2-1. GSM General Specification

Item		GSM850	EGSM 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		45MHz	45MHz	95MHz	80MHz
Mod. Bit rate/ Bit Period		270.833kbps 3.692us	270.833kbps 3.692us	270.833kbps 3.692us	270.833kbps 3.692us
Time Slot Period/ Frame Period		576.9us 4.615ms	576.9us 4.615ms	576.9us 4.615ms	576.9us 4.615ms
Modulation	GSM/ GPRS	0.3GMSK	0.3GMSK	0.3GMSK	0.3GMSK
MS Power		33dBm ~5dBm	33dBm ~5dBm	30dBm ~0dBm	30dBm ~0dBm
Power Class		5pcl ~ 19pcl	5pcl ~ 19pcl	0pcl ~ 15pcl	0pcl ~ 15pcl
Sensitivity		-102dBm	-102dBm	-102dBm	-102dBm
TDMA Mux		8	8	8	8
Cell Radius		35Km	35Km	2Km	2Km

2-2. GSM Tx Power Class

GSM850	TX Power control level	EGSM900	TX Power control level	DCS1800	TX Power control level	PCS1900	TX Power control level
33±2 dBm	5	33±2 dBm	5	30±3 dBm	0	30±3 dBm	0
31±2 dBm	6	31±2 dBm	6	28±3 dBm	1	28±3 dBm	1
29±2 dBm	7	29±2 dBm	7	26±3 dBm	2	26±3 dBm	2
27±2 dBm	8	27±2 dBm	8	24±3 dBm	3	24±3 dBm	3
25±2 dBm	9	25±2 dBm	9	22±3 dBm	4	22±3 dBm	4
23±2 dBm	10	23±2 dBm	10	20±3 dBm	5	20±3 dBm	5
21±2 dBm	11	21±2 dBm	11	18±3 dBm	6	18±3 dBm	6
19±2 dBm	12	19±2 dBm	12	16±3 dBm	7	16±3 dBm	7
17±2 dBm	13	17±2 dBm	13	14±3 dBm	8	14±3 dBm	8
15±2 dBm	14	15±2 dBm	14	12±4 dBm	9	12±4 dBm	9
13±2 dBm	15	13±2 dBm	15	10±4 dBm	10	10±4 dBm	10
11±3 dBm	16	11±3 dBm	16	8±4 dBm	11	8±4 dBm	11
9±3 dBm	17	9±3 dBm	17	6±4 dBm	12	6±4 dBm	12
7±3 dBm	18	7±3 dBm	18	4±4 dBm	13	4±4 dBm	13
5±3 dBm	19	5±3 dBm	19	2±5 dBm	14	2±5 dBm	14
				0±5 dBm	15	0±5 dBm	15

2-3. WCDMA General Specification

	WCDMA2100	WCDMA1900	WCDMA850	WCDMA900	WCDMA 1700
Freq. Band[MHz] Uplink/Downlink	1922~1977 2112~2167	1852~1907 1932~1987	824~849 869~894	880~915 925~960	1710~1755 2110 ~ 2155
ARFCN range	UL : 9612~9888 DL : 10562~10838	UL : 9262~9538 DL : 9662~9938	UL : 4132~4233 DL : 4357~4458	UL : 2712~2863 DL : 2937~3088	UL : 1312~1513 DL : 1537~1738
Tx/Rx spacing	190MHz	80MHz	45MHz	45MHz	400MHz
Mod. Bit rate/ Bit Period	3.84 Mcps	3.84 Mcps	3.84 Mcps	3.84 Mcps	3.84Mcps
Time Slot Period /Frame Period	Frame Length: 10ms Slot length: 0.667ms	Frame Length: 10ms Slot length: 0.667ms	Frame Length: 10ms Slot length: 0.667ms	Frame Length: 10ms Slot length: 0.667ms	Frame Length: 10ms Slot length: 0.667ms
Modulation	QPSK/HQPSK	QPSK/HQPSK	QPSK/HQPSK	QPSK/HQPSK	QPSK/HQPSK
MS Power	24dBm~-50dBm	24dBm~-50dBm	24dBm~-50dBm	24dBm~-50dBm	24dBm~-50dBm
Power Class	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)
Sensitivity	-106.7dBm	-104.7dBm	-104.7dBm	-104.7dBm	106.7dBm
TDMA Mux	8	8	8	8	8
Cell Radius	2Km	2Km	2Km	2Km	2Km

2-4. LTE General Specification

	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 2110~2170	1710~1785 1805~1880	1710~1755 2110~2155	824~849 869~894	2500~2570 1805~1880	2500~2570 1805~1880
ARFCN range	UL: 18000~18599 DL: 0~599	UL: 18600~19199 DL: 600~1199	UL: 19200~19950 DL: 1805~1880	UL: 19950~20399 DL: 1950~2399	UL: 20400~20649 DL: 2400~2649	UL: 20750~21449 DL: 2750~3449	UL: 21450~21799 DL: 3450~3799
Tx/Rx spacing	190MHz	80MHz	95MHz	400MHz	45MHz	120MHz	45MHz
Channel Bandwidth	60 MHz	60 MHz	75 MHz	45 MHz	25 MHz	70 MHz	35 MHz
Modulation	QPSK,16/64 QAM	QPSK,16/64 QAM	QPSK,16/64 QAM	QPSK,16/64 QAM	QPSK,16/64 QAM	QPSK,16/64 QAM	QPSK,16/64 QAM
MS Power (MPR)	-35~25.7 dBm	-35~25.7 dBm	-35~25.7 dBm	-35~25.7 dBm	-35~25.7 dBm	-35~25.7 dBm	-35~25.7 dBm
Sensitivit (QPSK) (BW 10MHz)	-96.3 dBm	-94.3 dBm	-93.3 dBm	-96.3 dBm	-94.3 dBm	-94.3dBm	-93.3dBm
Cell Radius	>5Km	>5Km	>5Km	>5Km	>5Km	>5Km	>5Km

	LTE Band 17	LTE BAND 20	LTE BAND 28	LTE Band38	LTE Band40	LTE Band41
Freq. Band[MHz] Uplink/ Downlink	704~716 734~746	704~716 734~746	703~748 758~803	2570~2620	2300~2400	2496~2690
ARFCN range	UL: 23703~23849 DL: 5730~5849	UL: 24150~24449 DL: 6150~6449	UL: 27210~27659 DL: 9210~9659	37750~38249	38650~39649	39650~41589
Tx/Rx spacing	30MHz	41MHz	55MHz	-		
Channel Bandwidth	12 MHz	30 MHz	45 MHz	5/10/15/20 MHz	5/10/15/20 MHz	5/10/15/20 MHz
Modulation	QPSK,16/64QAM	QPSK,16/64QAM	QPSK,16/64QAM	QPSK,16/64QAM	QPSK, 16/64QAM	QPSK,16/64QAM
MS Power (MPR)	-35~25.7 dBm	-35~25.7 dBm	-35~25.7dBm	-35~25.7 dBm	-35~25.7dBm	-35~25.7 dBm
Sensitivit (QPSK) (BW 10MHz)	-93.3 dBm	-93.3dBm	-94.8 dBm	-96.3 dBm	-96.3dBm	-94.3dBm
Cell Radius	>5Km	>5Km	>5Km	>5Km	>5Km	>5Km

Main Function

Item	Description
OS	Android V6.0.1 (Marshmallow)
RF	2G : 850/900/1800/1900 3G : 850/900/1700/1900/2100 LTE : Band 1/2/3/4/5/7/8/17/20/28/38/40/41
Battery	3,000mAh
Base Band	1.9GHz Octa(A53) (Exynos7880)
Other RF	GPS, Glonass, Beidou, BT 4.2, WIFI 802.11 a/b/g/n/ac(2.4+5GHz), NFC, MST, FM Radio
Camera	Main - 16M PDAF, Front - 16M FF MIPI SLSI (with Flash LED)
LCD	5.2” FHD OCTA(SDC), 1920×1280
RAM	3GB LPDDR4 +32GB eMMC
Sensor	Accelerometer, Barometer, Fingerprint, Gyro, Geomagnetic, Hall, Proximity, RGB Light
Accessory	Charger: 5V/2A, 9V/1.67A Data cable:2.8pi, 1.2M, TYPE C, Earphone : 3.5pi, 4Pin

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

1-1. 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.

1-2. 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.

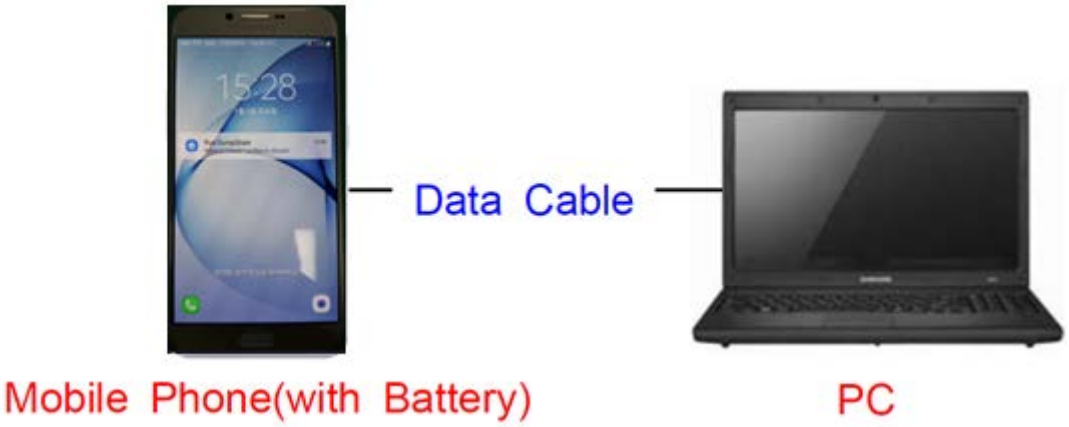
Properly shield the work environment from accidental electrostatic discharge before opening packages containing ESDs.

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.

