

# Data Sheet

Product	Bluetooth Low Energy Module
Solution	Nordic nRF52832 aQFN Package
Model NO.	<b>DK9182C</b> (Chip Antenna)
	<b>DK9180C</b> (PCB Antenna)

## Revision History

This table describes the changes to the specification.

Version	Date	Description
1.0.0	2024/05/17	Initial version

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# 1. Overall Introduction

Dexatek's **DK9180C&DK9182C** is a BT 5.2 stack (Bluetooth low energy or BLE) module designed based on Nordic nRF52840 SoC solution, which incorporates: GPIO, SPI, UART, I2C, I2S, PMD, PWM, ADC, NFC interfaces for connecting peripherals and sensors

Features:

1. Dual Transmission mode of BLE & 2.4Ghz RF upon customer's preference.
2. Compact size with (L) 16 x (W) 10 x (H) 2.3 mm.
3. Low power requirements, ultra-low peak, average and idle mode power consumption.
4. Be compatible with a large installed base of mobile phones, tablets and computers.
5. Fully coverage of BLE software stack.
6. BLE & RF transmission switching helps products fit all operation system and most hardware.

## 1.1. Application

IoT

- Home automation
- Sensor networks
- Building automation

Personal Area Networks

- Health / fitness sensor and monitor device
- Medical devices
- Key-fobs and wrist watches

## Interactive entertainment devices

- Remote control
- Gaming controller

### Beacons

## A4WP wireless chargers and devices

## Remote control toys

## Computer peripherals and I/O devices

- Mouse
- Keyboard
- Multi-touch trackpad 4 1.2.

## 1.2Features

- Multi-protocol 2.4GHz radio
- 32-bit ARM Cortex – M4F processor
- 512KB flash programmed memory and 64KB RAM
- Software stacks available as downloads
- Application development independent from protocol stack
- On-air compatible with nRF51, nRF24AP and nRF24L series

- Programmable output power from +4dBm to -20dBm
- RSSI
- RAM mapped FIFOs using EasyDMA
- Dynamic on-air payload length up to 256 bytes
- Flexible and configurable 32 pin GPIO
- Programmable peripheral interface - PPI
- Simple ON / OFF global power mode
- Full set of digital interface all with Easy DMA including:
  - 3 x Hardware SPI master ; 3 x Hardware SPI slave
  - 2 x two-wire master ; 2 x two-wire slave
  - 1 x UART (CTS / RTS)
  - PDM for digital microphone
  - I2S for audio
- Quadrature demodulator
- 12-bit / 200KSPS ADC
- 128-bit AES ECB / CCM / AAR co-processor
- Low cost external crystal 32MHz  $\pm$  40ppm for Bluetooth ;  $\pm$  50ppm for ANT Plus
- Low power 32MHz crystal and RC oscillators

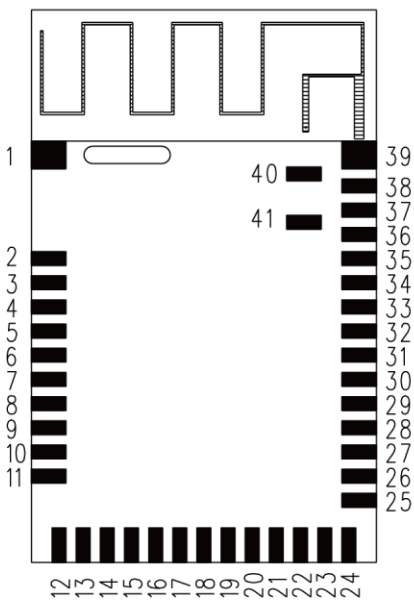
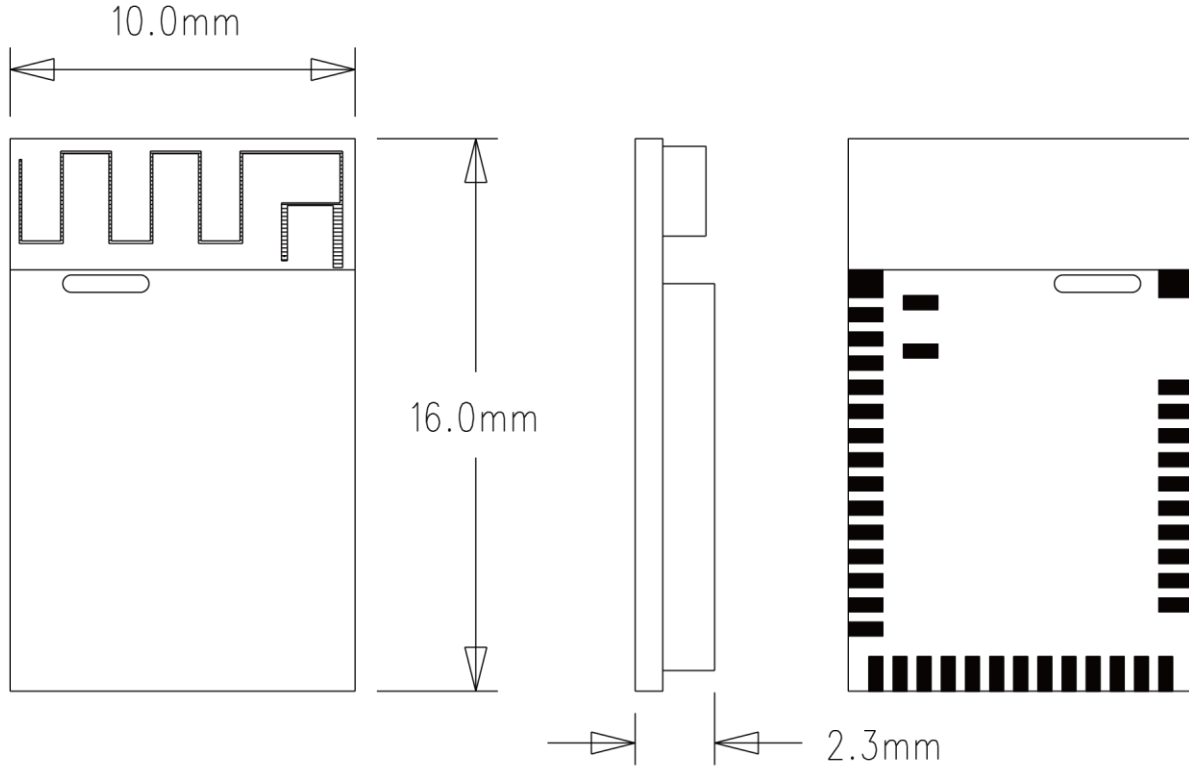
- Wide supply voltage range 1.7V to 3.6V
- On-chip DC/DC buck converter
- Individual power management for all peripherals
- Timer counter
  - 5 x 32-bit
  - 3 x 24-bit RTC
- Type 2 near field communication (NFC-A) tag with wakeup-on-field and touch-to-pair capabilities
- 3x 4-channel pulse width modulator (PWM) units with EasyDMA

