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HP-2017-000085 and HP-2019-000019

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

25 July 2024

Before:

MR JUSTICE LEECH

BETWEEN:

LUFTHANSA TECHNIK AG
(a company incorporated under the laws of Japan)

Claimant

- and -

**(1) ASTRONICS ADVANCED ELECTRONIC
SYSTEMS**

Defendants

**(a company incorporated in the state of
Washington USA)**

**(2) SAFRAN SEATS GB ZODIAC SEATS UK
LIMITED)**

AND BETWEEN:

LUFTHANSA TECHNIK AG
(a company incorporated under the laws of Japan)

Claimant

- and -

PANASONIC AVIONICS CORPORATION
**(a company incorporated in the state of
Delaware USA)**

Defendants

MR TIMOTHY HOWE KC and **MR MILES COPELAND** appeared on behalf of the Defendants in both claims (instructed by **Hogan Lovells International LLP** in Claim No. HP 2017 000085 and **Pinsent Masons LLP** in Claim No. HP 2017 000019)

MR HUGO CUDDIGAN KC and **MS MIRUNA BERCARIU** (instructed by **Jones Day**) appeared on behalf of the Claimant in both claims.

Hearing dates: 11 and 15 July 2024

APPROVED JUDGMENT

Mr Justice Leech:

I. The Application

1. By Application Notice dated 24 May 2024 (the “**Application**”) the Defendants (“**Astronics**” and “**Safran**” in the first action and “**Panasonic**” in the second action and together the “**Defendants**”) applied for permission to re-re-amend the Re-Amended Points of Defence and to rely upon a Notice of Experiments (the “**NOE**”) served on 25 April 2024. The facts which they sought to establish were that when measurements were carried out in accordance with the protocol in Schedule 1 the length of a plug pin which remained outside the socket of a number of different outlets was as set out in Schedule 2.
2. The Claimant (“**Lufthansa**”) originally opposed both limbs of the Application. On Thursday 11 July 2024 and Monday 15 July 2024 I heard the Application and by its commencement Lufthansa had accepted that permission should be granted for the Defendants to rely upon the NOE subject to the Court giving directions for the repetition of the experiments, the service of any reply experiments and the service of any further expert evidence. By the end of the hearing the Defendants did not oppose the timetable for directions which Lufthansa asked the Court to make.
3. The Defendants also sought permission for an extension of time until 11 July 2024 for the exchange of two expert reports one relating to the commercial market for the Defendants’ products and the other relating to forensic accountancy. By the end of the hearing the parties had also agreed a short further extension for service of the expert reports. Subject to one point I address the proposed amendments only in this judgment. However, Mr Hugo Cuddigan KC and Ms Miruna Bercariu, who appeared for Lufthansa, submitted that the Court should take into account the significant additional burden which the experiments would impose on the parties in considering whether to grant permission to re-re-amend. I must therefore consider the NOE and its consequences in that context.

II. Procedural History

(1) Background

4. The patent in suit EP(UK) 0,881,145 B1 (the “**Patent**”) claims a number of safety features of an in-seat power supply (“**ISPS**”) for supplying power to a socket in an aircraft

seat for use by passengers to power their personal electronic devices. Claim 1 of the Patent is to an ISPS system in which the socket is located remotely from the power supply, with cables passing between the two and a detector within the socket which detects the presence of a plug.

5. Astronics manufactures the components for a mains voltage ISPS system called the EmPower In-Seat Power Supply System (the “**EmPower System**”) in the USA. The EmPower System is supplied from the USA (still in component form) into the UK by both Astronics and Panasonic (separately). The components are then installed into aircraft seats by a number of different installers which include Safran. EmPower Systems can be supplied on a standalone basis or in conjunction with an in-flight entertainment or “**IFE**” system. Panasonic supplies the EmPower System exclusively in conjunction with the IFE systems which it manufactures and produces.
6. In a reserved judgment dated 22 July 2020 Morgan J held that the Patent was valid and that all three Defendants were liable for infringement: see [2020] EWHC 1968 (Pat) (the “**Liability Judgment**”). He declared that the EmPower System fell within claims 1 to 3 of the Patent but that a modified version of the EmPower did not fall with claim 2. He ordered an inquiry as to the damage which Lufthansa had suffered or, at its option, an account of profits: see the Order dated 22 July 2020. Lufthansa ultimately elected for an account of profits (the “**Account**”).
7. By Order dated 27 April 2023 Mr Recorder Douglas Campbell KC (sitting as a judge of the Patents Court) amended the Order dated 22 July 2020 so that it declared that Panasonic had infringed claims 1 to 3 of the Patent “by reason of its common design with its customer to connect the components to form the EmPower System in the UK”. By Order also dated 27 April 2023 the judge gave directions for the trial of the Account. He also ordered that a second CMC should be heard before 7 July 2023 and that the PTR should take place in the week commencing 9 September 2024. The PTR is now listed before me on 10 September 2024. The trial is also listed to commence before me on 1 October 2024 with a time estimate of 15 days.

(2) *The July Hearing*

8. On 12 July 2023 the second CMC took place before Sir Anthony Mann. It was primarily intended to deal with disclosure issues although shortly before the hearing the Defendants

made a strike-out application. There was an issue between the parties whether it was necessary for the Defendants to plead any counter-factual upon which they relied in answer to Lufthansa's causation case. Mr Cuddigan, who also appeared for Lufthansa on that occasion, submitted that the Defendants had to do so and, if they did, this would require wider disclosure and evidence. Pages 60 to 64 of the transcript record as follows:

"I already explained that the approach to causation in profits and causation of damages is the same and the loss caused by a tort is worked out by reference to the difference between the claimant's actual state and their state in the counterfactual world where the tort did not occur. That is "but for" causation. It is the same with profits. A defendant is prima facie liable for all the profits accrued by the infringing trade as against the profits it would have accrued if it had not carried out that infringing trade. It is that latter which is the counterfactual position. It is trite law that the court approaches the counterfactual world as a question of fact to be proved on the balance of probabilities. What that means is that if the defendants want to say that, but for the infringement they would have sold some alternative non-infringing product, they must plead that course as a factual assertion, give disclosure in relation to it and prove it on evidence at trial. It is our understanding that the reason the defendants, it is our expectation, the reason they made the infringing product is because they did not think anything else was going to work in the market. They rejected these alternatives on the facts. Assume with me I am right and they are sitting on documents saying "We cannot make product X, Y and Z work, the tests, the customers hate it, the airlines hate it, it is not going anywhere". What I want to avoid is a situation where those documents are not disclosed because the issue is not properly pleaded and at trial, or at some point, I am surprised by the, "Ah you have seen our pleading we have said we are relying on these alternatives and we did X, Y and Z". Really it comes down to this. It is my proposition that it must be right that if they are going to take this approach, if they want to assert a counterfactual, they need to plead it. It is common ground that the argument is absent from the pleaded case as it stands, that what gives cause for alarm is the way my learned friends deal with this in their skeleton. If you could turn, please, to page 12, this is referred to as issue C. I accept that that paragraph (f) can have a role to play on what is broadly called apportionment. THE JUDGE: I am sorry, page? MR. CUDDIGAN: Page 12. Issue C is apportionment of profits and non-infringing profits. I accept that the paragraph (f) has a minor role to play on apportionment. In effect, they say 1 that the patent is not a complete gateway to this market, you can get there other ways. So be it, but that is very different from saying not that other people have got there or one can, but "we would have done". "We would have done" is a very different state of affairs, a very different pleading, and the word "would" is absolutely critical. Would is an assertion of what would have happened in the counterfactual. So, they discuss apportionment from paragraphs 44 to 51 and then at 52 they record my learned solicitor's concerns. The concerns are, that the defendants do not plead that an in an alternative

world, without the EmPower system, they would have attempted to sell or would have sold such products into the relevant market. So that is the counterfactual on my side we are worried about. There is no pleading of what they would have done but for their infringements. The response is, the issue of what the defendants would have attempted to do is directed only to the case of whether, had the defendants not sold infringing EmPower systems, they could have sold alternative non-infringing systems. There is a problem there in the mixing of would and could. They are critically different because counterfactuals are dealt with in this court as factual issues.

THE JUDGE: Just a minute. Yes. MR. CUDDIGAN: The correct question is, are they advancing a case that they would have marketed, commercialised these products? Then if you move forward to paragraph 54, 54(c) is again my learned solicitor's concern. He says at 54(c) that if you are running this case it would require disclosure and evidence going to the question of whether the defendants would have attempted to sell these products into the market and whether the market would have responded positively. So that is a record of a very real concern. Again, the word "would" is important and it is not just disclosure. If a counterfactual case was pleaded, we would need far more extensive expert evidence, technical evidence about the performance of these products, etc. Indeed, possibly market evidence about the response of them. THE JUDGE: Is that additional evidence necessary over and above what you would need if it was just an apportionment --- MR. CUDDIGAN: Yes, because we can take apportionment because it is a minor aspect of the whole case. It really is relatively unimportant. Counterfactual could drive a coach and horses through the case and what we do not want is it just being waved at and said we do not -- and the alarm bells really come from paragraph 61, my learned friend's response to that concern. So if you turn up, please, paragraph 61 of the skeleton: "Mr McCulloch's third point does not apply to the product which was not an Astronics products (in respect of which there is no suggestion that Astronics could have sold in place of the Empower System). It can only apply to the two Astronics products" -- he is referring to the proposed amended points of claim. What he says there is not logically true but we are happy to take that as their position. He then says --- "Further, in referring to 'disclosure and evidence going to the questions of ... whether the market would have responded positively', Mr McCulloch raises the spectre of an issue which is not live on the pleadings." -- we agree --- "As explained above, the key issues are whether there were: (i) alternative designs of high voltage supply apparatus which do not use the inventive concept; and (ii) if these products were or would have been certified" -- again, on the pleadings we agree -- "At present, LHT's only responses are that the alternative products (i) are 'hypothetical' and therefore not relevant to the assessment of the profits (PoR28 [7]); (ii) that they would not have achieved certification" -- again on the pleadings we agree. Then here is the real problem: "Nowhere is it pleaded that if these devices were real, certified and marketed by the Defendants that they would not have sold well." So, my learned friend's position is that it is for Lufthansa to plead a negative case on what his clients would not have done in the counterfactual world and until Lufthansa do that, on the basis of his

paragraph 23(f), he can run a counterfactual. That is the worry. It cannot be right. It is an unworkable approach. It is clear that the legal and evidential burden falls on the defendants to plead and prove how they would have acted if they are going to run such a counterfactual case. This is the issue we need to flush out. It comes down to that line in the skeleton.”

9. Sir Anthony Mann accepted Mr Cuddigan’s submission and in his Order dated 12 July 2023 he ordered each of the Defendants to confirm whether it was running a case that it would “in the counterfactual have carried on commercial activity in relation to any allegedly non-infringing product(s) in place of the activity which it carried on in the real world in respect of the EmPower Systems” and to serve a statement of case which would provide particulars of that case.
10. On 2 August 2023 the Defendants served a confidential statement of case in relation to alternative products. They contended that if none of the Defendants could deal in the components used for assembling the EmPower System (as particularised in the Re-Amended Product and Process Description (the “**PPD**”)), Astronics would have modified the outlet units in a number of respects. They also contended that the optional components would have been supplied for use with the modified outlet units. The optional components included the Master Control Unit or “**MCU**” which is located in the electronic bay of the aircraft or the Advanced Master Control Unit or “**AMCU**”.

(3) *The Amended Points of Claim*

11. On 24 July 2023 Lufthansa served Amended Points of Claim, which recited the history of the proceedings and stated that Lufthansa elected for an account of profits: see paragraphs 1 to 10. Lufthansa then claimed the profits which accrued to Astronics, Safran and Panasonic and contended that no apportionment of profits was justified on the facts of the present case: see paragraphs 14 and 16. Lufthansa then pleaded that Astronics, Safran and Panasonic would have been unable to realise the profits set out in the Profits Information if they had not infringed the Patent, or been involved in acts of infringement: see paragraph 17.

(4) *The Amended Points of Defence*

12. On 11 August 2023 the Defendants served Amended Points of Defence. They answered the contention that no apportionment was justified by pleading that the EmPower System

made use of the inventive concept of the Patent by a limited combination of components (defined as the “**Components**”) but that those Components were not “functionally nor commercially an essential feature of the EmPower Systems” and that the systems could have existed without them. The Defendants gave detailed particulars of the allegation that the Components were not functionally essential which included the following:

“Functional non-essentiality

a. The functionality of the Components is incidental to the overall function of EmPower Systems. Hereunder the Defendants rely upon the functions of such Systems, all of which are independent of and unconnected with the inventive concept, including:

i. Power management, where configured with a Master Control Unit (MCU) or Advanced Master Control Unit (AMCU).

ii. Converting 115V AC, 360-800 Hz aircraft power to 110V AC, 60Hz power.

iii. Where configured for use with / integrated with In-Flight Entertainment (IFE) Systems, providing such Systems with a low voltage power source.

iv. Where configured with seats that contain in-seat reading lights, providing such reading lights with a low voltage power source.

v. Where configured with OUs that contain USB ports, providing passengers with a low voltage power source to operate passenger personal electronic devices.

vi. Where configured with in-use indicators (IULs), using the same to indicate that at least one of the passengers in a group of seats is operating a passenger personal electronic device.”

“c. Further or alternatively, for an electrical power supply product for installation in an aircraft cabin enabling inter alia the safe provision of in-seat high voltage power for passenger personal electronic devices to be fitted in and used in an aeroplane, it requires certification from the following regulatory bodies: the Federal Aviation Administration (FAA) in respect of the USA; and the European Union Aviation Safety Agency (EASA) in respect of EASA member states (of which the UK was one throughout the Relevant Period).”

13. The Defendants also relied on a number of alternative designs of high voltage supply apparatus which they alleged would not have used the inventive concept and which would have been certified by the FAA and EASA. These included the 1171 Twist Lock Outlet (the “**Twist Lock**”), the IFPL 1225 Outlet (the “**IFPL 1225**”) and the PowerBox in seat power system (the “**PowerBox**”). They then gave particulars of the allegation that the Components were not commercially essential and those particulars included the following:

“Commercial non-essentiality

g. The ultimate customers / users of EmPower Systems are the airlines into whose aeroplanes such Systems are fitted (the “Customer”).

h. EmPower Systems are typically purchased in two scenarios: (i) in conjunction with IFEs, or (ii) alone.

i. The majority of sales is made per scenario (i), as to which:

i. The EmPower System is supplied to the Customer by Astronics or the IFE provider. The latter is the entity responsible for selecting the System based on the IFE(s) it provides.

ii. Save in exceptional circumstances, the purchasing decision / choice with respect to the high voltage supply apparatus is made by the IFE provider, not the Customer. The Customer’s purchasing decision / choice is driven by factors relating to the IFE(s) offered by the provider, including: 1. price; 2. touch screen technology, in particular use of capacitive touch screen technology; 3. use of Android-based operating systems; 4. seat integration; 5. monitor design; 6. media storage capacity; 7. redundancy at the “head end”; 8. after sales support capability; 9. weight; 10. power drawn by / efficiency of the IFE; 11. mean time before failure (MTBF); 12. live TV content, in particular live sport; 13. offerability by Airbus and/or Boeing.

iii. The factors driving sales of the EmPower System from the perspective of the IFE provider include: 1. the reputation of the EmPower brand; 2. price; 3. whether the System was “turnkey” i.e. ready to be installed without further development or modification; 4. reliability and robustness of supply chain; 5. after sales service, in particular engineering support; 6. weight; 7. ability to integrate with IFE(s), including the technical feature of adequate heat dissipation; 8. offerability by Airbus and/or Boeing.

iv. The Components are not essential to any of the factors listed above.

j. The minority of sales is made per scenario (ii), as to which:

i. The Customer or leasing company acting on the instructions of the Customer procures the EmPower System directly or indirectly from a/the supplier Astronics.

ii. The key factors driving sales of the EmPower System from the perspective of the Customer include: 1. price; 2. after sales service; 3. weight; 4. power drawn; 5. MTBF; 6. offerability by Airbus and/or Boeing.

iii. The Components are not essential to any of the factors listed above.”

