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19 October, 2007

Dear Geoff,

Impact Assessment of Pre-Call Announcements
on fax/data modem operation

Thank you for your email received yesterday, requesting further information on the above issue. I note your concerns with respect to the risk associated with 0870 pre-call announcements. I also note that Ofcom needs to better understand the impact that these announcements may have upon automated calling systems, in the light of the problems detected in Ofcom's recent ill considered intervention in the 070 service.

I can confirm that I expect similar problems on 0870 to those suffered on the 070 service. Since the 0870 call volumes and customer bases are much larger than for 070, it is obvious that the incidence of call failure will be much higher and more widespread than for 070.

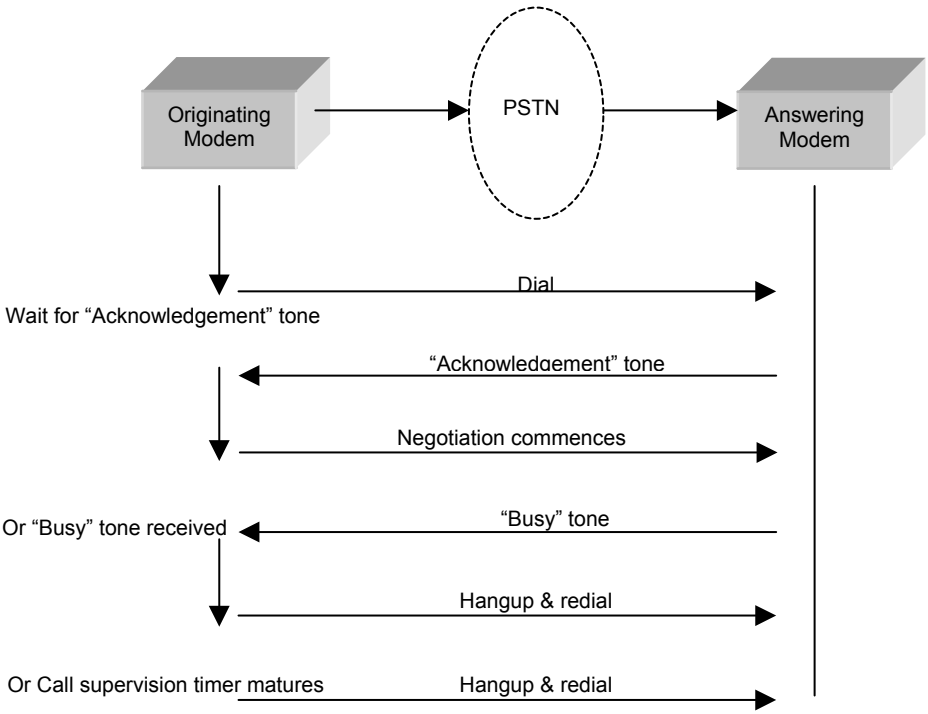
In my earlier correspondence I had assumed that Ofcom has systems engineers at hand who understand how data and fax modems work and so omitted an important, but obvious (to me) step. However, on reading your email I detect that Ofcom still does not grasp fully the underlying causative problem. As a Chartered Electronics Engineer, I am in a position to shed light on the matter and so perhaps save Ofcom and the industry considerable time and effort. I will now outline this missing step.

Fax/Data Modem Handshaking

In simple terms, both fax and data modems work on the same basic principles. Such modems are required to be used in all the types of service cited in your email i.e. fax, fax to email, dial-up Internet, security alarm services, personal alarm services, telemetry services and many other general point-to-point data services. Therefore the "failure" mode induced by pre-call announcements can be expected to be common to all such modem-based services and equipment. This insight should greatly simplify your task of assessing the impact of pre-call announcements on your service list.

Such modems initiate a call by dialling as per a normal "analogue" handset, as depicted in the following diagram. After completion of dialling this "originating" modem then "listens" to the line and waits for an "acknowledgement" tone sent from the far end "answering" modem. On receipt of this "acknowledgement" tone the modems then run through a complex handshaking sequence to determine the best operating speed based on their joint capabilities and the prevailing line quality.

If the "acknowledgement" tone is not heard within a specified time (the call supervision "timeout") then the "originating" modem assumes the call has failed and hangs-ups and redials. This redial timer is necessary to overcome temporary issues such as network congestion, busy line or abnormal call failure.



Redial Timeouts & Embedded Firmware

Over the past twenty years post-dial delay *(the time between the "originating" modem dialling the last digit to connection to the "answering" modem)* has reduced from over 60 seconds to less than 1 second. As a result many modem manufacturers (and also implementers of automatic calling systems) have improved performance by reducing the call supervision "timeout". Originally set to over 60 seconds, this can now be less than 30 seconds. Typically these timer values are stored in the firmware of the "originating" modem and therefore cannot be easily reprogrammed.

Busy Tone Detection

Most modems also can monitor for "busy tone". If, when listening to the line, busy tone is detected, these modems hang up immediately and then redial. This is provided for more efficient network and system operation.

