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Approval Sheet

(產品承認書)

產品名稱 (Product):	BLE AT Command Module
	in **Central / Master** Role
解決方案 (Solution):	Nordic nRF52832
產品型號 (Model No.):	**MDBT42Q – ATM** (Chip Antenna)
	MDBT42Q – PATM (PCB Antenna)
韌體版本 (FW Revision):	1.2

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. *Granted main regional certification such as FCC (USA), CE(EU)*

   TELEC (Japan), SRRC (China), IC (Canada), NCC (Taiwan), and KC (South Korea)

Index

1. Overall Introduction

Raytac's MDBT42Q-ATM & MDBT42Q-PATM is a BT 4.2 and BT 5 stack (Bluetooth low energy or BLE) module designed based on **Nordic nRF52832 SoC solution**, which incorporates: **UART** interface in only central/master role for data bridge in compact size **(L) 16 x (W) 10 x (H) 2.2 mm**.

2. AT Command

2.1. List of supported commands

- Setting of scanned device name
- Setting of scanned base UUID/service UUID/TX character/RX character
- Setting of scanned RSSI threshold
- Choose data rate of 1M bps or 2M bps on-air
- Set TX output power in 5 levels.
- Set scanning time
- Enable/disable scanning
- Set LED pattern indicating scanning or connecting status
- 7 sets of UART baud rates
- Enable/disable UART flow control
- Power-down mode for power saving and GPIO wake-up
- Support DC-to-DC and LDO power mode
- Use internal or external 32.768KHz oscillator
- Recover-to-default setting with hardware and software method
- System reset of hardware and software
- Set serial number and retrieve
- Retrieve MAC Address
- Retrieve ADC value for battery detection, delivering the information through battery service
- Support maximum MTU 247bytes / data payload up to maximum 244 bytes
- Enable/Disable Beacon information printed out through UART interface (31 bytes beacon)
- Support scan Beacon company ID/UUID (31 bytes beacon)

2.2. AT Command Sets

2.2.1. “Write” Commands

No.	Command	Description
(1)	**AT+NAME**	Set scanned device name. Max. length of 20 characters e.g. AT+NAME123 (device name 123, 3 characters)
(2)	**AT+RESET**	Set to reset system
(3)	**AT+SCANOLDSTART**	Set to start scanning paired device
(4)	**AT+SCANNEWSTART**	Set to start scanning **ALL** devices
(5)	**AT+SCANSTOP**	Set to stop scanning
(6)	**AT+SLEEP**	Set to get into deep sleep mode
(7)	**AT+BAUDRATE9600**	Set UART baud rate at 9600 bps,n,8,1
(8)	**AT+BAUDRATE19200**	Set UART baud rate at 19200 bps,n,8,1
(9)	**AT+BAUDRATE38400**	Set UART baud rate at 38400 bps,n,8,1
(10)	**AT+BAUDRATE57600**	Set UART baud rate at 57600 bps,n,8,1
(11)	**AT+BAUDRATE115200**	Set UART baud rate at 115200 bps,n,8,1
(12)	**AT+BAUDRATE230400**	Set UART baud rate at 230400 bps,n,8,1 **(recommended enabling flow control)**
(13)	**AT+BAUDRATE460800**	Set UART baud rate at 460800 bps,n,8,1 **(recommended enabling flow control)**
(14)	**AT+FLOWCONTROLDIS**	Disable UART flow control
(15)	**AT+FLOWCONTROLEN**	Enable UART flow control
(16)	**AT+TXPOWER4DBM**	Set RF TX power at + 4dBm
(17)	**AT+TXPOWER0DBM**	Set RF TX power at 0dBm
(18)	**AT+TXPOWER-4DBM**	Set RF TX power at - 4dBm
(19)	**AT+TXPOWER-8DBM**	Set RF TX power at - 8dBm
(20)	**AT+TXPOWER-20DBM**	Set RF TX power to - 20dBm
(21)	**AT+XTALINTERNAL**	Use internal RC 32.768KHZ low frequency oscillator
(22)	**AT+XTALEXTERNAL**	Use external crystal 32.768KHZ low frequency oscillator
(23)	**AT+CONNECTINDICATORLOW**	Set logic low output when connecting BT
(24)	**AT+CONNECTINDICATORHIGH**	Set logic high output when connecting BT

No.	Command	Description
(25)	**AT+PHYMODE1MBPS**	Set PHY mode at 1Mbps
(26)	**AT+PHYMODE2MBPS**	Set PHY mode at 2Mbps
(27)	**AT+WAKEUPLOW**	Set logic low at wake-up when in deep sleep
(28)	**AT+WAKEUPHIGH**	Set logic high at wake-up when in deep sleep
(29)	**AT+IDLETIMEtttt**	Set idle time **(Hex)** e.g. 0x001E (min. 30secs), 0x0258 (Max. 600secs) 0x0000 (forever)
(30)	**AT+SCANOLDTIMEtttt**	Set time of scanning of paired device **(Hex)** e.g. 0x001E (min. 30secs), 0x0258 (Max. 600secs) 0x0000 (forever)
(31)	**AT+SCANNEWTIMEtttt**	Set time of scanning all devices **(Hex)** e.g. 0x001E (min. 30secs), 0x0258 (Max. 600secs) 0x0000 (forever)
(32)	**AT+DCDCDIS**	Disable DC to DC converter
(33)	**AT+DCDCEN**	Enable DC to DC converter
(34)	**AT+CONNECTINTERVALMODE0**	Set connection interval mode for Peripheral 20ms/40ms usage (min. 20ms / Max. 75ms),
(35)	**AT+CONNECTINTERVALMODE1**	Set connection interval mode for Peripheral 8ms/8ms usage (min. 8ms / Max. 8ms)
(36)	**AT+IDLEPATTERNnnnnffff**	Set LED idle pattern **(Hex)**, where n = time when LED on, f = time when LED off e.g. 0x0064 (min. 100ms) 0x1388 (Max. 5,000ms) 0x00000000 (off) 0xFFFFFFFF (on)

No.	Command	Description
(37)	**AT+CONNECTPATTERNnnnnffff**	Set LED connecting pattern **(Hex)**, where n = time when LED on, f = time when LED off e.g. 0x0064 (min. 100ms) 0x1388 (Max. 5,000ms) 0x00000000 (off) 0xFFFFFFFF (on)
(38)	**AT+SCANOLDPATTERNnnnnffff**	Set LED pattern for scanning paired device **(Hex)**, where n = time when LED on, f = time when LED off e.g. 0x0064 (min. 100ms) 0x1388 (Max. 5000ms) 0x00000000 (off) 0xFFFFFFFF (on)
(39)	**AT+SCANNEWPATTERNnnnnffff**	Set LED pattern for scanning all devise **(Hex)**, where n = time when LED on, f = time when LED off e.g. 0x0064 (min. 100ms) 0x1388 (Max. 5000ms) 0x00000000 (off) 0xFFFFFFFF (on)
(40)	**AT+SERIALNOnnnnnnnn**	Set serial number e.g. AB000001, fixed 8-character length
(41)	**AT+RESPONSEDIS**	Disable response when sending “write” command
(42)	**AT+RESPONSEEN**	Enable response when sending “write” command
(43)	**AT+DISCONNECT**	Terminate the connection
(44)	**AT+RSSITHRESHOLDnnn**	Set RSSI threshold for scanning all devices (Ascii), e.g. -69 (min.); -29 (Max.)
(45)	**AT+BEACONINFODIS**	Disable scanning beacon (31 bytes)
(46)	**AT+BEACONINFOEN**	Enable scanning beacon (31 bytes) **When AT+BEACONINFOEN is set, *the device become a BEACON SCANNER only*. If you want to exchange data, please set “AT+BEACONINFODIS”.**
(47)	**AT+COMPANYIDdddd**	Set company ID for beacon **(Hex)**, e.g. 0x004C (for Apple ID)

No.	Command	Description
(48)	**AT+BEACONUUID uuuuuuuuuuuuuuuu uuuuuuuuuuuuuuuu**	Set UUID for beacon **(Hex)**, e.g. 01122334455667788 99AABBCCDDEEFF0
(49)	**AT+TXCHARACTERUUIDuuuu**	Set TX character UUID for NUS **(Hex)**, e.g. 0x0003
(50)	**AT+RXCHARACTERUUIDuuuu**	Set RX character UUID for NUS **(Hex)**, e.g. 0x0002
(51)	**AT+SERVICEUUIDuuuu**	Set service UUID for NUS **(Hex)**, e.g. 0x0001
(52)	**AT+BASEUUID uuuuuuuuuuuuuuuu uuuuuuuuuuuuuuuu**	Set base UUID for NUS **(Hex)**, e.g. 9ECADC240EE5A9E093F3A3B5**0000**406E 13th & 14th byte is reserved for service / TX character RX character UUID, always be 0000.
(53)	**AT+DEFAULT**	Back to default

2.2.2. “Read” Commands

No.	Command	Description
(1)	**AT?NAME**	To retrieve scanned device name
(2)	**AT?VERSION**	To retrieve firmware version
(3)	**AT?MACADDR**	To retrieve IC MAC address
(4)	**AT?BAUDRATE**	To retrieve current UART baud rate
(5)	**AT?FLOWCONTROL**	To retrieve UART status of flow control
(6)	**AT?TXPOWER**	To retrieve RF TX power
(7)	**AT?XTAL**	To retrieve status of 32.768KHz oscillator
(8)	**AT?CONNECTINDICATOR**	To retrieve logic of pin for BT-connecting indicator
(9)	**AT?PHYMODE**	To retrieve status of PHY mode
(10)	**AT?WAKEUP**	To retrieve logic of wake-up pin
(11)	**AT?IDLETIME**	To retrieve idle time **(Hex)**
(12)	**AT?SCANOLDTIME**	To retrieve time of scanning paired device **(Hex)**
(13)	**AT?SCANNEWTIME**	To retrieve time of scanning all devices **(Hex)**
(14)	**AT?DCDC**	To retrieve DC to DC converter status
(15)	**AT?CONNECTINTERVALMODE**	To retrieve status of connection interval mode
(16)	**AT?IDLEPATTERN**	To retrieve LED idle pattern **(Hex)**
(17)	**AT?CONNECTPATTERN**	To retrieve LED connecting pattern **(Hex)**
(18)	**AT?SCANOLDPATTERN**	To retrieve LED pattern when scanning paired device **(Hex)**
(19)	**AT?SCANNEWPATTERN**	To retrieve LED pattern when scanning all devices **(Hex)**
(20)	**AT?SERIALNO**	To retrieve serial number
(21)	**AT?ADCVALUE**	To retrieve 10bit ADC value
(22)	**AT?RESPONSE**	To retrieve status of response
(23)	**AT?RSSITHRESHOLD**	To retrieve scanning new RSSI threshold value **(Ascii)**
(24)	**AT?CONNECTRSSI**	To retrieve RSSI value when in BLE connection **(Ascii)**
(25)	**AT?BEACONINFO**	To retrieve beacon information
(26)	**AT?COMPANYID**	To retrieve company ID value **(Hex)**
(27)	**AT?BEACONUUID**	To retrieve beacon UUID value **(Hex)**

No.	Command	Description
(28)	**AT?TXCHARACTERUUID**	To retrieve TX character UUID value **(Hex)**
(29)	**AT?RXCHARACTERUUID**	To retrieve RX character UUID value **(Hex)**
(30)	**AT?SERVICEUUID**	To retrieve service UUID value **(Hex)**
(31)	**AT?BASEUUID**	To retrieve base UUID value **(Hex)**
(32)	**AT?ALLPARAMETERS**	To retrieve value of all parameters

2.2.3. Response (Default)

No.	Command	Response
(1)	**AT?NAME**	Raytac AT-UART (default)
(2)	**AT?VERSION**	e.g. version: 1.0
(3)	**AT?MACADDR**	e.g. D352BDE1E414
(4)	**AT?BAUDRATE**	0 baudrate9600 (default) (0 = 9600; 1 = 19200; 2 = 38400; 3 = 57600; 4 = 115200; 5 = 230400; 6 = 460800)
(5)	**AT?FLOWCONTROL**	0 flowcontrol dis (default) (0 = disabled; 1 = enabled)
(6)	**AT?TXPOWER**	0 txpower 4dbm (default) (0 = 4dBm; 1 = 0dBm; 2 = -4dBm; 3 = -8dBm, 4 = -20dBm)
(7)	**AT?XTAL**	0 xtal internal (default) (0 = internal; 1 = external, and XTAL = 32.768KHz oscillator)
(8)	**AT?CONNECTINDICATOR**	0 connect indicator low (default) (0 = output low; 1 = output high)
(9)	**AT?PHYMODE**	0 PHY mode 1Mbps (default) (0 = 1Mbps; 1 = 2Mbps)
(10)	**AT?WAKEUP**	0 wakeup low (default) (0 = low active; 1 = high active)
(11)	**AT?IDLETIME**	0000 (default: **Hex**, forever idle with no timeout, tttt: 0x0000)
(12)	**AT?SCANOLDTIME**	0000 (default: **Hex**, forever scanning paired device with no timeout, tttt: 0x0000)
(13)	**AT?SCANNEWTIME**	0000 default: **Hex**, forever scanning ALL devices with no timeout, tttt: 0x0000)
(14)	**AT?DCDC**	0 dcdc dis (default) (0 = disabled; 1 = enabled)

