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IN THE COMPETITION
APPEAL TRIBUNAL

Case No: 1403/7/7/21

Salisbury Square House
8 Salisbury Square
London EC4Y 8AP

Wednesday 22nd January 2025

Before:
Ben Tidswell
Dr William Bishop
Tim Frazer

(Sitting as a Tribunal in England and Wales)

BETWEEN:

Dr. Rachael Kent

Class Representative

v

Apple Inc. and Apple Distribution International Ltd

Defendants

A P P E A R A N C E S

Mark Hoskins KC, Tim Ward KC, Michael Armitage, Matthew Kennedy, Antonia Fitzpatrick
(Instructed by Hausfeld & Co. LLP) On behalf of Dr. Rachael Kent

Marie Demetriou KC, Brian Kennelly KC, Daniel Piccinin KC, Hugo Leith, Hollie Higgins
(Instructed by Gibson, Dunn & Crutcher UK LLP) On behalf of Apple Inc. and Apple
Distribution International Ltd

Wednesday, 22 January 2025

(10.30 am)

(Proceedings delayed)

(10.36 am)

THE CHAIRMAN: Good morning, Mr Kennelly.

MR KENNELLY: Good morning, sir. We call Mr Federighi. He
is already in the box as you can see.

THE CHAIRMAN: Yes. Can we swear Mr Federighi, please.

MR CRAIG FEDERIGHI (affirmed)

Examination-in-chief by MR KENNELLY

THE CHAIRMAN: Counsel will ask you some questions.

A. Thank you, sir.

MR KENNELLY: Good morning, Mr Federighi.

A. Good morning.

Q. You should have a hard copy bundle there, and your
witness statement should be behind tab 1.

A. Okay. Yes.

Q. Just to get it on the screen as well, it is already
there {B2/3/1}. Is this your witness statement?

A. It is, yes.

Q. Could you go, please, to {B2/3/45}?

A. Yes.

Q. Is that your signature?

A. It is.

Q. I understand, Mr Federighi, there are two corrections

1 you wish to make?

2 A. That is correct.

3 Q. Could I ask you to turn to {B2/3/14}, paragraph 50.

4 A. Yes.

5 Q. The second sentence.

6 A. Correct.

7 Q. Could you tell the Tribunal the correction you wish to
8 make?

9 A. Yes, here in the sentence where it says:

10 "Every Apple Device combines hardware, software, and
11 services designed to work together for maximum security
12 and a transparent user experience ..."

13 I would like to change that to "every iOS Device".

14 Q. Thank you, Mr Federighi. Then if you could turn to
15 {B2/3/34}, paragraph 108. Do you see that?

16 A. Yes.

17 Q. The last sentence.

18 A. Yes. So here where it says that:

19 "... Apple has required that all Apps distributed
20 outside the App Store must also be signed ..."

21 I would like to change it to "Apple has required
22 that all Apps distributed outside the App Store for
23 systems configured with the default Gatekeeper setting
24 must also be signed by the developer".

25 Q. Thank you.

1 A. There is a clarification on the original intent.

2 Q. So, Mr Federighi, with those corrections, are the
3 contents of this statement true to the best of your
4 knowledge and belief?

5 A. Yes, they are.

6 MR KENNELLY: Thank you. Mr Kennedy, my learned friend, has
7 some questions for you now.

8 Cross-examination by MR KENNEDY

9 MR KENNEDY: Good morning, Mr Federighi.

10 A. Good morning.

11 Q. I will be asking you some questions on behalf of the
12 Class Representative. Three preliminary points. You
13 should have three binders, I think, on your table.

14 A. I do.

15 Q. One should have your witness statement in it; one should
16 have, I think, 31 tabs.

17 A. Yes.

18 Q. At tab 1, as you've seen, you also have your witness
19 statement, and I think there is a separate binder that
20 has the exhibits to your witness statement.

21 A. Yes.

22 Q. I will hopefully be just taking you to the
23 31-tab binder.

24 A. Okay.

25 Q. I will give you a reference, which will be tab 5 or

1 tab 6, and a page number. I am going to give another
2 reference, which is for the electronic system, which
3 will be C2 something something, but you can ignore that
4 reference and just focus on the references I give you
5 for the hard copy bundle.

6 I am conscious, Mr Federighi, that aspects of
7 Apple's approach to security may be confidential.

8 I will let you know if any of the material that I take
9 you to has been designated by Apple as confidential, and
10 I will ask you just to read that; I won't read it out
11 loud.

12 A. Okay.

13 Q. But if you think that you are not able to answer my
14 question without revealing something confidential to
15 Apple, please let me know before you answer, and we can
16 make arrangements. Right at the end, I am going to ask
17 the court to sit in a closed session, just for one short
18 set of questions, where I am going to ask you about some
19 numbers that you have included in your witness statement
20 and which are marked confidential.

21 A. Okay.

22 Q. I think I will struggle to discuss the numbers just by
23 asking you to read them out.

24 A. Yes.

25 Q. That is the housekeeping, Mr Federighi.

1 If you could pick up your witness statement at
2 paragraph 37, that is {B2/3/9}, and it is tab 1, page 9
3 of the hard copy. If I can ask you to read paragraph 37
4 to yourself.

5 A. Okay. (Pause). Yes.

6 Q. So what you do here is you set out a number of facets of
7 the iPhone and the App Store which you say are relevant
8 to security, yes?

9 A. Yes.

10 Q. And then on to para 38 {B2/3/10}, you say:

11 "In considering these security concerns, we
12 evaluated the threat model faced by iPhone and how it
13 differed from that faced by Mac Devices."

14 Do you see that?

15 A. I do.

16 Q. Mr Federighi, you first worked at Apple between 1997 and
17 1999, correct?

18 A. Yes. Sort of 1994 in the sense that the company that
19 I joined then, NeXT, was acquired into Apple, and much
20 of what we did at Apple, or at NeXT, became part of
21 Apple as well, so Apple sees my employment as starting
22 in 1994.

23 Q. 1994. But you left in 1999?

24 A. That is correct.

25 Q. You returned to Apple in 2009?

1 A. Exactly, yes.

2 Q. So you were not employed by Apple when Apple launched
3 the iPhone in 2007?

4 A. That is correct.

5 Q. You were not employed by Apple when Apple launched the
6 App Store in July 2008?

7 A. That is correct.

8 Q. You were not, therefore, party to any discussions at
9 those times regarding the threat model faced by iPhone,
10 correct?

11 A. That is correct.

12 Q. You were not party to any discussions at those times
13 regarding the decision to prevent native iOS Apps from
14 being downloaded from sources other than the App Store,
15 correct?

16 A. Right, I only heard about it after the fact.

17 Q. So when you say "we" in paragraph 38, it is not
18 something you have first-hand knowledge of?

19 A. First hand only in the sense of talking to people
20 extensively after the fact when I joined.

21 Q. But you were not there at the time?

22 A. That is correct.

23 Q. You do not exhibit any contemporaneous documents that
24 record that decision or the reasons for that decision --

25 A. I was not there at that time, that is correct.

1 Q. Are you aware of any such documents?

2 A. Any such -- what documents are you referring to?

3 Q. Contemporaneous documents recording the reasons for the

4 decision to limit distribution of iOS Apps to the

5 App Store?

6 A. I have seen quotes, for instance, of Steve Jobs saying

7 at the time the App Store was introduced, that Apple was

8 trying to accomplish two diametrically opposed things,

9 to provide an environment for developers to provide

10 apps, and yet to keep the system safe from malware. So

11 that is a contemporaneous notion of what the company was

12 trying to achieve at that time.

13 Q. Go to {D1/993/1}. This is tab 23 for you, Mr Federighi.

14 Parts of this document are confidential, and so

15 I will just ask you to read certain parts, and I will

16 not read them out, but I will let you know when we get

17 to those parts, okay?

18 A. Yes.

19 Q. And you will see the document title, "Third Party

20 Applications on Mac OS X Embedded".

21 Yes?

22 A. Yes.

23 Q. I think you were cross-examined on this document both in

24 the United States and in Australia?

25 A. Correct.

1 Q. This must be starting to feel like Groundhog Day;
2 hopefully that means we can take it fairly quickly.

3 A. Okay.

4 Q. The date on the front is 2 November 2020, but we
5 understand that the correct date is -- actually it was
6 created for the first time on 11 October 2007, so can I
7 ask you to assume that that is correct?

8 A. I have heard that is so, okay.

9 Q. If we go over the page -- sorry, pardon me, staying on
10 {D1/993/1}, the authors are Mitch Adler, John Wright and
11 Dallas De Atley, and Mr Adler at the time worked on a
12 team that focused on iOS security, is that correct?

13 A. That is correct.

14 Q. Mr Wright led the core OS component of the iPhone OS
15 project, correct?

16 A. Correct.

17 Q. Mr De Atley was a member of Apple's iOS security team?

18 A. That is correct.

19 Q. And if we go over the page {D1/993/2}, you will see the
20 context in which this document was prepared. It says:

21 "We want to allow third parties to develop
22 applications for the Mac OS X Embedded platform."

23 Which at this time, Mr Federighi, is a reference to
24 iOS. That was the project name at the time, I believe?

25 A. Yes. I believe that is what they are referring to here.

1 Q. It says:

2 "The transition from a closed system to an open
3 model demands answers to questions of control and
4 security."

5 You see that?

6 A. I do.

7 Q. That is a reference to the decision by Apple to allow
8 third-party developers to develop native iOS Apps for
9 the iPhone, yes?

10 A. I believe that is one that was being explored, yes.

11 Q. If we go down to the heading, "Assumptions", and we will
12 see the first bullet which starts with, "We intend".
13 Some of -- this is marked confidential, but I am not
14 sure if that is correct, because some of this
15 information is in Mr Federighi's witness statement, but
16 let us proceed on the basis that it is confidential.
17 Can I just ask you to read the first bullet down to the
18 word marked in pink before the second bullet. (Pause)

19 A. Okay.

20 Q. I am going to have to ask you a slightly opaque
21 question, given that what you just read was
22 confidential --

23 A. Right.

24 Q. -- but the technology or the security mechanism that has
25 been described in those paragraphs was in fact

1 implemented on iOS, yes?

2 A. Yes, it is one of many such mechanisms that were

3 implemented.

4 Q. Then if we could look at the second bullet and just read

5 the first sentence of the second bullet. (Pause)

6 A. Yes.

7 Q. And that technology, that mechanism, was also

8 implemented on iOS, yes?

9 A. Well, a much enhanced version, but in spirit aligned

10 with what is being discussed here.

11 Q. It got better?

12 A. Yeah, substantially revised, yeah.

13 Q. The way in which that technology works is that it

14 restricts access by one piece of software, such as an

15 app, to a subset system resources and user data,

16 correct?

17 A. Yeah, that is one of the protections referred to here.

18 Q. It also allows Apple to utilise an entitlement system;

19 is that correct?

20 A. I don't believe that is explicitly referenced here, but

21 that is part of what was ultimately built into iOS, yes.

22 Q. You refer to that aspect of this technology in

23 paragraph 61 of your statement. Would it be convenient

24 to turn it up?

25 A. Sure.

1 Q. It is {B2/3/17}, internal page 17 for you, Mr Federighi.

2 A. Yes.

3 Q. You will see the word "entitlement" in bold about
4 two-thirds of the way down.

5 A. I do.

6 Q. That is in the context of this discussion of the
7 technology we have been looking at, yes?

8 A. Yes.

9 Q. That must ask a user for approval before it can access
10 information outside its sandbox, yes?

11 A. What was being referred to in this document did not
12 encompass that idea. This is referring to essentially
13 a static sandbox, one that is the same that the user
14 does not have discretion over. The concept in the part
15 of my statement you are referring to here refers to
16 something that was conceived of and developed later,
17 which is the notion that the user has additional control
18 over information they might want to expose to
19 applications conditionally, like saying: I want this app
20 to access my photos, but I don't want this other app to
21 access my photos. That was not envisioned or referred
22 to in the document that you are talking about, but was
23 later implemented as part of the protections of iOS.

24 Q. Thank you. If we go back to the document we were just
25 in, which is {D1/993/2}, you will see a heading that

1 says, "Malware reduction". Can I ask you to read the
2 first paragraph under that heading to yourself. Again,
3 parts of it are confidential so I will not read it out.

4 A. Okay. (Pause). Yes.

5 Q. So the two technologies that we have just been
6 discussing were seen at this time as central to
7 protecting iOS Devices from malware, yes?

8 A. I don't know about central. They were two things that
9 were considered as important components of iOS -- of
10 securing iOS.

11 Q. They remain important components of securing iOS?

12 A. They do, yes.

13 Q. If we can go over the page {D1/993/3}, you will see
14 a heading, "Distribution", and this bit is not
15 confidential, and what we see is:

16 "We will distribute third party applications through
17 the iTunes Music Store. However, our model will allow
18 for third parties to distribute their own applications
19 and for enterprise customers to deploy to their own
20 Devices."

21 And then the first sentence of the next paragraph is
22 not confidential:

23 "Signing does not imply a specific distribution
24 [model], and it's left as a policy decision as to
25 whether Apple signed applications are posted to the

1 online store, or we allow developers to distribute on
2 their own."

3 You see that?

4 A. I do.

5 Q. If we go forward to {D1/993/6}, we will see an appendix
6 marked, "Appendix C -- Developer Scenarios", have you
7 got that?

8 A. I see it.

9 Q. The first scenario that is considered is marked
10 confidential, but if I can just ask you to read the
11 title to yourself. (Pause)

12 A. Okay.

13 Q. If we just look at number 3 beneath the first
14 confidential title, we see:

15 "Decide you have final version ..."

16 So it is a version of an app?

17 A. Uh-huh.

18 Q. "... to deploy

19 "... Submit to Apple for signing

20 "... Get signed image and deploy as you wish".

21 You see that?

22 A. I do see that, yes.

23 Q. And Mr Federighi, you accepted in the United States and
24 Australia that this document envisages the possibility
25 of a distribution method in which all apps are signed

1 with an Apple certificate, but could be distributed by
2 developers however they wish. Do you recall that?

3 A. Do I recall it?

4 Q. Do you recall accepting that proposition in the
5 United States and Australia?

6 A. I don't specifically recall that.

7 Q. Okay. Could we go to --

8 A. It is quite possible, but if you are asking if I recall
9 it, no, I do not.

10 Q. Can we go to {H2/18}?

11 A. Sorry, where is that?

12 Q. It is just in the soft copy. It is going to come up on
13 the screen, Mr Federighi.

14 A. Okay, yeah, yeah.

15 Q. This particular document has not been marked as
16 confidential, but I imagine it is confidential, given it
17 is a transcript of the -- Mr Federighi's
18 cross-examination in the Epic Proceedings? Not
19 confidential? Just the deposition is?

20 And if we can go to {H2/18/3456}, it is going to
21 take us a minute just to get you your bearings, so bear
22 with me. But if you see at line 2, you will see:

23 "And do you see that it's a document or report
24 entitled 'Third-Party Application on macOS 10
25 Embedded.'"

1 So it is a reference to the document we are looking
2 at?

3 A. Mm-hmm.

4 Q. If we go to {H2/18/3461}, line 22, you will see that you
5 were taken to:

6 "It says 'Appendix C' at the top."

7 Do you see that?

8 A. I do.

9 Q. Over the page {H2/18/3462}, line 3, you see you were
10 taken to "Developer Scenarios", and then line 5:

11 "And one scenario ..."

12 This was marked confidential in the documents, so
13 I will not read it out, but we have seen those words a
14 moment ago in the document, yes?

15 A. Yes.

16 Q. And then {H2/18/3463}, we will pick it up at 5 and the
17 question is:

18 "And so the model contemplated in this white paper
19 requires Apple involvement in the form of signing, but
20 separates that signing by Apple from distribution,
21 correct?"

22 And you say:

23 "It has that option, envisions the possibility of
24 that option."

25 Do you see that?

1 A. Yes, I do.

2 Q. That was in the United States, that was the answer you
3 gave there?

4 A. Okay. Yeah, I think I am referring to a technical
5 possibility in a range of options presented, and
6 of course we ultimately came up with something much
7 better.

8 Q. But you envisage it as a possibility; you do not make
9 any reference there to it being a technical possibility
10 rather than anything else, do you?

11 A. I think that is implied.

12 Q. You say it envisages the possibility.

13 If we go to {G2/21/1}, this is the transcript of the
14 Australian Proceedings and for you, Mr Federighi, it is
15 tab 13 of your hard copy bundle.

16 A. Okay.

17 Q. If you see on the front page, it is the Australian
18 Proceedings, go to {G2/21/26} in the electronic and page
19 26 for you as well.

20 A. Okay.

21 Q. If we pick it up at just after line 35, we see question:

22 "And the model contemplated in this proposal
23 requires Apple's involvement in the form of signing, but
24 it separates the signing by Apple from distribution;
25 correct?"

1 Then the three dashes separate the question from the
2 answer:

3 "Yes. This component of the software they're saying
4 could be used in that way if -- if desired."

5 Then we see:

6 "And the authors do not recommend here that
7 distribution be limited to Apple's own App Store;
8 correct?"

9 "Yes. I don't think they're focused on that part of
10 the problem."

11 Then:

12 "And the authors don't suggest that once an app is
13 signed, distribution through Apple would be safer in any
14 way than distribution of Apple-signed apps through a
15 third party; you agree with that?"

16 "I don't think they comment on that either way."

17 If we go to the top of the next page {G2/21/27}, you
18 will see a final question:

19 "Thank you. And nothing in this document suggests
20 that centralised distribution for Apple is necessary to
21 ensure security; correct?"

22 The answer is:

23 "Not in this document."

24 A. Yeah, I do think that if you look earlier in the
25 document, it does describe that what is suggested in the

1 document does not provide complete security, and so in
2 that sense, I suppose I could have spoken more carefully
3 here to say that actually in the document, it is
4 envisioned that there are limitations.

5 Q. I was just asking you what your answer was in Australia
6 and in the United States.

7 A. Oh sorry, I thought you said whether I agreed with it.

8 Q. When you say that the document suggests that it is not
9 a complete answer, you are referring to the first bullet
10 that we looked at on the first page?

11 A. Somewhere in there, if you want to take me back --

12 Q. Let us go back to 23, then, quickly, and just make
13 sure --

14 A. Which tab?

15 Q. 23 of the hard copy, {D1/993/2}. I am not going to read
16 out the first word of the second paragraph, but I am
17 going to read out the next sets of words and tell me if
18 that is what you are thinking of. "Does not mean that
19 we will solve all of our security problems"; is that
20 what you had in mind?

21 A. Yes.

22 THE CHAIRMAN: What page is that?

23 MR KENNEDY: I am so sorry, sir, it is internal page 2 of
24 {D1/993/2}. It is the -- you will see "Assumptions",
25 and you will see a bullet point, sir, and then

1 a paragraph and the second paragraph, I did not read out
2 the first two words of the second paragraph.

3 THE CHAIRMAN: "Code signing does not mean ..."

4 MR KENNEDY: "... does not mean that we will solve all of
5 our security problems."

6 Thank you.

7 Mr Federighi, we go to {D1/993/3} of that document.

8 A. Yes.

9 Q. We will see a heading, "Development", and then we see
10 the words:

11 "The crucial problem to solve is ..."

12 Can I ask you to read --

13 A. I am sorry, I am not finding where -- you said
14 "Development"?

15 Q. I am so sorry. It is about two-thirds of the way down,
16 a blue heading, "Development", and then the words, "The
17 SDK itself", do you have that?

18 A. Oh, page 2 -- sorry, it is document page 2 page slash 3.
19 I have two -- I got you.

20 Q. Bottom right, {D1/993/3} you should have?

21 A. Got it, perfect, yes. You would like me to read what,
22 that whole section?

23 Q. Just read from the words "The crucial problem" until the
24 words "security threat", so the second paragraph.

25 A. Okay.

1 (Pause). Yes.

2 Q. Mr Federighi, do you understand this paragraph to be
3 a reference to what became known as ad hoc distribution?

4 A. No.

5 Q. And Mr Federighi, the document we have just looked at is
6 obviously highly relevant to the security issues you
7 deal with in your statement. Do you agree?

8 A. This document?

9 Q. This document.

10 A. Well, I mean it really represents some early and
11 incomplete thoughts that were substantially revised, so
12 I consider it sort of unformed thought.

13 Q. You were cross-examined on this document in the
14 United States in 2021, yes?

15 A. I was.

16 Q. Your witness statement in these proceedings is dated
17 24 January 2024, yes?

18 A. Sorry, say that date again?

19 Q. Your witness statement in these proceedings, we can go
20 to it, it is (B2/3/45}, you see your signature?

21 A. Yes.

22 Q. You see the date?

23 A. Yes, I do.

24 Q. You did not think this was a document you should refer
25 to in your witness statement in order to explain the

1 security considerations that Apple took into account
2 when deciding to set up the App Store?

3 A. No, I think what we ultimately built was what was of
4 most interest. This was an intermediate thought that
5 was improved upon.

6 Q. But the two particular features that we looked at, which
7 I will not mention because they are marked as
8 confidential --

9 A. Yes.

10 Q. -- did become part of the iOS security system, yes?

11 A. In part and were substantially modified.

12 Q. You don't refer to any contemporaneous documents in your
13 discussion of the reasons for -- or you don't refer to
14 any contemporaneous documents documenting Apple's
15 threat-modelling exercise at the time of the creation of
16 the iPhone or the App Store, do you?

17 A. I do not recall, but it is quite possible.

18 Q. Let us go to paragraph 39 of your statement, {B2/3/10},
19 page 10 internal for you, Mr Federighi. Just ask you to
20 read that quickly.

21 A. Okay. (Pause). Yes.

22 Q. At the time the iPhone was created, Apple did not know
23 that there would be ten times the number of iPhones as
24 Macs, correct?

25 A. At the time iPhone was created, there were --

1 Q. 2007 --

2 A. Yeah, there were no iPhones, so zero --

3 Q. You could not have known that the number would be ten
4 times --

5 A. No, we just envisioned -- and I say "we" -- what
6 Steve Jobs and -- publicly talked about in terms of --

7 Q. It is just a simple question.

8 A. I am sorry.

9 MR KENNELLY: I am sorry (inaudible - no microphone).

10 THE CHAIRMAN: Why do you not put the question again and
11 then let Mr Federighi answer it.

12 MR KENNEDY: The question is: Apple did not know at the time
13 the iPhone was created that there would be ten times the
14 number of iPhones as Macs?

15 A. Apple could not be sure, but had hopes for -- given the
16 size of the cell phone market, that it would be a vastly
17 bigger space than the Mac.

18 Q. At the time the App Store was created, Apple did not
19 know how popular apps would be with iOS Device users?

20 A. That is correct. It had hopes.

21 Q. In fact, Apple were surprised by the popularity of the
22 App Store, was it not?

23 A. Thankfully, yes.

24 Q. So it would not have been possible to take into account
25 the particular considerations that you identify in

1 paragraph 39 when evaluating the threat model faced by
2 the iPhone at the time of its creation?

3 A. Oh no, it absolutely would. You often, when designing
4 a system, envision the potential future in which that
5 system will exist, and in anticipation of that future
6 you design to be ready for it, and Apple had big
7 ambitions for how the iPhone could be a very popular
8 system, much more popular than anything we had ever
9 shipped before, it could touch more users because we had
10 seen what had happened to the smartphone market, and so
11 that absolutely was on the minds of people designing the
12 iPhone. You see that reflected in many of the
13 capabilities and decisions made around the product.

14 Q. Mr Federighi, look at paragraph 40 of your statement.
15 If I could just ask you to read that to yourself
16 {B2/3/11}. (Pause).

17 A. Yes.

18 Q. You do not identify any study or analysis of the nature
19 and extent of the information respectively held by Macs
20 or iOS in this paragraph, do you?

21 A. No.

22 Q. You do not refer to any documents at all in this
23 paragraph?

24 A. No. This point seems self-evident.

25 Q. The Mac Device user, so switching from iOS Device user

1 to Mac Device users, they might keep financial
2 information on their Mac?

3 A. Certainly.

4 Q. Health-related information?

5 A. They could. There is kinds of it that are only on iOS,
6 but they could have other information, sure.

7 Q. Other health-related information?

8 A. They could, yeah.

9 Q. A user's contacts can be synced between their iOS Device
10 and their Mac Device through iCloud, yes?

11 A. That is correct.

12 Q. A user may back up their iOS Device to their Mac, yes?

13 A. That basically does not happen anymore, but it is
14 a possibility.

15 Q. Two-factor authentication tokens are often sent, not
16 only to mobile Devices but also to email addresses?

17 A. Sometimes.

18 Q. That email address might be hosted through the Mail app
19 on a Mac Device, yes?

20 A. Yeah. I think that is less frequent than SMS, but it is
21 a possibility, yes.

22 Q. Mac Devices are used by professionals in a number of
23 industries, yes?

24 A. Mm-hmm.

25 Q. Those provisions may have confidential or proprietary

1 information on their apps?

2 A. Of course.

3 Q. Some people in this room may have confidential and
4 proprietary information on their Macs?

5 A. I hope they have Macs.

6 Q. I have a Mac, Mr Federighi.

7 A. Excellent.

8 Q. I have your confidential information on my Mac, so there
9 we go.

10 A. Fantastic. Well done.

11 Q. Giving evidence from the Bar. Macs have cameras and
12 microphones which could be exploited as real-time
13 spyware, yes?

14 A. Yeah, just they have much less opportunity than
15 an iPhone.

16 Q. A Mac laptop may reflect a user's real-time location,
17 yes?

18 A. With much lower frequency, yes.

19 Q. So it is an overstatement to suggest that the breadth
20 and level of sensitivity of information stored on an iOS
21 Device typically far exceeds that of a Mac Device, is it
22 not?

23 A. No, I think that really depends on what the attacker is
24 after, and we have seen since that attackers like
25 nation-state attackers, they attack the phone with far

1 greater ferocity than the Mac, because they want
2 guaranteed real-time location, they want guaranteed
3 real-time microphone that is with you. These pieces of
4 information to that kind of attacker are considered far
5 more valuable than some of the other information on the
6 Mac.

7 Q. At paragraph 48 {B2/3/13} of your statement, you say
8 that nation-state attacks only affect a tiny fraction of
9 individuals, yes?

10 A. That is correct.

11 Q. Mr Federighi, do you want to now have a look at
12 a document that you do exhibit to your witness
13 statement. If we could go to {D1/1176/1}, and it is
14 tab 5 for you. We can pick it up on {D1/1176/2}, we
15 will see the title.

16 A. Oh, sorry, which -- I am there on that document.

17 Q. Tab 5, blue cover, yes?

18 A. Thank you, by the way, for making this all happen in one
19 binder. I can't tell you what a positive experience
20 this is.

21 Q. It is not me, it is the people behind me who hate me.

22 A. Sorry. It is fantastic.

23 Q. Thank them, not me.

24 This is a document that Apple published in October
25 2011, yes?

1 A. Yes -- 2021.

2 Q. 2021, I misspoke. You refer to this document at
3 paragraph 99 of your witness statement; is that correct?
4 You can pick it up, it is {B2/3/31}, internal 31 for
5 you.

6 A. Yes.

7 Q. Were you involved in the preparation of this document?

8 A. Yes, I reviewed it.

9 Q. If we go to page 3 {D1/1176/3} you will see, "Key
10 Insights", and if we pick it up in the third sentence,
11 we see:

12 "However, some are demanding that Apple support the
13 distribution of apps outside of the App Store, through
14 direct downloads or third-party app stores, a process
15 also referred to as 'sideloading.' Supporting
16 sideloading through direct downloads and third-party app
17 stores would cripple the privacy and security
18 protections that have made iPhone so secure, and expose
19 users to serious security risks."

