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.

2. Specification

2-1. GSM General Specification

Item		GSM 850	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/ EGPRS	GMSK/ 8PSK	GMSK/ 8PSK	GMSK/ 8PSK	GMSK/ 8PSK
MS Power		33dBm~5dBm	33dBm~5dBm	30dBm~0dBm	30dBm~0dBm
Power Class		4(GMSK) E2(8PSK)	4(GMSK) E2(8PSK)	1(GMSK) E2(8PSK)	1(GMSK) E2(8PSK)
Sensitivity		-102dBm	-102dBm	-100dBm	-100dBm
TDMA Mux		8	8	8	8

2-2. WCDMA General Specification

Item	WCDMA 2100(B1)	WCDMA 1900(B2)	WCDMA AWS(B4)	WCDMA 850(B5)	WCDMA 900(B8)
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	UL：9612~9888 DL：10562~10838	UL：9262~9538 DL：9662~9938	UL：1312~1513 DL：1537~1738	UL：4132~4233 DL：4357~4458	UL：2712~2868 DL：2937~3088
Tx/Rx spacing	190MHz	80MHz	400MHz	45MHz	45MHz
Mod. Bit rate/ Bit Period	42.2Mbps(DL) 5.42Mbps(UL)	42.2Mbps(DL) 5.42Mbps(UL)	42.2Mbps(DL) 5.42Mbps(UL)	42.2Mbps(DL) 5.42Mbps(UL)	42.2Mbps(DL) 5.42Mbps(UL)
Time Slot Period/ Frame Period	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms	WCDMA 10ms/0.667ms HSPA 2ms/0.667ms
Modulation	QPSK 16QAM 64QAM	QPSK 16QAM 64QAM	QPSK 16QAM 64QAM	QPSK 16QAM 64QAM	QPSK 16QAM 64QAM
MS Power (dBm)	25.7 ~ -49(↓)	25.7 ~ -49(↓)	25.7 ~ -49(↓)	25.7 ~ -49(↓)	25.7 ~ -49(↓)
Power Class	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)	3(max+24dBm)
Sensitivity	-106dBm	-104dBm	-106dBm	-104dBm	-103dBm

2-3. LTE General Specification

Item	LTE Band1	LTE Band2	LTE Band3	LTE Band4	LTE Band5
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
ARFCN range	UL:18000~18599 DL:0~599	UL:18600~19199 DL:600~1199	UL:19200~19949 DL:1200~1949	UL:19950~20399 DL:1950~2399	UL:20400~20649 DL:2400~2649
Tx/Rx spacing (MHz)	190	80	95	400	45
Channel Bandwidth (MHz)	5/10/15/20	1.4/3/5/10/15/20	1.4/3/5/10/15/20	1.4/3/5/10/15/20	1.4/3/5/10
Modulation	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)
MS Power (dBm)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)
Sensitivity (QPSK, BW 10MHz) (dBm)	-96.3	-94.3	-93.3	-96.3	-94.3

Item	LTE Band7	LTE Band8	LTE Band12	LTE Band13	LTE Band17
Freq. Band[MHz] Uplink/Downlink	2500~2570 2620~2690	880~915 925~960	699~716 729~746	777~787 746~756	704~716 734~746
ARFCN range	UL:20750~21449 DL:2750~3449	UL:21450-21799 DL:3450-3799	UL:23010~23179 DL:5010~5179	UL:23180~23279 DL:5180~5279	UL:23730~23849 DL:5730~5849
Tx/Rx spacing (MHz)	120	45	30	-31	30
Channel Bandwidth (MHz)	5/10/15/20	1.4/3/5/10	1.4/3/5/10	5/10	5/10
Modulation	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)
MS Power (dBm)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)
Sensitivity (QPSK, BW 10MHz) (dBm)	-94.3	-93.3	-93.3	-93.3	-93.3

2. Specification

Item	LTE Band18	LTE Band19	LTE Band20	LTE Band25	LTE Band26
Freq. Band[MHz] Uplink/Downlink	815~830 860~875	830~845 875~890	832~862 791~821	1850~1915 1930~1995	814~849 859~894
ARFCN range	UL:23850~23999 DL:5850~5999	UL:24000~24149 DL:6000~6149	UL:24150~24449 DL:6150~6449	UL:26040~26689 DL:8040~8689	UL:26690~27039 DL:8690~9039
Tx/Rx spacing (MHz)	45	45	-41	80	45
Channel Bandwidth(MHz)	5/10/15	5/10/15	5/10/15/20	1.4/3/5/10/15/20	1.4/3/5/10/15
Modulation	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)
MS Power(dBm)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)
Sensitivity (QPSK, BW 10MHz)(dBm)	-96.3	-96.3	-93.3	-92.8	-93.8

Item	LTE Band28	LTE Band32	LTE Band38	LTE Band39
Freq. Band[MHz] Uplink/Downlink	703~748 758~803	N/A 1452~1496	2570~2620	1880~1920
ARFCN range	UL:27210~27659 DL:9210~9659	DL:9920~10359	UL/DL:37750 ~ 38249	UL/DL:38250 ~ 38649
Tx/Rx spacing (MHz)	55	N/A	0	0
Channel Bandwidth(MHz)	3/5/10/15/20	5/10/15/20	5/10/15/20	5/10/15/20
Modulation	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)
MS Power (dBm)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)
Sensitivity (QPSK, BW 10MHz)(dBm))	-94.8	-96.3	-96.3	-96.3

2. Specification

Item	LTE Band40	LTE Band41	LTE Band66
Freq. Band[MHz] Uplink/Downlink	2300~2400	2496~2690	1710~1780 2110~2200
ARFCN range	UL/DL:38650 ~ 39649	UL/DL:39650 ~ 41589	UL:131972 ~ 132671 DL:66436 ~ 67335
Tx/Rx spacing (MHz)	0	0	400
Channel Bandwidth(MHz)	5/10/15/20	5/10/15/20	1.4/3/5/10/15/20
Modulation	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)	QPSK,16/64QAM 256QAM(DL only)
MS Power (dBm)	25.7~-39(↓)	25.7~-39(↓)	25.7~-39(↓)
Sensitivity (QPSK, BW 10MHz)(dBm))	-96.3	-94.3	-95.8

2-4. TDSCDMA General Specification

Item	TDSCDMA2010(A)	TDSCDMA1880(F)
Chip rate	1.28 Mcps	1.28 Mcps
OBW	1.6 MHz	1.6 MHz
Freq. Band[MHz] Uplink/Downlink	2010~2025	1880~1920
ARFCN range	10054~10121	9404~9596
Tx/Rx spacing (MHz)	0	0
MS Power (dBm)	25.7 ~ -48(↓)	25.7 ~ -48(↓)
Power Class	2(max+24dBm)	2(max+24dBm)
Sensitivity (dBm /1.28 MHz)	-107.3	-107.3

2-5 GSM Tx Power Class

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

2-6. NR General Specification [SM-N976B]

Item	N78
Freq. Band[MHz] Uplink/Downlink	3300 ~ 3800
ARFCN range	620000 ~ 653332
Channel Bandwidth(MHz)	5/10/15/20/25/30/40/50/60/80/90/100
Modulation	QPSK,16/64QAM 256QAM(DL only)
MS Power(dBm)	19 ~ 26 (PC3)
Sensitivity (QPSK, BW 100MHz, 4RXK)(dBm)	-87.8

Main Function

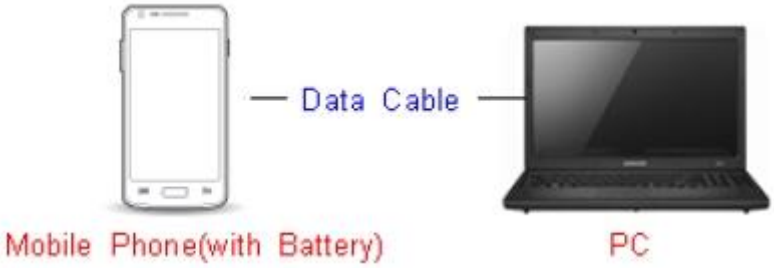
Item	Description
OS	Android V9.0
RF	**2G** GSM : GSM850 / GSM900 / DCS1800 / PCS1900 **3G** WCDMA : B1 / B2 / B4 / B5 / B8 TD-SCDMA : B34 / B39 **4G LTE** - FDD : B1 / B2 / B3 / B4 / B5 / B7 / B8 / B12 / B13 / B17 / B18 / B19 / B20 / B25 / B26 / B28 / B32 / B66 - TDD : B38 / B39 / B40 / B41 **5G [SM-N976B Only]** - N78(None Standalone)
Battery	Typ : 4,300 mAh
Base Band	EXYNOS9825 Quad 2.73GHz(2x), 2.4GHz(2x), 1.9GHz(4x)
Other RF	GPS, GLONASS, BEIDOU, Galileo, BT5.0, USB 3.1 Type-C, Wi-Fi 802.11 a/b/g/n/ac/ax MIMO, NFC, MST
Camera	Quad Camera (Wide: 12M, A/F, OIS, F1.5-2.4 / Tele: 12MP, A/F, OIS, F2.1 / Ultra Wide: 16M, F2.2, DepthVision(ToF): VGA) with LED Flash Front Camera (10M, A/F, F2.2)
LCD	6.8" FHD+, AMOLED
RAM	12GB
Storage	256GB / 512GB
Sensor	Accelerometer, Barometer, Fingerprint Sensor, Gyro Sensor, Geomagnetic Sensor, Hall Sensor, HR Sensor, Proximity Sensor, Light Sensor, Digitizer
Accessory	Charger: 9V/2.77A and 5V/3A AFC charging Data cable: USB Type-C Ear phone: USB Type-C

