MD8470A
SPEEDS DEVELOPMENT OF VIDEO CHIPS FOR CELL PHONES

Introduction

Testing prototypes of video chips used in cellular telephones is a difficult challenge. Chip manufacturers typically work with multiple cell phone manufacturers and must support many different models made by each manufacturer. Cell phone manufacturers continually develop new phones and the chip companies must quickly respond with existing products, usually with new software, or new products to deliver video capabilities. The result is that manufacturers of these chips are continually testing new hardware and software on large numbers of different phones. Typically, the phones are tested by sending video transmissions to different phones over the cellular network.

But engineers who test phones on the cellular network must contend with busy networks and coverage gaps that can greatly increase the time required for testing and potentially provide misleading test results. Use of the cellular network also greatly limits the potential for testing chip compatibility with streaming servers. Leading video chip manufacturers have reduced time-to-market by utilizing Anritsu's MD8470A signaling tester to simulate the GSM, CDMA, or WCDMA cellular networks under ideal conditions. Product development proceeds at a much faster pace by eliminating the effects of the live cellular network and any desired streaming server can be installed on the MD8470A.

The video chip product development challenge

Video chip suppliers frequently release new hardware designs and software releases in order to support new cell phones and services. During the development process, the new code must be tested many times on a wide range of different phones. These phones use different operating systems and have different RF shielding properties, different I/O specifications, cameras and interfaces. The testing process typically involves making a video connection between the two phones. An engineer then views the video on the receiving phone and evaluates the quality of the received picture. The tests may be performed in both end-to-end and video loopback mode. Another common test involves evaluating the performance of the cell phone in receiving a video transmission from a streaming server such as Helix or Darwin.

An operating cellular network is required for all three types of tests. It's important to note that video chip manufacturers typically build equipment for a wide range of cell phone manufacturers and often do not have detailed design information for the phones that their chips on installed on. The chips are tested on working phones. A typical manufacturer that develops chips for GSM phones requires a testing environment with GSM/GPRS video streaming using Real Time Streaming Protocol (RTSP) and WCDMA video telephone based on H.245 packets as an end-to-end live call.

Problems with testing over the cellular network

Generally, the phones that are being tested are prototypes provided by the cellular telephone manufacturer. The performance of these prototypes is often less than production phones. At the same time, the actual cellular network is affected by varying loads and coverage patterns. The result is that it may be difficult to get the phone working well with the actual network. Problems in the cellular connection may be reflected in video performance which might delay the development process by providing an indication of a problem where there actually is none. Engineers who are subjectively analyzing the performance of a particular chip over the actual cellular network have no way to know if the problem they are seeing is caused by network itself or a problem with their code.

Another problem in performing tests over the actual cellular network is that coverage gaps or high levels of network traffic may delay testing for extended periods of time. Graphics chips suppliers may also perform development in areas that do not support the networks used by some of their customers' phones.

Picking the right instrument

As a result, graphics chips suppliers generally use an instrument that duplicates the performance of the cellular network to test their products. Such an instrument eliminates the loading and coverage problems inherent in the real cellular network so engineers can be much more certain that the problem they are seeing is actually due to the performance of the chip. The instruments are typically connected through a wire to the cell phone, also eliminating RF transmission variables from the equation.
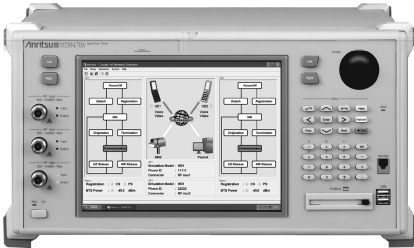

Anritsu MD8470A

Nearly all of the instruments that are capable of simulating the cellular network require that multiple instruments be connected together and require learning a cryptic user interface. This helps explain why most video chip manufacturers have selected the Anritsu MD8470A. The MD8470A is much easier to operate because it consists of a single box, avoiding the need to interface and configure multiple instruments for end-to-end testing as is required by competitive solutions. One MD8470A unit supports the network simulation required for voice, video calls and SMS/MMS transmission between two mobile terminals. It supports a wide range of call processing functions and networks. Video call testing can be performed by video data loopback within the MD8470A.

Another advantage of the MD8470A is that it provides a graphical user interface that makes it easy to configure the instrument and run tests. Developers use the Windows-based GUI to set basic call processing parameters and display the call processing status. Call origination and termination is controlled using the virtual terminal.

