XCAL-M

User Guide

Rev: 00

Ver: 3.4.xx

2015. 09

Accuver

Accuver Co., Ltd.,

Address: Innowireless B/D,190 Seohyeon-ro, Bundang-Gu, Seongnam-Si, Kyungki-Do, Korea

Web site: www.Accuver.com

Phone #: +82-31-788-1700

Fax #: +82-31-705-1246

Revision History

Rev	Product Version	Date	Description
0	3.04.xx	2015 September	Initial version

General Icons

Icon	Name	Description
	**Caution**	Alerts possible mechanical damage or malfunction.
	**Note**	Provides additional information or detailed specification of the function and feature.

Contents

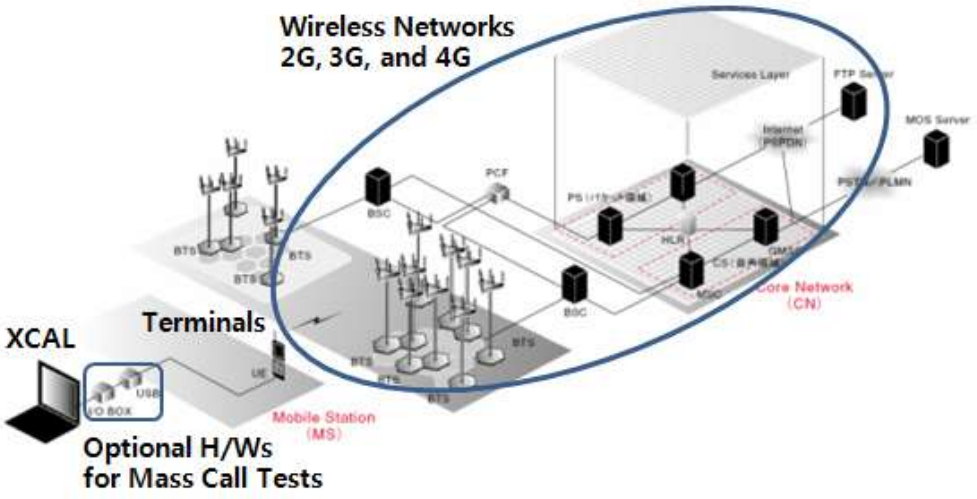
Overview

XCAL is a real-time software solution for wireless network optimization and performance measurement. It interfaces test terminals such as mobile phones, modems, network cards, and scanners to collect data and to perform QoS tests.

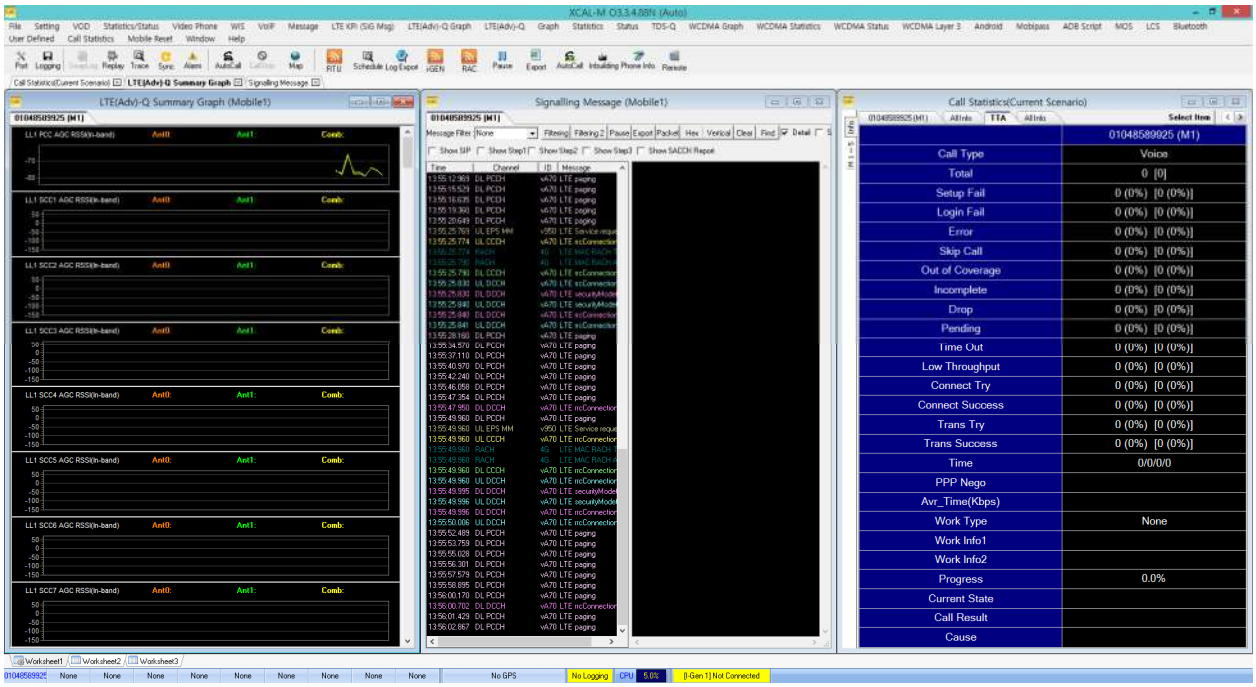
XCAL collects Layer 1, 2, 3 messages and TCP/IP packets from both the air and data interface of all commercially available technologies [CDMA IS95A/B, 1XRTT, EVDO (Rev. 0, Rev. A, and Rev. B), GSM, GPRS, EDGE, UMTS, HSDPA, HSUPA, HSPA+, DC-HSDPA, WiMAX, and LTE].

It also performs various QoS test on Voice and Data service by embedded automated call scripts. XCAL combines RF Air Interface information and QoS Tests in same platform for overall performance measurement and analysis. XCAL has been also proven as a good solution in global to significantly reduce overhead and improve operational efficiency.

XCAL is basically developed for a single PC (laptop) solution but it could be extended to mass call test solution with additional H/Ws to run quite a lot of terminals in parallel for benchmarking test and capacity test.



XCAL System Overview



XCAL Program Main Screen

Special Features

XCAL is provided with the following highlighted features:

Simple, Easy, Intuitive Graphic Interface

- To provide intuitive and user-friendly user interface.
- To provide useful and multiple icons and mouse menus.
- To provide simple and easy configurations for HW/SW installations and call tests.
- To visualize all call tests related status, real-time monitoring data, and statistics.

Log and Decode Data in Real-time

- To log and decode data in real-time.

Automatic Call Generation and Termination

- To create AutoCall scenarios by call types; Voice, FTP, HTTP, UDP, Email, VoIP, VOD, Ping, IPerf, SMS/MMS, etc.
- To measure Layer 1,2,3 messages and TCP/IP packet message by connecting mobiles and scanners to XCAL.
- To support call tests for maximum 20 mobiles at once.

All Commercially Available Mobile Chipsets Support

- CDMA/EVDO: Qualcomm chipset & VIA chipset
- GSM/GPRS/EDGE: Qualcomm chipset & Nokia chipset
- WCDMA/HSDPA/HSUPA: Qualcomm chipset, Nokia chipset, Samsung chipset, Icera chipset & Infineon chipset
- DC-HSDPA: Qualcomm chipset
- HSPA+: Qualcomm chipset & Infineon chipset
- WiMAX: Runcom chipset, Beceem chipset, GCT chipset, Sequans chipset, Intel chipset, MediaTekc, Samsung chipset
- LTE: Qualcomm chipset, LGE chipset, Samsung chipset, GCT chipset, Sequans chipset, Altair chipset, HiSilicon chipset

  XCAL series is provided with authorized license. Supporting items may vary according to license type.

Voice/Data performance test for different technologies/operators

- To compare and benchmark voice and data performance for different technologies and operators.

Real-Time Monitoring

- To visualize measurement data in real-time by linking GPS data.
- To monitor measurement data in real-time in various types; message, graph, table, chart, map, and etc.
- To provide comprehensive graphic analysis of signal and data throughput.
- To analyze handoff.

Diagnosis and Statistics

- To declare call events; Call Drop, Setup Fail, Low Throughput, etc.
- To provide statistical data in multiple types.

Various Scanners Support

- PCTel Scanner: LX Scanner, EX Scanner, PCI Scanner (MX Scanner by OCT-2011)
- Anritsu Scanner: 8720, 8740, 8780
- DRT Scanner: CDMA/EVDO, GSM/WCDMA, WiMAX (LTE by the end of 2011)
- Panasonic Scanner: WCDMA
- R&S Scanner: TSMW (LTE only), (TSMQ & TSMW by the end of 2011)

Audible/Visible Alarms

- To provide audible and visible alarms for important call events.

Log File Replay

- To replay log file.

System Requirements

Before you begin, ensure that your system meets the following requirements.

Minimum

Item	Minimum
CPU	Core i7 or above
Monitor	1024 * 768(16bit) or above
RAM	4GB or above
Hard Drive	500GB or above
Operation System	Window XP/Vista/7/8/8.1 (Unavailable for Windows Server/2000)

Recommended

Item	Recommended
CPU	Core i7 processor or higher
Monitor	Full HD (Over 1920 * 1080, 16bit high color)
RAM	8GB or above
Hard Drive	1TB or larger hard disk for collecting data
Operation System	Window XP/Vista/7/8/8.1

Getting Started

This chapter describes what components are to be provided with the initial purchase and how to install SW, Key Lock driver, and USB GPS driver. Make sure all components are provided properly with the purchase and follow the instructions for corresponding installation procedures.

Installing Software (with Setup Package)

Following procedure enables you to install XCAL software on test PC appropriately. All applications should be closed on your PC before beginning installation.

- Before installation of a new Setup Package, uninstall old XCAL if you have installed already in your PC.

1. Insert the supplied CD-ROM into your CD-ROM drive.

   The CD-ROM shall automatically run, and installation wizard is started.

   If the installation window does not appear, find the **setup.exe** from the supplied CD-ROM/XCAL Setup.

   - In case you have a Setup S/W via a web link, find the **setup.exe** and run it.

2. Installation wizard is started, read carefully and follow installation instructions properly.

   - Configure a Name and Company Name.
   - Assign Program Group and Program Folder.

(In default, it will use **ACCUVER** as program group and '*program files/ACCUVER/XCAL'* or '*program files(x86)/ACCUVER/XCAL'* as program folder.)

- Press **Next**, **Update**, **OK**, and **Finish** buttons.

3. The S/W will install the following S/W modules;
   - XCAL main S/W application.
   - Microsoft Dot Net Frame Work Application (Only for Windows XP).
   - SmartMap Engine Application.
   - WinPCAP Application.
   - HHD Serial Port Monitoring Module.
   - MapXtreme OEM Application.
   - Microsoft Dot NetFrame Work Application.

Installing Software (with Patch Files)

Software patch file should be installed after proper software is successfully installed in PC.

Following procedure enables you to install XCAL software patch file on test PC appropriately. All applications should be closed on your PC before beginning installation.

Before installation of a new software patch file, uninstall old XCAL if you have installed already in your PC.

1. Download S/W patch from web link provided by ACCUVER.
2. S/W patch is generally provided in zipped file. Unzip it after downloading.
3. Copy and paste all unzipped files and folders into the folder where the previous XCAL files were installed. Replace all files with the patch files in the folder.

Installing Security Program (Key Lock Driver)

In order to run XCAL program, XCAL security program (Key Lock Driver) must be installed in the PC.

1. Execute *.exe file in program installation folder (C:\Program Files (x86)\Accuver\XCAL-M\Driver).
2. Installation wizard is started, read carefully and follow installation instructions properly.
3. Click **Finish** button to complete installation of Key Lock Driver.

Installing USB GPS Driver

In order to sync USB GPS to XCAL program, GPS driver must be installed in the PC.

1. Execute USB GPS installation file.
   - USB GPS installation file is provided by Accuver via FTP server. Contact to Accuver technical support.
2. Installation wizard is started, read carefully and follow installation instructions properly.
3. Click **Finish** button to complete installation of USB GPS driver.

Connecting Test Terminals to XCAL

XCAL allows to connect the folloing test terminals; Mobile Phone, Data Card, USB Modem (Dongle), Scanner, GPS

- Appropriate drvier should be installed in test PC in advance to connect test terminals to XCAL. When test terminal is physically connected to XCAL and is not recognized in **Device Manager** in PC, XCAL cannot recognize test terminal as well.

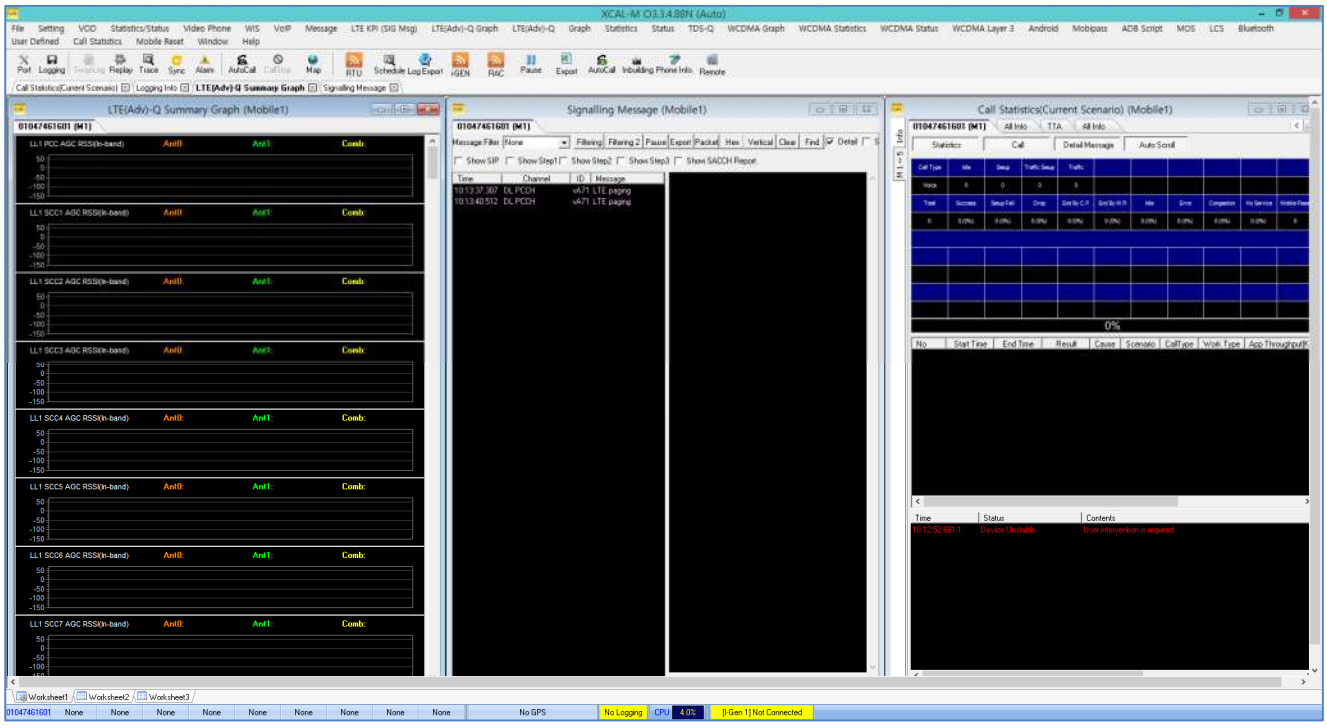
- Driver file may vary for phone models and manufacturers. Contact to provider to get a proper driver.

1. Install a proper driver.
2. Plug in test terminals to HW PIU slots by using phone cables.
3. Check if test terminals are installed properly in **Device Manager** in PC.
4. If required, connect GPS antenna to HW GPS antenna slot. (Optional)

Executing XCAL Program

XCAL program is now successfully installed, and you're ready to use XCAL.

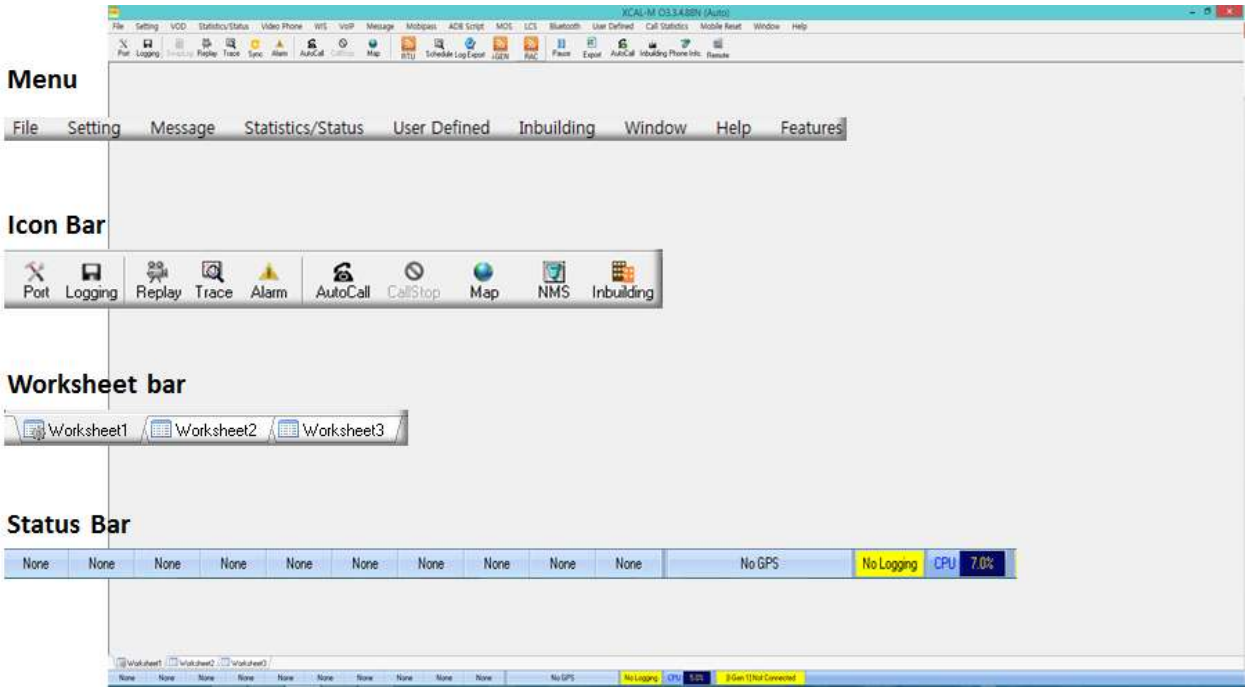
This chapter instructs how to run XCAL program.



XCAL main window

Graphic User Guide

XCAL is provided with intuitive and user friendly user interface.



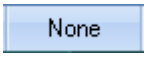
Classification	Description
Menu Bar	Includes File, Setting, Window, and Help. Menu items vary depending on supported technologies.
Icon Bar	Provides easy access on basic functions.
Workspace	Display various parameter windows.
Status Bar	Shows status of slot, mobile, and GPS.
Worksheet	Saves currently opened windows and their settings in a worksheet. You may create max 30 worksheets.

Icon Bar

Icon	Description
Port	Configures serial port setting between test mobiles and SW. For detail, see **Configuring Port** .
Logging	Saves measurement data. For details, see **Starting/Stopping Logging**.
Replay	Replays logging data. For detail, see **Replaying Measurement**.
Trace	Option for User Defined feature. Trace data in past time. The orange icons on Trace bar moves 10 seconds back and

Icon	Description
	forth between data, and the pink icons moves 1 second back and forth. 
	Notifies special events.
	Starts AutoCall. For detail, see **Performing AutoCall Test**.
	Stops AutoCall.
	Displays major RF parameters and Call result on Real Time Mapping. For detail, see **Monitoring Data in Map in Real-Time (Real Time Mapping)**.

Status Bar

Classification	Description
Phone Status	
	Slot in **Port Setting** window is not set. XCAL recognizes that there is no test mobiles connected.
	Communication between XCAL and test mobile is failed due to the following reasons. • No physical connection between mobile and PC. • Wrong phone (chip) type in Port Setting window. • Wrong port number in Port Setting window. • Wrong log mask setting in Port Setting window.
	Port between XCAL and test mobile is set successfully. Test mobile number or Mobile# appears when successfully connected.
GPS Status	
No GPS	GPS in **Port Setting** window is not set. XCAL recognizes that there is no GPS connected.
[,]	GPS connection attempts.
[E0.0000,N0.0000, m]	No exact GPS location information is received from satellite.
GPS Alarm	GPS connection attempt is failed.
[E127.3XX,N33.7XXX,83m]	GPS connection attempt succeed. For details, see **Monitoring Data** - **Statistics/Status** - **GPS Status**.

Configuring Port

This chapter explains how to configure external devices (mobile station, GPS, Scanner, and etc that are conencted to XCAL HW) in XCAL SW.

One slot supports one test mobile. You may test with several test mobiles by activating and configuring each slot in **Port Setting** window.

- Before you begine port setting, check SIO mode. SIO mode in mobile may vary, check ISO mode depending on test mobile type.

