

*In the United States Patent Trial and
Appeal Board*

**Apex Beam Tech. LLC
Patent Owner's Presentation**

**IPR2023-00598
U.S. Patent No. 10,462,767**

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**Before: John D. Hamann
Sean P. O'Hanlon
Scott Raevsky**
Administrative Patent Judges



DEMONSTRATIVE EXHIBIT – NOT EVIDENCE

Exemplary Challenged Claim

Claim 1

In a User Equipment (UE) for paging, comprising:

monitoring a first signaling in X time intervals; and

receiving a first radio signal;

wherein X is a positive integer; the first signaling is used for determining scheduling information for the first radio signal; the scheduling information comprises at least one of {occupied time-frequency resources, adopted Modulation Coding Scheme (MCS), subcarrier spacing of subcarriers in occupied frequency domain resource}; the first radio signal carries a paging message; the frequency domain resource used for transmitting the first signaling belongs to a first subband; the first subband comprises a positive integer number of consecutive subcarriers in frequency domain; and at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband} is used for determining the X time intervals.

Grounds

Ground 1 Two Reference Combination	Ground 2 Three Reference Combination
Claims 1, 4-6, 9-11, 14-16, 19, and 20 are not Obvious under 35 U.S.C. 103(a) over You in view of Liu	Claims 2, 3, 7, 8, 12, 13, 17, and 18 are not Obvious under 35 U.S.C. 103 over You in view of Liu and Mallick

Claim Construction Dispute

“time intervals” = variable ranges of time

PO:

- time intervals = “variable ranges of time”
- Competing experts agree time intervals are not fixed

Petitioner’s contention that POSITA understands time intervals to include fixed times contradicts their own expert’s understanding and contradicts lexicography set forth in the patent specification.

“time intervals” = variable ranges of time

Petitioner’s expert confirms “time intervals” is not a term of art and the meaning of “time intervals” depends on the context of Claim 1.

14	Q	Is "time interval" a term of art?
22	A	A person of ordinary skill in the
23		art with a master's degree and five years of
24		work experience would apply that skill to
25		understand what X time intervals means in
2		the context of Claim 1. And that's been
3		what <u>my testimony has been about, not</u>
4		<u>whether the term "time interval" has a</u>
5		<u>particular meaning to a person of ordinary</u>
6		<u>skill.</u>

“time intervals” = variable ranges of time

Petitioner’s own expert conceded to PO construction during his deposition:

16 Q And is it your testimony that the
17 DCI monitoring occasions in Liu is the
18 disclosed time interval or the claimed time
19 interval?

20 A So it's my opinion that the
21 claimed X time interval defines -- the
22 X time intervals rather -- define the -- the
23 ranges of time in which a DCI monitoring
24 occasion is included in the downlink
25 subframe.

2 Q So in your opinion, X time
3 intervals is not a direct mapping to DCI
4 monitoring occasions; is that right?

5 A The X time intervals are the
6 ranges of time within a subframe within
7 which a DCI monitoring occasion appears
8 within the subframe.

“time intervals” = variable ranges of time

Lexicography: The specification explicitly defines “time intervals” as having variable ranges of time. A fixed time interval is inconsistent with the spec.

In one embodiment, any two of the X time intervals have an equal time length.

In one embodiment, two of the X time times have different time lengths.

In one embodiment, any one of the X time intervals comprises M Orthogonal Frequency Division Multiplexing (OFDM) symbols, M is a positive integer smaller than 14.

In one embodiment, any one of the X time intervals comprises M OFDM symbols, M is a positive integer smaller than 7.

“time intervals” = variable ranges of time

- Petitioner’s “fixed” range of time is inconsistent with the Claims.
- The claims require time intervals to be **determined** and thus variable;
- The lengths of the X time intervals within a slot (or across slots), subframe (or across subframes), or frame (or across frames) are different lengths.
- The diversity of lengths among the X time intervals requires that time intervals are variable ranges of time.

