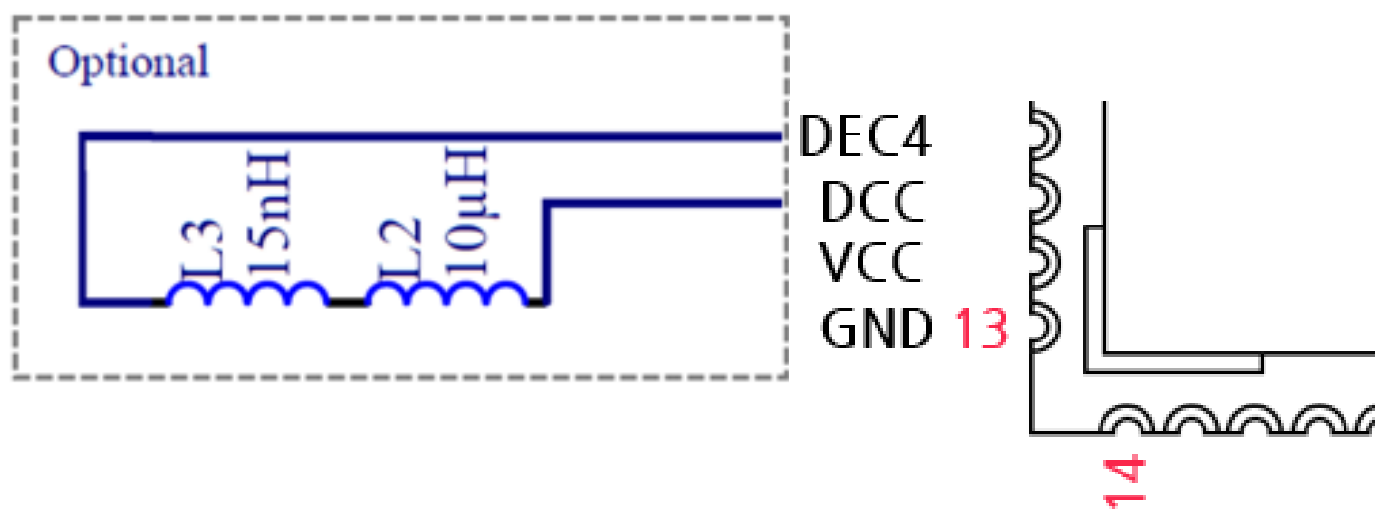


3. 3. 2 DC/DC mode (optional)

This module is configured in LDO mode.

DC / DC mode setup : add 10uH, 15nH to DCC and DEC4 as shown below.

(For details, see the [nRF52810 datasheet](#).)

