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Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes details for application 15/088,725 and examiner information.

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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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*Ex parte* BHUSHAN SHANTI ASURI, JINGCHENG ZHUANG,  
PRAVEEN SAMPATH, SHRENIK PATEL, JEREMY DARREN  
DUNWORTH, LAI KAN LEUNG, GURKANWAL SINGH SAHOTA, and  
JONG MIN PARK

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Appeal 2018-009211  
Application 15/088,725  
Technology Center 2600

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Before JUSTIN BUSCH, JENNIFER L. McKEOWN, and  
SCOTT E. BAIN, *Administrative Patent Judges*.

McKEOWN, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant<sup>1</sup> appeals under 35 U.S.C. § 134(a) from the Examiner's  
decision to reject claims 1–30. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm-in-part.

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<sup>1</sup> Qualcomm Incorporated (“Appellant”) is the applicant as provided in 37  
C.F.R. § 1.46 and is identified as the real party in interest. App. Br. 3.

STATEMENT OF THE CASE

Appellant's disclosed and claimed invention relates to "wireless communication systems, and more specifically to techniques for reducing spurious signal emissions." Spec. ¶ 2.

Claims 1 and 17 are illustrative of the claimed invention and reads as follows:

1. An apparatus for frequency hopping uplink transmission, comprising:

a transmit path;

a plurality of local oscillators (LO); and

a control unit configured to:

receive an upcoming resource block (RB) allocation;

determine whether the upcoming RB allocation is the same as a current RB allocation; and

in response to determining that the upcoming RB allocation is different than the current RB allocation:

select an unused LO of the plurality of LOs;

determine whether a number of allocated RBs associated with the upcoming RB allocation is greater than a threshold; and

in response to determining that the number of allocated RBs associated with the upcoming RB allocation is not greater than the threshold, tune the selected LO to a frequency corresponding to the upcoming RB allocation.

17. A method for frequency hopping uplink transmission, comprising:

receiving an upcoming resource block (RB) allocation;

determining whether the upcoming RB allocation is the same as a current RB allocation; and

in response to determining that the upcoming RB allocation is different than the current RB allocation:

selecting an unused local oscillator (LO) of a plurality of LOs;

determining whether a number of allocated RBs associated with the upcoming RB allocation is greater than a threshold; and

in response to determining that the number of allocated RBs associated with the upcoming RB allocation is not greater than the threshold, tuning the selected LO to a frequency corresponding to the upcoming RB allocation.

### THE REJECTIONS

The Examiner rejected claims 1–5, 7, 8, 10–14, 17–22, 24, 26, 29, and 30 under 35 U.S.C. § 103 as unpatentable over Schwartz (US 2013/0039368 A1; pub. Feb. 14, 2013) and Dong (US 2012/0262238 A1; pub. Oct. 18, 2012). Final Act. 8–18.

The Examiner rejected claims 6, 9, 23, and 25 under 35 U.S.C. § 103 as unpatentable over Schwartz, Dong, and Gaal (US 2010/0091641 A1; pub. Apr. 15, 2010). Final Act. 18–19.

The Examiner rejected claims 15, 16, 27, and 28 under 35 U.S.C. § 103 as unpatentable over Schwartz, Dong, and Nilsson (US 2014/0314175 A1; pub. Oct. 23, 2014). Final Act. 19–20.

### ANALYSIS

#### THE OBVIOUSNESS REJECTION BASED ON SCHWARTZ AND DONG

##### *Claims 1–5, 7, 8, 10–14, 17–22, 24, 26, 29, and 30*

Based on the record before us, we are persuaded that the Examiner erred in concluding that claims 1–5, 7, 8, 10–14, 17–22, 24, 26, 29, and 30 are unpatentable over Schwartz and Dong.

The Examiner finds that Schwartz teaches or suggests “determin[ing] whether a number of allocated RBs associated with the upcoming RB allocation is greater than a threshold” and “in response to determining that

the number of allocated RBs associated with the upcoming RB allocation is not greater than the threshold, tune the selected LO to a frequency corresponding to the upcoming RB allocation,” as recited in claims 1, 29, and 30. *See* Final Act. 8–9. The Examiner, in particular, finds

Schwartz [in Fig. 3B] shows subframe 2 will transmit seven allocated RBs at the frequency shown. In subframe 3, the transmit frequency is changed to a new transmit frequency and six allocated RBs are transmit during that subframe. In this case, prior to the transmission of RBs in subframe 3, the transmitter will know what the number of allocated RBs to be transmitted (in this case six RBs) and the transmitter will know that six RBs are not seven RBs. In response to RBs being allocated for transmission in subframe 3, the transmit frequency will be changed as shown in the figure 3B.

Ans. 18. In other words, the Examiner reasons that Schwartz determines if the number of upcoming allocated RBs is greater than a threshold because Schwartz’s transmitter knows six RBs is not greater than seven RBs. Further, according to the Examiner, Schwartz teaches the tuning in response to determining the threshold limitation because Schwartz changes the transmit frequency for subframe 3 with six RBs, which is less than the seven RBs of subframe 2. *See, e.g.*, Ans. 18–20. Appellant, on the other hand, contends that Schwartz does not teach or suggest “determin[ing] whether a number of allocated RBs associated with the upcoming RB allocation is greater than a threshold” and “in response to determining that the number of allocated RBs associated with the upcoming RB allocation is not greater than the threshold, tun[ing] the selected LO to a frequency corresponding to the upcoming RB allocation.” Appellant, in particular, points out that “[w]hile, FIG. 3B of Schwartz illustrates certain amounts of sub-slots or RBs allocated to each subframe, nowhere does Schwartz

describe any decision or comparison of the amounts or number of sub-slots or RBs, nor that the communicated frequency is based therefrom.” App. Br. 17. Appellant acknowledges that Schwartz’s system will “know” the number or resource blocks it transmits, but according to Appellants, Schwartz does not teach or suggest “actually determining that the number of RBs transmitted is not greater than the alleged threshold and in response to this determination doing anything with that information beyond transmitting that number of RBs.” *Id.*

We agree. Schwartz teaches determining a range of frequencies allocated to resource blocks [RBs] to be transmitted during a subsequent sub-frame slot and determining an approximate center frequency of the range of frequencies. *See* Schwartz ¶ 31. For example, as shown in Fig. 3B below, the local oscillator frequency over time is modified to the center of the frequency of the range of frequencies for the upcoming allocated resource blocks.