No.	Command	Response
(15)	AT?CONNECTINTERVALMODE	0 connect interval mode 0 (default) (0 = connection interval for Peripheral 20ms/40ms usage 1 = connection interval for Peripheral 8ms/8ms usage)
(16)	AT?IDLEPATTERN	00640f3c (default: Hex, 0.1sec on / 3.9sec off, nnnn: 0x0064, ffff: 0x0f3c)
(17)	AT?CONNECTPATTERN	00c80708 (default: Hex, 0.2sec on / 1.8sec off, nnnn: 0x00c8, ffff: 0x0708)
(18)	AT?SCANOLDPATTERN	03e803e8 (default: Hex, 1sec on / 1sec off, nnnn: 0x03e8, ffff: 0x03e8)
(19)	AT?SCANNEWPATTERN	00640064 (default: Hex, 0.1sec on / 0.1sec off, nnnn: 0x0064, ffff: 0x0064)
(20)	AT?SERIALNO	Display “ no data! ” string (default)
(21)	AT?ADCVALUE	Value varies from input voltage
(22)	AT?RESPONSE	1 response en (default) (0 = disable response; 1 = enable response)
(23)	AT?RSSITHRESHOLD	-51 (default: Ascii, nnn: -51)
(24)	AT?BEACONINFO	0 beaconinfo dis (default) (0 = disable print beacon info.; 1 = enable print beacon info.)
(25)	AT?COMPANYID	004C (default: **Hex**, dddd: 0x004C)
(26)	AT?BEACONUUID	01122334455667788 99AABBCCDDEEFF0 (default: **Hex**, uuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuu: 0x01122334455667788 99AABBCCDDEEFF0)
(27)	AT?TXCHARACTERUUID	0003 (default: **Hex**, uuuu: 0x0003)
(28)	AT?RXCHARACTERUUID	0002 (default: **Hex**, uuuu: 0x0002)
(29)	AT?SERVICEUUID	0001 (default: **Hex**, uuuu: 0x0001)
(30)	AT?BASEUUID	9ECADC240EE5A9E093F3A3B50000406E (default: **Hex**, uuuuuuuuuuuuuuuuuuuuuuuuuuuuuuuu: 0x9ECADC240EE5A9E093F3A3B50000406E)
(31)	AT?ALLPARAMETERS	Display value of all parameters, separated by "0x0d0x0a"

2.3. Default Info

No.	Description	Default
(1)	**Scanned device name**	Raytac AT-UART
(2)	**Base UUID**	0x9E, 0xCA, 0xDC, 0x24, 0x0E, 0xE5, 0xA9, 0xE0, 0x93, 0xF3, 0xA3, 0xB5, 0x00, 0x00, 0x40, 0x6E
(3)	**Service UUID**	0x0001 TX characteristic: 0x0003; RX characteristic: 0x0002
(4)	**Baud rate**	9600bps,n,8,1
(5)	**Status of flow control**	Disabled
(6)	**RF TX power**	+4dBm
(7)	**32.768Khz oscillator**	Using internal RC with 1,000ms calibration time
(8)	**Logic of BT connecting indicator**	Output set as logic low when BT is connecting
(9)	**PHY mode**	1Mbps
(10)	**Logic of wake-up pin**	Set logic low to wake up in deep sleep
(11)	**Idle time**	Forever idle with no timeout
(12)	**Time of scanning paired device**	Forever scanning for paired device with no timeout
(13)	**Time of scanning all devices**	Forever scanning for all devices with no timeout
(14)	**Status of DC-to-DC converter**	Disabled
(15)	**Connection interval mode**	Set at min. 20ms and Max. 75ms for Peripheral 20ms/40ms usage
(16)	**Idle LED pattern**	0.1sec on / 3.9sec off
(17)	**Connecting LED pattern**	0.2sec on / 1.8secs off
(18)	**LED pattern for scanning paired device**	1sec on / 1sec off
(19)	**LED pattern for scanning all devices**	0.1sec on / 0.1sec off
(20)	**Serial number**	Display “ no data! ” string
(21)	**ADC value**	Value varies from input voltage between 0x0000 ~ 0x03FF **(Hex)**.
(22)	**State of response**	Enabled

No.	Description	Default
(23)	**Scanning new RSSI threshold**	-51 **(Ascii)**.
(24)	**Beacon UUID**	0x01, 0x12, 0x23, 0x34, 0x45, 0x56, 0x67, 0x78, 0x89, 0x9A, 0xAB, 0xBC, 0xCD, 0xDE, 0xEF, 0xF0
(25)	**Company ID**	0x004C

2.4. Pin Assignment

Pin No.	Name	Pin Function	Description
(1)	**GND**	Ground	The pad must be connected to a solid ground plane
(2)	**NC**	No function	Not connected
(3)	**NC**	No function	Not connected
(4)	**NC**	No function	Not connected
(5)	**NC**	No function	Not connected
(6)	**NC**	No function	Not connected
(7)	**NC**	No function	Not connected
(8)	**NC**	No function	Not connected
(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)	**NC**	No function	Not connected when using internal RC (LFXO)
	XL1	Analog input	Connecting to 32.768KHz crystal when using external LFXO
(14)	**NC**	No function	Not connected when using internal RC (LFXO)
	XL2	Analog input	Connecting to 32.768KHz crystal when using external LFXO
(15)	**ADC**	Analog input	10bit resolution ADC is always on and update every 200ms
(16)	**Indicator**	Output / Logic	Output logic is selective about the action of BT connection
(17)	**Connecting or Adver. LED**	Output	Setting of LED pattern is changeable when it is active-low
(18)	**UART RTS**	Output	RTS, request to send
(19)	**UART TX**	Output	UART transmitter
(20)	**UART CTS**	Input	CTS, clear to send
(21)	**UART RX**	Input	UART receiver

Pin No.	Name	Pin Function	Description
(22)	**Wakeup**	Input / Logic	Output logic is selective about the action of wakeup from deep sleep
(23)	**UART PD**	Input	Active-high with internal pull-high to disable hardware UART interface. The default is disabled.
(24)	**GND**	Ground	The pad must be connected to a solid ground plane
(25)	**Flashed Default**	Input	Active-low with internal pull-high for 0.48sec ≦ logic low ≦ 1sec and return to logic high, then system will back to default.
(26)	**NC**	No function	Not connected
(27)	**NC**	No function	Not connected
(28)	**NC**	No function	Not connected
(29)	**NC**	No function	Not connected
(30)	**NC**	No function	Not connected
(31)	**NC**	No function	Not connected
(32)	**NC**	No function	Not connected
(33)	**NC**	No function	Not connected
(34)	**NC**	No function	Not connected
(35)	**RESET**	Input	Active-low to enable hardware 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)	**NC**	No function	Not connected
(39)	**GND**	Ground	The pad must be connected to a solid ground plane

3. How to Control via External MCU

3.1. How to Send AT Commands

- **When BT is NOT connected, for ALL commands**

1. Output low to UART PD pin to enable UART interface. Please keep it enabling during the whole time when sending AT commands.

2. Send any AT commands you want. Please wait for at least 250 ms before sending each command.

3. **Send command " AT+RESET " (not HW reset) to save all your settings.**

4. Output high or NC to UART PD pin to turn off UART interface.

- **When BT is connected, for following commands ONLY**
  Write: AT+DISCONNECT, AT+SLEEP, AT+SCANNEWSTART
  Read: AT?ADCVALUE, AT?CONNECTRSSI

1. Output low to flash default pin to enable the module to receive AT commands when BT is connected. Please keep it low during the whole time when sending AT commands.

2. Send "AT?ADCVALUE" or "AT+DISCONNECT" or "AT?CONNECTRSSI" or "AT+SCANNEWSTART" or "AT+SLEEP".

3. Output high or NC to flash default pin to disable the module to receive AT commands when BT is connected.

3.2. How to Return to Flashed Default Setting

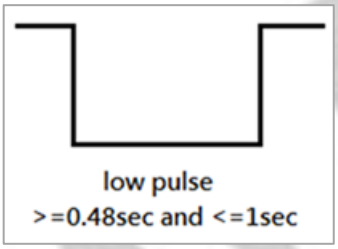
**** Only when BT is NOT connected ****

**** Note that default baud rate is "9600bps,n,8,1". For other default, please check "2.3 Default Info"***

- ## Use Hardware Method

1. Read indicator pin first to check if BT is *NOT* in connection.

2. Output a low pulse to flash default pin, then system will return to default setting.

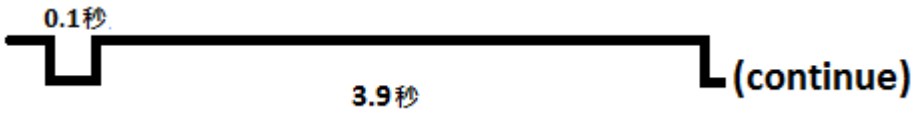
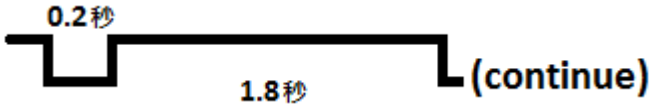
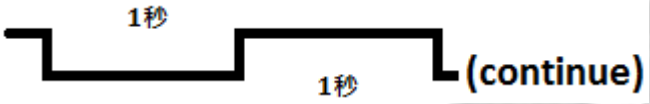


- ## Use Software method

1. Output low to UART PD pin to enable UART interface. Please keep it enabling during the whole time when sending AT commands.

2. Send command " AT+DEFAULT ", then system will return to default setting.

- Default Definition of LED Status

Mode	LED Status
Idle	 0.1 sec ON / 3.9 secs OFF
Connected	 0.2 sec ON / 1.8 secs OFF
Scan the paired device	 1 sec ON / 1 sec OFF
Scan all devices	 0.1 sec ON / 0.1 sec OFF

3.3. How to Start Scanning

This section describes how to start scanning using a physical button (hardware) or the AT Command (firmware) under various occasions. Before getting started, here are some notes applied to both methods.

- Each central device is only able to pair with 1 Peripheral.
- The device will be in idle directly when it is powered or not in BLE connection. It will go into deep sleep after a given timeout (no timeout in default).
- A few criteria must be met in order to complete BLE connection:

	Under Paired Scanning	**Under All-Devices Scanning**
Base UUID	√	√
Service UUID	√	√
Device name	√	√
RSSI Threshold		√
Mac Address in Paired Record	√	
RF Data Rate	√	√

● Use Key/Button

START Scanning Paired Device --- (a)

- Press the button for less than 2 seconds and release it to start scanning paired device.

START Scanning All Devices --- (b)

- Press the button for 2 seconds or longer directly to start scanning all devices.

STOP Scanning Paired / All Device(s)

- Press the button for less than 2 seconds and release it to stop scanning. The device will be back to idle and go into deep sleep after a given a timeout (no timeout in default).

	How to Start Scanning	
	Paired Device	All Devices
Device Status		
Idle	(a)[1]	(b)
BLE Connection	Not Available	(b)
Scanning Paired Device	Not Available	(b)

Remark 1: The device stays in idle when there is no paired record.

Use AT Command

START Scanning Paired Device --- (a)

- Enter “AT+SCANOLDSTART” to start scanning paired device.

START Scanning All Devices --- (b)

- Enter “AT+SCANNEWSTART” to start scanning all devices.

STOP Scanning Paired / All Device(s)

- Enter “AT+SCANSTOP” to stop scanning. The device will be back to idle and go into deep sleep after a given timeout.

	How to Start Scanning	
	Paired Device	All Devices
Device Status		
Idle	(a)[1]	(b)
BLE Connection	Not Available	(b)
Scanning Paired Device	Not Available	(b)

Remark 1: The device stays in idle when there is no paired record.

4. Report of Data Transmission

All testing is done under **PHY mode at 1M bps** and **D.L.** means "**Data Length**" and **D.I.** means "**Data Interval**" in the table.

4.1. MCU → Peripheral (MDBT42Q-AT/MDBT42Q-PAT) → Central → Console

Central Connection Interval	Peripheral Connection Interval	Baud Rate	Flow Control	MCU D.L. (bytes)	MCU D.I. (ms)	Total D.L. (bytes)	Total Trans. Time (sec)	Data Rate (k-bytes/sec)
min = 20ms Max = 75ms	min = 20ms Max = 40ms	9600	X	64	60	262152	273	0.96
				244	250	999432	1,042	
			V	244	250	999432	1,042	
min = 20ms Max = 75ms	min = 20ms Max = 40ms	115200	X	64	8	262152	33	7.9
				244	30	999432	124	8
			V	244	30	999432	124	8
min = 20ms Max = 75ms	min = 20ms Max = 40ms	460800	X	244	25	999432	103	9.7
			V					
min = Max = 8ms	min = Max = 8ms	9600	X	64	60	262152	273	0.96
				244	250	999432	1,042	
			V	244	250	999432	1,042	
min = Max = 8ms	min = Max = 8ms	115200	X	64	8	262152	33	7.9
				244	30	999432	124	8
			V	244	30	999432	124	8
min = Max = 8ms	min = Max = 8ms	460800	X	244	15	999432	62	16.1
			V					

4.2. MCU → Central → Peripheral (MDBT42Q-AT/MDBT42Q-PAT) → Console

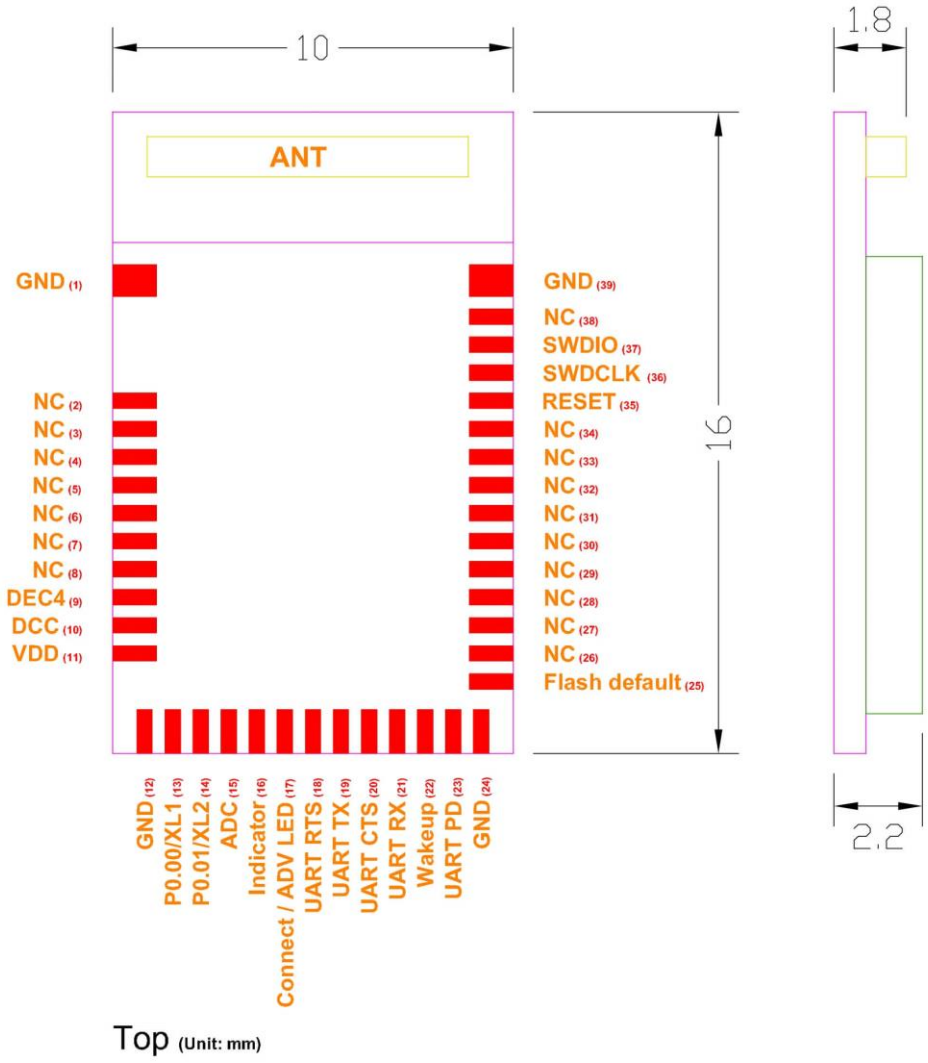
Central Connection Interval	Peripheral Connection Interval	Baud Rate	Flow Control	MCU D.L. (bytes)	MCU D.I. (ms)	Total D.L. (bytes)	Total Trans. Time (sec)	Data Rate (k-bytes/sec)
min = 20ms Max = 75ms	min = 20ms Max = 40ms	9600	X	64	60	262152	273	0.96
				244	250	999432	1,042	
			V	244	250	999432	1,042	
min = 20ms Max = 75ms	min = 20ms Max = 40ms	115200	X	64	8	262152	33	7.9
				244	30	999432	124	8
			V	244	30	999432	124	8
min = 20ms Max = 75ms	min = 20ms Max = 40ms	460800	X	244	18	999432	74	13.5
			V					
min = Max = 8ms	min = Max = 8ms	9600	X	64	60	262152	273	0.96
				244	250	999432	1,042	
			V	244	250	999432	1,042	
min = Max = 8ms	min = Max = 8ms	115200	X	64	8	262152	33	7.9
				244	30	999432	124	8
			V	244	30	999432	124	8
min = Max = 8ms	min = Max = 8ms	460800	X	244	15	999432	61	16.3
			V					

5. Product Dimension

5.1. PCB Dimensions & Pin Indication

- **MDBT42Q-ATM**

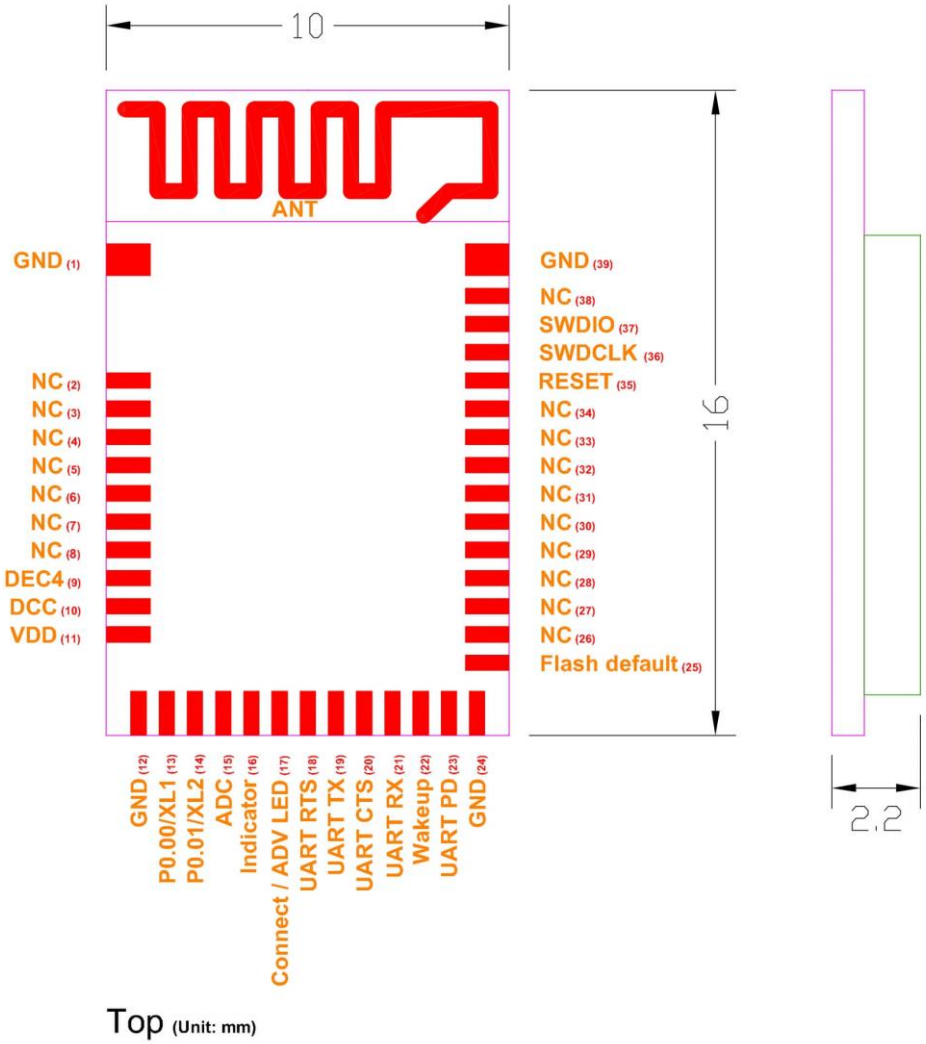
PCB Size (in mm)			
	Min.	Norm	MAX.
L		16	
W	- 0.15	10	+ 0.2
H		2.2	



Top (Unit: mm)

• MDBT42Q-PATM

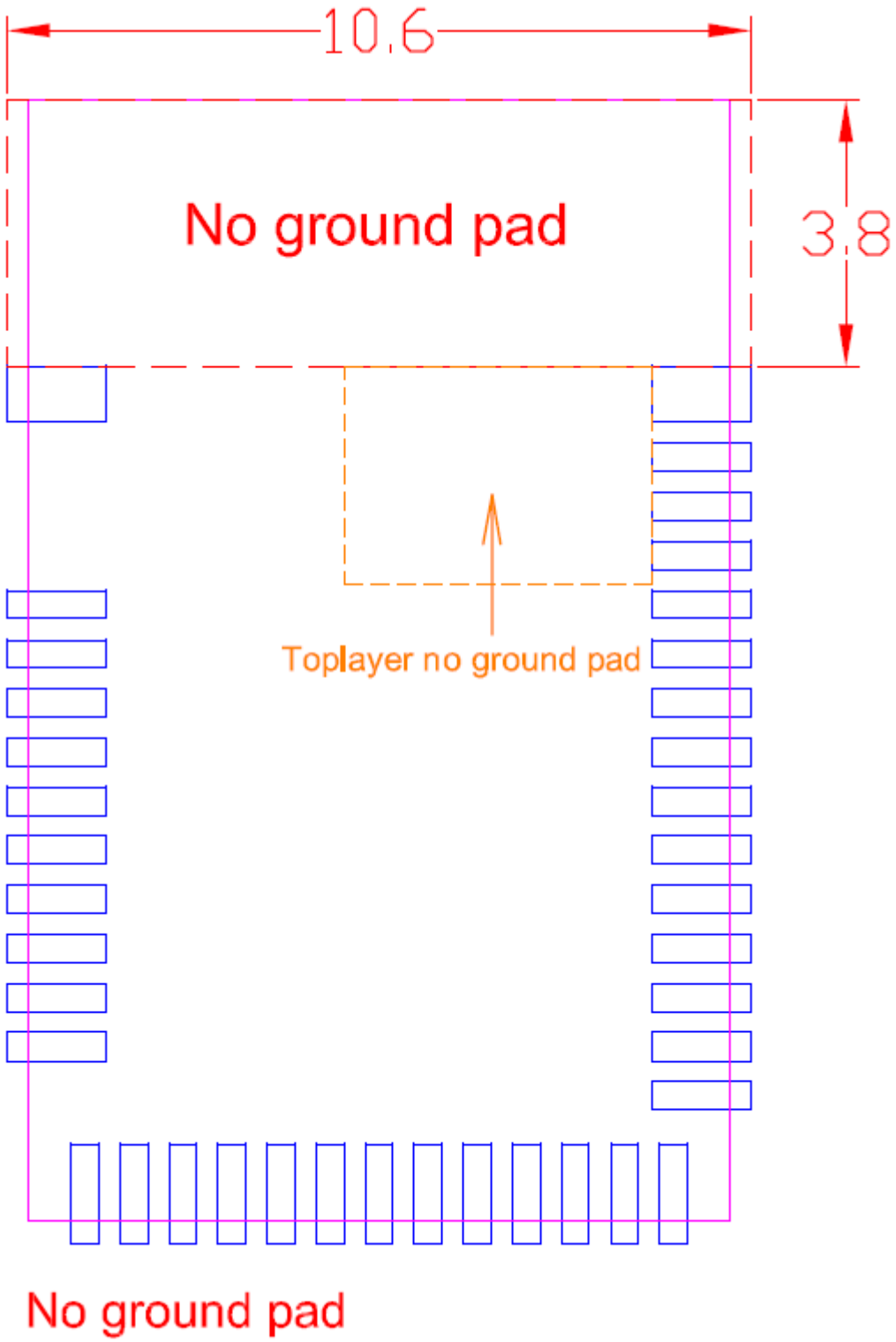
PCB Size (in mm)			
	Min.	Norm	MAX.
L		16	
W	- 0.15	10	+ 0.2
H		2.2	

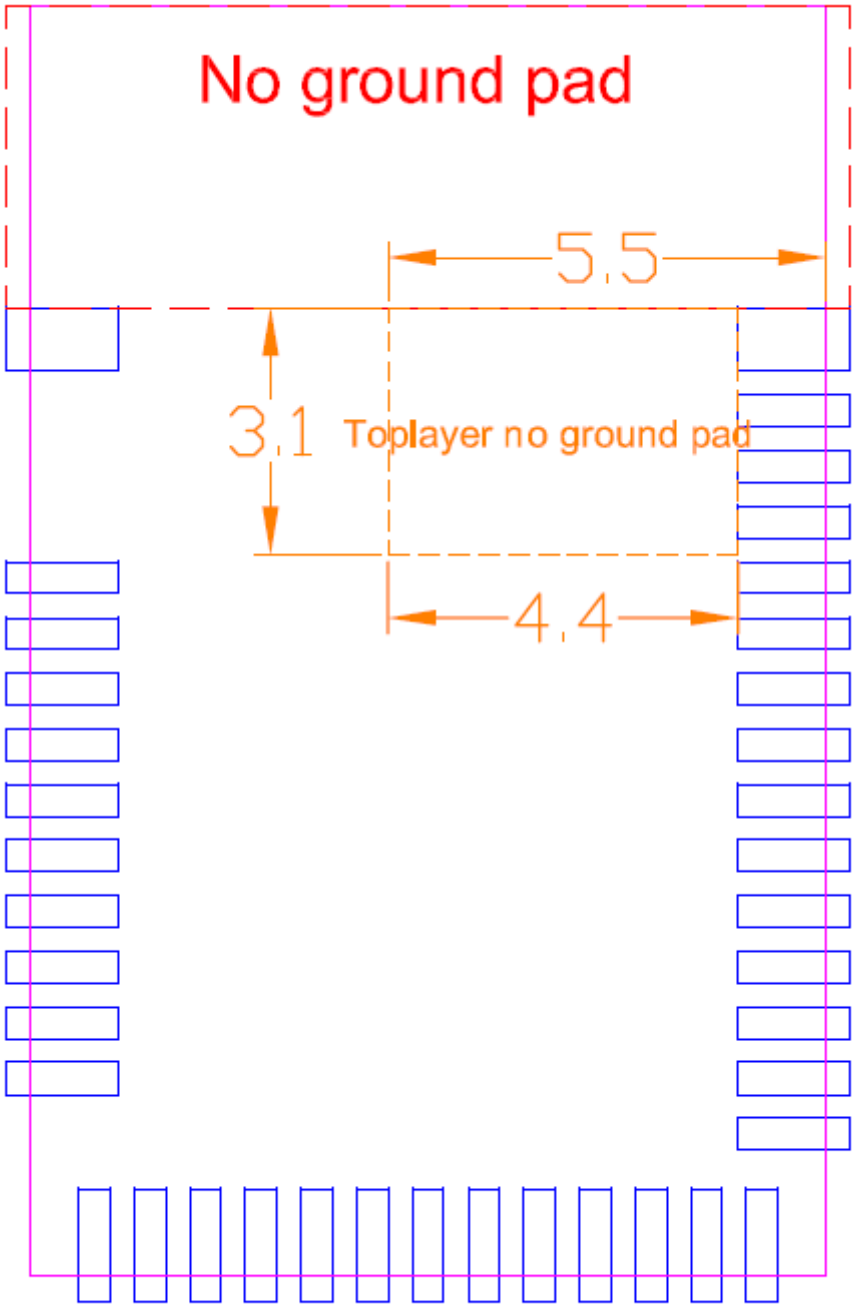


Top (Unit: mm)

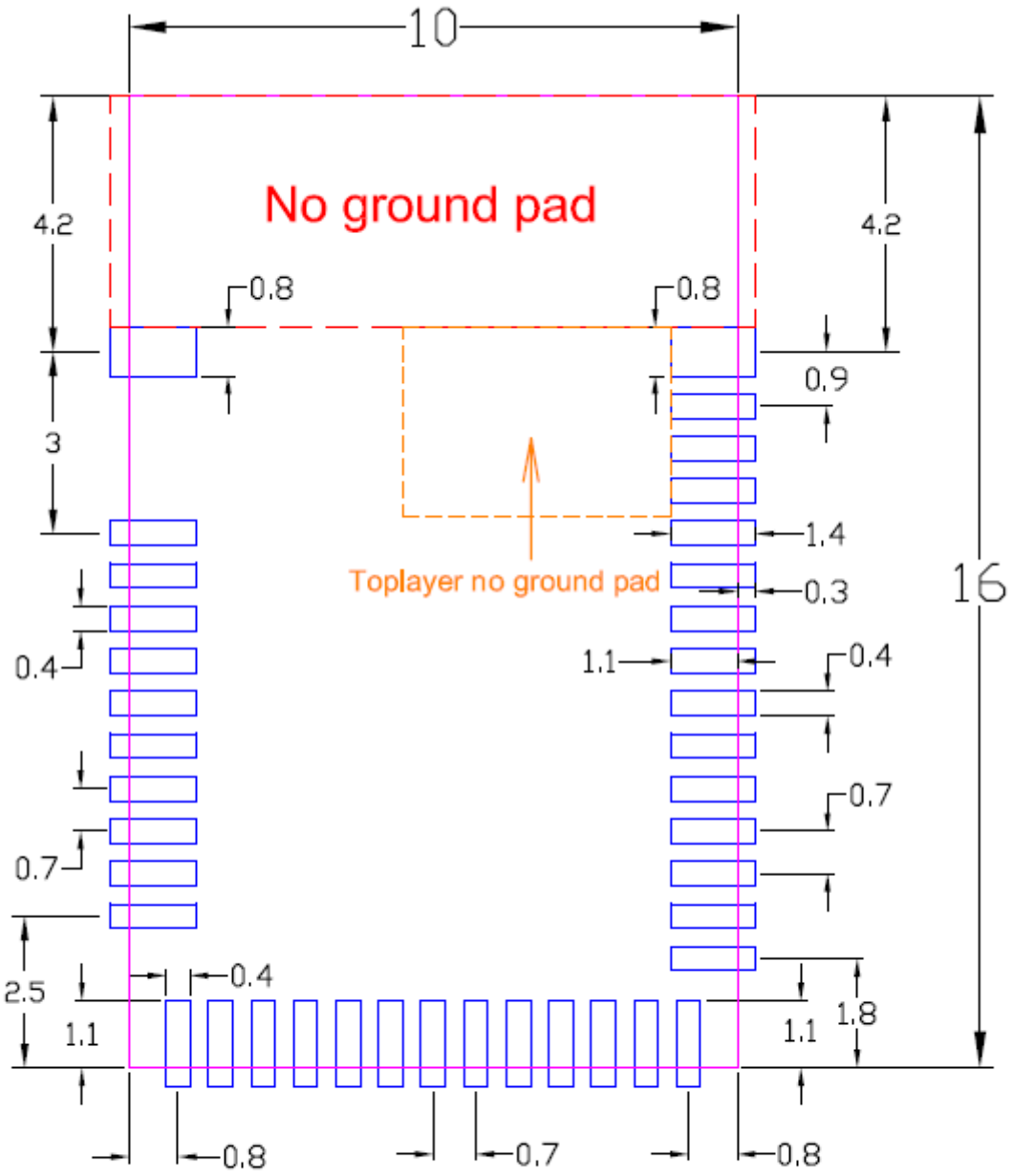
5.2. Recommended Layout of Solder Pad

Graphs are all in Top View, Unit in mm.





Toplayer no ground pad



Top View（單位：mm）

recommended solder pad layout

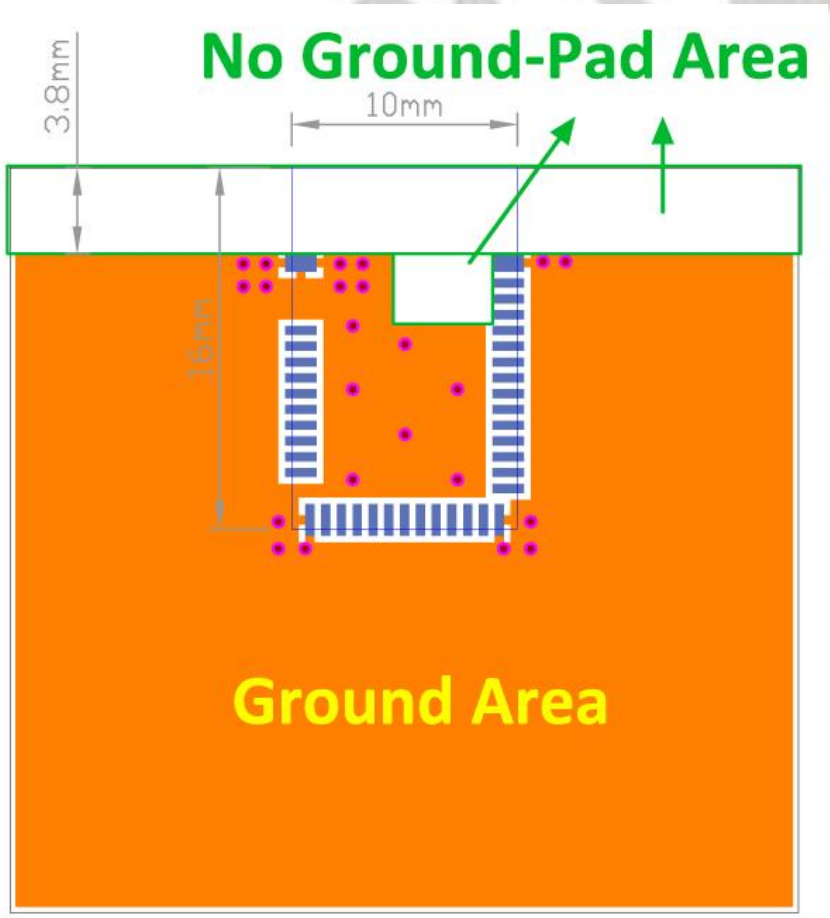
5.3. RF Layout Suggestion (aka Keep-Out Area)

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

No Ground Pad should be included in the corresponding position of the antenna in **EACH LAYER**.

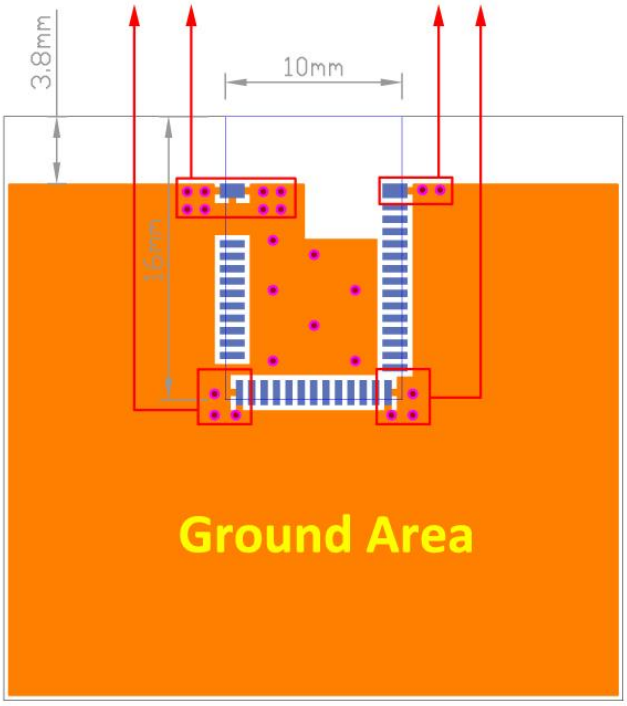
Place the module towards the edge of PCB to have better performance than placing it on the center.

Welcome to send us your layout in PDF for review at service@raytac.com or your contact at Raytac with title "Layout reviewing – Raytac model no. – YOUR company's name".

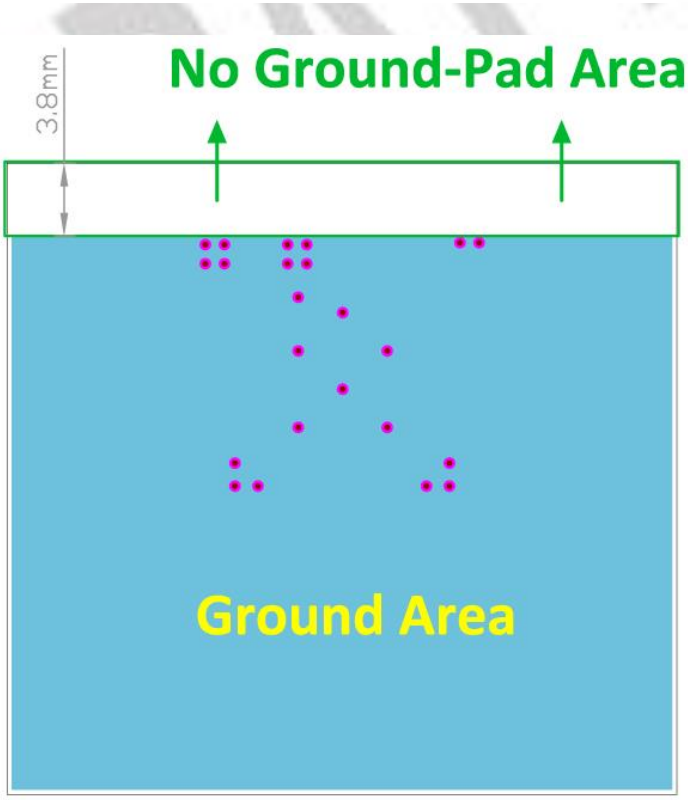


Top layer

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

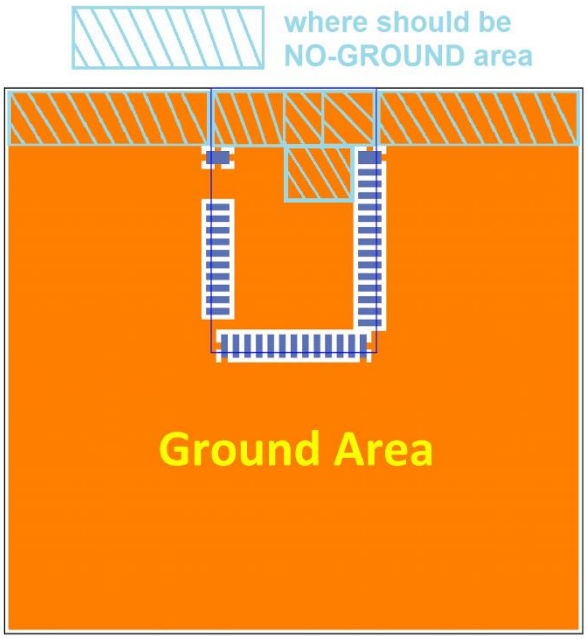


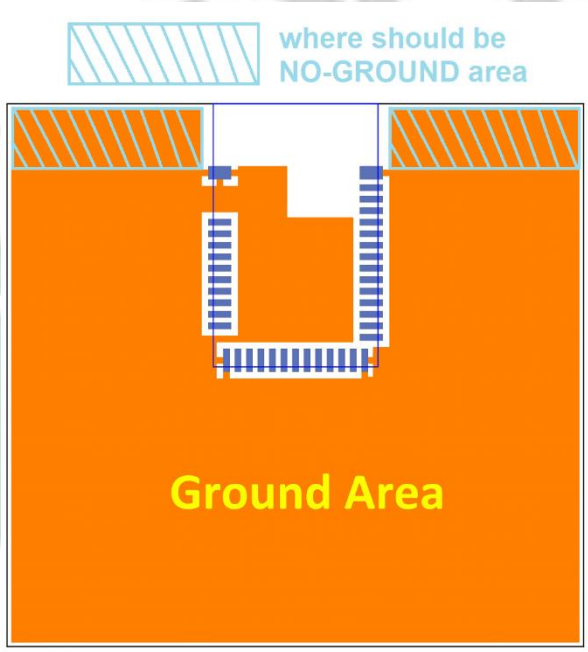
Top layer



Bottom layer

Examples of “**NOT RECOMMENDED**” layout





5.4. Footprint & Design Guide

Please visit “Support” page of our website to download. The package includes footprint, 2D/3D drawing, reflow graph and recommended spec for external 32.768khz.

6. Main Chip Solution

RF IC	Crystal Frequency
Nordic NRF52832	**32MHZ**

32MHz crystal is already inside the module.

7. Shipment Packaging Information

Model	Antenna	Photo
MDBT42Q-ATM	Chip/Ceramic	
MDBT42Q-PATM	PCB/Printed	

- Unit Weight of Module:

  MDBT42Q-ATM: 0.64g / pc (±0.02g) ; MDBT42Q-PATM: 0.62g / pc (±0.02g)

- Packaging Type: Anti-Static tray only

- Minimum Package Quantity (MPQ): 88 pcs per Tray

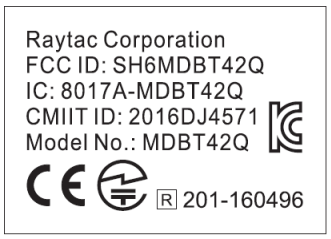
- Carton Contents: 1,760 pcs per carton (20 Full Tray + 1 Empty Tray)

- Dimension of Carton: (L) 37 x (W) 21 x (H) 13 cm

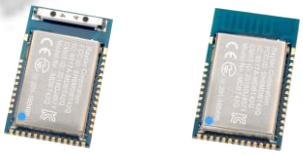
- Gross Weight: approx. 2.80 kgs per full carton (contains 1,760 pcs)

7.1. Marking on Metal Shield

7.1.1. Label

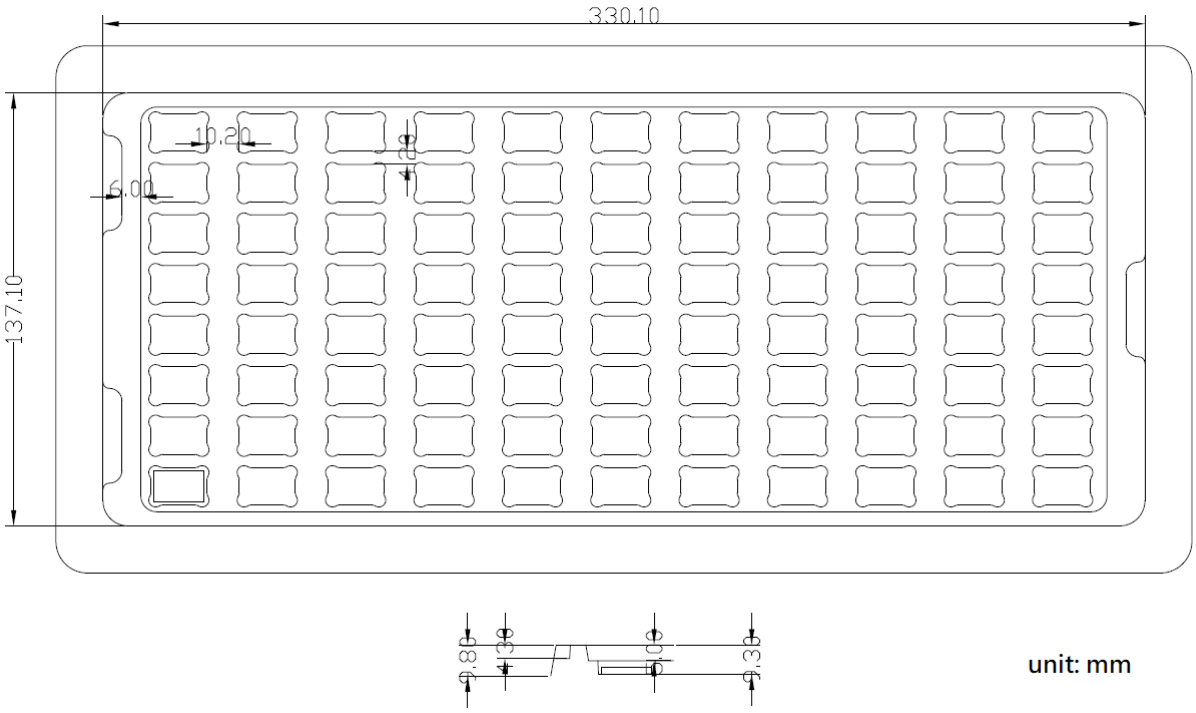


7.1.2. Dot Marking

Dot	Date Code	Photo
Yellow + Blue	before 019	
Blue	019	

7.2. Tray Info

Anti-static tray is specifically designed for mass production. It can be used directly on SMT automatic machine.



unit: mm

8. Specification

Any technical spec shall refer to Nordic's official documents as final reference. Contents below are from "nRF52832 Product Specification v1.4", visit the link to view full spec.

8.1. Absolute Maximum Ratings

	Min.	Max.	Unit
Supply voltages			
VDD	-0.3	+3.9	V
VSS		0	V
I/O pin voltage			
$V_{I/O}$, VDD ≤3.6 V	-0.3	VDD + 0.3 V	V
$V_{I/O}$, VDD >3.6 V	-0.3	3.9 V	V
NFC antenna pin current			
$I_{NFC1/2}$		80	mA
Radio			
RF input level		10	dBm
Environmental QFN48, 6×6 mm 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		

8.2. 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.

8.3. Electrical Specifications

8.3.1. 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
$f_{DELTA,BLE,2M}$	Frequency deviation @ BLE 2 Mbps		±500		kHz
fsk_{SPS}	On-the-air data rate	1		2	Mbps

8.3.2. Radio Current Consumption (Transmitter)

Symbol	Description	Min.	Typ.	Max.	Units
$I_{TX,PLUS4dBM,DCDC}$	TX only run current (DCDC, 3V) P_{RF} =+4 dBm		7.5		mA
$I_{TX,PLUS4dBM}$	TX only run current P_{RF} = +4 dBm		16.6		mA
$I_{TX,0dBM,DCDC}$	TX only run current (DCDC, 3V)P_{RF} = 0dBm		5.3		mA
$I_{TX,0dBM}$	TX only run current P_{RF} = 0dBm		11.6		mA
$I_{TX,MINUS4dBM,DCDC}$	TX only run current DCDC, 3V P_{RF} = -4dBm		4.2		mA
$I_{TX,MINUS4dBM}$	TX only run current P_{RF} = -4 dBm		9.3		mA
$I_{TX,MINUS8dBM,DCDC}$	TX only run current DCDC, 3V P_{RF} = -8 dBm		3.8		mA
$I_{TX,MINUS8dBM}$	TX only run current P_{RF} = -8 dBm		8.4		mA
$I_{TX,MINUS12dBM,DCDC}$	TX only run current DCDC, 3V P_{RF} = -12 dBm		3.5		mA
$I_{TX,MINUS12dBM}$	TX only run current P_{RF} = -12 dBm		7.7		mA
$I_{TX,MINUS16dBM,DCDC}$	TX only run current DCDC, 3V P_{RF} = -16 dBm		3.3		mA
$I_{TX,MINUS16dBM}$	TX only run current P_{RF} = -16 dBm		7.3		mA
$I_{TX,MINUS20dBM,DCDC}$	TX only run current DCDC, 3V P_{RF} = -20 dBm		3.2		mA
$I_{TX,MINUS20dBM}$	TX only run current P_{RF} = -20 dBm		7.0		mA
$I_{TX,MINUS40dBM,DCDC}$	TX only run current DCDC, 3V P_{RF} = -40 dBm		2.7		mA
$I_{TX,MINUS40dBM}$	TX only run current P_{RF} = -40 dBm		5.9		mA
$I_{START,TX,DCDC}$	TX start-up current DCDC, 3V, P_{RF} = 4 dBm		4.0		mA
$I_{START,TX}$	TX start-up current, P_{RF} = 4 dBm		8.8		mA

8.3.3. Radio Current Consumption (Receiver)

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

8.3.4. Transmitter Specification

Symbol	Description	Min.	Typ.	Max.	Units
P_{RF}	Maximum output power		4	6	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 Msps Nordic proprietary mode)		-25		dBc
$P_{RF2,1}$	2nd Adjacent Channel Transmit Power 2 MHz (1 Msps Nordic proprietary mode)		-50		dBc
$P_{RF1,2}$	1st Adjacent Channel Transmit Power 2 MHz (2 Msps Nordic proprietary mode)		-25		dBc
$P_{RF2,2}$	2nd Adjacent Channel Transmit Power 4 MHz (2 Msps Nordic proprietary mode)		-50		dBc
$P_{RF1,2,BLE}$	1st Adjacent Channel Transmit Power 2 MHz (2 Msps BLE mode)		-20		dBc
$P_{RF2,2,BLE}$	2nd Adjacent Channel Transmit Power 4 MHz (2 Msps BLE mode)		-50		dBc

8.3.5. 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, 1Msps nRF mode[1]		-93		dBm
$P_{SENS,IT,SP,1M,BLE}$	Sensitivity, 1Msps BLE ideal transmitter, <=37 bytes BER=1E-3[2]		-96		dBm
$P_{SENS,IT,LP,1M,BLE}$	Sensitivity, 1Msps BLE ideal transmitter >=128 bytes BER=1E-4 [3]		-95		dBm
$P_{SENS,IT,2M}$	Sensitivity, 2Msps nRF mode [4]		-89		dBm
$P_{SENS,IT,SP,2M,BLE}$	Sensitivity, 2Msps BLE ideal transmitter, Packet length <=37bytes		-93		dBm

1. Typical sensitivity applies when ADDR0 is used for receiver address correlation. When ADDR [1...7] are used for receiver address correlation, the typical sensitivity for this mode is degraded by 3dB.
2. As defined in the Bluetooth Core Specification v4.0 Volume 6: Core System Package (Low Energy Controller Volume).
3. Equivalent BER limit < 10E-04.
4. Same as remark 1.

Symbol	Description	Min.	Typ.	Max.	Units
$P_{SENS,DT,SP,2M,BLE}$	Sensitivity, 2Msps BLE dirty transmitter, Packet length <=37bytes		-93		dBm
$P_{SENS,IT,LP,2M,BLE}$	Sensitivity, 2Msps BLE ideal transmitter >= 128bytes		-92		dBm
$P_{SENS,DT,LP,2M,BLE}$	Sensitivity, 2Msps BLE dirty transmitter, Packet length >= 128bytes		-92		dBm

8.3.6. RX Selectivity

Symbol	Description	Min.	Typ.	Max.	Units
$C/I_{1M,co\text{-}channel}$	1Msps mode, Co-Channel interference		9		dB
$C/I_{1M,-1MHz}$	1 Msps mode, Adjacent (-1 MHz) interference		-2		dB
$C/I_{1M,+1MHz}$	1 Msps mode, Adjacent (+1 MHz) interference		-10		dB
$C/I_{1M,-2MHz}$	1 Msps mode, Adjacent (-2 MHz) interference		-19		dB
$C/I_{1M,+2MHz}$	1 Msps mode, Adjacent (+2 MHz) interference		-42		dB
$C/I_{1M,-3MHz}$	1 Msps mode, Adjacent (-3 MHz) interference		-38		dB
$C/I_{1M,+3MHz}$	1 Msps mode, Adjacent (+3 MHz) interference		-48		dB
$C/I_{1M,\pm6MHz}$	1 Msps mode, Adjacent (≥6 MHz) interference		-50		dB
$C/I_{1MBLE,co\text{-}channel}$	1 Msps BLE mode, Co-Channel interference		6		dB
$C/I_{1MBLE,-1MHz}$	1 Msps BLE mode, Adjacent (-1 MHz) interference		-2		dB
$C/I_{1MBLE,+1MHz}$	1 Msps BLE mode, Adjacent (+1 MHz) interference		-9		dB
$C/I_{1MBLE,-2MHz}$	1 Msps BLE mode, Adjacent (-2 MHz) interference		-22		dB
$C/I_{1MBLE,+2MHz}$	1 Msps BLE mode, Adjacent (+2 MHz) interference		-46		dB
$C/I_{1MBLE,>3MHz}$	1 Msps 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 frequency		-35		dB
$C/I_{2M,co\text{-}channel}$	2Msps mode, Co-Channel interference		10		dB
$C/I_{2M,-2MHz}$	2 Msps mode, Adjacent (-2 MHz) interference		6		dB
$C/I_{2M,+2MHz}$	2 Msps mode, Adjacent (+2 MHz) interference		-14		dB
$C/I_{2M,-4MHz}$	2 Msps mode, Adjacent (-4 MHz) interference		-20		dB
$C/I_{2M,+4MHz}$	2 Msps mode, Adjacent (+4 MHz) interference		-44		dB
$C/I_{2M,-6MHz}$	2 Msps mode, Adjacent (-6 MHz) interference		-42		dB
$C/I_{2M,+6MHz}$	2 Msps mode, Adjacent (+6 MHz) interference		-47		dB
$C/I_{2M,\geq12MHz}$	2 Msps mode, Adjacent (≥12 MHz) interference		-52		dB
$C/I_{2MBLE,co\text{-}channel}$	2 Msps BLE mode, Co-Channel interference		7		dB
$C/I_{2MBLE,\pm2MHz}$	2 Msps BLE mode, Adjacent (±2 MHz) interference		0		dB
$C/I_{2MBLE,\pm4MHz}$	2 Msps BLE mode, Adjacent (±4 MHz) interference		-47		dB
$C/I_{2MBLE,\geq6MHz}$	2 Msps BLE mode, Adjacent (≥6 MHz) interference		-49		dB
$C/I_{2MBLE,image}$	Image frequency Interference		-21		dB
$C/I_{2MBLE,image,\ 2MHz}$	Adjacent (2 MHz) interference to in-band image frequency		-36		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.