20 A. Yes.

21 Q. When you say, or when Apple says that "some are
22 demanding", is that a reference to the fact that by this
23 time, by October 2021, Apple's restrictions on the
24 distribution of iOS Apps and on payments within iOS Apps
25 were under significant scrutiny by both regulators and

1 courts around the world?

2 A. Well, I would say in particular in the European Union,
3 the DMA was -- being crafted, so I think that was
4 a particular focal point of that discussion at that
5 time.

6 Q. But are you aware that there were a number of lawsuits
7 in America and elsewhere that started either prior to or
8 around this time? You were involved in the --

9 A. The Epic one was certainly one example, yeah. That was
10 not a regulatory thing, but that was a private action as
11 I understand it.

12 Q. Yes, and the question was regulatory or court
13 proceedings?

14 A. Okay.

15 Q. It covers both DMA-type investigations, or legislative
16 projects and private litigation?

17 A. Yes, yes.

18 Q. At around this time, so around 2021, Apple produced
19 a number of documents which outline what it says are the
20 security benefits of the restrictions on sideloading,
21 yes?

22 A. Yes.

23 Q. So in April 2021, Apple prepared a document entitled:
24 "A Day in the Life of Your Data, A Father/Daughter
25 Day at the Playground."

1 You refer to this at paragraph 118(c) of your
2 statement, page {B2/3/37}:

3 "The white papers titled 'A Day in the Life ...'..."

4 You will see there?

5 A. Uh-huh.

6 Q. In June 2021, Apple prepared a document entitled
7 "Building a Trusted Ecosystem for Millions of Apps", the
8 important role of App Store protections. That is the
9 document you refer to in 118(b), yes?

10 A. Yes.

11 Q. It was no coincidence, Mr Federighi, that these
12 documents were prepared at this time, was it?

13 A. Oh no. I mean, we had done this -- what we thought was
14 incredible work and incredibly effective work, and we
15 thought it was not well enough understood by regulators,
16 and so we wanted to make sure that they understood what
17 was at stake.

18 Q. You said in the Australian litigation, and I think we do
19 not need to turn it up, given the answer you have just
20 given, that you prepared these documents with a policy
21 audience in mind; is that correct?

22 A. Among others, but certainly that as well, yes.

23 Q. You also said in the Australian litigation, the June
24 2021 white paper had the same origins as the October
25 2021 paper.

1 A. Could well be.

2 Q. We can turn up the June 2021 paper if that is helpful.

3 A. Okay.

4 Q. It is tab 4 of your hard copy bundle. It is {D1/1177}.

5 A. Mm-hmm.

6 Q. For example, if you pick it up at {D1/1177/5}, you will

7 see halfway down:

8 "Studies show that third-party app stores for

9 Android Devices, where apps are not subject to review,

10 are much riskier ..."

11 So on?

12 A. Yes.

13 Q. Those are the same matters that were covered in

14 the October 2021 paper, yes?

15 A. Yes.

16 Q. Would you like to see the October 2021 paper?

17 A. The one we were just looking at?

18 Q. The one we were just looking at, tab 5.

19 A. Yeah, yeah. I think they cover some of the same ground,

20 I am sure.

21 Q. Pick it up at {D1/1176/8}, tab 5 for you, and then we

22 see the first, the second and third paragraphs are

23 addressing Android and sideloading, yes?

24 A. Yes, yes, indeed.

25 Q. Did the June 2021 paper have the same purpose as

1 the October 2021 paper? Was it also a policy-orientated
2 document?

3 A. I suspect so, although I do not specifically recall.

4 Q. Thank you.

5 We will move to a different topic now, please, and
6 that is Apple's approach to security, so we are very
7 much in your bailiwick now, not mine.

8 A. Okay.

9 Q. Go to paragraph 49 of your statement, {B2/3/13}. You
10 say here --

11 A. I am sorry.

12 Q. I am so sorry, I am going too quickly.

13 A. You said page 13?

14 Q. Page 13, paragraph 49 under the heading, "Apple's
15 Approach to Security on iOS Devices"?

16 A. Yes.

17 Q. If we pick it up, first sentence:

18 "To defend against the various attacks that may be
19 mounted against its Devices, Apple has taken an in depth
20 approach -- sometimes referred to as 'defence in
21 depth' -- to its security."

22 You see that?

23 A. Yes.

24 Q. Then if we go to paragraph 64, which is on {B2/3/18},
25 you say:

1 "Each of the security measures discussed above
2 contribute to the overall security of iOS Devices."

3 Then you go on to address centralised distribution
4 and App Review in the sections that follow.

5 A. Yes.

6 Q. And it's correct, is it not, that the level of security
7 enjoyed by iOS Device users is a product of the
8 combination of the various different layers of security
9 that you describe in your statement?

10 A. Yes.

11 Q. The level of security enjoyed by a Mac Device user is
12 a product of the combination of the different layers of
13 security that apply to Mac Devices?

14 A. Yes.

15 Q. The level of security enjoyed by Android Device users is
16 a product of the combination of the different layers of
17 security that apply to Android Devices?

18 A. Yeah, I would say both the product of their protections
19 and the environments in which they exist.

20 Q. In each case, you need to look at the different layers
21 of security and how they interrelate in order to
22 understand the overall security posture of a given
23 category of Device, yes?

24 A. Mm-hmm, yes, correct.

25 Q. Now, you break down Apple's approach into the following

1 component elements: hardware, software, centralised
2 distribution and App Review, yes?

3 A. Yes.

4 Q. If we could pick it up at paragraph 51 {B2/3/14}, you
5 set that out. You see there:

6 "I describe below the following features of Apple's
7 security architecture:

8 "(a) hardware...

9 "(b) software...

10 "(c) ... centralised ... distribution ... combined
11 with computer and human App Review and ongoing
12 curation..."

13 Yes?

14 A. Yes.

15 Q. What I want to do is have a look at each of the
16 features, or each of the buckets in turn.

17 A. Okay.

18 Q. Starting with hardware. We pick it up at paragraph 53,
19 {B2/3/15}. You say:

20 "... an iOS Device utilises a secure boot that
21 allows only trusted operating system software from Apple
22 to load at startup."

23 Yes?

24 A. Yes.

25 Q. iOS Devices would continue to utilise a secure boot if

1 Apple permitted apps to be downloaded in the
2 United Kingdom from sources other than the App Store,
3 yes?

4 A. That is correct.

5 Q. Next sentence:

6 "To provide additional data protections, Apple uses
7 a Secure Enclave processor in the SoC that is isolated
8 from an iOS Device's main processor..."

9 Yes?

10 A. Yes.

11 Q. iOS Devices would continue to utilise a secure element,
12 if Apple permitted apps to be downloaded in the
13 United Kingdom from sources other than the App Store,
14 yes?

15 A. Yes.

16 Q. Even if an iOS Device is compromised by a malicious app,
17 the information stored in the secure enclave would
18 continue to be protected, yes?

19 A. I am sorry, can you say that again?

20 Q. Of course. Even if an iOS Device is compromised by
21 a malicious application, the information stored in the
22 secured enclave -- secure enclave would be protected,
23 yes?

24 A. Yes and no. If we want to go into any more detail about
25 the secure enclave, it is used sometimes to protect

1 information at the user's discretion. So the user may
2 be asked to type in their pass code to allow access to
3 certain information. When malicious software is on the
4 system, it may socially engineer or trick the user into
5 giving authorisation of the secure enclave, for
6 instance, typing their pass code, authenticating with
7 their face or so forth, causing the secure enclave to
8 follow the user's instruction, which is to reveal this
9 information, but the user has revealed it because they
10 have been manipulated by unsafe software that was trying
11 to manipulate them.

12 So the secure enclave does its best to meet the
13 user's intent, but malicious software can cause the user
14 to be fooled into doing things that do not represent
15 their actual intent.

16 Q. A social-engineering type attack --

17 A. Exactly, yes.

18 Q. -- might cause that information to be shared by
19 trickery?

20 A. That is correct, and so the secure enclave can only
21 protect the user to the extent the user is making good
22 decisions and is not being manipulated.

23 Q. But if we think about something other than a
24 social-engineering attack, I do not know what the
25 correct terminology -- a brute force attack perhaps,

1 then the secure enclave should continue to protect the
2 information that is stored?

3 A. Against a brute force attack, yes.

4 Q. So biometric information and financial information that
5 is stored in the secure enclave should remain safe in
6 the face of such an attack, yes?

7 A. Of that particular kind, yes.

8 Q. Paragraph 54:

9 "Apple also has designed a biometric security
10 architecture for its iOS Devices that utilises a secure
11 connection between the biometric sensor and the Secure
12 Enclave."

13 iOS Devices would continue to utilise that biometric
14 security architecture if Apple permitted apps to be
15 downloaded from sources other than the App Store?

16 A. They would, with the same caveats.

17 Q. The social-engineering caveats.

18 A. Yes, absolutely.

19 Q. That is hardware, Mr Federighi.

20 Let us go to software.

21 A. Mm-hmm.

22 Q. You identify in paragraphs 56 to 63 {B2/3/15-18}
23 a number of software techniques which you say enhance
24 the hardware protections we just looked at, yes?

25 A. Yes.

1 Q. Again, I just want to take them in turn, it is going to
2 be the same question each time, it is a little bit
3 repetitive, but hopefully we can go at pace. The first
4 is paragraph 56 {B2/3/15}. This is "Address Space
5 Layout Randomisation", and iOS Devices would continue to
6 utilise ASLR, even if Apple permitted apps to be
7 downloaded in the United Kingdom from sources other than
8 the App Store; yes?

9 A. That is correct.

10 Q. The next is paragraph 57 {B2/3/16}, "Kernel integrity
11 protection". Same question: iOS Device users would
12 continue to utilise kernel integrity protection even if
13 Apple permitted apps to be downloaded in the UK from
14 sources other than the App Store; yes?

15 A. Yes. So those mechanisms would exist. They would be
16 put under considerably higher stress if bad actors can
17 poke at their vulnerabilities with impunity.

18 Q. If they get through the net -- I am going to come on to
19 the net?

20 A. The net?

21 Q. The net, App Review.

22 A. Okay, yes, yes.

23 Q. So each of the -- as you describe in your statement, the
24 layers are stacked upon each other?

25 A. Indeed.

1 Q. So there is a layer above software, is there not, in the
2 form of App Review, that stops things even getting to
3 the software protections and the hardware protections;
4 correct? That is the --

5 A. Right, right.

6 Q. So we will come to that in due course.

7 A. Okay.

8 Q. Paragraph 58, we have largely covered this, but a couple
9 of questions. This is the code signing process. You
10 say:

11 "Apple requires that any software installed on an
12 iOS Device be 'signed' with an Apple-issued
13 certificate."

14 A couple of questions on how code signing works. By
15 requiring any software installed on an iOS Device to be
16 signed with an Apple-issued certificate, Apple can
17 control what software is installed on an iOS Device,
18 yes?

19 A. It gives us a tool to do so. It is a tool that has been
20 bypassed before, but it is a tool to do so.

21 Q. That is the intention behind code signing, or one of the
22 intentions?

23 A. Yes, yes, absolutely.

24 Q. For example, if Apple discovers that an app is acting
25 maliciously after it has been through App Review, Apple

1 can revoke the app's certificate, and that app cannot be
2 installed on any further iOS Devices, correct?

3 A. That is a technical capability, yes.

4 Q. Presumably, Apple keeps some sort of central record of
5 app certificates that have been revoked?

6 A. Yes.

7 Q. In the European Union, developers of iOS Apps can
8 distribute those apps through alternative app stores,
9 yes?

10 A. That is -- under the DMA, yes, that is correct, yes.

11 Q. Under the DMA changes, yes. Through the developer's own
12 website, yes?

13 A. Yes. Correct.

14 Q. But any iOS App installed on any iOS Device in the EU
15 must still be signed with an Apple-issued certificate,
16 yes?

17 A. That is correct, by going through a Notarisation review
18 process, yes.

19 Q. So it is possible for Apple-issued certificates to be
20 mandatory, Apple code signing to be mandatory, and for
21 app distribution to be decentralised, yes?

22 A. I mean, yeah, depending on the policy environment as to
23 whether it is allowed, but that is what we have made
24 possible in the EU under the DMA.

25 Q. Paragraph 61 {B2/3/17}, "Sandboxing and entitlements".

1 Again, we have had a quick look at this already. You
2 say sandboxing:

3 "... creates a boundary around a piece of software
4 to ensure that it is contained, and thus restricts
5 access by that software (such as an App) to a subset of
6 system resources and user data."

7 Yes?

8 A. Yes.

9 Q. Sandboxing can be used even if Apple permitted iOS Apps
10 to be downloaded in the United Kingdom from places that
11 were not the App Store, yes?

12 A. Yes, some form of review is critical to making
13 sandboxing effective, because the sandbox -- the
14 dimensions of the sandbox are determined by entitlements
15 that are included with the app, and so it is critical
16 that an app is only given the entitlements it should to
17 configure an appropriate sandbox, but in concert with
18 a human review, the sandbox could exist as it does in
19 the EU with other forms of distribution.

20 Q. Unsurprisingly, you are ahead of me Mr Federighi. My
21 next question was: apps distributed in the EU from any
22 source continue to be sandboxed; yes?

23 A. Yes.

24 Q. Sorry, I should say iOS Apps.

25 A. Yes, thank you. That is correct.

1 Q. We are going to come back to the question of
2 entitlements and human review in due course.

3 A. Okay.

4 Q. Paragraph 63 {B2/3/18}, you address malware scanning,
5 and again, just noting that, I will come back to malware
6 scanning when we have a look at App Review in due
7 course, okay?

8 A. Okay.

9 Q. Mr Federighi, paragraphs 68 to 86 of your witness
10 statement, and 88 and 89. Just have a quick flick
11 through. It starts on {B2/3/19}.

12 A. Mm-hmm.

13 Q. That is where you deal with App Review, yes?

14 A. Yes.

15 Q. I have discussed App Review at considerable length with
16 Mr Kosmyinka on Friday.

17 A. Yes.

18 Q. So I am only going to ask you a couple of questions
19 about App Review today, okay?

20 A. Okay.

21 Q. I would like to go to a document {D1/347/1}, and it is
22 in tab 25 for you, Mr Federighi.

23 A. Yes.

24 Q. It is an email from Phillip Shoemaker to Phil Schiller
25 and others, dated 18 October 2015?

1 A. Yes.

2 Q. At the time, I think Mr Shoemaker was in charge of App
3 Review; is that correct?

4 A. Yes.

5 Q. If we pick it up at the second paragraph, we see:

6 "Regarding the apps getting onto the store, we need
7 a dynamic analyzer in order to pro-actively find these
8 issues. Objective-C is so 'obfuscation friendly' that it
9 makes finding these issues very problematic. I had an
10 email exchange with Craig in August 13 that describes
11 this very well."

12 "Craig" is you?

13 A. It is indeed.

14 Q. Then we see below that:

15 "Phillip,"

16 It looks like Mr Shoemaker has copied and pasted
17 your email to him from August 2013. If we go over the
18 page {D1/347/2}, we can see:

19 ""Thanks,

20 "-- craig".

21 A. Yes, I believe that is what happened here, except that
22 is -- below "-- craig", that looks like maybe that is
23 not me, that is again more Mr Shoemaker.

24 Q. We can get the original, {D1/243/1}, and that is tab 26
25 for you. It starts right at the bottom of the page, 28

1 August, "Phillip", and ends "craig". So that's right;
2 below the dash is Mr Shoemaker, I believe, yes?

3 A. Yes, I believe so.

4 Q. If we go back to tab 25 {D1/347}, just so we can look at
5 the Mr Shoemaker version.

6 A. Uh-huh.

7 Q. The problem that you are addressing -- I will give you
8 a moment just to read it in a second, but it seems that
9 the problem you are addressing in your email is
10 obfuscated calls to private APIs. Does that sound
11 right?

12 A. Yes, it does.

13 Q. As you said, after the sign-off, there is some more
14 text, and it says {D1/347/2}:

15 "I know that some people have discussed the
16 potential of an acquisition here to help us (I've heard
17 that SourceDNA was one of these possible companies), and
18 I would agree: we need more automation, and dynamic
19 analysis has the best potential."

20 A. That is Shoemaker's --

21 Q. That is Shoemaker's summary.

22 A. Yes, indeed.

23 Q. So in August 2015 -- sorry, October 2015, it was the
24 head of App Review's opinion that greater automation was
25 needed in order to make App Review more effective.

1 A. Yeah, I think he felt that was a good idea, and I think
2 we all agree, you know, you apply automation when you
3 can, and humans are great at other things, so it is
4 a good one-two punch.

5 Q. Mr Federighi, are you familiar with an internal Apple
6 project called Columbus?

7 A. I have heard about it through documents I reviewed as
8 part of this case. It was not something in name that
9 I was aware of prior.

10 Q. You have only heard about it in the context of this
11 case, or in the context of other cases?

12 A. In this case.

13 Q. This particular case?

14 A. Yeah. But it referred to a system that I was aware of;
15 I just did not know it was called Columbus.

16 Q. The system you are referring to, can you clarify what
17 that is?

18 A. I know there was Columbus and there was Magellan, and
19 there was a system for helping human App Reviewers tee
20 up all their issues and review them. There was a system
21 that App Reviewers used on their Macs to drive remote
22 applications. There is a system that is used to do
23 static analysis, a system that is used to stress dynamic
24 analysis, and which name refers to which is something
25 I still cannot keep straight, but I knew like Columbus,

1 Magellan etc referred to different pieces of those. So
2 familiar with the existence of all those systems, but
3 not their names.

4 Q. Would you agree that the purpose of Columbus, insofar as
5 you are familiar with it, was also to increase
6 automation and the use of computer tools for App Review.

7 A. Yes.

8 Q. To reduce the amount of human review?

9 A. Oh, I do not think it is to reduce the amount of human
10 review, as much as to make human review more effective,
11 or perhaps to replace components where the human is, you
12 know, sifting through tedious information and instead
13 tee up for human judgment the part where the human
14 judgment is a value, so that human review is more
15 effective.

16 Q. Staying sort of with App Review, Mr Federighi, but its
17 relationship with centralised distribution. If we could
18 go to paragraph 90 of your statement, {B2/3/28},
19 internal page 28 for you.

20 A. Yes.

21 Q. You say:

22 "Centralised distribution through the App Store has
23 worked in tandem with App Review to play an essential
24 element of this security architecture."

25 That is a reference back to the security

1 architecture as a whole.

2 A. Yes.

3 Q. "Distribution of Apps through the App Store averts the
4 risk that Apps could circumvent the App Review process
5 and the human review element that is crucial to that
6 process, by blocking developers intent on causing harm
7 from being able to bypass App Review. Put another way,
8 Apple's security layers of centralised distribution with
9 App Review helps to assure users that the source from
10 which they download Apps is trusted. As a result, users
11 can download Apps that do what users expect them to do
12 because the Apps, along with the information they see
13 describing those Apps, have gone through Computer Review
14 and Human Review for privacy, security, safety, and
15 reliability."

16 Yes?

17 A. Yes.

18 Q. It would be possible, would it not, for Apple to permit
19 iOS Apps to be downloaded and updated from sources other
20 than the App Store in the United Kingdom, but
21 nonetheless still carry out App Review of all iOS Apps?

22 A. You could carry out App Review, but the overall security
23 architecture would be less effective than it is today.

24 Q. But on the narrow question of could you continue to
25 carry out App Review of all iOS Apps distributed in the

1 United Kingdom, the answer is...

2 A. We could carry out the review in some form, yes.

3 Q. That is what Apple is doing in the European Union, in

4 order to comply with the DMA, yes?

5 A. Well, we are carrying out a subset of the App Review

6 that we perform in the rest of the world.

7 Q. Notarisation for iOS, yes?

8 A. Yes, correct.

9 Q. Just looking at the notarisation process in the EU,

10 before the developer can submit an app for notarisation,

11 they must sign up to the Apple Developer Program, yes?

12 A. Correct.

13 Q. That is regardless of whether they ultimately intend to

14 distribute their app through the Apple App Store, yes?

15 A. Correct.

16 Q. As part of that enrolment process for the Developer

17 Program, Apple requires developers to verify their

18 identity, yes?

19 A. Yes.

20 Q. Notarisation for iOS involves a computer review and

21 a human review, yes?

22 A. That is correct.

23 Q. The tools used for the computer review element of

24 notarisation for iOS are the same tools used by Apple

25 for App Review?

1 A. I believe all the same tools are used, but checking
2 sometimes for a subset of the things.

3 Q. We are going to come on to the subset of guidelines?

4 A. Okay.

5 Q. Again, you are always ahead of me Mr Federighi, it is
6 going to be a trend.

7 A. Sorry.

8 Q. The tools that are used as part of the computer review
9 element, notarisation for iOS, include a malware scan,
10 yes?

11 A. Yes.

12 Q. I said we will come back to malware scan; we have now
13 come back to malware scan and the humans carrying out
14 the human review are the same people who carry out App
15 Review proper, yes?

16 A. I believe so. You would have to -- Trystan would know
17 better how he segregated the teams to do that work --

18 Q. It is --

19 A. I do not know if it is literally the same humans or
20 whether they are ultimately planning to have different
21 groups of people to do different kinds of review.

22 Q. Under notarisation for iOS, the human review element
23 will include a review of apps entitlement; yes?

24 A. Yes.

25 Q. You said earlier that is an important aspect of ensuring

1 the sandbox mechanism works correctly; yes?

2 A. It is. It is harder to do effectively in the EU,
3 because we have less information as input into the
4 review process, but an attempt is made.

5 Q. Less information about the app's entitlement requests?

6 A. About the app's purpose and how the app is representing
7 itself to the user, yes.

8 Q. Less information about how it is representing itself to
9 the user at the moment of review?

10 A. Yeah, so in -- historically in the App Store, the
11 advertisement, if you will, the way that the app markets
12 itself to the user is all provided, all the screenshots,
13 all -- there is a screen recording of a movie of the app
14 in action; if there is a set of claims about: buy this
15 app because of X, Y and Z; all that sort of marketing
16 material, if you will, around the app is presented as
17 part of the review, because it is going to be shown to
18 the store to the user before they make the purchasing
19 decision, which means that all of that marketing
20 material is available to the reviewer to understand how
21 this app is representing itself.

22 In the EU, on an alternative App Store, Apple is not
23 necessarily going to be the entity presenting that app,
24 so the developer does not need to present all that
25 information that they are going to ultimately show to

1 the user, to Apple, and so the reviewer does not see it.

2 So an app can submit with, like, very minimal
3 information to Apple, to the reviewer, and that is all
4 they have to go on, and meanwhile, when it comes time
5 for the user to see the app, oh, all kinds of claims
6 could have been made, could have represented the app
7 differently than Apple saw it.

8 So that assessment of what is this app saying it
9 does, what entitlement should it have and so forth, we
10 have less information going into the review process.

11 Q. But it is not correct, Mr Federighi, that Apple is not
12 provided with any information about marketing materials,
13 and so on, or app description and so on, at the time of
14 App Review under the notarisation model, is it?

15 A. We have an installation sheet -- these were the things
16 we fought for to minimally try to preserve the
17 protections we could. We have an installation sheet
18 that the user sees at the final moment after they have
19 seen all the marketing materials that were shown to them
20 on a website, or whatever the other distribution
21 mechanism did. That sheet is presented -- the contents
22 that will be shown on that sheet are presented to App
23 Review, but not the larger way in which the app is
24 marketing itself and representing itself to the users.

25 Q. On the app installation sheet, there is the app name,

1 yes?

2 A. It does have the name, yes.

3 Q. Developer name?

4 A. Sure.

5 Q. App description?

6 A. Yeah, it can be a very short description, but

7 a description string of some text of some sort.

8 Q. Screenshots of the app?

9 A. Optional.

10 Q. If we look at {D1/1707/12}. Pick it up at {D1/1707/1}.

11 This is tab 12 for you. See the title, "Complying with

12 the Digital Markets Act".

13 A. Uh-huh.

14 Q. This is a document Apple published about security

15 connection with DMA.

16 A. Yes.

17 Q. Were you involved in its preparation?

18 A. I reviewed it and gave some input, yes.

19 Q. Let us pick it up at {D1/1707/12}?

20 A. Sorry, slash 12?

21 Q. Yes.

22 A. Okay.

23 Q. Then we see in blue at the top:

24 "We have also created app installation sheets that

25 empower users to make educated choices about the apps

1 they download."

2 Yes?

3 A. Yes.

4 Q. Second paragraph:

5 "The sheets display information reviewed during
6 Notarization, such as the app name, developer name, app
7 description, screenshots, and system age rating, and
8 identify the marketplace a user is downloading the app
9 from, all in a clear, standardized form."

10 Yes?

11 A. Yes, that is exactly what I am referring to.

12 Q. It does not say that screenshots are optional.

13 A. Well, it is just saying things that can be there, yeah.

14 I do not believe it is saying that these are things that
15 are required. And the developer controls what
16 screenshots are shown, so even if a screenshot is
17 mandatory, which I do not believe they are, they could
18 show the first splash screen of the app, they could
19 show -- there is no hard rule as to what they show.

20 In this instance, a malicious developer or
21 ill-intentioned developer has a lot of latitude on sort
22 of the face they show App Review, which can be quite
23 different than the face they show the ultimate end user,
24 who might be the victim of social engineering. That is
25 an important -- limitation.

1 Q. In the scenario that you are envisaging, so you say that
2 the developer might choose a selective set of
3 screenshots, yes?

4 A. Yes, or none at all, I believe, yes, but --

5 Q. The example was selective screenshots, you said --

6 A. I kept both on the table, but whichever you prefer.

7 Q. Let us go with selective --

8 A. Sure.

9 Q. The human reviewer, under the notarisation system, looks
10 at the screenshots that have been chosen by the
11 developer; yes?

12 A. Yes.

13 Q. Then looks at -- runs the app, launches the app and runs
14 the app as part of the human review?

15 A. That is right.

16 Q. So if they took the view that the screenshots were
17 selective and misrepresented what the app actually was,
18 yes, that is the scenario --

19 A. No, no. So imagine it is a -- if you look at Android
20 where there is much more malware, a lot of these are
21 Trojans that misrepresent their functionality. They may
22 claim to be something more than they are. So they may
23 claim to be -- I am Adobe Photoshop, I have all this
24 great functionality, right. Imagine someone wants to
25 get an app that is going to claim to its users to have

1 all this glorious functionality and be Adobe Photoshop,
2 but they are not going to let the App Reviewer know that
3 that is what they are claiming.

4 They are going to give the App Reviewer an app that
5 obviously does considerably less, and they are going to
6 show just some select screenshots that are things that
7 are in the app, that are not the parts that will fool
8 the user into thinking it is Photoshop; they will show a
9 splash screen, they will show something like this. The
10 reviewer, yes, will say: yes, those things that are in
11 that little sheet, those are in the app, that is
12 correct.

13 Little do they realise that then that signed
14 notarised application will be marketed to developers,
15 claiming the app has all kinds of other functionality
16 that it does not have, and that the reviewer was unable
17 to say, like: hey, they are claiming the app has this
18 functionality, I never saw it in review because they
19 were never -- they did not have insight that that is
20 what the [developer] was going to claim to the user --
21 that the developer -- malicious developer was going to
22 claim to the user.

23 So it really creates this disconnect between what
24 the customer will see and what the reviewer sees, and
25 that is an unfortunate and critical compromise in this

1 alternate distribution.

2 Q. I think there is a number of things going on, and I just
3 want to try and work out what particular possible
4 problems it is you are addressing.

5 A. Okay.

6 Q. The example you just gave, is this an app that changes
7 its functionality after notarisation? Is this
8 a bait-and-switch app?

9 A. No. It could be, but in this case it does not even have
10 to be.

11 Q. The example was not a bait-and-switch app. The example
12 you gave.

13 A. Was not.

14 Q. Was not. Okay.

15 A. Yeah.

16 Q. So this is not an app which goes through notarisation
17 and through some process changes its nature after
18 notarisation at the point where the user downloads it,
19 and so the user sees something different from you. That
20 is the scenario --

21 A. It is not that. That is another scenario that we could
22 talk about, but that is not what I was talking about
23 here.

