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Case No: HP-2016-000070

IN THE HIGH COURT OF JUSTICE
BUSINESS AND PROPERTY COURTS OF ENGLAND AND WALES
INTELLECTUAL PROPERTY LIST (Ch D)
PATENTS COURT

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

Date: 18/11/2019

Before :

HIS HONOUR JUDGE HACON
(Sitting as a Deputy High Court Judge)

Between :

(1) TECHNETIX BV
(2) TECHNETIX LIMITED
- and -
TELESTE LIMITED

Claimants

Defendant

Hugo Cuddigan QC and Adam Gamsa (instructed by Haseltine Lake Kempner LLP) for the
Claimants

James Mellor QC and Thomas Jones (instructed by EIP Legal) for the Defendant

Hearing dates: 8-10 and 14 May 2019

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.

.....
HIS HONOUR JUDGE HACON

Judge Hacon :

Introduction

1. The first and second claimants (collectively ‘Technetix’) are respectively the proprietor and exclusive licensee of EP (UK) No. 1 259 074 B8 (‘the Patent’). The invention claimed is entitled ‘Communication system comprising means for preventing intermodulation products’. The communication system is a cable network used to supply television and broadband services. Intermodulation products is the name given to a form of signal distortion.
2. The Patent teaches the use of a filter to block low frequency signals and thereby at least partially to prevent the generation of intermodulation products.
3. Technetix and the defendant (‘Teleste’) are competing manufacturers of electronic components. Both supply products to Virgin Media, the principal provider of cable TV in the UK. Technetix allege that Teleste’s supply of products to Virgin Media constitutes an indirect infringement of the Patent pursuant to s.60(2) of the Patents Act 1977.
4. Teleste counterclaims for revocation of the Patent, alleging lack of novelty and inventive step, and that matter disclosed in the specification extends beyond that disclosed in the application for the Patent as filed.
5. Technetix has applied unconditionally to amend the Patent and also applies, if necessary, to make a conditional amendment to the Patent. The respective sets of claims were referred to as ‘the Unconditional Claims’ and ‘the Conditional Claims’.
6. Hugo Cuddigan QC and Adam Gamsa appeared for Technetix, James Mellor QC and Thomas Jones for Teleste.

The witnesses

7. Technetix’ expert was Dr Rob Fronen. He is an electronics engineer who since 1990 has worked for several companies in research and development, specialising in integrated circuits (IC) and their applications. He now leads an IC design centre and co-owns a company which provides solar energy installations. Between 2012 and 2014 Dr Fronen was Executive Vice-President of Technetix.
8. I found Dr Fronen to be generally a good witness who was trying to help the court. He had no practical experience of the cable TV industry, so his experience did not match that of the skilled person. Mr Mellor submitted that Dr Fronen’s evidence was coloured by his time at Technetix and that his answers concerning the Patent were the product of his knowledge of Technetix’ products, not what the Patent said. As to his lack of practical experience, I do not believe that this made Dr Fronen’s evidence any less helpful. However, I sometimes took the view that Dr Fronen’s loyalty to his former employer may have coloured his judgment as to the perception of the person skilled in the art.

9. Jean-Charles Point was Teleste's expert. Mr Point had more directly relevant experience than Dr Fronen having worked in the radio frequency (RF) industry since leaving university and this included development work in the cable TV sector. Since 2002 Mr Point has worked for his own company which develops products that include those used in the cable TV industry.
10. Mr Point, like Dr Fronen, was undoubtedly trying to help the court with the technology in issue. Mr Point had an impressive knowledge of his subject and was a good witness.
11. English is not the first language of either expert. Neither relied on an interpreter and I congratulate both on their patience and hard work in giving their evidence.

The Patent

12. The application for the Patent was filed on 3 May 2002. There is an undisputed priority date of 11 May 2001.
13. The specification explains that cable networks are used to transmit several signals at the same time in order to maximise exploitation. Signals travel not only from the provider to customers – the downstream signal – but increasingly also in the reverse direction – the upstream signal – to enable interactive services offered to customers. The signal-to-noise ratio can be low.
14. The Patent teaches the use of a high-pass filter to improve the signal-to-noise ratio. It attenuates the transmission of frequencies below a cut-off frequency, the value of which will depend on the filter. The filter reflects back the energy of voltage peaks of signals below the cut-off frequency. Thereby, at least partially, it prevents the generation of intermodulation products.
15. The effectiveness of such filters is said by the specification to depend on what it calls two insights. The first (stated at [0007]) is that low signal-to-noise ratio is caused in part by components in the network in which intermodulation products are created. The second (explained at [0008]) is that the greatest sources of intermodulation products are components comprising ferrite transformers and/or connectors. These components have a non-linear transfer function caused by saturation of the ferrite component.
16. The transfer function of a component is a measure of its output against input. The graphically represented relationship between output and input may be linear or non-linear.
17. Saturation of a ferrite or other magnetic material occurs when an increase in a magnetising force applied to it no longer increases its magnetic induction, i.e. the electromotive force (the voltage) across the material no longer increases.
18. The specification continues: a voltage peak applied to the ferrite component is capable of causing saturation. A filter placed at the input of the signal processing means will beneficially reflect the energy of voltage peaks.

