Neutral Citation Number: [2015] EWHC 3366 (Pat)

Case No: HP-2014-000005

IN THE HIGH COURT OF JUSTICE
CHANCERY DIVISION
PATENTS COURT

Royal Courts of Justice, Rolls Building,
Fetter Lane, London, EC4A 1NL

Date: 23/11/2015

Before:

THE HON. MR JUSTICE BIRSS

- -

Between :

UNWIRED PLANET INTERNATIONAL LIMITED	**Claimant**
- and -	
(1)HUAWEI TECHNOLOGIES CO., LIMITED **(2)HUAWEI TECHNOLOGIES (UK) CO., LIMITED** **(3) SAMSUNG ELECTRONICS CO., LIMITED** **(4) SAMSUNG ELECTRONICS (UK) LIMITED** **(5) GOOGLE INC.** **(6) GOOGLE IRELAND LIMITED** **(7) GOOGLE COMMERCE LIMITED**	**Defendants**
- and -	
UNWIRED PLANET, INC.	**Ninth Party**
UNWIRED PLANET LLC	**Tenth Party**
- and -	
TELEFONAKTIEBOLAGET LM ERICSSON	**Eleventh Party**

- -

Adrian Speck QC, **Mark Chacksfield** and **Thomas Jones** (instructed by **EIP Legal**) for **Unwired Planet**
Andrew Lykiardopoulos QC and **Ben Longstaff** (instructed by **Powell Gilbert**) for **Huawei**
Charlotte May QC and **Brian Nicholson** (instructed by **Bristows**) for **Samsung**

Hearing dates: 7th, 8th, 13th, 14th, 16th, 19th and 20th October 2015

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Approved Judgment

I direct that pursuant to CPR PD 39A para 6.1 no official shorthand note shall be taken of this Judgment and that copies of this version as handed down may be treated as authentic.

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MR JUSTICE BIRSS

Mr Justice Birss:

Introduction

1. This is a patent case in the mobile telecommunications field concerning EP (UK) 2,229,744 entitled "Method and arrangement in a wireless communication network". The priority date claimed by the patent is 8th January 2008, based on a US application US 61/019,746. The patent itself was granted on 22nd May 2013. The original patentee was Ericsson. The claimant Unwired Planet acquired the patent from Ericsson.

2. The patent is concerned with an efficient polling system for a wireless communication network. In this context the word "poll" refers to a message sent by a transmitter of data to the receiver to ask the receiver to tell the transmitter what information has been received. In the context of the mobile radio networks in this case, the poll asks the receiver to send a "status report". When the transmitter receives a status report it can work out whether the data transmitted has been received and if not, which packets of data are missing and need to be retransmitted.

3. This dispute is the first of a series of cases which concern the patent portfolio acquired by Unwired Planet from Ericsson. Further technical trials in relation to five other patents from this portfolio are currently listed. A non-technical trial to

determine FRAND and competition issues is also scheduled to take place following the conclusion of the technical trials.

4. The patent has been declared as essential to the LTE 4G telecommunications system. Unwired Planet alleges that Huawei and Samsung infringe the patent by manufacturing and selling equipment that operates in accordance with the LTE standard specified in 3GPP TS 36.322 release 8 version 8.8.0. Unwired Planet contends that the patent is essential to the standard and, therefore, Huawei and Samsung's compliance with the standard means they infringe. Huawei and Samsung argue that compliance with the standard does not fall within the claims. They also contend that the patent is invalid. Some of the arguments advanced in relation to construction and invalidity are common to both defendants, while others are put forward on an individual basis by either Huawei or Samsung.

5. Google were originally sued by Unwired Planet as well but that dispute has settled.

The issues

6. The relevant claims alleged to be independently valid are 1 and 9, as follows:

> Claim 1: Method in a first node for requesting a status report from a second node, the first node and the second node both being comprised within a wireless communication network, the status report comprising positive and/or negative acknowledgement of data sent from the first node to be received by the second node, wherein the method comprises the steps of:
>
> > *transmitting* a sequence of data units or data unit segments to be received by the second node, the method further comprises the steps of:
> >
> > > *counting* the number of transmitted data units and the number of transmitted data bytes of the transmitted data units, and,
> > >
> > > *requesting* a status report from the second node 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 9: Method according to any of the previous claims 6-8, wherein the steps of resetting the first counter and the second counter is performed when the first predefined value is reached or exceeded by the first counter or when the second predefined value is reached or exceeded by the second counter.

7. Claim 9 is dependent on claims 6-8 rather than being directly dependent on claim 1. Nothing turns on this. For example claim 6 refers simply to resetting each of the counters to zero.

8. The issues are:

   i) *Claim construction, infringement (essentiality) and priority*. Unwired Planet submits that on the correct construction of the claims they are entitled to priority and they cover the LTE standard. The defendants submit that if the claims are construed as Unwired Planet contend then they are not entitled to

priority. It is common ground that any claim which loses priority lacks novelty over the version of the relevant part of the LTE standard published in the period between the priority date and the filing date, 3GPP TS 36.322 V.8.3.0. It is also common ground that if the claims are construed as the defendants contend then they are not infringed.

ii) *Novelty.* Both sets of defendants rely on 3GPP temporary document R2-080236 ("the Ericsson TDoc"). It is common ground that the patent will be invalid if the Ericsson TDoc is part of the state of the art at the priority date. The debate is a point of law based on international time zones.

iii) *Obviousness* in the light of:

a) the draft LTE standard 3GPP TS 36.322 V8.0.0;

b) 3GPP temporary document R2-073538 ("the Motorola TDoc");

c) 3GPP temporary document R2-074270 ("the Samsung TDoc").

Points a) and b) are argued by Huawei, point c) is argued by Samsung.

The witnesses

9. Unwired Planet called Dr David Cooper as an expert. Dr Cooper has been an independent engineering consultant at Hillebrand Consulting Engineers since 2008. Prior to this, he worked at Panasonic Mobile Communications Development of Europe Ltd, first as manager for Digital Signal Processing and Chipset Development and subsequently as Standards and IPR Manager. He is also a director and part-owner of 3GWave Ltd, a mobile communication company.

10. Huawei called Mr Liam Wickins as an expert. Mr Wickins owns a consultancy business operating in the areas of wireless systems, embedded systems, project management and product development life cycle management. Prior to this, he worked as a software engineer concerned with wireless communications systems, particularly 3G systems. He has worked in industry since the late 1990s, mostly at PicoChip Designs Ltd in Bath.

11. Samsung called Dr James Irvine as an expert. Dr Irvine has been a Reader in the Institute of Communications and Signal Processing at the department of Electronic & Electrical Engineering at the University of Strathclyde since 2006. Dr Irvine has been involved in telecommunications since starting his PhD in 1989. He has worked with numerous companies involved with 3GPP standardisation activities and is a member of an IEEE committee concerned with training students in the standards development process. His current research interest includes resource management problems.

12. Unwired Planet submitted that Dr Irvine had muddled the concepts of a buffer and a window. It is true that Dr Irvine's first report was unclear in some places in this respect and he agreed that one diagram needed to be relabelled but the point cannot be taken too far. Dr Irvine explained how the two concepts relate to one another, as they clearly do. The fact a muddle took place did not undermine his evidence.

13. All three experts gave their evidence fairly, seeking to assist the court. I am grateful to each of them for their evidence and assistance in this case.

14. The defendants relied on two fact witnesses about the availability of the Ericsson TDoc. Neither was cross-examined. They were Christian Loyau and Gert-Jan Van Lieshout. There was also fact evidence from Chaoling Ye from Huawei about a sample Huawei product in issue and from Heather McCann about ownership of patents. Neither of those witnesses was cross-examined either.

The skilled person/team

15. There was no dispute amongst the identity of the person skilled in the art. Both Mr Wickins and Dr Irvine broadly agreed with Dr Cooper's characterisation of the skilled person in his first expert report, so I will start with Dr Cooper's formulation.

16. The skilled person is a telecoms systems engineer. He would be the technical lead of a team of engineers whose work consisted of designing and implementing transmission error detection / correction and stall prevention mechanisms (such as polling) for the air interface. This team would be part of a larger group designing and implementing the whole air interface.

17. The skilled person would have an undergraduate degree in either a relevant engineering field, such as telecoms or software engineering, or a related field such as mathematics or physics. He would also have at least five years post-academic experience in mobile telecoms system design and implementation, with particular emphasis on error detection / correction systems and stall prevention mechanisms.

18. Dr Cooper considered that the skilled person would have experience of designing and implementing systems such as UMTS (3G) and would be familiar with the relevant technical standards. Dr Cooper further stated that the skilled person would have similar knowledge in relation to the developing LTE system. Mr Wickins agreed that the skilled person would need to be familiar with UMTS systems. The skilled person would be interested in the work of the standards body in the context of designing or implementing the RLC for the developing LTE system and would be interested in the inputs to standardisation meetings.

The common general knowledge

19. Arnold J summarised the law on common general knowledge in ***KCI Licensing v Smith & Nephew*** [2010] EWHC 1487 (Pat) at paragraph 105-115. This summary was approved by the Court of Appeal ([2010] EWCA Civ 1260, see paragraph 6).

20. Mobile telecommunications systems consist of a fixed network within which a mobile handset (User Equipment or UE) may move around. The fixed network is formed of two parts. There is the core network which links to the Public Switched Telephone Network (PSTN) and also links to the internet. Then there is the radio access network (RAN) which comprises radio transmitters and links to the core network and mobile handsets over the air interface.

21. By the priority date mobile networks were digital and sent at least some types of information in "packets" – that is as groups of bits. The term packet switched

network drew a distinction from older digital mobile phone networks like GSM which were (originally) circuit switched. In a circuit switched network only a single information stream could use a communication channel at one time.

22. In general a packet may comprise payload data (that is content that the transmitting entity is to send to a receiving entity) and control data (that is data which enables the transmitting entity, receiving entity and mobile network to operate efficiently and process the packets). The control data is usually included in a packet as a header.

23. In order to operate by sending and receiving packets, each data stream has to be split up into packets for transmission and once received the packets must be reassembled into the data stream. To recreate the data stream with complete fidelity the receiver has to reassemble all the right packets, necessarily, in the right order.

24. Packet switched communication requires that the packets are temporarily stored at the transmitter and the receiver. The receiver must temporarily store the packets because they have to be received in their entirety before they can be processed properly. The transmitter must temporarily store packets because there is a possibility that the packet may be required to be retransmitted if it was not received.

25. Digital mobile telephony took off with the GSM system. This was known as a second generation or 2G system (1G referred to analogue networks). The first packet switched network in general use was the GPRS part of the GSM standard, known as 2.5G. This was followed by a 3G system known as the Universal Mobile Telecommunications System (UMTS). UMTS was the generation currently in use at the priority date. UMTS used packet switched services for web browsing, but circuit switched services for voice calls. Work on 4G had already commenced at the priority date. That standard was known as Long Term Evolution (LTE). LTE was to be the first fully packet switched network.

26. One of the significant drivers in the development of the different generations of mobile networks was consumer demand for access to the internet at increasing data rates. The backbone of the internet is a wired network (for this purpose "wire" includes fibre optic cable). As a wired network, transmission errors are relatively rare, in contrast to the error rates over the air interface in a mobile network. The latter occur relatively much more frequently and so packet switched systems have to be designed to include error detection and correction mechanisms on the air interface to make their behaviour more like that of the wired internet.

27. In order for two devices to communicate they need a set of rules which defines the semantics, syntax and sequencing of messages passing between them. That is a communications protocol. A very familiar idea in 2008, dating back to the OSI model in the 1980s, was a protocol layer stack. This allows different types of protocols to be used concurrently yet independently. Entities at the same layer in the stack communicate with each other with a defined protocol without having to be concerned about the protocols between entities at lower layers in the stack. For example an entity such as a computer game program running on a phone may wish to communicate with its peer entity in a computer hosting a website somewhere on the internet. The computer game has a protocol for communicating with the website but it does not need to know how to communicate over the air interface. That is taken care of by lower layer entities in the protocol stack. To send a message the

transmitting entity in the phone passes the message down to lower layer entities in the phone. At the lowest, physical, layer the message is sent across the radio link to a base station. Once the message is received in the base station, it may then be sent via different physical layer protocols to the core of the mobile phone network and from there, via other lower layer protocols it may be sent across the internet to the website. So higher layer entities can communicate with each other without being concerned with how the lower layer protocols work.

