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BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOAKIM AXMON, MUHAMMAD KAZMI, and TORGNY PALENIUS

Appeal 2019-003814
Application 14/911,382
Technology Center 2400

Before JASON J. CHUNG, JAMES W. DEJMEK, and MICHAEL T. CYGAN, *Administrative Patent Judges*.

CYGAN, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 39–42, 45–50, and 53–59, which are all of the pending claims in the application. Appeal Br. 1. We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] We use the word "Appellant" to refer to "applicant" as defined in 37 C.F.R. § 1.42 (2018). The real party in interest is stated to be Telefonaktiebolaget LM Ericsson (publ). Appeal Br. 2.

CLAIMED SUBJECT MATTER

The claimed invention generally relates to configuring or performing measurements in a mobile terminal operating in a wireless communication network. Appeal Br. 3–5. In a Long Term Evolution ("LTE") network, interference between communications nodes having different powers may be mitigated by identifying high-power resource blocks in the frequency or time domains. Spec. 5:2–20. This identification permits neighboring cells to schedule cell-edge users in a manner that avoids these high-power blocks, reducing the impact of inter-cell interference. *Id.* at 5:20–24.

Each User Equipment ("UE") is required to perform radio measurements on signals transmitted by neighboring cells, including determining the physical cell identity of the cell transmitting the measured signals. *Id.* at 8:2–10. To permit each UE to perform inter-frequency and inter-radio-access technology ("RAT") measurements, intervals may be required for the mobile terminal receiver to retune or reconfigure itself for a different RAT. *Id.* at 8:28–31. The network must configure measurement gaps for the UE in order to accommodate these intervals. *Id.* at 8:28–32. For LTE, measurement gaps of 6 milliseconds are defined for two periodic measurement gap patterns, the first having a repetition period of 40 milliseconds, and the second having a repetition period of 80 milliseconds. *Id.* at 8:32–34, 9:1–4. The claimed method sets forth a measurement gap pattern for configuring measurements in a mobile terminal.

Independent claim 39 is illustrative:

> 39. A method, in a network node of a wireless communication network, for configuring measurements in a mobile terminal, the method comprising:
>
> selecting a measurement gap pattern to be used by the mobile

> terminal, the measurement gap pattern having a series of measurement gap bursts such that the measurement gap bursts are separated by a repetition period of 1280 milliseconds and each measurement gap burst comprises two or more measurement gaps separated by a measurement gap repetition period of 40 or 80 milliseconds; and

signaling the measurement gap pattern to the mobile terminal.

Appeal Br. 30 (Claims App.).

Independent claims 50, 58, and 59 recite, respectively, a method, a network node apparatus, and mobile terminal having limitations similar to those in claim 39. Appeal Br. 30–36. Dependent claims 40–49 and 53–57 each incorporate the limitations of their respective independent claims. *Id.*

REFERENCES

Name	Reference	Date
Lee et al. (Lee)	US 8,451,757 B2	May 28, 2013
Drazynski et al. (Drazynski)	US 2014/044003 A1	Feb. 13, 2014
Kim et al. (Kim)	US 9,167,416 B2	Oct. 20, 2015
Kazmi et al. (Kazmi)	US 2017/0245239 A1	Aug. 24, 2017
3GPP, "3rd Generation Partnership Project; Technical Specification Group Radio Access Network; Evolved Universal Terrestrial Radio Access (E-UTRA); Requirements for support of radio resource management (Release 8)," 3GPP TS 36.133 V8.23.0, Sections 7.6.2.2–8.1.2.1.1, September 2013, 41–42 (hereinafter, "3GPP").		
"Discussion on gap enhancement," Huawei, HiSilicon, 3GPP TSG-RAN WG4 Meeting #80, R4-166020, Gothenburg, Sweden, 22-26 August 2016, 1–5 (hereinafter, "Huawei").		

REJECTIONS

Claims 39–42, 45, 47, 50, 54, and 57–59 are rejected under 35 U.S.C. § 103 as being obvious over the combination of Drazynski and Kazmi.

Claims 46 and 53 are rejected under 35 U.S.C. § 103 as being obvious over the combination of Drazynski, Kazmi, and Lee.

Claims 48, 49, 55, and 56 are rejected under 35 U.S.C. § 103 as being obvious over the combination of Drazynski, Kazmi, and Kim.