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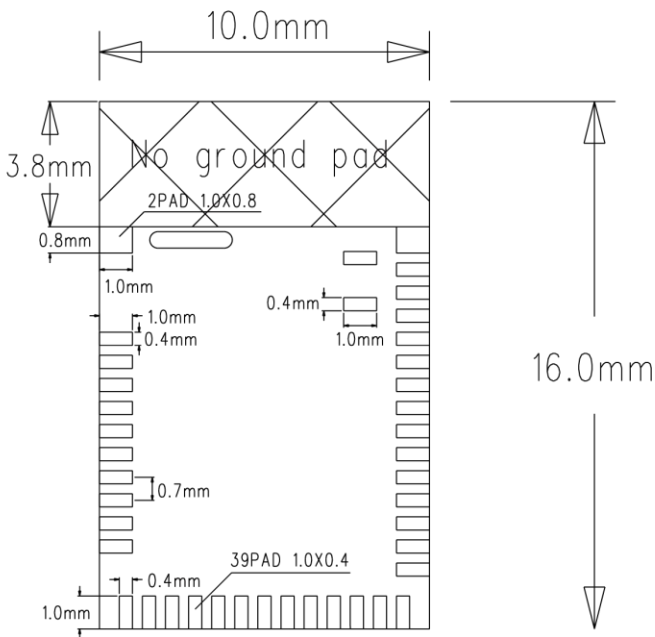
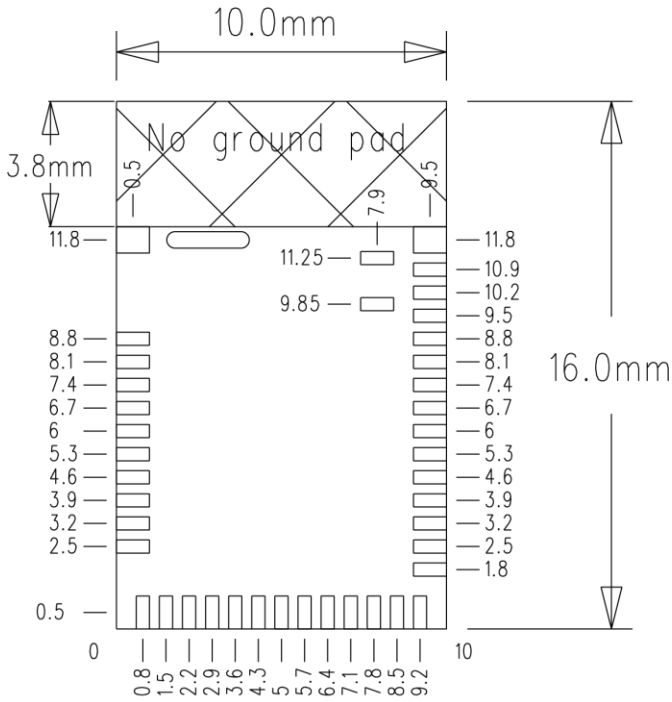


## 2. Product Dimension

### 2.1. PCB Dimensions & Pin Indication



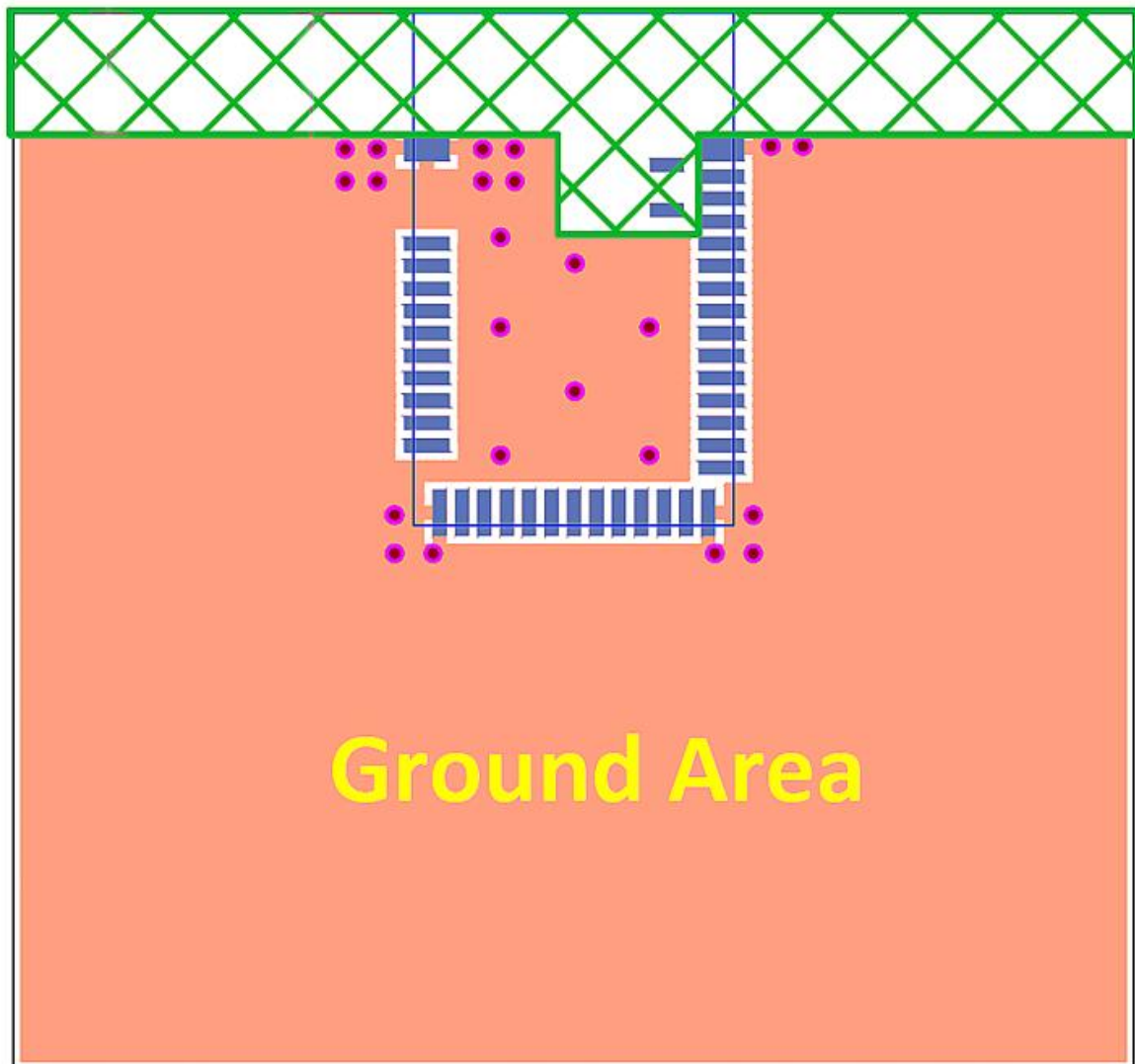
## 2.2. Recommended Layout of Solder Pad



## 2.3. RF Layout Suggestion (aka Keep-Out Area)

Please follow below instruction to avoid from having Ground Pad in the area of our RF test pad. Otherwise, it may cause shortage to the module