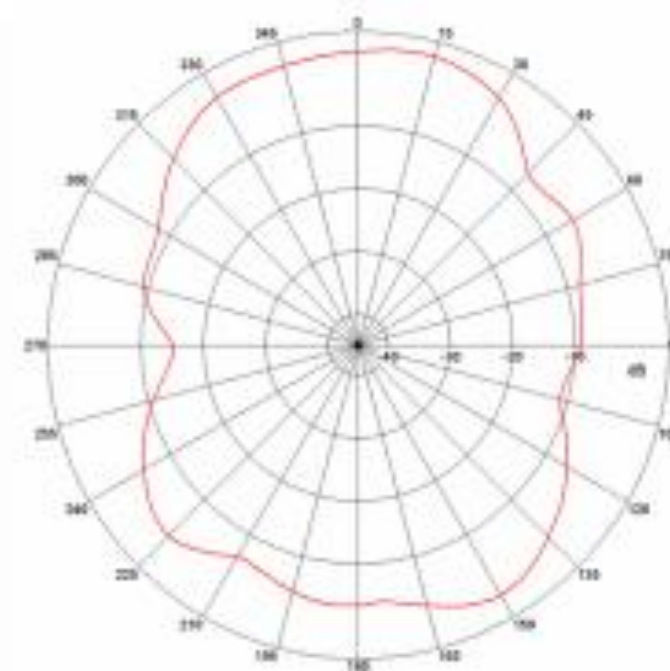
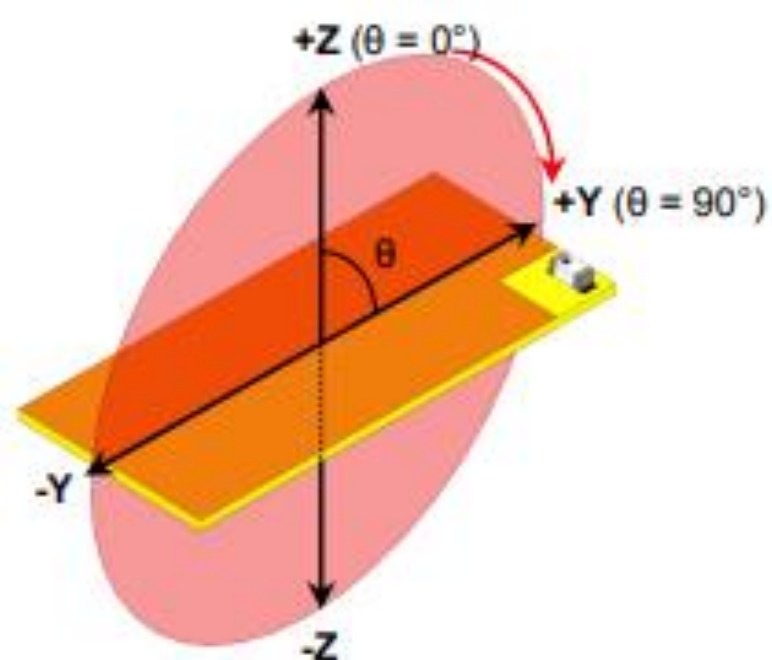


4. Antenna

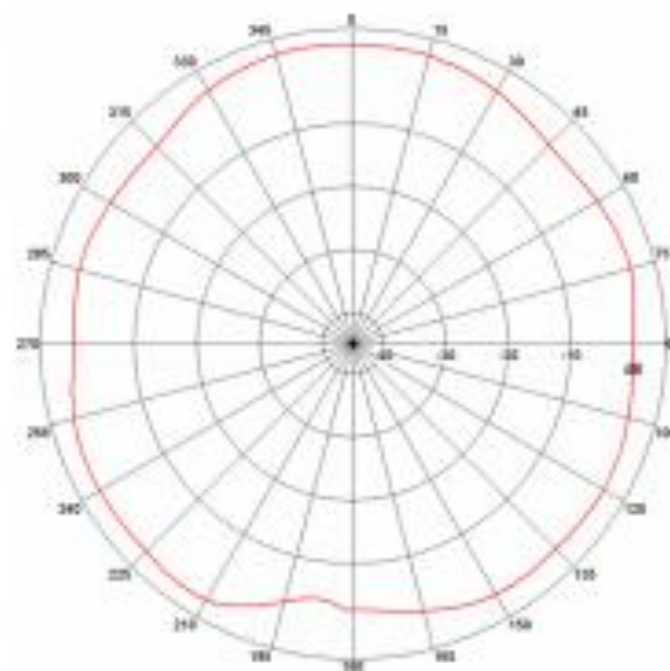
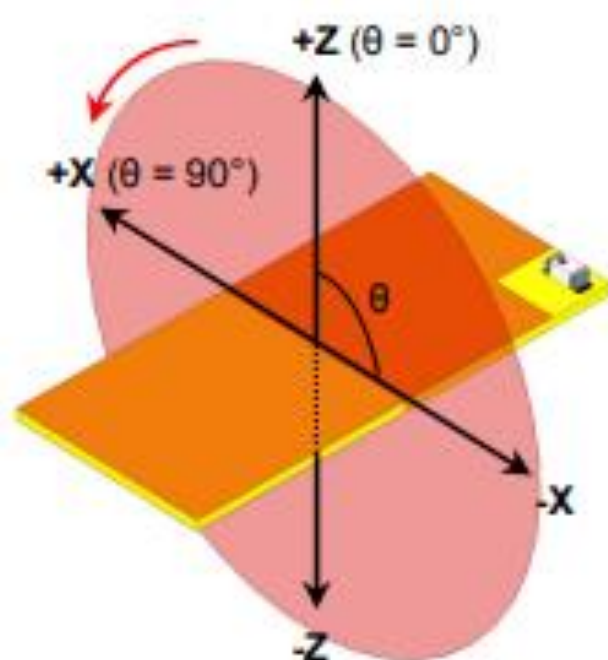
Mounting Considerations 1: Antenna Performance

