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Case No: CA-2021-000725

IN THE COURT OF APPEAL (CIVIL DIVISION)
ON APPEAL FROM BUSINESS AND PROPERTY COURTS
INTELLECTUAL PROPERTY LIST

Mr Justice Meade
CP2019000006

Royal Courts of Justice
Strand, London, WC2A 2LL

Date: 13/06/2022

Before:

LORD JUSTICE ARNOLD
LORD JUSTICE PHILLIPS
and
LORD JUSTICE BIRSS

Between :

OPTIS CELLULAR TECHNOLOGY LLC & ORS
- and -
APPLE RETAIL UK LIMITED & ORS

Respondent/Claimant
Appellant/Defendant

Tom Moody-Stuart QC and **Thomas Jones** (instructed by **EIP LLP**) for the
Respondent/Claimant
Lindsay Lane QC and **Jeremy Heald** (instructed by **Wilmer Hale LLP**) for the
Appellant/Defendant

Hearing dates: 4th & 5th May 2022

Judgment Approved

Lord Justice Birss:

1. This appeal concerns the validity of European Patent (UK) No. 2 229 744 B1 entitled “Method and Arrangement in a Wireless Communication Network”. The patent was filed on 7 October 2008 claiming priority from 8 January 2008 and granted on 22 May 2013. It has been declared essential to the relevant standards. The sole question on appeal is whether the patent is anticipated by a prior art document referred to as InterDigital (TDoc R2-071618). That question turns on the construction of three claims (claims 1, 6 and 9).
2. The action began as an infringement claim brought by the respondents (“Optis”) against the appellants (“Apple”) in February 2019. The action was split into a number of trials, including a FRAND trial. This appeal is from the judgment of Meade J given on 25 June 2021 [2021] EWHC 1739 (Pat). The same patent was previously litigated in Unwired Planet v Huawei ([2015] EWHC 3366 (Pat) and on appeal [2017] EWCA Civ 226). I was the trial judge, and my lord Arnold LJ was a member of the Court of Appeal in that case. There were no overlapping issues with the present case.
3. By the time of the judgment of Meade J, it was common ground that the patent was essential/infringed. The patent issues were all concerned with validity. There was also an issue about proprietary estoppel. The judge rejected Apple’s case that the patent lacked novelty or was obvious over the cited prior art. He gave permission to appeal on novelty. The judge also rejected Apple’s proprietary estoppel case and refused permission to appeal. Apple’s application for permission to this court on the proprietary estoppel ground was refused.

The technical background

4. A detailed exposition of the undisputed technical background and common general knowledge is set out in the judgment from paragraph [40] to [79]. As the judge explained, those passages were based on the earlier judgment of mine in the Unwired Planet case (cited above). No purpose would be served in setting them all out again here. In order to understand the issues in this appeal, what one needs to know is the following.
5. The case is about modern mobile telecommunications networks. These systems are specified by international standards which are set by standards setting organisations. In sequence the various digital systems specified by these standards are known as GSM (2G), UMTS (3G) and LTE (4G). Today there is also 5G, but that is irrelevant. The standards specify how the different entities in the network behave so that they can communicate effectively. This case is about the behaviour of the entity which is transmitting data to a receiver by radio waves (the radio link). An example would be the transmitter at a mobile phone mast, and a mobile phone as the receiver. The relevant protocol for this transmission is called the Radio Link Control or RLC.
6. The stream of data to be sent is divided up into separate units called PDUs (Protocol Data Units). As an example, a single PDU can be about 1,500 bits in length. Every PDU consists of a small string of bits called a header followed by the remaining bits which represent the data to be sent. The header contains control information. One piece of control information is a sequence number. The sequence number uniquely identifies the PDU. The fundamental problem is that the radio link is unreliable and so

one cannot guarantee that a PDU which is transmitted will be received. The sequence numbers allow the receiver to reassemble the data stream correctly using the individual PDUs. They also allow the receiver to identify if a PDU is missing. The receiver can therefore acknowledge (ACK) receipt of given PDUs and can also indicate that a given PDU has not been received (called a NACK – a negative acknowledgement). The way the receiver provides this acknowledgement information to the transmitter is by sending a status report. All control signalling, such as status reports, uses up bandwidth which might otherwise be used to send data. Therefore, in designing these systems there is a balance between having enough signalling to make them work efficiently, but not too much signalling which reduces the data capacity.

