

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TESLA, INC.,

Petitioner,

v.

INTELLECTUAL VENTURES II LLC,

Patent Owner.

Case No. IPR2025-00218
U.S. Patent No. 10,136,416

**DECLARATION OF DR. GARY LOMP IN SUPPORT OF
PATENT OWNER'S PRELIMINARY RESPONSE**

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I, Dr. Gary Lomp, do hereby declare:

I. INTRODUCTION

1. I am making this declaration at the request of Intellectual Ventures II, LLC (“Intellectual Ventures”) in the matter of the *Inter Partes* Review (“IPR”) proceedings before the United States Patent and Trademark Office (“USPTO”) of U.S. Patent No. 10,136,416 (“the ‘416 Patent”) to provide expert technical opinions with respect to the ‘416 Patent.

2. I am being compensated for my work in this matter at my standard hourly rate of \$450 for such consulting services. My compensation in no way depends on the outcome of this case, and I have no financial interest in the outcome.

3. In preparing this Declaration, I considered the following materials, the subject matter of which are all within the scope of my education and professional experience:

- The ‘416 Patent, Ex. 1001;
- The Petition for *Inter Partes* Review of U.S. Patent No. 10,136,416 (“Pet.”);
- the Declaration of Dr. Ding;
- U.S. Patent No. 8,761,814 (Ex. 1005)(“Kim”); and
- U.S. Patent No. 8,144,735 (Ex. 1006)(“Vayanos”).

II. PROFESSIONAL BACKGROUND

4. Based on my qualifications, education, knowledge, expertise, experience, and work background, I believe I am qualified to offer opinions relating to the technology described in the '416 Patent. Exhibit 2002 is a copy of my current *curriculum vitae* ("CV"), detailing my education and experience. Additionally, the following overview of my background pertains to my qualifications for providing expert testimony in this matter.

5. I am currently an Adjunct Professor in Wireless Communications at the NYU Tandon School of Engineering and President of TekTactiks, a research and expert consulting company. My job duties include directing and performing research in, and technical evaluation of, advanced communication system design, especially new cellular technologies. I have over 45 years of experience in the field of wireless telecommunications, including advanced military communications systems, commercial satellite, WiFi and cellular systems research and development. I have over 20 years of experience in providing expert services in the field of wireless telecommunications. I hold Ph.D., Master's and Bachelor's degrees in Electrical Engineering, all from the Polytechnic Institute of New York (now part of NYU Tandon School of Engineering).

6. I am a named inventor on over 100 issued U.S. Patents in the field of wireless telecommunications. Most of these patents pertain to wireless

communication, including communication system architecture, communication system signal processing and communication system protocols.

7. In addition to my technical experience in the field of wireless communications systems, I have been a principal and executive in multiple wireless technology corporations. In the late 1980s and early 1990s, I was Vice President and Chief Scientist at SCS Mobilecom, a wireless company that developed new technology based on spread spectrum technologies and advanced signal processing (DSP) techniques. Following the acquisition of SCS Mobilecom by InterDigital Communications, Corporation in 1992, I held various leadership roles at InterDigital, including General Manager of the Wireless Products Business Unit and Executive Vice President and Chief Technology Officer, where I helped develop 2G and 3G technologies. After InterDigital, I served in leadership positions at several wireless startups, including Symbol Technologies (where I led the Wide Area Wireless technology division), LayerOne Wireless Technologies Inc. (where I served as CEO) and incNetworks (where I served as CTO). I am also the Founder and President of The TekTacktics Group, Inc. a private company that has provided expert services and telecommunications consulting in the Telecommunications industry for the past 15 years.

8. In terms of commercial research and development (R&D) experience, I have worked extensively on the design and optimization of radio frequency (RF)

communications systems for enhanced capacity and service coverage. A further object of my work has been to realize systems that are “converged” or are ingredients in a converged network concept. Convergence means the technical integration of heterogeneous services (such as voice, data, and multimedia) and heterogeneous radio technologies (macrocellular, microcellular, WiFi, cordless phone) into a seamless operating unit. This work requires cross functional design in which the respective heterogeneous technologies are made to interoperate.

9. During this career activity, I have had first-hand knowledge and exposure to numerous discussions, and debates in support of the advancement of new wireless technologies and paradigms. These new technologies addressed various air interface methods, including orthogonal frequency division multiplexing (OFDM) and Orthogonal Frequency Division Multiple Access (OFDMA), a closely related method of utilizing the OFDM format to provide shared access. My current research includes the presently evolving 5G cellular concept, which incorporates, among other things, MIMO-OFDM/OFDMA processing. As outlined above, my involvement in wireless R&D has also drawn me to fundamental system architecture issues and philosophies including the functional portioning of the overall wireless network. I have had the benefit of collaboration and debate with numerous top tier innovators, from many industry-leading organizations in the field. In particular, I have detailed knowledge and recollection of the atmosphere surrounding the ongoing wireless

technology revolution that began in the late 1980s and continues to the present day, including the period surrounding the present invention, and also including attempts by interested parties across the globe to promulgate and protect preferred ideas and intellectual property.

10. With respect to the technologies relevant to the '416 Patent, my experience includes: Design of signaling methods that provide control of actions taken by communication endpoint processes during processing of access requests, alerting (of incoming communication, such as calls or messages), and synchronization. Such processes need to be fast, low profile (meaning maximum control effect per unit of signaling) and robust. I invented techniques that are among the earliest in the art of such signaling to employ cascade state-based progressions of process stages and which were optimized to minimize latency and consumption of signaling resources. These ideas and designs were developed and incorporated into one of the earliest embodiments of 3G wireless systems. The same development activity led to the introduction of a staggered multiplexed subscriber group signaling method (page group oriented alerting) aimed at minimization of power consumption while providing reliable and timely signaling. In a separate aspect, I was one the first to introduce "bandwidth on demand" techniques in a multiple access communication environment, including "bearer modification" protocols that enabled and effected creation of additional capacity "pipes" during an active wireless connectivity session. The latter

is similar in spirit to the teachings of Kim. It is a recognized hallmark of my engineering style to find solutions that overcome impasses, and which are often not mere modifications of standard or established techniques.

11. To place the experience I have in the context of innovation and invention, I have been involved throughout my career in the evolution of many basic radio communication technologies since their inception, such as MIMO, Multiuser Detection, and FEC coding advances, such as Turbo and LDPC, and soft output decoders such as the Soft Output Viterbi Algorithm (SOVA). A significant portion of the engineering design work I have performed has entailed the introduction of new techniques to provide capabilities that had not existed previously, such as a recently deployed novel baseband processor capable of robust demodulation and combining of signal components received on two antennas, respectively, at very low signal to noise ratios. Most recently, I have designed an advanced form of OFDM in which the impairments due to channel dispersion are mitigated in both the time domain (as in conventional OFDM) and the frequency domain (which is an Achilles heel of OFDM). This achievement is the result of many years of perseverance culminating in the discovery of a mathematical tool of broad applicability (*to wit*, Simultaneous Approximate Singular Value Decomposition). Previously, a similar tenacity-fueled accomplishment produced the first and only complete closed-form theory of equalization of offset modulation formats (e.g. O-QPSK) in multipath

channels, again a result of a persistent creative attack on the problem. In a word, I am well versed and well aware of the nuances of innovation and the toils of invention.

12. My CV contains further details on my education, experience, publications, and other qualifications to render an expert opinion in this case, Ex. 2002.

III. RELEVANT LEGAL STANDARDS

13. I have been asked to provide my opinion as to whether certain claims of the '416 Patent are obvious over Kim in combination with Vayanos, and Kim, Vayanos and the AAPA.

14. The opinions I am expressing in this report involve the application of my knowledge and experience to the evaluation of certain references with respect to the '416 patent. My formal knowledge of patent law is no different than that of any lay person. Therefore, I have requested the attorneys from Volpe Koenig, who represent Intellectual Ventures, to provide me with guidance as to the applicable patent law in this matter. The paragraphs below express my understanding of how I must apply current principles related to patent validity to my analysis.

15. I understand that an IPR is a proceeding before the USPTO for evaluating the patentability of an issued patent's claims based on prior-art patents and printed publications.

16. I understand that the claims of a patent are reviewed from the point of view of a hypothetical person of ordinary skill in the art (“POSITA”) at the time of the filing of the patent. The “art” is the field of technology to which a patent relates.

17. I understand that in determining whether a patent claim is anticipated or obvious in view of the prior art, the Patent Office must apply the *Phillips* standard to construe the claims.

18. I understand that, in this proceeding, Petitioners have the burden of proving that the challenged claims of the ‘416 Patent are unpatentable by a preponderance of the evidence. I understand that “preponderance of the evidence” means that a fact or conclusion is more likely true than not true.

19. I understand that there are two ways in which prior art may render a patent claim unpatentable. First, the prior art can “anticipate” the claim. Second, the prior art can render the claim “obvious” to a POSITA. I understand that for an invention claimed in a patent to be patentable, it must not be anticipated and must not be obvious based on what was known before the invention was made. For purposes of this Declaration only, I have applied the definition of a POSITA proposed in the Petition.

20. I understand that a patent claim may be invalid as “anticipated” under 35 U.S.C. § 102 if each and every limitation of the claim as construed by the court is found, either expressly or inherently, in a single prior art reference, such as a

publication or patent, that predates the claimed subject matter. I also understand that a patent claim may be invalid as obvious under 35 U.S.C. § 103 if the differences between the subject matter claimed and the prior art are such that the claimed subject matter as a whole would have been obvious to a POSITA at the time the invention was made. I also understand that several factual inquiries underlie a determination of obviousness. These inquiries include (1) the scope and content of the prior art, (2) the level of ordinary skill in the field of the invention, (3) the differences between the claimed invention and the prior art, and (4) any objective evidence of non-obviousness (i.e., “secondary considerations”).

21. I also understand that, when a party alleges obviousness based on a combination of references, that party should identify a reason why a POSITA would have been motivated to combine the asserted references in the manner recited in the claims and to explain why a POSITA would have had a reasonable expectation of success in making such combinations.

22. I understand that an obviousness analysis permits the application of “common sense” in examining whether a claimed invention would have been obvious to a POSITA. For example, I understand that combining familiar elements according to known methods and in a predictable way may suggest obviousness when such a combination would yield nothing more than predictable results. And I understand a party asserting obviousness should still provide a specific motivation to combine the

references as recited in the claims and explain why one would have reasonably expected to succeed in doing so.

23. I understand that one indicator of non-obviousness is when a prior art reference leads in a different direction or discourages that combination, recommends steps that would not likely lead to the patent's result, or otherwise indicates that a seemingly inoperative device would be produced.