6-1. S/W Download

6-1-1. Prepare for S/W Downloading

- Diagram of connection



6-2-2. How to download S/W

1) Downloading Binary Files

- Binary file for downloading SM-A520F
  - **xxx.pit**
  - **AP_XXXX.tar.md5**
  - **BL_XXXX.tar.md5**
  - **CP_XXXX.tar.md5**
  - **CSC_XXXX.tar.md5**

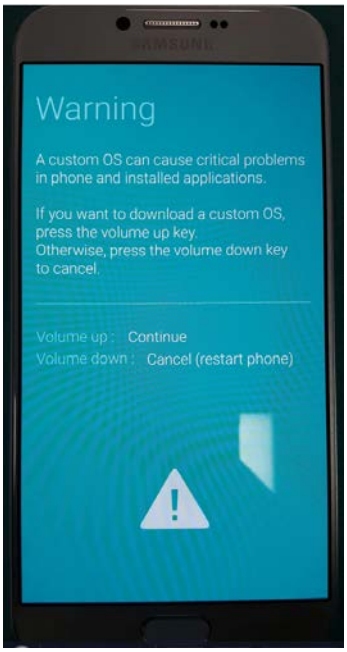
  (file size is about 2.9GB)

2) Prepare for Downloading

- Downloader Program (**Odin3 v3.12.exe**)
- SM-A520F Mobile Phone
- Data Cable
- Binary files

6. Level 1 Repair

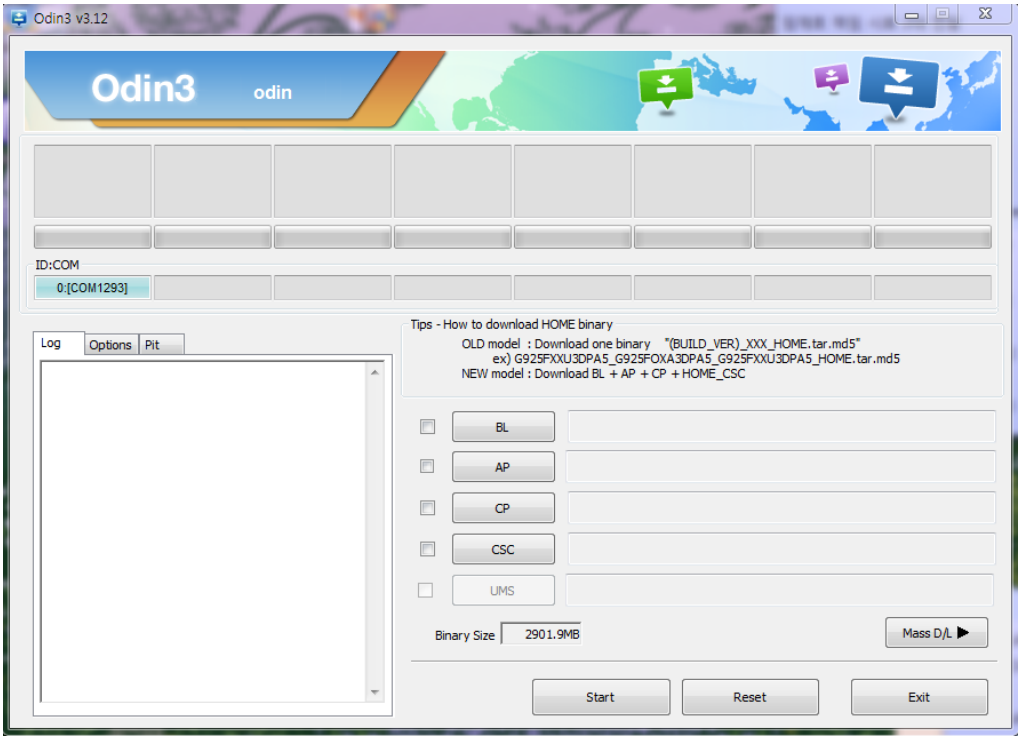
3) Boot the mobile phone by pressing 'Home + Vol Down + Power key at the same time, If you do properly, you can see the following message on the main LCD as the following.



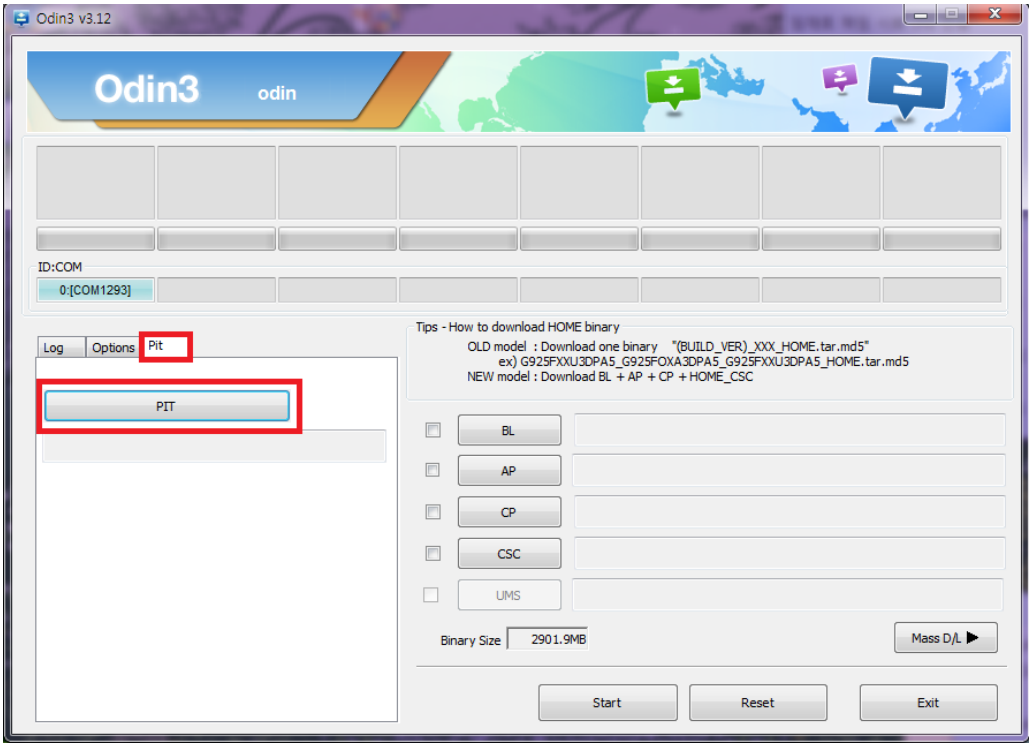
4) Press the Vol Up Key again, and you will see below message on Main LCD.

" Downloading... "

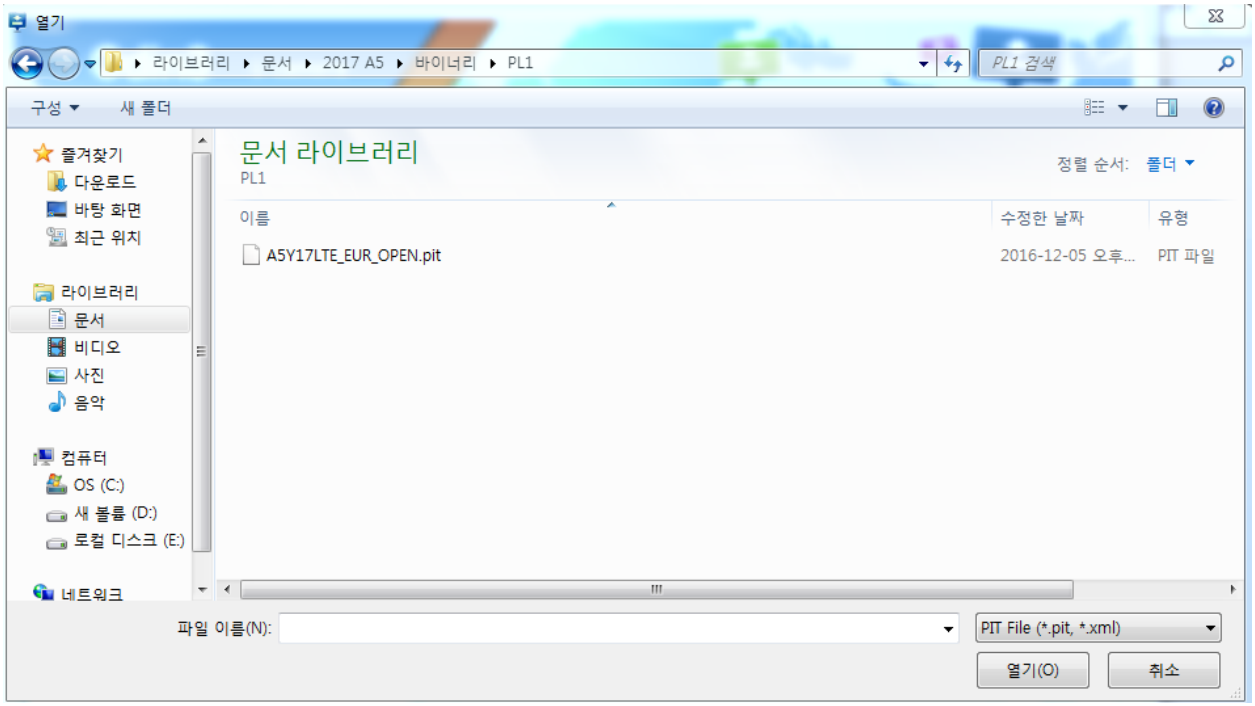
5) Load the binary download program.



6) Press "PIT" button to open the phone binary. (If you downloaded it once, afterward you don't need to download it again)

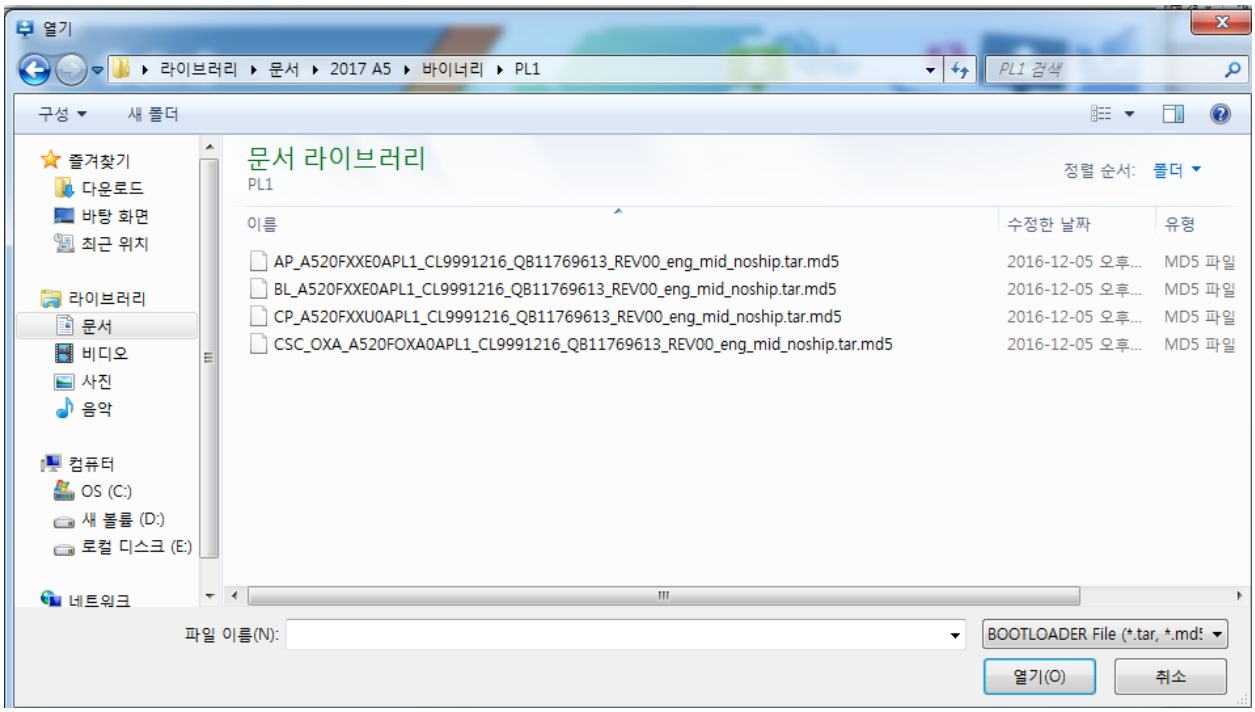


7) Select the phone SM-A520F "xxx.pit" binary from the file directory.