OPINION

We have reviewed the Examiner's obviousness rejections (Final Act. 6–16, Ans. 3–9) in light of Appellant's contentions of error (Appeal Br. 3–29, Reply Br.). We are not persuaded by Appellant's contention that the Examiner erred in rejecting claims 39–42, 45–50, and 53–59 under 35 U.S.C. § 103. We begin with claim 39.

A. Claims 39, 40, 42, 45–50, and 53–59

With respect to claim 39, Appellant argues error in the Examiner's rejection because the combination of references does not suggest the claimed 1280 millisecond repetition period. Appeal Br. 7. Appellant argues that the claimed repetition period is critical, that Drazynski expressly teaches away from changing the repetition period, and that Kazmi does not lead one having ordinary skill in the art to optimize Drazynski's repetition period in the claimed manner. *Id.* at 6. We review the Examiner's rejection, and then address each of Appellant's specific contentions in turn.

The Examiner finds Drazynski teaches or suggests all of the limitations of claim 39 except for a repetition period of 1280 milliseconds. Final Act. 6–7. The Examiner finds Kazmi teaches or suggests that longer

or shorter measurement intervals are desirable, to improve battery performance or terminal response time, respectively. *Id.* at 7. The Examiner further finds Kazmi teaches or suggests a measurement period that may be reduced from 10.28 seconds to 200 milliseconds. *Id.* at 3 (citing Kazmi ¶ 142). The Examiner states that Kazmi describes modifying the measurement pattern for a terminal in certain situations to "facilitate performance of the measurements," such as when "an emergency situation exists." *Id.* at 2–3 (citing Kazmi, Abstr., ¶ 159). The Examiner further finds it would have been obvious to "modify Kazmi to at time shorten this measurement gap burst repetition period to improve the terminal response time" to teach the claimed invention, and thereby, "balance the need for improving battery performance and the need to improve response time." *Id.*

Appellant characterizes Drazynski as performing inter-frequency measurements by a UE to determine whether the signal from a nearby small cell is strong enough to support a handover to that small cell, which is used to provide extra capacity. Appeal Br. 7. Appellant notes that Drazynski requires the measurement interval to be short so as to free up network resources, but not so short as to drain the UE's battery and interfere with normal data transmission and reception. *Id.* at 8. Appellant points to Drazynski's description of the repetition period as being "one minute or a half minute, for example." *Id.* at 10.

Appellant first argues that Drazynski teaches away from substantially shorter repetition periods, as this would drain the UE's battery. *Id.* Appellant argues that Drazynski's repetition period of "one minute or a half minute" represents a "carefully considered balance" of the advantages of

quick detection of nearby small cells and the disadvantages of reduced battery life and reductions in data throughput. *Id.* at 11.

Where the prior art "teaches away from combining certain known elements, discovery of a successful means of combining them is more likely to be nonobvious." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 416 (2007). A prior art reference may teach away from combining elements where the reference criticizes, discredits, or otherwise discourages the claimed invention. *In re Fulton*, 391 F.3d 1195 (Fed. Cir. 2004). A general preference for a different range than claimed has been found not to teach away from that range where the reference also expresses benefits associated with the claimed range. *In re Geisler*, 116 F.3d 1465, 1471 (Fed. Cir. 1997) (finding a statement that "'[i]n general, the thickness of the protective layer should be not less than about [100 Angstroms]' falls far short of the kind of teaching that would discourage one of skill in the art from fabricating a protective layer of 100 Angstroms or less[,]" where the reference also recognized benefits to keeping the protective layer as thin as possible.)

Although we agree that Drazynski teaches that some shorter repetition period would undesirably drain the UE's battery, Appellant has not shown Drazynski to discourage the claimed repetition period of 1280 milliseconds. Drazynski does not describe a repetition period that would be unacceptably short, and whether such a period would include the claimed period of 1280 milliseconds. On the contrary, Drazynski's discussion of the length of the repetition period as a balance of positive and negative effects, providing only "example" ranges, would encourage one of ordinary skill in the art to explore repetition periods below that range. *See In re Geisler*, 116 F.3d at 1471 (finding the reference's suggestion of benefits to be derived from a

thinner layer provides motivation to explore thickness levels below that range). Although Appellant argues that the claimed 1280 milliseconds is substantially shorter than that provided in Drazynski's examples, Appellant has not shown Drazynski to provide any guideposts as to what Drazynski would teach to be an unacceptably short period. Accordingly, Appellant has not shown that Drazynski's description of the benefits and drawbacks associated with battery drainage amounts to criticizing, discrediting, or otherwise discouraging the claimed repetition period of 1280 milliseconds. Thus, Drazynski has not been shown to teach away from the claimed repetition period.

