



CS710S-2

**EPC Class 1 Gen 2 RFID Sled
Handheld Reader User's Manual**



Version 2.2

***CSL: The One-Stop-Shop for RFID
Solutions***

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2 Regulatory Information

FCC STATEMENT

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.

Warning: Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help

the SAR limit of 4.0 W/kg over any 10 grams of tissue. The device complies with RF specifications when used at a distance of 19 mm from your Extremity. The highest reported SAR value: Extremity SAR: 2.95 W/kg.

IC STATEMENT

IC Notice to Canadian Users

This device complies with CAN ICES-3 (B)/NMB-3(B).

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

- (1) this device may not cause interference, and
- (2) this device must accept any interference, including interference that may cause undesired operation of the device."

Cet appareil est conforme à la norme CAN ICES-3 (B)/NMB-3 (B).

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 n' 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."

Para los países que adoptan el límite SAR de 4.0 W/kg sobre 10 gramos de tejido: El dispositivo cumple con las especificaciones de RF cuando se lo usa a una distancia de 19mm del Extrémité. Valor SAR más alto informado: SAR para Extrémité: 2.95 W/kg.

3. General

3.1 CS710S-2 RFID Sled Handheld RFID Reader

The CS710S-2 Sled handheld RFID reader is a reader designed to work with an off-the-shelf smart phone (such as iPhone or Android phone) via Bluetooth connection, where the application on the smart phone would control the CS710S-2 reader to perform RFID tag reading or barcode reading.

CS710S-2 is a handheld product. It is NOT a body worn product. User holds it using the handle as shown in below photo. Holding it by the handle is the only way of usage.

Below photo shows the smart phone separately handled by the user during operation:



Figure 1

Note: Smart phone and CS710S-2 can only be paired via the App provided. They DO NOT pair via the normal Bluetooth Device connection page of the OS. Therefore, install the App first and pair the CS710S-2 from inside the App.

Below photo shows the smart phone mounted (detachable) on top of the CS710S-2 reader during operation:



Figure 2

CS710S-2 can also be controlled via the USB connection by a PC. In this case, the Bluetooth connection is not used. The control commands enter via the USB cable. The application is on a PC.

Below photo show the CS710S-2 handheld reader connected via USB cable to (and controlled by) a PC.

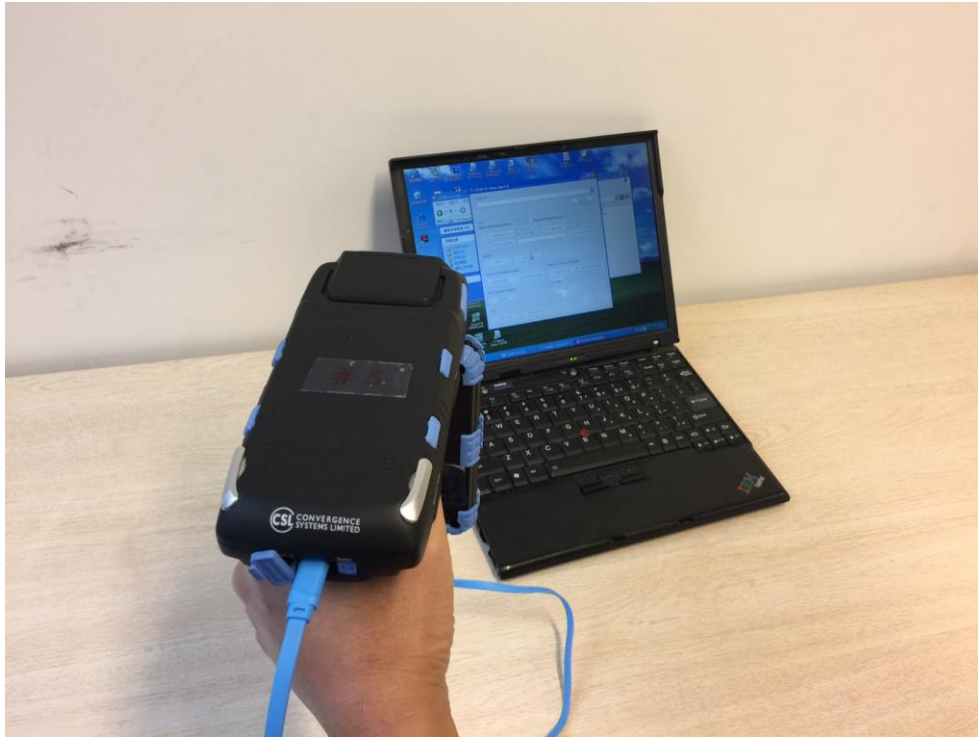


Figure 3

3.2 Product Package

3.2.1 Basic Package Content

The reader package contains:

- Handheld reader
- USB cable
- Battery – 1 piece

3.3 Product Specification



Figure 4: CS710S-2 Reader

Features:

- ISO 18000-6C and EPCglobal Class 1 Gen 2 UHF RFID protocol compliant including dense reader mode
- Ultra long read range – peak at more than 18 meters for Monza R6 Dogbone tag
- Sophisticated data handling for efficient management of large streams of tag data.
- Highly configurable buffering and tag filtering modes to eliminate the redundant tag data so as to reduce wireless LAN traffic and server loading
- Robust performance in dense-reader environments
- Excellent in transmit and receive mode – generates a different combination of unique reader-to-tag command rate, tag-to-reader backscatter rate, modulation format, and backscatter type
- Configurable parameters offer maximum throughput and optimal performance
- Supports all Gen 2 commands, including write, lock and kill

Specifications:

Physical Characteristics:	Length: 16.1 cm; Width: 9.0 cm; Height: 16.1 cm; Weight: 595 grams
Environment:	Operating Temp: -20 ⁰ C to 50 ⁰ C Storage Temp: -40 ⁰ C to 85 ⁰ C Humidity: 5% to 95% non-condensing Enclosure: IP-52
Antenna:	2.45 dBiL Gain internal patch antenna
RF Power:	Internal conducted power 30 dBm Max.
ERP Power:	1000mW
RFID Frequency Ranges:	902.75 – 927.25 MHz band
Interfaces	<ul style="list-style-type: none"> ● Bluetooth 5.0 Bluetooth Frequency : 2400 – 2483.5MHz Power : 1mW ● USB
Accessories:	USB cable
Order Code:	CS710S-2
Restrictions on Use:	Approvals, features and parameters may vary depending on country legislation and may change without notice

4 Introduction

4.1 Basic Hardware

The CSL CS710S-2 handheld RFID Reader is an EPCglobal Class 1 Gen 2 handheld reader product.

Below is the front view of the CS710S-2 reader. The barcode lies in a compartment at the top. The RFID reader is in the front box, with the embedded patch antenna inside the cover facing forward.



Figure 5 : CS710S-2 Reader Front View

Below is the left side view of the CS710S-2 reader. There are 5 LEDs on this side, from left to right, representing respectively:

- 1) RFID Power On
- 2) Status
- 3) Barcode Power On
- 4) Charging
- 5) External Power connected



Figure 6 : CS710S-2 Reader Left Side View

Below is the right side of the CS710S-2 reader. There are 2 buttons/LEDs here.

The left button/LED is for Bluetooth pairing, and the LED lighting up meaning Bluetooth is connected.

The right button/LED is for main power, with LED lighting up meaning power is on. Press the button continuously for 3 seconds, then release to power on. When the reader is on, press the button continuously for 3 seconds, then release to power off.



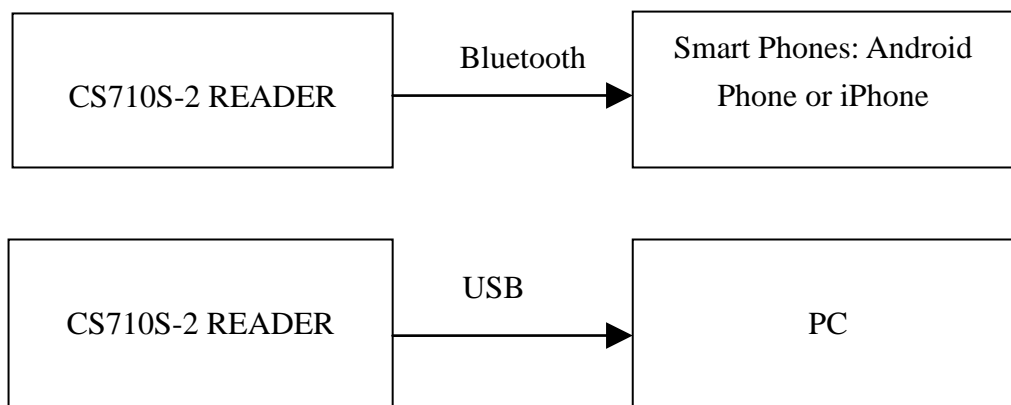
Figure 7 : CS710S-2 Reader Right Side View

Below is the rear view of the CS710S-2 reader. Here the USB Type C socket is on the left, allowing the user to connect CS710S-2 to a PC for control, or to a USB power source to recharge the battery inside the CS710S-2.



Figure 8 : CS710S-2 Reader Rear SideView

Based on this, one can see the CS710S-2 can be connected to either a smart phone via Bluetooth for control and data collection, or to a PC via USB cable for control and data collection.



4.2 Power Up Sequence

The reader can be turned on to run RFID and Barcode operation in a most simple manner:

1. Insert battery into the body of the handheld reader with the top plastic cover removed. Also, make sure it is in the correct direction in terms of front and back. The battery connectors should be at the back of the reader. Put the cover back once battery is inserted.
2. Press the power button on the right side of the reader continuously for 3 seconds then release.
3. After you release the finger, then the Blue LED should lit up.
4. The reader is now turned on.

4.3 Demo Applications

4.3.1 Software on Smart Phone

1. Press the Bluetooth button on the right side of the reader continuously until the blue LED starts flashing. Do not release your finger, you need to press UNTIL the Blue LED lit up. Because of that, press the button in a way such that the LED is not obstructed by your pressing finger.
2. The reader is now discoverable by smart phone App (Customer need to installed from the Apple Shop or Google Play) . Note that only the CSL App can connect to the CS710S-2. The generic Bluetooth Device Search of the OS cannot connect to CS710S-2.

Installation of Smartphone demo application . Below is using Android platform as demonstration, it works the similar way as in iOS platform.

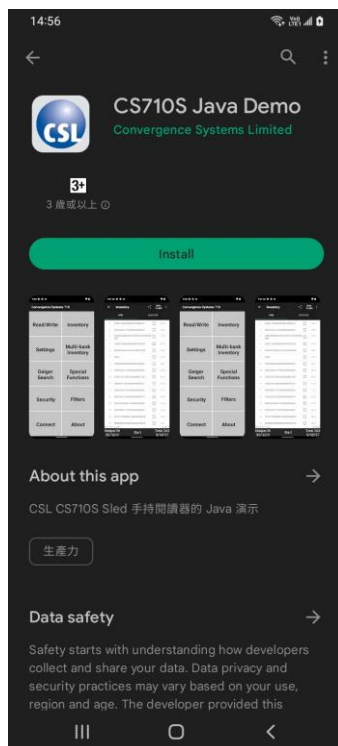


Figure 9

Once installed, The CS710S-2 Android App icon is as follows.



Figure 10

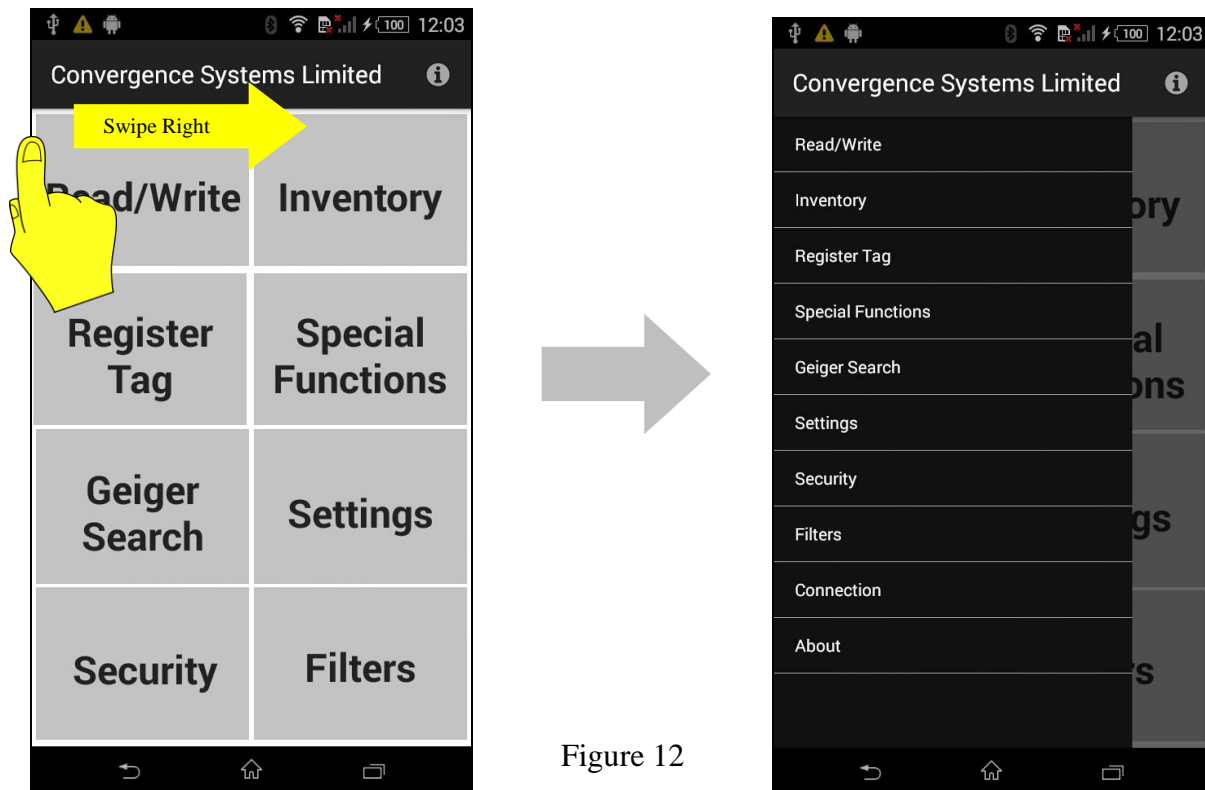
Executing the application will enter below main menu.. First, user carry out the Bluetooth LE association (device pairing), after that we can carry out the different kind of RFID operations.



Figure 11

4.3.2 Pairing

To start searching and connecting to (pairing with) a CS710S-2 nearby, use the finger to SWIPE the screen from the LEFT edge to invoke the menu:



Please make sure the CS710S-2 Bluetooth button has been pressed until the Blue LED is flashing, meaning the CS710S-2 is ready for discovery by Smart Phones nearby.

After that, select the line “Connection” to start the search and connect to CS710S-2 process:

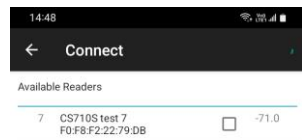


Figure 13



Then you should see all the available CS710S-2 nearby:

Select the one you want to connect to and press it first to select it and then press it again to start the connection process **(IN OTHER WORDS, YOU NEED TO PRESS 2 TIMES)**:



Figure 14

Note: If you have multiple CS710S-2, you should set them to different names to distinguish one from another.

4.3.3 RFID Inventory

To do an inventory of RFID tags, select the “Inventory” button:



Figure 15

Click the “enable continuous mode” box for continuous inventory:

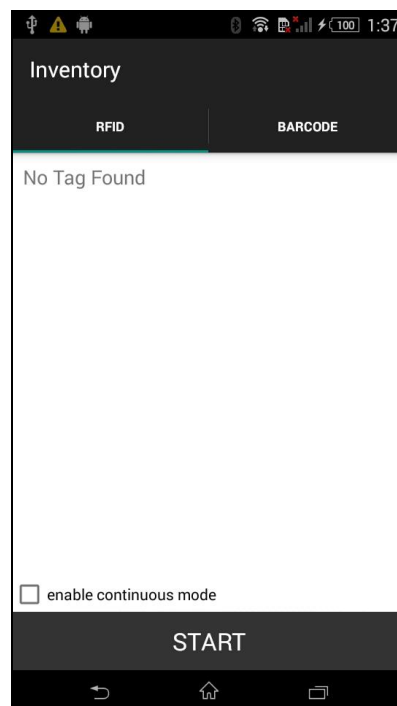


Figure 16

Wait for the CS710S-2 to start inventory and then you should see the RFID tags ID as shown below. The first column is the number of reads of that tag ID, second column is the RFID tag EPC ID, last column is the RSSI of the tag return. On the lower right, you can also see the battery voltage at that point. When fully charged, it is around 4.2 Volts. The unit should run to about 3.3 Volts before it stops.



Inventory		
RFID	BARCODE	
2 23051400000000000000FF	<input type="checkbox"/>	36.1
1 7099995000000000000004	<input type="checkbox"/>	35.6
5 19DEC160000000000000004	<input type="checkbox"/>	40.3
13 2305140000000000000001	<input type="checkbox"/>	39.6
10 E280116060000207A729A4DB	<input type="checkbox"/>	47.6
2 19DEC160000000000000005	<input type="checkbox"/>	44.9
3 19DEC160000000000000006	<input type="checkbox"/>	40.3
2 19DEC160000000000000001	<input type="checkbox"/>	36.1
2 709999500000000000000005	<input type="checkbox"/>	36.1
<input checked="" type="checkbox"/> enable continuous mode		4.207 V
23	6366	111,17

Figure 17

At any point, if you want to stop, just press the middle center location (here showing 6366) which is the location of the original start button, and the reader will stop inventory of RFID tags and the screen will become like the following, where the Start button appears again:



Figure 18

4.3.4 Barcode Inventory

To do a barcode inventory, go to Inventory button:



Figure 19

Then press the BARCODE button:



Figure 20

Press the START button. At this point, the red LED of the barcode reader should lit up to help you aim your CS710S-2 barcode reader onto the barcode. A focused circular dot should appear. That is where the distance of the barcode should be with respect to the reader.

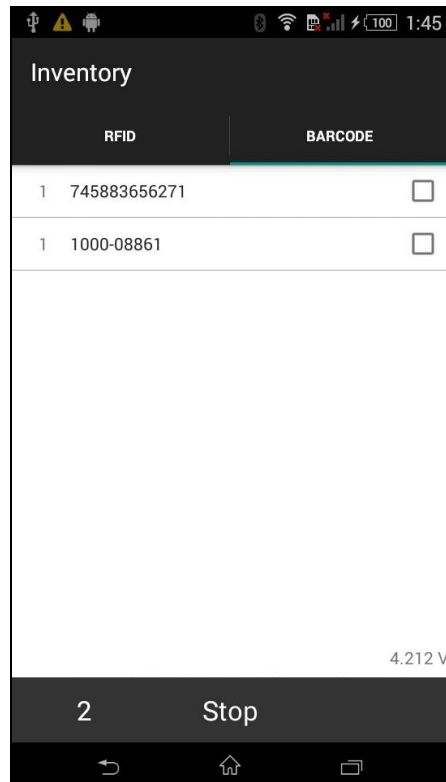


Figure 21

Once the barcode is read, you can now Stop.

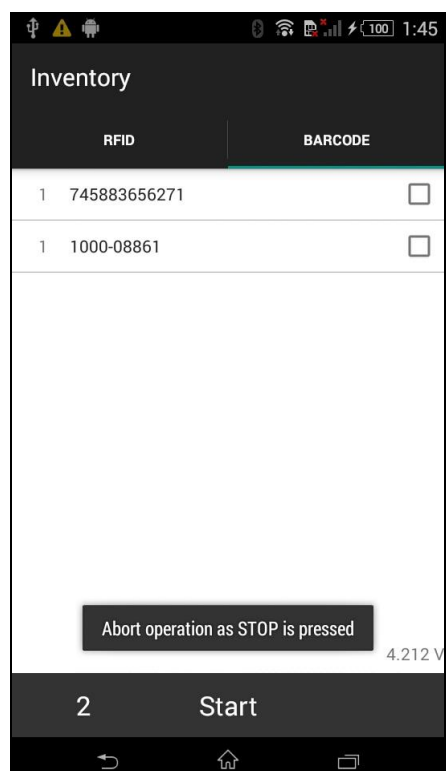


Figure 22

4.3.5 Exit the Software

By pressing the Home button, middle icon of the menu at the bottom, one can exit the software. Note that the software is not really completely stopped, as is well known by smart phone users. The software is really only sleeping.



Figure 23

4.3.6 Connect to Laptop computer

The CS710S-2 can also be controlled via the USB cable. In this case the mobile phone is not required and Bluetooth is not turned on.