19. At [0009] the specification states that such voltage peaks in cable transmission networks may give rise to major problems. The peaks may be caused by lightning or by equipment connected to the network. At [0010] the specification discusses known means to protect against voltage peaks (gas discharge tubes and varistors) and their disadvantages.
20. The improved means used in the invention is then explained:

“[0011] The prevention means as used in the use of the communication system according to the invention do not make use of gas discharge tubes or varistors, but they use a filter for preventing voltage peaks from entering into the components by reflecting the energy. Since there is no question of a short-circuit and of the accompanying very high short-circuit currents (the energy of the voltage peaks is reflected and there is no current flow) in this arrangement, there is no question of a (high) magnetic field being generated, either. As a result, the aforesaid voltage peaks having a high voltage level and a low energy level will not be generated.”
21. The specification describes a preferred embodiment:

“[0013] One embodiment of the communication system used according to the invention is characterized in that the high-pass filter comprises an LC-filter, including at least one coil and at least one capacitor.”
22. The L of an LC filter denotes an inductor, the C a capacitor. An inductor, or coil, is typically a wire wound around a solid central core. When current passes through the wire this generates a magnetic flux proportional to the current. The effect of the magnetic flux is to resist changes in current, so that a steady state current will flow easily through an inductor whereas a varying current will not. A capacitor is a device that stores electrical energy in an electric field. It resists steady state current but not varying current.
23. Two embodiments of the invention are described in paragraphs [0022]-[0024] and illustrated in Figures 2 and 3. The coils in those embodiments have an inductance of 3.3 μH (microhenrys); the capacitors have a capacitance of 1nF (nanofarad).
24. Paragraphs [0025]-[0029] describe four sets of experiments using the filter shown in Figure 2 of the Patent.

The claims

25. The claims as granted were centrally amended by the EPO on 31 October 2018. Although Technetix did not formally admit that the October 2018 claims are invalid, those claims had been abandoned by the time of the trial. There was occasional reference to them and I will call them ‘the Centrally Amended Claims’.
26. Claim 1 of the Unconditional Claims is:
 - (1) Use of a communication system, the communication system comprising a cable transmission network with several terminal connecting points provided with high-frequency transmission and/or receiving means,

- (2) in which the cable transmission network furthermore comprises signal processing means for processing high-frequency signals that can be transported via the cable transmission network,
 - (3) wherein the signal processing means comprise prevention means for at least partially preventing the generation of intermodulation products in the signal processing means,
 - (4) wherein said prevention means are provided with a pre-connected filter comprising a high-pass filter for stopping voltage peaks through reflection of the energy contained in the energy peaks,
 - (5) characterized in that the prevention means is used for the purpose of at least partially preventing the generation of intermodulation products in the signal processing means,
 - (6) and wherein the high-pass filter comprises an LC-filter including at least one coil and at least one capacitor.
27. Claim 1 of the Conditional Claims adds a seventh integer:
- (7) and wherein the LC-filter comprises two 1nF capacitors and a 3.3 μ H coil.

The products alleged to infringe

28. Teleste markets three products alleged to infringe. It was admitted that those designated GISX-100B and GIZ-101 fall within both the Unconditional and Conditional Claims. The defence in relation to those products rests on the Patent in both forms being invalid.
29. Teleste's ASH4P product is said by Technetix to infringe the Unconditional Claims. This is denied by Teleste. The product is not alleged to infringe the Conditional Claims.
30. Teleste also sought a declaration of non-infringement of the Conditional Claims in relation to two hypothetical products. By the time of closing speeches this fell away, for a reason I will explain.

The skilled person

31. The parties agreed that the skilled person is a design engineer working in the R&D section of a company which makes products for broadband and cable TV networks or alternatively working for a network operator.

The common general knowledge

Blocking capacitor

32. A single capacitor in series will, once charged, block a DC signal. Because of the repeated change in polarity of AC, an AC signal is not blocked. It was common ground that in relation to an AC signal, a capacitor will have a cut-off frequency. The signal will be attenuated at frequencies below the cut-off frequency but not above it.

These are characteristics of a capacitor which would have been well known to the skilled person.

33. The term ‘blocking capacitor’ is commonly used in the art. The experts were agreed that it is used to indicate that the primary function of the capacitor, in the context in which the term is used, is to block DC. In other words, ‘blocking’ is used to indicate the primary purpose of the capacitor in that context, not to define its properties. Depending on the context, the skilled person may expect a blocking capacitor to perform other functions of which it is capable.

Saturation and magnetisation of ferrites

34. In his first report Dr Fronen said this in the section on common general knowledge:

“63. When exposed to a high AC signal strength, a ferrite will become saturated and respond in a non-linear manner, but it will not normally become magnetised, because the saturation goes in both directions (as a result of the alternating current). Magnetisation happens when the ferrite is driven unidirectionally far into saturation as a result of exposure to a high voltage/current of one polarity (DC), such as a voltage surge ... “

35. In his second report Dr Fronen clarified this as referring to a purely sinusoidal AC signal (the plot of voltage against time is a sine wave):

“24. The skilled person would consider (as I explained at paragraph 63 of my First Report) that a DC voltage is capable of magnetising a ferrite, whereas a purely sinusoidal AC voltage is not, ...”

36. In his oral evidence Dr Fronen qualified this further by saying that in the paragraph 24 just quoted he was referring to a sinusoidal AC voltage which gradually decreases to zero. Such a signal would not magnetise a ferrite. On the other hand, a big pulse hitting a ferrite would magnetise it.

37. A document was put to Mr Point in cross-examination and it was suggested to him on behalf of Technetix that according to the common general knowledge no sort of AC would cause magnetisation. I think on a fair reading of the cross-examination Mr Point may have accepted that this was implied by the document put to him, but he did not accept it as a general proposition. It was also contrary to the evidence of Technetix’ own expert, Dr Fronen.

38. I find that at the priority date it was not the understanding of the skilled person that no AC of any sort could cause the magnetisation of a ferrite. I accept Dr Fronen’s more specific evidence of the skilled person’s understanding: a sinusoidal AC voltage which gradually decreases to zero will not magnetise a ferrite.

Intermodulation v harmonic distortion

39. Not long before the trial Technetix filed a fourth expert report from Dr Fronen. It was short and largely concerned a distinction which Dr Fronen said he had failed to make in his earlier reports concerning the meaning of intermodulation products and the understanding of that term on the part of the skilled person.

