2. Specification

2-1. Radio Frequency & Channel

1) LTE BAND frequency

Equa.	Freq. Range	CH Range
FUL = FUL_low+0.1(NUL-NOffs-UL)	LB1 : 1920 ~ 1980 LB2 : 1850 ~ 1910 LB3 : 1710 ~ 1785 LB4 : 1710 ~ 1755 LB5 : 824 ~ 849 LB7 : 2500 ~ 2570 LB8 : 880 ~ 915 LB17 : 704 ~ 716 LB20 : 832 ~ 862 LB28 : 703 ~ 748 LB38 : 2570 ~ 2620 LB40 : 2300 ~ 2400 LB41 : 2496 ~ 2690	18000≤N≤18599 18600≤N≤19199 19200≤N≤19949 19950≤N≤20399 20400≤N≤20649 20750≤N≤21449 21450≤N≤21799 23730≤N≤23849 24150≤N≤24449 27210≤N≤27659 37750≤N≤38249 38650≤N≤39649 39650≤N≤41589
FDL = FDL_low+0.1(NDL-NOffs-DL)	LB1 : 2110 ~ 2170 LB2 : 1930 ~ 1990 LB3 : 1805 ~ 1880 LB4 : 2110 ~ 2155 LB5 : 869 ~ 894 LB7 : 2620 ~ 2690 LB8 : 925 ~ 960 LB17 : 734 ~ 746 LB20 : 791 ~ 821 LB28 : 758 ~ 803 LB38 : 2570 ~ 2620 LB40 : 2300 ~ 2400 LB41 : 2496 ~ 2690	0≤N≤599 600≤N≤1199 1200≤N≤1949 1950≤N≤2399 2400≤N≤2649 2750≤N≤3449 3450≤N≤3799 5730≤N≤5849 6150≤N≤6449 9210≤N≤9659 37750≤N≤38249 38650≤N≤39649 39650≤N≤41589

2) WCDMA BAND frequency

Equa.	Freq. Range	CH Range
Tx = N*0.2	WB1 : 1920 ~ 1980 WB2 : 1850 ~ 1910 WB4 : 1710 ~ 1755 WB5 : 824 ~ 849 WB8 : 880 ~ 915	9612≤N≤9888 9262≤N≤9538 1312≤N≤1513 4132≤N≤4233 2712≤N≤2863
Rx = N*0.2	WB1 : 2110 ~ 2170 WB2 : 1930 ~ 1990 WB4 : 2110 ~ 2155 WB5 : 869 ~ 894 WB8 : 925 ~ 960	10562≤N≤10838 9662≤N≤9938 1537≤N≤1738 4357≤N≤4458 2937≤N≤3088

2. Specification

3) GSM BAND frequency

Equa.	Freq. Range	CH Range
Tx = 824.2+0.2*(N-128) Tx = 890+0.2*(N-1024) Tx = 1710.2+0.2*(N-512) Tx = 1850.2+0.2*(N-512)	GSM850 : 824 ~ 849 GSM900 : 880 ~ 915 DCS : 1710 ~ 1785 PCS : 1850 ~ 1910	128≤N≤251 975≤N≤1023 512≤N≤885 512≤N≤810
Rx = 869.2+0.2*(N-128) Rx = 935+0.2*(N-1024) Rx = 1805.2+0.2*(N-512) Rx = 1930.2+0.2*(N-512)	GSM850 : 869 ~ 894 GSM900 : 925 ~ 960 DCS : 1805 ~ 1880 PCS : 1930 ~ 1990	128≤N≤251 975≤N≤1023 512≤N≤885 512≤N≤810

2. Specification

2-2. GSM / WCDMA / LTE General Specification

1) GSM BAND

		GSM 850	GSM 900	DCS1800	PCS1900
Freq. Band[MHz] Uplink/Downlink		824~849 869~894	880~915 925~960	1710~1785 1805~1880	1850~1910 1930~1990
ARFCN range		128~251	0~124 & 975~1023	512~885	512~810
Tx/Rx spacing		45 MHz	45 MHz	95 MHz	80 MHz
Mod. Bit rate/ Bit Period	GPRS	270.833 Kbps 3.692 us	270.833 Kbps 3.692 us	270.833 Kbps 3.692 us	270.833 Kbps 3.692 us
Time Slot Period/Frame Period		576.9 us 4.615 ms	576.9 us 4.615 ms	576.9 us 4.615 ms	576.9 us 4.615 ms
Modulation	GPRS	0.3 GMSK	0.3 GMSK	0.3 GMSK	0.3 GMSK
MS Power	GPRS	33 dBm~5 dBm	33 dBm~5 dBm	30 dBm~0 dBm	30 dBm~0 dBm
Power Level	GPRS	5 pcl~19 pcl	5 pcl~19 pcl	0 pcl~15 pcl	0 pcl~15 pcl
Sensitivity		-102 dBm	-102 dBm	-100 dBm	-102 dBm
TDMA Mux		8	8	8	8
Cell Radius		3 Km	3 Km	2 Km	2 Km

2. Specification

2) WCDMA BAND

	WCDMA BAND1	WCDMA BAND2	WCDMA BAND4	WCDMA BAND5	WCDMA BAND8
Freq. Band[MHz] Uplink/Downlink	1920~1980 2110~2170	1850~1910 1930~1990	1710~1755 2110~2155	824~849 869~894	880~915 925~960
ARFCN range	9612~9888 10562~10838	9262~9538 9662~9938	1312~1513 1537~1738	781~4233 1006~4458	2712~2863 2937~3088
Tx/Rx spacing	190MHz	80MHz	400MHz	45MHz	45MHz
Mod. Bit rate/ Bit Period	3.84 Mcps/s	3.84 Mcps/s	3.84 Mcps/s	3.84 Mcps/s	3.84 Mcps/s
Time Slot Period/Frame Period	10ms	10ms	10ms	10ms	10ms
Modulation	UL : HQPSK DL : QPSK	UL : HQPSK DL : QPSK	UL : HQPSK DL : QPSK	UL : HQPSK DL : QPSK	UL : HQPSK DL : QPSK
MS Power	Max:23.0dBm (+1~-3)dBm Min:<-50dBm	Max:22.0dBm (+1~-3)dBm Min:<-50dBm	Max:21.5dBm (+1~-3)dBm Min:<-50dBm	Max:23.0dBm (+1~-3)dBm Min:<-50dBm	Max:23.0dBm (+1~-3)dBm Min:<-50dBm
Power Level	Class3	Class3	Class3	Class3	Class3
Sensitivity	-106.7dBm	-104.7dBm	-104.7dBm	-104.7dBm	-104.7dBm
TDMA Mux	-	-		-	
Cell Radius	-	-		-	

2. Specification

3) LTE BAND

	LTE BAND1	LTE BAND2	LTE BAND3	LTE BAND4	LTE BAND5	LTE BAND7	LTE BAND8
Freq. Band[MHz] Uplink/Downlink	1920~1980 2110~2170	1850~1910 1930~1990	1710 ~ 1785 1805 ~ 1880	1710~1755 2110~2155	824~849 869~894	2500~2570 2620~2690	880~915 925~960
ARFCN range	18000~18599 0~599	18600~19199 600~1199	19200 ~ 19949 1200~1949	19950~20399 1950~2399	20400~20649 2400~2649	20750~21449 2750~3449	21450~21799 3450~3799
Tx/Rx spacing	190 MHz	80 MHz	95 MHz	400 MHz	45 MHz	120 MHz	45 MHz
Mod. Bit rate/ Bit Period	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)
Time Slot Period/Frame Period	10ms	10ms	10ms	10ms	10ms	10ms	10ms
Modulation	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM
MS Power	Max:22.5±2.7 dBm Min:-49dBm	Max:22.5±2.7 dBm Min:-49dBm	Max:23±2.7dBm Min:-49dBm	Max:23±2.7dBm Min:-49dBm	Max:24±2.7dBm Min:-49dBm	Max:23±2.7dBm Min:-49dBm	Max:24±2.7dBm Min:-49dBm
Power Level	Class3	Class3	Class3	Class3	Class3	Class3	Class3
Sensitivity	-97dBm	-95dBm	-94dBm	-97dBm	-95dBm	-95dBm	-94dBm
TDMA Mux	-		-				-
Cell Radius	-		-				-

2. Specification

	LTE BAND17	LTE BAND20	LTE BAND28	LTE BAND38	LTE BAND40	LTE BAND41
Freq. Band[MHz] Uplink/Downlink	704~716 734~746	832~862 791~821	703~748 758~803	2570~2620 2570~2620	2300~2400 2300~2400	2496~2690 2496~2690
ARFCN range	23730~23849 5730~5849	19250 ~ 19950 1250~1950	20400~20650 2400~2650	37750~38249 37750~38249	38650~39649 38650~39649	39650~41589 39650~41589
Tx/Rx spacing	30 MHz	41 MHz	55 MHz			
Mod. Bit rate/ Bit Period	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)	9Mbps/s (at 10MHz BW,50RB)
Time Slot Period/Frame Period	10ms	10ms	10ms	10ms	10ms	10ms
Modulation	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM	UL : QPSK 16QAM 64QAM DL : QPSK 16QAM 64QAM 256QAM
MS Power	Max:24±2.7dBm Min:-49dBm	Max:24±2.7dBm Min:-49dBm	Max:23.5±2.7dBm Min:-49dBm	Max:23±2.7dBm Min:-49dBm	Max:23±2.7dBm Min:-49dBm	Max:23±2.7dBm Min:-49dBm
Power Level	Class3	Class3	Class3	Class3	Class3	Class3
Sensitivity	-94dBm	-94dBm	-95.5dBm	-97dBm	-97dBm	-95dBm
TDMA Mux	-	-			-	
Cell Radius	-	-			-	

2-3. GSM BAND TX power control level

TX Power control level	GSM850	GSM900	TX Power control level	DCS1800	TX Power control level	PCS1900
5	33±2 dBm	33±2 dBm	0	30±2 dBm	0	30±2 dBm
6	31±3 dBm	31±3 dBm	1	28±3 dBm	1	28±3 dBm
7	29±3 dBm	29±3 dBm	2	26±3 dBm	2	26±3 dBm
8	27±3 dBm	27±3 dBm	3	24±3 dBm	3	24±3 dBm
9	25±3 dBm	25±3 dBm	4	22±3 dBm	4	22±3 dBm
10	23±3 dBm	23±3 dBm	5	20±3 dBm	5	20±3 dBm
11	21±3 dBm	21±3 dBm	6	18±3 dBm	6	18±3 dBm
12	19±3 dBm	19±3 dBm	7	16±3 dBm	7	16±3 dBm
13	17±3 dBm	17±3 dBm	8	14±3 dBm	8	14±3 dBm
14	15±3 dBm	15±3 dBm	9	12±4 dBm	9	12±4 dBm
15	13±3 dBm	13±3 dBm	10	10±4 dBm	10	10±4 dBm
16	11±5 dBm	11±5 dBm	11	8±4 dBm	11	8±4 dBm
17	9±5 dBm	9±5 dBm	12	6±4 dBm	12	6±4 dBm
18	7±5 dBm	7±5 dBm	13	4±4 dBm	13	4±4 dBm
19	5±5 dBm	5±5 dBm	14	2±5 dBm	14	2±5 dBm
			15	0±5 dBm	15	0±5 dBm

3. Operation Instruction and Installation

Main Function

Item	Description
OS	Android V6.0.1 (Marshmallow)
RF	LTE Cat.6 (300/ 50Mbps)
Battery	3,600mAh
Base Band	Exynos7880 1.9GHz Quad + 1.9GHz Quad(octa core)
Other RF	A-GPS, Glonass, Beidou,, BT4.2, USB Type C, NFC, WIFI 802.11 a/b/g/n/ac 2.4+5GHz, MST
Camera	16M+16M Camera
LCD	5.7" FHD OCTA
RAM	3GB RAM + 32GB UFS
Sensor	Accelerometer, Barometer, Fingerprint Sensor, Gyro Sensor, Geomagnetic Sensor, Hall Sensor, Proximity Sensor, RGB Light Sensor
Accessory	Charger: 5V/2A (AFC: 9V/1.67A) Data cable : 1.2M C to A C to B usb connector 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 replacement parts may not function properly.