14. The Defendants pleaded that in the premises of these particulars, Lufthansa was only entitled to that portion of the overall profits which were attributable to the Components and that the appropriate portion was no higher than the costs of the Components: see paragraph 24. The Defendants also pleaded a positive case that it was necessary to apportion the profits between Lufthansa and K.I.D. Systems GmbH (“**KID**”), a wholly

owned subsidiary of Airbus and that the grant of a licence to KID was a deductible cost:

“51. Further or alternatively, in April 2002, GD AES had asserted that KID infringed two patents belonging to GD AES (US 5754445 and 6046513 (the “GD AES Patents”)) due to KID’s sale of inflight entertainment systems. It had further asserted that Airbus infringed the GD AES Patents by using integrated inflight entertainment/ SPSS products on Airbus aircrafts. Astronics is the successor in title to the GD AES Patents.

52. As noted above, in May 2002 KID and Airbus sent a letter to GD AES asserting that GD AES had infringed US 6016016.

53. Subsequently the 2003 Settlement Agreement included a release by AES for alleged infringement by KID and Airbus of the GD AES Patents occurring before the October 2003 date of the 2003 Settlement Agreement.

54. In addition, contemporaneously with the 2003 Settlement Agreement, GD AES and Airbus entered into a “Patent License Agreement” licensing Airbus under the GD AES Patents (the “Airbus Licence”).

55. Further, also contemporaneously with the 2003 Settlement Agreement, GD AES and KID entered into an Amendment to License Agreement (the “KID Amendment Licence”) which amended a previous “AES/KID Patent License Agreement” so as to grant to KID a licence under the GD AES Patents (collectively, the “KID Licences”).

56. The Airbus Licence and KID Licences continued until the expiration of the last to expire of the GD AES Patents.

57. The Airbus Licence and KID Amendment Licence were given in order to allow GD AES to continue to supply EmPower Systems without continuing threats of patent infringement from KID and/or Airbus and were continued to allow Astronics to continue to supply EmPower Systems without threat of patent infringement from KID.

58. Accordingly, the grant of the Airbus Licence and KID Amendment Licence represents a cost to Astronics of its supply of EmPower Systems which falls to be taken into account in the calculation of the profits derived by Astronics from its infringements of the Patent.

59. Astronics will say that the cost to it of the grant of the Airbus Licence and KID Amendment Licence is a matter for evidence. Without prejudice to the foregoing, and pending disclosure, Astronics will say that the cost is the value to Airbus and KID of licences under the GD AES Patents entered into in the KID Amendment Licence and Airbus Licence taking into account any payments received by GD AES and/or Astronics under the 2003 Settlement Agreement, Airbus Licence and/or KID Licences.”

(5) *The Re-Amended Points of Claim*

15. On 21 September 2023 Lufthansa served Re-Amended Points of Claim. It now pleaded a much more detailed case in relation to the consequences of infringement. I set out below the relevant paragraphs without colouring or underlining the new text or incorporating

the deleted text:

“14. Lufthansa is entitled to an award of the following profits:

- (a) the profits that Astronics’ acts of infringement (namely the supply and disposal in the UK of components of the EmPower System) caused Astronics to accrue;
- (c) the profits that Safran’s acts of infringement (namely the manufacture of EmPower Systems in the UK) caused Safran to accrue;
- (d) the profits that Panasonic’s acts of infringement (namely the supply and disposal in the UK of components of the EmPower System) caused Panasonic to accrue.; and (e) the profits accrued by Panasonic caused by Panasonic’s common design with its customers to infringe by connecting the components to form the EmPower System in the U.K.

Together, the above acts and activities are referred to as the “Infringing Dealings”.

14A. For the reasons set out further below, Lufthansa’s case is that the profits caused by Astronics’ Infringing Dealings include those realised on transactions between Astronics and the third parties with whom it engaged in the Infringing Dealings, namely the sale of, the supply of and other commercial transactions relating to, the following products and services:

- (a) the “Primary Components”, being Outlet Units (including mains AC/USB combined power outlets); power supply units known as ISPSs (In-Seat Power Supplies), SPMs (Seat Power Modules) or SPBs (Seat Power Boxes); and cables joining those components. Lufthansa’s current understanding of Astronics’ business practices is that the Primary Components are listed in Appendix A, which is an extract from AES’ Master Part List AES4-01227464. For the avoidance of doubt, the Primary Components include any parts which are functional substitutions for those listed in Appendix A for use in mains voltage power supplies;
- (b) the “Secondary Components”, being additional components of EmPower Systems. Lufthansa’s current understanding of Astronics’ business practices is that the Secondary Components are listed in Appendix B, which is an extract from AES’ Master Part List AES4-01227464. For the avoidance of doubt, the Secondary Components include any parts which are functional substitutions for those listed in Appendix B for use in mains voltage power supplies.

The Secondary Components include:

- (i) control units known as MCUs (Master Control Units), AMCUs (Advanced Master Control Units) or EMCUs (Enhanced Master Control Unit);
- (ii) in-use indicators/lights;
- (iii) installation kits, including kits for the galley, the head end, the MCU, ISPS, seats, the crew;
- (iv) covers, frontplates or faceplates, including for outlet units, the MC,

ISPS and in-use light indicators;

(v) backshells or other enclosures for Outlet Units, ISPS or other components;

(vi) dripshields for MCUs;

(vii) configuration modules;

(viii) side wall / floor disconnects;

(ix) mode select modules, power select modules or voltage source supplies;

(x) termination caps, studs and termination plugs;

(xi) circuit breakers, connectors, relays, resistors, rivets, pads, adapters;

(xii) brackets, clamps, clips, holders, bumpers, jumpers, straps, spacers, latches and hinges;

(xiii) screws, washers, screw retainers, nuts, plungers, grommets, pads, springs, tape;

(xiv) any cables, harnesses, extensions and wires, grounding or passing between, to or from Primary and/or Secondary Components;

(xv) DC power outlets, where such power outlets have been specified and supplied to be powered by an ISPS/SPM/SPB. For the avoidance of doubt, outlets integrated within IFE displays are not covered by this subparagraph.

(c) the following “Ancillary Goods and Services”:

(i) support services rendered with a view to completing qualification, including but not limited to testing, confirmation of parts conformity, provision of software, review of system integration and test plan, attendance at buyers’ facilities, review of installation engineering drawing package and wiring diagrams and related AES products, provision of simulated loads and DVD players to conduct EMI and flight testing, supplying fit check hardware, and on-site test and installation support;

(ii) installation and support services;

(iii) training services;

(iv) warranties and extended warranties;

(v) servicing, repairs and testing equipment (including but not limited to the parts listed in Appendix C, which is an extract from AES’ Master Part List AES4-01227464, and any parts which are functionally equivalent to such parts), and loaning testing equipment;

(vi) shipping costs and charges;

(vii) product and maintenance support;

(viii) re-certification and refurbishment fees.

14B. Hereunder Lufthansa refers to transactions for the Primary Components, the Secondary Components, and/or the Ancillary Goods and Services, as the “Relevant Transactions”.

14C. Additional payments made in response to any failures to meet minimum order quantities are included within Lufthansa's claims.

14D. Pending disclosure, evidence and further information received otherwise, in support of its case on causation against Astronics, Lufthansa will say that the Infringing Dealings drove the Relevant Transactions for the reasons set out below:

(a) the relevant market was at all material times for the market for systems which provided AC mains voltage power in an aircraft cabin through sockets suitable for conventional plugs;

(b) the key technical barrier to entry into that market was conceiving a power supply design which was sufficiently safe and robust to be certified by the relevant authorities and approved by the relevant airlines for use in the passenger cabin of an aircraft;

(c) the incorporation of the invention in claims 1 and/or 2 of the Patent enabled the EmPower Systems to overcome that technical barrier and hence caused the Defendants to obtain access to that relevant market and to achieve the Relevant Transactions.

14E. Further, EmPower Systems are modular in that the Primary and Secondary Components can be configured in different combinations in response to the demands and requirements of particular customers. However, the Secondary Components are designed to be optional and/or subsidiary and to be connected directly or indirectly to one or more Primary Components. Accordingly, transactions for Secondary Components are themselves direct consequences of transactions for Primary Components.

14F. Further, customers for EmPower Systems may require or benefit from technical assistance for the specification, qualification, installation and maintenance of components of EmPower Systems. The provision of any Ancillary Goods and Services by Astronics to such customers is a consequence of transactions for Primary Components."

16. Lufthansa then advanced corresponding claims against both Safran and Panasonic relying on the particulars in paragraphs 14B to 14F (above). Finally, Lufthansa relied on certain facts and matters set out in a witness statement and in Astronics marketing material but it is unnecessary for me to set out this material here.

(6) *The Re-Amended Points of Defence*

17. On 16 November 2023 the Defendants served their Re-Amended Points of Defence. They disputed Lufthansa's entitlement to profits on the basis that it was claiming to be entitled to profits not only for the primary components but also for "convoyed goods" (a legal expression referring to ancillary goods and services). They took a number of points about the definitions used. In particular, they defined the term "PPD EmPower System" as the

“Primary Components when connected together”. They then pleaded as follows (and again I omit the colouring and underlining):

“17B. As to §14A, §14G and §14I, it is denied that any of the Defendants’ profits realised on the Relevant Transactions were caused by the Infringing Dealings. Without prejudice to the generality of the foregoing, the Defendants will say as follows.

Astronics – Primary Components

17C. Paragraph 14D is denied. In relation to sub-paragraphs (a)-(c) thereof (each of which is denied), it is admitted that in order to achieve meaningful sales, the Outlet Units and ISPS/SPM/SPB of PPD EmPower Systems as they existed in December 2004 were certified by the FAA (which certification was recognised by other Certification Bodies as required) in December 2004. To the extent that the Components were so certified, the December 2004 certification was the basis on which subsequent versions of the Outlet Units and ISPS/SPM/SPB in PPD EmPower Systems were approved by the FAA and other Certification Bodies. The approval of PPD EmPower Systems for airline customers and by airframe manufacturers had also taken place on a number of occasions several years before the Relevant Period and did not involve any Infringing Dealings. Throughout the Relevant Period, the prior certifications and approvals referred to above were not a proximate cause of the decision by third parties to purchase the Primary Components and/or the revenue derived by Astronics, such decisions being driven instead by considerations of the kind set out in paragraphs 23i-j below.

17D. Further, the revenue derived by Astronics in relation to the Primary Components supplied to the UK was earned pursuant to the provisions of contracts with (i) airlines or leasing companies acting on the instructions of airlines (ii) Panasonic or (iii) seat manufacturers such as Safran. In relation to (i) and (ii), notwithstanding that the Primary Components were imported and supplied in the UK by Astronics, acts of infringement for which it has been found liable took place on some occasions in circumstances where the contractual right to payment for the Primary Components was triggered by the prior shipment of the same in the United States. In the premises, it is denied that the profits earned by Astronics through such transactions were caused by the Infringing Dealings; the profits in question were derived from acts that were themselves non-infringing and took place before infringement occurred. In relation to (iii), Astronics only contracted with third party seat manufacturers (including Safran) in circumstances where the relevant component was defective, lost or damaged in transit (as to which Astronics earned no revenue) or had been damaged by the seat manufacturer during installation (as to which the revenue earned by Astronics over the Relevant Period was negligible).

Astronics – Secondary Components

17E. Insofar as §14D(a)-(c) are relied upon in relation to Secondary Components, paragraph 17C above is repeated, as is paragraph 17D (with Secondary Components replacing Primary Components).

17F. With the exception of MCU/AMCU/EMCUs, in-use indicator lights and the cables by which such components are connected to ISPS/SPM/SPBs, none of the Secondary Components is designed to be connected directly or indirectly to the Components or to interact (whether functionally or otherwise) with the same.

17G. As for §14E, it is admitted that (i) the Primary and Secondary Components of PPD EmPower Systems can be configured in different combinations in response to the demands and requirements of different customers (ii) the Secondary Components are designed to be optional in the sense that PPD EmPower Systems are capable of operating without them and (iii) certain Secondary Components (for example cables for in-use indicators/lights) are designed to be connected to a Primary Component. The Defendants do not plead to the Secondary Components being designed to be “subsidiary” and “connected indirectly to one or more Primary Components”, these allegations being vague and/or meaningless. Save as aforesaid, §14E is denied. It is denied that the foregoing admissions (whether individually or collectively) establish that transactions for Secondary Components were themselves direct consequences of transactions for Primary Components, still less were they caused by the Infringing Dealings. Purchasing decisions in respect of Secondary Components were driven by considerations of the kind set out in paragraphs 23i-j below.

17H. Further, without prejudice to the foregoing, the list of Secondary Components in §14A(b) refers to parts which Astronics supplied to its customers free of charge including (but not limited to) certain types of configuration module. Accordingly, and without prejudice to the foregoing denials, the supply of such parts did not cause Astronics to accrue any additional profits beyond those already claimed.

17I. Yet further, and again without prejudice to the foregoing denials, Lufthansa is not entitled to Astronics’ profits in respect of Secondary Components which were not shipped by Astronics to the UK in the Relevant Period, including (but not limited to) certain types of installation kit, covers, frontplates, faceplates, backshells, dripshields for MCUs, side wall/floor disconnects, power select modules, circuit breakers, relays and rivets.

Astronics – Ancillary Goods and Services

17J. Insofar as §14D(a)-(c) are relied upon in relation to Ancillary Goods and Services, paragraph 17C above is repeated (with Ancillary Goods and Services replacing Primary Components).

17K. Save as follows, §14F is denied. It is admitted that customers for PPD EmPower Systems may require or benefit from technical assistance for the specification, installation and maintenance of components of such Systems. It is denied that the foregoing admission establishes that Ancillary Goods or Services were provided to customers as a consequence of transactions for Primary Components, still less that they were caused by the Infringing Dealings. Transactions in respect of such goods and services were a consequence of the decision making process set out in paragraphs

23i-j below and the considerations referred to therein.

17L. Further, without prejudice to the foregoing, the list of Ancillary Goods and Services in §14A(c) refers to goods and services which Astronics supplied to its customers free of charge including (but not limited to) testing equipment, support services rendered with a view to completing qualification and installation and support services. Accordingly, and without prejudice to the foregoing denials, the supply of such goods and services did not cause Astronics to accrue any additional profits beyond those already claimed.

17M. Yet further, and again without prejudice to the foregoing denials, Lufthansa is not entitled to Astronics' profits in respect of Ancillary Goods and Services which were not provided by Astronics in the UK in the Relevant Period, including (but not limited to) extended warranties.

18. The Defendants also advanced very similar defences on behalf of both Panasonic and Safran. In relation to Panasonic, they repeated paragraphs 17C-G and 17J-K and substituted "paragraph 23i" for "paragraphs 23i-j" in paragraph 17K (above). Under the heading "Apportionment" the Defendants re-amended the particulars of both technical and commercial non-essentiality and, in particular, to expand on the alternative designs upon which they placed reliance. They also added an additional paragraph to contend that profits should be apportioned by reference to the total number of patents protecting the Primary Components:

"24A. Further or alternatively, Lufthansa is only entitled to a portion of the overall profits earned by the Defendants from their activities in respect of PPD EmPower Systems, such portion being quantified by reference to the total number of patents which protected the Primary Components ("Total Patents") of which the Patent was but one. The remaining patents (the "Other Patents") relate to ISPS/SBP/SPM units in the manner identified in Annex 5. The Defendants will say that insofar as the technology residing in the Primary Components was the subject of patent protection, the Patent and each of the Other Patents should be treated as equally important for the purposes of this Account. In the premises, the proportion of the overall profits to which Lufthansa is entitled in respect of PPD EmPower Systems comprising the ISPS/SBP/SPM Units in Annex 5 is no more than the reciprocal of the number of Total Patents set out therein."