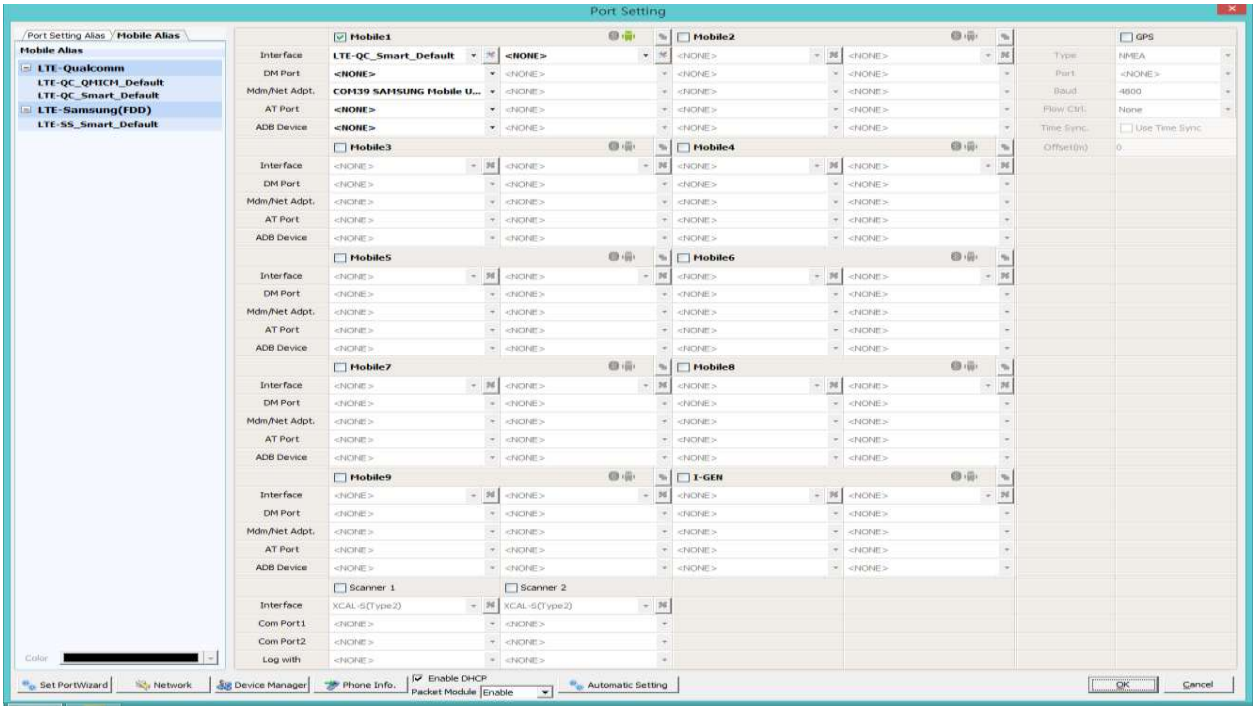
  Port setting, which is configured in mobile, and Data Port setting in XCAL should correpond. For detail of Data Port setting, see **Configuring Mobile Port (In Mobile Alias Setting window)** – **Data Port section**.

- For port configuration for each technologes, refer to corresponding technologies' Features User Guide provided seperately.
- Status bar in main window allows you to make sure phones and GPS are connected and configured successfully.

Configuring Port

1. Click **Port** 

icon from Icon bar, or go to Menu bar – **Setting** – **Port Setting**.
2. **Port Setting** window appears.



3. Enter a port setting alias name in **Interface** entry field, and click **Add/Edit** button.
4. Select checkbox of **Mobile#** to activate mobile slot. Configure mobile options. For details, see **Configuring Mobile Port (In Mobile Alias Setting window)**.

   (Optional) When GPS antenna is connected to HW, select the checkbox of **GPS** and configure options.

Classification	Description
Type	Selects GPS type. Supported GPS Type: NMEA, Trimble, Pioneer, Couei, TAIP(LN)
Port	Configures Com Port which receives location information from GPS. Make sure your Com Port information in Device Manager.
Baud	Configures communication speed between XCAL and GPS.
Flow Ctrl.	Select a flow control type; Hardware or Software. (Default: None)
Time Sync	Synchronizes time using GPS.

   (Optional) When Scanner is connected to HW, select the checkbox of Scanner and configure options.

5. Or, click **Automatic Setting** button to configure automatically.

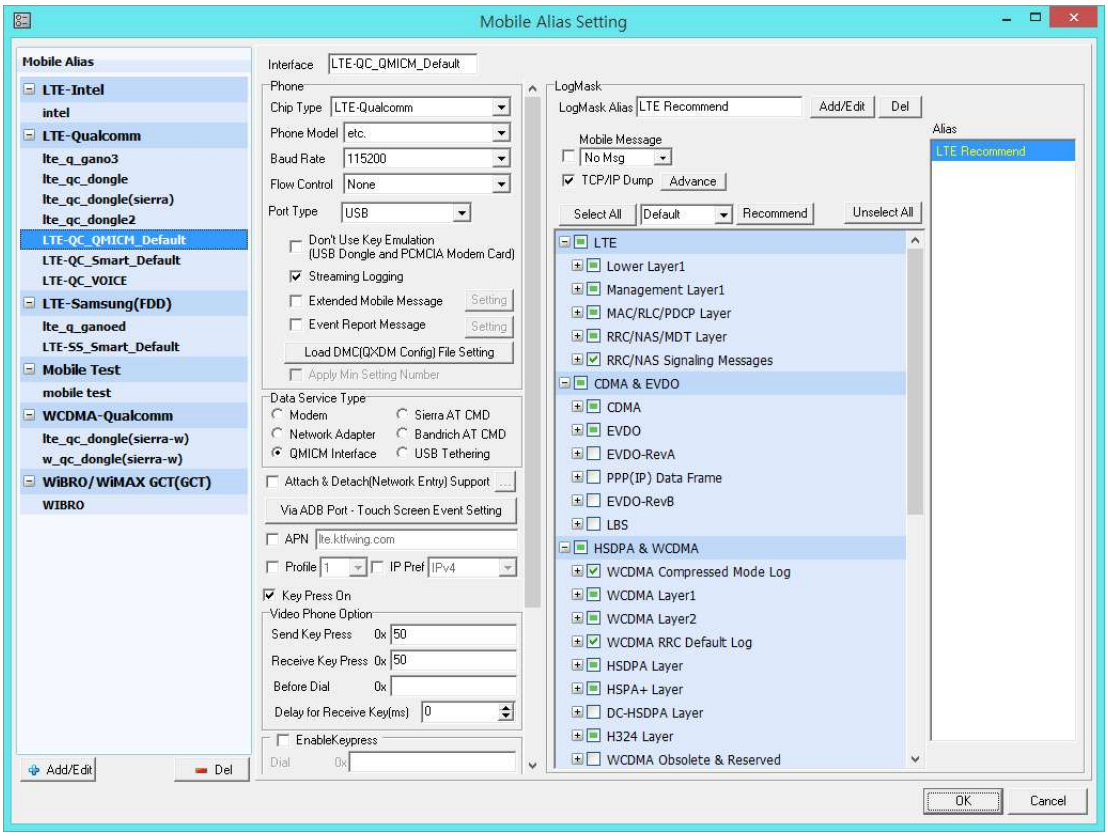
   DM port, Modem/Network Adapter, AT Port are automatically configured according to the options configured while configuring mobile port in **Mobile Alias Setting** window.

6. Click **OK**.

Configuring Mobile Port (In Mobile Alias Setting window)

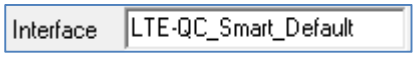
1. In **Port setting** window, select the checkbox of Mobile#.
2. Click **Mobile Alias Setting** button next to **Interface** of Mobile# setting.

   To edit existing mobile port setting, double-click a Mobile Alias name in **Mobile Alias** tab at the left side of **Port Setting** window.
3. **Mobile Ailas Setting** window appears.



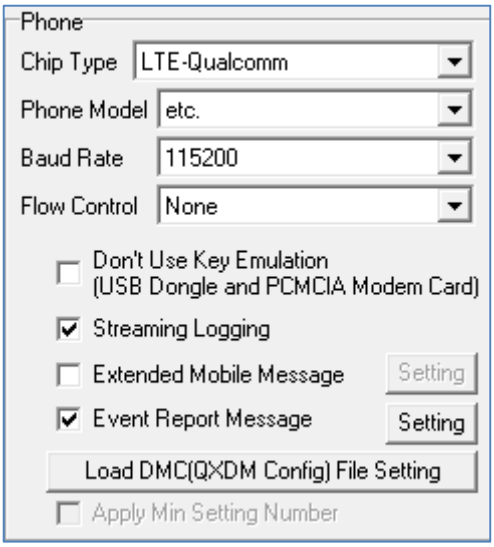
4. Select an existing default settings for mobile chipsets by double-clicking a mobile alias name in **Mobile Alias** tree at the left side of **Mobile Alias Setting** windiow.

5. Or, enter an Interface name in **Interface** entry field.
   Interface names are saved and to be used for saving mobile port configuration to re-use.



6. Configure **Phone**, **Data Service Type**, **Video Phone Option**, **Data Port**, **DUN**, **LogMask** section. For details, see the following sub-chapters.
7. Click **Add/Edit** button to save mobile port configurations. Make sure the newly configured mobile port configuraion is added in **Mobile Alias** list.
8. Click **OK**.

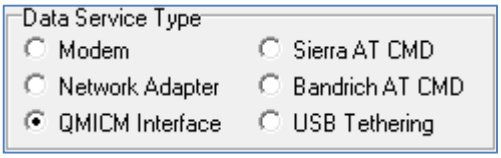
Phone section



Classification	Description
Chip Type	Defines the chipset of the mobile.
Phone Model	Selects the mobile model.
Baud Rate	Designates the communication speed through DM port.
Flow Control	Designates the method of flow control.
Don't Use Key Emulation (For Special Card Phone)	For specific card phone, key emulation function is note applied.
Streaming Logging	Determines if streaming logging is executed. - Checked (default): XCAL sends Packet Request Logmask to mobile and the mobile will send data continuously without any other requests. - Unchecked: XCAL sends Packet Request Logmask to mobile periodically and the mobile will sends data packets as per the requests. If streaming logging is checked for non streaming mobile, data is

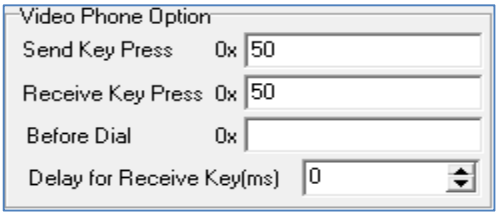
Classification	Description
	displayed once and then blank state will follow.
Extended Mobile Message	Additional mobile message User select extended mobile message which user want to see additionally.

Data Service Type section



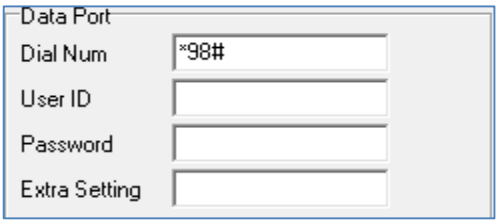
Classification	Description
Modem	Selects when using modem network.
Network Adapter	Selects when using network adapter or connection manager program.
QMICM Interface	Selects when using QMICM (Qualcomm MDM (MSM) Interface Connection Manager).

Video Phone Option section



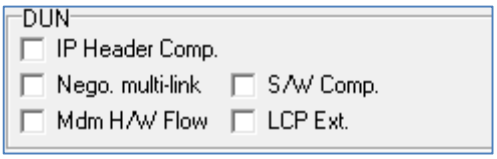
Classification	Description
Send Key Press	Enters send key value of test video mobile. If your send key value is 0x10, enter 10. If you need to enter more than one send key values, use semi colon between key values (e.g. 10;20;30).
Receive Key Press	Enters receive key value of test video mobile.
Delay for Receive Key (ms)	Enters receive key delay value of test video mobile.

Data Port section



Classification	Description
Dial Num	Configures dial number to connect to packet data switch.
User ID	Configures User ID to connect to packet data switch.
Password	Configures password to connect to packet data switch.
Extra Setting	Configures at+crm value used by packet data switch. *CDMA/EVDO: at+crm=1, at+crm=150, at+crm=160 …… *WCDMA : Example: AT+CGDCONT=1,IP+CGEQREQ=1,3,128,384 Note: Refer to standards document "Commands for Packet Domain of 3GPP TS 27.007 (AT command set for User Equipment (UE))"

DUN section



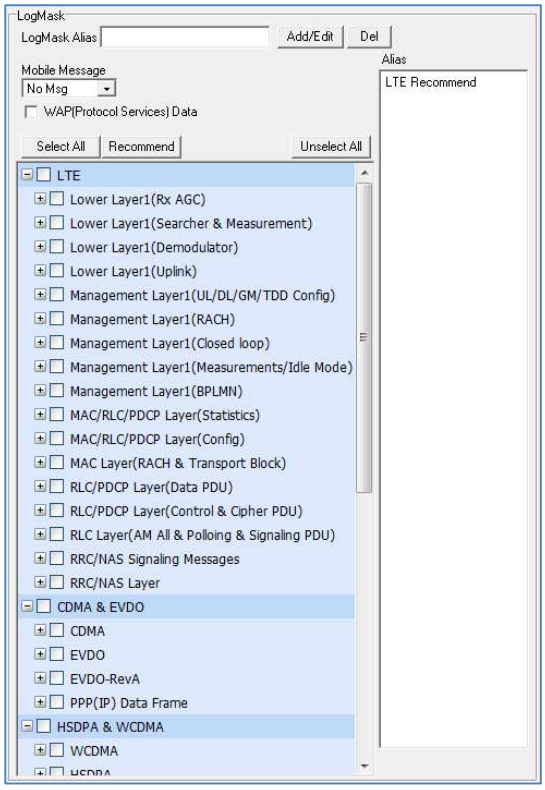
Classification	Description
IP Header Comp	Selects for using IP Header Compressor.
Nego. Multi-link	Negotiates multi link during initial LCP.
S/W Comp	Selects for using software compression.
Mdm H/W Flow	Selects for using hardware flow control.
LCP Ext	Selects for using LCP expansion.

LogMask section

LogMask part in **Mobile Alias Setting** window enables you to define log packets to receive from mobile and monitor in XCAL. By selecting necessary log packets in LogMask

list, you may save time for creating logging file and DM processing.

LogMask list varies depending on mobile and chip type.



1. Enter a LogMask Alias name in **LogMask Alias** entry field.

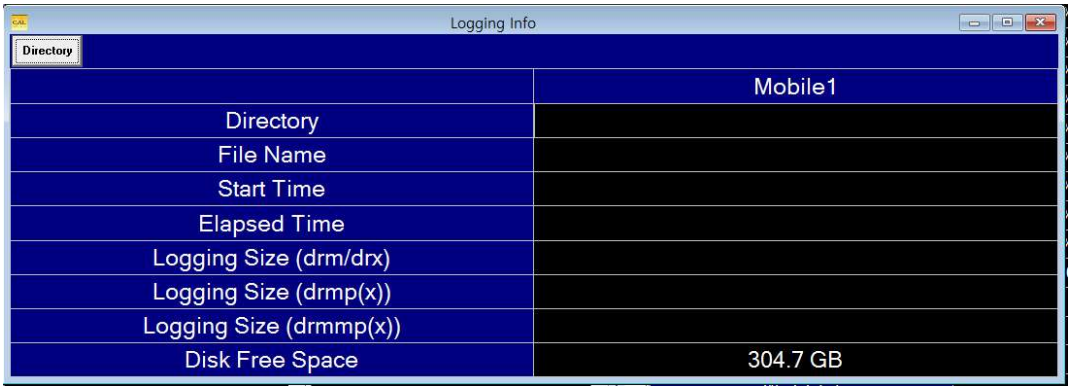
   LogMask name are to be used for saving LogMask list configuration in order to re-use configured LogMask list for other mobile ports and model.

2. Select checkboxes for packets in LogMask list.
3. Click **Add/Edit** button to save LogMask setting.
4. Make sure that the new LogMask setting is added to LogMask **Alias** list on the right side of LogMask part.

Starting/Stopping Logging

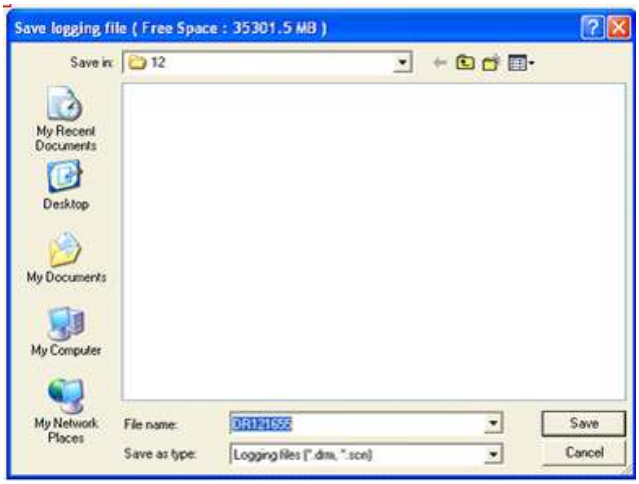
Signals and packet data collected during field test are saved in log file both manually and automatically.

- Log files are saved in the directory where the XCAL program files are saved in as default.
- To edit options for log files, go to main Menu bar – **Setting** – **Log File Setting**.
- **Logging Info** window displays logging status and detailed information. To open **Logging Info** window, go to main Menu bar – **Statistics/Status** – **Logging Info**. For details, **Monitoring Data** – **Statistics/Status** – Logging Info.



Starting/Stopping Logging Manually

1. Click **Logging**  button in Icon bar, or go to main Menu bar – **File** – **Logging On/Off**.
2. **Save Logging File** window appears.

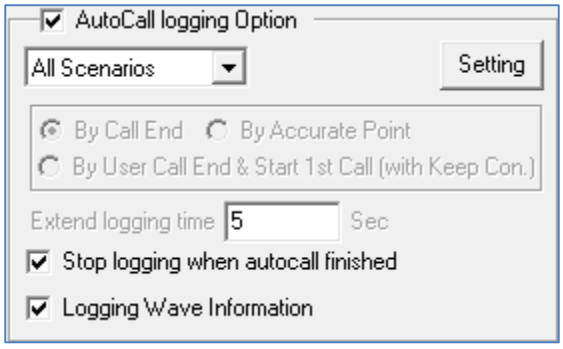


3. Designate a directory where the log file to be saved.
4. Click **Save**.
5. To stop logging manually, click **Logging** 

icon one more time.

Starting/Stopping Logging Automatically

While running an AutoCall test, log file is generated and saved automatically. In accordance with logging options in AutoCall Scenarios, XCAL generates and saves log file in designated directory.



When **All Scenarios** and **Stop Logging when AutoCall Finished** is configured in **AutoCall Logging Option** section in AutoCall Scenario, XCAL creates and saves all log files from the call start and stops saving logs at call end automatically.

For details, see **Configuring AutoCall Scenario**.

Performing AutoCall Test

XCAL generates and terminates various types of call tests based on pre-specified call scenario automatically. Multiple call types are avaiable for AutoCall test of XCAL such as voice, video telephony call (WCDMA), FTP, HTTP, PPP, Ping, Trace RT call, Email, SMS/MMS, YouTube, App, and etc. AutoCall scenario should be pre-configured for each call type.

This chapter guides you how to configure AutoCall scenarios for different call types, and starts and terminates call tests automatically. This XCAL User Guide instructs common call types; Voice, FTP, and HTTP.

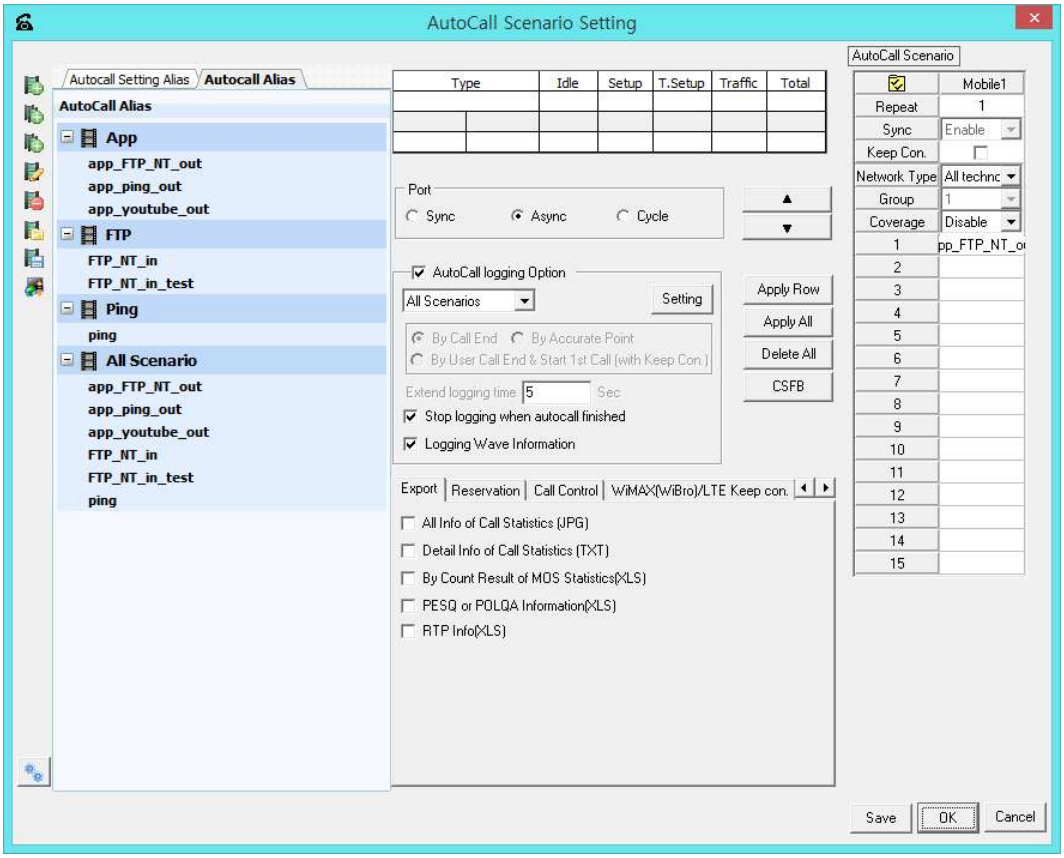
Call types vary depending on License Key.