7. In this context status reports are not sent all the time because that would be inefficient. Rather the standard specifies events which trigger them. The transmitter may realise it wants to receive a status report and so needs to ask the receiver to do it. This request is called a poll. One of the bits in the header of a PDU is defined as a poll bit. The way the transmitter polls the receiver to send a status report is by “setting” the poll bit in a PDU which is transmitted to the receiver. Every time the receiver receives a PDU, it will check the status of the poll bit. If the poll bit is set, then the receiver knows it is being asked for a status report. When the status report is received by the transmitter it will know which PDUs are ACKed and which are NACKed.
8. When the transmitter sends a PDU, it will need to keep a copy in a memory buffer until it knows that that PDU has been ACKed. Once the PDU is ACKed, the copy can be deleted, freeing up space in the memory buffer. If that PDU is NACKed then the transmitter knows to send it again.
9. The meaning of the various bits in the header of a PDU are defined by the standard and as part of this the number of bits used for the sequence number is defined. In UMTS 12 bits were used, giving 4096 possible numbers. Therefore the sequence number cycles back to zero when PDU number 4095 is sent. One cannot re-use a sequence number unless one is sure that the previous PDU with that number has been received. Therefore, if the transmitter runs out of available sequence numbers it cannot send any more PDUs. The system is said to stall.
10. In the standards at the time various criteria were specified which might trigger a poll. The two important ones in the relevant standard specification were a counter-based trigger and window-based trigger. A counter-based poll trigger counts the number of PDUs transmitted and when that number reaches a predetermined value a poll is triggered. The predetermined value is in a defined field called *Poll_PDU*. A window-based trigger keeps track of the percentage of the available sequence number resource which has actually been used, and so indicates how much is still available. The percentage was defined in the standard as a parameter J in the following equation:

$$J = \frac{(4096 + VT(S) + 1 - VT(A)) \bmod 4096}{VT(WS)} * 100$$

11. VT(S), VT(A) and VT(WS) are state variables. VT(S) is the sequence number of the next PDU to be transmitted. VT(A) is the sequence number of the last in-sequence acknowledged PDU. In other words, all the PDUs with a sequence number lower than

VT(A) must have been ACKed. There may also be ACKed PDUs with sequence numbers higher than VT(A) but they will not form a continuous sequence because of the presence of at least one NACKed PDU. VT(WS) is the pre-defined size of the transmission window.

12. The equation determines the difference between VT(S) and VT(A) as a proportion of the predefined window size VT(WS) expressed as a percentage. Because sequence numbers cycle round 4096 values the calculation is done modulo 4096. Thus by specifying a value for J which triggers a poll, the window-based method allows one to trigger a poll when the window is near to filling up (say 70% full) but has not yet filled up.
13. The purpose of both of these poll triggers is to poll periodically during continuous operation so as to avoid stalling. The window-based approach is more complicated to implement but more accurate than the counter-based method.
14. Originally PDUs had a fixed length. This meant that the PDU sequence number resource and the amount of memory buffer taken up by transmitted but unacknowledged PDUs were directly related to one another. However, before the priority date, the idea of variable length PDUs was introduced. These still had fixed headers, but the amount of data held in a PDU could vary. Therefore, one now needs to keep track of two resources, sequence numbers and memory space. Running out of either causes a stall.
15. This is the problem which the patent relates to. All of the above was common general knowledge.

The patent

16. In its background section (paragraphs [0006] and [0007]) the patent describes two existing criteria used to trigger a poll: one trigger is the transmission of the last PDU available, the other is the expiry of a poll retransmission timer. Then at paragraph [0008] the patent explains their limitations and describes how counter-based and window-based methods can be used to prevent stalling when transmitting continuous data:

“[0008] Such criteria for setting poll bits may work well for bursty traffic, where the poll is sent for the last PDU in each burst. For continuous transmission however, additional triggers may have to be considered. A properly designed polling procedure can be used to limit the number of outstanding, i.e. transmitted but not acknowledged, PDUs, or bytes, and to avoid stalling situations. Two mechanisms, counter-based and window-based, have been identified to avoid protocol stalling. Protocol stalling is an expression signifying that no more new data can be transmitted. Further, the polling mechanism may operate either on transmitted RLC PDUs or on transmitted bytes.”