19. Annex 5 contained a table of 11 patents which protected one series of components and 7 patents which protected another series of components. It contained the two GD AES Patents (above) which had originally defined in the Points of Defence dated 9 December 2022: US 5754445 and US 6046513. Mr Cuddigan also pointed out that it made no distinction between patents owned by the Defendants themselves and patents owned by

third parties.

20. The Defendants did plead a case in relation to differential profits although it was a specific alternative pleaded by reference to the modified EmPower System which Morgan J held did not infringe the Patent. Under the heading “**Differential profits/comparables**” the Defendants pleaded as follows:

28A. Further or alternatively, the Defendants will say that the appropriate measure of the profits to which Lufthansa is entitled is to be assessed by reference to the differential profits as between (i) PPD EmPower Systems and 1171-based EmPower Systems and/or (ii) PPD EmPower Systems and Modified 1171-based EmPower Systems as set out in the Statement of Case.

28B. Further or alternatively, the Defendants will say that the appropriate measure of the profits to which Lufthansa is entitled is to be assessed by reference to the payment provisions of the 2014 Teaming Agreement referred to in paragraph 37e below. The Defendants will say that the profit due to Lufthansa throughout the Relevant Period is no more than the rate payable per sale of Outlet Unit in the 2014 Teaming Agreement.”

(7) *Amended Points of Reply*

21. On 22 November 2023 Lufthansa served Amended Points of Reply (having provided a copy in draft). It took the position that the Defendants had not answered its case on causation and, in particular, the case that the Patent enabled Lufthansa to overcome the key technical barrier to entry into the relevant market. In particular, it replied to paragraph 17C of the Re-Amended Points of Defence (above) as follows:

“2E. Paragraph 17C purports to respond to Lufthansa’s case on causation, but does not do so. The reasons set out do not engage with Lufthansa’s positive case, and Lufthansa will rely hereafter on the absence of any legitimate reasons for the denials in paragraph 17C. Without prejudice to the generality of the foregoing: (a) The Defendants have not responded to the plea as to the relevant market, the key technical barrier or the overcoming of that barrier. They are accordingly precluded from leading positive evidence in relation to those matters. (b) The causative relationship relied on by Lufthansa is that between Infringing Dealings and the accrual of profit. Further, Lufthansa accepts that there were other causative factors informing the accrual of those profits, but they do not prevent the relationship relied on being sufficiently proximate to render profits recoverable. Save as aforesaid, paragraph 17C is outside the knowledge of Lufthansa and not admitted.”

(8) *The December Hearing*

22. On 1 December 2023 a hearing took place before Bacon J. Mr Christopher Hall appeared on behalf of Lufthansa and there was some debate between him and the judge about the pleading of apportionment. He took the judge to paragraph 23 of the Points of Defence and the pleading of non-essentiality. Mr Howe relied on the relevant passage because the judge expressed some surprise that Lufthansa had not replied in detail to the Defendants' apportionment case:

“MR. HALL: In the light of that letter I want to be clear about our position on apportionment. The defendants are running a case that essentially none of their profits should be apportioned to the invention, and we intend to challenge that case. We intend to do so in two ways. The first way we are going to challenge that case is by running a positive case that no apportionment is appropriate, and we should get 100% of the profits. MRS. JUSTICE BACON: That is the case referred to in this letter. MR. HALL: That is the case that they refer to in this letter, yes, and that is our positive case, the one that I have called commercial causation on our points of claim. If it turns out that apportionment is appropriate, then the court will have to decide upon the correct figure, and that is all a matter of weighting these different factors against each other, so it may be that 10% is contributed to a technical factor or 20% to a commercial factor, whatever it is. Lufthansa is likely to challenge the defendants' case by attacking each of the weightings that the defendants propose. So we may say, for example, that the defendants attach too much weight to that technical factor, or to this commercial factor, with the result that we will argue that the overall apportionment should go up. My submission is that this is a reflection of the fact that the court, at the quantum trial, is not restricted to making a binary decision between either 0 or 100. The judge may be perfectly entitled to take the view that neither extreme is correct, and the correct result is somewhere in the middle: 50, 60%, 40%, whatever the judge decides on the materials. The important point is that we are entitled to disclosure and then to lead evidence and make submissions in respect of that middle ground. That is what we intend to do. My Lady, I hope that that sets the background for the case, and what the dispute is and the key disputes on the pleadings. MRS. JUSTICE BACON: Is that middle ground case pleaded in the points of reply? Because if that is your case, then one would expect to see that there. MR. HALL: We are not pleading specific positive aspects, saying, for example, this particular technical feature carries less weight than that technical feature, or something to that extent. We do not actually have that pleading to respond to. You have seen the apportionment pleading of the defendants, and it simply lists various factors. It does not say the weighting here should be 5% or 2%. It just says there are lots of factors that are relevant. MRS. JUSTICE BACON: That goes to a case that none of the profits should be apportioned to the invention, so if your case is that some of those might be relevant, then is that not something that you would have had to plead? Because at the moment if one sees the party's pleaded case it is either nothing is relevant and there should be no apportionment, and your case that there should not

be any apportionment at all and you should get 100%. So if you are saying that, as an alternative, fall-back option, which I understand your case to be, that the court will then have to weigh it and come down to a figure that is somewhere between 0 and 100, I would have expected to see that pleaded.”

(9) *The DRD*

23. On 1 December 2023 Bacon J made an order for extended disclosure in accordance with sections 1A and 1B of the Disclosure Review Document annexed to the Order (the “**DRD**”). Issues 8 and 8A addressed Lufthansa’s case that the inventive concept was a barrier to the market and I set out each issue with the model for disclosure, disclosure requests and responses immediately below:

“Issue

8. What is the relative importance to the commercial success of the EmPower System of (i) the Components (as defined in paragraph 22 PoD) and (ii) the factors listed in paragraphs 23(a), (b), (i), (j) PoD.

Model for Disclosure

Astronics & Panasonic, to be provided in the manner proposed in HL’s second letter of 24 Nov 2023, save that each each of Lufthansa and Ds select 21 Astronics contracts concluded in the period 2007-2018, and 30 Panasonic contracts concluded in the period 2009-2018, with Lufthansa to select first.

Request made of Lufthansa

8.1 Contracts recording purchases by or procurement on behalf of the Lufthansa Group Airlines of components of the SkyPower product (including procurement as part of an IFE system) during the Relevant Period (in respect of which Lufthansa was involved or a party) and all the requests for information (RFIs), answers to RFIs, requests for proposals (RFPs), proposals and compliance matrices, that lead to those contracts.
8.2 Recommendations by Lufthansa to the Lufthansa Group Airlines or requests from the Lufthansa Group Airlines to Lufthansa indicating a recommendation or preference for a particular in-seat power supply system, based on some or all of the factors listed in PoD (23i).
8.3 Documents recording the reasons for the selection of EmPower instead of SKYPower for inclusion in the Panasonic IFEs for Deutsche Lufthansa AG’s 747-8i aircraft (see the Memorandum of Understanding dated 24.10.2007 between Lufthansa, Deutsche Lufthansa AG and Panasonic for the 747-8i project in which that selection is afforded to Deutsche Lufthansa AG and Lufthansa).

Response

8.1 – Agreed on a Model D basis whereby Lufthansa will conduct a search of pre-contractual materials based on search terms, to be agreed. Lufthansa

is not proposing limiting these searches to only a selection of contracts, and will run searches across all relevant documents. The Defendants are at liberty to seek disclosure of the contracts themselves if appropriate. 8.2 Not Agreed. 8.3 Agreed.

Issue

8A. Whether the relevant market was for AC mains voltage power, the barriers to entry into that market, and how EmPower Systems gained entry into that market.

Model for Disclosure

In relation to the relevant market – D (Astronics, Panasonic, to be satisfied by the Ds by disclosure given in respect of Issue 8). In relation to the remainder of the issue – C (Astronics, Panasonic) Model C disclosure from Lufthansa (see Request 8A.6 below).

Request made of the Defendants

The following documents in respect of Primary Components and of the 1171 Outlet Unit: 8A.1. FAA certification documents; 8A.2. Documents recording approval by airframe manufacturers; 8A.3 Documents sufficient to show offerability by each of Boeing and Airbus; 8A.4. Astronics' submissions to the FAA, including safety assessment; 8A.5 The package of documents as submitted to Airbus and Boeing.

Response

8A.1: Agreed. 8A.2: Documents recording approval by airframe manufacturers will be caught under Request 8A.3. 8A.3: Agreed 8A.4: Agreed. 8A.5: Agreed. Ds to provide (i) a list of packages submitted to Airbus and/or Boeing; (ii) one package of documents submitted to Boeing and one submitted to Airbus; (iii) one further package of documents selected by Lufthansa based on the list in (i).

Request of Lufthansa

8A.6: All concluded contracts for LHT Airlines for IFEs and in seat power in the AES Relevant Period (showing the mix of mains voltage and USB in seat power on the aircraft).

Response

8A.6: Not agreed. Lufthansa is willing to provide an extract from its procurement database (in the form of an excel spreadsheet) containing the number of USB-only outlets and the number of high voltage AC outlets which were sourced by Lufthansa for LHT Airlines (as defined in the DRD) from KID during the Relevant Period. Lufthansa also offers to search on a Model D basis for contracts concerning procurement of EmPower Systems by Lufthansa for Lufthansa Group Airlines during the Relevant Period.”

24. On 20 December 2023 Bacon J made a further order resolving the outstanding issues between the parties. She ordered the Defendants to provide the requested disclosure in answer to request 8 by reference to 42 Astronics contracts selected by both Lufthansa

and the Defendants in the period 2007 to 2018 and 30 Panasonic contracts. The requests which the Defendants were required to answer under Model C for Issue 8A had been agreed and the judge made no further order in relation to that issue.

(10) *Re-Amended Points of Reply*

25. On 19 January 2024 Lufthansa served Re-Amended Points of Reply pursuant to the Order made by Bacon J on that date. Lufthansa repeated the allegation that the Patent enabled the Defendants to overcome the technical barrier of a power supply design which was sufficiently safe and robust to obtain certification. They also pleaded that the MCUs which the Defendants used as their power management systems were “technically trite” or “commercially commonplace sundry materials”. They continued:

“2JB. In the context set out in paragraphs 2J and 2JA above, Lufthansa will say that the profits realised in respect of Secondary Components outside the UK and/or the Relevant Period will have been caused by Infringing Dealings in Primary Components where it was proposed or intended by the Defendants and/or their respective customer or their IFE agent that such components or goods would be directly connected on the same aircraft to Primary Components which were the subject of Infringing Dealings or indirectly connected on the same aircraft to such components exclusively via one or more other Secondary Components.

2JC. For the avoidance of doubt, Lufthansa will say that the relative timings of orders or supplies of (i) Primary Components and (ii) Secondary Components is not relevant to the causation asserted, in particular because airline customers would have returned Secondary Components or Ancillary Goods if the Primary Components with which it was proposed or intended that they be connected could not be supplied.”

(11) *Request for Further Information*

26. On 28 March 2024 Lufthansa served a request for further information relating to the Twist Lock and on 8 April 2024 Hogan Lovells provided the following response to that request:

“Of the first letter of Hogan Lovells dated 26 March 2024 and the paragraph: “As noted in your letter, our clients plead that both the 1171 Twist Lock Outlet (“Twist Lock”) and the IFPL 1225 Universal Outlet (“IFPL 1225”) did not use the inventive concept of the Patent, in that they provide power before full insertion of the pins (paragraph 23(f) of the Points of Defence). However we do not agree with the assertion that in pleading this, our clients are arguing that “there is a distinction in the degree of insertion of the pins before power is provided between the

infringing EmPower System and each of the Twist Lock and the IFPL 1225". Our clients make no such distinction, its case relies upon the scope of the claims of the patent as clearly construed in the judgement of Morgan J of 22 July 2020 (the "Liability Judgement")."

Request:

Notwithstanding that the Defendants are i) framing their argument on an alleged difference between, on the one hand, the Twist Lock / IFPL 1225 (as appropriate), and on the other, the scope of the claims of the Patent as construed by Morgan J in the Liability Judgement, and ii) not asserting any positive case based on any distinction in the degree of insertion of the pins before power is provided between the infringing EmPower System and the Twist Lock and IFPL 1225, the Defendants are asked to confirm that if there is found to be no material difference between the degree of insertion of the pins before power is provided as between i) the infringing EmPower System and ii) the Twist Lock / IFPL 1225 (as appropriate), then they accept that the Twist Lock / IFPL 1225 (as appropriate) requires a plug to be fully inserted before power is provided.

Response:

Not confirmed. In relation to the infringing EmPower System, the precise degree of insertion of the pins before power is provided (whether in relative or absolute terms) was not addressed by the parties at the liability trial. Furthermore, it did not form any part of the reasoning that supported Morgan J's decision in relation to infringement, still less was it fundamental to that decision. In the premises, the Defendants are not estopped from contending that the Twist Lock / IFPL 1225 (as appropriate) does not require a plug to be fully inserted before power is provided, even if there is no material difference between the degree of insertion in respect of such products as compared with that of the infringing EmPower System."

(12) The Proposed Amendments

27. On 10 May 2024 Hogan Lovells provided Jones Day with a draft of the Re-Re-Amended Points of Defence (the "**RRAPOD**"). By letter dated 21 May 2024 Jones Day informed Hogan Lovells that Lufthansa was not prepared to consent to the proposed amendments and on 24 May 2024 the Defendants issued the Application supported by a witness statement also dated 24 May 2024 ("**Bennett 18**") made by Mr Stephen Bennett, a partner at Hogan Lovells. On 20 June 2024 Mr Alastair McCulloch, a partner at Jones Day, made a witness statement on behalf of Lufthansa opposing both limbs of the Application ("**McCulloch 27**") and on 28 June 2024 Mr Bennett made a witness statement in reply ("**Bennett 20**"). On 5 July 2023 Mr McCulloch made yet a further witness statement ("**McCulloch 28**") updating his earlier evidence and replying to Bennett 20. The Defendants did not object to the admission of McCulloch 28.

28. On 17 May 2024 the parties also exchanged principal witness statements for trial. On 5 July 2024 the parties also exchanged the principal reports of a number of their experts. By letter dated 3 July 2024 Hogan Lovells wrote to Jones Day stating as follows:

“Given that Lufthansa has known the substance of the Defendants’ proposed amendments since 10 May 2024, and will have had more than 2 months by the date of the hearing next week before Leech J, it does not seem reasonable or proportionate to suggest that Lufthansa requires a further three weeks to respond to the RRAPoD. Accordingly, should the RRAPoD be permitted, the Defendants propose that Lufthansa can and should serve its Re-Re-Amended Points of Reply by 4pm on 18 July 2024.”

29. By letter dated 4 July 2024 Jones Day replied. They stated that they did not agree as a matter of procedural law that this was correct or that Lufthansa was under any obligation to incur the heavy costs of addressing the issues raised by the proposed amendments before they were issues in the case. They also stated that if the Court agreed with their own client’s view of the law, then the Defendants’ proposed directions were inadequate and invited Hogan Lovells to provide a new proposal for directions. There was no substantive reply to that letter.

III. The Disputed Amendments

30. Between 10 May 2024 and 11 July 2024 the issues had narrowed to some extent. Lufthansa had agreed to certain amendments and the Defendants had agreed to withdraw certain amendments (or some text from some of the proposed amendments). By the time of the hearing the following amendments remained in dispute.

