Intellectual Property Office

BL O/518/13

20 December 2013

PATENTS ACT 1977

APPLICANT Renesas Mobile Corporation

ISSUE Whether patent application number GB 1120543.2 complies with section 1(1)(b)

HEARING OFFICER Mrs S E Chalmers

INTERIM DECISION

Introduction

1 Patent application GB 1120543.2, entitled "Method and Apparatus for Calibrating Sleep Clocks", was filed in the name of Renesas Mobile Corporation on 30th November 2011, claiming priority of 20th May 2011 from earlier application GB 1108512.3, and was published as GB 2490980 A on 21st November 2012.

2 The examiner has objected that the invention lacks an inventive step and has maintained that objection through several rounds of correspondence with the applicant's agent. No agreement being reached, the examiner has offered and, on the applicant's behalf, the agent has requested a hearing.

3 A hearing was accordingly held before me on 11th November 2013. The applicant was represented by Mr Adam Flint assisted by Ms Emma Wilkins, both of EIP. The examiner, Dr John Cullen, also attended; as did Mr Daniel Voisey, as hearing assistant. I am grateful to Mr Flint for his pre-hearing submissions which I have taken into account in coming to my decision.

The invention

4 The invention is concerned with the calibration of sleep clocks from fast clocks eg in mobile telephones. Sleep clocks are low frequency clocks which run in (wireless) network apparatus while they are in energy saving sleep mode with some of their circuitry deactivated; and fast clocks are high frequency clocks which run in the network apparatus while they are in an active mode for use by a user or system. Regular calibration of sleep clocks is required as they are prone to frequency drift and the calibration of the sleep clock requires the fast clock to be running. Although a longer calibration period will render a higher quality calibration, it will also consume more energy, so it is desirable for the calibration period to be sufficiently long to obtain sufficient calibration quality, but not excessively long.

5 In accordance with the present invention a calibration is calculated and its quality determined, the length of time to a next calibration is estimated, it is determined whether the quality is sufficient to last that long, and, if not, the calibration measurement period is extended.

The claims

6 The most recent set of claims was filed on 20th April 2012 and comprises three independent claims to an apparatus, method and computer code for carrying out the method.

7 Claim 1 reads:

> Apparatus for use in a wireless network, the apparatus being associated with a fast clock for operation in an active wakeup mode and a sleep clock for operation in a sleep mode, the apparatus comprising at least one controller configured to:
>
> calculate a calibration for the sleep clock based on the fast clock;
>
> determine a quality value for that new calibration;
>
> estimate the length of time until the next calibration; and
>
> determine whether the new calibration is of sufficient quality to last for the estimated time until next calibration, and, if not, extend the calibration measurement period.

8 Claim 9 reads:

> A method for use in a network apparatus associated with a fast clock for operation in an active wakeup mode and a sleep clock for operation in a sleep mode, the method comprising:
>
> calculating a calibration for the sleep clock based on the fast clock;
>
> determining a quality value for that new calibration;
>
> estimating the length of time until the next calibration;
>
> determining whether the new calibration is of sufficient quality to last for the estimated time until next calibration, and, if not, extending the calibration measurement period.

9 Amended claims were proposed during the hearing, for my consideration should I determine that the present claims lack an inventive step. These comprised the present independent claims 1 and 9 each with the additional clause appended:

> ...and if necessary to extend the awake time of the apparatus to enable the calibration to take place during the extended calibration measurement period.

The law

10 The relevant parts of Section 1 of the Patents Act 1977 read:

> *1(1) A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say –*
>
> *(a) ...;*
>
> *(b) it involves an inventive step;*
>
> *(c) ...;*
>
> *(d) ...*

11 Section 3 of the Act relates to inventive step, and reads:

> *An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 2(2) above (and disregarding section 2(3) above).*

12 The approach to be followed in assessing whether an invention provides such an inventive step is that laid down by the Court of Appeal in *Pozzoli*[1]*.* That test comprises the following steps:

> (1)(a) Identify the notional "person skilled in the art"
>
> (1)(b) Identify the relevant common general knowledge of that person;
>
> (2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;
>
> (3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;
>
> (4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

Arguments and analysis

13 What I must do is determine whether the invention does or does not involve an inventive step. To do so, I will work through the steps set out above.

