PLE-52MR

DATA SHEET v1.4

BLE MODULE
PLE-52MR

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

L. LTECH

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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

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1. Introduction

PLE-52MR

The PLE-52MR 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.

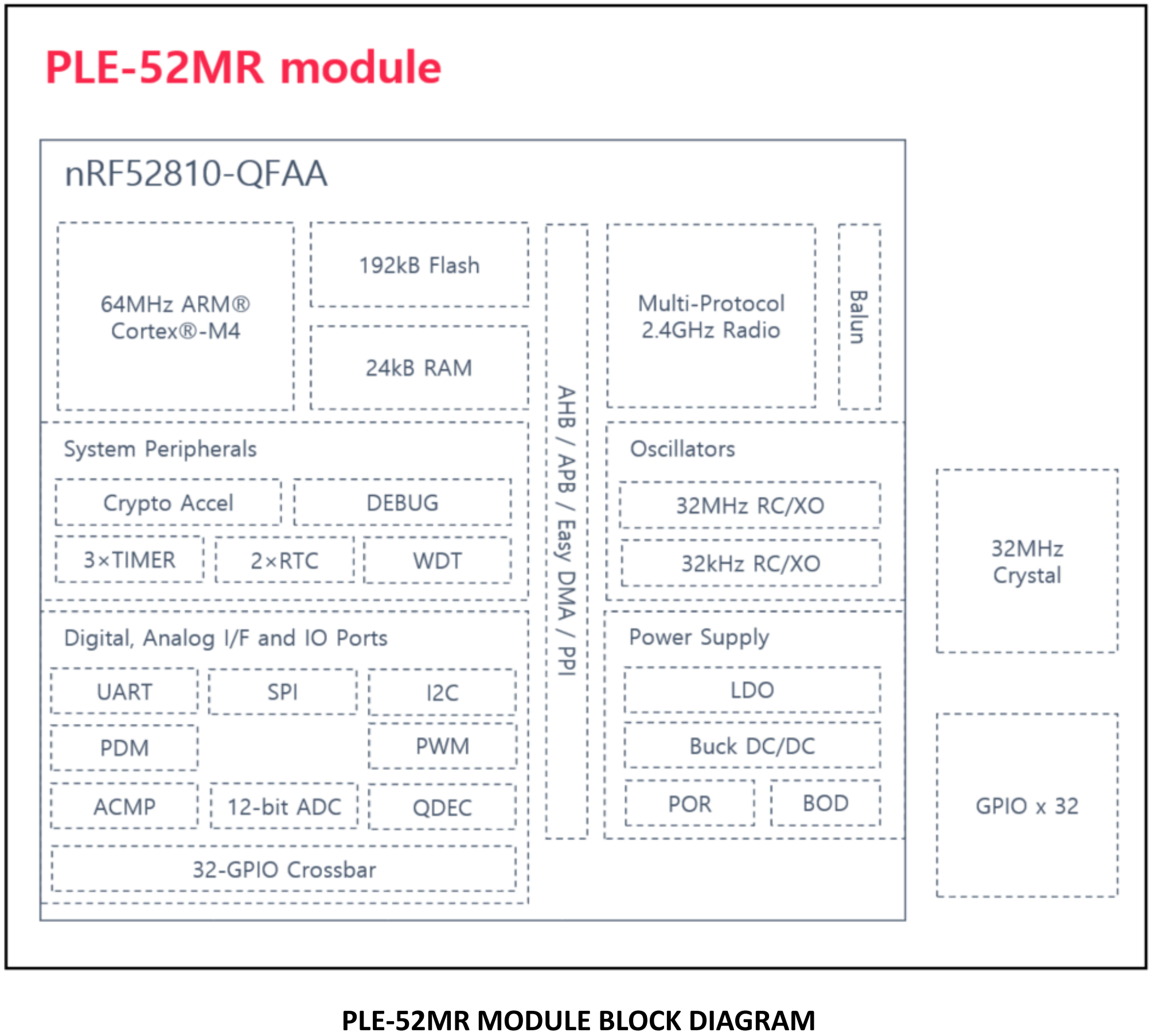
It is built around an ARM® Cortex™-M4 CPU running at 64 MHz. It has numerous digital peripherals and interfaces such as PDM, PWM, UART, SPI and TWI. It also has a capable 12-bit ADC. Exceptionally low energy consumption is achieved using a sophisticated on-chip adaptive power management system.

