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UNITED STATES PATENT AND TRADEMARK OFFICE
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BEFORE THE PATENT TRIAL AND APPEAL BOARD
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Unified Patents Inc.
Petitioner

v.

Red Rock Analytics, LLC
Patent Owner

IPR2017-01490
U.S. Patent 7,346,313

CALIBRATION OF I-Q BALANCE IN TRANSCEIVERS
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PETITIONER'S REQUEST FOR REHEARING

Petitioner respectfully requests rehearing of the Board's decision not to institute Grounds 1 and 2.[1] The Board misapprehended the claimed "calibration cycle" by finding that it is a feature of the "calibration signal" and not found in *Warner*. The Board is mistaken because—as the Petition, POPR, both parties' experts, and cited intrinsic record all agree—the "calibration cycle" is a three-step process, independent of the type of calibration signal. The three-step process being a feature of the calibration signal itself would not only be inconsistent with what a person of ordinary skill would understand but also technologically illogical. The Board overlooked that the parties agreed on the meaning of "calibration cycle" and that *Warner* discloses it. This limitation was the only reason the Board denied institution on Grounds 1 and 2. Inst. Dec. 15-19.

In denying institution, the Board found that *Warner* does not disclose or render obvious that "the calibration RF signal includes a calibration cycle." *Id*. The Board stated that "the *calibration cycle* relates to a feature of the calibration RF signal, rather than simply requiring that calibration occurs (i.e., having a calibration process)." *Id.* at 15. The Board further stated that the specification provides an example of a calibration cycle based on the following quote: "This

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[1] The Board's rules limit rehearing to matters the Board has misapprehended or overlooked. 37 C.F.R. § 42.71(d).

signal may be produced by the sequence {1, j, -1, -j} repeated for the duration of the calibration signal." *Id.* at 17 (quoting Ex. 1001, 10:67-11:1).

The Board is mistaken because the '313 Patent describes a "calibration cycle" as a three-step process, which cannot be accomplished as a feature of the calibration signal. As the Petition and Petitioner's expert, Dr. Williams, explained when addressing the first instance of this claim term:

> The '313 Patent describes [1] originating a calibration signal at the baseband transmit input, [2] observing the calibration signal at the receive baseband output, and [3] processing the calibration signal to form and minimize an observable indicator of I-Q imbalance.

Pet. 39; EX1004, ¶ 73. The Patent Owner and its expert describe the "calibration cycle" the same way. Specifically, the POPR describes sending the calibration signal through the transmit chain and back into the receive chain through a loopback path, followed by the statement that "*[t]he calibration cycle then determines* the [] I-Q gain settings which minimize an observable indicator." POPR at 10-11 (emphasis added); *see* EX2001, ¶ 53.

The claims support the parties' understanding of "calibration cycle" being a multi-step process. For example, claim 1 recites that "the calibration cycle determines transmitter I-Q gain settings which minimize an observable indicator." Pet. 3-13, 26-41. Such a determination is not and cannot be made by the

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calibration signal by itself or any individual feature thereof. Rather, determining gain settings is only made by completing the three steps of the cycle. *Id.* Indeed, it would be contrary to the '313 Patent for a feature of the calibration signal to determine gain settings, because minimizing an observable indicator should be based on imbalances measured in the transmitter, and not which calibration signal is used. *Id.* The Board refers to claims that "require *using* the included calibration cycle to determine the minimizing gain settings" (Inst. Dec. 15), but this requirement supports the parties' understanding for the same reasons—i.e., determining gain settings requires the three-step process, not merely a signal alone.

In addition, the Board's misunderstanding is also confirmed by dependent claim 15 because it requires that "successive calibration cycles are used to refine or maintain I-Q balance." Pet. 58. To "refine or maintain I-Q balance," the calibration cycle (i.e., the three-step process) must be repeated over time at some interval or frequency, as the '313 Patent describes. *See* Pet. 58; EX1001, 6:10-21 ("[A]fter stable operation is achieved some form of . . . algorithm could be used to minimize the frequency of *calibration cycles* required. In some applications the need for recurrent *calibration cycles* might be objectionable. . . . [T]here is usually a guard time interval . . . during which a transceiver just having finished a transmission could perform a *calibration cycle* with no impact on system operation."), 11:19-28 ("several basic *cycles of calibration*, *each comprising* a

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transmit and a receive variation of gain"; "changes are likely to be small on each *calibration cycle*") (emphases added).

The Board refers to a variety of calibration signals (e.g., a sampled or discrete phasor) disclosed and claimed in the '313 Patent (Inst. Dec. 16-17), but nowhere does the specification suggest that any of these features or types of calibration *signals* is a calibration *cycle*. The Board also identifies "the sequence {1, j, -1, -j} repeated for the duration of the calibration signal" as an example of a calibration cycle (Inst. Dec. 17 (citing EX1001, 10:67-11:1)), but neither the cited passage nor any other disclosure in the specification teaches or suggests that this embodiment of a calibration *signal* is a calibration *cycle*. The claims refer exclusively to the "calibration RF signal"—*not* the "calibration cycle"—as including these features. *See, e.g.*, Pet. 11 (citing EX1001, 11:56-15:32).

Instead, consistent with the parties' articulated understanding and the intrinsic record (including the claims), the specification describes the calibration cycle as the three-step process that can be repeated over time to refine or maintain calibration. For example, the Board overlooked that, in describing the disclosure of the '313 Patent, the Petition cites column 8, lines 21-30 (Pet. 20), which state:

> The RF signal from the transmit chain is provided a path
> to the RF receive chain, shown for example through an
> attenuator 120. This injection can be effected in many
> ways. It could be a dedicated signal path which is

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