28. From the point of view of an entity at a given layer in the stack, a packet of data received from a higher layer is called an SDU (service data unit) while the data sent down to a lower layer is called a PDU (protocol data unit). In general an entity which receives an SDU from a higher layer which is to be transmitted on to a lower layer adds its own layer control information to the packet in the form of a header. The SDU is untouched and treated as payload. The fact that the payload probably contains headers from higher layer entities is irrelevant. Once the packet, consisting of the SDU plus header, is passed down as a PDU, the lower layer receiving entity treats what it has received as an SDU. This lower layer entity may add its own header too. When the data is received the process is reversed as the data moves up the stack. This process was illustrated by Dr Cooper in the following diagram:

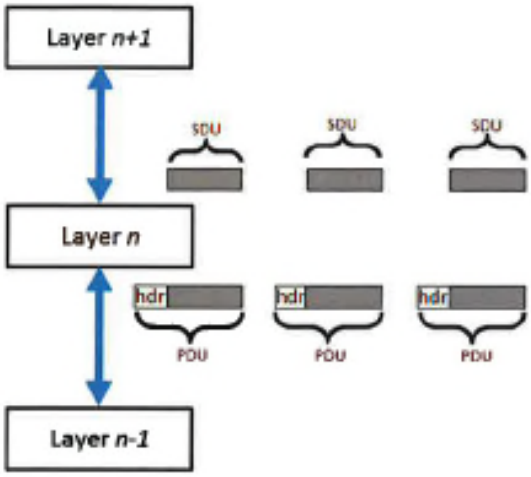


Figure 6 – OSI protocol stack layer concept

29. Web browsing over the internet utilises the HyperText Transfer Protocol (HTTP) protocol as its highest layer. Below that are layers called the Transmission Control Protocol (TCP) and the Internet Protocol (IP) (known together as TCP/IP). TCP/IP is designed to operate on a wired network and if it was used over the air interface it would involve transmission of an unacceptably high level of control information. Therefore, the UMTS protocol stack utilised a layer known as Packet Data Convergence Protocol (PDCP) which compressed the data from TCP/IP to an acceptable level. In addition, TCP/IP assumes a relatively error free packet stream. The way TCP/IP responds to errors is by reducing throughput, at least in part because any errors which do occur are assumed to arise from congestion. However that is not what causes errors in the air interface and so, in the context of mobile telephony, the TCP/IP response to errors would be counter-productive. Accordingly, UMTS uses a protocol called Radio Link Control or "RLC", which sits below PDCP, in order to try and ensure that TCP/IP experiences sufficiently error free data stream in appropriate

circumstances. The layer below RLC in UMTS is the Medium Access Control (MAC) layer. It sits between RLC and the physical layer, and is designed to share transmission resources between multiple RLC processes. It multiplexes multiple data bearers into a single data stream.

30. In UMTS the RLC PDUs are of fixed size, although their relationship with SDUs from the higher layer was arbitrary i.e. if an SDU was too long, it was segmented, if too short, it could be concatenated with other SDUs. This is illustrated in another of Dr Cooper's diagrams (fig 16):

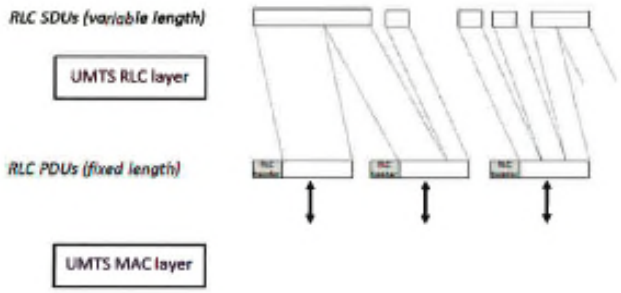


Figure 16 - UMTS-HSPA: mapping of RLC SDUs to RLC PDUs

31. The RLC protocol in UMTS employed something known as an automatic repeat request protocol or "ARQ". When PDUs are sent from the transmitting entity, the receiving entity acknowledges PDUs that have been received correctly. The acknowledgement is referred to as an "ACK". The receiver may also send a negative acknowledgement message for missing or erroneous PDUs to the extent that it can detect that this has happened. The negative acknowledgement is called a "NACK". One could imagine an arrangement in which each PDU has to be acknowledged before the next is sent. This is called a "stop and wait" protocol. The problem with it is that the transmission channel remains idle in the meantime and so is under used. This is inefficient and introduces a high overhead. There has to be at least one status message for every transmitted PDU.

32. More sophisticated ARQ systems use a sliding window. The system allows for the ability to transmit a limited number of new PDUs without having to wait for an acknowledgement of the last PDU. Each PDU is assigned a "sequence number". This allows the receiver to know which PDUs have been received and which are missing. It also allows the status report to identify which PDUs are being acknowledged as received ("ACKed") and which are missing and are being "NACKed". The sequence number also allows the receiver to reform the data stream into the correct order. There is a "transmitter window" of the number of PDUs which can be transmitted but not yet acknowledged. When the oldest PDU in the transmitter window is acknowledged, it is removed and the window moves, or slides, along.

33. The use of sequence numbers introduces an additional overhead because each PDU has to include this number in the header. However this is worthwhile as it enables several PDUs to be ACKed (or NACKed) together, thus reducing the number of ACK / NACK messages being sent on the reverse channel back from the receiver to the transmitter.

34. The number of possible sequence numbers is not infinite. For example if 9 bits are used for the sequence number, that gives 512 possible values. As long as no more than half the available numbers are used at any one time, the system will be robust to data loss in both directions. So for 512 possible values, the window of available numbers would be 256. The sequence numbers would be cyclic and wrap around from 511 back to 1. If the earliest unacknowledged PDU is sequence number 100, the window of available sequence numbers will be up to 355. If all the available sequence numbers are used up a stall occurs. At that point no more new PDUs can be sent since they would need new sequence numbers. In that sense the sequence number is a finite resource. In order to free up available sequence number resources, status reports from the receiver are needed. So in the example given, if the sequence number of the currently transmitted PDU had reached 355 the system would stall. If then a status report was received which ACKed PDUs with sequence numbers from 100 up to 229, the window would move forward to the span 230 – 485 and transmission could restart.

35. Using this method, once a PDU has been sent the transmitter has to keep it in case it needs to be retransmitted. The data is stored in the "retransmission buffer". There is a point of detail about what data is stored but that will be addressed in context. In practice the data may simply remain in the memory location in which it existed before it was transmitted but nothing turns on that. The significant thing is that the ability to retransmit a given PDU has to be preserved until that PDU has been acknowledged. Thus a status report frees up two resources, sequence numbers and buffer memory. Once a PDU has been ACKed, it can be deleted from the retransmission buffer. The buffer may operate as a cyclic memory system or by dynamic memory management. Either would do, with dynamic memory management being more likely in practice.

36. From the example explained, one can see that instead of stalling, waiting for a status report and then restarting, it would be better to try and arrange things so that status reports come in to the transmitter before the system stalls.

37. The receiver can decide to send a status report itself. If a PDU is missing from the sequence, the receiver can tell that this has happened from the sequence numbers. This is called "gap detection". The system can be arranged so that a receiver which detects a gap sends a status report. The report will NACK the missing PDU and ACK the PDUs which have been received.

38. When the system is operating well with few errors the transmitter may need to be able to poll the receiver to request a status report so that it can move the window forward. The different polls are characterised by what triggers them. There are end of transmission polls, which are not directly relevant. The relevant polls in this case apply in the course of continuous transmission. In general the way a poll is requested is by setting a bit in the header of a PDU. Thus when the receiver receives that PDU and finds the poll bit set, it knows to send a status report. One of the factors which has to be taken into account is that, given the errors on the air link, the PDU which contains the set poll bit might be lost in transmission and not received by the receiver and conversely, a status report sent by the receiver may not be received by the transmitter.

39. The UMTS standard defined a series of possible poll triggers which the implementer could use. The RLC has a number of modes of operation and the relevant definition

applies in "acknowledged mode" or AM. Acknowledged mode is the mode to use when dealing with email and web access, aiming to keep packet loss to a minimum but accepting that some packets may be received out of sequence. The other modes are called transparent mode (TM) and unacknowledged mode (UM). By contrast with email and web access, the considerations for transmitting speech data by packets are different and so the other modes are used. Speech can tolerate the loss of a few packets without degrading the speech quality. With speech, a PDU which arrives much later and out of sequence from its fellows might as well not be sent at all so there is no point in trying. In acknowledged mode the PDUs are called "AM PDUs" or "AMD PDUs".

40. The available triggers in the UMTS system were referred to in evidence as a "tool box". They included end of transmission polls: "Last PDU in buffer" and "Last PDU in Retransmission buffer" which are self explanatory. The defined polls also included the following (at paragraph 9.7.1 of 3GPP TS 25.322 V7.5.0):

    i) *"Poll timer"*. A timer is set when a poll is triggered and stopped in certain circumstances (such as when the right status report is received). If no status report appears before the timer runs out a further poll is sent. This aims to ensure that when a poll is sent, it is answered correctly.

    ii) *"Every Poll_PDU PDU"*. This is a PDU counter. The system counts the number of PDUs sent and when that number reaches the value in the field "*Poll_PDU*" a poll is triggered.

    iii) *"Every Poll_SDU SDU"*. This is an SDU counter. The system counts the number of SDUs received and when that number reaches the value in the field "*Poll_SDU*" a poll is triggered. To be precise the poll is triggered on the first transmission of the AMD PDU which contains the last segment of the RLC SDU.

    iv) "*Window based*". This poll trigger works by following the sequence number window at the transmitter. The poll is triggered when an AMD PDU is sent which represents a given percentage of the transmission window given by a formula. In other words when occupancy of the sequence number resource reaches a predetermined threshold the poll is triggered.

    v) "*Timer based*". This triggers a poll periodically based on a timer.

41. The triggers in the toolbox were there to be selected by an implementer. No-one would expect all these triggers to be used in the same system at the same time. For example Mr Wickins explained that timer based triggers were very rarely used in practice at all at the priority date.

42. The window based approach (iv) keeps track of the amount of the sequence number resource which has actually been used and therefore what is available. This is more complicated to implement but more accurate than a PDU counter (iii). A counter is simply an indication of the rate at which the resource is being used up.

43. The purpose of these triggers, particularly the counters (ii) and (iii) and the window based and timer based triggers (iv) and (v), is to poll periodically during continuous

AM operation so as to avoid stalling. The efficiency of the system involves a balance. Stalling is very inefficient and too few polls increase the risk of a stall. But too many polls are also inefficient since the status reports they generate use up bandwidth. The problem of too many polls was known as "superfluous polling". In the same paragraph of the UMTS standard (9.7.1) there is a reference to the Poll Prohibit function. Its purpose is to mitigate the problem of superfluous polling. The function works using a Poll Prohibit Timer (paragraph 9.5(b)) which is a timer which starts counting time when a poll is sent. Until the set period has expired any further polls are prohibited.

44. In the receiver a status prohibit timer played a similar role to the poll prohibit timer in the transmitter. The status prohibit timer prevented transmission of status reports if one had recently been sent. When the status prohibit timer expired a status report would be sent if any were triggered while it was active.

45. It was common ground that UMTS, and in particular the above aspects of it, were common general knowledge. It was also common ground that the skilled person would refer to the standard specifications and draft specifications in existence at the priority date which applied to the UTMS and LTE systems. These specifications were common general knowledge. As LTE was still in development as at the priority date, the skilled person would be well aware of the document 3GPP TS 36.322 V.8.0.0. Although it was only published in December 2007, shortly before the priority date, the skilled person would know it existed, know what it was and where to find it if they were interested.

46. The development of LTE took UMTS as a key starting point. The particular aspects of LTE which were common general knowledge and which have a bearing on this case were the following.

47. One significant structural difference between LTE and earlier generations was that LTE simplified the network architecture by combining what had been the separate entities of the Radio Network Controller (RNC) and the base station into a single entity. That single entity was referred to as the eNodeB. Putting functions together into the eNodeB enabled close coupling between ARQ and an additional error correction process known as "HARQ".

48. A significant change from UMTS was to provide for RLC to use variable size PDUs. The RLC was to provide variable size PDUs depending on how much capacity was available for that particular RLC process in the current transmission interval. This is fundamentally different from UMTS where the RLC PDU size was fixed. Dr Cooper produced a diagram to illustrate the variable sized PDUs in LTE:

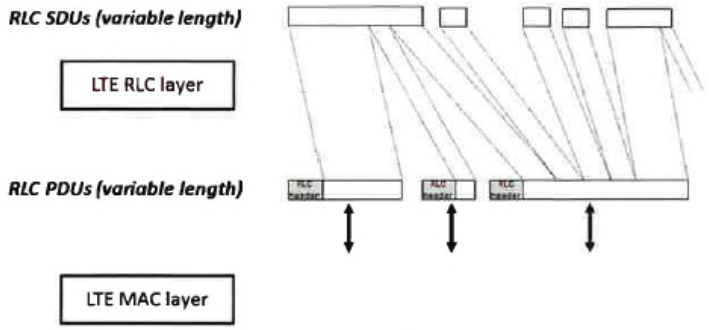


Figure 17 - LTE: mapping of RLC SDUs to RLC PDUs

49. A complication with having variable sized PDUs is that if a PDU is lost and needs to be retransmitted, the transmission opportunity which arose at the time of retransmission may not permit PDUs as large as the one which was lost. Thus it was agreed that LTE would allow for PDUs in that case to be broken up into segments and the segments transmitted separately. This process was called segmentation or re-segmentation (the usage was not exact in the evidence).

50. A problem created by variable sized PDUs in LTE is that the storage space needed in the retransmission buffer for unacknowledged PDUs is no longer directly related to the number of unacknowledged PDUs and so a stall can now be caused by two distinct phenomena: the transmitter could run out of sequence numbers but separately it could run out of storage space in the retransmission buffer. How to deal with this problem is what this case is about.

51. The other significant feature of LTE which was common general knowledge at the priority date was the desire to simplify the system as compared to UMTS. UMTS was regarded as complex and those working on LTE were aiming to produce a simpler system. The toolbox of polling triggers in UMTS was one aspect which the skilled person wanted to simplify.

52. There are other aspects of the common general knowledge which have a bearing on the issues in this case. They are dealt with in context below.