(1) Certification

31. The Defendants asked for permission to advance an alternative case in relation to the certification of the EmPower System by the FAA and other certification bodies. They wished to add the following additional wording to paragraph 17C:

“17C...Alternatively, to the extent to which the prior certifications and approvals referred to above were a proximate cause of the profits claimed by the Claimant such certifications and approvals did not involve any Infringing Dealings, alternatively no Infringing Dealing which the Claimant is entitled to rely upon owing to the effect of the limitation periods in these proceedings.”

(2) *Power Management*

32. They also propose to introduce an allegation that the relevant market was not limited to any particular design of high voltage supply apparatus (by cross-reference to paragraph 26(d)) and that the key technical barrier to entry into the market was not a power supply design which was sufficiently safe and robust to be certified but instead “power management architecture”:

“17C(A). §14D(a) is not admitted in that what Lufthansa contends is meant by the allegation that the market for systems which provided AC mains voltage power in an aircraft cabin through sockets suitable for conventional plugs is the “relevant market” is not understood. Without prejudice to the foregoing, insofar as Lufthansa contends that the market for such systems was not capable of being satisfied by systems providing DC power that allegation is denied. Paragraph 26d below is repeated. In relation to §14D(b) it is admitted that in order to have the opportunity to achieve meaningful sales the Outlet Units and ISPS/SPM/SPB of PPD EmPower Systems as they existed in December 2004 needed to be sufficiently safe and robust to be certified by the relevant authorities and to be approved by airframe manufacturers. Save as aforesaid §14D(b) is denied for the reason set out in (a) below. In relation to §14D(c) it is admitted that the EmPower Systems incorporated the invention in claims 1 and/or 2 of the Patent (as to which paragraph 22 below is repeated) but it is denied that that incorporation “enabled the EmPower Systems to overcome that technical barrier” or that such incorporation caused the Defendants to be certified by the relevant authorities, be approved by the airframe manufacturers, obtain access to that market or to achieve the Relevant Transactions for the following reasons:

(a) The first certified in-seat power supply system was AES’ DC Outlet EmPower System (launched in 1996). To the extent that there was one, the key technical barrier to providing an in-seat power supply system, whether DC or AC, was conceiving of a power management architecture which would allow an in-seat power supply system design to be certified by the relevant authorities and approved by the relevant airframe manufacturers for use in the passenger cabin of an aircraft;

(b) Whilst the Components contribute to the safe delivery of mains power to OUs they do so in conjunction with further safety features. Paragraph 23(b) is repeated;

(c) The rules and regulations of the FAA and EASA have not required the adoption of the inventions of the Patent to achieve certification. Paragraphs 23(c)-(d) below are repeated;

(d) The airframe manufacturers have not required the adoption of the inventions of the Patent to achieve approval;

(e) Alternative systems which provided AC mains voltage power in an aircraft cabin through sockets suitable for conventional plugs and which

were certified, approved by at least one airframe manufacturer and which did not fall within the scope of claim 1 existed. Paragraph 23(f) below is repeated.”

(3) *Location of Supply*

33. After further revision, the Defendants also proposed to advance a positive case that the Infringing Dealings should not be treated as the cause of the Relevant Transactions because the supply of Components in the UK was incidental to the Relevant Transactions (as defined) and not material:

“17C(B). Without prejudice to the foregoing, incorporation of the invention in claims 1 and/or 2 into the EmPower Systems is not an Infringing Dealing and the allegation in §14D(c) is not an allegation that supports a conclusion that the Relevant Transactions were caused by an Infringing Dealing. Further or alternatively, it is denied that the facts alleged in §14D(a)-(c) establish that the Infringing Dealings drove the Relevant Transactions. The decisions by third parties to enter into Relevant Transactions were in fact driven by considerations of the kind set out in paragraphs 23i-j below and not by Infringing Dealings. The Infringing Dealings were not a sufficiently proximate cause of the profits realised on Relevant Transactions because:

(a) Customers entered into contracts relating to Relevant Transactions prior to any Infringing Dealing and with no or insufficient regard to where components of EmPower Systems would be supplied;

(b) Although components of EmPower Systems were, in the cases for which Lufthansa claims in these proceedings, supplied in the United Kingdom, the location of supply was specified in Purchase Orders subsequent to the conclusion of the contracts relating to the Relevant Transactions. The location of supply was incidental to the Relevant Transactions and/or did not drive the Relevant Transactions. Further or alternatively had it not been possible to supply Primary Components anywhere in the world airline customers would have accepted the supply of a non-infringing system which provided AC mains voltage power in an aircraft cabin through sockets suitable for conventional plugs, namely the Modified 1171-based EmPower Systems defined at paragraph 23(f)(ii)(1A) below, which is repeated. In the premises profits realised on transactions in respect of Primary Components were not contingent upon an Infringing Dealing and accordingly an Infringing Dealing was not a proximate cause of such profits.”

34. The Defendants also applied for permission to make a similar amendment to paragraph 17G to address certain paragraphs in the Re-Amended Reply. The proposed amendments deal with the profits earned on Secondary Components and Ancillary Services:

“Further or alternatively, in respect of paragraphs 2JB and 2JC of the Re-Amended Points of Reply, had it not been possible to supply in the UK Primary Components to which it was proposed or intended that Secondary Components or Ancillary Goods would be directly or indirectly connected on the same aircraft, airline customers would not have returned the Secondary Components or Ancillary Goods. Further or alternatively had it not been possible to supply Primary Components anywhere in the world airline customers would have accepted the supply of a non-infringing system which provided AC mains voltage power in an aircraft cabin through sockets suitable for conventional plugs, namely the Modified 1171-based 44 - 15 - EmPower Systems defined at paragraph 23(f) (ii)(1A) below, which is repeated. In the premises, profits realised on transactions in respect of Secondary Components were not contingent upon an Infringing Dealing and accordingly an Infringing Dealing was not a proximate cause of such profits. Accordingly, Lufthansa is not entitled to Astronics’ profits in respect of Secondary Components whether shipped by Astronics to the UK in the Relevant Period or otherwise. Further, the Defendants will say that in fact other components are the dominant components in relation to which the Primary Components are subsidiary as follows: a) for all systems, the xMCU that provides power management; and b) in IFE systems, the parts that deliver video and audio content (including media servers and in-seat monitors).”

(4) *Alternative Designs*

35. The Defendants also proposed to amend paragraph 23f to plead that a further type of alternative design was non-infringing and to introduce a further example. The first amendment related to the location of the plug detectors (and the Defendants allege that this did not amount to an infringement of the Patent because of the findings of Morgan J) and the second amendment related to the Emteq Intellicabin Universal AC Outlet (“**Intellicabin**”):

“ii....and/or a product in which the plug is not detected by the pins making contact with plug detectors at the bottom of the plug holes and/or which has plug detectors on the sides of the plug holes rather than at the bottom of the plug holes.

”iv...2. The Defendants further rely upon the Emteq Intellicabin Universal AC Outlet EAC-B0256700021 as described in the Particulars provided to the Claimant on 10 May 2024, which was approved by the FAA including on or around 25 August 2016 for fitting on Boeing 787-8 passenger aircraft.”

(5) *Airbus and Boeing*

36. The Defendants also proposed to amend paragraph 23.i.13 to add the words “(including

requirements for power management)” to “offerability by Airbus and/or Boeing”. Until the hearing itself they had also intended to add the words “and compliance with the GD AES Patents (as defined below)”. However, during the course of his opening submission Mr Howe handed in a revised draft of the RRAPOC from which these words had been removed. I explain the significance of these words in greater detail below.

IV. The Evidence

(1) Bennett 18

37. Mr Bennett stated in Bennett 18 that the purpose of the amendments was “largely to make explicit and provide more detail in relation to points already in issue between the Parties” and to answer certain points raised by Lufthansa in the Re-Amended Points of Reply. He also addressed an objection raised by Jones Day to the Defendants raising new counter-factual cases and asserted that this issue had now been resolved.

(2) McCulloch 27

(i) Resources

38. Mr McCulloch gave evidence that Lufthansa, whilst a member of the overall Lufthansa group, was run as a separate entity and that the costs of both actions were a material issue, that his team consisted of himself, two associates and a trainee solicitor (although a German team was providing support) and that its resources were already at full capacity and it had expanded its counsel team to three to cover the substantial work involved. He also pointed out that Hogan Lovells appeared to be stretched because they had failed to meet disclosure deadlines which had compressed the evidence deadlines and added to the current pressure.

(ii) Intellicabin

39. Mr McCulloch objected to the introduction of Intellicabin as a fifth alternative design on the basis that Lufthansa would be entitled to disclosure on that issue and to address it in its own evidence:

“31.5. Paragraph 23(f)(iv)(2): Lufthansa objects to the introduction of the Intellicabin as an Alternative Design. Although Hogan Lovells has now confirmed that this system is not intended to be introduced as a

counterfactual case, we understand that it would be included as the Defendants' fifth pleaded Alternative Design. The introduction of a further Alternative Design would entitle Lufthansa to disclosure and would need to be considered in fact evidence. As previously noted, disclosure was given between January and April 2024 and the deadline for fact evidence in chief was 17 May 2024. Fact evidence in reply was served on 14 June 2024. Furthermore, addressing the Intellicabin will be a time consuming burden for Lufthansa and its advisers at a time when the proceedings have already been condensed through delays to the timetable. Lufthansa and its advisers just do not have time to address it. Further, given that the defendants have already pleaded four Alternative Designs, we do not see what a fifth could plausibly add.

31.6. In any event, the particulars that were provided for the Intellicabin are difficult to follow, and it is impossible from the photos and descriptions provided to check whether the description is a fair and full description of the product. Lufthansa would need a means to consider the product properly and then discuss it with its expert witnesses. In all likelihood Lufthansa would want to adduce expert evidence on the infringement issues raised. At a minimum it is likely Lufthansa would wish to consult its technical expert witness (Professor Pat Wheeler); its expert witness on the commercial market for in-seat power supply systems (Mr Mosebach); and its regulatory / product certification expert (Mr Repenning). Lufthansa is fully committed to addressing the current issues with its experts in the compressed timetable for evidence, and has not been able to progress this."

(iii) Location of Supply

40. Mr McCulloch objected that the Defendants ought to have pleaded their new case in paragraphs 17C(B) and 17G in response to the Order dated 12 July 2024 because those paragraphs postulated a counter-factual in which the Defendants delivered "non-infringing products" to overseas recipients. He also objected that this issue was not the same as the "convoyed goods and services" issue which the Defendants had already addressed in paragraph 17. He then dealt with the practicalities of addressing the new issue:

"58. If this plea were to be in the case, the consequential directions required in terms of disclosure and evidence would be very extensive. The theoretical relocation of an extensive business in another jurisdiction is a very challenging factual proposition.

59. As to disclosure, issues to be addressed include whether the Defendants would have in fact been able to deliver elsewhere in the world, for example in relation to the locations, capacity and willingness of seat vendor factories, and customer shipping arrangements and the possibility of altering them. This would extend to documents relating to discussion or negotiation of locations of supply, facilities at different customer locations,

any local IP constraints, and even tax considerations.

60. As to fact evidence, Lufthansa would wish to investigate this issue with both airline customers and seat vendors. This is also an issue on which employees at Lufthansa, and Lufthansa AG, may be able to provide assistance. Further or particular lines of investigation would be likely to arise out of the disclosure provided.

61. As to expert evidence, I have not had an opportunity to discuss this proposition with any of Lufthansa's experts (or indeed with Mr Muirhead), but it seems to me likely that the expert for the commercial market for in-seat power supply systems would have a view on this new case. It may also be the case that there are regulatory considerations in what the defendants are now proposing, and we would need to investigate this side of things as well.

62. As discussed above, my team has no time to investigate these issues in the run-up to trial. They are fully committed to preparing fact and expert evidence (remembering that the defendant has already raised 21 separate issues to reduce or eliminate the profits), addressing the defendants' late filed Notice of Experiments and indeed addressing this time-consuming application. Further, even if we had the resources available, any such investigations would be further hampered by holiday absences over the summer period.

63. Conversely, we note that the Defendants have introduced fact evidence on this point in relation to certain of their customers (First Choice, Virgin Atlantic). On the other hand, they have not given any disclosure of the factual issues (they have not even confirmed they have no known adverse documents). The effect is to ambush Lufthansa, in circumstances where Lufthansa has neither the time nor the materials with which to make a substantive challenge.

64. This raises three issues. First, there is extreme prejudice to Lufthansa, as it did not have the opportunity to raise this issue as part of the disclosure procedure (which has been underway for almost a year). The Disclosure Order is inadequate to address this counterfactual. Second, Lufthansa does not have time to now source additional witnesses to respond to the Defendants' evidence. In any event the deadlines for fact evidence in chief and fact evidence in reply have passed. Third, the fact that the defendants have adduced evidence on this case demonstrates that they had decided to try to advance it well before giving notice to Lufthansa. I discuss this concern further below."

(iv) Power Management

41. Mr McCulloch accepted that the Defendants had pleaded power management in relation to apportionment. He also accepted that the "re-positioning" of this issue as a defence to Lufthansa's case on causation did not give rise to any counter-factual argument. However, he gave evidence that this gave rise to the following practical consequences:

“67. There has been no disclosure on the issue of power management as a barrier to entry to the market and no agreement to adduce fact or expert evidence on this subject. Lufthansa has taken a reasonable and proportionate approach to disclosure, fact evidence and expert evidence, in respect of the issues in the case. There are so many live issues that it has simply been impossible to treat them all as having equal importance. As our submissions at the Second CMC demonstrate, Lufthansa considers that there is a significant difference between an issue being raised merely as an ‘umpteenth’ point on apportionment, and an issue that goes to the fundamental issue of causation. Thus, when the power management argument is redeployed from apportionment to causation, the position on disclosure and evidence is changed significantly.

68. As to disclosure, there has been no disclosure as to how frequently power management is used (i.e. how often the EmPower system was configured with an MCU or an MCU), and the importance attached to it, and to Astronics’ solution to it, by customers of the defendants. There has also been no disclosure on Astronics’ knowledge about different power management approaches on the market (though Astronics’ fact witness Mr Jouper accepts that they existed.

69. As to evidence, Lufthansa considers that the following matters could usefully and proportionately be addressed in detail in relation to the new case: i) a thorough analysis of the invalidity of Astronics’ power management patents, ii) the ease with which an alternative suitable power management architecture could be designed, iii) the regulatory position of power management versus other technical and safety requirements, and iv) what actually happened in the market and how providers of ISPSs viewed this technology. This would justify, and require, a much more detailed analysis of these issues than in the existing case which will look only at the relative commercial importance of power management as a means of apportioning profit. Again, the Defendants appear to have led substantial fact evidence on this issue (see Mr. Jouper’s Fourth Witness Statement). If the proposed amendment was allowed Lufthansa would obviously be prejudiced by not having attached appropriate resources. There is now insufficient time for Lufthansa to redress this.

70. A further point is that the parties exchanged the names of their expert witnesses on 10 May 2024, mere hours before Hogan Lovells sent to my Firm (with no prior notice) the draft RRAPoD. Power management is a discrete area of electronic engineering in its own right and from a regulatory point of view might be viewed as a separate topic from the certification of in-seat power supplies. In circumstances where the defendants were about to propose substantial amendments making Power Management a central pillar of their case, I am surprised that they proceeded with the exchange of expert witness names without giving Lufthansa notice of their intention to do so. If the amendments are allowed Lufthansa will have suffered prejudice by not having been able to take them into account in its choice of expert witnesses.

71. I have mentioned above, that Lufthansa would wish to give greater attention to the validity of Astronics’ power management patents. Indeed,

if this issue were to come into the case in the form proposed, Lufthansa would wish to put the validity of such patents in issue and examine the relative importance of the technology in considerably more detail than it would as the case is currently composed.”