24 Q. So the scenario we are talking about is where the --
25 a certain type of content or behaviour is present in the

- 1 app at the time of notarisation, yes?
- 2 A. Yes.
- 3 Q. Yes, so it is not bait and switch, so it is at the time,
4 the thing that you are concerned about happening later,
5 the content and the functionality is present during
6 review, yes?
- 7 A. Yes.
- 8 Q. Then the gap that you identified is the screenshots
9 might say one thing, but the content, and the behaviour
10 of the app might do another thing, yes?
- 11 A. Exactly.
- 12 Q. Okay, but it is -- all of this information is available
13 at the time of review, yes --
- 14 A. What is not known is how the app will represent itself,
15 so the app says you are going to get to watch free --
- 16 Q. I'm going to come on to the representation point.
- 17 A. Okay.
- 18 Q. That is a separate scenario again, but we are talking
19 here about an app that contains a functionality of
20 content that, let us say, does not comply with the
21 guidelines, contains that functionality of content at
22 the time of review, and has screenshots at the time of
23 review that don't reveal that content or functionality,
24 yes? That is the hypothesis.
- 25 A. It need not. The point is --

1 Q. Sorry --

2 A. Yes.

3 Q. It need not what?

4 A. It need not have additional malicious functionality to
5 be an issue. So say that the app is simply trying to
6 steal people's money by misrepresenting what
7 capabilities it has. So it says: I am a full-powered
8 version of Photoshop; and that is how it is going to be
9 marketed. But what we see in the App Review is it does
10 not have any of that functionality at all. It is not
11 malicious, it is not going to take over the user's
12 machine; it is just going to tell them they are getting
13 Photoshop, charge them \$30 for it, and then ultimately
14 not deliver any of that functionality.

15 Q. But --

16 A. So it misrepresented themselves. It was a -- I told you
17 I was going to give you some big thing and what you got
18 was much, much less. But the reviewer did not know it
19 was going to be represented as giving them all this
20 extra stuff. So they said: yeah, it does what it says
21 in the installation sheet, which was minimal. That is
22 just one kind of scam.

23 Q. Okay, so the hypothesis is an installation sheet that
24 says -- I will just take your example and try and riff
25 on it -- we are a basic photo-editing app.

1 A. It would not say that. It would just say "image editor
2 pro".

3 Q. Okay, "image editor pro" in the screenshot.

4 A. Uh-huh.

5 Q. The App Reviewer reviews the app with the name "image
6 editor pro". On your hypothesis, it is rubbish. It is
7 not a pro image editor --

8 A. It is not so pro. It is very cursory in its
9 capabilities.

10 Q. It is cursory in its capabilities.

11 A. But you say: okay, it passes review, it is accurate with
12 the sheet, so I guess, you know, it is fine.

13 Q. So it gets waved through by App Review, by notarisation,
14 despite --

15 A. Yes, this says it appears to --

16 Q. -- there being a mismatch between the marketing
17 description and the level of functionality?

18 A. Then little do we realise their marketing thing says: it
19 has hot AI features for altering images in cool ways, it
20 is feature complete with Adobe Photoshop etc, and none
21 of those things were true, and the reviewer never got to
22 know that these untrue claims were going to be made.

23 Q. So the description, "hot AI features for altering images
24 in cool ways" etc that representation is being made --

25 A. It does not sound as good when you say it back. It

1 sounded better coming out.

2 Q. I have to read the transcript every day, Mr Federighi.

3 Imagine my pain. That representation is made on

4 a third-party app store or developer's website, yes?

5 A. Right. Those claims.

6 Q. I think we now know what we are talking about.

7 A. Okay, great.

8 Q. You have been extremely helpful. The app has been

9 reviewed for malware as part of notarisation, so there

10 is no --

11 A. It may not be malware in this instance.

12 Q. No malware, and it has been reviewed for privacy

13 compliance against the guidelines?

14 A. In this case, yeah, that is not the threat. We can talk

15 about other scenarios where those other problems exist,

16 but this is just one example of how a user could get

17 ripped off, where App Review today could help prevent

18 it, and under the EU, we can't.

19 Q. But what we are talking about is a user downloading

20 a fundamentally safe app --

21 A. That does not do what it says it does.

22 Q. -- that -- is rubbish.

23 A. Yeah, that does not do what it says it does.

24 MR KENNEDY: Sir, that might be a convenient time before we

25 continue going round the houses on Adobe.

1 THE CHAIRMAN: We are going to take a break, 10 minutes for
2 the transcriber. While you are not in the witness box,
3 you are not to discuss your evidence with anybody else,
4 please.

5 THE WITNESS: Of course.

6 (11.45 am)

7 (A short break)

8 (11.55 am)

9 THE CHAIRMAN: Mr Kennedy.

10 MR KENNEDY: Mr Federighi, I have been asked by the
11 stenographer to slow down, so I will endeavour to do so.

12 A. Okay. I will endeavour to do so as well.

13 Q. It is painful, I know, but I want to go back very
14 briefly to the fake Adobe hypothetical we were
15 discussing a moment ago, and I think that where we got
16 to was that on a third-party App Store, not the Apple
17 App Store, there is an app being presented as being
18 an Adobe -- either equivalent or Adobe itself.

19 A. Or literally, yeah, either.

20 Q. And the materials that suggest that it is Adobe,
21 equivalent to Adobe itself, are on the third-party
22 website, and at the moment that an iOS Device user
23 downloads that app --

24 A. That's right.

25 Q. -- or rather just prior to that moment, they will be

1 served an app installation sheet, yes?

2 A. Yes.

3 Q. That app installation sheet will have the information

4 that we looked at earlier. I think you said you thought

5 screenshots might be optional?

6 A. Right.

7 Q. We went to the Apple document that gave the list. Let

8 us assume that all of that information is presented to

9 the user.

10 A. Yes.

11 Q. That will include the app description and the

12 screenshots.

13 A. That's right.

14 Q. The user will be able to compare those two pieces of

15 information, by which I mean the app installation sheet

16 information, and the marketing description on the

17 third-party website.

18 A. Yes.

19 Q. There should be some dissonance between those two sets

20 of information, should there not?

21 A. Well, they need to be -- you would hope that for the --

22 the attacker would attempt to keep them sensibly

23 correlated, so the user does not -- no red flags go up

24 for the user, but if what they see in the sheet is

25 generic enough, which says, you know, "professional

1 image editing", and -- like that, they go: oh yeah, that
2 is very consistent with what I saw, I was downloading
3 Photoshop, oh, I see in the sheet it says "professional
4 image editing", sounds good.

5 Q. A savvy attacker would not put any reference to Adobe in
6 the app installation sheet information?

7 A. Correct.

8 Q. Because otherwise it would get flagged by App Review and
9 rejected as being a copycat, yes?

10 A. Correct.

11 Q. So there would be no reference to Adobe or probably
12 Photoshop, because presumably that is trademarked?

13 A. Right.

14 Q. So a user will be comparing app installation sheet, no
15 mention of Adobe, website mention of Adobe, and may at
16 that point realise that something is amiss.

17 A. Oh, a small fraction of them will, but what we see in
18 practice is users are -- and probably some of us, even,
19 are super-poor at having our wits about us, and it
20 takes -- and then you have to be in constant vigilance
21 mode as a user, which is a horrible user experience as
22 well. So social engineering relies on the fact that
23 users make these mistakes all the time.

24 Q. You say a small fraction, but you have not presented any
25 empirical data in your witness statement, correct?

1 A. No, just what I have seen in my many years working in
2 the field, that we are constantly combating various
3 forms of social engineering, and we see users, even ones
4 you would think would be savvy, failing to notice
5 seemingly -- you know, the red flags, and I think in
6 this case, they need not have a particularly red flag.

7 You know, if I go to my banking -- what looks like
8 I am downloading the site -- the app that is the
9 official app for my bank, and when the download sheet
10 says, you know, "transaction manager from banking
11 technology incorporated", I don't think like: none of
12 that sounds like my bank. I think: my bank, that is
13 what they call their app, you know and I download it.

14 Q. Taking the example of a fake banking app --

15 A. Yeah.

16 Q. -- presumably, that is something that App Review is
17 particularly vigilant about?

18 A. Yes.

19 Q. Under the notarisation for iOS, presumably equally
20 vigilant about --

21 A. Yeah, the problem is that in this instance and, you
22 know, banking Trojans have been a real problem on
23 Android, and it has been something up to now on iOS, we
24 have been able to keep at bay. But imagine the
25 attacker, who, ultimately, very often, they want to

1 steal your log-in credentials for your bank, right, so
2 that they in fact later can log into your actual bank
3 account and steal your money.

4 They will put forward an app to App Review that
5 looks like: this is your banking transaction manager, it
6 is a thing you use to keep records of -- your banking
7 records. It does not say that it is your bank, or that
8 it is even a banking app, but it is close enough that
9 when the user downloads it, having been told it is the
10 banking app, and it puts up an authentication sheet,
11 says "log in", that they think they are logging into
12 their bank, so they provide their banking credentials.
13 But when App Review reviewed it, they thought: oh, this
14 just appears to be logging into this developer's site
15 where they help you manage your own transactions, and so
16 they can then steal your credentials and steal your
17 money.

18 Q. Sorry, can I just clarify your evidence. I think you
19 said that App Review had been successful at keeping
20 banking Trojans at bay; that is stopping them, yes?

21 A. Yeah, I think our App Review's been very, very effective
22 compared to Android, where that is one of the top
23 threats.

24 Q. Then you went on to say -- you gave the example of
25 an app that does not say it is the banking app, but some

1 sort of transaction management or --

2 A. Yeah, that is a hypothetical example, yes.

3 Q. You said:

4 "But when App Review reviewed it, they thought: oh,

5 this just appears to be logging into this developer's

6 site where they help you manage your own

7 transactions..."

8 When you said "App Review" there, were you referring

9 to Apple App Review or App Review generally?

10 A. No, I say -- in the notarisation world, where -- in the

11 EU notarisation world, where a developer is providing

12 minimal information into the notarisation review

13 process, that that would be how they would play it,

14 I believe. How the attacker would play it.

15 Q. But in the notarisation world, there is still computer

16 review of all apps.

17 A. Right.

18 Q. Static and dynamic analysis.

19 A. Indeed.

20 Q. Malware scan. There is still human review of all apps.

21 A. Yes.

22 Q. This would be an app that was either misleading, or

23 potentially a copycat app --

24 A. In this particular case -- we talked about the -- I sell

25 you something misleading, take your money and you do not

1 get what you paid for. Now, I have moved on to the
2 example of an information-stealing app, one that is
3 going to get your -- let us say your bank log-in and
4 ultimately steal all your money.

5 In that case, they do not need to be malware in the
6 sense that you describe it. They need to be an app that
7 gathers a password and some log-in credentials, which to
8 a reviewer looks perfectly normal for something to ask
9 for a log-in, but what's happening is instead of that
10 log-in being sent to your bank, to log into your bank,
11 it is being sent to an attacker's website who is going
12 to store that away and use it ultimately to themselves
13 log in to your bank and steal your money.

14 Q. I think I am slightly confused because we are not -- as
15 you say, we are not now on the sort of misleading
16 presentation hypothetical; we are on
17 an information-stealing hypothetical.

18 A. Where that app was misrepresented at distribution time,
19 so the website you went to claimed that this is -- I do
20 not know, what is a big bank around here? I would say
21 Bank of America, but that probably does not resonate.

22 Q. Just say Bank of America.

23 A. Bank of America. So on the website it says: Bank of
24 America, you know, do your checking at Bank of America.
25 The logo is all over it, it says: this is how you can

1 conveniently manage your savings and checking. So you
2 are thinking: great, this is my official banking app.
3 We have seen this in practice, like fake government
4 COVID apps, that really were not from the government,
5 but they made it look like it, right.

6 So you go to the site, and you think: wow, this is
7 from my bank. You download it. An installer sheet
8 comes up that is anodyne enough. It just says: yeah,
9 this is your transaction management. It has a
10 screenshot, listing a bunch of transactions. You are
11 like: that looks like a banking app. You download it,
12 you run it. It says: great, log into your account.

13 Okay, I type my stuff. Off it goes to -- I just
14 handed my credentials to the attacker.

15 The App Reviewer never saw it was going to be
16 marketed as the Bank of America app, but the user was
17 completely led to believe through distribution that that
18 is exactly what they were getting. So it sets it up for
19 social engineering and stealing of information.

20 Q. But the reviewer is reviewing the app itself at the time
21 of notarisation, yes? They are looking at the
22 functionality of the app, they are looking at its
23 presentation, and presumably the app would need to be
24 saying something about bank details specifically in
25 order to execute the social engineering attack. If it

1 just said your log in --

2 A. It need only say: log in to your account. A sheet comes
3 up: log into your account. The user -- it does not need
4 to say "Bank of America", because as a user, I am
5 thinking: great, I downloaded this thing, it says log in
6 to my account. I am thinking, because of how it was
7 marketed to me: well, they are talking about my Bank of
8 America account; and off we go.

9 Q. I am just confused as to why no red flags would be
10 raised at the notarisation stage?

11 A. Why is that?

12 Q. There is -- asking for either account information or
13 log-in information, and either that request is made
14 entirely acontextually, which I would think would raise
15 a red flag; there is an app with seemingly sort of
16 benign functionality, but it is telling you to just
17 randomly log in to something else.

18 A. Maybe I can be more clear in what the attacker app is.
19 I am not an evil attacker, so my inventiveness on this
20 front is limited. But if I were an attacker, I would
21 present to App Review an app that starts out with
22 a log-in screen, says: enter your account and then shows
23 me a blank account ledger, from which I can record my
24 checking transactions and do basic management.

25 To the App Reviewer, this looks perfectly normal.

1 I have established an account with the developer, that
2 is where it is going to store my transactions, great.
3 This app looks legitimate in how it is being presented
4 to me, the reviewer.

5 How it has been socially engineered and presented to
6 the person who thinks it is a banking app, it is very
7 different. They both see the same log-in screen, they
8 interpret it very differently, and unfortunately for the
9 duped user, they are typing their banking credentials
10 into that app.

11 Q. For App Review, I think also for notarisation, you must
12 provide App Review with a test account or a demo
13 account, yes?

14 A. Sure.

15 Q. So you need to give them a log-in that worked on -- you
16 say the first screen is: log in with your account
17 information or whatever.

18 A. Yeah.

19 Q. You give them your password, 123, or whatever it is.

20 A. Yeah.

21 Q. App Reviewer clicks on that and then gets this page that
22 says, you can manage your account ledger information --
23 I think was the example you gave, and look at
24 transactions.

25 A. Mm-hmm.

1 Q. So, at that point the reviewer does know it is connected
2 with banking in some way, shape or form?

3 A. Oh, but it is just a cheque ledger recording app. You
4 can add a transaction, you know, keep track of your
5 things, just a personal productivity kind of record
6 transactions, it will sum them up for you, it'll
7 categorise them, so it is like a personal database as
8 far as it is being presented to the reviewer. But how
9 it is being presented to the user who's been fooled to
10 log into it is: this is your bank. The ruse does not
11 need to go on any longer than past the log-in screen,
12 because once they've logged in, they've been had.

13 Q. At the log-in screen, if it was an app of the
14 description you have given, which is a simple kind are
15 addy-uppy --

16 A. Addy-uppy?

17 Q. Addition.

18 A. This might be a cultural divide here.

19 Q. It might be a cultural thing, Mr Federighi, I am sure.
20 A simple program, a simple Excel type program that
21 simply adds up the cheques that --

22 A. Okay, yeah, yeah.

23 Q. We are really back in time now that we are using
24 cheques.

25 A. Yes.

1 Q. You enter --

2 A. Your credit card transactions, where you spend money,

3 yeah.

4 Q. -- £5 in Starbucks, £6 in Starbucks, all the --

5 A. Like Quicken or something like that.

6 Q. It adds it up for you.

7 A. Uh-huh.

8 Q. But the log-in page would have to prompt you to give the

9 information you would need to get into your actual

10 banking app rather than simply creating an account with

11 Quicken or whatever the app is going to be called and

12 that might be different information, correct?

13 A. Oh, but if it is neutral enough -- I mean, there are

14 many ways this scheme could be done, but if it is

15 neutral enough, it is implied because you think it is

16 your banking account, that when it says, "Enter your

17 account number", that you think, "Oh, I guess I need to

18 enter my bank account number", because I think this is a

19 banking app that I am supposed to use to sign into my

20 bank. So the ambiguity works to the advantage of the

21 attacker.

22 Q. But on this premise it says, on the log-in sheet, "Enter

23 your account number".

24 A. Let us say. This is me, the amateur attacker, making up

25 this scam, but that is how mine works.

1 Q. So we have entered our account number, we have been
2 given the fake account number by the developer, we have
3 gone through what I have called the addy-uppy --

4 A. The addy-uppy, yeah.

5 Q. -- an Excel style program and this still does not raise
6 any red flag in the --

7 A. No, not to the reviewer. It just looks like the
8 addy-uppy is storing your transactions in an account
9 under the information you provided, so great, that is
10 things that addy-uppies do, and -- but it does not
11 matter for the victim because they've given up their
12 credentials to a bank.

13 So this just -- there are examples -- there are many
14 examples of the ways that social engineering is used to
15 attack users. That is the main way, that is why if you
16 look at Android having, you know, staggering like 15 to
17 47 times the malware, that is what a lot of that malware
18 is, are these info-stealing Trojans, and unfortunately
19 when you take away many of the tools that App Review has
20 to understand what is being reviewed and what
21 centralised distribution provides to meaning that the
22 user is going to see accurate information, you are
23 subject to many of those attacks still.

24 Q. I think we will move on from our hypothetical, you'll be
25 glad to know.

1 A. Okay.

2 Q. I said we will come back to this, but the difference
3 between App Review proper and notarisation for iOS is
4 that under notarisation for iOS, App Review does not
5 review apps against the full set of App Review
6 Guidelines, correct?

7 A. Under the DMA, that is correct, yes.

8 Q. It reviews them against a subset of those guidelines?

9 A. Yes.

10 Q. Is that the only difference between App Review and
11 notarisation for iOS in the EU?

12 A. There are certainly differences then, because of what is
13 enforced, things like all kinds of commercial terms and
14 capabilities that are relevant to the user experience
15 and to protecting the user are different. I am not sure
16 whether in the review itself in terms of, you know,
17 scanning for malware and so forth, if it is different,
18 again, other than the nature of the inputs that are
19 provided because we -- you aren't having to provide all
20 the information you use to market yourself on the
21 App Store.

22 Q. When you refer to the commercial terms and capabilities,
23 is that a reference to the business subset of the
24 guidelines?

25 A. Yes, and then the functionality associated with that.

1 You know, Ask to Buy capability to protect children, you
2 know, Screen Time age things. Numerous elements that
3 are not covered.

4 Q. We have explored Ask to Buy with Mr Schiller.

5 A. Okay.

6 Q. So I do not think we need to explore that now.

7 A. Okay.

8 Q. Mr Federighi, it is correct that Apple only reviewed
9 apps in the EU against a subset of the guidelines
10 because the European Commission would not permit Apple
11 to review against the full set of guidelines, yes?

12 A. Correct.

13 Q. But if the European would have permitted, Apple would
14 have conducted a review of all iOS apps in the EU
15 against the full set of guidelines, yes?

16 A. Well, if the EU had allowed us to fully protect our
17 users, we would not have done any of this. But yes, we
18 would have preserved more, if we would have been allowed
19 to preserve more of our protections.

20 Q. If you had been allowed to preserve all, you would have
21 preserved all?

22 A. Yes, but some of them just were -- you know, would not
23 work with things like -- some of the protections are
24 things like using IAP or other things that were against
25 other elements of the DMA.

1 Q. If the App Distribution Restrictions -- do you
2 understand what I mean by that term, Mr Federighi, just
3 before I ask the question? So, on this side of the
4 court, we refer to the "App Distribution Restrictions"
5 as the defined term to mean the prohibition on
6 distributing apps outside of the UK App Store store
7 front, okay?

8 A. Okay, I will now understand it as such.

9 Q. If the App Distribution Restrictions were removed for
10 the United Kingdom, it would be technically possible for
11 Apple to continue to review all iOS apps for
12 distribution in the UK against the full set of App
13 Review Guidelines, yes?

14 A. Again, depending on whether those commercial elements
15 were also permitted, right? So if law in Europe said,
16 "Yes and even though apps are distributed on other sites
17 they must use Apple's IAP", then Apple could continue to
18 review for IAP. If part of that legislation said, "No,
19 no, no, you cannot do IAP either", we would start
20 pulling away at those guidelines.

21 Q. Do not worry about IAP. We have had a conversation with
22 Mr Kosmyinka --

23 A. Yeah, I am just saying that is-- (overspeaking) --

24 Q. -- (overspeaking) -- just for your knowledge, I have
25 explored that with --

1 A. Oh, with Schiller?

2 Q. -- Mr Kosmyinka --

3 A. Oh.

4 Q. -- and the interaction between App Review and IAP or the

5 absence of IAP, but what I am interested in is

6 essentially what is technically possible and the

7 question is: is it technically possible for Apple to

8 continue to review all iOS Apps for distribution in the

9 UK against the full set of guidelines?

10 A. Yeah, Trystan would probably be best equipped to

11 understand the details of all the guidelines and whether

12 that is strictly true, but in principle, I think it is

13 possible, what you say.

14 Q. To the best of your knowledge?

15 A. Yeah, I believe so.

16 Q. Apple would do so if it was possible?

17 A. I would think so. I would think -- all that we could,

18 yeah.

19 Q. Thank you.

20 Mr Federighi, we can go to paragraph 91 of your

21 statement, {B2/3/28}, 28 of the hard copy.

22 A. Yes.

23 Q. Pick it up on the first sentence:

24 "These security layers are so critical because, if

25 developers could distribute Apps outside the App Store

1 and also avoid App Review, the mere presence of multiple
2 App stores would itself create a security risk for and
3 cause confusion to users. Even users who may have every
4 intention of continuing to download only from the
5 official App Store could be manipulated by various
6 social engineering attacks that, for example, mimic the
7 official App Store to trick the user into believing they
8 are downloading Apps from the official store. We have
9 already seen this happen outside of the iOS platform --
10 it is not unknown for unscrupulous actors to create fake
11 stores that look like another store. Indeed, a common
12 cybercriminal strategy is to mimic official App Stores.
13 I am aware of multiple examples of Apps that have
14 prompted users to download a fake Google Play Store,
15 which then infected the users' Devices with malware."

16 A. Yes.

17 Q. The premise of this paragraph is that there are no App
18 Distribution Restrictions in -- given the meaning I just
19 gave it to you a moment ago -- you can distribute
20 outside the Apple App Store?

21 A. Well, not -- no -- certainly if there were no
22 restrictions, this would be the case. But even with
23 many levels of DMA level restrictions, let us say, or
24 lack thereof, much of what I describe is quite possible.

25 Q. I just want to understand that I understand the premise

1 on which this paragraph is based.

2 A. Mm-hmm.

3 Q. So it says:

4 "... if developers could distribute Apps outside the

5 App Store ..."

6 So it is element one, decentralised distribution,

7 yes?

8 A. Yes.

9 Q. "... and also avoid App Review ..."

10 Element two?

11 A. Right.

12 Q. So that is the premise, yes?

13 A. For this. But some of what is described in the problem

14 even occurs with App Review in place? That is the

15 clarification I wanted to provide.

16 Q. So the problem of the fake Apple App Store arises even

17 when App Review in place?

18 A. Sure. App Review does not say anything about what the

19 marketplace that ultimately the developer will use to

20 distribute their app looks like.

21 Q. But if an app that was intended to present itself as

22 a fake Apple App Store was submitted to App Review, that

23 would be picked up by Apple's App Review, no?

24 A. Oh, so now -- I am sorry, we are -- (overspeaking) --

25 are you talking about? This could be -- for instance,

1 are we talking about web distribution, which is allowed
2 in the EU, so it is a website that Apple does not see or
3 control? Is it a marketplace? I am not sure of the --
4 I know the premise I am talking about; I am not sure of
5 the premise you are talking about.

6 Q. I am talking about paragraph 91 --

7 A. Yes.

8 Q. -- of your evidence. You say:

9 "... if developers could distribute Apps outside the
10 App Store and also avoid App Review ..."

11 A. Mm-hmm.

12 Q. You go on to give an example of a fake Apple App Store,
13 yes?

14 A. Yes.

15 Q. My question is if you assume that developers could
16 distribute apps outside the App Store but that there was
17 full App Review in accordance with the full App Review
18 Guidelines --

19 A. Yes.

20 Q. -- could you still have a fake Apple App Store?

21 A. Yes. So, for instance, take our banking app that we
22 belaboured so. Now imagine I am a developer who says
23 I want to create a fake App Store on which to serve that
24 banking app to fool victims. I will get some benign app
25 approved -- well, actually -- yeah, I will get some

1 benign app to be approved by Apple, and then on my
2 website, the banking website, will make itself look like
3 the App Store, even though it is just a website. It
4 will have Apple logos all over it, it will mimic the UI
5 style of the App Store, and many unsophisticated users
6 will be led to believe, "Oh, great, I am actually on the
7 Apple App Store", and now they are served up this
8 banking app which is, lo and behold, featured as the
9 number one most popular app that is trusted and has
10 great reviews, and that is where I think I am buying
11 from.

12 Q. I am sure it is me, Mr Federighi, but I am slightly
13 confused as to the hypothetical that we are dealing
14 with.

15 A. Okay.

16 Q. So we are back to the fake banking app.

17 A. Yes.

18 Q. It has gone through full App Review against the full
19 guidelines?

20 A. It could, yeah.

21 Q. It has snuck through?

22 A. In the way that we previously discussed, yes.

23 Q. But we are now talking about full --

24 A. Even full App Review, if we are still allowing alternate
25 distribution where Apple is not the sole distributor of

1 apps, then Apple is not seeing how the app will be
2 marketed and so an alternate store front can be
3 constructed that could very well mimic Apple's store
4 front, but that provides misleading information, fake
5 reviews, all sorts of other things to socially engineer
6 the user.

7 Q. The problem that you identified earlier, Mr Federighi,
8 under notarisation was that Apple at the point of review
9 was receiving less information about the app.

10 A. Yes.

11 Q. We are now talking about a situation in which that is
12 not the case because we have full App Review and we are
13 getting the same amount of information at the start of
14 the process.

15 A. Let me make sure I understand your premise. Your
16 premise here is that we are still providing alternate
17 distribution, is that correct?

18 Q. We are still providing alternate distribution.

19 A. Okay. In a world of alternate distribution, Apple is
20 not -- the developer is not incentivised to provide the
21 App Review process, even if it is the full App Review
22 process, with complete information. The reason
23 developers provide App Review with complete information
24 is because that is the only way they can put that
25 information in front of the buyer of the app. But when

1 they have alternate distribution, they no longer have
2 that incentive to provide the complete information, so
3 instead they have the opportunity to provide the review
4 process with minimal information, misleading
5 information, and then to use the alternate distribution
6 as the means to provide rich but misleading information
7 to perpetrate their attack.

8 Q. Mr Federighi, this is not about -- or not entirely about
9 the incentives of would-be bad actors. I think your
10 evidence earlier was that the limitation on the amount
11 of information that Apple receives under notarisation
12 for iOS, so in the EU, is a function of the particular
13 circumstances of that regime.