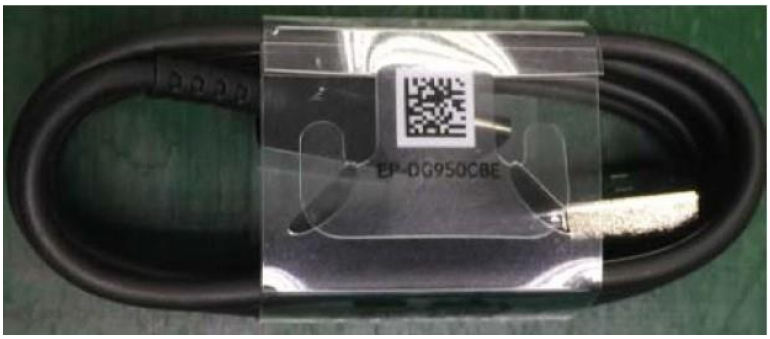
6-1. S/W Download

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

- Installation program: Downloader Program (**Odin3 v3.13.3.exe**)
- Mobile Phone
- Data Cable
- Mobile device specific S/W: Binary files

※ Settings

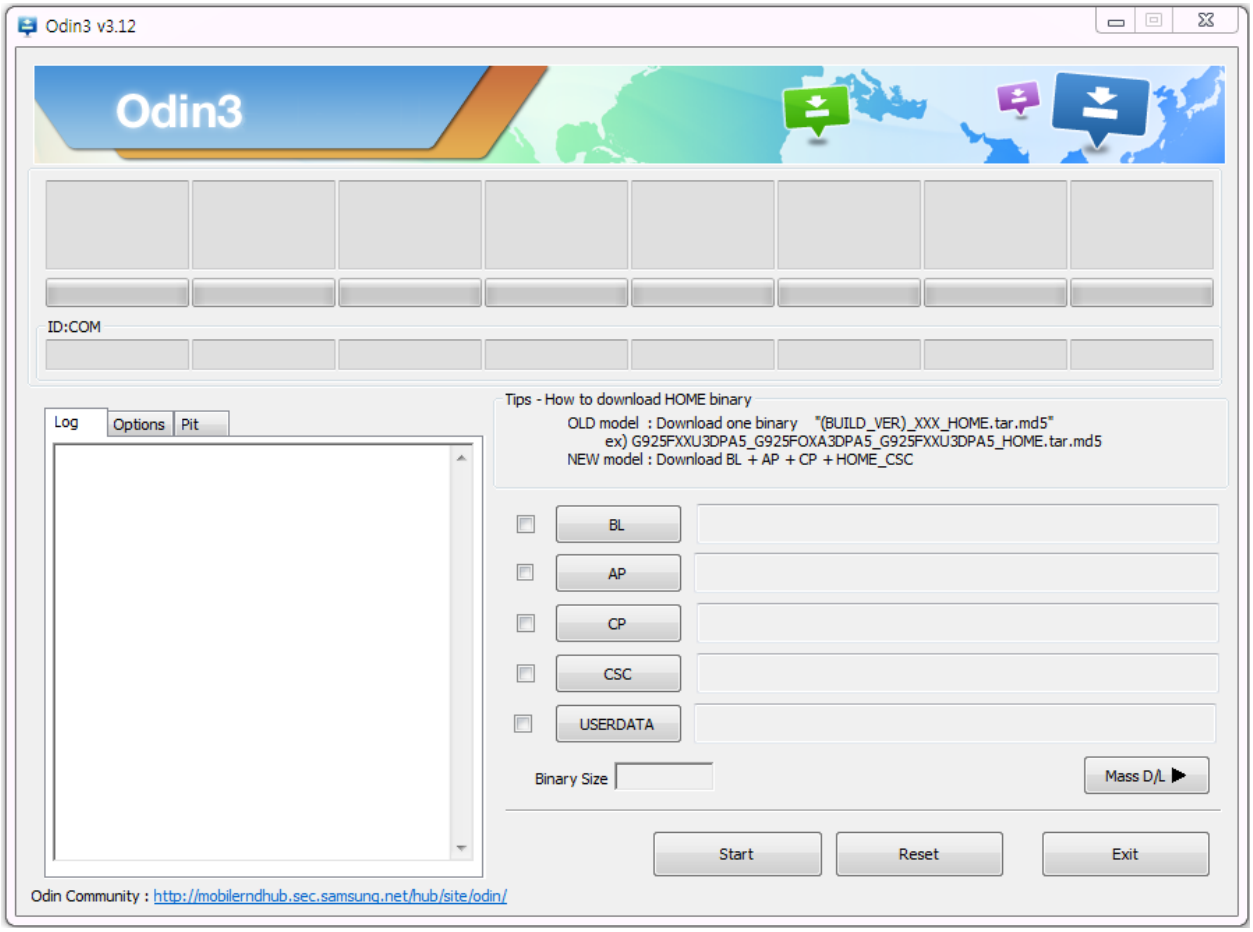




Data Cable :
GH39-02023A
GH39-02025A
GH39-02031A
GH39-02033A

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

■ Open up the S/W Installation Program by executing the **"Odin3 v3.13.3.exe"**

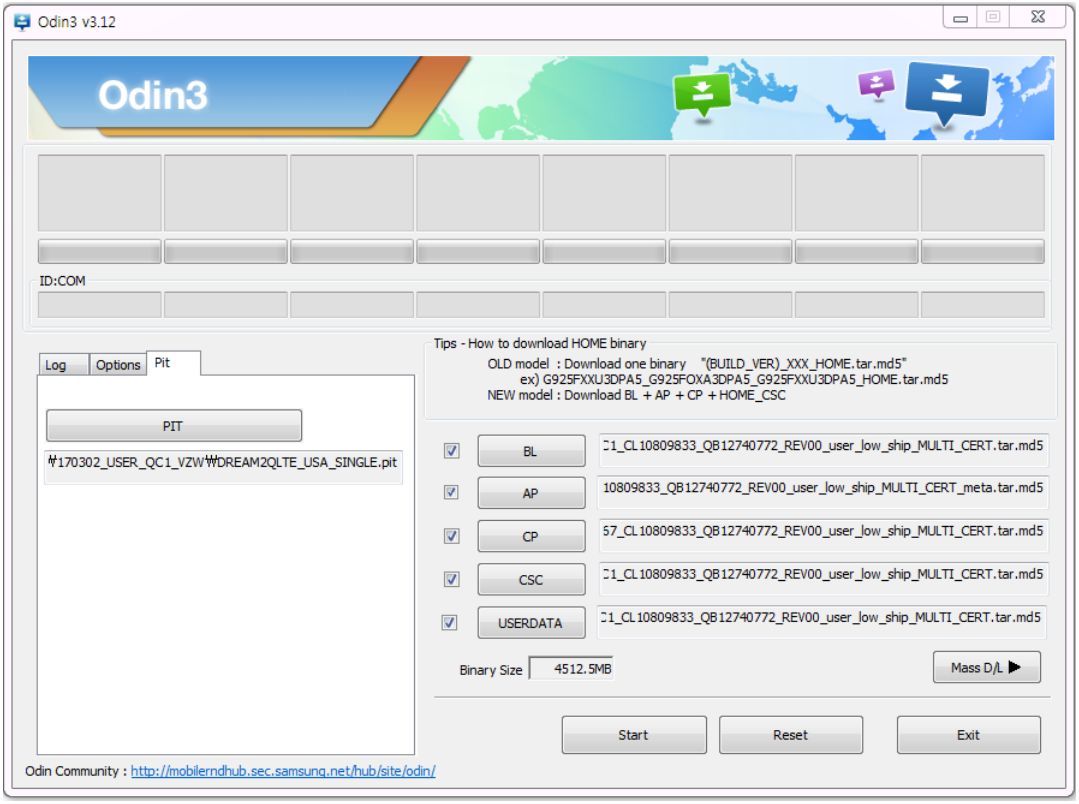


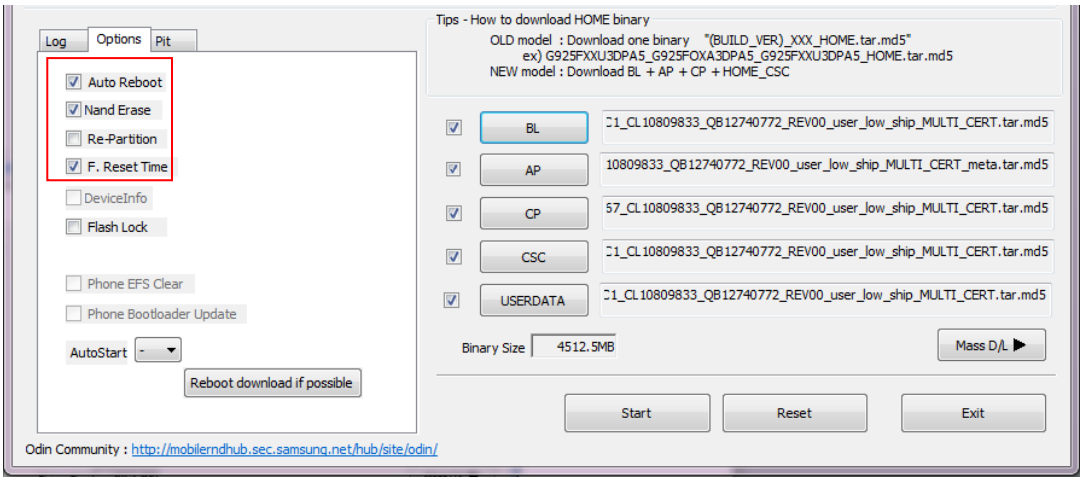