“time intervals” = variable ranges of time

Petitioner reads out claim requirements and ignores spec definition:

- Claim 1: “at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband} is ***used for determining*** the X time intervals”
- The UE uses numerologies such as: “location of the first subband in the frequency domain” and/or “subcarrier spacing of subcarriers included in the first subband” **to determine X time intervals** because those intervals are not fixed quantities (*i.e.*, are variables)
- If time intervals were fixed, they would not need to be determined. **//renders claimed determinations meaningless**

“time intervals” = variable ranges of time

Lexicography: LTE versus 5G: the patent specification distinguishes between LTE fixed and 5G variable.

a paging message in the PF. The radio frame in LTE has a fixed time length of 10 milliseconds, and the subframe has a fixed time length of 1 millisecond. Since an LTE network generally employs a single numerology or the numerology basically does not change in a long time in the network, the definition of the possible time of paging using the PF and PO having a fixed time length can simplify the design of system, under the premise of guaranteeing the paging capacity and not increasing the power consumption of UE. Under the 5G NR, a network supports different numerologies, thus, a given time length, for example, 1 millisecond, probably includes multiple basic scheduling units (for example, slot). If the legacy design of the current paging opportunity is employed, the UE would detect the paging message different times for different numerologies within the 1 millisecond. Therefore, power consumption in some numerology would be greatly increased. Meanwhile, the paging capacity varies greatly due to the adoption of different numerologies.

In order to solve the above design problem of paging when multiple numerologies are employed in the 5G NR, the present disclosure provides a solution, which determines the

IMPROPER NEW REPLY ARGUMENTS

Petitioner's Reply raises new arguments:

- Petition should have addressed proper construction of time interval; no basis to formulate new unauthorized grounds and rationale for obviousness
- Petitioner raises new mapping of *Liu* to “time intervals” which rises to the level of a “newly raised rationale to combine the prior art references that was not expressed in the petition” that is barred by the Board (*see* 37 C.F.R. § 42.23(b) Patent Trial and Appeal Board Consolidated Practice Guide at 74).

**No Motivation to Combine
*You or Mallick with Liu***

No Motivation to Combine

A POSITA would not combine the 4G/LTE System of *You* or *Mallick* with the 5G/NR System of *Liu*

- 5G is a progression from 4G
- There are various and substantial differences which make the combination of 4G and 5G not possible
- A POSITA would not regress to 4G/LTE again where those differences were already considered by standard setting organizations, such as 3GPP, at the time of transitioning to 5G

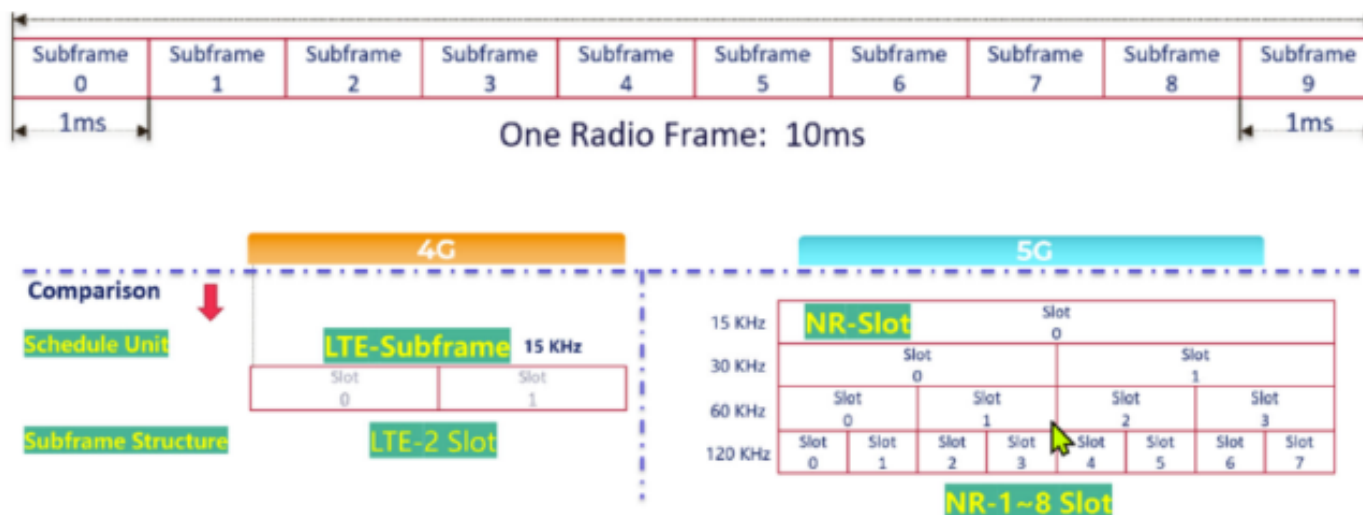
No Motivation to Combine

4G/LTE Systems have a single subcarrier spacing and the number of slots in a subframe are always fixed

- A frame is made up of 10 subframes each of 1 ms, and the frame duration is 10 ms
- Each subframe carries 2 slots, so 20 slots comprises a complete frame

5G/NT Systems have subframes as a numerology independent time reference while a slot is a typical dynamic scheduling unit