1. Safety Precautions

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.

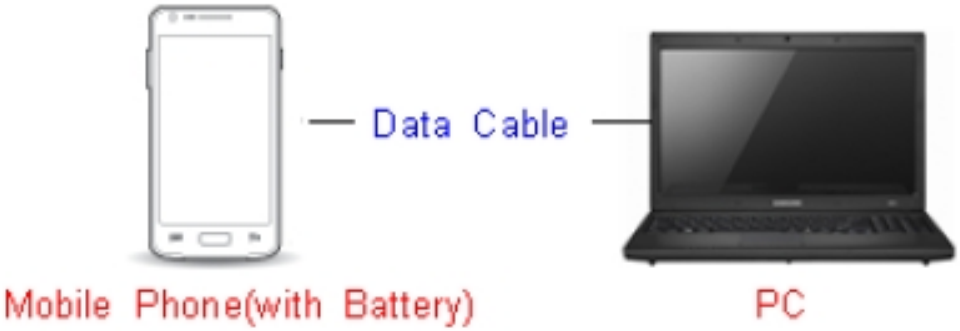
6. Level 1 Repair

6-1. S/W installation

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

- Installation program: Downloader Program (**Odin3 v3.12.5.exe**)
- Mobile Phone
- Data Cable
- Mobile device specific S/W: Binary files

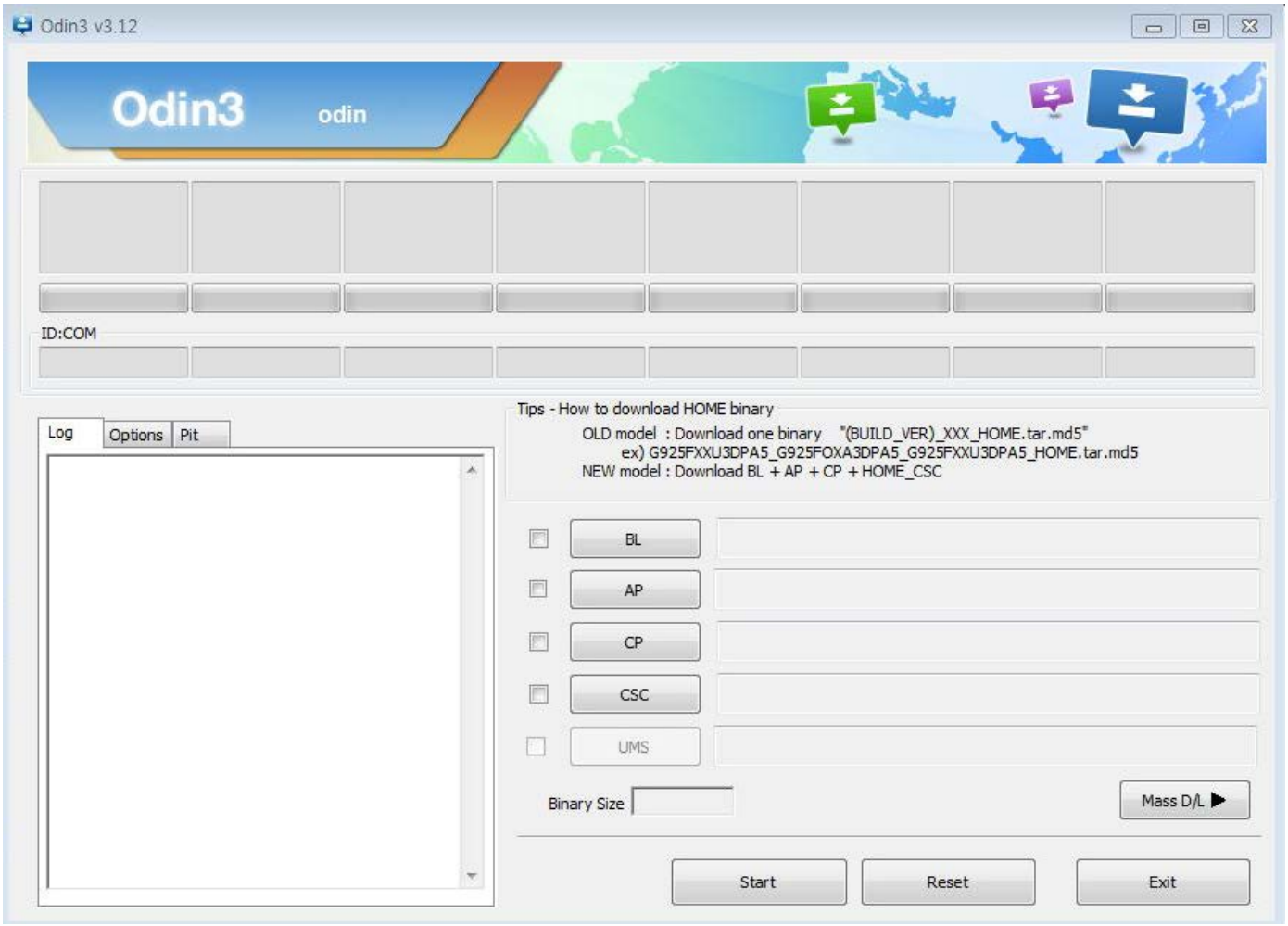
※ Settings



Data Cable : GH39-01886A

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

■ Open up the S/W Installation Program by executing the **"Odin3 v3.12.5.exe"**

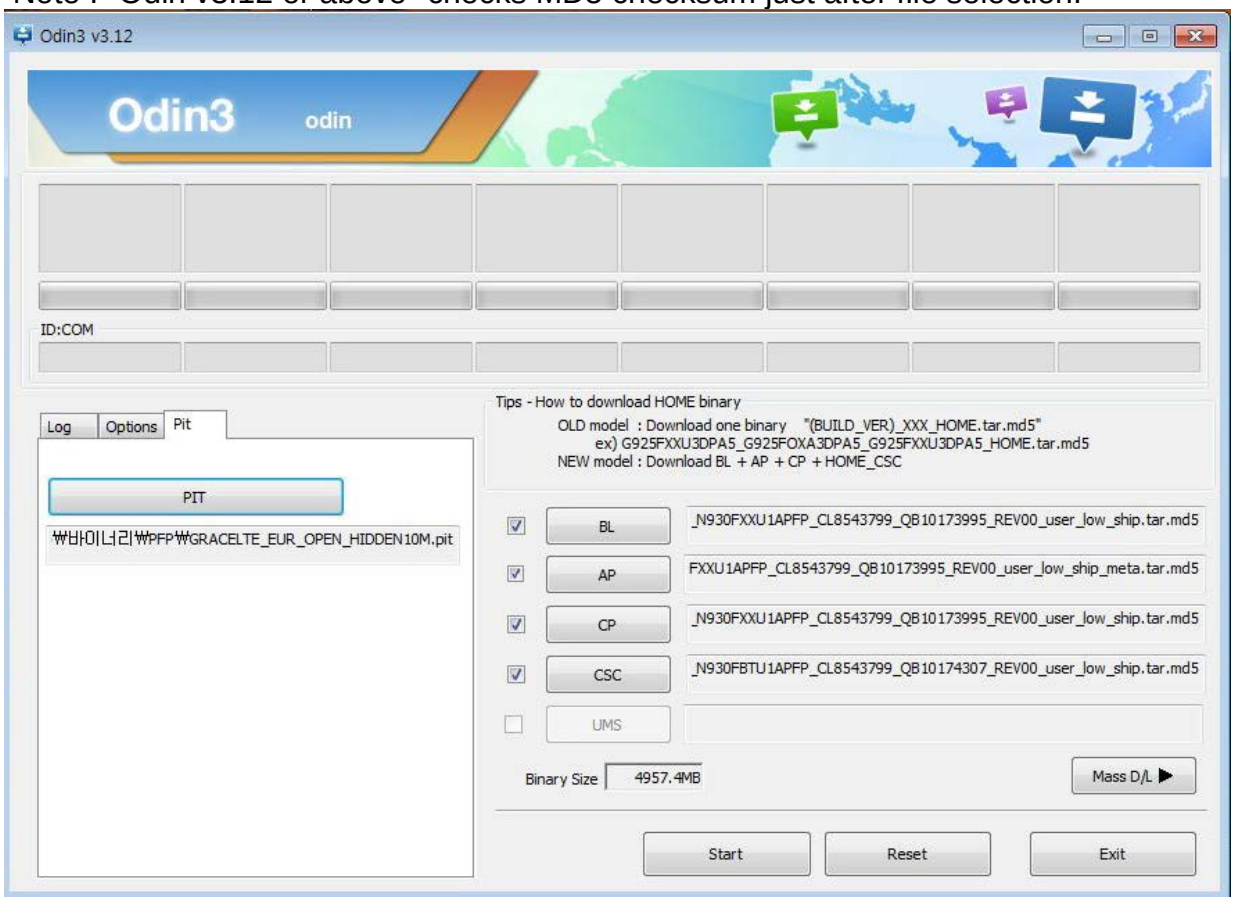


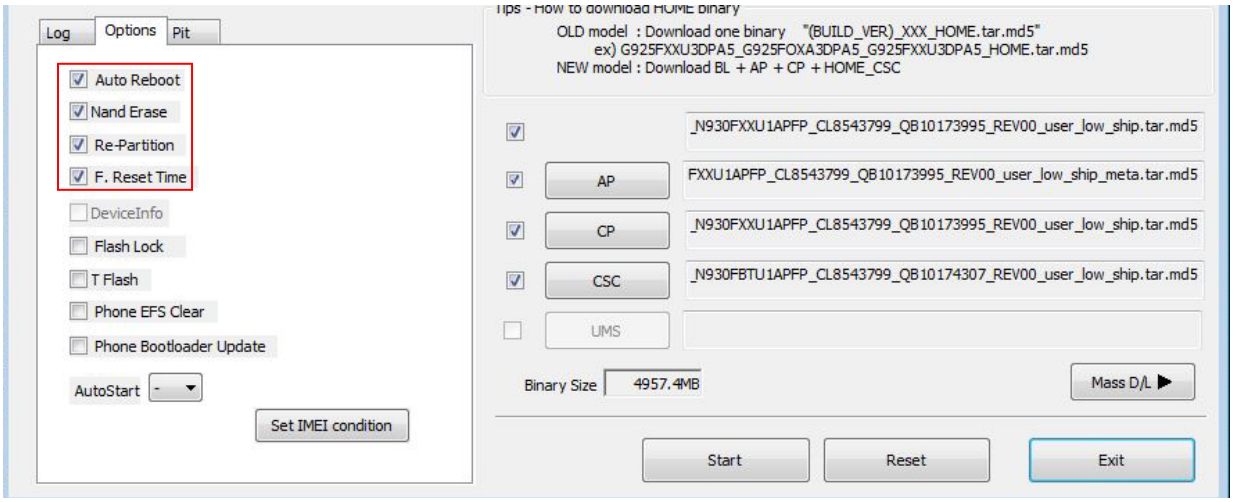
6. Level 1 Repair

1. Enable the check mark by click on the following options,

- Check Auto Reboot, Re-Partition, and F. Reset Time-
- Check PIT
- Check Nand Erase All
- Check BL, AP, CP, and CSC Files

