



The Validity of Fax over IP

A technical, yet not juridical remark on the question: “Will fax become less important after the conversion to All IP?”

White Paper 2017/10/04 | Ferrari electronic AG

The Situation

The inevitable switch from ISDN/analogue signaling to All-IP has shown to discomfort many users that occupy fax devices for document transmission, particularly of sensitive documents. Will I be able to continue using these devices and will fax retain its status in terms of universal acceptance and its superior security to E-Mail?

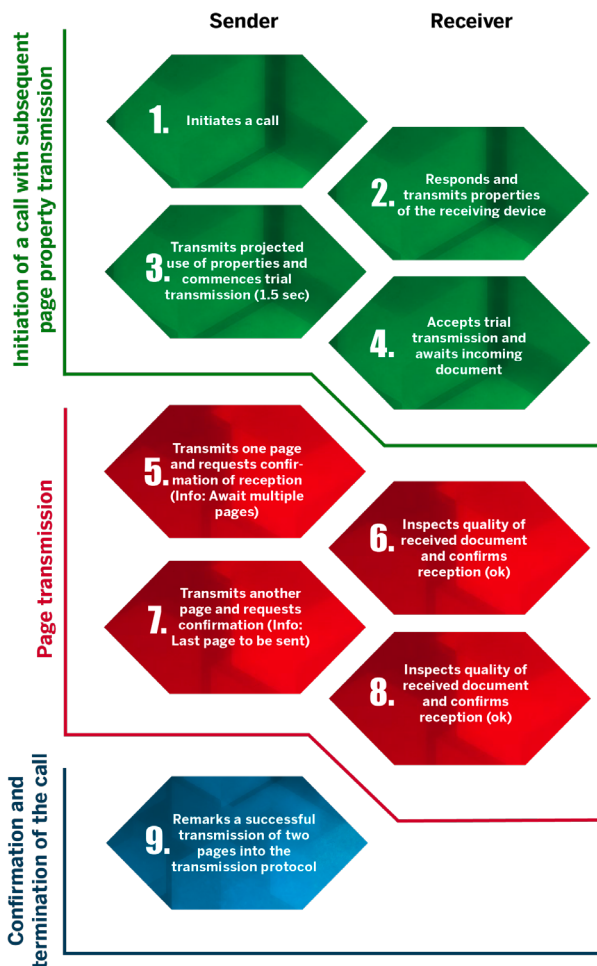
A so-called “OK-remark” has been mentioned in various court decisions. Technical specifications for fax communication do not list this term itself but often contain a similar connotation.

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Highly Simplified Process of a fax Transmission

In order to comprehend the process of a fax transmission, please refer to the image below. *



How Does the Receiving Party Check Whether a Page has Been Transmitted Successfully?

Firstly, two scenarios have to be considered:

► Transmission With ECM

If the two parties (addressor and addressee) agree on using the Error Correction Mode (ECM), the data package is divided into numbered blocks that are encrypted with HDLC framing with FCS (16 bit CRC). A CRC test detects possible errors upon which the receiver requests a repeated transmission of the faulty blocks by referencing the respective block number. This step is repeated until all data has been delivered successfully. Transmission with ECM enabled therefore assures that the entire content has been transmitted without any loss of content or quality- not even a single pixel is distorted.

► Transmission Without ECM

For resorting to a transmission without ECM, defective pixel rows are recognized by detecting invalid code words during decoding. Additionally, if a pixel row does not meet up with the predefined row length, it is also rendered as defective. Having detected an error, the receiving device omits the defective pixel row and continues on the next. Once the end of a page has been reached, the sender requests a confirmation of successful transmission. In order for the receiving device to judge it correctly, two criteria are considered:

- What is the extent of faulty pixel rows per page in percent?
- How many consecutive pixel rows are faulty?

Both criteria are important- Here is why: Given a standardized A4 fax page in high resolution (7.7 rows/mm) consists of approximately 2300 pixel rows. If, during the decoding process, 30 rows had been rendered as faulty, then the threshold percentage of acceptable pixel faults would not have been reached. If, however, the faulty rows are arranged consecutively, it would possibly emit an entire (text) line, particularly if the font size is small. In this case, the second criteria would render the entire page transmission as failed.