Configuring AutoCall Sceanrio

Before starting AutoCall test, AutoCall scenario for each call type should be configured in advance.

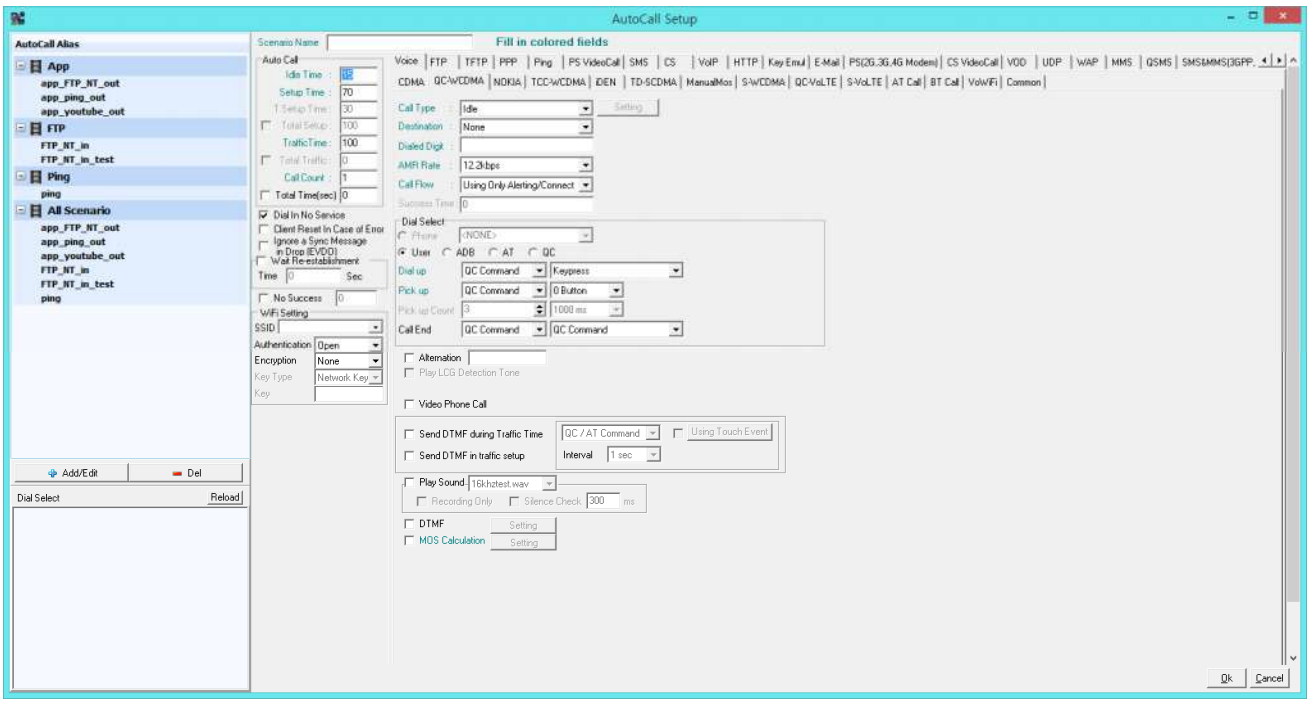
1. Click **AutoCall** 

icon from Icon bar, or go to main Menu bar – **File** – **AutoCall Start**.
2. **AutoCall Scenario Setting** window appears.



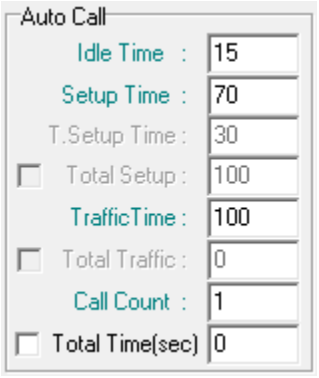
3. Click **Create New Scenario** button at the top left corner in **AutoCall Scenario Setting** window.

4. **AutoCall Setup** window appears.



5. Enter an AutoCall Scenario name in **Scenario Name** entry field.

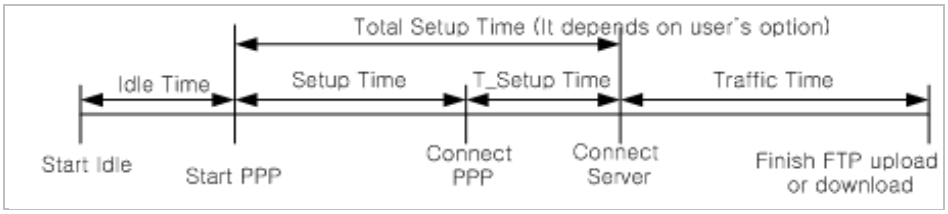
6. Configure AutoCall common timer options at the left side of **AutoCall Setup** window.



Option	Description
Idle Time	Waiting time in Idle mode between call attempts
Setup Time	Maximum allowance time to connect call to network after Idle Time end and call attempt. (unit: sec)
T.Setup Time	Maximum time period to connect to application server after establishment of PPP connection. This field is valid for packet data service application.
Total Setup	Setup time plus T_Setup time * Applies for only FTP & HTTP Call.
Traffic Time	Session maintenance time to determine call success after session is opened. (unit: sec)
Call Count	Repeat counts each call that Idle / Setup(T_Setup) / Traffic Time
Total Time (sec)	Time interval between calls Enter more than the time of (Idle Time + Setup Time (+T_Setup Time) + Traffic Time)

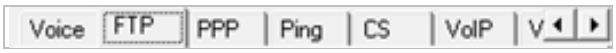
[Time diagram for Voice calls]

[Time diagram for Data calls]



7. Select a call type tab, and configure call test options for each call type.

   Options in green color should be configured.

   Following sections introduces how to configure common options for each call type. For details, see **Voice**, **FTP**, and **HTTP**.

8. When all necessary options are properly configured, click **Add/Edit** button at the lower left side of **AutoCall Setup** window to add the configured automated call script options to Alias list.

   Once an automated call script is created and saved in the Alias list, it is able to be used for other call tests.

9. Click **OK** button in **AutoCall Setup** window.

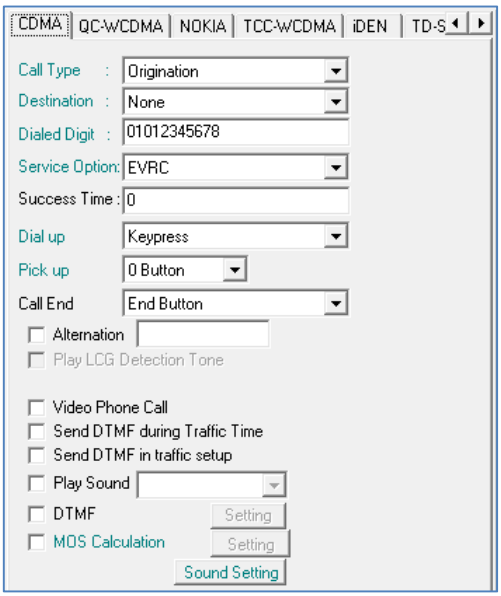
10. Backing to **AutoCall Scenario Setting** window, make sure that the configured AutoCall scenario is listed in AutoCall Scenario **Alias list**.

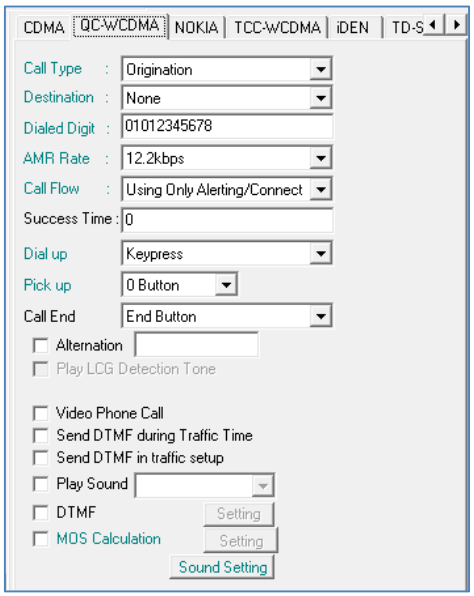
    Once a call scenario is created, it is stored in AutoCall Scenario **Alias list** and is able to be used for other call tests.

11. Click **OK**.

Voice

Select **Voice** tab and configure options for voice AutoCall measurement.

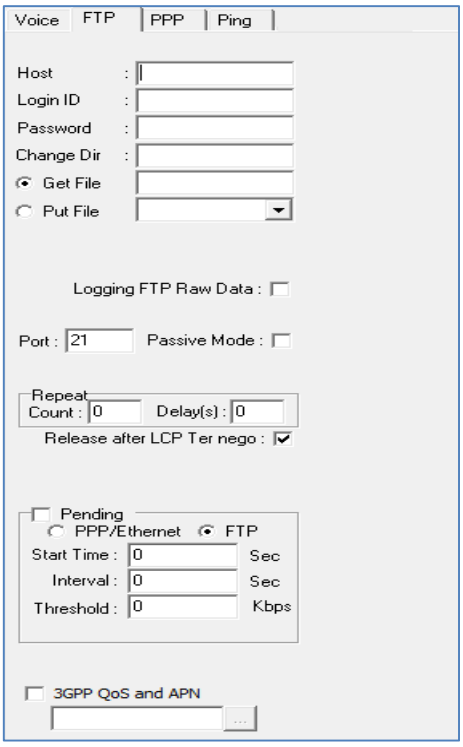




Option	Description
Call Type	Set AutoCall test type. **Idle**: Connect no calls and keep idle condition. **Origination**: Test mobile transmit call test. **Termination**: Test mobile receive call test. Sufficient Idle Time should be set due to it page responses in Idle Time. **Continuous Call**: The same as Origination, but it maintains a call continuously regardless of Traffic time on Auto Call Part. **M to M Org**: Calling the other mobile in case 2 mobiles are connected to XCAL. (Assign the other mobile in the Destination field). **M to M Ter**: Receiving a call from the other mobile in case 2 mobiles are connected to XCAL. (Assign the other mobile in the Destination field).
Destination	For M to M Org and M to M Ter type test. Select destination mobile number.
Dialed Digit	Designate phone number to be dialed.
Service Option	Designate Service Option for voice call. It is valid on the phones with CDMA Qualcomm chipset.
Dial up	Select how to dial up test mobile. **QC Command:** Dial up through QC Command. **Keypress:** Dial up through mobile key press. **AT Command:** Dial up through AT Command.
Pick up	Select how to pick up test mobile. **Send button:** Click Send button on test mobile to receive call. **0 button:** Click zero (0) button on test mobile to receive call. **AT Command:** Receive through AT Command. **NOTE**: For some WCDMA mobiles, it is impossible to receive call by zero (0) button.
AMR Rate	Designate AMR rate. It is valid on the phones with WCDMA Qualcomm chipset.
Call Flow	Designate the starting point for traffic state. Traffic state starts when RB Setup, Alert, or Connect message is detected.

FTP

Select **FTP** tab and configure options for FTP AutoCall measurement.

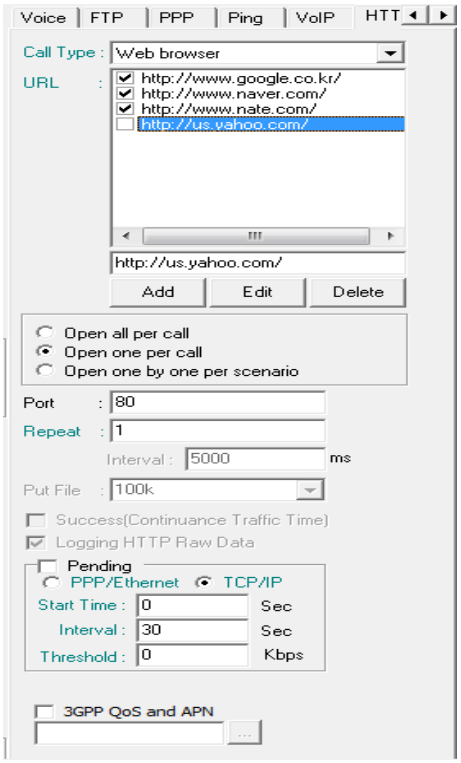


Option	Description
Host	Designates IP number of host server to connect.
Login ID	Configures Login ID of host server.
Password	Configures Password of host server.
Change Dir	Designates the directory of host server where file to be downloaded.
Ger File	Designates file name to be downloaded.
Put File	Designates file size to be uploaded. Select the file size from the drop down list. To transfer file size which is not on the list, type the number. - Unit: k = KB, m = MB - No unit = XCAL-MO assumes MB
Logging FTP Raw Data	Check: logging payload data of TCP Uncheck: logging only header data
Port	Configures port number per protocol.
Passive Mode	Selects the FTP server is connected with the passive mode
Repeat	Designates repeat count. After server connection, it repeats the Get File or, the Put File command in traffic. * Count : Set the repeat count * Delay : Set the delay until the before get file
Release after LCP Ter nego	If the option is checked, it will wait for PPP Release order after the completion of Data transmission. If the option is unchecked, it does not

Option	Description
	wait for PPP Release order and it ends call using the End button. User can confirm LCP packet from packet message window.
Pending	When measured traffic is kept lower than the configured conditions, XCAL release a current call forcibly and start the next call. The measured traffic is kept monitoring from Traffic Start. When the traffic lower than the configured condition [**Threshold**] is detected for [**Interval**] without any compulsory recover, Pending event is declared. **PPP/Ethernet**: Selects whether the pending condition will be applied to PPP/Ethernet layer throughput. **FTP**: Selects whether the pending condition will be applied to FTP (application) layer throughput. **Start Time (sec)**: The duration between the traffic start time and when pending condition starts to be measured. **Interval (sec)**: If the throughput value remains under the defined **threshold** value for the defined **interval** period, pending event is declared and the call is terminated. **Threshold (Kbps)**: The desired throughput value in kbps If throughput remains under the defined **threshold** value for the defined **interval** period, pending event is declared and the call is terminated.
3GPP QoS and APN	Sets QoS and APN of PDP Context which is defined in 3GPP. Refer to 3GPP TS 27.007 (http://www.3gpp.org/)

HTTP

Select **HTTP** tab and configure options for HTTP AutoCall measurement.



Classification	Description
Call Type	Selects a HTTP call type; Web Browser, Download, Upload.
URL	Enters URL Address to connect. More than 2 addresses can be configured. (Maximum: 70 addresses) Enter an URL address in the entry field, and click **Add** button. **Open all per call**: Performs test all registered URL at once for one call. **Open one per call**: Performs test all registered URL sequentially for one call. **Open one by one per scenairo**: For multi call tests. Every call is processed taking the listed URL sequentially. If the first scenario is completed not finishing the all listed URL, the second scenario continues the next URL.
Port	Configures control port number for each protocol. (Default: 21)
Repeat	Enters number of access attempt to HTTP address to connect.
Pending	When measured traffic is kept lower than the configured conditions, XCAL release a current call forcibly and start the next call. The measured traffic is kept monitoring from Traffic Start. When the traffic lower than the configured condition [**Threshold**] is detected for

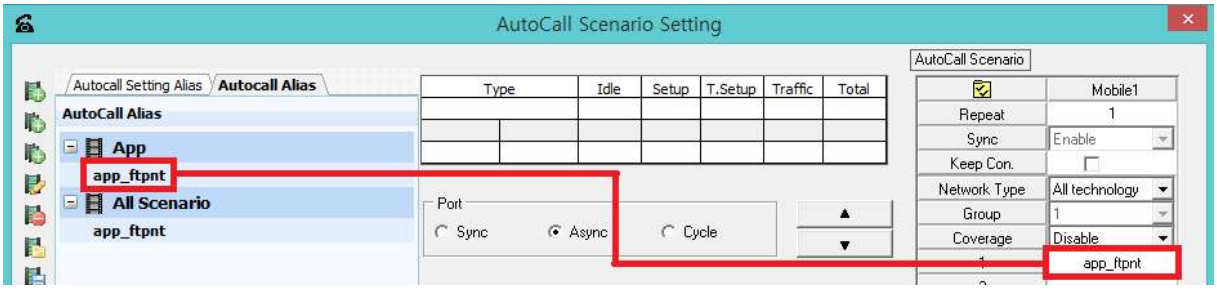
Classification	Description
	[**Interval**] without any compulsory recover, Pending event is declared. **PPP/Ethernet**: Selects whether the pending condition will be applied to PPP/Ethernet layer throughput. **FTP**: Selects whether the pending condition will be applied to FTP (application) layer throughput. **Start Time (sec)**: The duration between the traffic start time and when pending condition starts to be measured. **Interval (sec)**: If the throughput value remains under the defined **threshold** value for the defined **interval** period, pending event is declared and the call is terminated. **Threshold (Kbps)**: The desired throughput value in kbps If throughput remains under the defined **threshold** value for the defined **interval** period, pending event is declared and the call is terminated.
3GPP QoS and APN	Refer to 3GPP TS 27.007. (http://www.3gpp.org/)

Configuring Call Scheduler

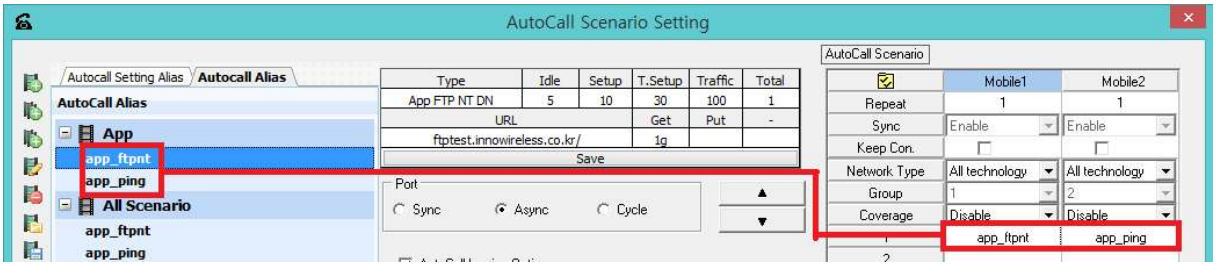
Now, you completed necessary AutoCall Scenario options for each call type, and the configured AutoCall scenarios are listed in AutoCall Scenario **Alias List**.

You need to give sequences on the configured AutoCall scenario by using Call Scheduler in **AutoCall Scenario Setting** window. You may perform call tests sequentially or in parallel with multiple mobile connections.

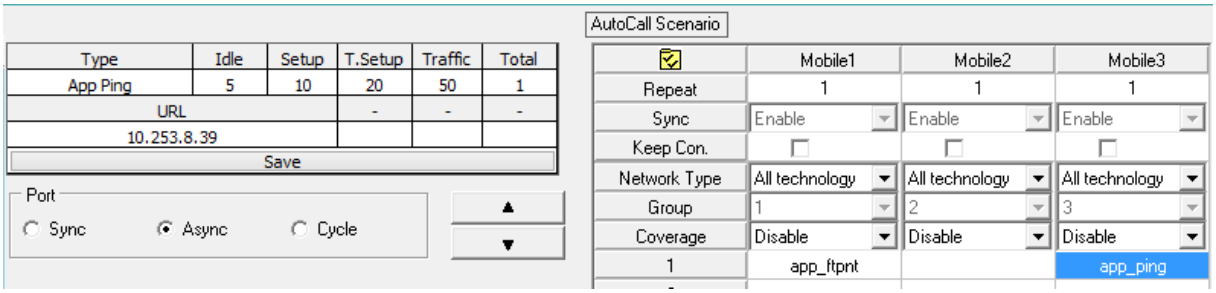
1. To list pre-configured AutoCall scenario from AutoCall Scenario **Alias List**, drag a call scenario from **Alias List** to Call Scheduler section.
2. If you want to perform call test sequentially, drag and drop more call scripts on Call Scheduer. XCAL will run AutoCall test in sequence as scenario is listed.

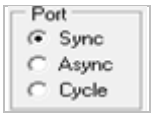


3. If you want to perform call test in parallel with multiple mobile connections, drag and drop call scenario for other mobile ports.



4. If multiple mobiles are configured in Call Scheduler, configure port options.

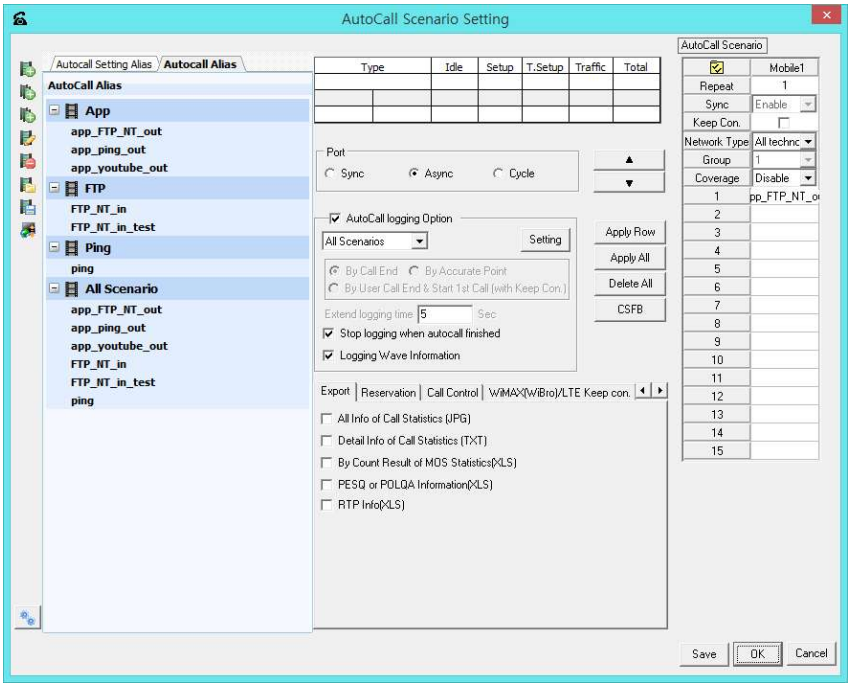


Option	Description
Port 	**Sync**: Synchronizes call start on every call attempt among multiple mobiles. **Async**: Perofrms call test independently. **Cycle**: Performs call test in turn.
Repeat	Configures how many times a call scenario to be repeated by each mobile.
Sync	Selects between enable or disable sync option. If it is configured to be **Enable**, the mobile port is affected by **Sync** option setting.
Keep Con.	Keeps a PPP connection between multiple PS calls. If it is not selected, XCAL releases PPP connection on every call.
Network Type	Selects network type to perform a call test in.

