

## 2-1. GSM General Specification

|                                         | GSM850                     | EGSM<br>900                | DCS1800                        | PCS1900                    | WCDMA<br>2100                  | WCDMA<br>1900                  | WCDMA<br>1700                                | WCDMA<br>900       | WCMDA<br>850       |
|-----------------------------------------|----------------------------|----------------------------|--------------------------------|----------------------------|--------------------------------|--------------------------------|----------------------------------------------|--------------------|--------------------|
| Freq. Band[MHz ] Uplink/ Downlink       | 824~849<br>869~894         | 880~915<br>925~960         | 1710~178<br>5<br>1805~188<br>0 | 0                          | 1922~197<br>7<br>2112~216<br>7 | 1852~190<br>7<br>1932~198<br>7 | 1710~175<br>5<br>2110~215<br>5               | 880~915<br>925~960 | 824~849<br>869~894 |
| ARFCN<br>range                          | 128~251                    | 0~124<br>& 975~10<br>23    | 512~885                        | 512~810                    | 8<br>DL:                       | 8<br>DL:                       | UL:<br>1313~151<br>3<br>DL:<br>1538~173<br>7 | 3<br>DL:           | 3<br>DL:           |
| Tx/Rx<br>spacing                        | 45MHz                      | 45MHz                      | 95MHz                          | 80MHz                      | 190MHz                         | 80MHz                          | 400MHz                                       | 45MHz              | 45MHz              |
| Mod. Bit<br>rate/<br>Bit Period         | 270.833k<br>bps<br>3.692us | 270.833k<br>bps<br>3.692us | 270.833k<br>bps<br>3.692us     | 270.833k<br>bps<br>3.692us | 3.84Mcps                       | 3.84Mcps                       | 3.84Mcps                                     | 3.84Mcps           | 3.84Mcps           |
| Time Slot<br>Period/<br>Frame<br>Period | 576.9us<br>4.615ms         | 576.9us<br>4.615ms         | 576.9us<br>4.615ms             | 576.9us<br>4.615ms         | h:<br>10ms                     | h:<br>10ms                     | FrameLengt h: 10ms Slotlength : 0.667ms      | h:<br>10ms         | h:<br>10ms         |
| Modulatio<br>n                          | 0.3GMSK                    | 0.3GMSK                    | 0.3GMSK                        | 0.3GMSK                    | QPSKHQPS<br>K                  | QPSKHQPS<br>K                  | QPSKHQPS<br>K                                | QPSKHQPS<br>K      | QPSKHQPS<br>K      |
| MS Power                                | 33dBm~5dB<br>m             | 33dBm~5dB<br>m             | 30dBm~0dB<br>m                 | 30dBm~0dB<br>m             | 24dBm~<br>-50dBm               | 24dBm~<br>-50dBm               | 24dBm~<br>-50dBm                             | 24dBm~<br>-50dBm   | 24dBm~<br>-50dBm   |
| Power<br>Class                          | 5pcl ~ 19pcl               | 5pcl ~ 19pcl               | Opcl ~ 15pcl                   | 0pcl ~ 15pcl               | 3(max+24d<br>Bm)               | 3(max+24d<br>Bm)               | 3(max+24d<br>Bm)                             | 3(max+24d<br>Bm)   | 3(max+24d<br>Bm)   |
| Sensitivit<br>y                         | -102dBm                    | -102dBm                    | -100dBm                        | -100dBm                    | -<br>106.7dBm                  | -<br>106.7dBm                  | -<br>106.7dBm                                | -<br>106.7dBm      | -<br>106.7dBm      |
| TDMA<br>Mux                             | 8                          | 8                          | 8                              | 8                          | 8                              | 8                              | 8                                            | 8                  | 8                  |
| Cell<br>Radius                          | 35Km                       | 35Km                       | 2Km                            | 2Km                        | 2Km                            | 2Km                            | 2Km                                          | 2Km                | 2Km                |