What is an „OK Remark“ Technically?

For the sender, a fax transmission can only be rendered successful if all pages had been transmitted and a positive confirmation of transmission was given. Otherwise, the fax device would indicate an error.

Is There any Difference From an “OK Remark” for Fax over IP to Fax Without IP?

Everything that has been outlined above can be applied to every form of fax transmission, regardless whether an analogous route (a/b), ISDN, IP with G7.11 or IP with T.38 had been used. The receiving device judges the sole outcome of a transmission without knowing the transmission route utilized.

Here is an Example to Make it More Comprehensible:

The general insecurity is undoubtedly increased by the many remarks on how the success rate of fax transmission via ISDN is allegedly higher than that of via IP. This may be true in some cases yet it cannot be generalized as Fax over IP performs just as well if adequate technical resources are provided.

The following example may outline the validity of fax:

A courier transports a sensitive parcel with his car. As soon as this parcel arrives at its designated destination, the recipient calls the dispatcher and informs him of the successful delivery (“OK-remark”).

Given the road has multiple potholes (“IP”) and the car reaches its destination in merely 97% of all attempts. As the recipient is unaware of the transport route taken, nothing changes for him; he would still give the dispatcher a call and notify him of the successful delivery. Again, the “OK remark” is just as reliable because it is only sent once the parcel has successfully arrived.

In short: Once the addressee receives an “OK-remark”, the transmission route taken is absolutely insignificant.

Is the Quality of This Sort of Confirmation Different From That Offered by Other Services (Such as E-Mail)?

Fax devices transmit faxes directly from one device to the other. In IP networks, this method is commonly referred to as Peer-to-Peer protocol. The delivery confirmation and the image data are routed through the same transmission route and session. Again, if a page or delivery confirmation is missing, an “OK-remark” cannot be entered into the fax journal. If, however, an “OK-remark” can be found in the fax journal, then the transmission of image data and its respective confirmation has been a success. Note that it does not reveal anything about the route quality; it is merely a protocol property. Other communication protocols (such as SMTP) are based rather on server communication than on direct device-to-device communication. These protocols transmit their data via a “Best-Effort” transmission and each SMTP-Hop receives an individual confirmation. Some clients possess an optional delivery confirmation for E-Mails. However, this confirmation itself is issued as E-Mail.

A Peer-to-Peer protocol is the only protocol that provides a reliable transmission of data and offers a legitimate transmission protocol.

About Ferrari electronic AG

Ferrari electronic is a leading German manufacturer of hard and software for Unified Communications. The OfficeMaster range integrates fax, SMS and voicemail into all existing email and application systems. The hardware seamlessly connects a company’s telecommunications infrastructure with the existing information technology. Customers benefit from greater efficiency and streamlined business processes. In August 2014, Ferrari electronic acquired innoventif Ltd. and thereby expanded their portfolio by the OfficeMaster **CallRecording** solutions. Thus call recording becomes an integral part of Ferrari electronic Unified Communications solutions. Companies can optimize their sales department, service quality and other processes with a wellrounded system. Ferrari electronic with

this move gains new opportunities, customers gain additional value. Research, development and support of Ferrari electronic AG are located entirely at the company’s headquarters in Teltow near Berlin. A pioneer in computerfax since 1989 with the product „ferrariFAX“, Ferrari electronic remains market and technology leader in this area to this day. Today, more than 50.000 companies with approx. 5 million users utilize Unified Communications products by Ferrari electronic. The customer base includes companies of all sectors and sizes. Some of the more notable companies include Allianz Suisse, Asklepios Kliniken, Boehringer Ingelheim Pharma GmbH & Co. KG, EUROVIA, European School for Management and Technology, Griesson - de Beukelaer, Österreichische Kontrollbank AG, Stadthalle Wien and Techniker Krankenkasse.

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* For extensive details about the process of fax transmission, particularly for Fax over IP and T.38, please refer to the [diploma project](#) of Hans Deutinger, CSO of Ferrari electronic (in German).

ADDITIONAL INFORMATION:

Please refer to the following White Paper for additional information on the topic of document transmission via fax.:

Electronic Transmission of Documents Using fax



Using fax for Business Operations



Exchanging Documents within a company