 **No Ground-Pad Area**



**Top View**

## 2.4. Pin Assignment

Pin	Name	Function	Description
1	GND	Ground	The pad must be connected to a solid ground plane
2	P0.25	Digital I/O	General purpose I/O
3	P0.26	Digital I/O	General purpose I/O
4	P0.27	Digital I/O	General purpose I/O
5	P0.28	Digital I/O	General purpose I/O
	AIN4	Analog input	SAADC/COMP/LPCOMP input
6	P0.29	Digital I/O	General purpose I/O
	AIN5	Analog input	SAADC/COMP/LPCOMP input
7	P0.30	Digital I/O	General purpose I/O
	AIN6	Analog input	SAADC/COMP/LPCOMP input
8	P0.31	Digital I/O	General purpose I/O
	AIN7	Analog input	SAADC/COMP/LPCOMP input
9	DEC4	Power	1.3 V regulator supply decoupling Input from DC/DC regulator Output from 1.3 V LDO
10	DCC	Power	DC/DC regulator output
11	VDD	Power	Power supply
12	GND	Ground	The pad must be connected to a solid ground plane
13	P0.00	Digital I/O	General purpose I/O
	XL1	Analog input	Connection for 32.768 kHz crystal (LFXO)
14	P0.01	Digital I/O	General purpose I/O
	XL2	Analog input	Connection for 32.768 kHz crystal (LFXO)
15	P0.02	Digital I/O	General purpose I/O
	AIN0	Analog input	SAADC/COMP/LPCOMP input
16	P0.03	Digital I/O	General purpose I/O
	AIN1	Analog input	SAADC/COMP/LPCOMP input
17	P0.04	Digital I/O	General purpose I/O
	AIN2	Analog input	SAADC/COMP/LPCOMP input
18	P0.05	Digital I/O	General purpose I/O
	AIN3	Analog input	SAADC/COMP/LPCOMP input
19	P0.06	Digital I/O	General purpose I/O
20	P0.07	Digital I/O	General purpose I/O
21	P0.08	Digital I/O	General purpose I/O

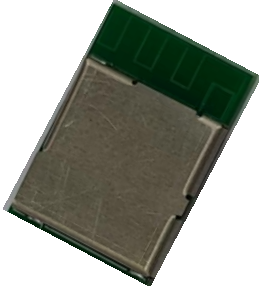
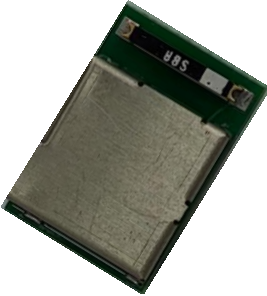
22	P0.09	Digital I/O	General purpose I/O
	NFC1	NFC input	NFC antenna connection
23	P0.10	Digital I/O	General purpose I/O
	NFC2	NFC antenna connection	NFC antenna connection
24	GND	Ground	The pad must be connected to a solid ground plane
25	P0.11	Digital I/O	General purpose I/O
26	P0.12	Digital I/O	General purpose I/O
27	P0.13	Digital I/O	General purpose I/O
28	P0.14	Digital I/O	General purpose I/O
	TraceData(3)	Trace port output	Trace port output
29	P0.15	Digital I/O	General purpose I/O
	TraceData(2)	Trace port output	Trace port output
30	P0.16	Digital I/O	General purpose I/O
	TraceData(1)	Trace port output	Trace port output
31	P0.17	Digital I/O	General purpose I/O
32	P0.18	Digital I/O	General purpose I/O
	TraceData(0)	Trace port output	Trace port output
33	P0.19	Digital I/O	General purpose I/O
34	P0.20	Digital I/O	General purpose I/O
	TraceCLK		Trace port clock output
35	P0.21	Digital I/O	General purpose I/O
	RESET		Configurable as system reset pin
36	SWDCLK	Digital input	Serial wire debug clock input for debug and programming
37	SWDIO	Digital I/O	Serial wire debug I/O for debug and programming
38	P0.22	Digital I/O	General purpose I/O
39	GND	Ground	The pad must be connected to a solid ground plane
40	P0.24	Digital I/O	General purpose I/O
41	P0.23	Digital I/O	General purpose I/O

### 3. Main Chip Solution

RF IC	Crystal Frequency
<b>Nordic NRF52832</b>	<b>32MHZ</b>

32MHz crystal and RF (VDD) DC/DC inductor (Reg1) are already inside the module.

## 4. Shipment Packaging Information

Model	Antenna	Photo
DK9180C	PCB	
DK9182C	Chip/Ceramic	

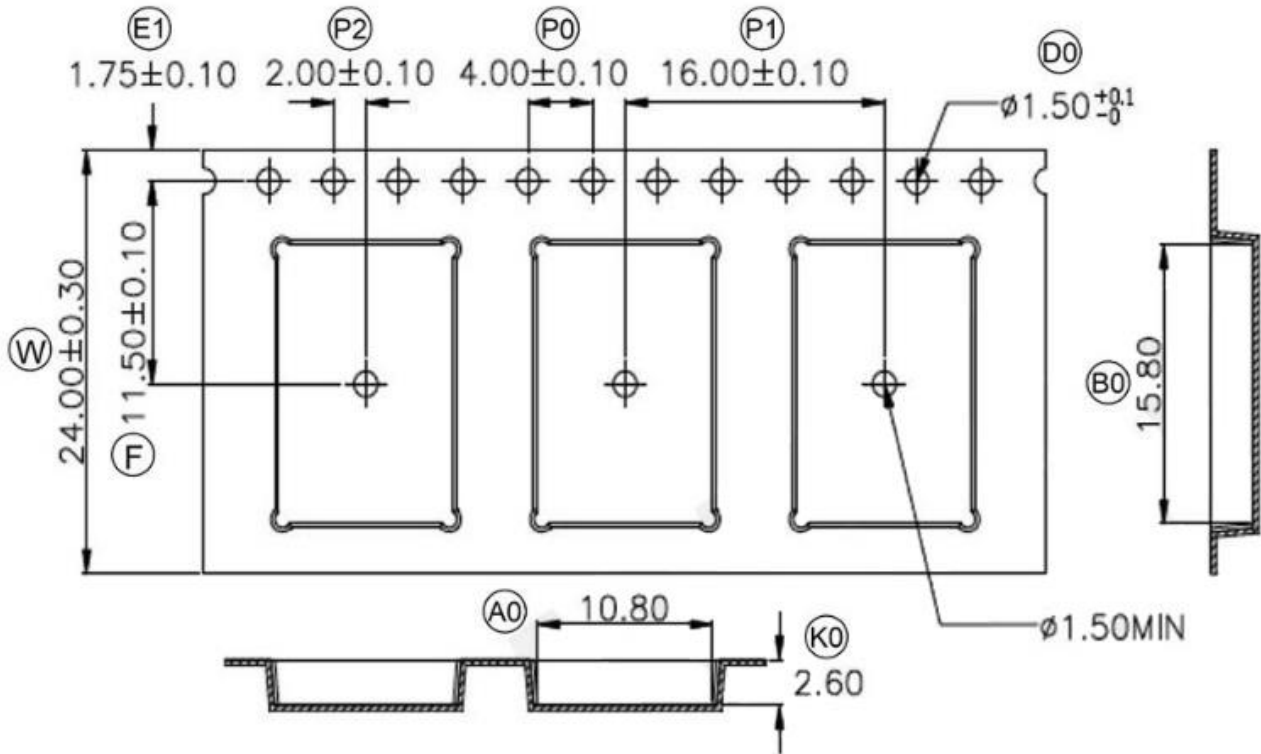
Module with one black dot is using revision 1 IC. The one without black dot is using revision 2 IC and date code starts from 914 and after.

