

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

TOYOTA MOTOR CORP. and
CONTINENTIAL AUTOMOTIVE SYSTEMS, INC.

Petitioners,

v.

INTELLECTUAL VENTURES II LLC

Patent Owner.

Case No. IPR2022-01130
U.S. Patent No. 8,811,356

PATENT OWNER'S RESPONSE

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PATENT OWNER’S EXHIBIT LIST

Ex. 2001	Declaration of Dr. Gary Lomp
Ex. 2002	CV of Dr. Gary Lomp
Ex. 2003	“Interval” - <i>Merriam-Webster.com Dictionary</i> , Merriam-Webster, https://www.merriam-webster.com/dictionary/interval , (captured on October 4, 2022)
Ex. 2004	Transcript of Deposition of Dr. Robert Akl, taken on February 21, 2023
Ex. 2005	Declaration of Dr. Gary Lomp in Support of Patent Owner’s Response

I. INTRODUCTION

At the time of the invention, time division-code division multiple access (TD-CDMA) was a third-generation (3G) technology that combined the benefits of time-division multiple access (TDMA), code-division multiple access (CDMA), and time-division duplex (TDD). TD-CDMA featured open-loop uplink power control which provided a significant advantage in a packet-based multiple-access communication system. User equipment (UE) that could derive information needed to access uplink channels from downlink beacon signals in a TD-CDMA system presented a significant advantage over the need for a lengthy configuration of a dedicated channel to establish a feedback in an older system.

However, channel reciprocity could not always be guaranteed. Sometimes the correlation between uplink and downlink channels might be lost. For example, in high speed mobile applications, the time delay between downlink and uplink transmissions might exceed the coherence time of the channel. Also, the use of multiple transmit/receive antennas at the base station (BS) and/or UE might introduce unintentional decorrelation between uplink and downlink channels.

Inventor Paul Howard sought to alleviate such problems by creating a new technique for uplink channel control that uses a feedback scheme as a substitute for the absence of channel reciprocity, with minimal impact on the ability of the air interface to support uplink shared channels. His invention enabled active feedback

control between a BS and a UE. In one aspect, the operation of a system designed for TDD, or unpaired mode, is expanded to operate in FDD, or paired mode, in which a UE can transmit the uplink physical channel control signal (UL_Beacon) independently from the uplink physical channel. In this paired mode, the UE allocates a time slot for a beacon signal separated from the time slots for data in a frame. A second time slot is allocated within the frame for the BS to transmit a control signal, in response to the beacon signal from the UE, to instruct the UE to adjust a transmission parameter. In another aspect, dedicated timeslot groups all of the UL_Beacon signals from multiple UEs in a specific uplink timeslot. By grouping the UL_Beacon signals together, separation between the UL_Beacon signals and the standard uplink physical channels is achieved.

To protect his invention that encompasses these improvements, Paul Howard filed a patent application on December 27, 2006, which issued as U.S. Patent 8,009,639. A continuation of that application issued as U.S. Patent 8,811,356 (“the ‘356 Patent”).

This proceeding involves Petitioners’ challenge of the patentability of claims 1-7, 22-28, and 43-46 of the ‘356 Patent (“Challenged Claims”) on three separate but related grounds. First, Petitioners assert that claims 22, 23, 25-28, 45 and 46 are anticipated by IEEE Std 802.16-2004, IEEE Standard for Local and metropolitan area networks, Part 16: Air Interface for Fixed Broadband Wireless

Access Systems (Ex. 1005) (“the Standard”). Second, Petitioners assert that claims 1-7, 24, 43 and 44 are obvious over the Standard. Third, Petitioners assert that claims 1-7, 43 and 44 are obvious over the Standard in combination with U.S. Patent App. Pub. No. 2007/0105600 to Mohanty (Ex. 1009) (“Mohanty”). The common thread between each of the grounds, and the principal reason they should all be denied, is the Standard.

II. SUMMARY OF ARGUMENT

Petitioners’ asserted grounds for unpatentability should be denied because the Standard is not available as prior art against the claims of the ‘356 Patent for which Petitioners sought review. The Standard is inadmissible evidence of prior art because: (1) it constitutes inadmissible hearsay and no hearsay exception applies; (2) it is not authenticated and is not self-authenticating; and (3) it is irrelevant because neither Petitioners nor their Declarant, Randall C. Schwartz (Ex. 1006), have provided any admissible evidence establishing its date of publication or the date that it became publicly accessible. *See* Patent Owner’s Objections to Evidence (Paper 15). Specifically, the Declarant lacks personal knowledge of the matters about which he testifies, including but not limited to the “general practices” of the IEEE (Ex. 1006 ¶¶6, 10, 13), the publication date of the Standard (Ex. 1006 ¶7), the accuracy and authenticity of the Wayback Machine

pages/information referenced in Paragraph 9, the date on which the referenced Wayback Machine pages/information was first publicly accessible, the date on which submitted documents of the purported IEEE 802.16 Working Group meetings were publicly accessible (Ex. 1006 ¶¶10, 12, 13), the date on which the purported final version of the Standard was published (Ex. 1006 ¶¶14, 16), what documents a person “implementing a cellular network or device” would have consulted (Ex. 1006 ¶15), the accuracy and authenticity of the Wayback Machine pages/information referenced in Paragraph 16, and/or the availability of access to the purported final version of the Standard to anyone in the public interested to do so (Ex. 1006 ¶16).

Given the lack of evidence to establish that the Standard was prior art to the ‘356 Patent, each and every one of Petitioners’ grounds for unpatentability fails. In particular, the first ground fails because it relies upon on the Standard as the anticipatory reference. Similarly, the second and third grounds fail because they rely upon the Standard, alone or as a primary reference in combination with another reference, for obviousness. Without the Standard, Petitioners’ asserted grounds for anticipation and obviousness grounds cannot satisfy the requirements for a *prima facie* case of unpatentability.

Even if the Standard was available as prior art, the first ground fails because the Standard fails to disclose each and every element of each of claims 22, 23, 25-

28, 45 and 46. Likewise, the second and third grounds fail because the Standard, alone or in combination with Mohanty fails to render obvious claims 1-7, 24, 43 and 44. The third ground also fails because the Standard, in combination with Mohanty, fails to render claims 1-7, 43 and 44 obvious.

III. THE PROBLEM AND SOLUTION PRESENTED IN THE ‘356 PATENT

A. The Problem Presented: How to Control the Uplink Channel in the Absence of Channel Reciprocity

Cellular systems are often able to control the uplink channel based on the conditions of the downlink channel, when “channel reciprocity” exists. As explained in the ‘356 Patent:

Channel reciprocity gives equipment the ability to derive information about uplink channel conditions from downlink channel conditions based upon signals received by the user equipment (UE). Pathloss is one example of channel information that can be obtained from channel reciprocity. Knowledge of the uplink pathloss enables open-loop power control to be employed for uplink transmissions. ... A data terminal that can derive information needed to access uplink channels from the downlink transmissions (beacon signals) has a significant advantage over a terminal that relies on the (lengthy) configuration of a dedicated channel in order to establish a feedback channel. Ex. 1001, 1:23-45.

Ex. 2005, ¶23.

While channel reciprocity provides significant advantages, situations exist where channel reciprocity cannot be guaranteed. As the ‘356 Patent explains:

However, channel reciprocity cannot always be guaranteed. For example TDD transmissions may not be permitted in certain frequency spectrum allocations; this is a regulatory issue and may be used to protect other wireless equipment in the same or adjacent frequency bands. In these situations the correlation between uplink and downlink channels is lost because the channels are transported on carrier frequencies that are separated in frequency by an amount that is greater than the coherence bandwidth of the channel (usually, only a few MHz separation is sufficient to cause the uplink and downlink fading profiles to be independent). Ex. 1001, 1:46-56.

Ex. 2005, ¶24.

The ‘356 Patent goes on to explain further situations where there is decorrelation between the uplink and downlink channels, resulting in a loss of reciprocity. For example, “the use of multiple transmit and/or receive antennas at the network and/or the mobile terminal can introduce unintentional decorrelation between the uplink and downlink channels.” Ex. 1001, 1:62-65. Ex. 2005, ¶25.

One of the stated goals of the ‘356 Patent is to “find a substitute for channel reciprocity” for applications “where the correlation between the uplink and downlink path loss is not guaranteed.” Ex. 1001, 1:66-2:2. Ex. 2005, ¶26.

