



Dragon BT

User Manual

DUALi Inc.

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We have our development center in South Korea to provide technical support. For any technical assistance can contact our technical support team as below;

Tel: +82 31 213 0074

e-mail : lab@duali.com

Revision History

- 2014.12.30(Ver.1.00): First release
- 2015.01.26(Ver.1.10): Change battery ADC value to percentage (%).
- 2015.02.12(Ver.1.20): Booting Pi-bi-beep sound twice when HID mode is enabled
Added Android device connection
- 2015.02.13(Ver.1.30): NDEF Tag Read Function(0xE7) add
- 2015.02.25(Ver.1.40): Add transmit format inquiry(0xE3)
- 2015.03.25(Ver.1.41): Download retrial process added
- 2015.06.30(Ver.1.42): PC control program usage added- Chapter 7
- 2015.07.07(Ver.1.43): Bluetooth mode inquiry explanation change
- 2017.06.08(Ver.1.50): Auto Reconnect explanation add (Chapter 6.8)
- 2018.11.22(Ver.1.60): Card read control command add (Chapter 6.7)
- 2019.02.13(Ver.1.61): Add setting method (SPP mode & HID mode password (Chapter 5.4, 5.5)
- 2019.08.05(Ver. 1.62): Add UI information (LED), modify charging time
Update Bluetooth pairing with PC (Chapter 5.4)
- 2020.02.18(Ver. 1.63): Add warranty condition and Precautions of Battery Usage (Chapter 8)

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1. Overview

Dragon BT is compact hand held type NFC reader which sends reading data from NFC tags to Host (PC/Smart phone/Tablet PC). It is ideal for organizations where frequented, but intermittent, use of personal computers, tablet PCs and Smartphones.

This manual contains hardware specification of Dragon BT as well as the usage.

Dragon BT support SPP (Serial Port Profile) as default mode and HID (Human Interface Device) mode as option.

System Requirements

Operating System	Windows	Android
OS Version	Windows® Vista® - 32-bit (x86) - 64-bit (x64) Windows 7 - 32-bit (x86) - 64-bit (x64) Windows 10 - 32-bit (x86) - 64-bit (x64)	Later than Jellybean (SPP) All version (HID)

Support card/tag types

Mifare	NXP Mifare Classic 1k / NXP Mifare Classic 4k
NFC Forum Type 1	Topaz
NFC Forum Type 2	NXP - Mifare Ultralight / Mifare Ultralight C/ NTAG203 INFINEON - my-d NFC SLE 66R01P / my-d NFC SLE 66R32P Kovio
NFC Forum Type 3	Sony FeliCa
NFC Forum Type 4	NXP Mifare DESFire EV1 ISO/IEC 14443 standard series, full compliant cards

2. Component confirmation

- 1 Dragon BT
- 1 micro USB cable (option)
- SDK – SDK PROGRAM, DRVIER, APK sample download link



Dragon BT



Mini USB cable (Option)

3. Hardware Specification

3.1 Basic specifications

ITEM	Specification	NOTE
CPU	STM32F103CBT6 Cortes-M3(ARMv7),48MHz, 32bit RISC	
Program Memory	128KByte FLASH	
Data Memory	20KByte SRAM	
RF Chip	SIC9410 (MIFARE, ISO14443, ISO15693, FeliCa, NFC Tag)	
Display	4 STATUS LED (Power, Battery, RF, Bluetooth)	
Communication	PC-USB or BT, Phone-BT	
Buzzer	Magnetic Buzzer	
Vibration Sensor	1034A, 3.0V Rated Voltage	
Input Voltage	USB 5V (Micro USB), Battery 3.7V	
Current	3.7V 110mA (RF operation)	
Bluetooth	WT12 (SPP, HID mode)	Blue GiGa
Battery	DC3.7V, 550mAh, Li-Polymer 5~8hours operation, 14 hours sleep Battery charging : 4hours using micro USB cable	
Switch	1 switch, POWER and Activation	
Contact card	ISO7816 SAM 1EA	

3.2 Bluetooth specification

ITEM	Specification	Note
specification	Bluetooth v.2.1 + EDR (Enhanced Data Rate)	
Class	Bluetooth class 2 radio	
Transmit Power	+3dBm	
Receiver Sensitivity	-86dBm	
Range	30 meters line-of-sight (Recommend to use within 10 m)	
Antenna	Integrated chip antenna (ACX AT3216)	
Protocol	SPP, HID	

4. Description of Parts

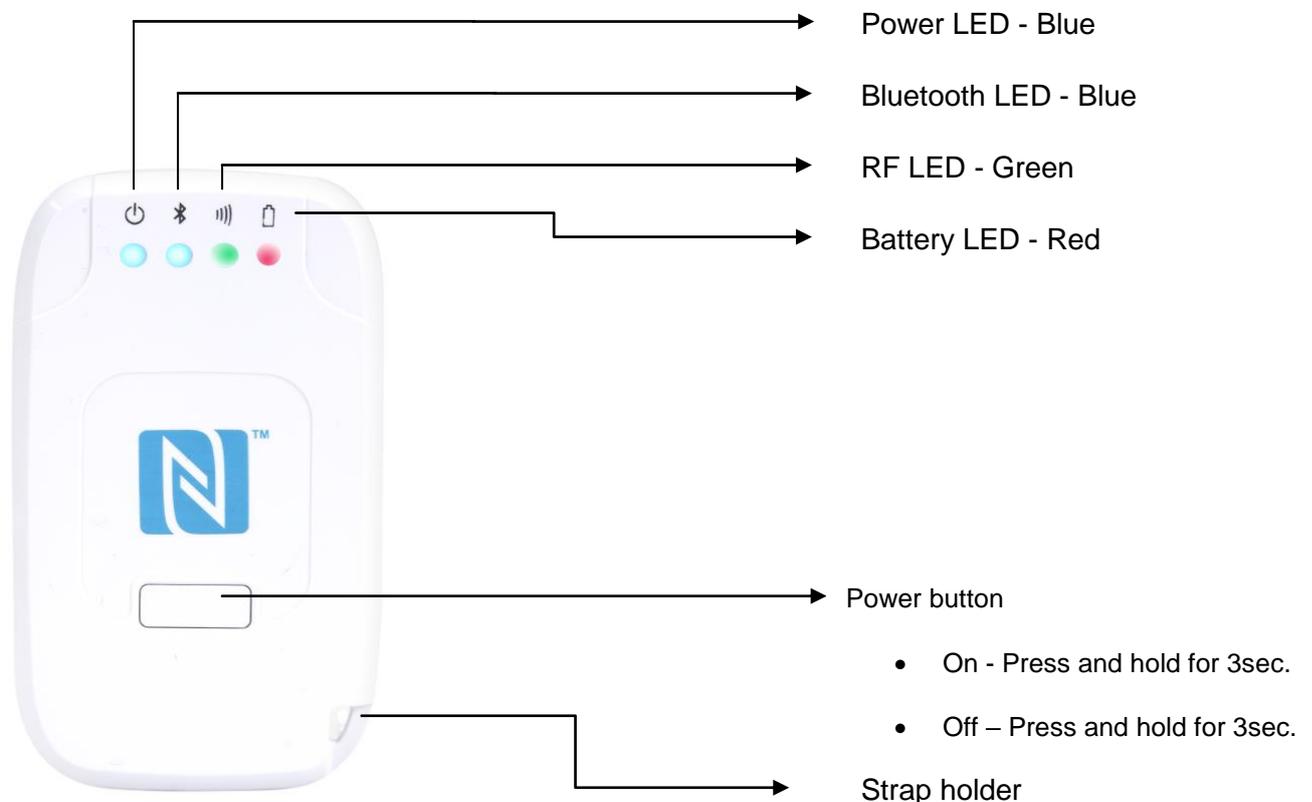
The following describes Dragon BT reader operation.

1) LED Indicator

- Power: Blinks when it acts.
 - Normal mode – Blinks every time when it tries to read card
 - Stand- by mode low battery (under 30%) – Blinks twice every 3 seconds
 - Stand- by mode – Blinks once every 3seconds
- Bluetooth: Blinks when Bluetooth is connected
- RF: Blinks when card is successfully read.
- Battery: Red LED light stays on while charging

2) Power button

- To power on: press and hold for 3 second until it beeps
- To awake from Sleep mode: press shortly to awake
- To power off: press and hold for 3 second until it beeps



5. Operation

5.1 Basic Operation

- Reader automatically reads UID of supported cards and uploads data through connected Bluetooth interface (SPP or HID) when it is booted.
- Reader stops automatic UID reading when it received any command from host device through USB or Bluetooth (SPP).
- Reader starts automatic UID reading again when power button is pressed.
- Reader fall into sleep mode and stop reading card when it is reached to timeout. (Default timeout is 20 second after last card reading)

5.2 Power On/Power Off

- Press power button and hold for 3sec. until it beeps

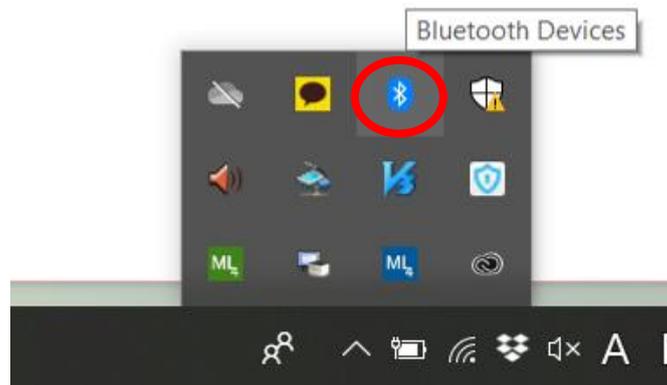
5.3 Charging

- Full charging takes around 4 hours.
- Power LED blinks twice every 3 second to indicate low battery (under 30%) when it is in sleep mode.
- To charge battery, please use micro 5pin USB cable.