No Motivation to Combine



Id. (citing <https://www.linkedin.com/pulse/4g-vs-5g-key-technology-differencespost-video-mohamed-eladawi>)

No Motivation to Combine

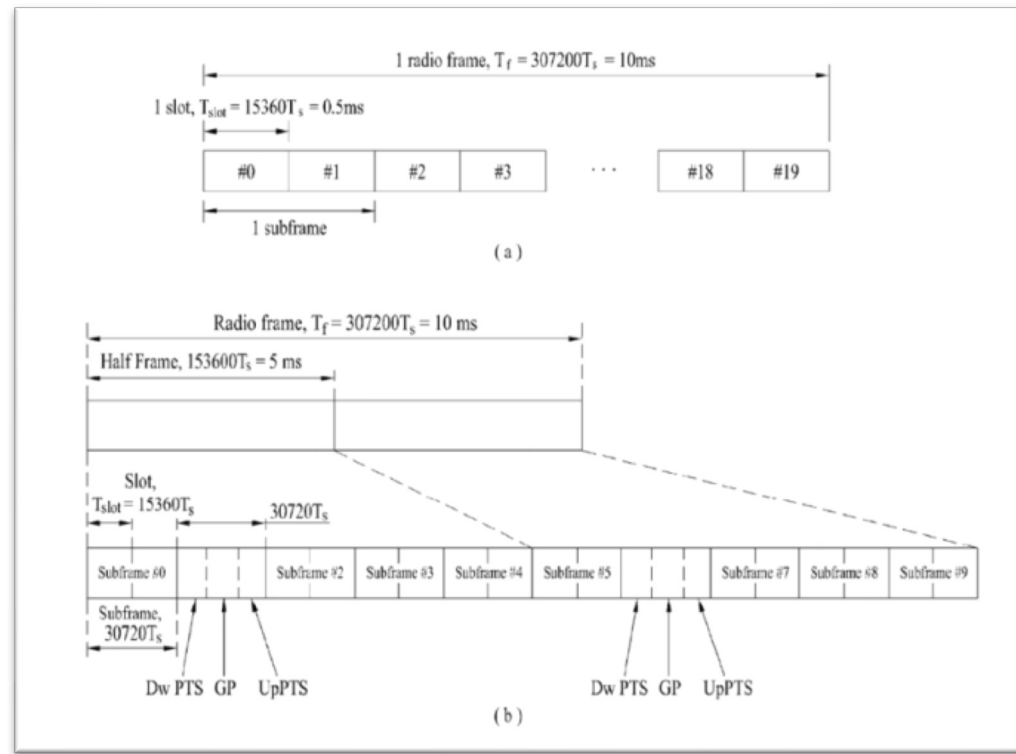
The '767 Patent is **an improvement to a basic 5G/NR system**.

In order to solve the above design problem of paging when multiple numerologies are employed, the present disclosure provides a solution, which determines the

No Motivation to Combine

A POSITA would not combine *You* or *Mallick* with *Liu* to create the 5G/NR System of the '767 Patent.

You is a typical 4G/LTE System which divides 10 ms frames into 1 ms subframes:



Paper 13 at 16; Ex. 1005, Fig. 1

No Motivation to Combine

This is admitted by Petitioner's expert:

- “paging control and scheduling in only particular portions of a subframe and not a search space that is the entirety of a subframe, but a search space that is only a subframe [] is not something expressly disclosed in *You*” because *You* discloses a 4G/LTE system
- Scheduling in particular portions of a subframe is “possible if *You* were to be [improperly] combined with other art such as *Liu*”
- “*You* is not expressly teaching that a UE should search through only a particular portion of a subframe”
- “different portions of a subframe in your hypothetical would have different symbol lengths, which is not something expressly disclosed in *You*”

Paper 13 at 17; Ex. 2005, 60:3-25, 61:2-11

No Motivation to Combine

Like *You, Mallick* is a 4G/LTE system:

- [0053] Approaches to lower the cost of LTE presently regard the volume of products as the primary reason. The impact of volume can be seen in two possible ways, depending on how low-cost MTC is developed. Firstly, if low-cost MTC may be very similar to mainline LTE and included in LTE chipsets, MTC has the benefit of the volume of LTE. Secondly, a low-cost MTC based on LTE may have significantly lower cost than mainline LTE. Although it appears not to have the volume benefit of LTE, the volume of MTC devices can be even larger due to a potentially greater number of supported MTC applications and scenarios.
- [0054] In this respect, the following approaches to lower the cost of LTE, i.e. defining low-cost MTC are discussed and found to have significant UE cost impact (for further details on low-cost MTC devices, see for example 3GPP, R1-112912, Huawei, HiSilicon, CMCC: "Overview on low-cost MTC UEs based on LTE"(NPL 6), section 4, available at <http://www.3gpp.org> and incorporated herein by reference):
- [0055] - Reduction in supported bandwidth for the low-cost LTE: The low cost of 1.4 MHz (6 RB) downlink bandwidth could cover most application scenarios of MTC. However, 3 MHz (15 RB) or 5 MHz (25 RB) could be considered given that the complexity does not increase much. Given that the uplink may have a larger requirement for MTC services, the possibility of reduced transmit power, and small baseband complexity (relative to downlink reception), any reduction in minimum transmission bandwidth in the UE should be carefully justified.
- [0056] - Modified PDCCH-related design for the low-cost LTE to simplify the PDCCH blind decoding and give efficient channel access for a large number of MTC devices. A reduction in maximum bandwidth (e.g., 1.4MHz) decreases PDCCH blind decoding naturally.

No Motivation to Combine

Mallick describes periodic subframes as its basic timing scheduling unit:

[0030] Therefore, for case A and B, with $N_s=1$ and $i_s=0$, the table would yield the subframe number 9, such that the UE for cases A and B would be paged regularly in subframe 9 of radio frame 76 of every paging cycle; i.e. for case A next radio frame 332 and for case B next radio frame 204 etc. For case C, the UE would be paged regularly in subframe 4 of radio frame 19 of every paging cycle, i.e. next radio frame 147 etc.

No Motivation to Combine

Liu is a 5G/NR system:

Liu criticizes the faults of *You / Mallick* and other conventional 4G/LTE Systems

[0004] In current LTE system, DCI monitoring is performed per subframe or per slot if the UE is in on duration of the discontinuous reception (DRX) active state. The DRX periodicity can be configured by higher layers.

[0005] However, with the current DCI monitoring solution in LTE, it cannot support the DCI monitoring occasion change due to numerology and scheduling unit size.

Paper 13 at 18; Ex. 1007, ,[0030]

No Motivation to Combine

The '767 Patent and *Liu* are directed towards 5G/NR systems

You and *Mallick* are 4G/LTE Systems and inapposite to the claims and disclosure of the '767 Patent

4G and 5G systems utilize different scheduling units

No Motivation to Combine

The specification of the '767 Patent describes that 4G/LTE and 5G/NR, even during development, had different principles of operation

a paging message in the PF. The radio frame in LTE has a fixed time length of 10 milliseconds, and the subframe has a fixed time length of 1 millisecond. Since an LTE network generally employs a single numerology or the numerology basically does not change in a long time in the network, the definition of the possible time of paging using the PF and PO having a fixed time length can simplify the design of system, under the premise of guaranteeing the paging capacity and not increasing the power consumption of UE. Under the 5G NR, a network supports different numerologies, thus, a given time length, for example, 1 millisecond, probably includes multiple basic scheduling units (for example, slot). If the legacy design of the current paging opportunity is employed, the UE would detect the paging message different times for different numerologies within the 1 millisecond. Therefore, power consumption in some numerology would be greatly increased. Meanwhile, the paging capacity varies greatly due to the adoption of different numerologies.

No Motivation to Combine

The Board cannot ignore that 5G developers made the decision not to incorporate certain elements of 4G/LTE standard in the 5G/NR standard because incorporating such elements from the 4G/LTE prior art (*You* and *Mallick*) to achieve Petitioner's combination **would change the principle of operation of the 5G/NR prior art (*Liu*)**. See Paper 13 at 14-17; Ex. 1041, 36:5-37:4; 37:18-38:18

Impermissible Hindsight: Petitioner admits that “the only different that Apex identified between 4G/LTE and 5G/NR is the very thing that Samsung's combination modifies based on *Liu*...”

Paper 17 at 11-14

***You and Liu* Do Not Render
Claims 1, 4-6 Obvious**

“monitoring a first signaling in X time intervals”

You does not disclose “monitoring a first signaling in X time intervals”

- *You*’s subframes (*i.e.*, fixed ranges of time) are not X time intervals, which are variable ranges of time
- The length of the time intervals are not necessarily equal and the time intervals are not necessarily periodic in time

“monitoring a first signaling in X time intervals”

