



Neutral Citation Number: [2023] EWCA Civ 758

Case No: CA-2022-001086

**IN THE COURT OF APPEAL (CIVIL DIVISION)**  
**ON APPEAL FROM:**  
**BUSINESS AND PROPERTY COURTS OF ENGLAND AND WALES,**  
**INTELLECTUAL PROPERTY LIST (ChD), PATENTS COURT**  
**Mr Justice Meade**  
**[2022] EWHC 561 (Pat)**  
**HP-2019-000006**

Royal Courts of Justice  
Strand, London, WC2A 2LL

Date: 04/07/2023

**Before:**

**LORD JUSTICE NEWEY**  
**LORD JUSTICE ARNOLD**  
and  
**LORD JUSTICE BIRSS**

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**Between :**

**Optis Cellular Technology LLC and Ors**  
**- and -**  
**Apple Retail UK Limited & Ors**

**Respondents**  
**Appellants**

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**Lindsay Lane KC, Jeremy Heald** (instructed by **Wilmer & Hale**) for the **Appellants**  
**Tom Hinchliffe KC, Jennifer Dixon** (instructed by EIP) for the **Respondents**

Hearing dates: 16, 17 & 18 May 2023  
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**Approved Judgment**

This judgment was handed down remotely at 10.30am on 4 July 2023 by circulation to the parties or their representatives by e-mail and by release to the National Archives.

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**Lord Justice Birss:**

1. This appeal concerns two patents said to be essential to the 4G LTE mobile telephony standard. They are EP (UK) 2 187 549, entitled “Radio communication device and response signal diffusion method”, and EP (UK) 2 690 810, entitled “Radio communication device and response signal spreading method”. The 810 patent is a divisional of the 549 patent. The patents claim priority from a Japanese filing dated 13<sup>th</sup> August 2007. The patents belong to the respondent, Optis. Following a trial in January 2022, Meade J gave judgment on 15<sup>th</sup> March 2022 ([2022] EWHC 561 (Pat)) holding that the patents were both valid as amended, essential to the relevant standard, and infringed by the mobile telephones of the appellant (Apple). The appellant appeals with the permission of the judge.
2. The patents are concerned with an uplink control channel in LTE called the Physical Uplink Control Channel (PUCCH). This channel is used by mobiles to send two kinds of signal to the base station. One is called an ACK/NACK and indicates whether a packet of data previously sent by the base station to the mobile has been accurately received (ACK) or not (NACK). The other is called CQI (which stands for channel quality indicator) and signals the quality of the downlink channel from the base station as received by the mobile. That information helps the base station allocate optimal resources to downlink communications. Control signalling on the PUCCH is sent via resource blocks which are shared between mobile phones. In other words these control signals from multiple mobiles are sent using the same set of resources controlled by the base station.
3. The claims are directed to so called “mixed resource blocks” (or MRBs). These are resource blocks which contain both ACK/NACK and CQI signals, whereas by contrast “dedicated” resource blocks contain only one kind of signal. Since a given mobile will only transmit one kind of signal, ACK/NACK or CQI, at one time, a mixed resource block will necessarily involve signals from different mobiles. This can lead to problems of interference between the signals, and the claims provide for the use of sets of rules which include restrictions to separate out the signals so as to keep the risk of interference at an acceptable level and allow the base station to distinguish the messages.
4. The claims in their amended form refer to the set of rules as a “code multiplexing structure”. The effect of the rules can be explained using a pattern, examples of which are shown in the figures of the patents. The key decisions, such as whether to use mixed resources blocks at all and, if so, which particular code multiplexing structure to use, are made by the base station. Nevertheless the claims in issue in this case are claims to the mobile itself. The main issues on this appeal arise from that.
5. Although mixed resource blocks are required by the LTE standard, and are used in some countries, they are not used in the UK. Broadly the reason is because of the way radio spectrum bandwidth is allocated to network operators here, but the details do not matter. Therefore a method implementing the inventions will not be in use in the UK. However, as the judge held, the patent claims mobiles adapted to use this system and the appellant’s mobiles are so adapted. An issue on appeal is whether these conclusions are correct. What is not in dispute is that the appellant’s mobiles need this capability in order to be compliant with the relevant standard. Moreover it is also not in dispute that the relevant mobiles will operate in the right way if they are taken abroad to a place

in which the mixed resource blocks are in operation. In other words for the mobiles to be able to “roam” to other places, they need to have that capability.

6. The judgment, rightly, covered a lot of ground and handled numerous issues, many of which do not arise on appeal. Before this court the application to amend the claims is no longer in issue and we can take the claims as amended. Moreover significant parts of the obviousness case in issue below are not in issue before this court. This appeal relates to three topics:

- i) Claim construction. The question is whether, as the appellant contends, the relevant claims (of 549 and 810) are limited to mobiles when they are using the relevant technique or are wider. There is also an issue, if the wider construction is adopted, whether the appellant’s mobiles satisfy the claim.
- ii) Anticipation. The question is whether, if claim 1 of 549 is construed widely, as the respondent contends and the judge held, it lacks novelty over prior art referred to as “Nokia”. Nokia is paper R1-073006 produced for a June 2007 meeting (3GPP TSG RAN WG1 #49bis) of the relevant standard setting group.
- iii) Construction and obviousness of claim 1 of the 810 patent. The issues here relate to a technique called implicit signalling and to a document referred to as the “Kobe agreement”. The Kobe agreement is another, earlier, document arising from the same standard setting process. It is a draft report or in effect minutes of the May 2007 meeting of the same group (Paper R1-072646 3GPP TSG RAN WG1 Meeting #49b).

7. Claim 1 of the 549 patent (as amended) is in the following form. The labelling of the integers is the same as below.

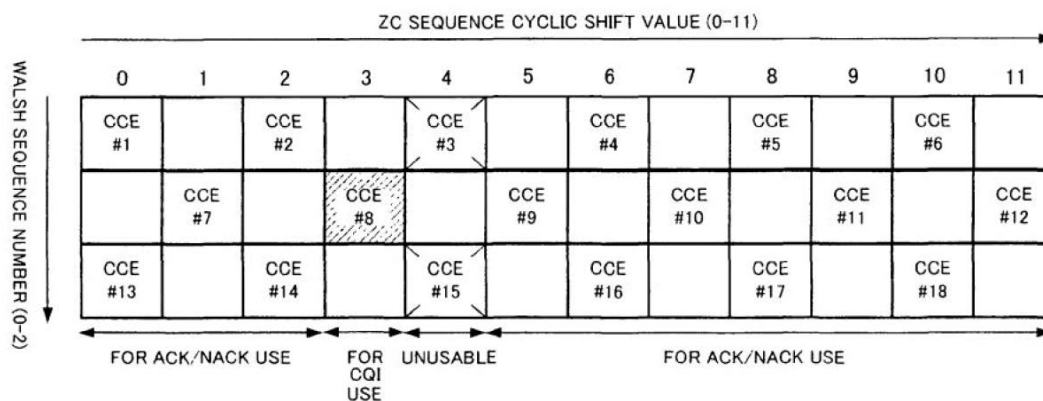
- 1 (a) A radio communication apparatus of a mobile station adapted to spread and transmit an ACK/NACK signal or a CQI signal in accordance with a code-multiplexing structure for code- multiplexing ACK/NACK signals and CQI signals from a plurality of mobile stations, the radio communication apparatus comprising:
  - 1 (b) a first spreading unit (214) adapted to spread the ACK/NACK signal with a sequence defined by one of twelve cyclic shift values, the sequence being one of twelve sequences that are mutually separable because of mutually different cyclic shift values of the twelve cyclic shift values;
  - 1 (c) a second spreading unit (219) adapted to spread the CQI signal with a sequence defined by another one of the twelve cyclic shift values, the sequence being another of the twelve sequences;
  - 1 (d) a third spreading unit (216) adapted to spread the ACK/NACK signal, after the ACK/NACK signal has been spread with the sequence defined by one of twelve cyclic shift values, with a sequence that is one of three orthogonal sequences that each have a different respective orthogonal sequence number of first, second and third orthogonal sequence numbers;
  - 1 (e) a control section adapted to:

control the spreading of the ACK/NACK signal by the first spreading unit (214) by setting a code-multiplexing cyclic shift value, of first cyclic shift values for spreading ACK/NACK signals, in accordance with the code-multiplexing structure;