(v) Timing

42. Mr McCulloch’s evidence was that if the disputed amendments were permitted, the disclosure and evidential burden was too great for the short period between the hearing of the Application and trial and that it would be necessary to vacate the trial. He pointed out that there were only 11 weeks to trial and that the parties had not exchanged their expert evidence in chief and that the timetable was even tighter because of the recent delays to disclosure. He also pointed out that a number of the Defendants’ factual witnesses had addressed the proposed amendments in their evidence (see further below) and he challenged Hogan Lovells to explain when they first considered introducing them.

(3) Bennett 20

(i) Power Management

43. Mr Bennett pointed out that Mr McCulloch had accepted that power management was a pleaded issue and he drew together the various references in the Re-Amended Points of Defence. He suggested that Lufthansa’s real complaint was that power management was now more important than it had previously appreciated but that this was only because it had taken a particular view of the law. He also pointed out that Bacon J had been surprised by Lufthansa’s lack of engagement with the apportionment issues. He dealt with the need for disclosure if the amendment was permitted in the following passage:

“31. Moreover, consistent with the fact that the significance of power management was already a part of the case (and that MCUs – the components which carry out the power management in the EmPower System - are within the scope of Lufthansa’s claim – i.e. are a component that Lufthansa is claiming the profits to), at the time disclosure was negotiated and ordered, the Disclosure Review Document as ordered by Mrs Justice Bacon on 20 December 2023 (the “DRD”, at Exhibit SDB-85) expressly covered the MCUs/AMCUs/EMCUs in almost every request:

(a) the financial disclosure given by PAC and AES covers the MCUs/AMCUs/EMCUs, as Lufthansa are claiming the profits for these components (see requests 1.1 to 1.10, 3.1 to 3.10, and 3.12 to 3.14 of the DRD);

(b) the extensive precontractual documents disclosed by PAC and AES

cover purchases of the MCUs/AMCUs/EMCUs (see issue 8 of the DRD);

(c) the contracts disclosed by PAC and AES cover purchases of MCUs/AMCUs/EMCUs (pursuant to request 1.11 and 3.11 of the DRD);

(d) the Defendants have disclosed all datasheets for the MCUs/AMCUs/EMCUs (which are used in precontractual negotiations) (pursuant to issue 8C of the DRD);

(e) all certification documents have been provided for the MCUs/AMCUs/EMCUs (pursuant to issue 8A of the DRD); and

(f) all of the disclosed (and numerous publicly available) marketing materials include references to MCUs/AMCUs/EMCUs and AES' "patented power management technology", including its significance. Indeed, a number of the documents served with the Defendants' CEA Notice also refer to the GD AES Patents on power management (see Exhibits SDB-88 and SDB-89). Indeed, even the marketing materials annexed to Lufthansa's own pleadings are littered with references to "Astronics' patented power management technology" and MCUs.

32. Mr McCulloch is accordingly incorrect to suggest that there has been no (or insufficient) disclosure in respect of power management and the importance attached to it, and to AES' solution to it, by customers of the Defendants. Indeed, the importance of power management was already in the case and if Lufthansa required more disclosure pursuant to this issue it could and should have specified this at the time the DRD was ordered (although the Defendants fail to see what possible further documents Lufthansa could require on this in view of the substantial amount of disclosure given in this regard).

33. Furthermore, in respect of the contracts disclosed by AES, it can be readily ascertained whether an MCU/AMCU/EMCU has been purchased (and thus configured) with an EmPower System. I asked two junior associates to carry out the task this week and it took them only a few hours across two days. Mr McCulloch is therefore incorrect to suggest that there has been no disclosure in this regard – the contracts disclosed by Astronics reveal how frequently power management is used by revealing when MCUs were purchased. Nor would it be correct to suggest that the analysis of the documents that Jones Day has had for several months is time-consuming.

34. As to the suggestion that there has "been no disclosure on Astronics' knowledge about different power management approaches on the market", AES' knowledge in this regard is irrelevant. The relevant issue to such disclosure, if this is a point that Lufthansa wishes to take at all, will be whether there were in fact power management systems on the market that did not implement the AES patents. The parties agree that AES and KID together accounted for the majority of the market. KID was licensed to use AES's technology and as Mr Mosebach (Lufthansa's expert on the commercial market, who has also given fact evidence in this case) confirms it did so. The only question therefore is whether some third party developed a power management technology that was not in the scope of AES's patents. That is not a matter for disclosure from the Defendants."

44. Mr Bennett also disputed that there was any need for additional factual or expert evidence. He argued that if this were necessary, Lufthansa would have adduced evidence in relation to this issue in response to the Defendants' existing case on apportionment (original emphasis):

“37. The first of these points is that the amendment put forward by the Defendants would require “i) a thorough analysis of the invalidity of Astronics’ power management patents”. This is incorrect. Were this required on the basis of the Defendants’ amendment at issue, then this would also have been required in respect of the Defendants’ existing pleading at paragraph 24A and Annex 5 of the Re-Amended Points of Defence that the GD AES Patents were at least of equal importance to Lufthansa’s Patent (accordingly, the Patent at issue was not an “essential feature” of the Defendants whole product). Yet Lufthansa had not raised this objection until now, and I respectfully submit that there is no merit or substance in it.”

“43. It is notable that Lufthansa chose to submit only a single short witness statement for its fact evidence in chief, from which any evidence at all on power management was conspicuously absent (other than a passing reference to MCUs being conveyed goods as they are part of an in-seat power system) notwithstanding that, as I have explained above, the issue of power management has always been an express and important part of the Defendants’ case. It is apparent that Lufthansa has, to date, made a tactical decision not to address but entirely to ignore or sidestep this live issue. In the context of this case which Lufthansa alleges to be worth many tens of millions of dollars, it is not reasonable for Mr McCulloch to suggest that merely because there are ‘many issues’, sufficient resource and time could not have been, and cannot be, devoted by Lufthansa and its legal team (in the UK and Germany) to dealing with issues of such importance. In any event, I note that Mr McCulloch also seeks wrongly to diminish the importance of power management in the case - in particular, stating at paragraph 67 of McCulloch 27 that there is a significant difference between an issue being raised merely as an ‘umpteenth’ point on apportionment’. This is incorrect and potentially misleading. As explained above, the Defendants’ case directly addresses the question as to whether or not there should be any apportionment at all in this case and the first point the Defendants plead in support of its case in this regard is power management; it is certainly not ‘the umpteenth’ point as Mr McCulloch suggests.

44. Mr McCulloch’s evidence and its reference to the “*umpteenth point*” is also liable to mislead in that he neglects to mention that Lufthansa’s evidence of fact has, with limited exceptions (as referred to below), not engaged with the Defendants’ already pleaded case on the various other factors that drove profits for the Defendants. The exceptions are as follows: (i) Mr Mosebach has given evidence relating to the importance of power management, heat dissipation and KID’s customer service; and (ii) Mr Muirhead of Lufthansa has addressed the pleaded factors of price

(although he says he can give no evidence on that) and weight. He also gives evidence on what he calls “number of contractual partners”. Those points occupy a total of four sentences of Mr Muirhead’s evidence. The remainder of the factors that are already pleaded by the Defendants as reducing the profits available to Lufthansa have been ignored or avoided in Lufthansa’s fact evidence. Far from being the “umpteenth” point, Lufthansa has selectively chosen just five of the pleaded factors overall to address in its fact evidence and power management is one of these that Lufthansa (presumably on Jones Day’s advice) has chosen to address. Of the pleaded factors it has decided to address in its fact evidence, power management has (along with heat dissipation) the most evidence directed to it (three paragraphs of Mr Mosebach’s statement). (To the extent, however that Lufthansa may have decided to reserve such issues to be addressed solely through its expert evidence, that expert evidence has yet to be exchanged, and Lufthansa (still) has available the time and resource required to do so).”

45. Mr Bennett also took issue with Mr McCulloch’s evidence that Lufthansa had been unable to address the power management issue in expert evidence. He pointed out that one of Lufthansa’s experts had power management patents in his name and had given some evidence about the GD AES Patents but stated that expert evidence was unnecessary because the nature of the technology was not in issue in the present proceedings.

(ii) Intellicabin

46. Mr Bennett stated that the Intellicabin outlet was not the Defendants’ product, that they would have no disclosure to give and that the only disclosure which the Claimants had sought in relation to the other alternative designs related to their certifications. He also stated that it was a minor point which Lufthansa could have addressed in its factual and expert evidence because it had the proposed amendments a week before exchange of witness statements and six weeks before the exchange of expert evidence in chief.

(iii) Resources

47. Mr Bennett also challenged Mr McCulloch’s evidence in relation to resources on the basis of the market capitalisation of the Lufthansa group, the personnel whom Jones Day would have available in the UK, US and Germany and the costs which Lufthansa has been prepared to devote to other issues in other jurisdictions. Indeed, he asserted that Lufthansa had launched “numerous tactical and oppressive section 1782 proceedings in the US” against Panasonic. He also took issue with Mr McCulloch’s evidence that Hogan

Lovells were stretched and blamed Lufthansa for the slippage in the timetable.

(iv) Timing

48. Finally, Mr Bennett gave evidence that Lufthansa's suggestion that it would not have sufficient time to deal with the proposed amendments was "overstated and untenable" because the NOA was served on 25 April 2024, the Intellicabin particulars were served on 5 May 2024 and the original draft RRAPOD were served on 10 May 2024. He did not, however, address the question whether Lufthansa would be able to address the amendments between the date of this hearing (or, indeed, this judgment) and the date of trial. Nor did he address Mr McCulloch's challenge to explain when the Defendants first considered the proposed amendments or why no application to re-re-amend was made until 11 weeks before trial.

(4) McCulloch 28

49. Mr McCulloch made a further witness statement to address the power management issue. He stated that in the light of Bennett 20, it had become clear that the Defendant's case had two strands: first, instead of a technical apportionment argument it was now their case that power management was the key barrier to entry into the ISPS market and, secondly, that to overcome that barrier any manufacturer or supplier had to avoid the infringement of the GD AES Patents. His evidence was that Lufthansa would have taken a different approach to disclosure in relation to Issue 8 and the agreed search terms:

"10. That search does not address specifically the importance which certification bodies, aircraft manufacturers and customers placed upon power management, and specifically upon the GD AES Patents. The search is a general one directed to trying to identify what (if any) of the myriad of factors relied upon as relevant to apportionment were actually relevant to the commercial success of the product. If power management had been pleaded as the key matter of import, Lufthansa would have taken a more focused approach to disclosure. Disclosure issues would need to focus on documents passing between the defendants and certification bodies, aircraft manufacturers and customers referring to power management and to the GD AES Patents.

11. Further, the infringement point would give rise to an inquiry into correspondence passing between Astronics and third parties regarding actual or potential infringement, licensing and/or validity of the GD AES Patents.

12. Once one appreciates the different nature of the inquiry at the time the

DRD was settled, it becomes apparent why the disclosure ordered is not sufficient to address the new case. For example, datasheets for MCUs/AMCUs/EMCUs were disclosed under Issue 8A, but the functions and designs of the systems do not address the scope of the new claim. Similarly, certification documents for MCUs/AMCUs/EMCUs (Issue 8A) do not inform on the question as to how certification was achieved. Key documents would include those recording: representations made by Astronics to the various regulators and airframe manufacturers; the development of regulatory requirements over time and throughout the Relevant Period; and how other market players responded to those requirements, for example. The mere fact of certification of power management technology is insufficient in this regard.”

50. Mr McCulloch also gave evidence that in the light of Bennett 20 and, in particular, paragraph 34 (above), the Defendants’ new case raised an “infringement case of considerable scope and complexity”. He identified six questions which Lufthansa would have to address in evidence:

“17. The defendants’ new case raises in effect a patent infringement case of considerable scope and complexity. The following matters would need to be addressed in evidence:

17.1. Who are the relevant third parties and where are they carrying on the allegedly infringing acts?

17.2. Did Astronics own any relevant patent(s) in that jurisdiction, and if so what was the scope of the patent protection? The scope of protection question is extremely wide-ranging, and would require extensive technical evidence on the relevant technical common general knowledge in respect of power management systems, and what the patent(s) would disclose to the hypothetical person skilled in that technical field as being the invention claimed.

17.3. Were these patents valid according to the relevant national patent law in force in the Relevant Period in the relevant jurisdiction? This too is an extremely wide-ranging question, which would require identification of relevant prior art in the technical field, and extensive technical expert evidence as to what that prior art would disclose to the person skilled in the technical art, and whether the claimed invention was obvious to the skilled person, or genuinely inventive, in the light of that prior art. I should emphasise that almost the vast majority of the liability trial before Morgan J was directed to this issue.

17.4. Did the acts of the third party infringe the patent? This is a very complicated question, because the GD AES Patents claim connected systems, much like the Lufthansa patent-in-suit. In this action, the defendants have raised a myriad of non-infringement arguments based on the fact that they supply the components of the system in unconnected form. That part of the liability trial which was not directed to validity, was directed to this question of infringement. For example, the defendants have

at one point or another relied on each of the following arguments as demonstrating non-infringement: the disconnected components do not fall within the scope of protection of a patent which claims a connected system; the components are supplied in separate consignments; whilst they know how to connect the components, they do not know how the underlying system, once connected, actually works; they supply different parts of the system into different jurisdictions. This in turn has led Lufthansa to advance indirect infringement allegations under s60(2), arguments based on the doctrine of equivalents, arguments based on joint tortfeasance with customers, and arguments based on the doctrine of a kit of parts.

18. Further, the new case raises arguments that go beyond a mere patent infringement trial, because the following points are also critical:

18.1. Could third parties have designed around the GD AES Patents? This is a complicated technical question which involves not only an investigation of the scope of protection of the patents, but also the technical feasibility of achieving alternative solutions to the technical problem.

18.2. What were AES's own practices in enforcing the GD AES Patents? What allegations of infringement were made? Did third parties request licences? Were they granted, and why? What were the terms of those licences? Did third parties fail to enter into the market because of these infringement issues, or for other commercial considerations? This would require additional disclosure and rounds of evidence. It is inconceivable that Astronics would not have important documents going to at least some of these issues.”

51. Finally, Mr McCulloch also explained that Lufthansa would face significant difficulties with the availability of its expert, Professor Wheeler, before trial. He also addressed Mr Bennett’s criticisms of his evidence about resources. He gave evidence that there would be prejudice in adding new members of the team who would not be familiar with the case, Lufthansa would incur additional costs in paying for them to read in and that it would have to lean on non-IP specialists to assist with highly technical issues.

(5) *Factual Evidence*

52. The Defendants have exchanged three witness statements of fact which deal with the power management issue. In a witness statement dated 17 May 2024 Mr Dennis Markert, who is the Director of Business Development for Cabin Electronics at Astronics, gave detailed evidence about “Market leading technology and the GD AES Patents”. In particular, it was his evidence that to viably enter the market an ISPS supplier either had to take a licence from AES to use its power management technology or design alternative power management architecture which did not infringe those patents and would be acceptable to Airbus or Boeing. He also stated the ISPS market was largely a duopoly

between Astronics and KID until the GD AES Patents expired in the US in 2015. Finally, he gave evidence about the relationship between Astronics and both Boeing and Airbus. In witness statements also dated 17 May 2024 Mr Jeffrey Jouper, Astronics' chief engineer, and Mr Robert Gleason, Senior Director of Product Line Management (hardware), In-Flight Systems for Panasonic, also gave supporting evidence about the GD AES Patents.

(6) *Expert Evidence*

53. In his third report dated 5 July 2024 Professor Patrick Wheeler gave expert evidence on behalf of Lufthansa in relation to the PowerBox system: see paragraphs 87 to 93. He gave evidence that having reviewed the particulars he found it difficult to understand what the implemented commercial product was. However, he was able to deal with the question of remoteness in four short paragraphs before concluding that the ISPS and outlet units satisfied the remoteness test laid down by Morgan J.
54. In his report dated 4 July 2024 Professor Stephen Burrow also gave expert evidence on behalf of the Defendants in relation to the location of the pin detectors issue. He had been provided with the NOA and he gave evidence that the methodologies used were straightforward. He was also able to give his comments on the results for the Twist Lock and the IFPL 1225 Outlet (two of the alternative designs) briefly and simply in two paragraphs.