6. Level 1 Repair

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

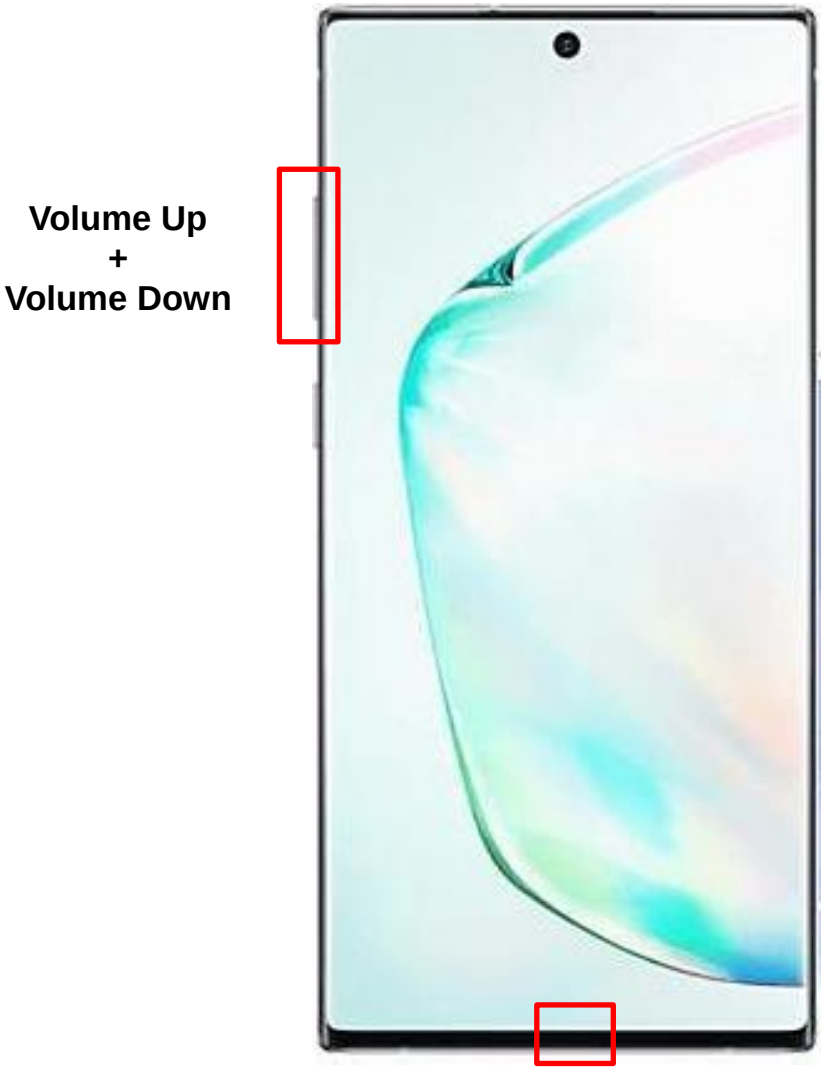
- Check Auto Reboot, F. Reset Time, Nand Erase
- Check PIT
- Check BOOTLOADER, PDA, PHONE, CSC and USERDATA Files

* Note : "Odin v3.13.2 or above" checks MD5 checksum just after file selection.



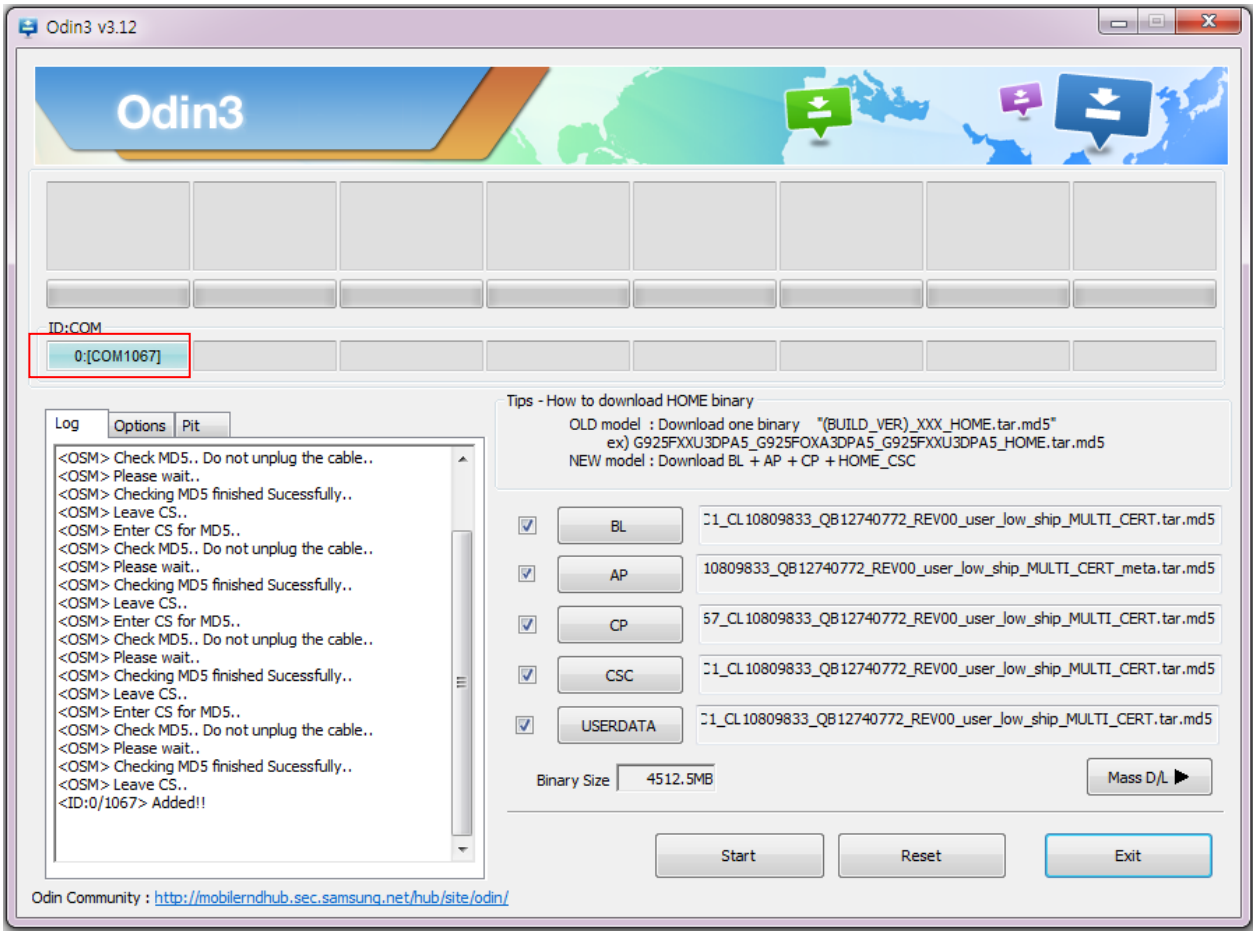


2. Enter into Download Mode
- Enter into Download Mode by pressing 2 button(Volume Up button + Volume Down) simultaneously and connect USB cable.
- Press volume up button after ‘Warning’ message and ‘Downloading’ message is displayed.