40. Dr Fronen identified two types of interference with signals in an RF system which can be caused by non-linear ferrite behaviour. The first are the product of one signal, being harmonics of that signal which can cause interference. The second type are the product of interactions between two or more signals and their respective harmonics. Those interactions give rise to sum and difference components which cause the interference. Dr Fronen said that while both phenomena are sometimes loosely termed ‘intermodulation products’, only the second type are correctly so described. The first are better termed ‘harmonic products’.
41. Dr Fronen also said that he was doing no more than agreeing with what Mr Point had stated in paragraphs 45 and 46 of Mr Point’s first report. I have re-read those paragraphs and do not find any such precision being given to the meaning of ‘intermodulation products’ by Mr Point. In closing Mr Mellor dismissed Dr Fronen’s distinction as a lawyer’s point developed very late in the day to deal with the prior art.
42. A passage in column 2 of the Patent was put to Mr Point in cross-examination:
- “The invention is based on the insight that the relatively low signal-to-noise of the data signals in the known communication system is caused in part by the signal processing means or components that are incorporated in (in particular bidirectional) cable transmission networks. The cable modems that are used generate a strong RF signal that is capable of generating harmonics or intermodulation products in said components (in particular in passive components).”
43. It was suggested to Mr Point that the skilled person would understand ‘intermodulation’ to mean only interactions between two signals. Mr Point answered that in this context intermodulation could be understood like that. Mr Point was in effect being asked to construe one part of the specification and his answer could reveal nothing about the common general knowledge. I am not convinced that Mr Point’s construction was necessarily right. The final sentence might be read as referring to ‘harmonics or [to give them another name] intermodulation products.’
44. It is convenient to mention here two further passages in column 2 of the specification raised in argument:
- “The invention is further based on the following insight: the greatest problems with regard to degeneration of harmonics or intermodulation products occur with passive components comprising ferrite transformers and/or connectors.”
- “A voltage peak is capable of introducing such a current into the transformer, causing the ferrite to become saturated already at a lower transmission level or signal level, as a consequence of which harmonics or intermodulation products can be generated sooner. This can be prevented by preventing the occurrence of voltage peaks by means of a filter at the input of the signal processing means, in which the filter reflects the energy contained in the voltage peaks.”
45. It seems to me clear from the second passage (to which Mr Point was not referred in cross-examination) that the reader is being told that the use of a filter is advantageous in preventing the generation of harmonics or intermodulation products. In other

words even if a distinction were being drawn in the Patent, the invention is directed to both harmonics and intermodulation products.

46. Returning to the common general knowledge, Dr Fronen was cross-examined on the distinction he had drawn in his final report. In his oral evidence he did not seem to attach much importance to it. He said that interference where there is a single signal (harmonic distortion) and interference caused by two or more input signals of different frequencies have different names, but both have the same cause and essentially the same effect. That is the reason why casual use of 'intermodulation' is taken to mean both.
47. It appears to me that there are two phenomena, not identical but closely related. Generally 'intermodulation products' would be used by the skilled person to encompass both. In certain contexts, a narrower meaning may be inferred.
48. As a matter of construction of the Patent, in my view the term 'intermodulation behaviour' is used broadly (see also paragraphs [0027] and [0028]), covering both phenomena. The same is true of 'intermodulation products' in claim 1.

Voltage surges and intermodulation products

49. According to Dr Fronen's first expert report, the skilled person in May 2001 knew that voltage surges would cause magnetisation of a ferrite in a signal processing means, thereby ferrite saturation and harmonic distortion, i.e. intermodulation products, in the processing means.
50. In his first report Mr Point agreed with what Dr Fronen had said about this. Dr Fronen did not respond to Mr Point's agreement or qualify any of his own evidence until his fourth report in which he attempted to introduce the distinction between harmonic distortion and intermodulation products I have just mentioned.
51. In cross-examination Mr Point was repeatedly challenged to accept that the skilled person did not know in May 2001 of the link between ferrite saturation and intermodulation products. He was asked for documentary evidence that this was common general knowledge. Mr Point maintained his ground and referred to such documents. These, it turned out, had not been disclosed to Technetix. Mr Cuddigan argued that in consequence Mr Point's evidence was of no value on this topic. I disagree. It was my impression that Mr Point was taken aback by the challenge because he had understood from Dr Fronen's written evidence that there was nothing between the two experts on the known cause of intermodulation products, namely magnetisation and saturation of the ferrite due to a voltage surge. I can see why Mr Point was surprised by this line of questioning.
52. In my view the experts' written evidence establishes that the causative link between magnetisation and saturation of the ferrite on the one hand and intermodulation products on the other was part of the common general knowledge. There is no need for me to place any reliance on the documents referred to by Mr Point in cross-examination.

Filter design

53. The experts agreed that if the skilled person required a capacitor to serve as a filter, i.e. to attenuate part of the spectrum of frequencies of AC signals, they could design the filter to suit their purpose. In particular, a suitable cut-off point could be selected.

Infringement – product ASH4P

54. Technetix alleged that the supply of Teleste’s ASH4P cable TV home distribution unit infringed the Unconditional Claims of the Patent. Infringement turned on a single issue: whether the unit contained a high-pass filter within the meaning of claim 1.

55. The units have filters and splitters located close to each output. The splitters each contain a ferrite. The filters have at least an inductor and a capacitor. The inductor is placed before the capacitor creating what the experts called ‘inductor first’ LC filters. Teleste’s case was that this arrangement would fail to achieve the result promised by the Patent, pointing in particular to paragraph [0011]:

“Since there is no question of a short-circuit and of the accompanying very high short-circuit currents (the energy of the voltage is reflected *and there is no current flow*) in this arrangement, there is no question of a (high) magnetic field being generated ...” (italics added)

56. Dr Fronen’s view in his reports was that an inductor first LC filter will serve to block voltage surges and will at least partially prevent the generation of intermodulation products. The skilled person would recognise it to be a high pass filter within the meaning of claim 1. Mr Point took the opposite view: low frequencies a current *can* flow through the inductor, which could generate a magnetic field with the potential to magnetise the ferrites in the splitters. He would therefore not understand this inductor first filter to be a high-pass filter.