The '767 Patent discloses the shortcomings of the 4G/LTE system of *You*

In existing LTE systems, transmission opportunities of paging are defined through a Paging Frame (PF) and a Paging Occasion (PO) uniformly. The PF is a radio frame which is likely to transmit a paging message, and the PO is used for determining a subframe which is likely to transmit a paging message in the PF. The radio frame in LTE has a fixed time length of 10 milliseconds, and the subframe has a fixed time length of 1 millisecond. Since an LTE network generally employs a single numerology or the numerology basically does not change in a long time in the network, the definition of the possible time of paging using the PF and PO having a fixed time length can simplify the design of system, under the premise of guaranteeing the paging capacity and not increasing the power consumption of UE. Under the 5G

“monitoring a first signaling in X time intervals”

The '767 Patent discloses the shortcomings of the 4G/LTE system of *You*

- Failure to include variable ranges of time
- 4G/LTE systems like *You* restrict the time periods for transmission opportunities for paging in subframes
- Petitioner's expert testified “paging control and scheduling . . . in only a portion of a subframe [] is not something expressly disclosed in *You*” because *You* discloses a 4G/LTE system

“monitoring a first signaling in X time intervals”

Liu does not disclose this limitation

- *Liu*’s description of “monitor[ing] one or more DCI monitoring occasions at the slot level” is inapposite to the claimed “X time intervals”
- The ’767 Patent explains the prior art 5G/NR systems utilize different numerologies to compute smaller scheduling units such as slots within 1 ms subframes in which to detect the paging message
- The slots are fixed ranges of time, and thus cannot be X time intervals

“monitoring a first signaling in X time intervals”

Liu does not disclose this limitation

- The '767 Patent describes a solution to the problem of the 5G / NR systems employed in *Liu*

In order to solve the above design problem of paging when multiple numerologies are employed in the 5G NR, the present disclosure provides a solution, which determines the transmission opportunities of paging according to the numerology employed by the paging, thereby guaranteeing that the UE has a small difference in the complexity and power consumption of monitoring the paging message under different numerologies and that the paging capacity basically remains the same. It should be noted the embodiments of the

“monitoring a first signaling in X time intervals”

Liu does not disclose this limitation

- *Liu* may describe slot-level monitoring of DCI, but does not disclose either the number (X) of time intervals or the duration of each of the X time intervals, which could be variable (*i.e.*, different duration for each interval)

“wherein X is a positive integer”

Because *Liu* and *You* do not disclose, teach, or suggest “monitoring a first signaling in ***X time intervals***,” it cannot disclose, teach or suggest “wherein X is a positive integer”

Petitioner also changes positions related to its construction of “positive integer”

“wherein X is a positive integer”

Petitioner also changes positions related to its construction of “positive integer”

- The Petition describes *You* in view of *Liu* teaches that “the paging M-PDCCH is monitored in ***one or more (i.e., a positive integer)*** time intervals”
- However, Petitioner’s expert testified that “in the context of Claim 1, the number one is not a positive integer”
- Dr. Bims’ contradictory testimony is an attempt to match Petitioner’s matching claim construction in the related district court litigation (“X time intervals . . . wherein X is a positive integer” as “plural, positive integer number of time intervals”

“wherein X is a positive integer”

Figure 7 of the '767 Patent explicitly points to the case where “X=1 time interval in the first time window” meaning that “positive integer” in the context of claim 1 means “one or more”

	Index of X=1 time interval in the first time window			
	Feature ID=a	Feature ID=b	Feature ID=c	Feature ID=d
Y=1	0	0	0	0
Y=2	0	1	0	1
Y=4	0	1	2	3
Y=8	1	3	5	7
Y=16	2	6	10	14

FIG. 7

“the first signaling is used for . . .”

Because *Liu* and *You* do not disclose, teach, or suggest “monitoring a first signaling in X time intervals,” it cannot disclose, teach or suggest “the first signaling is used for determining scheduling information for the first radio signal”

“the scheduling information comprises . . .”

Because *Liu* and *You* do not disclose, teach, or suggest “the first signaling is used for determining scheduling information,” it cannot disclose, teach, or suggest “the scheduling information comprises at least one of {occupied time-frequency resources, adopted Modulation Coding Scheme (MCS), subcarrier spacing of subcarriers in occupied frequency domain resource}

“the frequency domain resource used for . . .”