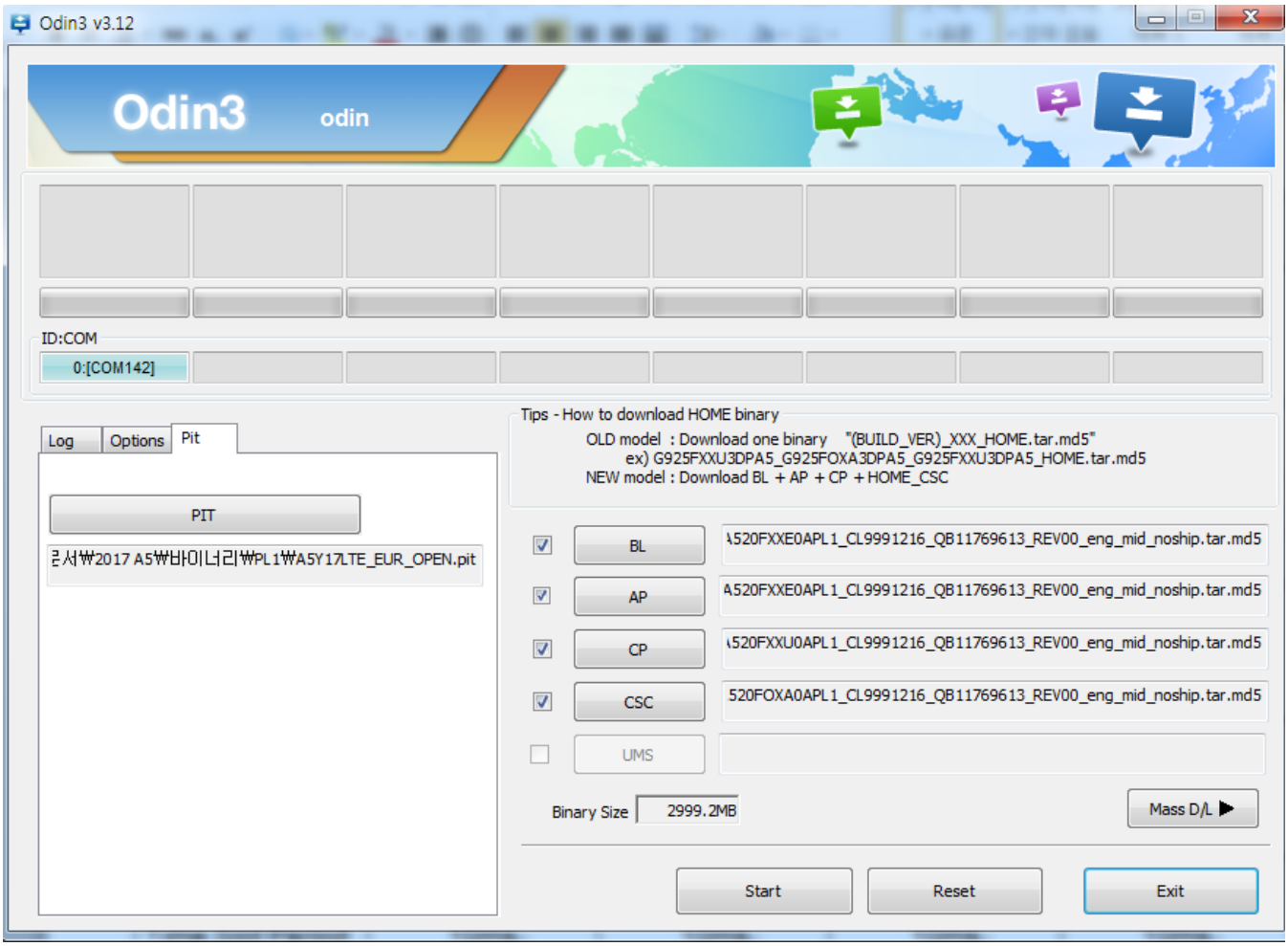
Slect the file as above:

- **AP_XXXX.tar.md5**
- **BL_XXXX.tar.md5**
- **CP_XXXX.tar.md5**
- **CSC_XXXX.tar.md5**



6. Level 1 Repair

8) Connect mobile and computer. The program show as follow.



9) Now press the button "Start".

10) Now it's time to take a rest and finish the downloading.

11) After finished downloading of phone binary, the mobile phone will restart automatically.

12) 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

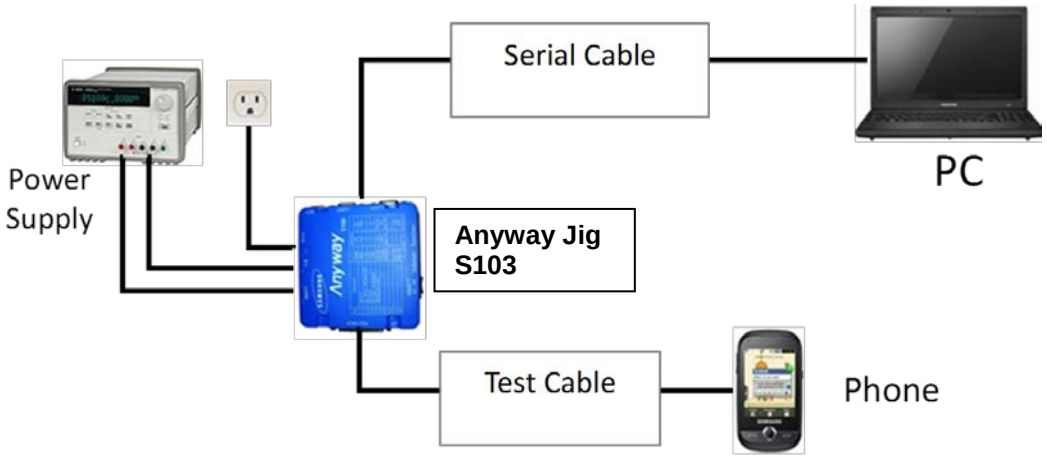
※ Caution. Never disconnect during the S/W downloading.

6-2 IMEI writing

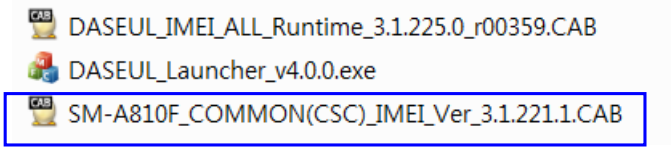
6-2-1 Preparation

- 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

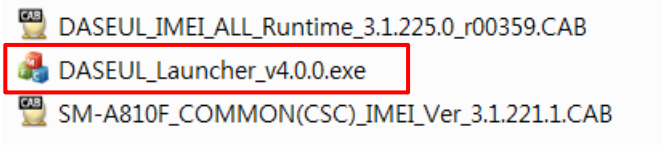


- S/W

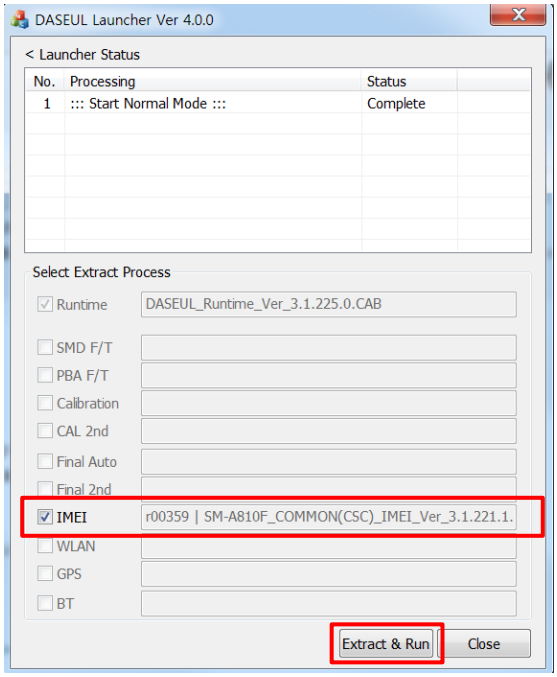
① Library Install	To use Daseul, library files should be installed. Refer to SVC Bulletin "(11-82) Daseul (New IMEI writing Program) Library Install guide_rev1.0"
②Launcher	DASEUL_SVC_Launcher_v3_0_25 or higher -Uploaded on HHPsvc Notice
③ Runtime File	1. DASEUL_IMEI_ALL_Runtime_3.1.136_r00183 .CAB or 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

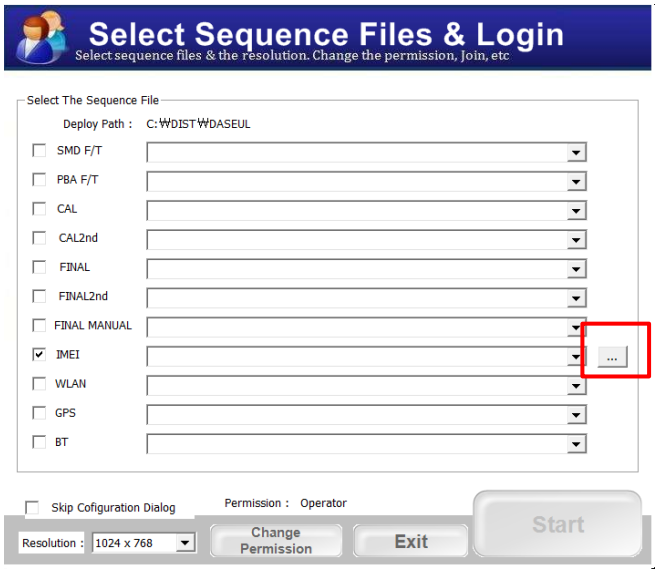
1. Run DASEUL_SVC_Launcher_v3_0_25



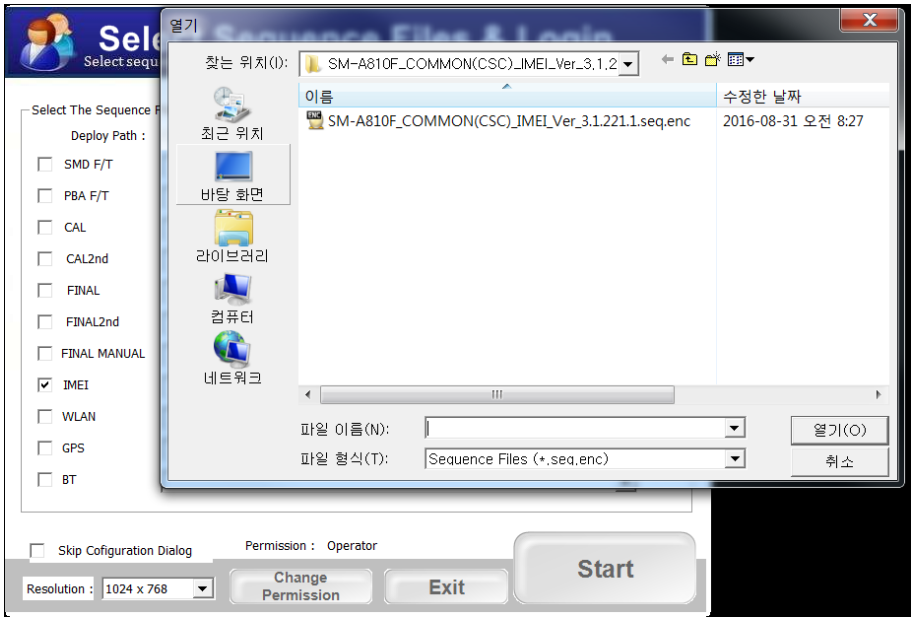
2. check IMEI and click 'Extract & Run'