Starting AutoCall Test

Configuration of AutoCall scenario and AutoCall scheduler is completed. You may start AutoCall test.

1. When all settings are configured in **AutoCall Scenario Setting** window, click **OK** button.



2. **Save logging files** window appears. Designate a directory to save log file.
3. Click **Save**.
4. **Call Statistics (Current Scenario)** window appears, and AutoCall test is started.

Stopping AutoCall Test

AutoCall test is stopped as configured in AutoCall scenario automatically. However, you may terminate a call test while the test is in progress.

1. Click **CallStop** 

icon from Icon bar, or go to main Menu bar – **File** – **AutoCall Stop**.
2. AutoCall test is terminated manually.

Monitoring Data

By performing manual and automatic call tests, multiple signal and packet data are collected, an d can be monitored in multiple formats in real-time.
This chapter introduces common monitoring windows; in **Messages**, **Statistics/Status**, and **User Define** menus in main Menu bar.

Provided monitoring windows vary depending on License Key.

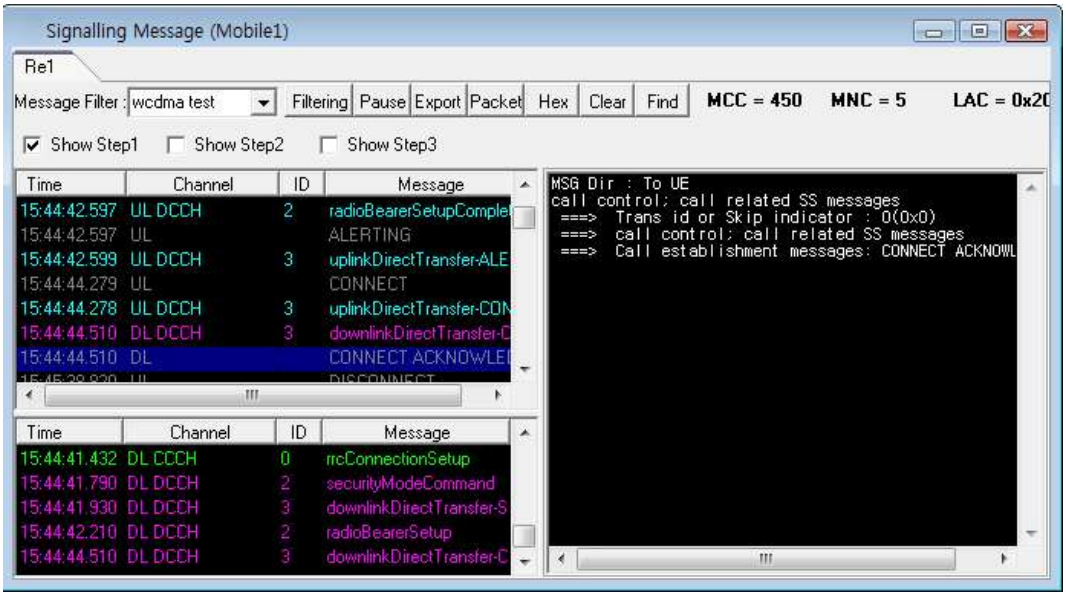
Messages

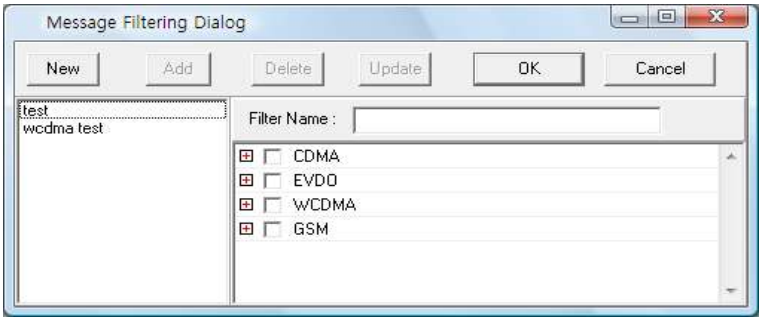
Following sub-menus are listed under **Message** menu in main Menu bar.

Signaling Message

Signaling Message window shows Layer3 messages collected from test mobile.

1. Select main Menu Bar - **Message** – **Signaling Message**.
2. **Signaling Message (Mobile#)** window appears.



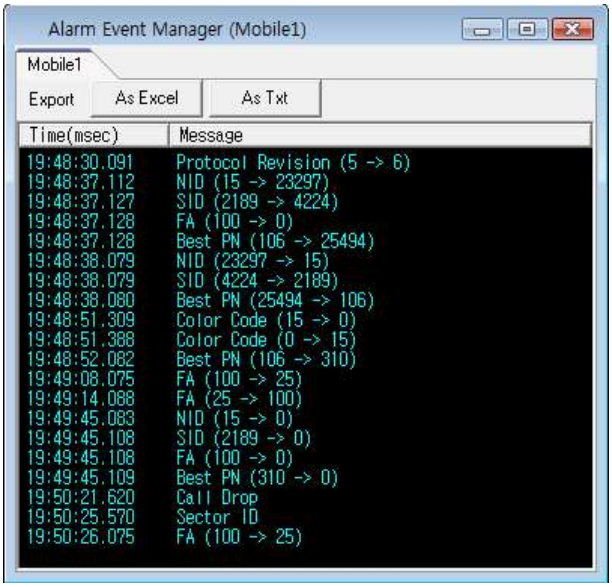
Item	Description
Message Filter	Clicks **Filtering** button to select filter name. **Filtered Message** window shows the filtered message flow.
Filtering	Adds/Deletes/Edits message filter. 1. Click **Filtering** button. 2. **Message Filtering Dialog** window appears.  3. Click **New** button. Enter message filter name in **Filter Name** entry field. 4. Select message type you want to filter. Click **Add.** 5. Click OK.
Pause/Resume	Pauses/Resumes message flow. If message flow is stopped by **Pause** button, messages are saved while logging is in progress.
Export	Exports the current message in the viewer in txt format.
Packet	Displays packet message with CAI message.
Clear	Deletes all messages shown in the window.
Find	Finds message.
Show Step 1,2,3	For WCDMA only. Displays selected Step 1,2,3 parameter in real time.

Item	Description
Message window	The upper left section in **Signaling Message** window. Displays signaling message.
Filtered Message window	The lower left section in **Signaling Message** window. Displays the selected parameter inforamtion.
Detailed Message Information window	The right section in **Signaling Message** window. Displays parameter information of the selected message.
Time	Shows Time Stamp for CAI message flow.
Show Step	For WCDMA only. Displays **Show Step 1, 2, 3** messages.
Channel	Shows message transfer channel.
ID	Shows message ID.
Message	Shows message name.

Alarm Event Manager

Alarm Event Manager window lists up alarm events.

1. Select Menu Bar - **Message** – **Alarm Event Manager**.
2. **Alarm Event Manager (Mobile#)** window appears.

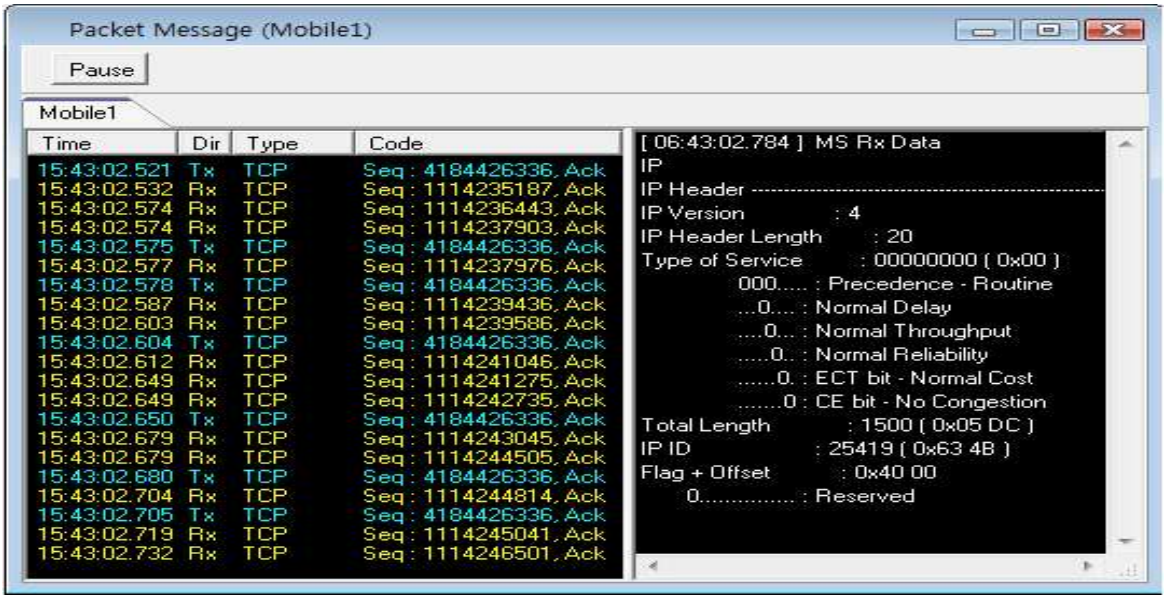


Item	Description
As Excel/Txt	Exports alarm event manager window in xls or txt.
Time	Displays time stamp of message.
Message	Displays event list which meet alarm condition.

Packet Message

Packet Message window displays message flow and detailed content of message of test mobile. Packets which generated from test mobile during data service such as LCP, CHAP, IPCP, IP, TCP, UDP, ICMP, and etc. are displayed in order.

1. Select Menu Bar - **Message** – **Packet Message.**
2. **Packet Message (Mobile#)** window appears.

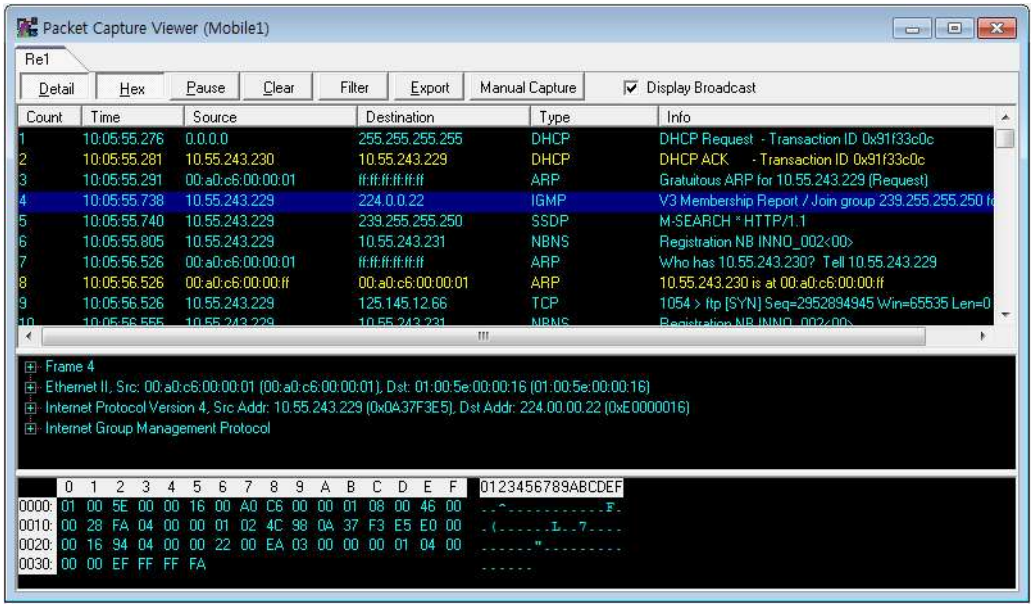


Item	Description
Pause/Resume	Pause/Resume message flow.
Time	Show time stamp of message.
Dir	Show message flow direction. **Rx**: Receive (Network > PC / MS) **Tx**: Transmit (PC / MS > Network)
Type	Show packet message type.
Code	Show message name and Seq/ACK number.
Message display window	The left section in **Packet Message** window. Display packets which generated from test mobile during data service such as LCP, CHAP, IPCP, IP, TCP, UDP, ICMP, and etc. are displayed in order.
Protocol analysis window	The right section in **Packet Message** window. A protocol analyzer which analyzes captured packets and display packet message. **NOTE**: Supported depending on product version.

Packet Capture Viewer

Packet Capture Viewer window displays captured packet messages.

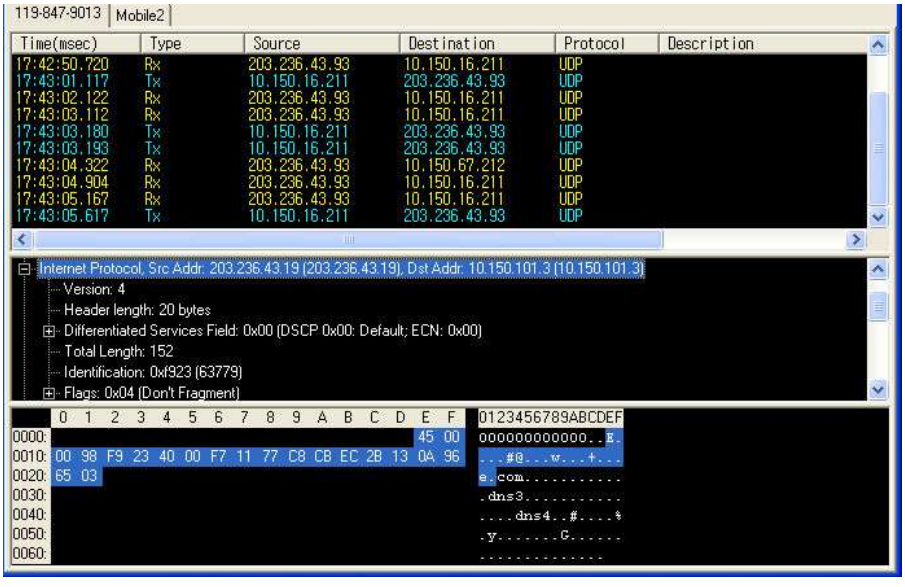
1. Select Menu Bar - **Message** – **Packet Capture Viewer.**
2. **Packet Capture Viewer (Mobile#)** window appears.



PPP Frame Message

PPP Frame Message window displays PPP Frame information including UM/RM/AN Frame.

1. Select Menu Bar - **Message** – **PPP Frame Message.**
2. **PPP Frame Message (Mobile#)** window appears.



Statisticcs/Status

Following sub-menus are listed under **Statistics/Status** menu in main Menu bar.

Call Statistics (Current Scenario)

Call Statistics (Current Scenario) window appears automatically when starting an AutoCall test, and displays call statistics of currently processed scenario.

Detailed call statistics including detailed fail reason, call procedure and information (setup time, traffic time, IP address) are displayed.

1. Select Menu Bar - **Statistics/Status** – **Call Statistics (Current Scenario)**.
2. **Call Statistics (Current Scenario)** window appears.

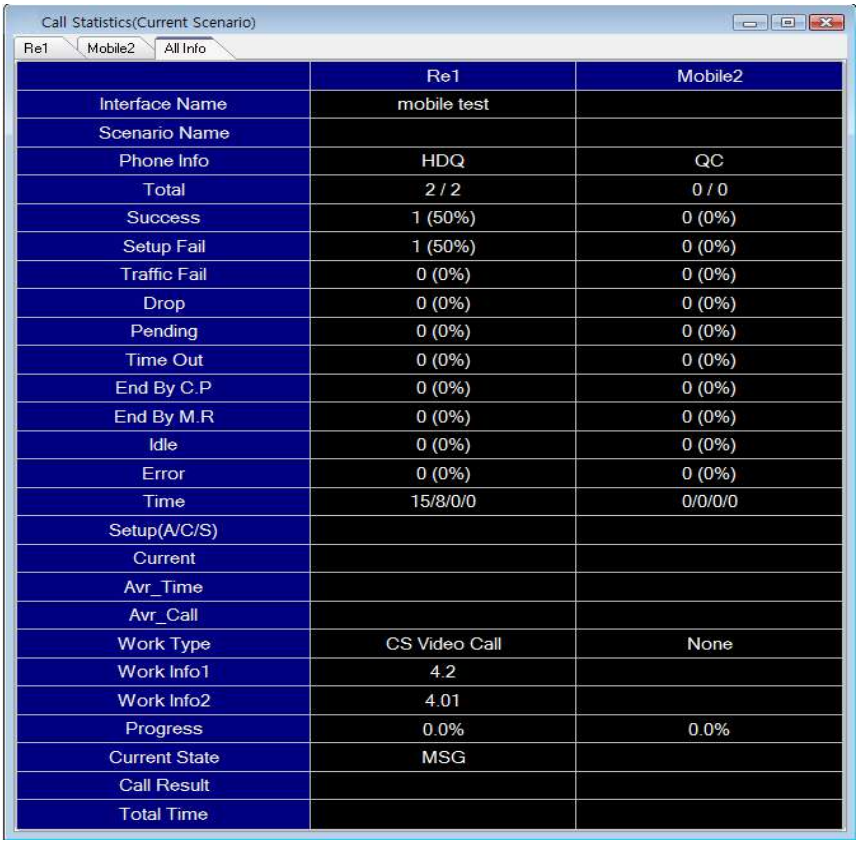
	Mobile1	Mobile2	Mobile3	01029214326	01029215772	Mobile9	01021462266	01021468027
Interface Name	LTE SKT 모뎀	.TE SKT 단말(음성	.TE SKT 단말(음성	KT-W 단말(음성)	KT-W 단말(음성)	LTE LG 모뎀	SKT-W 단말(음성)	SKT-W 단말(음성)
Scenario Name	FTP 업	toM ORG_1(SKT-l	toM TER_2(SKT-l	toM ORG_1(KT-W	toM TER_2(KT-W	FTP 업	/toM ORG_1(sk-W	/toM TER_2(sk-W
Phone Info	comm(USB Dongle	TE-Qualcomm(etc	TE-Qualcomm(etc	HDQ(etc.)	HDQ(etc.)	comm(USB Dongle	HUQ(etc.)	HUQ(etc.)
Total	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Success	0 (0%)	1 (100%)	1 (100%)	1 (100%)	1 (100%)	0 (0%)	1 (100%)	1 (100%)
Setup Fail	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Traffic Fail	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Drop	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Pending	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Time Out	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
End By C.P	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
End By M.R	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Idle	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Error	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Time	15/3/0/0	20/10/0/65	26/4/0/66	20/9/0/65	32/5/0/65	15/3/0/10	20/8/0/65	32/5/0/65
Setup(A/C/S)	//					//0.26		
Current								
Avr_Time	0					2302.2		
Avr_Call		3.28	3.66	3.39	3.71	2302.2	3.78	3.75
Work Type	Up	Org - M3	Ter - M2	Org - M7	Ter - M6	Up	Org - M14	Ter - M13
Work Info1		MOS Stop	MOS Stop	MOS Stop	MOS Stop		MOS Stop	MOS Stop
Work Info2								
Progress	0.0%	100.0%	0.0%	100.0%	0.0%	3.0%	100.0%	0.0%
Current State	Call End	Call End	Call End	Call End	Call End	Call End	Call End	Call End
Call Result	End by user	Success	Success	Success	Success	End by user	Success	Success
Total Time								

Call Statistics window has **All Info** and **Detailed Info** tabs.

All Info tab (Voice)

All Info tab in Call Statistics window displays call statistics, procedure, information of test mobile.

All Info tab displays different statistics items depending on call type (Voice, Data Call).