57. Mr Cuddigan referred me to the circuit diagram for Teleste’s ASH4P unit, saying that each of the four ports is ‘protected’ by an inductor first arrangement, adding that these products are available on the market. This does not disprove Teleste’s argument. It could mean that Teleste is content to market a product that is less protected from current surges than rival products.

58. I did not find either expert’s oral evidence on this matter easy to follow. Dr Fronen conceded that a current surge would result in a high current flow through the inductor and that this would create quite a significant magnetic field. He did not accept that this would affect nearby ferrites. However this seemed to be based on the RF engineer taking steps to cope with the magnetic field. Dr Fronen also rejected the passage in paragraph [0011] just quoted as an extreme state of affairs. He said that some current would almost always flow.

59. Mr Point at least agreed with this last remark: even in a capacitor first arrangement, some current would flow. It was put to Mr Point that even though the current would be higher in an inductor first arrangement (and so the risk of intermodulation greater), it would not be comparable to (i.e. as bad as) that using a gas discharge tube or varistor, the prior art which the Patent sought to distinguish. Mr Point disagreed, but apparently his disagreement was based on his view that the inductor first arrangement would be rejected by the skilled person on the ground that if a pulse was sustained for 50 microseconds the inductor would act like a short-circuit and burn the device.

60. The experts appear to have been addressing different issues. They agreed that the imposition of a surge current would result in current flow through the inductor. Mr Point thought that this would burn the device. Dr Fronen said that in consequence the skilled person would have to take steps to cope with the magnetic field generated. Neither seemed directly to address the real issue, which was whether an inductor first filter sufficiently reflects the energy contained in energy peaks such that, at least partially, it prevents the generation of intermodulation products.
61. Having the effect of at least partially preventing intermodulation products is not a high hurdle to meet, as Mr Mellor emphasised in another part of his argument with an eye on a different issue. The best I can make of Dr Fronen's evidence is that he maintained the view expressed in writing that the inductor first filter would partially prevent intermodulation products. The fact that the skilled person could by other means minimise their generation was not inconsistent with his written view.
62. As I have said, Mr Point's opinion that the inductor first arrangement would risk burning the device did not address whether intermodulation products would be partially reduced if the device did not burn out. I imagine that burning out is not an advertised feature of an ASH4P unit and may well be a rare event.
63. I think I can properly infer from Dr Fronen's evidence a view that an inductor first filter would, at least in part, prevent intermodulation. I am not sure that Mr Point disagreed. I therefore find that the ASH4P unit contains a high-pass filter within the meaning of claim 1 of the Unconditional Claims and the device as a whole falls within that claim.

Conditional claims – declaration of non-infringement

64. Technetix' argument that Teleste's two hypothetical products infringe Conditional Claim 1 was based on the doctrine of equivalents as explained in *Actavis UK Ltd v Eli Lilly & Co* [2017] UKSC 48; [2017] RPC 21 and *Icescape Limited v Ice-World International BV* [2018] EWCA Civ 2219; [2019] FSR 5.
65. Relevant to this, Dr Fronen expressed his view on the inventive concept disclosed in the Patent. In closing Mr Mellor said that Teleste, which up to then had not committed itself to an inventive concept, was content to endorse Dr Fronen's characterisation. The reason for this endorsement was that it suited Teleste's argument on validity. It also meant that Teleste had to accept that its two hypothetical products would infringe Conditional Claim 1, provided I were to accept the parties' joint view of the inventive concept.
66. I do, so I need say no more about the Teleste's application for declarations of non-infringement.

Validity – the issues

67. Teleste argued that the Unconditional Claims lack novelty over United States Patent No. 5,390,337 ('Jelinek').

68. Teleste further argued that both the Unconditional and Conditional Claims lack inventive step over (i) Jelinek, (ii) a paper presented at a conference in May 2000 ('Mothersdale') and (iii) another paper published in May 1999 ('Buie').
69. There was a separately pleaded contention that the alleged inventions did not make a technical contribution to the art and therefore lacked inventive step. This became an argument about Conditional Claim 1 and I will address it in my discussion of Jelinek and inventive step.
70. Finally Teleste argued that the specification of the Patent disclosed matter that extended beyond that disclosed in the application for the Patent as filed.
71. It is only necessary for me to consider claim 1 of each of the Unconditional and Conditional Claims.

Novelty – the law

72. No issue of law arose. The novelty of an invention was explained by Lord Hoffmann in *Synthon BV v SmithKline Beecham plc* [2005] UKHL 59; [2006] RPC 10, at [20]-[25]. A section of Lord Hoffmann's judgment seems to me to be of particular relevance. Having quoted from Lord Westbury L.C. in *Hill v Evans* (1862) 31 L.J. Ch (NS) 457 and from the Court of Appeal in *General Tire and Rubber Co v Firestone Tyre and Rubber Co Ltd* [1972] R.P.C. 457, Lord Hoffmann said:

“[22] If I may summarise the effect of these two well-known statements, the matter relied upon as prior art must disclose subject-matter which, if performed, would necessarily result in an infringement of the patent. That may be because the prior art discloses the same invention. In that case there will be no question that performance of the earlier invention would infringe and usually it will be apparent to someone who is aware of both the prior art and the patent that it will do so. But patent infringement does not require that one should be aware that one is infringing: “whether or not a person is working [an] ... invention is an objective fact independent of what he knows or thinks about what he is doing”: *Merrell Dow Pharmaceuticals Inc v H N Norton & Co Ltd* [1996] R.P.C. 76, 90. It follows that, whether or not it would be apparent to anyone at the time, whenever subject-matter described in the prior disclosure is capable of being performed and is such that, if performed, it must result in the patent being infringed, the disclosure condition is satisfied. The flag has been planted, even though the author or maker of the prior art was not aware that he was doing so.”