3. Click ...

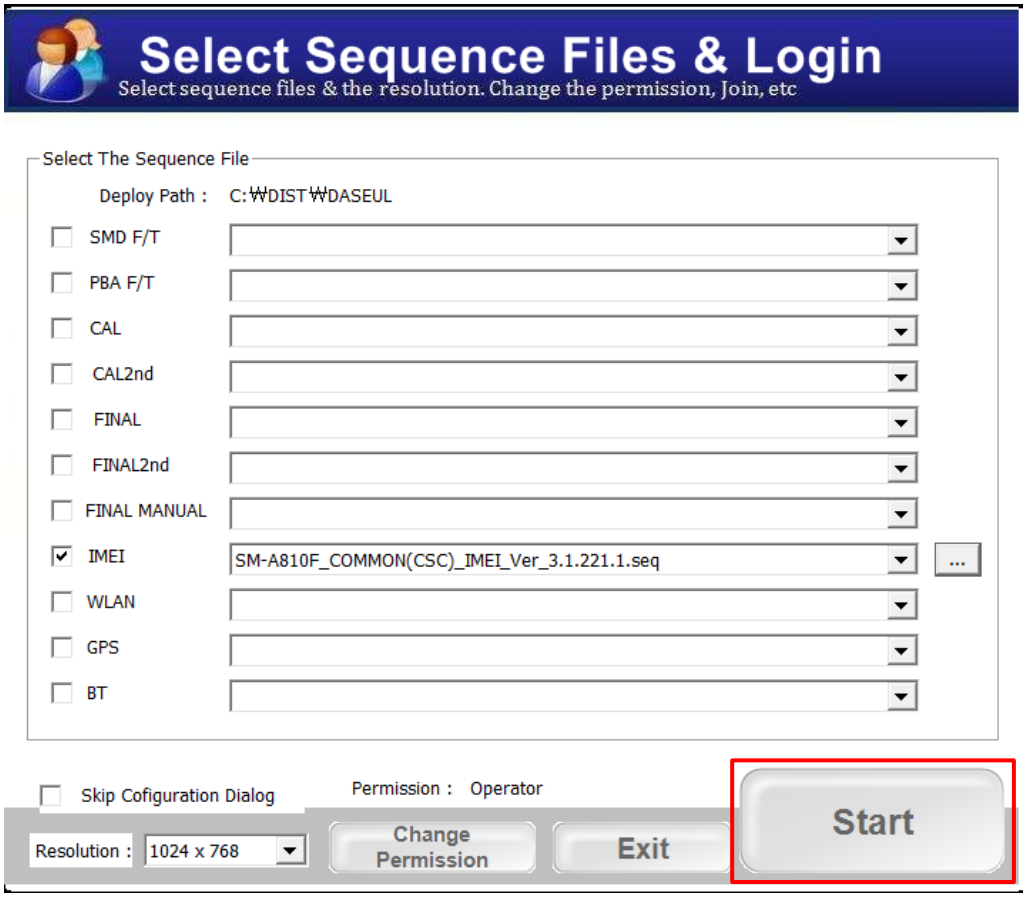


4. Select folder where the Launcher exists



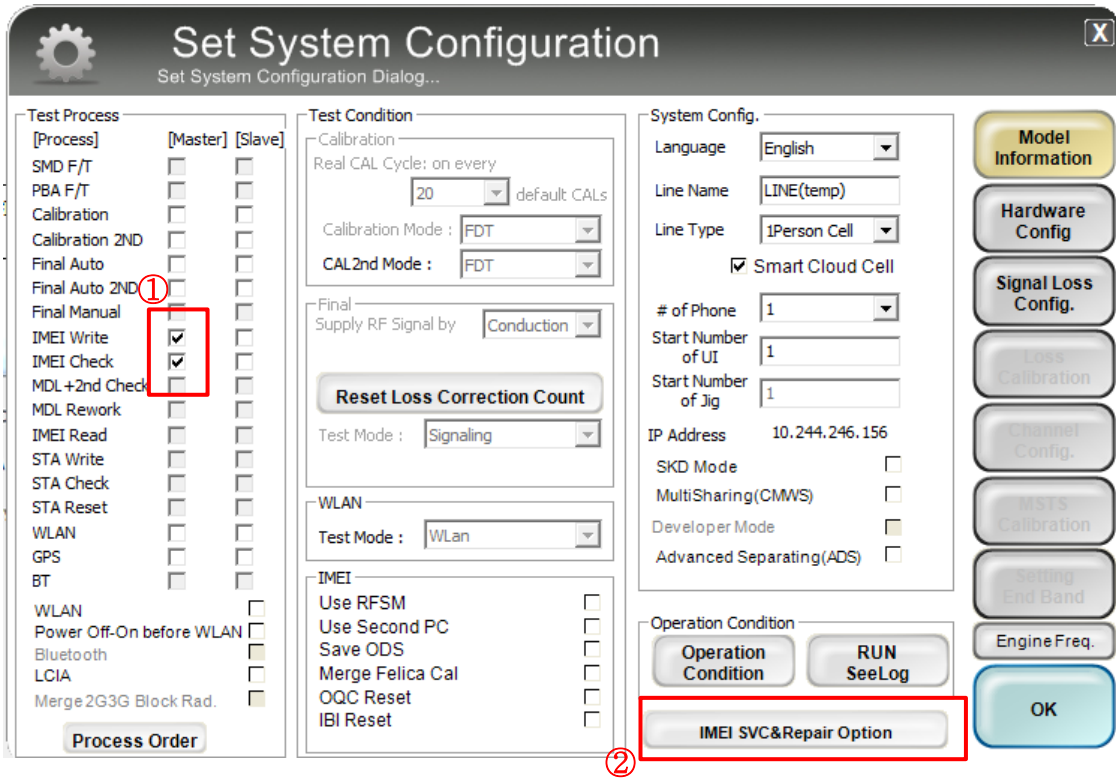
5. Check IMEI and click ‘Start

※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’.

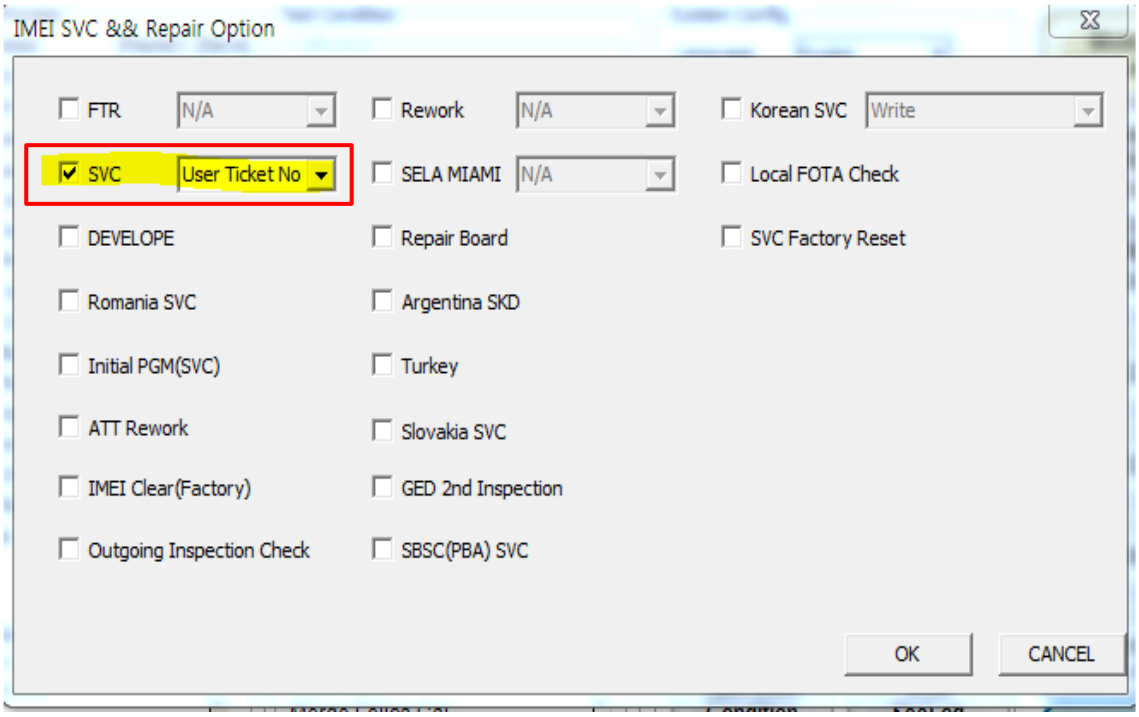


6. Level 1 Repair

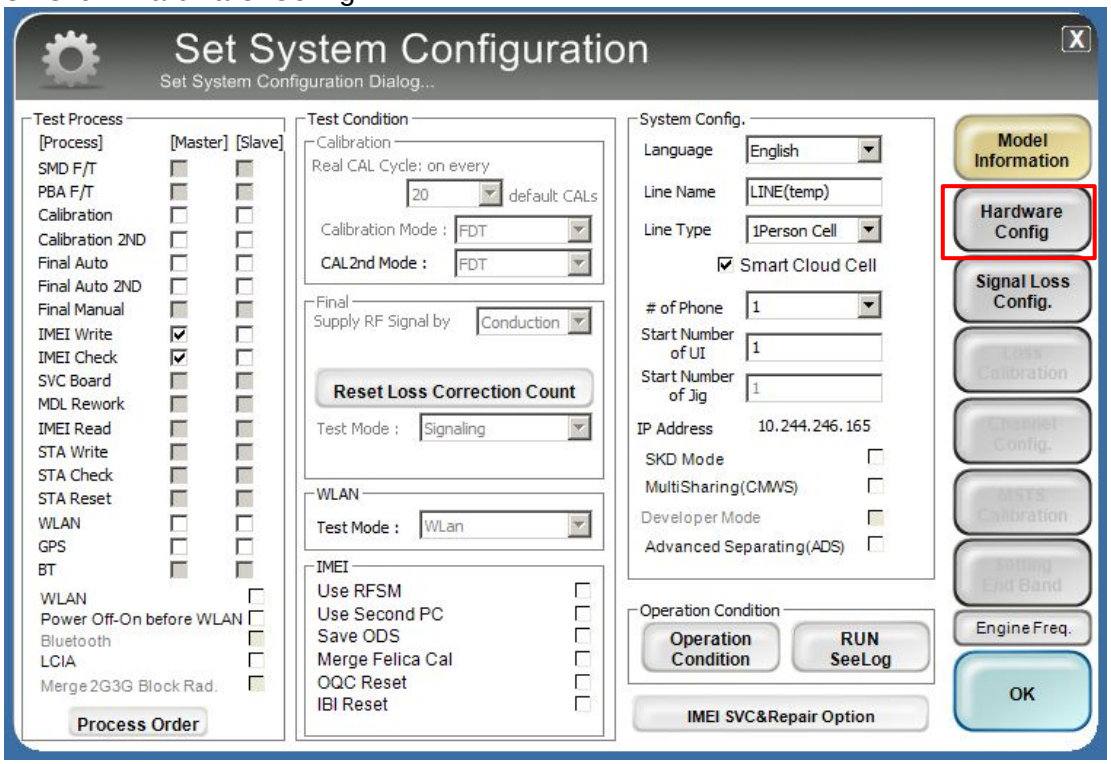
6. Check ‘IMEI Write / IMEI Check’, and click ‘IMEI SVC & Repair Option’