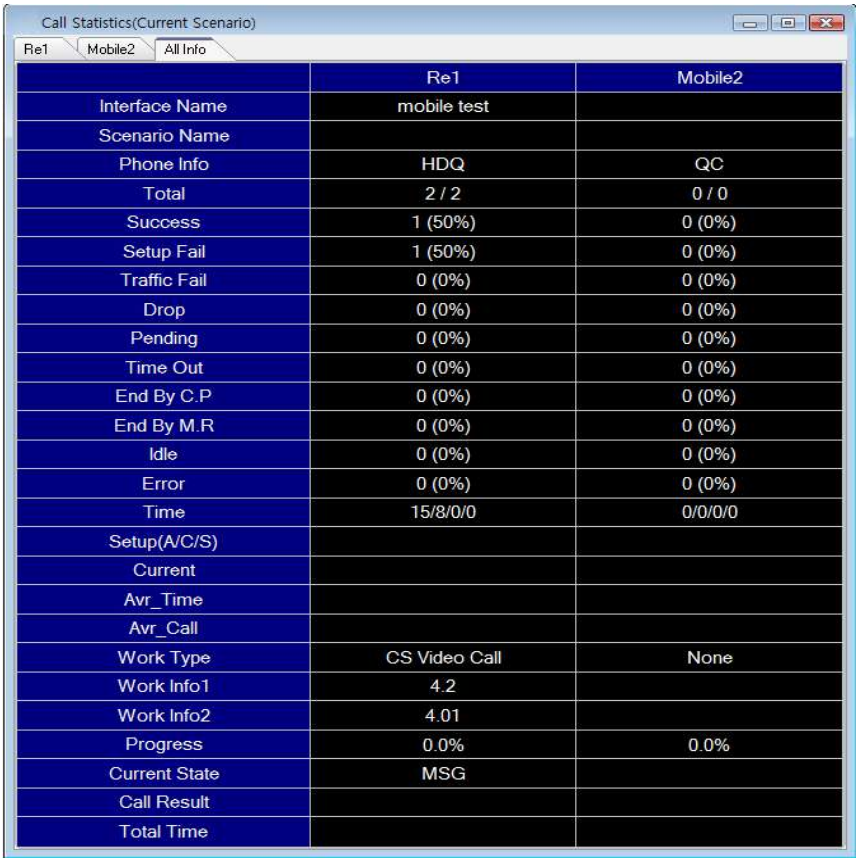
	Re1	Mobile2
Interface Name	mobile test	
Scenario Name		
Phone Info	HDQ	QC
Total	2 / 2	0 / 0
Success	1 (50%)	0 (0%)
Setup Fail	1 (50%)	0 (0%)
Traffic Fail	0 (0%)	0 (0%)
Drop	0 (0%)	0 (0%)
Pending	0 (0%)	0 (0%)
Time Out	0 (0%)	0 (0%)
End By C.P	0 (0%)	0 (0%)
End By M.R	0 (0%)	0 (0%)
Idle	0 (0%)	0 (0%)
Error	0 (0%)	0 (0%)
Time	15/8/0/0	0/0/0/0
Setup(A/C/S)		
Current		
Avr_Time		
Avr_Call		
Work Type	CS Video Call	None
Work Info1	4.2	
Work Info2	4.01	
Progress	0.0%	0.0%
Current State	MSG	
Call Result		
Total Time		

Item	Description
Interface	Shows name of Alias configured during Porting Setting.
Scenario	Shows the current scenario name (current count/total retry count).
Phone Info	Mobile Type (shows chip type and mobile type).
Total	The number of calls progressed/Total number of calls for auto call test
Success	The number and percentage of successful calls for attempted calls
Setup Fail	The number of setup fail calls (Setup fail occurs when radio link setup failure happens)
Drop	Call drop during progress of traffic
End By C.P	Disconnect by Counter party (release or drop) *This event is available for Voice and CS
End By M.R	Call disconnected by mobile, after traffic.
Idle	* CDMA : Fail to receive general page message * WCDMA : Fail to receive rrc Connection Request message
Error	Number of calls with various errors such as No ATDT, modem Error and port error. These errors are related to test phone
Time	Idle time/Setup time/Traffic setup time/Traffic time
Work Type	Autocall type such as FTP Up/Down state, Ping, HTTP and CS
Progress	It displays the progress of the current call
Current State	Indicate current state of application service
Call Result	Result of call

All Info tab (Data)

All Info tab in Call Statistics window displays call statistics, procedure, information of test mobile.

All Info tab displays different statistics items depending on call type (Voice, Data Call).



	Re1	Mobile2
Interface Name	mobile test	
Scenario Name		
Phone Info	HDQ	QC
Total	2 / 2	0 / 0
Success	1 (50%)	0 (0%)
Setup Fail	1 (50%)	0 (0%)
Traffic Fail	0 (0%)	0 (0%)
Drop	0 (0%)	0 (0%)
Pending	0 (0%)	0 (0%)
Time Out	0 (0%)	0 (0%)
End By C.P	0 (0%)	0 (0%)
End By M.R	0 (0%)	0 (0%)
Idle	0 (0%)	0 (0%)
Error	0 (0%)	0 (0%)
Time	15/8/0/0	0/0/0/0
Setup(A/C/S)		
Current		
Avr_Time		
Avr_Call		
Work Type	CS Video Call	None
Work Info1	4.2	
Work Info2	4.01	
Progress	0.0%	0.0%
Current State	MSG	
Call Result		
Total Time		

Item	Description
Interface	Shows name of Alias configured during Porting Setting.
Scenario	Shows the current scenario name (current count/total retry count) to run.
Phone Info	Mobile Type(shows chip type and mobile type)
Total	The number of calls progressed/Total number of calls for auto call test
Success	The number and percentage of successful calls for attempted calls
Setup Fail	Setup fail occurs when radio link setup failure happens
Traffic Fail	Traffic fail is declared if connection to application layer fails after finishing PPP layer connection. *This event is available for data service such as FTP, TFTP and HTTP
Drop	Call drop during progress of traffic
Pending	If throughput is sustained under predefined threshold for designated time threshold, then pending is declared and the call will be dropped For details, see **Configuring AutoCall Scenario** – **FTP** – **Pending** section.

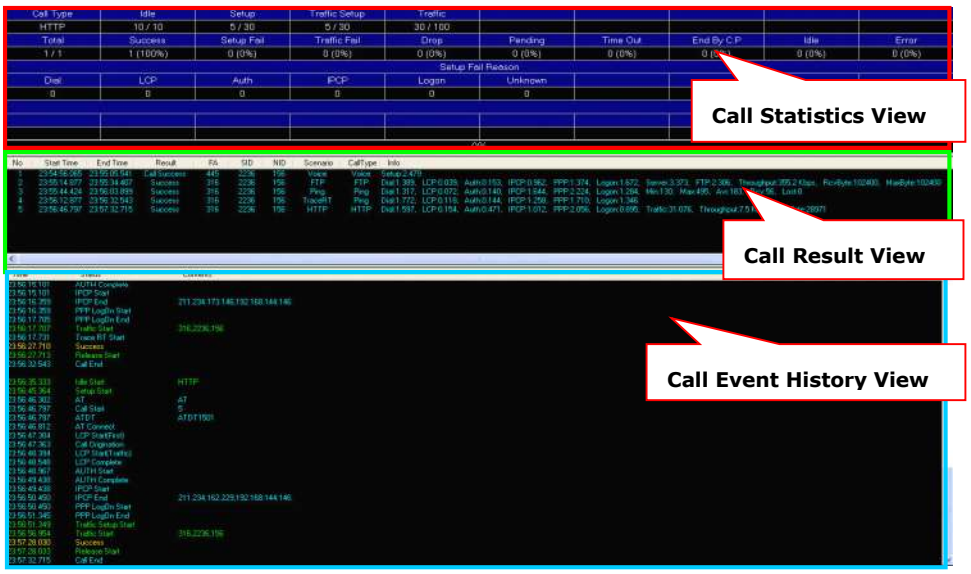
Item	Description
Time Out	If download or upload from/to application can not be finished during predefined traffic time interval, then Time Out is declared
Error	Number of calls with various errors such as No ATDT, modem Error and port error. These errors are related to test phone.
Time	Idle time/Setup time/Traffic setup time/Traffic time
Setup(A / C / S)	Connection Time for Air link setup time/Core link setup time/Server setup time **CDMA** **Air Time**: ATDT ~ LCP Start(Traffic) **Core Time**: LCP Start(Traffic) ~ IPCP End **Server Time**: FTP Connecting ~ FTP Load CMD **WCDMA** **Air Time**: ATDT ~ RRC Connection Complete **Core Time**: RRC Connection Complete ~ Activate PDP Context Accept **Server Time**: FTP Connection ~ FTP Load CMD **GSM** **Air Time**: ATDT ~ PDP Context Request **Core Time**: Activate PDP Context Request ~ Activate PDP Context Accept **Server Time**: FTP Connection ~ FTP Load CMD
Current	Displays throughput of proceeding call.
Avr_Time(Kbps)	Average throughput of calls averaged over time
Avr_Call(Kbps)	It is calculated as follows; Total received bytes / Total elapsed times of all FTP transmission
Work Type	Displays current call type.
Work Info1	IP address of application server before starting service application. File size to be downloaded or uploaded after starting service application
Work Info2	File name to be downloaded or uploaded before starting service application. Amount of data downloaded or uploaded after starting service application
Progress	Indicates percentage of data quantity downloaded or uploaded over total file size
Current State	Indicates current state of application service
Call Result	Result of call.

Detailed Info tab

Detailed Info tab displays call statistics, procedure, and event.

Detailed Info window consists of the following three sectinos.

- Call Statistics View
- Call Result View
- Call Event History View



Call Statistics View

Call Statistics View shows the statistics of call result over the current auto call scenario such as success rate, setup fail rate, traffic fail rate, drop rate and the specific reason of failed calls.

Call Type	Idle	Setup	Traffic Setup	Traffic					
FTP	1 / 1	6 / 10	1 / 10	0 / 100					
Total	Success	Setup Fail	Traffic Fail	Drop	Pending	Time Out	End By C.P	Idle	Error
1 / 1	0 (0%)	0 (0%)	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Setup Fail Reason									
Dial	LCP	Auth	IPCP	Logon	Unknown				
0	0	0	0	0	0				
Traffic Fail Reason									
Connect	Change Dir	File Open	Time Out	Unknown					
1	0	0	0	0					
0%									

Item	Description
AutoCall Setting	
Call Type	Call Type (Voice, FTP…)
Idle Time	Time interval between two successive calls
Setup Time	Time limit for the test phone to connect to Dial-Up Network. If the test phone cannot be connected to Dial-Up Network until the Setup Time expires, XCAL-MO counts it as fail call.

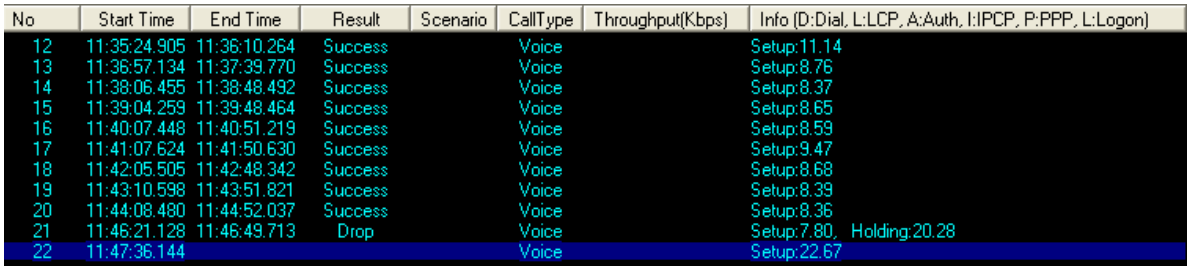
Item	Description
Traffic Setup Time	Duration from connecting to the FTP site to completion of downloading. If the call is dropped in the middle of the call before the Traffic setup Time expires, XCAL-MO counts it as drop call.
Traffic	No of calls successfully completed downloading during traffic time
Call summary	
Total	The number of calls progressed/Total number of calls for auto call test.
Success	The number and percentage of successful calls for attempted calls.
Setup Fail	Setup fail occurs when radio link setup failure happens.
Traffic Fail	Traffic fail is declared if connection to application layer fails after finishing PPP layer connection *This event is available for data service such as FTP, TFTP and HTTP.
Drop	Call drop during progress of traffic
Pending	If throughput is sustained under predefined threshold for designated time threshold, then pending is declared the call will be dropped. *This event is available for FTP.
Time Out	If down load or up load from/to application can not be finished during predefined traffic time interval, Time Out is declared. *This event is available for FTP.
End By C.P	The number of calls progressed/Total number of calls for auto call test.
Idle	* CDMA : Fail to receive page response message * WCDMA : Fail to receive rrc Connection Request message
Error	Number of calls with error
Congestion	Receive mobile is on line.
No Service	Fail to receive service connect message
Fail Reason	
Voice Call Setup Fail Reason (CDMA)	
Origination Fail	Fail to send origination message within setup time in origination type call
Channel Assign Fail N	Fail to receive channel assignment message. N is number of Origination of Page Response Messages
No Service	Fail to receive service connect message
BS Ack Fail	Fail to receive base station acknowledgement message after receiving channel assignment message
Alert Fail	Fail to receive alert message
Connect	Setup fail occurred after alert Message is received
Voice Call Setup Fail Reason (WCDMA)	
Origination	Fail to send origination message within setup time in origination type call
RRC Reject	Fail to setup call by receiving RRC connection reject message
RRC phase	Fail to receive RRC Connection Complete message
CM Setup phase	Fail to receive Downlink Direct Transfer(Call Proceeding) message after receiving Initial Direct Transfer(CM Service request) message

Item	Description
RAB Failure	Fail to setup call by receiving Radio Bearer Failure message
RAB Setup phase	Fail to receive Radio Bearer Setup Complete message after receiving Radio Bearer Setup Message
Alerting phase	Fail to receive Alerting Connection and Connection Ack message after receiving Radio Bearer setup complete message
Disconnect	Fail to setup call by receiving Downlink direct transfer(Disconnect) message
Registration Failure	Fail to setup call due to RT Area Update
Network Busy	Receive mobile is on line.
Data Call_Setup Fail Reason	
Dial Fail	Dial fail is declared if radio link can't be set up during setup time threshold.
LCP Fail	LCP fail is declared if LCP negotiation phase can't be finished before setup timer expires.
Auth Fail	Auth fail is declared if authentication negotiation phase can't be finished before setup timer expires.
Origination	Origination is declared if there is no Detail Code1 46 (Call Setup Status) while Setup Time in WCDMA/HSDPA/HSUPA.
RRC Connection reject	RRC Connection reject is declared if RRC Connection reject message is received while Setup Time in WCDMA/HSDPA/HSUPA.
RRC Phase Failure	RRC Phase Failure is declared if RRC Connection setup complete message is not received after RRC Connection request within Setup Time in WCDMA/HSDPA/HSUPA.
Service Setup Phase Failure	Service Setup Phase Failure is declared if RRC Connection Release message is received or RRC Connection Release message is sent within Setup Time in WCDMA/HSDPA/HSUPA.
Activate PDP Context Reject	Activate PDP Context Reject is declared if Active PDP Context Reject, Activate Secondary PDP Context Reject, or Request PDP Context Activation Reject is received after Activate PDP Context Request within Setup Time in WCDMA/HSDPA/HSUPA.
RAB Failure	RAB Failure is declared if RAB Setup Failure message is received within Setup Time in WCDMA/HSDPA/HSUPA.
RAB Setup Phase	RAB Setup Phase is declared if RadioBearer Setup Complete is not received after RadioBearer Setup message within Setup Time in WCDMA/HSDPA/HSUPA.
Activate PDP Context Phase	Active PDP Context Phase is declared if there is no Activate PDP Context Accept after Activate PDP Context Request within Setup Time in WCDMA/HSDPA/HSUPA.
IPCP Fail	IPCP fail is declared if clients can't receive IP allocation from network before setup timer expires.
Logon Fail	Logon fail is declared if network Logon can't be finished before setup timer expires.
Data Call_Traffic Fail Reason	

Item	Description
Connect Fail	Fail to connect to application server before traffic setup timer expires.
Change Dir Fail	Fail to locate directory of application server where download file is located before traffic setup timer expires.
File Open Fail	Fail to open download file before traffic setup timer expires.
Time out Fail	Fail to start download before traffic setup timer expires.
Data Call_Ping Statistics	
Lost (%)	Percentage of lost ping count over total ping count in total call
Min (ms)	Min RTT value in ms over total call
Max (ms)	Max RTT value in ms over total call
Avg (ms)	Average RTT value over total call
Hops (Min)	Min hop count over total call
Hops (Max)	Max hop count over total call

Call Result View

Call Result View shows summarized results of each call such as setup time, FA, End Time, Result, FA, SID, NID, Scenario, Call Type and Information.



No	Start Time	End Time	Result	Scenario	CallType	Throughput(Kbps)	Info (D:Dial, L:LCP, A:Auth, I:IPCP, P:PPP, L:Logon)
12	11:35:24.905	11:36:10.264	Success		Voice		Setup:11.14
13	11:36:57.134	11:37:39.770	Success		Voice		Setup:8.76
14	11:38:06.455	11:38:48.492	Success		Voice		Setup:8.37
15	11:39:04.259	11:39:48.464	Success		Voice		Setup:8.65
16	11:40:07.448	11:40:51.219	Success		Voice		Setup:8.59
17	11:41:07.624	11:41:50.630	Success		Voice		Setup:9.47
18	11:42:05.505	11:42:48.342	Success		Voice		Setup:8.68
19	11:43:10.598	11:43:51.821	Success		Voice		Setup:8.39
20	11:44:08.480	11:44:52.037	Success		Voice		Setup:8.36
21	11:46:21.128	11:46:49.713	Drop		Voice		Setup:7.80, Holding:20.28
22	11:47:36.144				Voice		Setup:22.67

Item	Description
No	Number of call
Start Time	Start time of call
End Time	End time of call
Result	Reason of call termination
Scenario	Scenario name
Call Type	Call Type (Voice, FTP, HTTP and Ping/TraceRT)
Throughput	Displays the information depending on the scenario
Info	Number of call

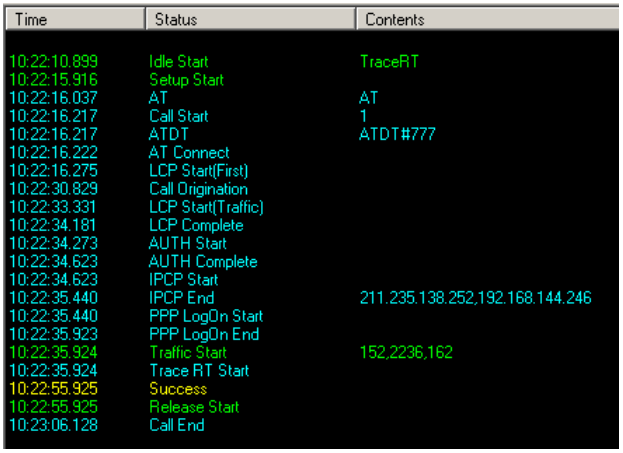
Following items are displayed in Info cell in Call Result View section.

Item	Description
Common	* D (Dial Time) : ATDT ~ LCP Start (First)

Item	Description	
	* L (LCP) : LCP Start (Traffic) ~ LCP Complete * A (Auth) : Auth Start ~ Auth Complete * I (IPCP) : IPCP Start ~ IPCP End * P (PPP) : LCP Start (First) ~ IPCP End * L (Logon) : PPP Logon Start ~ PPP Logon End	
	CDMA	FA : Frequency Assignment.(Invalid on WCDMA) SID : System Identification number(Invalid on WCDMA) NID : Network Identification number(Invalid on WCDMA)
Voice	CDMA	Setup: Elapsed time to setup radio link
	WCDMA	Setup: Elapsed time to setup radio link RRC : RRC Connection request ~ RRC Connection Setup Complete CM Setup : CM Service request ~ Call Proceeding RAB : Radio Bearer Setup ~ Radio Bearer Setup Complete RRC No : RRC Connection request Count
FTP	Server	Elapsed time for FTP Connection
	Traffic	Elapsed time for traffic
	Throughput	Throughput of FTP application layer
	RcvByte	Amount of total received bytes for a call
	MaxByte	Maximum size of file to be received in byte unit for a call
	Air, Core	Air, Core Time. For detaileds, see **Monitoring Data** – **Statistics/Status** – **Call Statistics (Current Scenario)** – **All Info** section.
Ping	RTT(Min)	Minimum RTT in a call
	RTT(Max)	Maximum RTT in a call
	RTT(Avg)	Average RTT of a call
	Rcv	Number of receive
	Lost	Number of ping lost in a call and percentage of lost ping count over total sent ping count in a call

Call Event History View

Call Event History View shows history of important events in call processing with timestamp. It displays the important call event with timestamp.



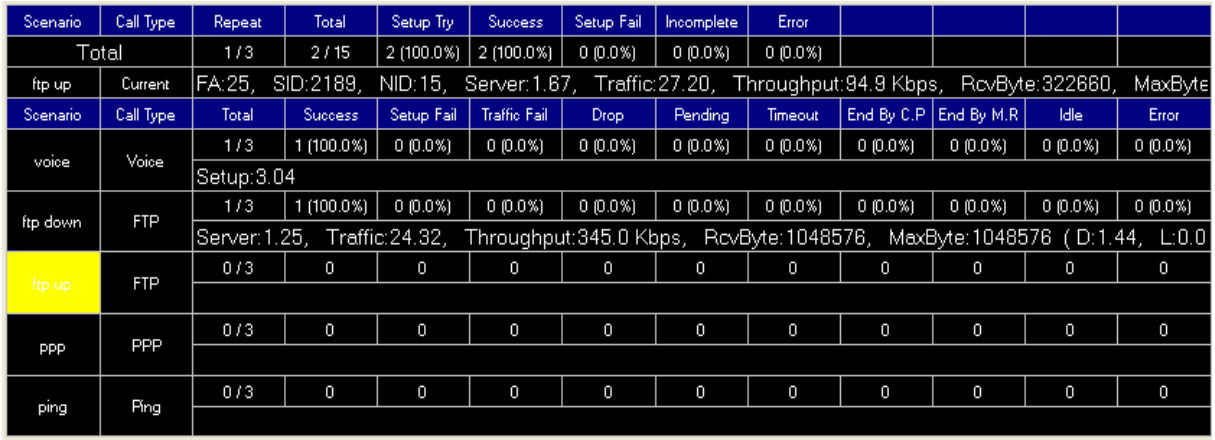
Time	Status	Contents
10:22:10.899	Idle Start	TraceRT
10:22:15.916	Setup Start	
10:22:16.037	AT	AT
10:22:16.217	Call Start	1
10:22:16.217	ATDT	ATDT#777
10:22:16.222	AT Connect	
10:22:16.275	LCP Start(First)	
10:22:30.829	Call Origination	
10:22:33.331	LCP Start(Traffic)	
10:22:34.181	LCP Complete	
10:22:34.273	AUTH Start	
10:22:34.623	AUTH Complete	
10:22:34.623	IPCP Start	
10:22:35.440	IPCP End	211.235.138.252,192.168.144.246
10:22:35.440	PPP LogOn Start	
10:22:35.923	PPP LogOn End	
10:22:35.924	Traffic Start	152,2236,162
10:22:35.924	Trace RT Start	
10:22:55.925	Success	
10:22:55.925	Release Start	
10:23:06.128	Call End	

Item	Description
Time	Time information of events.
Status	Detailed status of call in progress.
Contents	Supplemental information for status.