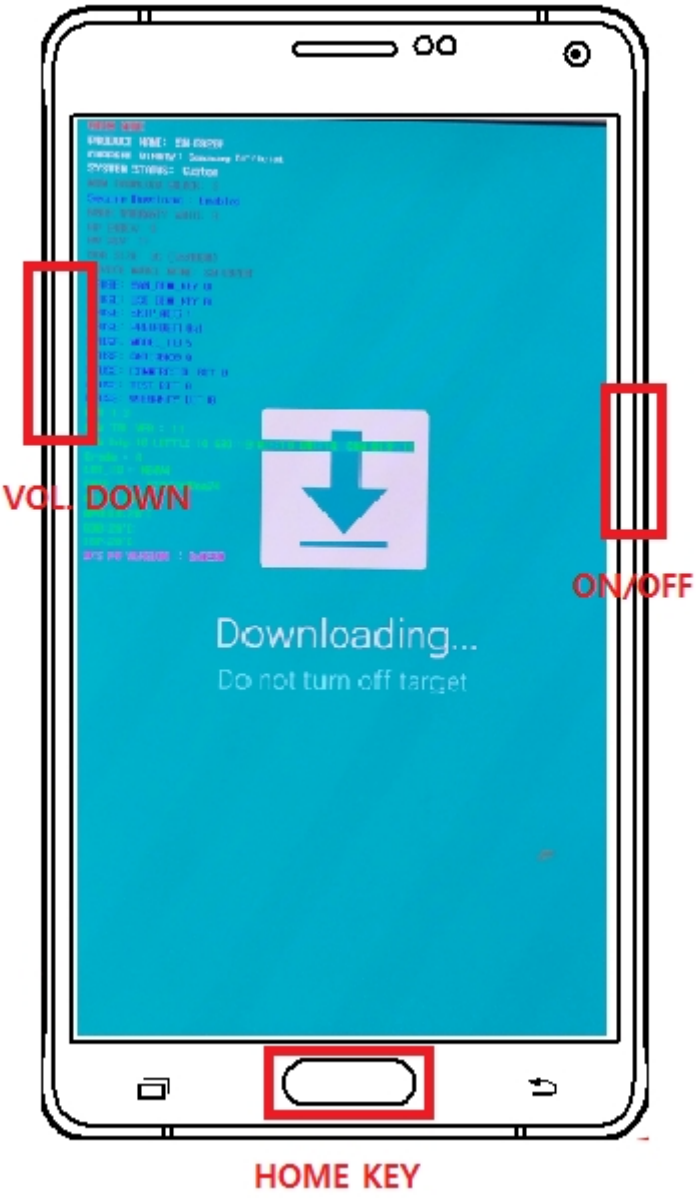
* Note : "Odin v3.12 or above" checks MD5 checksum just after file selection.



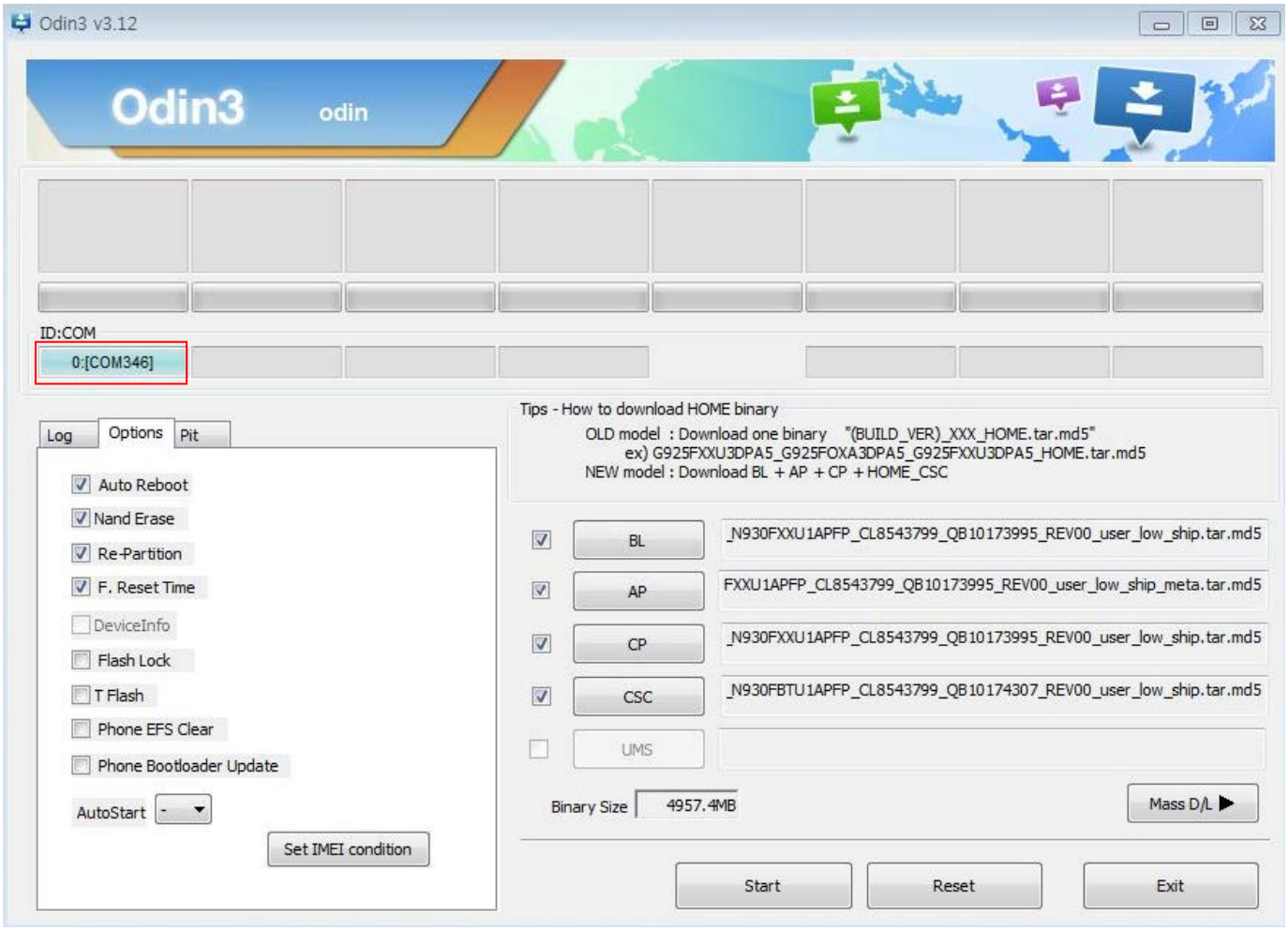


2. Enter into Download Mode

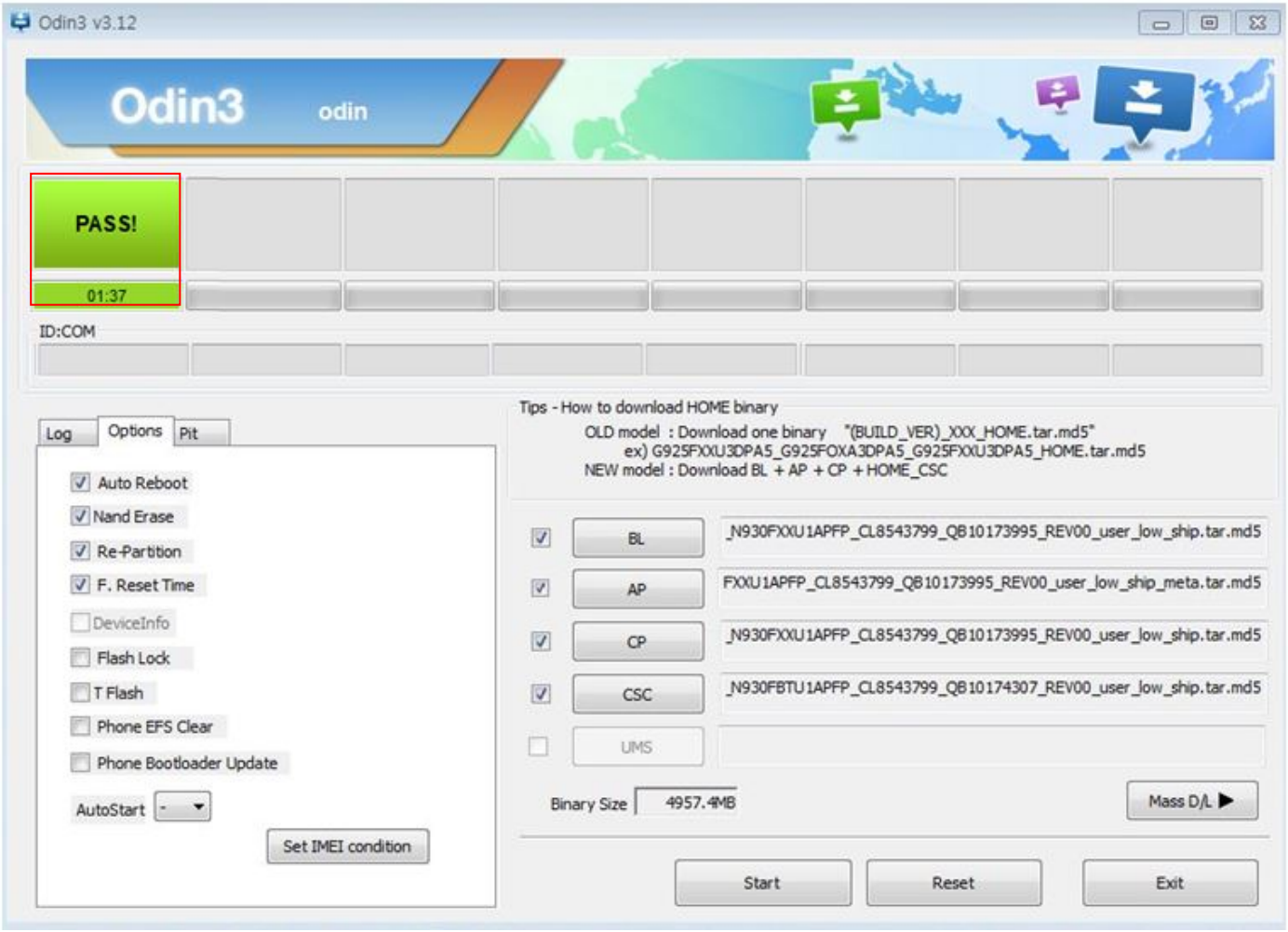
- Enter into Download Mode by pressing Home button, Volume Down button and Power On/Off Button simultaneously followed by pressing Volume up button as a direction of the phone.



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

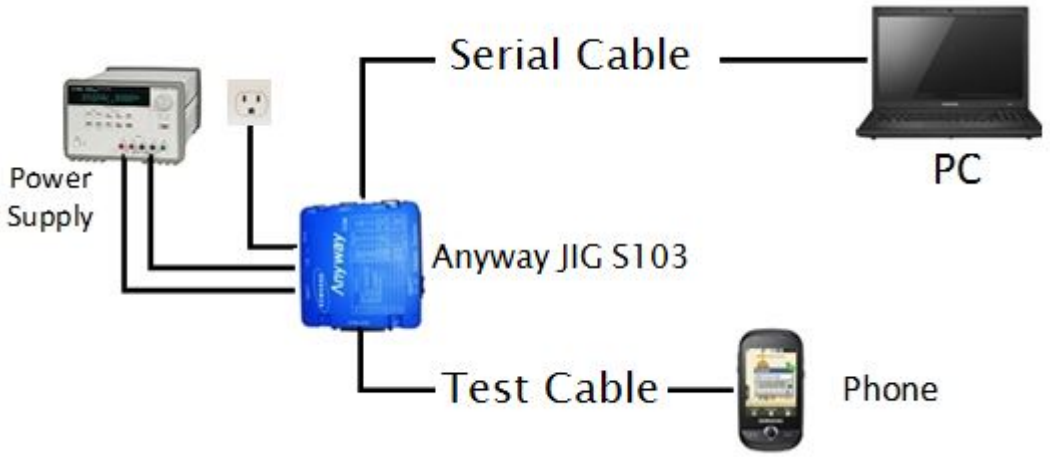
6. Level 1 Repair

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



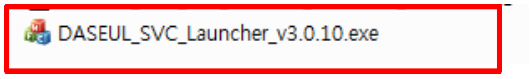
- S/W

① Library Install	To use Daseul, library files should be installed. Refer to SVC Bulletin "(11-82) Daseul (New IMEI writing Program) Library Install guide_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