IV. SPECIFICATION OF '416 PATENT

A. Operation Of Conventional Paging Channels

24. The '416 Patent begins by explaining the operation of a conventional Paging Channel (PCH) in a Universal Mobile Telecommunications System:

In the known art, the PCH comprises two blocks: the Paging Indicator Channel (PICH) and the PCH itself. The PICH comprises multiple indicator bits. Each UE is associated with one of the indicator bits within the PICH. Accordingly, when the UE is paged by the network using the PCH, the network sets the relevant indicator bit in the PICH. When in the idle state, the UE periodically decodes the PICH to see if the indicator bit with which it is associated has been set. If the relevant indicator has been set, the UE then reads the PCH.

Each UE has a unique identifier (UE-ID). When the network pages a UE, as previously mentioned, the network sets the relevant indicator within the PICH for that UE, and transmits the UE-ID for the UE being paged, and the relevant message within the PCH. In this manner, since more than one UE may be associated with an indicator bit in the PICH, the UE-ID enables a UE to determine whether the message is intended for that UE or not. If the PCH contains the UE-ID for the UE, the UE then reads the message, and performs the required actions. Thus, in the known art, the indicator bits are used in a paging channel to inform the UE whether it needs to turn its radio on for reading the PCH (i.e. as a battery saving mode). Ex. 1001, 2:11-33 (emphasis added).

25. Thus, in conventional paging systems, a UE first checks the PICH to determine whether an indicator bit associated with the UE has been set for the UE and, if so, the UE proceeds to read the relevant message (the message intended for the UE) on the PCH.

B. Inefficient Usage Of FACH Channels In Prior Art

26. The Forward Access Channel (FACH) “is a downlink transport channel that is used ... to allocate physical resource to the UE.” *Id.*, 2:43-49. In conventional systems, the UE “decodes the FACH every frame” to determine “[i]f the UE-ID in the FACH message 220 matches the identity that has been assigned to the UE.” *Id.*, 3:41-45. The Background of the ‘416 Patent discusses the problem that a timeslot for a FACH message is required to be reserved, even if there is no FACH or light FACH usage, which is an ineffective use of physical resources. From the ‘416 Patent:

... As previously mentioned, the physical resources 300 for the FACH are pre-assigned by the RNC 105, in the NODE B SETUP message 205, and cannot be reused by other channels. Even when the FACH is lightly used, for example when most UEs are in a connected state, receiving data traffic on a traffic channel, indicated as a High Speed Downlink Shared Channel (HS-DSCH) 305 in FIG. 3, the FACH timeslot 310 is still required to be reserved.

As will be appreciated by a skilled artisan, the fact that the FACH timeslot 310 is required to be reserved, particularly during light use of the FACH, is an inefficient use of physical resources. Consequently, the inventor of the present invention has recognized and appreciated that it is desirable for the timeslot 310 assigned to the FACH to be able to be used for other purposes when it is not required for the transmission of FACH messages. *Id.*, 3:50-65 (emphasis added).

C. Known Techniques For Reuse Of FACH Channels Increased Power Requirements

27. In connection with FIG. 3, the '416 Patent identified that "[a] known solution for the reuse for the FACH timeslot is for the traffic channel resources." *Id.*, 4:7-8. As shown in FIG. 3, a high-speed downlink shared channel (HS-DSCH) 305 is used for the transmission of FACH messages, and "the information that would have been transmitted on the FACH transport channel is instead transmitted on the HS-DSCH transport channel." *Id.*, 4:11-13. "In this solution the Node B 110, as opposed to the RNC 105, controls the FACH, and the FACH timeslot of FIG. 3 becomes an HS-DSCH timeslot. In this manner, in the example of FIG. 3, the HS-DSCH 305 always comprises eight timeslots, as opposed to seven. *Id.*, 4:7-18. "When there are no requests from the RNC 105 for the Node B 110 to transmit a FACH message, the Node B is able to use all of the HS-DSCH 305 resource for traffic data. In this manner, physical resources are used more efficiently, and in particular, physical resources are not permanently assigned for transmitting FACH messages, in particular when no, or few, FACH messages are required to be transmitted." *Id.*, 5:1-3.

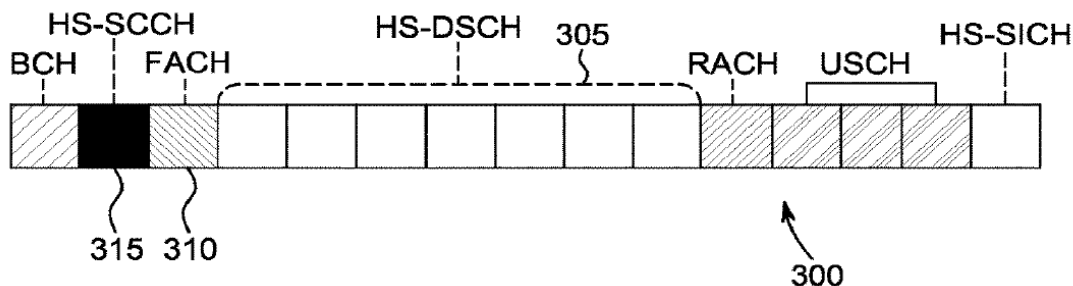


**FIG. 3
PRIOR ART**

28. A problem with the above approach of reusing the FACH timeslot is that it requires the use of both a high-speed shared control channel (HS-SCCH) and an HS-DSCH, as opposed to just a FACH channel, which increases power consumption. *Id.*, 5:9-14. So, although this technique may improve the use of physical resources, it increases power requirements, which is undesirable. *Id.*, 5:45-49. As explained in the '416 Patent:

FACH messages may be transmitted to a UE 120 when the UE is in an idle state (or alternatively in a connected state). Accordingly, the Node B 110 is unaware of the state of the transmission path between itself and the UE 120. As a result, normal power control is ineffective since the Node B 110 has no information with which to make an informed decision on the appropriate power level to use. Consequently, the power requirements must initially depend on the number of bits to be transmitted, and the coding rate, without explicit knowledge of the path loss between the UE and Node B.

A number of bits transmitted on the HS-SCCH 315 is comparable to a number of bits that are transmitted on a traditional FACH, in the order of 60 bits (57 bits for a 3.84 Mcps TDD HS-SCCH). The exact number of bits to be transmitted on the FACH depends on the particular implementation. The power requirements for HS-SCCH 315 and FACH at the start of a connection are therefore substantially the same, due to the similar number of bits to be carried

on each channel, for example approximately 33% of the Node B transmit power.

A problem with this known technique for reusing the FACH timeslot is that both the HS-SSCH 315 and the HS-DSCH 305 must be used in order to transmit a FACH message, each requiring approximately 33% of the Node B transmit power, albeit in different timeslots. This is in contrast to the traditional method of transmitting FACH messages, where using the dedicated FACH timeslot only required the one timeslot. Thus, the known technique for reusing the FACH timeslot requires an additional timeslot at 33% of the Node B transmit power.

A skilled artisan will appreciate that, although the reuse of the FACH timeslot by mapping the FACH onto HS-DSCH resources provides a considerable improvement in the use of the physical resources, this increase in the power requirements is undesirable. *Id.*, 5:15-49 (emphasis added).

1. Summary Of The Invention

29. The '416 Patent summarized the invention as follows:

According to a first aspect of the invention, there is provided a cellular communication network node comprising a transmitter operably coupled to signal processing logic and arranged to transmit at least one direct signaling channel indicator bit generated by the signal processing logic. The signal processing logic is arranged, upon receipt of a message to be transmitted, to set at least one direct signaling channel indicator bit to indicate that a direct signaling channel is active in at least one unit of resource. The signal processing logic is further arranged to reallocate the at least one unit of resource for use by at least one other channel when no message is required to be transmitted. *Id.*, 5:56-67 (emphasis added).

30. The Summary of the Invention explained that “the at least one direct signaling channel may be a Forward Access Channel(s) (FACH)” that “may be re-allocated for use by a High Speed Downlink Shared Channel (HS-DSCH)” such that

an “under-utilized FACH resource may be transferred to HS-DSCH resource, thus increasing the potential throughput of HS-DSCH.” *Id.*, 7:5-15.

V. Detailed Description of the ‘416 Patent

31. To address the shortcomings of the prior art techniques, the ‘416 Patent discloses the use of indicator bits to inform a UE whether it should be reading the resources ‘reserved’ for FACH as a FACH channel, or whether it should be ignoring those resources (for example when they are being used for another channel such as HS-DSCH). *Id.*, 9:50-58. The ‘416 Patent explains how the disclosed technique addresses the shortcomings of the prior art:

Furthermore, unlike for the known solution for reusing the FACH timeslot described above, as the HS-DSCH 505 and HS-SCCH 515 are not used for transmitting FACH messages, these two channels do not each require a significant proportion (e.g. approximately 33%) of the Node B transmit power when a FACH message is to be transmitted. Rather, only the FACH, when a FACH message is being transmitted, requires 33% of the Node B transmit power.

Thus, an embodiment of the invention may provide an advantage of a more efficient use of physical resources, whilst substantially avoiding an increase in power requirements. *Id.*, 12:64 to 13:8 (emphasis added).

32. The ‘416 Patent discloses embodiments where a plurality of indicator bits are sent over a broadcast channel (BCH).

A. Exemplary Embodiments Where *Each* Of A Plurality Of Indicator Bits Is Used To Signal Whether A *Respective* FACH Channel In A Subsequent Timeslot Is Active

33. FIG. 7 (shown below) shows two frames (n, n+1), where each frame is divided into time slots 710 (i.e., 15 rectangles per frame). *Id.*, 13:15-20. The BCH 725 is a broadcast channel that includes an indicator channel (INCH) 721. *Id.* 13:17-20. The INCH 721 comprises a plurality of *FACH indicator bits*, each of which can correspond to a FACH in a subsequent frame.