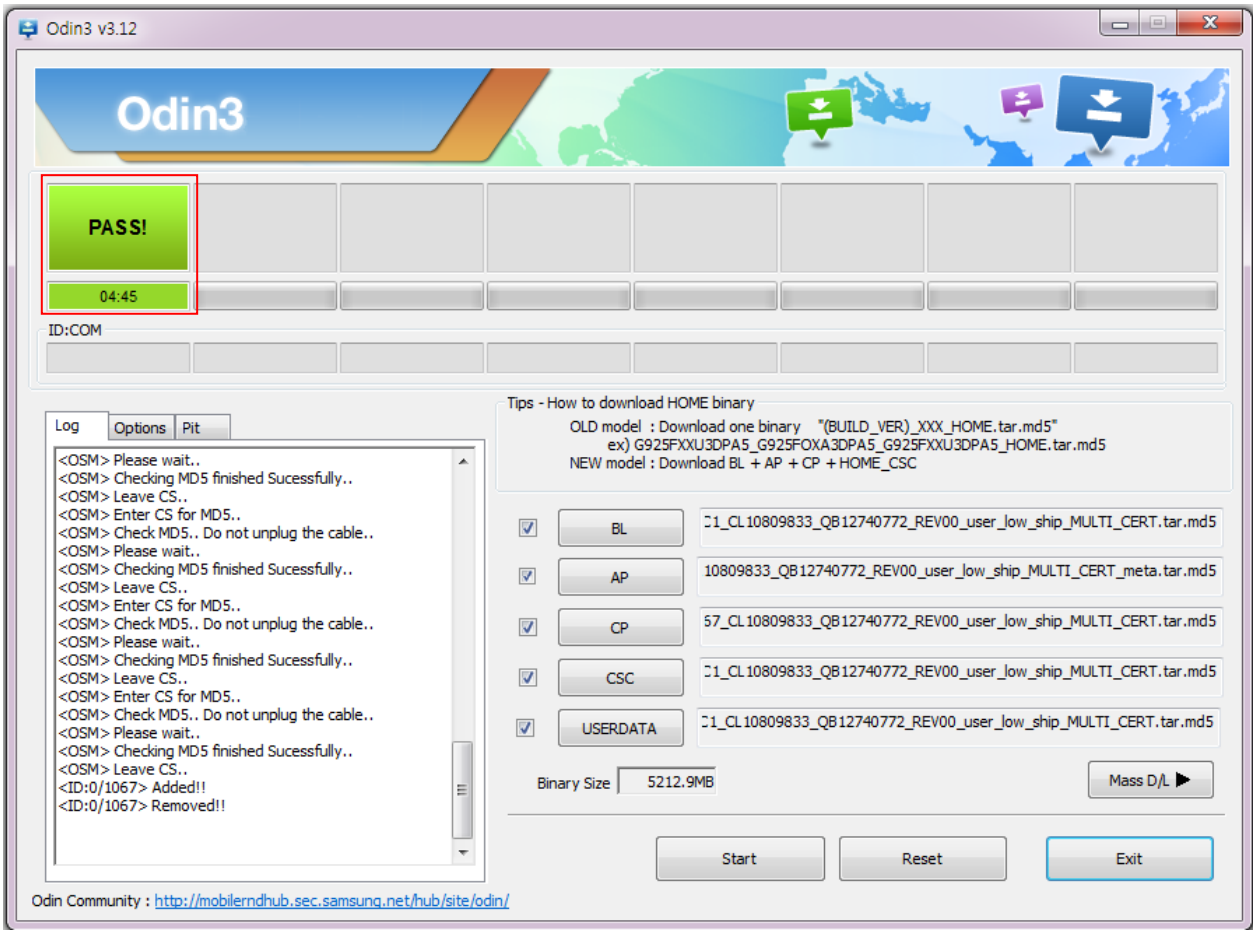
6. Level 1 Repair

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.



6. Level 1 Repair

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 data Reset by Settings → General Management → Reset

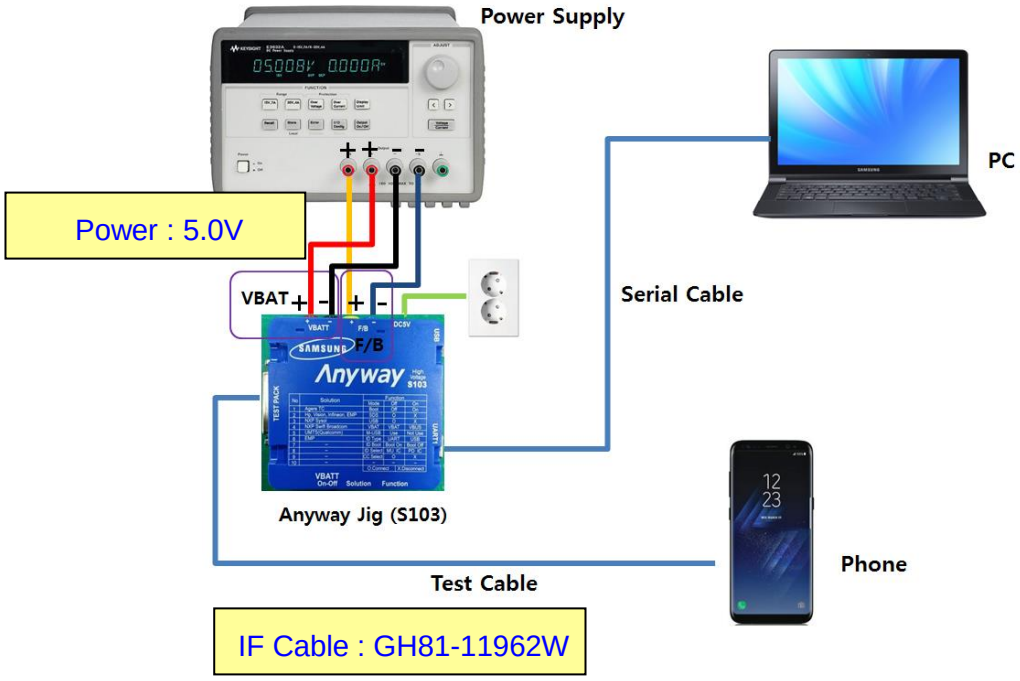
※ Caution. Never disconnect during the S/W downloading.

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

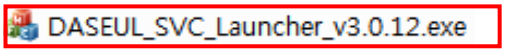


- S/W

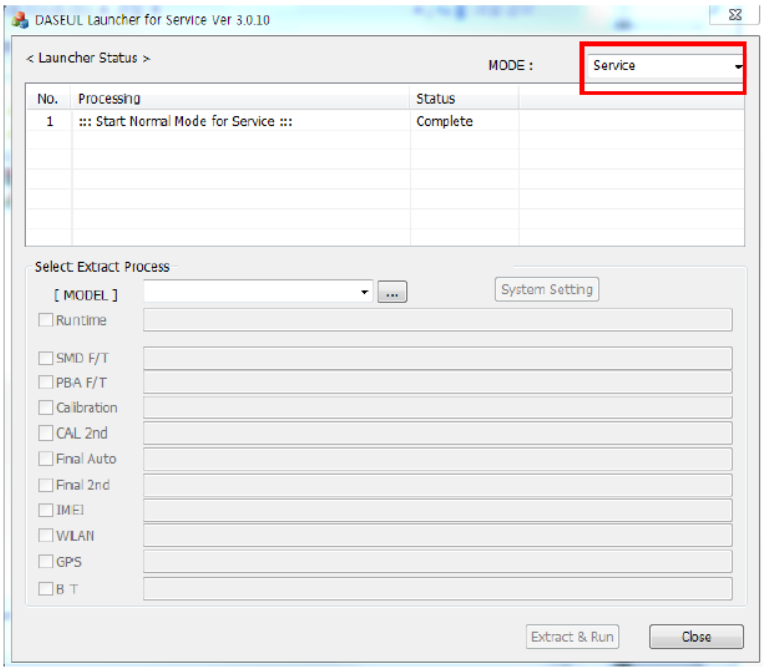
① Library Install	To use Daseul, library files should be installed. Refer to SVC Bulletin "(11-82) Daseul (New IMEI writing Program) Library Install guide_rev1.0"
	DASEUL_SVC_Launcher_v3.0.12.exe
	1. **DASEUL_IMEI_ ALL_SVC_Runtime_3.1.447.0_r00670.CAB** or higher -Uploaded on HHPsvc Notice 2. Make 'ModelName' folder at the same position with launcher & Runtime file. DASEUL_IMEI_ALL_Runtime_3.1.447.0_r00670.CAB SM-N976B_COMMON(CSC)_IMEI_Ver_3.1.444.4.CAB
④Model File	Copy Model File under the 'Model Name' folder