Step (1)(a): Identify the notional "person skilled in the art"

14 In his report of 5th August 2013, the examiner identified the skilled person as "an engineer skilled in the design of mobile handsets for use in cellular networks, with a particular interest in power saving techniques for maximising battery life". At the

[1] *Pozzoli SPA v BDMO SA* [2007] EWCA Civ 588

Hearing Mr Flint indicated his acceptance of this characterisation, and I am happy to adopt it as correct.

Step (1)(b): Identify the relevant common general knowledge of that person

The examiner asserted the common general knowledge of that person would include: that one way of saving power is to set a device into "sleep mode" whenever it is not being actively used by a user or system; that when in "sleep mode" many components are run by low power "sleep" clocks that are prone to frequency drift; that this drift can be corrected by calibrating a slow clock with a fast clock periodically; and a familiarity with the concept of "sampling error" that can affect the quality of a calibration. Mr Flint agreed with this view and I am content that this is an accurate assessment of the common general knowledge of the skilled person.

Step (2): Identify the inventive concept of the claim in question or if that cannot readily be done, construe it

15 The examiner identified that the inventive concept is aptly set out in claim 1. Mr Flint agreed that it is; he emphasised that the features interact with each other and do not stand in isolation. I agree.

Step (3): Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed

16 The examiner has cited two documents as the closest prior art found:

US 2010/0029267 A1 (YANG)

CN 1777310 A (KAIMING)

These were cited against the PCT equivalent application, and first cited against the claims of the present GB application in the examiner's report of 28th March 2013, following update of the search.

17 The discussion of the prior art concentrated on YANG due to language difficulties with KAIMING (there are no English language equivalents, and only computer translations are available). The examiner stated that the disclosure of KAIMING is "broadly similar" to that of YANG. At the hearing Mr Flint argued that the disclosure of YANG is the closest to the present invention, and I agree. I do not think that KAIMING adds anything significant to the disclosure of YANG.

18 YANG discloses calculating a calibration duration according to a discontinuous reception (DRX) period (i.e. the sleep period, the length of time before the next calibration may take place) and a clock error tolerance (i.e. a measure of the required accuracy of the clock), and calibrating the sleep clock from the fast clock for that calibration duration.

19 The examiner has maintained that the present invention comprises essentially equivalent steps to those of YANG, and is distinguished only in the order in which they are performed. Mr Flint contended that the present invention is entirely different to that disclosed in YANG. He refuted the suggestion that the present invention

comprises a re-ordering of the steps of YANG; further, he suggested that the invention of YANG would not work if the order of the steps were to be changed.

20 Mr Flint identified the key difference between the present invention and the disclosure of YANG as that in the present invention the calibration period is extended – and is extended to be as long as it needs to be so that the calibration will be good enough. I agree that there is no suggestion in YANG that the calibration period could be extended; however, I note that it does not need to be if the period is set to be sufficiently long initially. I also note that neither the present claims nor the proposed amended claims explicitly define extension of the calibration period to as long as is required to render calibration of sufficient quality.

21 What then are the differences between what is disclosed in YANG and the present invention? YANG teaches that a calibration period is determined which will render the required calibration quality and then the calibration is performed for that period. In contrast, in the present invention a calibration is performed, it is then determined whether the quality is sufficient, and if necessary the calibration period is extended.

22 For completeness I note that I do not find any material distinction in concept between wording such as "estimate the length of time until the next calibration" in the present invention, and "receiving discontinuous reception period (DRX period) information from a base station" in YANG. No attempt was made at the hearing or in the correspondence to distinguish the present invention from YANG on this basis.

Step (4): Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the person skilled in the art or do they require any degree of invention?