# 2. Specification



### 2-2. 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. Specification



## 2-3. LTE General Specification

|                                           | LTE Band1                              | LTE Band2                                 | LTE Band3                                  | LTE Band4                                  | LTE Band5                                  | LTE Band7                                  | LTE Band8                              |
|-------------------------------------------|----------------------------------------|-------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|--------------------------------------------|----------------------------------------|
| Freq.<br>Band[MHz]<br>Uplink/<br>Downlink | 1920~1980<br>2110~2170                 | 1850~1910<br>1930~1990                    | 1710~1785<br>1805~1880                     | 2520~2570<br>1805~1880                     | 824~849<br>869~894                         | 2500~2570<br>1805~1880                     | 880~914.9<br>925~959.9                 |
| ARFCN<br>range                            | UL:<br>18000~1859<br>9<br>DL:<br>0~599 | UL:<br>18650~1915<br>0<br>DL:<br>650~1150 | UL:<br>19200~1995<br>0<br>DL:<br>1805~1880 | UL:<br>20750~2144<br>9<br>DL:<br>2750~3449 | UL:<br>20400~2064<br>9<br>DL:<br>2400~2649 | UL:<br>20750~2144<br>9<br>DL:<br>2750~3449 | UL:<br>21450-21799<br>DL:<br>3450-3799 |
| Tx/Rx<br>spacing                          | 190MHz                                 | 90MHz                                     | 95MHz                                      | 400MHz                                     | 45MHz                                      | 120MHz                                     | 45MHZ                                  |
| Channel<br>Bandwidth                      | 5/10/15/20<br>MHz                      | 1.4/3/5/10/<br>15/20MHz                   | 1.4/3/5/10/<br>15/20MHz                    | 1.4/3/5/10/<br>15/20MHz                    | 1.4/3/5/10M<br>Hz                          | 5/10/15/20<br>MHz                          | 1.4/3/5/10M<br>Hz                      |
| Modulation                                | QPSK,16/64<br>QAM                      | QPSK,16/64<br>QAM                         | QPSK,16/64<br>QAM                          | QPSK,16/64<br>QAM                          | QPSK,16/64<br>QAM                          | QPSK,16/64<br>QAM                          | QPSK,16/64<br>QAM                      |
| MS Power<br>(MPR)                         | -35~25.7<br>dBm                        | -35~25.7<br>dBm                           | -35~25.7<br>dBm                            | -35~25.7<br>dBm                            | -35~25.7<br>dBm                            | -35~25.7<br>dBm                            | -35~25.7<br>dBm                        |
| Sensitivit<br>(QPSK)<br>(BW 10MHz)        | -94 dBm                                | -92 dBm                                   | -92 dBm                                    | -92 dBm                                    | -92 dBm                                    | -95dBm                                     | -95dBm                                 |
| Cell Radius                               | >5Km                                   | `>5Km                                     | `>5Km                                      | >5Km                                       | >5Km                                       | >5Km                                       | >5Km                                   |

# 2. Specification



|                                           | LTE Band17                             | LTE<br>Band20                          | LTE Band 38          | LTE Band 40       |
|-------------------------------------------|----------------------------------------|----------------------------------------|----------------------|-------------------|
| Freq.<br>Band[MHz]<br>Uplink/<br>Downlink | 704~716<br>734~746                     | 832~862<br>791~821                     | 2570~2620            | 2300~2400         |
| ARFCN range                               | UL:<br>24150~24450<br>DL:<br>6150~6450 | UL:<br>24150~24450<br>DL:<br>6150~6450 | UL, DL:<br>2570~2620 | UL, DL: 2300~2400 |
| Tx/Rx spacing                             | 30MHz                                  | 41Mhz                                  | _                    | -                 |
| Channel Bandwidth                         | 5/10/15/20 MHz                         | 5/10/15/20 MHz                         | 5/10/15/20<br>MHz    | 5/10/15/20<br>MHz |
| Modulation                                | QPSK,16/64QAM                          | QPSK,16/64QAM                          | QPSK,16/64QAM        | QPSK,16/64QAM     |
| MS Power<br>(MPR)                         | -35~25.7dBm                            | -35~25.7dBm                            | -35~25.7 dBm         | -35~25.7 dBm      |
| Sensitivit<br>(QPSK)<br>(BW 10MHz)        | -94dBm                                 | -94dBm                                 | -97dBm               | -97dBm            |
| Cell Radius                               | >5Km                                   | >5Km                                   | >5Km                 | >5Km              |

# 3. Operation Instruction and Installation



### **Main Function**

| Item      | Description                                                                 |  |  |  |
|-----------|-----------------------------------------------------------------------------|--|--|--|
| os        | Android V7.0 (Nougat OS)                                                    |  |  |  |
| RF        | 2G Quad(850/900/1800/1900), WCDMA(1,2,5,8), LTE (1,2,3,4,5,7,8,17,20,38,40) |  |  |  |
| Battery   | 2,400mAh                                                                    |  |  |  |
| Base Band | 1.4GHz Quad                                                                 |  |  |  |
| Other RF  | GPS, Glonass, Beidou, BT4.2, USB 2.0, WIFI 802.11 b/g/n SISO                |  |  |  |
| Camera    | 13MP AF (Main). 5M FF(Front)                                                |  |  |  |
| LCD       | 5" HD in Cell Touch LCD, 1280 x 720                                         |  |  |  |
| RAM       | 2GB LPDDR3 RAM + 16GB eMMC                                                  |  |  |  |
| Sensor    | Accelerometer, Proxy                                                        |  |  |  |
| Accessory | Charger: 5V, 1A Headset (Option)                                            |  |  |  |

#### 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 StandardES : 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-SolomonSI : 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.



