

TSG-SA Working Group 1 (Services) meeting #3
Hampton Court, Surrey, UK 10th-12th May 1999

TSGS1#3(99)274

Agenda: 6.1.2

SMG4/TSG-CN3/TSG-T2
London, 15-19 March 1999

TSGT2#2(99)241

From: SMG4
To: TSG-SA1
CC: TSG-SA2
Title: **LS on the Provision of Facsimile in UMTS and GSM**

SMG4 has been made aware that there have been discussions in S1 concerning the development of facsimile group 3 services for UMTS.

SMG4 has studied the provision of facsimile services in UMTS and GSM and would like to report the results to S1 and S2.

The study shows that an IP-based facsimile service can be offered over UMTS with exactly the same user experience as second generation systems without using T.30 over the radio interface and hence offering a significant improvement in reliability.

If these results were used then all market needs could be satisfied for sending and receiving fax between a mobile user and a fixed network fax machine (including PC-fax and dedicated scan-and-send or receive-and-print machines).

The highlights of the study can be summarised as follows:

- a real-time as well as a store-and-forward solution is proposed
- both of the solutions are applicable for GSM/GPRS as well as for UMTS
- the solutions are based on ITU-T recommendations T.37 and T.38 specifying Fax over IP (T.37 and T.38 specify the protocols between the Mobile Station and a Fax-Server, the protocol between Fax-Server and the fixed network Fax device is acc. to T.30)
- both of the solutions use bearers provided by the UMTS or GPRS, no additional standardisation in UMTS or GPRS is necessary
- T.30 based solutions, i.e.
 - transparent facsimile (GSM 03.45) or
 - non-transparent facsimile (GSM 03.46),are only supported in GSM, these services need not to be provided in UMTS
- handover between GSM/GPRS and UMTS is possible for each of the approaches according to T.37 or T.38, respectively, when the bearers can be handed over

- handover between the different facsimile solutions (i.e.
 - real-time facsimile IP based acc. to T.38,
 - store-and-forward facsimile IP based acc. to T.37,
 - transparent facsimile acc. to GSM 03.45 and
 - non-transparent facsimile acc. to GSM 03.46)
 is not possible

The entire study is contained in the technical report UMTS 22.45 (version 1.0.0) attached to this LS.

SMG4 is also aware of the CR UMTS 22.00-A008 where the statement "UMTS will not support direct end-to-end communication using T.30" was replaced by "UMTS will optionally support a real-time non-transparent facsimile transmission".

Concerning this new requirement, SMG4 understands that the term "non-transparent facsimile" is clear in the scope of GSM, but it appears to be very unclear in the scope of UMTS, where new quality of service categories were defined.

Further, the combination of real-time and non-transparent is unclear. The non-transparent service does not provide a real-time, but rather a delayed transmission, whereas the transparent transmission is real-time, i.e. without delay. Should "real-time" be understood as a contradiction to store-and-forward? Such a service is included in UMTS 22.45 too.

The requirements in UMTS 22.00 merge now requirements on the facsimile protocol with requirements on the facsimile service. A clarification would be helpful.

It should also be clarified what are the requirements for the MS/UE. Which devices have to be supported?

So, SMG4 think that the latest update of UMTS 22.00 related to facsimile is not sufficient as a requirement.

SMG4 believes that there is a need for clear advantages for introducing a non-transparent facsimile service according to GSM 03.46. The presented solutions in UMTS 22.45 are based on IP technologies that are in line with the trends of the IP world.

Further, in GSM exist a transparent as well as a non-transparent facsimile service. These services are not compatible. So, all of the GSM operators have chosen to use the transparent service because it meets better the requirements of the errors of the radio interface. Transparent facsimile is able to adapt the transmission speeds according to the error behaviour on the transmission link and it can activate the Error Correction Mode (ECM) when necessary. When a non-transparent facsimile would be required for UMTS then exist compatibility problems with operating GSM networks.

Further, the disadvantages of a T.30 based solution via the radio interface are summarised in UMTS 21.04 as follows:

The disadvantages are:

- Mobile terminated Fax requires pre-knowledge and connection of devices before the call comes in
- Fax software is required at the Mobile Station
- Because of the inherent problems of a radio interface and the nature of T.30 facsimile, this approach is very susceptible to call failures, premature disconnection, and corruption of the fax information.
- This approach may require the UMTS operator to offer dedicated IWF hardware which has been difficult and expensive to maintain and update in GSM networks.
- UMTS could offer access to existing GSM IWFs, but this would not be in any way innovative or revolutionary, and would offer the user exactly the same problems as GSM.

Because of the difficulties outlined above, this solution is not recommended by SMG4.

SMG4 has noticed that there are a lot of different requirements concerning the provision of the facsimile service in UMTS.

UMTS 22.00 (version 3.0.0) says in section 5.1:

Transfer of data to/from facsimile machines in the PSTN/ISDN should be supported seamlessly (as far as the user or the user's terminal is concerned) across the UMTS and GSM access network. It is envisaged that the main use of fax in the mobile environment will be via PCs. UMTS will not support direct end-to-end communication using T.30. Instead a store and forward service is envisaged where some kind of file transfer program is used to transfer text or images to a store and forward unit for subsequent delivery to the facsimile machine in the PSTN/ISDN. The user (or the users PC) may receive notification of successful delivery of the fax. No standardisation of a fax store and forward service is planned and it is envisaged that roaming subscribers will be supported via the VHE.

UMTS 22.25 (version 3.1.0) says in section 4.5:

A standardised way of supporting facsimile service will be defined for UMTS e.g. via a store and forward service or via support of ITU-T T.30.

First ideas exist in UMTS 22.29 (version 1.0.0) concerning the handover requirements between UMTS and GSM. The requirements in section 6.3.5 related to handover from UMTS to GSM are as follows:

It is not required that the non transparent facsimile service as defined in GSM 03.46 be supported by UMTS. Support of the transparent facsimile service as defined in GSM 03.45 shall be optional for UMTS networks. It is not required that a facsimile transmission that is active between UE and network at the time of handover from UMTS to GSM completes successfully.

{this remark from Nokia}

[Note that is still some disagreement concerning the need for 03.45 in UMTS, this is FFS]

The requirements in section 7.3.2 related to handover from GSM to UMTS are as follows:

It is not required that the non transparent facsimile service as defined in GSM 03.46 be supported by UMTS. Support of the transparent facsimile service as defined in GSM 03.45 shall be optional for UMTS networks. Therefore handover will depend upon whether the UMTS network supports transparent fax as defined in GSM 03.45. It is not required that a facsimile transmission that is active between UE and network at the time of handover from GSM to UMTS completes successfully.

{this remark from Nokia}

[Note that is still some disagreement concerning the need for 03.45 in UMTS, this is FFS]

It is unclear, how facsimile should be provided in UMTS because of these contradictory requirements.

In the light of all of the above, SMG4 suggests that S1 reconsider the current documented proposals for facsimile in UMTS.