2. Specification

2-1. GSM General Specification

	GSM850	EGSM 900	DCS1800	PCS1900	WCDMA 2100	WCDMA 900	WCMDA 850	WCDMA 1900
Freq. Band[MHz] Uplink/ Downlink	824~849 869~894	880~915 925~960	1710~1785 1805~1880	1850~1910 1930~1990	1922~1977 2112~2167	880~915 925~960	824~849 869~894	1852~1907 1932~1987
ARFCN range	128~251	0~124 & 975~1023	512~885	512~810	UL: 9612~9888 DL: 10562~10838	UL: 2712~2863 DL: 2937~3088	UL: 4132~4233 DL: 4357~4458	UL: 9612~9888 DL: 10562~10838
Tx/Rx spacing	45MHz	45MHz	95MHz	80MHz	190MHz	45MHz	45MHz	80MHz
Mod. Bit rate/ Bit Period	270.833kbps 3.692us	270.833kbps 3.692us	270.833kbps 3.692us	270.833kbps 3.692us	3.84Mcps	3.84Mcps	3.84Mcps	3.8Mcps
Time Slot Period/ Frame Period	576.9us 4.615ms	576.9us 4.615ms	576.9us 4.615ms	576.9us 4.615ms	FrameLength: 10ms Slotlength: 0.667ms	FrameLength: 10ms Slotlength: 0.667ms	FrameLength: 10ms Slotlength: 0.667ms	FrameLength: 10ms Slotlength: 0.667ms
Modulation	0.3GMSK	0.3GMSK	0.3GMSK	0.3GMSK	QPSKHQPSK	QPSKHQPSK	QPSKHQPSK	QPSKHQPSK
MS Power	33dBm~5dBm	33dBm~5dBm	30dBm~0dBm	30dBm~0dBm	24dBm~ -50dBm	24dBm~ -50dBm	24dBm~ -50dBm	24dBm~ -50dBm
Power Class	5pcl ~ 19pcl	5pcl ~ 19pcl	0pcl ~ 15pcl	0pcl ~ 15pcl	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)
Sensitivity	-102dBm	-102dBm	-100dBm	-100dBm	-106.7dBm	-106.7dBm	-106.7dBm	-106.7dBm
TDMA Mux	8	8	8	8	8	8	8	8
Cell Radius	35Km	35Km	2Km	2Km	2Km	2Km	2Km	2Km

2-2. GSM Tx Power Class

TX Power control level	GSM850
5	33±2 dBm
6	31±2 dBm
7	29±2 dBm
8	27±2 dBm
9	25±2 dBm
10	23±2 dBm
11	21±2 dBm
12	19±2 dBm
13	17±2 dBm
14	15±2 dBm
15	13±2 dBm
16	11±3 dBm
17	9±3dBm
18	7±3 dBm
19	5±3 dBm

TX Power control level	EGSM900
5	33±2 dBm
6	31±2 dBm
7	29±2 dBm
8	27±2 dBm
9	25±2 dBm
10	23±2 dBm
11	21±2 dBm
12	19±2 dBm
13	17±2 dBm
14	15±2 dBm
15	13±2 dBm
16	11±3 dBm
17	9±3dBm
18	7±3 dBm
19	5±3 dBm

TX Power control level	DCS1800
0	30±3 dBm
1	28±3 dBm
2	26±3 dBm
3	24±3 dBm
4	22±3 dBm
5	20±3 dBm
6	18±3 dBm
7	16±3 dBm
8	14±3 dBm
9	12±4 dBm
10	10±4 dBm
11	8±4 dBm
12	6±4 dBm
13	4±4 dBm
14	2±5 dBm
15	0±5 dBm

TX Power control level	PCS1900
0	30±3 dBm
1	28±3 dBm
2	26±3 dBm
3	24±3 dBm
4	22±3 dBm
5	20±3 dBm
6	18±3 dBm
7	16±3 dBm
8	14±3 dBm
9	12±4 dBm
10	10±4 dBm
11	8±4 dBm
12	6±4 dBm
13	4±4 dBm
14	2±5 dBm
15	0±5 dBm

3. Operation Instruction and Installation

Main Function

- Android OS v5.0.2 (Kitkat)
- LTE Cat.6 (300/50Mbps)
- 16MP, Auto Focus, LED Flash
- 5MP camera (Front)
- 5.1" 1440x2560 Pixels , Quad HD Super AMOLED capacitive touch screen
- A-GPS, GLONASS and Beidou / BT v4.1 / USB v2.0 / WiFi (802.11 a/b/g/n/ac VHT80, MIMO 2x2) / NFC
- Sensors: Accelerometer, Gyro, Proximity, Compass, Hall, RGB ambient light, Fingerprint, Heart Rate Sensor
- Additional :
  - 2.1GHz Quad + 1.5GHz Quad
  - Battery 2550mAh
  - Charger : 5V 2A, (AFC : 9V 1.67A)
  - Data cable : 2.7pi, 1.2m
  - Ear phone : 3.5pi 4pin

9. Reference Abbreviate

Reference Abbreviate

- **AAC**: Advanced Audio Coding.
- **AVC** : Advanced Video Coding.
- **BER** : Bit Error Rate
- **BPSK**: Binary Phase Shift Keying
- **CA** : Conditional Access
- **CDM** : Code Division Multiplexing
- **C/I** : Carrier to Interference
- **DMB** : Digital Multimedia Broadcasting
- **EN** : European Standard
- **ES** : Elementary Stream
- **ETSI**: European Telecommunications Standards Institute
- **MPEG**: Moving Picture Experts Group
- **PN** : Pseudo-random Noise
- **PS** : Pilot Symbol
- **QPSK**: Quadrature Phase Shift Keying
- **RS** : Reed-Solomon
- **SI** : Service Information
- **TDM** : Time Division Multiplexing
- **TS** : Transport Stream

1. Safety Precautions

1-1. Repair Precaution

Before attempting any repair or detailed tuning, shield the device from RF noise or static electricity discharges.

Use only demagnetized tools that are specifically designed for small electronic repairs, as most electronic parts are sensitive to electromagnetic forces.

Use only high quality screwdrivers when servicing products. Low quality screwdrivers can easily damage the heads of screws.

Use only conductor wire of the properly gauge and insulation for low resistance, because of the low margin of error of most testing equipment.
We recommend 22-gauge twisted copper wire.

Hand-soldering is not recommended, because printed circuit boards (PCBs) can be easily damaged, even with relatively low heat. Never use a soldering iron with a power rating of more than 100 watts and use only lead-free solder with a melting point below 250°C (482°F).

Prior to disassembling the battery charger for repair, ensure that the AC power is disconnected. Always use the replacement parts that are registered in the SEC system. Third-party replac ement parts may not function properly.

1-2. ESD(Electrostatically Sensitive Devices) Precaution

Many semiconductors and ESDs in electronic devices are particularly sensitive to static discharge and can be easily damaged by it. We recommend protecting these components with conductive anti-static bags when you store or transport them.

Always use an anti-static strap or wristband and remove electrostatic buildup or dissipate static electricity from your body before repairing ESDs.

Ensure that soldering irons have AC adapter with ground wires and that the ground wires are properly connected.

Use only desoldering tools with plastic tips to prevent static discharge.

Properly shield the work environment from accidental electrostatic discharge before opening packages containing ESDs.

The potential for static electricity discharge may be increased in low humidity environments, such as air-conditioned rooms. Increase the airflow to the working area to decrease the chance of accidental static electricity discharges.

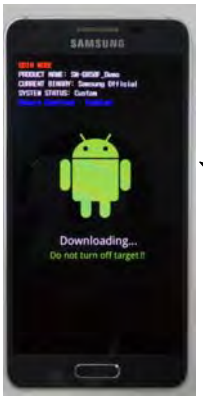
6. Level 1 Repair

6-1. S/W installation

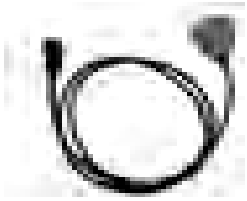
6-1-1. Required items in order to install S/W

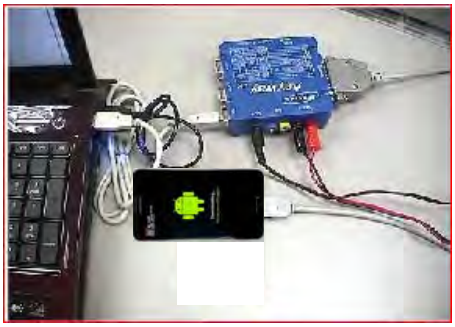
- Installation program: Downloader Program (**Odin3 v3.10.6.exe**)
- SM-G920F Mobile Phone
- Data Cable (GH39-01661A)
- JIG BOX (GH81-11888A)
- JIG Cable (GH81-10952A)
- Adapter (GH81-11888K)
- Serial Cable
- Mobile device specific S/W: Binary files

※ Settings



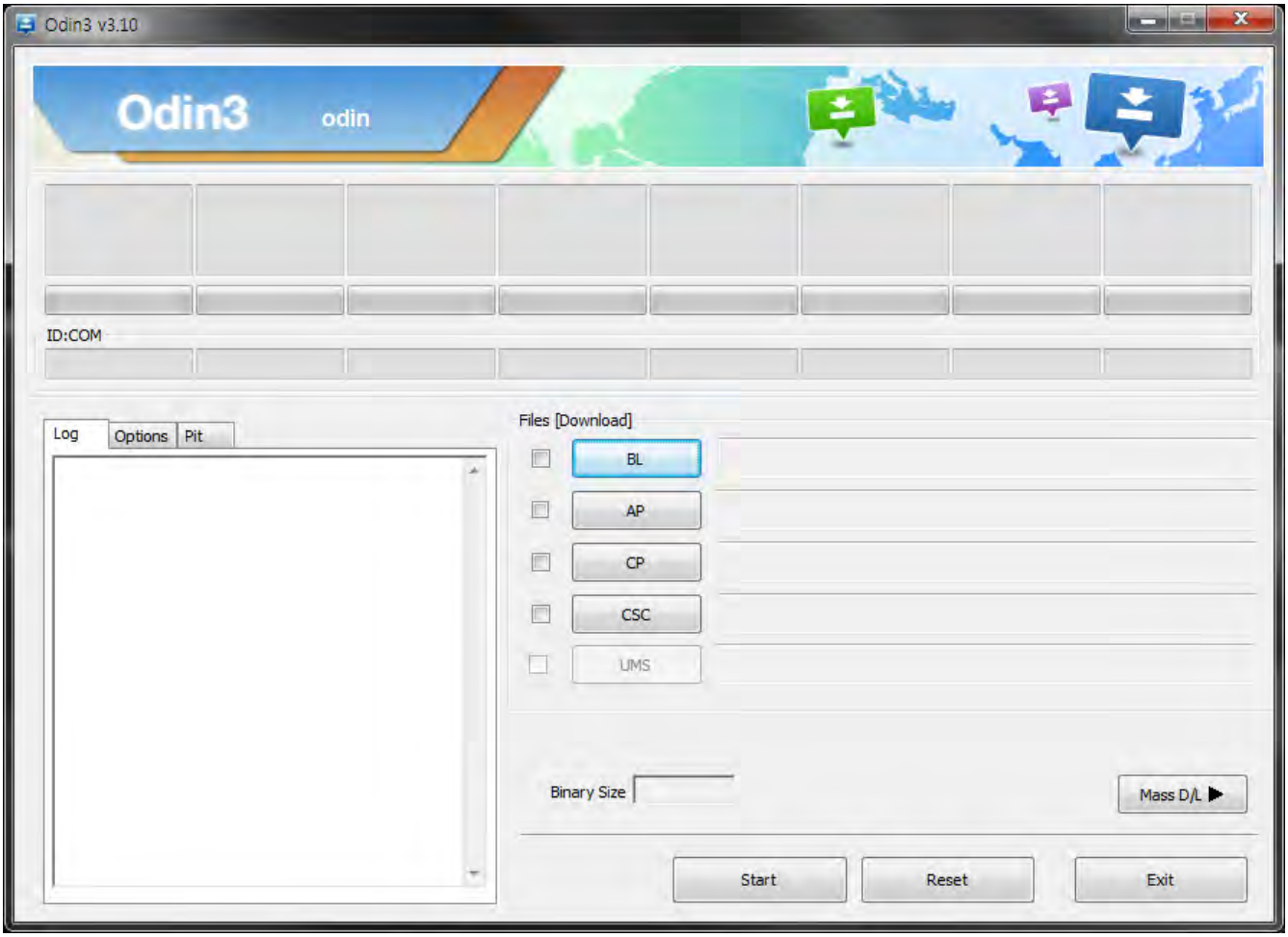
Connect ANYWAY JIG BOX
with JIG CABLE (Phone to JIG)
or PC to Phone Using Data Cable