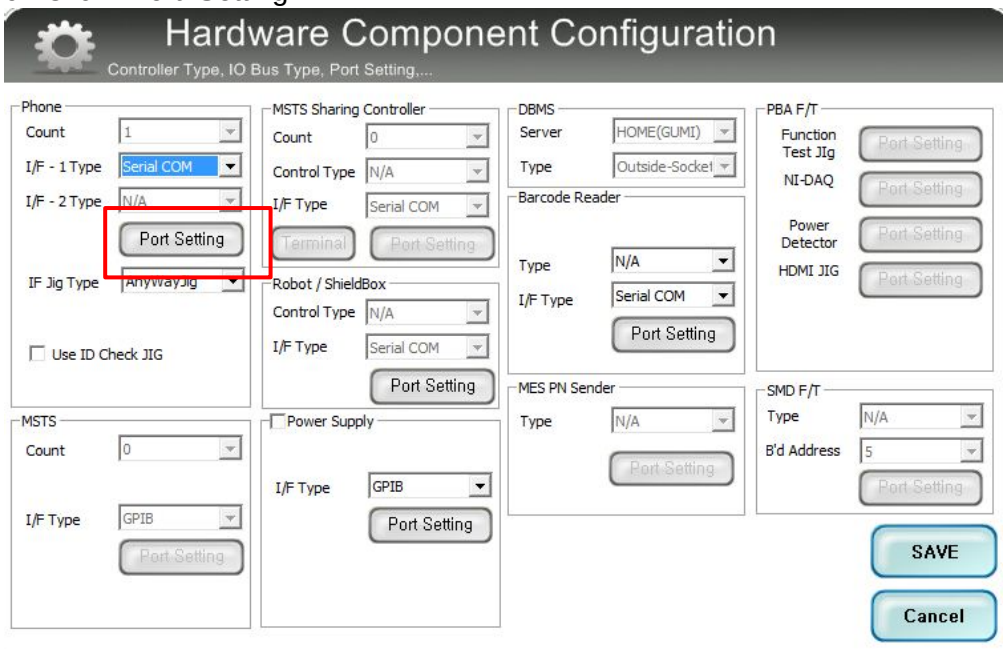
7. Check ‘SVC , User Ticket No’ and click OK



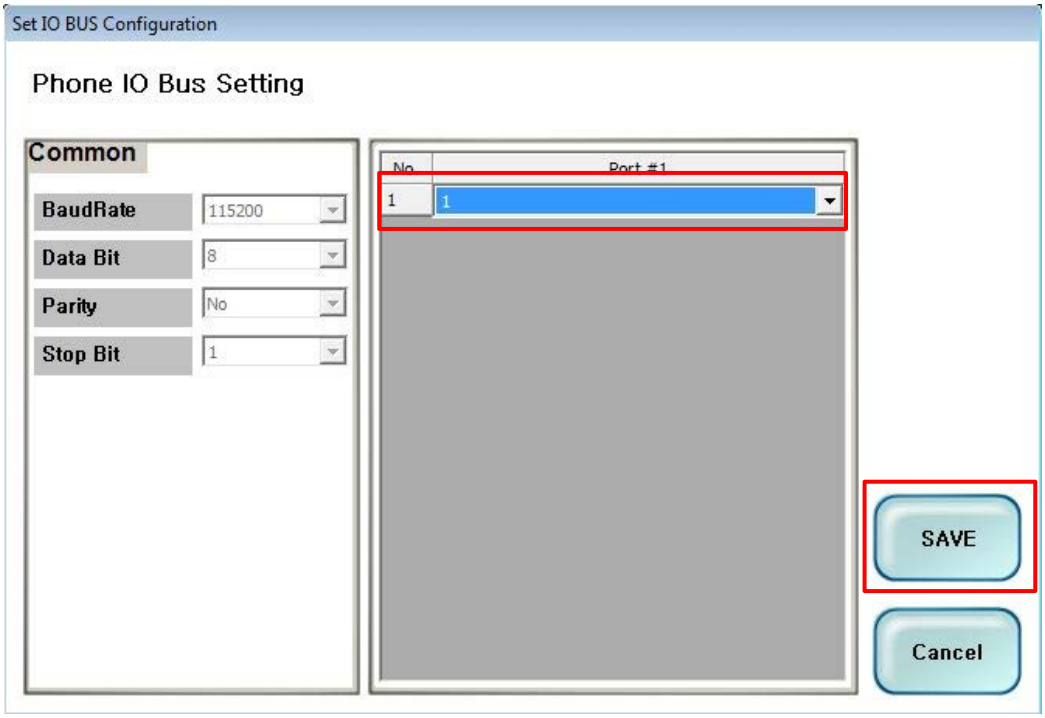
8. Click ‘Hardware Config’



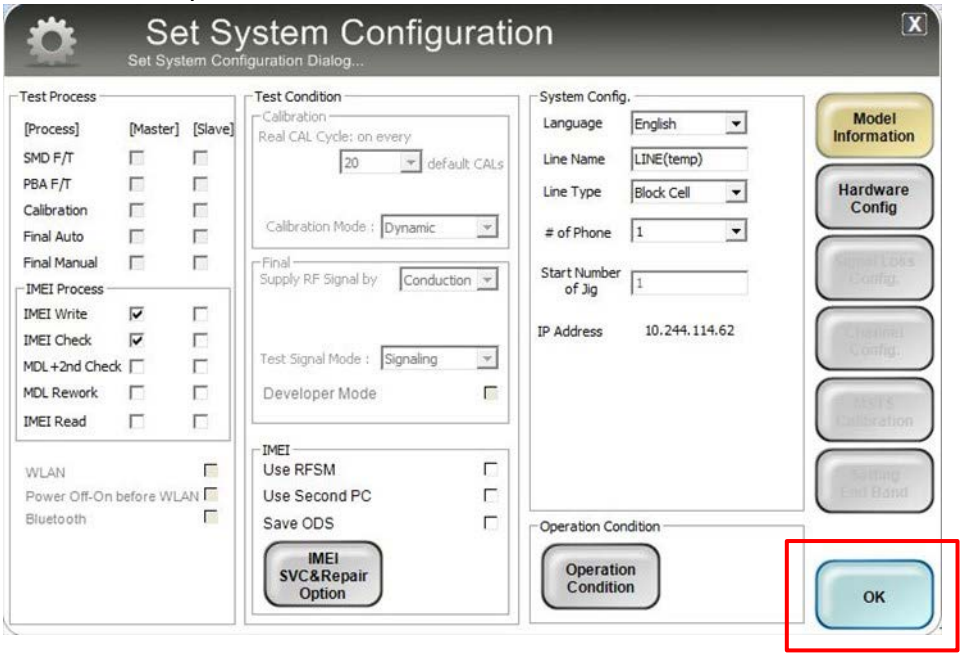
9. Click ‘Port Setting’