17. The patent then goes on to describe and contrast the counter-based and window-based methods in a bit more detail in paragraphs [0009] to [0013] as follows (omitting [0011] as irrelevant):

“[0009] A counter-based mechanism counts the amount of transmitted PDUs, or bytes, and sets the poll bit when a configured number of PDUs, or bytes, have been transmitted.

[0010] A window-based mechanism is similar but transmits the poll only when the amount of outstanding data exceeds a certain number of PDUs, or bytes. A window-based mechanism may need additional logic to transmit the poll regularly as long as the amount of outstanding data exceeds the threshold.

...

[0012] However, none of the existing mechanisms does take into account that stalling sometimes may occur due to sequence number limitations and sometimes due to memory limitations. In particular, the buffer memory of a user equipment such as e.g. a mobile phone may be limited.

[0013] The user access quality and overall capacity in a wireless communication network environment is affected by data loss and protocol stalling, but also by unnecessary polls and resending of data.”

18. The reference in paragraph [0010] to window-based mechanisms being “similar” to counter-based methods was the focus of argument and I will come back to it below.
19. The other passages of the patent worth setting out are parts of the summary section addressing unnecessary or “superfluous” polling. They follow consistory clauses mirroring the claims. The passages are [0017] to [0019]:

[0017] Thanks to the present methods and arrangements, superfluous polling due to both sequence number limitation and memory limitation is avoided by help of one single mechanism. By combining the two criteria "transmitted number of data units" and "transmitted number of bytes" into one mechanism, it is avoided that a poll is unnecessarily sent when the first criterion is fulfilled in situation when such a poll has already recently been triggered due to the other, second criterion. Thus unnecessary signalling between the nodes comprised within the wireless communication system is reduced, which leads to reduced overhead signalling and thereby increased system capacity. Thus an improved wireless communication system is provided as a consequence of the present improved mechanism for polling within the wireless communication network.

[0018] It is a further advantage of the present invention that the mechanism operates on both bytes and data units and thus avoids stalling due to both sequence number limitations and memory limitations. This is advantageously achieved by a single mechanism coordinating the polling by two criteria leading to an efficient polling mechanism.

[0019] An advantage of the present method and arrangement is that the generation of superfluous polls is eliminated or at least reduced.”

20. The remainder of the patent describes a specific embodiment (or embodiments) of the invention. There is no dispute that what is described in detail is a counter-based mechanism.
21. Finally Apple place emphasis on passages in the patent which use wide language. There is no need to set them all out, the point can be made by reference to two paragraphs ([0022] and [0047]) as follows:

“[0022] The invention is defined as a method and an arrangement which may be put into practice in the embodiments described below. This invention may, however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein; rather, these embodiments are provided so that this disclosure will be so thorough and complete, and will fully convey the scope of the invention to those skilled in the art. It should be understood that there is no intent to limit the present method or arrangement to any of the particular forms disclosed, but on the contrary, the present method and arrangement is to cover all modifications, equivalents, and alternatives falling within the scope of the invention as defined by the claims.

...

[0047] In order to clarify and further illustrate the present method, yet an example is discussed below. However, it is to be noted that this is a non limiting example only, not intended to limit the scope of the present method in any way, which scope is limited by the independent claims only.”

The claims

22. The relevant claims are 1, 6 and 9 and are as follows:

Claim 1:

Method in a first node (110) for requesting a status report from a second node (120), the first node (110) and the second node (120) both being comprised within a wireless communication network (100), the status report comprising positive and/or negative acknowledgement of data sent from the first node (110) to be received by the second node (120),

wherein the method comprises the steps of:

transmitting (306) a sequence of data units or data unit segments to be received by the second node (120),

the method further comprises the steps of:

counting (307) the number of transmitted data units and the number of transmitted data bytes of the transmitted data units, and

requesting (310) a status report from the second node (120) if the counted number of transmitted data units exceeds or equals a first predefined value, or the counted number of transmitted data bytes of the transmitted data units exceeds or equals a second predefined value.

Claim 6:

Method according to any of the previous claims 1-5, further comprising the steps of:

resetting (311) the first counter (421) to zero, and

resetting (312) the second counter (422) to zero.