Jelinek

73. Jelinek is concerned with filters used in amplifiers employed in cable TV networks. As already mentioned, the signals in such networks typically flow in two directions: the forward (or downstream) signals from the network supplier to the customer's TV and the reverse (or upstream) signals generated by the customer and used for pay-for-view services, messaging and so on. Two known types of filter are referred to in Jelinek. First, a diplex filter which consists of a high pass filter and a low pass filter joined at a common port. Secondly, a surge filter which protects the amplifiers from high energy transients. The invention claimed in Jelinek is a combination of the two

types of filter in a single modular unit. The high pass filter is dual-function in that it is designed also to serve as a surge filter. It performs the task of blocking low frequency return path signals and also protects the amplifier from high energy transients. The low pass filter, in the form of a plug-in module, attenuates forward signals in the return path.

74. The focus was on the section containing the high pass filter, the only filter required if there is no return path. A preferred embodiment illustrated in Figure 3 shows the high pass filter as being constructed of inductors and capacitors, i.e. it is an LC filter. In column 5 Jelinek states that while the description of Figure 3 refers to a specific filter, other filter types can be used.
75. It was common ground that the amplifier being protected would contain a ferrite. Figure 1A shows a simple prior art arrangement of filters in line with an amplifier. At column 3 the specification states:
- “The surge filters 12 and 15 protect against line transients and other voltage surges which could affect the distribution amplifier performance.”
76. Figure 1B illustrates a known two-way system (i.e. having both an upstream and downstream signal). The specification states that the high-pass filter in such systems have enough suppression capability to protect the amplifier in a manner similar to the surge filters of the one-way system.
77. In column 4 the specification explains that the high-pass filter used in the modules of the invention replaces the surge filter of the one-way system and the high-pass filter used in the two-way system.

The arguments

78. Mr Mellor submitted that Jelinek discloses an LC filter which, by protecting the amplifier ferrite from surges, prevents the generation of intermodulation products in the amplifier. It was common ground that the amplifier formed part of a signal processing means within the meaning of claim 1 of the Patent. According to Mr Mellor, all the integers of claim 1 of the Unconditional Claims were disclosed in Jelinek.
79. Mr Cuddigan pointed out that there is no express reference to the prevention of intermodulation products in Jelinek. He argued that Jelinek did not disclose such prevention. The link between surges and intermodulation was not part of the skilled person's common general knowledge. The skilled person would see from Jelinek that her high-pass filter protects against line transients which could affect the amplifier's 'performance' but would not make the connection with intermodulation products. The skilled person would therefore not interpret Jelinek as disclosing a prevention means for the purpose of at least partially preventing the generation of intermodulation products, as required by claim 1 of the Unconditional Claims.

Discussion

80. There was quite extensive evidence, particularly from Dr Fronen, establishing that all the elements of claim 1 of Unconditional Claim 1 are disclosed by Jelinek, save the

one highlighted by Mr Cuddigan: Jelinek did not explain that protecting the amplifier from transients would result in limiting intermodulation in the amplifier.

81. For the reasons explained above, I take the view that the skilled person would have understood, as part of their common general knowledge, that transient energy peaks would cause intermodulation products in a signal processing means within a cable TV network and therefore that protection against such peaks would reduce intermodulation. But to my mind Technetix' argument misses the point. It does not matter whether or not the skilled person, reading Jelinek, would appreciate that this is what would happen when the Jelinek invention is performed. What matters is whether in fact this partial prevention of intermodulation would happen, see *Synthon*. It would. The Unconditional Claims lack novelty.

Inventive step

Jelinek

82. Given my conclusion on lack of novelty, the argument on inventive step added nothing to the question whether the Unconditional Claims are valid.
83. Conditional Claim 1 contains the additional requirement that the LC filter comprises two 1nF capacitors and a 3.3µH coil.
84. There was no evidence that filters with at least two 1nF capacitors and a 3.3µH coil – without any further defining characteristics – have any technical advantage over other LC filters. This was Teleste's argument on lack of technical contribution. I agree with Mr Mellor that it is an example of 'parametritis', i.e. stipulating that a feature of the alleged invention must be present within a stated range, where the range is entirely arbitrary. In such cases the apparent novelty and inventiveness conferred by the range is illusory, see for example *LG Philips LCD Co Ltd v Tatung (UK) Ltd* [2006] EWCA Civ 1774; [2007] RPC 21, at [39]. Since there is no expert support for any technical advantage of the ranges of capacitance and inductance set out in the claim, it lacks inventive step.
85. It is also relevant to note Dr Fronen's view of the inventive concept of the invention as claimed in Conditional Claim 1. When Mr Mellor drew attention in argument to this formulation of the inventive concept advanced by Technetix' expert, Mr Cuddigan did not seek to qualify it in any way. I take it to be common ground.
86. The inventive concept advanced has nothing to do with specific values of capacitance or inductance imbuing the system with an advantage. In his third report Dr Fronen said:

“5. In my opinion the skilled person would understand the inventive concept of the Patent, as conditionally proposed to be amended, is an improved means for at least partially preventing the generation of intermodulation products in a signal processing means using a high pass LC filter.”