8.3.7. RX Intermodulation

Symbol	Description	Min.	Typ.	Max.	Units
$P_{IMD,1M}$	IMD performance, 1 Msps (3 MHz, 4 MHz, and 5 MHz offset)		-33		dBm
$P_{IMD,1M,BLE}$	IMD performance, BLE 1 Msps (3 MHz, 4 MHz, and 5 MHz offset)		-30		dBm
$P_{IMD,2M}$	IMD performance, 2 Msps (6 MHz, 8 MHz, and 10 MHz offset)		-33		dBm
$P_{IMD,2M,BLE}$	IMD performance, BLE 2 Msps (6 MHz, 8 MHz, and 10 MHz offset)		-32		dBm

Remark: Wanted signal level at PIN = -64dBm. Two interferers with equal input power are used. The interferer closet 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.

8.3.8. Radio Timing Parameters

Symbol	Description	Min.	Typ.	Max.	Units
t_{TXEN}	Time between TXEN task and READY event after channel FREQUENCY configured		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 1Msps		6		us
$t_{TXDISABLE,2M}$	Time between DISABLE task and DISABLED event when the radio was in TX and mode is set to 2Msps		4		us
t_{RXEN}	Time between the RXEN task and READY event after channel FREQUENCY configured in default mode		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 (channel FREQUENCY unchanged)		20		us
$t_{RXDISABLE}$	Time between DISABLE task and DISABLED event when the radio was in RX		0		us
$t_{TXCHAIN}$	TX chain delay		0.6		us
$t_{RXCHAIN}$	RX chain delay		9.4		us
$t_{RXCHAIN,2M}$	RX chain delay in 2Msps mode		5		us

8.3.9. 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

8.3.10. CPU

Symbol	Description	Min.	Typ.	Max.	Units
W_{FLASH}	CPU wait states, running from flash, cache disabled	0		2	
$W_{FLASHCACHE}$	CPU wait states, running from flash, cache enabled	0		3	
W_{RAM}	CPU wait states, running from RAM			0	
$I_{DDFLASHCACHE}$	CPU current, running from flash, cache enabled, LDO		7.4		mA
$I_{DDFLASHCACHEDCDC}$	CPU current, running from flash, cache enabled, DCDC 3V		3.7		mA
$I_{DDFLASH}$	CPU current, running from flash, cache disabled, LDO		8.0		mA
$I_{DDFLASHDCDC}$	CPU current, running from flash, cache disabled, DCDC 3V		3.9		mA
I_{DDRAM}	CPU current, running from RAM, LDO		6.7		mA
$I_{DDRAMDCDC}$	CPU current, running from RAM, DCDC 3V		3.3		mA
$I_{DDFLASH/MHz}$	CPU efficiency, running from flash, cache enabled, LDO		125		µA/MHz
$I_{DDFLASHDCDC/MHz}$	CPU efficiency, running from flash, cache enabled, DCDC 3V		58		µA/
CM_{FLASH}	CoreMark[5], running from flash, cache enabled		215		CoreM
$CM_{FLASH/MHz}$	CoreMark per MHz, running from flash, cache enabled		3.36		CoreM MHz
$CM_{FLASH/mA}$	CoreMark per mA, running from flash, cache enabled, DCDC 3V		58		CoreM mA

8.3.11. Power Management

Symbol	Description	Min.	Typ.	Max.	Units
$I_{ON\_RAMOFF\_EVENT}$	System ON, No RAM retention, Wake on any event		1.2		µA
$I_{ON\_RAMON\_EVENT}$	System ON, Full RAM retention, Wake on any event		1.5		µA
$I_{ON\_RAMOFF\_RTC}$	System ON, No RAM retention, Wake on RTC		1.9		µA
$I_{OFF\_RAMOFF\_RESET}$	System OFF, No RAM retention, Wake on reset		0.3		µA
$I_{OFF\_RAMOFF\_GPIO}$	System OFF, No RAM retention, Wake on GPIO		0.3		µA
$I_{OFF\_RAMOFF\_LPCOMP}$	System OFF, No RAM retention, Wake on LPCOMP		1.9		µA
$I_{OFF\_RAMOFF\_NFC}$	System OFF, No RAM retention, Wake on NFC field		0.7		µA
$I_{OFF\_RAMON\_RESET}$	System OFF, Full 64 kB RAM retention, Wake on reset		0.7		µA