#### 6-1. S/W Download

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

- Installation program: Downloader Program (Odin3 v3.11.exe)
- Mobile Phone
- Data Cable
- Mobile device specific S/W: Binary files

### **X** Settings



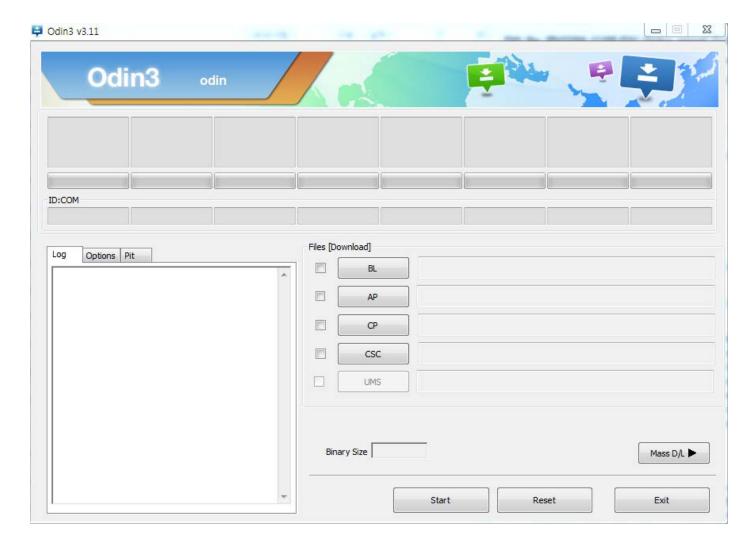


Data Cable: GH39-01710D



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

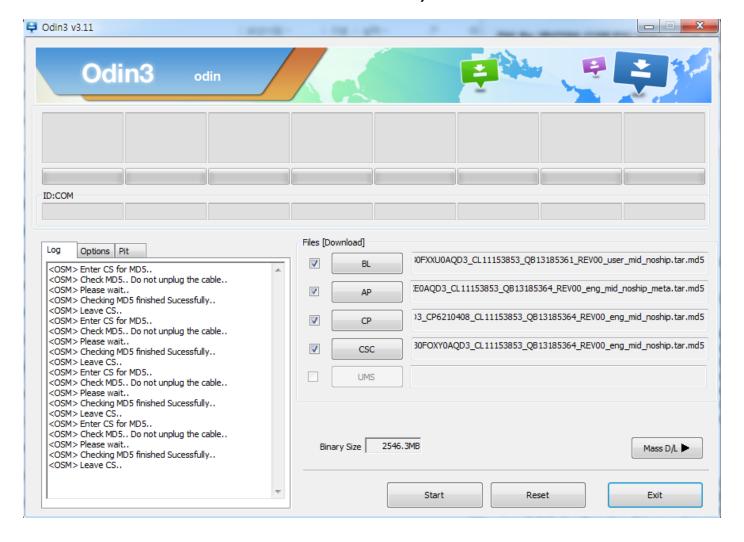
■ Open up the S/W Installation Program by executing the "Odin3 v3.11.exe"





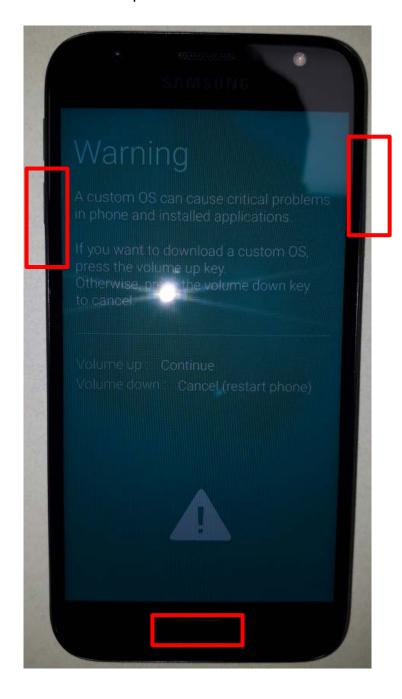


- 1. Enable the check mark by click on the following options,
- Check Auto Reboot, Re-Partition, and F. Reset Time
- Check PIT
- Check BOOTLOADER, PDA, PHONE, and CSC Files
- \* Note: "Odin v3.09 or above" checks MD5 checksum just after file selection.