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-52MR MODULE BLOCK DIAGRAM

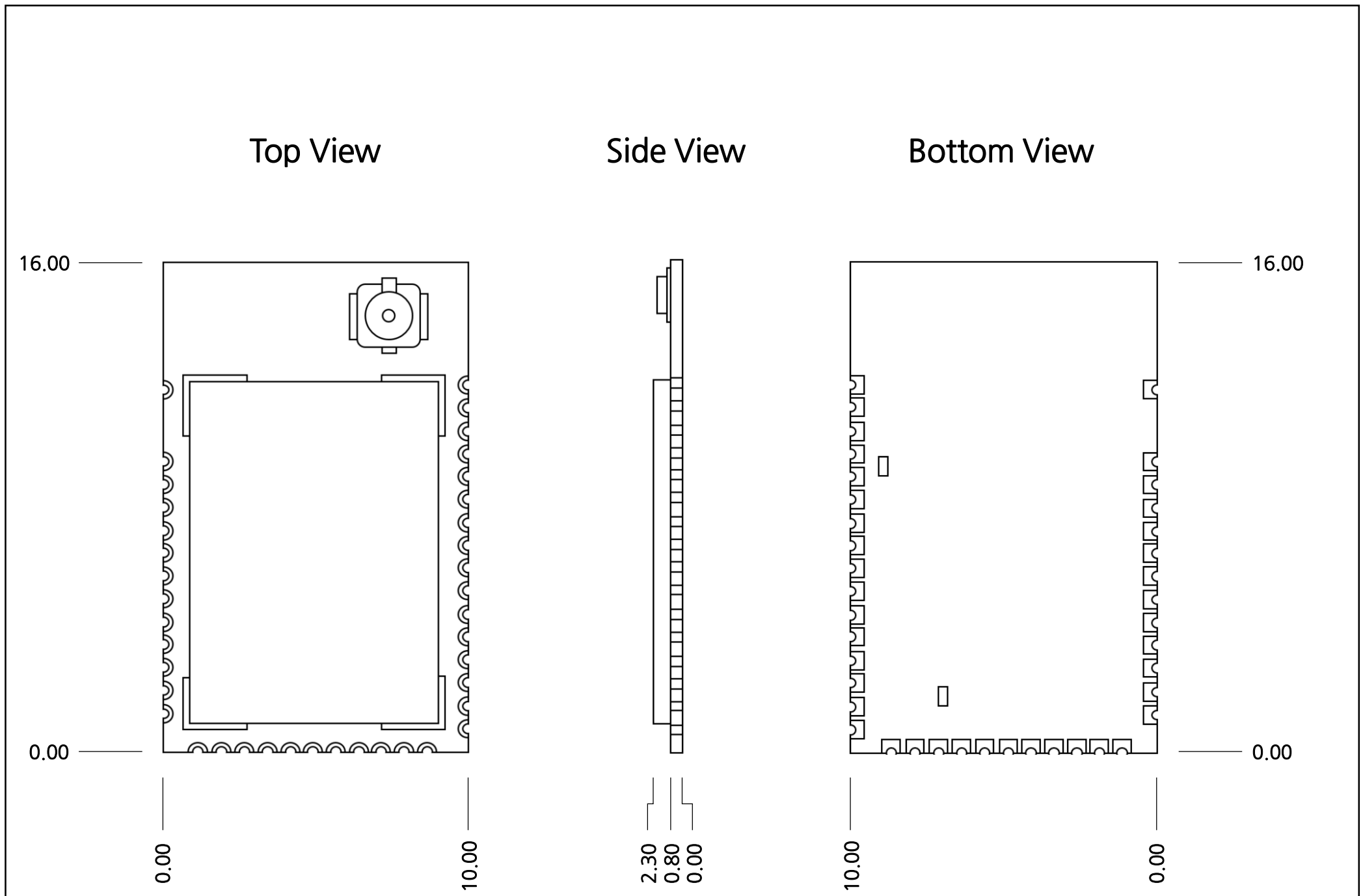
2. 2 Chipset Specifications (nRF52810)

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 µA in System OFF, no RAM retention 0.5 µA in System OFF, full RAM retention 0.6 µA in System ON, no RAM retention 0.8 µA in System ON, full RAM retention 1.5 µA 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 × 32 bit Timer 2 × 24 bit RTC PPI — 20 channels 4 × 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 × 6 QFN48 with 32 GPIO