Call Statistics (All Scenario)

Call Statistics (All Scenario) window displays overall statistics of all AutoCall scenarios.

1. Select Menu Bar - **Statistics/Status** – **Call Statistics (All Scenarios)**.
2. **Call Statistics (All Scenarios)** window appears.



Scenario	Call Type	Repeat	Total	Setup Try	Success	Setup Fail	Incomplete	Error				
Total		1 / 3	2 / 15	2 (100.0%)	2 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)				
ftp up	Current	FA:25, SID:2189, NID:15, Server:1.67, Traffic:27.20, Throughput:94.9 Kbps, RcvByte:322680, MaxByte										
Scenario	Call Type	Total	Success	Setup Fail	Traffic Fail	Drop	Pending	Timeout	End By C.P	End By M.R	Idle	Error
voice	Voice	1 / 3	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
		Setup:3.04										
ftp down	FTP	1 / 3	1 (100.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
		Server:1.25, Traffic:24.32, Throughput:345.0 Kbps, RcvByte:1048576, MaxByte:1048576 (D:1.44, L:0.0										
ftp up	FTP	0 / 3	0	0	0	0	0	0	0	0	0	0
ppp	PPP	0 / 3	0	0	0	0	0	0	0	0	0	0
ping	Ping	0 / 3	0	0	0	0	0	0	0	0	0	0

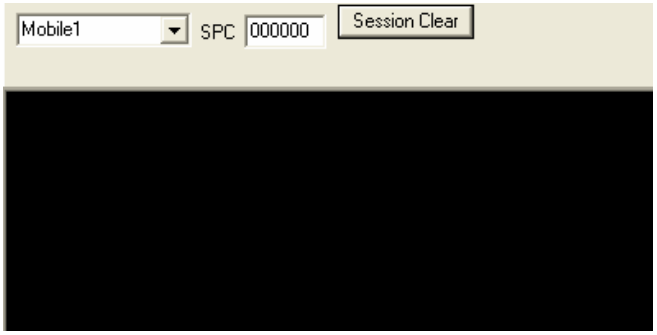
Item	Description
Scenario	Current scenario name
Call Type	Current call type
Repeat	Repeatition count of AutoCall scenario.
Total	The number of calls progressed for current call/Total number of calls for current auto call test. (If user uses the Setup Try function, the total is PPP setup count.)

Item	Description
Setup Try	Repeat count of auto call scenario
Success	Number of successful calls
Setup Fail	Setup fail occurs after radio link setup failure
Incomplete	Number of calls which are not successful. This parameter is for data service only.
Error	The number and percentage of error calls for attempted calls

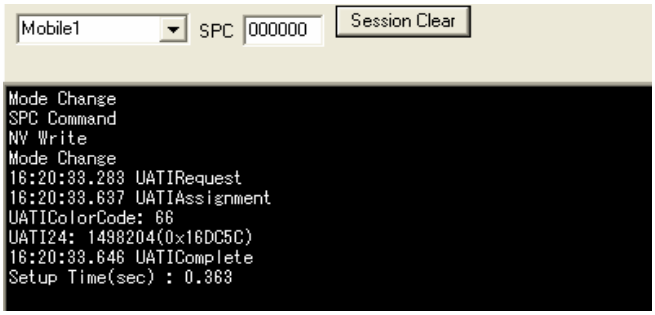
EVDO Session Assignment Test

In EVDO Session Assignment Test window, you are allowed to clear EVDO sessions by using NV Read/Write function automatically.

1. Select Menu Bar - **Statistics/Status** – **EVDO Session Assignment Test**.



2. Set values and click **Session Clear** button. The following items are displayed and the test mobile is reset.

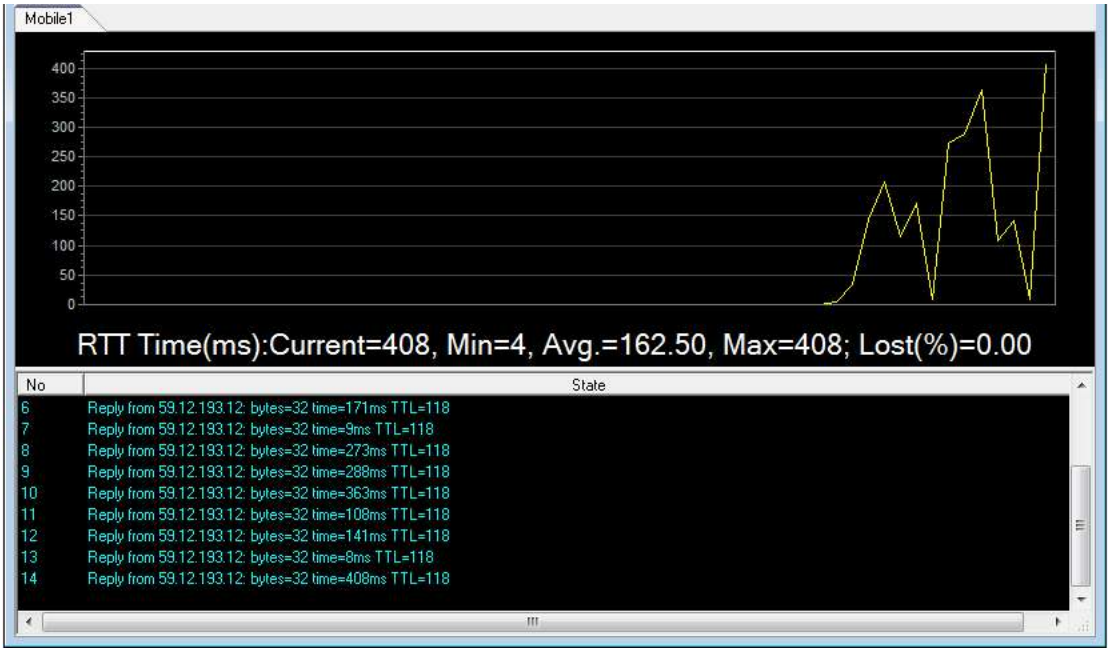


Item	Description
Mobile	Mobile Number
SPC	Displays the code in SPC
Session Clear	Resets the mobile

Ping Status

Ping Status window displays test result of single ping test in graph and statistics.

1. Select Menu Bar – **Statistics/Status** – **Ping Status.**



Item	Description
RTT Time (ms)	**Current**: RTT Time of current ICMP **Min**: Minimum RTT time **Avg.**: Average RTT time **Max**: Maximum RTT time **Lost(%)**: Loss rate of ICMP

TraceRT Status

TraceRT Status window displays TraceRT test result in statistics.

1. Select Menu Bar - **Statistics / Status** – **TraceRT Status**.

016-250-3755 | Mobile2

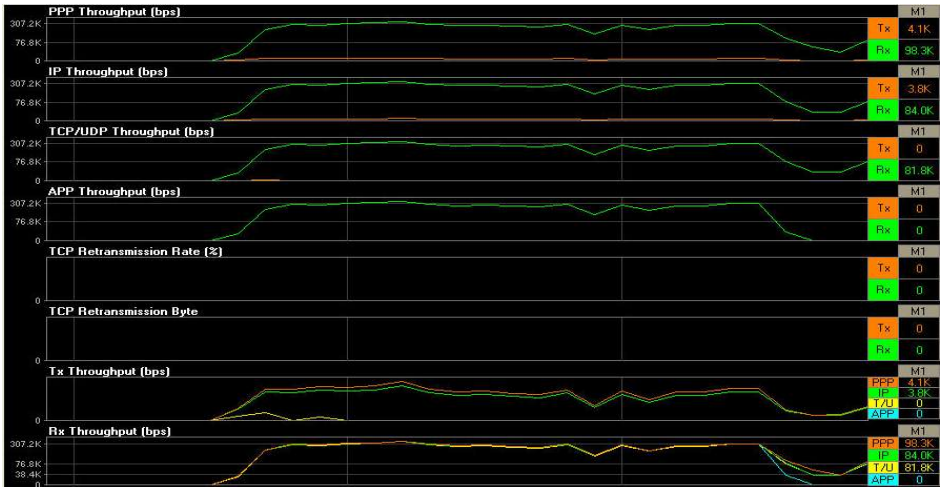
TTL	IP	Cur(ms)	Min(ms)	Max(ms)	Avg(ms)	Max-Min(ms)
1	Request timed out.	0				
2	10.100.0.67	859	203	859	531	656
3	10.128.6.1	243	191	243	217	52
4	10.128.1.2	193	193	433	313	240
5	10.128.1.14	197	197	197	197	0
6	10.128.1.25	447	214	447	330	233
7	10.36.10.65	255	164	255	209	91
8	10.36.10.26	421	181	421	301	240
9	128.134.40.129	202	202	210	206	8
10	220.73.168.26	234	191	234	212	43
11	220.73.168.1	277	277	603	440	326
12	168.126.109.6	218	218	234	226	16
13	168.126.88.66	186	165	186	175	21
14	168.126.88.118	272	200	272	236	72
15	221.148.91.226	576	203	576	389	373
16	211.196.214.78	377	267	377	322	110
17	221.148.52.99	381	381	433	407	52

Item	Description
TTL	Time to Live
IP	IP Address
Cur (ms)	Displays RTT of current IP
Min (ms)	Displays minimum RTT
Max (ms)	Displays maximum RTT
Avg (ms)	Displays average RTT
Max-Min (ms)	Max RTT – Min RTT

Throughput Info

Throughput Info window displays all throughput information.

1. Select Menu Bar - **Statistics/Status** – **Throughput Info**.

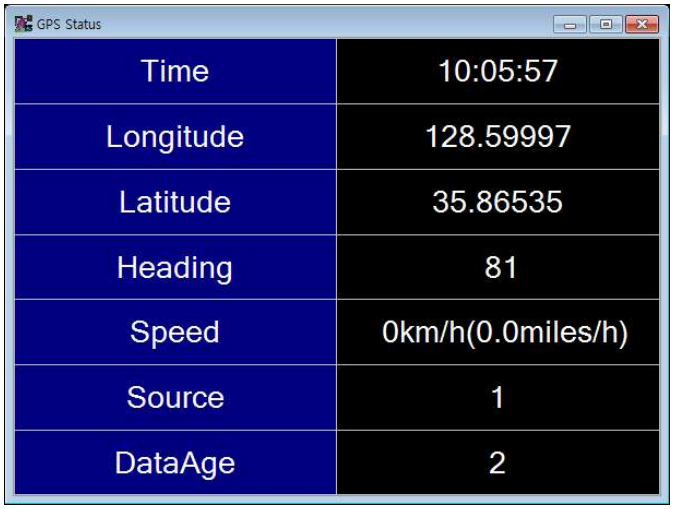


Item	Description
PPP Throughput	Displays throughput in PPP layer
IP Throughput	Throughput in IP layer that includes IP Header
TCP / UDP Throughput	Throughput in TCP and UDP layer
APP Throughput	Throughput of Specific port TCP * FTP: 20, HTTP: 80
TCP Retransmission Rate	Provides TCP retransmission rate
TCP Window Size	Buffer Window Size
Tx Throughput	Provides PPP, IP, TCP / UDP, APP Tx Throughput
Rx Throughput	Provides PPP, IP, TCP / UDP, APP Rx Throughput

GPS Status

GPS Status window displays location and time information received from GPS.

1. Select Menu Bar - **Statistics/Status** – **GPS Status**.



Item	Description
GPS Time	Current time information provided by GPS.
Longitude	Longitudinal location information provided by GPS.
Latitude	Latitudinal location information provided by GPS.
Heading	Orientation of movement.
Speed	Current moving speed.
Source	A textual evaluation of the current signal being received by the GPS

Item	Description
	receiver. Possible values are: (GPS receiver does not report quality, mostly for ETAK receiver support), (bad reception, so no GPS position can be derived), (Standard), (a usable signal from a standard GPS receiver, accurate within 50 meters), (good signal from a differential GPS receiver, so the reported position is especially accurate within 5 meters)
Data Age	An indicator of the freshness of the GPS data: either Valid or Stale.

GPS Satellite Status

GPS Statellite Status window displays satellite information collected via GPS.

1. Select Menu Bar - **Statistics/Status – GPS Satellite Status**.

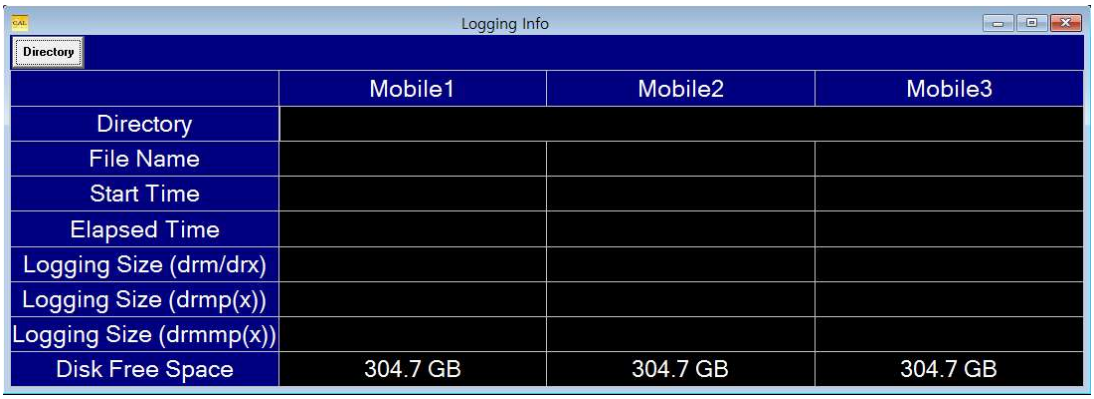
Satelite	1	2	3	4	5	6	7	8	9	10	11	12
PNR	29	26	10	2	8	6	21	27	0	0	0	0
Elevation	80	61	55	36	28	27	19	12	0	0	0	0
Azimuth	262	235	54	145	59	265	314	40	0	0	0	0
C/N	38	40	40	40	36	37	36	28	0	0	0	0

Item	Description
Satellite	The number of satellites , GPS is receiving signal currently from
PNR	Satellite ID
Elevation	Elevation information of satellite
Azimuth	Azimuth information of satellite
C / N	Carrier to Noise ratio of the satellite signal

Logging Info

Logging Info window displays detailed information of log file.

1. Select Menu Bar - **Statistics/Status** – **Logging Info**.

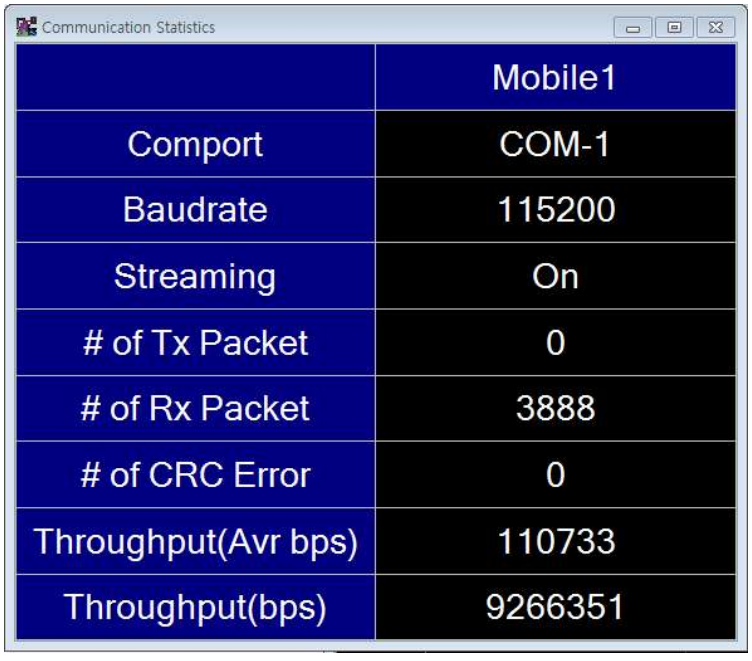


Item	Description
Directory	The name of the directory the drive test file is being saved.
File Name	Designated name for the drive test file.
Start Time	Start time of logging the drive test data.
Elapsed Time	Elapsed time from the start of logging.
Logging Size	Size of drive test file.
Disk Free Space	Free space of hard disk.

Communication Statistics

Communication Statistics window displays packet CRC error in statistics.

1. Select Menu Bar - **Statistics/Status** – **Communication Statistics**.



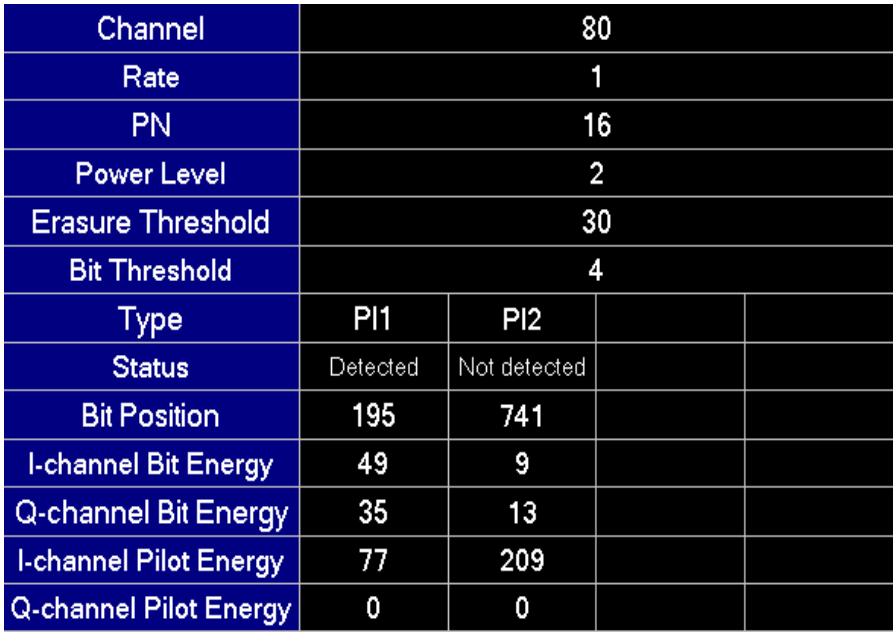
Item	Description
Comport	Designates communication port

Item	Description
BaudRate	Designates communication speed through DM port
Streaming	Determine if streaming logging is executed
# of Tx Packet	Count of Total Tx Packet
# of Rx Packet	Count of Total Rx Packet
# of CRC Error	Count of Packet Error

QPCH Statistics

QPCH Statistics window displays QPCH parameter and QPCH of test mobile.

1. Select Menu Bar - **Statistics/Status** – **QPCH Statistics**.



Channel	80			
Rate	1			
PN	16			
Power Level	2			
Erasure Threshold	30			
Bit Threshold	4			
Type	PI1	PI2		
Status	Detected	Not detected		
Bit Position	195	741		
I-channel Bit Energy	49	9		
Q-channel Bit Energy	35	13		
I-channel Pilot Energy	77	209		
Q-channel Pilot Energy	0	0		

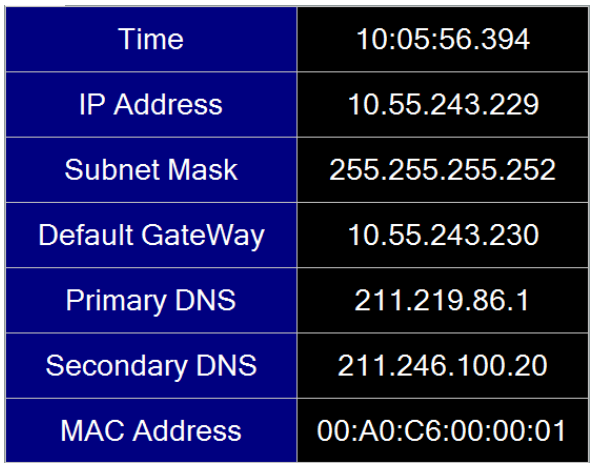
Item	Description
Channel	Provides QPCH Walsh channel
Rate	Least significant bit – RATE; rate for QPCH paging indicators: 0 – 4800 bps 1 – 9600 bps Upper seven bits – XFER_REASON; QPCH transfer reason (why QPCH could transfer back to idle): 0 – QPCH_NO_XFER 1 – QPCH_SLOT_IMMINENT 2 – QPCH_MC_NOT_VALID 3 – QPCH_CH_EST_BAD_SIGNAL 4 – QPCH_XFER_BCAST_DATA 5 – QPCH_BP_AND_PG 6 – QPCH_BP_NOT_SUPPORTED

Item	Description
	7 – QPCH_RWUP 8 – QPCH_PI1_PI2_ON 9 – QPCH_BI1_BI2_ON 10 – QPCH_NEXT_SLOT_NOT_SUPPORTED 11 – QPCH_CCI_HANDOFF 12 – QPCH_CCI_ON 13 – QPCH_DISABLE_BIO_SWITCH
PN	PN index of Pilot (0..511)
Power Level	Power level for paging indicator (0~7) 000 – 5 dB below Pilot Channel Transmit Power 001 – 4 dB below Pilot Channel Transmit Power 010 – 3 dB below Pilot Channel Transmit Power 011 – 2 dB below Pilot Channel Transmit Power 100 – 1 dB below Pilot Channel Transmit Power 101 – Same as Pilot Channel Transmit Power 110 – 1 dB above Pilot Channel Transmit Power 111 – 2 dB above Pilot Channel Transmit Power
Erasure Threshold	Threshold used to determine if the PI / CCI bit is an erasure
Bit Threshold	Threshold used to determine if the PI / CCI bit is 1 or 0
Type	Type of indicator (0~5) 0 – Paging Indicator #1 1 – Paging Indicator #2 2 – Configuration Change Indicator #1 3 – Configuration Change Indicator #2 4 – Broadcast Indicator #1 5 – Broadcast Indicator #2
Status	Result of indicator demodulation (0~4) 0 – Not applicable 1 – Not detected 2 – Detected 3 – Erasure 4 – Missed
Bit Position	Position of indicator (0~768)
I-channel Bit Energy	Indicator energy on I Channel (0~65535)
Q-channel Bit Energy	Indicator energy on Q Channel (0~65535)
I-channel Pilot Energy	Common pilot energy (0~65535)
Q-channel Pilot Energy	Diversity pilot energy (0~65535)

Network Info

Network Info window displays detailed information of network.