Depending on the quality of the busy tone detection circuit, or Digital Signalling Processing (DSP) algorithm, it is possible that some modems may interpret high levels of "noise" on the line as false "busy tone". This is particularly true for early DSP implementations, where the cost/processing power trade-off delivered mediocre filter performance, but a more stable product in terms of calibration and thermal effects. Many of these early DSP products are still in widespread use.

It is important to note that speech on the line will be seen as a very high level of "noise" in modem terms. Such "noise" levels are unexpected (as the line is normally silent at this time) and as such are likely to be outside the design envelope for commercial modems found in typical fax and data applications.

It is therefore **probable** that a pre-call announcement will cause some modems to detect busy or other progress tones falsely. The modem will then hang-up and retry. This will be dependent not only on the "originating" modem type, but also on the content of the announcement and the timbre of the voice used. If the announcement voice contains sufficient spectral energy, *even fleetingly*, the modem will trigger on "false tone" and hang-up. The symptoms are likely to be inconsistent and the results of a large number of tests need to be taken to confirm that a specific modem type is safe to use in such a hostile "noisy" environment.

Recent tests, with FleXtel customers, indicate that fax modems are suffering false trigger and interpreting speech on the line as either false "busy" tone or false "acknowledgement" tone. This matter is complex and FleXtel does not have the resources to perform the necessary tests to determine the exact nature of the failure.

This suggests that shortening of call announcement may not be a viable solution. Therefore the only option seems to be removal of pre-call announcements altogether.

In Conclusion

I hope the above note is helpful to Ofcom in that it clarifies that the failure is in the originating network modem equipment and this failure is being caused by the originating network's pre-call announcements and is likely to be a common problem for a wide variety of applications. It is also obvious to me that amongst these applications there will be a significant number that are "essential" as defined in your email i.e. where such a failure would put individuals or property at risk.

Although your email calls for an analysis of the various call types and terminating services, it should now be clear from the above that this is unnecessary and would be a waste of both Ofcom's and FleXtel's time and resources.

In any case the above data should now be self-evident and can be validated by reference to the appropriate specifications as published by the ITU and modem manufacturers. A good starting point being here:

http://en.wikipedia.org/wiki/Modem

The pre-call announcement hazard has now been in the network since the 1st September. Some 49 days have elapsed without any significant action being taken by Ofcom or BT. It continues to put over 99% of the live 070 service at risk, if used for modem operation. We believe much of the risk is latent and will occur only at the time of alarm trigger.

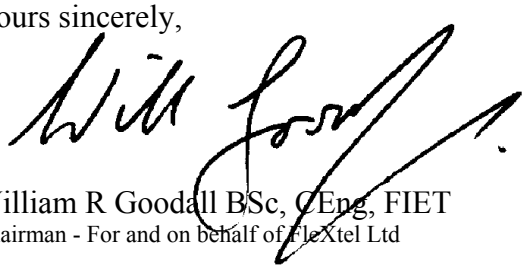
During the consultation process on this issue, Ofcom was warned about the potential failure of fax equipment, due to increased post-dial-delay. Ofcom noted the points made, but chose to carry on regardless. Had Ofcom made a fuller impact assessment and listened more carefully to the learned input of commercial stakeholders, it would have perceived the potential risk underlying this intervention. I have seen no evidence that Ofcom has performed such a risk assessment. It is also now apparent that this intervention has undergone little or no field trials or even laboratory testing. This is something that no professional network operator or switch supplier would normally tolerate for an intervention of this magnitude. I can only assume that the OCPs sit in such fear of Ofcom's dictatorial approach, that they have either forgotten sound working practice or ignore engineer's who plead for it. Indeed I'm very surprised and disappointed that BT, with all its vast resources at Martlesham Heath, could not have foreseen this issue arising. Surely, there must be at least one engineer left in BT who remembers how traditional analogue modems work. If so, he or she should be able to confirm the veracity of this short note.

It should not be up to a mere SME to educate Ofcom so late in the day. It's all very well focussing on the Consumer/Citizen, but Ofcom should learn to separate vested commercial interest from sound technical advice. This is not something that can have political spin applied to it, physics is not subject to such matters and the truth will out. I have warned Ofcom that this option was not viable, in my paper on call-price-labelling. Others have called Ofcom's 0870 intervention "bonkers". I would now agree that to press on in this manner is not only "bonkers" but also reckless and I use the term advisedly.

I would therefore strongly recommend that Ofcom withdraw its requirement for pre-call announcements immediately. There is no need for Consumer surveys, focus groups or market analysis. Just read the modem specifications and act accordingly.

If any of the above is not clear or you wish to discuss the matter further please do not hesitate to contact me. I confirm that I will be attending the NTS Focus Group next Thursday and so I am available on that morning, if you would like to meet at your offices.

Yours sincerely,



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Chairman - For and on behalf of FleXtel Ltd