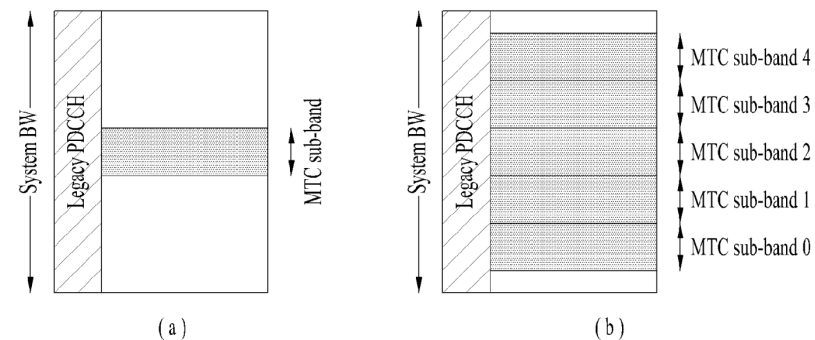
Because *Liu* and *You* do not disclose, teach, or suggest “monitoring a first signaling in X time intervals,” it cannot disclose, teach, or suggest “the frequency domain resource used for transmitting the first signaling belongs to a first subband”

“the frequency domain resource used for . . .”

Petitioner relies only on *You* for this limitation

- Specifically, Petitioner relies on Figure 6 of *You*, but the specification makes clear the alleged disclosed subband corresponds ***to a singular subframe*** in which M-PDCCH is monitored

[Fig. 6]



Paper 13 at 24-25; Ex. 1005, Fig. 6.

“the frequency domain resource used for . . .”

Petitioner relies only on *You* for this limitation

[176] As one method for reducing the cost of the MTC UE, an operation of the MTC UE may be performed at a reduced UE downlink and uplink bandwidth of 1.4 MHz, for example, regardless of an operating system bandwidth of a cell. At this time, a subband (narrowband) for operating the MTC UE may always be located at the center (e.g., 6 center PRBs) of a cell as shown in FIG. 6(a), or several subbands for MTC may be provided for one subframe to multiplex MTC UEs as shown in FIG. 6(b), whereby the UEs may use their respective subbands different from each other or the UEs use the same subband not the subband of 6 center PRBs.

Paper 13 at 25; Ex. 1005, [0176].

“the frequency domain resource used for . . .”

Petitioner relies only on *You’s 4G/LTE disclosure* for this limitation

- Time intervals are not subframes
- Under Petitioner’s own construction of “X” or “positive integer” of time intervals, meaning “more than one subframe,” *You’s 4G/LTE disclosure* would not disclose this claim limitation because it only describes **one** subframe per subband

“at least one of {location of the first subband . . .}”

Because *Liu* and *You* do not disclose, teach, or suggest “X time intervals” or “a first subband,” it cannot disclose, teach, or suggest “at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband} is used for determining the X time intervals”

“at least one of {location of the first subband . . .}”

Petitioner relies only on *Liu* for this limitation

- *Liu* only discloses periodic slots with fixed length for DCI monitoring sessions, which are not X time intervals

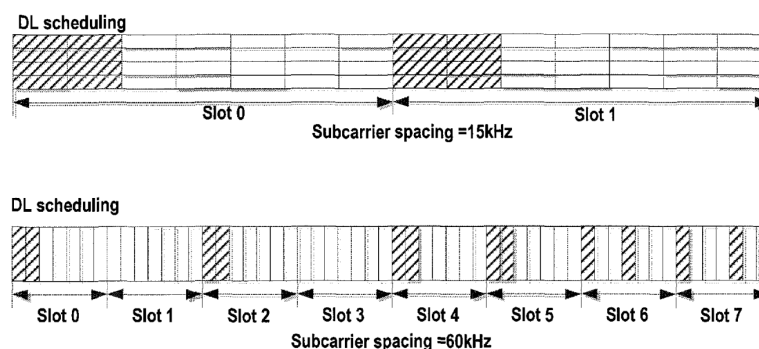


Fig. 2

“at least one of {location of the first subband . . .}”

Petitioner relies only on *Liu* for this limitation

- A POSITA would under “determining the X time intervals” to include determining the number of time intervals (*i.e.*, X), the duration of each of the X time intervals, and the spacing between each of the X time intervals
- *Liu* fails to disclose all 3 aspects using at least one of “a location of the first subband in frequency domain or subcarrier spacing of subcarriers included in the first subband to determine the X time intervals”

“at least one of {location of the first subband . . .}”

Petitioner relies only on *Liu* for this limitation

- According to Petitioner, *Liu*'s subcarrier spacing shows the quantity and fixed duration of each of *Liu*'s slots, and everyone of these slots discloses the X time intervals
- Petitioner's understand contradicts what a POSITA would understand to be X time intervals, which are X-number of variable ranges of time
- Slots have a fixed duration and occupy the entirety of a subframe (as show in Fig. 2 of *Liu*) and would render the term X time intervals redundant and eliminate possibility of spacing between each of the time intervals

“receiving a second radio signal . . .”