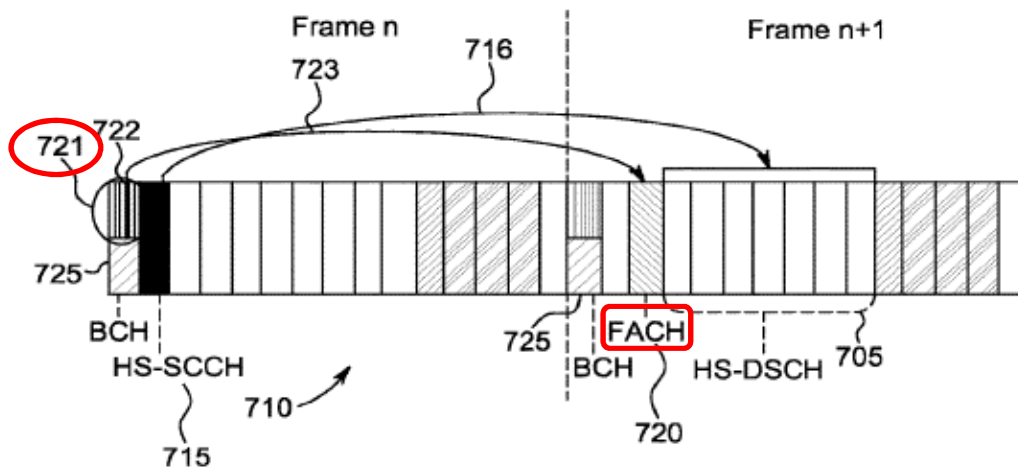


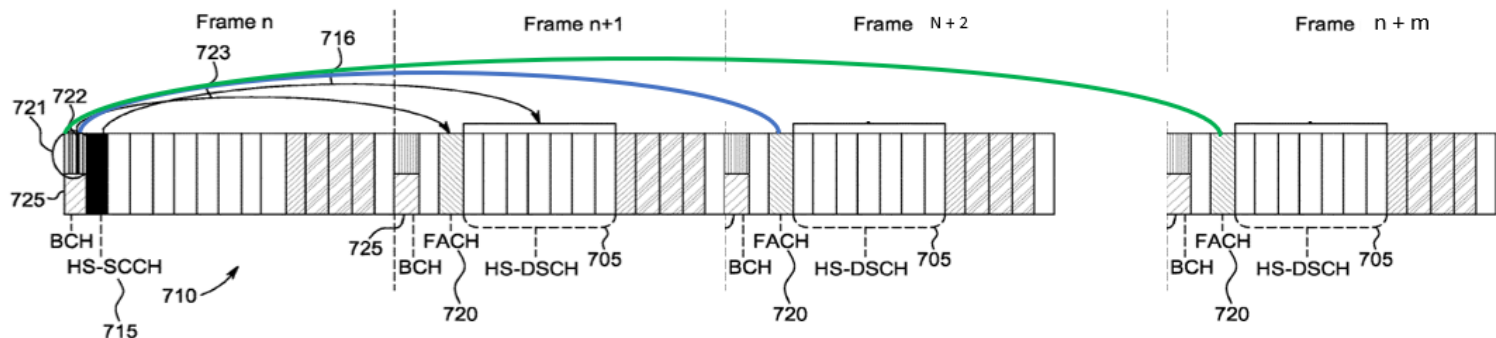
FIG. 7

34. In FIG. 7 (above), one of the FACH indicator bits 722 is highlighted (shaded black). *Id.*, 13:21-24. The highlighted FACH indicator bit 722 points to (arrow) the FACH 720 in the next frame. *Id.* 13:25-28. The FACH indicator bit 722 indicates the state of the FACH 720 (i.e., whether the FACH is active or not). *Id.* 13:25-30. From the '416 Patent:

For the embodiments illustrated in FIG. 7, the INCH 721 comprises a plurality of indicator bits, one of which, for the illustrated embodiments, is in the form of a FACH indicator bit 722, which indicates the state of the FACH 720 in a subsequent frame of the physical channel. For the illustrated embodiments, the FACH indicator bit 722 in frame 'n' indicates 723 the state of the FACH 720 within the next consecutive frame, frame 'n+1'. Thus, in FIG. 7, the FACH indicator bit 722 in frame 'n' is set, and thereby indicates that the FACH 720 is active in frame 'n+1'. In this manner, the processing requirements placed on a UE 430 are reduced, since the UE 430 is provided more time in which to prepare to decode the FACH 720 if the FACH 720 is active. *Id.*, 13:21-34 (emphasis added)

35. While the example depicted in Figure 7 shows an embodiment where there was only one FACH channel 720 (in frame n+1), the specification explains that the embodiment of FIG. 7 could be extended to a system where the plurality of indicator bits 722 are used to signal whether FACH channels spanning multiple timeslots are each active. *Id.*, 14:44-53 ("For the various embodiments illustrated and described herein, a single timeslot has been allocated for FACH channels. However, a skilled artisan will appreciate that more than one timeslot may be allocated for FACH channels. Accordingly, and in accordance with an embodiment of the invention, where more than one timeslot is allocated for FACH channels, the one or more timeslots may, individually or collectively, and as a whole or partly, be re-allocated for use by other channels when not required for the transmission of FACH messages.") An example of such an embodiment, where the plurality of indicator bits 722 are used to signal whether FACH channels spanning multiple

timeslots (e.g., FACH channels in subsequent frames) are each active, is illustrated in the diagram below (created by Patent Owner based on, e.g., FIG. 7 and 14:44-53 of '416 Patent):



36. In the embodiment illustrated above, each one of the plurality of indicator bits 722 is used to signal whether a respective FACH channel in a subsequent timeslot is active.

37. In contrast to FIG. 7 which contemplates a plurality of FACH channels (in subsequent frames) each of which corresponds to a different time interval, FIG. 9 (shown below) discloses an alternative embodiment where the plurality of FACH channels are arranged in the same time slot. In Fig. 9, a plurality of FACH indicator bits 922 are included in the BCH, and each of the FACH indicator bits indicates whether a respective FACH channel 920 is active. *Id.* 13:67-14:4. As shown in FIG. 9, two FACH indicator bits 922 are set and each FACH indicator bit points to a respective FACH 920.

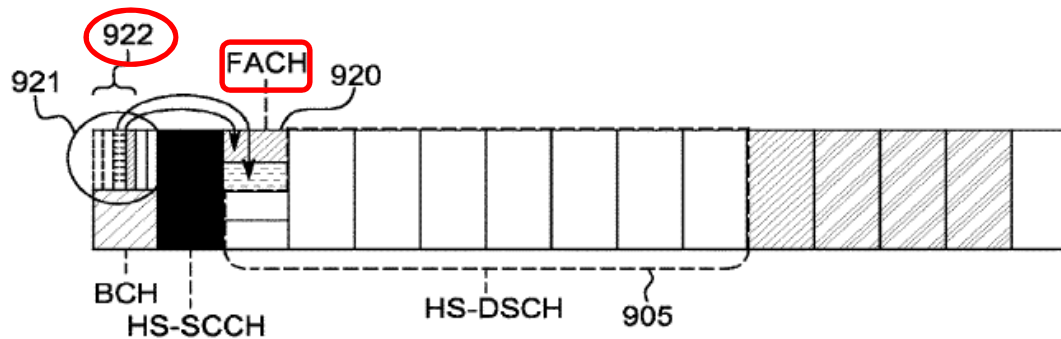


FIG. 9

38. As explained in the '416 Patent:

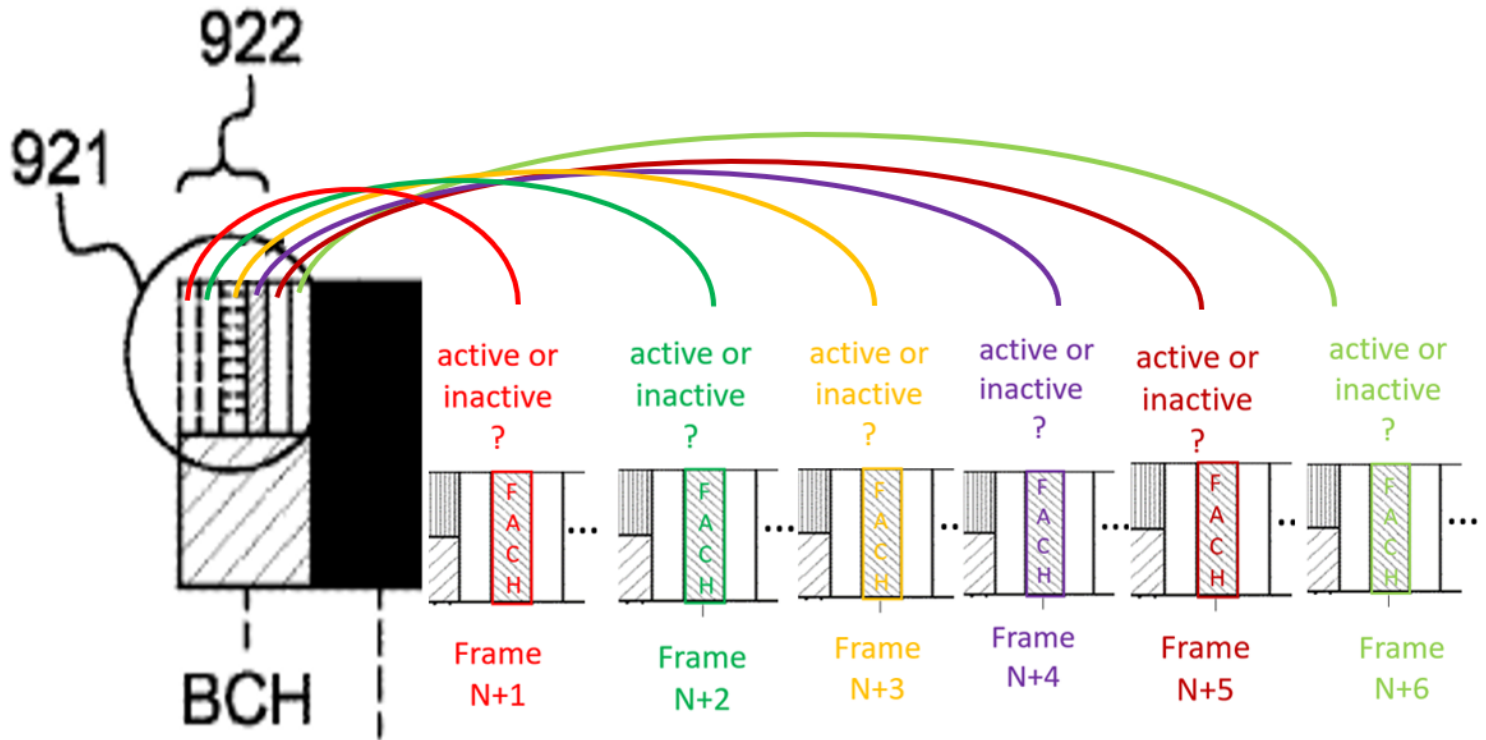
Referring now to FIG. 9, there is illustrated an example of resource allocation in accordance with embodiments of the invention. As in the embodiment illustrated in FIG. 8, four FACH channels are allocated to a single timeslot. However, *for the embodiments illustrated in FIG. 9, the INCH 921 comprises a plurality of FACH indicator bits 922.* For the illustrated embodiments, the INCH 921 comprises four FACH indicator bits 922, *each FACH indicator bit 922 relating to one of the FACH channels 920.*

In this manner, when the NODE B receives one or more FACH messages to be transmitted, the NODE B schedules transmission of the one or more FACH messages in one or more of the FACH channels 920, and *sets one or more of the FACH indicator bits 922, to indicate those FACH channels 920 that are active.*

Thus, FIG. 9 illustrates a case where the NODE B is required to transmit two FACH messages. Accordingly, the NODE B has set two of the FACH indicator bits 922, and transmits the FACH messages within the two corresponding FACH channels 920. As will be appreciated by a skilled artisan, for the embodiments illustrated in FIG. 9, only two out of four of the FACH channels 920 within the FACH timeslot are used. Accordingly, and in accordance with an embodiment of the invention, the NODE B re-allocates the timeslot resource for those FACH channels not required for transmitting FACH messages,

for use by another transport channel, such as the HS-DSCH 905. In this manner, even when the NODE B is required to transmit FACH messages, free resource within the FACH allocated timeslot may be reused for other channels. *Id.*, 13:63 to 14:25 (emphasis added).