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

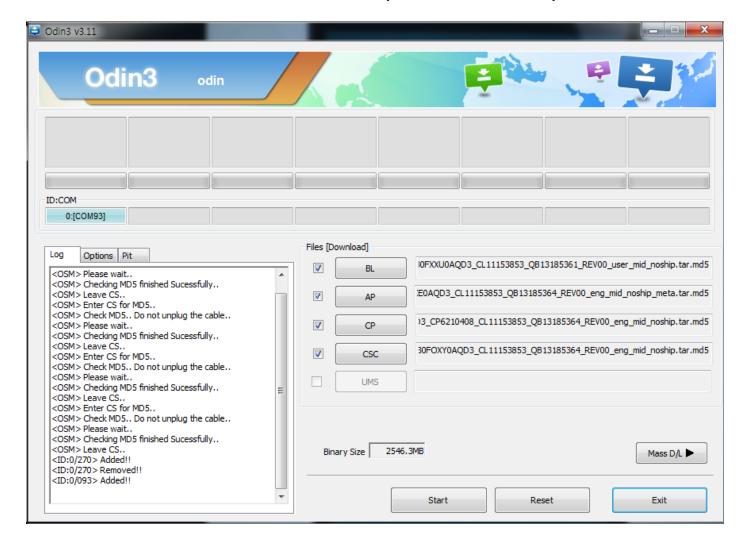






3. Connect the device to PC via Data Cable.

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.