Mothersdale

87. Mothersdale is a paper written by Martin Lee and Keith Mothersdale of Channel Corporation, based in North Carolina. The paper is entitled ‘Introducing Intermodulation – Its Role in Cable Modems And Reverse Path Operation’. It was presented at a conference in New Orleans in May 2000. A written copy was made available to attendees of the conference.

88. The second paragraph of the abstract includes this:

“This paper examines a specific problem, Intermodulation, as it relates to the transmission of high level reverse path signals through RF passive products. The factors contributing to Intermodulation Distortion occurring are explained in detail and a variety of solutions currently being pursued by passive product manufacturers are presented.”

89. Passive RF products, including LC filters, are those which do not increase the power of the signal, as opposed to active components such as transistors amplifying the signal, which do.

90. Under a section headed ‘The Problem’ the authors refer to saturation of the ferrite core of a device in a cable TV network. They say that when this occurs undesired harmonics of the original frequency are generated. The next section, headed ‘Common Approaches to Controlling Intermodulation in Passive Products’ begins:

“Manufacturers have for some time known about this problem and have made some attempts to develop and implement a solution. Initial solutions for the most part fell short in one fundamental manner. They did not address the problem at root cause, which is the physical design, material composition and linearity of the ferrite component itself. Other contributory solutions include ... adding components which prevent or limit other sources of interference such as impulse noise or other forms of voltage spikes. A closer examination of these different solutions reveals some of their inherent drawbacks if relied upon entirely.”

91. Having stated that components may be added to prevent voltage spikes, the paper explores this in a section headed ‘Adding Components to Prevent Re-Magnetization of the Ferrite’:

“Many manufacturers are now adding blocking capacitors with various voltage ratings to all ports of an indoor splitter. These blocking capacitors essentially reduce the level of the voltage spike reaching the ferrite, thereby preventing the ferrite from being re-magnetized. This method does help reduce the effects of low voltage spikes, but high voltage spikes can still induce enough magnetic change to cause the ferrite to operate non-linearly. It is therefore at best only a partial solution or defensive measure against the problem.”

Mothersdale and the Unconditional Claims

The evidence

92. In his second report Dr Fronen identified the issue on inventive step over Mothersdale as being whether it was obvious to use an LC filter as the high pass filter of claim 1 rather than using a simple blocking capacitor.
93. According to Dr Fronen the skilled person would understand that the Mothersdale blocking capacitor must be a DC blocking capacitor, i.e. one designed to block DC exclusively. The further information provided by the Patent is that a voltage surge can be seen as a burst of AC components together with a DC component. Dr Fronen referred to the first experiment disclosed in the Patent, which used a standardised IEC (International Electrotechnical Commission) 61000-4 5 level 2 pulse ('the IEC Pulse') to test robustness against lightning. He said that a transient pulse of such character will give rise to a number of short bursts of AC frequencies. Dr Fronen's view was that the skilled person would be informed after reading the Patent that a simple blocking capacitor has much less effect than an LC filter. He referred to simulations carried out by Technetix according to his instructions and said that these simulations had established that a blocking capacitor does not protect against an IEC Pulse whereas an LC filter does. He concluded this part of his report by stating that it would not have been obvious to a skilled person reading Mothersdale to replace the single blocking capacitor with an LC filter.
94. In his second report Mr Point strenuously disagreed. He rejected the assertion that the skilled person would understand the capacitor in Mothersdale to block DC only. Mr Point pointed out that Mothersdale refers to a voltage spike from lightning as the most common magnetising force. He said that long before the priority date it was well known that the profile of lightning had been standardised by the IEC Pulse and that the skilled person would have been very aware that this and lightning surges comprised AC components. The skilled person would know that impulse noise, also referred to by Mothersdale as a source of magnetisation, was not exclusively DC. Mr Point referred back to his first report in which he had said that the skilled person would easily appreciate that Mothersdale was teaching that component designers were using blocking capacitors as first order high pass filters as a partial solution to the problem of intermodulation distortion.
95. Mr Point continued in his report to say that any RF engineer would have in mind the range of ferrite containing passive components in the Mothersdale system and test the solution on a standard test bed before seeking to use the system. No skilled engineer would deploy any system without testing it first. This would reveal whether the single capacitor in the Mothersdale system made a measureable difference to intermodulation distortion. If an improved performance was required, it would be obvious to use a higher order filter in place of a single capacitor, about which the skilled person would be very familiar, namely an LC filter. The only limitations that would occur to the skilled person were physical space and budget.
96. In cross-examination Dr Fronen agreed that he would not have been prepared to give evidence in support of an argument that the Centrally Amended Claims were novel over Mothersdale. In other words, he confirmed that there was nothing inventive in the use of a high pass filter as a means of partially preventing the generation of intermodulation products. Any inventive step in the invention as claimed in the Unconditional Claims must lie in the use of an LC filter, a higher order filter, as the high pass filter.

97. Dr Fronen maintained his position that use of the word 'blocking' in Mothersdale, in the context of a blocking capacitor, would inform that reader that a component which blocked only DC would be used. However, he accepted that if, as Mr Point said, the skilled person would know that the blocking capacitor was also serving as a high pass filter, there was nothing inventive about moving from the Mothersdale high pass filter to a higher order high pass filter if, on investigation, the first order filter was not thought to be good enough.
98. In cross-examination Mr Point maintained his view that the skilled person would read Mothersdale as teaching the use of a high pass filter, i.e. by using the blocking capacitor. He was asked to assume that he was wrong about that. He answered that the skilled person would be surprised by the limitation that the capacitor should block only DC, would test it along with alternative filters to find out what worked, would conclude that it was necessary to block AC as well as DC and find the cut-off frequency that worked best.