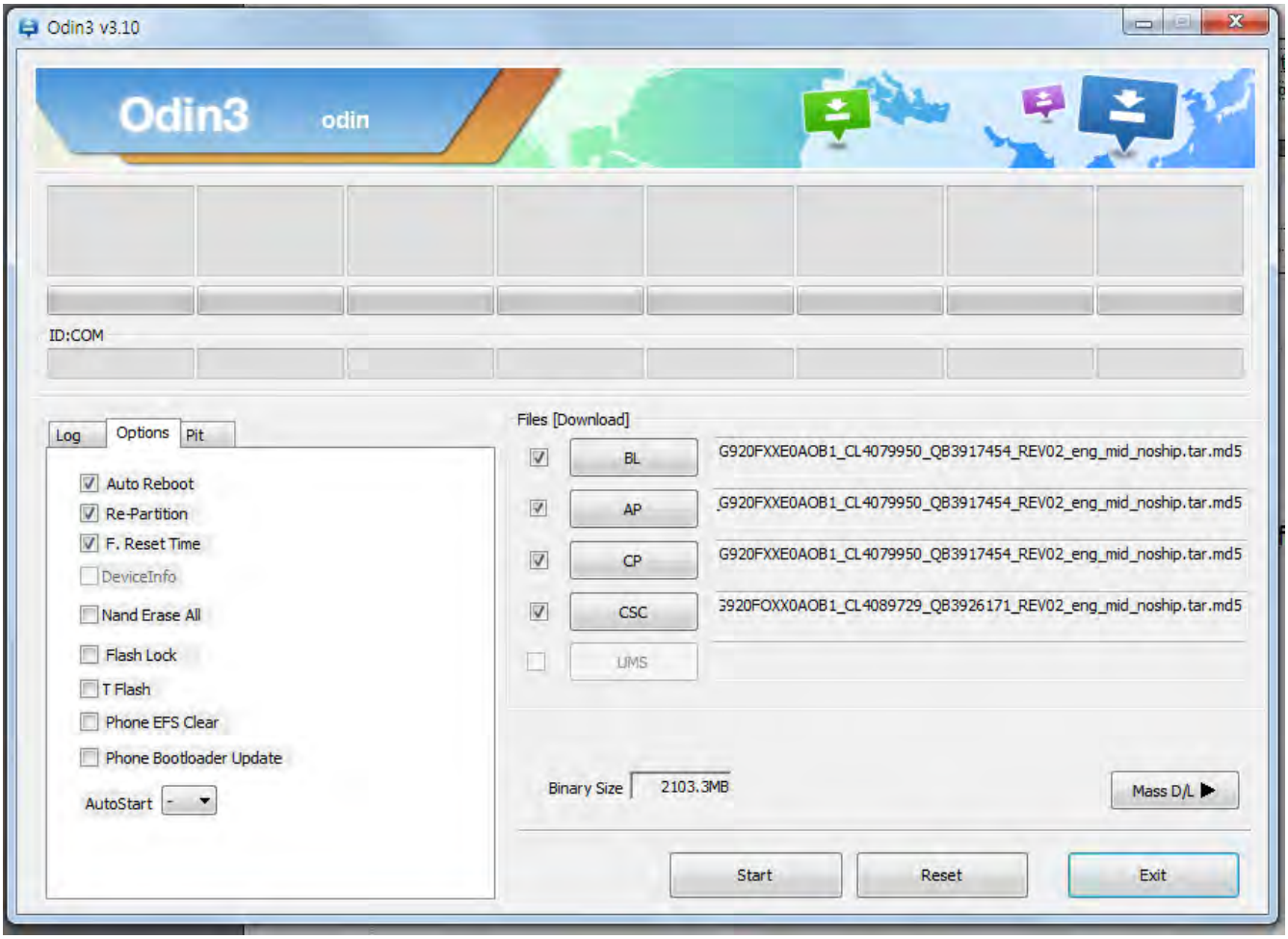


6-1-2. S/W Installation Program (Downloader program)

■ Open up the S/W Installation Program by executing the **"Odin3 v3.10.6.exe"**

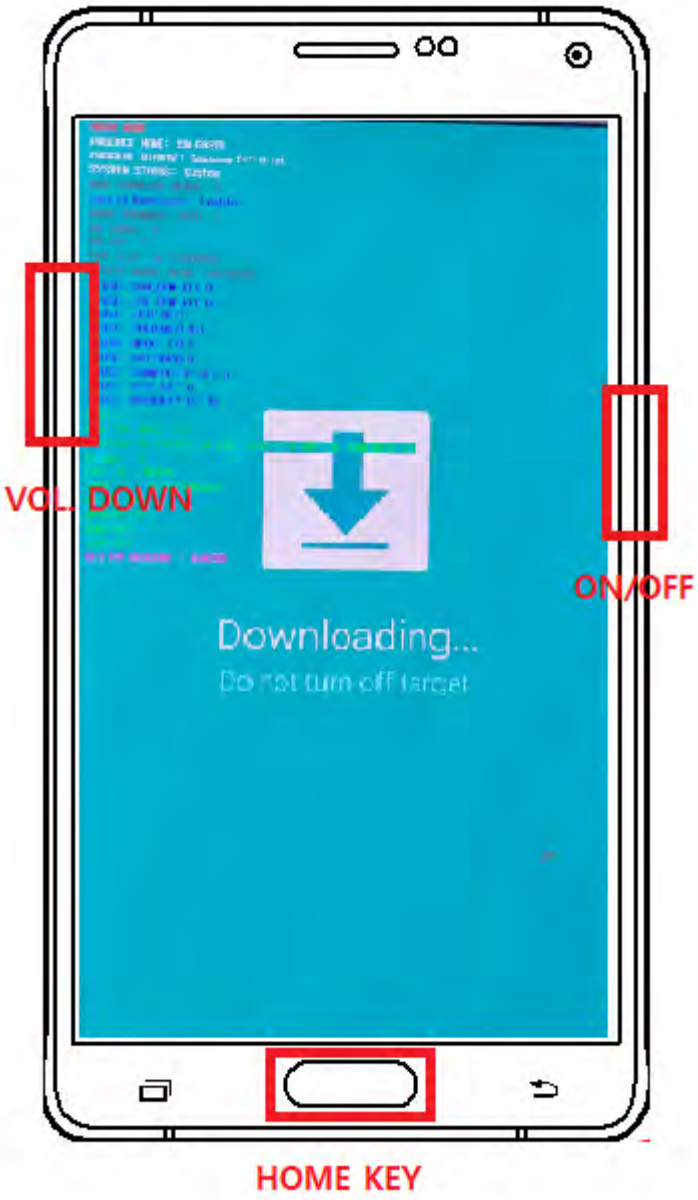


1. Enable the check mark by click on the following options,
   - Check Auto Reboot, Re-Partition, and F. Reset Time
   - Check PIT
   - Check BOOTLOADER, PDA, PHONE, and CSC Files
     * Note : "Odin v3.10 or above" checks MD5 checksum just after file selection.

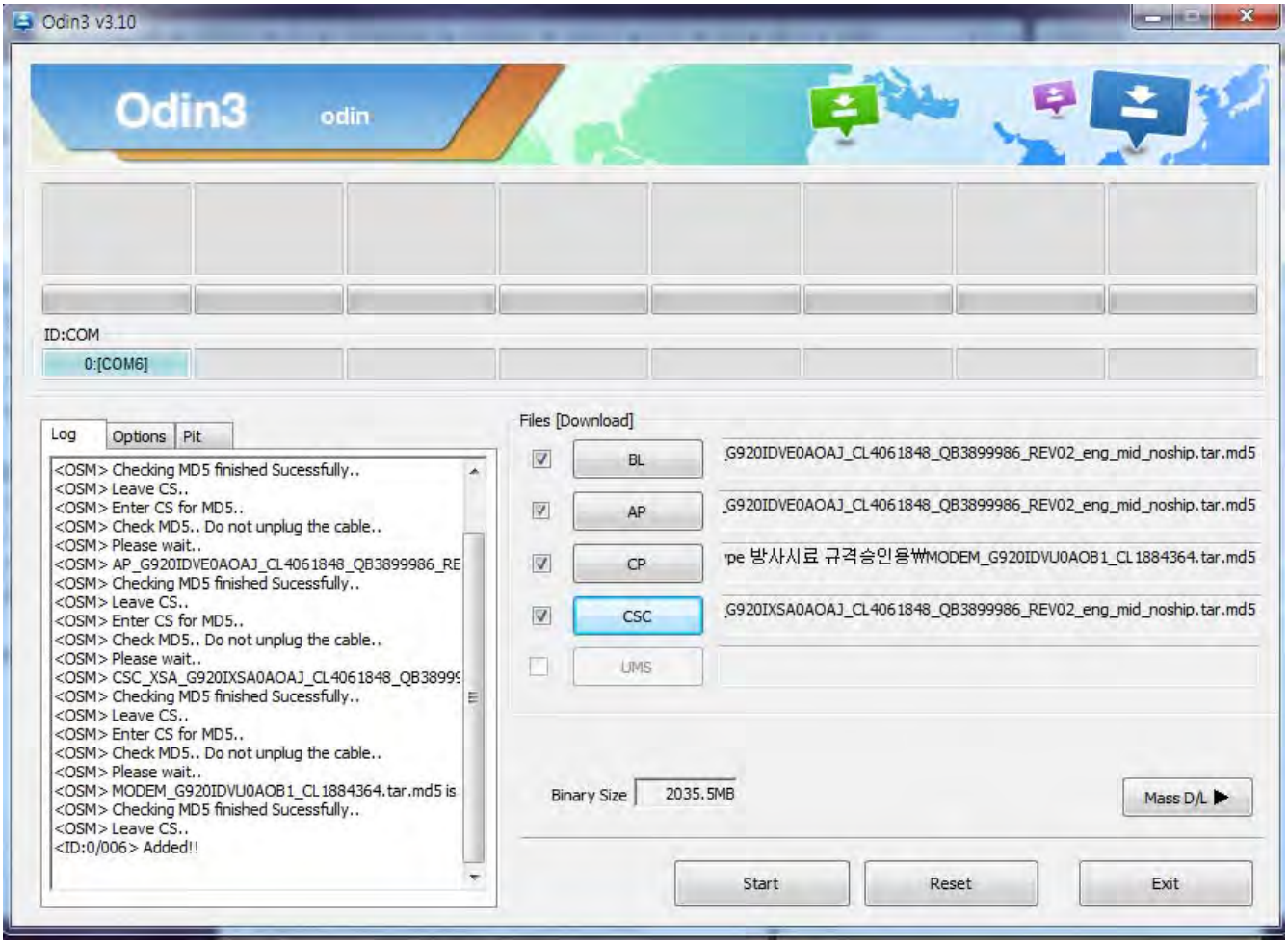


2. Enter into Download Mode

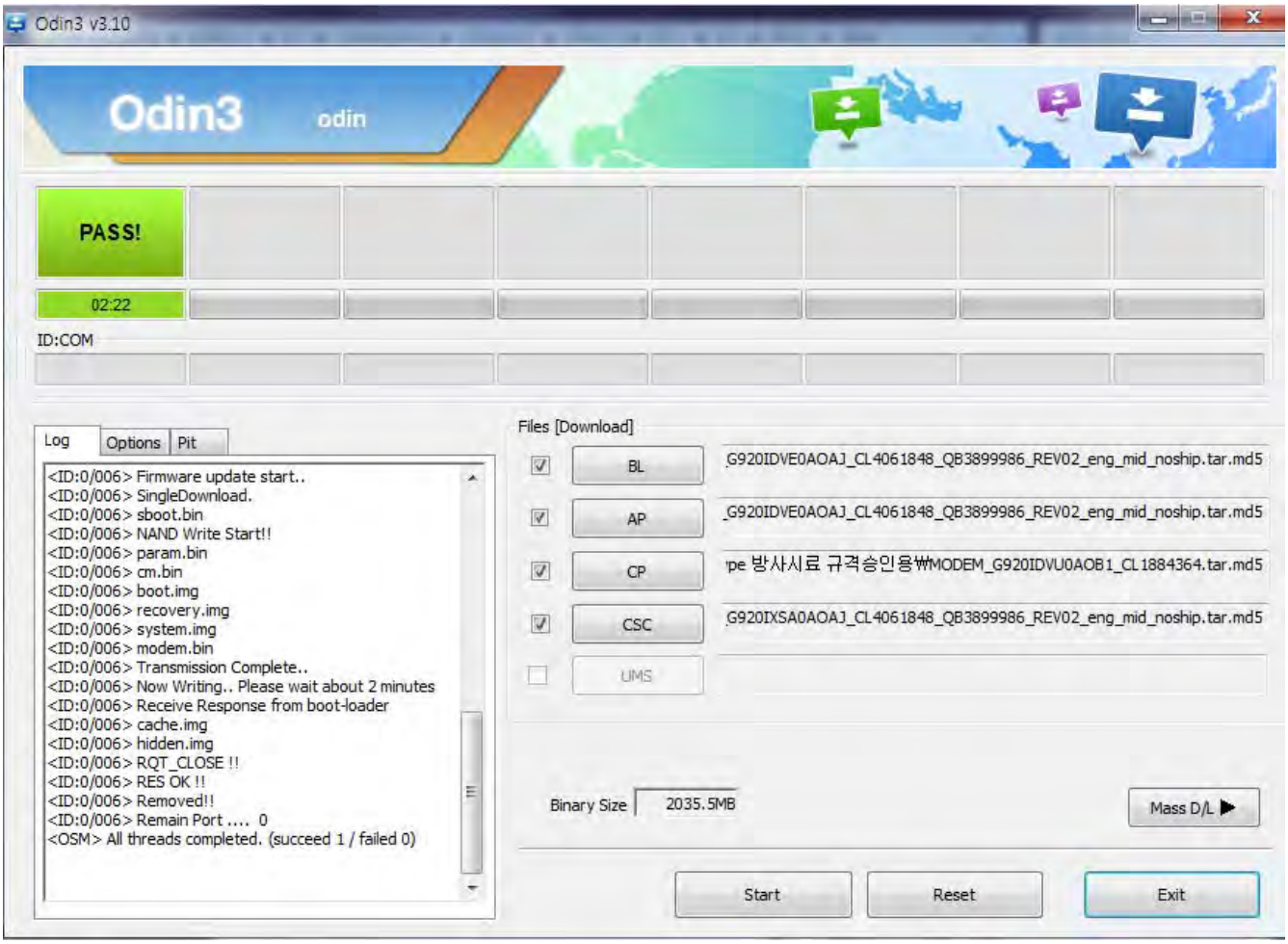
- Enter into Download Mode by pressing Volume Down button, Home button and ON/OFF Button simultaneously followed by pressing Volume up button as a direction of the phone.