14 A. No, maybe I did not make myself clear. Developers, when
15 they submit the app today in today's App Store world,
16 they have a choice of how much information they provide
17 to put on the App Store. They could say, "I am a simple
18 drawing app" and they could provide one screenshot, no
19 screenshot, a minimal thing. That would be a horribly
20 marketed app and that would be what their prospective
21 buyers would see and probably no one would buy or
22 download the app because they did such a horrible job
23 marketing themselves on the App Store, but even going
24 through full App Review, they could provide minimal
25 information, and if you go in the App Store, you may

1 find an app posted by a teenager or something who just
2 wanted to get an app on the App Store and that is what
3 they will have done and you will not want to download
4 that app. They can provide that level of information.

5 People who are attempting to actually get people to
6 download their apps, they go to great lengths to provide
7 compelling marketing material to describe all the
8 virtues and benefits of what they are selling. They do
9 that because they want to sell on the App Store. If
10 they are no longer actually selling on the App Store --
11 the App Store, they do not need to provide that
12 information into App Review, so they won't. They will
13 provide that information or fake versions thereof, to
14 their alternate App Store or their fake App Store.

15 Q. Mr Federighi, Apple is in charge of how much information
16 developers provide. You could say that if you provide
17 a risible amount of information, your example of one
18 screenshot and zero functionality, you could simply
19 reject it.

20 A. There are limits -- we do not have these people on
21 a waterboard and are torturing them into providing us
22 with more information. Today, developers, we do not
23 force them -- we say, "Look, you should provide" -- it
24 has always been incentive based. Developers want to
25 sell their apps so they provide good information to

1 encourage users to buy their apps. Apple -- I do not
2 know what it would look like to say, Apple, "No, market
3 yourself better, be more complete". Developers say,
4 "I am satisfied with the level of information I have
5 provided", you know, we -- there are great limits on our
6 ability to get them to provide more. But even if we ask
7 them to provide more, it would not have to be the same
8 as the misleading information that they would provide on
9 their alternate App Store.

10 Q. You obviously cannot force the developer to tell you
11 more, but you can stop an app being capable of
12 distribution on iOS through any source. You could
13 simply refuse to sign that app.

14 A. Right, but based on the scenarios we have talked about,
15 I do not think we would find either of these sort of
16 minimal descriptions to be objectionable, that Apple
17 would find them to be -- we would think it is
18 unfortunate, but I do not think we would be able to
19 require providing more information because it would have
20 been, you know, accurate inasmuch as it said anything.

21 Q. I think where we get to is that this reveals the
22 limitations of App Review more than anything else.

23 A. No, not in a world -- that is the thing. App Review and
24 distribution, a unified distribution, centralised
25 distribution, are critically interlinked in terms of the

1 closed loop between them and the incentive structure for
2 the developer. The developer's incented to provide
3 complete and good information, App Review is able to
4 review that complete and good information on behalf of
5 the user to make sure when the user sees it that is
6 actually what they are going to get. You break that
7 link between those two things and the value of App
8 Review is diminished and the opportunity for attackers
9 to get in the system goes way, way up. We have seen
10 this on other platforms to a great degree.

11 Q. But you could require a more fulsome version of app
12 installation sheets, yes?

13 A. Again, I am not sure how you would get developers to
14 provide much more information or how they could not just
15 provide more but still not show their hand as to how
16 they are then going to mislead the user on an alternate
17 site.

18 Q. But the more information that was provided on the app
19 installation sheet, then the more information that would
20 be available to the user at the point of distribution on
21 the alternative channel, yes?

22 A. On the alternate channel, they see whatever the
23 developer wanted to put there. It is not vetted by
24 Apple.

25 Q. And the app installation sheet?

1 A. At that last moment?

2 Q. At the last moment --

3 A. At the last moment.

4 Q. -- if there was more information on the app installation

5 sheet --

6 A. They would see it then.

7 Q. They would see it then and they would have more

8 information to compare against the information they

9 would see in the --

10 A. Yeah, but the developer -- the attacker does not want

11 them to see more and the user has already made -- by

12 that time, they've been the animal led to slaughter down

13 the path, they have already said, "Yes, I want this

14 app", they have been convinced. A final sheet coming up

15 and saying, "Do you want to download this?" The user's

16 mindset is like, "Yes". They are not like, "I love word

17 puzzles, let me try to compare what I saw a few pages

18 ago on the developer's website to this sheet"; they are

19 just not in that mode of operation in many cases.

20 Q. If, after App Review, there was an app on an alternate

21 App Store -- we will stay on the App Store as compared

22 to website.

23 A. Okay.

24 Q. It was presenting itself as the Apple App Store.

25 A. Right.

1 Q. Presumably Apple would be extremely eager to find that
2 out?

3 A. We would think that is bad.

4 Q. Presumably Apple enforces its IP rights zealously?

5 A. We would attempt to, but you know we have played this
6 whack a mole game with people playing games like this
7 and it is -- they have strong incentives, they are
8 resourceful, so it is an ongoing battle, and to the
9 extent an attacker has the opportunity to make some
10 money in this game, they will continue to pivot and
11 innovate, so we would do our best, but we would now be
12 stacking the deck against us in a way that today we are
13 able to stack the deck in favour of the customer.

14 Q. I said we would come on to the question of websites,
15 that is paragraph 92 {B2/3/29}. You say:

16 "I'm also aware that there have been attempts to
17 copy Apple products. For example, I am aware of
18 a website that made itself a mirror of an Apple website
19 and then distributed malware ..."

20 A. Yes.

21 Q. Again, taking the same hypothesis, full App Review of
22 all iOS Apps, only apps signed by Apple after App Review
23 can be downloaded into an iOS Device, yes? With me on
24 the premise?

25 A. Yes, I believe so.

1 Q. So App Review of all iOS Apps distributed in the
2 United Kingdom, only apps signed by Apple can get onto
3 an iOS Device.

4 A. Okay.

5 Q. Code signing.

6 A. Yes.

7 Q. But decentralised distribution.

8 A. Yeah.

9 Q. So you could go to this fake website that we are
10 hypothesising?

11 A. You could.

12 Q. You could get an app?

13 A. Yeah, mm-hmm.

14 Q. The only app that could be installed onto an iOS Device
15 from that website would be one that had been approved by
16 Apple's App Review, yes?

17 A. That is correct.

18 Q. So in so far as there was malware on that app, it would
19 be malware that Apple's App Review had failed to
20 identify, yes?

21 A. It would, and that is why we rely on these layers of
22 defence because things will get through App Review, but
23 the fact we have a quick closed-loop system where we can
24 learn and spot problems is what ultimately gives the
25 attacker a poor prospect of making money on attacking

1 iOS, and as long as we make it an economically bad
2 business to attack iOS users, attackers stay at bay.

3 Q. 92 {B2/3/29} continues:

4 "I am also aware of at least one instance where
5 a bad actor tried to create a fake version of Apple's
6 Xcode software, called Xcode Ghost, in order to try to
7 manipulate developers into unknowingly creating Apps
8 with embedded malware. In this case, Apple's App Review
9 was able to identify Apps with this malware embedded on
10 the App Store."

11 Mr Federighi, the bad actor here did not just try to
12 create a fake version of Apple's Xcode software; they
13 succeed, did they not?

14 A. Yeah, and I should clarify. They took a real version of
15 Apple's Xcode software and then doctored it to add this
16 additional Trojan vulnerability. That is correct. This
17 was an example of how, because Xcode was not distributed
18 through centralised distribution. This is on the Mac
19 where centralised distribution is not required. This
20 opens a vulnerability that they were able to distribute
21 this malicious version of Xcode outside of Apple's
22 distribution channel.

23 Q. The bad actor did not try to manipulate developers,
24 they --

25 A. They succeeded.

1 Q. They succeeded.

2 A. Yeah, this is exactly the kind of threats we are worried
3 about.

4 Q. Apple's App Review failed to identify the apps that had
5 been compiled using Xcode Ghost, yes?

6 A. Yes, you have -- Xcode Ghost -- there is sort of a
7 two-step process, right. Xcode Ghost was a case of
8 taking advantage of the Mac's -- or the Macintosh's more
9 lax software distribution mechanism to give developers
10 malicious versions of our developer tools. The
11 developer then, thinking they were using a correct
12 version of the developer tool, built their own iOS Apps
13 that they were intending to distribute, and this bad
14 version of Xcode put malware in that app, which was
15 subsequently submitted into Apple's App Review, and yes,
16 initially Apple's App Review failed to spot the malware
17 in that review and that is why it is so important that
18 if something gets through, which in this case it did and
19 we identified it, we are able to learn from it quickly,
20 block that malware, take all other instances that were
21 like that down, and ultimately make this
22 an uninteresting attack for people to conduct in the
23 future.

24 Q. I think there were about 3,800 apps that were affected
25 by Xcode Ghost in total.

1 A. That is correct.

2 Q. 128 million users, I think.

3 A. That last statistic I am not familiar with, but this is
4 an instance where things get through. It is like
5 fighting crime, you know, sometimes -- or traffic
6 fatalities. You know, something gets through; that does
7 not mean you should get rid of police. It means you
8 learn and you do better, and this was such an instance
9 where something did get through.

10 Q. I will not describe an attack affecting over 100 million
11 users as "uninteresting", would you?

12 A. Sorry, I did not --

13 Q. I would describe --

14 A. No, it is not uninteresting. I am sorry, if I used the
15 word "uninteresting", I was not referring to that. My
16 bad if --

17 Q. I think you have accepted -- it is page 88 of the
18 [draft] transcript, line 10. 86, sorry, my mistake.
19 I think you did say, Mr Federighi:

20 "... we are able to learn from it quickly, block
21 that malware, take all other instances that were like
22 that down, and ultimately make this an uninteresting
23 attack ..."

24 A. Exactly, by blocking it. By making it something that
25 would not succeed in the future, we made it an attack

1 that people would not want to carry out in the future
2 because it would not work. It was interesting the first
3 time. It was not interesting thereafter. I am
4 describing the state of affairs after Apple is able to
5 quickly learn from it and block it in the future and
6 that is what we have done in this instance.

7 Q. You accept that it was not accurate to describe the
8 attack as one that tried to create a fake version or
9 tried to manipulate developers; it succeeded in both
10 cases.

11 A. No, I think I could have stated that more clearly. This
12 succeeded, absolutely.

13 Q. Paragraph 93 {B2/3/29}, if we pick it up about halfway
14 down you will see a sentence that begins:

15 "Centralised App distribution through the
16 App Store ..."

17 A. Mm-hmm.

18 Q. It says:

19 "Centralised App distribution through the App Store,
20 working in tandem with App Review, also protects against
21 bad actors who would otherwise deliberately only make
22 their Apps available through App stores with lowered
23 security and privacy standards given the opportunity."

24 A. Mm-hmm.

25 Q. Again, same hypothesis. Apple App Review of all

1 iOS Apps distributed to the United Kingdom against the
2 full set of App Review Guidelines --

3 A. Okay.

4 Q. -- regardless of distribution source --

5 A. Mm-hmm.

6 Q. -- that would create a floor for the level of review
7 that was conducted of all iOS Apps distributed in the
8 UK, yes? A baseline?

9 A. Yeah, but that baseline would be considerably lower than
10 it is today because of the inputs problem that we have
11 been discussing this morning.

12 Q. You say:

13 "One malicious App downloaded onto one Device can
14 pose a threat to the entire network."

15 A. Yes.

16 Q. Again on this hypothesis, the only malicious apps that
17 can be downloaded onto iOS Devices would be ones that
18 had been missed by Apple's App Review?

19 A. Yes. Like I say, App Review is imperfect like policing
20 is imperfect. It is a critical layer, you would not
21 want to get rid of it, but it is not perfect. It works
22 in tandem with many other things.

23 Q. Then you continue:

24 "If a variety of distribution points for Apps were
25 permitted, it would be easier for a bad actor to fool

1 a user into downloading, for example, a counterfeit
2 App."

3 Yes?

4 A. Yes.

5 Q. I think we have probably done that to death so we can
6 move on.

7 A. Okay.

8 Q. Then you say in the final sentence:

9 "Whilst not a security consequence, an increase in
10 the variety of distribution points would also increase
11 the complexity for users in terms of finding, paying for
12 and downloading Apps. This would generate ... friction
13 that would potentially reduce a user's propensity to
14 download apps."

15 A. Absolutely.

16 Q. I just want to show you some statistics from the UK
17 Competition and Markets Authority, which is our version,
18 I think, of the FTC --

19 A. Okay.

20 Q. -- for context. It is {AB6/25/1}. For you, it is
21 tab 21 of your binder. I will just show you the first
22 page so that you get your bearings.

23 A. I see that.

24 Q. Are you familiar with this market study?

25 A. I had heard that one was done. I have not read it or

1 I do not know what is in it.

2 Q. It looked at various aspects of mobile ecosystems
3 including app distribution, in-app payment systems and
4 other matters such as that.

5 A. Okay.

6 Q. What I want to show you are some statistics on
7 proportion of downloads and proportion of Device
8 ownership. We can pick it up at page 91 {AB6/25/91} for
9 the electronic version and it should be page 2C of your
10 version.

11 A. Page 23?

12 Q. Page 2C.

13 A. Oh, got it. Yes, I am there.

14 Q. You will see figure 4.1:

15 "The proportion of downloads by app store across iOS
16 Devices, Android Devices, HMS Devices and Fire OS
17 Devices."

18 If we look at the key, we see App Store is dark red
19 and that is 30% to 40%.

20 A. Mm-hmm.

21 Q. Then we see Play Store, which is the Android, which is
22 50% to 60%.

23 A. Okay.

24 Q. Then we have "Other" in magenta.

25 Then if we go to page 35 {AB6/25/35} for the

1 electronic and page 2A for you.

2 A. Okay.

3 Q. It is paragraph 3.18. What we see is:

4 "While there are several manufacturers of
5 smartphones, virtually all active smartphones in the UK
6 come with either the iOS or Android ..."

7 Pick it up the next sentence:

8 "This shows that:

9 " - between [50-60]% of active smartphones in each
10 year of this period have been Apple's iOS Devices ...

11 " - [and] between [40-50]% of active smartphones in
12 each year of this period have been Android Devices ..."

13 What we see is that there is a greater proportion of
14 downloads on Android Devices, go back to figure 4.1
15 {AB6/25/91}, more downloads from the Play Store, which
16 is an Android store, obviously, albeit there is a lower
17 Device share for Android Devices. Do you see that?

18 A. I think so.

19 Q. What I am going to suggest to you is that this suggests
20 that decentralised distribution does not create
21 disincentives to download apps.

22 A. I see the point you are making. I do not know if that
23 would be true on our platform and I do not know what is
24 driving the propensity to download on Android. Early in
25 Android's life, a lot of the software that was

1 downloaded was pirated so there was an incentive to
2 download free illegally obtained material that drove up
3 the numbers. I do not know if that is the case in these
4 statistics. But yeah, I do not know.

5 Q. Can we go to {D1/1707/10}. Mr Federighi, this is --

6 A. I am sorry, which tab?

7 Q. I am just going to give you your tab number. Tab 12 for
8 you, it is page 10.

9 A. Yes.

10 Q. I am slightly behind you. I we pick it up, you will
11 see a cloud with a key; you see that?

12 A. I do.

13 Q. It says:

14 "Once an app has passed these reviews [that is
15 referring back to the notarisation process], we notarize
16 it -- it-giving the developer the signature required for
17 them to distribute that app on iOS. In an effort to
18 ensure that nothing changes between Apple signing the
19 app and the time a user actually installs the app on
20 their iPhone, notarized apps will also undergo a series
21 of basic checks during installation. This will help
22 ensure that the app has not been tampered with since it
23 was notarized and that the installation was initiated
24 through an authorized source initiated through
25 an authorised source."

1 Yes?

2 A. Yes.

3 Q. That is dealing with notarisation under iOS in the EU.

4 A. Yes.

5 Q. If we come back to our premise, which is decentralised
6 distribution in the United Kingdom, full App Review
7 against the full set of guidelines and Apple code
8 signing --

9 A. Yes.

10 Q. -- this mechanism could and would apply to apps
11 distributed in the United Kingdom?

12 A. Sure.

13 Q. So that is the start -- the starting point is that
14 an app cannot change in terms of its code from the
15 moment it has passed Apple's App Review and the moment
16 it is downloaded by a user, yes?

17 A. For the code that is contained within the app itself,
18 yes. As I am sure has been discussed other times in
19 this case, apps often download additional behaviour from
20 a website and that can change. It can change the
21 behaviour of the app post review.

22 Q. That is often referred to as a bait-and-switch app, yes?

23 A. It can occur for benign reasons. In other words,
24 sometimes developers want to say: well, we have -- it is
25 a good app, it is not a malicious app and it wants to be

1 updated with the latest promotions or whatever, and so
2 they dynamically download changes to enhance the app or
3 provide timely functionality, but it can also be used by
4 an attacker to do a bait and switch.

5 Q. We are dealing with the bad actors in our discussion.

6 A. Yes. Indeed.

7 Q. That circumstance is referred to as a bait and switch,
8 yes.

9 A. That is an example, bait and switch, yes, if they are
10 using it.

11 Q. One of the ways that you can --

12 A. Yeah. So you could sign it, get it through, it does not
13 change but its web behaviour changes so what the user
14 ends up seeing, what the victim ends up seeing is
15 something different than what the reviewer saw.

16 Q. So bait-and-switch apps are an existing problem on iOS
17 under the present centralised distribution model, yes?

18 A. That is correct. It is just with centralised
19 distribution we have more mechanism to nimbly react and
20 make it less profitable for a developer to attempt to
21 make a business out of performing those kinds of
22 attacks.

23 Q. If we pick it up your witness statement on page 94
24 {B2/3/30}, page 30 for you, Mr Federighi, and if you
25 could pick it up slightly more than halfway down you

1 will see a sentence that begins "And", do you see that?

2 A. In 94 or 95?

3 Q. It is seven lines up, the sentence starts about
4 two-thirds way across the line.

5 A. "And should"?

6 Q. Yes:

7 "And should a malicious app make it into the
8 App Store, whether because it changes functionality
9 subsequent to approval, is identified as a social
10 engineering attack, or for other reasons, centralised
11 distribution enables Apple to both remove the App
12 rapidly and take steps to prevent additional or repeated
13 attacks: Apple can remove the App from the App Store and
14 prevent its future download by users, review the entire
15 App Store and all App submissions for similar
16 vulnerabilities or exploits, and ban the developer from
17 submitting future apps."

18 Yes?

19 A. Yes.

20 Q. Again we are on the same hypothesis about centralised
21 App Review, decentralised distribution in the
22 United Kingdom.

23 A. Yes.

24 Q. Taking this example, if Apple identified a malicious app
25 after App Review, it could remove it from the Apple

1 App Store, yes?

2 A. In this scenario, maybe it was never on the Apple App
3 Store.

4 Q. If it was on the Apple App Store, it could remove it?

5 A. Correct.

6 Q. It could revoke the app's signature and that would
7 prevent the app from being downloaded from any source?

8 A. Yes. But the practical mechanics of doing that really
9 slow the process down.

10 Q. The practical mechanics of revoking the signature?

11 A. Of making the decision for Apple unilaterally to make
12 an app no longer available on someone else's store in
13 practice would likely require Apple to contact that
14 other store, tell them this is happening, see if there
15 is mitigating circumstances. There are all kinds of
16 things that in practice would slow -- likely slow down
17 our ability to take that kind of extreme action.

18 Q. In this scenario, Apple would remain the sole owner of
19 the iOS software, yes?

20 A. I would like to think so.

21 Q. It would be able to revoke the app's signature
22 unilaterally, that would be possible?

23 A. Again, the technical mechanism would exist. I am saying
24 in practice, our ability to go and take something off
25 someone else's App Store would be the kind of thing that

1 regulators, other people, may say, "Apple, you are doing
2 this improperly, what if you made a mistake? Or did you
3 do it for commercial reasons?" There are all kinds of
4 things that will cause us to have to be more cautious
5 about taking action in some -- that affects someone
6 else's App Store that will slow the process down in
7 practice, we believe.

8 Q. But if Apple were sufficiently concerned about security
9 risks, it could do that, yes?

10 A. With all the mitigations I described -- or all the
11 considerations I described, yes.

12 Q. Apple could review the App Store and it could review all
13 app submissions, past, present and future, for similar
14 vulnerabilities and exploit --

15 A. Yeah, once we became aware of the app. That is the
16 other piece of it. A non-centralised distribution
17 regime, our ability to get the signals to spot the
18 problem, spot the app, is strung out.

19 Q. We are coming on to --

20 A. Okay.

21 Q. -- that. But it could review all apps in the App Store
22 and it could review all submissions to identify --

23 A. In the scenario you describe, yes.

24 Q. Ultimately it could ban the app's developer from
25 submitting future apps, yes?

1 A. Yes, indeed.

2 Q. If we go to {E/36/1}, that is tab 15 for you,
3 Mr Federighi. Take it on page 1. These are the
4 "Alternative Terms Addendum for Apps in the EU". Are
5 you familiar with this document?

6 A. I suspect I reviewed it before it was produced but I am
7 not sure -- yeah, I think so.

8 Q. Is it correct these are the terms that developers have
9 to sign in the European Union if they wish to offer
10 an alternative marketplace or if they wish to use
11 an alternative payment processor, yes?

12 A. Yeah.

13 Q. If we can go to clause 2, which is on page 2 {E/36/2}.

14 A. Okay.

15 Q. This sets out the obligations on developers providing
16 alternative app marketplaces and website distribution,
17 so that is alternative app stores in normal Apple
18 parlance, yes?

19 A. Mm-hmm.

20 Q. Pick it up page 3 {E/36/3} halfway down, the fifth
21 bullet, starts:
22 "You must engage ..."
23 You see that?

24 A. Yes.

25 Q. It says:

1 "You must engage in ongoing monitoring and detection
2 of fraudulent, malicious or illegal activity in Your
3 Website (EU) or Your Applications (including Your
4 Alternative App Marketplace (EU)), or fraudulent
5 malicious, or illegal developers or Applications in Your
6 Alternative App Marketplace (EU), and take appropriate
7 action when You detect such activity, Applications, such
8 activity, applications, or developers ..."

9 Yes?

10 A. Yes, indeed.

11 Q. So developers of alternative app stores in the EU are
12 under a contractual obligation to Apple proactively to
13 seek to identify malicious apps, yes?

14 A. For what it is worth, yes.

15 Q. If they discover them, they are under an obligation to
16 take appropriate action, yes?

17 A. Yes, and what they deem to be appropriate action will
18 vary.

19 Q. But it might include removing the app from their
20 App Store in certain circumstances, yes?

21 A. It might. Or they might have very different incentives
22 and interests.

23 Q. The next bullet:

24 "You must be responsive to communications from Apple
25 regarding Your Alternative App Marketplace (EU), Your

1 Website (EU), or Applications distributed through Your
2 Alternative App Marketplace (EU) or Your Website (EU),
3 particularly regarding any fraudulent, malicious, or
4 illegal behavior, or anything else that Apple believes
5 impacts the safety, security, or privacy of end
6 users ..."

7 Yes?

8 A. Yes.

9 Q. So if Apple, again hypothetical, but if Apple contacted
10 an alternative app store and said, "We have discovered
11 this malicious app, it slipped through the net during
12 App Review, we have removed it and we suggest that you
13 do the same", you would expect that alternative app
14 store to do that, would you not?

15 A. This depends. We all have experience in the news about
16 social networks today that governments have all kinds of
17 laws written like this to make claims on how they should
18 conduct themselves and find themselves having quite big
19 disagreements with providers who say, "No, we think that
20 should stay up", and, "Oh, we think our safety and
21 content review process is adequate", and yet, you know,
22 others disagree, and there are incentives in the
23 alternate marketplace system for these marketplaces in
24 fact to want to differentiate themselves by being
25 permissive and renegade and so forth, so they will push

1 the limits of these kinds of things. That is what we
2 have seen in practice, that marketplaces that have been
3 created, often one of their selling points is just how
4 permissive they are, and sometimes how their clientele
5 are people that are doing sketchy things.

6 Q. But on the hypothesis that we are considering, there is
7 a limit to how permissive these alternative app stores
8 could be, is there not?

9 A. Well, it would be a fight. It would be a fight. It is
10 a fight in the EU. If we try to say, "This marketplace
11 is bad", they are likely to say, "Well, Apple, are you
12 not doing this because you are being commercially
13 restrictive? Maybe you do not like them." This
14 marketplace is going to claim, "Oh, this is
15 persecution", and we are going to say, "Hold it, you are
16 endangering our customers". So these things in practice
17 are a fight, and attackers benefit from the fractures in
18 this system.

19 DR BISHOP: Can I just ask a question?

20 A. Yes, sir.

21 DR BISHOP: You seem to be speaking about -- speaking
22 hypothetically. I am not quite sure whether you are
23 speaking entirely hypothetically or from some experience
24 of the last ten months. Which is it?

25 A. So I am speaking -- both, as you say, hypothetically on

1 a forward-looking basis, but also based on real
2 experience in what's happened in the Android space in
3 the past, where some of these kinds of regimes exist,
4 what has happened in -- even on iOS, where developers
5 have abused a particular loophole in some markets to
6 create kind of alternate app stores over the last
7 ten years, and speaking about what happens in other
8 regulated contexts around, say, social networks, about
9 how they are permissive and sometimes make a business on
10 being the more permissive distribution channel.

11 DR BISHOP: But you are not speaking about the things that
12 happened in the last few months in consequence of the
13 DMA, things you are obliged to do under the DMA?

14 A. That is correct. It is so early with the DMA that none
15 of this has really had time to flower into the mess
16 I think it is likely to become.

17 MR KENNEDY: Mr Federighi, staying with the DMA. In the
18 ten months that the DMA's been in force, has Apple had
19 experience of any alternative app store breaching either
20 of the two contractual obligations I have taken you to.

21 A. No. Like I say, the DMA is -- these marketplaces and
22 the world that ultimately will exist takes years to
23 reach scale so it has not happened up to this point, no.

24 Q. Does Android have an equivalent, does Google have
25 an equivalent contractual restriction or equivalent

1 contractual restrictions on alternative app stores in
2 the Android ecosystem?

3 A. I do not know what Google's business arrangement is.

4 Q. For one moment, staying on the question of the possible
5 extent of permissiveness, under the DMA regime, Apple
6 authorises each and every alternative app store, yes?

7 A. Yes, but with extreme pressure on being permissive for
8 who we would allow.

9 Q. It does review developers you are proposing to be
10 alternative app stores, yes?

11 A. Yes, but under extreme pressure.

12 Q. On the hypothesis that we have been considering, there
13 is full App Review of every app --

14 A. Oh, sorry, now we switched out of the DMA and into the
15 hypothetical world?

16 Q. (overspeaking) -- back to the hypothetical world.

17 A. Okay.

18 Q. In that hypothetical world, is it possible that Apple
19 would likewise continue or likewise authorise
20 alternative app stores prior to them being able to act
21 as alternatives?

22 A. This is your alternative world. I cannot tell you what
23 is likely -- what are you suggesting?

24 Q. The question was: is it possible, Mr Federighi?

25 A. Is it possible ...?

1 Q. Is it possible that Apple would take that approach?

2 A. Take the approach of licensing?

3 Q. The approach of reviewing alternative app stores prior

4 to them being able to act as alternative app stores.

5 A. I do not know what we would be allowed to do under this

6 proposed regime. If you are saying -- if we were

7 allowed to, we would continue to do the things that

8 protect our users the most, so it would be none of this.

9 But if you are saying we were forced to do some of these

10 things, I guess we would be forced to do some of these

11 things.

12 Q. What we are dealing with here is apps that change their

13 behaviour after App Review, yes?

14 A. That is one of the things we have talked about, yes.

15 Q. In this paragraph, that is what we have been dealing

16 with, paragraph 94 {B2/3/30}, that is --

17 A. Sorry, I am now in the Alternative Terms Addendum for

18 Apps in the EU.

19 Q. We got there from -- we started at paragraph 94:

20 "And should a malicious App make it into the App

21 Store, whether because it changes functionality

22 subsequent to approval ..."