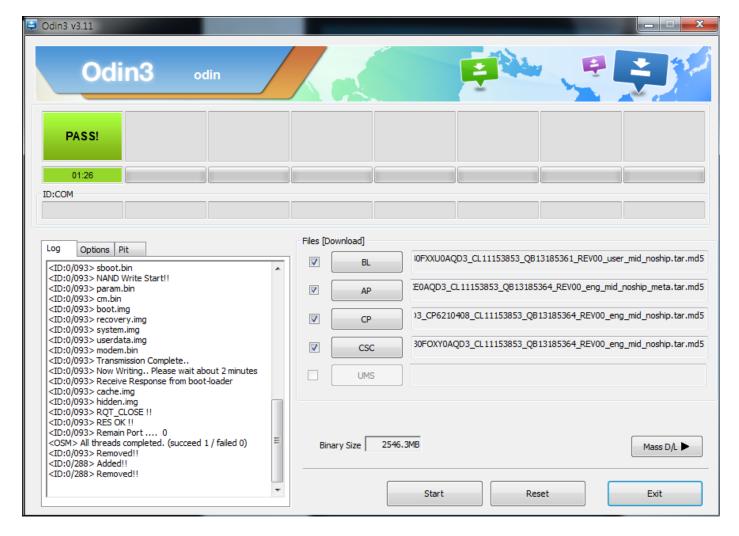




4. Start downloading the binary files into the device by clicking Start button on the screen.

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

**X** Caution, Never disconnect during the S/W downloading.

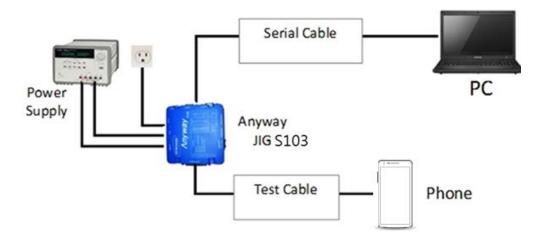


### 6-2 IMEI writing

### 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

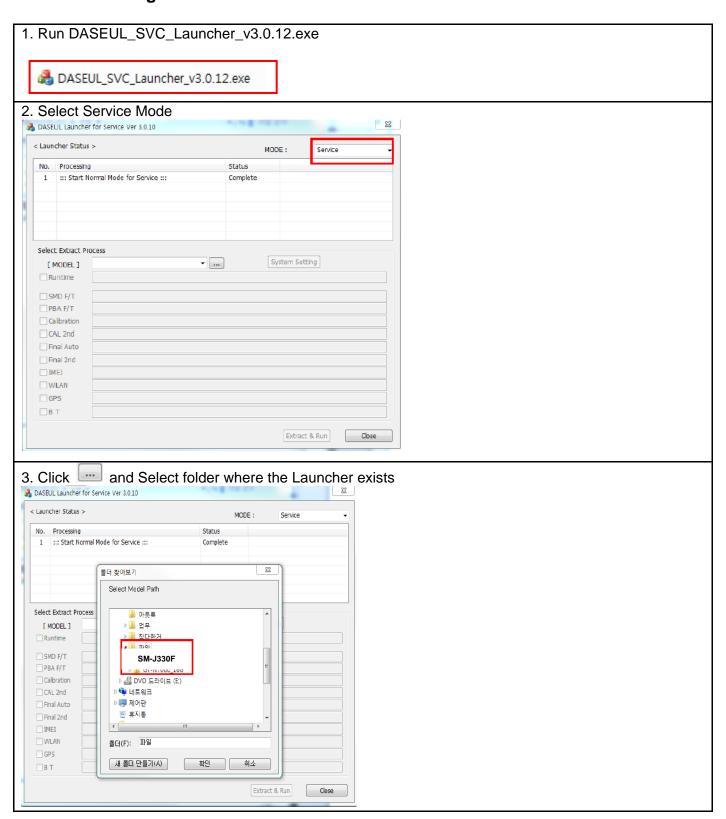


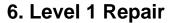
#### - S/W

| 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"         |
|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| 2)Launcher        | DASEUL_SVC_Launcher_v3_0_25 or higher -Uploaded on HHPsvc Notice                                                                                         |
| ③ Runtime File    | DASEUL_Runtime_Ver_3.1.139.0.CAB or higher     -Uploaded on HHPsvc Notice     Make 'ModelName' folder at the same position with launcher & Runtime file. |
| 4Model File       | Copy Model File under the 'Model Name' folder                                                                                                            |