V. The Law

(1) *Amendment*

55. The legal principles which the Court must apply in deciding whether to grant permission to amend under CPR Part 17 were not in dispute. In *Kawasaki Kisen Kaisha Ltd v James Kemball Ltd* [2021] EWCA Civ 33 Popplewell LJ stated that the Court will refuse permission to amend to raise a case which does not have a real prospect of success. He stated that both in this context and in the context of permission to serve out of the jurisdiction the principles are the same:

“(1) It is not enough that the claim is merely arguable; it must carry some degree of conviction: *ED & F Man Liquid Products Ltd v Patel* [2003] EWCA Civ 472 at paragraph 8; *Global Asset Capital Inc. v Aabar Block*

SARL [2017] 4 WLR 164 at paragraph 27(1).

(2) The pleading must be coherent and properly particularised: *Elite Property Holdings Ltd v Barclays Bank Plc* [2019] EWCA Civ 204 at paragraph 42.

(3) The pleading must be supported by evidence which establishes a factual basis which meets the merits test; it is not sufficient simply to plead allegations which if true would establish a claim; there must be evidential material which establishes a sufficiently arguable case that the allegations are correct: *Elite Property* at paragraph 41.”

56. The legal principles which the Court must apply in deciding whether to grant permission to make a late amendment were not in dispute either. Mr Howe and Mr Copeland cited *Quah Su-Ling v Goldman Sachs International* [2015] EWHC 759 (Comm) in which Carr J (as she then was) drew the existing authorities together to state the following propositions at [38]:

“a) whether to allow an amendment is a matter for the discretion of the court. In exercising that discretion, the overriding objective is of the greatest importance. Applications always involve the court striking a balance between injustice to the applicant if the amendment is refused, and injustice to the opposing party and other litigants in general, if the amendment is permitted;

b) where a very late application to amend is made the correct approach is not that the amendments ought, in general, to be allowed so that the real dispute between the parties can be adjudicated upon. Rather, a heavy burden lies on a party seeking a very late amendment to show the strength of the new case and why justice to him, his opponent and other court users requires him to be able to pursue it. The risk to a trial date may mean that the lateness of the application to amend will of itself cause the balance to be loaded heavily against the grant of permission;

c) a very late amendment is one made when the trial date has been fixed and where permitting the amendments would cause the trial date to be lost. Parties and the court have a legitimate expectation that trial fixtures will be kept;

d) lateness is not an absolute, but a relative concept. It depends on a review of the nature of the proposed amendment, the quality of the explanation for its timing, and a fair appreciation of the consequences in terms of work wasted and consequential work to be done;

e) gone are the days when it was sufficient for the amending party to argue that no prejudice had been suffered, save as to costs. In the modern era it is more readily recognised that the payment of costs may not be adequate compensation;

f) it is incumbent on a party seeking the indulgence of the court to be allowed to raise a late claim to provide a good explanation for the delay;

g) a much stricter view is taken nowadays of non-compliance with the CPR and directions of the Court. The achievement of justice means something different now. Parties can no longer expect indulgence if they fail to comply with their procedural obligations because those obligations not only serve the purpose of ensuring that they conduct the litigation proportionately in order to ensure their own costs are kept within proportionate bounds but also the wider public interest of ensuring that other litigants can obtain justice efficiently and proportionately, and that the courts enable them to do so.”

57. Mr Howe and Mr Copeland also relied on *Keadby Generation Ltd v Promanex (Total Fm & Environment Services) Ltd* [2020] EWHC 2444 (TCC) where O’Farrell J permitted late amendments where they arose out of issues which had already been pleaded even though the amendments might have required further expert evidence. The judge held that there was a good reason for being late, namely, that they arose out of the theories and explanations which an opposing expert had given in his report and that any further testing could be accommodated before trial: see [18], [21] and [25].
58. Mr Cuddigan and Ms Bercariu relied on the very recent decision *Steenbok Newco 10 SARL v Formal Holdings Ltd* [2024] EWHC 1160 (Comm) in which Bryan J refused permission to amend to make substantial amendments 4 weeks before trial. The judge set out the general principles for the exercise of the discretion in CPR Part 17.3 at [12] to [14] (original emphasis):

“12. CPR 1.1(2) provides that dealing with a case justly and at proportionate cost includes “ensuring that the parties are on equal footing” (CPR 1.1(2)(a)) and “ensuring that the case is dealt with expeditiously and fairly” (CPR 1.1(2)(d)). One aspect of this is the need to take into account the impact on a party’s trial preparation. The parties need to be “on an equal footing and can participate fully in proceedings, and that parties and witnesses can give their best evidence”. This is relevant from the position of the party that has to respond to the amendments. The equal footing principle was applied in *Scipion* at [91]. The Defendants submit that this would not be the case here if the amendments were allowed, as it is said that the consequence would be to deny the Defendants’ legal team the time that they require to prepare properly for a trial.

13. So far as fairness is concerned, a number of authorities recognise that amendments can be made to “catch up” with disclosure – see *Various Claimants v MGN Ltd* [2020] EWHC 553 (Ch) at [45], [48(c)], [60], [62(a)-(b)]; *Swain-Mason* at [72] and *Rose v Creativityetc Ltd* at [101] and also to provide further clarity about a generalised case – see *Various Claimants* at [42]-[49] and *Rose* [2019] EWHC 1043 at [110] in which it was stated that, “There are aspects of the proposed pleading which can readily be seen as properly permissible. Those are matters of clarification

or expansion of the case already set out”). The fact that a Court will take into account if a matter has, for example, only become clear on disclosure is an incident of the fact that the reasons for the delay will be taken into account. Where (as the Defendants submit applies in the present case) most of the Proposed Amendments could have been made sooner, that is a point telling against the grant of permission – see *Various Claimants v MGN* at [45] in the context of the phrase “catching up with disclosure” where it is stated that that the material “could not necessarily have been pleaded before”. 14. Permission may be granted where the pleadings bring the case in line with the witness or expert evidence. For example, in *Toucan Energy Holdings Ltd v Wirsol Energy Ltd* [2021] EWHC 895 (Comm), Henshaw J. identified at [9] (of the Annex to the judgment):

“It is relevant to have regard to the degree to which the case sought to be advanced by the amendment is one that the parties have in fact already been addressing. In *Hawksworth v Chief Constable of Staffordshire* [2012] EWCA Civ 293 (CA), the Court of Appeal stated, obiter, that it might appropriate to permit an amendment at trial in respect of a matter which, although not raised in the pleadings, had nevertheless been raised in some of the witness statements and experts’ reports served before trial. In *Ahmed v Ahmed* [2016] EWCA Civ 686, the claimants applied to have letters of administration revoked on the basis that the will annexed to them had not been duly executed or witnessed. At the start of the trial the claimants obtained permission to amend their particulars of claim so as to allege that the will had been forged. The Court of Appeal dismissed an appeal against that grant of permission: the amendment was no more than a formality bringing the claimants’ case into line with what had been argued for at least six months; the appellants had not been taken by surprise by the amendment and, indeed, had themselves sought at the pre-trial review permission to call a handwriting expert.”

59. Bryan J dealt with the principles to be applied to late amendments at [22] to [25]. For present purposes, it is important to note that he considered that the question whether or not amendments should be permitted must be considered at the date of the hearing not at the date on which they were first served or on which the application for permission is made (again original emphasis):

“22. A consideration of whether or not amendments are permissible is one that takes place at the date of the hearing of the amendment application – the question is not when the amendments were first foreshadowed or applied for – see *Holding* [2018] EWHC 852 (TCC) at 41(3): “Even after the application was made... where it was being opposed there was no reason, in my judgment, then for the claimant to take steps to meet the case that was being advanced in a proposed amended pleading, in respect of which no consent had been given and no permission provided by the court”. That makes clear that the correct position as a matter of law is that

a responding party is not obliged to divert themselves from their trial preparation to prepare to meet a case which is the subject of a contested application for permission to amend.

23. Lateness of an amendment is a relevant factor which should be weighed in the balance. Lateness is a relative concept; an amendment is late if it could have been advanced earlier, or involves the duplication of cost and effort, or if it requires the opposing party to revisit any of the significant steps in the litigation (e.g. disclosure, witness statements and expert reports) - see *CIP Properties* at [19(a)]. An application to make substantive amendments to a statement of case in the immediate lead up to a trial is, at the very least, a late amendment, and if it threatens the trial date itself it is a very late amendment (this is so even if, in contrast to the present case, the trial is still some way off).

24. A useful statement of the applicable principles in this regard was set out by Coulson J (as he then was) in *CIP Properties*, supra, in which Coulson J stated at [19] as follows:-

“(a)... An amendment is late if it could have been advanced earlier, or involves the duplication of cost and effort, or if it requires the resisting party to revisit any of the significant steps in the litigation (such as disclosure or the provision of witness statements and expert's reports) ...

(b) An amendment can be regarded as ‘very late’ if permission to amend threatens the trial date, even if the application is made some months before the trial is due to start. Parties have a legitimate expectation that trial dates will be met and not adjourned without good reason.

(c) The history of the amendment, together with an explanation for its lateness, is a matter for the amending party and is an important factor in the necessary balancing exercise. In essence, there must be a good reason for the delay...

(e) The prejudice to the resisting parties if the amendments are allowed will incorporate, at one end of the spectrum, the simple fact of being ‘mucked around’, to the disruption of and additional pressure on their lawyers in the run-up to trial and the duplication of cost and effort at the other. If allowing the amendments would necessitate the adjournment of the trial, that may be an overwhelming reason to refuse the amendments.

(f) Prejudice to the amending party if the amendments are not allowed will, obviously, include its inability to advance its amended case, but that is just one factor to be considered. Moreover, if that prejudice has come about by the amending party's own conduct, then it is a much less important element of the balancing exercise.” (emphasis added)

25. Accordingly, in considering the impact on a trial fixture, the Court is concerned not just with the ability to complete all the necessary steps consequential on the amendments, but also with the impact on the overall ability to prepare for the trial. Where there would be additional pressure

on a party in the run-up to trial, that is a substantial reason why amendments should not be permitted. In this regard in *Donovan v Grainmarket* [2019] EWHC 1023 (QB) at [27], it was stated that the need to revisit previous trial steps “in conjunction with the intense preparation already required even if there is no amendment” constituted “substantial prejudice” (see also *ADVA v Optron* at [47]). The amendments were, in that case, refused, even though (in contrast to the Defendants’ stance on the Proposed Amendments before me) the trial would not need to be adjourned if the amendments were permitted.”

60. In *ADVA Optical Networking Ltd v Optron Holding Ltd* [2018] EWHC 852 (TCC) Ms Joanna Smith QC (as she then was) also rejected the argument that a claimant should deal with a proposed amendment from the moment at which the draft amended pleading is served. She stated this at [41]:

“1. First of all, it seems to me that the claimant was entitled to assume that it only had to address the pleaded case and the pleaded case contained a clear admission which meant that the claimant needed to go only so far in investigating the issue of the supply of cables and, certainly, was not likely to recover its costs in the event that it carried out a full disclosure and witness statement exercise dealing with the supply of those cables.

2. Secondly, that in the middle of December 2017, the parties were all engaged in the preparation of their witness statements. I do not see why, at that stage, the focus should have been on dealing with a potentially new case which, at that point, had not even been placed formally on the pleadings and where an application had only been intimated. In fact, as I have already said, the application was not actually made until the end of January.

3. Even after the application was made at the end of January, where it was being opposed there was no reason, in my judgment, then for the claimant to take steps to meet the case that was being advanced in a proposed amended pleading, in respect of which no consent had been given and no permission provided by the court.”

(2) *Causation*

61. Section 61 of the Patents Act 1977 is headed “Proceedings for infringement of patent” and it provides the statutory remedy which Lufthansa asserts in these proceedings. The section provides as follows:

“(1) Subject to the following provisions of this Part of this Act, civil proceedings may be brought in the court by the proprietor of a patent in respect of any act alleged to infringe the patent and (without prejudice to any other jurisdiction of the court) in those proceedings a claim may be made—

(a) for an injunction or interdict restraining the defendant or defender from any apprehended act of infringement;

(b) for an order for him to deliver up or destroy any patented product in relation to which the patent is infringed or any article in which that product is inextricably comprised;

(c) for damages in respect of the infringement;

(d) for an account of the profits derived by him from the infringement;

(e) for a declaration or declarator that the patent is valid and has been infringed by him.

(2) The court shall not, in respect of the same infringement, both award the proprietor of a patent damages and order that he shall be given an account of the profits.

(6) Subject to the following provisions of this Part of this Act, in determining whether or not to grant any kind of relief claimed under this section and the extent of the relief granted the court or the comptroller shall apply the principles applied by the court in relation to that kind of relief immediately before the appointed day.”

62. The statutory remedy in section 61(1)(d) permits a patentee to recover only those profits which were “derived” by the infringer from the infringement and in the very recent decision *Lifestyle Equities CV v Ahmed* [2024] 2 WLR 1297 the Supreme Court explained the underlying rationale of the remedy for an account of profits. Lord Leggatt (with whom the other members of the Court agreed) stated as follows at [155] and [156]:

“155. A central purpose of intellectual property rights is to encourage and reward creativity and innovation by enabling the owner of the right to enjoy the fruits of its exploitation. That purpose is promoted by allocating profits made from exploiting the right to the owner, including where the right is infringed by commercial use made without the owner's consent. For this purpose it does not matter whether the infringement is deliberate or innocent. The reason for redirecting the profits to the owner of the right is not to punish or deter wrongdoing. It is to achieve the goals which the right exists to further. As Robert Stevens puts it in a valuable discussion of this subject in *The Laws of Restitution* (2023) at p 306: “The remedy of an account of profits is here the continuation of the reason for the right.” This explains why, in the words of Kitchin LJ in *Hollister Inc v Medik Ostomy Supplies Ltd* [2012] EWCA Civ 1419; [2013] Bus LR 428, para 55, the infringer “is treated as if he has conducted the infringing business on behalf of the claimant.”

156. Seen from this perspective, ordering an account of profits against an innocent infringer is in fact easier to justify than awarding compensatory damages. Whereas an award of damages may make the infringer worse off than if the infringement had not occurred, an account of profits does not have this effect. The effect is simply to put the infringer back in the same

position financially as if no infringement had taken place. It is hard to see how an innocent infringer can legitimately object to such restitution. Thus there is no irrationality in the approach adopted in the Copyright, Designs and Patents Act 1988 of establishing a defence based on lack of knowledge to a claim for damages but not to a claim for an account of profits. But I find it hard to see how the converse approach could be justified. As, therefore, lack of knowledge is no defence to a claim for damages for infringement of a trademark, it should not defeat a claim for an account of profits.”

63. The conventional way in which the Court will calculate compensatory damages in tort is by asking itself the counter-factual question what would have happened if the wrong had not been committed. Mr Cuddigan submitted that the Court should adopt exactly the same approach to an account of profits. He also submitted that the Court should approach the question of causation on the following basis and I quote from his Skeleton Argument including footnote 17 (original emphasis):

“22. Factual causation is established in the conventional manner. For lost profit damages, this involves assessing the difference between (i) the real world in which an infringer accrued revenue from acts of infringement at the patentee’s expense and (ii) the counterfactual (“CF”) world in which the patentee made profit from satisfying that same market demand with its own products. The assessment of the infringer’s profits is simply the converse exercise. The court assesses the difference between (i) the real world in which an infringer accrued revenue from acts of infringement and (ii) the CF world in which those acts of infringement did not take place, and that revenue was not accrued.