23 That is where we started.

24 A. Oh, back to my statement?

25 Q. We were in the alternative terms because your evidence

1 was that Apple may not know about it, yes?

2 A. Right, yes.

3 Q. But what we are dealing with is the subset of apps that

4 slip through the net during App Review, yes?

5 A. Yes.

6 Q. Let us move on to 95 {B2/3/30}.

7 A. Okay.

8 Q. Pick it up four lines from the bottom, the sentence

9 starting:

10 "Alternative App distribution models ..."

11 Do you have that?

12 A. Yes.

13 Q. "Alternative App distribution models (especially

14 distribution via websites) may not have user ratings or

15 comments (or, worse, may have fake ratings or comments).

16 This denies users a critical source of information about

17 fraudulent or misleading apps."

18 A. Yes.

19 Q. But you do not here identify an example of any

20 alternative app store that is available for iOS which

21 does not have any reviews or user comments?

22 A. Well, sorry, at the time this statement was made, there

23 were none.

24 Q. But you do not --

25 A. There were no alternative app stores for iOS.

1 Q. But you do not identify any, for example, Android
2 App Stores that do not have reviews or user ratings or
3 comments, do you?

4 A. No, but in the e-commerce world -- this is a well-known
5 issue of sites, you know, that are Amazon-like but are
6 packed with fake reviews, filtered reviews, misleading
7 reviews, so just translating that inevitability over to
8 the App Store world takes no imagination.

9 Q. But again on the hypothesis that we have been
10 considering, full App Review of all iOS Apps, then the
11 apps that would even be on a third-party website or
12 app store would be those that had been approved by
13 Apple's App Review, yes?

14 A. Sure. Yeah.

15 Q. So what we are dealing with either an absence of reviews
16 or fake reviews of apps that are fundamentally safe,
17 yes?

18 A. No. No, we spent a whole bunch of -- we talked at
19 length about our banking Trojan example. That is an app
20 that will pass review that is not fundamentally safe and
21 you can bet that the malicious App Store page will have
22 a review saying, "I love Bank of America's app, it is so
23 great, safe, and saves me time", and that will be all
24 completely fake, where if it were distributed instead on
25 Apple's App Store, the first review would be a zero star

1 review saying, "This app is a hoax, this thing ripped me
2 off". That is a big difference in signal to the user
3 before they make their decision to download.

4 Q. Paragraph 96 {B2/3/30}, Mr Federighi. You say:

5 "Returning to the threat model, centralised
6 distribution through the App Store with App Review thus
7 plays a critical role in the evaluation of the threat
8 model."

9 Two sentences down:

10 "Apple's model of centralised distribution with App
11 Review significantly lessens all of these
12 opportunities ..."

13 Yes?

14 A. Mm-hmm.

15 Q. Then over the page {B2/3/31}, final sentence:

16 "In other words, the strength of Apple's model
17 of centralised distribution with App Review provides one
18 of our best deterrents ..."

19 Yes? So what you are addressing here is the
20 combined effects of centralised distribution and App
21 Review on the security of iOS Devices, yes?

22 A. Correct, yes.

23 MR KENNEDY: Sir, I do not know if that is a convenient

24 time. I am about to move on to another topic. We are
25 making good progress and I think we will hopefully

1 finish by the transcriber's break this afternoon and
2 that will give time for Mr Howell.

3 THE CHAIRMAN: Yes, good, thank you.

4 Same rules, Mr Federighi. please do not discuss your
5 evidence with anybody.

6 THE WITNESS: Yes, sir.

7 THE CHAIRMAN: The court rises until 2 o'clock.

8 (12.59 pm)

9 (The luncheon adjournment)

10 (2.01 pm)

11 MR KENNEDY: Good afternoon, Mr Federighi.

12 A. Good afternoon.

13 Q. We are nearly done, I hope.

14 If we could pick it up at paragraph 97 of your
15 witness statement, {B2/3/31} and 31 in the hard copy.

16 A. Yes.

17 Q. In this section of your witness statement, you are
18 comparing iOS to other distribution models. We start
19 with a comparison to Android, yes? We see at 97:

20 "As I described above, the Android operating system
21 permits the sideloading of third-party Apps, and does
22 not mandate centralised distribution of Native Apps."

23 Then down to 99:

24 "In my role as Senior Vice President, Software
25 Engineering, I am aware that in around October 2021,

1 Apple undertook a threat analysis of sideloading, a copy
2 of which appears at..."

3 In the exhibit to your witness statement and that is
4 the October 2021 document that we looked at earlier,
5 yes?

6 A. Yes.

7 Q. Paragraph 100:

8 "That Threat Analysis conducted by Apple referenced
9 a third-party analysis finding that between 2018 and
10 2021, Android Smartphone Devices (which permit
11 sideloading) experienced 15 to 47 times more malware
12 infections than iOS Devices."

13 Yes?

14 A. Yes.

15 Q. It is correct, Mr Federighi, that decentralised
16 distribution is not the only difference between the
17 Android ecosystem and the iOS ecosystem, correct?

18 A. I think that is fair to say.

19 Q. Google, for example, does not verify all developers'
20 identities before they can create and distribution
21 an Android app to Android Device users?

22 A. Outside the Google Play Store, right, I think that is
23 true.

24 Q. Apps that have been signed only by a developer and not
25 by Google can be distributed to Android Device users,

1 yes?

2 A. I believe that is correct.

3 Q. Android Device users are manufactured by multiple OEMs,
4 yes?

5 A. Correct.

6 Q. As a result, there is more inconsistency in the
7 frequency and timing of security updates on Android
8 Devices as compared to iOS Devices, correct?

9 A. Yes.

10 Q. An app can be downloaded on to an Android Device that
11 has not been subject to any sort of App Review, yes?

12 A. Correct.

13 Q. The figures presented in your witness statement at
14 paragraph 100 do not show what proportion of malware
15 infections at Android are referable to the decentralised
16 distribution model, as opposed to, for example, the lack
17 of mandatory App Review, correct?

18 A. That is correct.

19 Q. You agreed with me earlier that the overall security of
20 Android is a product of the combination of the different
21 security features that that has, and the environment
22 within which those Devices operate, yes?

23 A. Yes.

24 Q. You would agree with me that the difference between the
25 number of malware infections on iOS, as compared to

1 Android, is similarly a function of the cumulative
2 differences between the security architecture as
3 employed on iOS on the one hand, and Android on the
4 other hand, yes?

5 A. Yeah, although it is not clear in what proportion --
6 with iOS we think of it as holistically, if you create
7 a chink in the armour, attackers will tend to attack
8 that vulnerability. So it is not that if you remove 5%
9 of the protections, you get a 5% increase in problems.
10 If you remove 5% of a wall that is meant to protect
11 something, you have opened the wall. So yes, it is
12 cumulative, but the totality is extremely important.

13 Q. That is Android, Mr Federighi. If we go to
14 paragraph 115 {B2/3/36}, we will have a look at what you
15 say about Mac. We are going to come back to
16 paragraph 114 in the closed session, so we will go to
17 115 for now.

18 A. Okay.

19 Q. You refer back to the statistics in 114, do you see
20 that:

21 "These statistics are consistent ..."

22 A. Yes.

23 Q. "... with my review of the methodology contained in
24 publicly available third-party analyses. For example, a
25 2023 third-party analysis of malware activity around the

1 world conducted by Nokia ... confirms my understanding
2 that malware infections on macOS represent around 7% of
3 malware infections across computers and Smartphone
4 Devices; by contrast, iOS represented virtually none of
5 the malware infections."

6 I just want to pick up the next sentence, just
7 insofar as it relates back to Android:

8 "Of note, this was ... significantly lower than the
9 number of malware infections on Android Devices, which
10 constituted 49% of all infected Devices."

11 If we could just stay on Android for one second,
12 sorry to jump around, but similarly to paragraph 100 of
13 your witness statement, the statistic that you present
14 in paragraph 115 does not isolate the number of malware
15 infections on Android Devices that are referable to the
16 absence of centralised distribution on Android, correct?

17 A. Right, there is an overall number.

18 Q. Overall number, thank you.

19 Back to Mac, 115 -- we have seen 7% plays --
20 virtually none, and I just want to look at the security
21 systems that you use on Mac --

22 A. Okay.

23 Q. -- compared to iOS. Mac has a decentralised app
24 distribution model, correct?

25 A. Correct.

1 Q. You can download from the Mac App Store, or from a
2 website. I think you give an example in your witness
3 statement of a USB, and various other things, yes?

4 A. Yes, correct.

5 Q. Sandboxing is not mandatory on Mac, correct?

6 A. That is correct.

7 Q. Sandboxing is less strict on Mac; is that correct?

8 A. That is correct.

9 Q. Mac Device users can install unsigned apps?

10 A. If they make certain settings by default --

11 Q. This is the correction -- I did not mean to --

12 A. Yes, the correction we made earlier, yes.

13 Q. The Gatekeeper is set to default, you cannot install
14 unsigned, but you can change the default setting you are
15 allowed to sign --

16 A. That is correct, exactly, yes.

17 Q. Sorry, you are allowed to download and install unsigned
18 and Mac Device users can install apps that have not been
19 reviewed by Apple through the notarisation for Mac --

20 A. If they bypass those settings, that is correct.

21 Q. -- system. Notarisation from Mac -- this is for
22 the Tribunal's benefit, notarisation from Mac is
23 different from notarisation for iOS.

24 A. Yes.

25 Q. Even apps that have been notarised from Mac have not

1 been subject to human review?

2 A. That is correct.

3 Q. It is computer review only. Mr Federighi, you would
4 agree that the comparative difference in security
5 enjoyed by Mac users, as compared to iOS users, is the
6 product of the combination of the differences between
7 the two systems in terms of security features, yes?

8 A. Well, I would say both in terms of the overall security
9 architecture, and the layers in defence in depth, but
10 also the environment in which they exist; the Mac is
11 a lower volume platform that is for a number of reasons
12 a less attractive target. That also contributes.

13 So that is one of the things that makes it so
14 notable, that despite being far less voluminous in
15 number, in terms of being a large market for the
16 attacker to go after, it represents so much more of the
17 actual attacks in practice than iOS.

18 Q. Coming back to the 7% figure malware infections, again,
19 what we cannot tell from this 7% figure is what
20 proportion of the malware infections on Mac Devices are
21 attributable to the decentralised distribution model
22 that is employed on Mac, correct?

23 A. You cannot strictly tell from that statistic, no.

24 Q. Again, it is an overall number?

25 A. That is correct.

1 Q. Thank you. Staying with Mac, Mr Federighi, hopefully
2 some underarm throws here. There are a number of
3 security features of Mac that are not currently deployed
4 on iOS. I am just going to refer you to three.

5 A. Yes.

6 Q. One is Gatekeeper, correct?

7 A. Correct, it just has no place in a world where there is
8 an App Store, yes, so it is not there.

9 Q. Gatekeeper verifies that software is from an identified
10 developer, it is notarised by Apple to be free of no
11 malicious content, and request user approval before
12 opening downloaded software to make sure the user has
13 not been tricked into running executable code, yes?

14 A. That is right. Centralised distribution on iOS serves
15 sort of that purpose and more, so there is no need for
16 Gatekeeper.

17 Q. Another one is XProtect?

18 A. Mm-hmm.

19 Q. XProtect automatically detects and blocks the execution
20 of known malware, correct?

21 A. That is correct.

22 Q. Finally, the malware removal tool, MRT, that detects and
23 removes malware that was able successfully to execute,
24 yes?

25 A. Yes.

1 Q. Would it be fair to describe these tools or any of these
2 tools as a form of anti-virus software?

3 A. In a limited way. I would say anti-virus software, as
4 you would see on Windows PCs and so forth, have a bunch
5 of characteristics that are not included in the
6 subsystems we just described, but this -- what you
7 described is a subset of that functionality.

8 Q. So in terms of malware detection etc that is an aspect
9 of anti-virus software, is it?

10 A. Well, I would say that anti-virus software, say on
11 Windows, is sometimes looking for -- dynamic signs of
12 attack, so did the software make -- try to use the
13 operating system in an unusual way. The -- XProtect and
14 MRT are solely doing kind of a static analysis to say:
15 is this a signature we have seen before, okay, then
16 block it; not a dynamic, is this software behaving
17 funny.

18 Q. Are there any tools on MacOS that operate in the manner
19 that you described for Windows, so --

20 A. From third parties, yes.

21 Q. From third parties but no -- not sort of integral to the
22 MacOS itself?

23 A. Correct.

24 Q. It is correct that although the three tools that we have
25 looked at, Gatekeeper, XProtect and MRT, are currently

1 only deployed on Mac, it would be technically possible
2 to deploy them on iOS, yes?

3 A. Yes.

4 Q. If they were deployed on iOS, that would contribute to
5 iOS's defence and depth approach to security, yes?

6 A. Yeah, sort of after you took away the good protections
7 and replaced them with lesser protections, it would
8 contribute.

9 Q. Another topic, Mr Federighi. We looked briefly earlier
10 at the alternate terms that Apple offers to developers
11 in the EU. Do you recall that?

12 A. Yes.

13 Q. We saw that Apple imposes a contractual obligation on
14 developers of alternative app stores to monitor their
15 stores for malicious apps, yes?

16 A. I did see that, yes.

17 Q. We saw that Apple also imposes a contractual obligation
18 on those developers to respond to communications from
19 Apple, yes? The contractual terms that Apple enters
20 into with developers of alternative stores are a product
21 firstly of the terms that Apple is willing to offer, and
22 of any regulatory constraints that Apple is under in any
23 given jurisdiction, yes?

24 A. I think so, yeah.

25 Q. For example, we saw that the commission has limited what

1 guidelines -- App Review guidelines Apple is permitted
2 to apply when carrying out notarisation for iOS, yes?

3 A. Yes.

4 Q. We saw that absent that regulatory restriction, you said
5 that Apple would do as much as it could to protect its
6 users and apply as many of the guidelines as possible,
7 yes?

8 A. Yes.

9 Q. It may be possible, Mr Federighi, for Apple to require
10 developers of alternative app stores to report
11 information to Apple about any malicious app or
12 developer that they discover on their store, yes?

13 A. We could make it part of our terms, but whether in
14 practice they do it well, or actually effectively
15 comply, is in doubt for me personally, and the
16 effectiveness, I think, is an area of huge scepticism on
17 my part.

18 Q. It is commonplace within the security industry to share
19 information between entities about things like malicious
20 attacks, forms of malware, yes?

21 A. Yes.

22 Q. It would be possible for Apple to require developers of
23 alternative app stores to apply certain agreed security
24 standards to the apps that they host on their
25 alternative app store, yes?

1 A. Again, we could attempt to, but they would certainly lag
2 considerably the kind of closed loop fast reaction and
3 improvement of the tools and checks that we are able to
4 perform in our current environment.

5 Q. It would be possible for Apple to impose a contractual
6 obligation on developers of alternative app stores to
7 remove any malicious apps or app developers that they
8 discover on their alternative stores, yes?

9 A. Yes.

10 Q. Moving on to privacy, Mr Federighi.

11 A. Okay.

12 Q. I want you to assume for the purpose of these questions,
13 we are going back to our favourite hypothetical, which
14 is that iOS Apps can be distributed in the
15 United Kingdom otherwise than through the App Store, but
16 we are doing full App Review of every iOS App,
17 regardless of ultimate source of distribution, okay?

18 A. Okay.

19 Q. We were discussing that earlier, and that is the
20 premise --

21 A. That is your hypothetical, yeah.

22 Q. If you go to paragraph 137 {B2/3/44} of your statement,
23 I just want to look at what you say here about enforcing
24 the privacy pillars that you identify a little earlier
25 in your statement. Let us pick it up at the first

1 sentence. You say:

2 "I am not aware of a means by which Apple could
3 implement the 'pillars' of Apple's privacy architecture
4 described above without requiring compliance by every
5 Native App downloaded to an iOS Device with the App
6 Store Review Guidelines and a review and distribution
7 approach that enforces those requirements."

8 Do you see that?

9 A. Yes, I do.

10 Q. I just want to clarify your evidence. It is not your
11 evidence that the privacy measures you outline in
12 paragraphs 128 to 136 {B2/3/40-43}, so that is where you
13 set out the various pillars, if you want to have a quick
14 look.

15 A. Mm.

16 Q. It is not your evidence that those could not be
17 implemented without centralised distribution, is it?

18 A. For a few of them, yes, it is my evidence.

19 Q. Shall we take them in turn then. Shall we start with
20 data minimisation, paragraph 129 {B2/3/40}. At 128 you
21 define what data minimisation is. Then you say -- let
22 me know if I am going too fast?

23 A. I am there on 129 now, yes, thank you.

24 Q. 129:

25 "Apple enforces the data minimisation policy during

1 App Review ..."

2 A. Yes.

3 Q. If we are in a world in which there is full App Review

4 of every iOS app before distribution, Apple would be

5 able to enforce the data minimisation principle during

6 App Review, yes?

7 A. That is correct, to the extent the app does not bait and

8 switch, change behaviour, those sort of things.

9 Q. Paragraph 130, this is the second pillar, user

10 transparency and control. I ask you to read that

11 quickly because you give an example of what you mean by

12 "user transparency and control". (Pause)

13 A. 130, yes.

14 Q. So the Maps example is just an example of the sort of

15 prompt that an app may need to give before it can access

16 certain kinds of user data, yes?

17 A. Yes.

18 Q. The example of user data here is location data, yes?

19 A. That is correct.

20 Q. If we go forward to 135 {B2/3/43} --

21 A. Right.

22 Q. -- it gives some further examples, pick it up halfway

23 through:

24 "In certain circumstances ..."

25 Sorry, my mistake. The first sentence.

1 A. "express consent before engaging in tracking activity",
2 in 135?

3 Q. "... Apple also requires that users expressly consent to
4 access by an App to Device hardware (such as the Device
5 camera or microphone) or other stored information
6 (including contacts, location data or photos)."

7 A. Yes.

8 Q. So those are other examples of the types of data or
9 hardware functionality that you must say to a user:
10 please may I access the camera or please may I access
11 the microphone; yes?

12 A. That is right. That is something that can be socially
13 engineered, if the app was distributed deceptively, but
14 the basic review time check could be performed, that is
15 correct.

16 Q. So during App Review, you accept that for each of these
17 categories of data or hardware functionality that we
18 have identified, App Review would be able to check the
19 extent to which the app is --

20 A. The categories that are listed on where?

21 Q. So 130 {B2/3/40} location data, yes?

22 A. 130, location data, yes.

23 Q. Then 135 {B2/3/43} we have microphone?

24 A. Yeah.

25 Q. Camera?

1 A. Correct. So to the extent the --

2 Q. Contacts and photos?

3 A. With the caveats I described.

4 I think, to cut to the chase, privacy nutrition
5 labels, which is 131 {B2/3/41}, are an important
6 component of user transparency --

7 Q. We are going to come to privacy nutrition labels --

8 A. Okay, you jumped past 131 on your journey, and I did not
9 want to miss it.

10 Q. Absolutely, just to group together the various
11 categories of data a user needs to be asked about, okay?

12 A. Okay.

13 Q. If we can go to {D1/1707/1} and it is tab 12 for you.

14 A. Oh, I am missing my big binder.

15 Q. Your bundle? I am so sorry.

16 A. Bundle. Thank you. Could you restate the tab?

17 Q. 12. It is the DMA security document, March 2024, that
18 we looked at earlier.

19 A. Yes, I am there now.

20 Q. If we pick it up at {D1/1707/9}, we see halfway down:

21 "Privacy: Notarization..."

22 A. You said page 9?

23 Q. Page 9, about halfway down, you will see a blue dot, and
24 "Privacy".

25 A. Yes, indeed.

1 Q. It is notarisation, which is a reference to notarisation
2 for iOS in this context?

3 A. I see that.

4 Q. "... will seek to prevent threats to user privacy by
5 ensuring that each app properly supports -- and does not
6 attempt to circumvent -- the privacy features that are
7 built into and essential to the integrity of all Apple
8 Devices. To protect user privacy and provide
9 transparency to users into how their data will be used,
10 Apple uses technical measures to prevent apps from
11 accessing users' sensitive information. iOS only allows
12 apps to access this kind of data after they have
13 obtained consent from the user -- which the user can
14 revoke at any time."

15 Then we see the list. The first two categories,
16 microphone, camera, number 5, location data, and then
17 further down we see contacts and photos, yes?

18 A. Correct.

19 Q. This section suggests that it is iOS that governs
20 whether or not apps are able to access each of these
21 kind of data, yes?

22 A. Well, so there is an entitlement that the developer
23 includes in their submission of their app for review.
24 It is the review that effectively verifies they have
25 reason to have access to the entitlement, so we would

1 block an app that had no good reason to ask for your
2 contacts, say, from applying for that entitlement.

3 Then yes, as you say, at the time the user is
4 running the app, it is iOS that takes an app that has
5 been granted that entitlement, and enforces whether the
6 user has said: yes, I do want to provide access to my
7 contacts.

8 As we have discussed earlier, that is vulnerable to
9 social engineering, if the user is under a misimpression
10 about what app they are running or why they are being
11 asked, but yes, iOS enforces that the user has tapped
12 yes.

13 Q. If you just stay on {D1/1707/9}, it is after the last
14 bullet, we see:

15 "Notarization will check that apps requesting these
16 permissions are clear and concise as to why the access
17 is needed, so the user can make an informed choice about
18 what permissions to grant -- and remain in the driver's
19 seat when it comes to their own data."

20 Yes?

21 A. That is the goal.

22 Q. So that is the approach that has been taken in Europe,
23 and it would be possible to take a similar approach in
24 the United Kingdom? I will restate the question: it
25 would be possible to take the same approach in the

1 United Kingdom?

2 A. It would.

3 Q. I promised to come on to privacy nutrition labels, that
4 is, as you said, paragraph 131 {B2/3/41}.

5 A. Yes.

6 Q. If Apple adopted a decentralised app distribution model
7 in the United Kingdom, but retained mandatory developer
8 registration, mandatory App Review and mandatory code
9 signing, is there any reason why Apple could not
10 continue to require developers to show iOS Device users'
11 privacy nutrition labels?

12 A. So first would be the question of whether such
13 regulation, or whatever you envision here, would allow
14 it, because in the EU we do not have that level of
15 control, and so I would be concerned that that could be
16 the situation elsewhere.

17 Secondly, if we are talking about distribution that
18 includes websites, of course very difficult to govern
19 what they are showing, even with an App Store, whether
20 they show them prominently enough, whether they hide
21 them maliciously at times. This becomes a difficult
22 thing to police. But as I say, in the EU in particular,
23 we are not allowed to even make this requirement.

24 Q. I believe that privacy nutrition labels might have been
25 suggested or even required by the CMA; is that correct?

1 The UK regulator?

2 A. I have no idea.

3 Q. In any event, Apple does not review every privacy
4 nutrition label for every iOS App, does it?

5 A. No, we rely on a closed loop of developer at a station
6 and user feedback.

7 Q. The first part of that is that you rely on developers
8 accurately self-reporting their data usage?

9 A. With the understanding that because we have centralised
10 distribution, we can receive feedback and correct if --
11 developers have a disincentive in misrepresenting, and
12 we have seen many instances where developers are called
13 out for misrepresenting their nutrition labels, and they
14 are forced to correct them.

15 Q. Staying in privacy, 131(b), app tracking transparency.

16 A. Uh-huh.

17 Q. App tracking transparency operates by preventing iOS App
18 developers from tracking users or accessing the IDFA
19 unless a user explicitly authorises them to do so. Is
20 that correct?

21 A. That is the purpose of app tracking transparency, yes.

22 Q. And it's the operating system, it is iOS which controls
23 access to the IDFA, correct?

24 A. That in particular, yes, a panel comes up and we require
25 that the user says yes in order to get the IDFA.

1 Q. That is a function of iOS, as opposed to the app in
2 question, yes?

3 A. That is correct. But app tracking transparency is far
4 broader than the IDFA. Most developers have moved on
5 from the IDFA as a mechanism, because they have other
6 ways that they will fingerprint and track users, so it
7 is the other elements of app tracking transparency
8 enforcement that have proven to be the important part.

9 Q. With respect to the non-IDFA aspects, so tracking more
10 generally, it is correct that Apple is reliant on
11 developers voluntarily complying with users' choices,
12 yes?

13 A. It is a requirement of the App Store guidelines that the
14 developers comply, and if they do not, they would be
15 discovered and removed from our store. So it is under
16 that penalty that even entities, many of which you are
17 familiar with, would not want to comply, but they are
18 required to, because they understand under our
19 centralised distribution, they would get blocked from
20 distribution, were they to be found to have violated
21 this.

22 Q. But it is correct that you are relying on developers
23 behaving properly? You do not have any systematic
24 ability to impose --

25 A. Yeah, to the extent -- like we require people to not

1 commit murder, to obey the law, but they do it in part
2 because they think they will get caught and thrown in
3 jail.

4 Q. If we -- sorry, I do not mean to interrupt you.

5 A. Yeah, that is it.

6 Q. If we are contrasting the IDFA aspect with a non-IDFA
7 aspect, for IDFA, the OS controls whether or not the
8 developer can get it. That is within your control.

9 A. That is correct.

10 Q. That is yea or nay, but for the broader behaviour, it is
11 an honour system, if I can put it that way. There are
12 other --

13 A. With teeth, yes.

14 Q. There are broader penalties that are available, but the
15 OS does not control whether or not --

16 A. That is correct. There was no way to make the OS
17 control this, yes. We had to use the other layers of
18 our defence in depth to make that protection.

19 Q. Mr Federighi, Apple's introduction of app tracking
20 transparency was not unambiguously good for iOS Device
21 users, was it? I wanted to show you what the UK CMA
22 said about that.

23 A. Okay.

24 Q. It is {AB6/35/1} and it should be 22 of your hard copy
25 bundle, and I have page 1, but I think that might be

1 a mistake. That is the cover page. This is an appendix
2 to the report I showed you earlier. I showed you the
3 Mobile Ecosystems Market Study, do you remember that?

4 A. Yes.

5 Q. This is one of the appendices to that, appendix J.

6 A. Okay.

7 Q. It concerns Apple and Google's privacy changes, and you
8 see paragraph 2, first bullet:

9 "Apple's App Tracking Transparency".

10 So it was one of the things that the CMA considered.
11 If you go to paragraph 185 {AB6/35/58} of the electronic
12 document, and it should be page 8 of your hard copy.

13 A. Okay.

14 Q. What we see is the CMA concluded that they were
15 concerned that:

16 "... Apple's current implementation of ATT..."

17 Which is app tracking transparency, yes?

18 A. Yes, I see that.

19 Q. "... is likely to result in harm to competition, make it
20 harder for app developers to find customers and to
21 monetise their apps, and ultimately harm consumers by
22 increasing the prices or reducing the quality and
23 variety of apps available to them."

24 Yes?

25 A. That is a striking conclusion.

1 Q. So even if ATT protected users' privacy, it may have
2 cost them money, according to the CMA, yes?

3 A. I cannot vouch for the CMA, but I find that to be
4 an appalling conclusion.

5 MR KENNEDY: Sir, that concludes the open section.

6 (Confidential section removed)

7 (Return to open court)

8 Re-examination by MR KENNELLY (continued)

9 MR KENNELLY: Mr Federighi, can we go back again in the
10 transcript to [draft] page 25, line 20. It was put to
11 you by my learned friend:

12 "... it is an overstatement to suggest that the
13 breadth and level of sensitivity of information stored
14 on an iOS Device typically far exceeds that of an
15 [iPhone] Device..."

16 You say:

17 "... I think that really depends on what
18 the attacker is after..."

19 You give an answer by reference to nation-state
20 attackers, do you see that?

21 A. Yes.

22 Q. It is put to you then over the page, [draft] line 6, by
23 reference to your statement that nation-state attacks
24 only affect a tiny fraction of individuals, do you see
25 that?