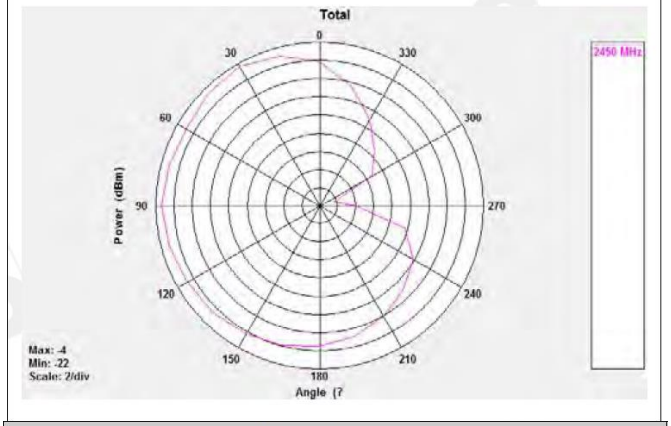
9. Antenna

9.1. MDBT42Q Series

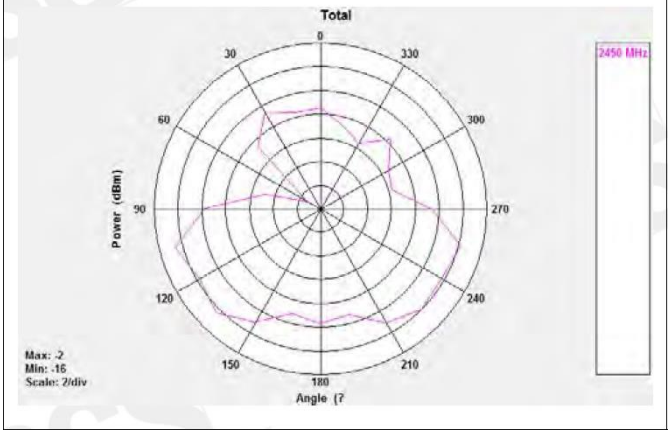
Test Result

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

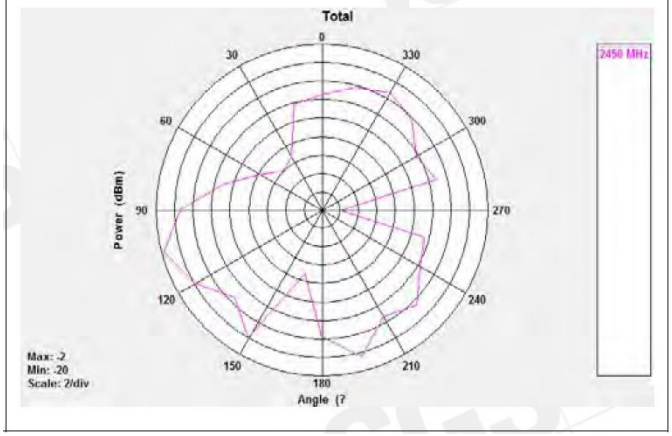
Free Space
EIRP (2450 MHz) – XY cut



Free Space
EIRP (2450 MHz) – XZ cut



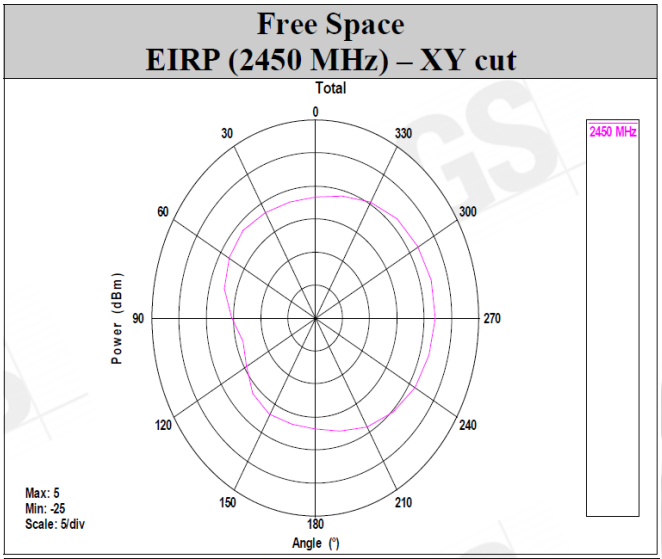
Free Space
EIRP (2450 MHz) – YZ cut

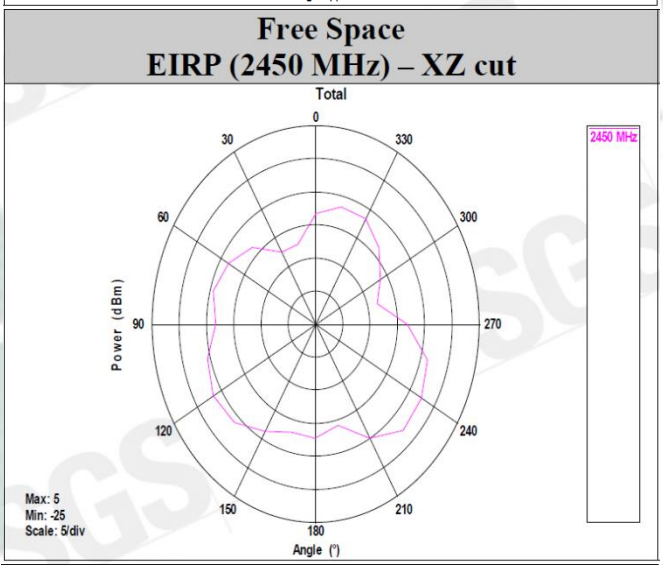


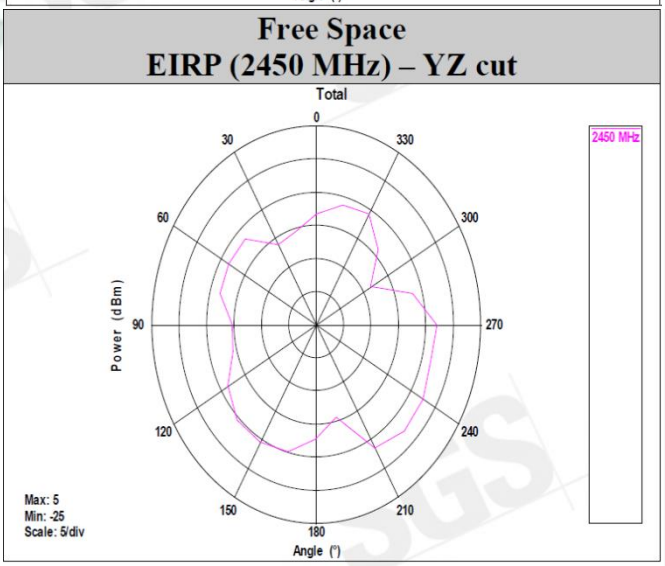
9.2. MDBT42Q-P Series

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







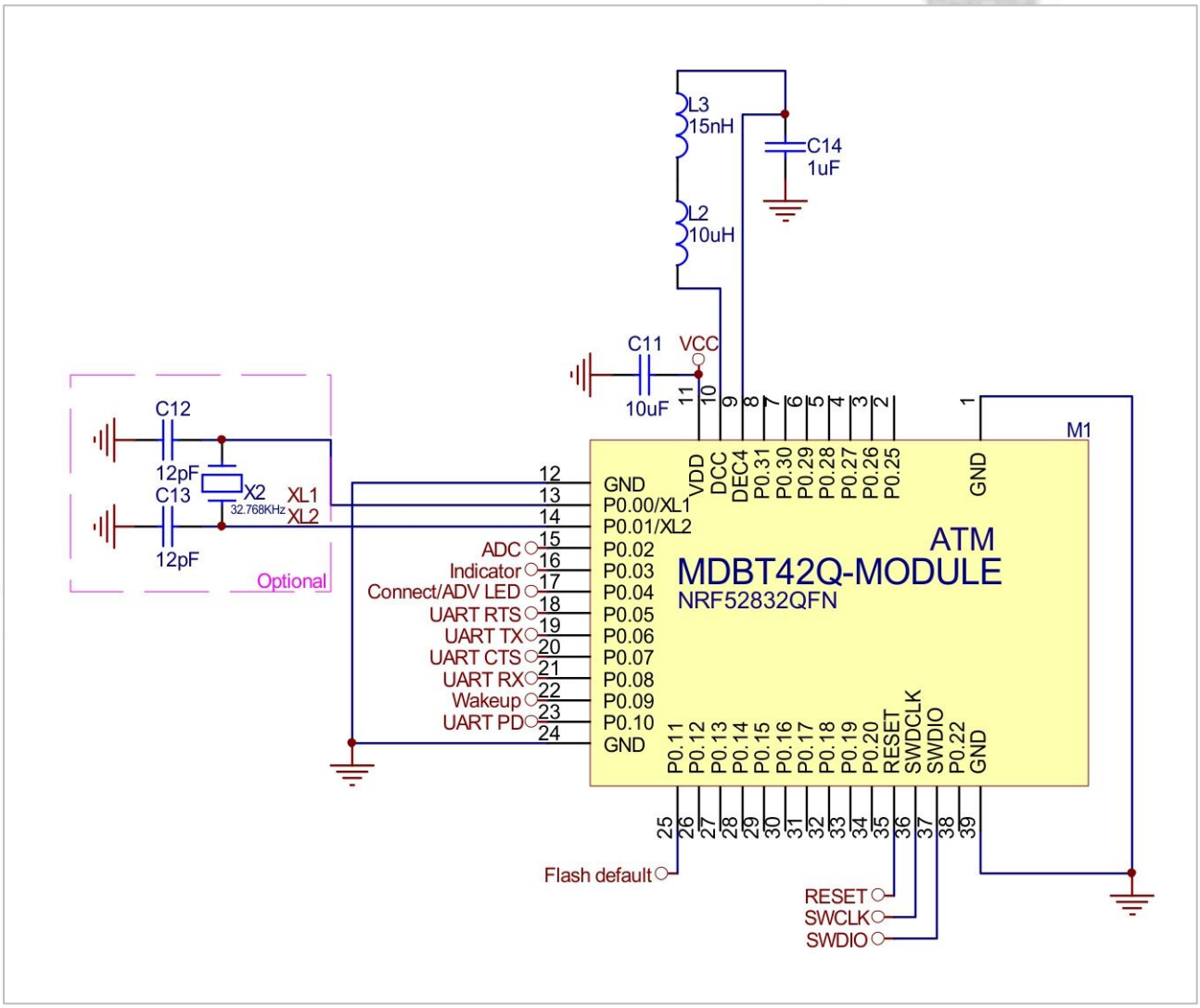
10. Reference Circuit

Module is pre-programmed with Raytac's AT command firmware. Default is NOT using "DC-DC mode" and is using internal 32.768khz RC oscillator.

REMARK:

***** When using DC-DC mode, please add L2 / L3 / C14. *****

***** When NOT using internal 32.768khz RC oscillator, please add X2 / C12 / C13.***



11. Certification

11.1. Declaration ID

BT 4.2

Declaration ID	QDID(s)	Company	Specification Name
D033661	91882 - End Product	Raytac Corporation	4.2

BT 5.0

Declaration ID	QDID(s)	Company	Specification Name
D036781	100551 - End Product	Raytac Corporation	5.0

BT 5.1

Declaration ID	QDID(s)	Company	Specification Name
D047708	139361 - End Product	Raytac Corporation	5.1

11.2. FCC Certificate (USA)

BLE 1 Mbps

telefication

TCB

GRANT OF EQUIPMENT AUTHORIZATION
Certification
Issued Under the Authority of the
Federal Communications Commission
By:

TCB

Telefication B.V.
Edisonstraat 12a
Zevenaar, NL-6902 PK
Netherlands

Date of Grant: 02/21/2017

Application
Dated: 02/21/2017

Raytac Corp.
5F., No.3, Jiankang Rd., Zhonghe Dist.,
New Taipei City,, 23586
Taiwan

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 Tolerance	Emission Designator
	15C	**2402.0 - 2480.0**	**0.0023**		

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.

Certificate No.: 162181172/AA/01	Mohammad Elhaj Product Assessor	

BLE 2 Mbps

telefication

TCB

GRANT OF EQUIPMENT AUTHORIZATION

Certification
Issued Under the Authority of the
Federal Communications Commission
By:

TCB

Telefication B.V.
Edisonstraat 12a
Zevenaar, NL-6902 PK
Netherlands

Date of Grant: 01/02/2018

Application
Dated: 12/18/2017

Raytac Corp.
5F., No.3, Jiankang Rd., Zhonghe Dist.,
New Taipei City,. 23586
Taiwan

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:	**BLE 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**	

C2PC: add BT5.0 by Firmware and change product name to BLE module from BT 4.2 module. 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.

Certificate No.: 162181172/AA/02	George Lo Product Assessor	George Lo

11.3. TELEC Certificate (Japan)

BLE 1 Mbps

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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

BLE 2 Mbps

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51565536
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telefication

Certificate

of

Radio Equipment in JAPAN

No: 201-160496 / 02

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 Specified Radio equipment (ordinance of MPT N° 37,1981)

Product description: **BLE 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: **23586 New Taipei City**
Country: **Taiwan**

This certificate is granted to:

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

This certificate has THREE Annexes.

Zevenaar, 23 May 2019

CAB

David Chen

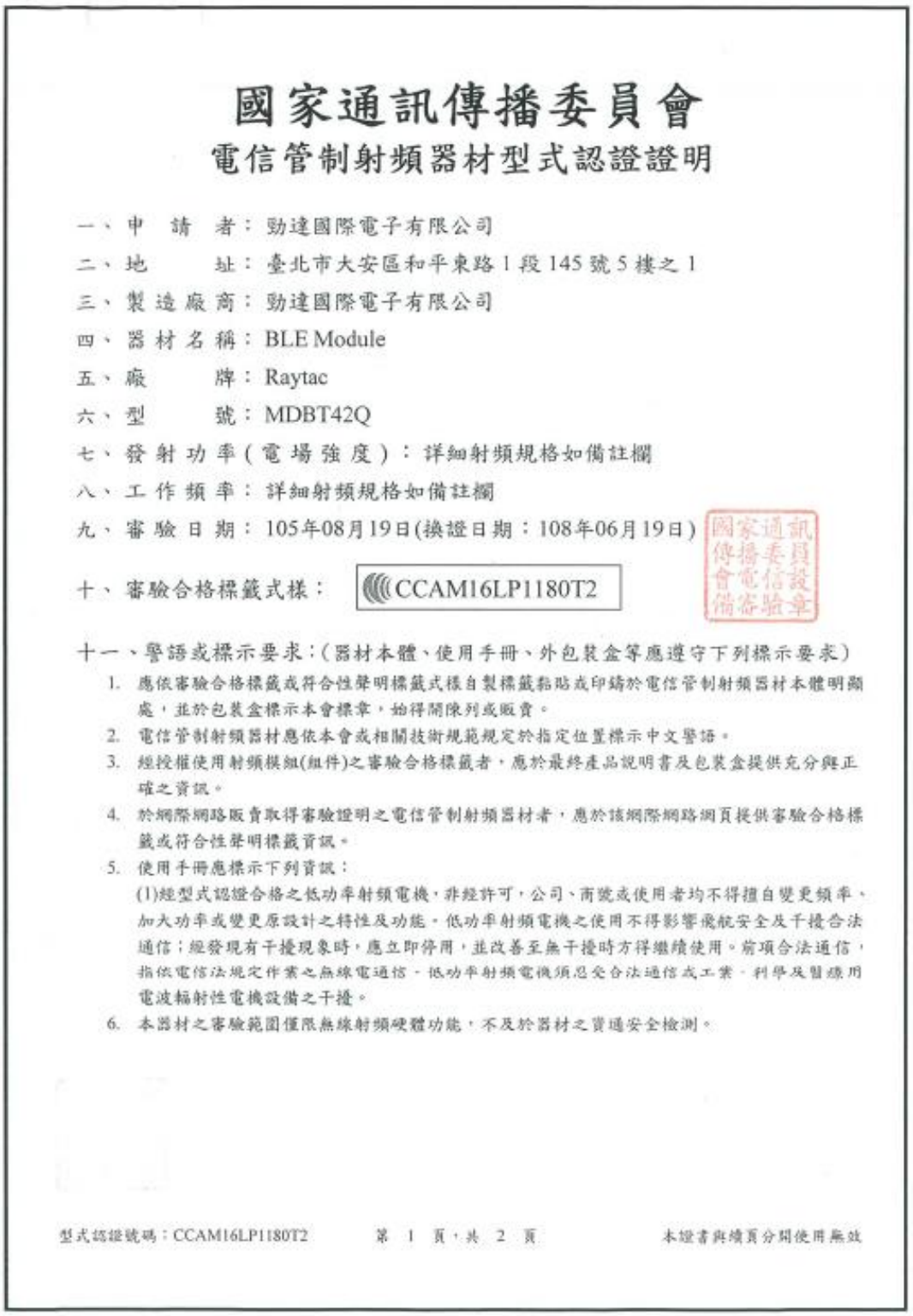
David Chen
Product Assessor

PRODUCTS
RvA C 224

11.4. NCC Certificate (Taiwan)

MDBT42Q Series

BLE 1 Mbps & 2 Mbps



國家通訊傳播委員會

電信管制射頻器材型式認證證明

一、申　請　者：勁達國際電子有限公司

二、地　　址：臺北市大安區和平東路 1 段 145 號 5 樓之 1

三、製造廠商：勁達國際電子有限公司

四、器材名稱：BLE Module

五、廠　　牌：Raytac

六、型　　號：MDBT42Q

七、發射功率(電場強度)：詳細射頻規格如備註欄

八、工作頻率：詳細射頻規格如備註欄

九、審驗日期：105年08月19日(換證日期：108年06月19日)

國家通訊傳播委員會電信設備審驗章

十、審驗合格標籤式樣：CCAM16LP1180T2

十一、警語或標示要求：(器材本體、使用手冊、外包裝盒等應遵守下列標示要求)

1. 應依審驗合格標籤或符合性聲明標籤式樣自製標籤黏貼或印錄於電信管制射頻器材本體明顯處，並於包裝盒標示本會標章，始得開除列或販賣。
2. 電信管制射頻器材應依本會或相關技術規範規定於指定位置標示中文警語。
3. 經授權使用射頻模組(組件)之審驗合格標籤者，應於最終產品說明書及包裝盒提供充分與正確之資訊。
4. 於網際網路販賣取得審驗證明之電信管制射頻器材者，應於該網際網路網頁提供審驗合格標籤或符合性聲明標籤資訊。
5. 使用手冊應標示下列資訊：
   (1)經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。
6. 本器材之審驗範圍僅限無線射頻硬體功能，不及於器材之資通安全檢測。

型式認證號碼：CCAM16LP1180T2　　第 1 頁，共 2 頁　　本證書與續頁分開使用無效

BLE 1 Mbps & 2 Mbps

國家通訊傳播委員會

電信管制射頻器材型式認證證明

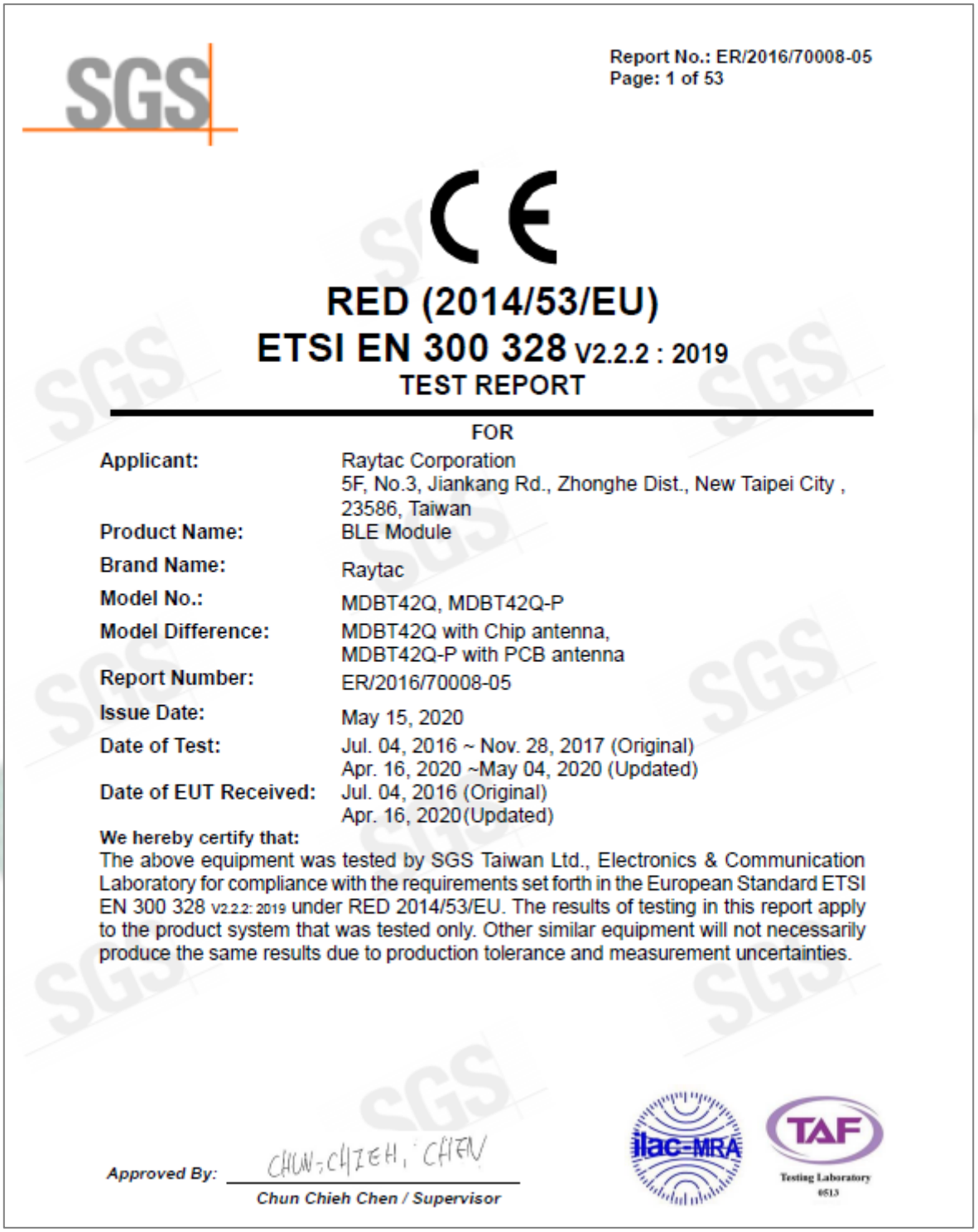
一、申　請　者：勁達國際電子有限公司
二、地　　址：臺北市大安區和平東路 1 段 145 號 5 樓之 1
三、製 造 廠 商：勁達國際電子有限公司
四、器 材 名 稱：BLE Module
五、廠　　牌：Raytac
六、型　　號：MDBT42Q-P
七、發 射 功 率（電 場 強 度）：詳細射頻規格如備註欄
八、工 作 頻 率：詳細射頻規格如備註欄
九、審 驗 日 期：105年08月19日(換證日期：108年06月19日)
十、審驗合格標籤式樣：CCAM16LP1181T1