39. While the embodiment depicted in FIG. 9 included four FACH channels in the same timeslot, the specification explains that the embodiment of FIG. 9 could be extended to a system where the plurality of indicator bits 922 are used to signal whether FACH channels across multiple timeslots are each active. *Id.*, 14:44-53 (“For the various embodiments illustrated and described herein, a single timeslot has been allocated for FACH channels. However, a skilled artisan will appreciate that more than one timeslot may be allocated for FACH channels. Accordingly, and in accordance with an embodiment of the invention, where more than one timeslot is allocated for FACH channels, the one or more timeslots may, individually or collectively, and as a whole or partly, be re-allocated for use by other channels when not required for the transmission of FACH messages.”). An example of such an embodiment, where the plurality of indicator bits 922 are used to signal whether FACH channels spanning multiple timeslots (e.g., FACH channels in subsequent frames) are each active, is illustrated in the diagram below (created by Patent Owner based on, e.g., FIGs. 7 and 9 and 14:44-53 of the ‘416 Patent):



40. Again, in the embodiment illustrated above, *each* of the plurality of indicator bits 922 is used to signal whether a *respective* FACH channel in a subsequent timeslot is active.

B. Monitoring FACH Channel(s) Indicated As Active To Determine Whether The Active FACH Channels Include A Message Intended For The UE

41. In a case where there are a plurality of FACH indicator bits, each of which corresponds to a FACH on a respective time slot, the UE monitors the FACH channels indicated as active for a FACH message intended for the UE. *Id.*, e.g., 9:50-56 (“in contrast to the known art ... the indicator bits are used to inform the UE whether it should be reading the resources ‘reserved’ for FACH as a FACH channel,

or whether it should be ignoring those resources”); *Id.*, 13:3-4 (each indicator bit “indicates the state of the FACH 720 in a subsequent frame”); *Id.*, 14:37-38 (“in accordance with embodiments of the invention, the UE is signaled whether the FACH is active.”)

42. When a FACH channel is active, it will contain one or more FACH messages each of which has two parts. Specifically, the message includes (i) the identity of the UE for which the message is intended (e.g., in the form of a UE-ID), and (ii) the content of the message. *Id.*, 11:44-46 (the FACH message comprises “the content of the message, and the identity of the UE 430, such as a UE-ID for which the message is intended.”) While an indicator bit informs a given UE that a particular FACH channel is active and should be monitored, the fact that the FACH channel is active does not mean that the FACH channel includes a message for the given UE. For example, the active FACH channel could include a FACH message for a different UE. Only by monitoring the active channel for a FACH message with, e.g., a UE-ID corresponding to a given a UE, does the given UE determine that there is a FACH message intended for the given UE on the active FACH channel. *Id.*, 3:43-46 (“If the UE-ID in the FACH message 220 matches the identity that has been assigned to the UE 120, the UE acts on the message contents.”)

43. It bears emphasis that in the disclosed embodiments, a two-step sequence of information is necessary to inform a given UE of a FACH message

intended for the given UE. Specifically, the UE needs to be informed using an indicator bit on a broadcast channel (the first item of information in the sequence) that a particular FACH channel is active, and the UE needs to subsequently detect a message on the active FACH channel matching the identity or the UE-ID of the UE (the second item of information in the sequence.) This stands in contrast to the prior art identified in the Background of the ‘416 Patent where a single step is used to inform a given UE of a message intended for the given UE. Since, in the prior art, “[e]ach UE is associated with one of the indicator bits on the PICH,” a UE in the prior art was informed of that a message was intended for the UE by monitoring a single bit on the PICH. *Id.*, 2:12-20. Thus, while singular information was used in the prior art (association of each UE with an indicator bit on the PICH) to inform a given UE of a message intended for the given UE, the embodiments disclosed in the ‘416 Patent require a two-step information sequence to inform a UE of a message intended for the UE.

VI. CHALLENGED CLAIMS OF THE ‘416 PATENT

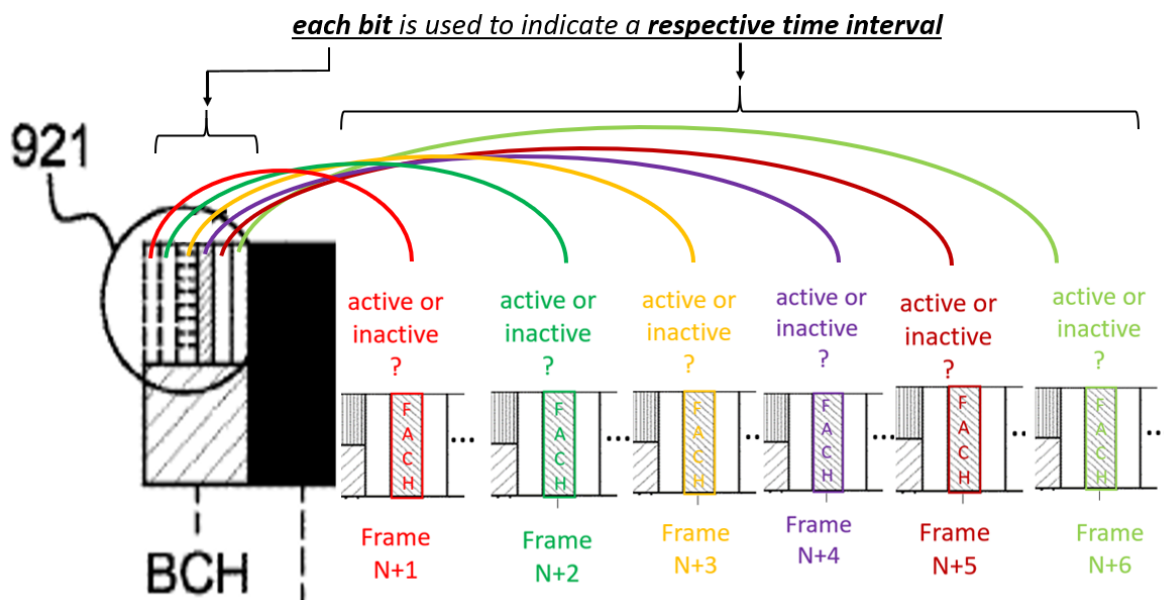
44. Petitioner challenges independent Claims 1 and 7, and dependent claims 2-6 and 8-12 of the ‘416 Patent. Independent Claim 1 is representative, and recites:

1. A user equipment (UE) comprising:
a receiver, the receiver configured to receive broadcast information including a plurality of bits, wherein each of the plurality

*of bits indicates a **respective time interval*** that physical shared channel resources are utilized to signal channels; and

a processor, the processor communicatively coupled to the receiver and configured to *monitor the signaled channels* in indicated time intervals, to *determine whether signaling information for the UE is present based on an identification of the UE*, and to process the signaling information in response to the determination that signaling information for the UE is present.

45. Significantly, claim 1 recites that “***each of the plurality of bits indicates a respective time interval*** that physical shared channel resources are utilized to signal channels.” This limitation corresponds, for example, to the embodiments of the ‘416 Patent discussed above (and reproduced again below), where each indicator bit (singular) transmitted on the BCH indicates whether a different FACH channel in a respective time interval is active:



46. In addition, claim 1 recites that the UE monitors “the signaled channels in indicated time intervals, to *determine whether signaling information for the UE is*

present based on an identification of the UE.” This limitation reflects the *two-step sequence of information* discussed above that is necessary to inform a given UE of a FACH message intended for the given UE. Specifically, the claim recites that the UE is first informed using an *indicator bit* on the broadcast channel (the first item of information in the sequence) of a respective time interval that physical shared channel resources are *utilized to signal channels*, e.g., the UE is informed by an indicator bit that a respective FACH channel in a subsequent time interval is *active*. Once the UE detects that the respective time interval is being utilized (e.g., that the respective FACH is active), the UE then monitors the indicated time intervals to determine “*whether signaling information for the UE is present based on an identification of the UE*” (e.g., the UE monitors the indicated time interval for a message with a UE-ID matching that of the UE.)

VII. CLAIM CONSTRUCTION

47. Below I interpret several claim limitations from the point of view of a person of ordinary skill in the art in light of the specification of the ‘416 Patent.

- A. “**broadcast information including a plurality of bits, wherein each of the plurality of bits indicates a respective time interval that physical shared channel resources are utilized to signal channels” (claims 1 and 7)**

48. Independent claim 1 recites a UE receiver “configured to receive broadcast information including a plurality of bits, wherein each of the plurality of bits indicates a respective time interval that physical shared channel resources are

utilized to signal channels.” Independent claim 7 includes a virtually identical limitation. Both the plain meaning of the claim language, and the specification, make clear that there is a one-to-one correspondence between each of the plurality of bits used to indicate the respective intervals and the respective time intervals themselves, such that each single bit (in the plurality of bits) indicates whether a different (respective) time interval is used to signal channels.

49. Turning first to the claim language itself, the juxtaposition of “each of the plurality of bits” with “a respective time interval,” signifies a one-to-one correspondence between each of the plurality of bits used to indicate the respective intervals and the respective time intervals themselves. Moreover, in the context of the claim language, both the term “each” and the phrase “a respective time interval” are expressed in the singular, making clear that each single bit (in the plurality of bits) indicates whether a different (respective) time interval is used to signal channels. Finally, all of the embodiments disclosed in the specification reflect a one-to-one correspondence between each of the plurality of bits and a respective FACH channel, where each single bit (in the plurality of bits) indicates whether a different (respective) FACH channel is active.

50. The Petition maintains that “no claim term requires express construction.” Pet., 15. However, Petitioner’s mappings raise a claim construction question with respect to the limitation at issue. Specifically, Petitioner, through its mappings,

maintains that a group of bits (plural) that collectively indicate a single time interval meet the claim language. However, the Petition fails to set forth any argument articulating how “each of the plurality of bits indicates a **respective** time interval” could possibly be construed to cover “a **group** of the plurality of bits indicates a **respective** time interval.”