Claim 9:

Method according to any of the previous claims 6-8,

wherein the steps of resetting (311, 312) the first counter (421) and the second counter (422) is performed

(i) when the first predefined value is reached or exceeded by the first counter (421)

or

(ii) when the second predefined value is reached or exceeded by the second counter (422).

[the italics and reference numerals are in the original but nothing turns on them]

23. Claims 1 and 6 above are presented in the same way as they appear in the printed patent, save that I have spaced out two phrases starting with the word “wherein” for clarity. In the judgment the claims were divided into integers, but given the narrow focus of this appeal, those are no longer necessary. The text of claim 9 above has also been separated out a little for clarity, and references (i) and (ii) added in.
24. Claim 1 is expressed to be a method of requesting a status report. The first node is the transmitter of data and the second node is the receiver. The method involves transmitting a sequence of data units and counting the number of transmitted data units and the transmitted data bytes. In the method the status report is requested from the receiver if the counted number of transmitted data units exceeds or equals a predefined value, or the counted number of transmitted data bytes exceeds or equals another

predefined value. On appeal the issue of construction arising from this claim is the meaning of the term “counting the ... transmitted [units/bytes]”.

25. Claim 6 adds the step of resetting both counters to zero. Although there is no express antecedent to the “counters” referred to in claim 6, it is easy to understand what the claim is getting at (and for what it is worth there are counters referred to expressly in claims 4 and 5). I suppose claim 1 implicitly requires or assumes the existence of a data unit counter and a byte counter to maintain the counts produced by the process of counting. The feature of initialising the counters to zero is actually claimed in claim 5, but that claim is not alleged to be independently valid. The point of resetting the counters to zero is to begin the count again when a poll has been triggered, but claim 6 itself does not actually specify the condition which triggers the reset referred to.
26. Claim 9 adds an important feature that both counters are to be reset when either reaches its threshold. In other words if, for example, the byte counter reached the relevant byte threshold then both the byte counter and the data unit counter must be reset, even though the data unit counter has not reached the relevant data unit threshold. This is the single mechanism operating on both bytes and data units which is described in paragraph [0018] (above). Claim 9 is dependent on claims 6-8 and owing to the way claims 7 and 8 are drafted, claim 9 is not necessarily dependent on claim 6, but nothing now turns on that.

The judgment

27. The judgment had to address a large number of issues which no longer matter. The finding which is the subject of this appeal is that claims 1, 6 and 9 are novel over the InterDigital prior art. That prior art discloses a window-based approach to triggering a poll. Anticipation of claim 1 turns on the construction issue I have mentioned already, i.e. the meaning of counting. Optis argued, and the judge accepted, that “counting” requires the maintaining of a count of transmitted PDUs and bytes and that this excluded window-based systems which do not involve such counting (paragraphs [109]-[122]). The judge held that the meaning of the term was heavily flavoured by the context, both in the technical field in general and the patent in particular, of there being a distinction between counter-based and window-based systems. Part of the judge’s reasoning ([122]) was to accept Optis’ submission that a count of transmitted PDUs (or bytes) only changes in one direction, i.e. is monotonic, because one cannot “untransmit” something. The result was that the method described in InterDigital did not anticipate claim 1, because that method is a window-based polling method and such an approach does not involve counting (judgment [212] – [229], particularly [221]-[229]).
28. The construction issue for claim 6 relates to the meaning of “resetting”. Again the judge accepted the construction advanced by Optis (paragraphs [123] – [128]), that resetting means reassigning the counters their previous starting value as a discrete step, which is distinct from their ordinary changes in value resulting from the counting itself ([124]). This has the result that InterDigital does not anticipate (paragraph [248(i)]).
29. The issues for claim 9 are the same point on “resetting” and a further point on the meaning of “when” (see claim 9 (i) and (ii) above). The judge accepted Optis’s construction of “when” as well (at [129] – [133]), holding that it means “immediately upon” or “at the point in time when” ([132]). The result of the construction of “when” is that InterDigital does not anticipate claim 9 (paragraph [246]).