1 A. Yes, I do.

2 Q. This is not on the transcript, but at that point I saw
3 you raise your hand to say something.

4 A. Yeah.

5 Q. Do you have anything you wish to add?

6 A. Yeah, what I wanted to say was this -- I described how
7 location information was of use to these nation-state
8 attackers. It is also of tremendous commercial
9 interest, more broadly, and in fact we have seen on our
10 platform and on other platforms how -- and you can read
11 about it in the news -- how developers attempt to
12 track -- to do different schemes, to track users'
13 locations continuously, use that to build profiles on
14 those users, and then use it to market them, if they are
15 semi-legitimate, or to blackmail them if they are not
16 legitimate. That is not just a nation-state concern,
17 that is a broad malware concern that is unique to iOS
18 versus the Mac.

19 Q. Thank you, Mr Federighi.

20 Finally, can we go, please, to the CMA final report
21 again, {AB6/35/58}, paragraph 185.

22 A. I do not have a tab --

23 Q. I do not know which tab this is on your hard copy
24 bundle. I may be helped by my learned friend.

25 MR KENNEDY: Tab 22, Mr Federighi, and it is internal page 8

1 in the handwritten numbers.

2 A. I am there, thank you.

3 MR KENNELLY: Do you see paragraph 185?

4 A. I do, yes.

5 Q. When you read this paragraph of the CMA's report, you
6 said that you found that to be an appalling conclusion.

7 A. Yes.

8 Q. May I ask you why?

9 A. So ATT is designed to put users in control of whether
10 they wish to be tracked across apps, so I am dealing
11 with -- I am reading The Times. Do I expect that things
12 about what I have done on The Times are handed to Meta
13 or are -- contributed to a general profile about me that
14 hotel knows about, or all of these different things.

15 The idea that users should not have control over
16 whether they are tracked, because, gosh, if we just
17 spied on users enough, we might be able to put
18 attractive app offers in front of them that they did not
19 want, based on information they did not want to reveal,
20 I mean, yeah, I guess you could say somebody would love
21 to put that targeted advertisement on you based on
22 something you read that you did not think anyone was
23 watching you read, but that seems like turning the
24 ethics upside down on this.

25 I think the greater concern is respecting users,

1 respecting their control over their own privacy, and the
2 idea that, well, would that not be commercially
3 interesting to spy on people in order to present them
4 with offers, I find appalling.

5 MR KENNELLY: Thank you, Mr Federighi. I have no
6 further ...

7 Questions by THE TRIBUNAL

8 THE CHAIRMAN: Mr Federighi, I have one question. I have a
9 line of questions to ask you about a topic, and it comes
10 back to something that Dr Bishop asked you about a bit
11 earlier, about the DMA, and where we are.

12 A. Yes.

13 THE CHAIRMAN: We do not have very much information about,
14 at least as far as I have been able to see, about where
15 we are at the moment with that.

16 A. For sure.

17 THE CHAIRMAN: I appreciate what you said to Dr Bishop, but
18 I just wondered if I can explore with you your
19 understanding of the current position.

20 A. Yes.

21 THE CHAIRMAN: Just a few things, just to make sure I have
22 them right. As I understand it, that came into effect,
23 the commission requirements came into effect from March
24 2024; is that correct?

25 A. That is correct.

1 THE CHAIRMAN: So there has been nine months of experience
2 since then.

3 A. Yes.

4 THE CHAIRMAN: About nine months. Can you tell us what has
5 actually happened in terms of things like, is there
6 an alternative App Store in existence, are there
7 third-party payment providers -- Mr Kennelly, I see you
8 are...

9 MR KENNELLY: I am so sorry, sir. The answer to this
10 question may need to go back into private.

11 THE CHAIRMAN: I see, okay.

12 MR KENNELLY: Because I thought the Tribunal -- been
13 chopping and changing --

14 THE CHAIRMAN: That is entirely fair and I had not thought
15 about that. That is my fault.

16 I suppose I am really asking you -- I think I am
17 asking you about things which --

18 A. Are publicly known.

19 THE CHAIRMAN: -- ought to be matters of public record. Are
20 you able to answer that question without getting into
21 things which are not in the public domain?

22 A. Right, I think I can restrict myself to information that
23 is in the public domain, such as the existence of
24 publicly available marketplaces in Europe.

25 THE CHAIRMAN: Yes.

1 A. I must say, I am not -- I do not operate that function
2 that authorises the marketplaces, so my access to that
3 information is somewhat stale, but there are several
4 marketplaces that launched. It took a while for --
5 after March for them to kind of do their technical work
6 and their business work and launch their marketplaces.

7 There is one by Epic Games, for instance, where they
8 sell the game Fortnite and make it available in Europe,
9 for instance, through their marketplace. There are
10 several others.

11 Many of the largest players that we ultimately would
12 expect to be interested in such distribution, you know,
13 some of the largest companies in the world in the
14 industry, have sat it out for now, for reasons
15 I probably do not want to speculate on on the stand, but
16 I can say that those are not probably representative
17 ultimately what will happen.

18 So the world, as we envision it coming to be, is
19 that when a large developer like that finally does make
20 the move into creating a marketplace, they control apps.
21 Just take an example of an app that I suspect many of
22 you here in the UK have on your Device, like WhatsApp,
23 let us say, as a messaging app.

24 If that app becomes exclusively available on their
25 marketplace, they create a marketplace and then to

1 create interest in that marketplace, they say: you have
2 to get WhatsApp here. Or if Microsoft says: if you want
3 to get Microsoft Office, Microsoft Word, Microsoft
4 Excel, we are moving that, that is only available in
5 this marketplace; the dynamics of the market will change
6 considerably, where most of you, if you were in the EU,
7 would find that if you want to get the app, you have to
8 go to these alternative marketplaces.

9 As that begins to normalise, we expect both the
10 customer experience to erode, but also the normalisation
11 of what we would call sideloading, loading from
12 alternate sources will begin to create the environment
13 where attackers will begin to make their way.

14 But I think what we see in this kind of business is
15 it is a little bit like outbreaks of pandemics. You
16 know, if you stop vaccinating children, you do not say:
17 well, it has been a couple months since we stopped
18 vaccinating children, how is the outbreak? It is that
19 the conditions take a while to set the stage, and then
20 as something begins to get hold, the outbreak occurs and
21 then economically these attackers start to build
22 a business out of it. Once they have a blood supply of
23 a business they can make out of it, it is very, very
24 hard to shut down, and Microsoft and Google have
25 suffered with this for over a decade, because once it

1 takes root, it is very hard to stop.

2 But the pandemic has not yet started in the EU.

3 THE CHAIRMAN: Yes, and so am I right in thinking that --
4 and again, I do not want you to stray into anything you
5 feel is not at least reasonably apparent in the public
6 domain.

7 A. Yes.

8 THE CHAIRMAN: In terms of the volumes of people who might
9 be using, for example, the Epic Games, the alternative
10 platforms at the moment, is there any information
11 available about how many users there are who have
12 actually accessed those --

13 A. I honestly do not know whether -- we would not be the
14 one to publish that information publicly. I do not know
15 whether Epic has, or whether it has been made public.
16 It is -- I mean, I will just say it is some, but it has
17 not taken Europe by storm.

18 THE CHAIRMAN: Yes, so I think your point is that we are not
19 at the stage, because there are not necessarily very
20 many people who have tried it, and because therefore
21 there is not an economic incentive for the bad actors.

22 A. That is right.

23 THE CHAIRMAN: There is not really a lot of evidence at the
24 moment that tells us what the full consequence from a
25 security --

1 A. Exactly.

2 THE CHAIRMAN: That is the point you are making?

3 A. Exactly.

4 THE CHAIRMAN: Yes, okay. Thank you.

5 Is there anything arising out of that anybody wants
6 to ask about?

7 In that case, Mr Federighi, we have finished with
8 you. Thank you very much for your evidence and you are
9 released.

10 THE WITNESS: Thank you very much.

11 (The witness withdrew).

12 MS DEMETRIOU: May I raise just one point before my learned
13 friends call Mr Howell. It is a point which emerged, we
14 think, from Mr Kennedy's cross-examination of
15 Mr Federighi, and it relates to the counterfactual.

16 So we have been very unclear on our side of the
17 court on what is precisely the counterfactual that is
18 alleged by Dr Kent. Could I just show you, first of
19 all, the pleading, the pleaded case on the
20 counterfactual?

21 THE CHAIRMAN: Yes.

22 MS DEMETRIOU: That is at {A1/1/34}. Here you have the
23 pleading as to the relevant counterfactual, and you see
24 in the first subparagraph that it is alleged that the
25 distribution market would have developed as

1 a competitive market:

2 "In particular..."

3 So there is some particularisation, and it says
4 that:

5 "... at least some iOS App developers would have
6 made iOS Apps available for direct download by iOS
7 Device users directly from their websites (just as Mac
8 users can download MacOS apps to their Apple personal
9 computer by direct downloads from a developer's
10 website..."

11 So this is the extent of the pleading on the
12 counterfactual, and there was nothing on the
13 counterfactual in my learned friend's skeleton argument,
14 so we have been rather shooting in the dark as to what
15 is the counterfactual that is being alleged by Dr Kent.
16 Obviously it is an important matter because it is
17 critical to identify the counterfactual in order to
18 assess whether or not there is any appreciable
19 restriction of competition.

20 In Mr Kennedy's cross-examination, we think he did,
21 at least as regards privacy and security, identify
22 Dr Kent's counterfactual, and can I just go to the
23 transcript, page -- if we could take it probably quite
24 shortly from -- he said this a number of times, but we
25 can look maybe at [draft] page 92.

1 THE CHAIRMAN: This is the hypothetical?

2 MS DEMETRIOU: The hypothetical. So he said at the bottom
3 of the page:

4 "If we come back to our premise, which is
5 decentralised distribution in the United Kingdom, full
6 App Review against the full set of guidelines and Apple
7 code signing --"

8 He said a number of times: this is our premise. You
9 see it, I think on the next page, or [draft] page 95, we
10 see another example, the same hypothesis, you can see at
11 the top.

12 If we go to [draft] page 102, line 9, again:

13 "On the hypothesis that we have been considering,
14 there is full App Review of every app --"

15 Really, the question we have is: is this -- could
16 Dr Kent's team confirm that this is the counterfactual
17 they are running in these proceedings, because if the
18 answer to that is yes, and that is what we take on our
19 side of the court from Mr Kennedy's cross-examination,
20 then it is considerably going to narrow the issues
21 between the experts in this trial, both, I apprehend,
22 when it comes to Dr Singer and Dr Lee.

23 So it would be very useful to -- for my learned
24 friends now to nail their colours to the mast, which we
25 say should have been done much earlier, but this may be

1 an opportunity for them to do so, and as I say, it
2 would, I think, assist in the effective case management
3 of this trial going forwards.

4 THE CHAIRMAN: Yes. One of the things I think about the
5 counterfactual for this purpose is -- two things,
6 really. One is -- and I suspect this is what somebody
7 is going to say -- I do not know who is going to stand
8 up and deal with this.

9 MR HOSKINS: It depends on what you say, sir.

10 THE CHAIRMAN: It depends on what I say. Some of this is
11 really a little bit dependent how the evidence comes
12 out, is it not, and one can see why, exploring some of
13 the things that Mr Kennedy has been exploring, has led
14 to perhaps, I do not know, different views, certainly
15 views about what might or might not be -- some of it is
16 actually about Apple's incentives, and some of it is
17 about technical possibilities. That is, I suppose, the
18 first point.

19 The second point is that in the nature of these
20 counterfactuals, there is a danger, is there not, of
21 over-precision, and I am not pushing back, and we will
22 see what they have to say, but the point I am just
23 making is -- just to test with you, is that it might not
24 be very helpful to restrict the experts, or at least to
25 indicate any restriction of experts, because it may well

1 be that the counterfactual does not completely settle
2 until we have had the expert evidence. Does that make
3 sense? So there is a bit of chicken and egg here. Does
4 that make sense? Do you see what I am saying?

5 MS DEMETRIOU: Sir, I see what you are saying, but to that,
6 I would say, that it is of course Dr Kent's case to
7 prove. It was incumbent on them, we say, to plead
8 a counterfactual which they did but with no real degree
9 of particularity. Of course they need to put their case
10 to our witnesses, and the case that we apprehend they
11 have put is this case of -- that Mr Kennedy explained,
12 which involves App Review by Apple. So if that is their
13 case on the counterfactual, that would considerably
14 simplify things going forward because we would know what
15 their case was and it would narrow the issues.
16 Of course --

17 THE CHAIRMAN: Yes, so you say there are -- there are still
18 some permutations, are there not, because there could be
19 an App Store that was on the App Store -- a marketplace
20 on the App Store, it could be a website, it could be
21 an App Store somewhere else -- I suppose it would be
22 a website in that case. But you are saying that if we
23 know that the case is always -- whatever the
24 configuration is, there will always be an App Review,
25 that is the proposal.

1 MS DEMETRIOU: By Apple. That seems to be the
2 counterfactual. That was the counterfactual we
3 understood Mr Kennedy to be putting to Mr Federighi. We
4 did not understand him to be putting any other
5 permutation.

6 THE CHAIRMAN: So then you are saying you do not have to
7 bother the experts about the incentives of other
8 developers or other marketplaces to conduct their own
9 review.

10 MS DEMETRIOU: Exactly.

11 THE CHAIRMAN: I do think that Mr Kennedy did put the
12 revised DPLA, the DMA version (inaudible) which has
13 those contractual restrictions in about material as
14 well. I cannot remember whether any of those
15 restrictions were actually about review, as opposed to
16 hoarding.

17 MS DEMETRIOU: Sir, we understood the counterfactual that
18 he put to be the one that I showed you. It comes up at
19 various points, and my only point now is that it would
20 be desirable, we say, for that to be clarified, so that
21 we all know where we stand in terms of the case that we
22 are facing going forward.

23 THE CHAIRMAN: Yes. Let us see what the answer to that is.

24 MR HOSKINS: We are not seeking to identify one true
25 counterfactual at this stage. Mr Kennedy was exploring

1 issues that primarily go to objective justification, and
2 was exploring various elements of that, and obviously
3 the relevance of that relates to proportionality and
4 necessity. What could Apple do, and what effect would
5 that have on security? That is one aspect of the case.

6 You have seen in Apple's skeleton, they tend to
7 conflate the counterfactual, because there is obviously
8 a question of the competitive counterfactual, and then
9 there is this question of objective justification, what
10 is proportionate, and they are not necessarily the same
11 question.

12 In relation to the competitive counterfactual, which
13 is a distinct issue, there may be overlap, I accept
14 that, but they are not exactly the same thing.

15 Sir, as you suggested, our position is absolutely
16 that that competitive counterfactual needs to be left
17 open so that we can hear the evidence on it. We have
18 started to hear the evidence and we will hear more, but
19 more importantly, the Tribunal's hands should not be
20 tied on that. To say that a claimant in our position in
21 a case of this complexity has to plead one
22 counterfactual and stick to it throughout the trial is
23 just unrealistic.

24 Indeed, if Apple had real concerns about this and
25 wanted to nail it down, they could have sent an RFI at

1 any stage and they have not. So to pop up during the
2 trial and try and tie our hands in this way, we suggest
3 is inappropriate. It has to be left open in light of
4 the evidence.

5 THE CHAIRMAN: I think the answer is no, at least
6 voluntarily, Ms Demetriou, so I am not sure where you
7 want to go with that.

8 MS DEMETRIOU: Well, sir, so be it. The marker that we lay
9 down is that we have heard the factual evidence, and
10 of course I take my learned friend's point that they do
11 not necessarily have to be tied down to one
12 counterfactual, but certainly every counterfactual they
13 want to keep in play had to have been put to our
14 witnesses, so we will put the marker down and leave it
15 there.

16 THE CHAIRMAN: Thank you. Then we will see what happens.

17 Shall we -- sorry, Mr Hoskins, I was going to say
18 shall we take our break now to avoid -- I suppose it is
19 a little bit early, but it might be convenient to avoid
20 disruption so why do not we take ten minutes. It is
21 Mr Howell?

22 MR HOSKINS: Mr Howell.

23 THE CHAIRMAN: We will get Mr Howell into the witness box
24 and start again at 3.05.

25 (2.56 pm)

1 (A short break)

2 (3.08 pm)

3 MR HOSKINS: I would like to call Mr Howell, who is already
4 in the box.

5 THE CHAIRMAN: We need to swear him.

6 MR DAVID HOWELL (affirmed)

7 Examination-in-chief by MR HOSKINS

8 THE CHAIRMAN: Mr Hoskins is going to ask you some
9 questions.

10 MR HOSKINS: The first document you should have in the black
11 folder should be the report of David S Howell, dated
12 14 May 2024.

13 A. Yes.

14 Q. Can we go, please, to {C2/4/115}. Is that your
15 signature?

16 A. Yes, it is.

17 Q. Is this your first report in these proceedings?

18 A. It is.

19 Q. If we can go to the second document, which is {C2/12/1},
20 it should be the reply report of David S Howell dated
21 13 September 2024. Do you have that?

22 A. Yes.

23 Q. Can we go to {C2/12/13}, please. Is that your
24 signature?

25 A. Is It is.

1 Q. Is this the second report in these proceedings that you
2 have made?

3 A. Yes.

4 Q. Can you confirm that these reports set out your expert
5 opinion?

6 A. Yes.

7 Q. Can you confirm that insofar as the facts set out in
8 these reports are within your own knowledge, are those
9 facts true?

10 A. Yes.

11 MR HOSKINS: There will be some questions now from Apple.

12 Cross-examination by MS DEMETRIOU

13 MS DEMETRIOU: Good afternoon, Mr Howell. I am going to ask
14 you questions about some areas of your report, and then
15 I am going to hand over at some point to Mr Kennelly,
16 who will ask you about other areas.

17 You have professional experience in the fields of
18 software engineering and mobile app design and
19 development, correct?

20 A. Yes.

21 Q. If we look at your CV attached to your report, and the
22 soft copy of that is at {C2/4/93}, I do not have -- I do
23 not know if you can find that easily in your hard copy.
24 It will come up on the screen.

25 A. I have it. It starts on page 92 {C2/4/93} for me.

1 Q. Oh, thank you. So if we go to page 93, we see that you
2 were founder and CEO of a company called Avatron,
3 correct?

4 A. That is true.

5 Q. You explain here that this was a bootstrapped company,
6 and by that I think you mean that the company did not
7 start off with much capital, but as you explain here, it
8 was funded entirely by app sales, correct?

9 A. That is true.

10 Q. We can see from your CV that Avatron sold \$14 million
11 worth of apps to 3 million consumers, correct?

12 A. Approximately.

13 Q. That is an achievement, is it not, starting with no
14 funds, that is a significant achievement?

15 A. Yes.

16 Q. A successful company?

17 A. I mean, it does not exist now, so -- it was highly
18 successful in its day.

19 Q. Now, two of the apps Avatron developed were Air Display
20 and Air Sharing, correct?

21 A. True.

22 Q. A consumer can use Air Display to put what is on their
23 MacBook screen on to an iPad or iPhone screen, correct?

24 A. Yes, or to use it as a secondary monitor.

25 Q. A secondary monitor. For iOS?

- 1 A. For iOS, Android, Mac or PC.
- 2 Q. Air Sharing was a document-viewing app for iOS, was it
3 not?
- 4 A. Yes.
- 5 Q. Okay, so one of the topics I think I want to start with
6 in your report is you look at the difference between web
7 apps and native apps. Do you remember that?
- 8 A. Yes.
- 9 Q. Your essential point, I think, if I can attempt to
10 summarise it, is that there are several features that
11 distinguish native apps from web apps, correct?
- 12 A. Yes.
- 13 Q. Both in terms of how they are developed, and in terms of
14 their functionality from a user perspective, yes?
- 15 A. Yes.
- 16 Q. If we turn to your first report at paragraph 34, so that
17 is at {C2/4/17}, do you have that?
- 18 A. I do.
- 19 Q. This paragraph is dealing, is it not, with difference in
20 functionality between native and web apps, yes?
- 21 A. Yes.
- 22 Q. Looking at 34.2, the point that you make here is that
23 native apps generally offer superior performance and
24 functionality than web apps, correct?
- 25 A. Yes.

1 Q. You make some numbered points within paragraph 34.2, and
2 can we go over the page {C2/4/18}, please, and you see
3 at the top of the page you have (ii), so the second
4 subpoint, you say that one of the reasons for this is
5 that "native apps are able to integrate with more of
6 a Device's hardware and software features and thereby
7 offer users more sophisticated functionality", correct?

8 A. Correct.

9 Q. Could you just give me an example of how an app might
10 integrate with a Device's hardware and software
11 features?

12 A. In our Air Display app, to use an example, we use
13 frameworks that are part of Apple's software development
14 kit, that allow us to connect to nearby Devices, that
15 would not have been possible from a web app.

16 Q. I see, so you are in a sense leveraging the Device? The
17 app is to do with the use of the Device?

18 A. Yes.

19 Q. Would another example be an app which uses a camera, for
20 example, on the Device? Would that be an example of
21 what you say here, which is integrating a Device's
22 hardware?

23 A. Yes.

24 Q. Would you agree that improvements to a Device's hardware
25 and software could lead to improvements in an app?

1 A. Yes.

2 Q. Your next point is that "native apps are generally
3 written using Apple's proprietary software tools,
4 libraries and frameworks", and that this enhances
5 development of efficiency and app quality, as compared
6 with web apps, yes?

7 A. Yes.

8 Q. You have a footnote here, and I just want to look at the
9 footnote. You say -- you refer to Mr Schiller's witness
10 statement, and then you say that Apple provides -- you
11 give examples of APIs that Apple provides, going beyond
12 the examples that Mr Schiller gave, yes?

13 A. Yes; yes.

14 Q. If we look at the final sentence of the footnote, you
15 say:

16 "These capabilities ..."

17 So these capabilities arising from the frameworks
18 and APIs and so on.

19 "... allow iOS App developers to create more
20 sophisticated, responsive, and efficient apps, offering
21 user experiences that web apps cannot replicate."

22 Yes?

23 A. Yes.

24 Q. I want to understand what you mean by that, so let us
25 take one of your examples. One of the examples you give

1 is Core ML, which is, as you say there in brackets,
2 machine learning. Am I right to think that that allows
3 a developer to integrate a machine learning model into
4 their app?

5 A. Yes.

6 Q. Could you give the Tribunal an example of a type of app
7 that might use Core ML?

8 A. An app could learn patterns of user behaviour, or could
9 analyse images from a camera to recognise objects. It
10 could -- well, to use one example, an app could
11 recognise objects in the camera's view.

12 Q. So, for example, I have an app on my phone that I can
13 point at a flower, and it will tell me what the species
14 of flower is. Would that be an example of an app that
15 might use -- incorporate machine learning?

16 A. Yes.

17 Q. So an app developer would likely use Core ML?

18 A. Well, they could. It is also possible to send an image
19 to the Cloud, and have the Cloud processor do the
20 machine learning, and then return an answer, whether it
21 is a classification, or some characteristic about the
22 flower, such as the species.

23 Q. If that happened, the developer would need to use some
24 sort of API to -- in order for the app to function on
25 iOS, yes?

1 A. Yes.

2 Q. Why do you say -- could you just explain why you say in
3 your witness statement that Core ML allows the developer
4 to create a more -- so Core ML, for example, just
5 focusing on this example because you give a number of
6 examples, so why do you say that Core ML might allow
7 a developer to create a more sophisticated app than they
8 would be able to do if they were developing a web app?

9 A. Well, the primary answer there is that I am listing
10 a number of frameworks and a number of advantages.
11 I did not mean to say that every one of those frameworks
12 got every one of those advantages. So the actual
13 processing and machine learning classification might be
14 the same, whether done on the Cloud or native.

15 The real advantage is responsiveness and efficiency.
16 You do not have the delay and latency of sending images
17 to the Cloud and waiting for a response, and requiring
18 an active internet connection. It all can be done
19 natively on the application.

20 Q. Thank you. You also mention in your footnote ARKit, and
21 that is an augmented reality framework provided by
22 Apple, yes?

23 A. Yes.

24 Q. I imagine that you might be familiar with Pokémon GO?

25 A. Yes.

1 Q. Are you aware that that had an augmented -- or it had an
2 augmented reality feature?

3 A. Yes.

4 Q. I am just going to ask for this document to come up on
5 the screen, {D1/486.1/1}. This is a press release by
6 Niantic, the developer of Pokémon GO. You can see the
7 heading there:

8 "The Next Evolution of Augmented Reality Games
9 Begins with Pokemon GO's New AR [plus] Mode Exclusively
10 on iPhone and iPad".

11 Then the next heading:

12 "Enhanced Augmented Reality Experience Leverages
13 Apple's ARKit to Create Dynamic Gameplay Based on Real
14 World Surroundings, Scale and Proximity".

15 Then I just ask you to read a little bit further
16 down, it says -- so in the first paragraph, at the end
17 of that:

18 "The new AR [plus] feature builds on core AR
19 gameplay in Pokemon GO and leverages Apple's ARKit
20 framework to enhance the visuals and dynamics of
21 catching Pokemon in the real world.

22 "After activating the new AR [plus] feature in
23 encounter mode, individual Pokemon will be more
24 accurately positioned based on their surroundings and
25 environment thanks to the six degrees of freedom the

1 technology provides. By utilizing ARKit's advanced 3D AR
2 scaling, a Pokemon's size will be more accurately based
3 on the world around them, changing in perspective and
4 size as Trainers move closer or further away."

5 So it is clear -- just a couple of questions about
6 your understanding of this. It is clear, is it not,
7 that the developer here has used Apple's proprietary
8 technology?

9 A. Yes.

10 Q. It has used ARKit to produce a new AR plus mode,
11 correct?

12 A. Mode?

13 Q. A new -- it says in the headline --

14 A. Oh.

15 Q. -- "New AR [plus] Mode Exclusively on iPhone and iPad"?

16 A. Yes.

17 Q. What it is doing in this press release is telling
18 everyone that the AR plus mode is an improvement on the
19 previous AR mode, do you see that?

20 A. I do.

21 Q. Because it enhances the visuals, and you can go through
22 the various improvements, it more accurately positions
23 the Pokémon based on their surroundings, and then it
24 talks about the six degrees of freedom the technology
25 provides. Do you know what that is referring to?

1 A. Yes.

2 Q. Could you just briefly explain what your understanding
3 of that is?

4 A. Yeah. You know, with the camera you have yaw, pitch,
5 roll, and then you have angle and different positions
6 for the camera.

7 Q. So how might that enhance the game?

8 A. Well, as a user moves around and changes the view, the
9 Pokémon will stay in the right position, the right size
10 and orientation.

11 Q. Thank you. By this press release, the developer is
12 publicising those improvements, yes?

13 A. Yes.

14 Q. Presumably that is because publicising these
15 improvements will attract more customers and more use of
16 its game, yes?

17 A. That makes sense.

18 Q. Therefore more money for the developer?

19 A. Yes.

20 Q. Going back to the footnote in your report that we were
21 looking at, so {C2/4/18}, you have here pointed out
22 a number of examples of software frameworks and APIs
23 which are of assistance to developers, and it is right,
24 is it not, that these frameworks, ARKit, Core ML, are
25 frequently improved and updated by Apple?

1 A. Yes.

2 Q. Apple -- were you aware that Apple -- you must be aware
3 that Apple developed a Lidar scanner?

4 A. Yes.

5 Q. That enhanced ARKit, correct? So there is often
6 an interplay between the technologies that Apple
7 develops?

8 A. Between the hardware and --

9 Q. Yes.

10 A. Yes.

11 Q. It is right, is it not, that Apple was constantly
12 improving the Devices themselves, so each time an iPhone
13 is released, it will have improved features, yes?