- 1 (f) control the spreading of the CQI signal by the second spreading unit (219) by setting a code-multiplexing cyclic shift value, of second cyclic shift values for spreading CQI signals, in accordance with the code-multiplexing structure; and
- 1 (g) control the spreading of the ACK/NACK signal by the third spreading unit (216) by setting a code-multiplexing orthogonal sequence number, of the first, second and third of orthogonal sequence numbers, in accordance with the code-multiplexing structure; and
- 1 (h) a transmitting unit (223) adapted to transmit the ACK/NACK signal, and adapted to transmit the CQI signal,
- 1 (i) characterized in that said first spreading unit (214), in each symbol that forms the ACK/NACK signal, uses said code-multiplexing cyclic shift value of said first cyclic shift values, and said first cyclic shift values form a portion of the twelve cyclic shift values, for the ACK/NACK signal;
- 1 (j) said second spreading unit (219), in each symbol that forms the CQI signal, uses said code-multiplexing cyclic shift value of said second cyclic shift values, and said second cyclic shift values are not within the portion of the twelve cyclic shift values, for the CQI signal; and
- 1 (k) a cyclic shift value between the first cyclic shift values and the second cyclic shift values is not used for either the ACK/NACK signal or the CQI signal,
- 1 (l) wherein the first cyclic shift values for spreading ACK/NACK signals and the first, second and third orthogonal sequence numbers are arranged in a 2-cyclic shift interval mesh structure in the code-multiplexing structure, according to which ACK/NACK signals for which the second orthogonal sequence number is set have 2-cyclic-shift-interval cyclic shift values set that are offset by one cyclic shift value with respect to 2-cyclic-shift-interval cyclic shift values that set for the ACK/NACK signals for which the first and third orthogonal sequence numbers are set,
- 1 (m) the CQI signals in the code-multiplexing structure are not spread with any of the orthogonal sequences, and
- 1 (n) the unused cyclic shift value is positioned after an immediately preceding cyclic shift value for spreading CQI signals, and before an immediately subsequent cyclic shift value for spreading ACK/NACK signals, in the code-multiplexing structure,
- 1 (o) so that a minimum value of a difference in cyclic shift values between the CQI signals and the ACK/NACK signals, after said immediately preceding cyclic shift value in the code-multiplexing structure, is equal to the 2-

cyclic-shift interval in cyclic shift values between the ACK/NACK signals in the mesh structure.

8. The claim is lengthy but the judgment accurately summarises what is claimed in paragraphs 206 to 218. Summarising even further, the claim amounts to the following. It is a claim to a product – a mobile. The mobile will spread and transmit ACK/NACK and CQI signals, although not both at once. The detail of what “spreading” means in this context does not matter. What one needs to know is that spreading a signal involves applying a code to that signal. The signals will be spread in accordance with a code multiplexing structure (CMS). A CMS is a set of rules which determine what a mobile is to do with ACK/NACK and CQI signals. The set of rules can be depicted in a grid or mesh pattern such as in figure 10 of the patent (below). The claim uses the term “mesh structure” for that reason.
9. An ACK/NACK is spread in one way using a code called a ZC/CAZAC cyclic shift, and there are twelve options for that. It is also spread in another way using a Walsh code. There are three options for that. The claims use generic functional language (code multiplexing cyclic shift value and orthogonal sequence number) instead of the terms ZC/CAZAC and Walsh respectively but like the judge I believe it is more understandable to use those terms. There are other terms used elsewhere in the argument but I will stick to these two expressions.
10. The claim calls for a “2-cyclic shift interval”. This means that for a given Walsh code (e.g. sequence number 0) and a given ZC/CAZAC code (e.g. shift value 0) the next ZC/CAZAC code to be used, when the same Walsh sequence is used, will be 2 cyclic shifts from that first given ZC/CAZAC code. So in this example the next ZC/CAZAC code to be used this way would be shift value 2.
11. Where a CQI is multiplexed it only uses a ZC/CAZAC code and not a Walsh code. The claim also requires that the cyclic shift following a CQI is not used at all (i.e. neither for another CQI nor for an ACK/NACK).
12. Claim 1 of the 810 patent is set out fully below but at this stage it is worth identifying the concept it adds to claim 1 of 549, which is a reference to the way the mobile receives control information. The 810 claim requires the relevant cyclic shift to be determined by signalling to the mobile from the base station. The claim refers to the use of a “control channel element” or CCE. This CCE is a feature of control signalling on the downlink from the base station. Subject to a point in construction which will be addressed in due course, the 810 claim relates the CCE(s) received on the downlink by the mobile to the particular place in the mesh structure (in other words the combination of ZC/CAZAC and, where relevant, Walsh codes) which the mobile should use to multiplex its ACK/NACK or CQI signal.
13. Figure 10 embodies all of this, as follows:



14. The final point worth making at this stage is that one can now see that a CMS is an abstract logical structure, or putting it another way, a set of rules (judgment paragraphs 242/243). The rules of the CMS called for by these claims specify both what must be done in certain circumstances, and also what must not be done (e.g. the non-use of a cyclic shift after a CQI).
15. The reason for doing things this way is to mitigate the risk of various kinds of interference. For example a 2-cyclic shift for the ZC/CAZAC codes has the effect of separating signals in time. There can be circumstances in which the timing of signals from different mobiles can drift relative to one another such that if one did not use the 2-cyclic shift, signals from different mobiles with adjacent ZC/CAZAC codes could arrive at overlapping times at the base station and interfere with one another. There is a conceptually similar risk of interference in a vertical sense looking at the grid diagram of fig 10 above, which is why the pattern has spaces above and below the blocks which are used. As mentioned already, the reason for the unused column in the diagram is because CQI signals are only spread with ZC/CAZAC codes and not Walsh codes and so to prevent the CQI from interfering with a following ACK/NACK the whole column is not used.

*Claim construction – “adapted”*

16. The issue can be addressed by considering claim 1 of 549. The appellant contended at trial that the relevant claim does not simply require that the claimed device has to be capable of doing the things required in the right circumstances, but that the claim required the device to be actually doing those things. Thus on the appellant’s case the CMS has to be in existence to satisfy the claim. In other words a mobile capable of operating with the required CMS would not be within the claim while it was not doing so. It would fall within the claim once the relevant CMS was in use but only for as long as that was in use. The judge rejected the appellant’s submission and held that the claim was to a mobile capable of doing what was required and so, provided it was indeed capable of doing the right thing in the right circumstances, a mobile would be within the claim irrespective of whether the relevant CMS was in fact in use at the time.
17. The forensic objective of the appellant’s submission is clear enough. Since mixed resource blocks are not in use in the UK, if the claim is limited to a device when the CMS is in use, then no mobiles in this country would infringe. The appellant’s point is that that is entirely sensible since, after all, the relevant aspect of the standard is not in use here.