51. For the reasons set forth above, the claim language reciting “each of the plurality of bits indicates a **respective** time interval” should be construed to require a one-to-one correspondence between each of the plurality of bits used to indicate the respective intervals and the respective time intervals themselves, such that each single bit (in the plurality of bits) indicates whether a different (respective) time interval is used to signal channels.

B. monitoring “the signaled channels in indicated time intervals, to determine whether signaling information for the UE is present based on an identification of the UE” (claims 1 and 7)

52. Claim 1 also recites that the UE monitors “the signaled channels in indicated time intervals, to determine whether signaling information for the UE is present based on an identification of the UE.” Claim 7 includes a virtually identical limitation. Both the plain meaning of the claim language, and the specification, make clear that there are two-steps to inform a given UE “whether signaling information [e.g., a FACH message] for the UE” is present. Initially, the UE receives one of the plurality of bits indicating “a respective time interval that physical shared channel

resources are utilized to signal channels.” Once the UE detects that the indicated time interval is being utilized, the UE then monitors for signaling information in “indicateded time intervals” (past tense) to determine “whether signaling information for the UE is present based on an identification of the UE.” The recitation that the UE monitor “indicateded time intervals” imparts a temporal requirement that the indicating of the time intervals occurs before the monitoring of such indicateded time intervals to determine “whether signaling information is present on such time interval based on an identification of the UE.”

VIII. A PERSON HAVING ORDINARY SKILL IN THE ART

53. For purposes of the institution decision only, I do not contest the definition of a person of ordinary skill in the art (“POSITA”) proposed in the Petition. Pet., 14-15. I reserve the right to contest Petitioner’s proposed definition of a POSITA if a trial is instituted.

IX. PRIOR ART RELIED ON IN PETITION

54. The Petition advances two Grounds against the Challenged Claims of the ‘416 Patent. In Ground 1, the Petition asserts that the Challenged Claims are obvious over a combination of Kim and Vayanos. In Ground 2, the Petition asserts that the Challenged Claims are obvious over a combination of Kim, Vayanos, and the so-called AAPA.

A. Kim

55. As its primary reference, the Petition relies on Kim. Kim is directed to a method for transmitting paging information in a cellular system. Ex. 1005, 1:6-7. While Kim discloses the use of a paging indication channel (PICH) that terminals in a group monitor to determine whether to search a paging channel (PCH), Kim is *silent as to the format of the indication information in the PICH*. Kim's description of the paging indicator channel is limited to the following:

A general paging procedure is as follows. Terminals are included in a specific paging group defined for an efficient paging procedure in a system. Therefore, *the base station notifies that a paging message arrives at terminals included in a corresponding group through the paging indication channel (PICH)*, which is a physical layer channel. The terminals monitor the paging indication channel every monitoring cycle. As a result of monitoring, when it is sensed that indication information corresponding to the group including the terminal exists in the paging indication channel, the terminals search PCH information. ... *Id.*, 1:38-48 (emphasis added).

* * *

In accordance with an aspect of the present invention, there is provided a method for transmitting paging information in a cellular system, including the steps of forming a paging channel (PCH) in a transport channel corresponding to generation of paging information; setting a paging indication channel (PICH) based on the paging information and forming the paging indication channel in a radio resource of a physical layer; and allocating the paging channel to the radio resource of the physical layer. *Id.*, 2:30-38 (emphasis added).

* * *

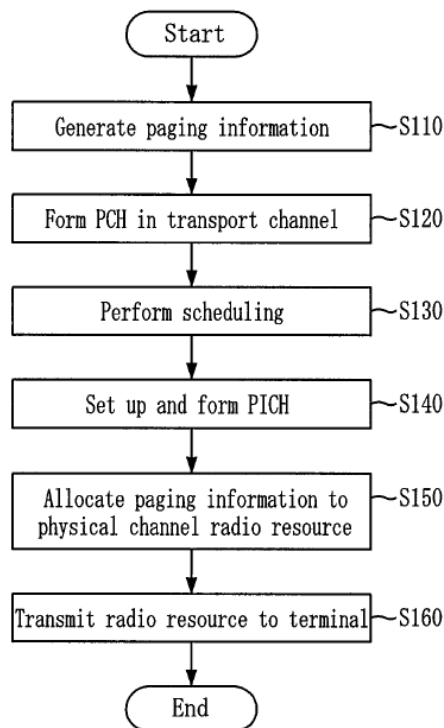
... *the base station sets up a paging indication channel 6* corresponding to the terminal or the terminal group indicated by the paging information and *forms the paging indication channel 6* at step S140

such that the terminal in the system can be divided into groups. *Id.*, 4:58-63 (emphasis added).

56. Thus, while Kim discloses the use of a PICH, it fails to disclose the format of the indication information in the PICH.

57. The Petition relies on Kim's method disclosed in FIG. 1 (shown below), which depicts "a paging information transmission procedure" performed by a base station. *Id.*, 2:65-67.

FIG. 1



58. In connection with the first two steps in FIG. 1, Kim discloses that when paging information 1 to be transmitted to a terminal is generated at step S110, the base station has a paging channel (PCH) included in the transport channel based on

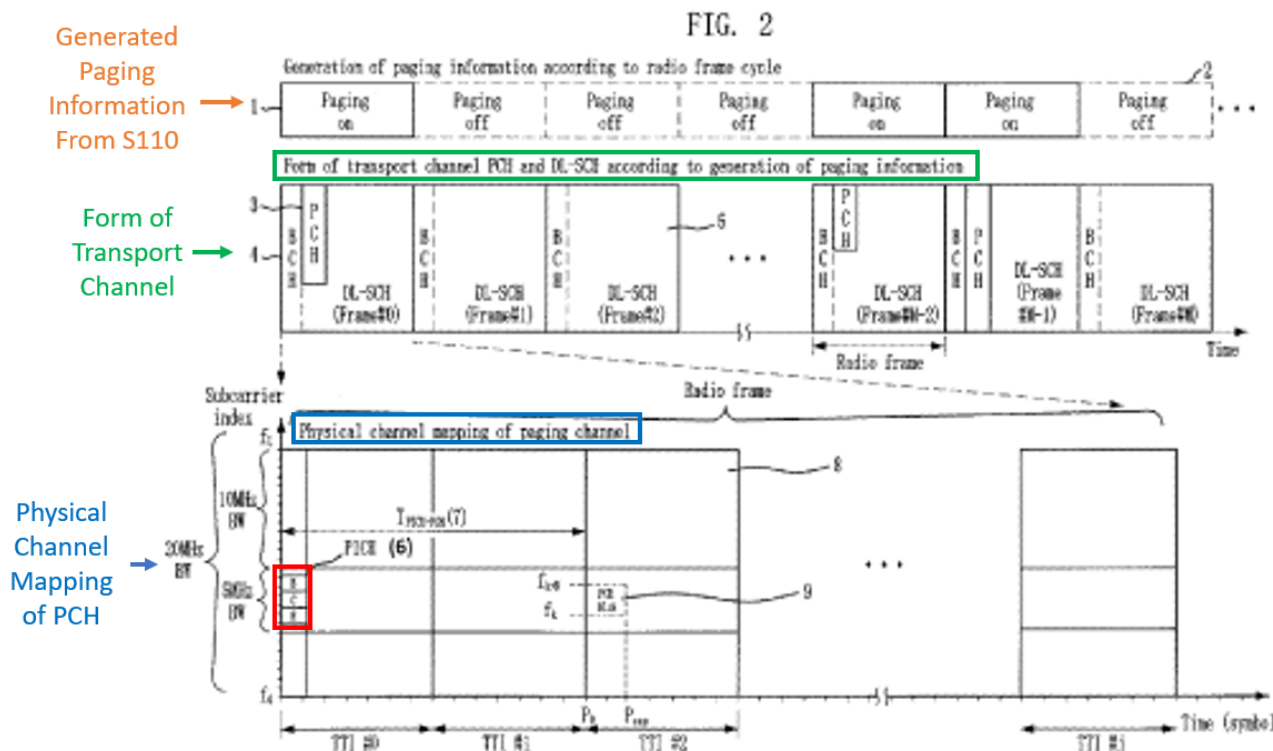
the generated paging information at step 120.” *Id.*, 4:48-52. In the next step (S130), a scheduler at the base station “performs scheduling on broadcasting channel (BCH) information, create[s] paging channel information and, traffic information to be transmitted to the terminal based on a transmission time interval (TTI).” *Id.*, 4:53-56. Next, in step S140, “the base station sets up a paging indication channel 6 corresponding to the terminal or the terminal group indicated by the paging information and forms the paging indication channel 6.” *Id.*, 4:58-63. In steps S150 and 160, “the base station performs mapping on the paging channel” and “transmits the radio resources to the terminal.” *Id.*, 4:64-5:8.

59. Significantly, Kim makes clear that the PICH is set up only in a case where paging information was generated (e.g., in step S110 described above):

... When no paging information is generated (see 2 of FIG. 2), the paging channel does not exist in the transport channel of the radio frame (see 5 of FIG. 2). In this case, the paging indication channel is not also set up. *Id.*, 5:9-17 (emphasis added).

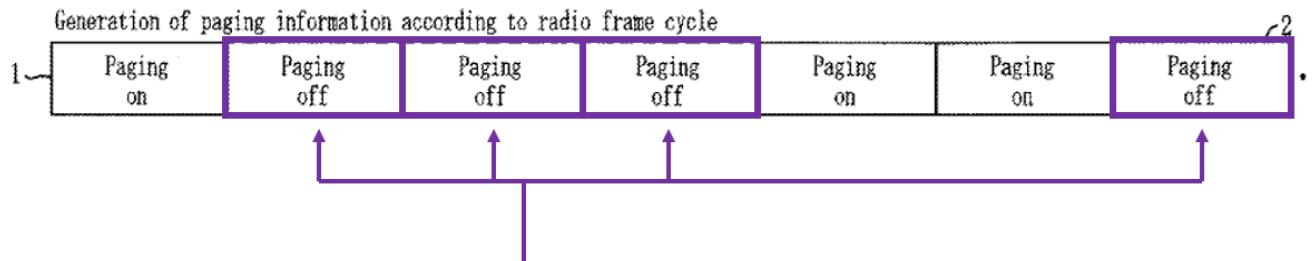
60. FIG. 2 of Kim “shows a transport channel and a physical channel in accordance with the first embodiment.” *Id.*, 3:1-2. As shown in the annotated version of FIG. 2 reproduced below, the “**form of transport channel**” (see language in **green box**) is positioned in the middle of the figure, while the “**physical channel mapping of the paging channel**” (see language in **blue box**) is positioned at the bottom of the figure. The “**physical channel mapping of the paging channel**” includes **PICH 6** (**red**

box). Other than showing boxes labelled “B,” “C” and “H,” FIG. 2 provides no further details on the format of the PICH.