14 A. Yes.

15 Q. I want to show you a 2014 article, written about Apple's
16 worldwide developer conference which took place that
17 year. It is at {D1/279.1/1}. It says this, if we can
18 scroll down, please, so I can see the text. Scroll up,
19 maybe. It says here, let me find the relevant part, can
20 we go over the page {D1/279.1/2}. If we go down to the
21 second paragraph:

22 "Much of Apple's new-found friendliness ..."

23 Do you see that?

24 A. Yes.

25 Q. "Much of Apple's new-found friendliness is being

1 lavished upon the developers who write the software that
2 helps make iPhones, iPads and Macs be such wonderful
3 machines.

4 "'I believe this developer friendliness is just
5 a natural progression -- as you get a larger and larger
6 developer community, you need to listen to them
7 more'..."

8 We see that that is -- Mr Narayan made that comment.

9 We see their next reference to:

10 "... 4,000 new APIs and more hand-holding than ever,
11 it's difficult to think of a time when Apple has been
12 more developer-centric."

13 Then the article attributes the following comment to
14 you:

15 "'I get the feeling somebody at Apple was given a
16 mandate to compile a massive list of developers'
17 enhancement requests and complaints, and to architect
18 an effective response to most of these issues,' says
19 Dave Howell, founder and CEO of Avatron Software and
20 former software engineering manager in Apple's
21 Applications division."

22 Do you remember giving that comment?

23 A. I do not actually remember this conversation with the
24 author for Cult of Mac. It does sound like my voice.
25 I am not sure I was talking about that WWDC. If it is

1 the conversation I am vaguely remembering, there is
2 a conversation about the history of WWDCs, and when big
3 changes came. I think I may have been talking about the
4 1994 WWDC, when there was a big return to publishing new
5 developer documentation and entertainment at the WWDC
6 and new APIs, but --

7 Q. This is -- sorry, I did not mean to cut across you. You
8 carry on.

9 A. I mean, I may have been talking about that WWDC, but
10 I actually do not remember the particular things that
11 came out that year.

12 Q. Would you agree with me that when Apple -- you do agree
13 with what you say here, which is that when Apple
14 develops its technology, such as the frameworks and
15 APIs, it is highly responsive to the requirements of
16 developers?

17 A. To a large degree, yeah.

18 Q. I want to look at an interview, a report of an interview
19 that you gave a few months ago in July of last year, so
20 it is at {D1/282.1}. This article explains your
21 background in the first paragraph, do you see that?

22 A. Did you say it happened this year?

23 Q. Oh, sorry, I got the date wrong. It is 2014, you are
24 quite right.

25 A. I look much younger.

1 Q. It is true. We all looked much younger, Mr Howell, in
2 2014. Yes, my mistake.

3 The article explains your background in the first
4 paragraph, and then attributes the following to you, so
5 it says -- you said there:

6 "'The iPhone SDK had just launched, and it created
7 this opportunity to make small, powerful apps. They
8 were fully self-contained, and smaller projects then
9 would've been on Mac or PC. It was really appealing to
10 solve a small problem incredibly well, instead of doing
11 a B plus job on a vast or complicated project,' Howell
12 said. 'I always wanted to form a company to create
13 software, but when I started, you needed a larger
14 company. The ecosystem Apple created with the iPhone
15 made it possible for a small company to thrive.'"

16 So you mentioned there that the iPhone SDK had just
17 launched, so we are talking about 2008, correct?

18 A. Yes.

19 Q. Which is the time you founded Avatron?

20 A. True.

21 Q. Looking at the points that you make there, so you say
22 the iPhone SDK created the opportunity to make small and
23 powerful apps and do it incredibly well, and you also
24 say that the iPhone ecosystem made it possible for
25 a small company to thrive. So Avatron would have been

1 an example of such a small company that you are talking
2 about there?

3 A. Yes, it was.

4 Q. By ecosystem, just so I understand, you are referring
5 collectively to the products and services that Apple
6 provides, including the hardware and iOS?

7 A. I may have been. I think I was probably just talking
8 about the App Store, but I may have been talking about,
9 you know, a world where people buy apps remotely.

10 Q. You say there:

11 "... The ecosystem Apple created with the iPhone
12 made it possible for a small company to thrive."

13 So you certainly would have been talking about the
14 frameworks for developers and APIs that we have just
15 been discussing, yes?

16 A. No, not necessarily, because, you know, we had used
17 these frameworks to make software long before the
18 iPhone. We made Mac apps using frameworks and APIs that
19 Apple made. What I am referring to in this is that
20 before the internet and before cell phones that could
21 run apps, we had to ship CD ROMs or diskettes or DVDs.
22 There was one product I made that had 17 CD ROMs, and it
23 was very expensive to make that kind of thing, and I did
24 not have the confidence before that to build a company
25 where there was a physical product to make.

1 Q. All right, so taking this in stages, the Air Sharing and
2 Air Display apps that Avatron created were designed to
3 enhance a consumer's use of Apple Devices, yes?

4 A. Yes.

5 Q. So to that extent, Apple's ecosystem, the hardware, made
6 it possible for Avatron to produce its product, yes?

7 A. Yes.

8 Q. To state the obvious, the Devices were essential to
9 Avatron's apps?

10 A. Yes.

11 Q. It is right, is it not, that going back to what you said
12 previously about all of these APIs and frameworks, they
13 created a position whereby small companies like Avatron
14 did not have to invest as much in software engineering,
15 because a lot of the work had been done by Apple?

16 A. Not so much the frameworks, because again, those existed
17 before the iPhone. It is -- the basis of all software
18 development is frameworks made by operating system
19 makers. But the delivery system is really what I am
20 referring to. The fact that we can sell a product that
21 gets marketed in a store -- I did not need a marketing
22 team or production staff or any investment in media
23 production.

24 Q. Yes. So that was -- so those were helpful -- so those
25 are helpful points that you are highlighting, that it

1 helped with marketing, because there was a store and
2 investment in marketing that you did not need to
3 replicate at a small company, is that what you are
4 saying?

5 A. Yes, and that was -- it was more true then than it is
6 now, but it certainly was a factor that an app could be
7 marketed through this online marketplace.

8 Q. Thinking about frameworks like ARKit, for example, the
9 existence of a framework like ARKit means that a small
10 company itself does not have to invent an augmented
11 reality framework for use on a Device, correct? That
12 work has been done?

13 A. Certainly, yes.

14 Q. That is significant work, is it not?

15 A. Yes.

16 Q. So it is right, is it not, that when Avatron developed
17 the Air Sharing and Air Display apps, it used frameworks
18 and APIs developed by Apple?

19 A. Yes, in addition to open-source frameworks, but yes.

20 Q. Do you remember which -- probably not -- but which
21 frameworks and APIs Avatron used?

22 A. For Air Sharing we used Core Graphics to display on
23 screen. We used the networking stack to talk to web --
24 file servers; and we used touch and gesture frameworks
25 to respond to user inputs, for example.

1 Q. So those are examples, they are the examples you can
2 think of right now. There may have been others?

3 A. Those were a few. There were probably dozens.

4 Q. Okay. Can we go back to your first report at {C2/4/61}.

5 I want to look at paragraph 130. Here you are
6 addressing the question -- you are talking here about
7 whether Apple's commerce engine is separate from the
8 App Store from a technical perspective. That is
9 a specific issue that Mr Kennelly will ask you about, so
10 I am not going to ask you about that particular issue,
11 but I want to look at what you say about the way that
12 Apple designs its APIs. Can I just ask you to read to
13 yourself that paragraph so you can remember it.

14 (Pause).

15 A. Yes.

16 Q. So one point that you are making here, as I understand
17 it, is that developers can use an API without doing
18 their own coding, correct?

19 A. Yes.

20 Q. So they do not even need to understand how it works from
21 a technical perspective, do they?

22 A. Often, depending on the framework, cyber security
23 framework, it is good to know how the cyber security
24 works, but in general, it hides implementation details
25 that you should not have to know about.

1 Q. Right. So the upshot of that is that a developer can
2 use Apple's frameworks, by use, to create their own iOS
3 Apps, by using very simple code, correct?

4 A. I like to think that it is not too simple, but simpler
5 than it would be without these frameworks.

6 Q. Apple provides guides to developers to explain how to do
7 this, does it not?

8 A. Yes, and online training.

9 Q. Online training, did you say?

10 A. WWDC videos, for example.

11 Q. Thank you. You say that this way of proceeding that you
12 discuss here in this paragraph, you say that that is
13 best practice for assisting developers to make apps at
14 scale; correct?

15 A. The practice of hiding implementation details, yes.

16 Q. Yes. To facilitate ongoing software maintenance?

17 A. Yes.

18 Q. To state the obvious, I think, it is helpful to
19 developers, is it not? It saves developers a lot of
20 expense?

21 A. Yes, it does.

22 Q. It opens up possibilities for developers to create apps
23 that would otherwise be impossible for them to do?

24 A. Yes.

25 Q. Just pausing here, it is different in that respect, is

1 it not, Apple's ecosystem, to PC app distribution
2 platforms such as Steam and the Epic Games Store because
3 they provide a store front, do they not?

4 A. In some cases like those, yes, although the Microsoft
5 Play Store or Google Play Store, the developers of those
6 stores also make operating systems and --

7 Q. So Google would be a closer comparator?

8 A. Yes, or Microsoft.

9 Q. But Steam and the Epic Games Store, the apps that they
10 are marketing are written to run on PCs operating mostly
11 on windows or MacOS, yes?

12 A. I do not know if that is right. I know that -- I do not
13 know whether they run on Xbox, for example, or
14 PlayStation.

15 Q. Just taking Steam and Epic Games Store, they are not
16 creating their own operating system?

17 A. No. They do offer frameworks for game development.
18 I believe Steam makes -- I forget which one. But they
19 make one of their engines for cross-platform game
20 development.

21 Q. But it would be right to say, would it not, that they do
22 not provide developers with anything like the suite of
23 tools and technology that Apple does?

24 A. I would say because they are focused on a narrower
25 subset of applications, they are just for games, they

1 only provide gaming frameworks.

2 Q. So the scope of the frameworks they provide is much,
3 much narrower?

4 A. Yes.

5 Q. Can we go to an interview that you gave to a publication
6 called CIO in 2009. That is at {D1/74.1/1}. You can
7 see the date there, so it is some time ago. We looked
8 even younger, Mr Howell, 2009. It is quite lengthy, but
9 if we go down to the very bottom of {D1/74.1/2}, we can
10 see a heading at the very bottom, do you see that:

11 "How was Air Sharing received?"

12 It is in bold type, at the very bottom of the page.

13 A. "How was Air Sharing perceived?"

14 Q. Yes, the text --

15 A. Oh, yes, "received", yes.

16 Q. I wanted you to see the heading, because we are going to
17 turn the page now, and the text under the heading
18 carries over on to the next page {D1/74.1/3}. Can
19 I just ask you to read to yourself that part until the
20 next bold heading. (Pause).

21 A. Yes.

22 Q. Going back to the success of the company, you had 20% of
23 iPhone users, so 1 million people, when at that time
24 there were only 5 million users, download Air Sharing in
25 two weeks, yes?

1 A. Yes, although there was an inaccuracy in that.
2 I realised after that interview that we were also
3 selling to iPod touch users, so it was not really 20%,
4 but it was quite a significant number.

5 Q. A significant number. You were happy with it. It was
6 successful.

7 A. Yeah.

8 Q. That was all obviously through the App Store, yes?

9 A. It was.

10 Q. It is right, is it not, that I think you say here that
11 Apple twice singled out Avatron's Air Sharing app as app
12 of the week, yes?

13 A. Yes.

14 Q. If we look at the bottom of the article, so, "Where do
15 you go from here?", so you say here:
16 "There's a couple of things."
17 I want to look at the second one. You say:
18 "Another is that we're offering something to
19 enterprises: an app building toolkit.
20 "They can deploy our app customized for their
21 company or school. They can have their own documents
22 pre-populated in the app. They can negotiate a licensing
23 agreement with us and then deploy it to their customers
24 and control how it's installed. They can create a banner
25 image and build their own version of the app."

1 So which of the apps, first of all, were you talking
2 about here?

3 A. This would have been -- if it had happened, it would
4 have been a variant of Air Sharing. We were approached
5 by the CTO of Disney about making a custom version of
6 Air Sharing, and because I was talking to CIO magazine,
7 I thought I would push that, but it never actually --

8 Q. It did not happen?

9 A. It did not happen.

10 Q. When you talk about a licensing agreement, what is it
11 that you were envisaging licensing?

12 A. So the idea was we would make a version of Air Sharing
13 customised for a company like Disney, and we would put
14 their logo on it, and they would use it for their
15 employees, and we had not exactly worked out how it
16 would be distributed. It might have been in the
17 App Store under our name -- I do not think at that time
18 there was such a thing as an enterprise App Store. We
19 would have done that if there had been, that would have
20 been perfect. So it would have been a new app with our
21 technology on it, white-labelled to a -- you know, sold
22 with somebody else's label on it.

23 Q. Thank you. When you talk about licensing, are you
24 talking about licensing your IP rights?

25 A. No, we were talking about licensing -- I mean, that

1 would have been a possibility, but what I was really
2 talking about was licensing the software itself, and the
3 rights to use it and distribute it.

4 Q. The software itself would have been protected by
5 intellectual property rights, yes?

6 A. Yes, copyright, mostly. There was no patent in it at
7 that time. Of course trade secrets.

8 Q. So you would license those rights to the customers, so
9 this was the idea, I appreciate it did not happen, but
10 you would license those rights to the customers. That
11 would enable them to customise the app and build their
12 own version so it would be a collaboration, in effect?

13 A. It would, and the idea was they would send us assets,
14 like images and texts and some rules, and we would build
15 a custom version of the app for them, and somehow
16 distribute it.

17 Q. Presumably the plan was to charge for that service, yes?

18 A. Yes.

19 Q. It is right to say, is it not, that your plan was to
20 monetise Avatron's proprietary rights; you would not
21 have given them away for free?

22 A. True.

23 Q. I want to switch to my last topic with you, before
24 handing over to Mr Kennelly, which is partly a warning
25 to him to get ready. I want to ask you, please, about

1 issue 10 in your report. Issue 10 in your report -- and
2 I appreciate there are lots of issues, so let me just
3 remind you what issue 10 was. It relates to what the
4 position might look like if there were alternative
5 distribution platforms for iOS Apps.

6 Let us pick up your first report at paragraph 109,
7 so {C2/4/50}.

8 A. Okay.

9 Q. Really, the next series of questions, Mr Howell, are
10 designed for me to try and understand what you are
11 saying, because I found some ambiguity in what you were
12 saying, so it is really just a -- some clarificatory
13 questions.

14 You say at paragraph 109 that:

15 "There is no technical limitation that would
16 prevent ... alternative distribution channels to the
17 App Store on iOS Devices in the UK. Absent the App
18 Distribution Restrictions, I would expect the
19 distribution of iOS Apps to be similar to app
20 distribution on desktop computers."

21 You then explain how distribution works on desktop
22 computers, yes?

23 A. Yes.

24 Q. The point I want to clarify, which is not clear to me
25 from the way that you have drafted this, you are

1 certainly saying, as I understand it, that from
2 a technical perspective, there would be no difference
3 between app distribution on a desktop and app
4 distribution of iOS Devices if the distribution
5 requirements were lifted, yes? So you are saying that?

6 A. I hope I did not say that quite that way. I meant that
7 there would be no significant differences. I mean, on
8 a desktop computer, I would download an installer, which
9 lives in a folder, and I double click it and none of
10 these things would happen, presumably. But it would
11 operate the same way, even though the user interactions
12 might be different in making those actions happen.

13 Q. Okay, thank you. So I think then that you are not also
14 saying that absent Apple's requirements, the
15 distribution restrictions, the mix between those
16 distribution methods would be similar for iOS Apps as it
17 is on desktop computers?

18 A. By the mix, do you mean the relative --

19 Q. Exactly. So you are not -- for example, that you would
20 have a similar proportion of iOS Apps being downloaded
21 through developer's websites as you see on desktops.
22 I think that is not the point you are making, but if it
23 is, please tell me?

24 A. It is not. I have no insight as to what those
25 relationships might be.

1 Q. Thank you. I am going to ask you the same clarificatory
2 question about the next section of your report. So if
3 we can go to 115 to 116, paragraphs 115 to 116
4 {C2/4/52}, thank you.

5 Here you say that different developers -- I am
6 looking at paragraph 115, you say:

7 "Different developers will consider different
8 factors when deciding whether to make their iOS Apps
9 available through alternative distribution channels."

10 Yes?

11 A. Yes.

12 Q. Then if we go over the page to 116 {C2/4/53}, I am
13 looking at the first two sentences. You say:

14 "As referred to above, absent the App Distribution
15 Restrictions, I would expect the distribution of iOS
16 Apps to be similar to app distribution on desktop
17 computers. Developers consider various factors when
18 deciding whether to offer a macOS app through the Mac
19 App Store or through alternative channels such as direct
20 downloading from a website, or both."

21 So again, but please correct me if I am wrong, I do
22 not think you are saying here that the profile of
23 distributions, so the mix, would be the same for iOS
24 Apps absent Apple's restrictions, as it is for desktop
25 apps?

1 A. No. I mean, I get the ambiguity now. Distribution can
2 mean the statistical make-up of a population, but
3 I really just meant the way that apps would be
4 distributed to users.

5 Q. Thank you. So I think I can take the next part quite
6 shortly. If we go back to -- if we -- yes, so I am
7 going to -- so I appreciate the limitations of what you
8 have said, but would you agree with me that if you are
9 going to be thinking about what the world would look
10 like in terms of how distribution would occur in a world
11 without Apple's distribution requirements, that a much
12 closer comparator would be the Google Play Store rather
13 than desktops?

14 A. That would entirely depend on how the alternative
15 distribution worked, and what the terms were and how
16 complicated it is to make it happen. I mean, the best
17 comparator might be the Mac, if it works similar to
18 that. If there is a lot of friction between the user
19 and the installation of an app, then it might be closer
20 to Google.

21 Q. Just thinking about using the Mac or a desktop, so Mac
22 users or desktop users are accustomed, are they not, to
23 installing apps on to their computers from sources other
24 than App Stores, so including downloading through
25 a developer's own website. That is a common phenomenon,

1 correct?

2 A. Yes, and it was the only way that we did it before the
3 Mac App Store.

4 Q. So that is an important factual difference, is it not,
5 between how people obtain apps on computers, as compared
6 to how they obtain apps on their mobile Devices?

7 A. Well, it is different than the current state on iPhone,
8 but in a counterfactual world where there had never been
9 an App Store, that would have been the only way also
10 that we installed apps, would have been direct.

11 Q. If we think about Android, which you understand that
12 Google does not impose the same requirements, so on
13 Android phones, there can be alternative App Stores and
14 there can be downloading. The very vast majority of
15 downloads go through the Google Play Store, something
16 like 90%. Did you know that?

17 A. I believe that. I think it is -- I knew that it was
18 a big majority.

19 Q. That is -- so that does signal a very big difference,
20 does it not, between the way people download apps on
21 mobile Devices and the way that they download apps on
22 computers?

23 A. It could. I am not sure if it means that exactly
24 because the devil is in the detail, right, it depends on
25 how hard it is on a platform to install, and I do not

1 know what a counterfactual world would look like.

2 Q. This is something that the CMA looked at in its market
3 study. Have you seen that document? Let us bring it
4 up. It is at {AB6/25/103}. In fact, let us start at
5 {AB6/25/1} so you can see the coversheet. Have you seen
6 this report of the CMA or read it at all?

7 A. I have. I did not read the entire thing but I looked at
8 it for points I needed to --

9 Q. I really do not blame you for not reading the entire
10 thing. If we go to {AB6/25/103}, please, and first of
11 all, here, this shows -- and the reason -- this shows
12 that the Play Store in the UK is by far the largest
13 Android App Store, and it says that it accounts for --
14 and the reason why it has got 90 to 100% in square
15 brackets is because the precise figure is confidential,
16 but it is in that range. So as you suspected, it is by
17 far the vast majority of transactions take place via the
18 Google Play Store.

19 If we look at paragraph 4.78 {AB6/25/104}, here what
20 the CMA is looking at is possible barriers to effective
21 competition faced by alternative Android App Stores. It
22 is asking itself: why is such a high proportion of
23 transactions, why do they take place via the Google Play
24 Store? You understand, I think, that Google permits
25 third-party App Stores on Android Devices, yes?

1 A. Yes.

2 Q. Also permits apps to be sideloaded, so the CMA is
3 considering what might be the reasons for such a high
4 proportion of downloads taking place via the Google Play
5 Store.

6 The first bullet point here relates to
7 pre-installation of App Stores. So it says that because
8 the Google Play Store is pre-installed, then that could
9 be a significant reason why so much traffic goes through
10 the Google Play Store. But in a counterfactual world
11 without Apple's restrictions, the same would be true,
12 correct? The App Store would be pre-installed on
13 Apple's Devices. That is a racing certainty?

14 A. It certainly could be, yes.

15 Q. Well, it is overwhelmingly likely, is it not?

16 A. I guess without that, there would not be any way to
17 install an alternative store, so it would have to be --
18 unless you can do it through the web, but let us suppose
19 that it is required.

20 Q. So we can agree on that, and then the second bullet
21 point says that the presence of indirect network effects
22 is likely to act as a barrier to entry and expansion.
23 Do you see that? I will just let you read that second
24 bullet point, Mr Howell.

25 A. Yes, I see that.

1 Q. Do you agree with that, first of all?

2 A. Yes. I mean, users who already have at least one app
3 from the main App Store would frequently go back to look
4 for updates or related apps, and that is sort of the
5 network effect I think we are talking about.

6 Q. In the same way that the Google Play Store benefits from
7 indirect network effects, the App Store would also
8 benefit from those effects, correct? In a world without
9 the distribution restrictions?

10 A. It could. I could imagine scenarios where that would
11 not be the case. If Microsoft's App Store, let us say,
12 drove virtually all iOS users to install, you know, the
13 Microsoft store, then that chicken and egg problem would
14 be resolved, at least with respect to that alternative
15 App Store.

16 Q. But that is the world that Google is already facing, is
17 it not? Because you can have third-party App Stores and
18 downloading, and yet still 90% of traffic is going
19 through the Google Play Store, so the same is
20 overwhelmingly likely to be the case, is it not, on iOS
21 with the App Store?

22 A. Right now, I believe you can get Office in Google's
23 store, I am not entirely sure about that, but I think
24 you can get it through Google Store as well. But if
25 Microsoft decided not to do that, then it could be

1 exclusively available within their own store, and then
2 the dynamics would be quite different.

3 Q. So the point that Mr Piccinin rightly is asking me to
4 put to you is that Microsoft has not decided, has it, on
5 Android to do what you are suggesting, so it still makes
6 its apps available through the Google Play Store?

7 A. Yes, I believe they do.

8 Q. So again, the overwhelming likelihood is that in a world
9 absent Apple's restrictions, Microsoft would do the same
10 thing?

11 A. They probably would.

12 Q. Then if we look at 4.79, we see here that:

13 "Samsung provided views that were consistent with
14 alternative Android app stores facing higher barriers to
15 competing. In particular, Samsung told us that its
16 approach 'reflects the difficulty of directly competing
17 against app store benefiting from first mover advantage
18 and network effects'."

19 So again Samsung is right about that, is it not?

20 A. It makes sense to me, yeah.

21 Q. The same would be a feature of the App Store without
22 restrictions, yes? The App Store would benefit from
23 first mover advantage?

24 A. Quite likely. The fact that it is installed by default
25 would be a big factor, although, you know, in the

1 Microsoft antitrust case, there was talk about requiring
2 or allowing other vendors who made Windows Devices to
3 ship with their own browser pre-installed, so you could
4 imagine on Google, anyway, that Samsung could put its
5 own store on every Device, like they did with the Bada
6 store, although ...

7 Q. Yes, and, Mr Howell, it does, I can tell you that
8 Samsung does do that. It also pre-installs its own
9 App Store, and yet despite that, we see 90% of traffic
10 going through the Google Play Store.

11 So the overall question that I am putting to you is
12 that it is right, is it not, that just thinking about
13 these points, so in a counterfactual world without the
14 restrictions, I think you have already agreed that the
15 App Store would be pre-installed and placed in
16 a prominent place on the Device. Apple has absolutely
17 no incentive to do otherwise.

18 A. I agree.

19 Q. So looking at these reasons so far that have been
20 identified by the CMA as being reasons why the Play
21 Store is used for 90% of Android app downloads, they are
22 all reasons, are they not, that would be present for the
23 App Store in a world without the restrictions?

24 A. Yes. Quite likely.

25 Q. So we can expect, can we not, that those features would

1 similarly mean that the vast majority of iOS App
2 transactions would take place through the App Store too,
3 yes?

4 A. Probably true, although I would point out that I think
5 the things you are allowed to do in an Android app,
6 I think the rules are more lenient than in the Apple
7 App Store, so if it were possible for an app to bypass
8 App Review in an alternative iOS store front, for
9 example, downloading code and running it, which you
10 cannot do now in the App Store, it would enable whole
11 new types of apps that are not currently possible, so
12 that could change the dynamic.

13 Q. So that would depend on not having App Review, on
14 bypassing App Review, is your point.

15 A. In that example, yes.

16 Q. I think, Mr Howell, the CMA then goes on to identify
17 some other Google-specific points, which, just to be
18 fair to you, I should point that out, which they say are
19 other features of Google's business model which may have
20 an impact, and because you are not familiar with this,
21 I am going to put those points to Dr Singer, who is the
22 expert economist called by Dr Kent, but -- because
23 I understand that you have not looked at this report in
24 detail; is that right? So I do not think there is any
25 point in going through those points of detail with you.

1 A. That may be true. I have read through this part that we
2 are looking at right now. I do know about --

3 Q. Okay. Let us just have a look at some of the rest of
4 it. If we go to {AB6/25/107}, we see at the top the
5 reference to "RSA 3.0", which is Google's most recent
6 revenue sharing agreement. Have you looked at that?

7 A. I think I have looked at this part of the CMA Report,
8 but I do not think that I looked at Google's revenue
9 sharing agreement.

10 Q. So are you aware that the proportion of Android Devices
11 that complied with the exclusivity obligations in the
12 revenue agreements was very, very small? Maybe that is
13 not the sort of detail you have looked at?

14 A. No, I did not see that.

15 MS DEMETRIOU: All right, that is it from me. Thank you
16 very much. I am going to hand over to Mr Kennelly.

17 Cross-examination by MR KENNELLY

18 MR KENNELLY: Good afternoon, Mr Howell.

19 A. Good afternoon.

20 Q. I will begin, if I may, with games consoles and
21 interchangeability. I will ask you to turn up, please,
22 your first report, paragraph 100, {C2/4/47}.

23 A. Okay.

24 Q. You say:

25 "... game consoles cannot be considered capable of

1 doing the same things as the App Store such as to be
2 directly 'interchangeable'."

3 You go on to give three reasons, do you see that?

4 A. Yes.

5 Q. I will take those in turn if I may. The first reason
6 you give is you say:

7 "... the same content may not be available on an iOS
8 App and the version of the app used on a games
9 console..."

10 A. Yes.

11 Q. But you accept that in some instances, a materially
12 identical game will be available through an iOS App and
13 through a game which can be played on a games console?

14 A. I would say almost never identical, but often analogous.
15 You know, they are -- one type of input Device has
16 buttons and the other one is using a touch interface, so
17 there is going to be some user interface difference
18 between the platforms, but it may be the same game with
19 some modifications.

20 Q. But you are familiar with the concept of cross-platform
21 play?

22 A. Oh yes.

23 Q. That is where players can, just for my benefit, play
24 each other simultaneously while each using a different
25 Device?