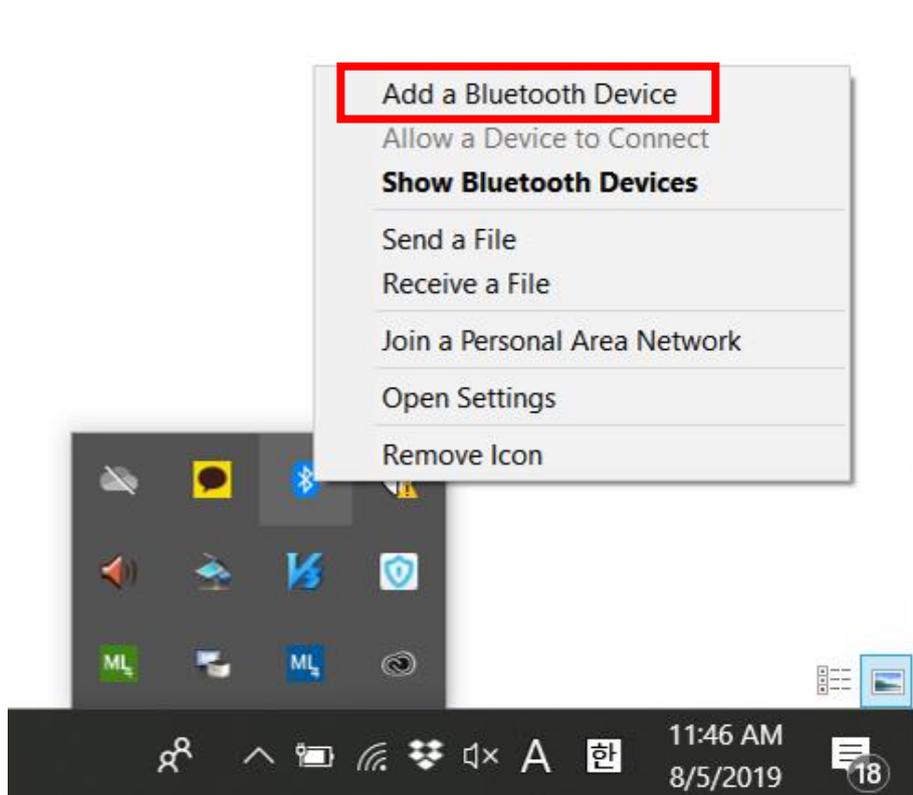


5.4 Pairing with PC (HID mode)

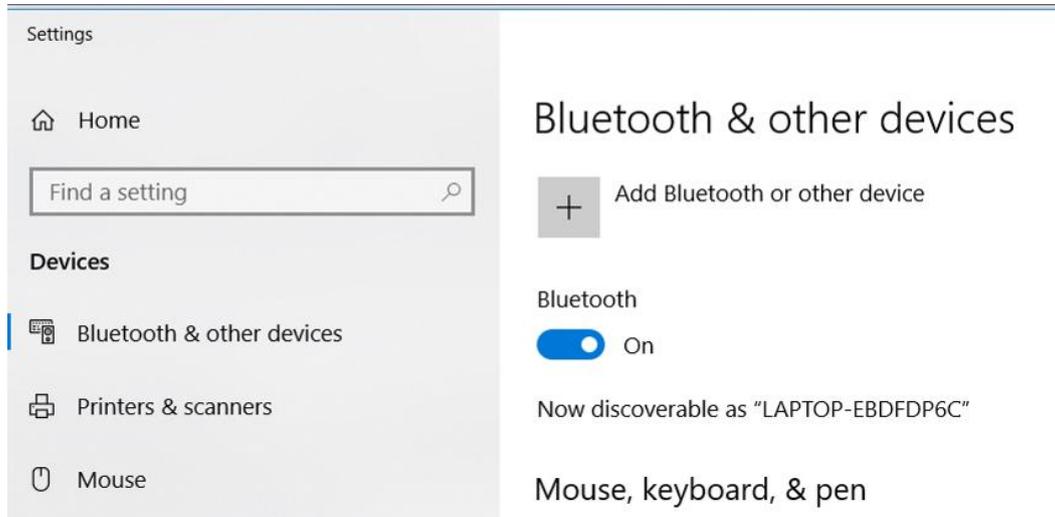
- Make sure Dragon BT is in HID mode (Production default is HID mode). When Dragon BT is in SPP mode, please convert reader into HID mode (refer to Chapter.7.4)
 - When it's failed to detect reader on WIN7 OS while test, please remove device name on Control panel > Hardware and Sound > Device and printer and try again



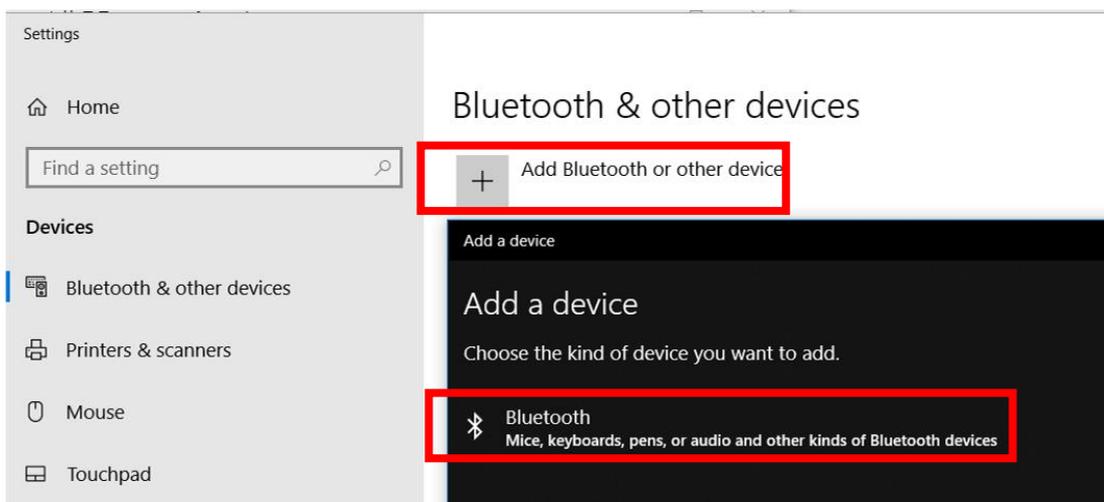
- Check your PC is capable of Bluetooth connection. The BT icon is active when it's Bluetooth supportive.



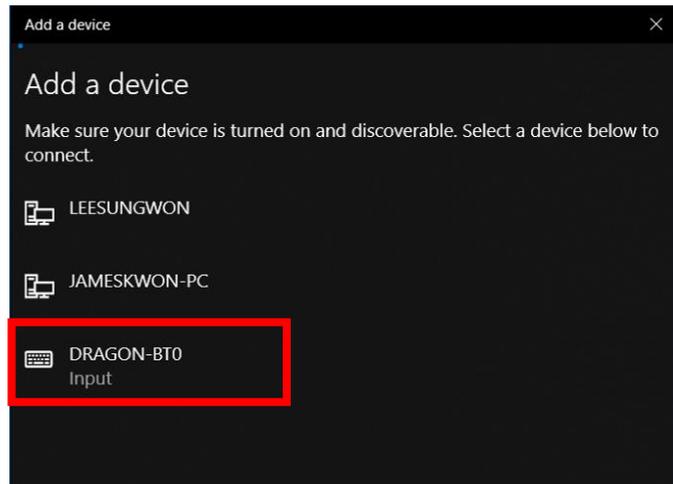
- Click Bluetooth icon and double-click Add a Bluetooth Device



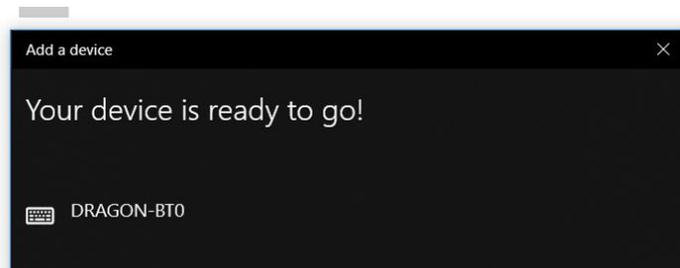
- From Bluetooth setting menu, make sure the function is On.