Nor are we persuaded by Appellant's argument that Kazmi teaches away from the claimed invention by teaching shorter repetition periods only at certain times; i.e., in response to a request for positioning. Reply Br. 7; *see also* Appeal Br. 7, 15. At best, this argument shows that Kazmi recognizes that different periods may be useful for different purposes. Appellant's argument does not show that Kazmi criticizes, discredits, or otherwise discourages the repetition period used in response to a request for positioning. The Examiner has stated, "Kazmi demonstrates that the tradeoff between conserving battery consumption and faster response time can, at times, be reasonably tilted in favor of faster response times and suggests a range that matches the claimed value for the repetition period." Ans. 7. We agree with this representation of the teachings of Kazmi, and are not persuaded that Kazmi teaches away from the repetition period that it describes for use in response to a request for positioning.

Appellant next argues that Kazmi describes shorter repetition periods not in Drazynski's context of inter-frequency measurements to detect small

cells, but instead, in the context of performing positioning measurements. Appeal Br. 11. Appellant argues that these are "very different" measurements, having "very different" tradeoffs that do not involve Drazynski's concerns of reduced battery life or throughput. *Id.* at 11–12. Appellant argues that although Kazmi may describe an inter-burst interval of 1280 milliseconds as desirable, that desirability is limited to Kazmi's positioning measurements, and not the inter-frequency measurements of Drazynski. *Id.* at 15. Appellant characterizes the reason for the shortened intervals in Kazmi as being in response to an explicit request for positioning measurements, and argues that this is not relevant to the measurements of Drazynski. *Id.* at 17–18.

Appellant's claim 39 recites "measurements in a mobile terminal." The Specification describes "UE measurements" as performing measurements on neighboring cells to support *both* handover and positioning functions. Spec. 7:30–8:6. Appellant has characterized Drazynski as performing handover-related measurements, and Kazmi as performing positioning related measurements. Appeal Br. 7, 11. Accordingly, both Drazynski and Kazmi provide teachings relevant to the claimed "measurements in a mobile terminal."

The test for obviousness is "not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference," but instead "what the combined teachings of the references would have suggested to those of ordinary skill in the art." *In re Keller,* 642 F.2d 413, 425 (CCPA 1981). Accordingly, the issue is not whether Kazmi's shorter repetition period may be incorporated into Drazynski's handover measurements. The issue is what the combined teachings of

Drazynski's method of configuring measurements in a mobile terminal and Kazmi's shorter repetition period would teach or suggest to one of ordinary skill in the art pertinent to measurements in a mobile terminal. The Examiner finds, and Appellant agrees, "both references describe measurements performed by UEs on neighbor cells for use at the network in a number of different calculations"). Final Act. 3–4; Appeal Br. 21. Appellant further agrees that "Kazmi's techniques 'overlap' those of Drazynski's in that the individual radio signal measurements underlying their respective processes may be the same, in some cases." Reply Br. 2 (addressing Ans. 4).

Nor is the obviousness determination limited by the problem sought to be solved in a single reference. *KSR*, 550 U.S. at 402 ("the appeals court erred in assuming that a person of ordinary skill in the art attempting to solve a problem will be led only to those prior art elements designed to solve the same problem. . . . a person of ordinary skill often will be able to fit the teachings of multiple patents together like pieces of a puzzle"). Appellant's arguments prominently focus on reasons why one addressing inter-frequency measurement problems in Drazynski would not look to teachings of positioning measurements in Kazmi. *See, e.g.*, Reply Br. 5 ("Kazmi, on the other hand, is concerned with a very different problem"). However, one having ordinary skill in the art would not be limited by Drazynski's particular problems in achieving a balance for inter-frequency measurement, but instead would look to both references in seeking to improve UE measurements.

For the above reasons, we are not persuaded that the Examiner erred in characterizing the teachings of both as relating to "neighbor

measurements" common to the systems of both Kazmi and Drazynski, and therefore relevant to determining how one of ordinary skill would perform such measurements in a mobile terminal as claimed. *See* Ans. 4.