Because *Liu* and *You* do not disclose, teach, or suggest “at least one of {location of the first subband . . .}” it cannot disclose, teach, or suggest “receiving a second radio signal wherein the second radio signal is used for determining at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband}”

“receiving a second radio signal . . .”

Petitioner relies on *You* in combination with *Liu* for the entirety of the claim limitation but only relies on *You*’s SIB to disclose “the second radio signal” aspect

- A POSITA would understand that *You* is a 4G/LTE system so its SIB would not determine at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband, which are 5G/NR numerology metrics”
- *You*’s SIB merely “includes parameters needed to determine if a specific cell is suitable for cell selection, as well as information about time-domain scheduling of other SIBs”

“the first subband belongs to one of the Q subbands”

Because *Liu* and *You* do not disclose, teach, or suggest “a first subband,” it cannot disclose, teach, or suggest “the first subband belongs to one of the Q subbands” as required by Claim 5

“the feature ID of the monitor . . .”

Because *Liu* and *You* do not disclose, teach, or suggest “the first signaling . . .,” it cannot disclose, teach, or suggest “the feature ID of the monitor of the first signaling is used for determining the first subband in the Q subbands” as required by Claim 5

You and Liu Do Not Render Obvious Limitations in Claim 1

Limitations “monitoring a first signaling in X time intervals,” “at least one of {location of the first subband in frequency domain, subcarrier spacing of subcarriers included in the first subband} is used for determining the X time intervals”

Petitioner equates “variable” with the fact “that switching the numerology (*i.e.*, subcarrier spacing) will change the DCI monitoring occasions” but no “determination” is performed as required by Claim 1, and therefore time intervals are not variables

You and Liu Do Not Render Obvious Limitations in Claim 1

There is a fixed range of time associated with each numerology

Petitioner cites to Figure 2 of *Liu* to “depict[] how the slot length and corresponding DCI monitoring occasions (the shaded portions) vary depending on the subcarrier spacing, such that the claimed “determining” is not necessary ***in contravention of Claim 1.***

You and *Liu* Do Not Render Obvious Limitations in Claim 1

Petitioner ignores that Claim 1 requires that ***the user equipment (UE)*** determines the time intervals

14 So yeah, I -- I agree that that's
15 the transmitting DCI configuration parameter
16 to the terminal. It contains information
17 about where these DL scheduling should be
18 located.

19 I guess what I was looking for --
20 and haven't really seen it here -- is that
21 this information is determined by the node --
22 the node B, whereas that's different than
23 what's in the '767 patent where the
24 subcarrier spacings are determined by the --
25 or the X time intervals are determined by

1 reference to the subcarrier spacings in the
2 UE.

3 It's -- a fundamental difference
4 between the Liu patent and the '767 patent is
5 that in the Liu patent, the node B is making
6 the determination about where all the
7 scheduling is occurring. But in the '767
8 patent, the claim clearly says that, "In at
9 least one location of first sub band in
10 frequency domain, subcarrier spacing or
11 subcarriers included in the first sub band is
12 used for determining the X time intervals,
13 and that's in a method of a UE, user
14 equipment, for paging."

You and *Liu* Do Not Render Obvious Limitations in Claim 1

Petitioner ignores that Claim 1 requires that ***the user equipment (UE)*** determines the time intervals

4 A The way I read Liu is that the node
5 transmits the information about what to do,
6 and the UE just simply accepts that and
7 enacts that.

8 So it's -- the UE just simply takes
9 instructions from the node B, whereas the key
10 fundamental difference is in that '767 patent
11 it is the UE that's making the determination,
12 and that's the terminology used here in the
13 claim.

14 It's -- subcarrier's location on
15 first sub band -- I'll start over.

16 "Location of the first sub band in
17 frequency domain, subcarrier spacing or
18 subcarriers included in the first sub band is
19 used for determining the X time intervals."

20 So the determination is made in the
21 UE. That's different than what Liu teaches,
22 which is that it's -- that a termination is
23 made in the node B. That's the way I read
24 Liu.

You and *Liu* Do Not Render Obvious Limitations in Claim 1

Petitioner ignores that Claim 1 requires that ***the user equipment (UE)*** determines the time intervals

10 I see that the DCI configuration parameters
11 are transmitted, and there's nothing in Liu
12 that teaches that the UE does the
13 determining.

14 It's just that in Liu, the UE
15 accommodates the subcarrier spacing by -- by
16 conforming to these DCI configuration
17 parameters. In the '767 patent, the UE
18 determines the X time intervals according to
19 the sub band frequency subcarrier spacing of
20 subcarriers.