23. In order to accurately and fairly to assess the CF position, the court must consider how third parties and the infringer would have competed absent any acts of infringement. This may in turn involve the assessment of the viability and profitability of a non-infringing alternative course of business. So if the defendant can prove that it could and would have obtained the same market share with a non-infringing sales of a different product, the claimant’s lost profit damages *caused by the acts of infringement* will be zero. Similarly, the infringer’s profits *caused by the acts of infringement* will be zero.¹⁷ Profits calculated according to this causation approach are typically called “differential profits” or “incremental profits”. We will use the phrase “causation/differential profits” below.

¹⁷ This proposition will likely be the subject of legal argument at trial. There is an old Scottish authority which constrains the freedom of the infringer to argue what they would have done in the CF - *United Horse Shoe and Nail Co Ltd v John Stewart & Co* (1888) 13 App. Cas. 401. The

case concerns damages, and not profits. Its reasoning has received wide academic criticism, and has been rejected at the highest level in Canada. It has also been rejected in the analogous context of licence fee (aka negotiating or reasonable royalty) damages.”

64. Finally, Mr Cuddigan submitted that apportionment was not appropriate in the present case because the Patent was the key technical barrier which the Defendants had to overcome in order to gain entry into the market. He argued that the term “apportionment” was ambiguous because the differential profits or incremental profits approach involved an apportionment between those profits caused by the infringement and those which were not. He summarised the consequences of the legal argument which he advanced as follows:

“28. It is well-established in patent law that a patentee can recover as damages lost profits for both the products covered by the patent in suit, and lost profits on ancillary goods (and services) which they prove would have been sold alongside the patented products. These ancillary trades have come to be called “convoyed goods”.

29. In the present case, Lufthansa seeks to apply the “convoyed goods” approach to profits. It asserts that, in addition to the patented products, Ds sold a range of associated goods which are required and intended to allow the ISPS systems to function. These include cables, in-use lights and master control units. Lufthansa seeks an award of the profits associated with these convoyed goods on the basis that, but-for their infringing acts, Ds would not have accrued those profits at all.

30. The UK jurisprudence on profits on convoyed goods under the apportionment approach is currently uncertain.”

65. Mr Howe submitted that this approach was wrong. He argued that even if Lufthansa satisfied the legal test for causation, it was still necessary for the Court to carry out an apportionment of the profits. Again, I can take the relevant principles which Mr Howe and Mr Copeland submitted that the Court should adopt from their Skeleton Argument:

“43. In particular, Lufthansa apparently contends that, as a matter of law (1) the “*but for*”/factual causation/differential profits approach it prefers to adopt and the concept of apportionment are mutually exclusive alternatives (and on this flawed basis Lufthansa has hitherto elected not to engage properly with the Defendants’ case on apportionment); and also (2) the “*but for*”/factual causation/ differential profits test upon which it relies constitutes the only relevant test for causation, and (once asked and answered) exhausts the whole of the enquiry into causation that the Court

needs to undertake in this case.

44. Lufthansa's contentions are incorrect as a matter of law (as well as wrong on the facts). This will be a matter for detailed legal submissions at the trial but, in summary, the Defendants maintain that:

(a) both the counterfactual differential profits approach and apportionment are relevant, necessary and complementary aspects of the overall enquiry into causation which the Court must undertake on the Account; in particular, even if, for the sake of argument, the counterfactual approach based on the non-infringing alternative product (the Modified 1171-based EmPower System referred to above) were not to be adopted by the Court at trial, it would in any event still be relevant and necessary for the Court to consider, analyse and ascertain apportionment as part of the full and proper determination of the causal enquiry arising on the Account; and

(b) the correct approach to this enquiry into causation involves the full and proper analysis and application of the test of *legal* causation (sometimes referred to as 'proximate' causation) and not merely the (threshold) "but for"/*factual* causation test - which is necessary, but not sufficient, to establish causation for this purpose.

45. Accordingly, the Defendants for their part dispute that there is a strict or rigid distinction, or a watertight and mutually exclusive division, between the "but for"/*factual* causation approach on the one hand and apportionment on the other: properly viewed, both are integral to the analysis of the issue of causation, i.e. to ascertaining what portion of profits was properly attributable to the infringing use of the invention. Very similar, if not identical questions, arise under both. For example, the issue of what factors drove the Defendants' customers' decisions to enter into profit-bearing transactions (to what extent was it the infringing nature of the EmPower Products or to what extent was it other factors?) is live both under the apportionment approach and also in determining whether in the absence of infringement the Defendants would have sold the Counterfactual non-infringing alternative, and if so how well the Counterfactual product would have sold."

66. Mr Howe and Mr Copeland relied on the decision of Laddie J in *Celanese International Corp v BP Chemicals Ltd* [1999] RPC 203 and the decisions of HHJ Hacon KC at first instance and in the Court of Appeal in *OOO Abbott v Design & Display Ltd*: see [2017] EWHC 932 (IPEC) and [2016] EWCA Civ 98 (in which Mr Cuddigan appeared for the patentee). They placed particular reliance upon the following passage in *Celanese International Corp v BP Chemicals Ltd* at [31]:

"Before turning to the case law, I should start by explaining why I reject the suggestion that the incremental route is an alternative way of working

out an apportionment. If these two routes arrive at similar figures it is a coincidence and no more. That this is so can be demonstrated as follows. If an infringer's process makes no profit overall, then whether infringement accounts for 10% or 100% of the profits, on an apportionment the plaintiff will recover nothing. A large percentage of zero is still zero. This was accepted as correct by Mr. Watson. He said it was inherent in his case that if BP made no profits, HC would recover nothing. On the other hand an infringer may benefit very significantly from infringing even though the whole process makes no profit overall. For example if a process makes a loss of £1M p.a. with the infringing step but would have made a loss of £3M p.a. without it, the benefit to the infringer is £2M p.a. Mr. Young accepts and asserts that on his incremental approach to an account, the latter sum would have to be paid to the plaintiff. The two approaches are quite different and in most cases are likely to produce different figures.”

67. Mr Howe and Mr Copeland submitted that in this passage Laddie J rejected the incremental or differential profits approach in favour of apportionment. They also argued that Lewison LJ cited *Celanese* with approval in *OOO Abbott* and held that the judge ought to have apportioned the overall profits in that case: see [26] to [27] and [37]. In his oral submissions in reply Mr Howe urged me to conclude on this application that Lufthansa’s case on causation was misconceived and wrong.
68. Although these two authorities appear at first sight to support Mr Howe’s submission that apportionment is either an alternative or a substitute to legal causation and although Mr Cuddigan accepted in his Skeleton Argument that the legal position was not entirely certain (see footnote 17 and paragraph 30), I am not prepared to decide this issue on this application. I say this for the following reasons:
 - (1) In *Celanese* Laddie J adopted apportionment as a response to a particular fact pattern which was very complex and which it is impossible to summarise or reproduce here. Moreover, in closing submissions counsel for the patentee accepted that it would be wrong in principle to award the patentee profits arising from acts which were not infringing and that apportionment was inevitable: see [28] and [29]. In the light of that concession, it is not possible to treat *Celanese* as authority for the proposition that apportionment is always a necessary ingredient of an account of profits.
 - (2) In both *Celanese* and *OOO Abbott* the Court expressed the view that causation was the principle underpinning the remedy of an account of profits. Laddie J stated this

at [37]:

“Although an account may give rise to a very different figure to that obtained on an inquiry as to damages, they both proceed on a common principle of legal causation. On an inquiry the court is trying to determine what damage has been caused, in a legal sense, by the defendant's wrongful acts. It has to decide whether the breach was the cause of the loss or merely the occasion of it (see for example *Galoo v Bright Grahame Murray* [1994] 1 WLR 1360). In an account the court is trying to determine what profits have been caused, in a legal sense, by those acts.”

- (3) In *OOO Abbott* Mr Cuddigan advanced a very similar argument to the argument which he advances in the present case: see [14] to [27]. Lewison LJ accepted that apportionment would be inappropriate where without the infringement the infringing articles would not have existed or where the ingredient was an essential ingredient in the creation of the infringer's whole product: see [28]. However, he held on the facts that this test was not satisfied because of the findings of the trial judge and that apportionment was the correct approach: see [30] to [37]. Moreover, Lewison LJ cited *Celanese* in support of the proposition that an apportionment would be inappropriate where all the profits were attributable to the act of infringement: see [27].
- (4) Finally, if there is a considerable doubt about the state of the law (and I will have to consider this at trial), then it may be appropriate to return to first principles and Lord Leggatt's statement of general principle in *Lifestyle Equities CV v Ahmed* provides support for Lufthansa's case.
69. But in any event, it would not be appropriate for me to approach the Application on the basis that Lufthansa's case on this issue is misconceived and wrong. It is not appropriate for me to do so because Lufthansa has pleaded in terms the case which Mr Howe and Mr Copeland challenged and no application to strike out those paragraphs was made before me (and the Defendants withdrew their earlier strike out application). Lufthansa pleaded that it is entitled to recover the entire profits from the Relevant Transactions and that apportionment is not justified on the facts of this case because the Infringing Dealings drove the Relevant Transactions and their infringement of the Patent enabled the Defendants to overcome the key technical barrier to entry into the relevant market: see,

in particular, the Re-Amended Points of Claim, paragraphs 14B, 14D and 16. Given that these are pleaded issues for trial it would be wrong in principle for me to dismiss Lufthansa's case on causation.

70. I approach the Application, therefore, on the basis that the Claimants are entitled to advance the case which I have summarised immediately above at trial. But, as Mr Howe urged me in reply, I also approach it on the basis that the Defendants may well succeed in meeting that case and persuading the Court that apportionment is the appropriate remedy whether or not Lufthansa succeeds on its causation case. I turn, therefore, to determine the issues on the Application and to give my decision and the reasons for it.

VI. Determination

(1) Real Prospect of Success

71. There was no dispute that the test in *Kawasaki* (above) was satisfied and that the Defendants had a real prospect of success in relation to the disputed amendments. It follows, therefore, that the issue for me to decide was whether to exercise the Court's discretion in CPR Part 17.3 to permit the amendments. I say this subject to two qualifications: first, Mr Cuddigan submitted that the amendment to paragraph 17C was incoherent. Secondly, when Lufthansa objected, the Defendants revised their draft amendments to paragraph 17C(A) and 17G to remove the sentences in which they expressly alleged that customers also bought systems providing DC power and that they would have accepted the supply of Primary Components in other jurisdictions and the supply of a DC only power supply. In their Skeleton Argument, Mr Cuddigan and Ms Bercariu maintained that the Defendants were still trying to advance the same case and that the remainder of the proposed amendments in paragraphs 17C(A) and 17G should be refused.

(2) Lateness

(i) Late

72. Mr Bennett did not accept that the Application was made late even though there is less than 11 weeks to trial and I have had to list the PTR in the vacation to ensure that it takes place in good time for the trial to begin. I have also had to list a disclosure application by

the Defendants at very short notice. Despite this, Mr Bennett did not acknowledge that the proposed amendments would increase the burden on either Lufthansa or the Court. Nor did he provide good reasons why the Court should give permission to amend in those circumstances. His position was that the proposed amendments would require no further disclosure or evidence of fact and, except in very limited circumstances, no further expert evidence.

73. In my judgment, the Application was made late. Mr Bennett did not suggest that the Defendants were unable to advance the disputed amendments earlier and I reject Mr Bennett's evidence that they will not involve the duplication of cost and effort: see *CIP Properties* at [19](a) cited by Bryan J in *Steenbok Newco 10 SARL v Formal Holdings Ltd* (above) at [24]. Indeed, I am satisfied that the Defendants could and should have pleaded the disputed amendments earlier. In the original Points of Claim, Lufthansa pleaded that apportionment was not justified and in the Re-Amended Points of Claim dated 21 September 2023 they set out their detailed case on causation. Moreover, in the Amended Reply dated 22 November 2023 (which the Defendants saw in draft before they served their Re-Amended Points of Defence) Lufthansa expressly pleaded that the Defendants had failed to engage with its case on causation or advance a positive case.
74. Mr Bennett sought to characterise the disputed amendments as providing further clarity about the Defendants' existing case: see *Steenbok* at [13]. I do not accept that this characterisation of the disputed amendments was accurate. I do not do so for the reasons which I set out in dealing with paragraph 17C(A) and the power management amendment (below). In my judgment, the Defendants were trying to advance a substantial new case that their power management system was the technical barrier to entry into the market only weeks before trial.

(ii) Very Late

75. Moreover, I am also satisfied that permission to amend would threaten the trial date. Mr Bennett challenged Mr McCulloch's evidence that further disclosure and witness evidence was unnecessary to address the disputed amendments. But he did not challenge Mr McCulloch's evidence that, if they were, the burden was too great for the short period between the hearing of the Application and trial and that it would be necessary to vacate the trial. His answer in Bennett 20 was that Lufthansa should have taken steps to address

the amendments when they were served in draft on 10 May 2024. Moreover, Hogan Lovells did not provide a substantive response to Jones Day's letter dated 3 July 2024 or offer a timetable which would have enabled the trial date to be kept if the Court accepted that Lufthansa should have time to deal with the amendments now.

76. In my judgment, the principle which Ms Joanna Smith QC accepted in *ADVA Optical Networking Ltd v Optron Holding Ltd* and Bryan J set out in *Steenbok* at [22] applies in the present case. I accept that it should not be held to apply invariably. But it is very important that parties should know where they stand in the run up to a trial and that the Court should apply this principle in the weeks or months before an action is listed for a trial of substantial length. In my judgment, Lufthansa and its legal team were not obliged to divert themselves from their evidential and trial preparations to prepare to meet a case for which the Defendants had not obtained permission to amend. Accordingly, it is irrelevant whether Lufthansa and its legal team could have addressed the amendments if they had diverted themselves from other tasks from 10 May 2024 (and I doubt very much whether they could have done so in any event).
77. For the reasons which I develop below, I am satisfied that it would only be just to give Lufthansa a full opportunity to address the disputed amendments. Given the Defendants' failure to address Mr McCulloch's evidence that the amendments would require the trial to be vacated or to put forward a realistic timetable in answer to Jones Day's letter dated 3 July 2024, I am also satisfied that the disputed amendments are very late because permission to amend would endanger the trial date. Indeed, I am satisfied that there is a very serious risk that the trial date would be lost if I grant permission to amend.

(iii) Good reason

78. It was for the Defendants to satisfy the Court that there was a good reason for the delay in making the Application: see *CIP Properties* at [19](d). Coulson J (as he then was) pointed out that this is an important factor in the balancing exercise. However, Mr Bennett did not offer any explanation for the failure to issue the Application until 24 May 2024. Moreover, the failure to make the Application is even more inexplicable given that Lufthansa had set out its stall on causation in the Re-Amended Points of Claim and the Amended Reply. There appears to be no reason why the Defendants could not have advanced a positive case in the Re-Amended Points of Defence that it was not

Lufthansa's inventive concept which overcame the technical barrier to entry into the market but their own invention, namely, a power management system.

79. Furthermore, I accept Mr Cuddigan's submission that the Defendants must have been considering the disputed amendments for some time because their witnesses of fact have addressed the power management issue in their witness statements dated 17 May 2024. I reject the submission made by Mr Howe and Mr Copeland in their Skeleton Argument that these witnesses were only addressing the apportionment issue or that Mr Bennett was only doing so in Bennett 20, paragraph 34. That evidence may well have been relevant to apportionment but it was clearly directed to establishing that the power management architecture which was protected by the GD AES Patents provided the technical breakthrough rather than the Patent. For example, it would be irrelevant to the apportionment exercise pleaded in paragraph 24A whether other entrants into the market might require a licence from Astronics or the commercial seal of approval from Airbus or Boeing.
80. I should make it clear that I express no view at this stage in relation to the question whether it was appropriate for a party to serve witness statements which address an issue which has not been pleaded, which the opposing party has disputed and for which the Court has not given permission to amend. For present purposes, however, this evidence is only relevant to timing and I draw the inference that the disputed amendments have been under consideration for some time from the witness statements of Mr Markert, Mr Jouper and Mr Gleason (see further below).