Appellant's final argument against claim 39 is that the specific limitations of the claim provide unexpected results relative to prior art techniques. Appeal Br. 22. Appellant argues that the evidence of record demonstrates that the claimed 1280 millisecond repetition period increases throughput in comparison with a conventional, uninterrupted measurement gap pattern. *Id.* Appellant primarily relies upon Huawei, referred to by Appellant as "R4-I66020," which is a document for discussion on gap enhancement attributed to a working group of the 3rd Generation Partnership Project. *Id.* at 23–25. Appellant also relies upon 3GPP, which is a technical specification describing requirements for support of radio resource management developed by the 3rd Generation Partnership Project (the project itself also commonly abbreviated as 3GPP).

Appellant characterizes Huawei as comparing simulations in which a quiet period between measurements ("T2") is varied from 720 milliseconds to 9720 milliseconds. Appeal Br. 23–24. Appellant characterizes the claimed 1280 millisecond repetition period as equating to a T2 time of 1000 milliseconds. *Id.* at 24. The claimed time is asserted to be in a range of "optimal throughput" in the Huawei simulations, in which the throughput tends to decrease as T2 approaches 30 seconds. *Id.* Appellant asserts, "[t]here is no evidence in the record to suggest that this improved throughput was predicted or predictable by the person of ordinary skill in the art," at least because the Huawei data was presented three years after the effective date of the present application. *Id.* Appellant argues that "the law [on

obviousness] is clear that a *prima facie* case of obviousness, with respect to a particular claimed value, can be rebutted with evidence of unexpected results flowing from the claimed value." *Id.* at 25.

Evidence of unexpected results must be factually supported by an appropriate affidavit or declaration to be of probative value. *See, e.g.*, *In re De Blauwe*, 736 F.2d 699, 705 (Fed. Cir. 1984) ("It is well settled that unexpected results must be established by factual evidence). Here, Appellant has provided the Huawei "discussion document" containing simulation data as evidence, unsupported by any affidavit or declaration. Permitting a publication to substitute for expert testimony would circumvent the guarantees built into the statute. *Ex parte Gray*, 10 USPQ2d 1922, 1928 (BPAI 1989). However, separate from Appellant's discussion in its briefs, we consider Huawei's disclosure to be evidence of the facts at issue, and we consider that evidence below.

"In order to establish unexpected results for a claimed invention, objective evidence of non-obviousness must be commensurate in scope with the claims which the evidence is offered to support." *In re Clemens*, 622 F.2d 1029, 1036 (CCPA 1980); *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990) ("The law is replete with cases in which the difference between the claimed invention and the prior art is some range or other variable within the claims. . . . [and] in such a situation, the applicant must show that the particular range is *critical,* generally by showing that the claimed range achieves unexpected results relative to the prior art range." (citations omitted)). That is to say, Appellant's claimed value of 1280 milliseconds must be shown to achieve unexpected results relative to the prior art range. Huawei does not mention any repetition period, whether

1280 milliseconds or some other period. Huawei instead describes a quiet period between measurements, described as the "T2" time, which Appellant states to be different from the claimed repetition period. Although Appellant asserts that the claimed invention is equivalent to a T2 time of 1000 milliseconds, Appellant's assertion is presented outside of a declaration, and therefore is not entitled to probative, factual value. *Gray*, 10 USPQ2d at 1928

Even were Appellant to have factually established that the claimed repetition period of 1280 milliseconds equates to a T2 time of 1000 milliseconds, Huawei does not establish that at T2 time of 1000 milliseconds provides an unexpected result compared to other values in the prior art.