3. Layout

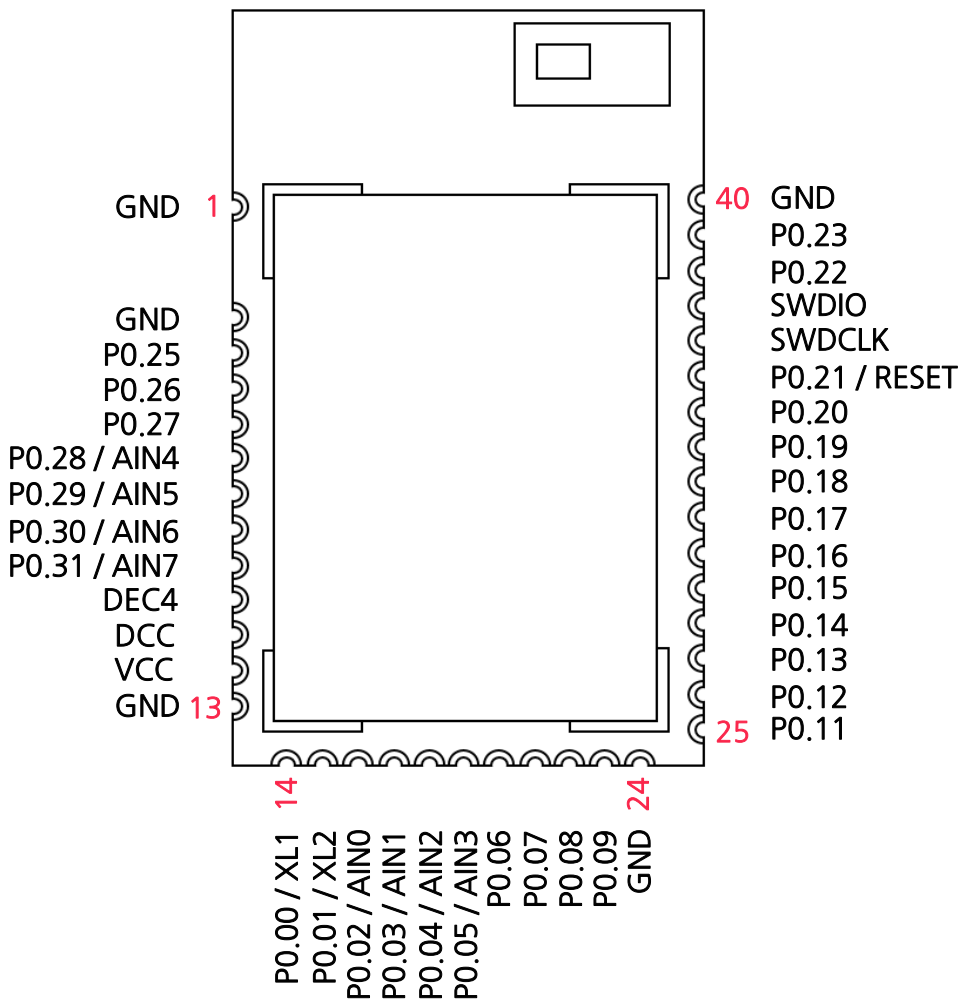
3. 1 Dimensions

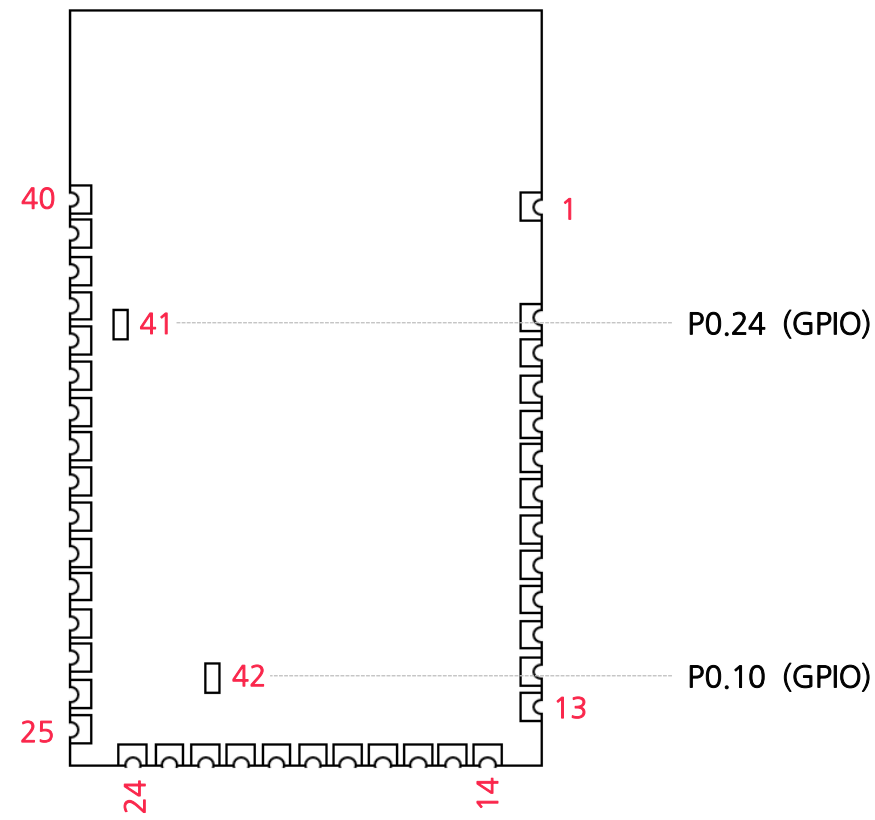
[unit : mm]