30. If the appeal on counting fails, then strictly there is no need to go any further because all three claims will be novel. However it will be convenient to deal with all three points of construction.
31. If Apple succeeds on construction, then that is not the end of the matter. Optis does not accept that InterDigital anticipates claims 6 or 9 even on Apple's construction, for two reasons. One relates to the fact that the way Apple puts its case over InterDigital relies on looking at what would happen if the method proposed in InterDigital was in operation in certain circumstances. Those circumstances were found by the judge to be rare but not entirely unrealistic (judgment [90(iii)]). However, the judge decided this point against Apple on the basis that all it demonstrated was that in some circumstances the prior art method produced the same result as the claimed method, whereas what had to be shown was not only that the result might be the same but that the methods by which these results were achieved were the same (see [149], applied at [233] and [248(ii)]). The other relates to the quality of the disclosure in InterDigital about an aspect of the mechanism for keeping track of bytes.

InterDigital

32. For the purpose of this appeal, all that it is necessary to know is that the InterDigital reference describes an extension of the window-based method to track occupied memory as well as sequence numbers. The paper sets out the same equation (as above) for sequence numbers and then proposes a further similar equation to be used for data. There was a point on the disclosure of that latter equation but it only matters if the appeal on construction succeeds.

Construction

33. There was no dispute on the law relating to claim construction. The principles summarised in *Saab Seaeye v Atlas Elektronik* [2017] EWCA Civ 2175 at [18] were taken as a convenient summary. Apple also referred to a point made by Floyd J (as he then was) in *Nokia v IPCOM* [2009] EWHC 3482 (Pat) at [41]:

“Where a patentee has used general language in a claim, but has described the invention by reference to a specific embodiment, it is not normally legitimate to write limitations into the claim corresponding to details of the specific embodiment, if the patentee has chosen not to do so. The specific embodiments are merely examples of what it claimed as the invention, and are often expressly, although superfluously, stated not to be ‘limiting’. There is no general principle which requires the court to assume that the patentee intended to claim the most sophisticated embodiment of the invention. The skilled person understands that, in the claim, the patentee is stating the limits of the monopoly which it claims, not seeking to describe every detail of the manifold ways in which the invention may be put into effect.”

34. Optis did not quibble with this passage. I agree with it.

35. As so often, the questions in this case do not turn on the law of construction, but on the proper construction of the patent itself.
36. In general, Apple submits that the judge failed to take proper account of its language, context and purpose when interpreting the patent.
37. Specifically in relation to ‘counting’, Apple says that the judge wrongly equated this with ‘counter-based’, the latter being a technical term denoting a specific kind of mechanism. Instead, Apple submits, the use of ‘counting’ in the claim has the result that the claim can cover both window-based mechanisms and counter-based mechanisms. The reason it covers the former is because a window-based mechanism uses counting in order to calculate the percentage of storage space that remains. Apple further submits that the description in paragraph [0010] of the two mechanisms as ‘similar’ to each other is a reference to this shared use of counting, and the shared aim of both mechanisms (to reduce stalling). It is said that the deliberately inclusive statements in the patent (such as [0022] and [0047] above) further supports this interpretation. Lastly, Apple considers that the judge was wrong to hold that ‘counting’ must take place monotonically, because the patent covers counting both upwards and downwards, and permits multiple bytes to be counted at once.
38. By contrast Optis supported the judge’s conclusion, arguing that calculating what is outstanding for the purposes of the percentage (which is what window-based mechanisms do) is not ‘counting’ and so is not within claim.
39. Regarding ‘resetting’, Apple submits that the judge erred in holding that this requires a discrete step, distinct from changes in value due to counting itself. Moreover, they consider he failed to take into consideration that the purpose of the reset is the same for both window-based and counter-based mechanisms: to track subsequent use of the resource, so a new poll request can be triggered once the threshold is met. In response Optis supports the judge’s conclusion for the reasons he gave.
40. In relation to ‘when’, Apple submits that the judge erred in holding that this means ‘immediately upon’, rather than ‘in consequence of’. They consider that although the latter may result in some superfluous polling, it will at least be reduced, which is permissible under the patent. Optis submit that the judge did construe ‘reset’ purposively as enabling a restart (rather than tracking subsequent usage, as Apple submits).

Counting

41. The skilled person reading the patent, in the light of their common general knowledge would think the word “counting” in claim 1 had the same meaning as that word appears elsewhere in the document and also the same sense of meaning as its cognate expressions, which include “counted” in claim 1, “counter” in claims 6 and 9, and “counts” in paragraph [0009]. Therefore I reject the submission made by Apple in this appeal that the judge erred in equating “counting” with a counter-based mechanism. Whatever the true construction of the term is, it is manifest that from the point of view of someone striving to understand what the patentee is using the language of the patent to mean, these various terms are all referring to the same thing. Counter-based mechanisms use a counter which maintains a count of something by counting it. The language of the claims is clearly based on the language in paragraph [0009].

