

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re *Inter Partes* Review of:)
U.S. Patent No. 10,965,512)
Issued: Mar. 30, 2021)
Application No.: 17/012,813)
Filing Date: Sep. 4, 2020)

For: **Method And Apparatus Using Cell-Specific And Common Pilot
Subcarriers In Multi-Carrier, Multi Cell Wireless Communication
Networks**

**PETITION FOR *INTER PARTES* REVIEW
OF U.S. PATENT NO. 10,965,512**

TABLE OF CONTENTS

I. INTRODUCTION 1

II. MANDATORY NOTICES (37 C.F.R. §42.8(A)(1)).....3

III. GROUNDS FOR STANDING (37 C.F.R. §42.104(A)).....6

IV. IDENTIFICATION OF CHALLENGE (37 C.F.R. §42.104(B))7

 A. Citation of Prior Art7

 B. Statutory Grounds for the Challenge.....8

V. TECHNOLOGY OVERVIEW.....8

 A. OFDMA Systems Were Well-Known8

 B. Communicating Various Pilots Signals Between Base Stations
 and Mobile Stations Was Well-Known.....9

 C. OFDM/OFDMA Cellular Systems Implemented Pilot Symbols
 for Channel Estimation and Data Recovery10

 D. Beamforming Was Well-Known.....10

VI. THE '512 PATENT 11

 A. Summary of the '512 Patent.....11

 B. Prosecution History Summary13

 C. Level of Ordinary Skill in the Art14

 D. Claim Construction14

VII. OVERVIEW OF THE APPLIED REFERENCES15

 A. Kim15

 B. Ketchum18

 C. Tong.....20

 D. Li.....20

 E. Smee20

VIII. GROUNDS OF UNPATENTABILITY.....20

 A. Ground 1: The combination of Kim and Tong renders obvious
 claims 1-30.21

 1. A POSA would have been motivated to combine Kim
 and Tong21

(a)	A POSA would have been motivated to implement beamforming in Kim’s base station, as taught by Tong.....	21
(b)	A POSA would have been motivated to use Kim’s pilots for channel estimation, and to recover the transmitted data, as taught by Tong.....	23
2.	Independent Claim 1.....	26
(a)	[1.P]: An orthogonal frequency division multiple access (OFDMA)-compatible base station that uses subcarriers in a frequency domain and time slots in a time domain, the OFDMA-compatible base station comprising:	26
(b)	[1.1] a plurality of antennas; and a transmitter operably coupled to the plurality of antennas;	27
(c)	[1.2] the transmitter configured to: insert first pilots of a first type onto a first plurality of subcarriers, wherein the first pilots are cell-specific pilots; and.....	28
(d)	[1.3] insert data and second pilots of a second type onto a second plurality of subcarriers;.....	31
(e)	[1.4] wherein at least some subcarriers of the first plurality of subcarriers or the second plurality of subcarriers are beam-formed; and	35
(f)	[1.5] the plurality of antennas configured to transmit the first plurality of subcarriers and the second plurality of subcarriers in at least one of the time slots;.....	37
(g)	[1.6] wherein the second type is different than the first type and wherein the first pilots do not interfere with the second pilots.....	39
3.	Independent Claim 8	40
(a)	[8.P] A method performed by an orthogonal frequency division multiple access (OFDMA)- compatible base station that uses subcarriers in a frequency domain and time slots in a time domain, the method comprising:	40

(b)	[8.1] inserting, by the OFDMA-compatible base station, first pilots of a first type onto a first plurality of subcarriers, wherein the first pilots are cell-specific pilots;.....	40
(c)	[8.2] inserting, by the OFDMA-compatible base station, data and second pilots of a second type onto a second plurality of subcarriers;.....	41
(d)	[8.3] wherein at least some subcarriers of the first plurality of subcarriers or the second plurality of subcarriers are beam-formed; and	41
(e)	[8.4] transmitting, by the OFDMA-compatible base station, the first plurality of subcarriers and the second plurality of subcarriers in at least one of the time slots using a plurality of antennas;	41
(f)	[8.5] wherein the second type is different than the first type and wherein the first pilots do not interfere with the second pilots.....	41
4.	Independent Claim 15	41
(a)	[15.P] An orthogonal frequency division multiple access (OFDMA)-compatible mobile station that uses subcarriers in a frequency domain and time slots in a time domain, the OFDMA-compatible mobile station comprising:	41
(b)	[15.1] at least one antenna; and a receiver; and	42
(c)	[15.2] the at least one antenna and the receiver are configured to: receive first pilots of a first type on a first plurality of subcarriers, wherein the first pilots are cell-specific pilots; and	43
(d)	[15.3] receive second pilots of a second type and data on a second plurality of subcarriers, wherein the first plurality of subcarriers and the second plurality of subcarriers are received in at least one of the time slots;.....	43
(e)	[15.4] wherein at least some subcarriers of the first plurality of subcarriers or the second plurality of subcarriers are beam-formed; and	44

(f)	[15.5] the receiver is further configured to: recover the data using channel estimates from at least the second pilots; and	44
(g)	[15.6] recover cell-specific information using the cell-specific pilots;.....	47
(h)	[15.7] wherein the second type is different than the first type and wherein the first pilots do not interfere with the second pilots.....	47
5.	Independent Claim 23	47
(a)	[23.P] A method performed by an orthogonal frequency division multiple access (OFDMA)- compatible mobile station that uses subcarriers in a frequency domain and time slots in a time domain, the method comprising:	47
(b)	[23.1] receiving first pilots of a first type on a first plurality of subcarriers, wherein the first pilots are cell-specific pilots;.....	48
(c)	[23.2] receiving second pilots of a second type and data on a second plurality of subcarriers, wherein the first plurality of subcarriers and the second plurality of subcarriers are received in at least one of the time slots;.....	48
(d)	[23.3] wherein at least some subcarriers of the first plurality of subcarriers or the second plurality of subcarriers are beam-formed;	48
(e)	[23.4] recovering the data using channel estimates from at least the second pilots; and	48
(f)	[23.5] recovering cell-specific information using the cell-specific pilots;.....	49
(g)	[23.6] wherein the second type is different than the first type and wherein the first pilots do not interfere with the second pilots.....	49
6.	Claims 2, 9, 16, and 24	49
7.	Claims 3, 10, 17, and 25	50
8.	Claims 4, 11, 18, and 26	52

Explore Litigation Insights

Docket Alarm provides insights to develop a more informed litigation strategy and the peace of mind of knowing you're on top of things.

Real-Time Litigation Alerts



Keep your litigation team up-to-date with **real-time alerts** and advanced team management tools built for the enterprise, all while greatly reducing PACER spend.

Our comprehensive service means we can handle Federal, State, and Administrative courts across the country.

Advanced Docket Research



With over 230 million records, Docket Alarm's cloud-native docket research platform finds what other services can't. Coverage includes Federal, State, plus PTAB, TTAB, ITC and NLRB decisions, all in one place.

Identify arguments that have been successful in the past with full text, pinpoint searching. Link to case law cited within any court document via Fastcase.

Analytics At Your Fingertips



Learn what happened the last time a particular judge, opposing counsel or company faced cases similar to yours.

Advanced out-of-the-box PTAB and TTAB analytics are always at your fingertips.

API

Docket Alarm offers a powerful API (application programming interface) to developers that want to integrate case filings into their apps.

LAW FIRMS

Build custom dashboards for your attorneys and clients with live data direct from the court.

Automate many repetitive legal tasks like conflict checks, document management, and marketing.

FINANCIAL INSTITUTIONS

Litigation and bankruptcy checks for companies and debtors.

E-DISCOVERY AND LEGAL VENDORS

Sync your system to PACER to automate legal marketing.