The patent

53. At [0001] the patent states that the invention relates to a method and arrangement in a first node in a wireless communication network, in particular relating to a mechanism for RLC polling for continuous transmission. In the Background section, the specification notes the potential risk that transmitted data units may not be received (for whatever reason), or may only be received in a distorted or corrupted way. One mechanism for determining whether such data will need to be resent is identified as a mechanism by which the sending node polls the receiving node to send a status report.

54. Paragraphs [0005] to [0007] outline the then currently agreed RLC poll triggers in the draft LTE standard. The polls are last PDU in buffer and a poll retransmission timer. It is acknowledged that while these criteria can work well for “bursty” traffic, additional triggers may be required to facilitate continuous transmission. The specification identifies that a polling procedure can be used to limit the number of

outstanding (i.e. transmitted but not acknowledged) PDUs or bytes to avoid protocol stalling.

55. Two mechanisms are identified to avoid protocol stalling: counter based and window based mechanisms. These are respectively described in paragraphs [0009] – [0010]. Paragraph [0012] suggests that no existing mechanisms take into account that stalling may sometimes take place because of sequence number limitations or sometimes due to memory limitations.

56. The Summary section starts at paragraph [0014] and amounts to a series of consistory clauses. Paragraph [0017] identifies that "superfluous polling" is avoided by combining the two criteria (counting data units and counting bytes) into one mechanism.

57. The patent includes four figures which illustrate both the embodiments of a wireless communication network and the operation of the invention in the first node. The Detailed Description begins at paragraph [0022]. Paragraph [0022] states in terms that the invention is a method and an arrangement which can be put into practice by, but is not limited to, the embodiments set out. Paragraph [0034] introduces figure 2 as a combined signalling and flowchart that depicts method steps and the transmission of signals between a first node (shown as a handset) and a second node (shown as a base station). The first node comprises a data unit counter and a byte counter which are initialised to zero in the first step (see paragraph [0036]). As data is transmitted the data unit counter is increased for each transmitted data unit and the byte counter is increased for every byte sent. The counters are then compared to see if either of the counters has reached or exceed their threshold limits (see paragraphs [0037] – [0038]). These limits may be predetermined or set as explained in paragraph [0039]. A poll is triggered if any of the first or the second threshold limit values is reached or exceeded. The poll is generated at the first node and sent to the second node, both counters are reset and, on receipt of the poll, the second node generates and sends a status report to the first node, see paragraphs [0040] – [0041].

58. Paragraph [0045] explains that this method may be denoted "in a compressed way of writing" by using the following pseudocode:

```
Initialise PDU_Counter and ByteCounter to their starting values;
[transmit data];
IF (PDU_Counter≥PDU_Threshold) OR (ByteCounter≥ByteThreshold) THEN
- Trigger a poll;
- Reset PDU_Counter AND ByteCounter;
END IF.
```

59. The experts explained that pseudocode is a sort of informal way of representing how a computer should be programmed. It looks like a computer program but is not in a real computer programming language. There is a dispute about this pseudocode which I will deal with in context.

60. Paragraphs [0046] – [0050] provide an example of the method previously described by the patent. This is expressed as being non-limiting. Figure 3, a flow chart illustrating the embodiments of method steps performed in a first node, is introduced at paragraph [0053] and explained at paragraphs [0054] – [0092]. Figure 4 is

introduced at paragraph [0093], its description continues until paragraph [0109]. Figure 4 depicts an exemplary embodiment of apparatus, which is also expressed to be non-limiting.

61. Paragraph [0095] includes the following sentence: "The transmitter 406 is adapted to transmit a *sequence of data units or data unit segments, data units*, to be received by the second node 120" (my emphasis). The defendants contended that this would be understood to represent a definition of the term "data units" so that it always meant both PDUs and PDU segments. The words data unit segments are clearly referring to possible segmentation during retransmission but I reject the submission that this passage would be understood to be a general definition. The words are not clear. The context is the middle of a paragraph describing part of one illustrative embodiment. That does not indicate that a statement of that sort of wide significance is being made. Paragraph [0095] describes the counting process in the context of figure 4. The words would be understood to mean that the idea of counting PDU segments as well as counting PDUs is contemplated as a way of operating the figure 4 system but that is all.

Claim construction

62. Lord Hoffmann summarised the law on claim construction in ***Kirin-Amgen*** [2005] R.P.C. 9. He stated at paragraph 32 that construction of patent claims "is concerned with what a reasonable person to whom the utterance was addressed would have understood the author to be using the words to mean." Sir Robin Jacob summarised the effects of the judgment in ***Kirin-Amgen*** and the principles to be applied in ***Virgin Atlantic Airways v. Premium Aircraft Interiors*** [2010] R.P.C. at paragraph 5. The defendants emphasised points (iv), (v) and (vi) which appear in paragraph 5 of ***Virgin***. That is to say that claims are not to be construed alone, purpose is vital but on the other hand purpose is not the be-all and end-all. One is still concerned with the meaning of the language.

63. Claim 1 relates to a method operating in a first node. In the context of the claim the first node is the transmitter and the second note is the receiver, both in a wireless network. The transmitter is sending data units (i.e. PDUs) to the receiver. It is common ground that in the context of the LTE network the relevant entity which acts in the claimed method is the RLC layer. It is also common ground that given the well known protocol layer stack approach, the term "transmitted" includes not only the transmission in the physical layer (across the air) but also includes the prior step inside the transmitter when the RLC layer passes a PDU which is to be transmitted to the MAC layer.

64. The method in claim 1 is a method of polling which counts both the number of data units and the number of bytes. If either of those counts reaches a predefined set value, a poll will be triggered. The point of the poll is to request a status report from the receiver. Although the claim does not spell it out, the skilled person knows that the point of the status report is for the transmitter to determine what data has been safely received so that it can release resources and what data needs to be retransmitted.

65. Claim 9 provides a further feature by specifying that both counters will reset if one of the counters reaches its predefined value. This approach makes the two counters part of a single mechanism.

66. There are three points on construction on claim 1 and a fourth on claim 9:

    i) counting retransmissions;

    ii) counting payload data;

    iii) upon assembly;

    iv) dual reset (claim 9).

Counting retransmissions

67. The question is whether claim 1 is limited to a method in which both initial transmissions and retransmissions are counted or whether the claim also covers the case in which only the initial transmissions are counted but not the retransmissions. Unwired Planet contend that the claim covers both cases. The defendants contend it does not cover counting initial transmissions only, or if it does the claim loses priority.

68. Before dealing with the language, it is convenient to address the context in which the patent is to be approached. It was common ground between the experts that in the common general knowledge UMTS system the PDU counter defined in the standard counted both initially transmitted PDUs and retransmissions. There was a suggestion that the word "new" used in the UMTS standard in this context was a term of art. I doubt that. I do accept that "new" there would be understood as referring to initially transmitted PDUs as distinct from retransmissions.

69. While the way in which UMTS worked is relevant as part of the background the skilled person would bring to bear when reading the patent, it does not mean that the skilled person would expect the claim to be limited to such a method.

70. The current draft LTE specification (3GPP TS 36.322 V8.0.0) was part of the common general knowledge and is also relevant as part of the background the skilled person would bring to bear. The draft LTE standard is also referred to in the patent at paragraph [0005] onwards. The skilled person would know that in the proposed LTE system a retransmission may involve re-segmentation of a PDU.

71. As a further point, the defendants submitted that the draft LTE standard "defines" Acknowledged Mode PDUs as both AMD PDUs and AMD PDU segments. I am not convinced the part of the draft standard referred to (section 6) is really a definition at all since the definition section is elsewhere and all the document says in section 6 is that PDUs can be categorized in various ways. But even if it is a definition, as the defendants submit, it has little bearing on how a skilled person would understand the claim. Paragraph [0008] of the patent mentions the idea of a polling mechanism operating on "transmitted RLC PDUs" but there is no reason to read that in a limiting sense by reference to a definition in the draft standard.

72. The defendants submitted that there is a technical benefit in counting retransmissions because it enables the counter to reach a predefined threshold more quickly and improve the ability to avoid a stall. This was based on a point in the evidence of Dr Irvine which Dr Cooper did not accept and described as hypothetical and unrealistic.

In my judgment the position is that the skilled person would understand that there are good technical reasons why one might count only initial transmissions and good technical reasons for counting both initial transmissions and retransmissions. Both make technical sense. One may be somewhat more complex than the other in certain respects but neither approach would be seen as so complex so as to have any bearing on how a skilled person would read the patent. I find that both would be regarded by a skilled person as reasonable approaches.

73. The defendants submitted that the skilled person would expect a clear teaching in the patent if it is to be read as different from UMTS, in other words if it is to be read as covering a case in which only initial transmissions are counted. I reject that submission. The skilled person's common general knowledge might well lead them to be surprised if this aspect of the claim did not cover the approach used in UMTS but it would not lead them to have any expectations that the claim would not cover other approaches too. Nor would the language of paragraph [0095] have any significance on this issue. I have dealt with it above.

74. Turning to the words of claim 1 – they are general in nature. They are apt to cover either case, in other words covering a method which counts only initial transmissions and also a method which counts initial and retransmissions.

75. The claim clearly requires initial transmissions to be counted. The question is whether there is any basis on which to conclude that it excludes a method which only counts initial transmissions. There is nothing in the claim or in the specification which would justify a narrow reading.

76. Moreover I believe counsel for Unwired Planet was correct when he submitted that one way of looking at this issue is to see that once a PDU has been transmitted initially it is a "transmitted data unit" (the words of claim 1). In one sense if it is then retransmitted it is still the same data unit (at least if it is not re-segmented) and so it has already been counted once. This point cannot be taken too far. It would not justify excluding from the claim a method which counted both but it does illustrate why the language is apt to cover counting only initial transmissions.

Counting payload data

77. A PDU has two parts: a header and a payload. The defendants contend that claim 1 is not infringed by a system which counts only payload bytes and not header bytes. Unwired Planet contends the claim is indifferent and covers either approach, in other words it covers a method which counts both payload and header and a method which counts only payload.

78. There was a major dispute in the evidence about the state of the skilled person's common general knowledge concerning the storage of header bytes in LTE. Although in the end the point was clear, it requires some explanation. The reason the claim requires counting bytes at all, as well as counting data units, is because it is concerned with a system, such as LTE, in which the PDUs can vary in size. As is explained in the common general knowledge section above, this is a change from conventional approach in UMTS in which PDUs had a fixed size. In fact in some UMTS variants there can be variable sized PDUs but that is a refinement which does not matter. In (normal) UMTS one could just count PDUs and thereby know both the

number of transmitted PDUs and also the amount of storage space those transmitted PDUs need to take up in the retransmission buffer. However in a system like LTE one cannot infer the amount of storage space needed in the retransmission buffer from the number of PDUs because the PDUs vary in size. So the claim requires counting both PDUs and bytes.

79. The skilled person would understand this, in other words the reader would understand the rationale for counting bytes. The rationale is to have some indication of the need for storage space in the retransmission buffer.

80. Since the rationale involves storage space, one needs to ask what the skilled person would think needed to be stored. At one extreme one could say: the retransmission buffer would have to store both the header and payload for each PDU and so the system must count both. At the other extreme one could say: only the payload would ever be stored in LTE, never header, and so the system only ever needs to count payload.

81. In the end the evidence was all one way. The UMTS specification required the storage of headers but there was no such requirement in the draft LTE specification. There was an attempt to interpret diagrams in the draft LTE specification as mandating the storage of header but those diagrams plainly do not require header storage and would not be understood in that way. As a technical matter the skilled person would know that in implementing an LTE system either possibility was available. One could store headers or not. If the header is not stored, it would have to be recreated "on the fly", in other words recreated if the PDU needed to be retransmitted, but that was perfectly feasible since the system created the header on the fly in the first place when the PDU was to be transmitted initially. The trade off would be between extra storage space and extra processing. Headers are small but they do take up storage, and space is at a premium especially in a mobile phone (UE). Because of the possibility of segmentation on retransmission in LTE, the skilled person would know that in some circumstances a header would have to be created on the fly in any event but this does not mean no header would be stored in LTE.

82. So, to a skilled person thinking of the LTE system, which would be the natural system to consider reading the patent, they would know that headers may or may not be stored. If they are stored then it makes sense to count them. If they are not stored it makes no sense to count them. Thus I find that the skilled person's common general knowledge would not lead them to think that the claim had to be limited to counting both payload and header. There is no technical reason why the claim only makes sense that way and every technical reason in the common general knowledge to understand the claim as allowing for either possibility.

83. The fact that the invention is not limited to LTE does not help either way.

84. Turning to the specification, the description simply refers to counting transmitted data bytes. It does not descend into a detailed discussion of headers and payload and does not exclude either possibility. To a skilled person the specification would not be read as requiring or assuming that header bytes will be stored.

85. What of the claim language? None of the relevant words are terms of art. The phrase "counting … the number of transmitted data bytes of the transmitted data units"

appears to refer to counting the *data* bytes in the PDU as opposed to some other sort of bytes in the PDU such as header bytes. It would not mean that the claim excluded counting header bytes as well but this construction would mean the claim referred to counting payload bytes, on the basis that "data bytes in data units" is to be understood to refer to payload bytes. However in the end that narrow approach to construction is too refined and I doubt it would be adopted by a skilled person. In my judgment the language of claim 1 is unspecific and general. It is not clearly referring to a subset of the bytes in a data unit nor is the language specific enough to be read as positively requiring every single byte of a data unit to be counted. A skilled person, knowing that headers may or may not be stored, would not think the claim excluded a system in which only payload bytes were counted.