Below is the screen capture of an application on PC controlling CS710S-2. Everything is self-explanatory in the application:

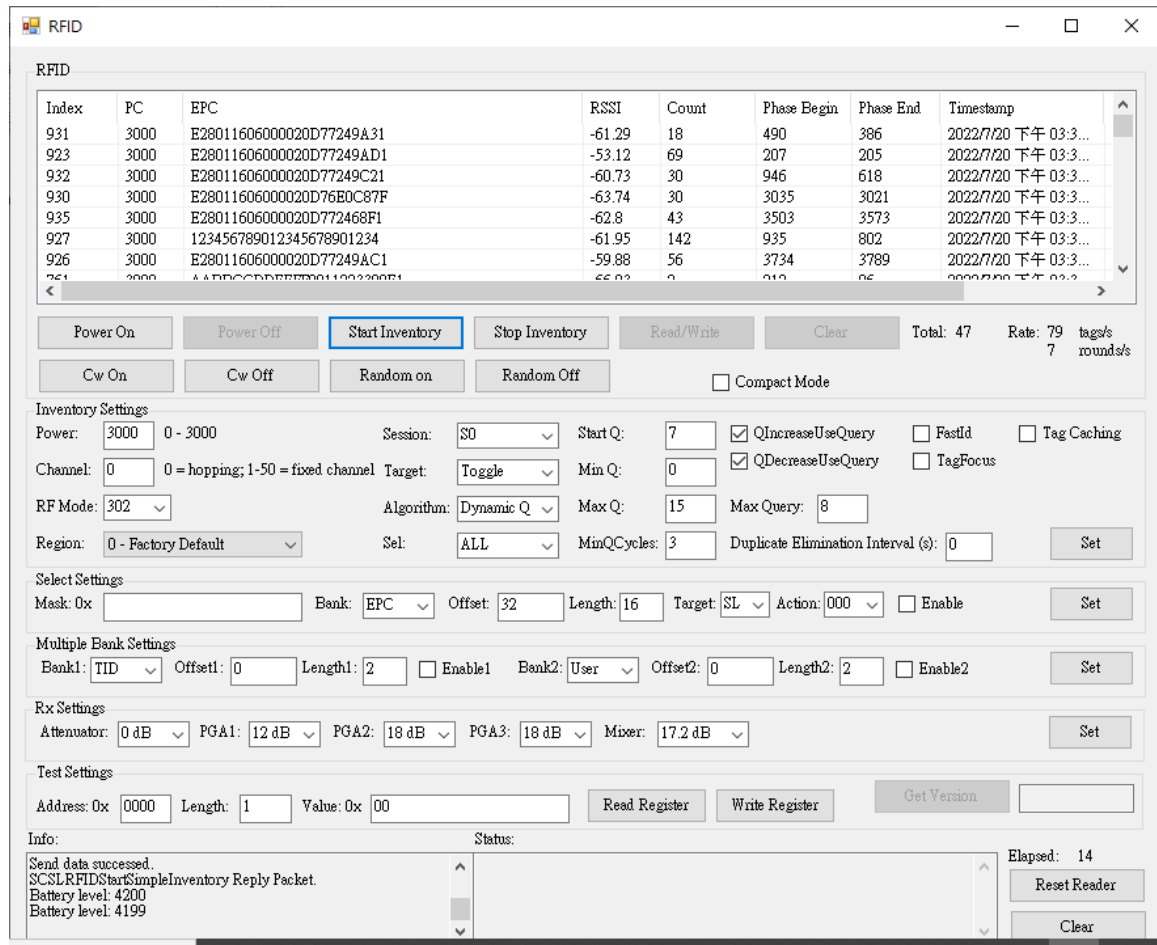


Figure 24 : PC Application Screen – controlling CS710S-2 via USB

Source codes of the PC App for CS710S-2 is also available for download from Convergence website: www.convergence.com.hk

4.4 Charging the CS710S-2

The CS710S-2 can be charged by inserting a USB cable with the following plugs:

- 1) USB Type C plug on one side
- 2) USB Type A plug on the other side
- 3) The above Type A plug connecting to a USB charger with the traditional Type A socket

2 LEDs will light up:

- 1) “Ext. Power” LED: Blue LED. Whenever the USB is connected with power supply, this blue LED will light up.
- 2) “Charging” LED: Red LED. When battery is heavily drained, this red LED will be bright. When battery is completely recharged, this red LED will be very dim. So if you connect the USB cable and this LED is very dim, do not be alarmed. It just means the battery is pretty full already.



Figure 25