1 A. Yes.

2 Q. You are familiar with what we call cross-platform
3 progress or cross-Device progress?

4 A. Yes.

5 Q. Again just for my benefit, that is where a user can play
6 one game across multiple Devices, with the progress in
7 the game, for example, syncing across those Devices, so
8 they can pick up where they left off?

9 A. Yes.

10 Q. Those things developed because there were materially
11 identical games available to play across different
12 Devices and platforms?

13 A. I am just disagreeing with the word "identical", but the
14 same game with different modifications to adapt to
15 the --

16 Q. Materially identical, not exactly identical.

17 A. Yes.

18 Q. In your reports, you do not cite, do you, any data which
19 might show the proportion of games that are available on
20 the iOS platform as a native app, and on another
21 platform?

22 A. No, I did not.

23 Q. You do not look at any data about what the proportion
24 might be by number or value, do you?

25 A. No, I do not think that came up in this report.

1 Q. Going back to your paragraph 100, and the second reason
2 you gave, you say:

3 "... iOS Device users can use iOS Apps 'on the go'
4 while games consoles can only be used in a fixed
5 location (usually one's home)..."

6 Do you see that?

7 A. Yes.

8 Q. It is not correct that every games console can only be
9 used in a fixed location?

10 A. No, I mean you can move it. It is transportable, and
11 there are handheld gaming Devices, like the Nintendo
12 Switch or something.

13 Q. Like the Nintendo Switch. Even before Nintendo Switch,
14 since we are discussing past times, the Sony PSP, even I
15 remember the Nintendo DS?

16 A. Yes.

17 Q. So it is more accurate to say that some games consoles
18 are not portable, right?

19 A. Yes.

20 Q. Of course --

21 A. Yes.

22 Q. So portability, and the portability of a Device, will
23 obviously only matter to those consumers who want to
24 play their games on the go?

25 A. Right, and for some games it might not matter at all,

1 and for some they will.

2 Q. Even then, it really only matters to the extent that
3 they want to play games on the go?

4 A. Yes.

5 Q. Because when they are at home, they could switch between
6 the Xbox or PS5 or the iPad?

7 A. For some games. I mean, I do not think you could do
8 that with Pokémon GO, for example. It has to have
9 a camera, it has to have GPS, certain mobility features,
10 but yes.

11 Q. You do not refer again in your reports to any data as to
12 the proportion of gamers that do wish to play on the go,
13 do you?

14 A. No, I did not analyse that.

15 Q. The third reason you give in paragraph 100 is:

16 "... although many games console owners may own an
17 iOS Device, many iOS Device users may not own a games
18 console."

19 Do you see that?

20 A. Yes.

21 Q. Just turning, if I may, to some of the expert evidence
22 in this case, and the numbers are confidential so please
23 do not read them out. I am going to ask you to turn up
24 Professor Hitt's second report, {C3/4/113}.

25 Paragraph 190. Do you see that?

1 A. Yes.

2 Q. Could you read that whole paragraph to yourself, please.

3 Actually, just down to the bottom of -- no, and over the

4 page, it goes over to {C3/4/114} as well.

5 A. Okay. (Pause). Okay, I am ...

6 Q. Have you read that, Mr Howell?

7 A. Yes.

8 Q. Could you just read again paragraph 191 on {C3/4/114},

9 just the first three sentences. It is a similar point.

10 (Pause)

11 A. Okay.

12 Q. You did not address any of this in your reply report,

13 did you?

14 A. No.

15 Q. What that evidence shows, the evidence you have just

16 read, is that there is, is there not, a fairly

17 significant proportion of gamers who do own and use

18 multiple Devices and platforms to transact and play

19 games?

20 A. Right. I mean, the majority do not, but some do, I am

21 sure.

22 Q. Moving on, if I may, to the anti-steering rules, what

23 you call the anti-steering rules imposed by Apple, just

24 to paraphrase what we understand by that, this is the

25 provision in Apple's App Review Guidelines, which says

1 that apps, iOS Apps, on the App Store may not include
2 buttons, external links or other calls to action that
3 direct customers to purchasing mechanisms other than
4 in-app purchase. Does that sound right to you?

5 A. Yeah.

6 Q. Now, that provision does not prevent a developer from
7 placing advertisements outside of their app, informing
8 users that they can purchase the same digital content
9 for a cheaper price elsewhere?

10 A. That does not. I seem to recall -- and this is vague,
11 but that there was a restriction about communicating
12 with customers using email that was provided through the
13 app, and sending them a message saying they could renew
14 a subscription, for example, outside of the store. But
15 other than that, no, I do not think so.

16 Q. In terms of the extent to which developers are able to
17 steer users, your reports do not cite again any data
18 which might demonstrate the extent to which developers
19 are able or not able to steer iOS Devices or to transact
20 on other platforms?

21 A. No, I was just looking at the rules.

22 Q. In particular, you do not look at any data which might
23 indicate how much of Apple's commission revenue is being
24 generated by the bigger developers?

25 A. I do not think I did. I am not sure.

1 Q. Because the bigger developers are presumably the ones
2 that are likely to have the resources to engage in
3 advertising outside of the iOS App. That is correct?

4 A. If by bigger you mean more revenues, yes.

5 Q. In this respect you do refer to the Multiplatform Rule,
6 which, as you know, allows users to buy content off-app
7 and consume it in-app, and a popular sort of
8 transaction, I think you would agree, that might fall
9 within the Multiplatform Rule, is something like
10 an in-app purchase within a game?

11 A. Yes.

12 Q. But the point that you make -- you make two points,
13 I think here. One is that the Multiplatform Rule
14 requires the content to be available on the iOS App, as
15 well as on the developer's website, for example.

16 A. Can you --

17 Q. Paragraph 136 {C2/4/65}.

18 A. Okay. Yes.

19 Q. Again, just to summarise. Two points you are making
20 here, if I can paraphrase. One is, as I said, that the
21 Multiplatform Rule requires the content to be available
22 on the iOS App as well as on the other platform?

23 A. Yes.

24 Q. The second point you make is that even if developers
25 advertise the fact, consumers are still likely to choose

1 to transact through the App Store?

2 A. Yes.

3 Q. Because I think you say here, if you go back to

4 paragraph 136, you say it is more convenient.

5 A. Yeah, although I would back up and say not through the

6 App Store, but through in-app purchase.

7 Q. Forgive me, yes. The reason you say why that is the

8 case, it is about three lines, maybe seven lines up from

9 the bottom of 136. You say:

10 "... I would expect the fact that the items are

11 available via the ASPS in the iOS App to result in most

12 users just choosing the most convenient option ..."

13 Do you see that?

14 A. Yes.

15 Q. But again, you do not present any data or research that

16 might assist the Tribunal in understanding the extent to

17 which that is right?

18 A. No. No, I do not.

19 Q. Likewise, you do not cite any data or research that

20 would help the Tribunal to understand the amount of

21 commerce which has moved away to other platforms as

22 a result of the Multiplatform Rule?

23 A. No, I did not analyse that.

24 Q. But you still went on to say -- going back to 136, it is

25 about five lines down from the top of 136, you say:

1 "First, in relation to each rule, the anti-steering
2 provision [which you go on to describe] ... is
3 absolute..."

4 Then you say this:

5 "... as a result it renders the ability to allow iOS
6 Device users to access previously purchased content
7 impractical and unfeasible as a business model."

8 Do you see that?

9 A. Yes.

10 Q. You do not support that with any empirical evidence at
11 all, do you?

12 A. No, I mean I am restating what is sort of best practices
13 among app developers. When you want to sell something
14 in an app, you present it at the time of need. I could
15 have found a quote to back that up, but it is
16 a well-known dynamic, that if you want users to pay for
17 something, you do it when they want it, and when you
18 know they want it, is when they have just completed a
19 level, but they cannot get to the next level without
20 paying, for example; or they kept losing a level and now
21 they need extra ammunition to make it to the next level.
22 That is the point when you would want to sell them
23 an upgrade.

24 Q. Mr Howell, particularly in relation to games, you
25 accept, do you not, this is a colossal multi-million

1 pound business globally?

2 A. Yes.

3 Q. So you would expect there to be some research or studies

4 to back up the point you just made?

5 A. That would have been even more helpful.

6 Q. You did not choose to look for any of that; you have not

7 chosen to investigate whether there are such studies

8 that support you?

9 A. I do not have any studies to cite.

10 Q. Moving on to in-app advertising, again in paragraph 86

11 {C2/4/41} of your statement -- I should have said

12 earlier on, if you were right, you would expect there to

13 be studies that support you. Just to be clear, I was

14 not agreeing with you.

15 A. Could you tell me the paragraph number again?

16 Q. Yes, we are on to paragraph 86 on page 41. Paragraph 86

17 on page 41.

18 A. Okay.

19 Q. If you look at the first sentence of paragraph 86, you

20 say:

21 "Some iOS Apps adopt free distribution with

22 monetization via ad placement ..."

23 Do you see that?

24 A. Yes.

25 Q. So you acknowledge there that some developers monetise

1 their apps by using in-app advertising?

2 A. Yes.

3 Q. Then you go on to say:

4 "This model is not suitable for many types of iOS
5 App for various reasons ..."

6 You go on to give three reasons why the monetisation
7 model is not suitable for certain types of apps. I will
8 take those in turn, if I may. Paragraph 86.1, you say:

9 "It can 'cheapen' the experience of using an iOS
10 App, which is undesirable for certain types of app,
11 e.g., a banking app, which relies more on the iOS Device
12 User's trust in its legitimacy..."

13 You see that?

14 A. Yes.

15 Q. Banking apps are normally free to download, are they
16 not?

17 A. Yes.

18 Q. They do not use IAP.

19 A. True.

20 Q. So a banking app is not a good example of an app which
21 might use IAP, but not be able to switch to in-app
22 advertising?

23 A. That is true, although I was not offering it as
24 an example of that.

25 Q. Well, at the top of 86 you say:

1 "Some iOS Apps adopt free distribution with
2 monetization via ad placement ... This model is not
3 suitable for many types of iOS App ..."

4 I think what you are suggesting is that ad placement
5 is not a good substitute for IAP for the examples that
6 follow. That is what you are trying to say, was it not?

7 A. It was not what I was trying to say. I could see how
8 you could read that, because this is in a section that
9 is about how the applicable level of commission charged
10 by Apple impacts these decisions. But really the
11 question was how did developers -- how do they monetise
12 apps, right? I am just saying they would not choose to
13 monetise via ads if they need to appear professional.

14 Q. So the banking app is not going to use ads, but not
15 because IAP is more suitable?

16 A. Right, it is not making a reference to IAP in there.

17 Q. So 86.2, you say -- I think you are saying here ad
18 placement is most suitable for iOS apps that are used
19 for hours at a time, because the revenue from ad
20 placement per view is quite low.

21 Do you see that?

22 A. Yes.

23 Q. 86.3, you say the third reason is actually the inverse
24 of that. In-app advertising is not suitable for apps
25 which are designed to help the user reduce the time

1 spent on the app, like productivity apps.

2 A. Right, I do not know about trying to reduce the time in
3 the app. More that apps where the user needs to focus
4 on the app are detrimented by distractions on screen.

5 Q. Okay, so some app developers, you say, might not feel
6 in-app advertising is appropriate, based on the content
7 of their app?

8 A. Yes.

9 Q. But again, you do not refer to any data to help
10 the Tribunal understand the proportion of apps that use
11 in-app advertising, do you?

12 A. No, I mean, my own experience, this has been
13 a consideration. We have often thought about using ads
14 in apps, and these are the sorts of considerations that
15 we considered.

16 Q. Because in relation to understanding the significance of
17 in-app advertising in the industry, may I just show you
18 a couple of documents. {D1/1449/4}. Do you see the
19 figure -- the key on the right tells you to look for
20 black for in-app advertising --

21 THE CHAIRMAN: Sorry to interrupt, what is this document?

22 MR KENNELLY: I am so sorry, if you go to {D1/1449/1},
23 please, this is, as you can see, a study published by
24 The Analysis Group describing the Apple App Store
25 ecosystem.

1 THE CHAIRMAN: Yes, thank you.

2 MR KENNELLY: Forgive me, sir. I should have taken you and
3 the witness to the first page.

4 Could we go back, please, to {D1/1449/4}, and there
5 you see at the bottom, Mr Howell, the figure for in-app
6 advertising.

7 A. Yes.

8 Q. \$109 billion.

9 In fact, if you compare that to the figure for sales
10 of digital goods and services, do you see that at the
11 top of that right-hand column?

12 A. Yes.

13 Q. \$109 billion is actually bigger than \$104 billion. Do
14 you see that?

15 A. I see it.

16 Q. Does that comparison surprise you?

17 A. I am not sure whether this is -- does this include the
18 price of apps that are sold, or is this only in-app
19 purchases?

20 Q. Maybe both.

21 If you go to page 10 -- I am sorry -- yes. Go to
22 {D1/1449/10} please, in the same document. Just focus
23 on the UK because that was a global figure. Again, this
24 is -- table 4 shows you billings and sales facilitated
25 by the App Store ecosystem, and it goes country by

1 country, and again you see just for the UK, do you see
2 the figure of 3.2 billion for digital goods and services
3 and 4.8 for in-app advertising?

4 A. I do, yes.

5 Q. I understand that, I think again to be both, to answer
6 the question that you asked earlier.

7 {D1/1449/29}, please, on this document. We are
8 looking at the heading, "In-app advertising", thank you.
9 You see it says:

10 "... frequently used and effective method of
11 monetizing apps ... Prominent examples of apps that
12 primarily make money through in-app advertising..."

13 The list is given there. Do you see that?

14 A. Yes.

15 Q. Then on {D1/1449/30}, next page, for some it is a more
16 effective way for advertisers to reach -- obviously
17 using the app environment is an effective way for
18 advertisers to reach their audiences, because in-app
19 advertisements allow for personalised, contextually
20 relevant ad messages.

21 Then the next paragraph:

22 "... in-app ad sales for iOS apps..."

23 So we are focusing now on the iOS apps, were, as you
24 saw, \$109 billion, with almost \$27 billion, 25%, tied to
25 gaming apps.

1 The short point I would put to you is there is a lot
2 of money being earned through in-app advertising on the
3 App Store?

4 A. Oh, absolutely, and even more in Google Play where the
5 primary way that people monetise is through ads.

6 Q. By game app developers in particular?

7 A. Yes.

8 Q. In fact, could I ask you to turn to Professor Hitt's
9 third report. This came after your reply report, so you
10 were not able to examine it. Hitt 3, {C3/8/91}. It is
11 paragraph 173b. Could you read that to yourself,
12 please. (Pause).

13 A. Okay.

14 Q. Again, would you agree, based on this data, that
15 especially for the revenue-earning genres, the majority
16 of app developers are using in-app advertising.

17 A. Majority as in number of users or number of apps or
18 amount of revenue?

19 Q. Number of -- if we go back we see, just to be clear, the
20 number of -- the percentage of -- if we look at the
21 confidential figures, and please do not say the numbers,
22 just the very last two sentences. Have you any reason
23 to doubt these figures?

24 A. No, I do not.

25 Q. Moving on to the question of payments and the extent to

1 which third parties could fully replicate the benefits
2 of the Apple ASPS. You accept, do you not, that
3 currently there is no third-party payment provider who
4 offers the full stack of services offered by Apple's --
5 what you call Apple's ASPS?

6 A. On iOS, you mean, yes?

7 Q. Yes.

8 A. No, I do not think they can.

9 Q. If we go to paragraph 148 of your statement.

10 Sorry, just to be clear, Mr Howell, it is --
11 obviously they cannot offer them on iOS because they are
12 not allowed, but across the board, the payment providers
13 that you examined, none of them provide the full stack
14 of services on any platform that Apple provides for its
15 users at the moment through ASPS?

16 A. Oh, I see what you are saying. On any platform, is it
17 an exact suite of offerings? Not exact, no.

18 Q. Paragraph 148, it is on {C2/4/71}. You say in the first
19 sentence:

20 "There are payment services providers whose current
21 offering encompasses most if not all of the payment
22 support services currently provided by Apple. One such
23 provider is Paddle. It may be that Paddle's current
24 offering does not extend to certain services such as
25 parental controls or family sharing..."

1 You say the reason is most likely because the demand
2 for such services from Paddle does not yet exist.

3 You see that? Again, you have not cited any
4 research conducted about the demand for these
5 functionalities, have you?

6 A. Oh, what I meant to say, what I implied or was trying to
7 say with this demand comment was that there is no way
8 for Paddle to offer this service on iOS, so the demand
9 is zero. Nobody can use it until it exists.

10 Q. The services like parental controls and family sharing?

11 A. No, in-app purchase to compete with Apple's.

12 Q. So you were not referring to parental controls or family
13 sharing at all?

14 A. I was talking about the full suite of features found in
15 Apple's in-app purchase, and whether there is anything
16 else out there that has that.

17 Q. So are you saying that you are not suggesting here that
18 there could be demand for parental controls and family
19 sharing from Paddle?

20 A. I meant that there is no demand for -- that would make
21 it make sense to Paddle to add that feature, unless they
22 are actually able to sell their service on iOS.

23 Q. Okay. But even if they were able to operate an iOS
24 Paddle and even if they could in theory offer parental
25 controls or family sharing, they could only do that for

1 the apps for which Paddle has been appointed the payment
2 provider.

3 A. Unless there were a public API for family sharing, that
4 is probably true.

5 Q. Because if a developer chose a payment provider other
6 than Apple, it would be for that payment provider, not
7 Paddle.

8 A. Well, family sharing would not be tied to a payment
9 provider. If there were a dozen payment providers, and
10 they could all access some third-party framework for
11 family sharing, or Apple's framework for family sharing,
12 then they could certainly do that.

13 Q. Certainly for Apple's framework for family sharing, but
14 for a third-party developer to offer family sharing for
15 all Apple users to all payment providers, that third
16 party would need access, an interface with every Apple
17 user?

18 A. Only the Apple users that used the app in question,
19 right? We are talking about family sharing for
20 a feature that is using in-app purchase? So presumably
21 every instance of that app on each family member's
22 Devices would have that app, or family sharing would not
23 be relevant to them.

24 Q. But that -- for each family to want that app to be
25 responsible for its family sharing, each user would have

1 to choose that family sharing app in order to allow it
2 to have that functionality.

3 A. I mean -- I do not see how it would be different than it
4 is on the current iOS. In fact, it could work
5 cross-platform, which Apple's family sharing does not.
6 So if I have got some people in my family with Google
7 and I have a multiplatform app, family sharing could
8 work across platforms and across Devices, unlike now.

9 Q. Just to be clear about what a user would have to do to
10 create this thing, they would -- each user would have to
11 make a positive decision to choose this third-party app
12 to handle its family sharing before that third-party app
13 could do that.

14 A. Well, as now, a family member, presumably an adult,
15 needs to set up each Device to have family
16 characteristics, and that would be the same.

17 Q. If -- the extent to which Apple would be providing
18 family sharing functionality for payment providers like
19 Paddle, would they not have to pay Apple for that
20 service?

21 A. I did not study or opine on that. That would be one way
22 for it to work. I mean, another would be work like all
23 the other frameworks on iOS, and it is monetised however
24 they are monetised, and I did not step into that fray.

25 Q. So certainly as things currently stand with a company

1 like Paddle, and the third-party payment providers, as
2 far as they are concerned, they cannot offer parental
3 controls, family sharing or subscription management,
4 unless they are the nominated billing partner for the
5 app in question?

6 A. You are saying that Paddle could not offer features
7 except to apps that use Paddle?

8 Q. Yes, because --

9 A. Yes.

10 Q. Moving on then to the prices, the question of whether
11 third-party payment providers would be cheaper than
12 Apple, Apple's commerce engine, can we go to your
13 paragraph 149, please, on {C2/4/72} of your statement,
14 first report, page 72. Can we just skim this because
15 here are your comparators. You mention Paddle, Stripe,
16 PayPal, FastSpring, do you see the list, it goes over
17 the page to {C2/4/73}.

18 A. Yes.

19 Q. If you carry on to paragraph 149.8 {C2/4/74}, skipping
20 over Verifone, and then paragraph 149.8, you say you are
21 aware of multiple other third-party payment service
22 providers:

23 "... to varying extents, offer comparable
24 functionalities to the ASPS..."

25 Then you go on to list them: Bluesnap, PayPal

1 Business, Amazon Pay, Square, and so forth. Do you see
2 that?

3 A. Yes.

4 Q. Just stopping here, you accept that some of these that
5 you have listed do not operate as merchants of record?

6 A. I think that is probably true. I did not look into
7 that.

8 Q. You know what a merchant of record is?

9 A. Yes.

10 Q. So for the developers who replace ASPs with a provider
11 that does not act as a merchant of record, they might
12 end up paying another third party to obtain those
13 services?

14 A. Yes.

15 Q. Or they might have to incur the cost of performing those
16 functions in-house?

17 A. Yes.

18 Q. You say that companies like Paddle, Square and Stripe
19 would have a pricing structure that means developers
20 would end up paying less than 30% of the transaction
21 value?

22 A. If they were just using these apps to conduct in-app
23 purchases, yes.

24 Q. But some of the companies you mention here, like Stripe
25 and Square, do not offer anything close to the full

1 stack of services that Apple offers through what you
2 call ASPS?

3 A. Right, and a developer would choose the one that does
4 offer the services that they do want to use.

5 Q. They have to pay for those additional services?

6 A. Presumably.

7 Q. Can we go to paragraph 158, please. {C2/4/79}.

8 Sorry, sir, give me a second.

9 THE CHAIRMAN: Mr Kennelly, we are just past 4.30. Were you
10 planning to go much longer?

11 MR KENNELLY: I am happy to ask this question and stop.

12 Forgive me, Mr Howell, if I just address the Tribunal
13 for a moment. I am a little concerned that I may need
14 more time -- sorry, I will definitely need more time, to
15 be blunt -- than I predicted in the calendar for the
16 trial for Mr Howell and Mr Burelli. I think we will
17 manage if we can perhaps have a shorter lunch break
18 tomorrow.

19 THE CHAIRMAN: Yes.

20 MR KENNELLY: I appreciate we are starting at 11.00, and if
21 the Tribunal can make up the time, and of course I am
22 conscious that I have Professor Lee immediately after
23 these witnesses, and so I will have to see what I can do
24 to shorten some of that as well. Just to forewarn you
25 that that is -- and I apologise --

1 THE CHAIRMAN: Just so I am clear, your best guess about --
2 at the moment, you have two-and-a-half hours tomorrow
3 for finishing Mr Howell and dealing with Mr Burelli. If
4 we give you half an hour back at lunchtime, then in
5 theory that is gone by 2 o'clock.

6 MR KENNELLY: Yes.

7 THE CHAIRMAN: But you think you will need more than that.

8 MR KENNELLY: I think I will. I think I am going to go with
9 Mr Burelli after lunch, so it is going to eat into some
10 of the time with Professor Lee.

11 THE CHAIRMAN: Yes.

12 MR KENNELLY: I will -- again, I am reluctant to impose on
13 the Tribunal, but if you could sit a little bit later
14 again tomorrow, and I will cut back on my Lee
15 cross-examination, we should be fine by the time we get
16 into the following week.

17 THE CHAIRMAN: I am sorry, Mr Howell, just dealing with
18 housekeeping. The following week at some stage, is it
19 that week that we were short a bit of time anyway, or is
20 it later on we are trying to make it up? I cannot
21 remember. Somewhere we thought we might not quite have
22 enough time for --

23 MR KENNELLY: Yes, it was next week, I think, where there
24 was a squeeze with the accounting expert.

25 THE CHAIRMAN: Yes.

1 MR KENNELLY: Maybe both weeks, that and the following week.

2 THE CHAIRMAN: So we are going to have to do a bit of work
3 to make all that work anyway.

4 MR KENNELLY: I am afraid so.

5 THE CHAIRMAN: Look, let us see -- I am afraid I need to
6 rise quite shortly. Why do you not finish your
7 question, but I have something else quite shortly. We
8 can sit to 5.00 tomorrow afternoon. That gives you
9 effectively an hour back, although we have taken half an
10 hour already.

11 MR KENNELLY: I am very grateful for that, thank you.

12 THE CHAIRMAN: Why do we not see how that goes. If you can
13 find some way of squeezing that all in, that would be
14 quite helpful. You have all day Monday with Dr Lee.

15 MR KENNELLY: Yes, I do. As you probably anticipated from
16 reading his reports, they are substantial reports, and
17 they go to all of the security and privacy matters that
18 we are discussing --

19 THE CHAIRMAN: Yes, okay. Why do you not finish what you
20 are doing now, if you can wrap it up in the next few
21 minutes, and then we will start again at 11.00.

22 MR KENNELLY: We are on {C2/4/80}. We are looking at the
23 table of fees, where you make the comparison from
24 Square, Paddle and Apple; do you see that?

25 A. Yes.

1 Q. Just to be clear, these third parties, Square and Paddle
2 on your table, are charging a flat fee. Do you see
3 that, the transaction fee?

4 A. Yes.

5 Q. So the overall percentage of the transaction value that
6 the developers will have to pay would increase as the
7 value of the transaction decreases?

8 A. Possibly. Not if they aggregate payments, so if
9 somebody made ten very small payments, as opposed to one
10 large payment, they would pay the same -- I am sorry,
11 they would pay one of the one-time fees.

12 Q. The developer would pay?

13 A. Yeah.

14 Q. If it had the benefit of some aggregation discount?

15 A. Right, yeah, they would need to do what Apple does with
16 credit card payment -- what I understand Apple does with
17 credit card payments, to only charge like once a day or
18 something like that.

19 Q. Of course you accept, do you not, that Apple gets
20 particularly good discounts on that basis?

21 A. No doubt.

22 Q. Because of the volume of transactions that it is
23 processing, it is an efficiency it has.

24 Now, regardless of the precise percentages here,
25 this comparison assumes in the counterfactual developers

1 who use an alternative payment service provider would
2 not have to pay any commission at all to Apple. That is
3 your assumption here, is it not?

4 A. In this table, yes. I am not proposing that as
5 a solution. I am just saying if that is what it were,
6 then these would be the numbers.

7 Q. If a developer had to pay a commission to Apple, say,
8 for its tools and technology, in addition to paying the
9 merchant of record, the payment processor, you accept
10 actually that there would be very limited scenarios in
11 which, given a choice, a developer would choose to do
12 that, to pay Apple and to pay fees to an alternative
13 payment service provider?

14 A. That would definitely be a factor.

15 Q. Let us go to your paragraph 163 on {C2/4/85}. Because
16 you are quite blunt in that first sentence of 163; do
17 you see this?

18 A. Yes.

19 Q. "I can only imagine very limited scenarios in which,
20 given a choice, a developer would decide to pay
21 commissions and fees to an alternative payment services
22 provider in addition to Apple."

23 A. Yes.

24 Q. To finish on this point, again, you have no evidence --
25 you do not cite any evidence of any demand at all from

1 developers for an alternative payment system in a world
2 where they would also have to pay something to Apple?

3 A. I do not cite it here. I think in other places in here,
4 I talk about people's response to the European Union
5 alternative pricing, and how the combination of amounts
6 paid to Apple and amounts paid to alternative store
7 vendors would make sort of an artificial disincentive to
8 adopt those alternative rules.

9 MR KENNELLY: We will come back to that tomorrow. I think
10 that is an appropriate point.

11 THE CHAIRMAN: Mr Howell, we are going to rise now, starting
12 at 11.00 tomorrow morning. While you are not in the
13 witness box but still giving evidence, you need to
14 refrain from discussing your evidence with anybody at
15 all. So you are not to discuss your evidence with
16 anyone until we see you again at 11 o'clock tomorrow
17 morning, please.

18 THE WITNESS: Understood.

19 THE CHAIRMAN: Thank you very much.

20 (4.40 pm)

21 (The hearing adjourned until 11.00 am
22 on Thursday, 23 January 2025)
23
24
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