18. A very similar claim construction argument succeeded at first instance in *Coflexip v Stolt* but was overturned on appeal at [2000] EWCA Civ 242 paragraphs 24-27. There the Court of Appeal held that claim 3 to a “device for operating” a method according to previous claims 1 or 2 did not mean only that claim 3 was limited to the device when the method was in use. On the contrary claim 3 meant a device “suitable for” operating the relevant method. In other words, claim 3 would cover a suitable device whether the method was in fact in use or not, as long as the device was in fact suitable. Otherwise the result would be that there was not really a device claim at all despite the clear intention of the patentee to have one. The fact this made the claim wider, and potentially vulnerable to an obviousness attack, was irrelevant.
19. *Coflexip* is illustrative but cannot be taken too far. That is because in the end the issue is always and only a matter for the true construction of the patent in question.
20. In paragraphs 247-253 the judge considered and rejected six reasons advanced by the appellant as to why the claim was not simply to a mobile suitable for doing the relevant thing when that thing was necessary, but, as the appellant submitted, required the CMS actually to be in existence. The first to fourth reasons involved considering the nature of the invention, the claim language, and parts of the specification. These were the judge’s main reasons and they are addressed in the appellant’s appeal, which I will consider below. The fifth point (paragraph 252) was a consequentialist argument, suggesting that the wide construction could lead to invalidity over Nokia. I agree with the judge that this argument does not have traction in this case as a point on construction. The claim as construed by the judge may turn out to lack novelty over Nokia and that is addressed below, but as the judge held the potential for that invalidity is not at all apparent from the patent, read by the skilled person in the light of the common general knowledge. Unless such a potential consequence would be apparent to the skilled reader, such a factor plays no part as a guide to construction of the claim. The sixth point was an alleged lack of clarity, which the judge rejected and which has not been appealed.
21. Before this court the appellant advances three reasons in support of its construction of the claim, and which are said to show how the judge erred in construing the claim. They are (i) the wording of the claims, (ii) the wording of the specification and (iii) the nature of the invention. I will take them in turn before looking at the construction as a whole.

*(i) Claim wording – “adapted” and “uses”*

22. Much of the claim is based on what patent law jargon calls “means plus function” language. A thing is defined by its ability to perform a function, i.e. being a thing for doing something. A claim to a mouse trap written this way could be written as “means for killing a mouse”. Conventionally this would be understood as a claim to any means suitable for performing that function.
23. The appellant draws attention to the fact that the means plus function language in the claim uses the expression “adapted to” six times in the pre-characterising portion of the claim (features 1(a), (b), (c), (d) and (h)), but then in the characterising portion the means plus function language changes to the expression “uses”. It does not (for example) say “adapted to use”. This use of “uses” appears in features 1(i) and (j), and there is a corresponding use of “is not used” in feature 1(k).

24. The submission both here and below is that the word “adapted” in the pre-characterising portion has its usual meaning of suitable for or capable of, and so does not require that the method is in use at the time, but the language in the characterising portion is said to mean that the CMS would be in use (and therefore in existence) at the relevant time. A development of the appellant’s point is to rely on the structure of the language, based on the EPO drafting convention from which this derives. Following the drafting convention, the pre-characterising portion of the claim is meant to represent the prior art and the characterising part describes the novel features over and above what is already known. So says the appellant in this case this would be understood to contemplate that mobiles capable of doing the tasks referred to in the pre-characterising part were known but what makes the mobile new and inventive is actually using the claimed CMS.
25. Starting with the language itself, the word adapted in feature 1(a) and the reference there to the CMS naturally means that the mobile has to be adapted, i.e. suitable, to work with that structure if that structure is present (as the judge held in paragraph 250). There is no reason to read “adapted” in the claim as having anything other than its usual meaning. As the judge also held in that paragraph the CMS is a logical structure created by the network, in effect a set of rules.
26. Turning to the word “uses”, read in context it would be understood as referring to what is to happen if and when the mobile actually does the spreading and transmission required by the claim (as the judge held at paragraph 251). That is a perfectly natural reading of these words. It also has the advantage of making the claim consist of features which define a product by its properties – which is what a skilled reader would expect to find – rather than limiting the definition in time so that the same product might sometimes be within the claim (when the CMS was in use) but other times not be (when it is sitting in a shop ready to be sold). A skilled reader (at least at the priority date) would not know whether this invention was in fact essential to the LTE standard. Nevertheless they would understand that this was meant to be a definition of a product for use in a standardised telecommunications scheme. The reader would expect the person drafting the patent to have used language to claim a mobile which had the capability to work in accordance with a given standard if they could. It would need very clear indications to the contrary and there are none here.
27. Furthermore the appellant’s argument also breaks down when one appreciates that a mobile is not expected to do both 1(i) and 1(j) at the same time (and the skilled reader would appreciate that). Feature 1(i) is about transmitting an ACK/NACK signal and feature 1(j) is about a CQI. But when the CMS is operating these are sent by different mobiles. Therefore for these two features to characterise a single mobile (which is what the claim plainly requires) they must refer to what that mobile will do in certain circumstances and not to what it is doing at any given moment. This shows that even the appellant’s construction requiring that the CMS must be “in existence” only works if these terms are read as referring to the capabilities of the mobile. To make sense the word “uses” has to refer to what will happen if the mobile is sending an ACK/NACK or a CQI. In that case these features have the meaning found by the judge and there is no hook on which to hang the reading in of a further limitation that the CMS has to be in existence.
28. The claim also contains negative features as well as positive ones. As well as stating what must be used in two circumstances (in features 1(i) and 1(j)) the claim also



expressly requires the mobile to not do something – the cyclic shift preceding the one for a CQI “is not used” (feature 1(k) and see also feature 1(n)). This property only makes sense as a capability of the claimed mobile.

29. The other aspect of this argument is the point about the characterising language. This does not help for two reasons. The relevant EPO Guidelines indicate that this drafting structure is to be used unless “inappropriate”. However as an aid to construction it is very weak because one cannot assume that the person drafting the claim intended that all the features of the pre-characterising part are in the prior art. That is because the EPO Guidelines also make clear that a patentee can insist on having features in that part of the claim which are not in the relevant prior art (March 2023 Part F Chapter IV paragraph 2.2). Without that assumption, the premise of using this as an aid to construction breaks down. Secondly, once claims are amended after grant (as here), the constraints on amendment undermine the strength of any inference drawn from that claim structure. To satisfy the requirements of clarity and added matter, an amendment might well put words describing prior art features into the characterising portion or features said to be inventive in the pre-characterising portion.
30. Finally the argument does not work anyway because the characterising portion of the claim is the place which specifies the idea of an unused cyclic shift value after the cyclic shift for spreading CQI signals and before any further cyclic shifts for spreading ACK/NACK signals. On any view, reading the patent as a whole this is one feature which the document presents to the reader as novel over the acknowledged prior art. Therefore irrespective of the debate about “uses” as opposed to “adapted”, the characterising portion can be understood as containing a feature which the document presents as novel over the prior art. That may turn out to be right or wrong but as a matter of discerning the intention of the person drafting the document, it does not suggest any reason to read “uses” in one way or another.
31. Finally, before leaving the claim language itself, it is also worth dwelling briefly on certain other aspects. At paragraph 244 the judge held that the claims did not require the CMS to be present on the mobile device in order for the mobile to be adapted to spread and transmit signals in accordance with the relevant CMS. The mobile device might have some simple procedural code without having the whole map. The paragraph also holds that a mobile which was programmed to put ACK/NACKs or CQIs in places which the CMS did not permit would not be “adapted” in the relevant sense, and would be outside the claim. I agree with both conclusions.
32. Then at paragraph 245 (i) the judge held that the claim did not require that a mobile had to use the same CMS all the time or could only be adapted to use one. I agree. The appellant relies on this conclusion later in the arguments (see below).
33. At paragraph 245 (ii) the judge addressed the question whether one could test the claim by looking at only part of how a given set of rules operated at a given moment, a particular example being if there were only a certain number of mobile devices present in a cell at a given moment. The argument was that one could take a prior art set of rules and compare what would happen if there were only (say) six mobiles in a cell at a given time. The pattern of code usage presented by that partial application of the prior art set of rules could then be shown to be the same as the pattern applicable following the CMS of the claim, albeit that if circumstances changed, e.g. the number of mobiles in the cell increased, then a mobile following the prior art set of rules would put an

ACK/NACK or CQI in a place forbidden by the claimed CMS. The judge's finding was to reject this as a legitimate approach. To be a CMS within the claim the whole set of rules has to satisfy the claim. Again this point will come up below.