B. Summary of the Invention – A New Feedback Technique For Use In Applications Where Channel Reciprocity Cannot Be Guaranteed

The first paragraph of the “Summary of the Invention” provides an exemplary description of the ‘356 Patent’s solution - a new feedback technique for use where reciprocity cannot be guaranteed:

Although it is desirable to support air interfaces where the pathloss is not reciprocal, known conventional methods do not deal directly with the evolution or adaptation of an air interface that uses channel reciprocity to deliver key features and advantages where channel reciprocity is not guaranteed. The adaptation provided in embodiments of the invention introduces a new technique for uplink channel control that uses a feedback scheme as a substitute for the absence of channel reciprocity, with minimal impact on the ability of the air interface to support uplink shared channels. Ex. 1001, 2:6-16 (emphasis added).

Ex. 2005, ¶27.

The Summary of the Invention provides further details of this feedback scheme, which “enable active feedback control between a base station and user equipment (UE).” Ex. 1001, 2:17-18. As explained in the Summary of the Invention, the solution includes a closed loop feedback scheme, where a timeslot for transmission of a control signal (referred to as ‘UL-Beacon’) is inserted in the uplink frame between time slots used for transmitting data:

... an uplink beacon function (for power control) and a modified random access process substitute for the information lost due to the lack of channel reciprocity in paired operation. Embodiments of the invention allow a terminal to transmit the uplink physical channel control signal (UL_Beacon) independently from the uplink physical channel. Therefore, the implementation of closed loop feedback may operate in the absence of an uplink physical channel. In one embodiment, a UE allocates a time slot for a beacon signal separated from the time slots for data in a frame. A second time slot is allocated within the frame for the base station to transmit a control signal in response to the beacon signal. The control signal instructs the UE to adjust a transmission parameter. Id., 2:21-34. (emphasis added).

Ex. 2005, ¶28.

C. Detailed Description of the Novel Feedback Technique

The Detailed Description discloses an active feedback control system in which user equipment (UE) (e.g., a cell phone) transmits a physical uplink control channel signal, such as an uplink beacon (UL_Beacon), to a base station. *See* Ex. 1001, 4:35-40. “When pathloss reciprocity is not available, the combination of an uplink physical channel control signal with a downlink feedback channel may be used to keep the terminal informed of the condition of the uplink channel.” *Id.*, 4:35-38. In the closed loop feedback system, “the base station detects the received power and/or other channel information from the UL_Beacon, and sends controlling commands back to each terminal to keep the terminal informed of the channel conditions observed at the base station.” *Id.*, 4:56-60. For example, the “base station may send power control commands on a shared downlink channel to each terminal based on the power received from the UL_Beacon signal.” *Id.*, 4:63-65. This disclosed closed loop power control maintains the uplink channel for the duration of a communication session or sub-session. This “always on” aspect is what enables the invention to “substitute” for the reciprocity that would be available in, for example, a TDD system. Ex. 2005, ¶29.

In the ‘356 Patent, a base station assigns timeslots in the uplink frame to individual UE’s serviced by the base station. *See* Ex. 1001, 5:61-6:4. Since

multiple UEs can communicate with the base station using this framework, the ‘356 Patent describes using the “physical uplink shared channel” in the uplink frame. Of particular significance, the ‘356 Patent teaches that each UE transmits the physical uplink control channel signal in a dedicated timeslot of the uplink frame, between time slots used for sending data to the base station. *Id.*, 2:29-33. This design is especially advantageous because, as explained more fully below, it allows the feedback control to operate during normal operation of the uplink channel even when a UE does not have data to send. Ex. 2005, ¶30.

An example of the patented uplink frame structure is illustrated in Fig. 2 of the ‘356 Patent, reproduced below:

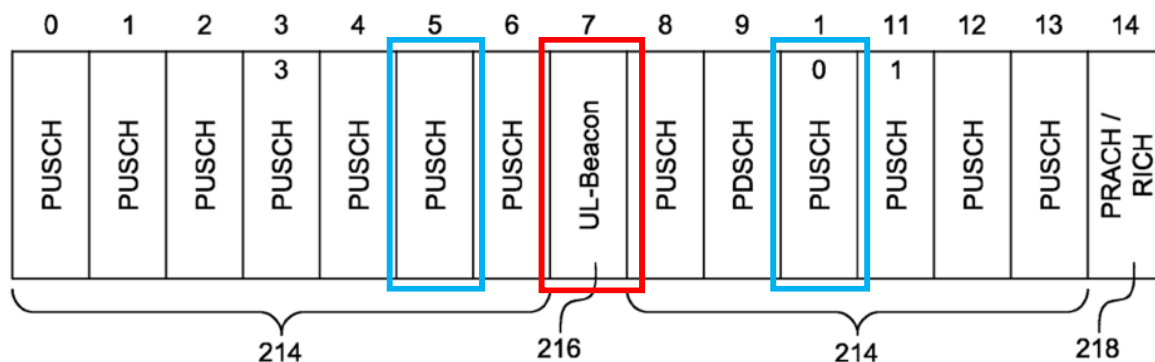


FIG. 2

In the uplink frame, data traffic (blue boxes) is carried in assigned intervals (timeslots) 214 of the frame. The UL_Beacon (i.e., the physical uplink control channel signal) (red box) is transmitted in a timeslot that is between timeslots used

for data traffic, i.e., in control timeslot 216 of the frame. Ex. 1001, 5:58-60. In this way, the time interval 216 is between the timeslots used by the UE for data traffic (assigned to time slots 214). Ex. 2005, ¶31.

Another example of the patented uplink frame structure is described in connection with Fig. 3 of the '356 Patent, where fractionalization is used for sending the physical uplink control channel signal. “When fractionation is employed, the RNC or other controller may allocate the physical uplink control channel timeslot in a given frame to a group of terminals depending on the current fractionation phase, thus increasing the number of terminals that can be supported with active physical channel feedback control. The maximum fractionation cycle length may be determined by the feedback update rate that the system requires in order to meet its performance targets.” Ex. 1001, 5:42-49. Ex. 2005, ¶32.

Fig. 3 shows an example “where the fractionation phase is 3. For example, the fractionation phase of terminal 304 occurs in frame #0 310, the fractionation phase of terminal 306 occurs in frame #1 312, and the fractionation phase of terminal 308 occurs in frame #2 314. Since the fractionation phase is 3, the phase for terminal 304 occurs again in frame #3 316.” Ex. 1001, 5:66-6:4.

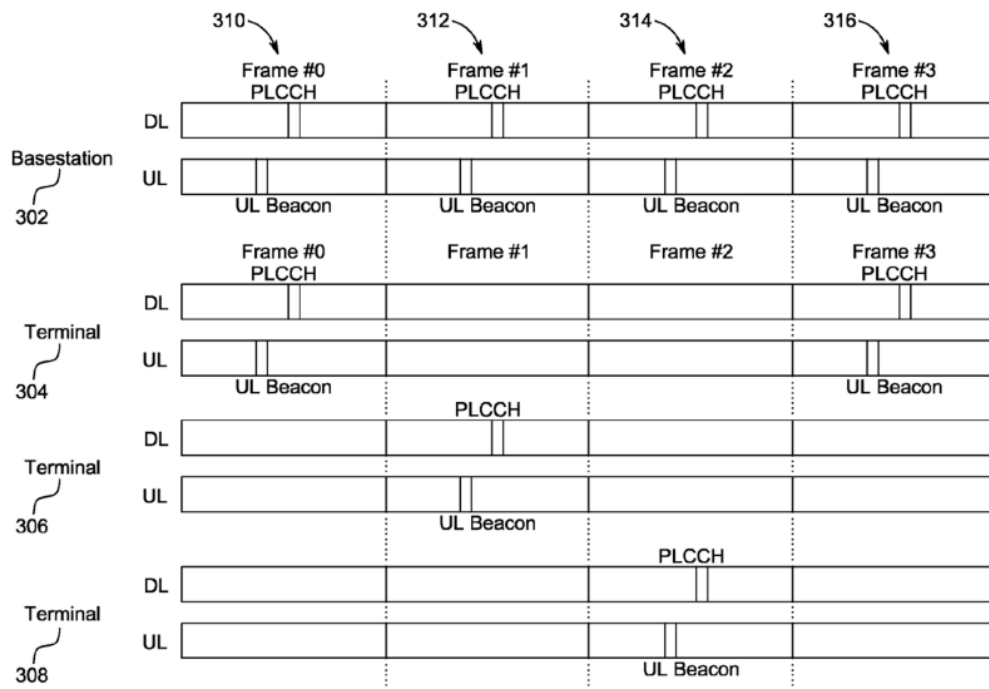


FIG. 3

Again, in Fig. 3, the UL_Beacon is separated from the timeslots used by the UE for data traffic in the same frame. Ex. 2005, ¶¶33-34.

The '356 Patent describes advantages of including the UL_Beacon within a dedicated time slot between data time slots in the frame:

By placing UL_Beacon signals in a dedicated timeslot, a dedicated detection scheme can be applied which may include performance enhancing features such as intra-cell cancelling (for alleviating the effects of cross-correlation interference between UL_Beacon signals transmitted by multiple terminals in the same cell), or inter-cell cancelling (for reducing the interference from neighboring cells in the case where the UL_Beacon timeslots are time synchronized). Ex. 1001, 5:21-28 (emphasis added).

The '356 Patent describes the UL_Beacon as an “uplink physical control signal” (*Id.*, 4:38-40), and explains that, since “the physical channel control signal is separate from the uplink (shared) physical channel, ... terminals are able to transmit a UL_Beacon independently of their access to the uplink shared channel.” *Id.*, 4:51-55. This is significant, because it “allows the control feed-back to operate even when the terminal does not have data to send, with the consequence that uplink shared channels can be used with maximum efficiency.” *Id.*, 6:34-37. Ex. 2005, ¶35.

IV. THE CHALLENGED CLAIMS

A. Claims of the '356 Patent

Claim 22 of the '356 Patent is a method claim which recites:

22. A method performed by a user equipment (UE), the method comprising:

receiving, by the UE, resource allocation information associated with an uplink physical control channel, wherein the uplink physical control channel and a physical uplink shared channel have different resources;

sending, by the UE, data over the physical uplink shared channel in assigned time intervals;

sending, by the UE in a time interval that it is not sending information over the physical uplink shared channel, a signal over the uplink physical control channel based on the received resource allocation information; and

receiving, by the UE, feedback information from a downlink control channel. Ex. 1001, 11:25-38 (emphasis added).

Independent claim 22 recites an uplink physical control channel (e.g., time slot 216 in Fig. 2) and a physical uplink shared channel (e.g., time slots 214 in Fig. 2), which have different resources (e.g., different time slots). A UE sends “data over the physical uplink shared channel in assigned time intervals” (e.g., time slots 214 assigned by the base station). The “signal [sent] over the uplink physical control channel” is sent in “a time interval that it is not sending information over the physical uplink shared channel.” Ex. 2005, ¶37.

Challenged independent claim 1 recites subject matter similar to claim 22, except that claim 1 is an apparatus claim directed to a user equipment (UE), claiming a processor configured to perform each of the process steps recited in claim 22. *Id.*, 9:40-54. Ex. 2005, ¶38.

Challenged independent claim 45 recites subject matter similar to claim 22, except that claim 45 recites “wherein in the time interval that the signal on the uplink physical control channel is sent by the UE, a plurality of UEs each send respective signals on respective uplink physical control channels in the time interval,” instead of “receiving, by the UE, feedback information from a downlink control channel.” *Id.*, 14:3-18. Ex. 2005, ¶39.

Challenged independent claim 43 recites subject matter similar to claim 45, except that claim 43 is an apparatus claim directed to a user equipment (UE),

claiming a processor configured to perform each of the processor steps recited in claim 45. *Id.*, 13:5-21. Ex. 2005, ¶40.

B. The Plain Meaning of Claim 22 Requires A Temporal Sequence Of Steps

In a method claim, the sequence of process steps may be important in order to read the claim in a logical manner. The general rule of interpreting a method claim is that “[u]nless the steps of a method [claim] actually recite an order, the steps are not ordinarily construed to require one.” *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1342 (Fed. Cir. 2001). The Federal Circuit has also held, however, that “a claim ‘requires an ordering of steps when the claim language, as a matter of logic or grammar, requires that the steps be performed in the order written, or the specification directly or implicitly requires’ an order of steps.” *Mformation Techs., Inc. v. Research in Motion Ltd.*, 764 F.3d 1392, 1398-99 (Fed. Cir. 2014) (quoting *TALtech Ltd. v. Esquel Apparel, Inc.*, 279 F. App’x 974, 978 (Fed. Cir. 2008)); see also *Function Media, LLC v. Google, Inc.*, 708 F.3d 1310, 1320 (Fed. Cir. 2013) (concluding that a claim that recites “processing” an “electronic advertisement” necessarily indicates that “the creation of the ad must happen before the processing begins”).

In *Mformation*, the claim at issue recited:

1. A method for remotely managing a wireless device over a wireless network comprising a server and the wireless device, the wireless network operable to communicatively connect the server and the wireless device, the method comprising the steps of:

transmitting registration information relating to the wireless device from the wireless device to the server;

verifying the registration information at the server; and

without a request from the wireless device, performing the steps of:

establishing a mailbox for the wireless device at the server,

placing a command for the wireless device in the mailbox at the server,

delivering the command from the mailbox at the server to the wireless device *by establishing a connection between the wireless device and the server*, transmitting the contents of the mailbox from the server to the wireless device, and accepting the contents of the mailbox at the wireless device, and

executing the command at the wireless device;

wherein the connection is established based on a threshold condition.

Mformation Techs., 764 F.3d at 1394 (italics in original). The Federal Circuit agreed with the district court’s construction and defendant’s argument that “claim 1 requires a connection be established before transmission,” *Id.* at 1399, based on the reasoning that “[a]s a matter of logic, a mailbox must be established before the contents of said mailbox can be transmitted.” *Id.* at 1400. The Court also noted that the specification describes a sole embodiment specifying a temporal sequence, and

while “we have expressly rejected the contention that if a patent describes only a single embodiment, the claims of the patent must be construed as being limited to that embodiment,” *Id.* ((quoting *Phillips v. AWH Corp.*, 415 F.3d 1303, 1323 (Fed. Cir. 2005) (en banc) (citation omitted))), construing the claim at issue as requiring a temporal sequence “is consistent with the sole embodiment in the specification.” *Id.*

Like claim 1 of *Mformation*, the elements of claim 22 of the ‘356 Patent also must be read in a temporal sequence in order to have a logical meaning. Ex. 2005, ¶¶ 41-43. For example, element 22[a] of claim 22 not only sets forth the antecedent bases for “an uplink physical control channel” and “a physical uplink shared channel,” but also expressly requires that “resource allocation information” be “associated with an uplink physical control channel” and that “the uplink physical control channel and a physical uplink shared channel have different resources.” *Id.* Element 22[b], “sending, by the UE, data over the physical uplink shared channel in assigned time intervals,” can be performed only after element 22[a] is performed, because only after the “physical uplink shared channel” is established can the UE send “data over the physical uplink shared channel in assigned time intervals.” *Id.*

Notably, element 22[b] recites the plural term “assigned time intervals” for the first time and requires that “the physical uplink shared channel” be “in assigned

time intervals.” Element 22[c] contains a negative limitation, “a time interval that it is not sending information over the physical uplink shared channel.” A plain reading of element 22[c] requires that “a time interval” in which the UE sends “a signal over the uplink physical control channel” be mutually exclusive of “assigned time intervals” for “the physical uplink shared channel.” Without the “assigned time intervals” in element 22[b], the recitation of “a time interval” for the first time in element 22[c] would be nonsensical. Thus, element 22[c] can be performed only after element 22[b] is performed. *Id.*, ¶ 44.

Moreover, the specification describes only embodiments of process steps performed in the temporal sequence described above. According to the ‘356 specification, “the RNC or other controller (e.g., other controller having its functionality in the core network) allocates resources so that the physical channel control signal is separate from the uplink (shared) physical channel.” Ex. 1001, 4:49-55 (emphasis added). The ‘356 specification also states that, “[t]o obtain rapid access to the uplink shared channels, terminals can transmit at the correct power with their first transmission so that latency can be kept to a minimum.” *Id.*, 4:45-48 (emphasis added). Furthermore, transmission of data in physical uplink shared channels (PUSCH) does occur before the transmission of UL-Beacon signal, as illustrated in an annotated portion of Fig. 2 of the ‘356 Patent, reproduced below, showing the uplink (UL) frame:

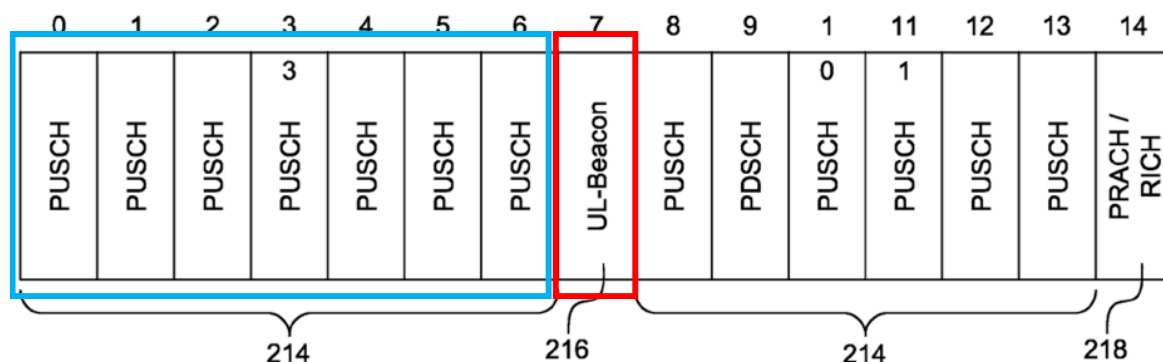


FIG. 2

Ex. 2005, ¶ 45.

In the UL frame, the PUSCH timeslots located before the UL-Beacon timeslot are marked with a blue box. Data is transmitted uplink within these PUSCH timeslots. The UL-Beacon signal is transmitted in a timeslot marked with a red box. As clearly shown in Fig. 2, the uplink transmission of data within the PUSCH timeslots (blue box) occurs before the uplink transmission of the signal within the UL-Beacon timeslot (red box). Although there are additional PUSCH timeslots after the UL-Beacon timeslot, any information within the PUSCH timeslots (blue box) preceding the UL-Beacon timeslot (red box) is transmitted before the UL-Beacon signal. Thus, element 22[c], “sending, by the UE in a time interval that it is not sending information over the physical uplink shared channel, a signal over the uplink physical control channel based on the received resource allocation information,” must logically and grammatically be performed after

element 22[b], “sending, by the UE, data over the physical uplink shared channel,” is performed in light of the plain meaning of claim 22 and the description in the specification. Ex. 2005, ¶¶46, 49.

Fig. 2 of the ‘356 patent shows a PRACH, which stands for a physical random access channel. A POSITA understands that a PRACH is used to access the network and to set the initial power level of the PUSCH. The UL-Beacon/uplink physical channel control signal has a different purpose, as it provides a feedback loop that is used for the duration of a call. Ex. 2005, ¶47.

Contrary to Dr. Akl’s assertion that the transmission of the initial ranging code message in a ranging subchannel is akin to the uplink physical control channel of the claims, see Ex. 1003, ¶¶73, 76, the initial ranging code message is more similar to the PRACH in the ‘356 patent than the uplink physical channel control signal. The initial ranging code is used to establish the initial power level and access the network, as does the PRACH of the ‘356 patent. The uplink physical channel control signal is different, as it is used as a continuous feedback mechanism during a call, after the initial power level is established for the uplink. A POSITA understands that the PRACH is used to set the initial power level of the PUSCH and that the uplink physical control channel is used afterwards as feedback during the call. Ex. 2005, ¶48.

V. RESPONSE TO PETITION GROUND 1

A. The Standard Does Not Disclose the Claimed “Channels” of the ‘356 Patent

As an initial matter, the Standard discloses a frame structure that is entirely different from the frame structure of the ‘356 Patent. Specifically, Dr. Akl relies upon the frame structure illustrated in Fig. 218 of the Standard (Ex. 1005, 500), reproduced below:

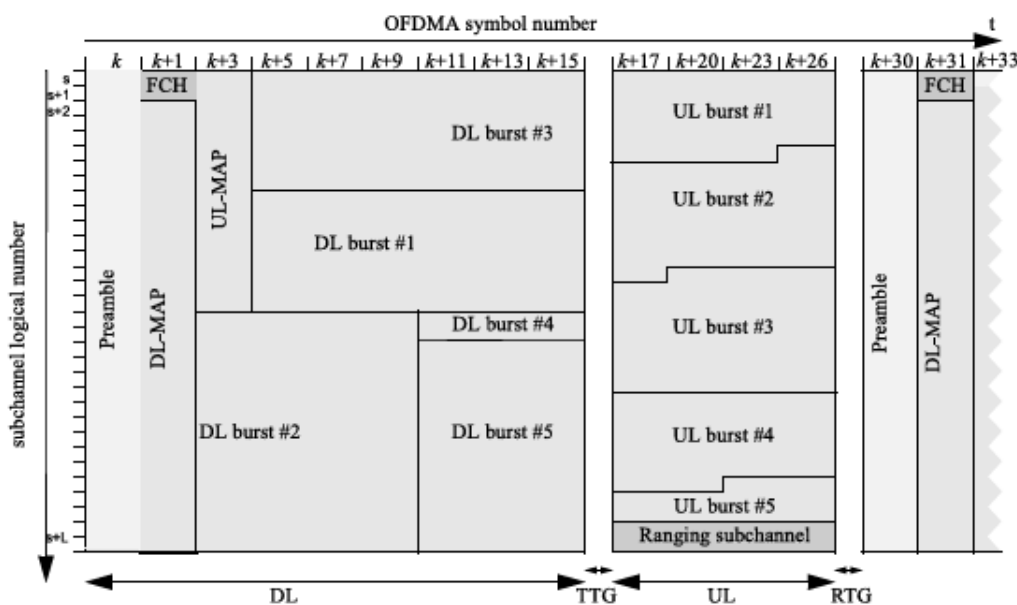


Figure 218—Time plan - one TDD time frame (with only mandatory zone)

Ex. 2005, ¶50.

The frames of the Standard are dynamic, and the structures of the frames may change from frame to frame. For example, subchannel allocation in the downlink may be performed in different ways: partial usage of subchannels (PUSC) where some of the subchannels are allocated to the transmitter, and full usage of the subchannels (FUSC) where all subchannels are allocated to the transmitter. Ex. 2005, 500. Moreover, each frame may have a variable duration from 2 ms to 20 ms, a variable split between the DL subframe and the UL subframe, variable sized DL-MAP and UL-MAP, and varying numbers and varying shapes and sizes of DL bursts and UL bursts. *See id.*, 520. Ex. 2005, ¶51.

In contrast, the ‘356 Patent discloses a frame structure for uplink (UL) and downlink (DL) frames as illustrated in Fig. 2 for frequency division duplex (FDD), reproduced below:

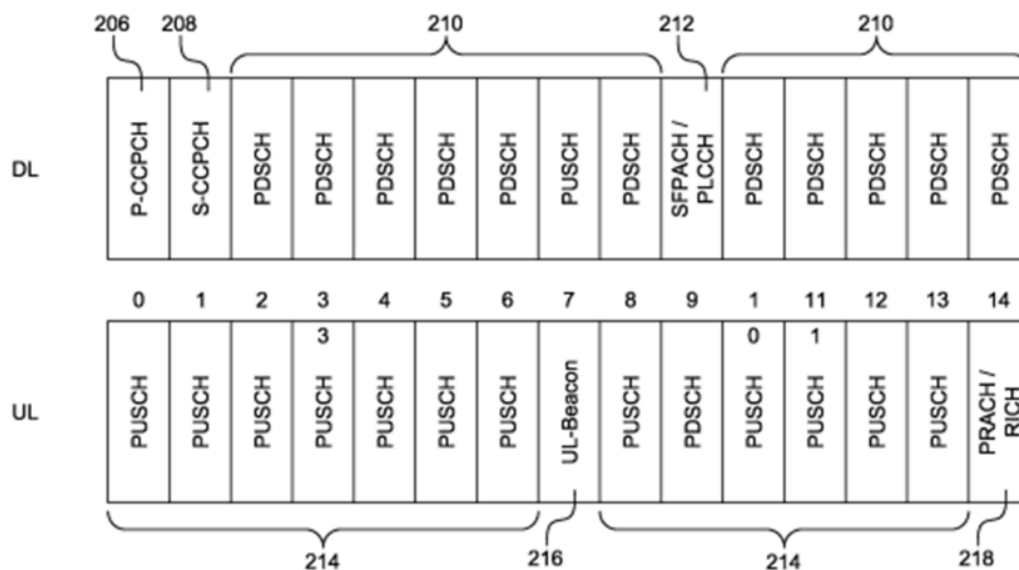


FIG. 2

Ex. 2005, ¶52.

B. Petitioners Fail to Show that the Standard Discloses the Claimed “physical uplink shared channel”

The Standard does not disclose a “physical uplink shared channel.” The Standard does not have a “physical uplink shared channel” because it utilizes a frequency channel with a bandwidth from 3.5 MHz to 28 MHz to carry frames which may be variable in size, where the data is mapped to respective regions of the physical channel on a frame-by-frame basis. Ex. 1005, 766. Ex. 2005, ¶53.

The Standard channel carries frames as shown in Figure 218:

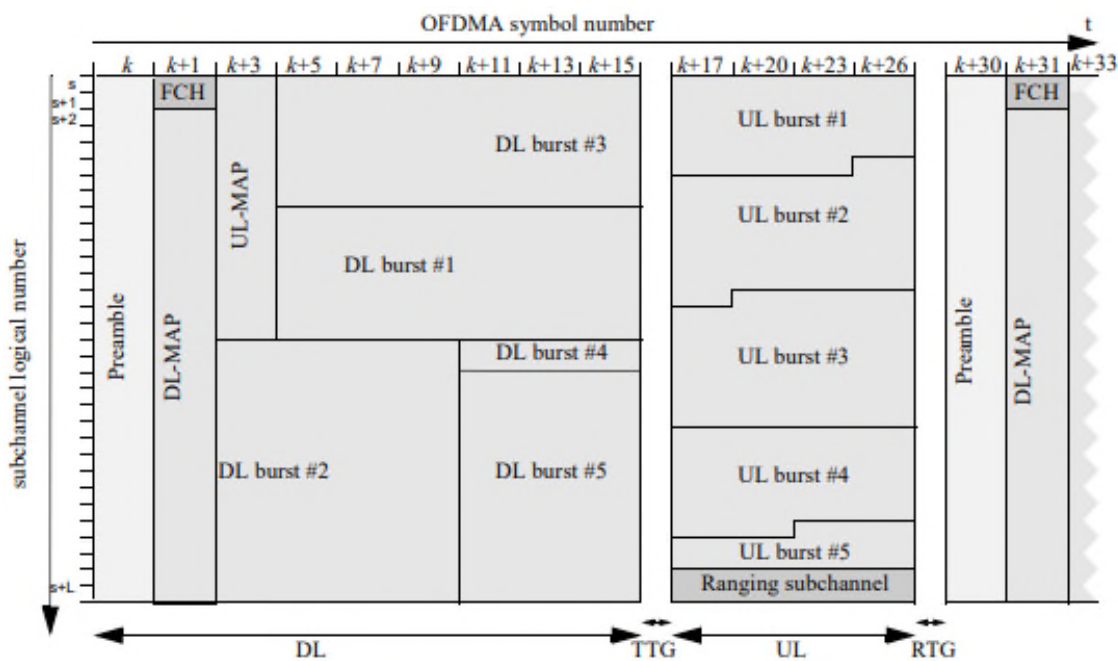


Figure 218—Time plan - one TDD time frame (with only mandatory zone)

Ex. 2005, ¶54.

According to the Standard, each frame has a preamble, a downlink subframe (denoted by bidirectional arrow “DL”) and an uplink subframe (denoted by bidirectional arrow “UL”). The downlink subframe and the uplink subframe are separated by a transmit/receive transition gap (TTG). The downlink subframe has a frame control header (FCH), a downlink MAP (DL-MAP), an uplink MAP (UL-MAP) and downlink (DL) bursts. Ex. 2005, ¶55.

According to the Standard, the uplink subframe has uplink (UL) bursts and a ranging subchannel. Each frame transmitted over the channel has a variable duration from 2 ms to 20 ms, a variable split between the DL subframe and the UL subframe, variable sized DL-MAP and UL-MAP, and varying numbers and

varying shapes and sizes of DL bursts and UL bursts. *See* Ex. 1005, 520. Ex. 2005, ¶56.

By contrast, the ‘356 Patent describes a fixed-duration frame structure as shown in Fig. 2, which is divided into time slots:

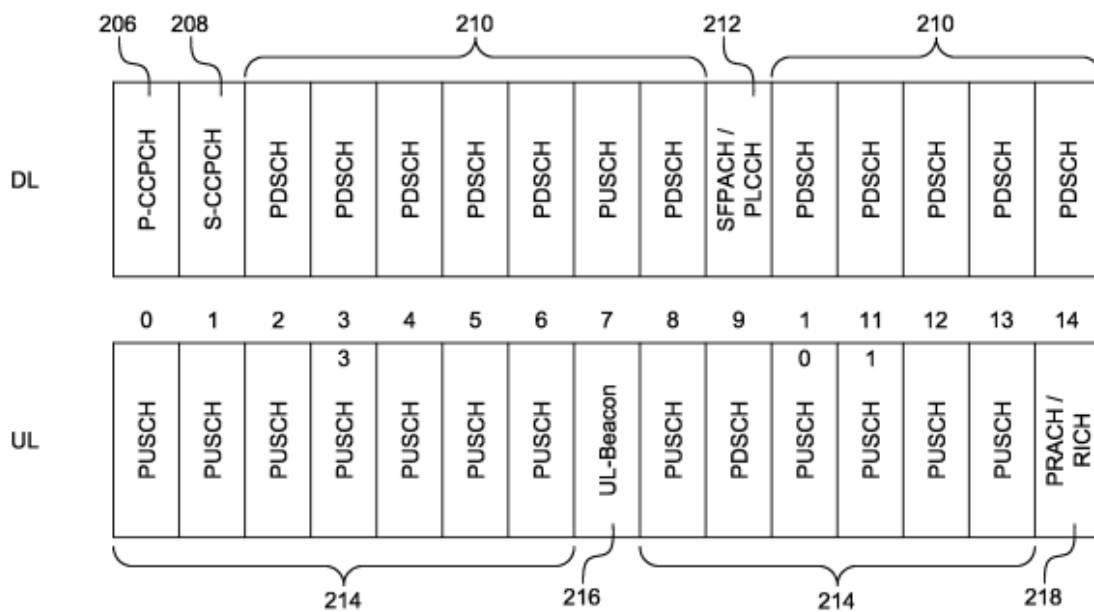


FIG. 2

Ex. 2005, ¶57.

Fig. 2 of the ‘356 Patent shows a frequency division duplex (FDD) scheme, in which the downlink (DL) and uplink (UL) transmissions are on different frequencies. The downlink frequency includes different types of channels, such as the physical downlink shared channel (PDSCH) and the physical logical control channel (PLCCH), which is a downlink control channel. The uplink frequency

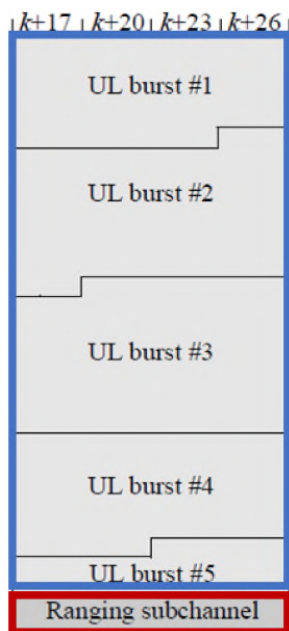
includes different types of channels, such as the physical uplink shared channel (PUSCH) and an uplink physical control channel, which can carry an uplink beacon (UL_Beacon), as shown in Fig. 2. The PDSCH and PUSCH channels are shared by multiple users and can carry user data, such as packet data. The uplink physical control channel carries control information, such as the UL_Beacon. The downlink control channel, such as the PLCCH, carries downlink control information. Ex. 2005, ¶58.

The '356 Patent uses a channel structure, such as shown in Fig. 2, to separate, transmit and receive various types of data. In contrast, the Standard, as illustrated in Figure 218, uses a completely different approach. It sends frames over the 3.5-28 MHz channel and each of these frames can vary both in duration, from 2ms to 20ms, and in uplink and downlink splits. Ex. 1005, 520, 766. Additionally, the content of these frames can be reconfigured in each frame. For example, the size of the DL-MAP and UL-MAP may change from frame to frame. The duration of the DL and UL subframes may also vary. Ex. 1005, 46, 48. Ex. 2005, ¶59.

The number of UL-bursts, if any, can vary. Figure 218 of the Standard is just one example showing five (5) UL bursts, and the actual number of UL bursts within a given UL subframe can be more or less than 5. Ex. 2005, ¶60.

Petitioners equate sending certain types of data in regions of a frame as being “channels.” Ex. 1003, ¶¶73-77. However, the Standard uses a single channel, and within a frame of that channel, sends certain data within a region of that frame. Then, another frame may be sent over that same channel with possibly an entirely new configuration. Accordingly, the Standard does not disclose any of the channels of the ‘356 Patent. Allocations of uplink bursts do not have to remain the same from frame to frame. Ex. 2005, ¶61.

The Standard does not disclose a “physical uplink shared channel.” The UL subframe portion of a time frame as shown in Figure 218 of the Standard is reproduced below, with a blue box marking the UL bursts and a red box marking the Ranging subchannel:



Ex. 2005, ¶62.

With respect to the “physical uplink shared channel,” Petitioners argue, “The uplink bursts are an ‘uplink shared channel’ because a POSA (or POSITA) would have recognized that each uplink burst is an allocation of a region on the uplink subframe in which the SS may transmit data, such that the uplink bursts collectively share the uplink subframe.” Paper 1, 34. That is not the case. The uplink bursts are placed in the channel, as previously explained, on a frame-by-frame basis. They do not constitute channels. The frame-carrying channel in the Standard (an example of which is shown in Figure 218) does not have a physical uplink shared channel. Ex. 2005, ¶63.

In the Standard, UL-burst regions are created for each frame. An SS is assigned a region for the UL-burst in the frame and transmits a one-time burst in that UL-burst in that frame. In the next frame, in addition to that frame having a new configuration including a different duration and/or a different split between the UL and DL subframes compared to those of the previous frame, that SS may be assigned to a totally different region of the UL subframe for a UL-burst, or assigned no burst at all. These one-time bursts are not channels. Ex. 2005, ¶64.

Furthermore, the Petition states, “the uplink bursts collectively share the uplink subframe.” Paper 1, 34. As noted in Figure 218, the “Ranging subchannel” is also in the UL subframe. Taking Petitioners’ incorrect interpretation of “physical uplink shared channel,” the ranging subchannel would also be a shared

channel, as the ranging subchannel also shares the UL subframe. Although Figure 218 illustrates the ranging subchannel is at the bottom of the UL subframe and spanning the UL subframe, the location of the ranging subchannel can be anywhere in the UL subframe. Ex. 1005, 534-35. This further illustrates that Petitioners are twisting the meaning of “shared channel” to suit its incorrect position. For example, Table 290 of the Standard discloses the following:

Table 290—CDMA Allocation IE format

Syntax	Size	Notes
CDMA_Allocation_IE() {		
Duration	6 bits	
Repetition Coding Indication	2 bits	0b00 – No repetition coding 0b01 – Repetition coding of 2 used 0b10 – Repetition coding of 4 used 0b11 – Repetition coding of 6 used
Ranging Code	8 bits	

Table 290—CDMA Allocation IE format (continued)

Syntax	Size	Notes
Ranging Symbol	8 bits	
Ranging subchannel	7 bits	
BW request mandatory	1 bit	1= yes, 0= no
}		

Duration

Indicates the duration, in units of OFDMA slots, of the allocation.

Repetition coding indication

Indicates the repetition code used inside the allocated burst.

Ranging Code

Indicates the CDMA Code sent by the SS.

Ranging Symbol

Indicates the OFDMA symbol used by the SS.

Ranging subchannel

Identifies the Ranging subchannel used by the SS to send the CDMA code.

BW request mandatory

Indicates whether the SS shall include a Bandwidth (BW) Request in the allocation.

Id. Ex. 2005, ¶65.

Petitioners rely on a primitive (archetypical) notion that all operations on a wireless communication system are carried out by “sharing” and therefore utilize “shared channels.” However, as a POSITA understands, the designation of functional channels and sharing of physical resources are not canonical. In other words, the designation of functional channels and sharing of physical resources do not apply to all systems uniformly. To the contrary, the designations applicable to a given system define that system with specificity. The various instances of sharing, archetypical of wireless communications, are not fungible. The behavior and performance of the respective systems depends explicitly on the particular designations and organizational structure of the wireless channel and associated resources (i.e., bandwidth, transmission time, etc.). Ex. 2005, ¶66.

For the foregoing reasons, Petitioners have failed to show that the Standard discloses a “physical uplink shared channel.” Ex. 2005, ¶67.

The above analysis in Subsection V.B applies to claims 1-7, 22-28, and 43-46. Ex. 2005, ¶68.

**C. Petitioners Fail to Show that the Standard Discloses the Claimed
“uplink physical control channel”**

As explained above, the Standard fails to disclose any of the channels as claimed in the '356 Patent, including the claimed "uplink physical control channel." Ex. 2005, ¶69.

According to the Petition, a Ranging Code message is sent over the ranging subchannel (red box) "'at initialization' for 'Initial Ranging,' that is, to allow a 'new station[] [to] join the network.'" Paper 1, 41-42, citing Ex. 1005, 49, 154. As the Petition explains, it is not until sometime after the Ranging Code message is sent that the device begins sending data (blue box) over the uplink (UL-bursts):

... at the time the Ranging Code message is sent by the SS, the SS has only received the First UL-MAP message, from which the SS determines the Ranging Subchannel over which to send the Ranging Code message. *Id.* *It is not until the SS receives the Second UL-MAP message that the SS is allocated its uplink burst in which to send information to the BS.* Paper 1, 41 (emphasis added).

Ex. 2005, ¶70.

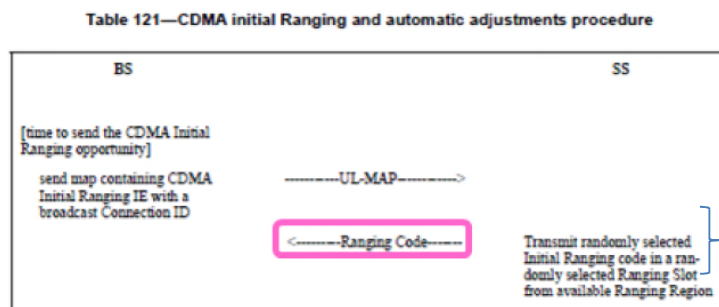
Petitioners allege that a Ranging Code message in an OFDMA system is "a ranging request ("RNG-REQ") message in OFDMA is called a Ranging Code message." Ex. 1003, ¶106. This is an incorrect characterization. A ranging subchannel in which a ranging request is sent uplink over an initial ranging interval is not a control channel because such a ranging request does not control anything. The Standard does not refer to the ranging subchannel in the UL subframe as a control channel. The Standard specifically indicates that the ranging subchannel is

not a channel, but it is a subdivision of a frame within the much larger channel in the standard. Ex. 2005, ¶71.

The Petition maps the “Ranging Code” sent over the ranging subchannel to the claimed uplink control channel signal. Paper 1, 34, 40. The Petition also discusses “Ranging Code” as follows:

2. Ranging Code Message

The SS then transmits a Ranging Code message in the Initial Ranging opportunity—that is, on the Ranging Subchannel—identified in the UL-MAP, as Table 121 shows. Standard, 49, 154, 175, 666.



Standard, Table 121 (cropped and annotated); Akl, ¶55.

Paper 1, 16-17 (color markings in original). Ex. 2005, ¶72.

Contrary to Petitioners’ allegations, the Standard (as shown in Table 121 above) simply refers to a “Ranging Code” – not a “Ranging Code message” – as the Petition alleges. Petitioners’ expert, Dr. Akl, admits that there is a distinction between “Ranging Code” and “Ranging Code message.” See Ex. 2004, 27:17-28:3. Ex. 2005, ¶73.

With respect to the Ranging Code, the Standard states, “Transmit randomly selected Initial Ranging code in a randomly selected Ranging Slot from available Ranging Region.” Ex. 1005, 206 (Table 121). The Standard does not disclose that a randomly selected ranging code transmitted in a randomly selected ranging slot is an uplink control channel signal, or explain how such a randomly selected ranging code constitutes an uplink control channel signal. Ex. 2005, ¶74.

As stated above, the Standard refers to a “Ranging Code” – not a “Ranging Code message” – as Petitioners allege. The Ranging Code in the Standard is just a code, and nothing more. Ex. 2005, ¶75.

The Standard states that Ranging Codes are binary pseudonoise codes generated by a pseudo-random binary sequence (PRBS) generator, as shown below:

8.4.7.3 Ranging codes

The binary codes are the pseudonoise codes produced by the PRBS described in Figure 243, which implements the polynomial generator $1 + X^1 + X^4 + X^7 + X^{15}$. The PRBS generator shall be initialized by the seed $b_0...b_{15} = 0, 0, 1, 0, 1, 0, 1, 1, s_0, s_1, s_2, s_3, s_4, s_5, s_6$ where s_6 is the MSB, and $s_6:s_0 = UL\_IDcell$.

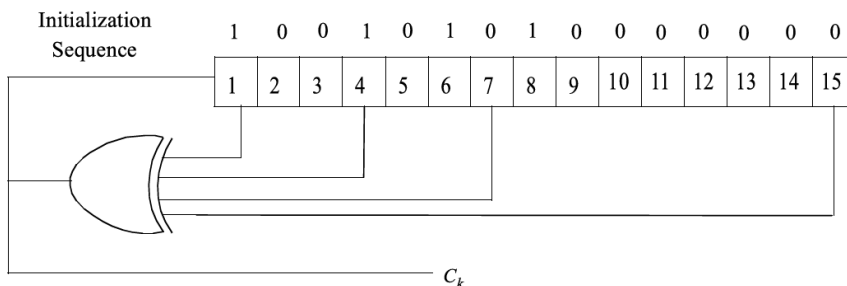


Figure 243—PRBS for ranging code generation

The binary ranging codes are subsequences of the pseudonoise sequence appearing at its output C_k . The length of each ranging code is 144 bits. These bits are used to modulate the subcarriers in a group of six (eight for the permutation defined in 8.4.6.2.5) adjacent subchannels. The index of the lowest numbered subchannel in the six (eight for the permutation defined in 8.4.6.2.5) shall be an integer multiple of six (eight for the permutation defined in 8.4.6.2.5). The six (eight for the permutation defined in 8.4.6.2.5) subchannels are called a ranging subchannel. The ranging subchannel is referenced in the ranging and Bandwidth Request messages by the index of lowest numbered subchannel.

For example, the first 144 bit code obtained by clocking the PN generator as specified, with $UL\_IDcell = 0$, the first code shall be 011110000011111... The next ranging code is produced by taking the output of the 145th to 288th clock of the PRBS, etc.

Ex. 1005, 578. Ex. 2005, ¶76.

The Petition states, “[t]he ranging subchannel is a ‘physical ... channel’ and the uplink bursts are a ‘physical ... channel’ because a POSA would have recognized that both are channels transmitted over the air at actual frequencies and times (as opposed to, for example, transport and logical channels, which are not). Akl, ¶73; Standard, Figure 218, 493 *et seq.*” Paper 1, 34 (emphasis added). However, Petitioners do not provide any evidence to support such a conclusory statement that a POSA (or POSITA) would have recognized those as physical

channels. To the contrary, the Standard itself, relied upon by Petitioners as the anticipatory reference in Ground 1 and as the primary reference in Grounds 2 and 3, shows that the ranging subchannel and the uplink bursts are not physical channels. Ex. 2005, ¶77.

Additionally, as previously explained, the ‘356 Patent has a physical random access channel (PRACH), which is used to access the network and set the initial transmission power level of the PUSCH. The uplink physical control channel has a different role. The uplink physical control channel is used as part of a feedback loop to maintain the call. A POSITA would not consider petitioner’s initial ranging code message as being part of this feedback loop to maintain the call, as it is used for initial power control and ranging. Ex. 2005, ¶78.

For the foregoing reasons, Petitioners have failed to show that the Standard discloses an “uplink physical control channel.” Ex. 2005, ¶79.

The above analysis in Subsection V.C applies to claims 1-7, 22-28 and 43-46. Ex. 2005, ¶80.

D. Petitioners Fail to Show that the Standard Discloses the Claimed “downlink control channel”

As explained above, the Standard fails to disclose any of the channels as claimed in the ‘356 Patent, including the claimed “downlink control channel.” Ex. 2005, ¶81.

Petitioners equate “the region of downlink subframe allocated to the UL-MAP” in the Standard to a downlink control channel. Paper 1, 42-43. As explained above, however, the size of the UL-MAP may change, as the size of UL-MAP_IE() (“IE” standing for Information Element) has a variable size. Ex. 1005, 48 (Table 18). Contrary to Petitioners’ allegation, a POSITA would not consider a region of the DL subframe allocated to UL-MAP, the size of which can vary from frame to frame, a channel, let alone a downlink control channel. Ex. 2005, ¶82.

For the foregoing reasons, Petitioners have failed to show that the Standard discloses a “downlink control channel.” Ex. 2005, ¶83.

The above analysis in Subsection V.D applies to claims 1-7 and 22-28. Ex. 2005, ¶84.

E. Petitioners Fail to Show that the Standard Discloses the Claimed “physical downlink shared channel”

As explained above, the Standard fails to disclose any of the channels as claimed in the ‘356 Patent, including the claimed “physical downlink shared channel.” Ex. 2005, ¶85.

With respect to the “physical downlink shared channel,” Petitioners argue that “The allocated downlink burst is a ‘downlink shared channel’ because it is an allocation of a region on the downlink subframe in which the SS may receive data (not control information) from the BS, and the downlink burst shares the downlink

subframe with other downlink bursts, as Figure 218 shows.” Paper 1, 53-54. For reasons similar to the “physical uplink shared channel,” the downlink bursts are not physical downlink shared channels because: (1) they are not channels; and (2) they are not shared. Ex. 2005, ¶86.

For the foregoing reasons, Petitioners have failed to show that the Standard discloses a “physical downlink shared channel.” Ex. 2005, ¶87.

The above analysis in Subsection V.E applies to claims 2, 3, 23 and 24. Ex. 2005, ¶88.

F. Petitioners Fail to Show that the Standard Discloses the Claimed “sending, by the UE in a time interval that it is not sending information over the physical uplink shared channel, a signal over the uplink physical control channel based on the received resource allocation information”

As explained in Subsection IV.B above, claim element 22[c], “sending, by the UE in a time interval that it is not sending information over the physical uplink shared channel, a signal over the uplink physical control channel based on the received resource allocation information,” must be performed after claim element 22[b], “sending, by the UE, data over the physical uplink shared channel in assigned time intervals.” Regardless of whether the Board agrees that claim 22 requires a temporal sequence as discussed in Subsection IV.B, Petitioners have failed to show that the Standard discloses this claim limitation for reasons stated below. Ex. 2005, ¶89.

The Petition states, “The Ranging Code message is sent over the Ranging Subchannel ‘based on’ the Initial Ranging opportunity because the SS identifies the Ranging Subchannel over which to send the Ranging Code message from the Initial Ranging opportunity sent by the BS in the UL-MAP message, as Table 121 shows. Standard, 174, 178, 205-06.” Paper 1, 40. *See also* Ex. 1003, ¶85. The Petition also states, “at the time the Ranging Code message is sent by the SS, the SS has only received the First UL-MAP message, from which the SS determines the Ranging Subchannel over which to send the Ranging Code message. *Id.* It is not until the SS receives the Second UL-MAP message that the SS is allocated its uplink burst in which to send information to the BS.” Paper 1, 41. *See also* Ex. 1003, ¶86. Ex. 2005, ¶90.

According to Petitioners’ interpretation of the Standard, which Patent Owner disputes, the alleged Ranging Code message, which Petitioners interpret as the uplink physical control channel signal, is sent over the Ranging Subchannel, which Petitioners interpret as the uplink physical control channel, based on the Initial Ranging opportunity, before information is sent in an uplink burst to the BS (based on the alleged Second UL-MAP message). *See* Paper 1, 14-22. This is in contrast to the uplink physical control channel, which is used to provide a feedback loop during a call. Thus, Petitioner’s interpretation is contrary to the sequence performed according to claim 22. Ex. 2005, ¶91.

Even if claim 22 is construed as not requiring that its steps be performed in a particular order, Petitioners still fail to show that element 22[c] is disclosed by the Standard. Neither the Petition nor Dr. Akl's Declaration in support of the Petition identifies any part of the Standard disclosing that SS sends the alleged Ranging Code message based on the Initial Ranging opportunity in a time interval that it is not sending information over an uplink burst (interpreted by Petitioners as the claimed physical uplink shared channel, which is an incorrect interpretation). Ex. 2005, ¶92.

A POSITA would understand that the process of (1) sending, by the SS, of an initial ranging request over the ranging subchannel, (2) receipt, by the BS, of the initial ranging request, and (3) transmission, by the SS, of data over the physical uplink shared channel, occurs over multiple frames. According to the Petition, “[w]hen an SS seeks to gain access to the BS, the SS waits for a UL-MAP message including the Initial Ranging opportunity from which the SS identifies the Ranging Region.” Paper 1, 15 (citing the Standard, 174, 178) (emphasis added). “The SS then transmits a Ranging Code message in the Initial Ranging opportunity—that is, on the Ranging Subchannel” *Id.*, 16. “Following the Ranging Code message from the SS, the BS transmits a RNG-RSP message, ...” *Id.*, 17. “At some point after the RNG-RSP message, the SS receives another UL-MAP message from the BS” *Id.*, 18. “This second UL-MAP message ‘allocates access to the uplink

channel.’” *Id.*, 19 (citing the Standard, 47) (emphasis added). Thus, according to Petitioners’ own argument, it would be impossible for the SS to transmit data over a physical uplink shared channel before the SS transmits an initial ranging request in an attempt to establish a connection with the BS. Ex. 2005, ¶93.