十一、警語或標示要求：(器材本體、使用手冊、外包裝盒等應遵守下列標示要求)

1. 應依審驗合格標籤或符合性聲明標籤式樣自製標籤黏貼或印鑄於電信管制射頻器材本體明顯處，並於包裝盒標示本會標章，始得陳列或販賣。
2. 電信管制射頻器材應依本會或相關技術規範規定於指定位置標示中文警語。
3. 經授權使用射頻模組(組件)之審驗合格標籤者，應於最終產品說明書及包裝盒提供充分與正確之資訊。
4. 於網際網路販賣取得審驗證明之電信管制射頻器材者，應於該網際網路網頁提供審驗合格標籤或符合性聲明標籤資訊。
5. 使用手冊應標示下列資訊：
   (1)經型式認證合格之低功率射頻電機，非經許可，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻電機之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前項合法通信，指依電信法規定作業之無線電通信。低功率射頻電機須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。
6. 本器材之審驗範圍僅限無線射頻硬體功能，不及於器材之資通安全檢測。

11.5. CE Test Report (EU)

BLE 1 Mbps & 2 Mbps



Report No.: ER/2016/70008-05
Page: 1 of 53

CE

RED (2014/53/EU)
ETSI EN 300 328 V2.2.2 : 2019
TEST REPORT

FOR

Applicant:	Raytac Corporation 5F, No.3, Jiankang Rd., Zhonghe Dist., New Taipei City , 23586, Taiwan
Product Name:	BLE Module
Brand Name:	Raytac
Model No.:	MDBT42Q, MDBT42Q-P
Model Difference:	MDBT42Q with Chip antenna, MDBT42Q-P with PCB antenna
Report Number:	ER/2016/70008-05
Issue Date:	May 15, 2020
Date of Test:	Jul. 04, 2016 ~ Nov. 28, 2017 (Original) Apr. 16, 2020 ~May 04, 2020 (Updated)
Date of EUT Received:	Jul. 04, 2016 (Original) Apr. 16, 2020(Updated)

We hereby certify that:
The above equipment was tested by SGS Taiwan Ltd., Electronics & Communication Laboratory for compliance with the requirements set forth in the European Standard ETSI EN 300 328 V2.2.2: 2019 under RED 2014/53/EU. The results of testing in this report apply to the product system that was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved By: CHUN-CHIEH, CHEN
Chun Chieh Chen / Supervisor

ilac-MRA TAF Testing Laboratory 0513

SGS Reference No: MH/2019/40103C

VERIFICATION OF EMC COMPLIANCE

Verification No.	:	MH/2019/40103C
Representative Model No.	:	MDBT42Q
Added Model(s)	:	MDBT42Q-P, MDBT42Q-U
Product Name	:	BLE 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	:	MH/2019/40103
Date of Issue	:	May 13, 2019
Applicable Standards	:	EN 301 489 –1 $_{v2.2.0}$: 2017-03 (Draft)
		EN 301 489 –17 $_{v3.2.0}$: 2017-03 (Draft)
		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:

Eddy Cheng

SGS TAIWAN LTD.
Eddy Cheng
Technical Asst. Supervisor

11.6. IC Certificate (Canada)

BLE 1 Mbps

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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 DÉLIVRÉ 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

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.

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.

ISSUED BY TELEFICATION BV, RECOGNIZED CERTIFICATION BODY BY INDUSTRY CANADA
DÉLIVRÉ PAR TELEFICATION BV, ORGANISME DE CERTIFICATION RECONNU PAR INDUSTRIE CANADA

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

DATE 21 Feb 2017 BY

Mohammad Elhaj
Product Assessor

This certificate has one annex.

PRODUCTS
RvA C 224

BLE 2 Mbps

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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/02
TEST SITE No. No. DE LABORATOIRE	4620A-5
ISSUED TO DÉLIVRÉ 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 2

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 ISED 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 ISED. 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 ISED.

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'ISDE 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'ISDE. 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 ISDE.

ISSUED BY TELEFICATION BV (NL0001), RECOGNIZED CERTIFICATION BODY BY INNOVATION, SCIENCE AND ECONOMIC DEVELOPMENT CANADA
DÉLIVRÉ PAR TELEFICATION BV (NL0001), ORGANISME DE CERTIFICATION RECONNU PAR INNOVATION, SCIENCES ET DÉVELOPPEMENT ÉCONOMIQUE CANADA

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

DATE 02 Jan 2018 BY

George Lo
Product Assessor

This certificate has one annex.

George Lo

PRODUCTS
RvA C 224

11.7. SRRC Certificate (China)

BLE 1 Mbps & 2 Mbps

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:

中华人民共和国工业和信息化部
（发证机关）
Sealed by issuing authority

有效期：五年
Validity

2016 年 8 月 12 日
Year Month Date

11.8. KC Certificate (South Korea)

BLE 1 Mbps & 2 Mbps

B58D-F9C0-417D-C63A

방송통신기자재등의 적합인증서

Certificate of Broadcasting and Communication Equipments

상호 또는 성명 Trade Name or Applicant	Raytac Corporation
기자재명칭(명칭) Equipment Name	특정소출력 무선기기(무선데이터통신시스템용 무선기기)
기본모델명 Basic Model Number	MDBT42Q
파생모델명 Series Model Number	MDBT42Q-P, MDBT42Q-U
인증번호 Certification No.	MSIP-CRM-ryt-MDBT42Q
제조자/제조국가 Manufacturer/ Country of Origin	Raytac Corporation / 대만
인증연월일 Date of Certification	2016-10-06
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.

2019년(Year) 05월(Month) 14일(Day)

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.

11.9. RoHS & REACH Report

Please visit “Support” page of our website to download.

11.10. 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.

11.10.1. 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”.

11.10.2. TELEC (Japan)

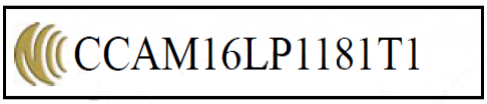
When manufacturer is placing the product on the Japanese market, the product must be affixed with the following Specified Radio Equipment marking:

11.10.3. 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。

11.10.4. 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”.

12. 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℃ to +125℃ 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 Raytac for any losses when applying modules in applications such as the ones described above.

13. Basic Facts for nRF52 Chip

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.

Nordic Solution	nRF52840	nRF52833	nRF52820	nRF52832	nRF52810	nRF52811
RAYTAC Model No. (MDBTXX)	50Q-1MV2 50Q-P1MV2 50Q-U1MV2	50Q-512K 50Q-P512K 50Q-U512K	50-256R 50-P256R	42Q-512KV2 42Q-P512KV2 42 series 42V series	42Q-192KV2 42Q-P192KV2	42Q-192KL 42Q-P192KL
Bluetooth Direction Finding		V	V			V
Bluetooth 5 Long Range (125kbps)	V	V	V			V
Bluetooth 5 High Speed	V	V	V	V	V	V
Bluetooth 5 Ad. Extention (x8)	V	V	V	V	V	V
Flash (kBytes)	1024	512	256	512	192	192
RAM (kBytes)	256	128	32	64	24	24
ANT Plus	V	V		V	V	V
IEEE 802.15.4	V	V	V			V
ARM® TrustZone® Cryptocell	V					
USB	V	V	V			
QSPI	V					
NFC	V	V		V		
I2S	V	V		V		
SPI, TWI, UART, PWM	V	V	V	V	V	V
PDM	V	V		V	V	V
ADC, Comparators	V	V	without ADC	V	V	V
Supply Range (V)	1.7 to 5.5	1.7 to 5.5	1.7 to 5.5	1.7 to 3.6	1.7 to 3.6	1.7 to 3.6

14. 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 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 nRF52832 : https://www.nordicsemi.com/eng/Products/Bluetooth-low-energy/nRF52832
  A brief introduction to nRF52832 and download links for Nordic's developing software and SoftDevices.

History of Firmware Revision

FW Ver.	Compatible HW Build	Release Date	Description of Revision	Note
1.0		2018/10/15	1st release.	99-52832-12A
1.1		2019/05/17	Fixed bug of not sending PHY information to peripheral device after BLE connection.	99-52832-12B
1.2		2020/04/13	Fixed issues of reading MAC address.	99-52832-12C

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

MDBT42Q Series (QFN Package IC)

Series	Nordic Solution	Raytac No.	IC Version	Antenna	RAM	Flash Memory
MDBT42Q	nRF52832	MDBT42Q-512KV2	2	Chip Antenna	64 kb	512 K
	nRF52810	MDBT42Q-192KV2	2		24 kb	192 K
	nRF52811	MDBT42Q-192KL	1			
MDBT42Q-P	nRF52832	MDBT42Q-P512KV2	2	PCB Antenna	64 kb	512 K
	nRF52810	MDBT42Q-P192KV2	2		24 kb	192 K
	nRF52811	MDBT42Q-P192KL	1			
MDBT42Q-U	nRF52832	MDBT42Q-U512KV2	2	u.FL Connector	64 kb	512 K

MDBT42 Series (WLCSP Package IC)

Series	Nordic Solution	Raytac No.	IC Version	Antenna	RAM	Flash Memory
MDBT42	nRF52832	MDBT42-512KV2	2	Chip Antenna	64 kb	512 K
MDBT42-P		MDBT42-P512KV2		PCB Antenna		

Series	Nordic Solution	Raytac No.	IC Version	Antenna	RAM	Flash Memory
MDBT42V	nRF52832	MDBT42V-512KV2	2	Chip Antenna	64 kb	512 K
MDBT42V-P		MDBT42V-P512KV2		PCB Antenna		

MDBT50Q Series (aQFN Package IC)

Series	Nordic Solution	Raytac No.	IC Version	Antenna	RAM	Flash Memory
MDBT50Q	nRF52840	MDBT50Q-1MV2	2	Chip Antenna	256 kb	1MB
	nRF52833	MDBT50Q-512K	1		128 kb	512 kb
MDBT50Q-P	nRF52840	MDBT50Q-P1MV2	2	PCB Antenna	256 kb	1MB
	nRF52833	MDBT50Q-P512K	1		128 kb	512 kb
MDBT50Q-U	nRF52840	MDBT50Q-U1MV2	2	u.FL Connector	256 kb	1MB
	nRF52833	MDBT50Q-U512K	1		128 kb	512 kb

Dongle	nRF52840	MDBT50Q-RX	1, 2	PCB Antenna	256 kb	1MB

MDBT50 & MDBT50-P Series

Series	Nordic Solution	Raytac No.	IC Version	Antenna	RAM	Flash Memory
MDBT50	nRF52820	MDBT50-256R	1	Chip Antenna	256 kb	32 K

MDBT50-P	nRF52820	MDBT50-P256R	1	PCB Antenna	256 kb	32 K

Release Note

- 2018/10/19 Version A: 1st release

- 2020/04/22 Version B

  (1) See *History of Firmware Revision* for FW revision 1.2.

  (2) Updated the tray info in section 7.2.

  (3) Added section 9: Antenna.

  (4) Added MDBT50-256R & MDBT50-P256R (nRF52820 module) in the list of Raytac BLE module.

- 2020/06/08 Version C

  (1) Refined description in section 3.

  (2) Added tolerance of size info in section 5.

  (3) Updated module photo and info of dot marking in section 7.

  (4) Updated CE EN300 328 v.2.2.2 and information of 2Mbps in section 11.

  (5) Added nRF52820 in section 13.