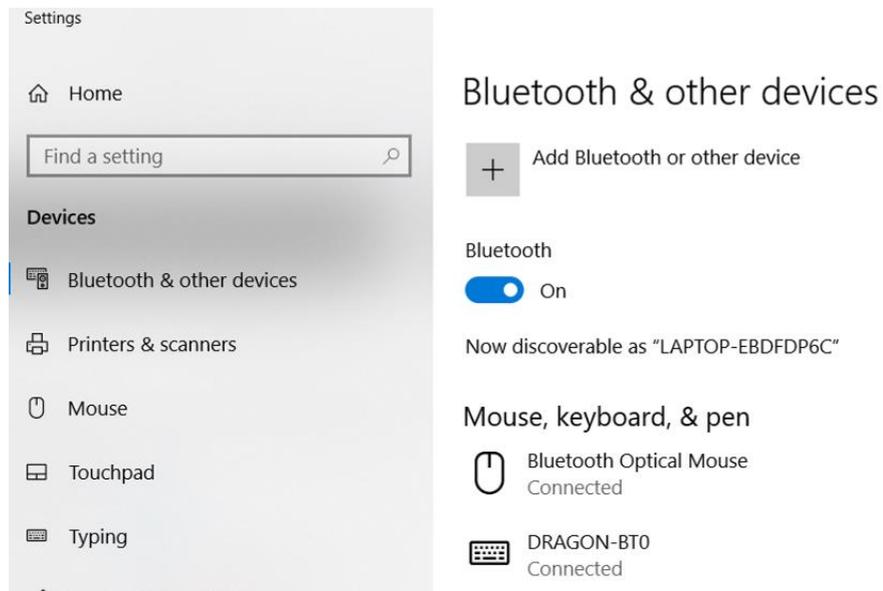
- Click + Add Bluetooth or other device, then available device will be shown on the list.



- Select Dragon BT, and click to pair.

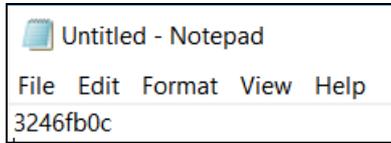


- The message will be shown when device is successfully paired



- When Dragon BT is connected as Keyboard emulation mode (HID Mode), the icon will look like keypad.

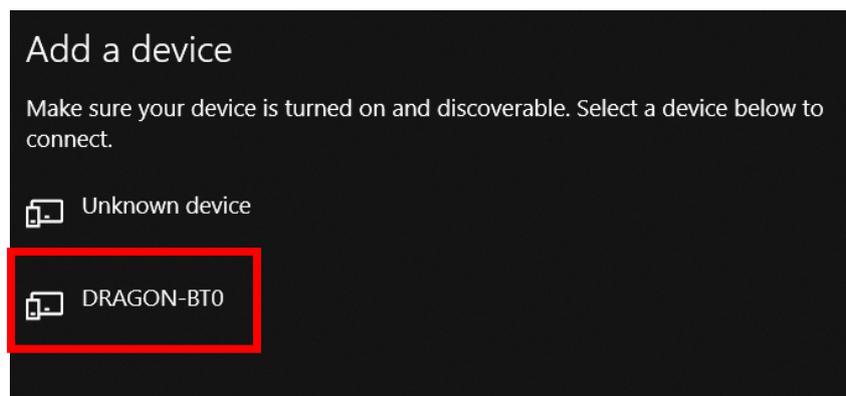
- When Dragon BT is connected via Bluetooth, it'll forward Card's UID into any open window like below image.



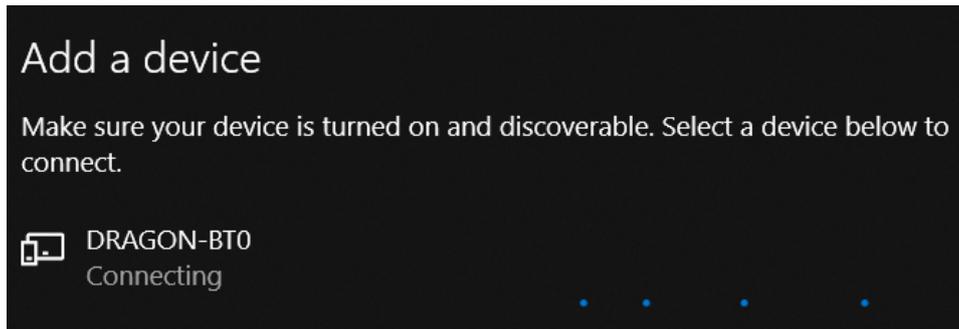
- Caution: Dragon BT automatically works as vendor reader while it's connected to PC via USB, so do not connect USB cable when it operate as Bluetooth interface.
- When the case PC is checking **PIN number (Password)**, please input as 0000. Once it's connected, it's listed as HID (Human interface device) from Device manger
- Confirm Dragon BT's Bluetooth LED is on, it's ready to use
- If there's several devices are detected under DRAGON-BT0(Default name), please change device name using 0x7A command, or Dragon BT Control program.

5.5 Pairing with PC (SPP mode)

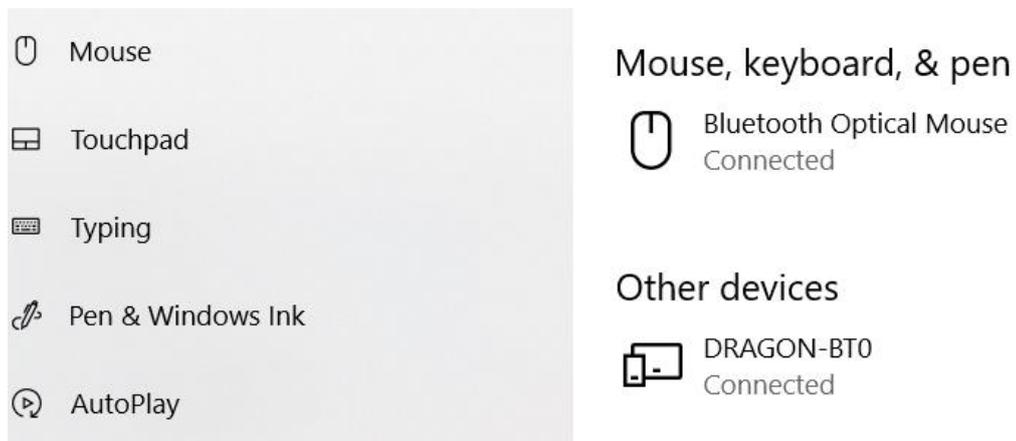
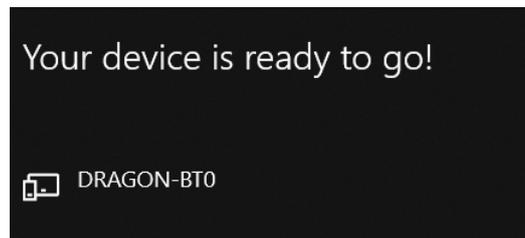
- Please change device communication mode into SPP to use SPP protocol and restart the reader. (Refer to Chapter. 7.4)
- Confirm COM Port number from device manger.
- Select Dragon BT from Bluetooth list.



- Wait till device is registered.

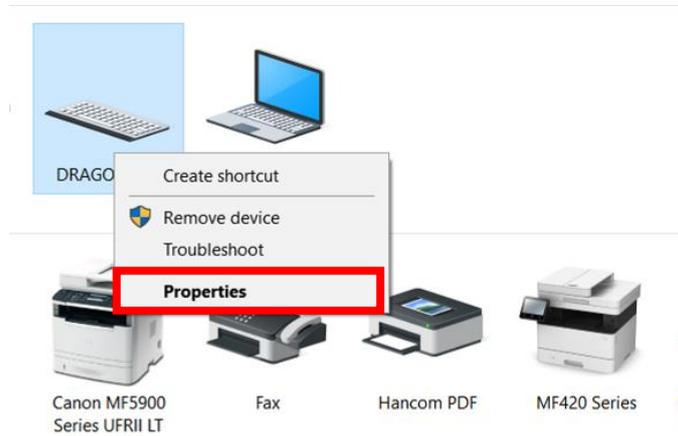


- The message will be shown when device is successfully paired



- When Dragon BT is connected as SPP mode, the icon will look like above.