61. Referring still to FIG. 2 above, the top portion of the figure corresponds to the paging information generated at the base station in step S110, which the base station uses internally to determine whether or not to form the PCH in step S120. The Petition (at 42-43) erroneously argues that the paging information at the top portion of FIG. 2 is transmitted to a terminal in the form of “a plurality of bits.” Kim makes no such statement, and Kim’s disclosure compels the opposite conclusion. As noted above, Kim discloses that “[w]hen no paging information is generated (see 2 of FIG. 2), the paging channel does not exist in the transport channel of the radio frame (see 5 of FIG. 2). In this case, the paging indication channel is not also set

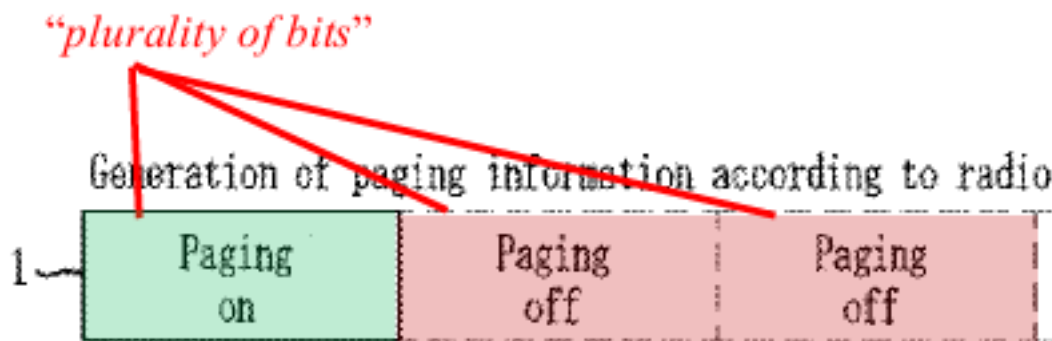
up." *Id.*, 5:9-17 (emphasis added). Thus, Kim makes clear that no paging indicator information (or any other paging information) is transmitted to the terminal for the boxes labelled "Paging off" in the top row of FIG. 2.



When no paging information is generated (see 2 of FIG. 2), the paging channel does not exist in the transport channel of the radio frame (see 5 of FIG. 2). In this case, the paging indication channel is not also set up." *Id.*, 5:9-17 (emphasis added).

62. Thus, contrary to the illustration set forth in the Petition (and reproduced in ¶63 below), it is clear that the top portion of FIG. 2 in Kim does not correspond to a "plurality of bits" transmitted from the base station to the terminal, because in Kim there is a complete absence of paging indicator information (not even a single bit) transmitted for the boxes labelled "Paging Off." Rather, a POSITA would have understood that the top portion of FIG. 2 corresponds to the paging information generated at the base station in step S110, which the base station uses internally to determine whether or not to form the PCH in step S120 -- rather than a string of bits transmitted to the terminal as argued in the Petition.

63. Below is the illustration from the Petition, which erroneously suggests that the paging information at the top portion of FIG. 2 in Kim is transmitted to a terminal in the form of individual paging bits:



The Petition fails to explain how the boxes labelled “Paging Off” could correspond to bits transmitted to a terminal in Kim, when Kim states that there is a complete absence of paging indicator information (not even a single bit) transmitted for the boxes labelled “Paging Off.”

B. Vayanos

1. In Vayanos, Each Paging Indicator Includes Multiple Bits All Of Which Have The Same Value

64. Vayanos is directed to transmitting signaling information for broadcast and multicast services. Vayanos describes a need to transmit signaling information for broadcast and multicast services in a manner to facilitate efficient reception of this information. Ex. 1006, 1: 49-51. Vayanos provides an example format of one frame of a PICH in FIG. 2B, reproduced below:

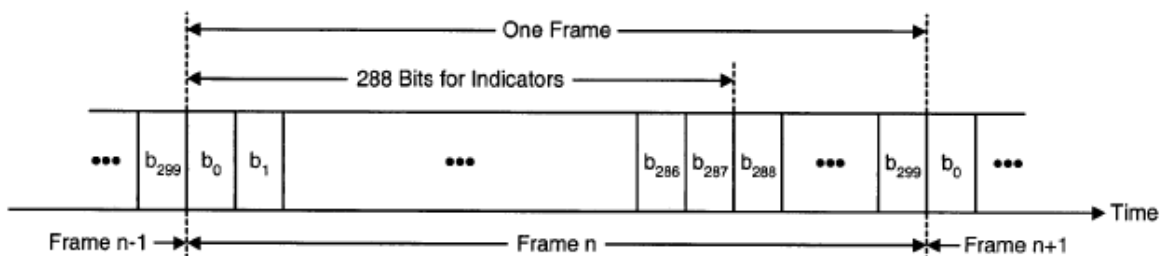


FIG. 2B

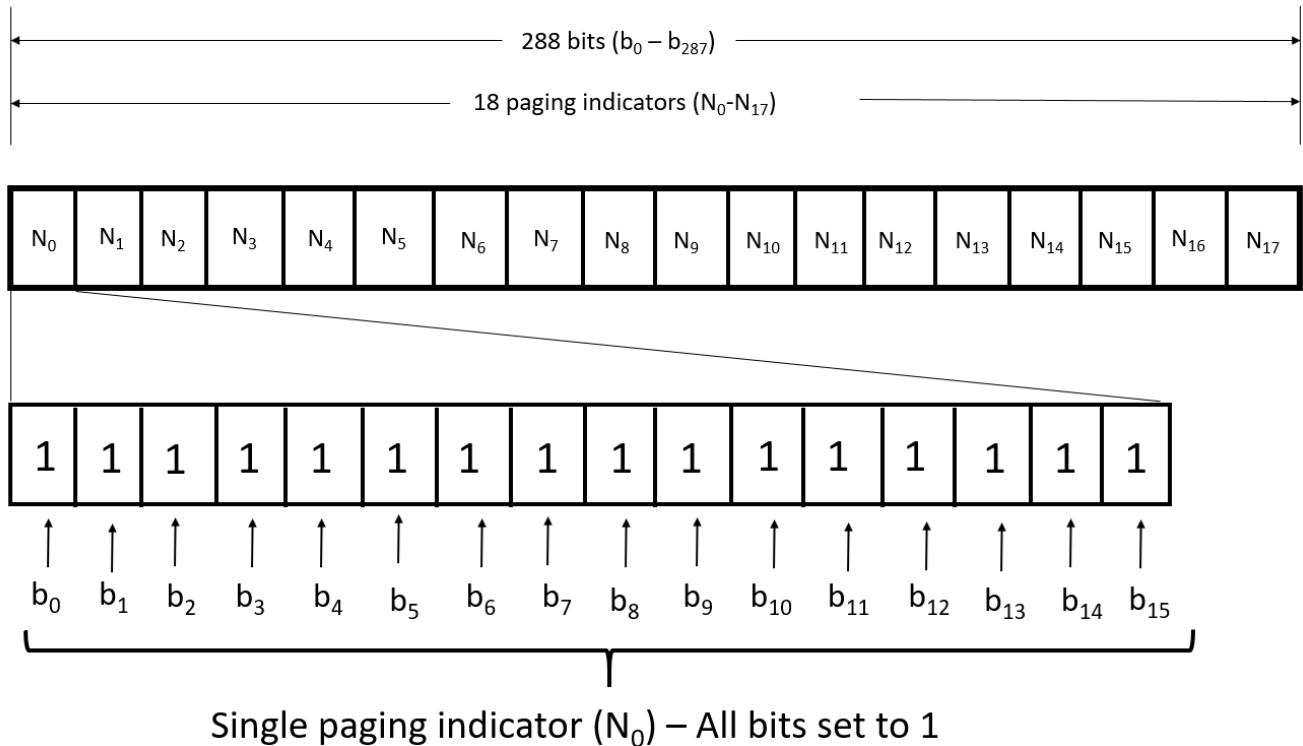
65. Vayanos describes FIG. 2B as follows:

FIG. 2B shows the format of one frame for the PICH. Each PICH frame includes 300 bits, which are labeled as bits b_0 through b_{299} . The first 288 bits are used for N_p paging indicators, and the last 12 bits are reserved. The number of paging indicators (N_p) in each PICH frame is configurable by the system and can take on a value of 18, 36, 72 or 144. Each paging indicator is sent in $288/N_p$ consecutive bits in the PICH frame, where $288/N_p$ can take on a value of 16, 8, 4 or 2. The $288/N_p$ bits are all set to 1 if the paging indicator is equal to 1 and are set to 0 if the paging indicator is equal to 0. The N_p paging indicators are sent in N_p paging indicator locations that are numbered from 0 through $N_p - 1$ (not shown in FIG. 2B). *Id.*, 3:26-38 (emphasis added).

66. Thus, each PICH frame in Vayanos includes 288 bits being used for N_p paging indicators. *Id.*, 3:26-29. The number of paging indicators (N_p) in each frame is configurable and can take a value of 18, 36, 72, or 144, meaning that $288/N_p$ (which corresponds to the number of bits per paging indicator) takes on a value of 16, 8, 4, or 2. *Id.*, 3:29-34. For example, if there are 18 ($N_p = 18$) paging indicators, $288/N_p = 288/18 = 16$ (meaning that each paging indicator is 16 bits long), if there are 36 ($N_p = 36$) paging indicators, $288/N_p = 288/36 = 8$ (meaning that each paging indicator is 8 bits long), if there are 72 ($N_p = 72$) paging indicators, $288/N_p = 288/72 = 4$ (meaning that each paging indicator is 4 bits long), and if there are 144 ($N_p = 144$)

paging indicators, $288/N_p = 288/144 = 2$ (meaning that each paging indicator is 2 bits long.) Thus, in all of the embodiments in Vayanos, each paging indicator (singular) includes multiple bits, i.e., each paging indicator (singular) has either 16, 8, 4 or two bits. Vayanos does not disclose a paging indicator having only a single bit.