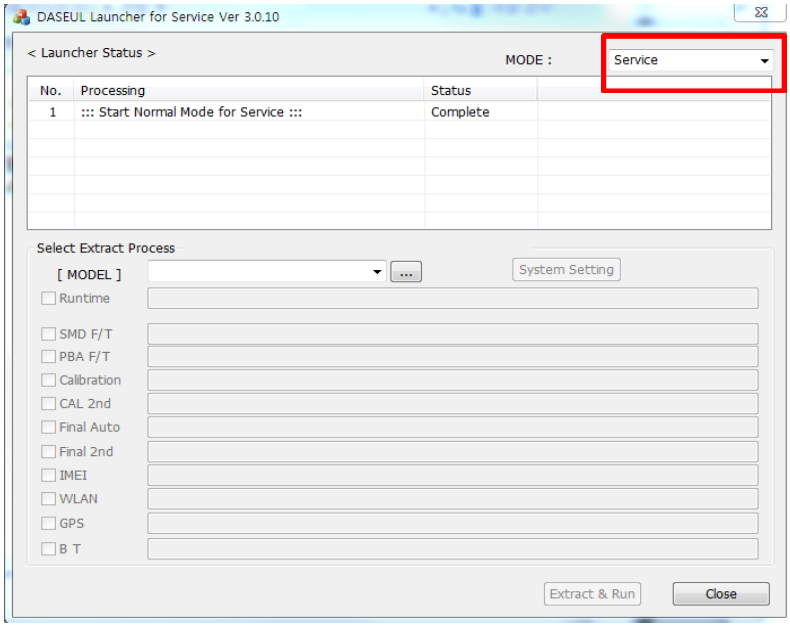
6. Level 1 Repair

6-2-2 IMEI writing Process

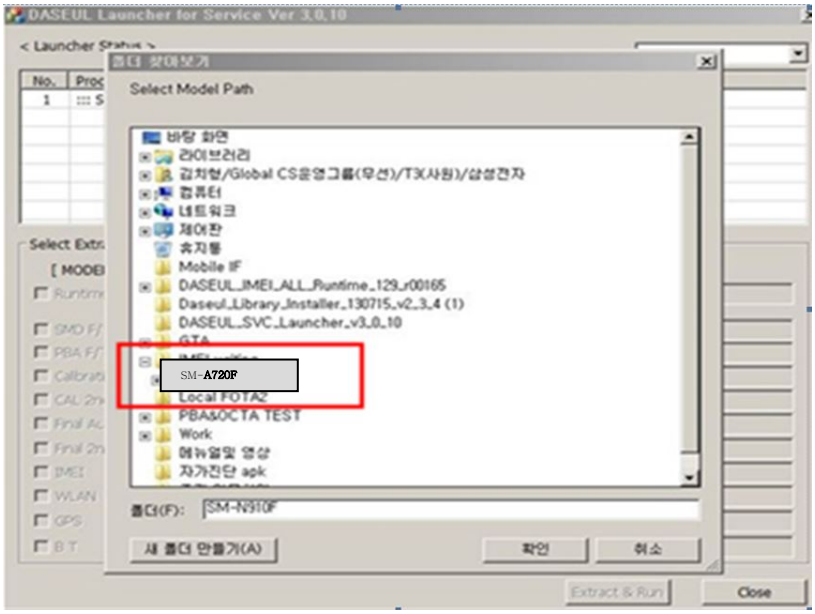
1. Run DASEUL_SVC_Launcher_v3.0.10.exe



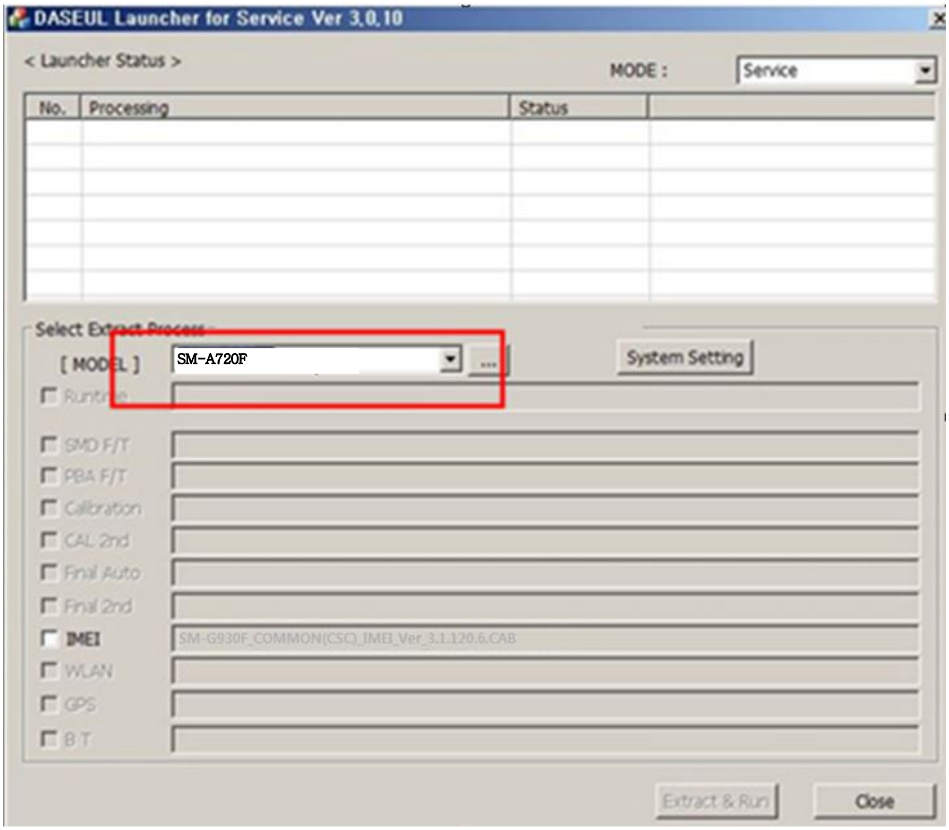
2. Select Service Mode



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

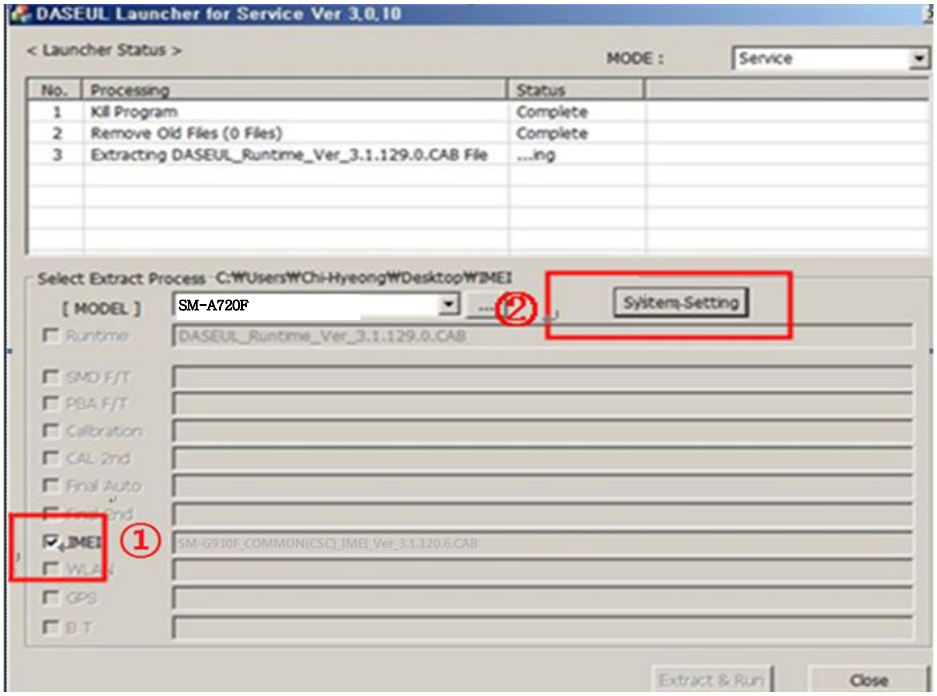


4. Select Model



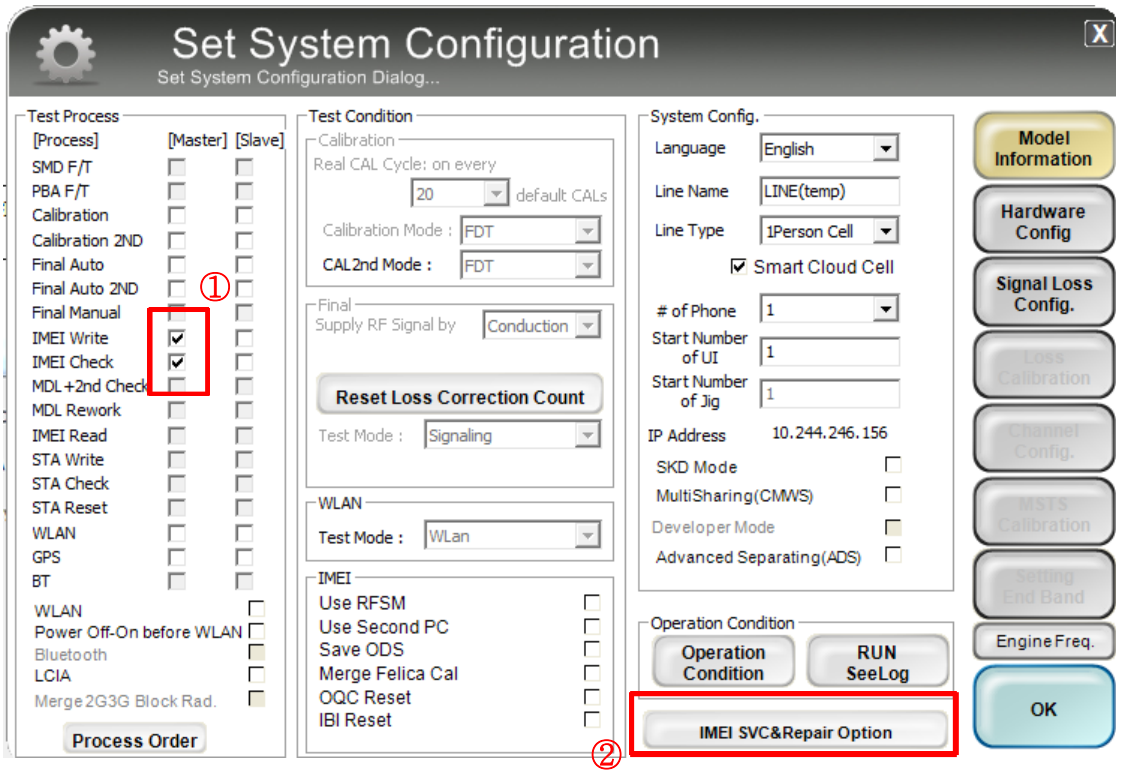
5. Check IMEI and click System Setting

※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.

