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U.S. Patent 10,492,199

U.S. Patent 10,492,199 ("*Redwood*" or the "patent-at-issue") was filed on July 14, 2016 and claimed an earliest priority date of December 8, 2000. Claim 1 of the patent-at-issue is generally directed to a transmitting apparatus that generates a transmission slot and a frame including a series of time slots, an effective symbol and a guard period. A frame guard period is added to the series of time slots to suppress frame loss due to interference. The generated frame is transmitted by the apparatus as a radio signal.

The primary reference, U.S. Patent 9,301,310 ("*Avago*"), was filed on July 2, 2013, and claimed an earliest priority date on October 30, 1998. The patent is directed to data transmission between a base station and a plurality of subscriber stations. The data bursts are defined by data packets and are separated by guard bands. Guard times are used to mitigate the occurrence of undesirable collisions between adjacent data packets. RF signals are transmitted by the base station on a selected downstream channel.

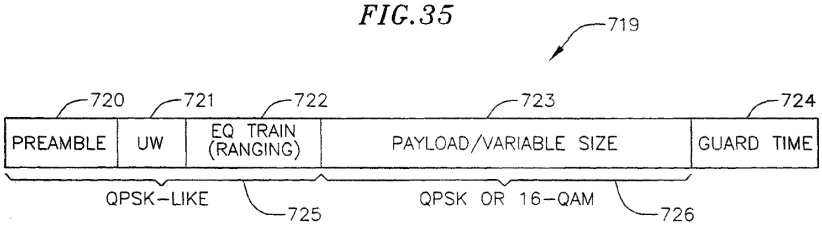
The secondary reference, U.S. Patent 8,363,576 (*"Qualcomm"*), was filed on July 2, 2004, and claimed an earliest priority date on November 9, 2000. The patent is directed to techniques for transmission of voice/data and data packet services. Data to be transmitted on each physical channel is partitioned into radio frames including time slots. A guard time is provided between the voice/data partition and the data packet partition to reduce the amount of overlap between them.

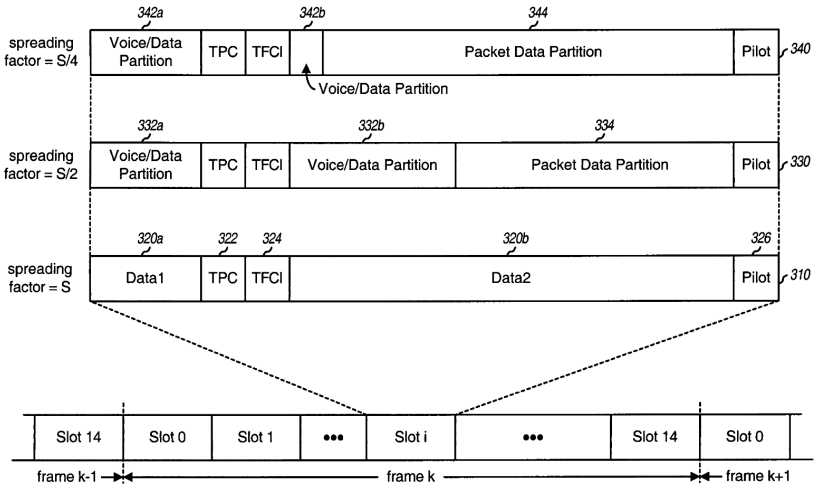
Patent Owner is now on notice that claims of this patent are invalid; as a result, any new or continued assertion of this patent may be considered meritless or brought in bad faith. *Octane Fitness, LLC v. ICON Health & Fitness, Inc.*, 572 U.S. 545, 554 (2014). Such considerations are relevant to whether a case is deemed "exceptional" for purposes of awarding attorneys' fees. 35 U.S.C. § 285; *see, e.g.*, *WPEM, LLC v. SOTI Inc.*, 2020 WL 555545, at *7 (E.D. Tex. Feb. 4, 2020), *aff'd*, 837 F. App'x 773 (Fed. Cir. 2020) (awarding fees for an exceptional case where plaintiff "failed to conduct an invalidity and enforceability pre-filing investigation"); *Energy Heating, LLC v. Heat On-The-Fly, LLC*, 15 F.4th 1378, 1383 (Fed. Cir. 2021) (affirming award of fees where, *inter alia*, the plaintiff knew "that its patent was invalid").

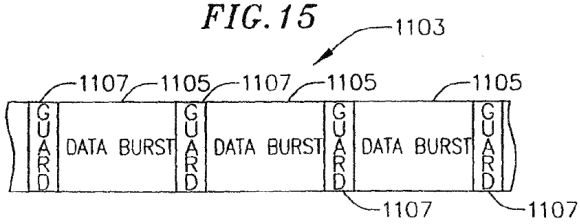
A sample claim chart comparing claim 1 of *Redwood* to *Avago* and *Qualcomm* is provided below.

US10492199 (“*Redwood*”)	**A. US9301310** (*“Avago”*) **B. US8363576** (*“Qualcomm”*)
1. A **transmitting apparatus** comprising **circuitry** configured to: **generate a transmission time slot based on transmission data**;	**A. US9301310** “1. A **base station** comprising: . . . **a transmitter configured to send a downstream signal** on a downlink channel from the base station to the subscriber station. . . .” *Avago* at Claim 1 “Referring now to FIG. 61, the MAC framing and the PHY or burst receiver framing are decoupled and upstream frame synchronization is based on timestamp messages (msgs). The cable modem termination system 10 generates a timestamp message which is utilized by a subscriber cable modem 12 to effect timing synchronization such that proper slot timing is facilitated. The **output from a headend timing generation circuit** 449 is reduced in frequency by a divider 450 and is **used by a timestamp counter** 451 to **generate slot**/frame **timing** 452.” *Avago* at col. 57:47-56 “**Each time slot** 92, as **defined by a MAP PDU** 487, includes a plurality of time intervals 110 and may additionally comprise one or more sub-intervals 489 in addition to the interval(s) 110. The number of intervals 110 and sub-intervals 489 contained within a time slot 92 depends upon the contents of the MAP PDU 487 which defines the time slot 92.” *Avago* at col. 43:36-42 “Referring now to FIG. 36, the contents of a **MAP protocol data unit (PDU)** 487 are shown. The **MAP PDU** 487, **which is transmitted on the downstream channel** by the cable modem termination system 10 (FIG. 27) to all of the cable modems 12 on a given frequency channel, **contains the time slot allocations for at least some of the cable modems** 12 **which have previously sent a request to transmit one or more data packets to the cable modem termination system** 10.” *Avago* at col. 42:56-63 **B. US8363576** “FIG. 5 is a plot of the transmit power for a number of voice/data transmissions and a number of **packet data transmissions from a particular base station**. **For each slot, the transmit power for all voice/data-only transmissions** can be summed and the total aggregate voice/data transput

(cont.) 1. A **transmitting apparatus** comprising **circuitry** configured to: **generate a transmission time slot based on transmission data**;	power can be plotted as shown in FIG. 5." *Qualcomm* at col. 12:51-56 "At a **transmitter unit** 410 **(e.g., a base station)**, voice/data is sent, typically in blocks, from a voice/data source 412 a to a transmit (TX) voice/data processor 414 a that formats, codes, and processes the data to generate coded voice/data. Similarly, packet data is sent, typically in packets, from a packet data source 412 b to a transmit packet data processor 414 b that formats, codes, and processes the data to generate coded packet data." *Qualcomm* at col. 9:44-51 "The **elements of transmitter unit** 410 and receiver unit 430 can be implemented in various manners. For example, **each data processor and controller** shown in FIG. 4 **can be implemented with one or more application specific integrated circuits (ASICs)**, digital signal processors (DSPs), programmable logic devices (PLDs), controllers, micro-controllers, microprocessors, other electronic units designed to perform the functions described herein, or a combination thereof." *Qualcomm* at col. 16:35-42 "FIG. 3 is a diagram of a frame format and a slot format for a dedicated physical channel as defined by the W-CDMA standard. A different frame format is defined by the W-CDMA standard for each type of physical channel such as the downlink dedicated channel (DPCH), the downlink shared channel (DSCH), and so on. The data to be transmitted on each physical channel (i.e., the traffic data) is **partitioned into radio frames, with each radio frame covering a 10 msec time period and including** 15 **slots labeled as slot** 0 through **slot** 14. **Each slot is further partitioned into one or more fields used to carry a combination of traffic data, overhead data, and pilot data**." *Qualcomm* at col. 5:36-47
generate a frame including: **a series of n (integer equal to or greater than 1) time slots**, **each time slot of the series of n time slots including an effective symbol period**, and **at least one time slot of the series of n time slots further including a guard period**; and	**A. US9301310** "It is possible, such as in light data traffic conditions, that **one or more adjacent time slots** might be empty, thereby further increasing the time between **adjacent data bursts**. Because the data bursts 1105 are discontinuous, **each data packet which defines a data burst** must be reacquired by the burst receiver 85 (FIG. 5A)." *Avago* at col. 29:54-59 "Referring now to FIG. 35, **a sample date packet** 719 **includes a QPSK-like portion** 725 **and a QPSK or 16-QAM portion** 726 comprising a payload 723. **Guard times** 724 are

(cont.) **generate a frame** including: **a series of n (integer equal to or greater than 1) time slots**, **each time slot of the series of n time slots including an effective symbol period**, and **at least one time slot of the series of n time slots further including a guard period**; and	typically **used between adjacent data packets**. **The QPSK or QPSK-like portion** 725 **includes a preamble** 720, **a unique word** 721, **and, optionally, an equalization training or ranging portion** 722, which facilitates ranging, as described in detail above." *Avago* at col. 50:23-30 "The **unique word** 721 **is in a distinctive symbol pattern to indicate the end of the preamble** 720 **and the beginning of the payload** 723. The payload 723 may be of variable size depending upon the length of the communication from the subscriber modem 12 to the headend 10. **The equalizer train** 722 **may be provided between the unique word** 721 **and the payload** 723. The equalizer train 722 may be in a random sequence. It is provided during the initialization period to train the equalizer to provide proper coefficients to the subscriber modem 12." *Avago* at 24:17-26 *FIG. 35*  **B. US8363576** "**The data to be transmitted on each physical channel (i.e., the traffic data) is partitioned into radio frames**, with **each radio frame** covering a 10 msec time period and **including 15 slots** labeled as slot 0 through slot 14. Each slot is further partitioned into one or more fields used to carry a combination of traffic data, overhead data, and pilot data." *Qualcomm* at col. 5:41-47 "When the selected TTI is longer than 10 msec, **the traffic is segmented and mapped onto consecutive transport channel radio frames**, in block 624. Each transport channel radio frame corresponds to a transmission over a (10 msec) radio frame period. In accordance with the W-CDMA standard, a traffic may be interleaved over 1, 2, 4, or 8 radio frame periods." *Qualcomm* at col. 14:7-13 "Within data processor 438 a, **the symbols in each radio frame period for each physical channel** are de-interleaved, in block 722, and the de-interleaved symbols from all physical channels **used for the transmission are concatenated**, in block 724." *Qualcomm* at col. 15:42-46

(cont.) **generate a frame** including: **a series of n (integer equal to or greater than 1) time slots**, **each time slot of the series of n time slots including an effective symbol period**, and **at least one time slot of the series of n time slots further including a guard period**; and	"As shown in FIG. 3, for the dedicated physical channel, **a slot** 310 **includes a first data (Data1) field** 320 a, **a second data (Data2) field** 320 b, **a transmit power control (TPC) field** 322, **a transport format combination indicator (TFCI) field** 324, **and a pilot field** 326. **Data fields** 320 a and 320 b **are used to send traffic data (e.g., voice, packet data, messaging, or others) for the dedicated physical channel**. **Transmit power control field** 322 **is used to send power control information** to direct the remote terminal to adjust its transmit power on the uplink either up or down to achieve the desired level of performance while minimizing interference to other remote terminals. **Transport format combination indicator field** 324 **is used to send information indicative of the format (e.g., the bit rate, channelization code, and so on)** of the dedicated physical channel as well as of a shared physical channel associated with the dedicated physical channel. **Pilot field** 326 **is used to send pilot data for the dedicated physical channel**." *Qualcomm* at col. 5:48-64  *FIG. 3* "To also reduce the amount of overlap between the voice/data and packet data partitions, **a "guard time" can be provided between the voice/data partition and the packet data partition**. The guard time can be a gap of a particular time duration in which no data of any type is transmitted. 3. The method of claim 1, further comprising: receiving signaling indicative of the **first and second partitions in the time slot**." *Qualcomm* at col. 12:19-23

a frame guard period added to the series of n time slots to suppress a frame loss due to interference, wherein **the length of the frame guard period is longer than a length of the guard period in the at least one time slot**; and	**A. US9301310** "Referring now to FIG. 15, data bursts 1105 define a discontinuous data stream 1103. The **data bursts** 1105 are typically defined by data packets and **are separated by guard bands** 1107. The area between **guard bands** 1107 **where the data bursts** 1105 **are located is defined by a time division multiple access (TDMA) time slot** which the cable modem termination system including line card 1042 pre-assigns to cable modems 1046 which have previously requested such time slots in order to facilitate upstream communications. The **guard bands** 1107 **provide some tolerance between adjacent time slots**, **so as to mitigate the occurrence of undesirable data collisions between adjacent data packets**." *Avago* at 29:41-59 *FIG. 15*  "Generally, a slot timing offset value will be transmitted, even if the actual slot timing offset is O. **When the slot timing offset signal is desirably located within the time slot, and does not extend into guard bands** which are located at either end of the time slot, **then no slot timing offset correction is necessary**. However, **when the slot timing offset signal extends into one of the guard bands of the time slot of the upstream communication, then a slot timing offset message** 28 **is generated by the slot timing offset generator** 26, which is transmitted downstream to the cable modem 12 **where the slot timing offset message** 28 effects a desired correction to the time at which upstream communications occur, **so as to cause the slot timing offset signal and other transmitted data to be positioned properly within their upstream time slots**." *Avago* at col. 12:23-37 "**Initially, the slot timing offset slot includes a comparatively large time slot, i.e., having comparatively large guard times**, so as to accommodate comparatively large slot timing offset error. Generally, communications will be initialized utilizing a comparatively large guard time. **After acquisition, when slot timing accuracy has been enhanced, then the guard time**

	may be reduced substantially, so as to provide a corresponding increase in channel utilization efficiency." *Avago* at col. 17:48-59
transmit the generated frame as a radio signal.	**A. US9301310** "Referring now to FIG. 15, **data bursts** 1105 **define a discontinuous data stream** 1103. The data bursts 1105 are typically defined by data packets and are separated by guard bands 1107." *Avago* at col. 29:41-44 "Referring now to FIG. 36, the contents of a MAP protocol data unit (PDU) 487 are shown. **The MAP PDU** 487, **which is transmitted on the downstream channel** by the cable modem termination system 10 (FIG. 27) to all of the cable modems 12 on a given frequency channel, **contains the time slot allocations for at least some of the cable modems** 12 **which have previously sent a request to transmit one or more data packets** to the cable modem termination system 10." *Avago* at *Avago* at col. 42:56-63 "1. **A base station comprising**: . . . **a transmitter configured to send a downstream signal** on a downlink channel from the base station to the subscriber station. . . ." *Avago* at Claim 1 "As illustrated in FIG. 85, each cable modem has a receiver 368 that processes **RF signals transmitted on a selected one of downstream channels** 338 and a transmitter 369 that sends RF signals to the headend on a selected one of upstream channels 339." *Avago* at col. 68:60-64 "Each of homes 14 is equipped with radio frequency modem (RFM) 2000. **A base station** 2002 **is in wireless RF contact with RFM's** 2000." *Avago* at col. 67:13-15 **B. US8363576** "**The data to be transmitted on each physical channel (i.e., the traffic data) is partitioned into radio frames**, with each radio frame covering a 10 msec time period and including 15 slots labeled as slot 0 through slot 14. Each slot is further partitioned into one or more fields used to carry a combination of traffic data, overhead data, and pilot data." *Qualcomm* at col. 5:41-47

(cont.) **transmit the generated frame as a radio signal**.	"When the selected TTI is longer than 10 msec, the traffic is segmented and mapped onto consecutive transport channel radio frames, in block 624. **Each transport channel radio frame corresponds to a transmission over a (10 msec) radio frame period**. In accordance with the W-CDMA standard, a traffic may be interleaved over 1, 2, 4, or 8 radio frame periods." *Qualcomm* at col. 14:7-13