*(ii) The specification – “conventional” and paragraph [0069]*

34. The second point is based on two inferences from the patent specification. The first inference said to support the appellant's claim construction is based on the fact that the patent describes a particular figure (Fig 7) as “conventional” and so, it is argued, the only claim features which make a mobile any different from that “conventional” (i.e. prior art) approach would be features in the characterising part of the claim, construed as the appellant submits.
35. A detailed description of what Fig 7 actually shows is not relevant. Briefly it depicts a kind of CMS which is close to but outside the claim. The CMS of Fig 7 does not have the unused cyclic shift values after the CQI cyclic shift.
36. The judge rejected the submission based on Fig 7, noting that Fig 7 is not in fact prior art and not part of the common general knowledge (paragraph 227(ii)). The judge was clearly right about that, and in my judgment that is sufficient to dispose of the argument. The skilled reader would just take the label “conventional” to be a mistake and not something which would bear any weight in considering construction.
37. Moreover, as the respondent also submitted, the argument also involves a repeat of the first point about the claim wording. The claim language will distinguish a mobile from the mobile running the CMS of Figure 7 on any view and so reliance on Fig 7 does not assist the appellant.
38. The second inference relates to paragraphs [0063] and [0069] of the patent. These state in terms that for certain respective embodiments (2 and 3), a base station and a mobile according to that embodiment have the same kind of configurations as a base station and a mobile of embodiment 1 of the patent and “differ only in regard to part of the processing performed by the control channel allocation section (control channel allocation section 102 shown in Fig 8)”. The appellant submits that this means that the patent is stating in terms that the only difference between the base station and mobile according to the different embodiments is in the processing performed within the base station. Thus the differences between the CMSs of the various embodiments (only two out of three of which fall within the claims) do not give rise to functional differences within the mobile itself. The base station decides on the codes to be used by the mobiles under its control, and the mobile simply responds to the instructions sent to it by the base station.
39. In my judgment this is the appellant's best point. It is at least capable of supporting the idea that if the mobiles in these different cases do not differ in their configuration at all and all the differences are in the base station, then perhaps the claim to a mobile should be read as referring to a mobile when the relevant CMS is in operation. Part of the appellant's argument on this here and below was that the respondent had to assert that paragraph [0069] in particular had to be wrong in order to support its interpretation of the claims.

40. The judge rejected the argument. Before the judge the issue arose in two contexts although on appeal there is only one. One was in the context of clarity of claim amendments (judgment paragraphs 434-436) and the other was in construction (paragraph 249, which refers to the logically prior paragraphs 434-436 albeit they are situated later in the judgment). Taking the passages together I summarise the judge's reasoning, which I agree with, as follows. Paragraph [0069] does not say, but it is self-evident that, the mobile will have to process different commands from the network if those commands vary. The skilled person would think so (and there was evidence of that from the experts which the judge was entitled to accept). Therefore it is true that a mobile in accordance with one of these embodiments will only differ a little from a mobile of one of the others, but they will differ. So a mobile which can only operate in accordance with Embodiment 3 (outside the claims) will not infringe. Paragraph [0069] is not erroneous, at most it is just unclear to a minor degree in not pointing that out, but the skilled person would understand in any case.
41. Therefore paragraphs [0063] and [0069] do not support the appellant's claim construction.

*(iii) Nature of the invention*

42. The appellant argued here and below that the invention is about the coordination by the base station of the use of uplink code resources by multiple mobiles so that all of their signals are able to be received without interference at the base station. Thus, what matters for the invention, is not just the code resource being used by one mobile but the fact that it is using a code resource that is sufficiently distinct from that being used by all the other mobiles using the same resource block. Thus, it is said, bearing this in mind the claims have to be limited to mobiles when the relevant CMS is actually in use because otherwise the advantages of the invention are not achieved. To illustrate this, for example, a mobile cannot achieve the advantages of the invention if it is used in a network where MRBs are never used. The inventor's purpose and the level of generality of the invention are key matters to which regard must be had when construing the claims and the judge erred in failing to do so.
43. I am not convinced. The flaw in the appellant's case is not in the high level summary of what the invention is about. It is indeed about coordination of resources to prevent interference between multiple mobiles. The flaw is in the deployment of that point on this narrow issue of claim construction of the claims to a mobile. The simple answer is that the high level summary of what the invention is concerned with and its advantages does not demand that the mobile device claim should be understood as limited to the device when the relevant CMS is in operation. That is because a mobile capable of doing the right thing in the right circumstances is itself a useful object, worth claiming, and something which takes advantage of the invention. That is the point of the mobile telecommunication standards. Even if only some networks deploy a particular feature and others do not, to be a device in accordance with the standard the device must be capable of acting appropriately in the right circumstances. As the judge held at paragraph 248 the appellant's point provides no reason for what is an unusually restrictive approach to "adapted".

*(iv) Overall construction of "adapted"*

44. I have addressed the appellant's three points individually because it is convenient but reflecting on them together does not assist the appellant either. Looking at the exercise as a whole, in my judgment the right construction of claim 1 of the 549 patent is the judge's construction. The mobile device must be capable of operating with the relevant CMS when required to do so but is not limited to a situation in which that CMS is in fact in use.

*Are the mobiles in fact adapted?*

45. The final aspect of this part of the appeal is the appellant's contention that on the construction the judge arrived at (now upheld) the judge erred in concluding that the appellant's mobiles are in fact adapted for use with the relevant technique.
46. Although presented a little differently in argument, this point is also, and only, a question of claim construction. I say that for two reasons. Often infringement will involve questions of fact, but there are none in issue here. There is no dispute about how the mobiles work or what happens in various circumstances. Secondly, much of the debate focussed on the judgment of the Court of Appeal in *IPCom v Vodafone* [2021] EWCA Civ 205 (Arnold LJ gave the leading judgment with which Lewison and Asplin LJ agreed). I will address *IPCom* below but the argument illustrates the problems which can arise when addressing issues of construction, of drawing comparisons between the facts of one case and another.
47. The judge held that the appellant's mobiles are adapted for use with the relevant technique. His reasoning is in paragraphs 279-289, concluding as follows:

“288. So overall taking into account the disclosure of the Patents and the general approach to “adapted to” claims, I conclude that the right approach to the claims of the Patents is to ask if the mobile, without reprogramming, would spread and send the ACK/NACK or CQI signal if a CMS as defined were present. But it is not necessary for the CMS in fact to be there.