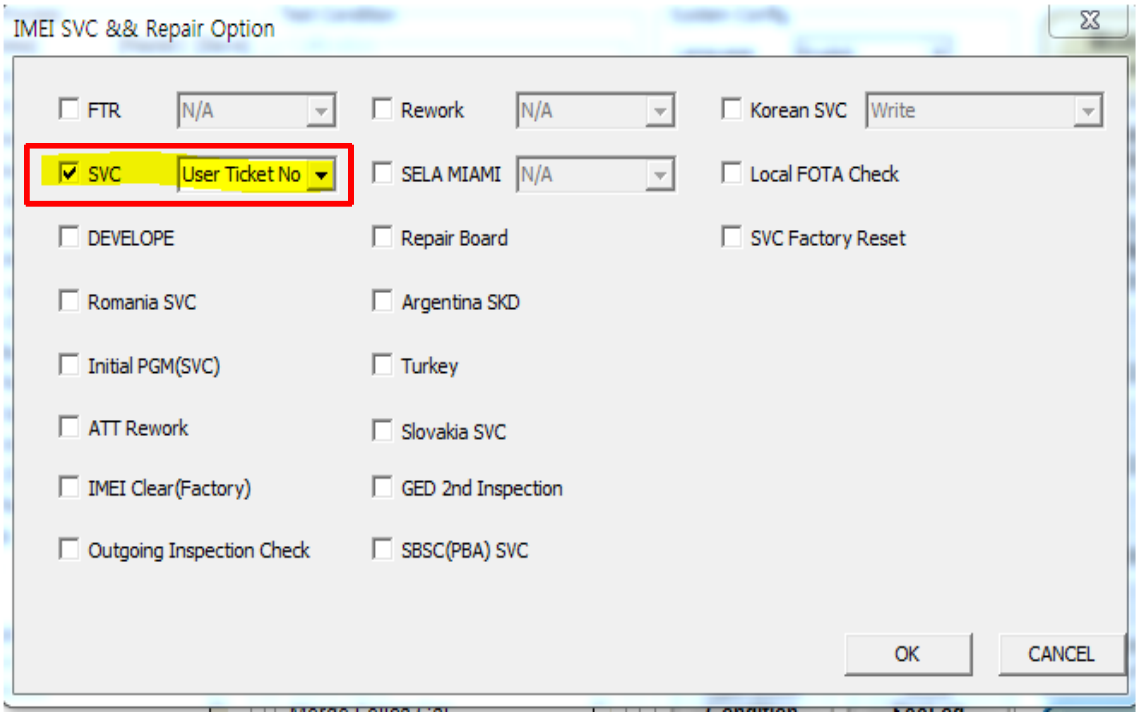


6. Level 1 Repair

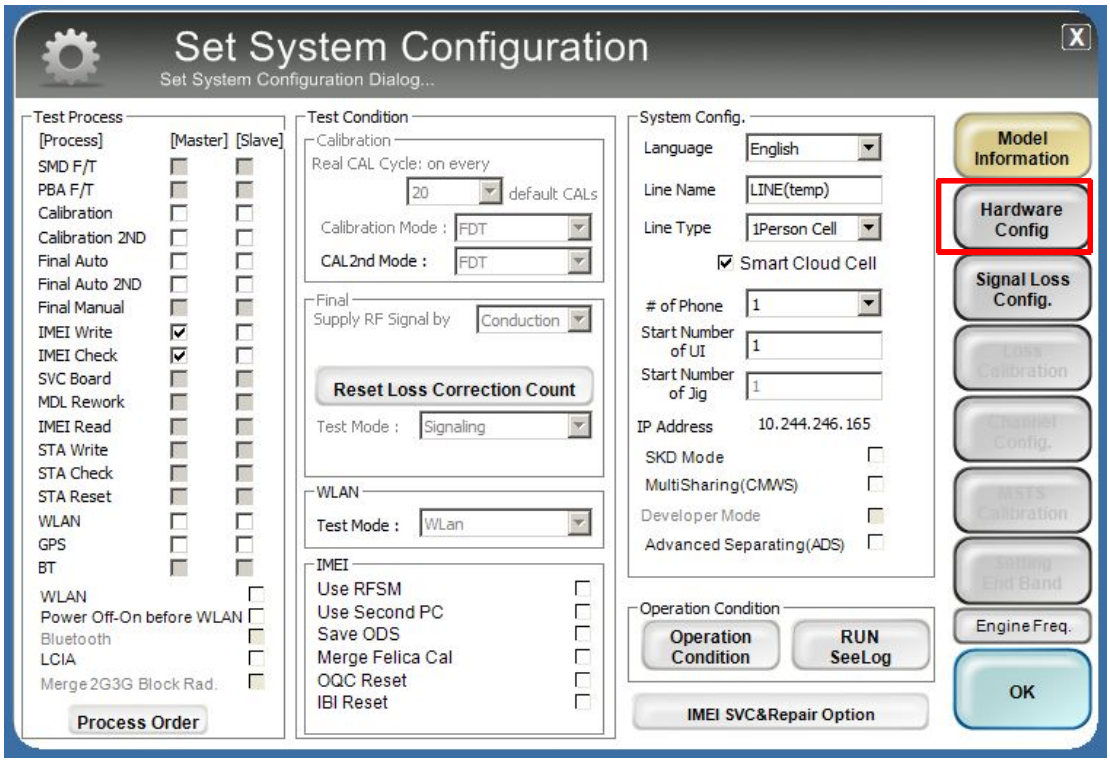
6. Check IMEI Write / IMEI Check and click IMEI SVC & Repair Option.



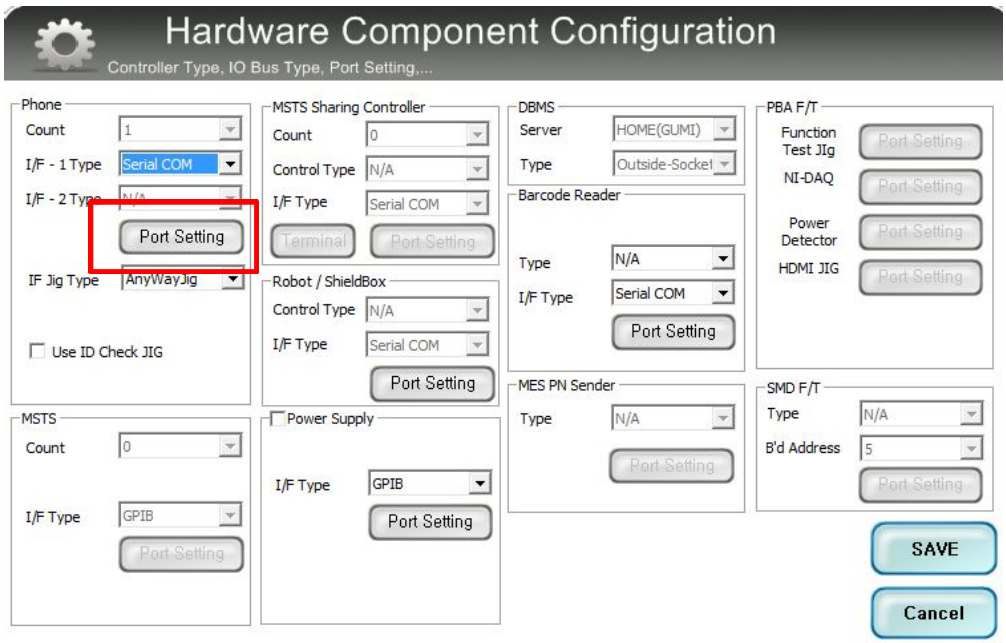
7. Check SVC , User Ticket No and click OK