42. It is also plain that the patentee would be understood in paragraphs [0008], [0009] and [0010] to be drawing a distinction between a counter-based mechanism [0009] and a window-based mechanism ([0010]). Both mechanisms were part of the common general knowledge. The patent explains that the two mechanisms are similar ([0010]) but the reader would not think that the patentee was trying to say that what made them similar – or even one aspect of their similarity – was “counting”. On the contrary the natural reading of these paragraphs is the opposite. Counting transmitted PDUs or bytes is what characterises a counter-based method and the language reflects that.
43. Looking into a window-based mechanism in a bit more detail, part of the way the system works is to keep track of the sequence number of the next PDU to be transmitted. In the relevant standards this is the state variable VT(S). The variable is needed for use in the equation set out above. VT(S) will be incremented when a PDU is transmitted, and that does look like counting. However tracking this variable is not the same as counting transmitted data units. If one has transmitted 100 data units, then the count will be 100. But the sequence number of the next data unit to be sent after 100 have been transmitted could be any number between 0 and 4095. It will be 100 larger than the sequence number of the first data unit to be transmitted but that is another matter. If the predefined threshold for requesting a status report is a count of 100 transmitted data units, then using the sequence number will not do what is required.
44. The other possible “counter” relied on by Apple is VT(S)-VT(A), which forms part of the equation in window-based methods (see paragraph 10 above). Recall that VT(A) is the sequence number of the last in sequence acknowledged PDU. VT(S)-VT(A) is not a count either because although it rises as PDUs are transmitted, it also shrinks again as PDUs are acknowledged.
45. Consistent with this, the word “count” and its cognate expressions are entirely absent from the description of window-based methods in the patent. That is not surprising because, as the skilled reader would understand, what a window-based method does is keeps track of the amount of outstanding data (PDUs or bytes). That value will go up as more PDUs are transmitted and it will go down again as in-sequence PDUs are ACKed.
46. I would hold that the similarity between the two mechanisms referred to in paragraph [0010] is that they both work by keeping track of a value and triggering a poll when that value reaches a pre-defined threshold. In the counter-based mechanism that value is the count of transmitted data which is (or perhaps is held in) a counter. By contrast in the window-based mechanism that value is the amount of outstanding data. Keeping track of what that value is is a more complicated exercise than counting transmitted PDUs. The value for the amount of outstanding data is not kept by a counter.
47. An important part of the context is that “counting” is concerned with counting the number of data units which have been transmitted (or bytes, but that does not matter for this point). This fact is the reason why the exercise is monotonic. It is the transmitted units which are counted and, as the judge held ([122]), it is not possible to “untransmit” them. Therefore the value of the counter can increase as more units are transmitted but the change in value itself cannot change direction. The patent allows for the idea of counting down instead– but that makes no difference. The fact the patent contemplates counting up or counting down does not mean a value which can both rise and fall is the result of counting.