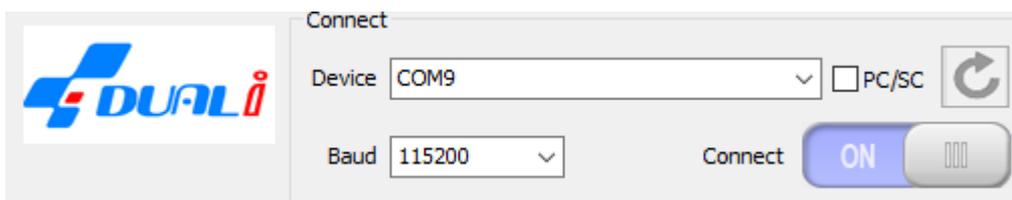
- How to check comport communication
 - Control panel -> Hardware and sound -> Devices and Printers



- Click right button of mouse and select Properties



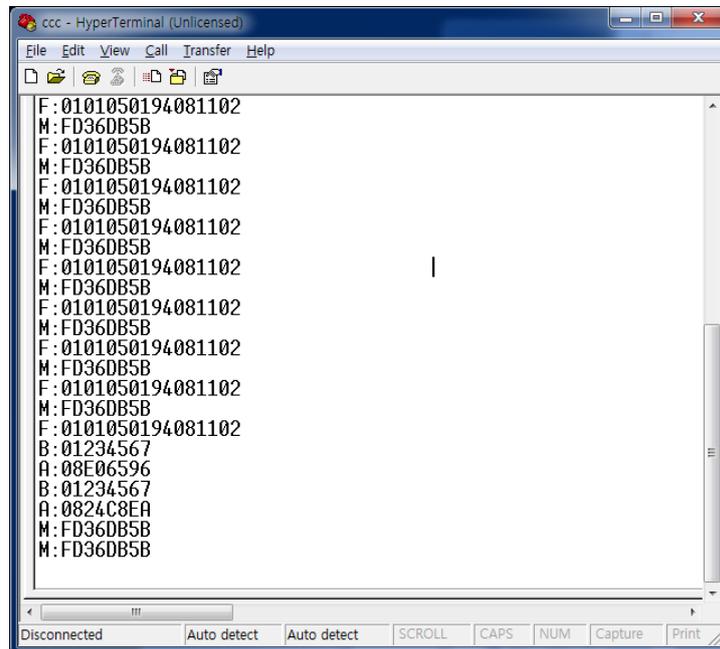
- In Hardware tap, confirm the Comport number.



<Dualcard program>

- When using Dualcard, please select same COM Port and click [Connect] button
It takes about 1sec to get connection unlike standard serial communication

- Once device is connected, user can use all function of Dualcard as other DUALi devices.



- In case using other serial test program (e.g. HyperTerminal), open the comport and it'll get the card data when Dragon BT detects RF card

- Trouble shooting

- When BT LED and BATTERY LED becomes off simultaneously

1) When Dragon BT reboots it's looking for reconnection in HID mode.

→ Once Dragon BT paired with previously connected device, LEDs become normal.

2) When Dragon BT restarted after change mode from HID -> SPP. Dragon BT is looking for reconnection.

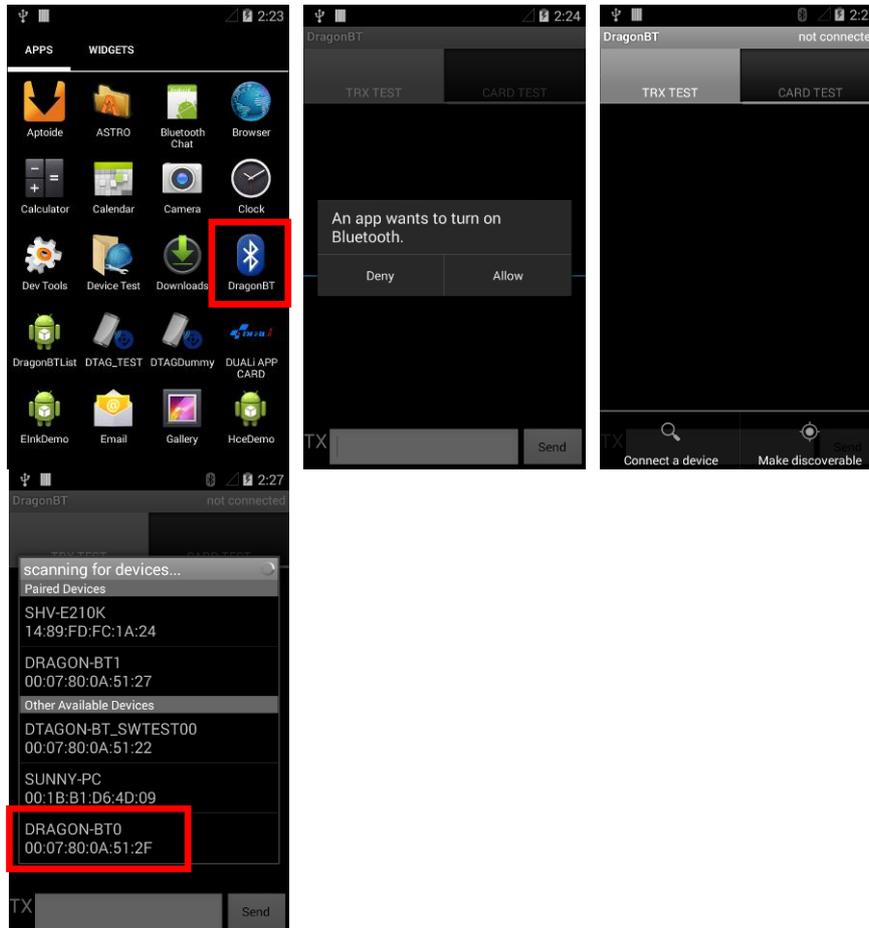
→ Remove Dragon BT from Bluetooth device list in Host when protocol mode changed. Press Dragon BT power button 4times, then it delete previous connect information and ready to pair. User need to pair Dragon BT with host device again.

5.6 Pairing with Smart phone (Android OS phone, SPP and HID)

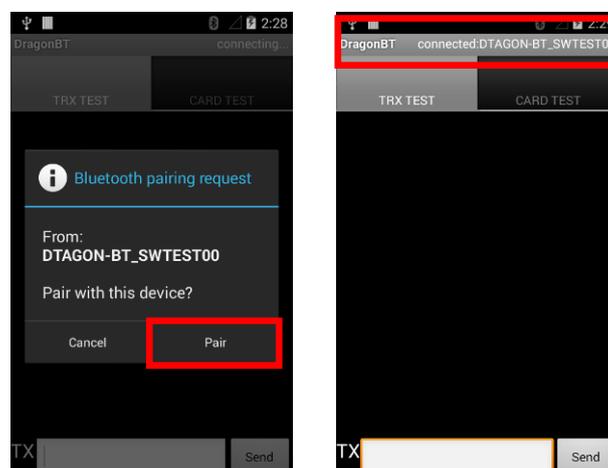
1) Bluetooth SPP device connection

- Execute provided “DragonBT” apk on Smart phone.

When phone’s Bluetooth is off, please [Allow] to turn on and select Dragon BT.



- If it is your first time pairing, following message box will pop up. Click [Pair]. Once the device is paired, you’ll see connected device name on top of apk.

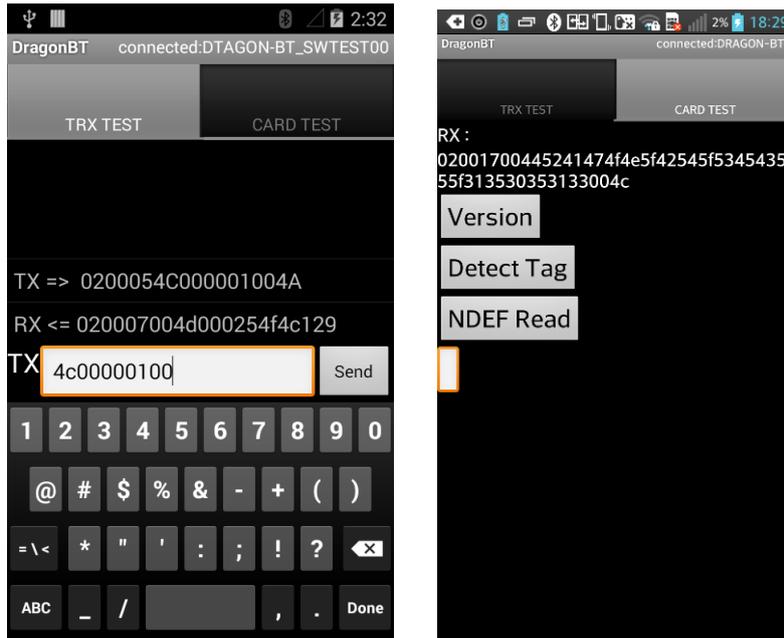


<TRX TEST >

User is able to input command and check RX data

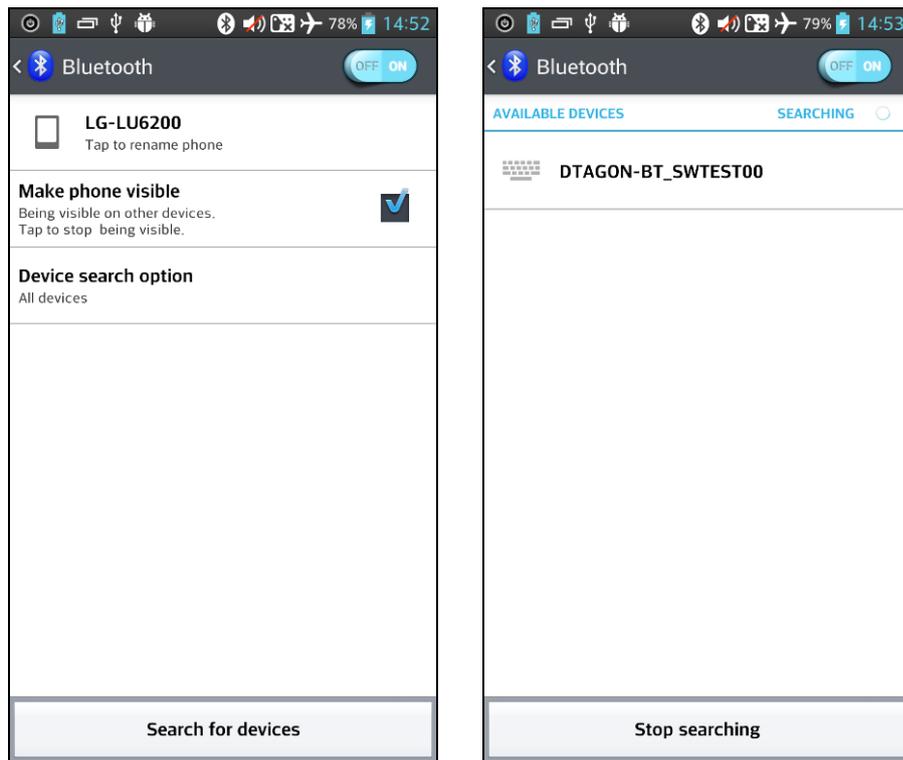
<CARD TEST>

- Version: Dragon BT firmware version check
- Detect Tag: ATR data of detected tag
- NDEF Read: Display NDEF format data from the tag.

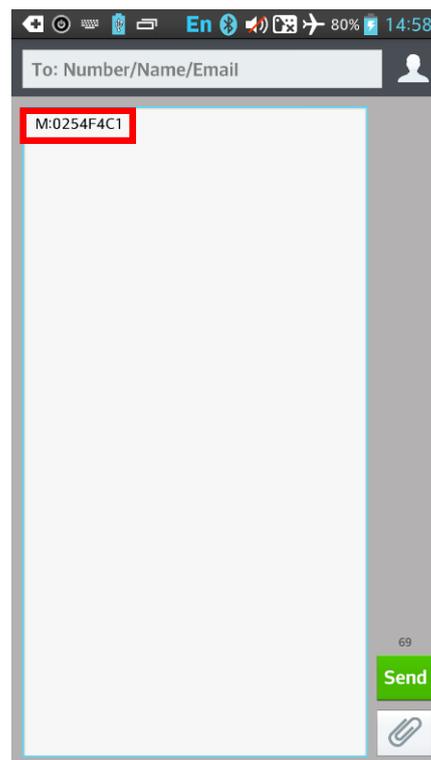
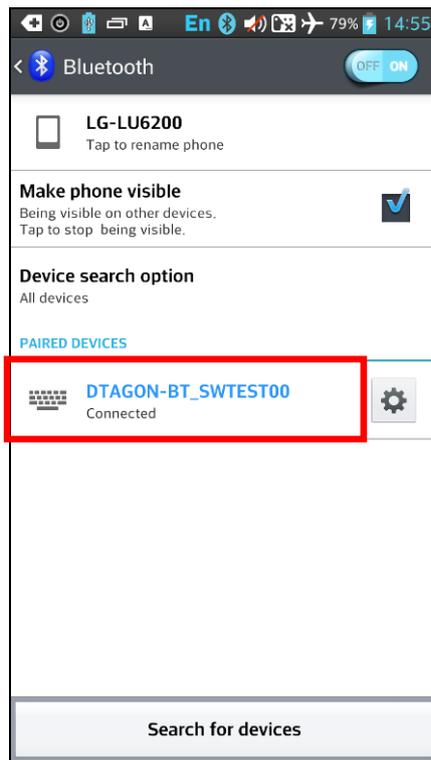


2) Bluetooth HID Device pairing

- Turn on Bluetooth from Setting menu. Search for available Bluetooth and select Dragon BT. To detected by Android device, Dragon BT need to set HID capable mode
- Dragon BT is on HID capable mode when it beeps twice while booting. Dragon beeps only once while booting means HID isn't capable. Please change mode setting refer to chapter "5.HID Set and confirm operation (0xEE)" and reset the device.
- When you want to change mode from to HID while Dragon BT is in pairing mode, we recommend to release pairing and change mode first
- When BT power LED blinks too fast and not turning on BT LED, reader is searching for previous pairing. If you want to reset Dragon BT, press power button 4 times and it'll automatically restart. After reboot, the reader is ready to pair with new device.



- While Dragon BT is connected, connection status will be displayed and Dragon BT is ready to receive card information
- Open any window or notepad on smartphone, and touch NFC tags into Dragon BT
Cardtype & UID will be displayed automatically in HID mode
 - **Card type indication**
 M: //Mifare A: //type-A B: //type-B
 I: //15693 F: //FeliCa T: Topaz



- To re-pair Dragon BT, following message pops up. Click F from “Input Device” from Setting and try pairing again.

5.7 How to connect PC (USB) and Update Firmware

1) Driver installation

- To communicate via USB interface with host, please install USB driver in provided SDK.
- Install driver refer to manual, and connect Dragon BT in PC.

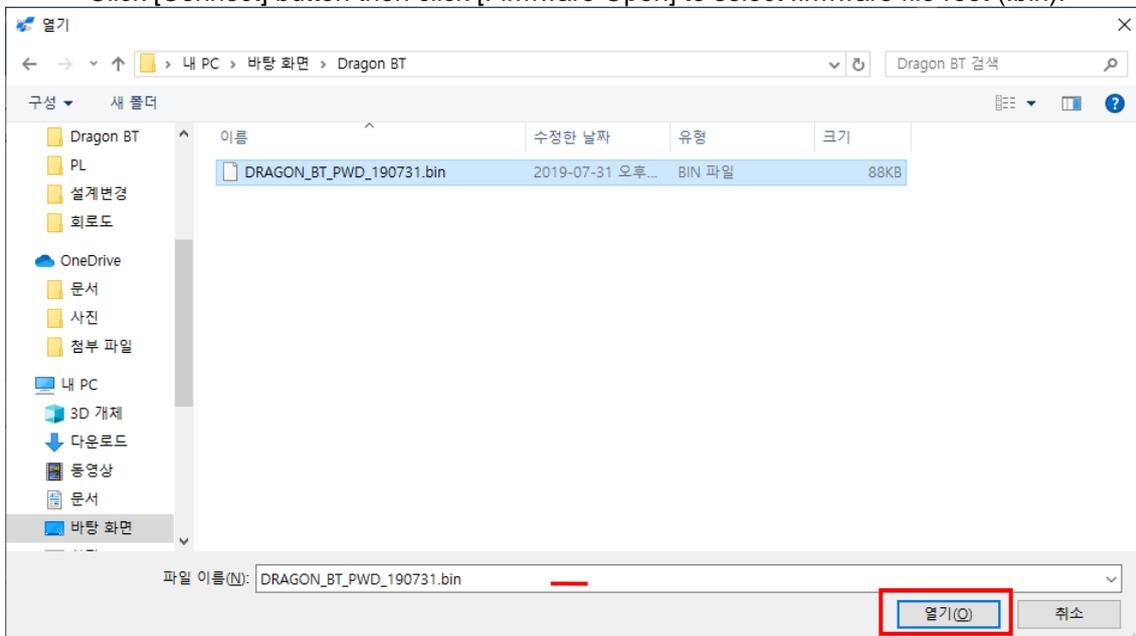
Once it's connected to DualCard.exe, it's capable to be controlled by this software same as the DUALi devices.

2) Firmware Update

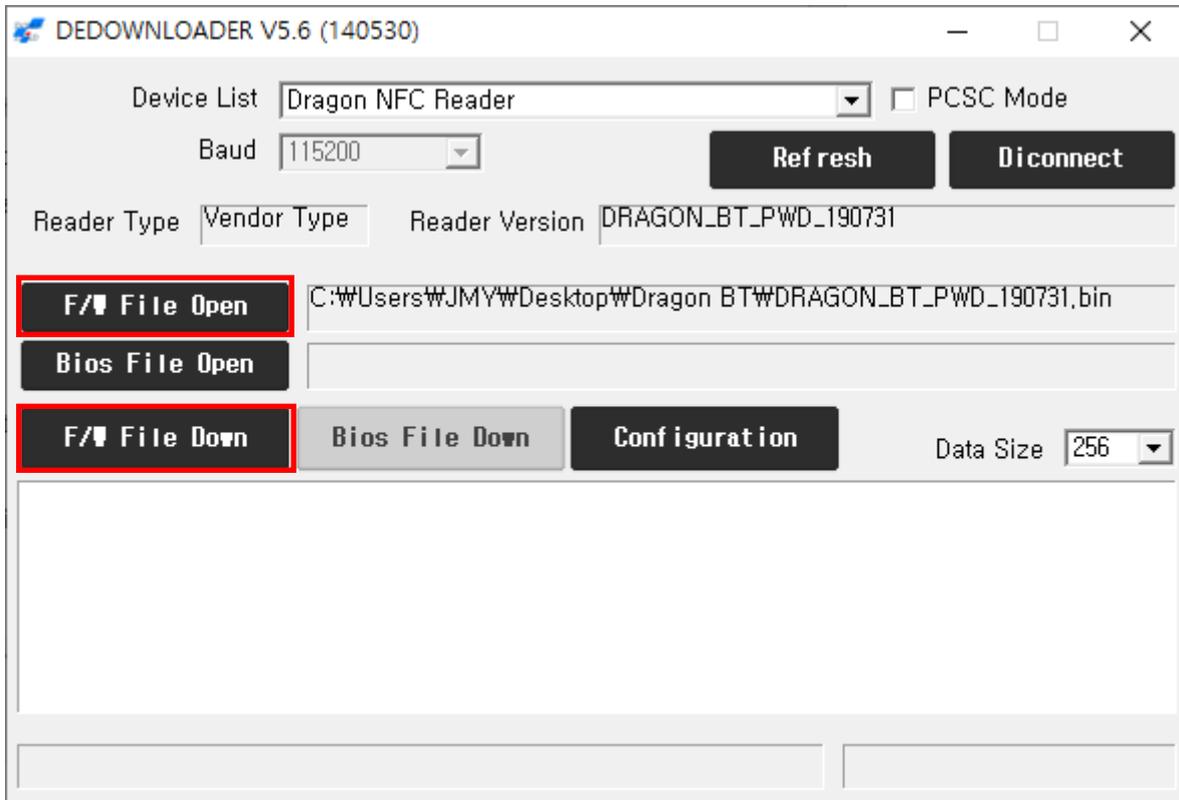
- Refer to following instruction when updating firmware.
- Execute DEDOWNLOADER.
- Click [Refresh] button to update Device list, confirm Dragon NFC Reader on list



- Click [Connect] button then click [Firmware Open] to select firmware file root (.bin).



- Click [FW file Down] to start downloading.



- Once download completed without error, "Download OK: 'updated firmware version'" will be shown.
- Press button and retry download within 10 second if download was failed at first trial. (Or, keep button pressed while download process bar is increasing)

5.8 How to operate / LED indication

Power On: Hold down the power button for 3seconds until it beeps.

Power LED becomes blue and device is ready

- Dragon BT is default set is HID communication.
- While booting Dragon BT, it beeps 1time it means the device in “SPP” mode, when it beeps 2 times, Dragon BT is in “HID” mode
- Bluetooth LED becomes blue when it connected with Host via SPP or HID. Please check connection when Bluetooth LED is off.
- In SPP mode, card data will be printed via Comport port window. In HID mode, card UID data will be printed on any text window.
- When Dragon BT 's power on, it operate as card detecting mode.
- **Sleep mode:** Dragon BT goes into sleep mode when card isn't detected for 20sec.

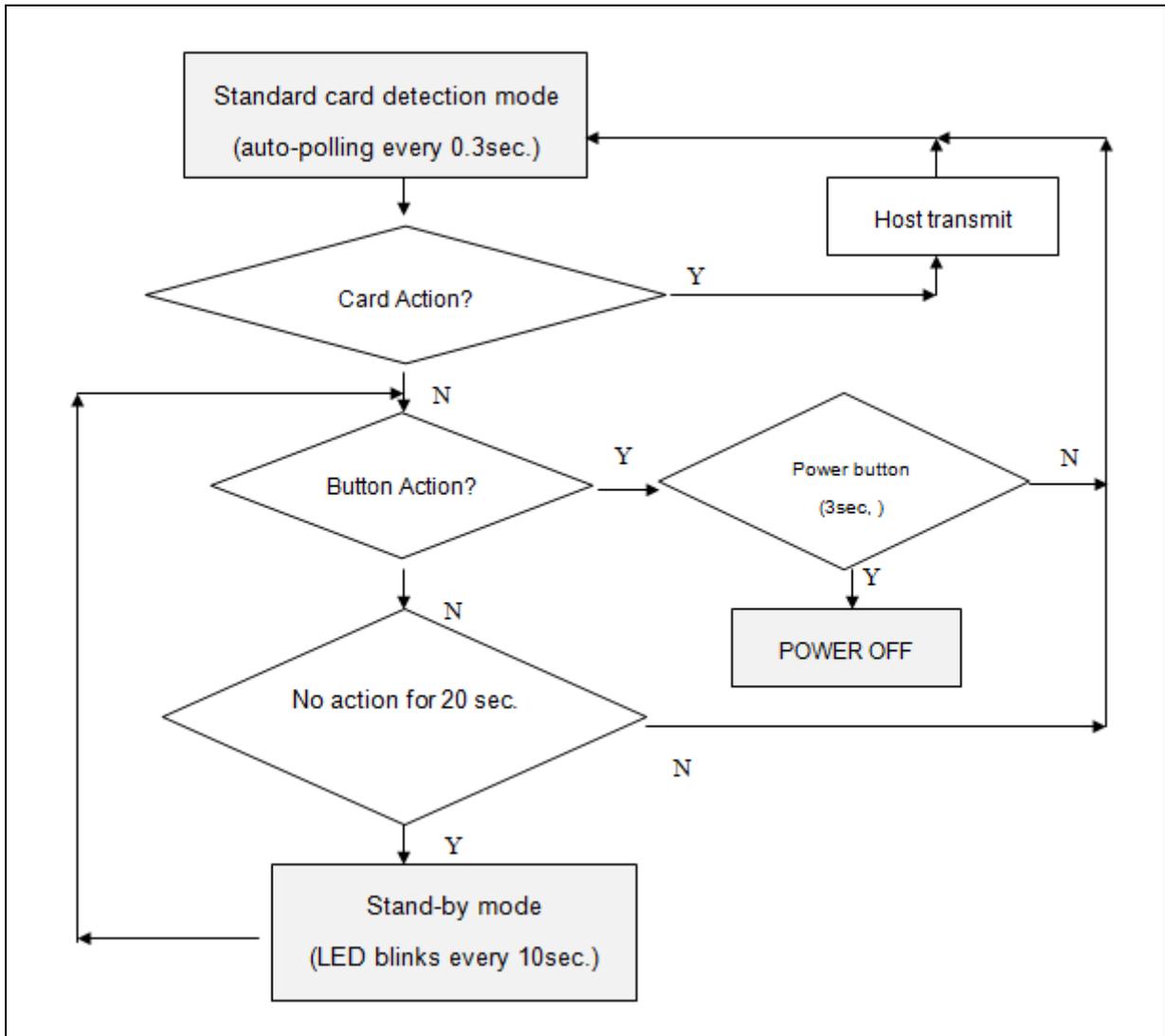
In sleep mode, Dragon BT blink LED every 3sec., and it doesn't detect card.

- **Wake up:** To wake up from sleep mode, press power button shortly
- **Low battery:** When device's battery is low, battery LED blinks twice every 10sec in sleep mode.
- Our device name will be displayed “DRAGON-BT0” on Bluetooth device list
- To change device name, refer to Chapter 6.4 or Chapter 7.3
- When device receives any command from HOST PC, it stops auto-detecting and wait commands from host PC (PC-controllable mode)
- **Power Off:** To turn off power, hold down power button for 3seconds until it beeps
- **When Bluetooth & Battery led becomes off simultaneously**

 power	 Bluetooth	 Card Detect	 Battery
			

Dragon BT is looking for the previous connected device. To pair with new device, plz press power button 4times and BT will be reboot and delete previous connection.

Flow chart



6. Command Set

6.1 HID interface set and inquiry(0xEE)

- To enable HID Mode, send 0xEE (Command) 0x01(Data) on Dualcard and reset the device.



CMD DATA

TX EE 01

TX Data Length 1 Bytes (2/2)

Saved Command

Run

- To convert SPP only mode, send 0xEE (Command) 0x00 (Data) on DualCard and reset the device.



CMD DATA

TX EE 00

TX Data Length 1 Bytes (2/2)

Saved Command

Run

- To inquiry current device Mode, send same command(0xEE) and Data [0] as 0xFF
 - ⇒ 0x00 (response data) means SPP mode
 - ⇒ 0x01 (response data) means HID mode (Keyboard emulation mode)
- While Dragon BT set HID mode and connected Host, it detects card automatically and displays CARD ID(UID) into any open window (works as keyboard emulation mode)

6.2 MIFARE card read setting (0xE2)

This command is used to read specific block of MIFARE card instead of UID DATA in HID mode.

STX	LENH	LENL	CMD	DATA	LRC
0x02	0x00	0x0B	0xE2	Data[0..9]	

Data	Value	Description
Data [0]	0x00	A Type key
	0x04	B Type key
Data [1..6]		6 byte Key data
Data [7]	0	ID is chip serial number
	1~	Block Number where ID exists
Data [8]	0~12(0x0C)	Start position of ID
Data [9]	4	ID Length
	5~16	

6.3 Data Transmit Option setting (0xE3)

STX	LENH	LENL	CMD	DATA	LRC
0x02	0x00	0x0_	0xE3	Data[0..1]	

Data[0]	Data[1]	Description
0x21	0x00	Hexadecimal to ASCII Transmit
	0x01	Integer type ASCII Transmit
	0x02	Hexadecimal itself Transmit
0x22	0x00	Normal order Transmit
	0x01	Reverse order Transmit
0x23	character	End Char (space, tab, return, ...)
0x24	0~0xFF	Sleep mode enter time in second
0x25	0x00	Buzzer and Vibrator act when card is read
	0x01	Buzzer and Vibrator do not act when card is read
0xFF		Return data Format (bit0, bit1) +Reverse(bit2), End character, Sleep enter time, Buzzer (Vibrator)

6.4 Battery Info Get (0xE4)

- To check Battery Level, send 0x E4 (Command)



CMD DATA

TX e4

TX Data Length 0 Bytes (0/2)

Saved Command

Run

- Response data: 0x63(=99%) means battery is full, 0x00(=0%) means it's out of battery.

6.5 Device Name Info Get(0xE5)

- To check Device name, send 0xE5(Command) 0x 00(Data). it only confirms device name from "DRAGON-BT0" ~" DARGON-BT9".



CMD DATA

TX e5 00

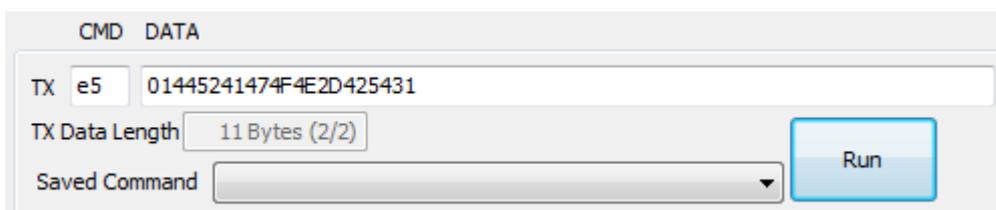
TX Data Length 1 Bytes (2/2)

Saved Command

Run

7	=>E500
8	<=>00445241474F4E2D4254300A

- To change the device name (DRAGON-BT) and number, input 0xE5 (Command), 0x01+" device name" (Data) and reset.
- Following is the same when we set device name as "DRAGON-BT1"



CMD DATA

TX e5 01445241474F4E2D425431

TX Data Length 11 Bytes (2/2)

Saved Command

Run

6.6 NDEF Format Tag Read(0xE7)

This command is used to read NDEF formatted tag reading. This command supports type2, type3 and type4 tags.

STX	LENH	LENL	CMD	DATA	LRC
0x02	0x00	0x03	0xE7	Data [0]: LED (bit 0x01), Buzzer (bit 0x02), Vibration (bit 0x04) action Data[1] : action time[ms]	

6.7 Card Read Control(0xEF)

This command controls stop/start of reading card.

Please send the stop reading command to Dragon BT to use it as vender reader (connect to Dual card program or NFC manager program)

STX	LENH	LENL	CMD	DATA	LRC
0x02	0x00	0x02	0xEF	Data [0] Stop Reading(0x01), Start Reading(0x00)	

6.8 Auto Reconnection Explanation (Bluetooth pairing)

- When Dragon BT reboots, it always trying reconnect to the previous connected device.
- To reconnect with previous device, make sure those devices are power on (PC, Mobile Phone, Tablet)
- Dragon BT tries reconnection for 30sec after booting, and delete this device connection information after 30sec. In this case user need to delete the Bluetooth connection from the device and add Dragon BT again.
- For some PC /OS version, the PC ask whether to reconnect Dragon BT. The user should approve reconnection within 20sec. Otherwise Dragon BT delete the previous pairing information after 20sec so it could connect with new device.
- Dragon BT detect contactless card without Bluetooth pairing, it beeps twice. In Normal card (Dragon BT paired with device); it beeps once when card is detected.
- **When User wants to delete the previous pairing information, press the power button of Dragon BT 4times. Then Dragon BT's power is off. Dragon BT reset the pairing information and waiting for new connection the next time when it's power is On.**

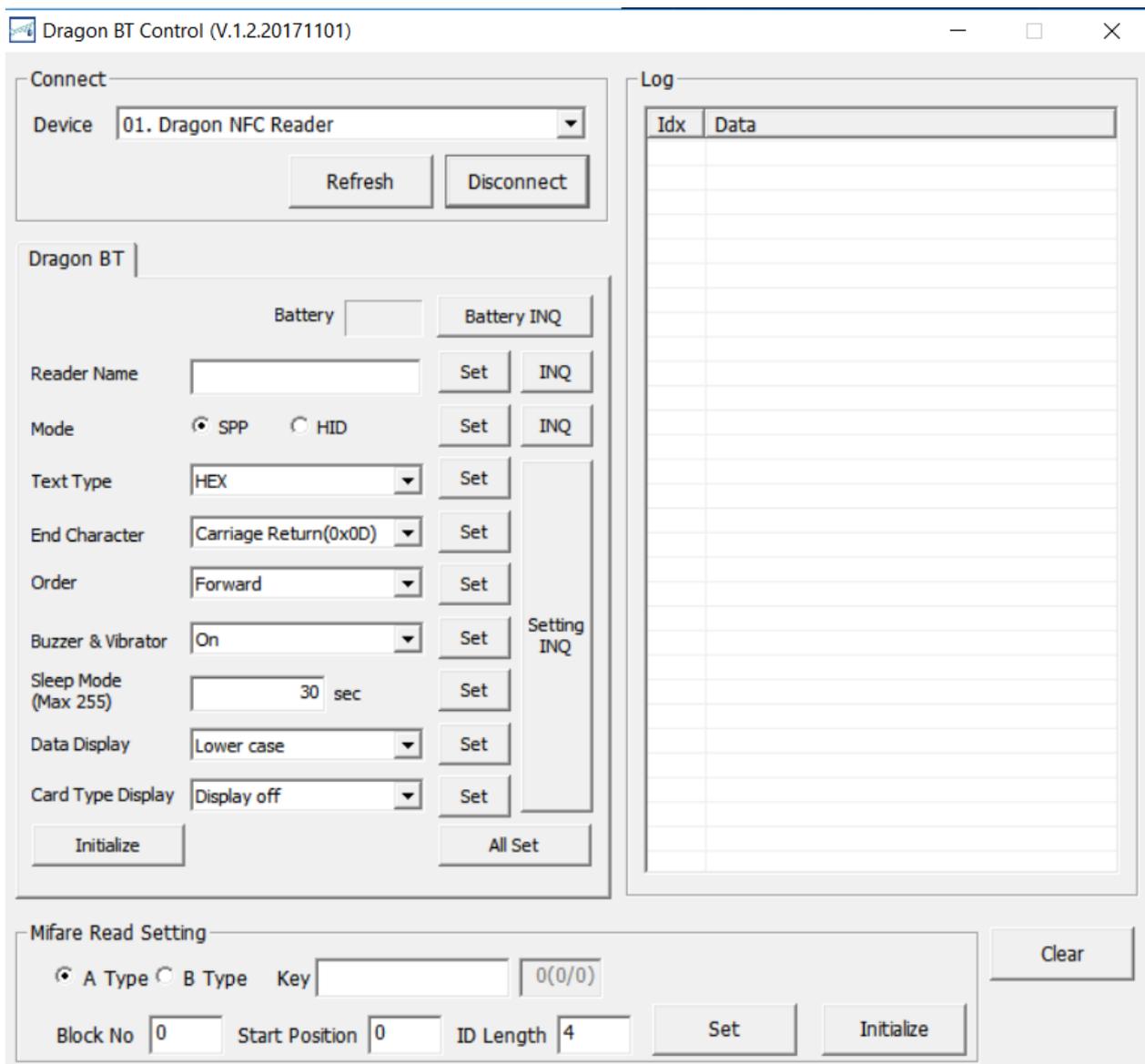
7. PC Control program

It is designed for non-professional user to easily check/control Dragon BT configuration

7.1 Device connect

To use this program, connect Dragon BT via Micro USB cable into PC while its power is on.

Find Dragon from the device list and click [Connect] button



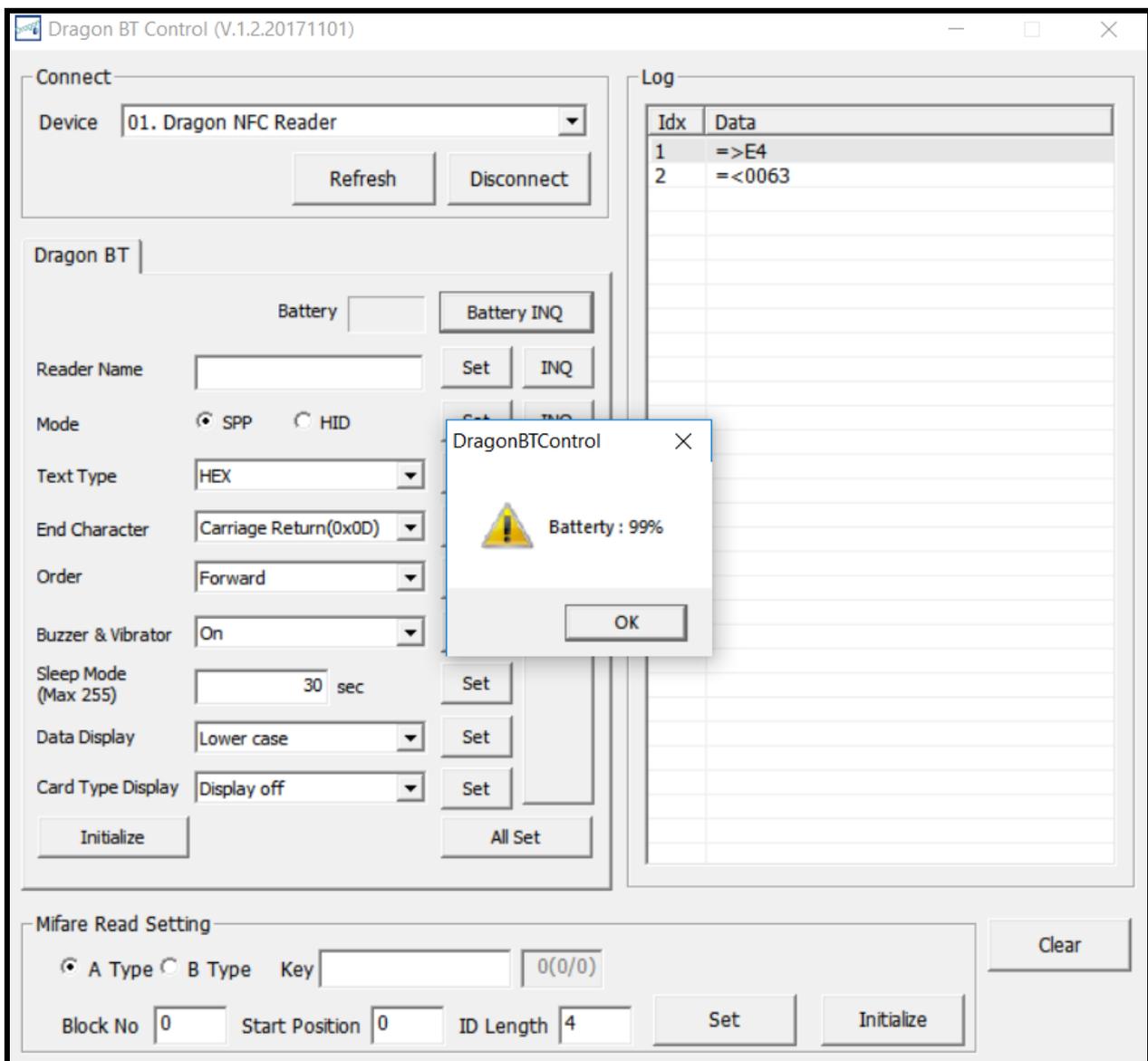
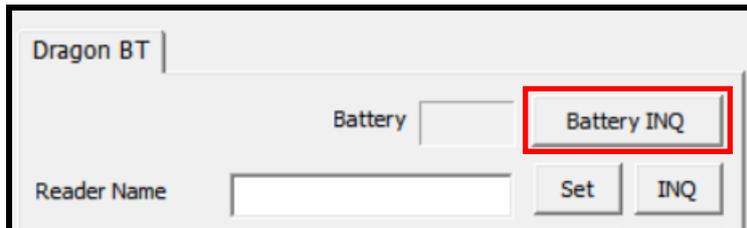
In case you can't find device name on list, kindly check following and retry

1. UBS Driver installation
2. DRAGON BT power (ON)
3. USB cable is capable of communication

(Some cables are only for charge purpose, so not able to communicate. You can use Smartphone USB cable)

7.2 Battery remains

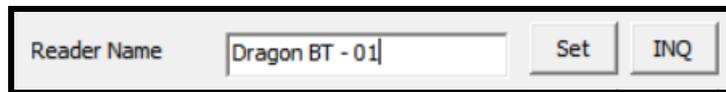
Click [Battery INQ] button, it shows the battery remains.



7.3 Device name setting

It shows connected device name. Input device name to change and click [set]

To apply this change, reset Dragon BT



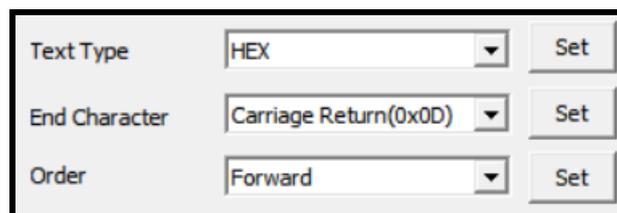
7.4 SPP/ HID mode change

Select the communication mode and click [set]. To apply this change, reset Dragon BT



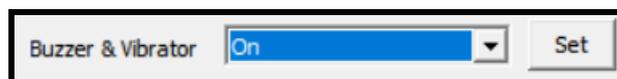
7.5 HID output Configuration

User is able to configure output format of Data in HID mode (HID/Integer/ASCII), End Character and order



7.6 Buzzer/Vibration

To change buzzer and Vibrator setting.



7.7 Sleep mode time change

To change time when Dragon BT convert into Sleep mode

It will become on sleep mode when there's no action from last card reading to set time

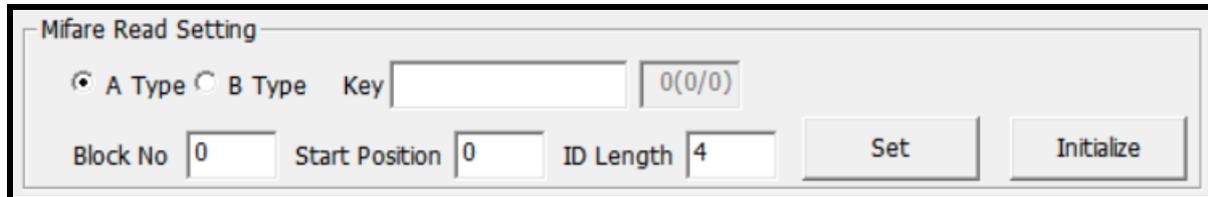
The longer you set this term, the shorter Dragon BT's operation time.

Input value from 1 ~ 255(Max)



7.8 Mifare card reading

User is able to configure Mifare read in case they want to use specific block



The screenshot shows a dialog box titled "Mifare Read Setting". It contains the following elements:

- Radio buttons for "A Type" (selected) and "B Type".
- A "Key" label followed by an empty text input field and a "0(0/0)" label.
- Input fields for "Block No" (value: 0), "Start Position" (value: 0), and "ID Length" (value: 4).
- "Set" and "Initialize" buttons.

8. Warranty & service

DUALi Inc. warrants to the original consumer or other end user that this product, Dragon BT, is free from defects in materials and workmanship for a period of 1 year from the date of purchase.

However, the warranty for the battery is 6 months from the purchase date (receiving date). This battery has been stored after measuring cell voltage/ deviation in an incoming inspection. The production/ storage condition of the battery is 50~60% of charging.

Regard to the feature of Lithium-polymer; the battery is consumable. Be aware of the issue that occurs by misuse of a user or charging and discharging issue after 6 months from receiving, can NOT be changed, refund, or covered by the warranty.

※ **Note** Warranty/non-warranty repair fees do not include shipping charges.

▶ The damages(defaults) prescribed below are NOT to be covered by warranty.

- User's misuse of part/component against the provided manual.
- Fault by the unqualified user's own intention of repairs.
- Adding certain functions or extension of system.

※ **Note** Operation Conditions of batteries

- Rechargeable battery with proper management can expect longer battery life.

However, storing batteries without use can be effect battery capacity and cycle.

- Do NOT expose the batteries to extreme temperature, more than 50 °C or less then -10 °C.
- To maintain the maximum capacity, use the battery indoor temperature.
- Battery storing & charging: Battery capacity can be reduced rapidly if it's used at low temperatures. The recommended temperature for charging is between 0 °C to 45 °C.

PRECAUTIONS

- Do not drop the device.
- Do not modify, repair, or disassemble.

- Do not expose directly to water, alcohol, benzene, etc for cleaning.
- Do not expose directly to flammables.
- Do not place or keep the device near flammables.
- Keep the device away from excessive humidity and dust.
- Do not place heavy objects on the device.
- Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- There is a risk of explosion if the battery is replaced by an incorrect type.

*Please contact our service team for the technical/ sales supports.

DUALi Inc.

1-309 Innoplex, 552 Wonchoen-dong, Youngtong-gu,

Suwon, Gyeonggi-do, Korea (zip: 443-380)

Tel : +82 31-213-0074

Fax : +82 31-213-0078

E-mail : lab@duali.com

Web-site : <http://www.duali.com>