67. Significantly, in Vayanos, all of the bits in a given paging indicator (always made up of multiple bits) are set to the same value. Specifically, the multiple bits in a given paging indicator “are all set to 1 if the paging indicator is equal to 1 and are set to 0 if the paging indicator is equal to 0.” *Id.*, 3:34-36 (emphasis added). Below is a diagram (created by Patent Owner) illustrating the format of the 288 bits (b_0 - b_{287}) used for the paging indicators in Vayanos, where the 288 bits are used to implement 18 paging indicators (N_0 to N_{15}). Each of the 18 paging indicators includes 288/18 bits (or 16 bits). As described in Vayanos, all of the bits (b_0 - b_{15}) in the first paging indicator (N_0) are set to the same value, either 0 or 1. In the diagram below, all bits in the first paging indicator are shown as set to 1, but alternatively, all such bits could be set to 0.



2. In Vayanos, Each Wireless Device Knows A Priori When To Read Information Intended From The Wireless Device On The Control Channel

68. In Vayanos, the location of each paging indicator in a given paging occasion is pre-assigned to a specific wireless device. As Vayanos explains, “[e]ach idle wireless device is mapped to a specific PI value based on its IMSI. The wireless device is also assigned a paging indicator in each paging occasion. This paging indicator is sent at a location that is determined based on a hash function $f(PI, SFN)$. The location of the paging indicator for the wireless device is thus determined by both the IMSI for the wireless device and the SFN for the paging occasion.” *Id.*, 3:39-46. In this respect, Vayanos is similar to the prior art identified in the Background of the ‘416 Patent where a single step is used to inform a given UE of

a message intended for the given UE. *Compare*, Ex. 1001, 2:12-20 (Background of ‘416 Patent explaining that, in the prior art, “[e]ach UE is associated with one of the indicator bits on the PICH”) *with* Ex. 1006 (Vayanos), 3:39-46 (“[e]ach idle wireless device is ... assigned a paging indicator in each paging occasion. This paging indicator is sent at a location that is determined by “the IMSI for the wireless device and the SFN for the paging occasion.”) Thus, like the prior art discussed in the Background of the ‘416 Patent, in Vayanos the paging indicator *by itself* informs a given UE that a message intended for the UE had been sent. *Id.*, 2:12-20.

69. By pre-assigning the location of each paging indicator to a specific wireless device, Vayanos eliminates the need for the specific wireless device to look for information matching the specific-device’s identity (e.g., the UE-ID of the specific device) in order to find a message intended for the wireless device on the signaling channel. More specifically, as a result of having a pre-assigning location for indicator bits on the paging indicator channel, a specific UE is informed *a priori* where to look for the indicated message when the indicator bits for the specific UE are set. *Id.*, 11:37-40 (“Transmission of notifications “can provide various advantages, such as: Simplify wireless device implementation since the wireless devices know *a priori* based on the MCCH schedule how long the notification will be sent on the MICH and when it would be useful to read the MCCH.”) Thus, unlike the disclosed embodiments of the ‘416 Patent where an active indicator merely

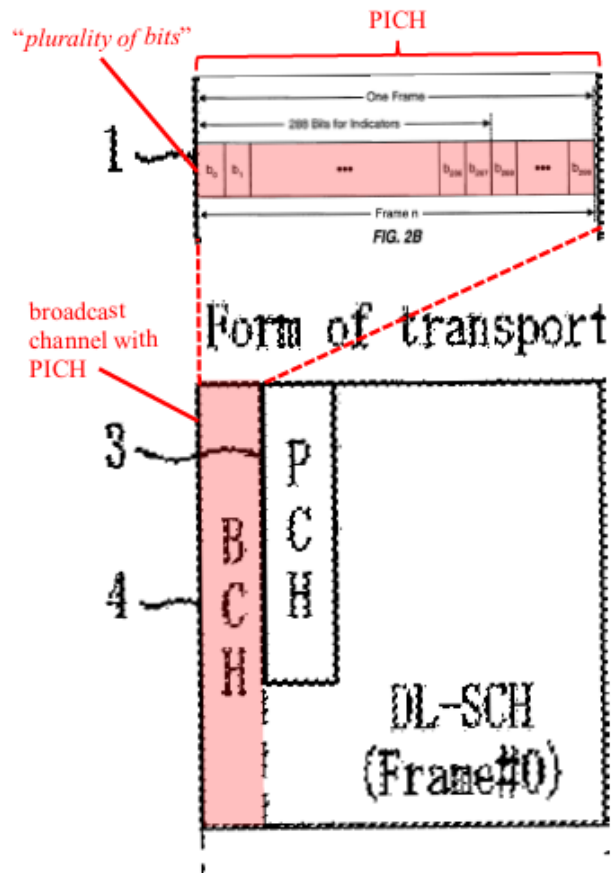
informs a UE that there *might* be a message intended for the UE (causing the UE to subsequently search the signaling channel for its UE-ID to see *if* a message intended for the UE actually exists there), in Vayanos the pre-assigned location of an active (multiple-bit) indicator informs a specific UE that a message intended for the UE *in fact exists* on the signaling channel at a location known *a priori* to the UE (eliminating the need for the UE to subsequently search the signaling channel for its UE-ID).

**X. GROUND 1 FAILS TO DEMONSTRATE A REASONABLE
LIKELIHOOD OF SUCCESS ON THE MERITS**

**A. Neither Kim Nor Vayanos Disclose Receiving “A Plurality Of Bits,
Wherein Each Of The Plurality Of Bits Indicates A Respective
Time Interval That Physical Shared Channel Resources Are
Utilized To Signal Channels”**

70. The Challenged Claims recite a UE receiver that receives “a plurality of bits, wherein *each of the plurality of bits indicates a **respective** time interval* that physical shared channel resources are utilized to signal channels.” As explained above, this claim language requires a one-to-one correspondence between each of the plurality of bits used to indicate the respective time intervals and the respective time intervals themselves, such that *each single bit* (in the plurality of bits) *indicates whether a different (respective) time interval* is used to signal channels.

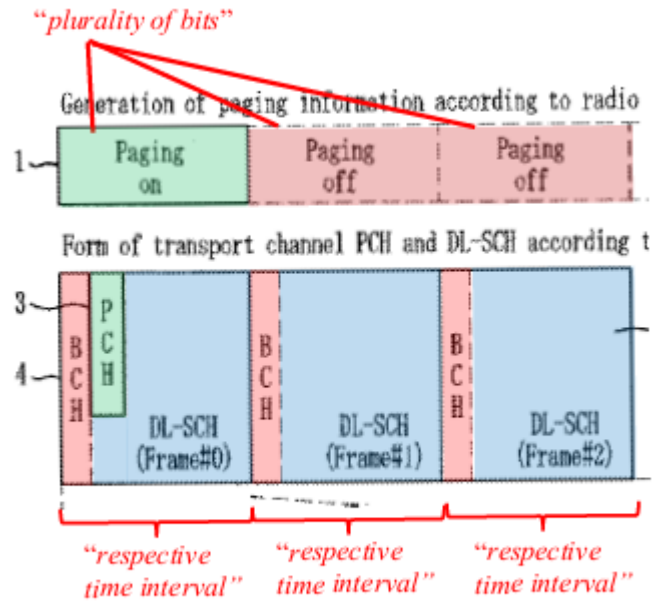
71. The Petition advances two mappings purporting to show that Kim/Vayanos meet this limitation. The first mapping uses the annotated combination of FIG. 2B of Vayanos and FIG.2 of Kim reproduced below:



Ex.1006, Fig. 2B and Ex.1015, Fig. 2 (partial, annotated); Ex.1003, ¶86.

Pet., 39. This mapping will be referred to hereinafter as the “First Mapping.”

72. The second mapping is based on an annotated version of the “Paging on, Paging off, Paging off” blocks at the top of FIG. 2 of Kim , reproduced below:



Ex.1005, Fig. 2 (partial, annotated); Ex.1003, ¶91.

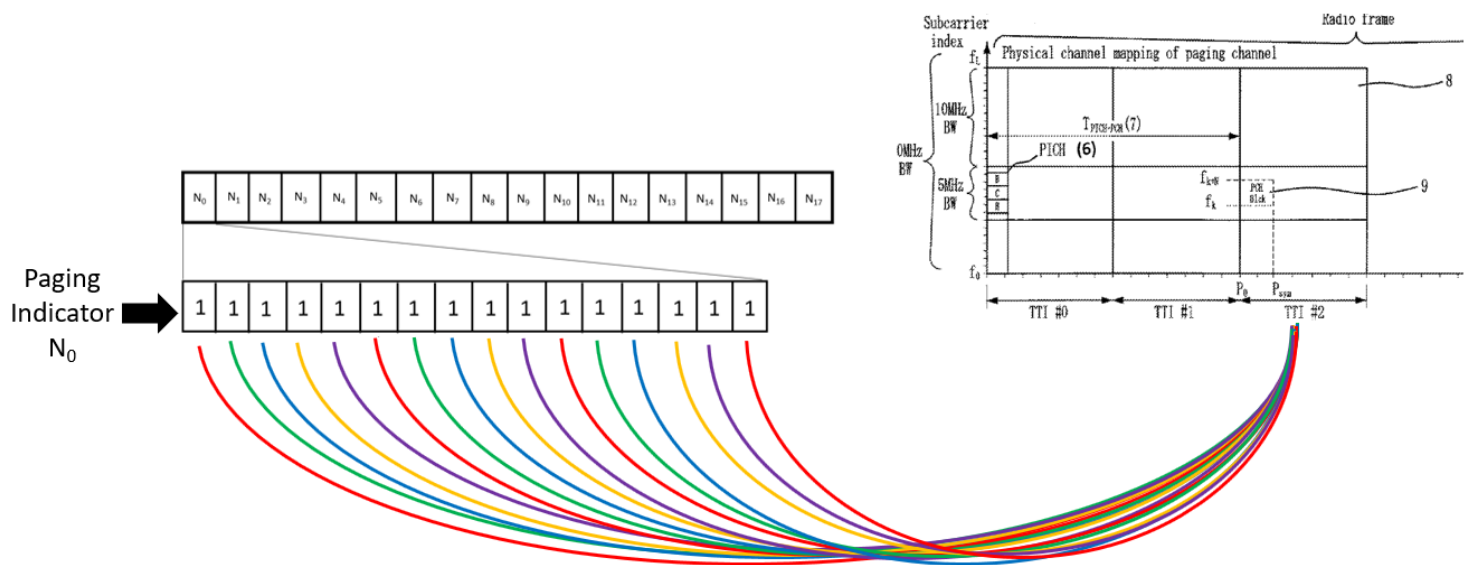
Pet., 43. This mapping will be referred to hereinafter as the “Second Mapping.”

73. As shown below, neither of these mappings show reception by the UE of “a plurality of bits, wherein *each* of the plurality of bits indicates a *respective* time interval that physical shared channel resources are utilized to signal channels,” as recited in Claims 1 and 7 of the ‘416 Patent.