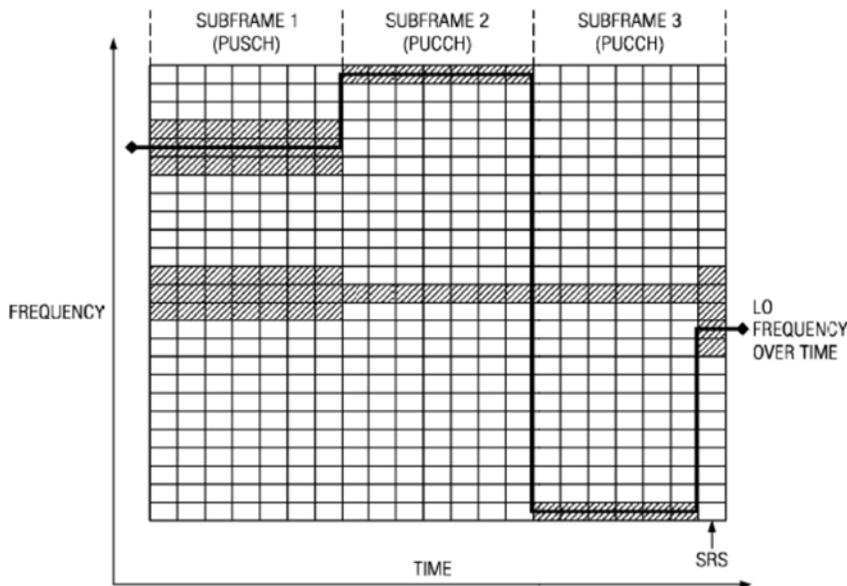


FIG. 3B

**Schwartz Figure 3B depicts “a graph of frequency versus time, showing an example allocation of resource blocks to particular frequencies during a transmission sub-frame of a wireless communication device” and “a local oscillator frequency over time for the wireless communication device.”**

While Schwartz’s transmitter may “know that six RBs are not seven RBs” (Ans. 18), merely knowing a number of upcoming allocated RBs does not teach or suggest determining that the upcoming allocated RBs is greater than a threshold. Nor does Schwartz teach or suggest that the transmit frequency is changed *in response to* Schwartz’s knowing that six RBs is not greater than seven RBs, as required by the claims. As such, we are persuaded of error in the Examiner’s rejection of independent claims 1, 29, and 30, as well as depending claims 2–5, 7, 8, and 10–14.

We are not persuaded, however, that the Examiner erred in rejecting independent claim 17. Claim 17 includes the determining and tuning steps discussed above, but these steps are conditioned on the preceding step – namely, determining whether the upcoming RB allocation is different from the current RB allocation. Because claim 17 is directed to a *method* for frequency hopping uplink transmission, when the upcoming RB allocation is the *same* as the current RB allocation, the conditional determining and tuning steps need not be performed. *See Ex Parte Schulhauser*, Appeal No. 2013-007847 (PTAB April 28, 2016).

Schwartz describes determining whether the upcoming RB allocation is different from the current RB allocation. Namely, Schwartz determines the range of frequencies allocated to RBs to be transmitted during a subsequent frame and may modify the transmit frequency to match the center of the range. *See, e.g.*, Schwartz Abstract, ¶ 31. A skilled artisan

would understand that Schwartz at least suggests, in some instance, the upcoming allocated RBs would be the same as the current RB allocation and, in that instance, Schwartz satisfies the claimed invention despite not performing the conditional determining and tuning steps. As such, we are not persuaded that the Examiner erred in rejecting claim 17, as well as depending claims 18–22, 24<sup>2</sup>, and 26.

Accordingly, based on the record before us, we reverse the rejection of claims 1–5, 7, 8, 10–14, 29, and 30, but affirm the rejection of claims 17–22, 24, and 26 as unpatentable over Schwartz and Dong.

#### THE REMAINING OBVIOUSNESS REJECTIONS

##### *Claims 6, 9, 15, 16, 23, 25, 27, and 28*

As discussed above, we are persuaded that the Examiner erred in rejecting the independent claims as unpatentable over Schwartz and Dong. The Examiner does not find the additionally cited prior art cures the deficiencies of Schwartz and Dong. As such, we similarly are persuaded of error in rejection of claims 6, 9, 15, and 16, which depend directly or indirectly from claim 1.

We are not persuaded of error, though, with respect claims 23, 25, 27, and 28, which depend from claim 17. For the reasons discussed above, we are not persuaded that the Examiner erred in rejecting these claims.

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<sup>2</sup> We note Appellant presents separate arguments with respect to claim 24. *See* App. Br. 18–19. The limitations of claim 24, though, are similarly conditioned on the preceding step of claim 17 and, therefore, these arguments are not persuasive.

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Accordingly, based on the record before us, we reverse the rejection of claims 6, 9, 15, and 16, but affirm the rejection of claims 23, 25, 27, and 28 as unpatentable over the cited combinations of prior art.

#### DECISION

We affirm the rejection of claims 17–28, but reverse the rejection of claims 1–16, 29, and 30.

AFFIRMED-IN-PART