Typical 2D radiation patterns @ 2.44GHz

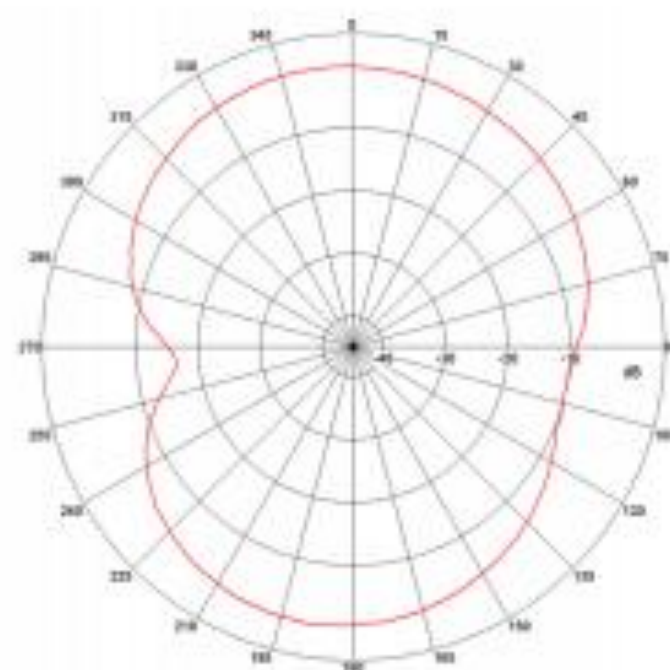
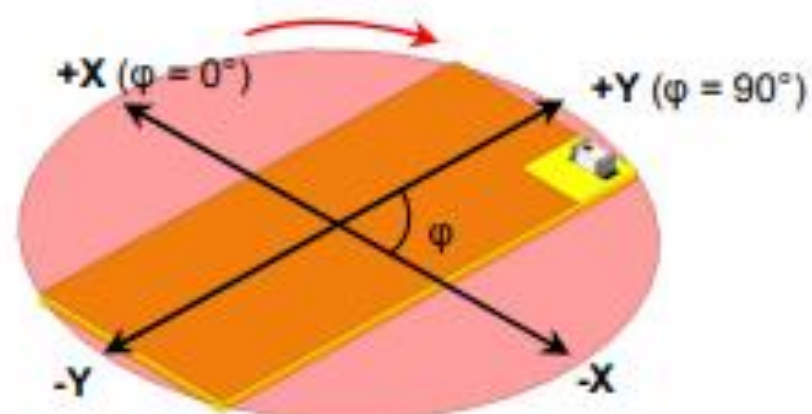
YZ-plane



XZ-plane



XY-plane



5. Certification

5.1 KC

D887-6297-768D-241D

방송통신기자재등의 적합인증서 Certificate of Broadcasting and Communication Equipments	
상호 또는 성명 Trade Name or Applicant	(주) 프로차일드
기자재명칭(명칭) Equipment Name	특정소출력 무선기기(무선데이터통신시스템용 무선기기)
기본모델명 Basic Model Number	PLE-52
파생모델명 Series Model Number	PLE-52M, PLE-52ML
인증번호 Certification No.	R-C-pro-B01
제조사/제조국가 Manufacturer/ Country of Origin	(주) 프로차일드 / 한국
인증연월일 Date of Certification	2019-04-26
기타 Others	
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