1. The First Mapping Is Deficient Because The PICH Frame In Vayanos Lacks “a plurality of bits, wherein *each* of the plurality of bits indicates a *respective* time interval that physical shared channel resources are utilized to signal channels”

74. As explained above, Vayanos does *not* disclose a paging indicator having *only a single bit*. Rather, in all of the embodiments in Vayanos, *each* paging indicator (singular) includes *multiple* bits, i.e., each paging indicator (singular) has either 16, 8, 4 or two bits. Moreover, in Vayanos, *all* of the bits in a given paging

indicator (always made up of multiple bits) are set to the same value. *Id.*, 3:34-36 (the multiple bits in a given paging indicator “are *all* set to 1 if the paging indicator is equal to 1 and are set to 0 if the paging indicator is equal to 0.”) In the Kim-Vayanos combination advanced in the Petition, all of the bits in a given paging indicator (always made up of multiple bits) correspond to a single (common) time interval. This “many-to-one” relationship between the multiple bits in a paging indicator in Vayanos and a single (common) time interval (a TTI from Kim) is depicted in the illustration (created by Patent Owner) below:



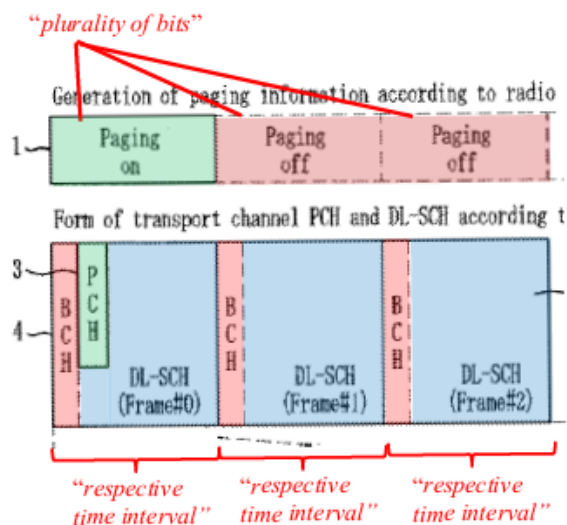
Vayanos – multiple indicator bits used to indicate one channel

75. The indicator format in Vayanos thus lacks “a plurality of bits, wherein each of the plurality of bits indicates a respective time interval that physical shared channel resources are utilized to signal channels.” Rather than meeting the claim

language, which requires a one-to-one correspondence between each of the plurality of bits and a respective interval (such that each single bit indicates whether a different (respective) time interval is used), Vayanos implements a many-to-one correspondence between the indicator bits and a particular time interval. The indicator bit format used in Vayanos is therefore outside the scope of the Challenged Claims. The Petition offers no explanation as to how the many-to-one correspondence between the indicator bits and a particular time interval in Vayanos meets the claim language.

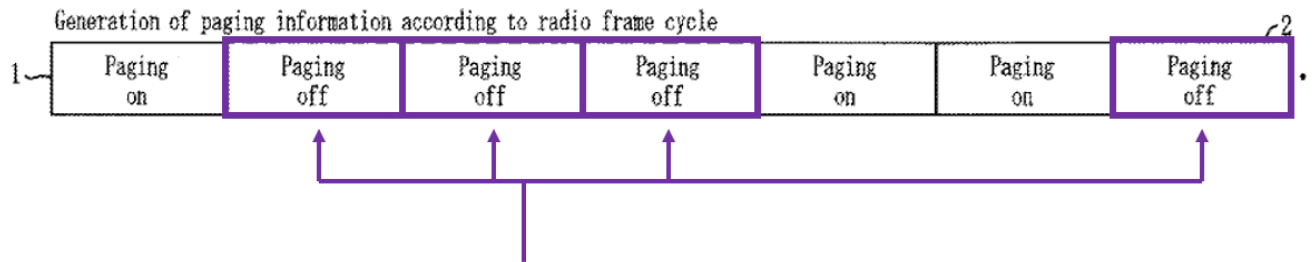
2. The Second Mapping Is Deficient Because The “Paging On”/“Paging Off” Blocks Shown In FIG. 2 Of Kim Are Not Bits That Are Transmitted To A Terminal

76. Alternatively, the Petition advances the Second Mapping, which purports to map the claim limitation requiring that the UE receives “a plurality of bits, wherein each of the plurality of bits indicates a respective time interval that physical shared channel resources are utilized to signal channels,” to the “Paging on, Paging off, Paging off” blocks at the top of FIG. 2 of Kim. An annotated version of these “Paging on, Paging off, Paging off” blocks from Kim was set forth at page 43 of the Petition and is reproduced below:



Ex.1005, Fig. 2 (partial, annotated); Ex.1003, ¶91.

77. The Second Mapping fails because, as explained above, the “Paging On”/“Paging Off” blocks at the top portion of FIG. 2 of Kim are not transmitted to a terminal as “a plurality of bits.” Instead, Kim’s disclosure compels the opposite conclusion because the reference explains that “[w]hen no paging information is generated (see 2 of FIG. 2), the paging channel does not exist in the transport channel of the radio frame (see 5 of FIG. 2). In this case, the paging indication channel is not also set up.” *Id.*, 5:9-17 (emphasis added). Thus, no paging indicator information (or any other paging information) is transmitted to the terminal for the boxes labelled “Paging off” in the top row of FIG. 2 of Kim.



When no paging information is generated (see 2 of FIG. 2), the paging channel does not exist in the transport channel of the radio frame (see 5 of FIG. 2). In this case, the paging indication channel is not also set up." Id., 5:9-17 (emphasis added).

78. Thus, the “Paging On”/”Paging Off” blocks at the top portion of FIG. 2 in Kim do not correspond to a “plurality of bits” transmitted from the base station to the terminal, because in Kim there is a complete absence of paging indicator information (not even a single bit) transmitted for the boxes labelled “Paging Off.” A POSITA would have understood that the top portion of Kim’s FIG. 2 corresponds to the paging information generated at the base station in step S110, which the base station uses internally to determine whether or not to form the PCH in step S120 -- rather than a string of bits transmitted to the terminal as argued in the Petition.

79. In summary, there is no “plurality of bits” sent to the UE corresponding to Kim’s “Paging On”/”Paging Off” blocks, as suggested in the Second Mapping set forth on pages 42-43 of the Petition. Accordingly, the Second Mapping fails to demonstrate that a UE receives broadcast information that includes such a “plurality of bits.”

B. It Would Not Have Been Obvious To Combine Kim And Vayanos In A Manner That Met The Claim Language

80. The Petition proposes that it would have been obvious to combine Vayanos and Kim in a manner that meets all of the elements of the independent claims of the ‘416 Patent. I disagree. As explained below, if the 288 paging indicator bits of Vayanos were used to implement the PICH of Kim, a POSITA would not have been motivated to have the UE subsequently monitor “the signaled channels in indicated time intervals, to determine whether signaling information for the UE is present based on an identification of the UE.”

81. As discussed above, in the Challenged Claims there are two-steps to inform a given UE “whether signaling information [e.g., a FACH message] for the UE” is present. Initially, the UE receives one of the plurality of bits indicating “a respective time interval that physical shared channel resources are utilized to signal channels.” Once the UE detects that the indicated time interval is being utilized, the UE subsequently monitors for signaling information in the “indicated time interval” to determine “whether signaling information for the UE is present based on an identification of the UE.”

82. In contrast to the disclosed embodiments in the ‘416 Patent, Vayanos pre-assigns the location of each paging indicator to a specific wireless device, thereby eliminating the need for the specific wireless device to look for information matching the specific-device’s identity (e.g., the UE-ID of the specific device) in

order find a message intended for the wireless device on the signaling channel. As explained above, as a result of having a pre-assigning location for indicator bits on the paging indicator channel, a specific UE in Vayanos is informed *a priori* where to look for the indicated message when the indicator bits for the specific UE are set. Ex. 1006, 11:37-40. Thus, unlike in the '416 Patent where an active indicator merely informs a UE that there might be a message intended for the UE (causing the UE to subsequently search the signaling channel for its UE-ID to see if a message intended for the UE actually exists there), in Vayanos the pre-assigned location of an active (multiple-bit) indicator informs a specific UE that a message intended for the UE in fact exists on the signaling channel at a location known *a priori* to the UE (eliminating the need for the UE to subsequently search the signaling channel for its UE-ID).

83. The combination of Kim and Vayanos in the Petition substitutes the 288 paging indicator bits of Vayanos for the PICH of Kim, while at the same time retaining the aspects of Kim requiring a UE to check the paging channel (PCH) based on the UE's identifier to see if there is a paging message for that particular UE. Pet., 38-40 and 54-56. Such an approach is illogical -- and a POSITA would not have been motivated to adopt it -- because the pre-assigned location of an active (multiple-bit) indicator in Vayanos by itself informs a specific UE that a message intended for the UE in fact exists on the signaling channel at a location known *a*

priori to the UE. This technique eliminates the need for the UE to subsequently search the signaling channel based on the UE's identity, as claimed. The Petition has failed to explain why a POSITA would have been motivated to retain the aspects of Kim in which a UE checks the paging channel (PCH) based on the UE's identifier to see if there is a paging message for that particular UE, when the indicator techniques in Vayanos eliminated the need to do so.

C. Ground 1 Fails To Demonstrate A Reasonable Likelihood Of Success With Respect To Any Dependent Claims

84. For the reasons set forth above, Petitioner has failed to demonstrate a reasonable likelihood that independent claims 1 and 7 of the '416 Patent are unpatentable. Since the arguments in the Petition relating to the dependent claims are all predicated on the arguments discussed above relating to independent claims 1 and 7, the Petition has also failed to demonstrate a reasonable likelihood that any of the dependent claims of the '416 Patent are unpatentable.

XI. GROUND 2 FAILS TO DEMONSTRATE A REASONABLE LIKELIHOOD OF SUCCESS ON THE MERITS

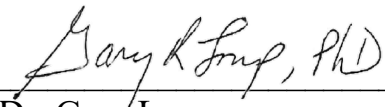
85. Ground 2 is substantially similar to Ground 1. However, Ground 2 combines Kim and Vayanos with the so-called Applicant Admitted Prior Art (AAPA), and relies on the AAPA in connection with elements [1.1] and [1.4]. Significantly, Ground 2 does not rely on the AAPA to cure any of the deficiencies in Ground 1 with respect to elements [1.2] and [1.3] articulated above. Thus, for the

same reasons explained above in connection with Ground 1, Ground 2 fails to demonstrate a reasonable likelihood of success with respect to any of the Challenged Claims.

XII. DECLARATION

I, Dr. Gary Lomp, declare that all statements made herein on my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code.

Date: March 12, 2025

By: 
Dr. Gary Lomp