R&S®CMU 200 / R&S®CTRU-G / -W

Standardized test solutions for PoC mobile phones

PoC (push to talk over cellular), the modern version of walkie-talkie communication, is a very promising new voice communications service in mobile radio networks. Voice messages are directly sent to one or more predefined subscribers at a keystroke. This bidirectional radio service – also used as PTT (push to talk) with only slight differences – is based on packet-switched voice transmission in GPRS, WCDMA(UMTS) or CDMA2000® networks, for example. This new form of group communications opens up new possibilities both for business customers and private users and is thus a cost-efficient alternative to telephony and SMS.

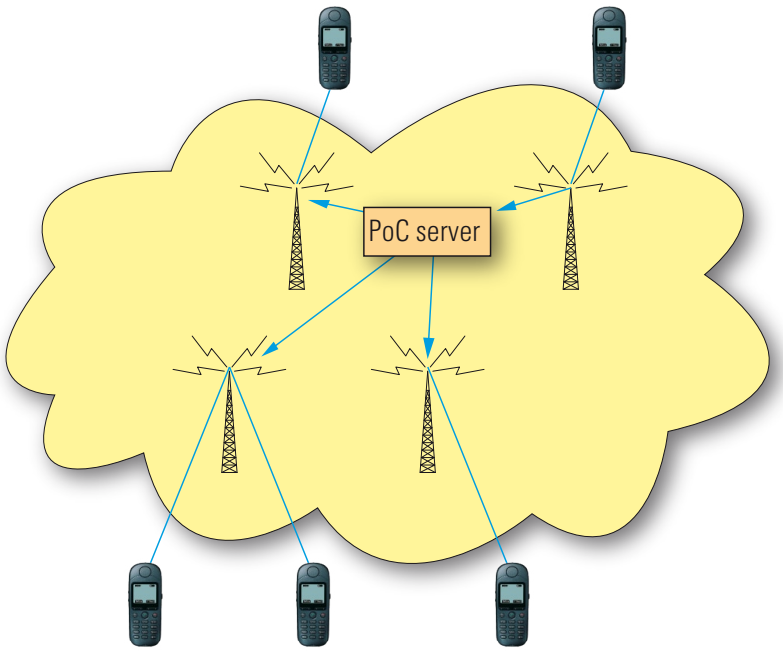
PoC – go ahead!

As with the classic transceiver, you just press a key on your PoC mobile phone to communicate by radio. In contrast to most conventional voice services with full-duplex transmission methods allowing both talking and listening at the same time, PoC is a semiduplex method: Only one subscriber at a time can talk. All others have to listen. The spatial limitation of current walkie-talkie communications has largely been eliminated owing to roaming in mobile radio networks. The PoC voice service works well in the complete mobile radio network, even across borders.

PoC is of interest primarily for closed user groups that have to communicate over large distances. In the US, for example, PTT has been used for years to ensure interruption free communication between couriers and their employers. And during the world bob sleigh racing championship in Oberhof, the assistants were also communicating via PTT. But also in private life, parties can work out a time and place to meet each other far more efficiently, faster and cost-effectively than per SMS or a number of lengthy phone calls.

Many mobile phone companies believe that PoC is going to become a real trend. Based on approx. 17 million PTT users in the US today, conservative estimates go up to more than 100 million subscribers worldwide for the year 2008. The impetus for the target growth will largely come from the demand in the business customer segment. According to network providers, PoC is supposed to be more cost-efficient for users than SMS.

FIG 1 Setup of mobile radio network with PoC service.



The cost-effectiveness of this service together with a wide range of different mobile phones and their blanket use will probably be the main reason for further acceptance of PoC.

Standard on its way

As currently only a few proprietary PTT solutions including the known restrictions exist, a uniform standard would be the missing link to mass market. In early 2003, a proposal for a standardized PoC solution was developed and submitted to the Open Mobile Alliance (OMA) standardization committee. Halfway through the year 2005, the committee announced the availability of the first open standard for PoC, a standard fully independent of the mobile radio technology used. The next step was the publication of specified test cases which are used to check compliance with the standard. FIG 1 illustrates the schematic overview of a mobile radio network offering PoC services.

PoC is based on the IP multimedia subsystem (IMS) standardized by 3GPP. This is a multimedia switching technique describing different IP-based multimedia applications. IMS forms the basis for the packet-switched transmission of multimedia data; it manages setup, control and the release of connections. Special realtime protocols (RTP, RTCP, TBCP) additionally ensure optimum voice transmission via the data network. Also, QoS (quality of service) has already been defined in IMS for the various network types.

Many network operators will soon offer access to IMS networks and many mobile phones will be equipped with a PoC client in line with open industry standards. This ensures trouble-free communication with the devices of other manufacturers and the infrastructure of most network operators. Moreover, IMS is the control level of future innovative services such as video transmission, multimedia messaging and virtual reality applications.

How PoC works

The voice message is converted to a data stream, packed in data packets and sent to the PoC server of the network operator via radio. The data packets find their way through the data network by means of the Internet protocol (IP). The voice communication service is based on a client-server architecture. The PoC client on the mobile phone uses the services of the PoC server in the network. The PoC server transmits the incoming data stream to one or more receivers and the data stream is received there with only a few seconds delay. One message thus reaches many receivers at a time. To control correct communication, the PoC server additionally takes over signaling and ensures that only one subscriber can transmit data and use the voice channel. It also controls the specified communications groups.