23 A distinctive feature of YANG, much debated in the correspondence and considered in some detail at the hearing, is that "the calibration is broken down into a number of calibration segments" so that "a long period for a one-time calibration can be avoided" (paragraph [0034]). This is presented as advantageous over acknowledged prior art systems in which clock calibration is described as taking around 500ms, whereas retrieving paging information takes only about 10ms (in 3G systems) or 20ms (for 2G). As a result, a considerable portion of the wakeup period is just to allow for calibration, which significantly increases power consumption (see paragraph [0020]). This length of clock calibration period is determined as being sufficient to calibrate to a quality adequate for a DRX period of 5.12s (see paragraph [0018]), which is identified as the upper limit of the DRX period in a 3G system (see paragraph [0022]). This means that the calibration period may be longer than that required to calibrate to the necessary quality. (I note that the description for the present application also refers to similar prior art, in which the device is put into wakeup mode just for calibration).

24 Both in correspondence with the examiner and at the hearing Mr Flint has maintained that YANG requires the calibration to be divided over plural segments, and that the present invention is inventively distinguished from this through performing the entire calibration in a single period. The examiner has maintained that whilst YANG discloses dividing the calibration period across a number of segments, that number may be one.

25 At the hearing Mr Flint argued that the references in YANG to the calibration being performed in a single calibration segment were to an “excluded, exceptional case”. He suggested that the method of YANG would not work with “very long” DRX periods. In his view, where YANG referred to a DRX period limit (e.g. 2.56s) and indicated that if the DRX period equalled or exceeded this then the number of times of calibration would be one (paragraph [0030]), this was an isolated case which fell outside the normal method.

26 I am not persuaded: clear reference is made in YANG a number of times to the calibration being made in one period, for example, in Table 1 (which was discussed at the hearing). There is nothing to suggest that a DRX period of 2.56s is considered exceptionally long and would make the method of YANG to fail. Indeed, as noted above, paragraph [0030] specifically mentions a single calibration. While performing the calibration in a single period might not be the main embodiment described in YANG, it is certainly within the scope of the disclosure of YANG.

27 Given that it was known to set the period to be long enough to ensure that the quality would be sufficient, in my view it would have been obvious to the skilled person that if the quality were not sufficient then the period could be extended. To extend the period after the quality has been found lacking rather than ensuring beforehand that it will be long enough to render sufficient quality is not inventive.

28 I therefore conclude that the invention claimed lacks an inventive step in light of the cited prior art documents.

Is the proposed amendment inventive?

29 At the hearing Mr Flint proposed the above amendment (see paragraph 9) for my consideration should I find the present claims to be obvious. He indicated that he considered this amendment to merely emphasise what was intended by the claims anyway, by making explicit that the device may be kept awake longer, if need be, to allow the calibration to take place.

30 I must first of all consider whether the proposed amendment is supported by the application as filed. I find such support in the description at page 14 lines 22-25 and I am therefore satisfied that there is no added matter. The amendment is therefore allowable. I shall now go on to consider whether it renders the claims inventive.

31 It is acknowledged prior art in YANG (and also in the description for the present application) that the wakeup period might be made long to allow for calibration to take place. Mr Flint pointed out that there is no suggestion in YANG that the calibration period could be extended beyond the paging period i.e. that the device could be kept awake long enough for the required calibration to take place. I agree. There is no suggestion that the wakeup period might be extended specifically to allow calibration to take place; rather it is implied that the wakeup period would be unnecessarily long in these cases. In my view, some degree of imaginative thought would be required to go from what was known and was disclosed in YANG to the invention whereby the calibration period is extended as required and the wakeup period is correspondingly extended to accommodate it. I therefore find that the proposed amended claims are inventive over YANG.

Conclusion

32 I find the invention defined by the present claims to lack an inventive step over the prior art. I therefore refuse the application under section 18(3) as it currently stands.

33 However, I find the invention defined by the proposed amended claims to be inventive. I hereby give the applicant 1 month from the date of this decision to formally submit these amendments noting that consequential amendments to the description will also be required.

Appeal

34 Any appeal must be lodged within 28 days

MRS S E CHALMERS

Deputy Director, acting for the Comptroller