PLE-52MR MODULE DIMENSIONS

3. 1. 1 Pin assignment





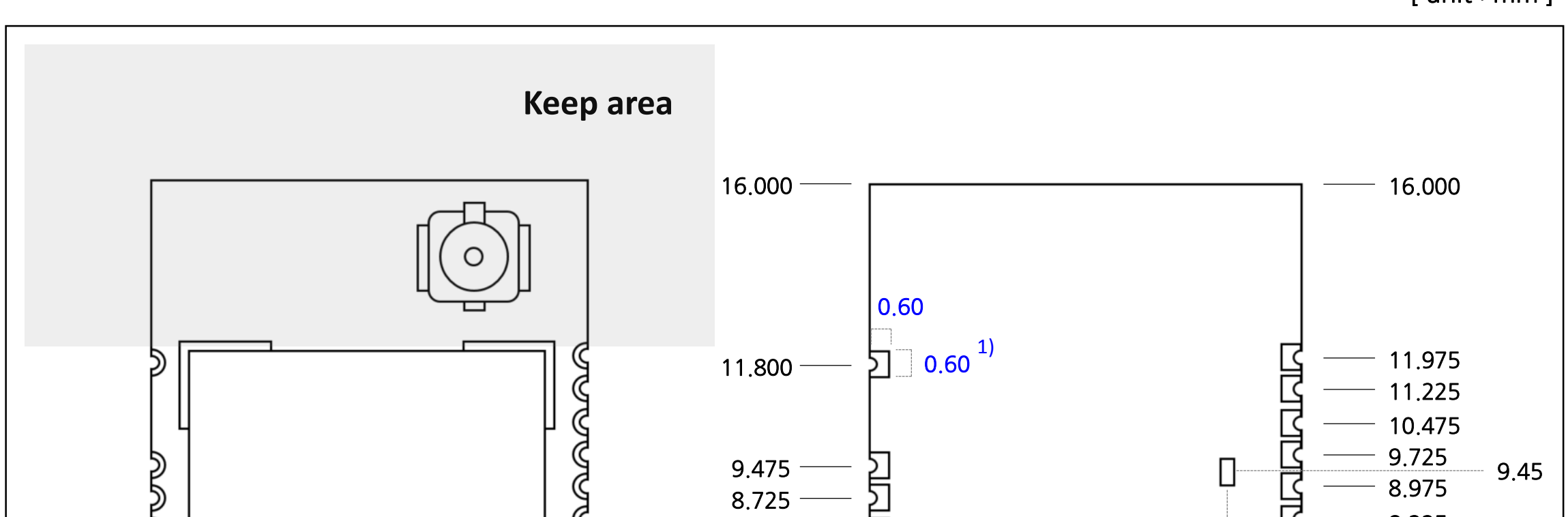
(For details, see the nRF52810 datasheet.)