Allround test solutions offered by Rohde&Schwarz

Based on the R&S®CRTU-ATE application test environment software platform, Rohde&Schwarz now also offers test solutions for PoC (FIG 2) in addition to MMS [1]. These test solutions include the Test Server R&S®CA-AA02 which offers a standardized reference to developers of PoC clients. The Test Server R&S®CA-AA02 supports the session types 1-1, Ad-Hoc, Prearranged and Chat and ensures that group subscriber lists can dynamically be created and changed by the mobile phone. Moreover, the associated test cases will be available under the product name R&S®CA AC02 after publication of the corresponding specification. Once validated, these test cases will then make it possible to certify the PoC functionality of mobile phones. Both PoC servers and the specified test cases will form a test environment at the application level that is most important to software engineers as regards the implementation, test and specification of the PoC functionality.

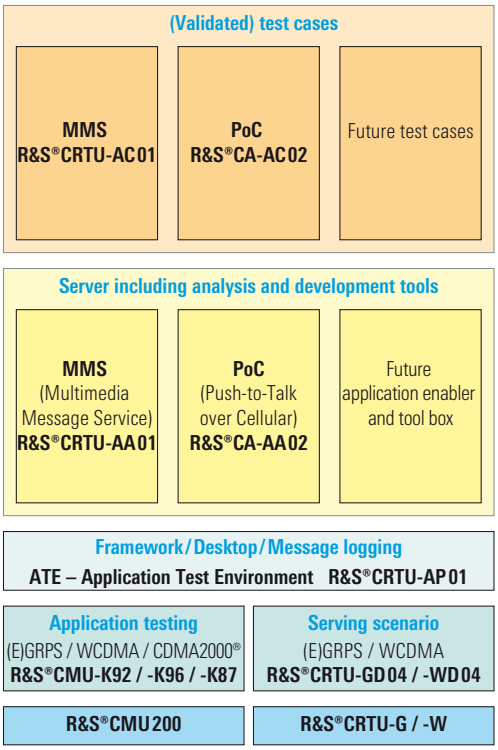


FIG 2 The test solutions of Rohde&Schwarz for MMS and PoC.

Both servers and the PoC test cases have been implemented as software products running on PCs based on Windows®. The link between the mobile phone and the PC is either the Universal Radio Communication Tester R&S®CMU 200 or the corresponding devices of the R&S®CRTU protocol tester family. These devices simulate a mobile radio network and make it possible to call up any IP-based applications of a mobile phone such as PoC [2], [3], [4]. In contrast to public mobile radio networks, you can individually define the radio parameters during such tests and repeat the test any time under reproducible

conditions. At an earlier development stage, it might still be useful to check the functionality of the mobile phone – without radiocommunications aspects – prior to migrating the PoC client software from the PC to the mobile phone. In this case, the Rohde&Schwarz PoC server provides its services to a PoC client that is installed on a laptop, for example. The PoC communications service then runs on two connected laptops without using a mobile phone.

Future prospects

With the R&S®CRTU-ATE application test environment software platform, the Rohde&Schwarz test solution portfolio in digital mobile radio ranges from the physical layer up to the application layer. Besides the development and availability of new multimedia applications, additional test solutions will follow on this basis.

Thomas A. Kneidel

More information and data sheet at www.rohde-schwarz.com (search term: PoC))

REFERENCE
[1] R&S®CRTU-W / -G: MMS tests on multimedia mobile phones. News from Rohde&Schwarz (2005) No. 185, pp 4–6.
[2] R&S®CMU 200: Test of CDMA 2000® data applications. News from Rohde&Schwarz (2004) No. 182, pp 11–13
[3] R&S®CMU 200: Versatile application tests in (E)GPRS mobile radio. News from Rohde&Schwarz (2004) No. 184, pp 10–13
[4] CMU goes Internet: Testing data applications for WCDMA. News from Rohde&Schwarz (2005) No. 186, pp 10–13

With the new Bluetooth® standard V2.0 + EDR (enhanced data rate), you can use I/Q modulation methods for Bluetooth® packets. For the RF Testers R&S®CBT and R&S®CBT32, Rohde&Schwarz now offers an option to carry out transmitter and receiver measurements on EDR Bluetooth® devices and modules. The option supports the loopback test mode and, owing to the very high measurement speed, yields a high throughput in production.

Bluetooth® RF Testers R&S®CBT / R&S®CBT32

Transmitter and receiver measurements for Bluetooth® V2.0 + EDR

New comprehensive measurement requirements

The new Bluetooth® standard V2.0+EDR (see box on page 18) offers a data transmission rate up to three times as high as that of the previous standards V1.1 and V1.2. The higher data rate is obtained through π/4-DQPSK or 8DPSK I/Q modulation for the payload of Bluetooth® packets. The header of an EDR Bluetooth® packet continues to be GFSK-modulated. Using two modulation methods within one Bluetooth® packet is a real challenge for RF design engineers and calls for flexible and versatile measuring instruments. The production lines for Bluetooth® modules or devices now require measuring instruments that, in addition to previous tests, are also able to measure the relevant EDR parameters in next to no time. The Bluetooth® RF Testers R&S®CBT and R&S®CBT32 (in short R&S®CBT) in combination with the new EDR option are ideal for meeting these requirements.

Measuring the new EDR RF test cases

The Bluetooth® RF test specifications V1.2 / 2.0 / 2.0 + EDR comprise a total of eight new test cases for measurements with EDR Bluetooth® packets:

Transmitter measurements

- TRM/CA/10/C (EDR relative transmit power)