Huawei's Figure 2 is reproduced below:

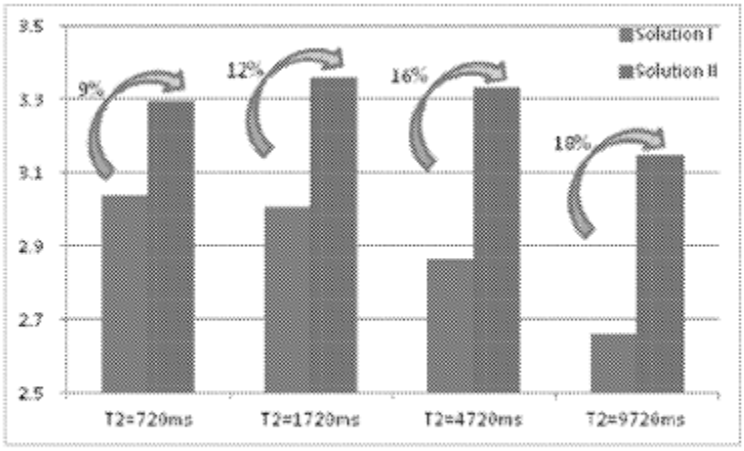

Figure 2 Average UE throughput of the solution I Rel-8 gap pattern and solution II burst gap pattern (Mbps)

Notably, Huawei does not present any results of its simulation having a T2 time of exactly 1000 milliseconds (allegedly equivalent to the claimed value). Instead, Huawei shows that throughput is slightly below 3.3 at T2= 720 milliseconds, rises to a value between 3.3 and 3.4 at T2=1720 milliseconds, and is slightly above 3.3 at T2=4720 milliseconds. Huawei,

Fig. 2. Huawei does not provide any explanation of the values between those three T2 values, such as whether T2 monotonically increases between those values, or whether T2 peaks at any particular intervening value. Accordingly, Huawei fails to show results that are commensurate in scope with the alleged value of T2=1000 milliseconds, which allegedly corresponds to the claimed 1280 millisecond repetition period. Because the claim recites the single value of 1280 milliseconds, and Huawei does not specifically address a T2 value corresponding to that claimed value, Appellant has not shown a nexus between Huawei and the merits of the claimed invention.

To the extent that we follow Appellant's unsupported assertion that one may interpolate Huawei's values between T2=720 and T2=1720 (Appeal Br. 24), this does not show that the throughput at the "claimed" T2=1000 value is unexpectedly greater than either T2=720 (which it would be slightly above) or T2=1720 (which it would be slightly below). Instead, the Examiner finds Huawei shows the largest throughput at T2=1720 and the second largest throughput at 4720. Huawei's range of largest throughput, of T2 values between 1720 and 4270, does not encompass Appellant's asserted value of T2=1000. Consequently, Huawei does not show that claimed invention to have a greater throughput, much less an unexpectedly greater throughput, than other unclaimed values.

We further consider the disclosure of Huawei as to its bearing on the obviousness determination. Huawei explains Figure 2 as reflecting the effects when T2 becomes longer, with the positive benefit of "schedul[ing] the UEs in more subframes" such that throughput increases, and the negative benefit of the concomitant reduction in the frequency of measuring the

signals of neighboring cells such that throughput decreases. Huawei 4. The Examiner has stated that Drazynski and Kazmi describe that a measurement scheme is designed by weighing different factors affecting the system, including battery drainage. Final Act. 5, 7. We are not persuaded that the Examiner errs by following the teachings of Drazynski and Kazmi in finding those to make obvious the invention of claim 39.

We further note that Appellant's arguments that the rejection is in error because neither Drazynski nor Kazmi specifically mentions a 1280 millisecond repetition period as claimed, are confined to its arguments of whether either reference teaches away, or whether the 1280 millisecond repetition period provides unexpected results. We have addressed those disputes, *supra*, and additionally note that the Federal Circuit has found obviousness in combining references where, as here, both references recognize a variable as one that can be varied to have a predictable effect on the result, where the primary reference does not teach away from the proposed modification, and where no unexpected results have been shown. *In re Urbanski*, 809 F.3d 1237, 1242–1244 (Fed. Cir. 2016).

Accordingly, we affirm the Examiner's rejection of claim 39. Appellant does not separately argue claims 40, 42, 45, 47, 50, 54, and 57–59, which therefore stand or fall with claim 39. 37 C.F.R. § 41.63 (c)(1)(iv). Consequently, we sustain the Examiner's rejection of claims 39, 40, 42, 45, 47, 50, 54, 57–59.

Appellant argues against claims 46 and 53, rejected over the base combination, and further in view of Lee, on the same reasoning as presented against the rejection of claim 39. Appellant argues against claims 48, 49, 55, and 56, rejected over the base combination, and further in view of Kim, on

the same reasoning as presented against the rejection of claim 39. For the same reasons discussed in sustaining the rejection of claim 39, we sustain the Examiner's rejection of claims 46, 48, 49, 53, 55, and 56.