※Unit Weight of Module: 0.68g (±0.02g)

※Packaging Type: Anti-static tray or Tape & Reel

	Tray	Tape & Reel
MPQ (Min. Package Qty)	88 pcs per tray	1500pcs per reel
Carton Contents (per Carton)	1760 pcs	1500 pcs
Carton Dimension L*W*H cm	37*21*13	37*36*6
Gross Weight	About 2.8 kgs	About 1.9kgs

## 4.1. Tape & Reel Packaging



## 5. Specification

Any technical spec shall refer to Nordic's official documents as final reference.

### 5.1. Absolute Maximum Ratings

	Min.	Max.	Unit
<b>Supply voltages</b>			
VDD	-0.3	+3.9	V
VSS		0	V
<b>I/O pin voltage</b>			
$V_{I/O}$ , VDD $\leq$ 3.6 V	-0.3	VDD + 0.3 V	V
$V_{I/O}$ , VDD > 3.6 V	-0.3	3.9 V	V
<b>NFC antenna pin current</b>			
$I_{NFC1/2}$		80	mA
<b>Radio</b>			
RF input level		10	dBm
<b>Environmental QFN48, 6x6 mm package</b>			
Storage temperature	-40	+125	°C
MSL (moisture sensitivity level)		2	
ESD HBM (human body model)		4	kV
ESD CDM (charged device model)		1000	V
<b>Environmental WLCSP, 3.0x3.2 mm package</b>			
Storage temperature	-40	+125	°C
MSL		1	
ESD HBM		2	kV
ESD CDM		500	V
<b>Flash memory</b>			
Endurance	10 000		Write/erase cycles
Retention	10 years at 85°C		



## 5.2. Operating Conditions

Symbol	Parameter	Notes	Min.	Nom.	Max.	Units
VDD	Supply voltage, independent of DCDC enable		1.7	3.0	3.6	V
t <sub>R,VDD</sub>	Supply rise time (0 V to 1.7 V)				60	ms
TA	Operating temperature		-40	25	85	°C

## 5.3. Electrical Specifications

### 5.3.1. General Radio Characteristics

Symbol	Description	Min.	Typ.	Max.	Units
f <sub>OP</sub>	Operating frequencies	2360		2500	MHz
f <sub>PLL,PROG,RES</sub>	PLL programming resolution		2		kHz
f <sub>PLL,CH,SP</sub>	PLL channel spacing		1		MHz
f <sub>DELTA,1M</sub>	Frequency deviation @ 1 Msps		±170		kHz
f <sub>DELTA,BLE,1M</sub>	Frequency deviation @ BLE 1Msps		±250		kHz
f <sub>DELTA,2M</sub>	Frequency deviation @ 2 Msps		±320		kHz
f <sub>DELTA,BLE,2M</sub>	Frequency deviation @ BLE 2 Msps		±500		kHz
f <sub>skSPS</sub>	On-the-air data rate	1		2	Msps

### 5.3.2. Radio Current Consumption (Transmitter)

Symbol	Description	Min.	Typ.	Max.	Units
I <sub>TX,PLUS4dBm,DCDC</sub>	TX only run current (DCDC, 3V) P <sub>RF</sub> = +4 dBm		7.5		mA
I <sub>TX,PLUS4dBm</sub>	TX only run current P <sub>RF</sub> = +4 dBm		16.6		mA
I <sub>TX,0dBm,DCDC</sub>	TX only run current (DCDC, 3V) P <sub>RF</sub> = 0dBm		5.3		mA
I <sub>TX,0dBm</sub>	TX only run current P <sub>RF</sub> = 0dBm		11.6		mA
I <sub>TX,MINUS4dBm,DCDC</sub>	TX only run current DCDC, 3V P <sub>RF</sub> = -4dBm		4.2		mA
I <sub>TX,MINUS4dBm</sub>	TX only run current P <sub>RF</sub> = -4 dBm		9.3		mA
I <sub>TX,MINUS8dBm,DCDC</sub>	TX only run current DCDC, 3V P <sub>RF</sub> = -8 dBm		3.8		mA

Symbol	Description	Min.	Typ.	Max.	Units
I <sub>TX,MINUS8dBm</sub>	TX only run current P <sub>RF</sub> = -8 dBm		8.4		mA
I <sub>TX,MINUS12dBm,DCDC</sub>	TX only run current DCDC, 3V P <sub>RF</sub> = -12 dBm		3.5		mA
I <sub>TX,MINUS12dBm</sub>	TX only run current P <sub>RF</sub> = -12 dBm		7.7		mA
I <sub>TX,MINUS16dBm,DCDC</sub>	TX only run current DCDC, 3V P <sub>RF</sub> = -16 dBm		3.3		mA
I <sub>TX,MINUS16dBm</sub>	TX only run current P <sub>RF</sub> = -16 dBm		7.3		mA
I <sub>TX,MINUS20dBm,DCDC</sub>	TX only run current DCDC, 3V P <sub>RF</sub> = -20 dBm		3.2		mA
I <sub>TX,MINUS20dBm</sub>	TX only run current P <sub>RF</sub> = -20 dBm		7.0		mA
I <sub>TX,MINUS40dBm,DCDC</sub>	TX only run current DCDC, 3V P <sub>RF</sub> = -40 dBm		2.7		mA
I <sub>TX,MINUS40dBm</sub>	TX only run current P <sub>RF</sub> = -40 dBm		5.9		mA
I <sub>START,TX,DCDC</sub>	TX start-up current DCDC, 3V, P <sub>RF</sub> = 4 dBm		4.0		mA
I <sub>START,TX</sub>	TX start-up current, P <sub>RF</sub> = 4 dBm		8.8		mA

### 5.3.3. Radio Current Consumption (Receiver)

Symbol	Description	Min.	Typ.	Max.	Units
I <sub>RX,1M,DCDC</sub>	RX only run current (DCDC, 3V) 1Msps / 1Msps BLE		5.4		mA
I <sub>RX,1M</sub>	RX only run current 1Msps / 1Msps BLE		11.7		mA
I <sub>RX,2M,DCDC</sub>	RX only run current (DCDC, 3V) 2Msps / 2Msps BLE		5.8		mA
I <sub>RX,2M</sub>	RX only run current 2Msps / 2Msps BLE		12.9		mA
I <sub>START,RX,DCDC</sub>	RX start-up current (DCDC 3V)		3.5		mA
I <sub>START,RX,LDO</sub>	RX start-up current (LDO 3V)		7.5		mA

### 5.3.4. Transmitter Specification

Symbol	Description	Min.	Typ.	Max.	Units
P <sub>RF</sub>	Maximum output power		4	6	dBm
P <sub>RFC</sub>	RF power control range		24		dB
P <sub>RFRCR</sub>	RF power accuracy			±4	dB
P <sub>RF1,1</sub>	1st Adjacent Channel Transmit Power 1 MHz (1 Msps Nordic proprietary mode)		-25		dBc
P <sub>RF2,1</sub>	2nd Adjacent Channel Transmit Power 2 MHz (1 Msps Nordic proprietary mode)		-50		dBc
P <sub>RF1,2</sub>	1st Adjacent Channel Transmit Power 2 MHz (2 Msps Nordic proprietary mode)		-25		dBc
P <sub>RF2,2</sub>	2nd Adjacent Channel Transmit Power 4 MHz (2 Msps Nordic proprietary mode)		-50		dBc
P <sub>RF1,2,BLE</sub>	1st Adjacent Channel Transmit Power 2 MHz (2 Msps BLE mode)		-20		dBc
P <sub>RF2,2,BLE</sub>	2nd Adjacent Channel Transmit Power 4 MHz (2 Msps BLE mode)		-50		dBc

## 5.3.5. RSSI Specification

Symbol	Description	Min.	Typ.	Max.	Units
RSSI <sub>ACC</sub>	RSSI Accuracy Valid range -90 to -20 dBm		±2		dB
RSSI <sub>RESOLUTION</sub>	RSSI resolution		1		dB
RSSI <sub>PERIOD</sub>	Sample period		0.25		us

## 5.3.6. Receiver Operation

Symbol	Description	Min.	Typ.	Max.	Units
P <sub>RX,MAX</sub>	Maximum received signal strength at < 0.1% BER		0		dBm
P <sub>SENS,IT,1M</sub>	Sensitivity, 1Msps nRF mode <sup>16</sup>		-93		dBm
P <sub>SENS,IT,SP,1M,BLE</sub>	Sensitivity, 1Msps BLE ideal transmitter, <=37 bytes BER=1E-3 <sup>17</sup>		-96		dBm
P <sub>SENS,IT,LP,1M,BLE</sub>	Sensitivity, 1Msps BLE ideal transmitter >=128 bytes BER=1E-4 <sup>18</sup>		-95		dBm
P <sub>SENS,IT,2M</sub>	Sensitivity, 2Msps nRF mode <sup>19</sup>		-89		dBm

## 5.3.7. RX Selectivity

Symbol	Description	Min.	Typ.	Max.	Units
C/I <sub>1M,co-channel</sub>	1Msps mode, Co-Channel interference		9		dB
C/I <sub>1M,-1MHz</sub>	1 Msps mode, Adjacent (-1 MHz) interference		-2		dB
C/I <sub>1M,+1MHz</sub>	1 Msps mode, Adjacent (+1 MHz) interference		-10		dB
C/I <sub>1M,-2MHz</sub>	1 Msps mode, Adjacent (-2 MHz) interference		-19		dB
C/I <sub>1M,+2MHz</sub>	1 Msps mode, Adjacent (+2 MHz) interference		-42		dB
C/I <sub>1M,-3MHz</sub>	1 Msps mode, Adjacent (-3 MHz) interference		-38		dB
C/I <sub>1M,+3MHz</sub>	1 Msps mode, Adjacent (+3 MHz) interference		-48		dB
C/I <sub>1M,±6MHz</sub>	1 Msps mode, Adjacent (≥6 MHz) interference		-50		dB
C/I <sub>1MBLE,co-channel</sub>	1 Msps BLE mode, Co-Channel interference		6		dB
C/I <sub>1MBLE,-1MHz</sub>	1 Msps BLE mode, Adjacent (-1 MHz) interference		-2		dB
C/I <sub>1MBLE,+1MHz</sub>	1 Msps BLE mode, Adjacent (+1 MHz) interference		-9		dB
C/I <sub>1MBLE,-2MHz</sub>	1 Msps BLE mode, Adjacent (-2 MHz) interference		-22		dB
C/I <sub>1MBLE,+2MHz</sub>	1 Msps BLE mode, Adjacent (+2 MHz) interference		-46		dB
C/I <sub>1MBLE,&gt;3MHz</sub>	1 Msps BLE mode, Adjacent (≥3 MHz) interference		-50		dB
C/I <sub>1MBLE,image</sub>	Image frequency Interference		-22		dB
C/I <sub>1MBLE,image,1MHz</sub>	Adjacent (1 MHz) interference to in-band image frequency		-35		dB
C/I <sub>2M,co-channel</sub>	2Msps mode, Co-Channel interference		10		dB
C/I <sub>2M,-2MHz</sub>	2 Msps mode, Adjacent (-2 MHz) interference		6		dB
C/I <sub>2M,+2MHz</sub>	2 Msps mode, Adjacent (+2 MHz) interference		-14		dB
C/I <sub>2M,-4MHz</sub>	2 Msps mode, Adjacent (-4 MHz) interference		-20		dB
C/I <sub>2M,+4MHz</sub>	2 Msps mode, Adjacent (+4 MHz) interference		-44		dB
C/I <sub>2M,-6MHz</sub>	2 Msps mode, Adjacent (-6 MHz) interference		-42		dB
C/I <sub>2M,+6MHz</sub>	2 Msps mode, Adjacent (+6 MHz) interference		-47		dB
C/I <sub>2M,≥12MHz</sub>	2 Msps mode, Adjacent (≥12 MHz) interference		-52		dB
C/I <sub>2MBLE,co-channel</sub>	2 Msps BLE mode, Co-Channel interference		7		dB
C/I <sub>2MBLE,±2MHz</sub>	2 Msps BLE mode, Adjacent (±2 MHz) interference		0		dB
C/I <sub>2MBLE,±4MHz</sub>	2 Msps BLE mode, Adjacent (±4 MHz) interference		-47		dB
C/I <sub>2MBLE,±6MHz</sub>	2 Msps BLE mode, Adjacent (±6 MHz) interference		-49		dB
C/I <sub>2MBLE,image</sub>	Image frequency Interference		-21		dB
C/I <sub>2MBLE,image,2MHz</sub>	Adjacent (2 MHz) interference to in-band image frequency		-36		dB

## 5.3.8. RX Intermodulation

Symbol	Description	Min.	Typ.	Max.	Units
P <sub>IMD,1M</sub>	IMD performance, 1 Msps (3 MHz, 4 MHz, and 5 MHz offset)		-33		dBm
P <sub>IMD,1M,BLE</sub>	IMD performance, BLE 1 Msps (3 MHz, 4 MHz, and 5 MHz offset)		-30		dBm
P <sub>IMD,2M</sub>	IMD performance, 2 Msps (6 MHz, 8 MHz, and 10 MHz offset)		-33		dBm