Discussion

99. Dr Fronen's view that it would not have occurred to the skilled person to use an LC filter in the Mothersdale system depended entirely on his stated conviction that the skilled person would understand the term 'blocking capacitor' in a narrow way.
100. It was not the experts' evidence that 'blocking capacitor' is a term of art with a fixed and narrow meaning; it has to be understood in context. The relevant context was Mothersdale. Dr Fronen's position on this can be seen from the following exchange:
- Q. In terms of unwanted signals, his system has to cope with, Mothersdale is talking about the lightning and impulse noise affecting ferrites; correct?
- A. (The witness nodded)
- Q. And the skilled person, as we have discussed, knows about the frequency components in those voltage spikes?
- A. Yes, he knows that there is some AC and DC there, yes.
- Q. And the document talks about strong return path signals; yes?
- A. Yes.
- Q. Which obviously have frequency components, and as we discussed, this document says specifically those return path signals, the strong ones, can push the ferrite into its non-linear region?
- A. Correct.
- Q. So, notwithstanding all of that context, Dr. Fronen, you think that when the skilled person reads about a blocking capacitor being used to reduce the level of the voltage spike reaching the ferrite, he thinks he

is being taught that it is exclusively used to block DC; right?

A. Correct.

Q. And your whole basis for that is the word "blocking"; yes?

A. Whole basis -- yes, okay.

101. I find Dr Fronen's answer unconvincing. As was put to him, in Mothersdale the blocking capacitor is being used as a means of limiting the effect of energy spikes such as lightning and impulse noise, both of which were known to contain an AC component. It was also intended to limit interference from return path signals which had frequency components. I accept Mr Point's evidence that in such a context the skilled person would not take a blinkered view of the meaning of the 'blocking capacitor', expecting rather that its function was to serve to block DC and also to act as an AC high pass filter. That being so, as both experts agreed, there was no inventive step in choosing to replace it with an LC filter.
102. Mr Cuddigan argued that Mothersdale directs the reader towards improving the ferrite, not improving the filter. I accept that improving the ferrite is the primary recommendation in Mothersdale, but do not see why that would distract the skilled reader from trying an obvious alternative to the single capacitor being used as a high pass filter. The experts were agreed that an LC filter was an obvious potential improvement.
103. Mr Cuddigan also asked, rhetorically, why such an improvement was not made to Mothersdale in the period between its publication in May 2000 and the priority date of the Patent in May 2001.
104. I cannot draw from the evidence in this case an inference that manufacturers did not find it obvious to replace a capacitor with an LC filter to reduce voltage spikes. The experts thought that it would have been obvious to do so. This is an instance in which an argument of long felt want could have carried force only if there had been evidence about the filters that manufacturers were actually using up to May 2001. Given what the experts said, they may have been using the better alternatives: LC filters.

Mothersdale and the Conditional Claims

105. As I have already said, Mr Point's evidence was that no engineer would use a filter without using a test bed to find the right filter for the requirement in hand. He said that the prospect of an expensive mistake when the system was deployed would rule out any other approach. I accept that evidence.
106. Mr Point thought that following routine testing on the test bed the skilled person would use a filter with characteristics falling with Conditional Claim 1. In cross-examination Mr Point was taken through six steps, each requiring a choice to be made by the skilled person, before they would arrive at such a filter. During the course of this Mr Point did not deny that each choice would be required. The suggestion that the entire process from start to finish would have been obvious – i.e. that it would

have been what the EPO sometimes calls a one-way street – was not put to Dr Fronen as a possibility.

107. I am not satisfied that it would be routine for the skilled person to arrive at a filter within Conditional Claim 1 having read Mothersdale, so that such a filter would be an obvious variant.
108. However, for the reasons given above in the context of Jelinek, the claim lacks inventive step.

Buie

109. Buie is an article in the May 1999 edition of Cablemaster magazine. In a section headed ‘Intermodulation’ the author says this:

“Cable modems send data on the cable system’s return path at a very high level. These signals can cause poor quality ferrites in the splitter to saturate and reduce both the upstream and downstream signal levels by as much as 50%. To prevent this, it’s a good idea to use ferrite material that will perform well with high level signals. Installing voltage-blocking capacitors on all ports will further prevent the ferrite cores from becoming saturated or magnetised. This can be done inside the passive or through the addition of expensive in-line voltage blocking couplers on the output ports.”

110. A ‘blocking coupler’ is another term for a blocking capacitor. The oral evidence on Buie tended to get swept up with that on Mothersdale. Mr Cuddigan’s position was that if Teleste did not get home on Mothersdale, Buie added nothing more of relevance. In fact I think it applies both ways. Dr Fronen’s approach to Buie was very similar to his perspective on Mothersdale. He took the view that the reference to using blocking couplers would be taken as to be about blocking DC only. Mr Point said that the article told the reader that a blocking capacitor can improve the problem of non-linear behaviour of ferrites. The skilled person would have progressed from Buie in the same way that they would have progressed from Mothersdale.
111. For the reasons I have discussed in relation to Mothersdale, I take the view that both the Unconditional and Conditional Claims lack inventive step over Buie.

Added matter

The point in issue

112. Technetix argued that the Conditional Claim 1 claims the features disclosed in paragraphs [0020] and [0021] of the application as filed, as illustrated in Figure 2. Therefore, contrary to Teleste’s contention, an amendment to introduce the Conditional Claims would not result in the specification disclosing additional matter.
113. The relevant paragraphs state (omitting reference numbers):

“[0020] Figures 2 and 3 show two embodiments of high-pass filters, which can be arranged in or before the signal processing means or components as a pre-connected filter (prevention means). The high-pass filters that are shown in the figure each comprise an input, an output and an LC-filter consisting of

one or more coils and a number of capacitors, which is arranged between said input and said output. Preferably, but not necessarily, the capacitors are all high-voltage capacitors having a relatively low temperature coefficient. Also other filter configurations are possible: higher-order filters based on the same principle (Chebishev) or filters based on other principles (Cauer filters or elliptical filters) may be used.