1. Select Menu Bar - **Statistics/Status** –**Network Info**.



Item	Description
Time	Time when network information is collected
IP Address	Allocated IP address
Subnet Mask	Configured Subnet mask
Default Gateway	Configured default gateway
Primary (Secondary) DNS	Configured primary (secondary) DNS
MAC Address	MAC address of test mobile

User Define

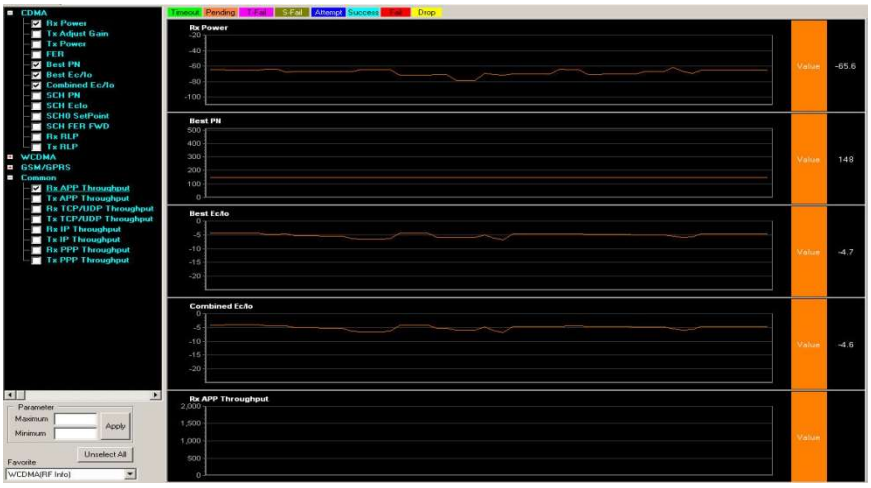
Following sub-menus are listed under **User Defin** menu in main Menu bar.

User Define menu visualize all parameters in various analysis formats such as graph, table, summar info table, cell measurement table.

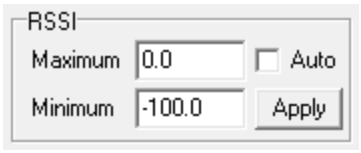
Graph

Graph window displays information of selected parameter in graph.

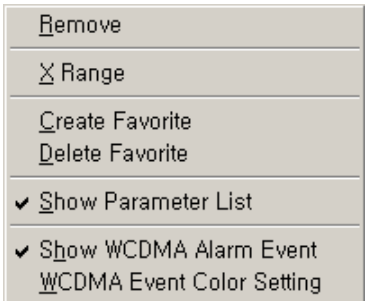
1. Select Menu Bar – **User Define** – **Graph.**
2. Select checkboxes for any parameters you want to display in graph from the parameter tree on the left section or drag it into the graph on the right section.



3. Set maximum and X, Y axis value. Click **Apply**.



4. Right click on Graph, and graph mouse menu appears.



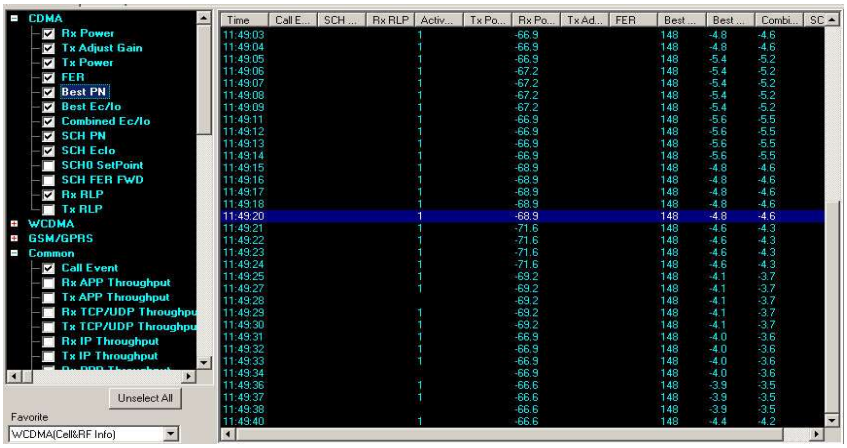
Item	Description
Remove	Deletes the chosen parameter.
X Range	Sets the range of X-axis of the Graph which displays the value of the chosen parameter. (unit: second)
Create Favorite	Saves the setting of the chosen parameter
Delete Favorite	Deletes the Favorite File previously generated
Show Parameter List	Check : Displays the parameter set-up window Uncheck : Doesn't show up the parameter set-up window

Item	Description
Show WCDMA Alarm Event	Check: Displays Attempt, Success. and Fail on Graph when Event Occurs Uncheck: Doesn't show Attempt, Success, and Fail on Graph when Event Occurs
WCDMA Event Color Setting	This option appears only when **Show WCDMA Alarm Event** is selected. Set attempt, success, fail color for WCDMA event. Select **WCDMA Event Color Setting**, and **Color Setting** window appears. 

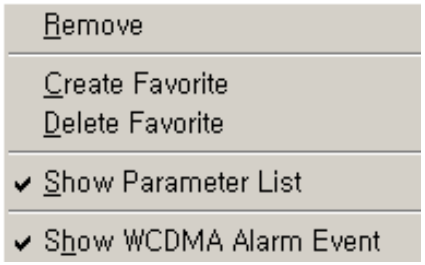
Table

Table window displays detailed information of selected parameter in table.

1. Select Menu Bar - **User Defined** –**Table.**
2. Select checkboxes for any parameters you want to display in table from the parameter tree on the left section or drag it into the graph on the right section.



3. Right click on Table, and table mouse menu appears.



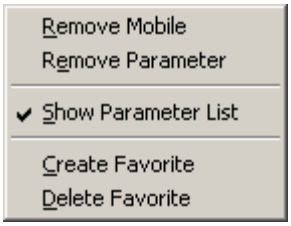
Item	Description
Remove	Deletes the chosen parameter
Create Favorite	Saves the setting of the chosen parameter
Delete Favorite	Deletes the Favorite file previously generated
Show Parameter List	Check : Displays the parameter set-up window Uncheck : Doesn't show up parameter set-up window
Show WCDMA Alarm Event	Check: Displays Attempt, Success. and Fail on Graph when Event Occurs Uncheck: Doesn't show Attempt, Success, and Fail on Graph when Event Occurs

Summary Info

Summary Info window displays current information of selected parameters. Parameter value of multiple test mobile can be monitored.

1. Select Menu Bar - **User Defined** – **Summary Info.**
2. Select checkboxes for any parameters you want to display in table from the parameter tree on the left section or drag it into the graph on the right section.

3. Right click on the table and Summary Info mouse menu appears.



Item	Description
Remove Mobile	Hides parameter.
Remove Parameter	Deletes parameter.
Show Parameter List	Shows/Hides parameter list section.
Create Favorite	Saves parameter selection setting in Favorite. Parameter selection setting is added under Favorite tree.
Delete Favorite	Deletes Favorite tree.

Cell Measurement

Cell Measurement window displays PN information of corresponding technology.

Signal strength of neighboring base stations and providing information may differ in accordance with technology.

1. Select Menu Bar - **User Defined** – **Cell Measurement**.

Monitoring Data in Map in Real-Time (Real Time Mapping)

XCAL is able to show measurement data on map graphically in real-time when conducting a measurement project with a connection of a GPS receiver. XCAL's real-time map displays major parameters, call events (Drop, Setup Fail, Success, and etc.), BTS/Repeater positions, serving lines, coverage, and etc. The intuitive graphic User Interface for real-time map enables you to visualize features in the map by configuring colors and shape of marks by data range.

This chapter explains how to (a) connect GPS receiver to XCAL, (b) open map files by map engines, and (c) start and manage XCAL real-time mapping window.

- XCAL real-time map supports the following map engines; MapX, MapXtreme, Smart Map.

Connecting a GPS Receiver

XCAL visualizes BTS, test mobile, measurement route, serving lines, and etc only when GPS receiver is connected to XCAL properly and transfers valid GPS data to XCAL.

To interface with a GPS receiver, connect a GPS receiver by

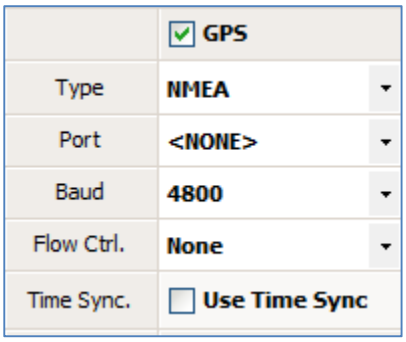
a) Conencting USB type GPS to host PC which is installed with XCAL program.

b) Connecting internal GPS on XCAL hardware. (Optional)

USB GPS

XCAL receives and displays GPS data through serial port of host PC, and supports general GPS supporting NMEA specification.

1. Install a GPS drvier which is provided with a purchase of GPS receiver, and configure COM port in **Device Manager**.
2. Select the COM Port connected to USB GPS receiver in **Port Setting** window. For details of Port Setting window, see **Configuring Port**.



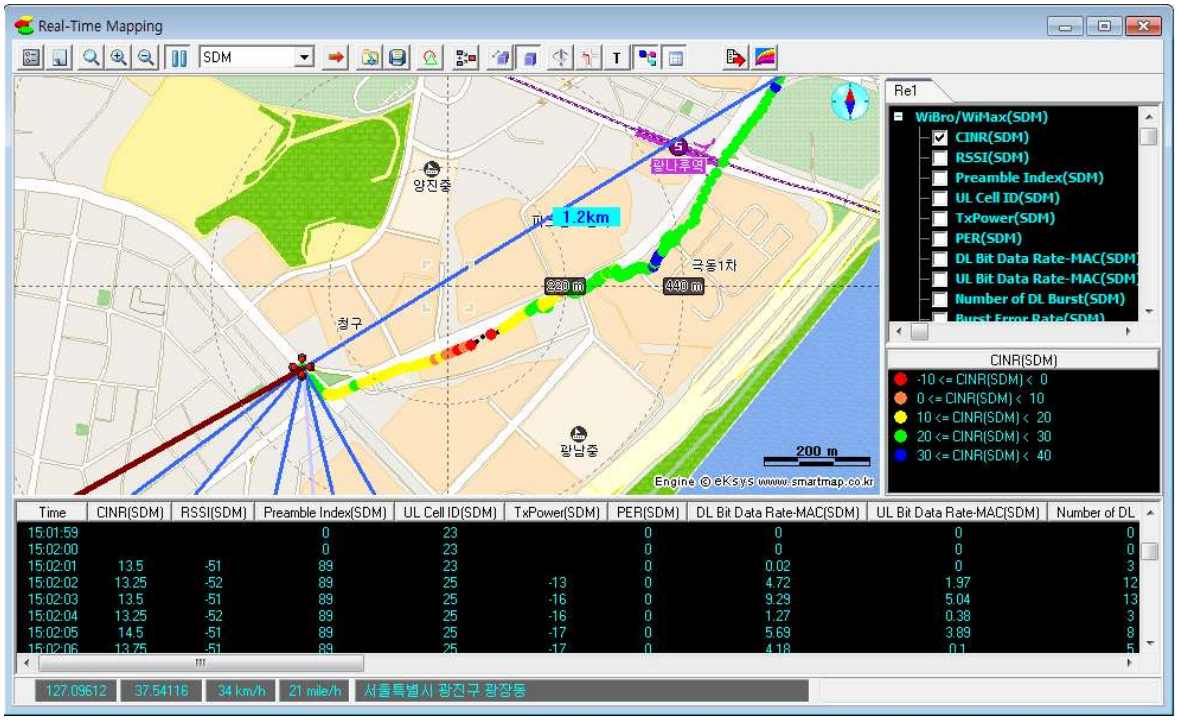
Opening Map Files

XCAL real-time map supports the following map engines; MapX(of MapInfo), MapXtreme (of MapInfo), Smart Map (free map engine).

Install a Map Engine with a valid license, and configure in XCAL program for each Map Engine type in order to open Map files.

Starting XCAL Real Time Mapping Window

1. To start XCAL real-time map, select main Menu bar – **File** – **Real Time Mapping**, or click **Map**  icon from Icon bar.
2. Real Time Mapping window appears.



3. Configure map options to import map files by clicking **Map Property**  icon at the upper left side of real time mapping window.

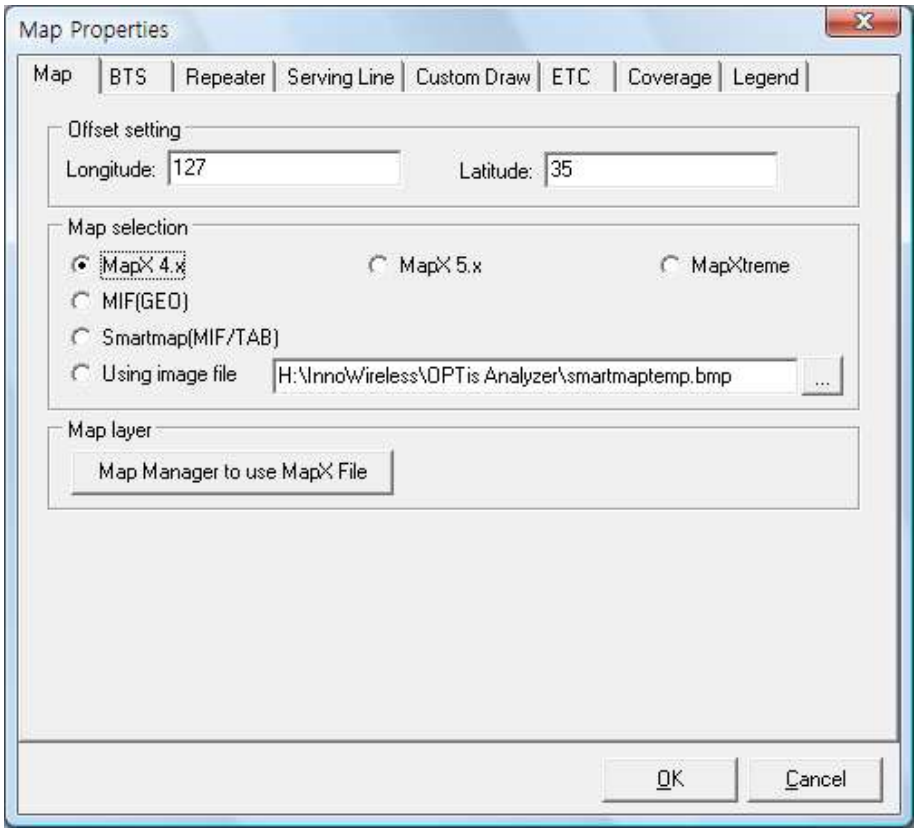
Following sub-chapters will show how to configure map options to import map files by map engine.

Configuring for MapX Engine

MapX engine is provided with map files in *.tab format.

Map files in *.gst format can be imported to XCAL. Map files in *.tab can be converted to *.gst format by using Geoset which is provided as a bundle with the purchase of MapX engine from MapInfo.

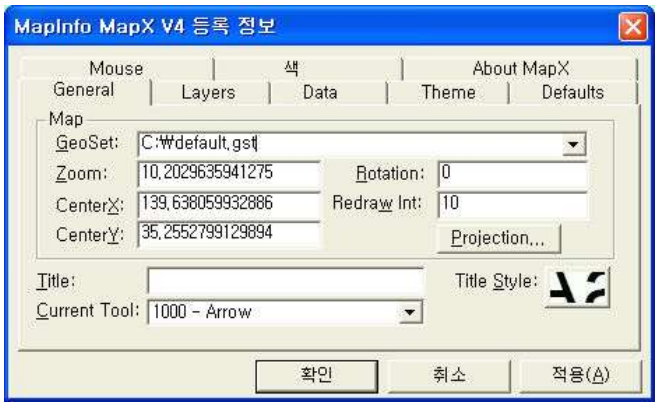
1. In Real Time Mapping window, click **Map Property**  icon, and **Map Properties** window appears. Select **Map** tab.



2. Select applicable version of MapX engine between **MapX4.x** or **MapX 5.x** in **Map Selection**.

   Offset setting: Configures offset value for longitude and latitude. Enter value in each entry field.

3. To load map file in *.gst format, select **Map Manager to use MapX File** button. **Layer Control** window appears.
4. Select **Layers** tab, and click **Add** button to import a map file in *.tab format.

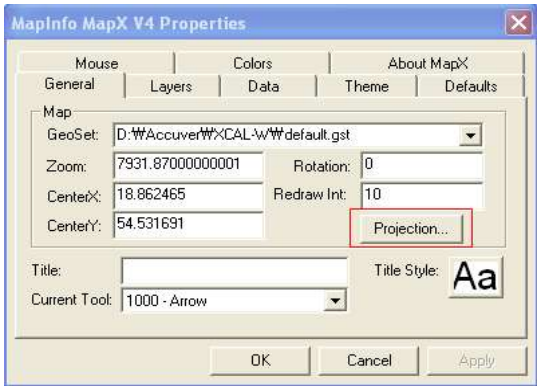


5. Click **OK**.

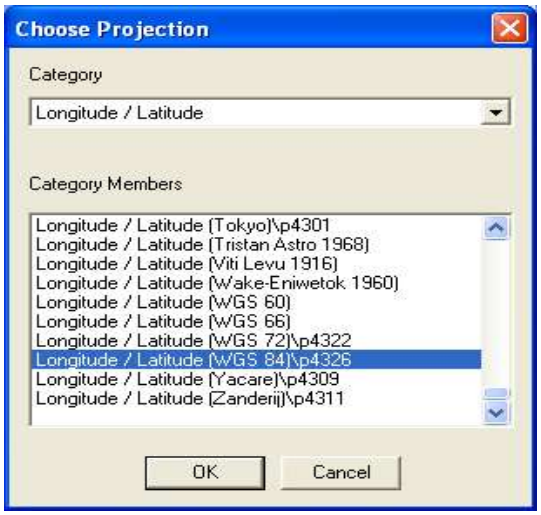
[Configuring Lat/Lon WGS(84)]

- XCAL supports projection category of Lat/Lon WGS(84).

1. Select **General** tab in **MapInfoMapX Properties** window.



2. Click **Projection** button, and **Choose Projection** window appears. Select **Lat/Lon WGS(84)**.

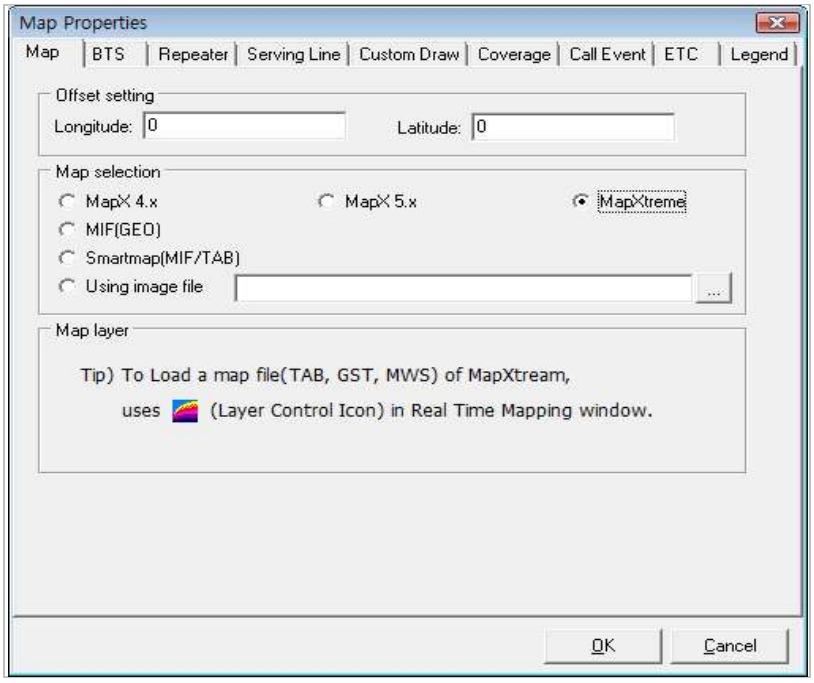


3. Click **OK**.

Configuring for MapXtreme

For MapXtreme engine, map files in *.tab, *.gst, and *.mws format can be imported to XCAL.