(iv) Prejudice

81. Finally, even if I am wrong and it were possible to address the disputed amendments before trial, I am satisfied that this will cause prejudice to Lufthansa which cannot be compensated in costs. I have no doubt that it will increase the pressure on Lufthansa's legal team very considerably and the authorities accept that this in itself amounts to substantial prejudice: see *Steenbok* at [25]. Moreover, it is no answer for the Defendants to assert that Lufthansa should increase the size of its team. The Defendants do not suggest that the Lufthansa's team has been unable to cope with this complex litigation to date. Indeed, it was the Defendants who were applying for an extension of time before me. But in any event, I accept Mr McCulloch's evidence that prejudice will be caused to

Lufthansa by having to recruit new team members who may not be specialists and to bring them up to date: see McCulloch 28. Finally, as I explain below, I am satisfied that Lufthansa has suffered specific prejudice in relation to the power management issue because the Application was made very late.

(2) *Paragraph 17C*

82. Mr Cuddigan objected to paragraph 17C on the basis that it was incoherent. I agree. Lufthansa does not allege that the certifications and approvals of the EmPower System were the proximate cause of the Defendants' profits and it makes no sense, therefore, to advance an alternative case which assumes that they were. I accept that Lufthansa did not apply to strike out the preceding sentence but the fact that the existing pleading is incoherent is no justification for permitting the amendment.

83. Moreover, I found the detailed explanation which Mr Howe and Mr Copeland gave in their Skeleton Argument difficult to follow. As I understand it, paragraph 17C is a plea that the infringement was the occasion for the profits and not their effective cause or that they were too remote for a number of reasons including the fact that the Defendants were able to obtain certification for the EmPower System in 2004. If this is the correct interpretation of the proposed amendment, then it adds nothing new. If it means something else, then I am unable to understand it. Either way, a late amendment should be clear and the Court should not be required to try and make sense of it just before trial.

(3) *Paragraph 17C(A)*

(i) Power Management: the pleaded case

84. This was the most important amendment and the one to which the parties devoted most of the hearing. Mr Howe and Mr Copeland submitted that the new causation case in paragraph 17C(A) gave rise to exactly the same issues as the Defendants' existing apportionment case. In their Skeleton Argument they submitted that no further investigation was necessary because the Defendants had already put in issue the opinions, preferences and actions of manufacturers, regulators and customers: see paragraphs 23a.i, 23d, 23f and 23.i. Mr Howe also relied on paragraph 24A and Appendix 5 in his oral submissions. I am unable to accept these submissions for the following reasons:

- (1) *Paragraph 23(a)(i)*: The Defendants relied on the MCU and AMCU together with five other technical features of the EmPower System in support of their case that the components of the EmPower System were not functionally essential. But, as Mr Cuddigan pointed out, they chose not to rely on any of these particulars as a defence to causation and relied only on the particulars of commercial non-essentiality: see the last sentence of paragraph 17C. It was reasonable, therefore, for Lufthansa and its team to assume that the Defendants were not advancing a positive defence to its causation case in reliance on the MCU or the AMCU.
- (2) *Paragraph 23(d)*: The same point can be made in relation to this paragraph. Moreover, in this paragraph the Defendants contend that certification by the FAA or the EASA did not require an aircraft manufacturer to adopt a particular design and, in particular, Lufthansa's inventive concept as reflected in the Patent. Again, the contents of this paragraph would not have put Lufthansa and its team on notice that the Defendants intended to plead that their power management architecture overcame the key technical barrier to entering the market.
- (3) *Paragraph 23(f)*: The same point can also be made in relation to this paragraph. The Defendants chose to rely on four alternative designs in support of their apportionment case but not their defence to Lufthansa's case on causation as set out in the Re-Amended Points of Claim. Moreover, the Defendants chose to advance a specific case on differential profits by reference to the Twist Lock but not by reference to the MCU or the AMCU: see paragraph 28A. Again, it was reasonable for Lufthansa and its team to assume that the Defendants were not advancing a positive defence to its causation case by relying on the MCU or the AMCU.
- (4) *Paragraph 23.i.iii.8*: This paragraph was incorporated by reference into paragraph 17C. However, offerability by Airbus or Boeing was clearly identified as a commercial and not a technical factor. Again, it was reasonable for Lufthansa and its team to assume that the Defendants were not advancing a technical defence to Lufthansa's causation case far less that the technical defence related to the MCU or the AMCU.
- (5) *Paragraph 24A*: In the Re-Amended Defence the Defendants relied on the GD AES

Patents in support of their case that there should be an equal apportionment between the Patent and all of the other patents which protected the Primary Components. Mr Cuddigan described this as “patent counting” and Mr Howe used a similar expression. However, it would not have been reasonable for Lufthansa and its team to appreciate from this that the Defendants also intended to advance a case that the power management architecture had unlocked the key technical barrier to the relevant market or that the GD AES Patents prevented any competitors gaining entry without a licence. This for two reasons: first, Appendix 5 did not distinguish between patents owned by the Defendants and by third parties and, secondly, the Defendants expressly pleaded that each of the patents in Appendix 5 should be “treated as equally important”. As Mr Cuddigan pointed out, this was inconsistent with their case that the GD AES Patents protected the critical inventive concept which provided the technical breakthrough which unlocked the relevant market.

85. It was also incumbent upon the Defendants to put evidential material before the Court which established a sufficiently arguable case: see *Kawasaki* (above). However, the only evidence before the Court to support paragraph 17C(A) was provided by Mr Markert, Mr Jouper and Mr Gleason in their witness statements. All three witnesses gave evidence about the importance of the GD AES Patents. Indeed, Mr Markert gave evidence that any manufacturer who wished to enter the market would need to obtain a licence from Astronics or design power management architecture which did not infringe those patents. Moreover, Mr Bennett clearly stated in Bennett 20 that the relevant issue to which paragraph 17C(A) gave rise was whether there were power management systems on the market which did not implement the GD AES Patents.
86. Mr Cuddigan relied on the evidence of Mr Markert, Mr Jouper and Mr Gleason to show that the Defendants were trying to introduce a case which Lufthansa would only be able to meet if it undertook an enormous exercise to verify the validity of the GD AES Patents and whether they had been infringed. This put the Defendants on the horns of a dilemma. It became increasingly obvious from the evidence and the correspondence that if they continued to ask for permission to amend to run the case which Mr Bennett set out in Bennett 20 and about which Mr Markert, Mr Jouper and Mr Gleason had all given evidence, it would be impossible for Lufthansa to investigate the issue, plead to it and prepare the necessary evidence before trial.

87. Mr Howe and Mr Copeland addressed this dilemma in their Skeleton Argument by stating that the Defendants were not relying on the GD AES Patents in support of the allegations in paragraph 17C(A) and that the evidence of Mr Markert, Mr Jouper and Mr Gleason was not directed at that issue. Mr Howe also confirmed this in his oral submissions. But if the Defendants do not now intend to rely on the GD AES Patents, it is entirely unclear to me how they intend to prove the allegations in paragraph 17C(A). All three witnesses rely on those patents as protecting the Defendants' power management architecture and, as Mr Cuddigan submitted, that technology was itself in the public domain. If the Defendants cannot rely on the patents themselves, it is unclear to me what evidence they intend to lead to show that their power management architecture was the key to overcoming the technical barrier rather than Lufthansa's inventive concept. This uncertainty is wholly unsatisfactory in relation to an application for permission to amend made 11 weeks before trial.

(ii) Disclosure

88. Mr Howe and Mr Copeland also submitted that the DRD covered the disclosure of any documents which the parties would be required to give in relation to paragraph 17C(A). They placed particular reliance upon Issue 8A: "Whether the relevant market was for AC mains voltage power, the barriers to entry in the market, and how EmPower Systems gained entry to that market." I also reject that submission for the following reasons:

- (1) The DRD provided that the Defendants were to give Model D disclosure in relation to the relevant market itself by reference to their disclosure in relation to Issue 8. The disclosure which the Defendants were ordered to give under that issue required them to address the relative importance to the commercial success of the EmPower System of the Components listed in the Re-Amended Points of Defence, paragraph 22. It is of some significance that those Components did not include either the MCU or the AMCU.
- (2) The DRD also provided that the Defendants were to give Model C disclosure in relation to the issue how the EmPower System gained entry to the market. Mr Cuddigan accepted that the issue itself went wider than perhaps was necessary to determine the pleaded issues. But in any event, the DRD imposed Model C disclosure upon the Defendants and I accept Mr McCulloch's evidence that the

requests which the parties agreed that the Defendants were required to answer (which were limited to 72 contracts) were far more limited than would have been necessary to address the new case which the Defendants wish to run.

- (3) Moreover, I also accept that if the Defendants had advanced the case in paragraph 17C(A) in the Re-Amended Points of Defence or shortly afterwards, Lufthansa would have taken a more focused approach to disclosure and would have required the Defendants to give disclosure of documents passing between them and certification bodies, aircraft manufacturers and customers relating to power management and to the GD AES Patents. I am satisfied, therefore, that Lufthansa has suffered prejudice as a consequence of the lateness of the Application.
- (4) Finally, I do not see how Lufthansa could be expected to amend the Points of Reply to address paragraph 17C(A) without the benefit of disclosure by the Defendants and technical input from its experts or consultants. In my judgment, it would be unjust to permit the Defendants to amend to plead paragraph 17A(C) unless Lufthansa were given sufficient time to consider the scope of the DRD, to identify what further searches the Defendants should be required to carry out and to consider the documents disclosed (and the adequacy of the disclosure exercise). Mr Bennett did not explain how any of this could be incorporated into the timetable in the run up to trial.

(iii) Factual and expert evidence

89. Finally, I accept Mr McCulloch's evidence that if the Defendants were to be permitted to amend to plead paragraph 17C(A) and even if they are permitted to lead the evidence of Mr Markert, Mr Jouper and Mr Gleason in support of it, it would give rise to a number of wide-ranging questions which Lufthansa's expert, Professor Wheeler, or a substitute expert would need to address. I also accept Mr McCulloch's evidence that Professor Wheeler would be unable to do so before trial and, indeed, that he might not be able to cope with the new case at all.

(4) Paragraph 17C(B)

90. Mr Bennett did not address paragraph 17C(B) in evidence and Mr Howe and Mr Copeland did not address it in their Skeleton Argument. Both Mr Bennett and counsel

stated unequivocally that the Defendants had withdrawn the two new counter-factual cases which they had intended to plead. Initially, they had contended that if they had not infringed the Patent, they would have produced and supplied to customers a low voltage DC power supply and, secondly, they would have supplied the EmPower Systems outside the jurisdiction. When they withdrew these allegations, however, this exercise involved the excision of a single sentence and a single phrase from paragraph 17C(B).

91. In my judgment, the appropriate course is to refuse permission to amend for the entire paragraph. The Defendants did not explain the purpose of paragraph 17C(B) without the two pleaded counter-factual allegations and they did not put forward a positive reason for allowing the remainder of the amendment (which consisted of 25 lines of densely argued text) to stand. Moreover, if I were to permit the amendments, this would clearly leave open the argument that the Defendants could have supplied the Components in other jurisdictions even though it is no longer open to them advance a positive case that they would have done so. This is either a recipe for confusion or a disguised attempt to leave open one of the counter-factual allegations which they claim to have withdrawn.

(5) *Paragraph 17G*

92. I refuse permission for paragraph 17G for the same reasons. The Defendants also removed one sentence and one phrase but did not explain why the Court should give permission to add the remaining 19 lines of text. Again, if I were to permit the amendments, it would leave open the argument that the Defendants could have supplied Secondary Components or Ancillary Goods anywhere in the world even if it is not open to them to argue that they would have done so. Again, this is either recipe for confusion or a disguised attempt to leave open one of the counter-factual allegations which the Defendants claim to have withdrawn.

(6) *Paragraph 23f.ii*

93. I will permit the Defendants to amend to plead that a system in which the plug detectors are located at the side of the plug holes instead of at the bottom does not make use of the inventive concept. Lufthansa's case in answer to this allegation is that this amounts to infringement "by equivalents" and Mr Cuddigan submitted that there was insufficient time before trial to run Lufthansa's defence. I do not accept that submission. The Defendants do not seek to rely on any other alternative designs in support of this case

apart from the three which they have already pleaded, namely, the Twist Lock, the modified versions of the EmPower System and the IFPL 1225 all of which Lufthansa has had time to consider. Moreover, in his expert report dated 4 July 2024 on behalf of the Defendants Professor Burrow was able to deal with the issue of equivalence very briefly.

(7) *Paragraph 23f.iv.2*

94. Finally, the Defendants applied for permission to rely on Intellicabin as a second product in which the supply device is not provided remotely from the socket and does not infringe the Patent. Mr Howe also relied on the evidence of Professor Burrow in relation to this issue. He drew attention to the few short paragraphs in which Professor Burrow had been able to deal with it and pointed out that Professor Wheeler had dealt with the PowerBox in a few paragraphs in his third report.
95. Mr Cuddigan submitted that I should refuse permission to amend both because the Defendants had given no explanation why they did not plead Intellicabin at the same time as the other alternative designs and also because they did not suggest that this was an amendment which could be critical to the outcome of the trial. He submitted that it was for the Defendants to justify a late or very late amendment and demonstrate why it would be unjust to refuse permission.
96. After some hesitation, I will give permission to the Defendants to rely on Intellicabin. I accept that it would be possible for Lufthansa and its legal team to address this discrete issue before trial and I do not consider that it will impose an unreasonable additional burden to require them to do so. Although the Defendants have already pleaded four different alternative designs including one, PowerBox, which goes to the same pleaded issue, I am not satisfied that this by itself is a sufficient reason to refuse the amendment. It seems to me that this is the kind of late amendment which the Court ought to allow to bring the statements of case into line with the expert evidence.

VII. Disposal

97. For these reasons I refuse permission to make the disputed amendments apart from the amendments to paragraphs 23f.ii and 23f.iv.2 (above). I will also grant permission to rely on the NOE but on terms that the Defendants agree to the timetable put forward by Jones Day for the hearing of the Application. Finally, I will extend time for the service of the

two expert reports (which ought to have been served by now). I invite counsel to agree a minute of order to reflect my decision and these directions. If the parties are unable to agree all outstanding issues, I will deal with the issue of costs and any application for permission to appeal either at the hearing of the Defendants' disclosure application on 25 July 2024 or, if that application has been resolved, either at the PTR on 10 September 2024 or in writing.

98. Finally, I should deal with two matters. First, Mr Cuddigan submitted that the NOE and the directions consequential upon it made it impossible for Lufthansa and its team to address any of the disputed amendments in time before trial. I had considerable sympathy for that submission but I did not consider it to be determinative or necessary to address it separately in giving my reasons. Nevertheless, I wish to make it clear that I have taken this additional burden into account when considering the effect of the amendments on the timetable to trial and, in particular, when granting permission for the discrete amendments to paragraph 23f.
99. Secondly, by email dated 17 July 2024 Mr Cuddigan wrote to me to inform me that the expert report of the Defendants' commercial expert, Mr Brady, which had been served that day contained extensive passages relating to the power management issue. By email dated 18 July 2024 Mr Howe and Mr Copeland wrote to my clerk stating that Mr Brady had been careful to address the existing pleaded issues and provided me with a detailed analysis of his evidence. Having looked at Mr Brady's report briefly, I do not consider that it is necessary for me to resolve this issue for the purposes of the Application and I have found it unnecessary to rely on that evidence in reaching my decision. I add that I had reached the conclusion that Mr Bennett and the Defendants' witnesses had all addressed the power management issue before receiving or reading Mr Brady's report.