## 5.3.9. Radio Timing

Symbol	Description	Min.	Typ.	Max.	Units
t <sub>TXEN</sub>	Time between TXEN task and READY event after channel FREQUENCY configured		140		us
t <sub>TXEN,FAST</sub>	Time between TXEN task and READY event after channel FREQUENCY configured (Fast Mode)		40		us
t <sub>TXDISABLE</sub>	Time between DISABLE task and DISABLED event when the radio was in TX and mode is set to 1Msps		6		us
t <sub>TXDISABLE,2M</sub>	Time between DISABLE task and DISABLED event when the radio was in TX and mode is set to 2Msps		4		us
t <sub>RXEN</sub>	Time between the RXEN task and READY event after channel FREQUENCY configured in default mode		140		us
t <sub>RXEN,FAST</sub>	Time between the RXEN task and READY event after channel FREQUENCY configured in fast mode		40		us
t <sub>SWITCH</sub>	The minimum time taken to switch from RX to TX or TX to RX (channel FREQUENCY unchanged)		20		us
t <sub>RXDISABLE</sub>	Time between DISABLE task and DISABLED event when the radio was in RX		0		us
t <sub>TXCHAIN</sub>	TX chain delay		0.6		us
t <sub>RXCHAIN</sub>	RX chain delay		9.4		us
t <sub>RXCHAIN,2M</sub>	RX chain delay in 2Msps mode		5		us

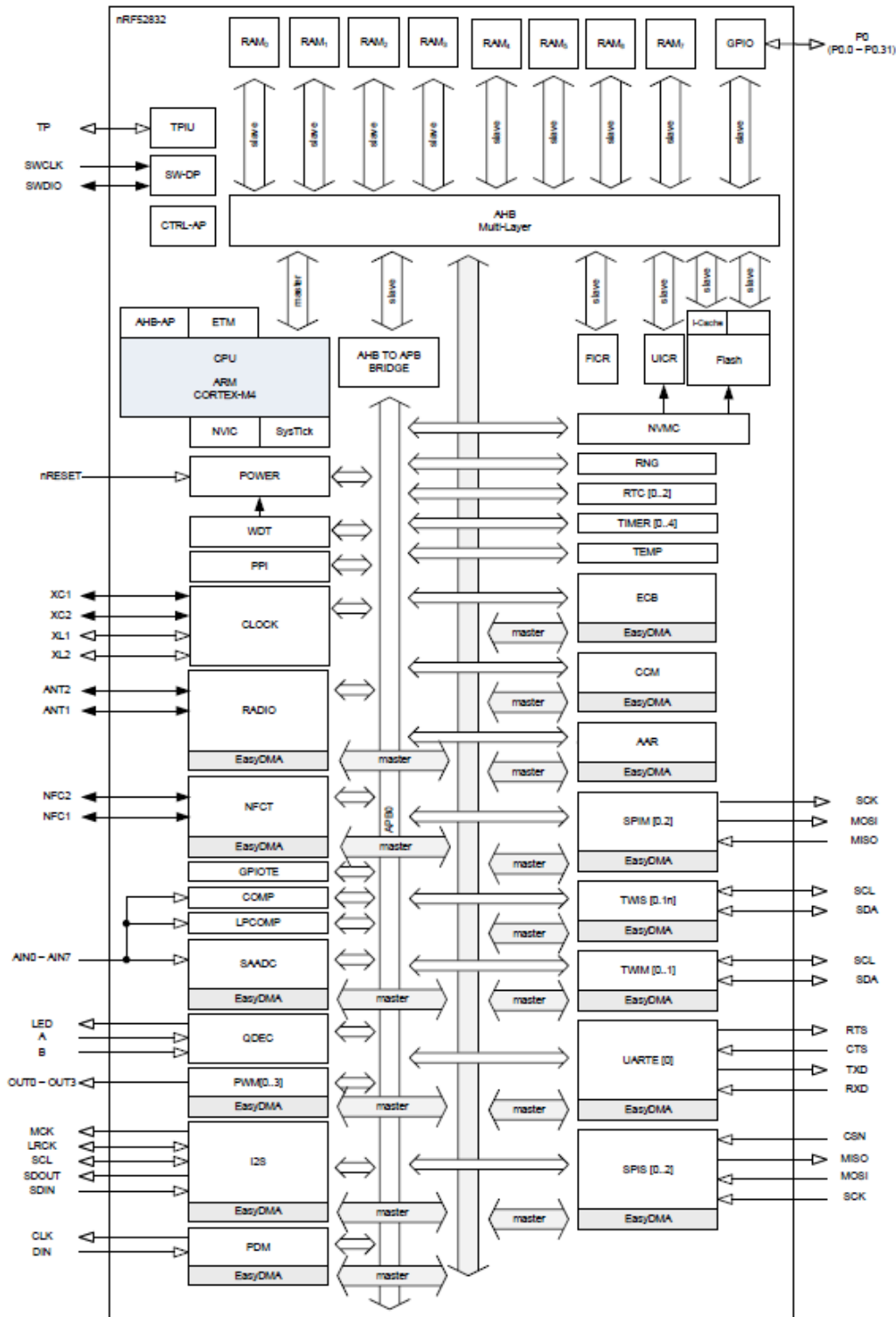
## 5.3.10. CPU

Symbol	Description	Min.	Typ.	Max.	Units
W <sub>FLASH</sub>	CPU wait states, running from flash, cache disabled	0		2	
W <sub>FLASHCACHE</sub>	CPU wait states, running from flash, cache enabled	0		3	
W <sub>RAM</sub>	CPU wait states, running from RAM			0	
I <sub>DDFLASHCACHE</sub>	CPU current, running from flash, cache enabled, LDO		7.4		mA
I <sub>DDFLASHCACHEDCDC</sub>	CPU current, running from flash, cache enabled, DCDC 3V		3.7		mA
I <sub>DDFLASH</sub>	CPU current, running from flash, cache disabled, LDO		8.0		mA
I <sub>DDFLASHDCDC</sub>	CPU current, running from flash, cache disabled, DCDC 3V		3.9		mA
I <sub>DDRAM</sub>	CPU current, running from RAM, LDO		6.7		mA
I <sub>DDRAMDCCDC</sub>	CPU current, running from RAM, DCDC 3V		3.3		mA
I <sub>DDFLASH/MHz</sub>	CPU efficiency, running from flash, cache enabled, LDO		125		μA/ MHz
I <sub>DDFLASHDCDC/MHz</sub>	CPU efficiency, running from flash, cache enabled, DCDC 3V		58		μA/ MHz

## 5.3.11. Power Management

Symbol	Description	Min.	Typ.	Max.	Units
I <sub>ON_RAMOFF_EVENT</sub>	System ON, No RAM retention, Wake on any event		1.2		μA
I <sub>ON_RAMON_EVENT</sub>	System ON, Full RAM retention, Wake on any event		1.5		μA
I <sub>ON_RAMOFF_RTC</sub>	System ON, No RAM retention, Wake on RTC		1.9		μA
I <sub>OFF_RAMOFF_RESET</sub>	System OFF, No RAM retention, Wake on reset		0.3		μA
I <sub>OFF_RAMOFF_GPIO</sub>	System OFF, No RAM retention, Wake on GPIO		0.3		μA
I <sub>OFF_RAMOFF_LPCOMP</sub>	System OFF, No RAM retention, Wake on LPCOMP		1.9		μA
I <sub>OFF_RAMOFF_NFC</sub>	System OFF, No RAM retention, Wake on NFC field		0.7		μA
I <sub>OFF_RAMON_RESET</sub>	System OFF, Full 64 kB RAM retention, Wake on reset		0.7		μA