Pin	Name	Description
1	GND	
2	GND	
3	P0.25	Low drive, low frequency I/O only.
4	P0.26	Low drive, low frequency I/O only.
5	P0.27	Low drive, low frequency I/O only.
6	P0.28 / AIN4	Low drive, low frequency I/O only.
7	P0.29 / AIN5	Low drive, low frequency I/O only.
8	P0.30 / AIN6	GPIO
9	P0.31 / AIN7	GPIO
10	DEC4	
11	DCC	
12	VCC	
13	GND	
14	P0.00 / XL1	GPIO
15	P0.01 / XL2	GPIO
16	P0.02 / AIN0	GPIO
17	P0.03 / AIN1	GPIO
18	P0.04 / AIN2	GPIO
19	P0.05 / AIN3	GPIO
20	P0.06	GPIO
21	P0.07	GPIO

Pin	Name	Description
22	P0.08	GPIO
23	P0.09	GPIO
24	GND	
25	P0.11	GPIO
26	P0.12	GPIO
27	P0.13	GPIO
28	P0.14	GPIO
29	P0.15	GPIO
30	P0.16	GPIO
31	P0.17	GPIO
32	P0.18	GPIO
33	P0.19	GPIO
34	P0.20	GPIO
35	P0.21 / RESET	RESET
36	SWDCLK	Serial wire debug clock input
37	SWDIO	Serial wire debug I/O
38	P0.22	GPIO
39	P0.23	GPIO
40	GND	
41	P0.24	GPIO
42	P0.10	GPIO

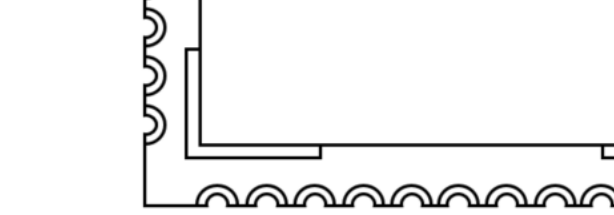
3. 2 Recommended PCB guide

[unit : mm]



PLE-52MR 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.

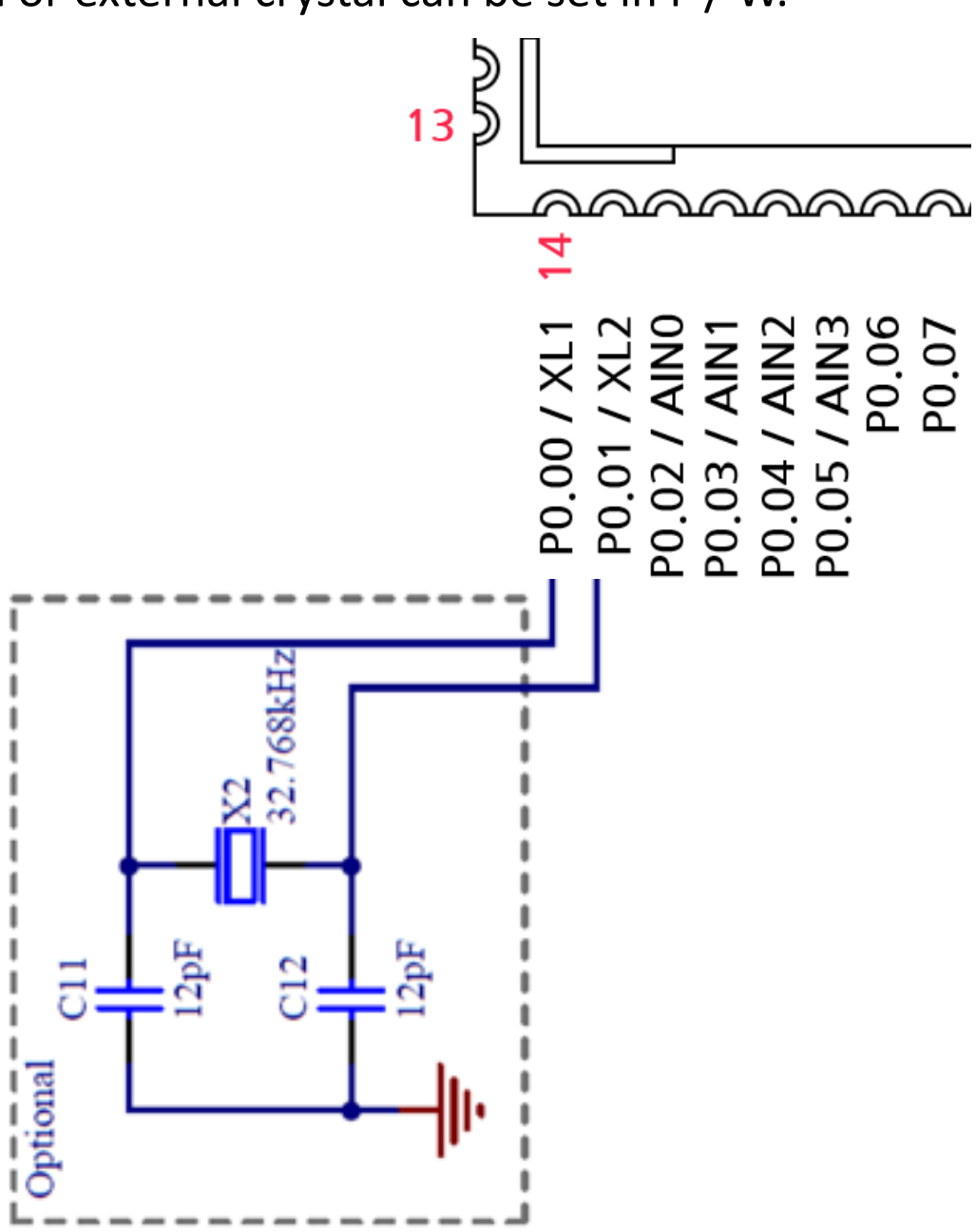


[실제 PAD Size] [권장 PAD Size]

3. 3 Schematic options

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

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

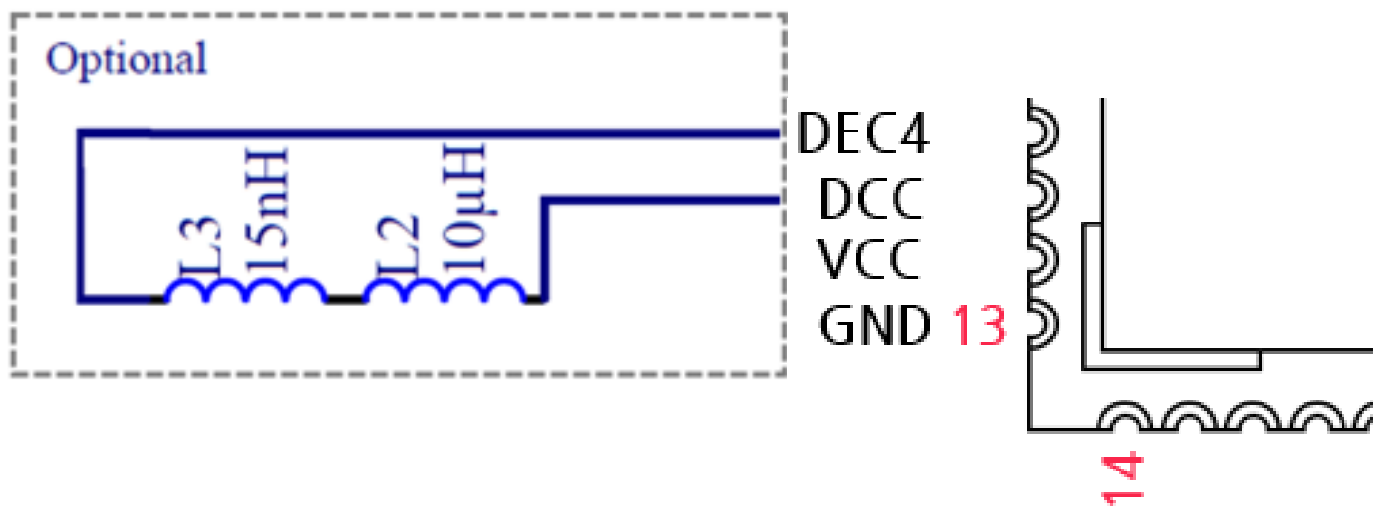


3. 3. 2 DC/DC mode (optional)

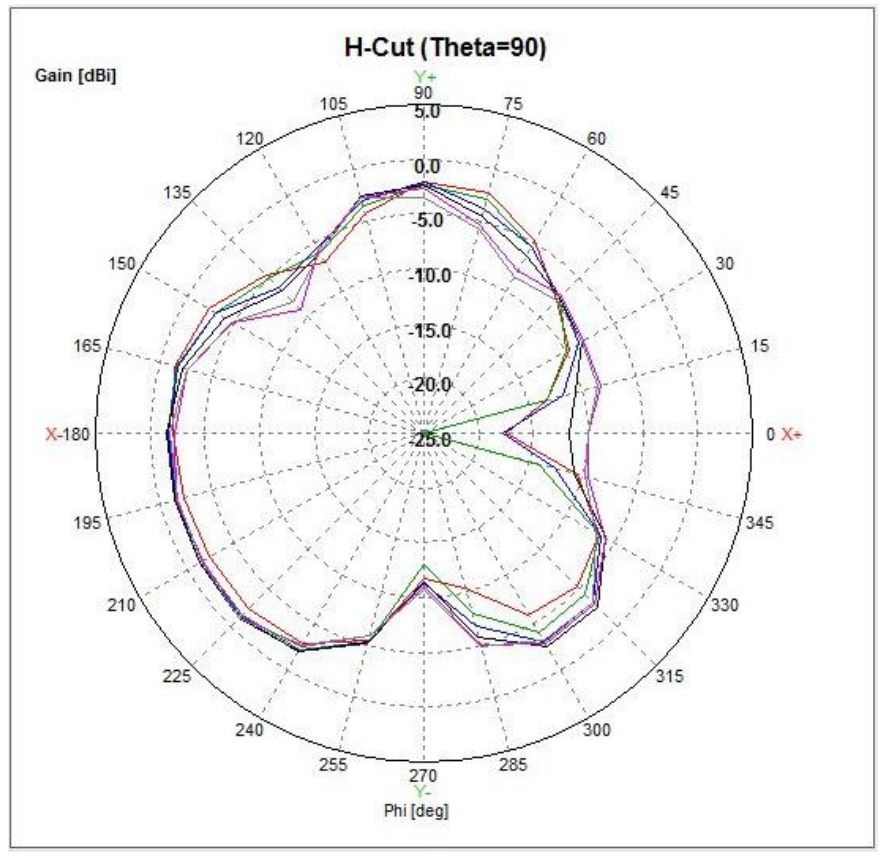
This module is configured in LDO mode.

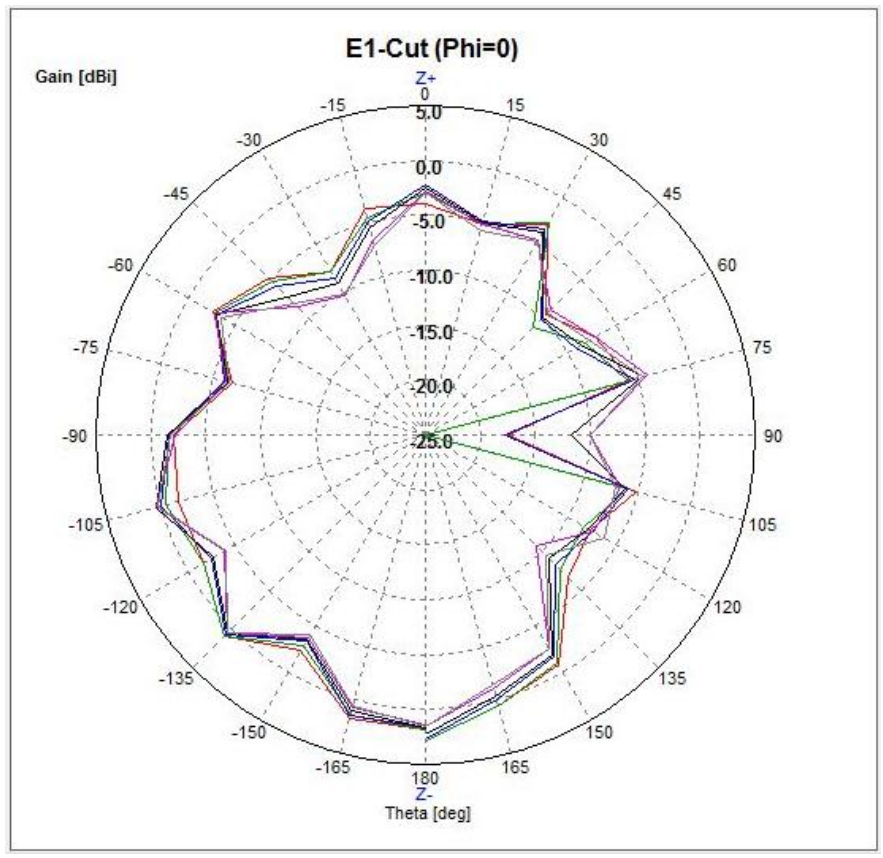
DC / DC mode setup： add 10uH, 15nH to DCC and DEC4 as shown below.