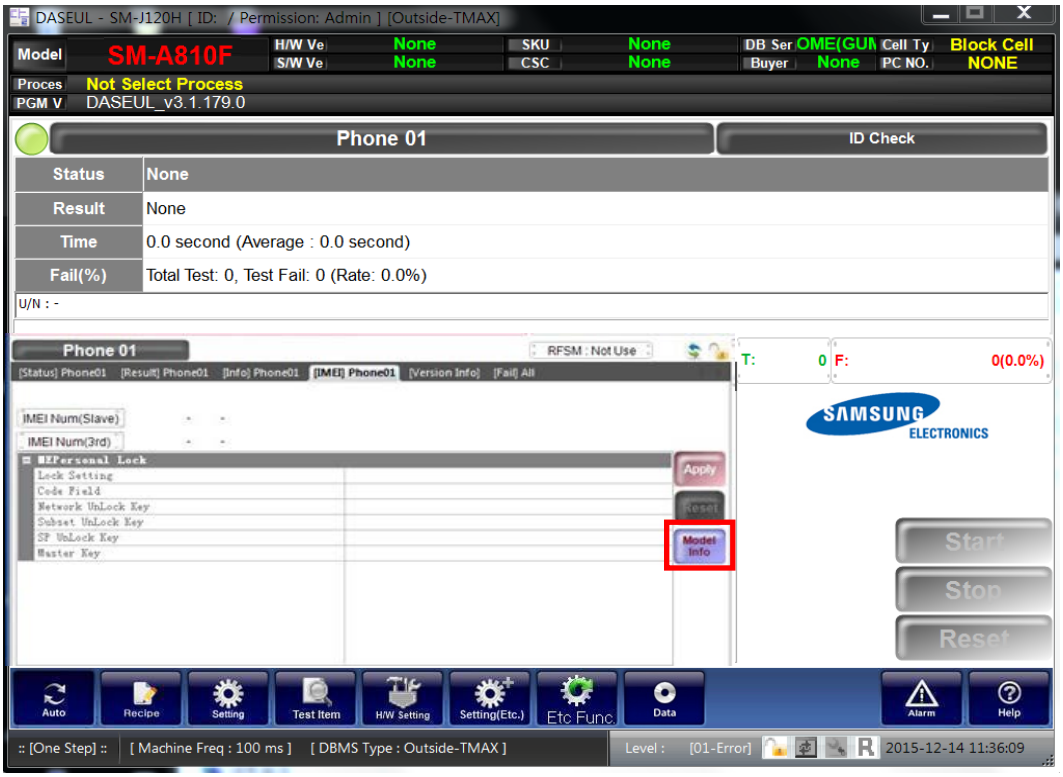
10. Select Port Number and SAVE



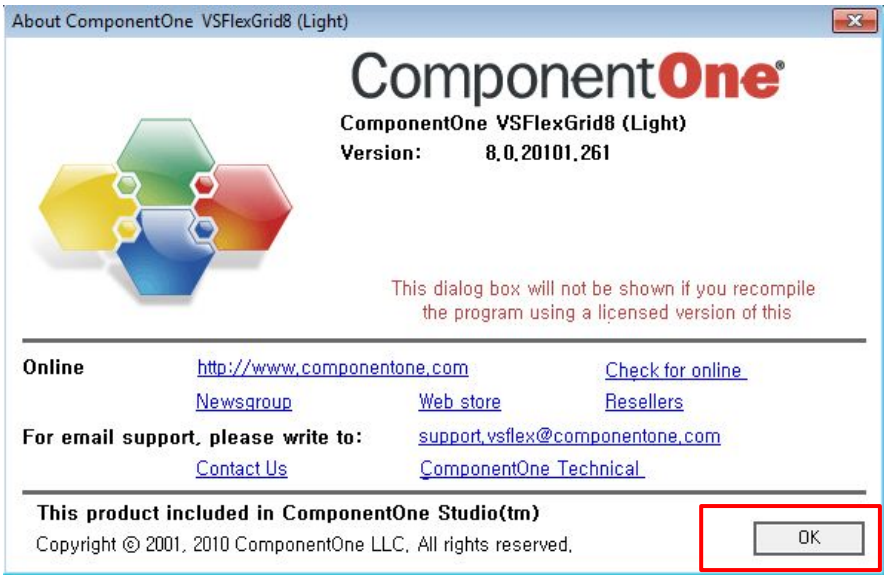
11.Click OK to proceed



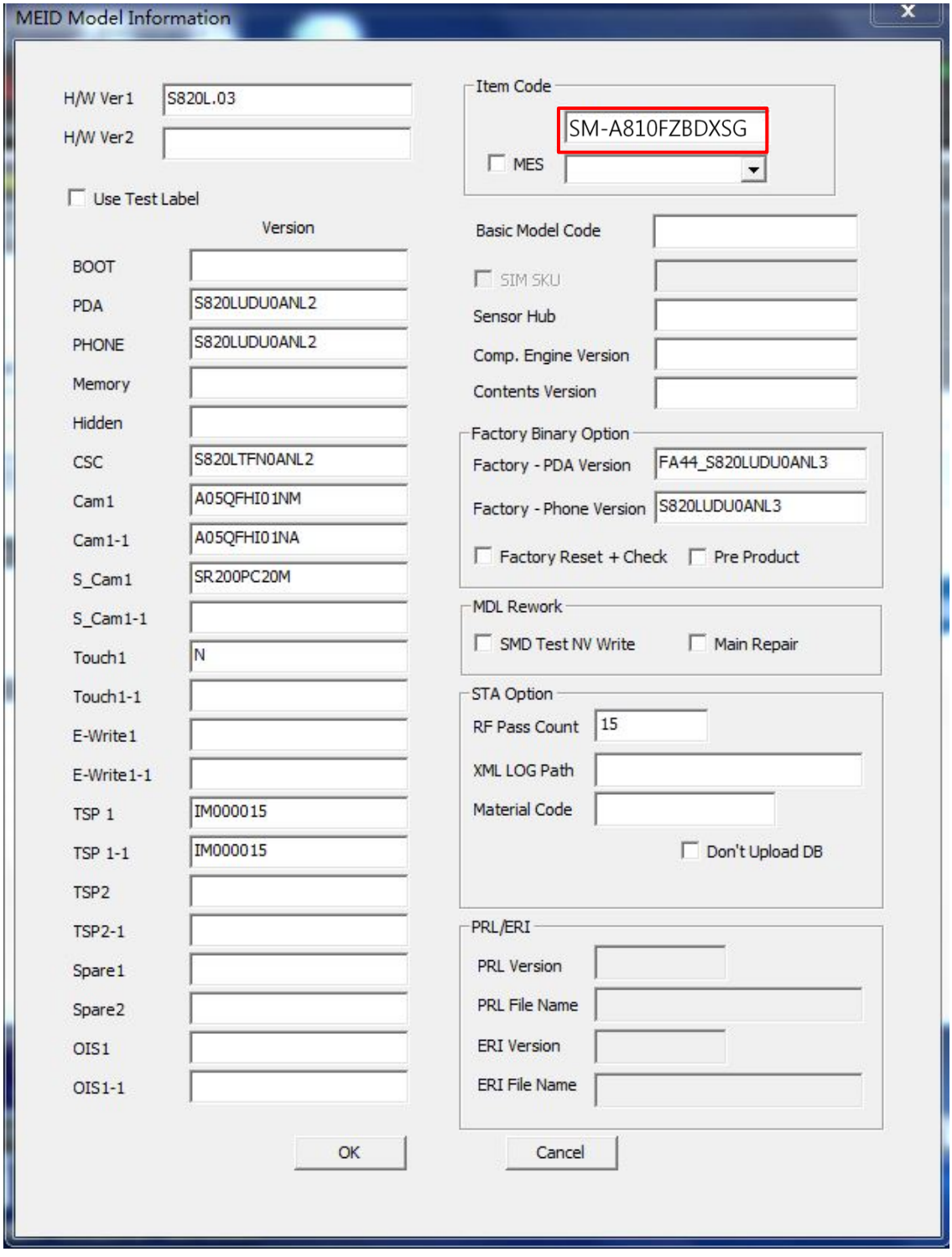
12. Click Model Info and OK when pop-up shows



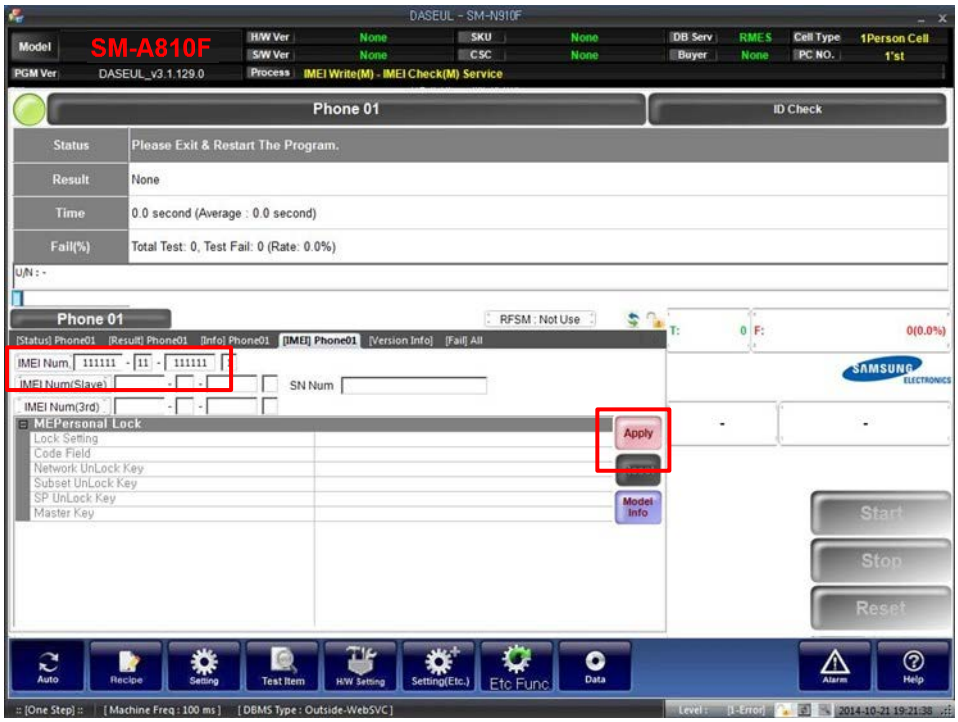
13. Click OK



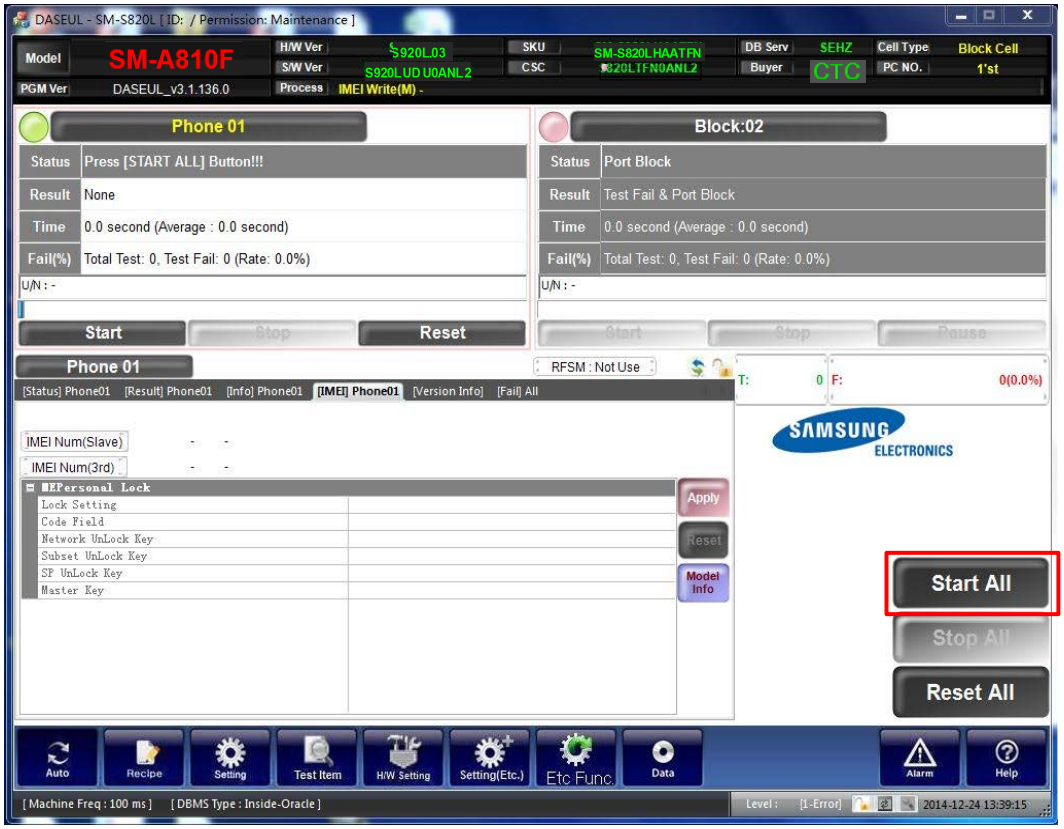
14. Input SKU_CODE, then click OK button.
※ Refer to HHPsvc→IMEI Review to check SKU Code and buyer



15. Input IMEI Number and click Apply



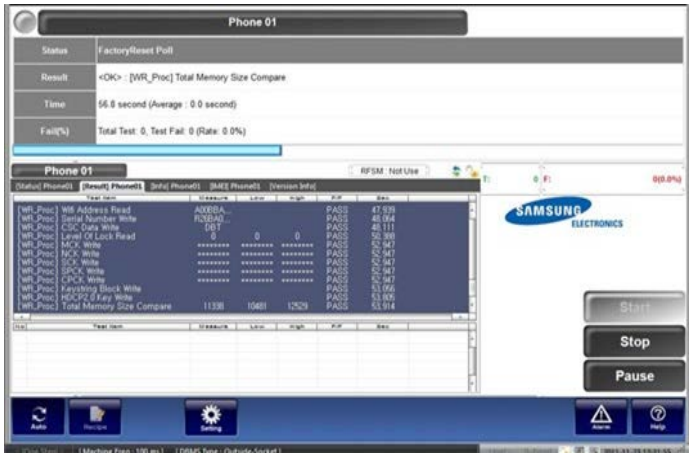
16. Click Start ALL



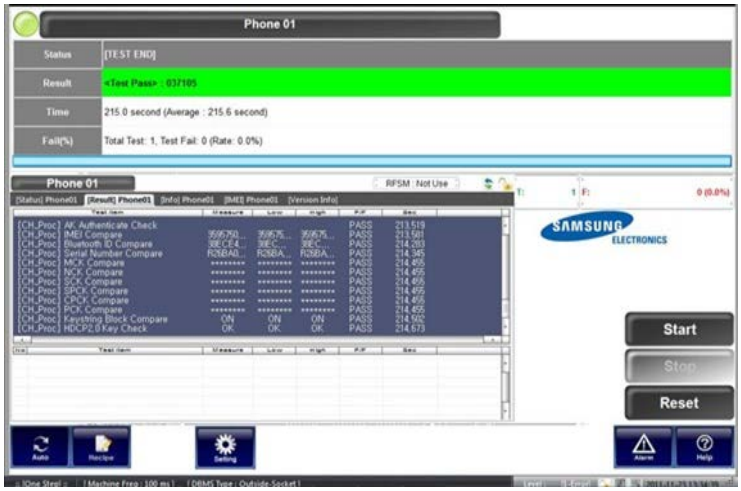
17. Connect the phone to Anyway JIG

※ 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. RF Calibration

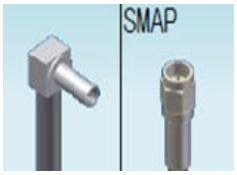
6-3-1. Required items in order to calibrate RF