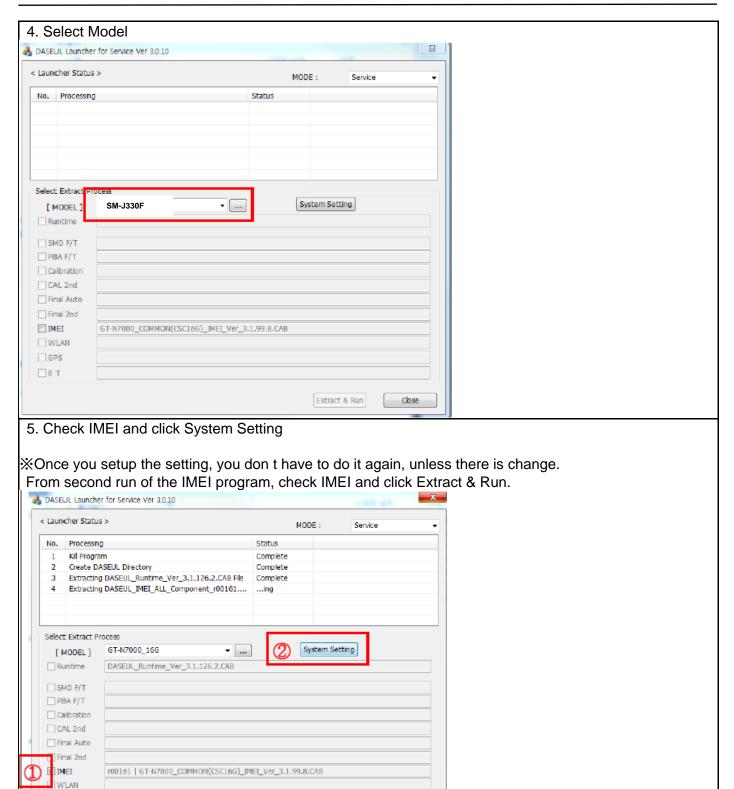
### 6-2-2 IMEI writing Process





GPS

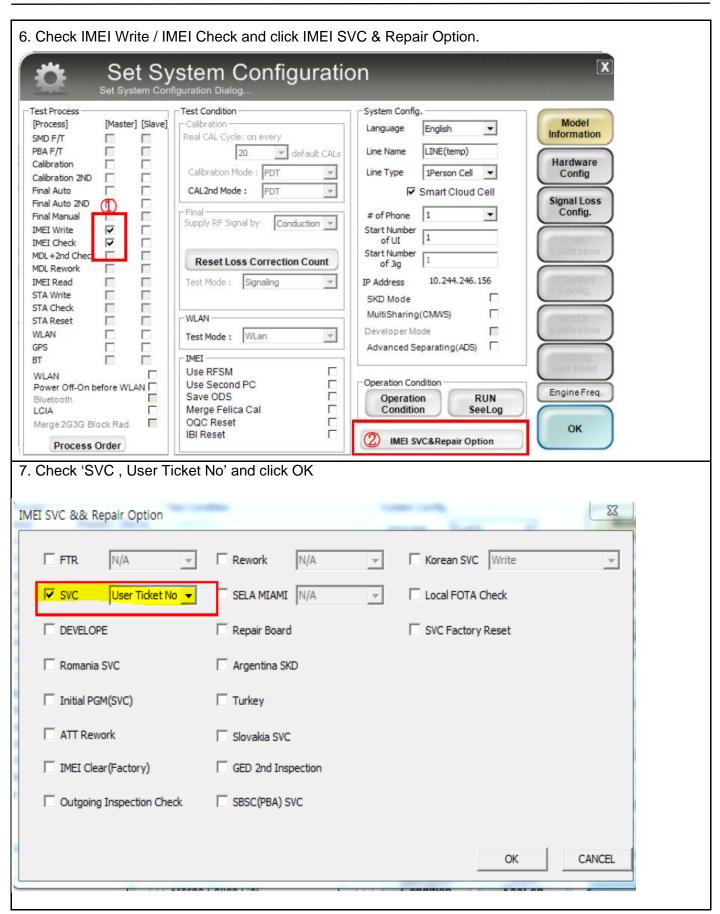




Extract & Run

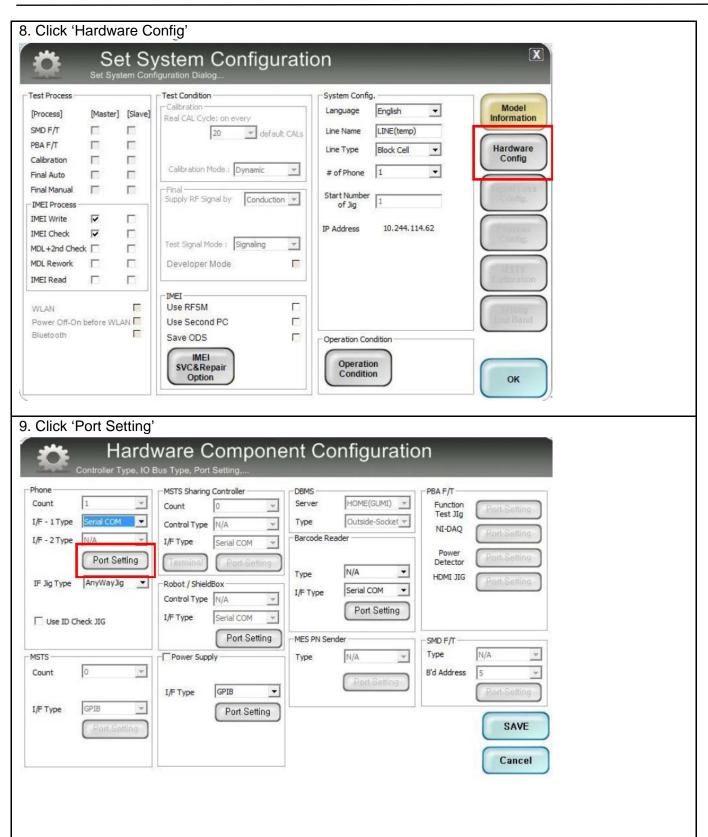
Close

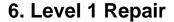




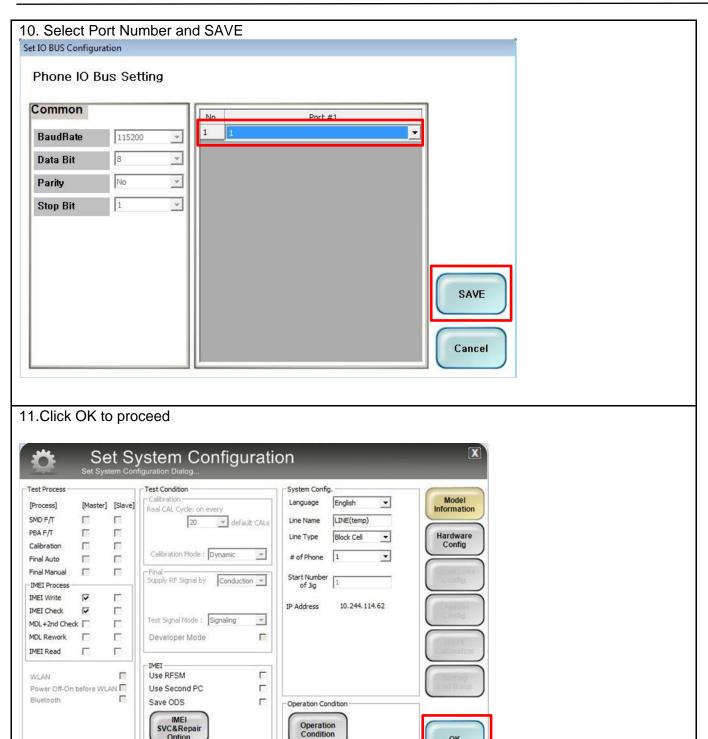






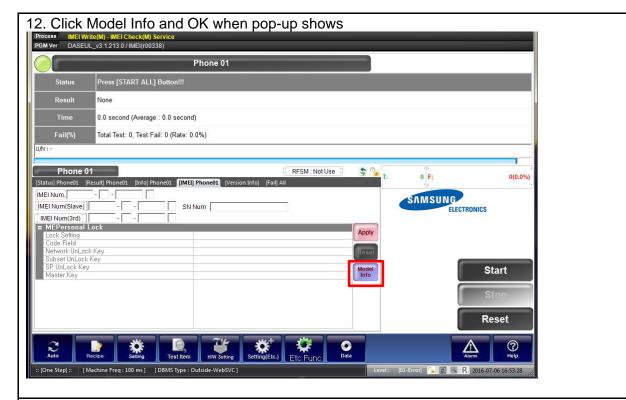












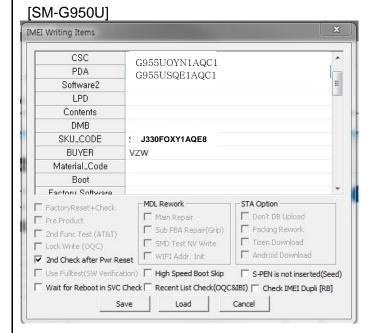
#### 13. Click OK



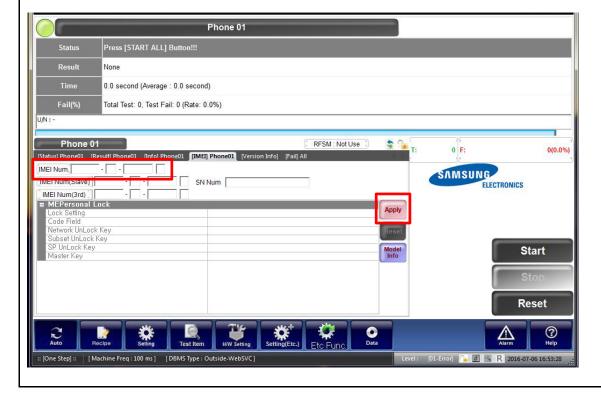




- 14. Input SKU\_CODE and BUYER, then click Save button.
- $\frak{\%}$  Refer to HHPsvcightarrowIMEI Review to check SKU Code and buyer

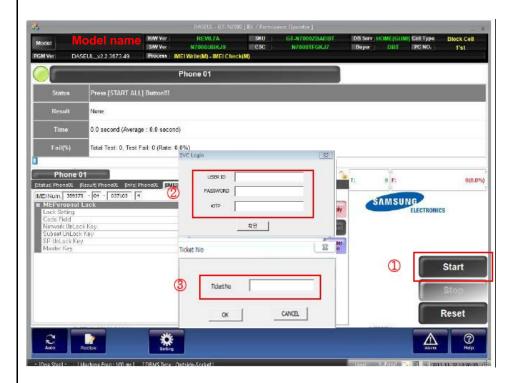


15. Input IMEI Number and click Apply





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.

STP 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