8. Click Hardware Config

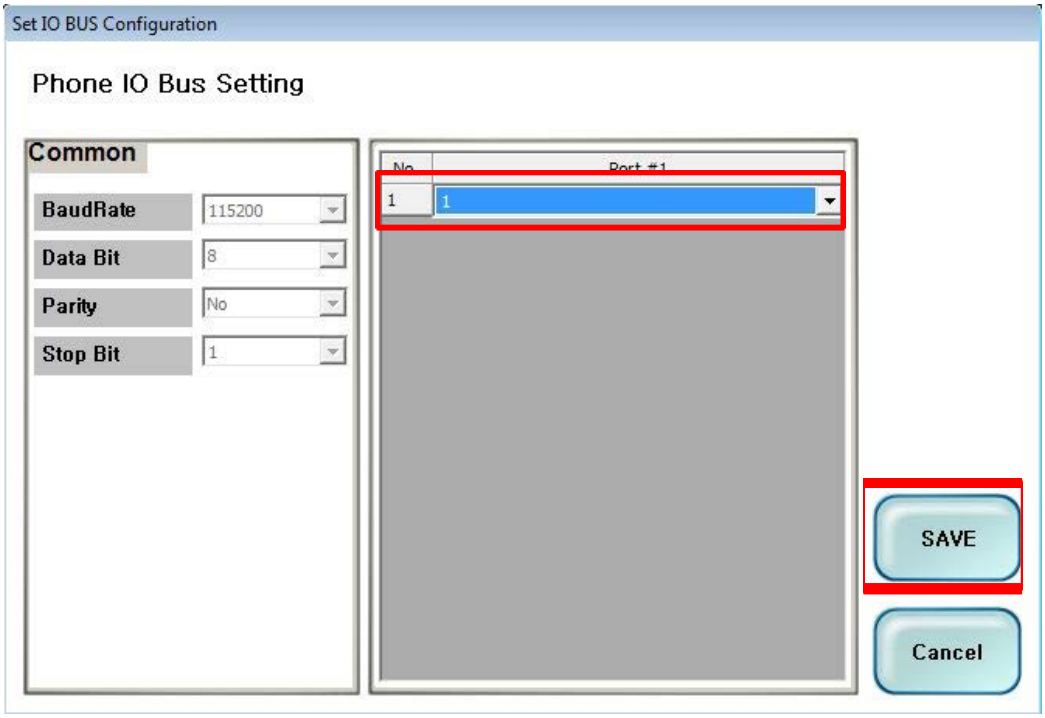


9. Click Port Setting

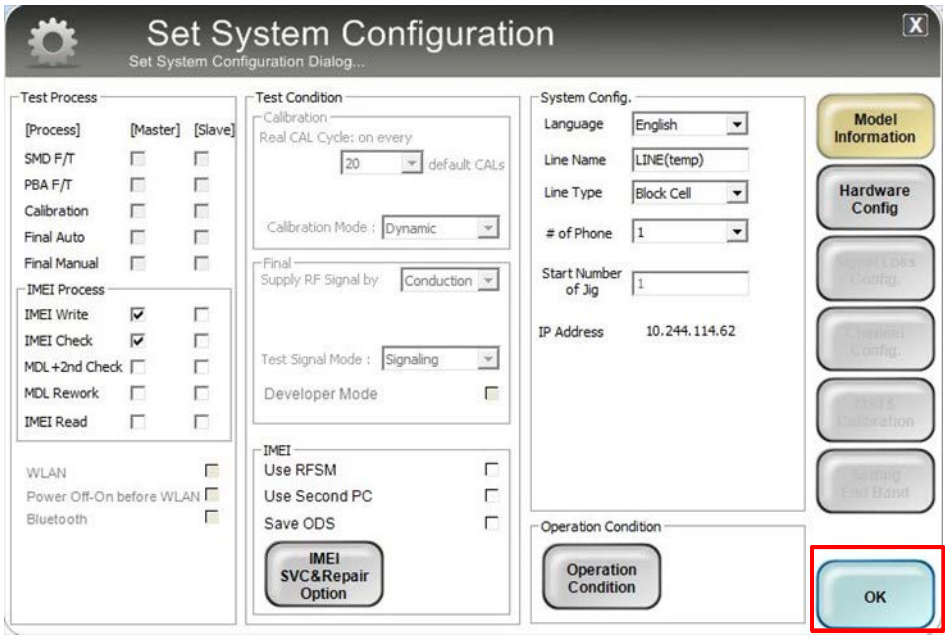


6. Level 1 Repair

10. Select Port Number and SAVE

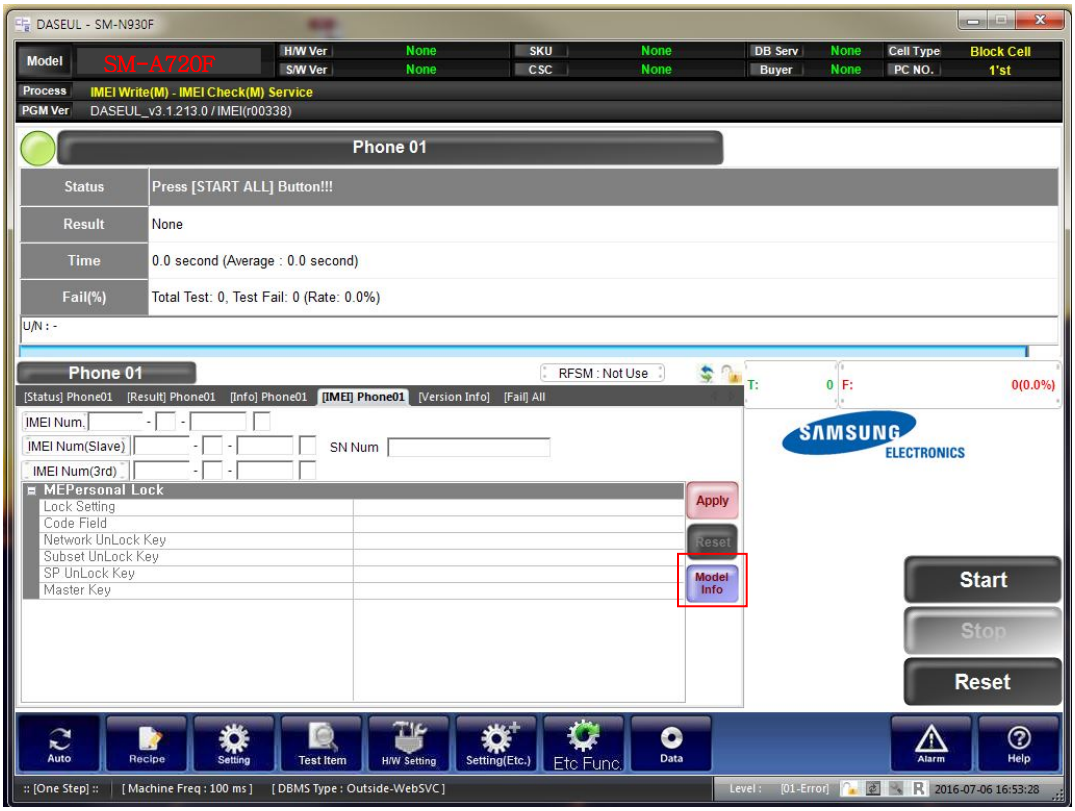


11.Click OK to proceed

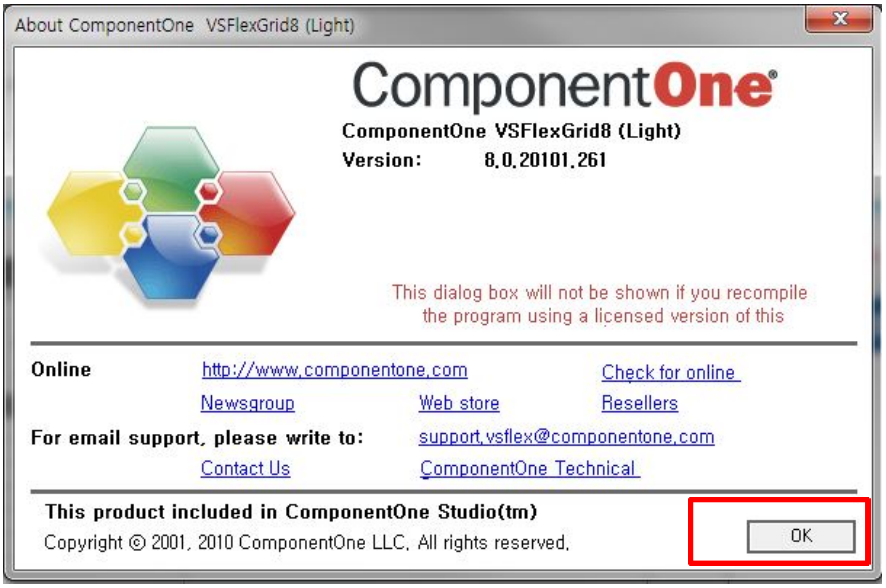


6. Level 1 Repair

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



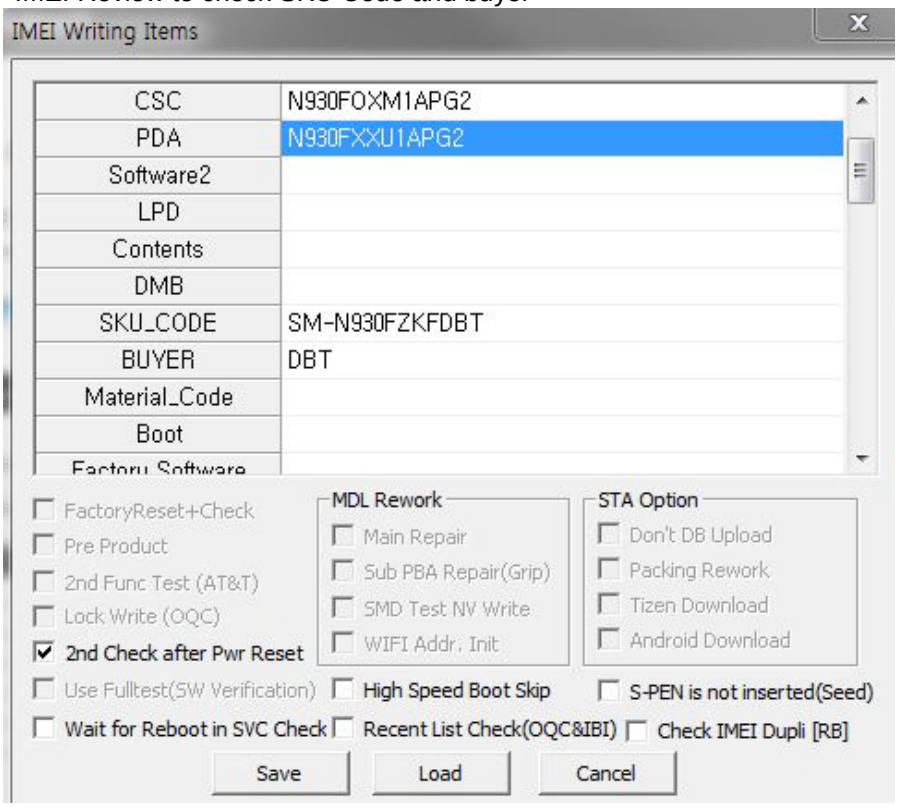
13. Click OK



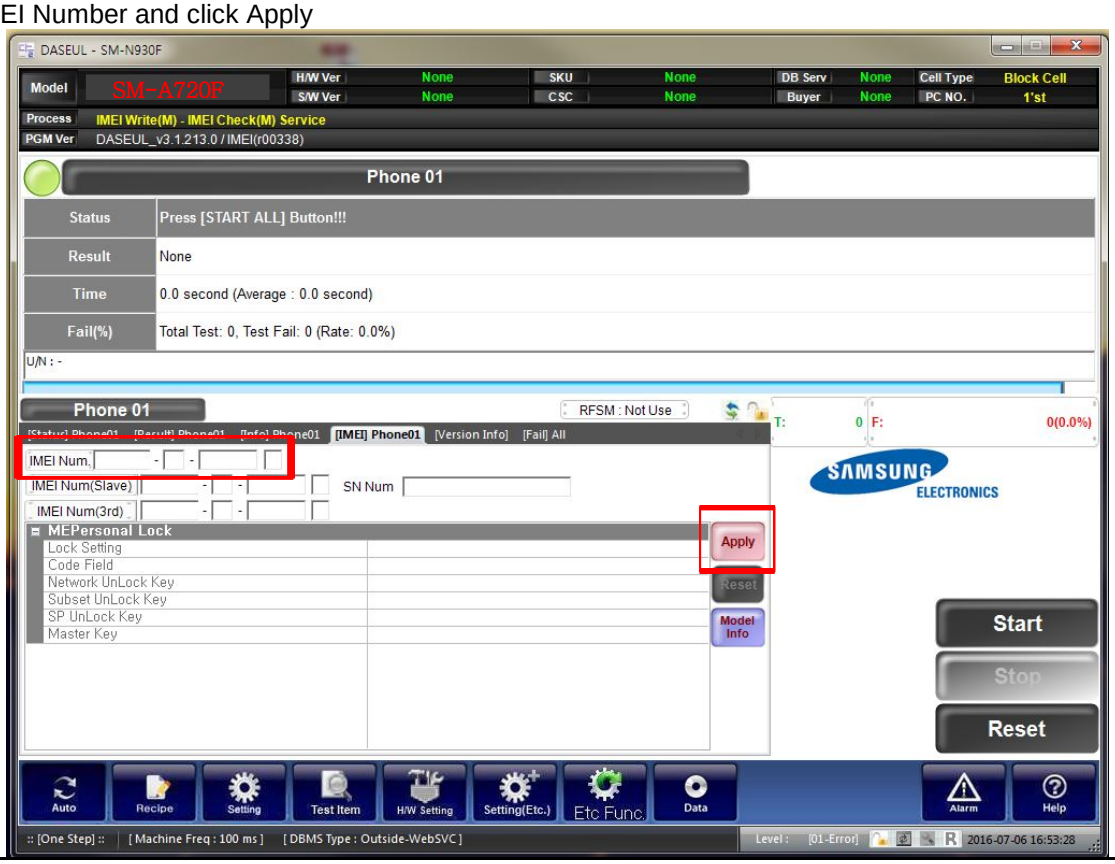
6. Level 1 Repair

14. Input SKU_CODE and BUYER, then click Save button.

※ Refer to HHPsvc→IMEI Review to check SKU Code and buyer

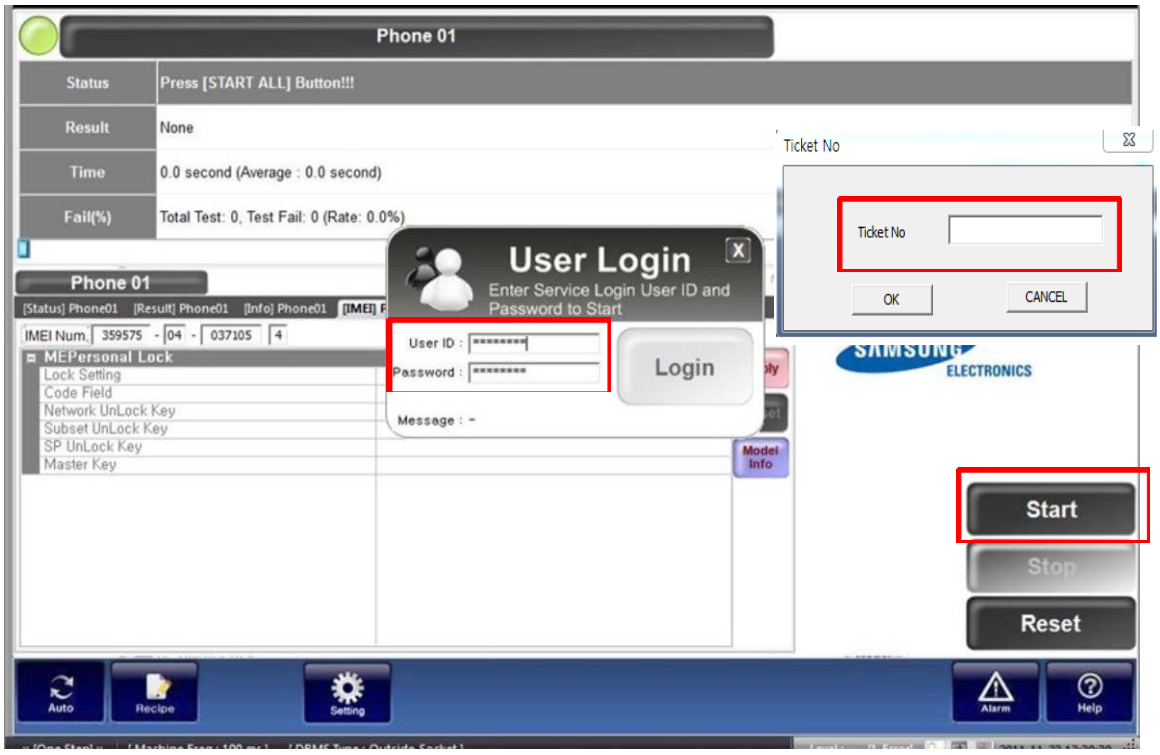


15. Input IMEI Number and click Apply



6. Level 1 Repair

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

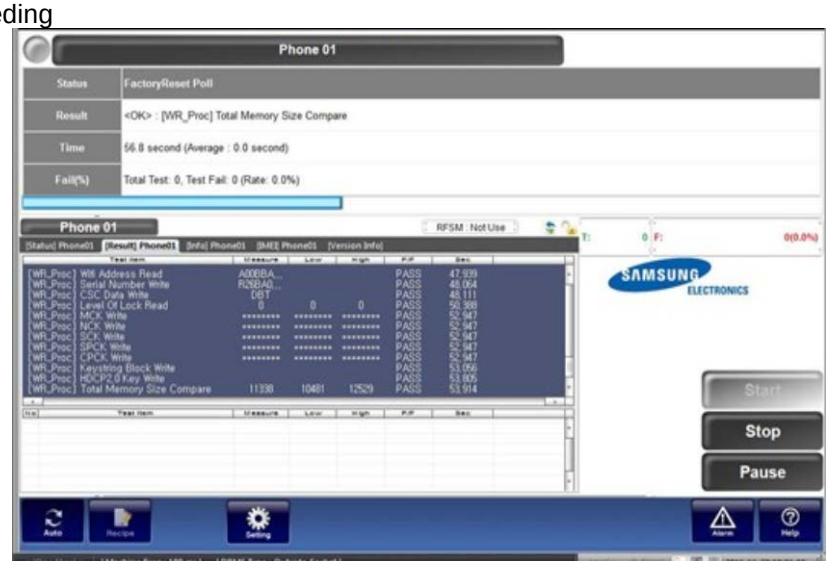


17. Connect the phone to Anyway JIG

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

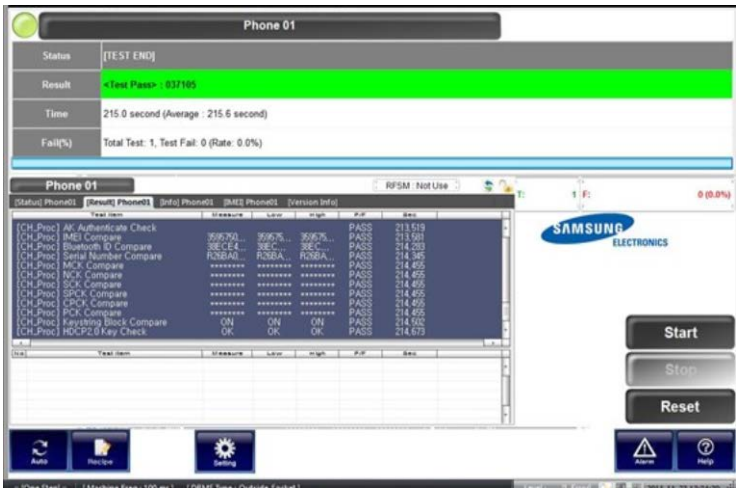
After connecting the phone, the phone will be booted automatically.

18. IMEI Writing Proceeding



6. Level 1 Repair

19. IMEI Writing Success



6. Level 1 Repair

6-3. RF Calibration

6-3-1. 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-A720F_OPEN_CALIBRATION_Ver_3.1.244.1.CAB**)

※ It is required to use the latest program.

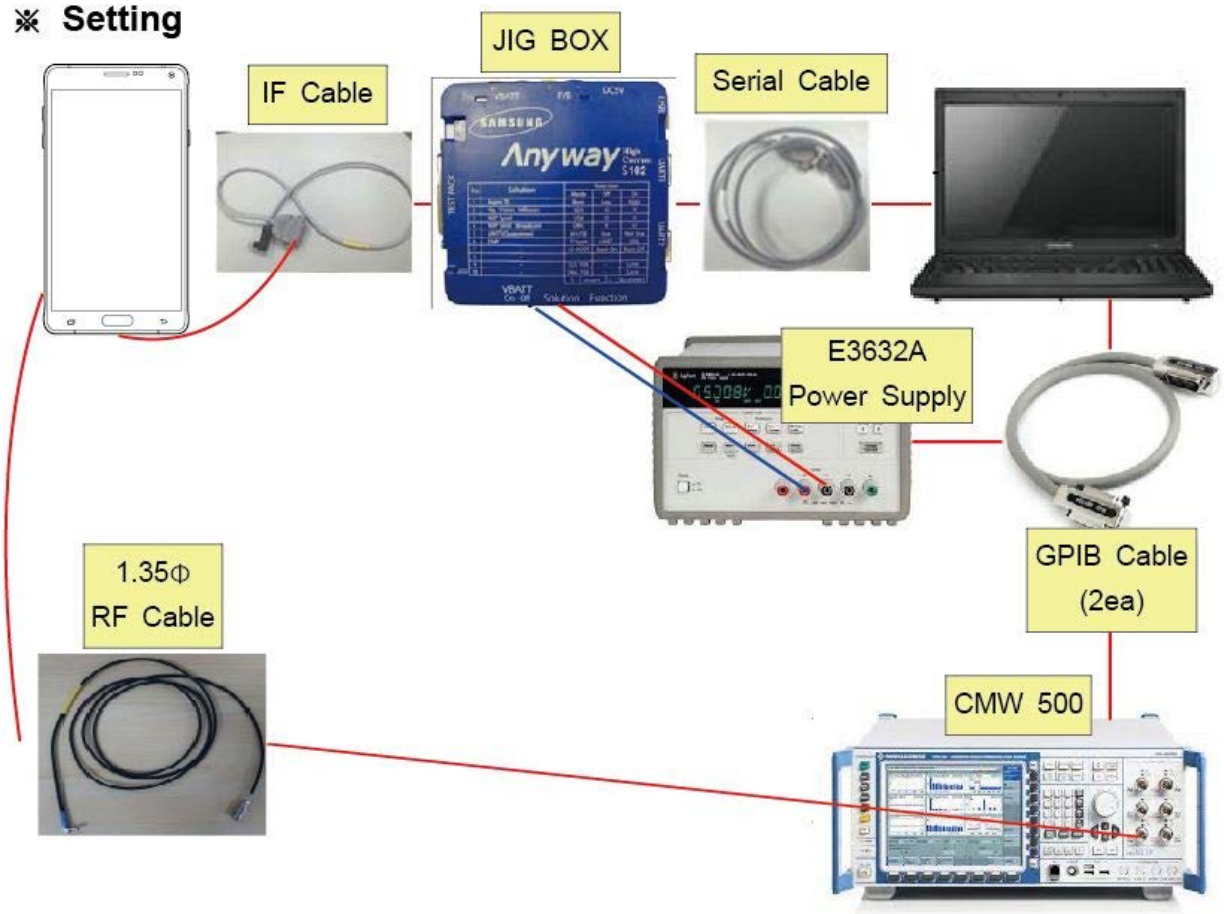
• **SM-A720F** Mobile Phone
• E3632A Power Supply
• JIG BOX (I-market: 1122429700(GH81-12520B))
• IF Cable (I-market: 1128242500(GH81-11962W))
• Adapter (GH81-11888K)
• RF Cable (GH81-11962G 1ea)
• R&S CMW500
• GPIB Cable (2ea)
• UART Serial Cable

• Table of test cables

IF Cable	GH81-10631A	GH81-11962W	GH81-11171A	
	11 pin	USB C Type	7 pin (Old)	
RF Cable (Manual)	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	GH81-11962B	GH81-11962E	
	Use / No use 	Divider Cable 	50Ω terminator 	