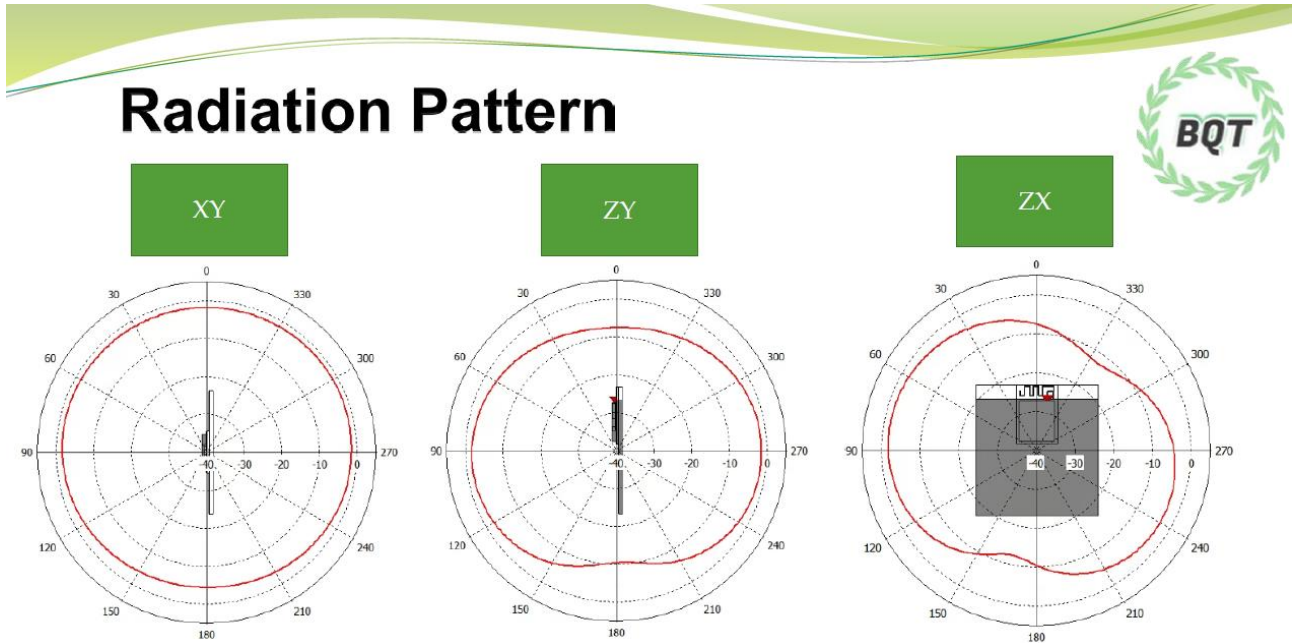
## 6. Block Diagram



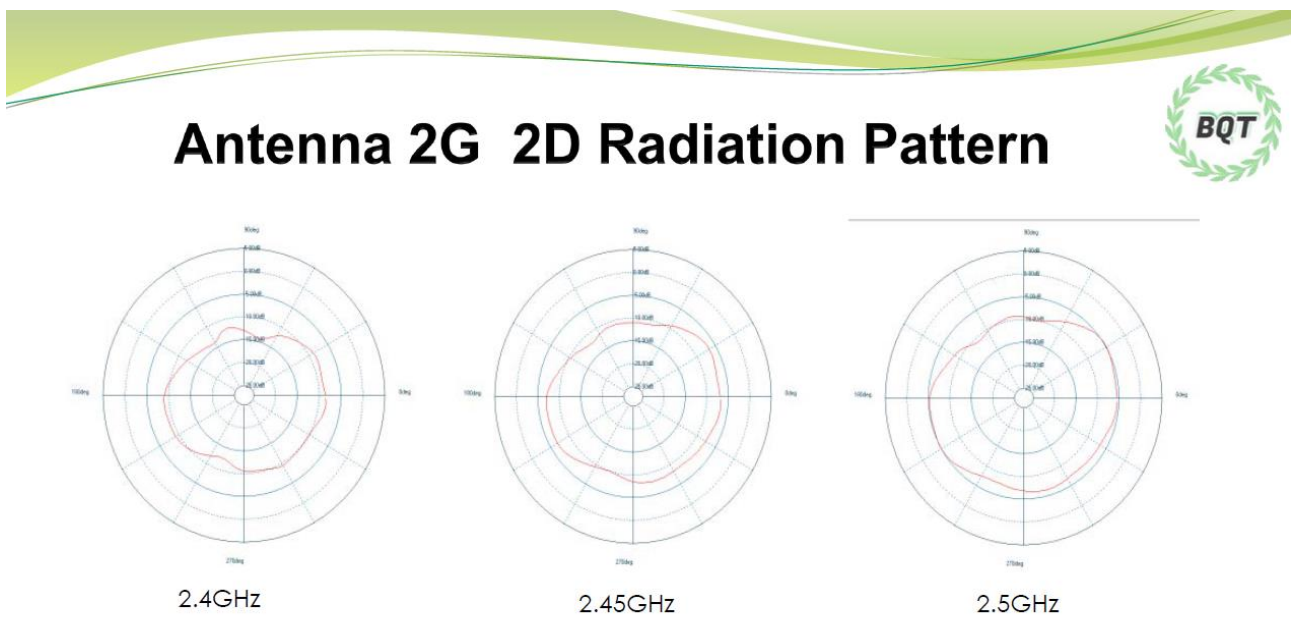
## 7. Antenna

Below chart shows a few options of external antenna which has been tested and approved to use with **DK9180&DK9182**

### DK9180



### DK9182

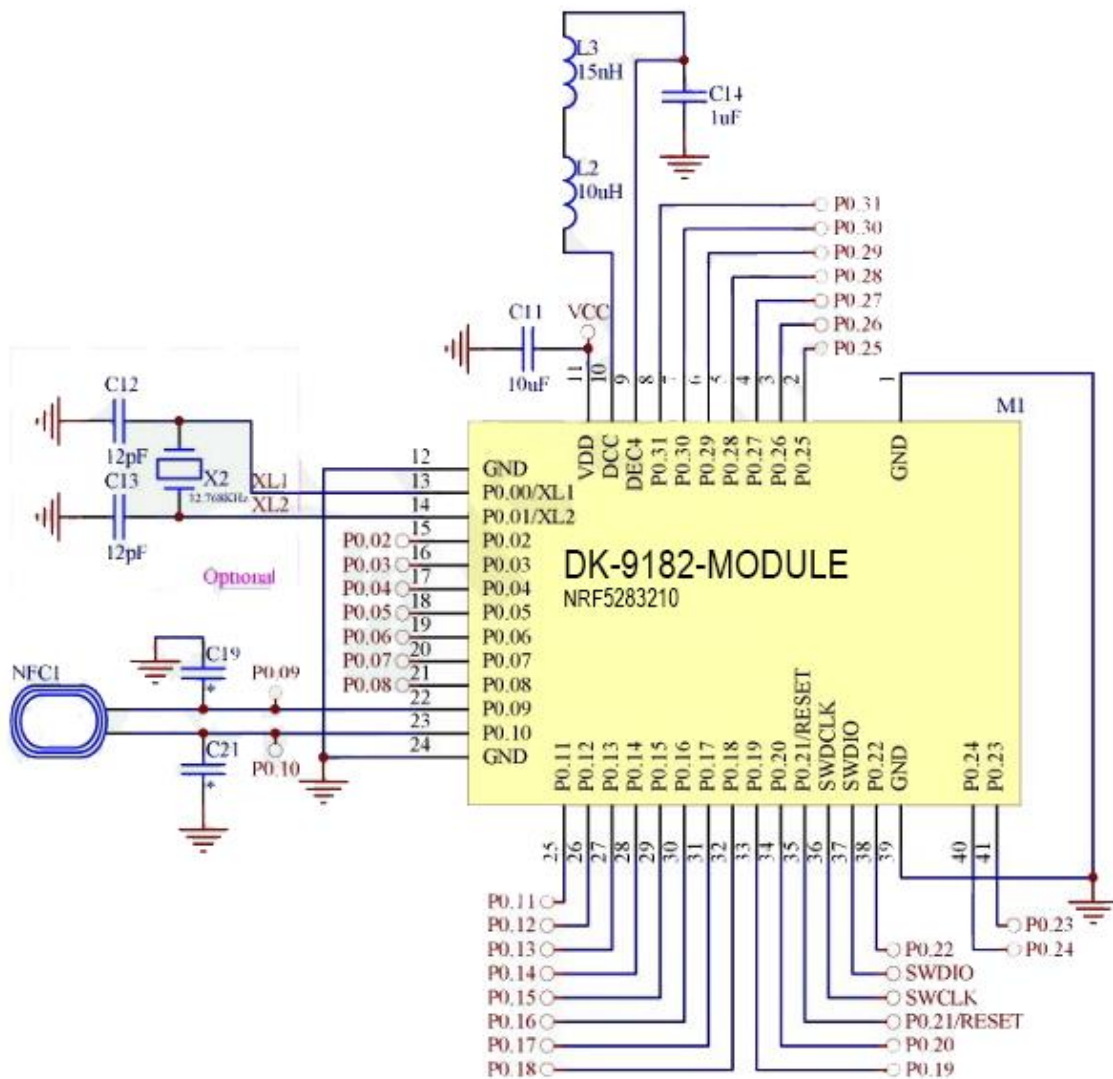


## 8. Reference Circuit

Module is pre-programmed with Dexatek's testing code. Default is using "LDO mode". Our firmware is set to use external 32.768khz so please add it to make module work.

### REMARK:

1. DEC4 decoupling capacitor (1 $\mu$ F) is already inside the module.
2. When using DC-DC mode, please add L2 / L3 / C14.
3. When NOT using NFC, please remove NFC1 / C19 / C21.
4. When using internal 32.768khz RC oscillator, please remove X2 / C12 / C13





## 9. Notes and Cautions

Module is not designed to last for a lifetime. Like general products, it is expected to be worn out after continuous usage through the years. To assure that product will perform better and last longer, please make sure you:

- Follow the guidelines of this document while designing circuit/end-product. Any discrepancy of core Bluetooth technology and technical specification of IC should refer to definition of Bluetooth Organization and Nordic Semiconductor as final reference.
- Do not supply voltage that is not within range of specification.
- Eliminate static electricity at any cost when working with the module as it may cause damage. It is highly recommended adding anti-ESD components to circuit design to prevent damage from real-life ESD events. Anti-ESD methods can be also applied in mechanical design.
- Do not expose modules under direct sunlight for long duration. Modules should be kept away from humid and salty air conditions, and any corrosive gasses or substances. Store it within  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$  before and after installation.
- Avoid any physical shock, intense stress to the module or its surface.
- Do not wash the module. No-Clean Paste is used in production. Washing it will oxidize the metal shield and have chemistry reaction with No-Clean Paste. Functions of the module are not guaranteed if it has been washed. The module is not suitable for life support device or system and not allowed to be used in destructive device or systems in any direct or indirect ways. The customer agrees to indemnify Dexatek for any losses when applying modules in applications such as the ones described above

## 10. Basic Facts for nRF52 Family

Below chart shows basic spec for Nordic nRF52 family, which is helpful to understand the differences between each SoC. Any discrepancy shall refer to Nordic's technical document as final reference.

Solution	Nordic 52840	Nordic 52833	Nordic 52832	Nordic 52810
Antenna	Iplex		Iplex	
Antenna Vendor	X		X	
RAM (KB)	256KB	128KB	64KB	24KB
Internal Flash	1MB	512KB	512KB	192KB
External flash	X	X	X	X
PIN OUT	48	42	32	32
Shielding Case	O	O	O	O
Package	6x6mm QFN48	7x7mm aQFN™73	6x6mm QFN48	6x6mm QFN48
RF	BT5.1	BT5.1	BT5.1	BT5.1
PA	X	X	X	X
Operating Temp	-40~85C	-40~85C	-40~85C	-40~85C
Tx Power(MAX)	8dBm	8dBm	4dBm	4dBm
Supply Voltage	1.7V~3.6V	1.7V~5.5V	1.7V~3.6V	1.7V~3.6V

## 11. Useful Links

- Nordic Infocenter: <https://infocenter.nordicsemi.com/index.jsp>

All the necessary technical files and software development kits of Nordic's chip are on this website.

- Nordic DevZone: <https://devzone.nordicsemi.com/questions/>

A highly recommended website for firmware developer. Interact, discuss and consult with other fellow developers and Nordic's employees to get answers to your questions. The site also includes tutorials in detail to help you get started.

- Official Page of nRF52832 : <https://www.nordicsemi.com/Products/nRF52832>

A brief introduction to nRF52832 and download links for Nordic's developing software and SoftDevices.

## Full List of DEXATEK's BLE Modules

Nordic Solution	DEXATEK NO.	Antenna	RAM	Flash Memory
nRF52840	DK9177a	ipex	256 kb	1 MB
nRF52832	DK9178c	ipex	64 kb	512 K
nRF52832	DK9180c	Pcb ant	64 kb	512 K
nRF52840	DK9181a	Pcb ant	256 kb	1 MB
nRF52832	DK9182c	Chip aNT	64 kb	512 K
nRF52840	DK9183a	Chip aNT	256 kb	1 MB
nRF52833	DK9177b	ipex	128 kb	512 kb
nRF52805	DK9178d	ipex	24 kb	192 K
nRF52805	DK9180d	Pcb ant	24 kb	192 K
nRF52833	DK9181b	Pcb ant	128 kb	512 kb
nRF52805	DK9182d	Chip aNT	24 kb	192 K
nRF52833	DK9183b	Chip aNT	128 kb	512 kb