289. An Apple phone would, without reprogramming, function properly in the example above where  $N_{cs}^{(1)} = 4$  and  $\Delta_{shift}^{PUCCH} = 2$ , which represents, on my findings a CMS within the claims of the Patents. So there is infringement arising from compliance with the standard in this way, and the Patents are essential.”

48. The parameters mentioned in paragraph 289 ( $N_{cs}^{(1)}$  and  $\Delta_{shift}^{PUCCH}$ ) are settings broadcast by the base station in a given cell. There is not (now) any dispute that when  $N_{cs}^{(1)}$  is set to 4 and  $\Delta_{shift}^{PUCCH}$  is set to 2 the cell will be using a CMS called for by the claims. These two parameters are never set this way in the UK but, for example, imagine someone who boarded a flight in the UK, turned off their mobile, arrived in the airport of a country which did use MRBs, and turned on their mobile. Assuming  $N_{cs}^{(1)}$  was set to 4 and  $\Delta_{shift}^{PUCCH}$  was set to 2 in the relevant cell at the foreign airport, the person's mobile would automatically behave appropriately without anyone having to do anything. Hence the mobile is one adapted to do what is required.

49. The point on appeal is about the word “reprogramming” in the judgment (see e.g. quoted paragraphs 288, 289 above). To address it one needs to take a step back. In *IPCom* and in an earlier decision of mine cited in *IPCom, Philips v Nintendo* [2014] EWHC 1959 (Pat), the question arose how to approach claims written using means plus function language in the context of programmable computer systems – like games consoles (*Philips*) or mobiles (*IPCom*). The claims in this case relate to a mobile defined by reference to its capacity to carry out a function (operate in accordance with a relevant CMS). The dilemma such language can raise in the context of computers is that a general purpose computer without the relevant programming could still in a sense be said to have that capacity (see *Philips* at paragraphs 98-104). In *Philips* I held that the answer was that the fact that a general purpose computer could be programmed in such a way as to make it suitable for carrying out the function did not mean that a general purpose computer on its own was itself suitable for carrying that function. Until the software was installed, it was not.
50. The issue came up again in *IPCom*. Here the claim was directed to a scheme in a telecommunications system in which a certain class of users, such as the police, would get privileged access to the network resources, in preference to other users. Such a scheme could be useful in an emergency. The patent had method claims and product claims. The relevant product claim called for a telecommunications system with a base station “set up to send” the relevant signals whereby the privileged access system would operate. The scheme was not normally in use in the UK. To put the scheme into practice a series of steps had to take place to alter the behaviour of base stations from their normal operation. The steps started with actions by a Vodafone engineer logging in to the network management software and choosing certain access classes. Once those steps were complete the relevant base stations would behave as required. At first instance the judge accepted Vodafone’s case that the change to put the scheme into practice required reprogramming the base station and so a base station in its normal state was not adapted to perform the relevant function and did not infringe. The change was not akin to simply switching on a device which was otherwise adapted to do what was required. On appeal the patentee argued that this was wrong because no actual “reprogramming” was required. All that was needed was to change certain settings in a base station. That did not amount to reprogramming and so a base station in its normal state was within the claim. The Court of Appeal dismissed the appeal. Arnold LJ held that the term “reprogramming” was not an accurate way to describe what was going on. The judge had also elsewhere in his judgment (Annex 2) characterised it as “changing the settings” and that was an accurate description. However even described that way the Vodafone base stations in normal use did not infringe. The key passage is paragraph 117 of Arnold LJ’s judgment, as follows:

“117. In my judgment the language which the judge used in Annex 2 is more accurate, as can be seen from Vodafone’s own summary quoted in paragraph 107 above. Even so, I do not accept IPCom’s argument that “chang[ing] the settings” of the base stations is equivalent to the scenario considered by Birss J in *Philips v Nintendo*. In that case, all that had to be done was for the apparatus to be switched on, at which point the software would be loaded into memory and would start running, when it would satisfy the functional requirements of the claim. In the present case, the settings of the base stations had to be changed

by the operator in order to make the base stations operate in a different way. This is true whether the settings were changed using LIMA, a different tool or manually. It is true that the base stations were capable of altering their mode of operation so as to send the relevant signals as soon as their settings were changed, but without that change the base stations could not operate in Annex C mode. I do not accept counsel for IPCom's submission that this is analogous to a radio which has a switch to change from mono (non-infringing) to stereo (infringing), because in that scenario there would be infringing circuitry present at all times even if it was not in operation at any particular time. In my judgment the judge was therefore correct to conclude that in normal use the base stations were not appropriately programmed or adapted or configured to send the barring parameters.”

51. The appellant in the present case sought to draw an analogy between the base stations in *IPCom* and the mobiles in the present case. I put the analogy this way. The fact that the Vodafone base stations in *IPCom* had the capacity to operate in accordance with the relevant method once their settings were changed appropriately as a result of a series of steps kicked off by a network engineer is (it is said) the same as the fact that a mobile in the present case in normal use in the UK has the capacity to operate with the relevant CMS method once its settings are changed appropriately as a result of a series of steps kicked off by a network engineer in the UK choosing to implement MRBs in this country. So if the former base stations do not infringe a claim construed as referred to a thing adapted to do the right thing, so too must the mobile not infringe the claims in this case which have the same meaning.
52. In my judgment this analogy is not a valid one and the judge in the present case was right to reject the appellant's argument for non-infringement and conclude that the mobiles here infringed and are essential to the standard. My reasons are as follows.
53. Starting with the present case, the skilled person reading the patent would have no difficulty seeing that the fact the mobiles are capable of operating in accordance with the relevant CMS when required to do so was meant to mean that they satisfy the claim. The skilled person understands that the claim is to a feature of a telecommunications standard which feature may or may not be put into use in certain circumstances. The standard is meant to be one with wide application and a mobile is intended to be able to move from one cell in which relevant circumstances may not be in place into a cell in which they are. What the claim is getting at is that the mobile needs to be capable of doing what is required automatically when it receives the right signals from a base station.
54. Moving to *IPCom*, I respectfully agree with the conclusion in that case that a base station in normal use, which will never send the relevant signals without a change to its settings which will only occur as a result of a series of steps initiated by an engineer's manual intervention is not a “base station that is set up to send” the relevant signals (those being the words of the claim).
55. A critical difference between these cases is that the present case is about mobiles whereas *IPCom* is about base stations. As the skilled person understands, in normal use the mobile is designed to move between cells and to respond in an appropriate way

automatically. The automatic exercise of the capability to work with a relevant CMS is part of the mobile's normal use. It makes sense for a patent claim to a mobile to be satisfied by a facility of the mobile to operate in that fashion. However a base station does no such thing. It is not a physically mobile object and does not move between cells as part of its normal operations. That is why it makes sense to the skilled person that the claim in *IPCom* would not be understood to cover a base station in normal use even though all that would be needed to turn it into a base station which did the right thing was a change to settings initiated by an engineer. Until the engineer did what was required the base station was not set up to send the right signals.

56. All three of *Philips*, *IPCom*, and the present case are ultimately concerned with the true construction of the patent claims in issue in them (all of which differ), applied to their own particular facts, again which are all different. One needs to be wary of putting too much stress on the similarities and differences between expressions like "programming" and "configuration" in the judgments of the previous cases or the judge's judgment below. Neither word is used in any of the claims in the cases nor are those words used in the statute.
57. The judge reached the right conclusion for the right reasons. In explaining those reasons the term "programming" was appropriate on the facts of this case.

#### *Anticipation by Nokia*

58. The prior art document referred to in this case as Nokia, as well as a companion document referred to as Nokia 002, were covered in detail in the judgment (paragraphs 344-386) as a result of the various issues the judge had to resolve. They included a major obviousness case advanced by the appellant below, which failed and is not appealed. There is no need to delve into most of that detail for the purpose of the sole point this court has to consider, which is a point on novelty.
59. The Nokia document was submitted into the 3GPP standardisation discussions for the meeting in Orlando in June 2007. It is entitled "Signaling of Implicit ACK/NACK resources" and makes proposals about how to tell the mobiles what codes to use for sending the ACK/NACK signals to the base station. At this stage in the standardisation work, the working group had decided to use the scheme of codes (ZC/CAZAC and Walsh codes) which broadly corresponds to the scheme of the patent claims. I say broadly because there is a point of detail about a distinction between the kind of ACK/NACK signals on which Nokia focusses ("non persistent scheduling" ACK/NACK signals) and another kind ("periodic" ACK/NACKs), addressed below.
60. The Nokia document presents a scheme to use to map implicitly control channel indexes on the downlink transmissions from the base station to the physical code resources to be used for ACK/NACKs on the PUCCH.
61. The appellant's case is that if the judge was right on construction and infringement/essentiality, as I believe he was, then the judge erred in rejecting the submission of lack of novelty over Nokia because he failed to apply the consequences of that construction. The appellant submits that a mobile constructed to operate in accordance with the Nokia proposal would be capable of operating in accordance with the relevant CMS of the claim and so the claim lacks novelty. This submission only applies to claim 1 of 549 and not to claim 1 of 810 because unlike claim 1 of 810, claim

1 of 549 has no limitation about how the implicit signalling takes place. That issue will be addressed below in the context of 810 but for present purposes can be ignored.

62. Nokia’s proposed signalling scheme is in section 4 of the document (judgment paragraphs 365-376). There are a number of parameters which allow the scheme to:
  - i) separately specify the number of cyclic shifts of the ZC/CAZAC codes and the Walsh codes (the parameters *num\_f\_shift* and *num\_t\_shift*);
  - ii) specify the gap between two resources in the code allocation schemes (the parameter *shift\_diff*); and
  - iii) specify that only certain ZC/CAZAC or Walsh codes are used, which in effect allows certain rows or columns in the scheme to be reserved for CQIs or ACK/NACK signals (*allowed\_t\_shift* and *allowed\_f\_shift*).
63. The document also expressly proposes multiplexing CQIs and ACK/NACKs in the same resource block, i.e. MRBs.
64. The appellant’s case is based on a situation in which the parameters are selected in a certain way and then the arrangement is considered in certain circumstances. Starting with the parameters, they are set up in such a way that there are four Walsh codes used for the relevant ACK/NACKs and twelve ZC/CAZAC codes. That would produce a 4 x 12 table (recall that the claim involves three Walsh codes – a 3 x 12 table). However another aspect of the appellant’s case is that use of the fourth Walsh code is also blocked using *allowed\_t\_shift*. This produces a 3 x 12 grid. The parameter *shift\_diff* is set at 2, which means there is a 2-cyclic shift between one ACK/NACK and the next. It is not disputed that this collection of parameters is within the disclosure of Nokia and therefore is something the appellant is entitled to advance for the purposes of novelty.
65. The circumstances in which this set up is to be considered is when there are 18 mobiles in the relevant cell. Obviously it is not disputed that at a given moment there could indeed be 18 mobiles in a cell.
66. The appellant’s point is that with this set up in these circumstances, the resulting pattern for ACK/NACKs is as follows:

RS ZC cyclic shift	Block-wise code		
	1	2	3
1	1		18
2		7	
3	2		13
4		8	
5	3		14
6		9	
7	4		15
8		10	
9	5		16
10		11	
11	6		17
12		12	

[This diagram works best in colour. The numbered blocks are yellow and the unnumbered blocks are white]



67. This, says the appellant, is a CMS within the claim and so a mobile capable of doing this is a mobile capable of operating in accordance with the claim and so the claim is anticipated. Note that the CQI signals are not shown in the picture but the appellant argues that the ability to reserve rows for CQIs means that that aspect of the claim is covered. For present purposes the CQI issue can be put to one side. It only arises if the appellant is right about ACK/NACKs.
68. The judge rejected this case for a number of reasons, challenged on appeal. I will come to those reasons, but before doing so it is worth explaining a bit more of the detail arising from the appellant's case. The number of mobiles being 18 is important. The same sort of argument works with fewer mobiles, but it is relevant to know what would happen when a 19<sup>th</sup> mobile became involved. Looking at the diagram above, the answer is that the scheme would put the 19<sup>th</sup> mobile's signal into one of the unnumbered white boxes. It does not matter which one. Also, as more mobiles joined (20<sup>th</sup>, 21<sup>st</sup> and so on), the rest of the grid would be filled until all 36 boxes were filled up. In other words the reason why the grid looks like the grid of the claim depends upon having no more than 18 mobiles. Now the appellant says this does not matter, but the respondent contends that it does. What is not in dispute is the behaviour of the scheme with the 19<sup>th</sup> mobile.
69. The other point to note is the distinction between different kinds of ACK/NACK signals. This approach shows three columns, because in the scheme three Walsh codes are reserved for non-persistent scheduling ACK/NACKs. However in accordance with the Nokia proposal there is nothing to stop the fourth Walsh code from being used for periodic ACK/NACK signals. In other words in this scheme four Walsh codes are actually available for ACK/NACKs in general. In the obviousness case the appellant had sought to argue that it was obvious to make only three Walsh codes available but that was rejected by the judge and has not been appealed.
70. Turning to the judge's rejection of this novelty attack, his reason (stated succinctly at paragraph 419) was that the CMS produced in the appellant's example was not a CMS according to the claim because as sets of rules the two sets, considered as complete sets, are different from one another. Even with looking at what happens with a limited set of mobiles (18) the CMS is still a set of rules which applies more generally to the complete set of resources. Thus, as the 19<sup>th</sup> mobile example shows, the Nokia CMS can still populate all the resources in the mesh grid. The whole CMS is not a 2-cyclic shift mesh because in the Nokia CMS there are no gaps. Moreover the fact that the fourth Walsh code could still be used for periodic ACK/NACKs also shows that the Nokia CMS is not the same as the claimed CMS.
71. In my judgment the judge was right about this for the reasons he gave. Putting it in my own terms, imagine a patent for a car with an automatic system for always complying with speed limits. To be within the claim the vehicle must be capable of operating that way. If you saw the car driving above the speed limit you would know it was not within the claim because it clearly had the capacity to break the speed limit. But if you saw the car driving below the speed limit in certain circumstances, that fact alone does not reveal whether or not it is capable of complying with the rules. In other words when examining whether something is capable of complying with a set of rules, one needs to distinguish between the set of rules themselves and the circumstances in which one is looking at the matter.

72. The appellant submitted that the judge was wrong because his conclusion was contrary to a finding made at paragraph 245(i) that there was nothing to say that the mobile has to use the same CMS all the time or can be adapted only to work with one. The judge did make that finding at paragraph 245(i), which as I have said above I agree with, but there is nothing inconsistent with that and the present conclusion. The fact a mobile within the claim may (but need not) be capable of operating in accordance with other CMSs makes no difference to this rejection of the appellant’s case.
73. The real issue is whether the judge was right that one needs to examine a CMS as a whole to compare it to the claim. That was the conclusion at paragraph 245(ii). I believe he was right. Putting the point another way, as the judge also held at paragraph 244, to be a mobile within the claim means that while a given CMS is in force the mobile has to have the capacity to not do certain things, for example to not send an ACK/NACK in the white blocks in the grid above. After all the point of the invention is to mitigate the risk of interference caused by sending ACK/NACKs without the 2-cyclic shift. The mobile of Nokia cannot mitigate that risk because when the CMS of Nokia is in force it will still be capable of sending ACK/NACK signals without the 2-cyclic shift.
74. The appellant also contends that its example shows that a mobile built in accordance with Nokia could be induced by the base station signals to work in accordance with the claim and so anticipates. I will take one example to illustrate why I do not accept this submission. The fourth Walsh code point shows that whatever one makes of the fact that the Nokia scheme will in certain circumstances produce a pattern which resembles the pattern of the claim, the Nokia scheme cannot and does not prevent a mobile from using the fourth Walsh code for ACK/NACKs. The mobile made that way has the capacity to use that fourth Walsh code and thus it is not a product according to the claim. The fact the network might choose not to use that fourth Walsh code for periodic ACK/NACKs is not (as the appellant submitted) “beside the point” because the focus of the debate is on the capabilities of a mobile. A mobile operating in accordance with the Nokia CMS would still be capable of using the fourth Walsh code and so would not be a mobile of the claim.
75. The respondent submitted that a more accurate depiction in grid form of the set of rules disclosed by Nokia is as follows:

		Block-wise code			
ZC cyclic shift		1	2	3	4
1		1	30	18	All available for periodic ACK/NACKs
2		19	7	36	
3		2	25	13	
4		20	8	31	
5		3	26	14	
6		21	9	32	
7		4	27	15	
8		22	10	33	
9		5	28	16	
10		23	11	34	
11		6	29	17	
12		24	12	35	

76. I agree with the respondent that this table accurately depicts the relevant CMS of Nokia. It shows all the resources available in that CMS and indicates that a mobile capable of doing this will be capable, while that given CMS is in operation, of putting resources in the wrong place.
77. Although this argument was elaborated at some length on appeal, these reasons are sufficient to show why I would reject this ground of appeal.

*Construction and obviousness of claim 1 of the 810 patent*

78. Having rejected the appeal relating to lack of novelty over Nokia, the issues under this head do not strictly arise, but it is convenient to deal with them briefly in any event. To do so I need to examine claim 1 of 810. It is as follows (with the same integer numbering as below):
- 1 (a) A mobile station (200) adapted to spread and transmit an ACK/NACK signal or a CQI signal in accordance with a code-multiplexing structure for code-multiplexing ACK/NACK signals and CQI signals from a plurality of mobile stations, comprising:
    - 1 (b) a receiver (202) configured to receive control information on a control channel element, CCE;
    - 1 (c) a first spreading unit (214) adapted to spread the ACK/NACK signal with a sequence defined by one of twelve cyclic shift values, the sequence being one of twelve sequences that are mutually separable because of mutually different cyclic shift values of the twelve cyclic shift values;
    - 1 (d) a second spreading unit (219) adapted to spread the CQI signal with a sequence defined by another one of the twelve cyclic shift values, the sequence being another of the twelve sequences;
    - 1 (e) a third spreading unit (216) adapted to spread the ACK/NACK signal, after the ACK/NACK signal has been spread with the sequence defined by one of twelve cyclic shift values, with a sequence that is one of three orthogonal sequences that each have a different respective orthogonal sequence number of first, second and third orthogonal sequence numbers;
    - 1 (f) a control section adapted to:

control the spreading of the ACK/NACK signal by the first spreading unit (214) by setting a code-multiplexing cyclic shift value, of a set of cyclic shift values for spreading ACK/NACK signals in the twelve cyclic shift values, in accordance with the code-multiplexing structure;
    - 1 (g) control the spreading of the CQI signal by the second spreading unit (219) by setting a code-multiplexing cyclic shift value, of a set of cyclic shift values for spreading CQI signals in the twelve cyclic shift values, in accordance with the code- multiplexing structure; and
    - 1 (h) control the spreading of the ACK/NACK signal by the third spreading unit (216) by setting a code-multiplexing orthogonal sequence number, of the first, second

and third orthogonal sequence numbers, in accordance with the code-multiplexing structure; and

- 1 (i) a transmitter (223) configured to transmit the CQI signal using the code-multiplexing cyclic shift value of the set of cyclic shift values for spreading CQI signals; and
  - 1 (j) the transmitter being further configured to transmit the ACK/NACK signal using the code-multiplexing cyclic shift value of the set of cyclic shift values for spreading ACK/NACK signals, and the code-multiplexing orthogonal sequence number of the first, second and third orthogonal sequence numbers,
  - 1 (k) characterized in that
  - 1 (l) the CCE is associated with a physical uplink control channel, PUCCH, and the PUCCH is determinative of a cyclic shift value among the twelve cyclic shift values comprising the set of cyclic shift values for spreading CQI signals and the set of cyclic shift values for spreading ACK/NACK signals, with one or more unused cyclic shift values separating the set of cyclic shift values for spreading CQI signals and the set of cyclic shift values for spreading ACK/NACK signals,
  - 1 (m) the set of cyclic shift values for spreading ACK/NACK signals and the first, second and third orthogonal sequence numbers are arranged in a 2-cyclic shift interval mesh structure in the code-multiplexing structure, according to which ACK/NACK signals for which the second orthogonal sequence number is set have 2-cyclic-shift-interval cyclic shift values set that are offset by one cyclic shift value with respect to 2-cyclic-shift-interval cyclic shift values that are set for the ACK/NACK signals for which the first and third orthogonal sequence numbers are set,
  - 1 (n) the CQI signals in the code-multiplexing structure are not spread with any of the orthogonal sequences, and
  - 1 (o) an unused cyclic shift value, of the one or more unused cyclic shift values, is positioned after an immediately preceding cyclic shift value for spreading CQI signals, and before an immediately subsequent cyclic shift value for spreading ACK/NACK signals, in the code-multiplexing structure,
  - 1 (p) so that a minimum value of a difference in cyclic shift values between the CQI signals and the ACK/NACK signals, after said immediately preceding cyclic shift value in the code-multiplexing structure, is equal to the 2-cyclic-shift interval in cyclic shift values between the ACK/NACK signals in the mesh structure.
79. In broad terms this claim can be understood as amounting to claim 1 of 549 with an extra feature relating to the signalling from the base station to the mobile to tell the mobile which cyclic shift to use for a transmission. The relevant words are in 1(b) and 1(l) of the 810 claim.