• Installation program: RF Calibration Program
- Daseul_Launcher_vx.x.xx.exe
- Daseul_CAL_ALL_Runtime_x.x.xxx.x.CAB
- Model File (**SM-A520F_OPEN_CALIBRATION_Ver_3.1.221.0t3000.CAB**)

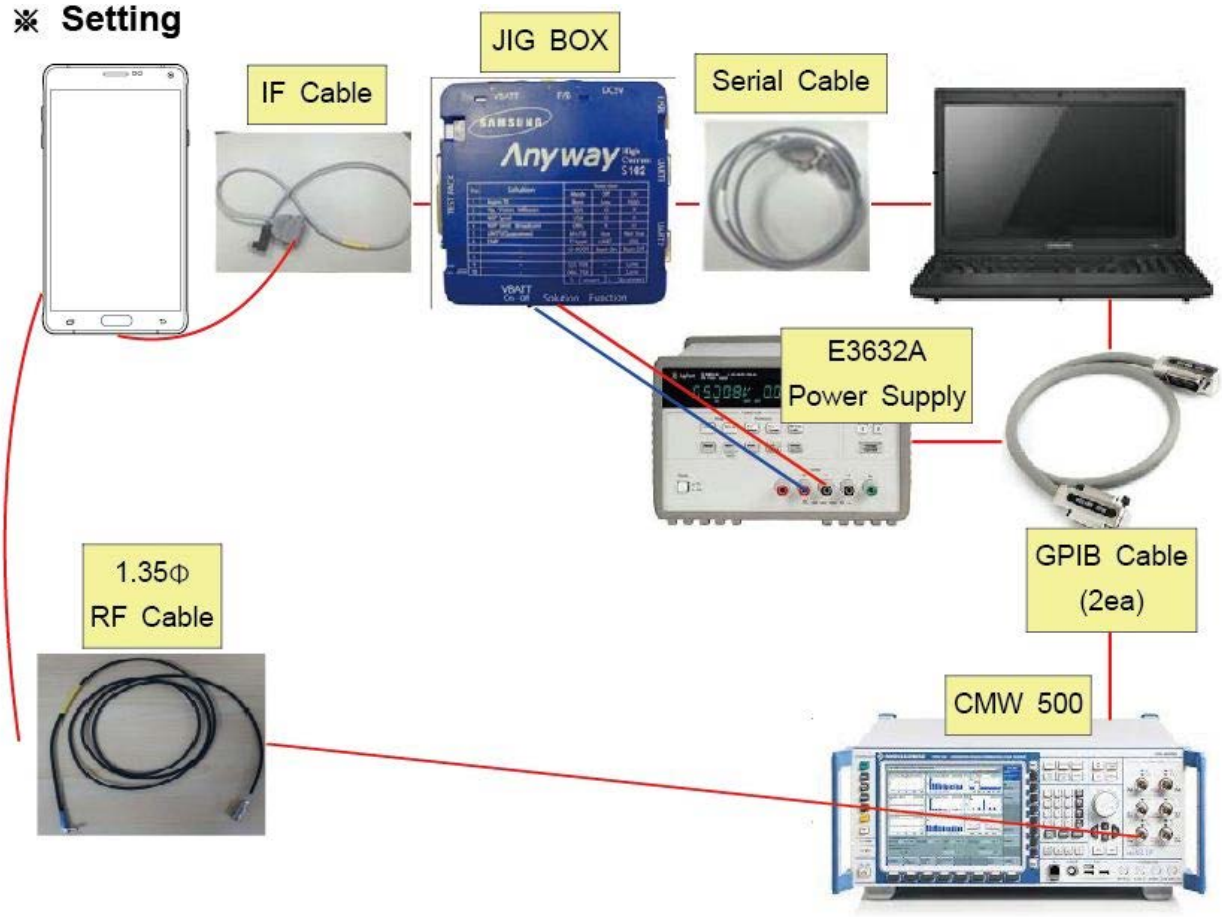
※ It is required to use the latest program.

• **SM-A520F** Mobile Phone
• R&S CMW500
• E3632A Power Supply
• GPIB Cable (2ea)
• JIG BOX (IMK code : 1122429700(GH81-12520B))
• Type-C IFCable (IMK code : 1128242500(GH81-11962W))
• UART Serial Cable
• Adapter (GH81-11888K)
• 1.35Φ RF Cable (GH81-11962G 1ea)

• Table of test cables

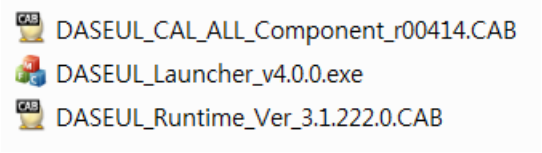
IF Cable	GH81-10631A 11 pin	GH81-11962W USB C Type	GH81-11171A 7 pin (Old)	
RF Cable (Manual)	GH81-11962D 1.35T, Short 	GH81-11962G 1.35T, Long 	GH81-11962C 1.6T, Short 	GH81-11962F 1.6T, Long 
4 Port Divider	GH81-11962A Use / No use 	GH81-11962B Divider Cable 	GH81-11962E 50Ω terminator 	