3. Connect the device to PC via Data Cable.
Make sure that the one of communication ports [ID:COM] box is highlighted in sky blue. The device is now connected with the PC and ready to download the binary files in it.



4. Start downloading the binary files into the device by clicking Start button on the screen. The green colored "PASS!" sign will appear on the upper-left box if the binary files have been successfully downloaded into the device.



5. Disconnect the device from the Data cable.

6. Once the device boots up, you can check the version of the binary file or name by pressing the following code in sequence;
   ***#1234#**

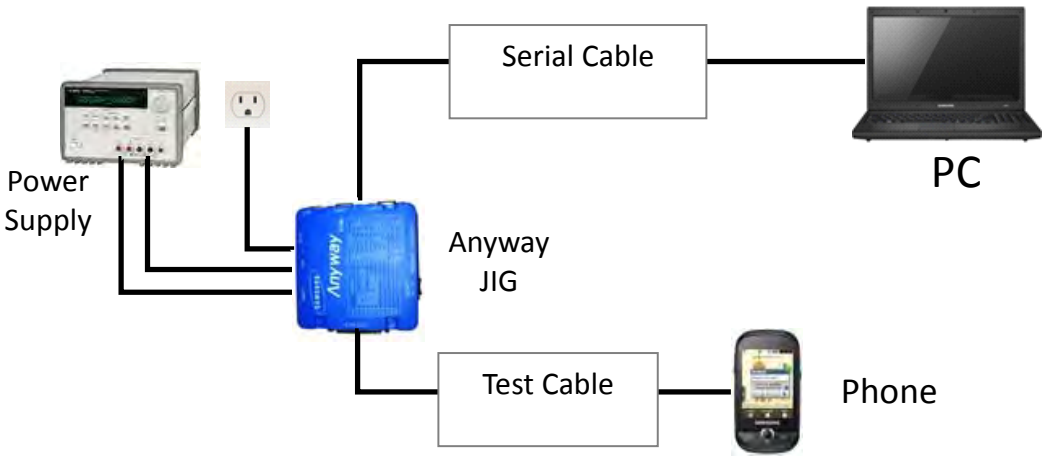
   You can perform Factory Reset by Settings → Accounts → Backup and reset

6-2 IMEI writing

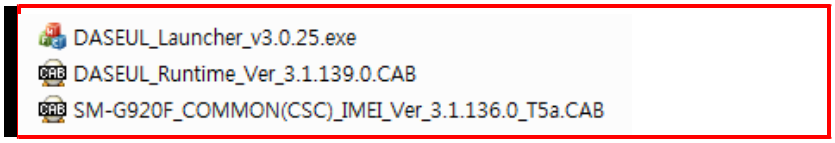
6-2-1 Preparation

- New IMEI writing Program has been released.
- Supported Model : Models which CAB files are uploaded on HHPsvc INI File category, instead of ini file.
- Refer to below IMEI writing procedure.

- H/W

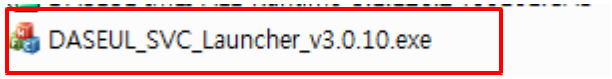


- S/W

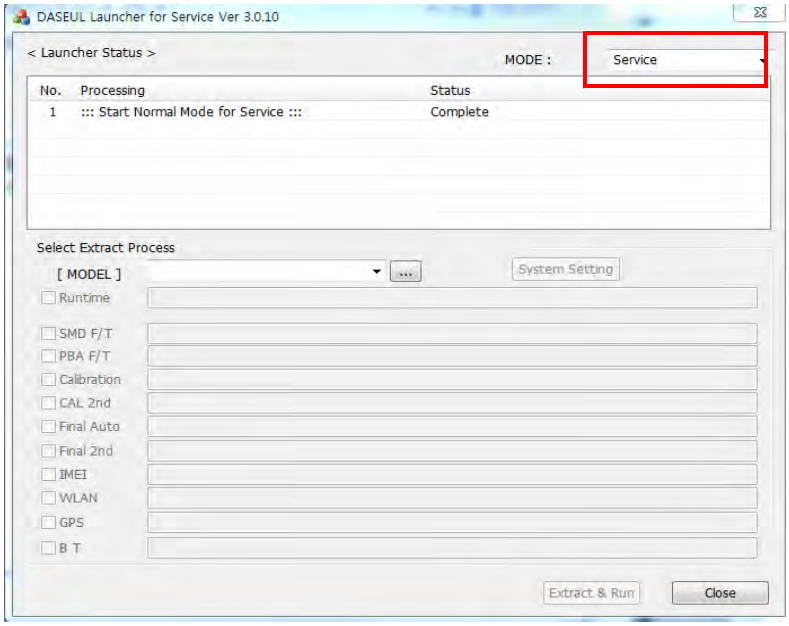
① Library Install	To use Daseul, library files should be installed. Refer to SVC Bulletin "(11-82) Daseul (New IMEI writing Program) Library Install gui de_rev1.0"
②Launcher	DASEUL_SVC_Launcher_v3_0_25 or higher -Uploaded on HHPsvc Notice
③ Runtime File	1. DASEUL_Runtime_Ver_3.1.139.0.CAB or higher -Uploaded on HHPsvc Notice 2. Make 'ModelName' folder at the same position with launcher & Runtime file. 
④Model File	Copy Model File under the 'Model Name' folder

6-2-2 IMEI writing Process

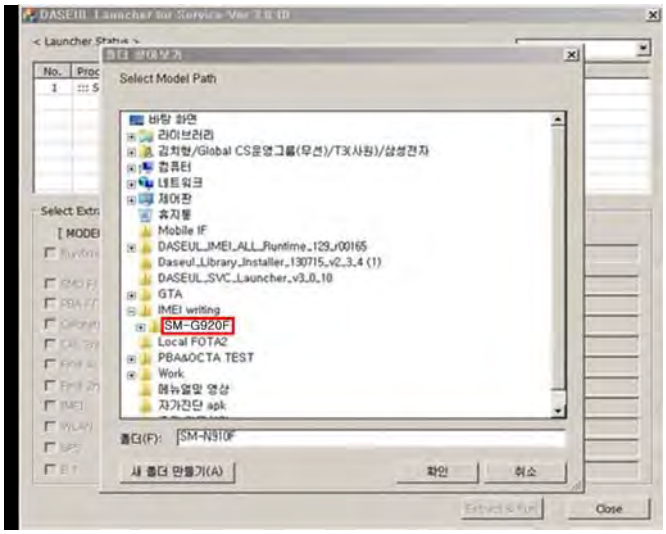
1. Run DASEUL_SVC_Launcher_v3.0.10.exe



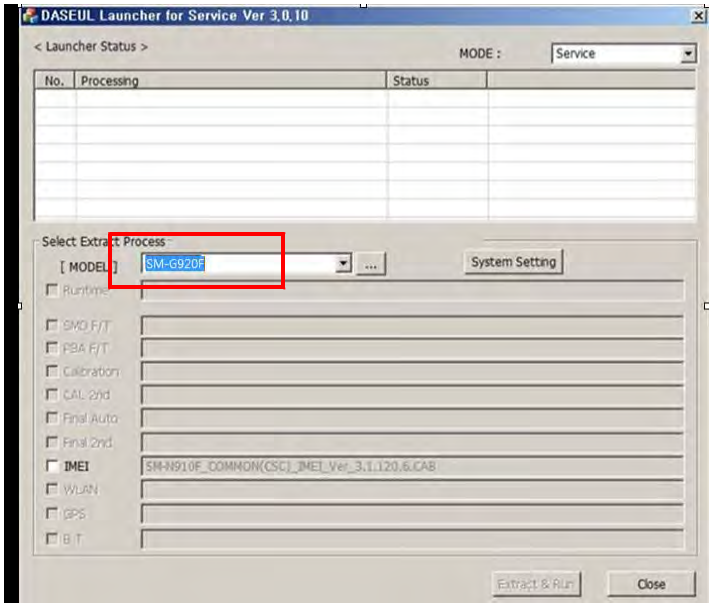
2. Select Service Mode



3. Click [ ] and Select folder where the Launcher exists

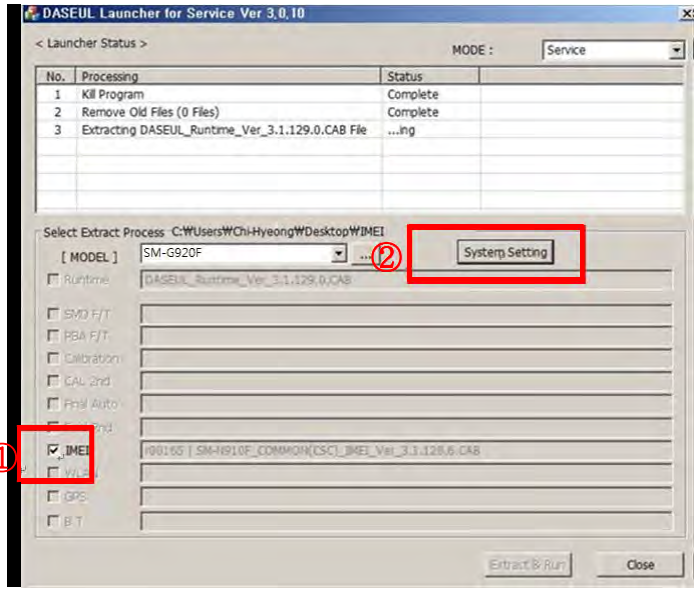


4. Select Model

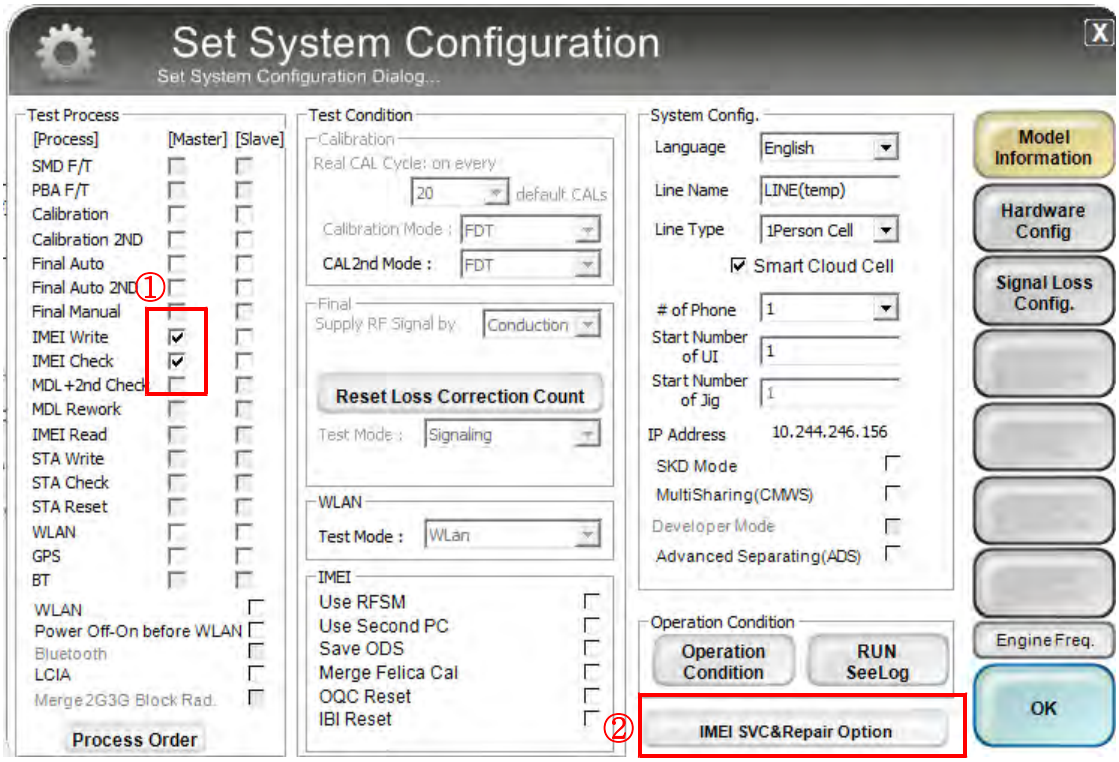


5. Check IMEI and click ‘System Setting’

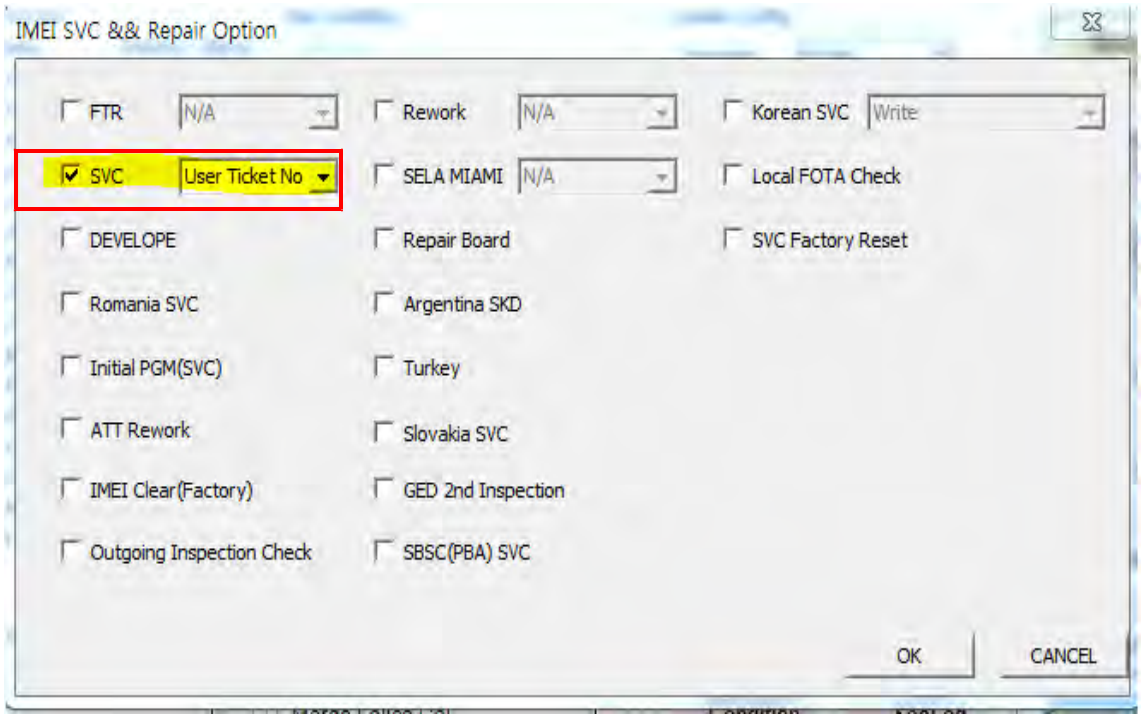
※Once you setup the setting, you don’t have to do it again, unless there is change. From second run of the IMEI program, check IMEI and click ‘Extract & Run’.



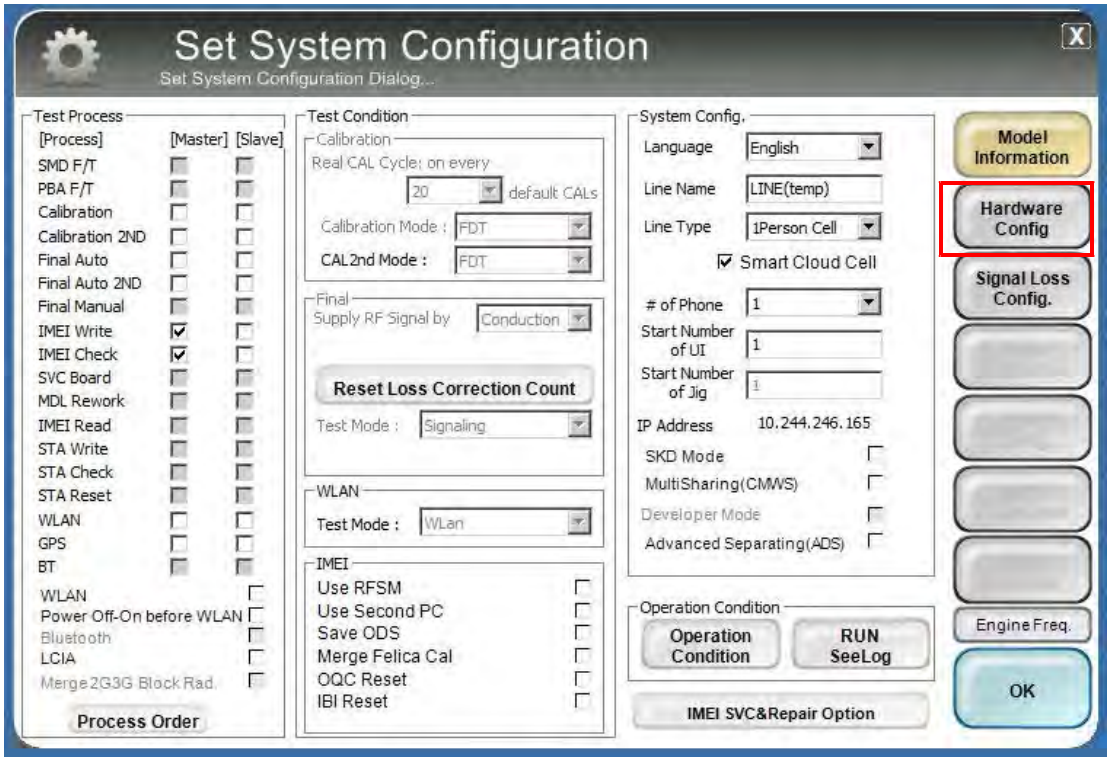
6. Check ‘IMEI Write / IMEI Check’, and click ‘IMEI SVC & Repair Option’



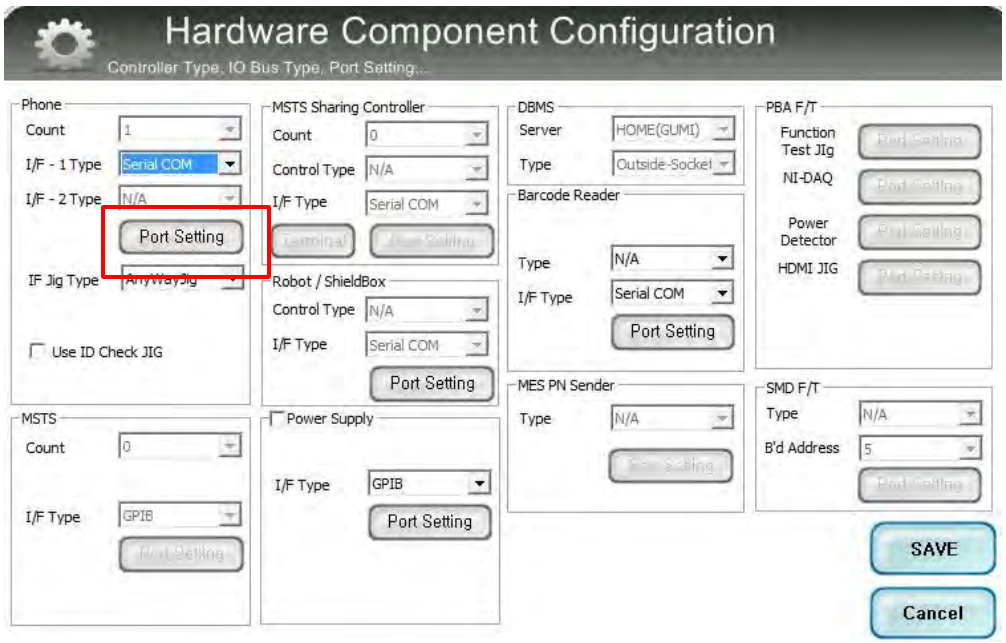
7. Check ‘SVC , User Ticket No’ and click OK



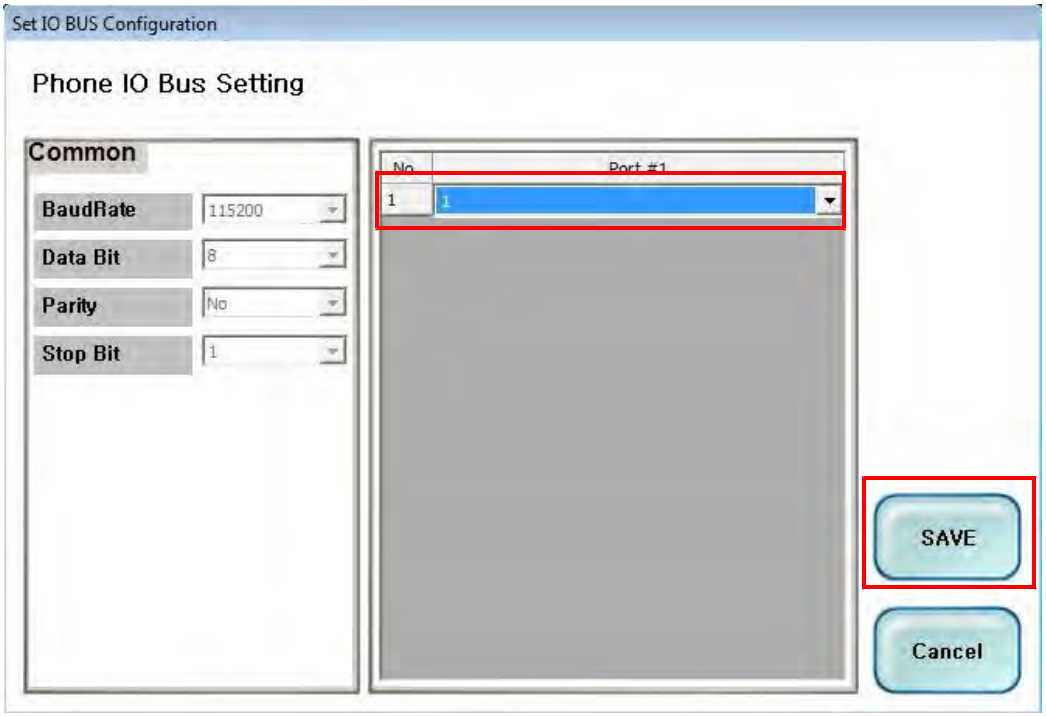
8. Click 'Hardware Config'



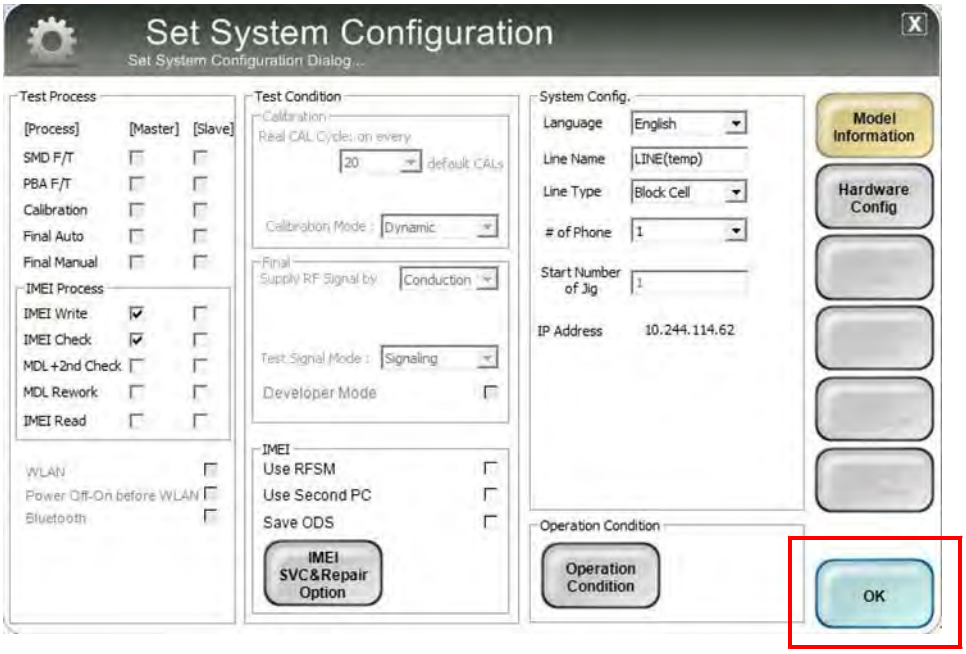
9. Click 'Port Setting'



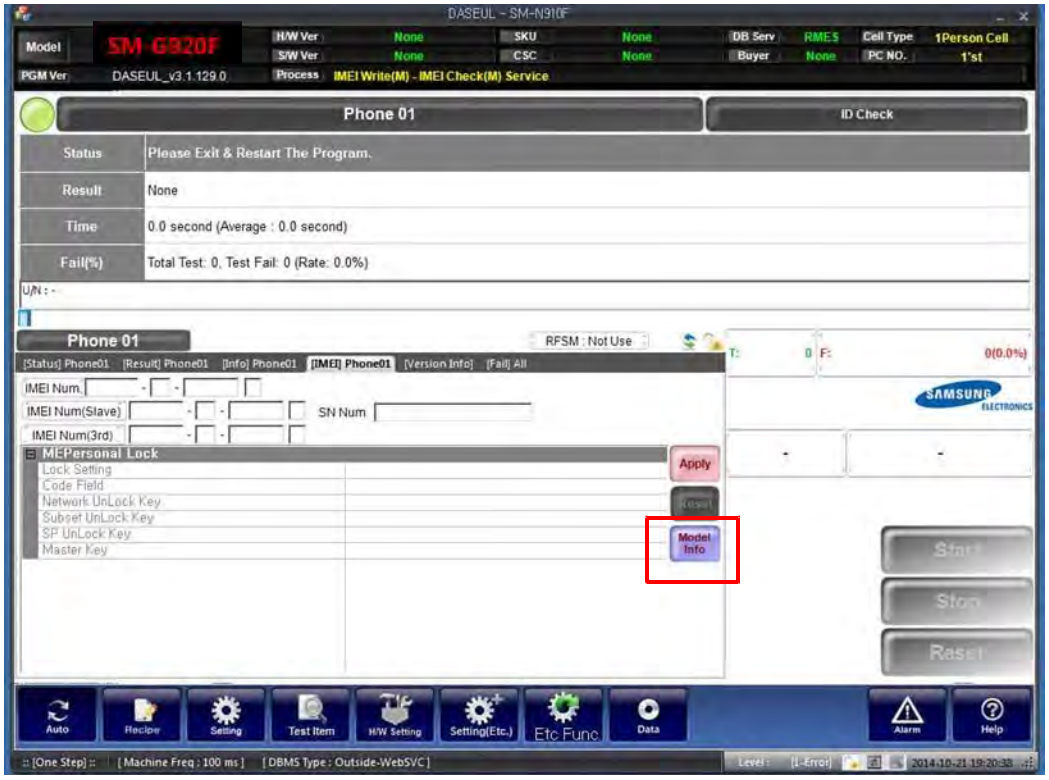
10. Select Port Number and SAVE



11.Click OK to proceed

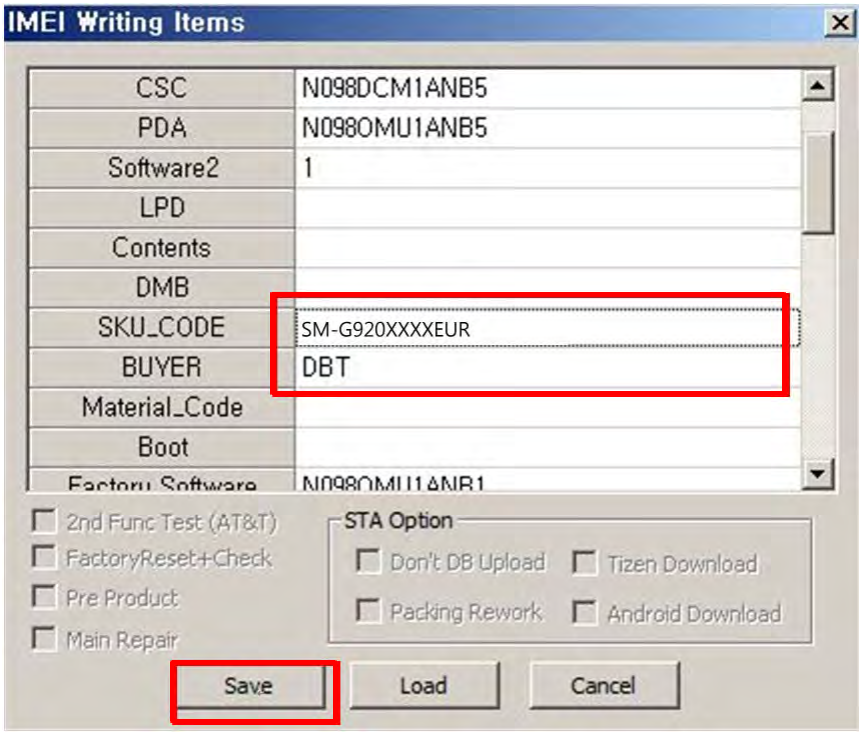


12. Click Model Info and OK when pop-up shows

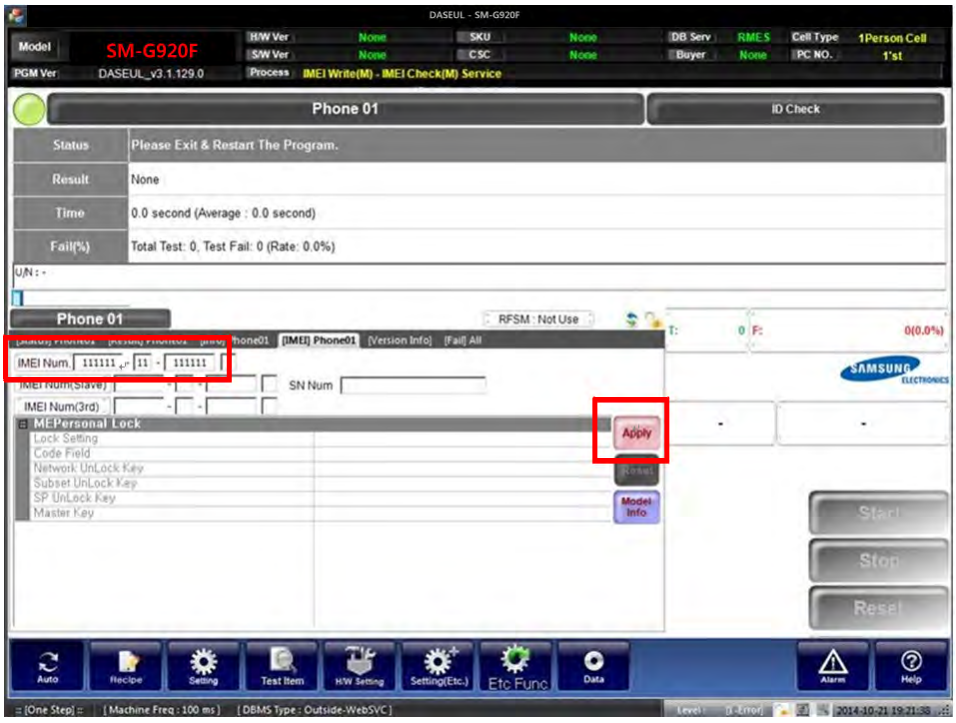


13. Click OK

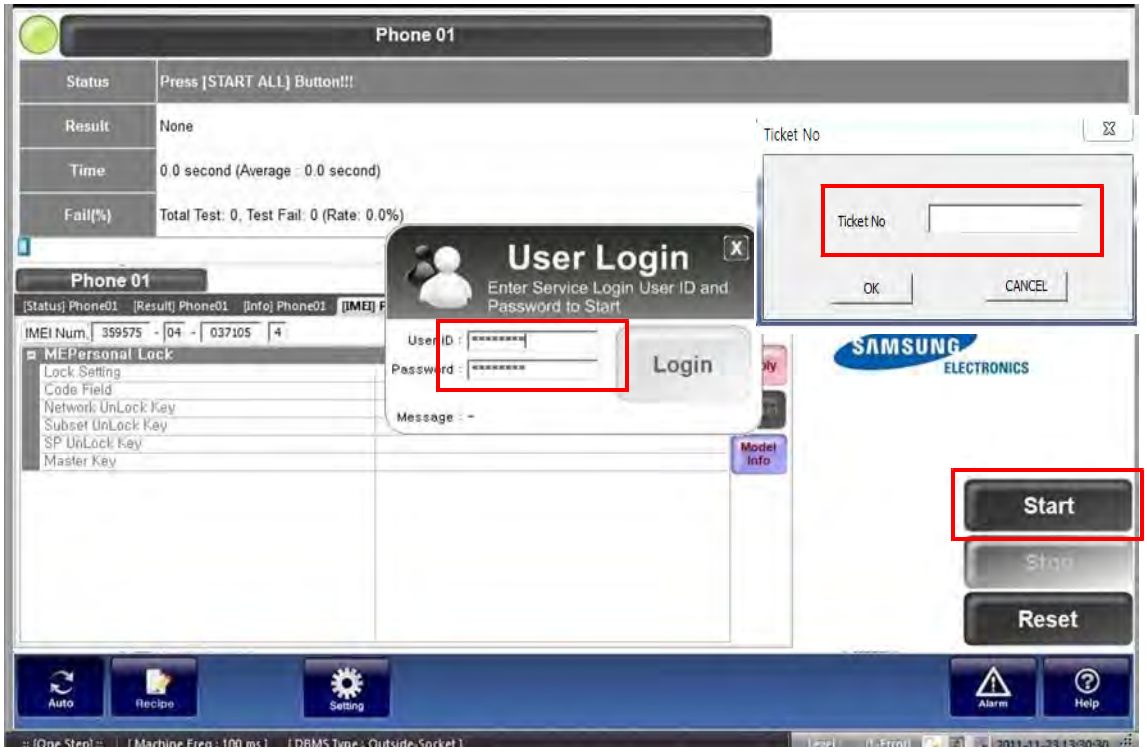
14. Input SKU_CODE and BUYER, then click Save button.
※ Refer to HHPsvc→IMEI Review to check SKU Code and buyer



15. Input IMEI Number and click Apply



16. ① Click Start, and input IMEI writing ID and Password →②input Ticket No



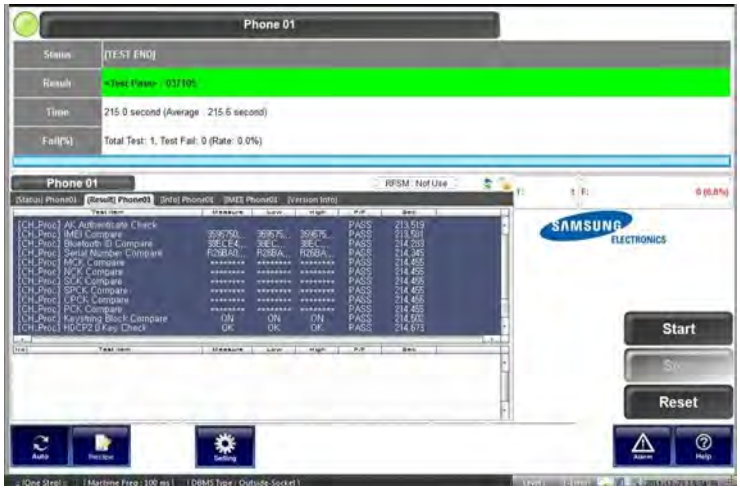
17. Connect the phone to Anyway JIG

※ When you connect the phone, the phone should be turned off.

After connecting the phone, the phone will be booted automatically.

18. IMEI Writing Proceeding

19. IMEI Writing Success



6-3. Boot Recovery

6-3-1. Symptom

- No Power on, Unable to enter download mode.

6-3-2. Coverage

- The device which get damaged for bootloader.

6-3-3. Required items in order to do Boot Recovery

- Downloader Program (**Odin3 v3.10.6.exe**)
- SM-G920F Mobile Phone(Normal device)
- Data Cable (GH39-01661A)
- Micro SD Card (Higher than SDHC type and 4GB)
- Full S/W binary(pit, BL, AP, CP)
- Recovery pit file and bootloader
  - pit file: ZEROFLTE_EUR_OPEN.pit
  - boot loader: normal bootloader(BL)

6-3-4. Brief process for Boot Recovery

1. Download recovery pit and bootloader to SD card by using normal device

2. Insert SD card to no power device and try to enter download mode.

3. Download full S/W to the defected device

6-3-5. Process of Boot Recovery

1. SW download

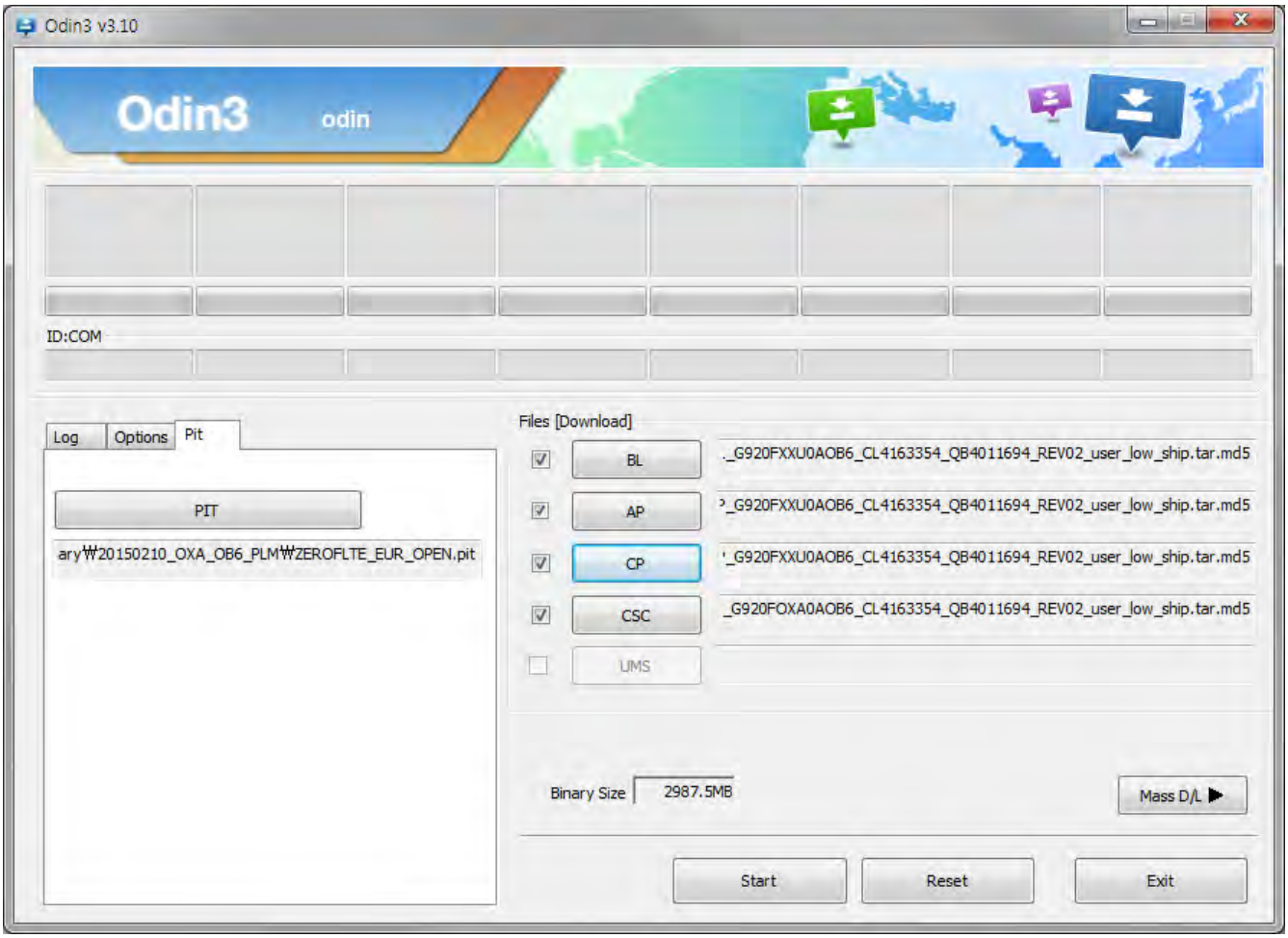
(1) Download full S/W(BL, AP, CP, CSC) to normal device.

2. Make SD card for Recovery

(1) Run Odin3 v3.10.6 exe

(2) Load "ZEROFLET_EUR_OPEN.pit" in PIT tap and "normal bootloader file" in BL tap.

(3) Connect the device to PC



(4) Click "Start" button to download Recovery pit and bootloader files to SD card.

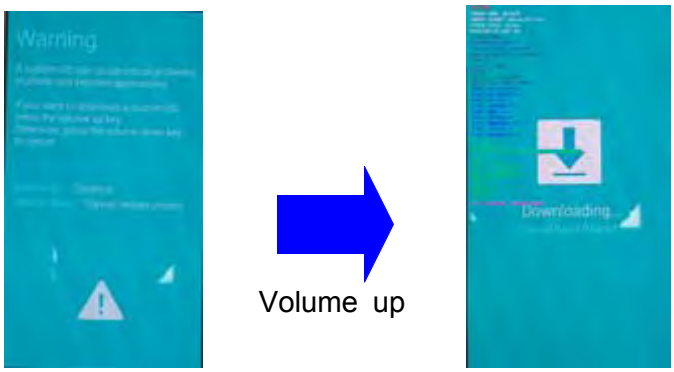
- If it is Pass, SD card has successfully made for boot recovery.
- If it is Fail, try to this with another SD card.(It would be defect of SD card)

3. Boot Recovery for damaged device

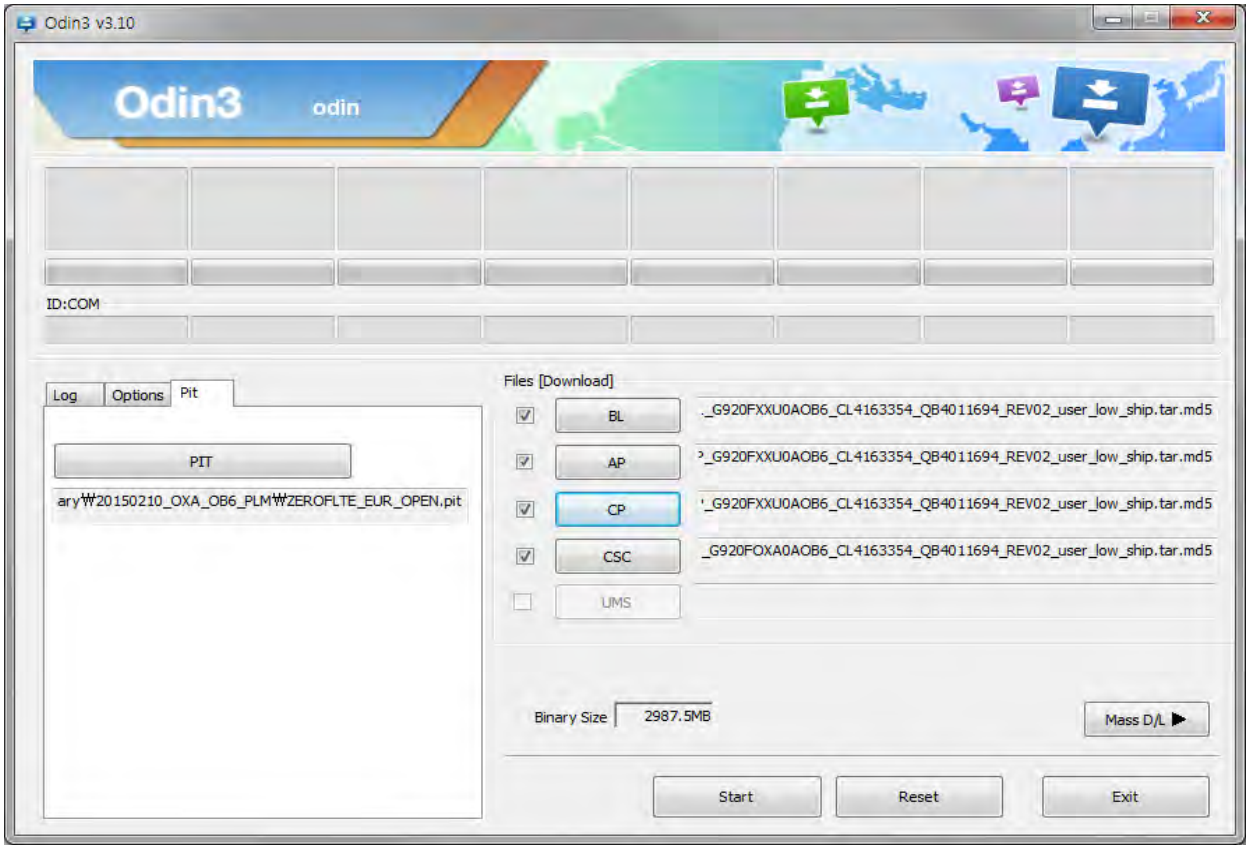
(1) Insert SD card to "No power" device

(2) Enter to download mode, using key combination(Volume down + Home + Power)

(3) If the device is successfully recovered, the device will enter download mode.



(4) After entering download mode, download full S/W to the device including BL(Bootloader), AP(Platform binary), CP(Modem binary) and CSC.



6-4. RF Calibration

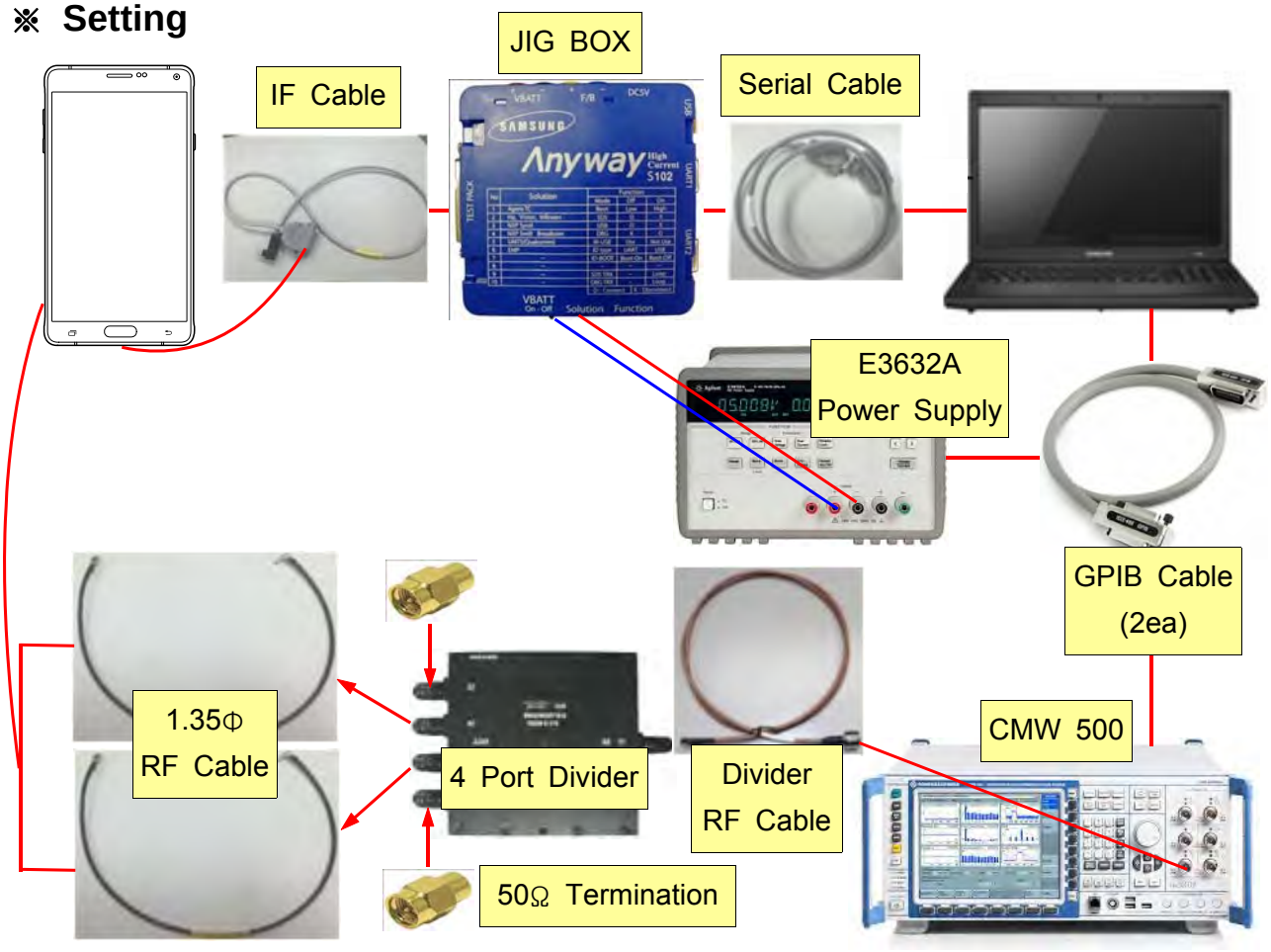
6-1-1. Required items in order to calibrate RF

- Installation program: RF Calibration Program
  - Daseul_Launcher_vx.x.xx.exe
  - Daseul_CAL_ALL_Runtime_x.x.xxx.x.CAB
  - Model File (SM-G920F_OPEN_CALIBRATION_VER_x.x.xxx.xx.CAB)

※ It is required to use the latest program.

- SM-G920F Mobile Phone
- E3632A Power Supply
- JIG BOX (GH81-11888A)
- Adapter (GH81-11888K)
- 4 Port Divider (GH81-11962A)
- 1.35Φ RF Cable (GH81-11962D, 2ea)
- R&S CMW500
- GPIB Cable (2ea)
- IF Cable (GH81-10631A)
- UART Serial Cable
- 50Ω Termination (GH81-11962E, 2ea)
- Divider RF Cable (GH81-11962B)

※ Setting

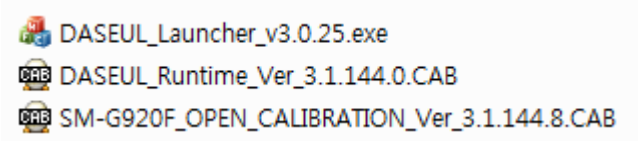


- Table of test cables

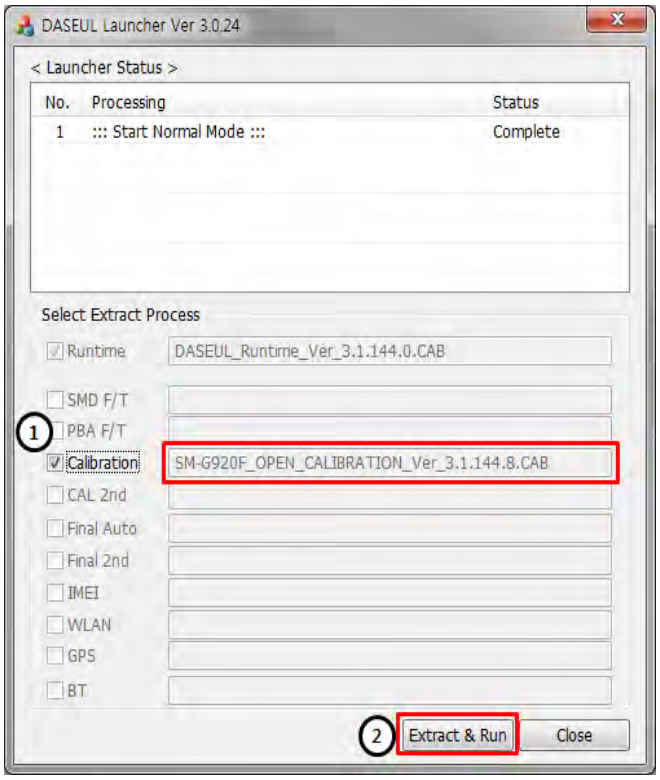
IF Cable	GH81-10953A	GH81-10952A	GH81-11171A	
	5 pin	7 pin (New)	7 pin (Old)	
RF Cable	GH81-11962D	GH81-11962G	GH81-11962C	GH81-11962F
	1.35T, Short	1.35T, Long	1.6T, Short	1.6T, Long
4 Port Divider	GH81-11962A			
	Use / No use			

6-1-2. RF Calibration Program

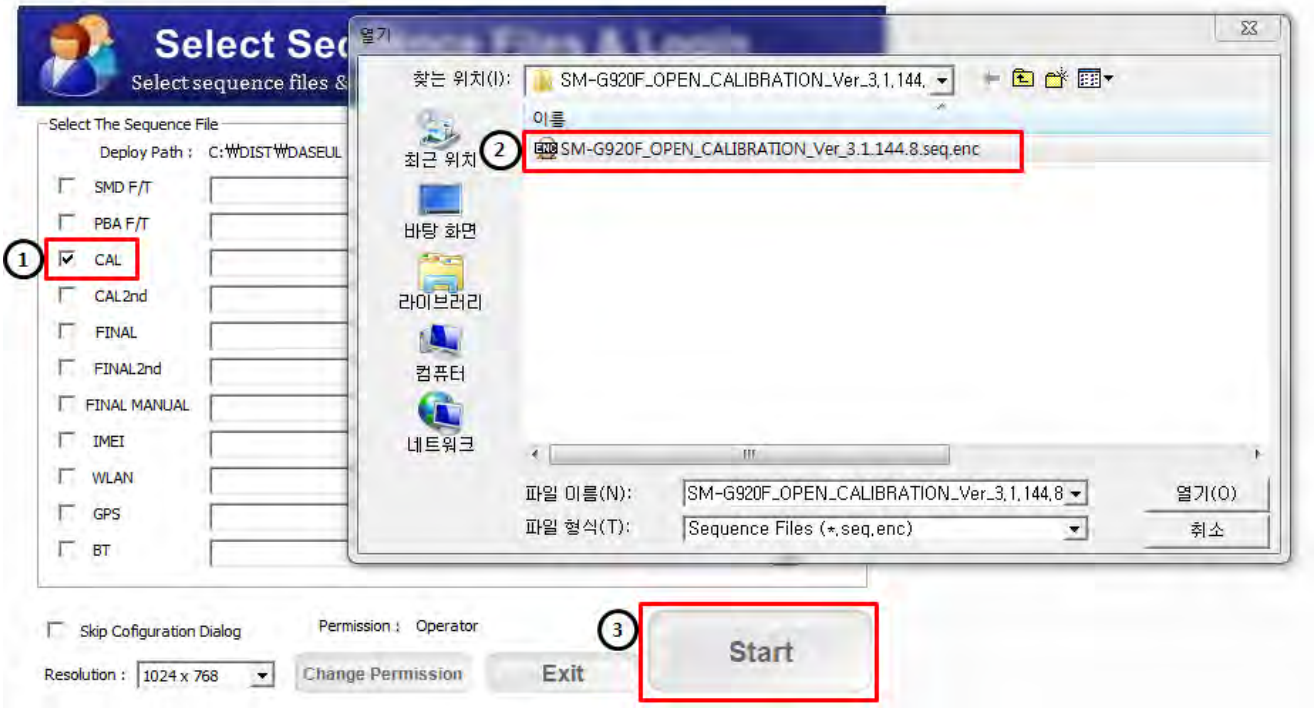
1. Run the RF Calibration Program Launcher, 'DASEUL_Launcher_vx.x.xx.exe'.



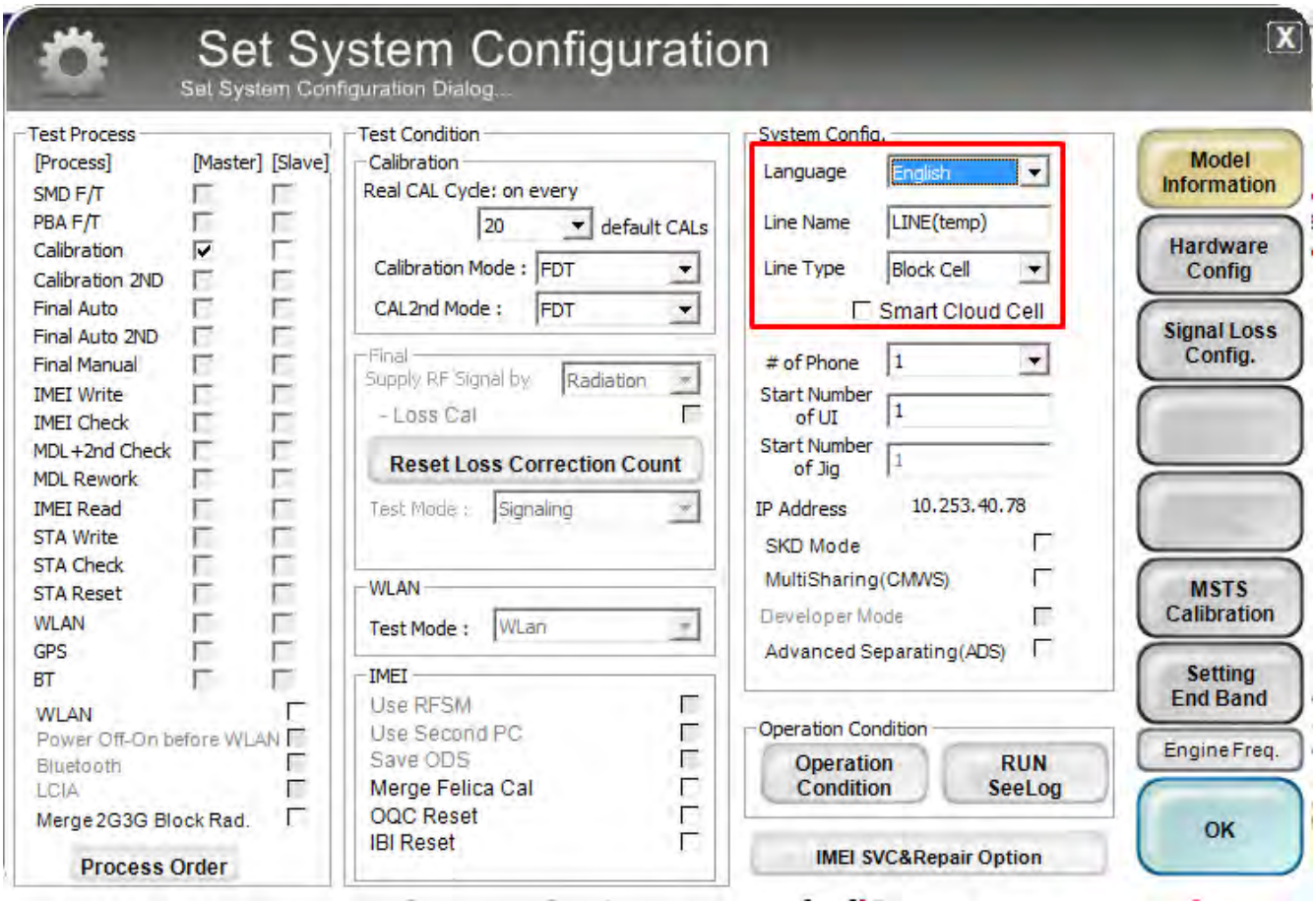
2. Check the 'Calibration' menu, and select 'Extract & Run'.



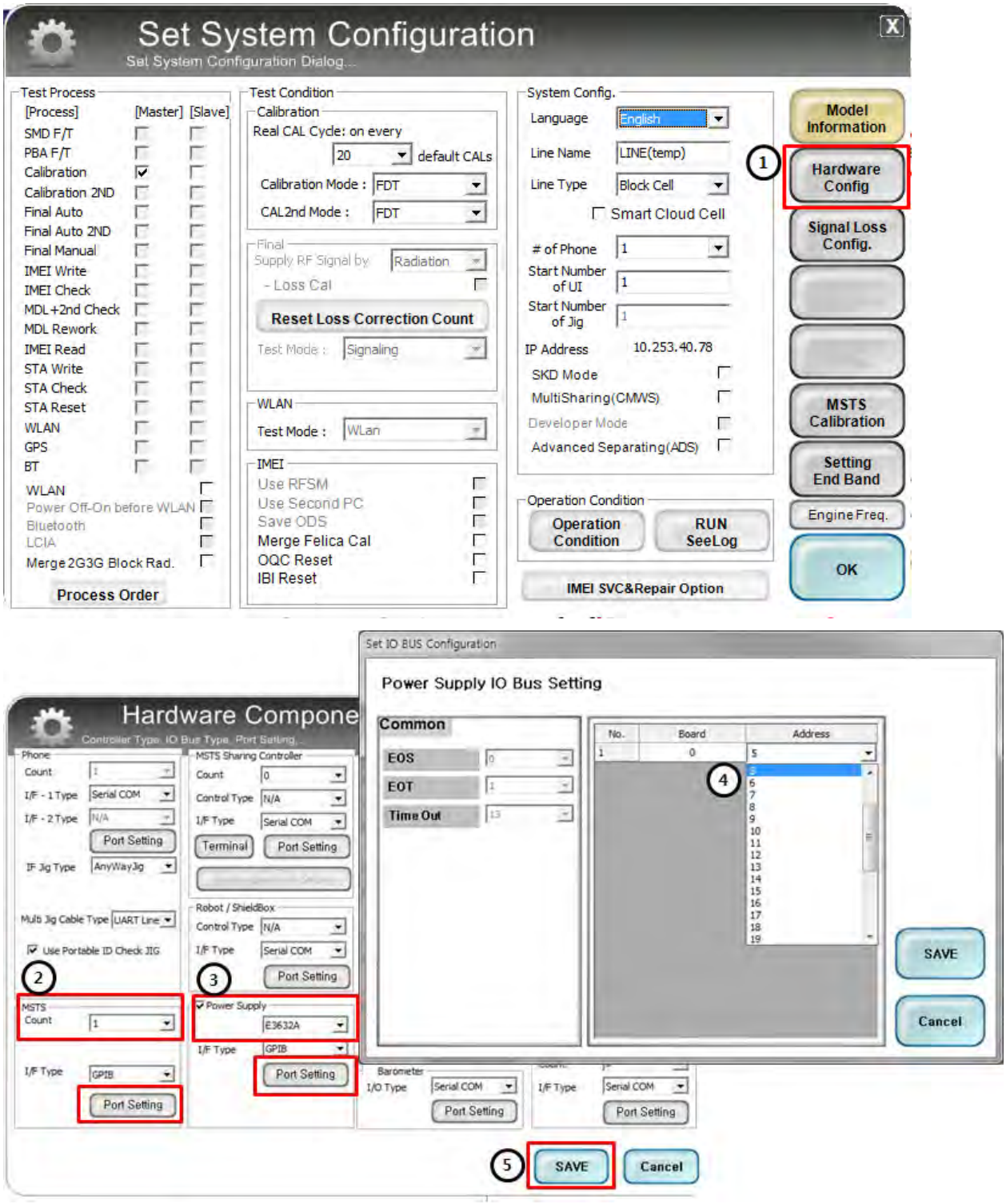
3. Check the 'CAL' and open the model file, then select 'Start' button.



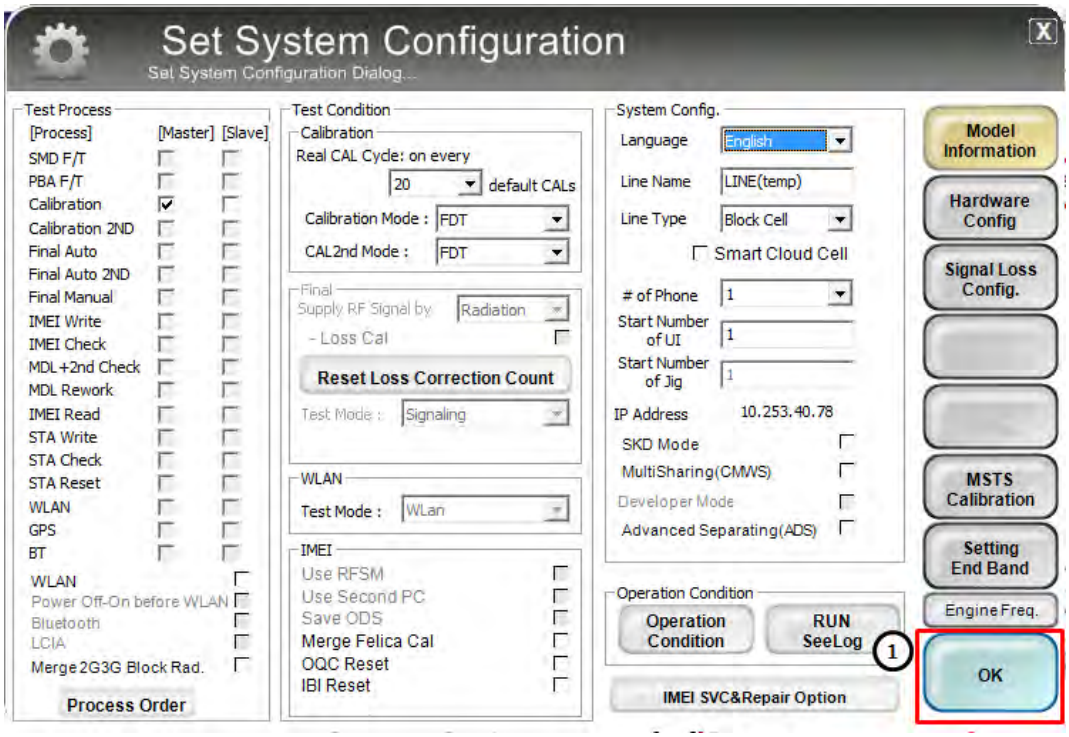
4. Change the Line Type to 'Block Cell' and disable 'Smart Cloud Cell'.