86. In its decision on 14th July 2015 (4b O 50/14) in an action on the German designation of the same European patent between Unwired Planet and Huawei, the Landgericht Düsseldorf decided this point in Huawei's favour (see section B II 1. (a) to (e)). I respectfully disagree with the Düsseldorf court's conclusion. I believe the primary cause of the difference is that the evidence before that court seems to have been that headers would always be understood to take up storage space and that the patent would be understood on that basis. I can see that if that were the case then the skilled person would approach the claim in a different way, although I am bound to say the claim language still seems to me to be unspecific.

Upon assembly

87. In order to send a PDU to the lower layer in a protocol stack, the relevant entity takes the SDU from the higher layer and formats and adds a header to create a PDU. Every PDU which is to be transmitted has to be assembled in this fashion, at least initially. Really this assembly is part and parcel of the transmission process.

88. In UMTS the counting of the PDU takes place during the assembly process and if the count reaches the relevant threshold, the poll bit is set in the header for that PDU. In other words in UMTS a PDU is counted "upon assembly" and then sent to the MAC layer. The skilled person knew, as a matter of common general knowledge, that the UMTS system worked this way. It would be regarded as a conventional approach.

89. The LTE standard today operates in the same way. Both counts occur during the assembly of the PDU and the poll bit is set in the header of the PDU which takes either count up to or over the threshold. Unwired Planet submits the claim covers this method. The defendants do not admit this is within claim 1 but the focus of their case is really that insofar as claim 1 covers such a method, it is not entitled to priority. Unwired Planet maintain the claim to priority but at this stage I am concerned with the true construction of claim 1.

90. There was a debate between the experts about whether this "upon assembly" approach had advantages over the alternative. The key characteristic of the alternative is not the point at which the counting takes place, but polling. The alternative involves the poll bit being set in the header of the next PDU sent, not the one which caused the threshold(s) to be satisfied. I find that the skilled person thought it was better to set the poll upon assembly because that means it was being set when it was needed.

91. The defendants relied on the pseudocode in the specification, particularly at paragraph [0045]. The reason for focussing on paragraph [0045] is that this pseudocode is also in the priority document. The defendants submitted that the pseudocode in paragraph [0045] excluded the possibility of counting and polling upon assembly. That is because the words "*[transmit data]"* come before the words "*IF … THEN … END IF*". The words which come later ("*IF* … etc.") represent the comparison between the two counters and their thresholds, the triggering of a poll and resetting of the counters. So, it is said, the poll trigger comes after the transmission and so excludes polling upon assembly.

92. At one stage the argument was that the pseudocode excluded *counting* upon assembly but that is plainly wrong since the pseudocode does not refer to the counting step at all. This illustrates a wider aspect of the pseudocode. It does not purport to deal with the whole process in detail. Even essential steps (like counting) are not mentioned. The skilled reader would see that the point which the pseudocode is really addressing is the combination of the two counters into a single mechanism. The important thing in the pseudocode is the content of the "*IF … etc.*" logic. It explains how to combine the two thresholds into a single mechanism for triggering a poll and resetting both counters. I find that this pseudocode would not be understood as purporting to lay down any requirement about sequencing of steps at all. The fact that in this pseudocode the statement relating to triggering a poll is after the statement referring to data transmission would not be regarded as significant.

93. The patent specification contains language such as paragraph [0058] which states in terms that steps may be conducted in any order and also has other generalising paragraphs [0022] and [0117]. Since they are not in the priority document, I have not taken them into account when focussing on the pseudocode in paragraph [0045].

94. Turning to the claim, it seems to me that with the relevant background the skilled reader would not understand the language as seeking to exclude the possibility of polling (and therefore counting) upon assembly. It is true that in the claim the step of transmitting a sequence of data units is mentioned first and then the claim refers to the step of counting the two values and finally to requesting a status report. However the language is not descending into the level of detail required to distinguish between the different ways of counting and polling. What really matters is counting both numbers. The counting and the poll requesting steps are part of the overall process of transmission of the sequence of PDUs. The fact that the count and the setting of a poll bit might occur upon assembly of a given PDU which is transmitted does not mean the method ceases to be a way of counting transmitted PDUs or transmitted bytes. A system which counts upon assembly of a PDU and sets the poll bit upon assembly of that PDU is covered.

Dual Reset (claim 9)

95. There is no doubt claim 9 refers to resetting both counters when either has reached the trigger. The question is whether claim 9 covers the case in which a system does do that but also, in other circumstances, resets both counters for other reasons. The former was referred to at trial as "dual reset" while the latter was referred to as "global reset". The defendants contend that a system is excluded from the claim if it practises global reset even though it will reset both counters when either has reached the trigger. Unwired Planet disagrees.

96. The defendants' submission refers to paragraphs [0085] to [0092] and figure 3. The argument is that here various options are described as alternatives including options in which both counters are reset when one has reached the relevant threshold and another option (paragraphs [0088] and [0092]) in which the counters are reset due to a different unrelated trigger. Thus the argument is that claim 9 would be understood as referring to the first option to the exclusion of the second.

97. Dr Cooper described an advantage of claim 9 in paragraph 97 of his second report. Essentially the point is that unlike a delayed poll caused by a poll prohibit timer, the method of claim 9 ensures that every poll that is triggered by a given one of the two counters (PDU or byte) relates to an amount of traffic (in PDUs or bytes respectively) that is the same. The defendants submitted that Dr Cooper accepted in cross-examination that this advantage was only an advantage of dual reset but not an advantage of a system which included global reset. Dr Cooper did not accept that. I find that the advantage applies to the claim read either way.

98. I reject the defendants' case on claim 9. As long as the method in question resets both counters when either is triggered, it is within the claim. The fact that the system may also reset the counters in other circumstances is not relevant. There is nothing in the words of claim 9 which exclude such a thing. A method which resets the counters when a poll is triggered for another reason is not outside the claim as long as it resets both counters when either counter reaches the appropriate threshold.

99. Neither the pseudocode in the specification, nor the fact the patent emphasises combining the counters into a single mechanism (paragraphs [0017], [0018] and [0046]) makes any difference to this conclusion.

Infringement / Essentiality

100. It was common ground that if the claims are construed in the manner above, then a telecommunications system compliant with the LTE standard 3GPP TS 36.322 release 8 version 8.8.0 and in particular section 5.2.2 would infringe. In the Particulars of Claim the case pleaded out by Unwired Planet is based on the first node being user equipment (UE) (such as a mobile phone) while the second node is the eNodeB, albeit that the assignment of nodes could be reversed. Nothing turns on that. The relevant transmission mode is acknowledged mode. The status reports produced by the second node when polled comprise both ACK and NACK fields and satisfy the requirement for positive and/or negative acknowledgement in claim 1. The transmission of RLC data PDUs which are either AMD PDUs or AMD PDU segments satisfies the requirement for the transmission of data units or data unit segments. The count of the number of transmitted data units mandated in the standard is the field PDU_WITHOUT_POLL. The byte count mandated by the standard is the field BYTE_WITHOUT_POLL. The thresholds are the defined values *pollPDU* and *pollByte* respectively. A status report is requested by setting the P field of the RLC data PDU to "1".

101. In accordance with this standard the RLC in the transmitter will count both PDUs and bytes. The bytes counted are payload bytes. The count is of transmissions rather than retransmissions. The counting and the setting of the poll bit occurs during assembly of the PDU, so that the poll bit is set in the header of the PDU which triggered either count reaching the relevant threshold. Thus claim 1 is satisfied.

102. When either the PDU counter or the byte counter reaches the appropriate threshold a poll is triggered and both counters are reset. Thus claim 9 is satisfied. The fact that the counters are also reset in other circumstances does not mean claim 9 is avoided.

Priority

103. Section 5(2) of the 1977 Act provides that an invention is entitled to priority from a priority document filed before the patent application if it is supported by matter disclosed in the priority document. The equivalent provision in the EPC is Art 87(1) which provides that the right of priority arises as long as the priority document is in respect of the "same invention". Although the language used is different, it must be taken to mean the same thing (***Unilin v Berry Floor*** [2005] FSR 6 at para 39). The law on priority was addressed by Court of Appeal in ***Medimmune v Novartis*** [2013] RPC 27 at paragraphs 151-154. This emphasises three points. First, the requirement of Art 87(1) EPC for claiming priority for "the same invention" requires the skilled person to be able to derive the subject matter of the claim directly and unambiguously using common general knowledge from the priority document as a whole. Second the approach is not formulaic but is a matter of technical disclosure, explicit or implicit. Third, the important thing is not the consistory clause or claims of the priority document but whether the disclosure as a whole is enabling and effectively gives the skilled person what is in the claim.

104. A point which the defendants emphasised arising on the facts in ***Medimmune*** was that priority was lost because the meaning of an expression found in both the priority document and the patent was different in the two documents. In the priority document a "derivative" was something identified using the technique of phage display (paragraph 174) whereas in the patent "derivative" was defined more broadly and included polypeptides which had not been selected using the phage display technique (paragraph 156). The defendants submitted that Unwired Planet has the same problem here with the word transmitted.

105. Another point which the defendants emphasised is that the court is not concerned with what is made obvious by the priority document. I agree. In ***HTC v Gemalto*** [2014] EWCA 1335 (Civ) Floyd LJ addressed a similar point at paragraph 65 having cited ***Medimmune***. He said:

> "65. The skilled person must be able to derive the subject matter of the claim directly and unambiguously from the disclosure of the priority document. Mr Tappin stressed that the question was one of what was disclosed to the skilled person, not what was made obvious to him by the priority document, for example in the light of his common general knowledge. I agree that, as the above passage shows, that is the correct approach. That does not mean, however, that the priority document should be read in a vacuum. The question of what a document discloses to a skilled person takes account of the knowledge and background of that person. A document may mean one thing to an equity lawyer and another to a computer engineer, because each has a different background. The document still only has one meaning because it is only the relevant skilled person's understanding which is relevant. What is not permissible is to go further than eliciting the explicit or implicit disclosure and take account of what a document might lead a skilled person to do or try, or what it might prompt him to think of."

106. Unwired Planet argued that the fact that a claim is wider in scope than a specific embodiment described in the priority document does not mean priority is lost. Unwired Planet submitted that the principle described by the Court of Appeal ***AC Edwards v Acme*** [1992] RPC 131 and ***AP Racing v Alcon*** [2014] EWCA 40 shows that the fact that a claim may be wider in scope does not equate to added matter. I accept (and the defendants did not disagree) that the considerations addressed in the context of added matter in the cases cited have a role to play in priority. After all the phrase "clearly and unambiguously derivable" which comes from the EPO cases (see ***G2/98***) is the EPO's added matter test.

107. The defendants did not focus on this issue of principle, preferring to argue the issues on the facts. Nevertheless, in a case in which a claim has a wider scope than that which is disclosed in a priority document, I do not accept Unwired Planet's submission if it goes as far as saying that the fact that such a claim satisfies an ***AC Edwards*** added matter test is necessarily enough to satisfy the test for priority. The ***AC Edwards*** line of cases is not followed in the EPO. That UK line of authority rests on the point that added matter is not concerned with claim scope at all but with what information is disclosed by the claim language. If a claim of wider scope does not disclose any new matter then the added matter test is satisfied but to maintain priority such a claim must also satisfy the principle that its scope is commensurate with the relevant technical contribution, in this case the technical contribution of the priority document (***Biogen v Medeva*** [1997] RPC at 48-49).

The priority document

108. The priority document is entitled "Method and Arrangement in a Telecommunication System". It has four sections. There are no claims.

109. The first section, Field of the Invention, notes in particular that the invention relates to RLC polling for continuous transmission. This orients the skilled person, who will be familiar with the fact that polling during continuous transmission raises distinct issues as compared to polling when the transmission is in discrete bursts.

110. The Background section begins on page 1 by noting that the draft LTE standard includes a polling procedure that transmits polls according to a number of criteria, which are set out. These are said to work well for "bursty" traffic, where the poll can be sent for the last PDU in each burst. However, at line 27 and continuing to page 2, the priority document acknowledges that continuous transmission requires additional triggers to be considered. Page 2, ln1 states that a properly designed polling procedure can be used to limit the number of "outstanding PDUs (or bytes)" to avoid stalling. Counter based and window based mechanisms are identified as examples of polling procedures at p2, ln3 and are described in the remainder of the section.

111. Next, the Summary section highlights a problem that the known mechanisms do not take into account the fact that stalling may sometimes occur due to sequence number limitations and sometimes due to memory limitations. Although the text does not say so in terms at this point, to the skilled person with their common general knowledge of the proposed LTE system, it is clear why this is so. It arises because in LTE, unlike UMTS, the PDUs have a variable size.

112. The present invention is then described, as follows:

> "The present invention intends to define two triggering mechanisms; one mechanism that counts the number of PDUs and one mechanism that counts the number of transmitted bytes. In particular, as those mechanisms would be independent of each other, according to one embodiment of the present invention the criteria "transmitted number of PDUs" and "transmitted number of bytes" are combined into one single mechanism.
>
> It is then an advantage of the present invention that the mechanism operates on both bytes and PDUs 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.
>
> Other objects, advantages and novel features of the invention will become apparent from the following detailed description of the invention."

113. This is, and would be understood by the skilled person to be, the key concept disclosed in the priority document. There are to be two triggering mechanisms, one a PDU counter and one a transmitted byte counter. The advantage of doing that is that the system works on both bytes and PDUs and avoids stalling relating to either limitation. One embodiment of the invention combines the two independent mechanisms into a single mechanism.

114. The final section is the Detailed Description. The passage at p4 ln2-18 describes how the problem of protocol stalling due to either sequence number or memory limitations arises from the fact that PDUs can vary in size. The words used do not put it that way but it would be clear to a skilled person that that is what is being described. The passage also highlights that the memory capabilities of user equipment are likely to be limited.

115. From p4 ln 19 onwards further details are given in which the counters are described in more detail, including the same pseudocode which appears in paragraph [0045] of the patent.

The submissions

116. The defendants submit that neither claim 1 nor claim 9 is entitled to priority. The reasons relate to the construction of the claims addressed already. The priority points are:

i) ("retransmissions"; claim 1) There is nothing in the priority document to suggest counting only initial PDUs and ignoring retransmissions. Given the conclusion on construction above, claim 1 covers a method of counting only initial transmissions. Construed this way the claim is not supported and not entitled to priority.

ii) ("payload data"; claim 1) This is the same kind of argument as for retransmissions. There is nothing in the priority document about counting only bytes of payload data. Construed to cover a method which counts only payload bytes, the claim is not supported and not entitled to priority.

iii) ("upon assembly"; claim 1) The priority document only discloses counting PDUs after they have been transmitted. Given the conclusion on construction above, claim 1 is wider than that. In its wide form the claim is not supported and not entitled to priority.

iv) ("dual reset"; claim 9) The priority document only discloses the dual reset approach rather than global reset. Given the conclusion on construction above, the claim is not supported and not entitled to priority.

117. Unwired Planet's general response to these arguments is that they all suffer from the same flaw. The flaw is said to be that the arguments focus on what is described in the Detailed Description section but that is merely an example of how to put the invention into practice. Unwired Planet submits that the defendants' arguments do not take into account the generality of what is disclosed.

118. The defendants contended that properly construed as a whole, the priority document does not present the Detailed Description section as merely an example of a possible way of putting the invention into effect. Rather it is presented as a detailed explanation of what the invention actually is. Accordingly any limitations in the Detailed Description section apply to the invention as a whole. They pointed out that while the patent, like many well drafted patents, includes language which states in terms that a detailed part of the description is to be regarded as exemplary and not limiting, there is no such wording in the priority document.

119. I do not accept the defendants' submission for two reasons. The first focusses on the priority document as a whole and its structure. Looking at the whole document, the skilled person would understand that the key concepts are disclosed in the Summary section in a general way. The reader would not expect details in the Detailed Description to be limiting.

120. The second reason is based on the language used in the Detailed Description section. The skilled person would readily understand that the explanation given in the first part of the Detailed Description (p4 ln2-18) is an example and is obviously not limiting. That in itself is a pointer against the defendants' submission. Then the paragraph at p4 ln19-21 introduces the remainder of the Detailed Description with the words "A combination of the criteria … into one single mechanism *can be achieved by a method as described* in the following:" (my emphasis). This language states in terms that what will be described is how something can be done, not how it must be done. It is not limiting.

121. Turning to the particular issues, there is no need to repeat the points on the common general knowledge of the reader of the priority document since they are the same as the matters addressed relating to claim construction.

Priority - Retransmission

122. The defendants' main argument about this point as a matter of construction was about the frame of mind with which the skilled person would approach the document (patent or priority document). I have held that this would not produce the finding on claim construction which the defendants argued for over the patent. The position is no different over the priority document. There is nothing in the priority document which

makes the defendants' case any better. Claim 1 covers a method which counts only initial transmissions and a method which counts initial transmissions and retransmissions. Just as the claim is in general terms as far as this is concerned, so too is the priority document. In this respect there is nothing in claim 1 which is not clearly and unambiguously derivable from the priority document.

123. In this context the defendants argued that the priority document was limited to LTE and UMTS as a result of the words on pages 1 and 6. The point does not matter but in any case the priority document is not limited to those two systems.

Priority – Payload data

124. As with the patent, the skilled person reading the priority document and thinking of LTE would know that while the payload of a PDU would be stored in the retransmission buffer after the initial transmission of the PDU, the header may or may not be stored after the initial transmission. Storing headers was one feasible approach but so was creating headers on the fly for retransmissions.

125. There was a debate whether the passage at p2 ln 10-15 of the priority document would be understood as referring to payload bytes. Mr Wickins accepted this and I find that it would be. The reason is as follows. In the context of LTE (see p1) the passage refers expressly to outstanding PDUs *or bytes* (my emphasis). The skilled person would know that technically you do not acknowledge header bytes, you acknowledge whole PDUs, save that in the case of segmented retransmissions (which are a feature of LTE) there can be acknowledgement of particular bytes. Those particular bytes are payload bytes. So, when one is talking about unacknowledged bytes as opposed to PDUs, that is a reference to payload bytes.

126. The defendants submitted that Dr Cooper, who had said in his report that he had read the priority document as referring to payload data, accepted in cross-examination that the passage at p2 ln10-15 had nothing to do with payload data. However that is not what Dr Cooper was asked and not what he accepted. He thought "data" in the passage did mean "PDU". That is all. He was not asked directly about the reference to "bytes" nor was he asked directly about payload or about segmented retransmissions.

127. Dr Irvine's evidence was that the priority document was talking about data bytes (i.e. payload bytes) as opposed to header bytes.

128. There was an argument about the passage at the start of p4 in the Detailed Description. In my judgment nothing turns on it but for what it is worth, I doubt the skilled person would see the general reference to "no more new data" being transmitted as being a reference to payload bytes. "Data" is a general word which is apt to refer simply to PDUs without descending into the detail.

129. The defendants submitted that there was no direct and unambiguous disclosure in the priority document of counting only payload data. Given that claim 1 is not directed to counting only payload data, that is not the correct approach. Claim 1 is written in general terms. In that respect it is clearly and unambiguously derivable from the priority document. As a matter of scope the claim includes a method in which header

and payload are counted and includes a method which counts only payload. I will deal with scope at the end. Subject to that, there is no loss of priority here.

Priority – Upon assembly

130. The skilled person's common general knowledge includes the knowledge that UMTS counts and sets the poll bit "upon assembly".

131. The defendants submit that the disclosure in the priority document is all concerned with a method which counts and polls after the PDU has been transmitted. Nowhere is there a description of a method in which counting or polling happens upon assembly of the PDU. The defendants draw attention to the following passages in support of their case:

    i) In the Background at p2 ln7-9 the document refers to counting "*transmitted* PDUs (or bytes)" and to setting the poll bit when a number of PDUs or bytes "*have been*" transmitted. (my emphasis)

    ii) In the Summary section at p2 ln26 the document refers to *transmitted* bytes and to the *transmitted* number of PDUs or bytes. (my emphasis)

    iii) The Detailed Description also refers to the *transmitted* number of PDUs or bytes at p4 ln19-21. (my emphasis)

    iv) The Detailed Description at p4 ln22-29 would be understood to state that after the data has been transmitted the counters are compared and if necessary a poll is triggered.

    v) The pseudocode (at p5) provides that the triggering of a poll happens after the data is transmitted.

132. For point (iv) Unwired Planet suggested that an alternative reading of the sentence could be to read it with commas inserted as "After that, data has been transmitted, the actual values of said counters are each compared …". I reject that interpretation. On the other hand on point (v) I reject the defendants approach to the pseudocode. Just as in the patent, the pseudocode here would not be understood to require any particular sequence of events.

133. The passages relied on do use the past tense to refer to what is counted and do describe polling as something happening afterwards. The document does not refer expressly to counting and polling upon assembly at all.

134. Read pedantically and without any context, these words can be said to exclude the idea of counting and polling upon the assembly of a PDU for transmission. But reading a document that way is not the right approach. The skilled person is aware of the conventional approach to counting and polling in UMTS as a matter of common general knowledge. The question is what would that skilled person understand the inventor to mean by the language which has been used (cf ***Kirin Amgen***). In my judgment the skilled person would not think this language was being used to address that issue at all.

135. One of the clearer passages in the defendant's favour is the reference on page 2 to setting a poll bit when a set number of PDUs or bytes "have been" transmitted. However this is actually in the Background section and would be understood to refer to known counter mechanisms. The most relevant counter mechanism in the common general knowledge which is actually in use is the one in UMTS which polls upon assembly. Therefore the reader would realise that the priority document was using language loosely.

136. Since the Detailed Description would be understood as illustrative, I place less weight on the passage on p4. In the Summary section the point turns on the word "transmitted". Read on its own or as part of the document as a whole, it is not a statement which would be understood to exclude counting or polling upon assembly. A method in the transmitter which counts and polls upon assembly does count the number of PDUs which are transmitted to the receiver and does set the poll bit based on the number of PDUs which are transmitted to the receiver. The meaning of the word "transmitted" has not changed between the priority document and the patent claim.

137. I conclude that claim 1, which covers counting and polling upon assembly, is clearly and unambiguously derivable from the priority document.

Priority – dual reset (claim 9)

138. The defendants submitted that the only teaching in the patent which could support what they called the broad meaning of claim 9 which I have accepted was paragraphs [0088] and [0092] which expressly describe a global reset. Therefore since those paragraphs are absent from the priority document, claim 9 loses priority.

139. I reject that submission. The absence of these paragraphs does not matter. The skilled person would not think the priority document was limited in such a way that a method which reset both counters when one was triggered was not an example of the invention just because in the same system there may be other circumstances in which the counters may be reset. This point does not give rise to a loss of priority.

140. In closing the defendants took a further point. Unwired Planet said it was unpleaded but the defendants explained that it arose from a submission on construction made at trial by Unwired Planet. The defendants' point was that claim 9 could not be said to be clearly and unmistakeably derivable from the Summary section of the priority document alone. To the extent Unwired Planet argued that it was, it was wrong. The defendants submitted that claim 9 can only obtain priority from disclosure in the Detailed Description section and so, since that only provides priority for dual reset, priority is lost.

141. I agree that the Summary section alone is not enough to support claim 9. The Summary section refers to combining the counter/triggering mechanisms into a single mechanism but does not state in terms how to do it. The feature in claim 9, resetting both when one is triggered, is described in the Detailed Description (e.g. p4 ln27-31 and the pseudocode on p5). However I do not agree that this means claim 9 loses priority. Claim 9 is clearly and unambiguously derivable from the priority document as a whole.

Priority – conclusion

142. Mr Wickins accepted in cross-examination that a method which involved each of the three construction issues relating to claim 1 approached in Unwired Planet's favour made use of the key concepts in the priority document and did so for the purposes of those concepts which are described in the priority document. This was a method which did not count retransmissions, counted only payload, and counted and set the poll bit upon assembly of a PDU for transmission. Dr Irvine's evidence was to a similar effect. I find therefore that to the extent claim 1 has a wider scope than the detailed description in the priority document, that scope is commensurate with the technical contribution made by the priority document. I reach the same conclusion about claim 9.

143. Claims 1 and 9 are entitled to priority.

Novelty

144. A patentable invention must be new. To be considered new the invention must not form part of the state of the art, which includes all matter made available to the public before the priority date (s1(1)(a), s2(1) and s2(2) of the 1977 Act and Art 54 EPC). In ***Synthon v SmithKline Beecham*** [2005] UKHL 59 the House of Lords held that to deprive a claim of novelty the prior art must be an enabling disclosure.

145. The prior art relied on is the Ericsson TDoc. This document was uploaded to a publicly accessible server for consideration at an ETSI Working Group Meeting. It is not in dispute that the Ericsson TDoc amounts to an enabling disclosure of the invention, the issue is whether it formed part of the state of the art.

146. The facts are these:

i) The first thing which happened was that the Ericsson TDoc was uploaded by Ericsson (in Europe) onto the ETSI file server. This occurred when the date in Europe was 8th January 2008. The upload was in preparation for a meeting of the relevant 3GPP committee which was considering the design of the RLC layer in LTE which was due to take place on 14-18th January 2008. The formal designation of the meeting was the TSG-RAN WG2 #60bis meeting. As soon as it was uploaded, the document was freely available on the internet to anyone anywhere in the world. An email from Janne Peisa of Ericsson announcing the availability of the Ericsson TDoc, which included a hyperlink to the document, was sent to participants in the meeting shortly after the document was uploaded. About an hour after it was uploaded, Mr Leishout who was then employed at Samsung in the Netherlands and was the Chairman of the relevant committee, downloaded it.

ii) Second, the priority document for the patent was filed at the United States Patent Office. This occurred when the date in Europe and the USPTO was 8th January 2008.

147. The timing of the events can be considered in four different frames of reference, Central European Time (CET), Greenwich Mean Time (GMT), Eastern Standard Time (EST) and the time in Hawaii. CET is the frame of reference of the person who

uploaded the document, GMT is the frame of reference applicable on the relevant dates in the country (UK) in which the patent is in force, EST is the frame of reference of the USPTO at which the priority document was filed and Hawaii is the frame of reference chosen by the defendants to make the point that when the document was available on the internet it was available to some people in the world for whom the date was 7th January 2008. The timings are:

	CET (GMT +1)	GMT	EST (GMT - 5)	Hawaii (GMT - 10)
Ericsson Doc uploaded to ETSI server	8 Jan 08:36	8 Jan 07:36	8 Jan 02:36	7 Jan 21:36
Ericsson Doc downloaded by Mr Lieshout	8 Jan 09:45	8 Jan 08:45	8 Jan 03:45	7 Jan 22:45
Priority Doc filed at USPTO	8 Jan 22:59	8 Jan 21:59	8 Jan 16:59	8 Jan 11:59

148. The defendants argue that in these circumstances the Ericsson TDoc should form part of the state of the art as at 7th January 2008 and so represents prior art. In their favour, they cite two decisions of EPO divisions. Both decisions relate to very similar factual circumstances, in that they are concerned with email disclosures made as part of the 3GPP standard setting process and patent applications filed at almost the same time.

149. One is a decision of the EPO Examining Division dated 6th August 2013 relating to a patent application by Huawei ***Application No. 09 733 661.4***. In that case the priority document was filed in China on 5th November 2008. The time of filing was not stated in the decision. The alleged prior art was sent to the 3GPP email server by a person situated in the US central time zone at 10:54 on 4th November 2008 local time. Considered in the frame of reference of the patent office in which the priority document was filed (China), the email was sent at 00:54 in the morning on 5th November. In other words the same day in China as the priority document was filed. No doubt in practice the priority document was actually filed some hours afterwards on the 5th November but one cannot tell.

150. The Examining Division held that the correct approach was to determine the calendar day at the location on which the prior art was available at the respective location. Since the email (and attachment) was available on the 4th November in the USA, where the server was located, the document was available in the USA on 4th November, hence one calendar day before the priority date. Therefore it was prior art and the patent application was refused.

151. In that case the applicant Huawei made the same submission that Unwired Planet make here, that the document was not prior art against the patent because looked at in the frame of reference of the office in which the priority document was filed, the document was not prior art. That submission was rejected by the Examining Division.

152. The other case is a decision of the EPO Opposition Division dated 31st July 2013, concerning ***Application No. 03 012 734.4*** by Innovative Sonic Ltd and opposed by Ericsson. The priority document was filed at the USPTO on 13th February 2013. The time of filing was not stated in the decision. The alleged prior art was made available

by an email to the ETSI server making them available at around 02:02 Central European Time (CET) on 13th February. Considered in the frame of reference of the patent office in which the priority document was filed (Eastern Standard Time in the USA), the email was available at 20:02 on 12th February EST. In other words before the day on which the priority document was filed.

153. The Opposition Division considered that the document made available on the ETSI website was prior art and revoked the patent. Their reasoning was that the "controlling time" was the time in the location of the office of first filing, i.e. the USPTO. Thus looked at in EST, the document was available before the priority date. The priority date started in Europe on 13th February at 6am GMT, which is after 02.02 CET and so the document was prior art.

154. The defendants submit that this case was correctly decided, but do not agree with the "controlling time" reasoning. The defendants submit that the document was prior art because at the point in time it was made available, it was made available all over the world. In some places in the world the calendar day was 12th February. That date is before 13th February and so the document is prior art. The fact that when the document was available happens to have been 12th February in the frame of reference of the patent office at which the priority document was filed is irrelevant.

155. Unwired Planet contend that the Opposition Division decision was right for the reasons it gave and, when those reasons are applied in this case the Ericsson TDoc is not prior art. Unwired Planet contends that the Examining Division decision is wrong.

156. In my judgment Unwired Planet is correct and the defendants' submission of law is wrong for the following reasons.

157. The starting point must be s2(2) of the 1977 Act and Art 54(1) EPC with which it corresponds. The words used in these two texts differ a little but the effect is identical. Paraphrasing them both: the state of the art shall be held to comprise everything made available to the public before the priority date. As Unwired Planet emphasise, these words refer to things made available before a date. The date mentioned is the priority date. There is no reference there to ascribing a calendar date to an item of prior art.

158. There are two questions. First, what is the priority date? Second, was the putative prior art made available to the public before that date? If the prior art was available anywhere in the world before the priority date then it is prior art. However before one can answer the second question, one needs to answer the first one.

159. At any given moment, the time and date around the world are different. Thus it is not meaningful to pretend that a given date has some absolute meaning. It does not. In order to decide if an event took place before it, the priority date has to be based on some frame of reference. The only frame of reference which makes sense is the one at the patent office at which the priority document was filed. Using any other approach would mean that an event which happened after the priority document was filed could count as prior art. That would be a very odd result.

160. Knowledge of the date of filing is what s2(2) and Art 54(2) require. This derives from Art 4A of the Paris Convention, which is the foundation on which the international system of priority is based. A right of priority arises from any regular national filing under the local domestic legislation (Art 4A(1) and (2)). Art 4A(3) defines a regular national filing as any filing adequate to establish the date on which the application was filed. Art 4C (1) and (2) define the priority period as 12 months from the date of filing, with the day of filing not being included in the period.

161. The international system ensures that the date on which a priority document was filed and the office in which it was filed are always known facts. They are all one needs to know in order to establish the priority date but both facts are needed. Nothing in any of these materials requires knowledge of the time at which a priority document was filed. If the law required one to know what date or time it was elsewhere in the world when a priority document was filed, one would need to know the time of filing as well as the date. But the system is not set up that way in general and the EPC and 1977 Act do not require it.

162. Once the priority date is correctly characterised the second question is simply, was the putative prior art made available before that date? That is how the EPO Opposition Division looked at the matter. I agree with their approach.

163. The Examining Division looked at the issue in a different way. It is clear from their reasoning that they were concerned about Art 54(3), i.e. prior unpublished patent applications. They held that it was evident from Art 54(3) EPC that Art 54(2) had to be construed in the sense that if the calendar day of publication of a document is earlier than the calendar day of filing then the document is comprised in the state of the art. That reasoning starts from Art 54(3), which provides:

> Additionally, the content of European patent applications as filed, that dates of filing of which are prior to the date referred to in paragraph 2 and which were published on or after that date, shall be considered as comprised in the state of the art.
>
> [Examining Division's emphasis]

164. Hence, the Examining Division reasoned, the filing dates (calendar days) of two patent applications are compared in order to determine which is prior art. They noted that the textbook by Derk Visser (2007 p82-83) came to the same conclusion, that time zones are not taken into account and the only thing which is relevant is the calendar day at the location on which the prior art is available.

165. I recognise that the approach I have applied to Art 54(2) does not sit happily with Art 54(3) but that provision, unlike Art 54(2), expressly refers to the date of filing of the earlier patent application. It seems to me that Art 54(3) requires only a comparison of the dates as they are stated on the face of the documents. The fact that time zones are not relevant under Art 54(3) does not mean they are irrelevant under Art 54(2).

166. By working in the way it does, Art 54(3) creates the possibility that a patent application with a priority document filed later in time that another one could be prior art for the purposes of that article. So a European patent application claiming priority from a Japanese filing which occurred at 8am on the 8th Japan would have an 8th

January priority date. 8am on the 8th January in Japan is 6pm on the 7th January in the USA in the EST time zone of the USPTO. A European patent application claiming priority from a US filing which occurred on hour later, at 7pm on the 7th January in the USA would have an 7th January priority date. Assuming the patent offices accept filings at these times, the document based on the later filed priority document would be prior art against the document based on the earlier filed priority document.

167. However Art 54(3) is a deeming provision which deems certain things part of the state of the art even though they were not then made available to the public. Its terms are conditioned by policy considerations different from those on which Art 54(2) is based. Using only dates makes the Art 54(3) system simpler and workable. The risk of unfairness caused by the US/Japanese scenario above is small. There is no reason why the effect of this policy based deeming provision should be transposed into Art 54(2).

168. Unwired Planet referred to the EPO Guidelines (Part G Ch IV-17 para 7.5.6) This states: "If a publication date is close to the relevant priority date, the time zone of publication may be crucial to interpret a publication date". I believe the logic of this observation favours Unwired Planet's argument rather than that of the defendants.

169. The defendants emphasised the justice in their submission given that the Ericsson TDoc was in fact made available to the public before the moment in time that the priority document was filed. However counsel accepted, rightly, that if the law was as the defendants submit it to be, it would catch as prior art things made available to the public at a time after the priority document was filed. The facts in this case flatter the defendants' argument. Consider what would happen if the content of a priority document filed at the Japanese Patent Office early in the morning was then placed on the internet one hour later. It would be available all over the world and at that moment the date in the USA would be the day before. On the defendant's submission this would be prior art because it is to be regarded as having taken place before the priority date. I do not agree.

170. Moreover Unwired Planet is correct that the EPC accepts that a disclosure on the same day as the priority date albeit earlier in time is not prior art. Art 54(2) refers to disclosures before the priority date, not on it.

171. If I apply the law as I have found it to be in this case the answer is clear. The priority document was filed in the USPTO on 8th January 2008. The frame of reference of the USPTO is the correct one. That is Eastern Standard Time. The Ericsson TDoc was made available to the public at 02.36 8th January 2008 EST. Therefore it was not made available to the public before the priority date. The fact that this time was 7th January in some places in the world such as Hawaii is irrelevant.

172. Finally I will say that I reject Unwired Planet's submission that somehow the fact that it seems no one in Hawaii actually downloaded or looked at the document is relevant to anything. The test under Art 54(2) /s2(2) is whether a document is available, not whether it was actually seen or read.

Obviousness

173. A patented invention must involve an inventive step, which means that it must not be obvious to a skilled person having regard to the state of the art (s1(1)(b) and s3 of the 1977 Act, Art 56 EPC). The structured approach to assessing obviousness was set out by the Court of Appeal in ***Pozzoli v BDMO*** [2007] EWCA Civ 588.

174. The following statement of Kitchin J in ***Generics v Lundbeck*** [2007] RPC 32 was approved by Lord Hoffmann (with whom the others of their Lordships agreed) in ***Conor v Angiotech*** [2008] UKHL 49, [2008] RPC 28:

> "The question of obviousness must be considered on the facts of each case. The court must consider the weight to be attached to any particular factor in the light of all the relevant circumstances. These may include such matters as the motive to find a solution to the problem the patent addresses, the number and extent of the possible avenues of research, the effort involved in pursuing them and the expectation of success."

175. In ***Medimmune v Novartis*** [2012] EWCA Civ 1234 the Court of Appeal, Kitchin LJ said at paragraph 93 that the court's task was ultimately "to evaluate all the relevant circumstances in order to answer a single and relatively simple question of fact"; see also Lewison LJ paragraphs 117 — 186.

176. All three of the prior art documents relied on arise in the same context. In the period up to the priority date the LTE standard was under development. The relevant committee working on the design of the RLC was TSG-RAN Working Group 2. The committee met every few months. Numerous papers were sent in by different participants in the standard setting process. The standard was in a draft form and the draft was evolving as the work progressed. One of the documents Huawei relies on, the Motorola TDoc, is a discussion document filed by Motorola for the committee meeting in Athens on 20 – 24 August 2007. The Samsung TDoc relied on by Samsung is a discussion document filed by Samsung for the committee meeting in Shanghai on 8-12 October 2007. After that there was a meeting in Jeju, Korea on 5-9 November 2007. The draft standard in its form relied on by Huawei as prior art was produced in December 2007 following the meeting in Korea. The next meeting after that was to be the meeting in Seville on 14-18th January 2008. This was the meeting for which the Ericsson TDoc was filed which is the novelty attack (above). The Seville meeting was after the priority date.

The Motorola TDoc

177. The document is entitled "RLC Polling Related Issues". It is concerned with the polling and status reporting mechanism. Polling triggers are discussed at section 2. The context is communication between AM RLC entities.

178. Section 2 identifies five polling triggers in total. The first polling trigger identified is "Transmission of the last data in the buffer". The document explains that this has already been defined and proposes four more. The first is a poll relating to handover preparation and the fourth is a poll retransmission timer. The important proposal is the second. The text relating to this and the third proposal is:

> "**2. Transmission of every N bytes data.**

> The sender triggers the polling function for every N bytes of data transmitted which haven't been ACK/NACK yet. This trigger aims at avoiding RLC buffer overflows. Note that RLC PDU size is flexible in LTE system, so the byte based polling is more accurate in reflecting the potential buffer level than PDU or SDU counts.
>
> **3. Transmission of every K TTIs.**
>
> The sender triggers the polling function periodically. This may be necessary if the transmitter wants to get the receiver updates periodically."

179. Huawei, supported by Mr Wickins, submitted that proposal 2 was a proposal for a trigger based on a byte counter. Unwired Planet, supported by Dr Cooper, did not agree. Unwired Planet submitted that properly understood this is a proposal for a window based trigger based on bytes.

180. The argument runs as follows. Huawei submits that the reference to "every N bytes" is a clear reference to a byte counter. However Unwired Planet contends that the words "which haven't been ACK/NACK yet" make more sense in the context of a window. A counter would not track the bytes which have or have not been acknowledged, it would simply count transmitted bytes. The idea of keeping track not only of what has been transmitted but also of what has been received is what a window mechanism does. Moreover the reference to trying to accurately reflect the buffer level is indicative of a window idea. That is what windows do. Huawei replies that the reference to ACK/NACK makes sense as a reference to the idea of counting initially transmitted PDUs (by contrast with UMTS which counts initial and retransmissions). As for reflecting buffer level, a window accurately reflects actual buffer level and so the word "potential" shows that a window is not what is proposed. It only makes sense to refer to the potential to reflect buffer level if a counter is what is being considered. Also the document refers to counters of other things (PDUs and SDUs) in comparison. The authors plainly knew what window based triggers were and if that is what they meant they would have said so. Unwired Planet submits that the word "yet" made no sense in Huawei's reading of the document. Huawei submits that Unwired Planet's reading made no sense of the reference to NACK.

181. Mr Wickins maintained that the document disclosed a counter albeit Unwired Planet submitted his reasons (discussed above) did not stack up. Dr Cooper maintained his view that the document disclosed a window but he agreed a reading in which it was understood as a counter was reasonable. Huawei also pointed out that others in the working group understood the proposal as a byte counter (part 3.1 of Nokia document R2-073895 for the Shanghai meeting).

182. I find that the Motorola TDoc discloses a byte counter based mechanism. There are indications in the text which point towards a window but they are not strong enough to displace the firm indications to a skilled person that a byte counter is proposed. The title "every N bytes" describes a counter. The reference to data transmitted which haven't been ACK/NACK makes sense as a teaching to count initially transmitted data as opposed to retransmissions. The word "yet" is an oddity but not enough to displace the clear meaning. The reference to ACK/NACK is a compound

expression referring to what comes back in a status report. I reject Huawei's argument that Unwired Planet's construction makes no sense of the reference to NACK. Finally, the last sentence makes more sense as a reference to a counter than to a window.

183. Turning to proposed trigger 3 in the Motorola TDoc, this is triggered by the transmission of every K TTIs. Just as N refers to the number of bytes to be counted to trigger a poll with the byte counter, so K refers to the number of TTIs to trigger a poll using the TTI counter. The proposal is a TTI counter. The term TTI refers to the Transmit Time Interval. In LTE it is 1 millisecond. Normally, for a given RLC entity, only one PDU may be sent in one TTI. There is a refinement mentioned in passing in that using MIMO (Multi In Multi Out) there may be more than one PDU per RLC entity per TTI but nothing turns on that. There may not be a PDU in every TTI but, subject to MIMO, there will be no more than one PDU per TTI.

184. Section 3 of the Motorola TDoc discusses how to indicate a polling request. No major issues arise from that. Section 4 discusses polling timers and proposes two – a poll prohibit timer and a poll retransmission timer. Both are familiar ideas from UMTS.

185. The document presents its conclusions in section 5. Four polling triggers and two polling timers are proposed. On the findings about the disclosure of the document above, the proposed triggers include a byte counter.

186. The skilled person and the common general knowledge have been identified above. The inventive concept is clear from the claim, properly construed. As compared to claim 1, the Motorola TDoc discloses the idea of a poll trigger based on a byte counter but does not propose counting PDUs as well. The step between this and the claim is to have a second poll trigger which counts PDUs alongside the byte counter.

187. Huawei submitted the invention was obvious. Its case in closing was as follows. There is no invention in using a byte counter over the Motorola TDoc. That is what is disclosed. The document tells the reader that it would be a better way of addressing retransmission buffer overflows than existing PDU or SDU counters. This is true and arises because of the variable size of PDUs in LTE, as the document recognises. But the skilled person also knows that they must be concerned about the sequence number limitation. Motorola teaches the use of a TTI counter. This is an approximation to a PDU counter and in some circumstances it is the same, if one PDU is sent in every TTI. The difference between this and the claim is minimal. The skilled person knew that a TTI counter was not as accurate as a PDU counter since counting TTIs gives the maximum number of PDUs which could have been sent rather the number actually sent. An alternative, more accurate, option for the skilled person would be a PDU counter.

188. Huawei submitted that claim 1 was obvious and that there was no evidence to the contrary. The latter submission is not accurate. In the extensive evidence and cross-examination about this topic there is evidence pointing either way. I now turn to that evidence.

189. Mr Wickins' opinion expressed in his report was that the claim was obvious but that opinion did not focus on the TTI counter. His opinion was that the claim was obvious

over the proposal to use a byte counter along with the common general knowledge of PDU counters. It was put to him that by the priority date, in the context of the fast developing standardisation process the Motorola TDoc would be seen as a proposal already rejected some months earlier in Shanghai. His response was that a skilled person or team working independently of the standard setting process could arrive at the use of two counters. It was also put to him that by the priority date those working on the standard appeared to be considering a single window based trigger rather than a counter or counters. His answer was that his personal view was that window based polling was misguided. When asked why none of the skilled people at the time appear to have spotted the idea in the Motorola TDoc, his answer was in effect that they missed it. The cross-examination was as follows;

> "Q. Have you got any explanation as to why none of the skilled people at the time spotted what you say they would have spotted, or should have spotted? Is it the same as before? They just missed it?
>
> A. As I say, it was a particular milestone in the process of evolving the standard. Yes, I think at that point in time perhaps they had not considered the full breadth of options and considerations. Maybe given more time they would have come up with similar proposals to the Ericsson TDoc.
>
> Q. If they had done some modelling?
>
> A. It is obviously commensurate with how much work and analysis you put in, the results that you get."

190. Dr Cooper's opinion expressed in his report was that the invention was not obvious. The cross-examination focussed on the common general knowledge. Dr Cooper accepted that the skilled person knew that in LTE PDUs were going to vary in size and therefore had in mind both resources, i.e. bytes in the retransmission buffer and sequence numbers. He accepted that the skilled person knew as a matter of common general knowledge that there was a potential for stall due to the two separate limitations. He accepted that a counter was simpler than a window based trigger. Both options (window and counter) had pros and cons and it was within the skilled person's skill to assess them both. A counter based solution was a reasonable one. These two points were made in the context of considering the case over the draft standard but they are applicable generally. Starting from the Motorola TDoc Dr Cooper accepted that a PDU counter was an alternative to counting TTIs which the skilled person would have in mind and would be an attractive option if he wanted a more accurate PDU count than came from a TTI counter. Also starting from the Motorola TDoc Dr Cooper gave the following answers:

> "Q. And he would conclude that it is perfectly within his skill and knowledge -- I will start that again. It is perfectly within his skill and knowledge when reading Motorola to think, I like the idea of the transmission of N bytes data which helps my buffer problem and I will use the N PDU for the sequence number problem.

> A. That is a perfectly plausible train of thought, yes.
>
> Q. And it is one that is within the skill and knowledge of a skilled person reading Motorola at the priority date?
>
> A. That is correct.
>
> Q. If he does that, he will then have two counters, which is correct, is it not? He would then have two counters.
>
> A. Yes, he will have two counters."

191. Unwired Planet submitted that this evidence was given following a classic step-by-step approach (per ***Technograph***) and was based on a number of hidden assumptions including: (i) that the skilled person would accept the Motorola TDoc as a suitable starting point at all, (ii) that at the priority date they would decide to move forward with the document at all given that the current thinking had moved on, (iii) that the Motorola TDoc proposed a comprehensive solution whereas Huawei treat it as a collection of options to be selected from, (iv) the comprehensive solution included a poll prohibit timer but by the priority date the committee had decided not to use a poll prohibit timer in LTE.

192. Unwired Planet also pointed out that the argument over the TTI counter was not in Mr Wickins reports and obviously had not occurred to him. As regards Dr Cooper's testimony, Unwired Planet submitted that the fact a train of thought is plausible is not enough to establish obviousness, particularly when there are a range of possible ways forward. Dr Cooper never accepted that it was obvious one counter would not be enough albeit the skilled person knew there were two separate dimensions to the problem (bytes and sequence numbers).

193. Pulling these and the other arguments together, Huawei's best point is the common general knowledge that the change from UMTS to LTE, whereby PDUs will vary in size, means that the risk of stalling during continuous transmission arises from two sources. So it is obvious to have regard to these two resources. Counters are a known and easy way of keeping track of the rate at which resources are being used. UMTS used a PDU counter as one of the available triggers. The Motorola TDoc proposes a byte counter expressly and proposes two counters side by side. The argument is that it would be obvious to take up the byte counter proposal and obvious to use a PDU counter as well, instead of the TTI counter. Mr Wickins thought the claim was obvious.

194. On the other hand Unwired Planet's best points are based on looking at what actually happened in the 3GPP committee dealing with this issue in 2007. There was a large array of proposals. Dr Cooper analysed them and explained that the vast majority were for window based approaches (over 40 in number). There was only one byte counter proposal or possibly two. By the priority date the proposals in the Motorola TDoc had been rejected. An editor's note in the draft standard in its form at the priority date proposed a single trigger, based on sequence numbers, either a PDU counter or window. This reflects the common general knowledge that an important aspect of the LTE project was to simplify the system as compared to UMTS. When

the reality of what happened was put to him, Mr Wickins' responses were indicative of inventiveness.

195. These arguments do not meet head on. Huawei's case might be said to avoid facing up to what actually happened. On the other hand Huawei contends that Unwired Planet avoids facing up to the technical simplicity of the step to be taken and seeks to distract attention from this, the primary issue, by focussing on secondary evidence. The defendants point out that while secondary evidence can have a role to play, it must be kept in its place (citing ***Mölnlycke v P&G*** [1994] RPC 49 at para 113 and ***Schlumberger v EMGS*** [2010] RPC 33 at para 77). I have that firmly in mind.

196. This invention is concerned with the definition of how entities in a mobile telecommunications system should behave. Defining these rules is precisely the task being undertaken in the standardisation process by the members of the relevant committee. To contemplate how a skilled person would think outside a standardisation process is unreal. It is true that the motives of commercial organisations can be opaque and will involve non-technical considerations. A holder of IP rights in a particular expedient may wish to persuade the committee to adopt it not for its technical merit but in order to give the holder an SEP and so a bargaining chip in the inevitable future licensing negotiations. Nevertheless the documents show that the debate on LTE was at its heart a technical one. It is also true that the period covered by the evidence is a short period of time (months) but it was manifestly a period of intense effort and focus by engineers from numerous leading firms in this field (including NTT, Motorola, Samsung, Ericsson, and Huawei). The evidence is indirect in that none of the experts can speak from first hand experience about what took place in the particular group, but the general tenor can be gauged from the documents. In my judgment what happened in the 3GPP committee in 2007 is good evidence of how the skilled person would approach and think about the problem in this case.

197. It seems to me that the most important factors which determine the outcome of this issue are the following.

198. First, the real system in which this is to take place has a number of facets. The function of the poll trigger(s) is to operate periodically to ensure that resources are freed up, noting that these trigger(s) are not the only ways in which status reports occur in the system. They are part of a whole, fairly complicated arrangement. Some of what is going on can be considered with the following simple numbers. The number of sequence numbers available in the transmit window in LTE was 512 (being half the total of 1024 to avoid ambiguity). The roundtrip time varies but can be regarded as about 128 ms (in other words if everything works there may be about 128 ms between the transmitter triggering a poll and the transmitter receiving a status report). Given a maximum rate of PDUs of one PDU per TTI, that equates to 128 PDUs. So to take into account the round trip, the counter threshold for a PDU count may need to be at least lower than 384 (=512-128) so as leave enough time for the transmissions to continue until the status report is received. On the other hand the receiver has a gap detection mechanism which sends a status report when it detects a PDU is missing. The evidence was that about 1 in 100 PDUs may not be received by the RLC at the receiver. In fact, at a lower layer, there are more errors and so more PDUs are not received first time, however the HARQ mechanism in the MAC layer can resend a PDU up to three times. There is only a gap when the HARQ process

fails for a given PDU. So with 1 in 100 PDUs going missing at the RLC receiver, a gap detection triggered status report will be sent on average every 100 PDUs. Note that the occurrence of errors is not uniform and so one should not imagine this happens in a regular uniform way. When a status report arrives it will free up some resources at the transmitter without either a PDU or byte counter based poll having been necessary. On the other hand too many polls/status reports are themselves a waste of resources. So the skilled person also takes into account things like a poll prohibit timer at the transmitter and/or a status prohibit timer at the receiver. The point is that overall, the skilled person understood that there were a series of factors to balance and trade-offs to make.

199. Second, although I am not convinced it is as clear as Unwired Planet submit, that Motorola's byte counter proposal was completely rejected in 2007, even if it was not, the reaction to it from the group was not indicative that it was an obvious approach to use either on its own or together with any other triggers. It seems that Motorola proposed a byte counter again for the January 2008 meeting (the proposal was after the priority date) but even if that means Motorola then had the same idea as Ericsson, it does not show it was obvious.

200. Third, a telling point in the patentee's favour is that the common general knowledge did indeed include knowledge that variable sized PDUs in LTE made for a problem with two aspects, bytes and sequence numbers. Despite that common general knowledge the relevant committee having considered the issue in detail for many months were clearly thinking at the priority date that a single mechanism might well be all that was needed (see the editor's note in the draft standard). Viewed with hindsight knowledge of the invention that may seem illogical but it is not necessarily illogical at all. One can use a single mechanism such as a PDU counter even though the two resources are more or less independent. For example the threshold for the sequence numbers could simply be set at a level based on the largest size of PDU in bytes. Then when the threshold is reached a poll will be triggered before either resource has run out. The skilled person would understand that this means a poll may be triggered earlier than might have been necessary from the point of view of the memory resource, e.g. if the PDUs had been small in size, and so such an approach may be less efficient than others but having a single trigger has the benefits of simplicity. The witnesses all talked about the need for simulations and modelling to be run of whatever triggers were proposed. That indicates that the impact of these proposals such as these was not trivial to predict and that this was known. An aspect of this case which came across most clearly from the evidence of all three experts was the multifactorial nature of the issue under consideration and the subtlety of the thought processes required of those working in this field.

201. Fourth, nevertheless it was clearly obvious to consider both memory and sequence numbers, and it was also obvious that for a single trigger mechanism such as one based on sequence numbers to be viable, one had to take both resources into account. To understand why a single trigger mechanism may be an acceptable trade off, as explained above, the skilled person more or less inevitably has to have in mind the alternative of two trigger mechanisms, one based on either resource. However that is not enough to take the skilled person into claim 1. If the claim was broad enough to cover two triggers of any kind, window or counter, then on this reasoning it would very likely be obvious, but the claim is not so wide. It is limited to counters. This

part of the skilled person's thinking is not specific to windows or counters and cannot, on its own, render claim 1 obvious.

202. Fifth, there was a prevailing view that a window based trigger mechanism was likely to be the right way forward. It was understood to be more complicated than a counter but that complexity was an acceptable trade for its greater accuracy.

203. Sixth, Dr Cooper's evidence shows that the invention is based on a step which could well have been taken but I accept Unwired Planet's submission that this evidence was based on a step by step analysis. That does not mean it is of no relevance but his answers have to be seen in that light. I am struck by Mr Wickins' evidence. In my judgment those actually working on the problem at the time did not propose the invention because they missed it. That is evidence for the existence of an inventive step.

204. Standing back it seems to me that while there are good reasons why claim 1 could be arrived at by a skilled person, the evidence of what those skilled in the art actually did is relevant evidence of non-obviousness. I conclude that claim 1 is not obvious over the Motorola TDoc.

The draft LTE standard 3GPP TS 36.322 V.8.0.0.

205. This is a draft of the 3GPP RLC protocol specification for release 8, being the first version of the specification that was intended to apply to LTE. It was published in December 2007. It was the most recent version of the standard at the priority date.

206. Polling is dealt with by section 5.2.2 on page 19. It begins by explaining that, in acknowledged mode, an RLC entity can poll its peer RLC entity in order to trigger status reporting at the peer RLC entity. The section then identifies two potential polling triggers that the 3GPP committee had decided to support. These were "Transmission of last data in buffer" and "Expiry of poll retransmit timer". Dr Cooper explained that these triggers were not directed to use in continuous transmission.

207. The editor's note is on page 19:

> "It has been decided to support either a PDU count based polling trigger or Window based polling trigger in addition to the polling triggers indicated above.

208. Thus this document proposes a PDU based trigger, with a counter as one possible approach. There is no express reference to a byte counter. Huawei's case over this document is very similar to its case over the Motorola TDoc, as long as that document is construed as disclosing a byte counter.

209. If the Motorola TDoc had been construed to disclose a byte window instead of a byte counter, then the case over the draft standard might have added something material to Huawei's case. However I cannot see how claim 1 could be obvious over the draft standard if it is not obvious over the Motorola TDoc construed as a disclosure of a byte counter. I find claim 1 is not obvious over the draft LTE standard.

Samsung TDoc

210. The document is entitled "RLC transmitting/receiving window". It was presented for the Shanghai meeting of the committee in October 2007. The document describes the RLC transmission window in section 2.

211. The document shows a diagram (in colour) of the proposed RLC transmission window, which in effect consists of two windows:

212. The upper window relates to sequence numbers (SN) while the lower one relates to the bytes in the retransmission buffer. VT(A), VT(S), VT(MS) and VT(B) are proposed state variables which define these windows. The first three are the same as in UMTS. VT(A) is the lowest unacknowledged PDU sequence number. VT(S) is the sequence number for the PDU being transmitted and VT(MS) is the highest sequence number in the window of available sequence numbers. The proposed variable VT(B) represents the available space left in the retransmission buffer.

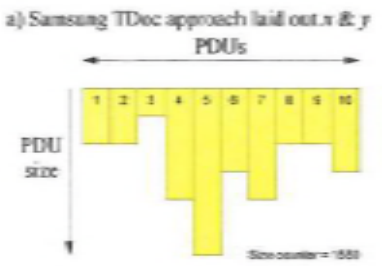
213. The Samsung TDoc proposes that

> "Transmitting entity shall not transmit RLC PDUs beyond the window, in other words RLC PDUs with higher SNs than VT(MS) shall not be transmitted and that RLC PDUs can not be transmitted when VT(B) is equal to zero."

214. The document goes on to consider the window at the receiver which is in a similar form. The proposal is to define a transmitting window in terms of both RLC SN space and buffer size. Other topics are mentioned, including a consideration from the point of view of the receiver that window based status reporting may be better than window based polling.

215. Samsung submitted that the document makes two important points. First it emphasises the potential for a stall in LTE both as a function of the sequence number limitation and as a function of the memory limitation. Second, it emphasises the two dimensions of what is transmitted; sequence numbers and bytes. Dr Cooper described the relationship as monotonic, i.e. as the number of PDUs goes up, then the amount of memory always increases too (albeit not necessarily by the same amount each time).

216. Dr Irvine provided an alternative representation of the two dimensional relationship in his first report. Dr Cooper agreed that this was another helpful way of visualising the relationship between sequence numbers and bytes for a particular sequence of PDUs. The representation is:



217. With that introduction to the document, I turn to consider obviousness. The skilled person and common general knowledge are the same as before. The Samsung TDoc does not make proposals for specific polling triggers at all. Therefore the difference between this prior art and the claim is that neither counter, of byte or PDUs, is disclosed.

218. Samsung submitted that claim 1 was obvious over the Samsung TDoc. In summary the argument is that it would be obvious to apply what is disclosed in the document to the design of polling triggers. It would be obvious from the document and the common general knowledge to poll against both the sequence number limitation and the buffer limitation in LTE. The skilled person would have both counters and window based poll triggers in mind from the common general knowledge when reading the document. In that case one obvious solution for the skilled person was to use a counter based mechanism for both the sequence number limitation and the buffer (counting bytes). Samsung submitted that Dr Cooper agreed that this was one obvious solution.

219. However Dr Cooper's evidence cannot be summarised in that way. The key part of the cross-examination on this point was as follows:

> Q. It follows, does it not, from that immediate realisation that the skilled person will have reading this document that he will also realise it will be necessary for him to take into account both of those potential stall situations when he is designing his polling triggers for LTE?
>
> A. That is correct.
>
> Q. One obvious solution available to him at the priority date is to poll against both the sequence number limitation and the buffer limitation. Correct?
>
> A. Both solutions are obvious. Individually, he would ask whether it is necessary to introduce both triggers, but he will certainly be aware of both triggers from his existing knowledge and might well contemplate that approach.

220. The first question and answer relate to the same point which has been made above relating to the Motorola TDoc. In this respect the Samsung TDoc does not add to the common general knowledge. The skilled person is well aware that they have to take into account possible stalls due to memory limitations and due to sequence number limitations.

221. What Dr Cooper was getting at in the second answer was that it was obvious to poll against one or the other trigger but the skilled person would ask if it was necessary to introduce both triggers. He accepted that they might well contemplate the approach of introducing both triggers. I think the transcript above does not completely convey the sense of Dr Cooper's answer, which is better conveyed with different punctuation as follows: "*Both solutions are obvious, individually. He would ask whether it is necessary to introduce both triggers, but he will certainly be aware of both …*". In any event his evidence is clear support for Samsung's case but it is not a concession that the claim is obvious. In that sense Dr Cooper's evidence is similar to his evidence in cross-examination over the Motorola TDoc.

222. Dr Irvine's evidence supported Samsung's case. He explained that the issue was to specify the ARQ protocol in the RLC. His view was that the skilled person would consider the existing polling mechanisms of UMTS as a legitimate starting point based on his common general knowledge, the draft LTE Standard available at the priority date still contained a number of gaps including in respect of the ARQ protocol, and the skilled person would consider the approach to polling triggers that had been adopted in UMTS when considering how to fill them. It was obvious to have both counter and windows based polling triggers in mind and the skilled person knew from the Samsung TDoc that the two different dimensions had to be considered.

223. Dr Irvine went on and gave evidence that if the skilled person did adopt counters, it would be obvious to reset them together but that aspect of the case relates to claim 9 and I do not need to consider it at this stage.

224. Unwired Planet pointed out that the Samsung TDoc, which is really focussed on the transmit window rather than directly on polling triggers, was sent to the committee along with another Samsung TDoc directly related to polling triggers (R2-074268). It submitted that the contemporaneous document did not propose the invention and so the court should infer Samsung missed the invention. Dr Irvine agreed that the other document represented an example of ordinary thinking at the time. There was a preference in the document for a window based trigger rather than a counter. Dr Irvine did suggest at one stage that Samsung proposed two dimensional polling but his evidence on this was not convincing. The contemporaneous document does not do that.

225. Despite the submission that I should not draw the inference that Samsung missed the invention, it seems to me to be a proper inference to draw. Samsung clearly understood the problem of two distinct resource limitations. The contemporaneous document is concerned with the very problem the invention relates to, polling triggers in UMTS. It can be taken to represent Samsung's view on polling triggers and status reporting triggers. The document makes various proposals for triggers but none of them are the invention. If those working inside Samsung did think of the invention at the time, they did not see fit to put it forward to the 3GPP committee.

226. Unwired Planet put to Dr Irvine that the art was well aware of the two causes of a stall and yet still proposed a single trigger. He accepted that that this did happen. Dr Irvine explained that the proposals for one trigger were the result of a push towards simplicity. The thrust of the proposals was to try and make things as simple as possible but no simpler, to try and minimise polling. Dr Irvine was clear that he did not accept that the thrust of the proposals was ever as extreme as to say that there

would only ever be one poll trigger. Nevertheless when he was asked directly why nobody suggested polling against the two dimensions, Dr Irvine's answer was telling:

> Q. We see that not one of the proposals is to poll against these two dimensions.
>
> A. That is right.
>
> Q. Why is that?
>
> A. Because if people had thought about the problem they probably thought that they could get a solution which was simpler by only looking at one of the dimensions.
>
> [T4/559]

227. In the end the argument over the Samsung TDoc is not materially different from the argument over the Motorola TDoc. What happened in the standard setting process is just as relevant to the one as to the other. Four of the factors I identified as important in relation to Motorola are the same: (1) the multi-faceted nature of the problem, (3) the fact the common general knowledge included knowledge of both causes of stall and yet so many of the actual proposals were for one trigger, (4) the claim is not as wide as covering just the two triggers, it is limited to two counters, (5) window based approaches were preferred.

228. The second factor (what did the committee actually do when presented with the document) works in the same way for Samsung as for Motorola. The Samsung TDoc was presented to the Shanghai meeting and yet the invention was not proposed. The sixth factor was focussed on the testimony of the two experts (Dr Cooper and Mr Wickins). Here I will focus on Dr Cooper and Dr Irvine. Again Dr Cooper's evidence shows that the step could have been taken by a skilled person but that is as far as it goes. Dr Irvine's view is that the invention is obvious but his testimony about what those in the field actually did is similar to that of Mr Wickins. It supports the existence of an inventive step.

229. There are many other points which are argued about the Samsung TDoc and it is true that it differs in detail from the Motorola TDoc but those differences favour the obviousness case over Motorola, since that document does at least disclose two counters, one of which is in the claim. The Samsung document is further away from the claim than the Motorola document. I find that claim 1 is not obvious over the Samsung TDoc.

Claim 9

230. Since claim 1 is not obvious, neither is claim 9.

231. In any case while the issue of obviousness over claim 1 is quite finely balanced, I was wholly unpersuaded by the obviousness case against claim 9 over any of the prior art on the footing that claim 1 was obvious. The argument that claim 1 is obvious, one way or another, involves the skilled person thinking that the two resources, memory and sequence numbers, are sufficiently distinct to be worth keeping track of

separately e.g. by two counters. The argument that claim 9 is obvious involves changing tack completely and saying that too many polls would be triggered by these two counters. The problem is one of superfluous polling. So one should have one mechanism resetting both counters when either counter triggers a poll. But if superfluous polling is a concern, I fail to see why it is obvious to count both things in the first place.

232. Note that two polls in swift succession are one example of superfluous polls but as the defendants clarified in a closing note, polls in swift succession are not the only example. Nevertheless the problem with the defendants' obviousness case remains. It does not depend on timing. It arises from the superfluous nature of the other poll which would otherwise be triggered.

233. It is true that there are advantages to counting both and using the claim 9 approach, as Dr Cooper explained and maintained in cross-examination, but the fact that advantages can be seen now does not mean they were obvious without hindsight. It is also true that the receipt of a status report triggered by one trigger (say PDUs) will free up both kinds of resource (bytes and sequence numbers) and so in a sense it can be said that one may not need to maintain the untriggered count after the first counter has triggered. However that idea represents the product of careful insight by the skilled person, not uninventive reasoning. Most important of all, there is no precedent for the idea of two counters being reset at the same time by the triggering of one of them. The defendants referred to the common general knowledge that a poll trigger such as a poll retransmission timer could be reset on the occurrence of another poll so as to avoid a further irrelevant poll. That example makes the point. It is only viewed with hindsight that any similarity between that and the invention can be seen. I was not convinced claim 9 was obvious.

Conclusion

234. The patent is valid and is infringed by wireless telecommunication networks which operate in accordance with the relevant LTE standard. Thus patent EP (UK) 2 229 744 is essential to standard 3GPP TS 36.322 release 8 version 8.8.0.