※ Setting

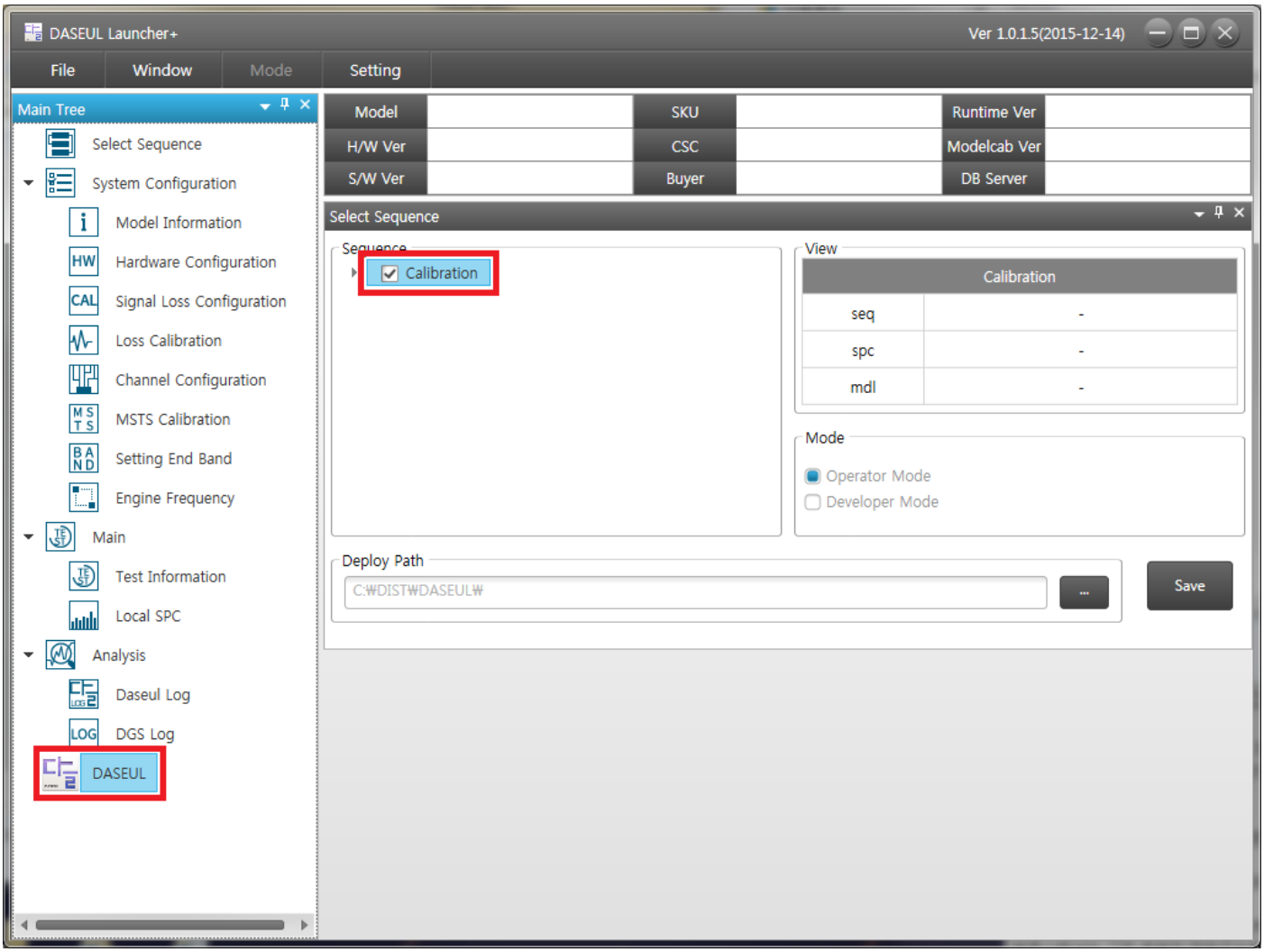


6-3-2. RF Calibration Program

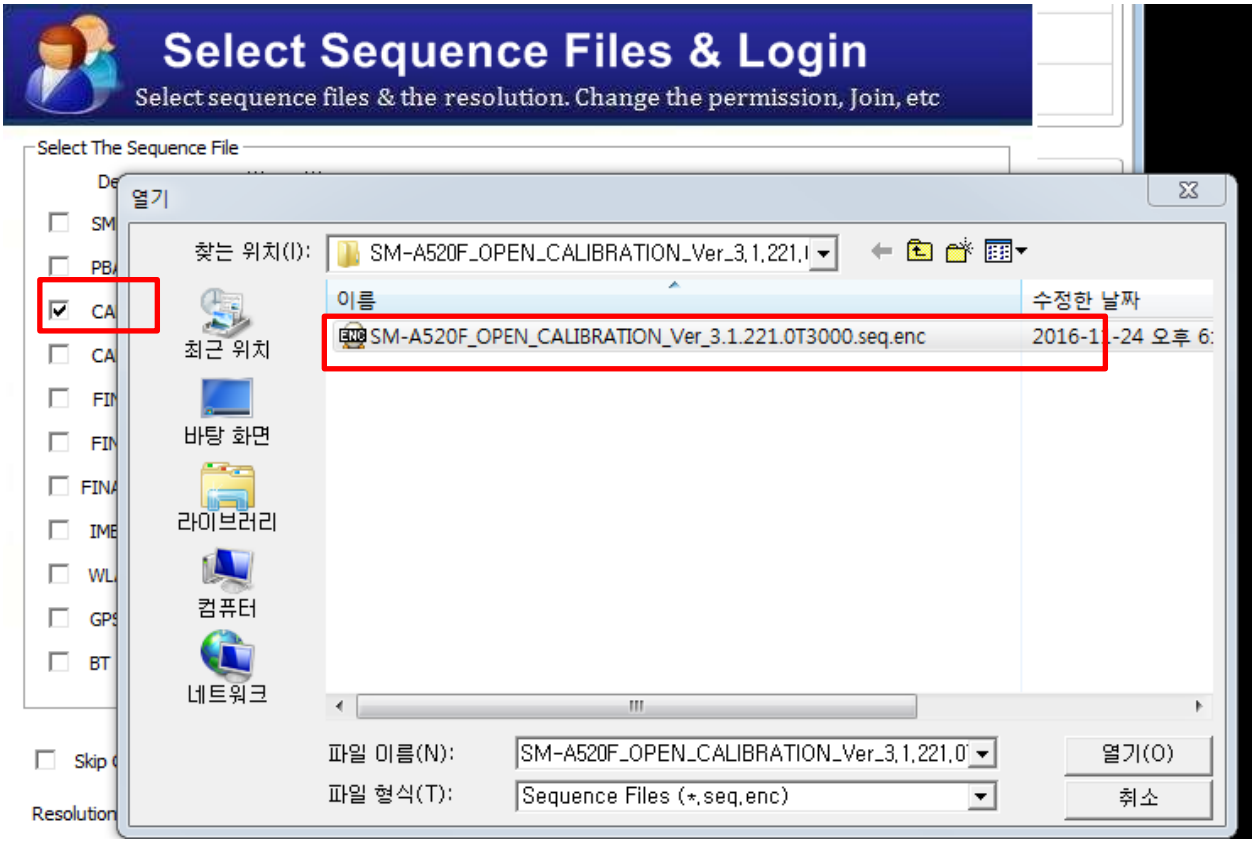
1. Run the RF Calibration Program Launcher, 'DASEUL_Launcher_vx.x.xx.exe'.



2. Check the 'Calibration' option and Click 'DASEUL' Icon on your left side.

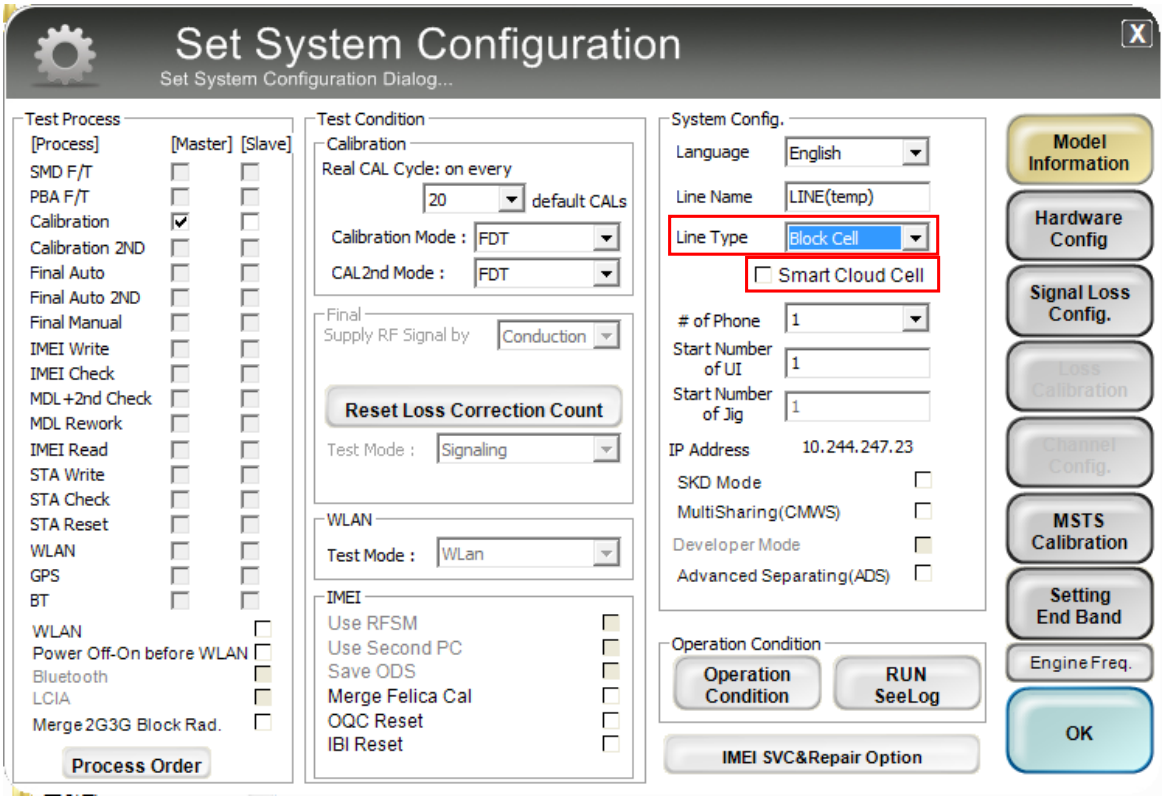


3. Check the 'CAL' and open the model file, then select 'Start' button.



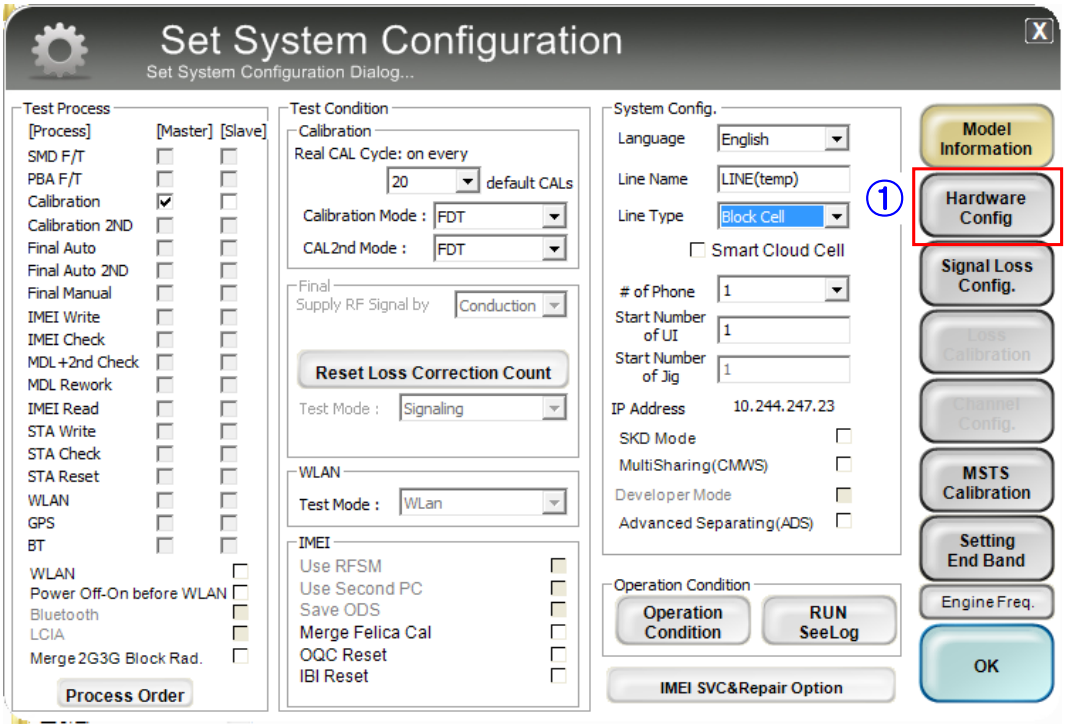
6. Level 1 Repair

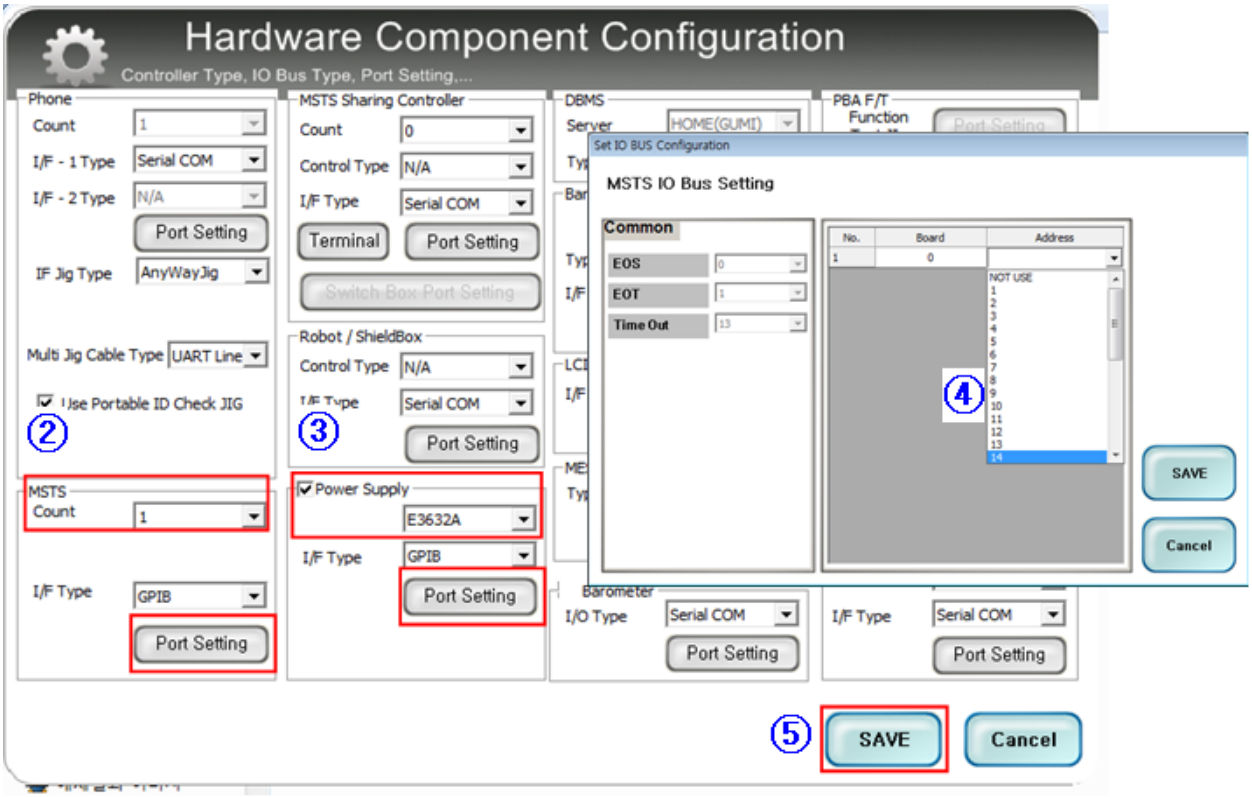
4. Change the Line Type to 'Block Cell' and disable 'Smart Cloud Cell'.



6. Level 1 Repair

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. Level 1 Repair

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