48. Apple refers to the paragraphs in the patent such as [0022] and [0047] which use expansive language, entreating that the invention should be understood in the widest terms, and Apple makes the point that the patentee cannot have it both ways. Essentially the submission is that, having gone to the trouble of putting such language into a patent, the patentee ought to take the consequences. The judge recognised this point but, as he put it, it is not a licence to give a word which was clearly intended to have one meaning, a different one ([119]). The reason why not is that these passages ultimately say two things. One is that the patent's scope should be limited by the claims rather than the specific embodiments. That is an unnecessary statement (in this jurisdiction anyway) but bearing in mind patents are international documents, it may have some effect somewhere else. It does not tell you anything about what the claim scope actually is. The second is that the patentee intended to encompass equivalents (and the like) if they are within the scope of the claims. That also takes matters very little further forward, although I suppose it might play a role in an equivalents case. If it is an entreaty to interpret the claims purposively then again it is an unnecessary statement in this jurisdiction.
49. Purposive construction is Apple's best point. The argument goes like this. The analysis of the meaning of "counting" above is essentially a literal one. It may be the starting point, but it is not the end, because what matters is to construe the claims purposively. What then would the skilled reader understand the patentee's purpose to have been in distinguishing between counter-based mechanisms and window-based mechanisms? The patent does not explain, and in fact, says Apple, there is no reason to exclude such a mechanism, particular since window-based methods do involve a task very like counting. The fact the two mechanisms are expressly recognised in paragraph [0010] as "similar", Apple argues, supports a purposive construction which puts window-based methods within the claim.
50. I am not convinced. The argument builds too much on the fact that the patent does not spell out expressly why a counting scheme is what is claimed, rather than a window-based scheme. The common general knowledge provides part of the answer. The two methods are not equivalent, they differ in the balance each of them strikes, trading off advantages and disadvantages. Counter-based methods are simple but less accurate, while window-based methods are more complicated but more accurate. That alone is enough to explain why the patentee describes the invention entirely in terms of a counter-based approach. Moreover the fact the document never states that a window-based approach is covered, or explains how that would be so, supports the idea that from the objective reader's point of view, the patentee did not intend to do that. If window-based systems were equivalent to counter-based systems then the language in expansive paragraph [0022] might have helped, but as already explained, they are not.
51. For these reasons, I would interpret counting in the same way as the judge and dismiss this ground of the appeal.

Resetting

52. The term "resetting" appears in claims 6 and 9. In both cases the thing which is reset is a counter. The judge held at paragraph 124 that "resetting" meant reassigning the counters their previous starting value (in claim 6 this must be zero) as a discrete step which is distinct from their ordinary changes in value resulting from the counting itself.

This mattered because part of the anticipation case advanced by Apple over InterDigital depended on identifying an event as a reset.

53. The argument was about the behaviour in certain particular circumstances of the window-based system proposed. The best illustration of Apple's case was again directed to $VT(S) - VT(A)$. What mattered was that in particular circumstances the value of the sum $VT(S) - VT(A)$ would abruptly go to zero. The circumstances were that a poll had been triggered and, before another PDU could be transmitted after the one in which the poll bit had been set, the status report sought had come back from the receiver which ACKed every single outstanding PDU (i.e. no NACKs). Therefore $VT(A)$ would equal $VT(S)$ and the difference between them would go from whatever number it had been to trigger the poll, to zero. The reason the status report has to come back before the next PDU is transmitted is to avoid a change in $VT(S)$ in the meantime. Apple argued that this was a reset of the "counter" $VT(S)-VT(A)$.
54. The judge rejected that submission (judgment paragraph [248(i)]) even if $VT(S)-VT(A)$ was indeed a counter, contrary to his decision that it was not, which I would uphold. It was rejected because the event was not a reset as he had construed the term, as the step taking the value to zero was "not a discrete step distinct from ordinary 'counting'".
55. Apple contended this was wrong because no discrete step was required in the true meaning of reset. However focussing on the term "discrete" rather misses the point. The key thing about the judge's construction, and his decision rejecting this part of the anticipation claim, is that to be a reset the change in value has to be something distinct from the ordinary changes in value resulting from the "counting" itself. In my judgment that is plainly the right construction of the term "reset", in context and considered through the eyes of the person skilled in the art. A reset is a re-assignment of the value different in kind from its ordinary changes.
56. The problem for Apple is that the change to zero in the example relied on is simply the happening of the ordinary changes in value of $VT(S) - VT(A)$ in a circumstance which happens to bring the value to zero. $VT(S)$ goes up when PDUs are sent and $VT(A)$ goes up when in-sequence outstanding PDUs are ACKed. These changes make the difference between these two state variables change. The term "abrupt" can be used to make the point that since a number of PDUs may be ACKed in one go, $VT(A)$ can jump upwards in value rather than going one step at a time – and so the difference between the two numbers can change abruptly. But that is still just the ordinary operation of the window-based system. In the end, it is perfectly apt to call a reset a discrete step, as the judge did, but what matters is not that it is discrete, what matters is that it is different from the ordinary changes.
57. If Apple's construction of reset was correct then every time a status report came in which changed $VT(A)$, the change in $VT(S) - VT(A)$ would amount to a reset. That was indeed Apple's case, but it just serves to highlight the fact that the changes relied on were the ordinary operation of the (alleged) counter.
58. I reject this ground of appeal.