For the foregoing reasons, Petitioners have failed to show that the Standard discloses “sending, by the UE in a time interval that it is not sending information over the physical uplink shared channel, a signal over the uplink physical control channel based on the received resource allocation information.” Ex. 2005, ¶94.

The above analysis in Subsection V.F applies to claims 22-28, 45 and 46 and similar limitations in claims 1-7, 43 and 44. Ex. 2005, ¶95.

G. Petitioners Fail to Show that the Standard Discloses the Claimed “a plurality of UEs each send[ing] respective signals on respective uplink physical control channels in the time interval”

Petitioners have failed to show that the Standard discloses “a plurality of UEs each send[ing] respective signals on respective uplink physical control channels in the time interval” at least because neither the Petition nor Dr. Akl’s Declaration in support of the Petition identifies any part of the Standard disclosing this limitation. Ex. 2005, ¶96.

With regard to claim element 45[d], the Petition refers to Dr. Akl’s Declaration, ¶117, Paper 1, 61, which in turn refers to the portion of his Declaration with regard to claim 27. Ex. 1003, ¶117. Regarding claim 27, Dr. Akl

states, “The Ranging subchannel, the Standard explains, includes multiple ‘ranging slots.’ Standard, 205. When an SS wishes to send a Ranging Code message over the Ranging subchannel, the SS will ‘choose randomly a Ranging Slot’ of the Ranging subchannel over which to send the Ranging Code message to the BS. *Id.*; *see also id.*, 147-48. From this, a POSITA would have recognized that, when multiple SSs send Ranging Code messages to the BS in the same time interval (as will happen, for example, when multiple SSs seek to access the BS in the same time interval), the SSs will send their respective Ranging Code messages to the BS in respective ranging slots of the Ranging subchannel.” Ex. 1003, ¶109. Ex. 2005, ¶97.

Petitioners’ argument is incorrect because, instead of disclosing a plurality of UEs each sending respective signals on respective uplink physical control channels in the time interval, the Standard discloses a contention-based initial ranging scheme. Page 205 of the Standard, cited by Dr. Akl, discloses the following:

6.3.10.3.1 Contention based initial ranging and automatic adjustments

A SS that wishes to perform initial ranging shall take the following steps:

- The SS, after acquiring downlink synchronization and uplink transmission parameters, shall choose randomly a Ranging Slot (with the use of a binary truncated exponent algorithm to avoid possible re-collisions) at the time to perform the ranging, then it chooses randomly a Ranging Code (from the Initial Ranging domain) and sends it to the BS (as a CDMA code).
- The BS cannot tell which SS sent the CDMA ranging request; therefore, upon successfully receiving a CDMA Ranging Code, the BS broadcasts a Ranging Response message that advertises the received Ranging Code as well as the ranging slot (OFDMA symbol number, subchannel, etc.) where the CDMA Ranging code has been identified. This information is used by the SS that sent the CDMA ranging code to identify the Ranging Response message that corresponds to its ranging request. The Ranging Response message contains all the needed adjustment (e.g., time, power, and possibly frequency corrections) and a status notification.
- When the BS receives an initial-ranging CDMA code that results in sending an RNG-RSP message with success status, the BS shall provide BW allocation for the SS using the CDMA_Allocation_IE to send an RNG-REQ message.
- Upon receiving a Ranging Response message with continue status, the SS shall continue the ranging process as done on the first entry with ranging codes randomly chosen from the Periodic Ranging domain.
- Using the OFDMA ranging mechanism, the periodic ranging timer is controlled by the SS, not the BS.

Ex. 1005, 205. Section 6.3.10.3.1 of the Standard discloses contention-based initial ranging. A POSITA would not consider “contention based initial ranging” as permitting multiple SSs, without restriction, to transmit multiple Ranging Codes within the same time interval. Ex. 2005, ¶198.

The Standard also describes “contention opportunities” in the context of uplink subframe as follows:

8.1.5 Uplink PHY

8.1.5.1 Uplink subframe

The structure of the uplink subframe used by the SS to transmit to the BS is shown in Figure 154. Three classes of bursts may be transmitted by the SS during the uplink subframe:

- a) Those that are transmitted in contention opportunities reserved for Initial Ranging.
- b) Those that are transmitted in contention opportunities defined by Request Intervals reserved for response to multicast and broadcast polls.
- c) Those that are transmitted in intervals defined by Data Grant IEs specifically allocated to individual SSs.

Ex. 1005, 334. As described by the Standard, the SS may transmit three classes of bursts in an uplink subframe, including bursts transmitted in contention opportunities reserved for Initial Ranging. Ex. 2005, ¶99.

In addition, the Standard does not disclose any uplink physical control channel for reasons stated in Subsection V.C above, let alone “uplink physical control channels” (plural) used by multiple UEs in the same time interval. Ex. 2005, ¶100.

For the foregoing reasons, Petitioners have failed to show that the Standard discloses “a plurality of UEs each send[ing] respective signals on respective uplink physical control channels in the time interval.” Ex. 2005, ¶101.

The above analysis in Subsection V.G applies to claims 43-46 and similar limitations in claims 6 and 27. Ex. 2005, ¶102.

H. Petitioners Fail to Show that the Standard Anticipates Claims 22, 23, 25-28, 45 and 46 under Ground 1

In order for Petitioners to prove anticipation, each and every limitation of a claim must be disclosed, either expressly or inherently, in a single prior art reference. If any one of those limitations is not disclosed, either expressly or inherently, by that reference, then the claim is not anticipated by that reference.

For reasons stated above, at least one limitation in each of claims 22, 23, 25-28, 45 and 46 is not disclosed, either expressly or inherently, by the Standard. Ex. 2005, ¶¶ 103-104.

Neither the Petition nor Dr. Akl's Declaration in support of the Petition sets forth any arguments or evidence to show that any of the limitations in each of claims 22, 23, 25-28, 45 and 46 that is not expressly disclosed is at least inherently disclosed by the Standard. Ex. 2005, ¶105.

Therefore, claims 22, 23, 25-28, 45 and 46 are not anticipated by the Standard. Ex. 2005, ¶106.

VI. RESPONSE TO PETITION GROUNDS 2 AND 3

The Petition combines obviousness arguments under Grounds 2 and 3 for each of the claims in Section IX.B. Paper 1, 62-83. Dr. Akl's Declaration in support of the Petition likewise combines obviousness arguments under Grounds 2 and 3 for each of claims 1-7, 24, 43 and 44. Ex. 1003, ¶¶119-150. Ex. 2005, ¶107.

Neither the Petition nor Dr. Akl's Declaration in support thereof sets forth any arguments or evidence to show that any one of the limitations discussed in Section V above that is not expressly or inherently disclosed by the Standard is rendered obvious by the Standard alone or by a combination of the Standard with Mohanty with regard to each of claims 1-7, 24, 43 and 44. Ex. 2005, ¶108.

Mohanty fails to teach or suggest any of the limitations discussed in Section V above. Ex. 2005, ¶109. Petitioners merely argue that Mohanty teaches the "processor configured to" limitation which is admittedly missing in the Standard. See Paper 1, 63-67; Ex. 1003, ¶¶120-125.

Therefore, the Standard, alone or in combination with Mohanty, would not have rendered claims 1-7, 24, 43 and 44 obvious. Ex. 2005, ¶110.

VII. CONCLUSION

For the foregoing reasons, the Board should find that Petitioners have failed to meet its burden to prove that any Challenged Claim is unpatentable by a preponderance of the evidence. The Petition should be denied, as each Ground fails for the reasons set forth herein.

Respectfully submitted,

Dated: April 7, 2023

By: /Ryan W. O'Donnell /
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IPR2022-01130
U.S. Patent No. 8,811,356

CERTIFICATE OF COMPLIANCE WITH WORD COUNT

Pursuant to 37 C.F.R. § 42.24(d), I certify that this Response complies with the type-volume limits of 37 C.F.R. § 42.24(b)(1) because it contains 8,384 words, excluding the parts of this Patent Owner's Preliminary Response that are exempted by 37 C.F.R. § 42.24(a), according to the word processing system used to prepare this Patent Owner's Preliminary Response.

Respectfully submitted,

Dated: April 7, 2023

By: /Ryan W. O'Donnell /
Ryan W. O'Donnell
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CERTIFICATE OF SERVICE

The undersigned certifies that pursuant to 37 C.F.R. § 42.6(e), a copy of the foregoing **PATENT OWNER'S RESPONSE** was served via email (as consented to by counsel) on April 7, 2023 to lead and backup counsel of record for Petitioners as follows:

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