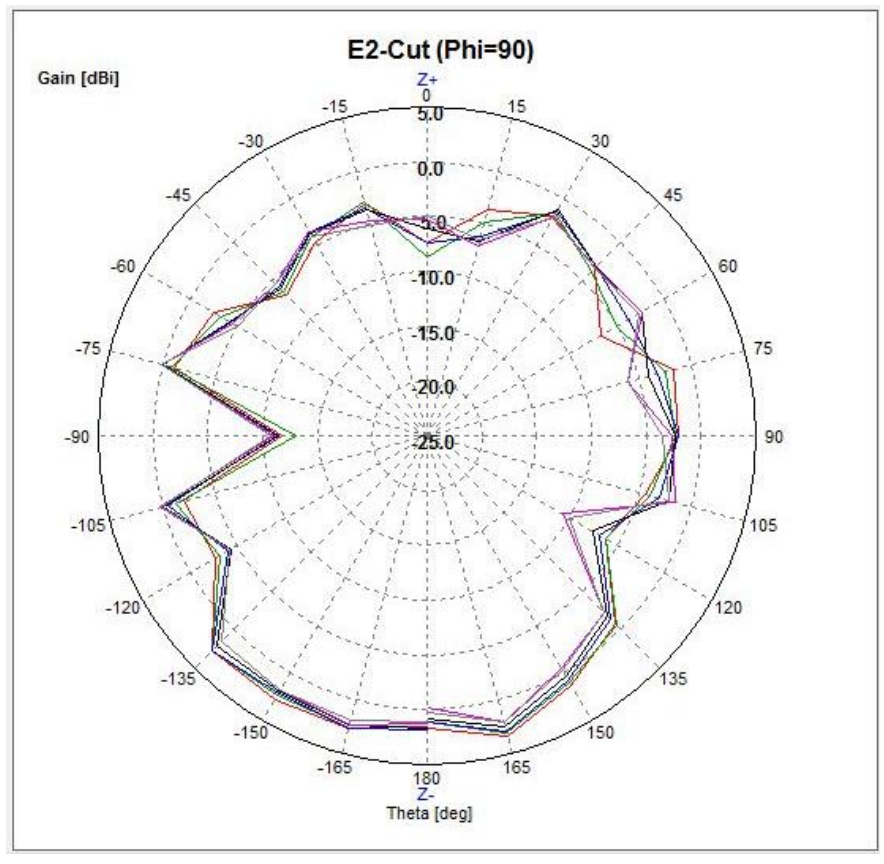
(For details, see the nRF52810 datasheet.)



4. Antenna


H-Cut (Theta=90)
Gain [dBi]
Y+
90
105
75
120
60
0.0
135
45
-5.0
150
30
-10.0
165
15
-15.0
-20.0
X-180
0 X+
-25.0
195
345
210
330
225
315
240
300
255
285
270
Y-
Phi [deg]


E1-Cut (Phi=0)
Gain [dBi]
Z+
0
-15
15
5.0
-30
30
0.0
-45
45
-5.0
-60
60
-10.0
-15.0
-75
75
-20.0
-90
90
-25.0
-105
105
-120
120
-135
135
-150
150
-165
165
180
Z-
Theta [deg]


E2-Cut (Phi=90)
Gain [dBi]
Z+
0
-15
15
5.0
-30
30
0.0
-45
45
-5.0
-60
60
-10.0
-15.0
-75
75
-20.0
-90
90
-25.0
-105
105
-120
120
-135
135
-150
150
-165
165
180
Z-
Theta [deg]

5. Certification

5. 1 KC

329E-4FB1-4918-2E2E

방송통신기자재등의 적합등록 필증

Registration of Broadcasting and Communication Equipments

상호 또는 성명 *Trade Name or Registrant*	**주식회사 엘테크**
기자재명칭(제품명칭) *Equipment Name*	**특정소출력 무선기기(무선데이터통신시스템용 무선기기)**
기기부호/추가 기기부호 *Equipment code /Additional Equipment code*	**LARN8**
기본모델명 *Basic Model Number*	**PLE-52R**
파생모델명 *Series Model Number*	**PLE-52MR, PLE-52MLR**
등록번호 *Registration No.*	**R-R-lte-PLE-52R**
제조자/제조국가 *Manufacturer/Country of Origin*	**주식회사 엘테크 / 한국**
등록연월일 *Date of Registration*	**2022-01-18**
기타 *Others*	

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2022년(Year) 01월(Month) 18일(Day)

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Director General of National Radio Research Agency

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