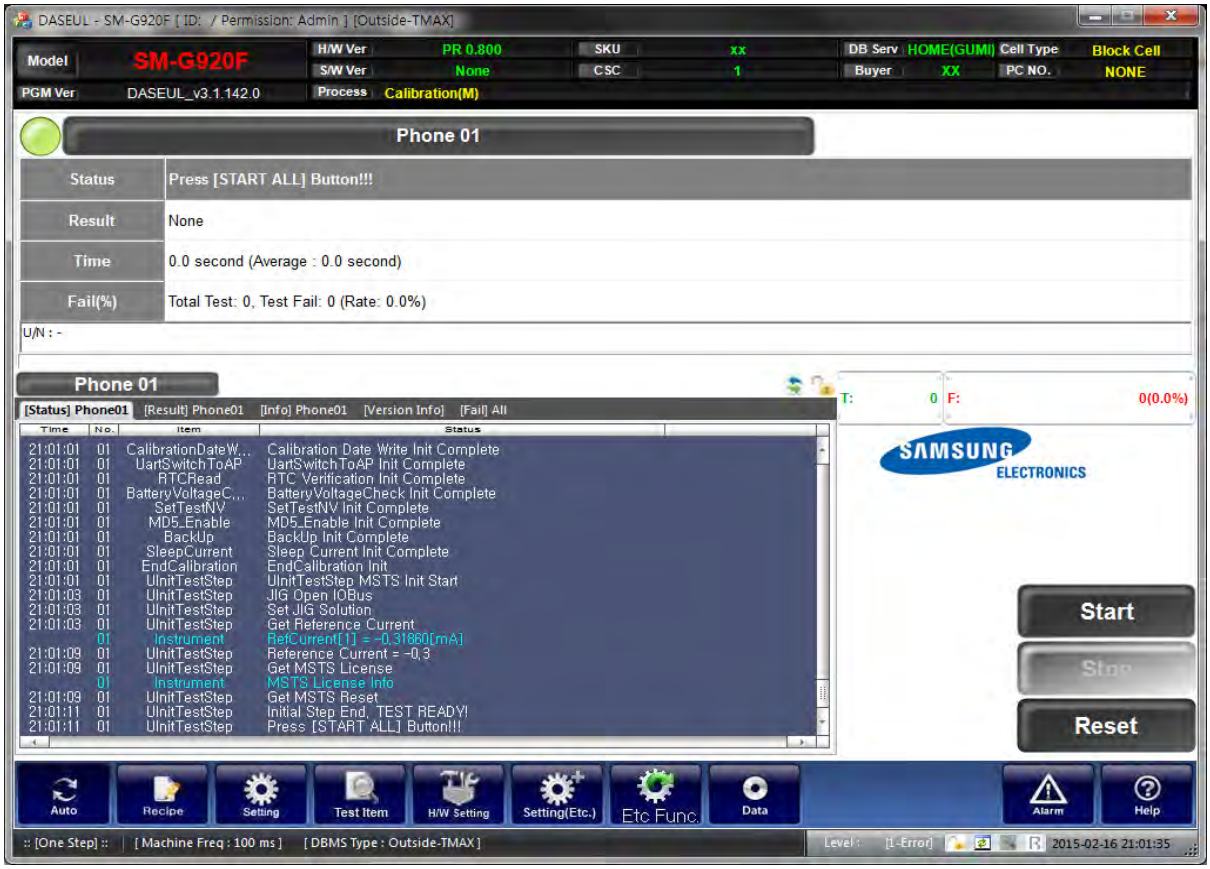


5. Set the GPIB address of MSTS(CMW500) and Power Supply(E3632A) to enter 'Hardware Config' and 'Save'. (Check the GPIB address of equipments in advance)



6. Press 'OK' to start RF Calibration after completing all settings.





7-1. Speaker Calibration

7-1-1 Notice

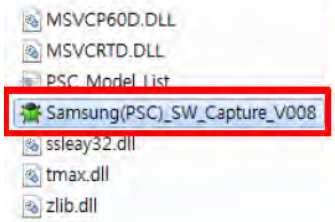
- It is necessary to calibrate the speaker for all cases of replacing the speakers.
- Target models : Galaxy A(A3/5/7), E(E5/7), S6 Series

7-1-2 You need :

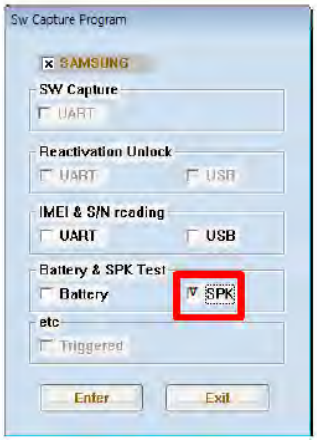
- Mobile device
- Laptop or Note PC
- Anyway Jig
- UART Serial Cable
- IF Test Cable (Different by models)

7-1-3 Lay-out

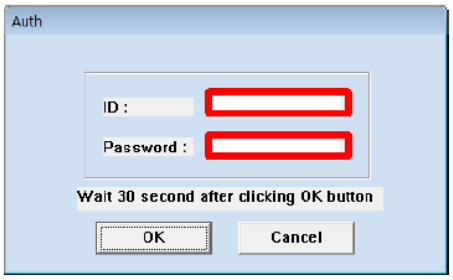
7-1-4 How to Calibrate Speaker



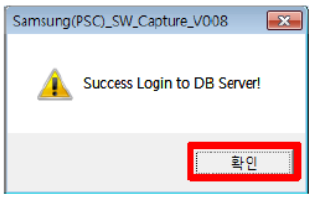
① Run 'Samsung(PSC)_SW_Capture_V008.exe'.



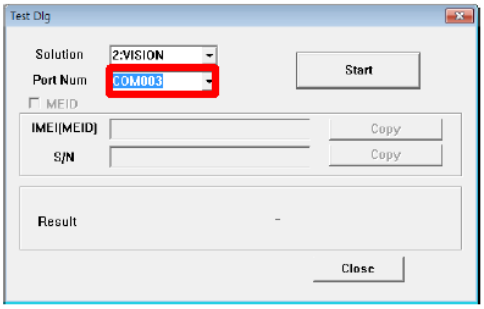
② Check 'SPK' item in the box.



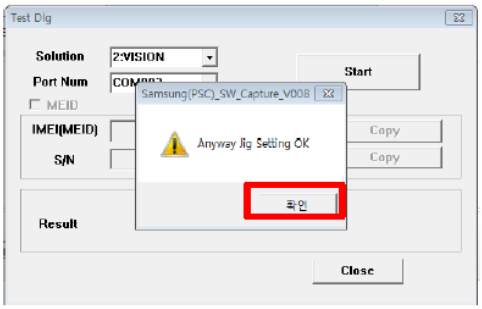
③ Input GSPN ID and Password, then press 'OK'.



④ Confirm Login to DB Server to press '확인'.

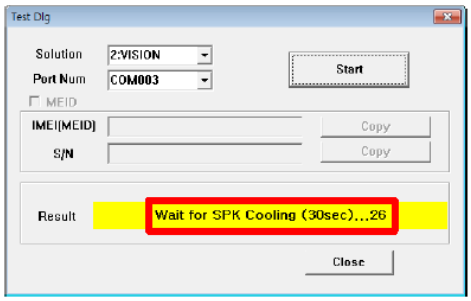


⑤ Set Port Number and press 'Start'.

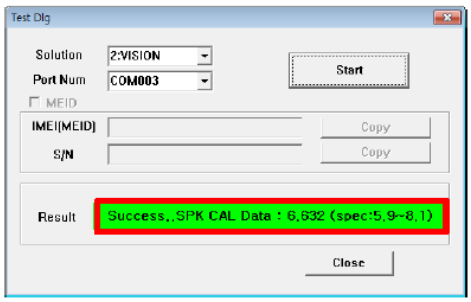


⑥ Confirm the Anyway Jig Setting to press '확인'.

⑦ Connect Mobile device to IF Test cable,
then power on to press power key.
※ Phone should be powered off before test.



⑦ Speaker Calibration will start within 30 seconds after Booting complete.
※ LCD must be turned on in order to test properly.



⑧ Confirm whether the Speaker Calibration is done successfully.

7-2. Battery Accumulated Usage Initialization

7-2-1 Notice

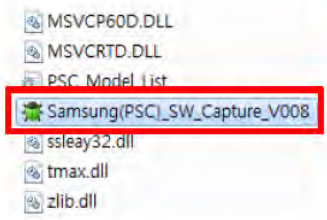
- It is necessary to initialize the battery accumulated usage for all cases of replacing the batteries.
- Target models : Embbeded-Battery Models >> Galaxy A(A3/5/7), E(E5/7), S6 Series

7-2-2 You need :

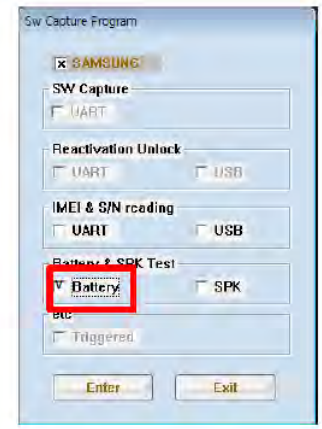
- Mobile device
- Laptop or Note PC
- Anyway Jig
- UART Serial Cable
- IF Test Cable (Different by models)

7-2-3 Lay-out

7-2-4 How to Initialize Battery Accumulated Usage

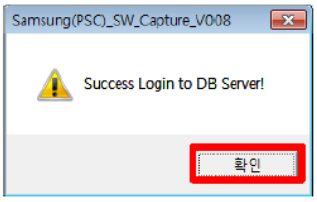


① Run 'Samsung(PSC)_SW_Capture_V008.exe'.

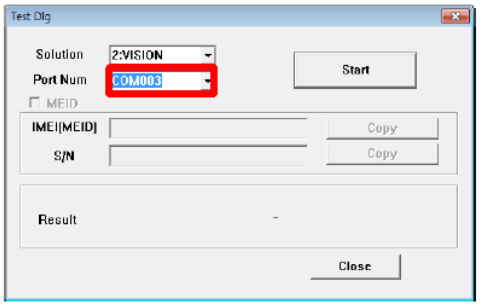


② Check 'Battery' item in the box.

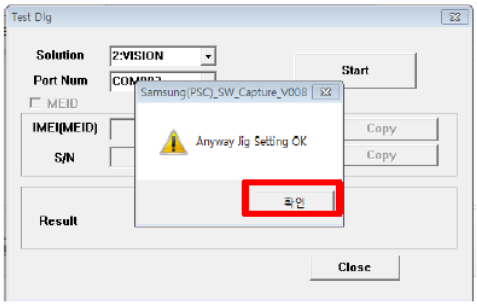
③ Input GSPN ID and Password, then press 'OK'.



④ Confirm Login to DB Server to press '확인'.

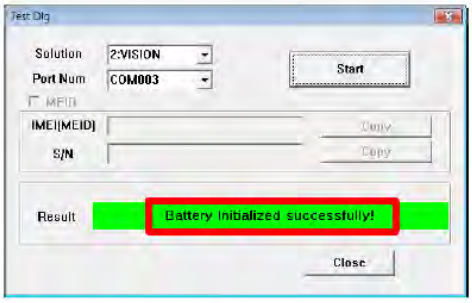


⑤ Set Port Number and press 'Start'.

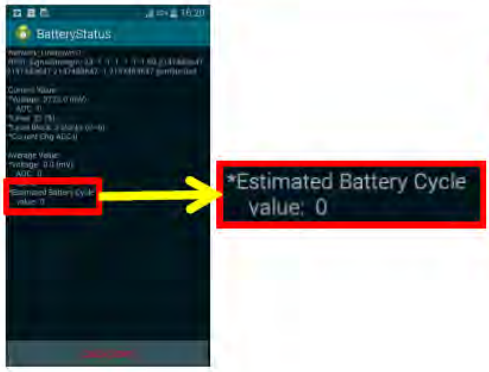


⑥ Confirm the Anyway Jig Setting to press '확인'.

⑦ Connect Mobile device to IF Test cable,
then power on to press power key.
※ Phone should be powered off before test.



⑦ Battery Accumulated Usage Initialization will start as soon as Booting complete.
※ LCD must be turned on in order to test properly.



⑧ Confirm whether 'Estimated Battery Cycle' is '0' after input key string *#0228#.