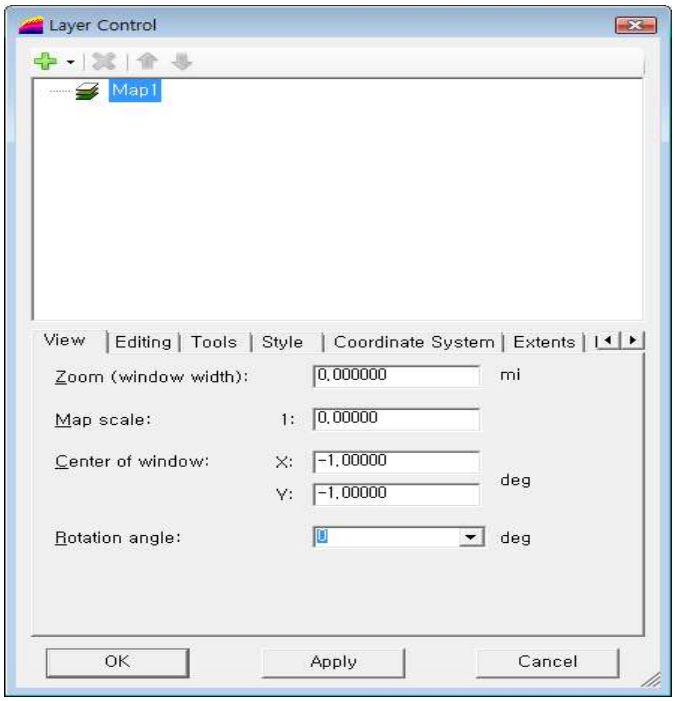
1. In Real Time Mapping window, click **Map Property**  icon, and **Map Properties** window appears. Select **Map** tab.



2. Select **MapXtreme** in **Map Selection**.

   Offset setting: Configures offset value for longitude and latitude. Enter value in each entry field.

3. Click **OK**.
4. Re-start (close and open) Real Time Mapping window.
5. To import map files, click **Layer Control**  icon in main Real Time Mapping window.
6. **Layer Control** window appears.



7. Click **Add** button and select a map file.

   Map files in *.tab, *.gst, and *.mws format can be imported to XCAL.

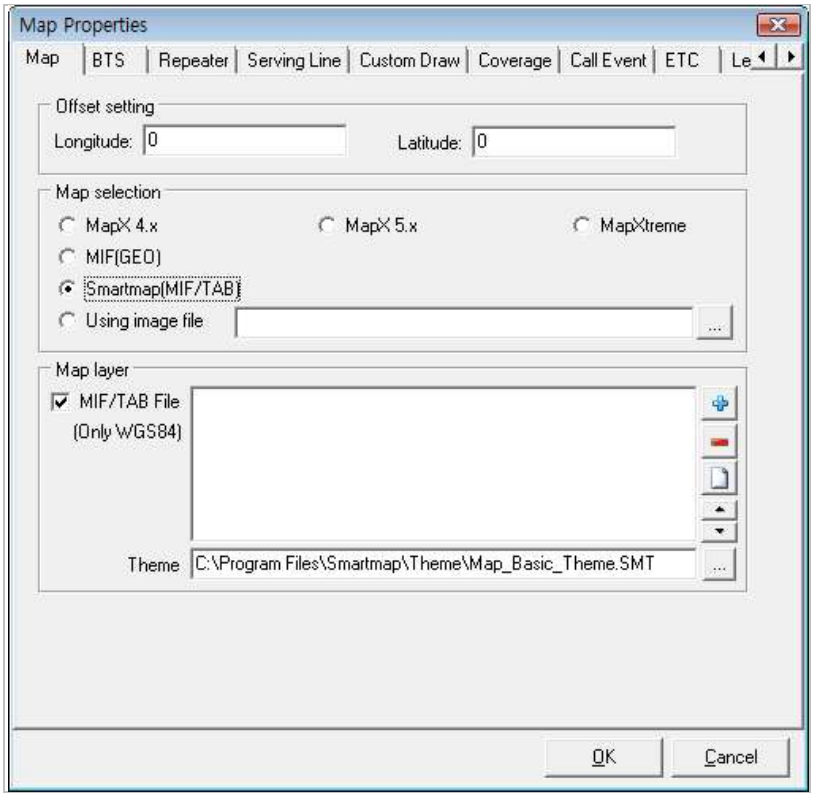
8. Click **OK**.

Configuring for Smart Map

For Smart Map engine, map files in *.mif and *.tab can be imported to XCAL.

Map files in *.mif format with project type of WGS84 should be imported.

1. In Real Time Mapping window, click **Map Property** icon, and **Map Properties** window appears. Select **Map** tab.



2. Select **Smartmap[MIF/TAB]** in **Map Selection**.

   Offset setting: Configures offset value for longitude and latitude. Enter value in each entry field.

3. To import map file, click the checkbox for **MIF/TAB File** in **Map Layer**, and click **Add** button.

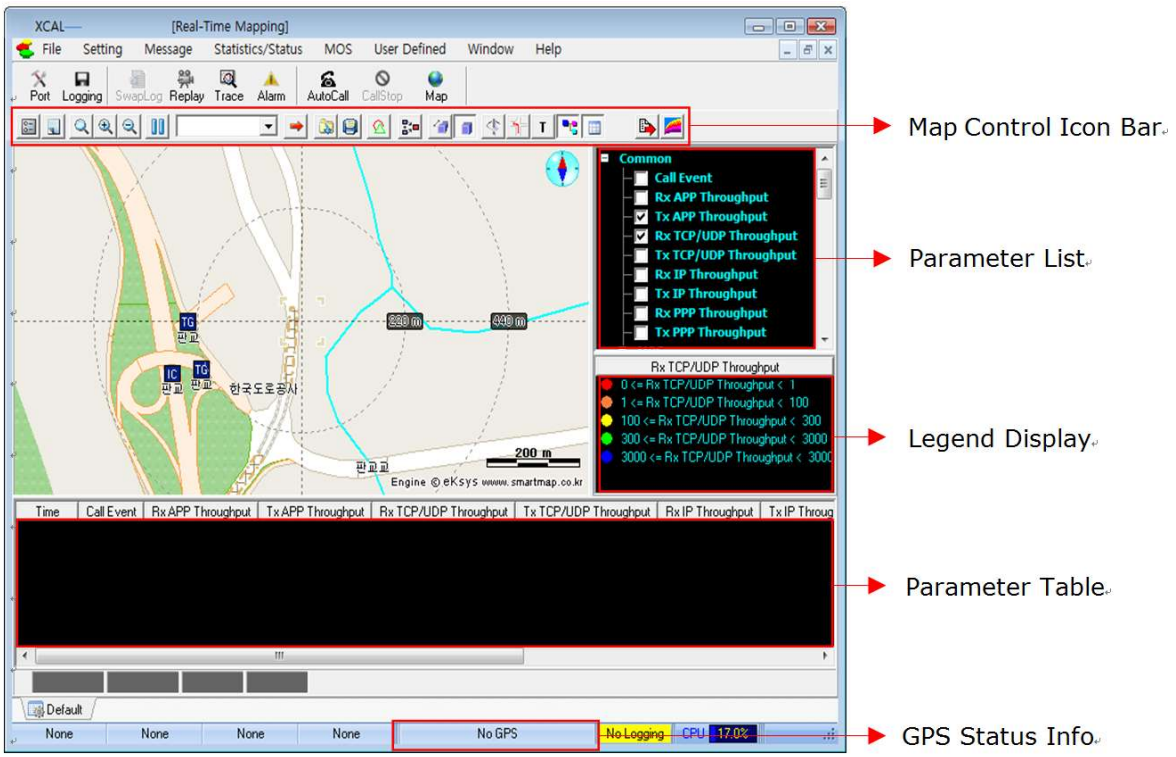
Map files in *.mif and *.tab format can be imported to XCAL.

9. Click **OK**.

Starting Real Time Mapping Window

This section explains how to open and manage XCAL Real Time Mapping window.

1. To start XCAL real-time map, select main Menu bar – **File** – **Real Time Mapping**, or click **Map**  icon from Icon bar.
2. Real Time Mapping window appears.



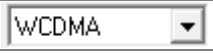
Section	Description
Map Control Icon Bar	Controls overall map options. - Scrolls and zooms in/out the map display. - Selects technologies to display in the map. [**Map Property icon**] - Selects map files by map engine. - Show/hide cell sites.

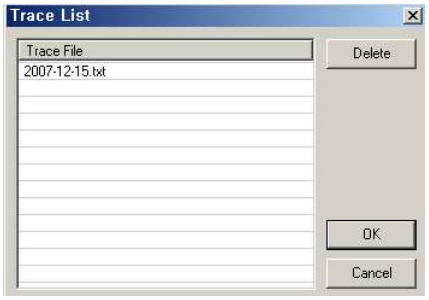
Section	Description
	- Manages color legend of BTS, Repeater, Coverage, Serving Line, call events, and etc. For details, see **Map Control Icons**.
Parameter List	Selects parameters to be displayed in the map.
Legend Display	Shows legend color of the selected parameter.
Parameter Table	Shows parameters in Parameter List in table.
GPS Status Info	Shows GPS coordinates (longitude, latitude) and speed of test mobile (km/h).

3. Select checkboxes for parameters from the Parameter List to graphically display in the map. Corresponding parameter data is displayed in map and Parameter Table in real-time.
4. Use Map Control Icons to control and manage measurement data display properties, and etc.

Map Control Icons

Map Control Icons section includes map basic controls (scrolling, zooming in and out, removing data, selecting technologies to show in the map) along with specialized map control icon of Map Property (selecting map file by map engine, showing/hiding BTS, Repeater, coverage, call events, serving lines, and etc.)

Icon Name	Icon Image	Description
Map Property		Selects map files by map engine, shows/hides cell sites, manages color legend of BTS, Repeater, Coverage, Serving Line, call events, and etc.
Clear		Removes all data displayed in the map.
File Scale		Places center of the map to the current location.
Zoom In/Out		Zooms in/out the map.
Pause		Pauses measurement data displayed on the map in real time.
Technology		Selects a technology.
Trace		Shows measurement route of existing logging file in the map by extracting from an existing logging file. Able to measure data chasing in the existing test route.
Map Mark Open/Save		Saves/Imports mark information displayed on map.
Map Mark		Shows/Hides mark information display on map.

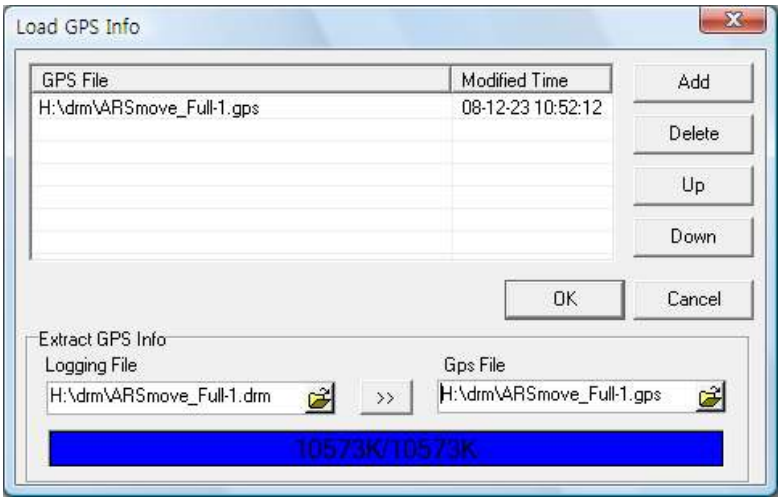
Icon Name	Icon Image	Description
Show/Hide		
Bird View		Displays map from an elevated view.
3D Building		Displays buildings on the map in three dimention.
Rotate		Rotates map and change location.
Tracking Head		Displays the direction of the map toward north.
Trace		Saves GPS information in txt format automatically. Display measurement route by using txt file. Able to remove txt file by using **Delete** button. 
Parameter Tree		Displays parameter tree on the right. 
Parameter Tree		Displays parameter tree on the bottom. 
Export		Exports current map file in *.bmp, *.kml, *.gif, *.jpg, and *.mif. Map file exported in *.kml format can be imported to

Icon Name	Icon Image	Description
		Google Earth.
Layer Control		Imports and configures map file of MapXtreme and SmartMap.

Using Trace Icon

Trace icon helps to extract GPS data from existing log file and display them on real time mapping window. It enables testing along the existing test route.

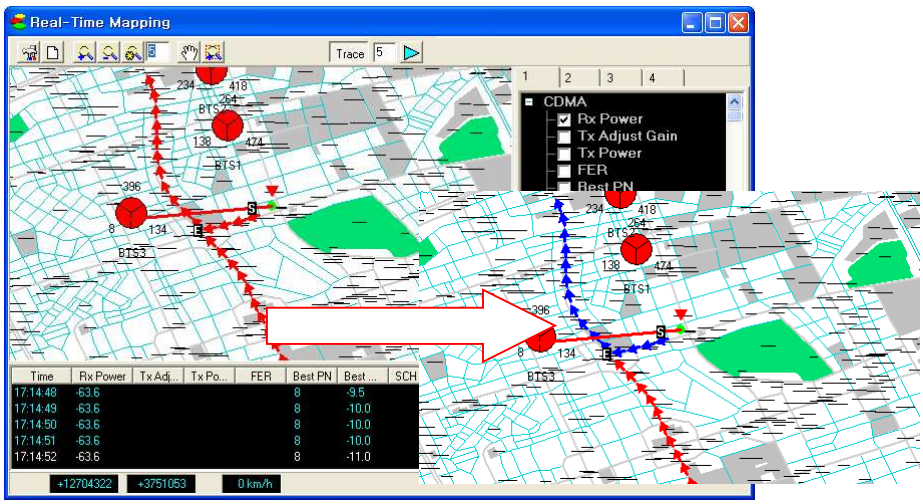
1. Select **Enable Trace**  icon in **Real Time Mapping** window.
2. **Load GPS Info** window appears.



3. Click **Open**  icon from **Extract GPS Info** – **Logging File**. Select logging file to extract GPS information.
4. Click **Open**  icon from **Extract GPS Info** – **Gps File**. Select GPS export path.
5. Click  icon to create a file with GPS information.

   The status bar shows its progress.
6. Repeat step 3 and 4 to extract GPS information from more than one logging files.
7. Click **Add** button. The converted GPS file is added to **GPS File** list.
8. Click **OK**.
9. Loaded GPS route is displayed with red line in **Real Time Mapping** window.

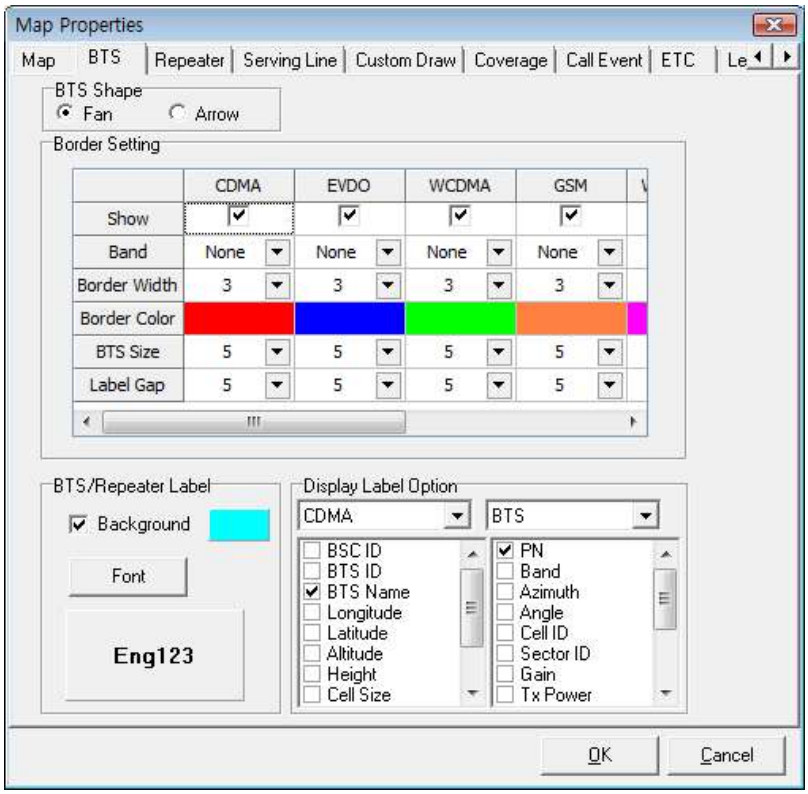
   Confirm start and end point of the route.



Displaying BTS / Repeater / Serving Line / Coverage

Map Layer Property  icon in Map Control Icon bar enables show/hide BTS, Repeater, coverage, call events, serving lines, and etc.

1. Click **Map Layer Property**  icon.
2. **Map Properties** window appears.



3. Select a tab to show/hide in the map, and configure map display options.

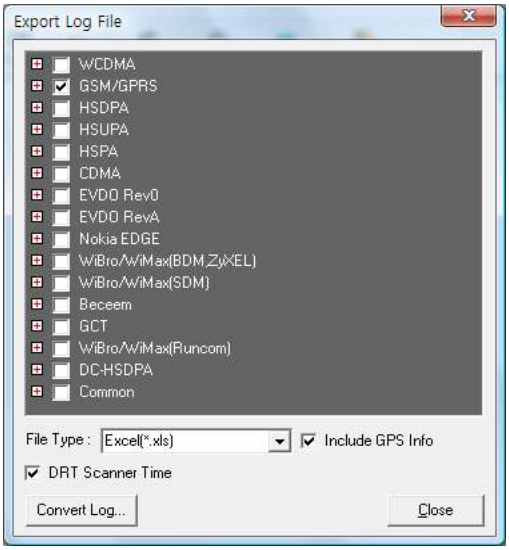
Tab	Description
BTS	To show BTS icon in the map, selects the checkbox for **Show** for each technology column. Configures BTS shape, color, size, and etc.
Repeater	To show Repeater icon in the map, selects the checkbox for **Show Repeater.** Configures link, label, and etc of repeater.
Serving Line	To show serving line in the map, selects the checkbox for **Show** for Active, Candidate, Neighbor Set respectively. Configures colors according to technology type and Ec/Io or RSSI threshold range.
Coverage	Configures colors of BTS coverage line for each range.

Exporting Logging Data

XCAL supports to export logging data of selected parameters to file in xls, csv, txt format.

1. Select Menu bar – **File** – **Export Log File**.
2. **Export Log File** window appears.

   Parameter list shown in **Export Log File** window may vary depenidng on products.



3. Select parameters you want to export to a file.
4. Define export options.

Option	Description
File Type	Select export file type (xls, csv, txt).
Include GPS Info	Include GPS information in export file.

5. Click **Close**.

Replaying Measurement

XCAL enables you to replay existing logging file during drive test.

1. Select Menu bar – **File** – **Replay**, or click on **Replay**  icon from Icon bar.
2. **Open** window appears. Select a logging file you want to replay, and click **Open**.
3. Replay Control bar appears.

4. Select chipset type of mobile station and replay speed.

Icon	Description
Open	Open existing logging file.
Play	Start or resume replay.
Rev.	Reverse replay.
Pause	Pause replay.
Stop	Stop replay.
Chip type	Select chipset type.
Speed	Control replay speed (0.5x, 1.0x, 2.0x, etc.).
Current Time	Show replay process time.
Time bar	Show replay status.

5. Click **Play** icon to start replay.

Regional offices

▪ Hong Kong (Head Office)

Accuver APAC
Unit 206, 2/F., No. 8 Science
Park West Avenue
Hong Kong Science Park
Shatin, NT, HONG KONG

Tel : +852 2210 7004
Fax : +852 2210 7017

Enquiries :
sales.apac@accuver.com
support.apac@accuver.com

www.accuver.com

▪ Japan

Accuver Japan
29F Shiroyama Trust Tower,
4-3-1 Toranomon,
Minato-ku, Tokyo,
105-6029, Japan

Tel : +81-3-6430-2580

Enquiries :
sales@accuver.jp
support_aj_1@accuver.com
http://www.accuver.jp/login.html

www.accuver.com

▪ United Kingdom

Accuver England
Suite Two I/F
Congress House
14 Lyon Road, Harrow
Middlesex, HA1 2EN

Tel : +44 20 8863 1118
Fax : +44 20 8863 1688

Enquiries :
sales.emea@accuver.com
support.emea@accuver.com
http://support2.accuver-emea.com

www.accuver.com

▪ Korea

Innowireless B/D
190, Seohyeon-ro,
Bundang-gu,
Seongnam-si,
Gyeonggi-do, Korea

Tel : +82 31 788 1700
Fax : +82 31 705 0712

Enquiries :
sales@accuver.com

www.innowireless.co.kr

▪ Poland

Accuver Poland
Domaniewska 37 street
02-672 Warsaw, Poland

Tel:+48 22 3702518

Enquiries :
sales.emea@accuver.com
support.emea@accuver.com
http://support2.accuver-emea.com

www.accuver.com

▪ USA

Accuver Americas
500 N. Central Expressway
Suite 210 Plano
TX, 75074, USA

Tel : +1 469 241 6100
Fax : +1 469 241 6199

Enquiries :
sales.usa@accuver.com
support.usa@accuver.com
http://help.usa.accuver.com/helpdesk

www.accuver.com