B. Claim 41

In its brief, Appellant separately argues that the Examiner's rejection of claim 41 over the combination of Drazynski and Kazmi is in error because the combination does not teach a "step of selecting a number of measurement gaps for each measurement gap burst based on a cell capacity limit for a serving cell for the mobile terminal." Appeal Br. 27. Appellant argues that the Examiner's reliance on Drazynski is in error because Drazynski teaches only that the mobile terminal (UE) "may turn on the measurement procedure when it does not get sufficient resources or when the base station indicates an overload situation." *Id.* Appellant argues that this "falls far short" of teaching a network node that selects a number of measurements gaps per burst, based on a cell capacity limit. Appeal Br. 27.

In the Answer, the Examiner finds Drazynski teaches that the network node (eNB) selects a number of measurement gaps based upon the existence or nonexistence of a cell capacity overload condition. Ans. 9. The Examiner finds Drazynski sets either a particular number of gaps or zero gaps based on the cell capacity being overloaded or not. *Id.* (citing Drazynski ¶ 49. The Examiner characterized Drazynski's reliance on a cell capacity as being "disclosed throughout" Drazynski, including paragraphs 30, 31, and 37. Final Act. 12.

In the Reply Brief, Appellant responds, "the UE transitions from using the pattern to using no pattern at all, based on this overload indication." Reply Br. 13. Appellant further argues that Drazynski's paragraph 49

describes a different embodiment than Drazynski's paragraph 52, which "describes an embodiment where . . . the UE transitions from using the pattern to using no pattern at all, based on [an] overload indication" from the eNB. *Id.* Appellant further argues that claim 41 requires the network node, e.g., the eNB, to perform the selection, unlike the embodiment of Drazynski's paragraph 52 in which the mobile terminal selects whether the measurement is performed or not based on the overload condition. *Id.* Appellant further argues that there is no reason to combine the embodiment of Drazynski's paragraph 49 in which the eNB performs a selection of an appropriate number of measurement gaps. *Id.*

We are not persuaded by this argument. Independent claim 39 provides, "in a network node," a step of "selecting a measurement gap pattern to be used by the mobile terminal." Appellant has not argued that the combination of Drazynski and Kazmi fails to teach or suggest the entity performing the "selecting" recited in claim 39. Claim 41 merely adds that the measurement gap "selecting" be based upon the cell capacity limit of the mobile terminal. Drazynski's paragraph 52 describes that the eNB (the network node) may indicate an overload (of cell capacity) that causes the UE (the mobile terminal) to set a first procedure (of measurements). Drazynski describes the first procedure as "how often" measurements are performed. Drazynski ¶ 39. The eNB is described as sending the command to the UE to perform the measurement according to that first procedure. *Id.* ¶ 42; *see also* ¶ 25 (the eNB "controlling . . . radio signal level measurements performed by a user terminal, carrying out its own measurements and performing handover based on the measurements") We agree with the Examiner that paragraph 52 of Drazynski, in context, describes the network

node selecting a procedure specifying how often measurements are performed, i.e., a measurement pattern, and commanding the mobile terminal to perform the measurement according to that procedure, based upon the cell capacity limit (overload) of the terminal. *See* Final Act. 12. In view of the foregoing, we are not persuaded that the Examiner errs in finding that Drazynski's selection of a particular number of gaps, arranged in a pattern, based on a non-overload of the cell, teaches or suggests selecting a number of measurements gaps for each measurement gap burst based on a cell capacity limit, as recited in claim 41.

CONCLUSION

For the above-described reasons, we affirm the Examiner's rejection of claims 39–42, 45–50, and 53–59 as being obvious over the applied references under 35 U.S.C. § 103, as detailed in the following decision summary.

DECISION SUMMARY

In summary:

Claims Rejected	**35 U.S.C. §**	**References/Grounds**	**Affirmed**	**Reversed**
39–42, 45, 47, 50, 54, 57–59	103	Drazynski, Kazmi	39–42, 45, 47, 50, 54, 57–59	
46, 53	103	Drazynski, Kazmi, Lee	46, 53	
48, 49, 55, 56	103	Drazynski, Kazmi, Kim	48, 49, 55, 56	
Overall Outcome			39–42, 45–50, 53–59	

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED