

Approval Sheet

(產品承認書)

產品名稱 (Product): BT 4.2 / BT 5 Module (nRF52810)

產品型號 (Model No.): MDBT42Q – 192K (Chip Antenna)

MDBT42Q – P192K (PCB Antenna)

Advantage of MDBT42Q & MDBT42Q-P series:

- 1. Long working distance:
MDBT42Q: over 80 meters in open space.
MDBT42Q-P: up to 60 meters in open space.*
- 2. Declaration ID includes all Nordic applied profiles.*
- 3. Granted main regional certification such as FCC (USA), CE(EU) TELECOM (Japan), SRRC (China), IC (Canada), NCC (Taiwan), and KC (South Korea).*

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1. Overall Introduction

Raytac's MDBT42Q-192K & MDBT42Q-P192K is a BT 4.0, BT 4.1, BT 4.2 and BT 5 stack (Bluetooth low energy or BLE) module designed based on **Nordic nRF52810 SoC solution**, which incorporates: **GPIO**, **SPI**, **UART**, **I2C**, **PWM** and **ADC** interfaces for connecting peripherals and sensors.

Features of the module:

1. Dual Transmission mode of BLE & 2.4Ghz RF upon customer preference.
2. Compact size with **(L) 16 x (W) 10 x (H) 2.2 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. See [1.3 Profile & Service Information](#).
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

1.2. Features

For full details of nRF52810's feature or requirements of development, please check Nordic's documents. Links are in [11 Useful Links](#).

- Multi-protocol 2.4GHz radio
- 32-bit ARM Cortex – M4 processor
- 192KB flash programmed memory and 24KB 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
- 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:
 - 1 x Hardware SPI master ; 1 x Hardware SPI slave
 - 1 x two-wire master ; 1 x two-wire slave
 - 1 x UART (CTS / RTS)
 - PDM for digital microphone
- 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
 - 3x 32-bit
 - 2 x 24-bit RTC
- 4-channel pulse width modulator (PWM) unit with EasyDMA

1.3. Profile & Service Information

Profile & Service are supported by MDBT42Q & MDBT42Q-P as below:

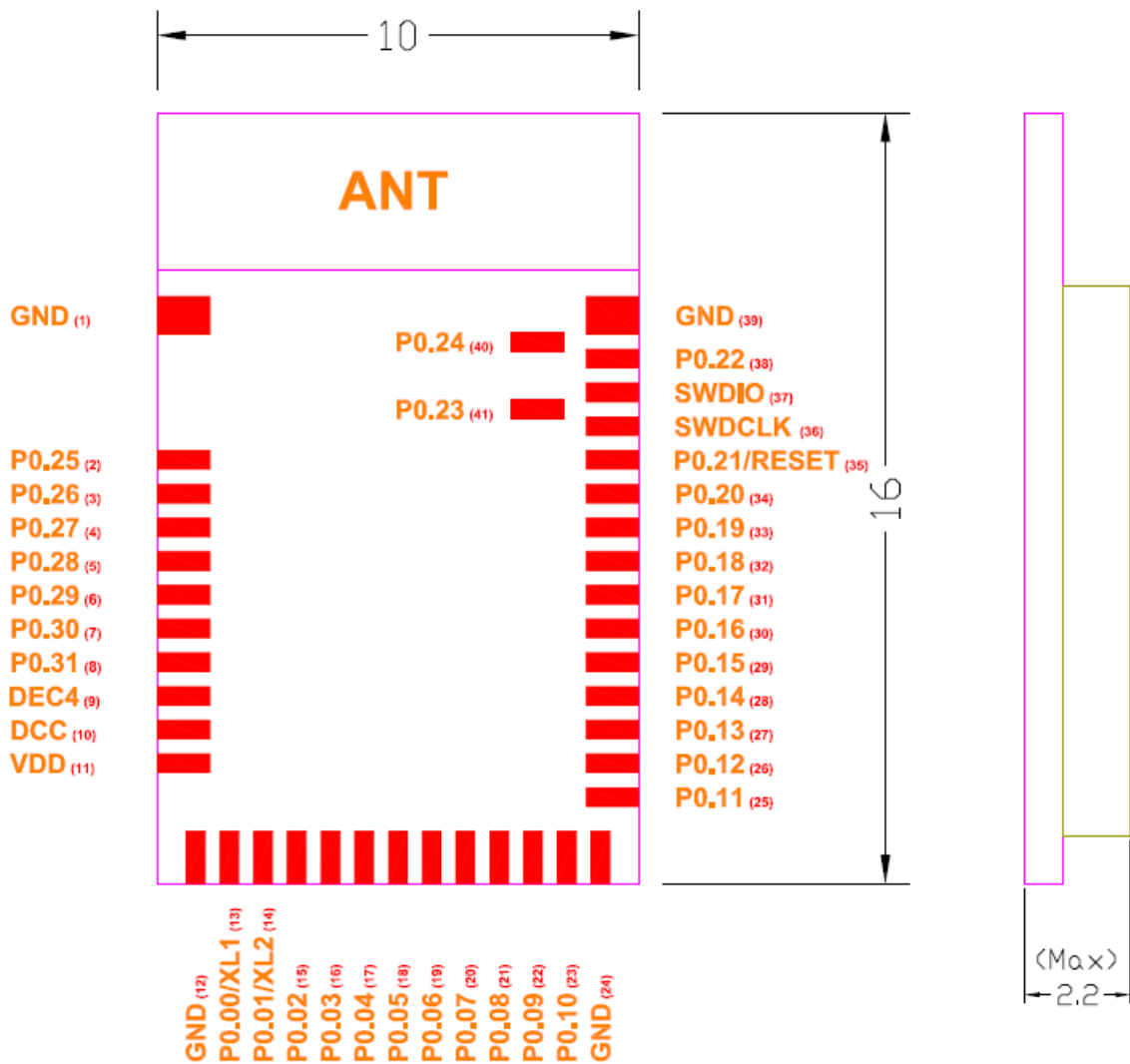
| Profile Description | Service Description |
|---------------------------------|---------------------------------|
| Alert Notification Profile | Alert Notification Service |
| Blood Pressure Profile | Blood Pressure Service |
| | Device Information Service |
| Cycling Speed & Cadence Profile | Cycling Speed & Cadence Service |
| | Device Information Service |
| Glucose Profile | Glucose Service |
| | Device Information Service |
| Health Thermometer Profile | Health Thermometer Service |
| | Device Information Service |
| Heart Rate Profile | Heart Rate Service |
| | Device Information Service |
| HID over GATT Profile | HID Service |
| | Battery Service |
| Proximity Profile | Link Loss Service |
| | Immediate Alert Service |
| | TX Power Service |
| Running Speed & Cadence Profile | Running Speed & Cadence Service |
| | Device Information Service |
| Time Profile | Time Profile Service |
| Glucose Profile (Central) | |

2. Product Dimension

2.1. PCB Dimensions & Pin Indication

- **MDBT42Q**

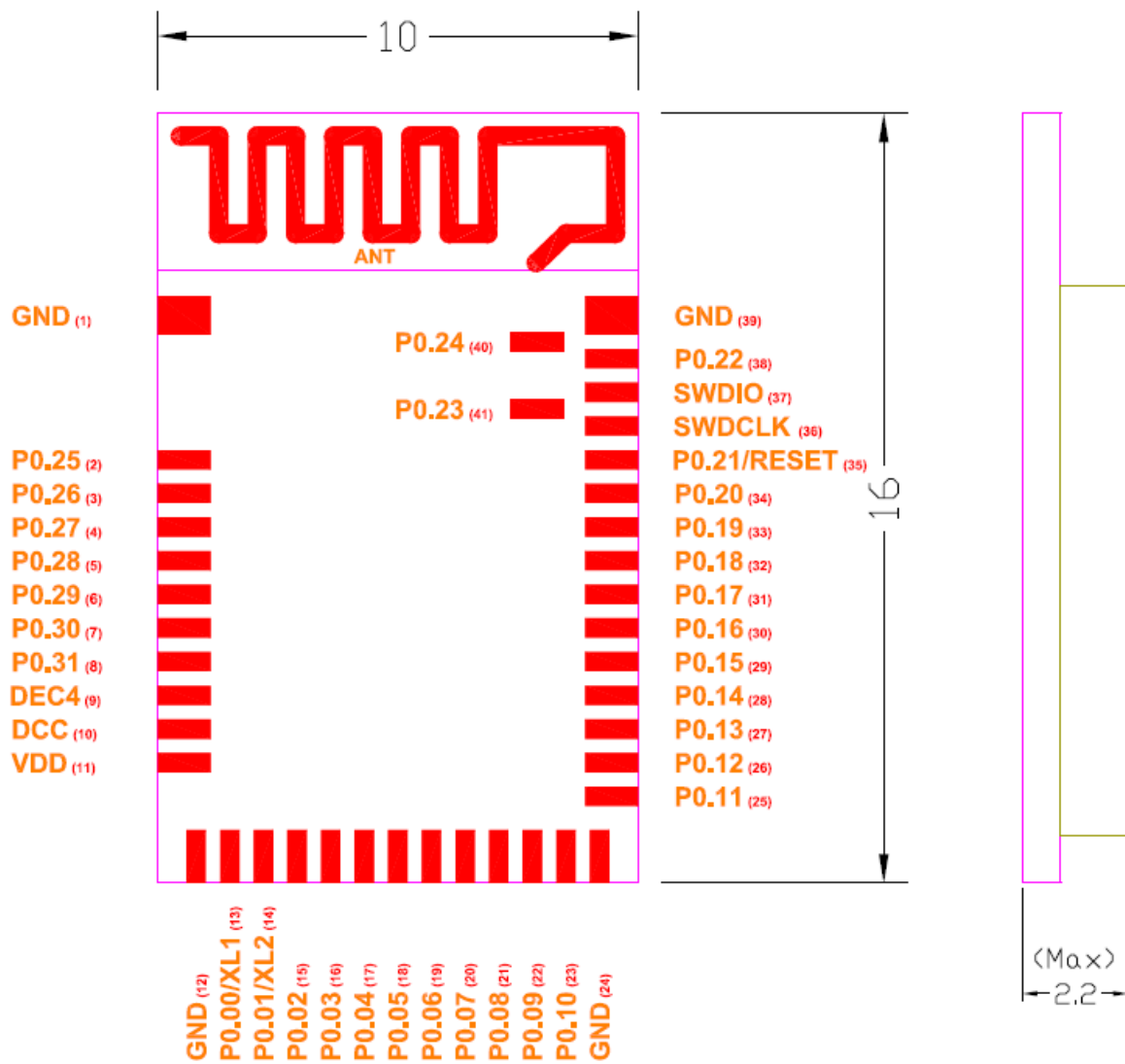
PCB SIZE: (L) 16 x (W) 10 x (H) 2.2 mm



Top 單位:mm

• MDBT42Q-P

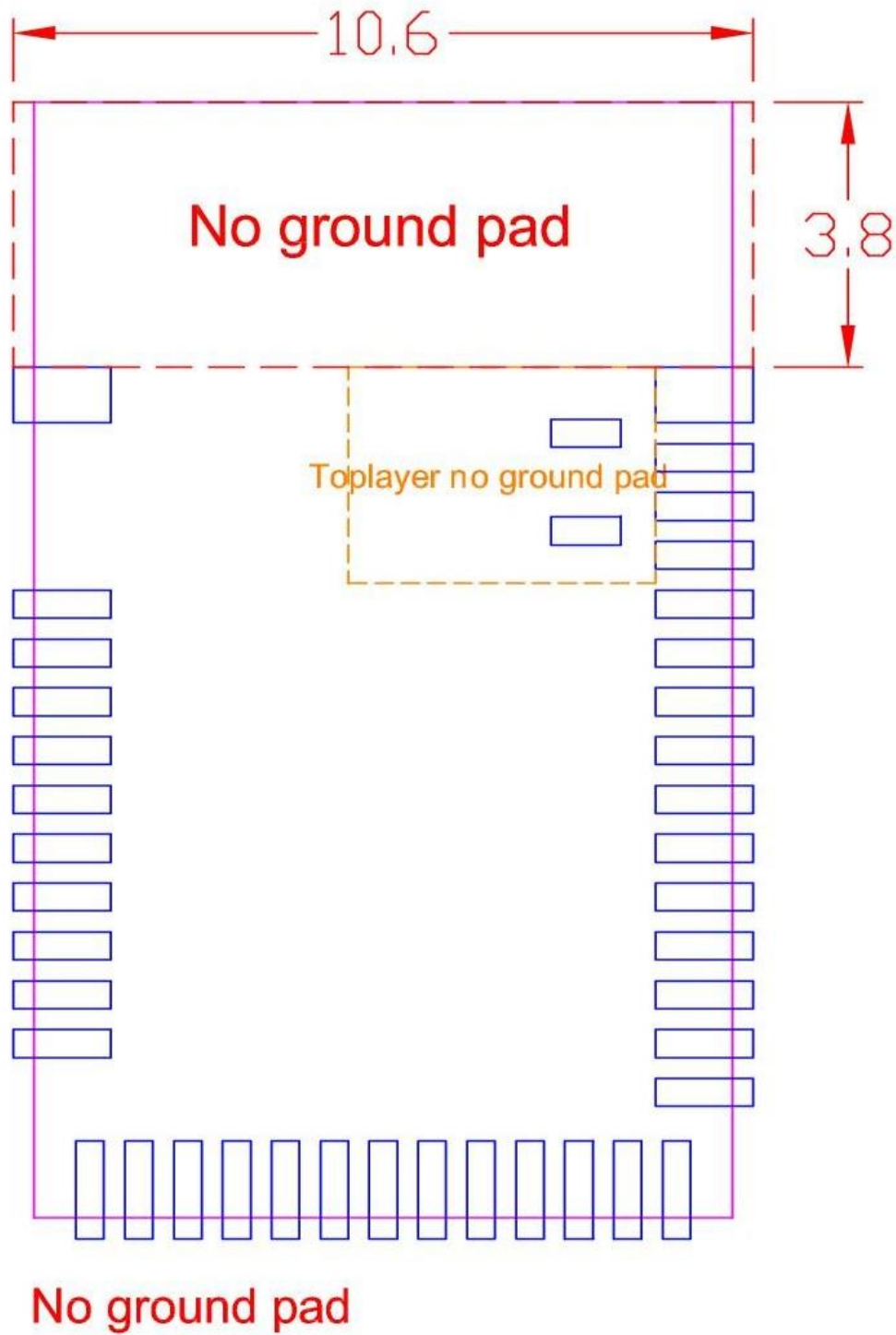
PCB SIZE: (L) 16 x (W) 10 x (H) 2.2 mm

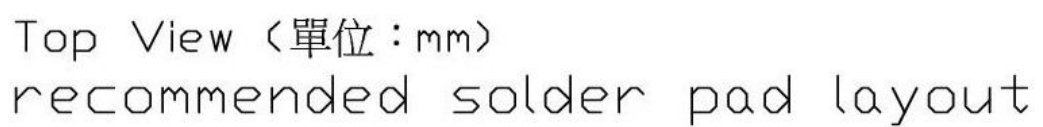


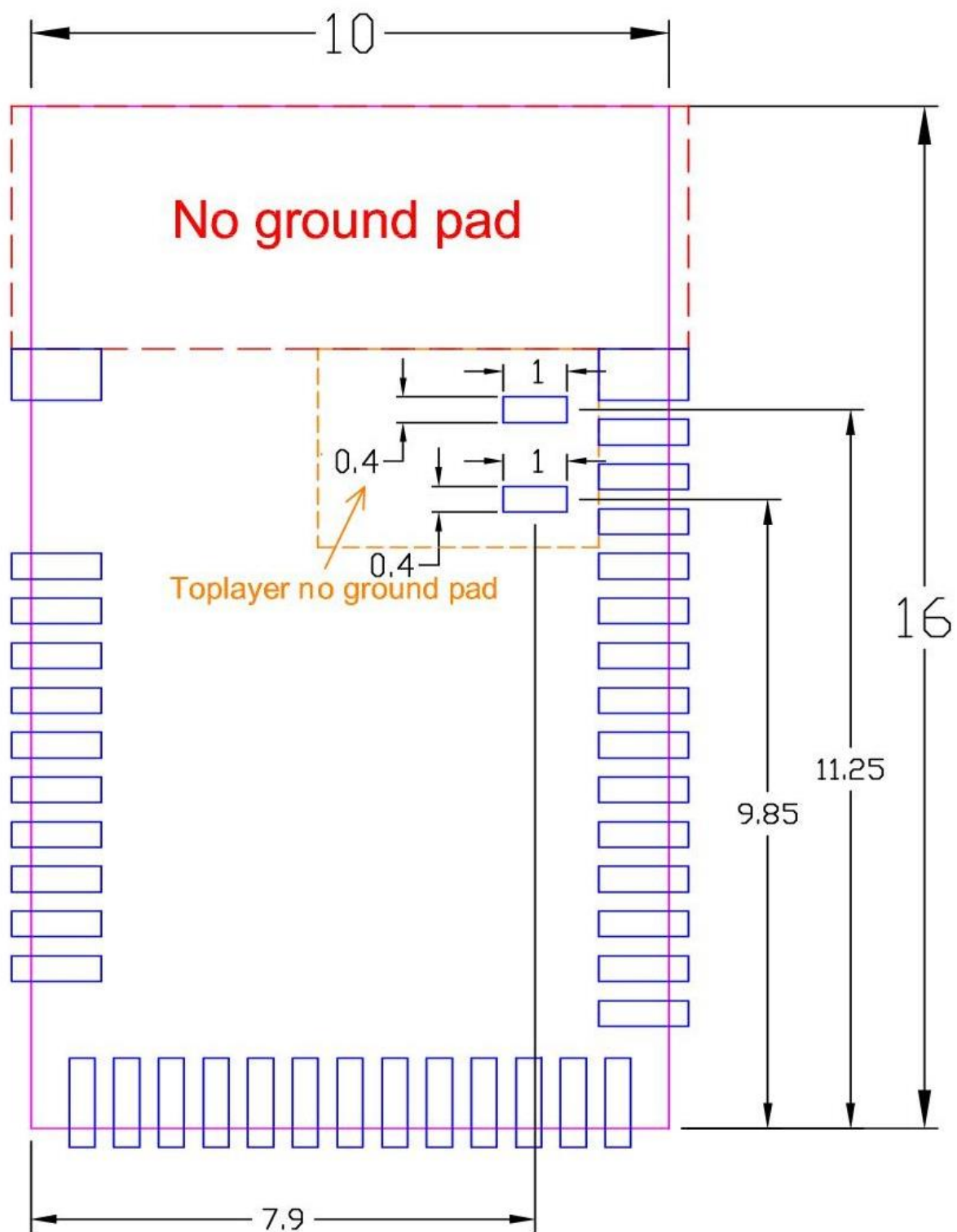
Top 單位<mm>

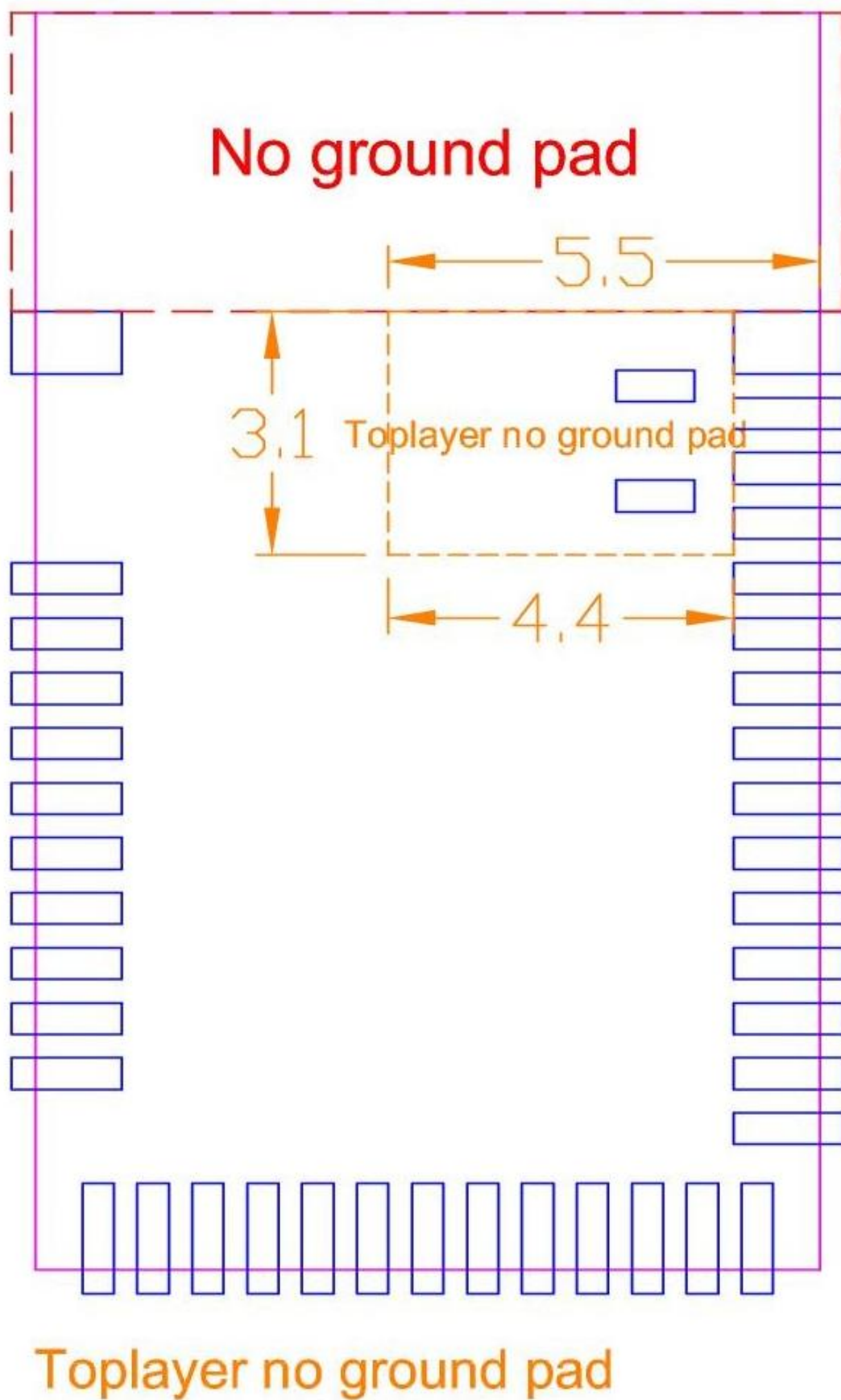
2.2. Recommended Layout of Solder Pad

Graphs are all in Top View, Unit in mm.





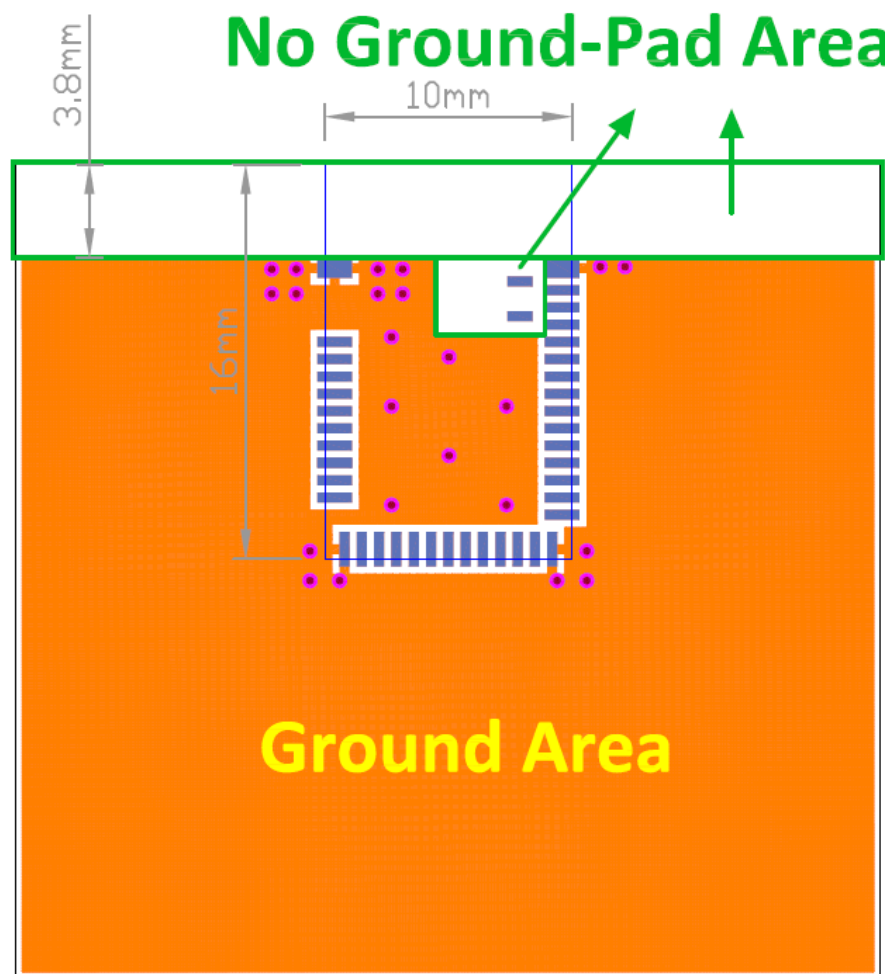




2.3. RF Layout Suggestion (aka Keep-Out Area)

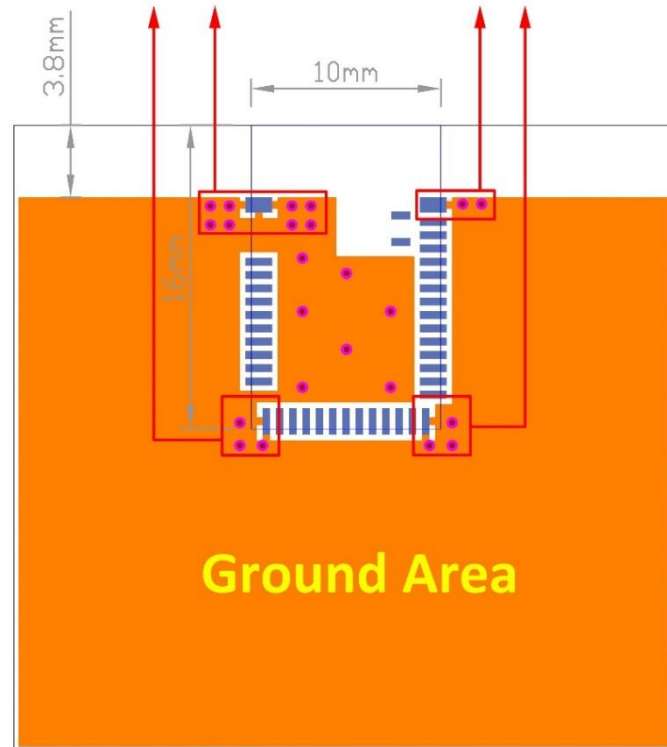
Please follow below instruction to have better wireless performance. Make sure to keep the “No-Ground-Pad” as wider as possible when there is no enough space in your design.

Welcome to send us your layout in PDF for review at service@raytac.com with title “Layout reviewing – MDBT42Q/MDBT42Q-P – YOUR company’s name”.

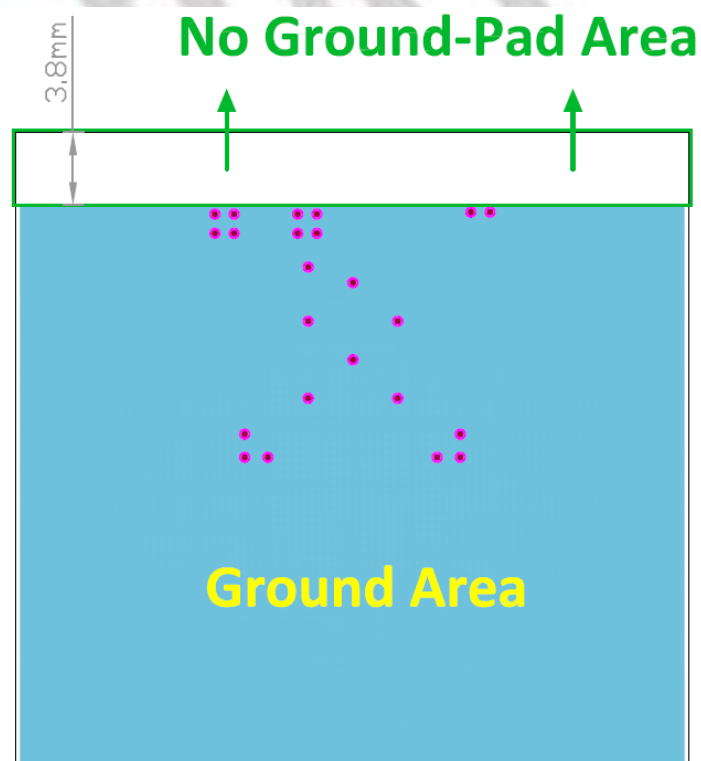


Top layer

Please add via holes in GROUND area as many as possible, especially around the four corners.

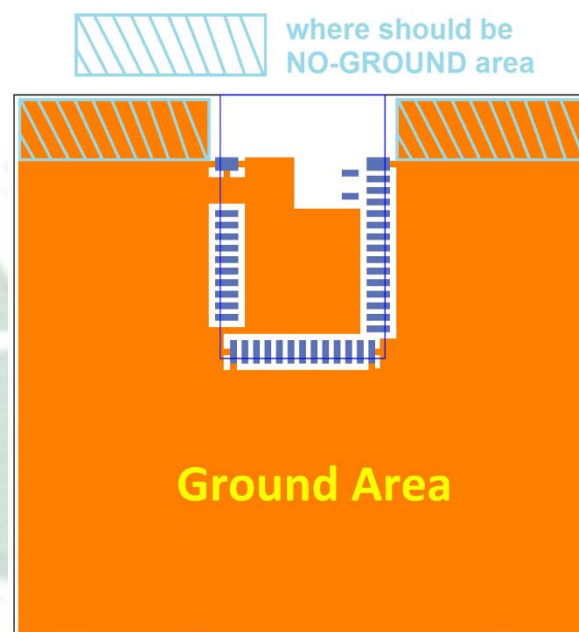
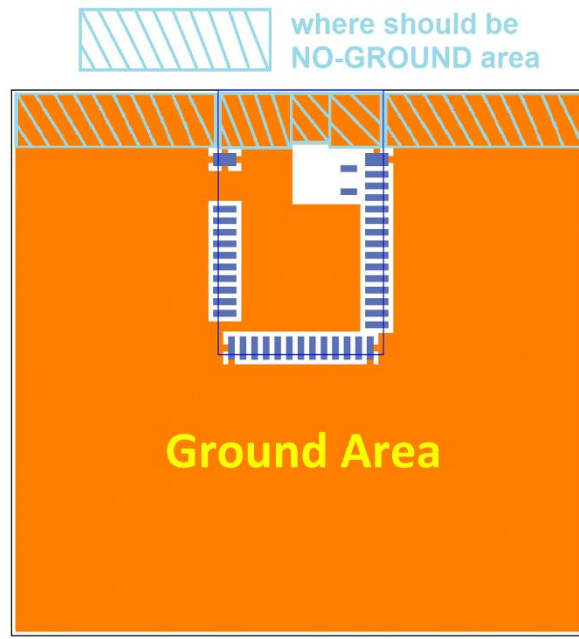


Top layer



Bottom layer

Examples of “**NOT RECOMMENDED**” layout



2.4. Footprint & Design Guide

[Click to download from our official website.](#)

2.5. Pin Assignment

| Pin No. | Name | Pin function | Description |
|---------|--------------|--------------|--|
| (1) | GND | Ground | The pad must be connected to a solid ground plane |
| (2) | P0.25 | Digital I/O | General-purpose digital I/O |
| (3) | P0.26 | Digital I/O | General-purpose digital I/O |
| (4) | P0.27 | Digital I/O | General-purpose digital I/O |
| (5) | P0.28 | Digital I/O | General-purpose digital I/O |
| | AIN4 | Analog input | SAADC/COMP input |
| (6) | P0.29 | Digital I/O | General-purpose digital I/O |
| | AIN5 | Analog input | SAADC/COMP input |
| (7) | P0.30 | Digital I/O | General-purpose digital I/O |
| | AIN6 | Analog input | SAADC/COMP input |
| (8) | P0.31 | Digital I/O | General-purpose digital I/O |
| | AIN7 | Analog input | SAADC/COMP input |
| (9) | DEC4 | Power | 1V3 regulator supply decoupling. Input from DC/DC converter. Output from 1V3 LDO . |
| (10) | DCC | Power | DC/DC converter output pin |
| (11) | VDD | Power | Power-supply pin |
| (12) | GND | Ground | The pad must be connected to a solid ground plane |
| (13) | P0.00 | Digital I/O | General-purpose digital I/O |
| | XL1 | Analog input | Connection to 32.768khz crystal (LFXO) |
| (14) | P0.01 | Digital I/O | General-purpose digital I/O |
| | XL2 | Analog input | Connection to 32.768khz crystal (LFXO) |
| (15) | P0.02 | Digital I/O | General-purpose digital I/O |
| | AIN0 | Analog input | SAADC/COMP input |
| (16) | P0.03 | Digital I/O | General-purpose digital I/O |
| | AIN1 | Analog input | SAADC/COMP input |
| (17) | P0.04 | Digital I/O | General-purpose digital I/O |
| | AIN2 | Analog input | SAADC/COMP input |
| (18) | P0.05 | Digital I/O | General-purpose digital I/O |
| | AIN3 | Analog input | SAADC/COMP input |
| (19) | P0.06 | Digital I/O | General-purpose digital I/O |
| (20) | P0.07 | Digital I/O | General-purpose digital I/O |
| (21) | P0.08 | Digital I/O | General-purpose digital I/O |

| Pin No. | Name | Pin function | Description |
|---------|--------|---------------|---|
| (22) | P0.09 | Digital I/O | General-purpose digital I/O |
| (23) | P0.10 | Digital I/O | General-purpose digital I/O |
| (24) | GND | Ground | The pad must be connected to a solid ground plane |
| (25) | P0.11 | Digital I/O | General-purpose digital I/O |
| (26) | P0.12 | Digital I/O | General-purpose digital I/O |
| (27) | P0.13 | Digital I/O | General-purpose digital I/O |
| (28) | P0.14 | Digital I/O | General-purpose digital I/O |
| (29) | P0.15 | Digital I/O | General-purpose digital I/O |
| (30) | P0.16 | Digital I/O | General-purpose digital I/O |
| (31) | P0.17 | Digital I/O | General-purpose digital I/O |
| (32) | P0.18 | Digital I/O | General-purpose digital I/O |
| (33) | P0.19 | Digital I/O | General-purpose digital I/O |
| (34) | P0.20 | Digital I/O | General-purpose digital I/O |
| (35) | P0.21 | Digital I/O | General-purpose digital 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 digital I/O |
| (39) | GND | Ground | The pad must be connected to a solid ground plane |
| (40) | P0.24 | Digital I/O | General-purpose digital I/O |
| (41) | P0.23 | Digital I/O | General-purpose digital I/O |

2.6. GPIO Located Near the Radio

Below remarks are extracted from Nordic's nRF52810 Spec. Any updates shall refer to Nordic's official release as final reference.

Below chart identifies some GPIO that have recommended usage. To maximize RF performance, these GPIO are only available to use under low drive, low frequency I/O only, wrong usage may lead to undesirable performance.



| GPIO | QFN48 pin | Recommended usage |
|-------|-----------|------------------------------------|
| P0.25 | 37 | Low drive, low frequency I/O only. |
| P0.26 | 38 | |
| P0.27 | 39 | |
| P0.28 | 40 | |
| P0.29 | 41 | |

3. Main Chip Solution

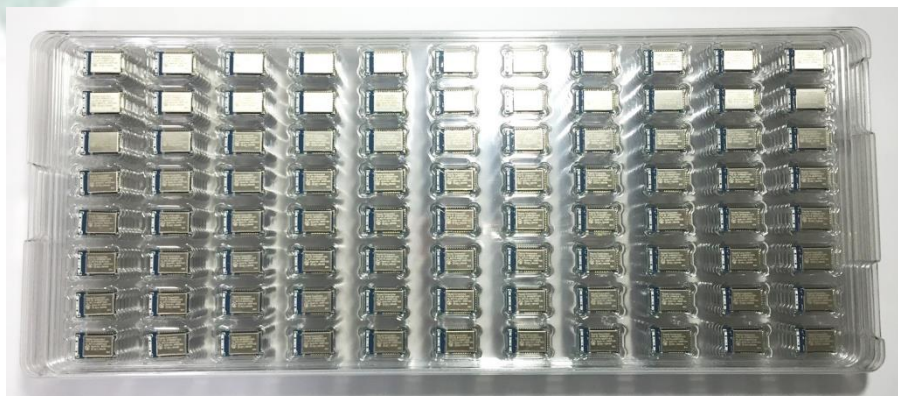
| RF IC | Crystal Frequency |
|-----------------|-------------------|
| Nordic NRF52810 | 32MHZ |

32MHz crystal is already inside the module.

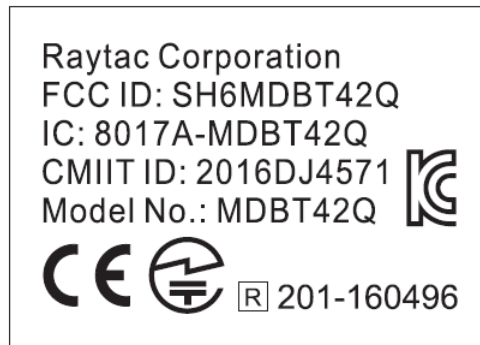
4. Shipment Packaging Information

| Antenna | Model |
|----------------------|--|
| Chip/Ceramic Antenna | MDBT42Q-192K |
| |  |
| PCB/Printed Antenna | MDBT42Q-P192K |
| |  |

- Unit Weight of Module: MDBT42Q-192K: 0.64g/pc ; MDBT42Q-P192K: 0.62g/pc
- Packaging Type: Tray only
- Minimum Package Quantity (MPQ): 88 pcs per Tray
- Carton Contents: 1760 pcs per carton (20 Full Tray + 1 Empty Tray)
- Dimension of Carton: (L) 37 x (W) 21 x (H) 13 cm
- Gross Weight: approx. 2.80 kgs per full carton (contains 1760pcs)



4.1. Marking on Metal Shielding



4.2. Color of Solder Mask and Dot Marking

Module(s) with date code “738” would have solder mask (PCB color) in **BLUE with one black dot on the lower right corner of the shielding**. Batches with other date code are all in **GREEN solder mask with no dot marking**.

5. Specification

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

5.1. Absolute Maximum Ratings

| | Note | Min. | Max. | Unit |
|------------------------------------|----------------------------|------------------|-------------|--------------------|
| Supply voltages | | | | |
| VDD | | -0.3 | +3.9 | V |
| VSS | | | 0 | V |
| I/O pin voltage | | | | |
| $V_{I/O}$, 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 |
| Radio | | | | |
| RF input level | | | 10 | dBm |
| Environmental (QFN package) | | | | |
| Storage temperature | | -40 | +125 | °C |
| MSL | Moisture Sensitivity Level | | 2 | |
| ESD HBM | Human Body Model | | 4 | kV |
| ESD CDM | Charged Device Model | | 1000 | V |
| Flash memory | | | | |
| Endurance | | 10 000 | | Write/erase cycles |
| Retention | | 10 years at 40°C | | |

5.2. Operation Conditions

| Symbol | Parameter | Min. | Nom. | Max. | Units |
|--------------|--|------|------|------|-------|
| VDD | Supply voltage, independent of DCDC enable | 1.7 | 3.0 | 3.6 | V |
| t_{R_VDD} | Supply rise time (0 V to 1.7 V) | | | 60 | ms |
| TA | Operating temperature | -40 | 25 | 85 | °C |

Important: The on-chip power-on reset circuitry may not function properly for rise times longer than the specified maximum.

5.3. Electrical Specifications

5.3.1. General Radio Characteristics

| Symbol | Description | Min. | Typ. | Max. | Units |
|---------------------|----------------------------------|------|-----------|------|-------|
| f_{OP} | Operating frequencies | 2360 | | 2500 | MHz |
| $f_{PLL,PROG,RES}$ | PLL programming resolution | | 2 | | kHz |
| $f_{PLL,CH,SP}$ | PLL channel spacing | | 1 | | MHz |
| $f_{\Delta,1M}$ | Frequency deviation @ 1 Mbps | | ± 170 | | kHz |
| $f_{\Delta,BLE,1M}$ | Frequency deviation @ BLE 1 Mbps | | ± 250 | | kHz |
| $f_{\Delta,2M}$ | Frequency deviation @ 2 Mbps | | ± 320 | | kHz |
| $f_{sk,SPS}$ | On-the-air data rate | 1 | | 2 | Mbps |

5.3.2. Radio Current Consumption (Transmitter)

| Symbol | Description | Min. | Typ. | Max. | Units |
|--------------------------|--|------|------|------|-------|
| $I_{TX,PLUS4dBm,DCDC}$ | TX only run current (DCDC, 3V) $P_{RF} = +4$ dBm | | 7.0 | | mA |
| $I_{TX,PLUS4dBm}$ | TX only run current $P_{RF} = +4$ dBm | | 15.4 | | mA |
| $I_{TX,0dBm,DCDC}$ | TX only run current (DCDC, 3V) $P_{RF} = 0$ dBm | | 4.6 | | mA |
| $I_{TX,0dBm}$ | TX only run current $P_{RF} = 0$ dBm | | 10.1 | | mA |
| $I_{TX,MINUS4dBm,DCDC}$ | TX only run current DCDC, 3V $P_{RF} = -4$ dBm | | 3.6 | | mA |
| $I_{TX,MINUS4dBm}$ | TX only run current $P_{RF} = -4$ dBm | | 7.8 | | mA |
| $I_{TX,MINUS8dBm,DCDC}$ | TX only run current DCDC, 3V $P_{RF} = -8$ dBm | | 3.2 | | mA |
| $I_{TX,MINUS8dBm}$ | TX only run current $P_{RF} = -8$ dBm | | 6.8 | | mA |
| $I_{TX,MINUS12dBm,DCDC}$ | TX only run current DCDC, 3V $P_{RF} = -12$ dBm | | 2.9 | | mA |
| $I_{TX,MINUS12dBm}$ | TX only run current $P_{RF} = -12$ dBm | | 6.2 | | mA |
| $I_{TX,MINUS16dBm,DCDC}$ | TX only run current DCDC, 3V $P_{RF} = -16$ dBm | | 2.7 | | mA |
| $I_{TX,MINUS16dBm}$ | TX only run current $P_{RF} = -16$ dBm | | 5.7 | | mA |
| $I_{TX,MINUS20dBm,DCDC}$ | TX only run current DCDC, 3V $P_{RF} = -20$ dBm | | 2.5 | | mA |
| $I_{TX,MINUS20dBm}$ | TX only run current $P_{RF} = -20$ dBm | | 5.4 | | mA |
| $I_{TX,MINUS40dBm,DCDC}$ | TX only run current DCDC, 3V $P_{RF} = -40$ dBm | | 2.1 | | mA |
| $I_{TX,MINUS40dBm}$ | TX only run current $P_{RF} = -40$ dBm | | 4.3 | | mA |

5.3.3. Radio Current Consumption (Receiver)

| Symbol | Description | Min. | Typ. | Max. | Units |
|------------------------|--|------|------|------|-------|
| $I_{RX,1M,DCDC}$ | RX only run current (DCDC, 3V) 1 Mbps / 1 Mbps BLE | | 4.6 | | mA |
| $I_{RX,1M}$ | RX only run current 1 Mbps / 1 Mbps BLE | | 10.0 | | mA |
| $I_{RX,2M,DCDC}$ | RX only run current (DCDC, 3V) 2 Mbps | | 5.2 | | mA |
| $I_{RX,2M}$ | RX only run current 2 Mbps | | 11.2 | | mA |
| $I_{START,RX,1M,DCDC}$ | RX start-up current (DCDC 3V) 1 Mbps / 1 Mbps BLE | | 3.5 | | mA |
| $I_{START,RX,1M}$ | RX start-up current 1 Mbps / 1 Mbps BLE | | 6.7 | | mA |

5.3.4. Transmitter Specification

| Symbol | Description | Min. | Typ. | Max. | Units |
|-------------|--|------|------|---------|-------|
| P_{RF} | Maximum output power | | 4 | 8 | dBm |
| P_{RFC} | RF power control range | | 24 | | dB |
| P_{RFCR} | RF power accuracy | | | ± 4 | dB |
| $P_{RF1,1}$ | 1st Adjacent Channel Transmit Power 1 MHz (1 Mbps) | | -25 | | dBc |
| $P_{RF2,1}$ | 2nd Adjacent Channel Transmit Power 2 MHz (1 Mbps) | | -50 | | dBc |
| $P_{RF1,2}$ | 1st Adjacent Channel Transmit Power 2 MHz (2 Mbps) | | -25 | | dBc |
| $P_{RF2,2}$ | 2nd Adjacent Channel Transmit Power 4 MHz (2 Mbps) | | -50 | | dBc |

5.3.5. Receiver Operation

| Symbol | Description | Min. | Typ. | Max. | Units |
|-------------------------|--|------|------|------|-------|
| $P_{RX,MAX}$ | Maximum received signal strength at < 0.1% BER | | 0 | | dBm |
| $P_{SENS,IT,1M}$ | Sensitivity, 1 Mbps nRF mode ¹⁵ | | -93 | | dBm |
| $P_{SENS,IT,SP,1M,BLE}$ | Sensitivity, 1 Mbps BLE ideal transmitter, ≤ 37 bytes BER=1E-3 ¹⁶ | | -96 | | dBm |
| $P_{SENS,IT,LP,1M,BLE}$ | Sensitivity, 1 Mbps BLE ideal transmitter ≥ 128 bytes BER=1E-4 ¹⁷ | | -95 | | dBm |
| $P_{SENS,IT,2M}$ | Sensitivity, 2 Mbps nRF mode ¹⁸ | | -89 | | dBm |

5.3.6. RX Selectivity

| Symbol | Description | Min. | Typ. | Max. | Units |
|--------------------------|--|------|------|------|-------|
| $C/I_{1M,co-channel}$ | 1 Mbps mode, Co-Channel interference | | 9 | | dB |
| $C/I_{1M,-1MHz}$ | 1 Mbps mode, Adjacent (-1 MHz) interference | | -2 | | dB |
| $C/I_{1M,+1MHz}$ | 1 Mbps mode, Adjacent (+1 MHz) interference | | -10 | | dB |
| $C/I_{1M,-2MHz}$ | 1 Mbps mode, Adjacent (-2 MHz) interference | | -19 | | dB |
| $C/I_{1M,+2MHz}$ | 1 Mbps mode, Adjacent (+2 MHz) interference | | -42 | | dB |
| $C/I_{1M,-3MHz}$ | 1 Mbps mode, Adjacent (-3 MHz) interference | | -38 | | dB |
| $C/I_{1M,+3MHz}$ | 1 Mbps mode, Adjacent (+3 MHz) interference | | -48 | | dB |
| $C/I_{1M,\pm 6MHz}$ | 1 Mbps mode, Adjacent (≥ 6 MHz) interference | | -50 | | dB |
| $C/I_{1MBLE,co-channel}$ | 1 Mbps BLE mode, Co-Channel interference | | 6 | | dB |
| $C/I_{1MBLE,-1MHz}$ | 1 Mbps BLE mode, Adjacent (-1 MHz) interference | | -2 | | dB |
| $C/I_{1MBLE,+1MHz}$ | 1 Mbps BLE mode, Adjacent (+1 MHz) interference | | -9 | | dB |
| $C/I_{1MBLE,-2MHz}$ | 1 Mbps BLE mode, Adjacent (-2 MHz) interference | | -22 | | dB |
| $C/I_{1MBLE,+2MHz}$ | 1 Mbps BLE mode, Adjacent (+2 MHz) interference | | -46 | | dB |
| $C/I_{1MBLE,>3MHz}$ | 1 Mbps BLE mode, Adjacent (≥ 3 MHz) interference | | -50 | | dB |
| $C/I_{1MBLE,image}$ | Image frequency Interference | | -22 | | dB |
| $C/I_{1MBLE,image,1MHz}$ | Adjacent (1 MHz) interference to in-band image freq | | -35 | | dB |
| $C/I_{2M,co-channel}$ | 2 Mbps mode, Co-Channel interference | | 2-C0 | | dB |
| $C/I_{2M,-2MHz}$ | 2 Mbps mode, Adjacent (-2 MHz) interference | | 6 | | dB |
| $C/I_{2M,+2MHz}$ | 2 Mbps mode, Adjacent (+2 MHz) interference | | -14 | | dB |
| $C/I_{2M,-4MHz}$ | 2 Mbps mode, Adjacent (-4 MHz) interference | | -20 | | dB |
| $C/I_{2M,+4MHz}$ | 2 Mbps mode, Adjacent (+4 MHz) interference | | -44 | | dB |
| $C/I_{2M,-6MHz}$ | 2 Mbps mode, Adjacent (-6 MHz) interference | | -42 | | dB |
| $C/I_{2M,+6MHz}$ | 2 Mbps mode, Adjacent (+6 MHz) interference | | -47 | | dB |
| $C/I_{2M,\geq 12MHz}$ | 2 Mbps mode, Adjacent (≥ 12 MHz) interference | | -52 | | dB |

Remark: Wanted signal level at PIN = -67 dBm. One interferer is used, having equal modulation as the wanted signal. The input power of the interferer where the sensitivity equals BER = 0.1% is presented.

5.3.7. RX Intermodulation

| Symbol | Description | Min. | Typ. | Max. | Units |
|-----------------------------|--|------|------|------|-------|
| P _{IMD,5TH,1M} | IMD performance, 1 Msps, 5th offset channel, Packet length <= 37 bytes | | -33 | | dBm |
| P _{IMD,5TH,1M,BLE} | IMD performance, BLE 1 Msps, 5th offset channel, Packet length <= 37 bytes | | -30 | | dBm |
| P _{IMD,5TH,2M} | IMD performance, 2 Msps, 5th offset channel, Packet length <= 37 bytes | | -33 | | dBm |
| P _{IMD,5TH,2M,BLE} | IMD performance, BLE 2 Msps, 5th offset channel, Packet length <= 37 bytes | | -31 | | dBm |

Remark: Wanted signal level at PIN = -64dBm. Two interferers with equal input power are used. The interferer closest in frequency is not modulated, the other interferer is modulated equal with the wanted signal. The input power of the interferers where the sensitivity equals BER = 0.1% is presented.

5.3.8. Radio Timing Parameters

| Symbol | Description | Min. | Typ. | Max. | Units |
|---------------------------|---|------|------|------|-------|
| t _{TXEN} | Time between TXEN task and READY event after channel FREQUENCY configured. Compatible with old devices. | | 140 | | us |
| t _{TXEN,FAST} | Time between TXEN task and READY event after channel FREQUENCY configured (Fast Mode) | | 40 | | us |
| t _{TXDISABLE} | Time between DISABLE task and DISABLED event when the radio was in TX and mode is set to 1 Mbps | | 6 | | us |
| t _{TXDISABLE,2M} | Time between DISABLE task and DISABLED event when the radio was in TX and mode is set to 2 Mbps | | 4 | | us |
| t _{RXEN} | Time between the RXEN task and READY event after channel FREQUENCY configured in default mode. Compatible with old devices. | | 140 | | us |
| t _{RXEN,FAST} | Time between the RXEN task and READY event after channel FREQUENCY configured in fast mode | | 40 | | us |
| t _{SWITCH} | The minimum time taken to switch from RX to TX or TX to RX when channel FREQUENCY unchanged | | 20 | | us |
| t _{RXDISABLE} | Time between DISABLE task and DISABLED event when the radio was in RX | | 0 | | us |
| t _{TXCHAIN} | Digital propagation delay (in radio only) when transmitting. Does not include EasyDMA access time. | | 0.6 | | us |
| t _{RXCHAIN} | Digital propagation delay (in radio only) when receiving. Does not include EasyDMA access time. | | 9.4 | | us |
| t _{RXCHAIN,2M} | Digital propagation delay in 2 Mbps mode (radio only) when receiving. Does not include EasyDMA access time. | | 5 | | us |

5.3.9. RSSI Specifications

| Symbol | Description | Min. | Typ. | Max. | Units |
|----------------------------|--|------|------|------|-------|
| RSSI _{ACC} | RSSI Accuracy Valid range -90 to -20 dBm | | ±2 | | dB |
| RSSI _{RESOLUTION} | RSSI resolution | | 1 | | dB |
| RSSI _{PERIOD} | Sample period | | 0.25 | | us |

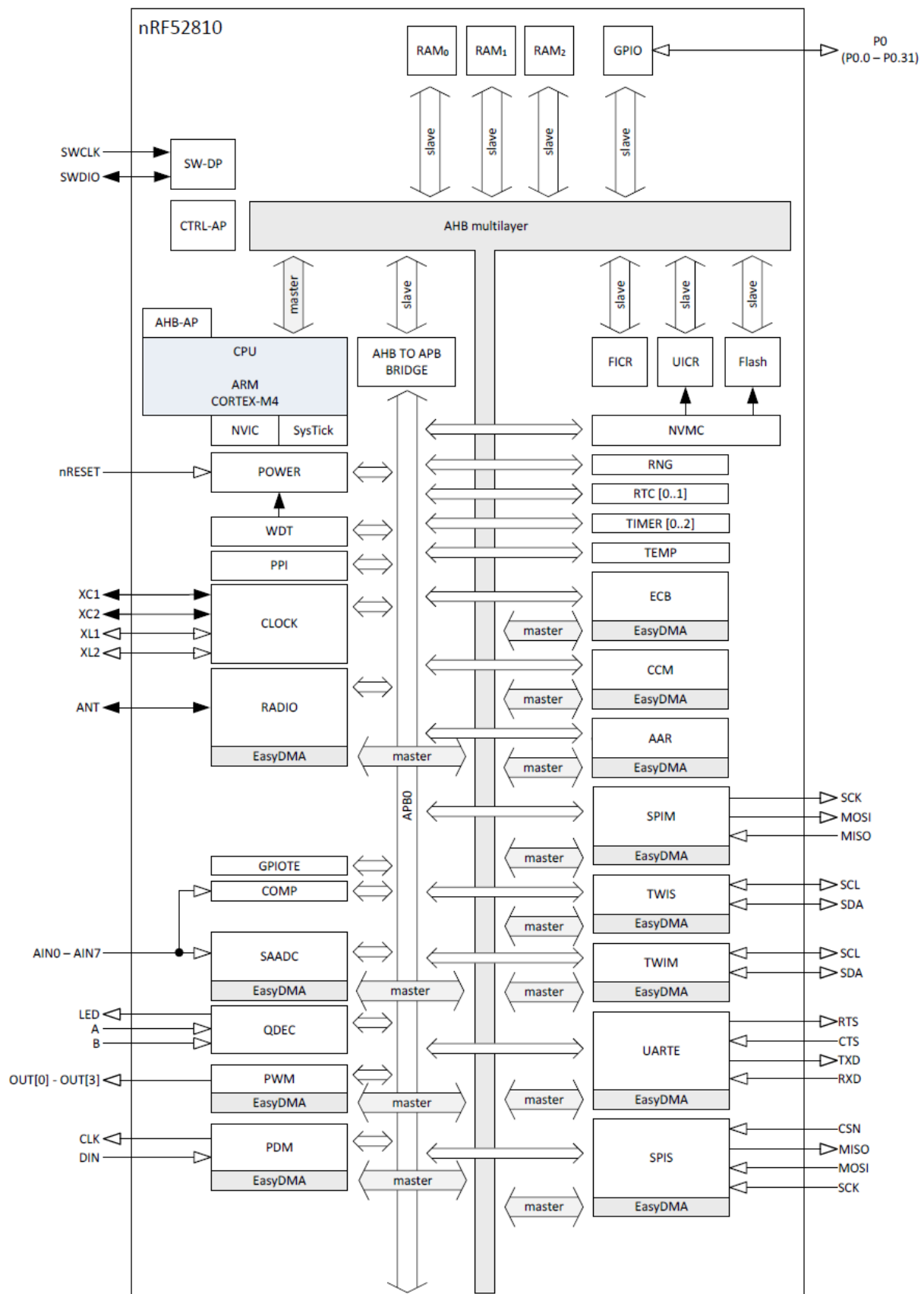
5.3.10. CPU

| Symbol | Description | Min. | Typ. | Max. | Units |
|-------------------------|--|------|------|------|------------------|
| W _{FLASH} | CPU wait states, running from flash | 0 | | 2 | |
| W _{RAM} | CPU wait states, running from RAM | | | 0 | |
| CM _{FLASH} | CoreMark ¹ , running from flash | | 144 | | CoreMark |
| CM _{FLASH/MHz} | CoreMark per MHz, running from flash | | 2.25 | | CoreMark/ MHz |
| CM _{FLASH/mA} | CoreMark per mA, running from flash, DCDC 3V | | 60 | | CoreMark/ |

5.3.11. Power Management

| Symbol | Description | Min. | Typ. | Max. | Units |
|----------------------------------|--|------|------|------|-------|
| I _{ON_RAMOFF_EVENT} | System ON, No RAM retention, Wake on any event | | 0.6 | | μA |
| I _{ON_RAMON_EVENT} | System ON, Full 24 kB RAM retention, Wake on any event | | 0.8 | | μA |
| I _{ON_RAMON_POF} | System ON, Full 24 kB RAM retention, Wake on any event, Power fail comparator enabled | | 0.8 | | μA |
| I _{ON_RAMON_GPIOTE} | System ON, Full 24 kB RAM retention, Wake on GPIOTE input (Event mode) | | 3.3 | | μA |
| I _{ON_RAMON_GPIOTEPORT} | System ON, Full 24 kB RAM retention, Wake on GPIOTE PORT event | | 0.8 | | μA |
| I _{ON_RAMON_RTC} | System ON, Full 24 kB RAM retention, Wake on RTC (running from LFRC clock) | | 1.5 | | μA |
| I _{OFF_RAMOFF_RESET} | System OFF, No RAM retention, Wake on reset | | 0.3 | | μA |
| I _{OFF_RAMON_RESET} | System OFF, Full 24 kB RAM retention, Wake on reset | | 0.5 | | μA |

6. Block Diagram



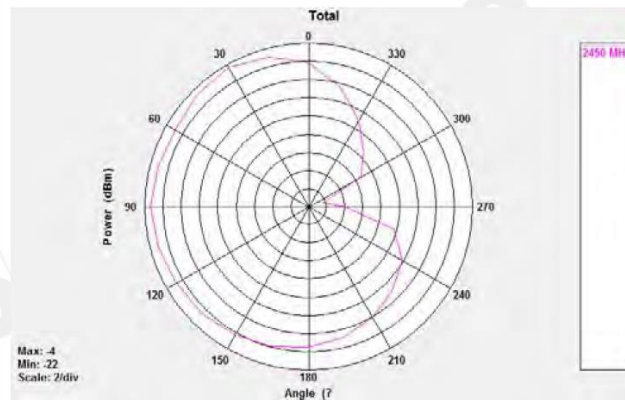
7. Antenna

7.1. MDBT42Q Series

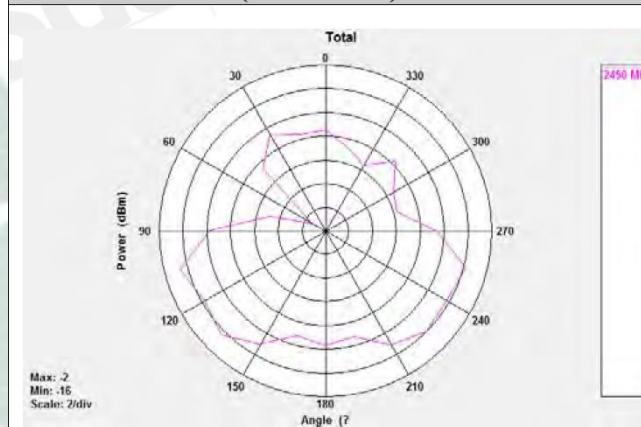
Test Result

| Frequency (MHz) | 2400 | 2410 | 2420 | 2430 | 2440 | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Gain (dBi) | -3.68 | -2.91 | -2.34 | -1.98 | -1.66 | -1.60 | -1.77 | -2.09 | -2.60 | -3.35 | -4.10 |
| Peak EIRP (dBm) | -3.68 | -2.91 | -2.34 | -1.98 | -1.66 | -1.60 | -1.77 | -2.09 | -2.60 | -3.35 | -4.10 |
| Directivity (dBi) | 4.98 | 5.11 | 5.12 | 5.02 | 4.93 | 4.76 | 4.58 | 4.38 | 4.11 | 3.77 | 3.42 |

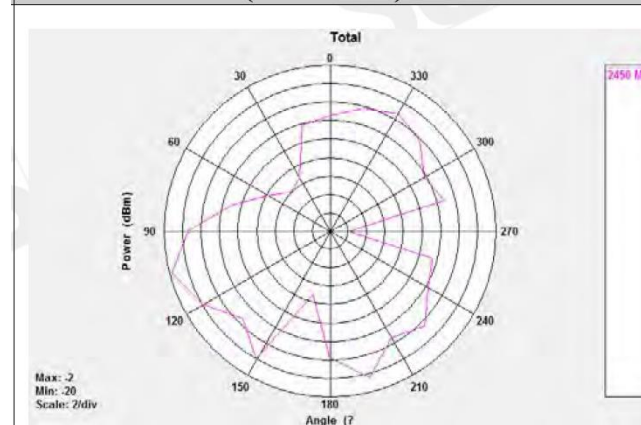
**Free Space
EIRP (2450 MHz) – XY cut**



**Free Space
EIRP (2450 MHz) – XZ cut**



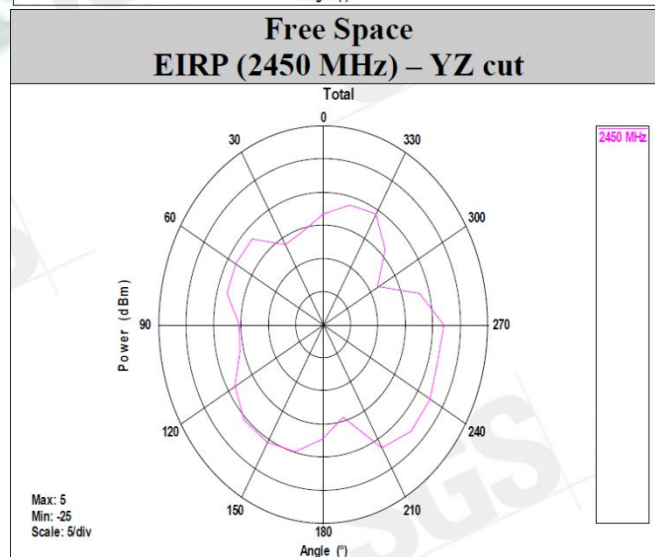
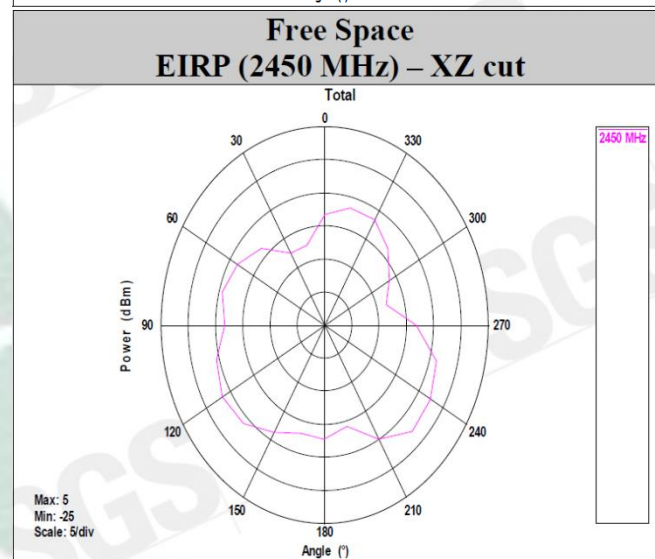
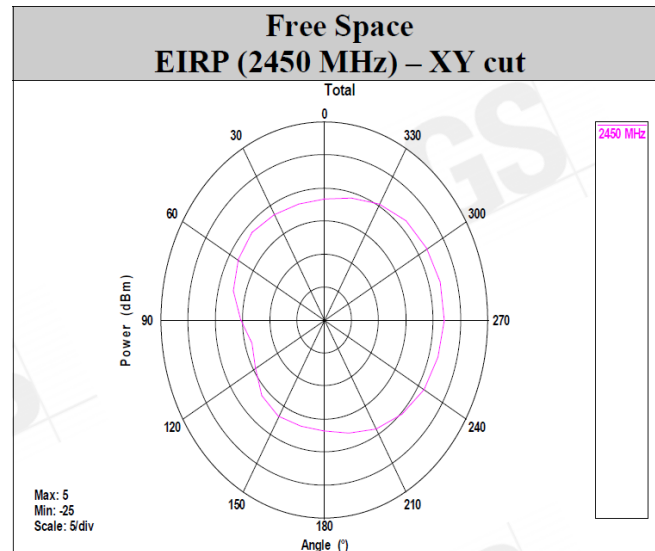
**Free Space
EIRP (2450 MHz) – YZ cut**



7.2. MDBT42Q-P Series

Test Result

| Frequency (MHz) | 2400 | 2410 | 2420 | 2430 | 2440 | 2450 | 2460 | 2470 | 2480 | 2490 | 2500 |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Gain (dBi) | -3.87 | -3.06 | -2.31 | -2.01 | -2.04 | -2.31 | -2.24 | -1.96 | -1.61 | -1.71 | -1.97 |
| Peak EIRP (dBm) | -3.87 | -3.06 | -2.31 | -2.01 | -2.04 | -2.31 | -2.24 | -1.96 | -1.61 | -1.71 | -1.97 |
| Directivity (dBi) | 3.79 | 4.00 | 4.25 | 4.17 | 3.86 | 3.51 | 3.54 | 3.91 | 4.39 | 4.44 | 4.49 |



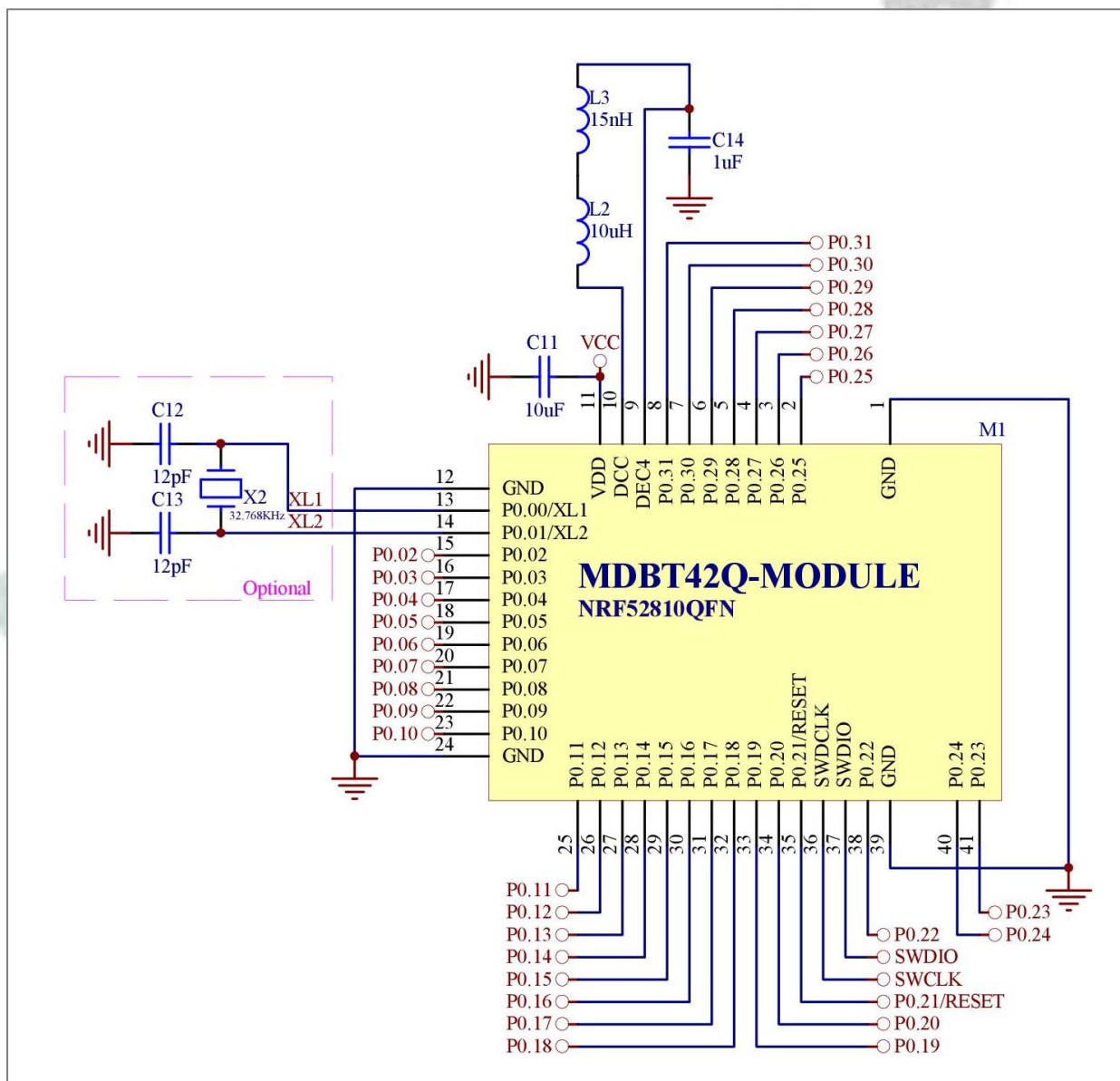
8. Reference Circuit

Module's default is using "DC-DC mode", and must connect it to external 32.768khz to work.

REMARK:

**** When NOT using DC-DC mode, please remove L2 / L3 / C13. ****

**** When using internal 32.768khz RC oscillator, please remove X2 / C12 / C13. ****



9. Certification

9.1. Declaration ID

QDL Bluetooth® qualified design listing

The Bluetooth SIG Hereby Recognizes

Raytac Corporation
Member Company

MDBT42 Series nRF52 Bluetooth Low Energy Module
Qualified Design Name

Declaration ID: D033661
Qualified Design ID: 91882
Specification Name: 4.2
Project Type: End Product
Model Number: MDBT42/MDBT42-P/MDBT42Q/MDBT42Q-P/MDBT42V/MDBT42V-P
Listing Date: 29 December 2016 Assessment Date: 29 December 2016
Hardware Version Number: V1 Software Version Number:

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

 **Bluetooth®**

QDL Bluetooth® qualified design listing

The Bluetooth SIG Hereby Recognizes

Raytac Corporation
Member Company

Multiprofile Subsystem for MDBTXX series module
Qualified Design Name

Declaration ID: D033622
Qualified Design ID: 91659
Specification Name: 4.2
Project Type: Profile Subsystem
Model Number: Multiprofile Subsystem for MDBTXX series module
Listing Date: 19 December 2016 Assessment Date: 19 December 2016
Hardware Version Number: NA Software Version Number: 1

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

 **Bluetooth®**

QDL Bluetooth® qualified design listing

The Bluetooth SIG Hereby Recognizes

Raytac Corporation

Member Company

nRF52xxx Bluetooth Module

Qualified Design Name

Declaration ID: D036781

Qualified Design ID: 100551

Specification Name: 5.0

Project Type: End Product

Model Number: MDBT42/MDBT42-P/MDBT42Q/MDBT42Q-P/MDBT42V/MDBT42V-P

Listing Date: 30 August 2017

Assessment Date: 30 August 2017



Hardware Version Number: 1

Software Version Number: 2

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



9.2. FCC Certificate (USA)

|  | | | | |
|--|----------------------------------|------------------------------------|----------------------------------|---|
| TCB | GRANT OF EQUIPMENT AUTHORIZATION | | | TCB |
| Certification Issued Under the Authority of the Federal Communications Commission By: | | | | |
| Telefication B.V. Edisonstraat 12a Zevenaar, NL-6902 PK Netherlands | | | Date of Grant: 02/21/2017 | |
| Raytac Corp. 5F., No.3, Jiankang Rd., Zhonghe Dist., New Taipei City,, 23586 Taiwan | | | Application Dated: 02/21/2017 | |
| Attention: Venson Liao , R&D 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: | | SH6MDBT42Q | | |
| Name of Grantee: | | Raytac Corp. | | |
| Equipment Class: | | Digital Transmission System | | |
| Notes: | | BT 4.2 Module | | |
| Modular Type: | | Single Modular | | |
| Grant Notes | FCC Rule Parts | Frequency Range (MHZ) | Output Watts | Frequency Emission Tolerance Designator |
| | 15C | 2402.0 - 2480.0 | 0.0023 | |
| <p>C2PC: To change module to be certified under portable device. Power output listed is conducted. This grant is valid only when the module is sold to OEM integrators and must be installed by the OEM or OEM integrators. The antenna's as listed in this application must not be co-located or operating in conjunction with any other antenna or transmitter. End-users may not be provided with the module installation instructions. OEM integrators and end-users must be provided with transmitter operating conditions for satisfying RF exposure compliance.</p> | | | | |
| Certificate No.: 162181172/AA/01 | | Mohammad Elhaj Product Assessor | |  |

9.3. TELEC Certificate (Japan)

telefication bv
The Netherlands
Chamber of Commerce
51565536
www.telefication.com

 **telefication**

Certificate
of
Radio Equipment in JAPAN

No: 201-160496 / 00

Telefication, operating as Conformity Assessment Body (CAB ID Number: 201) with respect to Japan, declares that the listed product complies with the Technical Regulations Conformity Certification of Terminal equipment (ordinance of MPT N° 31,1984)

Product description: **BT 4.2 Module**
Trademark: **Raytac**
Type designation: **MDBT42Q**
Hardware / Software version: **1 / 1**
Variants: **See Annex 3**

Manufacturer: **Raytac Corporation**
Address: **5F, No.3, Jiankang Rd., Zhonghe Dist.,**
City: **New Taipei 23586**
Country: **Taiwan**

This statement is granted to:

Name: **Raytac Corporation**
Address: **5F, No.3, Jiankang Rd., Zhonghe Dist.,**
City: **New Taipei 23586**
Country: **Taiwan**

This statement has THREE Annexes.

Zevenaar, 19 August 2016



CAB


Ramy Nabod
Product Assessor


PRODUCTS
RvA C 224

9.4. NCC Certificate (Taiwan)

MDBT42Q Series

| | |
|---|---|
|  | 台灣檢驗科技股份有限公司 |
| 低功率射頻電機型式認證證明 | |
| 一、申請者： | 勁達國際電子有限公司 |
| 地址： | 新北市中和區建康路3號5樓 |
| 二、製造廠商： | Ginstar Corporation |
| 三、器材名稱： | BT 4.2 Module |
| 四、廠牌： | Raytac |
| 五、型號： | MDBT42Q |
| 六、發射功率： | BT V4.2 single mode LE (GFSK): 3.57dBm (Peak) |
| 七、工作頻率： | 2402-2480MHz |
| 八、審驗日期： | 105年08月19日 |
| 九、審驗合格標籤式樣： |  CCAM16LP1180T2 |
| 說明： | |
| 1. 請依上列標籤式樣自製標籤，標貼或印鑄於器材本體明顯處，始得販賣或公開陳列。 | |
| 2. 經型式認證合格之低功率射頻電機，其廠牌、型號、設計、射頻性能如有變更，應重新申請型式認證。 | |
| 3. 違反低功率電波輻射性電機管理辦法之規定，擅自使用或變更無線電頻率、電功率者，除依電信法規定處罰外，驗證機關(構)並得廢止其型式認證證明或型式認證標籤。 | |
| 4. 送審廠商應保留送審樣品供日後核對。 | |
| 5. 本型式認證證明及其合格標籤使用權專屬取得本證明者。依電信管制射頻器材審驗辦法第15條規定，持有人得經由網際網路申請同意他人於同廠牌同型號之電信管制射頻器材使用型式認證標籤，並於次日起30天內，應檢具「電信管制射頻器材審驗合格標籤，或符合性聲明標籤同意使用備查表」送國家通訊傳播委員會備查。 | |
| 備註： | |
| 1. 本器材符合低功率射頻電機技術規範(3.10.1)之規定。 | |
| 2. 本公司僅對無線射頻特性技術規範辦理型式認證，其他仍須依本國相關法規辦理。 | |
| 3. 本器材使用天線型態: Chip Antenna，天線廠牌: Raytac，型號: MDBT42Q，增益: -1.6dBi。 | |
| 4. 本案審驗模組為完全模組，適用於任何平台。【平台】定義如下:若器材部組裝本案審驗模組，消費者仍能正常使用該器材主要功能，該器材得視為平台。若器材不組裝本案審驗模組，消費者不能正常使用該器材主要功能，該器材不能視為平台，該類不同廠牌型號器材組裝本案審驗模組後，須分別申請型式認證。 | |
| 5. 本公司係經國家通訊傳播委員會委託之驗證機構，核發本型式認證證明。 | |



MDBT42Q-P Series



台灣檢驗科技股份有限公司

低功率射頻電機型式認證證明

- 一、申請者：勁達國際電子有限公司
地址：新北市中和區建康路3號5樓
- 二、製造廠商：Ginstar Corporation
- 三、器材名稱：BT 4.2 Module
- 四、廠牌：Raytac
- 五、型號：MDBT42Q-P
- 六、發射功率：BT V4.2 single mode LE (GFSK): 3.57dBm (Peak)
- 七、工作頻率：2402-2480MHz
- 八、審驗日期：105年08月19日
- 九、審驗合格標籤式樣：



說明：

- 請依上列標籤式樣自製標籤，標貼或印鑄於器材本體明顯處，始得販賣或公開陳列。
- 經型式認證合格之低功率射頻電機，其廠牌、型號、設計、射頻性能如有變更，應重新申請型式認證。
- 違反低功率電波輻射性電機管理辦法之規定，擅自使用或變更無線電頻率、電功率者，除依電信法規定處罰外，驗證機關(構)並得廢止其型式認證證明或型式認證標籤。
- 送審廠商應保留送審樣品供日後核對。
- 本型式認證證明及其合格標籤使用權專屬取得本證明者。依電信管制射頻器材審驗辦法第15條規定，持有人得經由網際網路申請同意他人於同廠牌同型號之電信管制射頻器材使用型式認證標籤，並於次日起30天內，應檢具「電信管制射頻器材審驗合格標籤，或符合性聲明標籤同意使用備查表」送國家通訊傳播委員會備查。

備註：

- 本器材符合低功率射頻電機技術規範(3.10.1)之規定。
- 本公司僅對無線射頻特性技術規範辦理型式認證，其他仍須依本國相關法規辦理。
- 本器材使用天線型態：PCB Antenna，天線廠牌：Raytac，型號：MDBT42Q-P，增益：-1.61dBi。
- 本案審驗模組為完全模組，適用於任何平台。【平台】定義如下：若器材部組裝本案審驗模組，消費者仍能正常使用該器材主要功能，該器材得視為平台。若器材不組裝本案審驗模組，消費者不能正常使用該器材主要功能，該器材不能視為平台，該類不同廠牌型號器材組裝本案審驗模組後，須分別申請型式認證。
- 本公司係經國家通訊傳播委員會委託之驗證機構，核發本型式認證證明。

9.5. CE Test Report (EU)



SGS Reference No: E1/2016/90006C-01

VERIFICATION OF EMC COMPLIANCE

| | |
|--------------------------|---|
| Verification No. | : E1/2016/90006C-01 |
| Representative Model No. | : MDBT42Q |
| Added Model(s) | : MDBT42Q-P |
| Product Name | : BT 4.2 Module |
| Brand Name | : Raytac |
| Applicant | : Raytac Corporation |
| Address of Applicant | : 5F, No.3, Jiankang Rd., Zhonghe Dist., New Taipei City, 23586, Taiwan |
| Test Report Number | : E1/2016/90006-01 |
| Date of Issue | : May 18, 2017 |
| Applicable Standards | : EN 301 489-1 _{v2.1.1} : 2017-02, EN 301 489-17 _{v3.1.1} : 2017-02 EN 55032 : 2015+AC:2016-07 EN 61000-4-2 : 2009, EN 61000-4-3 : 2006+A1:2008+A2:2010 |

Conclusion
The apparatus meets the requirements of the above standards and hence compliance the essential requirements under article 3.1b of the RED (2014/53/EU) Directive.

*This verification is only valid for the equipment and configuration described, and in conjunction with the test report as detailed above.



Authorized Signatory:


SGS TAIWAN LTD.
Wisely Huang
Technical Asst. Supervisor

9.6. IC Certificate (Canada)

| | | | |
|--|--|---|----------------------------|
| telefication bv The Netherlands Chamber of Commerce 51565536 www.telefication.com | |  telefication | |
| TECHNICAL ACCEPTANCE CERTIFICATE | | CERTIFICAT D'ACCEPTABILITÉ TECHNIQUE | |
| CERTIFICATION No. No. DE CERTIFICATION | 8017A-MDBT42Q | | |
| TELEFICATION No. No. DE TELEFICATION | 162170280/AA/01 | | |
| TEST SITE No. No. DE LABORATOIRE | 4620A-5 | | |
| ISSUED TO DELIVRÉ A | Raytac Corporation | | |
| TYPE OF EQUIPMENT GENRE DE MATÉRIEL | Bluetooth device | | |
| TRADE NAME AND MODEL MARQUE ET MODELE | Raytac / MDBT42Q Raytac / MDBT42Q-P | | |
| CERTIFIED TO CERTIFIÉ SELON LE | SPECIFICATION CAHIER DES CHARGES | RSS-102 RSS-247 | ISSUE EDITION 5 1 |
| <p>Certification of equipment means only that the equipment has met the requirements of the above-noted specification. Licence applications, where applicable to use certified equipment, are acted on accordingly by the Industry Canada issuing office and will depend on the existing radio environment, service and location of operation. This certificate is issued on condition that the holder complies and will continue to comply with the requirements and procedures issued by Industry Canada. The equipment for which this certificate is issued shall not be manufactured, imported, distributed, leased, offered for sale or sold unless the equipment complies with the applicable technical specifications and procedures issued by Industry Canada.</p> | | <p>La certification du matériel signifie seulement que le matériel a satisfait aux exigences de la norme indiquée ci-dessus. Les demandes de licences nécessaires pour l'utilisation du matériel certifié sont traitées en conséquence par le bureau de délivrance d'Industrie Canada et dépendent des conditions radio ambiantes, du service et de l'emplacement d'exploitation. Le présent certificat est délivré à la condition que le titulaire satisfasse et continue de satisfaire aux exigences et aux procédures d'Industrie Canada. Le matériel à l'égard duquel le présent certificat est délivré ne doit pas être fabriqué, importé, distribué, loué, mis en vente ou vendu à moins d'être conforme aux procédures et aux spécifications techniques applicables publiées par Industrie Canada.</p> | |
| ISSUED BY TELEFICATION BV, RECOGNIZED CERTIFICATION BODY BY INDUSTRY CANADA DELIVRÉ PAR TELEFICATION BV, ORGANISME DE CERTIFICATION RECONNU PAR INDUSTRIE CANADA | | | |
| <i>I hereby attest that the subject equipment was tested and found in compliance with the above-noted specification. J'atteste, par la présente, que le matériel a fait l'objet d'essai et a été jugé conforme à la spécification ci-dessus</i> | | | |
| DATE 21 Feb 2017 BY | Mohammad Elhaj Product Assessor | | |
| This certificate has one annex. | | | |
|  | |  PRODUCTS RvA C 224 | |


9.7. SRRC Certificate (China)

无线电发射设备
Radio Transmission Equipment
型号核准证
Type Approval Certificate

劲达国际电子有限公司（台湾）：

根据《中华人民共和国无线电管理
In accordance with the provisions on the Radio
条例》，经审查，下列无线电发射设备
Regulations of the People's Republic of China , the following
符合中华人民共和国无线电管理规定和
radio transmission equipment , after examination , conforms
技术标准，其核准代码为：CMIIT ID: 2016DJ4571
to the provisions with its CMIIT ID:

有效期：五年
Validity


(发证机关)
Sealed by issuing authority

2016 年 8 月 12 日
Year Month Date

9.8. KC Certificate (South Korea)

B58D-F9C0-417D-C63A

| 방송통신기자재등의 적합인증서 <i>Certificate of Broadcasting and Communication Equipments</i> | |
|--|-------------------------------|
| 상호 또는 성명 <i>Trade Name or Applicant</i> | Raytac Corporation |
| 기자재 명칭 <i>Equipment Name</i> | 특정소출력 무선기기 (무선데이터통신시스템용 무선기기) |
| 기본모델명 <i>Basic Model Number</i> | MDBT42Q |
| 파생모델명 <i>Series Model Number</i> | MDBT42Q-P |
| 인증번호 <i>Certification No.</i> | MSIP-CRM-ryt-MDBT42Q |
| 제조사/제조국가 <i>Manufacturer/ Country of Origin</i> | Raytac Corporation / 대만 |
| 인증연월일 <i>Date of Certification</i> | 2016-10-06 |
| 기타 <i>Others</i> | |
| <p>위 기자재는 「전파법」 제58조의2 제2항에 따라 인증되었음을 증명합니다.</p> <p>It is verified that foregoing equipment has been certificated under the Clause 2, Article 58-2 of Radio Waves Act.</p> <p style="text-align: right;">2016년 (Year) 10월 (Month) 06일 (Date)</p> <p style="text-align: center;">국립전파연구원장</p> <p style="text-align: center;">  </p> <p style="text-align: center;"><i>Director General of National Radio Research Agency</i></p> <p>※ 인증 받은 방송통신기자재는 반드시 "적합성평가표시" 를 부착하여 유통하여야 합니다. 위반시 과태료 처분 및 인증이 취소될 수 있습니다.</p> | |

9.9. RoHS & REACH Report

Please click link below to download full report.

- [RoHS Report for MDBT42Q & MDBT42Q-P](#)
- [REACH Report for MDBT42Q & MDBT42Q-P](#)

9.10. End-Product Label

It is suggested using following content adding to package or user manual or label to obey the regulation. Any rules of end-product label shall refer to each certification for final reference.

9.10.1. FCC (USA)

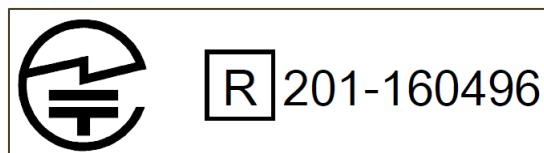
The FCC statement should be included in the user manual when there is no enough space on label. Otherwise, it should be included on the label.

“This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions. (1) This device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation.”

The final end product must be labeled in a visible area with the following: “Contain FCC ID: SH6MDBT42Q”.

9.10.2. TELEC (Japan)

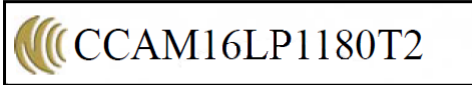
When manufacturer is placing the product on the Japanese market, the product must be affixed with the following Specified Radio Equipment marking:



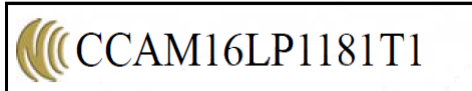
9.10.3. NCC (Taiwan)

請依下列標籤式樣自製標籤，標貼或印鑄於器材本體明顯處，始得販賣或公開陳列。

MDBT42Q Series



MDBT42Q-P Series



平台廠商必須於平台上標示字樣「本產品內含射頻模組：ID 編號 CCAM16LP1180T2」或「本產品內含射頻模組：ID 編號 CCAM16LP1181T1」。

「平台」定義如下：若器材組裝本案模組，消費者仍能正常使用該器材主要功能，該器材得視為平台。若器材不組裝本案模組，消費者不能正常使用該器材主要功能，該器材不能視為平台。該類不同廠牌型號器材組裝本案審驗模組後，須分別申請型式認證。

9.10.4. IC (Canada)

The IC statement should be included in the user manual when there is no enough space on label. Otherwise, it should be included on the label.

“This device complies with Industry Canada license-exempt RSS Standard(s). Operation is subject to the following two conditions. (1) This device may not cause harmful interference. (2) This device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.”

The final end product must be labeled in a visible area with the following: “Contain IC ID: 8017A-MDBT42Q”.

10. Basic Facts for nRF52 Chip

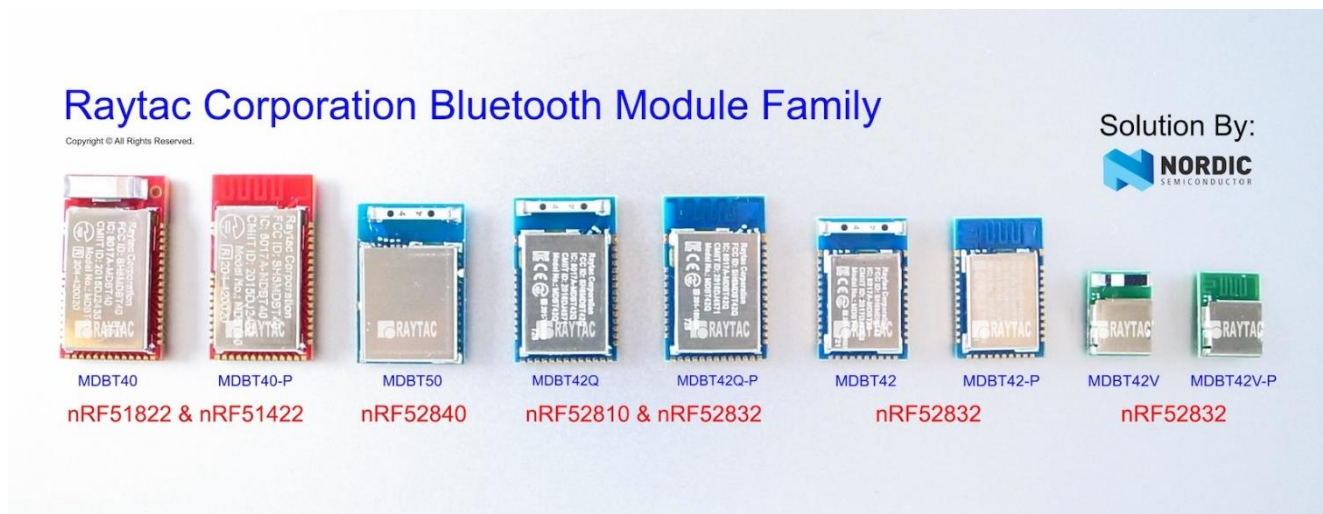
Below is the comparison chart between nRF52840, nRF52832 and nRF52810. Any discrepancy shall refer to Nordic's technical document as final reference.

| | nRF52840 | nRF52832 | nRF52810 |
|---|--|------------|------------|
| RAYTAC Model No.: | Click to see " Full List of Raytac's BLE Modules " | | |
| Bluetooth 5 Long Range (x4) | V | | |
| Bluetooth 5 High Speed | V | V | V |
| Bluetooth 5 Advertisement Extension (x8) | V | V | V |
| Flash (kBytes) | 1024 | 512 | 192 |
| RAM (kBytes) | 256 | 64 | 24 |
| ANT | V | V | V |
| IEEE 802.15.4 | V | | |
| ARM® TrustZone® Cryptocell | V | | |
| USB | V | | |
| QSPI | V | | |
| NFC | V | V | |
| I2S | V | V | |
| SPI, TWI, UART, PWM | V | V | V |
| PDM | V | V | V |
| ADC, Comparators | V | V | V |
| Supply Range (V) | 1.7 to 5.5 | 1.7 to 3.6 | 1.7 to 3.6 |

11. Useful Links

- **Nordic Infocenter:** <https://infocenter.nordicsemi.com/index.jsp>
All the necessary technical files of Nordic's chip are on this website.
- **Nordic Developer Zone:** <https://devzone.nordicsemi.com/questions/>
A highly recommended website for firmware developer. Interact with other developers and Nordic's employees will help with your questions. The site also includes tutorials in detail to help you get started.
- **Official Page of nRF52810 :** <https://www.nordicsemi.com/eng/Products/nRF52810>
A brief introduction to nRF52810 and download links for Nordic's developing software and SoftDevices.

Full List of Raytac's BLE Modules



MDBT40 & MDBT40-P Series

| Series | Nordic Solution | Raytac No. | IC Version | Antenna | RAM | Flash Memory |
|-------------------|-----------------|--------------------|------------|--------------|-------|--------------|
| MDBT40 | nRF51822 | MDBT40-256V3 | 3 | Chip Antenna | 16 kb | 256 K |
| | | MDBT40-256RV3 | | | 32 kb | 256 K |
| MDBT40-P | nRF51822 | MDBT40-P256V3 | 3 | PCB Antenna | 16 kb | 256 K |
| | | MDBT40-P256RV3 | | | 32 kb | 256 K |
| MDBT40 - ANT | nRF51422 | MDBT40-ANT-256V3 | 3 | Chip Antenna | 16 kb | 256 K |
| | | MDBT40-ANT-256RV3 | | | 32 kb | |
| MDBT40 - ANT-P | nRF51422 | MDBT40-ANT-P256V3 | 3 | PCB Antenna | 16 kb | 256 K |
| | | MDBT40-ANT-P256RV3 | | | 32 kb | |
| MDBT40 Nano | nRF51822 | MDBT40-n256V3 | 3 | N/A | 16 kb | 256 K |
| MDBT40 - ANT-Nano | nRF51422 | MDBT40-ANT-n256V3 | 3 | N/A | 16 kb | 256 K |

MDBT42 Series

QFN Package IC

| Series | Nordic Solution | Raytac No. | IC Version | Antenna | RAM | Flash Memory |
|---------|-----------------|--------------|------------|--------------|-------|--------------|
| MDBT42Q | nRF52832 | MDBT42Q-512K | 1 | Chip Antenna | 64 kb | 512 K |
| | nRF52810 | MDBT42Q-192K | | | 24 kb | 192 K |

| | | | | | | |
|-----------|----------|---------------|---|-------------|-------|-------|
| MDBT42Q-P | nRF52832 | MDBT42Q-P512K | 1 | PCB Antenna | 64 kb | 512 K |
| | nRF52810 | MDBT42Q-P192K | | | 24 kb | 192 K |

WLCSP Package IC

| Series | Nordic Solution | Raytac No. | IC Version | Antenna | RAM | Flash Memory |
|----------|-----------------|--------------|------------|--------------|-------|--------------|
| MDBT42 | nRF52832 | MDBT42-512K | 1 | Chip Antenna | 64 kb | 512 K |
| MDBT42-P | | MDBT42-P512K | 1 | PCB Antenna | | |

| Series | Nordic Solution | Raytac No. | IC Version | Antenna | RAM | Flash Memory |
|-----------|-----------------|---------------|------------|--------------|-------|--------------|
| MDBT42V | nRF52832 | MDBT42V-512K | 1 | Chip Antenna | 64 kb | 512 K |
| MDBT42V-P | | MDBT42V-P512K | 1 | PCB Antenna | | |

MDBT50 Series

| Series | Nordic Solution | Raytac No. | IC Version | Antenna | RAM | Flash Memory |
|----------|-----------------|------------|------------|--------------|--------|--------------|
| MDBT50 | nRF52840 | MDBT50-1M | 1 | Chip Antenna | 256 kb | 1MB |
| MDBT50-P | | MDBT50-P1M | | PCB Antenna | | |

Release Note

- 2017/08/02 Version A: 1st release
- 2017/11/10 Version B:
 - (1) Updated Chapter 2 (2.2, 2.3, 2.4 & 2.6), Chapter 4 (adding description of changing color of solder mask), Chapter 5 (updating technical spec based on Nordic nRF52810 PS V1.0), Chapter 9.1 (adding BT 5.0 certificate), and full list of model no..
 - (2) Added Chapter 10 and Chapter 11.
- 2017/12/26 Version C:
 - (1) Updated Chapter 4 (removing marking info), Chapter 8 (revising typo of two C13).