Testing video chips in the MD8470A

The cell phone negotiates sending and receiving of data by circuit switching using the H.245 protocol. H.245 is the segment allocated by the Control Channel Segmentation and Reassembly Layer (CCSRL) and the retransmission control is performed by the Numbered Simple Retransmission Protocol (NSRP). The video is coded in MPEG-4 and the audio is coded in the Adaptive Multirate (AMR) Codec. The video and audio data and control message (H.245) are all multiplexed in H.223 and transmitted by the U-plane. The ability to save H.245 control protocol trace data during video calls supports offline analysis of H.245 message logs
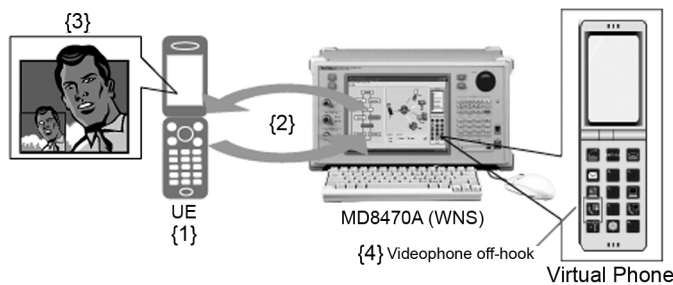

Video loopback test.

The simplest test of a videophone function is a loopback test with a connection with the cellular network. The cell phone is connected to the MD8470A. H.245 negotiation occurs between the cell phone and MD8470A and the audio and video data generated by the cell phone is looped back and played on the cell phone itself.

An even more important test involves the end-to-end testing using the MD8470A unit. In the past, the MD8470A required two units for end-to-end testing but Couple-UE Network Simulator (CNS) software provides an economical and space-saving solution with just one MD8470A. The user simply registers the two phones via the RF Aux1 and RF Aux2 jacks on the front of the MD8470A. The user then presses the video call button on one phone and calls the other phone.

Setting up video streaming server
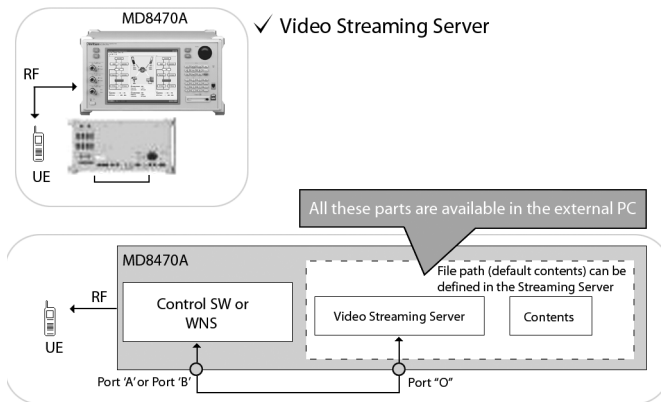
Using MD8470A with a streaming server

The MD8470A also supports installation of a video streaming server. The following example explains how to install and use the Darwin Streaming Server with the MD8470A.

Installation and setup for Darwin Streaming Server:
The procedure of installation is
1. Install Perl (execute "ActivePerl-5.8.4.810-MSWin32-x86.msi" file)
2. Install [Darwin Streaming Server] (execute DSSSetup.exe)
   (Set the Username/Password both to "xst")
3. Swap the "default.htm" file located in "c:\inetpub\wwwroot\" (the new default.htm has an added link
   "rtsp://192.168.1.2/v.sdp")

After a successful installation, the following shortcuts can be seen:

How to use Darwin:
Confirm the following before starting "Darwin":
Windows Start>Control Panel>Administrative Tools>Services
Select the "Darwin Streaming Server" and click "start service"
After the step above, restart "Darwin Streaming Server".
The following DOS prompt will appear:
<This is the Darwin Streaming Server Main display>

After this, start "Streaming Server Administration"
Input the user name and password (both "xst") to see the following screen:
Confirm "Server is Running" and "Host name (ex: APN95049…..)". If the "Host name" is "localhost", the streaming server does not reliably. Try the operation again (please go back to step 1). If everything looks OK, go to "Playlists".
Go to "New Movie Playlist"
Select a folder with .3gp files and push "Open folder".

Select some of .3gp contents and move to "play list" area. Modify "Mount
Point" to "v.sdp" and play movie to "sequential looped". Then push the "save changes" button.
Push the "play' button and confirm the "status playing".
Setting up and verification of the streaming server is now finished. After the Darwin streaming server is set up. Use the WNS (wireless network simulator) interface on the MD8470A to do a packet call to the web page on the MD8470A (192.168.1.2) and click on the link for the streaming server. You will then see the video streaming to your phone.

Conclusion

The MD8470A greatly increases testing speed by eliminating network loading and coverage problems from the equation and allowing development teams to test phones that support cellular services not found in their area. Video chip manufacturers use the MD8470A to identify a wide range of issues such as: problems with video loopback functionality, video working one direction but not the other; phones not displaying video at all, etc. After engineers identify these problems, they can diagnose the cause by analyzing and decoding the protocol signals in the protocol analyzer. As a result, video chip manufacturers that use the MD8470A have reduced development time and brought new products to market ahead of competition.

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