21 There's a fundamental difference in
22 that Liu seems to just accommodate them,
23 whereas the '767 actually does the
24 determining according to the subcarrier's
25 spacing.

You and *Liu* Do Not Render Obvious Limitations in Claim 1

Petitioner ignores that Claim 1 requires that ***the user equipment (UE)*** determines the time intervals

12 A Well, again, my point is that Liu
13 says that it will send the DCI configuration
14 about how it should be structured so that the
15 UE can accommodate the -- the numerology, but
16 it doesn't say that the UE will determine
17 according to the subcarrier spacings.

18 So that's a fundamental difference
19 that there's additional information in that
20 the '767 patent teaches that would -- that
21 will allow the UE to determine, to do the
22 determining. This simply shows that the UE
23 in Liu was accommodating the -- their
24 numerology, but it's getting instructions
25 from the node.

***You, Liu, & Mallick* Do Not
Render Claims 2 & 3 Obvious**

“wherein any one of the X time intervals . . .”

Because *Liu* and *You* do not disclose, teach, or suggest “time intervals” it cannot disclose, teach, or suggest “wherein any one of the X time intervals belongs to a first time window in time domain”

“wherein any one of the X time intervals . . .”

Mallick does not cure the deficiency of *You* with *Liu* because Mallick is a 4G/LTE system, and only describes a periodic subframe per paging cycle

[0030] Therefore, for case A and B, with $N_s=1$ and $i_s=0$, the table would yield the subframe number 9, such that the UE for cases A and B would be paged regularly in subframe 9 of radio frame 76 of every paging cycle; i.e. for case A next radio frame 332 and for case B next radio frame 204 etc. For case C, the UE would be paged regularly in subframe 4 of radio frame 19 of every paging cycle, i.e. next radio frame 147 etc.

“wherein any one of the X time intervals . . .”

Petitioner’s expert confirmed that the subframe 9 in Mallick “in which paging scheduling information would be delivered to the UE” is repeated for each paging cycle

16 Q Do you see where it says:
17 Therefore, for case A and B with NS equals 1
18 and i_s equals zero, the table would yield
19 the subframe number 9 such that the UE for
20 cases A and B would be paged regularly in
21 subframe 9 of radio frame 76 of every paging
22 cycle?

23 Is it your understanding that this
24 description refers to using a feature ID to
25 determine a subframe in which a paging

2 message is transmitted to the UE?

3 A Paragraph 30 is written in the
4 context of describing a DRX cycle, which
5 paragraph 30 calls a paging cycle. And a
6 paging cycle spans multiple radio frames.

7 So what this is saying is that
8 subframe 9 of radio frame 76, in each and
9 every one of these cycles is what would be
10 the subframe in which the paging scheduling
11 information would be delivered to the UE. So
12 this is not indicating the location of a
13 single subframe but rather the repetition of
14 a subframe in each DRX paging cycle.

“wherein any one of the X time intervals . . .”

Mallick does not disclose the claimed “time intervals” because a subframe is not the claimed time interval, and because the time interval is variable and not predictably subject to periodicity (*e.g.*, every subframe 9) like in Mallick

“the first time window is divided into Y time intervals”

Because *Liu*, *You*, and *Mallick* do not disclose, teach, or suggest “time intervals” it cannot disclose, teach, or suggest “the first time window is divided into Y time intervals”

“the X time intervals are X time intervals . . .”

Because *Liu*, *You*, and *Mallick* do not disclose, teach, or suggest “time intervals” it cannot disclose, teach, or suggest “the X time intervals are X time intervals of the Y time intervals, Y being a positive integer not smaller than X”

“the subcarrier spacing of subcarriers . . .”

Because *Liu*, *You*, and *Mallick* do not disclose, teach, or suggest “the first subband” or “Y time intervals” it cannot disclose, teach, or suggest “the subcarrier spacing of subcarriers included in the first subband is used for determining Y”

“a feature ID of a monitor of the first signaling . . .”

Because *Liu*, *You*, and *Mallick* do not disclose, teach, or suggest “the first signaling” or “time intervals” it cannot disclose, teach, or suggest “a feature ID of a monitor of the first signaling is used for determining the X time intervals in the Y time intervals”

“the feature ID of a monitor of the first signaling . . .”

Because *Liu*, *You*, and *Mallick* do not disclose, teach, or suggest “the first signaling” or “time windows” that include “time intervals” it cannot disclose, teach, or suggest “the feature ID of the monitor of the first signaling is used for determining the first time window in the Z time windows”