80. It was common ground (judgment paragraph 258) that feature 1(1) describes an implicit signalling scheme whereby the mobile is told what to do by the base station. In other words, as the judge explained, the network does not explicitly or distinctly tell the mobile where to put its ACK/NACK or CQI among the options available in the code multiplexing structure, but the mobile works it out by implication from something else sent on the downlink control channel.
81. At this point it is necessary to explain a bit more detail about how the signalling works on the physical downlink control channel (PDCCH). This channel is the way the base station sends control messages to the mobile. A CCE is the smallest unit of resources available on the PDCCH. The CCEs are sent in a block. The scheme works by blind decoding, in other words the mobile does not know which CCE is intended for it but has to decode candidate CCEs until it finds one addressed to it. One of the previous *Optis v Apple* appeals this year ([2023] EWCA Civ 438) was concerned with a way of limiting the number of CCEs which the mobile had to decode in order to find the right one. Once a mobile has decoded the CCE meant for it, the mobile will also thereby know the index number of that CCE.
82. CCEs can be aggregated such that while the message for one mobile may consist of a single CCE, if channel conditions are less favourable, it might consist of an aggregation of 2, 4 or 8 CCEs. In other words a given message might require more CCE resources to send in some circumstances and fewer resources in other circumstances.
83. The downlink control message has a channel number or “index”. Thus for example if 4 downlink messages were sent to 4 mobiles, the first being a single CCE, the second being a message in an aggregate of 2 CCEs, the third being in an aggregate of 4 CCEs and the fourth message being in an aggregate of 8 CCEs, these four messages respectively would have downlink control channel numbers 1, 2, 3 and 4.
84. Before the judge three possible interpretations of the claim were advanced. Optis’ case was that the claim required that the CCE itself was used for implicit signalling. In effect this means using the CCE number. The appellant contended that the claim was wider than that and either meant that any implicit signalling would do or that at least it also covered using the downlink control channel number. The judge rejected these latter two interpretations. On appeal the appellant does not challenge the rejection of the widest construction (any implicit signalling) but does contend that the claim covers using the control channel number.
85. The critical words are at the start of feature 1(1): “the CCE is associated with a physical uplink control channel, PUCCH, and the PUCCH is determinative of a cyclic shift value”. This phrase has two parts, the CCE is to be “associated” with a PUCCH, and the PUCCH is “determinative” of a cyclic shift value. The appellant points out that “associated” is a wide term. The appellant makes the point that although the specification describes a one to one mapping of CCE number with cyclic shift value as a way to implement the invention, the reader would consider that by using “associated” the patentee must have intended something wider than that.
86. I agree with that submission but it does not go far enough to assist the appellant. The specification includes examples in which a strict one to one mapping breaks down because the use of aggregation means that more than one CCE can be used to send control information from the base station to a given mobile. This means that to have

simply stated that the CCE had to be determinative of the PUCCH would have ruled out these other examples. In fact what the specification describes when more than one CCE is sent to a mobile is to use the lowest CCE number (patent paragraph [0049] ln31-37), but it would be apparent to a reader that it did not have to work that way. Perhaps the highest CCE number could be used instead. Therefore the use of the wider word “associated” is apt to make the point that there has to be an association with the CCE even if it is not a simplistic one to one mapping in all cases.

87. At paragraph 265 the judge rejected a submission there would necessarily be an association between the CCE number and the downlink channel number (referred to in the specification as the L1/L2CCH). That was because the downlink channel number applied to the aggregate set of the CCEs used to send data to a single mobile. So if for example 10 mobiles received data in 10 single CCEs each, there would also be 10 downlink channels, numbered from 1 to 10 and one to one mapped with CCE number. However if things changed and the first four CCEs were used to transmit to one mobile, the downlink channel number 1 would apply to that set of four CCEs, and downlink channel number 2 would now apply to CCE 5, etc. I agree with the judge. The skilled reader of the patent would understand from the examples in the patent together with their common general knowledge that there was no necessary association between downlink channel number and CCE.
88. That conclusion is fatal to the appellant’s construction of claim 1 of 810 because although the word “associated” is wide in nature, the claim is clear that what the PUCCH has to be associated with is the CCE. Given that absence of a necessary relationship between the CCE and the downlink channel number, no reader of the patent would think the claim encompassed a scheme whereby the implicit signalling was done using the downlink channel number.
89. For that reason alone, this aspect of the appeal must fail before one gets to the other aspects of the argument, the one on construction which relates to the document referred to as the Kobe agreement, and the other on obviousness over Nokia. Nevertheless in deference to the argument I will address the Kobe agreement argument briefly.

*The Kobe agreement*

90. The judge decided that the Kobe agreement was common general knowledge and that what the Kobe agreement amounted to was an agreement to use implicit signalling of the downlink channel number to signal the cyclic shift. On appeal the appellant contends that this conclusion was wrong but also that it was the lynchpin of the judge’s construction of claim 1 of 810 which rejected the submission that the claim covered using implicit signalling of the downlink channel number to signal the cyclic shift. The judge did take the Kobe agreement into account as relevant (paragraph 263) on the basis that it meant that using downlink control channel number was common general knowledge and so the skilled reader would have the impression the patentee was proposing something different, but I would not describe that point as a lynchpin. Regardless of its importance to the judge’s own approach, in my judgment, see above, there are strong factors which have nothing to do with Kobe agreement (whatever it means) which rule out a construction of the claim which covers using the downlink channel number.

91. Putting things another way even if, as the appellant contends on appeal, the Kobe agreement was ambiguous – in that it would be understood not to specifically require use of the downlink control channel number but it might also have been understood to contemplate other possibilities such as CCE number or downlink control channel candidate, this makes no difference to the outcome of the interpretation of claim 1 of 810.
92. Finally and in any case, I believe the judge’s construction of the Kobe agreement was right. Section 7.13.2 of the document records a conclusion reached at the Kobe meeting about uplink control signalling in the following way:

“For non-persistent scheduling the ACK/NAK resource is linked to the index of the control channel used for scheduling”
93. The words here refer to linking the ACK/NACK resource – i.e. the code to be used to send the ACK/NACK signal on the uplink to the “index of the control channel”. As a matter of words that unambiguously means the control channel index. (The index is the number of the channel). That is what the judge concluded (paragraph 179).
94. The document also cross-refers to a second document R1-072472 which recorded a summary of the email discussion. Like the judge I doubt anyone would go back over that discussion, because the Kobe agreement is unambiguous but if one was in any doubt and did look back at that summary, it would support the idea that the Kobe agreement meant what I believe it says (see judgment paragraph 181).
95. The appellant’s best points were a later document referred to as “Panasonic” and what was said by Mr Bradford in cross-examination. The Panasonic document states in terms that the Kobe agreement is ambiguous and proposes two possible meanings, one of which was to use the CCE number. However like the judge (paragraph 182) I believe that document is in fact diplomatically phrased. It is attempting to put forward a different approach but in doing so it is characterising its proposal as a “clarification” of earlier language. It does not mean the Kobe agreement really was ambiguous or seen as ambiguous at all.
96. We were taken to passages of the transcript from Mr Bradford’s cross-examination in which it was contended that the witness was saying that the Kobe agreement itself was unclear. However I agree with counsel for Optis that read in context what Mr Bradford was saying was not that the agreement was unclear itself, but that what was unclear was how to put it into practice. That is a different matter and does not advance the case on appeal.

*The obviousness of claim 1 of the 810 patent*

97. At trial the appellant’s case that claim 1 of the 810 patent was obvious was considered in detail and rejected. This was focussed on that claim as being one which required using the CCE number as the means of signalling. The obviousness case advanced on appeal is different (and was not considered below). It works in the following way. First it depends on succeeding in the novelty attack based on Nokia against claim 1 of 549. If that had succeeded then the point would be that all those features which were also in claim 1 of 810 were anticipated by Nokia and so the only difference between Nokia and claim 1 of 810 would be the matter of implicit signalling. Second it depends on

succeeding on appeal in overturning the judge's construction of the claim as requiring that the CCE itself was used for implicit signalling. If that had succeeded then the point would be that the idea of using the channel index number as the means of signalling was obvious and so the claim was invalid.

98. However leaving aside the fact that the two premises of this submission have both been rejected (novelty over Nokia and construction), the argument founders in this court because the appellant was unable to identify any evidence to support a finding of obviousness had those premises been satisfied. The most that could be said was that there was evidence from the experts that it was technically possible to do what would have been necessary to put the allegedly obvious step into practice. That is not enough.
99. Accordingly this part of the appeal also fails. It follows that I would dismiss this appeal on all three grounds.

**Lord Justice Arnold:**

100. I agree.

**Lord Justice Newey:**

101. I agree.