[0021] The coils and the capacitors in the high pass filters that are shown in Figures 2 and 3 preferably have the following values:

coils	3.3 μ H
capacitors	1nF / 2kV / Y5E
capacitor	470 preferably”

114. Teleste contended that Conditional Claim 1 claims a system in which the LC filter comprises two 1nF capacitors and a 3.3 μ H coil, whereas the Figure 2 embodiment explained in paragraphs [0020] and [0021] (a) is limited to the specific features there set out and (b) these include features not mentioned in Conditional Claim 1, notably a 2kV voltage rating.

The law

115. Mr Cuddigan pointed to the distinction between the content of the general specification, which describes the invention, and the claims, which delimit the patentee’s monopoly. Relying on *AP Racing Ltd v Alcon Components Ltd* [2014] EWCA Civ 40; [2014] RPC 27, he said this in his written closing submissions:

“Accordingly, the law does not prohibit the addition of claim features which state in more general terms that which is described in the specification.”

116. In my view this is too general to be an accurate statement of the law. The circumstance in issue in *AP Racing* was this: a narrow class of products was disclosed in the application as filed, whereas in the patent as granted the patentee had gone for a wider monopoly by drafting claims to a broader class of products within which the narrow class fell. I discussed *AP Racing* in *Edwards Lifesciences LLC v Boston Scientific Scimed, Inc* [2017] EWHC 405 (Pat). Having quoted passages from the judgment of Floyd LJ, I referred to his paragraph 40 and said:

“[231] I interpret this paragraph to mean that if the skilled person reading the application as filed would understand that the narrower class disclosed *exemplifies* a broader class, then a claim in the granted patent to the broader class discloses no new technical information and does not offend the prohibition against added matter. On the other hand, if the skilled person would not have that understanding and the broader class is not otherwise disclosed in the application as filed, the court is liable to conclude that a claim to the broader class in the granted patent constitutes a disclosure of added matter.”

117. There is a related point of law, known as intermediate generalisation. Kitchin LJ (with whom Laws and Etherton LJJ agreed) explained the concept in *Nokia Corporation v IPCom GmbH & Co KG* [2012] EWCA Civ 567; [2013] RPC 5:

“[56] Turning to intermediate generalisation, this occurs when a feature is taken from a specific embodiment, stripped of its context and then introduced into the claim in circumstances where it would not be apparent to the skilled person that it has any general applicability to the invention.

[57] Particular care must be taken when a claim is restricted to some but not all of the features of a preferred embodiment, as the TBA explained in decision T 0025/03 at point 3.3:

“According to the established case law of the boards of appeal, if a claim is restricted to a preferred embodiment, it is normally not admissible under Art.123(2) EPC to extract isolated features from a set of features which have originally been disclosed in combination for that embodiment. Such kind of amendment would only be justified in the absence of any clearly recognisable functional or structural relationship among said features (see e.g. T 1067/97, point 2.1.3).”

[58] So also, in decision T 0284/94, *Neopost/Thermal Printing Mechanism* [2000] E.P.O.R. 24, the TBA explained at points 2.1.3-2.1.5 that a careful examination is necessary to establish whether the incorporation into a claim of isolated technical features, having a literal basis of disclosure but in a specific technical context, results in a combination of technical features which is clearly derivable from the application as filed, and the technical function of which contributes to the solution of a recognisable problem. Moreover, it must be clear beyond doubt that the subject matter of the amended claim provides a complete solution to a technical problem unambiguously recognisable from the application.

[59] It follows that it is not permissible to introduce into a claim a feature taken from a specific embodiment unless the skilled person would understand that the other features of the embodiment are not necessary to carry out the claimed invention. Put another way, it must be apparent to the skilled person that the selected feature is generally applicable to the claimed invention absent the other features of that embodiment.

[60] Ultimately the key question is once again whether the amendment presents the skilled person with new information about the invention which is not directly and unambiguously apparent from the original disclosure. If it does then the amendment is not permissible.”

118. The principle I discussed in paragraph 231 of *Edwards Lifesciences* is at root the same as the one there explained by Kitchin LJ. If the skilled person would have understood that the particular embodiment of the invention disclosed in the application as filed exemplifies a broader class, in the sense that the invention may be performed without this or that incidental feature of the particular embodiment, there will be no intermediate generalisation if the claims in the patent as granted are not limited by reference to those incidental features. On the other hand, if this would not have been

the skilled person's understanding, there *will* be an intermediate generalisation should those features, not perceived as merely incidental, be excluded from a claim in the patent as granted (or as sought to be amended).

119. In this context Mr Mellor referred, by way of example, to *Cantel Medical (UK) Ltd v Arc Medical Design Ltd* [2018] EWHC 345 (Pat) at [149]-[151].

Discussion

120. I was given no reason to suppose that the skilled person reading paragraphs [0020] and [0021] of the patent application as filed in this case would take from those paragraphs an understanding that provided the LC filter includes at least two 1nF capacitors and one 3.3 μ H coil there is freedom regarding the other features of the LC filter. In other words, I do not believe that the skilled person would understand that the embodiments of the communication system disclosed in those paragraphs and in Figure 2 exemplify the broader class of systems as now defined in Conditional Claim 1. Conditional Claim 1 discloses new information to the reader, namely the particular significance of using at least two 1nF capacitors and a 3.3 μ H coil and, by extension, that other features such as the voltage rating are merely incidental.
121. Conditional Claim 1 is invalid as disclosing matter which extends beyond that disclosed in the application as filed.

Conclusion

122. The Unconditional Claims would be invalid for lack of novelty and inventive step. The Conditional Claims would be invalid for lack of inventive step and added matter. The Patent stands to be revoked.
123. Had the Unconditional Claims been valid they would have been infringed by all three of Teleste's products in issue.