#### 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-J330F\_OPEN\_CALIBRATION\_Ver\_3.1.302.2.CAB)

#### It is required to use the latest program.

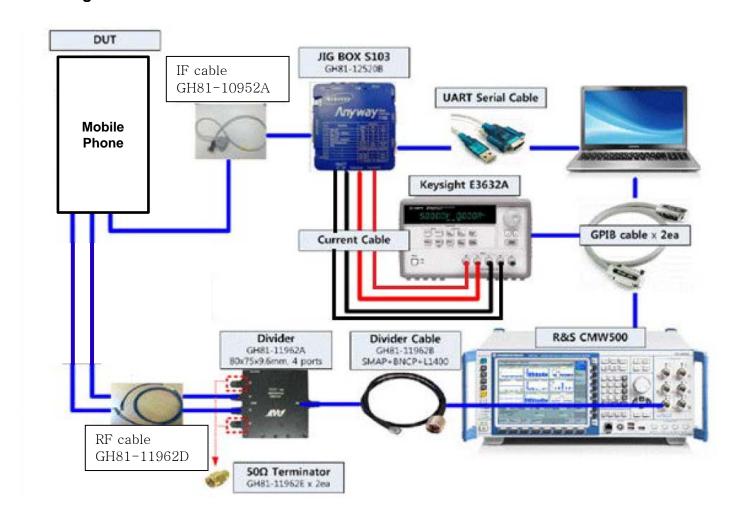
- Mobile Phone
- R&S CMW500
- E3632A Power Supply
- GPIB Cable (2ea)
- JIG BOX (GH81-12520B)
- Adapter (GH81-11888K)
- UART Serial Cable
- IF cable: GH81-10952A(7pin)

#### ❖ Table of test cables

|                      |             | GH81-11962D   |                |
|----------------------|-------------|---------------|----------------|
| RF Cable<br>(Manual) |             | 1.2T, 102mm   |                |
|                      | GH81-11962A | GH81-11962B   | GH81-11962E    |
| 4 Port Divider       | Divider     | Divider Cable | 50Ω terminator |



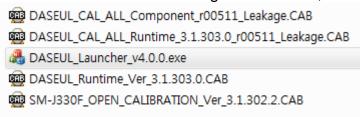
#### ❖ Setting



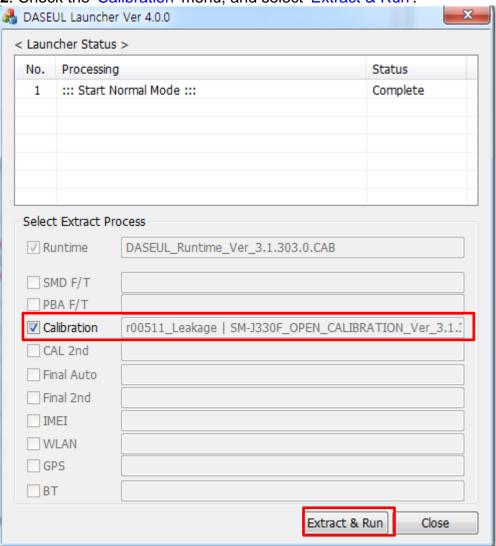


#### 6-3-2. RF Calibration Program

1. Run the RF Calibration Program Launcher, 'DASEUL\_Launcher\_vx.x.xx.exe'.

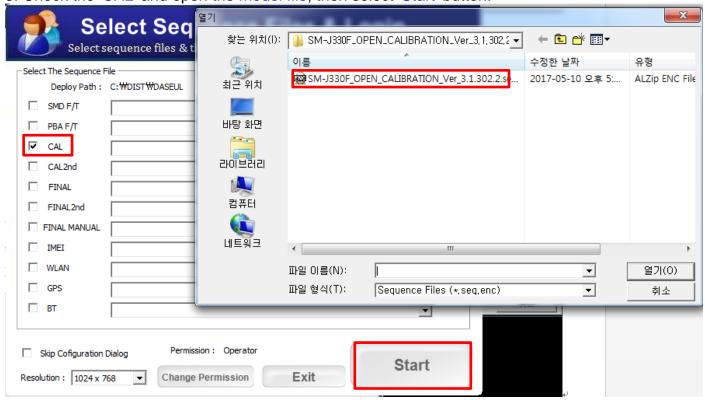


2. Check the 'Calibration' menu, and select 'Extract & Run'.





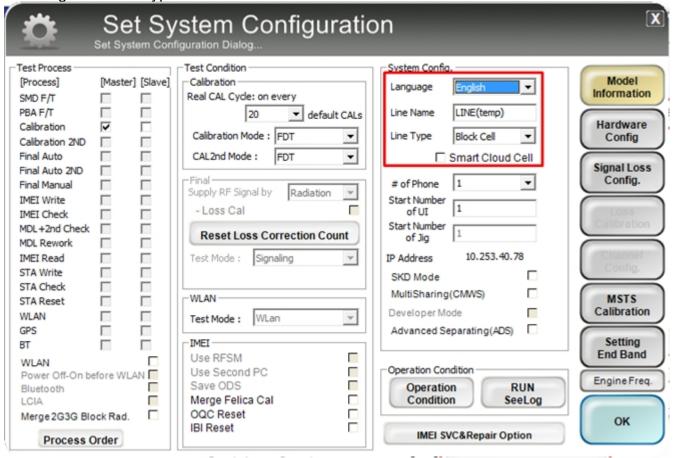
3. Check the 'CAL' and open the model file, then select 'Start' button.





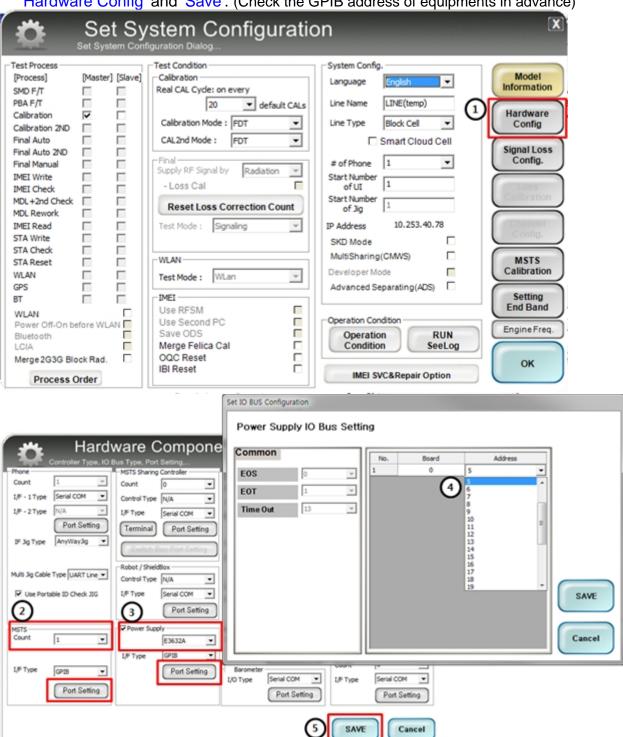


4. Change the Line Type to 'Block Cell' and disable 'Smart Cloud Cell'.





**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.