When

59. Claim 9 provides that the reset is “performed *when* the first predetermined value is exceeded ...”. Optis contended that this meant “at a point in time when” or “immediately upon” whereas Apple contended that it meant “at any time thereafter” or “in consequence of”. The judge preferred the Optis construction, with the consequence that claim 9 would differ from the InterDigital prior art for this reason too, even if Apple were to win on “counting” and “reset”. That is because in the circumstance relied on as a reset (see above) the alleged reset does not occur immediately upon the counter reaching the predetermined value. What happens is that the counter (VT(S) – VT(A)) reaches the threshold to trigger a poll and the transmitter will set the poll bit in the relevant PDU transmitted. However the system does not then “reset” VT(S) – VT(A). On the contrary the system could send out further PDUs if it saw fit. The so called “reset” can only take place when the status report comes in from the receiver.
60. The reason the judge gave for preferring the Optis construction of “when” was that it makes much more purposive sense of “when” because, as the judge put it, if there is a time lag then a superfluous poll could be triggered during [*that time lag*] as a result of further data being transmitted, and it is the object of claim 9 to avoid that (judgment paragraph [132]).
61. There is no doubt that the judge was correct that the time lag permitted by Apple’s construction would allow for the risk of some superfluous polling. The question on appeal is whether the judge was right to hold that the object or purpose of claim 9 was to “avoid” superfluous polling altogether, or merely to reduce superfluous polling. Apple contended its construction would indeed reduce superfluous polling, and that would be enough.
62. Clear support for the judge’s construction is found in paragraphs [0017] - [0018] of the patent (cited above) which describe how the invention “avoids” superfluous polling and why that is an advantage. The first and second sentences of [0017] expressly state as much and paragraph [0018] says that this combination provides an “efficient” polling mechanism (see also patent paragraph [0046]).
63. However Apple draw attention to the very next paragraph [0019] (also cited above) which refers to superfluous polls being “eliminated or at least reduced”. The submission is that here the patentee has qualified the purpose, softening it from necessarily eliminating (or avoiding) superfluous polling, to at least reducing superfluous polls even if they are not eliminated altogether. Moreover while the judgment does deal with paragraphs [0017] (and a similar passage in paragraph [0046] – see judgment [96], [134] and [137]), it does not mention paragraph [0019].
64. I reject Apple’s submission on the meaning of “when” for two different reasons. First, looking at the document as a whole, the construction which requires the reset to take place immediately on the threshold being reached makes more sense and is consistent with the overall teaching. If circumstances are allowed to develop further before the reset, which is required by the threshold being reached, actually happens, then that reset is not taking place when the triggering event has occurred, it is taking place in some other circumstances. Second, the skilled person would not understand paragraph [0019] in the manner contended for by Apple. A skilled person imbued with the common general knowledge will know that there are various different kinds of poll trigger and therefore superfluous polls can be caused in various ways. That is why paragraph [0017] itself does not refer to superfluous polling in general, but to the

avoidance of superfluous polls with particular causes (number and memory limitation). The reader would understand that the invention is intended to avoid (i.e. eliminate) that kind of superfluous polling. Thus the qualification in paragraph [0019] allows for the fact that the invention is not being said to get rid of superfluous polls of any sort.

65. I would therefore dismiss this aspect of the appeal as well. The judge's construction of "when" was the right one.

Anticipation

66. On the construction arrived at above, it is common ground that there is no anticipation of any of claims 1, 6 or 9 by the prior art. It is therefore not necessary to examine the further arguments arising on the anticipation case. As explained above, the judge held that even on Apple's construction claims 6 and 9 were novel because the fact the prior art method produces the same result as the claim method in special rare but not unrealistic circumstances did not mean it was the same method. As this point was argued on appeal it also raised an issue about the relationship for the purposes of novelty between a method claim and a situation in which the method described in the prior art would (so it was contended) be within the claim in those special circumstances. This throws up the question whether there is an analogy with *Hoechst Celanese Corporation v BP Chemicals Ltd* [1998] F.S.R. 586 and also whether and if so how the requirement for an inevitable result works. I will say no more about these points because I prefer to address them in a case in which they would be decisive.

Conclusion

67. I would dismiss the appeal.

Lord Justice Phillips:

68. I agree.

Lord Justice Arnold:

69. I also agree.