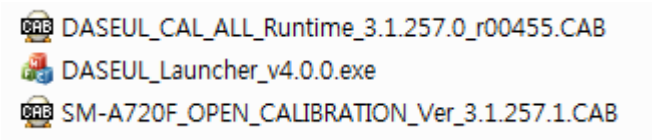
6. Level 1 Repair

※ Setting

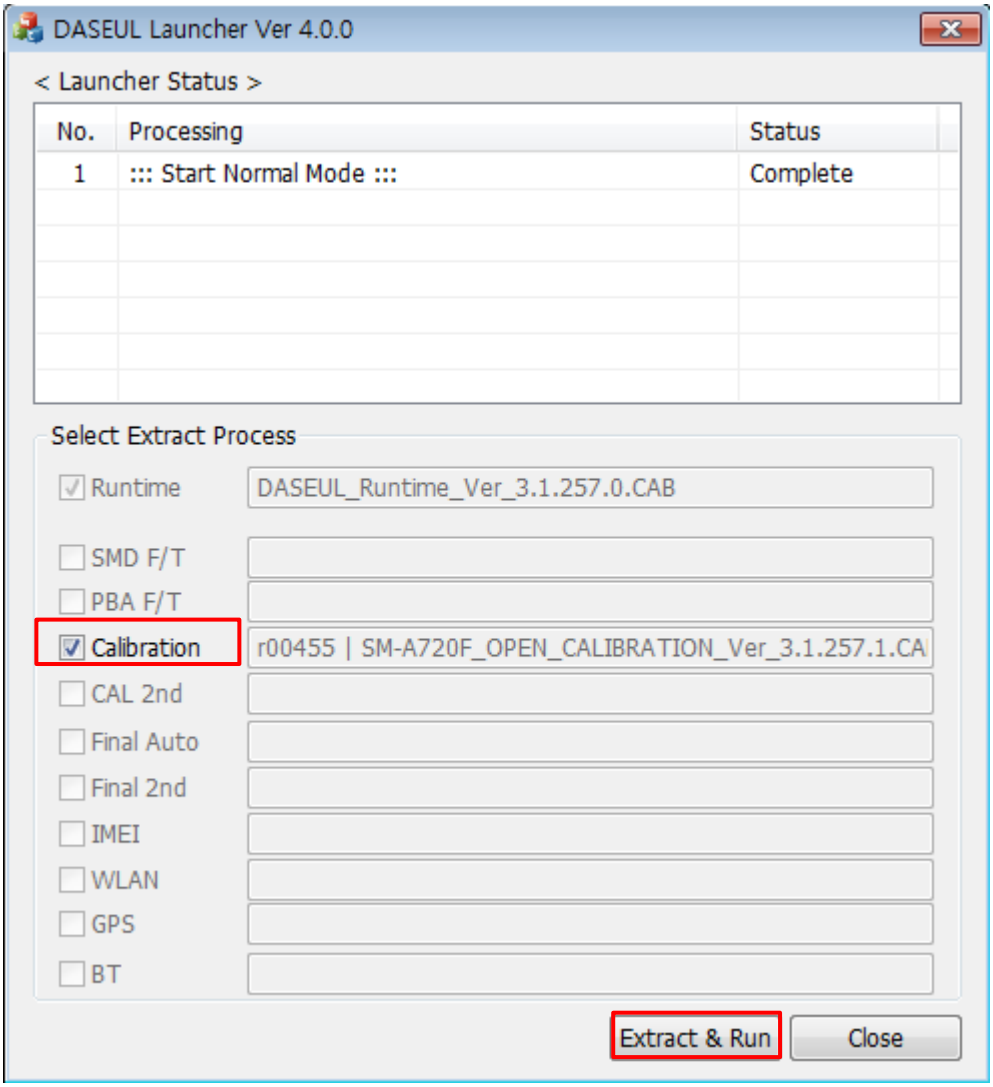


6-3-2. RF Calibration Program

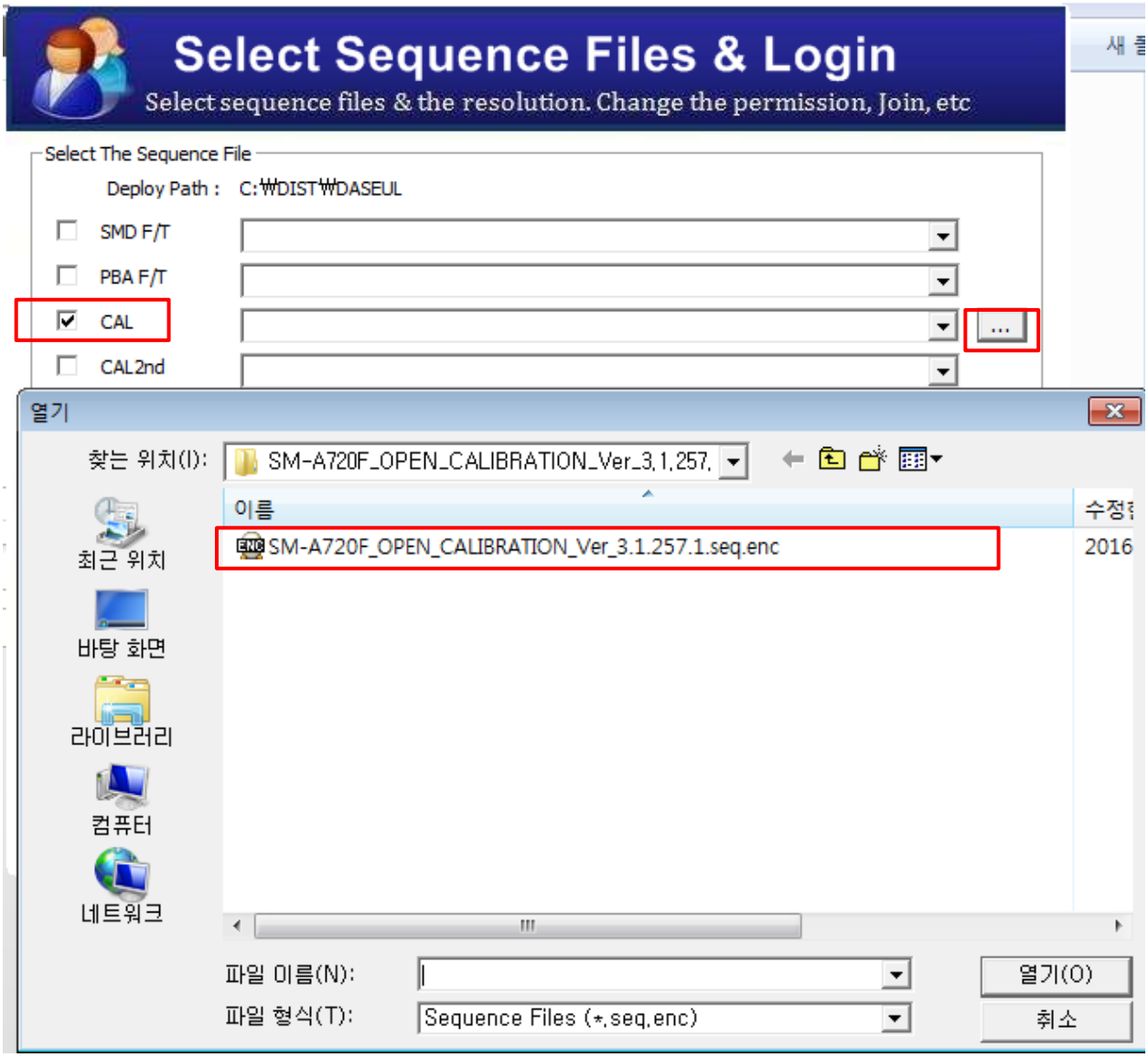
1. Run the RF Calibration Program Launcher, 'DASEUL_Launcher_vx.x.xx.exe'.



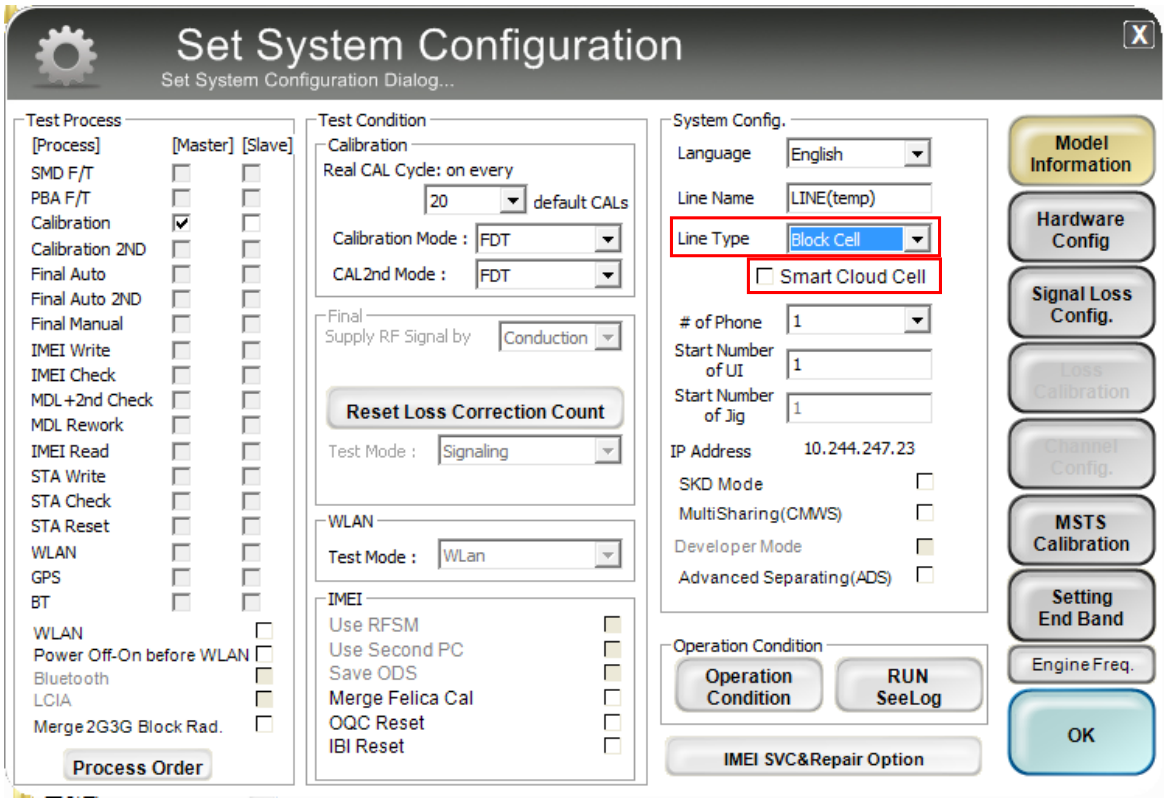
2. Check the 'Calibration' menu, and select 'Extract & Run'.



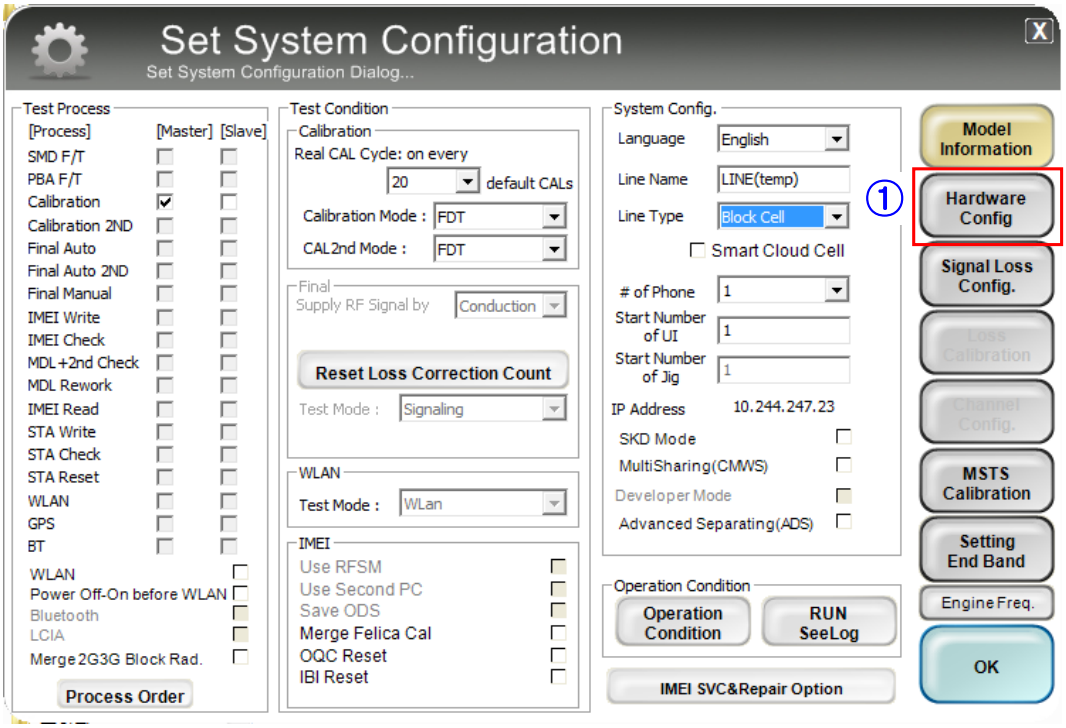
3. Check the 'CAL' and open the model file, then select 'Start' button.

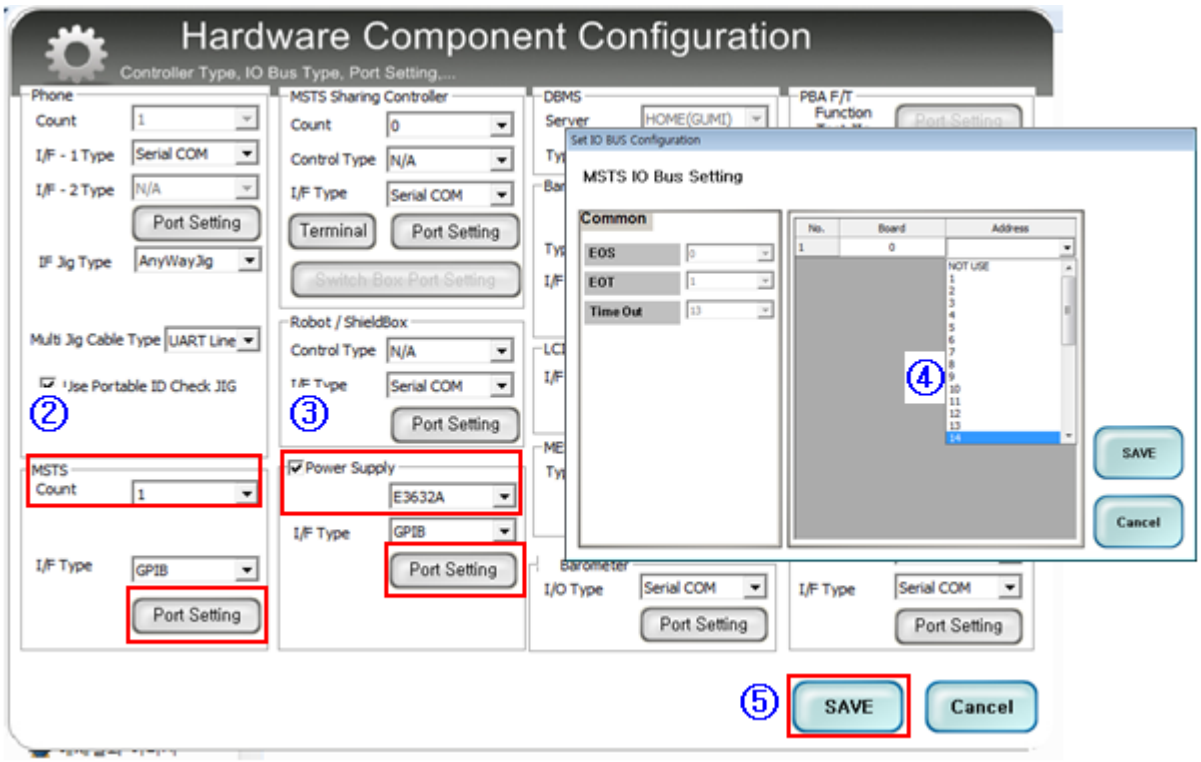


4. Change the Line Type to 'Block Cell' and disable 'Smart Cloud Cell'.



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.