6-2-2 IMEI writing Process

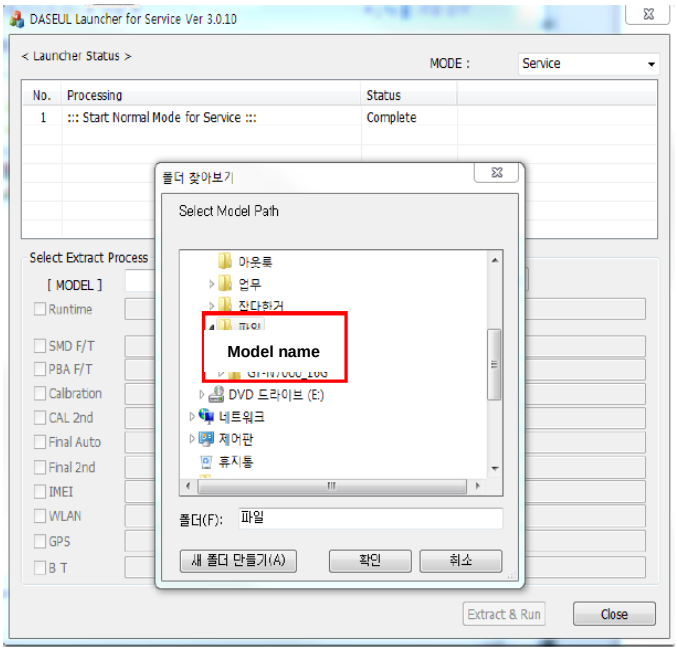
1. Run DASEUL_SVC_Launcher_v3.0.12.exe



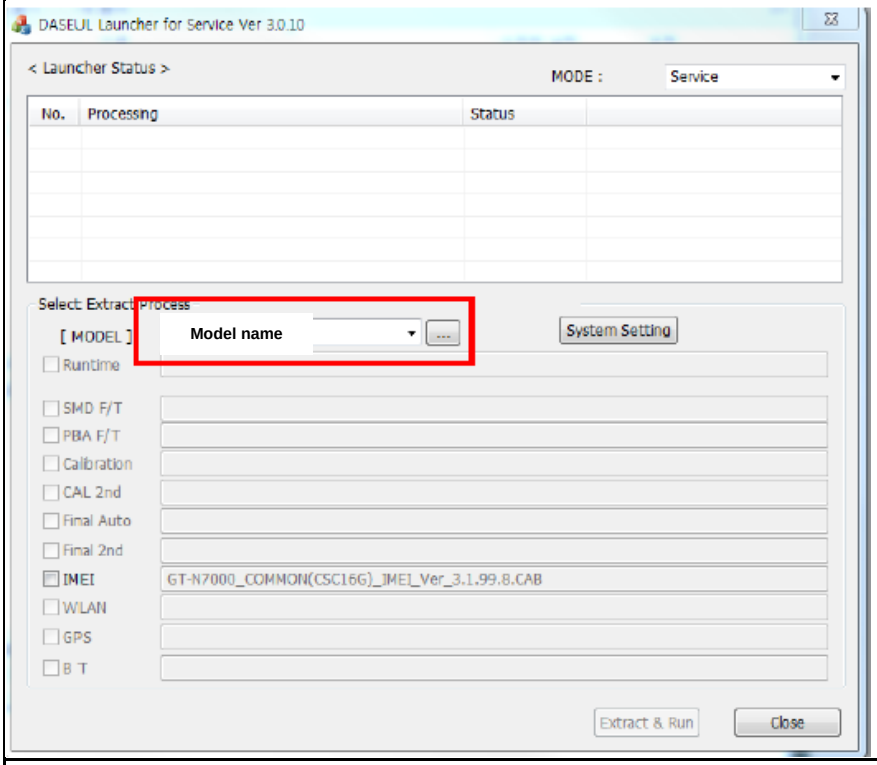
2. Select Service Mode



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

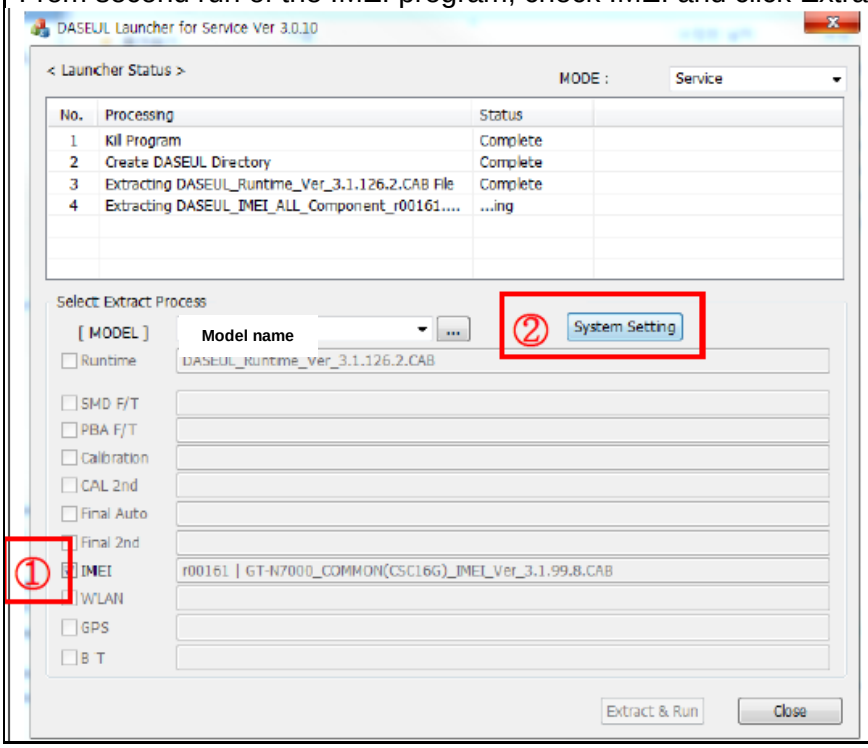


4. Select Model

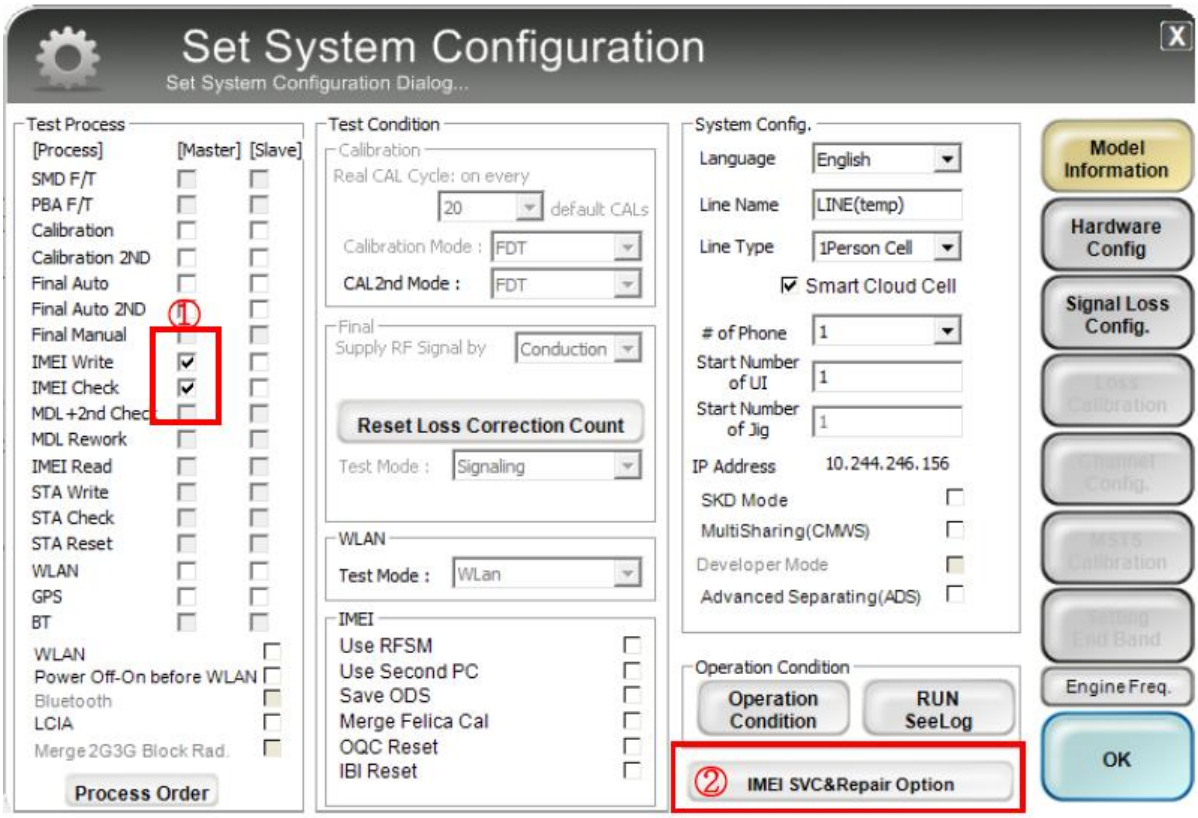


5. Check IMEI and click System Setting

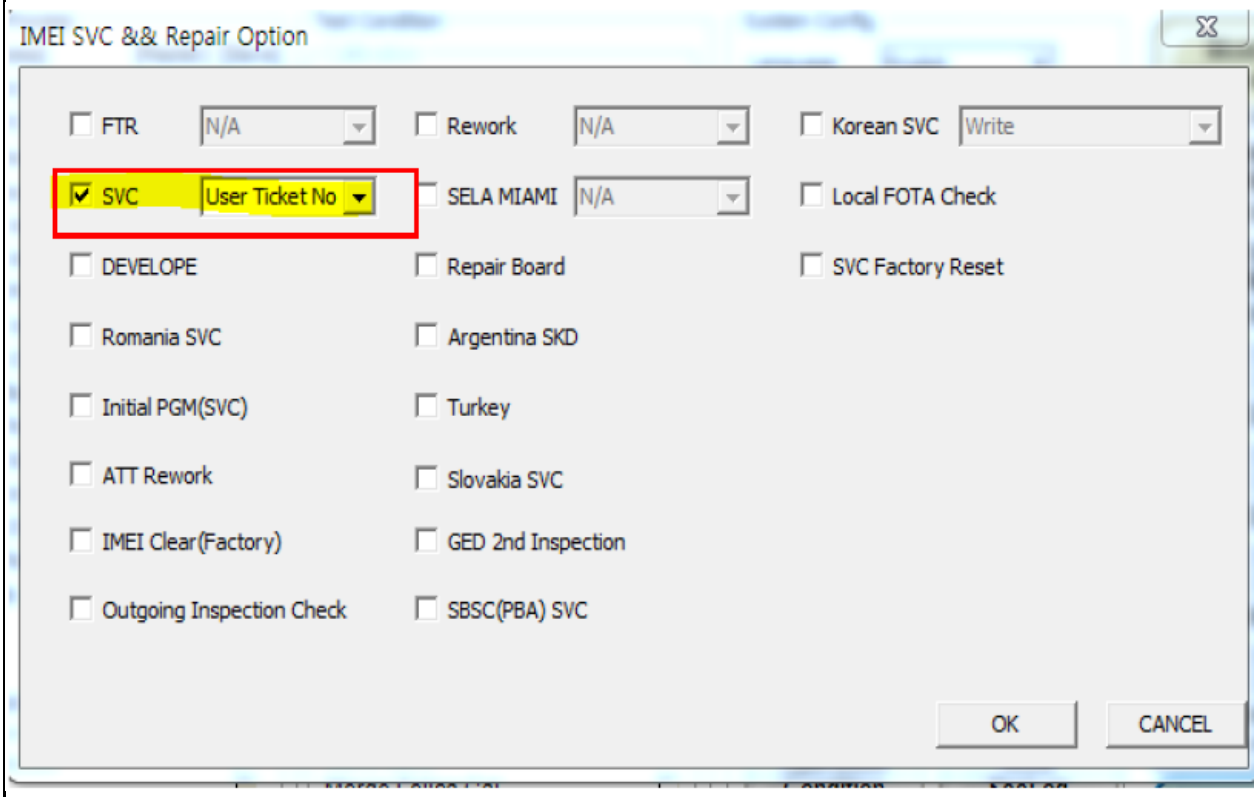
※Once you setup the setting, you don t have to do it again, unless there is change.
From second run of the IMEI program, check IMEI and click Extract & Run.



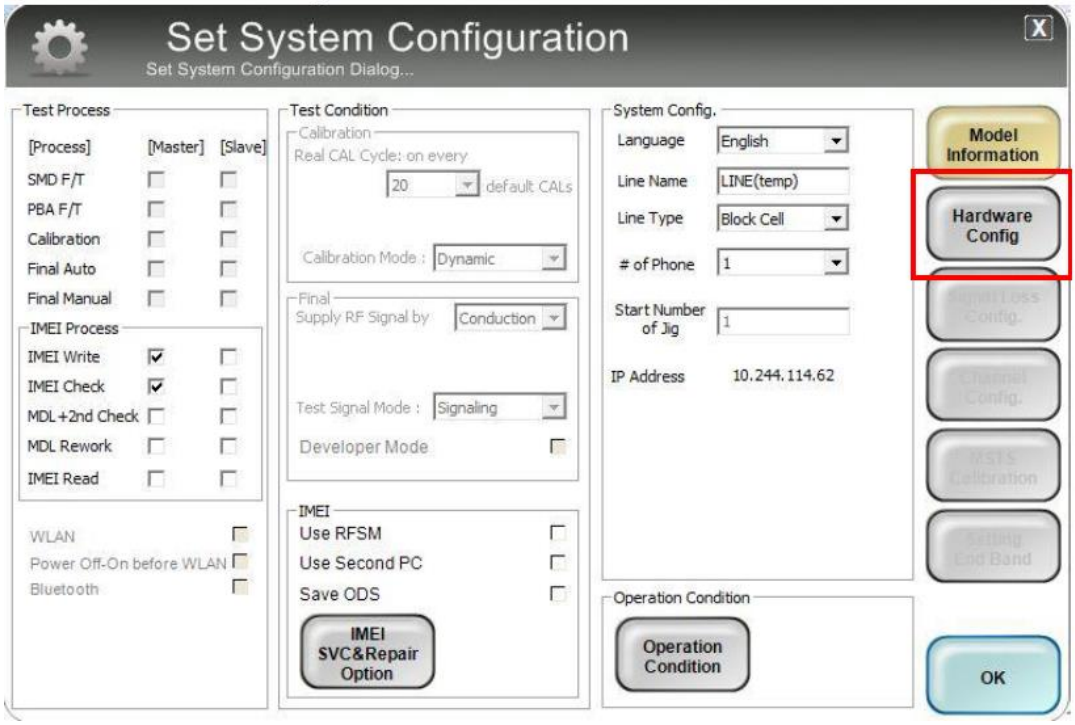
6. Check IMEI Write / IMEI Check and click IMEI SVC & Repair Option.



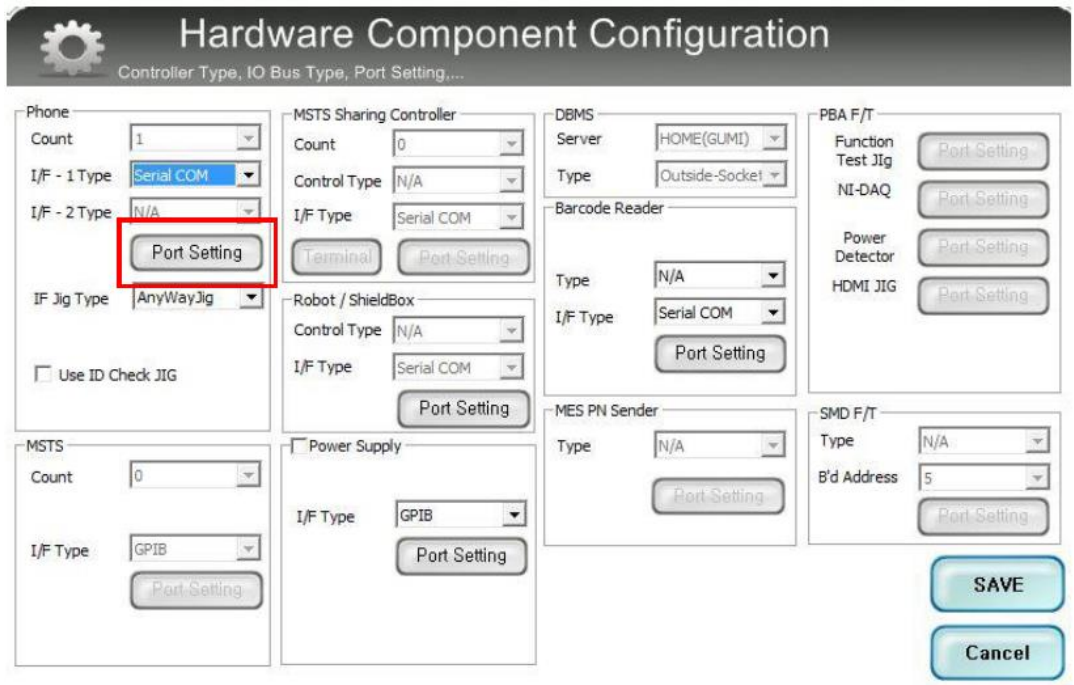
7. Check 'SVC , User Ticket No' and click OK



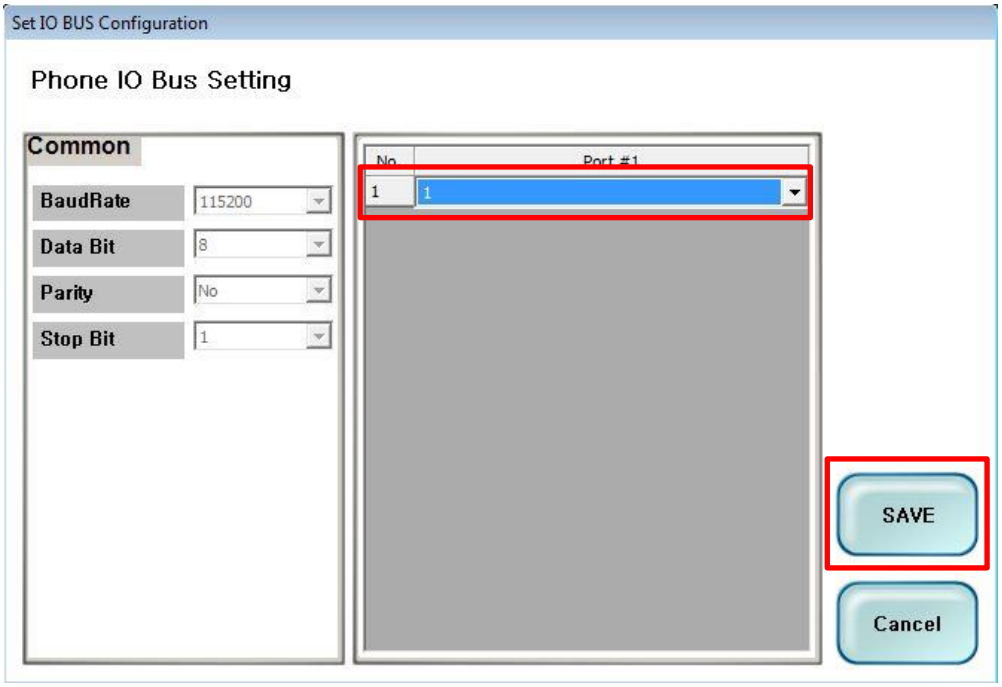
8. Click ‘Hardware Config’



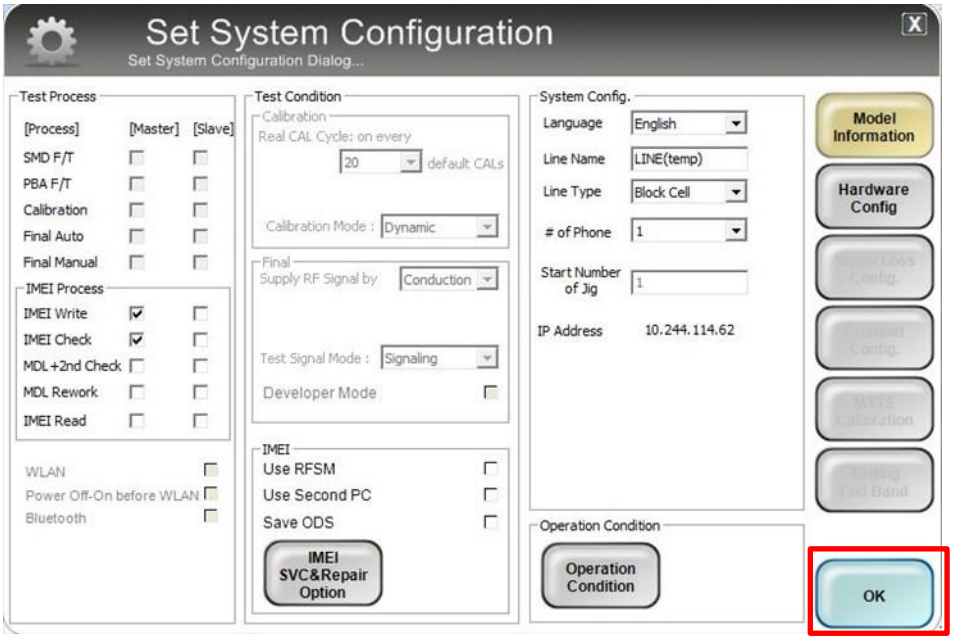
9. Click ‘Port Setting’



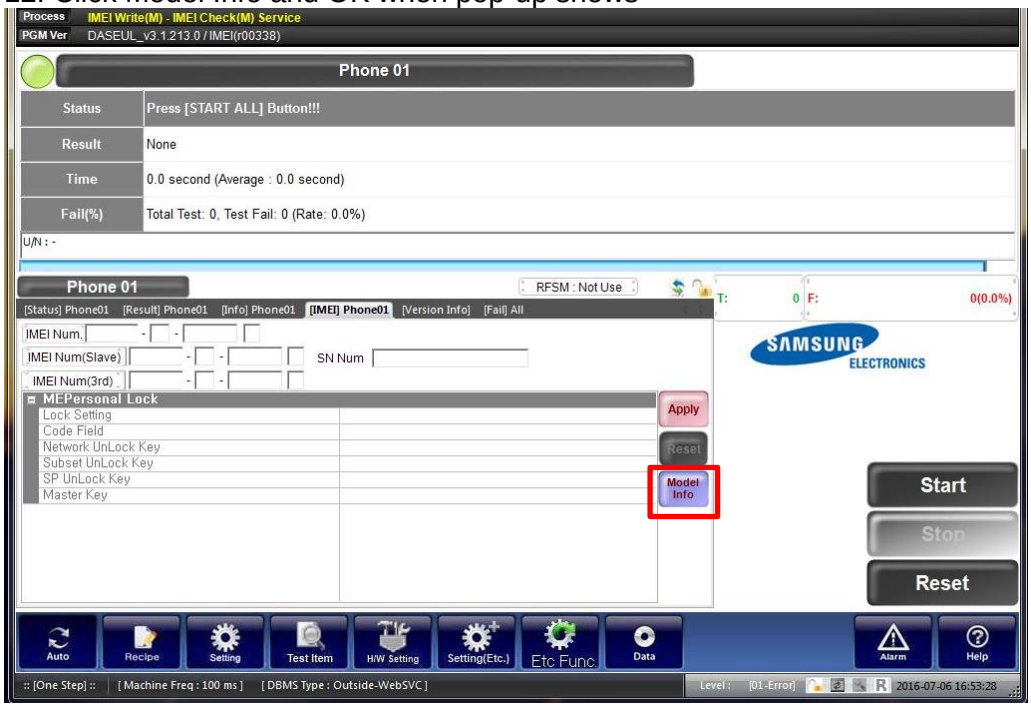
10. Select Port Number and SAVE



11.Click OK to proceed



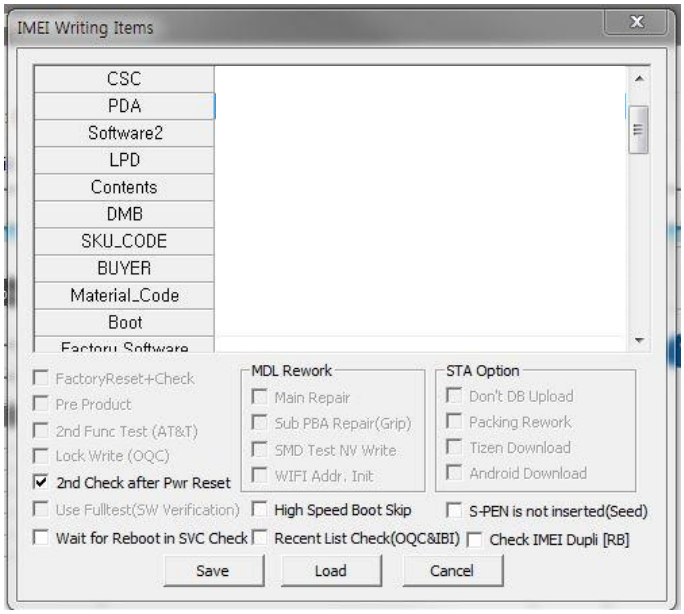
12. Click Model Info and OK when pop-up shows



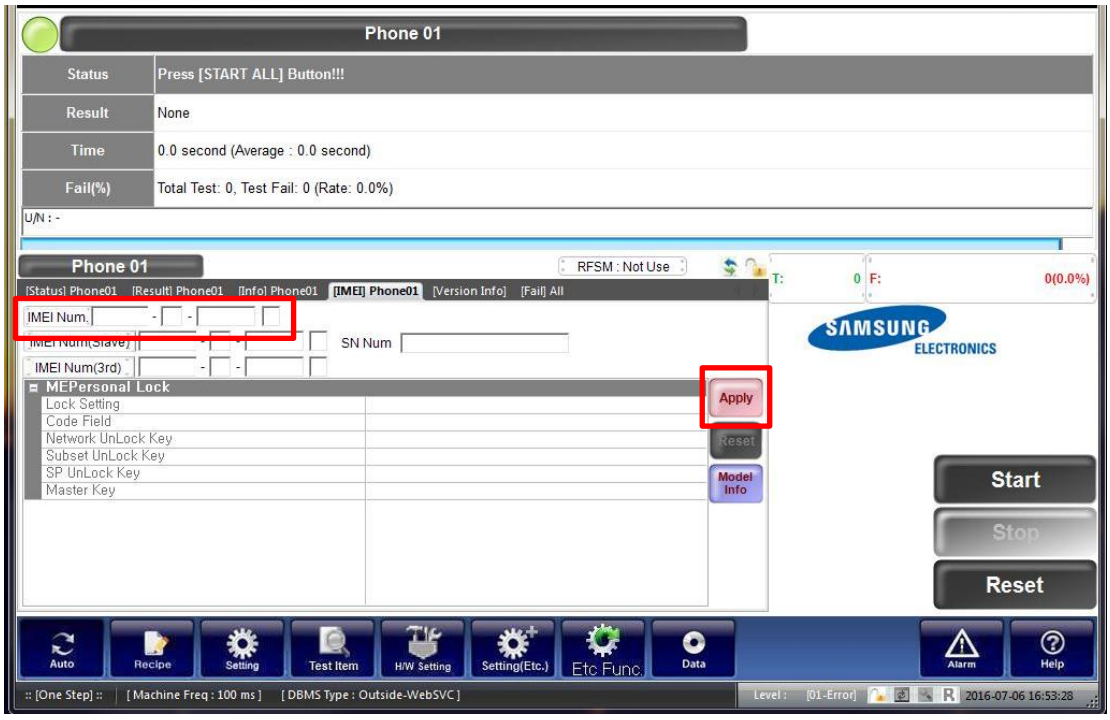
13. Click OK

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

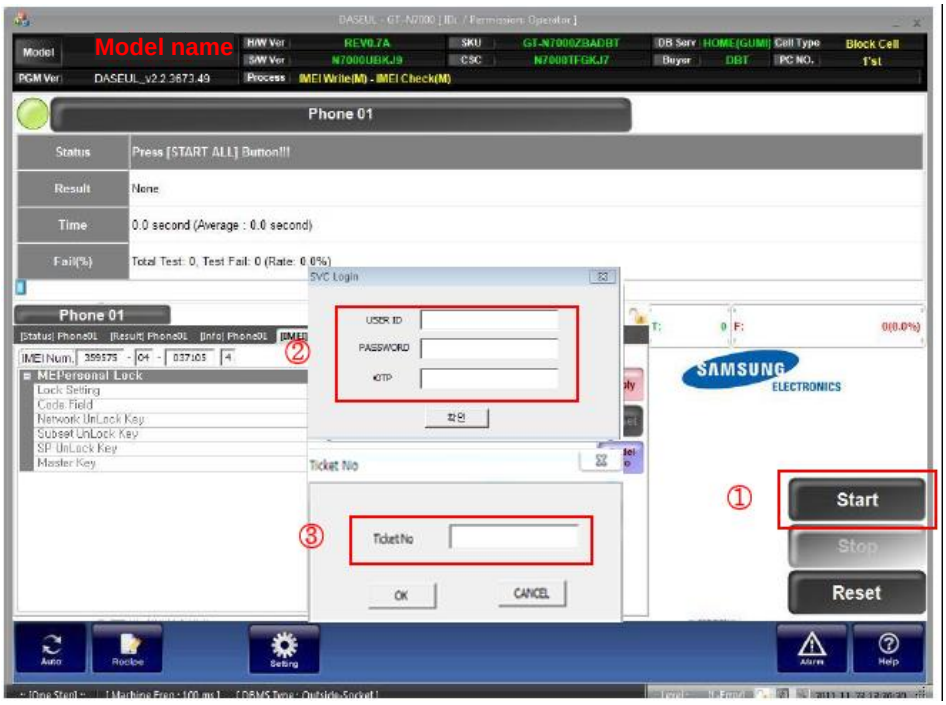
※ Refer to HHPsvc→IMEI Review to check SKU Code and buyer



15. Input IMEI Number and click Apply



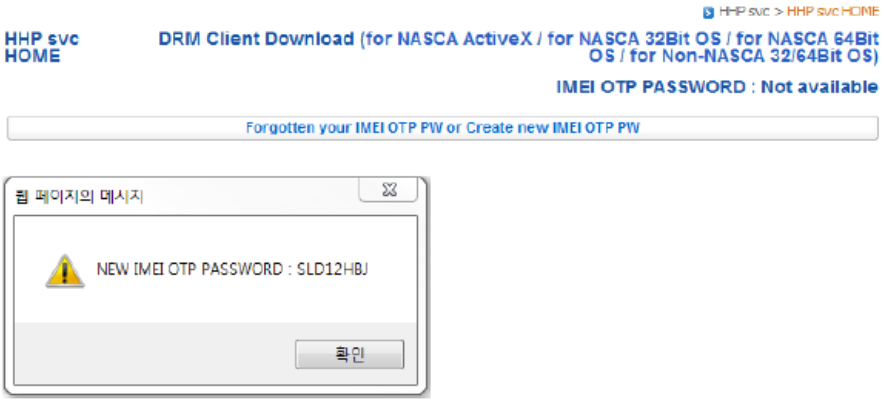
16. ① Click Start → ②Input IMEI writing ID and Password & OTP → ③Input Ticket No



※ OTP(One time Password) : OTP is valid for 6 hours.

After that, you can get new OTP by click the "Forgotten your IMEI OTP PW or Crete new IMEI OTP PW" button.

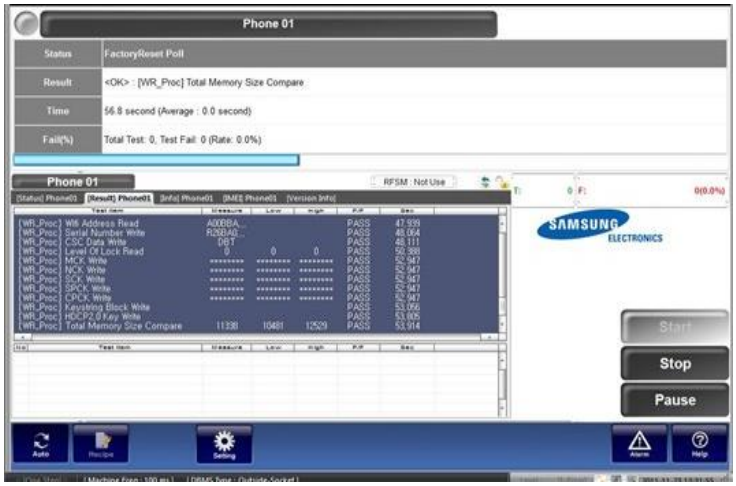
☞ OTP Location : GSPN → Knowledge → HHP svc → Home



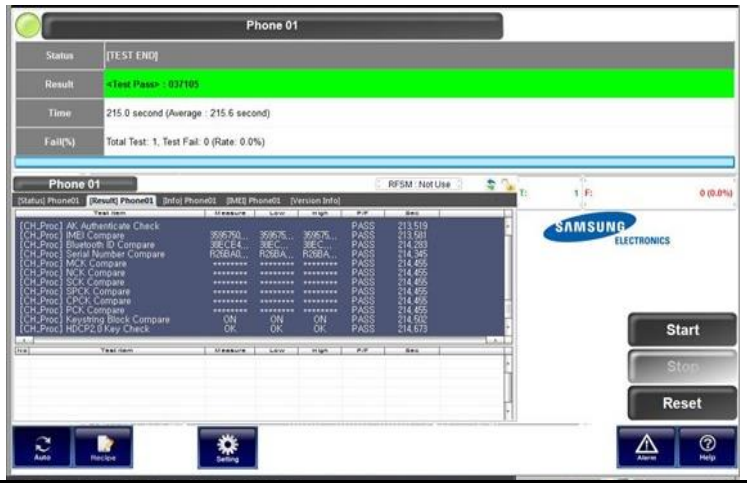
17. Connect the phone to Anyway JIG

※ 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



Reference Abbreviation

— **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